Time and Stone

The Emergence and Development of Megaliths and Megalithic Societies in Europe

Bettina Schulz Paulsson



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Archaeopress Archaeology

Archaeopress Publishing Ltd
Gordon House
276 Banbury Road
Oxford OX2 7ED

www.archaeopress.com

ISBN 978 1 78491 685 5
ISBN 978 1 78491 686 2 (e-Pdf)

© Archaeopress and B Schulz Paulsson 2017

Cover: Dolmen de la Carena, Cap de Creus

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Acknowledgements

This project was realized with the financial support of the Graduate School "Human Development in Landscapes" at Kiel University and the FAZIT foundation in Frankfurt on the Main. I would like to express my gratitude for the opportunity to undertake the venture reported here. In addition to funding my PhD-project, both the Graduate School and the FAZIT foundation gave me the chance to carry out successful excursions from 2008–2011 to the megalithic regions, Sardinia, Corsica, Southern and Northwest France, Catalonia, Andalusia and Scotland.

My wholehearted thanks go to my supervisor Prof Johannes Müller, whose seminar European Megaliths at the FU Berlin in 1996 was the trigger for my ongoing passion for megaliths. My very special thanks go my other supervisors Dr. Marie-Josée Nadeau, who always had an open mind and door for discussions and all my dating concerns and to Prof Hans-Rudolf Bork. I would also like to thank my mentor Dr Mara Weinelt for all the support, and further members or previous members of the Graduate School, in particular Prof Piet Groothes, Prof Antonia Davidovich, Rhina Colunge, Dr Kemal Moetz, Dr Stefan Dreibrodt, Dr Carolin Lubos, Dr Engdawork Assefa, Prof Lutz Käppel, Dr Vasiliki Pothou, Dr Helmut Kroll, Dr Almut Nebel, Dr John Meadows, Prof Ben Kyora-Krause, Prof Doris Mischka, Dr Martin Furholt, Dr Martin Hinz, Dr Robert Hofmann, Michael Teichmann, Dr Christoph Steffen, Dr Andrea Ricci, Dr Natalia Toma-Kansteiner, Phillip Meurer, Dr Christoph Nübel, Dr Vincent Robin, Dr Melanie Harder, Dr Rémi Berthon, Dr Aikatharini Glykou, Stefanie Bergemann and Daniel Zwick.

The creation of such a supra-regional analysis would not have been possible without the help of the megalith specialists for the singular regions. I would therefore like to thank the members of the European megalith community, who supported me with data, books, articles, important information, commentaries, discussions, and photo material. Special thanks go to those researchers who received me as an unknown PhD student from Germany during my field trips throughout Europe in their offices, in coffeehouses, at their homes, and on their excavations.

Since I honestly do not know who to mention first, I have to sort these great people from north to south according to megalithic regions. From Scandinavia I would like to mention Prof Karl-Göran Sjögren, Prof Lars Larsson, Dr Torbjörn Ahlström, Dr Ludvig Pappmehl-Dufay, Dr Thorben Dehn, Dr Nils H. Andersen, Prof Cornelius Holtorf and Dr Magnus Andersson. From Great Britain Prof Richard Bradley, Prof Alex Bayliss, Prof Chris Scarre, Prof Alistair Whittle, Dr Bisserka Gaydarska, Prof Michael Parker-Pearson, Prof Colin Richards, Dr Alison Sheridan, Dr Magdalena Midgley, Dr Gordon Cook, and Dr Ann Brundle were of great assistance. In France Dr Serge Cassen, Dr Christine Boujot, Dr Gérard Sauzade, Dr Frank Leandri, Prof Phillipe Chambon, Dr Jean Deloges, Dr Cyrill Billard, Anne Ropars, Stefan Tzortsis, Prof Jean Guilaine, Prof Olivier Lemercier, Dr Luc Laporte, Prof Roger Joussaume and Dr Reena Perschke were incredibly helpful. On Sardinia Prof Maria Grazia Melis, Prof Giuseppa Tanda, Giacomo Paglietti, Dr Luca Lai, and Prof Robert Tykot were of vital assistance. In Spain Prof Juan Antonio Camara Serrano, Dr Liliana Spanedda, Dr Joseph Tarrús, Prof Juan Molina, Dr Roberto Risch, Dr Juan Barcelo, Dr Miquel Molist, Prof Mimi Bueno helped me considerably and in Portugal Dr Philine Kalb, Prof Manuel Calado, Dr Rui Boaventura, Tanya Armbrüster and Prof Jorge Oliveira were indispensable. I would like to thank Prof Kristian Kristiansen for support and advice.

For the English corrections of this manuscript I would like to thank Dr Eileen Küçükkaraca and Jonathan Horwitz. For useful comments on the text my thanks go to Prof Maria Grazia Melis, Dr Frank Leandri, Dr Serge Cassen, Dr Martin Hinz and Dr Robert Hofmann and I am grateful to Ines Reese and my sisters Jessica Young and Jennifer Schulz-Hutter for graphical advice. I wish to thank Gunnel and Ingvar Paulsson. For useful comments and juridical support I would like to thank Kathrin Sachsenberg, Berlin and Tom Frey, Appenzell.

I would like to sincerely thank my parents for all their support in the past years.

And finally, my special warm thanks go to my team and family Jonathan, Fifi, Sigge and Jonas Paulsson. They followed without complaint on the field trips to the splendid European megalithic regions: Corsica, Sardinia, Malta, Southern France, Catalonia, Andalusia, the Alentejo, the Bretagne, the Calvados, the Paris Basin, the Lake District, Dumfries and Galloway, Aberdeenshire, Perthshire, the Orkney Islands, Denmark and Scania. Their support as chauffeurs, surveying technicians, photo assistants, and location scouts was invaluable. For them, no mountains were too high, no gorge too steep, no wetland too dangerous, no brush too tight, no landowner too angry, no bull too wild, no grave too narrow, and no weather too bad. They always accompanied me with enthusiasm and a map in their hands on the way to find the next megalith. Without their never-ending endurance I would not have managed.

This book is dedicated to them.

Chapter 1

Megaliths and megalithic societies in Europe

Summary: There are two competitive hypotheses for the origin of megaliths in Europe. The conventional views in the early 19th century were single-source theories with the emergence and spreading of megaliths in Europe outgoing from i.e. the orient. An alternative hypothesis arose under the impact of the early radiocarbon dating in the seventies of the last century and is until today dominating the megalith research. This hypothesis claims different nucleus areas for an independent and time delayed emergence of megaliths in Europe. The first chapter of this volume introduces the subject, surveys the central research questions and provides a history of ideas on the emergence of megaliths in Europe.

Introduction and central research questions

Megaliths (deduced from the Old Greek μέγας (mégas) big and λίθος (líthos) stone), which include megalithic tombs, standing stones, stone circles, alignments, and megalithic buildings or temples, are a worldwide, time-transcending phenomenon and appear in Europe, North and West Africa, Madagascar, the Near East, in North and South America and in Asia.

In Europe, where the main focus of this analysis is centered, the most of the approximately 35000[1] still existing megaliths were constructed during the Neolithic and the Copper Ages and are located in coastal areas. These megaliths represent just a small portion of the original existing monuments. They were built, on the one hand, along the so-called Atlantic façade in Norway, Sweden, Denmark, North Germany, the Netherlands, Belgium, Scotland, England, Ireland, Northwest France, Northern Spain and Portugal and, on the other hand, in the Mediterranean region in Southern and Southeast Spain, Southern France, on the Islands of Corsica, Sardinia, Malta and the Baleares, in Northern Italy, Apulia, Sicily and also in Switzerland (cf. Figure 1.1.)

Strikingly, in Europe and even worldwide, the appearance and the architectonic concepts of megaliths are similar or even identical. Throughout the mentioned geographical areas, megalithic graves were built as dolmens and as passage or gallery graves. Moreover, anthropogenic erected stones stand either isolated in the landscapes or were arranged as circles or in rows. Furthermore, there is evidence all over Europe for an orientation of the graves towards the east or southeast in the direction of the rising sun.

After megaliths became popular in science, art, and literature in the Zeitgeist of Romanticism at the end of the 18th and the beginning of the 19th centuries, and the first excavations were undertaken in that period, for example at the Maltese megalithic temples, the described similarities were recorded by travelers at that time. These reports represent the kickoff of a research debate continuing until today on the origin and emergence of the megaliths (cf. chap 1, p. 2).

The question arises if there is a single, original source from where a megalithic movement spread throughout Europe or whether these structures developed independently and/or even convergent in the singular regions with similar forwarding factors? Were megaliths part of an ideology which spread all over Europe? If so, how was such a transfer of knowledge implemented?

In an investigation on a wide, supra-regional European phenomenon like megaliths, an immense potential is created to observe cultural-historical processes and to carry out cognitive or social interrogations for and within the various prehistoric societies. With this in mind, it is possible to determine indications of interaction, of transfer and migration movements, and moreover the development of technical skills and the inner and outer organization of these societies. The construction of many of these monuments required an immense labor effort and building materials were often transported over long distances. Thus, the building and planning of these megaliths represent well-organized, communal endeavors.

In order to contribute to the ongoing debate, it is evident that the timeframe of the construction of the different megalithic forms must be determined and compared. Therefore, the approximately 2410 available radiocarbon results from European megalithic, pre-megalithic and contemporaneous non-megalithic contexts were compiled for this project, evaluated according to their context and quality, and finally compared. With an interpretative Bayesian statistical framework, it was possible to untangle the nuances of the differences for the calendar years as well as the origin and the spreading of the megaliths in the different regions to a greater extent and to define

[1] This number is a rough estimate reconstructed after Soulier 1998; Burl 2000; Kalb 2002; Trump 2002; Tarrús i Galter 2002; Sjögren 2003; Midgley 2008; Sanjuan 2009; Cicilloni 2010; Fritsch *et al.* 2010a; Leandri *et al.* 2014.

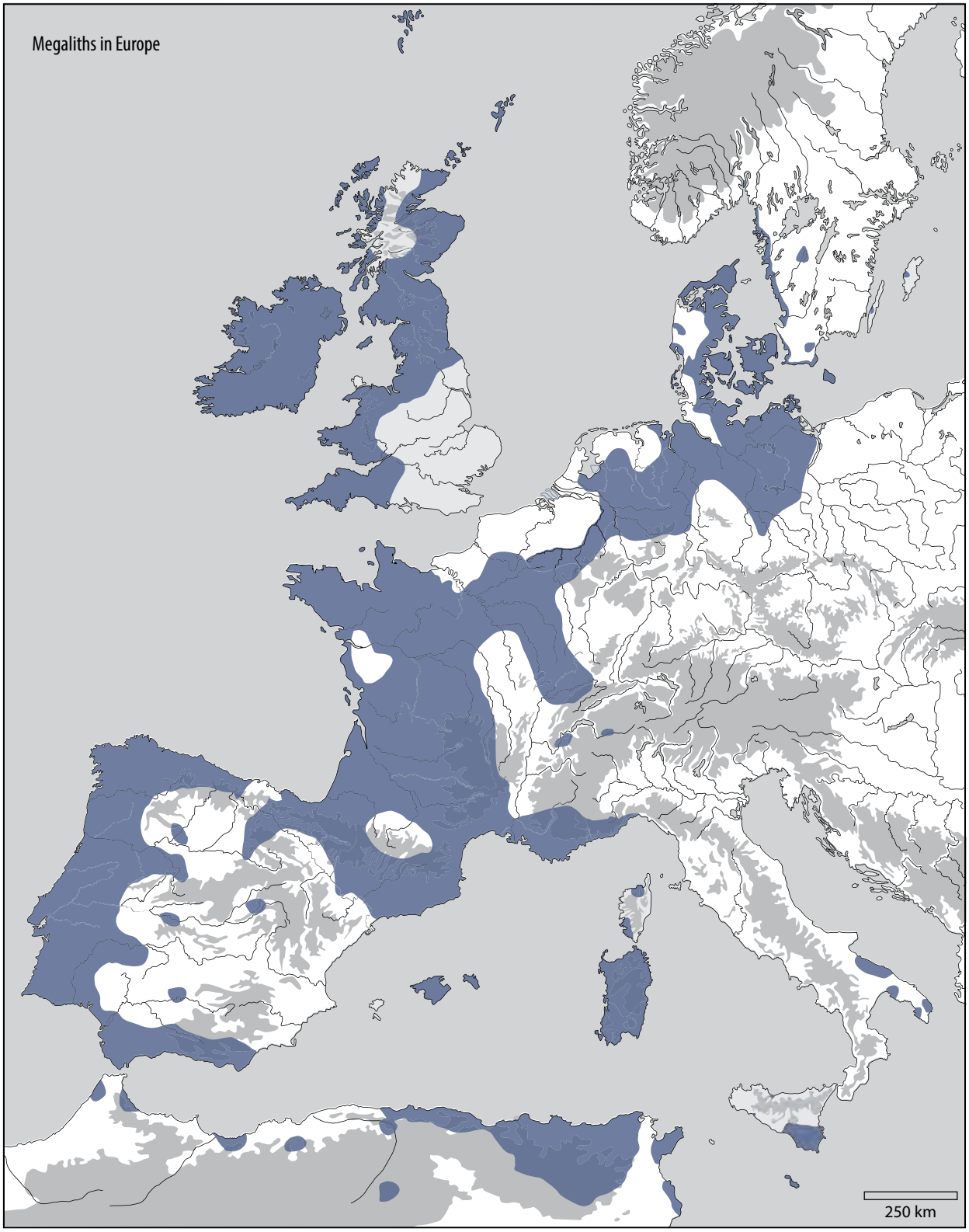


Figure 1.1 The megalithic regions in Europe and North Africa (after Camp 1961; Whitehouse 1981; Soulier 1998; Burl 2000; Kalb 2001; Malone 2001; Trump 2002; Sjögren 2003; Piccolo 2007; Scarre 2007; García Sanjuán 2009; Cicilloni 2010; Fritsch et al. 2010a; Leandri et al. 2014)

possible emergence and spreading scenarios for the archeological remains, for

> '*It's a capital mistake to theorize before one has data*' (Arthur Conan Doyle, A scandal in Bohemia 1891, 4).

Theories on the emergence and spreading of megaliths

Research on megaliths during recent decades was dominated by regional studies. Manifold publications are available for the different regions. Just a few

approaches considered megaliths as a wide, supra-regional phenomenon and focused on the origin and the spreading of megaliths throughout Europe. In the following, main research theories regarding this perspective will be summarized.

Research on megaliths from the late 19th century to the 1960s was mainly embossed by one-source and diffusion theories based on the typology and the morphology of the different graves.

One of the most influential approaches of this time was Oscar Montelius's consideration of megaliths world-wide (Montelius 1905) (Figure 1.2). He formulated the theory of the spreading of an idea and a super-diffusionistic view regarding the global megalithic movement.

Dösarna I Indien, Syrien, Sudan, Algeriet och Europa kunna icke tilskrivas ett och sammafolk, ej ens och samma folkgrupp (Montelius 1905: 41).

The expansion of the megalithic idea was, according to Montelius, an ongoing process extending from the Orient over the southern European Mediterranean coast to Western Europe and from there over the coasts of the North Sea to the regions of the Baltic (Montelius 1889: 28; 1905). This theory corresponded to the ex oriente lux Zeitgeist of the 19th and the beginning of the 20th century.

Similar rudiments regarding megaliths in Brittany, Ireland, England and Scandinavia and their origin from the Orient were already asserted by M. Jehan de St. Clavien in 1863 in a short communication for the Société polymathique du Morbihan (St. Clavien 1863).

Gustav Kossina suggested Southern Scandinavia as the origin of the megalithic world which spread with the ancient Indo-European migration movement (Kossina 1910). Ernst Sprockhoff postulated a migration route from Ireland to Southern Scandinavia. His arguments for their origin in the Nordic countries were limited and restricted to observations solely on a similar form of the chambers (Sprockhoff 1938).

Most researchers preferred Montelius´s theory of the spreading of an idea rather than whole migration movements. Gordon Childe considered the entire trans-European megalithic occurrence and he incorporated early the idea of a diffusion of 'oriental culture' by a partial maritime exchange (Childe 1925, 213). According to Childe, megaliths were assumed to have spread by the diffusion of a megalithic religion/idea by way of migrants who settled down long enough among local societies. Due to a certain prestige status, they were supposedly able to convert local inhabitants and perhaps form a spiritual aristocracy (Childe 1940: 52) (cf. Figure 1.3).

Megalith-builders must be conceived as families coming by the sea from different quarters and settling down among native populations, to whom they brought their own peculiar version of the faith (Childe 1940: 52–53).

As a proliferation path he proposed a route from the Mediterranean to the Atlantic North West across the Pyrenean isthmus and a further dissemination of the megalithic tradition from there to Britain and then later over the sea route around Spain and Portugal (cf. Figure 1.3).

Later Childe extended this theory about the spreading of a megalithic religion along the coastlines over the sea route (Childe 1950; 1957; 1958: 124–134) by way of missionaries or prospectors with developed seafaring as a base. Similar theories were proposed by Brønstedt (1957: 193) and Nordman (1935: 75).

According to Glyn Daniel, the spreading of the megalithic tradition coincides with the prospection for copper (Daniel 1960); the impetuses behind the dispersal were colonialism, trade, and prospection by people with a strong religious faith and complex burial rites (Daniel 1963: 128).

At the beginning of the 1970s with the invention of radiocarbon dates in megalith research together with a processualist approach, single-source theories were questioned and discussions concerning the possibility of independent, converging regional developments and different nucleus areas in Europe resulted.

Colin Renfrew defined four or possibly five regions with an independent development of megaliths based on radiocarbon dates and on typological considerations including Portugal, Andalusia, Brittany, South West England, Denmark and possibly Ireland, Brittany being the earliest region with tombs already built before 4000 BC (Renfrew 1973: 120–129).

But we are no longer obliged to see the tombs as a result of a single movement, whether it originated in Iberia or in Brittany. Instead our task is to create some social model, some simple picture of how it all came about (Renfrew 1973: 124).

According to Colin Renfrew´s more neo-evolutionistic approach, Neolithic societies were egalitarian and segmentally structured during the Early Neolithic and then changed in the younger horizons of the Neolithic to a stratified society with the hengue monuments as central places. Thus, megaliths appeared as territorial markers for the Early Neolithic segmentary



1. India, Katapur



2. Kaukasus, Krim



3. Sudan, Ladó



4. Portugal, Ayorolos



5. Palestine, Hebron

Figure 1.2 Dolmens world-wide. Drawings from Montelius 1905 Orienten och Europa. 1. India, p. 11, Figure 4; 2. Krim, p. 14, Figure 8; 3. Sudan, p. 16, Figure 9; 4. Portugal, p. 23, Figure 13; 5. Palestine, p. 13, Figure 6

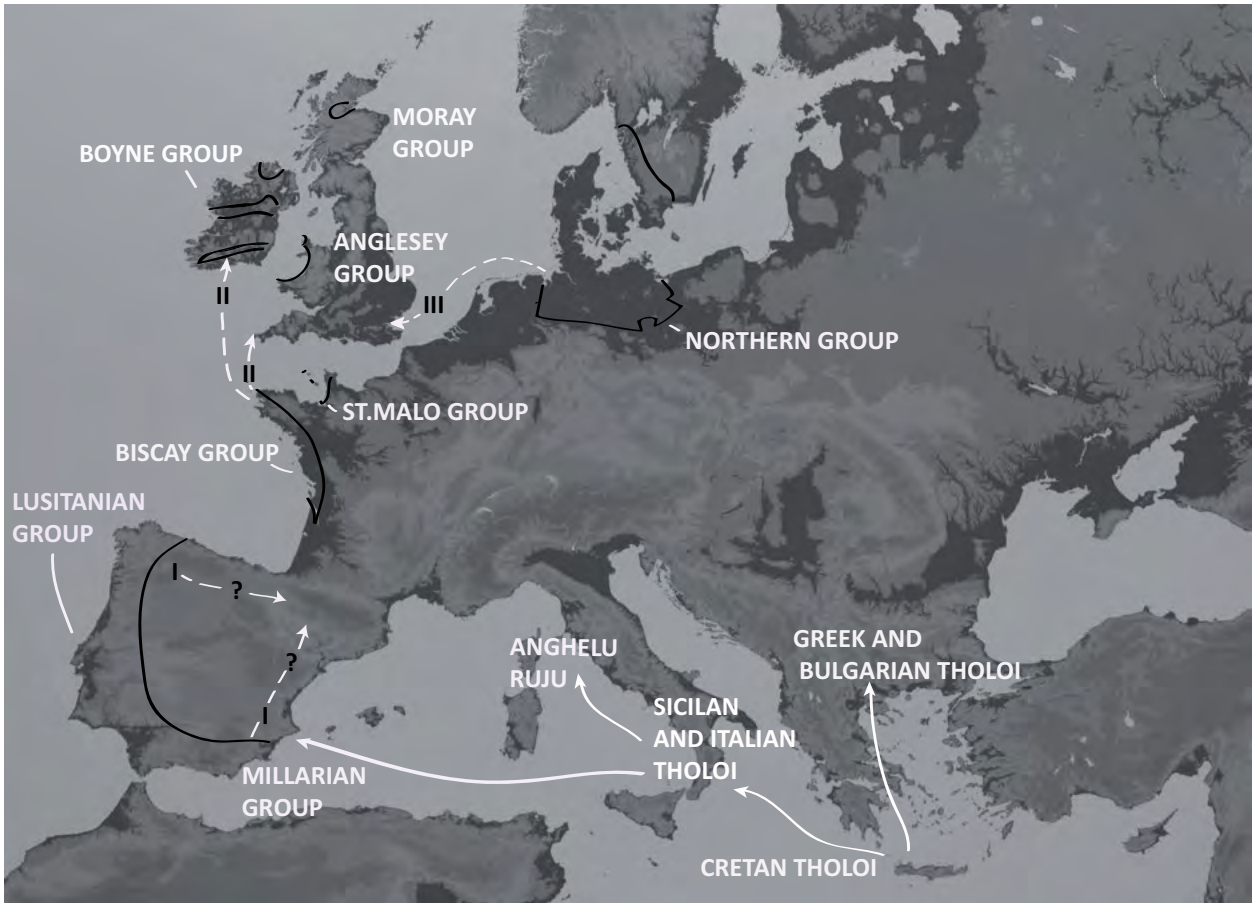


Figure 1.3 The modified diffusionism of Gordon Childe in Europe and his successors. Passage graves are seen as derivations of Cretan passage graves (after Renfrew 1973: 46)

societies. The dynamic behind this territorial behavior originated in a phase of population pressure through Central Europe in connection with agriculture. The Atlantic coast represented a natural border for the colonialization of new regions and competition for arable land necessitated territorial behavior and the marking of the landscape by pronounced monuments (Renfrew 1976). He later revised this model and the presumed coherence between territorial marking and segmentary societies due to fieldwork in Maes Howe and Quanterness on the Orkney Islands (Renfrew 1979; 1981).

Like Renfrew, Chapman proceeded from an independent development model for formal disposal areas and megaliths in the different regions. According to his interpretations, interments in cemeteries and monuments emerged in periods of imbalance between society and critical resources (Chapman 1981).

Andrew Sherratt compared the genesis of megaliths and monuments within three areas including Western France, Britain and Northern Europe and similarly developed a model of an independent origin from different starting points on the loess periphery (Sherratt 1990).

In his book Le dolmen pour le morts, Roger Joussaume provided an outline on megalithic regions in Europe and the world on a larger scale than Oscar Montelius in 1905. Joussaume compared architecture, archaeological material, and burial rites (Joussaume 1985) and registered megaliths which were constructed in Colombia, Japan, China, Korea, the Maghreb, Ethiopia, Syria, Libya, Israel, Jordan, the Caucasus, India, and on the Arabian Peninsula and Madagascar. Even if Joussaume accepted that the development of megaliths worldwide can only be considered as a convergent development, he again took a diffusionist standpoint and viewed the megaliths of the Atlantic façade as the origin of the megaliths in the Mediterranean regions. Furthermore, he considered megalithic developments in North Africa to be the result of a dispersal of megalithic phenomena from Europe (Joussaume 1985: 370–372; 2003).

The emphasis of Johannes Müller's approach was to define the chronology of the different megalithic grave forms for Europe (1987; 1998; 1999) based on 603 radiocarbon dates and sum calibrations. He determined two or three centers of origin for European megaliths: North West France, the Western Iberian Peninsula and possibly Ireland with passage graves

and dolmens in these specific regions from 5000 cal BC onwards. The megalithic grave tradition spreads from there to the backlands of West and Central France, to Southern Ireland and possibly to Wales and the South of England (Müller 1998: 78). Radiocarbon dates from the Netherlands, Northwest Germany, Denmark, and Scandinavia suggest the beginning of megalithic architecture in these regions shortly before 3400 cal BC. The emergence of megaliths in the Mediterranean was, according to Müller's calculations, even later than their occurrence in the Northern regions, with Catalonia as a possible exception (Figure 1.4).



Figure 1.4 Estimates for the start of construction of accessible megaliths from Müller (1998), based on the then available 606 radiocarbon results out of megalithic and long barrow contexts. The time intervals are showing the approximate modified values from sum calibrations (1-sigma ranges) for the earliest accessible megalithic architecture in the regions as dolmens and passage graves. The early results originate mostly from including too many terminus post quem values into the calculations.

However, the trend in megalithic research in the last two decades or even longer focused on studies of regional scale and recognized the enormous diversity of monuments, burial rites, and megalithic societies (Midgley 2008: 178) (see various papers in volumes such as Beinhauer *et al.* 1999; Burenhult 2003; Furholt *et al.* 2011; 2012; Schulz Paulsson/Gaydarska 2014).

Investigated megalithic regions

The choice of megalithic regions to be described in more detail anticipates the synthesis of this analysis. The preference for the chosen areas followed an evaluation of the available 2410 radiocarbon determinations.

The selected megalithic regions have an ongoing megalithic sequence, where megaliths either first emerged in Europe or where a transfer of the megalithic thought occurred in the 5th millennium BC. Moreover, some neighboring regions are considered in order to determine and to demonstrate the demarcation of megalithic development in the specific areas. The selected regions include the Paris Basin, Brittany, the Channel Islands, Central West France, Catalonia, Southern France, Corsica, Sardinia, Malta, Andalusia, Portugal and Galicia.

The entire geographical area of Northwest France (the Paris Basin, the Channel Islands, Brittany, and Central West France) is considered in chapter 3 and portrays the largest analyzed area in this project. The main goal hereby was to compare and to demonstrate the quite similar emergence of monumental proliferation in this region. Although the Channel Islands belong to Great Britain today, they are also discussed in this chapter due to their geographical closeness to the French coast and Brittany and a similar megalithic sequence.

The other megalithic regions in Northern Europe and the Mediterranean with a later emergence or a transfer of megaliths in the 4th or even the 3rd millennium cal BC are shortly summarized in chapter 11. In parts of these regions, extensive research projects are being carried out or are recently finished. Results from these finished projects are available based on the application of Bayesian statistical frameworks such as those for the dating of enclosures and megaliths in England and Ireland (Whittle *et al.* 2011). In others of these 'later' megalithic regions, such as Northern Germany or Southern Scandinavia research projects with dating programs and the application of Bayesian statistical frameworks are still ongoing, and the end results are not available yet (cf. chap 11, p. 304-306, 306-308). Preliminary reports are currently available for the ongoing Priority Programme of the German Research Foundation 'Frühe Monumentalität und soziale Differenzierung' at the University of Kiel (e.g. Dibbern/Hage 2010/2011; Fritsch *et al.* 2010; Furholt *et al.* 2014; Hinz/Müller 2012; Mischka 2011, cf. chap 11, p. 304-306) or for the ESS-, and Döserrygg projects of the Statens historiska museum in Sweden (e.g. Andersson/Nilsson 2009; Andersson *et al.* 2015; Lagergren *et al.* 2013, cf. chap 11 306-308).

Chapter 2

Methodical Approach: Radiocarbon Dates and Bayesian Chronological Modelling

Summary: For the 'Time and Stone'project, 2410 available radiocarbon results were compiled from megalithic, pre-megalithic and contemporaneous non-megalithic contexts in Europe. These were analyzed and incorporated, as far as possible, in Bayesian chronological models. By comparing the results and involving indications gained from cultural and bone material, it was possible to establish a scenario for the emergence and development of megaliths in Europe.

The aim of the presented project Time and Stone was to refine megalithic chronologies for Europe with the current available radiocarbon date stock and an application of Bayesian modeling, in order to create a synthesis regarding the emergence and development of megaliths and megalithic societies together with the archeological remains and the anthropological records. Currently, 2410 radiocarbon results are available from European megalithic, but also pre-megalithic and to the megaliths contemporaneous, contexts.

The preferable research questions and dating events formulated at the outset of the project focused on:

1) the construction of the monuments as single events to untangle the nuances of the differences for the genesis and the possible diffusion of the megaliths in the different regions, enabling a discussion on convergence versus diffusion.
2) events which were associated with the use of the monuments such as burial activities, feasting, and rituals in order to reconstruct the life-history of the monuments and the cosmology and social internal organization of the communities which used these sites as burial and meeting places.

Radiocarbon results gained from long-lived, often context less samples for which source criticism was lacking have been taken into account to date European megaliths for many decades. The result shows that many megalithic regions have been misdated as too old since there have been too many termini post-quos values involved in the calculations. This is especially problematical for regions where there is no or bad bone preservation, e.g. in Brittany or on the Iberian Peninsula. In Brittany over 90% of the results entail dates gained from charcoal samples. Many of these represent termini post quos values which were mixed up due to building activities, persistence in using the same localities and sites for centuries, and complicated building sequences (cf. Figure 3.69, chap. 2, p. 9-10).

The radiocarbon dates were re-evaluated regarding their stratigraphical context and their quality and incorporated, as far as possible, in Bayesian chronological models. By comparing the outcomes and including indications gained from cultural and bone material from the studied sites, it was possible to remodel and define the temporal patterns based on the radiocarbon determinations together with the archaeological material and to discuss possible 'megalithic movements' and scenarios behind these phenomena.

The radiocarbon dates

Composition of data

The tables of this volume provide the available details of 1093 radiocarbon determinations from the altogether 2410 considered radiocarbon dates (for all 2410 radiocarbon dates, cf. appendix 3 for download). The majority of these results are compiled from research literature, some of which is unpublished but was provided by the researchers in the different regions. Further sources include the available internet databases for Scotland and results from the radiocarbon laboratories in Lyon, Catalonia, Central Europe and Scandinavia.[1] A methodological problem with bibliographic work can be observed in the fact that material and data are publicized and represented in different qualities and that they are partly incomplete. Therefore, it was not always possible to realize the full potential provided by an application of Bayesian modeling. Similarly, this approach is not to be compared with a recent research project with Bayesian modeling for Southern Britain and Ireland (Whittle *et al.* 2011). The number of the involved radiocarbon dates (2350 dates) is close to the number here, but the former project covered a much smaller area and 427 newly obtained dates and radiocarbon sequences, compared to the results compiled out of the research literature in this analysis, allowed an impressive demonstration of

[1] http://canmore.rcahms.gov.uk/en/project/919374/; www.bandora.fr; www.telearcheology.es; www.radon.de

the power of Bayesian modeling. Yet, the available radiocarbon dates for megaliths in Europe and the models produced for the presented analysis permit the formulation of tendencies. Furthermore, one of the positive outcomes of this investigation is the demonstration of the paucity of data for important regions and appearances, which points out the possibility of future research to select significant megalithic sites to produce suitable new radiocarbon sequences required to construct further narratives for the megalithic societies of Europe.

The largest portion of the considered 2410 radiocarbon results are gained with a total of 1065 samples from human bones. Most of them are uncalcined and only 19 samples stem from cremated bone material. 82 of the samples are from animal bones or antlers, 51 of the bone samples are indetermined. 944 samples stem from charcoal, 34 from charred plant remains, 36 are non-charred bark, wood or grass samples. 16 bulk sediment, sediment or peat samples are also available. The remaining 18 samples stem from organic residue, humic acid, seashell, ceramic or mixed material. From 164 samples, which are primarily measurements from the early days of radiocarbon dating, no information on the material is available.

In the study presented here, 40 AMS measurements are rather accurate with a standard deviation between ±0 to ±25, whereas 947 determinations show a standard deviation between ±25 and ±50. 999 radiocarbon measurements show a standard error between ±50 and ±100. The 372 radiocarbon results with a standard error between ±100 and ±200 were considered with restrictions, their significance is limited. 52 measurements, mostly made in the early days of radiocarbon dating, even showed a standard deviation between ±200 and ±450. These results were only marginally involved in the analysis.

From the total of 2410 radiocarbon results used for the study, 1093 are associated with the closer considered regions, which are relevant regarding the emergence of megaliths in Europe: the Mediterranean and Continental Western Europe. For these regions, it was possible to insert 596 radiocarbon results from altogether 126 sites into 50 Bayesian models. Those were one-phased, multi-phased or outlier models either for single sites or for regions.

Classification of the contexts and data quality

The interpretation of radiocarbon dates is often disputable and there are two main categories of problems to consider in dating megaliths by such dates. These involve problems of context and

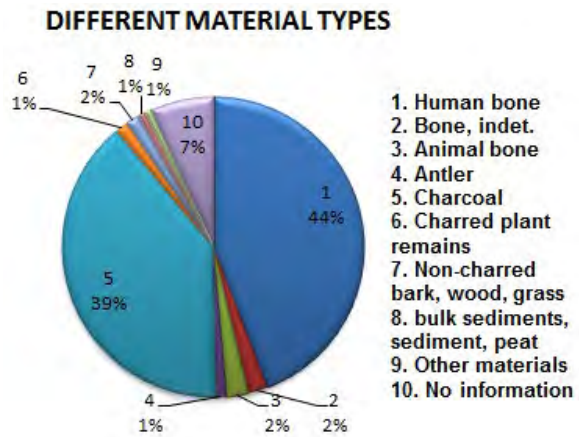


Figure 2.1 Number of radiocarbon dates considered in this volume obtained from different material types (n=2410)

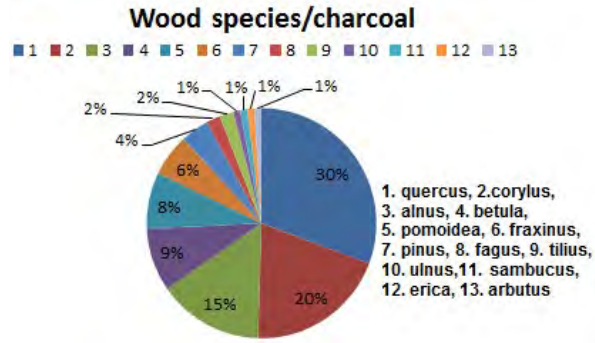


Figure 2.2 Number of radiocarbon dates from charcoal samples identified after wood species (n=102)

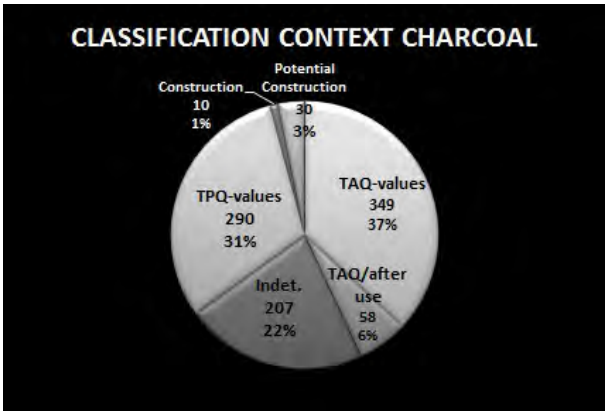


Figure 2.3 The charcoal samples: classification of the contexts (n=944)

problems of quality, whereas the former problems are the ones of most concern.

The question arises hereby, if the samples in this analysis can be associated with the desired dated event, either to the construction or to the use of the megaliths or if they date any other kind of activities undertaken at the same place. Radiocarbon dating dates samples not contexts (Waterbolk 1971). Many

of the current available and in this volume considered radiocarbon results represent termini post quos values with regards to the construction of the megaliths, i.e. they are older than the monuments and originate from earlier pre-megalithic structures or, for example, from settlement layers under the graves (cf. Figures 2.3, 2.4, 3.69, i.e. 5.17, 10.10). The construction of a megalith is an intrusion into the ground and during building activities material like charcoal, ceramics, and bones from layers under the grave may merge with the chamber or the mound. Consequently, it is important to divide the data into termini post quos and termini ante quos values. Termini post quos values regarding the construction of the graves date pre-megalithic contexts, i.e. settlement layers under the grave, which are mostly independent from the grave event itself. Termini ante quos dates represent the use of the grave and are determined by way of human bones, grave goods, and samples from burial activities or other rituals around the grave. Only very few samples can be directly associated with the construction of megalithic structures like birch bark as a filling material between the slabs of dry walls in Danish passage graves (Dehn/ Hansen 2006) or deer antler which can be associated with construction and digging activities (i.e. Bayliss 2007: 36) (cf. Figure 2.4).

It is a complex endeavor to sort out these dates and is often only possible by means of a critical consideration of the sample contexts, the correlation to the archaeological remains, and sometimes by the determination of a hiatus between the termini post quos values and the earliest samples which are associated with the burial activities.

It was necessary for this analysis to evaluate each sample according to its context. Dates gained from charcoal from the mound filling were not castaway a priory, but considered together with other available results and the archaeological material from the chambers and the sequences of the places, e.g. from possible pre-megalithic activities. While it is more plausible that human bones and the material within the chambers are associated to the burial activities and the graves, charcoal often originated from other pre-megalithic or surrounding activities.

To demonstrate this problem, let us consider as an example the sequence of the dolmen de l´Ubac in Goult, Southern France, one of the larger sequences available in France and the only megalithic one for the Southern part (Bizot *et al.* 2001: 5; Sauzade *et al.* 1997; 1999; 2002; Sauzade/Bizot 2001, see also chap. 5, p. 163-164 and Figure 5.17). Four of the respective determinations are processed from human bones and the probability of the resulting dates extends over a time horizon of ~500 y from 3099 to 2546 cal BC, 95.4%. This interval is maintained by archaeological material stemming from the chamber. Only one of the remaining 14 'charcoal dates' lies within this interval and can be associated with the burial activities. The other 13 radiocarbon results cover a time span of ~6000 y, with a hiatus of several 100 y between the termini post quos values and the initial burial activity, and thus tell the story of anthropogenic impact on this site with pre-megalithic activities and subsequent uses of the grave.

31% of all the charcoal samples considered in this analysis represent terminus post quem values. This amount is rather high, if we take into consideration that just a handful of these data can lead to complete misinterpretations regarding the beginning of a period or the emergence of megaliths. This is especially problematic for regions where we have no or little bone conservations and are depended most on charcoal samples as in Brittany or the Northwest Iberian Peninsula. For Brittany, 41% of the charcoal samples with known context could be classified as terminus post quem-values.

The quality of the samples and radiocarbon dates is another factor to be considered and includes problems such as the old wood, terrestrial, or marine reservoir effects as well as the treatment of the samples in the laboratories.

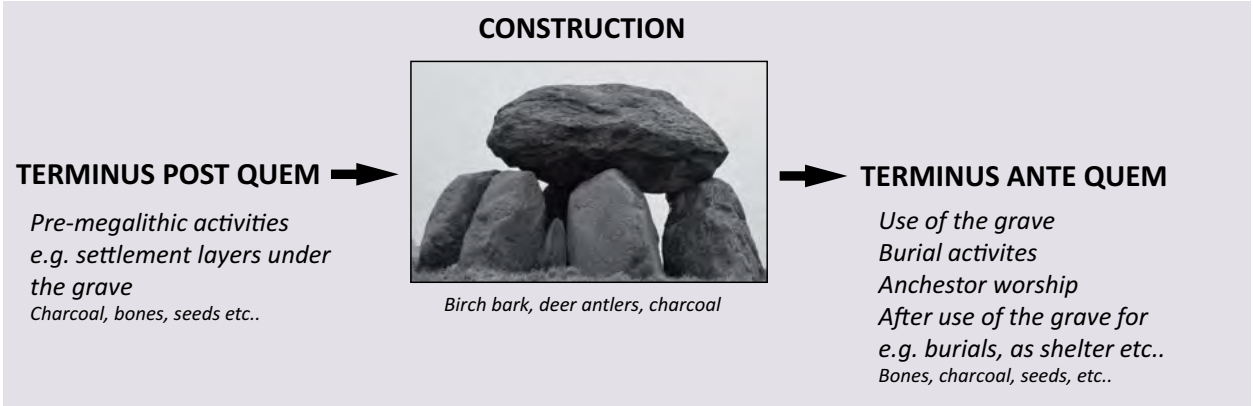


Figure 2.4 Classification of the sample contexts

Charcoal or wood samples can evince a so-called 'old wood effect', where dates are obtained on wood or charcoal from a long-lived tree sample. A tree can be several hundred years old before being cut down. The carbon in a tree-ring dates from the year in which that tree-ring was formed. Therefore, the samples of wood and charcoal should either consist of material from a known position in a tree-ring series or be from the outer rings of the tree or from twigs. The type of wood should be determined before the sample is processed. Short-lived samples like hazel branches are more convenient to process than e.g oak, although a wood-offset of a few decades cannot be ruled out.

89% of the charcoal samples in this analysis are unidentified charcoal. These samples have all a potential inbuilt age. This 'old wood effect' problem may occur also e.g. with black colour made of charcoal, sooting on pottery sherds, which derives usually from the fuel or calcinated bone with incorporated carbon from the pyre fuel during the cremation process (Snoek et al 2014).

Reservoir effects occur when the carbon that is incorporated into a sample during life is not in equilibrium with the contemporary atmosphere. This gives the sample an apparent older. radiocarbon age. Bones can have a marine or a terrestrial reservoir effect, depending on the diet of the buried individuals. If marine or sweet water resources were an important part of the diet, then the radiocarbon result is too old compared to contemporaneous terrestrial organisms, since the carbon of the consumed marine organisms, the water, and the so-called reservoir age are added to the measurement.

Through the measurements of the stable isotopes of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) in the bone collagen, it is possible to gain information on the protein part of the diet and thereby to determine a possible reservoir effect on the radiocarbon results. While the stable isotope ratio of carbon ($\delta^{13}C$) helps to estimate the proportion of consumed marine sources relative to terrestrial sources in the diet, the nitrogen stable isotope composition reflects the tropic level of a consumer (Olsen *et al.* 2010, 636). Herbivores have lower values than carnivores (Schoeniger/De Niro 1984) and diets from fresh and or marine waters can usually be discerned by their elevated $\delta^{15}N$-values. Marine samples are normally calibrated and corrected using the internationally agreed marine calibration curve (Marine13) and an appropriate local 'Delta R' (ΔR) correction. For mobile marine organisms, a general average reservoir age of 400 ^{14}C yr is estimated, assuming that they moved in the upper mixed layer of the open ocean (Hughen *et al.* 2004; Stuiver/Braziunas 1993). In shallow water, on the contrary, the reservoir age can vary and be lower or higher. The reasons behind this are to be found in the alternating atmospheric CO_2 exchange, the upwelling of deep ocean water, and the inflow of hard freshwater (Heier-Nielsen *et al.* 1995). The correction of the reservoir age for marine diet consuming prehistoric societies, for example by a Mas Balance calculation, is accordingly difficult if we must assume that for e.g Mesolithic populations shell fish harvested in shallow water represents a substantial part of the diet. The freshwater reservoir age differs notably according to location and time and there are even changes from season to season, since freshwater may contain decomposed $CaCO_3$ from fossil carbonate in soils (Heier-Nielsen *et al.* 1995; Lanting/van der Plicht 1998; Ohlsen *et al.* 2010: 635).

One method to correct the reservoir age was proposed by Ohlsen *et al.* (2010). The stable isotope ratio of 15 individuals from the cemetery of Ostorf in Northeast Germany was measured. While the $\delta^{13}C$ values vary between -21.5‰ and -19.4‰ and there is evidence of a more terrestric diet and no reservoir effect, the $\delta^{15}N$ values were significantly elevated with values between 12.8‰ and 15.2‰. The calculation of a reservoir age of up to ~800 y was possible for the radiocarbon results from animal bones, like bone pendants in the graves.

In this analysis, as far as the stable isotope values are known, the results with $\delta^{13}C$ values lower than -18‰ and $\delta^{15}N$ values higher than 12‰ were either not taken into account or rather critically considered and were calculated in the Bayesian models as outliers or with an outlier model (for this cf. Bronk Ramsey 2009). This affected mostly human bones from Mesolithic sites. Fortunately, there are very few dietary offsets obvious in the human bone material from the megalithic and the Neolithic contexts. Only 11 human bone samples out of altogether seven megalithic graves show $\delta^{13}C$ values lower than -18‰. 18 human bones from the two megalithic graves Mysinge 2 and Le Déhus on the islands of Öland, Sweden and Guernsey, Channel Islands exhibit $\delta^{15}N$ values higher than 12‰.

Another problem to be considered is the accuracy of the measurements by the laboratories. Different laboratories employ different pre-treatment procedures and philosophies. If the material is contaminated with either too old or mostly with too young material it is only possible to get rid of the contamination with accurate pre-treatment and cleaning of the samples. There are cases (e.g. Rössberga or Gökhem 17 in Falbygden)[2] in which radiocarbon results on the same samples from different laboratories are completely different.

Alternative dating approaches

There are further scientific methods which are occasionally used to date the construction of megaliths, such as the dating of the last exposure of stones with

[2] Personal communication with Karl-Göran Sjögren, Göteborg.

OSL-dating (optically stimulated luminescence) and the dating of ceramics with TL (thermoluminescence) (e.g. Bluszcz 2005; Furetta 2010; Chen/Pagonis 2011). Due to their high standard deviation both are not convenient for this analysis. OSL-dating is a method to measure doses of ionizing radiation. Compared to radiocarbon measurements which date organic material, luminescence is used to date minerals, like quartz and feldspars. Thus, it is possible to date events according to their last exposure to sunlight. Unfortunately, the standard deviation is so high that it is only possible to determine the millennium when the megaliths were erected. This method can nevertheless be of some use if there is no other radiocarbon datable material available which can be connected to the monuments. This is often the case with standing stones. The same problem exists with thermoluminescence dating, which is a common tool to date ceramics or other fired archaeological materials, as heat empties or resets the thermoluminescent signature of the material. The standard deviation here is much higher than the deviation of radiocarbon dates.

The Bayesian approach

To obtain calibrated results which are as exact as possible, it is necessary – besides the already mentioned accurate sorting of the data – to present the dating sequences in Bayesian Models. This Bayesian statistical framework is considered today as the third radiocarbon revolution (Bayliss 2009) and provides the possibility to considerably limit the proposed time interval for desired calendar dates. Bayesian approaches to modeling were introduced two decades ago (Buck *et al.* 1991; 1992; 1996; Naylor/Smith 1988) and since then they have been increasingly applied, especially in Britain in order to model and clarify archaeological chronologies (among others see Bayliss/Harry 1997; Bayliss *et al.* 1997; Bayliss *et al.* 2004; Bayliss *et al.* 2007a; 2007b; Bayliss/Woodman 2009; Buck *et al.* 2007; Meadows *et al.* 2007; Parker-Pearson *et al.* 2007; Whittle *et al.* 2007; 2011; Boaventura 2009; Müller 2009; Darvill *et al.* 2012).

Before the Bayesian approach, precise assessments for archaeological applications had not been realized. The calibration curves have wiggles or changes of slope, significant inversions, and a number of regions with a low gradient (cf. Figure 2.10). Consequently, radiocarbon results were only correlated between decades and centuries of calendar years. In the low gradient regions, even a high-precision radiocarbon measurement resulted in a respectable length on the calendar scale. Furthermore, radiocarbon results were inexact. The value itself is a function of samples and parameters including sample size and counting time, and each result has a standard deviation which is an estimate of analytical uncertainty by the laboratory (Buck *et al.* 1994: 252). The difference between actual calendar dates and the calibrated probabilities of radiocarbon determinations can be demonstrated by the simulation of radiocarbon dates by a process of back-calibration (Figure 2.5 and Figure 2.7).

With the current Bayesian statistical approach, it is possible to unify radiocarbon results, archaeological information, and the high precision curve into one calibration process. All the models and calibrated data presented in this analysis have been performed with the help of the program OxCal v4.1 (Bronk Ramsey 2001; 2008; 2009; 2009a) and the calibration data of Reimer *et al.* (2009), Intcal09. The program OxCal can accomplish automatic wiggle matches and calculate probability distributions for samples in sequences and phases (Bronk Ramsey 1995). For this analysis, the Bayesian approach was applied as much as possible on four available radiocarbon models, from simple models onwards to multi-phased models with up to 27 measurements. In short, the objectives of Bayesian chronological modeling for megaliths can be summarized as follows: 1) to provide calendrical dating for pre-megalithic activities, 2) to determine the structural sequence of monuments, in particular to determine the construction dates of the megaliths, 3) to estimate the duration of the period in which human remains were interred in the monuments, 4) to explore spatial differences in the chronology of mortuary deposits (i.e. different chambers, vertical stratigraphy), and 5) to define burial breaks and times when the graves were not in use.

The methodology of Bayesian chronological modeling has been discussed in detail in previous years in different publications (cf. Bayliss/Bronk Ramsey 2004; Bayliss *et al.* 2007; Bayliss 2009; Bronk Ramsey 1995; 2000; 2008; 2009a; 2009b; Buck *et al.* 1991; 1992; 1996) and will be discussed here with reference to its main facets.

The basic idea behind the Bayesian approach for archaeology is the theorem of Thomas Bayes (Bayes 1763; Bayliss *et al.* 2007, 4):

$$P(\text{parameters}) \times \frac{P(\text{data}|\text{parameters})}{P(\text{data})} = P(\text{parameters}\,|\,\text{data})$$

Prior beliefs x Standardized likelihoods = Posterior beliefs

Previous knowledge of and experience with the problem is the prior belief, i.e. the stratigraphy of a site and which radiocarbon sequence we want to incorporate in such a model. The new collected data represents the standardized likelihood, in this analysis the radiocarbon results.

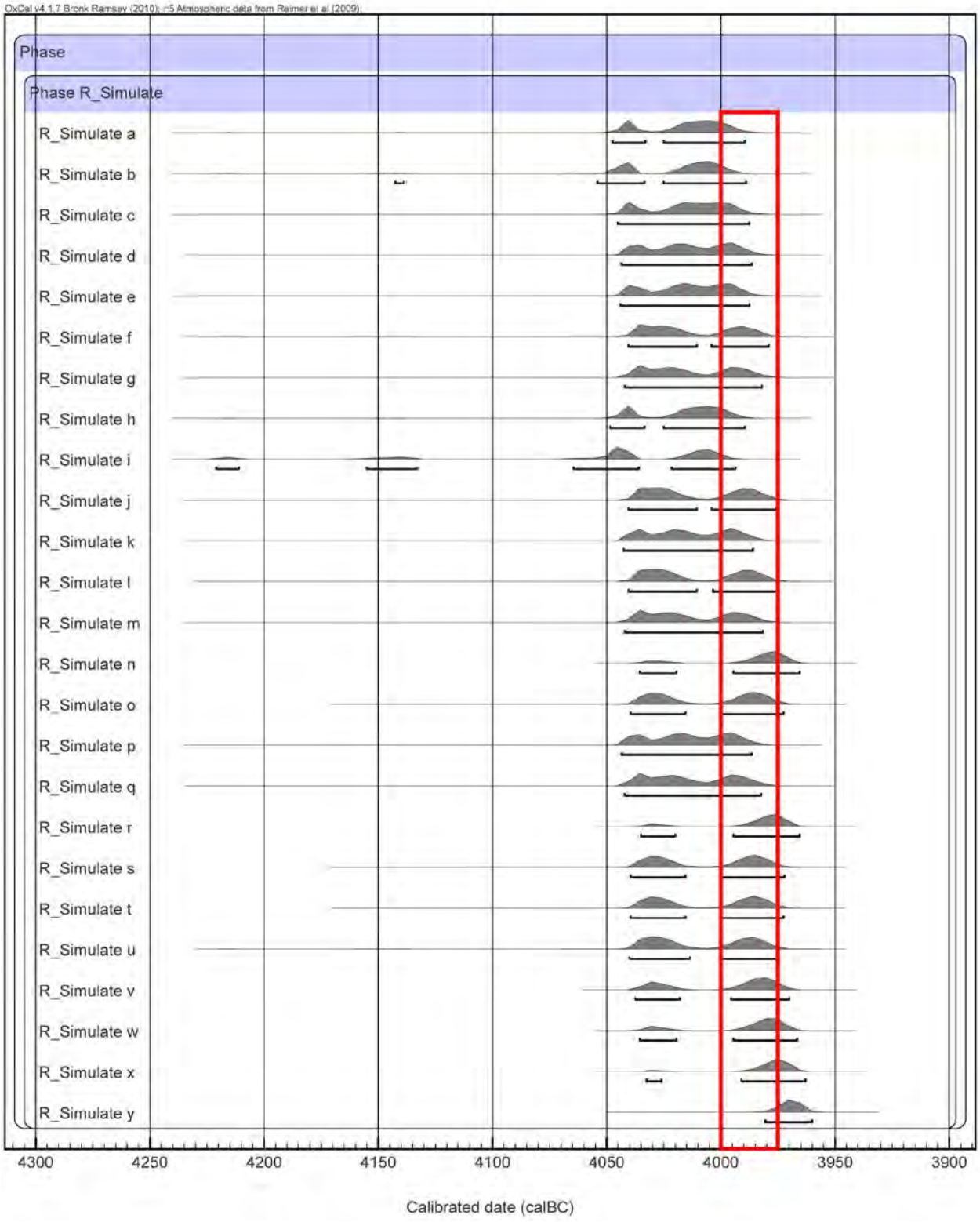


Figure 2.5 Simulation A by a process of back-calibration of calibrated dates for 25 radiocarbon determinations which actually date within 25 y from 4000–3976 BC

Previous knowledge of and experience with the problem is the prior belief, i.e. the stratigraphy of a site and which radiocarbon sequence we want to incorporate in such a model. The new collected data represents the standardized likelihood, in this analysis the radiocarbon results. Both the existing and known data and the new data lead to the posterior belief and a new understanding and interpretation of the problem. First the model has to be defined in OxCal in sequences and phases with the help of all available information

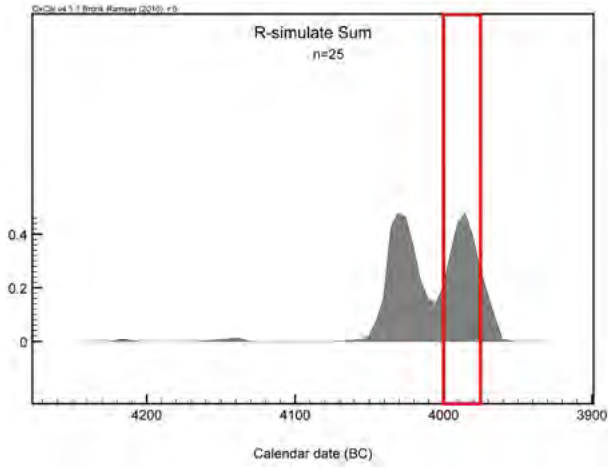


Figure 2.6 Sum calibration of simulation A. The bar marks the actual time span and shows that a sum calibration would extend the real time interval 4 times

from the sites, such as the vertical or the horizontal stratigraphy. A sequence is hereby a group of elements in a given order, a phase is a group of elementsfor which there are no fixed relations known (Bronk Ramsey 1995: 426). Archaeological judgment is thus very important in making deductions from stratigraphical information, it is essential that the prior beliefs in a chronological model are correct. If not, the results from the model are wrong. According to the problem or question, boundaries are determined and incorporated into the model structure, for example if it is desired to define the transition between two phases. The program first calculates the probability distribution of each radiocarbon result. The program then attempts to reconcile this information by a repeated sampling of the distribution of these dates with the determined prior information. Thus, it builds up a set of solutions consistent with the structure of the model (Stuiver/ Reimer 1993; Bayliss *et al.* 2007; Bronk Ramsey 2009).

In order to test for unreliable chronological models or intrusive material, the agreement index A is calculated to exclude the inconsistency of a model. This has a value of ~100%, sometimes it is higher and it can fall down to 60%. The agreement index A overall is calculated as a whole for the model, which is likewise ~100%, it should not fall below 60%. These two indices represent a threshold value analogue to the 0.05 significance level in a χ^2-test (Bronk Ramsey 1995: 428). The range of calibrated dates can be reduced by the use of replicated samples and the r-combine function in the model. The replicated samples must therefore be from the same source, for example from the same skeleton or from seeds for which we might assume that they ceased to metabolize in the same year. In this analysis, only such samples were combined within the models.

Often the measurement data does not agree with the model (Bronk Ramsey 2009: 356; 2009a). The most common form of such data is represented by a result where the radiocarbon measurement is namely correct, but the outlier is processed by samples of intrusive material and is a result of deposition processes, which are particularly hard to understand and to untangle. This data is furthermore found among measurements with a reservoir effect or where the radiocarbon measurement of a particular sample might not be correct due to the fact that the pre-treatment procedure was insufficient. There is the possibility to sort out these data manually or, as used as much as possible for this analysis (if reasonable and plausible), to define and show them in the model as outliers (Christen 1994; 2003; Bronk Ramsey 2009: 356; 2009a). Thus, the respective samples are so down-weighted in the model if they are inconsistent with the rest of the prior information. These outliers can be identified either by the outlier analysis (Christen 1994; Bronk Ramsey 2009a) or by the agreement index of the model.

Multiple phase models can be used either for single sites or for a more general chronological framework and describe, e.g. the chronology of a region (Bronk Ramsey 2009: 351) as recently carried out for the Dynastic periods of Egypt, the Iron Age of Israel, and the Aegean Late Bronze Age (Bronk Ramsey *et al.* 2010; Boaretto/Jull 2005; Manning *et al.* 2006).

Bayesian models should be used instead of sum calibrations. Probability sums were used for many years to calculate and represent the beginning, the duration, and the end of a period and it is still a very popular method. It is, however, not meaningful to sum probabilities of distributions (Bayliss 2006: 10, Millard 2009). The standard deviations are likewise summed up and can elongate cultural archaeological phases even for centuries. Thus, for example, the sum calibration of a simulation for 25 radiocarbon determinations within 25 y extends the actual time interval of the real time approximately 4 times. The same experiment for 30 radiocarbon determinations within 300 y is a sum calibration extending the real time interval by more than 50% (Figure 2.6 and Figure 2.8). Andrew Millard showed on simulations with identical Gaussian uncertainties and calendar dates drawn randomly from a uniform distribution that it is only relevant to sum the probability of distributions when there are many dates with an uncertainty much smaller than the floruit (Millard 2009). For 100 dates within 300 calendar years with an uncertainty of 15, the 95% range lays close to the fluorit. But even with 100 dates, the larger the uncertainty, the further the summed distribution visually deviates in the simulation from the actual uniform distribution. Accordingly, summed probabilities as well as simple calibrated dates do not inform us about the start, the end, or the duration of the time interval from where the dates originated.

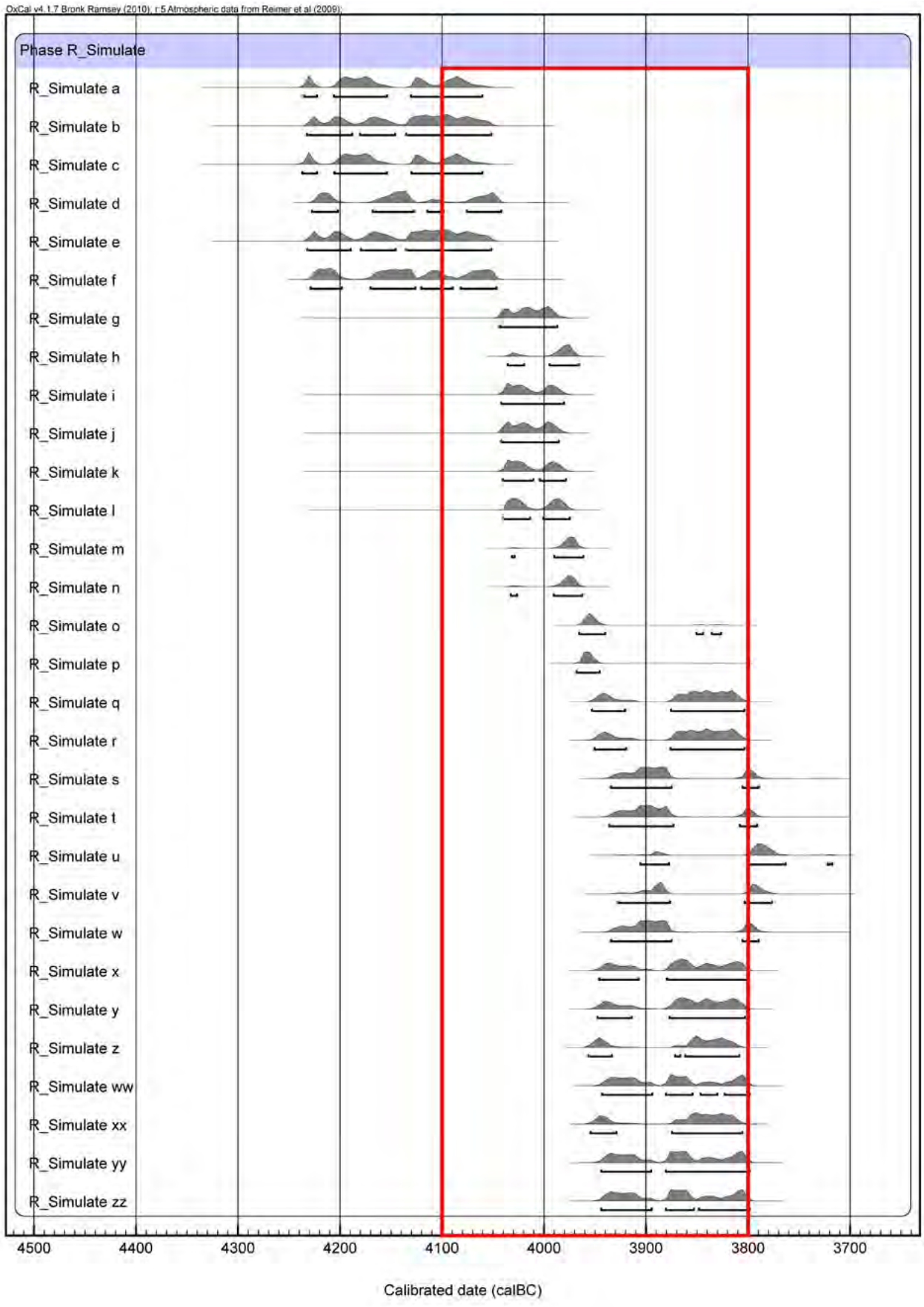
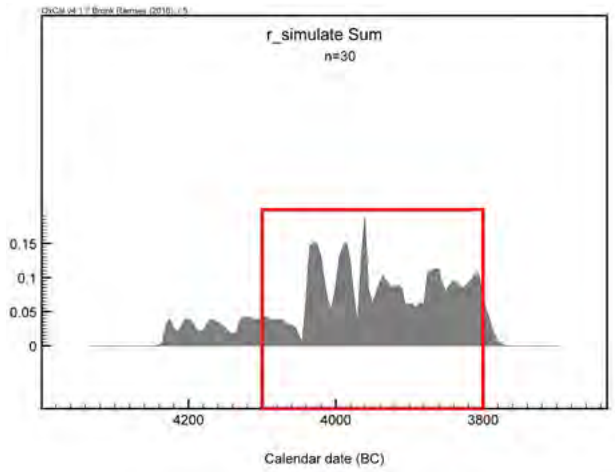


Figure 2.7 Simulation B by a process of back-calibration of calibrated dates for 30 radiocarbon determinations which actually date within 300 y from 4100–3800 BC



In contrast, in a Bayesian model with the same radiocarbon results 10 dates with an uncertainty of 60 were already enough to closely determine the start, the end, and the duration of the uniform distribution. Hence, Bayesian models are of much greater utility here than summed probability distributions.

Figure 2.8 Sum calibration of simulation B. The bar marks the actual time span and shows that a sum calibration would extend the real time interval by more than 50%

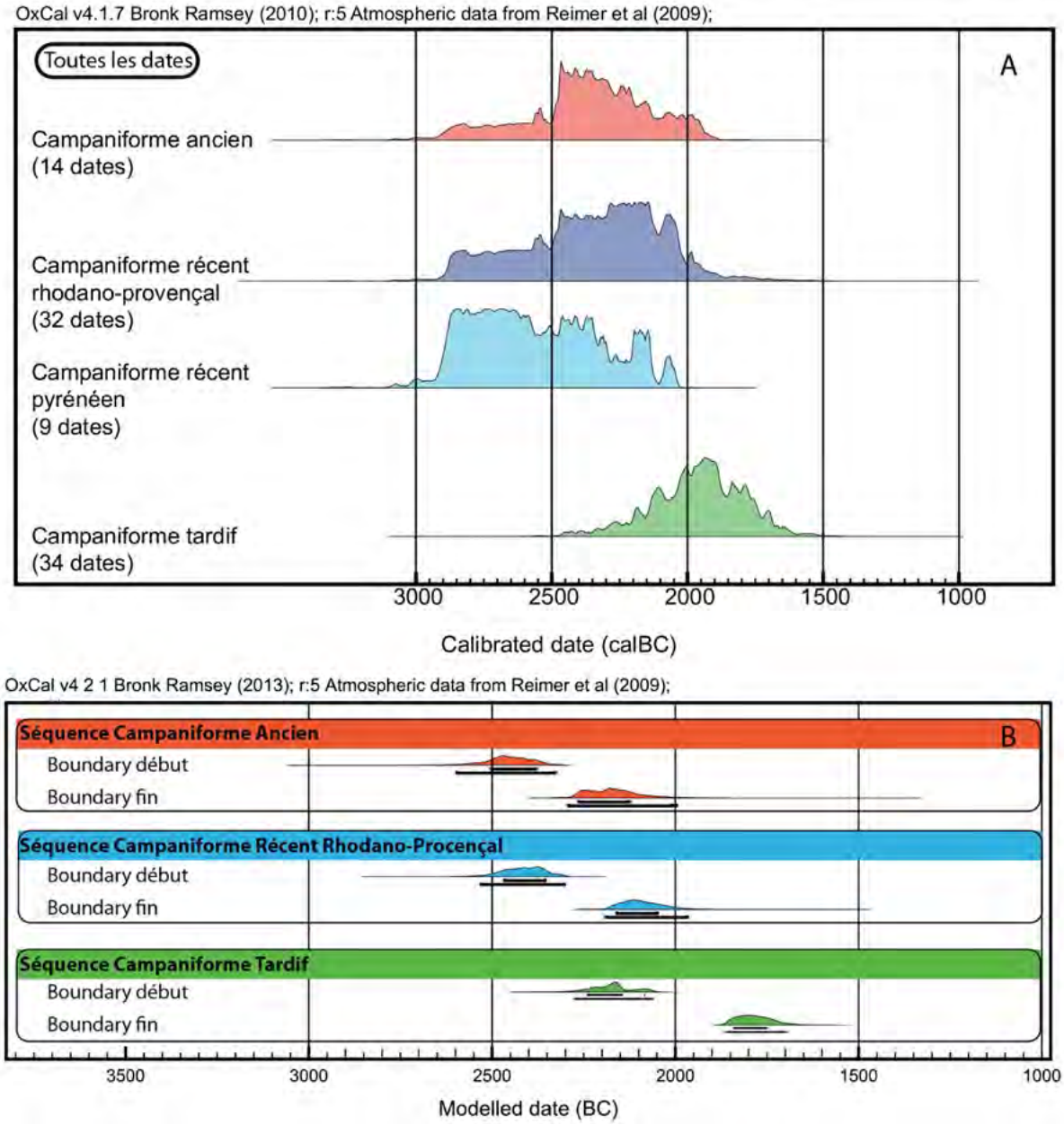


Figure 2.9 Sum calibration versus Bayesian statistical framework. The analysis of all available radiocarbon dates for the Bell Beaker contexts in Southern France (Lemercier et al. 2014, Figure 13) show the large discrepancies between the two different methodological approaches. The in archaeology still frequently used sum calibration would compared to the Bayesian analysis expand the time interval for the different Bell Beaker horizons partly for ~700y

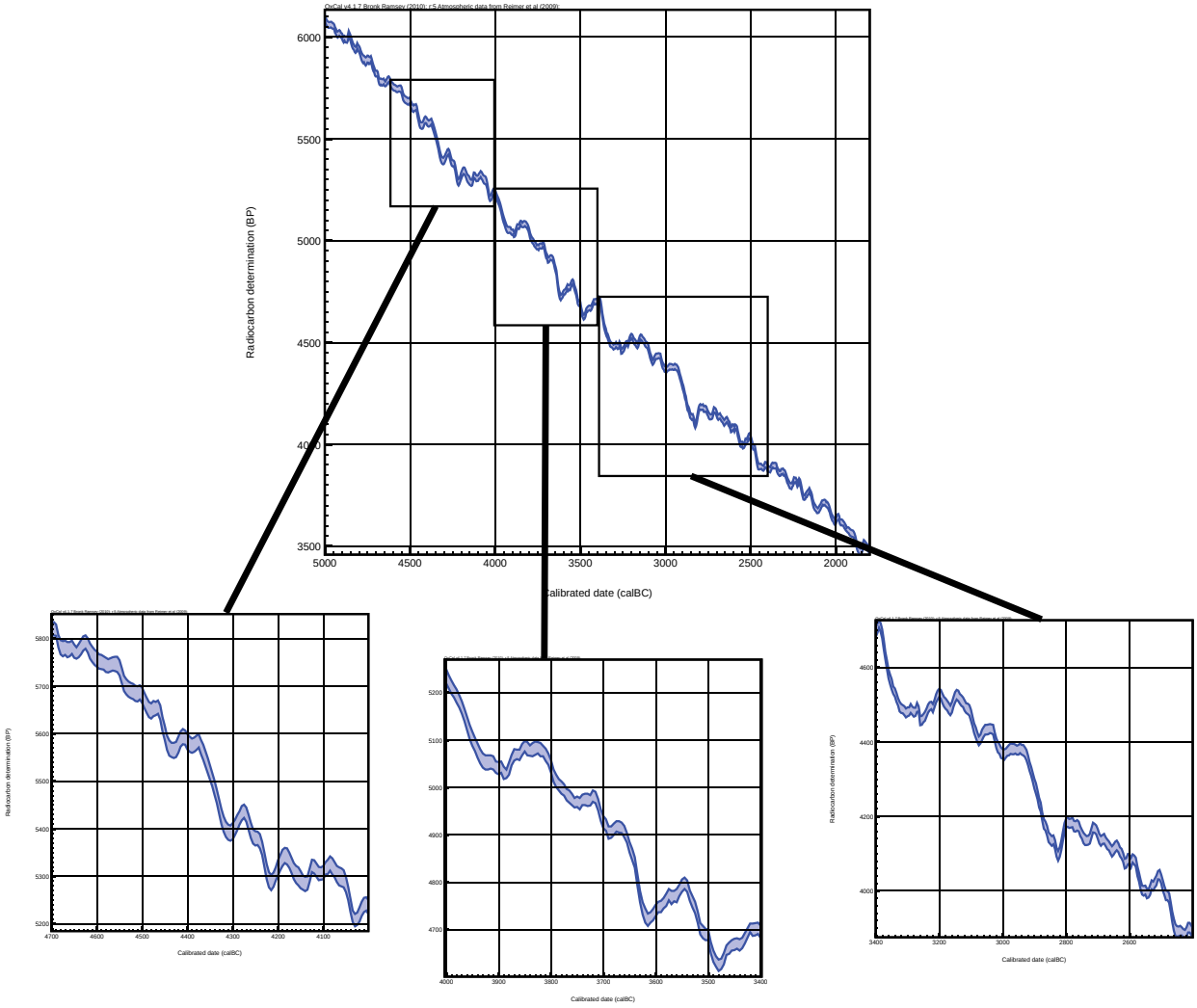


Figure 2.10 The calibration curve Intcal09 (Reimer et al. 2009). Detailed the for this analysis important time intervals

Chapter 3

Northwest France

Summary: For decades, there has been an ongoing, vivid scientific debate regarding the emergence of monuments and megaliths in Northern France. The available radiocarbon dates suggest that the earliest monumental graves in Europe arise in the very beginning of the 5th millennium in the Paris Basin. These graves have no megalithic chamber yet. Some centuries later the first monumental graves are built in the North and Central West of France and especially in the region of Carnac. The earliest megalithic graves are documented within these structures. Chapter 3 presents the complex emergence and development of megalithic architecture in Brittany, the Channel Islands, the Central West France and the Paris Basin.

Northwest France is a region with a distinctive sequence of Neolithic monuments and an exceptional peculiarity and diversity of megalithic architecture. Due to early radiocarbon results available from these contexts, Northwest France has been discussed for decades as one of the core regions regarding the rise of monuments and megaliths in Europe (e.g. Joussaume 1985; Laporte *et al.* 2002; Müller 1998; Mohen/Scarre 2002; Sheratt 1990; 1999; Scarre 2001; Scarre *et al.* 2003; Renfrew 1973). Thus, a closer consideration and a critical discussion of the existing radiocarbon measurement stock and the contexts from where the samples originate is required for this megalithic region.

Formally, this chapter is divided into main sub-regions including the Paris Basin, Brittany, the Channel Islands, and the Central West. These different areas show specific regional developments and characteristics, but also supra-regional common features such as monumental architecture with long earthen and stone tumuli. Not only the region around Paris is considered with the Paris Basin, but also the geological and the River Seine Basin and the cultural-historical connected areas including the Normandy, parts of the Picardy, and the Centre. Due to their geographical closeness to France, the British Channel Islands are discussed in this chapter as well together with Brittany, since there is evidence for a transfer between these two regions in the Neolithic Age and they exhibit a similar megalithic profile.

Pre-megalithic structures and pre-megalithic funeral rites in Northwest France

Pre-megalithic structures in the Paris Basin/Northern France

The Paris Basin/Northern France is the nuclear area in Europe regarding the proliferation of monumental funeral architecture (cf. appendix 1; 12.2). Both, radiocarbon dates and archaeological material are indicating that. The earliest grave monuments are documented from this region at the end of the Early Neolithic with the monumental, but non-megalithic graves of the Passy type.

But in advance, pre-monumental and pre-megalithic burials will be discussed. A Mesolithic grave with the remains of two individuals in a pit is registered from Varennes in Val-de-Reuil in the Normandy (Billard *et al.* 2001; Verron 2000: 65). The primary burial was covered by ochre and contained nine flint blades and the burnt bones of mostly wild animals - altogether 11,88kg from deer, wild boar, and small and big ruminants. It was disturbed by a second inhumation with an individual laid on his/her back in a stretched position (Verron 2000: 65). Another Mesolithic burial is found at 'Le Petit Marais' in La Chaussée-Tirancourt. The pit contained cremated human bones and shell beads (Midgley 2005: 62).

The Linear Pottery and the post-Linear Pottery funeral rites in the Paris Basin are quite similarly configured like the Mesolithic burials (Billard 2007a: 76–77). Small clusters of pit burials are documented, mostly related to house structures, in comparison to Eastern France, where large Linear Pottery necropolises are registered with up to 200 graves. The individuals were buried in a crouched position with some small ventral or dorsal exceptions. Grave goods such as ceramics, a few lithic tools, bracelets, pendants, pearls, and spondylus jewelery are common as well as the use of ochre.

Recently discovered Early Neolithic burials include the sepultures in the settlement of Lazzaro in the Normandy and the burial at Saint-Pierre d´Autils in Eure. The Late Linear Pottery settlement of Lazzaro in Colombelles was occupied in the last three centuries of the 6th millennium. 17 pit burials were placed on the long sides; three are arranged in the backyards of the house structures (Billard/Degobertière 2007: 73). The individuals were buried in extreme crouched positions in simple pits. One of these pits had a side niche, also common for burials east of the Paris Basin. Grave goods added in four graves included ceramics, a flint arrowhead, several chalk pearls, and one variscite pearl. There is also some evidence of ochre (Billard/Degobertière 2007: 73). The burial at Saint-Pierre d´Autils in Eure is a pit inhumation from the to the Linear Pottery contemporaneous, early Villeneuve-Saint-Germain horizon (Aubry/Honoré 2007: 74). It

is the inhumation of a child in a crouched position with a shell collier, perforated teeth, three schist and one ceramic bracelet, six flint blades, and a decorated vessel. Again, this burial was accompanied by ochre.

The Passy Graves

With the graves of the Passy type in the Paris Basin, the first monumental graves in Europe presumably already emerged in the Late Early Neolithic. These graves are labor-intensive, non-megalithic structures up to 280m long which are grouped in 13 necropoles in the Seine-Yonne area (Chambon 1997; Chambon 2003, 2010; Delor *et al.* 1997; Duhamel *et al.* 1997; Mordant 1997). In Western France, one Passy cemetery is also documented for the vicinity near Dissay (Chambon 2010; Joussaume 1999: 61).

The Passy graves are marked above ground either by a tumulus, a palisade enclosure, or a mixture of both concepts covering or enclosing a few pit burials with mostly singular inhumations (Figure 3.7). The monuments primarily have an east-west orientation and are arranged in a parallel or slightly fan-shaped fashion. It is a common observation that compared to the labor effort invested in the structures, there are only few grave goods recorded with some few exceptions. For example, jadeite axes were not found in any of the Passy graves, although they had already been imported in larger amounts to Brittany during that time horizon (among others cf. Cassen 2009; 2011; Herbaut 2000; Klassen 2000; Klassen *et al.* 2011; Pétrequin *et al.* 1997, 2006, 2008, 2010). All the bone material used for body decoration or tools is from wild animals, for example from rabbit, deer, bear, and wolf. This evidence suggests a hunting symbolism associated with the funeral contexts (Chambon 2010) and that death was closely associated with the wild (Hodder 1990, 27).

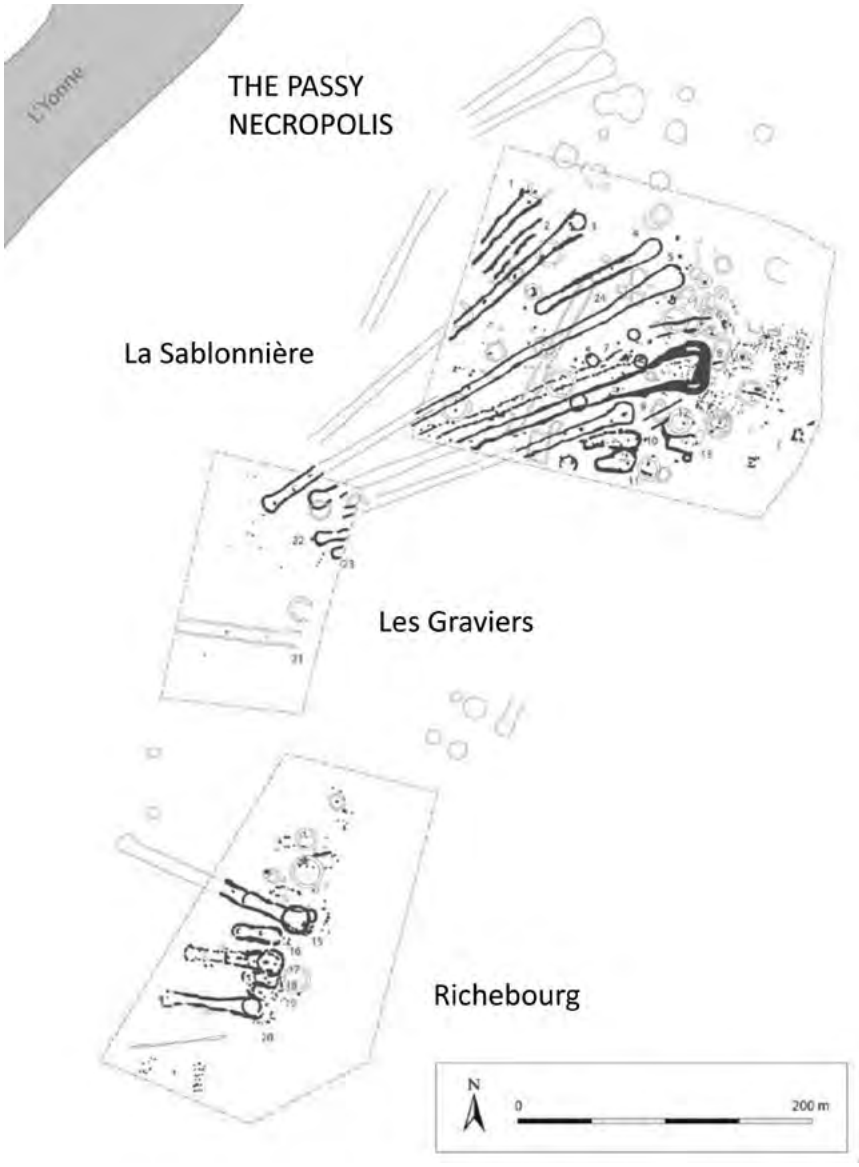


Figure 3.1 Planum necropolis Passy (Lemercier et al. 2010)

Radiocarbon results are available from the Passy and Balloy necropolises. The necropolis Passy in the community of Passy is the site with the most recent investigations. From this site a sequence of 18 radiocarbon results and anthropological records are available (Lemercier *et al.* 2010; 2011).[1] Potentially, this necropolis can enable a more in-depth understanding of the development of these European-wide earliest funeral monuments and a closer investigation of the societies which constructed them. Therefore, this necropolis deserves closer attention.

Passy is formally divided into three sectors: La Sablonnière, les Graviers, and le Richebourg. La Sablonnière and le Richebourg have been excavated. There are 19 elongated monuments documented with a total of 26 graves and between one and four burials per structure (Figure 3.1). Seven of these

[1] The Passy Project N3P: Projet Collectif de Recherche 2010-2012, Nécropoles préhistorique et protohistorique Passy. Olivier Lemercier and Phillippe Chambon gave me the kind permission to use the unpublished data for my thesis.

monuments are outreaching and considerably longer than the others. Burials are registered from four of the longest structures, whereby three of them contained one grave (monument 5, 7, 8) and one monument (15) contained three graves. From three of these structures in the sector Le Richebourg there is evidence of round ditches on the outer, southeastern end. The Passy graves have been destroyed aboveground and were discovered by aerial photography. Evidence for their monumental character can be seen in 1) the enclosures that show traces of massive posts, and 2) the ditches in the outer thickened periphery that are filled by different sediments than the rest of the enclosures. This infill represents the remains of round tumuli.

In the 26 graves, 30 individuals have been determined, including 25 body inhumation and 5 cremations. The deposition of the individuals seems to be sex-related. The inhumations in a dorsal position are more related to males (60%), while those in a crouched position are more closely associated with females (40%). Therefore, it can generally be stated that the monuments seem to be gender specific and separated according to sex when regarding adult individuals (Chambon 2010: 9–11). 10 of the individuals are determined to have been adults (>20 y), six of them were males and four were females. From the remaining five skeletons, the sex is undetermined and they are classified as either juveniles or adults.

Half of the 30 individuals died before they reached the age of 20. 75% of the individuals exhibit hyperplasia of the enamel of the permanent teeth with several supposed stress periods during growing phases. Half of the individuals also display cribia orbitalia, another possible indication of dietary deficiencies.

There are 18 radiocarbon determinations from human bones and different individuals available from Passy (Figure 3.2). 17 of these dates were recently produced within the Passy Project N3P, one radiocarbon result was processed earlier in 1997 (Ly -7808, 5545±50) (Affoltern *et al.* 2010: 37). Two of these determinations were not taken into account (grave 11.2 Ly-6351; 3690±30 BP; grave 12.1, Ly 6352; 3345±30 BP), since they clearly represent secondary burials from the 2nd millennium. The earliest radiocarbon results from both sectors A and B (Ly-6364, monument 1; Ly-6362, monument 4; Ly-6349, monument 5; Ly-6350, monument 8; Ly-6363 and Ly-6356, monument 17) stem from the oldest known buried individuals in monuments in Europe to date. Nevertheless, we do not know their stabile isotope values and have to take the possibility of a sweet water reservoir effect into consideration, even if it is small.

It is not clear if the two excavated sectors of La Sablonnière and Le Richebourg belonged to one big necropolis or two different necropolises (Lemercier *et al.* 2010). Both hypotheses were tested by Bayesian statistical frameworks.

The first model was established under the presumption that all the monuments belonged to one big necropolis of the same society (Figure 3.3). Accordingly, the first burial is calculated to 5056–4856 cal BC (95.4%; 5023–4937 cal BC, 68.2%), the last burial to 4361–4236 cal BC (95.4%; 4344–4287 cal BC, 68.2%). The duration of the burials is therefore estimated from 530 to 772 y, 95.4% and from 610 to 719 y, 68.2%.

The second model was established taking the following profound arguments into account: Regarding the architecture, the burial rites, and the paleopathology there are strong indications that La Sablonnière and Le Richebourg are two different necropolises (Figure 3.4). The structures from both sectors are rather similar regarding their architectonic concepts, but clear differences are visible. 1) The monuments in La Sablonnière are more stretched out, 2) the three structures with round ditches on the outer end are all situated in the sector Le Richebourg, 3) the monuments in La Sablonnière are orientated to the southwest, whereas the monuments in Le Richebourg are orientated to the northwest, even if these differing orientations could be due to the fan-like whole arrangement of the necropolis, and 4) there is evidence for more inhumations per monument in the southern sector of Le Richebourg, where three burials were inserted twice and four burials were inserted once. In contrast, only one or two burials are registered at the monuments in the northern sector of La Sablonnière.

In addition to the architectonic differences, distinctions regarding the grave equipments can also be ascertained. Generally, it can be stated that the more equipped graves are located in the northern sector of La Sablonnière (Duhamel *et al.* 1997, 402–427). Furthermore, the individuals from the Le Richebourg sector show more traces of nutritional deficiencies during periods of growth. Based on these obvious differences, the two sectors were separated within the model.

Sector A La Sablonnière:

In this model the earliest burial in sector A La Sablonnière is calculated from 5061–4858 cal BC (95.4%, 5029–4946 cal BC, 68.2) and the last from 4492–4337 cal BC (95.4%, 4455–4370 cal BC, 68.2%). The span of La Sablonnière is calculated to have lasted from 432–695 y (95.4%; 508–633 y, 68.2%) (Figure 3.5).

Furthermore, the hypothesis was tested for sector A whether the structures were successively built from north to south. For monument 4, solely grave 4.1 was taken into account. Grave 4.2 is excluded from the sequence, but calculated for the whole phase since it is a clear secondary burial. The north-south sequence works with a high model agreement of A_{model}=92.4, $A_{overall}$=94.3, if we also exclude Ly-7808 from the sequence

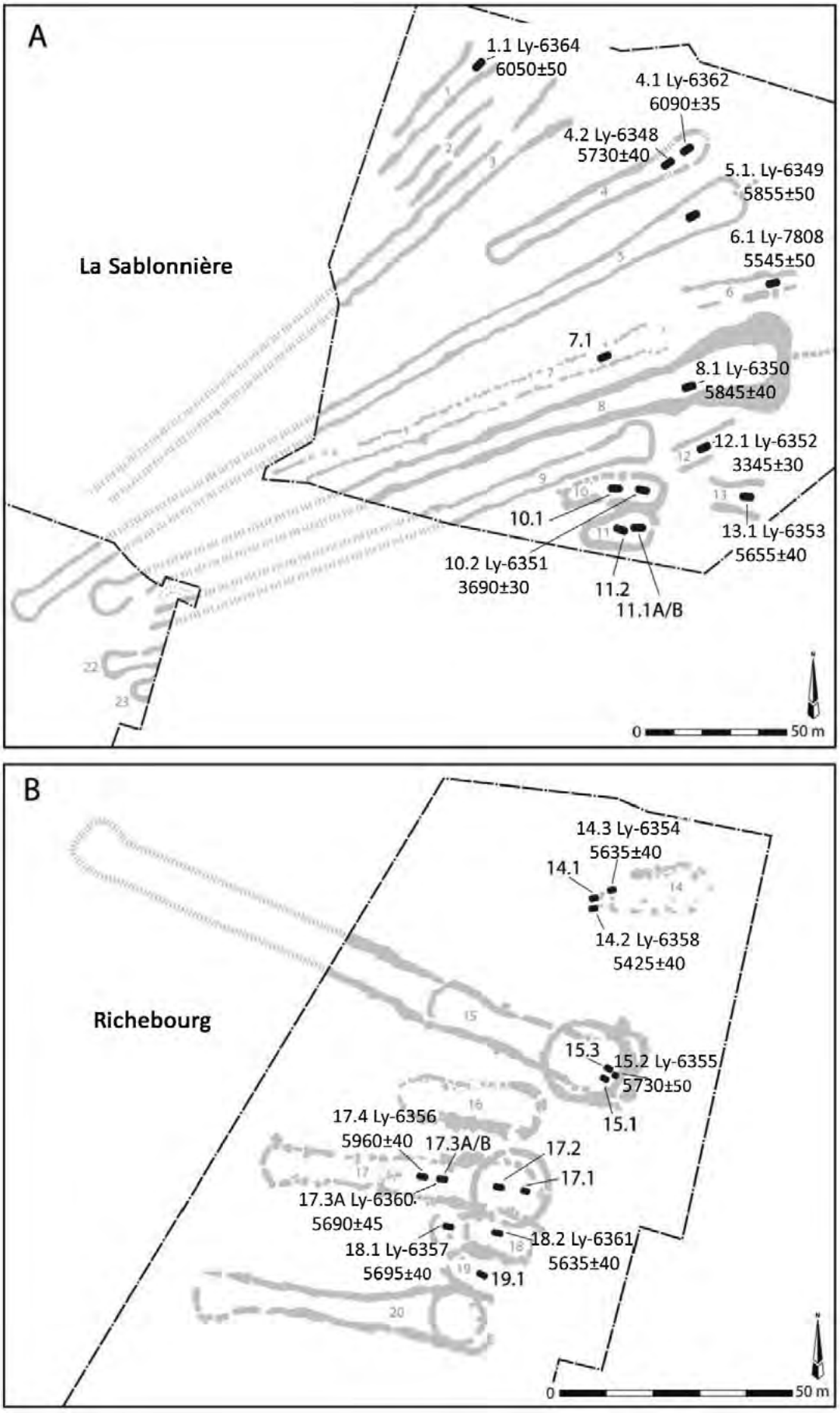


Figure 3.2 Necropolis Passy. The monuments of sector A and B with burials and radiocarbon determinations

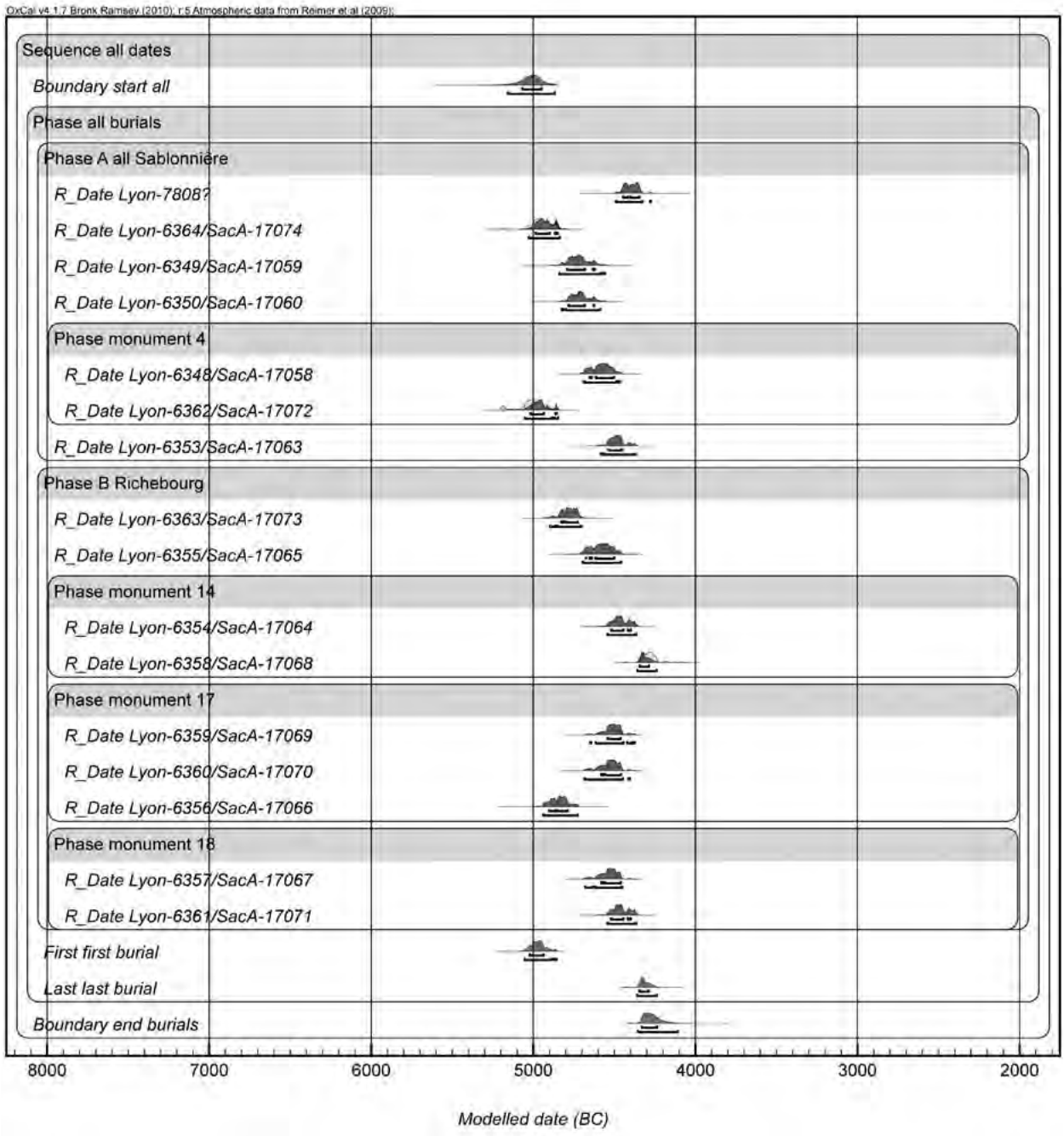


Figure 3.3 Probability distributions of dates from the necropolis Passy (cf table 3.1). Model 1 is established under the assumption, that all monuments of sector A and sector B belong to one necropolis and the same society. Model agreement: A_{model}=98, $A_{overall}$=97.1

but calculate it for the phase. This date is the only one from the whole series which was processed earlier than the others in 1997. Hence, the monuments in Sector A were either constructed in a complete horizontal, chronological order or monument 6 was built later than the other monuments in the sector.

Sector B Le Richebourg:

For the sector B Richebourg, the sequence starts ~150 y later. The first burial is estimated from 4907–4727 cal BC (95.4%; 4851–4746 cal BC, 68.2%) and the last ranges from 4356–4238 cal BC (95.4%; 4342–4283 cal BC, 68.2; 4356–4238 cal BC, 95.4%). The span and the duration of the sector are calculated from 397–628 y (95.4%; 450–565 y, 68.2%). Accordingly, burial activities in sector B started later, but both sectors are contemporaneous for burials frequented (Figure 3.6).

The second model has a high agreement (A_{model}=92.4, $A_{overall}$=94.3) and regarding the already discussed differences we prefer this second model. Thus, there are two possible scenarios. The two sectors either belong to one big necropolis with subsectors and differences

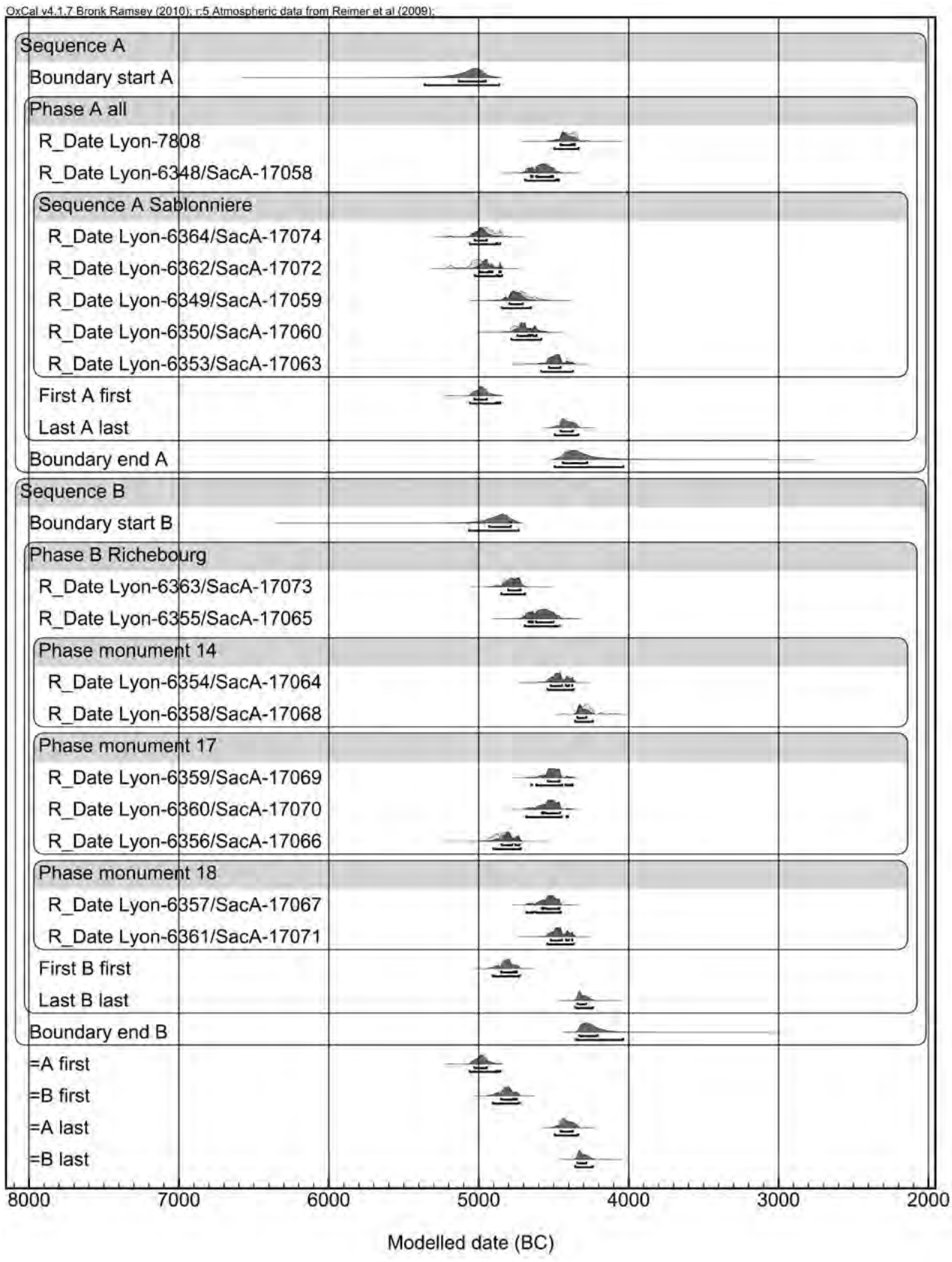


Figure 3.4 Probability distribution of dates from the necropolis Passy. Model 2 is established under the assumption, that the necropolis is divided into the two sectors A and B. Regarding the architecture, the burial rites, and the paleopathology there are indications that sector A and sector B are two different necropolises. Model agreement: A_{model}=92.4, $A_{overall}$=94.3

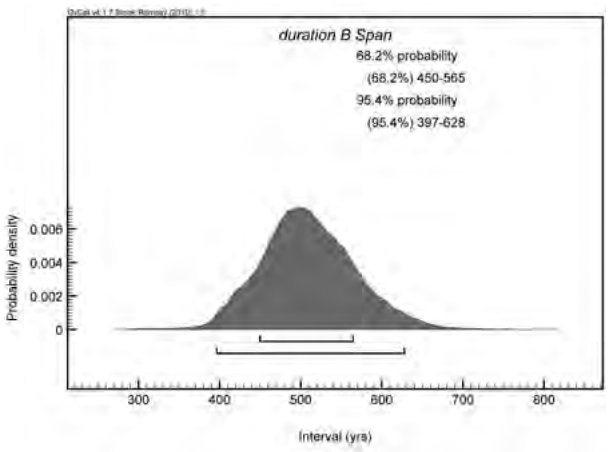


Figure 3.5 Span A, sector La Sablonnière

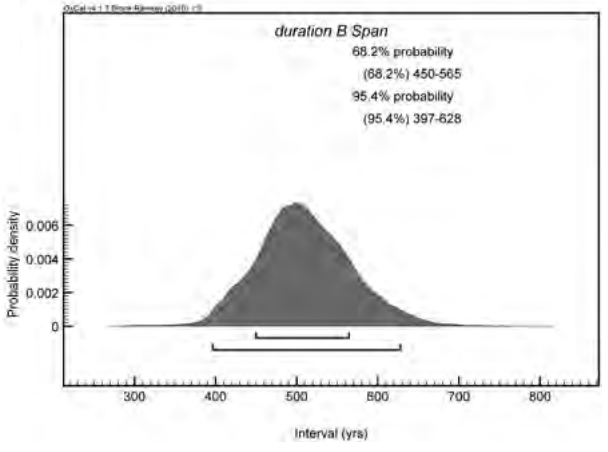


Figure 3.6 Span B, sector Le Richebourg

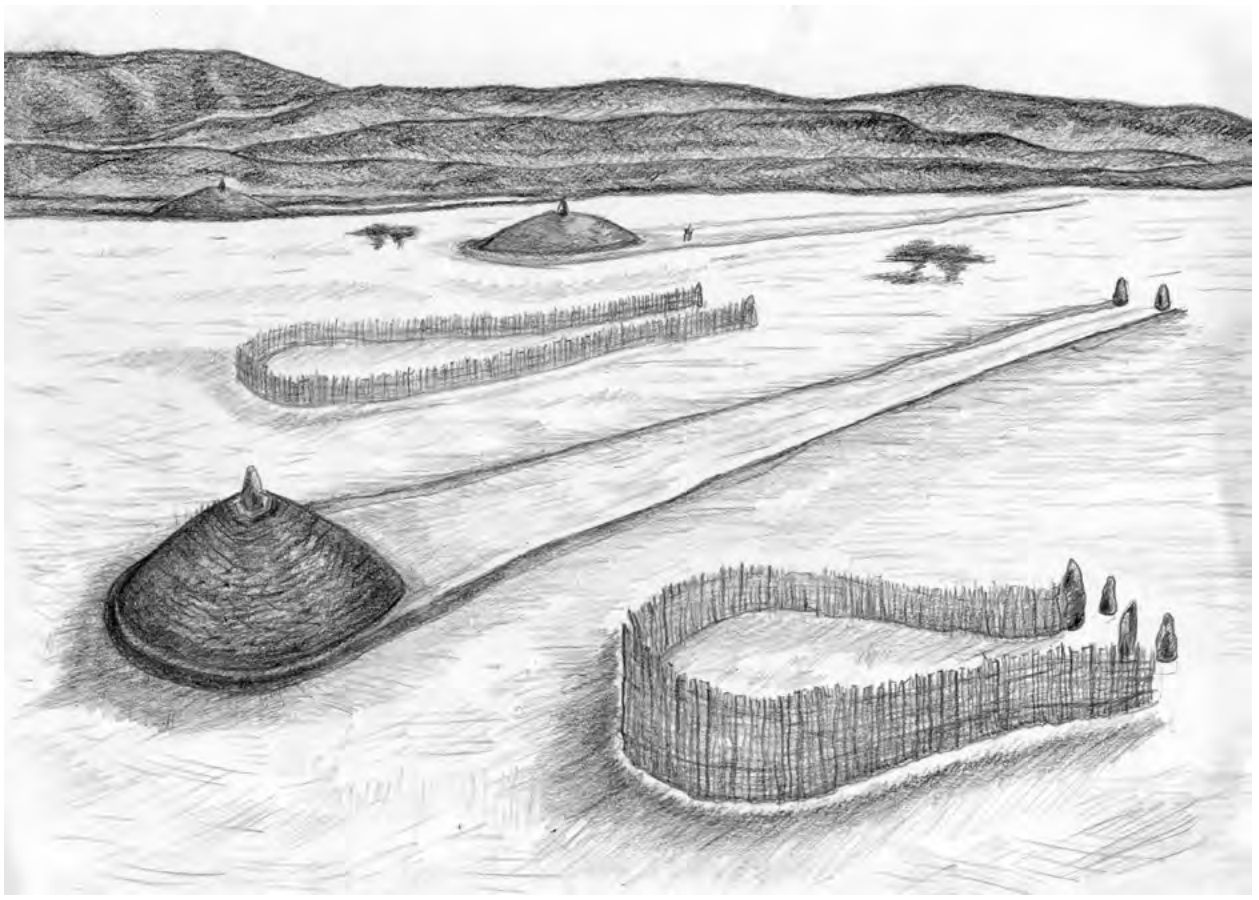


Figure 3.7 Reconstruction of the Passy graves. Drawing by the author after G. Tosello (Constantin et al. 1997)

within the society or the two sectors represent two necropolises which were autonomous and belong to two different societies which were culturally assimilated.

The calibrated probabilities of the radiocarbon determinations suggest not more than one burial every second or third generation. Even if we incorporate the possible individuals in the non-excavated area into the calculation, there would have been no more than one burial every generation.

This argument implies that these inhumations did not represent the burial sites for the whole society but for selected persons.

Who were these selected persons? The labor effort invested in the Passy monuments might allow us to assume that we have the burials of persons, who were members of a social, political, or religious elite. But relative to the labor effort invested in the construction of the graves, the grave goods seem rather poor and

not all of the burials even contained such goods. It is helpful to more closely consider the grave equipment of the two different sectors, from the northernmost to the southernmost monument.

In the northernmost part of sector A, a burial is only documented for monument 1: grave 1.2 contained the inhumation of an adult woman with no grave goods and the earliest radiocarbon determination. From the monuments 2, 3 and 24 the burials are not preserved or the monuments never contained inhumations. Monument 4 and grave 4.1 represent an exception with one of the most equipped graves. It is the gravesite of an adult male individual with ceramics, twelve arrowheads, a flint knife, two tranches, flint blades, a perforated deer antler, flint tools, a forked tool, two bone awls, a fragment of a stone bracelet, a mussel, a tooth pendant, anodonta shells, and a scallop shell (Bernardini *et al.* 1992; Chambon 2010, 3; Duhamel *et al.* 1997). This grave contained a richly decorated Groβgartach vessel with hanging rhombic incisions. Beside grave 4.1, there is the inhumation of an adult individual of undetermined sex and no inserted grave goods. Monument 5 contained the burial of a male adult individual with two ceramic vessels, 22 arrowheads, a flint blade, and an object that is called 'Eiffel tower' due to its form. These objects are fabricated from deer bone and a possible interpretation mentions that they were spear points for ceremonial purposes (Midgley 2005: 124; Sidéra 2000). Monument 6 also contained the burial of an adult male with an 'Eiffel tower'object, four arrowheads, and two flint blades. Monument 7 involved the grave of a juvenile individual or a child with two arrowheads. Monument 8 included the inhumation of a 1–9 month-old baby with an arrowhead and a ceramic vessel. Monument 9 contained a potentially destroyed burial on the outer end: a 30cm deep pit with no traces of bones or grave goods. In monument 10, a child and a baby 0,5–4 months-old were inserted, accompanied by four arrowheads and a flint blade. Monument 11 contained three burials: an adult man with an 'Eiffel tower' object, a juvenile individual or child, and a child <5 with no grave goods. Monument 12 contained the grave of an adult individual of undetermined sex and monument 13 enclosed a double burial of two small children together with one wild boar fang.

There are obviously fewer grave goods added in the graves of sector B Le Richebourg. Nine of the altogether 13 burials contained very few grave goods. In monument 14 the remains of two adult women and a small child were inserted. One of the women had a ceramic fragment in the burial pit; the child was buried with a perforated wild boar fang. In monument 15 two to three burials were found, one pit was empty. Furthermore, the cremated bones of a child from 9–15 years of age and the skeleton of a small child together with a bracelet of perforated mussels were discovered. Monument 16 contained an empty pit. Monument 17 contained four burials arranged in an axial line with six individuals: an adult woman together with a small child, an adult man and three more children, one of them cremated. The adult woman was buried with four arrowheads, a schist pendant, and few ceramics. One of the children was buried with a flint tool and a bracelet made out of chalk pearls and one child was buried with a flint blade. Monument 18 enclosed the burials of two children with no grave goods, whereas monument 19 contained the burial of an adult man together with a flint tool. Monument 20 contained no traces of a burial (Duhamel *et al.* 1997).

Accordingly, most of these graves are children burials with no grave goods. Only three or maybe altogether four of the graves from both sectors contained several grave goods.

To summarize this: on the average not more than one burial per generation was inserted into the monuments. The buried individuals did not represent the whole society, rather selected persons. 75% of these individuals display traces of dietary deficiencies and malnutrition. A remarkable part of the inhumations are the graves of children, among them there are 16 children with no or very few grave goods. Remarkable grave equipment is documented from just a few burials. Furthermore, another important fact should not be neglected: the majority of the monuments were extended over several phases (Duhamel *et al.* 1997). Their final appearance was a result of a long process. The original monuments were smaller.

After having emphasized all these arguments, we have to take another possibility and hypothesis into account than an interpretation of the Passy graves as the graves of persons who were members of social, religious, or political elites. In particular, the interpretation should be considered that Passy was not primarily conceived as a necropolis and the monuments not predominantly as graves, but meeting and communal places for the Passy societies. Thusly, the burials could have been intended to function as founding graves for the sites, for the protection of the places or as a fetish. The graves were either built in times of malnutrition or the buried individuals had not fully access to the resources of the Passy society.

Balloy, Le Réaudins

The second necropolis with radiocarbon determinations is Balloy, Le Réaudins (Mordant 1997) (Figure 3.8, 3.9). The whole complex covered an area of 6 hectares and consisted of 18 monuments with 45 burials, an enclosure, and some house structures. Most of the 18 east-west orientated monuments are clustered within

the two sectors C and B. From the northern sector C, 11 monuments are documented with 42 burials, one of these being a cremation. 33 of the graves were inserted within the monuments; nine graves are registered outside the ditches (Figure 3.8).

Four of the monuments from sector C were constructed directly on the remains of Late Rubanée Pottery (RRBP) houses (Mordant 1994; Chambon/Mordant 1996). The similarity between the ground plans of long houses and long tumuli or barrows was discussed by different authors and the erection of long tumuli on abandoned settlements and house structures, but also on ploughed fields, is a common feature in Europe (among others Bradley 1998: 36–50; Hodder 1984; Midgley 1985; 2005; Mischka 2014; Sherratt 1990).

In sector B, six monuments were built with a total of 3 inhumations. One of the individuals was buried on the outside of the monuments. In sector A, one monument is documented with no traces of a burial. Approximately 60m to the west of sector A, a 1,5ha large Middle Neolithic enclosure is located with two palisades and one interrupted ditch covering two house structures of the Villeneuve-Saint-Germain horizon.

From a total of 52 individuals, 24 could be determined as adults, 3 as juveniles and 13–14 as children, 11 of the individuals are male and 12 are female (Chambon 1997: Figure1). The Balloy monuments are similar to the Passy graves in that they were gender-related (Chambon 1997, 2010).

There are seven available radiocarbon results from human bone samples, which were all gained from the monuments in the northern sector C (monuments I, II, IV, VI) (Figure 3.9). These determinations cover a short time interval and the death of the first buried individuals is therefore calculated from 4489–4341 cal BC (95.4%; 4442–4356 cal BC, 68.2%), the last burial from 4343–4107 cal BC (95.4%; 4330–4228 cal BC, 68.2%). The span and the duration of this data is minimally 8 and maximally 338 y (95.4%; 40–204y, 68.2%).

There are few grave goods documented. In 12 of 27 axial graves, there is no evidence for any grave goods and in 10 graves there is one object like an arrowhead or an awl (Chambon 2010: 10). Furthermore, there are only a few shells, ceramics, and wild boar fangs registered. In grave 5 there is an Eiffel tower object accompanying an adult man.

Within the last two decades, several necropolises on the Plain of Caen in the Basse Normandy that have structures similar in architecture and concept to the monuments of the Passy type were discovered through aerial prospections. They are also elongated, stretched structures, but already show megalithic elements, including pits partly constructed with stone slabs (Chancerel/Desloges 1998; Desloges 1997; 2007: 129–131).

Approximately 30 monuments are registered, mostly with an alignment from east to west and partly isolated in pairs or clustered in necropolises like Rots, Mathieu, Fleury sur Orne, and Blainville sur Orne. These necropolises cover an average area of 10–20 hectares (Chancerel/Desloges 1998: 94).

In light of their architectonic features, it is possible to divide the monuments into two groups. First, a group of trapezoidal monuments which are at least 40m long and opened on both sides like Blainville sur Orne, Colombiers I, and Sarceaux. Secondly, a group of monuments such as those within the necropolises Rots and Fleury which are more elongated, between 85m and 350m in length, and show parallel ditches on the outer sides of the monuments as well as one of the outer ends formed as a half circle (Figure 3.10, 3.11).

The monuments cover a few burials, whereby the longest monument in Fleury measuring 350m enclosed one single burial (Chancerel/Desloges 1998: 96–97; Desloges 2007: 129). With the investigations on Rots and Fleury sur-Orne, it is possible to determine two kinds of burials: either simple pit burials or pit burials where the pit is constructed with stone slabs. The pits of the first group are spacious with measurements of up to 3m x 1m, the individuals were deposed in a crouched or dorsal position and buried similar to the Passy societies at the Yonne-Seine Valley with few grave goods such as bone awls, a lighter consisting of a flint blade and a ferrous bulb, wild boar fangs, and arrowheads. Furthermore, animal bones of sheep and goats are registered. In one of the graves in Fleury sur Orne, five complete sheep were even offered. The second grave type consists of pits constructed with limestone tiles building a subterranean chamber. The chambers must have first been covered by wooden beams and thereafter sheltered by tiles. The few human remains indicate that the graves contained single individuals. Remarkably, these more labor-intensive graves with the stone tile constructions contained fewer grave goods. The investigations of the two chambers in Rots brought solely a flint point and a 'percussion instrument' (nodule de percussion) to light (Desloges 2007: 131).

These two grave types might represent chronological differences, but without radiocarbon results and with only few grave goods no fine chronological considerations are possible. These monuments are also assigned to the Cerny horizon in the first half of the Middle Neolithic between ~4700 - 4200 cal BC according to the few grave goods (Lespez 2007: 36), but rather in a later phase of this time horizon.

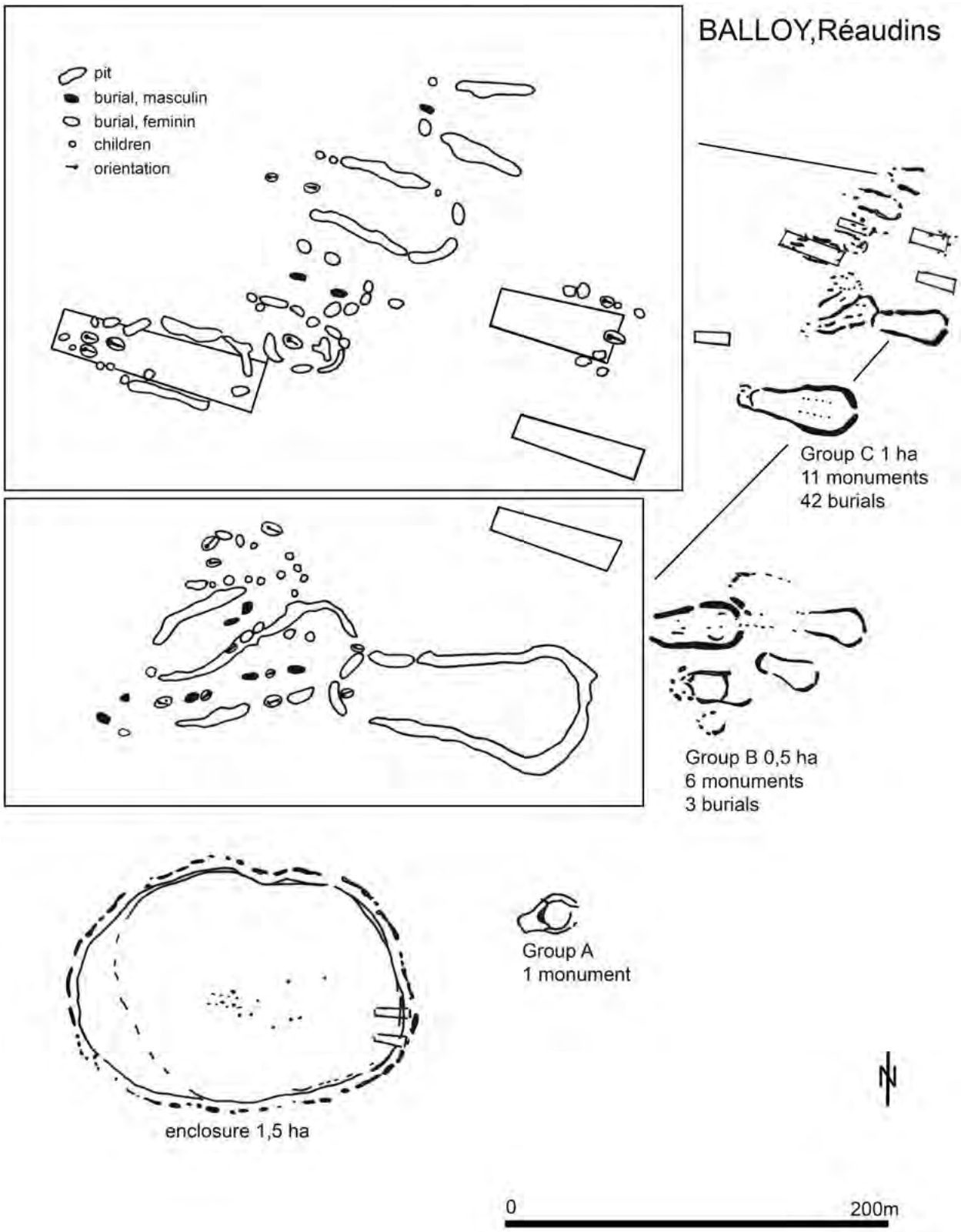


Figure 3.8 Planum necropolis Balloy, Le Réaudins with the available radiocarbon dates (planum after Mordant 1997, 450)

The isolated monument of Sarceaux in the vicinity of Argentan in the Basse Normandy offered radiocarbon results and potentially belongs to this group of monuments (Chancerel 1992; Chancerel/Desloges 1998: 98–104). It is a 64m long and 27m–31m wide tumulus, approximately triangular with a northeast-southwest orientation and completely built in earth with a ditch around the monument averaging 2,20m in width. But in the old excavation reports from 1811, possible passage graves are described that were constructed with stone

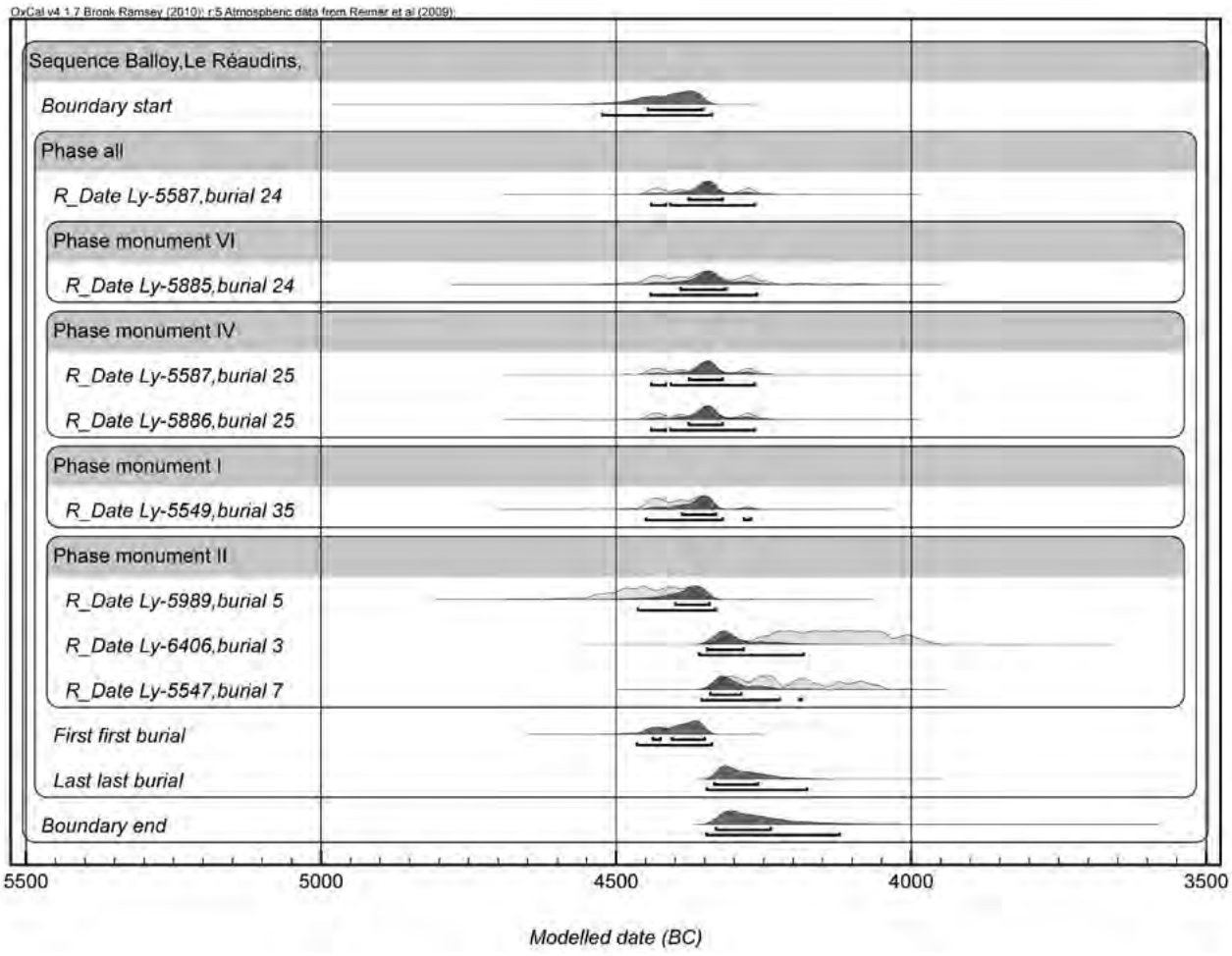


Figure 3.9 Probability of dates from Balloy, Le Réaudins. Model agreement: A_{model}=10, $A_{overall}$=105.9

slabs and dry wall elements including three skeletons and seven (lost) axes fabricated from 'beau jade vert'. A subsequent excavation unearthed a 1,40m long pit burial in the eastern central part of the tumulus. There are four radiocarbon results available.[2] One result from ~6520 BC (7670±70 BP, 6589–6459 BC, 68.2%; 6642–6427 BC, 95.4%) originated from the ancient layer under the tumulus. Two results represent later activities on the site (1445±70 BP; 3880±90 BP). One radiocarbon result stems from a sample of a bovide bone and is measured to ~3750 cal BC (3928–3643 cal BC, 68.2%; 3968–3527 cal BC, 95.4%) and is thus possibly connected to the use of the grave. The construction of this monument is unclear.

Other contemporaneous, non-monumental subterranean burials with megalithic elements are burials under slabs (sépultures sous dalles) such as Marseules in Malesherbes, Loiret, and d´Orville. These graves are attributed to the early Middle Neolithic and to the Cerny horizon in its regional Videlles variation. Other similar graves with pits covered by a stone slab and individuals in crouched and stretched positions are known from Essone and in the Loiret (Tarrête 1999; Verjux *et al.* 1998: 59–70).

Additionally, contemporaneous simple pit burials are also documented from Monéteau and Bonnard (Chambon 2007). The site Macherin in Monéteau in Yonne (Augereau/Chambon 2006; Chambon 2007: 81–85) is a Middle Neolithic necropolis with pit burials in a rectangular shape, measuring between 1,80m–2m x 1,20m. Accordingly, it is possible that the individuals were buried in wooden cists in an extremely crouched position. This necropolis is designed similar to the necropolises of the Chamblandes type from Western Switzerland (Chambon 2007: 81–83).

In the Middle Neolithic, pit graves with side niches are also common from the Rubanée/Linear Pottery horizon. This grave type is mainly registered from the Picardie and the Champagne, but also from the Calvados, for example in Colombelles (Billard 2007a: 77) and in the Southwestern Paris Basin in Yonne. This special grave type is documented within the Middle Neolithic necropolis Noisats á Gurgy: a site with over 100 pit burials (Rottier 2007: 99) and in Sublaines Le

[2] The laboratory codes are not published, Chancerel/Desloges 1998, 98–105.

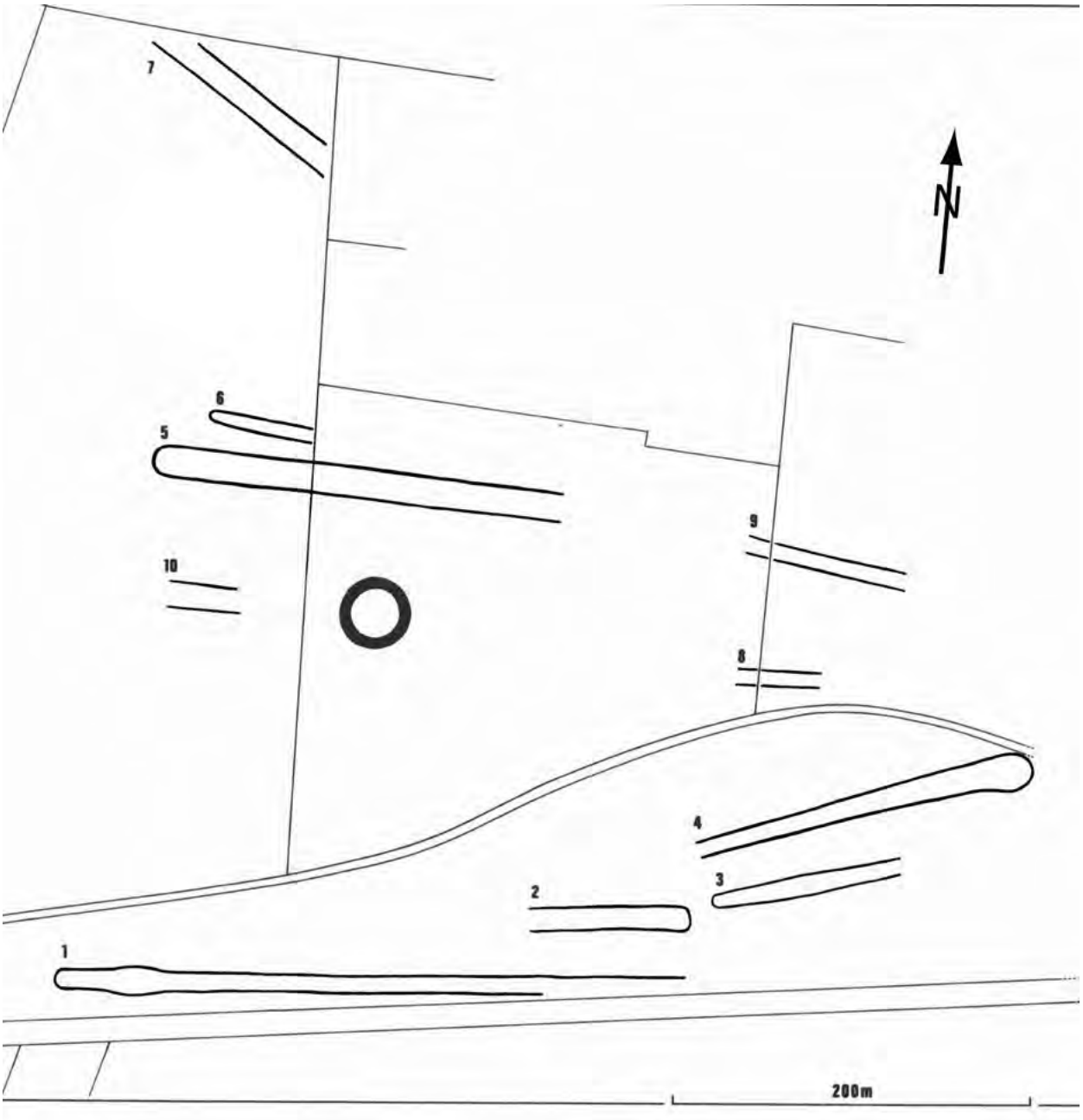


Figure 3.10 Necropolis Fleury-sur-Orne (Desloges 1994: 532)

grand Ormeau, where one third of the graves could be attributed to this grave type (Texier 2007). The individuals in these graves were interred in the side niches, whereas the central pit functioned as an access area and a zone to depose grave goods. This more elaborated grave type could be considered as a transition type to the first vaults (Billard 2007a: 77).

Pre-megalithic structures in Brittany and on the Channel islands

In Brittany, the shell middens Beg-an-Dorchenn, Beg-er-Vil, Téviec, and Hoëdic are dated to the Mesolithic (Dupont *et al.* 2009) with burial sites in Téviec and Hoëdic (Dupont *et al.* 2009, 96; Péquart *et al.* 1937; Péquart/Péquart 1929, 1934, 1954; Schulting 2001) (Figure 3.12, 3.13). These graves are interpreted as a first monumental stage in Brittany (Cassen 2011, 4) and discussed by different authors as possible pre-megalithic sites (e.g. Case 1976; Scarre 1992; Scarre *et al.* 2003, 76), since a part of the graves in the necropolis of Teviéc and in the region are covered by low mounds and graves J and K in Hoëdic have small standing stones in front of the graves.

Téviec and Hoëdic are located today on small islands on the coast of the Morbihan. Formerly, Téviec was part of the Quiberon peninsula, but the sea level and the coast line have changed considerably since the Mesolithic (cf. Dupont *et al.* 2006; 2009, Figure 2).

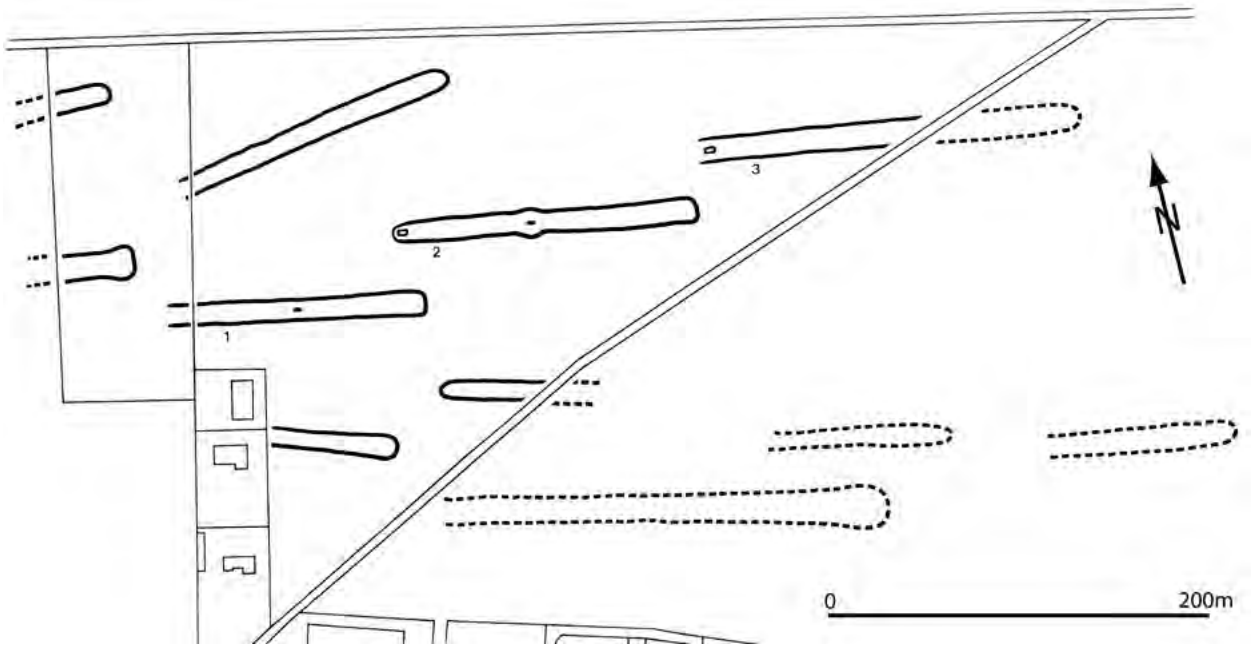


Figure 3.11 Rots (Desloges 1994: 518)



Figure 3.12 Reconstruction of a double burial in Téviec, Museum Toulouse. Photo courtesy of Didier Descouens - CC-by-sa / Wikimedia Commons

From Téviec 10 graves are documented with an MNI[3] of 23 and with a structure which is interpreted as a cenotaph. The nine graves from Hoëdic contained an MNI of 14 and an empty grave which is interpreted as the grave of a child due to its limited size. From both graveyards, single, double, and multiple successive

[3] Minimal number of individuals. The common abbreviation MNI is used throughout the whole volume.

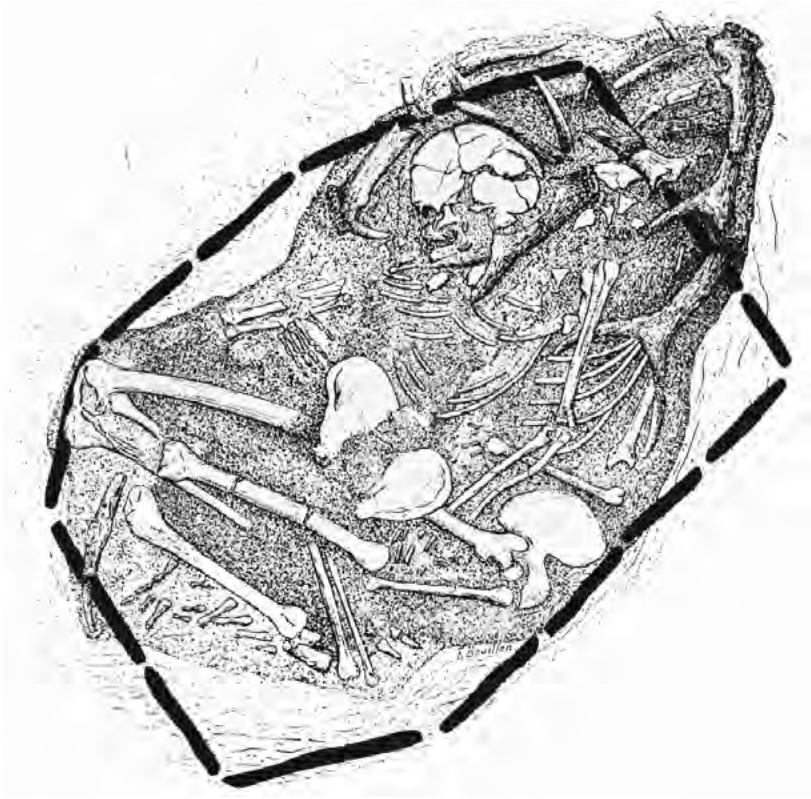


Figure 3.13 Planum of the double burial A in cist, Téviec (Midgley 2005: 59; Péquart et al. 1937)

burials in small stone cists are recorded (Péquart *et al.* 1937; Péquart/Péquart 1929; 1934; 1954; Schulting 2001).

Radiocarbon determinations as well as stable isotope results are available for 14 individuals, including eight from Teviéc and 6 from Hoëdic (Schulting 2001, Tab. 2, cf.Tab. 3.2). The radiocarbon results of the different individuals from Téviec hint to a time interval uncorrected from 5736–4372 cal BC (95.4%; 5711–4455 cal BC, 68.4%). They have $\delta^{13}C$ values from -17.0‰ to -14.1‰ and $\delta^{15}N$ values from 6.2‰ to 15.2‰. The radiocarbon determinations from Hoëdic lie within a time interval of 6211–3714 cal BC (95.4%; 6083–3801 cal BC, 68.4%) with $\delta^{13}C$ values from -14.2‰ to -12.9‰ and $\delta^{15}N$ values from 12.3‰ to 14.3‰.

The results from both sites show a heavy marine based diet customary for populations with a Mesolithic lifestyle on the coast.[4] This value suggests that the bones were influenced by a marine reservoir effect and the measured results are too old. A correction of the radiocarbon results is problematic, since the proposed methods, e.g. a Mas Balance calculation, proceed from a generally estimated reservoir age of 400 ^{14}C yr for the consumed marine organisms, assuming that they moved in the upper mixed layer of the open ocean (Hughen *et al.* 2004; Stuiver/Brazanius 1993). On the contrary, in shallow water where shellfish is harvested, the reservoir age can vary and be lower or higher due to the alternating atmospheric CO_2 exchange, the upwelling of deep ocean water, and the inflow of hard freshwater (Heier-Nielsen *et al.* 1995). From both sites, shell middens, the remains of shellfish, fish, and a few remains of sea mammals like seal teeth and whale bones are recorded (Dupont *et al.* 2009; Schulting 2001: 317).

A method to correct this reservoir effect would entail the radiocarbon dating of the terrestrial material and the animal bones such as deer antlers found in the graves (cf. Olsen *et al.* 2010). This correction would position theses burials shortly before and a part of the burials even contemporaneous to the first megalithic structures in Brittany.

Only two of the individuals, both are young adults from Téviec, have stable isotope values which are pinpointed to a border area and are more reliable: burial B(2) has $\delta^{13}C$ values from -17.0‰ and a radiocarbon result from ~4520 cal BC (OxA-6662, 5680±50 BP; 4545–4461 cal BC, 68.2%; 4668–4375 cal BC, 95.3%). Burial H1 (14) has a $\delta^{13}C$ value of -16‰, a $\delta^{15}N$ value of 6.8‰, and a radiocarbon result from ~4880 BC (OxA-6701; 6000±60 BP; 4962–4801 cal BC, 68.2%; 5041–4728 cal BC, 95.4%) (Schulting 2001, Figure 2).

The grave goods consist of marine shell beads, red deer antlers, bone pins, and flint objects (Schulting 1996; Schulting 2001: 316–318). The lithic assemblage dates to the Later Mesolithic (Marchand 1999; Péquart *et al.* 1937; Péquart/Péquart 1954; Rozoy 1978).

One further interesting observation has been made that noticeable differences regarding the grave goods and the respective graves exist, with the most significant equipment appearing at the graves in Hoëdic that have standing stones (Cassen 2011: 5).

On the Channel Islands there is evidence for Mesolithic activities, such as microliths from a layer under the early megalithic grave of Les Fouaillages (Kinnes 1982; Kinnes/Grant 1983: 11, 25), but to date there are no known pre-megalithic burials.

[4] Cf. the values from pitted ware groups on Öland (Eriksson 2000).

Pre-megalithic structures in the Central West France

From Central West France, an Early Neolithic pit burial is documented from Germignac in Charente. The inhumations of an adult women and an 8–9 year-old child were accompanied by more than 3000 discoid mussel pearls and two disc rings. The measurement of a human bone offered a result of ~5030 cal BC (6090±70 BP, 5205–4856 cal BC, 68.1%; 5216–4836 cal BC, 95.4%)[5] (Joussaume 1999: 60; Laporte 2005: 112).

A group with stone cists of the Chambon horizon (for the chronology of the cultural horizons, cf. appendix 1) is centered in the Haut Poitou and the Middle Loire (Joussaume 1999: 60). These graves are subterranean structures similar to the graves of the Chamblandes type from Switzerland (Soler 2007: 115). The burial site Goumoisière in the department of la Vienne consists of five east-west-oriented small stone cists (Chambon 2003: 105–108; Joussaume 1999, 60; Patte 1971; Soler 2007) (Figure 3.14). From those graves with skeletons in anatomical order,[6] it is possible to derive that the individuals were buried in a crouched position on their left side with their heads to the left and their faces oriented to the south. The cists 2 and 3 are double or individual graves, cists 1 and 5 are ossuaries and or collective graves, and cist 4 was destroyed to such an extent that any closer determination was hindered (Soler 2007: 120). From this burying place, altogether 20 radiocarbon dates were obtained from available human bone samples (Figure 3.15). In cist 2, two children were buried together with a flint tool, a ceramic vessel with two lugs, and a plastic moustache decoration (en moustache). There is one available radiocarbon date measurement from these children pinpointed at ~4600 cal BC (OxA-9337, 5770±70 BP; 4686–4556 cal BC, 68.2%; 4726–4493 cal BC, 95.4%). Cist 3 was the grave of a juvenile woman with a handled cup and a relief decoration. From the destroyed cist no. 4, a bone sample was available giving a radiocarbon result from ~4400 cal BC (Beta-217480; 5560±40 BP; 4447–4357 cal BC, 68.2%; 4462–4338 cal BC, 95.4%).

Cist no. 1 with the remains of at least 8 individuals has been interpreted as a possible ossuary (Soler 2007, 117). The bones were completely disarticulated with neither an indication for a primary burial, nor evidence of a successive burial practice. The bone material is reduced, but probably unintentionally, since the largest reduced bone category is made up of small hand and foot bones. This is a particular attribute of ossuaries, where the dead are first buried and decay before they are subsequently placed at the final deposition site (cf. Soler 2007: 118 and Figure 3). There are six radiocarbon results from different humeri available for a time interval from 4510–4131 BC (95.4%; 4423–4234 BC, 68.2%). Both the primary burial place of these individuals as well as the construction date of the cist are unknown.

Cist 5 is the only structure with the remains of a probable tumulus. From the center of the grave, the articulated skeletons of an adult individual and a child are documented. Around these two individuals, the dislocated remains of six other individuals are grouped (Soler 2007: 121–123). The grave is either a collective grave with successive inhumations, whereby the two associated individuals represent the final burials and older burials were arranged beside them, or the grave is a combination of an ossuary with two regular burials. It is not clear, if the disarticulated bones and the adult with the child in the center were deposed contemporaneously or time-delayed. Grave goods include a ceramic vessel with an oval orifice and small handles, a flint arrowhead, and two goat teeth. There are twelve radiocarbon dates available, eight of them are processed from the left femora to gain results from the different individuals. The dates hint at a time interval from 4860–4413 cal BC (95.4%; 4810–4206 cal BC, 68.2%), and the span of this data ranges from 476–723 y, 68.2% and from 367–918 y, 95.4%. The death of the earliest disarticulated individual is thus calculated to ~4800 cal BC (GifA-97293, 5940±50 BP; 4869–4727cal BC, 68.2%; 4988–4626 cal BC, 95.4%) and the death of the associated individual to ~4200 cal BC (Beta-217482; 5350±40 BP; 4313–4071 cal BC, 68.2%; 4324–4051 cal BC, 95.4%). Thus, it represents the youngest age determination within the grave. This fact supports both assumptions: the collective grave theory with successive burial practices and the grave as a primary burial place, as well as the ossuary theory with the combination of two regular funerals and the grave as a partial secondary burial place.

Having emphasized this distinction, radiocarbon determinations as evidence for the construction of the graves are not available for cists no. 1 and no. 5. They represent solely the age of the individual's deaths. The construction of the graves and the custom to rebury the ancestors at a new place can be much younger. So at least a part of the bone results represent termini post quos values regarding the construction of the cists and the burial rites. Graves most similar to the Goumoisière graves are those from Sublaines (Chambon 2007, 119; Soler 2007: 123).

Further graves which are equipped with Chambon material include pit burials such as those at Le Basseau in Fléac, les Varennes in Néon-sur-Creuse, and Sablons in Sonzay. Les Chevrettes in Chambon has pit burials and a cist consisting of small stones.

Early monumental non-megalithic grave structures are registered from Central West France with the necropolis

[5] There is no laboratory code denoted.
[6] Cists 2, 3, and 5.

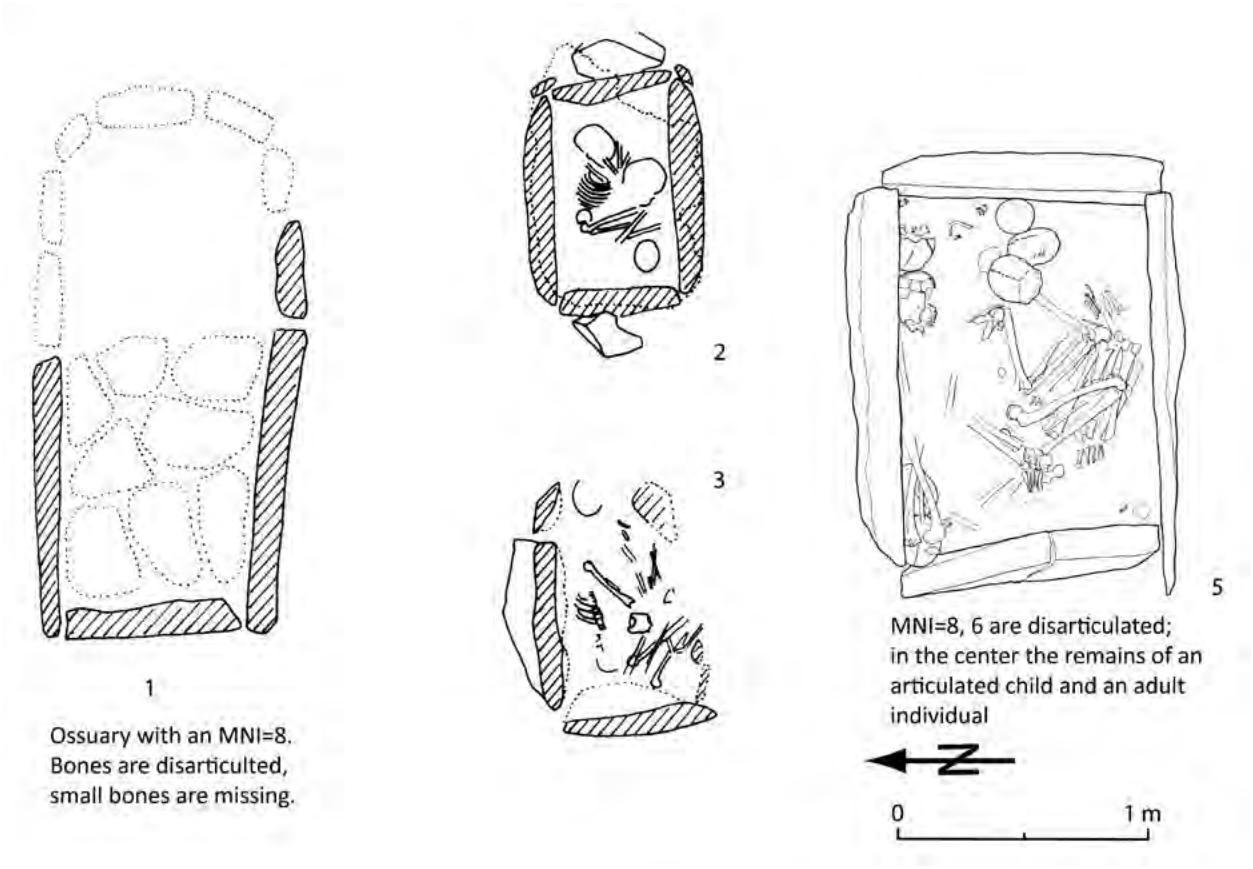


Figure 3.14 Goumoisière, cists 1, 2, 3, and 5 (after Soler 2007: 117)

La Jardelle in Dissay. Monuments there are similar to the graves of the Passy type in the Paris Basin. From the center of the monuments, stone or formerly wooden cists are recorded which were originally covered by a low mound. These mounds were surrounded by a round ditch with palisades and partially by elongated ditches with palisades which are open at both sides (Joussaume 1999: 61). One of the pits contained the remains of two small children which were buried contemporaneously in a crouched position. The children were buried within the time interval from 4418–4177 cal BC. Another radiocarbon result from one of the elongated ditches is determined to lie between 4496 and 4367 cal BC.[7]

Transitional structures and the emergence of megaliths in Northwest France

The vivid debate of the last decades on the emergence and the chronological relationship of Neolithic monuments in North and Northwest France (among others Boujot/Cassen 1992; 1998; Cassen 1993; Cassen *et al.* 2000; Cassen 2009; Giot *et al.* 1994; Joussaume 1999; Laporte 2005; 2010; Scarre 1992; Scarre *et al.* 1993; 2002; 2003) was much dominated by the question - here shortly simplified and summarized - whether the first megaliths in Northwest France are represented by fully developed passage graves and sophisticated structures, e.g. Barnenez in Finistère or Bougon in the Central West, or if round and elongated tumuli with small non-accessible chambers are the first megalithic structures in this region.

The debated early chronological setting of passage graves in Northwest France since the 1960s was much based on radiocarbon determinations which represent de facto termini post quos values regarding the construction of the graves. Many of these monuments are composed of multi-phased structures, which were renewed and extended over centuries, and due to building activities organic material was frequently mixed up. Particularly in Brittany, the sequence settlement/non-megalithic or megalithic long tumulus/passage grave in several phases is common and documented for several sites (cf. Figure 3.72). The fact that there is no bone material preserved nearby in the acidic soil of the region complicates a determination of the moment of construction even more. In contrast, the burial rites and radiocarbon results gained from the bone material of possible ossuaries in Central West France are problematic for a chronological classification of the monuments. This highly complex topic is discussed further in chapter 3, p. 71-81, 85-87.

[7] A calibrated age is published without a declaration of the sigma range, Joussaume 1999, 61.

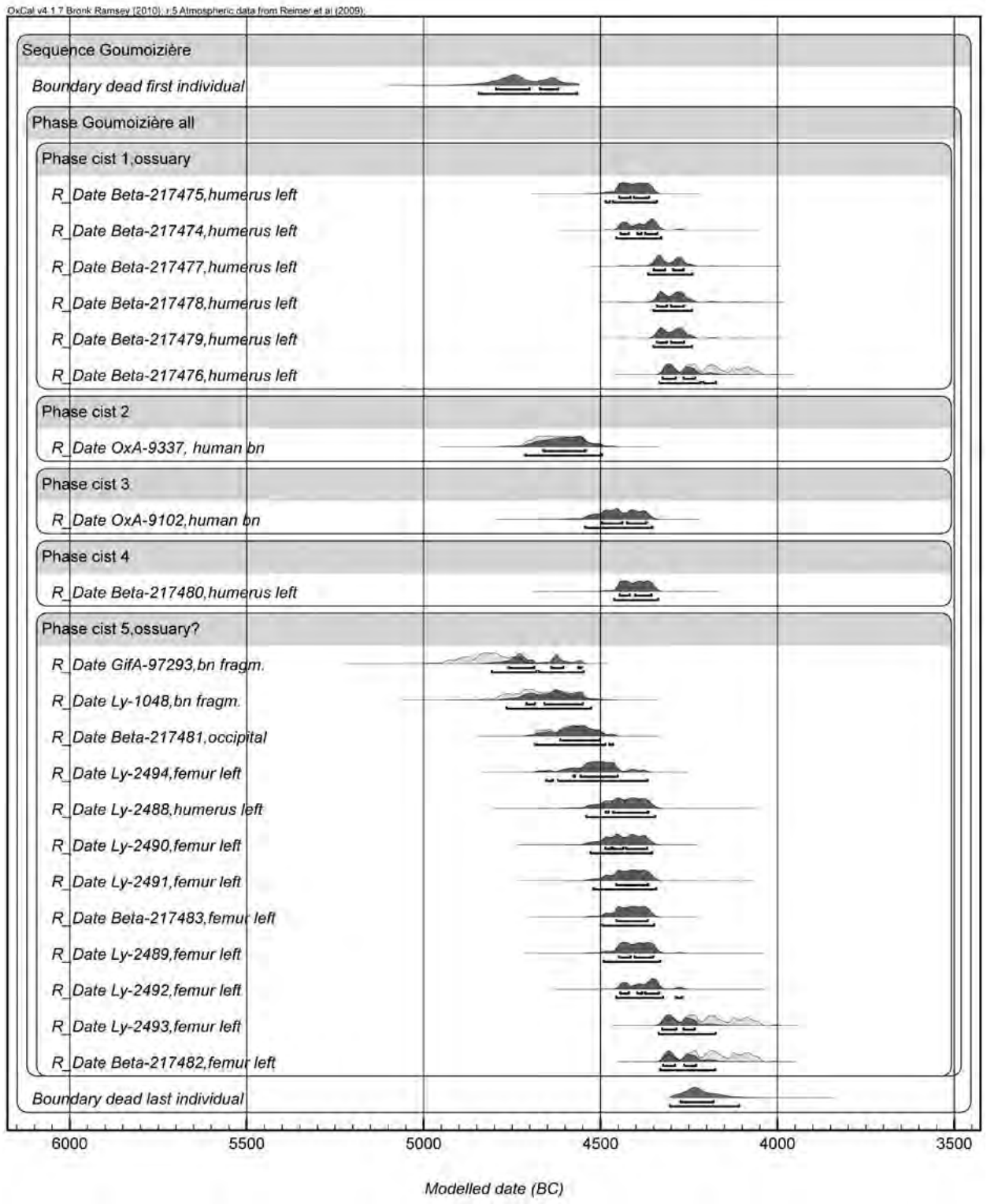


Figure 3.15 Probability of dates from all available radiocarbon results in the cist burial site Goumoisière. Model agreement: A_{model}=85, $A_{overall}$=82.7

The emergence of megaliths in the Paris Basin/Northern France

In the Paris Basin/Northern France, only few structures represent transitional stages of the megaliths. Due to a lack of building material, megaliths in this region did not develop like those in the area of the Armorican massif and dry wall constructions are more common (cf. chapter 3, p. 87-93). To be mentioned here is the tumulus of Motte des Justices close to Thouars in Deux Sèvres, even if this grave is situated on a border zone of the Paris Basin and the Armorican massif. It is a

colossal 184m long and between 25m and 17,5m wide earthen monument with a chamber which is covered by a megalithic capstone at the northwestern part of the tumulus (Germond *et al.* 1994; Tarrête 1999: 79). The tumulus is constructed with inner dry wall compartments or even in a honeycomb-technique like similar tumuli in Central West France (cf. Joussaume 2006; Laporte *et al.* 2002). There is one radiocarbon result available from a deer antler sample rendering a construction date of ~ 4160 cal BC (Gif-8292, 5340±100 BP, 4316–4051 cal BC, 68.2%; 4353–3969 cal BC, 95.4%) (Germond *et al.* 1994: 405). This date is substantiated by Middle Neolithic II material consisting of arrowheads, flint tools, an axe, deer antlers, and few ceramic pieces from the regional Chasséen Cous horizon (Germond *et al.* 1994, Figure 16).

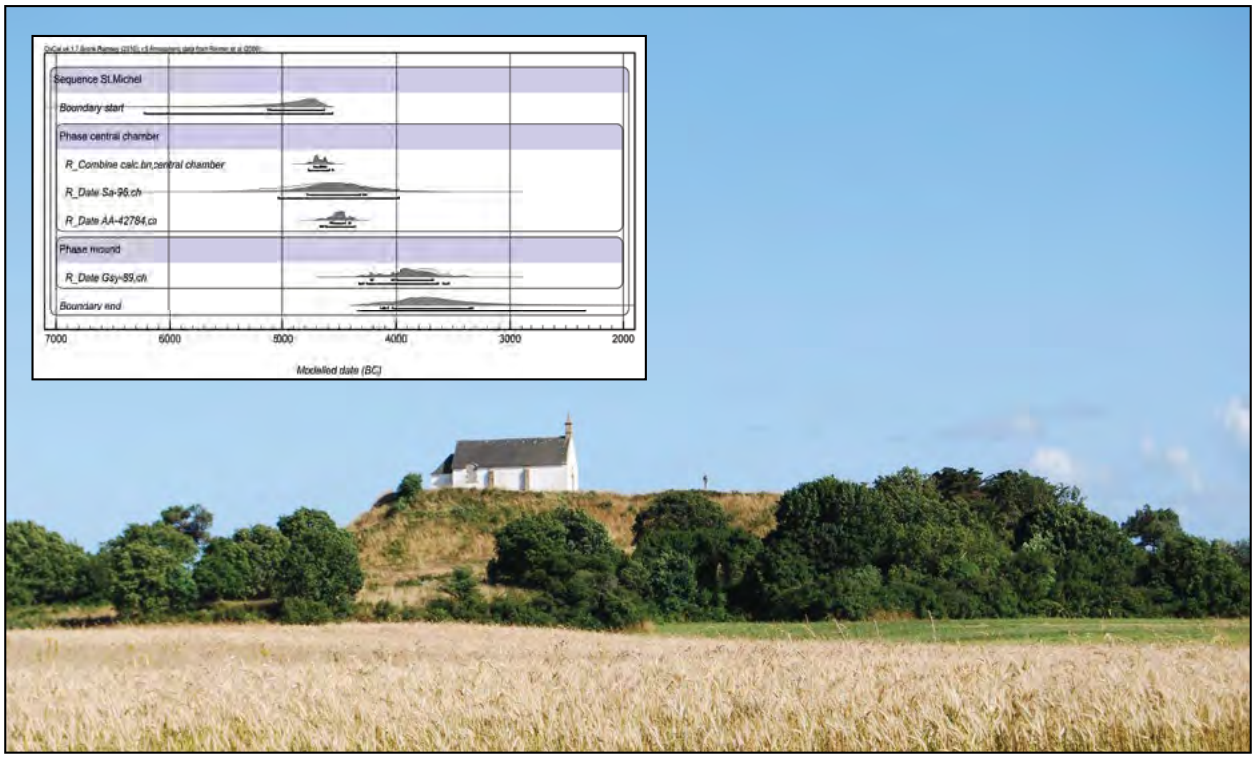
The emergence of megaliths in Brittany and the Channel Islands

Boujot and Cassen proposed a reasonable sequence for the Neolithic mortuary monuments of Brittany based on the architecture, the archaeological material, and a critical consideration of the available radiocarbon determinations. This sequence involved the development of the interior as well as the development of the outer structures of the monuments (Boujot 1996; Cassen/Boujot 1992; 1998; Cassen 1993; Cassen *et al.* 2000; Cassen 2009). Thus, they positioned the so-called tertre, round or long tumuli, as an anterior phase of the passage graves. Starting from their outer appearance, it is possible to divide these monuments into three classes (Boujot/Cassen 2000: 35) The classical tertre (literally translated small hill or lift), or sometimes called tertre tumulaires or tertre Armoricaine, are round or elongated tumuli built from earth with only a slight elevation covering one or several graves also constructed from earth; 2) long or round tumuli constructed with a mixture of earth and mostly stone covering one or several graves and the tumuli. They are also referred to as tertre in the literature; and 3) the Tumuli Carnacéen, which represent a special regional, and in their later stages colossal form of the tertre in the Morbihan. The tumuli cover a few graves.

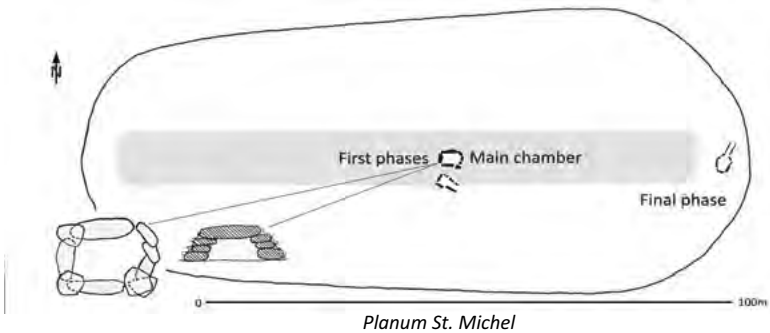
For the early phases of the tumulus Carnacéen St. Michel in Carnac, the earliest radiocarbon results are available from a tertre for a transitional stage to the megaliths. Within the tertre and the tumuli Carnacéens, the first phases of megaliths in Brittany are considered to take on the form of non-accessible ancient dolmen covered by round or long tumuli.

