Algar do Bom Santo: a research project on the Neolithic populations of Portuguese Estremadura (6th-4th millennia BC)

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Nota prévia

O presente artigo tem como propósito a apresentação do conteúdo, âmbito e objectivos do projecto de investigação consignado ao estudo da gruta-necrópole neolítica do Algar do Bom Santo (freguesia da Abrigada, concelho de Alenquer). Quando pertinentes, incluem-se também breves descrições preliminares dos resultados dos trabalhos de campo realizados neste sítio pela Dra. Cidália Duarte entre 1994 e 2001.

No seu essencial, o texto que se segue corresponde à componente técnico-científica do projecto submetido a financiamento à Fundação para a Ciência e a Tecnologia, razão pela qual, aliás, se encontra redigido em língua inglesa.

As principais alterações tiveram em vista a introdução de um maior desenvolvimento das diversas partes que compunham o conjunto da candidatura, assim como o seu encadeamento numa sequenciação lógica. Acrescentou-se ainda uma bibliografia mais completa e algumas fotografias obtidas aquando dos referidos trabalhos de campo.

Conquanto não financiado por aquela Fundação, outros apoios institucionais entretanto conseguidos permitiram garantir, pelo menos, o cumprimento de parte das análises laboratoriais pretendidas (ver adiante). Os resultados a obter serão publicados em revistas especializadas nas diversas áreas científicas que compõem o projecto, e serão levados a cabo pelos especialistas nesses domínios que o integram, estando também planeada uma publicação final, de cariz monográfico.

Aim and scope of the project

The Algar do Bom Santo is a cave site located in the eastern slope of the Montejunto Mountain, facing the Tagus valley at a 350 meters a.s.l., north of Lisbon (Fig. 1). It preserves a vast necropolis, only preliminarily studied and published, where 121 individuals lying on the surface were listed and an indeterminate number is buried beneath them. According to the accompanying material culture items and available radiocarbon dates, the most extensive use of the cave as necropolis took place in the Late Neolithic.

Therefore, Bom Santo cave is a site with an enormous scientific potential to the understanding of several questions regarding the Neolithic populations of Portuguese Estremadura, such as physical anthropology, demography, funerary rituals and associated votive items, and subsistence strategies. For these reasons, a research project was designed to obtain raw data and to explicitly address those questions. This project will take place between 2007 and 2009, and will count with the participation of several specialists on distinct scientific domains.

The main effort of the project focus on the abundant materials already excavated and stored at the *Museu Nacional de Arqueologia* (Lisbon). Research will thus rely mostly on laboratorial analyses, whether on bioanthropology and archaeology, or on the domain of chemistry. Within the latter, the objective is to direct dating osteological material by AMS, run isotopic analyses for the reconstitution of palaeodiets and to determine possible migration processes. The latter are particularly important given the controversies arose by some interpretative models where the existence of such processes in the Neolithic of Portugal is assumed, and, on the other hand, given its novelty in the research of Portuguese Prehistory. Human osteological material from other Neolithic sites will also be sampled and analyzed in order to obtain a sound framework for comparisons in those specific domains and far-reaching conclusions.

The goal of the archaeological excavations planned for Bom Santo is to complete observations made during the field work carried out at the site under the direction of C. Duarte, which remain unpublished for the most part (Duarte and Arnaud, 1996; Duarte, 1998). Therefore, excavations will take place only if strictly necessary to solve any question resulting from the study of the material kept at the museum. In effect, given the excellent state of preservation of the site, the philosophy underlying the excavations has a conservationist perspective and aims its classification as archaeological reserve for future research.

Algar do Bom Santo: brief description of the site

As mentioned above, only two brief syntheses on the work done at the site have been published. Duarte and Arnaud (1996) provide a first presentation of the site, describing its main funerary features, artefacts, and the 11 sectors in which the 285 m^2 of the cave were divided; the main novelty in Duarte's (1998) paper concerns the radiocarbon dating of some burials.

The cave can be briefly described as a karstic complex with several galleries connected by irregular corridors forming three main distinct levels, of which only the two upper ones have revealed archaeological remains of human occupations (Fig. 2).

