Radiocarbon, Vol 66, Nr 1, 2024, p 155–204 DOI:10.1017/RDC.2024.19

CHRONOLOGICAL STUDY OF COLLECTIVE BURIALS IN THE NORTHERN IBERIAN PLATEAU: ANALYSIS OF RADIOCARBON DATES ON HUMAN BONES FROM THE MEGALITHIC COMPLEX OF LA LORA (BURGOS, SPAIN)

Angélica Santa Cruz[1,2]*

[1]Dept. de Prehistoria, Historia Antigua y Arqueología. Universidad de Salamanca, Salamanca, Spain
[2]Dept. de Prehistoria, Arqueología, Antropología Social y CC. TT. Historiográficas. Universidad de Valladolid, Valladolid, Spain

ABSTRACT. This paper offers a temporal analysis of the megalithic group of La Lora in the context of northern Iberian Plateau megalithism. For this purpose, 67 accelerator mass spectrometry radiocarbon (AMS ^{14}C) dates were obtained on human bone from the minimum number of individuals recovered from nine tombs. This is the first systematic dating project carried out in this dolmen group and has enabled the chronology of the main funerary series to be updated. The results reveal that the actual funerary use dates mainly to the 4th millennium BC, although, as deduced from the archaeological material, some tombs were reused in later periods. Additionally, the significant architectural polymorphism of the group, consisting mainly of simple dolmens and large corridor tombs, suggested a temporal evolution to monumentality. However, the dating shows a more complex reality, since it is likely that the large tombs functioned as funerary pantheons during the 4th millennium BC, characterized by a cyclical and recurrent use. In contrast, the simpler structures were preferred to be of shorter use and restricted to the first half of the 4th millennium.

KEYWORDS: Bayesian modeling, megalithic tombs, northern Iberian Plateau, radiocarbon AMS dating.

INTRODUCTION

Dolmens have traditionally been taken as monumental tombs with a long period of use during the most advanced phase of the Neolithic, despite their burial function continuing into later times, with frequent evidence of burials ascribed to the Chalcolithic and the Bronze Age. However, it is not until recent years when research on the megalithic chronology seems to have definitively taken off in light of the improvement in direct radiocarbon dating by AMS on short-lived samples, mainly human bone (to cite some examples, the publications of Bayliss et al. 2007a, 2007c; Whittle et al. 2007a, 2007b; Wysocki et al. 2007; Fernández-Eraso and Múgica-Alustiza 2013; García Sanjuán et al. 2018; Lozano Medina and Aranda Jiménez 2018; Aranda Jiménez et al. 2017, 2018a, 2018b, 2020a, 2020b, 2022; Blank et al. 2020; Linares-Catela 2022; Linares-Catela and Vera-Rodríguez 2021, 2023; Alday-Ruiz et al. 2023, etc.). At first, the appearance of very old dates in different regions hinted at the emergence of various autochthonous regions where dolmens were to be found in different parts of Europe (Renfrew 1976). However, recent studies involving radiocarbon data collection point to a somewhat different process of European megalithisation. The adoption of funerary megalithic structures would have spread by sea from the northwest-northeast regions of France and northeast-south of the Iberian Peninsula to the rest of Europe; this would have been for not much longer than 200–300 years at the end of the 5th millennium BC (Schulz Paulsson 2019: 3463).

Unfortunately, the main problem faced by studies of the megalithic chronology is that dolmens are difficult archaeological records to understand, not only due to extent of their use, but also because the ossuary itself, often referred to as *"palimpsest"* (Aranda Jiménez et al. 2020a: 1147), makes a detailed and thorough analysis of archaeological material and bones

*Corresponding author. Email: angelica.santa-cruz@usal.es

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

impossible. Fragmented and mixed bones abound in this type of tomb "commingled remains," the result of prolonged use and accumulation of such elements (Osterholtz et al. 2014). Megalithic ossuaries, while following the characteristics of collective and diachronic burials, are the result of continuous and long-term access (open burials) (Roksandic, 2002). They are also affected by various post-depositional processes, anthropic or otherwise, resulting in ossuaries of highly fragmented and mixed remains.

The formation of the megalithic tomb causes the fragmentation and mixing of the remains, which makes it extremely difficult not only to interpret the nature of the site, but also to conduct a detailed study of the individuals, their demographic analysis, an evaluation of population homogeneity and an anthropological characterization (Silva 2012; Fernández-Crespo 2015). The only way to study an ossuary of such characteristics is to carry out a careful registration of each of the fragments recovered during the excavation (Masset 1987; Ubelaker 1974, 2007; Duday 2006; Fernández-Crespo 2015; Knüsel and Robb 2016) and a subsequent tabulation of the anatomical, morphological and taphonomic variables that these provide us with (Ubelaker 2007; Osterholtz et al. 2014). These tasks represent an essential prior step for correctly focusing the analysis of megalithism from all perspectives, including a temporal interpretation of the tradition of megalithic use.

As mentioned above, advances and refinement in radiocarbon methods have made possible an accurate analysis of the age of many dolmen sites, which is of vital importance for understanding the megalithic phenomenon in a large part of Europe. Development in this field is mainly due to the improvement in radiocarbon dating and the calibration of dates by Bayesian models, since they allow interpretative estimates (posterior information) of archaeological events, combining prior information with the standardized probabilities provided by radiocarbon dates (Bronk Ramsey 1995; Buck et al. 1992; Bayliss et al. 2007b). Thus, there is a combination of relative chronological information, provided by the archaeological record, and the calendar age, that is, the absolute measurements obtained by scientific dating methods (Bayliss et al. 2007b; Bronk Ramsey 2009a). The development of Bayesian temporal models based on megalithic sequences has made it possible to place funerary uses in time. These analyses have also revealed that, despite the very long time series found in megalithic tombs, these uses may have been cyclical and often sporadic (Bayliss et al. 2007a, 2007c; Whittle et al. 2007a, 2007b; Wysocki et al. 2007; Santa Cruz del Barrio et al. 2020b; Meadows et al. 2020).

In this paper an important megalithic group of the northern Iberian Plateau is studied: the dolmens of La Lora and the Sedano Valley in Burgos (Spain). The aim is to define the duration and funerary practice of the tombs, contributing to research on the dating and sequencing of northern plateau megaliths in the context of the megalithisation of the center-north of the peninsula; this is in line with absolute dating of the minimum number of individuals in each dolmen.

THE MEGALITHIC SITE OF LA LORA

The timeframe paradigm of Iberian megalithism has changed substantially since the first diffusionist hypotheses, which saw passage tombs as a reflection of the dolmens of the west of the peninsula, and more specifically the Portuguese Alentejo, due to their significant resemblance to the tombs of the interior (Delibes de Castro et al. 1982; Delibes de Castro and Rojo-Guerra 1997; Laporte and Bueno Ramírez 2019: 1174). In Central Iberia, whether in the Northern Plateau, the Tagus Valley or the Rioja Alavesa, the antiquity and importance of the megaliths has gradually been recognized (Bueno Ramírez 1991; Bueno Ramírez et al. 1999, 2004, 2007, 2010, 2016; Andres 1997; 2000, 2005; Fernández-Eraso and Múgica-Alustiza 2013; Fernández-Eraso et al. 2015; Fernández-Eraso et al. 2019).

Previous research in the north of the Iberian Peninsula had provided an overview, revealing megalithism as a "polymorphous phenomenon extending over a long period of time" (Delibes de Castro and Rojo-Guerra 2002: 21). In particular, the tombs of La Lora would feature in settling down the types of neolithization in the northeastern area of the Iberian Plateau, but with certain particularities that have been defined after years of study (Rojo-Guerra 1993; Delibes de Castro and Rojo-Guerra 2002; Delibes de Castro 2000; Delibes de Castro et al. 2010; Villalobos García 2014). Former radiocarbon data, together with the characteristics of the grave goods, were key when proposing that the architectural heterogeneity of the La Lora dolmens was compatible with an evolution towards increasingly monumental structures (Delibes de Castro and Rojo-Guerra 1997, 2002). In this proposal, the process would culminate with the great passage tombs towards the second half of the 4th millennium BC. The architectural variety of La Lora includes:

(a) *Small mounds without a megalithic structure* in which the bones are deposited on the ground with no specific tomb area. They may correspond to a phase prior to the megalithic phenomenon, judging by the simplicity of their forms and the archaism of their grave goods. The best evidence of these proto-megalithic mounds is recorded in Rebolledo (Delibes de Castro et al. 2023) and are chronologically attributed to the end of the 5th millennium BC.

(b) At a later time, the first actual megalithic monuments, *simple closed dolmens without a passage* below small mounds, comparable to a certain extent to the *rundgräber* of the southeast of the peninsula (Leisner and Leisner 1943). The clearest examples are to be found in the necropolis of Fuentepecina. Their archaic grave goods also attest to the antiquity of these sites, since they abound in triangular or trapezoidal microlithic tools with concave sides, as well as quartz crystal prisms, dentalium shells and slate beads (Delibes de Castro and Rojo-Guerra 1997, 2002; Delibes de Castro 2010; Villalobos García 2014).

(c) These simple dolmens would give way to the *first graves with a passage, also termed "transitional" or short-passage* (Delibes de Castro and Rojo-Guerra 2002), many with a long chamber, such as Ciella, La Nava Negra or Vademuriel. In these tombs the geometric microliths are somewhat more developed than those of the previous tombs, with trapezoids or segments, but no longer inspired by those of the Cocina-type and the Mediterranean Epipaleolithic (Delibes de Castro et al. 1982; Delibes de Castro and Rojo-Guerra 2002).

(d) Finally, the sequence would culminate in large passage graves such as Las Arnillas, La Cabaña or El Moreco towards the middle of the 4th millennium BC; some, however, have a much earlier reference from level under the mound (Delibes de Castro and Rojo-Guerra 1997). In these cases, the lithic grave goods show a considerable degree of modernity, linking them to Late Neolithic and Chalcolithic typologies. This is the case of flat retouched arrowheads, bone rings or lignite tubular beads, which, except for Fuentepecina I (simple tomb without a corridor; see Supplementary material), always appear in passage tombs (Delibes de Castro and Rojo-Guerra 2002).

According to the main authors, the evolution towards the monumental nature of the La Lora graves could reflect the internal dynamics of the neolithic communities that were settling in the northern regions. At first, the investing of time, effort and technology that is needed for constructing the great monumental tombs is not required (Delibes de Castro 1995; Delibes de Castro and Rojo-Guerra 2002; Delibes de Castro 2010; Villalobos García 2016a). In

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

addition, these early stages represent closed, and perhaps abandoned, architectural solutions, giving way to large passage tombs (Delibes de Castro 2010: 31). In any case, the architectural evolution of the tombs seems clearly defined by their increasingly monumental characteristics, being conceived as landmarks of territoriality according to traditional interpretations (Renfrew 1976), but also as memorials with increasing characterization as the processes of neolithization and sedentary life take root in the territory (Sherratt 1990).

Finally, a further phenomenon regarding the development of dolmens are the so-called post-classical stages, that is, funerary reuse events that restore burial functions to the megalithic tombs. As research into the evolution of megalithic graves has progressed, more and more evidence of burials after the Neolithic stages has been gathered. The dating of such events is a clear testimony that, after years of abandonment or closure, these tombs would again be used for funerary purposes, a point that seems to have been especially notable from the Late Chalcolithic. This is shown by the many tombs throughout the Iberian Peninsula in general and particularly in the northeast and southwest of the Iberian Plateau (Delibes de Castro and Santonja 1987; Benet et al. 1997; Garrido-Pena 2000; Delibes de Castro 2004; Álvarez-Vidaurre 2006; Tejedor-Rodríguez 2015; Santa Cruz del Barrio et al. 2020a).

The Sites Studied

The study of the La Lora dolmens was conducted in an archaeological project of the 1980s, leading to the excavation of a large number of collective tombs around Sedano. It provided substantial information relating to the megalithic phenomenon in the center of the peninsula (Delibes de Castro et al. 1982, 1986, 1993; Rojo-Guerra 1993; Moreno Gallo 2004; Villalobos García 2014; Moreno Gallo et al. 2020, 2021, etc.). Dolmen sites are located between the Cantabrian Mountains, the northern Iberian Plateau, and the foothills of the Iberian Mountain Range. The sites occupy a large part of La Lora in Burgos, but also extend towards the Hoces del Alto Ebro and Rudrón Natural Park, in the northeast of the northern Iberian Plateau. The innumerable studies of the area found that the optimal ecological-environmental factors are concentrated in a particular region in the center of the La Lora plateaus. The characteristic crescent shape around which a significant number of dolmen tombs are distributed led to its being termed the "*Golden Crescent*" of the La Lora megaliths, perhaps having a strong relationship with population dynamics in the Late Neolithic in that region (Moreno Gallo 2004; Villalobos García et al. 2014).

In order to find the oldest references to these tombs we have to go back to the mid-twentieth century, the first being El Moreco, discovered by L. Huidobro in 1954 (Rojo-Guerra 1993; Delibes de Castro 2018). But it would not be until the 70s when real investigation into megalithism on the northern Iberian Plateau began, with the excavation of the dolmen of La Cotorrita (Osaba et al. 1971). Between 1976 and 1990 new studies took place, this time by a team of archaeologists from the University of Valladolid (Spain). The highlight of this project was the excavation of 14 megalithic tombs, among which are the following: Las Arnillas, El Moreco, La Cabaña, the necropolis at Fuentepecina, La Cista de Villaescusa, San Quirce, Ciella and La Cotorrita (Figure 1); a description of the excavation is given in the doctoral thesis of 1993 by Manuel Rojo-Guerra. The excavations in the dolmens of La Lora were the starting point of numerous investigations embodying extensive scientific production dealing with different aspects. Key here were spatial analysis (Rojo-Guerra 1990; Moreno Gallo 2004), and the study of symbolic elements, probably linked to megalithic ceremonies (Gil-Merino et al. 2018; Santa Cruz del Barrio et al. 2021).

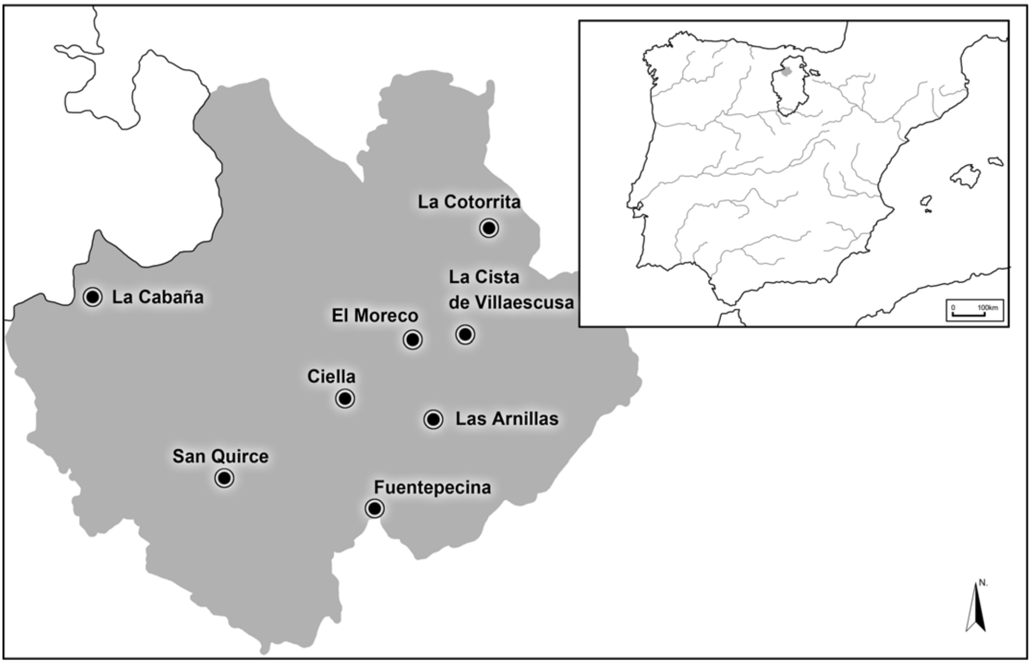

Figure 1 Location of La Lora region and Sedano Valley in the North Iberian Plateau (Spain) and distribution of megalithic sites (elaborated by Francisco Tapias).

As for architectural characteristics, it is possible to appreciate differences, mainly regarding their monumentality; this served as the basis for justifying the previously mentioned architectural evolution of the tombs (Figure 2). Las Arnillas, El Moreco, La Cabaña and La Cotorrita are the largest passage graves in the complex. At Las Arnillas, the largest ossuary of the megalithic complex in the area was excavated. In it there appeared elements with certain modern traits, such as flat retouch arrowheads typical of the Chalcolithic stages. For this reason, the burial function of the tomb was dated at the end of the 4th millennium; this would later be revealed by the only dating carried out on human bone before the present study (Supplementary material). However, elements from later times were also found at Las Arnillas, such as Bell-Beaker ceramics, materials from the Late Bronze Age or even from historic times. Of these elements we highlight a series of incised vessels in the Ciempozuelos style and two prismatic V-perforated bone buttons, located at the opposite end of the entrance (Delibes de Castro et al. 1986: 26-27); however, it was not possible to identify different burial events.

One of the great tombs is El Moreco, the largest passage tomb of the megaliths. The collection of bones and archaeological material is scant owing to the constant looting of the tomb. El Moreco has several architectural particularities that have made it possible to determine the existence of previous phases on the basis of a study of the soil's composition (Delibes de Castro and Rojo-Guerra 2002). This suggests the existence of a mound prior to the construction or rebuilding of the tomb in the current passage (Delibes de Castro and Rojo-Guerra 2002:26). However, in the absence of Bell-Beaker or later materials, it was proposed that the tomb might not have been reused (Rojo-Guerra 1993; Delibes de Castro et al. 1993). The last great passage tomb is La Cabaña, and this was also visited quite often during historic times. The destruction of this dolmen inevitably reduced the bone collection. Nevertheless, the recovered material could be assigned to the Late Neolithic phase (Rojo-Guerra 1993:165).

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

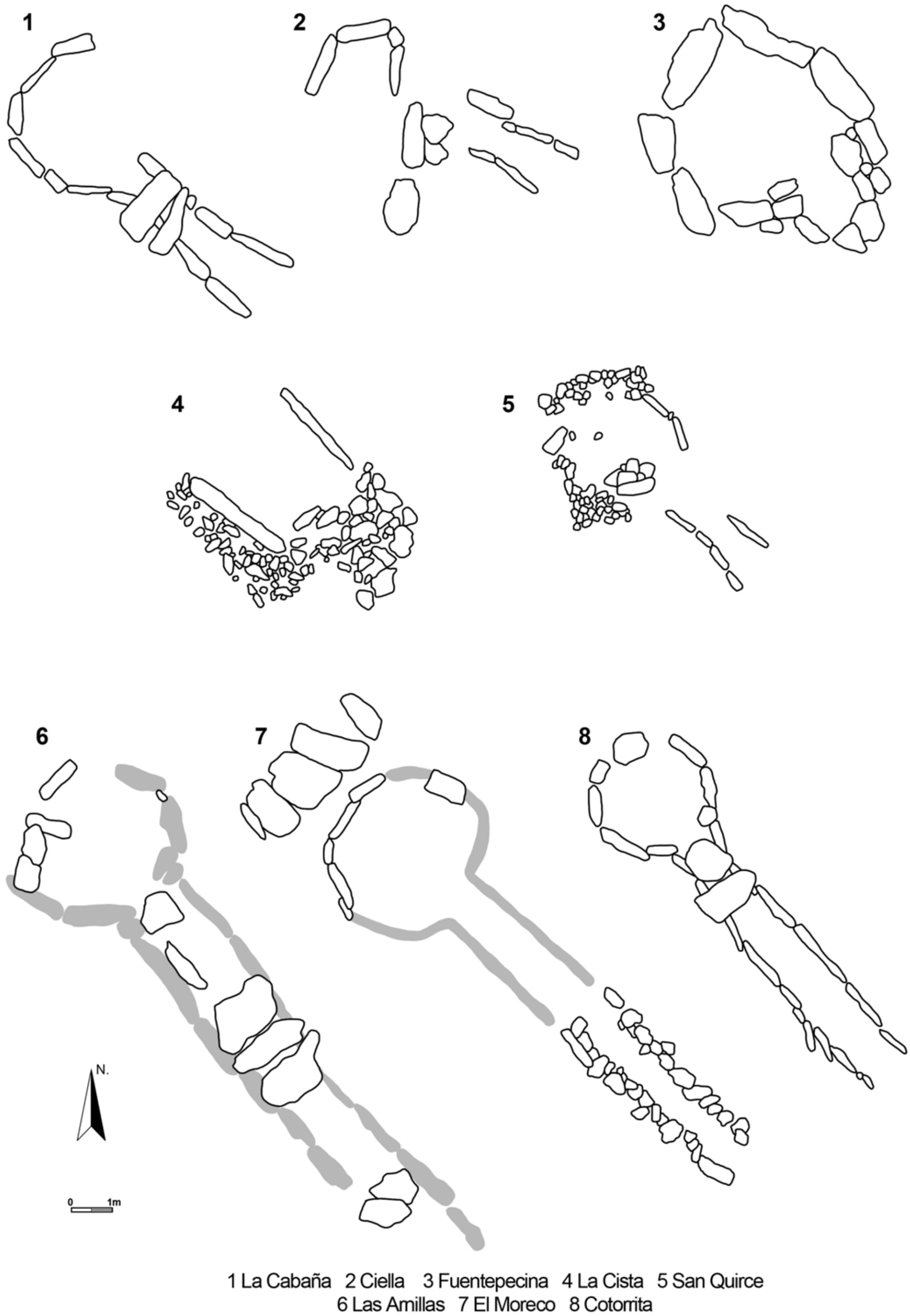

Figure 2 Floor plans of the megalithic graves in La Lora region studied in this work (elaborated by Francisco Tapias from Delibes de Castro et al. 1986 and Rojo-Guerra 1993).

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

Another megalithic complex of great importance in La Lora is the necropolis of Fuentepecina, made up of four simple small dolmens without a passage or with small entrances. Fuentepecina I and IV were visibly damaged, and Fuentepecina III had been modified by a later medieval necropolis. This is the reason why its bone collection has been rejected in this study. Finally, Fuentepecina II was the best preserved and presumably intact tomb, with an ossuary consisting mainly of long bones and skulls, as well as a complete collection of grave goods. The simplicity of its architecture was from related to the antiquity of the materials; among these feature microliths and bone spatulas, which could be included in the typology known as San Martín-El Miradero, and various lignite beads, elements that could correspond to the first stages of the introduction of megaliths on the northern Iberian Plateau (Delibes de Castro et al. 2012; Alonso Díez et al. 2015).

The Cista de Villaescusa also stands out among the tombs with simple structures. This is a simple dolmen in the form of a rectangular megalithic box, an architectural peculiarity not documented in the region (Rojo-Guerra 1993). In this case, a large bone collection was recovered, together with a very complete set of grave goods, in which innumerable necklace beads of various materials and arrowheads with a certain degree of modernity are worthy of note in terms of apparent chronological correspondence (Delibes de Castro et al. 1993). This made it possible to relate the tomb to more modern typologies corresponding to those found in the large passage tombs mentioned above (Delibes de Castro et al. 1993: 91; Delibes de Castro and Rojo-Guerra 1997; Delibes de Castro 2010; Delibes de Castro et al. 2010).

The remaining dolmens are short-passage tombs and of a smaller size, categorized as "transitional dolmens" (Delibes de Castro 2010). Thus, for example, San Quirce presents a typically megalithic collection of grave goods, formed by ceramic fragments, flint blades and microliths with certain archaic characteristicssuch as Cocina-type triangles with a lateral appendix (Delibes de Castro and Rojo-Guerra 2002). Nevertheless, charcoal dates provided more recent activity between the 3rd–2nd millennia BC (Supplementary material) consistent with intrusive elements, among which we highlight everted-rim vessels with mamelons associated with the Bronze Age.

