# Pescadores e Mariscadores Mesolíticos do Sudoeste Português

## Novos dados

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**Direcção** Carlos Tavares da Silva
Joaquina Soares

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**Desenho de campo** Jorge Costa†, Júlio Costa

**Desenho de materiais** Ana Castela, Fernanda Sousa e Teresa Rita Pereira

**Mapas** Paula Covas

**Fotografia** Arquivo MAEDS, Joaquina Soares e Rosa Nunes

**Inventário** Fernanda Fino, Teresa Rita Pereira, Susana Duarte e Virgínia Ajuda

**Restauro** Paula Palmeira

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**Informações e permutas**
Museu de Arqueologia e Etnografia do Distrito de Setúbal
Avenida Luisa Todi, 162 - 2900-451 Setúbal (Portugal)
Tel.: +351 265 239 365/265 534 029
E-mail: maeds@amrs.pt
Site: http://maeds.amrs.pt/
Blog: http://maedseventosactividades.blogspot.pt/

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/Associação de Municípios da Região de Setúbal

# LISTA DE AUTORES

**Ana Beatriz Santos**
Faculdade de Letras da Universidade de Lisboa – UNIARQ.
absantos5986@gmail.com
https://orcid.org/0000-0002-8932-5594

**Carlos Tavares da Silva**
MAEDS - Museu de Arqueologia e Etnografia do Distrito de Setúbal/ AMRS - Associação de Municípios da Região de Setúbal. Faculdade de Letras da Universidade de Lisboa – UNIARQ.
ctavaressilva@gmail.com
https://orcid.org/0000-0002-0447-9237

**Cleia Detry**
Faculdade de Letras da Universidade de Lisboa - UNIARQ.
cleiadetry@campus.ul.pt
https://orcid.org/0000-0002-5359-2500

**João Pedro Tereso**
CIBIO, Centro de Investigação em Biodiversidade e Recursos Genéticos, InBIO Laboratório Associado; BIOPOLIS Program in Genomics, Biodiversity and Land Planning. Centro de Estudos Interdisciplinares, Universidade de Coimbra. UNIARQ - Centro de Arqueologia da Universidade de Lisboa. MHNC - UP - Museu de História Natural e da Ciência da Universidade do Porto.
joaotereso@cibio.up.pt
https://orcid.org/0000-0003-0871-8255

**Joaquina Soares**
MAEDS - Museu de Arqueologia e Etnografia do Distrito de Setúbal/ AMRS - Associação de Municípios da Região de Setúbal. Faculdade de Letras da Universidade de Lisboa – UNIARQ.
joaquinasoares1@gmail.com
https://orcid.org/0000-0001-5957-3354

**José Mateus**
Double-u Replay Associação. Centro de Tecnologia, Restauro e Valorização das Artes (Techn&Art).

**Paula Fernanda Queiroz**
Double-u Replay Associação. Centro de Tecnologia, Restauro e Valorização das Artes (Techn&Art).
paulafernandaqueiroz@gmail.com

**Susana Duarte**
MAEDS - Museu de Arqueologia e Etnografia do Distrito de Setúbal/ AMRS - Associação de Municípios da Região de Setúbal.
cea.maeds@amrs.pt
https://orcid.org/0000-0001-6071-9680

# ÍNDICE

# Harvesting the sea on the Portuguese Southwest: the Mesolithic shellfish gatherers of Castelejo (Algarve)

Joaquina Soares*
Carlos Tavares da Silva**

*L'exploitation des bancs de coquillages s'apparente d'ailleurs bien plus à la gestion d'un troupeau domestique qu'à celle de populations d'animaux sauvages.*[1]

## Introduction

The multi-layered shell midden of Castelejo, located on the seashore of the southwest of Iberia, provides new insights into the Mesolithic seasonal exploitation strategies of coastal resources, at the long way to neolithization. This open-air site has a well-preserved stratigraphic record, with no archaeologically visible changes in subsistence activities for over two millennia. In fact, the long-term Holocene stratigraphic sequence did not reveal major cultural gaps in the enduring Mesolithic way of life, even when aridity increased with the 8.2 Ka cal BP cold event (Alley and Agustsdottir, 2005) or when the first Neolithic externalities arrived (ceramics).

The most relevant aspects of Castelejo are its seasonal occupation rhythm and economic specialization in the exploitation of marine invertebrates, namely molluscs gathering. Except for the early Mesolithic layers, that include scarce remains of land mammals, exclusively marine invertebrates constitute the entire faunal record of the other layers. In accordance with this narrow subsistence spectrum a rather limited set of tools had been recovered (lithic industry).

Besides shellfish gathering, the site had probably played other roles in the whole regional taskscape, namely as a land marker of community identity and territoriality. The long *durée* of this specialized campsite supports the hypothesis of a stable regional Mesolithic settlement system articulated by a short-range logistic mobility (*sensu* Binford, 1980). In fact, shellfish gathering cannot be seen strictly as a "tiding-over" strategy when other better-ranked food resources (hunting) were scarce, but also as a very wise and conservationist strategy of territory exploitation, avoiding resources stress, so taking into account the ecosystem diversity and seasonality. Ultimately, some Neolithic cultural novelties, namely ceramics have been adopted without visible changes in subsistence patterns.

*MAEDS - Museu de Arqueologia e Etnografia do Distrito de Setúbal/AMRS - Associação de Municípios da Região de Setúbal. Faculdade de Letras da Universidade de Lisboa – UNIARQ. joaquinasoares1@gmail.com | https://orcid.org/0000-0001-5957-3354
** MAEDS - Museu de Arqueologia e Etnografia do Distrito de Setúbal/AMRS - Associação de Municípios da Região de Setúbal. Faculdade de Letras da Universidade de Lisboa – UNIARQ. ctavaressilva@gmail.com | https://orcid.org/0000-0002-0447-9237
1 - Chenorkian, 1989, p. 48.

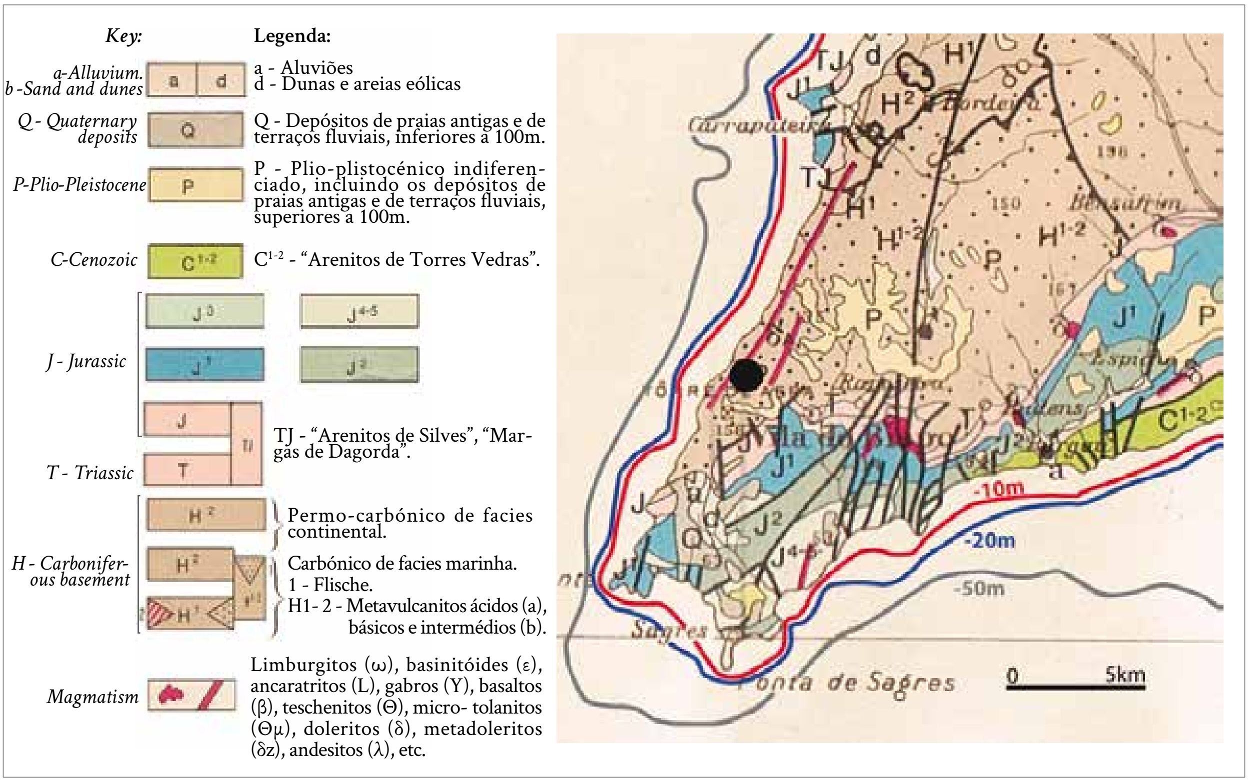



Fig. 1 – Location of the Mesolithic site of Castelejo in a geological map, scale 1:50.000 (F. 51B, Carta Geológica de Portugal. Direção Geral de Minas e Serviços Geológicos). The bathymetrics -50m to -10m display the submerged coastal plain by the Flandrian transgression after the early Mesolithic to the late Mesolithic/early Neolithic.

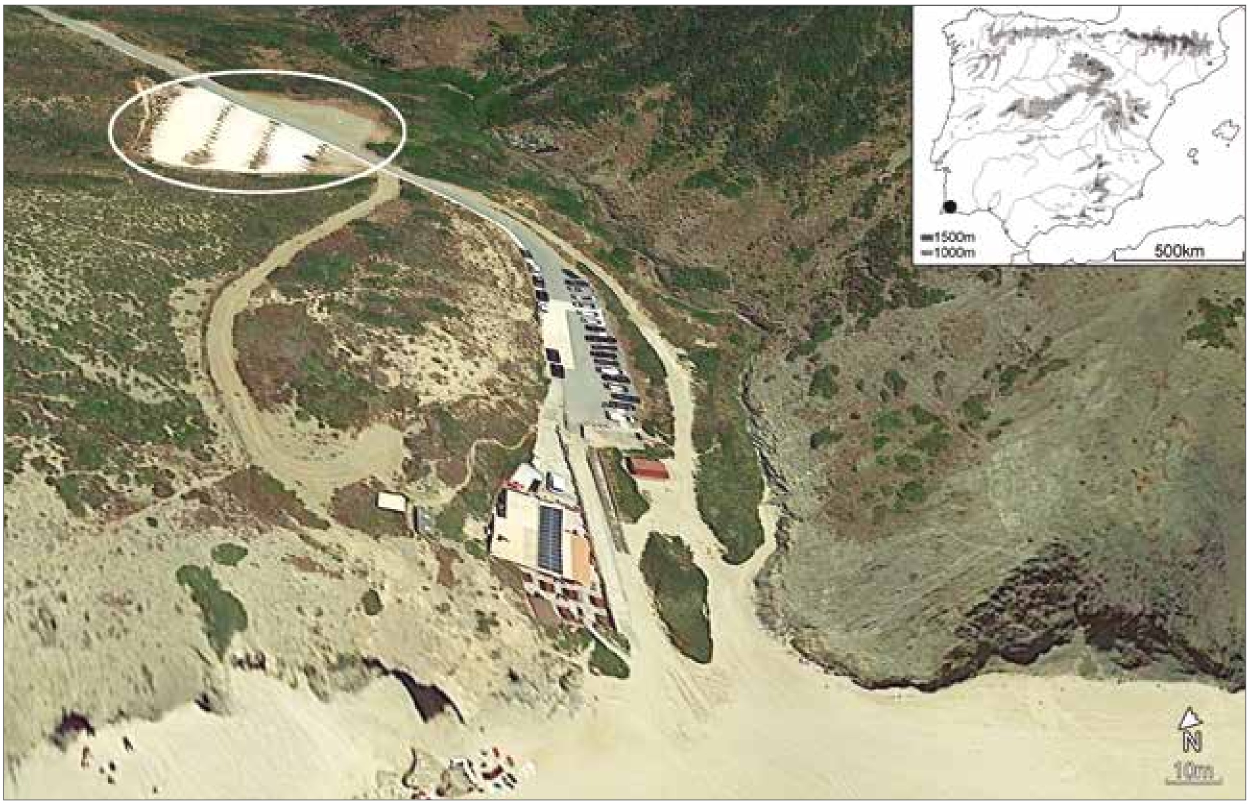


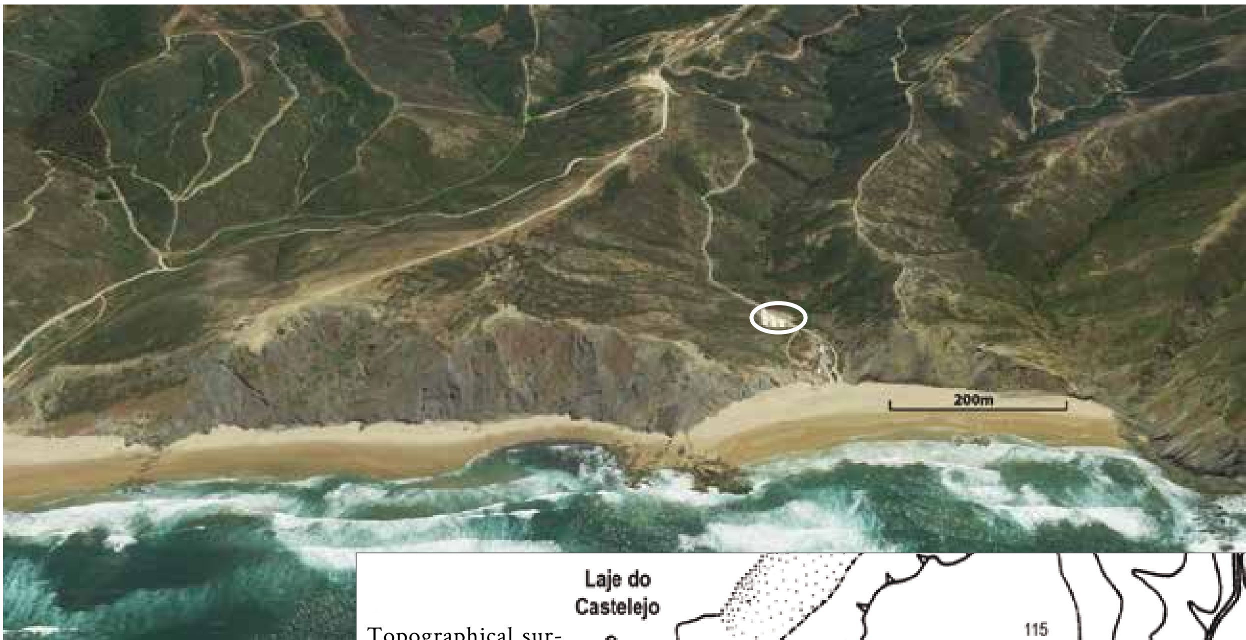

Fig. 2 – Location of Castelejo (Vila do Bispo) on the western coast of Algarve and in the Iberian Peninsula. Image from Google Earth.

