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Human landscapes of the Late Glacial Period in the interior of the Iberian Peninsula: La Peña de Estebanvela (Segovia, Spain)

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ABSTRACT

The chronostratigraphic framework of the Magdalenian in the interior of the Iberian Peninsula currently covers the period 21,440–21,040 cal BP (level 2 of the Cueva del Gato site at Epila, Province of Zaragoza) to 12,770–12,570 cal BP (level I of the La Peña de Estebanvela site, Ayllón, Province of Segovia). These dates embrace times of strong climatic oscillation, beginning with very rigorous environmental conditions (stage GS2) and ending with a temperate climate (Alleröd); over this period, extreme events such as Heinrich event 1 occurred. However, little information is available that would allow the environments through which human groups moved during the Late Last Glacial of the Iberian interior to be characterised. The La Peña de Estebanvela site is something of an exception in that its archaeological features allow the reconstruction of the surrounding environment, and provide information on how natural resources may have been used. The faunal remains represented at this site reflect changes in palaeoecology over time. Taphonomic analysis of recovered macromammals and lagomorphs shows that these animals were brought to the site, butchered and consumed. The available data on seasonality fix the occupation of levels I–III from the spring to the autumn. Certain types of wood were collected for use as firewood. Other elements found in the record (personal ornaments, mobiliary art and raw materials) provide evidence that the people that occupied the site moved over a more extensive territory.

1. Introduction

The present work provides an updated view of the human landscape of the Late Glacial Period (encompassing Greenland Stadial 2 [GS 2] and Greenland Interstadial 1 [GI 1]) of the interior of the Iberian Peninsula. The study area is bordered to the north by the Cantabrian mountains, to the northeast by the Ebro Depression (although some sites in the Jalón Basin are taken into account given their apparent connection to sites in the interior), to the east by the Iberian Range, to the south by the Betic Range, and to the west by Portugal. It has many different types of terrain that must have conditioned the contact between human groups within and beyond its boundaries. Its settlement is therefore unlikely to have been uniform during the Late Pleistocene. The archaeological record shows it was occupied from the beginning of the Upper Palaeolithic, more intensely so from the Magdalenian (Cacho et al., 2010).

2. The Magdalenian in the interior of the Iberian Peninsula

As in other parts of the Peninsula, the evidence of occupation of the interior becomes common in the Magdalenian, and in particular

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in the Upper Magdalenian. The Late Glacial period was a time of increasing human population, which led to more intense occupation of the territory (Cacho, 1999) (Fig. 1).

The Jalón Valley, a route into the study area, is home to the Cueva del Gato (Epila, Province of Zaragoza), level II of which has been assigned to the Archaic Magdalenian. The level contains evidence of a crude lithic industry, without *raclettes*, but with scrapers, burins and denticulates, along with bone industry including Placard-type spear point and other decorated elements. Radiocarbon dates of this level show it to be rather older than the Deza sites, situating its occupation between 22,800 and 21,040 cal BP (Utrilla et al., 2010, 2011).

The Early and Middle Magdalenian is well documented in Spain's Northern Meseta at the Alejandre and Vergara rock shelters (Deza, Province of Soria) and La Peña de Estebanvela rock shelter (Ayllón, Province of Segovia). These sites have been radiocarbon dated to 18,930–17,850 cal BP, 17,390–16,950 cal BP and 17,840–17.130 cal BP, respectively. A survey undertaken at the Alejandre rock shelter showed a single archaeological layer (level III). This stratigraphic unit, with its limited archaeological record given the small area excavated, has been assigned to the Early Magdalenian, within the cold Dryas I period (Utrilla et al., 2006).

The occupation of the Vergara rock shelter also seems to correspond to the cold Dryas I period. Excavated between 1996 and 1997, this rock shelter conserves an archaeological deposit with abundant lithic material in levels *c* and *d*. Backed bladelets with fine direct retouchings, burins, and carinated end scrapers are common in these levels. Multiple perforators are also found (Utrilla and Blasco, 2000; Utrilla et al., 2006). These finds reflect an industry very reminiscent of that described for the Buendía rock shelter (Province of Cuenca) (Cacho and Pérez Marín, 1997).