Finally, Ciella is another short-passage dolmen. This tomb was heavily looted, and its grave goods showed recent characteristics (arrowheads and large blades), although dating from layer under the mound puts back its construction to the end of the 5th and beginning of the 4th millennium cal BC (Supplementary material). In fact, previous radiocarbon analyses of the La Lora megalithic sequence provided previous dates of the layer under the mound with wide time intervals for its construction, that is, in the middle of the 5th millennium BC.

There are other burials in the temporal context of the La Lora burials, but with very poor skeletal collections. For this reason, they were not included in this study. Two tombs not analyzed here, Valdemuriel, el Rebolledo, as well as Fuentepecina II, yielded dates of considerable antiquity. However, these dates have been dissociated from the construction event of the tomb due to their notorious chronological discrepancy (Delibes de Castro and Rojo-Guerra 1997:407–408). Another dating, from the same Valdemuriel tomb characterized by a certain archaism in its structure (Delibes de Castro and Rojo-Guerra 1997, 2002) provided a somewhat more coherent date (GrN-14028: 5670 + 110), with calibrated dates between 4780–4330 cal BC (2 σ) (Supplementary material) (Figure 3).

It was concluded that the La Lora series began at the end of the 5th millennium cal BC, based on the typological sequences and radiocarbon dates obtained under the barrows. The simplest

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

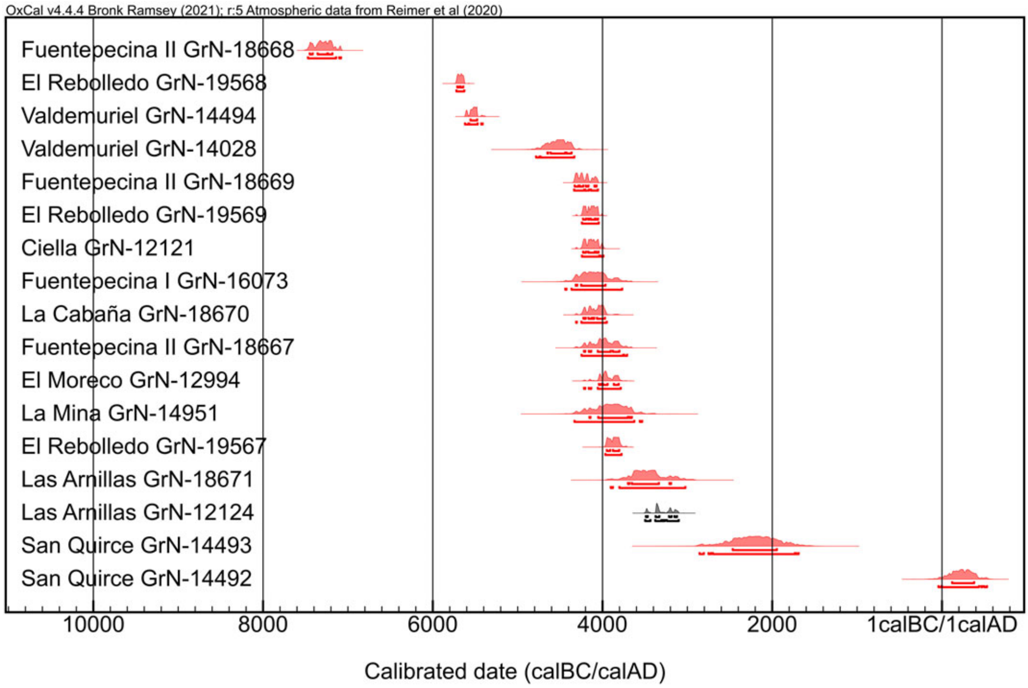

Figure 3 Charcoal dates under the mounds of La Lora tombs (red) (Delibes de Castro and Rojo-Guerra 1997). A date on a human bone from Arnillas is included but has been excluded from this analysis as it is not part of the MNI series.

tombs would have been built first, and as the millennium progressed, tombs with short passages would have been built. Finally, the funerary use of large passage tombs would have been built and generalized towards the end of the 4th millennium BC (Delibes de Castro and Rojo-Guerra 1997; Delibes de Castro 2010).

Skeletal Collections and Anthropological Analysis

The age estimation methods were as follows: in the case of immature individuals, the analysis was based on long bone development (Scheuer and Black 2000) and dental eruption stage (Ubelaker 1989; AlQahtani et al. 2010, 2014). Diagnostic criteria vary depending on the bone type used to age adult bones. For example, epiphyseal fusion in the long bone is used as a criterion for physical maturation, although the degree of epiphyseal fusion varies over time. On the contrary, mature specimens with fragmented or altered epiphyses have been classified as "indeterminate adolescent-adult" because of the impossibility of assigning them to any age group. As for the adult postcranial skeleton, according to Buckberry and Chamberlain (2002), the metamorphosis of the auricular surface was the diagnostic feature despite the high degree of fragmentation of the specimens.

Finally, obliteration of cranial sutures (Meindl and Lovejoy 1985) and degree of molar wear, according to Brothwell (1981), were chosen as cranial skeletal variables for age assignment in adults. Both methods provide imprecise age estimates and can only provide a correct diagnosis with other skeletal age indicators. For example, dental wear is a multifactorial process, so it

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

could not be the better age indicator. However, the approximation of adult age by other methods or by comparing different variables is impossible due to the high degree of fragmentation of the assemblages. Therefore, the choice of these techniques is mainly due to the methodological unity since many prehistoric collections with similar characteristics offer data based on this methodology.

Nevertheless, this work assumes, as already warned by other authors (Masset 1971, 1973), that innumerable biases can influence the estimation of adult age. For this reason, the age classification of adult individuals was taken as a reference. It is not strictly indicative of a paleodemographic analytical approach.

Sex estimation was exclusively based on mature bones, especially the pelvis, and skull according to their morphology (Ferembach et al. 1980), and the pelvis and long bones according to metric analysis (Alemán Aguilera et al. 1997; Murail et al. 2005).

The minimum number of individuals in each series was determined by classifying by sex and age and selecting the most repeated bone in each category.

Due to the better preservation of the skeletal series, the following sites were chosen for the study: Las Arnillas, El Moreco, La Cabaña, Fuentepecina, La Cista, San Quirce, and Ciella. The documentary basis for radiocarbon dating was based on the study of the demographic composition of the collections. Few conclusions have been drawn from dolmens such as El Moreco or Ciella, with very small skeletal samples, of 6 individuals and only one child in each collection. On the other hand, samples such as Las Arnillas, La Cabaña, or San Quirce include at least 32, 17, and 19 individuals, respectively. The Fuentepecina necropolis offers 38 individuals, although in a poorer state of preservation. Finally, La Cista also has 30 individuals. Therefore, the total minimum number of individuals in the series is 148[1].

Megalithic Burial Practices in La Lora Region

Megalithic burial practices have traditionally been studied (Vílchez Suárez et al. 2023; Santa Cruz del Barrio et al. 2023). More recently, there has been an increase in the use of taphonomic analysis, which has been instrumental in the attribution of the co-existence of different types of burial in the same space. The region of La Lora is no exception. The various graves contained anatomically related skeletons and skeletal representation patterns consistent with secondary burials (Santa Cruz del Barrio 2022; Santa Cruz del Barrio 2023).

The taphonomic analysis has, therefore, provided an insight into burial practices in La Lora region. Although the high proportions of some skeletal elements suggest secondary practices after the initial deposition of the bodies, the overall bone representation index indicates that primary inhumation was the preferred form of burial. All anatomical regions are generally represented in passage graves, although the abundance of skulls and long bones is remarkable. This phenomenon is repeated in those graves that contain unusual concentrations of some bones, such as the bundles of bones at San Quirce or the "nests of skulls" at Las Arnillas. This practice suggests the deliberate selection of certain remains, which may have had a special meaning in the context of the funerary ceremonies.

[1]This is the total MNI of the sites dated in La Lora, but there are individuals in the funerary series that are not prehistoric. The paleodemographic analysis, which is not the subject of this work, must take this issue into account.

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

The differential preservation of anatomical elements can be interpreted as either a deliberate selection of certain bones or an attempt at ossuary reduction. In this respect, evidence of perimortem processing has been found in La Cabaña (Santa Cruz del Barrio 2022). The signs of defleshing and disarticulation, which do not appear for nutritional purposes, would have been aimed at removing the soft tissues. The identification of such practices could support the most widely accepted hypothesis. According to this hypothesis, some bones were involved in a ritual program aimed at the circulation of bone relics. Such a practice is reminiscent of ancestor worship, which has already been documented in Mesolithic and Neolithic contexts (Cauwe 1997).

It is, therefore, possible to observe common burial patterns within the complex burial practices of the megalithic period. In this sense, direct evidence of manipulation of human remains can be related to secondary reduction practices after burial and to ancestor worship, shared in different megalithic contexts.

MATERIAL AND SAMPLE SELECTION

As has been seen, the dates so far available for these dolmens had served as a reference for establishing the initial construction of the La Lora megaliths. However, the fact that they were the result of using long-lived samples means that the phenomenon also known as the "old wood effect" (Schiffer 1986) cannot be ruled out. In addition, many of these dates display very wide statistical deviations, with the resulting timeframes sometimes spanning several centuries (Figure 3), and thereby inaccurately putting back or bringing forward the event. In all cases, charcoal-based samples have been discarded, as well as dates with wide statistical deviations. Previous dates with large statistical deviations have been excluded from the models because: a) they offer such wide ranges in the modeled dates that they artificially extend the limits of the archaeological events; b) most of them are made on charcoal and it is preferable to adjust the chronology of funerary events with short-lived samples (the burials); c) one date of the Arnillas was made on human bone, but it was not recorded which individual was dated.

The absolute dating project was proposed parallel to the anthropological study, thereby allowing the samples to be chosen from the minimum number of individuals in each series of dolmens. According to the number of individuals in each collection and the state of preservation of the bones, between 30% and 50% of the minimum number of individuals have been sampled, with the exception of some graves, such as those at Fuentepecina II, where all the specimens represented by the cranial skeleton have been dated (15). The bone selected for sampling depended on the conservation of the remains, the options of the dating projects, or the demographic composition of the dolmen. Thus, in Las Arnillas, the most represented bone (femur) was chosen; in La Cabaña, El Moreco, La Cista and San Quirce, the elements that best reflected the demographic composition of the dolmen were the mandible and femur; and in the case of Ciella, it was the dental collection that provided the highest NMI (upper canine).

METHODOLOGY

Radiocarbon measurements were carried out in the Poznan Radiocarbon Laboratory (Poz), by means of accelerator mass spectrometry (AMS)[2]. Sample preparation was performed in Poznan's laboratory, following the chemical sample pre-treatment protocol of Brock et al.

[2]The ^{14}C dating procedure with the AMS technique used in the Poznan Radiocarbon Laboratory is described in https://radiocarbon.pl/en/. Quality test is available at https://radiocarbon.pl/en/prl-quality-tests/.

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

(2010). For collagen the procedure of R. Longin (1971), modified by N. Piotrowska and T. Goslar (2002), was applied, after verification of collagen degradation. The procedure includes the acid-alkaline-acid, centrifugation, ultra freezing and freeze-drying steps. Ultrafiltration was performed according to C. Bronk Ramsey et al. (2004). Next, after an evaluation of the quality of the collagen, CO_2 was graphitized according to Czernik and Goslar (2001), for subsequent measurement in an accelerator mass spectrometer. In Poznan, the "Compact Carbon AMS" produced by NEC (National Electrostatics Corporation, USA) was used, as described in T. Goslar et al. (2004). The conventional age of C14 was calculated using isotopic fractionation correction (Stuiver and Polach 1977).

The quality of bone collagen (Table 1) provided in all cases recommended values for the C:N ratio, in accordance with MJ. De Niro (1985) (C:N = 2.9 to 3.6), as well as acceptable results for $\delta^{13}C$ values according to GJ. Van Klinken (1999) $\delta^{13}C$ = –19 to –22‰. Only Poz-101931/ARN18.1 samples are slightly below $\delta^{13}C$, Poz#2-122178/CAB19.8.; Poz# 2-115893/CAB19.5 (18.9‰). However, the C%, N% and C:N measurements are in perfect agreement with recommended values. A total of 69 samples were radiocarbon dated, two of these being rejected for not meeting the recommended collagen quality standards.

The OxCal program has been used for both date calibration and Bayesian modeling (v.4.4.) (Bronk Ramsey 2009a), using the recently updated Northern Hemisphere IntCal20 calibration curve (Reimer et al. 2020). Here we recall the additional difficulty in obtaining time sequences with the greatest possible "generational" precision, since many of the dates of the Late Neolithic are located on the calibration plateau of the end of the 4th millennium BC (Meadows et al. 2020: 1261; Reimer et al. 2020; Fernández-Crespo et al. 2021: 9). In these cases, if the archaeological event is shorter than the calibration plateau it is difficult to establish periods of short duration, or to find the relationship between several events, since the timeline is adapted to the wide interval for this plateau. We anticipate the likelihood of calibration uniformity in the concentration of chronological events from the second half of the 4th millennium BC. This makes it more difficult to identify the time limits of the event or events we want to define. The dates are presented according to the conventions proposed for Millard's ^{14}C determinations (2014) (Millard 2014; Bayliss and Marshall 2022), and for calibrations the results have been rounded to 10 years, since all radiocarbon deviations were greater than 25 (Stuiver and Polach 1977).

Bayesian modeling has been chosen for statistical treatment of the radiocarbon series. The Uniform Phase function has been used, in the "sequential," "contiguous" or "overlapping" mode, depending on the time interval between the phases of each series. It is likely that dates with poor internal agreement within the model will occasionally be displayed; these will be taken as outliers, that is, an atypical statistical value that may suggest the residual or intrusive nature of a sample (Bronk Ramsey 2009b). The Kernel Density Estimation (KDE_Model) analysis has also been generally chosen, since it has been postulated as the best option for analyzing wide sets of radiocarbon dates, correctly defining the distribution of events frequential and not from a strictly Bayesian approach (Bronk Ramsey 2017).

The radiocarbon series were subjected to Bayesian modeling. The Uniform Phase function was used in its "sequential" or "overlapping" form, according to the time interval that the previous chronological reading established between the phases of each series (Buck et al. 1996; Bronk Ramsey 2001, 2008, 2009a). Occasionally, there will likely be dates with poor internal consistency within the model, and these will be read as outliers, i.e., a statistical outlier that may indicate the residual or intrusive nature of a sample (Bronk Ramsey 2009b). Kernel Density

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

Table 1 Radiocarbon series of the La Lora region. Collagen quality and $\delta^{13}C$ and $\delta^{15}N$ isotope values are included.

Laboratory code	Name and site	ID	Material	Type of bone	Individual age	Sex	Context
Poz-101931	ARNILLAS18.1.	ARR5	Human bone	L Femur	Adult	Undetermined	Corridor (C-II/C-III)
Poz-101932	ARNILLAS18.2.	ARR14	Human bone	L Femur	Adult	Undetermined	Corridor (C-III)
Poz-101933	ARNILLAS18.3.	ARR13	Human bone	L Femur	Adult	Undetermined	Corridor (C-III)
Poz-101934	ARNILLAS18.4.	ARR32	Human bone	L Femur	Non-adult	Undetermined	Corridor (C-III)
Poz-101935	ARNILLAS18.5.	ARR33	Human bone	L Femur	Non-adult	Undetermined	Corridor (C-III)
Poz-101936	ARNILLAS18.6.	ARR34	Human bone	L Femur	Non-adult	Undetermined	Corridor (C-III)
Poz-101937	ARNILLAS18.7.	ARR45	Human bone	L Femur	Adult	Undetermined	Chamber (C-IV/C-V)
Poz-101938	ARNILLAS18.8.	ARR71	Human bone	L Femur	Adult	Undetermined	Chamber (C-V)
Poz-101940	ARNILLAS18.9.	ARR70	Human bone	L Femur	Adult	Undetermined	Chamber (C-V)
Poz#2-104085	MORECO18.1.	MO/CR-310	Human bone	Mandible	17-19 years	#Male	Chamber
Poz#2-104086	MORECO18.2.	MO/CR-89	Human bone	Mandible	Adult	Undetermined	Mound (SECTOR H: removed)
Poz#2-104087	MORECO18.3.	MO/EX.364	Human bone	R Femur	6-9 years	Undetermined	Chamber
Poz#2-115901	CABANA19.2.	CA-1212	Human bone	Mandible	33-45 years	#Male	Chamber
Poz#2-115903	CABANA19.4.	CA-604	Human bone	Mandible	17-25 years	#Female	No context
Poz#2-115893	CABANA19.5.	CA-609	Human bone	Mandible	17-25 years	Undetermined	No context
Poz#2-115894	CABANA19.6.	CA-603	Human bone	Mandible	25-35 years	#Male	No context
Poz#2-115895	CABANA19.7.	CA-607	Human bone	Mandible	17-25 years	Undetermined	No context
Poz#2-115896	CABANA19.8.	CA-606	Human bone	Mandible	17-25 years	#Male	No context
Poz#2-115898	CABANA19.9.	CA-604	Human bone	Mandible	9-10 years	Undetermined	No context
Poz#2-115899	CABANA19.10.	CA-609	Human bone	Mandible	25-35 years	Undetermined	No context
Poz-136974	CA-EX-176	CA-EX-176	Human bone	R Femur	12-18 years	Undetermined	Chamber
Poz-136976	CA-CP-1248	CA-CP-1248	Human bone	Ilium	3-5 years	Undetermined	No context
Poz-125772	F.P.II-CR11.1.	CR-351	Human bone	Skull	Maduro	#Female	Chamber (4° LAYER)
Poz-125835	F.P.II-CR1.2.	CR-341	Human bone	Skull	Juvenile	#Male	Chamber
Poz-125837	F.P.II-CR15.3.	CR-352	Human bone	Skull	Infant	Undetermined	Chamber (4° LAYER)

Table 1 (*Continued*)

Laboratory code	Name and site	ID	Material	Type of bone	Individual age	Sex	Context
Poz-125838	F.P.II-CR4.4.	CR-344	Human bone	Skull	Infant	Undetermined	Chamber (3° LAYER)
Poz-125839	F.P.II-CR2.5.	CR-342	Human bone	Skull	Juvenile	#Female	Chamber (3° LAYER).
Poz-125841	F.P.II-CR3.6.	CR-343	Human bone	Skull	Adult	#Male	Chamber
Poz-125842	F.P.II-CR9.7.	CR-348	Human bone	Skull	Adult	#Female	Chamber (4° LAYER)
Poz-125843	F.P.II-CR10.8.	CR-349	Human bone	Skull	Adult	#Female	Chamber (4° LAYER)
Poz-125844	F.P.II-CR14.9.	CR-350	Human bone	Skull	Maduro	#Male	Chamber (4° LAYER)
Poz-125845	F.P.II-CR352.10.	CR-352	Human bone	Skull	Juvenile	#Male	Chamber (3° LAYER)
Poz-125846	F.P.II-CR354.11.	CR-354	Human bone	Skull	Maduro	Undetermined	Chamber
Poz-125862	F.P.II-CR5.12.	CR-345	Human bone	Skull	Adult	Undetermined	Chamber
Poz-125863	F.P.II-CR6.13.	CR-346	Human bone	Skull	Adult-Juvenile	#Female	Chamber
Poz-125864	F.P.II-CR7.14.	CR-347	Human bone	Skull	Undetermined	Undetermined	Chamber
Poz-125865	F.P.II-CR432.15.	CR-432	Human bone	Skull	Undetermined	Undetermined	Chamber
Poz-125866	F.P.I-MAN1.1.	414	Human bone	Mandible	Adult	Undetermined	Chamber
Poz-126001	F.P.I-MAN2.2.	415	Human bone	Mandible	Adult	#Female	Chamber
Poz-126002	F.P.I-MAN3.3.	416	Human bone	Mandible	Adult	Undetermined	Chamber
Poz-126003	F.P.IV-CR165.1.	CR-165	Human bone	L Temporal	Adult-Juvenile	Undetermined	Chamber
Poz-126004	F.P.IV-CR160.2.	CR-160	Human bone	L Temporal	Adult-Juvenile	#Female	Chamber
Poz-126005	F.P.IV-CR173.3.	CR-173/ CRÁNEO 1	Human bone	L Temporal	Adult-Senile	#Female	Chamber
Poz-126007	F.P.IV-CR166.4.	CR-166	Human bone	L Temporal	Adult	Undetermined	Chamber
Poz-126008	F.P.IV-CR162.5.	CR-162	Human bone	L Temporal	Adult-Juvenile	#Male	Chamber
Poz-126009	F.P.IV-CR163.6.	CR-163	Human bone	L Temporal	Adult-Juvenile	#Male	Chamber
Poz-126010	F.P.IV-CR164.7.	CR-164	Human bone	L Temporal	Adult-Juvenile	#Male	Chamber
Poz#2-122176	CISTA20.1.	EX_10	Human bone	L Femur	2-4 years	Undetermined	Chamber
Poz#2-122177	CISTA20.2.	EX_1	Human bone	L Femur	4-3 years	Undetermined	Chamber

(*Continued*)

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

Table 1 (*Continued*)

Laboratory code	Name and site	ID	Material	Type of bone	Individual age	Sex	Context
Poz#2-122178	CISTA20.3.	EX_102	Human bone	L Femur	6-9 years	Undetermined	Chamber
Poz#2-122179	CISTA20.4.	EX_5	Human bone	L Femur	6-9 years	Undetermined	Chamber
Poz#2-122180	CISTA20.5.	EX_14	Human bone	L Fémur	10-14 years	Undetermined	Chamber
Poz#2-122181	CISTA20.6.	MAN_1088	Human bone	Mandible	17-25 years	Undetermined	Chamber
Poz#2-122255	CISTA20.7.	MAN_1079	Human bone	Mandible	17-25 years	Undetermined	Chamber (Sector E)
Poz#2-122256	CISTA20.8.	MAN_1085	Human bone	Mandible	+45-50 years	Undetermined	Chamber (Sector E)
Poz#2-122257	CISTA20.9.	MAN_1090	Human bone	Mandible	17-25 years	Undetermined	Chamber (Sector E)
Poz#2-122258	CISTA20.10.	MAN_1072	Human bone	Mandible	25-35 years	#Male	Chamber (Sector E+ Sector W)
Poz-136978	CI-D-26	CI-D-26	Human bone	RI^{2}	Adult-Juvenile	Undetermined	No context
Poz-136979	CI-D-6	CI-D-6	Human bone	RI^{2}	Adult-Juvenile	Undetermined	Chamber (Sector C)
Poz#2-137095	CI-D-4	CI-D-4	Human bone	lc^{1}	Adult-Juvenile	Undetermined	Chamber (Sector C)
Poz-136980	CI-D-41	CI-D-41	Human bone	RI^{2}	Adult-Juvenile	Undetermined	Chamber (Sector D)
Poz-136983	CI-D-40	CI-D-40	Human bone	RI^{2}	Adult-Juvenile	Undetermined	Chamber (Sector C)
Poz-140604	SQ.21.746	MAN_746	Human bone	Mandible	Adult-Juvenile	Undetermined	Chamber (Sector NW)
Poz-140646	SQ.21.747	MAN_747	Human bone	Mandible	25-35 years	Undetermined	Chamber (Sector NW)
Poz-140647	SQ.21.745	MAN_745	Human bone	Mandible	25-35 years	Undetermined	Chamber (Sector NW)
Poz-140679	SQ.21.738	MAN_738	Human bone	Mandible	33-45 years	Undetermined	Chamber (Sector NW)

Table 1 (*Continued*)