Discovered intact in 1993 by a team of spelunkers, the systematic excavation of some of the sectors took place in 1994, 1995, and 1997 in the so-called *Sala A* ("Room A") and *Sala B* ("Room B"); a fourth field campaign had to be done in 2001 after the violation of the cave by treasure hunters. The topography of the cave was drawn (Fig. 2), and the whole area was subjected to a detailed recording of the surface finds by photography and video, a task that also served to estimate a minimum number of individuals. Its good state of preservation is due in part to the collapse of the entrance immediately after its use as a necropolis in the Neolithic. The best testimony of this fact is the finding of a few Neolithic footprints, of one or more individuals, still preserved in the sediments of a two square metres sector of the cave. These footprints have been recorded through its moulding into an artificial support for future analysis (Fig. 3). As acknowledged above, the 121 individuals counted on the surface can only represent a minimum estimate; the exact number is still unknown given the extension of the surface covered with human remains and the fact that many more are still buried. As an example of this fact, Duarte (1998: 111) mentions that in *Sala B* one square meter was excavated in order to exhume what was thought to be a single burial; however, this has resulted on the recover of osteological material belonging to three more adults and three sub-adults!

About 30 more or less complete skeletons have been exhumed during the excavations. Except for a MA thesis on cranial diseases and traumas (McGarvey, 2002), no systematic publications exist on bioanthropology, although part of the analyses have already been started. The votive artefacts include polished stone axes and adzes, bone perforators, adornments – bracelets made of limestone and shell of *Glycymeris glycymeris* (Fig. 4), discoid beads in schist and perforated shells of *Triva* –, flint blades, and microlithic trapezes. Interestingly, pottery is very scarce (only a few fragments and an intact pot were recorded), and other Late Neolithic artefacts common in burial contexts, such as schist slates and arrow points with bifacial retouch, are not present. The absence of the typical engraved slate plaques in Bom Santo is a fact also found in other Neolithic cave sites, mainly in Ossos (Oosterbeek, 1993b), Barrão (Carvalho *et al.*, 2003), layer 3 of Feteira (Zilhão, 1984), and Lugar do Canto (Leitão *et al.*, 1987), in Estremadura, or Escoural (Araújo and Lejeune, 1995), in Alentejo. The reason underlying this difference is still a question of debate, but it may lie on slightly older chronologies for these sites.

Considering the general homogeneity and simplicity of the votive items, significant differences of status among individuals are not explicit, which, in accordance to the almost absence of individualized burials, seem to imply, in the current state of the research, an essentially egalitarian community whose habitation sites are still unknown.

Research guidelines

The origins and history of Prehistoric Archaeology in Portugal is deeply rooted on the excavation of three types of sites: shell middens, Megalithic monuments, and caves. The study of these sites started in mid-19th century and is still one of the most attractive focuses of research nowadays. Although this tendency provided an abundant corpus of data, the corresponding results are for the most part unusable today due to the methodologies employed, inappropriate to the present state of the questions under discussion. Another limitation, of taphonomic nature, is the non-preservation of bone material in the majority of the Megalithic monuments located in regions of acid soils (North Portugal, the Beiras, and Alentejo regions). These facts constitute serious obstacles to the acquisition of osteological data (and, therefore, direct data on the populations themselves), and of a chronometric framework based on the direct dating of burials. The available data is thus of uneven quality and has been interpreted according to the theoretical background of its time.

Therefore, the main topics of the project (rituals and funerary practices, absolute chronology, subsistence economy, and detection of migration events) can be outlined as follows.

Rituals and funerary practices

Only in some sites of Estremadura, there is recently recorded stratigraphy and evidence on Neolithic rituals and funerary practices. These seem to indicate a major trend that should be tested in the context of the Bom Santo project:

- During the Early Neolithic (c. 5.500-4.500 cal BC), there were only individual disposals on the surface of caves, or individual pit burials in open air habitation sites. The former situation is recorded at the caves of Picoto (Carvalho, 2007), N.ª S.ra das Lapas – where the only burial, of a child, was individualized by a circle of stones around a shallow pit, in layer B (Oosterbeek, 1993a) –, and Caldeirão (Zilhão, 1992), all located in Estremadura. In the latter cave, according to Zilhão, the scattering of the votive artefacts and osteological material "[…] suggests that the bodies were not placed inside protective burial features but simply laid down on the floor, while the location of the clusters of cranial material suggests that the heads were probably placed against the walls of the cave" (Zilhão, 1993: 23). At the sites of Pedreira de Salemas (Cardoso *et al.*, 1996), in Estremadura, and Castelo Belinho, excavated by M. V. Gomes, in the Algarve, individual burials took place in the settlements themselves, using the limestone bedrock or excavated pits, respectively.