## Location

The shell midden, with about 3000 m$^2$, was partially installed on clay substrate from alteration of Carboniferous schist and greywacke, close to the rivulet A do Marinho, and on carbonated aeolian sandstone at the northern side (Figs. 1-5).

The regional Palaeozoic geology (Zona Sul Portuguesa) consists of intensely folded and lightly metamorphosed Carboniferous turbidites and greywackes. A polycyclic relief submitted to intense erosion, with abrupt slopes and deep incisions of the water streams, characterizes the landscape (Chester and James, 1995). On the right bank of the A do Marinho stream, a Wurmian dune was deposited, over the Carboniferous substratum (Pereira, 1987). That carbonated aeolian sandstone explains the presence of *Olea* sp. and other shrubby vegetation characteristic of carbonated substrate.

The site was excavated on 47m$^2$ under the direction of the authors, between 1985 and 1989 (Fig. 6). The site occupied a sheltered place on a small platform in the lower section of the narrow valley (right bank) of A do Marinho rivulet about 10 km north of the S. Vincent Cape (Tavares da Silva and Soares, 1997). Currently the site is 100 m from Castelejo beach and about 25 m above sea level. A larger coastal plain, about 1-1.5 km wide (in accordance with the bathymetrics of -20m to -10m), now submerged by the Flandrian transgression (Dias, Rodrigues and Magalhães, 1997; Garcia-Artola *et al.,* 2018; Vanney and Mougenot, 1981), suggests the existence of an accessible corridor along the western and southern coast of the Algarve (Fig. 1). So, a pathway along the seashore could link the transverse riverside lines that crossed the high upland and



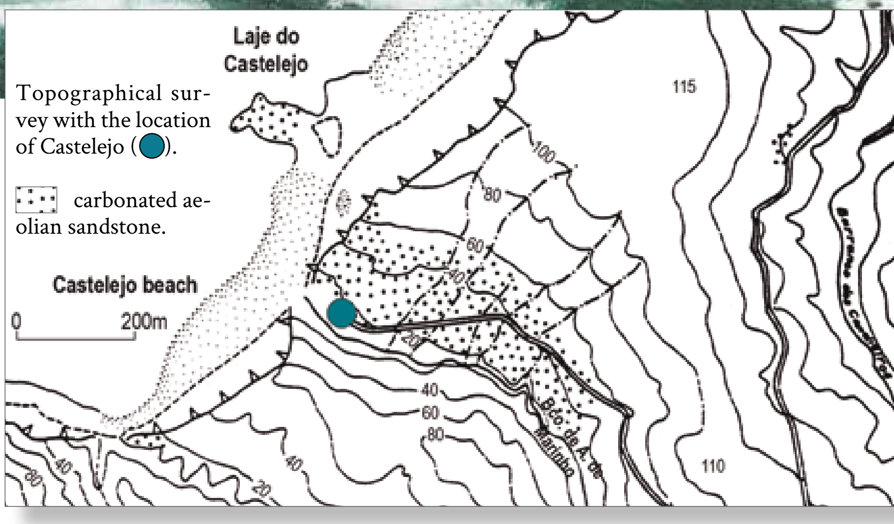




Fig. 3 – The site of Castelejo is surrounded by dark and steep cliffs of the Palaeozoic basement, strongly folded and faulted. The current beach is narrow, but it was larger in the living time of the archaeological site of Castelejo. Indeed, there are remains of consolidated dunes that testify to the last glacial maximum, when a high wind swept the sands of a beach, currently submerged, over the northern bank of the A do Marinho stream. Images from Google Earth and Pereira, 1987.

Fig. 4 - View of Castelejo from east, 2015. Photo by Rosa Nunes.

Fig. 5 - Castelejo beach at the mouth of the rivulet A do Marinho, 2015. Photo by Rosa Nunes.

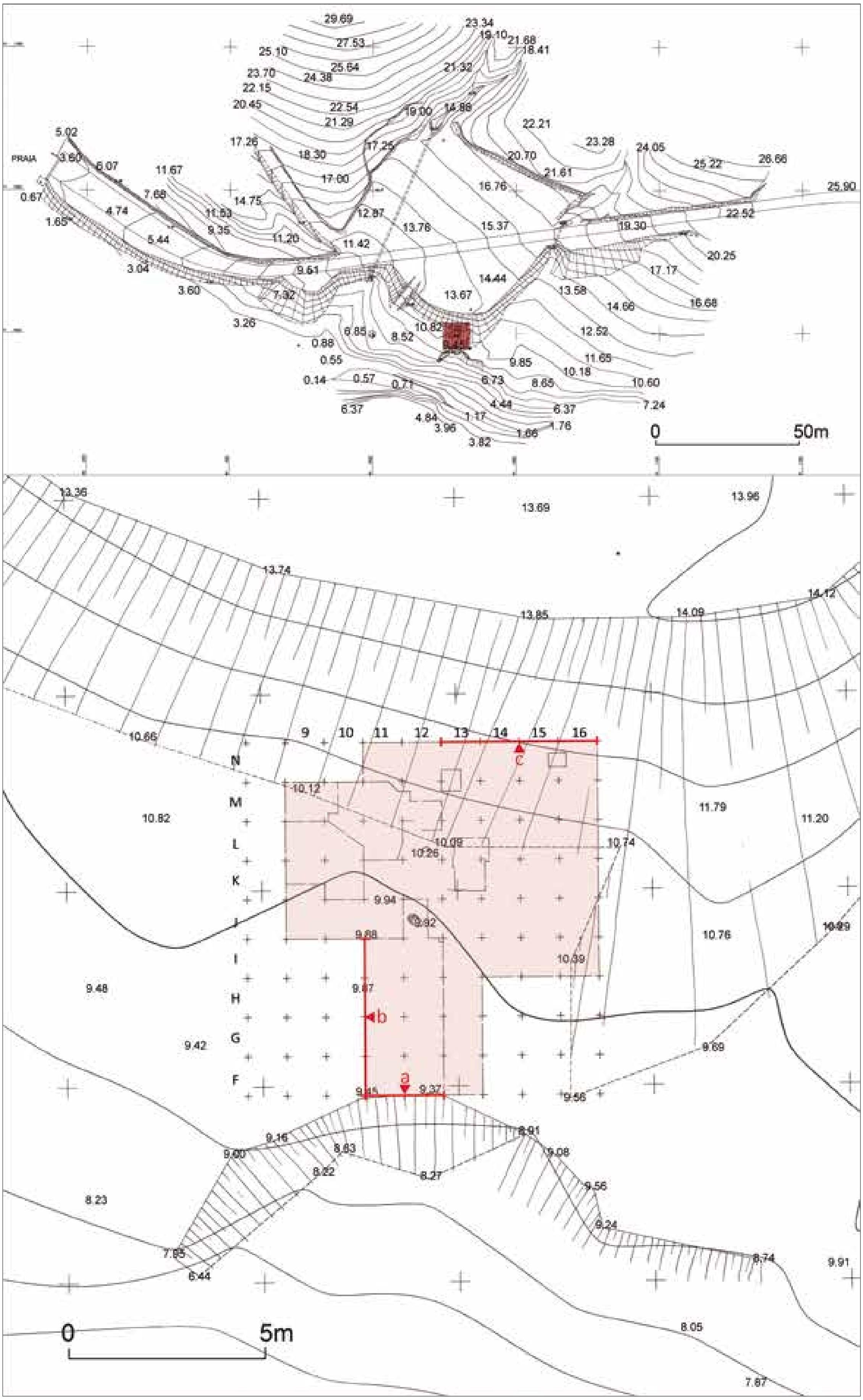



Fig. 6 - Topographical plans of Castelejo with the total area excavated between 1985-1987.
Stratigraphic profiles: a and b - 1985 (Fig. 8); c - 1987 (Fig. 9).

the mountains, composing a network of pathways through which hunter-gatherer communities could appropriate and exploit their territories (Soares and Tavares da Silva 2004, 2018). The metamorphosis of the seascape by postglacial marine transgression, the flooding of large coastal areas to the present coastline, had submerged many missing links of the Mesolithic pathways.

The Southwest Coast offered a diverse marine ecosystem. It has a dominant rocky seabed that generates greater diversity of habitats than sandy substrate. The Mira estuary provides good sheltering and feeding conditions for spawning and for the first stages of growth of juveniles of many species. Some watercourses, like Ribeiras de Melides, Azinhal, Seixe and Aljezur, would have small active estuaries in the Mesolithic (Freitas *et al.,* 2003, 2011) that contributed positively to biodiversity and biological productivity of this littoral (Soares, Mazzucco and Tavares da Silva, 2017, 2021). The summer atmospheric circulation provides upwelling of cold and nutrient-rich waters along the coast, even if its intensity has been very variable (Abrantes 1988, 1991, 2000; Soares 2005); in the transition to the Holocene it decreased; in the Holocene, after the 8.2 ka cal BP event "it dropped below current levels" (Haws and Bicho 2007, p. 40). The diversity and year-round availability of the fish species of the Southwest Coast complemented by shellfish (Marques-Gabriel, 2015; Soares and Tavares da Silva, 2018; Soares, Mazzucco and Tavares da Silva 2017, 2021; Tavares da Silva and Soares, 1997) had been a key factor in subsistence diversification against the supposed decline of foraging returns of higher-ranked resources, namely aurochs and red deer (Davis and Detry 2013).

## Chronological framework

The site of Castelejo could have held a strong meaningful position in the mental map of the western Algarve Mesolithic groups, as indicated by the very long-time span during which the site had been occupied seasonally between *c.* 7900 cal BC (Layer 11/85, Beta-165943; Phase I) and the early Neolithic (layer SB/1985, Beta-168461, Phase IV), at the last quarter of the 6$^{th}$ millennium cal BC. A set of 17 very coherent radiocarbon dates on charcoal and marine shell samples from almost all the stratigraphic unities (7941-7598 to 5375-4990 cal BC, 2$\sigma$) confirms the previous statement (Table 1, Fig. 7). The chronological sequence, from the Boreal to the Atlantic, highlights the long-lasting continuity of the site in a temporary rhythm of use.

## Stratigraphic sequence and site formation

The stratigraphy of the site is quite complex with a maximum thickness of about 3 m. It reveals an alternation between occupational and abandonment phases (Figs. 8-9). The initial installation took place either on clay sediment from the alteration of the schist bedrock, and also on carbonated aeolian sandstone (*terra rossa*). After the construction of flimsy domestic structures for short periods of use, the space became covered by waste very rich in marine shells, forming shell midden layers; the campsite got abandoned. Onwards, the decomposition of the organic waste and the natural deposition of sediments over the anthropogenic layer restored the dwelling conditions for a new occupation. Therefore, this stratigraphic sequence presents unities, in general, constituted by: occupation layer with domestic structures installed on abandonment layer, and superimposed by a shell midden formation. This pattern of site formation had been observed from the bottom to the top of the sequence.

The late Mesolithic and early Neolithic layers (upper layers), more affected by roots and animal intrusions, are very compressed may be because the shell remains preservation is worse than in the middle layers. The carbonate calcium dissolution from thousands of mollusc shells, which cemented the shell midden, leads to the recomposition of its structure (Chenorkian, 1989).

At the beginning, this temporary campsite was established near the rivulet bank that bounded it to the south and so the food waste was thrown onto the slope. As shell middens increased and covered domestic structures the residential core moved northward. In the northern sector of the site (Squares T-X/14), 15 m from the rivulet valley, the stratigraphic sequence showed several habitat layers without shell midden deposits. In the slope of the valley the stratigraphy was thicker and more disaggregated (1985 fieldwork) and it decreased towards the north (1986-1989 fieldworks).

Clayed sediments constituted the abandonment layers of the lower and middle zones of the stratigraphic sequence (layers 3, 5, 7B). Layer 1C (1985 fieldwork) and Layer 1B2 (1987 fieldwork) of the upper stratigraphic zone, are sandy and archaeologically sterile layers.