Seven of the tumuli Carnacéens, Er Grah, Kerlud, Mané-Lud, Mané er Hroek, Le Moustoir, Tumiac, and the St. Michel are known (Schulting *et al.* 2009: 769). They are all located within a radius of 20km around Carnac in the region of the Morbhian. There is evidence that their impressive, current monumental outer appearance is the result of several building phases similar to building phases of the Passy graves in the Paris Basin. The main inner structures of the first stages consist of non-megalithic grave chambers aboveground in dry wall technique, subterranean or semi-subterranean cists and pits. The main structures were covered with a round or long tumuli like in Mane-Lud, Le Moustoir, and St. Michel (Cassen/Boujot 1992, Figure 3; Schulting *et al.* 2009: 769). In later phases, megalithic chambers or passage graves were built and covered by the final massive and primarily east-west-oriented mound, for example at St. Michel or Mane Lud. From the early phases of the tumulus Carnacéen St. Michel in Carnac, the earliest radiocarbon results stem from such a structure and are available for a transitional stage to the megaliths. Ancient Castellic material is particularly documented from the first phases of the tumuli Carnacéens, and grave goods with exotic raw materials, such as extreme green variscite and green jadeite, were selected and elaborated (Cassen *et al.* 2000; 2011; Schulting 2009: 769).

The St. Michel monument is with its approximately 125m x 60m size and its 10m height, the most massive and imposing of these monuments (Figure 3.16) The reconstruction of the building sequence, based on excavation reports of the 1860s and the 1920s (Galles 1862; Le Rouzic 1932; Schulting *et al.* 2009: 10), documents a small, non-accessible main chamber aboveground, which is completely built in dry wall technique in the center of the eastern mound. To the south of the main chamber another small, but accessible chamber is located. Either the main chamber or both chambers were first covered by a circular stone cairn and then by an elongated tumulus, before the whole structure was incorporated within the massive earth and stone mound which is visible today. In the eastern end of the final mound, a small northeast-oriented passage grave is located, which also belongs to this end phase. Hearths and smaller stone structures witness activities which took place on the site before the construction of the first elongated tumulus and the final mound. Furthermore, from Le Rouzic's excavations, a series of 21 smaller stone cists around the two central chambers is recorded (Le Rouzic 1932). From the chambers and the cists, small fragments of calcined bones are documented. The bones from the cists are determined as remains of ruminants (Boujot/Cassen 1998: 113; Schulting *et al.* 2009: 770).The dating of the building sequence is instable with only five radiocarbon results. More data should urgently be produced. Four of the samples for radiocarbon determinations were gained from the central main chamber, one from the final mound. Two of the results from the main chamber were processed from the same cremated bone (GrA-20197, 5780±45 BP; UB-6869, 5845±38 BP) (Schulting *et al.* 2009: 773). Combined, they hint at a time interval of 4777–4585



The tumulus Carnacéen St. Michel from the North and the probability of available radiocarbon results



Planum St. Michel



The St. Michel from the Southwest.



Green stone artifacts from the St. Michel

Figure 3.16 The tumulus Carnacéen St. Michel in Carnac with probability of radiocarbon dates. Planum according to Le Rouzic 1932 and Boujot/Cassen 1992. Photo of green stone artifacts with the kind permission of Serge Cassen, University Nantes (Cassen 2011, Figure 4). Model agreement: Amodel: 95.4, Aoverall: 96.7

cal BC (95.4; 4722–4616 cal BC, 68.2%). The other two results from the chamber are acquired from charcoal samples. One result is defined within the time interval 4667–4363 cal BC (AA-42784; 5665±54 BP, 95.4%; 4580–4403 cal BC, 68.2%, Pétrequin *et al.* 2003). Due to its high standard deviation the other result (SA-96; 5720±300 BP, Delibrias *et al.* 1964) is merely provisionally applicable. The possible construction and the burials in the main chamber thus date to ~4680 cal BC. Since the main chamber is not accessible and the burial is a singular act, one should not expect a younger determination of the charcoal than for the bone samples from the main chamber, but there is a hiatus of ~200 y. Therefore, this charcoal presumably intruded into the chamber either during the building of the first tumulus or the bone sample is contaminated.

The last result obtained from a sample of the mound filling from the time interval 4339–3631 cal BC (95.4%; 4235–3715 cal BC, 68.3%, GSY-89; 4980±150 BP) (Coursaget *et al.* 1966) is an indication for the later construction of the final mound and the passage grave in the outer periphery at ~4000 cal BC.

From the whole monument, 12 jadeite axes, 36 fibrolite axes, and 111 variscite beads and pendants are recorded (Herbaut 2000; Schulting 2009: 769). The majority of the axes are documented from the main chamber. 11 jadeite and 26 fibrolite axes were deposited vertically with the cutting edge on top in a deposit of ashes and burnt bones (Le Rouzic 1932: 9). This deposition practice is likewise known from other deposits in Mané er Hroëk or Petit Rohu (Cassen *et al.* 2010; Galles 1863a; Schulting *et al.* 2009). There are only a few ceramics, mostly recorded from the second main chamber (Le Rouzic 1932, 22).The St. Michel monument reached its final colossal form in a later stage for which there is evidence similar to the other tumulus Carnacéen (cf. Cassen/Boujot 1992) (cf. planum Figure 3.16). Again we might ask, as for the Passy graves in the Paris Basin, if the monumentality of these graves represents the buried person as a political or religious leader of the Carnac societies, or if these graves were incorporated into communal places and the final structures were not primarily conceived as graves.

From the earliest megaliths in Brittany, no radiocarbon results are available, so they are classified according to the archaeological material from the Middle Neolithic Ancient Castellic horizon material. The earliest known megaliths in Brittany are represented by non-accessible ancient dolmens registered in a few tertre and tumuli Carnacéens. The Ancient Castellic horizon is defined by the sequences of the Table des Marchands in Locmariaquer from 4650–4270 cal BC, 95.4% (Cassen 2009: 759). A modeling of the radiocarbon results from the few definite Ancient or Recent Castellic contexts (St. Michel, El Souc´h, Lannec er Gadouer, and Table des Machands) gives a nearly similar result.

The start of the Ancient Castellic horizon is therefore calculated to ~4680 cal BC (4770–4617 cal BC, 68.2%; 4794–4556 cal BC, 95.4%), the transition to the Recent Castellic to ~4240 cal BC (4441–4034 cal BC, 68.2; 4483–3999 cal BC, 95.4%).

Round tertre or tumuli with non-accessible ancient dolmens and material from or contemporaneous to the Ancient Castellic horizon are the tumulus Carnacéens Tumiac and the smaller structures of St. Germain, Castellic, and Kervinio and the first phase of the long tumulus Kerlescan (Boujot/Cassen 1992; Cassen *et al.* 2000: 551–554; Soler 2007: 124–125) (Figure 3.17-3.20).

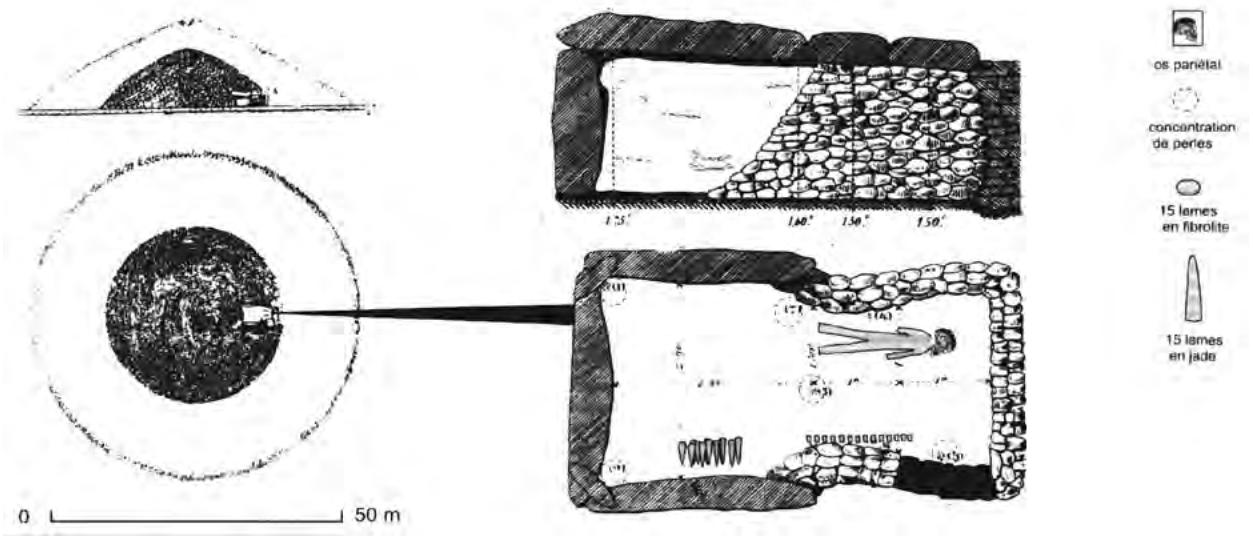


Figure 3.17 The tumulus Carnacéen Tumiac. Planum after Fouquet 1857, musée de la Société polymathique du Morbihan, Vannes (Herbault/Querré 2004: 501)



Figure 3.18 Tumiac. Photo courtesy of Stéphane Batigne, CC-by-sa /Wikimedia Commons



Figure 3.19 Jade axes and variscite collier, Tumiac. Photo courtesy of Serge Cassen (Cassen 2011: Figure 3)

The round tumulus Carnacéen Tumiac (or Butte de César) by Azon in the Morbihan is a monument approximately 50m long and, at present, 15m high. The eastern part of the tumulus covered a non-accessible dolmen measuring 9,3m², constructed to two-thirds from stone slabs. The eastern part and the closure of the chamber were built in dry wall technique. The dry wall part of the chamber represents an opening and therefore a possible entryway to the chamber. But the dolmen was closed and then covered first by a round or a half-round stone tumulus and then by a final round earthen tumulus with no indications of any access or passage (Herbaut/Querré 2004, Figure 3). According to examinations of the 19th century (Cassen 2011: 8; Malaguti 1862), human remains were discovered in the chamber which belonged to one adult individual. Accompanying this individual was a remarkable amount of green stone artifacts and, with 251 variscite pearls and pendants, the most luxurious variscite equipment in the Morbihan. Furthermore, two different depots with axes were documented: one depot contained 15 jade axe heads of jadeite, eclogite, and one head of nephrite. The other depot concealed 15 fibrolite axe heads Cassen 2011, 10).

Before its destruction, St. Germain in the region of Erdeven was a tumulus 12m in diameter and 2,70m high, constructed in two building phases (Cassen *et al.* 2000: 471–474; Gouézin 2007: 44–45). In the first phase, there was a small, non-accessible ancient dolmen erected with four stone slabs and a corbelled roof in dry wall technique which measured 1.68m x 1,95m. This chamber was covered by a round flat tumulus together with the chamber in the northwestern part. Calcined bones, ceramic fragments, wooden pieces, and a transversal arrowhead were reported from the chamber (Cassen *et al.* 2000: 471). In the second phase, a second small dolmen was built with dry wall elements on the first tumulus, following the east-western side of the first grave chamber. This structure measures 1,80m x 1,95m and has an opening and a small entrance built from two side stones. The chamber itself was covered by a dry wall corbelled roof, the entrance area by a capstone. This dolmen was also covered by an earthen tumulus. From the chamber two diagnostic Ancient Castellic vessels are recorded. One of them is a bowl with a round knob, impressed wave-lines and a pine tree. Furthermore, three golden agrafes were recovered.

Two similar graves from the same time horizon, but with more Southern Chambon-related ceramics are found at Castellic and Kervinio in the region of Carnac. Castellic or Bois du Latz in Carnac is a grave measuring 2,5m x 2m with a small, non-accessible ancient dolmen constructed from five stone slabs. The chamber was covered by a corbelled roof. Within the dolmen round bowls with oval openings and small lugs were detected. From an earthen round tumulus, two triangular arrowheads are recorded (Boujot/Cassen 1992; Soler 2007: 125). There is one radiocarbon result available from a charcoal sample, but due to its high standard deviation of ±300 it is not useful for this analysis (Gif-198B, 5025±300 BP; 4231–3521 cal BC, 68.2%; 4493–3034 cal BC, 95.4%).

Kervinio in Trinité-sur-Mer is similarly a non-accessible ancient dolmen with five side stones covered by a small tumulus 6m in diameter. As at Castellic, the chamber contained a vessel with an oval opening (Lukis 1866 in Cassen *et al.* 2000: 420–421). These vessels with oval openings are common in the Chambon contexts of Central West France, as in grave no. 5 at Goumoiziére, but plastic decoration is missing on the Armorican examples (Soler 2007: 124).

A tertre or long tumulus with a non-accessible ancient dolmen was covered by a round tumulus in the first phase of Kerlescan near Carnac. This round tumulus was then covered by an approximately 98m long tumulus with four additional chambers or non-accessible dolmens in the western part of the structure. From the first phase, Ancient Castellic ceramics with applicated knobs on the lip (boutons á repoussé) are registered (Boujot/Cassen 1992, Figures 2 and 5; L´Helgouach 1971, Figures 2 and 5).

There are a few long tertre or tumuli with one or several non-accessible ancient dolmens associated to registered Ancient Castellic material (Cassen *et al.* 2000, Figure 69; Boujot/Cassen 1992: 202–203). Le Manio 5 in Carnac belongs to a group of six long tumuli. Some of them are trapezoidal with several chambers, but most of them are non-megalithic and built with a dry wall technique (Cassen *et al.* 2000, Figure 69). Le Manio 5 is a rectangular long tumulus with two chambers. In the western part of the structure a dry wall chamber exists, which represents the first phase of the monument and was then covered by a round tumulus. In the eastern part of the structure, a non-accessible ancient dolmen was placed with five remaining side stones. This grave was inserted into the final mound. A further long tertre or tumuli with a small, non-accessible ancient dolmen and Ancient Castellic material is Mané Hui (Boujot/Cassen 1992: 202–203). In the eastern part of the nearby 90m long tumulus Mané Hui in Carnac, a non-accessible ancient dolmen is located (Boujot/Cassen 1992: 202; Gaillard 1897) and grave goods were recovered, for example a bowl with round knobs, a wide opening, and a small lug decorated with impressed wave-lines, half-circles or horseshoes, and triangular motifs. Another vessel is decorated with applicated knobs on the lip. Furthermore, two jadeite and two fibrolite axes, a nucleus of a blonde flint, and a series of trapezoid transversal arrowheads belonged to the grave inventory.

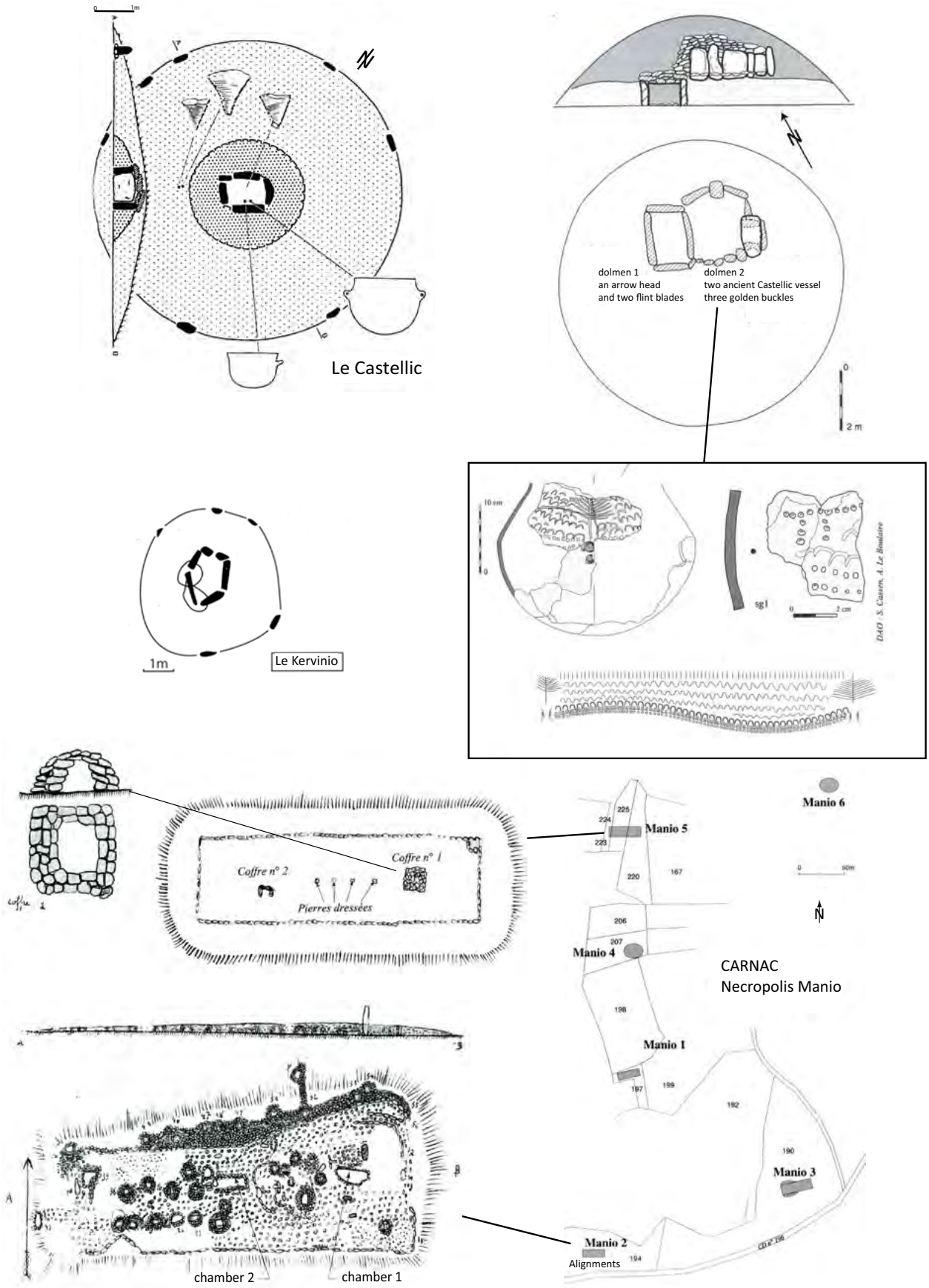


Figure 3.20 Round and long tumuli with non-accessible ancient dolmens. Le Castellic and Kervinio (after Soler 2007); St. Germain (after Cassen et al. 2000). Ceramic of St. Germain with the kind permission of Serge Cassen. The necropolis Manio (after Cassen 2000)

Within the tertre and especially within the long tumulus and the tumulus Carnacéen, it is also possible to witness the development to the passage graves (Boujot/Cassen 1992: 198; Boujot/Cassen 1998; Boujot/Cassen 2000: 30) and a transition to accessibility of the grave chambers implicating a fundamental change regarding burial rites and ancestor worship.

From the simple terte Lannec er Gadouer and the tumulus Carnacéen Er Grah there are radiocarbon sequences available for two long tumuli with cist burials and small dolmens and indications for a passage made of organic material (Boujot/Cassen 1998; Cassen *et al.* 2000: 313–341; Cassen *et al.* 2009: 751–752; Le Roux *et al.* 2006). Thus, Lannec er Gadouer was constructed at the end of the Ancient Castellic horizon and Er Grah at the beginning of the Recent Castellic horizon.

Lannec er Gadouer in Erdeven/Morbihan is a recently excavated northwest-southeast oriented long tumulus or tertre with a maximal length of nearly 45m and a width of 16m (Boujot/Cassen 1998; Cassen *et al.* 2000). From the western central part, a small half-subterranean cist is documented which was clearly implanted into a pit. This structure consists of nine side stones and measures 1,4m x 1,7m. An opening in the side stones of the chamber and large boulders as possible entrance stones or a mouth in the side of the tumulus are interpreted as the possible remains of a passage, perhaps of a wood construction (Boujot/Cassen 1998: 115; Boujot 2000: 30). The tumulus was constructed in several phases and there is a registered layer under the monument with pre-monument activities and Ancient Castellic material (Cassen *et al.* 2000: 129–137) (Figure 3.21). There are a total of seven radiocarbon results available (Cassen *et al.* 2000: 313–331) (Figure 3.22). The pre-monument phase hints at a time interval from 4808–4332 cal BC (95.4%; 4688–4431 cal BC, 68.2%). The construction of the chamber is calculated to ~4300 cal BC (4503–4104 cal BC, 95.4%, 4431–4232 cal BC, 68.2%). The grave goods consist of a flat round Ancient Castellic bowl with a pine tree and water waves on the outer knobs. This bowl is interpreted as a vessel for salt making purposes (Cassen *et al.* 2000: 249–267). Furthermore, a fibrolite axe, a green jaspis pendant, a lignite pearl, and a quartz tool are documented from the chamber. Close by the opening, a depot was registered with a quartz pendant and an unworked special formed rock crystal (Boujot/Cassen 2000: 63–64). From the enclosing ditch of the monument, Recent Castellic material is available, such as footed cups (coupes-á-socles) (Cassen *et al.* 2000, 136). A radiocarbon result from ~4100 cal BC (4234–3991 cal BC, 68.2%; 4244–3961 cal BC, 95.4%) has been determined. Traces of ochre were found around the chamber (Cassen *et al.* 2000: 268 and Figure 753), but documented directly from the top of the ancient soil before the construction of the chamber.

The tumulus Carnacéen Er Grah represents together with the Table des Marchands, the Grand Menhir, and a no longer existent alignment a cluster with Neolithic monuments in Locmariaquer in the Morbihan (Cassen *et al.* 2009, 741–765; Le Roux *et al.* 2006). In the northern part of the 140m long north-south-oriented monument, an ancient dolmen is situated with an access (Boujot/Cassen 1998, 112; Boujot/Cassen 2000: 64). The tumulus

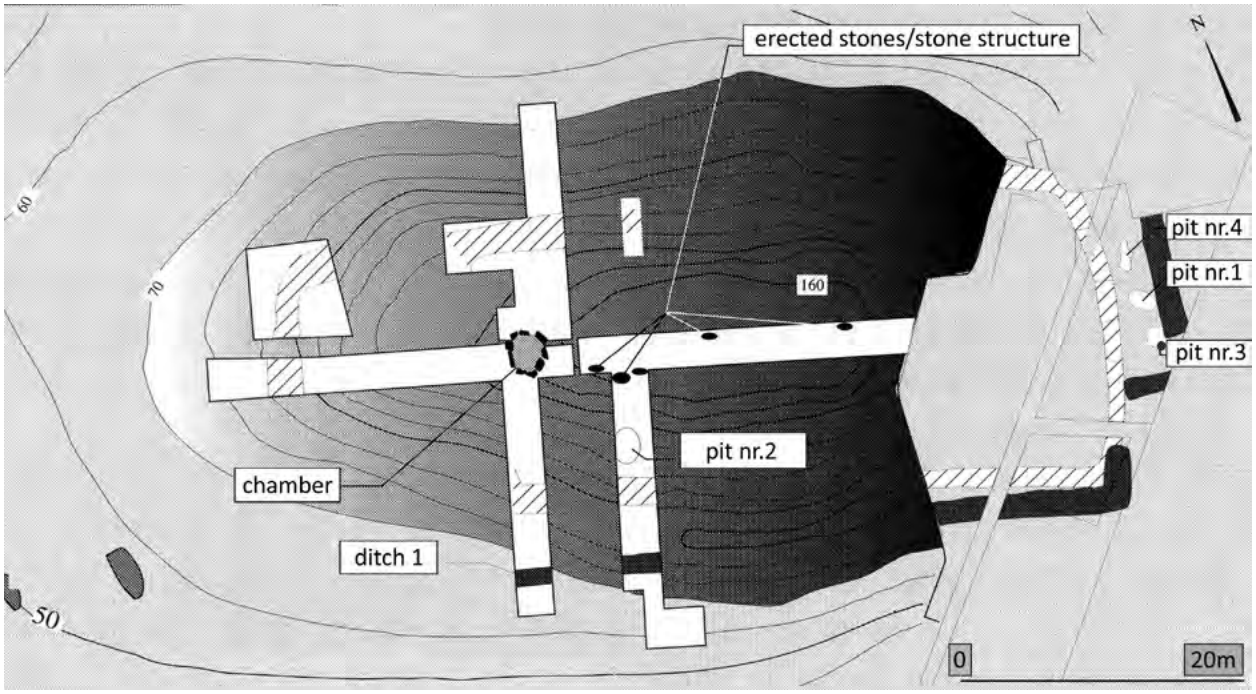


Figure 3.21 Planum Lannec er Gadouer (after Boujot/Cassen 1998, Cassen et al. 2000, Figure 3)

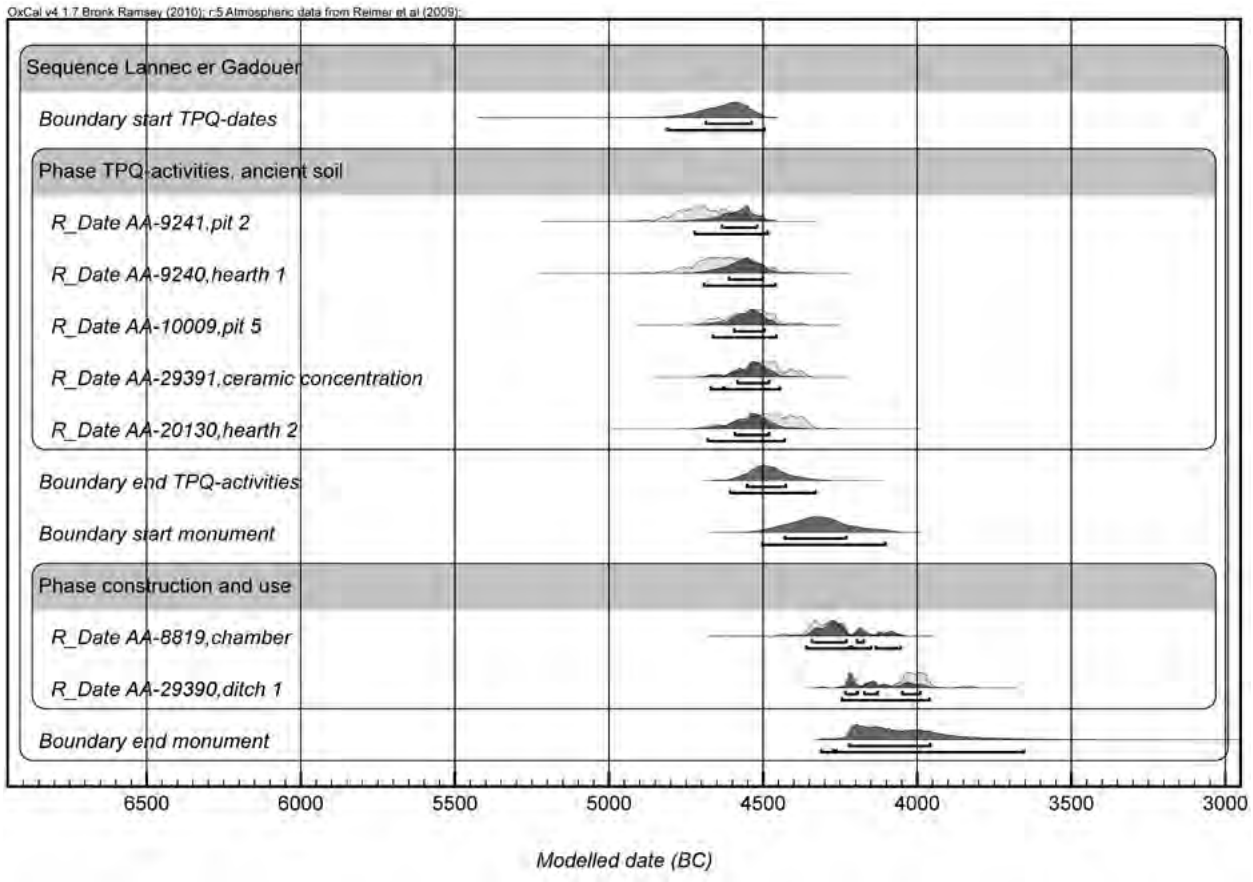


Figure 3.22 Radiocarbon determinations from Lannec er Gadouer. Model agreement: A_{model}=69, $A_{overall}$=71.9

was constructed in at least two phases. Under the first tumulus, a pre-monument layer is documented with charcoal and Ancient and Recent Castellic material (Cassen 2000, 327; 2009: 744) (Figure 3.23, 3.24). Both the radiocarbon results and the archaeological material highlight the difficulties in dating monuments with underlying pre-construction layers which are mixed up during the building process. There are eight radiocarbon determinations available, whereas a part of these samples originate from the settlement layer under the tumulus, likewise the Ancient Castellic settlement material in the earth deposit of the first tumulus. Thus, the excavation of the southern façade and the primary tumulus exhibit a pit with mixed material including charcoal with an early radiocarbon result (A-8913, 5960±65 BP; 4939–4770 cal BC, 68.2%; 5023–4693 cal BC, 95.4%), ox bones, a Middle Neolithic arrowhead and, in the upper part, a considerable amount of Recent Castellic ceramics (Cassen 2009: 744; Le Roux 2006: 192). Assuming that the radiocarbon result from a charcoal sample - extracted from a ceramic fragment of the level of the ancient floor under the tumulus - represents a 'modern' intrusion (Lyx 56 (OxA), 4885±65 BP; 3761–3635 cal BC, 68.2%; 3905–3522 cal BC, 95.5%) the model has a low, but still sufficient agreement (A_{model}=71.6, $A_{overall}$=73.1). The radiocarbon results from the terminus post quem activities at the monument hint at a time interval from at least 5793–4080 cal BC (95.4%; 5438–4122 cal BC, 68.2%), while the outset of the construction and the use of the primary monument and the southern façade is calculated to have occurred not before ~4140 cal BC (4194–4067 cal BC, 68.2%; 4265–4011 cal BC, 95.4%). Castellic material is registered from the different sectors of the monument (Le Roux 2006). Castellic ceramics with bow and 'boomerang' motifs are available from the primary tumulus. Similar ceramics were found in the southern tumulus. Footed cups (coupe á socle) are documented from the basement of sector I and IV (Le Roux 2006).

The sequences from Lannec er Gadouer and Er Grah indicate that the transition and the development of passage graves did not commence before ~4300 cal BC and therefore at the end of the Ancient Castellic horizon in transition to the Recent Castellic period.

An even later tertre or tumulus in Brittany with radiocarbon dates is Croix St. Pierre in the Grée de Cojoux close to Ile-et Vilaine (Briard *et al.* 2004: 97; Giot *et al.* 1995: 39–47). There are three terminus post quem values regarding the construction of the grave from a hearth under the mound available. The pre-monument phase starts at ~4700 cal BC (4652–4387 cal BC, 68.2%; 5046–4337 cal BC, 95.4%) and ends at ~4150 cal BC (4476–4204 cal BC, 68.2%; 4581–3724 cal BC, 95.4%), therefore the construction of the grave did not

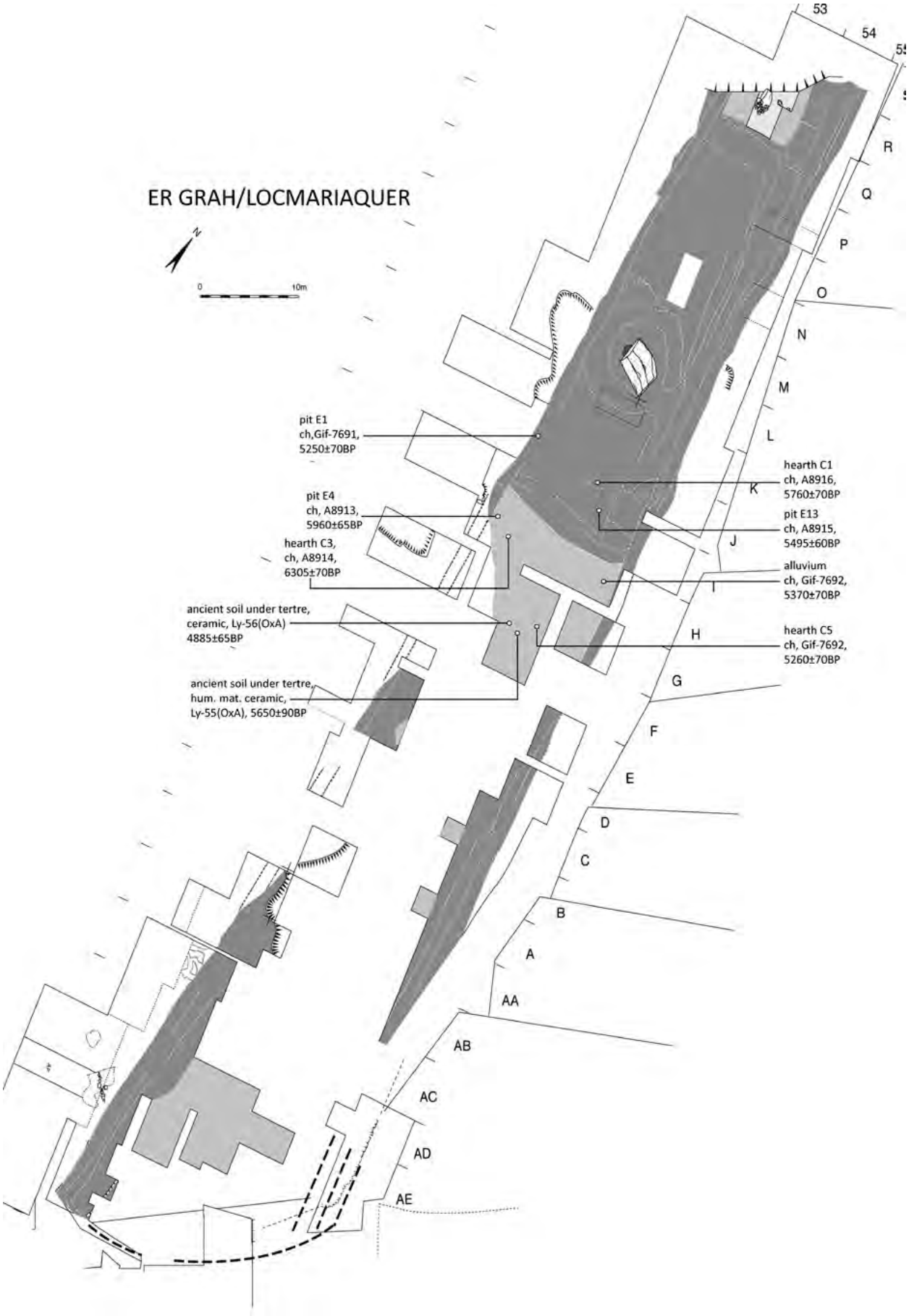


Figure 3.23 Planum Er Grah with radiocarbon results (after Cassen 2009, Figure 7)

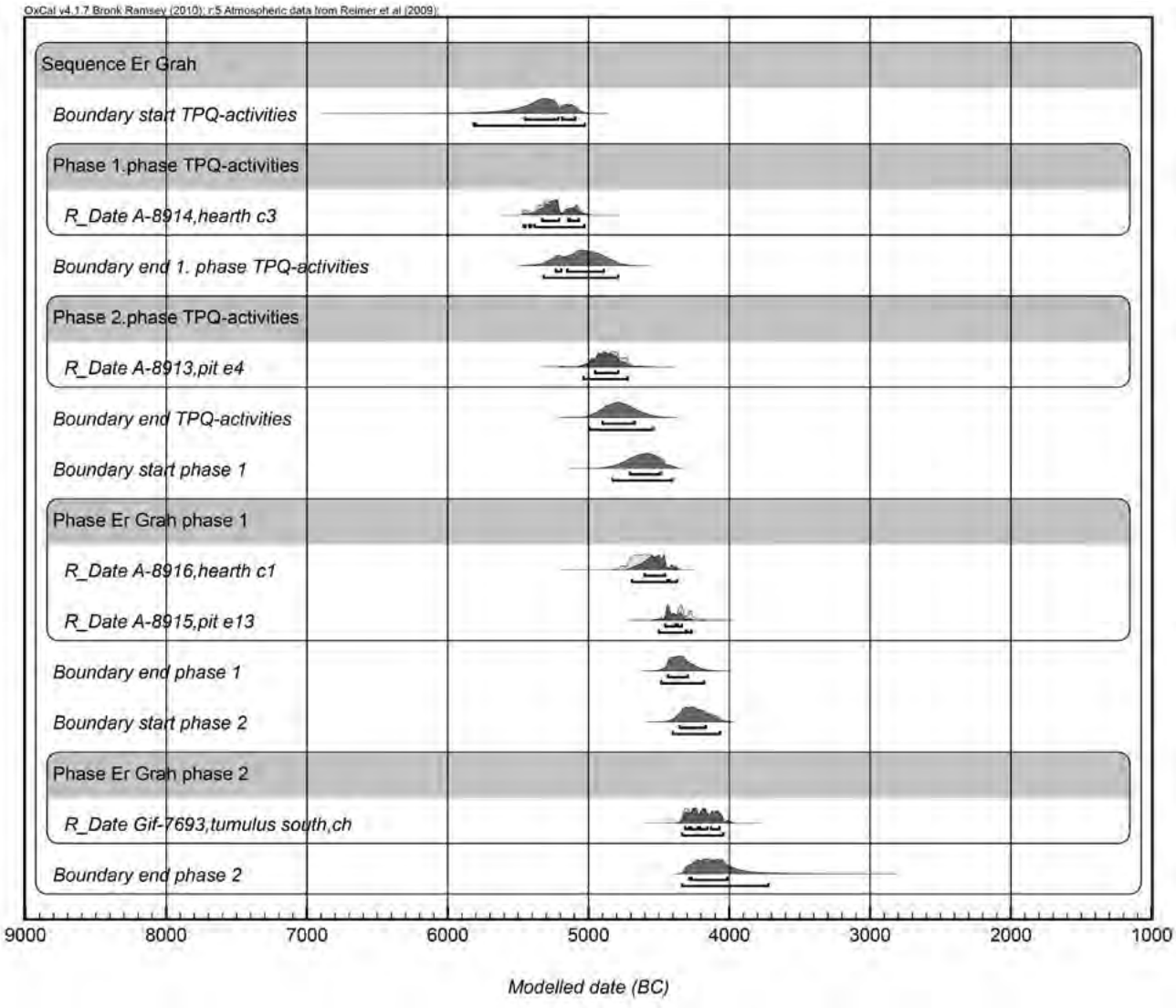


Figure 3.24 Radiocarbon determinations from Er Grah. Model agreement: A_{model}=71.6, $A_{overall}$=73.1

commence earlier. There are two possible results for the use or the subsequent use available from ~3310 cal BC onwards (3395–2624 cal BC, 68.2%; 4094–2524 cal BC, 95.4%).

From the Channel Islands with Les Fouaillages in the northeastern part of Guernsey, a transitional structure leading to the megaliths or even an early megalithic stage is documented (Kinnes 1982, Kinnes/Grant 1983) (Figure 3.25). Rather early radiocarbon results and archaeological material are available. Thus, the site deserves closer consideration. Les Fouillages is a long trapezoid tumulus or long tumulus which measures 20m x 10m and was 2m in height before excavation. This tumulus covered four stone structures (Figure 3.25). With phase 1, a (pre-megalithic) Mesolithic phase under the site is documented by means of microliths. In Phase 2, four stone structures were constructed in northeast-southwest alignment. In the southwestern part, a circular paved area is registered. Close by, a cist covered by a sub-rectangular, small stone cairn and a capstone were excavated. Both structures were covered by a final small mound with a small standing stone at the side. To the east small accessible or non-accessible cists with megalithic elements and a double chamber with a length of 2.6m are situated. The latter was constructed with a combination of stone slabs and dry wall technique. This structure is special and therefore not easy to classify, because the double chamber rather resembles a subterranean cist, while the two back stones are clearly megalithic elements aboveground. We cannot definitely determine the grave as a small dolmen. There were no capstones detected. This condition and a gap in the southern façade give reason to believe that the chamber was accessible during the first open stage (Kinnes/Grant 1983: 31). But, if these structures were partly open for a while, then it is also plausible that capstones originally existed which were removed in ancient times before the construction of the final mound and the ritual burying of the complex in phase three during the Early Bronze Age. The missing capstones are therefore not necessarily evidence for

accessibility. At the very eastern part of the tumulus a small 1,8m long slab-built cist or even a small non-accessible dolmen are located. All four constructions were enclosed by the triangular 20m long flat mound constructed from cut and stacked turfs and surrounded by a kerb wall of granite boulders and slabs with some dry wall infill (Kinnes 1982: 26–27; Kinnes/Grant 1983: 25–37). The monument is interpreted at this stage as a singularly planned and built complex with structures of different functions (Kinnes/Grant 1983, 28). We would take a sequential mound construction into consideration, beginning with the two structures to the west which were covered by a cairn, and a later extension to the east with the small double chamber and the cist.

Due to the acidic soil on this part of the islands, bone preservation is not available and a different function of the structures, except for the stone platform, cannot be clearly determined. From the double chamber two whole vessels are registered. From the cist to the west, ceramic fragments were excavated and from the stone platform fragments of a decorated vessel and parts of a stone bracelet were discovered. In total, seven radiocarbon results are available from charcoal samples of the grave and from a later settlement around the grave. The earliest three of these radiocarbon determinations originate from the base of the mound and one stems from the backfilling of the unroofed double chamber. They hint at a time interval from 4463–3781 cal BC (95.4%; 4448–3971 cal BC; BM-1892, 5590±50 BP; BM-1893, 5510±60 BP; BM-1894, 5280±140 BP). Despite the high standard deviation from BM-1894, the context likewise provides the possibility of terminus post quem values. An old-wood effect seems to be excludable so far, the samples were selected from small round wood (Schulting 2010: 15). However, the radiocarbon determinations from this site were part of a series that were revised at the British Museum laboratory (Bowman *et al.* 1990: 68). The revised dates are even earlier and after calibration the determination shifts to the first half of the 5th millennium and to 5051–3816 cal BC (95.4%; 4934–4352 cal BC, 68.2%). Nevertheless, the standard deviation of these revised dates between ±170 – ± 100 is rather high and a new series of radiocarbon results from the site refers to the (pre-megalithic) Mesolithic activities from phase 1 (Schulting *et al.* 2010: 163). This evidence suggests that the discussed and revised radiocarbon determinations also originate from the pre-monument layer and are unfortunately not suitable to date this early stage of megaliths on Guernsey.

The archaeological material is, in this case, more convincing: seven almost complete vessels have been found at the base of the mound on the western paved area (Kinnes 1982: 27) and two were found in the double main chamber. The ceramics are Cerny- and Castellic-related pottery or so-called Pinnacle/ Fouaillages ceramics (Patton 1995: 138) from the Early Middle Neolithic, preceded by Chasséen pottery which is related with passage graves on the Channel Islands (Cassen 1993; Guyodo/Hamon 2005; Patton 1995: 25; Schulting *et al.* 2010: 163). The excavated vessels were determined to have originated between 4700–4200 cal. BC. All around the mound more material was available: small transverse arrowheads and scrapers, fragments of stone rings (anneaux disques), and pottery of a wide range of fabrics and vessel sizes (Kinnes 1982: 27; Kinnes/ Grant 1983: 25–39). A certain similarity of this grave to the Cerny horizon with regard to the architecture and the ceramics, and especially to monuments in Brittany, such as Le Manio 5, Mané-Ty-Ec, and Mané-Pochat, has been discussed by several authors (Constantin 1985; Giot *et al.* 1979: 212–218; Patton 1995).

Moreover, the use of the monument by later societies and the incorporation of the ancient monument are interesting. In phase two, the stone enclosure of the mound was restored and the site was formally closed: the small dolmen was filled with large stones to the level of the side slabs and closed by a boulder wall built across its entrance. The cist to the west was filled with beach sand and the forecourt was plugged with boulders (Kinnes 1983: 32). Sometime in the 3rd millennium,

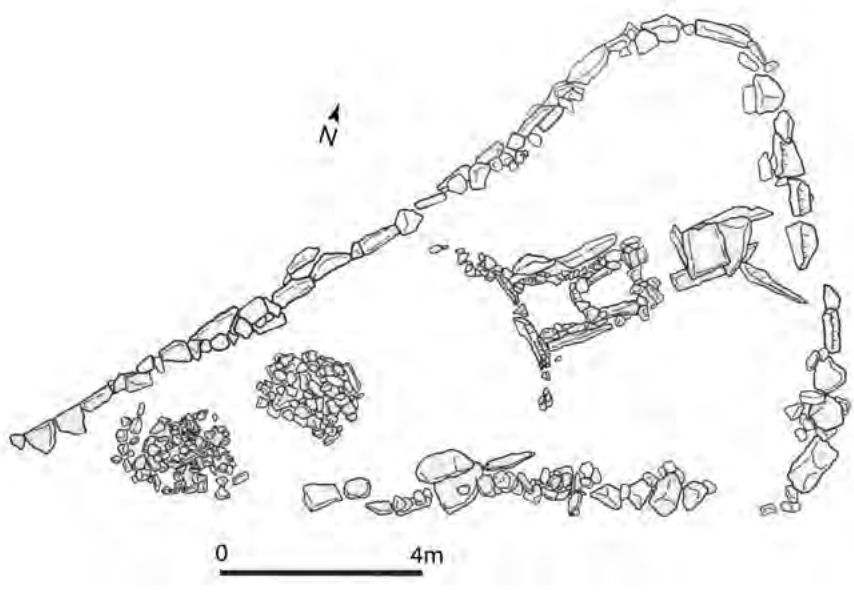


Figure 3.25 Planum Les Fouaillages, Guernsey (after Kinnes/Grant 1983: 30)

the whole mound was incorporated in a massive semi-circular platform, which served as the foundation of a building consisting of an oval space with a diameter of 3,8m enclosed by two concentric settings of boulders. Finally, in the Early Bronze Age the whole complex was buried as a permanent memorial into a massive final 35m long and 15m wide tumulus (Kinnes/Grant 1983: 32–35).

The emergence of megaliths in Central West France

Structures similar to those in Brittany are documented in Central West France. In particular, round or long tumuli are found which were partly erected in several building phases. There are structures which cover cists or non-accessible ancient dolmens. Unfortunately, no radiocarbon results are available from these transitional structures.

Within the necropolis des Chirons in Bougon (Deux Sèvres), two non-accessible ancient dolmens in the eastern part of the monument are registered from the southwest-northeast oriented tumulus B (Mohen 1973; Mohen/Scarre 2002) (Figure 3.54). The two dry wall passage graves B1 and B2 represent later intrusions into the monument. La Tombe de la Demoiselleau Thou between Cigogne and La Preuille (Charente-Maritime) is a 100m long and 10m wide east-west-oriented long tumulus with a current maximal height of 2,65m (Joussaume 1999: 64). A small non-accessible ancient dolmen is documented from the tumulus with a length of 1,30m. The contents of the dolmen included a fragment of a human skull, but no grave goods are documented. Bernet in Saint-Sauveur is a 26m long north-south-oriented long tumulus erected in several phases (Joussaume 2003: 161). The first phase of the monument is represented by a round tumulus with a non-accessible ancient dolmen. This dolmen measures 2,10m x 0.80m and contained one individual in a crouched position. The grave goods consist of a wild boar fang and two Middle Neolithic vessels with round knobs. In a later phase, this grave was incorporated into the middle of a long tumulus with an accessible dolmen or a possible passage grave with a destroyed passage in the southern section. Campet in Saint-Laurent-et-Benon is a round sand monument, 100m in diameter with a current preserved height of 4m. In the center of the structure, a non-accessible ancient dolmen is registered which consists of five stone slabs covered by a corbelled roof. In the chamber, the remains of a juvenile individual were documented together with more non-specific grave goods such as a polished axe and some flint (Joussaume 1999: 66; Joussaume 2003: 161). The tumulus La Grosse-Motte in Bouhet measures approximately 60m x 12m. From the western axis of the tumulus, three non-accessible dolmens are reported, oriented in a west-east direction measuring 1,50m x 0,80m. Seven individuals are documented from these graves (Joussaume 2003: 166). Two radiocarbon results from human bones of this site have been processed. One sample originating from a grave chamber stems from around ~4180 cal BC (Gif-8292, 5340±100 BP; 4316–4051 cal BC, 68.2%; 4353–3969 cal BC, 95.4%). Another sample documents the subsequent use of the tumulus (Ly-1057, 4535±65 BP; 3362–3105 cal BC, 68.1%; 3498–3023 cal BC, 95.4%).

An already clearly accessible small dolmen is documented from the first phase of tumulus C in the necropolis Péré in Prissé-la-Charrière in the district of Deux-Sèvres (Joussaume 1999: 65; Laporte *et al.* 2002). Construction and burial activities are calculated according to the human remains with an MNI of 3 to ~4320 cal BC (4357–4276 cal BC, 68.2%; 4370–4263 cal BC, 95.4%) (cf. also chapter 1).

Appearance and architectonical features of megaliths in Northwest France

Megaliths in the Paris Basin/Northern France

In sensu stricto of this analysis and in relation to the other regions, only few fully megalithic mortuary monuments are documented from the Paris Basin/ Northern France. Multiplex contemporaneous monuments exist which were constructed in dry wall technique or in wood and imitate the principle megalithic concepts. The main reason for this may have been a lack of building materials. The considered region is divided into two larger geological regions by the very eastern part of the Armorican Massif with igneous intrusive stone layers like granite and to the west of the Normandy by the limestone plateaus of the Paris Basin (Aesch *et al.* 2005; Billard/Chancerel 1998: 247).

The Middle Neolithic tumuli passage graves in dry wall technique, such as La Hogue, La Hoguette, and Ernes, will be subsequently discussed in chapter 3, p. 87-91 as contemporaneous burials.

One of the earliest fully megalithic monuments is Colombiers-sur-Seulles in the Commune Sèche in the Normandy. In the tradition of the pre-megalithic monuments of Northern France and the Paris Basin, it is a trapezoid formed tumulus more than 60m long and 9m–17m wide. This tumulus is built with inner dry wall compartments which are arranged along one middle main axis with at least 24 cross walls. In the northwestern part of the structure, a passage grave is located with a round megalithic chamber consisting of six stone slabs (Chancerel/Desloges 1998: 104–105, Verron 2000: 124) (Figure 3.28). Colombiers-sur-Seulles is a unique and an atypical structure for the region. Parts of the architectonical concept are similar to the long tumuli of the Central West, but nearly identical structures can be found in Southern England (cf. chapters 3, p. 51-54 and 11, p. 301-306).

From the southwest of the Paris Basin in Eure et-Loire, a small group of megaliths with three simple dolmens and a standing stone in Changé in Saint Piat are registered. One of these dolmens has engravings in an Armorican style. There are 21 singularly isolated dolmens noted mainly from the North of the Il-de France and five dolmens from Essone and Seine-et Marne. Small dolmens exist furthermore in Eastern France and in Franche-Compte in Beaufremont dans les Voges (Tarrête 1999: 80–81). The majority of these graves were destroyed and emptied in ancient times.

In the Recent and the Final Neolithic, collective burials and galley graves (allées couvertes and allées sepulcrales) were common. The division between the French designations allée couverte and allée sepulcrale is not always clear. The French expression allée sepulcrale is used for structures made of both stone and wooden constructions (Basse de Ménorval 1953; Chambon/Salanova 1996; Leclerc 1988) and underline that not all of these structures were covered by capstones. Gallery graves were built half-subterranean or aboveground, but also, especially in the Paris Basin, completely subterranean. The subterranean gallery graves show in principle the same architectonic features as the half-subterranean or structures aboveground, but they are only partly covered by capstones (Billard 2007: 145). Aboveground, they are marked partly by a discrete tumulus and these graves imply the end of monumental expansion in Northwest France during the 3rd millennium (Boujot 2004: 252).

The megalithic gallery graves are above all present to the northwest of Paris in the Seine Basin, where 22 gallery graves in Yvelines and in the Val d´Oise are registered. These graves are from 6m–20m long and 1m–2m wide and have half-subterranean structures or structures aboveground, including paved floors and dry wall elements between the orthostats. At some of the graves, like in Bois Couturier and in Guiry-en-Vexin, dry walls carry the capstones instead of orthostats (Chambon/ Salanova 1996: 105). In the Normandy, further megalithic gallery graves are located in the border area of the Amorican plateau. Many of these graves had an antechamber or an entrance area and entrance stones with a round perforation (trou d´homme) measuring 40cm–60cm in diameter. These perforations provided for a closure with wood or stone similar to evidence for Guiry-en-Vexin. Another entrance form with a thrilith construction is registered from Pierre Turquaise in Saint Martin-du-Tertre. Some of these graves are partly inserted into the natural terrain and dug into limestone as in Trou á Morts in Parmain (Tarrête 1999: 82).

Another Late Neolithic structure is l´Ouche de Beauce in Maisse. It is a 45m long and 4m–11m wide trapezoid formed structure with a small non-accessible dolmen (Tarrête 1999: 78).

In the Paris Basin, 42 isolated standing stones still exist today from altogether 147 originally registered stones (Tarrête 1999: 88). Their height reaches from a few dozen centimeters up to 5,40m such as Silly-en Gouffern in the Normandy. One notable alignment with 12 still visible stones exists in Montchauvet (Marcigny *et al.* 2007: 149). The standing stones were erected on high topographical points as well as on the knobs of the valleys. The incisions on some of the stones enable their classification to the Neolithic and even more precisely to the Middle Neolithic.

Megaliths in Brittany and on the Channel Islands

Many prehistoric monuments and settlements in Northwest France are lost due to a rise in the sea level. In the Bay of Morbihan for example, the sea level was between -5m and -7m lower during the Neolithic (Cassen 2010: 111; Dupont *et al.* 2009). A considerable rise of the sea level and the sea surface temperature by one or two degrees Celsius from 5500 BC onwards is recorded from a core near the Rockall Plateau between Ireland and Iceland (Duplessy *et al.* 2005). Considerable changes are similarly estimated for the north coast of France and the Channel Islands (Pailler *et al.* 2008: 99–100; Sebire 2005: 16; Scarre 2010: 11; Sebire/Renouf 2010). In the 5th millennium, Jersey may still have been connected to the mainland at least at low tides (Pailler *et al.* 2008: 99–100; Sebire 2005: 16; Scarre 2010: 11), while Guernsey became an island several centuries earlier (Sebire 2005: 54). The islands can roughly be estimated to have been twice the size of their current size (Kinnes/Grant 1982: 12).

More than 1000 megalithic graves are estimated for Brittany (Giot 2007: 5). A classification of megalithic grave architecture and a schema of their development in Brittany has been proposed by several authors (among others Boujot 2004; Boujot/Cassen 1992; Cassen 1993; Giot 1981; Le Rouzic 1933; L´Helgouac´h 1965; 1990).

A first megalithic stage is represented, as already discussed in chapter 3, p. 34-47, by non-accessible ancient dolmens covered by round or long tumuli. An architectonical hybrid between the early grave architecture with long tumuli or tertre, but with megalithic passage graves, is the grave complex Barnenez in Finistère (Giot 1987). The outer structure is a labour intensive 90m long stone tumulus constructed in dry wall technique, which covers 11 megalithic passage graves with round chambers. This combination of long tumulus and megalithic passage grave is also observed at some of the Tumulus carnaceén in the region of Carnac, for example the later or final building stages of the St. Michel and Mane Lud (Boujot/Cassen 1992, Figure 1; Galles/Mauricet 1864: 81; Le Rouzic 1932).

The sequence of the passage graves starts with more simple structures, including round, quadratic, or polygonal chambers, either with a central or a lateral passage (Boujot/Cassen 1992, Figure 1). These passage graves are mostly covered by more decent round stone tumuli, compared to the antecedent long tumuli in earth or in stone. The early round chambers are either megalithic, like Parc-Guren I in Crac´h, Kerlagat in Carnac, or Kerroch-Mono in Quéven, or the round chambers are built in dry wall technique and covered by a corbelled roof (cf. chapter 3, p. 87-91). Some of the simple passage graves with quadratic chambers were originally round chambers, such as the dolmen Moulin des Oies, which obtained its current quadratic form during the restoration of le Rouzic in 1932 (Gouézin 2007, 31; cf. also Perschke 2010). The graves with quadratic chambers can be supplemented with a small side chamber in a further stage as in Kermarquer. The simple one-chamber graves are extended by several chambers in later stages either into transepted tombs with several round or quadratic chambers on each side of the corridor or into graves with inner compartments (Boujot/Cassen 1992). The transepted passage graves are either singularly transepted, like the Dolmen de Loceltas in Locoal- Mendon, or doubly transepted, like the Dolmen de Cruguellic in Ploemeur, a monument which measures 10,50m x 7m (Gouézin 2007: 90). In later construction phases, passage graves are built with a polygonal ground form, but are more elongated or even exhibit chambers built completely in a V-form like the Dolmens de Rondossec in Plouharnel (Gouézin 2007: 99).

In the second half of the 4th millennium, chambers are still constructed in quadratic form with inner compartments, either as rectangular chambers with a lateral passage or as angle-formed graves such as Pierres Plates in Locmariaquer or Gâvres in Kerven (Giot 2007: 102–103, 81).

In the 3rd millennium, later constructions are represented by graves with a rectangular long structure similar to the gallery graves but with a small narrowed angevin entrance, and by gallery graves (allées couvertes) such as Pors-Poulhan in Plouhinec or Roche or Maison-des Feins in Tressé (Briard *et al.* 2004: 119). Gallery graves are, similar to those of the Paris Basin, partly subterranean or half-subterranean structures inserted into the ground and covered by discrete tumuli, which are actually no longer monumental (Boujot 2004: 252).

Small dolmens with no corridor, which seem to be a later appearance, are known from the Morbihan from Lez-Variel in Guidel, where a small dolmen is registered with a chamber measuring 1,20m x 1,20m and a height of 1m (Gouézin 2007: 66–67).

In Brittany more than 6000 standing stones are registered. Around 1000 of them stand isolated in the landscape, approximately 5000 standing stones are grouped in alignments, stone circles, or squares (Giot 2007: 5). Although the strongest concentration of stone alignments is noted for Brittany, further but smaller stone alignments are also documented from Corsica, Sardinia, and in Great Britain.

The alignments in Brittany are up to 3km long and the most remarkable alignments on land stand in the regions of Carnac, Menéc, Kermario, and Kerlescan. Together with the inventories noted in the last years, alignments in the sea were discovered (Boujot/Lorho 2005), such as the Kerdual alignment in the closer surrounding of the tertre Kerdoual in La Trinité-sur-Mer. This alignment is arranged parallel to the alignments of Menec and Kermario (Cassen *et al.* 2003; 2009; 2010; 2010a) and together they build an impressive complex of standing stones visible from the sea during the Neolithic.

The interpretations of these sites are diverse and there exist as many interpretations as scholars, who tried to interpret them. The explanations reach from descriptions as ceremonious or religious avenues and astronomic observatories to funeral necropolises and temples. Recent approaches increasingly accentuate cognitive archaeological aspects and, according to Serge Cassen, we can understand them as a conceptual border between two worlds and a passage to the alterite (Cassen 2009, 2010). If we take the new discoveries and the parallel arrangement of the alignment into consideration, we might not be antipathetic to a functional interpretation of these alignments as a border of the Carnac societies or a representation of these as visible sites from the sea to the outer world.

The Grand Menhir near Locmariaquer, measuring 350t and 21m in length, is Europe's most colossal standing stone or standing stone project, which lies on the ground today and is broken into several pieces. It is not clear, if the erection of the stone was ever successful or if it fell at later times and was destroyed by an earthquake (Cassen 2000: 201–203). This entirely worked, and with the symbol of a sperm whale engraved stone was transported over 10km from the Vannes region (Cassen 2010: 111; Cassen/Vaquero Lastres 2000). It was the front stone of an alignment which does not exist any longer. Three parts of another stone of the alignment that were decorated with symbols, such as a sperm whale, a polished axe, crosiers, and horned animals, were subsequently incorporated - adjacent to the alignment - into the tumulus Carnacéen Er Grah, the passage grave Table des Marchands, and into the passage grave Gavrinis on the island of Gavrinis in the Morbihan.

On the Channel Islands, the first megalithic stage is represented by the above discussed Le Fouaillages on Guernsey with a trapezoid long tumulus and a cist with megalithic elements (Barrett/Kinnes 1988; Kinnes 1982; 1983). On the islands altogether 15–20 passage graves, 2–3 gallery graves, 13–16 cists-in-circles, and a number of standing stones are preserved (Kinnes 1988; Patton 1995: 52–-53, 84; Scarre 2010: 5). On Guernsey, a few passage graves are registered, for example Le Déhus, La Varde, Le Creux es Faies, Le Trépied, and La Rocque qui Sonne. The latter was destroyed to such an extent that closer determinations were not possible (Kendrick 1928; Kinnes 1983). In Le Dehus, Le Creux es Faies, and la Varde the chambers are mostly trapezoidal. The chambers in Le Trépied are rectangular shaped. As architectonical features, Le Déhus has two additional small side cells on each side of the passage.

The chambers are partly built with dry wall elements and they show respectable chamber sizes from a length of 5.5m in Le Trépied to 11m in La Varde. At Le Déhus and La Varde, stone pillars from the middle of the high chapel-like chambers are documented which originally supported the capstones. The graves are covered by round tumuli measuring up to 18m in diameter, for example in La Varde, Le Déhus, and Le Creux es Faies. A part of them is surrounded by stone enclosures.

A later megalithic appearance, which is especially restricted to Guernsey and Herm, is represented by the so-called cists-in-circles, for example L´Islet, La Platte Mare, La Mare ès Mauves, and Martello 7. Small cists or non-accessible dolmens are covered by circular mounds up to 15m in diameter and, like in L´Islets, surrounded by boulder walls. However, due to the material these structures can be associated with the Late Neolithic (Kinnes 1983: 18).

In addition, standing stones are registered on the Islands of Guernsey Le Crocq, La Longue Pierre, La Longue Rocque, La Petite Longue Rocque, and Route St. Clair. The standing stones are up to 3,5m high, for instance La Longue Rocque on Guernsey. Moreover, two standing stone statues are documented: Câtel and La Gran mère du Chimquière. Câtel is an anthropomorphic, female figure with breasts in high relief and some kind of belt or grindle. La Gran mère du Chimquière is a similar figure with breasts in relief above curved arms and a grindle marked by incised lines, though completely remodeled in Roman times (Kinnes/Grant 1983: 42–43; Scarre 2010: 7–9).

Megaliths in Central West France

Similar architectonical concepts known for Brittany can be observed in the megalithic grave architecture of Central West France. The outer structures are built as long or round tumuli or tertre either with earth or in dry wall technique within partly sophisticated building techniques. The inner structures consist mainly of one or several megalithic passage graves or passage graves in dry wall technique. Both building techniques can be observed at the same burial site (Joussaume 1997; 1999; 2003). The monuments are often grouped to necropolises including several monuments, such as Bougon, Champ-Châlon, La Pointe, Biarnes, Mille-Écus, Moindreaux, la Boixe, Chenon, Taizé, Maupas, Tusson, Luxé, Cous, d´Avrillé-Le Bernard, and la Frébouchère (Joussaume 2006: 82–86). Corresponding to Brittany, there is evidence here for several building phases.

The long tumuli are either rectangular, like Montiou, or trapezoid, like Mille-Écus and monument F0 in Bougon (Mohen 1986). At la Motte-des-Justices and within the necropolises of Tusson and de Luxé, the most colossal tumuli are registered. They are comparable in their dimensions to the Tumuli Carnacéens in Brittany. La Motte-des-Justices is 180m long. Le Gros Dognon in the necropolis Tusson is 120m long and approximately 12m high. This monument is associated to two others monuments, 90m and 60m in length (Joussaume 1999: 67; 2006: 83). In Folatière in Luxé, a tumulus 140m in length is registered and is grouped together with two dolmens.

Furthermore, more quadratic structures are registered with mainly one grave chamber, such as structures at La Grosse Pierre or La Joselière (Joussaume 1999: 62). Another special outer form is represented by the pyriform structures observed, for example, at Pierre Folles de Cous and La Bajoulière.

A special building technique for the tumuli is documented in the region of Charente (Burnez *et al.* 2003; Joussaume 2006). These tumuli are built as alveoles, meaning that the dry walls form small cells which were filled with earth as in the necropolises of Champ-Châlon or Cruchaud in Sainte Lheure. The outer borders of these tumuli are likewise bounded by dry walls. Similarly built monuments with inner dry wall compartments are found at Prissé la Charièrre (Laporte *et al.* 2002).

The inner structures of the Central West monuments consist of non-accessible or accessible dolmens and passage graves with either round, quadratic, or rectangular chambers. A part of the quadratic or rectangular chambers have inner compartments similar to the Dolmen de Pierre Levée. Some structures with quadratic chambers are T-formed with an antechamber like the tumulus de Mousseaux or La Joselière. A special form is represented by the so-called dolmen angoumoisin with P-or Q-formed passage graves and a quadratic or a rectangular chamber. The corridors are built from stone slabs or in dry wall technique and are constructed on the left or the right side of the chambers.

According to the classification of monuments in Central West France from Roger Joussaume (Joussaume

1997, 1999), different combinations of outer and inner structures exist: long tumuli with one passage grave either situated in the middle or at one end of the tumuli, long tumuli with two or more passage graves, or round or quadratic tumuli with one accessible dolmen or one passage grave.

Long tumuli with only one passage grave directed at the long side of the monuments can be found at Mille Ecus in Benon, La Motte de la Garde in Luxé, Or Grand Bourgne, the second phase of Péré C, and at la Motte-des-Justices (Joussaume 1999: 67).

Long tumuli with one passage grave at one end of the structure and with the opening and the corridor to the short side of the monument are, among others, found at monument C in Champ Châlon, Pierre-Levée, la Tombelle-de-la Tonnelle, Le Vieux Breuil in the necropolis Tusson, or at Le Gros-Dognon and le Petit-Dognon.

Less common seems to be the position of the grave at one end of the tumulus with an orientation to the long side. This architectonical feature can, nevertheless, be observed in the structures of the tumulus Mille Ecus in Benon or chamber F0 in Bougon, although the latter was first inserted into a round tumulus and in a later stage into the long tumulus with another passage grave at the other end of the structure (Mohen 1986; Mohen/ Scarre 2002). This long tumulus with two passage graves has entrances on the same long side similar to tumuli B and E in Bougon and other tumuli in Fouqueure, La Vallée, Pey-de Fontaine, and tumulus B from Champ-Châlon. The latter was built in two stages: chamber B1 was first inserted into a round tumulus which was probably covered in a later stage with a long tumulus in which chamber B2 was inserted.

Long tumuli with several passage graves similar to Barnenez in Finistére but with passage graves in Q-form (dolmen angoumoisin) can be observed at the tumulus Montiou in Sainte-Soline, an approximately 50m long structure with four or five passage graves, or at the tumulus du Platin in Availles-sur Chizé, a 46m long monument erected in two different building phases comprised of altogether 10 passage graves.

Round tertre or tumuli were constructed primarily with one dolmen or passage grave, for example the first stage of Péré C with an accessible dolmen inserted into a round stone tumulus. The Dolmen de la Ciste des Cous in Bazoges-en Pareds and La Boixe C in Charente are comprised of round tumuli with passage graves and simple round chambers.

Circular outer structures with a passage grave and a rectangular chamber or a dolmen angumoisin are documented from the tumulus A in Bougon and the Dolmen E 143 in Taizé. Furthermore, rectangular tumuli are documented with one passage grave from Joselière in Clion and La Grosse-Pierre in Sainte Radégonde.

A special form is represented by the dolmen angevin, consisting of pyriform monuments with one passage grave like the Bajouliere in Saint Rémy or Pierre-Folles de Cous (Joussaume 1999: 62–63).

Megalithic structures with radiocarbon sequences and radiocarbon dates

Megaliths with radiocarbon results in the Paris Basin/ Northern France

Few radiocarbon results are available from megalithic contexts in the Paris Basin. The three radiocarbon determinations from the Dolmen de Changé in Saint Piat in Eure-et Loire are the earliest available measurements from this region. The Dolmen de Changé is an extended dolmen. The chamber measures 4 to 3 meters and 'douzends' of individuals were recorded in the old excavation reports (Badouin 1925 cit. after Renaud 1996, 310; Jagu 1996; 2003). The earliest radiocarbon result is gained from a human bone sample from ~4250 cal BC (Gif A- 92352, 5470±90; 4391–4176, 68.2%; 4452–4052, 95.4%). The remaining two (Gif-7864, 4780±350 BP; 3956–3097, 68.2%; 4347–2635, 95.4% and GifA-91091, 5230±110 BP; 4232–3958, 68.2%; 4328–3798, 95.4%) suffer from large errors ranging from ±350 and ±110 and their significance is limited.

From the three dolmens Acon, L´Hotel de Dieu, and the Dolmen de Mailleton additional singular radiocarbon measurements have been gained. The two results stemming from human bone material from L´Hotel de Dieu in the Normandy and the Dolmen de Mailleton in Loiret have been processed and suggest a time interval from 3519–3035 cal BC (95.4%; 3498–3110, 68.2%). A charcoal sample from the dolmen Acon was measured to ~3800 cal (3932–3709 cal BC, 68.2%; 3949–3665 cal BC, 95.4%).

Most passage graves in the region are non-megalithic and constructed in dry wall technique (cf. chap. 3, p.87-93). One of the few exceptions is La Pierre Tourneresse in Cairon (Clément-Sauleau *et al.* 2000; Ghesquière/ Marcigny 2011) (Figures 3.26-27). Two passage graves are covered by a round tumulus, 24m in diameter, with inner dry wall compartments. The main chamber 1 is a megalithic passage grave, oriented to the north. Chamber 2 is a passage grave in dry wall technique, opposite to chamber 1 and oriented to the south. In chamber 1 the remains of at least 8 skeletons and a footed cup (coupe á socle) were documented. Chamber 2 contained a child wearing a perforated canine tooth. Seven radiocarbon determinations gained from bones suggest the beginning of burial activities at ~4100 cal BC (4067–3965 cal BC, 68.2%; 4229–3952 cal BC, 95.4%)

and the use of the grave to ~3100 cal BC (3262–2925 cal BC, 68.2%; 3327–2906 cal BC, 95.4%) with six of the dates clustering in the first half of the 4th millennium.

An atypical structure for the region is Colombiers-sur-Seulles in the Commune Sèche in the Normandy, consisting of a trapezoid formed tumulus with inner dry wall compartments and a megalithic passage grave (cf. chap. 3, p.47) (Chancerel/Desloges 1998; Verron 2000, 124; Marcigny *et al.* 2007: 132–134) (Figure 3.28). From Colombiers-sur-Seulles, one radiocarbon determination from a charcoal sample was processed in 1970 with a high standard deviation (Gif-1917, 5150 BP±130; 4224–3781 cal BC, 68.2, 4312–3665 cal BC, 95.4%). There is no archaeological material from the chamber available, but a Cerny horizon exists under the grave (Chancerel/Desloges 1998, 45–47) and provides a terminus post quem restriction. The radiocarbon result might cover the time of the construction or the use of the grave.

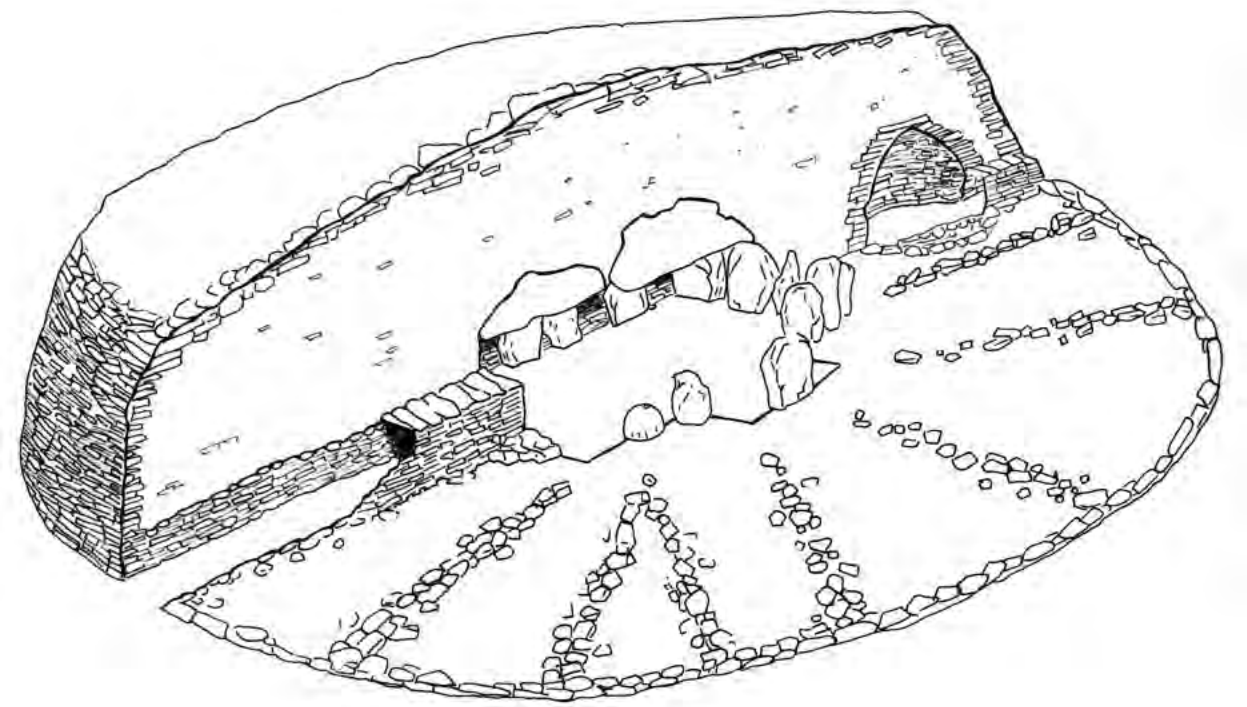


Figure 3.26 Reconstruction La Pierre Tourneresse. Drawing after Cédric Lacherez,-CC-by-sa /Wikimedia Commons

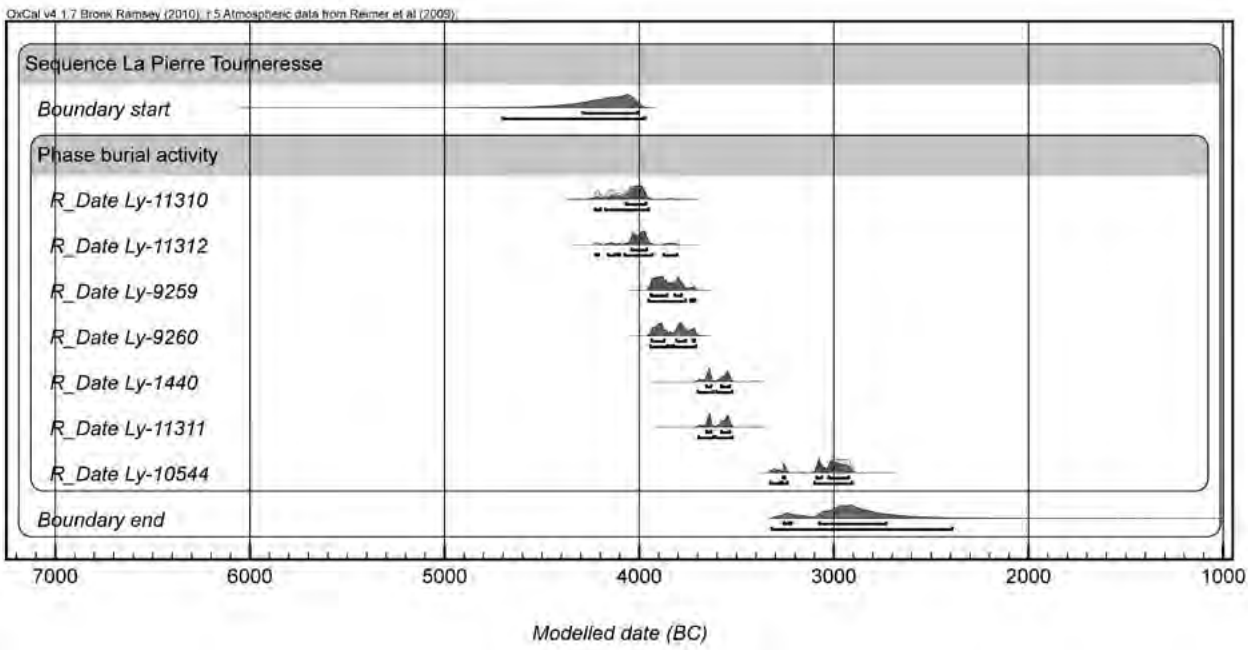


Figure 3.27 Probability of radiocarbon dates, La Pierre Tourneresse, Cairon, Calvados. Model agreement: A_{model}=94.9, $A_{overall}$=95

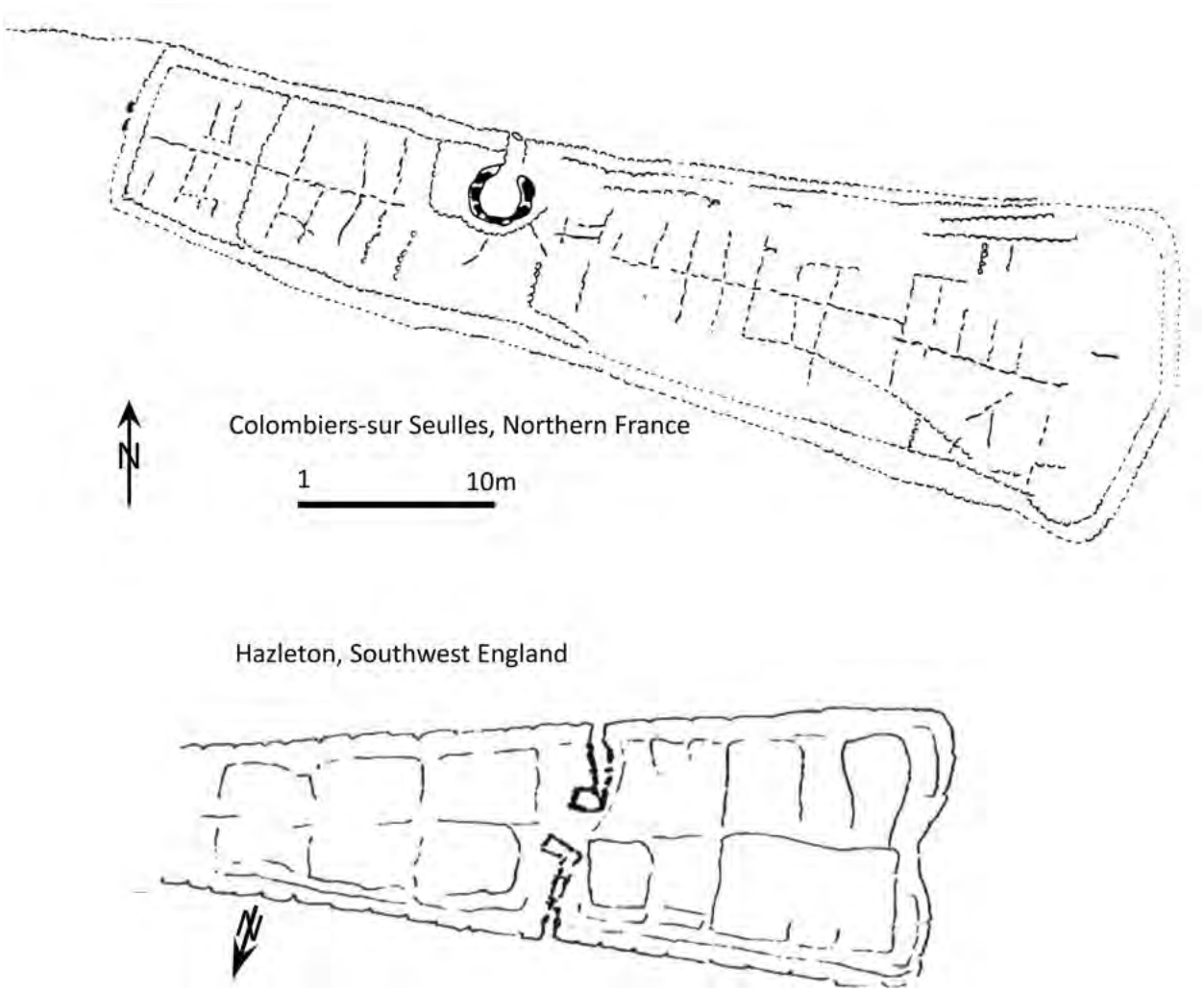


Figure 3.28 Colombiers-sur Seulles (after Billard/Chancerel 1998, 253) and Hazleton in Southwest England (after Malone 2005, 120)

Thus, the construction of this grave may possibly be set during the time interval 4312–3665, 95.4%. Colombiers-sur-Seulles is an atypical structure for the region of Central West France with its megalithic chamber and, as mentioned, its long tumuli with inner compartments (cf. Joussaume 2006; Laporte *et al.* 2002). A nearly identical architectonic concept comparable to Colombiers-sur-Seulles is documented by the Severn-Cotswold tombs in England and also particularly by Hazelton (Figure 3.28). For the latter, a radiocarbon sequence determined with Bayesian modeling to 3695–3650 cal BC, 95.4% is available which allows a determination of the end of the construction of the Hazelton tumulus (Meadow *et al.* 2007: 61).

Further radiocarbon determinations have especially been processed from gallery grave contexts. The subterranean gallery grave La Chaussée Tirancourt close to Picquigny in the Picardie is an 11m long structure with an original 2m long antechamber (Leclerc/Masset 2006; Masset 1972; 1995). An MNI from 341 individuals deposited in three layers is documented from the chamber (Chambon 2003: 289). Altogether, six radiocarbon results are available: three are gained from human bones and three from charcoal. The earliest dated individual died at ~3260 BC (GifTAN-94186; 4540±70 BP; 3362–3101 cal BC, 68.2; 3498–3016 cal BC, 95.4%) the latest at ~2250 cal BC (2397–2133 cal BC, 68.2%; 2462–2040 cal BC, 95.4%). Three results for an MNI of 341 individuals are insufficient for any closer idea of the duration of the burial activities. Three results gained from charcoal (Gif-1378; 3650±120 BP; Gif-1372, 3650±120 BP; Gif-1289; 3350±130 BP) show a late use or secondary activities on the site in the 2nd millennium. Two copper pearls are documented from the chamber, whereas in the antechamber deer antlers, small axes, pendants partly made of green stone, and SOM-ceramics were found.

La Butte du Cyr in Valle du Reuil is a gallery grave with an MNI of at least 109 individuals. Both sexes and all ages, except for small children under two years of age, are represented. Four radiocarbon determinations from human bone material are available with the earliest

result from ~3370 cal BC onwards (Ly-123, 4690±90 BP; 3362–3101 cal BC, 68.3%; 3498–3016 cal BC, 95.4%) and the most recent result from ~2690 cal BC (Ly-125; 2865–2621 cal BC, 68.2%; 2881–2505 cal BC, 95.4%). The grave goods consist of SOM-ceramics, flint daggers, mussel shells, bear or bovid teeth, lignite pearls, a pearl in varisicite (probably from Catalonia), and copper objects, including copper pearls and two copper daggers (Billard *et al.* 1995). Again, the significance of these four results is limited since so many individuals are buried.

Vers-sur-Selles in Somme is another megalithic gallery grave with available radiocarbon dates (Piningre/Bréart 1985). The grave is rather destroyed and the location of the stone slabs is defined according to the remaining pits. Of the four radiocarbon results available, one stems from a human bone sample from the chamber and three stem from charcoal samples from the filling. The result from the human bone is dated to ~2900 cal BC (Gif-5740, 4240±100 BP; 3009–2627 cal BC, 68.2%; 3313–2488 cal BC, 95.5%). Two of the charcoal samples suggest a time interval of 3324–2287 cal BC (95.4%; 3011–2471 cal BC, 68.2%; Gif-3700, 4240±120 BP; Gif-3699, 4060±120 BP), one is considerably later (1451–1132 cal BC, 68.2%; 1605–1008 cal BC, 95.4%) (Figure 3.29).

Furthermore, radiocarbon results are available for singular human bones from the gallery graves La Cave aux Fées, Bois Coutourier, and Guiry-en Vexin (Chambon/Salanova 1996, 111, Figure 9; Delibrias/Guilliet 1988, 64). According to the radiocarbon determinations for human bones from gallery graves in the Paris Basin (Figure 3.29), the earliest known buried individual from La Butte du Cyr in Val du Reuil died at ~3370 cal BC (3526–3126 cal BC, 68.2%; 3634—3098 cal BC, 95.3%). This determination solely represents an estimation of the outset of construction and burial activities in the gallery graves. The burial activities last at least until 2130 BC (2204–1955 cal BC, 68.2%; 2439–1823 cal BC, 95.4%)

Megaliths with radiocarbon results in Brittany and on the Channel Islands

Bone preservation in Brittany is poor due to acidic soils. From the altogether 177 available radiocarbon determinations from megalithic or pre-megalithic tumuli or terte contexts, only 9 stem from human bones.

From the remaining 168 radiocarbon results gained from charcoal, carbonized seeds, peas, nut shells, and

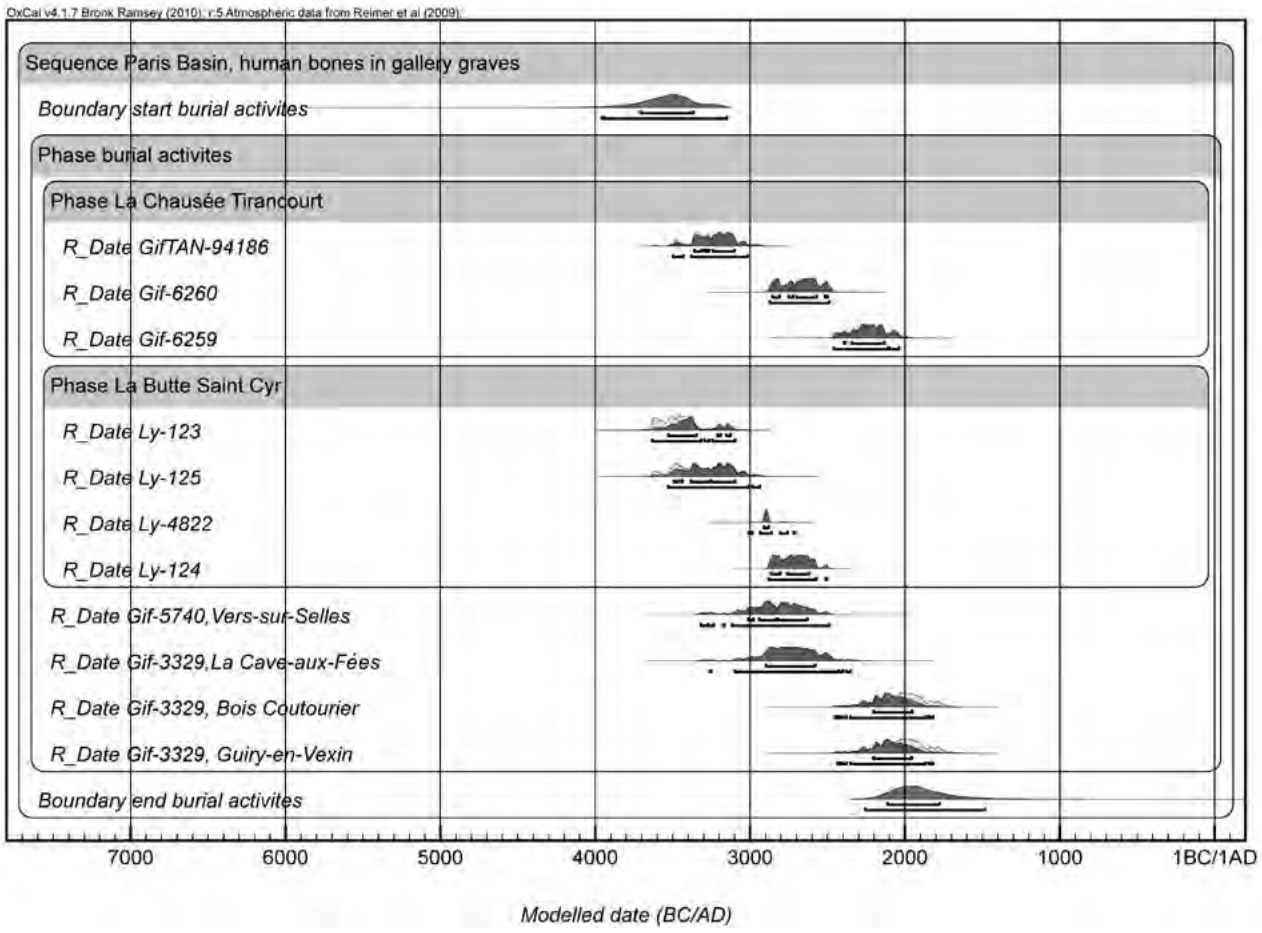


Figure 3.29 Probability distribution of dates from human bones in gallery graves in the Paris Basin. Model agreement: A_{model}=94.4, $A_{overall}$=93.2

humidic material from ceramics (cf. Tab. 3.1), many cannot be directly associated with the megalithic structures, their construction, and their use due to the persistence of Neolithic societies in this region, who used the same localities and sites for centuries, and due to complicated and complex building sequences (cf. chap. 2, p. 9-12, Figure 2.1). Much of this data represents reliable termini post quos values regarding the construction of the megalithic structure. They originate from pre-monument activities and were mixed up during building activities. Another problem is the fact that most of the charcoal samples are not determined according to species and they are thus potentially long-lived samples. This implicates the possibility of an old-wood effect.

Radiocarbon Results for Human Bones from Megalithic Graves in Brittany

Since it is especially problematic to correlate charcoal samples to their original stratigraphical contexts in Brittany, the few megalithic graves with radiocarbon dates measured for human bones deserve closer consideration. Dated human bone material is available from the passage graves Port Blanc, Er Yoh, and Conguel (Schulting 2005: 166) and from Beg-an-Dorchenn and Roc´h-Avel (Giot *et al.* 1994) (Figure 3.30).

Directly at the cliffs of Port Blanc on the peninsula of Quiberon in the Morbihan, two passage graves are situated with a southeast orientation (Figures 3.31-32). They are covered by a round stone tumulus. The bone material of these graves is preserved due to the mussel chalk in the sand. The western grave is constructed with a simple circular chamber, 3m in diameter, and a passage which is oriented to the southeast. It can be reconstructed from the old excavation report of F. Gaillard (Gaillard 1883; Gouézin, 2007: 123), which stated that the burials were deposed in two layers which are separated by stone slabs. From the upper layer, 12 skulls and disarticulated bones are registered. In the lower layer, 10 skulls were found, whereby two of them are from articulated individuals. 'Some' articulated skeletons are described for the eastern grave with a nearby quadratic chamber measuring 2m x 2,50m (Gouézin 2007: 123). Radiocarbon determinations are available from three human bones. Unfortunately, the position of these samples in the grave cannot be determined. The first dated burial is from ~3840 cal BC (3959–2634 cal BC, 95.4%; 3942–2697 cal BC, 68.2%;

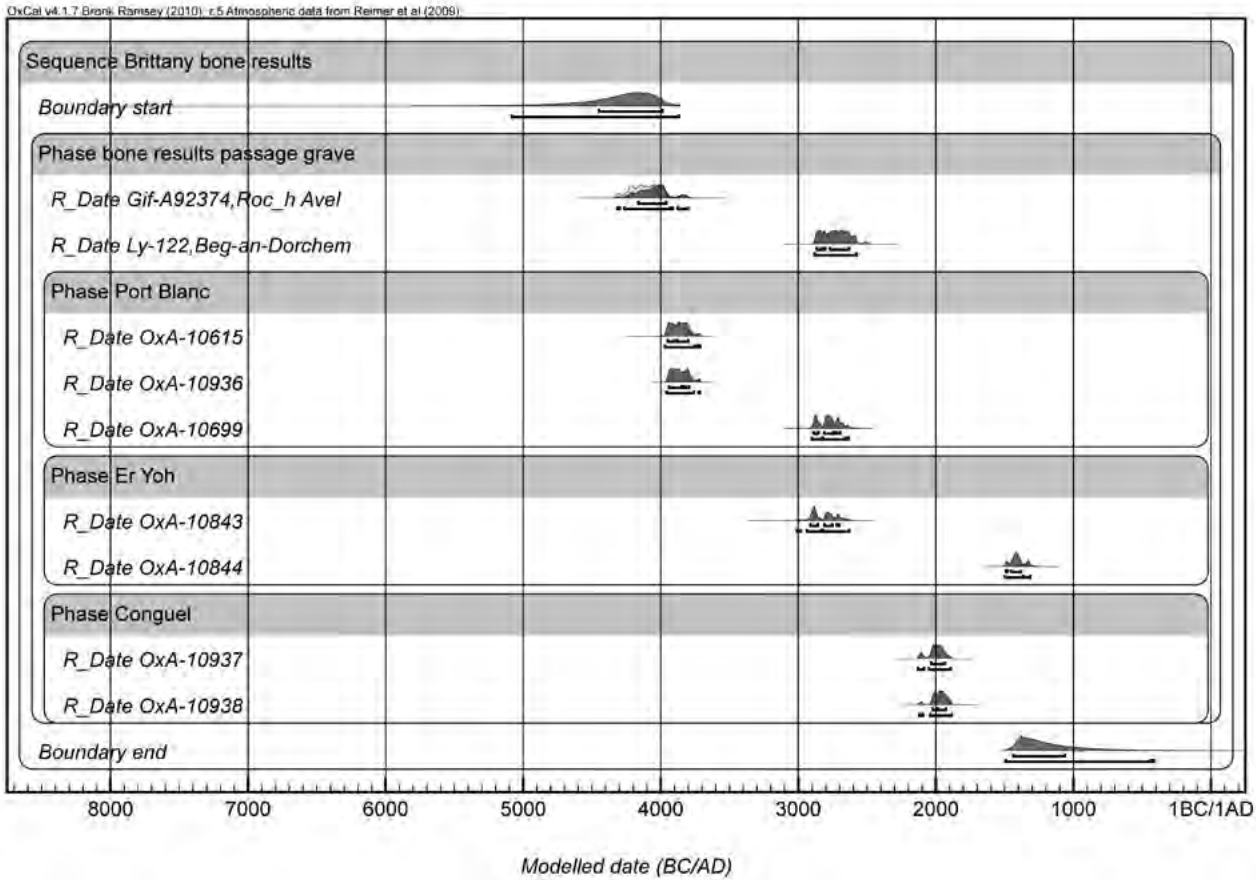


Figure 3.30 Probability distribution of dates from human bone samples from megalithic graves in Breton. Model agreement: A_{model}=97.1, $A_{overall}$=97.4



Figure 3.31 The passage graves in Port Blanc, Quiberon

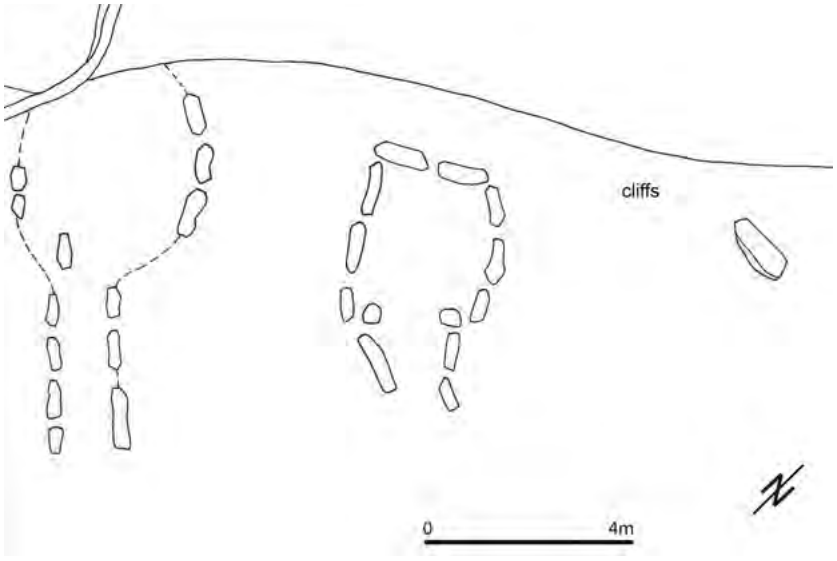


Figure 3.32 Planum of the passage graves at Port Blanc showing their location directly on the cliffs (after Gouézin 2007). The southwestern grave is today partly eroded

OxA-10936; 5050±40 BP; OxA-10699; 4200±45 BP; OxA-10615; 5070±50 BP), the last from ~2770 cal BC (OxA-10699, 4200±45 BP; 2891–2697 cal BC, 68.2%; 2902–2634 cal BC, 95.3%). But since only few individuals are dated, an earlier construction of this grave is also possible. The stable isotope values for the $\delta^{13}C$ rate vary between -19.9 and -19.6‰ and for the stable nitrogen value $\delta^{15}N$ between 10.9 and 11.0‰ (Schulting 2005: 166). Accordingly, a reservoir effect can be excluded so far.

Furthermore, two radiocarbon results from human bones are available for the passage grave Beg-an-Dorchem on the Ile de la Torche in Plomeur. In the sand of one of the two lateral chambers and in its passage, dislocated remains of at least five individuals were detected (Giot 1947; 1994, 624; 2007: 61). One result is from ~4250 cal BC (Gif-A92372, 5490±90 BP; 4443–4082 cal BC, 68.2%; 4466–4047 cal BC, 95.3%), whereas the other result is from ~2730 cal BC (Ly-122, 4140±55 BP; 2868–2631 cal BC, 68.2%; 2882–2576 cal BC, 95.4%). Unfortunately, there are no stable isotope values available. Close to the grave, a shell midden which did not survive until present indicates a possible marine diet of the inhabitants of the Ile de la Torche (Giot 2007: 61).

On the edge of Roc´h-Avel in the commune of Landéda, two passage graves are inserted in a stone tumulus including an MNI of three individuals with one radiocarbon determination from around ~4080 cal BC (Gif-A92374, 5260±90 BP; 4229–3982 cal BC, 68.2%; 4331–3821 cal BC, 95.4%). Another not surprising early available result with a high standard deviation stems from the charcoal sample of an oak trunk from the first level of the grave (Gif-5510, 5800±100 BP; 4777–4542 cal BC, 68.2%; 4928–4407 cal BC, 95.4%) (Giot 1994: 625). An old-wood effect is plausible.

From the passage grave Er Yoc´h in the commune Houat in the Morbihan, one radiocarbon result is available from ~2820 cal BC (OxA-10937, 4240±55 BP; 2913–2702



Figure 3.33 Barnenez from the southeast.



Figure 3.34 Destroyed section of Barnenez from the northeast

cal BC, 68.1%; 3010–2631 cal BC, 95.4%). The remaining results from Er Yoc´h and from Congruel are from the Bronze Age (Schulting 2005: 166) and will not be considered further.

Corresponding to the presented results, the earliest so far known individual buried in an Armorican passage grave on the Ile de Torche died at ~4290 BC (Gif-A92372, 5490±90 BP; 4449–4258 BC, 68.2%; 4521–4056 BC, 95.3%).

Multi-Phased Megalithic Structures in Brittany

Finistère

Barnenez

Barnenez in Plouezoc'h in Finistère is a sophisticated and complex monument with passage graves. Based on radiocarbon determinations, it has been discussed for decades as the earliest megalithic grave in Brittany and as one of the earliest megaliths in Europe (Giot 1981; 1987; 1991; 1994; Le Roux 2006: 251). Barnenez is a northwest-southeast-oriented stone tumulus over the bay of Morlaix with a length of up to 90m and a width of up to 40m constructed in dry wall technique with several platforms. 11 passage graves are inserted into the tumulus with the entrances to the southeast façade (Figures 3.34-36).

Seven radiocarbon results are available from charcoal samples of altogether six passage graves (Figure 3.37). Three of them show subsequent use of the site (entrance chamber B; Gif-1311, 3200±120 BP) and (Gsy-147, 2690±105 BP; Gsy-30, 2200±200 BP) (Delibrias *et al.* 1971: 215). Unfortunately, none of the samples of the remaining four radiocarbon results are from a context which allows their association to the construction or first use phase of the grave. They originate more from typical termini-post-quos situations (Cassen 2009: 738). The analysis of an accumulation of charcoal grains provided material from 12 different types of trees and shrubs which could not have grown together. P. R. Giot took into consideration that this material was presumably from torches (Giot 1994: 625). Nevertheless, the earliest result from Chamber G (Gif-1309; 5750±150

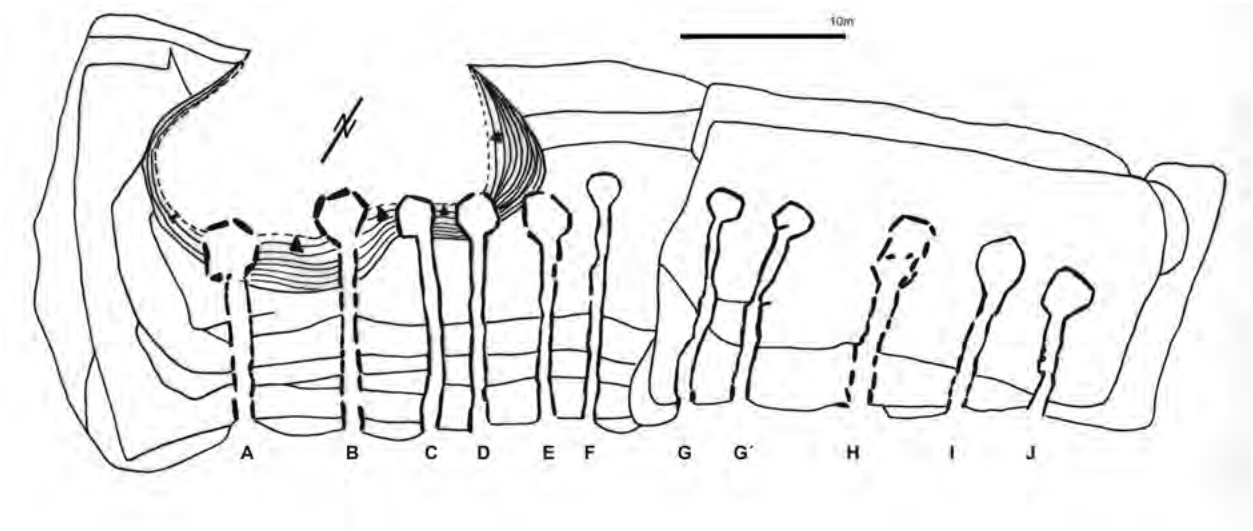


Figure 3.35 Planum Barnenez (after Joussaume 1985: 129)

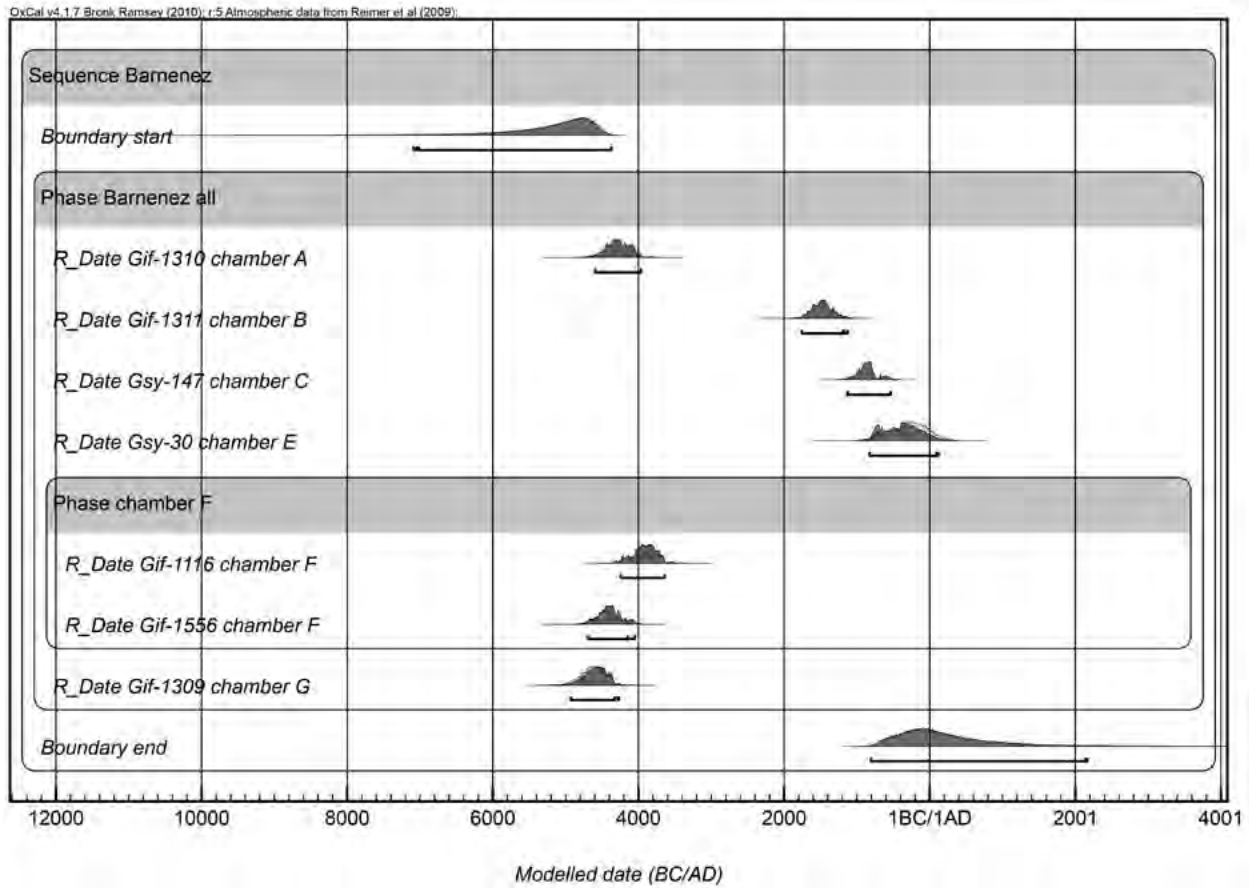


Figure 3.36 Probability of radiocarbon determinations from Barnenez

BP; 4781–4452 cal BC, 68.2%; 4982–4332 cal BC, 95.4%) is obtained from a clayey layer, which was imported from somewhere else to even out the floor of the chamber (Cassen 2009, 738; Giot 1987, 37). The charcoal from chamber F (chamber F, Gif-1556, 5550±140 BP; 4547–4245 cal BC, 68.2%; 4706–4052 cal BC, 95.4% and Gif-1116, 5100±140 BP; 4041–3712 cal BC, 68.2%; 4243–3640 cal BC, 95.4%) originates from a 40cm deep layer of sterilely clay covered by a stone pavement which contained the archaeological material. The sample from chamber A (Gif-1310; 5450±150 BP; 4451–4069 cal BC, 68.2%; 4612–3964 cal BC, 95.4%) is obtained from a pit from outside the chamber with gravel to even out the ground line (Cassen 2009: 738; Giot 1987: 57).

There is just a little archeological material documented for the site, such as some ceramics from the chambers A, F, E, C, D, flint blades, and transversal arrow heads

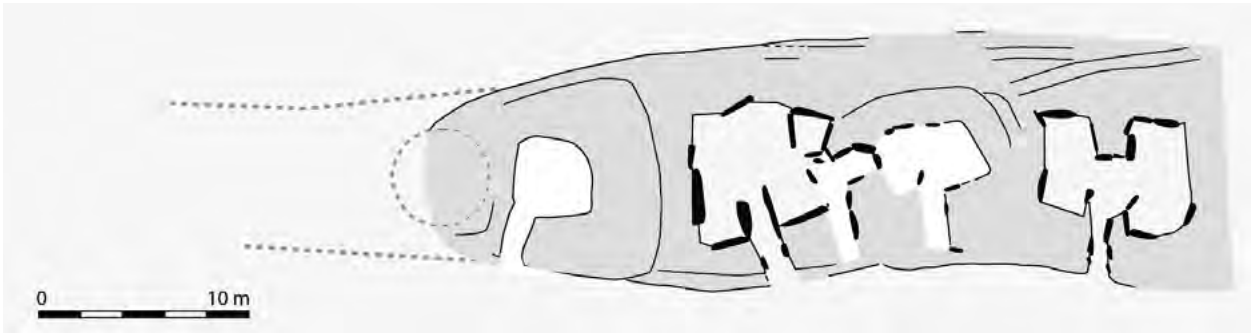


Figure 3.37 Planum Le Souc´h (after Laporte 2010)

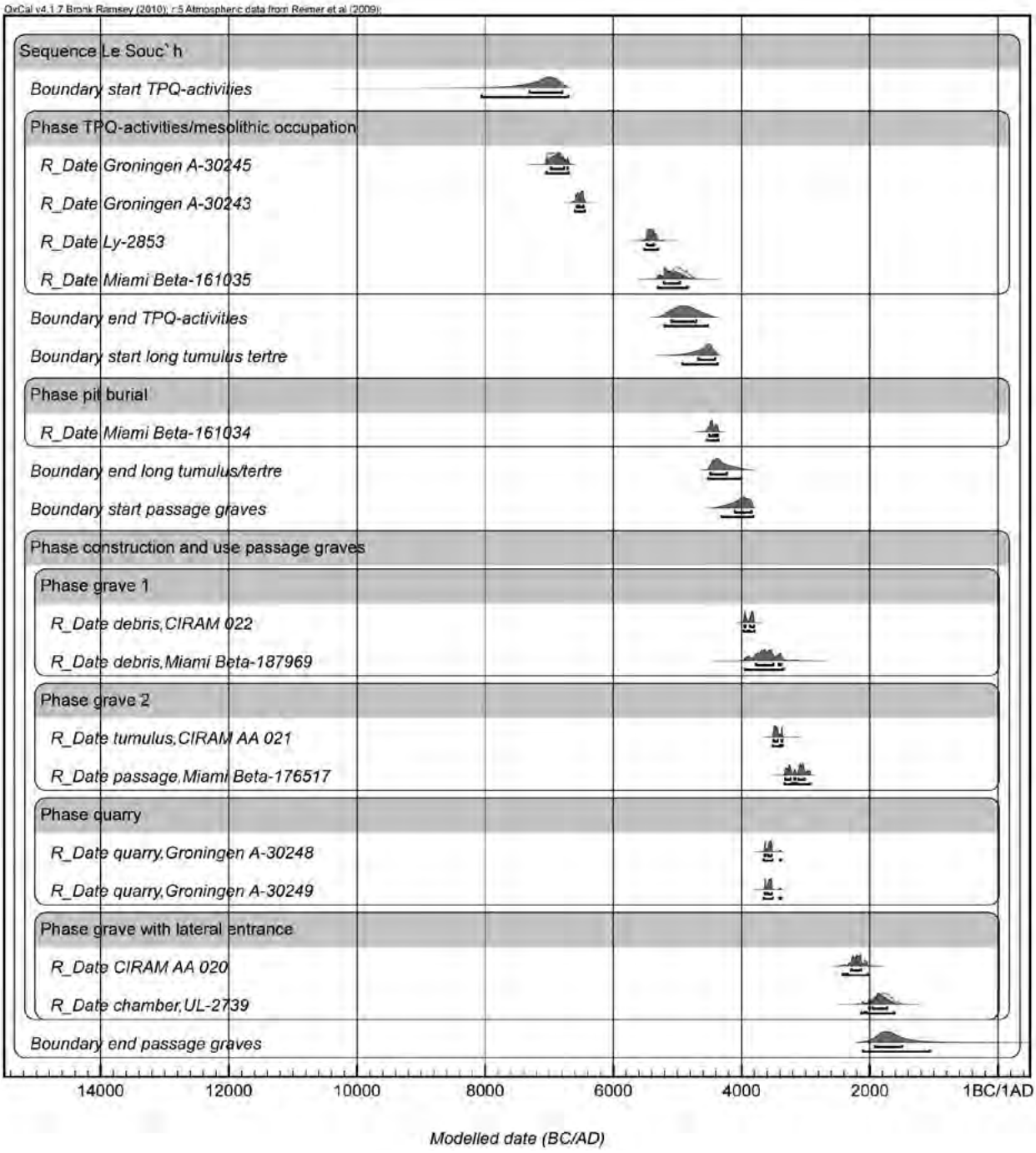


Figure 3.38 Probability of radiocarbon results from Le Souc´h. Model agreement: A_{model}=94.3, $A_{overall}$=94.3

from the Recent Castellic horizon, the Bell Beaker, and the Medieval period (Giot 1987; Giot 1991: 26–27) which support the last two radiocarbon results from ~4290 cal BC onwards.

Le Souc´h

Another monument which was built in several phases, for which a radiocarbon sequence is available, is found at Point de Souc´h in Plouhinec, Finistère (Cassen 2009: 753–754; Laporte 2010: 4–5, 20; LeGouffic 2002; 2004; 2006) (Figures 3.37-38). The later phases have an architectonical concept similar to Barnenez: passage graves are arranged along one line and inserted into a long tumulus. In total, we have 12 radiocarbon results at our disposal (Cassen 2009: 753; LeGouffic 2002; 2004; 2006).

For the site a pre-monument layer is documented and the end of the pre-megalithic activities is calculated to ~4860 cal BC (5071–4684 cal BC, 68.2%; 5199–4517 cal BC, 95.4%). In a first phase, a round tumulus or tertre was built with a pit burial. This round tumulus was later inserted into a low long north-northwest/south-southeast-oriented tumulus. From the burial pit, a charcoal sample is available from ~4450 cal BC (4503–4374 cal BC, 68.2%; 4538–4365 cal BC, 95.4%). The archaeological material, such as a ceramic with an oval opening, is comparable to the material of other similar structures at Kervinio in Trinité-sur-Mer and la Croix-Saint-Pierre, but also to the Ancient Castellic material from the pre-monument layer at Dissignac (Cassen 2009: 754). On one part of this structure, five passage graves were erected, two of them P-formed and covered by stone tumuli. Six radiocarbon results originate from graves 1 and 2 and from the grave with the lateral entrance. The radiocarbon determinations connected to the passage graves do not begin before ~4070 cal BC (4107–3846 cal BC, 68.2%; 4318–3817 cal BC, 95.4%) or possibly even later, since the charcoal samples from grave 1 originate from debris, which includes the probability of termini post quos values. These results contain a time interval of 3969–3351 cal BC (95.4%; 3957–3381 cal BC, 68.2%). Two samples from the quarries beside the monument indicate building activities between 3658–3384 cal BC (95.4%; 3643–3528 cal BC, 68.2%). The determinations of samples from the passage and the tumulus from grave 2 begin later at ~3440 cal BC (3498–3369 cal BC, 68.2%; 3517–3361 cal BC, 95.4%) and range from 3517–2926 cal BC (95.4%; 3498–3017 cal BC, 68.2%). Evidence for a late use of the burial complex is verified by two radiocarbon results from the graves with the lateral entrance in the middle of the monument. The determinations extend from 2429–1615 cal BC (95.4%; 2289–1731 cal BC, 68.2%). The archaeological material from the passage graves is Auzay-Sandun-related Souc´h and Carn material (Cassen 2009: 754).

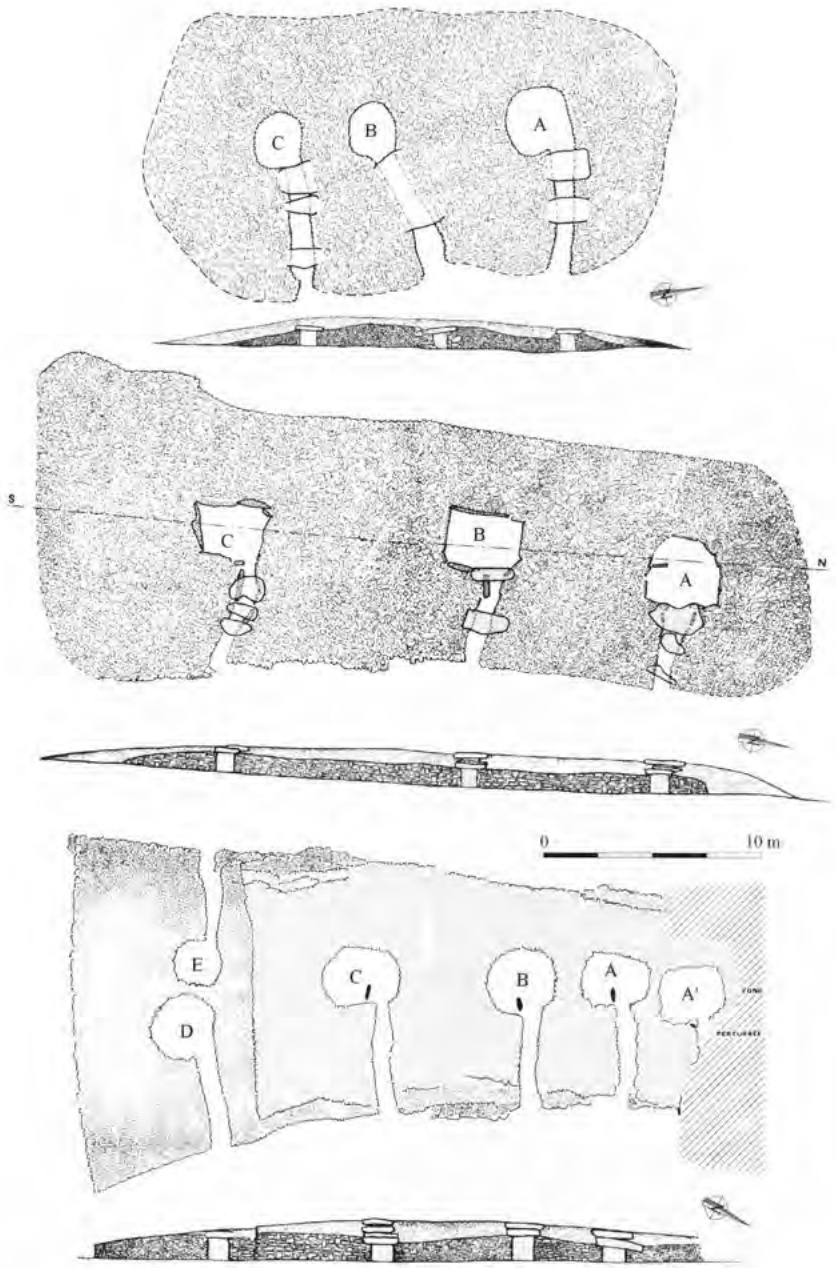


Figure 3.39 Ile Guénioc, tumuli I, II and III (after Giot 2007: 42)

Ile Cairn and Ile Guennoc

Other complexes with passage graves and radiocarbon results in Finistère are documented from the Ile Cairn in Ploudalmézeau and nearby from the Ile Guennoc or Guénioc (Giot 1987; 2007, 42; Giot *et al.* 1998; Sparfel/ Pailler 2009: 205–209). Ile Cairn is a structure with three passage graves inserted into a stone tumulus, from which four radiocarbon results are available.

Three of these results have a high standard deviation between ±150 and ±250 and will not be used for this analysis. One charcoal sample from the central chamber (Delibrias *et al.* 1970: 431) provided a radiocarbon result of ~4060 cal BC (Gif-1968, 5230±75 BP; 4226–3965 cal BC, 68.2%; 4313–3811 cal BC, 95.4%). Close by on the Ile Guennoc, three or four stone tumuli are registered with several passage graves (Figure 3.39). Three radiocarbon results are available, all with a high standard deviation between ±120 and ±300. One of them will not be considered further (Gif-165, 5800±300 BP). The remaining data begins at ~3890 BC and ranges from 4239–2902 cal BC (95.4%; 4034–3024 cal BC, 68.2%).

St. Laurent

Another passage grave in Finistère with a few results is located at St. Laurent. Two more radiocarbon results from a passage grave context are available here. This passage grave has a double chamber inserted into a stone tumulus in dry wall technique (Coursaget/Le Run 1966: 135; L´Helgouach 1965). One of the charcoal samples is measured to ~3650 cal BC (Gsy-111, 4825±125 BP; 3759–3379 cal BC, 68.2%; 3943–3359 cal BC, 95.4%), whereas the other determination is calculated to somewhat later at ~2240 cal BC (Gif-809, 3800±120 BP; 2457–2051 cal BC, 68.2%; 2572–1915 cal BC, 95.4%) and attests a possible reuse of the grave.

Morbhian

Table des Marchands

Further to the south in the Morbihan, the so far most extensive series of radiocarbon measurements for a megalithic site in France is available from the passage grave Table des Marchands nearby Locmariaquer (Cassen 2009). An interpretation of these 27 radiocarbon results is complicated, since the site is a cluster of various pre-Table des Marchands activities and the most measurements represent termini post quos values regarding the construction of the passage grave (Cassen 2009: 737–768)

(Figures. 3.40-42). The Table des Marchands is an eastern-oriented, 12m long passage grave with a polygonal chamber, covered today by the reconstruction of a stone tumulus in dry wall technique. Just beside the grave to the west, a northeast-southwest-oriented alignment, which is lost today, was originally situated with 19 standing stones, including the Grand Menhir at the very southwestern end. This originally 280t, 20.6m long standing stone is fragmented today and lies on the ground. The alignment was covered by a layer of Recent Castellic material, which represents a pre-construction layer of the passage grave. A fragment of a decorated alignment stone was used as a cover stone for the Table des Marchands and for the long tumulus Er Grah, which was erected after the alignment but before the passage grave to the west of the Table des Marchands (cf. chap. 3, p. 34-47). Another fragment of the same standing stone was used as a cover stone for the passage grave of Gavrinis on today´s Gavrinis Island.

22 of the radiocarbon determinations reflect termini post quos activities regarding the construction of the passage grave and they originate from a pre-monument layer directly under the Table des Marchands, namely from the pits of the lost alignment, from hearths, and from a quarry outside the grave. The samples from the filling of the quarry were taken into consideration as outliers, since this filling is an unstratified accumulation from all kinds of material from the whole site. The model shows a high agreement with Amodel=94.7 and Aoverall=95.1. The beginning of the termini post quos activities regarding the construction of the passage grave including the erection of the alignment. The Recent Castellic layer on the alignment is calculated to ~5170 cal BC (5223–5047 cal BC, 68.2%; 5370–4970 cal BC, 95.4%) and the end of the termini post quos activities to ~4120 cal BC (4207–4056 cal BC, 68.2%; 4257–3976 cal BC, 95.4%). It is problematic to connect the six radiocarbon results from the pits of the standing stones to the erection of the alignment, since it is possible that they originate either from the layer under the alignment or from the time when the standing stones were deconstructed. This must have occurred at least partly before the erection of the Table des Marchands.

The construction and use of the Table des Marchands is thus not calculated before ~4181–3841 cal BC (95, 4%; 4112–3932 cal BC, 68.2%).

St. Michel

From the same region, the most recent determination of the St. Michel sequence stems from Carnac (cf. chap. 3, p. 36-38 for the whole sequence) and is an indicator for the construction of a passage grave with a round chamber inserted in the eastern part of the tumulus at ~4000 cal BC. However, we consider this measurement with limitations since it suffers from large error terms. The charcoal sample is obtained from the filling of the final mound and the result is calculated to a time interval of 4339–3631 cal BC (95.4%; 4235–3715 cal BC, 68.3%; GSY-89; 4980±150 BP) (Coursaget *et al.* 1966; Schulting *et al.* 2009: 773).

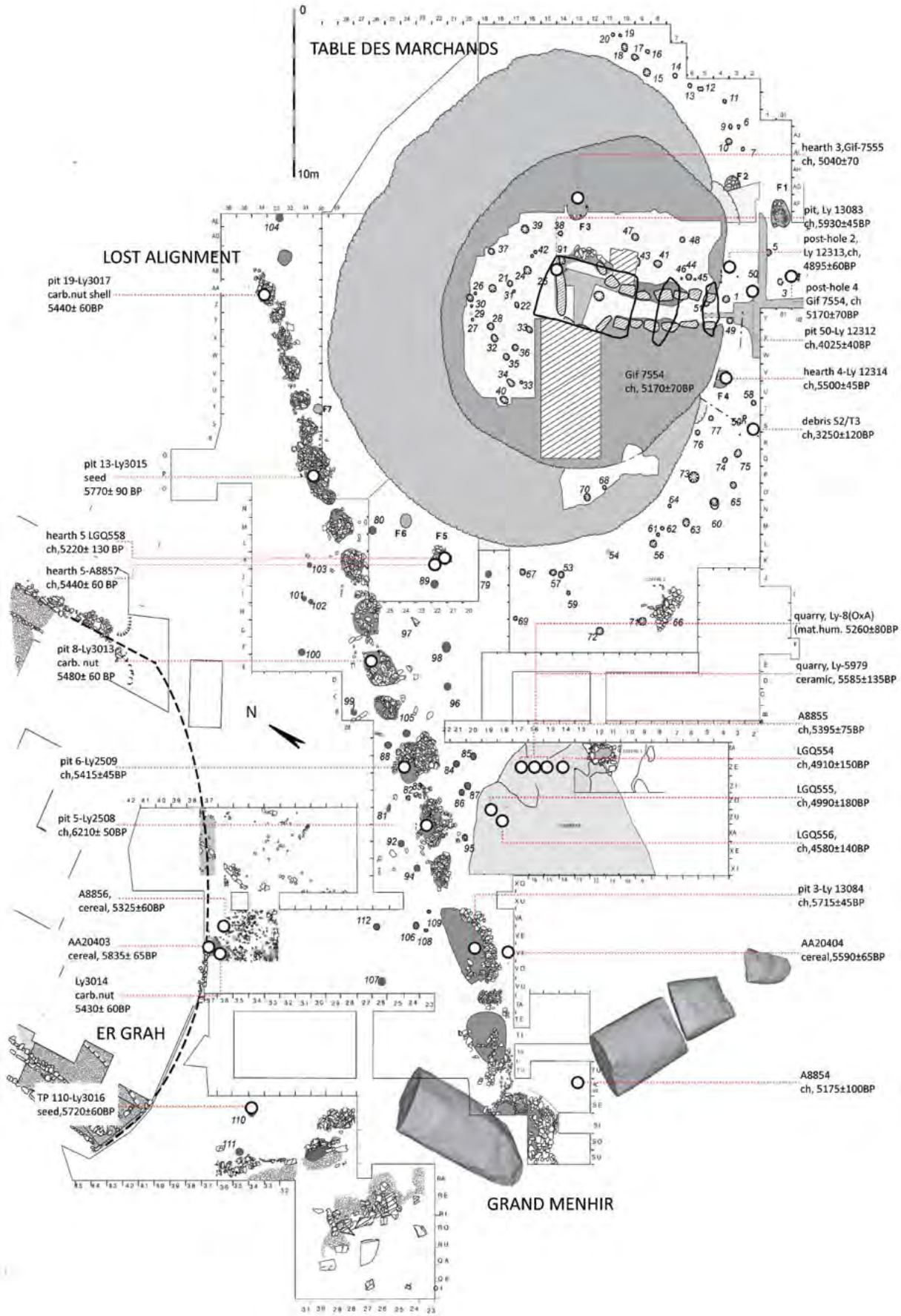


Figure 3.40 Planum Table des Marchands with radiocarbon results (after Cassen 2009)

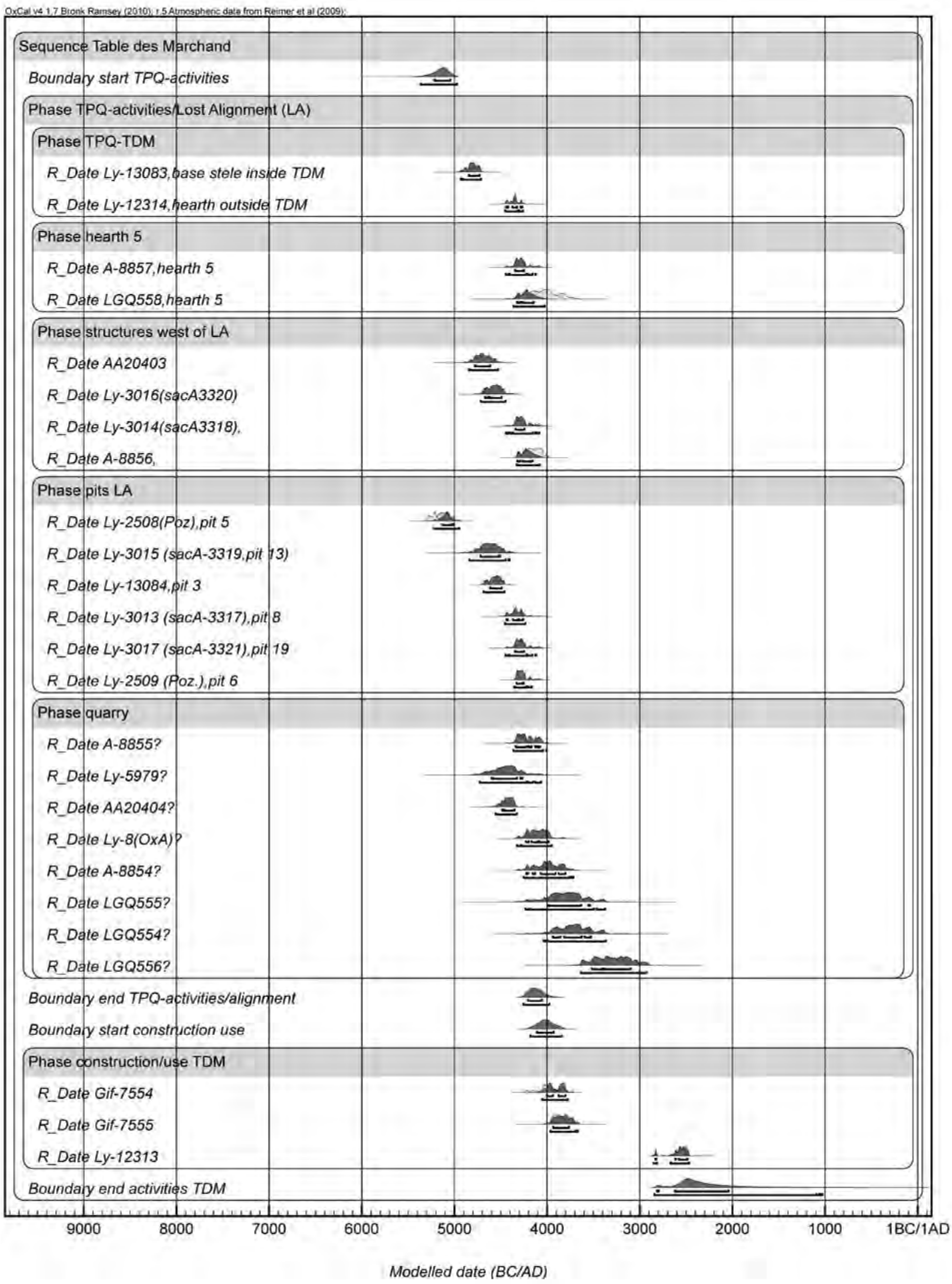


Figure 3.41 Probability of all dates from the site Table des Marchands. Start alignment/TPQ-activities 5223–5047 cal BC, 68.2%; 5370–4970 cal BC, 95.4%; end alignment TPQ-activities 4208–4057 cal BC, 68.2%; 4257–3977 cal BC, 95.4%; start TDM 4112–3932 cal BC, 68.2%; 4181–3841 cal BC, 95.4%. Model agreement: A_{model}=94.7 and $A_{overall}$=95.1



Figure 3.42 Table des Marchands from the southeast

Petit Mont

The Petit Mont, a complex structure with several building phases, is located further to the south in Arzon on the Rhuys peninsula (Cassen 2009: 752; Giot 2007; Le Cornec 1987; 1994). Today, the final stone tumulus measures 60m x 46m and is between 6m and 7m high (Figures 3.43, 3.45). In the first stage, a long tumulus was erected. The next phase is represented by a round stone tumulus (cairn I) and a structure without a chamber. The third structure (cairn II) is a round stone tumulus which covers a passage grave with eastern orientation. The fourth structure is a half-round stone tumulus (cairn III) covering cairn I and II. Two eastern oriented passage graves are inserted in this last structure. Altogether 11 radiocarbon determinations from charcoal samples are available (Cassen 2009: 752; Le Cornec 1994) (Figure 3.44). One radiocarbon result from the initial long tumulus or tertre is calculated to ~4420 cal BC (Gif-6844, 5650±70 BP; 4428–4348 cal BC, 68.2%; 4515–4333 cal BC, 95.4%), since there is an ancient soil registered with a result from ~4530 cal BC (Gif-6846, 5600±70 BP, 4547–4427 cal BC, 68.2%; 4679–4387 cal BC, 95.4%). It is likewise possible that this charcoal originates from the pre-monument layer. A series of seven radiocarbon determinations is available from chamber II, passage II, passage III, and from the eastern façade of the final tumulus. The construction of grave II, which is the earliest passage grave of the complex, is calculated to 3944–3798 cal BC (95.4%, 3887–3817 cal BC). One result is available from passage grave III, indicating construction or use of grave III some decades later at ~3830 cal BC (Gif-8287, 5130±40 BP; 3847–3803 cal BC, 68.2%; 3882–3777 cal BC, 95.4%). The determination of a charcoal sample from the eastern façade suggests activities at the final tumulus cairn III at ~3670 cal BC (3760–3639 cal BC, 68.2%, 3808–3536 cal BC, 95.4%). Chamber II provided clear Auzay-Sandun material, while from chamber III both Auzay-Sandun material, such as a knobbed bowl with a concave foot, and Recent Castellic material, such as the fragment of a footed cup (coupe-à-socle), are recorded (Lecornec 1987, Figure 21–25). The Castellic material possibly originates from the initial tumulus or tertre, such as a variscite pendant from the back of the chamber which is similar to the pendants in the tumuli Carnacéens (Cassen 2009: 755).

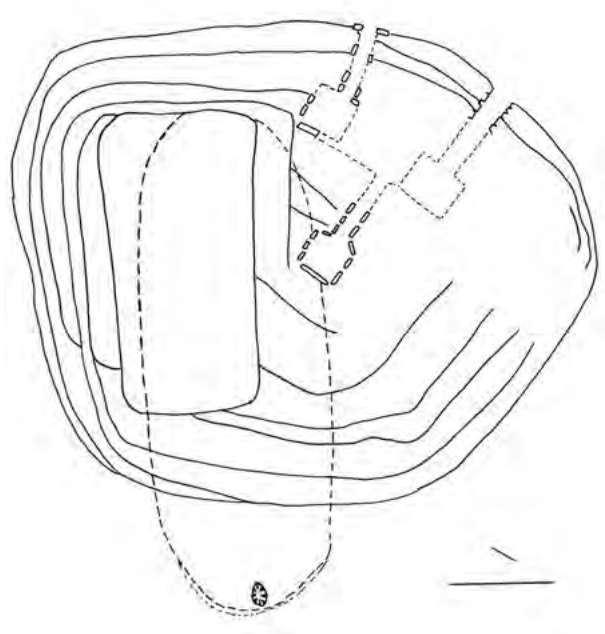


Figure 3.43 The Petit Mont in Arzon (after Le Roux 1999: 51)

Gavrinis

In this region of the Morbihan, the passage grave Gavrinis is likewise situated on Gavrinis Island near Larmor Baden. In prehistory, the site was on the mainland. The sequence from Gavrinis commences with a settlement layer with Cerny, Ancient Castellic, or Villeneuve-Saint-Germain-related material in

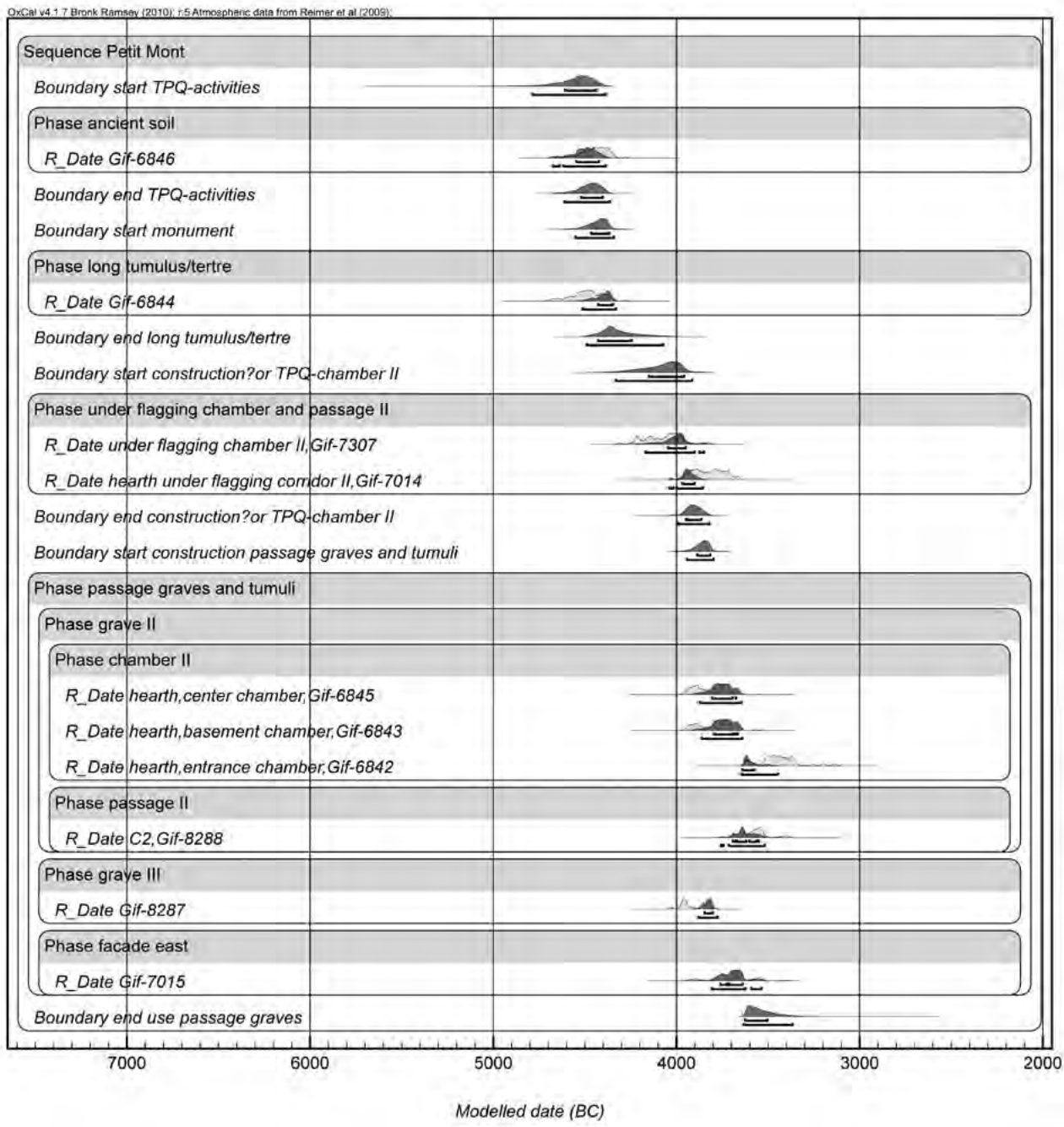


Figure 3.44 Probability of the dates from the Petit Mont in Arzon. Model agreement: A_{model}=74.4, $A_{overall}$=77.8.

its regional Augy-Ste-Pallaye variety. Afterwards, a tumulus or tertre is documented with no identified grave chamber (Cassen 2009: 755). Finally, today's visible structure consists of a passage grave covered by a half-round stepped stone tumulus in dry wall technique with a façade 28m in length (Briard 2000, 39; Le Roux 1985) (Figure 3.46). The rectangular grave chamber measures 2,7m x 2,3m and was covered by a decorated cap- stone, which was originally a part of a standing stone from the lost alignment in Locmariaquer. Other fragments of the same stone were inserted into Er Grah and the Table des Marchands. The passage is 11,8m long and is comprised of 23 side stones richly decorated with axes and water motifs.

Three radiocarbon measurements are available from charcoal samples of the façade and from a ditch (Gif-6295, 4060±60 BP; Gif-6294, 4470±80 BP; Gif-5766, 4470±80 BP). They range from 3360–2467 cal BC (95.4%; 3337–2481 cal BC, 68.2%). The grave equipment consisted of Auzay-Sandun material (Cassen 2009, 755).

Larcuste

Larcuste in the interior of the Morbihan in South Colpo is a site with two tumuli and three passage graves (Briard 2000: 26; Giot *et al.* 1979: 249; Lecornec/L´Helgouach 1976). Larcuste I is a half-round stone tumulus in dry wall technique with a maximal length of 13m including



Figure 3.45 Petit Mont. Photo courtesy of Manvyi, - CC-by-sa /Wikimedia Commons



Figure 3.46 Façade of Gavrinis

two inserted simple passage graves. These graves have a parallel construction and are oriented to the southeast. Larcuste II is a monument with a 17,5m long oval stone tumulus in dry wall technique. It covers a transepted passage grave with six round side cells, which are arranged around a 10m long corridor. Four radiocarbon measurements from charcoal samples are available from Larcuste II. They were processed in the 1970s (Giot *et al.* 1979: 249; Lecornec/L´Helgouach 1976: 396) and due to their high standard deviation of between ±110 and ±120, we consider them critically.

One sample from the passage provided a result from ~4300 cal BC (Gif-2826, 5490±120 BP; 4487–4175 cal BC, 68.2%; 4586–4004 cal BC, 95.4%), whereas the determination of one sample from the tumulus is measured to ~3330 cal BC (Gif-2454, 4610±110 BP; 3622–3114 cal BC, 68.2%; 3637–3026 cal BC, 95.4%). Two results indicate late Neolithic activities at the façade of the grave (Gif-2827, 4060±120 BP; 2863–2471 cal BC, 68.2%; 2905–2287 cal BC, 95.4% and Gif-2453, 3980±110 BP; 2832–2299 cal BC, 68.2%; 2872–2202 cal BC, 95.4%).

Dissignac

Further to the south and in the west part of Saint-Nazaire in Loire-Atlantique, four radiocarbon results

of charcoal samples from the grave complex Dissignac are at our disposal (L´Helgouach 1990; 1997). Dissignac is a round stone tumulus in dry wall technique with a diameter of 28m, including two passage graves. Both graves have an 11m long corridor. They are arranged in parallel and oriented to the southeast (Briard 2000, 29; L´Helgouach 1997) (Figure 3.47). From the site a pre-monument layer is documented with Mesolithic and Ancient Castellic material (Cassen 2004; Cassen 2009: 755). Three of the samples originate from the pre-monument layers and show a time interval from 6230–3973 cal BC (95.4%; 5589–4274 cal BC, 68.2%). One sample with a result from ~3710 cal BC (Gif-3821, 4940±140 BP; 3948–3638 cal BC, 68.2%; 4043–3378 cal BC, 95.4%) originates from the entrance area of chamber B and thus can possibly be associated with the use of the grave. This determination is supported by the homogenous Auzay-Sandun material from the passage graves and from the façade of the monument (Cassen 2009: 755).

Kermené

A late Neolithic passage grave is situated at Kermené in Guidel in the Morbihan. Two charcoal samples provided measurements from 3500–2287 cal BC (95.4%; 3331–2459 cal BC, 68.2%). These results are maintained by the Late Neolithic material from the chamber (Coursaget/Le Run 1966: 135; Delibrias *et al.* 1974: 22).



Figure 3.47 Planum Dissignac after the excavations in 1976 (after www.http://bsecher.pagesperso-orange.fr/Dissignac.htm, Figure 14)

Goërem

Later structures with radiocarbon results are represented by the angle-formed grave Goërem and the gallery graves Liscuis (Delibrias *et al.* 1970: 433; Delibrias/Guillier 1988: 65; Le Roux 1977: 411–415) (Figure 3.48). Goërem in Gâvres by Plouhinec in the Morbihan is a structure with a 17m long chamber divided into four compartments and a 9m long corridor which leads in an angle from the grave chamber. The grave is covered by an earthen oval tumulus (Giot 2007: 81; Gouézin 2007: 48–49; L´Helgouach 1970) from which five charcoal samples have been processed (Delibrias *et al.* 1970: 433). Three of these determinations show the subsequent use of the site and were obtained from charcoal in the corridor (Gif-329, 3860± 200 BP; Gif-769, 3470±120 BP; Gif-330, 2620±200 BP). Two of the results can possibly be related to the construction of the grave and the first burial activities. One of these samples was taken from the deepest level and main layer of the chamber, which contained Kerigou and Bell Beaker ceramics and measured to ~3160 cal BC (Gif-1148, 4430±140 BP; 3334–2920 cal BC, 68.3%; 3620–2698 cal BC, 95.4%). One result from ~2620 cal BC (Gif-768; 4100± 140 BP; 2876–2492 cal BC, 68.2%; 3020–2213 cal BC, 95.4%) originates from a charcoal found together with Kerigou ceramics under a broken pavement in the grave chamber.

Liscuis

In the north of the Bretagne at the Côtes d´Amor by Laniscat, the small necropolis Liscuis consists of three gallery graves. Liscuis I is a V-formed, 12m long gallery grave covered by a tumulus of cist plates (Figure 3.49). Liscuis II, 8,5m long and Liscuis III, 13m long, are both classical gallery graves (Langouët 2006: 37–49; Giot 2007: 43). In total, there are six radiocarbon results from charcoal samples of these graves (Müller 1998: 95; Delibrias/ Guillier 1988: 65; Le Roux 1977). From Liscuis I, we have one charcoal sample at our disposal with a measurement of ~3900 cal BC (4051–3781 cal BC, 68.2%;

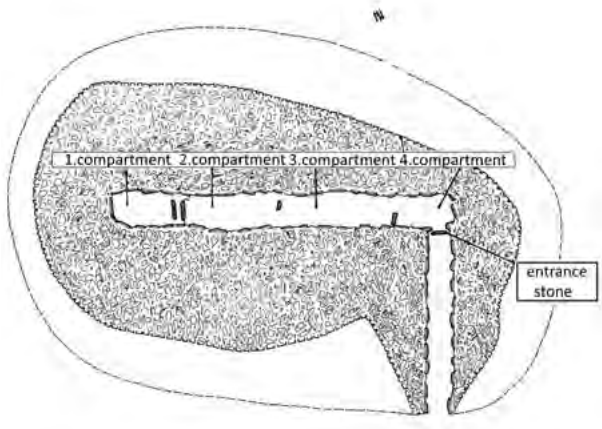


Figure 3.48 Planum from the angle-formed grave Goërem (after Briard 2000).

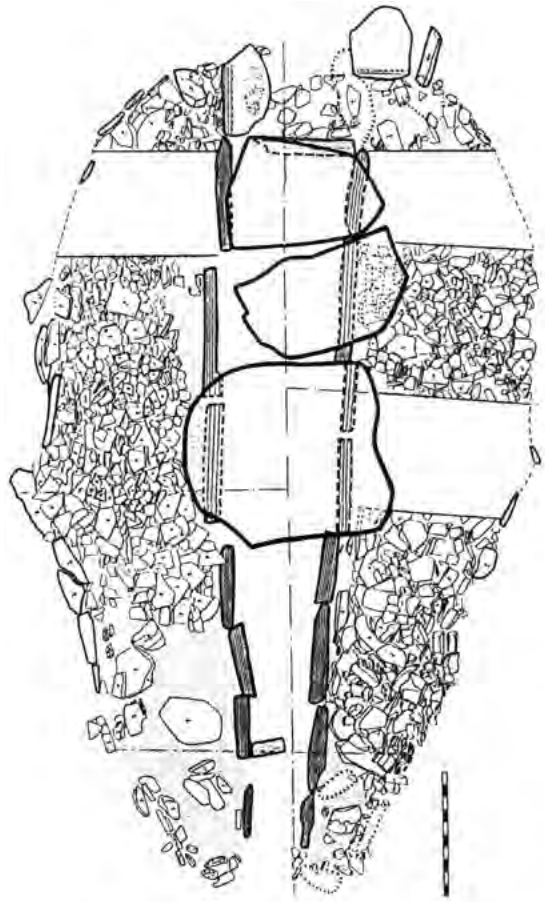


Figure 3.49 Planum V-formed gallery grave Liscuis I (after Briard 2000, 41)

4234–3704 cal BC, 95.4%). From Liscuis II, two results are available from the time interval 3019–2886 cal BC (95.4%; 2890–2943 cal BC, 68.1%; Gif-3585, 4170±110 BP; Gif-3944, 4450±110 BP) (Figure 3.50).

From Liscuis III, three radiocarbon determinations have been measured. One of these results is possibly connected to the construction and the use of the grave and dates to ~2780 cal BC (Gif-4076, 4200±110 BP; 2906–2624 cal BC, 68.2%, 3089–2475 cal BC, 95.4%). The sample is from a hearth and is associated with a vessel from the SOM (Seine-Oise-Marne) horizon. The other two samples originate from hearths in the chamber and represent subsequent use of the grave (Gif-3943, 2250±90 BP; Gif-4075, 3680±110 BP).

Channel Islands

From the Channel Islands, radiocarbon determinations from three megalithic grave monuments are currently available. They stem from the abovementioned trapezoid tumulus at Les Fouaillages (cf. chap. 3. 2), which partly contains megalithic cists (Kinnes 1982), and from the two passage graves Le Déhus on Guernsey (Schulting 2010) and La Hogue Bie on Jersey (Patton 1995).

Le Déhus

Five radiocarbon results of human bone material come from the passage grave Le Déhus in the northeast corner of Guernsey Island close by the village of Paradis

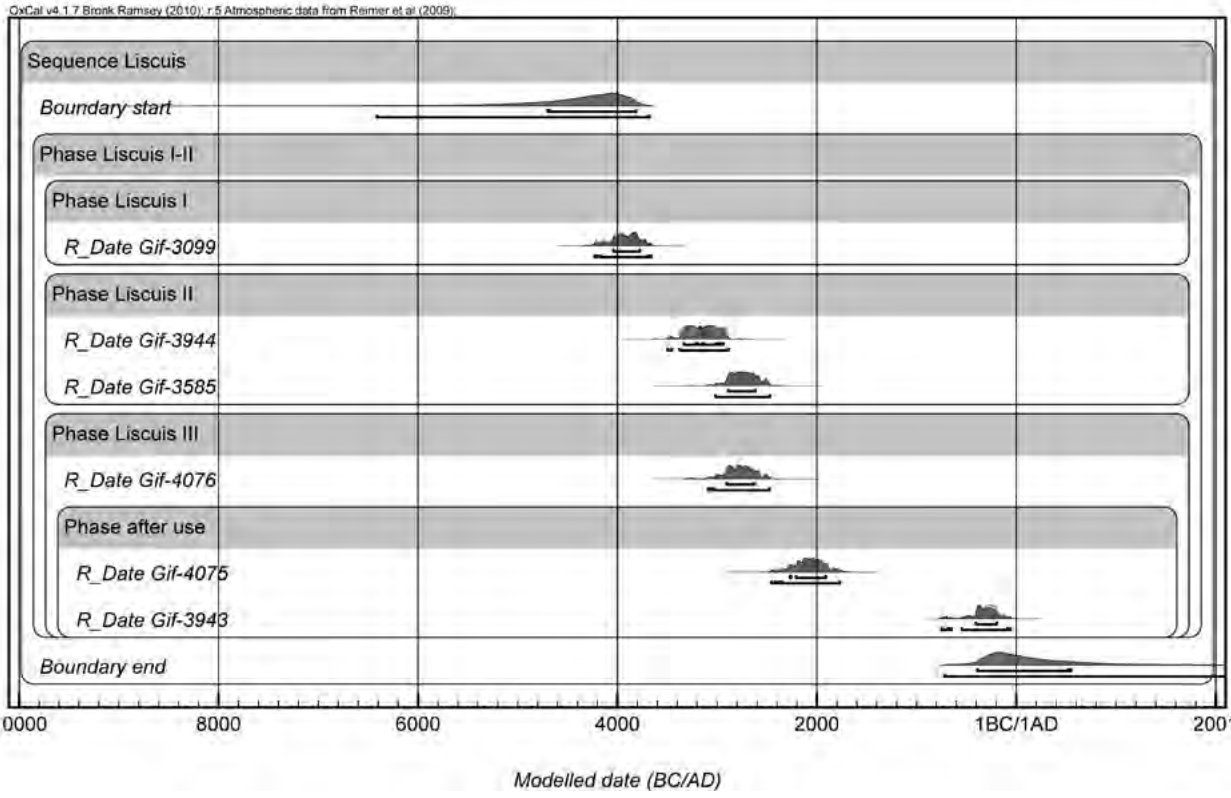


Figure 3.50 Probability of the dates from the the necropolis Liscuis. Model agreement: A_{model}=98.7, $A_{overall}$=98.7

(Schulting 2010: 160, Tab. 1). Le Déhus is an eastern-oriented grave with a central chamber which measures 5m x 3,7m and a passage with 3,5m length. To both sides of the chamber and the passage altogether six small round side chambers, A–F, are arranged (Figure 3.51). The grave is covered by a round tumulus, 18.3m in diameter, which is surrounded by a combination of drystone walling and stones (Kinnes/Grant 1983: 53; Schulting 2010, Figure 2).

According to old reports, two adults, a child, and cremated bones are documented for the main chamber (Patton 1995a; Schulting 2010: 153). The original contents of the central chamber were either cleared out for later burials or the central chamber had a more ritual function (Schulting 2010: 153). Eight individuals can be associated with the side chambers, where the bone samples for the radiocarbon results originate. A sample of a cranium from chamber B hints at a time interval from 2872–2586 cal BC (95.5%; 2861–2630 cal BC, 68.2%) and is considerably younger than the other three dated individuals from the southern part of the grave and the chambers D and C. The latter data ranges in a simple model and with a combination of two results from an adult individual in chamber C (after Schulting 2010: 12) within a time interval from 3960–3735 cal BC (95.4%, 3924–3779 BC, 68.2%) and with a model agreement of A_{model}=95.8 and $A_{overall}$=96.8. (Figure 3.52).

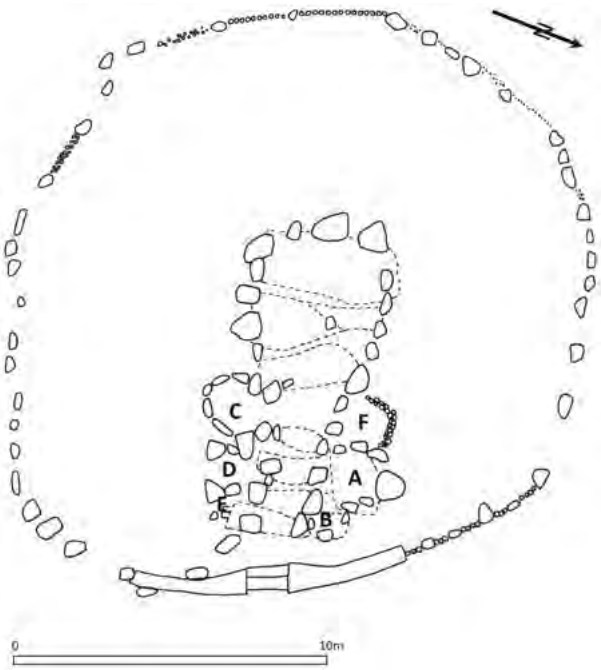


Figure 3.51 Planum Le Déhus (after Schulting 2010: 151)

The stable isotope ratio of carbon $\delta^{13}C$ from the individuals with values varying between -20.4‰ and -20.2‰ does not reveal any indicators of a significant marine diet or a reservoir effect on the radiocarbon results. In contrast, the $\delta^{15}N$ values of the three individuals of the early phase of chambers C and D are considerably elevated with values of between 13.7‰ to 14.5‰. This indicates a freshwater fish diet and a significant reservoir effect on the radiocarbon results and, shortly said, the radiocarbon results are older than the true age of these individuals. Schulting proposes a consumption of freshwater eel, since hardly any freshwater fish habitats exist on the Channel Islands (Schulting 2010: 20) and eels spend their lifetime in freshwater and in the sea. We do not know much about the island's original size nor about freshwater fish habitats, since the sea level has significantly risen since then. The freshwater reservoir age differs notably according to location and time, but how much the measured age and the true age of buried individuals can differ is shown in the analysis of the cemetery of Ostorf in Northeastern Germany (Olsen *et al.* 2010). The $\delta^{15}N$ values of the 15 measured individuals vary between 12.8‰ and 15.2‰. It was possible to calculate a reservoir age of up to ~800 y for the grave goods made of animal

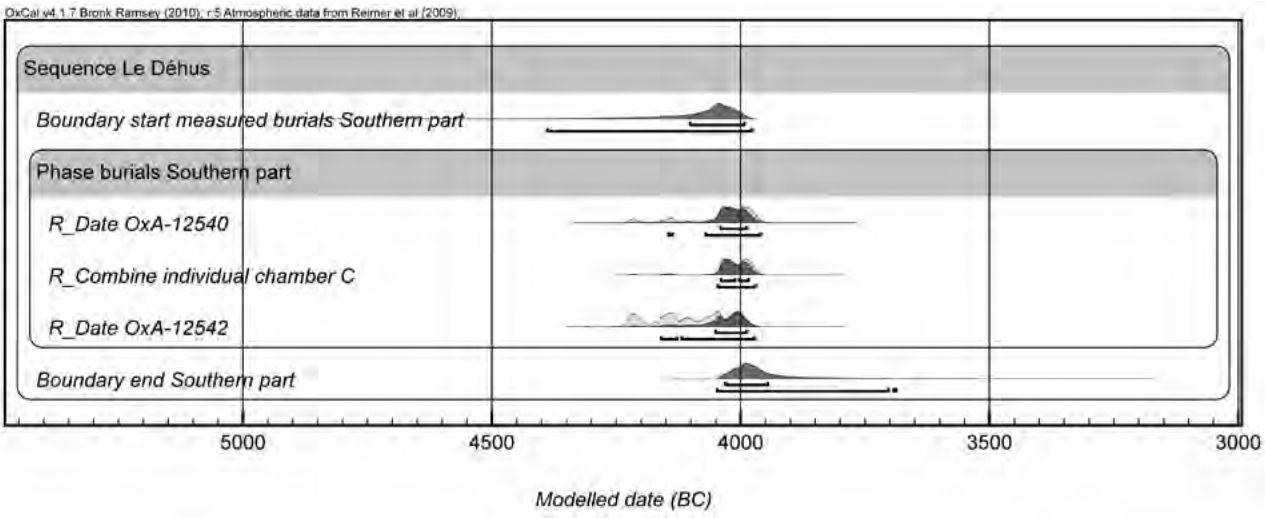


Figure 3.52 Probability distributions of dates from Le Déhus

bones, like bone pendants. Thus, the radiocarbon results are insufficient. Due to a reservoir effect, they are also too old and not suitable to determine the construction of the grave.

The archaeological material from the small side chambers consists of ceramics, a bone point, a hammer stone, and a few lithic artifacts (Schulting 2010: 153). In chamber B no ceramics were recovered. In contrast, in chambers C and D ceramics are documented to the Middle Neolithic Chasséen tradition of Western France (Cassen 1993, Figure 2). Chamber A contained Middle Neolithic pottery, pieces of a vessels of the Late Neolithic Seine-Oise-Marne horizon, unstratified Beaker pottery, and a polished green serpentine axe. From the main chamber, Chalcolithic or Early Bronze Age vessels are recorded. Three decorated Bell Beakers and a tanged copper dagger from the upper layer of the central chamber are documented, possibly deposited with the few human remains (Patton 1995a) and attesting the subsequent use of the grave after a possible cleaning of the chamber (Schulting 2010: 153).

La Hogue Bie

The passage tomb of La Hougue Bie on Jersey (Patton 1995: 582–586; Patton/Finch 1999; Schulting 2010: 163–165) is a large cruciformed structure with a chamber measuring 3m x 9m and an 11m long corridor covered by a stone cairn, 55m in diameter. Its height today measures 9m. A series of nine radiocarbon results from charcoal samples of unknown and thus potentially long-lived samples is available (Patton 1995), but they are associated with well-documented stratigraphic contexts (Figure 3.53).