Laboratory code	Name and site	ID	Material	Type of bone	Individual age	Sex	Context
Poz-140680	SQ.21.764	MAN_764	Human bone	Mandible	Adult-Juvenile	Undetermined	Outside the burial chamber (removed)
Poz-140681	SQ.21.726	MAN_726	Human bone	Mandible	17-25 years	Undetermined	Chamber (Sector NW)
Poz-140682	SQ.21.778	MAN_778	Human bone	Mandible	6.5-7.5 years	Undetermined	No context

Age ^{14}C (BP)	‰δ^{13}C (AMS)	‰δ^{13}C (IRMS)	‰δ^{15}C	%C	%N	C:N	Calibrated dates 1 cal sigma	Calibrated dates 2 cal sigma	Note
4480 ± 35	−18.6 ± 0.3	−18.9	10.4	46.7	17.1	3.19	3330–3100	3350–3030	Used
4474 ± 35	−17.3 ± 1.2	−19.8	8.6	47.5	17.3	3.2	3330–3090	3340–3030	Used
3650 ± 35	−16.9 ± 0.5	−19.2	8.2	48.5	17.7	3.2	2120–1960	2140–1930	Used
4621 ± 35	−18.5 ± 0.6	−19.4	8.8	48.5	17.7	3.2	3500–3360	3520–3350	Used
4979 ± 35	−19 ± 0.6	−19.1	8.9	49.3	18	3.2	3790–3660	3930–3650	Used
4379 ± 30	−19 ± 0.6	−19.5	8.9	47.3	17.3	3.19	3020–2920	3090–2910	Used
4370 ± 34	−17.2 ± 0.3	−20	8.7	48.4	17.8	3.17	3020–2920	3090–2920	Used
4508 ± 35	−20.2 ± 0.5	−19.7	8.8	48.6	17.8	3.19	3340–3110	3360–3100	Used
3450 ± 35	−17.5 ± 0.6	−19.3	8.6	49.4	18	3.2	1880–1690	1880–1640	Used
4981 ± 38	−21.9 ± 0.2	−19.7	9.2	49.9	18.4	3.16	3800–3660	3940–3650	Used
3640 ± 35	−20 ± 0.3	−20	8.6	48.2	17.7	3.18	2120–1950	2140–1910	Used
4981 ± 37	−18.9 ± 0.1	−19.7	8.6	49.7	18.4	3.15	3790–3660	3940–3650	Used
4604 ± 31	−19 ± 0.8	−19.6	10.1	52.3	18.8	3.25	3490– 3350	3510–3140	Used
4403 ± 33	−19.6 ± 1.1	−19.7	9	52.5	19	3.22	3090–2930	3320–2910	Used
4377 ± 30	−18.6 ± 0.9	−18.9	9.4	49.8	18	3.23	3020–2920	3090–2910	Used
4951 ± 29	−18.3 ± 0.6	−19.8	8.9	50.7	18.3	3.23	3770–3660	3780–3650	Used
4214 ± 33	−19.1 ± 1.1	−19.7	8.8	50.8	18.3	3.24	2890–2710	2900–2670	Used
4385 ± 34	−20.9 ± 1.5	−18.9	10.4	50.6	18.3	3.23	3070–2920	3260–2910	Used
4526 ± 33	−21.5 ± 0.5	−20.1	9.2	51.4	18.7	3.21	3360–3110	3360–3100	Used

(*Continued*)

Table 1 (*Continued*)

Age ^{14}C (BP)	‰δ^{13}C (AMS)	‰δ^{13}C (IRMS)	‰δ^{15}C	%C	%N	C:N	Calibrated dates 1 cal sigma	Calibrated dates 2 cal sigma	Note
4814 ± 32	−20.3 ± 1.3	−19.8	9.1	53.9	19.5	3.22	3640–3530	3650–3530	Used
4300 ± 32	−14.3 ± 0.5	−19	10.2	49.1	17.7	3.24	2920–2890	3010–2880	Used
4414 ± 33	−16 ± 0.7	−19.3	8.6	49.3	17.9	3.21	3100–2930	3320–2920	Used
4824 ± 29	−20.8 ± 0.5	−19.4	9.9	49.8	17.9	3.25	3650–3530	3650–3530	Used
4840 ± 35	−21.9 ± 1	−19.5	9	49.9	18	3.23	3650–3530	3700–3530	Used
4783 ± 30	−18.9 ± 0.6	−19.3	9	51.3	18.5	3.24	3630–3530	3640–3520	Used
4874 ± 35	−20.5 ± 0.4	−19.9	8.7	50.1	18	3.25	3700–3630	3760–3530	Used
4805 ± 35	−21.4 ± 0.9	−19.4	9.6	50.1	18.1	3.23	3640–3530	3640–3530	Used
4887 ± 35	−22.7 ± 0.5	−19.7	8	51.5	18.6	3.23	3700–3640	3770–3540	Used
4900 ± 35	−22.8 ± 0.2	−19.8	10.1	51.9	18.8	3.22	3710–3640	3770–3640	Used
4839 ± 35	−22.9 ± 0.3	−19.6	8.5	51.8	18.8	3.21	3650–3530	3700–3530	Used
4918 ± 34	−20.6 ± 0.3	−19.8	8.4	51.6	18.7	3.22	3710–3650	3770–3640	Used
4859 ± 35	−21.8 ± 0.4	−19.7	8.3	50.4	18.2	3.23	3700–3540	3710–3530	Used
4912 ± 35	−23.8 ± 0.5	−19.8	8.7	52.9	18.8	3.28	3710–3640	3770–3640	Used
4905 ± 29	−18.1 ± 1.7	−19.8	8.5	51.2	18.5	3.23	3710–3640	3770–3640	Used
4878 ± 35	−20.9 ± 0.1	−19.8	8.4	53.1	19.2	3.23	3700–3640	3770–3540	Used
4900 ± 34	−20.7 ± 0.6	−19.7	8.9	51.5	18.6	3.23	3710–3640	3770–3640	Used
4990 ± 35	−22.1 ± 0.2	−19.7	9.1	50.4	18.2	3.23	3890–3660	3940–3650	Used
4821 ± 35	−21.4 ± 0.3	−19.4	9.9	48.7	17.5	3.25	3640–3530	3650–3530	Used
4900 ± 36	−20.9 ± 0.5	−19.5	9	52.5	19.5	3.14	3710–3640	3770–3640	Used
4927 ± 32	−21 ± 0.2	−19.3	9	53	19.9	3.11	3760–3650	3770–3640	Used
4970 ± 29	−17.8 ± 1.5	−19.9	8.5	56	21	3.11	3780–3660	3890–3650	Used
4937 ± 31	−21.5 ± 0.4	−19.8	8.2	52.4	19.6	3.12	3760–3650	3780–3650	Used
4850 ± 30	−20.4 ± 0.4	−19.8	8.4	52.8	19.9	3.1	3650–3540	3710–3530	Used
4889 ± 36	−20.2 ± 0.4	−19.5	8.8	53.4	20	3.12	3710–3640	3770–3540	Used
4834 ± 36	−19.6 ± 0.6	−19.6	9	52.7	19.9	3.09	3650–3530	3700–3530	Used
4909 ± 32	−20.6 ± 1.1	−19.4	9.9	54.6	20.7	3.08	3710–3640	3770–3640	Used
4840 ± 36	−19.5 ± 1.2	−19.4	10.1	52	19.6	3.1	3650–3530	3700–3530	Used
4501 ± 35	−20.1 ± 0.3	−19.6	10.5	52.9	19.8	3.12	3340–3100	3360–3040	Used

Table 1 (*Continued*)

Age ^{14}C (BP)	‰δ^{13}C (AMS)	‰δ^{13}C (IRMS)	‰δ^{15}C	%C	%N	C:N	Calibrated dates 1 cal sigma	Calibrated dates 2 cal sigma	Note
4550 ± 35	−18.8 ± 0.8	−19.8	9	54	20.4	3.09	3370–3110	3490–3100	Used
4367 ± 34	−20.1 ± 0.3	−19.9	8.3	48.3	20	2.82			Omitted
4543 ± 31	−18.9 ± 0.4	−19.8	8.6	51.3	19.3	3.1	3360–3110	3370–3100	Used
4476 ± 32	−20 ± 0.8	−19.9	8.1	53.2	19.9	3.12	3330–3100	3340–3030	Used
4464 ± 32	−21.5 ± 0.2	−20	9.1	53.9	20.3	3.1	3330–3030	3340–3020	Used
4449 ± 34	−19.7 ± 0.2	−19.8	9.1	53	19.9	3.11	3320–3030	3340–2940	Used
4535 ± 32	−19.4 ± 0.2	−20.6	9.5	53.8	20.2	3.11	3360–3110	3370–3100	Used
4516 ± 32	−17.4 ± 0.2	−19.9	9.9	52.6	19.7	3.12	3350–3110	3360–3100	Used
4624 ± 35	−18.7 ± 0.2	−19.6	10.4	53.3	19.9	3.12	3500–3360	3520–3350	Used
5076 ± 38	−16.3 ± 0.5	−19.4	9.7	49.8	18.2	3.19	3950–3800	3970–3780	Used
4801 ± 35	−25.4 ± 0.6	−20.5	9.5	53.2	19.5	3.18	3640–3530	3640–3520	Used
4096 ± 32	−25.8 ± 2	*	*	n.m.	n.m.	*	—	—	Omitted
4979 ± 37	−17.6 ± 0.7	−20.5	9.5	51.3	18.8	3.18	3790–3660	3930–3650	Used
4961 ± 33	−17.7 ± 1	−19.5	8.7	49.9	18.2	3.2	3780–3660	3890–3650	Used
4937 ± 38	−17.5 ± 0.3	−19.3	9.5	50.3	18.4	3.19	3760–3650	3790–3640	Used
4867 ± 37	−19.8 ± 0.5	−19.5	9	51.6	18.8	3.2	3700–3540	3760–3530	Used
4900 ± 37	−20.9 ± 0.6	−19.3	9	54.6	19.8	3.22	3710–3640	3770–3630	Used
4905 ± 37	−21 ± 0.6	−19.5	9.3	52.4	19.1	3.2	3710–3640	3770–3640	Used
4897 ± 38	−20.7 ± 0.4	−19.5	9.1	51.2	18.5	3.23	3710–3640	3770–3630	Used
4766 ± 33	−19.4 ± 1.7	−19.3	9	48.9	17.7	3.22	3630–3530	3640–3380	Used
4834 ± 38	−21.5 ± 0.9	−19.5	8.9	49.3	18	3.2	3650–3530	3700–3530	Used

Model (KDE_Model) was also chosen for the overall analysis of funerary use at La Lora. KDE_Model has been argued to be the best option for the analysis of large sets of radiocarbon dates, correctly defining the distribution of events in a Bayesian frequency approach that blurs the temporal boundaries of ending (Bronk Ramsey 2017). As required by Bayesian statistics in Oxcal (Bronk Ramsey 1995), correlation indices greater than 60% (A_{model}) are acceptable for models.

On the other hand, the KDE_Plot function was used within some models that were implemented individually for each site. According to Bronk Ramsey (2017), this function can be combined with a uniform phase model. The combination of these functions allows the blurring of abrupt phase boundary transitions (Bronk Ramsey 2017: 1817).

In terms of prior information, the skeletal records of the graves analyzed here (Supplementary material) did not provide stratigraphic analysis. However, there were some clear hypotheses about the funerary use of some sites. For example, in both Las Arnillas and El Moreco, there was a clear temporal discontinuity. This discontinuity can be seen a priori between the Neolithic phase of use, confirmed by the appearance of recent Neolithic grave goods, and later reuse events in the Late Chalcolithic, according to the recovery of bell beaker elements. For this reason, at Las Arnillas, the modeling was carried out using the sequential phase function since we assume that the absence of activity in the record corresponds to the absence of funerary activity. In Moreco, although there is a second phase or a date of burial, we did not use Bayesian modeling because we only have three dates.

Other cases, such as Fuentepecina, were interpreted as a necropolis of similar function, of archaic and short duration, and possibly of simultaneous use. Furthermore, the Fuentepecina burials share architectural characteristics, similarities in the chronotypology of the grave goods, or the correspondence of the taphonomic condition of the bones. Therefore, the model applied the overlapping phase function, assuming that the different phases are completely independent and could have overlapped, considering each site as a single chronological event.

La Cista, San Quirce, or Ciella were analyzed as single events. Despite the dates recovered under the mounds, they had such wide standard deviations that they distorted the chronologies. In the case of La Cista, the burial goods were homogeneous, and there were no discontinuities or breaks in the archaeological record. San Quirce or Ciella are somewhat more complex cases. They may have been reused or remodeled, but the preservation and the bone record do not support these events. At San Quirce, there were two posterior dates in charcoal, possibly related to later intrusions, but our work focuses on the strict dating of burial events. Similarly, at Ciella, a Palmela arrowhead is found, consistent with Bell Beaker burials at other sites, but here there is no radiocarbon dating.

RESULTS

First, a brief analysis of the isotopic signal (Figure 4) shows that $\delta^{13}C$ values ($n = 67$) range from –18.9‰ to –20.6‰, with an average of –19.62 ± 0.34‰. In addition, $\delta^{15}N$ Figures ($n = 67$) range between 8‰ and 10.5‰, with an average of 9.09 ± 0.61‰. The isotopic $\delta^{13}C$ values are quite homogeneous, since fractionation barely exceeds the range of 1‰. In the case of nitrogen, the range is greater but do not exceed the trophic level (≤ 2.5‰)[3]. Although in

[3]Because there are non-adult individuals in the sample, it would not be strange for the most significant differences to be partly due to the isotopic indication of breastfeeding. However, it should be noted that none of the individuals dated is under 3 years of age.

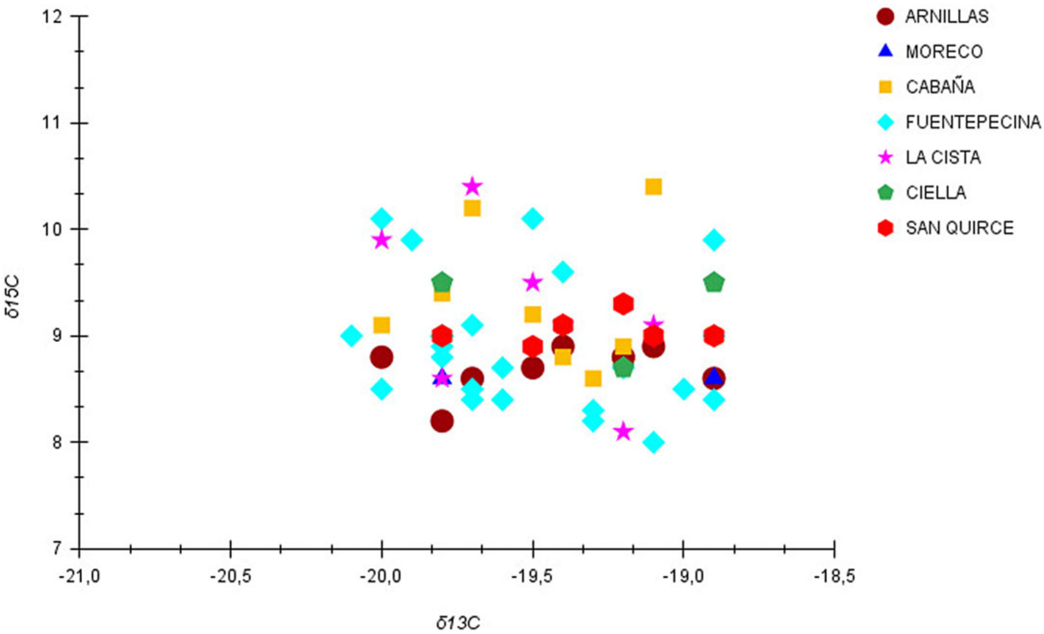

Figure 4 Isotopes results ($\delta^{13}C$ and $\delta^{15}N$) of individuals sampled in the present study.

some samples $\delta^{13}C$ content is slightly lower than 19‰, the values generally correspond to land protein consumption, mainly from herbivores, and C_3 plants from temperate and cold regions (O'Leary 1988), with appropriate values for late prehistoric societies on the Iberian Peninsula (Alt et al. 2016; Fontanals-Coll et al. 2017; Díaz-Zorita Bonilla et al. 2019; Fernández-Crespo and Schulting. 2017). Meanwhile, $\delta^{15}N$ values above 10‰ ± 1‰ and around –12 ± 1‰ for values of $\delta^{13}C$ are usually interpreted as biased because of aquatic food resources among European populations (Lanting and van der Plicht 1998; Richards and Hedges 1999; Richards et al. 2003), but all samples analyzed here display values below this. The $\delta^{13}C$ and $\delta^{15}C$ values, as well as the lack of evidence regarding marine or fluvial resources on the sites, means that calibration can be carried out by the terrestrial calibration curve, in light of a typical representation of a diet based on terrestrial products and are not affected by reservoir effect in ^{14}C measurements (Stuiver et al. 1986; Lanting and van der Plicht 1998; Richards and Hedges 1999; Van Klinken 1999; Alves et al. 2019).

Regarding chronological results, the dates of some series have revealed the funerary temporality of the dolmens of La Lora (Table 1). In general and using a complete modeling of all the dates with KDE_Model ($n = 67$), the funerary sequence of the La Lora megalithic groups occurred between 3870–3780 (2σ) and 3950–3770 (2σ) BC, and ended between 1880–1810 (2σ) and 1910–1740 (2σ), with a timespan between 1880–1810 (2σ) and 1920–1730 (2σ) ($A_{model} = 95.3\%$; $A_{overall} = 98.6\%$) (Figure 5). The greatest period of strictly megalithic burial activity extends throughout the 4th millennium BC and even part of the first half of the 3rd millennium, surpassing 1000 years of recurrent and active burial in this type of tomb.

In other aeras of Iberian Peninsula, similar types of burials have been documented by radiocarbon analysis. For example, in La Rioja Alavesa, where dolmens such as Alto de La Huesera or La Txabola de la Hechicera continue this activity until the Middle Chalcolithic

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

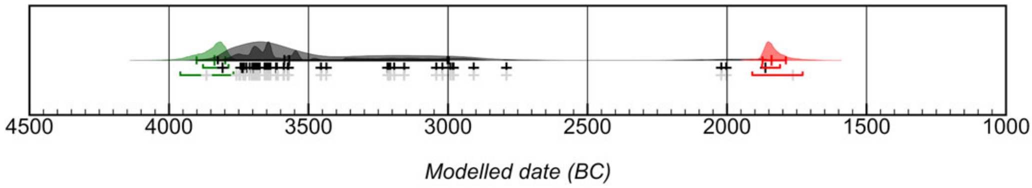

Figure 5 Kernel-density estimate (KDE_model) of 67 dates analyzed in La Lora region.

(Fernández-Eraso and Múgica-Alustiza 2013; Fernández-Eraso et al. 2019). In the southeast of the peninsula, where the dates of the Panoría, Barranquete, or Las Churuletas groups also exceed 1000 years of burial activity (Lozano Medina and Aranda Jiménez 2018; Aranda Jiménez et al. 2017, 2020a, 2022). However, not all burials follow the same pattern with respect to the duration and periodicity of their funerary sequence.

Another peak in La Lora burial activity occurs in the transition from the 3rd to the 2nd millennium cal BC; this represents a period of low funerary intensity during the Final Chalcolithic-Early Bronze Age, which may well respond to the Bell-Beaker goods found in various tombs. A detailed analysis of each case will help to better understand the temporal dynamics of the La Lora megaliths, serving as a framework for its contextualization within megalithism in the northern interior of the peninsula.

Las Arnillas

The chronological events identified in the Las Arnillas dolmen show several post-Neolithic intrusions extending into modern times. The later intrusions show that the dolmen was converted into a shepherds' shelter and probably used as an animal depot at the beginning of the 16th century AD (Delibes de Castro et al. 1986).

The archaeological material was used to describe the burial's chronological events. They were not identified stratigraphically (Supplementary material). However, the recovery of archaeological material in level III, the burial level, allowed us to identify the funerary chronological events.

The Neolithic material assemblage includes objects attributed to both the first megalithic phases and the late 4th millennium BC (Delibes de Castro et al. 1986; Delibes de Castro et al. 1993; Rojo-Guerra 1993). Polished axes, large flint blades, geometric and bone awls, numerous jet beads, and European Trivia shells of Atlantic origin were identified, which are considered exotic materials due to their scarcity in sites in the interior of the Iberian Plateau. On the other hand, objects dating from the end of the 4th millennium BC have also been found, such as arrowheads. Unfortunately, it was not possible to identify a temporal discontinuity between the possible Neolithic burial phases. The entire ossuary level was considered as a single burial event.

However, the discovery of incised Ciempozuelos-style pottery and two V-perforated prismatic bone buttons (ca. 2500–2000 BC) (Delibes de Castro et al. 1986: 26–27) confirms the long period attributed to the burial sequence at Las Arnillas. These materials were found inside the chamber at the end opposite the entrance. It was suggested that certain orthostats may have been conditioned to deposit the new burials. The conclusion was that there may have been a new burial phase that was completely independent of the first burial phase.

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

Finally, other materials indicate new intrusions. However, it is uncertain whether they were funerary (Supplementary material).

The radiocarbon information available for the Las Arnillas burial prior to this study was limited to a dating of the ossuary. Another date was recovered from the level below the burial mound, dated as a pre-foundational event (Delibes de Castro and Rojo-Guerra 1997). The bone date places the burial in the second half of the 4th millennium BC, coinciding with the period proposed for this tomb (Delibes de Castro et al. 1986; Delibes de Castro and Santonja, 1987; Delibes de Castro and Rojo-Guerra 1997; Delibes de Castro and Rojo-Guerra 2002).

On the other hand, there needs to be more correspondence between the areas of Bell-Beaker intrusion and the dated bones. Therefore, we suspect that the burials could have taken place anywhere in the monument.

Calibrated dates from Las Arnillas show that most of the individuals dated in this tomb were buried between 3500–3360 and 3020–2920 BC (1 cal σ) and between 3520–3350 and 3090–2910 (2 cal σ). These dates would correspond to the peak of the burial sequence, a hypothesis that was already being considered for the La Lora long-passage tombs, due to the presence of Late Neolithic grave goods with modern contributions (Delibes de Castro et al. 1986; Delibes de Castro and Rojo-Guerra 1997; Delibes de Castro 2010). It is noteworthy that the age of the individual ARN18.5 (Poz-101935) is situated between 3790 and 3660 cal BC (1 cal σ) and between 3930 and 3650 cal BC (2 cal σ), which would put back the beginning of the burial sequence to the first half of the 4th millennium BC. This is closer to the dates obtained below the mound also processed some years ago (GrN-18671: 4720 ± 150 BP) (Delibes de Castro and Rojo-Guerra 1997). Furthermore, the most recent prehistoric burials ARN18.3 (Poz-101933) and ARN18.9 (Poz-101940), which are consistent with the archaeological materials found, provide two dates between the 3rd and 2nd millennium cal BC: 2120–1960 (1 cal σ) and 2140–1930 (2 cal σ), and 1880–1700 (1 cal σ) and 1880–1680 (2 cal σ), respectively. The first could be associated with the presence of the aforementioned Bell-Beaker grave goods, but the second date would correspond to the Early Bronze Age and represent the first evidence of megalithic burial practice in post-Chalcolithic times for this group. However, there is not much correspondence between the areas where Late Chalcolithic elements appear and the dated bones, except in the case of one of these coming from inside the chamber. The other date corresponding to the beginning of the 2nd millennium BC is also from the passage, so we surmise that re-utilization could have taken place in any part of the monument.

Otherwise, a large number of Neolithic dates seem to be concentrated in the covered and best-protected area of the passage. However, these would not belong to a single burial event, as the temporal values are evenly distributed throughout the 4th millennium BC. For this reason, the analysis models were chosen below to discard the a priori data on the origin of the samples, given the chronological confusion in this context.