Table 1 – Castelejo. Radiocarbon dates. A series of 17 radiocarbon dates on charcoal and marine shell samples, from almost all the stratigraphic unities of Castelejo, indicating the long standing of the site, although, used in a seasonal rhythm as the stratigraphic information revealed. Calibration by OxCal v4.4.4. Marine data from Heaton *et al.,* 2020; atmospheric data from Reimer *et al.,* 2020.

| | Context | Lab. Ref | Material | $\delta^{13}C$ ‰ | Date $^{14}C$ (BP) | Calibrated dates (cal BC) (1σ) | (2σ) | |
|---|---|---|---|---|---|---|---|---|
| EARLY MESOLITHIC<br>Phase I | Square H11, Layer 11 1985 | Beta - 165943 | Charcoal. *Olea* sp. | -24.8 | 8720±40 | 7786-7614 | 7941-7598 | |
| MIDDLE MESOLITHIC<br>Phase II | Square N13, Layer 5 1987 | ICEN - 211 | Charcoal | -23.98 | 7970±60 | 7036-6781 | 7051-6689 | |
| | Square N13, Layer 4 B 1987 | ICEN - 213 | Charcoal | -23.59 | 7900±40 | 6821-6660 | 7032-6645 | |
| | Square N13, Layer 4 B 1987 | ICEN - 215 | Charcoal | -23.75 | 7880±40 | 6798-6649 | 7030-6602 | |
| | Layer 4. 1987 | ICEN - 218 | Marine shells *Mytilus* sp. | +1.79 | 8200±60 | 6697-6522 | 6779-6380 | |
| | Square N15, Layer 4 1987 | ICEN - 222 | Marine shells *Patella* sp. | +0.32 | 8190±45 | 6666-6536 | 6724-6388 | |
| | Square N14, Layer 4 1987 | ICEN - 220 | Marine shells *Patella* sp. | +0.39 | 8160±45 | 6626-6507 | 6677-6364 | |
| | Square N15, Layer 4 1987 | ICEN - 216 | Marine shells *Stramonita haemastoma* | +1.65 | 8140±70 | 6624-6466 | 6703-6277 | |
| | Square N14, Layer 4 1987 | ICEN - 214 | Marine shells *Stramonita haemastoma* | +1.89 | 8140±110 | 6682-6426 | 6832-6217 | |
| LATE MESOLITHIC<br>Phase III | Square N14, Layer 2 1987 | ICEN - 745 | Marine shells *Patella* sp. | +0.04 | 7910±60 | 6396-6261 | 6417-6066 | |
| | Layer 2B, 1985 | Beta - 2908 | Charcoal | | 7450±90 | 6407-6239 | 6456-6087 | |
| | Square G12 (western 1/2 square), Layer 2A 1985 | Beta - 499904 | Charcoal (*Olea?*) | -23.8 | 7300±30 | 6217-6105 | 6226-6078 | 8.2 Ka cal BP event |
| | Square I11, Layer 1C 1985 | Beta - 499903 | Charcoal (*Olea* sylvestris) | -22.4 | 7170±30 | 6056-6015 | 6075-5987 | |
| | Square N14, Layer 1B1 1987 | ICEN - 743 | Marine shells *Patella* sp. | +0.31 | 7530±60 | 6008-5882 | 6023-5683 | |
| | Square J12, Layer 1B 1985 | Beta - 496360 | Charcoal (*Pistacia lentiscus; olea europaea)* | -24.3 | 7020±30 | 5980-5881 | 5987-5833 | |
| EARLY NEOLITHIC<br>Phase IV | Square J12, Layer1A, 1985 | Beta-598981 | Charcoal *Pistacia lentiscus* (?) | -24.8 | 6450±30 | 5447-5467 | 5479-5361 | |
| | Square K12, Layer SB Hearth 7; 1985 | Beta - 168461 | Marine shells: *Stramonita haemastoma, Mytilus* sp., *Patella* sp., *Phorcus lineatus* | 0.0 | 6830±60 | 5296-5101 | 5375-4990 | |

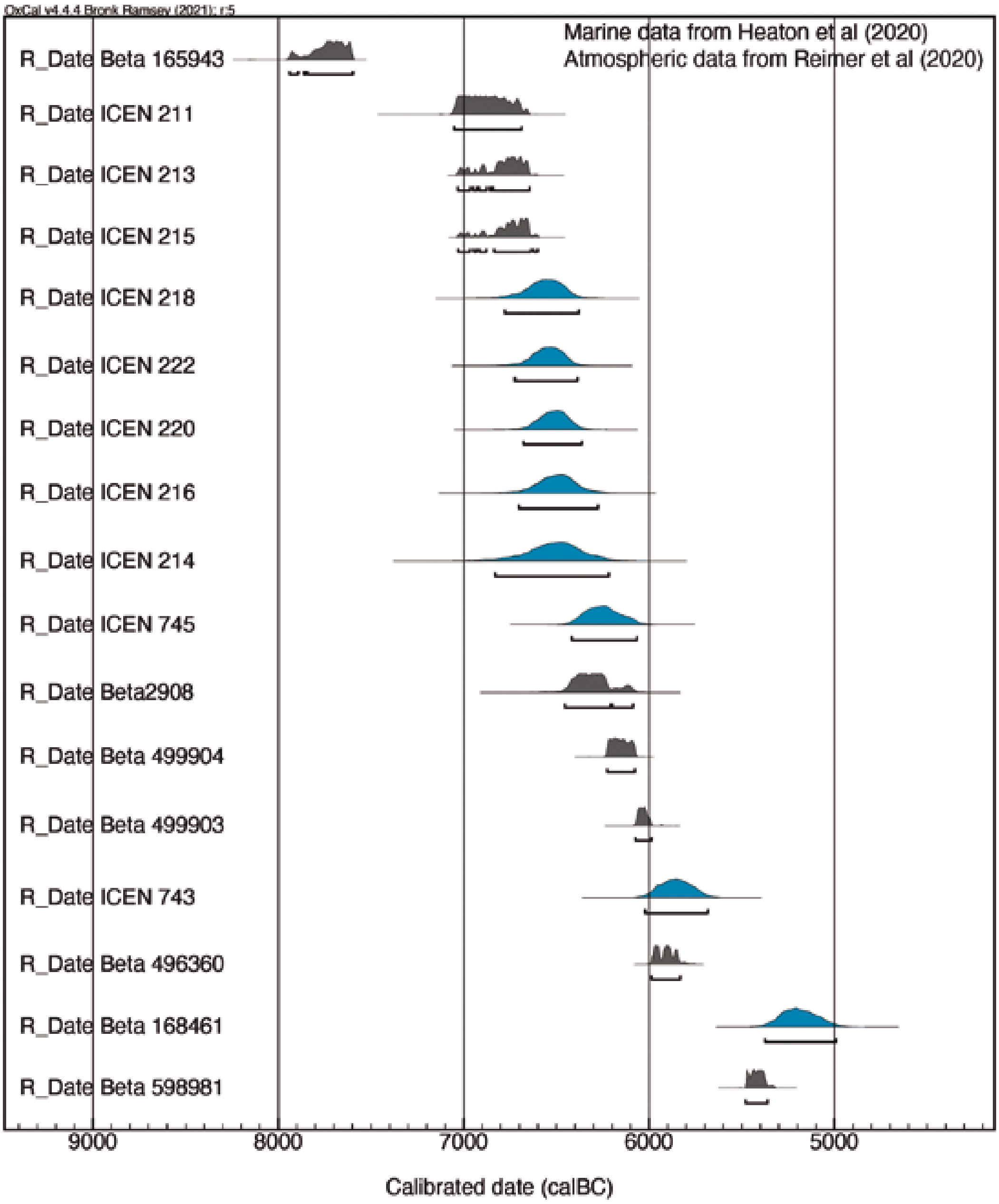



Fig. 7 - Castelejo. Calibration of the radiocarbon dates (OxCal v4.4.4): Marine samples (blue); Charcoal samples (grey).

## A "CORRELATIVE" EVENT OF THE 8.2 KA CAL BP CLIMATIC PERTURBATION IN GREENLAND ?

Between the late Mesolithic (layers 1B-2B/1985) and early Neolithic (SB and 1A layers) no changes in mobility pattern were observed, but Layers 1C (1985 fieldwork) and 1B2 (1987 fieldwork), by their aeolian sand constitution, invoke an abrupt increase in aridity and the degradation of the vegetation cover; therefore the wind blow transported the sand without any transformation from the beach to the archaeological site, a distance of about 100 metres. This biogeographical event had been radiocarbon dated from the end of the 7$^{th}$ millennium cal BC (Table 1). Thus, the sandy Layer 1C of the 1985 fieldwork was radiocarbon dated on a charcoal sample of *Olea sylvestris* (Beta-499903; 7170 ± 30 BP; 6075-5987 cal BC, 2σ), displaying a synchronous result with the return of short-lived cool, dry, and likely windy climatic conditions suggested by the charcoal analysis of the late Mesolithic site of Vale Marim I – Sines (this volume, Queiroz and Mateus). For now, we correlate both contexts with the 8.2 ka cal BP climatic perturbation

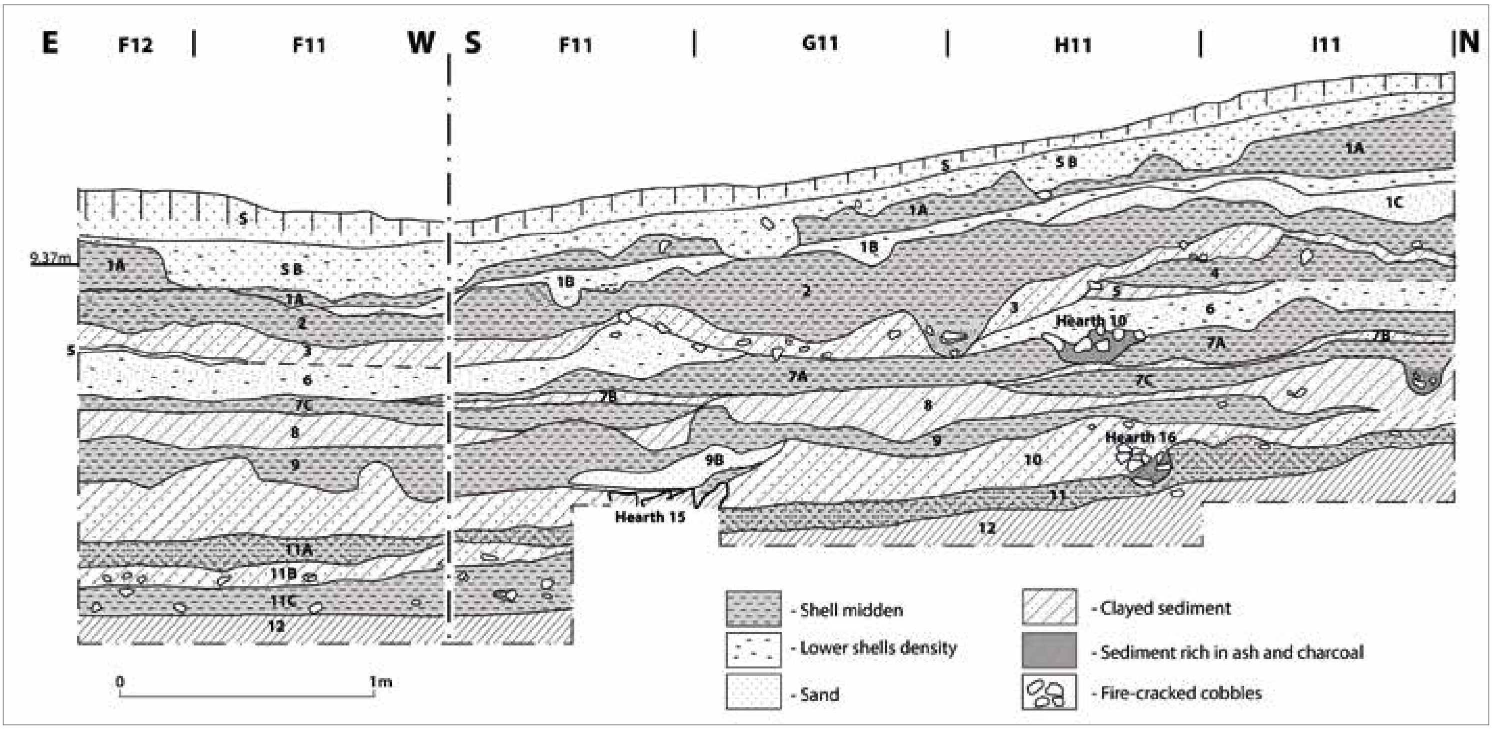



Fig. 8 - Stratigraphic sequence. The stratigraphy is complex with a maximum thickness of about 3 m. It reveals periods of occupation separated by abandonment phases. Fieldwork of 1985.

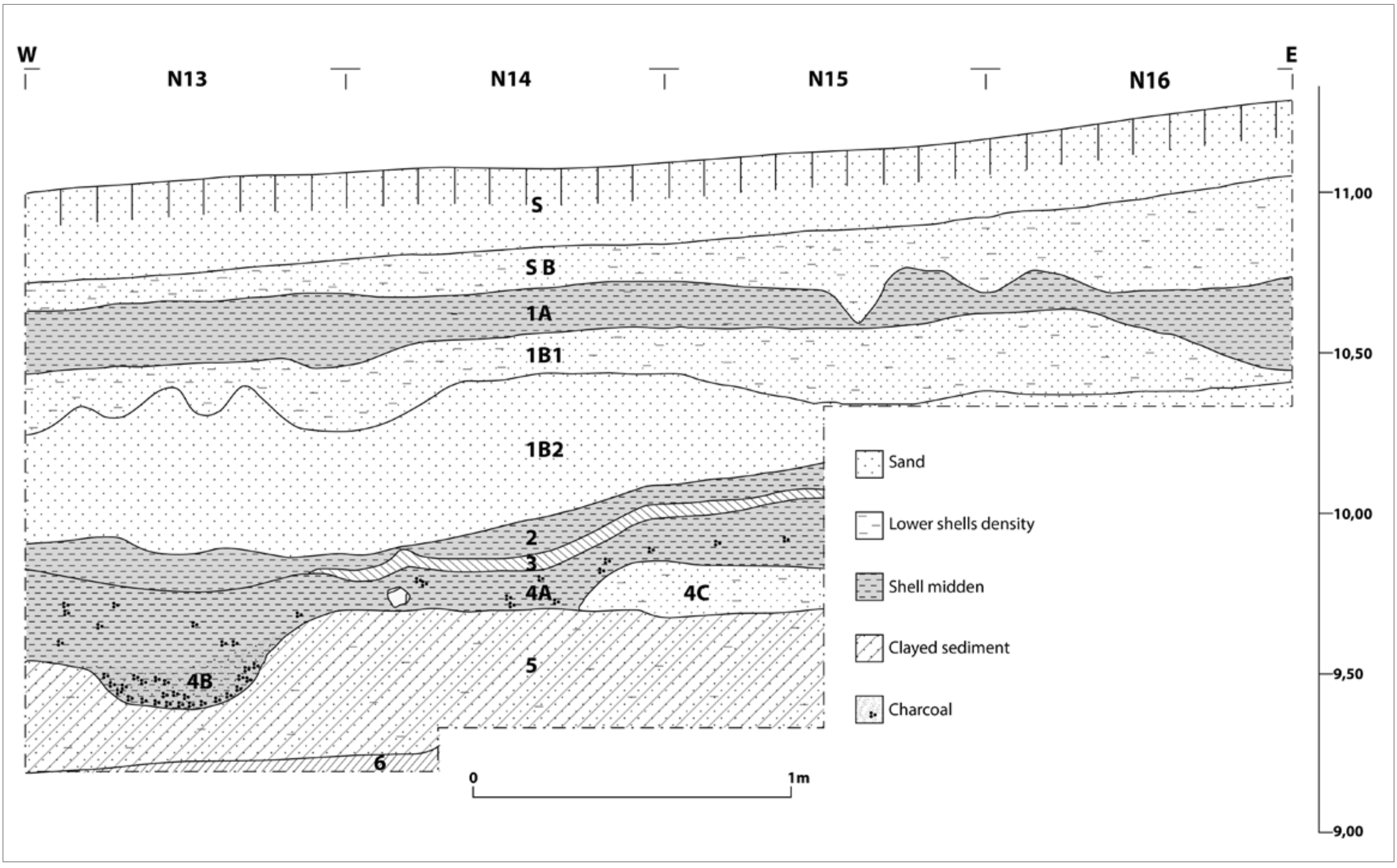



Fig. 9 – Stratigraphic sequence of the fieldwork of 1987.