- In the Middle and Late Neolithic (c. 4.500-3.000 cal BC), probably as a consequence of the so-called "Neolithic demographic transition" (Bocquet-Appel, 2005), collective burials seem to become widespread as the Megalithic monuments of passage grave type expand, mainly throughout the regions of the interior. It is also commonly accepted that a previous stage, characterized by cistoid chambers for individual burials, may have taken place immediately before the building of the mentioned large dolmens, but detailed field records are not numerous and absolute chronologies are virtually unknown for these earlier monuments. In Estremadura, passage graves are scarce and seem to date, alongside rock-cut tombs, to the Late Neolithic. This is because the several caves located in the limestone massifs of the region were used as necropolises during the Neolithic. Despite the lack of modern excavations in well-preserved caves, the mentioned widespread of collective burials is clearly recorded in sites with good quality field data such as Ossos (Oosterbeek, 1993b), Barrão (Carvalho *et al.*, 2003), Lugar do Canto (Leitão *et al.*, 1987), and especially Bom Santo. In these sites, there are numerous secondary burials, which resulted sometimes in the formation of very dense ossuaries. These ossuaries implied the previous stripping off the flesh or a first deposition of the bodies (buried or not) before its definitive disposal, which in turn was sometimes proceeded by complex rituals (e.g., the use of fire, the powdering with red ochre, and the covering of the bodies and/or bones with earth from outside the caves). Due to exceptional favourable conditions for bone preservation, collective burials are also known in Late Neolithic or slightly later sites located in the Alentejo and Algarve. Such is the case mainly of Escoural cave (Araújo and Lejeune, 1995), the *tholos* of Perdigões (Valera *et al.*, 2000; Duarte *et al.*, 2006), the dolmen 3 of Santa Margarida (Gonçalves, 2003), and the rock-cut tomb of Monte Canelas (Parreira and Serpa, 1995; Silva, 1997).

The excavations that took place at Bom Santo permitted to conclude, on a preliminary basis, that this is in fact a collective necropolis where the bodies were disposed on the cave's surface (which, in a strict sense, makes the term "burial" not fully appropriate to describe this ritual). The use of the available space in the various sectors of the cave was complex: there are single individuals, sometimes in partial anatomical connection, and accumulations of bones of several individuals.

Currently, the interpretation for these two main rituals concerning the disposal of the bodies is the following:

- Given the fact that the accumulations are spatially distinct from each other, they may be understood as ossuaries of individuals tied by kinship (families) or, alternatively, as ossuaries of the distinct agro-pastoral communities settled in the sur-

rounding territories, if one considers the extension of the cave and the great number of individuals it contains. Clearly, both hypothesis need further research – for example, through DNA tests in the first case – and have important consequences concerning our understanding of the social organization of the Neolithic populations in the region. However, the hypothesis of Bom Santo being a common burial ground of several communities seems interesting given the total absence of differences in the material culture, which in turn may reflect some political integration at this higher level of social organization.

- The individualized burials may be a first stage of the funerary rituals consisting on the deposition of the bodies for the clearing of the flesh, before the definitive accumulation of the bones in structured ossuaries. Alternatively, the reason for a different treatment of these individuals may lay on their distinctive social status. This possibility seems unlikely given, as mentioned above, the homogeneity of the votive items and the absence of any other distinctive feature. One possible exception is that of an adult female disposed on a narrow chamber, whose only votive artefact is a polished stone axe, a sector therefore named *Sala da Caçadora* ("Hunter's Room").

Two particular aspects of the rituals deserve mention. The first is the arrangement of skulls independently of the infra-cranial elements. The latter are accumulated near the skulls, being the long bones particularly notorious in terms of visibility. Stones in semi-circles sometimes limit these arrangements of skulls, a feature that resembles the *Sala da Entrada* ("Entrance Room") of Algar do Barrão, a Late Neolithic cave necropolis where two skulls and a pot turned upside-down were in a niche separated from highly fragmented bones by a limestone slab (Carvalho *et al.*, 2003: Fig. 3).

Another feature recorded in Bom Santo is the building of "terraces" with stones in order to level the ground; these features also served as independent sections of the ossuary purposely made to contain bones separated according to anatomical parts.