The Bayesian modeling must consider some aspects of the funerary record. Firstly, there is no evidence that burials continued after the end of the Neolithic phase until the final Chalcolithic phase. Although this is a statement that is difficult to maintain based on chrono-typological classification alone, random sampling has revealed groupings of very different dates and a clear temporal gap between the burials of the 4th millennium BC and those of the end of the 3rd millennium BC. Therefore, the Sequence Phase model was chosen.

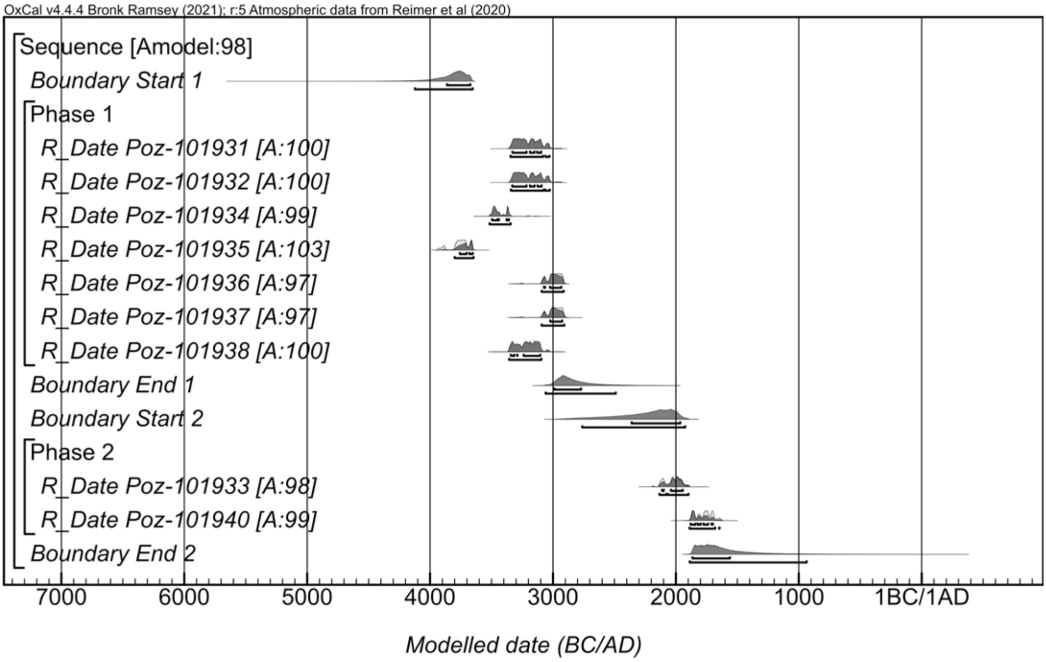

Figure 6 Bayesian phase model for the funerary series of the Las Arnillas dolmen.

The model obtained is statistically consistent ($A_{model} = 98.2\%$; $A_{overall} = 97.8\%$) (Figure 6). According to this analysis, the timeframe of the burial sequence displays a closer temporal fit, probably beginning between 3860–3670 cal BC (1 σ) and 4120–3650 cal BC (2 σ), and going up to the end of this phase between 4120–2770 BC (1 σ) and 3060–2490 cal BC (2 σ). Consequently, burial practice would continue almost without interruption until the 3rd millennium BC, its duration fluctuating between 690 and 810 (1 σ) and 620–880 (2 σ).

After a likely period of abandonment, the post-Neolithic phase would begin, most likely related to the appearance of Bell-Beaker and later materials, which would develop between 2360–1970 and 1870–1560 cal BC (1 cal σ) and 2760–1930 and 1890–940 cal BC (2 cal σ). The dates closest to the time of this second burial sequence are those modeled at 1 cal σ probability (68.2%), which assumes that the chalcolithic burial stage began in the last third of the 3rd millennium BC. There is, therefore, a break in the timeframe of approximately 600 (1 cal σ). This period of inactivity of more than half a millennium allows us to understand the Late Chalcolithic burials as events that are unrelated to the Neolithic burial sequence.

El Moreco

In this case, we do not indicate the context in which the bones were found. The excavation reports only show the destruction of the site. Only a small part of the ossuary was saved, buried under one of the orthostats removed from the chamber. The rest of the bones collected came from the surface of the burial mound, where they are thought to have arrived as "later contributions from the chamber."

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

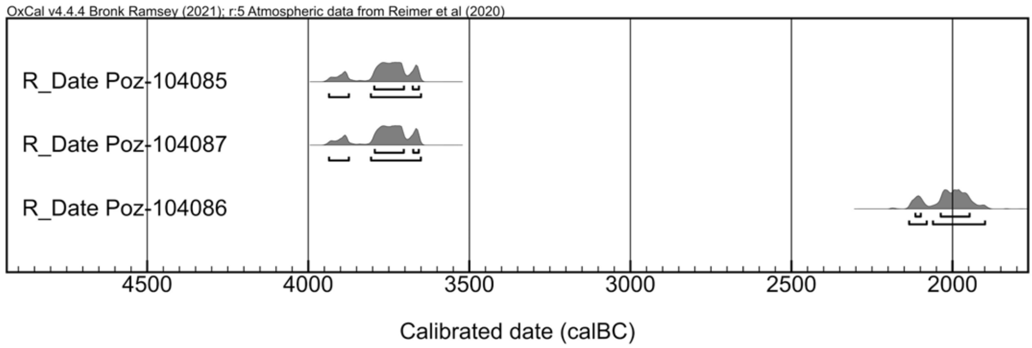

Figure 7 Calibrated dates of El Moreco passage grave.

It was also not possible to identify a phase prior to the construction of the tomb with the poor temporal information we have. Therefore, we assume that the construction of this tomb must have taken place at least shortly after the preparation of the ground for the building that still exists today, possibly in the early 4th millennium BC.

In El Moreco, two calibrated dates for the subjects from the most intact sector of the ossuary are identical, situated between 3940 and 3650 BC (2 cal σ) (Figure 7). This phase coincides fully with the period when the first megalithic funerary series appeared on the northern Iberian Plateau, as demonstrated by the radiocarbon dates of the oldest tombs in the region (Rojo-Guerra et al. 2005; Alt et al. 2016; Santa Cruz del Barrio et al. 2020b). In line with the oldest date obtained in Las Arnillas, we once again have radiocarbon evidence prior to the last third of the 4th millennium BC from a passage tomb. Although in this case there are only two subjects, the specimens come from part of an ossuary located *in situ* and protected by an orthostat that had collapsed; thus, it is very likely that it represents an original burial level. The dating of this ossuary segment is very relevant, insofar as it is strange for there to be no record in El Moreco of any dating of the last third of the millennium, given the presence of arrow-head elements in the grave goods.

Regarding post-Neolithic phases, and despite the absence of any material evidence associated with the Bell Beaker phenomenon, the third date (MORECO18.2.) Poz#2-104086 represents an intrusive burial between 2140 and 1910 BC on calibrated dates (2 σ). This radiocarbon record makes it possible to corroborate the existence of further burials in the series of El Moreco which had previously not been proven. This would add to the list of dolmens being reutilized in the Late Chalcolithic on the northern Plateau, together with the aforementioned dates for Las Arnillas (Santa Cruz del Barrio et al. 2020a). Given the few registration references and the small radiocarbon sample, it has been decided not to carry out Bayesian analysis in this case.

La Cabaña

In La Cabaña there is a relative grouping of dates in the second half of the 4th millennium BC, in perfect harmony with the timeframe hypotheses proposed for this dolmen. Again, we do not have an archaeological context to establish the correct stratigraphic sequence. It was only possible to document that the main part of the bone collection was found under a large

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

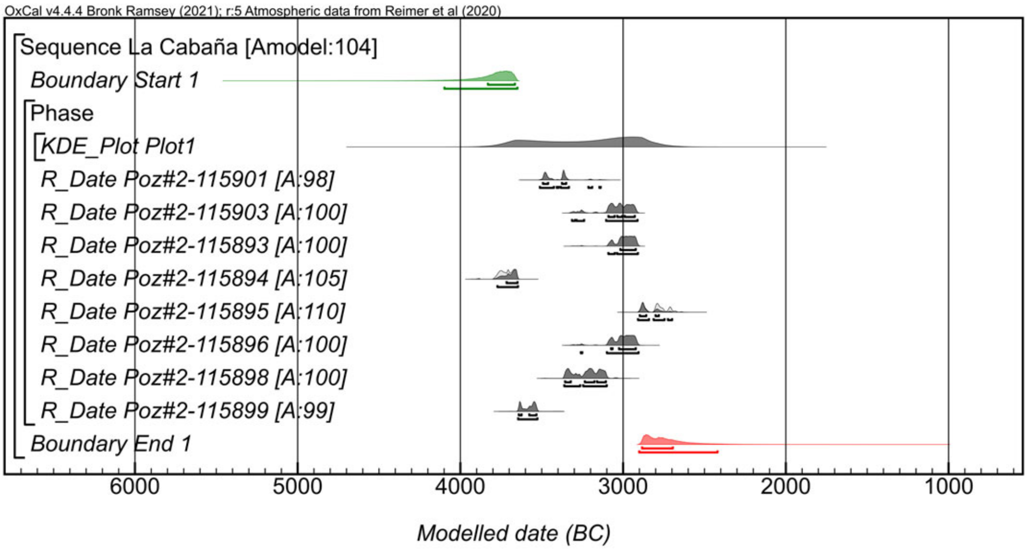

Figure 8 Bayesian model for dates from La Cabaña dolmen.

limestone block in the center of the chamber at about 135 cm. For this reason, a "uniform phase" model was used with KDE_model to adjust the start and end phase intervals.

The oldest (CABANA19.6. Poz#2-115894: 4951 ± 29; CABANA19.10. Poz#2-115899: 4814 ± 32) are in the first half of the 4th millennium. The model is acceptable ($A_{model} = 103.5$; $A_{overall} = 103.6$) (Figure 8). The start of the burial sequence is situated between 3830–3670 cal BC (2 σ) and 4010–3650 BC (2 σ), dates which are consistent with the beginnings of the burial cycle that have been analyzed. Another interesting aspect is that at La Cabaña the hypothesis of burials structured in cyclic funeral sequences appears to have greater consistency, as a result of brief or contemporary funerary events throughout the second half of the 4th millennium BC until the early-mid of 3rd, lasting between 760–1000 years (2 σ).

The Necropolis of Fuentepecina

The bioarcheological characteristics of the sample like gracile morphometric features, the taphonomic traits[4], and the proximity of the four tombs have made it possible to establish a time relationship, which is important a priori information for burial events. Moreover, the taphonomic uniformity, together with other strong arguments such as the temporal coherence of the grave goods (Supplementary material) and the apparent absence of funerary intrusions, allows us to infer the tombs' contemporaneity. Therefore, this analysis uses the overlapping phases model to verify the funerary temporality of each tomb and its relationship to the rest of the surrounding burials. The "overlapping" model also assumes that the different events are entirely independent (Bronk Ramsey 2009b: 348). Thus, it was considered the most appropriate for the case of Fuentepecina.

[4]All the bone fragments, without exception, had severe degradation of the cortical surface and substantial root marks (Supplementary material).

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

The resulting dates also confirm the contemporaneous relationship between the subjects buried there and the total absence of funerary reuse. According to overlapping model (A_{model} = 181.5%, $A_{overall}$ = 173.7%), Fuentepecina II represents a more recent phenomenon, between 3670–3650 cal BC (1 σ)/3700–3640 cal BC (2 σ), and 3640–3630 cal BC (1 σ)/3650–3620 cal BC (2 σ) (Figure 9). However, in the statistical analysis the F.P.II-CR432.15./Poz-125865 (4990 ± 35) dating is not statistically consistent (A = 37%), and as a result has finally been considered an *outlier* (Bronk Ramsey 2009b). It should be noted, however, that Fuentepecina II had one of the most homogeneous material assemblages, with no trace of late 4th millennium objects such as lignite beads (found at Fuentepecina I).

Thus, the model reveals that the funerary cycle of Fuentepecina II would have lasted for very few years during the 37th century cal BC. This is corroborated by the Span function, giving a duration of 10–30 years (1 σ)/0–60 years (2 σ), and reaching a few generations (2 or 3 at most).

For its part, the Fuentepecina I series would have begun between 3770–3650 and 4060–3640 cal BC (1 σ) and continued until the middle of the 4th (1 σ), with a duration of between 0 and 120 years (2 σ), which is not long if compared to the passage tombs. Moreover, Fuentepecina IV dates back further than Fuentepecina II, probably commencing between 3710–3650 cal BC (1 σ) and 3760–3650 cal BC (2 σ) and ending between 3650–3620 cal BC (1 σ) and 3700–3550 cal BC (2 σ), with a duration of between 0–60 years (1 σ).

The dating seems to place the burial series in a more recent phase than the other two monuments, despite the greater simplicity of the architecture of Fuentepecina II and the chronotypological indications of its archaeological material. Nevertheless, we are inclined to think that Fuentepecina II is a closed tomb with a short burial sequence and whose radiocarbon limits allow us to define its funerary phase very accurately. Moreover, it is interesting to consider the different temporalities between the three tombs, especially Fuentepecina IV. Its non-megalithic state has suggested its function as a ustrinum or secondary burial space (Delibes de Castro et al. 2023). Therefore, interacting with other burials, such as Rebolledo, cannot be excluded.

La Cista de Villaescusa

At La Cista, most of unmodeled dates are distributed between 3480–3100 and 3340–2940 cal BC (2 σ). It is a short period, in which burials could have been contemporary, or which at least would have occurred within a very short timeframe, as can be seen from the contemporaneity test of Ward and Wilson (1978) (χ^2-test: df = 7 T = 9.3 ((5%) 14,1)), resulting in a fully developed funerary event during the last third of the 4th millennium BC. A further subject, CISTA20.10. (4624 ± BP), does not correspond to the aforementioned funerary series. This is an individual who was buried in the middle of the 4th millennium (3520–3350 cal BC (2 σ)).

The model chosen to evaluate the temporality of the funerary sequence of La Cista has been uniform phase analysis modeled with KDE_Plot (Figure 10) since all the bones came indistinctly from the chamber. This model is consistent (A_{model} = 88.3%, $A_{overall}$ = 84.6%), exhibiting burial sequence limits throughout the second half of the 4th millennium BC. The hypothesis is therefore confirmed that La Cista is more recent than other more archaic tombs such as the necropolis of Fuentepecina, probably beginning between 3420–3200 cal BC (2 σ) and 3510–3130 cal BC (2 σ) and ending between 3300–3070 cal BC (2 σ) and 3330–3020 cal BC (2 σ).

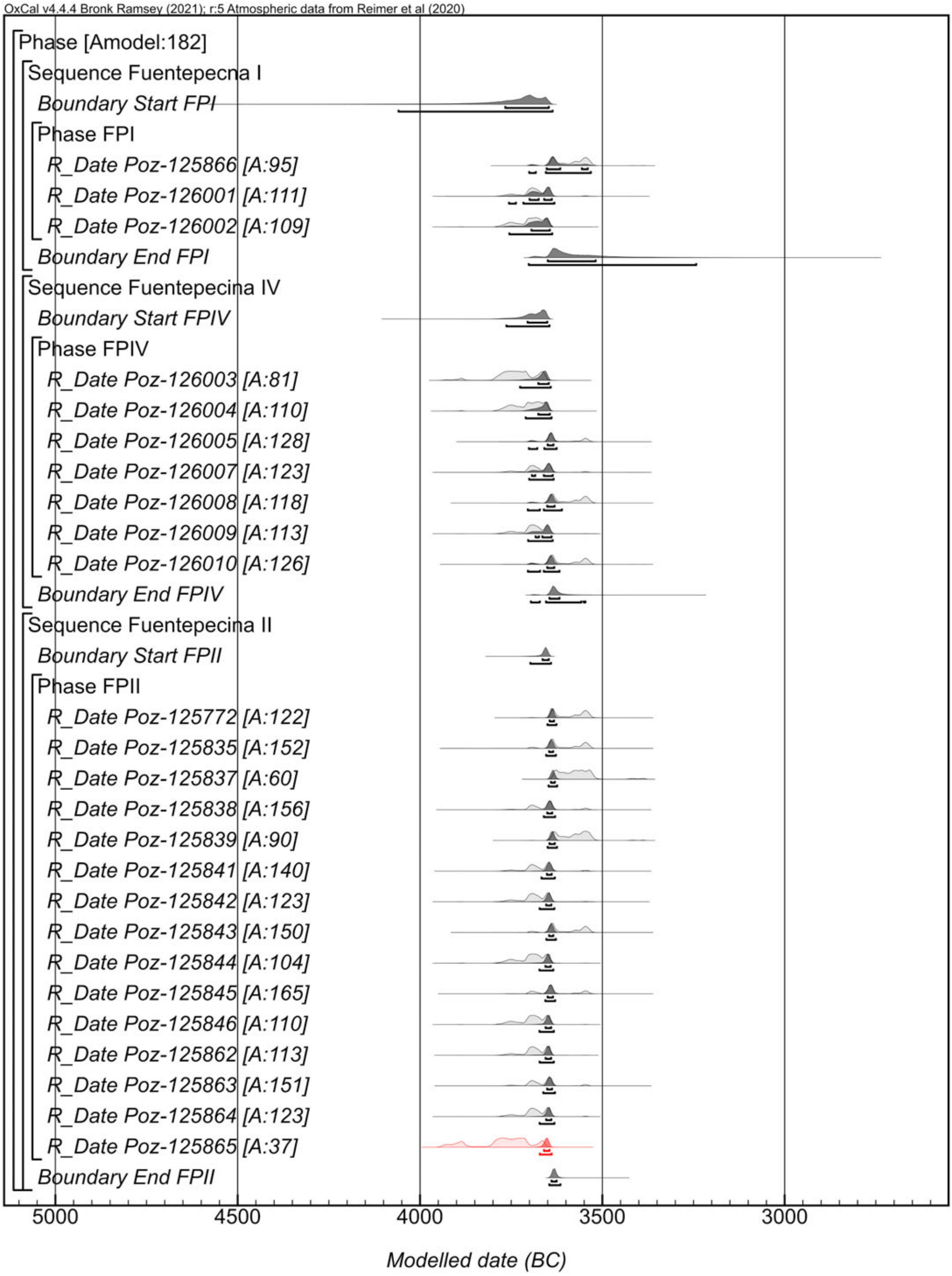

Figure 9 Bayesian model applied to the Fuentepecina necropolis using the overlapping phases function of the Oxcal v.4.4 program (Bronk Ramsey 2009a). The date with poor agreement is highlighted.

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

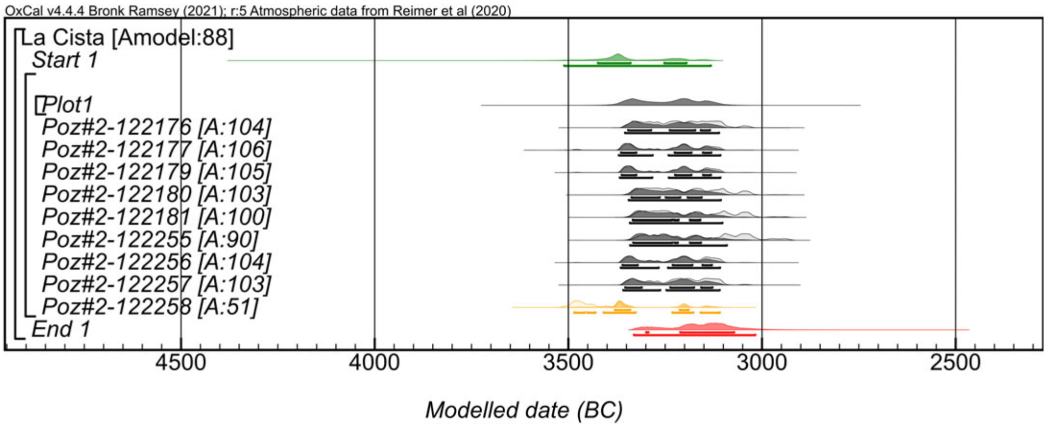

Figure 10 Bayesian phase model for the funerary series of La Cista. Outlier is colored.

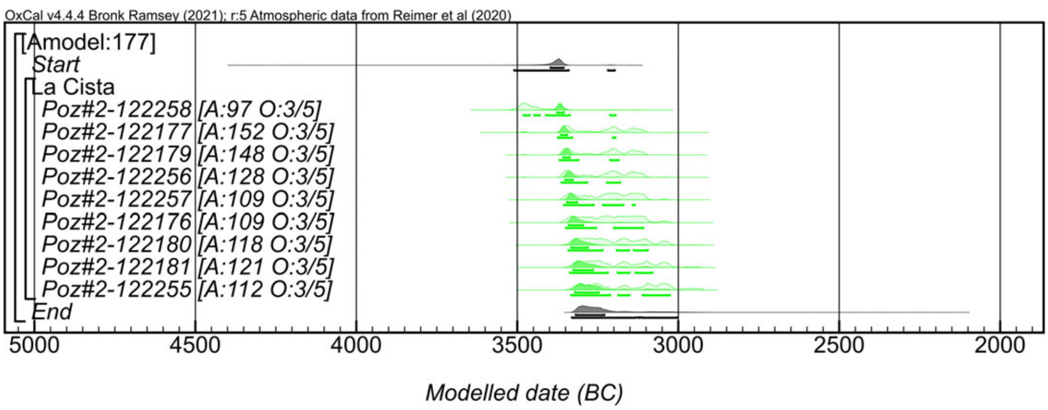

Figure 11 Outlier model of La Cista. The model offers a good agreement and integrates the outlier Poz#2-122258.

However, it is worth considering the last date (CISTA.20.10. Poz#2-122258.; 4624 ± 35) since it falls outside the burial series with a low agreement (A = 51%). From this date, we cannot assume the punctual or "intrusive" burial of an individual around 3000 BC since a good percentage of the individuals in the ossuary have not yet been dated. We have applied the outlier function to the date with a low agreement to assess the temporal limits. This other model also provides an acceptable consistency index ($A_{model} = 177.3\%$; $A_{overall} = 168.6\%$) (Figure 11), with a closer start boundary (3400–3360 cal BC (1 σ) and 3510–3200 cal BC (2 σ)). The end dates are closer to 3000 BC (3320–3230 cal BC (1 σ) and 3330–3000 cal BC (2 σ)), indicating a shorter duration of the burial series: 40–120 years (1 σ).

Nevertheless, this individual likely represents a group of very few burials during the last phases of La Cista, coinciding with the tomb's closure or decline. The problems with the calibration curve for this period must also be taken into account. It causes large statistical deviations from the absolute dates, altering the margin of certainty obtained (Fernández-Crespo et al. 2021). Therefore, differentiating between closed burial cycles and defining a narrower time interval

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

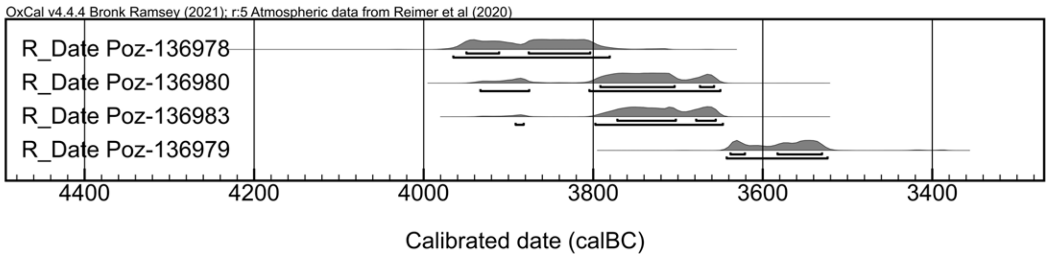

Figure 12 Calibrated dates of Ciella dolmen.

for the La Cista burials is very difficult. Nevertheless, the proximity and concentration of most of the dates between 3500 and 3000 cal BC is observable.