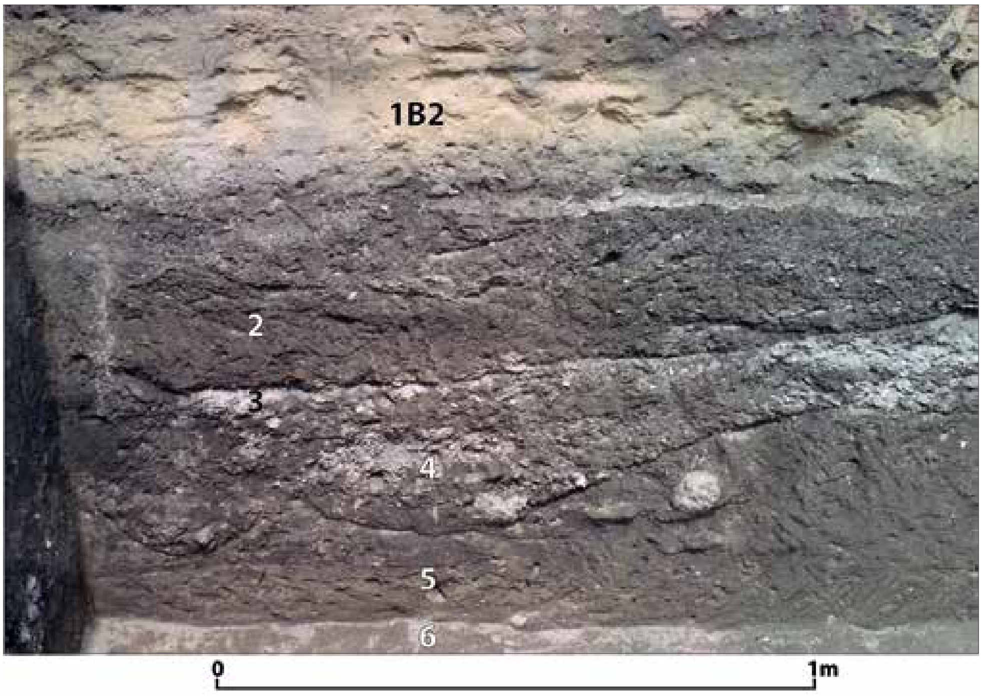



Fig. 10 A – Detail of the sandy eolian Layer 1B2 from the stratigraphic profile of Fig. 9 (fieldwork of 1987).

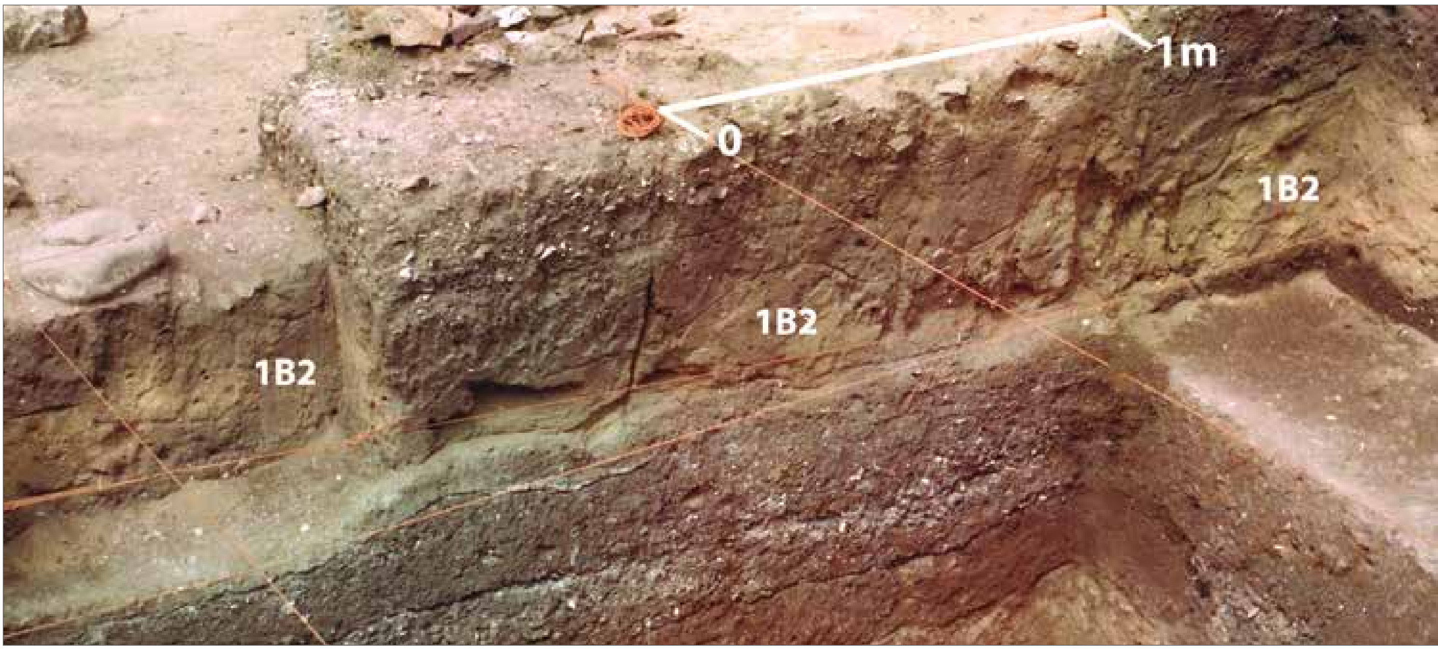



Fig. 10 B – Detail of the Layer 1B2 constituted by eolian sand, which corresponds to an episode of abandonment with increased aridity and degradation of the vegetation cover. Fieldwork of 1987/88. Stratigraphic western profile. Squares M13 and N13.

in the ice-core record of Greenland (e.g., Dansgaard, 1987), even if temporalities are not just coincident. The largest deviations for the main indicators of the 8.2 ka cal BP event occurred between *ca.* 8.4 and *ca.* 8.0 ka, peaking at *ca.* 8.25 ka or *ca.* 7500 $^{14}$C yr BP (Alley and Agustsdottir, 2005).

## Vegetation dynamics

For the regional scale there are relevant pollen sequence records and palaeoecological information (Turon, Lézine and Denèfle, 2003; Fletcher, Boski and Moura, 2007; Mateus and Queiroz, 1991; Queiroz and Mateus, 2004; Queiroz, 1999).

At the late Boreal, when the campsite of Castelejo began, the regional vegetation mosaic got more complex; there is evidence of well-wooded littoral pinewoods, mixed *Pinus* and *Quercus* forests and of the appearance of Mediterranean sclerophyllous forests (Queiroz, 1999). In the Guadiana estuary, a forested landscape (*Pinus* sp., *Quercus* sp., *Olea* sp., *Phillyrea* and *Pistacia* sp.) emerged at 9800-8960 cal BP (Fletcher, 2005, p. 260). The palaeovegetation changed through a long transition from a humid early Holocene towards a drier late Holocene. The results of the anthracological study of Castelejo by Ernestina Badal (2000) corroborate the regional picture and show a particularly dry local environment, mainly in the Atlantic chronozone (Fig. 11).

A total of 2197 wood charcoal remains collected during the fieldworks of 1985 and 1987 at Castelejo were studied by Ernestina Badal (unpublished report). The anthracological diagram (Fig. 11) concerning the stratigraphic sequence of the 1985 fieldwork, with a sample of 1964 charcoals, shows a great representation of *Olea europaea* var. *sylvestris* in the lower and middle zones of the sequence, reaching 50% or even more in the vast majority of the layers. *Olea europaea* var. *sylvestris* (prominent taxon of the termomediterranean evergreen forests) is followed by *Pistacia lentiscus* and *Cistus* sp. along with *Ramnus-Phillyrea* and *Arbutus unedo* with low percentages. Evergreen *Quercus* and the conifers *Juniperus* and *Pinus* have a residual representation. There is also *Sorbus-Crataegus* and *Prunus* indicating the existence of a more humid area in the valley slopes.

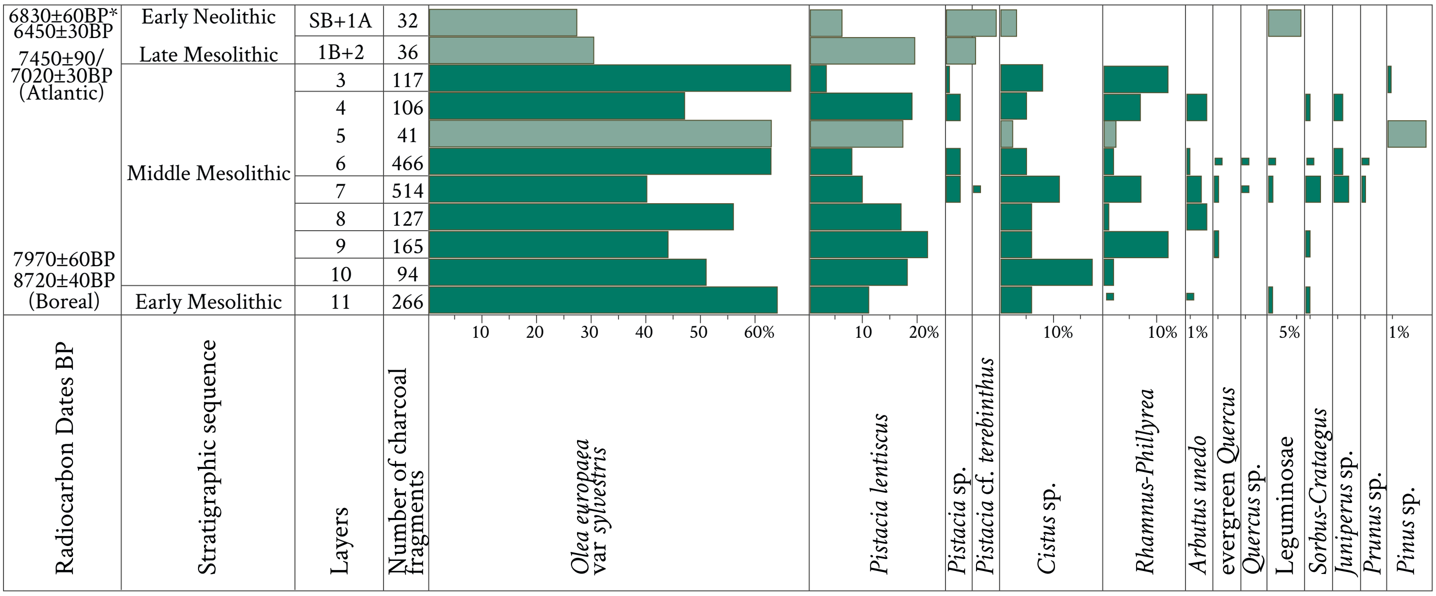



Fig. 11 – Anthracological diagram of Castelejo, adapted from Ernestina Badal, 2000. 1985 fieldwork.
Small samples; * Marine shells sample.

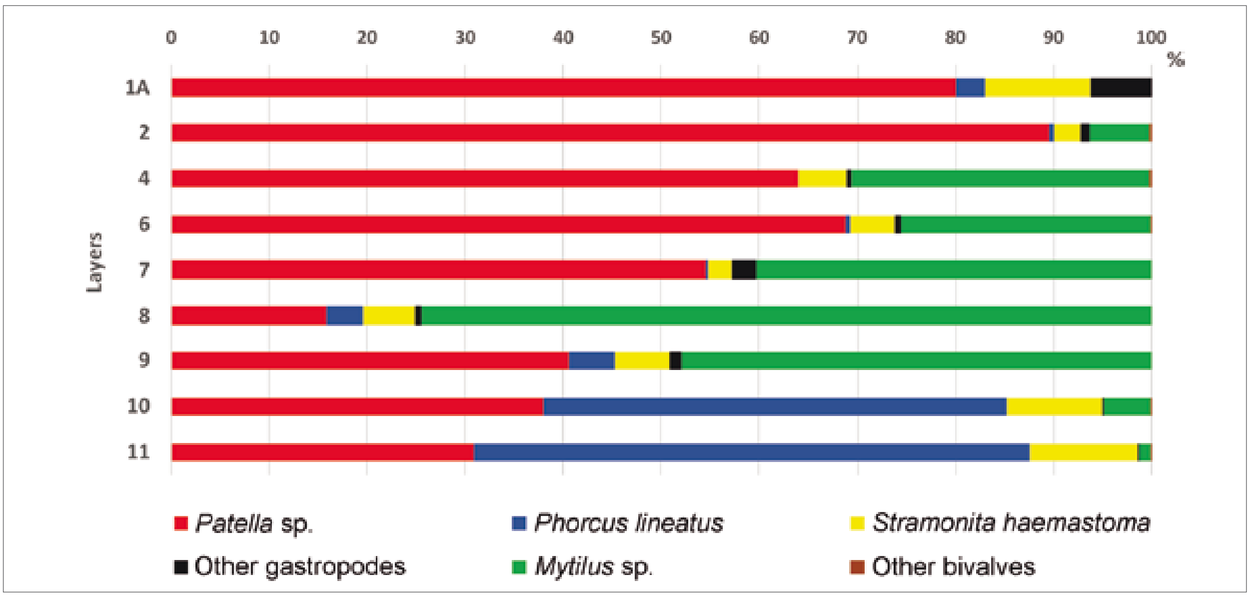



Fig. 12 – Castelejo. Faunal remains of marine invertebrates. Fieldwork of 1985. Based on Table 2.