Absolute chronology

The available chronology for the Neolithic in Estremadura counts with a fair number of radiocarbon dates, but the boundaries of some chronological stages are still blurred and the detailed phasing of some specific items of material culture are open questions. This is because many samples were composed by bulk charcoal of unknown species; moreover, these have sometimes doubtful or highly subjective associations to the contexts that are intended to be dated. In the case of burial sites, many dates were obtained using human bones, which provides a direct dating of the necropolises. However, in the case of bone assemblages recovered with no or little stratigraphic record (as happened in the excava-

tions that took place between the 19th and mid-20th centuries), dates serve only as blind tests, and the reconstitution of the original contexts is virtually impossible. Soares (1999) has pointed out the existence of the same problems in what respects the determination of the foundation, construction, and abandonment phases of Megalithic monuments in Centre and North Portugal. In order to avoid these limitations, only AMS dates on bones from well-defined contexts will be carried out in the framework of the Bom Santo project.

Until now, six radiocarbon determinations on human bones have been obtained for the Bom Santo necropolis (Duarte, 1998). Five out of those six indicate the third quarter of the 4th millennium (between c. 3.600 and 3.200 cal BC) as the time period in which the cave was used (Fig. 5), a period usually considered to correspond to the Late Neolithic. The date ICEN-1181, younger than the ones obtained by AMS technique, has less reliability given its low percentage of colagene (Duarte, 1998).

These results need, however, further confirmation based on a larger set of AMS determinations, using samples from distinct stratigraphic provenance in order to determine the full length of the occupation. The find of a decorated potsherd, typical of the Evolved Early Neolithic (first half of the 5th millennium), requires a fine chronological (and functional) definition of the context where this piece comes from.

Subsistence economy

Patterns of Neolithic subsistence economy are not well known in the case of Estremadura due to the lack of excavated contexts with organic preservation. Remains of edible plants were not discovered yet and significant mammalian osteological assemblages are restricted to a few sites; this is the case especially of Caldeirão cave (Rowley-Conwy, 1992), the rock shelter of Pena d'Água (Valente, 1998), and the large Late Neolithic open air settlement of Leceia (Cardoso and Detry, 2001/02). The data provided by the fauna from these sites, among other less important assemblages, indicates a general predominance of wild species (mainly wild boar and red deer) during the early stages of the Neolithic. This conclusion, however, is probably distorted by the fact the only caves and rock shelters were excavated and open-air sites, where more permanent occupations may have taken place, are for the moment unknown. In the case of the Late Neolithic site of Leceia, in effect, domestic species are almost exclusive (it totals 99%) and, according to the cited authors, the increasing number of sheep and goats are considered proof of the ongoing development of the so-called "secondary products revolution".

At Bom Santo, however, the fauna is attested only indirectly, as bone artefacts (perforators). The exception is the find of several sheep / goat phalanges (Fig. 6), with no other associated bone elements. This pattern probably indicates the use of skins of those species as clothes – which should, therefore, be understood as shrouds, given the nature of this context – from which the feet of the animals were not removed. In sum, only through

stable isotope analyses ($\delta^{13}C$ and $\delta^{15}N$) we can obtain some insights on the subsistence strategies of the population buried at Bom Santo.

So far, the use of isotope analyses to reconstruct subsistence patterns in Neolithic Estremadura was meant mainly to evaluate the transition to farming, by comparing the Muge shell middens with some Neolithic burial caves (Lubell *et al.*, 1994). This has shown a clear shift from a balanced terrestrial and aquatic economy during the Mesolithic to a full terrestrial-based economy in the Neolithic. The main aspects of this model were recently confirmed by other studies, although different in their scales of analysis and specific goals. According to the $\delta^{13}C$ values so far obtained alongside the radiocarbon dates, the human group buried at Bom Santo also seems to confirm this exclusively terrestrial subsistence pattern. Notwithstanding, some interesting exceptions to this general model seems to have existed. Umbelino (2006) has shown that the Mesolithic individuals buried in the upriver section of the Sado river (Amoreiras and Cabeço do Pez) had terrestrial-based subsistence strategies, while in the sites located downriver (Arapouco) there is evidence for a higher dependence on foods of aquatic origin. On the other hand, the $\delta^{13}C$ values obtained to the burials of Pedreira de Salemas and Costa do Pereiro (Carvalho, 2007), in Estremadura, suggest an important aquatic component in these, respectively, Early and Middle Neolithic groups. These examples may be the tip of the iceberg in what concerns the existence of Neolithic communities more or less dependent on aquatic resources throughout the period, depending on particular geographical and ecological features of their economic territories.