One radiocarbon result from the matrix of the primary terrace from ~4400 cal BC provides a terminus post quem value regarding the construction of the grave (4430–4182cal BC, 68.2; 4717–4074 cal BC, 95.4%). Another result from the matrix of the secondary terrace is likewise a terminus post quem value for the construction of the grave from ~4150 cal BC (4199–4053 cal BC, 68.2%; 4264–4040 BC, 95.4%). According to Patton's interpretation, at the end of the use of the passage grave the entrance was blocked by a massive deposit of rubble and there a radiocarbon result from

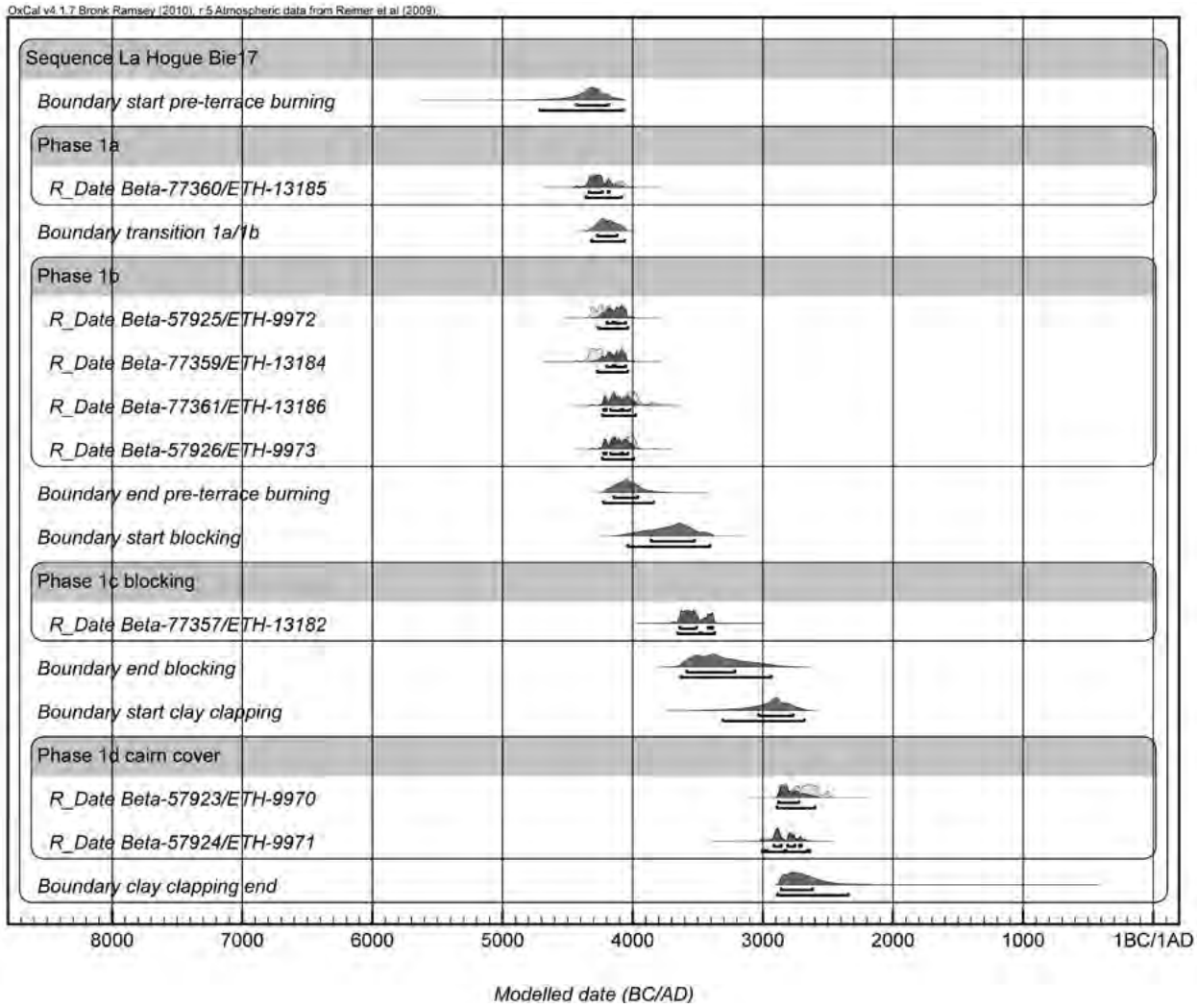


Figure 3.53 Probability distribution for the dates of the passage grave La Hogue Bie, Jersey (after Schulting 2010). Model agreement: A_{model}=84.9, $A_{overall}$=85.9

~3500 cal BC is available (3639–3385 cal BC, 68.2; 3656–3371 cal BC, 95.4%), representing a terminus post-quem value for the closing of the chamber. The construction of the grave is viewed to have occurred somewhere in phase 1b, which is defined by three radiocarbon determinations hinting at a time interval from 4275–3991 BC (95.4%; 4201–4037, 68.2%) (Patton 1995).

Megaliths with radiocarbon determinations in Central West France

In Central West France, in contrast to Brittany, conditions for the conservation of bone material are given. Therefore, 39 radiocarbon results are available from human bone material of different individuals from megalithic contexts. 35 results originate from altogether five sites with passage graves, the samples for four of these determinations stem from three accessible dolmens.

With the measurements from the necropolis Chirons in Bougon, the earliest human bones from a passage grave in Europe were processed and for decades this necropolis was considered to be the beginning of the passage grave tradition in Northwest France (among others Joussaume 1999, 65; 2003; Laporte 2005; 2010; Mohen 1986; Mohen/Scarre 2002; Scarre *et al.* 1993, 857; 2003). In recent years, the debate is concerned with the possibility of an ossuary tradition for this specific site (Chambon 2003; Mohen 1977; Mohen/Scarre 2002; Scarre *et al.* 2003) and the arguments for this hypothesis accumulate cogently. Accordingly, the individuals were decomposed somewhere else and thus represent termini post quos and not a termini ante quos values regarding the construction of the graves. Consequently, the human bones should be older than the graves. Les Chirons/Bougon deserves closer consideration due to its special position regarding the megalithic chronology debate in France.

Les Chiron/Bougons:

The necropolis Les Chiron/Bougons in Bougon near La-Mothe-Saint-Héray in Deux Sèvres consists of the six monuments A–F. These constructed complexes, partly built in several phases, are round or long stepped stone tumuli in dry wall technique with altogether eight passage graves and two non-accessible dolmens (Mohen 1986; Mohen/Scarre 2002) (Figure 3.54).

All the monuments are oriented in completely diverse directions. Monuments A and C are round tumuli. The former is 42m in diameter and covers a passage grave oriented to the south, whereas the latter is 58m in diameter and covers a small passage grave oriented to the west. The structures B, F, and E are long tumuli. Tumuli B is a 36m long complex oriented along a southwest-northeast axis. In the northeastern part of the monument, two non-accessible dolmens are located. In the southwestern sector, p-and q-formed passage graves (dolmen angoumoisin) were probably built in a later phase. Both passage graves are constructed in dry wall technique and oriented to the southeast. Monument E is a 22m long tumulus oriented along a southeast-northwest axis, including one passage grave with a round chamber and one with a polygonal chamber, both in dry wall technique and directed to the northeast. Finally, the 72m long tumulus F is positioned in a north-south alignment. The first stage of the monument F is represented by the passage grave FO built at the southern end in dry wall technique and covered by a round stone tumulus (Figure 3.55, 3.57). The monument was then possibly extended to the north with the megalithic passage grave F2 at the most northern end.

Human bone material is available from all monuments (Chambon 2003: 72; Germond 1980; Mohen 1973; Mohen/Scarre 2002). Monument A contained an MNI of 200 individuals deposited in three layers. In contrast, four individuals are documented from monument C. Chamber E1 has an MNI of 11 individuals, whereas chamber E2 contained 15 individuals (Mohen/Scarre 2002: 110). Chamber F2 was emptied in ancient times by the owner of the land (Chambon 2003: 72). Chambers F0 and B2 were the most intact. From the former, 11 individuals are documented and this grave was considered quite early in the research discussion to be an ossuary (Mohen 1990). In grave B2 an MNI of 16 is recorded. This grave also reveals indications of an ossuary practice. The context of these bones is not easy to evaluate (Chambon 2003: 72–78) and since it is quite possible that they were secondarily deposited in the grave, they are not suitable to determine the construction of the graves.

20 radiocarbon results obtained from human bones are available for the whole necropolis, including the three earliest radiocarbon results processed from human bones found in French passage graves (Scarre *et al.* 1993: 857; Mohen/Scarre 2002) (Figure 3.56). From these three early radiocarbon results, two originate from the chamber FO (Q-3234, 5860±65 BP; Ly-1700, 5830±140 BP) and one from chamber E1 (Ly-966, 5800±230 BP). The last suffers from large error terms and its significance is therefore limited. The two radiocarbon dates from chamber FO are calibrated, suggesting a time interval from 4842–4363 cal BC (95.4%; 4785–4373 cal BC, 68.2%).

Between these results and the next of the remaining 15 radiocarbon determinations from Chiron/Bougon, a hiatus of ~400 y can be recorded and the next available results from the necropolis and from chamber FO continue at ~4200 cal BC (Ly-1699, 5480±170 BP; 4360–4041 BC, 68.2%; 4548–3824 BC, 95.4%) and end with a determination at ~3890 cal BC (Q-3217, 5145±90 BP; 4105–3852 cal BC, 68.2%; 4221–3559 cal BC, 95.4%).

This hiatus would be an argument for an ossuary and the deposition of bone material from another primary burial site in the chamber. But what arguments for

this hypothesis can be further deduced from the documentation of the grave?

FO is a non-megalithic passage grave completely built in dry wall technique with a round chamber which measures 2,50m x 2,10m. There are two layers separated by stone slabs. This stratigraphy is debated and the layers are partly interpreted to separate the bone material with the early results from the four individuals with the later radiocarbon determinations (Scarre *et al.* 1993; 2003: 79; Mohen/Scarre 2002). Another interpretation of the stratigraphy states that the upper layer contained a child from the Final Neolithic buried together with a dog and that all the individuals with radiocarbon results, such as the two with the very early measurements, originate from the same sub-layer which was solely 30cm deep (Cassen *et al.* 2000: 322; Chambon 2003: 73).

A reevaluation of the bone material from the chamber and its context provided interesting results (Chambon 2003: 73–78, 156–162). Chambon speculated on the removal and re-arrangement of the bones after the decomposition of the bodies, successive burial practices, or otherwise on an ossuary similar to the earliest interpretation of Jean-Pierre Mohen (Chambon 2003: 73; Mohen 1977).

Nevertheless, an ossuary with a re-arrangement of the individuals appears most plausible taking the following arguments into account:

1. Five adults and six children are recorded. Four of the adult individuals seem to be rearranged in some kind of loose connection. The children's bones are spread over the whole grave. A so-called falsarium is also recorded: two individuals, an adult and a child, were composited together as one person.
2. Some of the long bones, such as the femura and the humeri, and most of the small bones, such as finger and hand bones as well as sterna and carpae, are missing. This is possibly a result of a taphonomic loss, but is likewise typical for an ossuary because the bodies decayed somewhere else.

Further arguments for the ossuary hypothesis include:

3. The archaeological material from the chamber stems from the Middle Neolithic II from the Chambon related Copus horizon, which would support the later determinations in the chamber.
4. With the Goumoiziére graves (cf. chap. 3, p. 30-33), contemporaneous radiocarbon results for ossuaries for Central West France are available from ~4720 cal BC to ~4220 cal BC and from ~4420 cal BC to 4240 cal BC. Such burial rites or ancestor worship are well-documented for the region, for example also for La Ciste de Cous, La Pierre Virante, and possibly Champ Châlon.
5. The remaining 15 available measurements for human bones out of passage graves in Central West France continue with the measurements of an individual from Péré C at ~4280 cal BC (OxA-10204, 5470±45 BP; 4322–4255 cal BC, 68.2%; 4329–4241 cal BC, 95.4%) and thus after a hiatus of ~over 300 y compared to the latest of the two early determinations from chamber F0 in Chiron/Bougon. It is hard to imagine that the passage grave tradition was invented in Bougon with these complex and sophisticated structures and that the idea and the architectonic concept were then pursued again after a hiatus of several hundred years. Accordingly and based on a confirmation of an assumed ossuary, none of the radiocarbon results is a sure indicator for the construction and the use of this monument.

From the megalithic passage grave F2 at the northern end of the monument F, two results are processed from ~3760 cal BC and ~3560 cal BC (Ly-967, 4790±220 BP; 3894–3409 cal BC, 68.2%; 4224–3289 cal BC, 95.4%; Ly-967, 4790±220 BP, 3652–3352, 68.2%; 3941–3188 cal BC, 95.4%). One result is available from a quarry on the level of chamber F2 from ~4200 cal BC (4346–4174 cal BC, 68.2%; 4362–4052 cal BC, 95.4%) contemporaneous to the outset of the younger burials in chamber FO and it offers a possible construction date for chamber F2. The material of the chamber contained Middle Neolithic Chasséen and Late Neolithic material (Mohen/Scarre 2002: 94).

Chamber B1 in monument B also shows evidence for a rearrangement of the bones and is therefore a possible ossuary (Chambon 2003: 163; Mohen 1990: 53). Only two radiocarbon dates are available suggesting a time interval from 4259–3810 cal BC (95.4%; 4229–3959 cal BC, 68.2%). Passage grave B1 is a q-formed and so-called dolmen angoumoisin with a megalithic, trapezoid-formed 2,60m long chamber. The reexamination of the bone material revealed that no bone group is completely missing, so the individuals were decomposed at the grave. Additionally, at least 16 skulls are documented (Chambon 2003: 156–162). The skulls were arranged in the chamber in two lines and some of them were deposed in association with long bones (Mohen 1990: 53). Between 8 and 12 skulls were arranged in an east-west line. Nine left humeri and one left femura are preserved as well as four right humeri and eight right femura. Chambon supposed that the chamber was selectively emptied or that the grave is partially an ossuary and dislocated skulls from somewhere else were inserted into the grave at certain times and re-arranged (Chambon 2003: 162; Mohen 1989: 227; 1995: 96). Again, in this case, the radiocarbon results do not either date the wished event, e.g. the construction or the use of the grave. Middle Neolithic Chasséen ceramics are recorded from the chamber (Mohen/Scarre 2002: 93).

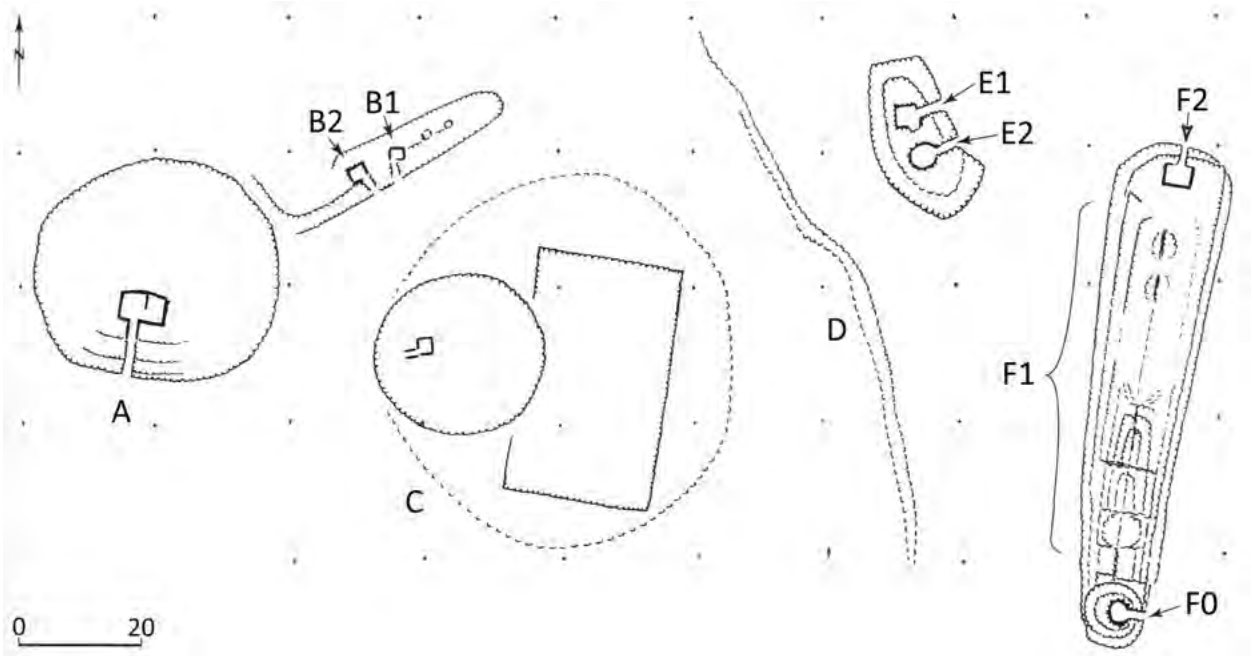


Figure 3.54 Planum Chirons/Bougon (after Mohen 1986)



Figure 3.55 Tumulus F and passage grave FO,Chirons/Bougon. Photo courtesy of Joachim Jahnke, CC-by-sa /Wikimedia commons

Further radiocarbon measurements and determinations for the archaeological material are available from the tumuli A, C, and E (Mohen/Scarre 2002: 93). From monument A, one determination from the corridor is processed to ~4190 cal BC (OxA-9106/Ly-1051, 5365±50 BP; 4325–4073 cal BC, 68.2%; 4331–4053 cal BC, 95.4%) and the three results from the chamber imply a time interval from 4333–3712 cal BC (95.4%; 4325–3801 cal BC, 68.2%). Middle Neolithic Chasséen material from the chamber and the corridor is recorded. Recent Neolithic Peu-Richien

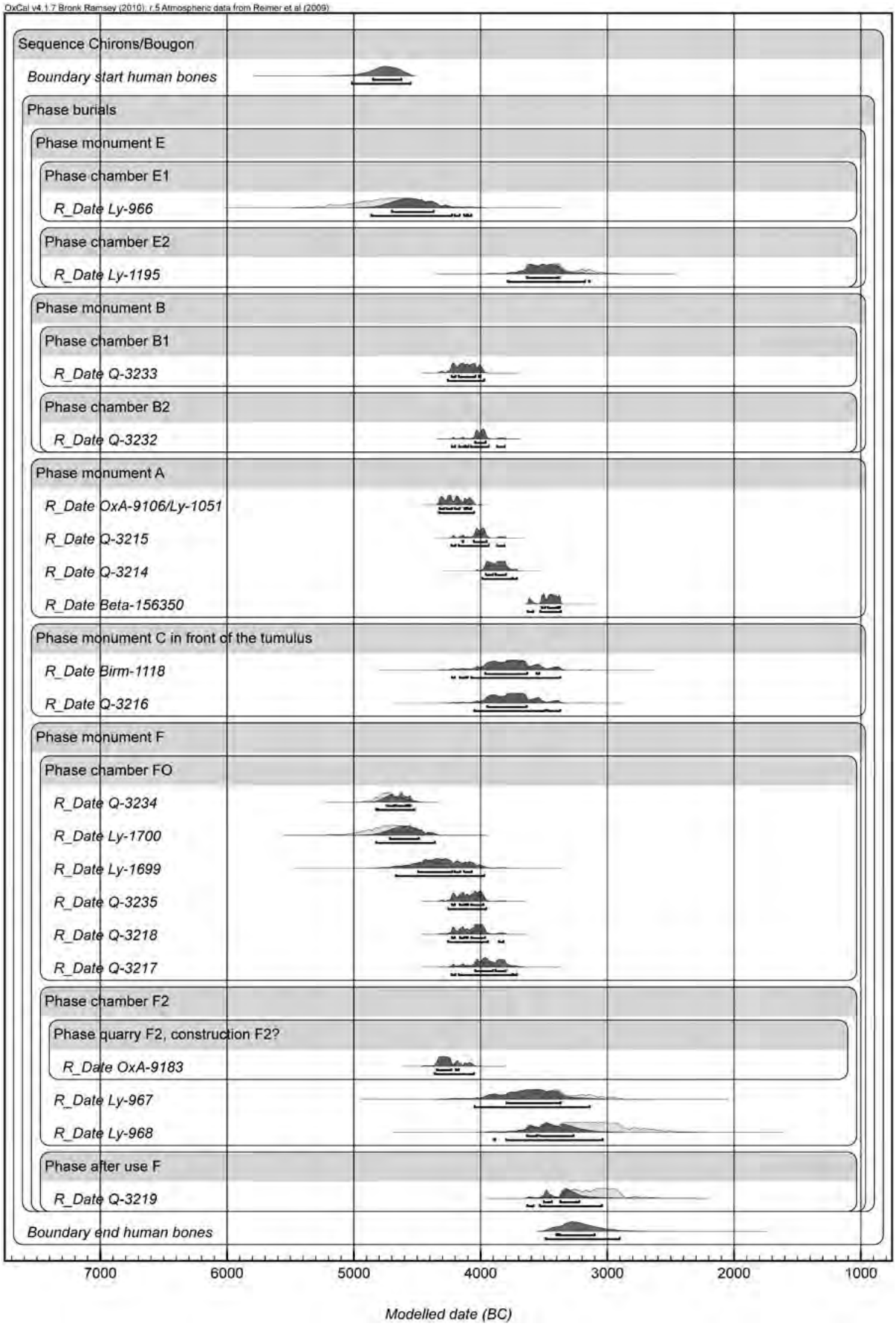


Figure 3.56 Probability of radiocarbon determinations from monuments A-F, Chirons/Bougon. Model agreement: A_{model}=96.4, $A_{overall}$=94.5

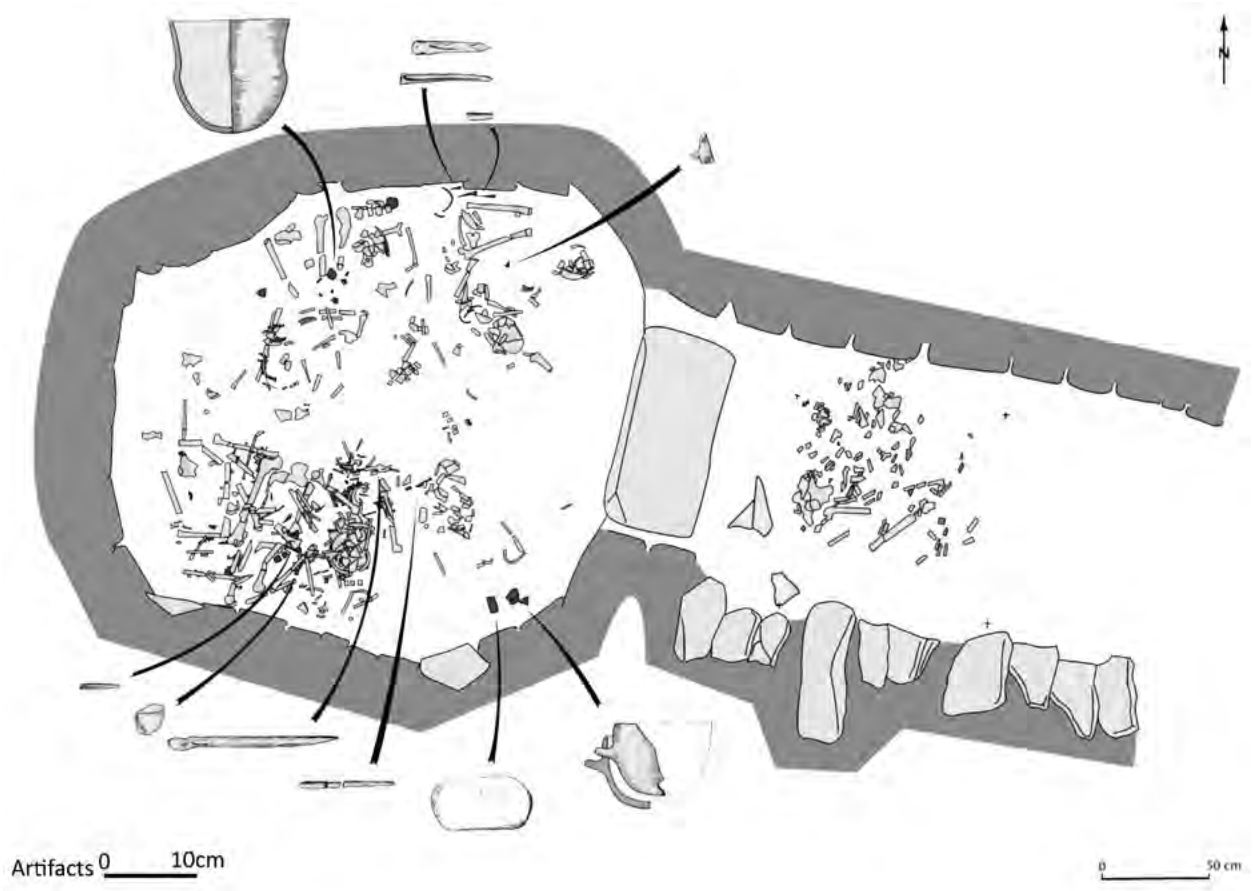


Figure 3.57 Chamber FO, Chirons/Bougon (after Chambon 2003, Figure 26)

material documents the re-use of the chamber. Apart from the already discussed difficulties with the site as a possible secondary burial place, four determinations for an MNI of altogether 200 individuals constitute far too little data for any further statements. From monument C two results are available originating from the front of the tumulus from ~3800 cal BC and ~3720 cal BC (Birm-1118, 4960±170 BP; 3962–3547 cal BC, 68.2%; 4226–3380 cal BC, 95.5% and Q-3216, 4950±150 BP; 3945–3638 cal BC, 68.2%; 4050–3380 cal BC, 95.4%). Furthermore, in front of the chamber Neolithic material was found. Radiocarbon determinations from both chambers of monument E are available. The result from chamber E1 is one of the three aforementioned very early dates from the site with the high standard deviation of ±230, too high for any closer determination (Ly-966; 5800±230 BP; 4701–4369 cal BC, 68.2%; 4870–4073 cal BC, 95.4%). From chamber E2 a measurement for ~3600 cal BC is available (Ly-1195, 4700±140 BP; 3646–3418 cal BC, 68.2%; 3904–3305 cal BC, 95.4%). The material from chamber E1 is described as homogenous Middle Neolithic material. For chamber E2, it has been documented that Middle Neolithic material is mixed with late Neolithic material.

Taking all the mentioned arguments into consideration, we would propose the construction of the earliest monuments with the round tumulus FO not before ~4200 BC or even later, since the possibility must be taken into account that chamber FO was not the first burial place of any of the deposited individuals.

Champ Châlon/Benon

Another necropolis with stone tumuli, passage graves, and a radiocarbon sequence is Champ Châlon in Benon (Figure 3.58). Five monuments are arranged in a northwest-southeast line and they measure between 60m and 105m (Joussaume 1980; 1982; 2006; Joussaume/Cadot 1986). The outer structures are built in a partly elaborate dry wall technique and as long tumuli (monument A to D) or as round tumuli (monument E). The inner structures consist of non-megalithic passage graves in dry wall technique (monuments A and C) or as megalithic passage graves with dry wall elements (monument B). Monuments A to D have been excavated, whereas monument D and the chamber have been destroyed. Altogether, six radiocarbon results are available which were obtained from human bones from the different monuments (Joussaume 2006: 21, 31, 38, 68, 76) (Figure 3.59). Monument A is an 18m long tumulus with a p-formed passage grave (dolmen angoumoisin) oriented to the north and constructed in dry wall technique with corbelled roof. On the southeast side of the chamber, a little niche is found. From the main chamber, a few human remains have been documented with an MNI of 8. The

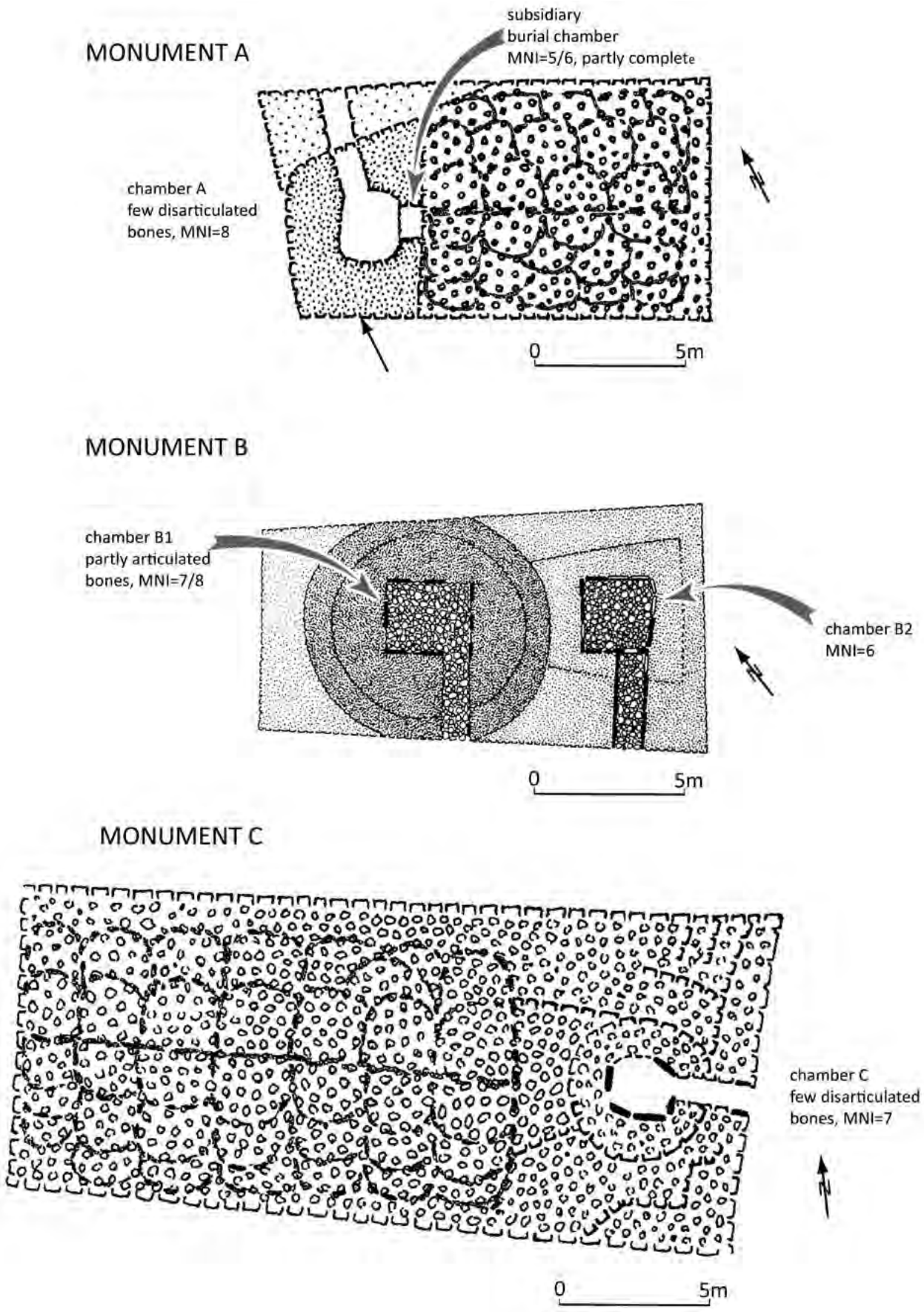


Figure 3.58 Planum necropolis Champ Châlon/Benon, monuments A, B and C (after Joussaume 2006)

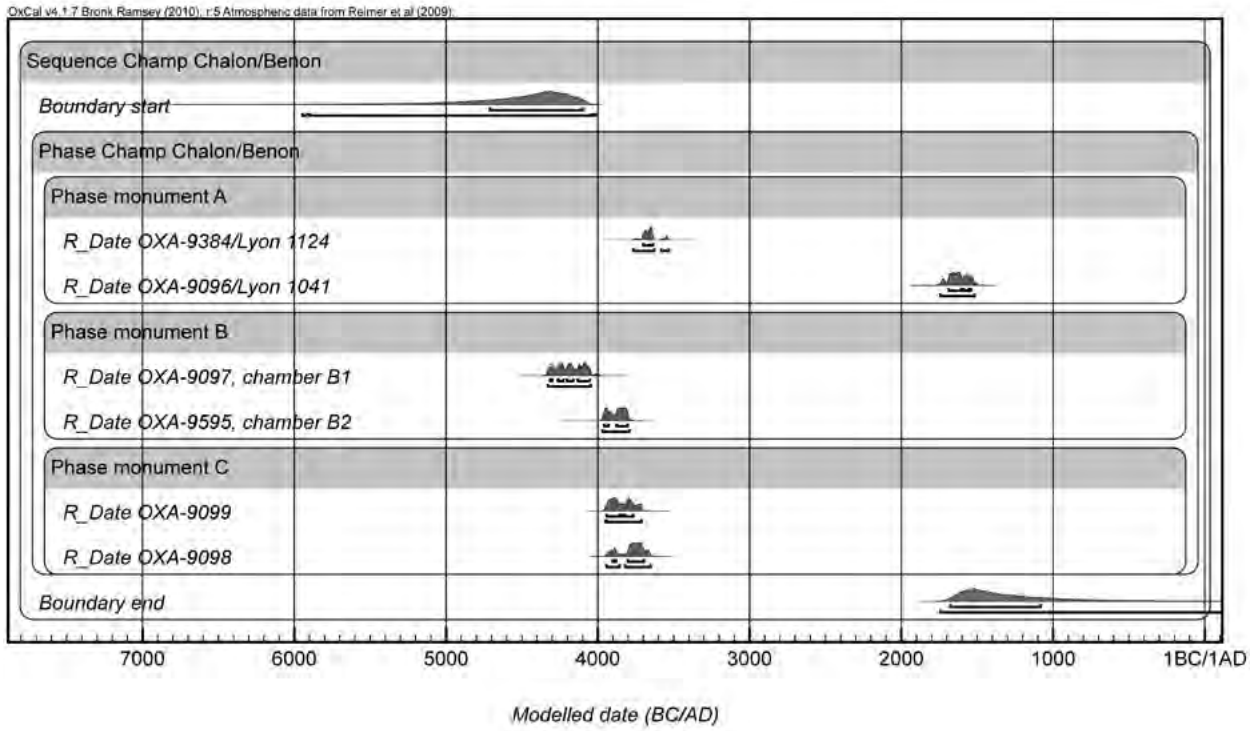


Figure 3.59 The probability of radiocarbon dates from the necropolis Champ Châlon. The earliest individual in the necropolis is buried in monument B1 at ~4190 cal BC (4311–4054 cal BC, 68.1%; 4329–4046 cal BC, 95.4%). Four of the individuals in the monuments B2, C and A were deposited within the time interval 3969–3532 cal BC 95.4%. Model agreement: A_{model}=97.7, $A_{overall}$=97.7

small chamber beside the main chamber contained 5 to 6 nearby complete individuals. R. Joussaume interprets the main chamber as partly emptied, since none of the bones are articulated and important bones are missing (Joussaume 2006: 21, 30–31). A radiocarbon measurement is available from one of these loose bones from the main chamber dating to ~3650 cal BC (OxA-9384/Lyon 1124, 4870±45 BP; 3701–3637 cal BC, 68.2%; 3764–3532 cal BC, 95.4%). From the neighboring chamber, a later result of ~1630 cal BC (OxA-9384/Lyon 1124, 4870±45 BP, 1688–1541 cal BC, 68.2%; 1741–1519 cal BC, 95.4%) indicates the use or re-use of the chamber during the Bronze Age.

Monument C is a trapezoidal, 25m long tumulus in the eastern part arranged on an east-west axis with a megalithic chamber originally oriented to the east. Pits show that the 2m x 1,80m large chamber was originally constructed with stone slabs. It contained a few human remains with an MNI of 7 determined by the teeth. The radiocarbon determination of a human bone from chamber C provided a calibrated result of ~3830 cal BC (OxA-9099, 5030±45 BP; 3942–3767 cal BC, 68.2%; 3948–3712 cal BC, 95.4%). The 2,70m long corridor is constructed in dry wall technique with two stone slabs on both sides at the entrance. In this corridor, an individual >60 y was deposed in a crouched position like a guard of the grave contemporaneous to or even somewhat later than approximately ~3800 cal BC (3902–3696, 68.2%; 3942–3653 cal BC, 95.4%).

Monument B is a 15m long northeast-southwest oriented long tumulus with two megalithic q-formed passage graves (dolmen angoumoisin) oriented to the southwest. Both graves were covered first by a round stone tumulus before they were finally covered by a long tumulus. The chambers were built in a combination of stone slabs and dry walls with a paved floor and they were covered by a corbelled roof. Chamber B1 measures 2,60m x 2,30m and exhibit an MNI determined by the teeth of 7 or 8 individuals. A human bone provided a radiocarbon result of around ~4190 cal BC (4313–4054 cal BC, 68.2%; 4328–4047 cal BC, 95.4%). Chamber B2 is a trapezoidal-formed structure measuring 2,70m x 2,50m and a paved floor. The entrance to the chamber is closed by a slab with a round opening. From the chamber an MNI of 6 persons is documented for determinations of teeth. One result of the bones can be dated to ~3880 cal BC (OxA-9595, 5090±40 BP, 3958–3805 cal BC, 68.2%; 3969–3793 cal BC, 95.4%).

R. Joussaume rightly notes that the radiocarbon data does not necessarily reflect the oldest buried individuals, since too few processed measurements are available. Only one date per chamber is available. Furthermore, a secondary deposition of bones must also be taken into consideration. In this case, the construction of the graves is later than the radiocarbon results (Joussaume 2006: 32, note 7) and they might here again represent termini post quos values. Nevertheless, there are not enough arguments for an ossuary or a selective removal of the bones. The scarcity of bone material from chambers A and C could as well be a result of taphonomic losses. All the individuals should be dated for further argumentation.

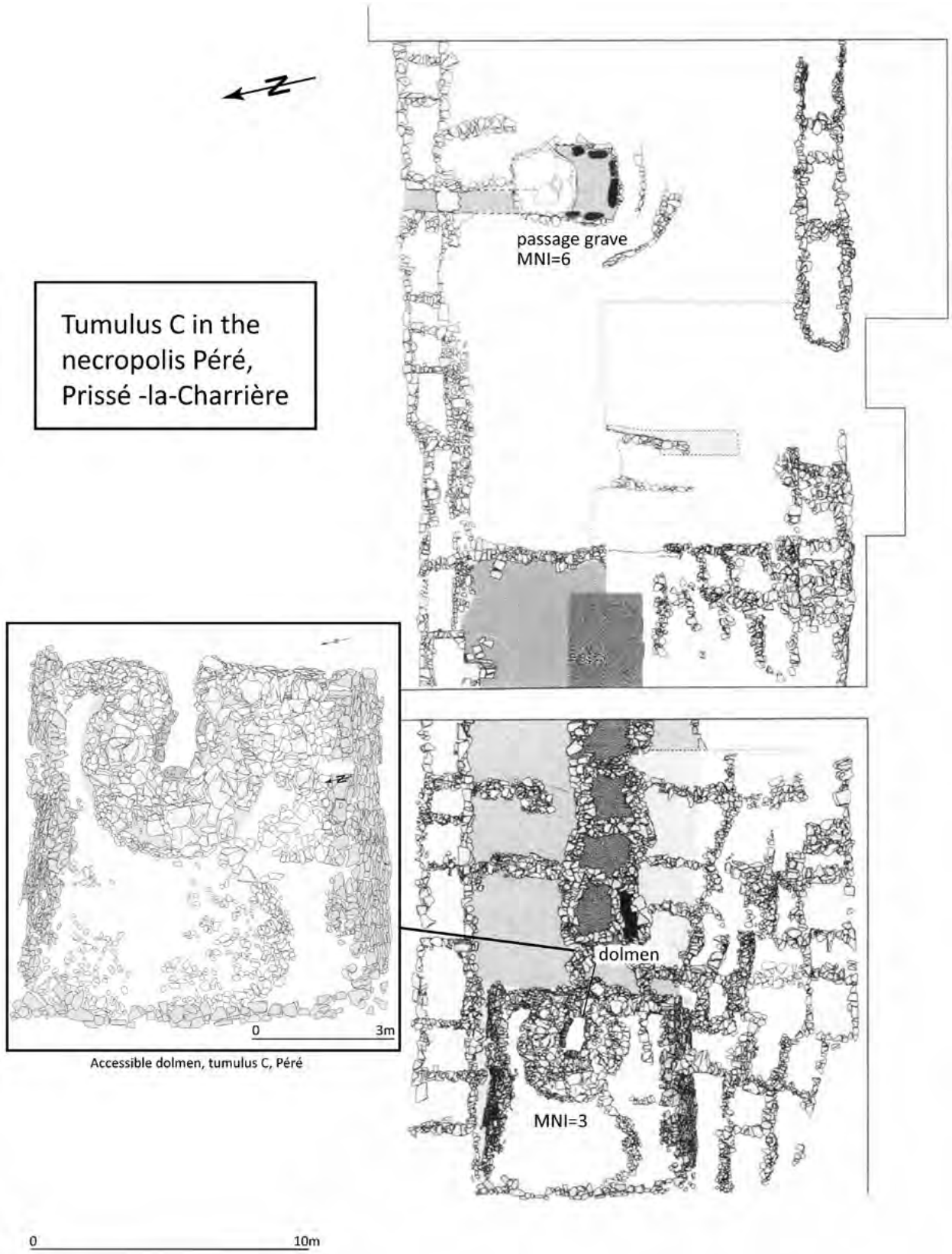


Figure 3.60 Planum Péré C (after Laporte et al. 2002)

The radiocarbon results are supported by the Late Middle Neolithic archeological material, which is quiet homogenous and diagnostic (Cassen 2009: 738). From all the excavated graves, decorated so-called footed cups (coupe-á socle or vase support) are registered (Joussaume 2006: 9–66, Figure 35, 36, 51, 62, 86).

The construction activity in Champ Châlon and monument B is thus not calculated before ~4200 cal BC (OxA-9097, 5365±55 BP; 4314–4055 cal BC, 68.2%; 4329–4047 cal BC, 95.4%).

Péré/Prissé -la-Charrière

Péré in Prissé-la-Charrière in the department Deux-Sèvres is a small necropolis consisting of two tumuli: one with an elongated and one with a small round shape. From tumulus C of the long monument altogether seven radiocarbon determinations are available (Laporte *et al.* 2002). The whole monument in its final stage is 100m long, trapezoidal-formed, and erected in honeycomb dry wall-technique. This monument was erected in different phases (Figure 3.60).

In the first phase, an accessible dolmen was constructed, covered by a round stone tumulus measuring 7,2m x 8.8m with an opening to the chamber. The chamber, which is oriented to the east, is polygonal-formed and elongated. From this dolmen an MNI of three individuals has been determined. Radiocarbon results from two individuals are available with close results (Figure 3.61). They might have been buried contemporaneously or shortly time-delayed and combine unproblematic (OxA-10249, 5500±45 BP; OxA-10248, 5440±45 BP). Thus, the burial activity started at ~4320 BC (OxA-10249, 5500±45 BP; 4357–4276 BC, 68.2%; 4370–4263 BC, 95.4%). Close by the dolmen, Middle Neolithic material, such as carinated ceramics, a flint and a fibrolite axe, a small trapezoidal arrowhead, a fibrolite pendant, and the fragment of a bracelet out of red rock, were detected: possible traces for a clearing of the chamber were noted (Laporte *et al.* 2002: 179). In a following stage, the entrance was blocked and the structure was enlarged to the east with a 23m long stone tumulus. This extension covers the antecedent accessible dolmen at the western end and at least one q-formed passage grave (dolmen angoumoisenne). The size of chambers of this passage grave measured approximately 5m² and the corridor is 5m long. The passage grave contained human remains with an MNI of 6: 2 children and 4 adults. The five available radiocarbon results from this grave range within a close time interval. The first burial in this grave occurred at ~4280 BC (4322–4255 cal BC, 68.2%; 4329–4241 cal BC, 95.4%), the last radiocarbon result is from ~4270 cal BC (4323–4241 cal BC, 68.2%; 4330–4205 cal BC, 95.4%) with stable carbon isotope measurements which provide little or no evidence for a marine diet and thus a reservoir effect. The model

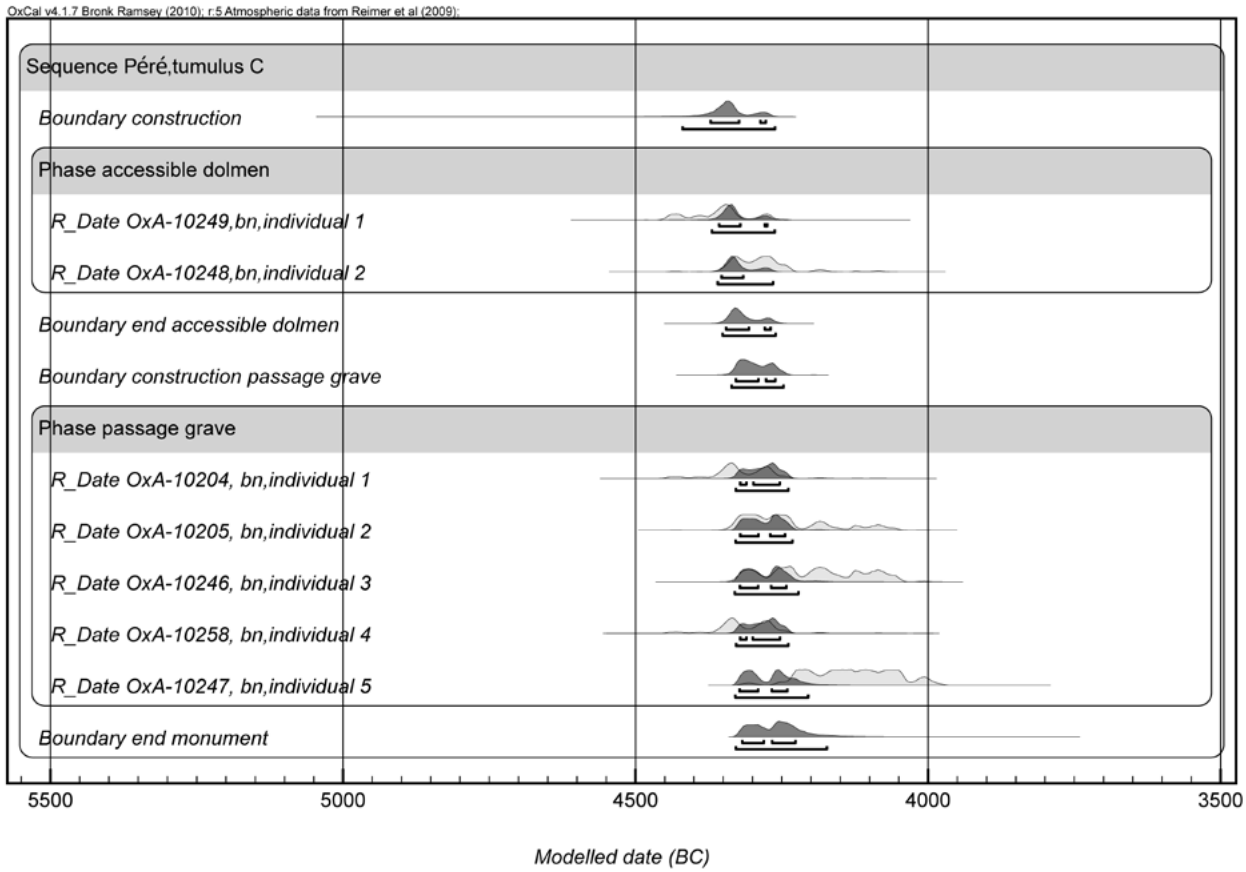


Figure 3.61 Péré C: The model calculates the construction of the monument and phase I with the accessible dolmen to ~4340 cal BC (4372–4278 cal BC, 68.2%, 4420–4262 cal BC, 95.4%) and the enlargement with the section to the east and the passage grave somewhat later to ~4290 cal BC (4329–4262 cal BC, 68.2%; 4337–4248 cal BC, 95.4%). Model agreement: A_{model}=65.6, $A_{overall}$=65.7

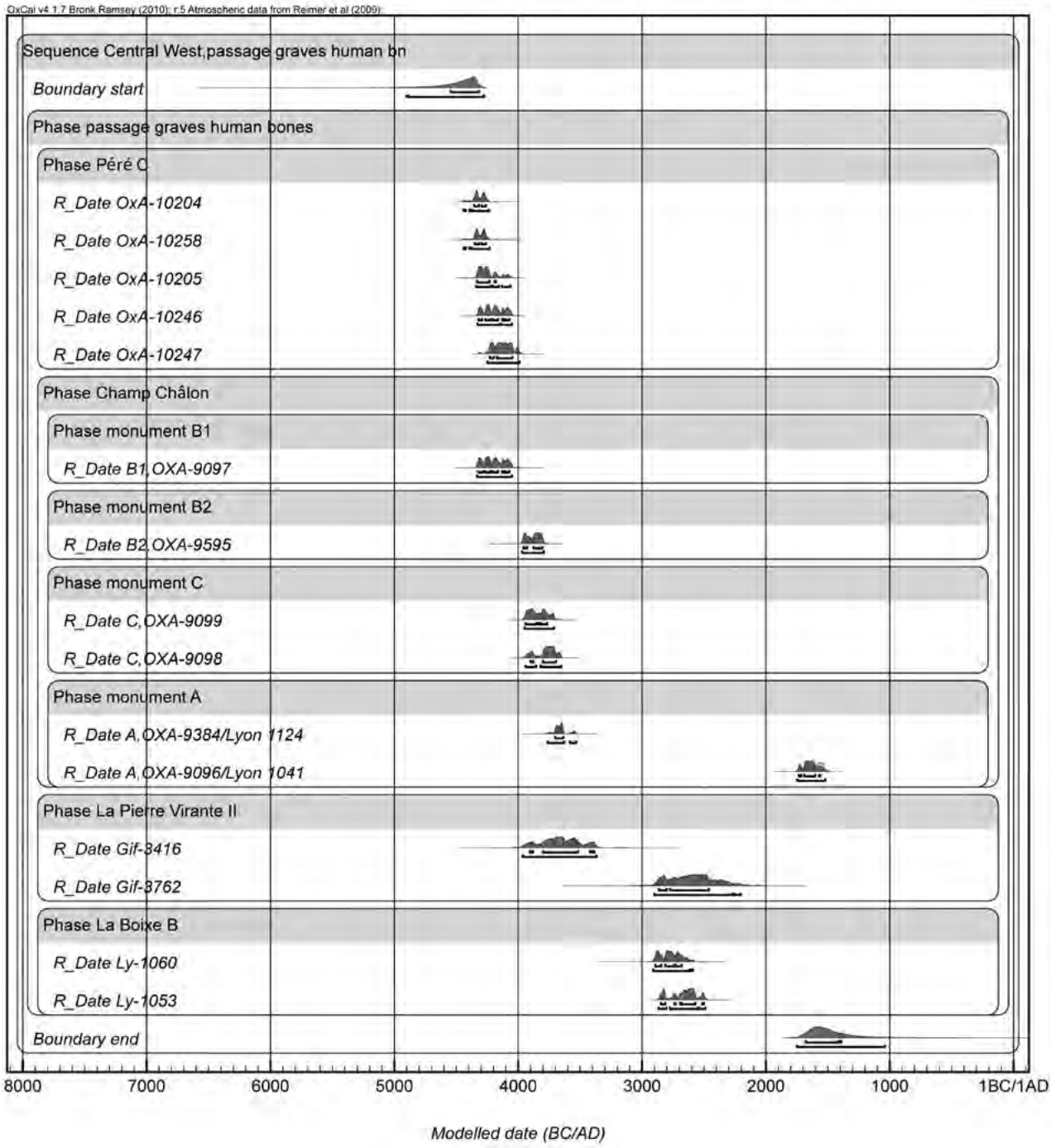


Figure 3.62 Probability of all available radiocarbon results from human bones out of passage graves in the Central West (without Bougon).Model agreement: A_{model}=98.8, $A_{overall}$=98.7

shows a low agreement of A_{model}=65.6, $A_{overall}$=65.7 due to the youngest measurement of individual 5 from chamber B (OxA-10247, 5295±45) with an agreement of A= 29.0% (A'c= 60.0%).

The material found with the bones in the grave supports the radiocarbon determinations. Further findings also include Middle Neolithic material, such as a fragment of a footed cup (coupe á socle or vase support) or a fibrolite axe (Laporte *et al.* 2002: 193) which so far also endorse the radiocarbon results.

A few further measurements from human bones are available from passage graves and simple dolmens. The remaining four available radiocarbon results for human bones from regional passage graves are from the sites La Boixe B in Charente and Montiou in Saint Soline and they suggest a time interval from 3710–2490 cal BC (95.4%; 3661–2502 cal BC, 68.2%). With the dolmens Pierre Virante II and Les Aspies, simple accessible dolmens are registered with singular radiocarbon determinations extending from 3963–2206 cal BC (95.4%; 3903–2460 cal BC, 68.2%) (Figure 3.62).

Dating the megaliths on the basis of the artifacts

The material in the early megaliths

The earliest material documented from megalithic graves in Northwest France is from the Middle Neolithic I horizon. These early graves are in Brittany, on the Channel Islands, and registered in the Central West.

In Brittany this material is from the Ancient Castellic horizon, which is documented in funeral contexts from the round tumuli or tertre with ancient non-accessible dolmens like Kervinio, Castellic, St. Germain, and Tumiac. Furthermore, such material has been secured from the long tumuli or tertre with ancient non-accessible dolmens in Manio 5, Mané Hui, and Kerlescan. The Ancient Castellic horizon is defined according to the sequences from the site Table des Marchands, dated from 4650–4270 cal BC, 95.4% (Cassen 2009: 759) (cf. chap. 3.2.2). Diagnostic for the Ancient Castellic ceramics are vessels with cannelures, applicated nubs, flat openings with fingernail impressions like in the ensemble of Mané Hui, and pine tree decorations.

The ceramics from St. Germain consist of two diagnostic vessels; one of them is a nearly complete bowl with round knobs, a narrow opening, and a small lug on one side. There is an undulated (carenée) decoration carved around the neck of the vessel together with a pine tree and a double line of round impressions by a mussel (Cassen 2000: 474). Furthermore, three golden agrafes are documented from this grave. From Kerlescan, ceramics with applicated knobs (boutons á repoussé) on the lip are registered. From Mané Hui in Carnac (Gaillard 1897 in Boujot/Cassen 1992: 202) a bowl with round knobs, a wide opening, and a small lug decorated with impressed wave-lines, half-circles or horseshoes, and triangular motifs has been recovered. Additional vessels are decorated with applicated knobs on the lip. Furthermore, two jadeite and two fibrolite axes, a nucleus of blonde flint, and a series of trapezoid transversal arrowheads belong to the grave inventory.

Vessels with an oval opening are registered for several graves from the Early Castellic horizon in Kervinio and Castellic. These vessels with oval openings are common in the Chambon contexts of the Central West, such as in Goumoisière grave no. 5, but the Armorican examples do not have the plastic decorations (Soler 2007: 124).

Moreover, transversal arrowheads and jadeite axes are diagnostic for the early megalithic contexts of Breton. These jadeite axes are precious, labor-intensive prestige goods fabricated from intense green raw material from the Italian Piemont area and exported or imported throughout Europe (Pétrequin *et al.* 1997, 2006, 2008, 2010, Herbaut 2000, Klassen 2000, Klassen *et al.* 2011; Cassen 2009; Cassen *et al.* 2011) (Figure 3.16). The axes took a core position in the value system of the 5th millennium societies and their highest concentration can be observed in Brittany. If jadeite axes were found in funeral contexts, then they are exclusively documented from low tertre with several ancient non-accessible dolmens and from the first stages of the tumuli Carnacéens with deposits of up to 15 jadeite axes, for example in Tumiac (Cassen *et al.* 2011: 10). Furthermore, they were found in depositions with several axes sometimes covered by stone slabs, which can also be interpreted as possible graves although the covering tertre has disappeared (Cassen 2000: 411).

No jadeite axes are registered from passage graves which further supports the assumption that the tumuli and tertre in the region appeared during an antecedent phase before the construction of passage graves.

On the Channel Islands, the ceramics in the early megalithic structure Les Fouaillages are Ancient Castellic, but also Cerny-related local Pinnacle-Fouaillages pottery with circular-impressed arcs, rims with rows of incised notches, and small handles have been registered (Boujot/Cassen 1992; Cassen 1993; Guyodo/Hamon 2005; Kinnes 1982; Patton 1995: 138; Schulting 2010). Applicated buttons, impressed dots, notched mouldings and small handles are diagnostic for this material (Cassen 2000: 443).

Carniated ceramics, a flint and a fibrolite axe, a small trapezoidal arrowhead, a fibrolite pendant, and the fragment of a bracelet out of red rock are registered in Central West France from the accessible dolmen Péré C in Prissé-le Charriere (Laporte *et al.* 2002: 179).

The material in the passage graves

Little material is registered from the few full megalithic passage graves in the Paris Basin and Northern France. In the chamber of la Pierre Tourneresse, the fragments of a footed cup (coupe-á socle) with a quadrangular and a regional typical short foot were found. This ceramic belongs to the middle sepentrional Chasséen horizon and to the Middle Neolithic II (Ghesquière/Marcigny 2000).

The early passage graves in Brittany are associated with Middle Neolithic II Recent Castellic material. In the few cases where Ancient Castellic material is registered, there is evidence after closer consideration of the context that this material originates from settlement layers under the graves (Cassen 2000: 438). Thus, from the passage graves in La Croix St. Pierre and Mané er Grageux fragments of ceramics with applicated knobs are registered (Bailloud 1975, Briard *et al.* 1995). The fragments in La Croix St. Pierre originate either from the tumulus or from the ancient soil in the passage. In the vicinity, an Ancient Castellic settlement is registered. In Mané er Grageux, Ancient Castellic ceramics are registered from a chamber destroyed by later intrusions. A settlement under the western part of the tumulus is likewise described.

Ceramics from the Recent Castellic horizon in the Morbihan (4270–3870 BC, 95.4%) are registered in some early passage graves with round or quadrangular chambers such as Kerlagat 1, Kercado, Mané Gravor, Parc Guren I, Er Roh, and Kermarker. The latter is a passage grave with a round chamber and a lateral cell, but the ceramics are unfortunately lost (Cassen 2000: 439). In Finistère, Recent Castellic ceramic material has been detected in the round passage grave Île Guennoc IIID and from the passage graves with round chambers C and D in Barnenez (Cassen 2000: 437–443; Giot 1987). Recent Castellic or Chasséen Armorican material is furthermore registered from the ancient non-accessible dolmens, for example in Coëby.

Very diagnostic for this ceramic horizon are footed cups (coupes-á-socles) or, often richly decorated with triangular decors. Cannelures and inserted and concentric bows with horseshoe-shaped motifs (en fer á cheval) are also characteristic for sites such as Kerlagat (Cassen 2000: 553; Le Rouzic 1930).

Material from the sequencing Auzay-Sandun horizon (4090–3025, 95%) is documented from most passage graves (Cassen 2009: 759), for example from Kercado in Carnac, Kerleven, Table des Marchands, d´Er Lannic, Lann Kerber, Lann Vras, Lizo, Noterio, Moustoir in Carnac, Saint Adrien a Ploumeur, L´ile Cairn central grave, Barnenez grave A, Dissignac monument A, Par car Hastell, and Ile Guennoc grave E. The most diagnostic ceramics of this horizon are the decorated tulip-formed vases and vessels with a concave foot or with a ruptured profile as well as plates and cups (Cassen 2009: 549).

From the Channel Islands, the earliest ceramics from passage graves include Middle Neolithic II Recent Castellic-related material in the Chasséen tradition of Western France (Boujot/Cassen 1992, Cassen 1993, Cassen *et al.* 2000: 445, 2009; Schulting *et al.* 2010), for example footed cups (coupe á socle). Late Neolithic material, Beaker pottery, and Early Bronze Age material show the subsequent use of the graves.

In Central West France, ceramics in the earliest passage graves stem from the Middle Neolithic II horizon in its regional variations, for example Cous, Chasséen Atlantique, or Matignons. Characteristic for this material are vessels with ruptured and marked profiles, bowls with a wide opening, flat bowls, and also footed cups (coups á socles or here vase support). This material is documented from passage graves with a round chamber, such as le Cous (Cassen 1993, Figure 5) and la Motte-des-Justice, from which a Middle Neolithic II vessel with a ruptured profile is documented (Joussaume 1999: 67). Furthermore, Middle Neolithic II ceramics from passage graves with quadratic or rectangular chambers are documented, for example the dolmen angoumoisins in Montiou by Sainte-Soline with the earliest documented ceramic vessel with a marked profile, for Chiron/Bougon chamber A with vessels including ruptured bowls and footed cups (coupe á socle or vase support) (Mohen/Scarre 2002), or for the passage grave Péré C in Prissé-le Charriere. In the necropolis Benon, evidence from the passage graves documents Middle Neolithic II material which is quiet homogenous and diagnostic for this horizon (Joussaume 2006, Figure 35, 36, 51, 62). Decorated footed cups (coupe-á soucle or vase support) are registered from all the excavated graves and from tumulus A further fragments of a vessel with a narrow opening, a vessel with a ruptured profile, and a hemispheric bowl are documented. Furthermore, fibrolite axes, a polished dolerite axe, transverse arrowheads, a perforated rabbit tooth, flint blades and tools, wild boar fangs, bone needles, a pendant made from green stone, and a pearl are registered from the necropolis (Joussaume 2006: 12–62).

The material in the later megalithic grave forms

Among other collective graves, the grave inventory of 15 megalithic gallery graves were analysed by Phillip Chambon and Laure Salanova for the Paris Basin (Chambon/Salanova 1996). The material of 13 of these graves was attributed exclusively to Recent Neolithic material like SOM-[8]ceramics in the form of segmented, rectilinear, and rounded (galbé) goblets, perforated mussels, axe pendants, and rhombic arrowheads. From the five graves Champignolles, Bardouville, La Bellée, Verneuil-sous-Coucy, and Bois Coutourier exclusively Recent Neolithic Material was registered. In the remaining eight graves, final Neolithic material, such as Congeal ceramics and Bell Beaker vessels, petiolated arrowheads, daggers, and pins are evidence for either long time, continual use or a subsequent use of the graves. From the two megalithic gallery graves La Ferme Dupont and Verneuil-sous-Coucy, entirely Final Neolithic material was recorded. Bell Beaker ceramics with arc-shaped (vase á cordon arciforme) or plain decorations (vase á cordon lisse) from the maritime or international style are registered from Uisine Vivez, Les Mureaux, and Portejoie fosse XIV (Chambon/Salanova 1996: 108). Among the grave goods and objects of personal use from the gallery graves, evidence for prestige and transfer objects such as copper daggers, pearls, amber pearls from the Baltique, variscite from Spain, and flint knives from the region of Saumur are documented (Billard 2007: 146).

La Neolithic Kerogou and Conguel material in Brittany is associated to dolmens such as the dolmen du Kerogou and also to angle-formed graves (dolmen en equerre or dolmen à coudé) and gallery graves (allée couverte). Characteristic for the Kerogou material are wide round bowls, partly with interrupted profiles and vertical incisions, such as those in Goërem (L´Helgouach 1970). Distinctive for Conguel material are wide bowls with vericular, unregular incisions interrupted by horizontal lines and bow ornamentation,

[8] Seine-Oise-Marne.

such as the material in the Conguel dolmen in Goërem, Port Blanc, Le Rocher au Bono, and Butten-er-Hah (Giot *et al.* 1979: 255, 259).

In Brittany, there are small dolmens with no corridors which seem to be later appearances. They are known in the Morbihan from Lez-Variel in Guide, where a small dolmen is registered with a chamber which measures 1,20m x 1,20m x 1m (Gouézin 2007: 66–67). According to old reports, a cremated burial at this site seems plausible. Outside the chamber a bronze axe was found.

The burial rites of megalithic societies in Northwest France

Burial rites in the Paris Basin/Northern France

The burial rites of non-megalithic grave contexts from the Paris Basin and Northern France are better known than those directly from megalithic graves (cf. chap. 3, p. 87-93), since there are diverse non-megalithic burial forms which co-exist with the megaliths.

From the earliest megalithic structures in this region, for example the long tumulus with the megalithic passage grave Colombierre-sur-Seulles, no bone material is preserved (Chancerel 1992). Little is known about the burial rites of the small dolmens in the region. They contained several individuals, for example a small dolmen at the Ile de France in Presles with a ground surface of 2m², including the remains of 3 children and 5 adults (Tarrête 1999: 81). The dolmen de Mailleton in Malesherbes is a small monument measuring 2,20m x 1,80m in the center of a tumulus measuring 13m in diameter. The bone material is fragmented and an MNI of 37 is assumed, including 8 children and at least 27 adult individuals as viewed by the composition and the spatial distribution of the bone material. There are indications for a selective removal of bone material (Chambon 2003: 148–156), but it is difficult to discuss the transport of human relicts because of the taphonomic problems which beset the interpretation of this material.

From the chamber of the 11m long subterranean gallery grave La Chaussée Tirancourt near Picquigny in the Picardie (Masset 1972, 1995), an MNI from 341 individuals in three layers is documented (Chambon 2003: 289–293). The dead were buried successively over time and were ultimately covered in a final act with a layer of chalk and loess. The articulated individuals in all layers were deposited in a crouched position. The lowest layer VI contained only a few human remains of individuals buried in the Recent Neolithic around ~3200 cal BC. This layer was emptied in ancient times. The next layer V contained the remains of 60 individuals, deposed in two sectors of the grave and there is likewise evidence for a concentration of secondarily deposited bones. From the center articulated bones are noted, whereas along the side walls more disarticulated skeleton material is recorded. Next to one of the orthostats, the remains of a relatively aged woman were found buried together with an axe. In the more upper layer III, 200 individuals were buried with a low percentage of children amounting to 7%. P. Chambon interprets the population in the grave as a selected part of the society with children having been partly excluded from the burial site (Chambon 2003: 291).

A Late Neolithic structure with a non-accessible dolmen is found at Loaches de Because in Matisse. The grave was constructed on a 45m long and between 4m and 11m wide trapezoid-formed long tumulus from the Middle Neolithic (Chambon 2003: 108; Tarrête 1999: 78). The dolmen contained the poor preserved human remains of juveniles or adults with an MNI of 5. The position of two of the individuals could be reconstructed, both lying on their backs with non-arranged extremities randomly placed beside their bodies.

The burial rites in Brittany and on the Channel Islands

Due to acidic soil conditions in Brittany, there is nearly no bone material preserved in the region and the basis for a reconstruction of the burial rites of the Breton megalithic societies is therefore limited.

The size of the first megalithic chambers is mostly restricted and thus suggests single or double burials. This calculation can be far too simple when regarding the number of individuals buried or secondarily deposed in pre-megalithic graves and small cists, for example the multiple burials from Téviec and Hoëdic (Péquart *et al.* 1937) or Goumoiziére in Central West France (Soler 2007).

For the transitional structures leading to the megaliths and the first stage of the Tumuli Carnacéens St. Michel, some small calcined bone fragments are registered (Schulting *et al.* 2009: 770). According to Schulting, enough calcined bones are preserved to indicate burials or even a singular burial for the main chamber. In the earliest reports, however, the human remains of the chambers in St. Michel are described as non-calcined:

Les ossements trouvés dans les crypts n´avaient pas été soumis á l´action du feu ils y avaient été inhumés (Mauricet 1865: 27).

The main chamber is surrounded by 21 stone cists, two of which contained calcined animal bones identified as ruminants (Le Rouzic 1932, Schulting *et al.* 2009: 770). From the ancient non-accessible dolmen St. Germain as well as from Barnenez and St. Thois cremated bones are reported (Le Roux/Giot in Cassen 2000: 241).

According to Serge Cassen, it is also possible when viewing the results of recent excavations that some of the calcined

bones in the old excavation reports were actually decayed, uncalcined bone material (Cassen 2000: 240).

From the main chamber of the tumuli Carnacéens Mané Lud in Locmariaquer, an impression from an inhumation of a body in a crouched position was documented (Boujot/ Cassen 1992; 2000: 31) and in the main chamber of the tumulus Carnacéen Tumiac the remains of one adult individual were recovered (Malaguti 1862).

The two passage graves from Port Blanc are nearly the only sites with sufficient available bone material (Gaillard 1883: 301; Schulting 2005: 166–167; Gouézin 2007: 123). These graves are situated on cliffs directly at the sea and the bones were preserved due to the mussel chalk in the sand. According to the old excavation reports from Gaillard (Gaillard 1883), the individuals in the western passage grave were deposited in two layers and separated by stone slabs. From the lower layer 'dozens' of skulls were described which were lying against one of the stone slabs together with disarticulated bone material. This could be the result of a successive burial practice, but an ossuary is even possible. The second layer contained 10 skulls; two of them belonging to articulated individuals, which would be typical for successive burial practices and the clearing of older burials. The second passage grave contained articulated individuals. The exact number of individuals is unknown (Gouézin 2007: 123–124). The earliest available radiocarbon result from these individuals dates to ~3830 cal BC (cf. chap. 3, p. 55-57). Since there are solely three available determinations, an earlier outset of these burial activities is equally possible.

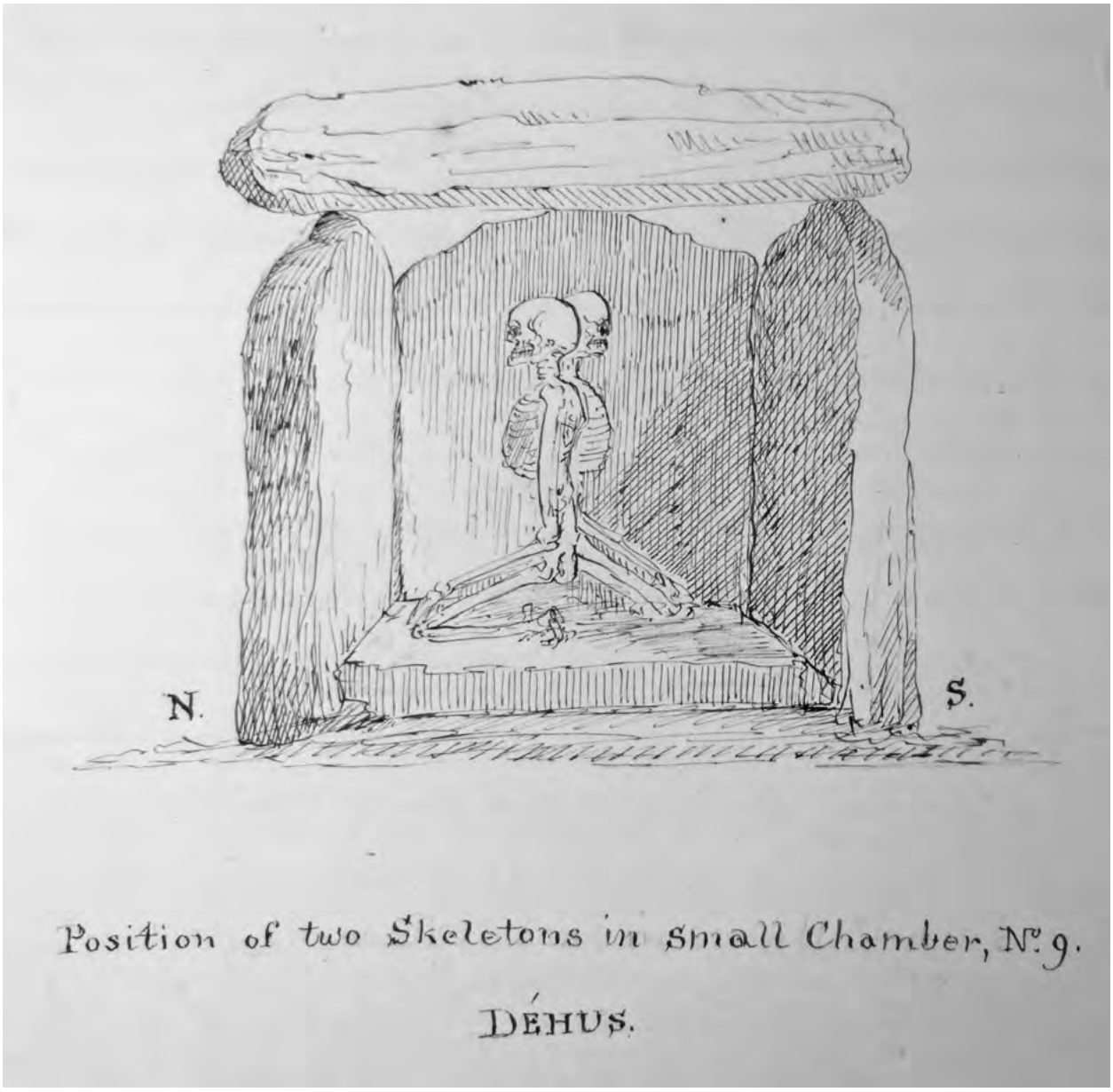


Figure 3.63 Sketch of Chamber B with the reported two 'seated' skeletons from F.C. Lukis (Schulting 2010, Figure 3) with the kind permission of Coll. Ant. V © Guernsey, Museum / Galleries, State of Guernsey 2009).

An accumulation of bones with six skulls beside a stone slab is deposited 5,20m to the east of the second passage grave. Together with the bone material, the fragment of an axe, an ornamented vessel, and two other non-specific ceramic fragments are documented. This depot can be interpreted either as a 'regular' secondary burial or rather as a clearing of one or both of the chambers.

From the double passage grave Roc´h Avel, the remains of at least three individuals are documented from the ground level of the wall in the northern chamber. Since the chamber was already partly washed out by the tides when the excavation started, more remains might be assumed (Giot *et al.* 1994: 624).

Furthermore, a few human remains are reported in old excavation reports from the end of the 19th and the beginning of the 20th century from at least nine passage graves (Cassen 2000: 242), for example at Trois Squelettes in Pornic in the very South, where the remains of a man, a woman, and a child are documented. Further remains are also known for Beg an Dorchenn in Penmarc´h, Béniguet in Finistere, Kervadel in Plobannalec, Rosmeur in Penmarc´h, Daint-Dreyel in Plouhinec, Pierre Plates in Locmariaquer, Mané er Roc´h Feutet in Carnac, Kergonfals in the Morbihan, and the unspecified megalithic graves of La Couronne Blanche in Petit-Auverné and Conguel in Quiberon.

More evidence for the burial rites of megalithic societies on the Channel Islands is attested by bone material from the passage grave le Déhus on Guernsey (Schulting 2010) (Figure 3.63). As in Brittany, acidic soil conditions on Guernsey were not convenient for bone preservation, but the filling of a part of the chambers with limpet shells preserved the bones. From the site an MNI is estimated which includes 26 adults and 7 juveniles. In the old excavation reports, human remains in the upper layer of the main chamber of the grave are documented together with Chalcolithic and Bronze Age ceramics (Patton 1995a; Schulting 2010: 158–159, 163). These human remains included both unburned and cremated bones, whereby two adults and a child could be determined. The original contents of the main chamber were either cleared out for later burials (Schulting 2010: 153) or the main chamber had a more ritual function and was later reused as a burial spot. Altogether six side cells, which included most of the human remains and Middle Neolithic material, were attached alongside the corridor and the main chamber. These side chambers were partly filled with limpet shells.

According to the old reports, the two individuals in chamber B, which is the very first side cell on the northern side of the monument, were interred as seated burials facing opposite directions. Both individuals were probably female adults. This interpretation by the excavator Lukis in 1844 should not be excluded a priori, since the shell filling of the chamber can also preserve a part of the anatomical order of the bodies (Schulting 2010; 5). This account should also be considered, since the interpretations of old excavation reports of Scandinavian passage graves with upright sitting burials were confirmed by modern excavation and measurement techniques (cf. chap. 11 and Ahlström 2009). This burial tradition is already documented from Mesolithic coherences. Seated burials are known for sites, including Skateholm in Sweden (Larsson 1982, 1985, 1988, 1989; 1993), from a few graves at Teviéc, Hoëdic, and Auneau in France (Péquart *et al.* 1937; Verjux 1999; Midgley 2005: 57), and from Janislawice and Mszano in Poland (Marciniak 1993) or from the Early Neolithic Cueva de los Murcielagos in Andalusia (cf. chap. 9, p. 221)

From chamber D, bone piles are documented from two different layers with limpet shell fillings, which can alike be interpreted as the remains of burials in sitting positions. From the last upper layer, two individuals are reported with flexed positions together with more human remains (Schulting 2010: 5 and Figure 4, after Kendrick 1928).

Burial rites in Central West France

While there is little known from the graves of Brittany, far more bone material is available from Central West France. Nevertheless, the reconstruction of burial rites is complex.

The megalithic burial rites in this region include singular or double burials, multiple collective burials, the secondary deposition of bones or ossuaries in the megaliths, a successive burial practice with clearings of older inhumations, and the possible selective or partial removal of bones from the graves. There is evidence for singular or double burials and from the Middle Neolithic onwards collective burials in the region can be assumed.

Non-accessible dolmens in tumuli of these regions are connected to possible single burials, such as Bernet in Saint-Sauveur, Campet in Sain-Laurent, and La Tombe de la Demoiselleau Thou or the tumulus La Grosse-Motte in Bouhet with singular or double inhumations (Joussaume 1999: 66; Joussaume 2003: 12).

From the accessible dolmen from the first phase of the tumulus C in the necropolis Péré in Prissé-la-Charrière in the departement Deux-Sèvres (Joussaume 1999; Laporte *et al.* 2002), there is evidence for either a collective grave or a multiple burial. An MNI of 3 from the chamber is recorded and the radiocarbon determinations suggest that these individuals were buried contemporaneously or with a minor time delay (cf. chap. 3, p. 79-80) at ~4320 cal BC.

There are indications for ossuaries or the secondary depositions of bone material in the necropolises with passage graves, for example in Bougon, or perhaps also in Benon, Montiou, Ciste de Cous, and the Dolmen Pierre Virante.

The arguments for an ossuary in Bougon are extensively debated in chapter 3.4, since it is crucial for the determination of the grave´s construction, whether these graves were the primary burial places of the bones, or if the bodies decayed somewhere else, possibly long before these megalithic graves were built. Shortly summarized, the arguments for ossuaries in Bougon are as follows: 1) In the passage grave F0, four of the five adult individuals seem to be re-arranged in a loose connection, one individual is composed including the bones of both an adult and a child, the remaining bones of children are dispersed all over the grave, 2) Most of the small bones in FO, such as finger and hand bones as well as sterna and carpae are missing, 3) In the passage grave B2, no bone group is completely missing, suggesting that the individuals were decomposed at the site. But altogether 16 skulls are documented which were arranged in two lines, some of them deposed together with long bones. In total, nine left and eight right humeri and nine left humeri and four right femura were preserved. Accordingly, it is possible that some of the skulls were inserted from somewhere else with a re-arrangement of the bones and that the grave partly served as an ossuary (Chambon 2003: 156–162; Ferrer-Joly 1995; Mohen 1989: 227, 1995, 96). A further interpretation suggests a removal of part of the bones from the graves with a rearrangement of the skulls (Chambon 2003: 156–162). No determination of the sex of the interred individuals was possible. In chamber FO, five adults and two children can be classified for an MNI of 11 individuals. An MNI of 20 is determined from chamber B1, including 14 adults or juveniles and 6 children (Chambon 2003: 162).

The necropolis of Champ Châlon in Benon consists of five monuments with passage graves covered by stone tumuli. A small number of individuals, for example a family, was buried in the singular monuments with an MNI of between five and eight (Joussaume 2006: 12–72). Complete or partly articulated individuals are registered from chamber B1 and from the subsidiary burial chamber of monument A. Few remains and disarticulated bones are documented from the chambers A, B, and C. Roger Joussaume took a selective removal of bones into consideration, or postulated an ossuary with a secondary deposition of bones in the grave. But a normal taphonomic loss is likewise plausible, since there is no evidence for a manipulation or re-arrangement of the bones. From the subsidiary burial chamber, a radiocarbon result from ~1630 cal BC (OxA-9384/Lyon 1124, 4870±45 BP, 1688–1541 cal BC, 68.2%; 1741–1519 cal BC, 95.4%) indicates that this alcove was used or re-used during the Bronze Age.

A determination of sex was not possible, whereas the age of the individuals was determined by tooth material. The buried population shows a normal demographic composition with all age groups. From the megalithic passage graves, chamber B1 features 131 teeth with an MNI of 7 or 8 individuals, including 5/6 adults, 1 mature and 2 infants. From chamber B2, 102 teeth are registered from an MNI of 6. Three of them are between 20 y and 30 y, two between 30 y and 40 y and one was older than 50 y. From the megalithic chamber C, an MNI of 7 individuals is determined from the teeth including two adults between 20 y and 25 y, two between 25 y and 30 y and three children aged 4 y, ~6 y, and 9-11 y. There is one individual deposited in the corridor, which was estimated to have been older than 60 y. For chamber A, an MNI of 8 was determined: three adults aged between 20 y and 30 y, one between 30 y and 35 y and one mature individual older than 40 were determined. Three children were estimated to have been ~2 y, ~4 y and ~6 y.

From the dolmen Pierre Virante, indications for the secondary deposition of bone material in the grave are available. Pierre Virante is not a classical dolmen, but rather some kind of a long tumulus with a partial megalithic chamber. A sub-triangular stone between sides, 2,50m and 2,80m in length, is carried by three pillars of two or three stones. On the west side of this structure a chamber was built by stone slabs in the extension of the tumulus (Chambon 2003: 240–252; Joussaume/Gruet 1977). In the area around the megalith human remains were found. The MNI is not easy to determine, but individuals in their 40s or 50s were included. The composition of the bone material indicates a secondary deposition of the deceased, since the small bones are absent or not frequent. Bones are recorded from the western chamber and suggest an MNI of 15 deposited individuals in two layers as well as traces of the removal of a part of the bones. Two individual graves are registered as well - one from the tumulus and one from the Northern wall (Chambon 2003: 240).

The Ciste de Cous is another passage grave with possible secondary depositions according to the old excavation reports from 1913 (Gutherz 1998: 284; Joussaume 1978: 585). In the middle of the round chamber of the megalithic passage grave, disarticulated human remains were deposited, including 471 teeth calculated to <15 individuals.

There are indications for successive burials from passage graves, for example from Montiou in Sainte Soline (Deux-Sèvres). Montiou is a 50m long and 23m–24m wide tumulus with originally at least four passage graves (Germond *et al.* 1978, 1979, Joussaume 1985, 1999; Chambon 2003: 78–104). The graves are parallel to each other with the opening to the southern side of the monument and the structure's contours are similar to that of Barnenez in Finistere. Three of the

graves are rectangular dolmen angoumoisin, the grave on the very southeastern side of the tumulus has a polygonal chamber. Grave I and the neighboring grave II have been investigated and human remains were recovered. For grave I an MNI of 22 was determined, grave II has an MNI of 14. In both graves the dead are deposited in the chambers and the corridor.

According to P. Chambon, there are no clear indications for an ossuary or secondary deposits, but rather some evidence for successive burial practices with later individuals deposited in the corridors. Possible indications for a secondary burial or an ossuary in the corridor of grave II with disarticulated bone material from several individuals under a stone slab have been discussed (Joussaume 1981, Gutherz 1998: 284). In chamber I, 64% of the individuals died as children or young adults, while from chamber II 34% belong to this age category (Chambon 2003: 104).

The passage grave in the tumulus Péré C in the necropolis of Prissé-la-Charrière contained human remains with an MNI of 6: two of them are children, four are adults. The radiocarbon measurements suggest, for example for the dolmen in the same tumulus, multiple contemporaneous burials or burials with short time intervals between the burials from 4270 cal BC onwards and a collective successive burial site. Five of the available radiocarbon results from this chamber hint at close time intervals.

There is also evidence for later single inhumations as, for example, in the dolmen de Taizé in Deux Sèvres. The structure is a so-called dolmen angevin with a single inhumation against the western wall including Bell Beaker material (Chambon 2003: 332; Hébras 1965).

Contemporaneous non-megalithic burials

Especially in the Paris Basin and in Northern France, diverse non-megalithic grave forms are contemporaneous to the co-existing megalithic graves. The former graves, such as the wooden gallery graves or the dry wall passage graves in the Paris Basin, are in sensu stricto of this analysis clearly non-megalithic and accordingly they are discussed within this chapter, even if the architectonic concept partly imitates megalithic principles and their appearance is also a result of the available and limited megalithic building material in the lime plateaus of the Paris Basin (Aesch 2005; Billard/Chancerel 1998: 247).

Contemporaneous non-megalithic burials in the Paris Basin/Northern France

Contemporaneous structures to the megalithic graves in the Paris Basin and Northern France also include, beside the monuments which imitate megalithic graves, further structures such as so-called houses for the dead and hypogea.

Dry Wall Structures

From the Calvados, a series of Middle Neolithic II elaborated round tumuli with passage graves in dry wall technique is registered, for example La Hogue, La Hoquette, Ernes, Condé-sur-Ifs, and Vierville. In the literature, they are denoted as megalithic cairns, but even if some of them have megalithic elements, such as the cover stones of the corridor or a trilithon in the chamber in La Hoguette, they are non-megalithic burials and their chambers are completely built in dry wall technique and covered by corbelled roofs. Generally, we can state that these were collective graves with successive burial practices including two or three dozen burials. All sexes and ages are buried in the same grave except for children under two years of age (Billard/Chancerel 1998: 250; Marcigny *et al.* 2007: 133–139).

Vierville/Butte á Luzerne

The monument with the earliest available radiocarbon dates is Vierville or Butte á Luzerne in Vierville in Manche, Basse-Normandy (Chancerel *et al.* 1986; Schulting 2010: 164; Verron 2007: 139–142) (Figures 3.64-65). One dry wall passage grave (chamber A) with a round chamber 3,20m in diameter is registered and is covered by a round tumulus. To the south, another tumulus is annexed with a passage grave (chamber B) and a quadrangular chamber. Both graves are oriented to the east. In the paved chamber A, the disarticulated remains of minimally 16 adults (7–8 men, 8–9 women and 2 undetermined) and 12 children were found (Verron 2007: 140). Four radiocarbon results stem from chamber A and two stem from chamber B. All are from human bone samples. The earliest available result is from chamber A and measures to ~4450 cal BC (OxA-11395, 5690±45 BP; 4536–4368 cal BC, 68.2%; 4596–4356 cal BC, 95.4%), the last result measures to ~4250 cal BC (OxA-3018, 5339±35 BP; 4324–4199 cal BC, 68.2%; 4331–4164 cal BC, 95.4%). The grave goods in chamber A consist of 16 worked bones, including seven awls, 57 flint objects, such as blades, knives, arrowheads with transverse edges, and flint tools. Furthermore, perforated shells, animal teeth, bone pendants, pearls of red amber, three steatite pearls, a variscite pearl and fragments of at least 10 vessels, such as hemispheric bowls or goblets with spheroid paunch showing short collars, were found. One of the vessels is decorated with a cannelure, building a concentric arc in the tradition of the Breton Recent Castellic ceramics, and in the ceramic spectrum Castellic as well as Carn elements are to be considered (Cassen 2000 *et al.* 554; Verron 2007: 140).

From chamber B, an MNI of 34 to 38 individuals is recorded, 13 of them are children or juveniles. The

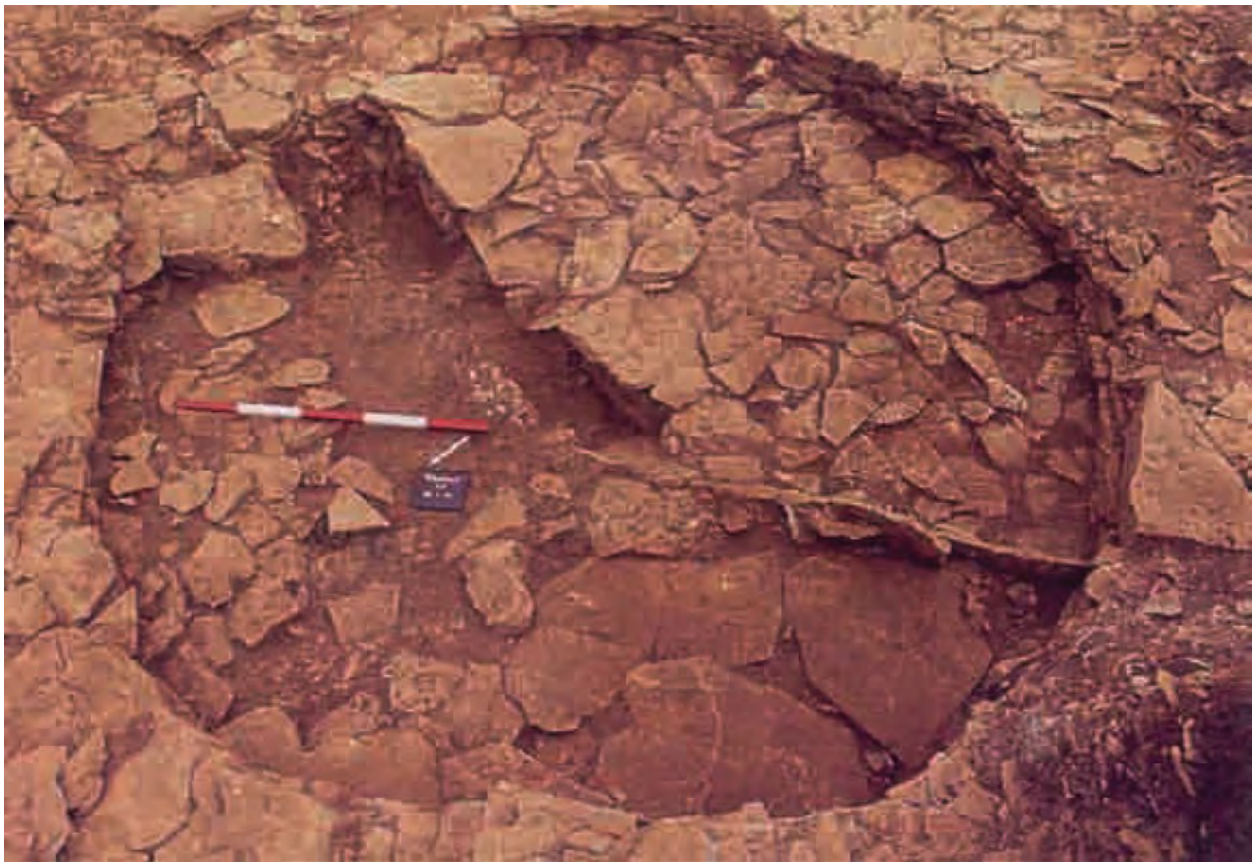


Figure 3.64 Vierville/Butte á Luzerne, chamber A. (Verron 2007: 139)

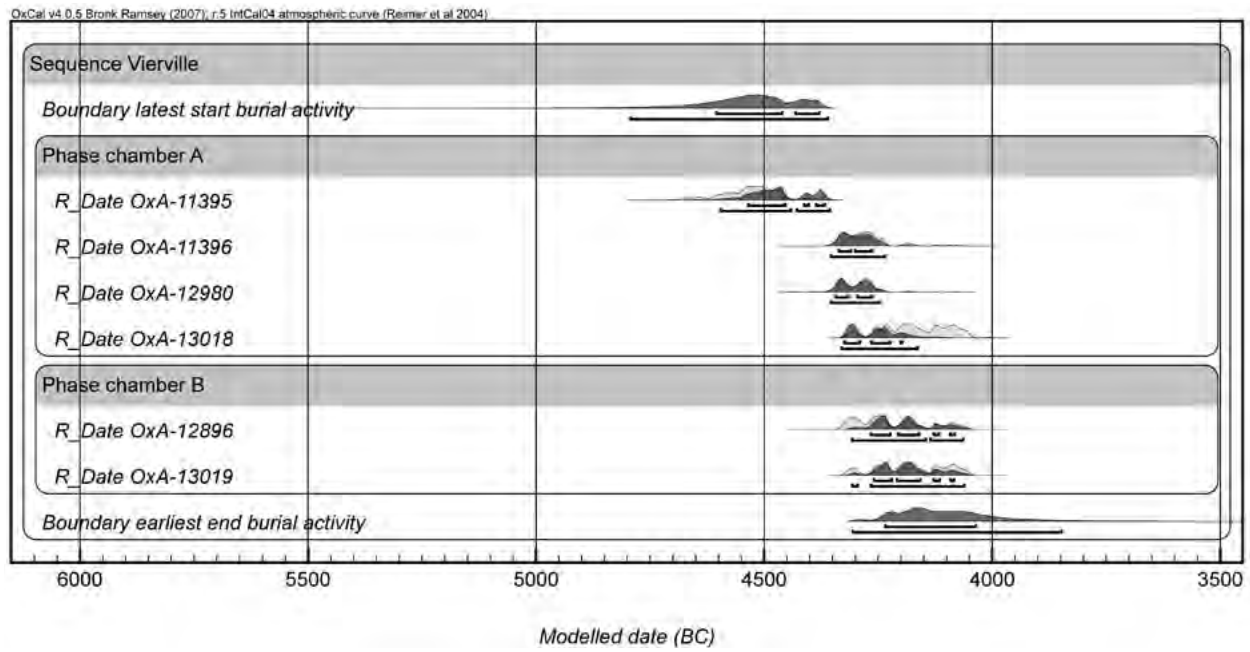


Figure 3.65 Probability of dates from Vierville/Butte á Luzerne. Model agreement: A_{model}=81.9, $A_{overall}$=84.4

articulated individuals are deposited in a lateral position, one child is buried in a dorsal position and two individuals seem to be deposited ventrally (Verron 2007: 141).

The available radiocarbon results from chamber B begin a little later, the earliest determination starting at ~4170 cal BC (OxA-12896, 5375±40 BP; 4267–4082 cal BC, 68.2%; 4308–4064 cal BC, 95.4%).

These for a dry wall passage grave very early results are not yet confirmed over the stabile isotope values and a reservoir effect like for LeDéhus might be possible (in chapter 3, p. 51-81).

There were only a few grave goods found, including flint tools, arrowheads with transversal edges, a bone tool, two marcasite fragments, and Chasséen pottery. Under the pavement of chamber B, a pit burial is documented with a few grave goods like the fragment of a schist bracelet, a flint tool, and a goblet with an S-profile.

La Hoguette

La Hoguette in Fontenay-le-Marmion in the Calvados was formerly a round stone tumulus with a diameter of 32m, covering seven passage graves in dry wall technique with a round chamber up to 4,50m in diameter and partly paved floors. Three of the passage graves are oriented to the southwest and three to the northeast. Between 4 and 14 individuals were deposited in the chambers (Figure 3.66)

Some pre-monument activities, such as hearths, were documented (Delibrias 1972: 280; Envin *et al.* 1973: 143–144). One radiocarbon result is available from a hearth in chamber IV and provides a possible date for the construction or the use of the grave at ~4380 cal BC (4581–4234 cal BC, 68.2%; 4713–4044 cal BC, 95.4%), but this context also provides the possibility of a TPQ-value.

Two radiocarbon results are obtained from human bones and have a high standard deviation. They are measured to approximately ~3700 cal BC (Ly-421, 5160±190 BP; 3893–3539 cal BC, 68.2%; 4053–3379 cal BC, 95.4% and Ly-420, 5050± 260 BP, 3861–3390 cal BC, 68.2%; 4053–3315 cal BC, 95.4%). The poor archaeological material, for example a Chasséen vessel and la Hoguette ceramics, possibly originates from the ancient soil. As in chamber I and II, the individuals are primarily deposited in the chamber in a crouched position on the left or on the right side, partly along the walls and no correlations regarding age, sex, or position could be distinguished. The bodies were not covered by earth after deposition (Chambon 2003: 64).

A later structure is the so-called crematory at the northeastern part of the monument (Caillaud/Lagnel 1972). It is a rectangular structure which measures 12m x 1,30m with the cremated remains of an MNI amounting to at least 16 persons (Chambon 2003: 218). The crematory is also interpreted as a subterranean gallery grave (allée sepulcrale) made out of wood (Billard 1998: 50). The archaeological material from the crematory belongs to the SOM-horizon. The four

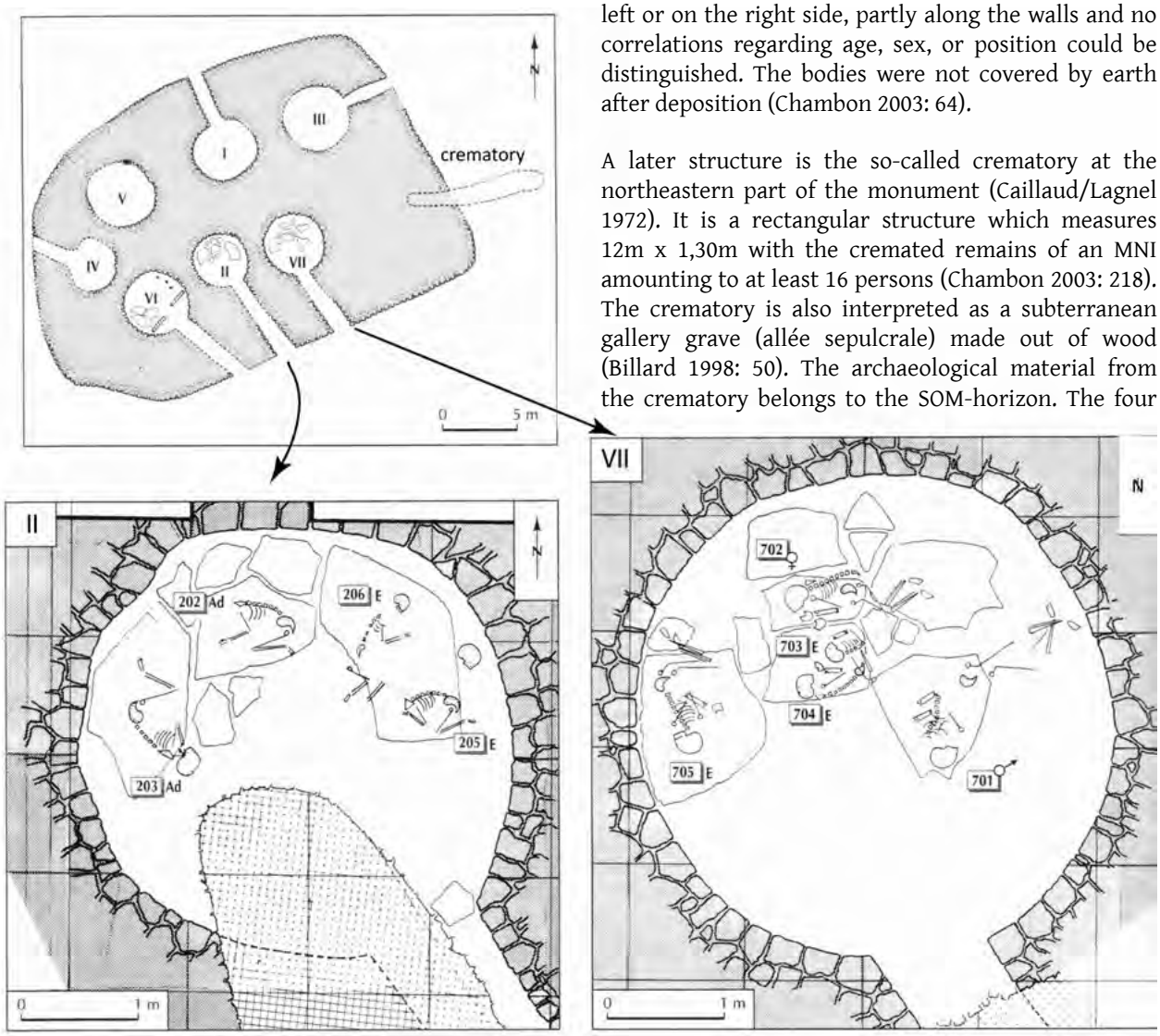


Figure 3.66 La Hoguette (after Caillaud/Lagnel 1972 and Chambon 2003: 64)



Figure 3.67 Corridor in dry wall technique La Hogue

available radiocarbon results (Gif-1513; 4800±120 BP; Gif-1347, 4750±120 BP; Gif-1514; 4720±120 BP; Gif-1346; 4300±120 BP) suggest a time interval from 3804–2895 cal BC (95.4%; 3694–3074 cal BC, 68.2%) (3.68).

The structure La Hogue is located close to Fonteney-le Marmion and La Hoguette. It is a rectangular tumulus which measures 40m x 30m and still has a height of 6m. In the monument 12 passage graves with round chambers in dry wall technique are inserted, formerly covered by a corbelled roof (Figure 3.67). The only megalithic elements are a trilithon construction in a chamber and the cover stones of the corridor. From chamber A, the disarticulated bones of 6 individuals are documented (Chambon 2003: 308; Lagnel/Verron 1995). No radiocarbon dates, but rather Middle Neolithic II ceramics are available.

Condé-sur-Ifs

In the Calvados in the southern part of the Caen, the necropolis Condé-sur-Ifs is documented with several monuments including Ernes, La Butte Hu, and la Bruyere du Hamel in dry wall technique (Figure 3.69). These graves include one or two dry wall passage graves covered with a corbelled roof (cf. among others Billard/Chancerel 1998; Caillaud/Langnel 1972; Chambon 2003: 306–310; Dron 1992; Langnel/Verron 1995; Le Goff *et al.* 1995; Marcigny *et al.* 2007; Verron 1977, 2007). Under the graves the remains from a Cerny Middle Neolithic I horizon are verified.

Ernes represents the most elaborated structure with inner dry wall compartments and dry walls which lead from the central chamber in a star-formation. These inner compartments were originally filled with earth. If size and spatial distribution are indications for a social differentiation within the necropolis, two of these monuments suggest such an interpretation since they are more colossal than the others. Two passage graves are inserted into the monument An in Condé-sur-Ifs and it is surrounded by six smaller and two larger monuments. There are no differences to be considered among the grave goods, which consist of flint tools, mussels, stone or bone pendants, as well as one footed cup (coupe á socle) and a goblet. The chambers contained between 4 to 16 individuals deposed successively on the right or on the left side. From La Bruyere du Hamel, two radiocarbon results are available from human bone samples with the earliest result indicating ~3500 cal BC (Gif-8799, 4690±70 BP; 3627–3372 cal BC, 68.1%; 3638–3356 cal BC, 95.4%; Gif-9651, 4090±60 BP; 2857–2503 cal BC, 68.2%; 2872–2490 cal BC, 95.4%). Two radiocarbon determinations of bone samples from Ernes are also available with the earliest result at ~3660 cal BC (Gif-8798, 4880±70 BP; 3764–3539 cal BC, 68.2%; 3926–3389 cal BC, 95.4%; Gif-90046, 4840±150 BP; 3789–3378 cal BC, 68.2%; 3978–3127 cal BC, 95.4%). The grave goods are

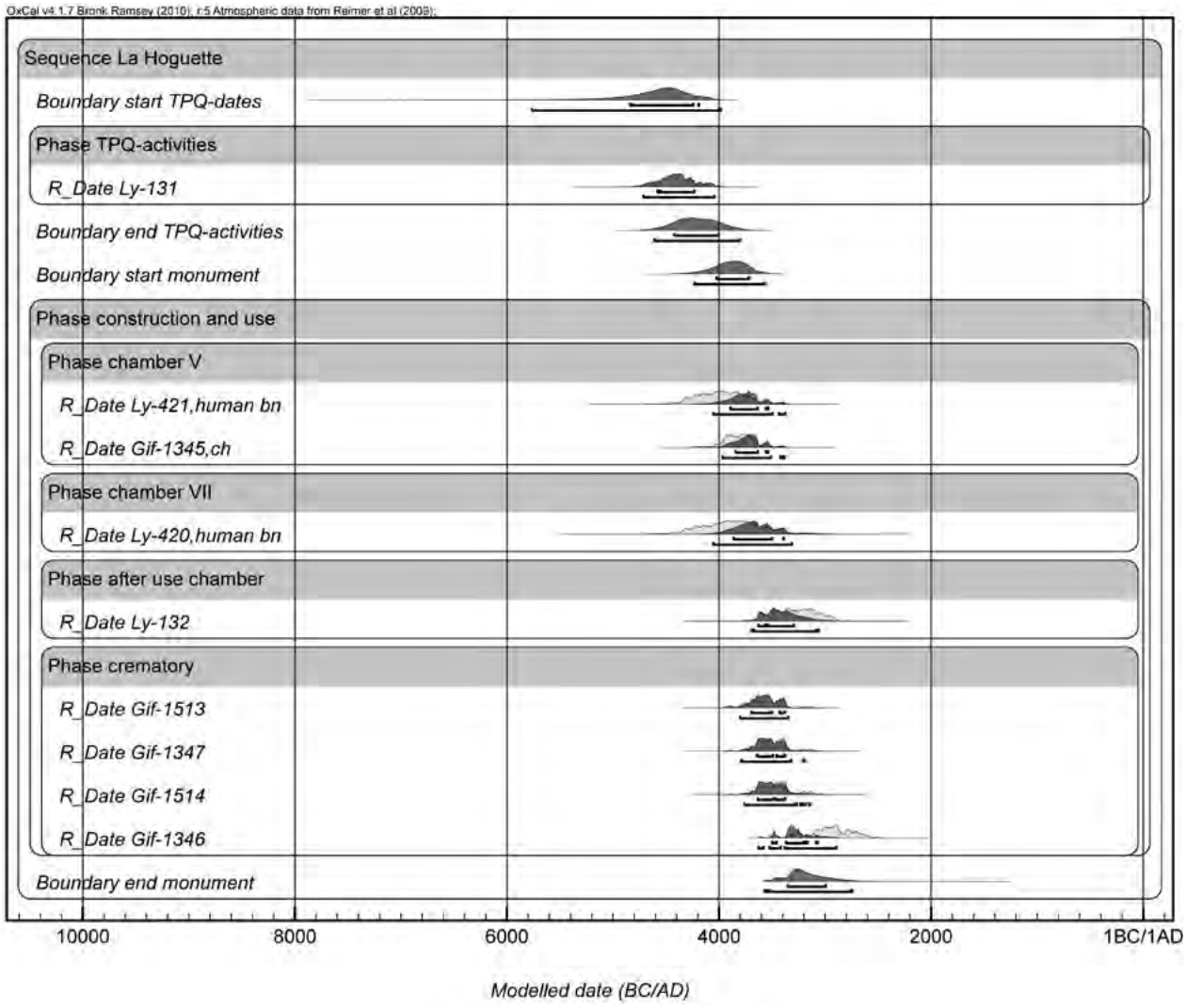


Figure 3.68 Distribution of the probability of radiocarbon measurements from La Hoguette. Model agreement: A_{model}=83.1, $A_{overall}$=79.8

associated to the Middle Neolithic II. A DNA-analysis is also available from chamber C in Condé. No maternal line could be recognized (Verron 2007: 136).

Wooden Gallery Graves

Gallery graves (allées sepulcrales) found in the Paris Basin are similar to the megalithic gallery graves, but built in wood and partly covered by megalithic capstones.

From Porte-Joie in Eure, a subterranean gallery grave (allée sepulcrale) is registered: pit XIV and tomb 1. Pit XIV is recognized as a subterranean gallery grave with stone slabs on the side. Tomb 1 was formerly a complete wooden gallery grave (Billard *et al.* 1995; Billard 2007: 145; Chambon/ Salanova 1996). Four radiocarbon results are available from tomb 1, including human bone samples with the earliest result from ~3120 cal BC (3264–2924 cal BC, 68.2%; 3331–2915 cal BC, 95.3%) and the last result from the Early Bronze Age at ~1600 cal BC (1872–1325 cal BC, 68.2%; 2111–1092 cal BC, 95.5%). The grave goods of these burials consist of stone or bone pearls, axe pendants, two small gold plates, and petiolated arrowheads.

At Val-de-Reuil in les Varennes in the province Eure, a further gallery grave constructed from wood is registered measuring 14m x 3m. There is an MNI of 29 determined for the grave including all ages and sexes, among them 2 perinatals, 8 children <5 y, 3 juveniles or young adults (between 15 y–25 y) and 16 adults. 6 men and 3 women could be identified (Billard *et al.* 1995; Chambon 2003: 137). According to the articulated material, at least five individuals could be determined as primary burials. The dead were buried on their backs with their heads in an eastward direction. Two radiocarbon measurements from human bones are available, one from ~3212 cal BC (Ly-6238, 4505±110 BP; 3363–3028 cal BC, 68.2%; 3516–2909 cal BC, 95.4%) and

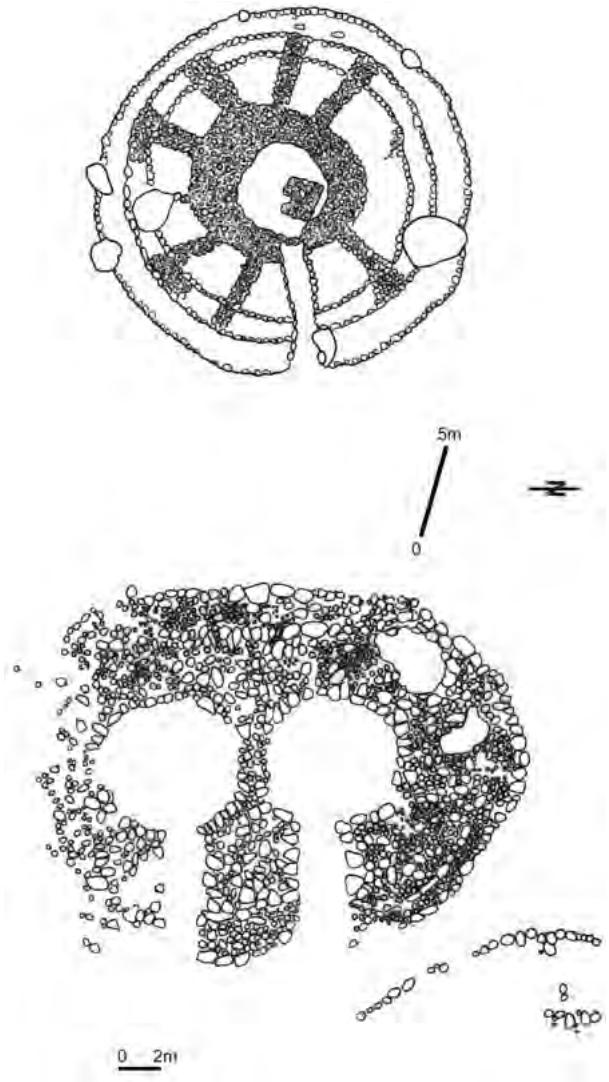


Figure 3.69 Necropolis Condé-sur Ifs. Planum Ernes and La Bruyere du Hamel (after Billard/Chancerel 1998)

one from ~1850 cal BC (Ly-6116, 3505±60 BP; 1901–1747 cal BC, 68.2%; 2014–1687 cal BC, 95.4%). Among other grave goods, three stone axes and ceramics belong to the SOM-horizon (Billard *et al.* 1995; Marcigny *et al.* 2007: 166).

The grave in Bois de Muisement in Bazoches-sur-Vesles is a structure with an original length of 7m x 1,40m (Leclerc 1993; 1995) and stone slabs as a cover with a thickness of 0,20m x 0,60m. The grave contained the rather fragmented remains of dozens of individuals. The bone material was partly articulated and partly dislocated and shows a normal demographic composition of both sexes and all ages. The grave goods consisted of some SOM-ceramics, mussel pendants, and triangular arrowheads (Chambon 2003: 237–240; Tarrête 1999: 84).

A similar structure is registered from Oix-a la Croix-Saint-Ouen. Here, a layer of stones covers a rectangular pit, formerly a structure constructed out of wood. The wood is preserved in a carbonized state, since the grave must have burnt. 17 inhumations are determined. More graves like this are registered from the Haute Normandie in the region of Presles and the Ile de France (Tarrête 1999: 84).

Pit Burials and Secondary Deposits or Ossuaries

With Marolles-sur-Seine in Seine-et Marne, a small graveyard with nine pits and traces of secondary deposits or ossuaries is registered and dated to the Middle Neolithic II (Chambon 2003: 194–204; Tarrête 1999: 85). The structures include three individual graves, one double burial, two structures with secondary deposits and three pits with an unknown function. The position of one of the single individuals could be reconstructed: it was deposited in a crouched position on the left side. Structure 305 contained two individuals, but it is not clear if they were contemporaneously or successively buried. Structure 301 contained the disarticulated remains of 14 individuals, whereas structure 302 disclosed the remains of 7 individuals. These pits contained different bone categories and the individuals might have been divided into the two pits after decomposition. While the long bones are missing in the first pits, they are present in the second ones. It cannot be reconstructed, if the bones were concurrently deposited or rather time-delayed. In the literature, these burial sites are denoted as ossuaries, but we prefer to classify them as secondary burial places, since they are pit burials and not chambers and ossuaries in the classical sense.

Another grave in this category might be grave no. 13 in Les Réaudins in Balloy (Chambon 2003: 186). The grave is situated in a Middle Neolithic enclosure (cf. 1.1), but due to a radiocarbon result of ~2300 cal BC (Ly-5550, 3850±56 BP; 2456–2208 cal BC, 68.3%; 2470–2144 cal BC, 95.4%) it is attributed to the very Final Neolithic or the Early Bronze Age. With a size of 3m², the grave is relatively small. There is one sector with 9 articulated individuals and a sector including disarticulated skeleton material with an MNI of 37. The individuals were buried in different layers in crouched positions and oriented in different directions. Within the articulated individuals, exclusively young adults are determined: four women and four men. The disarticulated bones included at least 9 women and 11 men. Additionally, at a 100m distance a small pit measuring 0,70m–0,55m was documented with the disarticulated remains of at least 5 individuals (Chambon 2003: 193–194).

In Vieux Tordoir in Berry-au-Bac in Aisne, two pits measuring 3m x 3,20m and 4m x 4,50m, respectively, belong to structure 347. Altogether, 5700 disarticulated, partly calcined bones and bone fragments are documented with an MNI of 32 individuals. 13 of these were immature individuals. One radiocarbon

result stems from a human bone sample from the Recent Neolithic at ~3140 cal BC (Ly-5846, 4460±70 BP; 3333–3024 cal BC, 68.3%; 3351–2927 cal BC, 95.4%). The material is associated with the SOM-horizon (Chambon 2003: 181).

The most of these secondary deposits might be contemporaneously buried secondary burials, even if we cannot assume this with certitude. There are no indications for successive secondary burials, for example accessibility, which is more likely for a chamber or a megalithic grave and for 'classical' ossuaries.

Hypogea

In the Paris Basin, a traditional construction of hypogea has been observed. A concentration of hypogea in the Marne region can be detected with 150 registered sites organized in several necropolises along the Cote d´Île de France. Several hypogea are documented in the l´Oise and in the South of the Seine-et-Marne, where eight destroyed sites are presently registered (Cambon/Salanova 1996: 105; Tarrête 1999: 86).

These hypogea are often dug into the limestone with a small corridor and a small pre-cave or an anti-chamber. The opening is found at a falsa porta or a trou d´homme, averaging approximately 50cm. The grave forms are comparable with gallery graves. Hypogea contain collective burials with several dozen individuals deposited successively. From the hypogea Le Mont Aimé II in Val-de-Marais in Marne, one radiocarbon result of a human bone is available from the Late Neolithic dated to ~2730 cal BC (Ly-5345, 4160±55 BP; 2875–2671 cal BC, 68.2%; 2888–2581 cal BC, 95.4%). Another radiocarbon result of a human bone sample is available from Les Gouttes d´Or in Merseules. This measurement is from ~ 2120 cal BC (Gif-2169, 3690±100 BP; 2271–1937cal BC, 68.2%; 2457–1777 cal BC, 95.4%) (Chambon/Salanova 1996, Figure 9, 111).

Houses for the Dead

The houses for the dead (cabane funéraire) are structures with an oval, rectangular, or sub-rectangular ground plan built in dry wall technique with a paved floor and a vault like the structures from Hazoy and Noisy-sur-Ecole (Chambon/Salanova 1996: 104). The remains of several dozen cremated bones are available from a ground surface of 5m² at Maison Rouge in Montigny. There is no charcoal found in the grave, which suggests that the bodies were burnt somewhere else and the grave is no funeral pyre in situ (Chambon 2003: 206). The two radiocarbon results Gif-3759, 4310±130 BP and Gif, 3760, 4490±130 BP with large error terms indicate that the burials were carried out in the Recent Neolithic (3311–2696 cal BC, 68.2%; 3350–2581 cal BC, 95.4% and 3364–3013 cal BC, 68.2%; 3621–2891 cal BC, 95.4%). The four results from charcoal samples from Noisy-sur-Ecole range from 3500–937 cal BC (95.4%; 3348–1118 cal BC, 68.2%) (Brezillon *et al.* 1973; Müller 1998: 96). Another possible originally wooden house for the dead on the basement of a pit is located at Neuvy-en Duno in Eure et Loire (Chambon 2003: 205; Masset 1968), including the cremated bones of at least 15 adults and 6 children.

Burials in Rock Shelters

In addition to the other mentioned non-megalithic burials, Neolithic burials are documented from the Normandy in Mestreville and in Saint-Pierre-d´Autils under rock shelters. The rock shelters 1 and 2 contained individual graves. In rock shelter 1, the remains of a child and in the upper layer the mandibula of an adult were found. In rock shelter 2, the skeleton of a woman, the fragment of another human skull, and fragments of a child skull were recovered. The grave was limited by big stone slabs. In rock shelter 3, the remains of an adult individual together with two children between 4 y and 7 y were documented. All burials included lithic tools, animal bones, and ceramics as grave goods. A human bone from rock shelter 2 provided a radiocarbon result of ~4380 BC (Gif A-92100, 5550±100 BP; 4499–4270 BC, 68.2%; 4682–4083 BC, 95.5%) (Billard 2007: 138).

Contemporaneous non-megalithic burials in Brittany and on the Channel Islands

Megalithic graves represent the most common grave architecture in Brittany. Contemporaneous, non-megalithic burials are also documented, such as passage graves in dry wall technique with corbelled roofs and pit burials.

Ty Floc´h is a monument with passage graves in dry wall technique and corbelled roofs with available radiocarbon dates (Giot 2007: 51). One of the chambers is divided into two compartments and the grave has similarities with the graves on the Île Cairn. There is one radiocarbon result from a charcoal sample available from ~4400 BC (Gif-5234, 5580±120; 4551–4270, 68.2%; 4718–4079, 95.3%) and one radiocarbon result of a bone sample from the southern chamber from ~4140 BC (4230–3991, 68.2%; 4326–3957, 95.4%). The grave goods are from the Middle Neolithic. A later date indicates a third construction phase of the tumulus (Gif-5223; 4670±120; 3637–3343, 68.2%; 3694–3031, 95.4%) (Le Roux/Lecerf 1980). In the eastern part of Brittany, a burial is found which is situated at La Croix-Saint Pierre in the southwest of Ille-et-Vilaine. It is a 2m long pit burial surrounded by approximately 15 postholes and a stone pavement made of small blocks. The postholes are interpreted as the remains of an approximately 4m long timber construction which covered the grave (Briard *et al.* 1995; Le Roux 1998: 69). Two globular vessels with

small handles and an oval opening are documented from the grave, similar to Southern Chambon ceramics (Solar 2007: 124).

Little is known on contemporaneous, non-megalithic burials on the Channel Islands (Patton 1995).

Contemporaneous non-megalithic burials in Central West France

Burial forms contemporaneous to megalithic burials appear less frequently in the Central West. Although burials are registered for rock shelters or caves from the Recent Neolithic, such as Bellefonds in Vienne and Queroy in Chazelles, not much information is available about these burial sites. Le Queroy contained two layers with skeletons. The more recent layer contained the remains of two adults and one neonate, whereas the more ancient layer cannot be reconstructed since the bones eroded from the entrance area of the cave to the interior (Chambon 2003: 324–325; Gomez/Laporte 1990). In Champ Durand, human remains were found in an interrupted enclosure. Moreover, in Chatelliers at Vieil-Auzay in Vendée a stone tumulus with three pits was registered, each with two simultaneous burials (Chambon 2003: 321).

Conclusion

The earliest monumental, but non-megalithic funeral architecture in Northwest France and in all of Europe emerges with the Passy graves in the Paris Basin and with the necropolis Passy, which dates at the latest from ~4960 cal BC (5029–4946 cal BC, 68.2%; 5061–4858 cal BC, 95.4%) onwards. These monuments are impressive and colossal structures with a length of up to 280m and contained single or few burials. The buried individuals do not represent the whole society, since maximally one burial per generation is calculated based on the radiocarbon results. The implication of this argument might support the conclusion that the Passy graves were the burial sites for a selected part of the Passy societies such as the religious, social, or political elite.

However, only four of the graves seem to emphasize this hypothesis. They include hunting symbolism showing graves and prestige goods, such as the so-called Eiffel towers, which are interpreted as ceremonial spears made from deer bone. Nevertheless, some generations buried children with no grave goods and over the half of the buried individuals are children with no or little grave goods. To be noted here are the interesting anthropological records of these individuals. Several traces of nutritional deficiencies during growth periods and an early age of death under 20 years of age of most individuals were detectable. This evidence suggests that the Passy graves were either built in times of malnutrition or that the buried individuals had not fully access to the resources of the Passy society.

These monuments may not have been primarily concepted as graves, but rather as communal places for the social life of the whole society and for the performance of rituals. In this case, the burials can be understood as founder graves, as protection markers of the selected sites, or even as a kind of fetish symbol. Up to now, this very early result can unfortunately not be confirmed with the help of stabile isotope values or a negative reservoir effect balance.

Altogether, 13 necropolises with these types of monuments were detected in the Seine-Yonne region by aerial photography. From the same region somewhat later results are available with the measurements for the necropolis Les Réaudins Balloy from 4420 cal BC onwards (4442–4356 cal BC, 68.2%, 4489–4341 cal BC, 95.4%). Similarly concepted monuments from the Cerny horizon, but temporally not closer determined, include the necropolises in the plain of Caen, such as Rots, Mathieu, Fleury sur Orne, and Blainville sur Orne.

In Brittany, the earliest monuments to be considered are the tertre, long or round tumuli, and the first phases of the tumuli Carnacéen. The earliest available radiocarbon result from these contexts is obtained from a cremated bone sample and measured to ~4690 cal BC (4782–4594 cal BC, 95.4%). It originates from the first stage of the tumulus Carnacéen St. Michel with a chamber completely built in dry wall technique aboveground.

This early monumental phase is denoted by remarkable grave inventories with an accumulation of prestigious grave goods fabricated out of exotic raw materials such as jadeite axes and variscite beads. From these early stages indications such as the stratigraphy at the Table des Marchands attest that a part of the standing stones and the alignments were erected in this phase or even earlier. The tumuli Carnacéen were successively extended and there are indications that they did not reach their final, presently visible colossal form before the Recent Castellic horizon from ~4270 cal BC onwards. Again, we question whether these sites in their final form represented the burial places for selected persons in the Carnac societies with the construction effort being a communal undertaking or if the purpose of these monuments should rather be identified as a type of social meeting place as already discussed for the Passy graves.

The emergence of the first megalithic structures is recorded from Brittany, the Channel Islands, and furthermore from Central West France. Since too few radiocarbon results or sequences are available, it is not possible to untangle the nuances of the emergence of megaliths in North West France and it is thus only possible to formulate tendencies.

The earliest megalithic graves in Brittany are represented by ancient non-accessible dolmens covered by round or long tumuli or tertre such as in Kervinio, Castellic, St. Germain, Manio 5, Mané Hui, and Kerlescan. For these early megalithic structures in Brittany, no radiocarbon determinations are available and it is only possible to limit the time interval of the grave goods to the Ancient Castellic horizon (4730–4250 cal BC, 95.4%). For the Channel Islands, the first megalithic structure or transition to the megaliths is documented in the form of a cist with partial megalithic elements aboveground covered by a trapezoid long tumulus or barrow at Les Fouaillages. The construction of this structure cannot yet be closely determined, since the available radiocarbon measurements are possibly termini post quos values. The material positions this grave in the Cerny- and Castellic-related Les Fouaillages/Pinnacle horizon and thus to the same time interval as the early megaliths of the Ancient Castellic horizon in Brittany.

In Central West France possible early similar structures are registered, for example the non-accessible dolmens in monument B in the necropolis Chiron in Bougon. From the Central West, the earliest accessible dolmen known until now is the first phase of the tumulus C in the necropolis of Prissé-la-Charrière in the departement of Deux-Sèvres. This dolmen is a polygonal elongated east-oriented structure which was covered by a round dry wall tumulus, 8.8m in diameter. Burial activities began at ~4320 cal BC (4357–4276 cal BC, 68.2%; 4370–4263 cal BC, 95.4%).

Due to a lack of preserved bone material from the early graves in Northwest France, it is not possible to reconstruct the burial rites, although some sparse indications are available that these graves were individual or double burials. Nevertheless, multiple burials are also recorded from pre-megalithic grave forms to grave forms contemporaneous with the first megaliths, for example at Téviec and Goumoizière.

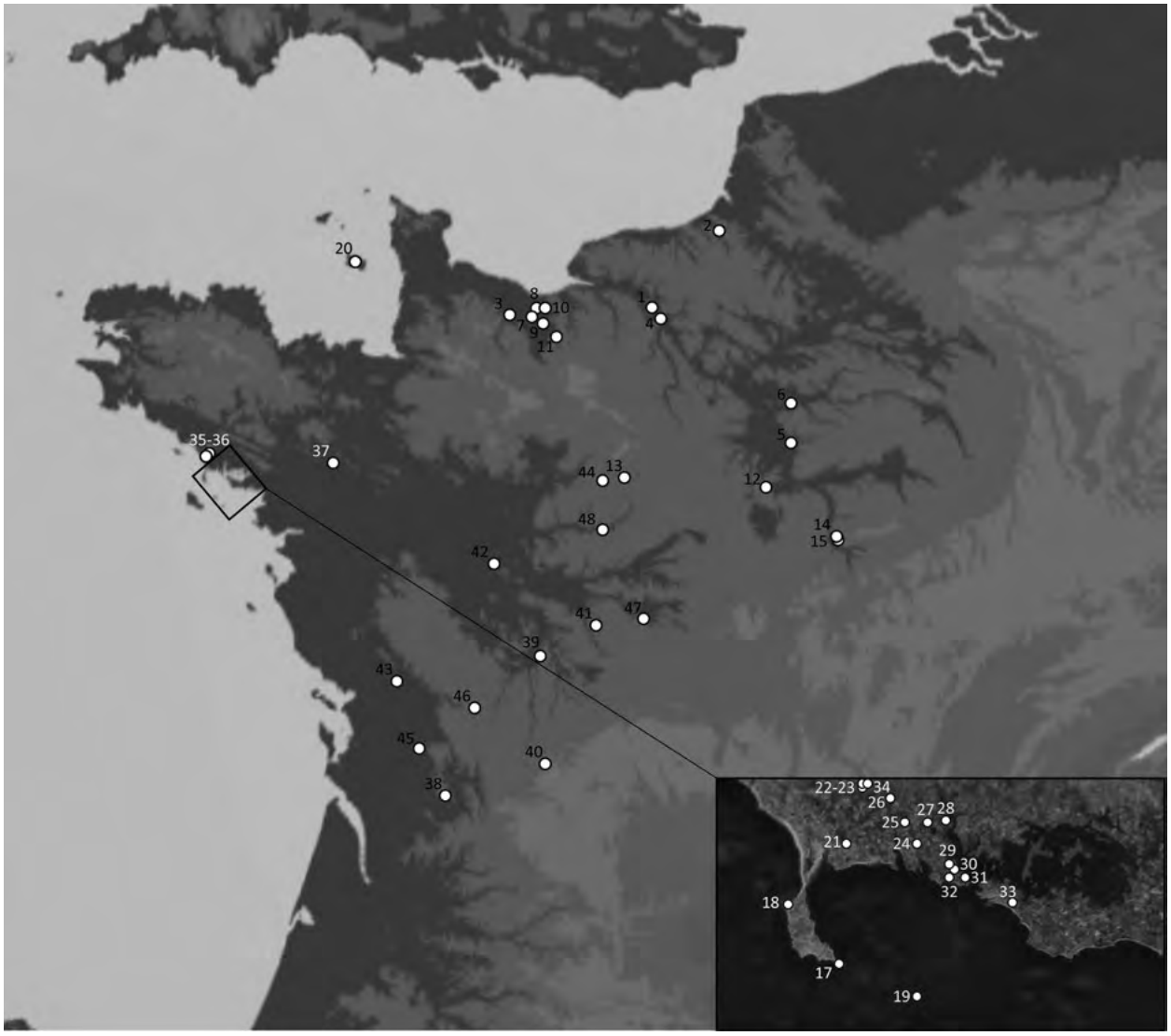
A change to passage graves and thus a fundamental change regarding burial rites and ancestor worship must first be considered with non-megalithic structures. In Northern France early radiocarbon determinations for the round dry wall passage grave A in Vierville/Butte at Luzerne are available from ~4450 cal BC onwards (OxA-11395, 5690±45 BP; 4536–4368 cal BC, 68.2%; 4596–4356 cal BC, 95.4%). The stabile isotope values of this bone material and the population living close to the coast of Vierville are unknown, so again we cannot exclude a reservoir effect. Due to the lack of suitable megalithic building material, passage graves in dry wall technique remain common for Northern France and only few exceptions with megalithic passage graves such as la Pierre Tourneresse and Colombierre-sur-Seulles are known with burial activities dated at the latest from ~4100 cal BC (4067–3965 cal BC, 68.2%; 4229–3952 cal BC, 95.4%) onwards.

The early chronological positioning of passage graves, such as Barnenez, could not be confirmed for Brittany. The samples for these early radiocarbon results represent, as a result of their context, typical termini post quos values and the Recent Castellic material from these graves maintains a later construction. In Brittany, the first transitional structure before the passage graves is documented within the long tumulus or tertre Lannec er Gadouer at the end of the Ancient Castellic horizon to ~4300 cal BC (4431–4232 cal BC, 68.2%; 4503–4104 cal BC, 95.4%) and there is evidence about openings in the chamber and the tumulus revealing that the subterranean stone cist was once accessible through a passage made of organic material. First fully developed megalithic passage graves with simple round or quadratic chambers are not documented in Brittany before the Recent Castellic horizon (4250–3880 cal BC, 95.4%).

On the Channel Islands, the earliest known passage grave documented until now is La Hogue Bie dated from ~4150 cal BC onwards (4199–4053 cal BC, 68.2%; 4264–4040 cal BC, 95.4%).

In the Central West, the earliest radiocarbon results from European passage graves are available for Chiron/Bougon. Strong arguments are put forth which support the assumption that these bones were secondarily deposited in the passage graves which served as an ossuary. Therefore, it is not possible to use these measurements as an indication for the construction of the graves. The tradition to deposit or rebury the bones of the ancestors is well-documented from other sites like Goumoizière, Montiou, Ciste de Cous, the Dolmen Pierre Virante, and possibly Benon and seems common in the Central West. With the results of bone material from Prissé-le-Charrière dated to ~4290 BC (4329–4262 BC, 68.2%; 4337–4248 BC, 95.4%), the earliest reliable primary deposited burials known in a passage grave in the Central West are documented.

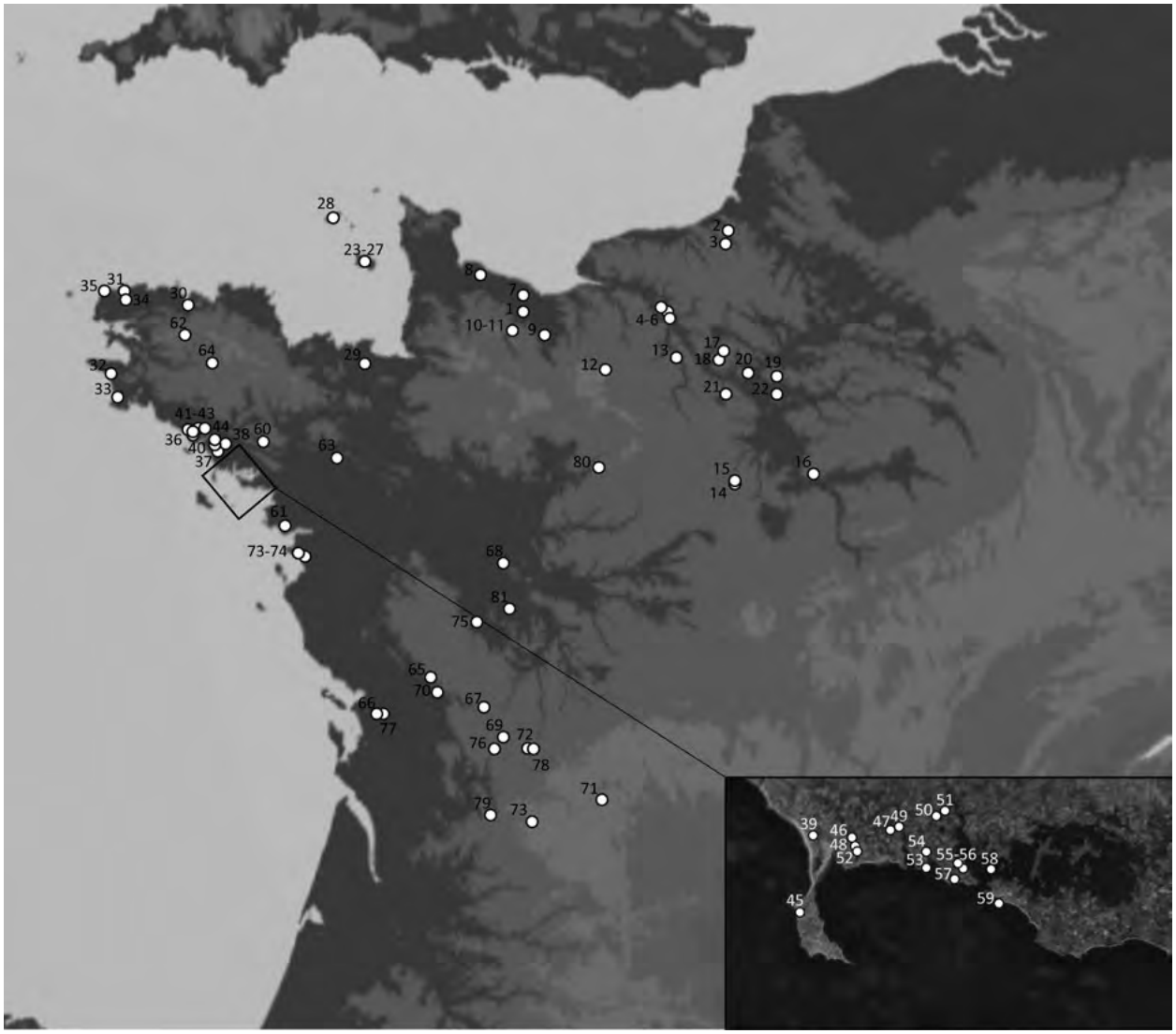
With the rise of the passage graves, multiple and collective burials with successive burials became common practice as documented for the regions with good bone preservation: the Paris Basin/Northern France, the Channel Islands, and Central West France. These burial practices were intensified in the second half of the 4th millennium with later megalithic forms like the gallery graves. In the Paris Basin, bone preservation with several hundreds of burials in one grave can be observed at the latest from ~3370 cal BC (3526–3126 cal BC, 68.2%; 3634–3098 cal BC, 95.3%) onwards with the earliest known individual in such a structure at La Butte du Cyr in Val du Reuil.



1. Varennes, 2. 'Le Petit Marais', 3. Lazzaro, 4. Saint-Pierre d´Autils, 5. Passy, 6. Balloy, 7. Rots, 8. Mathieu, 9. Fleury sur Orne, 10. Blainville sur Orne, 11. Sarceaux, 12. Marseules, 13. Sublaines Le grand Ormeau, 14. Macherin, 15. Noisats, 16. Beg-an-Dorchenn, 17.Beg-er-Vil, 18.Téviec, 19. Höedic, 20. Les Fouaillages, 21. St. Michel, 22. Mané-Ty-Ec, 23. Mané-Pochat, 24. Kervinio, 25. Kerlescan, 26. Le Manio 5 in Carnac, 27. Bois du Latz/Castellic, 28. Mané Hui, 29. Mané-Lud, 30. Er Grah, 31. Mané er Hroek, 32. Kerlud, 33.Le Moustoir, 34.Tumiac, 35. St. Germain, 36. Lannec er Gadouer, 37. Croix St. Pierre/Grée de Cojoux, 38. Germignac, 39. Goumoisière, 40. Le Basseau, 41. La Jardelle 42. Motte des Justices, 43. Chirons/Bougon, 44. La Tombe de la Demoiselleau Thou, 45. The tumulus La Grosse-Motte, 46.Péré/Prissé-la-Charrière, 47. Les Varennes, 48. Sablons

Figure 3.70 Main pre-megalithic sites and earliest megaliths mentioned in the text (chapter 3, p. 19-47).

Nevertheless, we have to maintain that the significance of the available radiocarbon stock is limited particularly if we intend to understand the beginning of this phenomena in Northwest France and also in Europe. It is merely possible to formulate tendencies and we are far away from any closer determinations which are crucial to be able to define, for example, the central role of Brittany for European societies in the 5th millennium cal BC.



1. Colombiers-sur-Seulles, 2. La Chaussée Tirancourt, 3. Vers-sur-Selles, 4. Val-de-Reuil, 5. Porte-Joie, 6. La Butte du Cyr, 7. La Pierre Tourneresse, 8. Vierville/Butte á Luzerne, 9. Condé-sur-Ifs (Ernes, La Butte Hu, la Bruyere du Hamel), 10. La Hogue, 11. La Hoguette, 12. Silly-en Gouffern, 13. Changé, 14. Mailleton, 15. l´Ouche de Beauce, 16. Noisy-sur-Ecole, 17. Guiry-en-Vexin, 18. La Cave aux Fées, 19. Pierre Turquaise, 20. Trou á Morts, 21. Maison Rouge, 22. Oix-a la Croix-Saint-Ouen, 23. Le Déhus, 24. La Varde, 25. Le Creux es Faies, 26. Le Trépied, 27. La Rocque qui Sonne, 28. La Hogue Bie, 29. Maison-des Feins, 30. Barnenez, 31. Roc´h-Avel, 32. Le Souc´h, 33. Beg-an-Dorchem/Ile de la Torche, 34. Ile Cairn, 35. Ile Guennoc, 36. Dolmen de Cruguellic, 37. Pors-Poulhan, 38. Dolmen de Loceltas, 39. Dolmens de Rondossec, 40. Goërem, 41. Lez-Variel, 42. Kermené, 43. Kerroch-Mono, 44. Moulin, 45. Port Blanc, 46. St. Michel, 47. Kerlescan, 48. Menéc, 49. Kermario, 50. Kerlescan, 51. Parc-Guren I, 52. Kerlagat, 53. Kerdoual, 54. Kervinio, 55. Grand Menhir, 56. Table des Marchands, 57. Pierres Plates, 58. Gavrinis, 59. Petit Mont, 60. Larcuste, 61. Dissignac, 62. Ty Floc´h, 63. Croix-Saint Pierre, 64. Liscuis, 65. Chiron/Bougon, 66. Benon /Champ-Châlon, 67. Pére C/ Prissé la Charière, 68. Motte-des-Justices, 69. Le Gros Dognon/ Le Petit-Dognon, 70. Montiou in Sainte-Soline, 71. Dolmen de Pierre Levée, 72. Folatière,73. La Grosse Pierre, 74. Trois Squelettes, 75. Dolmen de la Ciste des Cous, 76. La Boixe C, 77. Mille Ecus, 78. La Motte de la Garde, 79. Joselière, 80. Tumulus La Grosse-Motte, 81. Dolmen de Taizé

Figure 3.71 Main sites mentioned in text (chapter 3, p. 47-94)

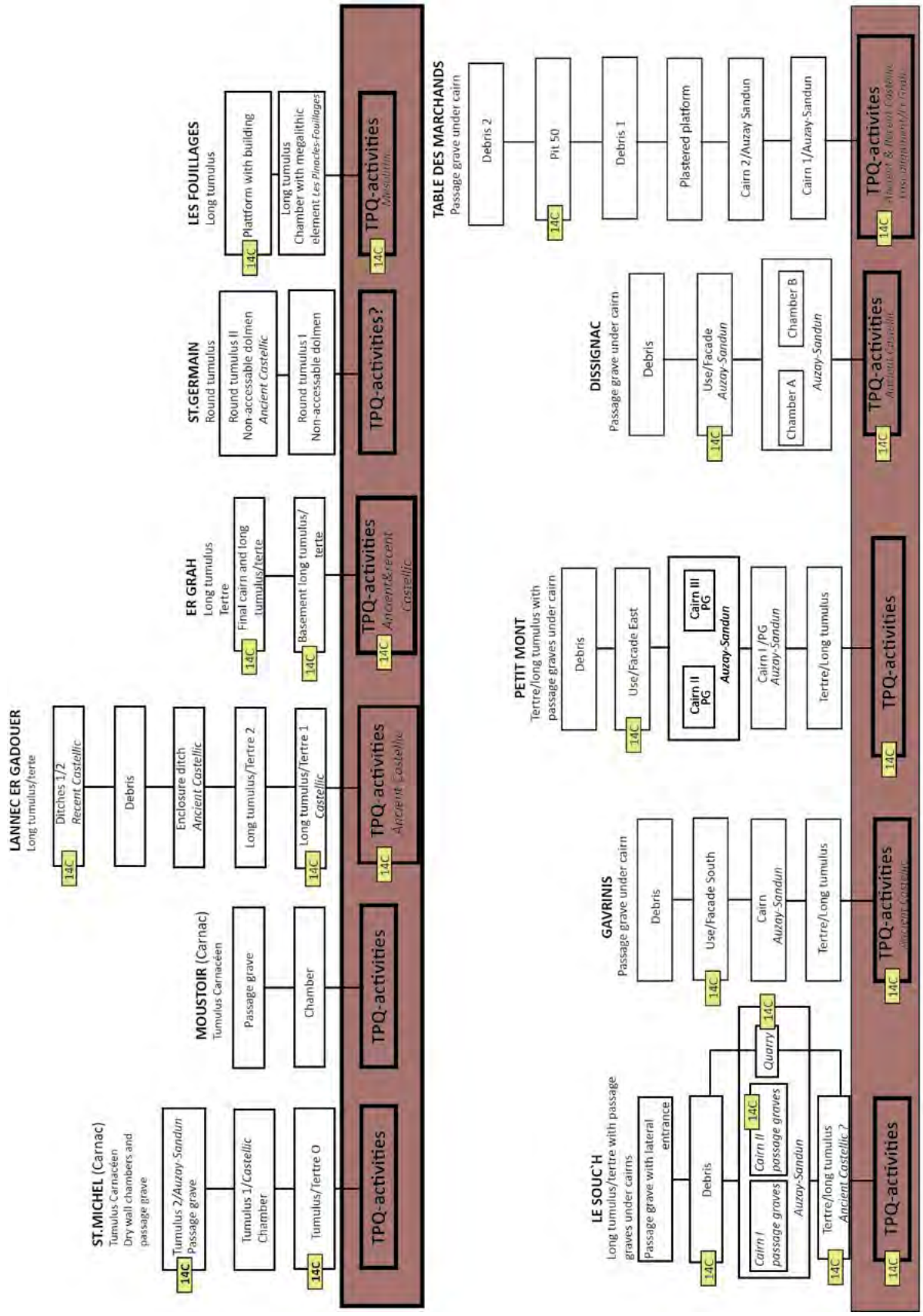


Figure 3.72 Matrix of sites in Northwest France with known stratigraphy (after Cassen 2009, completed). All sites have a pre-megalithic horizon

Table 3.1 Radiocarbon dates from the Paris Basin/Northern France

Laboratory Number	Architecture/ Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Acon, Eure, Normandy						
Ly-193	Dolmen	Niveau S4	ch	5005	55	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=7929&cpt=6, 01.06.2008
Balloy, Les Réaudins, Seine-et-Marne						
Ly-5547	Non-megalithic, pit burials, round tumulus with elongated enclosure	Burial 7, monument II	human bn	5315	50	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=6762&cpt=1, 30.12.2011
Ly-5549	Non-megalithic, pit burials, round tumulus with elongated enclosure	Burial 35, monument I	human bn	5532	50	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=6762&cpt=1, 30.12.2011
Ly-5587	Non-megalithic, pit burials, round tumulus with elongated enclosure		human bn	5500	50	Constantin et al. 1997, 709
Ly-5885	Non-megalithic, pit burials, round tumulus with elongated enclosure	Burial 24, Monument VI	human bn	5500	70	Mordant 1997, 447-478
Ly-5886	Non-megalithic, pit burials, round tumulus with elongated enclosure	Burial 25, Monument IV	human bn	5610	50	Mordant 1997, 447-478
Ly-5989	Non-megalithic, pit burials, round tumulus with elongated enclosure	Burial 5, Monument I-II	human bn	5615	55	Mordant 1997, 447-478
Ly-6406	Non-megalithic, pit burials, round tumulus with elongated enclosure	Burial 2, Monument I-II axe	human bn	5305	75	Mordant 1997, 447-478
Bardouville, Normandy						
Ly-2348	Gallery grave		ch	4550	130	Chambon/Salanova 1996, 111
Beaulieu, Bardouville, Seine Maritime						
Ly-2348	Non-megalithic collective grave	Sepulture	human bn	4550	130	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=2648&cpt=3, 1.06.2008
Berry-au-Bac, Picardy						
Ly-5846	Non-megalithic collective grave		human bn	4460	70	Chambon/Salanova 1996, 111.