Table 2 – Castelejo. Distribution of the marine invertebrates by stratigraphic sequence (archaeological excavation of 1985). Sampling: Layer 1A – 30L (Squares F11, H12, N6); Layer 2 – 20L (Square H11); Layer 4 – 50L (Squares F11, H11, H12); Layer 6 – 60L (Squares F11, G12, H11, H12); Layer 7 – 50L (Squares F11, H11); Layer 8 – 40L (Squares F11, H11); Layer 9 – 20L (Squares F11, H11); Layer 10 – 130L (Squares F11, F12, G11, H11, I11); Layer 11 – 70L (Squares F11, F12, G11, H11, I11).

| *TAXA* | LAYERS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1A** | | | | **2** | | | | **4** | | | | **6** | | | | **7** | | | | **8** | | | | **9** | | | | **10** | | | | **11** | | | |
| | **NR** | **P (g)** | **MNI** | **%** | **NR** | **P (g)** | **MNI** | **%** | **NR** | **P (g)** | **MNI** | **%** | **NR** | **P (g)** | **MNI** | **%** | **NR** | **P (g)** | **MNI** | **%** | **NR** | **P (g)** | **MNI** | **%** | **NR** | **P (g)** | **MNI** | **%** | **NR** | **P (g)** | **MNI** | **%** | **NR** | **P (g)** | **MNI** | **%** |
| **CRUSTACEA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pollicipes pollicipes* | 14 | 5,6 | | | 91 | 32,8 | | | 3 | 1,2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Decapoda | | | | | | | | | | | | | | | | | | | | | 1 | 2 | 1 | | | | | | 2 | 2 | | | 3 | 1,8 | | |
| **MOLLUSCA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Patella* sp. | 68 | 98 | 52 | 80,0 | 494 | 488,6 | 422 | 89,6 | 352 | 471,6 | 339 | 64,0 | 1231 | 1519 | 1116 | 68,8 | 907 | 1350 | 879 | 54,5 | 52 | 72,6 | 47 | 15,8 | 221 | 306,4 | 211 | 40,7 | 689 | 830,4 | 624 | 38,0 | 1439 | 1138 | 1206 | 30,9 |
| *Phorcus lineatus* | 2 | 115,2 | 2 | 3,08 | 3 | 2,4 | 2 | 0,42 | | | | | 7 | 4,4 | 7 | 0,43 | 3 | 1,6 | 3 | 0,19 | 11 | 11,8 | 11 | 3,7 | 25 | 23,4 | 24 | 4,62 | 871 | 1030 | 778 | 47,3 | 2377 | 3008 | 2210 | 56,7 |
| *Stramonita haemastoma* | 7 | 167,2 | 7 | 10,8 | 28 | 101,6 | 13 | 2,76 | 56 | 152 | 26 | 4,91 | 135 | 470 | 74 | 4,56 | 157 | 552,8 | 41 | 2,54 | 42 | 158,2 | 16 | 5,39 | 111 | 223 | 29 | 5,59 | 327 | 898 | 160 | 9,73 | 679 | 2013 | 433 | 11,1 |
| Other gastropodes | 4 | 3,8 | 4 | 6,15 | 4 | 4,2 | 4 | 0,85 | 3 | 7,4 | 3 | 0,57 | 11 | 7,8 | 11 | 0,68 | 38 | 39,8 | 38 | 2,36 | 2 | 0,65 | 2 | 0,67 | 6 | 0,5 | 6 | 1,16 | 2 | 2,25 | 2 | 0,12 | 5 | 5,2 | 5 | 0,13 |
| *Mytilus* sp. | | | | | 69 | 68,4 | 29 | 6,16 | 450 | 638,6 | 161 | 30,4 | 984 | 1456 | 413 | 25,5 | 1547 | 3634 | 651 | 40,4 | 565 | 1513,6 | 221 | 74,4 | 1077 | 689,2 | 249 | 48 | 197 | 157,9 | 78 | 4,74 | 102 | 48,7 | 45 | 1,15 |
| *Cerastoderma edule* | | | | | 2 | 0,4 | 1 | 0,21 | 1 | 2,2 | 1 | 0,19 | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ruditapes decussatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 0,4 | 1 | 0,06 | 2 | 2,2 | 1 | 0,03 |
| Other bivalve molluscs | | | | | | | | | | | | | 1 | 0,05 | 1 | 0,06 | | | | | | | | | | | | | 1 | 0,05 | 1 | 0,06 | 2 | 0,05 | 1 | 0,03 |
| **TOTAL** | 81 | 384,3 | 65 | 100 | 600 | 665,6 | 471 | 100 | 862 | 1271,8 | 530 | 100 | 2369 | 3458 | 1622 | 100 | 2652 | 5579 | 1612 | 100 | 672 | 1756,9 | 297 | 100 | 1440 | 1243 | 519 | 100 | 2089 | 2919 | 1644 | 100 | 4606 | 6215 | 3901 | 100 |

Thus, for the lower and middle layers, during the early and middle Mesolithic, the anthracological diagram suggest a stable environment, in balance with a probable *Olea* woodland formation, growing, by hypothesis, in the exposed south slopes of the valley, on soil derived from carbonated sandstone. In this supposed termo-mediterranean environment no human impacts were estimated on the local vegetation. The long lasting invisible 'human footprint' on the landscape, suggests a balanced exploitation of natural resources and demographic control during the early and middle Mesolithic. In the late Mesolithic-early Neolithic layers, the small amount of charcoal advises prudent interpretation, but the abrupt decline of *Olea europaea sylvestris* at Layer 2 onward is noteworthy. This turning point to more open vegetal formations (reduction of *Olea* sp. and leguminosae increase) correlates with a dry-xeric climate, peaking at the layers 1C/1985 and 1B2/1987 in accordance with their sedimentological signatures.

### SEASONALITY

The temporary character of Castelejo, well expressed by the stratigraphy, can be ascribed to seasonal rhythms by charcoal macro-remains and by the availability/accessibility of aquatic resources (shellfish):

- In the layer 9/1985, the charcoal analysis revealed two branches of *Rhamnus-Phillyrea* that had been cut at springtime (Ernestina Badal report);
- The marine invertebrates of the shell midden layers (Table 2, Fig. 12) were available all year round but they would be gathered especially in spring and autumn, avoiding the strongest winter hydrodynamics and the high toxicity of some aquatic plants in summer. Equinoxes would be the more favourable peaks of availability because larger infra-littoral areas were exposed.

## Faunal remains

The faunal remains of Castelejo are almost exclusively represented by marine invertebrates (with the exception of the lower layers 10 and 11 (fieldwork of 1985):

– *The lower layers* included mammal bones mostly from micro-fauna (78%), namely rabbits (*Oryctolagus cuniculus*), while there were also bones from large size game (*Bos? Cervus?*) (13%); mesofauna has 4,5% and *Felis silvestris,* a residual representation (0,6%); 4% of the bones were undetermined (sample of 177 bone fragments, classified by Cleia Detry). The molluscs are very well represented by the species *Phorcus lineatus* (top shell) and *Patella* sp. (limpet), followed by *Stramonita haemastoma* (whelks) and *Mytilus* sp. (mussel); *Ruditapes decussatus* (clam) and *Cerastoderma edule* (cockle) were quite rare. A few decapod crustaceans of the Brachyura infraorder had been registered;

– *In the middle layers* (layers 4-9) *Mytilus* sp. were highly frequent, especially in layer 8 where larger sizes also dominated. Onwards in this level *Mytilus* decreased giving space to *Patella* sp. The species *Stramonita haemastoma* and *Phorcus lineatus* were scarce, with the exception of the lower layers, where lined top shells were abundant. There were also rare remains of crabs (Layer 8) and a residual presence of *Cerastoderma edule* (cockle) in Layer 4;

– *In the upper layers* (SB, 1, 2) *Patella* sp. was dominant with 80 to 90%; *Mytilus* was scarce (6.2%) in layer 2, and absent in layer 1A. *Phorcus lineatus* and *Stramonita haemastoma* occurred in low frequencies. *Cerastoderma edule* (cockle) had a residual presence (layer 2). *Policippes policipes* was present in layers SB, 1 and 2. The small amount of preserved faunal remains (invertebrates) in Layer SB did not allow a statistical treatment; besides the mentioned *Policippes policipes* there were still *Patella* sp.; *Mytillus* sp., *Stramonita haemastoma* and *Phorcus lineatus.*

Although the year-round availability of shellfish species and their high consumption in Castelejo, they might have only been gathered, as already referred, in spring and autumn. The most persistent species were *Patella* sp. (limpet) in the whole stratigraphy and *Mytilus* sp. (mussel) in the middle layers. The later was dominant in layer 8 and decreased onwards becoming rare (SB) or absent (L. 1) in the upper layers, what can be interpreted as a sign of overexploitation? *Policipes policipes* (barnacle), an indicator of the broadening spectrum of resource exploitation, is well represented in the top of the stratigraphy of Castelejo. Estuarine molluscs of sandy/mud intertidal environments as expected by the site location are very rare: only 2 individuals from layers 10 and 11 of *Ruditapes decussatus* (clam), and 2 individuals of *Cerastoderma edule* (cockle) from layers 4 and 2, illustrating a limited capacity of A do Marinho rivulet.

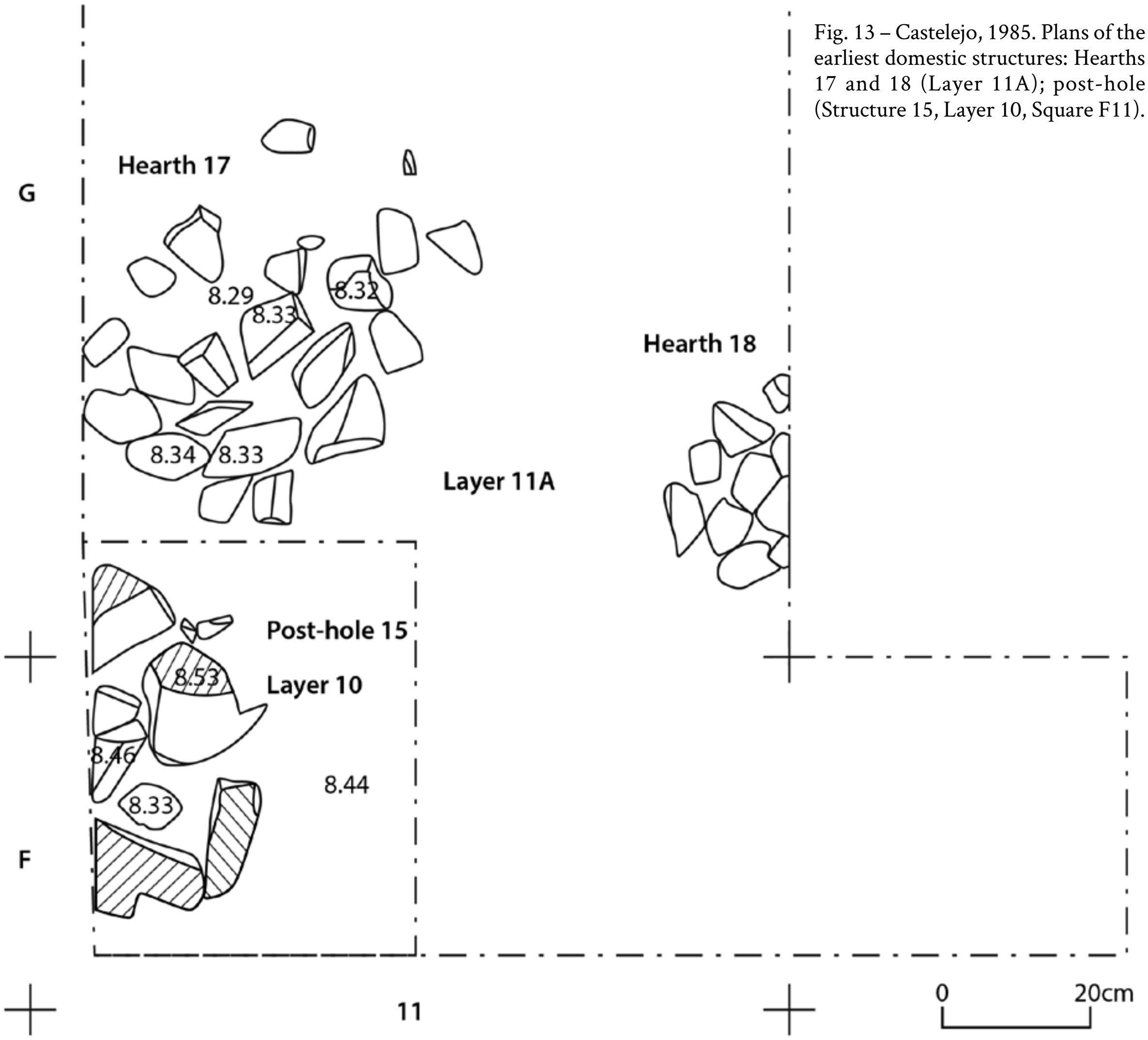



Fig. 13 – Castelejo, 1985. Plans of the earliest domestic structures: Hearths 17 and 18 (Layer 11A); post-hole (Structure 15, Layer 10, Square F11).


Fig. 14 – Castelejo, 1985. Domestic structures from the lower layers: Hearths 17 (Layer 11A) and post-hole (Structure 15, Layer 10, Square F11).

Fig. 15 – Castelejo, 1985. Post-hole (Structure 15). Layer 10, Square F11. Under the mostly dense shell midden layers.

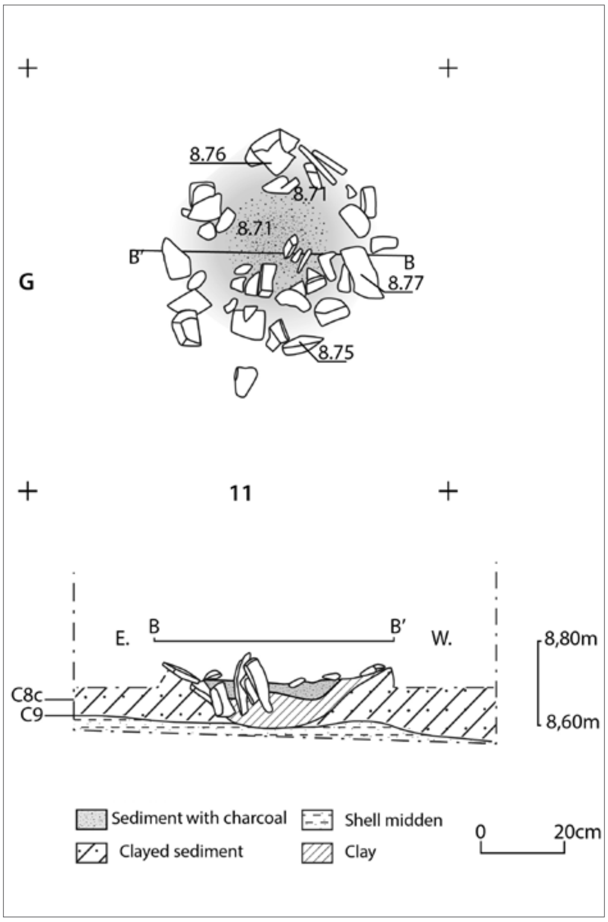



Fig. 16 – Castelejo. Plan and profile of hearth 13. Layer 8. Fieldwork of 1985.