Therefore, the probable duration of the burial sequence could be between 0 and 330 years (2 σ). However, the contemporaneity test allows us to identify a phase of increasing frequency in the graves that were close to the same time. Hence, the existence of short or contemporary burial cycles framed within a more diachronic funerary use seems quite probable.

Ciella

Despite the few individuals recovered in Ciella (n = 4), sampling has made it possible to detect almost continuous funerary practice during the first half of the 4th millennium cal BC, ca. 3700 for most dates. According to calibrated dates (Figure 12), the earliest dating is probably closer to the 5th millennium cal BC than to the second half of the 4th millennium (4010–3800 cal BC (1 σ) and 4420–3720 cal BC (2 σ)). The temporality of this burial sequence is significant since it delays the activity of the large passage tombs by a few centuries earlier than previously thought. This chronology contrasts with the idea that in the first third of the 4th millennium megalithic activity was limited to simple dolmens of a less monumental type.

Unfortunately, it has not been possible to associate any of these dates with the moment in which the documented closure of the passage occurred, due to the presence of a large orthostat that blocked the entrance; this is also associated archaeologically with Bell-Beaker materials (Delibes de Castro et al. 1982).

San Quirce

In San Quirce, the uniform phase analysis with KDE_Plot displays coherent values, with all the dates from the radiocarbon study of the funerary series ($A_{model} = 132.8$ $A_{overall} = 135.2$) (Figure 13). The initial modeled dating would be between 3710–3650 cal BC (1 σ) or 3770–3640 cal BC (2 σ), ending in the middle of the 4th millennium BC, between 3640–3600 cal BC (1 σ) and 3650–3530 cal BC (2 σ). The results also confirm the brevity of the burial cycles, as the identified series would only last between 10–80 years (1 σ) and 0–150 years (2 σ). The dates provided might even be those of a single burial event, in which six of the seven dates are contemporary or correspond to individuals buried in a very small timespan, according to the contemporaneity test of Ward and Wilson (1978) (χ^2-test df = 5 T = 34.4 (5% 11,1)).

In addition, and only in this case, a second model has been carried out with dated charcoal from the burial level. Despite its considerable statistical deviation, this has been included as a result of the temporal data it provides regarding possible evidence of a second post-Neolithic

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

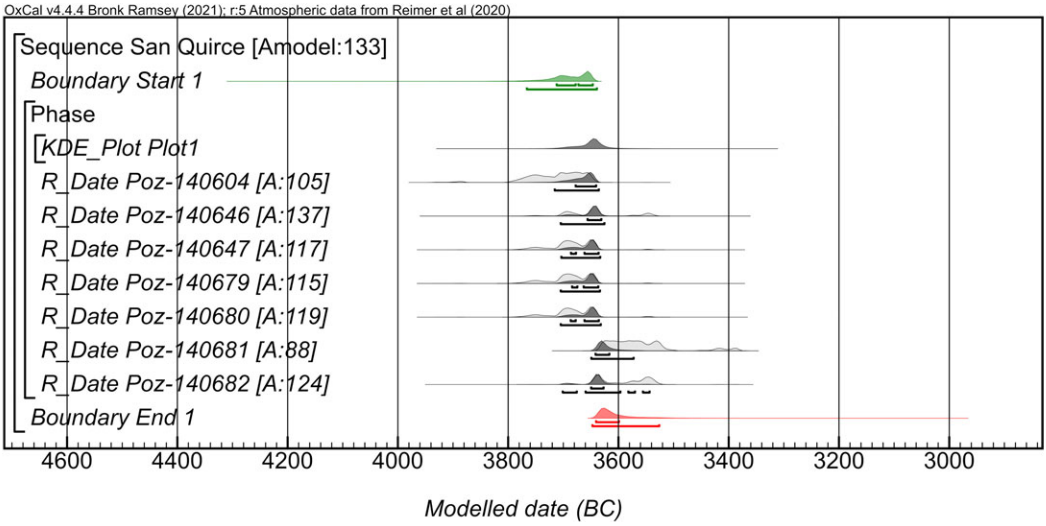

Figure 13 Bayesian phase model for the funerary series of San Quirce dolmen.

function. Modeled dating offers a timespan between 2560–1920 cal BC (2 σ) or 2870–1750 cal BC (2 σ), very much in keeping with the dates for Late Chalcolithic examples from other tombs such as Las Arnillas or El Moreco. This hypothesis would make sense according to certain archaeological materials and the dating of the burial level at the 3rd or 2nd millennium cal BC. However, the bone record has not provided any evidence in this regard apart from certain secondary relocations of long bones that could be from phases after the short period recorded by radiocarbon.

In summary, the detailed analysis clearly reveals that the Fuentepecina necropolis corresponds to the first phases of La Lora megalithism, at the beginning of the 4th millennium, and in line with the most archaic grave goods. However, the passage tombs such as El Moreco, Las Arnillas, La Cabaña, Ciella or San Quirce began their burial practice during the same time frame, so it is likely that these tombs were already fully dedicated to this function around 3800–3600 BC (Figure 14). In the case of another of the simple tombs analyzed, namely, La Cista, a later funeral sequence than that of the others is observed. This supports the timeline proposed by the excavators in view of the objects comprising the grave goods, locating its fully operational status in the second half of the 4th millennium (Table 2).

Renewed activity during the Final Chalcolithic at Las Arnillas and El Moreco is particularly striking, with evidence of burials around 2000 BC, despite the absence of associated grave goods in the latter. At Ciella, on the other hand, no individual has been identified as having been buried around the Late Chalcolithic or the Bronze Age, despite the Bell-Beaker testimony represented among the materials that comprised the ossuary's grave goods (Delibes et al. 1982; Delibes 1984; Santa Cruz del Barrio et al. 2020a).

DISCUSSION

There is extensive research on the timeline of dolmens in the interior of the peninsula. Thanks to these studies, the number of radiocarbon series have expanded significantly, suggesting that megalithism started in this region towards the 5th millennium BC; this is according to the oldest

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

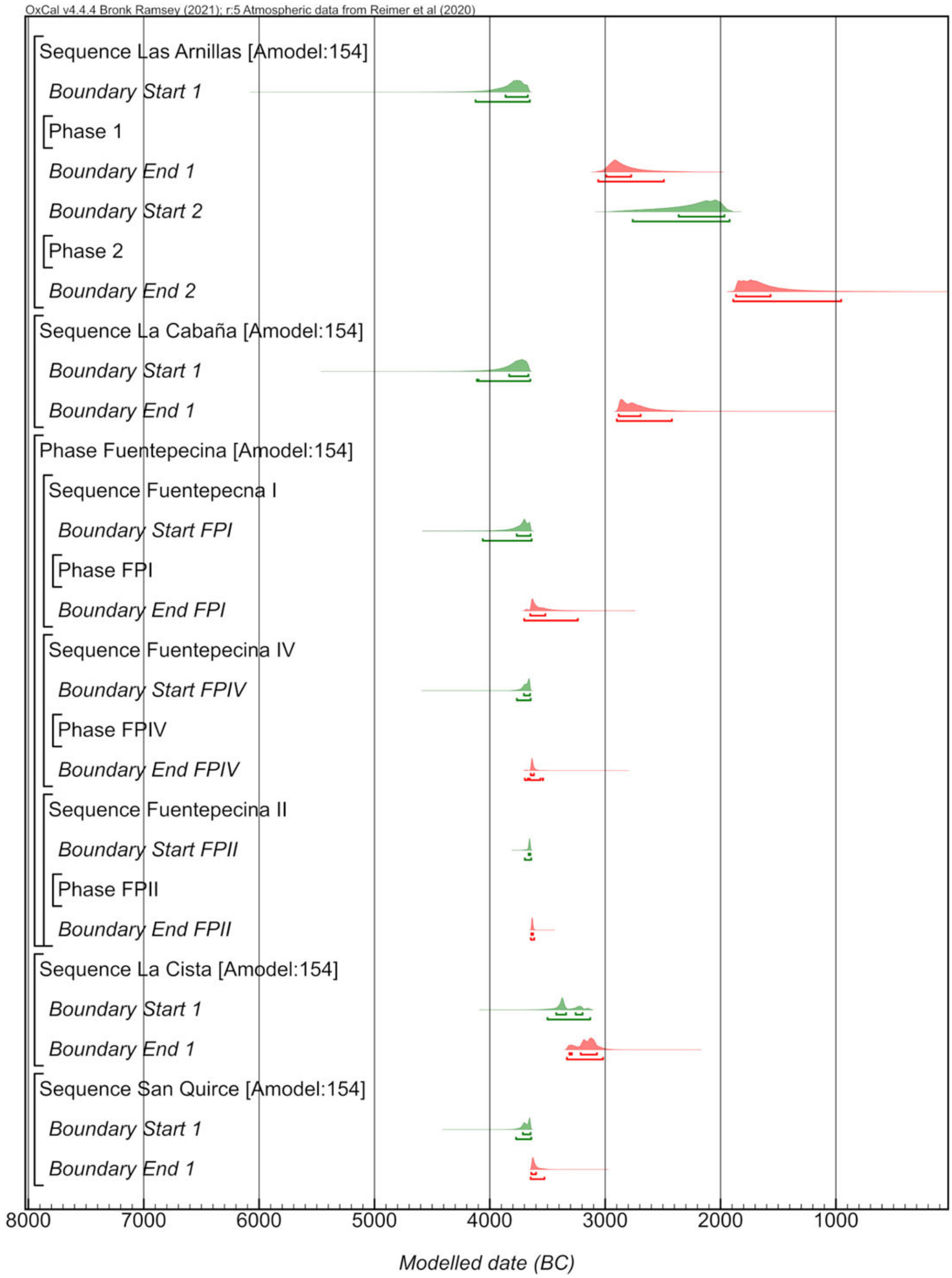

Figure 14 Modeled start and end boundaries for each phase of the La Lora sequences.

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

Table 2 Modeled dates of start and end boundaries calculated for the prehistoric funerary series of the La Lora region, according to the selected Bayesian models.

		Start of phase 1		End of phase 1		Span phase 1		Start of phase 2		End of phase 2		Span phase 2	
Site	Model	1 cal σ	2 cal σ	1 cal σ	2 cal σ	1 cal σ	2 cal σ	1 cal σ	2 cal σ	1 cal σ	2 cal σ	1 cal σ	2 cal σ
Las Arnillas	Phase Sequential $A_{model} = 98.2/A_{overall} = 97.8$	3860–3670	4120–3650	2990–2770	3060–2490	690–810	620–880	2360–1970	2760–1930	1870–1560	1890–940	120–310	70–410
La Cabaña	Uniform phase (KDE_Plot) $A_{model} = 103.5$ /$A_{overall} = 103.6$	3830–3670	4100–3650	2880–2700	2900–2420	770–900	760–1000	—	—	—	—	—	—
Fuentepecina $A_{model} = 181.5\%$/ $A_{overall} = 173.7\%$	Fuentepecina I Overlapping phase	3770–3650	4060–3640	3650–3520	3700–3240	0–120	0–170	—	—	—	—	—	—
	Fuentepecina II Overlapping phase	3670–3650	3700–3640	3640–3630	3650–3620	0–60	0–120	—	—	—	—	—	—
	Fuentepecina IV Overlapping phase	3710–3650	3760–3650	3650–3620	3700–3550	10–30	0–60	—	—	—	—	—	—
La Cista	Uniform phase (KDE_Plot) $A_{model} = 88.3/A_{overall} = 84.6$	3420–3200	3510–3130	3000–3070	3330–3020	0–190	0–330	—	—	—	—	—	—
	Outlier model $A_{model} = 177.3$ /$A_{overall} = 168.6$	3400–3360	3510–3200	3320–3230	3330–3000	40–120	20–350	—	—	—	—	—	—
San Quirce	Uniform phase (KDE_Plot) $A_{model} = 132.8$ /$A_{overall} = 135.3$	3710–3650	3770–3640	3640–3600	3650–3530	10–80	0–150	—	—	—	—	—	—

dates obtained on human bone in the Tagus Valley, found both in the Azután dolmen (Ly 4578: 5750 ± 130 BP) and in the Castillejo mound (Beta 132917: 5710 ± 150 BP) (Bueno Ramírez 1991; Bueno Ramírez et al. 1999, 2004, 2007, 2016).

However, recent reviews (Scarre et al. 2003; Aranda Jiménez et al. 2017; García Sanjuán et al. 2022) concur in their statistical rejection of dates of long-lived samples for a general analysis of peninsular "megalithisation." According to these latest studies, it is proposed that the first megalithic constructions took place during the 5th millennium (Scarre 2010; Laporte and Bueno Ramírez 2019) in coastal areas associated with European neolithic maritime routes (Schulz Paulsson 2019). The radiocarbon measurements on human bone that support this proposal derive from the "protomegalithic" structures discovered in Campo de Hockey (Cádiz, Spain), with dates around 4300 cal BC (Vijande-Vila et al. 2015, 2022; García Sanjuán et al. 2022), and from some tombs in northeastern Catalonia, with chronological intervals in ca. 4200 cal BC (García Sanjuán et al. 2022: 5). After these early megalithic stages, burials could have occurred synchronously in various points on the peninsula, starting approximately between 3900–3700 cal BC. Examples of funerary series that begin within this timeframe are to be found in the southeast and southwest of the peninsula, where excellent dating studies have been carried out in necropolises such as El Barranquete, Panoría, Las Churuletas, Llano del Jautón or La Atalaya (Granada and Almería) (e.g.; Aranda Jiménez and Lozano Medina 2014; Lozano Medina and Aranda Jiménez 2018; Aranda Jiménez et al. 2017, 2018a, 2018b, 2020b); in Pozuelo (Huelva) (Linares-Catela 2022); or in central and southern Portugal (Rocha and Morgado 2020), in the Areita dolmen (Viseu) (García Sanjuán et al. 2022), the Carrascal dolmen (Sintra) (Silva et al. 2019) or the El Sobreva dolmen (El Guiry et al. 2016), to name a few examples.

Regarding the antiquity of megalithism in the interior of the Iberian Peninsula, recent studies carried out in the area of the present study suggest the probable "old-wood problem" in charcoal samples, positing its use in the 4th millennium cal BC, at least in the northern Iberian Plateau. This has, for example, been the case of the El Rebolledo non-megalithic mound, archaic in appearance, and temporally closer to megalithic constructions than to the burials of the Early Neolithic in the region (Delibes et al. 2023). And it is evident that the results provided here confirm the modernity of the funerary series, in terms of the 5th millennium BC; this means that the dates previously published can be conclusively ruled out (Delibes and Rojo-Guerra 1997).

Regarding a chronological analysis of the interior megalithic group near the area of La Lora, it may be affirmed that the earliest phases of the appearance of megaliths on the northern Iberian Plateau are during the first centuries of the 4th millennium BC (Figure 15). According to published dates, the first burials would have begun between 3900–3800 cal BC, a timeframe similar to that of the Alto del Reinoso mound (Alt et al. 2016), the Burgos mound of Silo (Moreno Gallo et al. 2010–2012), the Soria tombs of La Sima, La Tarayuela and La Mina (Rojo-Guerra et al. 2005) or those of the first burials in the dolmen of Los Zumacales in the central part of the Duero Valley (Santa Cruz del Barrio et al. 2020b).

But if we consider a more general analysis of the three major regions of the central-northern peninsula that have a close typological and material relationship with La Lora the Central Duero Valley, the Ambrona Valley in the east of the northern Iberian Plateau, and La Rioja Alavesa (Delibes de Castro et al. 1987; Andrés-Rupérez 1997: 434–435, Fernández-Eraso and Múgica-Alustiza 2013; Fernández-Eraso et al. 2015), it is possible to appreciate certain

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

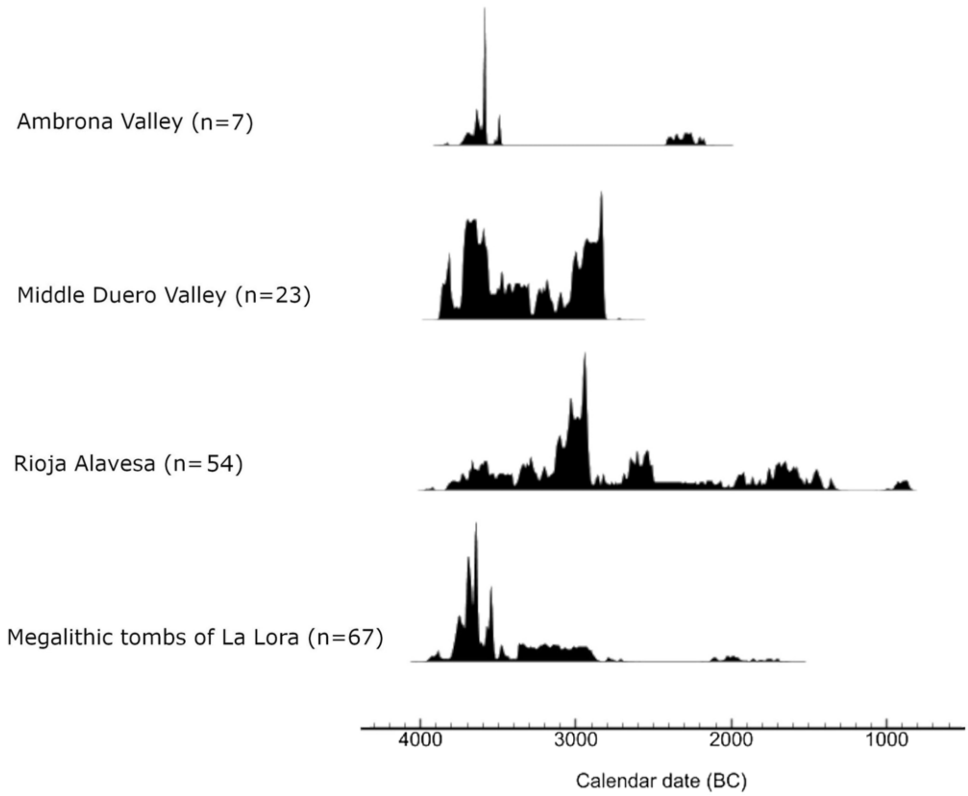

Figure 15 Sum of probabilities comparative of dolmen groups dates from the northern-interior Peninsula.

occupation dynamics that could cast light on the process of megalithisation in the northern central area of the Iberian Peninsula. On the one hand, in La Lora, there are few burials during the first centuries of the 4th millennium (ca. 3900–3800 cal BC). In the middle of the Duero Valley, it seems that burials progressively increase during the same time interval, with an ancient sequence beginning in the aforementioned dolmen of Los Zumacales and continuing in La Velilla, a tomb with similar characteristics (Zapatero 2015; Zapatero and Esparza-Arroyo 2018). Meanwhile, in the northeast of the northern Plateau, the only dating for the entire collection at La Lora comparable to those first stages corresponds to a sample from Ciella located between 3950–3800 cal BC (2 σ) and 3970–3780 cal BC (2 σ). Following this, different burial events can be distinguished between 3800 and 3600, encountered in the simple dolmens of Fuentepecina II, in the Ciella tomb, and even in the large passage tombs such as El Moreco and Las Arnillas. It is from this time on (ca. 3600–3500) when all the burials at Fuentepecina, San Quirce, together with a few at Ciella and La Cabaña, take place more simultaneously, with an easily identifiable burial period ending towards the first half of the millennium.

However, if we consider La Rioja Alavesa, only a couple of dates correspond to the end of the 5th millennium BC: one from the lower level of the Cameros tomb of Collado Palomero II (CSIC-897; 4900 ± 110 BP) (López de Calle and Ilarraza 1997) and another from the dolmen of the Chabola de la Hechicera (Beta-307795; 4940 ± 30 BP) (Fernández-Eraso and Múgica-Alustiza 2013: 99). Both were carried out on charcoal and, therefore, liable to undergo an ageing process that would be substantiated by the recent dates obtained from bone in this

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

region. Consequently, we again see the start of a megalithic funerary series around the first centuries of the 4th millennium BC, and in accordance with the accepted timeframes for the interior of the peninsula. In this region, it is also possible to observe a tendency contrary to that documented in La Lora, with the greatest number of burials taking place during the transition between the 4th and 3rd millennium BC. This moment was identified by MT. Andrés-Rupérez (1997) as a second megalithic phase, characterized by a phenomenon of "demographic emergence" that would have led to social tensions, socioeconomic changes, and a progressive abandonment of megalithic burials in the face of other types of funerary options that mark the beginning of the Chalcolithic (Delibes de Castro and Romero Carnicero 2011; Villalobos García 2016b).

In fact, the dating of the La Rioja Alavesa group provides some interesting assumptions based on the timeframe proposed by MT. Andrés-Rupérez (1997). It seems clear that there is a first phase that corresponds to the first centuries of the 4th millennium BC, and which extends to the second half (Andrés-Rupérez 1997), despite the scant radiocarbon evidence (Fernández-Eraso and Múgica-Alustiza 2013). The first studies on the La Rioja timeframe revealed that there already existed during this first phase a "periodically or exceptionally regulated reuse" (Andrés-Rupérez 1997: 437–438), with the hypothesis that this involved short-cycle practices and the construction of certain tombs for specific funerary events not intended for diachronic use of the burial space (Andrés-Rupérez 2000: 65; Rojo-Guerra et al. 2005; Scarre 2010). After this first phase, the researcher MT. Andrés-Rupérez identified a sequence of "transition," between 3000 and 2500 BC, a time that is interpreted as a progressive abandonment of megalithic monuments, perhaps motivated by environmental and demographic factors. Apparently, the beginning of the sub-boreal climate period (4.2 ky BP event) would entail a series of transformations among which an increase in demographic pressure in the region was prominent (Chapman 1991; Andrés-Rupérez 2000; Fernández-Eraso and Múgica-Alustiza 2013; Blanco-González et al. 2018; Fernández-Crespo et al. 2021). This would lead to a gradual change towards new types of burial, something also observed on the northern Iberian Plateau (Estremera Portela 2003; Bellido Blanco and Ascensión-Gómez Blanco 1996; Villalobos García 2016b). Such transformations could also cause possible violent episodes perhaps related to the scarcity of resources (Etxeberría and Herrasti 2007; Fernández-Crespo 2017; Fernández-Crespo et al. 2018), and population movements in search of these resources towards lower areas or valleys (Andrés-Rupérez 1997) in the case of La Rioja Alavesa. The importance of these changes in the megalithic world could be reflected in the radiocarbon sequences of the tombs of La Rioja and Los Cameros, since from the 3rd millennium BC they were progressively abandoned, sometimes even as a result of various intentional closures, such as activities involving filling, remodeling or rituals related to fire (Andrés-Rupérez 2000; Fernández-Crespo 2015).

The profound changes that have been documented since the 3rd millennium BC throughout the peninsula have not only served to explain the progressive abandonment of megalithic material and mental structures in the north of Iberian Peninsula, but a similar phenomenon is observed on the southern coast, giving way to the funerary models typical of the Early Bronze Age at the end of the millennium (Blanco-González et al. 2018; Linares-Catela 2022: 1055). In fact, many of the megalithic stations in these regions also display substantial architectural polymorphism, with authentic reconstructions, remodeling and reuse that survive well into the second millennium (Rojo-Guerra et al. 2005; Tejedor-Rodríguez et al. 2017; Aranda Jiménez et al. 2017; Linares-Catela 2022, etc.). In one of these, El Pozuelo (Huelva), radiocarbon documentation has established a chronological sequence that corroborates, with its regional architectural particularities, the consolidation and survival of large passage structures during the final megalithic periods, while the single or multiple tombs would mark the beginning of the process (Linares-Catela 2022).