Clearly, these situations – that resembles the so-called "*Touch not the fish*" debate concerning the diet-revolution proposed by Schulting and Richards (2001) to characterize the Mesolithic-Neolithic transition in northern Europe – needs further research, namely by increasing the number of samples analysed in every site and by broadening the geographical scale of approach to the issue. In this sense, the isotopic analysis of human burials from coastal and riverside sites located in the Estremadura, Alentejo and Algarve would be essential to test hypotheses.

Migration events

An important question presently under debate concerns the existence of processes of migration and movements of people during the Neolithic. This is particularly the case of the earliest communities of Estremadura: according to Zilhão (1993), a pioneer colonization may have been the process under which the transition to farming occurred in this region in c. 5.500 BC. To portrait the Neolithic-Chalcolithic transition, Gonçalves (1995) defend a model of coexistence of highly mobile Neolithic groups exploiting vast territories of Estremadura and Alentejo, on one hand, and the emergence of communities settled in fortified sites and dealing with copper metallurgy and the "secondary products revolution", on the other.

Exchange networks between Estremadura and more inland regions are presumed to exist, at least, since the Early Neolithic, but projects specifically oriented to this questions have never been made. In what concerns the later stages of the Neolithic and the Chalcolithic, those exchange networks are attested by provenance studies on polished tools from sites located in the Estremadura – which were made of amphibolites from Alentejo (Cardoso and Carvalhosa, 1995) – and, on the other hand, by the presence of seashells in some sites located in Alentejo (Gonçalves, 1995). However, the question on the scale of mobility of the Neolithic groups through the above-mentioned routs – or even its very existence – is still an open debate.

The analysis of this phenomenon will be carried out in this project through the use of the $^{86}Sr/^{87}Sr$ isotope ratio in human bones. This consists on a relatively recent developed method, with no prior use in Portuguese Archaeology, according to which the comparison of the strontium isotope signatures in archaeological human skeletons with regional geochemical features may permit the distinction between "locals" and "immigrants" at a given region (for a recent detailed description of the method, see Bentley, 2006). This may produce far-reaching inferences concerning the mobility and the social organization of the communities under study if variables such as age, gender, and status (if recognizable archaeologically) of the individuals analysed are taken into consideration.

This method, if well succeeded in this project, may stimulate its use in the future in Portugal, whether on the same topic or on other historical contexts where specific questions on the presence of immigrants may be raised and need independent confirmation. Such may be the case for the inhabitants of the Chalcolithic fortified settlements or the Phoenician colonies, the evaluation of the real percentage of people arriving during the Roman, Wisigothic or Arab periods. Or even, in more recent times, the question of the introduction of African slaves to work in the rice plantations of the Sado river, among many other possible topics.

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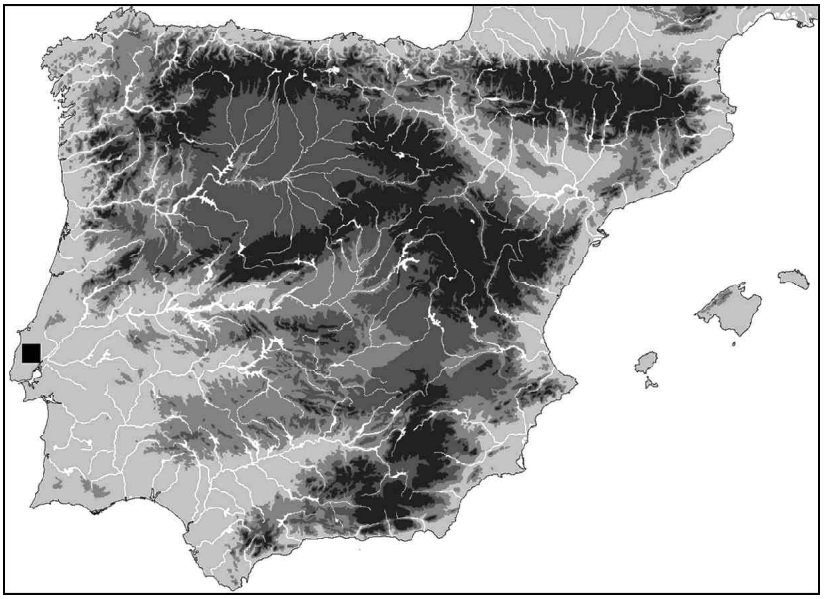

FIGURE 1. Location of Algar do Bom Santo in the Iberian Peninsula.