Laboratory Number	Architecture/ Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Champtier des Bureaux, Ile-de-France						
Gif-5935	Non-megalithic collective grave	Chamber	ch	3950	70	Müller 1998, 96, Delibrias et al 1987, 217
Changé, Saint Piat, Eure-et-Loire						
Gif A- 91091	Dolmen, extended	Under fallen orthostate	human bn	5230	110	Müller 1998, 84, Renaud 1996, 310.
Gif A- 92352	Dolmen, extended	Sepulture 6	human bn	5470	90	Müller 1998, 84, Renaud 1996, 310.
Ly-7373	Dolmen, extended	Orthostate	human bn	2750	50	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=8311&cpt=29
Gif 7864	Dolmen, extended	Ditch	ch	4780	350	Jagu 2003, 150
Colombiers-sur-Seulles						
Gif-1917	Passage grave in long tumulus	No finds	ch	5150	130	Delibrias et al. 1974, 15
Dolmen de Mailleton, Malesherbes, Loiret						
Ly-9123	Dolmen		human bn	4520	45	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=10786&cpt=11, 1.06.2008
Ernes, Calvados, Normandy						
Gif-8798	Passage grave in dry wall technic in round tumulus	Nr. 32	human bn	4880	70	Verron 2000, 347
Gif-90046	Passage grave in dry wall technic in round tumulus	Person of restricted growth	human bn	4840	150	Verron 2000, 347
Essômes-sur-Marne, Picardie						
Gif-4262	Non-megalithic collective grave		human bn	3580	120	Chambon/Salanova 1996, 111
Germigny-l´Evêque, Ile-de-France						
Gif-2723	Non-megalithic collective grave	Entrance		3970	120	Müller 1998, 96, Baumann/Tarrête 1979
Guiry-en Vexin, Val d´Oise						
Gif-3329	Gallery grave		human bn	3640	100	Müller 1998, 96, Chambon/Salanova 1996, 111
L´Hotel de Dieu, Les Ventes, Normandy						
Ly-3113	Dolmen	5cm deep	bn	4610	40	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=17328&cpt=24, 01.06.2008
La Bruyere du Hamel, Condé-sur-Ifs, Normandy						
Gif-8799	Passage grave, dry wall, round tumulus	Nr. 44	bn	4690	70	Verron 2000, 347
Gif-9651	Passage grave, dry wall, round tumulus		bn	4090	60	Verron 2000, 347

Laboratory Number	Architecture/ Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
La Butte Saint Cyr, Val de Reuil						
Ly-4822	Gallery grave, subterranean		human bn	4270	35	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=7922&cpt=4, 01.06.2008
Ly-123	Gallery grave, subterranean	Level 1662	human bn	4690	90	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=7921&cpt=3, 01.06.2008
Ly-124	Gallery grave, subterranean	Level 1839	human bn	4130	55	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=7922&cpt=4, 01.06.2008
Ly-125	Gallery grave, subterranean	Level 5498	human bn	4590	100	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=7923&cpt=5, 01.06.2008
La Cave aux Fées, Picardy						
Gif-3929	Gallery grave		human bn	4170	130	Chambon/Salanova 1996, 111
La Chaise, Malesherbes, Centre						
Ly-1797	Non-megalithic collective grave	Inhumation in pit tumulus I	human bn	6190	210	Müller 1998, 97, Vintrou/Richard 1991, 57
La Chaussée Tirancourt, Picardy						
Gif-1289	Gallery grave		ch	3350	130	Müller 1998, 95, Delibrias et al. 1971, 222
Gif-1372	Gallery grave		ch	3650	120	Müller 1998, 95, Delibrias et al. 1971, 222
GifTAN-94186	Gallery grave	VII	human bn	4540	70	Chambon/Salanova 1996, 111
Gif-6260	Gallery grave		human bn	4090	70	Chambon/Salanova 1996, 111
Gif-6259	Gallery grave	III-I	human bn	3790	70	Chambon/Salanova 1996, 111
Gif-1378	Gallery graves		ch	3650	120	Chambon/Salanova 1996, 111
La Hoguette, Fontenay-le Marmion, Normandy						
Gif-1348	Passage grave, dry wall, round tumulus	Hearth outside monument	ch	4820	130	Delibrias et al. 1972, 280
Ly-132	Passage grave, dry wall, round tumulus	Hearth outside chamber (after use)	ch	4580	150	Müller 1998, 82,
Ly-420	Passage grave, dry wall, round tumulus	Chamber VII	human bn	5050	260	Müller 1998, 82, Delibrias et al.1970, 431
Gif-1345	Passage grave, dry wall, round tumulus	Hearth under chamber V	ch	5000	130	Delibrias et al. 1972, 280, Caillaud/Lagnel 1972
Ly-421	Passage grave, dry wall, round tumulus	Chamber 5	human bn	5160	190	Müller 1998, 82, Evin et al. 1973, 143
Ly-131	Passage grave, dry wall, round tumulus	Hearth in chamber IV	ch	5560	150	Müller 1998, 82, Evin et al. 1973, 143
Gif-1346	crematory in dry wall passage grave	Crematory	ch	4300	120	Delibrias et al. 1972, 280, Caillaud/Lagnel 1972
Gif-1514	crematory in dry wall passage grave	Lower structure of crematory	ch	4720	120	Delibrias et al. 1972, 280, Caillaud/Lagnel 1972
Gif-1347	crematory in dry wall passage grave	Exterior limit of crematory	ch	4750	120	Delibrias et al. 1972, 280, Caillaud/Lagnel 1972
Gif-1513	crematory in dry wall passage grave	Lower structure of crematory	ch	4800	120	Delibrias et al. 1972, 280, Caillaud/Lagnel 1972

Laboratory Number	Architecture/ Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
La Pierre Godon, Eure-et-Loire						
Ly-1738	Dolmen	Corridor	human bn	4550	150	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=2092&cpt=9, 01.06.2008
La Pierre Tournesse, Cairon, Normandy						
Ly-9259	Passage graves in round tumulus	US 39-3, chamber 1	bn	5040	35	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=10945&cpt=13, 01.06.2008
Ly-9260	Passage graves in round tumulus	Quadrat P19 and P20, chamber 1	bn	5020	35	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=10946&cpt=14, 01.06.2008
Ly-1440	Passage graves in round tumulus		bn	4830	40	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=12743&cpt=25, 01.06.2008
Ly-10544	Passage graves in round tumulus	Chamber 1 ref. 4457	bn	4370	40	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=12744&cpt=26, 01.06.2008
Ly-11310	Passage graves in round tumulus		bn	5235	55	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=14245&cpt=92, 01.06.2008
Ly-11311	Passage graves in round tumulus		bn	4825	40	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=14247&cpt=94, 01.06.2008
Ly-11312	Passage graves in round tumulus		bn	5190	50	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=14248&cpt=95, 01.06.2008
La Pointe aux Oies, Wimereux, Pas de Calais						
Ly-2571	Non-megalithic collective grave	Sepulture	human bn	1890	180	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=2855&cpt=4, 1.06.2008
Le Hazoy, Oise						
Gif-1221	Non-megalithic collective grave	Burial	human bn	4250	75	Chambon/Salanova 1996, 111
Le Mont Aimé II, Val-de-Marais, Marne						
Ly-5345	Hypogeum		human bn	4160	55	Chambon/Salanova 1996, 111
Les Erves, Normandy						
Gif-3415	Passage grave, dry wall in round tumulus		human bn	4650	130	Müller 1998, 82
Ly-3100	Passage grave, dry wall in round tumulus	Burial	Bn	4650	130	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=3665&cpt=15, 01.06.2008
Ly-3099	Passage grave, dry wall in round tumulus	Ditch	human bn	5580	140	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=3666&cpt=16, 01.06.2008

Laboratory Number	Architecture/ Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Les Gouttes d´Or, Merseules						
Gif-2169		Hypogeum		human bn	3690	100
Les Mournouards						
Gif-114		Hypogeum		ch	3750	150
Les Varennes, Val de Reuil, Eure						
Ly-6116	Non-megalithic gallery grave	Sepulture	human bn	3505	60	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=6807&cpt=8, 1.06.2008
Ly-6238	Non-megalithic gallery grave,	Individual in crouched position	human bn	4505	110	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=6808&cpt=9, 1.06.2008
Maison Rouge, Montigny, Loiret						
Gif-3760	Non-megalithic collective grave	BIII, ditch under dry wall	human bn	4490	130	Chambon/Salanova 1996, 111
Gif-3759	Non-megalithic collective grave	D3-D2III, ditch east	ch	4310	130	Chambon/Salanova 1996, 111
Mestreville, St. Pierre-d´Autils, Normandy						
GifA-92100	Rock shelter	Disarticulated children bones	human bn	5550	100	Billard 2007a, 138
Motte de Justices, Thouars in Deux Sèvres.						
Gif-8292	pit burial with megalithic capstone, long tumulus	Tumulus debris	deer antler	5340	100	Germont et al. 1994, 405
Neuvy-en-Dunois, Centre						
no information	Non-megalithic collective grave			5250	140	Müller 1998, 96, Masset 1968
Noisy-sur-Ecole, Seine-et-Marne						
Gif-2241	Non-megalithic collective grave		ch	4480	110	Müller 1998, 96
Gif-2242	Non-megalithic collective grave		ch	4500	110	Müller 1998, 96
Gif-4675	Non-megalithic collective grave		ch	4500	60	Müller 1998, 96
Gif-2243	Non-megalithic collective grave	Between the wells		2970	100	Müller 1998, 96
Passy, Yonne						
Ly-6363/SacA-17073	Non-megalithic, pit burials, round tumulus with elongated enclosure	L19.1, pit burial with singular burials	human bn	5910	40	Lemercier et al. 2010, 37
Ly-6361/SacA-17071	Non-megalithic, pit burials, round tumulus with elongated enclosure	L18.2, pit burial with singular burials	human bn	5635	40	Lemercier et al. 2010, 37
Ly-6360/SacA-17070	Non-megalithic, pit burials, round tumulus with elongated enclosure	L17.3A, pit burial with singular burials	human bn	5690	45	Lemercier et al. 2010, 37
Ly-6359/SacA-17069	Non-megalithic, pit burials,	L17.2, pit burial with singular burials	human bn	5675	40	Lemercier et al. 2010, 37

Laboratory Number	Architecture/ Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Passy, Yonne						
Ly-6358/SacA-17068	Non-megalithic, pit burials, round tumulus with elongated enclosure	L14.2, pit burial with singular burials	human bn	5425	40	Lemercier et al. 2010, 37
Ly-6354/SacA-17064	Non-megalithic, pit burials, round tumulus with elongated enclosure	L 14.3, pit burial with singular burials	human bn	5635	40	Lemercier et al. 2010, 37
Ly-6355/SacA-17065	Non-megalithic, pit burials, round tumulus with elongated enclosure	L 15.2, pit burial with singular burials	human bn	5730	50	Lemercier et al. 2010, 37
Ly-6356/SacA-17066	Non-megalithic, pit burials, round tumulus with elongated enclosure	L 17.4, pit burial with singular burials	human bn	5960	40	Lemercier et al. 2010, 37
Ly-6357/SacA-17067	Non-megalithic, pit burials, round tumulus with elongated enclosure	L 18.1, pit burial with singular burials	human bn	5695	40	Lemercier et al. 2010, 37
Ly-6364/SacA-17074	Non-megalithic, pit burials, round tumulus with elongated enclosure	L12, pit burial with singular burials	human bn	6050	40	Lemercier et al. 2010, 37
Ly-6362/SacA-17072	Non-megalithic, pit burials, round tumulus with elongated enclosure	L 4.2, pit burial with singular burials	human bn	6090	35	Lemercier et al. 2010, 37
Ly-6349/SacA-17059	Non-megalithic, pit burials, round tumulus with elongated enclosure	L 5.1, pit burial with singular burials	human bn	5855	50	Lemercier et al. 2010, 37
Ly-6350/SacA-17060	Non-megalithic, pit burials, round tumulus with elongated enclosure	L 8.1, pit burial with singular burials	human bn	5845	40	Lemercier et al. 2010, 37
Ly-6351/SacA-17061	Non-megalithic, pit burials, round tumulus with elongated enclosure	L 11.2, pit burial with singular burials	human bn	3690	30	Lemercier et al. 2010, 37
Ly-6352/SacA-17062	Non-megalithic, pit burials, round tumulus with elongated enclosure	L 12.1, pit burial with singular burials	human bn	3345	30	Lemercier et al. 2010, 37
Ly-6353/SacA-17063	Non-megalithic, pit burials, round tumulus with elongated enclosure	L 13.1B, pit burial with singular burials	human bn	5655	40	Lemercier et al. 2010, 37
Ly-7808	Non-megalithic, pit burials, round tumulus with elongated enclosure	L 6.1, pit burial with singular burials, 1. date 1997	human bn	5545	50	Lemercier et al. 2010, 36
Pincevent, La Grande Paroisse						
Ly-1171	Pit burial		human bn	3580	140	Chambon/Salanova 1996, 111

Laboratory Number	Architecture/ Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Portejoie, Val-de-Reuil, Eure						
OxA-7302/ (Lyon 618)	Non-megalithic gallery grave	On the base of the pit	human bn/ artic. vertebrae	4435	55	Billard et al. 2010a, Annex 7
Ly-703	Non-megalithic gallery grave		human bn	4040	180	Billard et al. 2010a, Annex 7
Ly-702	Non-megalithic gallery grave		human bn	3040	180	Billard et al. 2010a, Annex 7
Ly-705	Non-megalithic gallery grave		human bn	3260	190	Billard et al. 2010a, Annex 7
Saint-Maur-sur-Le-Loir, Eure-et-Loire						
Gif-1787	Passage grave	Late occupation, upper level.	ch	1500	90	Delibrias et al. 1974, 16
Sarceaux/Butte du Houx, Normandy						
Gif-10191	Tumulus, central pit gravee	Pre-monument horizon, small pit	ch	7670	70	Chancerel/Desloges 1998, 99
Gif-n/a	Tumulus, central pit grave	Basement of the monument/	bn	1445	70	Chancerel/Desloges 1998, 99
Gif-10192	Tumulus, central pit grave,	In the border region of the ditch	ch	3880	90	Chancerel/Desloges 1998, 99
Gif-10190	Tumulus, central pit grave	From the basement of the ditch, bovid	animal bn	4950	100	Chancerel/Desloges 1998, 99
Tinqueux, Marne						
Gif-360	Hypogeum	Layer 6	ch	3910	200	Lanting/Mook 1977, 70.
Vers-sur-Selles, Picardy						
Gif-3698	Gallery grave	Destruction level of monument	ch	3070	110	Delibrias/Guillier 1988, 61
Gif-3699	Gallery grave	pit	ch	4060	120	Delibrias/Guillier 1988, 61
Gif-3700	Gallery grave	Filling ditch with SOM-ceramic	ch	4240	120	Delibrias/Guillier 1988, 61
Gif-5740	Gallery grave	chamber	human bn	4240	100	Delibrias/Guillier 1988, 61
Vierville/La Butte á Luzerne, Manche, Normandy						
OxA-11395	Passage graves, dry wall, round tumulus	Chamber A, bone H12-178	human bn	5690	45	Verron 2007, 142
OxA-11396	Passage graves, dry wall, round tumulus	Chamber A, bone F11-150	human bn	5430	45	Verron 2007, 142
OxA-12980	Passage graves, dry wall, round tumulus	Chamber A, bone G13-251	human bn	5448	37	Verron 2007, 142
OxA-13018	Passage graves, dry wall, round tumulus	Chamber A, bone F11-150	human bn	5339	35	Verron 2007, 142
OxA-12896	Passage graves, dry wall, round tumulus	Chamber B, bone V85-N5-347	human bn	5375	40	Verron 2007, 142
OxA-13019	Passage graves, dry wall, round tumulus	Chamber B, bone V85-O6-280	human bn	5349	34	Verron 2007, 142

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Barnenez, Plouézoc´h, Finistère								
Gif-1310	Passage graves, long tumulus	Chamber A	ch	5450	150			Giot et al. 1994, 625
Gif-1311	Passage graves, long tumulus	Chamber B, entrance	ch	3200	120			Delibrias et al. 1971, 214
Gsy-147	Passage graves, long tumulus	Chamber C	ch	2690	105			Coursaget/Le Run 1966, 137
Gsy-30	Passage graves, long tumulus	Chamber E	carb. seed, burnt grains and plant	2200	200			Coursaget/Le Run 1966, 137
Gif-1116	Passage graves, long tumulus	Chamber F, upper level corridor	ch	5100	140			Giot et al. 1994, 625.
Gif-1556	Passage graves, long tumulus	Chamber F	ch	5550	140			Giot et al. 1994, 625
Gif-1309	Passage graves, long tumulus	Chamber G	ch	5750	150			Giot et al. 1994, 625.
Beg-an-Dorchem, Ploumeur, Finistère								
Gif-A923372	Passage grave with lateral chambers		human bn	5490	90	-19.5		Giot et al. 1994, 625, Schulting 2005, 166
Ly-122	Passage grave with lateral chambers		human bn	4140	55			Giot et al. 1994, 625
Brunec I, Fouesnat, Finistère								
Gif-1463	Passage grave	Chamber, late use	ch	1250	90			Delibrias et al. 1972, 280
Conguel. Quiberon, Morbihan								
OxA-10937	Dolmen	Burial	human bn, individual 283	3630	35	-20.6	7.9	Schulting 2005, 166
OxA-10938	Dolmen	Burial	human bn, individual 283	3610	35	-20.7	9.8	Schulting 2005, 166

Table 3.2 Radiocarbon dates from Brittany

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Crec´h Quillé, St-Quay-Perros, Côte d´Amor								
Gsy-344	Passage grave	Corridor, closure entrance	ch	3740	200			Müller 1998, 84, Giot et al.1979, 320
Dissignac, Saint Nazaire, Loire-Atlantique								
Gif-3821	Passage graves, round tumulus	Chamber B, entrance	ch	4940	140			Müller 1998, 82, L´Helgouach 1977
Gif-3823	Passage graves, round tumulus	Pre-monument layer		6250	150			Le Roux 2006, Annex III
Gif-3822	Passage graves, round tumulus	Pre-monument layer		6250	150			Le Roux 2006, Annex III
GifA-92325	Passage graves, round tumulus	Pre-monument layer	graines	5720	90			Le Roux 2006, Annex III
Er Grah, Locmariaquer, Morbihan								
A-8914	Cist under long tumulus	Structure C3	ch	6305	70			Cassen et al. 2009, 751, Le Roux et al. 2006
A-8916	Cist under long tumulus	Hearth c1 under tumulus	ch	5760	70			Cassen et al. 2009, 751, Le Roux et al. 2006
A-8915	Cist under long tumulus	Pit e13 under tumulus	ch	5495	60			Cassen et al. 2009, 751, Le Roux et al. 2006
Gif-7693	Cist under long tumulus	Long tumulus south	ch	5370	70			Cassen et al. 2009, 751, Le Roux et al. 2006
Gif-7592	Cist under long tumulus	Hearth c5 under tumulus	ch	5260	70			Cassen et al. 2009, 751, Le Roux et al. 2006
A-8913	Cist under long tumulus	"Ox pit" e4	ch	5960	70			Cassen et al. 2009, 751, Le Roux et al. 2006
Ly55-OxA	Cist under long tumulus	Pre-monument layer (sector E)	sherd, humidic material	5650	90			Cassen et al. 2009, 751, Le Roux et al. 2006
Gif-7691	Cist under long tumulus	Pit under outer pavement	ch	5250	70			Cassen et al. 2009, 751, Le Roux et al. 2006
Ly56-OxA	Cist under long tumulus	Pre-monument layer (sector E)	ceramic	4885	65			Cassen et al. 2009, 751, Le Roux et al. 2006
Er Yoc´h, Île d'Houat, Morbihan								
OxA-10843	Dolmen	Chamber	human bn, individual EY.HS.4	4240	55	-19.3	12.0	Schulting 2005, 166

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Er Yoc´h, Île d'Houat, Morbihan								
OxA-10810	Dolmen	Chamber	human bn, individual EY.HS.2	3130	40	-18.7	10.7	Schulting 2005, 166
Gavrinis, Morbihan								
Gif-6295	Passage grave, halfround tumulus	Zone N8 facade	ch	4060	70			Delibrias et al. 1987
Gif-6294	Passage grave, halfround tumulus	Zone M1 ditch B	ch	4470	80			Delibrias et al. 1987
Gif-5766	Passage grave, halfround tumulus	Facade end phase	ch	4470	80			Le Roux 1985, 55.
Goërem, Gâvres, Morbihan								
Gif-1148	Gallery grave, angle-formed	Deepest leayer of chamber filling with "Kerigou" and Bell Beaker ceramic	ch	4430	140			Delibirias et al. 1970, 433
Gif-329	Gallery grave, angle-formed	Corridor	ch	3860	200			Delibrias et al. 1970, 433
Gif-330	Gallery grave, angle-formed	Indicates Iron age intrusion.	ch	2620	200			Delibrias et al. 1970, 433
Gif-768	Gallery grave, angle-formed	Chamber under broken pavement with Kerigou ceramic	ch	4100	140			Delibrias et al. 1970, 433
Gif-769	Gallery grave, angle-formed	Upper Hearth in room, in relation with a later intrusion	ch	3470	120			Delibrias et al. 1970, 433
Sandun, Guérande, Loire-Atlantique								
Gif-7703	Dolmen	Phase I		5660	100			Le Roux 2006, Annex III
Haut Mée, Saint-Étienne en Coglès, Ille-et-Vilaine								
Ly-356/AA-21673	Settlement	Ditch 2	nut shell	5975	65			Cassen 2000, 330
Ly-7660	Settlement	Ditch 43	ch	4900	55			Cassen 2000, 330
Ly-7661	Settlement	Ditch 76	ch	5995	65			Cassen 2000, 330

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Haut Mée, Saint-Étienne en Coglès, Ille-et-Vilaine								
Ly-7663	Settlement	Ditch 174	ch	5650	70			Cassen 2000, 330
Ly-7662	Settlement	Post hole 121	ch	5995	65			Cassen 2000, 330
Hoëdic, Quiberon, Morbihan								
OxA-6708	Non-megalithic cists and pit burials	Burial A(12)	human bn, infant	7165	60	-13.3	14.4	Schulting 2001, 7
OxA-6705	Non-megalithic cists and pit burials	Burial B(1)	human bn, juv--adult female	5080	55	-14.2	12.3	Schulting 2001, 7
OxA-6706	Non-megalithic cists and pit burials	Burial C1(2)	human bn, young adult male	6280	60	-13.1	14.2	Schulting 2001, 7
OxA-6709	Non-megalithic cists and pit burials	Burial F1(5)	human bn, old adult male	6645	60	-12.9	13.9	Schulting 2001, 7
OxA-6707	Non-megalithic cists and pit burials	Burial H(8)	human bn, young adult female	6080	60	-13.7	12.6	Schulting 2001, 7
OxA-6710	Non-megalithic cists and pit burials	Burial K(9)	human bn, young adult male	5755	55	-13.6	13.3	Schulting 2001, 7
Hotié de Viviane, Paimpont, Ille-et-Vilaine								
Gif-7465	Dolmen	1m southeast orthostate E1	ch	4370	80			Müller 1998, 84, Briard 1989, 28
Île Carn, Finistère								
Gif-414	Passage grave	Chamber C, lower level	ch	5340	250			Giot et al. 1994, 625, Delibrias et al. 1970, 431
Île Carn, Finistère								
Gif-1362	Passage grave	Chamber S	ch	5390	150			Delibrias et al. 1970, 431
Gif-1363	Passage grave	Chamber N, later context	ch	4840	150			Giot et al. 1994, 625, Delibrias et al. 1970, 431
GRN-1968	Passage grave	Chamber C, upper level	ch	5230	75			Giot et al. 1994, 625, Delibrias et al. 1970, 431

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Île Guennoc III, Finistère								
Gif-813	Passage grave	Chamber E, later context	ch	4500	120			Giot 1994, 625
Gif-1870	Passage grave	Chamber C	ch	5075	140			Giot 1994, 625
Gif-165	Passage grave	Chamber C, foot of stela	ch	5800	300			Giot 1994, 625
Îlot de Roc´h Avel, Landéda								
Gif-5510	Passage grave	Charcoal in accumulation of burnt stones, ceramic, flint and fragm. of a granite quern	ch	5800	100			Giot et al. 1994, 625
Gif-A92374	Passage graves	Chamber	human bn	5260	90			Giot et al. 1994, 625.
GRN-1966	Passage grave	Central chamber		5340	60			Le Roux 2006, Annex III
GRN-1968	Passage grave	Central chamber		5230	75			Le Roux 2006, Annex III
Jardines aux Moines, Brocéliande, Morbihan								
?625	Long tumulus, no chamber	Central hearth		3580	90			Müller 1998, 92, Briard 1989, 106
Kercado, Carnac , Morbihan								
Sa-95	Passage grave, round tumulus	Chamber	ch	5840	300			Delibrias/Labeyrie 1964, 247
Kerléven, Saint Laurent, Finistère								
Gif-809	Passage grave	Chamber C	ch	3800	120			Delibrias et al. 1971, 214
Gsy-111	Passage grave	Chamber, associated with middle Neolithic ceramic	ch	4825	125			Coursaget and Le Run 1966, 135, L´Helgouach 1965
Kermené, Guidel, Morbihan								
	Passage grave, tumulus		ch	4390	140			Delibrias et al. 1974, 22
L´Île Bono, Côtes d´Armor								
Gsy-64	Passage grave	Bottom of the chamber	**ch**	5195	300			Coursaget and le Run 1966, 134
La Pierre Couvretière II, Ancenis, Loire Atlantique								
Gif-3763	Passage grave	Chamber	human bn	2880	100			Delibrias/Guillier 1988, 66

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
La Pierre Couvretière II, Ancenis, Loire Atlantique								
Gif-3415	Passage grave	Chamber	human bn	2990	110			Delibrias /Guillier 1988, 66
Lannec er Gadouer, Erdeven, Morbihan								
AA9241	Cist under long tumulus	Ditch 2, filling	ch	5835	65			Cassen et al. 2009, Tab.3, 14-15, Coursaget/Le Run 1966, 129
AA-10009	Cist under long tumulus	Ditch 5, filling	carb. vranche	5700	55			Cassen et al. 2000, 313-343
AA-29391	Cist under long tumulus	Ceramic AI 43	carb. Nut	5660	55			Cassen et al. 2000, 313-343
AA-20130	Cist under long tumulus	Hearth 2	seed, wheat	5640	80			Cassen et al. 2000, 313-343
AA-8819	Cist under long tumulus	Floor chamber	ch, pinus	5445	60			Cassen et al. 2000, 313-343
AA9240	Cist under long tumulus	Hearth1	ch	5770	80			Cassen et al. 2000, 313-343 Coursaget/Le Run 1966, 129
AA-29390	Cist long tumulus	Ditch 1, filling.	seed, wheat	5210	55			Cassen et al. 2000, 313-343
Larcuste II, Colpo, Morbihan								
Gif-2453	Passage graves, round tumulus	Tumulus II, facade (end use)	ch	3980	110			Müller 1998, 84, Giot et al 1979, 249
Gif-2827	Passage graves, round tumulus	Tumulus II, facade (end use)	ch	4060	120			Müller 1998, 84, Giot et al 1979, 249
Gif-2454	Passage graves, round tumulus	Tumulus II	ch	4610	110			Müller 1998, 84, Giot et al 1979, 249
Gif-2826	Passage graves, round tumulus	Corridor tumulus II	ch	5490	120			Müller 1998, 84, Giot et al 1979, 249
Le Castellic, Carnac, Morbihan								
Gif-198A	Non-accessible ancient dolmen in round tumulus	Hearth 13, zone E, extension East	ch, oak	3930	250			Delibrias et al. 1966, 78-79
Gif-198B	Non-accessible ancient dolmen in round tumulus	From non-accessible dolmen	ch	5025	300			Delibrias et al. 1966, 78-79

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Le Champs Grosset, La Croix St. Pierre, Côtes-d´Armor								
Gif-283	Gallery grave		ch, oak	3820	200			Delibrias et al. 1966, 75
Le Grée de Cojoux, La Croix St. Pierre, Ile-et Vilaine								
Gif-5235	Long tumulus	Long tumulus, early Bronze age (after burial)	ch	3940	80			Müller 1998, 92, Le Roux 1981
Gif-5457	Long tumulus	Hearth under tumulus	ch	5550	120			Müller 1998, 92, Le Roux 1981.
Gif-5456	Long tumulus	Hearth under tumulus	ch	5580	120			Müller 1998, 92, Le Roux 1981
Gif-5660	Long tumulus	Hearth under tumulus	ch	5660	120			Müller 1998, 92, Le Roux 1981
Gsy-31	Long tumulus		ch	4270	120			Coursaget/Le Run 1966, 135
Le Souc´h, Plouhinec, Finistère								
GrA-30249	Passage graves in long tumulus	Quarry	ch	4795	40			Cassen et al. 2008, Tab.7, 16, Le Goffic 2002, 2004, 2005
GrA-30243	Passage graves in long tumulus	Pre-monument layer (mesolithic)	ch	3775	50			Cassen et al. 2009, Tab.7, 16, Le Goffic 2002, 2004, 2006
Miami Beta-176517	Passage graves in long tumulus	Corridor 2	ch	4440	40			Cassen et al. 2009, Tab.7, 16, Le Goffic 2002, 2004, 2006
CIRAM AA 020	Passage graves in long tumulus	Sepulture	ch	3775	50			Cassen et al. 2009, Tab.7, 16, Le Goffic 2002, 2004, 2006
GrA-30248	Passage graves in long tumulus	Quarry	ch	4800	40			Cassen et al. 2009, Tab.7, 16, Le Goffic 2002, 2004, 2006
Miami Beta-161034	Passage graves in long tumulus	Long tumulus, inhumation	ch	5630	40			Cassen et al. 2009, Tab.7, 16, Le Goffic 2002, 2004, 2006
Miami Beta-161035	Passage graves in long tumulus	Pre-monument layer (mesolithic)	ch	6090	100			Cassen et al. 2009, Tab.7, 16, Le Goffic 2002, 2004, 2006
Miami Beta-187969	Passage graves in long tumulus	Debris dolmen 1	ch	4840	140			Cassen et al. 2009, Tab.7, 16, Le Goffic 2002, 2004, 2006

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Le Souc´h, Plouhinec, Finistère								
UL-2739	Passage graves in long tumulus	Chamber	ch	3460	90			Cassen et al. 2009, Tab.7, 16, Le Goffic 2002, 2004, 2006
Gröningen A-30245	Passage graves in long tumulus	Pre-monument layer (mesolithic)	ch	7985	45			Cassen et al. 2009, Tab.7, 16, Le Goffic 2002, 2004, 2006
CIRAM AA 022	Passage graves in long tumulus	Debris dolmen 1	ch	5105	30			Cassen et al. 2009, Tab.7, 16, Le Goffic 2002, 2004, 2006
CIRAM AA 021	Passage graves in long tumulus	Tumulus, dolmen 2 (construction)	ch	4645	30			Cassen et al. 2009, Tab.7, 16, Le Goffic 2002, 2004, 2006
Ly-2852	Passage graves in long tumulus	Sample 1 P 45	ch	2200	35			http://www.archeometrie.mom.fr/banadora/echantillon.php?num=17081, 11.09.2008
Ly-2853	Passage graves in long tumulus	Pre-monument layer (mesolithic)	ch	6440	65			http://www.archeometrie.mom.fr/banadora/echantillon.php?num=17082, 11.09.2008
Ly-2854	Passage graves in long tumulus	Sample 3 L 43	ch	5650	45			http://www.archeometrie.mom.fr/banadora/echantillon.php?num=17083, 11.09.2008
Ly-2855	Passage graves in long tumulus	Sample 4 N 46	ch	6235	45			http://www.archeometrie.mom.fr/banadora/echantillon.php?num=17084, 11.09.2008
Liscuis , Laniscat, Côtes-d´Armor								
Gif-3099	Gallery grave (V-formed)	Liscuis I	ch	5140	110			Müller 1998, 84, Giot et al. 1970, 320
Gif-3585	Gallery grave	Liscuis II	ch	4170	110			Müller 1998, 95, Le Roux 1977
Gif-3944	Gallery grave	Liscuis II	ch	4450	110			Müller 1998, 95, Le Roux 1977, 60
Gif-3943	Gallery grave	Liscuis III, after use	ch	2250	90			Müller 1998, 95, Le Roux 1977, 60
Gif-4075	Gallery grave	Liscuis III, hearth close by chamber after use	ch	3680	110			Müller 1998, 95, Le Roux 1977, 60
Gif-4076	Gallery grave	Liscuis III, hearth with	ch	4200	110			Müller 1998, 95, Le Roux 1977, 60
Mané Kernaplaye, Saint Phillibert, Morbihan								
Gsy-88	Passage grave	Dolmen 19	ch	4585	200			Müller 1998, 84, Coursaget/Le Run 1966, 135

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Petit Mont, Arzon, Morbihan								
Gif-6844	Passage graves, round tumulus on long tumulus	Long tumulus	ch	5650	70			Cassen et al. 2009, Tab.4, 15 Lecornec 1994, 151
Gif-8288	Passage graves, round tumulus on long tumulus	Corridor II- C2	ch	4820	60			Cassen et al. 2009, Tab.4, 15 Lecornec 1994, 151.
Gif-7014	Passage graves, round tumulus on long tumulus	Hearth under stone flags, corridor II	ch	5020	70			Cassen et al. 2009, Tab.4, 15, Lecornec 1994, 151.
Gif-7307	Passage graves, round tumulus on long tumulus	Under paving stones, chamber II	ch	5230	70			Cassen et al. 2009, Tab.4, 15, Lecornec 1994, 151.
Gif-6845	Passage graves, round tumulus on long tumulus	Central hearth chamber II	ch	4990	70			Cassen et al. 2009, Tab.4, 15, Lecornec 1994, 151.
Gif-8288	Passage graves, round tumulus on long tumulus	Central hearth chamber II	ch	4820	60			Cassen et al. 2009, Tab.4, 15, Lecornec 1994, 151.
Gif-6843	Passage graves, round tumulus on long tumulus	Hearth bottom of chamber II	ch	4970	70			Cassen et al. 2009, Tab.4, 15, Lecornec 1994, 151.
Gif-6842	Passage graves, round tumulus on long tumulus	Hearth, entrance chamber II	ch	4650	70			Cassen et al. 2009, Tab.4, 15, Lecornec 1990, 151.
Gif-8287	Passage graves, round tumulus on long tumulus	Corridor IIIb	ch	5130	40			Cassen et al. 2009, Tab.4, 15, Lecornec 1990, 151.
Gif-7015	Passage graves, round tumulus on long tumulus	Facade east	ch	4900	70			Cassen et al. 2009, Tab.4, 15, Lecornec 1990, 151.
Gif-6846	Passage graves, round tumulus on long tumulus	Pre-monument layer	ch	5600	70			Cassen et al. 2009, Tab.4, 15, Lecornec 1990, 151.
Plélauff, Côtes-d´Armor								
Gif-3587	Gallery grave	Chamber	ch	3640	110			Müller 1998, 95, Delibrias et al. 1988, 65 Giot et al. 1979

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Plélauff, Côtes-d´Armor								
Gif-3586	Gallery grave	Under pavement	ch	3680	110			Müller 1998, 95, Giot et al. 1979, 373
Pors-Poulhan, Plouhinec, Finistère								
Gif-7610	Gallery grave	Under tumulus	ch	4300	60			Müller 1998, 95, Giot 1990, 113
Port Blanc, Saint-Pierre-Quiberon, Morbihan								
OxA-10936	Passage graves	Burial	human bn, indivual Broca 265	5050	40	-19.5	10.3	Schulting 2005, 166.
OxA-10699	Passage graves	Burial	human bn, individual R82.3125	4200	45	-19.6	11.0	Schulting 2005, 166.
OxA-10615	Passage graves	Burial	human bn, individual R82.31.1	5070	50	-19-9	10.9	Schulting 2005, 166.
Poulguen, Penmarc´h, Finistère								
Gsy-55a	Passage grave	From secondary use with Gallo-Romain material	ch	1460	105			Coursaget/Le Run 1966, 136
Prajou Menhir, Trébeurden, Côtes-d´Armor								
Gif-767	Gallery grave	Chamber	ch	5330	150			Müller 1998, 95, Delibrias et al.1988, 215
Quélarn, Plobannalec, Finistère								
Gif-5061	Passage grave	Chamber B, southeast compartement	ch	5760	120			Giot 1994, 625, Giot 1987, 183
Gif-5768	Passage grave	Chamber B	ch	6990	90			Müller 1998, 84, Delibrias et al. 1987, 217
Sandun								
Gif-7703	Settlement	Chamber	n/a	5660	100			Le Roux, Annex III
Saint Michel, Carnac, Morbihan								
UB-6869	Dry wall chamber, passage, grave, tumulus Carnacéen	Central chamber	calc. human bn, controll date GRA-20197	5854	38			Schulting 2010

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Saint Michel, Carnac, Morbihan								
Gsy-90	Dry wall chamber, passage, grave, tumulus Carnacéen	From small cists in the interior	ch, sub-fossil wood?	8800	300			Coursaget/Le Run 1966, 135
Gsy-89	Dry wall chamber, passage, grave, tumulus Carnacéen	Debris final tumulus	ch	4980	150			Cassen et al. 2009, Tab.5, 15, Delibrias et al. 1964, 247
Sa-96	Dry wall chamber, passage, grave, tumulus Carnacéen	Central chamber	ch	5721	300			Cassen et al. 2009, Tab.5, 15, Delibrias et al. 1964, 247
AA-42784	Dry wall chamber, passage, grave, tumulus Carnacéen	Central chamber	ch	5665	54			Cassen et al. 2009, Tab. 5, 15, Pétrequin et al. 2003
GrA-20197	Dry wall chamber, passage, grave, tumulus Carnacéen	Central chamber	calc. human bn	5780	45			Cassen et al. 2009, Tab. 5, 15, Delibrias et al. 1964, 247
Table des Marchands, Locmariaquer, Morbihan								
LGQ-557	Passage grave	Basement debris	ch	3250	120			Cassen et al. 2009, Tab.1, 14
A-8856	Passage grave	Pre-monument layer (VA-VI36-37)-ceramic	ch	5325	60			Cassen et al. 2009, Tab.1, 14
Ly-13084	Passage grave	Ditch 3 alignment, layer 6	ch	5715	45			Cassen et al 2009, Tab.1, 14
Ly-3014(sacA3318)	Passage grave	Pre-monument layer (VA-VI37)-ceramic	carb. nut shell	5430	60			Cassen et al. 2009, Tab.1, 14
Ly-8(OxA)	Passage grave	Quarry (ZE16)	sherd, humidic material.	5260	80			Cassen et al. 2009, Tab.1, 14
Ly-3016(sacA3320)	Passage grave	Post hole 110 pre-monument layer	pea	5720	60			Cassen et al. 2009, Tab.1, 14
Ly-13083	Passage grave	Pit standing stone, layer 4	ch	5930	45			Cassen et al. 2009, Tab.1, 14
LGQ555	Passage grave	Quarry (ZU19)	ch	4990	180			Cassen et al. 2009, Tab.1, 14
A-8855	Passage grave	Quarry (ZE16)	ch	5395	75			Cassen et al. 2009, Tab.1, 14
Ly-12314	Passage grave	Hearth 4	ch	5500	45			Cassen et al. 2009, Tab.1, 14

Laboratory Number	Architecture/Location	Context	Material.	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Table de Marchands, Locmariaquer, Morbihan								
Ly-5979	Passage grave	Quarry (ZE16)	ceramic	5585	135			Cassen et al. 2009, Tab.1, 14
AA20404	Passage grave	Quarry (ZEd)	wheat	5590	65			Cassen et al. 2009, Tab.1, 14
Ly-12313	Passage grave	Post hole 2/ pre-monument layer	ch	4895	60			Cassen et al. 2009, Tab.1, 14
Gif-7555	Passage grave	Hearth "precairn" horizon	ch	5040	70			Müller 1998, 84, Patton 1991, 67
Gif-7554	Passage grave	Hearth "precairn" horizon	ch	4025	40			Müller 1998, 84, Patton 1991, 67
A-8857	Passage grave	Hearth 5	ch	5440	60			Cassen et al. 2009, Tab.1, 14
LGQ558	Passage grave	Hearth 5	ch	5220	130			Cassen et al. 2009, Tab.1, 14
AA20403	Passage grave	Pre-monument layer (VA-VI37)-ceramic	wheat	5835	65			Cassen et al. 2009, Tab.1, 14
Ly-3017 (SacA-3321)	Passage grave	Ditch al.ignement	carb. nut shell	5440	60			Cassen et al. 2009, Tab.1, 14
Ly-3015 (sacA-3319)	Passage grave	Ditch 13 alignment layer 3	wheat	5770	90			Cassen et al. 2009, Tab.1, 14
Ly-3013 (sacA-3317)	Passage grave	Ditch 8 alignment, layer 3	carb. nut	5480	60			Cassen et al. 2009, Tab.1, 14
A-8854	Passage grave	Quarry (TU-SA14-15)	ch	5175	100			Cassen et al. 2009, Tab.1, 14
Ly-2509 (Poz.)	Passage grave	Ditch 6 alignment	ch	5415	45			Cassen et al. 2009, Tab.1, 14
LGQ556	Passage grave	Quarry (ZU18)	ch	4580	140			Cassen et al. 2009, Tab.1, 14
Ly-2508 (Poz.)	Passage grave	Ditch 5 alignment, layer 6	ch	6210	50			Cassen et al. 2009, Tab.1, 14
LGQ554	Passage grave	Quarry (ZA16)	ch	4910	150			Cassen et al. 2009, Tab.1, 14
Ly-12312	Passage grave	Ditch 50	ch	5170	70			Cassen et al. 2009, Tab.1, 14
Téviec, Quiberon, Morbihan								
OxA-6662	Non-megalithic cists and pit burials	Burial B(2)	human bn, young adult, fem	5680	50	-17.0		Schulting 2001, 7
OxA-6701	Non-megalithic cists and pit burials	Burial H1(14)	human bn, young adult, fem.	6000	60	-16.0	6.8	Schulting 2001, 7
OxA-6702	Non-megalithic cists and pit burials	Burial H3(15)	human bn, young adult female	6530	60	-15.2	11.7	Schulting 2001, 7

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
OxA-6663	Non-megalithic cists and pit burials	Burial K1(8)	human bn, mid-adult, male	6440	55	-15.6		Schulting 2001, 7
OxA-6664	Non-megalithic cists and pit burials	Burial K4(10)	human bn, adult 14-16	6510	50	-16.0		Schulting 2001, 7
OxA-6703	Non-megalithic cists and pit burials	Burial K6(16)	human bn, young adult	6500	65	-14.1	13.4	Schulting 2001, 7
OxA-6704	Non-megalithic cists and pit burials	Burial L(20)	human bn, infans 1-2mth	6515	65	-14.3	15.2	Schulting 2001, 7
OxA-6665	Non-megalithic cists and pit burials	Burial M(13)	human bn, young adult, amle	6740	60	-15.3		Schulting 2001, 7
Tossen-Keler, Tréguier,								
Gif-280	Gallery grave	Central hearth	ch	4500	260			Müller 1998, 95, Giot et al. 1979
Ty Floc´h, St. Thois, Finistère								
Ly-119	Passage grave	Chamber	bn	5270	80			Giot et al. 1994, 625
Gif-5233	Passage grave	3. phase tumulus	ch	4670	120			Müller 1998, 84, Le Roux/Lecerf 1980, 27-49
Gif-5234	Passage grave	Bottom chamber B	ch	5580	120			Müller 1998, 84, Le Roux/Lecerf 1980, 27-49

Table 3.3 Radiocarbon dates from the Channel Islands

Laboratory Number	Architecture/ Location	Context	Material	Radiocarbon age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
La Hogue Bie, Grouville, Jersey								
Beta-57925/ETH-9972	Passage grave, halfround tumulus	Matrix of the secondary terrace, phase 1b	ch	5360	60			Patton 1995, 583
Beta-77359/ETH-13184	Passage grave, halfround tumulus	Land surface under facade secondary terrace, phase 1 b	ch	5400	70			Patton 1995, 583
Beta-77361/ETH-13186	Passage grave, halfround tumulus	Land surface under facade secondary terrace, phase 1 b	ch	5210	70			Patton 1995, 583
Beta-57926/ETH-9973	Passage grave, halfround tumulus	Land surface under facade secondary terrace, phase 1 b	ch	5245	60			Patton 1995, 583
Beta-77358/ETH-13183	Passage grave, halfround tumulus	Fill of the ditch	ch	4590	70			Patton 1995, 583
Beta-77360/ETH-13185	Passage grave, halfround tumulus	From matrix of first terrace, terrace, phase 1a	ch	5410	70			Patton 1995, 582
Beta-77357//ETH-13182	Passage grave, halfround tumulus	From the blockage rubble, phase 1c	ch	4760	70			Patton 1995, 584
Beta-57923/ETH-9970	Passage grave, halfround tumulus	From clay overlaying soil built up on top of blockage rubbel	ch	4110	60			Patton 1995, 584
Beta-57924/ETH-9971	Passage grave, halfround tumulus	From clay overlaying soil built up on top of blockage rubbel	ch	4260	60			Patton 1995, 584
Le Déhus, Paradis, Guernsey								
OxA-12541	Passage grave, round tumulus	Chamber C	human bn, mandible, adult	5194	39	-20.3	15.2	Schulting 2010, 160, 162
OxA-21199	Passage grave, round tumulus	Chamber C	human bn, tooth (same ind. as OxA-12541).	5222	35	-20.2	14.5	Schulting 2010, 160, 162
OxA-12540	Passage grave, round tumulus	Chamber D	human bn, mandible, adult	5215	40	-20.4	13.5	Schulting 2010, 160, 162
OxA-12542	Passage grave, round tumulus	Chamber D	human bn mandible adult	5263	38	-20.2	13.7	Schulting 2010, 160, 162

Laboratory Number	Architecture/ Location	Context	Material	Radiocarbon age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Le Déhus, Paradis, Guernsey								
OxA-21198	Passage grave, round tumulus	Chamber B	human bn cranium adult	4133	32	-20.3	10.1	Schulting 2010, 160, 162
Les Fouaillages, Saint Peter Port, Jersey								
BM-1894	Cists, megalithic elements, long tumulus	Associated with vessel from the base of the mound	ch	5670	170			Bowman et al. 1990, 68 rev. dates Kinnes 1982, 27
BM-1893	Cists, megalithic elements, long tumulus	Phase 2 associated with vessel at the base of the mound	ch	5900	110			Bowman et al. 1990, 68 rev. dates Kinnes 1982, 27
BM-1892	Cists, megalithic elements, long tumulus	Phase 2 associated with vessel at the base of the mound	ch	5850	50			Bowman et al. 1990, 68 rev. dates Kinnes 1982, 27
BM-1896	Cists, megalithic elements, long tumulus		ch	5270	100			Bowman et al. 1990, 68 rev. dates Kinnes 1982, 27

Table 3.4 Radiocarbon dates from Central West France

Laboratory Number	Architecture / Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Bougon/Chiron, Deux Sèvres						
Q-3215	Passage grave in round tumulus	Tumulus A, megalithic passage grave, chamber	human bn	5195	55	Mohen/Scarre 2002, 93
Q-3214	Passage grave in round tumulus	Tumulus A, megalithic passage grave, chamber	human bn	5085	60	Mohen/Scarre 2002, 93
Beta-156350	Passage grave, in round tumulus	Tumulus A, megalithic passage grave, chamber	human bn	4680	40	Mohen/Scarre 2002, 93
Birm-1118	Passage grave in round tumulus	Tumulus C, in front of the tumulus	human bn	4960	170	Mohen/Scarre 2002, 93
Q-3216	Passage grave in round tumulus	Tumulus C, in front of the tumulus	human bn	4950	150	Mohen/Scarre 2002, 93
Q-3233	Passage grave in long tumulus	Tumulus B, megalithic passage grave B1	human bn	5280	60	Mohen/Scarre 2002, 93, Evin et al. 1973, 41
Q-3232	Passage grave in long tumulus	Tumulus B, megalithic passage grave B1	human bn	5190	50	Mohen/Scarre 2002, 93, Evin et al. 1973, 41
Q-3217	Passage grave, dry wall, in round and long tumulus	Tumulus F, passage grave F0 in dry wall technic, chamber	human bn skull	5145	90	Mohen and Scarre 2002, 93, Evin et al. 1973, 41
Q-3218	Passage grave, dry wall, in round and long tumulus	Tumulus F, passage grave F0 in dry wall technic, chamber	human bn skull	5230	70	Mohen and Scarre 2002, 93, Scarre et al.1993, 857
Q-3235	Passage grave, dry wall, in round and long tumulus	Tumulus F, passage grave F0 in dry wall technic, chamber	human bn skull	5250	65	Mohen and Scarre 2002, 93, Scarre et al.1993, 857
Ly-1700	Passage grave, dry wall, in round and long tumulus	Tumulus F, passage grave F0 in dry wall technic, chamber	human bn, femur	5830	140	Mohen and Scarre 2002, 93, Evin et al. 1979, 438
Q-3234	Passage grave, dry wall, in round and long tumulus	Tumulus F, passage grave F0 in dry wall technic, chamber	human bn	5860	65	Mohen and Scarre 2002, 93, Scarre et al.1993, 857
Ly-966	Passage grave in long tumulus	Tumulus E with passage grave in dry wall technic E 1, chamber	human bn	5800	230	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=1061&cpt=2
Ly-967	Passage grave in long tumulus	Tumulus F, megalithic passage grave F2	human bn	4790	220	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=1062&cpt=3
Ly-968	Passage grave in long tumulus	Tumulus F, megalithic passage grave F2	human bn	4470	230	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=1063&cpt=4

Laboratory Number	Architecture / Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Bougon/Chiron, Deux Sèvres						
Ly-1195	Passage grave in halfround tumulus	Tumulus E with passage grave in dry wall technic E2, chamber	human bn	4700	140	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=1291&cpt=5
Ly-1699	Passage grave, dry wall, in round and long tumulus	Tumulus F, passage grave F0 in dry wall technic FO, chamber south	human bn	5480	170	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=1869&cpt=7, 1.06.2008
OxA-9106/Ly-1051	Passage grave in round tumulus	Tumulus A, megalithic passage grave, corridor	human bn	5365	50	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=11325&cpt=3, 1.06.2008
OxA-9183	Long tumulus	Quarry F2, construction?	human bn	5415	65	Mohen/Scarre 2002, 94
Q-3219	Long tumulus	After use tumulus F	human bn	4410	120	Mohen/Scarre 2002, 94
Champ Châlon, Benon, Vendée						
OXA-9384/Lyon 1124	Passage grave, long tumulus	Main chamber	human bn	4870	45	Joussaume 2006, 21
OXA-9096/Lyon 1041	Passage grave, long tumulus	Side chamber	human bn	3335	45	Joussaume 2006, 31
OXA-9097	Passage grave, long tumulus	Main chamber	human bn	5365	55	Joussaume 2006, 38
OXA-9595	Passage grave, long tumulus	Main chamber	human bn	5090	40	Joussaume 2006, 41
OXA-9099	Passage grave, long tumulus	Main chamber	human bn	5030	45	Joussaume 2006, 50
OXA-9098	Passage grave, long tumulus	Corridor, senil individual	human bn	4980	50	Joussaume 2006, 50
Chenon						
Ly-1105	Passage grave	Grave B1	Bn	5540	140	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=1148, 1.06.2008
Germignac, Poitou-Charentes						
no information	Pit burial		human bn,	6090	70	Joussaume 1999, 60
Goumoizère, Valdivienne, Poitou-Charentes						
Beta-217474	Cist	Sepulture 1	human bn, humerus G	5530	40	Soler 2007, 118
Beta-217475	Cist	Sepulture 1	human bn, humerus G	5570	40	Soler 2007, 118
Beta-217476	Cist	Sepulture 1	human bn, humerus G	5360	40	Soler 2007, 118
Beta-217477	Cist	Sepulture 1	human bn, humerus G	5460	40	Soler 2007, 118
Beta-217478	Cist	Sepulture 1	human bn, humerus G	5440	40	Soler 2007, 118

Laboratory Number	Architecture / Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Goumoizère, Valdivienne, Poitou-Charentes						
Beta-217479	Cist	Sepulture 1	human bn, humerus G	5440	40	Soler 2007, 118
OxA-9337/Ly-1125	Cist	Sepulture 2	human bn	5770	50	Soler 2007, 118
OxA-9102/Ly-1047	Cist	Sepulture 3	human bn	5620	50	Soler 2007, 120
GifA-97293	Cist	Sepulture 5	human bn	5940	50	Soler 2007, 120
Beta-217482	Cist	Sepulture 5	human bn	5350	40	Soler 2007, 120
Beta-217483	Cist	Sepulture 5	human bn	5590	40	Soler 2007, 120
Ly-2488	Cist	Sepulture 5	human bn, humerus G, child	5605	55	Soler 2007, 120
Ly-2489	Cist	Sepulture 5, central bone accumulation	human bn, femur G	5555	50	Soler 2007, 120
Ly-2490	Cist	Sepulture 5, articulated individual	human bn, femur G	5610	45	Soler 2007, 120
Ly-2491	Cist	Sepulture 5, southern bone accumulation	human bn	5590	50	Soler 2007, 120
Ly-2492	Cist	Sepulture 5, southern bone accumulation	human bn	5520	45	Soler 2007, 120
Ly-2493	Cist	Sepulture 5, southern bone accumulation	human bn	5360	45	Soler 2007, 120
Ly-2494	Cist	Sepulture 5, southern bone accumulation	human bn	5675	50	Soler 2007, 120
Ly-1048	Cist	Sepulture 5	human bn	5825	55	Soler 2007, 120
Beta-217481	Cist	Sepulture 5	human bn	5730	40	Soler 2007, 120
Jard-sur-mer, Plage de Légère, Vendée						
Gif-1119	Long tumulus		ch	3300	120	Delibrias et al. 1971, 217
La Boixe B, Vervant, Charentes						
Ly-1060	Passage grave in round tumulus	B1 corridor	human bn	4200	60	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=11341&cpt=19, 1.06.2008
Ly-1053	Passage grave in round tumulus	B2 chambrer	human bn	4085	45	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=11342&cpt=20, 1.06.2008

Laboratory Number	Architecture / Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
La Ciste de Cous, Bazoges-en-Pareds, Vendée						
Gif-4180	Passage grave in round tumulus	Chamber, upper layer		4640	130	Müller 1998, 84, Joussaume 1981, 131-140
Gif-3676	Passage grave in round tumulus		ch	4680	130	Delibrias et al. 1988, 69
La Grosse Motte, Le Bouhet, Charente Maritime						
Ly-1057	Long tumulus	BH 602	human bn	4535	65	http://www.archeometrie.mom.fr/banadora/ echantillon.php?num=11326&cpt=12, 1.06.2008
La Motte de Justices, Deux Sèvres						
Gif-8292	Long tumulus	Chamber	human bn	5340	100	Roussot-Larroque 1998,
Le Aspies, Nieul-sur-l´Autize, Vendée						
Gif-3417	Dolmen	Burial assoc. with Bell Beaker, Chalcolithic industry	human bn, skull	4040	130	Delibrias et al. 1988, 68
Montiou, Saint-Soline,						
Gif-4373	Passage graves in long tumulus	Corridor 2 under tumulus	human bn	4530	50	Müller 1998, 84, Joussaume 1981, 131-140
Gif-4906	Passage graves in long tumulus	Chamber 2	human bn	4830	50	Müller 1998, 84, Joussaume 1981, 131-140
Péré, tumulus C, Prissé-la-Charrière, Deux Sèvres						
OxA-10249	Dolmen/passage grave in long tumulus	Chamber accessible dolmen, individual nr. 1	human bn, long bone	5500	45	Laporte et al. 2002, 179
OxA-10248	Dolmen/passage grave in long tumulus	Chamber accessible dolmen, individual nr. 2	human bn, phalange, main proximale	5440	45	Laporte et al. 2002, 179
OxA-10204	Dolmen/passage grave in long tumulus	Chamber passage grave, individual nr. 1	human bn, adult, left humerus	5470	45	Laporte et al. 2002, 179
OxA-10205	Dolmen/passage grave in long tumulus	Chamber passage grave, individual nr. 2	human bn, child, diaphysis fibula	5395	45	Laporte et al. 2002, 179
OxA-10246	Dolmen/passage grave in long tumulus	Chamber passage grave, individual nr. 3	human bn, child, illiac bone left	5360	45	Laporte et al. 2002, 179
OxA-10258	Dolmen/passage grave in long tumulus	Chamber passage grave, individual nr. 4	human bn, adult, diaphysis humerus left	5465	45	Laporte et al. 2002, 179
OxA-10247	Dolmen/passage grave in long tumulus	Chamber passage grave, individual nr. 5	human bn, adult, diaphysis humerus left	5295	45	Laporte et al. 2002, 179

Laboratory Number	Architecture / Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Pierre Virante II, Xanton-Chassenon, Vendée						
Gif-3762	Dolmen		human bn	4040	130	Müller 1998, 84, Delibrias/Guilier 1988, 69
Gif-3416	Dolmen		human bn	4870	140	Müller 1998, 84, Delibrias/Guilier 1988, 69

Chapter 4

Catalonia

Summary: The earliest megalithic horizon in Catalonia is represented by small occurences of non-acccessible dolmens covered by earthern mounds. These graves emerge in the second half of the 5th millennium cal BC and are restricted to the Tavertet region. After a hiatus of a few hundred years, again megaliths are built in Catalonia in two main regions: the Catalonian central depression with simple dolmens and cists, and also in the coastal region of the Pyrenees with passage graves. Simple inhumations in natural caves and the open-air and burials in hypogea are the conventional burial forms in these regions, while megalithic graves are more exceptional.

Pre-megalithic structures and pre-megalithic funeral rites in Catalonia

The first burials in caves or rock shelters in Catalonia, such as the Cova de Avellaner, the Cova de Griuteres, the Cova del Pasteral, or the Cova dels Lladres, are documented from the beginning of the 5th millennium. From these caves evidence for domestic use is available and a few single or double burials are recorded with little grave goods (Clop *et al.* 1995; Gibaja Bao 2004: 11). Two radiocarbon dates from the Cova de Avellaner are available: GAK-12933, 5920±180 BP and UBAR-109, 5830±100 BP. These results are calibrated ranging within the time interval of ~5293–4461 cal BC (95.4%; 5005–4553 cal BC, 68.2%). In the cave between 12 and 19 individuals were buried in three areas subdivided by dry walls. The grave goods consist of Montboló ceramics, geometric microliths, flakes, blades made of flint or quartz, bone tools, bracelets, stone beads, wild boar fangs with perforations, cardium shells, and organic macro rests (Bosch i Lloret/Tarrús i Galter 1991: 101). One radiocarbon date is available from the burials in the Cova del Lladres (UBAR-63, 5330±90 BP; 4309–4047cal BC, 68.2%; 4337-3981 cal BC, 95.4%) as well as Epicardial material such as 1800 Cardium and 139 stone pearls (Ten 1980). The caves were less frequented from the second half of the 5th to first half of the 4th millennium BC (Gibaja Bao 2004).

On the South Catalan coast at the mouth of the Ebro River there is a region with a concentration of 18 sites with Early Neolithic post-cardial burials, for example Barranc d´en Fabra, Masdenvergenc, and Mas Benita. Three different types of burials are described for this region: cists, pit burials with stone slabs on the bottom, and pit burials with small stone cairns (Bosch 1995; Gibaja Bao 2004: 14). Approximately 10 burials are isolated in the landscape, whereas the rest is organized in small necropolises of up to 11 graves. Most of these graves are single burials, but there are also burials including two or three individuals. The dating of these graves is carried out by the typo-chronological consideration of the materials, for example for ceramics, shell and stone beads, and bracelets.

Transitional structures and the emergence of megaliths in Catalonia

The first megalithic structures in Catalonia developed within the Late Early Neolithic or the Postcardial Montboló horizon in the Tavertet region which is situated at the Eastern border of the Catalan Central Depression (Cruells *et al.* 1992; Gibaja Boa 2004: 13; Molist *et al.* 1987, 2007; Tarrús I Galter 2003). Inside an area with a diameter of 1800m on a plateau in the south of Cabrères, small necropolises and single burials are clustered with so-called cistas and cambres amb túmul. There are graves known at Rajols, Font de la Vena, El Padró, La Rambla, and St. Corneli (Cruells *et al.* 1992; Molist *et al.* 1987, 2007). These graves are constructed in a cist-like fashion, consisting of four side stone slabs and a cover stone, which provided the only possible access to the rectangular or trapezoidal chamber and leads to the important conclusion that the burials were therefore single acts, since the chambers are non-accessible. The cists are not subterranean and embedded into the ground like some quite similar, but subsequent constructions in the Solsonés region (Castanys 1992). They are built above the ground level with side stones having a height of 0,50m–1,26m. The length of the chambers measures from 1,40m–1,85m and they are 1,50m–1,70m wide. Their 'monumental character' is underlined by huge earth tumuli with a diameter between 11m–22m and a still existing height of up to 2m. The tumuli are mostly surrounded by a stone circle (Figures 4.1-4.3).

These monuments can be determined either as transitional structures to the dolmens or as proto-megalithic structures as proposed by J. Guilaine (Guilaine 1992; 1996). They are definitely megaliths and indicate the earliest megalithic and monumental stage in this region. Their classification as cists in the literature is insufficient and, in sensu strictu of this analysis, they shall be clearly separated from cists, since they are structures aboveground with monumental character. Accordingly, they are non-accessible dolmens.

The graves are obviously single and possibly double graves, since they are limited in their size and because

of the results of El Padró II. The bone material from most of the Tavertet graves is rather destroyed, but from El Padró II there is a single burial recorded from an adult man in crouched position (Cruells *et al.* 1992; Molist *et al.* 2007: 63).

Five radiocarbon dates are available from EL Padró II and from Font de la Vena we have two radiocarbon results at our disposal (Cruells *et al.* 1992: 245; Molist *et al.* 2007: 64). They deserve closer consideration, since they are obviously the earliest available radiocarbon dates from this type of structures on the Mediterranean. All of these dates are processed from charcoal samples, which are taken from the tumulus or from the chamber although they are a good example of how difficult it is to date a construction and a burial on charcoal. Not all of these dates here are suitable to determine the act of construction or the burial, which is in this case one single event.

The earliest date from El Padró II is from the Late Mesolithic and dates to ~6780 cal BC (UBAR-59, 7850±150 BP; 7027–6534 cal BC, 68.2%; 7136–6431 cal BC, 95.4%) (Molist *et al.* 2007: 64). The grave goods of these Tavertet graves belong to the Montboló horizon and there is a hiatus of approximately 2100 years from this date to the next date of the 33 radiocarbon dates which are available from the Catalonian Montboló/Molinot and Empordanià horizons. Thus, the date is a TPQ-value regarding the construction of the grave and the burial act (Figure 4.15)

The other four unmodeled dates from El Padró II are distributed within a time interval from 4986–4071 cal BC, 95.4% probability. Again, the burial is a single act and it is quite presumable that only the youngest of these dates is from ca. 4400 cal BC (UBAR-116, 5530±130 BP; 4584–4267 cal BC, 68.1%; 4723–4071 cal BC, 95.4%). It is possibly connected to the construction or the burial act.

The other three dates (UBAR-115, 5970±100 BP; 4982–4727 cal BC, 68.2%; 5207–4611 cal BC, 95.4%, UBAR-114, 5770±80 BP; 4716–4532 cal BC, 68.2%; 4826–4451 cal BC, 95.4% and UBAR-113, 5600 ±130 BP; 4600–4331 cal BC, 68.2%; 4778–4079 cal BC, 95.4%) show a hiatus of between ~800 to 240 calendar years to the next of the 33 radiocarbon dates which are available from the Catalonian Montboló, Molinot, and Empordanià horizons. The samples originate from previous activities on the site or have an old-wood effect. The youngest of these dates (UBAR-116, 5530±130 BP; 4584–4267 cal BC, 68.1%; 4723–4071 cal BC, 95.4%) is also quite close to the next following date within the Montboló horizon from the Cova del Toll (MC-1477, 5490±100 BP; 4452–4245 cal BC, 68.2%; 4535–4053 cal BC, 95.4%). In any case, an old-wood effect cannot be excluded here either (Figure 4.15).

A similar range of evidence is shown with the two radiocarbon results from Font de la Vena. Both measurements are processed from charcoal samples. The earlier date measures to ~5100 cal BC (UBAR-61, 6190±100 BP; 5295–5021 cal BC, 68.2%; 5366–4851 cal BC, 95.4%) and there is a hiatus of ca. 400 years to the next date (Cova del Toll, see above) of the 33 dates of the Catalonian Montboló/Molinot and Empordanià horizons. So it is much more probable that the younger date from approximately 4660 cal BC (UBAR-60, 5780±290 BP; 4996–4343 cal BC, 68.2%; 5324–4002 cal BC, 95.4%) is closer to the construction or the burial, but there is also a hiatus of around 250 y to the only possible date from El Padró II and of around 350 y to the closest dates of the Montboló horizon from the Cova del Toll. This together with the fact that the standard deviation of this radiocarbon result of ± 290 y is fairly high makes this date not suitable to determine the beginning of these graves in the Northeast Iberian Peninsula.

In sum, the construction of these graves can be determined at the earliest to ~4400 cal BC (4581–4267 cal BC, 68.2%; 4535–4053 cal BC, 95.4%), if not later (Figure 4.15). Thus, they are to be estimated for the second and not to the first half of the 5th millennium BC, which is normally postulated (cf. Cura i Morera/Vilardell 1996; Gibaja Bao 2004; Guilaine 1996; Molist *et al.* 2007), even if the database is far too poor to closely determine the start of these early megaliths. The dates are maintained by the typo-chronological consideration of the material. The grave goods of the Tavertet graves consist of Montboló ceramics, such as globular vases and vessels with a base bottom, flint artifacts like trapezoidal or triangular geometric microliths, nuclei, and blades, bone objects like awls, bracelets and necklaces made of stone and shell, and teeth of wild boars and mills (Cruells *et al.* 1992: 245). The ceramics in the grave El Padró II were directly deposed next to the individual. Two whole Montboló vessels were deposited in the tumulus as well (Molist *et al.* 2007: 64).

From the Alt Empordá and the coastal Pyrenean area, quite similar graves are documented, which are also classified as cista amb tumúl. They are spread at the Cap de Creus in a region which is limited in the south by the Cap Norfeu and Roses and to the north with the Serra de Rodes and Port de la Selva (Aliaga *et al.* 1992). In the region of Roses, the necropolis of Cala Montjoj is registered with the Tomba del General, Pla de les Gates, the Puig Alt, and the Puig Rodó (Tarrús i Galter 2002: 75–92) (Figure 4.4). The largest part of the chambers is constructed aboveground as well and they can be surely considered to be megaliths or non-accessible dolmens. These graves are situated in special places, high up and with difficult access. Unfortunately, there are no radiocarbon dates and just very little material is available from the excavations in the 1980s. From the Tomba Del General and Puig Rodó few ceramics and a piece of a schist disk were recovered. Furthermore, fragments of polished ceramics are noted from the Cista



Figure 4.1 El Padró I. Photo courtesy of Miquel Molist

de Canyelles at Canyelles, the Cista de la Vinya d´en Berta and the Cista de la Sureda at the Coll de Raimeres.

On the French side of the Pyrenees, similar graves are recorded from the necropolis Champ del Ginèbre, Caramany, and from Fenouilllet. The tumuli are smaller, but the graves are also limited by a stone circle (cf. chap. 5, p. 152) (Gibaja Bao 2004; Guilaine 1996; Tarrús i Galter 1999: 110).

Appearance and architectonical features of megalithic structures in Catalonia

Megaliths developed in Catalonia within two main regions: in the Catalonian central depression with simple dolmens and cists and in the coastal region of the Pyrenees with passage graves (Tarrús i Galter 1999: 108). The southern border of megaliths in Catalonia is found in Querol Alt Camp in the region of Tarragona with the dolmen du Mas Pla de Vallderossa. The Spanish coast is completely megalith-free between this site and Andalusia.

The earliest megaliths in the Catalan central depression are not easy to define as already discussed in detail in chapter 4, p. 127-129. They are mostly classified in Catalonian scientific literature as cists, or cists with a tumulus (cista amb túmul), but some of them can be clearly determined as non-accessible ancient dolmens, since they are definitely megalithic and the main part of their structures are aboveground. Subsequently, from the Middle Neolithic onwards another cluster of quite similar megaliths arises in the region of Solsonès in the Central Catalan depression. These structures are non-accessible ancient dolmens covered by tumuli, like in Costa del Garrics del Caballo I, Carni des Casais, or Estació del Llord, or they are subterranean cists covered by tumuli, like in Costa del Garrics del Caballo II, Estactó del Llord, Santes Creus del Bordell, Colliles, and La Trinxera (Castany *et al.* 1992). Some of these burials are associated with small standing stones which are erected on the top of the tumuli, for example at Costa dels Garrics Del Caballo II (Castany *et al.* 1992; Gibaja Bao 2004). The graves are isolated similar to those at Cal Rajoli, El Clerc, and El Vilaro, or grouped in small necropolises such as the structures at El Solar, Del Llord, and Ceuró (Gibaja Bao 2004: 18). They are also single or double burials with chambers designed with rectangular, triangular, or quadrangular ground plans. Another group of this grave type is represented by the small necropolis in Feixa Del Morro del Juberri in Andorra which was connected together with a settlement, but these graves only have subterranean inner structures (Cura i Morera/Vilardell 1996; Llovera 1992). A later appearance of the cista amb tumúl are the so-called cista megalitica, which are also small cists or dolmens aboveground directly constructed on the bedrock and inserted into a round tumulus, for example at Bressol Mare de Déu de L´Espunyola or into a quadratic tumulus, for example at Cal Conill, Gros de



Figure 4.2 Font de la Vena. Photo courtesy of Miquel Molist

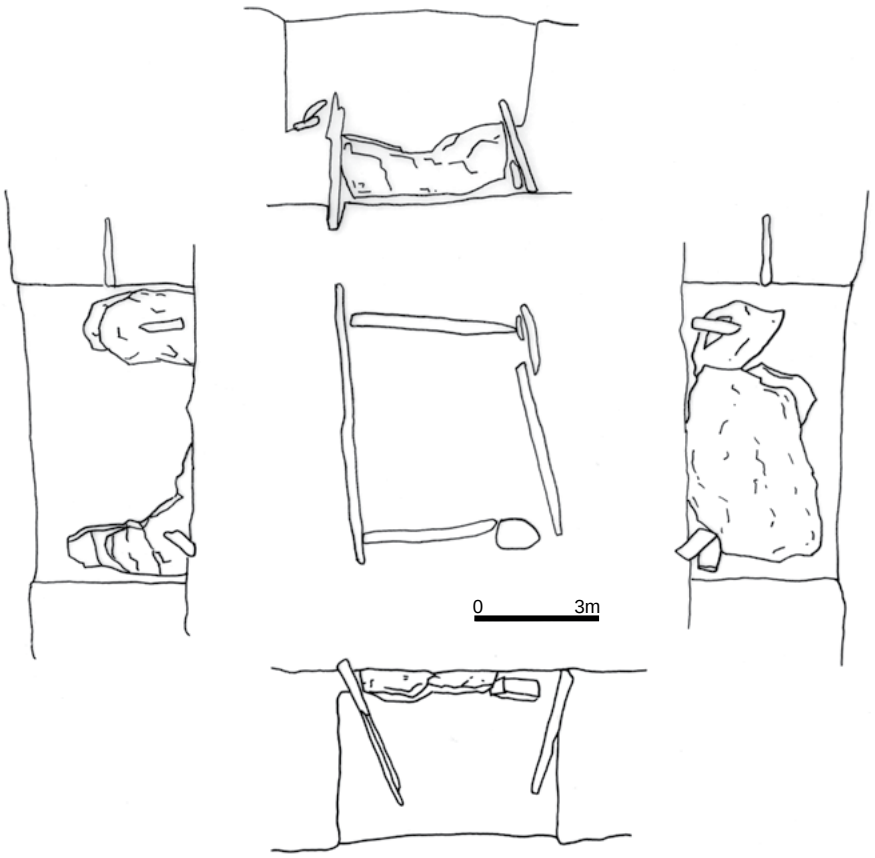


Figure 4.3 Font de la Vena, planum and side profiles chamber (after Molist et al.1987, 64)



Figure 4.4 Tomba del General, Cap de Creus from the north

Montmajor, and Call Pallot de Puig-Reig or Berguedà. The cista megalithica are distributed in the Plateau Central and in the occidental Pyrenees in Berguedá, Solsona, and Alt Urgell. They were constructed from the Final Neolithic to the Early Bronze Age (Tarrús i Galter 1999). From the Chalcolithic onwards, the simple dolmen is the most often built megalithic grave type in the whole Pyrenees from the Basque region to Catalonia (Tarrús i Galter 1999: 115). Three different types of grave entrances have been described: large closed dolmen, the so-called Pyrenean chambers, and tombs with an anti-chamber. The first type includes dolmens with four orthostats of the same size and a capstone on top which is typical for the central plateau in Moaines/Osona. The front stone is not movable and access to the chamber is quite difficult, but can nevertheless be carried out from above. The Pyrenean chambers are tombs whose entrance is formed by a stone slab which is placed in more of a horizontal position than the side orthostats, thus leaving a small access space in the upper part of the tomb. An example of these chambers can be observed in the Dolmen de la Soreda. The last dolmen type has a prominently round anti-chamber, which is built in dry wall technique or with small stone slabs like the dolmen du Salt d´en Peió. The anti-chamber is covered by a capstone, which could be removed to access the chamber. Simple dolmens are rare in the Empordá, a region with mostly passage graves (Tarrús i Galter 1999: 115).

According to Joseph Tarrús I Galter, passage graves originated in Catalonia from the mountain regions l´Albera, Serra de Rodes, and Cap de Creus (Tarrús i Galter 1998, 2002). The most of the early passage grave types are known from there, such as the tombs with a sub-circular or with a trapezoidal chamber. These very early architectural features are absent to the north in the Roussillon and to the south in the Baix Empordà. From the Alt Empordá, which is a coastal area of the Pyrenees, the following four types of passage graves are recorded (Tarrús i Galter 1999: 110): graves with a sub-circular chamber, graves with a trapezoidal chamber, graves with a rectangular chamber, and the galerías catalanes. The tombs with a sub-circular chamber have a small and short passage and are erected in dry wall technique sometimes combined with stone slabs, for example at Fonte del Roure and Arreganyats (Figure 4.14). The tombs with a short or a long trapezoidal chamber are constructed in dry wall technique as well, occasionally combined with stone slabs as found in Les Morelles, Comes Llobes de Pils, and Barrancs. The tombs with a rectangular chamber have a short or a long passage but they have no dry wall elements and are completely built with stone slabs as observed at Ruïnes (Figure 4.8, 4.12), Talaia, and Mas de la Mata. The galerías catalanas are a late appearance of the Final Neolithic and gallery graves, where the passage is an enlargement of the rectangular chamber with the same width as the chamber. These graves are also completely

built with stone slabs, but there are no incorporated dry wall elements. The galerías catalanas are known in all sizes, such as the small Coll de Madas I (Figure 4.5), the medium-sized Rocalba, and the very large Cova d´en Daina (Figure 4.11). The galerías catalanas originated on the coast, but this grave form also spread to the regions where predominately dolmen and cists were constructed (Tarrús i Galter 1999: 110).

On many of the passage graves in the Pyrenees, quite similar rock art was placed together with cup marks on the cap stones of the megaliths. Dozens of cup marks are combined with crosses which possibly represent anthropomorphic figures and thus personate the Neolithic people. Examples for these decorated megaliths are to be found on the French side of the Pyrenees at the dolmens by Fournas and on the Spanish side as well at the Cap de Creus on the dolmen Taula Del Ladres (Figure 4.9) An indication that the rock art and the cup-marks are contemporaneous to the construction and use of the graves and that they are even placed on the cap stones of the graves from the very early stage of megaliths onwards is represented by the tomb from Vinya d´en Berta in the Serra de Rhodes (Tarrús i Galter 1999: 114; 2002). The grave is a small non-accessible ancient dolmen (cista-amb tumúl) with cup-marks, drains on the capstone, and rock art with circles, half-circles, and cup marks combined with crosses or anthropomorphic symbols. The grave was completely covered by an intact tumulus and uncovered by excavations in 1932. Assuming that the covering of the grave by a tumulus occurred contemporaneously or somewhat later than the sepulture, the rock art and cup-marks thus represent a terminus post quem regarding the construction of the tumulus (Tarrús 1999: 114; 2002: 68). Similar rock art with cup marks combined with anthropomorphic figures are also known from many bedrocks in the Pyrenees (Tarrús i Galter 2002: 727–783).

The so-called para-dolmens are almost megaliths. They are formations, in which the chamber is naturally and occasionally formed by stone slabs. Sometimes there are more stone slabs enclosed as an additional architectonic feature and dry walls with a small or a long passage covered by a frontal tumulus (Tarrús i Galter 1999: 116). The majority of these graves are to be found in the Alt-Empordá and in Selva including the para-dolmens Pallera and Tafania (Tarrús i Galter 1999: 116; 2002: 645, 856).

Some of the graves, the so-called grotte-dolmens, are very similar to megaliths and can be considered as semi-megalithic, but they use natural caves as a part of the construction for the burial chamber. The caves are closed with stone slabs or dry walls and a megalithic passage is built from stone slabs, which is covered by a frontal tumulus. Such burials are known from Tossal



Figure 4.5 Coll de Madas I by Catallops. The simple dolmen is part of a small necropolis



Figure 4.6 Estanys I, La Jonquera, dolmen with antechamber



Figure 4.7 Dolmen de la Carena, Cap de Creus from the west



Figure 4.8 Dolmen de les Ruïnes, Cap de Creus from the southwest



Figure 4.9 Dolmen Taula del Lladres, Coastal Pyrenees, simple dolmen with cup marks on the cap stone



Figure 4.10 Vines Mortes I, Cap de Creus. Passage grave with rectangular chamber



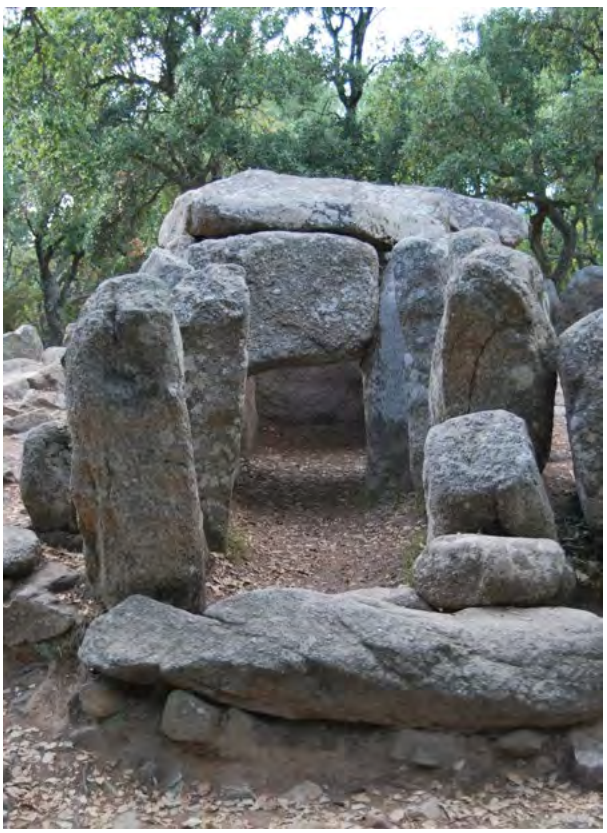


Figure 4.11 Left: dolmen Mas Puig de Caneres, East Pyrenees with a sub-circular chamber, right:gallery Cova d´en Diana, Baix Empordá

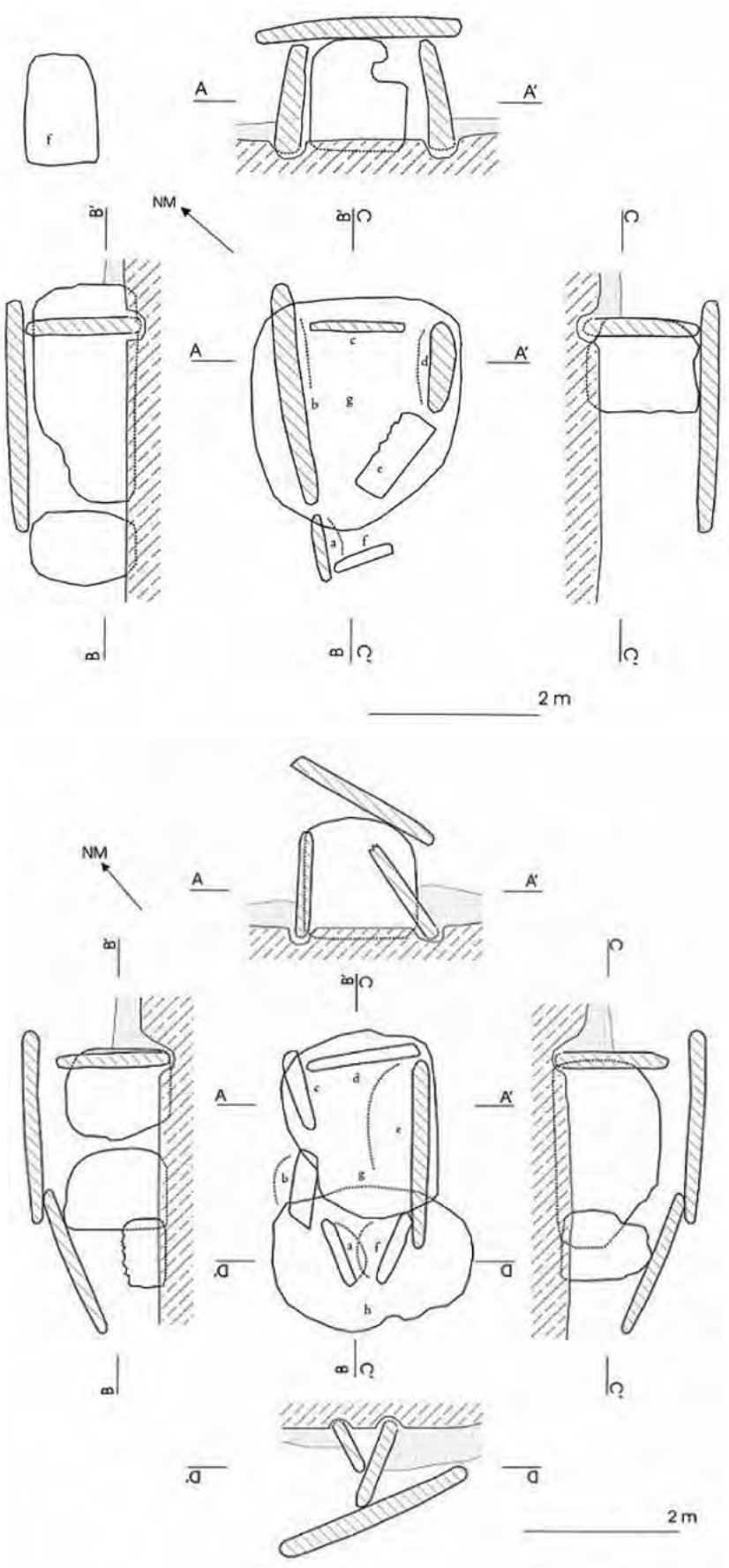


Figure 4.12 Catalonian megalithic graves. Left: dolmen de la Carena (after Tarrús i Galter 2002, Figure 223, right: Dolmen de les Ruïnes, Cap de Creus (after Tarrús i Galter 2002, Figure 222)

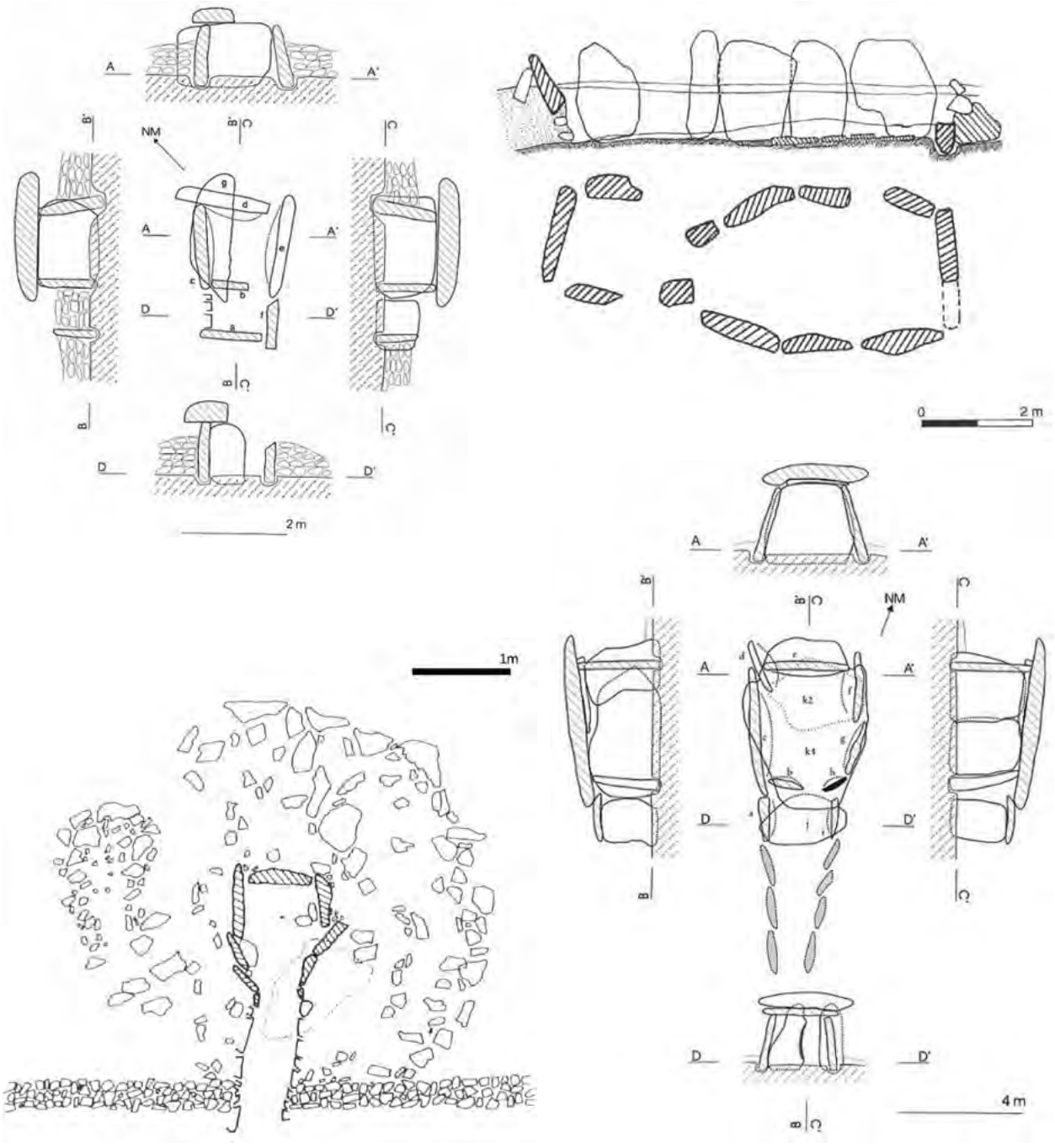


Figure 4.13 Catalonian megalithic graves. Above left: dolmen de Estanys I (after Tarrús i Galter 2002, Figure 69), right: dolmen de Estanys II (Cura/Morera 1996, Figure2). Below left: dolmen de Arrenyats (Cura i Morera/Vilardell 1996, Figure 3) right: dolmen Creu d´En Cobertella (after Tarrús i Galter 2002, Figure 293)

Gros à Toroella de Montgri in the Baix Empordà or in Riera Quarentena in Roses (Tarrús i Galter 1999: 116).

Standing stones are registered for the whole area, whereby many stand in a close spatial relation to graves. Joseph Tarrús i Galter suggests that the time of their erection should already be associated with the first megalithic stages, for example there are standing stones which are combined with passage graves from the Middle Neolithic in the Empordá such as Estanys I (Figure 4.6) and Pedra Gentil. In the Late Neolithic, standing stones were erected in combination with passage graves, for example most likely at Casa Cremada I and II in the Coastal Pyrenees (Tarrús i Galter 2002: 923–924) and with the subterranean cists from Costa del Garrics II (Castanys 1992a, Cruells *et al.* 1992). From the early Chalcolithic, examples of the galería catalana are known, such as Quer Afumat II and the simple dolmen Vinya Monera (Tarrús I Galter 2002: 924). A special feature is represented by the recinto megalithico of Mas Baleta close to the dolmens Mas Baleta I and II in the region of La Jonquera. A standing stone is surrounded there by an ellipse-formed stone circle, 8m long and 4m wide ending in a 3m wide corridor. The presumable Chalcolithic structure



Figure 4.14 Recinto Mas Baleta, La Jonquera from the west

is southwest-oriented and at the west corner a half-circle is connected to the structure. It is surrounded by five circle-formed Iron Age tombs (Figure 4.14) (Tarrús i Galter/Carreras i Vigorós 2006; 2012).

Megalithic structures with radiocarbon sequences and radiocarbon dates

Up to the present day, no sequences and just a few radiocarbon results are available from megalith contexts in Catalonia.

The earliest megaliths, which were already discussed in detail here in chapter 4, p 127-129, are recorded from the Osona/Tavertet region. Since so little data is available, Bayesian methods help to confine the time interval of the archaeological phases or cultural horizons in which megaliths developed for the different regions, for example in the Coastal Pyrenees, the Central Catalonian coast and in hinterland regions such as the Central Pyrenees and the eastern part of the Central Catalonian depression. The first megaliths developed in the Montboló horizon which is defined in the Catalonian hinterland by the dates of Font de la Vena, El Padró II, Cova de Griuteres, Cova del Toll, and Ca l´Oliaire (Figure 4.15).

The dates of Font del Vena and three dates from El Padró are calculated as outliers (cf. 4.2). Thus, the Montboló horizon extends in this region from ~4400 to 4000 cal BC (4581–4267 cal BC, 68.1%; 4722–4068 cal BC, 95.4% and 3977–3826 cal BC, 68.2%; 4047–3716 cal BC, 95.4%).

The ceramic sequence is equally based on the vertical stratigraphy and the phases are partly parallel. Epicardial contexts are registered parallel to the Montboló horizon and the first megaliths, and there are dates proceeding from samples which are connected to Epicardial material available mostly from the caves Cova d´Avellaner, Cova Del Toll, and Cova Del Pastoral (Bosch i Lloret/Tarrús i Galter 1991: 101, Martín 1998).

In the area of the Coastal Pyrenees, the Montboló-Molinot-Empordanià horizon started at ~4500 cal BC and lasted to ~3570 cal BC (4722–4372 cal BC, 68.2%; 4869–4176 cal BC, 95.4% and 3887–3456 cal BC, 68.2%; 3990–3155 cal BC, 95.4%). There are graves similar to the non-accessible ancient dolmen from the Tavertet region existing at the Cap the Creus, but there are neither radiocarbon dates nor material available from these structures. From this region two radiocarbon dates are available from early passage graves with sub-circular chambers, which indicate an early chronological setting of this grave type to the Middle Neolithic in the Coastal and the Pre-Pyrenees (Tarrús i Galter 1999).

From the dolmen de Arreganyats (Espolla) (Figure 4.13), a radiocarbon result is available calibrated and unmodeled to ~3930 cal BC (UGRA-148, 5400±100 BP; 4345–4070 cal

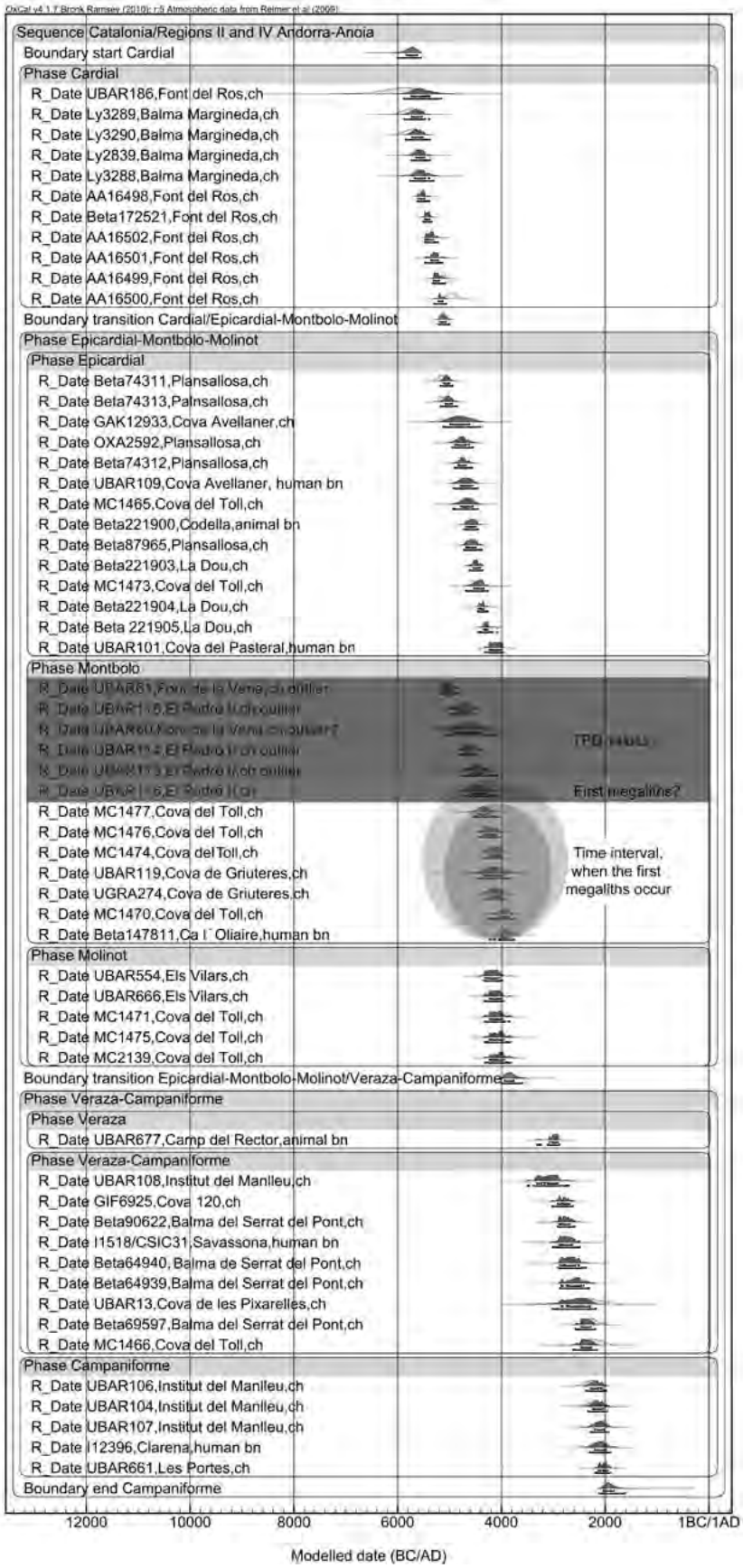


Figure 4.15 Bayesian model with available radiocarbon dates from the Neolithic and the Copper Age, zone II and IV (according to www. telearchaeology. com with the megalith zones East Pyrenees and Central Catalan Depression,where the first megaliths in Catalonia occur. Model agreement: Amodell: 94.7, Aoverall: 94.

BC, 68%; 4448–3993 cal BC, 95.4%) (Tarrús i Galter 1999: 118). In the chamber a lanceolate arrowhead was found which supports the data (Tarrús i Galter 2002: 327). The date from the dolmen de Tires Llargues is positioned in a similar time interval unmodeled to ~3930 cal BC (GAK-12162, 5090±160 BP; 4046–3696 cal BC, 68.2%; 4324–3537 cal BC, 95.4%). The samples were both taken from the base of the corridor. The context of the samples would equally suggest a TPQ-value. Furthermore, a date is available from the dolmen Costa Del Garrics del Caballo I on the Catalan Central plateau Catalan. The radiocarbon result from a human bone is measured to ~3790 cal BC (UBAR-127, 4950±70 BP; 3796–3652 cal BC, 68.2%; 3944–3638 cal BC, 95.4%).

Dating the megaliths on the basis of the artifacts

From the first megaliths in the Tavertet/Osona region, the non-accessible ancient dolmen (cista amb túmul) reveals Montboló material, such as globular vases and vessels with a base bottom, artifacts such as trapezoidal or triangular geometric microliths fabricated from 'blonde' flint, nuclei, blades, bone objects like awls, bracelets and necklaces made from stone and shell, fangs of wild boars, and mills (Cruells *et al.* 1992; Cura i Morera/Vilardell 1996: 319).

To the northwest of the Tavertet group, quite similar constructions developed within the Solsonès group: non-accessible ancient dolmens covered by a tumulus as well as ordinary cists were found under a tumulus. But these constructions are somewhat younger than the graves in the Tavertet region and can be connected to Middle Neolithic material such as triangular microliths, flint blades, bone awls, wild boar fangs, and a few ceramic pieces (Castanys 1992, 1992a; Cura I Morera/Vilardell 1996: 321).

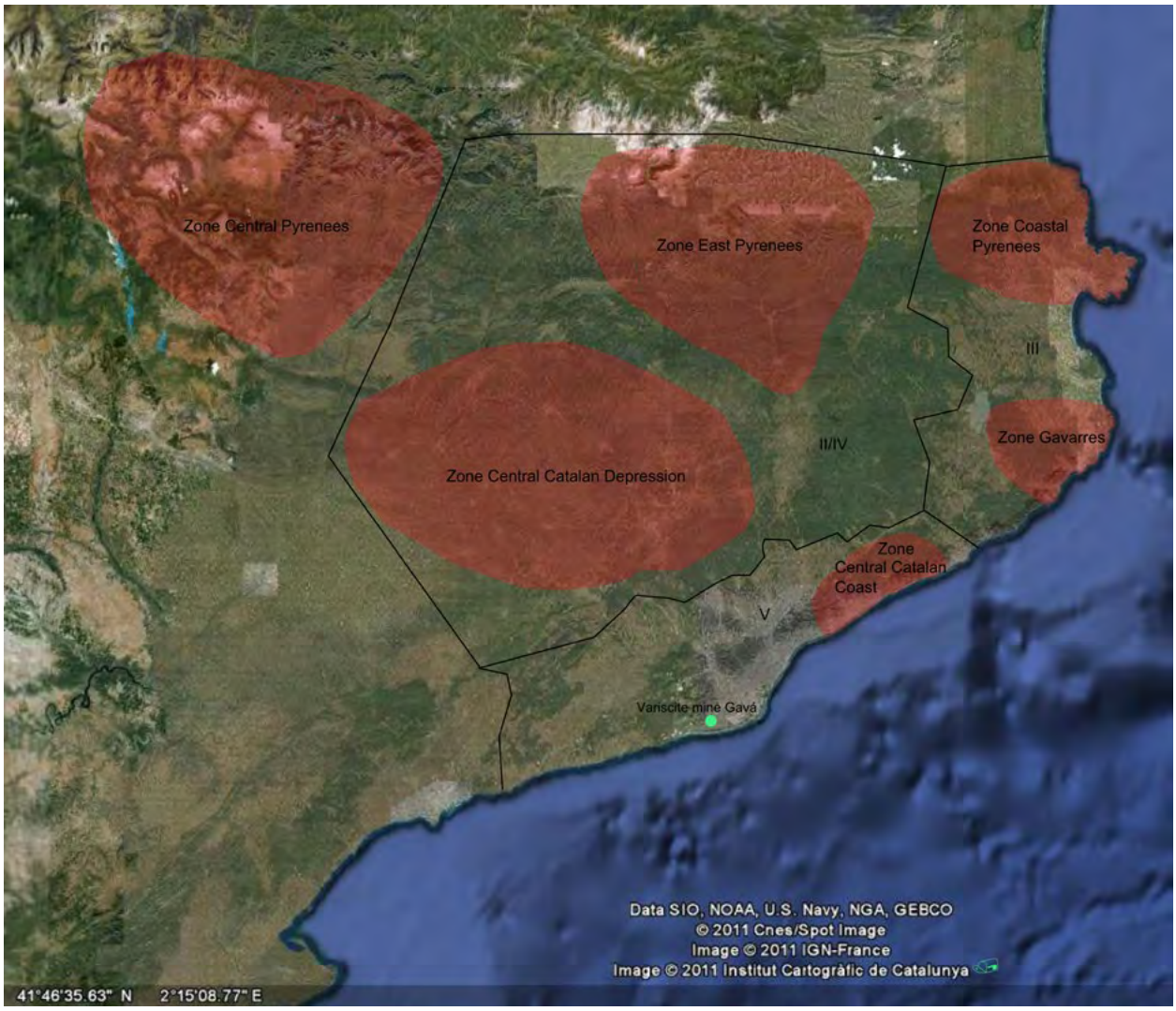


Figure 4.16 The zoning of the available radiocarbon dates in Catalonia according to www.telearchaeology.es. The proposed zoning follows recent landscapes and natural borders. The main megalithic regions are red marked. Map source Google Earth, 20.09. 2011

From Serra de Rhodes, Cap de Creus, and l´Albera, significant material from 30 monuments is available which was analyzed by Joseph Tarrús (Tarrús i Galter 2002: 787–794). The earliest material in the passage graves of the Alt Empordá, such as beads of variscite, is from the Middle Neolithic. The beads from the dolmen Font del Roure are tub-formed and those from Comes Llobes de Pils are cylindrical. Furthermore, trapezoidal geometric microliths and polished ceramics are documented from Estanys II, cylindrical vessels from Col du Barranc and Tires Llargues, and lanceolate arrowheads from Arreganyats and Tires Llargues (Tarrús i Galter 1999: 117).

Material from the beginning of the late Neolithic Veraza period is recorded from passage graves with trapezoidal chambers. Passage graves with rectangular chambers, such as Mas dels Buencs, Talaia, Ruines, or Mas de la Mata are connected with Veraza or with international Bell Beaker material. The same material is found in the galerías catalanes, for example in Na Christiana, Balma Del Moro, Roccalba, Barraca Del Ladre, Cavena, and Vinyes Mortes I (Tarrús i Galter 2002: 924). Veraza material is represented by semi-globular vases, such as those from Gutina, by small bowls with handles from Morelles, and by most of the undecorated vases in the galería catalana Cementiri des Moros de Torrent. Moreover, this material is also represented by polished axes and schist plates from Cabana Arqueta and by petiolated arrowheads and large retouched flint blades from Coll de Madás and Fontanilles (Tarrús i Galter 1999: 117). The first use of older monuments from Bell Beaker people is documented in the Veraza horizon from Tires Llargues, Barraca d´en Rabert, Barranc, Coma Felis, and Coll de Madás I. Maritime international, mixed international, and geometric international Bell Beaker material and international Bell Beaker material with incised circular lines is recorded from Tires Llargues (Tarrús i Galter 2002: 924).

Later Chalcolithic Pyrenean Bell Beaker ceramics are registered from simple dolmens, such as Salt d'en Peio, or from the Pyrenean chambers with a door window, for example from Sureda de Maurellàs (Tarrús i Galter 2002: 789–790, 914). The re-use of older monuments by Bell Beaker people continues so that regional Pyrenean Bell Beaker ceramics are recorded from Coll de Brau, Tires Llargues, Barranc, Barraca d´en Robert, Gutina, Morelles, Comes Llobes del Pils, Cabana Arqueta, Coma de Felis, and the galería catalane Barraca Del Lladre. According to Joseph Tarrús, the high period of the alternative grave styles is represented by the later Chalcolithic with the Pyrenean Bell Beaker graves and they almost entirely replaced the megaliths during the Early and the Middle Bronze Age (Tarrús i Galter 2002: 790; 1998).

The megalithic burial rites

The earliest megaliths in the Tavertet region were quite destroyed by plundering, but nevertheless there is evidence that they were single burials, on the one hand due to their limited size and their architectural composition as non-accessible monuments, and on the other hand due to the anthropological records of El Padró II, where one male adult individual was found inside the chamber in a crouched position (Cruells *et al.* 1992: 244; Molist *et al.* 2007: 63).

More information is available from the necropolis Camp Del Ginèbre (Tarrús i Galter 2002: 854; Vaquer 1998) on the French side of the Pyrenees. In one of the earliest graves, a primary burial of one individual is documented in situ together with four cremated burials and from the east zone of the graveyard three single graves with child burials are documented.

A considerable part of the very early passage graves with sub-circular or trapezoidal chambers in the Empordá were almost entirely emptied by treasure seekers or farmers and there is just sparse fragmented bone material conserved from the following eight graves: Mas Puig de Caneres, Morelles, Barranc, Girarols I, Cabana Arqueta, Vinya del Rey, Devesa, and Roca Miralles (Tarrús i Galter 1999: 118; 2002: 853).

The collective burial tradition or better said a collective use is documented from the Late Neolithic onwards in the dolmen of the Pyrenees central and the Pre-Pyrenees, the passage graves of the Alt Empordá, and the gallery or so-called galerías catalanas graves of the oriental zone (Cámara Serrano 2001; Rincón 1998: 302).

Most bone material is available from the galerías catalanas, for example from Cementiri dels Moros, Turò de Sant Dalmau, and Puig del Moro, where mainly teeth were studied to determine the MNI. From the large galería catalana Cementiri dels Moros, 460 of totally 708 tooth pieces were studied. The MNI of these 460 pieces amounted to 75 individuals. All ages at the time of death could be observed: 8 neonates, 6 infans II, 11 juveniles, 44 adults, 3 matures, and 3 seniles. The determination of the rest of these teeth would give a total MNI of 100–130 persons (Esteva 1978; Tarrús i Galter 2002: 856). The study of the tooth material from the small galería catalana Turó de St. Dalmau and Puig del Moro offered an MNI of 36±6 individuals for Turó de St. Dalmau, including 14 infans, 10 juveniles, 9 adults, 1 senile and for Puig del Moro an MNI of 9 individuals was determined with one infant, 1 juvenile, and 7 adults (Tarrús 2002: 855). Most of these individuals were deposed successively, although some contemporaneous bone depots are likewise recorded. There are traces of emptying and cleaning out the chambers by fire (Tarrús i Galter 1992:119; 2002: 927).

It is possible to consider similar burial rites from simple dolmens, for example at Santes Masses and the para-dolmen Cau-Conniliers: a successive burial practice and a partial secondary manipulation of the bones, e.g. depots from the skulls and from the long bones, are documented. Since a significant taphonomic loss of bones could be recorded for the described cases, it is not possible to determine any minimal number of individuals (Tarrús i Galter 1999: 119). Finally, in the para-dolmen Tafania the remains of five adult individuals, four males and one female, together with Bell Beaker material were recorded. Once more, individual graves were documented with Bell Beaker material, such as grave goods, from the end of the Chalcolithic (Rincon 1998: 302).

Contemporaneous non-megalithic burials

In Catalonia manifold burial forms contemporaneous to the megaliths have been observed. The caves are still in use as burial places. Between the second half of the 5th millennium to the end of the 4th millennium they are less often frequented, but Final Neolithic and Chalcolithic material verifies their later use (Gibaja Bao 2004: 12).

Furthermore, rock-cut tombs, such as those in Solius, the Cova des Moros, and La Tuna, are documented in Catalonia. They are mostly built into the granite bedrock in the coastal area between the Baix Empordá and the Maresme. Most of them do not reveal a constructed corridor out of dry wall or stone slabs as practiced in many regions of the Mediterranean (Tarrús i Galter 1999: 117), for example in Mas Rissec a Llagostera and Tuna al Solius (Tarrús i Galter 2003a: 21), although rock-cut tombs also exist with a megalithic corridor and an entrance in Costa de Can Martorell.

Pit burials are known from the second part of the 5th millennium onwards, e.g. the sepulcros de fosa (Bosch-

Gimpera 1919). They are found isolated or organized in necropolises, for example in Sant Pau del Camp, Hort d´en Grimau, Pujolet de la Moja, Camí de Can Grau, Puig d´en Roca, Pla Del Riu de las Macetas, and the large necropolis Bòbila Madurell with 130 graves (Blasco/Villalba 1997; Cámara Serrano 2001: 45–47; Gibaja Bao 2004: 16–19). Beside 'classical' pit burials, there are also structures existing with a lateral access or pits which are covered by subterranean stone slabs.

From the necropolis Bòbila Madurell (San Quirze del Vallés) Barcelona, four radiocarbon results from human bones are available from ~4410 cal BC to 2630 cal BC (4775–4046 cal BC, 68.2%; 6126–3849 cal BC, 95.4% and 3479–2805 cal BC, 68.2%; 3621–1641 cal BC, 95.4%) (Marti *et al.*1997: 157). This necropolis provided an opportunity to study a homogenous district with these graves, the grave goods, and the interrelationship between sex and age (Blasco/Vilalba 1997: 89; Cámara Serrano 2001: 44). Variscite pearls are the only prestige element in these graves and generally it can be stated that in graves of the males more grave goods were buried along with a notable part of animals or animal parts. Male individuals and children had flint nuclei, polished axes, and geometric microliths added as grave goods (Martín *et al.* 1996). In the graves of females and children, more skin working tools, e.g. awls, were recorded. Variscite platelets are only known for child's graves. The child's graves in Bòbila Madurell also show differences in their equipment. In one grave approximately 100 variscite pearls were buried along with a child (Blasco/Vilalba 1997: 95; Cámara Serrano 2001). The grave goods from Sant Pau del Camp consisted of variscite and lignite pearls, axes, blades, flaxes, meal stones, bone awls, and macro rests (Gibaja Bao 2004: 14).

Contemporaneous to the megaliths, burials are recorded with subterranean cists in the Solsonès, which are usually covered by an earthen tumulus, for example in the graves of Costa dels Garrics Del Caballo II, Estactó Del Llord, Santes Creus Del Bordell, Colliles and La Trinxera. There is a date available from Costa dels Garrics Del Caballo II from a human bone pinpointed at ca. 3660 cal BC (3762–3526 cal BC, 68.2%; 3933–3377 cal BC, 95.4%) (Castanys 1992, 254).

From the variscite mine Tinto Cantorer in Gavà, Barcelona burials in old galleries are recorded from the end of the 5th to the middle of the 4th millennium (Gibaja Bao 2004: 19; Villalba *et al.* 1992). Some of these burials are collective graves with few grave goods. Others, such as burial 83, are single burials with more grave goods. This burial included ceramics, flint nuclei, blades, geometric microliths, an obsidian blade, three axes, bone tools, and a collier with variscite pearls.

Pits covered by an earthen tumulus or a stone tumulus are referred to as hémi-dolmens and include a capstone, sometimes even decorated and mounted on the top of the tumulus. Mainly Bell Beaker material is documented for these graves (Tarrús i Galter 1999: 117).

Conclusion

The earliest megalithic stage in Catalonia and on the North East Iberian Peninsula is represented by non-accessible ancient dolmens (cista amb túmul) in the Tavertet/Osona region. These graves could be dated by evaluating and re-sorting the available radiocarbon dates for the Montboló material in the graves, and by narrowing the time interval of the Montboló contexts in this area at the earliest to 4400 cal BC or even somewhat later. The Tavertet graves are covered by monumental labor-intensive tumuli, which are up to 22m in diameter and stand in no relation to the comparatively small chambers. The tumuli represent the collective efficiency of a community. They can be classified as single or double burials due to the limited size of their chambers and to the record of El Padró II with the conserved bone material of an adult individual in situ in a crouched position. Furthermore, this was a single burial act, since the chambers consist of four side stones and a cover stone with no access. Once closed and covered by the tumulus, the graves were not easily reopened.

There are similar structures known from other parts of Catalonia, for example in the Alt Empordá, the coastal Pyrenees, and the Solsonès region. The graves from the Alt Empordà and the coastal Pyrenees are only dated by their architectural similarity to the Tavertet graves, since there is no available material or radiocarbon dates. The graves in the Solsonès region seem to be somewhat younger.

Contemporaneous to this first monumental proliferation are burials documented in caves and pits. For some of these contemporaneous burials in caves, a burial costume, which is to be considered for the region from the beginning of the 5th millennium onwards, is recorded for Epicardial contexts and groups with an Epicardial life style. These societies are - approximately 450 y until the first century of the 4th millennium - coactive to the people with the new megalithic burial tradition and maybe even a new system of their society. Contemporaneous pit burials are known from the central Catalan coast and they are forerun, on their part, by the burials at the South Catalan Coast on the mouth of the Ebro River. The necropolis of Bòbila Madurell provides some evidence for a social stratification of the buried community with variscite as an element of prestige.

The first evidence of grave accessibility and thus an alteration of burial rites and the possibility of collective graves and successive burial practices is documented

from the first century of the 4th millennium onwards from passage graves with a sub-circular chamber in the Alt Empordá. The morphology of the passage graves changed around the middle of the 4th millennium to trapezoidal chambers and during the end of the 4th millennium to rectangular chambers and to gallery graves, the galerías catalanas. There is not much bone material available, but it is nevertheless possible, especially for the gallery graves, to postulate a successive burial practice. Some contemporaneous bone depots are likewise recorded and traces of emptying and cleaning out the chambers by fire are available as well. There is evidence for a normal demographic composition of the individuals in the graves and all ages at death could be determined from Cementiri dels Moros, Turò de Sant Dalmau, and Puig Del Moro.

From the Chalcolithic onwards and during the 3rd millennium cal BC, simple dolmens are the most often built megalithic type in the entire Pyrenees and, generally said, a simplification of the grave architecture occurred subsequently. The re-use of nearly all accessible megalithic types during the Bell Beaker period is recorded from ~2800 cal BC onwards. Furthermore, individual graves with Bell Beaker material as grave goods are again documented from the end of the Chalcolithic.

There is no evidence for special communal megalithic structures in Catalonia. A possible exception is represented by Mas Baleta III, a stone circle with a standing stone close to La Jonquera in the Alt Empordá. But the age of this structure has not yet been clearly determined.



Figure 4.17 The main pre-megalithic sites and early megaliths mentioned in the text (chapter 4, p. 127-129).

1. Variscite mine Tin Cantorer/Gavà, 2. Cova de Avellaner, 3. Cova de Can Sadurní, 4. The Cova de Griuteres, 5. The Cova del Pasteral, 6. The Cova dels Lladres, 7. Barranc d´en Fabra, 8. Masdenvergenc, 9. Mas Benita, 10. Font de la Vena, 11. El Padró, 12. Rajols, 13. La Rambla, 14. St. Corneli, 15.Tomba del General, 16. Pla de les Gates, 17. Puig Alt, 18. Puig Rodó, 19. Cista de Canyelles, 20. Cista de la Vinya d´en Berta, 21. Cista de la Sureda.

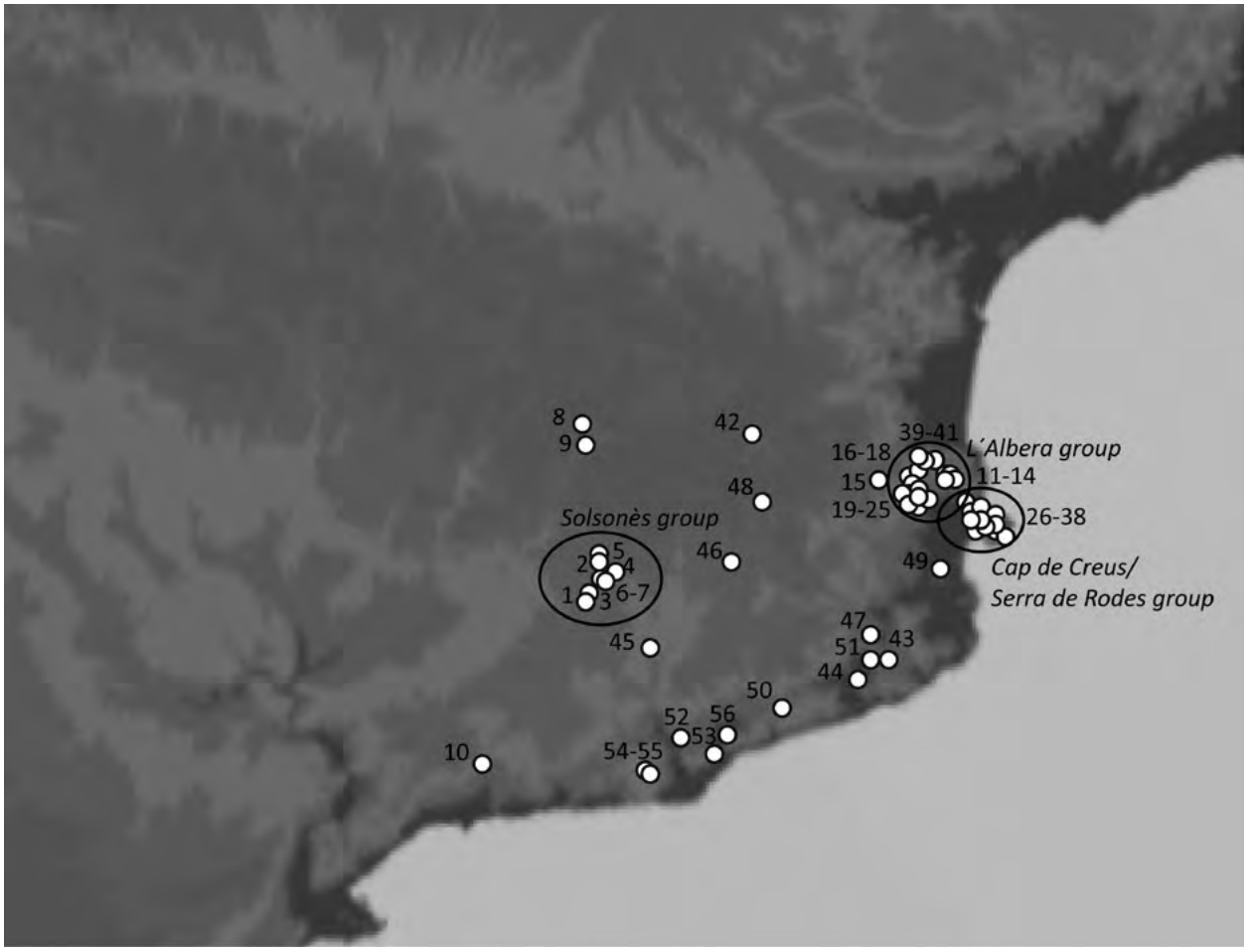


Figure 4.18 The main sites mentioned in text (chapter 4, p. 149-142).

1. Costa del Garrics del Caballo, 2 Estació del Llord, 3. Santes Creus del Bordell, 4. Collies, 5. La Trinxera, 6. El Solar, 7. Ceuró, 8. Feixa Del Morro, 9. Carni des Casais, 10. Dolmen du Mas Pla de Vallderossa, 11. Fonte del Roure, 12. Dolmen de Arreganyats, 13. Dolmen de Tires Llargues, 14. Cau Conilliers, 15. Dolmen de Mas Puig de Caneres, 16. Estanys I-III, 17. Coll de Madas I-III, 18. Dolmen de Estanys I-III, 19. Dolmen de Salt d'en Peio, 20. Dolmen de Morelles, 21 Dolmen de Coma Felis,22. Dolmen Mas dels Buencs, 23. Barraca Del Lladre, 24. Menhir Quer Afumat II, 2. Dolmen Vinya Monera, 26. Vinyes Mortes I, II, 27. Dolmen de Ruïnes, 28. Dolmen de Talaia, 29. Mas de la Mata, 30. Comes Llobes de Pils, 31. Dolmen Taula del Ladres, 32. Dolmen de la Carena, 33. Dolmen de Morelles, 34. Vinya del Rey, 35. Dolmen de la Sureda I, II, 36. Col du Barranc, 37. Menhir Casa Cremada I and II, 38. Pallera, 39. Dolmen Na Christiana, 40. Dolmen Balma Del Moro, 41. Dolmen Coll de Brau, 42. Sureda de Maurellàs, 43. Cementiri dels Moros, 44. Cova d´en Daina, 45. Cova del Toll, 46. Ca l´Oliaire, 47. Turó de St. Dalmau, 48. Puig del Moro, 49. Tafania, 50. Costa de Can Martorell, 51. Mas Rissec a Llagostera, 52. Bòbila Madurell, 53. Sant Pau del Camp, 54. Hort d´en Grimau, 55. Pujolet de la Moja, 56. Camí de Can Grau.

Table 4.1 Radiocarbon dates from Catalonia

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Balma del Serrat del Pont, Garrotxa						
Beta64939	Settlement, rock shelter		ch	4020	100	Alcalde et al. 1997
Beta64940	Settlement, rock shelter		ch	4100	100	Alcalde et al. 1997
Beta69597	Settlement, rock shelter		ch	3840	90	Alcalde et al. 1997
Beta90622	Settlement, rock shelter		ch	4200	70	Alcalde et al. 1997
Balma Margineda, Andorra						
L 3290	Settlement, rock shelter		ch	6820	170	Guilaine 1995, 255
Ly2839	Settlement, rock shelter		ch	6670	120	Guilaine 1995, 255
Ly3288	Settlement, rock shelter		ch	6640	160	Guilaine 1995, 255
Ly3289	Settlement, rock shelter		ch	6850	160	Guilaine 1995, 255
Bòbila Madurell, Alt Penedès						
UBAR-405	Pit burial	7.7	human bn	4880	173	Martí et al. 1997, 157
UBAR-443	Pit burial	Tomb E	human bn	4560	80	Bordas et al. 1994
UBAR-401	Pit burial	Sepulture G10	human bn	5540	450	Martí et al. 1997, 157
UBAR-442	Pit burial	Sepulture G17	human bn	5310	90	Martí et al. 1997, 157
Ca l'Oliaire, Berguedà						
Beta147811			human bn	5080	80	Martín et al. 2007, 182
Camp del Rector, Anoia						
UBAR677	Settlement		human bn	4355	55	Font 2001
Can Roqueta II, Vallès Occidental						
UBAR-697	Hypogeum	Hypogeum CRII-459A-3	human bn	3465	60	http://www.telearchaeology.com/c14, 14.01.2011
UBAR-670	Hypogeum	Hypogeum CRII-70B2	human bn	3370	50	http://www.telearchaeology.com/c14, 14.01.2011
UBAR-671	Hypogeum	Hypogeum CRI-222B-2	human bn	3305	55	http://www.telearchaeology.com/c14, 14.01.2011
UBAR-797	Pit burial	Multiple inhumation in pit CRII-481	human bn	3500	45	http://www.telearchaeology.com/c14, 14.01.2011
UBAR-673	Pit burial	Multiple inhumation in pit CRII-634	ch	3360	60	http://www.telearchaeology.com/c14, 14.01.2011
Can Roqueta/Torre de Romeu, Vallès Occidental						
UBAR-863	Hypogeum	Hypogeum CRTR-151	human bn	3530	40	http://www.telearchaeology.com/c14, 14.01.2011
Can Sadurni, Begues						
I-13315/12717	Cave	Layer C9	ch	4100	70	Edo et al. 1986, 41
I-11533	Cave	Inhumation	human bn	4225	90	Edo et al. 1986, 41

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Carrer Paris, Vallès Occidental						
UBAR-817	Hypogeum, paradolmen	UE-15	ch	4110	60	http://www.telearchaeology.com/c14, 14.01.2011
UBAR-860	Hypogeum, paradolmen	UE-1	human bn	3870	45	http://www.telearchaeology.com/c14, 14.01.2011
Cau d´en Calvet, Baix Empordà						
UBAR-243	Cave	Bone layer	human bn	4100	60	Pons et al. 1989, 27
Cau de la Guineu, Bages						
UGRA-156	Cist		human bn	4040	110	Castany 1987
Clarà, Solsonès						
UBAR-838	Dolmen	DC-04 AA	ch	2685	40	http://www.telearchaeology.com/c14, 14.01.2011
Clarena, Bages						
I12396	Tumulus	Chamber grave 1	human bn	3700	100	http://www.telearchaeology.com/c14, 14.01.2011
Codella, Garrotxa						
Beta221900			animal bn	5720	60	http://www.telearchaeology.com/c14, 14.01.2011
Coll de Madas, Cantallops						
Vgra-158	Gallery grave	Multiple inhumation in pit	human bn	440	100	Cassen et.al. 1996, 515; Müller 1998, 87
Costa de Can Martorell, Maresme						
Ly-7837	Hypogeum, paradolmen	Chamber	human bn	3810	55	Mercadal 2003, 221-228
Ly-7838	Hypogeum, paradolmen	Access	human bn	3795	55	http://www.telearchaeology.com/c14, 14.01.2011
Costa dels Garrics de Caballol i Pinel						
UBAR127	Cist under tumulus	Burial		4950	70	Martín 1998, 786
Cova 120, Garrotxa						
GIF-6925	Cave, pit burial	Layer 3	ch	4240	70	Agustí et al. 1987
Cova Cervereta, Baix Ebre						
UBAR-503	Cave	Inhumation	human bn	3540	130	http://www.telearchaeology.com/c14, 14.01.2011
Cova de l´Avellaner						
UBAR-109	Cave	Sepulture in cave 3a	human bn	5830	100	Bosch i Lloret/Tarrús i Galter 1991, 101
GaK-12933	Cave		human bn	5920	180	Bosch i Lloret/Tarrús i Galter 1991, 101
Cova de Griuteres, Tavertet, Osona						
UBAR119	Settlement		ch	5300	180	Castany 1995, 88
UGRA274	Settlement		ch	5280	90	Castany 1995, 88
Laboratory	**Architecture/Location**	**Context**	**Material**	**Radiocarbon Age (BP)**	**STD**	**Bibliography**

Cova de la Font del Molinot, Alt Penedès						
C-1112	Cave	Layer 5	ch	4650	60	Martín/Mestres 2002
Cova de las Encantades de Martis, Pla der l´Estany						
MC-1021	Cave		bone	3570	250	Bosch 1992
MC-1022	Cave		human bn	4480	250	Bosch 1992
Cova de les Pixarelles, Tavertet, Osona						
UBAR13	Settlement		ch	3940	220	Àlvarez /Rauret 1996
Cova del Frare, Vallès Occidental						
MC-2297	Cave	Y35-C4	ch	4450	100	Martín/Mestres 2002
Cova del Lladres, Vallès Occidental						
UBAR63	Cave		human bn	5330	90	Ten 1980
Cova del Pasteral, Girona						
UBAR101			human bn	5270	70	Bosch i Lloret/Tarrús i Galter 1991, 101
Cova del Toixò, Alt Penedès						
UBAR-408	Cave	Layer IV	human bn	4740	70	Nadal et al. 2001
Cova del Toll, Bages						
MC1465	Settlement		ch	5810	100	http://www.telearchaeology.com/c14, 14.01.2011
MC1466	Settlement		ch	3800	120	Guilaine et al. 1982
MC1470	Settlement		ch	5100	100	Martín 1998, 783
MC1471	Settlement		ch	5240	100	Martín 1998, 783
MC1473	Settlement		ch	5590	100	Martín 1998, 783
MC1474	Settlement		ch	5300	100	Martín 1998, 777, 783
MC1475	Settlement		ch	5220	100	Martín 1998, 783
MC1476	Settlement		ch	5400	100	Martín 1998, 777
MC1477	Settlement		ch	5490	100	Martín 1998, 777
MC2139	Settlement		ch	5210	90	Martín 1998, 777
Coveta del Marge del Moro, Baix Llobregat						
Beta-125440	Cave, paradolmen	Tumulus 1	human bn	4160	90	Edo et al. 2004
Vgra-148	Passage grave	Ancient soil, corridor	human bn	5400	100	Cassen et. al 1996; 515, Müller 1998, 87
Dolmen de Tires Llargues, Empordania						
GaK-12162	Dolmen	Ancient soil	human bn	5090	160	Tarrús i Galter 1988, 45

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
El Llord, Vallès Occidental						
UBAR-362	Pit burial		human bn	4290	130	http://www.telearchaeology.com/c14, 14.01.2011
El Padró II, Tavertet						
UBAR113	Non-accessible ancient dolmen	Montboló	ch	5600	130	Cruells et al. 1992, 245
UBAR114	Non-accessible ancient dolmen	Montboló	ch	5770	80	Cruells et al. 1992, 245
UBAR115	Non-accessible ancient dolmen	Montboló	ch	5870	100	Cruells et al. 1992, 245
UBAR116	Non-accessible ancient dolmen	Montboló	ch	5580	130	Cruells et al. 1992, 245
Els Garrofers del Torrent de Sta. Maria, Garraf						
UBAR-100	Circular tomb	Chamber	human bn	5100	100	Martín/Miret 1990
Els Vilars, Sant Martí De Tous						
UBAR-554	Settlement	Level IV	ch	5340	90	Clop et al. 2005, 557
UBAR-666	Settlement	Level IV	ch	5280	90	Clop et al. 2005, 557
Feixa del Moro, Andorra						
Vgra-15?	Dolmen/cist		human bn	4930	170	Cassen et. al 1996; 515, Müller 1998, 87
Font de la Vena, Osona, Tavertet						
UBAR60	Non-accessible ancient dolmen	Montboló	ch	5780	290	Cruells et al. 1992, 245
UBAR61	Non-accessible ancient dolmen	Montboló	ch	6190	100	Cruells et al. 1992, 245
Font del Ros, Berguedà						
AA16498	Settlement		ch	6561	56	Bordas et al. 1995, 402-403
AA16499	Settlement		ch	6243	56	Bordas et al. 1995, 402-403
AA16500	Settlement		ch	6058	79	Bordas et al. 1995, 402-403
AA16501	Settlement		ch	6307	68	Bordas et al. 1995, 402-403
AA16502	Settlement		ch	6370	57	Bordas et al. 1995, 402-403
UBAR186	Settlement		ch	6980	390	Bordas et al. 1995, 402-403
Fontanilles, Alt Empordá						
GaK-12934	Passage grave	Chamber entrance	ch	3180	70	Tarrús i Galter 2002, 45
Institut de Manlleu, Manlleu, Osona						
UBAR104	Settlement		ch	3760	90	Boquer et al. 1995
UBAR106	Settlement		ch	3810	90	Boquer et al. 1995
UBAR107	Settlement		ch	3700	80	Boquer et al. 1995

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Institut de Manlleu, Manlleu, Osona						
UBAR108	Settlement		ch	4400	120	Boquer et al. 1995
La Dou, Garroxa						
Beta 221905	Settlement		ch	5450	50	http://www.telearchaeology.com/c14, 14.01.2011
Beta221903	Settlement		ch	5660	50	http://www.telearchaeology.com/c14, 14.01.2011
Beta221904	Settlement		ch	5520	50	http://www.telearchaeology.com/c14, 14.01.2011
Les Portes, Solsonès						
UBAR661	Settlement, cave		ch	3630	55	Castany et al. 2005, 21-43
Les Maioles, Barcelona						
UBAR558	Dolmen	Individual E	human bn	3475	50	Clop/Faura 2002
UBAR559	Dolmen	Individual A	human bn	3475	50	Clop/Faura 2002
UBAR560	Dolmen	Individual B	human bn	3475	50	Clop/Faura 2002
Llanera, La Segarra						
MC-1113	Gallery grave	Tumulus	human bn	2550	90	Cassen et. al 1996; 515, Müller 1998, 87
Plansallosa, Garroxa						
Beta74311	Settlement		ch	6180	60	Bosch et al. 1998, 26-28
Beta74312	Settlement		ch	5870	60	Bosch et al. 1998, 26-28
Beta74313	Settlement		ch	6130	60	Bosch et al. 1998, 26-28
Beta87965	Settlement		ch	5720	70	Bosch et al. 1998, 26-28
OXA2592	Settlement		ch	5890	80	Bosch et al. 1998, 26-28
Pujolet de Moja, Alt Penedès						
Beta-2852	Pit burial	Pit E-13	human bn	4690	100	Mestres et al. 1997
Reguers de Seró, Lleida						
Beta-230406	Cist in tumulus	RGS07-125	human bn	4150	40	http://www.telearchaeology.com/c14, 14.01.2011
Savassona, Osona						
I-1518/CSIC-321	Pit burial	Sepulture	human bn	4180	100	Muñoz 1972
Tafaina, Barcelona						
UBAR246	Dolmen		human bn	3300	50	Bosch et al. 1993

Chapter 5

Southern France

Summary: A similar early megalithic stage as in Catalonia is observable for Southern France in the last third of the 5th millennium cal BC. Ancient non-accessible dolmens covered by tumuli and partly arranged to small necropolises are associated to the Chassean horizon. From the Recent and Final Neolithic onwards megalithic graves were built in the form of dolmens, passage and gallery graves. The megalithic grave is either not the exclusive grave form in this region. Manifold contemporaneous structures and burial sites, such as subterranean cists, hypogea, natural caves, and rock shelters were in use as collective graves for successive burials.

Pre-megalithic structures and pre-megalithic funeral rites in Southern France

The Early Neolithic societies in Southern France buried their dead in pit burials, mostly in caves and under rock shelters, but also sporadically in the open air. Several caves and rock shelters do offer evidence for interments of this time horizon as in the Cova de l´Esprit in the Pyrenees (Abelenet/Charles 1964; Beyneix 1997), the Languedoc la Baume Bourbon in the Gard, the Grotte Sicard in the Chateauneuf-les-Martigues, La Grotte de Riaux in Marseilles, and in the Grotte de l´Adaouste in Jouques. Such burials are also observed in the Provence in the Grotte de Uang in the Vaucluse, the Grotte de Fontbregoua in the Var, and the rock shelter de Pendimoun in the Alpes-Maritimes (de Labriffe *et al.* 2007, 27–30). At most of these sites, several individual graves in simple pits were found with the dead buried in a crouched position. These burials are particularly edged by stone blocks or slabs, for example in Pendimoun (Binder *et al.* 1993). Furthermore, dispersed human remains are documented in the caves and rock shelters, either as possible secondary bone deposits or as a result of post-depositional processes.

Early Neolithic open air pit burials are not frequent. In Roussillone Sud (Jallot 2001), two pits with the inhumations of an adult and a child are documented. Additionally, similar pit burials are registered at le Moulin au Barret-de-Lioure and Col Saint-Anne in Simiane-Collongue (Beyneix 1997: 195). Evidence of ochre as an element of the burial rites is observed in the pit burial of Col Saint-Anne, where the body of an approximately 40 year-old woman in classical stretched position was buried together with a few ceramics, flint blades, and covered by ochre (Courtain 1986).

During the Middle Neolithic, the dead were still buried in pits within caves, rock shelters, and in the open air, although the pits are in part more elaborated. Many of the graves were constructed by digging a pit of an appropriate size directly into the ground. Others were dug as pear-formed pits, in which the basement is broader than the opening as in storage pits. Thus, these graves may simply represent the re-use of the storage pits. A special regional appearance restricted to the eastern Languedoc and mostly in the Nîmes region are pit burials with a side niche. These are documented from three sites in Nîmes, namely Esplanade Sud, Forum Kinepolis, and Parc George Basse II and additionally in Les Crès at Bézies. The dead were deposited in the side niches as single burials in a crouched position. The side niches are distinguished from the main pits by stone slabs (de Labriffe *et al.* 2007: 31). Six of these burials are known in Crès with few grave goods from the Chasséen horizon, including transverse arrowheads, a variscite pearl, and grinding material. Some of these Middle Neolithic burials might have been contemporaneous to the first megaliths, but for a further classification the required radiocarbon results are lacking.

In the Provence, single burials were equally common in pre-megalithic times, i.e. before the Final Neolithic. The dead were buried in the open air or in caves, but generally more often at open air sites and also within settlements. These individual inhumations were frequently, but not exclusively buried in ancient settlement structures such as pits, silos, and wells (Sauzade 2013, forthcoming). Within the settlement Martins in Roussillon in the Vaucluse, (D´Anna 1993) several pits from the Chasséen or the Final Neolithic horizon are documented. Four of these pits contained the remains of one individual. The same is registered from Vallon de Gaude in Manosque, Alpes-de-Haute-Provence (Bérard *et al.* 1991). Each of the three pits contained one individual. Successive deposits often with two individuals are observed in wells re-used as burial space. In these cases, the deposited individuals were frequently incomplete, for example in the well of Héritière II in Vernègues, Bouches-du-Rhône (Chapon *et al.* 2002). In contrast, two articulated skeletons in different layers of the filling are documented in the well of Coustelet in Cabrières-in Avignon (Gagnière/Vareilles 1931).

Despite several cases with double or multiple burials for a small group of persons, for example a family in the Provence, no grave from the pre-megalithic Chasséen horizon fulfills the criteria for a collective burial so

far. Although the inhumation in the cave Délubre in Vauvenargues Bouches-du-Rhône (Cheylan/Cheylan 1972) is known as Chasséen and as a collective grave, by a closer consideration both the non-homogeneous graves goods and the high number of individuals indicate a burial from the Final Neolithic (Sauzade 2014). One site, however, could correspond to a family collective funerary structure. It is a small pit from the Chasséen horizon measuring 1m x 0,80m with a depth of 0,60m in the settlement Clavelles à Lurs, Alpes-de-Haute-Provence (Muller 1988). This pit contained the remains of 5 individuals, including 3 children and 2 adults, successively deposited in 3 or 4 layers. There is evidence for two simultaneous deposits of 2 children, separated by a sediment layer from the third deposit, which contained the remains of a possible third child. A fourth deposit, strongly damaged by plowing activities, is comprised of 2 adults in a stretched position that were buried simultaneously or successively (Sauzade 2014).

There are a few documented examples of pre-megalithic cremations, a burial practice which will become common in the Final Neolithic in megalithic contexts primarily in the North Provence (cf. chap. 5, p. 163-164) (Sauzade 1983a; Vaquer 1998; Sauzade 2014). Thus, from the Middle Neolithic site Bagnoles on the L´Isle-sur-la-Sorgue, Vaucluse fragmented and burnt human bones are documented (Sargiano *et al.* 2010). In Vallon in Gaude, one of the funeral pits contained burnt human bones together with lithic objects such as axes and arrowheads, some of which were exposed to fire. The pit contained charcoal and ashes, but the individuals were cremated on a pyre outside. Moreover, the structures FS 47 and FS 48 of the Middle Neolithic site Bagnoles on the L´Isle-sur-la-Sorgue in the Vaucluse delivered fragmented and burnt human bones (Sargiano *et al.* 2010). Evidence for this exceptional Middle Neolithic practice is further documented in the Provence from La Bastidonne in Trets (Escalon/Palun 1955), where inhumations and incinerations co-existed, and in the Plaine de Trets with silos which contained cremated human remains (Escalon 1961).

Transition to the megalithic structures and the emergence of megaliths

The first or transitional megalithic stage in Southern France is represented by ancient non-accessible dolmens and structures aboveground from the Middle Neolithic Montbolo or Chasséen horizon. In the literature these are all nominated as cists or coffre and there is partly no division between subterranean or structures aboveground. These graves are either organized in small necropolises or are isolated in the landscapes, and the graves are partly surrounded by stone circles or pavements and covered by round tumuli. In the western region of Southern France these graves are situated in hilly or mountainous regions with available building material and they are additionally situated on the plains, such as the necropolis Camp del Ginèbre, and on very elevated places, such as Catllar, Arca de Calahons, and Najac.

The necropolis Camp del Ginèbre in Caramany is one of the most important sites from the Middle Neolithic Montbolo horizon regarding the emergence of monuments in Southern France. 23 funeral structures are agglomerated within eight stone structures and on the same burial place both simple stone cists completely dug into the ground and monuments built aboveground can be observed. The monuments aboveground are cists and ancient non-accessible dolmens, both covered by a round stone tumulus (Vaquer 1998: 176; Vaquer 2007: 16–17; Vignaud 1993; 1998;) (Figs. 5.1,5.2).

Two or originally three ancient non-accessible dolmens are surrounded by a round stone pavement, originally the basement of a tumulus mixed of stone and earth. These tumuli measure between 6m and 7,30m and retain a present height of 0,60m. Unfortunately, the bones are badly preserved. Smaller graves are grouped around these graves. These are cists incorporated into pits, covered by stone tumuli, and they contained the poorly preserved remains of children. In a destroyed part of the necropolis, further small cists are registered. It can no longer be determined, if they were also originally covered by a tumulus. These stone graves seem to have been built for inhumations. There is also evidence for cremations on the site, grouped in zone 1 and 2 of the necropolis. In zone 1 the cremated human remains are covered by a stone tumulus, similar to the ones covering the cists. The burnt bones in zone 2 are buried in small pits, measuring 0,40m on average. Those cremations were practiced both in situ in the pits or on a pyre outside the graves (Vaquer 1993; 2007: 17; Vignaud 1998). There are three radiocarbon results available. A charcoal sample from structure 11 gave a result from ~4327–4051 cal BC (95.4%, 4319–4072 cal BC, 68.2%; Ly-226, 5335±45 BP). The measurement of a bone sample from grave 2 ranges from 4039–3715 cal BC (95.4%; 3967–3802 cal BC, 68.2%; Ly-267, 5100±40 BP). The grave goods in all the different burial forms are associated to the Montbolo and to the ancient Chasséen horizon and so to the second part of the 5th millennium. The second bone sample from grave 1 (3305± 60 BP, 1663–1512 cal BC, 68.2%; 1738–1451 cal BC, 95.4%) is evidence for a later subsequent use of the chambers, which is also indicted by glass pearls (Vaquer 2007: 17).

The grave L´Arca de Calahons in Catllar in the Pyrenees is a non-accessible dolmen covered by a tumulus. The bones are not preserved, but a typical Chasséen mobiliar, such as discoid pearls in schist and variscite, five transverse arrowheads, and a quartz flake, were recovered. A similar grave is registered nearer to the

coast at Arca de la Font Roja in Caixas (Abelanet 1970, 1970a; Vaquer 2007: 15).

In the Hérault another Middle Neolithic necropolis with five graves is registered with Najac in Siran (Mahieu 1992) (Figure 5.3, 5.4). According to the classification of this analysis, the graves remaining today are ancient non-accessible dolmens. Since these graves are built on a slightly northeast-southwest slope, we have to take the possibility into consideration that the graves were originally completely incorporated into the ground and lay open today through erosion processes. In four of these graves, single burials in a crouched position are observed. In chamber 2, three individuals are successively deposited in three layers.

Three radiocarbon dates (Erl-12289, 5354 ± 50 BP; Erl-12290, 5265 ± 50 BP; Erl-12291, 5268 ± 50 BP) from a time interval from 4328–3979 cal BC (95,4%; 4318–3995 cal BC) indicate that these individuals were buried contemporaneously or with short time-delays at the end of the Early Chasséen (Le Bras-Goude *et al.* 2012).

Stable isotope values are available from four individuals (Le Bras-Goude 2012: 3). The δ13C values vary between -19.8 and -19.5‰, and the δ15N values between 10.3 and 8.7 ‰ indicate a terrestric diet and thus no reservoir effect on the bone material.

The graves contained diagnostic Chasséen material, including a ceramic plate with lozenge-decor on the rim or vessels with a perforated ledge. Moreover, bone needles, iangular transverse arrowheads, a schist plate, and flint tools made of white silex were found.

To the east another Middle Neolithic structure is documented by Boujas, Aigne in the Hérault (Taffanel *et al.* 1975: 16). A clear aboveground non-accessible dolmen was covered by a tumulus and surrounded by a stone circle (Figure 5.5). Four similar graves are registered on the Causse de Blandas, for example the Ciste de Lacam, but there is no Chasséen material available from these graves to confirm an association to the Middle Neolithic (de Labriffe *et al.* 2007: 33).

In the Cévennes and in the Chausse, numerous subterranean stone structures and small monuments aboveground are described. These were often organized in necropolises. The most of them remained undated until today, not least because many of the structures and monuments were excavated in the early days of archaeology with insufficient documentation. There is evidence for these burial forms from the Middle Neolithic to the Middle Ages. Some potentially Middle Neolithic ensembles are concentrated in Minervois and Corbières (Salles/Bordreuil 1966; de Labriffe *et al.* 2007: 33).

Saint Jean du Desert in Marseille is the most eastern site with these early megalithic graves (Sauzade/Grenet 1996; Vaquer 1998) (Figure 5.6). Two non-accessible structures aboveground were arranged nearly parallel and inserted into an earthen tumulus. The tumulus is surrounded by a stone circle or a round stone pavement with 11m on average to limit the structure or as a basement for the tumulus. The dolmens were less than 1m long with a height of 0,60m. Unfortunately, there are no preserved human remains. From one of the dolmens, a small vessel is documented and from the area of the round stone pavement a ceramic similar to a carinated bowl is recorded, which is attributed to the Middle Neolithic Chasséen horizon (4400–3300 cal BC). The

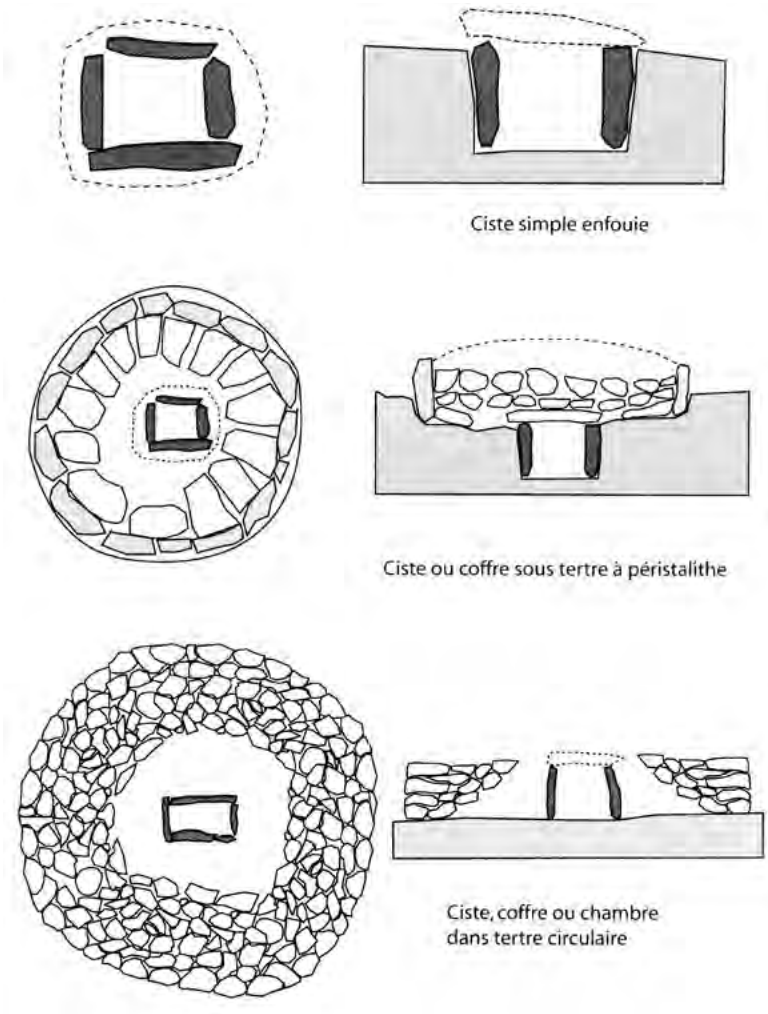


Figure 5.1 Camp del Ginèbre, Caramany. The different grave forms (after Vaquer 2007: 17)

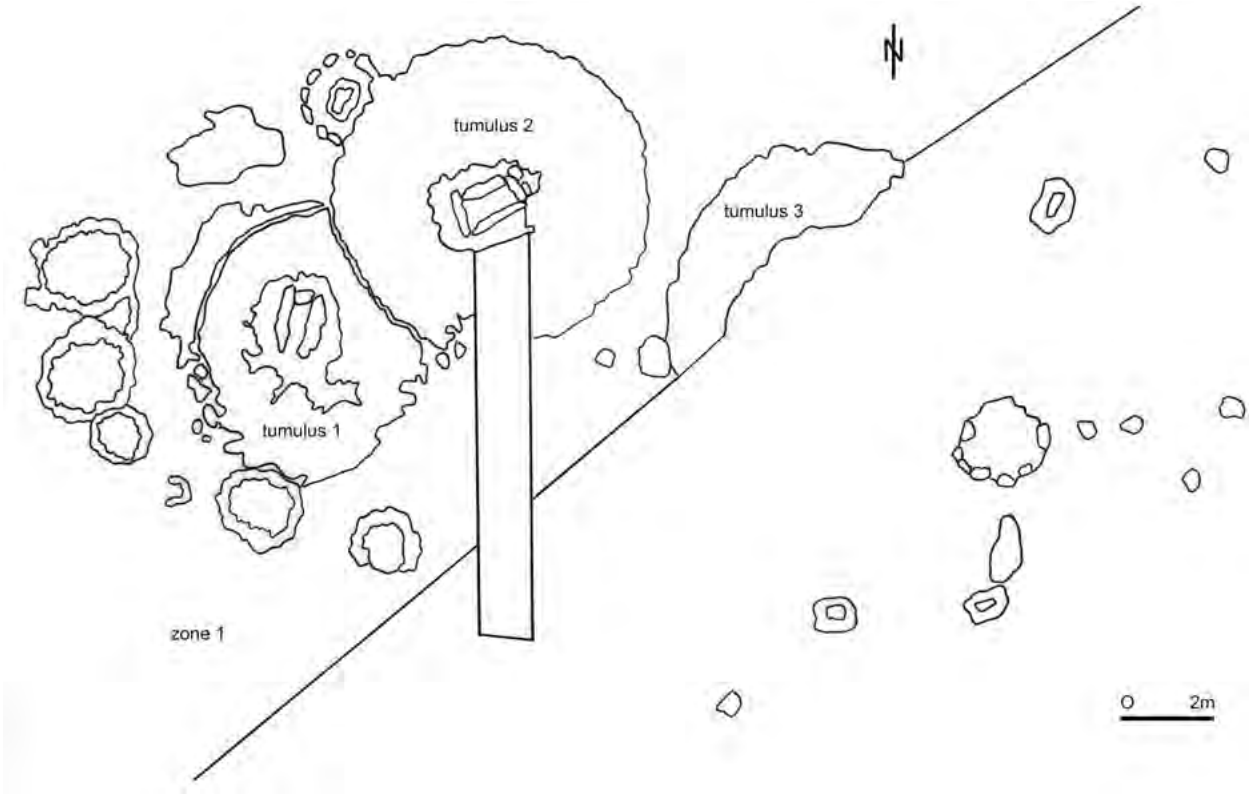


Figure 5.2 Planum Camp del Ginèbre (after Claustre 1998, 170)

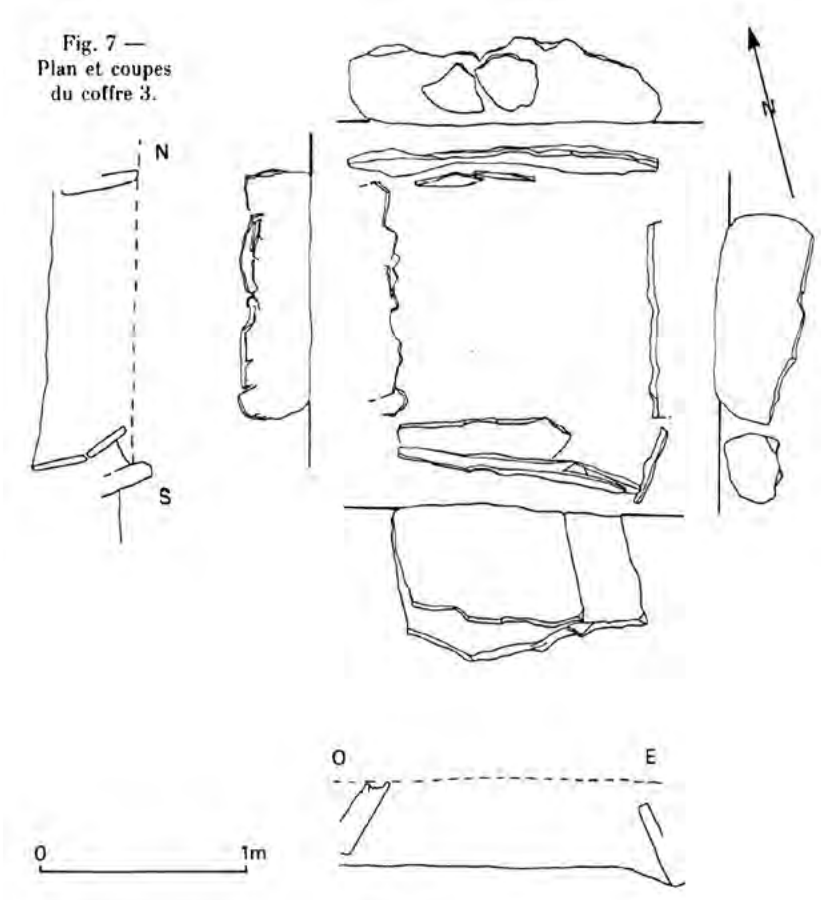


Figure 5.3 Necropolis Najac, Siran, Hérault. Planum chamber 3 (after Mahieu 1992: 146)

ceramic was deposited before the tumulus was raised. Furthermore, three mussel shells were found in the round stone pavement: a patella ferruginea, a conus mediterraneus, and an acanthocardia tuberculate.

The Recent Neolithic necropolis Château Blanc in Ventabren (Hasler *et al.* 1998; 2002) is a rather recent excavated burial site rescued by the TVG-rescue excavation with five earthen tumuli surrounded by stone circles, averaging 11m–17m. Inside tumuli I, II and III are pits with ceramic deposits and one of four small standing stones which are registered in connection with the graves. The burials are located in the center of these tumuli, either in pits or in oval tombs in dry wall technique. One of the pit burials was covered by stone slabs. The graves are individual graves of adults, with the exception of monument I in which two children are buried in one pit. One of the Château Blanc burials is an oval dry wall grave structure with an adult individual (Hasler *et al.* 1998: 237). Among these grave

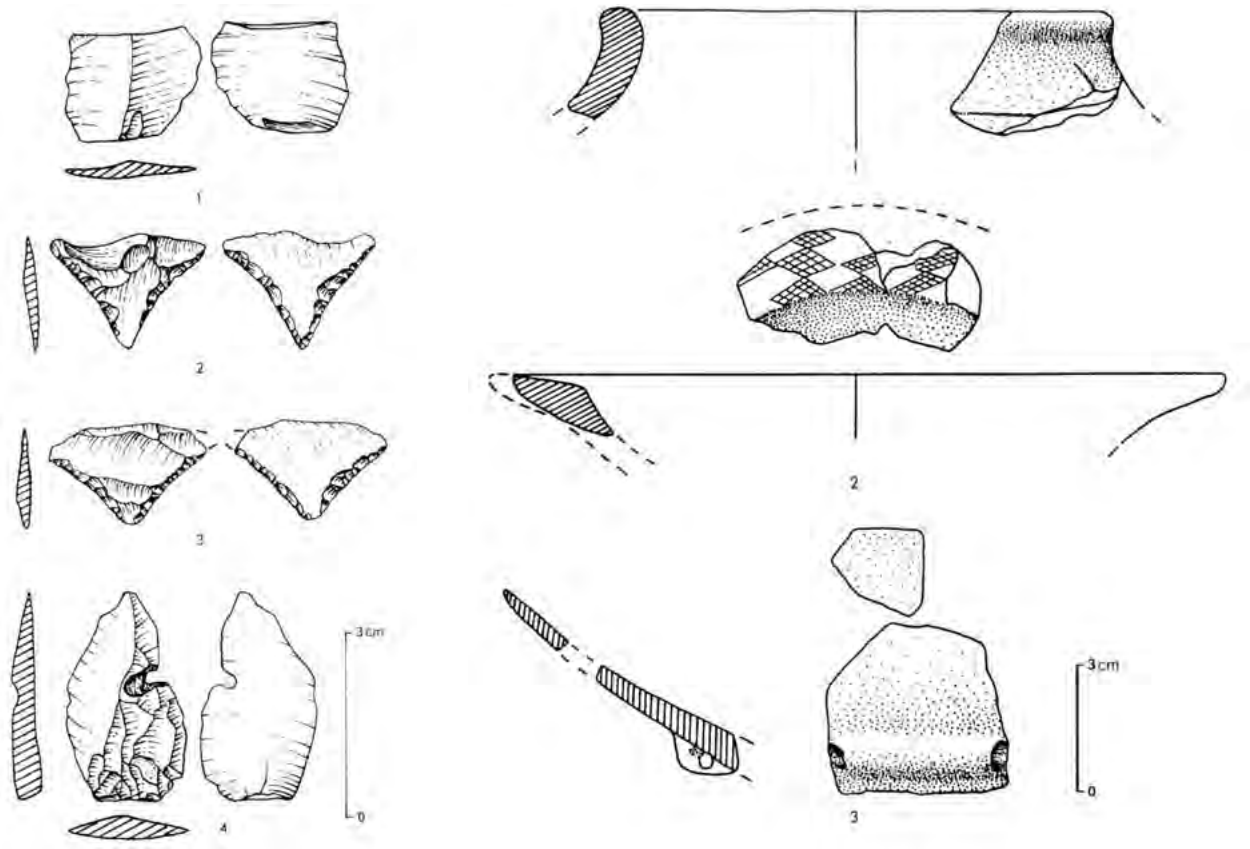


Figure 5.4 Necropolis Najac, Siran, Hérault. Transversal arrowheads from chamber 2, diagnostic Chasséen ceramic chamber 3 (after Mahieu 1992: 146, 149)

structures is a possible destroyed dolmen Provencal with a side wall in dry wall technique similar to the dolmen de l´Ubac in Goult (cf. also chap. 5, p. 163-164). There are altogether eight radiocarbon results available from human bone samples of different individuals. The first burial on this site is calculated to 3501–3030 cal BC (95.4%; 3379–3100 cal BC, 68.2%). Burial activities were performed on this site over a time span of 340–779y, 68.2%; 230–1141, 95.4%. The radiocarbon results ETH-15259, 2720±55 BP and ETH-15262, 3305±55 BP indicate the sporadic subsequent use of the site and the re-use of tumuli IV and III. The main burial phase ends with the pit burial in tumulus I between 2923–2601 cal BC (95.4%; 2897–2763 cal BC, 68.2%, ETH-15735, 4155±75 BP). The few grave goods consist of a transverse and a petiolated arrowhead as well as a small vessel.

Appearance and architectonical features of megaliths in Southern France

In the southern regions of France, approximately 3000 of the altogether 5000 megaliths in France are registered with the densest megalith concentration of 1200 structures in the Cévennes, primarily in the Ardèche region.

The simple rectangular or quadratic dolmens are the commonest forms of megalithic grave chambers and

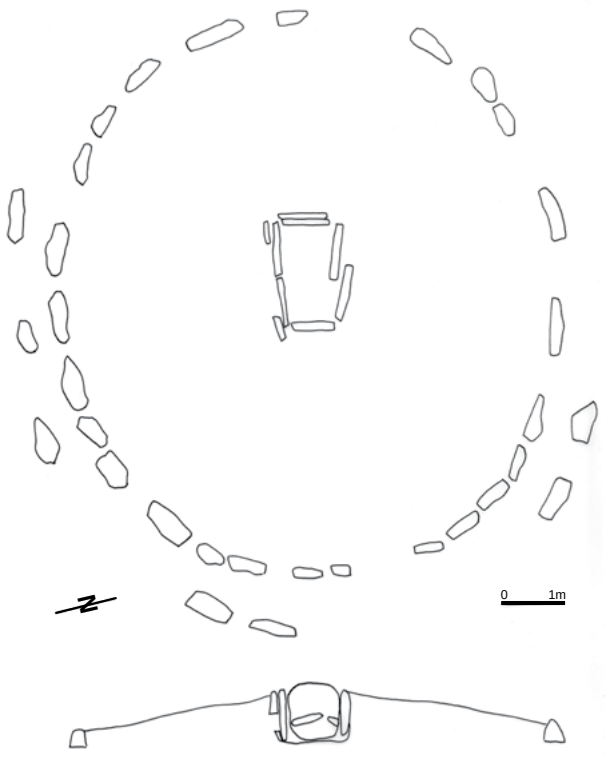


Figure 5.5 Planum and profile Boujas, Aigne (Hérault) (Vaquer 2007: 16)



Figure 5.6 Chasséen grave St. Jean du Desert. Photo courtesy of Gérard Sauzade

are found in large numbers across Southern France. Furthermore, passage graves and a few gallery graves are registered. These graves were mainly erected in the Final Neolithic between 3450 and 2500 BC. There is evidence for late dolmens with a short use from the Bell Beaker horizon. To date, no megalithic graves are known which were built in the Bronze Age, but the already built graves were still in use in this period. The region is also richly equipped with standing stones, including a series of known stone circles.

If we start our survey at the very southwest of France, we find ourselves in the outer borders of the megalithic regions; there are only few monuments registered in this mountainous region from the French part of the Pyrenees and the Ariège. In the Mediterranean region of the French Pyrenees at the Roussillon approximately 50 megalithic graves and 20–30 monuments are registered, if we take unverified and recent discoveries of the last decades into consideration (Claustre 1998: 159). These graves are either very simple dolmens or Final Neolithic passage graves partly surrounded by a round dry wall platform as a basement for a tumulus (Figs. 5.9, 5.10) and / or with engravings, such as cup marks and cross-formed, anthropomorphic symbols similar to the graves on the Spanish side of the Pyrenees. The simple dolmens on the coast were erected like their Spanish neighbors in the mountains often with difficult access. From Ariège more to the North, not more than 16 simple dolmens are registered (Guilaine 1998: 141–142).

In the Aude about 70 megalithic graves remaining today are known as simple dolmens, passage graves, and some as colossal gallery graves, such as the dolmen de Fadas in Pépieux and the dolmen de Saint-Eugène (see below) (Guilaine 1998: 142; Guilaine/Guilaine 1998: 175–176).

In the departement of the Hérault, another dense megalith concentration is registered with 350 monuments. Many of them are poorly preserved, so this number is not more than a vague estimation. The Final Neolithic dolmens Languedocien are situated in the west of the Hérault. These southeast-oriented passage graves are concentrated in the north of Montpellier in the region of Saint Hippolyte du Fort (Guilaine 1998: 148) and built in a later stage with an anti-chamber, for example in the Dolmen de Lamalou (Figure 5.11) The entrance stones of the inner compartments are partly stone slabs with worked in ‘doors’. This is an architectonic feature which can also be found on the entrances of simple dolmens, such as the dolmen de Grammont in Soumont, where a so-called falsa porta is worked into the front stone.

In the mountainous region Lozère in the southwest of the Cévennes ca. 300 small simple dolmens are registered

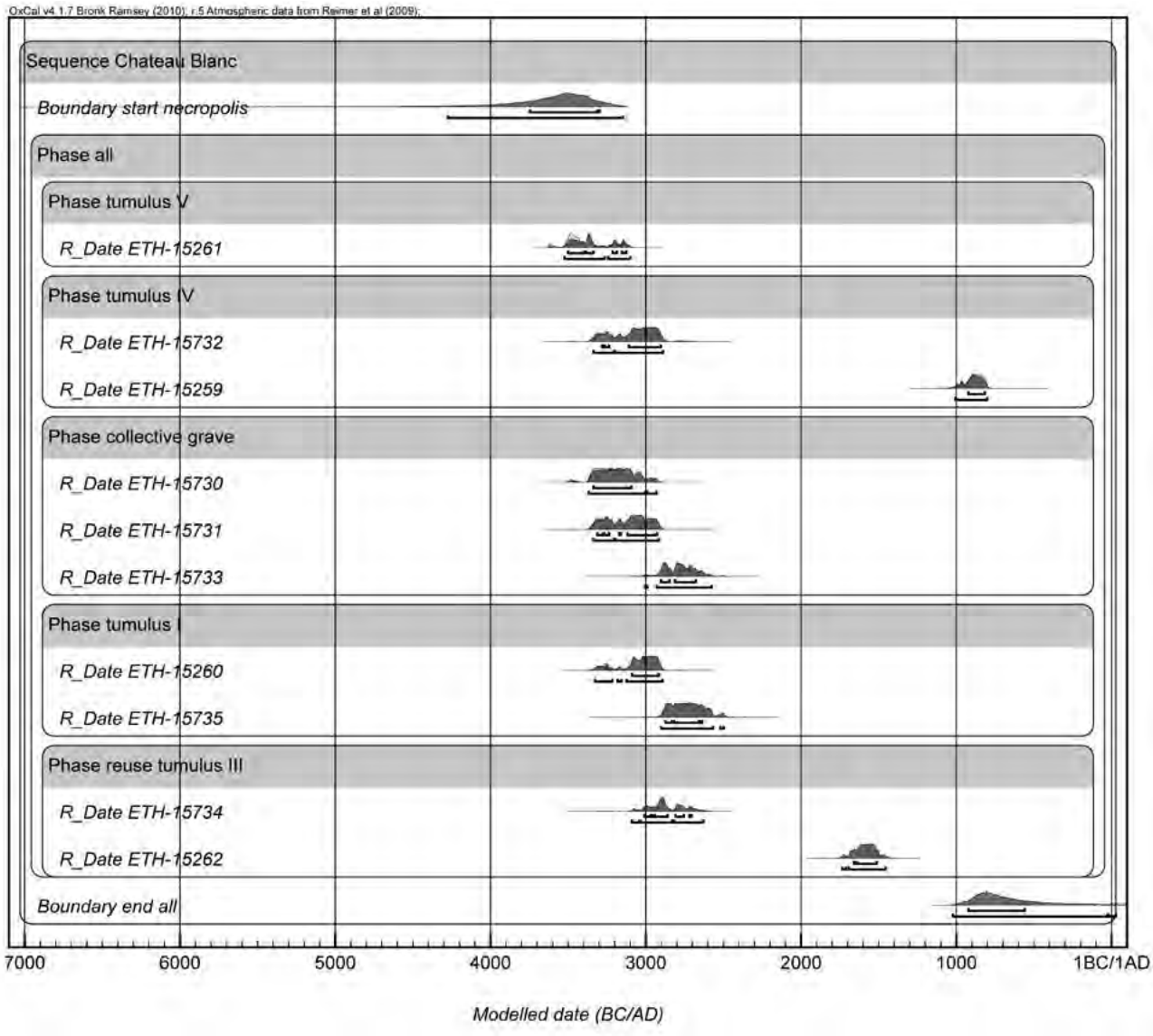


Figure 5.7 Probability of radiocarbon results from Château Blanc in Ventabren. Model agreement: Amodel=87, Aoverall=87.5

(Figure 5.12). Further to the north in the southern part of the Ardèche, a limestone region with many natural caves can be observed. The densest concentration of monuments for this region is recorded from there in the region of the rivers l´Ardèche, la Beaume, and le Chassezac with ca. 700 monuments (Guilaine 1998: 138–139). The majority of the Ardèche dolmens are organized in small necropolises as simple constructions with quadrangular chambers and sizes ranging from 2m–4m. Partial remains of tumuli are documented and the graves are orientated to the south-southeast or to the south-southwest.

More to the north in the region of the Grand Quercy, the densest megalithic concentration of the Midi Pyrenees is listed with around 800 monuments (Pajot 1999: 141–172), more than 500 megaliths are found in the region of the Lot. The architecture of these megalithic graves is quite homogenous: simple dolmens with a rectangular or trapezoidal chamber. A part of them is built with an axial entrance, a small antechamber, or an entrance area. The dolmens are covered by a round, half-round, rectangular, or trapezoidal-formed tumuli in dry wall technique. Some of these chambers are constructed with dry wall elements, for example in Les Grèzes. The cap stones in this region are quite large with a length of up to 5,30m. Only a few structures have multiple chambers.

With ca. 100 megalithic structures, the Provence represents the very eastern border of the Mediterranean megalithic continental regions (Sauzade 1998; 1999). The current state of research in this part of France is better than in the most parts of Southern France due to the extensive research of the last decades. Thus, this region deserves closer consideration. Most of the graves are simple dolmens or passage graves, designed quite homogenously. Their orientation to the west or

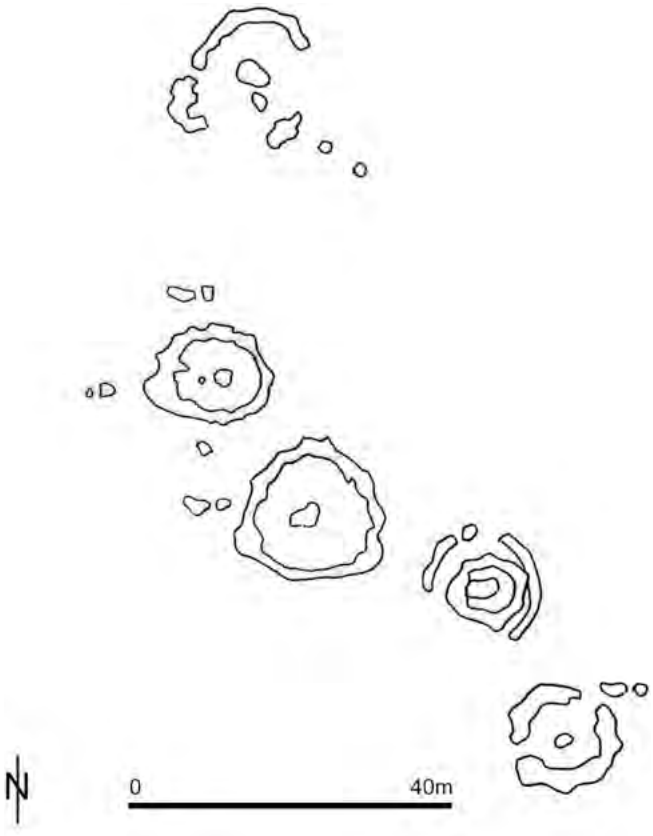


Figure 5.8 Château Blanc, Ventabren. Plan after Hasler *et al.* 1998

the southwest represents an exception from the European norm, which prefers an orientation to the east or the southeast. Often, the presence of a round or an oval stone tumulus is registered and these graves are partly built with dry wall elements. Moreover, a few gallery graves are documented. The megaliths are more concentrated in the coastal regions due to the availability of building materials and they are more scattered inland in the Vaucluse, the Var, the Alpes Maritime and the Alpes Haute Provence. A significant aspect regarding the spatial relationship between grave form and landscape is the observation that dolmens with rectangular chambers are more frequently situated on topographical elevated places and on hills, while the graves with more quadratic chambers are distributed on the plains (Sauzade 1999: 130). This might have either chronological reasons or may reflect regional preferences.

There are three different architectonic forms which emerged and co-existed in the Final Neolithic: the alpine dolmens, the 'dolmens carrée' in the eastern Provence, and dolmens with an elongated chamber in the western Provence (Sauzade 1998: 295–297). The alpine dolmens are an isolated group of seven simple dolmens in the region around Gap. These graves are constructed with two side slabs and a



Figure 5.9 Simple dolmen at Coll del Pinyer and Cap the Creus, French Pyrenees



Figure 5.10 Dolmen with a round stone basement for a tumulus

short corridor or an entrance area and they are up to 2m long. The 'dolmens carrée' in the eastern Provence is the most important group with 80 passage graves oriented to the east with a small chamber of up to 2m length (Figure5. 14). They are covered by a round or oval stone tumulus. 14 dolmens with an elongated rectangular chamber are registered for the western Provence. These graves can have a partial trapezoidal chamber and dry walls substitute the stone slabs of the side walls, as in the dolmen de Coutignards.

In the Copper Age, dolmens were still common or in use and other grave forms emerged like tombs en bloc (also called tholos) or tombs en lauses. 21 tombs en bloc exist in the Alpes Maritime in the region of Saint-Vallier and Saint Cézaire-sur-Signe. These graves are round, rectangular or quadratic structures built with stone blocks and partly incorporated into the bed rock or the ground. They are covered by a tumulus with an average of up to 12m in dry wall technique. Such tumuli are not vaults, suggested by the occasional denotation of these graves as 'tholos'. The tombes en lauses, such as la Lauve in the Var, are round small completely closed graves. A later Copper Age form of non-accessible dolmens is documented by Collorgues and Puits des Quatre Points in the Var (Sazaude 1998: 297¸ 1999: 132).

A few gallery graves are recorded in Southern France, for example the group of the gallery grave type Aquitaines in the region of Garonne. The dolmen du Morrel de las Fadas, a Final Neolithic gallery grave with the imposing length of 24m, is registered as one of the largest gallery graves in France in Pépieux in the Aude. This grave is constructed with stone slabs, dry wall elements, three inner compartments, and two entrance stones with large entrances or port holes. The dolmen de Saint Eugéne by Minervois is a gallery grave also built with dry wall elements with a total length of 15m and several inner compartments (Guiliane 1998: 142; Guilaine/Guilaine 1998: 175–176). Since the entrance leads through a corridor, the grave might be considered as a hybrid between gallery and passage graves. In the Provence, the Gauttobry dolmen in la-Londe-les Maures should especially be mentioned with its 6m long rectangular chamber, two internal divisions, and a small corridor or antechamber. The associated artifacts connect the tomb to the Final Neolithic or to the Chalcolithic.

In the South of France standing stones are common, either as unworked or worked simple standing stones or as anthropomorphic standing stone statues. Furthermore, a few stone circles are registered for



Figure 5.11 Ante-chamber Dolmen Languedocien de Lamalou, St. Hippolyte du Fort



Figure 5.12 Dolmen Cham du Florac in Lozere



Figure 5.13 Dolmens in Quercy



Figure 5.14 Provence, Dolmen by Grasse. Photo courtesy of Jonas Paulsson.



Figure 5.15 Standing stone Cham du Florac in Lozere



Figure 5.16 The stone circle Peyarine in the Cévennes with an average of approximately 140m is one of the largest stone circles in Europe

this region. Approximately 30 simple standing stones are registered in the l´Aude, 38 in the Garde, 20 in the Hérault and more to the north in the Tarn 75 standing stones are recorded. In the Lozère, 154 known simple standing stones are concentrated on a limestone plateau of approximately 10km² (Figure 5.15). The Cham de Bondons lies in the mountainous region of the Lozère by the Mont Lozère. These granitic stones are up to 6m long. Until today, three spatial groups have been identified which appear to have no intentional order with the exception of a few stones arranged in half-circles or vague circles (Marc 2011: 60–70). Finally, 20 simple standing stones are noted for the Var in the Provence.

Standing stone statues are mostly common in Southern France in the Provence, moreover in the Languedoc-Roussilon and in the Tarn. The Languedoc-Roussillon statues are concentrated in the Gard and in the Hérault. The first group is represented by statues with stylized faces, partly with head ornaments, 'owl eyes', and depicted extremities. On the female statues, breasts and colliers are pictured. On the probable male statues, objects like axes, bows, and daggers can be identified.

The Provence statues are concentrated in the Vaucluse and in the Var, and in an early stage during the first half of the 4thmillenium they are small, rectangular, or trapezoidal and ornamented with a human face. In a later phase, the standing stone statues can be divided into two stylistic groups: the 'Statues menhirs Rouergates' in the west and the 'Statues menhirs Provençal or Duracien' in the eastern regions. The former group is represented by statues between 1m and 2m in size and they are similarly worked like the statues in the Languedoc Roussilon with breasts and colliers on the feminine statues and with objects such as axes, bows, and daggers on the male statues. The statue menhirs Duracien are triangular-formed and ornamented with a stylized face, and occasionally with chevron patterns (Guilaine 1998: 71–77).