On the northern Iberian Plateau, meanwhile, the hypothesis of evolution towards monumentality consistently proposed for the La Lora region would have been valid, if the burial intensity detected in the early stages only occurred in those simpler or short-passage dolmens. However, very old dates in the large passage tombs such as El Moreco, Las Arnillas, La Cabaña, or even San Quirce, representing a grouping similar to that found at Fuentepecina, would not be congruent with such a hypothesis. Neither does this proposal seem clear in the case of La Rioja Alavesa, since, as has been documented in La Lora, the passage graves represent ancient burial series probably coexisting with simple or small examples (Fernández-Eraso and Múgica-Alustiza 2013; Fernández-Eraso et al. 2019; Alday-Ruiz et al. 2016), a kind of polymorphism also documented in Los Cameros, with dates that also encompass the entire 4th millennium cal BC, regardless of the nature of the tomb (López de Calle and Ilarraza 1997). This evolution, if ever interpreted as evidence of regional autochthonism, does not seem to be the result of a European tendency towards constructing tombs destined to embody successive generations of burials (Schulz Paulsson 2019: 3462), and on the Iberian Peninsula it appears simultaneously in different territories (Linares-Catela 2022).

However, it is worth understanding the possible scenarios involving the appearance in the large passage tombs of such ancient bones with no relation to the chrono-typology of the grave good materials found in their ossuaries. A good interpretation of this is seen in the work of Blank et al. (2020), where the megalithic sequence of southern Sweden is studied. It documents a phenomenon similar to that of gallery tombs and presumably more modern than dolmens and passage tombs. The authors thus refer to four possible scenarios (Blank et al. 2020: 20): a) the bones come from previous tombs and constitute symbolic elements or relics; b) the tombs are misinterpreted dolmens; c) these tombs are contemporaneous with the dolmens; d) there is a huge number of architectural varieties of megalithism, thereby invalidating any type of classification.

In the field studied in this paper it is possible that the most archaic dates situated events prior to the construction of the monument with other ancient tombs being removed and located with the new burials as a link with ancestors. This phenomenon, rooted in Mesolithic times and already proposed in many megalithic contexts, could demonstrate the important symbolism of bones - taken as relics- and their association with a past legitimizing the social structures typical of the communities buried in these tombs (Cauwe 1997; Chambon 2003; Jones 2005; Bueno Ramírez et al. 2016; Fernández-Eraso et al. 2015; Delibes de Castro et al. 2019; Esparza-Arroyo et al. 2018, 2020, etc.). Therefore, there would be justification for the presence and consolidation of certain lineages in the region, giving rise to what could be seen as itinerant relics to be found at the time the tombs are constructed; these are the so-called "skeletons in motion" (Cauwe 1997). This hypothesis has also been defended for megalithic contexts, in which evidence of fleshing and dismemberment has been found; for instance, in the large British mounds, where a great complexity in the burial treatment of skeletons has been documented (Thomas 1991: 140–142; Smith and Brickley 2009; Wysocki et al. 2013; Crozier 2016). Although certain *peri-mortem* procedures have been reported in La Lora or in the mid Duero Valley that could support this idea (Santa Cruz del Barrio 2022), the evidence is still insufficient to demonstrate the existence of funerary foundation ceremonies based on the circulation of relics. In fact, solid radiocarbon series such as that of San Quirce reveal that its period of greatest burial intensity is during the first half of the 4th millennium BC, between 3800 and 3700 BC; it is, therefore, unlikely that all the ancient bones of the passage structures represent relics or foreign bones.

It is also possible that the ancient dates found in the most monumental tombs come from earlier architectural possibilities, ones which are more modest, remodeled or rebuilt in the same place during the course of the millennium. To find examples of remodeling, not only do we have to cite the aforementioned southern megalithic tombs, as in the northern interior of the peninsula evidence of remodeling has also been documented in El Teriñuelo (Salamanca) (Tejedor-Rodríguez et al. 2017) or in La Mina (Rojo-Guerra et al. 2005). In La Lora, it would not be unreasonable to think of a similar example in places such as the dolmen of El Moreco, where sediment analyses showed a possible previous occupation level (Delibes de Castro et al. 2010). However, we recall that in this site the bones were extracted from the sealed and probably intact burial level, and in addition, that there is no further evidence of reconstruction in the tomb. Consequently, there is a strong likelihood of the portion preserved by one of the orthostats corresponding to one of the original burial levels, revealing that El Moreco was functioning perfectly as a large passage tomb around 3800 cal BC.

Rather, and in accordance with the broad timeframes of many of the funerary series, and in particular the longer ones, it is possible to affirm a certain temporal correspondence between the different types of tombs. In this regard, the oldest dates from the large passage tombs would correspond to residual elements remaining in the burial space after recurrent cleaning or *"vidange,"* which is widely reported in many megalithic contexts (Wysocki et al. 2007; Smith and Brickley 2009; Fernández-Crespo 2015). This practice is very well recorded nowadays in many ossuaries, both anatomically—with a tendency to over-represent skulls and long bones—and by taphonomic results (Bayliss et al. 2007b; Meadows et al. 2007; Wysocki et al. 2007; Fernández-Crespo 2015; Robb 2016). And not only an analysis of the area and bone material have demonstrated the existence of cleaning cycles, but also studies based on radiocarbon dating have revealed this practice with skeletal elements that could be termed "residual" (Boz and Hager 2013; Robb 2016). For example, in the necropolis of Panoría (Granada), systematic dating of the required number of subjects and a series of teeth has shown that the latter belong to earlier periods (Aranda Jiménez et al. 2020a). Although they do not become immediately detached, the teeth may eventually separate from the jaw due to degradation of the periodontal ligament.

The chronological results obtained in La Lora would point to this same phenomenon, whereby certain small bones or teeth would accidentally remain in the tomb after the ossuaries had been cleaned so as to accommodate new bodies. This in turn would explain the mixed nature of the funerary deposit of many of the megalithic tombs, in which the anatomical representation provides arguments in favor of a mainly primary burial, yet not without a certain over-representation in terms of elements that could be intentionally preserved, fundamentally skulls and long bones. In fact, not in all, but in those where longer series have been identified, an anatomical representation more consistent with primary burials has been documented, perhaps due to the recurrent accumulation of the smallest skeletal elements (Santa Cruz del Barrio 2022) (Figure 16).

Neither, however, is it possible to state that all the tombs are contemporaneous, since some temporal patterns have been detected that would permit us to mention certain changes in the megalithic burials at La Lora. For example, it has been observed that those simpler or smaller

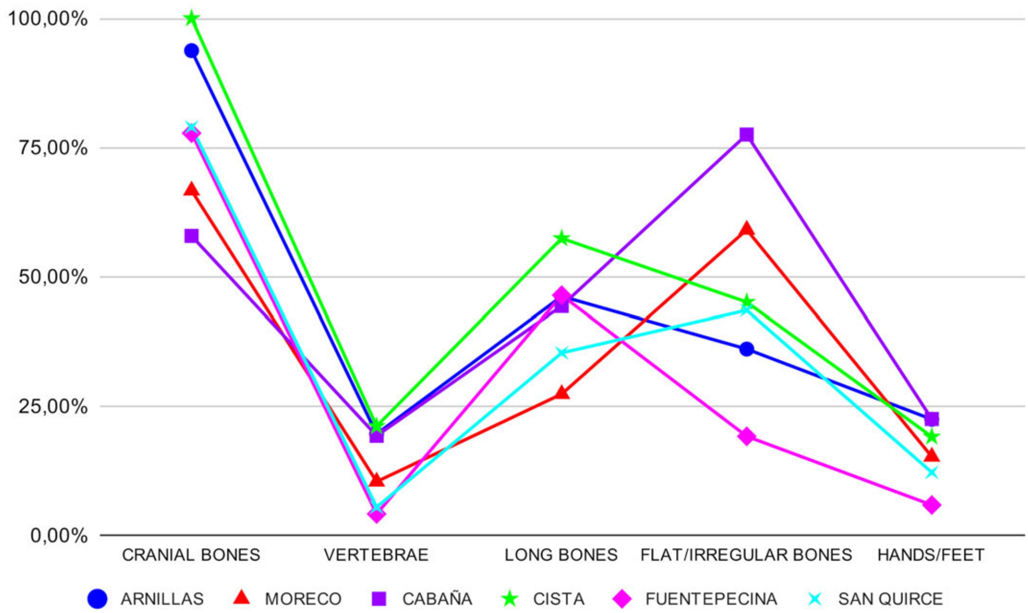

Figure 16 Comparative anatomical representation of La Lora ossuaries. The general anatomical representation index reflects primary burial as the preferred burial form, although the high proportions of certain skeletal elements suggest secondary gestures. The tombs offer proportional levels of all anatomical regions, although skulls and long bones are notable in some sites.

tombs could be characterized as "short-term usage tombs," while the large passage tombs prolong their activity almost systematically until the late 4th or early 3rd millennium. The average duration of these large tombs ranges between 800–1000 years of megalithic funerary occupation, a point that has already been recorded in other tombs in the south of the peninsula (Lozano Medina and Aranda Jiménez 2018; Aranda Jiménez et al. 2017, 2018b; Linares-Catela 2022), with many of the burials in the second half of the 4th millennium BC. Similarly, simple structures dated in this second megalithic phase, for instance at La Cista, reveal a relatively short funerary use (ca. 500–400 years), which proves that this trend does not only occur when dolmens are starting to appear. As a result, perhaps the true essence of the great passage tombs implies large pantheons intended to accommodate several generations of individuals and bring together different groups of inhabitants, something that undoubtedly would have occurred in order to construct tombs of this size (Renfrew 1976; Villalobos García 2014, 2016a; Schulz Paulsson 2019: 3462). At the same time, smaller or simpler monuments, which require the investing of less energy, could have been aimed at smaller communities (Masset 1972; Chambon 2000).

The existence of short and intense burial periods is increasingly evident from the analysis of megalithic radiocarbon series (Whittle et al. 2007a; Meadows et al. 2020). Researchers such as MT. Andrés-Rupérez (1997, 2000) already proposed a sporadic and cyclical, rather than successive and diachronic, funerary occupation. The same was suspected of some supposedly archaic monuments in the Duero Valley; for instance, Los Zumacales, where an obvious concentration of burials in the first centuries of the 4th millennium BC has been identified (Santa Cruz del Barrio et al. 2020b). Similarly, some authors have given their views on Cantabrian megalithism, making the case for a brief use of megalithic tombs by virtue of multiple dates at the beginning of the millennium (Arias González et al. 2006). We find a similar situation in other 4th millennium tombs on the northern Plateau. A paradigmatic case is the non-megalithic tomb of El Alto del Reinoso (Burgos), with a funerary sequence not exceeding more than 3 generations (Alt et al. 2016: 6). The times of the highest concentration of radiocarbon dates will most likely reflect specific events when bodies are buried. Accordingly, our study highlights very specific events of unusual burial intensity in the early megalithic phases of La Lora (ca. 3800–3600) in dolmens such as Fuentepecina or San Quirce.

In short, it seems clear that the timeframe of the La Lora megaliths would span the entire 4th millennium BC, with a notable initial representation of shorter burial cycles in the first half, and another moment of "more homogeneous" intensity in the second half of the millennium[5], which seems to give considerable prominence to large passage tombs. If we observe the time context for the dolmens in the north of the peninsula, we can see something similar in areas such as the Duero Valley, where the first megalithic burials coincide with the beginning of the 4th millennium, shortly prior to the majority of dates for the first phase of La Lora.

Post-Neolithic Phase

The most modern dates allow us to infer that the Late Neolithic graves survived as monuments which were represented in the landscape, with some degree of interaction on the part of the chalcolithic communities. Towards the end of the millennium there was a decline in radiocarbon dates, resulting in a substantial gap during the 3rd millennium BC, which seems to bear little resemblance to the burial practices of the nearby megalithic region of La Rioja Alavesa. Given the traditional "cultural" and material relationship recorded between both foci, it might perhaps not be unreasonable to see some correspondence between the times of occupation-abandonment in the north-eastern part of the interior of the Iberian Peninsula. Whilst in La Rioja Alavesa the moment of abandonment does not take place until the second half of the 3rd millennium BC, in La Lora the beginning of this millennium is characterized by an authentic abandoning of the collective tombs. Despite the existence of Early Chalcolithic sites at many points on the northern Plateau (Esparza-Arroyo et al. 2008; Fabián García and Blanco González 2012; Carmona Ballestero et al. 2013; Delibes de Castro et al. 2018; Delibes de Castro et al. 2019, among others), the reality is that in the region of La Lora occupations at these times have not yet been identified, apart from a few records of materials collected in excavations, such as those from the La Nava Alta site in Huidobro (Delibes de Castro et al. 2010). The dichotomy between megalithic burials and new chalcolithic burial trends has been the object of extensive study on the northern Iberian Plateau (Fabian 1995; Esparza-Arroyo et al. 2008; Delibes de Castro et al. 2019). However, in La Lora it is not possible to identify a period when certain tendencies were abandoned and others were initiated, since a radiocarbon vacuum is reported for much of the 3rd millennium BC. In addition, there is practically no evidence of Early Chalcolithic burials in dolmens on the region. Neither the Duero Valley nor the Ambrona Valley and La Lora have provided initial dating beyond approximately 2900 cal BC. The only cases known are those in which materials associated with this period have been found. For example, in the Arroyal I dolmen, a level complete with bones and typically pre-Bell Beaker ceramics was located (Carmona Ballestero et al. 2014; Tejedor-Rodríguez 2014).

The last phase of La Rioja, on the other hand, is characterized by the actual megalithic burial reuse of some tombs during the entire 3rd millennium BC. This is recorded thanks to the

[5]A degree of caution, however, should accompany this claim, if we consider that the effect of the calibration curve plateau at this time may standardize the calibrated results, making it impossible to detect short-term events.

radiocarbon sequencing of dolmens such as Sotillo, El Montecillo, La Chabola de la Hechicera, San Martín and Peña Guerra II (Barandiarián 1964; Fernández-Eraso and Múgica-Alustiza 2013). This stage is described as a sporadic event of reoccupation and a change in burial practices, which now highlighted the individuality of those who are buried (Andrés-Rupérez 2005) as a likely response to new socioeconomic realities (Delibes de Castro and Santonja 1987; Fernández-Eraso and Múgica-Alustiza 2013).

In La Lora, on the other hand, it is not until almost one millennium after abandonment that a new phase is established, of very low intensity and totally unrelated, at least temporarily, from Late Neolithic burials.

There is a long historiographical tradition, focusing its attention on the reuse of dolmens by groups associated with the Bell-Beaker set since initial research into the dolmen tombs of the Iberian Peninsula (Maluquer de Motes 1960; Delibes de Castro and Santonja 1987; Benet et al. 1997); this attributes to chalcolithic burials an intrusiveness that seemed to be common in the territories of the Lower Guadalquivir and in Portugal, as argued in the nineteen forties by V. and G. Leisner (Delibes de Castro and Santonja 1987). The presence of Bell-Beaker vessels in dolmens was considered at that time a rare or isolated phenomenon, and it is well documented for regions in the south of Spain (Maluquer de Motes 1960; Delibes de Castro and Santonja 1987). Years later, with progressive knowledge of new dolmen tombs with Late Chalcolithic goods, this was seen to be a widespread phenomenon in the regions of Salamanca and Zamora, after its discovery by D. Cesar Morán in the 1960s (Delibes de Castro and Santonja 1987; Benet et al. 1997). Later, the number of cases in Zamora and Salamanca in which these materials were recovered continued to increase (Arias 1989; Palomino 1990; López Plaza et al. 2000). To cite a few examples, we highlight La Ermita de Galisancho or the dolmen of El Teriñuelo, in the southwest of the northern Plateau, due to its important role in the phenomenon of Bell-Beaker reuse (Delibes de Castro and Santonja 1987; Tejedor-Rodríguez et al. 2017). Other discoveries in the Upper Ebro also bear witness to Late Chalcolithic intrusiveness in dolmens; this demonstrates the global nature of the phenomenon, as it would have occurred simultaneously in many regions (Delibes de Castro and Santoja 1987; Andrés-Rupérez 1997; Benet et al. 1997). The multiplicity of examples in the interior of the peninsula make it clear that post-Neolithic reuse is not a singular or isolated case, and an analysis of the timeframes in the region reveals the intrusive and exceptional character of the burials associated with the Bell-Beaker phenomenon (Fabián García 1995; Benet et al. 1997; Garrido-Pena 2000; Rojo-Guerra et al. 2005; Carmona Ballestero et al. 2014; Martín Vela et al. 2021; Santa Cruz del Barrio et al. 2020a, etc.).

Despite the fact that no further radiocarbon evidence has been found other than that mentioned for Las Arnillas and El Moreco, the dolmens of La Lora constitute sites that clearly exhibit archaeological intrusions, corresponding to the so-called "Bell-Beaker set" (Garrido-Pena 2000: 168–191); such is the case of La Cotorrita, La Mina or Ciella, with ceramics, an archer's armband and a Palmela-type arrowhead (Delibes de Castro et al. 1982; Rojo-Guerra 1993). The case of El Moreco is highlighted, since prior to the time analysis chalcolithic reuse had not been documented in the tomb, a fact that could be extended to other tombs. Las Arnillas, on the other hand, did have material evidence attributed to this period (Figure 17).

The same situation has been perfectly recorded in other megalithic regions, such as the Ambrona Valley. The individualized burials of La Sima del Miño de Medinaceli are an authentic example of the intention of identity and singularity of the Bell-Beaker burials of

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

1

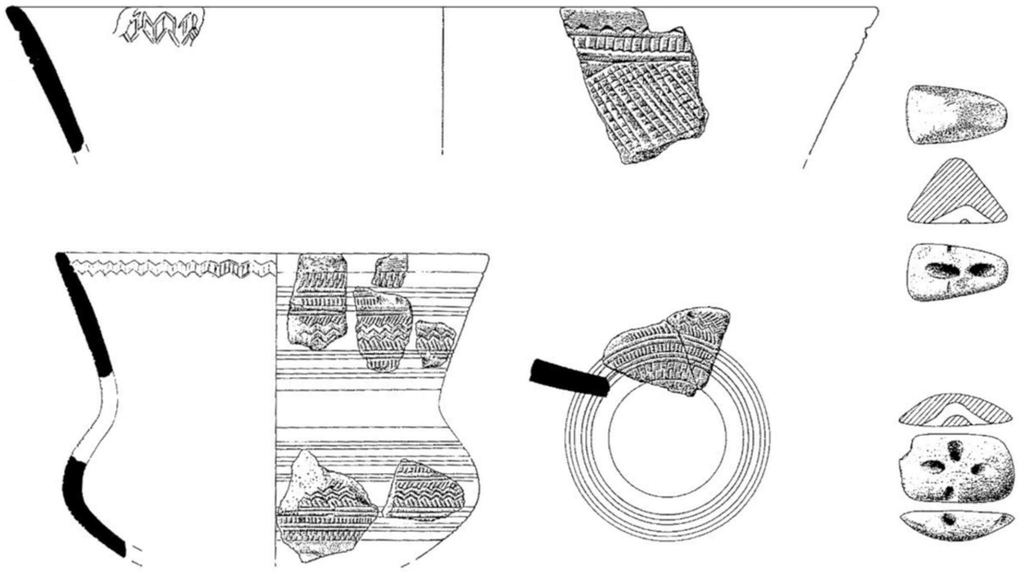

Figure 17 Bell-Beaker elements recovered from Las Arnillas (published in Delibes de Castro et al. 1986).

exceptional wealth, even taking place in remodeled spaces or cists to preserve their individuality with respect to the ancient dolmen ossuary (Rojo-Guerra et al. 2005). For its part, the megalithic station of La Rioja Alavesa is consistent with the stratigraphic discontinuity of Late-Chalcolithic burials (Pérez Arrondo and Rodanés Vicente 1979; Fernández-Eraso and Múgica-Alustiza 2013; Fernández-Eraso et al. 2019). Despite this temporal discontinuity, which seems to be more evident in the north of the Iberian plateau, the profuse identification of Chalcolithic funerary reuses has led, in short, to consider them to be "another phase of unquestionable personality in the biography of the megalithic monuments of the Iberian Peninsula" (Santa Cruz del Barrio et al. 2020a: 35–36).

CONCLUSIONS

The results provide a slight modification of the classic hypothesis of evolving towards monumentality, initially proposed for the temporality of La Lora megalithism. First of all, the funerary series does not display any dates prior to the 4th millennium BC, the oldest being located in the first centuries of that millennium. These results contrast with the infratumular dates, which in certain cases traced the construction of some of the monuments back to the 5th millennium BC. According to the Bayesian analyses, the construction of most of the tombs very likely took place from ca. 4000 BC onwards, coinciding—which is significant—with the first appearances of dolmens in the rest of the northern Plateau and the Upper Ebro.

As far as the evolutionary sequence of the dolmens is concerned, there is no compelling argument in favor of the construction of all the large passage tombs commencing when the simplest ones had already been closed. The seemingly most archaic dolmen complex, the Fuentepecina necropolis, has displayed burial series contemporary to tombs such as San Quirce, located between 3800–3600 cal BC. A similar timeframe is revealed by the dating of the

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

incomplete ossuary preserved at the burial level of El Moreco, one of the largest tombs of La Lora. Other large passage tombs, such as Las Arnillas or La Cabaña, also provide dates prior to 3500 cal BC. We do not rule out the possibility of some of these samples coming from "foundational" bones unrelated to the burial sequence of these dolmens, but the analyses carried out suggest that the series probably began around 3800–3700 cal BC.

An aspect that should be pointed out about the evolutionary sequence of the dolmens, is that the theoretically more archaic tombs provide radiocarbon series restricted to the first half of the 4th millennium BC, while the large passage tombs remain open and in use until the end of that millennium, when their burial activity appears to increase. Only Ciella and El Moreco show sequences which are somewhat different from the above-mentioned activity since the megaliths of both are dated in the first half of the 4th millennium BC.

Bayesian analysis has also identified short burial cycles. Whether or not of prolonged duration, burial sequences appear to be characterized by being rather brief events. This seems clearer in simple or short-lived structures, but it is also possible to distinguish a concentration of burials in sequences over a longer time span, and more associated with large passage tombs.

A case which is distinct from the time-type sequence set forth here is that of La Cista de Villaescusa. This is a monument with unique architectural features in the area (a rectangular chamber without a passage, that is, a canonical cist). In terms of age, this tomb is exceptional, insofar as it is the only one without any burial activity prior to 3500 cal BC; in other words, it is the only tomb which can be shown to be recent compared to the others. We should, therefore, ask ourselves whether this site might represent the end of what we have considered the "burial tradition" of the megalithic program, perhaps as a symptom of certain socio-economic changes possibly occurring throughout the 4th millennium BC.

The radiocarbon series of the strictly megalithic stage ends in the first centuries of the 3rd millennium BC, when La Lora graves were progressively abandoned. A similar trend is observed at La Rioja Alavesa, although here funerary activity at megalithic tombs continued until 2500 BC. In terms of the traditional link between both megalithic regions, this is supported by the architectural characteristics and the typologies of their grave goods, it would not be strange to find a certain relationship between the timeframe for the abandonment of both.

Finally, it is important to mention radiocarbon confirmation of funerary reuse events after the "classic phase" of megalithism. Some dates reveal intrusive burials between the Late Chalcolithic, undoubtedly associated with the presence of Bell-Beaker ceramics and Early Bronze Age pottery, but only restricted to passage tombs.

ACKNOWLEDGMENTS

I would like to thank Prof. Germán Delibes de Castro for the support and supervision for the PhD thesis from which this work has been derived. I would also like to thank my co-directors and my tutor, Elisa Guerra Doce, for their support. The dating projects have been fully funded by the Heritage and Culture section of the Junta de Castilla y León, and I am also grateful for the special interest expressed by Nicolás Benet and Jesús del Val. Finally, I would like to mention the help and suggestions for the radiocarbon analysis provided by Dr. Cristina Tejedor-Rodríguez, Dr. Teresa Fernández-Crespo, and Dr. Rodrigo Villalobos García.