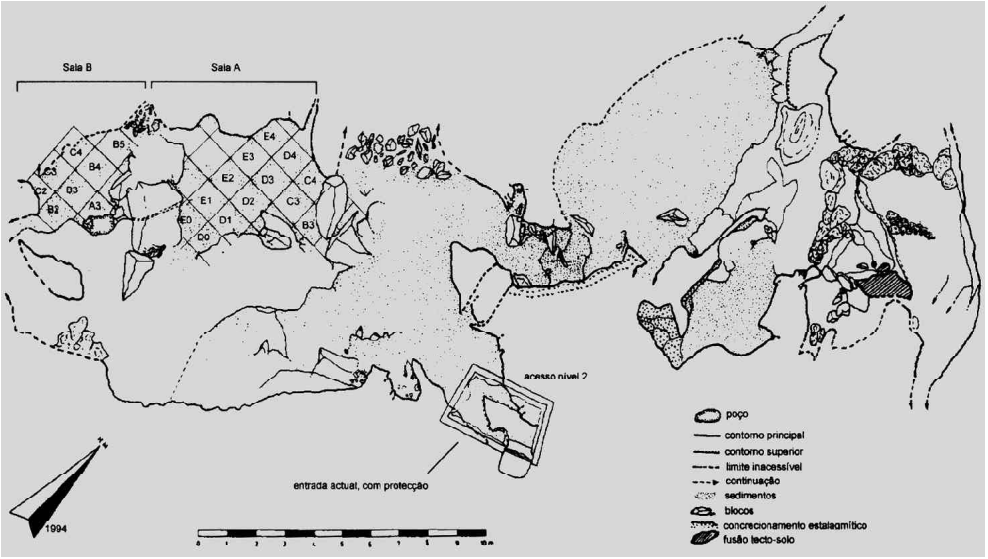

FIGURE 2. Topography of the upper level of Bom Santo cave, with indication of the units excavated in *Sala A* and *Sala B* (Duarte, 1998: Fig. 1).

FIGURE 3. Photos of the footprints found inside Bom Santo cave, and of their record by moulding (photos by C. Duarte).

FIGURE 4. Individual disposal at the *Sala das Pulseiras* ("Bracelets' Room"): detail of a mandible and a radius or ulna with a bracelet still *in situ* (photo by C. Duarte).

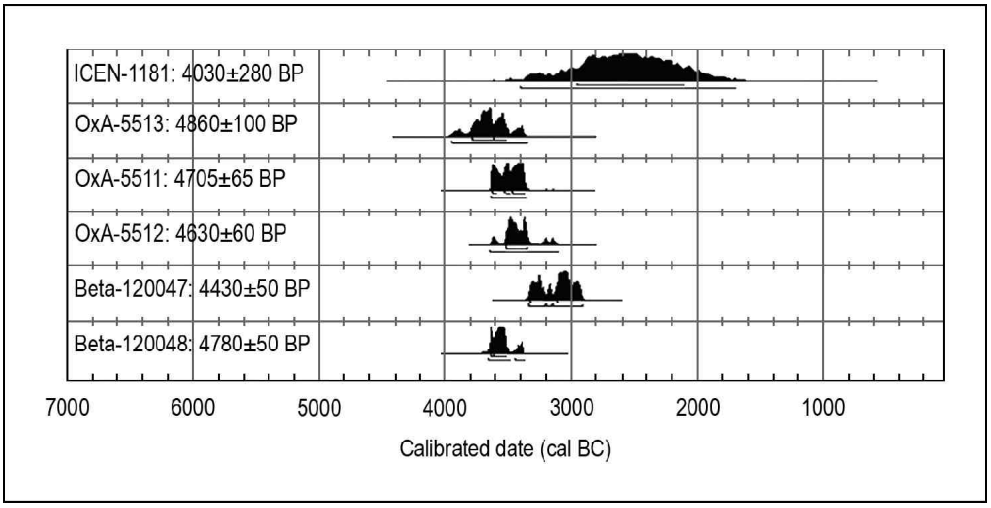

FIGURE 5. Available radiocarbon dates for Algar do Bom Santo.

FIGURE 6. Phalanges of sheep and/or goat, probably remnant of clothes or shrouds (photo by C. Duarte).