## Domestic structures

All the stratigraphic unities (constituted by occupation layer, shell midden deposit and abandonment layer) included flimsy domestic structures in accordance with the temporary character of the site. The charcoal analysis of the content of the Mesolithic hearths 14 (Layer 7), 13 (Layer 8) and 32 (layer 5) showed that in the last ignition of those fireplaces monospecific firewood was used (exclusively *Olea europaea* var. *sylvestris* in hearth 14 and *Pistacia lentiscus* in hearths 13 and 32); this expedient behaviour is consistent with short temporary occupations.

Three general types of domestic structures were recognized crossing the long diachrony:

1) Post-hole limited by small standing stones (Square F11, Layer 10/1985) (Figs. 13-15);

2) Hearth installed on the surface covered by a cobble pavement, very adequate for grilling food (Figs. 13 and 17). Pebbles got fire-cracked by the intensity of use;

3) Hearth installed in a pit filled with pebbles for heating conservation (Fig. 16);

4) Hearth in a shallow pit surrounded by an asymmetric crown of stone blocks, with the thicker side facing the prevailing winds (the westerlies). The pebbles got fire-cracked by the intensity of use (thermoclasts, e. g. Structure 7, Figs. 17-18).

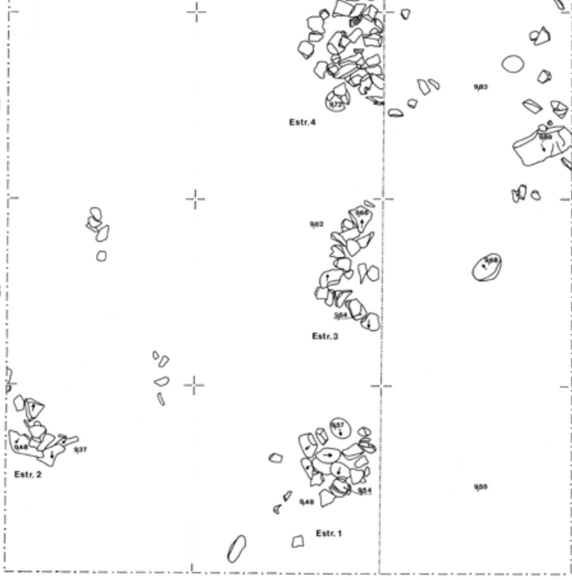



Fig. 17 – Castelejo. Plans of early Neolithic (layers 1A and SB)and late Mesolithic (Layer 1B)domestic structures. The early Neolithic hearth 7/85 (Layer SB) was radiocarbon dated by a sample of marine shells: Beta 168461 - 6830±60 BP (5375-4990 cal BC, 2σ).

Fig. 18 – Castelejo. Hearth 7, Layer SB/1985.

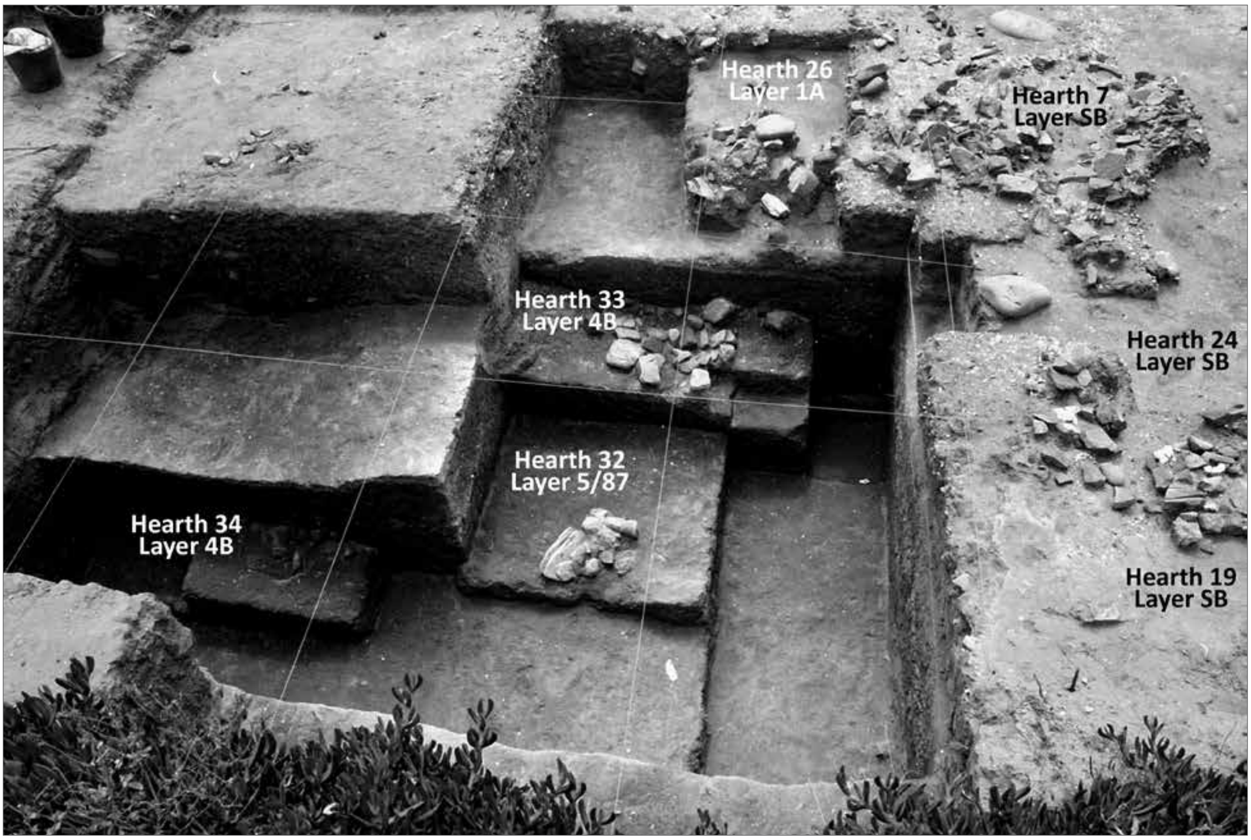



Fig. 19- Castelejo. Fieldwork of 1987. Domestic structures (fireplaces) were present at several layers. At the top (Layer SB), a very dense set of hearths.

## Material culture

At the temporary shellfish gathering camps of the Portuguese Southwest Coast, artefacts are very scarce. This observation had been done from the early Mesolithic campsites of Pedra do Patacho — Mira estuary (Soares and Tavares da Silva, 1993), Medo da Fonte Santa —Aljezur coast (Tavares da Silva and Soares, 2016) and Montes de Baixo — Odeceixe estuary (Tavares da Silva and Soares, 1997). The same technological behaviour had been registered in the Neolithic shellmidden of Medo Tojeiro, Almograve or in the middle Bronze Age shellmidden of Oliveirinha beach - Sines (Tavares da Silva and Soares, 1997). Castelejo is not an exception to this pattern, but at the late Mesolithic/early Neolithic transition, the scarcity of lithic artefacts is replaced by a more representative set of artefacts. The raw materials used in its production indicate the direction of the Mesozoic formations of Cabo de S. Vicente, c. 10 km away, turning to the southern coast of Algarve. Jurassic flint was selected to the manufacture of chipped stone and the common limestone, to the manufacture of heavy tools such as hammers (Fig. 20, 1). Only a regular connection between Castelejo and S. Vicente Cape could explain the transport of raw materials for expedient tools such as limestone, that apparently could be replaced by other lithologies available in the gravels of the Castelejo beach.

### LITHIC ASSEMBLAGE

The lithic artefacts are rare in the lower and middle layers of Castelejo and they had been expediently manufactured on cobbles locally available or even more rarely on flint.

In fact, a reorientation took place in the technological behaviour at the transition to early Neolithic; in the upper layers more than one hundred flint artefacts of the micro-geometric technological complex, with trapezes, were recovered in late Mesolithic layers (Fig. 21), and 285 artefacts, in the early Neolithic SB layer, from the curated technological subsystem

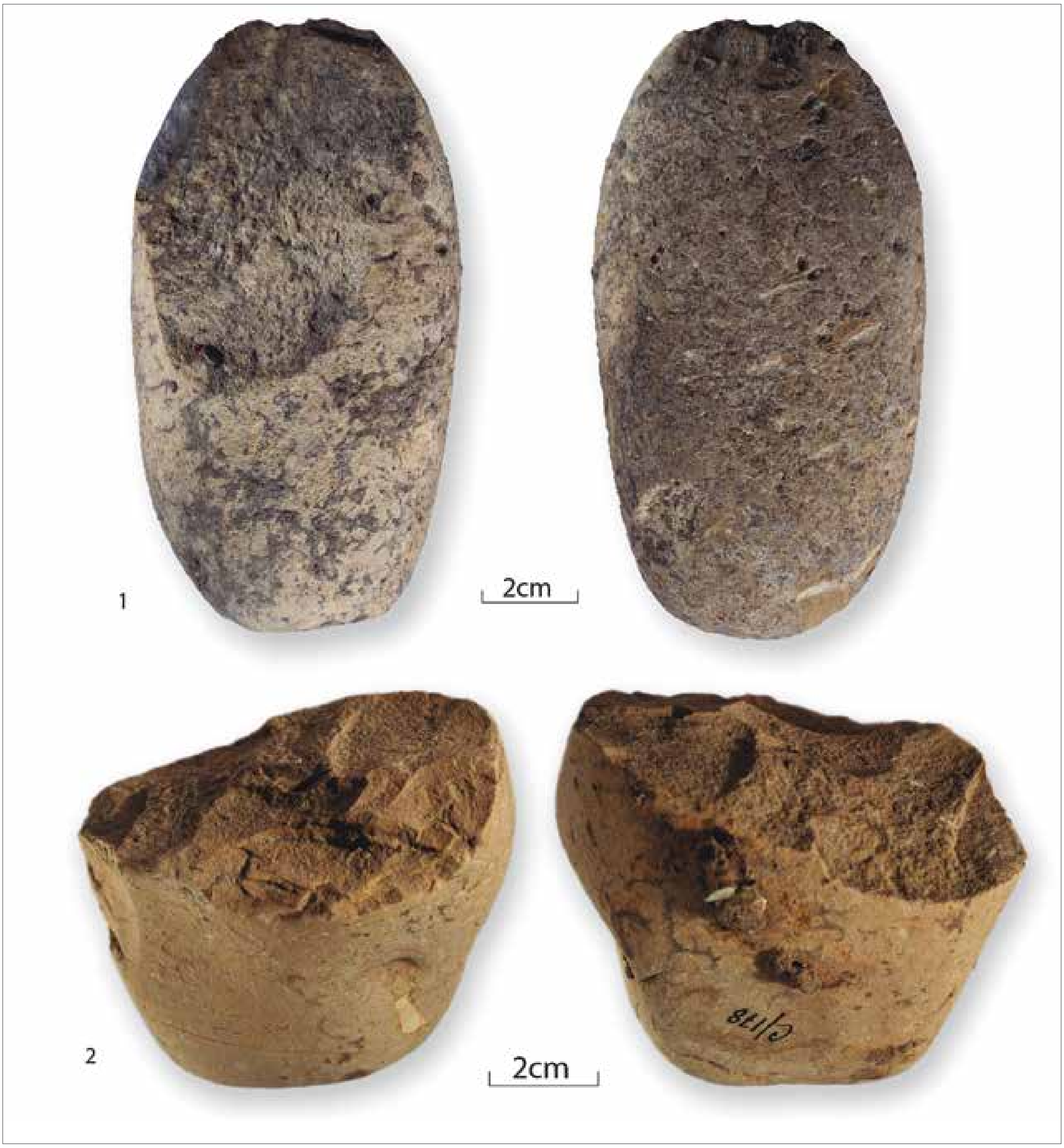



Fig. 20 – Castelejo. Expediently manufactued stone tools and heavy-duty tools are present from the bottom to the top of the stratigraphy. 1- Double soft hammerstone (Inv. C/542) on a limestone cobble, submitted to thermic alteration (fire-cracked). Late Mesolithic. Square I11 Layer 2B/ 1985). 2- Flake core on a quartzite cobble (Inv. C/178). Early Neolithic. Square H11, Layer SB/1985. Photos by Rosa Nunes.

(Figs. 22-24). They had been mostly manufactured on flint apparently from S. Vincent cape area (Armação Nova and Beliche) (Ribeiro and Terrinha, 2005-2007, 2007), 10 km south of Castelejo.

The change observed in the lithic industry at the transition to the early Neolithic could be an outcome of a probable territory reorganization with a distinct geological setting. Castelejo foragers could be a task group of a larger community, with ownership rights over the rich flint sources of S.Vincent Cape area, or alternatively could be partners of a new network of interactions, privileging the connections with the neighbours of Cape de S. Vicente (Armação Nova, Rocha das Gaivotas, Cabranosa, Vale Santo).