SUPPLEMENTARY MATERIAL

To view supplementary material for this article, please visit https://doi.org/10.1017/RDC.2024.19

REFERENCES

Alday-Ruiz A, Campos AR, Castañeira N, Díaz M, Domingo J, Echeverria AM, et al. 2016. 180 años después del primer dolmen. Reflexiones sobre el quién el dónde y el cuándo del megalitismo del área vasca. Estudios de Arqueología Alavesa 28:29–45.

Alday-Ruiz A, Rodríguez-Lejarza A, Mejías-García JC. 2023. 'Plus ça change, plus c'est la même chose'? Continuities and discontinuities in the funerary record of the northern half of Iberia. Documenta Praehistorica 50. https://doi.org/10.4312/dp.50.3

Alemán Aguilera I, Botella López MC, du Souich Henrici P. 1997. Aplicación de las funciones discriminantes en la determinación del sexo. Estudios de Antropología Biológica 9:69–77.

Alonso Díez M, Delibes de Castro G, Santiago Pardo J. 2015. El sepulcro megalítico de Los Zumacales en Simancas (Valladolid). In: Wattenberg García E, editor. Conocer Valladolid. VII Curso de patrimonio cultural. Valladolid: Real Academia de Bellas Artes de la Purísima Concepción. p. 13–35.

AlQahtani SJ, Hector MP, Liversidge HM 2010. Brief communication: The London atlas of human tooth development and eruption. American Journal of Physical Anthropology, 142(3): 481–490. https://doi.org/10.1002/ajpa.21258

AlQahtani SJ, Hector MP, Liversidge HM 2014. Accuracy of dental age estimation charts: Schour and Massler, Ubelaker and the London Atlas. American Journal of Physical Anthropology 154(1):70–78. https://doi.org/10.1002/ajpa.22473

Alt KW, Zesch S, Garrido-Pena R, Knipper C, Szécsényi-Nagy A, Roth C, Tejedor-Rodríguez C, Held P, García-Martínez-de-Lagrán I, Navitainuck D, Arcusa Magallón H, Rojo-Guerra MA. 2016. A community in life and death: the late Neolithic megalithic tomb at Alto de Reinoso Burgos Spain. PLoS ONE 111. https://doi.org/10.1371/journal.pone.0146176

Álvarez-Vidaurre E. 2006. Percepción y reutilización de monumentos durante la prehistoria reciente: El caso de Navarra. Cuadernos de arqueología de la Universidad de Navarra 14 117–150.

Alves EQ, Macario KD, Urrutia FP, Cardoso RP, Bronk Ramsey C. 2019. Accounting for the marine reservoir effect in radiocarbon calibration. Quaternary Science Reviews 209 129–138. https://doi.org/10.1016/j.quascirev.2019.02.013

Andrés-Rupérez MT. 1997. Fases de implantación y uso dolménico en la Cuenca Alta y Media del Ebro CAME. Fábregas Valcarce R Pérez Losada F. y Fernández Ibáñez C. Eds: Arqueoloxía da Morte. Arqueoloxía da Mortena Península Ibérica desde as Orixes ata o Medievo Xinzo de Limia. Universidad de Santiago de Compostela. p. 431–444

Andrés-Rupérez MT. 2000. El espacio funerario dolménico: abandono y clausura. Saldvie: Estudios de prehistoria y arqueología 1: 59-76.

Andrés-Rupérez MT. 2005. Concepto y análisis del cambio cultural: su percepción en la materia funeraria del Neolítico y Eneolítico. Monografías Arqueológicas 42. Zaragoza: Departamento de Ciencias de la Antigüedad Universidad de Zaragoza.

Aranda Jiménez G, Díaz-Zorita Bonilla M, Hamilton D, Milesi L, Sánchez Romero M. 2020b. The radiocarbon chronology and temporality of the megalithic cemetery of Los Millares Almería Spain. Archaeological and Anthropological Sciences 125:104. https://doi.org/10.1007/s12520–020–01057-7

Aranda Jiménez G, Díaz-Zorita Bonilla M, Hamilton D, Milesi L, Sánchez-Romero M. 2020a. A radiocarbon dating approach to the deposition and removal of human bone remains in megalithic monuments. Radiocarbon 62(5):1147–1162. https://doi.org/10.1017/RDC.2020.67

Aranda Jiménez G, Lozano Medina A, Sánchez Romero M, Díaz-Zorita Bonilla M, Hervé B. 2018b. Chronology of megalithic funerary practices in southeastern Iberia: the necrópolis of Panoría (Granada, Spain). Radiocarbon 60(1):1–19. https://doi.org/10.1017/RDC.2017.96

Aranda Jiménez G, Lozano Medina Á, Camalich Massieu MD, Martín Socas D, Rodríguez-Santos FJ, Trujillo Mederos A, et al. 2017. The radiocarbon chronology of the oldest megalithic monuments in southeastern Iberia: the necropolises of Las Churuletas La Atalaya and Llano del Jauton Purchena Almeria. Trabajos de Prehistoria 74:257–277. https://doi.org/10.1017/RDC.2017.96

Aranda Jiménez G, Lozano Medina A. 2014. The chronology of megalithic funerary practices: a Bayesian approach to Grave 11 at El Barranquete necropolis Almería Spain. Journal of Archaeological Science 50(1):369–382. https://doi.org/10.1016/j.jas.2014.08.005

Aranda Jiménez G, Lozano Medina ÁL, Díaz-Zorita Bonilla M, Sánchez Romero MS, Escudero Carrillo JE. 2018a. Cultural continuity and social resistance: the chronology of megalithic

funerary practices in southern Iberia. European Journal of Archaeology 212:192–216. https://doi.org/10.1017/eaa.2017.42
Aranda Jiménez G, Milesi García L, Hamilton D, Díaz-Zorita Bonilla M, Vílchez Suárez M, Robles Carrasco S, et al. 2022. The tempo of the Iberian megalithic rituals in the European context: The cemetery of Panoría. Journal of Archaeological Science 140:105579. https://doi.org/10.1016/j.jas.2022.105579
Arias L. 1989. Contribución al estudio del Fenómeno Megalítico en el Occidente de la Meseta Norte: el dolmen de 'El Torrejón' Villarmayor Salamanca. En XIX Congreso Nacional de arqueología Valencia 1987:399–408.
Arias González P, Armendáriz A, Teira L. 2006. The megalithic complex in Cantabrian Spain. In: Rodríguez Casal A, editor. Le Megalithisme Atlantique. Acts of the XIVth UISPP Congress. University of Liège Belgium 2-8 september 2001. Symposium 9.4 British Archaeological Reports. International Series 1521 Oxford. p. 11–29.
Barandiarián JM. 1964. Excavaciones del dolmen de San Martín Laguardia. Bol. Inst. Sancho Sabio VIII:41–66.
Bayliss A, Benson D, Galer D, Humphrey L, McFadyen L, Whittle A. 2007a. One thing after another: the date of the Ascott-under-Wychwood long barrow. Cambridge Archaeological Journal 17:29–44. https://doi.org/10.1017/S0959774307000157
Bayliss A, Bronk Ramsey C, Van der Plicht J. Whittle A. 2007b. Bradshaw and Bayes: towards a timetable for the Neolithic. Cambridge Archaeological Journal 17(S1):1–28. https://doi.org/10.1017/S0959774307000145
Bayliss A, Marshall P. 2022. Radiocarbon dating and chronological modelling: guidelines and best practice. London: Historic England. https://historicengland.org.uk/images-books/publications/radiocarbon-dating-chronological-modelling/
Bayliss A, Whittle A, Wysocki M. 2007c. Talking about my generation: the date of the West Kennet Long Barrow. Cambridge Archaeological Journal 17:85–101. https://doi.org/10.1017/S0959774307000182
Bellido Blanco A, Ascensión-Gómez Blanco JL. 1996. Megalitismo y rituales funerarios. Complutum Extra 61:141–152.
Benet N, Pérez R, Santonja M. 1997. Evidencias campaniformes en el valle medio del Tormes. En II Congreso de arqueología Peninsular: Zamora del 24 al 27 de septiembre de 1996. Fundación Rei Afonso Henriques. p. 449–470
Blanco-González A, Lillios KT, López-Sáez JA, Drake, BL. 2018. Cultural demographic and environmental dynamics of the Copper and Early Bronze Age in Iberia 3300–1500 BC: towards an interregional multiproxy comparison at the time of the 4.2 ky BP event. J. World Prehist 31:1–79. https://doi.org/10.1007/s10963-018-9113-3
Blank M, Sjögren KG, Storå J. 2020. Old bones or early graves? Megalithic burial sequences in southern Sweden based on ^{14}C datings. Archaeological and Anthropological Sciences 12:1–33. https://doi.org/10.1007/s12520-020-01039-9
Boz B, Hager LD. 2013. Making sense of social behavior from disturbed and commingled skeletons: a case study from Çatalhöyük Turkey. In: Osterholtz AJ, Baustian KM, Martin DL, editors. Commingled and disarticulated human remains. New York: Springer. p. 17–33.
Brock F, Higham T, Ditchfield P, Bronk Ramsey C. 2010. Current pretreatment methods for AMS radiocarbon dating at the Oxford Radiocarbon Accelerator Unit (ORAU). Radiocarbon 52(1):103–112. https://doi.org/10.1017/S0033822200045069
Bronk Ramsey C. 1995. Radiocarbon calibration and analysis of stratigraphy: the OxCal Program. Radiocarbon 37(2):425–430. https://doi.org/10.1017/S0033822200030903
Bronk Ramsey C. 2001. Development of the radiocarbon calibration program. Radiocarbon 43(2):355–363. https://doi.org/10.1017/S0033822200038212
Bronk Ramsey C. 2008. Radiocarbon dating: revolution in understanding. Archaeometry 50(2):249–275. https://doi.org/10.1111/j.1475-4754.2008.00394.x
Bronk Ramsey C. 2009a. Bayesian analysis of radiocarbon dates. Radiocarbon 51(1):337–360. https://doi.org/10.1017/S0033822200033865
Bronk Ramsey C. 2009b. Dealing with outliers and offsets in radiocarbon dating. Radiocarbon 51(3):1023–1045. https://doi.org/10.1017/S0033822200034093
Bronk Ramsey C. 2017. Methods for summarizing radiocarbon datasets. Radiocarbon 59(6):1809–1833. https://doi.org/10.1017/RDC.2017.108
Bronk Ramsey C, Higham TFG, Bowles A, Hedges REM. 2004. Improvements to the pretreatment of bone at Oxford. Radiocarbon 46(1):155–163. https://doi.org/10.1017/S0033822200039473
Brothwell DR. 1981. Digging up bones. the excavation, treatment and study of human skeletal. London: British Museum (Natural History).
Buck CE, Cavanagh WG, Litton CD. 1996. Bayesian approach to interpreting archaeological data. Chichester: Wiley.
Buck CE, Litton CD, Smith AF. 1992. Calibration of radiocarbon results pertaining to related archaeological events. Journal of Archaeological Science 195:497–512. https://doi.org/10.1016/0305-4403(92)90025-X
Buckberry JL, Chamberlain AT. 2002. "Age estimation from the auricular surface of the ilium: A revised method". American Journal of Physical Anthropology 119(3):231–239. https://doi.org/10.1002/ajpa.10130
Bueno Ramírez P. 1991. Megalitos en la Meseta sur: los dólmenes de Azután y La Estrella Toledo. Madrid: Ministerio de Cultura.

Bueno Ramírez P, Barroso Bermejo R, de Balbín Behrman R. 2010. Entre lo visible y lo invisible: registros funerarios de la Prehistoria reciente de la Meseta Sur. En Bueno Ramirez P. Gilman A. Martín Morales C. y Sánchez-Palencia F. J. Eds.: arqueología Sociedad Territorio y Paisaje. Estudios sobre Prehistoria Reciente Protohistoria y transición al mundo romano en Homenaje a Ma. Dolores Fernández Posse. Madrid: Consejo Superior de Investigaciones Científicas. Instituto de Historia. p. 53–74.

Bueno Ramírez P, Barroso Bermejo R, de Balbín Behrmann R. 2004. Construcciones megalíticas avanzadas de la cuenca interior del Tajo: el núcleo cacereño. SPAL 13:83–112.

Bueno Ramírez P, de Balbín Behrmann R, Barroso Bermejo R, Rojas Rodríguez-Malo JM, Villa González R, Félix López R, Rovira Llorens S. 1999. Neolítico y Calcolítico en Huecas Toledo. El Túmulo de Castillejo. Campaña de 1998. Trabajos de Prehistoria 56(2):141–160. https://doi.org/10.3989/tp.1999.v56.i2.280

Bueno Ramírez P, de Balbín Behrmann R, de Barroso Bermejo R. 2016. Between east and west: megaliths in the center of the Iberian Peninsula. En Laporte L. y Scarre Ch. Eds.: The megalithic architectures of Europe. Oxford Oxbow Books. p. 157–166. https://doi.org/10.2307/j.ctvh1dpw8.19

Bueno Ramírez P, Represa Bermejo R, de Balbín Behrmann R. 2007. Megalitos en la cuenca interior del Tajo. En Actas del Congreso Internacional sobre Megalitismo y otras manifestaciones funerarias contemporáneas en su contexto social económico y cultural. Sociedad de Ciencias Aranzadi. p. 152–187.

Carmona Ballestero E, Arnaiz Alonso MÁ, Alameda Cuenca-Romero MC. 2014. El dolmen de Arroyal I: usos y modificaciones durante el III milenio cal AC. En J. Honrado M. Á. Brezmes A. Tejeiro y Ó. Rodríguez Eds.: II Jornadas de Jóvenes Investigadores del Valle del Duero. Del Neolítico a la Antigüedad Tardía León 2012 2. Valladolid Glyphos Publicaciones. p. 41–54.

Carmona Ballestero E, Valdivieso Gutiérrez E, Pascual Blanco S, Vega, Miguel J. 2013. Restos humanos contextos funerarios y diversidad formal: los yacimientos calcolíticos de El Hornazo y El Túmulo IL. C1 de Cótar Burgos. Revista atlántica-mediterránea de prehistoria y arqueología social 15:53–80. http://hdl.handle.net/10498/17012

Cauwe N. 1997. Les morts en mouvement. Essai sur l´ origine des rites fune- raires mégalithiques. Fábregas Valcarce R Pérez Losada F. y Fernández Ibáñez C. Eds: Arqueoloxía da Morte. Arqueoloxía da Mortena Península Ibérica desde as Orixes ata o Medievo Xinzo de Limia. Universidad de Santiago de Compostela. p. 719–737.

Chambon Ph. 2000. Les pratiques funéraires dans les tombes collectives de la France néolithique. Bulletin de la Société préhistorique française. p. 265–274.

Chambon Ph. 2003. Les morts dans les sépultures collectives néolithiques en France. Du cadavre aux restes ultimes. XXXV Supplément a Gallia Prehistoire. Bayeux.

Chapman R. 1991. La formación de las sociedades complejas: El sureste de laPenínsula Ibérica en el marco del Mediterráneo occidental. Barcelona: Crítica.

Crozier R. 2016. Fragments of death. A taphonomic study of human remains from Neolithic Orkney. Journal of Archaeological Science: Reports 10:725–734. https://doi.org/10.1016/j.jasrep.2016.05.036

Czernik J, Goslar T. 2001. Preparation of graphite targets in the Gliwice Radiocarbon Laboratory for AMS ^{14}C dating. Radiocarbon 43(2A):283–291. https://doi.org/10.1017/S0033822200038121

De Niro MJ. 1985. Postmortem preservation and alteration of in vivo bone collagen isotope ratios in relation to palaeodietary reconstruction. Nature 3176040:806–809. https://doi.org/10.1038/317806a0

Delibes de Castro G, Esparza-Arroyo A, Velasco Vázquez J, Zapatero Magdaleno P, Palomo Díez S, Fernández Rodríguez C, Carbajo Arana M, Palomo Díez S, Misiego Tejada J. 2018. Dos tumbas individuales calcolíticas en las inmediaciones de los dólmenes de Osorno y Simancas: Estudio bioantropológico ofrenda de perros y afterlife megalítica en el valle medio del Duero. Trabajos de Prehistoria 7622:236–253.

Delibes de Castro G, Esparza-Arroyo Á, Velasco Vázquez J, García García M, Santa Cruz del Barrio A, Misiego Tejeda J. 2019. Dobles exequias y circulación de reliquias en el Calcolítico Inicial de la Cuenca del Duero: Sobre las inhumaciones parciales del recinto de fosos de Santa Cruz III Cabezón de Pisuerga Valladolid. Cuadernos de Prehistoria y arqueología. p. 27–50.

Delibes de Castro G, Moreno Gallo MA, Del Valle González A. 2010. Dólmenes de Sedano Burgos y criadero cuprífero de Huidobro: una relación todavía posible. En Bueno Ramirez P Gilman A. Martín Morales C. y Sánchez-Palencia F. J. Eds. arqueología Sociedad Territorio y Paisaje. Estudios sobre Prehistoria Reciente Protohistoria y transición al mundo romano en Homenaje a Ma. Dolores Fernández Posse. Madrid: Consejo Superior de investigaciones científicas. Instituto de Historia.

Delibes de Castro G, Rodríguez Marcos JA, Sanz Mínguez C, del Val Recio J. M. 1982. Dólmenes de Sedano I. El sepulcro de corredor de Ciella. Noticiario Arqueológico Hispanico 14:149–196.

Delibes de Castro G, Rojo-Guerra MÁ, Santa Cruz del Barrio A, Etxeberría Gabilondo F, Villalobos García R. 2023. El túmulo neolítico de El Rebolledo Sedano Burgos: un testimonio indirecto de complejidad en los rituales funerarios megalíticos. Complutum 34 Núm. Especial: 71–84.

Delibes de Castro G, Rojo-Guerra MÁ, Represa Bermejo JI. 1993. Dólmenes de La Lora. Junta de Castilla y León. Consejería de Educación y Cultura.

Delibes de Castro G, Rojo-Guerra MÁ. 1997. C14 y secuencia megalítica en La Lora burgales: acotaciones a la problemática de las dataciones absolutas referentes a yacimientos dolménicos. En Rodrígez Casal A. ed.: O Neolítico atlánticoe as orixes do megalitismo. Santiago de Campostela: Universidad de Santiago de Compostela: 391–414.

Delibes de Castro G, Rojo-Guerra MÁ, Sanz Mínguez C. 1986. Dólmenes de Sedano II. El sepulcro de corredor de Las Arnillas Moradillo de Sedano Burgos. Noticiario Arqueológico Hispanico 27:7–41.

Delibes de Castro G, Rojo-Guerra MÁ. 2002. Reflexiones sobre el trasfondo cultural del polimorfismo megalítico en La Lora Burgalesa. Archivo Español de arqueología 75:21–35.

Delibes de Castro G, Romero Carnicero F. 2011. La plena colonización agraria del Valle Medio del Duero/The full farming colonization of the Middle Duero Valley. Complutum 222:49.

Delibes de Castro G, Santonja M. 1987. Anotaciones en torno al megalitismo del occidente de la Meseta Salamanca y Zamora. En Megalitismo en la Península Ibérica: 200–210.

Delibes de Castro G, Guerra Doce E, Zapatero Magdaleno P, Villalobos García R. 2012. Les spatules-idoles de type San Martín-El Miradero: Identité, symbolisme, liturgie et prestige dans les mobiliers des tombes mégalithiques de la Vielle Castille (Espagne). In: Sohn M,. Vaquer J, editors. Sépultures collectives et mobiliers funéraires de la fin du Néolitique en Europe occidentale. Archives d'écologie préhistorique. p. 305–331.

Delibes de Castro G. 1985. El megalitismo ibérico. Madrid: Cuadernos Historia 16.

Delibes de Castro G. 1995. Ritos funerarios, demografía y estructura social entre las comunidades neolíticas de la submeseta norte. In: Fábregas R, Pérez F, Feránadez C, editors. Arqueología da Morte. Arqueología da Mortena Península Ibérica desde as Orixes ata o Medievo. Concello de Xinzo de Limia. p. 61–94.

Delibes de Castro G. 2000. Itinerario arqueológico de los dólmenes de Sedano Burgos. Trabajos de Prehistoria 572:89–103.

Delibes de Castro G. 2004. La impronta Cogotas I en los dólmenes del occidente de la cuenca del Duero o el mensaje megalítico renovado. Mainake 26:211–231.

Delibes de Castro G. 2010. La investigación de las sepulturas colectivas monumentales del IV milenio A.C. en la Submeseta Norte española. Horizonte 2007. En Fernández-Eraso J. y Múgica-Alustiza J. A. Eds.: Actas del Congreso Internacional sobre Megalitismo y otras manifestaciones funerarias contemporáneas en su contexto social económico y cultural. Munibe. Suplemento 32 Sociedad de Ciencias Aranzadi. Donostia. p. 12–56.

Delibes de Castro G. 2018. Balance de medio siglo de estudio salvaguarda y promoción del patrimonio megalítico de La Lora burgalesa. Boletín de La Institución Fernán González 257:257–282.

Delibes de Castro G, Alonso Díez M, Rojo-Guerra Guerra MÁ. 1987. Los sepulcros colectivos del Duero Medio y Las Loras y su conexión con el foco dolménico riojano. En El Megalitismo en la Península Ibérica. Madrid Ministerio de Cultura. p. 181–197.

Díaz-Zorita Bonilla M, Aranda Jiménez G, Bocherens H, Escudero Carrillo J, Sánchez Romero M, Lozano Medina Á, et al. 2019. Multi-isotopic diet analysis of south-eastern Iberian megalithic populations: the cemeteries of El Barranquete and Panoría. Archaeological and Anthropological Sciences 11:3681–3698. https://doi.org/10.1007/s12520-018-0769-5

Duday H. 2006. L'Archéothanatologie ou l'archéologie de la mort. Translated by Knüsel. In: Gowland RL, Knüsel CJ, editors. Social archaeology of funerary remains. Oxford: Oxbow Books: 30–56.

Esparza-Arroyo Á, Delibes de Castro G, Velasco Vázquez JV, Cruz Sánchez PJ. 2008. Historia de un golpe en la cabeza: Sobre el enterramiento calcolítico del Hoyo 197 de El Soto de TovillaTudela de Duero Valladolid. BSAA arqueología 74:9–48. http://uvadoc.uva.es/handle/10324/9166

Esparza-Arroyo Á, Velasco Vázquez J, Sánchez Polo AS. 2020. Manipulación de restos humanos en el Bronce Medio meseteño: el fragmento fronto-facial hallado en el yacimiento de La Huelga Dueñas Palencia. Complutum 311:49–69.

Esparza-Arroyo A, Sánchez-Polo A, Velasco-Vázquez J. 2018. Damaged Burials or Reliquiae Cogotenses? On the Accompanying Human Bones in Burial Pits Belonging to the Iberian Bronze Age. Archaeologies 14(3):346–376. https://doi.org/10.1007/s11759-018-9351-0

Estremera Portela MS. 2003. Primeros agricultores y ganaderos en la Meseta Norte: el Neolítico de la Cueva de la Vaquera Torreiglesias Segovia. Valladolid Junta de Castilla y León arqueología en Castilla y León 11.