In the Central South a few, but imposing stone circles are documented. In an inventory from 1905, three stone circles in the Lozère were noted (de Mortillet 1905). In the Cévennes, two colossal stone circles are still present in the region Gard near the village le Vigan. The Cromlech de Lacam de Peyrarines is situated on the limestone plateau of Blandas. With 46 remaining stones between 0,75m to 1,90m in size and an average of 120m it is one, if not the largest stone circle in Europe. In the center of the Lacam de Peyrarines, a 2,15m high standing stone is erected (Figure 5.16). Another stone circle nearby with an average of 90m is registered for Cromlech de la Rigalderie. The remaining 20 limestones have sizes between 0,75m and 1,80m. Furthermore, from the same region the smaller stone circles from the Garrigue can be mentioned here: La Can de Ceyrac in Conqueyrac, Le Devois de Tourre in Pompignan and La Gardiole, Le Pioch-de-Roumarins, Le Pioch de Perdigaliere and Puy-de-Pauliac in Aubazine (Guilaine 1998: 67). More to the north near Cahor in Quercy, the Cromlech de Peyrebrune, a small and rather destroyed stone circle, is likewise documented.

Megalithic structures with radiocarbon sequences and radiocarbon dates

Until today, the available radiocarbon results for the Southern France megalithic contexts are far too limited for any closer determinations regarding the emergence and development of megaliths. The radiocarbon stock of altogether 33 available radiocarbon dates consists, with the exception of the dolmen de l´Ubac, of one or maximally two results per site. The significance of such single or double dates is rather limited when regarding the long-term use of many megalithic graves as collective burial sites with a successive burial practice, current horizons of use of slightly hundreds of years, and a number of deposited individuals, which exceeds the known cases by several 100 individuals.

A pleasant exception and an isolated beacon even for the continental European megalithic research is the excavation of the Dolmen de l´Ubac in Goult in the Vaucluse, Provence under the direction of Gérard Sauzade with a total of 18 available radiocarbon dates (Figures 5.17, 5.18). The data, including four results gained from human bones and 14 from charcoal samples, enables a reconstruction of the history of the site over a time span of ~6700 y. At the same time, they demonstrate the partly intensive human impact on prehistoric sites over millenniums. At least 14 of the radiocarbon measurements directly from the grave stand in no connection to the grave construction and to the burial activities. This fact might again reflect how important it is, when regarding the context of grave contents for all the megalithic sites dated in the last decade on the basis of one radiocarbon determination per grave, to involve the measurements of charcoal samples into the calculations.

The dolmen de l´Ubac is, with regards to the architectonic features, comparable to the dolmen of the Western Provence with its elongated chamber, paved floor, a short corridor, and side walls in dry wall technique. The dolmen was surrounded by two concentric stone circles and covered by an earthen tumulus (Bizot *et al.* 2001: 5; Sauzade *et al.* 1997; 1999; 2001; Sauzade/Bizot; 2002). There is evidence for at least 11 complete individuals, 21 articulated body parts, and also disarticulated bones. The layers under and on the basement of the tumulus are evidence for pre-megalithic activities in the Mesolithic and the Early Neolithic from at least 7098–5767 cal BC onwards (95.4%; 6337–5862 cal BC, 68.2%) during ~2300 y. The four measurements from human bone samples witness

burial activities from ~3190 cal BC (3153–2930 cal BC, 68.2%; 3463–2913 cal BC, 95.4%) to ~2750 cal BC (2816–2685 cal BC, 68.2%, 2865–2638 cal BC, 95.4%) and these are synchronous to the earliest available results from human bones from a megalithic grave in Southern France. Final Neolithic material from the grave is documented, such as lozenge-formed arrowheads and variscite pearls. Up to 8 of the radiocarbon results indicate the subsequent use of the grave or the tumulus over ~2200 y, for example the charcoal from several hearths in the tumulus with a measurement of (Gif-10651, 3350±60 BP; Ly-945, 3785±85 BP; Ly-9125, 3640±40 BP).

In addition to the sequence for the dolmen de l´Ubac, altogether 13 radiocarbon results for the entire region of Southern France are available from megalithic contexts. All are single dates except for those from two sites, where two measurements are current for each site. Eight results originate from the Provencal sites Les Dolmens de Cudières, La Bouissière, Roque d´Aille, Le Prignon, Le Villard, Villevielle, de Saint Marc and Arnajons (Sargiano *et al.* 2010: 144). The remaining data is from Central and Southwestern France, including dolmens such as the Dolmen de l´Abeille and the Dolmen de l´Ithe.

This southern French modeled radiocarbon data ranges from 3294–854 cal BC (95.4%; 2684–1215 cal BC, 68.2%), whereby 85% of these results take place in the 3rd millennium BC. The earliest result from one of these remaining megalithic graves is gained from a human bone sample in the Dolmen de Cudières in Joques Alpes-de-Haute-Provence and dates from 3336–2678 cal BC (95.4%, 3263–2873 cal BC, 68.2%, 4325±90 BP).

The dolmen du Villard in Lauzet-Ubaye in the Alpes-de-Haute-Provence is a simple alpine dolmen with a short corridor and a small chamber which measures 1,5m x 1,5m (Courtin 1982; Sauzade 1998) (Figure 5.19). The dolmen was originally covered by a tumulus averaging between 7m and 9m. An MNI of 26 was determined for the dolmen, including 13 adults, 5 juveniles, 7 children, and 1 perinatal deposited in two layers. From the lower horizon articulated individuals but no children are documented. The bones in the upper level are disarticulated without the bones of children. Two radiocarbon results are available from the bones of the second layer. One is dated to the time interval 2876–2152 cal BC (95.4%; 2834–2293 cal BC, 68.2%, Ly-3257, 3980±120 BP), the second determination is from a Bronze Age individual that died between 1611–831 cal BC (1423–1013 cal BC, 68.2%; Ly-3022, 3000±170 BP). The datable grave goods contain exclusively Bell Beaker material such as ceramics, stone wrist guards, and a copper awl. Furthermore, Final Bronze Age material was found in the tumulus (Chambon 2003: 252).

Dating the megaliths on the basis of the artifacts

The first megaliths in the form of non-accessible dolmens in Southern France are associated to the Chasséen horizon of the Middle Neolithic (~4600–3500 cal BC) by means of Chasséen material (cf. chap. 5, p. 152-155), including grave goods such as fine round based smooth surface pottery with mostly undecorated carinated rims, blonde flint, transverse arrowheads, polished stone balls or bills, and obsidian artifacts. Thus, the grave goods in the Pyrenees in Camp del Ginèbre are associated to the early Chasséen horizon and the grave goods from L´Arca de Calahons are also Chasséen material, including a few discoid pearls in schist and variscite, five transverse arrowheads, and a quartz flake (Abelanet 1970 a and b; Vaquer 2007: 15). The graves in Najac, Siran, and Hérault contained diagnostic Chasséen ceramics in the form of a plate with lozenge-décor on the rim or a vessel with a perforated ledge, moreover bone needles and triangular transverse arrowheads (Figure 5.4). The grave goods from Saint Jean du Desert in Marseille are likewise documented as Chasséen material, for example a small carinated bowl (Sauzade 1999; 2002).

The elaborated megalithic graves can be associated to the Final Neolithic if we take the archaeological material into account. Bell Beaker and Bronze Age material can also be documented, but less frequently. In the Pyrenees and the l´Aude, major Final Neolithic material is found. The passage graves in the Pyrenees are associated with the Final Neolithic Veraziénne horizon after numerous finds of ceramics with plain cords (Claustre 1998: 160). In a few cases, earlier material is also registered, such as ceramics with cord circle reliefs, e.g. in the passage grave La Clape 7 and at Salza III (Guilaine 1998: 57). In the Languedoc-Roussillon, very few cases of Chasséen material can be documented from passage graves. Most of the material can be attributed to the Recent and Final Neolithic horizon (~3500–2900 cal BC), which speaks for this time phase as the main construction and usage phase of the megalithic graves (Guilaine 1998: 54). The typical elements from the Ferrières horizon, for example ceramics with chevron patterns, leaf-formed pearls, and corrugated pendants, are documented for numerous graves. The graves were subsequently used in later periods, for example during the Copper Age in Fontbuisse as witnessed by the later Bell Beaker material and also in the Bronze Age.

Primarily Final Neolithic material is also recorded in the simple dolmens in the Lozère and in the Ardèche. The earliest material recorded from Lozère is attributed to the early Final Neolithic Treille horizon, for example vessels with a round bottom and cord decorated rims as found in the dolmens de Fraysse in Salles-Prunet and Combe-Lébrouze in Montbrun (Guilaine 1998: 55). Until now, only few Final Neolithic and Copper

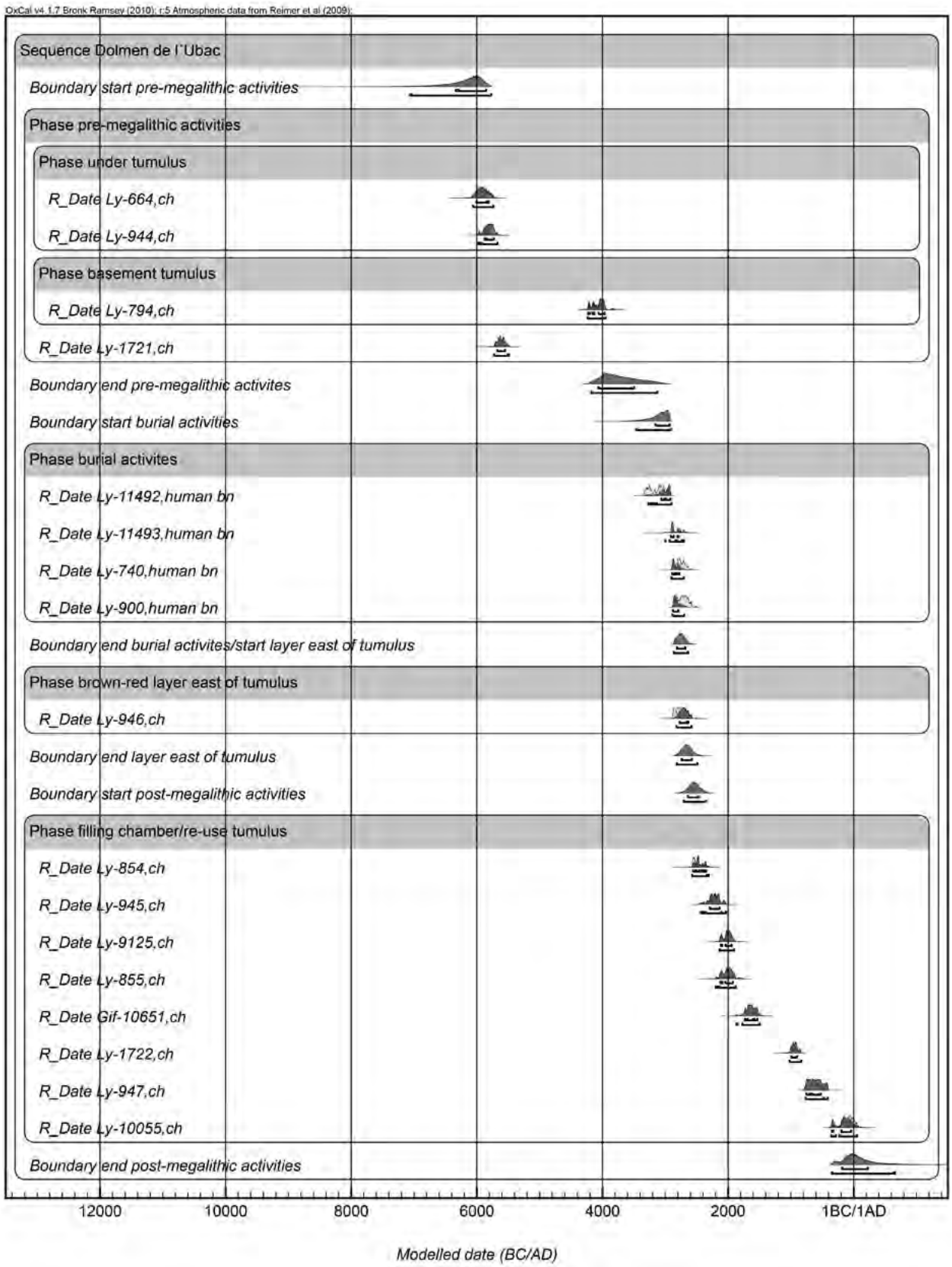


Figure 5.17 Probability of the 18 radiocarbon results from the Dolmen de l´Ubac. Model agreement: Amodel=93.1, Aoverall=93

Age artifacts are available from the Ardèche dolmens. Among these artifacts mostly lithic objects, lozenge formed arrowheads, leaf-formed and globule pearls, big flint blades, and daggers can be noted. The ceramics are more unspecific, although material with chevron decor is documented for the grave Saint Martin-d´Ardèche. A

few metal objects, such as rhombic awls (Guilaine 1998: 54), are recorded from a later re-use of the dolmens.

According to the material, the dolmens In the Midi Pyrenees in Quercy were constructed and used in the Recent and the Final Neolithic, thus from the second half of the 4th millennium until the end of the 2nd millennium. Final Neolithic material is registered, such as the regional Le Crosien, the Copper Age l´Artenacien and Early Bronze Age material. In a few cases, Bell Beaker material is noted as well. Ceramics from the chambers are nearly absent, but are rather documented from the exterior in front of the graves. Accordingly, this material is not suitable to date the construction of the graves (Pajot 1999: 158–164). The largest proportion of the ceramic material is from the Artegnacien horizon. The lithic material consists of flint blades, rhombic and peticulated arrowheads, and partly polished stone axes. Moreover, bone objects such as needles, awls, rings, and wild boar fangs are documented and copper objects such as needles with cabochon or enrolled heads, buttons, and both simple and spiral pearls are also recorded. Furthermore, Columbella snails are registered.

For the Provence, a recent observation of the material from megalithic contexts gives new insight on the construction of the megalithic graves in this region. Based on the material, the first elaborated dolmens in the Provence were constructed in the Final Neolithic I (Sauzade 2014). Ceramics, with the exception of the Bell Beaker material, is generally absent in the graves or unspecific. It was possible to identify other markers between the lithic artifacts, for example for the arrowheads and for the decorative elements by combining several parameters such as the association, the number, the frequency, the form, the size, and the raw material. Certain tendencies are indicated when regarding small stones and worked bone elements of phase I of the Final Neolithic, sometimes even to a large extent for specific forms of pendants and pearls. The Final Neolithic II horizon is diagnostic by means of larger artifacts, such as bow-formed pendants with a horizontal suspension, polished Glycymeris valves, bi-conical olive-formed and discoid pearls, V-buttons in a pulley, and needles. In the early Bronze Age, certain shell objects, unworked or worked by the sea, were used in large amounts like Columbella, Glycymeris valves, and Cardium. The form of the arrowheads follows both chronological and geographical specific differences. Hence, the leaf-like and bifacial arrowheads are associated to the recent phases of the Final Neolithic and to a first phase of the Early Bronze Age. The same forms, but with ridged edges, are clustered in the Basse Provence and to a lesser extent in the Alpes Maritimes. In the Final Neolithic II, the dolmens were often re-used and Bell Beaker material is registered. In the same period, a group of dolmens was constructed in the Provencal Alpes with exclusively Bell Beaker material.

Megalithic burial rites

Compared to the number of megalithic graves in Southern France, the available anthropological material is limited and there is little known about megalithic burial rites (Chambon 2003: 327).

There is evidence for the early megalithic stage of the non-accessible dolmens that they were built as single or double burials. Three burials, which are partly documented, were deposited successively (cf. chap. 5, p. 152-155) such as in the necropolis Najac in the Hérault and in the Lozère (de Labriffe *et al.* 2007: 33), where good preservation conditions are given for bone material on the limestone substrate. These multiple burials initialize the later common collective graves.

For subsequent megalithic grave forms there are indications of successive burials and they were partially used on a long-term basis as collective graves. However, without complete radiocarbon sequences of graves of the separated individuals it is impossible to determine for most of these graves, whether they were designed from the very beginning as collective graves or if they were originally built as single graves and then reused in later periods. There are regions with results available from all individuals buried in a grave, for example from Sweden (cf. chap. 11). The grave first built was erected as an individual grave and then re-used after a hiatus of several hundreds of years for secondary burials.

In the Provence, the examples of Château Blanc (cf. chap. 5, p. 152-155) and, to a lesser degree l´Ubac, Goult in the Vaucluse, illustrate the surprisingly fast transition in hardly more than one century from individual to collective burials (Sauzade 2013, forthcoming). The number of buried individuals in the megalithic graves of Southern France varies considerably. In some dolmens the remains of a few individuals are documented, in others bone material is suggested for burials of over 100 individuals. For instance, in the Dolmen de Villeneuve in the Lot an MNI of over 100 was determined, in the Dolmen de Granges in the Ardèche an MNI of over 130 was recorded, in the Dolmen de Peyaoutes in Grasse in the Provence an MNI of 172 was noted, and in the Dolmen de Saint Eugène in the Aude an MNI of 300 was documented (Guilaine 1998: 125; Chambon 2003: 328). These graves witnessed successive burials and a use of the graves over long time periods. There are some indications for secondary deposits in Jastres and also for two tombs in the Var (Chambon 2003: 328). In certain graves there is evidence that the chambers were emptied or cleared out, for example in the primary chamber Dolmen du Pech and from the Dolmen du Frau de Cazals 2, and furthermore in the Final Neolithic horizon from Ithé 2. In Ithé 2, the repeated disposal of bone material is documented. Skulls and long bones were thrown out of the chamber.

One of these clearances was found behind the orthostat in the back of the grave. In Muraires I in the Var, the skull fragments are distributed along the side walls of the tombs as a result of a manipulation of bone material from older burials (Chambon 2003: 328).

The dolmen du Villard at Lauzet-Ubaye in the Provence is one of the megalithic graves of the alpine group with a documentation of altogether 2286 human bones, which allows the reconstruction of the successive depositions of the dead. The 1,50m x 1,50m rather small dolmen contained an MNI of 27 individuals deposited in several layers. A first series of inhumations with adults and children was inserted into grave. These burials were arranged aside for seven successively deposited articulated individuals. In this second phase of utilization the children was excluded (Courtin 1982; Chambon 2003: 263).

Beside body burials in Southern France, incinerations and the deposition of cremated bone material in the megaliths were common in Var in the Provence (Sauzade 1998; Sauzade 2013, forthcoming). Thus, an MNI of up to 75 cremated individuals is documented for the dolmen de San Sébastien II. The incineration of the dead was practiced outside the graves. These cremations either represented the exclusive burial form of the graves, or cremated bones were deposited in the graves beside body inhumations, partly even in the same layer as in La Gastée and Roque d´Aille. In certain areas, such as Cabasse and Brignoles, megalithic graves with similar archaeological material were documented, but these included exclusively body graves. Accordingly, the cremations either represented a co-existing burial rite or there might be chronological differences to the body graves. The incineration conditions of the bone material of the same graves are either rather homogenous, or the bones were cremated on different levels, as in the dolmen de Roque d´Áille, where the cremation degree ranges from white burned bones to bones with black burning traces and a cremation not exceeding 500 degrees (Chambon 2003: 325–327).

Contemporaneous non-megalithic burials

Contemporaneous to the megalithic tombs, other manifold grave forms were common in Southern France. These include burials in cists, in hypogea, and in pits in the open air, in natural caves, and in rock shelters.

Stone Cists

In addition to burials in the first megaliths, it was common in the Middle Neolithic Chasséen horizon to bury the dead in non-accessible dolmens in cists, which are completely built into the ground. Numerous subterranean stone structures are registered. They are often organized in necropolises and their age is often unknown. There is evidence that this burial form was used from the Middle Neolithic to the Middle Age. The larger cists are partly referred to in the regional literature as coffres. This grave form is more frequent in Western and Central Southern France and cists are concentrated, for example, in the mountainous and hilly regions in the l´Aude and in the region of Minervois and Corbières (Salles/Bordreuil 1966; Vaquer *et al.* 2007: 19, 33 and Figure 5) at Delà Laïa, La Faïchos, Labau, Castelnuadry, Pech dal Ome, Bordasse, la Serre, and Roca Blanca. In the Hérault at La Coste Rouge in Beaufort a recently discovered cist has been registered (Vaquer 2007; Vaquer *et al.* 2007; Le Bras Goude *et al.* 2012). The grave contained the remains of a child aged 5-8 y with tooth and bone pendants, flint blades, arrowheads, bone awls, and bones from domestic and wild animals. One radiocarbon date (Erl-9626; 4743 ± 46 BP) indicates that the burial belongs to the Late Chasséen culture from 3638–3337 cal BC (Le Bras-Goude 2012: 3; Vaquer *et al.* 2007: 154). A similar structure is found at La Chambre Verte in Béziers.

In the Aude in Couharnel, the small necropolis Delà Laïa (Guilaine, 1959; 1962) is documented with three large cists incorporated into the ground. Two of those are twin graves with small dimensions (1m x 0,60m and 1,30m x 0,60m). Two graves are double burials, whereas the third grave is a single burial with the individuals in a crouched position. Grave 2 contained five Middle Neolithic transversal arrowheads and stone bills and can therefore be associated to the Chasséen horizon. In the mountainous region of the Lozère, a group of larger subterranean destroyed cists with Chasséen material is described in old excavation reports for Carignargues near Uzès in the Gard. One skeleton in a crouched position is mentioned as well as a few grave goods such as flint blades, stone bills, and two small vessels (de Labriffe *et al.* 2007: 33). A Middle Neolithic cist is likewise documented for Col de Barrière in Campestre in the Gard. For this grave, three transverse arrowheads are registered without any bone remains.

In the Provence cists are not frequent. One example is found in Crillon-le-Brave in the Vaucluse. A double burial in a cist built with a combination of stone slabs and dry walls is registered (Buisson-Catil 1995). According to the domestic context of the site, this cist is attributed to the end of the Chasséen horizon or to the Recent Neolithic. In the rock shelter Pont in Quinson in the Alpes-de-Haute-Provence (Courtin 1974), a burial was registered from the Chasséen horizon including some kind of cist formed by stone slabs and the wall of the rock shelter. Also in the Vaucluse some kind of cist from the Chasséen horizon with loose stone slabs and the remains of an incomplete individual were documented for the rock shelter 2 in Fraischamp in Roque-sur-Pernes (Sauzade 2014).

Hypogea

In Southern France approximately 24 hypogea are known. Most of them are centered in the Vaucluse in the Provence (Chambon 2003: 328; Sauzade 1998, 295; 1999). These graves are associated to the Final Neolithic. Especially in the Vaucluse in the Provence, some of the most remarkable hypogea which exist in Europe are documented. The hypogea in this region are classified into two regional groups: the hypogea of Fonteville and the hypogea of the North Vaucluse. Altogether four hypogea are known from Fonteville. These tombs are worked into the ground and their architectonic concept is reminiscent of gallery graves. The chamber is covered by several megalithic capstones. The size of these hypogea varies considerably. The hypogea Epee de Roland is one of the most impressive structures of this kind in Europe with a length of 43m, a height of 4m and a width of 3,80m. The smallest hypogea de la Source has a length of 16,60m, a height of 2,50m and a width of 2,50m. The graves are marked aboveground by round tumuli (Sauzade 1998: 295). Nine hypogea of the North Vaucluse type are registered. Two of them, the hypogea du Serre de Huguenots in Mirabel and Pérpetairi in Mollans, are situated in the south of the department in the Drome. The other seven hypogea, Echaffins in Cairanne, Crotte in Roaix, Capitaine in Grillon, Bois de l´Ubac in Carpentras, Boileau in Sarrians Granges, Vielles in Villedieu and Petit Barsan in Viason-la Romaine are centered in the North Vaucluse. These graves are completely dug into the primarily tertiary helvetic molasse with a rectangular ground plan. Their sizes vary from the approximately 130m² of the hypogea Capitaine in Grillon with an MNI of 176 individuals and the approximately 13m² of the hypogea of Sarrians with an MNI of 350 individuals. Further hypogea are documented from Gard like Devois de l´Étang, and Roc de Camp a Beauvoisin, and in the Hérault at Pioch de Redon.

Except for Devois de l´Étang, the available information for these graves is limited to the hypogea of the Vaucluse. The graves contained adult individuals and also children. Many of the individuals are primary articulated burials, for example in Roaix, Sarrians, Roc de Camps, and Devois de l´Étang. The deposition of the dead did not follow any specific conventions. In Roaix like in Sarrians, both a stretched and a crouched position of the bodies are common and the bodies with all kinds of orientations were deposited successively. A part of the individuals in Roaix seem to have been deposited simultaneously, and there is also evidence for two simultaneously burials in Roc des Camps. The dislocated bones are partly rearranged, for example skulls and long bones in a corner of the hypogea in Roaix.

In the hypogea Crottes in Roaix (Bouville 1980; Courtin 1974; Sauzade 1983) (Figure 5.20), an MNI of altogether 136 is determined from individuals deposited in two layers. For the first layer an MNI of 58 is estimated for the articulated bones (Chambon 2003: 50–51). From this first layer (C5) radiocarbon results from the time interval 3020–2213 cal BC (95.4%; 2876–2492 cal BC 68.2%, Gif-1620, 4100±140 BP) are available. The material found in this layer, such as lithic and decorative objects, is from the Early Final Neolithic. The 50 complete individuals in the second layer are deposited in all thinkable positions and orientations, which implies a contemporaneous deposition in the grave and therefore seems to fulfill more practical aspects than to follow a stereotype burial modus. In the northern part of the graves, an accumulation of around 50 skulls was arranged against the wall. One available radiocarbon date from this layer ranges from 2913–2151 cal BC (95.4%; 2872–2411 cal BC, 68.2%; Gif-857, 4040±140 BP). After the insertion of the last bodies, there is evidence of traces of fire on some of the bones and that fire was light in the grave after the deposition of the last bodies. There are only very few grave goods documented in this layer, including ceramics from the Frontbuisse horizon. Three of the individuals had arrowheads stuck in their bones. Therefore, this layer was interpreted as the burial place of individuals who died due to the same violent act (Sauzade 1983) or with a slight time delay. 79 of these individuals are adults according to a reinvestigation of the bone material (Chambon 2003: 50–62) and 57 are immature, classified as 52 children and perinatals and 7 juveniles. The sex of 28 individuals could be determined and both sexes are equally represented.

The most spacious hypogea, Capitaine in Grillon with a 120m² ground plan, is the second structure of its type with an available radiocarbon date. There are two layers documented with the sepultures in the lower layer (couche II) and an MNI of 136, including 98 adults, 6 juveniles, 30 children and one perinatal. A determination of the sex of the individuals was difficult, but both sexes were represented. Altogether 11 complete skeletons are registered and additionally 18 partial anatomically-connected body parts. One radiocarbon result obtained from a human bone lies within a time interval ranging from 3505–2480 cal BC (95.4%; 3335–2699, 68.2%, Ly-3021 4330±180 BP). The final Neolithic grave goods consist of few ceramics and an extraordinary amount of decorative elements, such as 335 leaf-formed pendants, 27000 steatite pearls, flint blades, and lozenge-formed arrowheads.

The hypogea were abandoned after the Final Neolithic and their entrances were blocked, for example in Roc des Camps, de la Clausonnette, and Pujols in the Gard (Chambon 2003: 328–329). An exception is represented by the hypogea Pérpetairi in Mollans, for which Bell Beaker material is documented.

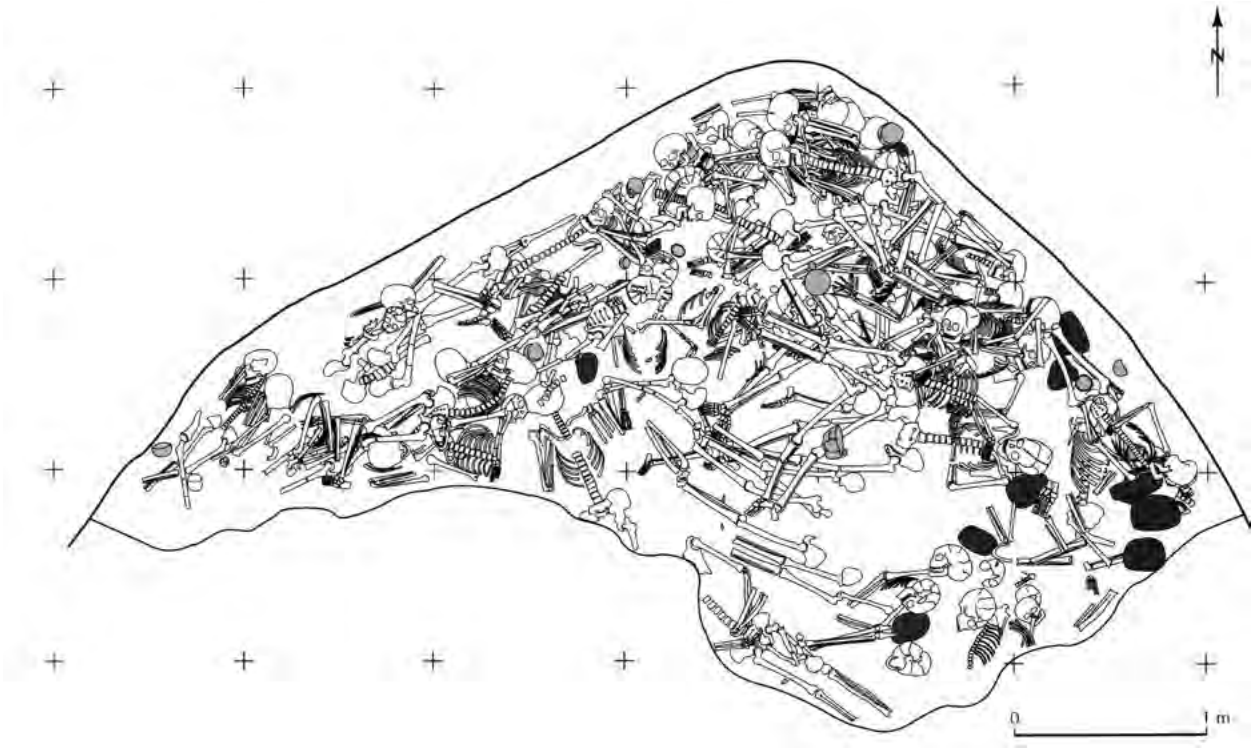


Figure 5.20 Planum hypogea Crottes, Roaix in Vaucluse, layer 2 with articulated skeletons (after Chambon 2003: 51)

Natural Caves avd Rock Shelters

Natural caves and rock shelters are still frequently used as burial sites contemporaneous to the megaliths between the Final Neolithic and the Bronze Age in Southern France (Claustre 1998; Leduc 1998; Sauzade 1998: 294). Around 145 funeral caves and approximately 20 rock shelters are registered in the Provence. In all sectors where natural occurrences of caves, avens, and rock-shelters are common, they are implemented for funerary proposes, particularly if their characteristics fulfilled certain requirements, for example small chambers, exiguous bowels, clogged avens, and accesses (Sauzade 2014). Only few sites enable the reconstruction of the burial rites. At some sites, for example in Las Claosus III in the Aude or L´Amaga la Dona in the Pyrenees, the entrance zones are closed by a stone slab or a dry wall. Primary burials with articulated skeletons are registered as well as disarticulated bone material which is arranged aside. An exception is represented by the cave Roquefort-des-Corbières in the l´Aude which is described as an ossuary. The funeral deposits often only cover a small corner of the cave (Chambon 2003: 329–330). From the western part of Southern France, radiocarbon dates are available which were gained from human bones from Montbolo or Early Chasséen contexts in the Montou and Caune de Belesta caves (Ly-4661, 5095±60 BP; 3964–3801 cal BC, 68.2%; 4037–3714 cal BC 95.4%; Ly-3302, 5640±120 BP; 4602–4353 cal BC, 68.2%; 4778–4261 cal BC, 95.4%) (Claustre 1998: 165). The remaining 13 radiocarbon results from megalithic contemporaneous cave contexts are clustered in the second half of the 4th and the 3rd millennium. In the Provence a few cases with individual burials are known from the Final Neolithic onwards, generally within a domestic context. Remarkable is that the natural caves and the rock shelters are abandoned in the Final Neolithic I. In addition, few individual burials are associated to open air settlements, but their number increases with extensive excavations carried out by exploitation archaeology.

Pit Burials

Some marginal cases of individual pit burials are registered within settlements such as Brémonde, Buoux, Fabrys, and Bonnieux in the Vaucluse (Bretagne/d´Anna 1988), but their dating to the first period of the Final Neolithic is not attested. In the site Clairière in Fraischamp, the destroyed remains of an adult individual were discovered on the base of the Final Neolithic Ia layer. Finally, a Recent or Final Neolithic I pit burial was recorded (Sauzade 2014) in connection with the TGV rescue excavations on the site of Ribauds in Mondragon in the Vaucluse (Margarit *et al.* 2002).

Conclusion

Southern France is a region rich in megaliths and preserved bone material. Unfortunately, the available radiocarbon stock is too limited for any closer definitions regarding the emergence of megaliths

and the reconstruction of the monumental sequence. However, it is possible to formulate some tendencies.

In pre-megalithic times, the dead were buried in pits, caves, rock shelters, or in open air and settlement contexts. The first megalithic and also monumental stage in Southern France is represented by ancient non-accessible dolmens, partly surrounded by stone circles and covered by tumuli. These graves are either isolated in the landscape or arranged in necropolises. This early grave form is limited to the western and to the central part of Southern France and associated to the Middle Neolithic Montboló and even more to the Chasséen horizon (~4600–3500 cal BC) (cf. appendix 1). Based on the material as a chronological parameter, there is evidence that at least seven of these sites are associated, to this time horizon. Furthermore, from the two necropolises, Camp de Ginèbre and Najac, five radiocarbon results are available. For Camp de Ginèbre this data indicates the construction and use of the graves between 4327–3715 cal BC (95.4%; 4319–3802 cal BC) and therefore at the end of the Early and at the beginning of the Final Chasséen horizon. The three radiocarbon dates from Najac within the time interval 4328–3979 cal BC (95.4%; 4318–3995 cal BC) suggest contemporaneous or burials with short time-delays at the end of the Early Chasséen.

The early megaliths were used primarily for individual or double body inhumations. As an exception to that is the successive deposition of three individuals in each one of the graves within the necropolises Camp del Ginèbre and Najac, indicating the beginning of the collective burial tradition. There is also first evidence

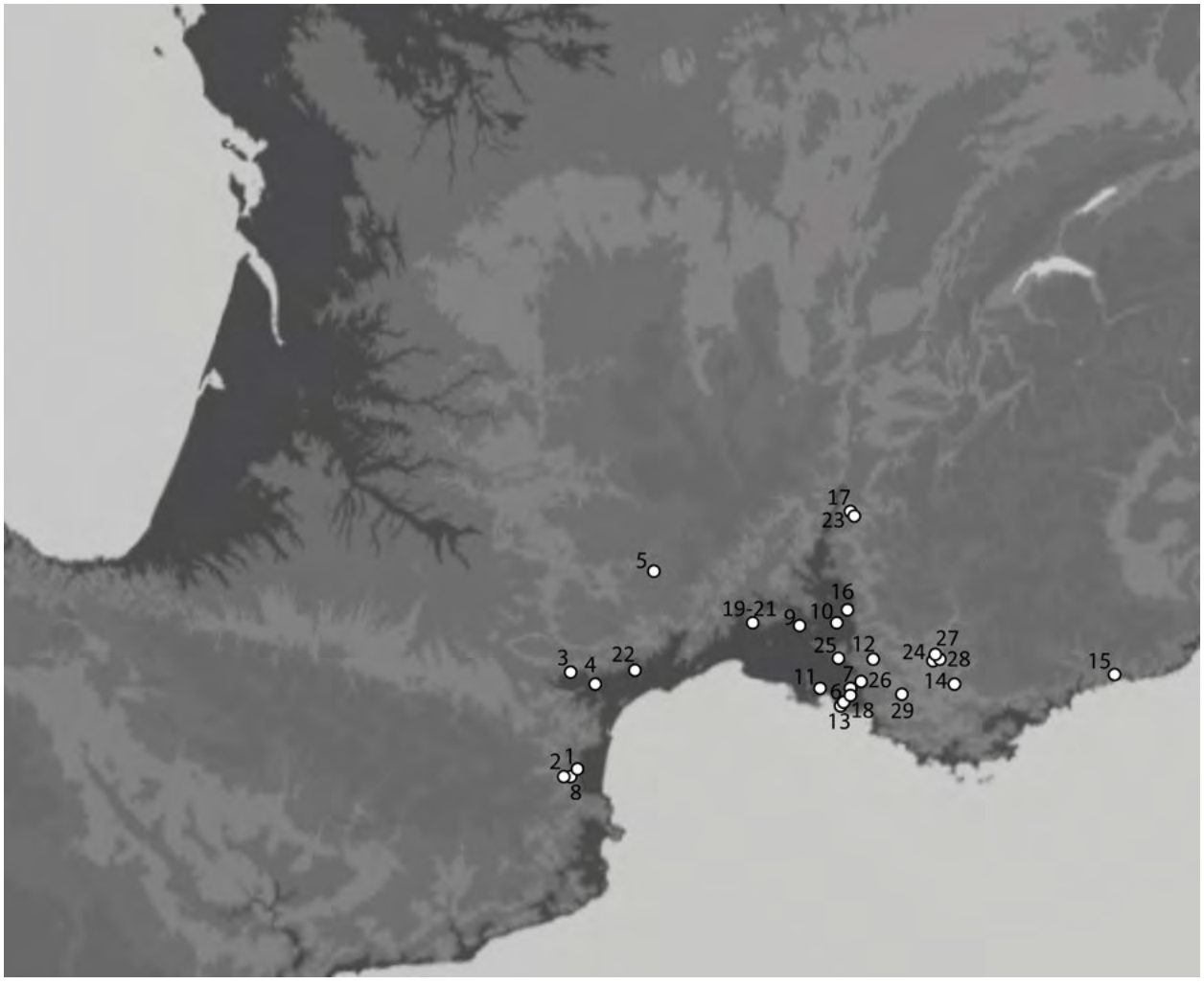


Figure 5.21 Main sites mentioned in text with pre-megalithic sites and earliest megaliths (chapter 5, p. 151-155).

1. Camp del Ginèbre, 2. Arca de Calahons, 3. Najac, 4. Boujas, 5. Causse de Blandas, 6. Saint Jean du Desert, 7. Château Blanc in Ventabren, 8. Cova de l´Esprit, 9. La Baume Bourbon, 10. Grotte de Uang, 11. Grotte Sicard, 12. Grotte de l´Adaouste, 13. La Grotte de Riaux, 14. Grotte de Fontbregoua, 15. Abri Pendimoun, 16. Roussillone Sud, 17. le Moulin, 18. Col Saint-Anne, 19. Esplanade Sud, 20. Forum Kinepolis, 21. Parc George Basse II, 22. Les Crès, 23. Martins, 24. Vallon de Gaude, 25. Héritière II, 26. Délubre, 27. Clavelles, 28. Vallon, 29. La Bastidonne

for incinerations in Camp del Ginèbre, a common burial practice in later megalithic contexts especially in the Northern Provence.

Further to the east in the Provence later transitional structures to the megalithic graves are documented within the necropolis Château Blanc in Ventabren. Even, those are pit burials, are the architectonic principles of the antecedent cited graves partly imitated and the burials are surrounded by stone circles and covered by a round tumulus. Moreover, small standing stones in connection with the graves are noted. The first buried individual in this necropolis is dated from 3524–3101 cal BC (95.4%; 3501–3128 cal BC, 68.2%).

From the Recent and the Final Neolithic onwards, megalithic graves were built as dolmens, passage graves, and gallery graves in the entire region of Southern France, whereas the simple rectangular or quadratic dolmen is the commonest form of megalithic grave chambers and found in large numbers across the whole region. Megalithic graves were constructed later in the Provence than in the other regions and, based on the archaeological material and the radiocarbon dates of the dolmen de l´Ubac, associated to the Final Neolithic with burial activities from ~3190 cal BC onwards (3152–2929 cal BC, 68.2%; 3459–2912 cal BC, 95.4%).

The megaliths were used as collective graves in all of Southern France with up to 300 successively deposited individuals over hundreds of year. However, without the required radiocarbon sequences for the separated individuals, it is impossible to determine, if the megalithic builders had intended to construct graves for the whole community, for families, or if the graves were designed as graves for one individual or a small group and then successively used for subsequent burials of following generations.

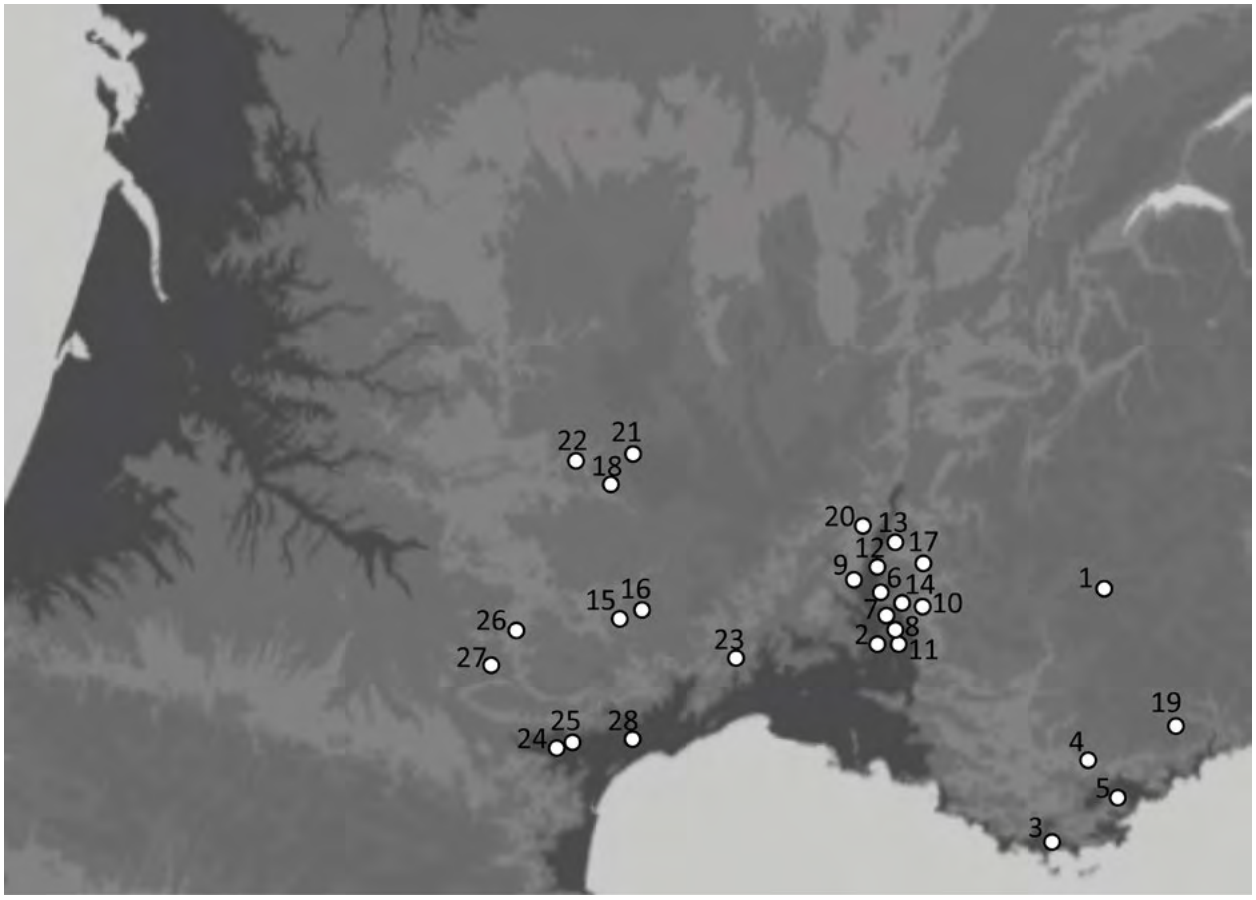


Figure 5.22 Main sites mentioned in text (chapter 5, p. 155-169).

1. Dolmen Le Villard, 2. Dolmen de L´Ubac, 3. Dolmen de Gauttobry, 4. Dolmen Roque d´Aille, 5. Dolmen de San Sébastien II, 6. Hypogea Capitaine, 7. Hypogea Crotte 8. Hypogea Boileau, 9. Hypogea Serre de Huguenots, 10. Hypogea Pérpetairi, 11. Hypogea Bois de l´Ubac, 12. Hypogea Echaffins, 13. Hypgea Vielles in Villedieu, 14. Hypogea Petit Barsan, 15. Cromlech de Lacam de Peyrarines, 16. Cromlech de la Rigalderie, 17. Les Dolmens de Cudières, 18 Dolmen La Bouissière, 19. Dolmen Le Prignon, 20. Saint Martin-d´Ardèche, 21. Dolmen du Pech, 22. Dolmen du Frau de Cazals 2, 23. Dolmen de Lamalou, 24. Dolmen de Fadas in Pépieux, 25. Dolmen du Morrel de las Fadas, 26. Dolmen de Saint-Eugène, 27. Delà Laïa, 28. La Chambre Verte.

The megalithic grave is not the exclusive grave form at that time. Manifold contemporaneous structures and burial sites, such as subterranean cists, hypogea, natural caves, and rock shelters were in use in the Final Neolithic as collective graves for successive burials. A similar number of dead individuals were deposited both in the megalithic graves and the hypogea. In the caves, obviously fewer individuals were buried. Until today, no real differences regarding the demographic composition and the treatment of the dead between the different grave types could be defined. The choice of the burial form seems to have been made according to the landscapes and the available building material. In all regions natural occurrences like caves, rock-shelters, and avens were used for funerary purposes if their characteristics fulfilled certain requirements such as easy access, small chambers, etc. Architecture, such as megaliths, hypogea, and cists, appear in regions with available building material and with easy workable rock, for example the hypogea in the North Vaucluse, where no megalithic building activities are noted. Standing stones, either as simple standing stones or as standing stone statues, are common in the whole region of Southern France. As possible communal places a few registered stone circles in the Cévennes and in the Tarn come into question.

Table 5.1 Radiocarbon dates from Southern France

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
L´Abeille, Labeaume, Ardèche						
Ly-5962	Dolmen		human bn	3335	70	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=6656&cpt=40, 27.03.2012
Arnajons, Le Puy-Saint-Réparade,						
Ly-4582	Dolmen	Upper layer	human bn	4140	35	Sargiano et al. 2010, 137
Balma de Montbolo, Montbolo, Pyrenees						
MC-592	Cave	Chalcolithic layer	ch	4120	90	Claustre 1998, 166
Boussière, Cabasse, Provence-Alpes-Côte d´Azur						
Gsy-57	Dolmen	Pavement	human bn	3975	130	Müller 1998, 86
Camp del Ginébre, Caramany, Pyrenees						
Ly-226	Ancient non-accessible dolmen in round tumulus, necropolis	Structure 11 P3-477	ch	5355	45	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=8523&cpt=1, 27.03.2012
Ly-266	Ancient non-accessible dolmen in round tumulus, necropolis	Tomb I	human bn	3305	60	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=8523&cpt=1, 27.03.2012
Ly-267	Ancient non-accessible dolmen in round tumulus, necropolis	Tomb II	human bn	5100	60	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=8523&cpt=1, 27.03.2012
Can Pey, Montferer, Pyrenees						
Gif-3282	Cave	Numerous disarticulated bones	human bn	4420	120	Claustre 1998, 166
Capitaine, Grillon, Provence-Alpes-Côte d´Azur						
Ly-3021	Hypogeum	Sepulture	human bn	4330	180	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=3418&cpt=5, 1.06.2008
Caune de Belesta, Fenouilllèdes, Pyrenees						
Ly-3302	Cave	Hall VII, 32 individuals	human bn	5640	120	Claustre 1998, 165
Châtaigniers, Vingrau, Aude						
Gif-1275	Cave	Bronce age material	human bn	3430	120	Claustre 1998, 165

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Château Blanc, Ventabren, Provence-Alpes-Côte d´Azur						
ETH-15735	Tumulus, non-megalithic	Inhumation in pit burial tumulus I	human bn	4155	75	Hasler et al. 2002, 237
ETH-15260	Tumulus, non-megalithic	Inhumation in oval tomb tumulus I	human bn	4385	60	Hasler et al. 2002, 237
ETH-15734	Tumulus, non-megalithic	Reuse pheripheral depot tumulus III	human bn	4270	70	Hasler et al. 2002, 237
ETH-15732	Tumulus, non-megalithic	Inhumation pit burial tumulus IVa	human bn	4390	85	Hasler et al. 2002, 237
ETH-15261	Tumulus, non-megalithic	Inhumation oval tomb tumulus V	human bn	4620	60	Hasler et al. 2002, 237
ETH-15730	Tumulus, non-megalithic	Inhumation collective grave	human bn	4495	75	Hasler et al. 2002, 237
ETH-15733	Tumulus, non-megalithic	Inhumation collective grave, individual laying on antecendent (ETH-15730)	human bn	4215	70	Hasler et al. 2002, 237
ETH-15731	Tumulus, non-megalithic	Inhumation reusing collective grave	human bn	4430	70	Hasler et al. 2002, 237
ETH-15262	Tumulus, non-megalithic	Inhumation reuse tumulus III	human bn	3305	55	Hasler et al. 2002, 237
ETH-15259	Tumulus, non-megalithic	Inhumation reuse tumulus IV	human bn	2720	55	Hasler et al. 2002, 237
Coffre de Lo Pou, Cerdagne, Pyrenees						
Gif-7282	Non-accessible dolmen in ovale tumulus	Basement chamber, rectanbgulary structure		4200	70	Claustre 1998, 164
Coma Franceze, Salses, Pyrenees						
Gif-9079	Cave	Layer Cb3 disarticulated bones	human bn	4110	90	Claustre 1998, 166

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Cudières, Jouques, Provence-Alpes-Côte d´Azur						
Ly-5059	Dolmen	Cudières 1, C1		3770	70	Sauzade 1998, 303
Ly-5058	Dolmen	Cudières 2, C2		4325	90	Sauzade 1998, 303
L´Ubac, Goult, Vaucluse, Provence-Alpes-Côte d´Azur						
Ly-740	Dolmen	Ubac 17	human bn	4190	45	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=10165&cpt=3
Ly-854	Dolmen	Quadrat F6 A-1.50m	ch	3970	40	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=10771&cpt=5
Ly-855	Dolmen	Quadrat F7A-1.66	ch	3635	55	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=10772&cpt=6
Gif-10651	Dolmen	Hearth	ch	3350	60	Sauzade 1999
Ly-664	Dolmen	K12,-3.15m	ch	7060	90	Sauzade 1999
Ly-944	Dolmen	Trench under tumulus, 4m deep	ch	6920	70	Sauzade 1999
Ly-945	Dolmen	Hearth 2, trench SE- tumulus	ch	3785	50	Sauzade 1999
Ly-9125	Dolmen	Hearth, quadrant J14-15	ch	3640	40	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=10773&cpt=7
Ly-794	Dolmen	K12 foyer A-2.45M	ch	5220	60	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=10774&cpt=
Ly-900	Dolmen	I6-I7 Nr 72 and 73	human bn	4140	40	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=10776&cpt=10
Ly-946	Dolmen	Brown layer A -2.60	ch	4160	50	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=11304&cpt=17
Ly-947	Dolmen	1.80m deep level	ch	2475	50	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=11305&cpt=18
Ly-10055	Dolmen	S2 coupe NW	ch	2060	65	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=12181&cpt=22

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
L´Ubac, Goult, Vaucluse, Provence-Alpes-Côte d´Azur						
Ly-1721	Dolmen		ch	6700	70	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=13301&cpt=27
Ly-11493	Dolmen	Individual in stretched ventral position	human bn	4245	45	Sauzade 2001, 26.
Ly-1722	Dolmen		ch	2790	35	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=13302&cpt=88
Ly-11492	Dolmen	Base niveau	human bn	4440	-45	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=14429&cpt=96
Grotte de Leygonie, Neuvic-sur-Isle, Dordogne						
Gif 3596	Cave		ch	3660	150	Delibrias et al. 1986, 15
Grotte de Puechmargues, La Roque-Saint Marguerite, Ayeron						
Gif-446	Cave	Under a Chalcolithic ossuary /Tardenoisian level	ch	6420	180	Delibrias et al. 1970, 423
Grotte d'Eybral, Coux-et-Bigaroque, Dordogne						
Gif 2384.	Cave	Burial cave with remains of 60 skeletons	ch	4140	140	Delibrias et al. 1986, 15
Ithe, Aussurucq,Aquitaine						
Ly-3378	Dolmen	Layer 3B	human bn	4000	110	http://www.archeometrie.mom.fr/banadora/echantillon.php?num=3784&cpt=18
Le Pringnon, Saint-Cézaire-Sur-Siagne, Provence-Alpes-Côte d´Azur						
GIF-2859	Dolmen	Under layers	human bn	4040	110	Sauzade 1998, 303
Le Stade, Venasque, Vaucluse, Provence-Alpes-Côte d´Azur						
MC-1480	Cave			4700	90	Sauzade 1998, 303
Les Crottes, Roaix, Provence-Alpes-Côte d´Azur						
Gif-857	Hypogeum			4040	140	Sauzade 1998, 303
Gif-1620	Hypogeum			4100	140	Sauzade 1998, 303

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Montou, Corbère-les-Cabanes, Pyrenees						
Ly-3856	Cave	Chalcolithic layer	human bn	4270	200	Claustre 1998, 166
Ly-4661	Cave	Chalcolithic layer	human bn	4405	70	Claustre 1998, 166
Gif-8175	Cave	8 indivduals together with Montbolo/Chasséen cheramic	human bn	5095	60	Claustre 1998, 165
Najac, Siran, Hérault						
Erl 12289	Non-accessible dolmen		human bn	5354	50	Le Bras-Goude 2012, 2
Erl 12290	Non-accessible dolmen		human bn	5265	50	Le Bras-Goude 2012, 2
Erl-12291	Non-accessible dolmen		human bn	5268	50	Le Bras-Goude 2012, 2
Riffat, Thedirac, Lot, Midi-Pyrenees						
Ly-1188	Tumulus			4090	130	Müller 1998, 86
Roque d´Aille, Lorgues, Var, Provence						
MC-720	Dolmen		human bn	3710	90	Müller 1998, 86, Delibrias et. al. 1976, 893
Saint-Gervais, Bonnieux, Vaucluse, Provence-Alpes-Côte d´Azur						
MC-1482	Cave		human bn	4400	120	Sauzade 1998, 303
MC-1483	Cave		plant remains	4420	120	Sauzade 1998, 303
Saint-Marc, Aix-en Provence, Provence-Alpes-Côte d´Azur						
Gif-1613	Dolmen		human bn	3950	140	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=10776&cpt=10
Saint-Véran, Vaucluse, Provence-Alpes-Côte d´Azur						
MC-1747	Cave			3850	95	Sauzade 1998, 303
MC-1748	Cave	Ditch 2		4200	120	Sauzade 1998, 303
Vallon Carbonel, Cabrieres-d'Avignon, Vaucluse, Provence-Alpes-Côte d´Azur						
MC-1479	Cave			6200	150	Sauzade 1998, 303
Val de Fer, Valensole, Provence-Alpes-de-Haute Provence						
Ly-4900	Hypogeum			3500	80	Sauzade 1998, 303

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Villard, Lauzet Ubaye, Provence-Alpes-Côte d´Azur						
Ly-3022	Dolmen	Layer 2	human bn	3000	170	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=3419&cpt=13
Ly-3257	Dolmen	Layer 2	human bn	3980	120	http://www.archeometrie.mom.fr/ banadora/echantillon.php?num=3683&cpt=4
Villevielle, Demandolx, Provence-Alpes-Côte d´Azur						
Ly-3023	Dolmen	Chamber	human bn	3970	140	Sauzade 1998, 303

Chapter 6

Corsica

Summary: The island of Corsica is another Mediterranean region, with very early megaliths occurring in the last third of the 5th millennium cal BC on the Monte Revincu in the Northern part of the island. Burials in single cists or cist necropolises are the dominant graveforms in Neolithic Corsica, and just a few clearly or assumed classical dolmens and passage graves are known. Compared to the megalithic graves, far more standing stones are registered either arranged in alignments or standing isolated in the landscape. According to recent field surveys, 633 standing stones and 96 statue-standing stones are remaining on the island.

Pre-megalithic structures and pre-megalithic funeral rites on Corsica

Pre-megalithic burials on Corsica took place either in natural caves, rock shelters, single stone cists, or in stone cist necropolises. Only a few body inhumations have been registered for pre-megalithic Corsican contexts since the Mesolithic. There is evidence for two Mesolithic single burials in cave shelters with individuals buried in a stretched back position at Torre d´Aquila (Costa 2004: 119; Madeleine 1994) and with an adult woman buried at Araguina-Sennola. Her head and shoulders were covered by a dark red brown powder, possibly ochre (de Lanfranchi/Weiss 1977). Furthermore, the only burial from the Early Neolithic is reported from L´Araguina-Sennola with an individual in a crouched position deposited in a pit, possibly with ochre on the skeleton. Beside the skull, a small Early Neolithic vessel was deposited with a red substance in the ceramic. Some inhumations are also documented from rock shelters, for example a rather destroyed skeleton from the valley of Saint Julien. The individual was buried together with oyster shells, fragmented ceramics, obsidian fragments, and the burnt bones of ovicapridae. One of these bones could be radiocarbon dated to the first half of the 5th millennium BC (Costa 2004: 121; de Lanfranchi 1995).

Until present, there are approximately 75 stone cists recorded on Corsica at altogether 41 sites (Leandri *et al.* 2007: 43). Some of them might be contemporary to the megaliths on the island or they were even constructed later. These stone cists are closed subterranean or half-subterranean structures; many are included in small stone tumuli and they are located mostly in the mountains or on hilltops. The cists vary in size between 1,5m and 3m in length and they are oriented to the southeast. A part of these graves are clustered at the sites of Vasculacciu, Tivulagju, Poggiaredda, Cardiccia-Foce-Cumpra, Palavese, Ciutulaghja, Capu-di Loco, and Monte Revincu. These necropolises are located on the southern part of the island with the exception of the necropolis on the Monte Revincu, which is situated in North Corsica near Bastia. Bone preservation on Corsica is poor due to acidic soils, but small remains of calcined human bones are partly preserved. These remains suggest a cremation burial praxis. In general, the cists are considered to be single graves (D´Anna *et al.* 1998: 92), but evidence for the verification of this proposition lacks until today.

The necropolis Vasculacciu, well-situated on a hilltop in the depression of Figari and Porto-Vecchio, contains at least eight cists (Leandri *et al.* 2007: 44). Some of them are equipped with one or two standing stones in the entrance area and there are visible remains of stone or earthen tumuli. Structures A and B are more elaborated and labor-intensive then the other structures. The grave goods from these two cists include several hundred flint and obsidian fragments, and several oval and discoid pearls as well. Based on the lithic material, the site is typo-chronologically dated to the second half of the 5th millennium BC (Tramoni *et al.* 2004). Poggiaredda is likewise situated in the depression of Figari and Porto Vecchio and exhibits a southwest-oriented cist or even a dolmen surrounded by a stone circle with two standing stones. The grave goods consist of obsidian flakes, possibly evidence for a settlement close by, but it is not possible to date this site closer (Leandri *et al.* 2007: 45; de Lanfranchi/Costa 2000: 563). From Tivulagiu in the commune of Porto Vecchio, two stone cists are documented: structure A, a half-subterranean cist measuring 5,8m² and structure B with a 4m² floor size and a tumulus originally 10,55m in diameter (Grosjean/Liegeois 1964; Leandri *et al.* 2007: 44). The site Cardiccia-Foce-Cumpra in the commune of Sartene is a site with six cists and some standing stones near the Dolmen de Cardiccia. The site is difficult to access. From the cist Foce-Pastini, which lies isolated from the others 80m to the southeast, the only recorded artifact is a perforated spheroid in stone approximately 5cm in diameter (Leandri/Tramoni 1998). Palavese in the commune of Porto Vecchio is a stone cist, originally covered by a stone cairn averaging 5m to 6m and including an End Neolithic or Chalcolithic arrowhead from the surface of the grave (Leandri *et al.* 2007: 47; Pasquet 1979). Ciutulaghja is a monument quite similar to Poggiareda with a cist or even a dolmen inserted into a cairn 4m in diameter. Due to plundering no closer datable material is available (Leandri *et al.* 2007: 48; de Lanfranchi 1986). Capu di Locu is a rather destroyed

site on a plateau with one clear cist and maybe three structures with unknown function. In addition, some obsidian is recorded from the surface (Leandri *et al.* 2007: 48). Finally, on the Monte Revincu there is a necropolis localized closely and within a settlement with at least nine cists and dolmens (Figures 6.2-6.4) (Leandri *et al.* 2007, 2007a, Leandri *et al.* 2010). Since it is possible through recent investigations and radiocarbon results

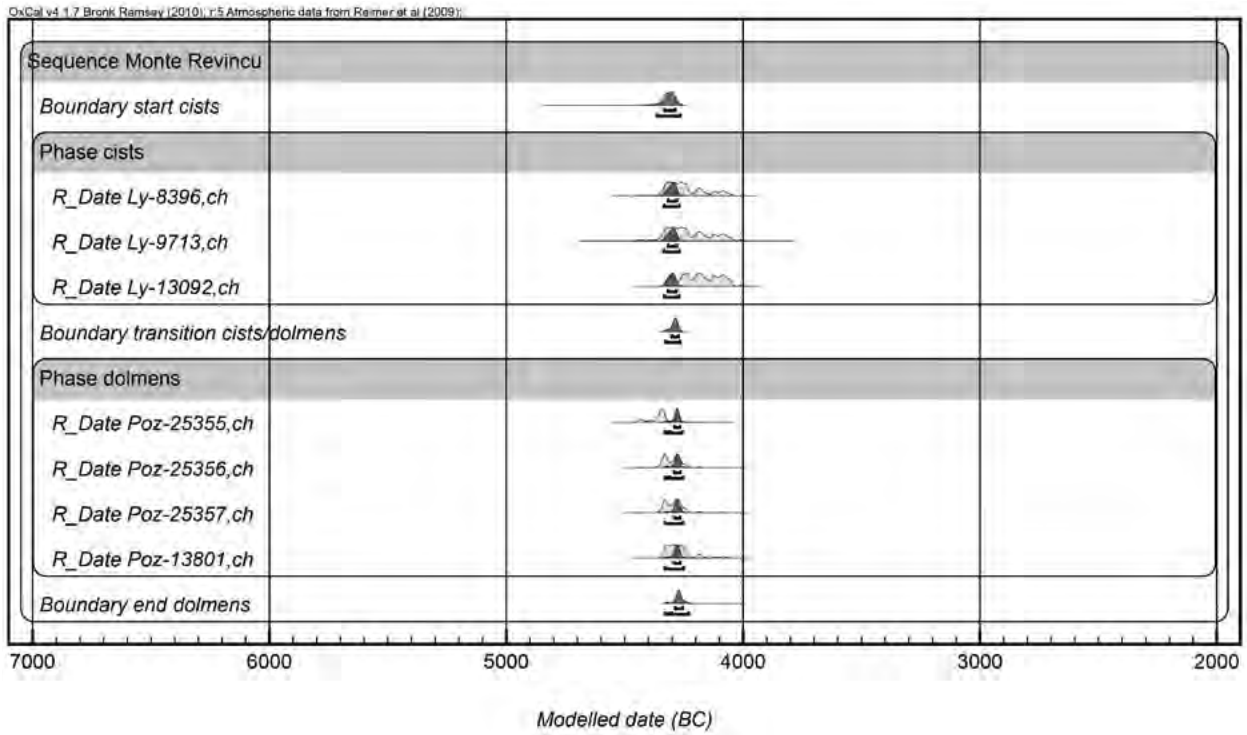


Figure 6.1 Probability of radiocarbon determinations from the Monte Revincu. Model agreement A_{model}=127.5, $A_{overall}$=124.5

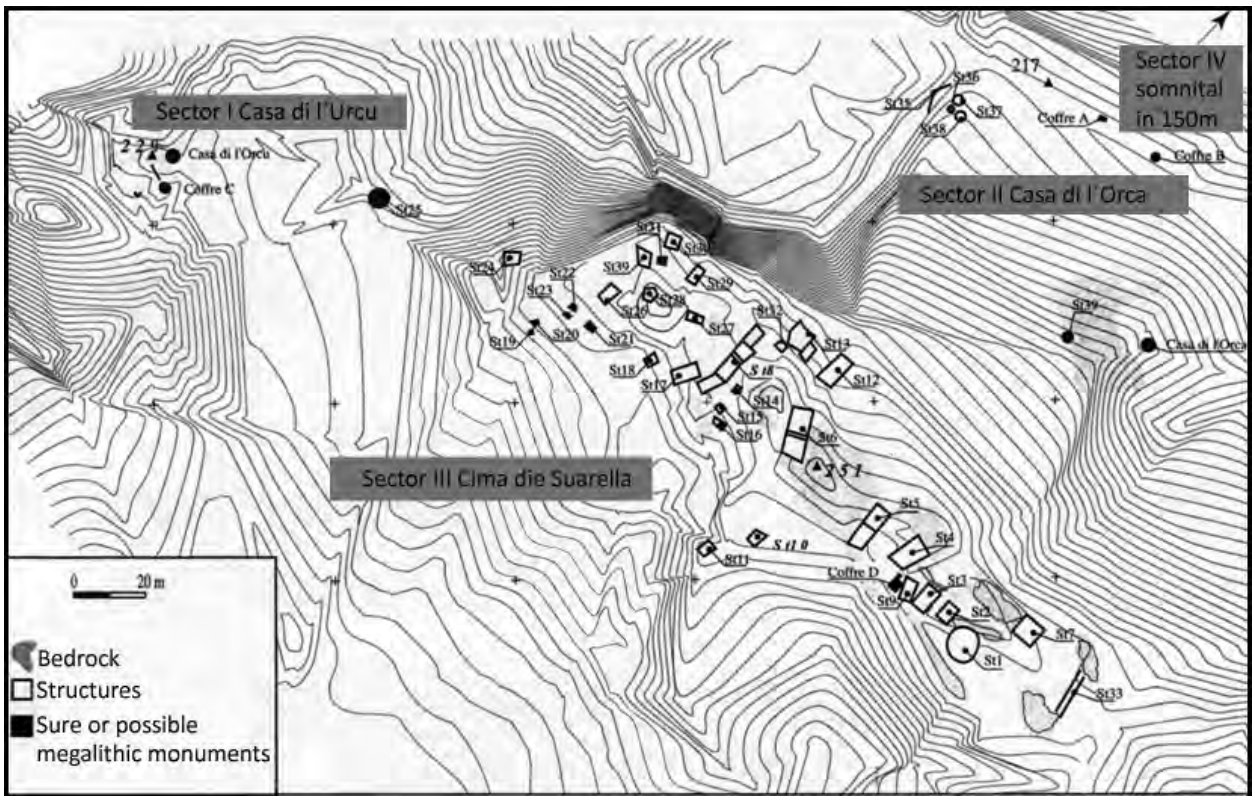


Figure 6.2 The Neolithic settlement with necropolis on the Monte Revincu, North Corsica (after Leandri et al. 2007, Figure 12)

to determine the transition from cists to dolmens, this site will be further discussed in chapter 6, p. 181-182.

Transitional structures and the emergence of megaliths on Corsica

The Monte Revincu is the only stone cist necropolis with radiocarbon results. Within this necropolis it is possible to follow the transition from subterranean stone cists to monuments aboveground (Gilabert *et al.* 2011; Leandri *et al.* 2007; 2010). As the only known necropolis in North Corsica, Monte Revincu lies 30 km north of Bastia on a hill in the Agriate desert in a mountain area 1500m above sea level. Within twelve hectares ca. 50 house and grave structures are clustered, most of them constructed at the end of the 5th millennium (Figures 6.1, 6.2). There are at least nine registered clear graves, three of them are dolmens. Since no bone material is available from these places, the radiocarbon results were processed with charcoal samples. This could include the possibility of *termini-post quos* values. Nevertheless, the radiocarbon results seem convincing in this case, since the data from different structures and places are quiet homogeneous and maintained by typo-chronological considerations of the associated archaeological material. This evidence suggests that the charcoal is directly connected to the burial rites and the cremation of the bodies.

Three of the radiocarbon results are from stone cists; four are from dolmens (Figure 6.1). One of the radiocarbon results (Ly-8396, 5405±55 BP, 4332–4261 cal BC, 68.2% and 4351–4190 cal BC, 95.4%) is from cist D in the main sector Cima di Suarella with 34 houses and grave structures. Cist D had two layers. The layer on the basement of the grave, where the sample originated, was rich in charcoal. Some small ceramic fragments, quartz, obsidian, and a grinder fragment in the cist verify the dating of this grave to the end of the 5th millennium (Leandri *et al.* 2007: 49-52).

end of the 5th millennium (Leandri *et al.* 2007: 49-52). A cluster of graves with cist C and the dolmen Casa di L´Urcu are located around 70m to the northwest of Cima de Suarella and outside the house sector. Cist C has an approximately 4m² floor size and features the rest of a stone tumulus, originally 5m in diameter. The sample for the radiocarbon date originates from the basement of the cist and the surface of a stone pavement.

(Ly-9713, 5405±70 BP, 4330–4280 cal BC, 68.2% and 4346–4267 cal BC, 95.4%). In the cist a ryolite arrowhead was found and in the tumulus fragments of an obsidian blade were recovered.

The stone cist is close to the Dolmen Casa di L´Urcu, which is rather a passage grave orientated to the southeast and constructed over an older structure.



Figure 6.3 Dolmen Cellucia or Somnital on the Monte Revincu, North Corsica. Photo courtesy of Franck Leandri



Figure 6.4 The Monte Revincu from Saint Florent

This older structure is determined to have been a stone cist, which was constructed before the dolmen and as a neighbor to cist C in the middle of the second half of the 5th millennium (Leandri *et al.* 2007: 53). The stone cist was oriented in the same position as the dolmen above it. Thus, here we can follow the transition from a subterranean structure to a monument aboveground. The sample originates from the base of a side stone of the grave (Ly-13092, 5355±55 BP, 4298–4260 cal BC, 68.2% and 4332–4247 cal BC, 95.4%) and it is also possible that the sample is connected to the cist under the dolmen. However, this radiocarbon result is quite close to a radiocarbon date from the Dolmen Somnital or Cellucia and so it is a possible dating of the dolmen itself. In the same sector, Middle Neolithic ceramic deposits were found as well. The Dolmen de Cellucia is a grave on the top of a hill 150m from sector II. It is a structure with a clear access and a passage oriented to the southeast with the remains of a stone tumulus, a surrounding stone circle, and a standing stone in front of the entrance. The chamber is quite modest with a floor size of 1m² and emptied in ancient times. The sample for the radiocarbon date was taken from the passage (Poz-13801, 5410±40 BP, 4297–4261 cal BC, 68.2% and 4332–4252 cal BC, 95.4%). This measurement is maintained by typo-chronological considerations from the material found in the passage including three symmetric polished axes, small quartz pebbles, and 16 polished pendants. Further three results are available from the dolmen of the Casa di Urca (Leandri *et al.* 2014: 24). It is a grave surrounded by two concentric stone circles with a small corridor. The three radiocarbon dates (Poz-25357, 5440±40BP; Poz-25355, 5490±40BP; Poz-25356, 5450±40BP)are modeled hinting a time interval from 4334-4256 cal BC (95.4%; 4291-4263 cal BC, 68.2%). The beginning of the stone cist necropolis on the Monte Revincu is so calculated on 4390-4263 cal BC (95.4%; 4341-4284,68.2%) and the transition from cists to dolmens and even to passage graves on 4335-4264 cal BC (95.4%; 4305-4269, 68.2%)

Appearance and architectonical features of megalithic structures on Corsica

Megaliths developed on Corsica in all their diversity with simple dolmen, passage graves, stone alignments, standing stones, standing stone statues, and small stone circles. The Bronze Age settlement sites Torre and Castelli on Corsica are not further discussed in this analysis. Just ca. 22 clearly or assumed classical dolmens and passage graves are known from Corsica (Leandri *et al.*: 23, cf. also D'Anna *et al.* 1998: 105), which include two megalithic graves on the Monte Revincu, and graves at Paomina, Tremeca, Ciutulaghja, Piscia, Tola di U Turmento (Figure 6.5), Settiva (Figure 6.7), Taravo, Figa la Sarra, Grossa, Bizzicu-Rosu, Pazzanile, Campu

Fiorellu, Fontanaccia (Figure 6.6), and Speranzata, while some of these graves, for example Ciutulaghja, are not even clear megalithic structures. On Corsica, megalithic graves are situated in the west or southwest with the exception of the graves at the Monte Revincu, which are located on the north of the island. Most of them are situated on hilltops with difficult access. Just a few exceptions exist in the lowlands, for instance the dolmen of Fontanaccia on the plain of Cauria, which is placed in the middle of a valley close to two alignments. In contrast, settlements from the 5th and the 4th millennium are registered for the coastal area (Costa 2004, 73–80). Some of the graves on Corsica are documented as gallery graves, for example Caldiano in Olmeto, l´Aghja, Sapara Terragna, and Saparello in the Grossa region, but these monuments do not exist any longer. In comparison to the dolmens it appears that they had more than one capstone and can rather be considered as a local variation of extended dolmens (D'Anna 1998: 93). Most of the megalithic graves were originally covered by an earthen or a stone tumulus. Some of them were provided with a stone circle, for example the Dolmen de Settiva and the megalithic graves on the Monte Revincu, and they are oriented to the southeast or to the east. Only five of these graves have been investigated and were already described here in chapter 6, p. 181-182., i.e. two dolmens on the Monte Revincu, the Dolmen de Cardiccia, the Dolmen de Settiva and the Dolmen of Figa-La-Sarra. The Dolmen de Casa di L´Urcu on the Monte Revincu is a small simple dolmen in the Cima di Suarella sector with the remains of a stone tumulus surrounded by house structures and stone cists. The Dolmen Cellucia is a passage grave 150m to the northeast of the settlement, whereas a necropolis lies on the top of the Monte Revincu. The dolmen was originally covered by a stone tumulus surrounded by a stone circle. Close by on the mountain top, a sub-rectangular structure with unknown function and a standing stone are also recorded (Leandri *et al.* 2007: 54–55). Furthermore, on the plateau of Cauria the simple dolmen of Cardiccia is found, which is grouped together with four cists situated on a hilltop difficult to access (Leandri/Tramoni 1998). The isolated dolmen itself is situated 30m to the north of cist 1. The Dolmen of Settiva outside the village of Petreto-Bicchisano is located on the southeast slope of a small hill above the valley of Orgonu (Grosjean 1972) (Figure 6.7). The structure is a simple dolmen with a chamber measuring 1,70m x 1,60m. The grave is surrounded by a stone circle with massive stones which are up to 1m in height. Originally, two anthropomorphically-formed standing stones faced the entrance. One is still standing in front of the southeast-oriented entrance and measures approximately 1,60m in length. A natural, specially-formed rocky outcrop and a stone row with small standing stones stand close by to the east of the



Figure 6.5 Dolmen di Tola di U Turmento, southwest Corsica



Figure 6.6 Dolmen de Fontanacchia, plain of Cauria



Figure 6.7 Dolmen de Settiva, Petreto-Bicchisano

grave. Finally, the dolmen from Figa da Sarra by Olmeto is situated on the hill crest in the massif of the Monte Barbattu which faces the sea. It is a partly destroyed simple structure with a rectangular chamber 1,5m in length (Cesari 2001).

Compared to megalithic graves, there are far more standing stones registered on Corsica. 633 standing stones and 96 statue-standing stones are known according to recent field surveys. The majority of the stones stand as groups or stone alignments. The rest stands isolated in the landscape. Only 37 completely isolated standing stones are registered (Leandri *et al.* 2014: 23-24). The standing stones are either unworked, anthropomorphically formed, or even dressed as statues with faces, dresses, and weapons. R. Grosjean established a chronology describing a development which progressed from the natural simple monoliths to the elaborated standing stone statues (Grosjean 1967), but this chronology is not easy to verify. A large portion of the single standing stones or alignments is located in the close surrounding of the dolmens and cists, for example at the Monte Revincu, Bizziucu, Rossu, Fontanaccia, La Piana, Campo-Fiorello, Taravon, Poghjaredda, Sapara Ventosa, Paddaghju, Renaghju, Tivolaghju, and Vasculaghju.

Parallel occurrences of cists connected with single standing stones are known from Sardinia, for example at Li Muri or Pránu Muttedu di Goni.

Derivated from the depicted weapons, many of these standing stone statues can be attributed to the Bronze Age. Due to their spatial and possible functional closeness to the simple standing stones, they deserve closer consideration. According to their spatial distribution and iconographic considerations, the standing stone statues can be divided into four micro-regions: Nebbio, Sagone, Taravo, and Sartene (D'Anna 1998: 93–103). The Nebbio group is located in the central depression of the island in the mountains. Approximately ten standing stone statues are registered, fabricated from local calk stone, schist, or granite. The statues are characterized by their long and gracile form, short symmetric shoulders, primarily realistic faces, and the absence of weapons.

The Sagone group in the triangle Ajaccio-Sagone-Renno consists of nine known standing stone statues which are more compact than the statues of the Nebbio group. The ears and the pectoral are plastically formed; small cups indicate the nipples and weapons are absent. The Taravo group around Taravo consists of 34 statues, including the statues from Filitosa I to XIX. On the well-conserved exemplars, low reliefs of daggers or swords are placed. Some of them have very realistic faces and backs with scapula and ribs, whereas some of the statues are more schematically depicted. The Sartene group in the southwest part of the island is concentrated in an area limited by the valleys of Rizzaneza and Ortolu. There are at least 16 statues with visible weapons, such as daggers and swords, and the statues are more massive and rectangular. A large portion of the standing stones of the island is registered in this region. Many of them are incorporated in alignments such as Palaghju, Apazzu, Sartene, and Renaghju (Figure 6.8).

In this area on the plain of Cauria, two of the large stone alignments are situated: the alignment of Renaghju with ostensible simple standing stones and the alignment of Stantari with standing stone statues. In this region it is apparently possible to witness the development of the statues from simple standing stones to anthropomorphic stones and finally to standing stone statues. For example, the simple Dolmen de Fontanaccia with a 4m² base size is placed 550m to the northeast of the alignment Renaghju (Figure 6.6, 6.8.). Here it is notable that these alignments seem to follow a vertical development from simple small standing stones to sophisticated standing stone statues. Renaghju is an alignment consisting of approximately 188 simple unworked standing stones; most of them are oriented in an approximately 45m long line from the southeast to the northwest. The alignment is located close to natural, anthropomorphically-formed rock formations (cf. Figure12.10) and the megalith landscape is incorporated here in a ritual natural landscape. Geo-archaeological investigations close to Renaghju showed a small water source, which could be as well jointly responsible for the choice of location (D´Anna *et al.* 1998: 101).

The alignment de Renaghju on the south of the plain is one of the only alignments on Corsica with recent investigations and excavations from 1996/1997 (D´Anna *et al.* 1998: 100–103; 2001). According to the excavator, this investigation verified a stratigraphical sequence with six chronological phases.

The alignment de Renaghju on the south of the plain is one of the only alignments on Corsica with recent investigations and excavations from 1996/1997 (D´Anna *et al.* 1998: 100–103; D´Anna *et al.* 2001). According to the excavator, this investigation verified a stratigraphical sequence with six chronological phases. Phase 1 and 2 correspond to the Early Neolithic Cardial through analyses of Cardial ceramics and trapezoidal arrowheads. Thus, they represent a pre-megalithic occupation of the site. The first small standing stones were erected in phase 3. They are probably connected to a destroyed cist beside the alignment, as is the case on the Monte Revincu or at Vasculacciu. In phase 4 at least 35 standing stones were erected with a height between 1m and 1,60m. There are only two exceptions: the statue-standing stone no. 1 is 2,30m and the standing stone no. 7 is 2,40m in height. It is not yet possible to date these two phases corresponding to the alignment. Phase 5 and 6 are post-megalithic and correspond to the destruction of the site possibly during medieval times.



Figure 6.8 The alignment de Renaghju, plain de Cauria



Figure 6.9 The alignment of Stantari, plain de Cauria

The alignment of Stantari is situated 500m to the north of Renaghju (Figure 6.9). Today, a wetland is found between the two alignments. The alignment at Stantari presently consists of 13 standing stones. Seven of them are standing stone statues partly equipped with Bronze Age daggers. The standing stone statues either symbolize real persons, mythical figures, or supernatural beings.

Approximately 10 quite small stone circles are known from the island (Leandri *et al.* 2014: 23, 25). Their functions and ages are unknown so far and none of them has been excavated. They are between 3m and 7m in diameter and consist of small stones up to 50 cm large (Frank Leandri, pers. comment). Single stone circles are known from Pastini in South Corsica, Monte Battagliola, and Aghiola in Haute Corsica. Some stone circles are grouped, for example three stone circles on the Monte Revincu and seven from Stanti a Rogliano in High Corsica (D´Anna 1998: 93).

Megalithic structures with radiocarbon sequences and radiocarbon dates

Till this day there are very few radiocarbon dates available from megalithic Corsican contexts. In fact, only the radiocarbon results from the two dolmens at the Monte Revincu discussed in chapter 1. 2 are connectable to the construction and the original use of the graves (Figure 6.1). They are modeled hinting a time interval from 4334-4252 cal BC (95.4%; 4297-4261 cal BC, 68.2%) (Dolmen de Casa di L´Urcu, Poz-25357, 5440±40BP; Poz-25355, 5490±40BP; Poz-25356, 5450±40BP and Dolmen de Cellucia, Poz-13801, 5410±40 BP).

The two radiocarbon dates from the Dolmen de Settiva verify a medieval secondary burial and will not be discussed here further (Gif-2566, 2320±100 BP and Gif-2567, 1510±100 BP) (Delibrias *et al.* 1986: 20). The same applies to four dates from the alignments de Stantari and Palladium, although it is difficult to connect samples to the erection of the stones and the samples here are rather connected to later activities on the site, since the alignment de Stantari was produced in the Bronze Age at the latest as seen by the depicted weapons. Nevertheless, a later erection of the stones cannot be excluded (Gif-1397, 2120±110 BP; Gif-1396, 2950±110 BP; Alignment de Pallagiu, Gif-476, 2650±150 BP; Gif-477, 2680±150 BP) (Evin *et al.* 1978, 20; Delibrias *et al.* 1970, 424).

Dating the megaliths on the basis of the artifacts

Five of the megalithic graves have been excavated scientifically: the two dolmens at the Monte Revincu, the Dolmen de Cardiccia, the Dolmen de Settiva in Petreto-Bicchisano and the Dolmen Figa-La-Sarra in Olmeto. These graves are nearly all simple dolmens, whereas only the Dolmen Somnital or Cellucia on the Monte Revincu is a small passage grave. Exclusively the archaeological material from the dolmens already discussed in chapter 6, p. 181-182 from Monte Revincu can be connected to the construction and original use of the graves. The depot from the Dolmen Cellucia contained the most significant material from this kind of structure on Corsica, since most structures were robbed or emptied or the typo-chronological dating of the material supplies only possible terminus-post quem or terminus-ante quem values. The depot from the Dolmen Cellucia is documented from the passage of the grave, whereas the chamber was emptied in former times. The material consists of polished ceramic fragments, three symmetric polished axes with lengths of 11,5cm, 7,9cm and 4,3cm, small quartz pebbles, and 16 polished pendants produced from a light green local rock (Leandri 2007 *et al.*: 54–57). This material is typologically quite close to the San Chiriaco material from Sardinia, for example from Li Muri, which includes non-accessible ancient dolmens from the last quarter of the 5th millennium (cf. chap. 7, p. 191).

The Dolmen de Cardiccia was excavated at the beginning of the 1980s. Nearly 800 pieces of lithic material are documented from inside and the outside the chamber. The material is interpreted to have originated from a pit located outside the grave and to represent a terminus post quem value. The material is quiet homogenous and characteristic for the end of the 5th and the 4th millennium (Costa 2004: 157; Leandri/Tramoni 1998). From the Dolmen de Settiva, which is located outside of the village Petreto-Bicchisano, nearly 20 intact Bronze Age cups and secondary burials with a medieval dating are recorded. The Bronze Age cups could be also a secondary deposit (Grosjean 1972a). Some Iron Age glass pearls from the chamber are recorded from the destroyed Dolmen Figa da Sarra by Olmeto (Cesari 2001).

Megalithic burial rites

Since bone preservation is quiet poor in Corsican soil, burial rites are largely unknown. Some cremated bones suggest a cremation burial practice, but they can also have originated from secondary burials, for example at the Dolmen de Settiva. The charcoal, which was mixed in the upper layer of this dolmen together with cremated bones, offered a radiocarbon result from medieval times. In general, the megalithic graves are connected to a collective burial practice (D´Anna *et al.* 1998: 93), but evidence for this proposition lacks until the present day.

Contemporaneous non-megalithic burials

From the Punta di Murtuli, an inhumation together with ceramics from the middle of the 4th millennium is

recorded from a rock shelter. On the plateau of Cauria, two inhumations with at least two adults and a child were discovered together with Chalcolithic terrinien material in the natural caves Cauria XX and Cauria XXI. In I Calanchi several rock shelters were used as collective graves between the 3rd and the beginning of the 2nd millennium. To be mentioned here are particularly Taffoni 2 and 3 with the remains of several individuals and at least one child (Cesari 1986; Costa 2004: 121–124). The individuals were exposed to high temperatures and a large part of the long bones are deformed. Radiocarbon results from charcoal samples are available for both places (Taffonu 2, Gif 7153, 4080±60 BP 2852–2498 cal BC, 68.2%, 2871–2476 cal BC, 95.4%; Taffonu 3, L.G. Q-7154, 3740±60 BP; 2274–2036 cal BC, 68.2%, 2341–1958 cal BC, 95.4%) (Costa 2004: 99). In the front of the entrance of Taffonu 2, a standing stone marked the burial place. Another rock shelter and a collective grave with a similar treatment of the individuals were excavated in Castellucciu in the Sartene region. The bodies showed traces of heat influence. This grave could be associated to the beginning of the Bronze Age (Cesari 1986).

Conclusion

Corsica is one of the earliest megalithic regions in Europe. On the Monte Revincu, it is possible to consider a transition from subterranean cists to accessible monuments and passage graves aboveground. This transition was accomplished at 4335-4264 cal BC (95.4%-4305-4269, 68.2%), possibly somewhat earlier. According to the material culture, there is evidence for a connection to Sardinia, the contemporaneous San Chiriaco horizon, and the necropolis Li Muri, although the Li Muri graves are comparable to the non-accessible structures and non-accessible ancient dolmens on the Monte Revincu. Thus, the Dolmen Somnital or Cellucia on the Monte Revincu represents the earliest known passage grave and accessible megalith in the Mediterranean. This grave and the dolmen Casa di L´Urcu are the only two megalithic graves on Corsica with radiocarbon results connectable to the construction or the first use of the graves. The number of dolmens and passage graves on Corsica is limited today to 18. Since Corsica is rather unexploited, this low number cannot only be explained by extensive land use and the destruction of the monuments. Instead, this evidence suggests that it is highly probable that the megalithic graves on Corsica do not represent the burial places for the entire Neolithic population. Unfortunately, there is nothing known about the burial practices and too little about the contemporaneous non-megalithic graves to proclaim the dolmens and the passage graves as burial places for special groups or members of the society, even if there are some indications, such as the megalithic-contemporaneous burials in the caves of Calanchi, which show a ‘less’ careful burial praxis. To cremate a body completely is a labor-intensive procedure so that is can be stated that the individuals in the Calanchi caves were entirely exposed to high temperatures, but not totally cremated.

The megalithic graves on Corsica were erected on special places in the mountains with difficult access, sometimes in connection with a settlement like on the Monte Revincu, but never at the coast or in connection with the settlements there.

The question remains how the 685 registered standing stones on Corsica should be interpreted, which are much more numerous than the megalithic graves. Many of them stand in front of a stone cist or a megalithic grave and some are anthropomorphically-formed or sculptured as standing stone statues and thus symbolize real persons, mythical figures or supernatural beings. The traditional interpretation of the standing stones as a typological development from small simple standing stones to high artistic statues is problematic, even if there are some indications which support this hypothesis, for instance the connection between simple standing stones at Neolithic cists, the depiction of Bronze Age weapons on standing stone statues and the spatial relations of the standing stones on the plain of Cauria. However, the production of simple standing stones in later periods cannot be excluded. A closer determination of the erection of the alignments is difficult or impossible.



Figure 6.10. Main sites mentioned in text (map source: SRTM geodata.)

1. Torre d´Aquila, 2. Araguina-Sennola, 3. Saint Julien, 4. Vasculacciu, 5. Tivulagju, 6. Poggiaredda, 7 Cardiccia-Foce-Cumpra, 8 Palavese, 9.Ciutulaghja, 10 Tremeca, 11. Monte Revincu, 12. Capu-di Loco, 13. Paomina, 14. Piscia, 16. Tola di U Turmento, 17. Settiva, 18. Taravo, 19. Figa la Sarra, 20. Grossa, 21. Bizzicu-Rosu, 22. Pazzanile, 23. Campu Fiorellu, 24. Fontanaccia, 25. Speranzata, 26. Caldiano in Olmeto, 27. l´Aghja/Sapara Terragna/Saparello, 28. Palaghju, 29. Apazzu, 30 Venturoso 2, 31. Renaghju, 32. Stantari, 33. Cauria XX/Cauria XXI, 34 I Calanchi Taffoni 2 and 3, 35 Castellucciu

Table 6.1 Radiocarbon dates from Corsica

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	Bibliography
Dolmen de Settiva, Petreto-Bicchisano						
Gif 2566	Passage grave	0.50m deep in level with ceramic	ch	2320	100	Delibrias et al. 1986, 20
Gif 2567	Passage grave	0.40m deep in level with ceramic	ch	1510	100	Delibrias et al. 1986, 20
I Calanchi, Olmeto						
LGQ-7154	Cave	Taffoni 3	ch	3740	60	Costa 2004, 99
Gif-7153	Cave	Taffoni 2	ch	4080	60	Costa 2004, 99
Monte Revincu, San-Pietro-di Tenta						
Ly-8396	Cist	Sector de la Cima de Suarell, basement layer chamber	ch	5405	55	Leandri et al. 2007, 49
Poz-13801	Passage grave	Dolmen de Cellucia, corridor	ch	5410	40	Leandri et al. 2007, 55
Poz-25355	Dolmen	Dolmen Casa di L´Urca	ch	5490	40	Leandri et al. 2014, 24
Poz-25356	Dolmen	Dolmen Casa di L´Urca	ch	5450	40	Leandri et al. 2014, 24
Poz-25357	Dolmen	Dolmen Casa di L´Urca	ch	5440	40	Leandri et al. 2014, 24
Ly-13092	Dolmen	Casa di L´Urcu, basement implantation dolmen	ch	5355	50	Leandri et al. 2007, 53
Ly-9713	Cist in round tumulus	Casa di L´Urcu , basement cist, on accumulation of small stones	ch	5405	70	Leandri et al. 2007, 53
Ly-8395	Settlement	US 108, structure 106	ch	5355	55	www.archeometrie.mom.fr/banadora/echantillon.php?num10058&cpt=01.04.2008
Palaggiu, Sartène						
Gif-476	Alignment	Cist A, interior level	ch	2650	150	Delibrias et al. 1970, 424
Gif-477	Alignment	From burning level, basement alignment	ch	2680	150	Delibrias et al. 1970, 424
Stantare, Sartène, Cauria						
Gif-1397	Alignment	From the bottom of the 5th monolith	ch	2120	110	Delibrias et al. 1971, 220
Gif-1396	Alignment	From bottom of the 5th monolith	ch	2950	110	Delibrias et al. 1971, 220

Chapter 7

Sardinia

Summary: On Sardinia, as on Corsica, early non-accessible dolmens are grouped in small necropolises on the Northern part of the island and date from the last third of the 5th millennium cal BC. From the 4th millennium onwards, the megalithic tradition seemed to be more common on this island. More than 200 dolmens, passage graves, and gallery graves are reported from Sardinia and around 650 standing stones. A unique monument for the entire European megalithic world is represented by the megalithic pyramid Monte d´Accoddi, which served as a platform for a building in the northwestern part of the island. The radiocarbon dates suggest the construction of this monument in the first third of the 4th millennium cal BC.

Pre-megalithic structures and pre-megalithic funeral rites on Sardinia

No Mesolithic burials are documented on Sardinia (Lugliè 2009) and there is little evidence of burial rites in the Early Neolithic Cardial horizon (Depalmas *et al.* 1998; Lugliè 2009a). From the rock shelter Su Carropu, skull fragments of a masculine and a feminine individual together with sea mussels, schist pendants, and a grinder are interpreted as the remains of Early Neolithic burials (Atzeni 1972; Lugliè 2009a: 47).

From the Early Middle Neolithic Bonu Ighinu horizon and the second and the third quarter of the 5th millennium (Usai 2009, Figure 9), a few burials are recorded for a hypogea necropolis, in pits, and in natural caves (Depalmas *et al.* 1998; Santoni 2000; Usai 2009: 54). With the necropolis Cuccuru S´Arriu-Cabras, the earliest known hypogea on Sardinia are documented (Germaná/Santoni 1992; Santoni 1982; 2000). This necropolis consists of 19 graves from the Middle Neolithic Bonu Ighinu horizon, 13 are hypogea and the remaining graves are pit burials (Santoni 2000: 372). Most of these structures are conceived as single burials with one chamber and an access. From two of the graves there is evidence for a double burial. The individuals were buried in a crouched position on the left side and partly covered with ochre. Grave goods included feminine figurines, lithic and bone tools, obsidian geometric microliths, ceramic-like lugged goblets, keeled vessels, and flat bowls (Depalmas *et al.* 1998; Santoni 2000, Figure, 2 and 6).

In the cave of Rifugio di Oliena in Nuoro, an ossuary is documented with secondarily deposited skeleton material with an unknown primary burial place (Agosti *et al.* 1980).

Transitional structures and the emergence of megaliths on Sardinia

The necropolis Li Muri, close to Arzachena in the province of Olbia-Tempio, represents the earliest documented megalithic stage on Sardinia. The necropolis is situated on the top of a plateau in the middle of bizarre-formed natural rocky outcrops and consists of four small ancient non-accessible dolmens and a passage grave (Antona Ruju/Ferrarese Ceruti 1992: 22–29; Antona Ruju 2003; Puglisi 1942: 123–141) (Figure 7.1). In the scientific literature, the structures in Li Muri are partly referred to as cists, but they are ancient non-accessible dolmens in the sense of this analysis since they are clearly aboveground structures. These dolmens are all oriented to the south or to the southwest and they are surrounded by several concentric circles or a stone pavement, which originally most presumably stabilized a tumulus. The dolmens are between 1,6m and 2m long and 1,2m and 1,6m wide and in their outer stone circles, varying between 5.3m and 8.5m in diameter, small standing stones are incorporated. The passage grave is situated in the outer periphery of the dolmens and, in contrast to the dolmens, oriented to the southeast. It obviously represents a younger construction with different burial rites. Between the graves altogether three small cists or shrines with unknown function are placed. They were empty. Fragments of human long bones were preserved in the dolmens and traces of red ochre on the granite stones are an indication that the bodies were originally covered with this red substance. There are no radiocarbon dates available from Li Muri. The grave goods in the dolmens consist of polished triangular axes, beads, pearls, flint blades, a steatite ceramic bowl with handles and a ring on the base, and a steatite cup (Antona Ruju/Ferarese Ceruti 1992: 15). The grave goods and especially the steatite cup are attributed to the Late Neolithic San Ciriaco horizon (e.g. Alba 1999; Antona Ruju 2003; Melis 2007a and b; Usai 2009: 56), which is determined by solely two radiocarbon dates from the settlement Contraguda in North Sardinia (Boschian *et al.* 2000–2001: 256) (Figure 7.8). Thus, the San Ciriaco horizon started at ~4400 BC (4472–4099, 68.2%; 4728–4070, 95.4%). The transition to the Ozieri horizon is calculated to 4100 BC (4116–4005, 68.2%; 4218–3986, 95.4%) and accordingly contemporaneous to the necropolis on the Monte Revincu on Corsica. An extension of the time horizon is possible, since there is far too little data available. In the Arzachena region, a similar structure is documented with la Macciunitta (Antona Ruju/Ferrarese Ceruti 1992: 31–32; Paglietti



Figure 7.1 The Li Muri graves in Arzachena. Plan of the necropolis after Antona Ruju Ferrarese Ceruti 1992: 42

2009: 98–99). Similar but later structures exist with the necropolis Pranu Muttedu at Goni (Figure 7.6) and Masone-Perdu at Laconi (Atzeni 1981; 1982; Atzeni/ Cocco 1989; Melis *et al.* 2007: 261; Melis 2009: 93; Tanda 2009: 65). Li Muri belongs to a Mediterranean appearance, the tomba a circoli, which Jean Guilaine (Guilaine 1996: 124; compare as well Antona 1998; Santoni *et al.* 1997; Paglietti 2006) defined as pre- or proto-megalithic grave architecture with similar structures in Catalonia, Languedoc, the Provence, and perhaps even in Andalusia.

Appearance and architectonical features of megalithic structures on Sardinia

On Sardinia megaliths exist in the form of dolmens, passage graves, gallery graves, and furthermore as standing stones, which were either isolated or organized in groups or alignments erected in the landscape. Moreover, a unique monument of the entire European megalithic world is documented on Sardinia: the megalithic pyramid Monte d´Accoddi.

Later megalithic appearances are the so-called tombei di giganti, colossal constructions similar to gallery graves with a length of up to 15m. These graves resemble the nuraghi (stone towers), ostensibly attributed to the Bronze Age. They are not an object of this analysis.

Altogether 215 dolmens, passage graves, and gallery graves are reported from Sardinia, whereby at least 30 of these structures were destroyed in partly recent times (Cicilloni 1999; 2007; 2010). These graves are distributed over the northern half of the island with the exception of eight graves, which are located in the northwestern and the southeastern part of the southern half of Sardinia. No tumuli have been preserved from the Sardinian megalithic graves. A large portion of the graves is surrounded by stone circles or pavements, which could have served to stabilize a tumulus. 69% of theses monuments are oriented between the east and the southwest, while around 41% of these structures are directly oriented to the southeast. A more unusual orientation for megaliths between the west and the northeast is documented from 21% of the graves (Cicilloni 2010: 151; Hoskin-Zedda 1997).

The simple dolmens amounting to 161 monuments are the most common structures on the island. From 134 of these graves it is possible to reconstruct the ground plan. Among these, 84 simple dolmens are registered with a quadrangular or rectangular ground plan. The smallest is hereby the dolmen no. 6 in the necropolis Matta Larentu (Figure 7.3), which measures 1m x 52cm (Cicilloni 2010: 71; Moravetti 2000: 324). This necropolis consists of six small dolmens, with partial remains of a stone circle. According to their architectonic concept, they resemble the Li Muri graves but in an accessible form. The largest registered dolmen is the Dolmen San Sebastiano (Cicilloni 2010: 60; Meloni 2002), a construction with partly dry wall elements and a length of 4,80m x 1,15m. The Dolmen Mura e Putzu in Abbasanta is the only grave with a lateral entrance. A hybrid between dolmens and hypogea is represented by the Dolmen di Maone in Benedutti, which is partly worked into the bedrock and constructed with dry wall elements (Cicilloni 2010, Figure 69).

Among these dolmens, the most elaborated exemplar is the Dolmen de Sa Coveccada in Mores (Atzeni 2007: 453–456; Calvia 1905; Moravetti 1998). This grave is constructed with four up to 4,65m long side stones and a capstone which measures 3,25m x 60 cm. A falsa porta in the entrance stone and a niche inside the chamber with a bench are architectonic parallels to the hypogea (Figures 7.4/2, 7.5).



Figure 7.2 Dolmen de Ladas, Dolmen de Billela, Dolmen de Ciuledda, northern Sardinia

31 of the simple dolmens are constructed with a polygon, a half-polygonal or an elliptic ground plan with diameters ranging between 1,2m, for example the Dolmen di Corrizola in Biori, and 4,10m, for example the Dolmen di Paulo Rues in Dualci (Cicilloni 2007: 155, 157; Cicilloni 2010, 100; Moravetti 1998: 28). The latter is covered by a colossal nearly 1m thick capstone which measures 4m x 4,65m. Furthermore, a few examples of so-called tripod dolmen are registered, for instance the Dolmen Su Caddalzu in Chiaramonti and the Dolmen Loelle in Buddusò with three rather small side stones, which are placed on the bedrock not building a chamber in the proper sense, but carrying the capstone (Cicilloni 2010: 141–142).There are no remains of preserved tumuli, which would be necessary so that the structures could have served as burial places. A part of the simple dolmens are built into the natural terrain using the bedrock as side or back stones, for example the Dolmen de Oronitta or the Dolmen Arbu in Birori (Cicilloni 2010, Figure 52, 121).

Only five graves are determined as passage graves. These are Ladas in Luras, Sculacacca in Oniferi, Motorra (Figure 7.4/3) in Dorgali, Arbu II in Birori, and Minde Puzze in Laconi (Cicilloni 2010: 142).

The graves Ladas and Sculacacca (Cicilloni Type IIA) are hereby graves with a rectangular chamber and a short passage, which can be more classified as an antechamber.

Arbu II, Motorra, and Minde Puzzu are passage graves with a polygonal or half-polygonal chamber. Arbu II is a smaller structure with a short corridor. The Dolmen de Motorra is a grave with a polygonal chamber consisting of eight remaining side stones, a 2,10m long corridor, and a stone circle with a diameter of 4,10m (Lilliu 1968; Moravetti 1998: 27; Cicilloni 2007: 155, 159; Cicilloni 2010: 79). Minde Puzzu is a structure with a 3m long elliptic chamber and a 5m long corridor (Atzeni 1982: 25–26; Moravetti 1998, 28; Cicilloni 2007: 155, 159; Cicilloni 2010: 122).

There are 20 gallery graves documented from Sardinia. They are either subterranean structures or half-subterranean graves, like Sa Corte Noa in Laconi or the gallery grave in Montessu, or they are structures completely aboveground like the highest monument today, Sa Perda Piccada, with a height of 1,30m. The gallery graves are up to 9m long like Sa Corte Noa, which is a structure with an entrance or passage stone with a falsa porta in the middle (Atzeni 1982a: 17–19; Cicilloni 2007: 155, 159; Cicilloni 2010: 144, Figure 173; Moravetti 1998: 28). The capstones from some of the gallery graves are missing today. It is unclear if they were removed or if the graves were originally covered by wooden timbers.

The necropolis Pranu Muttedu, close by Goni in the southeast region of the island, consists of five graves which are determined as tomba a circoli and are attributed to the Recent Neolithic Ozieri horizon as a later form of the Li Muri graves (Atzeni/Cocco 1989; Melis *et al.* 2007: 261; Melis 2009: 93; Tanda 2009: 65). The similarities of the graves to the tomba a circoli are restricted to the concentric stone circles around the chambers as possible basements of the tumuli and the standing stones connected to the graves. In contrast, the inner structures of the graves are different with round or rectangular chambers, either as a dry wall construction with an antechamber as in graves I and II or as a passage grave with a megalithic

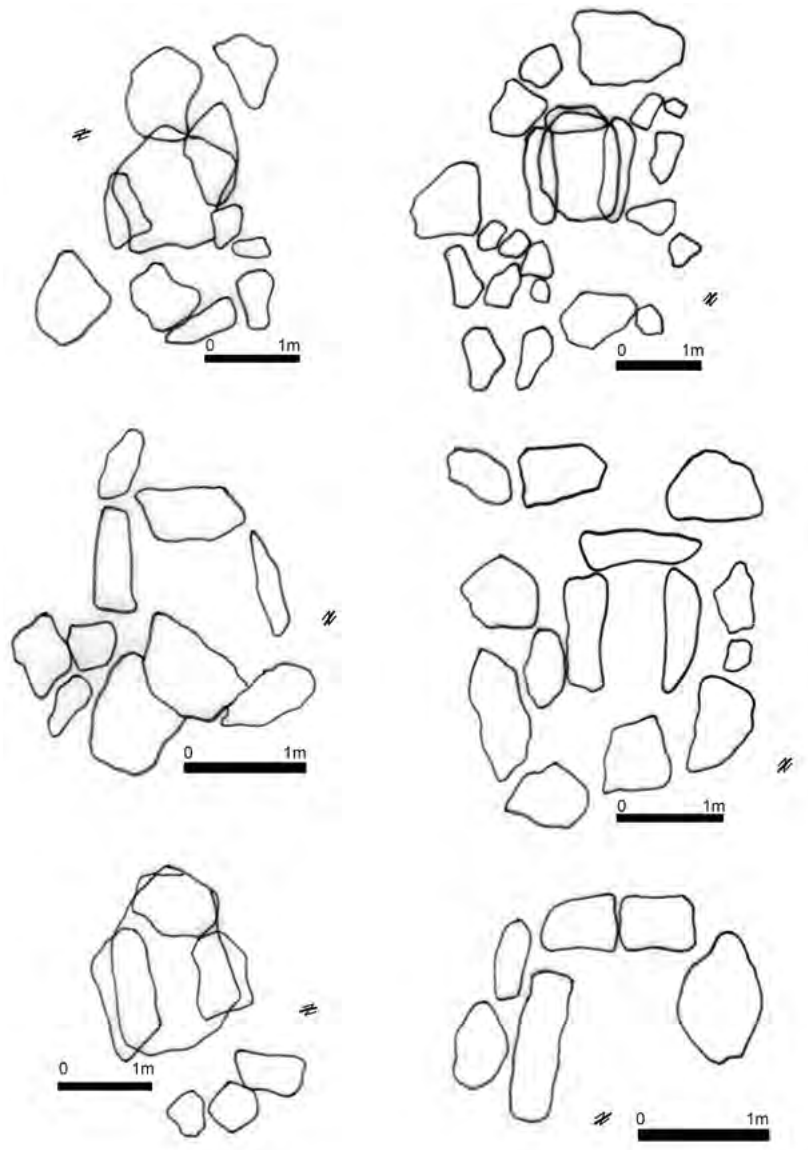


Figure 7.3 Simple Sardinian dolmens : Dolmens Matta Larentu I-VII (after Cicilloni 2010, Figure 90)

corridor in the concentric stone circles. Grave II is an outstanding structure with hypogea elements and a megalithic antechamber with two entrances. Today, inner megalithic compartments and another stone wall division with a passage are visible, which may have originally been covered by a round dry wall construction. The structures are surrounded by a dry wall and a round stone pavement, 14,20m in diameter, and an anthropomorphically-formed standing stone at the outer periphery. The whole structure is surrounded by another outer stone circle, 30m to 35m in diameter, with standing stones at the entrance (Figure 7.6). With a total of 60 standing stones, the site exhibits the largest concentration of such stones on Sardinia. They are either connected to the graves or organized in alignments with up to 20 partly anthropomorphically-formed standing stones.

Until the present day, 610 simple and proto-anthropomorphic standing stones are clustered on altogether 161 sites on Sardinia (Soula 2007). Similar to Corsica, it is also possible on Sardinia to witness a development from simple standing stones to anthropomorphic stones and finally to standing stone statues. Beside the numerous simple standing stones isolated or grouped on the island, there are simple standing stones connected to graves such as Li Muri and Pranu Muddedu in Goni since the Middle Neolithic (Puglisi 1942: 123–141; Atzeni 1981; 1982; Atzeni/Cocco 1989; Antona Ruju/Ferrarese Ceruti 1992: 22–29). Approximately 50 anthropomorphic standing stones and standing stone statues are registered from Sardinia. Most of them are located in the center of the island in the region of Laconi. A large portion of them is equipped with Bronze Age daggers with two blades and with reversed anthropomorphic symbols (Atzeni 2004).

A special construction for the whole European megalithic world is represented by the megalithic pyramid Monte d´Accoddi, situated on a plain close to Sassari in Northwest Sardinia (Contu 1953a; 1953b; 1984; 2000; Tiné 1987; 1992, Tanda 1987; Melis 2009) (Figure 7.7). The Monte d´Accoddi is an almost square building constructed with massive unworked stones in three platforms and a ramp as an access to the upper platform. The lowest platform is at the base 38m long and 31m wide. The ramp is oriented to the southwest and 42m long and between 14m and 9m wide. A standing stone is erected beside the ramp. The complex was built in two phases and used - and reused - in several phases. From the upper platform, the remains of a building measuring 15m × 5m are recorded with traces of red paint. The entrance to this upper platform was flanked by two posts (Contu 2000: 40). The pyramid was not conceived as a grave. The only burial within the structure, a Bonnanaro child's burial in the southeast corner of the upper platform, is evidence for the subsequent use of the pyramid during the Bronze Age (Contu 2000: 57). The pyramid was surrounded by two Neolithic settlements, one from the Middle Neolithic San Ciriaco horizon with round huts, and one settlement from the Ozieri period, contemporaneous to the pyramid, with an estimated size of 22000m². Contemporaneous to the use of the pyramid were also six hypogea necropolises located in the surroundings within 2.5km². The closest necropolis,

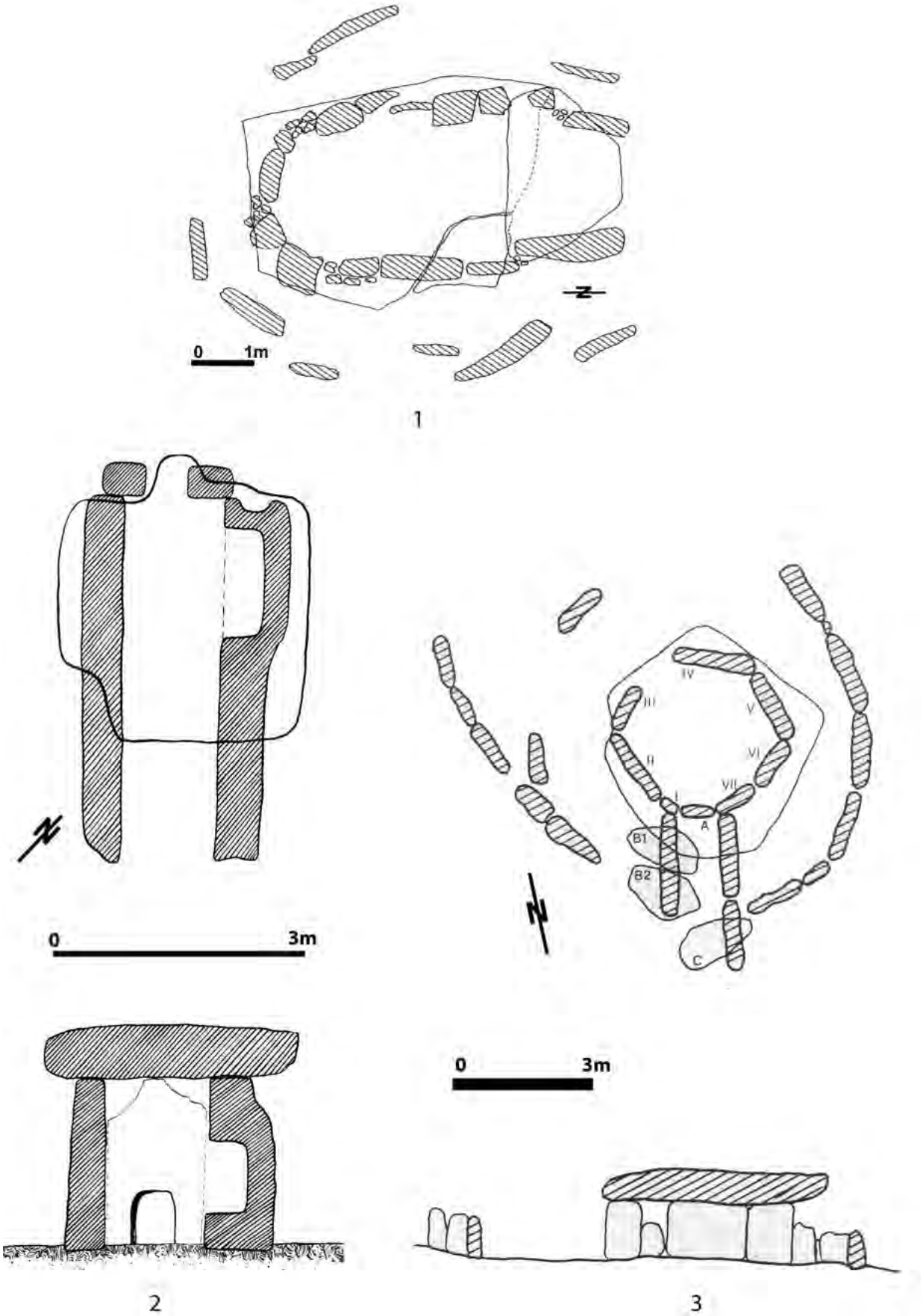


Figure 7.4 More elaborated dolmens and passage graves. 1) Dolmen de Ladas, 2) Dolmen de Sa Coveccada, 3) Dolmen de Motorolla (after Cicilloni 2010 Figure 4, Figure 55, Figure 97)



Figure 7.5 Dolmen de Sa Coveccada, near Mores



Figure 7.6 Dolmen de Pranu Muttedu, near Goni

the 'Necropolis of Monte d'Accoddi', was situated at a distance of 500m to the west and consisted of at least eight hypogea. Tomba I was obviously more sophisticated than the others. Nine cells surrounded a main central cell, including two rectangular pillars, a falsa porta such as elements from houses, and benches on the sides (Contu 2000: 11–16). These architectonical elements are well-known from other hypogea on Sardinia such as Anghelu Riuju and Montessu. They can be interpreted as sanctuaries, or more labor-invested burial places, indicating the possibility of a stratified society with the Monte d´Accoddi as a communal building or residence place.

Megalithic structures with radiocarbon sequences and radiocarbon dates

The Monte d´Accoddi is the only megalithic context on Sardinia with available radiocarbon dates. At the moment there are five processed radiocarbon results from the Monte d´Accoddi necropolis available (Melis 2009, Figure 18) (Figure 7.7). The earliest determinations are gained from samples originating from the pavement and from a layer of the first mound. This data is supported by the 'classical' Ozieri material documented from the layers VI to IX. A terminus-post quem value can be excluded so far (Melis 2009: 83). Five radiocarbon determinations are far too limited for such a structure, thus an even earlier construction date can be considered. Until now, the construction of the lowest mound is therefore calculated to ~3780 BC, within the time interval 4004–3550 cal BC (95.4%; 3773–3652 cal BC, 68.2%). Subsequently, the structure was burnt down and re-erected at ~3500 cal BC within the time interval 3701–3311 cal BC (95.4%; 3680–3504 cal BC, 68.2%). The most recent radiocarbon results originating from layer III at the standing stone in front of the structure is from ~3140 cal BC (3335–3017 cal BC, 68.3%; 3353–2921 cal BC, 95.4%).

Derivated from the archaeological material, the second pyramid was in use during the entire Chalcolithic until ~2200 cal BC and a frequent later re-use is recorded as well. Artifacts are documented from the Sub-Ozieri, Filigosa, Abealzu, Monte Claro, and a few from the Bell Beaker horizon (Contu 2000: 45; Melis 2009). Moreover, the burial of a child with Bonnano material in the southeast corner of the upper platform is evidence for the subsequent use of the structure during the Bronze Age (Contu 2000: 40).

The time interval for the megalithic graves can only be determined according to the archaeological material and the radiocarbon results stemming from settlement contexts (Figure 7.8). Thus, the San Ciriaco horizon with the ancient non-accessible dolmens is determined by only two radiocarbon dates from the settlement Contraguda in North Sardinia (Boschian *et al.* 2000–2001: 256) and starting at ~4400 cal BC (4472–4099 cal BC, 68.2%; 4728–4070 cal BC, 95.4%) the transition to the Ozieri horizon is calculated to 4100 cal BC (4116–4005 cal BC, 68.2%; 4218–3986 cal BC, 95.4%). The Ozieri horizon is the time period with the first accessible dolmens and passage graves determined by radiocarbon results stemming from settlement contexts at Contraguda, San Benendetto, Filestru, Sa Ucca, Grotta del Guano, and the earliest layers of the Monte d´Accoddi (Boschian *et al.* 2000–2001: 256; Lai 2009: 318; Melis 2009: 85; Tanda 2009; Tykot 1994). The transition to the Sub-Ozieri horizon is therefore calculated to 3540 cal BC (3640–3501 cal BC, 68.2%; 3652–3433 cal BC, 95.4%).

Dating the megaliths on the basis of the artifacts

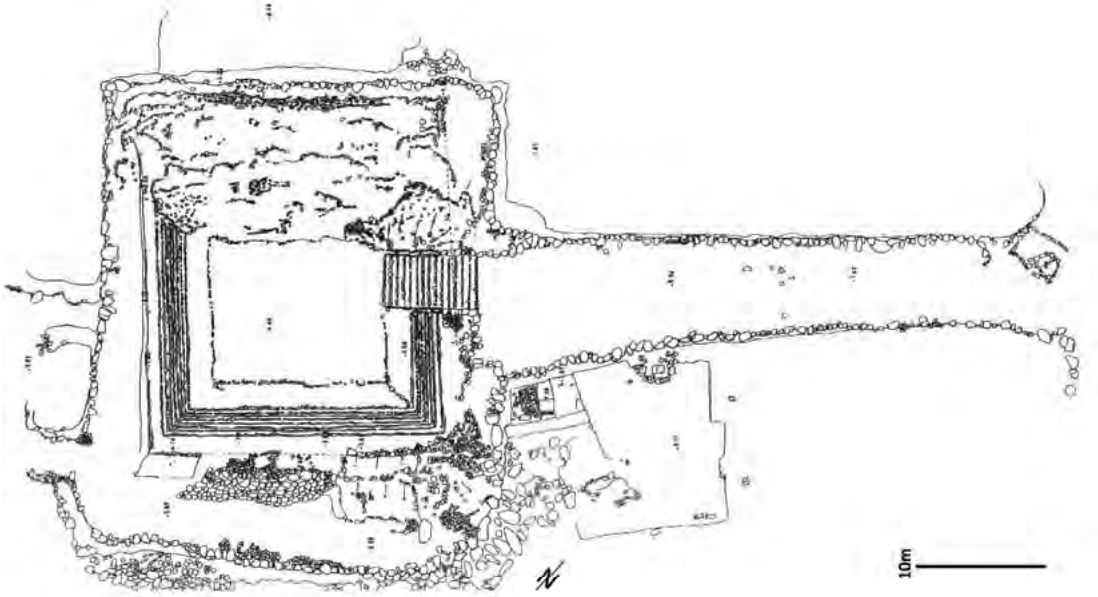
Only few megalithic graves are investigated. Archaeological material is available from 28 dolmens, passage graves, and gallery graves. Most of the graves contained non-diagnostic material (Cicilloni 2010: 175). The material of the first megalithic graves on Sardinia - the ancient non-accessable dolmens in Li Muri - has already been described here in chapter 5, p. 151 and was attributed to the Late Neolithic San Ciriaco horizon (~4400-4100 cal BC).

Diagnostic material is furthermore available from the simple dolmens Alzoledda and Ciuledda, from the passage grave Dolmen de Motorra, Monte d´Acuto, Berchidda, and Monitju Coronas, from the gallery graves Sa Corte Noa and Montessu (Cicilloni 2010: 175), from the tomba a circoli Pranu Muttedu, and from Masone Perdu (Atzeni 1981; 1982; Guilaine 1992: 130; Melis 2009, Figure 3). The material in the accessible megalithic graves is dated from the Ozieri horizon onwards to the Bell Beaker period. Final Neolithic Ozieri (4115-3501, 68, 2%; 4218-3433 cal BC, 95, 4%) material is registered from Alzoledda, Ciuledda, the Dolmen de Mottorra, and Montessu (Basoli 1998: 154–155; Cicilloni 2010: 175–180; D´Arragon 1999, 143; Lilliu 1968, 74–128) and furthermore from the tomba a circoli Pranu Muttedu (Atzeni 1981; 1982, Atzeni/Cocco 1989; Melis 2009: 93).

The Ozieri material from the dolmen di Alzoledda and from Ciuledda, such as spheroid and keeled vessels as well as hemispheric bowls, originated from layers outside the chambers (Cicilloni 2010: 175; D´Arragon 1999: 139–141, 161) and suggests the possibility of a terminus post quem regarding the construction of these dolmens. The same problem exists with the gallery grave Sa Corte Noa in Laconi. The Filigosa material represents a terminus post quem for the construction and the use of the grave (Cicilloni 2010: 176) and the Middle End Neolithic Abealzu material, for instance long-necked vessels and tripods, is associated to the use of the grave (Atzeni 1988: 526–527). From the gallery grave in the hypogea necropolis in Montessu, there is likewise some Sub-Ozieri material available together with a copper ring, a silver spiral, small polished axes, flint and obsidian arrowheads, and two geometric microliths (Atzeni 1987: 29).The dolmen Monte Acuto at Berchidda rendered a few fragments of Monte Claro ceramics in addition to medieval material. The material from the dolmens Montiju Coronas in Ozieri was used during the Bell Beaker period (Basoli 1998: 143–146, 155–156; Cicilloni 2010: 177).

According to the Nuragic material, there is further evidence for a late use or construction of the dolmens Ladas in Luras, Dolmen le Casacce in Arzachena, Mesu Enas and Cannigheddu e S´Ena in Abasanta, Nurarchei in Norbello, and Dorroles in Dorgali (Cicilloni 2010: 27–124, 177).





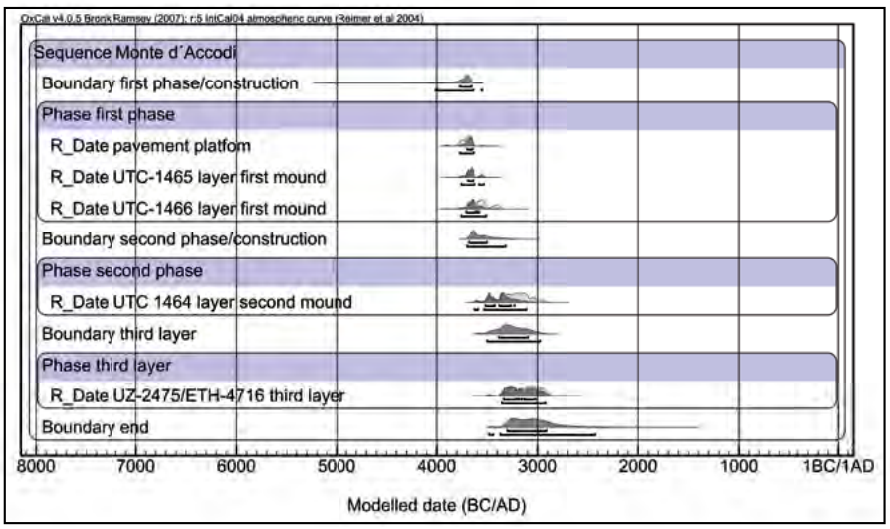


Figure 7.7 The megalithic pyramid Monte d´Accoddi, Sassari from the southwest, the planum after restauration (after Contu 2000, 42) and the probability of radiocarbon results. Model agreement: A_{model}=109, $A_{overall}$=108.5

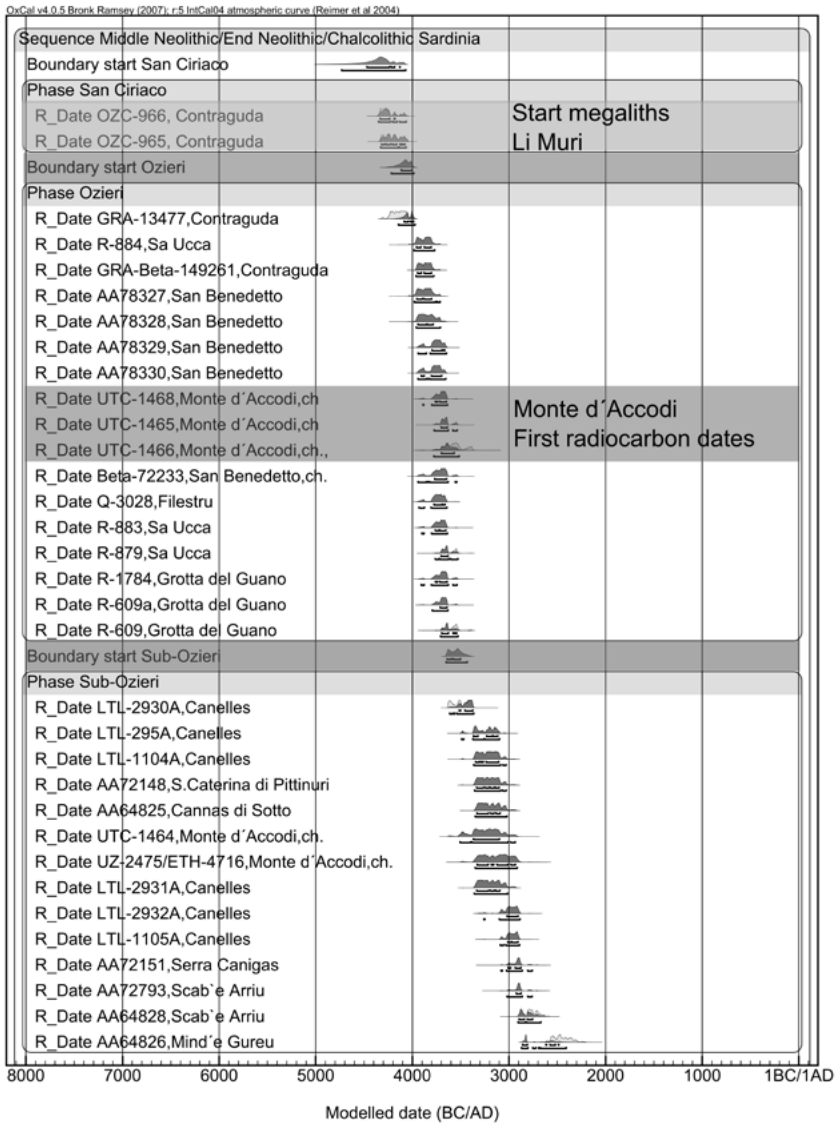


Figure 7.8 Probability of all available radiocarbon dates from the Late, the Recent and the End Neolithic from Sardinia (Boschian *et al.* 2000–2001: 256; Lai 2009: 318; Melis 2009: 85; Tanda 2009; Tykot 1994). From the whole San Ciriaco horizon, two radiocarbon dates are available for the time interval 4334–4077 cal BC, 95.4%. The beginning of the Recent Neolithic Ozieri horizon is thus calculated to ~4050 cal BC, the beginning of the Chalcolithic to ~3570 cal BC. Model agreement: A_{model}=85.2, $A_{overall}$=84.8

Due to material determinations, hypogea with megalithic corridors are attributed to the end of the Ozieri horizon (Tanda 2009: 68).

Megalithic burial rites

Since only few megalithic graves have been investigated, there is not much known about the megalithic burial rites. From the ancient non-accessible dolmens, the tomba a circoli, in the necropolis Li Muri, some long bones have been conserved (Antona Ruju/Ferrarese Ceruti 1992). Theses graves are classified as singular burials. Furthermore, there is evidence that the use of ochre was an element used during the burial rites. From the Later Recent and Final Neolithic necropolises Pranu Mutteddu and Laconi that show similar architectonic features, singular burials or singular and double burials are registered as another possible indication of the relation between these graves (Melis 2009: 93). Sporadic bone fragments are registered from the remaining megalithic graves, for example from the Dolmen de Motorra. Unfortunately, they do not provide sufficient evidence for a reconstruction of the burial rites (Atzeni 1982; Cicilloni 2010: 78, 123; Lilliu 1968).

Contemporaneous non-megalithic burials

On Sardinia, hypogea or Domus de Janas were already used as burial places before the earliest megalithic structures. There are about 3500 hypogea recorded from Sardinia, either isolated in the landscape or organized in one of the 50 existing necropolises (Contu 2000: 335; Tanda 2009: 67). Their construction began in the Middle Neolithic, whereas the peak of construction occurred during the Recent Neolithic Ozieri horizon. During the End Neolithic, further hypogea were built, although existing structures were primarily in use during this period and also later in the Bronze Age lasting until the Nuragic period. The size of these graves varies from one-celled structures measuring 1m x 1,50m to extended structures measuring 17m x 20m including 17 cells (Contu 2000a: 319).

The earliest known hypogea on Sardinia were built in Cuccuru s´Arriu di Cabras in Central West Sardinia in the pre-megalithic Middle Neolithic Bonu Ighinu phase (cf. chap. 5, p. 151) This necropolis was possibly extended in the San Ciriaco horizon and so parallel or even a little earlier in use than the Li Muri graves. These hypogea are simple, mostly one-celled structures worked into the ground or the rock with an access and singular or double burials (Santoni 2000). A likewise early San Ciriaco horizon is also recorded from the hypogea necropolis Anghelu Ruju (Santoni *et al.* 1997: 232; Usai 2009) as well as from Sant´Iroxi in Decimoputzu and Santu Pedru near Alghero (Melis 2009: 93; Ugas 1990).

During the Ozieri horizon, singular or collective graves are recorded for pits within settlements in the region of Campidano and in the golf of Oristano. Furthermore,

collective burials and ossuaries were established in natural caves such as Palmaera, Sant´Elia, and Sant Bartolomeo (Tanda 2009: 67), although the hypogea represent the most common grave form. The Ozieri hypogea differ from the precedent Middle Neolithic hypogea regarding the ground plans and the corridors. The Ozieri hypogea are constructed with one or several cells, with one central chamber with different outgoing chambers, or they are constructed in a t-shape. The form depended on the topography and they were worked into the local rocks such as limestone, basalt, trachyte, tuff, and granite. The grave chambers often have benches along the walls. The entrances were constructed with little antechambers, ramps, long corridors or dromos, or with a megalithic covered passage. Around twenty hypogea are recorded with a megalithic corridor formed by blocks (Tanda 2009: 68). The hypogea are organized in numerous necropolises, the largest ones at Montessu in South Sardinia (Figures 7.9,7.10), Angelu Ruju, and San Pantaleo near Sassari (Basoli 1989: 141, Contu 2000: 315; Demartis 1986), or with simple cells and more elaborated chambers including pillars and falsa porta. These structures can be interpreted as more sophisticated tombs or sanctuaries. During the Sub-Ozieri horizon, existing hypogea were still in use, or extended like in Perda Lada in Decimoputzu with an architectural addition in the form of a half-circular stone structure and secondary burials in the chamber (Depalmas 1998). Furthermore, in the Chalcolithic Filigosa, Abealzu, Monte Claro, and Bell Beaker horizons nearly all hypogea were re-used, for example the hypogea San Pedru, Anghelu Ruju near Sassari, Su Crocifissu Mannu near Porto Torres, Serra Crabiles near Sennori, and Sos Furrighesos near Anela. There is evidence for new constructions from the Filigosa period with new architectonic features such as longer corridors and ante chambers (Contu 2000: 313–366; Depalmas *et al.* 1998; Foschi 2000; Tanda 2009: 67).

The hypogea are more highly associated with a collective burial custom from the Ozieri horizon onwards. For example, in Angelu Ruju between two and 30 individuals are recorded per grave (Demartis 1986). The individuals are deposited in a dorsal position with indications of secondary burials; in four tombs indications for cremation burials were found. Moreover, in Angelu Ruju there is evidence from tombs I and VI for the preparation of some kind of burial beds with a chalky substance and from tomb

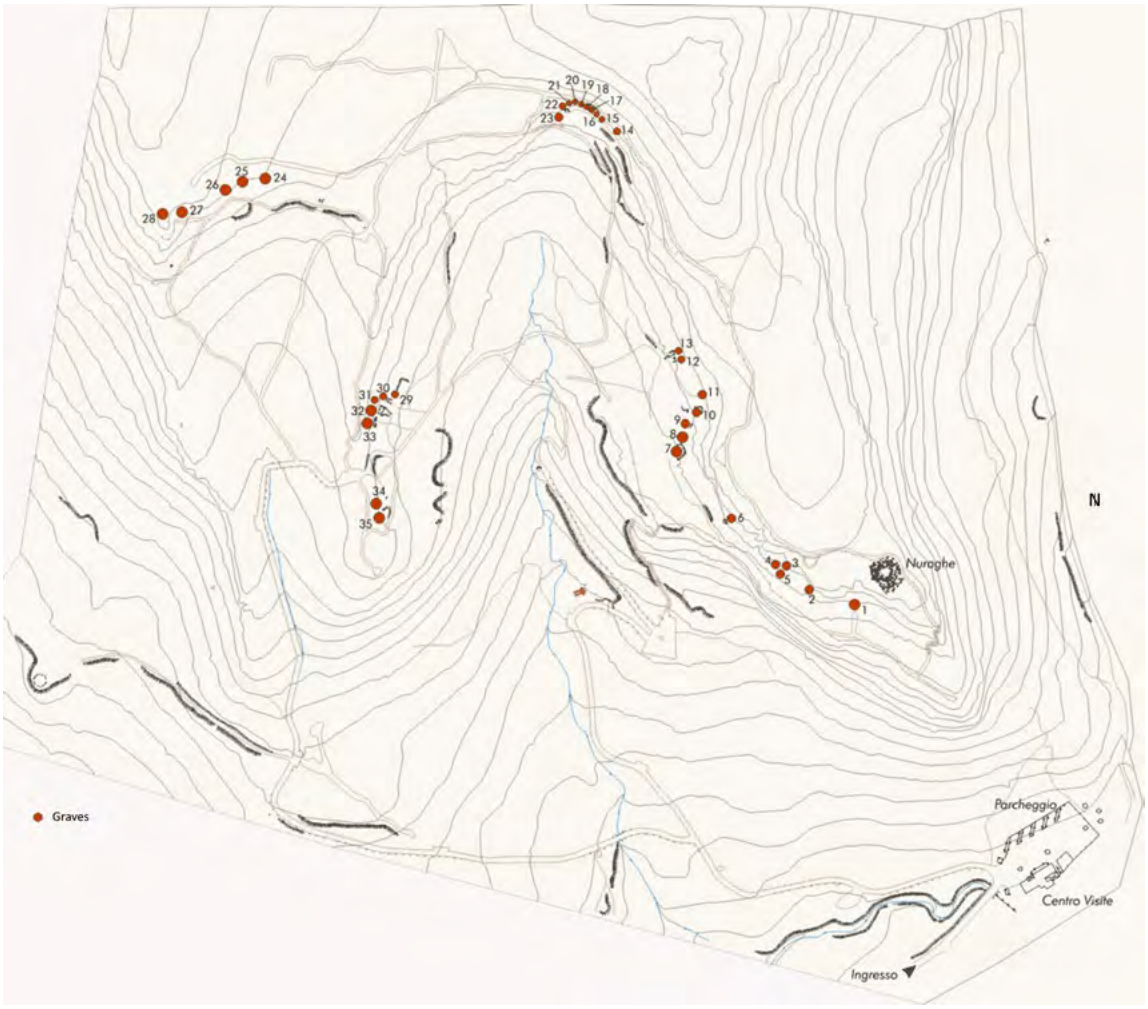


Figure 7.9 Plan of the hypogea necropolis at Montessu. With the kind permission of Area archeologica di Montessu.



Figure 7.10 The hypogea necropolis Montessu in Southwest Sardinia, grave VII and VIII.

XXVII the remains of red ochre are registered as also documented for other hypogea (Contu 2000; Demartis 1986: 22; Tanda 2009: 67). Numerous shell mussels together with bones and charcoal inside the corridors and chambers verify funeral meals or food offerings. Vessels from outside the external entrance are an indication of offerings.

That the act of the construction of these graves was viewed as a symbolic act is underlined by the analysis of lithic tools from the Ozieri hypogea of Sedilo. The picks for digging the hypogea in the rock were deposited as grave goods in the chambers. The tools were broken, used, or they had remains of a red substance on their surface (Cappai/Melis 2005–2008). In the Monte Claro horizon, further individual and collective burials in natural caves, pits and cists are common (Moravetti 2009: 100–101).

Conclusion

The first megalithic graves on Sardinia are the ancient non-accessible dolmens in the necropolis Li Muri in Arzachena in Northeast Sardinia. There are no radiocarbon results available from these earliest graves. Derivated from the grave goods, which are attributed to the Late Neolithic San Ciriaco horizon, and the radiocarbon results from the San Ciriaco layers in the settlement Contraguda, it is possible to restrict the emergence of these graves to a time interval of ~4400 cal BC (4472–4099, 68.2%; 4728–4070, 95.4%) to ~4100 cal BC (4116–4005 cal BC, 68.2%; 4218–3986 cal BC, 95.4%), even if there are far too little determinations available and an extension of this time horizon may be taken into consideration. These graves are a singular appearance at this time and concentrated in the Arzachena region. In observance of the grave architecture, a transfer of the non-accessible dolmen tradition and the tomba a circoli from the West Mediterranean continental coast or even Corsica is plausible, whereas these graves represented a megalithic colony on Sardinia, where hypogea, pit burials, and burials in natural caves were the common burial form at this time. There is evidence stemming from the material culture which verifies contacts between Li Muri and the contemporaneous or even earlier necropolis on the Monte Revincu on Corsica. Within the Final Neolithic Ozieri horizon between 4218-3433 cal BC (95, 4%; 4115-3501, 68, 2%), the first accessible megalithic structures are registered and there is Ozieri material documented from the simple dolmens Alzoledda, Ciuledda, the passage grave Dolmen de Motorra and the the tomba a circoli in Pranu Muttedu.

Hypogea are the most common burial form on Sardinia and approximately 3500 registered hypogea can be compared with 227 coexisting megalithic graves covering nearly the same area mostly in the middle and the northern half of the island. These hypogea are partly labor-intensive elaborated structures and the megalithic graves can rather be interpreted as a different kind of burial praxis

as a result of a repetitive transfer and exchange with other megalithic regions over the centuries than as the burial places for a special part of the society.

Similar to Corsica it is possible to follow a development from simple standing stones, to anthropomorphic stones, and finally to standing stone statues, which represent natural and mythical persons or the supernatural. While simple standing stones are connected to burials from the Middle Neolithic onwards, anthropomorphically formed stones are connected to Ozieri contexts as in Pranu Muttedu. The most of the standing stones, however, are depicted with double Bronze Age daggers.

From ~3780 cal BC (4004–3550 cal BC, 95.4%) onwards, a centralizing tendency must be considered in North West Sardinia during the Final Neolithic with the settlement Monte d´Accoddi and the megalithic pyramid as either a communal building or a residence place for a political or religious elite.

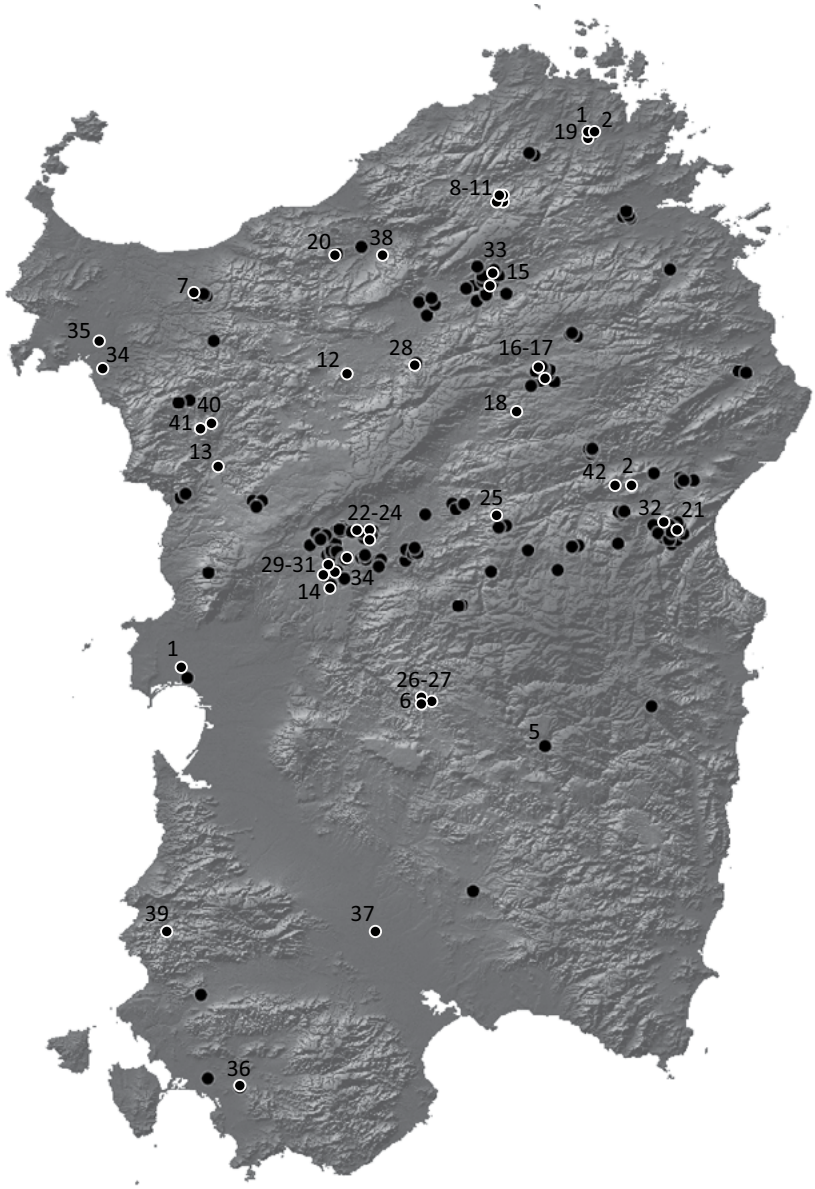


Figure 7.11 Main sites mentioned in text (map source: SRTM geodata, black with white circle: site mentioned in text: black: megalithic graves on Sardinia).

1. Su Cuccuru S´Arriu-Cabras, 2. Rifugio di Oliena, 3. Necropolis Li Muri, 4. Macciunitta, 5. Necropolis Pranu Muttedu,6. Masone-Perdu, 7. Monte d´Accoddi, 8. Dolmen Alzoledda, 9. Dolmen Ciuledda, 10. Dolmen Ladas, 11. Dolmen Bilella,12. Dolmen de Sa Coveccada, 13. Dolmen San Sebastiano, 14. Dolmen Mura e Putzu, 15. Dolmen Monte d´Acuto, 16. Dolmen de Oronitta, 17. Dolmen Loelle, 18. Dolmen di Maone, 19. Dolmen le Casacce, 20. Dolmen Su Caddalzu, 21. Dolmen Motorra, 22. Dolmen di Corrizola, 23. Dolmen di Paulo Rues, 24. Dolmen Arbu, 25. Dolmen Sculacacca, 26. Dolmen Minde Puzze, 27. Sa Corte Noa in Laconi, 28. Dolmen le Casacce, 29. Dolmen Mesu Enas, 30 Dolmen Cannigheddu e S´Ena, 31. Dolmen Nurarchei, 32. Dolmen Dorroles, 33.Dolmen Berchidda (S. Catarina), 33. Tombei di Giganti Sa Perda Piccada, 34. Anghelu Riuju, 35. Santu Pedru, 35. Montessu, 37. Sant´Iroxi, 38. Contraguda, 39. San Benendetto, 40. Sa Ucca, 41. Filestru, 42. Grotta del Guano

Table 7.1 Radiocarbon dates from Sardinia

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	Bibliography
Canelles, Cagliari								
LTL-1104A	Settlement	Sub-Ozieri, layer 39, US 1085		4512	50			Melis 2009, 85
LTL-1105A	Settlement	Sub-Ozieri, layer 47, US 1081		4345	40			Melis 2009, 85
LTL-2930A	Settlement	Sub-Ozieri, layer 134, US 1206		4708	45			Melis 2009, 85
LTL-2931A	Settlement	Sub-Ozieri, layer 46b, US 1202		4481	50			Melis 2009, 85
LTL-2932A	Settlement	Sub-Ozieri, layer 46b, US 1202		4350	50			Melis 2009, 85
LTL-295A	Settlement	Sub-Ozieri, layer 39, US 1038		4554	45			Melis 2009, 85
Cannas di Sotto, Carbonia								
AA64825	Rock cut tomb	Post-Ozieri	human bn	4476	43	-19.9	10.5	Lai 2008, 281, Lai 2009, 318
Contraguda, Perfugas								
GRA-13478	Settlement	Ozieri	ch	5310	40			Boschian et al. 2000-2001, 256
GRA-Beta-149261	Settlement	Ozieri	ch	5070	40			Boschian et al .2000-2001, 256
OZC-965	Settlement	San Ciriaco	ch	5369	51			Boschian et al. 2000-2001, 256
OZC-966	Settlement	San Ciriaco	ch	5423	47			Boschian et al. 2000-2001, 256
Grotta del Guano, Oliena								
R-1784	Cave	Ozieri		4900	60			Tykot 1994, 131
R-609	Cave	Ozieri		4830	50			Tykot 1994, 131
R-609-alpha	Cave	Ozieri		4900	50			Tykot 1994, 131
Grotta Filiestru, Mara								
Q-3028	Cave	Ozieri		4950	50			Tanda 2009, 59-71
Mind´e Gureu, Gesturi								
AA64826	Cist	Post-Ozieri		3957	56	18.9	14.5	Lai 2008, 281, Lai 2009, 318
Monte d´Accodi, Sassari								
UTC 1464	Megalithic pyramid	Sub-Ozieri, layer and ch. accumulation/monument II	ch	4540	90			Melis 2009, 85
UTC 1465	Megalithic pyramid	Ozieri, layer in the the area monument I	ch	4870	50			Melis 2009, 85
UTC 1466	Megalithic pyramid	Ozieri, layer in the area monument I	ch	4810	80			Melis 2009, 85
UTC 1468	Megalithic pyramid	Ozieri, floor sanctuary	ch	4920	50			Melis 2009, 85
ZU-2475/ETH4716	Megalithic pyramid	Sub-Ozieri, layer III close by standing stone	ch	4440	85			Melis 2009, 85
Oridda, Iglesias								
R-1060	Hypogeum	Burial in cave, zone D, capa II	human bn	3170	50			Rubinos/Ruiz Gálvez 2003, Tab.1

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	Bibliography
Padru Jossu, Sanluri								
AA72152	Rock-cut tomb	Campaniforme	human bn	3845	41	-18.7	11.4	Lai 2008, 281, Lai 2009, 318
AA72153	Rock-cut tomb	Campaniforme	human bn	3843	41	-19.2	10.1	Lai 2008, 281, Lai 2009, 318
AA72790	Rock-cut tomb	Monte Claro	human bn	3957	56	-19.3	9.4	Lai 2008, 281, Lai 2009, 318
S. Caterina di Pittinuri, Cuglieri								
AA72148	Rock-cut tomb	Post-Ozieri	human bn	4496	46			Lai 2009, 318
Sa´Ucca de su Tintirriolu, Mara								
R-879	Cave	Ozieri		4850	50			Tanda 2009, 59-71
R-883	Cave	Ozieri		4930	50			Tanda 2009, 59-71
R-884	Cave	Ozieri		5090	50			Tanda 2009, 59-71
San Benedetto, Iglesias								
AA78327	Rock-cut tomb	Ozieri	human bn	5078	58			Lai 2009, 318
AA78328	Rock-cut tomb	Ozieri	human bn	5044	58			Lai 2009, 318
AA78329	Rock-cut tomb	Ozieri	human bn	4969	52			Lai 2009, 318
AA78330	Rock-cut tomb	Ozieri	human bn	4984	52			Lai 2009, 318
Beta-72233	Rock-cut tomb	Ozieri	human bn	4920	70	-19.1	11.3	Lai 2008, 281, Lai 2009, 318
Scab e Arriu, Siddi								
AA64829	Rock-cut tomb	Monte Claro	human bn	3989	41	-19.3	10.8	Lai 2008, 281, Lai 2009, 318
AA64828	Rock-cut tomb	Post-Ozieri	human bn	4202	45	-19.2	11.2	Lai 2008, 281, Lai 2009, 318
AA72793	Rock-cut tomb	Post-Ozieri	human bn	4278	42			Lai 2009, 318
Seddas de Daga, Sanluri								
AA64830	Cist	Monte Claro	human bn	4091	41			Lai 2009, 318
Serra Cannigas, Nuraminis								
AA72151	Cist	Post-Ozieri	human bn	4289	47			Lai 2009, 318
Su Stampu e Giovnnicu Meli, Villaputzu								
Q-3028	Cave	Post-Ozieri	human bn	4019	45	-19.8	10.5	Lai 2008, 281, Lai 2009, 318

Chapter 8

The Maltese Archipelago

Summary: The Maltese Archipelago is the most southern megalith region in Europe with megalithic structures, which, for the whole of Europe and the Mediterranean area, are unique appearances. The first monuments aboveground are represented here by megalithic buildings, which emerge ~3400 cal BC and are noted as temples in the scientific literature. On an area of 316km², 36 clear separable units are grouped for 23 locations. These megalithic structures are not graves, and in none of them are burials recorded. The grave architecture is subterranean in the form of hypogea or rock-cut tombs. First megalithic grave architecture in the form of classical simple dolmens do not appear before the Early Bronze age on the islands and are the result for a transfer of the dolmen tradition from the Italian mainland.

Pre-megalithic structures and pre-megalithic funeral rites on the Maltese Archipelago

There is evidence from the radiocarbon dates and the archaeological material that the first colonization of the Maltese archipelago proceeded in the second half of the 5th millennium cal BC. For the entire Early Neolithic Għar-Dalam-phase, only two charcoal radiocarbon dates are available (with a high standard deviation Trump 2002, 46), which are not really sufficient to determine the beginning of the settlement of this archipelago closer. Thus, it is calculated to ~5200 cal BC (5295–4750 cal BC, 68.2%; 5827–4543 cal BC, 95.4%). This is supported by Impresso ceramics from the lowest levels of the Għar-Dalam cave on the southeast coast of Malta and typological linking to Sicilian Stentinello ware.

The pre-megalithic and pre-temple population on Malta and Gozo interred their dead in natural caves, rock-cut-tombs, and hypogea. Five rock-cut tombs are documented from Żebbuġ from the pre-temple Żebbuġ phase (Baldacchino/Evans 1954). There is evidence for another hollow or pit burial at San Pawl Milqui (Malone *et al.* 2009; Pace 2004: 25). Further little Żebbuġ material is recorded from around the entrance of the hypogea Ħal Saflieni (Trump 2002: 128).

From the hypogea at the Brochtorff or Xagħra circle on Gozo, a tomb from the pre-megalithic Żebbuġ phase was discovered in the southeast corner of the grave with at least 65 individuals, including 54 adults and 11 children (Stoddart *et al.* 2009: 318). The grave consisted of two oval chambers with a maximum length of 2,6m and a height of 1,4m. The chambers are cut into the rock from the base of a 70cm deep vertical shaft. The individuals were buried successively together with quantities of red ochre imported from Sicily. The grave goods consisted of strongly fragmented ceramics (only two cups were complete), over 400 beads of fossil shells, and 27 pendants - the so-called 'jelly babies' due to their schematic human figure. Additionally, there were six V-perforated buttons and 16 miniature stone axes, ranging from 22m to 86m. Five of these axes were made of greenstone from southern Italian and Sicilian sources (Malone *et al.* 2009a: 253). 52 sea-shells with one large Tonnea galea was possibly used as an instrument. An anthropomorphic statue is documented inside the entrance of one of the chambers and represented, for example, the personification of an ancestor or a guardian figure (Malone *et al.* 2009a: 219–313; Trump 2002).

Five radiocarbon dates from human bones are available, three from the west chamber, one from the east chamber, and one from a burial niche (Malone *et al.* 2009: 342). They are dated within the time interval 4549–3413 cal BC, 95.4% (4341–3518 cal BC, 68.2%) and the end of the Żebbuġ burial activity is thus calculated to ~3670 cal BC (OxA-5038, 5330±100 BP; OxA-3568, 5170±65 BP; OxA-3567, 4860±65 BP; OxA-5039, 5170±65 BP; OxA-3572, 5380±70 BP) (Figure 8.11). However, too few radiocarbon results exist to precisely determine the transition from the Żebbuġ- to the Ġgantija-phase.

Transitional structures and the emergence of megaliths on the Maltese archipelago

The so-called Skorba shrine, a pre-structure to the megalithic buildings on Malta is known from Skorba in North West Malta (Trump 1966: 11–14). The structure belonged to the Red-Skorba horizon and consisted of two adjoining rooms. They were constructed with a base of massive stones and filled with grey clay, which is interpreted by the excavator David Trump as disintegrated mud brick from the upper walls of the structure (Trump 2002: 59). The existence of such an early clay brick architectural structure was quite notable since limestone was easily available as a building material and the next blue clay source was at least one kilometer away. There is no trace of an entrance into the rooms. The floor is rough bedrock and inside the rooms there were no traces of a hearth, but quantities of red-Skorba ceramics, deposits of sheep and goat bones, two complete goat skulls, tarsalia from cattle with engravings, and the fragments of four figurines were excavated (Trump 1966: 11–14). From the Skorba

shrine there is only one radiocarbon date available for the Red Skorba horizon dating within the time interval 4442–4080 cal BC (95.4%, 4330–4157cal BC, 68.2%, BM-148, 5175±150 BP) (Trump 1966).

The question arises in what cultural context were the first temples built? During the pre-temple periods there is evidence for long trade relations with obsidian from Lipari and Pantelleria, flint from Syracusa, serpetinite and jadeite from the Piedmont, red ochre from the Agrigento, and ceramics from Sicily and Lipari (Malone *et al.* 1995: 325–329; Trump 2002: 38–39). In the transition from the Żebbuġ- to the Ġgantija phase, no serious changes or breaks in the economy or trade are to be considered (Trump 2002: 209). The further evolutionary development of the ceramics was already an object of discussion of John Evans in the 1950s (Evans 1953). The first larger collective grave, the Żebbuġ rock-cut tomb on Gozo, was already discussed here in chapter 1, p. 1-2. Interesting hereby is the anthropological record from the 65 individuals in correlation to the first temples (Malone *et al.* 1995: 335–341). Traces of diseases were only detected on 0.6% of the bones. The most of them had degenerative age arthritis, whereas only two individuals had Harris lines, which is a sign for malnourishment during periods of growth. There are nearly no traces of a hyperplasia of the dental enamel, another indicator of malnourishment and diseases with high fever during childhood. Only 2.3% of the teeth were carious. Thus, the population of the first temple builders was very healthy with nearly no traces of a lack of resources.

Appearance, architectonical features and function of the megalithic structures on the Maltese archipelago

The Maltese Archipelago 80km south of Sicily including the islands of Malta, Gozo, and Comino is the most southern megalith region in Europe. Due to a very isolated insular situation and environmental conditions, it is possible to consider the development of a unique megalithic landscape in Europe. The first monuments aboveground are represented here by ritual structures or meeting places, which are noted as temples in the scientific literature, while the grave architecture is subterranean in the form of hypogea or rock-cut tombs.

During the 18th century, many of these buildings were examined and respectively cleared out. Just a few have been published. On an area of 316km², 36 clear separable units are grouped for 23 locations. Since they are well preserved and due to their spatial distribution, it is possible to get an idea of the macro-social development of the Neolithic societies on these islands (Figure 8.1).

The function of these buildings is still under discussion. The megalith structures are definitely not graves. No burials are recorded from the structures and no disarticulated skeleton material has been documented, which would be evidence that only one part of the burial rites were practiced in the megaliths, as is the case for example in the North or- Middle European Sarup enclosures or roundels (Andersen 1997: 307–308). Most of these buildings are described in recent literature as temples and as sacral buildings.

For a better understanding of the Maltese megaliths in their European context, it is necessary to discuss their architectural features as well as their functions more strictly. The largest portion of these buildings was examined and respectively cleared out during the 18th century, while just a few have been published. Indicators for the function of the megaliths according to their architectonical appearance, their location in the landscape, and their orientation have been examined (Schulz Paulsson 2009).

With reference to the architectonical features, the concept of singular units is quite similar: they consist of a forecourt, an entrance area, side stones, a corridor, an inner court, and several apsidae or d-formed chambers. The most ample forecourt is paved; the entrance consisted of two side stones and a cover stone. From the entrance, the corridor led to the open paved inner court, around which primarily three to six apsidae were grouped. Just a few special forms existed (Trump 2002: 73). Trefoiled units are documented from the early temple Ġgantija phase from Kordin III West, Skorba West, Buġibba, Mnaidra East, Santa Verna, and most probably Ġgantija South. Four-apsed temple units are known from the early temple Ġgantija phase Ġgantija North and from the later temple Tarxien phase Ġgantija North, Tarxien South and East, Mnaidra South and Central, Skorba East, Borġ in-Nadur and Xrobb il-Għaġin. Five-apsed temple units are recorded from Ġgantija South, Tarxien Far East, Ħaġar Qim North and Ta Marżiena. The only six-apse temple ground plan is preserved from the Tarxien horizon in Tarxien Central (Trump 2002: 202–203).

In many of the buildings there is evidence for altar-like features, which can clearly be considered for Tarxien near Valletta. In addition to sheep and goat bones, obsidian blades were deposited in the altar (Zammit 1930: 14–15). Some of these buildings had large floor pits on the bedrock and gullies to catch liquid, in others there are remains of fireplaces and plastered hearths. Door constructions, for example in Ġgantija and in Tarxien suggest that the inner courts and rooms were at least partly closed and the rituals, which were performed there, were meant for just a small part of the society (Figure 8.8), while the large paved front courts were accessible to the whole community. In Tarxien there are also perforations in the exterior walls, which could have served to fix animals to be offered. The large

amounts of strong fragmented ceramic pieces in front of the temples either witness the cleaning out of the structures in the 18th century or the rituals which were performed in front of the megalith structures. From the later Tarxien temple phase, statues of voluminous women are integrated in the buildings, for example in Tarxien and Ħaġar Qim. The statues are nonchalantly titled as Fat Ladys in the literature and are found as well as figurines, such as the sleeping lady from Hal Saflieni (Trump 2002: 99) and with children on their knees, for example from the Xagħra circle (Stoddart *et al.* 1993: 3).

Small 3-dimemsional temple models made from chalk stone or ground plans of burnt clay and graffiti on the temple walls allow a possible reconstruction of the original appearance of the monuments. From Skorba in North West Malta, a small model is known measuring from 4,5cm to 3,7cm. It is a structure with one chamber and a roof (Trump 2002: 192–196). In two lines the compound of a corbelled roof is visible covered by capstones or better said parallel bars which could as well picture wooden beams. The compound of a corbelled roof is still conserved today in Ħaġar Qim, and in the Ħal Saflieni hypogea such a roof is imitated and subterranean sculptured into the chalk stone. From Tarxien there are fragments of a 33cm high model of a facade found with a bench and a projection along the wall. Ground plans of burnt clay are recorded from Ħaġar Quim and Tarxien and building sketches in the form of graffiti are known from the walls of Mnajdra and Skorba. The context is not known for any of the models or ground plans, but they can be interpreted, on the one hand, as de facto building proposals of a collective undertaking and, on the other hand, as ritual objects.

The unique temple appearance is also evidence for the environment during the temple periods, for example that wood was insufficiently available as a building material. Door, window, table, stair, and shelf constructions are all sculptured into the limestone and the structures can thus be compared with Skara Brae on the Orkney Islands, where similar conditions are to be considered (Schulz Paulsson 2009). The research on Quaternary deposits in the valley of Fiddien rendered vegetation including Corylus, Pinus, Alnus, Ostrya, Filicales und Cyperace during the interstadials of the Pleistocene (Hunt 1997: 102–103). It is not yet clear, when the deforestation of the islands occurred, but it appears that this process was already completed in pre-megalithic times. Mollusks from the pre-megalith Żebbuġ grave on Gozo are an indicator of an open landscape around the grave with open steppe vegetation covered with relatively dense steppic and garrigue vegetation in the earliest phases (Fenech 2007: 1–2; Malone *et al.* 2009: 17–39; Schembri 1997; Malone et. al. 1995: 329–333). Later records of sediments near Marsa and Tas Silġ in West and South West Malta show a landscape similar to today's landscape for the temple period. The mollusks and the polls are evidence of an open landscape with no traces of forest. Small more protected areas with denser vegetation can also be considered and there is evidence of small groups of trees, but not in a dimension as on Corsica (pers. communication Kathrin Fenech 2008).