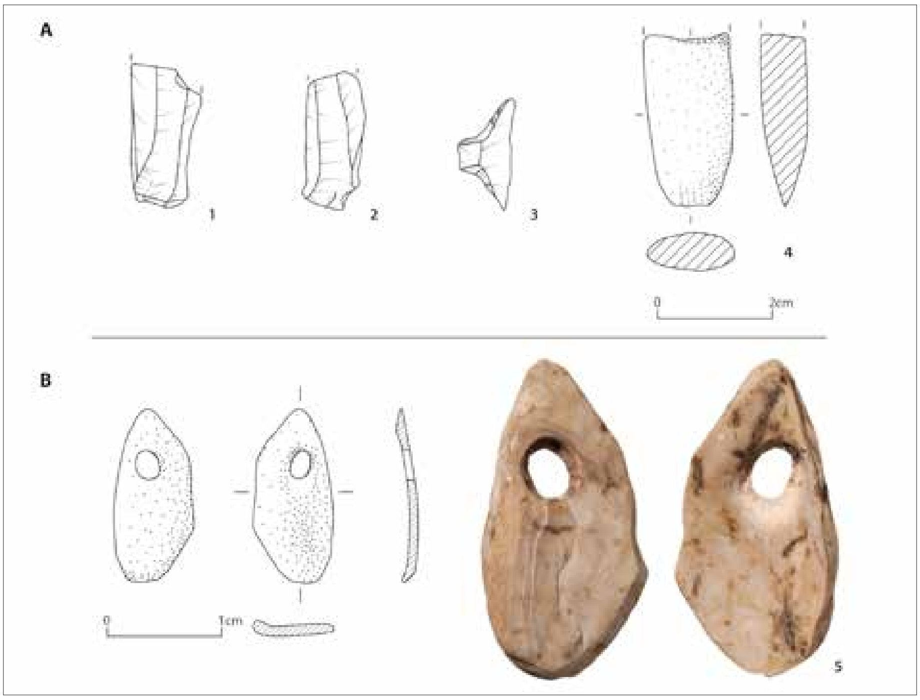



Fig. 21 – Castelejo. Late Mesolithic material culture.
A - Layer 1B. Flaked artefacts (1 - 3) and a polished chisel in siliceous schist (4): 1 and 2 – C/289 and C/290, bladelets unretouched; 3 – C/291, symmetrical trapeze; 4 – C/286, polished chisel.
B - C/135, ornament (pendant)on a *Pollicipes pollicipes* calcareous plate. Square H12, Layer 2A.
Drawing by Ana Castela; photos by Rosa Nunes.

Table 3 – Castelejo. Early Neolithic occupation. Flint knapped industry.

| Typological categories | N | % |
|---|---|---|
| Cores | 7 | 5,7 |
| Debris | 12 | 9,8 |
| Microburins | 4 | 3,3 |
| Debitage (flakes) | 48 | 39,0 |
| Debitage (bladelets) | 35 | 28,5 |
| Retouched flakes | 6 | 4,9 |
| Retouched bladelets | 6 | 4,9 |
| Geometric microliths | 5 | 4,1 |
| Total | 123 | 100 |

Table 4 – Castelejo. Early Neolithic occupation. Bladelets. Platform types.

| Typological categories | Faceted platform | | Unfaceted platform | | Reduced/ punctiform | | Cortical | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Nº | % | Nº | % | Nº | % | Nº | % | Nº | % |
| Bladelets | 22 | 66,7 | 4 | 12,1 | 5 | 15,2 | 2 | 6 | 33 | 100 |

Table 5 – Castelejo. Early Neolithic occupation. Bladelets. Bulb of percussion and cross section types.

| Typological categories | Bulb | | | | | | Cross section types | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Diffuse | | Pronounced | | Total | | Triangular | | Trapezoidal | | Total | |
| | Nº | % | Nº | % | Nº | % | Nº | % | N | % | N | % |
| Bladelets | 24 | 72,7 | 9 | 27,3 | 33 | 100 | 13 | 39,4 | 20 | 60,6 | 33 | 100 |

Table 6 – Castelejo. Early Neolithic occupation. Bladelets. Debitage condition.

| Typological categories | Whole | | Proximal fragment | | Distal fragment | | Midsection | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Nº | % | Nº | % | Nº | % | Nº | % | Nº | % |
| Bladelets | 17 | 34,0 | 16 | 32,0 | 10 | 20,0 | 7 | 14,0 | 50 | 100 |

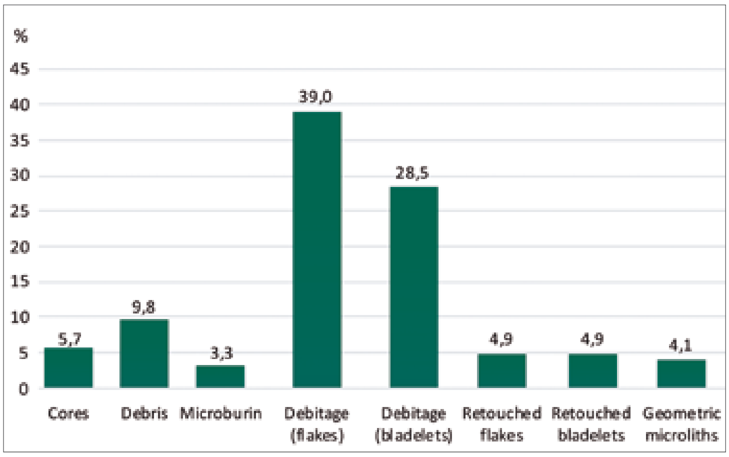



Fig. 22 – Graphics of the flaked flint industry (Tables 3-6).

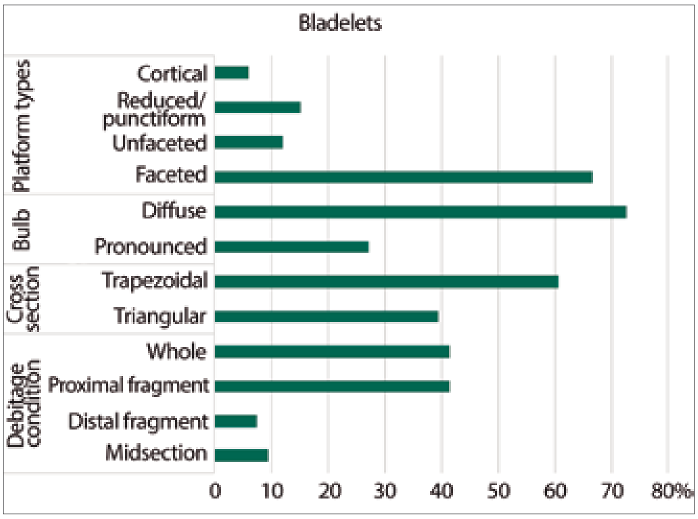



Table 7 – Bladelet width (mm) classes from late Mesolithic and early Neolithic contexts of Southwest Coast: late Mesolithic occupations of Vale Marim I, Gaspeia and Vidigal (Phases II and III); early Neolithic occupations of Vale Pincel I, Montum de Baixo and Castelejo (Layer SB). There are two quite distinct clusters with chronological relevance. The upper layers of Castelejo belongs to the early Neolithic cluster.

| Width (mm) | Vale Marim I | | Mesolithic Gaspeia | | Vidigal (Phase II) | | Vidigal (Phase III) | | Vale Pincel I | | Montum de Baixo | | Castelejo (Layers SB and 1A) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| 3-3,9 | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |
| 4-4,9 | 1 | 0,6 | 7 | 9,9 | 0 | - | 4 | 2,6 | 1 | 0,9 | 0 | - | 0 | - |
| 5-5,9 | 9 | 5,0 | 10 | 14,1 | 4 | 8,2 | 11 | 7,2 | 2 | 1,7 | 1 | 0,4 | 0 | - |
| 6-6,9 | 22 | 12,3 | 16 | 22,5 | 11 | 22,4 | 25 | 16,4 | 8 | 6,8 | 12 | 5,1 | 4 | 7,5 |
| 7-7,9 | 46 | 25,7 | 13 | 18,3 | 13 | 26,5 | 40 | 26,3 | 9 | 7,7 | 24 | 10,3 | 4 | 7,5 |
| 8-8,9 | 34 | 19,0 | 9 | 12,7 | 10 | 20,4 | 25 | 16,4 | 19 | 16,2 | 40 | 17,1 | 6 | 11,3 |
| 9-9,9 | 32 | 17,9 | 5 | 7,0 | 4 | 8,2 | 23 | 15,1 | 21 | 17,9 | 45 | 19,2 | 14 | 26,4 |
| 10-10,9 | 16 | 8,9 | 6 | 8,5 | 4 | 8,2 | 15 | 9,9 | 19 | 16,2 | 36 | 15,4 | 10 | 18,9 |
| 11-11,9 | 11 | 6,1 | 3 | 4,2 | 1 | 2,0 | 5 | 3,3 | 13 | 11,1 | 48 | 20,5 | 7 | 13,2 |
| 12-12,9 | 4 | 2,2 | 0 | 0,0 | 1 | 2,0 | 2 | 1,3 | 14 | 12,0 | 9 | 3,8 | 6 | 11,3 |
| 13-13,9 | 3 | 1,7 | 1 | 1,4 | 0 | - | 0 | - | 4 | 3,4 | 8 | 3,4 | 2 | 3,8 |
| 14-14,9 | 1 | 0,6 | 0 | - | 1 | 2,0 | 1 | 0,7 | 4 | 3,4 | 6 | 2,6 | 0 | - |
| 15-15,9 | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 1 | 0,4 | 0 | - |
| 16-16,9 | 0 | - | 1 | 1,4 | 0 | - | 1 | 0,7 | 2 | 1,7 | 1 | 0,4 | 0 | - |
| 17-17,9 | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 2 | 0,9 | 0 | - |
| 18-18,9 | 0 | - | 0 | - | 0 | - | 0 | - | 1 | 0,9 | 1 | 0,4 | 0 | - |
| Total | 179 | 100 | 71 | 100 | 49 | 100 | 152 | 100 | 117 | 100 | 234 | 100 | 53 | 100 |

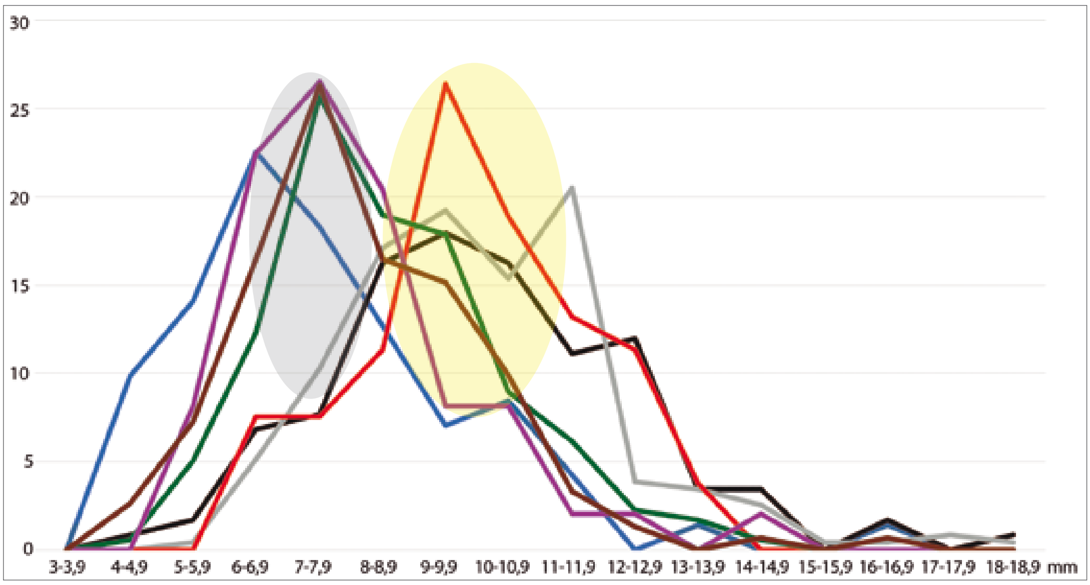



Fig. 23 - Graphic of table 7. ▬ Vale Marim I; ▬ Mesolithic occupation of Gaspeia; ▬ Vidigal (Phase II); ▬ Vidigal (Phase III); ▬ Vale Pincel I; ▬ Montum de Baixo; ▬ Castelejo (layer SB). There are two quite distinct clusters with chronological relevance. The upper layer of Castelejo belongs to the early Neolithic cluster.

● - late Mesolithic;

● - early Neolithic.

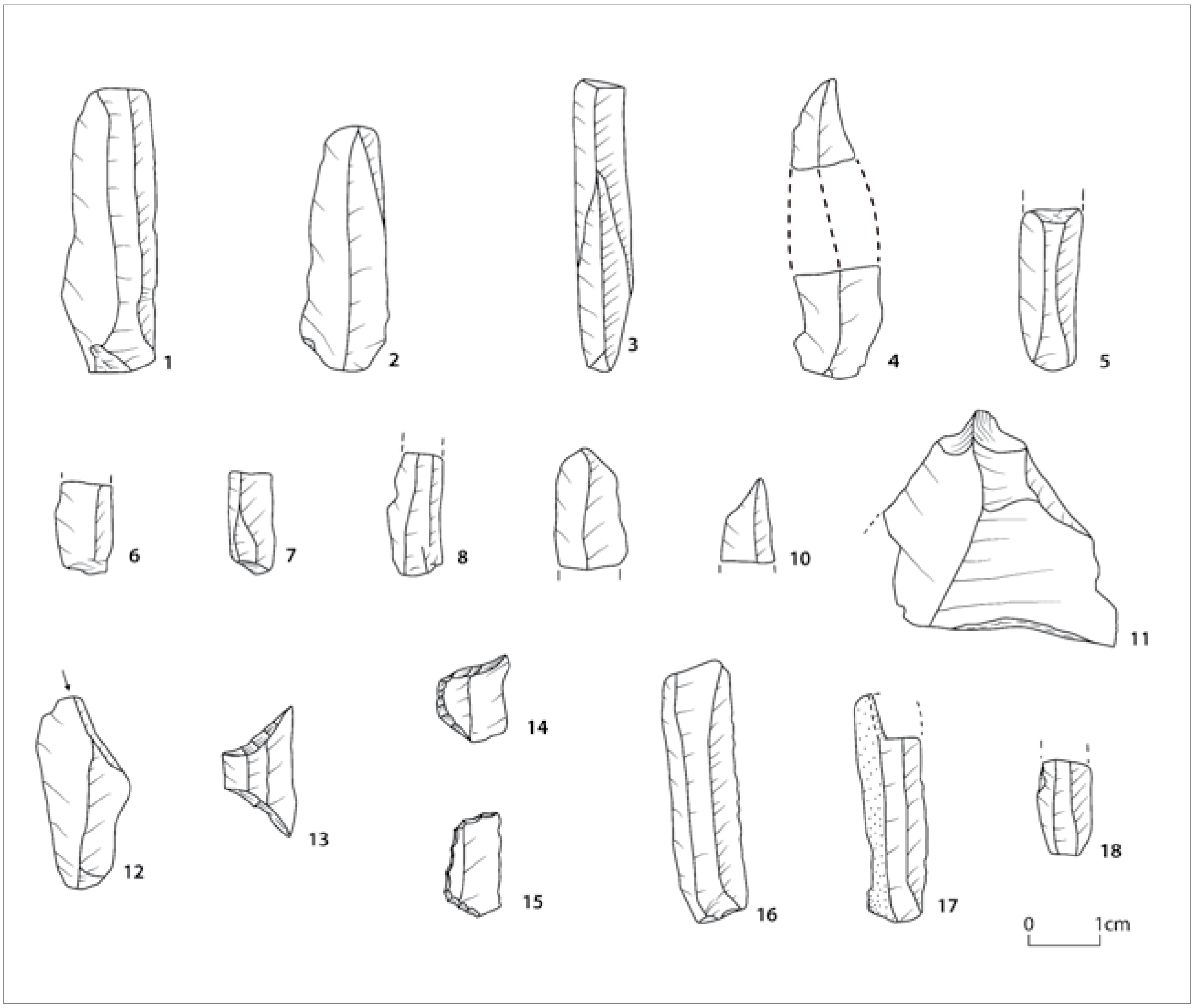



Fig. 24 – Castelejo. Lithic assemblage on flint (Layer SB): 1 - unretouched blade (C/279); 2 to 10 - unretouched bladelets (C/202, C/281, C/203-204, C/201, C/205, C/208, C/288, C/209 and C/207); 11 - perforator on flake (C/282); 12 - burin on truncation (C/48); 13 - symmetrical trapeze (C/283); 14 - symmetrical trapeze with retouched short base (C/287); 15 - trapeze with retouched short base (C/284); 16 to 18 - bladelets with use-wear traces (C/101, C/280 and C/108).