Etxeberría F, Herrasti L. 2007. Los restos humanos del enterramiento de San Juan ante Portam Lantinam Laguardia Álava: caracterización de la muestra tafonomía y paleopatología. In: San Juan ante Portam Latinam: una inhumación

colectiva prehistórica en el Valle Medio del Ebro. Memoria de las excavaciones arqueológicas 1985 1990 y 1991. Vitoria-Gasteiz: Fundación José Miguel de Barandiarán y Diputación Foral de Navarra: 159–280.
Fabián García J. 1995. El aspecto funerario durante el Calcolítico y los inicios de la Edad del Bronce en la Meseta Norte. Salamanca: Ediciones de la Universidad de Salamanca.
Fabián García J, Blanco-González A. 2012. Cuatro enterramientos calcolíticos en hoyo del Cerro de la Cabeza Ávila. Complutum 231:99–120.
Ferembach D, Schwidetzky I, Stloukal M. 1980. Recommendations for age and sex diagnoses of skeletons. Journal of Human Evolution 9:517–549.
Fernández-Crespo T. 2015. Aportación de la Arqueoantropología a la interpretación de la dinámica sepulcral de las tumbas megalíticas de Cameros La Rioja España. Trabajos de Prehistoria 722:218–237. https://doi.org/10.3989/tp.2015.12152
Fernández-Crespo T. 2017. New Evidence of Early Chalcolithic interpersonal violence in the Middle Ebro Valley Spain: two arrowhead injuries from the Swallet of Las Yurdinas II. International Journal of Osteoarchaeology27:76–85. https://doi.org/10.1002/oa.2445
Fernández-Crespo T, Ordoño J, Schulting RJ. 2021. Subsistence shift and socio-economic response to cultural and climate changes among north-central Iberian megalithic groups. Journal of Archaeological Science 133 105451. https://doi.org/10.1016/j.jas.2021.105451
Fernández-Crespo T, Schulting RJ. 2017. Living different lives: Early social differentiation identified through linking mortuary and isotopic variability in Late Neolithic/ Early Chalcolithic north-central Spain. PLoS ONE 12(9): e0177881. https://doi.org/10.1371/journal.pone.0177881
Fernández-Crespo T, Schulting Rick J, Ordoño J, Duering A, Etxeberria F, Herrasti L, Armendariz Á, Vegas JI. 2018. New radiocarbon dating and demographic insights into San Juan ante Portam Latinam a possible Late Neolithic war grave in North-Central Iberia. American Journal of Physical Antrhopology 166: 760–771. https://doi.org/10.1002/ajpa.23465
Fernández-Eraso J, Arévalo Muñoz E, Camarero Arribas C, Múgica-Alustiza JA. 2019. El campaniforme en la Rioja Alavesa. In: Delibes de Castro G, Guerra Doce E, editors. Un brindis por el príncipe!: el vaso campaniforme en el interior de la Península Ibérica 2500–2000 AC: Museo Arqueológico Regional Comunidad de Madrid: exposición del 9 de abril al 29 de septiembre 2019. Museo Arqueológico Regional. p. 279–296.
Fernández-Eraso J, Múgica-Alustiza JA. 2013. The megalithic station of the Rioja Alavesa: chronology origins and utilisation cycles. Zephyrus 71:89–106.
Fernández-Eraso J, Múgica-Alustiza JA, Fernández-Crespo T. 2015. Sobre la cronología de los ídolos-espátula del dolmen de San Martín Laguardia-Álava. ARPI arqueología y Prehistoria del Interior Peninsular 3:257–271.
Fontanals-Coll M, Eulàlia Subirà M, Díaz-Zorita Bonilla M, Gibaja JF. 2017. First insight into the Neolithic subsistence economy in the north-east Iberian Peninsula: paleodietary reconstruction through stable isotopes. American Journal of Physical Anthropology 1621:36–50. https://doi.org/10.1002/ajpa.23083
García Sanjuán L, Mora Molina C, Lozano Medina A, Aranda Jiménez G. 2018. La cronología radiocarbónica del dolmen de Menga. In: García Sanjuán L, Mora Molina C, editors. La Intervención de 2005 en el Dolmen de Menga. Temporalidad Biografía y Cultura Material en un Monumento del Patrimonio Mundial. Junta de Andalucía - Universidad de Sevilla, Sevilla. p. 307–322
García Sanjuán L, Sánchez Díaz F, Morell Rovira B. 2022. The "Megalithisation" of Iberia: A Spatio-Temporal Model. L'anthropologie 126 5. https://doi.org/10.1016/j.anthro.2022.103072
Garrido-Pena R. 2000. El Campaniforme en la Meseta Central de La Península Ibérica c. 2500–2000 AC. Vol. 892. BAR International Series.
Gil-Merino R, Moreno Gallo M, Delibes de Castro G, Villalobos García R. 2018. Luz para ver y ser vista: los efectos de la iluminación solar durante el solsticio de invierno en los dólmenes de corredor de la provincia de Burgos. Munibe Antropologia-Arkeologia 69:157–175.
Goslar T, Czernik J, Goslar E. 2004. Low-energy ^{14}C AMS in Poznań radiocarbon laboratory, Poland. Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms 223:5–11. https://doi.org/10.1016/j.nimb.2004.04.005
Guiry EJ, Hillier M, Boaventura R, Silva AM, Oosterbeek L, Tomé T, Valera AC, Cardoso JL, Hepburn JC, Richards MP. 2016. The transition to agriculture in south-western Europe: new isotopic insights from Portugal's Atlantic coast. Antiquity 90:604–616. https://doi.org/10.15184/aqy.2016.34
Jones A. 2005. Lives in fragments? Personhood and the European Neolithic. Journal of Social Archaeology 52:193–224. https://doi.org/10.1177/1469605305053367
Knüsel CJ, Robb J. 2016. Funerary taphonomy: an overview of goals and methods. Journal of Archaeological Science: Reports 10:655–673. https://doi.org/10.1016/j.jasrep.2016.05.031
Lanting JN, van der Plicht J. 1998. Reservoir effects and apparent ^{14}C ages. Journal of Irish Archaeology 9:151–165.
Laporte L, Bueno Ramírez P. 2019. On the Atlantic shores. The origin of megaliths in Europe? In:

Laporte L, Large JM, Nespoulous L, Scarre C, Steimer-Herbet T, editors. European Megaliths. Archaeopress: 1173–1192.

Leisner G, Leisner V. 1943. Die Megalithgraber der Iberischen Halbinsel: Der Suden. Walter de Gruyter. Berlín

Linares-Catela JA. 2022. Radiocarbon chronology of dolmens in the Iberian southwest: architectural sequence and temporality in the el Pozuelo megalithic complex Huelva Spain. Radiocarbon 64(5):989–1064. https://doi.org/10.1017/RDC.2022.48

Linares-Catela JA, Vera-Rodríguez JC. 2021. La cronología de la necrópolis de La Orden-Seminario (Huelva). Temporalidades de la actividad funeraria en las sepulturas del III milenio cal BC. Trabajos de Prehistoria 78(1): 67–85. https://doi.org/10.3989/tp.2021.12265

Linares-Catela JA, Vera-Rodríguez JC. 2023. Small Houses of the Dead: A Model of Collective Funerary Activity in the Chalcolithic Tombs of Southwestern Iberia. La Orden-Seminario Site (Huelva, Spain). Open Archaeology 9(1): 20220294. https://doi.org/10.1515/opar-2022-0294

Longin R. 1971. New method of collagen extraction for radiocarbon dating. Nature 230(5291): 241–242. https://doi.org/10.1038/230241a0

López de Calle C, Ilarraza JA. 1997. Fases Antiguas del megalitismo de Cameros La Rioja: caracterización y cronología. In: Rodrígez Casal A, editor. O Neolítico atlántico e as orixes do megalitismo. Universidad de Santiago de Compostela. Santiago de Campostela. p. 415–428.

López Plaza S, Luis Francisco J, Salvador Mateos R. 2000. Megalitismo y vías de comunicación en el SO Salmantino. In: Jorge VO, editor. Actas do 3o Congresso de arqueología Peninsular. Pré-Historia Recente da Península Ibérica Porto 2000:271–288.

LozanoMedina Á, Aranda Jiménez G. 2018. Long-lasting sacred landscapes: the numerical chronology of the megalithic phenomenon in south-eastern Iberia. Journal of Archaeological Science: Reports 19:224–238. https://doi.org/10.1016/j.jasrep.2018.02.038

Maluquer de Motes J. 1960. Nuevos hallazgos de la cultura del vaso campaniforme en la Meseta. Zephyrus 11:119–130.

Martín Vela R, Delibes de Castro G, Municio González L. 2021. Megalitos al norte de La sierra de Guadarrama: primicias de La excavación del dolmen de Santa Inés en Bernardos Segovia. Cuadernos de Prehistoria y arqueología de La Universidad Autónoma de Madrid 472:1–28. https://doi.org/10.15366/cupauam2021.47.2.001

Masset C. 1971. Erreurs systématiques dans la détermination de l'âge par les sutures crâniennes. Bulletins et mémoires de La Société d'anthropologie de Paris 7(1):85–105.

Masset C. 1972. The megalithic tomb of la Chaussée-Tirancourt. Antiquity 46184:297–300.

Masset C. 1973. La Démographie des populations inhumées: Essai de paléodemographie. L'Homme 4(4):95–131.

Masset C. 1987. Le recrutement d'un ensemble funéraire. En Duday H. y Masset C. 1987: Anthropologie physique et archéologie: méthodes d'études des sépultures. Paris: Editions du CNRS. Paris Editions du CNRS. p. 111–134.

Meadows J, Barclay A, Bayliss A. 2007. A short passage of time: the dating of the Hazleton Long Cairn revisited. Cambridge Archaeological Journal 17:45–64 https://doi.org/10.1017/S0959774307000169

Meadows J, Rinne C, Immel A, Fuchs K, Krause-Kyora B, Drummer C. 2020. High-precision Bayesian chronological modeling on a calibration plateau: the Niedertiefenbach gallery grave. Radiocarbon 62(5):1261–1284. https://doi.org/10.1017/RDC.2020.76

Meindl RS, Lovejoy CO. 1985. Ectocranial suture closure: A revised method for the determination of skeletal age at death based on the lateral-anterior sutures. American Journal of Physical Anthropology 68(1):57–66. https://doi.org/10.1002/ajpa.1330680106

Millard AR. 2014. Conventions for reporting radiocarbon determinations. Radiocarbon 56(2):555–559. https://doi.org/10.2458/56.17455

Moreno Gallo M, Delibes de Castro G, Villalobos García R, Basconcillos Arce J. 2020. Tumbas de gigantes: dólmenes y túmulos en la provincia de Burgos. Burgos: Diputación Provincial de Burgos.

Moreno Gallo M. 2004. Megalitismo y geografía. Análisis de los factores de localización espacial de los Dólmenes de La provincia de Burgos. Studia Archaeologica 93. Valladolid: Universidad de Valladolid.

Moreno Gallo M, Delibes de Castro G, López Sáez JA, Manzano Rodríguez S, Villalobos García R, Fraile Vicente A, Bastoncillos Arce J. 2010–2012: Nuevos datos sobre una alineación de menhires en el norte de Burgos: el yacimiento de Las Atalayas en Avellanosa del Páramo Burgos. Sautuola 16–17:71–93.

Moreno Gallo M, Delibes de Castro G, Villalobos García R, Santa Cruz del Barrio A, Basconcillos Arce J. 2021. Territorio megalítico. Burgos: Agrupació de Municipios Territorio Megalítico Burgos. Ayuntamiento de Los Altos Sargentes de La Lora Tubilla del Agua y Valle de Sedano.

Murail P, Bruzek J, Houët F, Cunha E. 2005. DSP: A tool for probabilistic sex diagnosis using worldwide variability in hip-bone measurements. Bulletins et mémoires de la Societé d'Anthropologie de Paris 17(3–4):167–176. https://doi.org/10.2458/56.17455

O'Leary MH. 1988. Carbon isotopes in photosynthesis. Bioscience 385:328–336. https://doi.org/10.2307/1310735

Osaba B, Abásolo JA, Uribarri JL, Liz C. 1971. El dolmen de Porquera de Butrón, en la provincia de Burgos. Noticiario Arqueológico Hispano XV: 77–108. Madrid.

Osterholtz AJ, Baustian KM, Martin DL, Potts DT. 2014. Commingled human skeletal assemblages: Integrative techniques in determination of the MNI/MNE. In: Osterholtz AJ et al., editors. Commingled and disarticulated human remains. Springer New York. p. 35–50.

Palomino ÁL. 1990. Nuevas aportaciones al conocimiento del fenómeno megalítico de la provincia de Zamora. En I Congreso de Historia de Zamora Zamora 1990 II: 173–200.

Pérez Arrondo C, Rodanés Vicente JM. 1979. Excavaciones en la zona dolménica de Peña Guerra Nalda Rioja. Cuadernos de Investigación Geografía e Historia 5(2):75–94.

Piotrowska N, Goslar T. 2002. Preparation of bone samples in the Gliwice radiocarbon laboratory for AMS radiocarbon dating. Isotopes in Environmental and Health Studies 38(4): 267–275. https://doi.org/10.1080/10256010208033272

Reimer PJ, Austin WE, Bard E, Bayliss A, Blackwell PG, Ramsey CB, et al. 2020. The IntCal20 Northern Hemisphere radiocarbon age calibration curve 0–55 cal kBP. Radiocarbon 62(4):725–757.

Renfrew C. 1976. Megaliths territories and populations. In: Acculturation and continuity in Atlantic Europe.

Richards MP, Hedges REM. 1999. Stable isotope evidence for similarities in the types of marine foods used by Late Mesolithic humans at sites along the Atlantic coast of Europe. J Archaeol Sci 26(6):717–722. https://doi.org/10.1006/jasc.1998.0387

Richards MP, Schulting RJ, Hedges REM. 2003. Sharp shift in diet at onset of Neolithic. Nature 425–366. https://doi.org/10.1038/425366a

Robb J. 2016. What can we really say about skeletal part representation, MNI and funerary ritual? A simulation approach. Journal of Archaeological Science: Reports 10:684–692. https://doi.org/10.1016/j.jasrep.2016.05.033

Rocha, L, Morgado, P. 2020. Duas novas datações para contextos funerários do Sul de Portugal: a Anta da Serrinha (Monforte). Scientia Antiquitatis 4(2):105–116.

Rojo-Guerra MÁ. 1990. Monumentos megalíticos de La Lora Burgalesa: Exégesis del emplazamiento. Boletín Del Seminario de Estudios de Arte y arqueología: BSAA 52:53–63.

Rojo-Guerra MÁ. 1993. El fenómeno megalítico en La Lora burgalesa [unpublished PhD thesis]. Universidad de Valladolid.

Rojo-Guerra MÁ, Kunst M, Garrido-Pena R, García-Martínez de Lagrán I, Morán Dauchez G. 2005. Un desafío a la eternidad: tumbas monumentales en el valle de Ambrona. En arqueología en Castilla y León Vol. 14. Junta de Castilla y León. Consejería de Educación y Cultura.

Roksandic, M. (2002). "Position of skeletal remains as a key to understanding mortuary behavior." En Haglund, W. D. y Sorg, M. H. (Eds.): Advances in forensic taphonomy: method, theory, and archaeological perspectives: 99–117.

Santa Cruz del Barrio A. 2022. Caracterización antropológica y temporalidad de los sepulcros megalíticos de La Lora Burgos [unpublished PhD thesis]. Universidad de Valladolid.

Santa Cruz del Barrio A, Delibes de Castro G, Villalobos García R. 2020a. Sobre la impronta campaniforme en los dólmenes de La Lora Burgos: dataciones de C-14 y naturaleza funeraria. En Estudios y recuerdos In Memoriam Prof. Emilio Illarregui Gómez. IE Universidad. p. 23–39.

Santa Cruz del Barrio A, Martín-Gil J, Delibes de Castro G, Martín-Ramos P. 2021. A Rubia spp.-based red pigment on bones from the megalithic passage grave of El Moreco Huidobro Burgos Spain. Archaeometry: 1–16. https://doi.org/10.1111/arcm.12707

Santa Cruz del Barrio A, Villalobos García R, Delibes de Castro G. 2020b. Nueva serie de dataciones radiocarbónicas sobre hueso humano para el dolmen de Los Zumacales Simancas Valladolid. Reflexiones sobre la temporalidad del fenómeno megalítico en la Meseta Norte. Trabajos de Prehistoria 771:130–147. https://doi.org/10.3989/tp.2020.12250

Scarre C. 2010. Rocks of ages: tempo and time in megalithic monuments. European Journal of Archaeology 132:175–193. https://doi.org/10.1177/1461957110370731

Scarre C, Arias P, Burenhult G, Fano M, Oosterbeek L, Schulting R, et al. 2003. Megalithic chronologies. BAR International Series 1201:65–114.

Scheuer L., Black, S. 2000. Developmental Juvenile Osteology. London: Academic Press.

Schiffer MB. 1986. Radiocarbon dating and the old wood problem: the case of the Hohokam chronology. Journal of Archaeological Science 131:13–30. https://doi.org/10.1016/0305-44038690024-5

Schulz Paulsson B. 2019. Radiocarbon dates and Bayesian modeling support maritime diffusion model for megaliths in Europe. Proceedings of the National Academy of Sciences 1169:3460–3465. https://doi.org/10.1073/pnas.1813268116

Sherratt A. 1990. The genesis of megaliths: Monumentality ethnicity and social complexity in Neolithic north-west Europe. World Archaeology 222:147–167.

Silva AM. 2012. Antropologia funeraria e paleobiologia das populaçoes portuguesas (litorais) do Neolítico Final/Calcolítico. Textos universitarios de ciencias sociais e humanas, Fundaçao Calouste Gulbenkian. Lisbon: Fundaçao para a Ciencia e a Tecnologia.

Silva AM, Sousa AC, Boaventura R, Scarre C. 2019. Los huesos olvidados del dolmen de Carrascal (Agualva, Sintra, Portugal). Examinando los restos humanos antiguos. Trabajos de Prehistoria 76(2):345–356. https://doi.org/10.3989/tp.2019.12242

Smith M, Brickley M. 2009. People of the long barrows: life death and burial in the earlier Neolithic. History Press Ltd.

Stuiver M, Pearson GW, Braziunas TF. 1986. Radiocarbon age calibration of marine samples back to 9000 cal yr BP. Radiocarbon 28(2B):980–1021.https://doi.org/10.1017/S0033822200 060264

Stuiver M, Polach HA. 1977. Discussion reporting of ^{14}C data. Radiocarbon 19(3):355–363. https://doi.org/10.1017/S0033822200003672

Tejedor-Rodríguez C. 2014. Reconstruyendo biografías megalíticas: algunos ejemplos de alteraciones estructurales en monumentos megalíticos del valle del Duero/Douro. Actas de La s II Jornadas de Jóvenes Investigadores Del Valle Del Duero. p. 67–86.

Tejedor-Rodríguez C. 2015. La pervivencia de los "usos megalíticos" en el valle del Duero/Douro a lo largo de La Prehistoria reciente IV-II milenio cal. BC [PhD thesis]. Universidad de Valladolid. http://uvadoc.uva.es/handle/10324/17998 consulta 31-1-2020.

Tejedor-Rodríguez C, Rojo-Guerra M, Garrido-Pena R, García de Lagrán I, Palomino A. 2017. "Biografía" de un monumento megalítico: fases de uso y clausura en el dolmen de El Teriñuelo. Zephyrus LXXXIX: 39–61. https://doi.org/10.14201/zephyrus2017793961

Thomas J. 1991. Rethinking the Neolithic. Cambridge: Cambridge University Press.

Ubelaker DH. 1974. Reconstruction of demographic profiles from ossuary skeletal samples: a case study from the tidewater Potomac. Contributions to Anthropology 18:1–79. https://doi.org/10.5479/si.00810223.18.1

Ubelaker DH 1989. Human skeletal remains: excavation, analysis, interpretation. Washington: Washington Taraxacum.

Ubelaker DH. 2007. Enterramientos Humanos: excavación análisis interpretación. In: Etxeberría F, Prieto JL, Roselló J, editors. Munibe Vol. 24. Donostia: Sociedad de Ciencias Aranzadi Zientzi Elkartea.

Van Klinken GJ. 1999. Bone collagen quality indicators for palaeodietary and radiocarbon measurements. Journal of Archaeological Science 266:687–695. https://doi.org/10.1006/jasc.1998.0385

Vijande-Vila E, Díaz-Zorita Bonilla M, Morell-Rovira B, Olalde I, Sánchez-Barba Muñoz LP, Domínguez-Bella S, Emslie SD, Becerra-Martín S, Rubio-Salvador A, Fernández-Sánchez DS, et al. 2022. At the beginnings of the funerary Megalithism in Iberia at Campo de Hockey necropolis. Scientific Reports 12:9431. https://doi.org/10.1038/s41598-022-13014-6

Vijande-Vila E, Domínguez-Bella S, Cantillo Duarte JJ, Martínez López J, Barrena Tocino A. 2015. Social inequalities in the Neolithic of southern Europe: the grave goods of the Campo de Hockey necropolis San Fernando Cádiz Spain. Comptes Rendus Palevol 14(2):147–161. https://doi.org/10.1016/j.crpv.2014.11.004

Vílchez Suárez M, Aranda Jiménez G, Díaz-Zorita Bonilla M, Robles Carrasco S, Sánchez Romero M, Milesi García L, Esquivel Sánchez, FJ. 2023. Burial taphonomy and megalithic ritual practices in Iberia: the Panoría cemetery. Archaeological and Anthropological Sciences 15:18. –https://doi.org/10.1007/s12520–023-01716-5

Villalobos García R. 2014. The megalithic tombs of the Spanish Northern Meseta. Material political and ideological ties between the Neolithic people and their territory. Préhistoires Méditerranéennes Colloque 1–17. http://pm.revues.org/1047

Villalobos García R. 2016a. Una aproximación cuantitativa al trabajo destinado a la arquitectura monumentaal en la Prehistoria Reciente de La Meseta Norte española. SPAL 25:43–66. https://doi.org/10.12795/spal.2016i25.02

Villalobos García R. 2016b. Análisis de las transformaciones sociales en la Prehistoria reciente de la Meseta Norte española milenios VI-III CAL AC a través de empleo de la variscita y otros minerales verdes como artefactos sociotécnicos. Studia Arqueológica 101. Universidad de Valladolid.

Villalobos García R, Delibes de Castro G, Moreno Gallo MÁ, Basconcillos Arce J. 2014. The megalithic Golden Crescent. An approach to one space in Northern Burgos Spain which hosted the adoption and evolution of megalithism. In: Maximiano GA, Ríos-Garaziar J, editors. Debating Spatial Archaeology. p. 131–142.

Ward GK, Wilson S.R. 1978. Procedures for comparing and combining radiocarbon age determinations: a critique. Archaeometry 20(1):19–31. https://doi.org/10.1111/j.1475-4754.1978.tb00208.x

Whittle A, Barclay A, Bayliss A, McFadyen L, Schulting R, Wysocki M. 2007a. Building for the dead: events processes and changing worldviews from the thirty-eighth to the thirty-fourth centuries cal. BC in Southern Britain. Cambridge Archaeological Journal 17:123–147. https://doi.org/10.1017/S0959774307000200

Whittle A, Bayliss A, Wysocki M. 2007b. Once in a lifetime: the date of the Wayland's Smithy Long Barrow. Cambridge Archaeological Journal 17:103–121. https://doi.org/10.1017/S0959774307000194

https://doi.org/10.1017/RDC.2024.19 Published online by Cambridge University Press

Wysocki M, Bayliss A, Whittle A. 2007. Serious Mortality: The Date of the Fussell's Lodge Long Barrow. Cambridge Archaeological Journal 17:65–84. https://doi.org/10.1017/S0959774307000170
Wysocki M, Griffiths S, Hedges R, Bayliss A, Higham T, Fernandez-Jalvo Y, Whittle A. 2013. Dates, Diet, and Dismemberment: Evidence from the Coldrum Megalithic Monument, Kent. Proceedings of the Prehistoric Society 79:61–90. https://doi.org/10.1017/ppr.2013.10
Zapatero, MP. 2015. El Neolítico en el Noroeste de la Cuenca del Duero: el yacimiento de la Velilla en el Valle del Valdavia (Palencia) [PhD thesis]. Universidad de Valladolid.
Zapatero MP, Esparza A. 2018. ¿Continuidad o ruptura en una tumba megalítica? Modelado bayesiano de las dataciones radiocarbónicas del yacimiento de La Velilla (Osorno, prov. Palencia). BSAA arqueología LXXXIV:54–70. https://doi.org/10.24197/ba.LXXXIV.2018.54-70