The question can be posed if they could have been resident places for the elite or as profane buildings? Just a few alternative settlement places have been documented and excavated: Skorba on Malta and Għajnsielem, Taċ Ċawla/Victoria on Gozo, and Is Sruġ (Malone *et al.* 1988; Malone *et al.* 2009b: 7; Trump 1966; Trump 2002: 207). Furthermore, there are traces of settlements from Ħaġar Quim and Kunċiżżjoni (Malone *et al.* 2009b: 2) and probably even from Debdieba. Some of these settlements are associated with the temples, others are self-contained. In Skorba, Ġgantija huts were found under a later temple structure, which also superimposed earlier Żebbuġ settlement structures (Trump 1966). Additional buildings to the temple units are also known, among others in Ħaġar Qim, where a group of irregular buildings stands to the east of the temples (Malone *et al.* 2009b: 7, Trump 2002: 149), but the clearances of the 18th century avert a closer determination of their function.

The excavated settlement structures are simple small and partly ellipse-formed buildings with a paved floor. In two cases an adobe-tile technique is reported. The reason for this small amount of settlement places is due to intensive land use and the layout of terraces in the terrain which changed the morphology of the island dramatically. Furthermore, a big part of the islands is overbuilt. Through erosion processes, only thin soil layers have been conserved. Therefore, pre-historic settlement horizons remain on just a few places (Malone *et al.* 1988; Trump 2002: 207; Trump 1966).

In order to function as permanent resident places, the temples must have been built close to water sources. Today, only few sources and all year round rivers exist. However, this lack of water is a relatively recent problem originating in the 19th century (Fenech 2001, 2007: 23–25; Schembri 1997: 121–124) and the megalithic buildings were preferably built close to freshwater (Grima 2005: 150–152).

In spite of this, a use of the megalithic buildings as permanent resident places for a larger community can rather be excluded due to the limited size of most of the temples and the existence of alternative residential structures. We can understand them more as central gathering places and as communal efforts, maybe multifunctional and partly inhabited, but with emphasis on sacral and ritual use for the whole community, which took place partly inside but also in front of the megaliths on the wide paved forecourts as well.

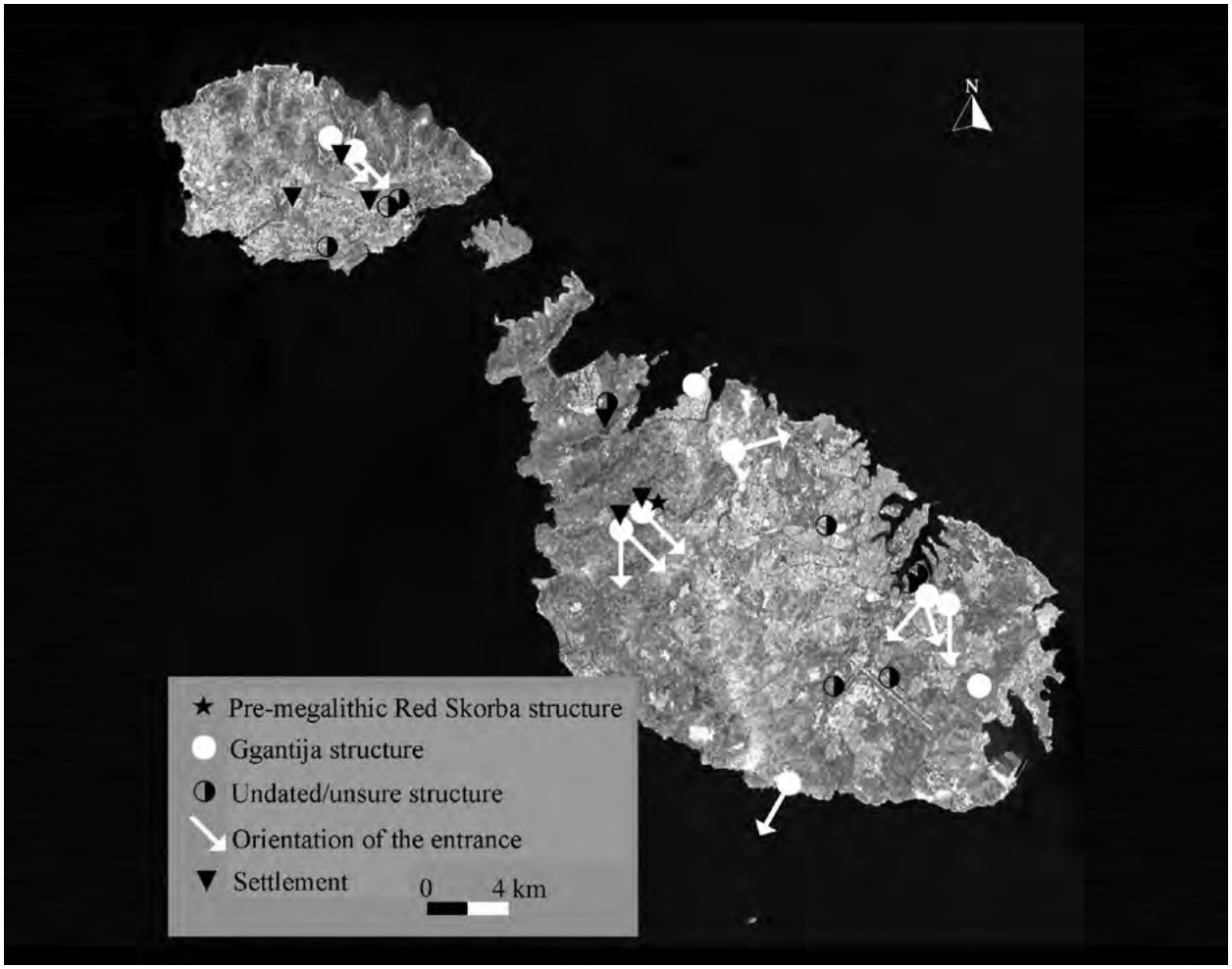


Figure 8.1 Megalithic temples, settlements and grave forms on the Maltese archipelago

Other indicators to further determine the function of these megalithic buildings can be searched by taking a closer diachronical look at their placement, their orientation and their enlargement within the landscape (Schulz Paulsson 2009) (Figures 8.2, 8.3).

The islands consist of limestone plateaus which are based on globigerine or coralline limestone. The main islands have coastal areas, lowlands in the north and the east, and many bays with scarp cliffs and numerous caves which have difficult access in the south and in the west. The highest elevation on Malta is 283m and on Gozo 124m. The majority of the structures in the Ġgantija phase were built at the coast and the sea, but not on the topographic highest elevations. Exceptions are represented by Ġgantija and Skorba/Ta´Ħaġrat. These structures were built in the interior on central places and situated on a hill side. At both places there is evidence for settlements, even from pre-megalithic times and the choice of the location points, in these cases, more to continuity in the use of earlier settlement places. Tal-Quadi was originally close to the sea as well, across the bay from Bur Marrad, but the sea level in the 4th millennium was higher and the sea rose into the interior of the island (Trump 2002: 160). The significance of the location at the coast can include a type of territorial marking or 'wrapping' of the island. The orientation of the entrances of the early temples supports this theory. Astronomic researchers postulated that the temples were possibly oriented to some of the brighter stars in the sky like α Cen (Serio *et al.* 1992). An orientation to the equinoxes of the rising sun can only be considered at Mnaidra South, a temple of the Later Tarxien phase. More important seems to be the concrete orientation of the structures. At a part of them, for example at the more central temples of Ġgantija, Skorba/Ta´Ħaġrat and Kordin/Tarxien, the axes and the entrances of the singular temple modules are quite similarly aligned therefore possibly being oriented to a unit of the pre-historic landscape, for instance a road. In contrast, the axes and the entrances of the temples at the sea are - as far as can be determined - directly oriented to the sea. Buġibba is insufficiently restored to be able to clearly determine the orientation of the bay of St. Paul, but Tal Quadi is oriented to the temple period sea level and the entrance of Mnaidra East is aligned directly to the sea and to the island of Fifla (Figure 8.2).

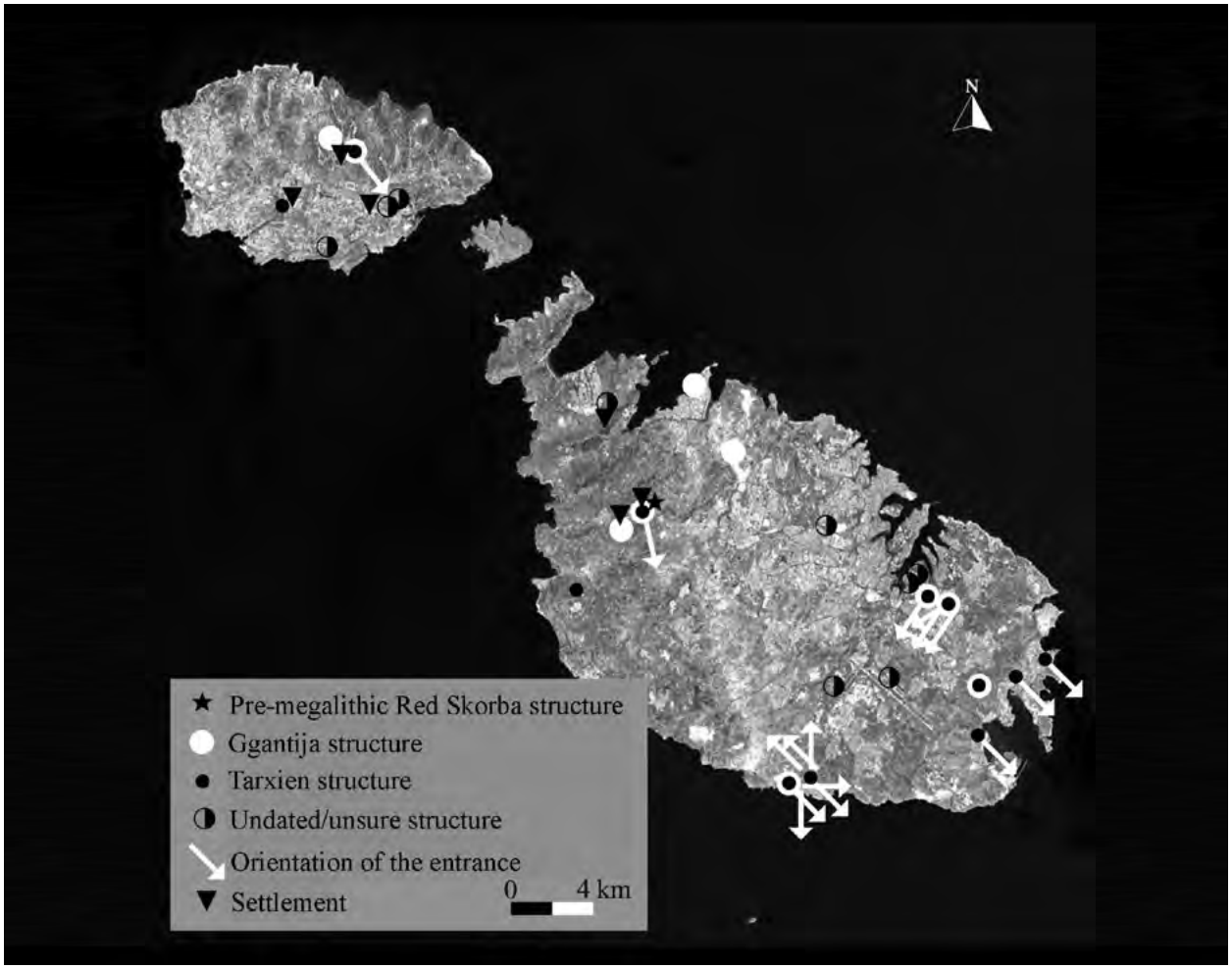


Figure 8.2 Situation in the landscape and orientation of the megaliths during the Ġgantija phase

In the later temple phase, the so-called Tarxien horizon, it is possible to witness the successive enlargements of Skorba, Tarxien, Kordin, and Mnajdra and the re-use of the old temple units of the Ġgantija phase. Mnaidra was extended with two additional units and the high complex structure Ħaġar Qim was erected 700m straight to the northeast. Completely new locations were chosen, the most of them again directly at the sea and the coast, such as on the steep southeast coast of Malta at Xrobb il-Għaġin, Tas Silġ, and Borġ in-Nadur and on the west coast at Kunċiżżjoni and Ħaġar Qim. The orientations of the temples from Skorba and Tarxien are practically the same and are aligned according to elderly structures. The enlargements of Mnajdra are grouped around the forecourt, central Mnaidra is oriented to the southeast, and Mnaidra South is oriented, as already discussed, to the rising sun of the equinoxes. The new temple of Ħaġar Quim consists of five temple units, two of the units are oriented to the sea, three to the north or the northwest and to the interior, similar to the temple complexes at Kordin and Tarxien. The newly built megalith structures on the southern coast at Xrobb il-Għaġin, Tas Silġ, and Borg in-Nadur are directed again completely towards the sea (Figure 8.3).

Renfrew analyzed six spatial clusters with sixteen temple units for Malta and Gozo, and he divided the island's area into six hypothetical territories: Gozo with Ġgantija, Northwest Malta with Skorba/ Ta´ Ħaġrat, Northeast Malta with Buġibba and Tal Quadi, Southern Malta with Mnaidra and Ħaġar Quim, Southeastern Malta with the structures at the coast and Eastern Malta with Tarxien and Kordin (Renfrew 1973: 161–182). These clusters were located at a distance of 6km from each other on average. Renfrew thus created a model of a segmentary society with territories and each segment with megalithic standing structures. Today it is possible to postulate more clusters with an average distance of 3km from each other, for example Għajsielem and Marżena on Gozo, the area around the Saint-Pauls-Bay with a settlement on Malta, rock-cut tombs and the remains of a quite destroyed temple at Xemxija, Kunċiżżjoni on the west coast and finally the area around today's airport with the two structures Hal Resqun and Derdieba (the latter with a rectangular ground plan and so most probably a building with another function). A possible cluster is also Ta´Raddiena and Tal Quadi and Buġibba may belong to two different groups (Schulz Paulsson 2009). But the sophisticated

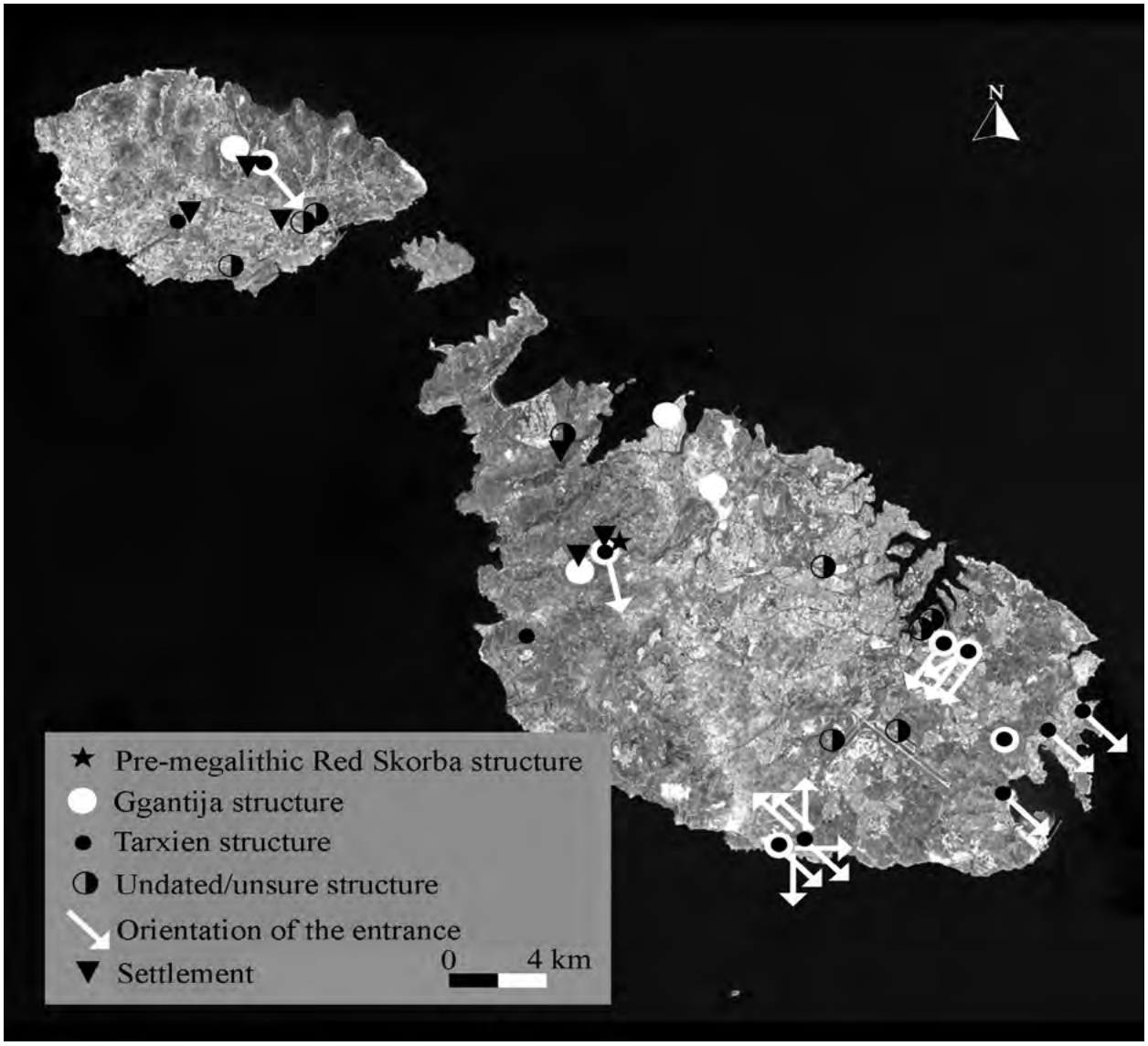


Figure 8.3 Situation in the landscape and orientation of the megaliths during the Tarxien phase

and highly complex structures from Tarxien/Kordin, Mnajdra/Ħaġar Quim and Ġgantija are not comparable to the more simple structures at the sea, for example Tal Quadi, Buġibba, Xrobb l-Għagin, Tas Silġ, and Borġ in-Nadur. Although Renfrew took different group sizes into consideration (Renfrew 1973: 169), it is equally possible that the temples had a different function.

At the end of the Tarxien period is a sharp cultural break must be considered. The old temple locations were abandoned or re-used in a different way. Skorba and Borġ in-Nadur were used as residences, the wall in Skorba was provisionally repaired, and Tarxien was converted into an urn grave field. The hypogea were also abandoned and a shift of burial rites to a cremation burial custom, first simple copper artifacts, and the first classical dolmen can be assumed (Trump 2002: 278) (Figure 8.9). Thus, the first megalith grave architecture built on the Maltese Archipelago in the form of simple dolmens appeared approximately 1000 calendar years later than the first megalithic structures. However, these first simple megalith graves stand in no relation to the sophisticated antecedent megalithic temple structures. There are approximately 18 dolmens which are still preserved on the islands, including Wied Filep, Wied Żnuber, Misraħ Sinjura, Ta Ħammut, and Ta Ċenċ. The dolmen consist of four small side stones and a large cap stone up to 3,80m in length, for instance in Wied Filep (Figure 8.9). The dolmens are associated to Bronze Age Tarxien cemetery ceramics and probably housed urns which are not preserved (Evans 1956; Trump 2002: 250). The dolmens of the Otranto group on Apulia or the dolmens on Sicily (cf. chap. 11) are typologically and geographically close.

The reasons for this sharp cultural break and the end of the temples have not been identified: There is no evidence for a hostile acquisition like a burnt layer or clear evidence for a natural disaster (Bonnano 1999: 103;



Figure 8.4 Ħaġar Quim from the southwest



Figure 8.5 Mnaidra with view to the islands of Fifla

Trump 2002: 238–241). In sum, during the Ġgantija-Phase the temples are comparable in size and composition, but at the same time both Ġgantija temples and both temples from Kordin III are outstanding with a higher central significance. This tendency is intensified in the Tarxien phase with the enlargement of Tarxien/Kordin and Mnajdra/Ħaġar Quim. The more simple stations at the sea had, in addition to their ritual use, a second or maybe even a primary function as watch towers and sea stations to control the sea and trade, as well as to defend against hostile acquisition and to represent the Maltese societies to outside groups. Dolmens are a later appearance on Malta and they are a result of a transfer or even a migration



Figure 8.6 Mnaidra South



Figure 8.7 Entrance Ġgantija

Megalithic structures with sequences and with radiocarbon dates

For the whole pre-historic Maltese sequence, just a few radiocarbon dates are available. The sequence is rather limited with 15 results for both megalithic temple periods Ġgantija and Tarxien (Figure 8.10). Only two of these radiocarbon dates are directly from megalithic contexts (BM-712, 4478±56 BP and BM-143, 4380±150 BP). Three radiocarbon dates are available from the early temple Ġgantija horizon: one date originates from a Ġgantija insertion in the Żebbuġ grave at the Brochtorff circle (Malone *et al.* 2009: 342), one is from a settlement layer in Skorba (Trump 1966), and one is from the south temple in Tarxien (Malone *et al.* 2009: 342) (OxA-3566, 4600±65 BP; BM-101, 4485, 150 BP and BM-712, 4478, 56 BP). The outset of the Ġgantija phase is thus calculated to 3596–3126 cal BC (95.4%; 3475–3201 cal BC, 68.2%), but there is far too little data to reliably determine the beginning and more sequences should urgently be produced. The Ġgantija insertion in the Bayesian model of the Brochtorff circle is calculated quite similarly to ~3675–3131 cal BC (95,4%; 3591–3210 cal BC, 68.2%)(Figure 8.11). More data is available from the second temple phase. 11 dates are from human bones stemming from the hypogea at the Brochtorff circle and one is from Skorba from the west temple floor (Malone *et al.* 2009: 342; Trump 1965). The transition from the Ġgantija to the Tarxien horizon is therefore calculated to ~3020 cal BC (3083–2911 cal BC, 68.2%



Figure 8.8 Door construction Tarxien

and 3211–2824 cal BC, 95.4%). The end of the temples, the beginning of the Bronze Age Tarxien cemetery period, and first metallurgy is assumed for ~2380 cal BC (2441–2309 cal BC, 68.2% and 2472–2190 cal BC, 95.4%).

Dating the megaliths on the basis of the artifacts

Skorba is the only stratigraphic excavated and published temple on Malta (Trump 1966). Some earlier settlement structures were found beside, behind and beneath the two temples and for Maltese circumstances well-preserved soil and layers could maintain the ceramic sequence Għar Dalam - Grey Skorba – Red Skorba – Żebbuġ – Mġarr – Ġgantija – Tarxien (Trump 2002: 58). The megalith structures were built and in use during the Ġgantija and the Tarxien phase. The evolutionary development of the ceramics was already described by Evans (Evans 1953) and only the ceramics are suitable to date the temples closer (Trump 2002: 233). The ceramics of the Ġgantija phase are dark, well-polished, and hard-fired. The most common vessel forms are large cups and bowls in two standard forms: bowls with vertical or in-sloping necks, short shoulders, and convex bottoms with small bases and bowls with no shoulders, more concave necks, and handles. The ceramics were decorated with fine scratched lines, such as hatched designs, alternated checkers, and red ocher incrustation. The material of the Tarxien period is characterized by better prepared clay and sandy pink ware. The most common form, which was discovered in



Figure 8.9 Classical late dolmen Wied Filep

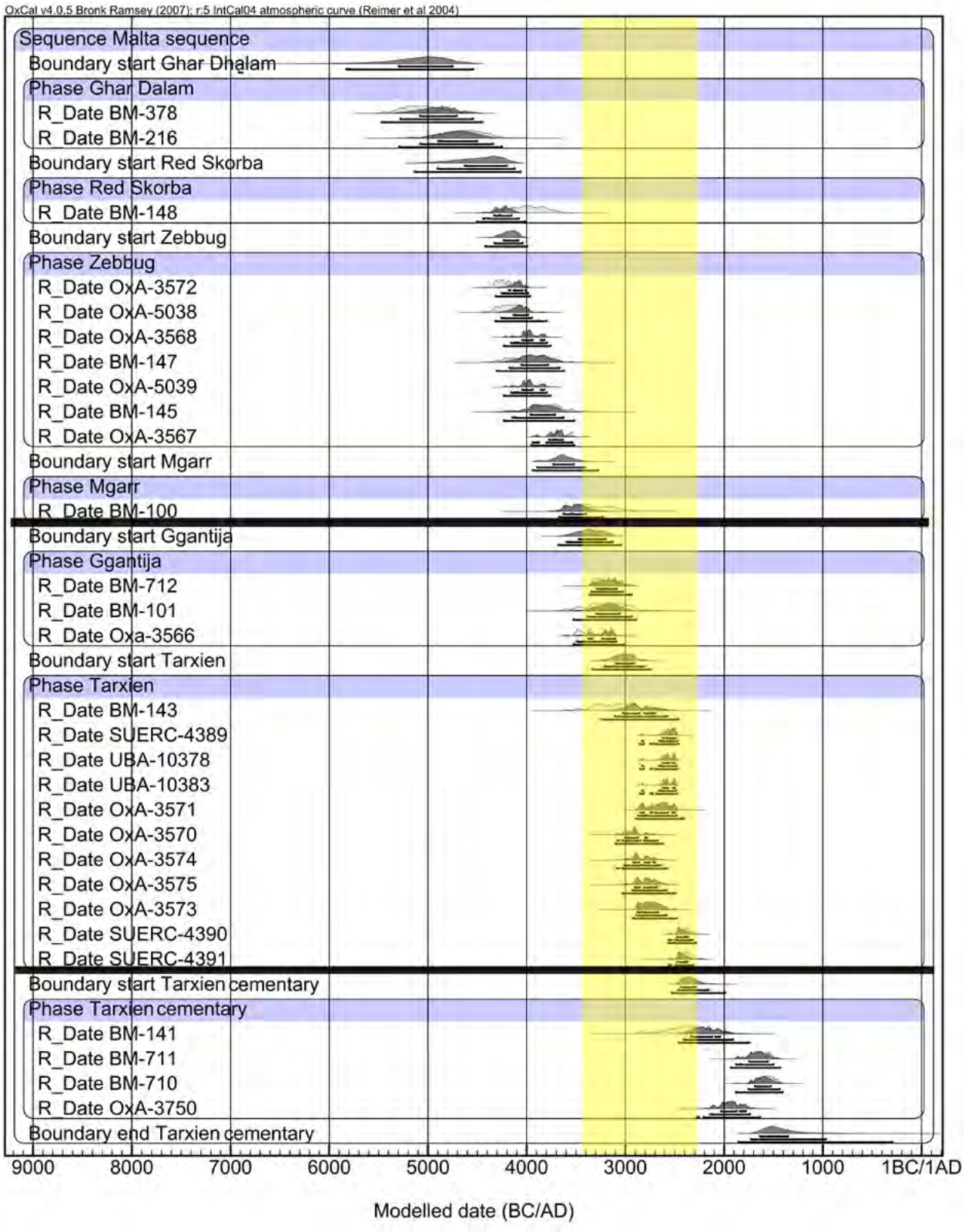


Figure 8.10 The Malta sequence. Bayesian model with the probability of dates from all available radiocarbon results of Maltese Neolithic and Bronze Age Tarxien cemetery contexts. Model agreement: A_{model}=89.7, $A_{overall}$=90,0

great numbers from all temple sites, is a carinated bowl, which has a vertical concave neck, a convex body, and a small flat base. Most of them have handles and jars which are ovoid, carinated, or S-formed and most of the bowls are 20cm on the average and can measure up to one meter. The bowls are quite variably decorated, most frequently with a volute pattern, or circular studs all over the outer side, or with circular and lentil-shaped

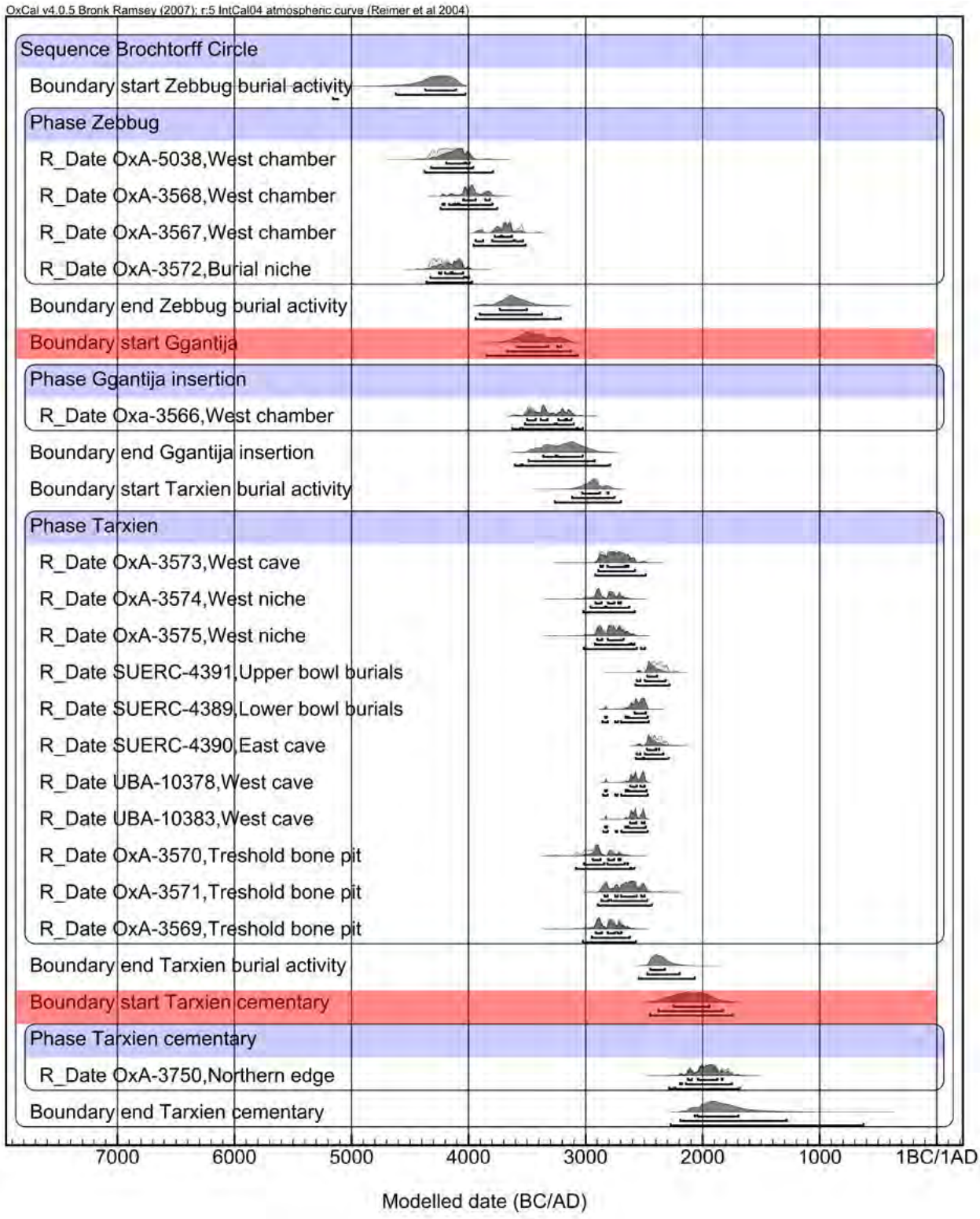


Figure 8.11 The Brochtorff circle sequence. Model agreement: A_{model}=92.7, $A_{overall}$=89.3

pellets on the vessel surface and scratched motifs such as zoomorphic forms, for example cattle under trees and birds (Trump 2002: 217–233).

Ġgantija material is recorded from Ġgantija North and South, Kordin III East and West, Skorba, Buġibba, Mnajdra, Santa Verna, Tarxien Far East, Ta´Ħaġrat, and Ta Marziena. Tarxien material from Ħaġar Quim, Tarxien South, Tarxien East, Tarxien Central, Mnajdra South and Central, Sorba East, Borg in-Nadur, Xrobb il Ghagin, Tarxien Central, Ta´Ħaġrat, Buġibba, and Kunċiżżjoni (Trump 1966, 2002: 120–191).

Contemporaneous burial rites

During the whole temple period, rock-cut tombs were a common contemporaneous grave form and small graves are known at Xemxija, Binġemma and Ta´ Ħamet. A natural cave close by Bur Mgħeż Mqabba was also in use during the whole temple period as a burial place where at least 75 individuals were buried (Trump 2002: 118).

Two large and elaborated hypogea still exist: Ħal Saflieni on Malta and the Brochtorff or Xagħra circle on Gozo. Both were already in use during the pre-temple Żebbug phase (cf. 1.1) and during the entire temple period. They are collective graves with successive burial practices and were mainly used during the Saflieni- and the Tarxien phases (Stoddart *et al.* 1993). The hypogea Ħal Saflieni was already excavated in 1906. Unfortunately, only 19 individuals were stored, whereas the rest was disposed. From the hypogea at the Xagħra circle, an MNI of at least 800 individuals is documented. According to the burial rituals, there is no clear evidence for a stratified society.

Conclusion

The megalithic temples, which are unique for Europe and the Mediterranean area, emerged at ~3400 cal BC (3591–3210 cal BC, 68.2% and 3675–3131 cal BC, 95.4%) on the Maltese archipelagos and probably somewhat earlier. The data base is too scarce for any closer determination.

A pre-megalith or transitional structure is documented from the end of the 5th millennium with the Red Skorba shrine at Skorba in North West Malta. In the transition from the pre-megalith Żebbuġ to the first temple phase, the so-called Ġgantija horizon, there are no cultural changes to be mentioned regarding the economy, trade, or handicrafts. The genesis of the megalithic temples on Malta and Gozo can be understood as a development which was ongoing in Europe since the middle of the 7th millennium with the organization of Neolithic societies by the creation of central meeting places. The Maltese meeting places are unique in this framework and are fortunately preserved since they are created in stone, in contrast to places like the Sarup enclosures or

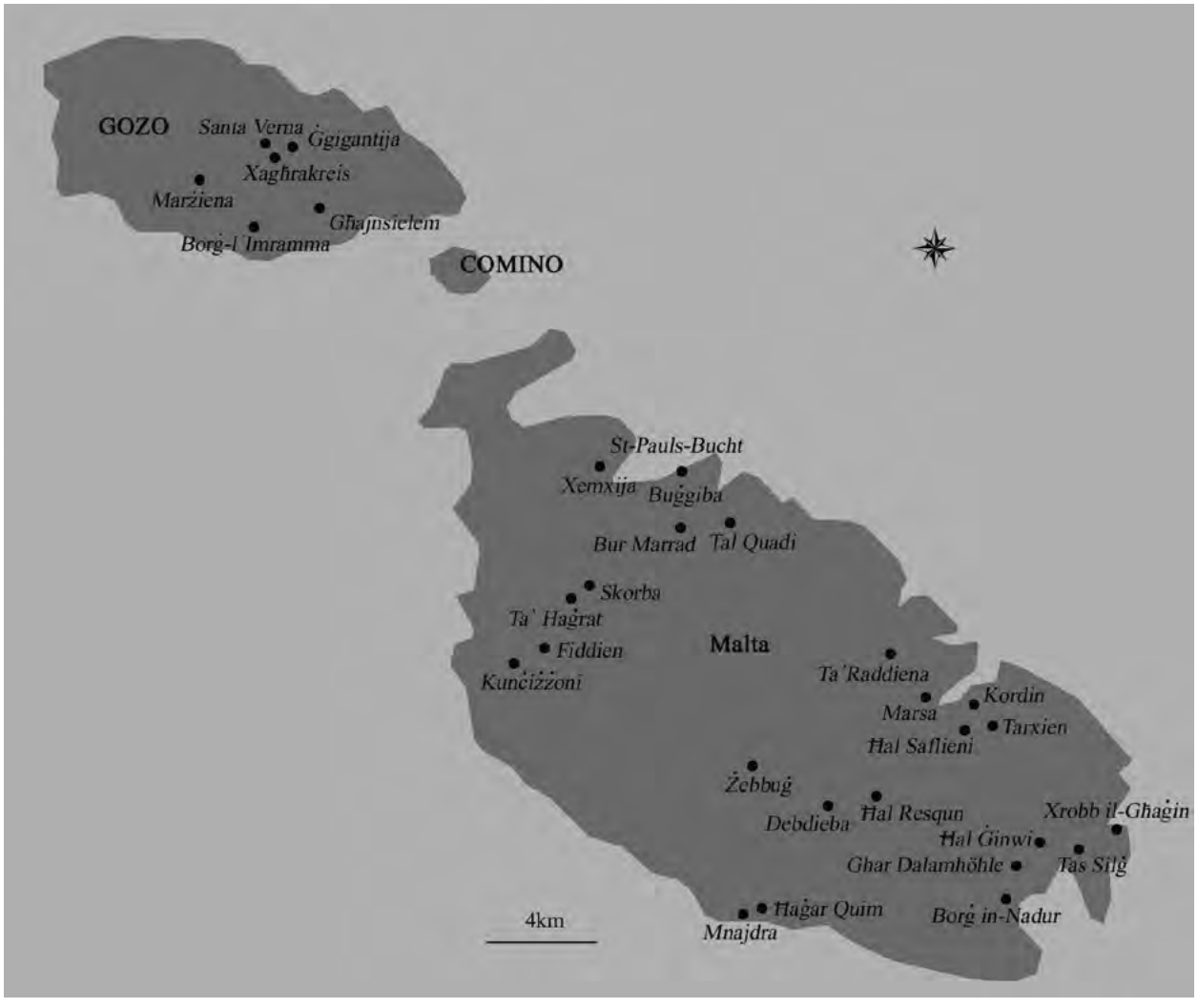


Figure 8.12 Main sites mentioned in text

roundels with a system of ditches or palisades, but the principle is the same in a higher level European sense.

Due to their placement in the landscape, their orientation, and their enlargements through time, there is evidence of different functions for the different temple units. Both Ġgantija temples and both temples from Kordin III were already outstanding in the Ġgantija phase and had a more central significance. This tendency was intensified in the Tarxien phase with the enlargements of Tarxien/Kordin and Mnajdra/ Ħaġar Quim. The more simple stations at the sea had, in addition to their ritual use, possible functions as watch towers and sea stations as well. At the end of the temple period at ~2380 cal BC (2441–2309 cal BC, 68.2%; 2472–2190 cal BC, 95.4%) a cultural break or a collapse of the temple society can be observed: many temples were abandoned or converted, burial rites changed, the first metal artifacts can be recorded, and first megalithic grave monuments were built in the form of simple dolmens. This is an indicator of a transfer and/or spread of the dolmen tradition or even of a population shift from somewhere else, for example the Italian mainland.

Table 8.1 Radiocarbon dates from Malta

Laboratory Number	Architecture	Context	Material	Radiocarbon age (BP)	STD	δ13C (‰)	δ15N (‰)	Bibliography
Brochtorff Circle, Xagħra, Gozo								
OxA-3572	Rock-cut tomb	Żebbuġ burial niche	human bn	5380	70	-19.6		Malone et al. 2009, 342
OxA-3568	Rock-cut tomb	Zebbug rock-cut tomb (west chamber)	human bn	5170	65	-16.4		Malone et al. 1995, 343
OxA-5038	Rock-cut tomb	Zebbug rock-cut tomb (west chamber)	human bn	5330	100	-19.49		Malone et al. 1995, 343
OxA-5039	Rock-cut tomb	Zebbug rock-cut tomb (east chamber)	human bn	5170	65	-20.35		Malone et al. 1995, 343
OxA-3567	Rock-cut tomb	Zebbug rock-cut tomb (west chamber)	human bn	4860	65	-24.1		Malone et al. 1995, 343
OxA-3570	Hypogeum	Treshold bone pit	human bn	4300	65	-17.9		Malone et al. 2009, 342
OxA-3569	Hypogeum	Treshold bone pit	human bn	4250	65	-18.3		Malone et al. 2009, 342
OxA-3574	Hypogeum	West niche	human bn	4260	60	-18.6		Malone et al. 2009, 342
OxA-3575	Hypogeum	West niche	human bn	4225	70	-18.9		Malone et al. 2009, 342
OxA-3573	Hypogeum	Burial display in West Cave	human bn	4170	65	-18.3		Malone et al. 2009, 342
OxA-3571	Hypogeum	Treshold bone pit	human bn	4080	65	-20.2		Malone et al. 2009, 342
UBA-10383	Hypgeum	Deposits in west Cave below Bayer pit	human bn	4054	24	-20.35	9.4	Malone et al. 2009, 342
UBA-10378	Hypogeum	Deposits in west Cave below Bayer pit	human bn	4048	28	-19.6	9.9	Malone et al. 2009, 342
SUERC-4389	Hypogeum	Lower bowl burials	human bn	4035	35	-19.8		Malone et al. 2009, 342
SUERC-4391	Hypogeum	Upper bowl burials	human bn	3910	40	-19.7		Malone et al. 2009, 342
SUERC-4390	Hypogeum	East Cave deposits	human bn	3920	35	-19.3		Malone et al. 2009, 342
OxA-3750	Hypogeum	Tarxien Cemetery deposit	human bn	3580	75	-17.7		Malone et al. 2009, 342
OxA-3751	Hypogeum	Tarxien Cemetery deposit	animal bn	1480	70	-21.0		Malone et al. 2009, 342
Oxa-3566	Rock-cut tomb	West chamber, Ggantija insertion in Zebbug rock-cut tomb	human bn	4600	65	-20.8		Malone et al. 1995, 343
Bur Mgheż, Malta		**Context**						
OxA-8165	Cave	Ġgantija-Tarxien Cemetery	human bn	4305	65			Malone et al. 2009, 342
Hal Saflieni, Paola, Malta								
OxA-8197	Hypogeum		human bn	4130	45			Malone et al. 2009, 342
Skorba, Żebbiegħ, Malta								
BM-378	Settlement	Skorba FB6	ch	6140	160			Malone et al. 2009, 342
BM-216	Settlement	Skorba FB6	ch	5760	200			Malone et al. 2009, 342
BM-148	Pre-temple Structure	Skorba Red Skorba shrine	ch	5175	150			Malone et al. 2009, 342

Laboratory Number	Architecture	Context	Material	Radiocarbon age (BP)	STD	δ13C (‰)	δ15N (‰)	Bibliography
Skorba, Żebbieġħ, Malta								
BM-145	Settlement	Skorba ZA4	ch	5000	150			Malone et al. 2009, 342
BM-147	Settlement	Skorba GA7	ch	5140	150			Malone et al. 2009, 342
BM-142	Settlement	Skorba GC3 hut of querns	ch	5240	150			Malone et al. 2009, 342
BM-712	Settlement	GC3 hut of querns	ch	4478	56			Malone et al. 2009, 342
BM-143	Temple	Skorba-west temple floor	ch	4380	150			Malone et al. 2009, 342
Ta´ Ħaġrat, Mġarr, Malta								
BM-100	Temple	Mġarr-east temple	ch	4640	150			Malone et al. 2009, 342
Tarxien, Malta								
BM-101	Urn cemetery	Tarxien Cemetery , south temple	ch	4485	150			Malone et al. 2009, 342
BM-141	Urn cemetery	Tarxien-cinerary urn south Temple	beans	3880	150			Malone et al. 2009, 342
BM-711	Urn cemetery	Tarxien-cinerary urn south Temple	barley	3354	76			Malone et al. 2009, 342
BM-710	Urn cemetery	Tarxien-cinerary urn south Temple	beans	3286	72			Malone et al. 2009, 342

Chapter 9

Southern Spain

Summary: Southern Spain is the region with the densest concentration of megalithic necropolises in Europe. From the Recent Neolithic onwards large necropolises arise in Southeastern Andalusia in the initial phases of the Almeria horizon (~4200–3600 cal BC). The Copper Age (~3300–2000 cal BC) is the zenith of the collective graves. Strong indications for a social stratification within the Copper age societies are observable in the necropolises of Los Millares. Contemporaneous elaborated monumental graves in Southwestern Spain with only a few buried individuals and grave goods fabricated from prestigious and exotic raw materials are underlining this tendency.

Pre-megalithic structures and pre-megalithic burial rites in Southern Spain

Pre-megalithic societies in Andalusia buried their dead in caves or in pits within settlement contexts. Since the Upper Paleolithic, natural caves were used in Andalusia as sanctuaries and burial places (García Sanjuán 2009a: 21), for example the Cueva de la Mora in Jabugo, Huelva and the Cueva de los Covachos in Almaden de la Plata. From the Cueva de los Murcielagos in Albuñol, Granada there is evidence of several Early Neolithic burials. This site is one of the rare examples in Europe, where it appears possible to reconstruct the burial rites and even the garb of the buried individuals due to good preservation conditions of the organic material. According to old research reports (García Sanjuán *et al.* 2011, 125; Góngora/Martínez 1868: 29–50), the mummified bodies of more than sixty people were discovered in the interior of the cave. Twelve of them were arranged in a semi-circle around a woman dressed in leather clothes with a necklace of esparto grass and seashells and carved boar tusk. In other halls of the cave more individuals were deposited with leather clothes, hats, sandals made of esparto, and baskets. From esparto grass altogether four radiocarbon results are available ranging from 5208–4047 cal BC (95.4%; 5193–4079 cal BC, 68.2%) (CSIC-1133, 6086±85 BP; CSIC-1134, 5900±38 BP; CSIC-1132, 5861±48 BP, CSIC-246, 5400±80 BP). One date gained from wood is considerably older, stemming from the 7th millennium BC, for which an old-wood effect seems possible (CSIC-247, 7440±100 BP; 6416–6229 cal BC, 68.2%; 6461–6085 cal BC 95.4%). Within the settlement Cerro Virtud, a collective grave in a ditch is documented with 11 individuals, some are primary burials, others secondary depositions. Six radiocarbon results from bone material are at our disposal, four of the individuals died during the time interval from 5198–4495 cal BC (95.4%; 4994–4594 cal BC, 68.2%), two of the individuals are after burials (García Sanjuán *et al.* 2011, Table 2; Montero Ruiz *et al.* 1999). The pit contained stone bracelets (pectunculos), arrowheads, and cross-formed idols. Moreover, there is evidence of pre-megalithic pit burials in the settlement Los Castillejeros in Peña de los Gitanas (Cámara Serrano/Costa Caramé 2009; Cámara Serrano *et al.*, forthcoming) (cf. chap. 9, p. 227-238).

Transitional structures and the emergence of megaliths in Southern Spain

Megaliths emerged in the southern part of Spain within the first half the Recent Neolithic, also classified as Late Neolithic (4200–3600 cal BC). A recent investigated transitional structure to the megaliths is tomb no. 11 from the necropolis Campo de Hockey, San Fernando in the region of Cádiz (García Sanjuán *et al.* 2011: 126, 129; Vijande Vila 2009: 273-274) (Figure 9.2). It is a circular small structure with a diameter of 2m, built with stone slabs, and covered by a small tumulus. In the grave, the remains of two successively deposited individuals were found. Tomb 11 is surrounded by several single and some double inhumations deposited in pits in a crouched position, which are partly covered by stone slabs. There is one radiocarbon date available from the second half of the 5th millennium from a gastropod shell sample of the species Monodontalineata (García Sanjuán *et al.* 2011: 126) (CNA-664, 5650 ± 40 BP; 4536–4451 cal BC, 68.2%; 4581–4364 cal BC 95.4%). This result is not suitable to determine the construction of the grave and the mussel were not necessarily contemporaneously harvested.

A second available result from this site is obtained from a sample of a human bone from the double grave 10 and can be positioned within the time interval 3951–3705 cal BC (95.4%; 3937–3714 cal BC, 68.1%).

The first clear megalithic structures are documented in the southern part of Spain in the Recent Neolithic within the initial phase of the Almeria horizon (Acosta Martinez/Cruz Auñón 1981; Guilaine 1996: 136–137). These graves were studied at the end of the 19th century (Siret 1890) and later works are based on these early reports (Acosta Martinez/Cruz Auñón 1981; Leisner/Leisner 1943). Until today no radiocarbon dates are available, nor are there any clearly defined

transitional structures, so that the contemporaneity to other regions with early megaliths remains unassertive and vague.

According to Leisners, the Almeria horizon is divided into the three phases I, II and II/IIIa. The architectonic features of phase I have been described in detail by Acosta Martinez and Cruz Auñón (1981). The tombs of this earliest phase can be classified into three main groups: graves with round ground chambers, graves with quadratic or rectangular chambers, and small passage graves. Siret and Leisners proposed a classical development of the megalithic sequence in three phases starting with simple constructions of circular chambers, then quadratic chambers with corridors, and finally rectangular chambers (Cámara Serrano 2001: 59; Leisner/Leisner 1943; Siret 1890). A part of these early graves are denoted as Rundgräber according to Leisners terminology. The graves built in stone slabs or in a combination of stone slabs and dry walls can already be defined as simple, but fully developed megaliths and belong to the first megalithic stage in Andalusia. At the time of Acostas Martinez and Cruz Auñóns analysis, 47 graves of this initial megalithic phase were known (Acosta Martinez/Cruz Auñóns 1981: 72). The graves are between 1m and 3m long, while 60% are of rather modest size with measurements of between 1m and 1,5m. Nearby 80% of them are described as simple structures with a round or an oval ground plan, whereby 25 of the graves were registered with a round and 12 with an oval ground plan. These graves are either built with stone slabs, in dry wall technique, or with a combination of both. Graves with a round or oval plan only with orthostats are registered e.g. from Huércal-Overa, Overa 3/1, Bédar Los Gallardos, Cantoria, and Huércal-Overa. The same grave form built in dry wall technique is known from Purchena, Loma de la Atalaya 2 and 11, as well as from Urrácal and Antas. A combination of both forms is documented from Purchena, Loma de la Atalaya 4, and Cantoria Loma de la Cucador 10. The 3 quadratic and the 4 rectangular registered graves are built with stone slabs. The simple quadratic or rectangular grave chambers are known from Antas, Tabernas, Níjar, and Mojácar. One grave with a polygonal ground plan built in stone slabs is noted from Vera, and a passage grave also built with stone slabs is registered from Purchena in Loma de Antalaya. From this grave the rest of one individual with an arrowhead is documented.

In 40 of these 47 graves there is evidence of human bones, 29 are classified as collective graves, but this can likewise reflect a later re-use of the graves which were designed originally as single or double graves. Nine graves are clearly classified as individual graves, and two as double graves. A few grave goods are documented in 34 of these graves, including unspecific ceramics, few blades, arrowheads, partly transversal triangular polished axes, and shells. J. Guilaine indicated possible parallels between the early megaliths in the Almeria region to other early megalithic appearances in the Mediterranean regarding their architectonic principles (Guilaine 1996: 136), for example on Sardinia, in Catalonia or in Southern France. According to Guilaines interpretation, the regional sequence starts with round pits or cists during the end of the 6th millennium, shifts to megalithic graves with polygonal chambers, and finally to the passage graves.

Appearance and architectonic features of megalithic structures in Southern Spain

Up to the present day, approximately 1500 megaliths are registered in Andalusia, which is just a small portion of the original monuments. Andalusian megaliths exhibit a large morphological diversity and they are built as simple grave forms, such as circular chambers without passages, the so-called Rundgräber, simple and extended dolmens with rectangular or trapezoid chambers and sometimes inner compartments, passage graves, gallery graves and tholoi. Furthermore, a few standing stones and one stone circle are known. Andalusia is a region rich in megalithic necropolises like no other region in Europe and some of the most outstanding megalithic structures are documented from this area. The megaliths were built from Huelva to Almeria and from the Recent Neolithic onwards, but the most of them were built within the Copper Age. In the Bronze Age megaliths were still constructed, similar to so many places in Europe, but the constructions declined. Many of them were just re-used, including both the chambers and also the tumuli for single burials.

Remarkable is a group of megalithic graves in this region which are very outstanding with regards to their realization, their architectonic concept, and the respective invested labour efforts. These monumental structures are situated in Central or East Andalusia, but most of all in the Valle del Guadalquivir. To be mentioned here are, above all, the megaliths from Antequera, Menga, Viera and El Romeral, and the structures from Valencina de la Concepción, El Gandul, El Soto, Alberite I, Ontiveros, Montelirio, Sevilla Matarubilla, and La Pastora (Figures 9.3, 9.4).

These graves are not to be compared with the small and simpler graves from Almeria and Granada, which appear in dense concentrations and large necropolises, but rather with other colossal structures in Portugal, for example the Anta Grande in Valverde. They deserve closer consideration.

In the region of Antequera, the Dolmen de Menga, the Dolmen de Viera, and the Dolmen El Romeral are documented (Figure 9.3). The Dolmen de Menga is situated on an elevation of the terrain in Antequera and

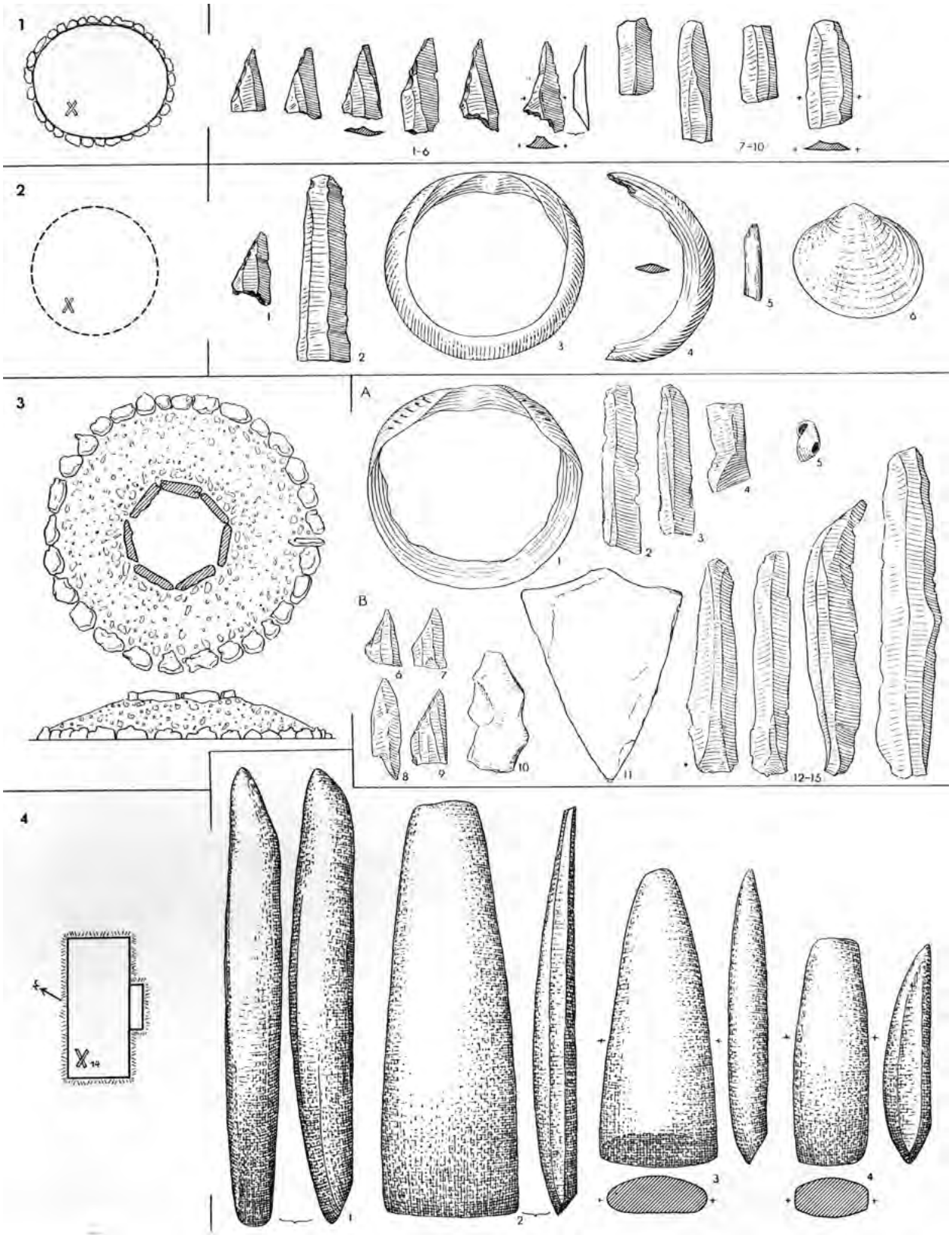


Figure 9.1 Almeria graves. Zurgeña : 1) Loma de las Eras I, 2) Palacés II, 3) Vélez Blanco. Tabernas: 4)Llano de la Rueda I (Leisner/ Leisner 1943, Tafel 2)

exhibits a passage grave built of large stone slabs with a chamber length of 27,5m and a short corridor with a trapezoid atrium. The proportions of the chamber as compared to the corridor could be interpreted as a transition to gallery graves (García Sanjuán 2009a: 23). The tumulus had a diameter of 50m and the grave

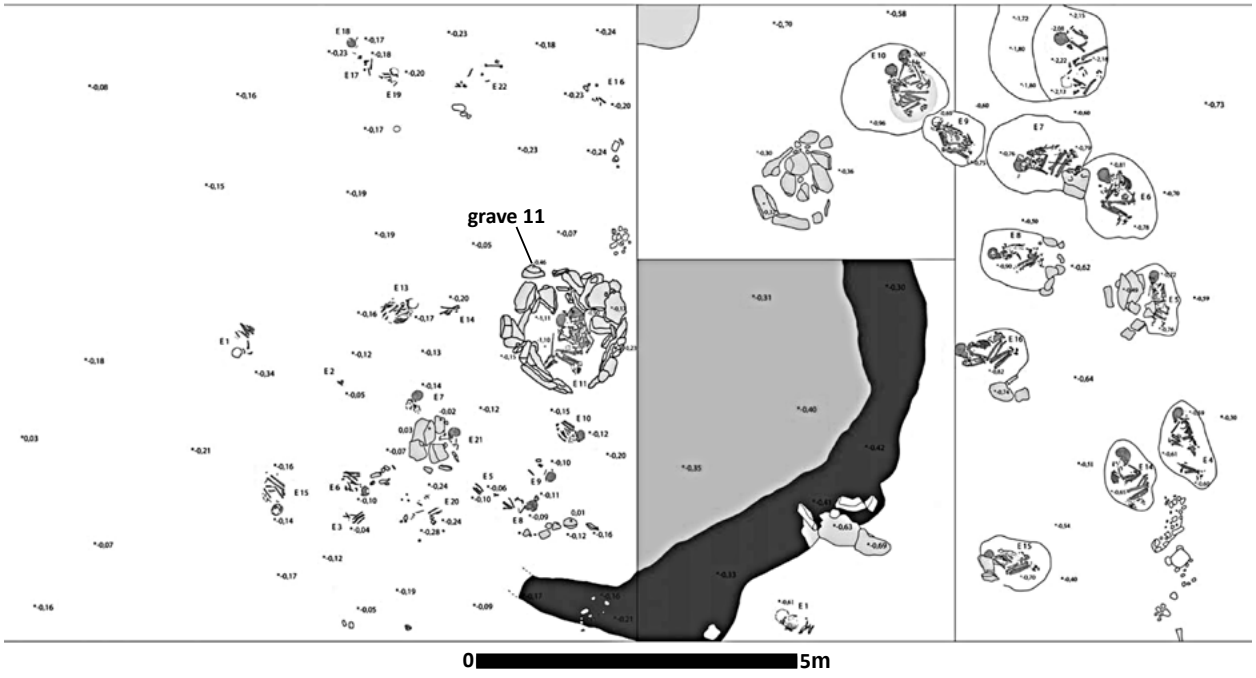


Figure 9.2 Planum Campo de Hockey with grave 11 as a transitional structure to the megaliths (after Vijande Vila 2009, Figure 7)

was covered by some 3000m³ of earth and stone. In the immediate surroundings of Menga, the passage grave Viera was also constructed on an elevation of the terrain. With a length of 1,6m, the chamber is rather small. The corridor, however, measures 19m. Thus, the covering tumulus reached an average diameter of 50m (Figure 9.4). The chamber in the tholos El Romeral measured 5,20m on the average and the corridor is 26m long. A small corridor led into side chambers measuring 2,34m in diameter. Both chambers are covered by corbelled roofs. The whole construction is built in a dry-wall technique and the only megalithic stones are represented by the capstones and the ports. From all three graves, nearly no grave goods and no bone material are documented (García Sanjuán 2009a: 22–23), except few ceramics, small silex tools, stone axes, and a copper awl. Therefore, a chronological classification remains problematic.

From Sevilla, the tholos of Matarrubilla belongs to the most elaborated structures. The tholos is a passage grave with a round chamber and a total length of 32m, covered by a corbelled roof (Figure 9.4). From the inside, a black marble block is recorded, which must have been placed before the construction of the roof. The tholos La Pastora is documented one km airline from there. It exhibits a passage grave with a small chamber, 2,5m in diameter, and a corridor with a length of 42m (García Sanjuán 2009a: 239–247).

In the region Valencia de la Conception in Cádiz, two extraordinary gallery graves are recorded with the Dolmen Alberite I and the Dolmen de Soto in Huelva at Trigueros. The Dolmen Alberite I is a grave with a length of 20m. It was originally covered by a tumulus, 50m in diameter, and is a part of the necropolis Alberite consisting of at least seven tombs with Alberite I and II as the largest graves. In the front of the chamber of Alberite I is an atrium. The entrance is marked by two small standing stones and four anthropomorphic standing stones that were positioned in the atrium. The orthostats and the roof are decorated with red ochre paintings with geometric figures, zigzag lines, axes, knifes, suns, snakes, and anthropomorphic symbols (Hurtado Pérez 2009: 67–69). The Dolmen de Soto is a grave with a length of 21m with up to 4m high orthostats. The tumulus, which covers the grave, is 75m in average. The Dolmen de Soto is likewise decorated with remarkable symbols, incisions, and paintings. An anthropomorphic figure with a child in its arms is engraved into the stone of one of the orthostats. In front of this orthostat, the actual skeletons of a child and an adult were found (García Sanjuán/Linares Catela 2009: 141–150).

The fact that some of these extraordinary monuments, such as Menga, El Romeral, Matarubilla, and La Pastora are oriented to the north or to the south and are not oriented, like most of the other graves, to the east or to the southeast is interpreted as an indication for a possible special second function of the graves, for example as communal buildings (García Sanjuán 2009a: 26). Unfortunately, we do not have enough indications for their chronological setting (cf. chap. 9, p. 227-238). However, these big monuments coexisted together with megaliths in more modest dimensions.



Figure 9.3 The elaborated monumental graves of Antequera. Above: entrance area Dolmen de Menga with members of the European megalithic studies group, in the middle: interior Dolmen de Menga, below on the left: entrance area Dolmen de Viera, below on the right: corridor El Romeral. Photo courtesy El Romera of El pantera - CC-by-sa /Wikimedia Commons.

From the very west of Andalusia in Huelva altogether 250 megaliths are recorded. Here, the megaliths emerged somewhat later than megaliths in the other regions, from the High Copper Age onwards (Cámara Serrano / Linares Catela 2009: 4). In the region of the river Tinto and Odiel, large structures were recently detected at the site El Seminario, including important structures from the Copper Age and several hypogea and tholoi, averaging up to 5m in diameter. The necropolis of El Pozuelo consists of 18 monuments and passage graves with some multiple chambers (García Sanjuán/Linares Catela 2009: 154–160).

In the region of Sevilla, 65 monuments are noted. Beside the already mentioned graves from Valencia de Conception, the Dolmen de Alberite I, and the Dolmen de Soto, further important megalith complexes in the province of Sevilla include El Gandul and Almaden de la Plata. El Gandul is a site with tumuli and two gallery graves with burial and subsequent use activities from the 3rd millennium to the late Roman Imperial period. Almadén de la Plata is a region with approximately 20 megalithic structures. The most unique structure is Palacio III, a gallery grave with a length of 5m, which is the earliest structure on the site and a tholos with 6m in average as a second structure. In Almadén de la Plata a further structure, the La Traviesa necropolis with stone cists, is documented. One larger structure is considered to be megalithic. The chamber is 3,25m long and 1,30m wide and it is covered by a tumulus measuring 6m in average (García Sanjuán 2009a).

In the province of Malaga, the necropolis Los Gigantes is to be mentioned which is localized in the western part of the province and consists of two gallery graves known as La Giganta and El Gigante with a trapezoid ground plan and lengths of 10m, respectively 8m. Another important megalith of the region is El Tesorillo de la Lana. Originally, the passage grave with an antechamber and a round chamber most probably belonged to a necropolis (Márquez Romero 2009).

In the area of Córdoba, megaliths are distributed in three regions: in the Sierra Morena in the north, in the depression of Guadalvir, and in the centre and the Cordillera Subbética in the south. Most of these

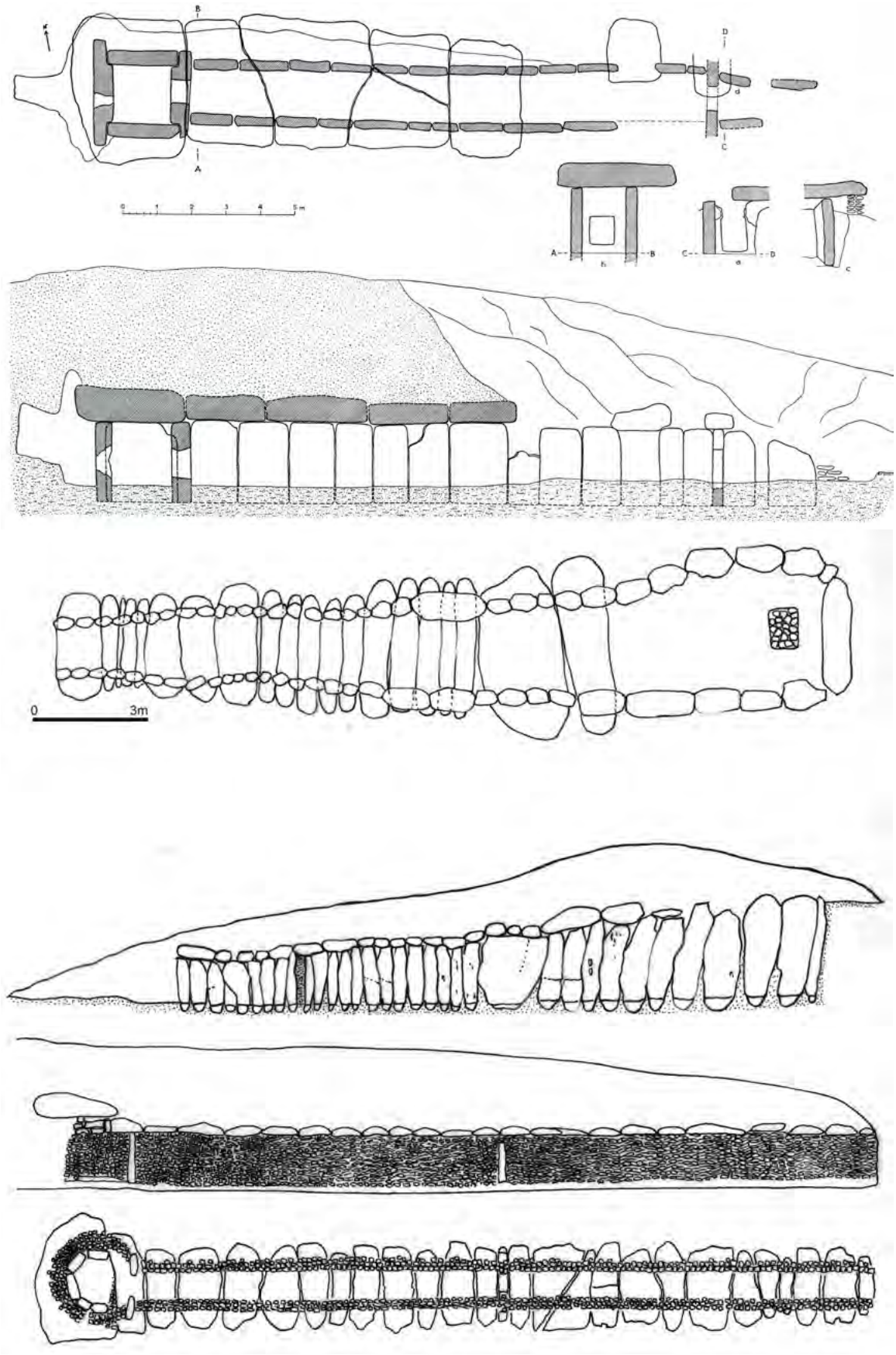


Figure 9.4 The elaborated megalith graves of Andalusia. Above: Dolmen de Viera (Leisner/Leisner 1943, Tafel 57), in the middle: Dolmen de Soto in Huelva (after García Sanjuán/Linares Catela 2009: 143, after Hugo Obermeier), below: Dolmen La Pastora in Sevilla (after García Sanjuán 2009a: 213, after Hugo Obermeier)

megaliths are gallery graves. The tholos El Minguillo represents one of the few exceptions. Based on archaeological material, most of them are associated to the Copper Age (Ortiz Moreno 2009).

In the region of Granada, important megalithic sites are concentrated in the Hoya Guadix-Baza. Today, the necropolis of Gorafe still includes 142 remaining monuments (Figures 9.5, 9.6). Originally, 250 graves were estimated. These graves were built from the bottom of the valley to the surrounding highlands and the valley of the Rio Gor. The early megaliths in the Final Neolithic are built with a rectangular chamber and a short corridor, the graves associated to the Early and the High Copper Age exhibit polygonal or trapezoid-formed chambers with perforated entrances, the so-called falsa portas. In the Bronze Age and the later periods of the necropolis, the dead are buried in stone cist graves without corridors. The grave goods include ceramics, arrowheads and blades in flint, different idols, metallic weapons, and metallic elements (Cámara Serrano/Costa Caramé 2009).

From the Recent Neolithic onwards Rundgräber, dolmens, extended dolmens, small tholoi, and passage graves were built in the neighboring region Almeria, (cf. chap. 9, p.221-222). Another grave variant are the megalithic cists, but they are traditionally seen to be a later form appearing at the end of the Copper Age or even at the beginning of the Bronze Age (Molina González/Cámara Serrano 2009). In the Almeria region, several necropolises are noted, for example the necropolis from Los Millares (Figures 9.7-9.9), primarily with ca. 80 tholoi, the necropolis de Rambla de Huechar, the necropolis de Galera, and the necropolis de Gador (Molina González/ Cámara Serrano 2009).

More to the northeast in the province of Jaén, few megaliths are registered. This region includes the outer offshoots of the southern Spanish megalithic tradition. In the northern part several tumuli are registered. Furthermore, the Dolmen de Enicarejo can be noted, a semi-hypogeic structure from the transition of the 4th to the 3rd millennium (Costa Caramé 2009).

Standing stones not found as often in Andalusia as on the rest of the Iberian Peninsula. An exception is the region in the northwest of Huelva, where a couple of single standing stones are noted, for example Monte Chico and La Alcalaboza. The former is 4,25m long and maximally 0,85m in diameter. The re-use of standing stones for megalith constructions is documented for structures such as those found in Llano de la Belleza (Aroche, Huelva), Casa de Don Pedro (Bélmez, Cordoba), and the Dolmen de Soto (García Sanjuán 2009a, 2011). No alignments are recorded from Andalusia, but one stone circle at Huelva in Abad in Rosada de la Frontera, although this stone circle possibly represents a later construction (García Sanjuán 2009: 20) and consists of 6 monoliths with an outer diameter of 4,50m (García Sanjuán 2009: 20).

Megalithic structures with sequences and with radiocarbon dates

37 radiocarbon dates from the altogether current available 445 radiocarbon measurements from Andalusian Neolithic and Copper Age contexts are directly connectable to a megalithic framework. Furthermore, 11 results from megaliths are available which are associated to the Bronze Age, which will not be closely considered within this analysis (cf. García Sanjuán *et al.* 2011, Table 3, Aranda Jimenez *et al.* 2013, Table 2). This radiocarbon stock is modest when compared to the intensity of excavations carried out since the second half of the 19th century (García Sanjuán *et al.* 2011: 123). From most of these graves solely one or two data are available and no sequences from the grave contexts have been produced until now. The problems in using single data to classify collective burial monuments and to determine the terminus of the construction of those structures has been already discussed in several sections of this analysis (cf. e.g. 2.1, 3.4).

For the settlements however, there are radiocarbon sequences available and two of them are nonetheless worth considering regarding the development of megaliths in this region, since they are from settlement structures which directly belong to megalithic necropolises: the partly fortified settlement Los Millares, which includes megalithic elements, and Peña de los Gitanas near Montefrío.

Los Millares

The fortified settlement of Los Millares is a remarkable site of megalithic Europe. It is special regarding the architecture with a megalithic necropolis within partial megalithic walls and surrounding settlement walls, which thus provides the possibility to consider the development of Copper Age societies between 3150–2300 cal BC over nearly 1000 y (Almagro/Arribas 1963; Molina González/Cámara Serrano 2005; Molina González *et al.* 2004) (Figures 9.7-9.10).

24 radiocarbon dates are available from the settlement from one megalithic grave and from the forts which encompass the settlement (Molina González *et al.* 2004: 149–150, Tables 3-5) (Figure 9.10). This data allows the reconstruction of the settlement and the fortification history. The settlement is surrounded by four concentric walls: the Murallas I-IV. Within these walls, round house structures are documented, including an aqueduct, an artificial water basin, a metallurgy center, and a large communal building. 80 megalithic graves used for collective burials with successive burial



Figure 9.5 The Gorafe necropolises: Hoyas del Conquin. Above: dolmen 134, below view over the high plateau Hoyas del Conquin with grave 118

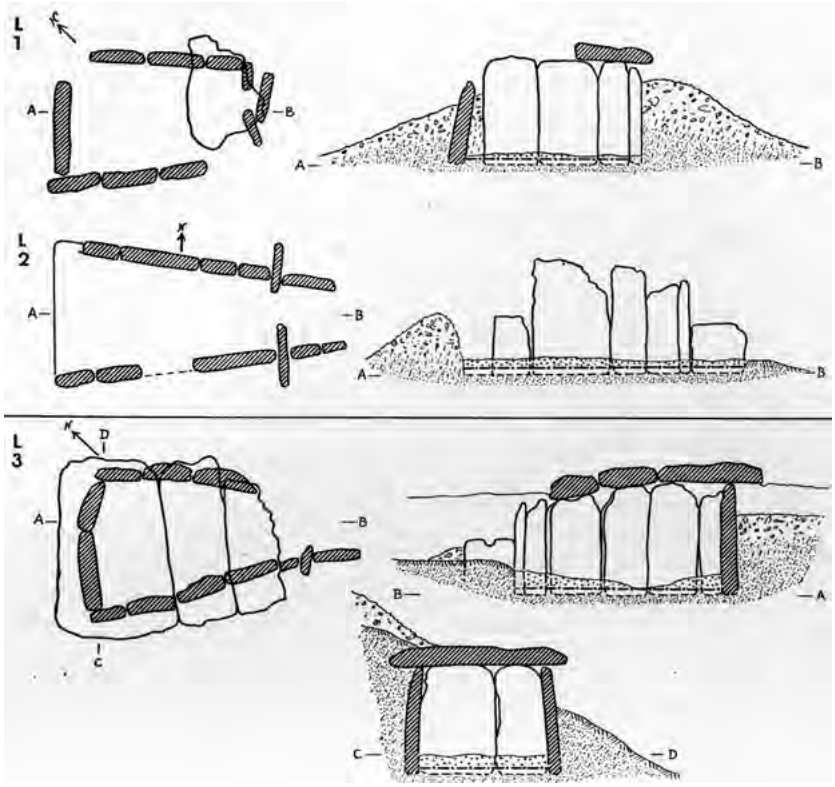


Figure 9.6 The Gorafe necropolises: graves La Sabina (Leisner/Leisner 1943, Tafel 35)

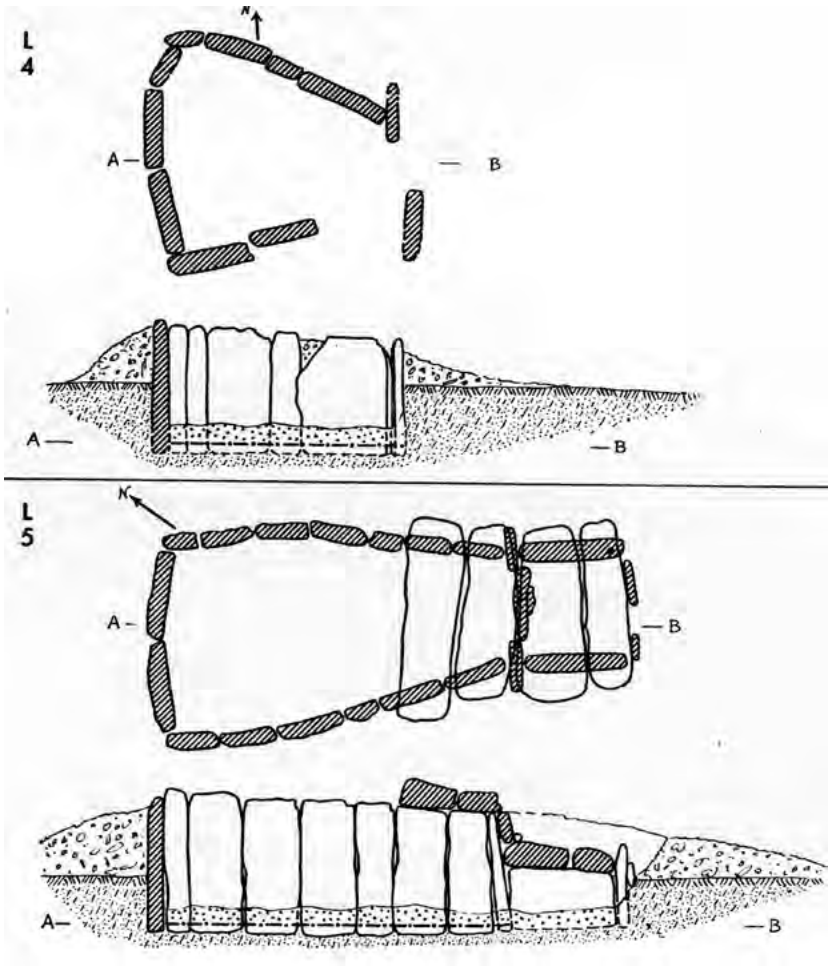


Figure 9.7 The Gorafe necropolises: graves La Sabina (Leisner/Leisner 1943, Tafel 35)



Figure 9.8 The fortified settlement of Los Millares. Above: the main gate, below muralla I, sector with megalithic architectonic elements

practices are located either within the walls or close to the outside of the outer wall Muralla I.

The sequence starts in the Early Copper Age with the phases 1g and 2d of Muralla II at ~3170 cal BC (3195–2941 cal BC, 68.2%; 3462–2921 cal BC, 95.4%). Phase 1g is calculated to 3265–2907 cal BC (95.4%; 3073–2921 cal BC, 68.2%; Beta-124523, 4460 ±70 BP), phase g to 3265–2899 cal BC (95.4%; 3061–2921 cal BC, 68.2%, Beta-124524, 4420±70 BP). Moreover, phase I from Muralla IV is associated to the Early Copper Age (Beta-124532, 4410±60 BP, 3056–2922 cal BC, 68.2%; 3265–2900 cal BC, 95.4%). Muralla II and IV are the inner fortification walls of the settlement with the central structures and in additionally the structures closest to the Andratx River. Muralla IV is moreover the section in the settlement erected with huge megalithic blocks instead of in dry wall technique. There are no radiocarbon dates available from Phase 1 of Muralla III, but this wall may have been erected in the early phases of the settlement (Molina González *et al.* 2004: 150).

The transition from the Early to the High Copper Age is calculated in the model to the time interval 3042–2752 cal BC (95.4%; 2969–2848 cal BC, 68.2%). During the High Copper Age, Muralla I was built with the outer fortification wall as a strong border against the outside with 17 bastions and towers inbuilt and the main entrance with two semicircular towers (Figure 9.8). This wall exhibits a perimeter of ~400m and an average thickness of 2m. The radiocarbon measurements from Muralla I range from 2956–2570 cal BC (95.4%; 2921–2615 cal BC, 68.2%). The available radiocarbon dates from Muralla III date later phases of the structure from 2911–2588 cal BC (95.4%, 2894–2684 cal BC, 68.2%). In the northeast sector, the wall was covered in a later period by a couple of house structures. From the High Copper Age, more data from Muralla IV and II are available as well. In the Late Copper Age, data from a further use of the Muralla IV phase 7a (Beta-124529; 4020±60 BP; 2623–2516 cal BC, 68.2%; 2837–2472 cal BC, 95.4%) and Muralla II are available, both from ~2550 cal BC (Beta-124522, 3990±60 BP; 2621–2516 cal BC, 68.2%; 2837–2472 cal BC, 95.4%). The first Bell Beaker material in the settlement is documented from this time interval. This material is fabricated in the typical Mediterranean style with geometric motifs, incisions, and paintings. The final levels of Muralla I were eroded, although for many years researchers thought that this area was abandoned. During recent years Bell Beaker pottery was found by excavation campaigns. In the Final Copper Age, 13 forts on topographical well-situated places were erected. The transition to the Final Copper Age is calculated in the model to the time interval 2580–2470 cal BC (95.4%; 2580–2470 cal BC, 68.2%). Altogether nine radiocarbon results are available from these forts. However, this data does not represent the actual construction of the forts, but their destruction since the most of this data is from samples from burnt layers which are connected to the destruction of these buildings. The forts (from the west to the south) 13, 12, 2, 1, 3, 4, 7, 5, 6 surround the settlement in a line. The closest fort to the settlement is hereby no. 6. It is situated at an approximate 500m distance. The forts can be divided into three architectural types (Molina González/Cámara Serrano 2005: 62–79): simple round towers with a corridor as an entrance construction, for example Fortin 3 and 6, smaller enclosures with integrated bastions in the outer walls (Fortins 4, 5, 7) and more complex forts with double enclosures, with an inner building, and two outer walls with integrated bastions and as well two outer ditches and an outer wall, such as Fortin I (Figure 9.9) and most probably Fortin II. From the nine available radiocarbon dates from the forts, six dates from the main and most elaborated Fortin I are available. The exact time of the construction of this fort is not determined. At least two older phases from Fortin I are known which are not radiocarbon dated (Molina González *et al.* 2004: 152). Some unspecific ceramics of a later date have been found, but in contrast no Bell Beaker ceramics. The results from Fortin I can be placed within the time interval 2520–2299 cal BC (95.4%; 2488–2330 cal BC). From Fortin IV, one result exists from ~2400 cal BC (Beta 135669, 3830±70 BP, 2463–2343 cal BC, 68.2%; 2466–2316 cal BC, 95.4%) and two dates from Fortin V from the interval 2468–2299 cal BC (95.4%; 2463–2336 cal BC, 68.2%). The forts were destroyed within these time intervals. Fortin I was erected in two phases and the outer, later constructed wall with six bastions shows a diameter of 30m. There is evidence for domestic house structures inside the enclosure and the bastions in the internal enclosures were used as residential places with meal stones, hearths, plenty of ceramics, and benches. The huts within the open areas were flint workshops for arrowheads. In the open areas, there are several sections documented with meal stones on a stone pavement. These meal stones were used to grind cereals, mostly barley, and the chemical analysis of the grains and the sediments suggest that they were also used for salt crushing (Molina González/Cámara Serrano 2005: 73). Accordingly, these forts were erected within the Final Copper Age, on the one hand, as strategic buildings for defending the settlement to the south, the southwest, and the southeast and as watch towers. To the north the river represented a natural border. On the other hand, there is evidence that these forts were either used as the permanent settlements of a small group of people or, in unquiet times as a refuge for the people of Los Millares. The meal stones are an indicator of a central storage of cereals and salt and the distribution of goods and thus for the beginning of a tendency as can be considered for later El Agrar settlements. The end and the abandonment of Los Millares are calculated in the model to a time interval of 2456–2147 cal BC (95.4%; 2402–2229 cal BC, 68.2%).



Figure 9.9 The fortified settlement of Los Millares. Above grave LIV form the southeast, below Fortín I and view to the northeast

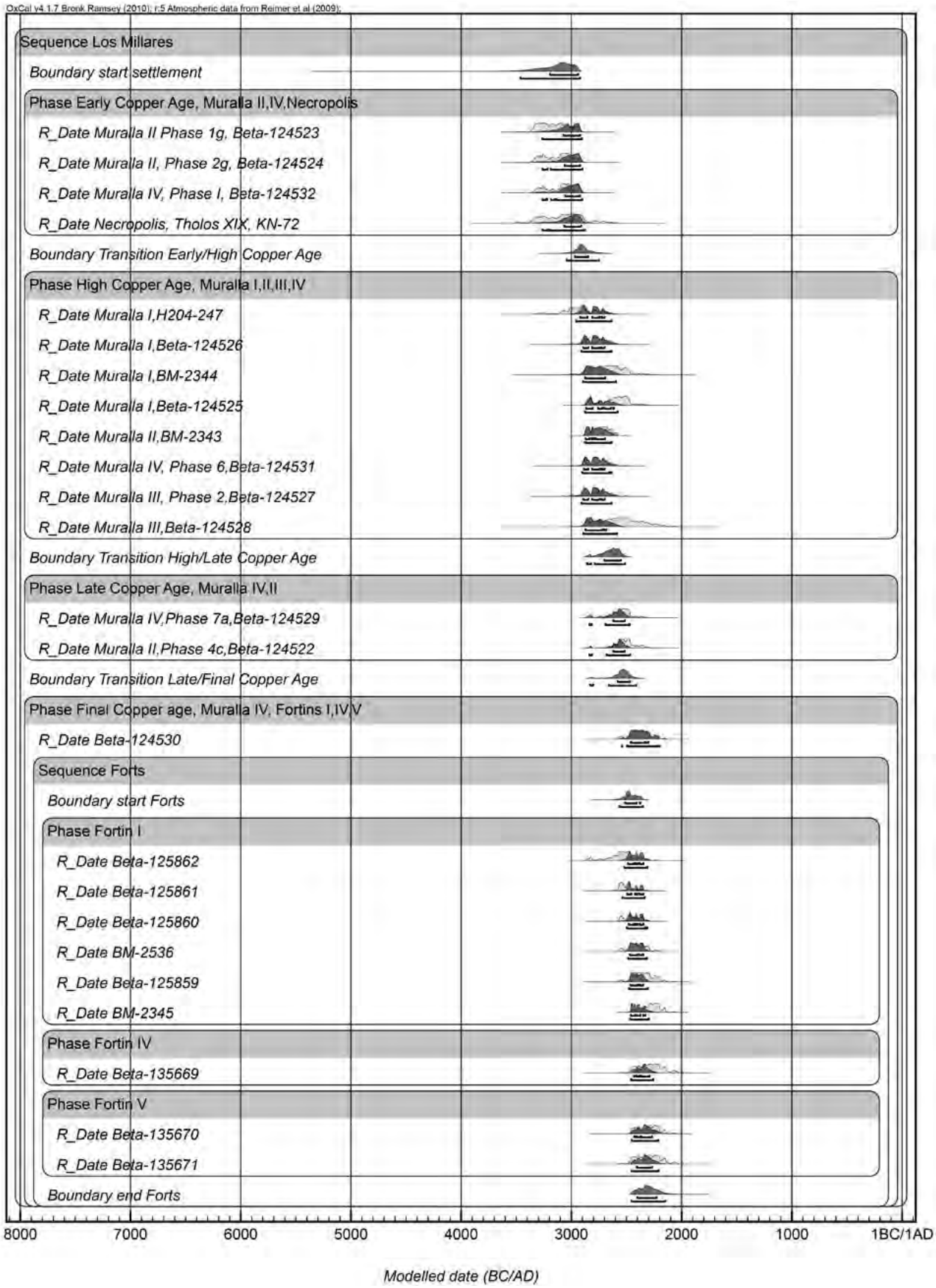


Figure 9.10 Probability of radiocarbon determinations from the fortified settlement of Los Millares, Andalusia. Model agreement: A_{model}=92.2, $A_{overall}$=88.1

Only one result from the necropolis is available which is associated to the Early Copper Age (tholos XIX, KN-72, 4380±120 BP; 3064–2912 cal BC, 68.2%; 3265–2877 cal BC, 95.4%). However, the grave goods from the necropolis indicate the most contemporaneous use of the necropolis and the settlement. The necropolis consists of 80 collective graves extending over an area of 13ha. One of the graves is situated within the fortification wall, the others on the outside of Muralla II, mostly in the west, the southwest and the south of Muralla I. Most of the tombs are tholoi, which implies tombs with a corridor and a circular chamber that are either constructed with megalithic orthostats or in dry wall technique (Figure 9.9). They are covered with a corbelled roof or by an organic construction. The graves are covered by a tumulus of stone and earth and they are partly built with side niches. Some graves show the same architectonic concept, but the chamber is partly or completely worked into the bed rock. There are even the remains of red paintings documented from the inside of the chambers. Furthermore, a few classical dolmens with a rectangular or trapezoid ground plan can be noted and also some simple cists. The graves are all oriented to the east or to the southeast with the exception of a grave concentration in the north of the site. These graves are all oriented to the southwest.

The graves are used as collective burials with successive burials and an MNI of between 20 and up to 114 burials. Most of the bones are disarticulated, whereas some of the last inserted individuals are articulated. Older burials are arranged aside or even cleared out of the chamber. Inhumations in the corridor or in the small side niches are documented and mainly children are deposited in the niches (Molina González *et al.* 2005: 51–62). Some deposits with burnt human bones suggest incineration as one of the burial forms in Los Millares. The grave goods consist of numerous ceramics, such as Bell Beaker ceramics or vessels with symbols decorated similar to the typical Copper Age oculus motif. Furthermore, goods produced from precious and exotic raw materials like marble, eggshell of ostrich, and copper are documented. Between the tombs there is evidence of fragmented ceramics which suggests funeral feasting or ancestor worship. The grave goods indicate a primarily contemporaneous use of the necropolis and the settlement. The differences within the grave inventories are not explainable merely by chronological parameters. Different approaches have been undertaken to define social classes based on the grave goods and the architecture (i.e. Chapman 1981; Molina González/Cámara Serrano 2005: 59–62). Molina and Cámara Serrano worked out four different sets or different social classes. Interesting is hereby that in all four spatial grave clusters on the site, the graves of all four levels are registered with the graves grouped around one central grave. This spatial distribution maintains the theory of a social differentiation which is reflected by the burials and the equipment. The first level and the central graves are equipped with metallic weapons, daggers, numerous arrowheads, sophisticated ceramics with iconic symbols or decorative paintings, stone vessels, marble objects, and numerous idols. Additionally, these graves have closed ceremonial areas. The second class is not that different from the first one with metallic elements, daggers, and arrowheads of flint, marble, and stone objects. The third group had some metallic objects and decorated ceramics in the graves and the fourth group exhibited no metal finds but rather Bell Beaker ceramics in the graves. Without the required radiocarbon sequences for the single graves, it is not possible to further reinforce this theory on the social differences of the Los Millares societies. A similar possible class system is also defined for other megalithic necropolises, such as for Barraquette in the town of Tarajal, Nijal. In the further surrounding of Los Millares, several other megalithic necropolises are known: Loma del Galera in the west, the necropolis del Gador, the necropolis de Rambla de Huechar in the southwest, and the necropolis de Gador in the southeast.

Las Peñas de los Gitanos (Montefrio, Granada)

The second settlement with an available radiocarbon sequence and an associated megalithic necropolis is Las Peñas de los Gitanos close to Montefrío in Granada (Figures 9.11-9.14). The site is situated on a mountain hill with formed plateaus, providing the possibility to consider the Neolithic occupation within a region which is limited by natural borders (Figure 9.12). The megalithic graves are hereby situated on a southwest slope of the hill on plateaus in different levels. They were primarily constructed on lower levels, while the settlement Los Castillejos is situated on a higher plateau 1050m above sea level (Cámara Serrano 2005; Cámara Serrano *et al.* forthcoming: 3). No radiocarbon dates are directly produced from the megalithic graves, but the sequence from the settlement Los Castillejos and so from the megalith builders provides important information regarding the construction of the megaliths. Furthermore, it allows us to better understand and determine the Andalusian chronology of the Neolithic and the Copper Age. The stratigraphy of the settlement Los Castillejos is complex and consists of at least 30 layers. A Bayesian statistical framework was applied for 33 radiocarbon results from charcoal and seed samples (Cámara Serrano *et al.* 2005, Cámara Serrano *et al.*, forthcoming) (Figure 9.13). The settlement history of Los Castillejos starts from the Early Neolithic onwards at ~5300 cal BC (5359–5236 cal BC, 68.2%; 5478–5087 cal BC, 95.4%) with radiocarbon dates sampled from the Cueva de las Cabras in the west of the district. The Early Neolithic layer contains six phases or strata with Cardial material (Cámara Serrano *et al.*, forthcoming: 26–28). The transition to the Middle Neolithic is calculated to ~5050 cal BC

(5086–5017 cal BC, 68.2; 5168–5002 cal BC, 95.4%). The Middle Neolithic layer consists of the five layers 7 to 12 with nine available radiocarbon dates which range in the short time interval between 5126–4950 cal BC, 95.4%.A hiatus in the radiocarbon dates can then be observed and there is obviously no settlement activity on site within the next 900 y. With the next layer 13, the Recent Neolithic activity started from ~4100 cal BC onwards (4227–3995 cal BC, 68.2 probability and 4233–3981 cal BC, 95.4). There is evidence for Recent Neolithic Material up to layer 15 and thus to ~3800 cal BC (3791–3707 cal BC, 68.2%; 3930–3661 cal BC, 95.4%). From this period there is a pit grave known from the north of the site and evidence of the time interval when the megaliths were constructed. Traditionally it is assumed that they were constructed somewhat later (Arribas/Molina 1979; Molina González 1983). Another hiatus of ~400 y is to be considered and the start of the Copper Age with phase 16 is calculated to about 3380 cal BC (3426–3231 cal BC, 68.2; 3536–3124 cal BC, 95.4), and the end of the Final Copper Age phase and so the end of Los Castillejos to 1920 cal BC (2012–1828 cal BC, 68.2% and 2107–1628 cal BC, 95.4%).

The megalithic graves of Montefrío are concentrated in four regions: El Rodeo, La Camarilla, Los Guirretes, and El Castellón. The graves are small or middle sized, cut partly into the bedrock and formerly covered by tumuli, in some cases there is evidence for a ring of stones around the tumulus. The structures are passage graves with a short corridor and with mostly trapezoid chambers built from stone slabs. At some of the graves there is evidence for a falsa porta in the entrance stones (Figure 9.11). Most of the graves are oriented east-south-east. Decorations are documented from the inside of the graves, such as reliefs of horns, as well as zoomorphic and geometric incisions. Little archaeological material is available from the graves, but there is evidence for the use of the necropolis since the Recent Neolithic, for example by mussel pectunculo bracelets in grave 18 (Cámara Serrano *et al.* forthcoming: 83). The pit burials in the settlement are discontinued in the Recent Neolithic in the settlement layer 12/13, which is a further indication for the beginning of this necropolis in the Recent Neolithic (Arribas/Molina González 1979). The start of this phase is calculated in the settlement model to ~4100 cal BC (4227–3995 cal BC, 68.2% and 4233–3981 cal BC, 95.4%). This timeframe seems plausible when compared to the remaining results from megalithic contexts in Andalucía. Also confirmed is the use of the necropolis during the Copper and the Bronze Ages (Cámara Serrano *et al.* forthcoming: 83). From the High Copper Age material, evidence of mussel bracelets is documented, from the



Figure 9.11 Necropolis Peñas de los Gitanos, Montefrío. Left: grave 23, right grave 18

Middle Copper Age clay weights were found, and from the Recent Copper Age bone buttons and marbles with V-perforations were excavated. The old excavation reports noted collective burials with successive burial practices, such as in grave 14 (Mergelina 1941–42: 91) with the dead deposited in a crouched position.

The remaining radiocarbon results from Southern Spain

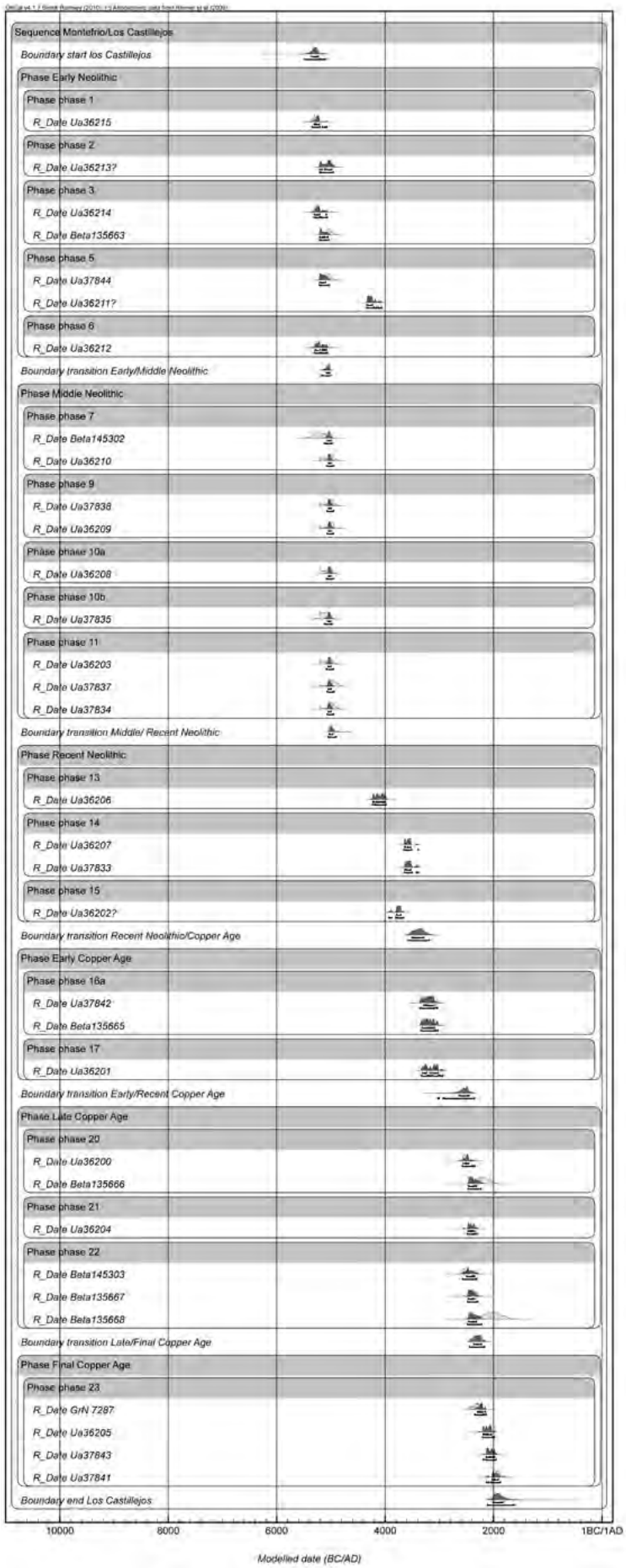
The remaining radiocarbon results from megalithic contexts in Andalusia are mostly single dates, there are no larger data sets produced yet. Before we turn our attention to these data it is important in this context to discuss first a series of early radiocarbon dates from megalithic contexts north of Andalusia from the Southern Meseta.

The earliest available data there are from elaborated megalithic graves like the Dolmens de Azutan and Castillejo in Toledo and Joaniña in Cáceres (Bueno Ramírez *et al.* 1999; Forte Oliveira, 1998). All three results are from the first half of the 5th millennium cal BC and are not only rejected by the Spanish colleagues (García Sanjuán 2011: 126) due to their high standard deviations (±130y, ±150y, ±210y). The data from Castillejo in Toledo and Joaniña in Cáceres are gained from unidentified charcoal. The early date from the Dolmen de Azutan (Ly-4578, 5840±130 BP; 4847–4537 cal BC, 68.2%; 5029–4373 cal BC, 95.4%) is gained from a human bone and shows moreover a hiatus of ~900 y to the remaining three dates from the grave which are all measured to the 4th millennium cal BC from 4039–3138 cal BC (95.4%; 3962–3356 cal BC, 68,2%) (UGRA-288, 5060±90 BP; Ly-4500 BP, 4590±90 BP; Beta-145277, 4620±40 BP). This hiatus is more an indication for an ossuary and the deposition of bone material from another primary burial site in the chamber as it is discussed also for other regions in Europe (cf. 3.4.3, 122-127).

Seven quite early radiocarbon results are available from the previous described outstanding and monumental megalithic graves in Andalusia (cf. chap. 9, p. 227-238). These dates are from the gallery grave Alberite, and from the passage graves Viera and Menga. They are a possible indicator of an early megalithic horizon with monumental graves within the time interval 4328–3384 cal BC, 95.4%. Nevertheless, these results are gained from charcoal and their context deserves a closer consideration, since most of them are possible terminus post quem values. The earliest radiocarbon dates of this series are those from the Dolmen de Alberite in Cádiz. Three radiocarbon results are at our disposal from a time interval of 4328–3661 cal BC (95.4%, 4255–3715 cal BC, 68.2%) (Beta-80602, 5320 ± 70 BP; Beta-80600, 5110 ± 140 BP, Beta-80598, 5020 ± 70 BP). All three measurements are gained from charcoal samples from a 'find at the base of the



Figure 9.12 Peñas de los Gitanos, Montefrío, main plateau from the northeast



tomb' and associated with a layer of ochre. Even if this hearth is partly interpreted as stemming from the use of the interior of the grave (e.g. García Sanjuán 2011: 126), we have to take into consideration that it may correspond to an earlier use of the site. In addition, the structure was partly destroyed by plowing and it is possible that older charcoal thus found its way into the chamber. Furthermore, this kind of architecture in Andalusia is associated to the Copper Age and in Europe to later appearances. Summa summarum, all this evidence indicates a later grave form and termini post quos values. The grave goods consist of 1600 pearls of variscite, bone, and mussels, 20 quartz prisms, ceramics, a polished axe, limestone trowels, and a crusher for ochre, but for a part of the material it is also possible that it was stirred up from an earlier, deeper structure by plowing activities.

Six data from animal bone and charcoal samples are available from the Dolmens de Antequera. An early data from Viera is connected to the ancient soil (Marqués Merelo *et al.* 2004: 250) and represents a potential terminus post quem value (GRN-16067, 4550±140 BP; 3733–3662 cal BC, 68.2%; 3769–3646 cal BC, 95.4%). Two later data gained from animal bones from layers in the funeral chamber (Beta-353820, 4090±30 BP; 2836-2577 cal BC; 68.2%; 2860-2498 cal BC, 95.4% and Beta-353822, 3580±30 BP, 1964-1889 cal BC, 68.2%; 2028-1786 cal BC, 95.4%) are indicating depositions in the Copper and the early Bronze Age. Three early data gained from charcoal are available from the Dolmen de Menga from the time interval 3791-3384 cal BC (95.4%; 3634-3522 cal BC, 95.4%, Ua-24582, 4935±40 BP; Ua-24583, 4865±40 BP; Ua-36216, 4760±30 BP) (Aranda Jimenez *et al.* 2013, Table 2, García Sanjuán 2009: 19). These samples are originating from a depression in the atrium or the basement of the tumulus and are also representing potential termini post quos- values. There is also the fact, that an inbuilt age of old wood is possible, since the wood species is

Figure 9.13 Probability of dates from las Peñas de los Gitanos/Los Castillejos (Montefrío, Granada). Model agreement: A_{model}=75; $A_{overall}$=75.2.

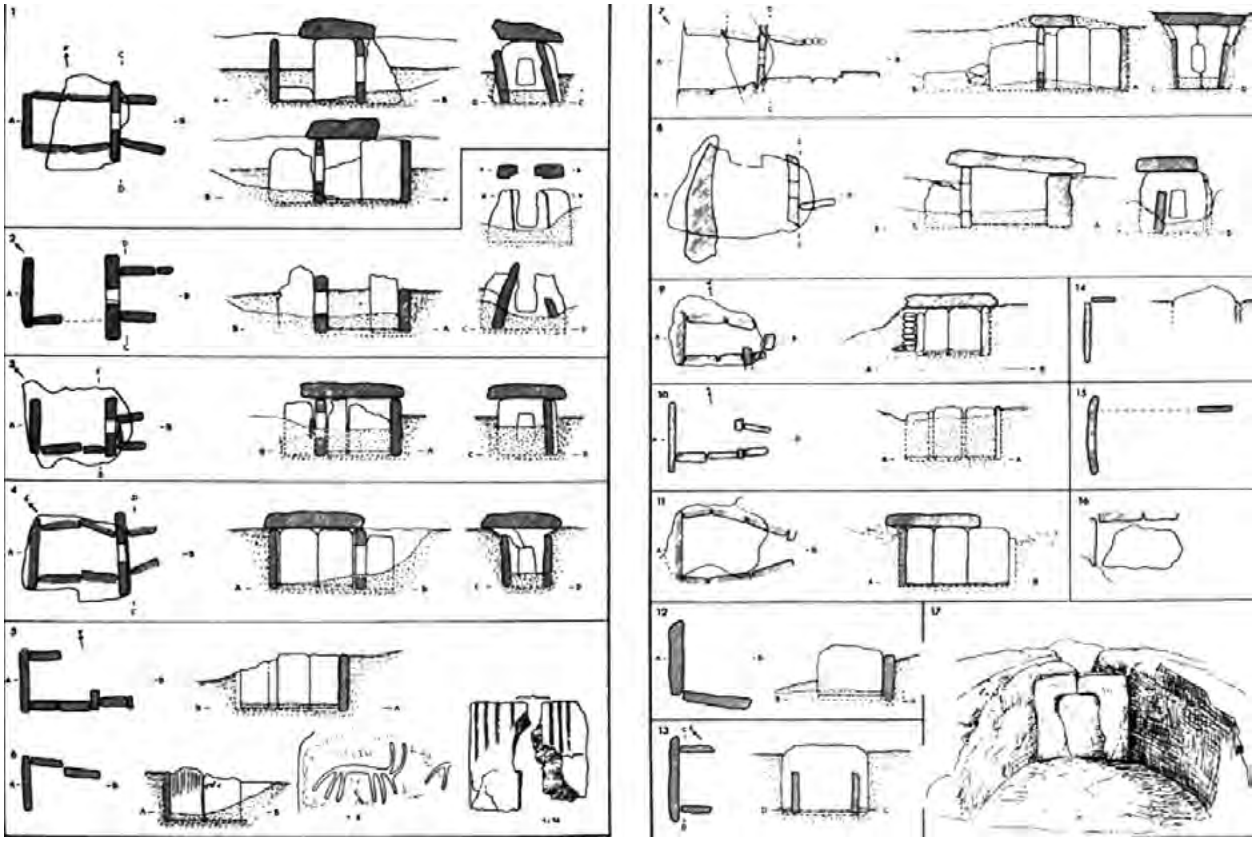


Figure 9.14 Necropolis Peñas de los Gitanos, Montefrío. Graves group 25 (Leisner/Leisner 1943, Tafel 52)

not determined. There are no grave goods known from these graves to closely evaluate the significance of the early radiocarbon dates. This is the possible result of a clearing out of the 27,5m long chamber in antique and historical times for re-use. Two radiocarbon dates from a burial in the atrium (CNA-1174, 1250±35 BP; CAN-1173, 1100±45 BP) are indicating an after use of the grave while this time horizon (Díaz-Zorita Bonilla/García Sanjuán 2012: 237-49). Another early date is available from the Dolmen El Palomar (Beta- 75067, 4930±70 BP; 3781–3647 cal BC, 68.2%; 3943–3538 cal BC, 95.5%) with no information regarding material and context.

In sum, it can be stated that in all of the discussed graves with early radiocarbon dates, the possibility of termini post quos values is given and we cannot use them to postulate an early monumental megalithic stage in Southern Spain.

With the Dolmen de Tremedal in Dehesa Boyal (Cáceres), another monument is available from the Southern Meseta, north of Andalusia with early results from the first half of the 4th millennium cal BC. It is a grave with a round chamber built with nine orthostats and a short passage. There are two radiocarbon results available from charcoal. Again, these radiocarbon dates are highly problematic. The first date (Gra-15903, 5000±60 BP; 3932–3706 cal BC, 68.2%; 3948–3661 cal BC, 95.4%) is obtained from a carbon sample taken from the passage's paved floor. The second date (Gra-15941, 4860±60 BP; 3708–3536 cal BC, 68.2%; 3782–3520 cal BC, 95.4%) is gained from a carbon sample on the base of the earliest part of the chamber. After this early radiocarbon data horizon, a hiatus is recorded.

For Andalusia altogether 37 radiocarbon measurements dates from direct megalithic contexts. The most of these radiocarbon dates - 64% - are clustered in the 3rd and the 2nd millennium cal BC. 10 of the results are measured to the 4rd millennium cal BC.

Dating the megaliths on the basis of the artifacts

The earliest archaeological material in the Andalusian megalithic graves is associated to the first part of the Recent Neolithic: during the Late Neolithic from ~4200–3600 cal BC (Molina Gonzáles/Camára Serrano 2006). This material is documented mainly from dolmens and passage graves. The main construction and use horizon of megaliths might, according to the archaeological material, be in the second part of the Recent Neolithic: during the Final Neolithic from ~3600–3200 cal BC and in the Copper Age from 3200–2100 cal BC. Furthermore, megaliths with exclusively Bronze Age material are documented.

The Recent Neolithic is associated to the later Cueva, Silo, and the Almeria horizons. Generally, it can be

contested that the ceramics are simplified when regarding the forms, the decorations, and the lugs as compared to the antecedent Middle Neolithic material. Diagnostic for the material are first open ceramic forms like bowls and plates with a partly sharp ruptured profile. Furthermore, spherical, oval or ellipsoid and also collared vessels with small, partly double lugs are common. The ceramics are partly decorated with cordons in relief or painted, e.g. with geometric motifs. In addition, petiolated and winged arrowheads are recorded and polished axes, stone pearls, petunculus shell jewels, and bone idols are also documented. Diagnostic for the ceramic material from the Copper Age are 'bellied' vessels, vessels with a narrow mouth, bowls, and tone-formed vessels. Characteristic are the symbol ceramics, which are richly decorated vessels, e.g. with sun and eye motifs. Furthermore, petiolated arrowheads or arrowheads with concave bases are recorded. Stone and copper axes, bone and copper awls, pearls fabricated from bone, or stone such as variscite and shells were excavated. Finally, more accentuated idols, phalanx with eye motifs, idols made from ivory, copper axes, and awls are also common (Martin Socas *et al.* 1998: 889–895).

The necropolises exhibit, according to the material, construction as well as burial activities over several centuries. Thus, megalithic graves with grave goods from the Recent Neolithic to the Copper Age are registered in the eastern part of Andalusia from the Gor and Gorafe necropolises of the Almerian culture. These goods include ceramics, arrowheads, flint blades, different idols such as a horse phalanx idol in the Morena 3 grave, prestigious objects including awls made from ivory, an alabaster vessel in the necropolis of Majadillas, and copper weapons. Interesting is hereby that no real indications for social differences within the grave goods can be determined (Cámara Serrano/Costa Caramé 2009: 112–140). From the already discussed monumental structures (cf. chap. 9, p. 227-238), however, there is evidence of elaborated grave equipments. The two gallery graves dolmens de Alberite I and de Soto and the tholoi La Pastora and Mantarubilla provide material, but all three lack radiocarbon results. They are just mostly associated to the Copper Age by both the typo-chronological considerations of the architecture and by the archaeological material. From the Dolmen de Alberite I, 1600 pearls of variscite, bone, and mussels are documented. Additionally, 20 quartz prisms, a polished axe, limestone trowels, a crusher for ochre, and ceramics were found. Since this dolmen was partly destroyed by plowing it is not clear if all these grave goods originate from the grave context, or from a settlement under the grave. In the Dolmen de Soto in Huelva grave goods were recorded, such as ceramic vessels, stone tools, a bone bracelet, a schist object, an ivory stick, plenty of animal bones from marine birds, wild boars, oxen, horses, mussels, and a fossil shark tooth (García Sanjuán /Linares Catela 2009: 149). From the tholos La Pastora close to Sevilla, Copper Age grave goods have been recovered, such as gold blades, arrowheads, pearls of rare material and ceramics. In the outer part of the monument, a ceramic vessel was deposited with copper spear points. Only some ceramic fragments are documented from the chamber of Mantarubilla. In the corridor there was some material found in situ, including stone tools, fragments of gold tinsel, and some ivory objects, such as the unworked tooth of an elephant and several pearls.

The gallery graves are associated to the Final Neolithic and to the Copper Age, but mostly to the Copper Age with evidence of later re-use in the Bronze Age. Therefore, from Palacio III around 200 artifacts are conserved from inside the chamber, for example stone tools, arrowheads, blades and axes, ceramics, amulets, and an anthropomorphic idol (García Sanjuán 2009: 249–254). Another example is El Tesorillo de la Lana, Malaga where grave goods, such as arrowheads with concave bases and two prismatic blades were excavated. In addition, Bronze Age material such as ceramics, pearls pendants, and metal objects including a silver spiral and copper awls were recovered. The tholoi are mostly associated to the Copper Age with a few exceptions. Thus, six tholoi were excavated in Churuletas in Purchena, including mussel bracelets, a triangular idol, and some triangular arrowheads in grave one. The first phase of this necropolis is associated to the Recent Neolithic, but the tombs were in use during the entire Copper Age. From the tholos Sierrezuela I in Fuente Obejuna, six flint arrowheads, a copper arrowhead, a schiffer plate with triangular motifs, and further ceramics, such as Bell Beaker ceramics and carinated bowls, are known (Ortiz Moreno 2009: 98–104). Further to the northwest in Huelva, megalithic graves were obviously constructed later and therefore associated to the Copper Age. The material from El Pozuelo, a necropolis with 18 passage graves and some multiple chambers, consists of pearls made from various materials, cross-formed idols, and decorated schiffer plates with geometrical forms and elements like arms or eyes. Furthermore, a so-called baculos from the site is registered. These schiffer objects are common for the Copper Age in Southern Portugal (García Sanjuán / Linares Catela 2009: 154–163).

The megalithic burial rites

The early megaliths in the Almeria region (cf. chap. 9, p. 221-222) are single, double, or collective graves. 11 of 40 graves with human remains could be determined as single or double graves, 29 graves exhibit evidence of collective graves. We have to take into consideration that these graves contained successive burials, but without any radiocarbon sequences and measurements of the single individuals it is impossible to determine

if these graves were built as collective graves or single or double graves and re-used by later generations as burial sites. Most of the elaborated Andalusian megalithic tombs are classified as collective graves with successively deposited bodies (García Sanjuán 2009: 24–26). The number of buried individuals within the necropolises varies considerably. Thus, in the necropolis of Los Millares an MNI of 114 buried individuals is recorded from grave 40, whereas 100 were placed in the chamber and 14 in the corridor. In other graves, less than 10 persons are deposited (García Sanjuán 2009). Up to 22 individuals are documented from the necropolis Gorafe, Granada. Within the necropolis Pantano de Los Bermejales, an MNI of between 3 and 32 persons is recorded from the chambers. Evidence for a reconstruction of the burial rites for some of these monumental elaborated monuments in Andalusia is described in chapter 9, p. 222-227. There is nothing known about the bone deposits of the Menga, Viera, and El Romeral graves. However, in general we can state that few persons were buried. Accordingly, in El Soto an MNI of 8 individuals is determined and in Alberite I the fragmented bodies of a female and a male adult were found. Furthermore, the bones in Alberite I exhibited a more elaborated burial ritual with traces of excarnation and they were covered with ochre. In the tholos Mantarubilla, few remains of one individual in a crouched position were found during the second excavation. These are indications that the labor intensive structures in Southern Spain were built for a special social or religious part of the social class. The grave equipment documented from the Dolmen de Alberite I and the Dolmen de Soto, consisting of opulent grave goods partly fabricated from exotic raw materials (cf. chap. 9, p. 222-227), supports this hypothesis. In Cádiz, the necropolis Tomillo close by the Alcalá del Valle is recorded with circular tombs and small gallery graves (Hurtado Pérez 2009: 20). Interestingly, in most of the graves 'couples' were buried with one male and one female adult in each grave. As an exception, one individual burial is known, but the manner in which the skull and the long bones were deposited rather indicates a secondary deposition. Moreover, an incineration practice is partly common (Martin Socas *et al.* 1998: 897).

Contemporaneous non-megalithic burials

In the Recent Neolithic, pit burials contemporaneous to the megaliths are furthermore found in caves and rock shelters, but are also common within domestic structures (García Sanjuán 2009a: 23). Moreover, hypogea were built and worked into the bedrock during the Copper Age in Southern Spain, similar to the entire Mediterranean region. These artificial caves can be found all over Andalusia, but especially in the valley des Gualdaquivir. The hypogea are conceived in a similar style as the megalithic graves with round chambers and a corridor and they were used as collective graves with a successive burial practice. Many hypogea are built and grouped in small necropolises and worked into the bedrock. The best known hypogea are found at Alcaide in Antequera near Málaga. 21 hypogea with up to 7m long corridors, ramps, and stairs, which lead to the chambers, were excavated in the early 1980s. There are three radiocarbon results from human bones available (Marqués Merelo *et al.* 2004: 252). The burial activities are therefore calculated to a time interval of 3398–752 cal BC (95.4%; 2874–291 cal BC, 68.2%). Some of these hypogea are constructed with a combination of dry walls and orthostats. An example of such a semi-megalithic structure is the Cueva de la Sima, Castellar de Santisteban. One half of the chamber is constructed from a natural cave and the other half as a hypogeum with a megalithic corridor. Similar constructions are to be found from the necropolises of Las Aguilillas in Málaga, Los Algarbes in Cádiz, and Sierrcal Martilla in Granada. From the southwest of Andalusia, the necropolis of Cerro de Las Aguillas in the northwest of Malaga is to be mentioned, which consists of altogether seven hypogea. Cave no. 6 is semi-artificial and the chamber is partly excavated into the rock. The 7m long corridor is covered by capstones. Extending from this chamber is a small corridor leading into another chamber which is likewise covered by capstones (Márquez Romero 2009: 218–221). In the Sevilla region, the hypogea are mostly concentrated in Gilena y Moron de la Fronera and in the southeast of the region (García Sanjuán 2009: 257–259). In Cádiz, the hypogeum of Tariff should be mentioned with two different architectonic types: hypogea with chambers and lateral entrances and hypogea with vertical chambers (Hurtado Pérez 2009: 82–87). From Cordoba, the small hypogeum La Calva (Santaella) can be noted. It is a structure with an oval chamber and four niches inserted into the side walls. The chamber measures 3,50m x 2,85m and is 1,90m high. An MNI of 20 has been determined. The individuals are partly deposited in the side niches and the grave goods indicate the use of the graves over several generations. Stone-wrist-guards and ceramics are evidence for an intense subsequent use by Bell Beaker societies (Ortiz Moreno 2009: 107–111). A probable hypogeum is noted for the east of Andalusia Granada with the Carada Cave in Huéscar. More than 168 individuals were buried from the 4th millennium cal BC onwards. The numerous grave goods consist of bone objects like awls, strikers, pins, pearls, anthropomorphic idols, stone bracelets, polished axes, stone vessels, and ceramics (Cámara Serrano 2009: 123). Moreover, one of Andalusia´s most important hypogeum concentrations is known from the northeast of Jaén near Marroquíes. These graves are primarily built with a rectangular ground plan and were in use during the 3rd and the 2nd millennium cal BC. Further graves from Jaén are registered with the hypogea in La Carolina, Cortijo Amelia, and La Carolina (Costa Caramé 2009: 186–196).

Conclusion

Pre-megalithic societies buried their dead in Southern Spain in pits, within caves, rock shelters, or at settlements. There is just little evidence for transitional structures leading to the megaliths from Andalusia. An exception is tomb no. 11 from the necropolis Campo de Hockey at San Fernando in the region of Cádiz. Within this necropolis with round pits and single or double burials, tomb 11 represents a more elaborated grave form for two individuals with a small circular structure averaging 2m, built with stone slabs and covered by a small round tumulus. One result from a human bone is available from the graveyard from ~3830 cal BC (3937–3714 cal BC, 68.1%; 3951–3705 cal BC, 95.4%). First clear megalithic structures in Southern Spain are documented in the eastern area of Andalusia in the first part of the Recent Neolithic at ~4200–3600 cal BC within the initial phase of the Almeria horizon. From this phase graves with round ground chambers, with quadratic or rectangular chambers, and small passage graves are known. There are no radiocarbon results directly available from these first megaliths. Therefore, any chronological classifications remain vague. The

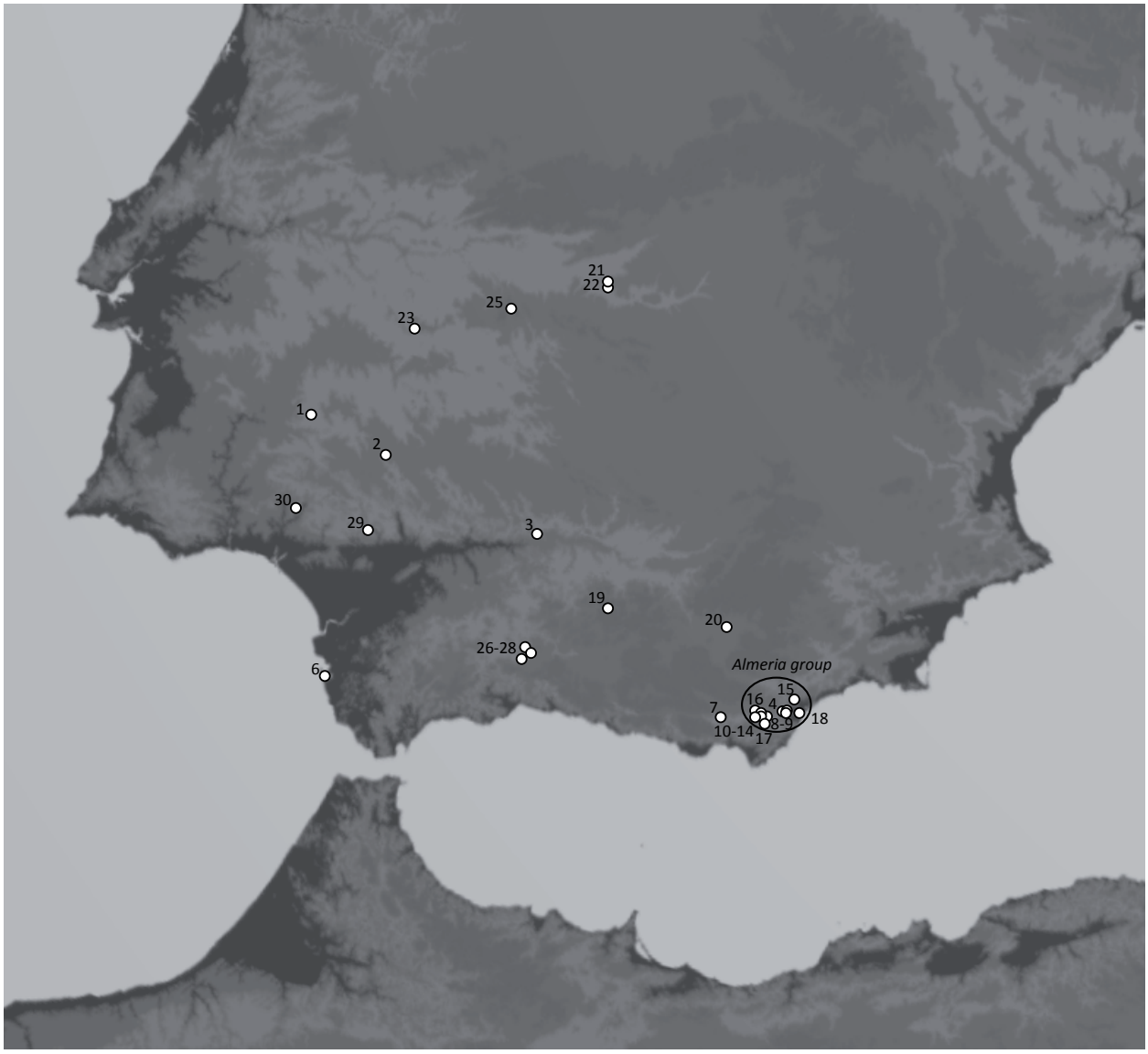


Figure 9.15 Main sites mentioned in the text.

1. Cueva de la Mora, 2. Cueva de los Covachos, 3. Cueva de los Murcielagos, 4. Cerro Virtud, 5. Galera, 6. Campo de Hockey, 7. Los Millares, 8. Huércal-Overa, 9. Overa 3/1, 10. Bédar Los Gallardos, 11. Cantoria Loma de la Cucador, 12. Purchena, 13. Loma de la Atalaya, 14. Urrácal, 15. Antas, 16.Tabernas, 17. Níjar, 18. Mojácar, 19. Las Peñas de los Gitanos, 20. Gorafe necroplises, 21. Dolmens de Azutan, 22. Castillejo in Toledo, 23. Joaniña, 24. Dolmen El Palomar, 25. Dolmen de Tremedal, 26. Menga, 27. Viera, 28. El Romeral, 29. El Gandul, 30. El Soto, 31. Alberite I, 32. Ontiveros, 33. Matarubilla, 34. La Pastora, 35. Montelirio, 36. El Pozuelo, 37. El Gandul, 38. Palacio III, 39. Los Gigantes, 40. Planilla, 41. Gador, 42. Alcaide, 43. Cueva de la Sima, 44. Cerro de las Aguillas

graves are recorded as single or double graves with some first indications in this region of megalithic collective graves. It is not possible to clearly define the beginning of the passage graves, since only few or singular radiocarbon results gained from charcoal samples are available and many of them represent potential TPQ-values. According to the material, first passage graves are associated to the first part of the Recent Neolithic, also nominated as Late Neolithic and both, archaeological material and radiocarbon results, indicate the beginning of the construction of the passage graves for the first half of the 4th millennium BC. In Southern Spain, unlike elsewhere in Europe, the megaliths are grouped from the Recent Neolithic onwards in necropolises with, for example, up to 250 estimated graves in the necropolis of Gorafe. In a large part of these necropolises no remarkable differences regarding the quality and the amount of the grave goods could be identified. The Copper Age (~3300–2000 cal BC) is then the prime age of the collective graves and differences between both the grave equipments and the grave architectures in necropolises, for example in Los Millares, are strong indications for social stratification within the buried societies. A tendency in this direction is underlined by contemporaneous, elaborated labor-intensive monumental graves with only a few buried individuals and grave goods fabricated from prestigious exotic raw materials, for example at El Soto and Matarubilla. With the fortified settlement of Los Millares, a further unique site for Europe in the Early Copper Age from 3370–2923 cal BC onwards (95.4%; 3137–2941 cal BC) emerges with a complex inner settlement organization and first indications of resource control.

Table 9.1 Radiocarbon dates from Andalusia

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	Bibliography
Alberite, Cádiz						
Beta-80602	Gallery grave			5320	70	García Sanjúan et al. 2011, Tab. 2, Ramos Muñoz/Giles Pacheco 1996
Beta-80600	Gallery grave			5110	140	García Sanjúan et al. 2011, Tab. 2, Ramos Muñoz/Giles Pacheco 1996
Beta-80598	Gallery grave			5020	70	García Sanjúan et al. 2011, Tab. 2, Ramos Muñoz/Giles Pacheco 1996
Alcaide, Málaga						
GrN-16062	Hypogeum		human bn	4030	110	García Sanjúan et al. 2011, Tab. 2, Marqués Merelo et al. 2004
GrN-19198	Hypogeum		human bn	3830	180	García Sanjúan et al. 2011, Tab. 2, Marqués Merelo et al. 2004
GrN-19197	Hypogeum		human bn	3755	210	García Sanjúan et al. 2011, Tab. 2, Marqués Merelo et al. 2004
Amarguillo, Sevilla						
Beta-75066	Small cave (covacha)	Tomb 2		4070	60	Cabrero Garcíá et al. 1997
Azutan, Southern Meseta						
Ly-4578	Passage grave			5840	130	García Sanjúan et al. 2011, Tab. 2
UGRA-288	Passage grave			5060	90	García Sanjúan et al. 2011, Tab. 2
Beta-145277	Passage grave			4620	40	García Sanjúan et al. 2011, Tab. 2
Ly-4500	Passage grave			4590	90	García Sanjúan et al. 2011, Tab. 2
Campo de Hockey, San Fernando, Cádiz						
CNA-664	Double burial in pit	Tomb 10	human bn	5650	40	Vijande Vila 2009
CNA-360	Transitional structure to the megaliths	Tomb 11	mussel shell	5020	50	Vijande Vila 2009
Castillejo, Southern Meseta						
Beta-145274	Dolmen			3810	70	García Sanjúan et al. 2011, Tab. 3
Beta-132917	Dolmen		ch	5710	150	García Sanjúan et al. 2011, Tab. 2
Casullo Huelva						
CNA-346	Dolmen			4410	50	García Sanjúan et al. 2011, Tab. 2
Cerro de la Corrona, Málaga						
Beta-93020	Passage grave			3490	120	García Sanjúan 2009, Tab. 1, Recio Ruiz et al. 1998

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	Bibliography
Cerro Virtud, Almería						
Beta-90885	Collective grave in ditch, domestic context	Burials	human bn	5920	70	García Sanjúan et al. 2011, Tab. 2
OxA-6715	Collective grave in ditch, domestic context	Burials	human bn	5895	55	García Sanjúan et al. 2011, Tab. 2
Beta-101425	Collective grave in ditch, domestic contex	Burials	human bn	5860	70	García Sanjúan et al. 2011, Tab. 2
OxA-6580	Collective grave in ditch, domestic contex	Burials	human bn	5840	80	García Sanjúan et al. 2011, Tab. 2
OxA-6713	Collective grave in ditch, domestic contex	Burials	human bn	5765	55	García Sanjúan et al. 2011, Tab. 2
Beta-90884	Collective grave in ditch, domestic contex	Burials	human bn	5660	80	García Sanjúan et al. 2011, Tab. 2
Cortijo de el Tardón, Málaga						
GrN-16066	Cist			3745	25	García Sanjúan 2009, Tab.1
UGRA-260	Cist			3530	60	García Sanjuán 2006, 153
Cuesta de los Almendrillos, Málaga						
GrN-25302	Dolmen			4450	20	García Sanjúan et al. 2011, Tab. 2
Cueva de los Murciélagos, Granada						
CSIC-247	Cave	Uppright sitting burials	wood	7440	100	Chacho Quesada et al. 1996, 116
CSIC-1133	Cave	Uppright sitting burials	esparto grass, (lygeum spartum)	6086	45	Chacho Quesada et al. 1996, 116
CSIC-1134	Cave	Uppright sitting burials	esparto grass, (lygeum spartum)	5900	38	Chacho Quesada et al. 1996, 116
CSIC-1132	Cave	Uppright sitting burials	esparto grass, (lygeum spartum)	5861	48	Chacho Quesada et al. 1996, 116
CSIC-246	Cave	Uppright sitting burials	esparto grass, (lygeum spartum)	5400	80	Chacho Quesada et al. 1996, 116
Dolmen de la Paloma, Huelva						
Beta-150153	Dolmen			4070	70	García Sanjúan 2009, Tab.1
Dolmen de la Venta, Huelva						
Beta-150157	Dolmen			4200	70	García Sanjúan 2009, Tab.1
Beta-150158	Dolmen			3820	50	García Sanjúan 2009, Tab.1
Dolmen de Menga, Málaga						
Ua-24582	Passage grave	Depression atrium	ch	4935	40	García Sanjúan 2009, Tab.1

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	Bibliography
Dolmen de Menga, Málaga						
Ua-24583	Passage grave	Depression atrium	ch	4865	40	Aranda Jimenez et al. 2013, Tab.2
Ua-36216	Passage grave	Basement tumulus	ch	4760	30	Aranda Jimenez et al. 2013, Tab.2
CNA-1174	Passage grave	Burial atrium	human bn	1250	35	Aranda Jimenez et al. 2013, Tab.2
CNA-1173	Passage grave	Burial atrium	human bn	1100	45	Aranda Jimenez et al. 2013, Tab.2
Dolmen de Viera, Sevilla						
Beta-353822	Passage grave	Chamber		3580	30	Aranda Jimenez et al. 2013, Tab.2
Beta-353820	Passage grave	Chamber		4090	30	Aranda Jimenez et al. 2013, Tab.2
GrN-16067	Passage grave	Ancient soil		4550	140	García Sanjúan 2009, Tab.1
El Baranquete, Almería						
CSIC-81	Tumulus/tholos	Tomb 7	ch	4280	130	Sanjuán et al. 2011, 19, Alonso et al. 1978
CSIC-82	Tumulus/tholos	Tomb 7	ch	4300	130	Sanjuán et al. 2011, 19, Alonso et al. 1978
El Palomar, Sevilla						
Beta-75067	Dolmen			4930	70	Sanjuán 2006, 152, Ramos Muñoz/Gilez 1996
Fuente Alamo, Almería						
OxA-4972	Small cave/covacha, Tomb 75			3545	65	García Sanjúan 2011, Tab.4
RCD-2111	Small cave/covacha, Tomb 90			3435	55	García Sanjúan 2011, Tab.4
Gatas, Almería						
OxA-4475	Cist			3570	65	García Sanjúan 2011, Tab.4
OxA-3965	Cist			3560	60	García Sanjúan 2011, Tab.4
OxA-3969	Cist			3530	60	García Sanjúan 2011, Tab.4
OxA-4472	Cist			3520	80	García Sanjúan 2011, Tab.4
OxA-5047	Pithos burial			3490	60	García Sanjúan 2011, Tab.4
RCD-2111	Pithos burial			3380	60	García Sanjúan 2011, Tab.4
OxA-3961	Pithos burial			3355	60	García Sanjúan 2011, Tab.4
Joaniña, Southern Meseta						
Sac-1380	Dolmen		ch	5400	210	Forte Oliveira, 1998
La Paloma, Huelva						
Beta-150154	Dolmen			4070	70	García Sanjúan et al. 2011, Tab. 3
Beta-150153	Dolmen			4220	40	

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	Bibliography
La Venta, Huelva						
Beta-150157	Dolmen			4200	70	García Sanjúan et al. 2011, Tab. 3
Beta-150158	Dolmen			3820	50	García Sanjúan et al. 2011, Tab. 3
La Castillejos, Las Peñas de los Gitanos Montefrío						
Ua-36215	Settlement with megalithic necropolis	Fase 1		6310	45	Cámara Serrano (forthcoming)
Ua-36214	Settlement with megalithic necropolis	Fase 3		6260	45	Cámara Serrano (forthcoming)
Beta-145302	Settlement with megalithic necropolis	Fase 7		6250	80	Cámara Serrano (forthcoming)
Ua-36212	Settlement with megalithic necropolis	Fase 6		6240	45	Cámara Serrano (forthcoming)
Ua-37835	Settlement with megalithic necropolis	Fase 10b		6155	45	Cámara Serrano (forthcoming)
Ua-37844	Settlement with megalithic necropolis	Fase 5		6140	45	Cámara Serrano (forthcoming)
Beta-135663	Settlement with megalithic necropolis	Fase 3		6120	40	Cámara Serrano (forthcoming)
Ua-36208	Settlement with megalithic necropolis	Fase 10a		6120	40	Cámara Serrano (forthcoming)
Ua-36213	Settlement with megalithic necropolis	Fase 2		6120	40	Cámara Serrano (forthcoming)
Ua-36203	Settlement with megalithic necropolis	Fase 11b		6115	40	Cámara Serrano (forthcoming)
Ua-36210	Settlement with megalithic necropolis	Fase 7		6100	45	Cámara Serrano (forthcoming)
Ua-37838	Settlement with megalithic necropolis	Fase 9		6095	45	Cámara Serrano (forthcoming)
Ua-36209	Settlement with megalithic necropolis	Fase 9		6090	40	Cámara Serrano (forthcoming)
Ua-37834	Settlement with megalithic necropolis	Fase 11b		6085	45	Cámara Serrano (forthcoming)
Ua-37837	Settlement with megalithic necropolis	Fase 11a		6065	50	Cámara Serrano (forthcoming)
Ua-36211	Settlement with megalithic necropolis	Fase 5		5400	45	Cámara Serrano (forthcoming)
Ua-36206	Settlement with megalithic necropolis	Fase 13		5265	45	Cámara Serrano (forthcoming)
Ua-36202	Settlement with megalithic necropolis	Fase 15		4980	35	Cámara Serrano (forthcoming)
Ua-36207	Settlement with megalithic necropolis	Fase 14		4795	40	Cámara Serrano (forthcoming)
Ua-37833	Settlement with megalithic necropolis	Fase 14		4775	45	Cámara Serrano (forthcoming)

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	Bibliography
La Castillejos, Montefrío						
Ua-37842	Settlement with megalithic necropolis	Fase 16a		4510	45	Cámara Serrano (forthcoming)
Beta-135665	Settlement with megalithic necropolis	Fase 16b		4480	40	Cámara Serrano (forthcoming)
Ua-36201	Settlement with megalithic necropolis	Fase 17		4450	35	Cámara Serrano (forthcoming)
Ua-36200	Settlement with megalithic necropolis	Fase 20		3990	40	Cámara Serrano (forthcoming)
Beta-145303	Settlement with megalithic necropolis	Fase 22		3960	50	Cámara Serrano (forthcoming)
Ua-36204	Settlement with megalithic necropolis	Fase 21		3925	30	Cámara Serrano (forthcoming)
Beta-135667	Settlement with megalithic necropolis	Fase 22		3910	40	Cámara Serrano (forthcoming)
GrN-7287	Settlement with megalithic necropolis	Fase 23b		3840	35	Cámara Serrano (forthcoming)
Beta-135666	Settlement with megalithic necropolis	Fase 20		3770	70	Cámara Serrano (forthcoming)
Ua-36205	Settlement with megalithic necropolis	Fase 23b		3720	35	Cámara Serrano (forthcoming)
Ua-37843	Settlement with megalithic necropolis	Fase 23a		3670	35	Cámara Serrano (forthcoming)
Beta-135668	Settlement with megalithic necropolis	Fase 22		3640	120	Cámara Serrano (forthcoming)
Ua-37841	Settlement with megalithic necropolis	Fase 23c		3580	40	Cámara Serrano (forthcoming)
Los Gabrieles, Huelva						
Beta-185649	Gallery grave			3920	50	García Sanjúan 2009, Tab.1
Beta-185648	Gallery grave			3850	40	García Sanjúan 2009, Tab.1
Beta-185650	Gallery grave			3700	50	García Sanjúan 2009, Tab.1
Los Millares, Almería						
Beta-124524	Fortified settlement with megalithic necropolis	Muralla II. Fase 1g		4420	70	Molina González et al. 2004, Tab. 3
Beta-124532	Fortified settlement with megalithic necropolis	Muralla IV. Fase 1		4410	60	Molina González et al. 2004, Tab. 3
KN-72	Tholos	Necropolis, tholos XIX	bn	4380	120	Molina González et al. 2004, Tab. 3
H204-247	Fortified settlement with megalithic necropolis	Muralla I		4295	85	Molina González et al. 2004, Tab. 3
Beta-124526	Fortified settlement with megalithic necropolis	Muralla I		4220	70	Molina González et al. 2004, Tab. 3
Beta-124527	Fortified settlement with megalithic necropolis	Muralla III. Fase 2		4220	70	Molina González et al. 2004, Tab. 3
Beta-124531	Fortified settlement with megalithic necropolis	Muralla IV. Fase 6		4200	60	Molina González et al. 2004, Tab. 3

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	Bibliography
Los Millares, Almería						
BM-2343	Fortified settlement with megalithic necropolis	Muralla II		4150	40	Molina González et al. 2004, Tab. 3
BM-2344	Fortified settlement with megalithic necropolis	Muralla I		4110	110	Molina González et al. 2004, Tab. 3
Beta-124525	Fortified settlement with megalithic necropolis	Muralla I		4040	70	Molina González et al. 2004, Tab. 3
Beta-124528	Fortified settlement with megalithic necropolis	Muralla III		4030	130	Molina González et al. 2004, Tab. 3
Beta-124529	Fortified settlement with megalithic necropolis	Muralla IV. Fase 7a		4020	60	Molina González et al. 2004, Tab. 3
Beta-125862	Fortified settlement with megalithic necropolis	Fortín I		4000	70	Molina González et al. 2004, Tab. 3
Beta-124522	Fortified settlement with megalithic necropolis	Muralla II. Fase 4c		3990	60	Molina González et al. 2004, Tab. 3
Beta-125861	Fortified settlement with megalithic necropolis	Fortín I		3980	40	Molina González et al. 2004, Tab. 3
Beta-125860	Fortified settlement with megalithic necropolis	Fortín I		3950	40	Molina González et al. 2004, Tab. 3
BM-2536	Fortified settlement with megalithic necropolis	Fortín I		3920	50	Molina González et al. 2004, Tab. 3
Beta-124530	Fortified settlement with megalithic necropolis	Muralla IV. Fase 9		3900	60	Molina González et al. 2004, Tab. 3
Beta-125859	Fortified settlement with megalithic necropolis	Fortín I		3880	60	Molina González et al. 2004, Tab. 3
Beta-135670	Fortified settlement with megalithic necropolis	Fortín V		3840	50	Molina González et al. 2004, Tab. 3
Beta-135671	Fortified settlement with megalithic necropolis	Fortín V		3840	70	Molina González et al. 2004, Tab. 3
Beta-135669	Fortified settlement with megalithic necropolis	Fortín IV		3830	70	Molina González et al. 2004, Tab. 3
BM-2345	Fortified settlement with megalithic necropolis	Fortín I		3820	40	Molina González et al. 2004, Tab. 3
Paraje de Monte Bajo, Cádiz						
Beta-233956	Passage grave	Tomb 4		4220	40	García Sanjúan et al. 2011, Tab. 3
Beta-233955	Passage grave	Tomb 4		4210	40	García Sanjúan et al. 2011, Tab. 3
Pocito Chico, Cádiz						
UGRA-552	Small cave/covacha	Pocito Chico UE11		3830	100	García Sanjúan et al.2009, Tab.1
Puerto de los Huertos, Huelva						
CNA-342	Tumulus/tholos			4070	50	García Sanjúan et al. 2011, Tab. 3

Chapter 10

West Iberian Peninsula

Summary: The Western Iberian Peninsula and in particular, the northern parts have been discussed in research literature since the introduction of the first radiocarbon dates to be one of the earliest megalithic regions in Europe. The start of megalithic building activities were estimated to the first half of the 5th or even to the 6th millennium cal BC. After a critical re-evaluation of the available radiocarbon dates and the analysis of recently produced radiocarbon series, we could not confirm these approaches. Early megaliths in the form of small non-accessible dolmens are emerging in Galica. These are so far associated to the very end of the 5th millennium cal BC. More potential early non-accessible dolmens are known from the Alentejo and the Algarve. The radiocarbon dates suggest the onset of the passage graves in the Westiberian peninsula not before ~3850 cal BC.

Pre-megalithic structures and pre-megalithic funeral rites

The earliest graves on the West Iberian Peninsula are recorded from natural caves or rockshelters (Arias Cabal/Alvárez-Fernández 2004; Ferreira 1982; Oosterbeek 1997; Zilhão/Trinkaus 2002) with first evidence for a burial in a cave from the Upper Palaeothic Gravettien horizon in Lagar Velho in the Estremadura (Arias Cabal/Alvárez-Fernández 2004: 227).

In addition, Late Mesolithic cemetaries are documented in Central and Southern Portugal from the Late Mesolithic onwards. Since the 19th century, around 300 burials have been excavated in shell middens in the Muge valley in the Ribatejo and the Muge-Magos areas. The dead were deposited in supine, flexed or half-flexed positions in natural shallow depressions in the sand or partly in pits on the base of shell middens. From these sites (Meijklejohn *et al.* 2009), altogether 18 radiocarbon dates are available from the 6th to the beginning of the 5th millennium cal BC. From the 100 burials in shell middens known from the river Sado valley in the Alentejo, five further radiocarbon dates are available dating the necropolis between the end of the 7th and the beginning of the 5th millennium cal BC. The Sado burials were dug into the nearly sterile sandy layer at the base of the shell middens and deposited in flexed or semi-flexed positions. Altogether 11 of these results from the Ribatejo and the Sado river valley indicate a reservoir effect with $\delta^{13}C$ values varying between -16.9‰ and -15.3‰ and $\delta^{15}N$ values between 10.4‰ and 13.4‰. This reservoir effect was corrected by Meiklejohn *et al.* (2009) using CALIB version 5.0.1 and the Portugal marine mean, 256 ± 29, with limits for pure marine and pure terrestrial of -12 and -20 (Meiklejohn *et al.* 2009: 6–12).

Furthermore, the caves or rock shelters were continuously frequented as burial sites and later consecutively in use contemporaneous to the megaliths during the 4th and the 3rd millennia BC (Boaventura 2011) (cf. 10.4, 10.7). Due to the acidic soils, the data basis for pre-megalithic burials and human bones for the northern regions is rather limited. From different natural caves in the Estremedura, however, radiocarbon dates gained from human bones are available, disclosing the natural caves as pre-megalithic funeral places which sometimes even immediately precede the megaliths in this region (Boaventura 2011: 163), for example Caldeirão (Lubell/Jackes 1988; Zilhão 1992; 1995; Lubell *et al.* 1994), Nossa Senhora das Lapas (Oosterbeek 1993), Casa da Moura (Lubell/Jackes 1988; Lubell *et al.* 1994), Correio-Mór (Carvalho 2007a) or even Algar do Picoto (Carvalho 2007a; Zilhão/Carvalho 1996). From Correio-Mór there is evidence for the earliest known burial in the mentioned natural caves with a radiocarbon result from the Early Neolithic (Sac-1717, 6330±60BP; 5368–5224 cal BC, 68.2; 5471–5211 cal BC, 95.4%) (Carvalho 2007a). In general, the pre-megalithic burials in the caves were simply designed as pits with a few grave goods, including ceramics and shells. An exception is represented by the site Nossa Senhora das Lapas, where one of the individual burials was surrounded by blocks (Oosterbeek 1993). In the Alentejo, evidence from the Gruta dos Escoural for pre-megalithic burials in natural caves was available with a result from a human bone sample dating to ~4400 cal BC (OxA-4444, 5560±160BP, 4597–4240 cal BC, 68.2%; 4777–4042 cal BC, 95.4%) (Araújo/Lejeune 1995). Finally, burials are recorded from the cave Algarão da Goldra. One radiocarbon date (SMU-2197, 4990±320BP; 4228–3378 cal BC, 68.2%; 4487–2936 cal BC, 95.4%) is determined from a charcoal sample originating from a pit with human bones, a few ceramic pieces, and flint blades (Straus 1989). It exhibits a high standard deviation and the significance of this result is therefore limited.

From the Early and the Middle Neolithic, examples of pit burials are known as well, mainly connected to settlements like Castelo Belinho in the Algarve (Gomes 2008) and Valle de Ambrona, Soria (Rojo Guerra *et al.* 2008). For instance, two radiocarbon results from human bones are available from the pit burials in Castelho Belino (Beta-199912, 5500±40BP; 4442–4271 cal BC, 68.2; 4450–4263 cal BC, 95.4%; Beta-199913; 5720±40BP, 4613–4497 cal BC, 68.2%; 4685–4463 cal BC, 95.4%).

Eira da Vinha (Perais, Vila Velha de Ródão) is discussed as a possible pre-megalithic structure (Santos/Figueira 2011). It is a tumulus with an oval central grave structure, surrounded by concentric stone circles and built on a round stone platform. Until now, there are no radiocarbon results available. The archaeological material is sparse and consists of polished stone axes, one geometric microlith and undecorated fragments of globular or hemispherical pottery. The chronological classification of this monument remains accordingly unsecure.

Transitional structures and the emergence of megaliths on the West Iberian Peninsula

There is evidence from the southern regions of the West Iberian Peninsula for a transition to megaliths at the natural Cave of Cadaval (Boaventura 2009; Boaventura 2011: 164; Cruz 1997; Oosterbeek 1994). For this cave, an MNI of 24 has been determined (Lopes 2005–06) and one of the dead was covered by a big stone slab and buried together with geometric microliths, thin flint blades, an axe, shell beads, and ceramic fragments. The radiocarbon date ICEN-464 obtained from human bones for this burial is measured to 5160±50BP (4041–3823 cal BC, 68.1; 4146–3799, 95.4%) and so to ~3970 cal BC.

The transitional, proto-megalithic or first megalithic stage on the whole West Iberian Peninsula is associated, according to the classification of this analysis, to small non-accessible or accessible dolmens covered by tumuli or, according to Leisners (1983) definition, to small most elongated chambers with a small height. These graves are known in a small number from the whole working area. Up to the present day, nearly no reliable radiocarbon results have been produced, from which the context allows a connection between the sample and the construction or the early use of these graves. The association of these graves to the early stage is therefore based on the typo-chronological consideration of the artifacts, which are rather homogenous for these regions, and/or on the architecture. The latter is to be reflected upon with restrictions, since we have to take the construction of these graves contemporaneous to other megalithic grave forms or even in post-megalithic times into consideration.

In the Alentejo, the earliest tombs are built as simple small or extended cists or non-accessible small dolmens and they contained just few individuals (Boaventura, 2009, 2011: 162; Soares/Tavares da Silva 2000; Rocha 2005: 71). The grave goods consist of geometric microliths, axes with round, oval or quadrangular tranverse sections, thin blades with none or a limited retouch, ground stone tools and nearly no ceramics. This material is associated to the first half and to the middle of the 4th millennium cal BC. The available radiocarbon dates are associated with the 3rd millennium BC and are more a result of accumulation processes of deposition through time. The grave Marco Branco in the Serra de Grândola is discussed as a grave of this proto-megalithic or first megalithic phase in the Alentejo (Soares/Tavares da Silva 2000: 118–119). It is a small naviformed grave chamber or non-accessable dolmen, measuring 1,70m x 1, 35m and covered by a small tumulus, 2,50m in average, with concentric stone circles. The grave goods consist exclusively of flint artifacts, such as thin flint blades, flakes, a discoid schiffer bead and a ceramic fragment. From an architectonical point of view, Marco Branco is similar to small megalithic graves excavated by Manuel Heleno in the Alto Alentejo (Savory 1969: 98). Those graves are likewise associated to singular graves and single burials. For example, Areias grave 10 in Reguengos de Monsaraz is inserted into a small tumulus and constructed with a small chamber, which measures 2m x 1,10m (Leisner/Leisner 1951; Soares/Tavares da Silva 2000: 119–120) and the non-accessible dolmen under tumulus Azinhal 3 (Coruche) exhibits an oval chamber with a ground plan measuring 2,5m x 1,5m and grave goods including geométric microliths, thin blades, and an axe with a sub-circular transversal section (Leisner 1983; Soares/Tavares da Silva 2000: 120).

A further similar grave is dolmen 2 do Cabeçodo Torrão in the district Elvas (Lago/Albergaria 1995). The grave displays a former oval ground, measuring 2,60m x 1,70m and was covered by a tumulus. The graves goods consist of geometric microliths and an axe with a sub-circular transversal section. A further possible grave of this group is also registered in Elvas in Portalegra at the grave Poco Peireira, a small non-accessible dolmen measuring 1,20m x 2m and featuring four axes, two geometric microliths, quartz, and ceramics from the chamber.

The first phase of the Anta 6 do Couto da Espanhola in Idanha-a-Nova (Cardoso/Soares 1995) exhibits an oval chamber measuring 1,75m x 0,75m and an oval tumulus, 10m in diameter on average. For this first phase, artifacts such as thin flint blades, a geometric microlith, and an amphibolithe axe with a rectangular transverse section were documented.

Grave Alamo 5 by Valverde in the Evora district possibly also belongs to that group, as well as the other 4 graves registered for this small necropolis. Alamo 5 is a small non-accessible dolmen, measuring 2,60m x 1,20m and includes the remains of a tumulus (Figure 10.2).

In the Algarve in the mountains of Mochique, further possible early megaliths are known within the necropolises Palmeira, Buço Preto, Eira Cavada, and Mirante da Mata (Leisner/Leisner 1959: 264, Tafel 44–45; Soares/Tavares da Silva 2000: 121). These graves include non-accessible and accessible dolmens covered

by round stone tumuli. With altogether 16 graves, Palmeira is the largest necropolis (Figure 10.1). At Buço Preto, 7 graves are registered and at both Eira Cavada and Mirante da Mata 3 graves are registered. Furthermore, in the region singular graves are registered at Rencovo and Navete.

Clear non-accessible dolmens are documented from all the necropolises. The dolmens exhibit exclusively rectangular chambers, either with one side stone or they are constructed as extended dolmens with several side stones, for example at Palmeira 2, 3, and 8, at Eira Cavada 1 and 2 and at Buço Preto 2, 3, 4, 5, 9, 10, and 13. Several of these chambers are partly inserted into one tumulus at Buço Preto tumulus 7, including the graves 3, 4, and 5. The grave goods in these dolmens consisted of geometric microliths, thin flint blades, axes with oval transversal sections, chisels, discoid schiffer beads, beads made of green stone, for example variscite and serpetinite, and undecorated ceramics. From the same necropolis, later accessible structures are recorded at Buço Preto 7, which is rather a gallery grave with Copper Age material.

The northern part of the Western Iberian Peninsula, encompassing Beira, Northern Portugal and Galicia is a region with bad bone preservation. Therefore, the available radiocarbon stock from these regions is nearly exclusively limited to results gained from charcoal samples (cf. 10.4), whereas many of them represent terminus post quem values. In these regions, megaliths emerge within tumuli (Fábregas Válcarce/Vilaseco Vázquez 2003; Cámara Serrano 2001, 23, Cruz 1995, 1998, Jorge 1989, Jorge 1998) from the final Neolithic and ~4200–4000 cal BC onwards, if not later. The first megalithic stage is represented here by non-accessible or accessible dolmens covered by round small earthen tumuli. These tumuli likewise cover central graves, wooden constructions, pits, stone cists, and para-megalithic structures. The first dolmens were built with a rectangular or mostly polygonal ground plan covered by a more modest to average size earthen tumuli compared to later monuments with passage graves and exclusively stone structures (Alonso Matthíás /Bello Diéguez 1997: 508–509). The earliest results are gained from charcoal from Chan de Prado 6, Chan da Cruz 1, and Alta da Barreira (GrN-19620, 6575±35 BP; 5547–5484, 68.2%; 5614–5477 cal BC, 95.4%; CSIC-1039, 6030±30 BP, 4985–4852 cal BC,68.2%; 5004–4839 cal BC,95.4%; GaK-11395, 5890±120 BP; 4932-4611 cal BC , 68,2%; 5056-4461 cal BC, 95,4%). The results all originate from layers under the graves, from layers directly over the ancient soil, and from the tumulus debris and thus provide typical termini post quos values. These categories also match the remaining 41 radiocarbon results available from similar structures (cf. 10.4) and it is therefore difficult to define the emergence of the megaliths in this region. The sample contexts are only more reliable from a few of these Galican results. Cotogrande 1 is a less classical structure with a chamber consisting of five orthostats in a half round circle and one big stone slab leaning against those and therefore building a cap and a side stone (Abad Gallego 1992/93). This chamber, which is documented as an individual grave, was finally covered by a round tumulus. Based on the context, one of the radiocarbon results originates from the central structure with possible usage data (GrN-18420, 4940±80 BP, 3888–3644 cal BC, 68.2%; 3951–3538 cal BC, 95.4%). A further possible usage or construction date is available from Chan de Cruz 1 (CSIC-642, 5210±50 BP, 4144–3961 cal BC, 68.2%; 4230–3947 cal BC, 95.4%).

Appearance and architectonical features of megaliths on the West Iberian Peninsula

The megaliths occupy the following principle areas on the Western Iberian Penninsula: in the north 1) the uplands north of the Douro valley, 2) Beira and the ancient massif uplands and in the south 3) the ancient massif lowlands of the Alentejo, 4) the limestone areas of the Estremadura, and 5) the Algarve (Scarre *et al.* 2003: 84). The megalithic graves stand mostly isolated in the landscapes and are partly arranged as small necropolises.

On the West Iberian Peninsula, megaliths are documented which exhibit the entire diverse construction spectrum and the specifities verified for the remaining areas of the Iberian Peninsula and other European regions (Boaventura 2009: 13; Bradley 1998; Leisner/Leisner 1943; 1959; Leisner 1965; Masset 1997; Mohen/Scarre 2003; Scarre 1996). In the research literature, two main megalithic grave types are classified for the region: the antas, which include dolmens, passage graves, and tholoi, and falsa coppola, which include chambered tombs with corbelled roofs. Antas are built as non-accessible, accessible, and extended dolmens, furthermore as passage graves with a long or a short corridor and with a polygonal/round or rectangular/round groundplan for the chambers. In addition, gallery graves are also documented.

The tholoi (falsa coppola) are a phenomena associated to the Copper Age, which is primarily limited to the southern regions mainly on the coastal lines and at the opening of the big rivers of the Estremandura and the Algarve, but partly also to the Alentejo. Only few tholoi are documented in the northern regions, for example at Segura in the Beira Baixa.

Tholoi are either built with a megalithic chamber or as non-megalithc structures in dry wall technique or with massive bloque walls covered with a corbelled roof. The chambers of the megalithic tholoi are either built with thin side stone plates

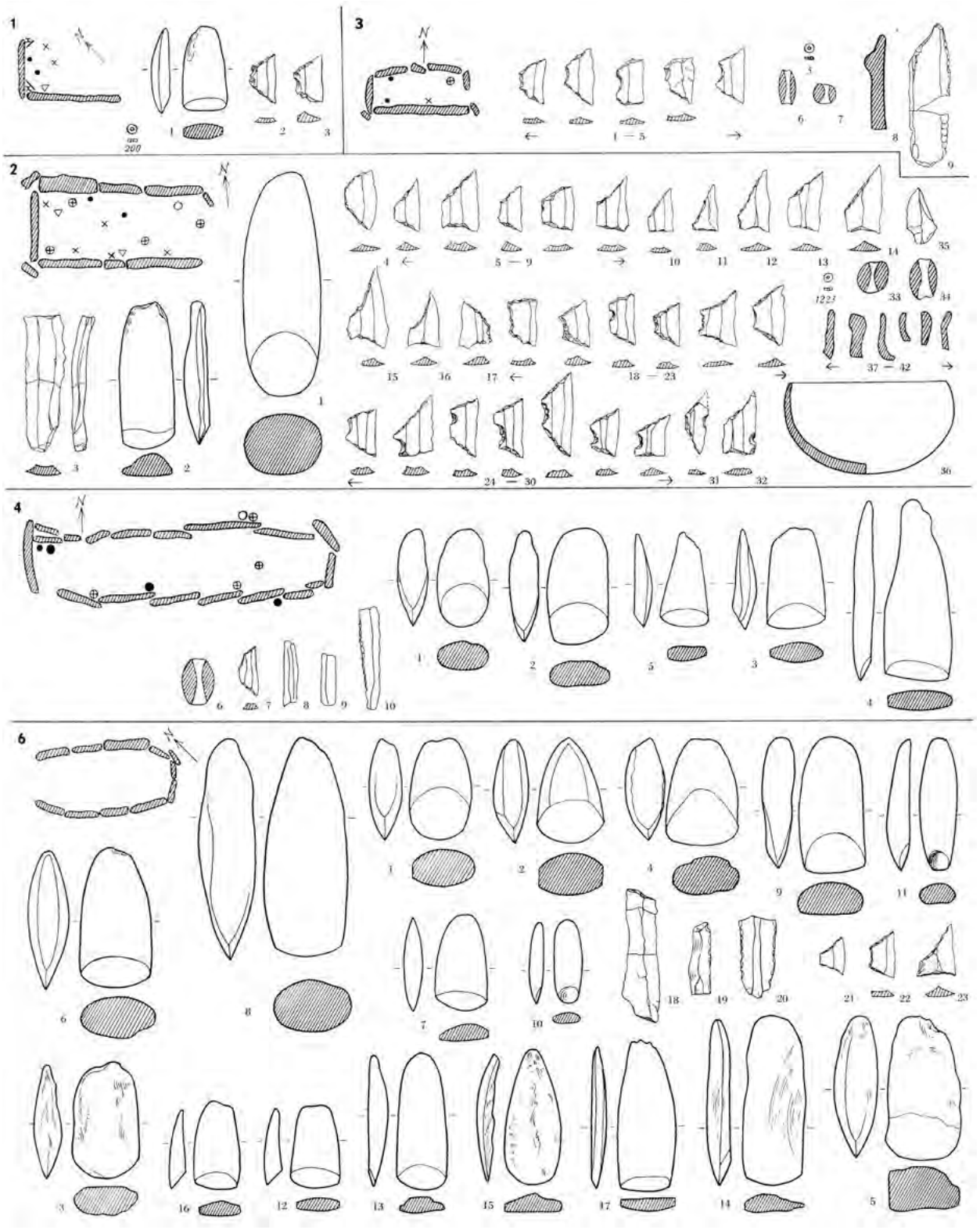


Figure 10.1 Necropolis Palmeira in the Mochique Mountains, Algarve. Graves 1-17 (Leisner/Leisner 1959, Taf. 46) (1)

or with more massive stone slabs and a corridor. The groundplan of these tholoi is mostly round, and partly also trapezoid as observed at monument 1 in Vale de Rodrigo in the Alentejo (Leisner/Leisner 1956, Tafel 3).