The first stages of decortication and roughing-out could have occurred at the "quarries", as well as the core formatting steps. At the early Neolithic a lithic-curated industry on flint was oriented towards bladelets with a relatively standardized module size: 28.1X9.4X3mm and a controlled Montbani style (trapezoidal cross section). A studied sample of 123 artefacts (Layer SB) from the curated technological subsystem (Table 3, Fig. 22) is very eloquent in what concerns the temporary character of the campsite. Debris, the by-products of knapping activity, have a very low frequency. The task group that moved seasonally to Castelejo would transport the least load possible, so they brought some cores and blanks already formatted (in the debitage and retouched products, flakes and bladelets were balanced and blades were almost absents). The morpho-technology of bladelets is in accordance with the regional early Neolithic pattern (Tables 4-7, Figs. 22-24), rooted in the late Mesolithic tradition. Geometric microliths manufactured using the microburin technique are present, mainly trapezes (Fig. 24, n$^{os}$ 13-15), some with the small base retouched close to the segment form, with good parallels at Vale Santo (Carvalho, 2008, Est. 68, n.10), and Vale Pincel I (Tavares da Silva and Soares, 2015, Fig. 11, nº 15).

## POTTERY

Pottery is very scarce. For now, it is possible to consider the existence of 2 vessels based on ceramic pastes, as the potsherds have not preserved rims, and a probable third vessel, assigned to fragments also without rims. All the ceramic sherds are attributed to Layer SB.

There are two very distinct types of ceramic pastes: type A, that is less compact, with rare non-plastic elements ≥ 0.5mm, whose firing conditions had been in a reducing-oxidizing atmosphere, responsible for a reddish outer surface (Munsell 10R4/8); surfaces are smoothed; this ware technology is similar to the pottery production of the group A from the early Neolithic settlement of Vale Pincel I (Sines), radiocarbon dated from 2nd quarter and middle of the 6th millennium cal BC (Tavares da Silva and Soares, 2015). This manufacture type is represented by a necked storage jar with an incomplete profile without rim, and a channeled decoration with a roughly impressed line probably with the edge of a seashell. The tecnological groupe B is compact and has numerous non-plastic elements with c. 0.5mm; the outer surface is well smoothed and reddish (Munsell 10R4/8) in acordance with a reducing-oxidizing firing atmosphere.

The presence of pottery in the Layer SB of Castelejo, where faunal remains are exclusively constituted by marine invertebrates species, allows the formulation of the following question: Is Layer SB a Mesolithic context with ceramics? Or assigned to Neolithic foragers? Organic residue analysis of ceramic pastes would be important for composing the answer because pattern of pottery use by Neolithic and Mesolithic people seems to be different (Heron *et al.*, 2007; Robson *et al.*, 2019; Bondetti *et al.*, 2021). However, the available information on the chipped stone industry and the radiocarbon chronology point to a early Neolithic temporary site. In the same sense, it is also relevant to consider the similar case of the early Neolithic shell midden of Medo Tojeiro, in the Alentejo coast (Tavares da Silva, Soares and Penalva, 1985). Thus, we attribute the Layer SB of Castelejo to a task group from the early Neolithic community of the Western Algarve (S. Vicente Cape area).

## Temporalities

### THE FOUNDATION PHASE OF CASTELEJO: RESIDENTIAL MOBILITY

We have been defending elsewhere (Soares 1995, 1997; Soares and Tavares da Silva, 2004) that the unbalanced demo-ecological rapport could be a key factor to explain the increase in the range of foodstuffs consumed by Holocene hunter-gatherers, including apparently low-priority resources, with low profit. The subsistence diversification would act as a strategy against the declining returns of the hunting of higher-ranked preys, mainly aurochs and red deer (Davis and Detry, 2013).

On the other hand, a focus on littoral environments occurred, with the foundation of campsites of shellfish gathering, which had been frequented by Mesolithic mobile groups and continued to be used by more sedentary Neolithic groups. This general pattern is observed in the Southwest Coast and with some distinct outlines, not discussed in this paper, at the littoral of Estremadura (Sousa and Soares, 2016).

The diversity and high productivity of the Southwest Coast in shellfish species had been intensively exploited since the Young Dryas, as observed at the shell middens of Pedra do Patacho (Soares and Tavares da Silva, 1993) and Medo da Fonte Santa (Tavares da Silva and Soares, 2016) onwards (Tavares da Silva and Soares, 1997; Stiner, 2003; Soares, 2020, 2021).

The foundational phase of Castelejo (layers 11, 10/1985; layer 5/1987), of the late Boreal shows a broad-spectrum foraging strategy, with the following remains of foodstuffs, already mentioned:

— Mammals, mainly lagomorphs (rabbit), with about 78% of the number of remains, and also meso and macro-fauna, probably *Bos* and *Cervus*;

— Huge volumes of molluscs (*Patella* sp., *Phorcus lineatus*, *Stramonita haemastoma*, *Mytilus* sp.) and few crabs.

These results fit well into the concept of residential mobility (Binford, 1980): mobile hunter-gatherers move their residential camps as a whole to the resources places they wish to consume. After the first recognition and appropriation, the site will be operated differently (logistic mobility) to solve the spatio-temporal dispersion of edible resources with a reduction in social costs.

This mobility strategy supposes the existence of more permanent base-camps, that might have been occupied all year round, larger in size and with a higher population density (Schalk, 1981; Soares, 1995, 1996), close to some important resources, but far from other equally important ones that were exploited by task groups leaving the base camps to these small and specialized-purpose sites. The early Mesolithic littoral site of Palheirões do Alegra, at Cape Sardão (Vierra, 1995), illustrates quite well the presented base-camp concept. Thus, it is likely that the Mesolithic settlement system of southern

Portugal has integrated both mobility strategies. In addition to specialized shellfish gathering sites, such as Castelejo, or base camps such as Palheirões do Alegra, other temporary specialized purpose camps were identified, such as the flint exploitation site of Armação Nova, S. Vicente Cape (Carvalho, Valente and Dean, 2009; Soares, Tavares da Silva e Canilho, 2005-07), or the hunting camp of Barca do Xarez de Baixo, in the Guadiana valley (about 240km/50 hours of walking from Castelejo). This coeval site (7941-7059 cal BC) of the first phase of Castelejo revealed activities of butchering and fur processing from big game like aurochs, red deer, horses and small game as rabbits, using stone artefacts (flakes) expediently manufactured from locally very abundant quartzite cobbles (Araújo and Almeida, 2013). The coastal-inland articulation during the early Mesolithic, probably through river corridors, is an issue that requires further investigation.

## THE MIDDLE AND LATE MESOLITHIC. LOGISTIC MOBILITY

After the first occupation, the mobility pattern seems to "fossilize" in a logistic model (sensu Binford, 1980); the temporary campsite of Castelejo turned to an economically specialized camp in the marine shellfish gathering, for about two thousand years. Thus, the shell midden layers contained huge captures of shellfish; no mammals, fish or bird remains were found.

Task groups radiating out from base-camps would return recurrently in spring and/or autumn (equinoxes) to exploit seasonal resources as confirmed by charcoal analysis and by the faunal taxonomic composition. The edible plant species, probably a very important component of the diet, are not represented in the archaeological record.

The Castelejo foragers constructed light huts, documented by post-holes, adapted to short stays. The wild *Olea* had been the main fuel to feed the domestic fire in simple fireplaces.

This temporary site with such a narrow spectrum of faunal resources would most likely be integrated in a settlement system led by year-round base-camps where a broad range of activities were practised on a large spectrum subsistence context, as observed in Samouqueira I (Soares, 1995, 1996), Vale Marim I (Soares and Tavares da Silva 2018; Soares, Tavares da Silva and Mazucco, 2017, 2021), Fiais (Lubell *et al.*, 2007; Rowley-Conwy, 2015), Vidigal (Soares, Tavares da Silva and Duarte, this volume). The logistic foraging or collecting observed at the late Mesolithic of Alentejo Littoral (Soares, 1996) implies a degree of scheduling and supposes the social need to storage food resources for delayed consumption (Testart, 1982), which means that a more dynamic economic intensification and semi-sedentism were on way, creating internal conditions to further integration of Neolithic novelties. This general logistic mobility pattern had been maintained apparently with no gaps into the early Neolithic at the campsite of Castelejo and Rocha das Gaivotas (Carvalho, Valente and Dean, 2009), both in Algarve; the early Neolithic shell midden of Medo Tojeiro, in Almograve (Tavares da Silva, Soares and Penalva, 1985) also seems to follow a similar mobility pattern.

Material culture of Castelejo is very scarce in the early and middle Mesolithic layers, as already referred. This technological behaviour can be seen as a response to the high mobility and/or low acess to lithic raw materials.

## BECOMING NEOLITHIC

The paleoenvironment of the Southwest coast was changing. A sub-humid to dry termo-mediterranean climate was advancing. The vegetation got more opened and degraded. Could human impacts have contributed to this vulnerable palaeoecological scenario by overexploitation of resources? So far as reported by the sedimentological information, charcoal analysis and radiocarbon dates of the stratigraphy of Castelejo, evidence of vegetation degradation are likely to be attributed to the regional effects of the 8.2 ka cal BP Greenland event.

Some scholars (López Sáez, López Merino and Pérez Díaz, 2008; Berger and Guilaine, 2009; McClure, Barton and Jochim, 2009; Cortés Sánchez *et al.*, 2012; Weninger *et al.*, 2014) seek to read the climatic crisis (increasing aridity and resources stress) as a boost factor to the transition to Neolithic. We do not rule out the possibility that climate changes have developed some catalysing effect on the process of cultural change among Mesolithic communities (mainly when they reached a strong degree of demographic-ecological imbalance), leading them to adopt at different rates the Neolithic novelties.

The sudden increase of flint industry in the upper layers of Castelejo, can be interpreted as the result of a territory reorganization of the late Mesolithic/early Neolithic communities in a more complex and multiscale interaction system at the moment of the inception of Neolithic externalities (Soares, 2020).

In the middle of the 6th millennium cal BC the Mesolithic way of life was changing at a regional scale. Among the Mesolithic groups of the Atlantic coast, economic and cultural Mediterranean Neolithic innovations were being tested and incorporated by cultural osmosis (Tavares da Silva and Soares, 2007).

The upper layers of Castelejo (L. 1A and L. SB), dated by radiocarbon from the third and last quarters of the 6th millennium cal BC (Table 1), just similar to the early Neolithic occupation of Rocha das Gaivotas (WK-17029 - 6801±39BP - Carvalho, Valente and Dean, 2009), registered a temporary rhythm of use as in the Mesolithic period, with the same narrow economic focus on shellfish exploitation, without any evidence of hunting, fishing activities, or domestication items. Nonetheless, the material culture, namely lithic artefacts (Figs. 22-24) and rare pottery, indicates Neolithic times. The early Neolithic temporary sites of Castelejo and Rocha das Gaivotas would be connected with the coeval base-camps, namely of Cabranosa and Padrão (Carvalho, 2008), where the incorporation of livestock was in progress, inside a large spectrum subsistence pattern. At the same time, in the base-camp of Vidigal (Soares, Tavares da Silva and Duarte, this volume), on the littoral of Alentejo, resilient Mesolithic continued their way of life, adopting from the "Neolithic package" only scarce ceramics and polished stone tools, like the Mesolithic communities of Sado and Tejo paleo-estuaries (Soares, 2016).

The presence of ceramics does not necessarily mean a Neolithic lifeway, a shellfish gathering camp does not indicate a Mesolithic economic system. Recalling the statement of Julian Thomas (1991, p.127), to become Neolithic is to become part of a new social order.

## Final remarks

Mobile residential hunting groups had frequented Castelejo in the early Mesolithic. In middle - late Mesolithic the site became a temporary shellfish gathering camp, in the frame of the seasonal paths of a logistic mobility system.

Apparently, Castelejo continued to be used in the same way by early Neolithic task groups coming, by hypothesis, from the base-camps of Cabranosa and/or Padrão.

The lithic industry got more abundant, based on standardized bladelets (Montbani style) and using flint from the neighbouring S. Vincent Cape area. Ceramics are very rare, but they are inscribed in the early Neolithic cycle. Castelejo, for its long-lasting continuity notwithstanding its temporary rhythm of use, could be much more than a shellfish gathering campsite; it should be seen as a place of memory for regional Mesolithic hunter-gatherer communities.

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