Standing stones are common for the southern regions, erected as simple or decorated monoliths or in later stages as decorated stelae either isolated in the landscape or arranged as stone circles (Scarre *et al.* 2003: 83).

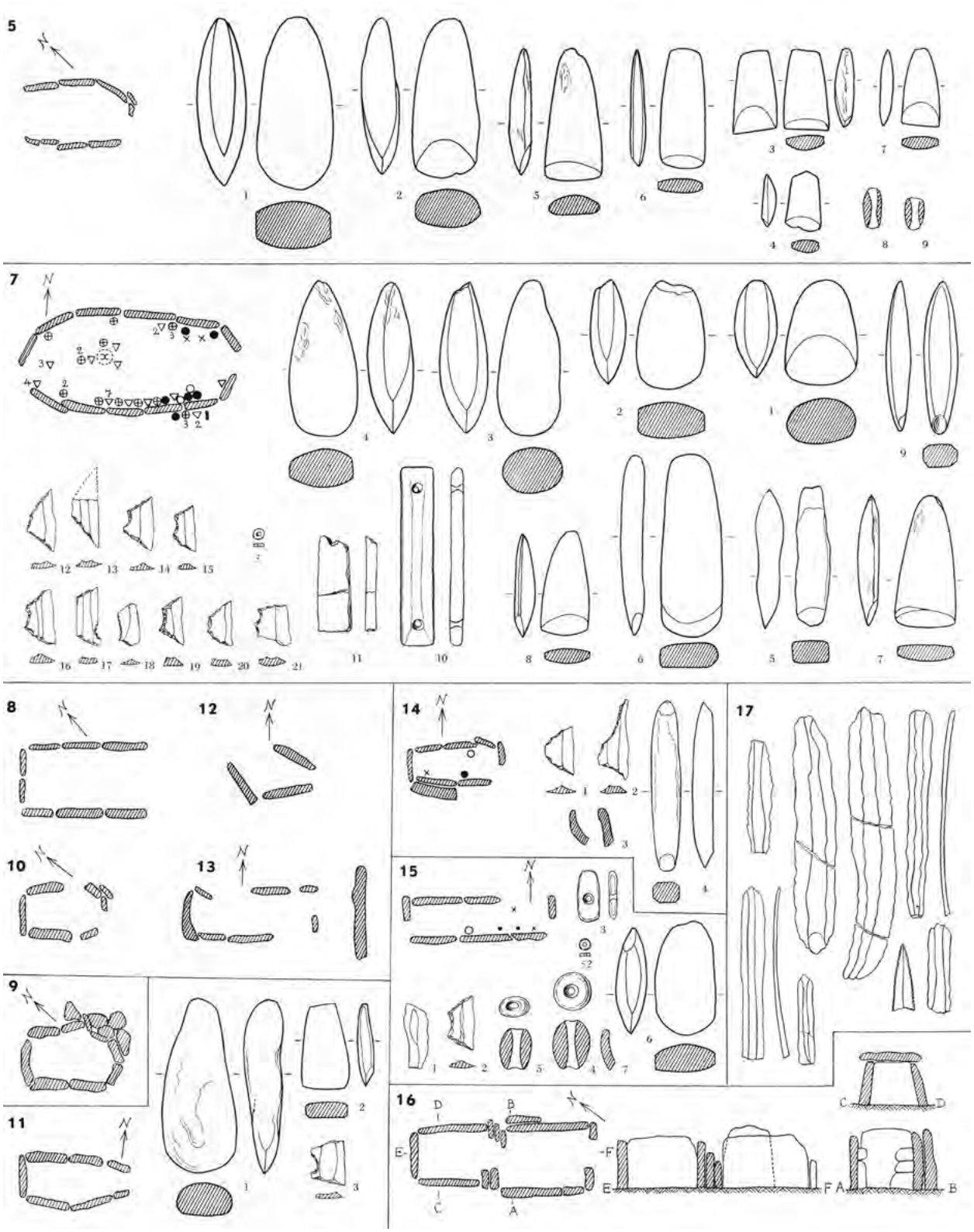


Figure 10.1 Necropolis Palmeira in the Mochique Mountains, Algarve. Graves 1-17 (Leisner/Leisner 1959, Taf. 46) (2)

Megalithic graves in the southern regions: Estremandura, Alentejo, and Algarve

In the Estremadura, megaliths are clustered particularly in the region of Lissabon and constructed in the form of accessible dolmens, passage graves, and tholoi. Approximately 20 megalithic graves and 13 tholoi are registered in this region (Boaventura 2009: 210–213: 293–299; Leisner/Leisner 1959, Tafel 44). A few structures exhibit a rectangular (e.g. Boiças 2,



Figure 10.2 Alamo Grave 5, Valverde/Evora, Alentejo

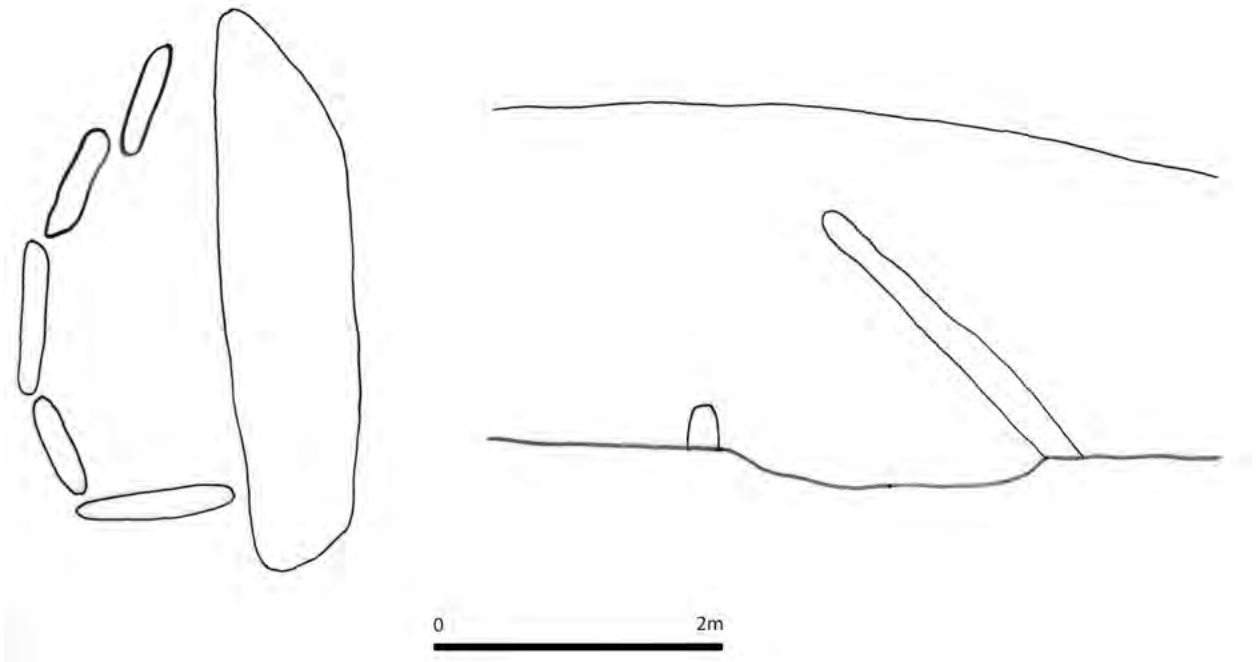


Figure 10.3 Planum Cotogrande 1 (after Fábregas Válcarce/Vilaseco Vázquez 2003, Figure 5)

3; Lousdal 2) or a trapezoidal ground plan (e.g. Anta Arruda, Anta de Monte Serves, and Anta de Casal do Penedo) (Boaventura 2009, Figure 107: 111–112, 109–110). Graves with a polygonal or a round ground plan are built in the form of dolmens, as for example the Anta de Pedras da Granja (Boaventura 2009, Figure 117) or as passage graves, observed for example at Monte Branco or Boiças 1. The tholoi in this region partly exhibit a round antechamber before the grave chamber, for example at Lousal 1 (Leisner/Leisner 1959, Tafel 44) or they are built with huge blocks as observed at Barro (Leisner/Leisner 1956, Tafel 6).

In the mountains of Mochique, necropolises such as Palmeira, Buço Preto, Eira Cavada, and Mirante da Mata are documented with non-accessible and accessible dolmens (cf. 10.2) and gallery graves covered by round stone tumuli. From Rencovo and Navete, further singular graves are registered (Leisner/Leisner 1959: 264). With 16 graves, Palmeira is the largest necropolis, whereas graves are registered from Buço Preto 7 and both Eira Cavada and Mirante da Mata contain 3 graves.

From all these necropolises, clear non-accessible dolmens are documented. These graves exclusively exhibit rectangular chambers, either with one side stone or they are constructed as extended dolmens with several side stones, for example Palmeira 2, 3, and 8 or Eira Cavada 1.

Several of these chambers are partly inserted into one tumulus as in Buço Preto 7. From the same necropolis, later accessible structures are recorded, such as dolmen Palmeira 16 with an inner compartement or an antechamber or Palmeira 11. These structrues can partly be classified as gallery graves (Buço Preto 7, Palmeira 4 and 7). While the material in the non-accessible and or extended dolmens consists of geometric microliths, axes, and beads made of green stone (variscite and serpetinite) and are therefore associated to the Final Neolithic, the more elaborated structures, such as as gallery grave 7 from Buço Preto, contained partly Copper Age material, for example idol plaques and protuberant or slightly concave arrowheads.

The tholoi cover the region in the very southwest as well as the area at the border zone to Huelva and are documented with megalithic and non-megalithic chambers, some having a small antechamber. To be mentioned here, is the necropolis Alcalar in Portimão, which is outstanding regarding size and architecture with altogether 18 monuments and 7 tombs.

Megalithic graves in the northern regions: Beira, Northern Portugal, Galica

More to the north in the Beira, a further megalith concentration is registered with non-accessible or accessible dolmens, passage graves, and a few tholoi. In this region, the main parts of the earthern tumuli remain, partly sourrounded by stone circles. The non-accessible dolmens are documented as small simple rectangular chambers, for example at Castillejo in the



Figure 10.4 Passage grave Anta do Olival da Pega 2 . Photo courtesy João Carvalho-CC-by-sa Wikimedia Commons



Figure10.5 The more elaborated passage graves in the Alentejo: Anta Grande do Zambujeiro, Valverde and Anta Grande da Comenda da Igreja, Montemor-o-Novo

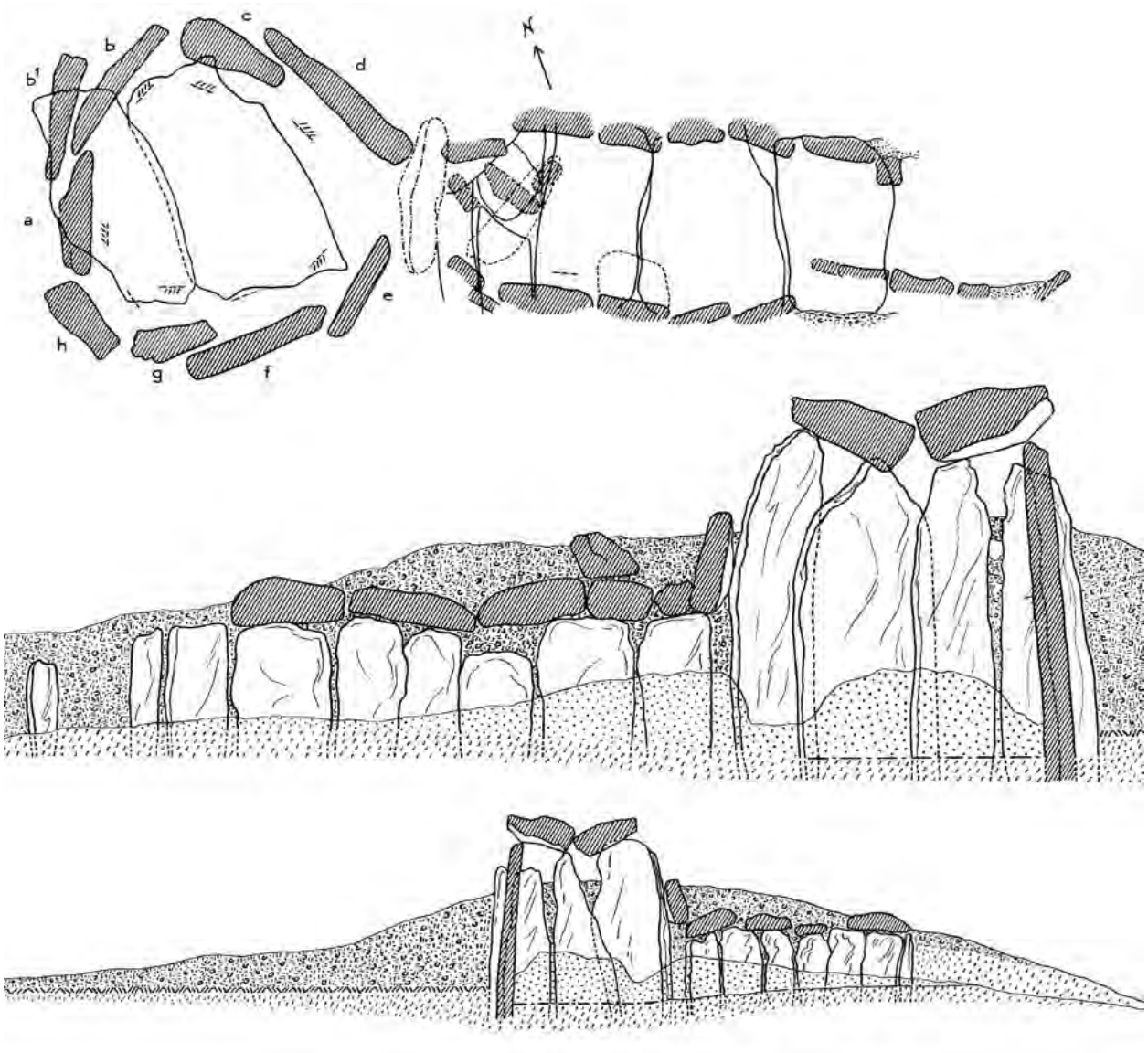


Figure 10.6 The Anta Grande da Comenda da Igreja, Montemor-o-Novo(Leisner/Leisner 1959, Tafel 25)

In the Alentejo, one of the densest megalith concentrations on the West Iberian Peninsula is documented, including non-accessible and accessible dolmens, passage graves, tholoi, single standing stones, and stone circles. In particular, dolmens and passage graves with polygonal or round chambers are located here (Leisner/Kalb 1998, Tafel 1–43). Common are small polygonal dolmens without a corridor or with a very short corridor. Furthermore, simple passage graves with corridors and in later phases and more associated to the Copper Age elaborated passage graves with more longstreched chambers and or graded roofs are prevalent. The most monumental graves of the whole working region are registered from the Alentejo with the Anta Grande do Zambuceiro in Valverde/Evora or the Anta Grande da Comenda da Igreja in the district of Montemor-o Novo (Figures 10.5, 10.6). The Anta Grande do Zambujeiro is altogether 19m long and covered by a tumulus with an original average of ~55m. Manifold grave goods, such as 154 idol plaques, ca. 500 pearls, 30 axes, over 500 arrow heads, and 40 complete vessels, indicate that the grave served as a collective burial site and communal place for a larger community. A few tholoi are documented from the Alentejo, such as Vale de Rodrigo 1 in Evora, the Tholos da Comenda and Olival da Pega 2b in Regenguos de Monsaraz (Gonçalves 2006; Leisner/Leisner 1959, Tafel 41–43; Soares 1999) (Figure 10.4).

The megalithic graves in the the very southern part of the considered area, the Algarve, are concentrated in the southwest in the Mochique Mountains and close to the border of the Spanish province Huelva. The megaliths here are built as simple non-accessible or accessible dolmens, as passage or gallery graves, and as tholoi. Furthermore, the Algarve is rich in standing stones.

province Viseu or as polygonal or round chambers, for instance at Mamoinha do Sr. do padrao, near Viseu (Leisner/Leisner 1956, Tafel 23, 28; Leisner/Leisner 1959; Leisner/Kalb 1998, Tafel 25). The same concepts with rectangular and round chambers are registered from accessible dolmens without corridors. For the passage graves, simple small polygonal or round chambers, polygonal chambers with partly unregular chamber forms, such as oval broad chambers at Orca dos Castenaires (Leisner/Kalb 1998, Figure 3), and trapezoid ground forms are noted. Furthermore, partial lateral corridors are documented and for some of the passage graves small antechambers are known. Elaborated passage graves were partly built with graded cover stones, for example at Carapito 1 in Aguiar da Beira (Leisner/Leisner 1956, Tafel 19; Leisner/Kalb 1998, Figure 4). Only a few tholoi are documented, such as the tholoi Monte Velho and Monte das Pereiras, whereas Monte Velho is built with an extended corridor instead of an antechamber (Leisner/Leisner 1959, Tafel 43).

In Northern Portugal in the regions of Minho and Tras-o-Montes north of the Douro valley, other megalithic clusters are noted. The megalithic occurrences are not as frequent here as in Beira or the more northern Galicia, but this might not reflect the original status due to extensive land use and the destruction of megalithis in these regions. Here, the megalithic repertoire is similar to Beira and consists of non-accessible and accessible dolmens, as well as passage graves. Non-accessible and accessible dolmens are known with rectangular chambers, such as Antela da Mamoa in Oliveira de Frades, sometimes also as extended dolmens and with a polygonal or a round chamber (Leisner/Leisner 1956, Tafel 28, 23). Passage graves were likewise constructed with a polygonal or a round chamber. They partially exhibit an oval broad groundplan or are built as more elaborated types with graded cover stones such as Val de Cadella in Vila Nova de Paiva (Leisner/Leisner 1956, Tafel 14, 19) (Figure 10.8).

One of the highest megalith concentrations in Europe is registered in the very northwest of the Iberian Peninsula in Galicia, where 4000 monuments are located (Scarre *et al.* 2003: 80). The first megalithic stage in Galicia is pinpointed to the final Neolithic with round earthern tumuli and represented by non-accessible or accessible dolmens (cf. 10.2) partly connected to standing stones (Alonso Matthíás / Bello Diéguez 1997: 508–509).

For ostensible closed structures, accesses are documented, for example the dolmen of Dombate, which features a free open area cut into the earthen tumulus (Figure 10.6). Thus, these graves did not necessarily need a corridor for accessability and re-use (Fábregas Válcarce/Vilaseco Vázquez 2003: 286). The early dolmens are documented with polygonal or rectangular chambers. In the first half of the 4th millenium BC, Galicien passage graves were built and represent the exclusive grave form in the second half of the 4th millennium cal BC. They were more elaborately constructed than structures in the other subregions on the Western Iberian Peninsula. In the transition to the Bronze Age, graves with atypical and more rectangular chambers were built (Rodriguez Casal 1979; Scarre *et al.* 2003: 80). In the second part of the 3rd millennium, passage graves were either reused by people with Bell Beaker material or tumuli were still constructed with different central structures such as pits (Fábregas Válcarce/Vilaseco Vázquez 2003: 288; Vaquero Lastres 1995). In the transition to the Bronze Age, further graves with atypical and more rectangular chambers were common (Rodriguez Casal 1979, Scarre *et al.* 2003: 80).

Especially in the southern regions, standing stones are frequent, either as isolated monuments or grouped in circles (e.g. Calado/Rocha 2006; Calado 2006; Scarre *et al.* 2003: 83). The densest concentrations of standing stones are known from the West Algarve and the Central Alentejo. Thus, in the Algarve ca. 259 standing stones are registered from 80 sites. In the Central Alentejo, 87 sites with approximately 374 standing stones are documented (Calado 2006: 4). Striking are the 7m highest standing stones in the working area, namely the Menir de Meada at Castelo de Vide and the Cromlech dos Almendres bei Valverde in Evora, which is the largest stone circle in the West Iberian Peninsula (Figure 10.9). On an area of approximately 40 to 70m, approximately 95 'egg-formed' monoliths stand in small groups building an oval form. A part of these monoliths are decorated with circles or anthropomorphic figures. Further large stone circles are found at Vale Maria do Meio and Portela de Mogos. A part of the standing stones in these regions, such as Fontaínhas in the Alentejo, are situated on the basement of the archaeological settlement material nearby and associated to the Early Neolithic or even to the Mesolithic (Calado 2003, 2004; Calado/Rocha 2006; Calado *et al.* 2007). Compared to the south, a few standing stones are registered in the northern regions, situated more in connection to tumuli, for example Luzim (Penafiel, S. Paio de Antas (Esposende) (Tavares da Silva/Soares 1998: 1012). In Galica, two currently destroyed stone circles are registered from Chaira da Mourela (As Pontes, A Coruña) (Maciñeira, 1929) in addition to a couple of isolated standing stones, such as A Lapa de Gargantáns in Moraña, Pedra Chantada in Vilalba, El de Cristal in Ribeira, Gargantáns in Moraña (Pontevedra), Pedra Chantada in Villalba, and Glas in Ribeira (Villoch Vázquez 1998).

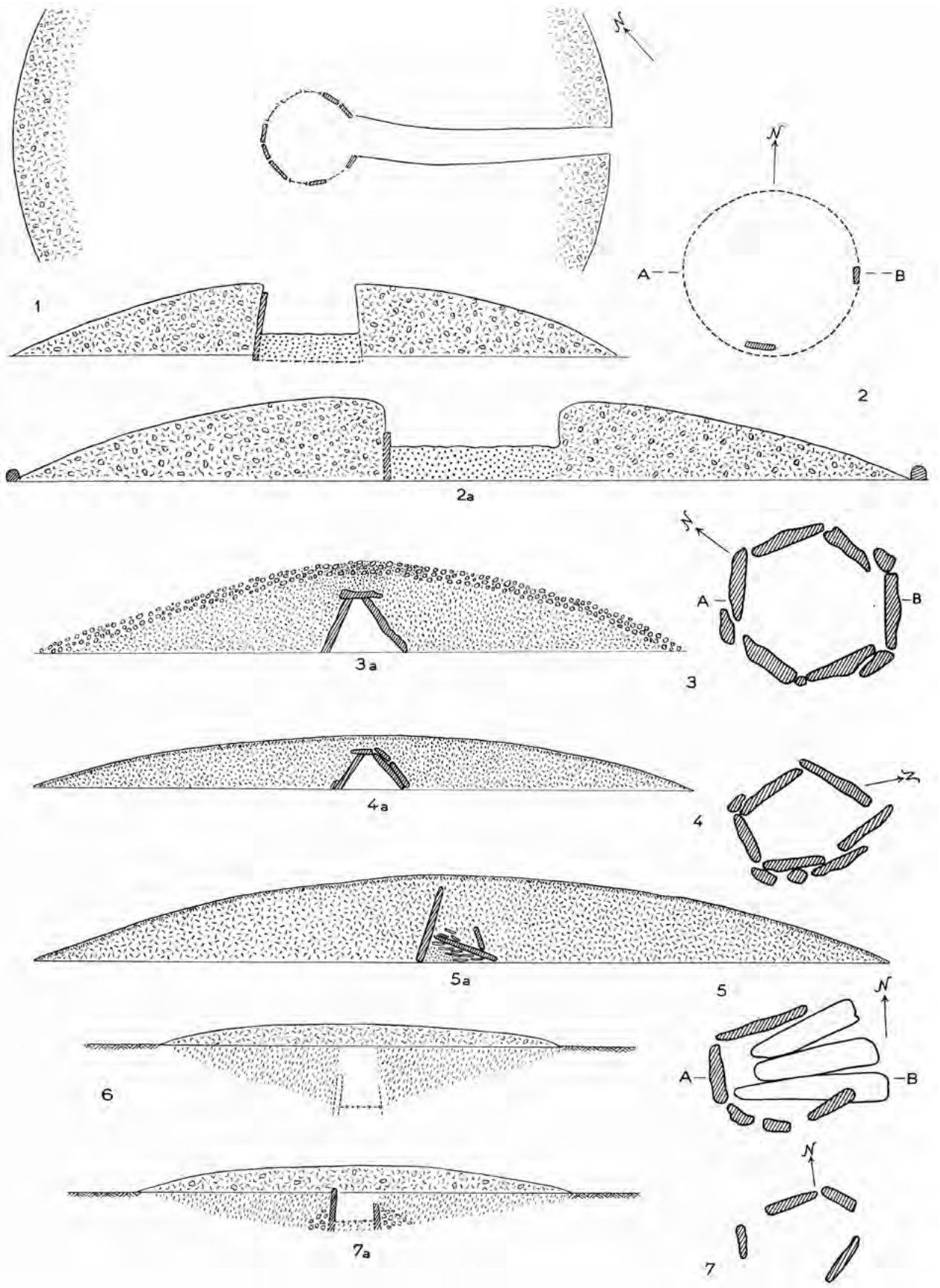


Figure 10.7 Non-accessible dolmens in Galicia (Leisner/Leisner 1956, Tafel 22). 1. Agro dos Balados, 2. Mamoa von Espinareda, 3. -5. La Mourela, 6.-7. Mamoa 2 und 7, Monte de Morá

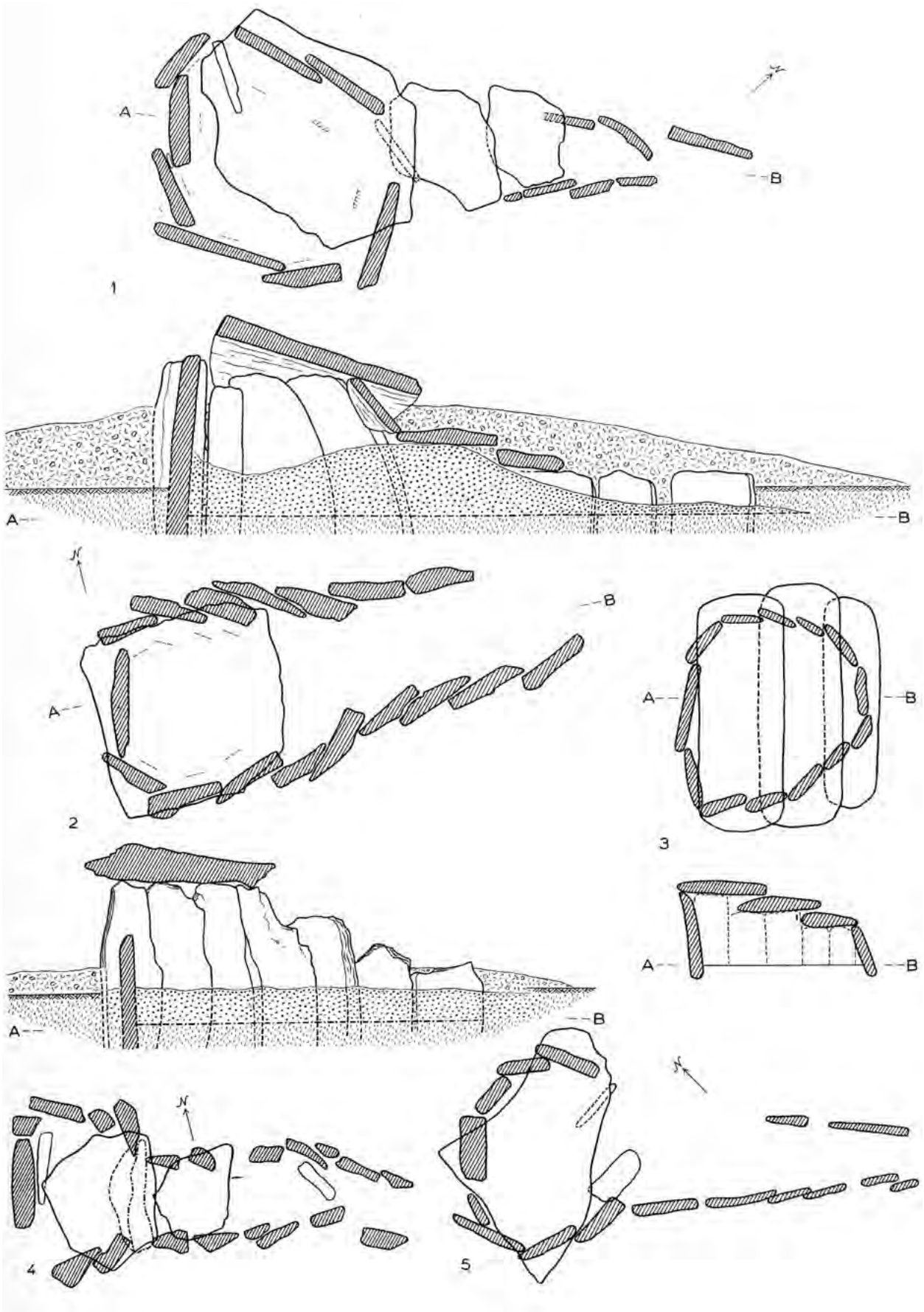


Figure 10. 8 Passage graves with graded cover stones in Beira and Minho (Leisner/Leisner 1956, Tafel 19). 1.) Dolmen de Carapito, 2.) Anta da Barrosa, 3.) Chã do Mezio 4, 4.) Lapa do Repilau, 5.) Val de Cadella 2



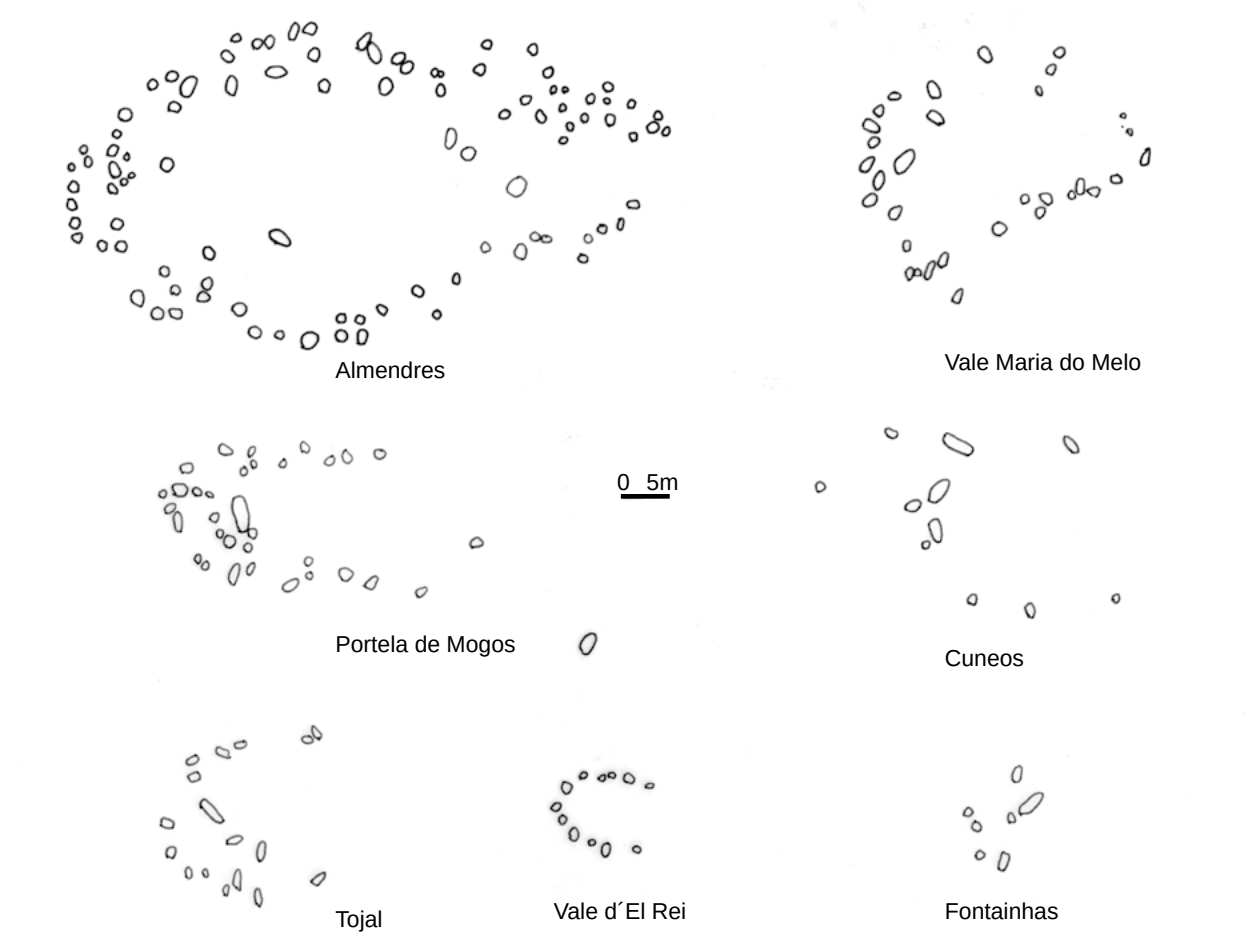


Figure 10.9 Cromlech dos Almendres, Alentejo and stone circles in the southern Westiberian peninsula (planum after Calado 2006, Figure 4)

Megalithic structures with radiocarbon sequences and with radiocarbon dates

Today, altogether 309 radiocarbon results from megalithic contexts from the Western Iberian Peninsula are available. Even if this amount of data seems to be sufficient to define the emergence of megaliths in this region or to formulate at least some tendencies, the rise of megaliths remains unclear and the Western Iberian Peninsula is still one of the most complicated and debated megalithic regions. In particular, the northern parts have been discussed in research literature since the introduction of the first radiocarbon dates and it is considered to be one of the main and core regions regarding the early emergence of megaliths in Europe.

The most extreme positions postulated the start of megalithic building activites at the early or the first half of the 5th or even the 6th millennium cal BC (e.g. Armbruester 2010; Castro Martínez *et al.* 1996; Jorge 1998; Müller 1998; Scarre *et al.* 2003). This early positioning of the Western Iberian megaliths has been criticized in the last decade, iterated by Spanish and Portuguese collegues (e.g. Boaventura 2009; 2011; Cámara Serrano 2001; Cruz 2001; Gonçalves/Sousa 2006). Moreover, a series of early thermoluminiscence dates from the 1970s, such as the date Ox/TL-169a, 4640±430 cal BC from the Dolmen of Poço da Gateira, became the foundation upon which an early start of megaliths was proclaimed and these dates have been repeatedly cited (e.g. Castro Martínez *et al.* 1996; Cardoso 2002; Figueiredo 2006; Joussaume 1985; Renfrew 1973; Scarre *et al.* 2003). We already mentioned the problems in dating megaliths with thermoluminescence results in this analysis (2.1). For example, the standard deviation and similarly OSL-datings with several hundreds of years are much too high and thus this method is not convenient for any closer determination of the construction and use of megaliths.

For the northern regions of the Western Iberian Peninsula, the situation is similar to Brittany, where organic material is sparsely preserved due to the acidic soils. Accordingly, nearly no results are available from human bones. The approaches postulating an early start of the megaliths in this region are exclusively based on results from charcoal samples. Among these calculations, many results are from unsure contexts or typical termini post quos situations are involved. The samples stem, therefore, from earlier activites on the places, for example from layers under the tumulus or from tumulus debris. Furthermore, most of the samples are from unidentified wood species (Boaventura 2009: 355; Soares 1999) and old wood effects have to be taken into consideration. The results produced from human bones in the last decade (e.g. Boaventura 2009; Cruz *et al.* 2003; Figueiredo 2006) correct this picture and indicate a later start of megaliths for the West Iberian Peninsula. Today, altogether 75 results from human bones are available. These bone results are densely grouped, primarily in the 4th millennium BC from the second quarter of the 4th millennium onwards.

It becomes obvious that the results gained from charcoal samples begin ~3800y earlier than the first results from human bones and that 60 of the known 213 results from charcoal samples are grouped within this time interval (Figure 10.10). This discrepancy maintains the hypothesis that the early results from charcoal are termini post quos values and in no relation to the construction and the use of the megaliths. Furthermore, it must be mentioned that the duration of the results from charcoal samples is 8657-9028y (95.4%; 8687-8867y, 68.2%) and so ~3.5 times longer than the duration of the measurements from human bones of 2312–2567y (95.4%; 2392–2499y, 68.2%) and that the latter can be fixed to the time when burial activites were performed at the graves. This evidence further shows that many of the dates gained from charcoal samples are associated to pre-megalithic activities.

Nethertheless, a possible early phase for the northern part of the Western Iberian Peninsula is still discussed by different authors (e.g. Armbruester 2010; Cruz 2001; Cruz *et al.* 2003; Senna-Martinez /Ventura 2008).

Radiocarbon results from human bones in megalithic contexts

Compared to the northern regions of the West Iberian Peninsula, radiocarbon dates from human bones are available for the Algarve, the Estremadura, and for some tombs of the Alentejo, most of them recently produced within the last decade (Boaventura 2009; 2011; Cruz *et al.* 2003; Figueiredo 2006). Prior to the project of Rui Boaventura, e.g. (2009), there were no results for human bones available from the Lissabon region. The recent results give us a completely new understanding of the previous unsure absolute chronology based on charcoal samples, which rather reflect a persistance in the usage of the same sites for millenniums than the construction of the megalithic graves.

There are altogether 75 radiocarbon results available from human bones. Three of these data were too recent to and not considered further (Beta-196092, 1720±40 BP; Beta-234137, 890±40 BP; Beta-228581, 270±40 BP). From 53 of them, further stabile ^{13}C isotope values are at our disposal which show values between -26,10‰ and -19,00 ‰ . We can exclude a reservoir effect on the results so far, since according to the values, marine resources did not represent an important part of the diet within the megalithic societies on the West Iberian Peninsula.

One of these bone results is measured to the 1st quarter of the 4th millennium, 22 results lie within the time interval between the 2nd and the 4th quarter of the

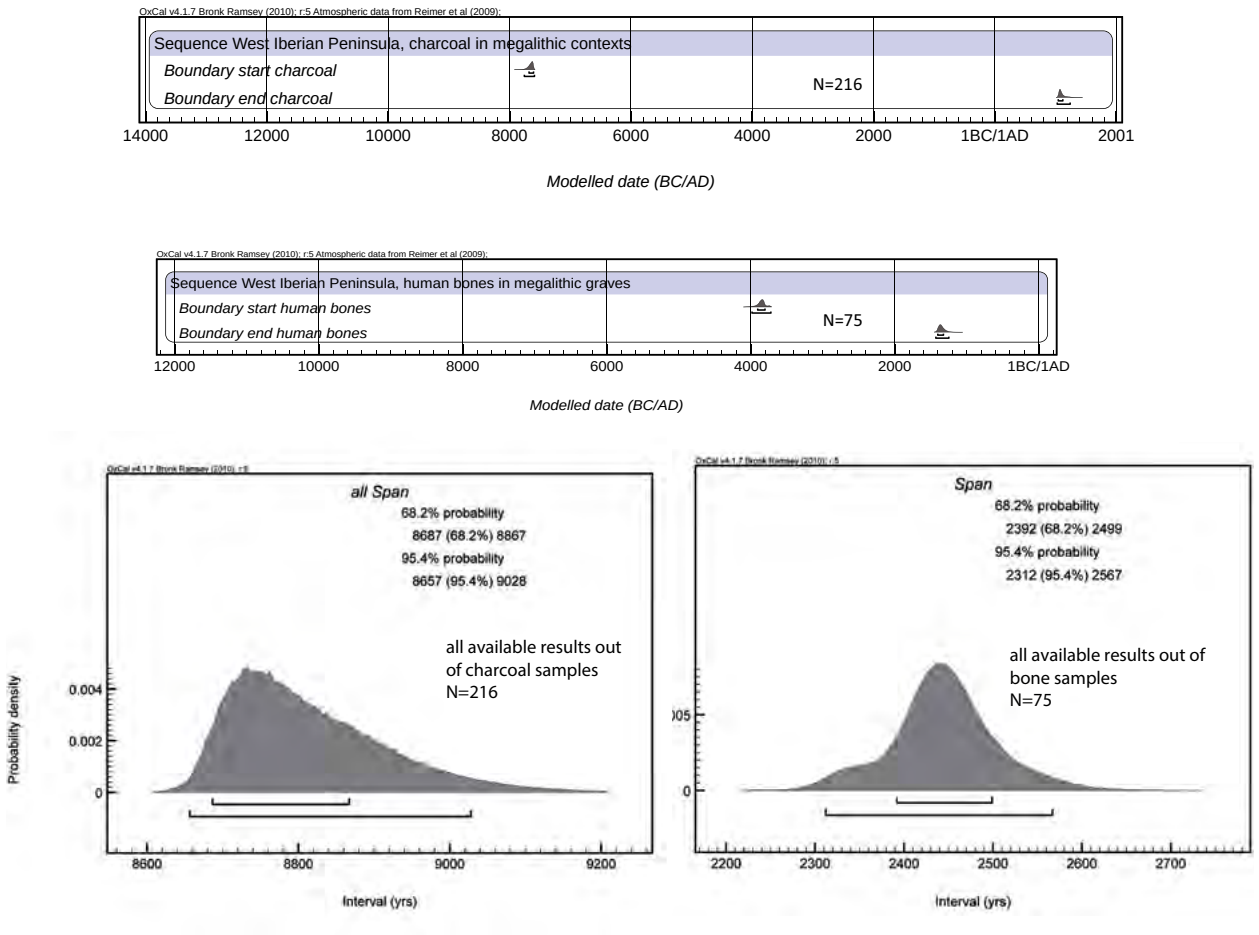


Figure 10.10 Time interval and span for the results gained from charcoal samples compared to the results gained from human bones from megalithic grave contexts on the West Iberian Peninsula. The measurements for the charcoal samples start ~3800y earlier than the results for human bones. Furthermore, the span for charcoal samples is ~3.5 times longer than the span for the human bone samples. 60 of the 213 available radiocarbon results from charcoal samples precede the first radiocarbon dates from human bones

4th millennium BC. With 46 results the majority of these radiocarbon results are associated to the 3rd millennium BC, placing the main megalithic burial period in that phase. Only a few singular bone results show a late use of the graves in the 2nd millennium BC.

The earliest and the only the human bones measured to the 1st quarter of the 4th millennium BC originate from the Dolmen de Areita 1 in São João da Pesqueira in the Beira interior in Northern Portugal. The Dolmen de Areita 1 is an elaborated passage grave with paintings, a round or polygonal chamber with seven side stones, one large capstone, and a length of about 8,20m (Figure 10.14). There are two available measurements from human bones which originate from the basement of the chamber. One of them is calculated to ~3960 cal BC (3976–3795 cal BC, 68.3%; 4037–3712 cal BC, 95.4%), the second to ~3660 cal BC (3696–3532 cal BC, 68.2%; 3766–3384 cal BC, 95.4%).

Since there is a gap of ~300y between these measurements and the older result is rather isolated compared to the remaining following 76 radiocarbon dates from human bones from the West Iberian Peninsula megalithic contexts with a hiatus of ~400y we also have to take the deposition of secondary burials into consideration. The individuals or at least a part of them decomposed somewhere else, as is also discussed for other graves in the region (Rocha 2005) and for Northwestern France, Schleswig-Holstein and Irelalnd (cf. 3. 6, 11.1, 11.2). The result would therefore represent a terminus post quem value and not the construction of the grave.

There are only a few more available dates from human bones from the same region due to the already mentioned poor preservation conditions in the north part of the working area. Altogether eight radiocarbon results from human bones from four sites are at our disposal. These dates extend from 3767 to 1912 cal BC (95.4%; 3696–1968 cal BC, 68.2%) if we subtract the result from Areite 1 which is discussed as a terminus post quem value (GrA-18518, 5170±60BP, 4038–806 cal BC, 68.3%; 4146–3781 cal BC, 95.4%). Nethertheless, five of the eight results from human bones are measured to the first half of the 4th millennium.

The next following earliest results from human bones after the early date from Areite 1 (GrA-18518, 5170±60BP, 4038–3806 cal BC, 68.3%; 4146–3781 cal BC, 95.4%) are documented for the southern regions, particularly from the Alentejo. Five femuri of different individuals in the chambers of the graves Cabeceira 4 and Sobreira 1 and from the chamber of the Anta do Carascal in the region of Lissabon (Boaventura 2009, Table 22, 24; Rocha 2005: 93) were recovered with measurements clustered in a close time intervall in the 36th and 35th century cal BC. All three graves are passage graves with a small chamber and a short corridor. From Cabeceira 4, two human bone results are available from a time interval 3641–3379 cal BC (95.4%; 3637–3520 cal BC) with the earlier result at ~3520 cal BC (Beta-196094, 4780±40BP; 3637–3526 cal BC, 68.2%; 3648–3382 cal BC, 95.4%). From Sobreira 1, one result is available for ~3510 cal BC (Beta-233283, 4770 ±70 BP; 3636–3523 cal BC; 68.2%; 3644-3381, 95.4%) and from Carascal two radiocarbon dates are available which range from 3644–3351 cal BC (95.4%; 3636–3363 cal BC, 68.2%) with an earlier result at ~3510 cal BC (Beta-196094, 4780±40 BP; 3636–3523 cal BC, 68.2%; 3644–3381 cal BC, 95.4%).

From the most of the megalithic sites on the Western Iberian Peninsula with radiocarbon results, one or two dates are available. Only a few grave projects provide sequences with human bones such as Santa Margarida 3, Rego da Murca, and Cabeço de Arruda.

The Anta de Santa Margarida 3 in the region of Reguengos de Monsaraz in the Alentejo is a passage grave with a polygonal or round chamber and a remaining tumulus (Gonçalvez 2003; Leisner/Leisner 1951: 251). From the chamber, altogether nine radiocarbon results from human bones are available. Three of these samples orginiate from different craniums, one from a phalanx, one from the tibia and one from the patella. Five of these individuals died in the first half of the 3rd millennium cal BC and their results hint to a time interval of 3012–2495 cal BC (95.4%; 2921–2578 cal BC, 68,2%) with the earliest result from ~2900 cal BC (2921–2882 cal BC, 68.2%; 3012–2779 cal BC, 95.4%). A second time intervall with the deposition of four bodies in the second half of the 3rd millennium cal BC is determined to 2344–2021 cal BC (95.4%; 2283–2061 cal BC, 68.2%).

In the Tejo valley in the Estremadura, the megalithic complex Rego da Murca is documented with three megalithic graves and several standing stones. From the Antas Rego da Murca 1 and 2, sequences from human bones have been produced (Figueiredo 2006, 2010) with altogether six radiocarbon results for the Anta Rego da Murca 1 and three for the Anta Rego da Murca 2. Both are passage graves with a polygonal or round chamber. The bones of Anta Rego da Murcia 1 hint to a time interval of 3359–2905 cal BC (95.4%, 3239–3099 cal BC, 68.2%) with the earliest result at ~3000 cal BC (3021–2919 cal BC, 68.2; 3092–2905 cal BC, 95.4%) and a subsequent burial in the first quarter of the 2nd millennium cal BC. The results from grave 2 are positioned a little later within the time interval between 3022–2779 cal BC (95.4%; 2927–2491 cal BC, 68.2%).

Finally, Cabeço de Arruda 2 is a tholos in the Estremadura with three results from different human femuri. The oldest measured individual died at ~3370 cal BC (3623–3362 cal BC, 68.2%; 3643–3106 cal BC, 95.4%) and the calibrated results extend from 3643–2579 cal BC (95.4%; 3623–2696 cal BC, 68.2%).

From the most southern part of the Algarve, altogether three results from human bones are available from Castro Marim and Pedra Escorregadia (Boaventura 2009, Annex 3; Gomes *et al.* 1994). The probability of these radiocarbon dates extends from 3491–1954 cal BC (95.4%; 3356–2058 cal BC, 68.2%), but there are too few dates to closely define the beginning of the megaliths in the Algarve.

All available radiocarbon dates from megalithic contexts and the regional sequences

Larger sequences with radiocarbon dates from the West Iberian Peninsula are rare. The significance of the few available dates is limited since there are nearby only termini post quem values involved, for example from the Dolmen de Dombate in Galicia (see below in this chapter).

In a recent approach, Rui Boaventura (2009; 2011) could establish regional sequences for the West Iberian Peninsula based on new radiocarbon measurements, the re-evaluation of the context of the available radiocarbon results, a Bayesian statistical framwork and especially for the south and the central south areas on the association of the results to the diagnostic archaeological material with typo-chronological classifications. We will follow Boaventuras approach and present within this chapter the summarized main results, but will limit the models to the megalithic graves and exclude contemporaneous grave forms with similar grave goods.

The Southern Regions

The phases in the regional Bayesian models proposed by Boaventura (2009, 2011) connect the radiocarbon results with the presence and absence of specific - and for the chronology diagnostic - artifacts in the graves. The primarily considered artifacts are idol-plaques (plato de xisto) made from slate, schist or sandstone which are common in the Alentejo, but also present in the Estremadura, the Algarve, and in the Spanish Huelva as well (Gonçalves 2006; Lillios 2002; 2003; 2004; 2008)

(Figure 10.20). The proposed phases for the regional models of the southern regions are hereby (Boaventura 2011: 167):

1. the pre-idol-plaque phase with results from megalithic graves with sets limited to early artifacts, like geometric microliths, thin blades, ground stone tools, and plain ceramic vessels. Absent artifacts include arrowheads, idol-plaques or similar artifacts, thick and retouched blades, halberds, and ovoid blades.
2. the first idol-plaque phase with the first idol-plaques and partial geometric microliths, thin and non- or slightly retouched blades, and ground stone tools. Absent are little ceramic vessels.
3. the second idol-plaque phase with idol-plaques, arrowheads (first with a protuberant and later with a concave base), thick and abundantly retouched blades, ground stone tools, and many ceramic vessels.
4. the third post-idol-plaque phase. This phase is, until now, primarily present in the Estremadura with evidence of limestone votive artifacts and no or reused idol-plaques.

For the Estremadura, the start of the pre-idol-plaque phase and the beginning of megaliths are calculated to ~3610 cal BC (3658–3432 cal BC, 68.2%; 3844–3383 cal BC, 95.4%) with Carrascal, Pedras Grandes and Trigache 4 in the region of Lisbon as the earliest megalithic graves. All three graves are built with a polygonal or a round chamber and a short corridor. The available measurements are calibrated between the end of the 2nd and the fourth quarter of the 4th millennium cal BC. These graves contained only a few individuals and the early results are maintained by material such as geometric microliths, blades, and ground stone tools. Here, the earliest result is from the grave Carrascal dating within the time interval 3637–3376 cal BC (95.4%; 3573–3380 cal BC, 68.2%).

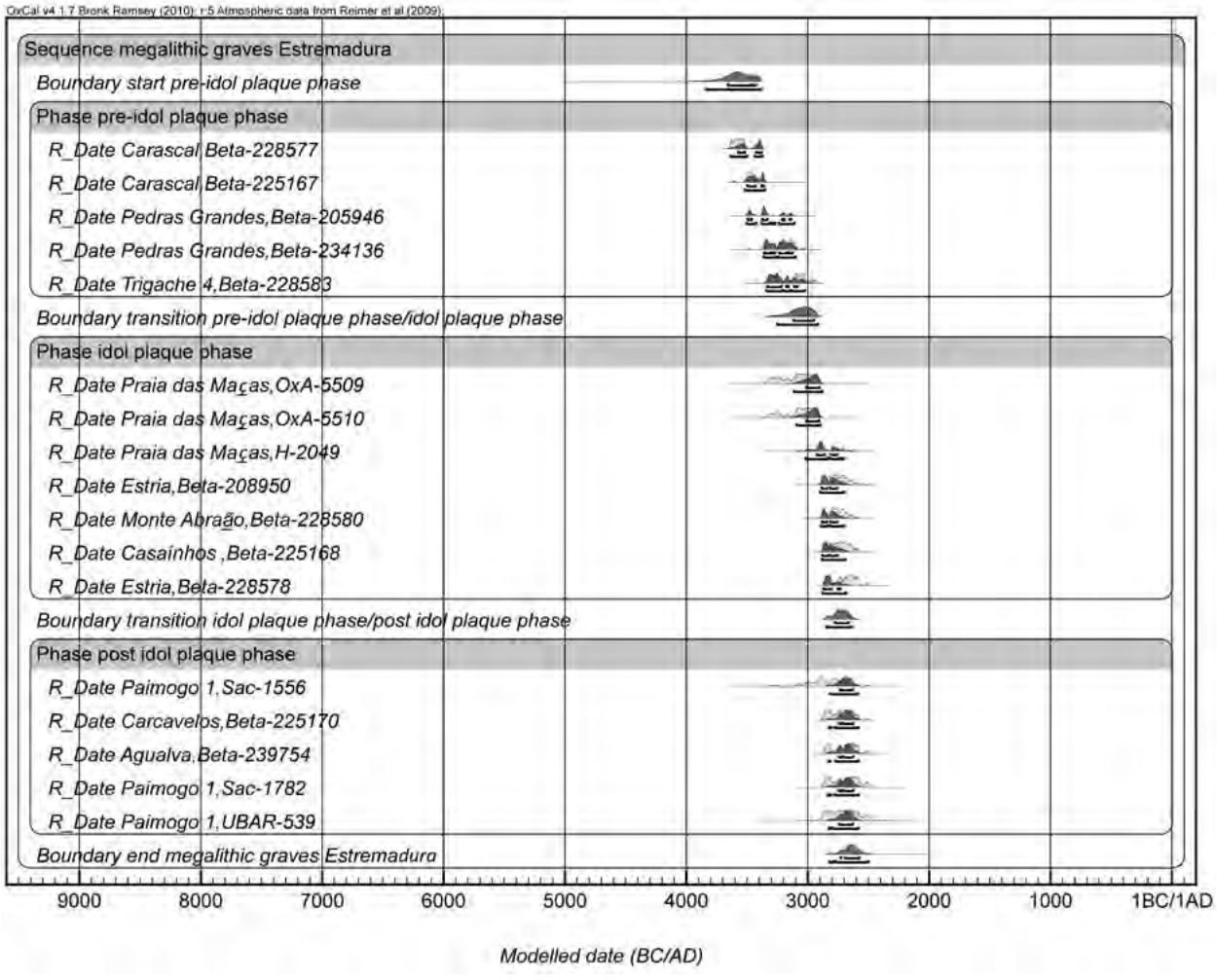


Figure 10.11 Probability of radiocarbon dates from megalithic contexts in the Estremandura with associated diagnostic material. Model structure and phases (defined according to the approach of Boaventura 2009, 2010).
Model agreement: A_{model}=110.4, $A_{overall}$=110.5

The transition to the idol-plaque phase with dates from Monte Abraão, Estria, Casaínhos, and the tholos Praia das Maçãs is calculated to 3250–2917 cal BC (95.4%; 3116–2951 cal BC, 68.2%), whereas the transition to the post-idol-plaque phase is finally registered with dates from Paimogo 1, Carcavelo, and Agualva to 2846–2636 cal BC (95.4%; 2774–2664 cal BC, 68.2%).

For the regional model of the Alentejo, similar results are available. Two radiocarbon dates from Vale de Rodrigo 2 and 3 present sure TPQ-values: (Ua-10830, 4905±70BP, 3785–3712 cal BC, 68.2%; 3911–3696 cal BC, 95.4%). These values are gained from charcoal samples originating from one settlement layer under the grave Vale de Rodrigo 2 (Larsson 2000), and from a layer under the tumulus of Vale de Rodrigo 3 (KIA-31381, 4996±29BP; 3784–3697 cal BC, 68.2%; 3913–3640 cal BC, 95.4%) (Armbruester 2007) near Valverde, Evora. The pre-idol-plaque phase and thus the beginning of the accessible megaliths in the Alentejo started at ~3620 cal BC within the time interval 3746–3516 cal BC (95.4%; 3671–3566 cal BC, 68.2%), the radiocarbon dates from the contexts of Cabeceira 4, Cabeço da Areia Sobreira 1, Rabuje 5, and Santa Margarida 2 are involved to determine this first phase with accessible megaliths.

The transition to the idol-plaque phase is calculated to ~2990 cal BC (2986–2902 cal BC, 68.2%; 3089–2892 cal BC, 95.4%) with results from Estanque, Bola da Cera, Santa Margarida 2, and Olival da Pega 2b. The post-idol-plaque phase is finally represented by one date from subsequent use and a burial in the entrance area of Vale de Rodrigo 2 (Ua-10831, 3905±75BP; 2574–2340 cal BC, 68.2%; 2842–2205 cal BC, 95.4%) (Larsson 2000). Therefore, the calculated interval for the transition is too large, rendering a limited significance

The idol-plaque phases in the southern regions begin accordingly in the Estremadura at ~3000 cal BC and nearly contemporaneous in the Alentejo at ~2990 cal BC with a short duration of ~200y and these phases also end nearly contemporaneous in both subregions.

Tholoi in South-Central Portugal

A small number of radiocarbon dates are available from a few tholoi in South-Central Portugal. The emergence of the tholoi is calculated to ~3390 cal BC (3517–3136 cal BC, 68.2%; 3668–3103 cal BC, 95.4%). The earliest result stems from a human bone from Cabeço da Arruda 2. This individual died within the time interval 3540–3027 cal BC (95.4%; 3437–3102 cal BC, 68.1%; Sac-1613, 4700±80 BP). The remaining radiocarbon dates from the tholoi show the main use of this kind of grave during the first half of the 3rd millennium BC and their continuous use throughout the second half of the 3rd millennium cal BC.

From the most southern region, the Algarve, the already discussed (cf.10.4.1) human bone results from Castro Marim and Pedra Escorregadia are available (Gomes *et al.* 1994; Boaventura 2009, Annex 3), which indicate a time interval of 3491–1954 cal BC (95.4%; 3356–2058 cal BC, 68.2%). The emergence of megaliths there remains unclear.

The Northern Regions

More to the north in Beira, Northern Portugal, and Galicia, the radiocarbon results suggest an earlier outset of the megaliths, but not as early as postulated in the research literature of the last decades. The northern part of the West Iberian Peninsula is a region which is traditionally considered and often cited as one of the core regions for the emergence of European megaliths. The emergence of the passage graves was defined here to the 5th or even the 6th millennium cal BC (e.g. Armbruester 2010; Castro Martínez *et al.* 1996; Jorge 1989; Müller 1998; 1999; Scarre *et al.* 2003: 85).

This early determination of the megaliths in the northern regions is, as already discussed (10.4), exclusively based on termolumniscence datings and radiocarbon results gained from charcoal samples from typical terminus post quem situations, like 1) samples originating from layers under the tumulus of the graves 2) from the debris of the tumulus material 3) from hearths or fire activites within the tumulus or the grave with no clear association to the funeral activities (Boaventura 2009: 355; Cruz 1995; Cruz 2001; Cruz *et al.* 2003). The terminus post quem phase in the regional model for Beira and for the radiocarbon results with sure contexts is calculated to 8577–3797 cal BC (95.4%; 8027–3809 cal BC, 68.2), including the pre-megalithic layers and results from the material of the tumuli from the graves Orquinha dos Juncais, Casinha Derribada, Orca de Merouços, Antela do Pau 2, Lameira da Cima 2, Orcas dos Padroes, Areita 1, Antelas, Carapito 1, and Senhora do Monte.

The start of the construction and use of the graves is calculated to ~3820 cal BC (3837–3796 cal BC, 68.2%; 3883–3782 cal BC, 95.4%). Involved are results from the megalithic grave phases of Orca da Seixas, Orcas de Castenaires, Orca da Penela 1, Lameira da Cima 2, Orca de Merouços, Picoto do Vasco, Areita 1, Carapito 1, and Vale de Cerva. This phase extends from 2889 to 2736 cal BC (95.4%; 2872–2807 cal BC; 68.2).

Dolmen Areita 1

The dolmen Areita 1 at São João da Pesqueira in the Beira interior is an elaborated passage grave with paintings, a round or polygonal chamber with seven side stones, one large capstone and an overall length of about 8,20m. In the research literature, Areita 1 is

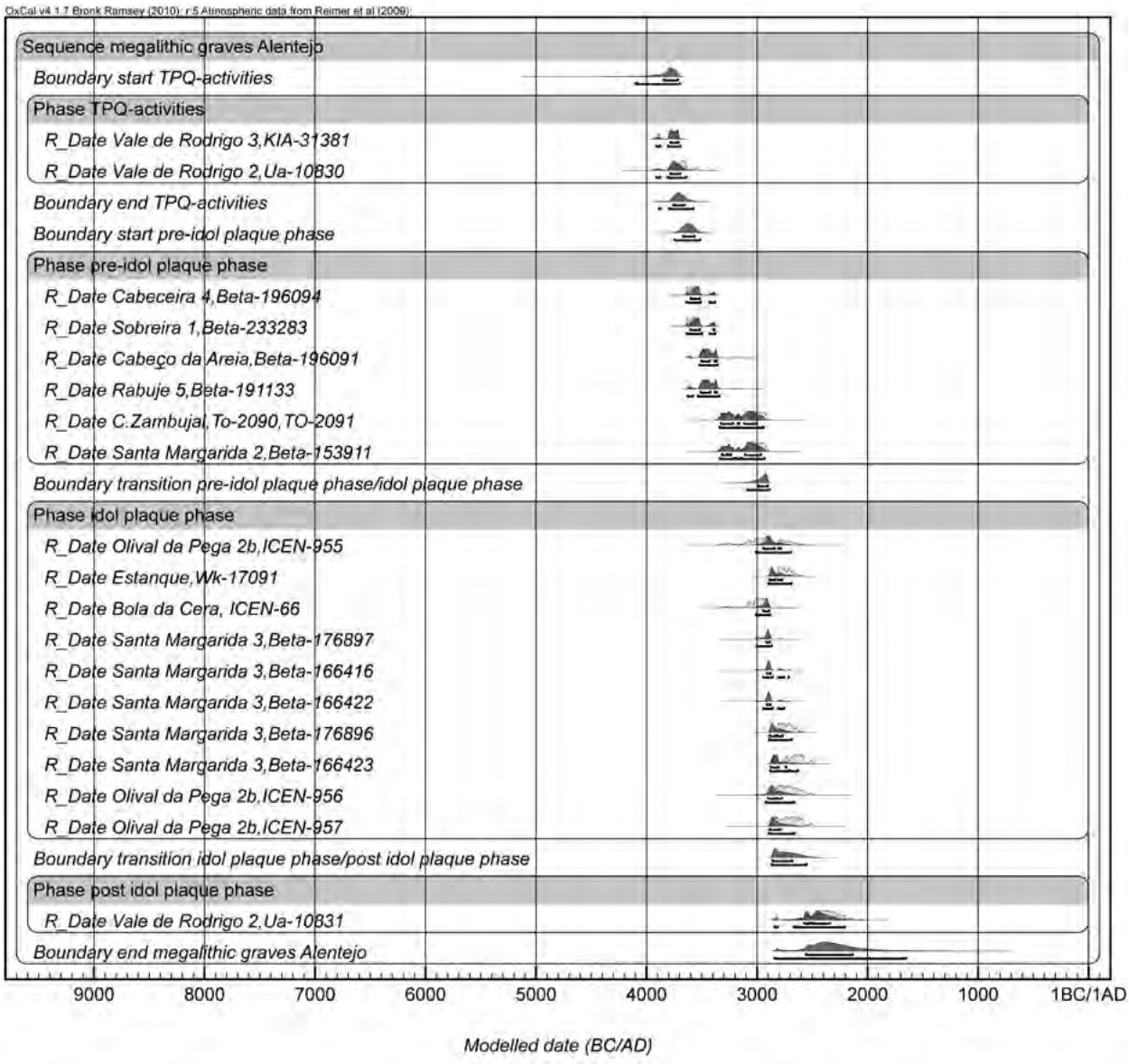


Figure 10.12 Probability of dates from megalithic contexts from the Alentejo according to the diagnostic archaeological material. Defined phases and model structure (after Boaventura 2009). Model agreement: A_{model}=113.8, $A_{overall}$=113.5

defined as one of the earliest megalithic graves in the region on the basis of four radiocarbon results gained from charcoal (10.14, 10.15). The results determine the construction of the graves in the second third of the 5th millennium BC (e.g. Armbruester 2010; Cruz *et al.* 2003; Gomes *et al.* 1998; Senna-Martínez/Ventura 2008). According to the two available results from human bones which have already been shortly discussed (cf. 10.4.1), the whole sequence and the hiatus between the results from charcoal samples and human bones are presented within this chapter.

The obvious discrepancy of ~700y between the results from samples of charcoal from the species Pinus pinaster and Pinus pinea-pinaster found in the chamber and the radiocarbon dates measured from human bones is an indicator for a possible old wood effect. The charcoal and terminus post-quem phase lasts from 5310–4112 cal BC (95.4%; 4992–4307 cal BC, 68.2%). There are two available measurements from human bones which originate from the basement of the chamber. One of them is calculated to ~3960 cal BC (4038–3806 cal BC, 68.3%; 4146–3781 cal BC, 95.4%), the second one to ~3660 cal BC (3709–3536 cal BC, 68.2%; 3793–3518 cal BC, 95.4%). The earlier result seems to represent a terminus post quem value (cf. 10.4.1). From the chamber, geometric microliths made from silex, beads made from schist, flint blades, and ceramics axes made from variscite, fluorite and silimanite are documented (10.14).

In the most northern part of the West Iberian Peninsula in the Spanish region of Galicia, altogether 52 radiocarbon results from megalithic contexts are available. All of them are gained from charcoal samples,

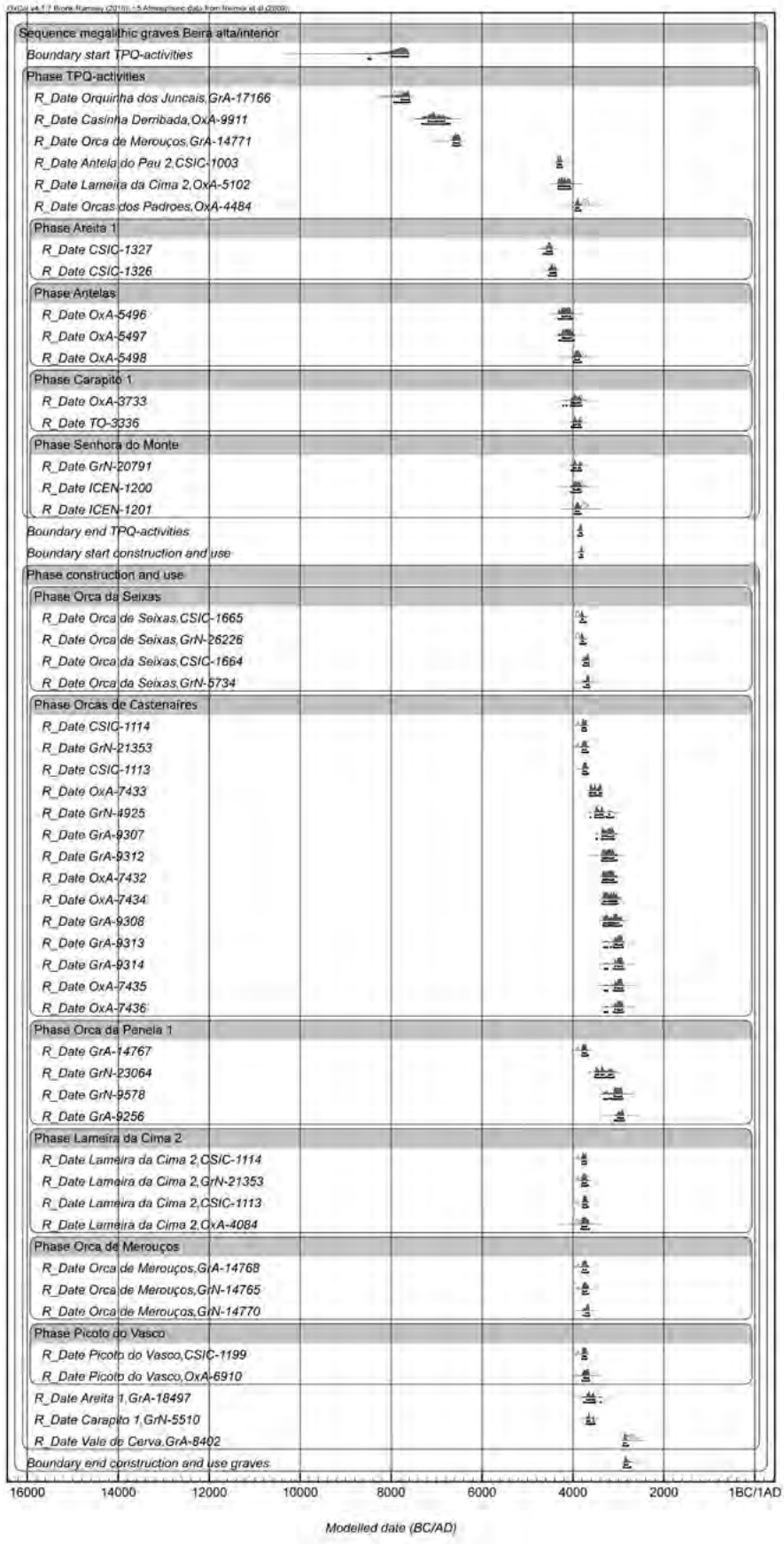


Figure 10.13 Probability of all dates from megaliths in Beira with clear contexts.Model agreement: A_{model}=104.1, $A_{overall}$=104.3. The TPQ-values originate from contexts such as the ancient soil and layers under the tumuli or the debris of the tumuli. The phase of construc-tion and use is defined according to samples originating from the chambers. The model is established following Boaventuras approach (2009)



Figure 10.14a Dolmen de Areita. The grave from the front and geometric microlites (Museu Eduardo Tavares, S. João da Pesqueira). With the kind permission of Artur Oliveira, Cultural Heritage, Municipality of S. João da Pesqueira



Figure 10.14b Dolmen de Areita. Beads of schist, variscite and fluorite (Museu Eduardo Tavares, S. João da Pesqueira) and planum dolmen de Areite. With the kind permission of Artur Oliveira, Cultural Heritage, Municipality of S. João da Pesqueira.

the most of them originating from typical terminus post quem values stemming from layers under the tumulus, from the surface of the ancient soil and from the debris of the tumulus. From most of the sites, single or double results are availalble.

Dolmen de Dombate

From the dolmen Dombate by Borneira, a sequence of altogether 16 radiocarbon results has been produced for Galicia (Alonso Matthíás /Bello Diéguez 1995; Bello Diéguez 1995; Fábregas Válcarce/Vilaseco Vázquez 2003, Figure 1, 293). Dombate is a simple dolmen with difficult access through the top of the covering earthern tumulus (Figure 10.16). The Dombate sequence demonstrates impressively how difficult it is to date megaliths in the region according to charcoal (Figure 10.17). Solely four of the 16 results are - with respect to their context - certainly connected to the construction or the burial activites. The remaining 21 samples originate from the surface of the ancient soil or from the debris of the tumulus. It is not possible to determine whether the results from the tumulus represent termini post quos activities and were mixed up by the building activities, or if they are connected to the construction or the use of the graves, as CSIC-948, 4200±30BP and CSIC-1066, 4090±60BP. There are two possibilities given: either construction or use began between 3339–3027 cal BC (95.4%; 3328–3093 cal BC, 68.1%) or as late as 3060–2924 cal BC (95.4%; 3020–2944 cal BC, 68.2%).

The Colour Sequence

For the Galician megalithic graves, one sequence has been produced from the charcoal of black paintings inside the grave chambers (Bueno Ramírez 2007: 637-640, Carrera Ramírez 2011, 482; Steelman *et al.* 2005). 10 of these 'colour results' are available for altogether eight

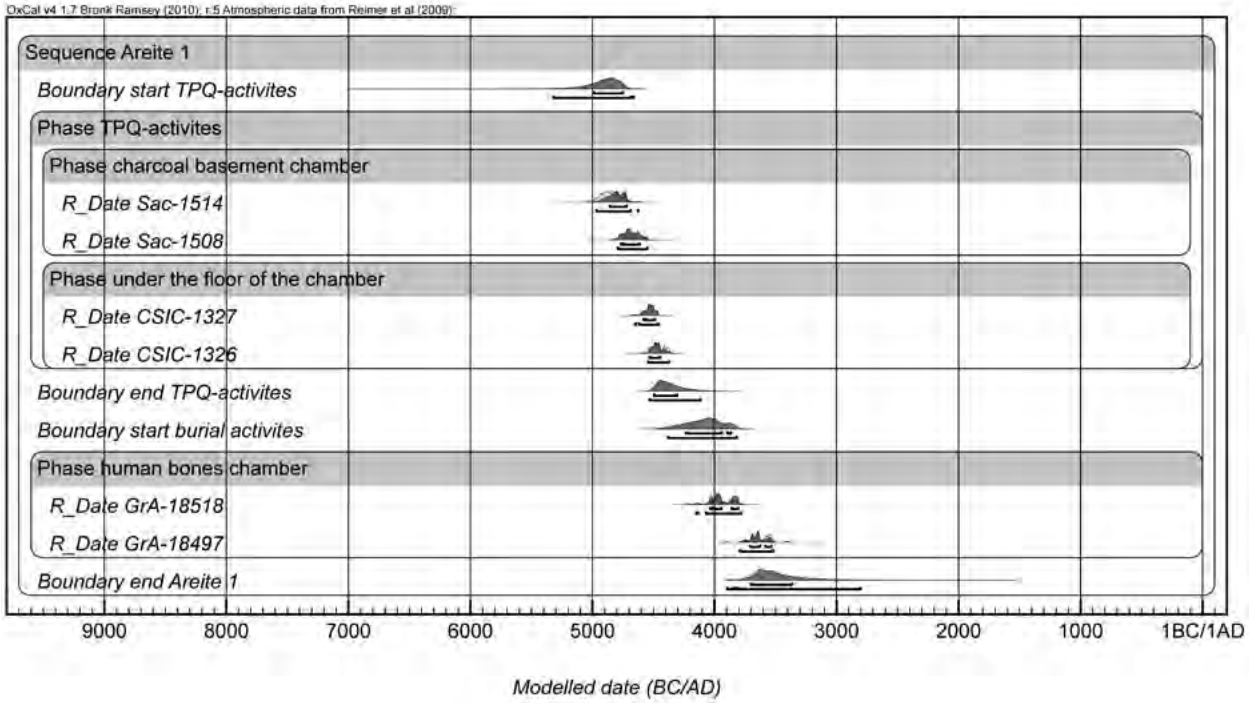


Figure 10.15 Probability of dates from Areite 1/ S. João da Pesqueira in the Beira interior. Model agreement: A_{model}=90.4, $A_{overall}$=90.1

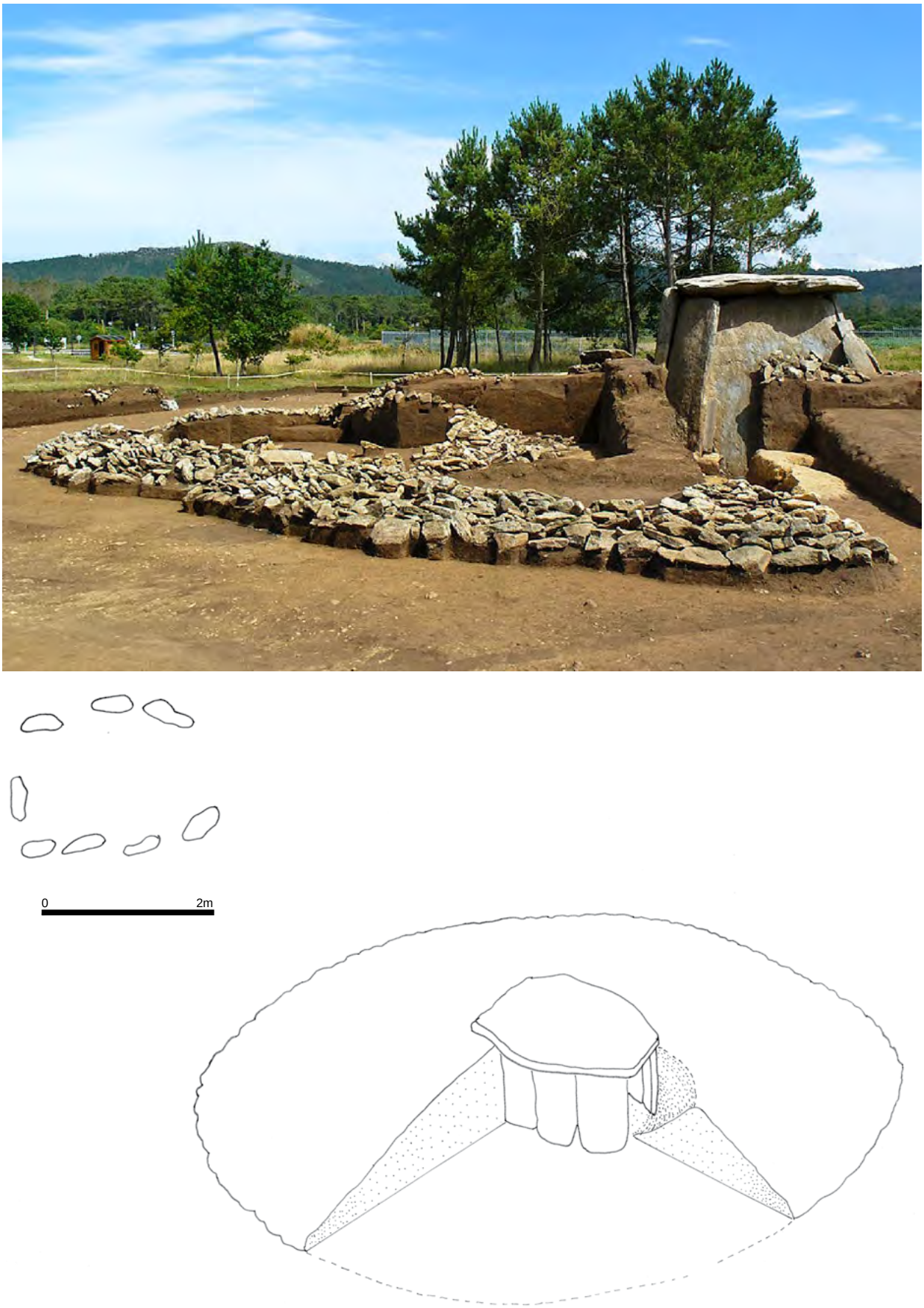


Figure 10.16 Dolmen de Dombate. Above, photo courtesy Lanbricae - CC-by-sa /Wikimedia Commons, Below (after Fábregas Válcarce/Vilaseco Vázquez 2003, Figure 3)

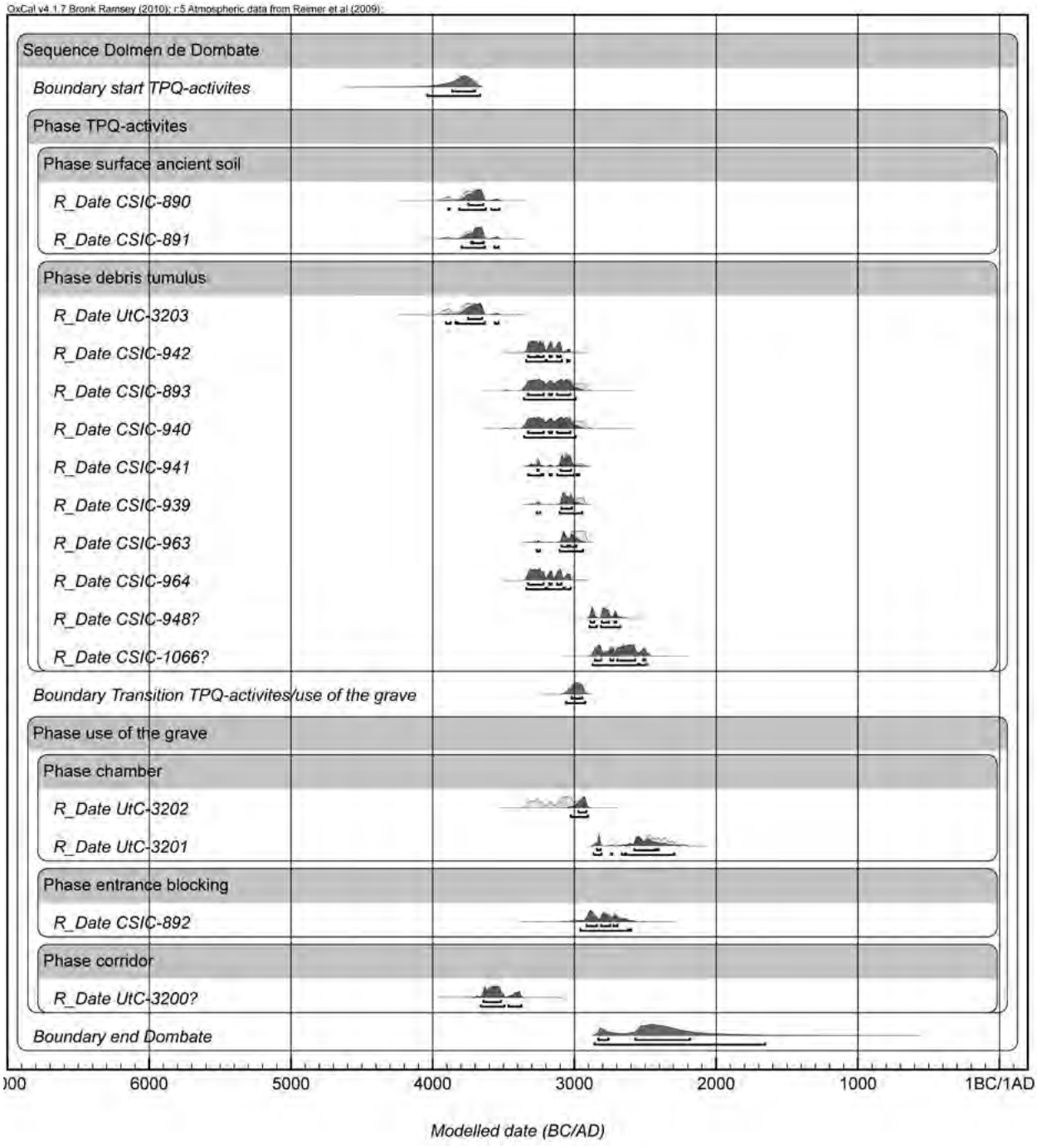


Figure 10.17 Probability of dates from the dolmen de Dombate. Model agreement: A_{model}=98.8, $A_{overall}$=99.6

passage graves (Dolmen de Antelas, Pedra Moura, Casota do Páramo, Pedra Cuberta, Mámoa do Monte dos Marxos, Fomo dos Mouros, Anta de Serramo, Coto dos Mouros) (Figure 10.18, 10.19). Unfortunately, this sequence does not closely define the beginning of the megaliths. Interestingly, one of the results from the grave Coto dos Mouros is rather early (CAMS-83116; 6050±110BP, 5202–4799 cal BC, 68.2%; 5291–4711 cal BC, 95.4%) and is possibly the result of painting with 'old' charcoal. A second result from the same chamber is considerably younger (CAMS-83631; 3830±60BP, 2436–2154 cal BC, 68.3%; 2470–2064 cal BC, 95.4%). The problem with the remaining results is that it is neither possible to define the wood species, although we must take an old-wood effect into consideration since larger charcoal pieces are more suitable for the production of black colour and for painting, nor do we know where the used charcoal stems from: either produced on site for the painting act, or collected from the site or somewhere externally.

Nevertheless, the colour sequence starts between 4505–4237 cal BC (95.4%; 4448–4331 cal BC, 68.2%) and ends between 2471–1461 cal BC (95.4%; 2420–2023 cal BC, 68.2%).

However, the fact that the majority of these dates (60%) are concentrated within the first half of the 4th millennium cal BC is an indicator for the outset of passage graves in this region, since this time interval is highly congruent with the results of the models for the Alentejo, Estremadura, and Beira regions and the beginning of the megalithic graves in the first half of the 4th millennium BC.

Dating the megaliths on the basis of the artifacts

Non-accessible structures, such as rectangular or round dolmens, are documented from the whole working area. Unfortunately, there are no radiocarbon results available for these structures and their chronological association remains, for the most part, vague. Nevertheless, the recovered grave goods

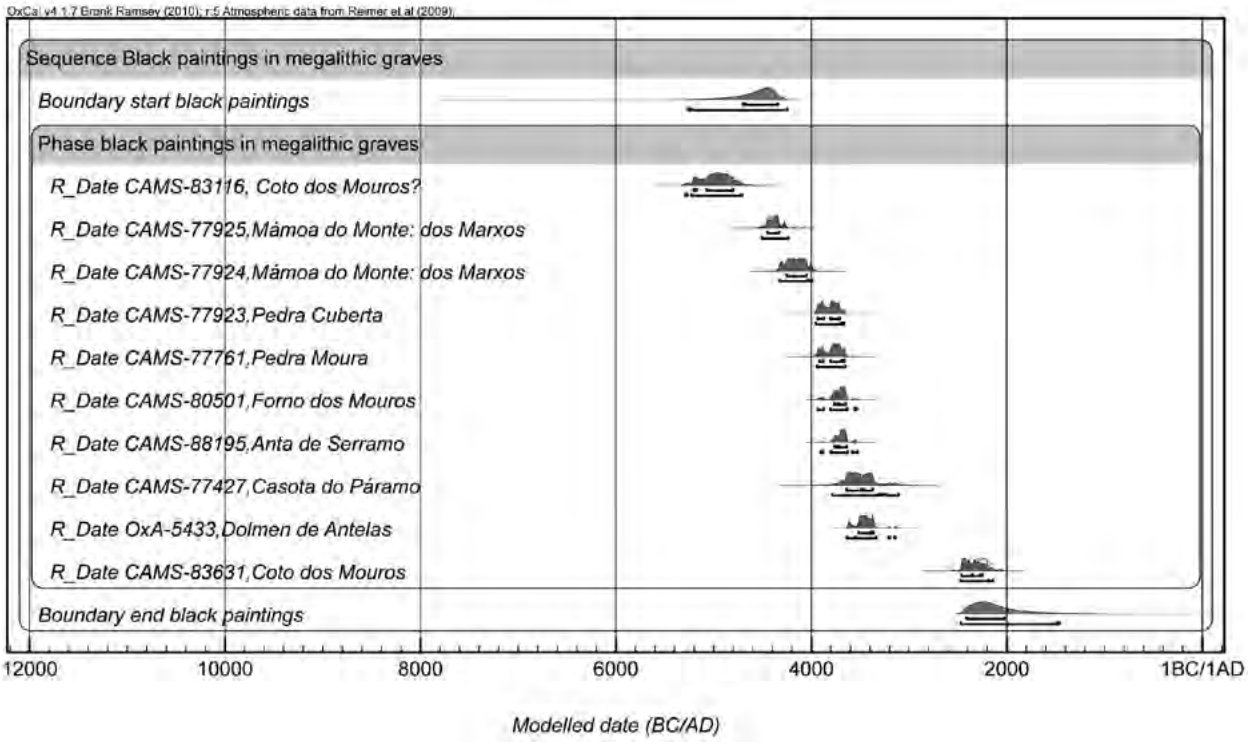


Figure 10.18 The 'black colour sequence' from Galician megalithic graves. Modell Agreement: A_{model}=97.8, $A_{overall}$=97.7

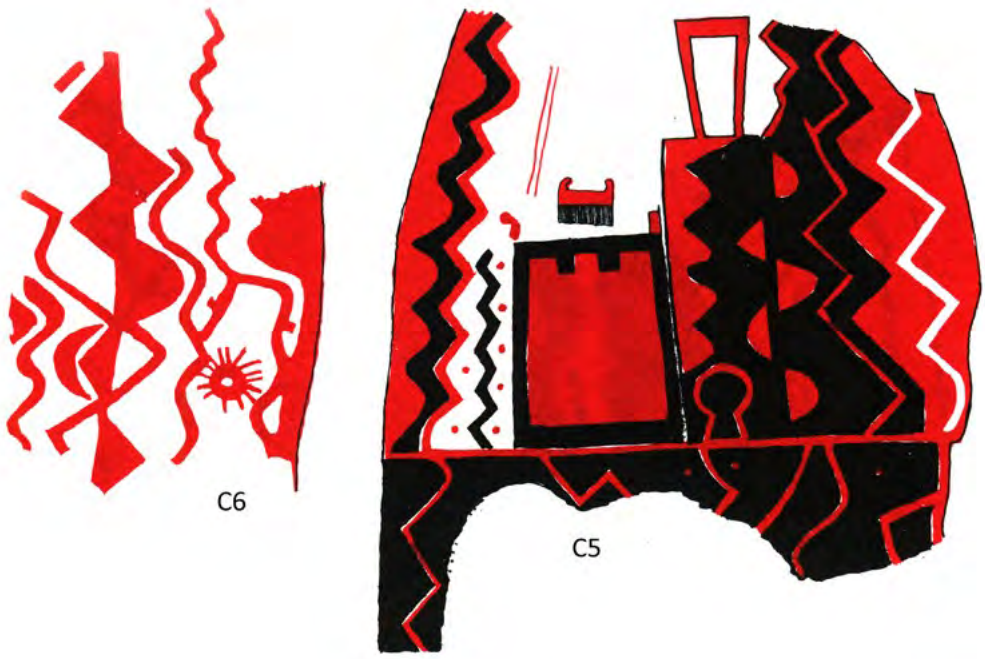


Figure 10.19 Black and red paintings on the side stones C6 and C5 in the Dolmen de Antelas, Viseu (Shee Twohig 1981, Figure 38)

indicate the earliest megalithic stages on the West Iberian Peninsula (cf. 10.3). Accordingly, within the necropolises in the mountains of Mochique non-accessible dolmens are documented at Palmeira, Buço Preto, Eira Cavada, and Mirante da Mata with rectangular chambers which are inserted into stone tumuli (Leisner/Leisner 1959: 263–272, Taf. 46; Soares/Tavares da Silva 2000) (cf. 10.3). The material in these graves is associated to the Late Neolithic and consists of geometric microliths, polished and unpolished axes, up to 1223 big and small disk-formed schiffer pearls (e.g. in Palmeira 2), small ceramic vessels, and double conical, zylindrical or olive-formed beads made from variscite and serpetinite green stone. The more elaborated structures in these necropolises contained Copper Age material, which supports the archictectonical sequence.

The artifact assemblages for the accessible megaliths are rather homogenous for the whole working area. For the first megalithic stages with accessible structures, geometric microliths, undecorated pottery, and polished axes are documented from the very south extending to Galicia (Kalb 1981; Jorge 1985, 389; Rocha 2005: 79; Scarre *et al.* 2003: 80) and are associated with similar grave forms, such as simple most polygonal or round dolmens, simple passage graves with polygonal or round chambers, and a passage with a short or a long corridor. Again following Boaventuras classification of the archaeological material in the megalithic graves (Boaventura 2009; 2011), geometric microliths, thin blades, ground stone tools, and plain ceramic vessels are diagnostic for this first megalithic accessable stage in the southern regions. In this phase, arrowheads, idol-plaques or similar artifacts, thick and retouched blades, halberds, and ovoid blades are absent (cf. 10.4). Typical graves of this phase, where the material maintains the radiocarbon measurements of human bones, are the passage graves with a short passage found, for example, at Carrascal, Pedras Grandes, and Trigache 4 in the region of Lisbon or located in the northern regions at Lameira de Cima 1, the Dolmen de Areita 1, Arquinha da Moura, and Carapito 1 in Beira. The latter exhibit artifacts such as geometric microliths, thin blades, quartz, a large votive axe made from schiffer, small axes made from amphibolit or fibrolithe, and double conical, olive-formed, and round beads made from variscite or schiffer (Boaventura 2009, Figure 52, 70, 63; Cruz *et al.* 2003; Cunha Gomes 1996; Gomes *et al.* 1998; Jorge 1995; Leisner/Kalb 1998, 76–77; Leisner 1965).

Especially for the southern regions and mainly for the Alentejo, but also for the Algarve in the regions north of the Tejo and Guadiana, idol-plaques are the most diagnostic artifacts and they are documented for the more elaborated passage graves and tholoi (Lilios 2003; 2004; 2008; 2010). These engraved stone plaques

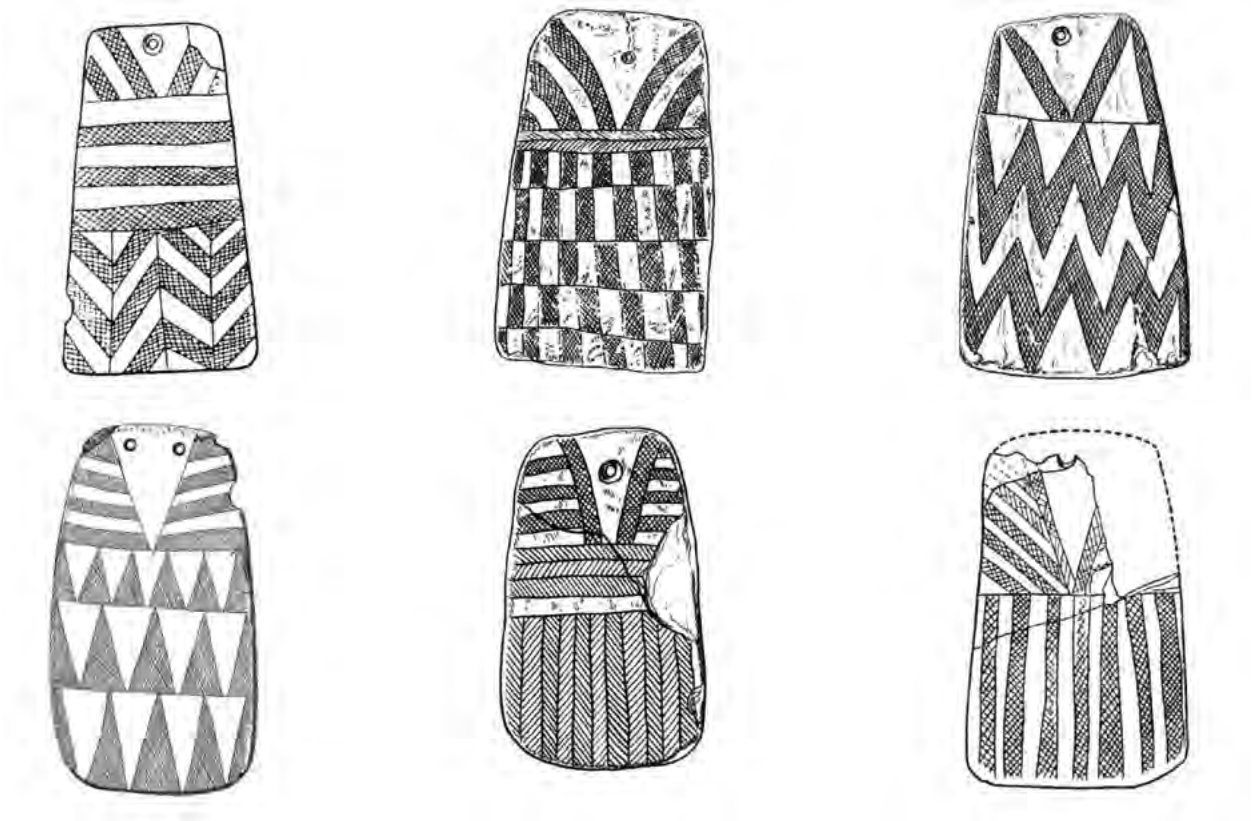


Figure 10.20 Idol plaques, Lilios classical type I (2010, Fig: 4a)

are almost entirely associated with grave contexts and since the 1800s over 1300 engraved stone plaques have been found in over 200 collective tombs in the southern regions of the West Iberian Peninsula (Lillios 2010: 49). Most of the stone plates are perforated and when they were found together with human remains, they were located in the vicinity of the torsos or the chests as in Santa Margarida 3 (Gonçalvez 2003: 90–91). In the more elaborated passage graves, for example the Anta do Zambujeiro, up to 154 plaques were recovered. They were produced as a set of standardized forms, including Classic, Transitional, Unipartite, Hoe, Strappy, Rug, Biomorph simple, and Biomorph wiskered types (Lilios 2010, Figure 3.3) (Figure 10.20). With recently implemented Bayesian approaches, it is possible to narrow down the duration of the idol-plaques to ~200y from ~3000–2800 cal BC (Boaventura 2009, 2011) (cf. 10.4).

In the early idol-plaque phase, first idol-plaques, partially geometric microliths, thin and non- or slightly retouched blades, and ground stone tools are registered in the graves. Small ceramic vessels are absent. The second idol-plaque phase is associated to idol-plaques, arrowheads (first with a protuberant and later a concave base), thick and abundantly retouched blades, ground stone tools, and many ceramic vessels (Boaventura 2011: 167).

The idol-plaque phase is subsequently connected to simple passage graves with a polygonal/round or a rectangular chamber with a short corridor as in Estria, Santa Margarida 3 and also to more elaborated passage graves with a longer corridor. Tholoi are likewise partly associated to idol-plaques, for example at Praia da Macas, Olival da Pega 2, and Vale de Rodrigo 1, where 50–60 plaques were registered together with, among others, parts of a crosier (baculos), 8–10 axes, numerous disk-formed schiffer beads and double conical and olive-formed beads made from green stone, bowls with a round base, small cups and perforated teeth (Leisner/Leisner 1959: 190, Taf. 42). In other tholoi, the idol-plaques are absent, for instance, in Alcalar 1 in the Algarve. The grave goods included arrowheads with a concave basis, an axe, and the fragment of a golden diademe (Leisner/Leisner 1959, Tafel 47).

Typical for the post idol-plaque phase are limestone votive artifacts and no or reused idol-plaques. Associated to this stage are again passages graves with a short corridor as observed at Agualva and the tholos Paimogo 1 in the Estremadura. The presence of bell beaker artifacts seems to be less prominent in megalithic graves than in other types of tombs (Boaventura 2009). The Bell Beaker ceramics are from an early international type with imprinted decorations (Salanova 2005), which could be an indication for such burials around the 3rd millennium BC.

Megalithic burial rites

The West Iberian Peninsula is, as already cited (cf. 10.2, 10. 4), a region with poor bone preservation due to a high ph-level of the soils on granite and schist grounds. Especially in the northern regions, nearly no or very few bone remains are preserved. A reconstruction of the megalithic burial rites is accordingly difficult. Nevertheless, several contexts from; the southern regions are documented with preserved human bones (Boaventura 2009; 2011; Weiss-Krejci 2005; 2011). Especially for the regions around Lisboa, bones from megalithic graves are available from recent investigations at some sites. Thus, for the southern regions anthropological records are available and an MNI has been determined from 16 dolmens and passage graves and for five tholoi (Boaventura 2009, Figure 11, 14). The burial sequence simplified presented is: single or a few individuals-few individuals-collective graves with successive burial practices- individual burials.

The first megalithic stages are generally associated to individual burials or burials with a few individuals as noted for Galica or the necropolises in the Mochique mountains in the Algarve (Leisner/Leisner 1959; Soares/Tavares da Silva 2000: 128). From these graves there is evidence of animal bones, ochre, and in some cases the use of fire. Since bone material is mostly absent, assumptions on these stages must again be undertaken by regarding the size of the chambers, the amount of the grave goods, or the location of the graves goods, for example, variscite and serpetinite beads in the chambers of the graves in the Mochique necropolises (Leisner/Leisner 1959: 264). Early simple dolmens or passage graves with polygonal chambers and a short corridor, as observed at Carrascal, Pedras Grandes, and Trigache 4 in the Lisabon area, are located in the regions with available bone material associated to a few individuals.

During the second half of the 4th and throughout the 3rd millennium cal BC, but especially in its first half, developed and elaborated megalith graves were used as collective burial sites. We do not know if they were conceived as collective graves from the very beginning. In order to determine this, we would need whole sequences with the radiocarbon results of the singular individuals in the graves.

The contexts of the bones in the megalithic graves indicate the successive deposition of bodies and the rearrangement of older bone material, later reuse of the graves, and possible secondary depositions of bones older than the monument. The anthropological records of the graves in the Lisabon region show that all ages and both sexes are buried. The MNI determined from the individuals buried in the dolmens and passage graves is between 3 (Pedra dos Mouros) and

81 (Anta de Carcavelos). In the tholoi even up to 431 individuals were constated. From the five tholoi with defined MNI, <74 individuals were buried in three graves (Boaventura 2009, Figure 11, 14). Megalithic graves with no bone material, but with the required adequate size are likewise considered to be collective graves based on the proportions and the composition of the grave goods. For example, the perforated and decorated idol-plaques in the southern regions are a possible indication of the number of individuals. Most of the stone plates are perforated and their positions in the graves are located on the torsos or on the chests of human remains. The idol-plaques in Margarida 3 (Gonçalvez 2003) indicate their function as chest amulets. Some of these plates are over 20cm long and the calculation of one individual-one plaque seems possible, but we cannot exclude that one individual is possibly associated to several plates.

The human bones in the West Iberian tombs are often disarticulated, broken, partly cut, chopped, and burned (e.g. Antunes/Cunha 1998; Figuereido 2010; Hillier *et al.* 2009; Rojo Guerra/Kunst 2002; Weiss-Krejci 2005; 2011).

The secondary deposition of individuals in the graves, where the decomposition process was fulfilled at a different location, must be taken into consideration, even if the argumentation for this is not easy (cf. 3.6.3, 12.3) (Boaventura 2009: 293; Rocha 2005). The presumption about the West Iberian graves was discussed by Leonor Rocha (2005: 269) as an explanation for chronological discrepancies between the grave architecture and the grave goods. Although small chambers are partially bone-free, there is evidence for artifacts that are older than the grave architecture, e.g., in more elaborated passage graves. In graves such as São Pedro Estoril 2, the radiocarbon results from human bones date earlier than the artifacts. This fact can be explaned by the secondary deposition of bone material, although a reservoir effect for the bone material or altered burial rites are further possibilities.

Evidence that some of the graves contained secondary burials and that they even served as ossuaries stems, for example, from the megalithic complex of Rego da Murta and from the megalithic monuments of the Alto Nabão region (Figuereido 2010). The entire skeleton material is disarticulated ao that no anatomical connections were found. In addition, sediment analyses confirm that the humus layer inside the chamber with the burial assemblage is different from the layers outside the monuments, suggesting that the whole layer was imported from somewhere else. Interesting is hereby that some of the human bones in dolmen 2 exhibit cutting marks as possible traces for the act of defleshing, similar to evidence in further sites of the working area, such as the dolmen de Carcavelos (Hilier *et al.* 2009: 260–261).

Some megalithic tombs contained burned bones in combination with a low number of bodies that may have resulted from the treatment of a fresh corpse (Weiss-Krejci 2011). Evidence for this procedure is available from the Anta Arquinha da Moura (Silva 1995: 142), where three femuri exhibit traces that the bones had been exposed to fire while still in flesh, and additionally from Rego da Murta dolmen 2, where a small amount of bones was cremated to different degrees. For a number of decades, artificial mummies have been discussed in the literature for the megalithic graves of the Iberian Peninsula, for example for the Dolmen de Soto 1 in Andalusia (Leisner/Leisner 1943: 546–47; Weiss-Krejci 2011), or as upright sitting burials, at the tholos in Vale de Rodrigo 1 (Höck/Kalb 2001: 231). For this form of treatment of the bodies, Weiss-Krejci (2005) takes small fires in the graves into consideration, which may have promoted the dehydration process.

In the end of the Copper Age, individual burials became common again (Fábregas Válcarce/Vilaseco Vázquez 2003: 5).

Contemporaneous non-megalithic burials

The main contemporaneous burial sites to the megaliths were natural caves or rock shelters and hypogea or rock-cut tombs. The use of natural caves or rock shelters was also a pre-megalithic burial tradition (cf. 10.7), which was continued during megalithic times.

Caves and Rock Shelters

Especially for the southern regions of the investigation area, numerous natural caves are registered as burial sites contemporaneous to the megaliths. Evidence for the contemporaneous use of natural caves and megaliths from the second quarter of the 4th millennium to the second half of the 3rd millennium is based on measurements from human bones (Boaventura 2009, Annex 3) available from sites in the Estremadura, including the Gruta das Salemas, Porto Covo, Lapa do Fumo, Lapa do Bugio, Lapa da Furada, Poço Velho, Verdelha dos Ruivos, Leceia – Locus 2, Penedo do Lexim, Caldeirão, Cadaval, Casa da Moura 1, Casa da Moura 4, Lugar do Canto, Lapa da Bugalheira, Algar do Bom Santo, Buraca dos Mouros, Algar do Barrão, Cova da Moura, Feteira (C3), Buraca dos Mouros, Algar do Barrão, Feteira 1, Ossos, Cova das Lapas, Marmota 2, Serra da Roupa, Rochaforte 2, Carrasca, Covão do Poço, Furninha, Fontaínhas, Bolores, Alqueves, and Covão d'Almeida. For the Alentejo, cave burials contemporaneous to megalich burials can be ascerted for the caves Gruta do Escoural, Ceca do Zambujal, and Lagar. These caves served as collective burial sites with successive burial practices. An MNI has been determined from a total of 24 caves in the southern regions (Boaventura 2009: 296). The MNI amounts to 340 deposited individuals in

the Casa do Mouro. This is an exception. The remaining 23 caves exhibit between 6 and 131 individuals.

Hypogea/Rock-Cut Tombs

Contemporaneous to the megaliths of the West Iberian Peninsula, hypogea represent, as in the entire Mediterranean region, a different type of burial constructions (Weiss-Krejci 2011: 159). In the research literature, these structures are normally classified as hypogea, even if some of them should rather be considered as rock-cut tombs, since they are more simply concepted.

For seven hypogea, an MNI between 19 (Cabeço Da Arrud 1) and 254 individuals (São Paulo 2) has been determined (Boaventura 2009: 208-210). These artificial caves were dug into the limestone and are not as common as the burials in the caves. Hypogea are limited to the southern regions in the Estremadura and the Algarve, are scattered as well in the Alentejo, and are usually arranged in small clusters, for example, at Palmela and Monte Canelas.

The main usage horizon of the hypogea ranges from the Late Neolithic to the Early Bronze Age and also in the Bell Beaker horizon especially in the Estremadura. Similar to the caves, a high amount of individuals were buried in hypogea and from seven of them an MNI ranging between 19 (Cab. Da Arrud 1) and 254 individuals (São Paulo 2) was determined (Boaventura 2009, Figure 12). Evidence for a successive burial practice was also determined for Monte Canelas (Silva 1997; Weiss-Krejci 2011). Additionally, two different regional architectonical types were documented (Boaventura 2011: 165; Rivero Galán 1986; 1988): the tombs from the Estremandura and the Lisabon region were dug into the ground with a corridor as an access, whereas the chambers of the graves from the Alentejo and the Algarve are accessed by a shaft or a ramp.

The radiocarbon dates from several bone samples place the hypogea around the middle of the 4th millennium BC and especially to the third quarter of the 4th millennium. The artifacts maintain this picture and the artifact repertoire is quiet similar to that of the contemporaneous natural caves and the megalithic graves.

For the Estremadura, the earliest date for a human bone for this kind of grave is measured to ~3380 cal BC (4630±45BP; 3507–3357 cal BC, 68.2%; 3625–3138 cal BC, 95.4%) from the probable, quite destroyed rock-cut tomb of Monte do Castelo (Cardoso/Soares 1995; Oliveira/Brandão 1969). Considering all the available dates for the Estremadura (Boaventura 2009; 2011: 165), it is possible to determine the construction of the hypogea and the rock cut tombs primarily to the last quarter of the 4th millennium BC with a second increase of depositions in the first half of the 3rd millennium and a more sporadic use during the second half.

From the Algarve and the Alentejo, radiocarbon dates for Monte Canelas 1 (Morán/Parreira 2007; Parreira/Serpa 1995) and for Sobreira de Cima, Alentejo (Valera *et al.* 2008) are available. For Monte Canelas in the Algarve, two results from human bones from ~3100 cal BC (OxA-5514, 4370± 60BP; 3089–2907 cal BC, 68.2%; 3327–2888

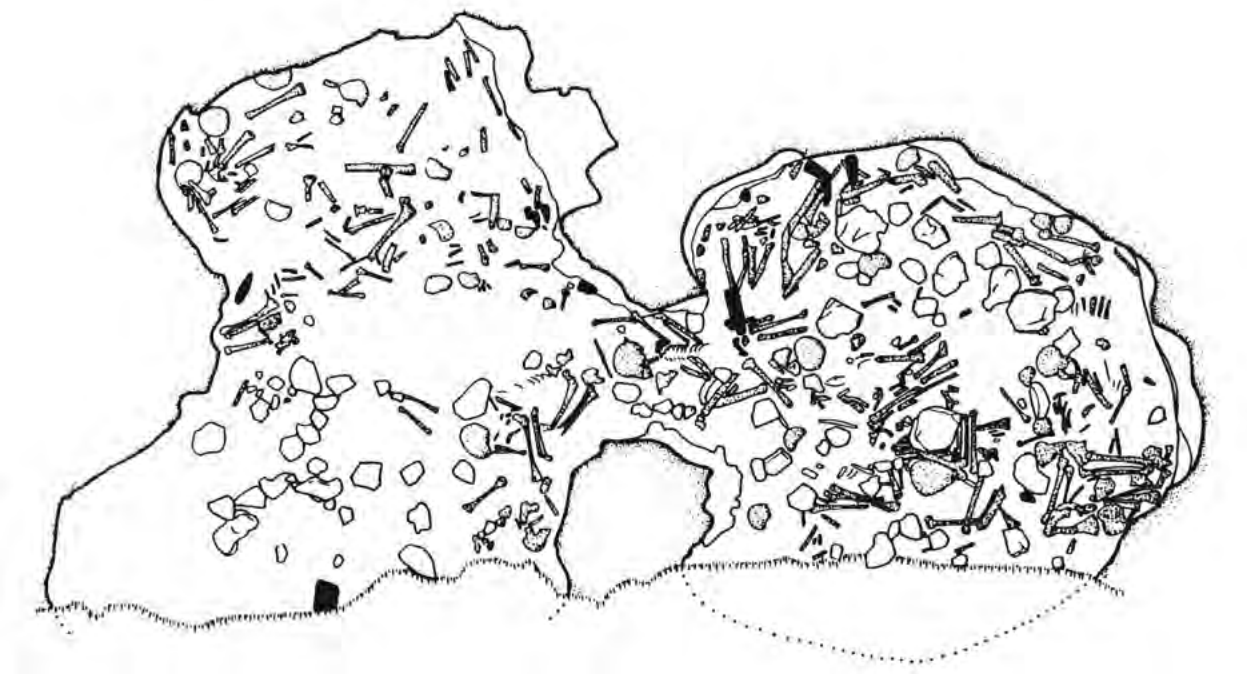


Figure 10.21 Planum Monte Canelas 1, the under layer (after Parreira/Serpa 1995: 5)

cal BC, 95.5%) and ~3120 cal BC (OxA-5515, 4420±60BP, 3311–2923 cal BC, 68.2%; 3336–2911 cal BC, 95.4%) are at our disposal. Since there is a determined MNI of 171, two results are far too sparse for the determination of the time interval of grave usage (Figure 10.21). From the necropolis Sobreira de Cima in Vidigueira, altogether five results from human bones are at our disposal, ranging from 3630–2497 cal BC (95.4%; 3498–2580 cal BC, 68.2%). The important differences between natural caves and hypogea were discussed by Weiss-Krejci 2006, 2011). For example, burnt bones are lacking in hypogea so that burial rites must have also been partly different. Furthermore, only few animal bones are registered for the hypogea in comparison to the caves where human remains are found together with deer, hares, rabbits, wild and domestic pigs, goats, sheep, cattle, horses, dogs, reptiles, rodents, fish, and birds.

For the north of Portugal, the monumental graves are more the exception compared to numerous non-monumental pit burials (Jorge 1992, 467). Furthermore, from the working area pit burials or singular human bones within Copper Age settlements are documented from Castelo Velho, Leceia, and Zambujal (Weiss-Krejci 2011: 162).

Conclusion

The West Iberian Peninsula is one of the most complex and complicated regions regarding the determination of the transition to and the emergence of megaliths, since there are too many radiocarbon terminus post quem values, originating from contexts, such as settlement layers under the tumulus or from debris, calculated and presented in the research literature as results connected to the construction of the graves and the burial activites. Moreover, thermoluminescence results are not convenient to closely define the beginning of megaliths in these regions due to their high standard deviation. At least 30% of the radiocarbon results gained from charcoal represent TPQ-values and there is a time span of 3800y from the earliest charcoal results to the first of the 79 radiocarbon dates available from human bone samples. This resulted in the notion that the West Iberian Peninsula was considered in research literature to be one of the core regions regarding the emergence of megaliths with the beginning of the graves there in the first half of the 5th millennium or, according to the most extreme position, in the 6th millennium cal BC. After critical evaluations of the existing radiocarbon stock and recently produced results from human bones, this picture shifts considerably so that megalithic building activites started considerably later in the working area.

Having emphasized this problem, we first need to consider pre-megalithic burial sites. Natural caves and rock shelters were used on the West Iberian Peninsula from the Palaeolithic onwards, continuously frequented as burial sites throughout time and used at the same time as megalithic burials. Since there is, in general, nearly no available bone material from the northern regions, our conclusions are mainly based on the contexts of the central and the southern regions. For the Estremnadura, there is evidence from different caves that natural caves served as pre-megalithic funeral places, based on radiocarbon measurements of human bones. Burials in caves sometimes even immediately preceded the megaliths in this region, for example at Caldeirão Nossa Senhora das Lapas, Casa da Moura, Correio-Mór or Algar do Picoto. These pre-megalithic burials in the caves were simply concepted: pits with a few grave goods, such as ceramics and shells. A pre-megalithic burial with structures exhibiting transitional character to the megaliths is documented from the natural cave of Cadaval. A pit burial covered by big stone slabs provided a radiocarbon date from 5160±50BP (4041–3823 cal BC, 68.1; 4146–3799 cal BC, 95.4%) and thus date to ~3970 cal BC. Additionally, Late Mesolithic cemetaries are documented in Central and Southern Portugal in the Muge Valley (Ribatejo) and the Muge-Magos area from the Late Mesolithic onwards. The dead were deposited in a supine, a flexed or a half-flexed position in natural shallow depressions or pits on the base of shell middens. Further pit burials within domestic contexts are documented in Castelo Belinho in the Algarve and in Valle de Ambrona, Soria.

The transitional, proto-megalithic or first megalithic stage on the entire West Iberian Peninsula is represented by a small amount of non-accessible dolmens with a rectangular or polygonal/round ground plan covered by small tumuli. Up to the present day, nearly no further reliable radiocarbon results have been produced where the context is connectable to the construction or the early use of the respective graves. Thus, the classification of this early stage is based on architecture and artifacts, such as geometric microliths, thin blades, ground stone tools, nearly no or undecorated ceramics and axes with round, oval or quadrangular transverse sections. These graves are documented from the Algarve within the necropolises in the Mochique Mountains, including Palmeira, Buço Preto, Eira Cavada and Mirante da Mata, and in the Alentejo in the regions of Reguengoz de Monsaraz and Elvas. The material in these early graves in the southern regions is associated to the first half and to the middle of the 4th millennium cal BC. In the northern part of the West Iberian Peninsula, these graves co-exisit with numerous tumuli covering non-megalithic structures such as wooden constructions, pits, and cists. The radiocarbon results from Cotogrande 1 and Chan de Cruz 1, which are possible due to their context associated to the constrcution and early use of the graves, date to (GrN-18420, 4940±80 BP, 3888–3644 cal BC, 68.2%; 3951–3538 cal BC, 95.4%) and (CSIC-642 5210±50 BP, 4144–3961 cal

BC, 68.2%; 4230–3947 cal BC, 95.4%), respectively. These results and the material from the small megalithis indicate the construction or use of these graves at the very end of the 5th millennium or rather to the first half of the 4th millennium cal BC.

For the accessible megalithic graves and for contemporaneous grave forms especially for the southern regions where the bones are preserved, the data basis is more reliable today with 79 radiocarbon results provided by human bones. Thus, the regional sequences for the Estremadura show an outset of the megalithic structures at ~3610 cal BC (3658–3426 cal BC, 68.2%; 3838–3384 cal BC, 95.4%) with the earliest known megalithic graves Carrascal, Pedras Grandes, and Trigache 4 in the region of Lisbon. These graves built with a polygonal/round chamber and a short corridor contained only a few individuals and the measurements are confirmed by the available material, including geometric microliths, blades, and ground stone tools. The dates for the Alentejo suggest an outset of the pre-idol-plaque phase and so the accessible megaliths to ~3620 cal BC within the time interval 3746–3516 cal BC (95.4%; 3671–3566 cal BC, 68.2%). Involved are contexts with radiocarbon results from the megalithic graves of Cabeceira 4, Cabeço da Areia Sobreira 1, Rabuje 5, and Santa Margarida 2.

The phase in which idol-plaques are common in the graves of the southern regions and the time of the elaborated passage graves begins in the Estremadura at 3112–2883 cal BC, (95.4%; 3014–2904 cal BC, 68.2%) with a short duration of ~200y. Similarly, this phase starts and ends nearly contemporaneous in the Alentejo beginning at 3089–2892 cal BC (95.4%; 2986–2902 cal BC, 68.2%).

The beginning of the tholoi in South Central Portugal is calculated to ~3390 cal BC (3517–3136 cal BC, 68.2%; 3668–3103 cal BC, 95.4%). They were constructed or in use over the entire 3rd millennium, but mainly in the first half of the century. After the exclusion of the terminus post quem values over the regional sequences in the northern region, the beginning of the megalithic graves in Beira is calculated somewhat earlier to ~3820 cal BC (3833–3797 cal BC, 68.2%; 3865–3784 cal BC, 95.4%). From the dolmen de Areita, an earlier measurement from a human bone from ~3960 cal BC (4038–3806 cal BC, 68.3%; 4146–3781 cal BC, 95.4%) is available, which we can discuss as a possible terminus post quem value based on the stated argumentation.

For Galicia, one sequence is finally produced from the charcoal of black paintings inside the grave chambers (Steelman *et al.* 2005), suggesting the beginning of the construction at 4505–4237 cal BC (95.4%; 4448–4331 cal BC, 68.2%). Nevertheless, this proposition is problematic, since we can neither determine the wood species from which the colour originated, thus excluding a possible old wood effect, nor whether the used charcoal was especially made for the painting act or collected somewhere externally, thus representing a possible terminus post quem value for the site.

Especially for the regions around Lisbon, bones from megalithic graves are available from some recent investigation sites. For example, for the southern regions anthropological records are available from 16 dolmens and passage graves and for five tholoi an MNI has been determined (Boaventura 2009, Figure 11, 14). Simply stated, the burial sequence includes single or a few individuals-few individuals-collective graves with successive burial practices- individual burials.

The first megalithic stages with non-accessible or partly accessible dolmens covered by a tumulus are normally associated to individual burials based on the chamber size and the position of the grave goods. It has already been underlined in this analysis, though, that small chambers do not necessarily indicate a small amount of individuals (c.f. 3. 1.3). Early simple dolmens or passage graves with polygonal chambers and a short corridor, such as Carrascal, Pedras Grandes, and Trigache 4 in the Lisbon area, are associated to a few individuals. During the second half of the 4th millennium cal BC and during the 3rd millennium cal BC - especially in the first half with the developed and elaborated passage graves - these graves are used as collective burial sites with successive burial practices. For 16 dolmens and passage graves, an MNI of between 3 and 81 has been determined with a normal demographic composition. In the tholoi even up to 431 individuals have been determined. The anthropological records suggest accordingly that the graves were used as a communal burial site for a family or a community with a continuous use of the site or several phases of subsequent use.

Disarticulated, broken, cut, chopped, and burned bones in the graves indicate a partial special treatment of the bodies after death as a possible mummification and deposition of bodies on site, where the decomposition process was fulfilled externally. The latter hypothesis is supported by discrepancies between measured bone age and the typo-chronological considerations of the grave goods.

Beside the megalithic graves, further caves, rock shelters and hypogea/rock-cut tombs were in use as collective burial sites. Furthermore, pit burials are known within settlement contexts.

The burial costumes in the caves, rock shelters and hypogea/rock-cut tombs are, when compared to that of the megalithis and tholoi, rather similar. These sites were used as collectice graves with successive

burial practices with MNI as high as 341 for the caves and 251 for the hypogea/rock-cut tombs. Some small differences are observed, for example, the lack of burnt human bones in the hypogea/rock-cut tombs, indicating partially different burial rites between the different grave types.

Standing stones and stone circles are especially common in the southern regions. There are indications that some of them might have already been re-erected during Mesolithic times. Nevertheless, the difficulties and problems in dating standing stones have already been described several times in this analysis.

Taking all the enumerated facts into consideration, there is no reliable evidence until present that the early megaliths emerged or were transferred to the West Iberian Peninsula before the very end of the 5th millennium. The accessible monuments were built in the northern regions from the end of the first quarter of the 4th millennium cal BC and in the south in the second quarter of the 4th millennium cal BC.

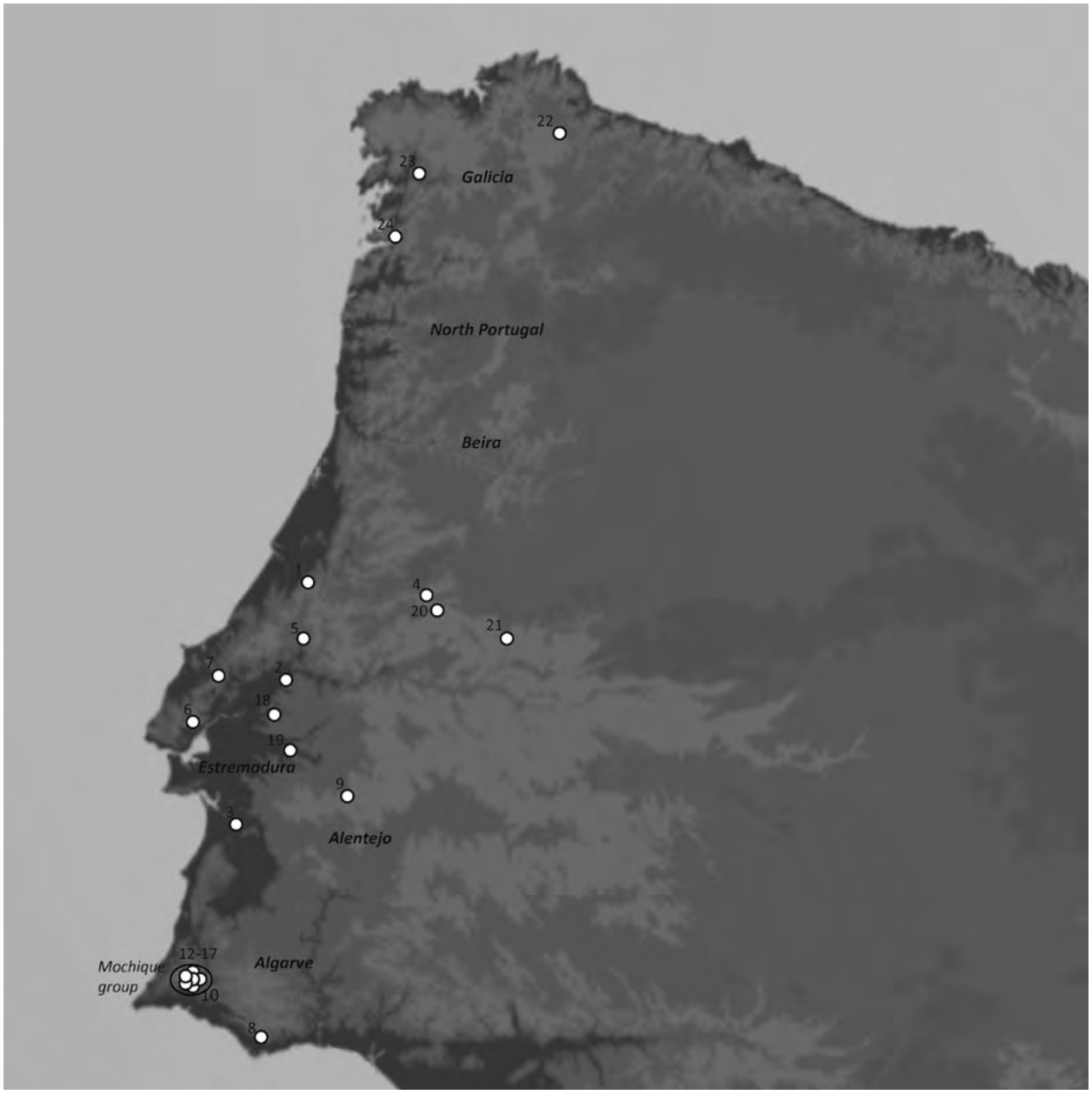


Figure 10.22 The main pre-megalithic sites and early megaliths mentioned in the text (chapter 10, p. 249-251).

1. Lagar Velho, 2. Muge, 3. Sado, 4. Nossa Senhora das Lapas, 5. Caldeirão, 6. Correio- Mór, 7. Cadaval, 8. Algarão da Goldra, 9. Gruta dos Escoural, 10. Castelo Belinho in the Algarve, 11. Eira da Vinha, 12.Palmeira, 13. Buço Preto, 14. Eira Cavada, 15. Mirante da Mata, 16.Rencovo, 17.Navete, 18. Azinhal, 19. Poco Peireira, 20. Anta 6 do Couto da Espanhola, 21. Alamo, 22. Chan de Prado, 23. Chan da Cruz 1, 24. Cotogrande

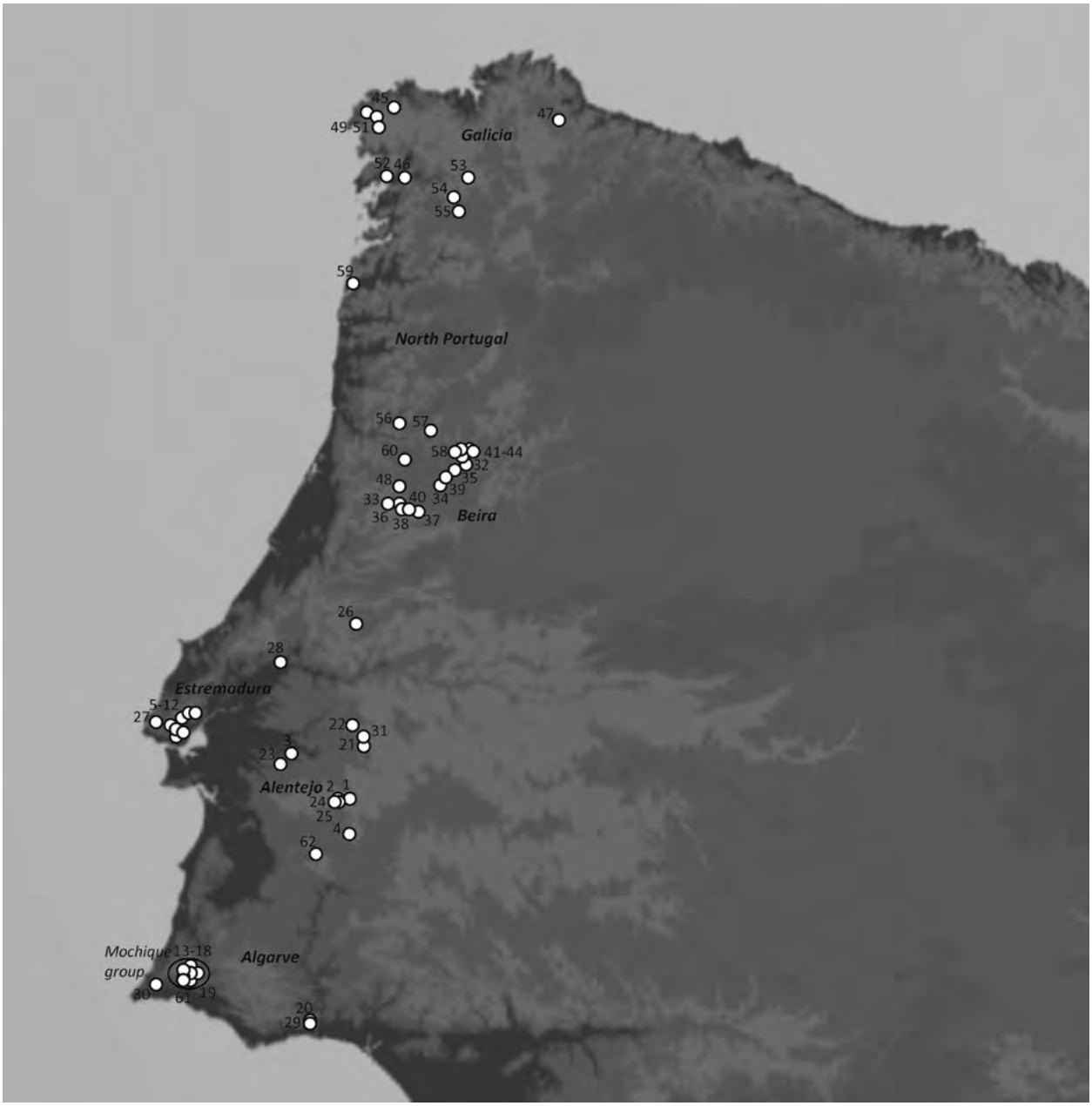


Figure 10.23 Main sites mentioned in text (chapter 10, p. 251-278)

1. Vale de Rodrigo, 2. Anta Grande do Zambuceiro, 3. Anta Grande da Comenda da Igreja, 4. Olival da Pega, 5. Carrascal, 6. Pedras Grandes, 7. Trigache, 8. Monte Abraão, 9. Estria, 10. Casaínhos, 11. Carcavelo, 12. Anta de Casal do Penedo, 13. Palmeira, 14. Buço Preto, 15. Eira Cavada, 16. Mirante da Mata, 17. Rencovo, 18. Navete, 19. Castelo Belinho, 20. Alcalar, 21. Rabuje, 22. Santa Margarida, 23. Estanque, 24. Cromlech dos Almendres, 25. Vale Maria do Meio, 26. Rego da Murca, 27. Praia da Macas, 28. Cabeço de Arruda, 29. Castro Marim, 30. Pedra Escorregadia, 31. Dolmen of Poço da Gateira, 32. Areita 1, 33. Antelas, 34. Carapito 1, 35. Lameira de Cima, 36. Arquinha da Moura, 37. Orquinha dos Juncais, 38. Casinha Derribada, 39. Orca de Merouços, 40. Orcas dos Padroes, 41. Senhora do Monte, 42. Orca da Penela 1, 43. Orca da Seixas, 44. Picoto do Vasco, 45. Dolmen de Dombate, 46. Chan da Cruz, 47. Chan de Prado, 48. Mamoa in Oliveira de Frades, 49. Pedra Cuberta, 50. Pedra Moura, 51. Anta de Serramo, 52. Casota do Páramo, 53. Fomo dos Mouros, 54 Mámoa do Monte dos Marxos, 55. Coto dos Mouros, 56. Chã Parada, 57. Madorras, 58. Val de Cadella, 59. Anta da Barrosa, 60. Lapa do Repilau , 61. Monte Canelas, 62. Sobreira de Cima

Table 10.1 Radiocarbon dates from the West Iberian Peninsula

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Abogalheira 1, Northern PortugaL								
KN-2955	Passage grave	Basement tumulus	Ch	4590	85			Cruz 1995
Agualva; Lissabon region								
Beta-239754	Tholos	Chamber	human bn, femur	4110	40			Boaventura 2009, Annex 3
Alcalar 7, Algarve								
Beta-180980	Tholos	Entrance area	Ch	3860	40			Morán/Parreira 2007
Beta-180978	Tholos	Under tumulus, layer 1	Ch	5810	40			Morán/Parreira 2007
Sac-1794	Tholos	Under tumulus, layer 1	Ch	5640	100			Morán/Parreira 2007
Beta-180981	Tholos	Under tumulus, layer 2	Ch	5690	40			Morán/Parreira 2007
Aldeia de Bertiandos 6, Alentejo								
Beta-196092	Megalithic grave	Chamber	human bn	1720	40	-20.0		Rocha 2005, 189-190
Algarão da Goldra, Alentejo								
SMU-2197	Cave	Pit burial	human bn	4990	320			Straus 1989
Alto da Barreira, Galicia								
CSIC-1038	Megalithic grave/tumulus		Ch	2840	40			Válcarce/V. Vázquez 2003
CSIC-1039	Megalithic grave/tumulus		Ch	6030	30			Válcarce/V. Vázquez 2003
Ansião, Alta Estremadura								
Sac-1559	Megalithic grave	Chamber	human bn	4640	90	-20.2		Silva 2002, 13; Boaventura 2009, Tab.22
Antelas, Beira Alta								
OxA-5496	Passage grave	Corridor	Ch	5330	60			Senna-Martinez/ Ventura 2008, 324
OxA-5497	Passage grave	Corridor	ch, same sample as OxA-5496	5295	60			Senna-Martinez/ Ventura 2008, 324
OxA-5498	Passage grave	Corridor	Ch	5070	65			Senna-Martinez/ Ventura 2008, 324
OxA-5433	Passage grave	Painting with black charcoal	Ch	4655	60			Senna-Martinez/ Ventura 2008, 324
Arapouco, Alentejo								
Sac-1560	Pit burial	Grave 2A	human bn	7200	130	-16.9		Meiklejohn et al. 2009, 10

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Areita 1, Beira Alta								
CSIC-1326	Passage grave	Under floor of the chamber	ch, same sample as CSIC-1327	5629	38			Senna-Martinez/ Ventura 2008, 324
CSIC-1327	Passage grave	Under floor of the chamber	ch, same sample as CSIC-1326	5699	31			Senna-Martinez/ Ventura 2008, 324
GrA-18497	Passage grave	Basement chamber	human bn	4840	60			Cruz et al. 2003
GrA-18518	Passage grave	Basement chamber	human bn, cranium	5170	60			Cruz et al. 2003
Sac-1508	Passage grave	Basement chamber	ch, pinus pinaster	5830	50			Gomes et al. 1998 Cruz et al. 2003
Sac-1514	Passage grave	Basement chamber	ch, pinus pinaster	5970	60			Gomes et al. 1998 Cruz et al. 2003
Arquinho da Moura, Beira Interior								
GrA-23198	Megalithic grave	Basement chamber	Ch	3710	60			Cruz et al. 2003
GrA-9573	Megalithic grave	Basement chamber	Ch	4160	50			Cruz et al. 2003
GrA-9255	Megalithic grave	Basement corridor	human bn	3650	50			Cruz et al. 2003
GrA-9575	Megalithic grave	Basement corridor	Ch	3030	50			Cruz et al. 2003
GrA-9577	Megalithic grave	From the under level	human bn	3740	50			Cruz et al. 2003
Arruda, Lissabon region								
Beta-229584	Megalithic grave	Chamber	human bn, radius	4410	40	-19.7		Boaventura 2009, Tab.22
As Pereiras, Galicia								
GaK-11821	Megalithic grave/tumulus	Tumulus	Ch	4850	210			Válcarce/V.Vázquez 2003
As Rozas 1, Galicia								
CSIC-11189	Megalithic grave/tumulus	Ancient soil	Ch	5150	140			Válcarce/Vázquez 2003
Barrocal de Freiras 3, Alentejo								
Wk-17086	Megalithic grave	Chamber	human bn, femur	3355	35	-19.7		Boaventura 2009, Annex 3
Bola da Cera, Alentejo								
ICEN-66	Megalithic grave			4360	50			Oliveira 1997
Cabeceira 4, Alentejo								
Beta-17084	Passage grave	Chamber	human bn, tibia	4759	41	-19.2		Boaventura 2009, Tab.24
Beta-196094	Passage grave	Chamber	human bn, femur	4780	40			Rocha 2005, 197

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Cabeço da Amoreira, Muge, Alentejo								
Beta-127450	Pit burial/shell midden	Grave 7,	human bn	6850	40	-16.5		Meiklejohn et al. 2009, 6
TO-11819R	Pit burial/shell midden	Grave Cam-00-01,	human bn	7300	80	-16.3		Meiklejohn et al. 2009, 6
TO-10225	Pit burial/shell midden	Grave Cam-01-0,	human bn	6550	70	-19.3	8.2	Meiklejohn et al. 2009, 6
Cabeço da Areira, Alentejo								
Beta-196091	Megalithic grave	Chamber	human bn	4650	40			Rocha 2005, 207
Cabeço da Arruda, Muge, Ribatejo								
TO-359	Pit burial/shell midden	Grave 42	human bn	6960	70	-17.2	11.8	Meiklejohn et al. 2009, 7
Beta-12745	Pit burial/shell midden	Grave 6	human bn	7550	100	-19.0		Meiklejohn et al. 2009, 7
TO-354	Pit burial/shell midden	Grave A	human bn	6970	60	-19.0	12.2	Meiklejohn et al. 2009, 7
TO-10217	Pit burial/shell midden	Grave CA-00-01	human bn	6620	60	-18.1	10.5	Meiklejohn et al. 2009, 7
TO-10216	Pit burial/shell midden	Grave CA-00-02	human bn	7040	60	-17.9	10.6	Meiklejohn et al. 2009, 7
TO-355	Pit burial/shell midden	Grave D	human bn	6780	80	-18.9	10.3	Meiklejohn et al. 2009, 7
TO-360	Pit burial/shell midden	Grave III	human bn	6990	110	-17.7	11.2	Meiklejohn et al. 2009, 7
TO-356	Pit burial/shell midden	Grave N	human bn	6360	80	-15.3	12.5	Meiklejohn et al. 2009, 7
Cabeço das Amoreiras, Alentejo								
Beta-125110	Pit burial	Grave 5	human bn	7230	40	-20.8		Meiklejohn et al. 2009, 10
Cabeço de Arruda 2, Alta Estremadura								
Sac-1613	Tholos	Chamber	human bn, femur	4700	80	-19,4		Silva 2002
Sac-1784	Tholos	Chamber	human bn, femur	4460	45	-13,7		Boaventura 2009, Annex 3
UBAR-538	Tholos	Chamber	human bn, femur	4230	100			Silva 2002
Cabeço do Pez, Alentejo								
Beta-125109	Pit burial	Grave 4	human bn	6760	40	-22.6		Meiklejohn et al. 2009, 11
Sac-1558	Pit burial	Grave 4	human bn	6740	100	-19.3		Meiklejohn et al. 2009, 11
Cabecuda, Alentejo								
ICEN-978	Megalithic grave			7660	60			García Sanjuán 2009,Tab.1
ICEN-979	Megalithic grave			3720	45			García Sanjuán 2009,Tab.1
ICEN-977	Megalithic grave	Basement chamber	Ch	3650	110			Oliveira 1997

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Cabras, Northern Portugal								
CSIC-1055	Passage grave	Layer 3	Ch	6160	70			Cruz 1995
CSIC-1056	Passage grave	Layer 3	Ch	6570	90			Cruz 1995
ICEN-1267	Passage grave	Layer surface hearth	Ch	5220	60			Stockler 1998
CSIC-1057	Passage grave	Surface ancient soil	Ch	3850	60			Stockler 1998
ICEN-1265	Passage grave	Surface ancient soil	Ch	5290	50			Stockler 1998
ICEN-1266	Passage grave	Surface ancient soil	Ch	5220	60			Stockler 1998
Cabritos 1, Northern Portugal								
Gif-7019	Passage grave	Basement tumulus	Ch	2700	60			Cruz 1995
Cabritos 3, Northern Portugal								
Gif-7020	Passage grave		Ch	6100	70			Cruz 1995
Campiños 6, Galicia								
GrN-14328	Megalithic grave			4300	60			Boaventura 2009, Tab.31
Carapito 1, Beira Alta								
TO-3336	Passage grave	Hearth on the chamber floor, same sample as GrN-5110	ch	5120	40			Senna-Martinez/ Ventura 2008, 324
GrN-5110	Passage grave	Hearth on the chamber floor	Ch	4850	40			Senna-Martinez/ Ventura 2008, 324
OxA-3733	Passage grave	Pit side stones	Ch	5125	70			Senna-Martinez/ Ventura 2008,333
Carascal, Lissbon region								
Beta-225167	Passage grave	Chamber	human bn, femur	4640	40	-20.1		Boaventura 2009, Tab.22
Beta-228577	Passage grave	Chamber	human bn, femur	4770	40	-19.3		Boaventura 2009, Tab.22
Carcavelos, Lissbon region								
Beta-208518	Passage grave	Chamber	human bn, femur	4270	40	-20.2		Boaventura 2009, Tab.22
Beta-225170	Passage grave	Chamber	human bn, mandib.	4130	40	-20.5		Boaventura 2009, Tab.22
Carvahal, Beira Interior								
GrA-5427	Passage grave		Ch	6730	50			Cruz et al. 2003
GrN-20792	Passage grave	Pit side stone	Ch	3100	90			Cruz 1995
Casainhos, Lissabon region								
Beta-225168	Megalithic grave	Chamber	human bn, femur	4150	40	-20.2		Boaventura 2009, Tab.22

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Casal do Penedo, Lissabon region								
Beta-229585	Megalithic grave	Chamber	human bn, femur	4280	40	-20.0		Boaventura 2009, Tab.22
Beta-234134	Megalithic grave	Chamber	human bn, femur	4280	40	-19.9		Boaventura 2009, Tab.22
Casinha Derribada, Beira Interior								
OxA-9910	Megalithic grave	Hearth inside Chamber	Ch	3115	90			Cassen et al. 1996, 514
OxA-9911	Megalithic grave	Pit central Chamber	Ch	8080	90			Cassen et al. 1996, 514
Casota do Páramo, Galicia								
CAMS-77427	Passage grave	Painting with black charcoal	Ch	4740	120			Steelman et al 2005, 385.
Castelhanas, Alentejo								
ICEN-1264	Passage grave			6360	110			García Sanjuán 2009,Tab.1
OxA-5432	Passage grave	Basement chamber	carb. human bn	3220	65	-26.1		Oliveira 1997
ICEN-1263	Passage grave	Chamber	Ch	780	60	-26.1		Oliveira 1997
Castelo Belinho, Algarve								
Beta-199912	Settlement	Pit burial in settlement	human bn	5500	40			Gomes 2008
Beta-199913	Settlement	Pit burial in settlement	human bn	5720	40			Gomes 2008
Castro Marim, Algarve								
OxA-5441	Tholos	Chamber	human bn, tibia	4525	60			Gomes et al. 1994
Catasol 2, Galicia								
CSIC-984	Megalithic grave/tumulus	Surface ancient soil	Ch	5470	35			Fábregas/Vilaseco 2003
CSIC-985	Megalithic grave/tumulus		Ch	5680	35			Fábregas/Vilaseco 2003
Cave de Cadaval, Estremadura								
ICEN-464	Cave	Pit burial in cave covered by stone slabs	human bn	5160	50			Boaventura 2011, 164
Cebolinhos 2, Alentejo								
Beta-176899	Passage grave	Chamber	human bn	3900	40			Gonçalvez 2003
Cebolinhos 2, Alentejo								
Beta-177471	Passage grave	Chamber	human bn	3840	40			Gonçalvez 2003

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Châ da Parada 1, Northern Portugal								
Gif-7672	Passage grave	Ancient soil	Ch	3940	80			Cruz 1995
ICEN-172	Passage grave	Ancient soil	Ch	4900	260			Cruz 1995
ICEN-409	Passage grave	Basement layer 4 pheriphery monument	Ch	4130	45			Cruz 1995
ICEN-408	Passage grave	Basement layer 5, mixed	Ch	4180	110			Cruz 1995
CSIC-979	Passage grave	Basement tumulus	Ch	5010	35			Cruz 1995
CSIC-953	Passage grave	Surface ancient soil	Ch	4920	40			Cruz 1995
CSIC-954	Passage grave	Surface ancient soil	Ch	4820	40			Cruz 1995
Gif- 7873	Passage grave	Surface ancient soil	Ch	4610	45			Cruz 1995
ICEN-407	Passage grave	Surface ancient soil	Ch	4880	50			Cruz 1995
ICEN-780	Passage grave	Surface ancient soil	Ch	4930	50			Cruz 1995
ICEN-173	Passage grave	Ancient soil	Ch	4610	45			Cruz 1995
ICEN-781	Passage grave	Surface ancient soil	Ch	4980	50			Cruz 1995
Châ da Parada 3, Northern Portugal								
Gif-8290	Passage grave	Ancient soil		6910	70			Cruz 1995
Gif-8289	Passage grave	Entrance structure		5070	100			Cruz 1995
Châ da Parada 4, Northern Portugal								
GrN-17433	Passage grave	Basement tumulus	Ch	5055	40			Cruz 1995
ICEN-890	Passage grave	Basement tumulus	Ch	5240	90			Cruz 1995
ICEN-162	Passage grave	Layer 1 basement tumulus	Ch	5470	45			Cruz 1995
ICEN-891	Passage grave	Surface ancient soil	Extract NaOH	5240	70			Cruz 1995
ICEN-170	Passage grave		Ch	5530	300			Cruz 1995
ICEN-169	Passage grave	Layer 2 basement tumulus	Ch	5420	40			Cruz 1995
ICEN-822	Passage grave	Basement tumulus	Ch	4970	50			Cruz 1995
Châ de Carvahal 1, Northern Portugal								
OxA-1848	Passage grave	Ancient soil	Ch	6150	80			Cruz 1995
OxA-1849	Passage grave	Surface ancient soil	Ch	5450	80			Cruz 1995
OxA-1850	Passage grave	Ancient soil	Ch	6340	80			Cruz 1995
OxA-2128	Passage grave	Ancient soil	Ch	7030	130			Cruz 1995
UGRA-355	Passage grave	Ancient soil	Ch	5860	60			Cruz 1995

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Châ de Santinhos 1, Northern Portugal								
Gif-6783	Passage grave	Basement tumulus	Ch	4980	50			Cruz 1995
Châ de Santinos 2, Northern Portugal								
Gif-6784	Passage grave	Basement monument	Ch	4990	50			Cruz 1995
Gif-6785	Passage grave	Basement monument	Ch	4930	50			Cruz 1995
Chan da Cruz 1, Galicia								
Gak-11395	Passage grave	Surface ancient soil	Ch	5890	120			Müller 1998, 86
CSIC-642	Megalithic grave		Ch	5210	50			Boaventura 2009, Tab.31
CSIC-642	Megalithic grave/tumulus	Surface	Ch	5210	50			Fábregas/Vilaseco 2003
GaK-11395	Megalithic grave/tumulus	Surface	Ch	5890	120			Fábregas/Vilaseco 2003
Chan de Prado 6, Galicia								
GrN-19620	Megalithic grave/tumulus		Ch	6575	35			Fábregas/Vilaseco 2003
Correio- Mór, Estremadura								
Sac-1717	Cave		human bn	6330	60			Carvalho 2007a
Coto dos Mouros, Galicia								
CAMS-83116	Passage grave	Painting with black charcoal	Ch	6050	110			Steelman et al 2005, 385
CAMS-83631	Passage grave	Painting with black charcoal	Ch	3830	60			Steelman et al 2005, 385
Cotogrande 1, Galicia								
GrN-17698	Non-accessible dolmen	Surface floor	Ch	5329	80			Fábregas/Vilaseco 2003
GrN-18420	Non-accessible dolmen		Ch	4940	80			Fábregas/Vilaseco 2003
Cotogrande 2, Galicia								
GrN-19374	Dolmen	Surface floor	Ch	4875	40			Fábregas/Vilaseco 2003
Cotogrande 5, Galicia								
GrN-19565	Dolmen		Ch	4065	45			Fábregas/Vilaseco 2003
GrN-19566	Dolmen		Ch	4390	50			Fábregas/Vilaseco 2003
Coureleiros 4, Alentejo								
ICEN-976	Passage grave	Corridor	Ch	4240	150			Oliveira 1997

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Cova da Onça (Magos), Ribatejo								
Beta-127448	Pit burial		human bn	7140	40	-17.2		Meiklejohn et al. 2009, 8
Dombate, Galicia								
UtC-3203	Dolmen	Floor chamber	Ch	4950	70			Fábregas/Vilaseco 2003
UtC-3200	Dolmen	Floor corridor	Ch	4780	60			Fábregas/Vilaseco 2003
CSIC-1066	Dolmen	Debris tumulus	Ch	4090	60			Fábregas/Vilaseco 2003
CSIC-893	Dolmen	Debris tumulus	Ch	4450	70			Fábregas/Vilaseco 2003
CSIC-939	Dolmen	Debris tumulus	Ch	4410	25			Fábregas/Vilaseco 2003
CSIC-940	Dolmen	Debris tumulus	Ch	4450	70			Fábregas/Vilaseco 2003
CSIC-941	Dolmen	Debris tumulus	Ch	4430	25			Fábregas/Vilaseco 2003
CSIC-942	Dolmen	Debris tumulus	Ch	4480	25			Fábregas/Vilaseco 2003
CSIC-948	Dolmen	Debris tumulus	Ch	4200	30			Fábregas/Vilaseco 2003
CSIC-962	Dolmen	Debris tumulus	Ch	4020	30			Fábregas/Vilaseco 2003
CSIC-963	Dolmen	Debris tumulus	Ch	4380	35			Fábregas/Vilaseco 2003
CSIC-964	Dolmen	Debris tumulus	Ch	4470	30			Fábregas/Vilaseco 2003
CSIC-892	Dolmen	Chamber	Ch	4230	70			Fábregas/Vilaseco 2003
UtC-3201	Dolmen	Chamber	Ch	3950	60			Fábregas/Vilaseco 2003
UtC-3202	Dolmen	Chamber	Ch	4430	50			Fábregas/Vilaseco 2003
CSIC-890	Dolmen	Surface soil	Ch	4930	70			Fábregas/Vilaseco 2003
CSIC-891	Dolmen	Surface soil	Ch	4910	60			Fábregas/Vilaseco 2003
Dorna, Galicia								
CSIC-1037	Megalithic grave			4820	40			Boaventura 2009, Tab.31
Estanque, Alentejo								
Wk-17091	Dolmen	Chamber	human bn, femur	4182	39	-20.1		Boaventura 2009, Tab.24
Estremoz 7, Alentejo								
Wk-17089	Megalithic grave	Chamber	human bn, cranium	3758	36	-19.7		Boaventura 2009, Tab.24
Estria, Lissabon region								
Beta-208950	Passage grave	Chamber	human bn, humerus	4180	50	-20.0		Boaventura 2009, Tab.22
Beta-228578	Passage grave	Chamber	human bn, mandibula	4110	40	-20.0		Boaventura 2009, Tab.22
Figueira Branca, Alentejo								
ICEN-823	Megalithic grave			6210	60			García Sanjuán 2009,Tab.1

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Forno dos Mouros, Galicia								
CAMS-80501	Passage grave	Painting with black charcoal	Ch	4920	60			Steelman et al 2005, 385.
Furnas 1, Northern Portugal								
CSIC-777	Passage grave	Basement monument		5270	70			Cruz 1995
Furnas 2, Northern Portugal								
CSIC-775	Passage grave	Surface ancient soil	Ch	5270	70			Cruz 1995
Gruta dos Escoral, Alentejo								
OxA-4444	Cave	Pit burial	human bn	5560	160			Araújo/Lejeune 1995
Horta, Alentejo								
Beta-194313	Megalithic grave	Chamber	human bn, mandibula	4480	40	-19.7		Carvalho 2007
Illade 3, Galicia								
GrN-19213	Megalithic grave/tumulus		Ch	3855	60			Fábregas/Vilaseco 2003
Illade 3, Alentejo								
Sac-1380	Megalithic grave			5400	120			García Sanjuán 2006, 152
Sac-1381	Megalithic grave			3840	170			García Sanjuán 2006, 153
Lameira de Cima 1, Beira Interior								
OxA-4084	Passage grave	Upper layer	Ch	4990	80			Senna-Martinez/ Ventura 2008, 333
Lameira de Cima 2, Beira Interior								
Oxa-5102	Passage grave	Corridor	Ch	5360	55			Cruz 1995
CSIC-1113	Passage grave	Corridor	Ch	4961	27			Senna-M./ Ventura. 2008, 333
GrN-21353	Passage grave	Corridor	Ch	4990	40			Senna-M./ Ventura. 2008, 333
CSIC-1114	Passage grave	Corridor	Ch	49999	29			Senna-M./ Ventura 2008, 333
Madorras I, Beira Interior								
OxA-5102	Passage grave	Corridor	Ch	5360	55			Cruz 1995
CSIC-1114	Passage grave	Corridor	Ch	4999	29			Cruz 1995
CSIC-1113	Passage grave	Corridor	Ch	4961	27			Cruz 1995
Madorras I, Northern Portugal								
OxA-5199	Passage grave	Ancient soil	Ch	4540	65			Cruz 1995
GrA-855	Passage grave	Entrance area, floor atrium	Ch	4420	40			Cruz 1995
GrN-21066	Passage grave	On side stone	Ch	4790	60			Cruz 1995
CSIC-1030	Passage grave	Between orthostats	Ch	5280	40			Cruz 1995

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
CSIC-1029	Passage grave	Surface ancient soil	Ch	8000	40			Cruz 1995
GrA-1418	Passage grave	Surface ancient soil	Ch	7840	160			Cruz 1995
GrA-884	Passage grave	Surface ancient soil	Ch	3500	40			Cruz 1995
Mamoa do Castelo 1, Northern Portugal								
CSIC-1814	Dolmen	Entrance area	Ch	4136	33			Sanches et al. 2005
CSIC-1815	Dolmen	Antechamber	Ch	3862	33			Sanches et al. 2005
CSIC-1817	Dolmen	Corridor	Ch	4057	33			Sanches et al. 2005
Ua-19122	Dolmen	Corridor	Ch	4080	70			Sanches et al. 2005
Ua-19121	Dolmen	Entrance area	Ch	4560	65			Sanches et al. 2005
CSIC-1816	Dolmen	Under side stones	Ch	3806	32			Sanches et al. 2005
CSIC-1818	Dolmen	Under side stones	Ch	5112	36			Sanches et al. 2005
Mámoa do Monte: dos Marxos, Galicia								
CAMS-77924	Passage grave	Painting with black charcoal	Ch	5330	80			Steelman et al 2005, 385.
CAMS-77925	Passage grave	Painting with black charcoal	Ch	5540	70			Steelman et al 2005, 385.
Menhir de Meada, Alentejo								
UtC-4452	Standing stone			6022	40			García Sanjuán 2009,Tab.1
Meninas do Crastro 2, Northern Portugal								
CSIC-656	Passage grave		Ch	5260	50			Müller 1998, 86
CSIC-657	Passage grave		Ch	5260	50			Müller 1998, 86
Meninas do Crastro 2, Northern Portugal								
CSIC-658	Passage grave		Ch	5260	60			Müller 1998, 86
CSIC-659a	Passage grave			5260	60			Müller 1998, 86
Meninas do Crastro 3, Northern Portugal								
CSIC-776	Passage grave	Ancient soil	Ch	4960	70			Cruz 1995
Meninas do Crastro 4, Northern Portugal								
GaK-10943	Passage grave	Ancient soil	Ch	4220	140			Cruz 1995
CSIC-660	Passage grave		Ch	3800	50			Müller 1998, 86
CSIC-661	Passage grave		Ch	3830	50			Müller 1998, 86

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Mina do Simão, Northern Portugal								
CSIC-715	Passage grave	Basement chamber	Ch	5010	70			Cruz 1995
CSIC-716	Passage grave	Basement chamber	Ch	5050	70			Cruz 1995
CSIC-717	Passage grave	Ancient soil	Ch	5130	90			Cruz 1995
Moinhos de Vento 1								
ICEN-196	Dolmen	Charcoal peripheral grave	Ch	4720	40			Senna-Martinez/ Ventura 2008, 333
Moita do Sebastião (Muge), Ribatejo								
Beta-127449	Pit burial	Grave 16	human bn	7120	40	-16.8		Meiklejohn et al. 2009, 9
TO-131	Pit burial	Grave 22	human bn	7240	70	-16.1	12.2	Meiklejohn et al. 2009, 9
TO-132	Pit burial	Grave 24	human bn	7180	70	-16.8	11.9	Meiklejohn et al. 2009, 9
TO-133	Pit burial	Grave 29	human bn	7200	70	-16.9	10.4	Meiklejohn et al. 2009, 9
TO-134	Pit burial	Grave 41	human bn	7160	80	-16.7	11.2	Meiklejohn et al. 2009, 9
TO-135	Pit burial	Grave CT	human bn	6810	70	-15.3	13.4	Meiklejohn et al. 2009, 9
Monte Abraão, Lissabon region								
Beta-228579	Dolmen	Chamber	human bn, femur	4040	40	-20.7		Boaventura 2009, Tab.22
Beta-228580	Dolmen	Chamber	human bn, femur	4180	40	-19.9		Boaventura 2009, Tab.22
Monte Canelas 1, Algarve								
OxA-5514	hypogeum	Chamber	human bn	4370	60			Morán/Parreira 2007
OxA-5515	hypogeum	Chamber	human bn	4420	60			Morán/Parreira 2007
Monte da Dorna, Galicia								
CSIC-1037	Megalithic grave/tumulus		Ch	4820	50			Fábregas/Vilaseco 2003
Monte da Olheira, Northern Portugal								
GrN-15330	Passage grave	Ancient soil	Ch	5195	25			Cruz 1995
GrN-15331	Passage grave	Hearth		5400	40			Müller 1998, 86
UGRA-287	Passage grave	Hearth		5630	90			Müller 1998, 86
Monte da Romea, Galicia								
Ua-20004	Megalithic grave	Stone deposit, entrance	Ch	4520	50			Mañana Borrazas 2003
Ua-20005	Megalithic grave	Debris tumulus	Ch	5055	55			Mañana Borrazas 2003
Ua-20003	Megalithic grave	Debris tumulus	Ch	4265	50			Mañana Borrazas 2003

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Monte Maninho, Northern Portugal								
CSIC-755	Passage grave	Under tumulus	Ch	5680	80			Cruz 1995
GrN-15569	Passage grave	Under tumulus	Ch	5805	40			Cruz 1995
Mourela 7, Galicia								
CSIC-977	Megalithic grave	Floor chamber	Ch	3820	35			Fábregas/Vilaseco 2003
Olival da Pega 2b, Alentejo								
ICEN-957	Tholos	Chamber/Depot 5/7	human bn/ch carb.bn mixed with ch	4130	60			Soares 1999
ICEN-955	Tholos	Chamber/Depot 6/7	human bn/ch carb.bn mixed with ch	4290	100			Soares 1999
ICEN-956	Tholos	Chamber/Depot 7/7	human bn/ch carb.bn mixed with ch	4180	80			Soares 1999
Orca da Matança, Beira Interior								
ICEN-480	Dolmen	Side stone	Ch	1140	60			Cruz 1995
ICEN-481	Dolmen	Side stone	Ch	1120	60			Cruz 1995
ICEN-482	Dolmen	Side stone	Ch	1170	60			Cruz 1995
Orca da Penela 1, Beira Interior								
GrA-14767	Megalithic grave	Atrium	Ch	4990	40			Cruz et al. 2003
GrA-9256	Megalithic grave	Basement chamber	human bn	4320	50			Cruz et al. 2003
GrN-23064	Megalithic grave	Basement chamber	human bn	4590	60			Cruz et al. 2003
GrN-9578	Megalithic grave	Basement chamber	human bn	4400	50			Cruz et al. 2003
Orca das Castenairas, Beira Alta								
OxA-7435	Passage grave	Atrium	Ch	3365	45			Senna-Martinez/ Ventura 2008, 333
OxA-7436	Passage grave	Atrium, late phase	Ch	4365	50			Senna-Martinez/ Ventura 2008, 333
OxA-7432	Passage grave	corrdior	Ch	4510	45			Senna-Martinez/ Ventura 2008, 333
OxA-7433	Passage grave	corrdior	Ch	4720	40			Senna-Martinez/ Ventura 2008, 333

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Orca das Castenaires, Beira Alta								
OxA-7434	Passage grave	Corrdior	Ch	4470	45			Senna-Martinez/ Ventura 2008, 333
GrN-4925	Passage grave	Chamber	Organic material	4610	50			Senna-Martinez/ Ventura 2008, 333
GrN-4924	Passage grave	Basement chamber	Ch	5060	50			Senna-Martinez/ Ventura 2008, 333
GrA-9312	Passage graves	Atrium	Ch	4520	50			Senna-Martinez/ Ventura 2008, 333
GrA-9313	Passage graves	Atrium	Ch	4380	50			Senna-Martinez/ Ventura 2008, 333
GrA-9314	Passage graves	Atrium, late phase	Ch	4365	50			Senna-Martinez/ Ventura 2008, 333
GrA-9307	Passage graves	Corridor	Ch	4540	50			Senna-Martinez/ Ventura 2008, 333
GrA-9308	Passage graves	Corridor	Ch	4440	50			Senna-Martinez/ Ventura 2008, 333
Orca de Merouços, Beira Interior								
GrA-14768	Passage grave	Atrium	Ch	4980	40			Cruz et al. 2003
GrN-13687	Passage grave	Atrium	Ch	4480	40			Cruz et al. 2003
GrN-14765	Passage grave	Atrium	Ch	4960	40			Cruz et al. 2003
GrN-14770	Passage grave	Atrium	Ch	4910	40			Cruz et al. 2003
GrA-14771	Passage grave	Basement atrium	Ch	7740	50			Cruz et al. 2003
Orca de Seixas, Beira Interior								
GrN-26226	Passage grave	Cist structure atrium	cork	5045	25			Cruz et al. 2003
CSIC-1665	Passage grave	Corridor	Ch	5045	25			Cruz et al. 2003
CSIC-1664	Passage grave		Ch	4929	34			Cruz et al. 2003
GrN-5734	Passage grave	Chamber	Ch	4900	40			Müller 1998, 88

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Orca dos Padroes, Beira Interior								
OxA-4484	Passage grave	Ancient soil	ch	4960	65			Müller 1998, 86
Orquinha dos Juncais, Beira Interior								
GrA-17166	Megalithic grave	Ancient soil	ch	8750	70			Cruz et al. 2003
GrA-17167	Megalithic grave	Ancient soil	ch	4620	60			Cruz et al. 2003
Outeira de Gregos I, Northern Portugal								
Csic-771	Cist	Debris tumulus		3360	50			Cassen et al. 1996, 515.
Csic-772	Cist	Debris tumulus		3620	50			Cassen et al. 1996, 515.
Outeiro de Ante 1, Northern Portugal								
Gif-8291	Megalithic grave	Ancient soil	ch	6310	80			Cruz 1995
Outeiro de Ante 2, Northern Portugal								
GaK-10937	Passage grave	Debris tumulus	ch	5920	130			Cruz 1995
Outeiro de Ante 3, Northern Portugal								
Gif-4856	Passage grave	Debris tumulus	ch	4800	80			Cruz 1995
Gif-4857	Passage grave	Debris tumulus	ch	5780	80			Cruz 1995
Gif-4858	Passage grave	Debris tumulus	ch	5540	90			Cruz 1995
Gif-4859	Passage grave	Debris tumulus	ch	4090	120			Cruz 1995
Outeiro de Gregos 1, Northern Portugal								
CSIC-771	Non-accessible dolmen	Layer under peripheric structure	ch	3360	50			Cruz 1995
CSIC-772	Non-accessible dolmen	Layer under peripheric structure	ch	3620	50			Cruz 1995
Outeiro de Gregos 2, Northern Portugal								
CSIC-774	Passage grave	Ancient soil	ch	5030	70			Cruz 1995
KN-2768	Passage grave	Debris tumulus	ch	5500	70			Müller 1998, 86
CSIC-547	Passage grave	Ancient soil	ch	4950	50			Cruz 1995

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Outeiro de Gregos 3, Northern Portugal								
KN-2765	Passage grave	Debris tumulus	ch	5200	65			Müller 1998, 86
KN-2766	Passage grave	Debris tumulus	ch	5230	75			Müller 1998, 86
KN-2767	simple Dolmen	Intrusion Chamber	ch	2510	55			Cruz 1995
Outeiro de Gregos 5, Northern Portugal								
CSIC-659	Dolmen	Debris tumulus	ch	4780	60			Cruz 1995
CSIC-773	Dolmen	Layer under tumulus	ch	3250	60			Cruz 1995
Paimogo 1, Alta Estremadura								
Sac-1556	Tholos	Chamber	human bn, femur	4250	90	-20.4		Boaventura 2009, Annex 3
Sac-1782	Tholos	Chamber	human bn, femur	4100	60	-20.0		Silva 2002
UBAR-539	Tholos	Chamber	human bn, femur	4130	90			Silva 2002
Pedra Cuberta, Galicia								
CAMS-77923	Passage grave	Painting with black charcoal	ch	5010	60			Steelman et al 2005, 385.
Pedra dos Mouros; Lissabon region								
Beta-228581	Dolmen	Chamber	human bn, bos	270	40	-21.2		Boaventura 2009, Tab.22
Beta-228582	Dolmen	Chamber	human bn, mandibula	4210	50	-19.7		Boaventura 2009, Tab.22
Pedra Escorregadia, Algarve								
ICEN-1028	Dolmen	Chamber	human bn	3800	100	-19.7		Gomes et al. 1994, 13C
ICEN-844	Dolmen	Chamber	human bn	4060	70	-19.4		Gomes et al. 1994, 13C
Pedra Moura, Galicia								
CAMS-77761	Passage grave	Painting with black charcoal	ch	4980	70			Steelman et al 2005, 385.
Pedras da Granja, Lissabon region								
Beta-225171	Megalithic grave	Chamber	human bn, mandibula	4050	40	-20.2		Boaventura 2009, Tab.22
Pedras Grandes, Lissabon region								
Beta-205946	Dolmen	Chamber	human bn, femur	4590	40	-20.8		Boaventura 2009, Tab.22
Beta-234136	Dolmen	Chamber	human bn, femur	4530	40	-19.2		Boaventura 2009, Tab.22
Picoto da Vasco, Beira Interior								
GrN-22816	Dolmen	Basement atrium	ch	3690	130			Cruz et al. 2003
CSIC-1199	Dolmen	Basement corridor	ch	4988	31			Cruz et al. 2003
CSIC-1221	Dolmen	Basement corridor	ch	5160	42			Cruz et al. 2003

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Picoto da Vasco, Beira Interior								
GrN-22443	Dolmen	Basement corridor	ch	5140	40			Cruz et al. 2003
GrN-22817	Dolmen	Basement corridor	ch	5100	60			Cruz et al. 2003
GrN-22815	Dolmen	Corridor	ch	4670	150			Cruz et al. 2003
OxA-6910	Dolmen	Corridor	ch	4930	60			Cruz et al. 2003
CSIC-1328	Dolmen	Entrance chamber	ch	5124	30			Cruz et al. 2003
Ponte da Pedra, Galicia								
GrN-19216	Megalithic grave/tumulus	Ancient soil	ch	2970	90			Fábregas/Vilaseco 2003
GrN-19217	Megalithic grave/tumulus		ch	5020	70			Fábregas/Vilaseco 2003
Portela do Pau 1, Beira Interior								
CSIC-1003	Passage grave	Ancient soil	ch	5440	35			Cruz 1995
Portela do Pau 2, Beira Interior								
CSIC-1119	Passage grave		ch	5087	31			Boaventura 2009, Tab.31
CSIC-1120	Passage grave		ch	5131	28			Boaventura 2009, Tab.31
CSIC-1121	Passage grave		ch	5435	44			Cruz 1995
Praia das Maças, Lissabon region								
H-2048	Tholos	Chamber	ch	3650	60			Soares/Cabral 1984
H-2049	Tholos	Chamber	ch	4260	60			Soares/Cabral 1984
OxA-5509	Tholos	Chamber, bone needle	bn	4410	75			Cardoso/Soares 1995
OxA-5510	Tholos	Chamber, bone needle	bn	4395	60			Cardoso/Soares 1995
Rabuje 5, Alentejo								
Beta-191133	Megalithic grave	Chamber, under stone slabs	ch, arbutus unedus	4650	50	-23.5		Boaventura 2009, Tab.24
Reboredo 1, Galicia								
GrN-19214	Megalithic grave/tumulus		ch	3820	70			Fábregas/Vilaseco 2003
Rego da Murca 1, Alta Estremadura								
Beta-189999	Passage grave	Chamber	human bn, femur	3510	40	-20.3		Figueiredo 2006
Beta-189998	Passage grave	Chamber	human bn, femur	4490	60	-19.9		Figueiredo 2006
Beta-190000	Passage grave	Chamber	human bn, femur	3640	40	-20.7		Figueiredo 2006
Beta-190001	Passage grave	Chamber	human bn,	4520	40	-20.0		Figueiredo 2006
Beta-190002	Passage grave	Chamber	human bn, femur	4370	40	-19.5		Figueiredo 2006
Beta-190003	Passage grave	Chamber	human bn	4400	40	-19.3		Figueiredo 2006

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Rego da Murca 2, Alta Estremadura								
Beta-190004	Passage grave	Chamber	human bn	4290	40	-19.6		Figueiredo 2006
Beta-190007	Passage grave	Chamber	human bn	4190	40	-19.8		Figueiredo 2006
Beta-190008	Passage grave	Chamber	human bn	4060	50	-19.8		Figueiredo 2006
Samarra, Lissabon region								
Sac-1827	Tholos	Chamber	human bn	3820	60			Silva et al. 2006
Samouqueira I, Alentejo, Alentejo								
TO-130	Pit burial	Grave H2	human bn	6370	70	-15.3	16.5	Meiklejohn et al. 2009, 13
San Bieito 2, Galicia								
ICEN-762	Megalithic grave/tumulus	Surface floor	ch	4717	270			Fábregas/Vilaseco 2003
Santa Margarida 2, Alentejo								
Beta-153911	Passage grave	Chamber	ch, erica umbellata	4410	60	-26.1		Gonçalvez 2003
Santa Margarida 3, Alentejo								
Beta-166419	Passage grave	Layer J8	carb. seed, arbutus unedo	730	40	-26.1		Gonçalvez 2003
Beta-166424	Passage grave	Layer J8-572	carb.seed, arbutus unedo	560	40	-26.1		Gonçalvez 2003
Beta-166416	Passage grave	Chamber	human bn	4270	40	-19,8		Gonçalvez 2003
Beta-166417	Passage grave	Chamber	human bn, tibia	3770	40	-19,2		Gonçalvez 2003
Beta-166418	Passage grave	Chamber	human bn, patella	3780	40	-19,0		Gonçalvez 2003
Beta-166420	Passage grave	Chamber	human bn, phalanx	3720	50	-20,5		Gonçalvez 2003
Beta-166421	Passage grave	Chamber	human bn	3730	40	-20,6		Gonçalvez 2003
Beta-166422	Passage grave	Chamber	human bn, cranium	4270	40	-20,0		Gonçalvez 2003
Beta-166423	Passage grave	Chamber	human bn, cranium	4100	40	-20,5		Gonçalvez 2003
Beta-176896	Passage grave	Chamber	human bn, cranium	4170	40	-20,2		Gonçalvez 2003
Beta-176897	Passage grave	Chamber	human bn	4290	40	-19,7		Gonçalvez 2003
São Gens 1, Alentejo								
Beta-234137	Megalithic grave	Chamber	human bn	890	40	-26.1		Boaventura 2009, Annex 3
Senhora do Monte 3, Beira Interior								
GrN-21304	Megalithic grave	Hearth/tumulus	ch	5060	50			Cruz 1995

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Senhora do Monte 3, Beira Interior								
GrN-20791	Passage grave	Corridor	ch	5130	40			Cruz 1995
ICEN-1200	Passage grave	Corridor	ch	5100	70			Cruz 1995
ICEN-1201	Passage grave	Corridor	ch	4990	70			Cruz 1995
Serramo, Galicia								
CAMS-88195	Passage grave	Painting with black charcoal	ch	4900	60			Steelman et al 2005, 385.
Sobreira 1, Alentejo								
Beta-233283	Passage grave	Corridor	human bn, femur	4770	40	-19.4		Boaventura 2009, Tab.24
Sobreira de Cima 1, Alentejo								
Sac 2261	Hypogeum	Chamber	human bn	4500	50	-18.7		Valera et al. 2008
Sac-2260	Hypogeum	Chamber	human bn	4530	50	-18.7		Valera et al. 2008
Beta-231071	Hypogeum	Chamber	human bn	4670	50			Valera et al. 2008
Sac-2256	Hypogeum	Chamber	human bn	4520	35	-19.3		Valera et al. 2008
Beta-232637	Hypogeum	Chamber	human bn	4080	40			Valera et al. 2008
Tituaria, Lissabon region								
OxA-5446	Tholos	Chamber	human bn	3995	65			Boaventura 2009, Tab.22
Tremedal, Alentejo								
GrN-15938	Passage grave	Basement chamber	ch	7960	60			Ruiz-Gálvez Priego 2000
GrN-15941	Passage grave	Basement tumulus	ch	4860	60			Ruiz-Gálvez Priego 2000
GrN-15903	Passage grave	Corridor	ch	5000	60			Ruiz-Gálvez Priego 2000
Trigache 2, Lissabon region								
Beta-239755	Passage grave	Chamber	human bn, cranium	4340	40	-19.3		Boaventura 2009, Tab.22
Trigache 4, Lissabon region								
Beta-228583	Passage grave	Chamber	human bn, cranium	4450	40	-19.9		Boaventura 2009, Tab.22
Vale da Cerva, Beira Interior								
GrA-8402	Megalithic grave	Chamber	human bn	4140	45			Cruz et al. 2003
Vale de Rodrigo 2, Alentejo								
Ua-10830	Passage grave	Ancient soil	ch	4905	70			Larsson 2000, 450
Ua-10831	Passage grave	Front of the corridor	ch	3905	75			Larsson 2000, 451

Laboratory Number	Architecture/Location	Context	Material	Radiocarbon Age (BP)	STD	$\delta^{13}C$ (‰)	$\delta^{15}C$ (‰)	Bibliography
Vale de Rodrigo 3, Alentejo								
KIA-31381	Passage grave	Ancient soil		4996	29	-26.9		Armbruester 2007
Ventin 4, Galicia								
CSIC-1108	Megalithic grave/tumulus		ch	5320	40			Fábregas/Vilaseco 2003
Zambujeiro 4, Alentejo								
Beta-196093	Passage grave	Chamber	human bn	3040	40	-26.1		Rocha 2005, 189-190

Chapter 11

The other megalithic regions in Northern Europe and in the Mediterranean

Summary: In this volume, we focused on continental Western and Southern Europe and on the Central Mediterranean Islands. These are the regions with the earliest megalithic occurences in Europe in the second half of the 5th millennium cal BC and they exhibit an ongoing megalithic sequence. However, in Northern Europe and in parts of the Mediterranean megaliths make a later architectonic appearance or are restricted to the early megalithic horizons. The main tendencies regarding monumental proliferation in these areas are shortly summarized in this chapter.

Megaliths emerged in the 5th millennium on continental Western and Southern Europe and on the Central Mediterranean Islands. The here presented analysis was focused on these regions.

The other regions with megalithic architecture in Northern Europe and parts of the Mediterranean are those, where megaliths emerged or were transferred to later in the 4th or even as late as the 3rd millennium. In parts of these regions, especially in Northern Europe, extensive research projects with large dating programs and the application of Bayesian statistical frameworks are recently finished and results and publications are available, as are those for the dating of enclosures and megaliths in England and Ireland (Whittle *et al.* 2011) or Northern England (Griffiths 2011). In other regions, such as Northern Germany (Priority Programme of the German Research Foundation 'Frühe Monumentalität und soziale Differenzierung') or Southern Scandinavia (ESS-, and Döserrygg projects of the Statens historiska museum) research projects with dating programs and the application of Bayesian statistical frameworks are still ongoing, and the results are not available yet.

The main tendencies regarding monumental proliferation in these areas are shortly summarized in this chapter.

The Northern megalithic regions

Britain and Ireland

The results of recent dating projects with newly produced radiocarbon sequences and the application of Bayesian statistical frameworks are available from Britain and Ireland (e.g. Bayliss *et al.* 1997; Bayliss/ Whittle 2007; Bayliss 2007a; 2007b; Darvill 2012; Griffiths 2011; Leary/Marshall 2012; Marshall *et al.* 2013; Meadows *et al.* 2007; Parker-Pearson *et al.* 2007; Whittle *et al.* 2007; Whittle *et al.* 2011). These approaches changed our knowledge regarding the monumental sequences in these regions considerably and might have a role model character for other megalithic regions. Here, the main tendencies are shortly summarized. According to the critical evaluation of the available radiocarbon measurement stock, we have to admit that there is no ground for the existence of the very early passage graves, which are postulated in the scientific literature for the west of Ireland and Scotland. The rotunda and oval barrows in Cotswolds and southern Britain are not necessarily early types and there is too little and also unclear evidence for the early dating of the portal tombs in Britain and Ireland (Whittle *et al.* 2011: 872, Figure 12.31, 11.10).

Megaliths were built in England and Wales as dolmens and passage graves incorporated in mostly long or round tumuli/barrows. Furthermore, standing stones are registered, partly arranged as stone circles or alignments. In Southeastern England, the only cluster of megalithic graves in this region is noted for the district of Kent with the Medway tombs. Most of these tombs are rectangular long barrows with a megalithic chamber and a stone setting around the tombs. In the Southwestern part of Britain, Portal tombs, Cotswold-Severn tombs and passage graves are common. British portal tombs were built with two or several side stones, which carried a large capstone. The two side stones in the entrance area built a portal. The classical Cotswold-Severn chambered mounds are long trapezoid formed barrows or tumuli with either one or several megalithic chambers or passage graves with partly several side cells. These grave chambers are incorporated either at the short or at the long side of the tumuli. With regard to the architectonic principles, these graves are similar to the long tumuli in Northwestern France with nearly identical structures like Hazelwood and Colombierre-sur-Seulles (cf. chap. 3, p. 35). Finally, passage graves were built on the coast of Wales. They were covered by a round tumulus and exhibited a polygonal chamber and a short passage in their first stages.

The earliest Neolithic impact is documented in the very southeastern part of Britain from 4075–3975 cal BC (95%; 4035–3990 cal BC, 68%) (Bayliss *et al.* 2011a, Figure 14.177). From this region, the Greater Thames estuary with the Medway tombs is the only cluster with megalithic graves documented in Eastern England. One

of these graves is Coldrum, situated 10km west from White horse stone and is, according to radiocarbon results on human bones, the earliest known megalithic grave in Britain and Ireland. Coldrum is a partly ruined long barrow with a megalithic stone chamber or dolmen in its eastern site. It is surrounded by a rectangular setting of sarsen stones (Bayliss *et al.* 2011: 381–382). Human remains are documented in two layers. 16 radiocarbon results were recorded from separated individuals in these layers (Bayliss *et al.* 2011, Table 7.7). The modeled results suggest the construction of the grave from 3971–3805 cal BC (95.4%; 3960–3880 cal BC, 68.2%) and first burial activities in 3926–3735 cal BC (95.4%; 3881–3761 cal BC, 68.2%). A second interval with burial activities is pinpointed to 3704–3546 cal BC (95.4%; 3656–3561 cal BC, 68.2%) and lasted to 3314–3014 cal BC (95.4%; 3297–3200 cal BC, 68.2%). More grave constructions are known in Britain closer to 3800 cal BC, for example Burn Ground, Broadsands, and the Post and Sweet tracks. Broadsands in Hampnet is a trapezoidal long tumulus with transepted chambers and a transverse corridor. It is estimated to have been built in 4140–3760 cal BC (95.4%; 3860–3790 cal BC, 22%) (Dixon *et al.* 2011: 467–468, Figure 9.25).

In Southwest England and Wales, the first Neolithic activities are suggested for a somewhat later timeframe than in the eastern part of Southern England from 3855–3735 cal BC (95%; 3820–3760 cal BC, 68%). Even if there is punctual typologically early pottery documented from the Portal tombs in Southwest England (Lynch 1976), there is also evidence for a later construction of these graves (Bayliss *et al.* 2011: 545). Thus, from the Carreg Coetan portal dolmen in Pembrokeshire a series of radiocarbon results from bulk charcoal is available. These samples are all termini post quos values and suggest the construction of the dolmen after 3640–3360 cal BC (95%; 3470–3370 cal BC, 38%). From the Cotswold-Severn tombs several sequences with the application of a Bayesian statistical framework are available (cf. different papers in Whittle *et al.* 2007). These results suggest a construction of the graves between ~3800 and 3600 cal BC. The start of the constructions for these tombs is calculated with Ascott-under Wychwood to the second half of the 38th century cal BC (Bayliss *et al.* 2007b). Hazleton was built in the first half of the 37th century cal BC (Meadows *et al.* 2007, Figure 8) and the West Kenneth long barrow (Bayliss *et al.* 2007c) was constructed in the middle of the 37th century cal BC. The active use of all three graves ended in the latter part of the 37th cal BC century.

Stone circles as megalithic communal places are known from England and Wales. Most of them are situated in southwest Britain and Cumbria, whereas henges with partial timber circles are to be found more in the eastern lowlands. One of the reasons for this spatial pattern might surely be the availability of building material (Scarre 2011: 92). The largest and possibly earliest are Castlerigg, Long Meg and her Daughters, and Swinside in Cumbria.

Based on early radiocarbon results (e.g. Renfrew 1973; Müller 1998, 1999), Ireland was declared to be one of the megalithic core regions in Europe in the last decades with its most extreme example with a Mesolithic origin for the passage graves in Carrowmore, in Co. Sligo (Burenhult 1980: 111–113; 1984; 2001; 2003). After a critical consideration of the available radiocarbon stock, many of these results are termini post quos values and the early start of megaliths could not be confirmed there (Cooney *et al.* 2011: 637–657).

Comparable megalithic appearances to the British megaliths are documented in Ireland like the Portal dolmens and the passage graves, but with their own regional architectonic particularities. Megalithic graves are built in Ireland as Portal dolmens, Court tombs, Linkardstown graves, passage graves, and the later Wedge tombs and Boulder burials.

The Irish Portal tombs are constructed with two parallel side stones increasing in height towards the entrance and carrying a massive capstone. Court cairns are graves with a most trapezoid long tumulus in dry wall technique with elongated arms framing a wide forecourt to the chamber (Scarre 2007: 131). The Linkardstown tombs are, according to the classification of this analysis, either subterranean cists or small non-accessible dolmens under a round tumulus and surrounded with one or several stone circles. These graves are mostly present in the region between County Dublin and the Counties Carlow and Kilkenny and restricted to Southern Ireland.

Wedge tombs are later in date and built as accessible dolmens or galeries and covered by a half-round dry wall tumulus. The boulder burials in Cork and Kerry were constructed even later, which are more grave markers than chambers: two or three side stones carry a large capstone. There are no registered remains of tumuli (Scarre 2007: 134–147).

In this context, it is also important to note that the start of the Neolithic and the first Neolithic activities in Ireland are now not determined before 4000–3700 cal BC (95.4%; 3840–3725 cal BC, 68.2%). The beginning of the Irish megaliths is still unclear. There is too little and also unclear evidence available for the early dating of the portal tombs and also for the Court tombs. Both kinds of tombs are generally assumed to have evolved in the Early Neolithic. For the Portal tombs, Poulnabrone is the only example with a radiocarbon sequence (Cooney 2011: 604, Figure 12.31). This grave contained the remains of over 20 individuals. Nevertheless, the dating of the tombs is challenging, since there is

evidence for a possible secondary deposit of the bones according to the context and those dates would so represent termini post quos values. The most of the bones were disarticulated, an articulated neonate died considerably later. Furthermore, single bones in cracks on the chamber floor are documented. The material in the grave is from the Early or the Middle Neolithic. The oldest individual deposited in the grave died between 4270–3715 cal BC (95%; 4055–3785 cal BC, 68%). If those dates represent termini post quos values, then the construction of the grave is assumed to 3290–2520 cal BC (3165–2830 cal BC, 68%). Other available radiocarbon dates from Portal tombs in Ireland are considerably younger (Cooney 2011: 604).

The outset of the Court tombs in Ireland also remains rather unclear, even if numerous graves were excavated in the first half of the twentieth century. The available radiocarbon results were obtained mainly from bulky charcoal samples and most of them are determined today as termini post quos values. A recent sequence is available from Parknabinnia on the Burren (Jones 2004: 46–51). According to the available information, the monument was constructed between 3885–3440 cal BC (95%, 3715–3530 cal BC 68%) with a burial activity estimated to 2900–2640 cal BC (95%, 2880–2760 cal BC).

The Linkardstown tombs contain mostly individual or double burials and from Poulawack, Co. Clare, several individuals are reported (Hencken 1935). Evidence for secondary deposited bones is available, which complicates the dating of the graves considerably. A dozen of them have been a subject of a dating programme (Brindley/Lanting 1990; Cooney *et al.* 2011: 634). The beginning of these grave types is thus calculated to 3835–3500 cal BC (90%; 3710–3560 cal BC, 68.2%). The sequence for the Linkardstown tombs ends between 3425–3015 cal BC (95.4%; 3355–3180 cal BC, 68.2%) (Cooney *et al.* 2011: 637).

Like for many other regions, the determination of the construction for the passage graves is also highly problematic, since there is evidence that many available radiocarbon results are termini post quos values gained from charcoal from pre-megalithic activity layers. From nearly all passage graves with radiocarbon dates, the sequences are noted as termini post quos values (cf. Cooney 2011: 637–657, for Townleyhall, Knowth, Newgrange, and Carrowkeel, Fig 12.46, for the Mount of hostages, Figure 12.49, and for Carrowmore, Figure 12.50). The artifact repertoire places the passage graves clearly after the Early Neolithic. The critical discussion for the available radiocarbon dates and their contexts supplied a result for the beginning of the construction between 3640–3205 cal BC (95.4%; 3495–3285, 68.2%), even if this estimation is assumed to be tentative regarding the current state of research. But an outset of the construction within the fourth quarter of the 4th millennium seems most plausible. One of the characteristics of the Irish megaliths might also be mentioned that cremation practices were dominant when compared to Britain (Bradley 2007: 59–67).

Approximately 100 small stone circles are registered in the Cork and Kerry counties and they appear to date to the Middle or the Late Bronze Age (Scarre 2007: 147).

In Scotland, megalithic graves were mostly built in the western regions and in the north as dolmens and passage graves covered partly by long or round tumuli. Furthermore, dry wall structures are common. Numerous standing stones and stone circles are registered throughout the whole region. The stone constructions are more predominant in the west and the north. Clyde cairns and Bargrennan passage graves are common in Southwestern Scotland. The Clyde cairns are elongated trapezoid formed dry wall structures with a gallery chamber and inner compartments at the concave entrance façade. The Bargrennan tombs are passage graves covered by a small oval or round tumulus and situated more in isolated upland basins. Megaliths are also common in the island archipelagos of western and northern Scotland, for example on the Inner and Outer Hebrides, on the Shetland Islands, and on the Orkney Isles. On the latter, a unique megalithic landscape is preserved including megalithic tombs, stone circles such as the Ring of Brodgar, the Stones of Stenesse, and settlements like Skara Brae, Ness of Brodgar, and Barnhouse. The megalithic tombs are either built as stalled cairns with rectangular ground plans and inner compartments or as Maeshowe graves, which are passage graves with cross-formed chambers. From the Orkney Islands, the earliest radiocarbon results from individuals deposited in a megalithic grave are available from the Point of Cott on Papa Westray. This grave is a so-called stalled cairn including a chamber with a rectangular ground plan and inner compartments. The construction of the grave is calculated to 3822–3374 cal BC (95.4%; 3624–3423, 68.2%) with burial activities ongoing to 2894–2359 cal BC (95.4%; 2857–2612 cal BC, 68.2%).

While in the west and in the north of Scotland stone structures are predominant, the first Neolithic monuments were built in the lowland zone with timber or earth and timber. The chambered tombs are scarce and regarding their construction only tendencies concerning their ages can be suggested (Whittle *et al.* 2011: 875; Bayliss et al. 2011a: 808–833). The first Neolithic activities in East Scotland are noted from 3950–3765 cal BC (95%; 3865–3780 cal BC, 68%). A modeling of the rare radiocarbon dates for the southeastern Scottish chambered tombs with the potential usage dates rendered an outset of the construction from 4295–3495 cal BC (95.4%; 3800–3560 cal BC, 68.2%). The phase of the chambered tombs ended between 3625–3180 cal BC (95%; 3525–3335 cal BC, 58%).

In Scotland, numerous stone circles remain. These circles are partly built with huge stone slabs and show impressive averages of up to 90-100m, like the Ring of Brodgar on the Orkney Islands and the Twelve Apostles at Holywood in Southwest Scotland. Some of the larger circles are associated to the Neolithic, for instance the Stones of Stenesse (Bradley 2011: 182). However, the available radiocarbon results from the Stones of Stenesse from ~2900 cal BC are not necessarily connected to the erection of the monument (OxA-9763 4425±50 BP; OxA-9764, 4405±50 BP; OxA-9765, 4390±50 BP; OxA-9752; 4240±45 BP)[1] (Schulz Paulsson 2009). For the Scottish stone circles and hengue monuments, it is generally assumed that they were built during the Late Neolithic or the Early Bronze Age. The research of recent years offers interesting results regarding the building sequences and a possible erecting of the circles until the Late Bronze Age (Bradley 2005). Thus, for the Northeast recumbent stone circles, like Tomnaverie, Cothiermuir Wood, and Aikey Brae, evidence is available that the sites began as circular enclosures or as rubble platforms. The stone circles themselves were later developments. The platform at Tomnaverie provided termini post quos values from the mid to the late 3rd millennium and Bell Beaker material with the erection of the stone circle after this date. Berrybrae exhibits termini ante quos values around 1900–1550 cal BC (Bradley 2005: 101).

Belgium

The four megalithic graves, Wéris I, Wéris II, Lamsoul, and Laviô and a few dozen standing stones remain until today in Belgium (de Laet 1981; Toussaint *et al.* 2002). This is just a small part of the original megalithic corpus. Six additional graves, which are more destroyed, are known from old reports. These megaliths are situated in the region of Namur and Luxembourg and mainly within what is known as the megalithic field of Wéris. Three of these graves are gallery graves with parallels regarding the architectonic features and the archaeological material to the gallery graves of the Paris Basin. One of these, the Dolmen de Laviô, is a passage grave with a lateral corridor. The Petit Dolmen (Joussaume 1985: 41) is a typical subterranean structure, altogether 10m long with an antechamber and a Kennel hole or falsa porta (de Laet 1981; Joussaume 1985: 41). The grave goods consist of SOM-ceramics, polished axes, flint tools, and arrowheads. Close by, the Grande Dolmen is situated with a similar concept, including an antechamber and a round perforation or a port hole, but in length somewhat longer. Beside both graves, alignments of standing stones are erected. From the gallery graves Wéris and Lamsoul, altogether six radiocarbon results from human bone samples are available (Toussaint *et al.* 2006: 106–107). The earliest of these results are from ~2800 cal BC and the samples originate from the graves at Wéris I (OxA-6457 4240±65BP, 2918–2696 cal BC, 68.2%; 3013–2626 ca BC, 95.4%) and Wéris II (OxA-8956, 4240±45BP, 2908–2760 cal BC 68.2%; 2924–2669 cal BC, 95.4%).

Further destroyed graves are found at Jemelle, the Velaine, and two at Hargimont (de Laet 1981). One of the Hargimont graves was originally 15m long and contained human remains with an MNI of 200. The second monument, situated 50m to the east of the first one, was probably a dolmen, since it is described as table-shaped. It had a 5m long capstone. There are a few unspecific flint tools documented from this grave (Toussaint et al. 2002: 95).

Northern Germany, Netherlands

Megaliths in this part of Europe developed within the Northern Funnel Beaker societies and were built, shortly summarized, as dolmens and passage graves. The dolmens were constructed as simple ancient non-accessible dolmens, the so-called Urdolmen, thereafter as simple accessible or polygonal dolmens and as extended dolmens with two or three opposing orthostats and an axial access. The passage graves were constructed with oval or rectangular chambers with either an axial or a lateral corridor (Aner 1963; Müller 2011: 31; Sprockhoff 1966).

The traditional sequence of the Neolithic monuments is: non-megalithic long barrows – ancient non-accessible dolmens – extended dolmens – passage graves. The megaliths are covered by elongated, rectangular, oval or trapezoid formed tumuli, by round and even by square tumuli (Müller 2011: 34). Different construction phases are documented for example for the dolmen Lüdelsen 3 (Demnick *et al.* 2008) and the passage grave Lüdelsen 6 in the Altmark (Müller et a. 2014), and in Schleswig Holstein for a dolmen in Rastorf (Müller 2011: 37; Steffens 2009), for the monument Borgstedt LA 22 and Albersdorf LA 56 (Müller et al 2014) and for monument LA3 in Flintbek (Mischka 2011). The sequence non-megalithic tumulus in several phases-tumulus with megaliths seem common. This, together with the fact that bone material is rare in the region and that samples for the radiocarbon dates are most restricted to charcoal makes Northern Germany one of the regions of most difficulty dating similar to Brittany and the Westiberian peninsula. We have already been pointing out at several occasions in this analysis (cf. chap. 2, p. 9; 3, p. 54, matrix Figure 3.73) the methodological difficulties in dating multi-phased sites based on charcoal samples. The possibility is given, that such charcoal is mixed up while building activities from layers under the grave or transported with the building material from somewhere else and is according to that not connected to the construction of the megaliths.

[1] http://www.historic-scotland.gov.uk/radiocarbon-dating-detail.htm?CD_ID=2562-2565, 4. März 2008.

Nethertheless, there are sites with human bone material and the best available evidence for the emergence and development of megaliths in Northern Germany is provided from the necropolis of Flintbek near Kiel and the Western Baltic (Mischka 2011, 2011a) with a recently produced radiocarbon sequence. The necropolis of Flintbek contains 88 Neolithic and Bronze Age burials. Here it was possible within monument LA3 to determine the transition from non-megalithic wooden constructions to stone structures based on 32 radiocarbon results and the application of a Bayesian statistical framework. These structures are not further defined, since they were solely identified according to the pits remaining after the removement of the orthostats in ancient times and they were either non-accessible (Urdolmen) or accessible dolmens.

Due to acidic soils, bone preservation is poor in the region and the main part of the samples, altogether 24, stem from charcoal. However, five radiocarbon measurements from bone samples are available from altogether four dolmens at the Flintbek site. Four of these are from human bones; one is gained from an animal bone. Control measurements of carbon and nitrogen values did not indicate any reservoir effect on the bones and the fact that the bone samples gave results dating ~100y earlier than the charcoal samples was interpreted by Doris Mischka as being a secondary deposition of bone material from earlier burials in the chambers (Mischka 2011: 754). This hypothesis should not be cast away a priori, since the secondary deposition of earlier bone material is well documented from other European regions, for example from Northwestern France and Ireland (cf. chap. 3, p. 83; chap. 11, p. 301).

The sequence of the monument was, according to this presumption, reconstructed as follows: the first stages of the 53m long tumulus LA3 in the northeastern part of the cemetery was represented by up to eight non-megalithic graves, starting with the earliest grave A at ~3500–3480 cal BC, which was covered by a round earthen tumulus. The further graves B to H were covered by round overlapping tumuli and thus finally built an elongated tumulus. The monument reached its final size with four dolmens incorporated into the enlargement of the tumulus. The earliest dolmen I was hereby erected in the second half of the 35th century cal BC and the construction calculated by Bayesian statistical framework to 3475-3417 cal BC (95,4%; 3462-3432, cal BC,68.2%). Mischka 2010, Figure 2, for the 95,4% interval pers. commitment Mischka). The whole sequence from monument LA3, starting with Grave A and ending with the construction of Dolmen III, is calculated to between ~3500–3400 cal BC and to a time span of ~100 y (Mischka 2011, Figure 2, 755).

Earlier dating propositions for other megalithic structures in Northern Germany with no bone material available, based on radiocarbon results from charcoal, for example for the extended dolmen Lüdelsen 3, the construction is determined to ~3650 cal BC (Müller 2011: 35). For the three megalithic graves Borgstedt LA 22 and Albersdorf LA 56 and Lüdelsen 6 recently produced radiocarbon sequences are available. Albersdorf LA 56 is a long tumulus built in two phases. The first tumulus is a non-megalithic mound; the second tumulus construction is associated to dolmen chambers. The construction date for the megaliths is specified to 3670 BCE (Müller *et al.* 2014: 176) based on two charcoal samples (alnus) from the second mound.

Nevertheless, the mound is described as highly destroyed and the sods and sandy material for the second mound are transported from somewhere else on the site. The context of this charcoal needs more source criticism and the early chronological setting of these megaliths is not on solid ground. We face the same problem with the multi-phased grave Borgstedt LA 22. The pre-megalithic tumulus from Borgstedt LA 22 is set on 3970-3800 cal BC (Müller *et al.* 2014), based on two charcoal samples from a posthole of the mound enclosure, which represents a typical terminus post quem situation. One charcoal sample from the extended dolmen is measured to 3700-3650 cal BC.

The construction of the megalithic grave Lüdelsen 6 in the Altmark is calculated to somewhat later to 3400 BCE (Müller 2014: 174). Lüdelsen 6 is built in three phases with two pre-megalithic tumuli and a third and final phase with a passage grave (Demnick *et al.* 2008). There are altogether eight radiocarbon dates available (Müller 2014: 174) gained out of charcoal (birch/alnus/acorn). The emergence of the first pre-megalithic tumulus is calculated to 3650 BCE.

Contemporaneous multifaceted non-megalithic burials and burial rites are recorded and associated with the megaliths from the Funnel Beaker regions. The common flat graves are organized either as single graves or as small cemeteries. These flat graves can be partly compared to the megalithic graves and a part of them exhibit elaborated constructions and suggest a remarkable labor effort, which was invested in their construction (Kossian 2005).

No megalithic communal places are documented from the Funnel Beaker regions. Communal places were constructed as non-megalithic causewayed enclosures with a ditch system and partly in combination with a palisade construction. In the Northern group at least 16 early enclosures can be found from 3600 BC onwards (Klatt 2009; Müller 2011: 23) with Büdelsdorf and Sarup on Funen as the earliest known sites. Until now, three causewayed enclosures are documented in Northern Germany, which emerged in this region within the second half of the 4th millennium (Andersen 1997;

Müller 2010; 2011: 22) in the Late Early Neolithic. The quantity of the archaeological material, for example from Albersdorf-Dieksknöll, cannot be compared with the material from domestic sites. The evidence suggests that the communal places were sites for temporal activities like feasting and ritual gatherings (Brozio 2011; Dibbern/Hage 2011; Müller 2011: 27). There are also recently excavated causewayed enclosures documented, which are interpreted as fortified settlements, for example in the northwestern end of the Central German region and in the Southern Funnel Beaker group with the enclosure of Hundisburg-Olbetal (Fritsch/ Lindemann/Müller/Rinne 2010).

Further to the south approximately 40 gallery graves and similar forms are documented today from Westphalia and Hesse on the northern border of the Central Germany uplands (Schierhold 2009; 2012). These gallery graves are classified into several regional groups with distances of up to 30km between each other. The gallery graves were constructed from ~3400 cal BC onwards and are between 10m and 35m long and 2m to 3m wide. Like a part of the North French constructions, these graves were completely built subterranean and incorporated into the ground and as a further parallel to the French graves a part of the entrance stones exhibit portholes. The gallery graves were covered or marked by a flat tumulus. Two main architectonic types are distinguished: the Züschen graves with an access on the smaller, axial side and an antechamber and the Rimbeck graves with an access on the longer, lateral side. The gallery graves are collective burial sites with an MNI of up to 100 and a normal demographic distribution with both sexes and all age classes.

In the Western Funnel Beaker regions in the Netherlands approximately 54 megalithic graves, locally named hunnebedden, remain (Louwe Koojmans *et al.* 2005: 288–289). These graves are built as either extended dolmens or they are, according to their architectonic concept, comparable to the gallery graves: they exhibit a rectangular ground plan with several orthostats arranged in two parallel lines covered by several cap stones. Many of the graves exhibit remains of an earthen tumulus. The hunnebedden were constructed in the Drouwen horizon (~3400–3050 cal BC). Due to the acidic soils, no bone material is preserved and it is not possible to reconstruct the burial rites. Contemporaneous individual graves in flat caves and stone cists are common.

Scandinavia

Scandinavia is a special megalithic region with an advanced current state of research. It is the only place in Europe with radiocarbon dates directly referable to the constructions of the megaliths produced from birch bark as a filling material between dry walls. Compared to the more southern Funnel Beaker regions, the bone material is preserved and it is possible to reconstruct the burial rites. Furthermore, several radiocarbon sequences from Scandinavian megalithic graves are available (Schulz Paulsson 2010). Therefore, this region deserves a closer consideration within this last chapter.

The most megaliths in Scandinavia are registered from Denmark and in this region from Eastern Jutland, Southern Denmark, and from Zealand. In addition, graves are known from the Swedish coastal regions and from an inland dense concentration in Västergötland. A few graves can also be found on the southwestern coast of Norway.

The megalithic graves can be classified into three main groups: dolmens, passage graves, and hällkista. These graves are embedded into a primarily earthen tumulus, partly with an encompassing stone setting. The dolmens are built as ancient non-accessible dolmens and simple accessible dolmens and in the regional terminology classified as round and long dolmen according to the form of the mound or the stone setting. Passage graves are partly built with dry walls between the orthostats and also in Denmark as twin graves. The hällkista or hellekisten are, with regards to their architectonic concept, either half-subterranean or subterranean gallery graves or smaller stone cists. To distinguish the Neolithic hällkista, which are larger and built with different proportions from the most much younger constructions, they are named megalithic hällkista in the regional literature (Ahlström 2009: 9). The traditional research opinion assumes that megaliths were built from the Neolithic to the Iron Age from ~4100 BC–1700 BC and that the sequence includes dolmens in the Early Neolithic, passage graves in the Middle Neolithic, and hällkista in the Late Neolithic or Copper Age (Ahlström 2009: 9; Blomquist 1989; Montelius 1905; Persson/Sjögren 1995; 2001). This sequence has been questioned in the last years (Persson/Sjögren 1995; 2001; Sjögren 2003: 98).

The emergence of the Scandinavian dolmens is, when compared to the passage graves, less secure. Recent excavations projects on the dolmen necropolises ESS and Döserrygg in Scania[2] showed one more time the difficulty of dating dolmens in Scandinavia based on charcoal samples. In Scania we have a similar situation as in Denmark and many of these graves were destroyed long before the excavation and are preserved as impressions in the soil. There is nearby no bone material available. Both necropolises ESS and Döserrygg are multi-phased sites with evidence for Mesolithic or very Early Neolithic activities from layers either under or immediately around the dolmens and the dolmens

[2] From the Statens historiska Museet (formerly known as riksantikariembetet).

are only preserved as impression from the orthostats in the soil (Andersson/Nilsson 2009; Andersson *et al.* 2015; Lagergren et al 2013). For both sites large radiocarbon sequences with mostly charcoal samples are produced with the application of a Bayesian statistical framework. Despite the contextual difficulties, there are indications for the beginning of the dolmens in the Early Neolithic in the time interval between 3500-3300 cal BC. This dating is also supported by the archaeological material in front of the dolmen entrances. [3]

Beside the two mentioned sites, 24 radiocarbon dates are available from a total of 11 dolmens and long dolmens in Scania, Västergötland, Bohüslan, and Smaland. At least 7 of these dates are certain termini post quos values. The oldest possible construction or use is positioned within around 3490 cal BC, based on a charcoal sample from the chamber of the dolmen Holtenes III in Västergötland (T-5828, 4660 ± 80 BP; 3626–3359 cal BC, 68.2%; 3640–3113 cal BC, 95.5%) (Sjögren 2003: 99). This is a similar time interval as proposed for the dolmen necropolises ESS and Döserrygg. Reliable dates for the use of the dolmens is provided by a bone sequence from Kinneved 21 with the beginning of use in 3500–3097 cal BC (95.4%; 3492–3118 BC, 68.2%; GrA-15135) (Sjögren 2003: 98) and Falköping västra 7 (GrA-15142, 4560 ± 60 BP; 3486–3110 BC, 68.1%; 3505–3031 BC, 95.4%) (Cullberg 1961). There is no evidence yet for a clear context with Early Neolithic archaeological material from a dolmen chamber from the Swedish west coast around Bohüslan and from Scania (Sjögren 2003: 101), the Early Neolithic material was found in the mound or entrance area. The radiocarbon dates, however, indicate the beginning of the early dolmen tradition between 3500-3300 cal BC.

Twelve radiocarbon dates are available from dolmen contexts in Denmark. The earliest dates with secure prior information which can be connected with the construction and the burial activity are contemporary to the passage graves with the earliest results from a bone deposit in Klokkehoj (K-2954/K-3015, 4550 ± 65 BP, 3368–3106 cal BC, 68.2%; 3501–3026 cal BC, 95.4%). There are five earlier radiocarbon dates available from charcoal from between 3500–3300 cal BC, which all derive from typical terminus post quem contexts. These are samples from the long dolmen of Vroude Hede, Ølstykke, and Kjeldbäckgård (Jørgensen 1977, Midgley 1992: 497). More indications for the age of the dolmens are provided from the archaeological material found in the graves. From a study in Sydfyn, it is known that in 22 of 201 megalith graves Early Neolithic material (including Fuchsberg material) was discovered (Sjögren 2003: 101; Skaarup 1985).

There is more evidence for the age of the passage graves (Schulz Paulsson 2010) in Scandinavia. The first passage graves, based on the available radiocarbon dates and a Bayesian statistical framework, were built in the 34th century cal BC on the Swedish Islands Oland and Gotland, which are both situated in the Baltic Sea. On both islands, the graves are clustered in small colonies on the west coasts, suggesting that the passage grave tradition and the megalith builders had migrated from elsewhere, for example from the south.

From the grave Mysinge 2 on the west coast on Öland, successively deposited human remains are recorded and a sequence of those human remains with altogether 34 radiocarbon dates is available. These results from separated individuals show burial activities over a time span of 2290 y (Papmehl-Dufay 2006; Ericsson *et al.* 2008) and stable isotope values, which indicate no terrestrial or marine reservoir effect on these bones. The oldest burial in the first phase of the grave was thus deposited at ~3390 cal BC (GrA-16855, 4685±40 BP, 3409–3364 cal BC, 68.2% probability and 3504–3349 cal BC, 95.4% probability). From the only known megalithic grave Ansarve Hage in the Tofta Parish on Gotland, altogether five radiocarbon dates are available from an MNI of 29 with the earliest individual buried at ~3350 cal BC (Ua-3785, 4640±70 BP, 3619–3351 cal BC, 68.2% probability and 3635–3112 cal BC, 95.4% probability).

A third region, Västergötland, provided very early dates with the results from the passage grave Gökhem 17 (Schulz Paulsson 2010; Sjögren 2003). Two radiocarbon measurements Ua-13551, 4700±110 BP and St-11267, 5005±235 BP were available from the individual E 'Babsan' from the lowest level of the grave, which were calculated with the r_combine function to 3629–3379 cal BC, 68% and 3713–3118 cal BC, 95% and therefore shortly before the transition to the 35th century BC at the end of the Early Neolithic. A third control measurement provided a result from a later time interval ~3300 cal BC[4] and thus we have to take the contamination of the bones with older organic material into account and consider that those two early results are no longer significant.

The passage graves in Denmark were constructed somewhat later. Here it is possible to establish a building sequence for the passage graves on the basis of results gained from birch bark, which was used as filling material in the dry walls between the orthostats (Dehn/Hansen 2006). Therefore, the samples can be directly connected to the construction of the graves. Ten of these results are available from altogether eight Danish passage graves. The birch date sequence was established under the presumption that the graves were built within a short time period, within a couple of weeks, and that the bark was harvested in the same year (Schulz Paulsson 2010: 1012). There are no traces

[3] Personal communication with Magnus Andersson 2015.

[4] Personal communication with Karl-Göran Sjögren.

of restoration work inside the monument. In this case, it was possible to combine the dates within the graves Jordhøj and Olshøj. The construction of the passage graves therefore starts with Hvalshøje and Snibhøj on north and northeast Jutland and with Raevehøj on Sjaeland at ~3300 cal BC (3506–3111 cal BC, 95.4%, 3487–3117 cal BC, 68.2%) and ends with Olshøj around 2900 cal BC (2916–2886 cal BC, 68%; 3019–2876 cal BC, 95.4%) and the sequence for the construction of the passage graves from birch bark dates thus lasted ~400 y , between ~3300 and 2900 cal BC. Seven of the passage tombs were built within 270 years between 3370 and 3100 cal BC. Only Oldshøj was built later around 2900 cal BC.

Judging from the archaeological material, the oldest ceramics from passage graves belong to the Middle Neolithic Ib. The passage graves were primarily constructed during this phase or even in the following Middle Neolithic II (Sjögren 2003; Skaarup 1985). This is compatible with the birch bark dates.

Regarding the burial rites, the research of the last years in Sweden offered instructive results and supplied new aspects for the research of megaliths for all of Europe (Ahlström 2003; 2009: 51–66; Sjögren 2010). It is an old debate, which started with the first excavation in the late 18th and early 19th century, whether the megalith graves in Sweden are tombs or ossuaries. The scientific opinion concerning this has shifted from proper tombs to ossuaries and then to proper tombs again (Shanks/Tilley 1982).

The MNI from 18 investigated megalithic graves with bone material in Sweden varies between 6 individuals at Hunnebo, Öllsjo and 131 at Rössberga. Hereby, the dolmens are collective graves with an MNI of between 18 and 25 individuals as well. Recent anthropological investigations of fourteen graves are available (Ahlström 2009). The entire bone material was unburnt and strongly fragmented. No anatomical pattern can be observed such as the absence of the same bone category in several graves. This would be an indication that a ritual, such as the removal of special bone categories, is the reason for the composition of the bone material documented from the graves, as is postulated by Shanks and Tilley (Ahlström 2009: 73–81; Shanks/Tilley 1982). The composition of the preserved bone material would, in this case, be the result of a taphonomic reduction. Further investigations exhibited that the dead were deposited in an upright sitting position, as is already noted in the old excavation reports from the 19th century for several graves (Ahlström 2009: 51–66; Sjögren 2006) From the passage grave Frälsegarden in the parish of Gökhem, an intact bone layer with two articulated individuals and disarticulated bone material was exactly documented during an excavation in 2001. This allowed the reconstruction of the burial rites. The rotation and articulation of some of the skeleton parts implied that the bodies were deposited in an upright sitting crouched position. The measurement of the bones and bone categories und the use of statistical methods for the point pattern analysis, for example Nearest Neighbour and Ripley´s K-function, indicated the same results. The bones were placed in ordered patterns or clusters and the spreading of the bones was no coincidence. Clusters were mostly built from bones from the axial skeleton including the cross bone, the cranium, the atlas and the axis, vertebrae, and hips. The Ripley´s K-function rendered that the foot bones were more clustered than the hand bones (Ahlström 2003). These analyses together with the context of the bones indicate that the buried were sitting upright in a crouched position against the orthostats most probably orientated with their faces towards the entrance and that the anatomic pattern is the result of movement developed during decomposition. Wild pig feet are a normal category found in Swedish megalithic graves with up to 61 exemplars in Frälsegarden. They suggest that these bodies were wrapped in animal skins (Ahlström 2009: 94–96).

The other Mediterranean megalithic regions

In general, the megalithic graves in the remaining megalithic Mediterranean regions like Apulia, the Balaeric Islands, and possibly Sicily are hypothesized to be mostly Late Bronze Age appearances. Nevertheless, a few scattered, partly very early megalithic graves are known from Northern Italy and also Southern Italy, indicating a transfer of the early megalithic tradition from other megalithic Mediterranean regions like Southern France or Corsica.

The Balearic Islands

Based on 781 radiocarbon results, studies in recent years allowed the reconstruction of the prehistoric sequence on Mallorca and Menorca (Gili *et al.* 2005; Micó 2005). The Balearic Islands were, in comparison with other western Mediterranean islands with megalithic architecture like Sardinia, Corsica or Malta, occupied relatively late. While Neolithisation on these three islands starts as early as the 6th millennium cal BC, the permanent occupation of the Balearic islands proceeds from the second half of the 3rd millennium cal BC onwards (Alcover *et al.* 2001; Gili *et al.* 2005; Lull *et al.* 2004; Micó Perez 2005).

The available radiocarbon results suggest that some centuries later during the first quarter of the 2nd millennium cal BC, the settled societies began with the construction and the development of an outstanding local megalithic architecture with ongoing building activities up until the Roman conquest in 123 cal BC (Gili *et al.* 2005: 829). Rock-cut tombs, dolmens, caves with entrance-walls, and boat-shaped tombs (navetes) served

as graves constructed in an overlapping chronological order. Belonging to this megalithic architecture as well are boat-shaped housed (naviformes), megalithic towers-like structures (talaiots), and t-shaped structures (taulas), which are standing stones up to 5m high with a capstone on the top.

The first graves on Mallorca and Menorca were built at the latest from ~2200 cal BC onwards as simple rock cut tombs with a passage and a façade constructed with large stone blocks as first megalithic elements, for example at Biniai Nou (Micó Perez 2005: 41–43). A few centuries later at ~1800 cal BC dolmens were built for a relatively short period, mainly on Menorca, for instance at Ses Roques Llises and on the northeastern coast of Mallorca at S'Aigua Dolca. These dolmens are constructed with a small rectangular chamber, an entrance area or short corridor oriented to the southwest or to the west and they are usually surrounded by a circular platform similar to the dolmens in the area of the Pyrenees (cf. 4.3 and 5.3). They are collective graves with the remains of some dozens of individuals and with indications for a successive burial practice. The dolmen architecture, the ceramics, and the presence of 'tortoise-shaped' buttons exhibit parallels to northern Catalonia and southwestern France (Chevalier 1984; Clop/Faura 2002; Gasco 2004; Gili *et al.* 2005; Lull *et al.* 2004; Vilardell 1987). This evidence suggests that the megalithic idea reached the islands by way of a transfer or even a migration. Based on the radiocarbon results, the abandonment of the dolmens is determined to ca. 1550 cal BC (Gili *et al.* 2005: 832).

In the beginning of the so-called naviform period on Mallorca and Menorca, a new type of rock cut tomb was built with houses in boat form at ~1600 cal BC. The megalithic entrance is replaced by a dromos and the underground chamber is extended into an elongated space with a final apse. At approximately 1450 cal BC, natural caves were used as burial places with megalithic entrance constructions with the walls similar to the naviform houses. The grave Ses Arenes represents a transitional structure between the dolmens and the boat-formed graves, the navetas. The beginning of the navetas is not clear yet, but the abandonment of the navetas and the caves with megalithic walls is calculated to the 9th century cal BC.

Hundreds of megalithic towers (talaiots) are contemporaneous on Mallorca and Menorca and similarly constructed to the Sardian nuraghi and the Corsican torres. These generally occupy different locations than those chosen by the Naviform societies (Gili 1995; Gili *et al.* 2005). The t-shaped taulas are megalithic monuments with partial colossal dimensions measuring up to 5m high. The taulas are restricted to the island of Menorca and generally related to a later Talayot horizon. Their function is unknown until present. They possibly functioned as altars or meeting places of small societies or clans, or as anthropomorphic stones and symbols for outreaching personalities of the society, mythical figures, or the supernatural.

Italian mainland and Sicily

From Northern Italy, few scattered megalithic graves are documented. This region is not a megalithic region in the classical sense, since the megalithic building tradition never prevailed in this region and other burial forms such as cists, pit burials in the open air, or in caves remained more common.

Small single non-accessible dolmens without stone circles are documented from Northern Italy from the Middle Neolithic Vasi a Bocca Quadrata square-mouthed pottery horizon like in La Vela-Trento (Grazia Melis 2012, forthcoming; Pedrotti 1998: 21) and the Chassey-Lagozza horizon, e.g. Maddalena di Chiomonte-Torino (Bertone/Fozzati 1998: 30–42). Thus, they were constructed in the second half of the 5th millennium cal BC. Maddalena di Chiomonte-Torino near the valley of di Susa in Liguria is a necropolis consisting of seven small non-accessible dolmens. A few further single simple dolmens are known, for example the dolmen de Monticello, and in the Piedmont the simple dolmen de Bassi with a small standing stone, and the dolmens della Biscia.

From the southern Italian mainland in Apulia, a megalithic grave with Final Neolithic Diana-Bellavista material is known from the grave Madonna delle Grazie in Rutigliano in the region of Bari. This structure seems to be a non-accessible dolmen or a megalithic cista. There are a few more of these graves documented from the region (Ciancio/Radina 1979; Cipollini Sampo *et al.* 1998: 51). In addition, typical burial forms in the region include cists, earthen graves, and burial shafts (Grazia Melis 2013, forthcoming; Manfredini 2001).

Further small megalithic occurrences are registered from Apulia (among others Malagrinò 1978; Orlando 1995; Palumbo 1956; Striccoli 1985; Whitehouse 1967; 1981) and two regions with a completely different grave architecture in Bari-Tarente and in Otranto.

From the Bari-Tarente region altogether 12 preserved megalithic graves are registered, which are all situated close to the sea. They are simple dolmens with a quadratic chamber or gallery graves with lengths varying between 3m and 17m (Whitehouse 1981). The remains of oval or rectangular tumuli are partly visible. Some of these gallery graves exhibit inner compartments, for example at Corato and Giovinazzo. Furthermore, a perforation hole in one of the inner compartment stones is registered from Corato. Giovinazzo is one of the largest graves covered by a cairn measuring 27m in diameter.

The most of these megalithic graves were cleared out in ancient times; just a few human remains and little archaeological material were preserved, for example from the gallery graves of Bisceglie and Giovinazzo (Whitehouse 1981). Bisceglie is a construction with a length of 12m and a width of 2m with four orthostats on each long side. A huge cap stone is placed on the 2m high western part. The remains of around 13 human individuals are documented, most of them are disarticulated, whereas some were articulated and deposited in a flexed position. This context is an indication for a successive burial practice. The disarticulated remains of nine adults, two juveniles, and two children are recorded from Giovinazzo. All of them are disarticulated and were placed in the same compartment of the grave (Joussaume 1985; Whitehouse 1981). From these graves, Mycenean I ceramics are also registered, showing the subsequent use of the sites. The archaeological material from Gionazzo and Leucaspide is from the Proto-Apenin B horizon of the Early Bronze Age.

The other group with 16 registered graves is clustered in the region of the Port d´Otrante in the very southeast of the south Italian heel. They are completely different structures when compared to the Bari-Tarente group exhibiting small dolmens with a sub-circular or polygonal chamber, varying in length between 2m and 4m, and covered by a singular cap stone. The remains of a tumulus are partially visible. There is no archaeological material available from these graves. Furthermore, approximately 100 standing stones are registered which cover regions as far as those with the megalithic graves on Apulia. They are up to 4,7m high, for example Lu Chiofilu near Martano and partly anthropomorphic formed. Some standing stone statues are documented, for instance an isolated group of statues in Castelluccio dei Sauri with breasts in relief and collars, or like the standing stone statues from Mattinata (Tor di Lupa), which are depicted with daggers (Orlando 1995; Palumbo 1956).

The location at the coast and the architectonical features of the megalithic graves in Apulia indicate a transfer of megalithic building skills from somewhere else, for example from Southern France or Sardinia. The graves of the Otranto group are possibly older then the graves of the Bari region.

From Sicily, further single megalithic graves are registered, which are assumed to be late megalithic appearances and built in the Bronze Age (Piccolo 2007). On Western Sicily, the two megalithic graves Mura Pregne by the Monte San Mauro and Sciara by Sciacca are registered. Most graves are known from the eastern part of the island from the Monte Bubbiona by Mazzarino, Butera in Piano Messe, Cava dei Servi by Ragusa, Cava Lazarus by Rosolini and Avola.

Most of these graves are simple dolmens. Special forms for the region are found in Butera, which is a small non-accessible dolmen, and Mura Pregne, which was built with a rectangular corridor-like antechamber.

Switzerland

The dolmens from Petit-Chasseur are a further small cluster with megalithic graves with their own regional peculiarities (Besse 2014; Gallay 1971, 1989; 1989b; Harrison/Heyd 2007; Stöckli *et al.* 1995). The earliest of these graves, such as M VI and M XII, are structures with a rectangular ground plan, a lateral entrance, and a forecourt formed by the elongations of the long triangular tumulus or platform. The later final Neolithic Antenna-dolmens are built without the characteristic forecourt. The outset of the burial activities in Petit Chausseur is calculated on the base of 14 radiocarbon results (Gallay 1986: 53-54) to 3121–2619 cal BC (95.4%; 3030–2704 cal BC, 68.2%) with a span of burial activities from 517–898 y, 68.2%.

These graves were collective graves with successive burial practices and dolmen M XII contained human remains with an MNI of 90. The entrance stones are partly configured as anthropomorphic steles with daggers or collars, similar to steles in the Mediterranean in Southern France or Italy. Bell Beaker material verifies the subsequent use of the graves.

A gallery grave, Aesch, is documented in the northern part of Switzerland in Basel. The available radiocarbon results (Ewald/Sedlmaier 1994: 132; Suter/Bacher 1994: 310) suggest the construction of this grave at ~2500 cal BC (2535–2371 cal BC, 68.2%; 2678–2316 cal BC, 95.4%) and the time interval of use ranges from 0–198 y, 68.2% and 0–483 y, 95.4%.

Chapter 12

Synthesis: the emergence and spreading of megaliths and megalithic societies in Europe

Summary: The last chapter synthesizes the main results presented thus far in the precedent parts of the volume and provides possible scenarios for the emergence and development of megaliths in Europe. Moreover, it offers a theoretical discussion concerning the significance of megaliths for prehistoric, non-literate societies.

The discussion of megalithic proliferation in the preceding chapters demonstrated 1) the homogeneity of the architectonical concepts of monumental and megalithic architecture in Europe, 2) the similarities regarding the initial megalithic stages and ongoing architectonical developments and 3) the cognate modification of the burial costumes.

To return to the core questions of this analysis: is this homogeneity the result of a convergent, though independent development, as proclaimed in the research literature of the last decades (cf. chap.1, p1.2), or is there evidence for a transfer of megaliths either by direct migration or by the conveyance of an ideology or the knowledge of megalith building during the 5th and 4th millennia cal BC millennia? To conclude, the main results regarding the emergence of megalithic architecture in Europe and the development of megalithic societies presented thus far are summarized here.

Standing stones as the first megalithic monuments?

Standing stones - either isolated or arranged as circles or alignments - are a common feature of the megalithic landscapes in Europe with thousands of registered anthropogenic erected stones. An exception is represented by the Funnel Beaker area, where this costume is nearly unknown in the Neolithic. Unfortunately, in comparison to the grave architecture, no contenting dating method is available for a chronological classification of the standing stones (cf. 1.2). Organic material and the samples recovered to gain radiocarbon results from the foot of the stones are not necessarily connected to their erection. The results from methods, such as OSL-dating, solely reflect the millennium in which the stones were erected and are accordingly inapplicable for closer determinations. Nevertheless, for a few standing stones the stratigraphy of the site or their association to, for example, settlements or graves render indications of their age and that they are even partly antecedent or contemporaneous to the earliest megalithic grave architecture in the regions. For instance, small standing stones are documented from the Mesolithic graves J and K in Höedic (Case 1976; Cassen 2011: 4; Scarre 1992; Scarre *et al.* 2003: 76). The pits left after removing the standing stones of the lost alignment close by the Table des Machands and Er Grah in the Morbihan were covered by a layer with Recent Castellic material, giving a *terminus ante quem* for the erection of the standing stones. For the West Iberian Peninsula, a part of these standing stones, such as Fontaínhas in the Alentejo, are located on the basement of the archaeological settlement material close by and discussed as being associated with the Early Neolithic or even the Mesolithic (Calado 2003; 2004; Calado/Rocha 2006; Calado *et al.* 2007).

The very beginning: first monumental non-megalithic grave architecture in Europe

Before we turn our attention to the earliest megalithic grave architecture, it is necessary to focus on the very beginning and present the earliest monumental, but non-megalithic grave architecture in Europe. These early monuments emerge in the beginning of the 5th millennium in the Paris Basin in Northwest France with the graves of the Passy type and especially with the Passy necropolis itself (cf. 3.1.1) (Chambon 1997; 2003; 2010; Duhamel 1997; Lemercier *et al.* 2010; 2011). The Passy graves are impressive labor intensive structures with a length of up to 280m, built as round earthen tumuli covering single or a few burials and enhanced with long palisade systems. 19 monuments are known from the Passy necropolis covering altogether 26 burials. For 17 of these individuals, radiocarbon results are available. The earliest individual died in ~4960 cal BC (5029–4946 cal BC, 68.2%; 5061–4858 cal BC, 95.4%). The measurement of the last burial yields a time span ranging from 4356–4238 cal BC (95.4%; 4342–4283 cal BC, 68.2%). According to these results, the individuals in the graves do not represent the whole society, since maximally one burial per generation is calculated. The implication of this argument might support the conclusion that the Passy graves were the burial sites for a selected part of the Passy societies such as the religious, social, or political elite. The fact that over half of the buried individuals are children with no or little grave goods shows that this conclusion might again be

a far too easy presumption. Based on the grave goods, is appears that only four of the altogether 26 graves emphasize the hypothesis of elite graves with prestige goods, such as the so-called Eiffel towers objects, which are interpreted as ceremonial bone spears. These distinctions may imply another hypothesis: the sites were rather monuments with graves than monumental graves. This suggests that the monuments were not primarily conceived as graves, but rather as communal places for social life and the performance of rituals for the whole society. In this case, we have to understand the burials rather as founder graves, as protection markers of the selected sites, or even as some type of fetish symbol. The pre-monumental grave forms in the region are limited to pit burials and there are no known transitional structures leading to the Passy graves. We do not know much about the motivations behind the arising 'monumental behavior' of the Passy societies, whereby solely anthropological records provide possible interesting indications for the economical circumstances under which these monuments were built. Evidence, such as several traces of malnourishment during growth periods and an early age of death under 20 y of age of most individuals, suggests that the Passy graves were built as a necessity in times of dearth and a lack of resources. We also have to take another hypothesis into account: the buried individuals had no fully access to the resources of the Passy societies.

From Brittany, not many reliable radiocarbon dates are available for the definition of the emergence of monumental grave architecture. The graves J and K from the Mesolithic graveyard Hoëdic in the Morbihan are discussed as a possible transitional form leading to the monumental grave architecture (Case 1976; Cassen *et al.* 2011: 4; Scarre 1992; Scarre *et al.* 2003: 76). The pit burial graves were covered by low mounds and small standing stones were placed in front of the graves. Both the radiocarbon results as well as the stable isotope values of the bones and the connected reservoir effect indicate their contemporaneity to the earliest megaliths in the Morbihan. The first monumental, but non-megalithic graves in Brittany were built as long or round tumuli (*tertre*), covering pit burials, stone cists and dry wall chambers as the first phases of the tumuli Carnacéens. These emerge somewhat later than the early structures in the Paris Basin. The first stage of the tumulus Carnacéen St. Michel with a dry wall chamber aboveground covered by a small tumulus is measured according to the results of a cremated bone to the time interval 4782–4594 cal BC (95.4; 4724–4618 cal BC, 68.2%). This early monumental phase is associated in Brittany partly to remarkable grave inventories with an accumulation of prestigious grave goods fabricated from exotic raw materials such as jadeite axes and variscite beads (among others cf. Cassen *et al.* 2011; Herbaut 2000; Klassen 2000; Klassen *et al.* 2011; Pétrequin *et al.* 1997; 2006; 2008; 2010). The tumuli Carnacéen were successively extended over centuries and there are indications that, for example, the St. Michel did not reach its final, presently visible colossal form before the Recent Castellic horizon from ~4270 cal BC onwards. Again, we question whether these sites in their final form represented the burial places for selected persons in the Carnac societies with the construction effort being a communal undertaking or if the purpose of these monuments should rather be identified as a type of social meeting place as already discussed for the Passy graves where the graves were assumingly incorporated into a communal place.

The emergence of megalithic graves in Europe

The first megalithic graves in Europe are non-accessible structures built with stone slabs aboveground and mostly covered by an earthen round or less common long tumulus. These graves emerge in the second half of the 5th millennium cal BC in Northwest France, on the Channel Islands, in Catalonia, in West and Central Southern France, in Northern Italy, on Corsica and on Sardinia. Moreover, Andalusia and Galicia presumably belong to these early megalithic occurrences, the available data base does not yet permit a definite classification. Reconstructed from the few contexts with available bone material, for example, Tumiac in the Bretagne, El Padró in Catalonia and the necropolises Camp del Ginèbre or Najac in Southern France, are those the graves for single inhumations or the burials for a few persons. The early megaliths emerge in Europe within the same time interval or with a short time delay.

In Northwest France, the first megalithic structures are known from Brittany and possibly from the Channel Islands (cf. 3.2.2). Since there are far too few reliable radiocarbon results or sequences available, it is not possible to untangle the nuances of the emergence of megaliths in Northwest France and it is thus only possible to formulate tendencies. The earliest megalithic graves in Brittany are built within the *tertre* - round and long tumuli - and are represented by ancient non-accessible dolmens such as Tumiac, Kervinio, Castellic, St. Germain, Manio 5, Mané Hui, and the first phases of Kerlescan (Boujot/Cassen 1992; Cassen *et al.* 2000: 551–554; Soler 2007: 124–125). For these early megaliths, no radiocarbon determinations are available. It is only possible to limit the time interval of construction based on the typo-chronological considerations of the grave goods to the Ancient Castellic horizon and according to Ancient Castellic contexts with associated radiocarbon results ranging from 4794–3999 cal BC (95.4%; 4770-4034 cal BC, 68.2%) (cf. 3.2.2). The early non-megalithic monuments are the more elaborated ancient non-accessible dolmens associated to remarkable artifact assemblages with partly prestigious goods made from

green stone (among others cf. Cassen 2009; Cassen *et al.* 2011; Herbaut 2000; Klassen 2000; Klassen *et al.* 2011; Pétrequin *et al.* 1997; 2006; 2008; 2009), whereas the tumulus Carnacéen Tumiac exhibits 251 variscite pearls, pendants, and depots with altogether 15 axe heads of jadeite, eclogite, and one head of nephrite. In addition, remarkable grave goods are registered from smaller monuments such as St. Germain, Erdeven in the Morbihan. While the early stage of St. Germain is connected to small ceramic pieces and a transversal arrowhead, from a later grave three golden agrafes are recorded beside diagnostic Ancient Castellic ceramics. Other small structures, such as Kervinio in Trinité-sur-Mer and also Castellic in Carnac, contained more modest grave goods, for example, vessels with an oval opening (Lukis 1866 in Cassen *et al.* 2000, 420–421). A further early megalithic structure is documented from the Channel Islands at Les Fouillages with Cerny- and Castellic-related Les Fouaillages/Pinnacle ceramics.

Similar structures, the so-called *cista amb túmul,* are reported from Catalonia in the same time interval and probably even collateral to the Morbihan graves. These graves represent the earliest known monumental grave proliferation in the northeast of the Iberian Peninsula, clustered as a megalithic colony in small necropolises and single burials in an area with a diameter of 1800m on a plateau in the Tavertet region, which is situated at the eastern border of the Catalan Central Depression (Cruells *et al.* 1992; Gibaja Boa 2004, 13; Molist *et al.* 1987; 2007; Tarrús i Galter 2003). These graves are non-accessible ancient dolmens partly covered by monumental earthen tumuli averaging up to 22m. So far there is no evidence for transitional structures leading to the Tavertet graves. Further graves are known at Rajols, Font de la Vena, El Padró, La Rambla, and St. Corneli (Cruells *et al.* 1992; Molist *et al.* 1987; 2007). The re-evaluation of the available radiocarbon results in addition to the exclusion of the *termini post quos* values of the Tavertet graves (for the argumentation cf. 4.2) yielded a dating of the construction of these graves and the start of the Montboló horizon in the region not before ~4400 cal BC (UBAR-116, 5530±130 BP; 4584–4267 cal BC, 68.1%; 4723–4071 cal BC, 95.4%), if not later. The grave goods consist of Montboló ceramics, trapezoidal or triangular geometric microliths, nuclei and blades, bone objects such as awls, bracelets, necklaces made of stone and shell, teeth of wild boar, and mills (Cruells *et al.* 1992: 245). There are similar structures known from other parts of Catalonia, for example in the Alt Empordá, the coastal Pyrenees at the Tomba del General, Pla de les Gates, the Puig Alt, and the Puig Rodó (Tarrús I Galter 2002: 75–92) and at graves in the Solsonès region. For the graves from the Alt Empordà and the coastal Pyrenees, similarities are limited to the architecture since no material or radiocarbon dates are available. The graves in the Solsonès region, however, are considerably younger than the Tavertet graves.

On the eastern side of the Pyrenees in the western and central part of Southern France, further non-accessible dolmens covered by tumuli associated to the Montboló and the Chasséen horizons are known and are thus from the same time interval, but, as the available radiocarbon dates suggest, originate somewhat later during the last third of the 5th millennium cal BC. These graves are either isolated in the landscape or arranged in necropolises. Based on the material as a chronological parameter, there is evidence that at least seven of these sites are associated to this early megalithic stage. From the two necropolises, Camp del Ginèbre and Najac, further radiocarbon results are available from human bones (Le Bras-Goude *et al.* 2012; Mahieu 1992; Vaquer 1998: 176; Vaquer 2007: 16–17; Vignaud 1993; 1998), indicating the construction and use of the graves of Camp del Ginèbre between 4327–3715 cal BC (95.4%; 4319–3802 cal BC). The three results for Najac within the time interval 4328–3979 cal BC (95.4%; 4318–3995 cal BC) suggest burials with short time-delays at the end of the Early Chasséen.

Further to the east in the Provence, the emergence of and transition to megaliths is pinpointed to a later time-span within the necropolis of Château Blanc in Ventabren. The first buried individual in this necropolis died between 3524–3101 cal BC (95.4%; 3501–3128 cal BC, 68.2%).

More clusters with an early emergence of megaliths are documented from the second half of the 5th millennium from the Central Mediterranean and the northern coastal islands of Sardinia and Corsica. On both islands small necropolises are registered for this time horizon as singular appearances. The first megaliths on Sardinia are ancient non-accessible dolmens surrounded by stone platforms as the former tumuli basements.

No direct radiocarbon results could be derived from the grave goods which are attributed to the Late Neolithic San Ciriaco horizon. According to the radiocarbon results from the San Ciriaco layers in the settlement of Contraguda, it is possible to limit the emergence of these graves to a time interval from ~4400 cal BC (4472–4099, 68.2%; 4728–4070, 95.4%) to ~4100 cal BC (4116–4005 cal BC, 68.2%; 4218–3986 cal BC, 95.4%), even if these measurements are insufficient for any closer determinations of the time horizon, so that an extension may be taken into consideration.

Finally, in the northern region of Corsica on the Monte Revincu graves similar to the already described ancient non-accessible dolmens are documented, but here they are accessible. Within the necropolis on the Monte Revincu, it is possible to follow the transition from subterranean stone cists to accessible small dolmens and passage graves aboveground (Gilabert *et al.* 2011; Leandri *et al.* 2007; Leandri *et al.* 2010). There are

altogether three dolmens known from the necropolis, the Dolmen Casa di L´Urcu was erected over an older subterranean cist. The transition from cists to dolmens and even to small passage graves with the Dolmen de Cellucia or Somnital is calculated to ~4300 cal BC (4305-4269 cal BC, 68.2% and 4335-4264 cal BC, 95.4%). These measurements are maintained by typo-chronological considerations of the material from the dolmens. The grave goods, such as symmetric polished axes (partly fabricated out of jadeite from the Piemont), small quartz pebbles, and 16 polished pendants made from green stone, exhibit close parallels to the San Chiriaco material detected in the Li Muri graves on Sardinia.

In the described regions, the ancient non-accessible dolmens adduce an ongoing megalithic development. From Northern Italy and possibly Apulia, further early non-accessible dolmens are documented without radiocarbon results, but based on the archaeological material it is possible to associate these structures to the same time horizon and the second half of the 5th millennium cal BC. However, the megalithic occurrences in these regions are limited to these structures and no other megalithic grave forms are registered. Thus, ancient non-accessible dolmens without stone circles are documented in Northern Italy from the Middle Neolithic *Vasi a Bocca Quadrata* square-mouthed pottery horizon, for example, in La Vela-Trento (Grazia Melis 2014; Pedrotti 1998: 21), and from the Chassey-Lagozza horizon, for example, in the small necropolis Maddalena di Chiomonte-Torino (Bertone/Fozzati 1998: 30–42). From the southern Italian mainland in Apulia, further possible non-accessible dolmens with Final Neolithic Diana-Bellavista material are registered, such as Madonna delle Grazie in Rutigliano in the region of Bari (Ciancio/Radina 1979; Cipollini Sampo 1998: 51) (cf. 11.2.2).

From the West Mediterranean regions and on the West Iberian Peninsula, clusters with similar non-accessible dolmens are known which represent the earliest megalithic stage in this region, but they seem to be somewhat later appearances and are either from the very end of the 5th millennium cal BC or the first half of the 4th millennium cal BC. Similarly, megaliths in Andalusia emerge in the first half of the Recent Neolithic or Late Neolithic (~4200–3600 cal BC). The first clear megalithic structures here are documented within the initial phase of the Almeria horizon. With this phase non-accessible, but also accessible dolmens and small passage graves are registered (Acosta Martinez /Cruz Auñón 1981; Guilaine 1996: 136–137). No radiocarbon dates are available and association with or contemporaneity to other regions with early megaliths remain uncertain and vague. Transitional structures from the region of Almeria are also unknown. From the region of Cádiz, a recently investigated possible transitional structure to the megaliths is recorded within the necropolis Campo de Hockey (García Sanjuán *et al.* 2011: 126, 129; Vijande Vila 2009), including a circular small structure built with stone slabs and covered by a small tumulus.

From the non-accessible dolmens under tumuli in the southern regions of the West Iberian Peninsula, such as in the Algarve and the Alentejo, no radiocarbon results are available which are connectable to the construction and use of the structures. Based on the archaeological material, they also seem to be somewhat later than the early megalithic appearances in the central Mediterranean region. The artifact assemblages in these regions are rather homogenous and consist of geometric microliths, axes with round, oval or quadrangular transversal sections, thin blades with none or a limited retouch, ground stone tools, nearly no ceramics, discoid schiffer pearls, and especially in the Algarve beads made from green stone such as variscite and serpetinite. This material is associated to the first half and the middle of the 4th millennium cal BC (Boaventura 2009; 2011: 162; Rocha 2005: 71; Soares/Tavares Da Silva 2000).

Finally, in the northern part of the West Iberian Peninsula there are early megaliths in the form of non-accessible and accessible dolmens within tumuli mainly in Galicia (Cámara Serrano 2001: 23; Cruz 1995; 1998; Jorge 1989; 1998; Valcarce/Vilaseco Vázquez 2003), again emerging a little earlier, but not as early as in the central Mediterranean and the northwest French graves as suggested by the available radiocarbon stock. The most of the produced radiocarbon results are gained from charcoal and represent *termini post quos* values (cf. 10.4). The early megaliths in Galicia are associated to the Final Neolithic and specifically at the earliest to the very end of the 5th millennium cal BC, if not later, and thus also to the first half of the 4th millennium cal BC. The few radiocarbon results, which according to the context are connectable to the construction and use of the graves, are rather limited. Accordingly, from Chan de Cruz 1 a possible construction or usage date from ~4080 cal BC (CSIC-642, 5210±50 BP, 4144–3961 cal BC, 68.2%; 4230–3947 cal BC, 95.4%) is available and from Cotogrande 1 a result from ~3740 cal BC (GrN-18420, 4940±80 BP, 3888–3644 cal BC, 68.2%; 3951–3538 cal BC, 95.4%) has been recorded.

Convergence vs. transfer and possible transfer scenarios

To summarize the antecedent passages: clear early megalithic structures emerge within the same time interval during the second half of the 5th millennium cal BC in Brittany on the Channel islands, in Catalonia, in West and Central Southern France, on Sardinia, in Northern Italy, possibly in Apulia and on Corsica, whereas there is the possibility that the graves in Northwest France, Catalonia and Sardinia may have be constructed somewhat earlier than in the remaining

enumerated regions. These graves were built in the form of ancient non-accessible dolmens aboveground and covered by a most round tumulus with the exception of Corsica, where the early megaliths already exhibited an access, one even possessing a small passage. Beside non-accessible dolmens, evidence for accessible structures is likewise available for Northern France from the last third of the 5th millennium cal BC onwards. For a finer temporal graduation of the different megalithic occurrences, we need to produce additional radiocarbon results.

For the Western Mediterranean and the West Iberian Peninsula, the data base for the same concept of grave forms at the earliest megalithic graves in that region are scarce and mostly based on typo-chronological considerations of the archaeological material. However, the material suggests that megaliths there emerge somewhat later during the first half of the 4th millennium cal BC with a possible start for Almeria and Galicia during in the very end of the 5th millennium cal BC.

To return to one of the core questions of this analysis: is the continuous megalithic proliferation in the mentioned regions the result of a transfer due to migration, the adaption of an idea or building technique, or is this development convergent, meaning independent in this case? To anticipate the results of the synthesis: there are more indications for a transfer, then for a convergent development.

Arguments for independent regional developments of the early megaliths in the 5th millennium cal BC are limited to Northwest France, and there especially to the Morbihan, and to Corsica. The Morbihan is potentially one of the three earliest megalithic regions and the only region which provides a complete sequence regarding pre- and early megaliths: a) a pre-megalithic monumental labor-intensive grave architecture, b) transitional monumental structures leading to the megaliths (i.e. the first stage of the St. Michel, Carnac), c) non-accessible megaliths with different outer structures (i.e. round or long tumuli), d) transitional stages to accessible megaliths (i.e. Lannec er Gadouer), e) accessible grave structures.

The second region, where we can distinctly consider a transition from subterranean cists to three accessible dolmens or small passage graves is Corsica, but a) not in the same scale as for Morbihan and limited to one site with colony character on the Monte Revincu in North Corsica, b) possibly somewhat later than in Northwest France. Accordingly, a transfer of megaliths here is also more plausible.

For the remaining regions with an early megalithic proliferation in the 5th millennium cal BC, such as Catalonia, Southern France, Sardinia and the Italian mainland, megalithic occurrences in small clusters are registered and they represent further small megalithic islands or colonies. They are exceptional grave forms for that time in the respective regions, where primarily caves and further subterranean cists and hypogea were still the most popular burial site structures. Similar observations can be made for the potentially later early megaliths in regions in the West Mediterranean and on the West Iberian Peninsula.

The enumerated arguments implicate that the proposed three to five core regions for megalithic proliferation mentioned in research literature (e.g. Chapman 1981; Müller 1987; 1998; 1999; Renfrew 1973; Sherratt 1990) are possibly reduced to only one: the Morbihan.

Green stone as an economical factor: trade and prospection as a driving force for the transfer of the early megaliths

How can we understand the ostensible transfer of early megaliths in the 5th millennium cal BC to the Mediterranean and possibly to the West Iberian Peninsula? Are there further indications for interaction between these regions than just the presented emergence of megalithic grave architecture in a congruent or shortly delayed time horizon?

Evidence for short- and long-distance contacts, based on the dispersal of raw material, prestige artifacts, and domesticated resources are numerous. Especially research on jadeite and variscite artifacts and the provenience of these rare green stone materials lead to completely new insights in the value system of the societies in Central and Western Europe in the 5th millennium cal BC (among others cf. Cassen *et al.* 2011; Herbaut 2000 Klassen 2000; Klassen *et al.* 2011; Pétrequin *et al.* 1997; 2006; 2008; 2010;). According to provenience analyses, these approaches demonstrated the important role of green stone as a precious pre-monetary raw material and prestigious good, while within the eastern periphery of Europe a different value system existed based on copper and gold.

Based on provenience analysis for most of all the variscite artifacts from Northwest France (Herbaut/ Querré 2004; Querré *et al.* 2008, Querré *et al.* 2012), it is also now possible to reconstruct interactions between the early megalithic regions and to develop possible transfer scenarios of the megalithic concept.

Variscite, also called *callais*, is an extremely green and relatively rare mineral used for jewellery in the Neolithic. The shining color of variscite attracts attention and even surpasses the green of North Italian jadeite. The by far largest accumulation of artifacts made from jadeite and variscite in the form

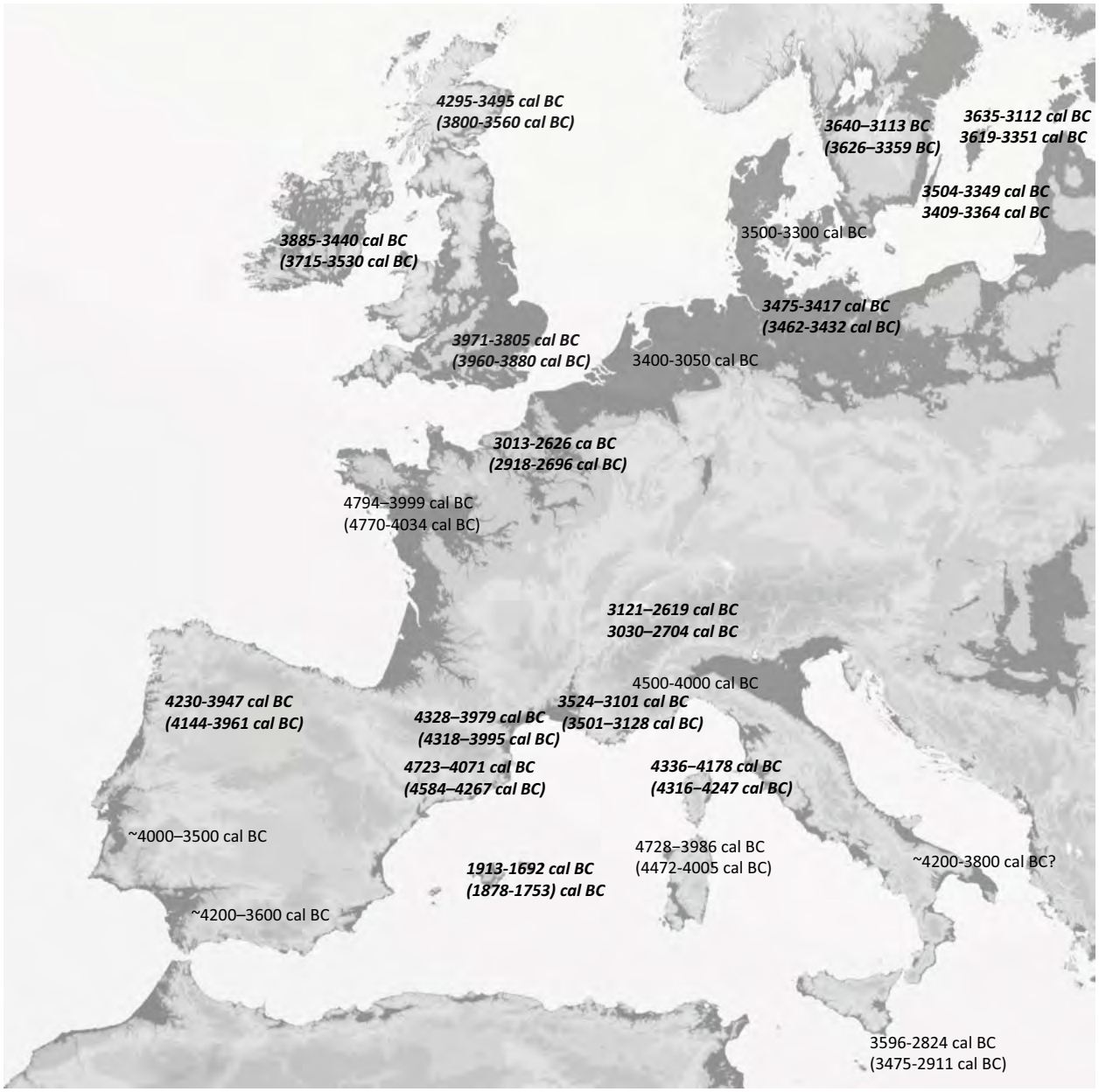


Figure 12.1 Map showing dates estimated for the start of megaliths in the different European regions in 95% probability (68% probability in brackets). Bold and cursive are the estimations represented based on samples out of megalithic contexts, straight the time intervals associated to the earliest cultural material in the megaliths

of prestige axes, beads, and pendants is documented from the Morbihan in Brittany and there especially from the region of Carnac (Figure 12.4–6). This once more accentuates the importance and even central role of this area during the 5th millennium cal BC (Cassen *et al.* 2011). Thus, 11 axes made from alpine jadeite are documented from the first stage of the St. Michel. From Tumiac, 15 jade axe heads made from jadeite and eclogite and one made from nephrite are registered. From Mané er Hroëck, 11 jade axes are documented. Artifacts made from variscite are registered from the St. Michel, including 101 beads and nine pendants. From Tumiac, 237 beads and 12 pendants and from Mané er Hroëck 44 beads and two pendants are registered. An important fact is that the variscite pendants and the jadeite axes are only registered and diagnostic for the early funeral contexts in Brittany described until now and they are also mostly from the tumuli Carnacéens (Cassen 2000; Herbaut/Querré 2004: 173). But where are the sources of the Breton green stone artifacts and is it possible to reconstruct any trading activities between the early megalithic regions?

Variscite is a relatively rare phosphate mineral in Europe and at present there are not more than ten geological deposits known on this continent plus some indications for sources (Querré *et al.* 2008: 120). Most of the variscite sources in Europe are concentrated in

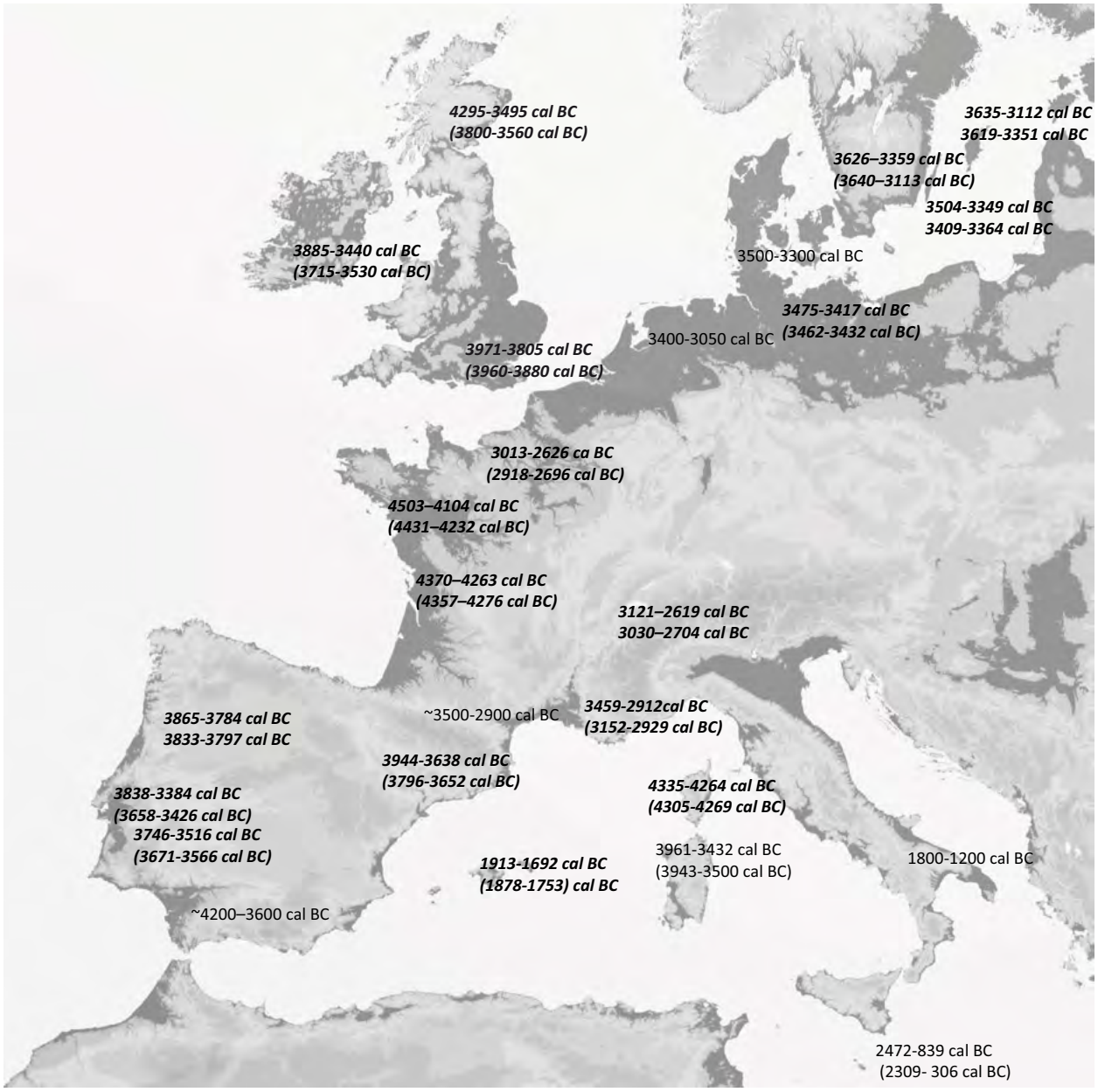


Figure 12.2 Map showing dates estimated for the start of accessible megaliths as dolmens and passage graves in the different European regions in 95% probability (68% probability in brackets). Bold and cursive are the estimations represented based on samples out of megalithic contexts, straight the time interval associated to the earliest cultural material in the accessible megaliths

the Northwest of the Iberian Peninsula at El Bostal by San Vincente de la Cabeza and at Palazuelo by Zamora (Figure 12.4). However, several additional variscite deposits or indications for deposits are known from this region (Querré *et al.* 2008: 120; Querré *et al.* 2012, Figure16; Real 1992; Villalba *et al.* 1998). From the southern and the southwestern part of the Iberian Peninsula in Andalusia, Encinasola and La Encantada are registered and in the very east of the Iberian Peninsula in Catalonia a variscite source is known that had an extended mining activity during the Neolithic and was contemporaneous to the early megaliths in Catalonia at Can Tintorer by Gava, Barcelona (Gibaja Bao 2004: 19; Villalba *et al.* 1992). More variscite deposits are available in Pannec´e in Northwest France, which is actually situated close to Carnac and indications for sources are also registered in the Middle French Montrebras and in South Sardinian Sarrabus.

The regions of megalith emergence on the Iberian Peninsula are partly congruent with the variscite sources and mining. Particularly, the connection between one of the potential earliest megalithic regions in Northwest France and Catalonia and the Neolithic variscite mine Can Tinorer is hereby interesting, since these are the contemporaneous regions from where the most dense variscite bead concentrations are known at that time (Figure 12.4). From the Northwest Iberian



Figure 12.3 Variscite beads from the tumulus Er Grah. Foto with the kind permission of the museum in Carnac

Peninsula and the South of France are solely isolated variscite beads contemporaneously documented (Herbault/Querré *et al.* 2004, Figure 16).

In the provenience analysis of Querré *et al.* (2008), samples from six of these variscite deposits were investigated regarding their chemical fingerprint with the non-destructive PIXE method (Particle induced Xrayemission) in the areas corresponding to the distribution area of the Neolithic variscite objects. Each of the sources had a unique chemical composition, except for Encinasola which exhibited two fingerprints.

The analysis of the variscite artifacts included 22 beads and two pendants from Northwestern France with the following results: the only known variscite source in Northwest France Pannec´e, which is even close to Carnac and Palazuelos de Las Cuevas on the Northwest Iberian Peninsula, could be so far be excluded as a source for the tested beads and pearls.

The fingerprint of the Catalonian Can Tintorer mines, however, was shown by six analyses of two artifacts deposited in the tumulus Carnacéen St. Michel and in Auverné in the Loire Atlantique. Furthermore, the analysis of artifacts in the tombs B1, E1, F2 in C in Bougon/Chiron rendered Can Tintorer as an origin of the variscite mineral stone.

Ecinasola in Andalusia (Cassen *et al.* 2011: 37) is identified as a further source for variscite objects from the St. Michel as for the Castellic variscite objects found under the Table des Marchands at Locmariaquer in the Morbihan (Querré 2009; Figure 6). Eight analyses of three beads from the Dolmen de la Joselière in the Loire Atlantique, from Kervilor in the Morbihan, and from the site Plichancourt revealed San Vincente or Encinasola as a source. The remaining variscite artifacts show a dispersion of values and cannot be connected to one of the mineral deposits (Querré *et al.* 2008: 119).

In later megalithic horizons between 3500 and 2000 cal BC, variscite beads are documented along the coastal areas between Andalusia and the Provence and along the Atlantic coast of the Iberian Peninsula with the densest concentrations in Southern France and the Northwest Iberian Peninsula (Figure 12.5)

The eastern 'expansion' of the early megaliths is partly connected to the regions of extensive jadeite mining and trade. Sources of the jadeite axes were identified at the foot of the Monte Viso in recent years, 70km southwest of Turin and smaller axes in Beigua to the north of Genau with thousands of work pieces from mining activities between 5200 and 3800 cal BC and a peek in production between 5000 and 4200 cal BC (Pétrequin *et al.* 2006; 2008; 2010: 173).

Accordingly, early megaliths are known for North Italy and in the regions of the jadeite mines from the Middle Neolithic *Vasi a Bocca Quadrata* square-mouthed pottery horizon, for example, in La Vela-Trento (Grazia Melis 2014; Pedrotti 1998: 21) and the Chassey-Lagozza horizon, for example, Maddalena di Chiomonte-Torino (Bertone/Fozzati 1998: 30–42). These graves are ancient non-accessible dolmens as well and the megaliths in the region are basically limited to these grave forms. With the abandonment of these mines and the associated change of the value-system, it seems that Northern Italy was no longer attractive for megalithic societies.

To sum up these arguments, one possibility to interpret the congruence between green stone sources and early megalithic occurrences is to consider trading activities with the raw material of green stones and the graves transferred by migrants or people involved in trading. But how can we interpret the early megaliths in Southern France, Sardinia, and Corsica, far away from any sources?

Rocks, forms, megalithic landscapes

The megalithic occurrences in Southern France, Sardinia and Corsica are not in the relative proximity of green stone sources. Even if there is evidence for alpine jadeite

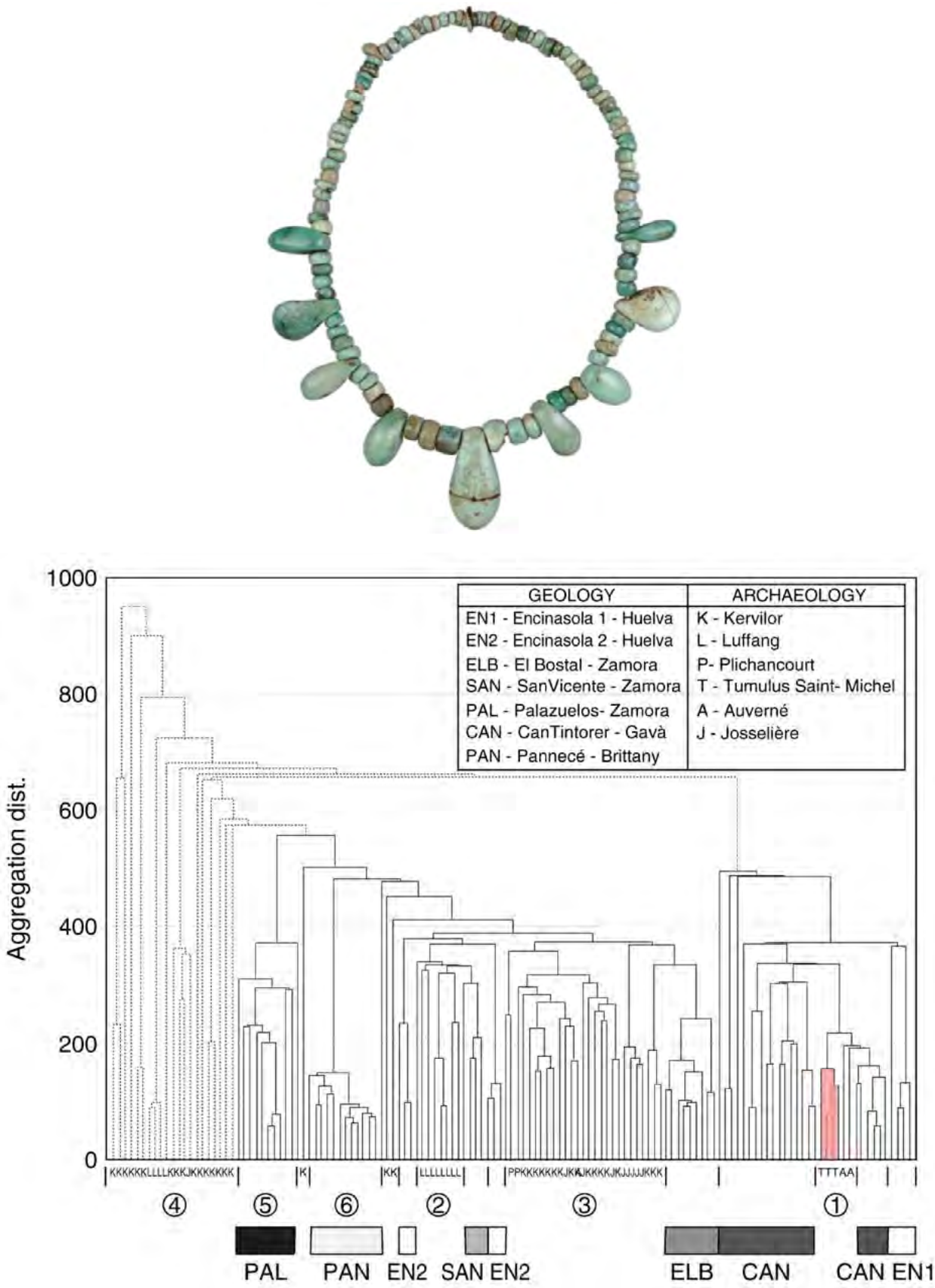


Figure 12.4 Variscite beads from the tumulus St. Michel with the kind permission of the Museum Carnac (Photo courtesy of Serge Cassen), and dendrogram obtained from a hierarchical classification of data from Neolithic beads and geological references of variscite (minimum skip, Euclidian distances, 24 chemical elements) (after Querré et al 2008, Figure 2). The variscite beads from the St. Michel exhibit Can Tintorer in Catalonia as source

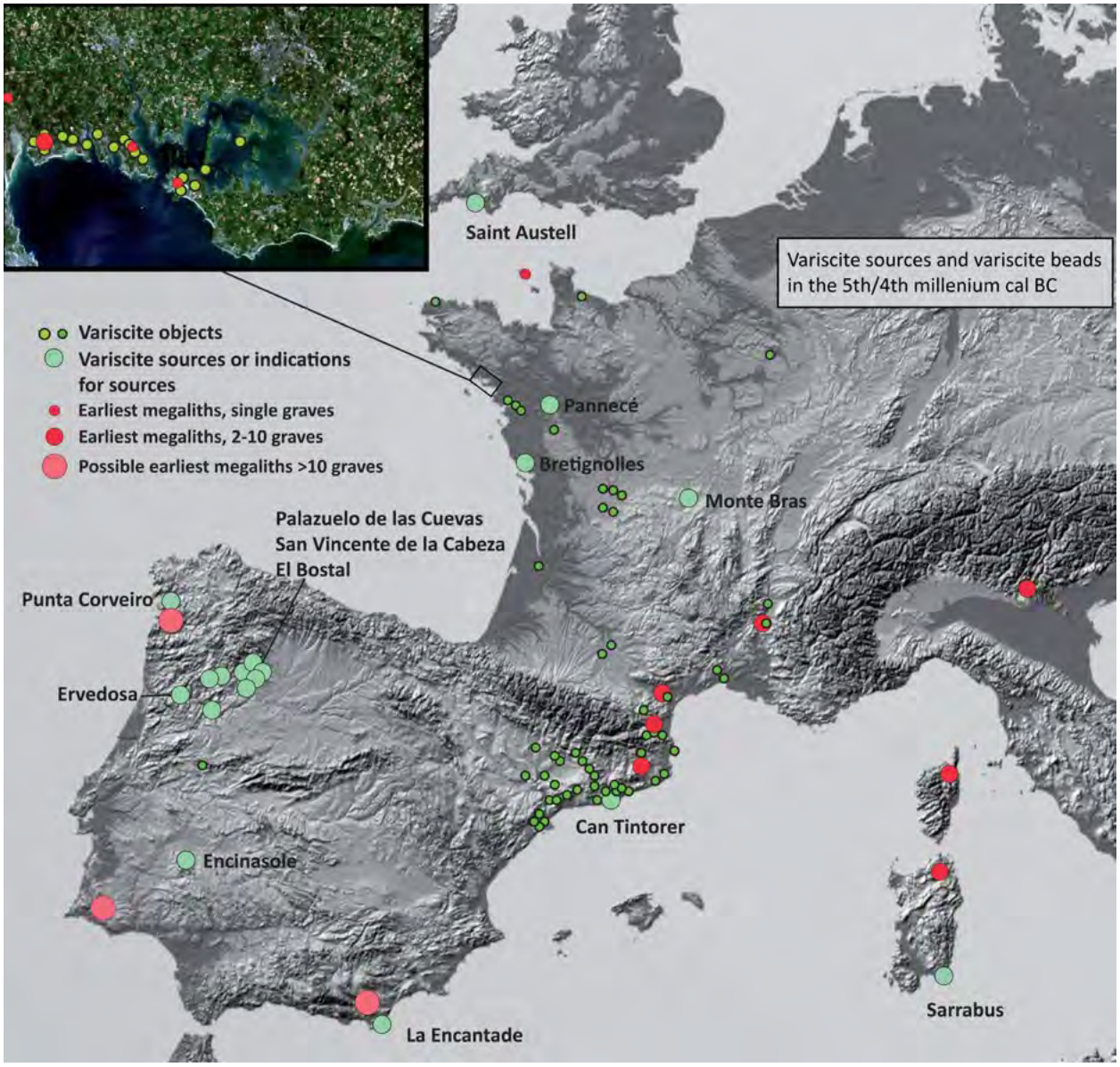


Figure 12.5 Variscite sources and indications for sources in Europe with the distribution of variscite objects in the 5th millennium and the first half of the 4th millennium cal BC (after Herbaut/Querré 2004) correlated to the early megaliths of the 5th millennium cal BC



Figure 12.6 Variscite beads from the tumulus Mane er Hroëck, Carnac. Photo courtesy of Serge Cassen

from the dolmens on the Monte Revincu on Corsica and for green stone pearls in Li Muri on Sardinia and these green stone artifacts associate these megalith builders to the same value system as the megalithic societies on the continent, the choice of location here might be differently motivated. Interaction between Sardinia and Corsica is indicated by the grave goods in the Dolmen Somnital or Cellucia, which are typologically close to the material in the Sardinian Li Muri graves and the San Chiriaco horizon and furthermore by indications of trade, for example, with the Sardinian Monte d´Arci obsidian to Corsica in the second half of the 5th millennium cal BC (Melis 2009).

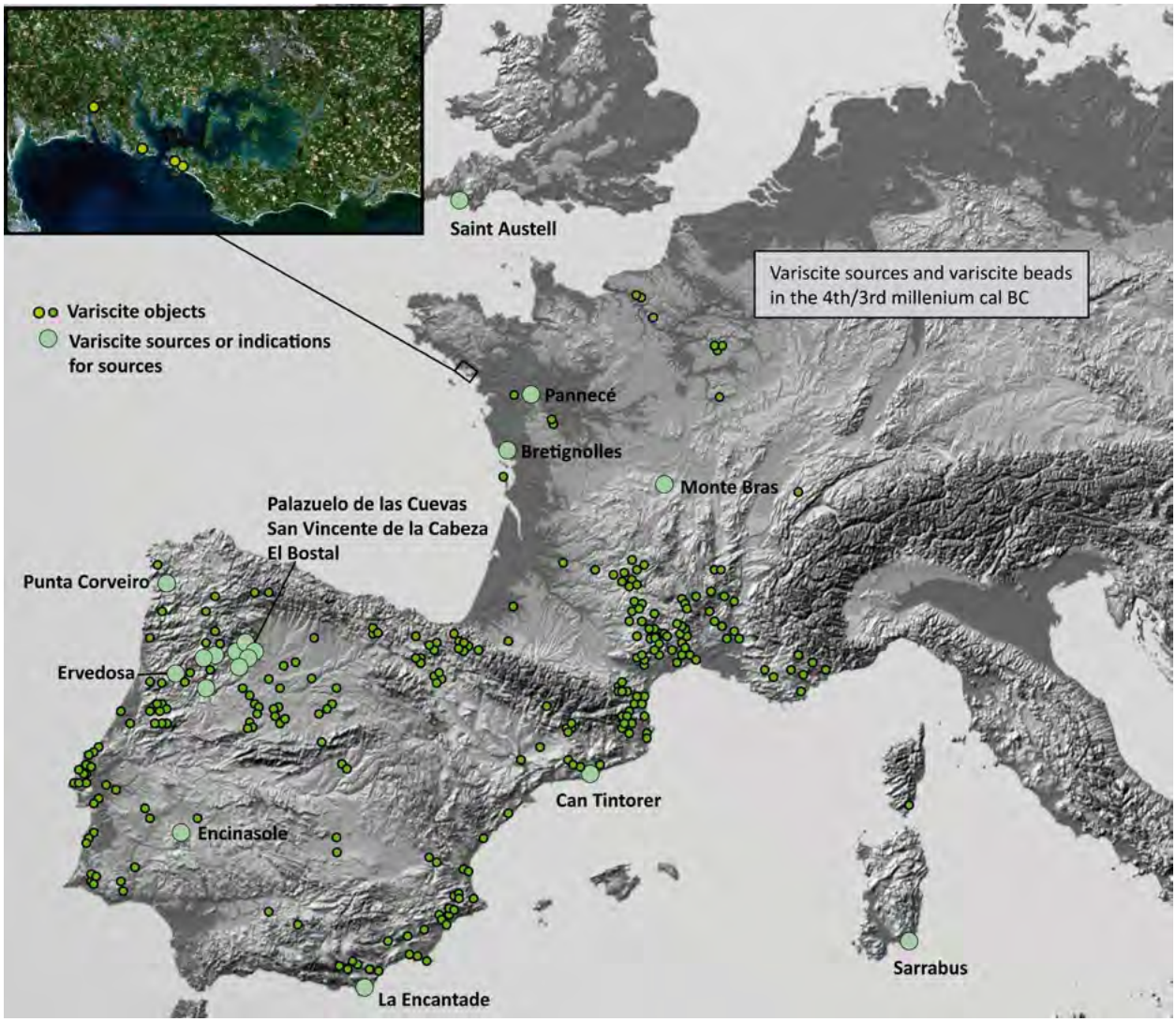


Figure 12.7 Spreading of variscite objects in contexts from the second half of the 4th and the 3rd millennium cal BC (after Herbaut/Querré 2004)

If we consider the geology of these regions, the early megaliths on Corsica, Sardinia and in Southern France were built in regions of intrusive, ingenious rocks such as granite, whereas the southern French locations are furthermore partly associated to sedimentary rocks (Figure 12.6). On the one hand, this warranted available building material and on the other hand, these regions are characterized by special bizarrely-formed rock formations, promising the prospection of new precious stone sources which occur in this geology.

Specially formed rock formations close by these megalithic locations can implicate a further hypothesis. The megalithic landscapes in the Mediterranean are, in several cases, associated to rocks that bear a certain resemblance to humans, animals, or altars so that a link between the megaliths and the naturally-formed sacred space is given (Schulz Paulsson 2014). One significant example of this can be observed at the early megaliths on Sardinia at the Li Muri graves by Arzachena in the northeast section of the island. In the small necropolis, a naturally-formed altar-like stone is incorporated and an anthropomorphic rock formation is situated immediately beside the graves (Figure12.7–8).These arguments implicate the hypothesis that the transfer of megaliths is also possibly connected to the prospection for green stone sources and or that these graves were imbedded in a natural ritual landscape.

Accessibility and change

Primarily non-accessible graves are diagnostic for the described early megalithic stage. Graves with small chambers aboveground were closed by capstones and covered by earthen, partly monumental tumuli. Accordingly, burials were singular acts and rituals, e.g. ancestor worship, were performed at the tumuli. Based on a few available anthropological records and on the size of the chambers, these graves are in general associated to single or double inhumations (cf. 12.3).

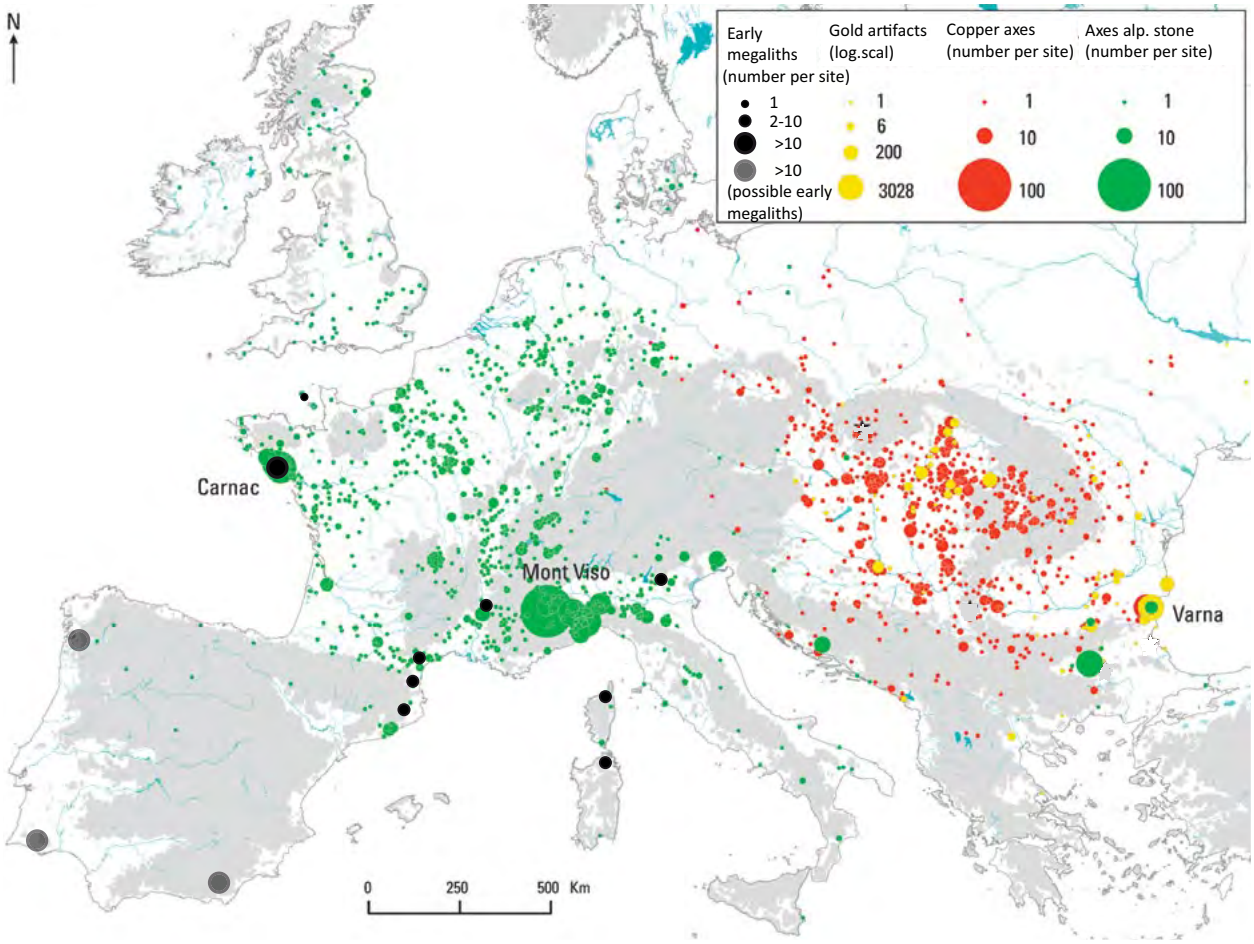


Figure 12.8 Distribution of jadeite axes from the 5th and the beginning of the 4th millennium cal BC with the jadeite sources compared to the cooper axes and gold artifacts in Eastern Europe (after Pétrequin *et al.* 2012: 193) and correlated to the early megalithic clusters

There is evidence for a few of these graves that they were re-opened to bury more individuals, as in the necropolises Camp del Ginèbre and Najac in Southern France (cf. 5.6), with each grave including three successively deposited individuals in one chamber. Contemporaneous accessible structures are known from Northwest France and Corsica.

This may have been the beginning of a new tendency for the whole of Europe: the construction of graves with an access which are easy to re-open for further successive depositions within the same chamber over centuries or even millennia, either in a continuously consecutive manner or with burial breaks and distinct phases of subsequent use at the same sites. Access to the chambers further provided the possibility to perform regular rituals within the chambers or the corridor, either for burial activities, rites des passage or for ancestor worship. Hereby, it is forehand irrelevant if these graves were built as dolmens or passage graves, since both grave forms can formerly fulfill the same function. The corridors of the passage graves are thought to have provided the possibility to construct a more colossal but easy accessible monument and the length of the corridor was dependent on the outer form of the tumulus. Accordingly, the rise of the passage graves might have been a result of complex social processes within and between the megalithic societies and the construction of increasingly more elaborated and prestigious graves an expression of communal undertakings and an important factor for group identity.

The majority of these accessible graves are associated throughout Europe, based on the pattern of the bone material and the successive burials denoted as collective graves in the research literature. In particular, this refers to the sequential deposition of bodies and the disturbance of the anatomical order of older bones by younger bodies. The older bones were either treated carefully, sorted and re-arranged, or less carefully handled and pushed aside to make place for the new bones. Further possible scenarios included rituals of commemoration, sporadic reuse and exhumation, and

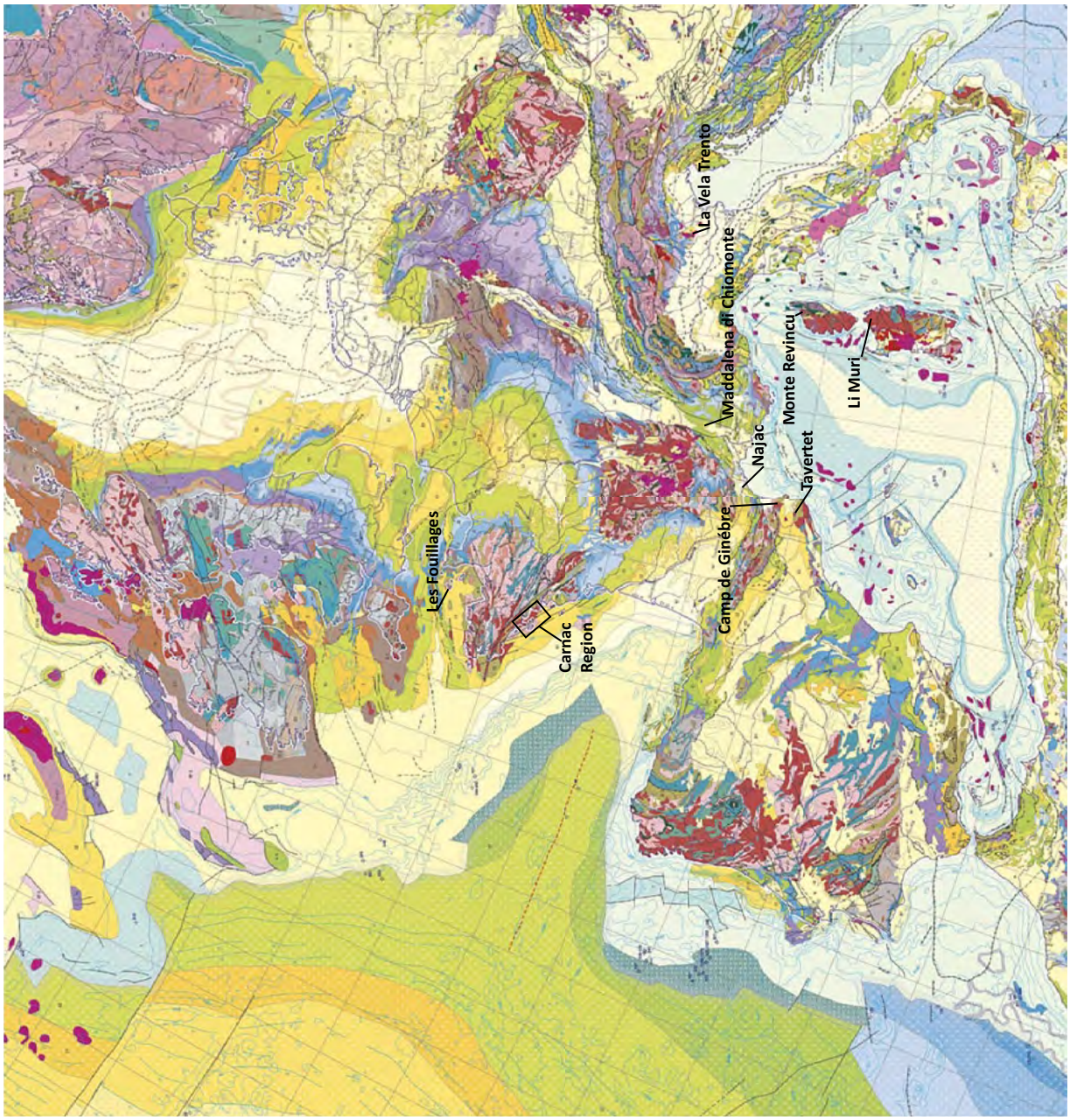


Figure 12.9 Detail, the 1:5 Million International Geological Map of Europe and Adjacent Areas Map. BGR (Hannover), (Asch 2005) with the early megalitic occurrences. Simplified legend: Reddish: igneous intrusive rocks; pink: igneous extrusive rocks; yellow: sedimentary rocks; green/blue/lila: Mesozoic. Brown: Paleozoic



Figure 12.10 The natural ritual landscape. Rock formations at the alignment Renaghju on Corsica and the necropolis Li Muri on Sardinia

can be reconstructed by the pattern of the bones in the chambers. Slight regional differences, such as partial incinerations and traces of fire on the bones can be observed and for some regions, such as Southern France (cf. 5.6), the removal of bones from the graves has been discussed, where the bones were partly broken, cut, and chopped.

Moreover, some of the megalithic graves served as ossuaries with the deposition of bone material from individuals whose decomposition process occurred externally, verified by evidence and discussions for Northwest France, Northern Germany, Ireland and the Iberian Peninsula (cf. 3.3.6, 11.1.3, 11.1.1, 10. 6).

But were the accessible graves conceived from the very beginning as collective graves? Or were they built primarily for the inhumations of one or a few persons and then subsequently used by later generations? To answer this question, we need to produce complete sequences for graves with excellent bone preservation and gain radiocarbon results for the separated individuals, for example from each mandibula. Such sequences are still scarce today. One of the few completely reviewed contexts is the grave Gökhem 17 in Falbygden, Sweden. In addition to the stratigraphy of the skeletons, radiocarbon results for all individuals are available (Ahlström 2009; Sjögren 2003; Schulz Paulsson 2010). These results show that the grave was initially built for a mature woman. The remaining burials are a result of the sporadic subsequent use of the burial site with partly a couple hundreds of years between the different burial layers.

After a critical re-evalution of the radiocarbon dates, we could not confirm the earliest settings of the passage graves which have been maintained in research for decades for Northwest France (cf. 3.4), the northwest of the Iberian Peninsula (cf. 10.4) or Ireland (cf. 11.1).

In the following, the main tendencies regarding the emergence of accessible graves in Europe are summarized. As discussed before, the earliest accessible structures are determined from Northwest France and Corsica (cf. 12.4), but not as early as postulated for a part of the passage graves, for example for Barnenez or Bougon/Chîron (for the argumentation cf. 3.4). The early chronological positioning of these graves within the first half of the 5th millennium cal BC could neither be justified on the basis of the radiocarbon results nor according to the archaeological material. Furthermore, the facts suggest that 1) jadeite axes are not known from the passage graves in Northwest France (Cassen 2000; Herbaut/Querré 2004: 515–516) (cf. 3.5.1), and 2) that the peak of exploitation activities for jadeite in North Italy ended at ~4200 cal BC with the proposed emergence of the passage graves, which underlines arguments for a later chronological position (Pétrequin *et al.* 2010: 173). It appears that jadeite lost its cultural esteem at that time in Northwest France and the value/social system possibly changed.

Evidence for the earliest accessible structures or passage graves lies within the non-megalithic structures in the Paris Basin/Northern France and the dry wall passage grave A with a round chamber in Vierville/Butte at Luzerne. Radiocarbon results were gained from human bones dating to ~4450 cal BC onwards (OxA-11395, 5690±45 BP; 4536–4368 cal BC, 68.2%; 4596–4356 cal BC, 95.4%). Nevertheless, stabile isotope values of this bone material are unknown and the location close to the sea indicates a possible marine diet of the population buried in the grave. Accordingly, we cannot exclude a reservoir effect, as also suggested by evidence for the region with the passage grave Le Déhus on the Channel Islands.

The earliest accessible megalithic grave in that region is located in the central west area with the dolmen of the first phase of tumulus C in the necropolis of Prissé-la-Charrière, Deux-Sèvres. The beginning of burial activities at that grave is calculated to ~4320 cal BC (4357–4276 cal BC, 68.2%; 4370–4263 cal BC, 95.4%) (cf. 3.2.3). Transitional structures to the passage graves are documented for Brittany and for the long tumulus or *tertre* Lannec er Gadouer radiocarbon results are available which pinpoint this transition to the end of the Ancient Castellic horizon and so to ~4300 cal BC (4431–4232 cal BC, 68.2%; 4503–4104 cal BC, 95.4%) (cf. 3.2.2). First fully developed megalithic passage graves with simple round or quadratic chambers are not documented in Brittany before the Recent Castellic horizon (4250–3880 cal BC, 95.4%) (cf. 3.5.2).

As already outlined in the previous chapter, the transition to accessible structures in Brittany is determined to the time horizon 4336–4178 cal BC (95.4%; 4316–4247, 68.2% cal BC) (cf. 6.2, 12.3)

For the remaining regions, a partial hiatus of several hundreds of years between the first megalithic stages with the small colonies of non-accessible dolmens to the occurrence of first accessible structures can be observed. Accordingly, small passage graves with a sub-circular chamber in the Alt Empordá, Catalonia are not known before the first centuries of the 4th millennium or even later (cf. 5.4) For Western and Central Southern France, most of the material in accessible megaliths is attributed to the Recent and Final Neolithic horizon (~3500–2900 BC) and the dolmens and passage graves there are a relatively late appearance (cf. 6.4). From the passage grave Dolmen de L`Ubac in the Provence, the earliest radiocarbon results for the region are available dating from 3459–2912 cal BC onwards (95.4%; 3152–2929 cal BC, 68.2%). On Sardinia, the earliest accessible graves were built within the Ozieri horizon, which extended

from 3961–3432 cal BC (95.4%; 3943–3500, 68.2%) (cf. 6.4 and Figure). On Malta, a few accessible dolmens were built in the Bronze Age between 2472–839 cal BC (95.4%; 2309–1306 cal BC, 68.2%). A closer determination is not possible with available data base. For the accessible megalithic occurrences on Apulia, a similar chronological classification based on the archaeological material is proposed, dating to the Early Bronze Age, thus from ~800–1200 cal BC.

For the western part of the working area in Andalusia, there is evidence for a few passage graves within the initial phase of the Almeria horizon, dating within the time interval of ~4200–3600 cal BC. On the West Iberian Peninsula, the intervals for the accessible structures are closer determined. For the Estremadura, the outset of the accessible structures is calculated to 3838–3384 cal BC (95.4%; 3658–3426cal BC, 68.2%), for the Alentejo to 3746–3516 cal BC (95.4%; 3671–3566 cal BC, 68.2%), for the northern regions somewhat earlier, and for Beira to 3865–3784 cal BC (95.4%; 3833–3797 cal BC, 68.2%).

The already mentioned hiatus of several hundreds of years between the early megalithic occurrences in the 5th millennium and the first passage graves, especially for the enumerated regions in the Central Mediterranean such as Catalonia, Southern France and Apulia, is a further indication of the colony character of the early megalithic occurrences in the 5th millennium cal BC. At the outset, the 'megalithic movement' could not be established for all regions, but occurred in some areas only after centuries when accessible megaliths were built in these regions and once again partly transferred.

For the entire scope of northern megalithic Europe, later emergences of megaliths with already accessible structures from the very beginning must be considered. For instance, the earliest megaliths in Britain and Ireland are calculated to the first half of the 4th millennium cal BC. These graves are all accessible. The earliest megalithic grave in Southeast England, Coldrum is calculated to 3971–3805 cal BC (95.4%; 3960–3880 cal BC, 68.2%). In Ireland, the Court tombs are possible candidates belonging to the earliest megaliths with dates from Parknabinnia on the Burren from ~3885–3440 cal BC (95%; 3715–3530 cal BC 68%).

Finally, an even later megalithic development occurring in the second half of the 4th millennium is observed for the Funnel Beaker area as the last larger connected zone. These areas seem rather isolated when compared to the other regions. Interesting hereby is the observation that the full sequence non-accessible dolmen (*Urdolmen*)/accessible dolmen/passage graves is repeated here one more time, but with a considerable time delay and compared to regions, such as Northwest France, approximately one millennium later. Even if the possibility of an independent development of megaliths in the Funnel Beaker area is based on profound arguments and we do agree with Klassens *et al.* (2011: 33) hypothesis of this development as a result of social-historical processes with a complex combination of ecological, cultural-historical and social-psychological factors, we should not be too categorical. In this region, the *Urdolmens* or ancient non-accessible dolmens are usually incorporated into long tumuli and the beginning of the megaliths in the Funnel Beaker area may have started with a transfer of the long barrow tradition from northern regions such as Britain.

A theoretical approach towards the significance of megaliths and megalith building for prehistoric societies

To fulfill the circle, let us consider the significance of megaliths in a more general view. Neolithic and Chalcolithic societies in Europe created large-scaled megalithic and monumental landscapes over centuries. The construction of these structures required, beside the essential technical skills, an immense labor and planning effort and the approximately 35000 remaining megaliths in Europe witness the communal efficiency of past societies. These monuments represent the first permanent and abiding structures in European Prehistory, built to outlive time and further generations. But what significance and function did the megaliths have? What was the motivation to build them? And what concept of monumentality did these societies have?

Beside their first function as graves, meeting places, astronomical centers, and territorial markers, megaliths played an important role for the memory and thus for the ritual culture of non-literate societies.

Megaliths as a part of the memory and ritual culture of non-literate societies

We have a semantic and an episodic memory. The latter is an experience memory closely connected to iconic representations. The former memory is a didactic memory based on propositional representations (Atran 2002: 150; Whitehouse 2000). Accordingly, symbols and rituals are important elements required for our memory.

The emphasis of research on time history, generation research, and oral history is placed on the communicative memory and memory societies beyond the *floating gap* (Erll 2005: 50–55; Niethammer 1995), which encompasses historical experiences between the present and between 80 and 100 years into the past. Research on oral history showed in interviews that it is not possible without the help of written sources to incorporate a time horizon of remembering of more

than 80 or 100 years. This includes memories which are not experienced but directly communicated. *Therefore, without the help of symbols and rituals, it is not possible to encompass a time horizon of remembering of more than three generations.*

Before the connection between megaliths and memory is further discussed, it is important to expose some general aspects on the memory and in particular for the conditions of memory and trading of non-literate societies.

The social, cultural, and biological conditions of memory

According to Maurice Halbwachs in his famous work '*On the Collective Memory*', memory only develops within a social component and is therefore a social phenomenon. Human beings need social relations to develop a common memory. Events can be several thousand years past, but a collective exists, which wants to remember and, in turn, an individual remembers that he/she is a part of the collective. According to Halbwachs, memory is always a *mémoire vécue,* a living memory, opposite to *tradition*. Tradition is a special case of communication, in which information is not exchanged horizontally, but vertically along the generation line (Halbwachs 1950). Halbwachs' concept of memory as a social phenomenon, in which memory is rather a cultural than an individual faculty, has been assumed by Connerton and the social cultural memory debate at the end of the 20th century (Connerton 1989). However these early rudiments of Halbwachs' hypothesis and the school of Emile Durkheim as already criticized in the 1920s by Marc Bloc (Erll 2005: 14).

But the early rudiments of Halbwachs and the school of Emilie Durckheim and the problems of a concept of a collective memory was criticized already in the 1920s by Marc Bloc (Erll 2005: 14): individual-psychological phenomena should not be generalized for a too broad frame of collectivity (Bloch 1925: 73–83). If so, it is necessary to rather talk about collected memories, than from an abstract non-existing collective memory. Nevertheless, the concept of a collective memory - or better said *the collected memories of the individuals of a society,* is used in this text, but here as more of a metaphor as is used in modern cultural memory research (cf. Erll 2005: 96).

Research from the University of Ontario (Winermann 2005; MacDonald *et al.* 2000) shows that memory is closely connected to cultural differences and can be contemplated in a wider frame than in a simple individual-psychological sense. The study focused on first memories and how culture helps to shape how we remember our past and how far back our memory stretches. Memory varies from person to person, but between different cultures there is a variation of up to two years for the average age of first memories. People who grow up in societies that focus on individual personal history, like the United States, or societies that focus on personal family history, like the Maori, will have different - and often earlier -childhood memories than people who grow up in cultures that, like many Asian cultures, value interdependence rather than personal autonomy. In the study the Maoris had the longest lasting childhood memories.

> '*In Maori culture there's a very strong emphasis on the past - both the personal past and the family's past. They look backward with an eye to the future*' (MacDonald et al. 2000; Winermann 2005: 56).

Functionally, our memory is organized in a sensory short-term and long-term memory. Storage processes of the long-term memory are broadly unknown, but there are indicators that memory is stored divided into various elements in several places at once beside just the hippocampus (Kandel 2009: 12753). Important episodes in life require nearly no narrative embedding. They are encoded as flashbulb memories (Atran 2002: 161; Whitehouse 1995, 2000). The psychologists Brown and Kulik (Brown/Kulik 1977) pioneered the so-called flashbulb memory theory and they speculated that such memories are triggered by a biologically evolved 'Now Print' mechanism, adapted for remembering surprising, highly consequential events as represented, for example, by initiation rites often connected to physical pain and sensorial invasive processes. They are emotionally imprinted in memory as alarm recalls. Without this emotional priming it is possible that the cognitive system undervalues and forgets low-probability events (Atran 2002: 161).

Stone and symbol

Megaliths are places and symbols from non-literate societies for collectives, for individuals or even for actions. Symbols are a base for the episodic memory and the interaction between symbols and memory is transferred from the famous button in the handkerchief to the monument. Aby Warburg, the founder of iconography and one of the founders of social memory research (Assmann 2000: 116), connected his art-historical research with the theory of a collective memory (Erll 2005: 20; Ginzburg 1995). For Warburg, culture is based on the memory of symbols and memory is thus a cultural institution visible in signs, symbols, pictures, texts and rites (Warburg 2000).

According to Maurice Halbwachs, *Lieu de mémoire* and a system of memory places are, in addition to rituals feasts and traditions, monuments which allow individuals who live together in a society to have the same interpretations of a symbol as the other members

of this system. They are therefore a part of the collective and the collective memory (Assmann 2000: 20; Halbwachs 1941). The reconstructed past arbitrates a common bond. In contrast, Pierre Noras' concept of the *Lieu de mémoire,* from a recent point of view on French history, described these places of memory in a wider tradition of the loci of the mnemo-technique of ancient cultures (Erll 2005: 23; Nora 1984–1992). These places of memory can be of geographical nature, or they can be buildings, monuments, and pieces of art, but also historical personalities, commemoration days, philosophical and science texts or symbolic acts (Erll 2005: 23).

How symbols support memory and even how they can help orientation in the landscape is demonstrated by landscapes of the Aborigines in Australia. Natural elements of the landscape are symbols for the ancestors or ancestral actions. For example, ochre is the blood of the ancestors, wells are where the ancestors dug into the ground, and trees grow where they had their sticks. According to John Pfeiffer, the incorporation of landscape features into myths and stories also help to store big quantities of geographical information (Pfeiffer 1982).

Megalithic landscapes are, particularly in the Mediterranean regions, geologically characterized by intrusive, ingenious rocks like granite and specially formed rock formations (Schulz Paulsson 2014). Thus, several of these locations, such as Southwest Corsica, Sardinia, the Pyrenees, Andalusia, and the Alentejo, are associated to rocks that bear a certain or an obvious resemblance to humans, animals, or altars and the link between the megaliths and symbols forming a natural ritual space is given.

Stone and Ritual

A further basis of oral tradition and memory are rituals. Megaliths were also places to perform rituals to render collected memories and so to create tradition and the identity of a group. Rituals connected to the megaliths include, for example burial rites, rites of passage, ancestor worship, or initiation rites and repetitive feasts.

Rituals are, according to Scott Atran's definition, often formulaic, sequentially typed public performances which also form personal identity and memory according to cultural parameters. Rituals are set by signs and displays that abstract and overact elements of the surrounding natural environment with movement, sound, sight, and smell. Finally, rituals communicate a moral consensus, for example from a sort of N-person (Atran 2002: 149). Different modes of religiosity closely connected to the two types of memory are grounded experimentally by cognitive psychology: the doctrinal mode, which is based on the verbal non-contextualized semantic memory, and the imagistic mode, which is based on nonverbal, contextualized episodic and flashbulb memory (Whitehouse 2000).

Without the possibility of writing or of some kind of writhing the memory and the knowledge which creates the identity of a group, rites have no other space than the memory, and scripture was an exteriorization of the memory at first (cf. Assmann 2000: 105–114).

> *The information has to be stored in the brain and it has to be demanded. To memorize it, it is helpful to recite it in rhythm or poetical form including a ritual production with acting or singing. This occurs mostly in front of the community with collective participation.* (Assmann 2000: 54).

The Navaho Indians are an impressive example for the use of the semantic memory and how rituals help to remember and convey the collective memory and knowledge in myths with their blessing and healing rituals (Kluckhorn/Leighton 1962: 102, 119, 203, 212–213, 225). These rites are performed by singers and are known as chant ways, such as the blessing way and the night chant. The Navaho rituals were extremely complex and therefore very difficult for novices to learn and to memorize flawlessly. The performance of some of the most elaborate rituals took a full nine days. The rituals had to be learned properly and then performed exactly in front of the commune to achieve the desired effect (Dutton 1976: 28-31; Iverson 1990: 32). If something was not performed correctly, the healing or the blessing was endangered. If the supernatural judged that a chant way was performed correctly, they would then reciprocate by curing the patient. The night way represents an initiation rite for boys and girls for full participation in ceremonial life. During the nine days, different acts are performed throughout the night in an orderly and regular manner. The participants just take short rests. The acts are a complex of ceremonies having a name and an origin legend carried out according to a certain ritual. Four nights include singing, sand paintings, symbolic offerings and rituals and on the ninth night the climax of the ritual is performed with a drama illustrating an elaborate myth performed by actors representing Talking god, Born-of water. Along with the singer and the actors there are normally twelve performing dancers.

A singer who knows one nine-night chant must learn as least as much as someone who sets out an entire Wagnerian opera, which includes the orchestral score, every vocal part, all the details of the settings, the stage business, and each requirement of the costumes. Some of the singers know three or more long chants as well as various minor rites. (Kluckhorn/Leighton 1962: 224–252).

Experts are richly rewarded in prestige and a prodigious memory is demanded. Boys with a better-than average memory are encouraged to apprentice themselves as well-known singers, then beside a high social prestige there is a strong interconnection between the economic and the religious system.

More simple blessing ways are often performed, in which the content of family life is ritualized and often performed. The investigation by Kluckhorn and Leighton in 1962 on the Ramah area showed that an adult man gave at this time one third or one fourth of his productive time to activities connected to rites, which included the time they spent as patients, helpers, spectators, trips to summon ceremonialists to gather plants and other materials, and to take care of attendees and guests by cooking food, organizing water and firewood. Women invested one fifth to one sixth of their productive time (Kluckhorn/Leighton 1962: 225).

The episodic memory or the religious imagistic mode according to Whitehouse (Whitehouse 2000) relies on non-verbalized, emotionally arousing experiences and the most relevant rites are one-in a lifetime events often physically excruciating and sensorial invasive (Atran 2002: 153) with horrifying sounds, masks, body paintings, and extraordinary body states such as extended sleep, food deprivation, drug use, and pain. This confirms Friedrich Nitsche's memory concept, accentuating the connection between mnemotechnic and pain and that, in the long run, only pain stays permanently in the memory (Assmann 2000: 109; Nitsche 1960). Physical pain is and was a component of diverse rituals, for example initiation rites and unpleasant rites such as the Navajo hazing and the Cheyenne sun dance (Atran 2002: 153–160). Thus, in an artificial way these rituals create well-organized circumstances for memorizing, both as individual and as collective important life-events.

Beside their often religious character, rituals also have a very important social and conflict resolution function and the attendees are also drawn to them to meet and feast together and to see and to be seen. There is often a social pressure in the sense of a duty to attempt to be a full member of the society. In this manner, rituals also help to preserve a social order and the nature of a public ritual is to maintain its stability (Bradley 1998: 89).

Rituals with more emphasis on social than on religious aspects are initiation rites which are carried out to accept young people as full members of an adult community or, for example, the Squaw dance to introduce young people to the marriage market and the community, a rite which is also well-expressed in its modern form in our society, for instance at the cotillion ball of the Vienna Opera Ball.

The abovementioned examples describe possible rituals performed at megaliths and their importance for memory culture and the conveyance of collected knowledge and the social framework. But even the construction act of the megaliths can be interpreted as a public communal ritual which helped to preserve the social balance as a type of generator.

Conclusion

After concluding all the mentioned arguments in this volume as a critical comparison of the determined sequences for grave architecture in the different regions and analyzing the spatial correlation of the megaliths and their relation to other contemporaneous burial forms in each studied area, one scenario and narrative became increasingly plausible:

Megaliths emerged in the second half of the 5th millennium cal BC within the same time interval in Northwest France, Catalonia, Southern France, Northern Italy, Corsica, Sardinia, possible the Southwest of the Iberian Peninsula and Galicia. Based on the determined time intervals for Northwest France, Catalonia and Sardinia, a slightly earlier outset is possible. Arguments for independent regional developments are limited to two regions: the Morbihan and Corsica, while the clearest and strongest evidence stems from the Morbihan. The Morbihan is one of the three potential earliest regions and the only region which exhibits the full sequence of early grave forms: 1) a pre-megalithic monumental labor-intensive grave architecture 2) transitional monumental structures leading to the megaliths, such as the first stage of the St. Michel, Carnac, 3) non-accessible megaliths with different outer structures, such as round or long tumuli, 4) transitional stages to the accessible megaliths as observed at Lannec er Gadouer, and 5) accessible grave structures.

Furthermore, the Morbihan is the region with the highest accumulation of prestigious goods produced from exotic raw material. Based on provenience analyses, this material was imported from other regions with early megaliths, such as Catalonia, the Southwestern Iberian Peninsula, and Northern Italy. This emphasizes the hypothesis of the Morbihan as a central region regarding the megalithic proliferation in Europe.

For Corsica there is evidence for the transition from subterranean cists to accessible megalithic graves, although these considerations are limited to one site and the necropolis on the Monte Revincu is a small, isolated megalithic occurrence for that time. The megaliths there emerged possibly somewhat later than those in Northwest France. Accordingly, a transfer of the megalithic concept is a more plausible scenario

here. From the remaining regions with early megaliths in the 5th millennium cal BC, such as Catalonia, Southern France, Sardinia, and the Italian mainland, there are no known transitional stages leading to the megaliths. Moreover, the first megalithic occurrences are registered in small clusters. These represent small megalithic islands or colonies and exceptional grave forms for that time in those regions, where caves, subterranean cists and hypogea were the most frequent burial sites. Accordingly, the megalithic concept transferred to these regions. Similar observations can be made for the potentially later early megaliths in regions of the West Mediterranean and on the West Iberian Peninsula. The described 'megalithic colonies', such as Catalonia, Southwestern France, and Northern Italy, are located in the proximity of green stone sources, for example variscite and jadeite, and the spreading of the megaliths and the connected ideology in the 5th millennium cal BC appears to be the result of prospection, mining, trade in connection with prestigious green stone and a pre-monetary value system with goods and gifts.

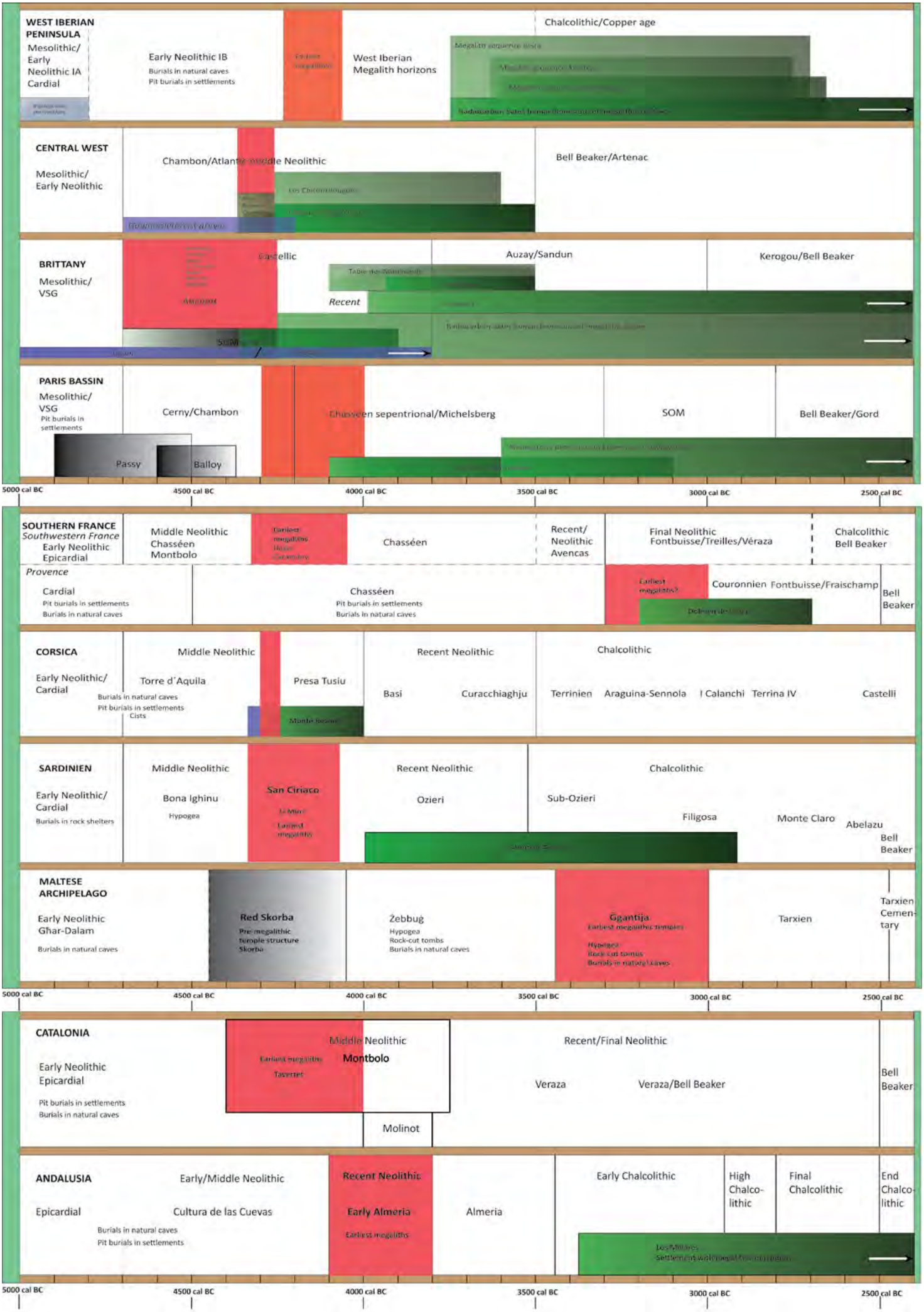
At the beginning of the project, we expected to confirm convergence for at least a part of the regions. The concept of convergence implies indigenous regional developments and these past models needed to be balanced against inter-cultural contacts. We found more indications for a transfer between the regions and for the mobility of the megalithic societies.

After an obvious change of the value system in Northwest France with a decrease of the cultural esteem of green stone in association with the emergence of passage graves, a partial hiatus of a couple of hundreds of years in the described regions could be observed until the megalithic sequences continued with many thousands of accessible megalithic grave monuments and meeting places. But how can we understand this increased 'monumental behaviour 'and the necessity of past societies to express themselves with symbols in the landscape by creating permanent communal or memorial places? The construction of monuments and megaliths by prehistoric societies in Europe shows a complex endeavor and it was only possible to illuminate certain aspects. The motivation to build these monuments and their functions might have varied considerably between the regions and the societies. Nevertheless, it is possible to make some overall remarks. The Europe-wide construction of numerous permanent monuments along the coasts indicates, on the one hand, mobility, maritime interaction and a new form and organization of communal efforts and, on the other hand, a new sense of space and time within these societies. The importance of the places for the memory and ritual culture might be interpreted by viewing their function as unifying elements and as generators of social balance. Additionally, we can understand these megaliths as symbols and memorials and thus as messages for following generations.

Appendix 1

Oversight Graphic

The diagram on the following page (p. 332) illustrates the investigated megalithic regions (chapters 3-10) with the most significant pre-megalithic and megalithic radiocarbon sequences (95.4% probability). Blue: pre-megalithic non-monumental sequences, grey: monumental non-megalithic sequences, red: time interval for the emergence of the earliest megaliths, green: most significant megalithic sequences.


WEST IBERIAN PENINSULA
Mesolithic/ Early Neolithic IA Cardial
Early Neolithic IB
Burials in natural caves
Pit burials in settlements
West Iberian Megalith horizons
Chalcolithic/Copper age
CENTRAL WEST
Mesolithic/ Early Neolithic
Chambon/Atlantic Middle Neolithic
Bell Beaker/Artenac
BRITTANY
Mesolithic/ VSG
Castellic
Recent
Auzay/Sandun
Kerogou/Bell Beaker
PARIS BASSIN
Mesolithic/ VSG
Pit burials in settlements
Cerny/Chambon
Chasséen sepentrional/Michelsberg
SOM
Bell Beaker/Gord
Passy
Balloy
5000 cal BC
4500 cal BC
4000 cal BC
3500 cal BC
3000 cal BC
2500 cal BC
SOUTHERN FRANCE
Southwestern France
Early Neolithic
Epicardial
Middle Neolithic
Chasséen
Montbolo
Chasséen
Recent/ Neolithic
Avencas
Final Neolithic
Fontbuisse/Treilles/Véraza
Chalcolithic
Bell Beaker
Provence
Cardial
Pit burials in settlements
Burials in natural caves
Chasséen
Pit burials in settlements
Burials in natural caves
Couronnien
Fontbuisse/Fraischamp
Bell Beaker
CORSICA
Early Neolithic/ Cardial
Middle Neolithic
Torre d´Aquila
Burials in natural caves
Pit burials in settlements
Cists
Presa Tusiu
Recent Neolithic
Basi
Curacchiaghju
Chalcolithic
Terrinien
Araguina-Sennola
I Calanchi
Terrina IV
Castelli
SARDINIEN
Early Neolithic/ Cardial
Burials in rock shelters
Middle Neolithic
Bona Ighinu
Hypogea
San Ciriaco
Recent Neolithic
Ozieri
Chalcolithic
Sub-Ozieri
Filigosa
Monte Claro
Abelazu
Bell Beaker
MALTESE ARCHIPELAGO
Early Neolithic
Ghar-Dalam
Burials in natural caves
Red Skorba
Żebbuġ
Hypogea
Rock-cut tombs
Burials in natural caves
Ġgantija
Hypogea
Rock-cut tombs
Burials in natural caves
Tarxien
Tarxien Cemetary
5000 cal BC
4500 cal BC
4000 cal BC
3500 cal BC
3000 cal BC
2500 cal BC
CATALONIA
Early Neolithic
Epicardial
Pit burials in settlements
Burials in natural caves
Middle Neolithic
Montbolo
Molinot
Recent/Final Neolithic
Veraza
Veraza/Bell Beaker
Bell Beaker
ANDALUSIA
Epicardial
Early/Middle Neolithic
Cultura de las Cuevas
Burials in natural caves
Pit burials in settlements
Recent Neolithic
Early Almeria
Almeria
Early Chalcolithic
High Chalco-lithic
Final Chalcolithic
End Chalco-lithic
5000 cal BC
4500 cal BC
4000 cal BC
3500 cal BC
3000 cal BC
2500 cal BC

Appendix 2

Glossary

To compare similar monuments within and between the regions, it is necessary to define and then use a common terminology. The aim hereby was not to primarily compare and describe the architectonic features in as much detail as possible and to find inner-regional differences, as to compare features on a wider scale which reflect changes in the societies regarding burial rites and ancestor worship, e.g. the accessibility of graves and the invention of the passage grave. The research traditions of the different regions were respected, but they are in part diverse or even contrary, whereby misleading denotations are common for similar megalithic appearances (cf. Fig. 1.5). The following explications present definitions for megaliths currently found in Europe, including pre-megalithic or contemporaneous stone-built structures for a better demarcation.

Megalith: A man-made structure with more than half constructed in stone slabs. Megaliths are always more than halfway aboveground. An exception is represented by a part of the gallery graves, which are completely inserted into the ground, but signify the end of a long megalithic sequence.

Funeral architecture – inner structures

Cist (chiste, Steinkiste, kista): A *cist* is a small stone-built box of pre-megalithic or contemporaneous megalithic origin. It was always built subterranean or more than half-subterranean, usually with four side stones. Cists were either covered by a capstone or with an organic cover, e.g. by wooden planks.

Dolmen (anta): Dolmens represent the simplest, most common megalithic grave form in Europe. Dolmens were usually built with four side stones or orthostats, a capstone, an entrance or a door stone and in some cases with an entrance area. Extended dolmens can have more than one side stone. An emphasis of this analysis is the distinction between non-accessible and accessible dolmens. Dolmens were always built aboveground or more than halfway aboveground.

Non-accessible dolmen (coffre, Urdolmen, cista amb túmul, tombes á cercles, tomba a cercoli): Non-accessible dolmens are megalithic cist-like structures, but in contrast to cists they were always built aboveground or more than half aboveground. Non-accessible dolmens are mostly built with four side stones and a capstone. Access is theoretically possible through removal of the capstone, but many of them are covered by a round or long partly colossal tumulus or there are indications for tumuli-like concentric stone circles or pavements around the chambers as possible basements. Thus, burials were singular acts. The ancient, non-accessible dolmens represent the earliest megalithic stage in Europe.

Accessible dolmen: Accessible dolmens are indicated by a clear entrance area with an opening and partly by removable door stones or an entrance stone. Some of these entrance stones incorporated a small door, a so-called falsa porta. Collective successive and secondary burials were possible.

Passage grave (dolmen á couloir, dolmen a corredor, Ganggrab, ganggrift): Passage graves are accessible megalithic graves with side stones, cap stones, and a corridor. It was possible to use both dolmens and passage graves as collective graves with successive burials, but the passage included the possibility to construct a much larger and more impressive monument, since the inner stone structure built with slabs or dry walling was mostly covered by an outer construction such as an earthen or a stone tumulus. Some of these graves were built with vaults in a dry wall technique (i.e. the tholoi).

Gallery grave (allée couverte, allée sepulcrale, galerie catalane, dolmen de galleria, Galeriegrab, hällkista): Gallery graves are structures with an extended chamber, several side stones and an entrance area or corridor with the same extension as the chamber if the entrance is on the short side of the chamber. There are also gallery graves with the entrance on the long side of the grave. These graves are either half-subterranean or subterranean, but are considered to be megaliths, since they represent a later appearance and continuation of earlier megaliths. Gallery graves were often built with inner compartments and entrance stones which divided grave chambers and entrance areas. These entrance stones were partly perforated with a round hole, the so-called Portal or Kennel holes.

Funeral architecture – outer structures

Tumulus (tertre, cairn, barrow, mound, Langhügel, hög): In Europe the above-mentioned structures are mostly covered either by a long or a round mound built with earth, dry walls or a combination of both. In order to simplify the classification of similar structures for the regions, the different structures are summed up under the term tumulus, which is supplemented throughout this volume with closer descriptions regarding form and material.

Other megalithic structures

Standing stone (menhir, pierre dressée, bautasten): A standing stone is an anthropogenic erected stone with unknown function. Interpretations include functions such as memorial stones, territorial markers, ritual meeting places, calendars, and astronomical markers. Standing stones can be simple and small or several meters long. The longest recorded exemplar so far is the Grand Menhir in Brittany with a former length of approximately 21m and a weight of 270t. Standing stones can be anthropomorphically formed or sculptured as standing stone statues.

Stone circle (cercle de pierre, cromlech): Stone circles consist of standing stones with unknown functions. Most interpretations refer to these circles as possible ritual meeting places or astronomic centers.

Alignment: An alignment is a row of standing stones with unknown functions. Its interpretation is similar to that of stone circles.

Megalithic buildings: More uncommon are megalithic buildings. Their function is mostly unclear and still under discussion, but they are usually interpreted as ritual buildings like the Maltese temples or the megalithic pyramid Monte d´Accodi on Sardinia or they represent profane or defensive buildings like in Los Millares in Andalusia.

Non-megalithic contemporaneous burials

Rock-cut tomb: This simple, often vertical grave chamber cut into rock included either a vertical or a horizontal shaft.

Hypogeum: This subterranean grave was either cut into rock or dug into the ground and often included several side cells or chambers.

Britain/This analysis	France	Spain	Catalonia	Portugal
Cist	*Chiste*	*Cista*	*Cista*	*Cista*
Dolmen	*Dolmen*	*Dolmen*	*Dolmen*	*Anta*
Non-accessible dolmen	*Coffre/tombe á circle* *Tombe á circle*	*Dolmen*	*Cista amb túmul*	*Anta*
Passage grave	*Dolmen à couloir*	*Dolmen de Corredor*	*Dolmen de Corredor*	*Anta com corredor*
Gallery grave	*Allée couverte/* *Allée sepulcrale*	*Dolmen de Galeria*	*Dolmen Catalan*	
Tumulus	*Tertre/Cairn*	*Tholoi*	*Túmul*	*Mamoa/Tholoi*
Standing stone	*Menhir/Pierre dressée*	*Menhir*	*Menhir/Monòlit*	*Menhir*
Stone circle	*Cercle de Pierre*	*Crómlech*	*Cromlec*	*Cromlech*
Alignment	*Alignement*	*Alineamientos*	*Aligneament*	*Conjunto de menhires*
Rock-cut tomb	*Rock-cut tomb*	*Sepultura pétreas*	*Cova artificial*	*Gruta artificai*
Hypogeum	*Hypogée*	*Hipogeo*	*Hipogeu*	*Hipogeu*
Britain/This analysis	**Italy**	**Germany**	**Denmark**	**Sweden**
Cist	*Cista*	*Steinkiste*	*Stenkisten*	*Kista*
Dolmen	*Dolmen*	*Dolmen*	*Dysse*	*Dösa*
Non-accessible dolmen	*Tomba a circoli*	*Urdolmen*	*Dysse*	*Dösa*
Passage grave	*Dolmen a corridoio*	*Ganggrab*	*Jaettestue*	*Ganggrift*
Gallery grave	*Dolmen a galleria*	*Galeriegrab*	*Hellekisten*	*Hällkista*
Tumulus	*Tumulo*	*Langhügel, Rundhügel*	*Høj (long,rund)*	*Hög (long, rund)*
Standing stone	*Menhir*	*Monolith/Menhir*	*Bautasten*	*Bautasten/Monolit*
Stone circle	*Cromlech*	*Steinkreis*		
Alignment	*Allineamento*	*Steinreihe*		
Rock-cut tomb	*Domus de Janas*	*Felskammergrab*		
Hypogeum	*Ipogeo*	*Hypogäum*		

Figure Appendix 2.1 Megalithic terminology of the various regions

Appendix 3

Data

Online sections containing:

Database of Radiocarbon Dates
Model Outcomes of Calibrated Data
Programming Codes

are avaliable to download from: http://bit.ly/2vRAqEz

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