The first evidence of occupation of the Southern Meseta during the Magdalenian is provided by the Jarama II site (Valdesotos, Province of Guadalajara). This small cave on the south face of the Spanish Central Range has provided, along with a round, ivory figurine of a mustelid that was removed from its stratigraphic context a collection of materials dated to the Lower Magdalenian from bone industry evidence (Adán and Jordá Pardo, 1989).

The greatest novelty in the Southern Meseta during the Upper Palaeolithic was made known by the recently found Abrigo del Monte, the only site known to show signs of occupation in what is now the Autonomous Region of Madrid. This rock shelter, located at El Vellón, has an Early Magdalenian level showing occupation dated to between 17,900 and 16,700 cal BP. Its archaeological record includes lithic blade technology, decorated bone industry, and personal ornaments on fox canine teeth (Vega et al., 2008).

Another site reflecting the first stages of the Magdalenian (determined via radiocarbon date) is the Buendía rock shelter in the Province of Cuenca. Surface collection at the site provided a good series of lithic industry elements – largely burins, most of which were carinated (Cacho and Pérez Marín, 1997). However, assessment of the occupations at the site with greater precision must await the publication of the systematic excavations in progress (De La Torre et al., 2007).

Radiocarbon dates of samples from the lower levels (V and VI) at the Veldepino site (also in the Province of Cuenca) suggested the

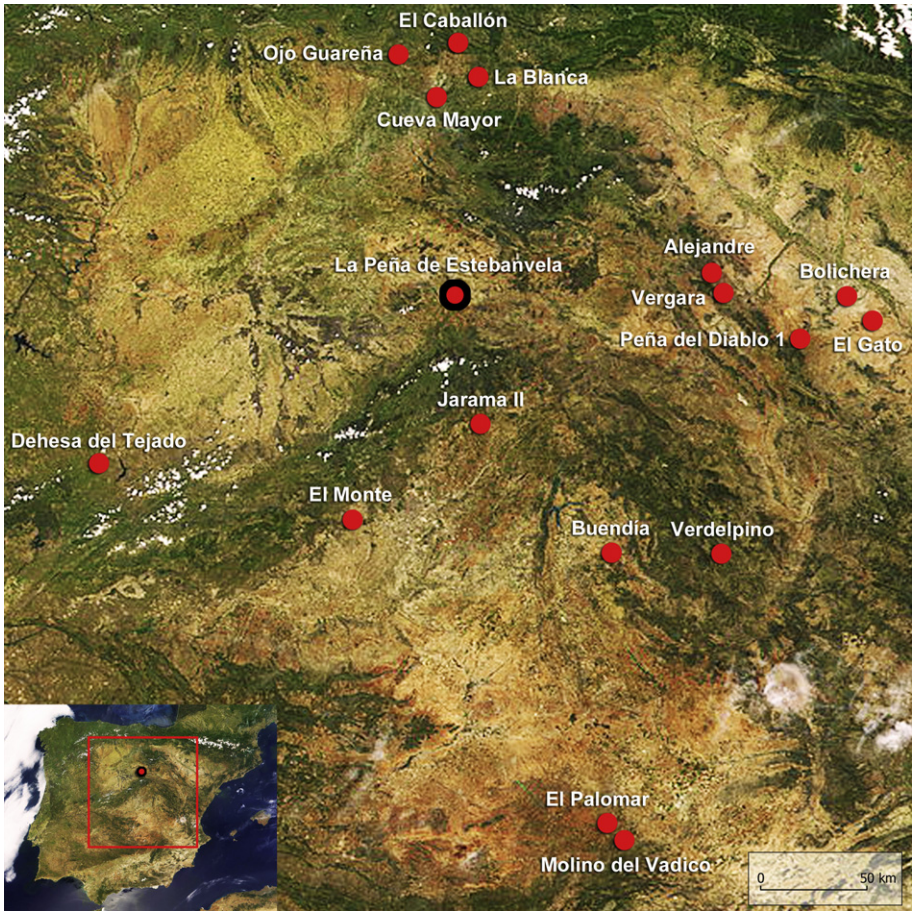

Fig. 1. Map with Magdalenian sites.

first stages of the Magdalenian (Moure and López, 1979), but stratigraphic problems and the review of the site's sequence in a later excavation have invalidated this interpretation (Rasilla et al., 1996). Thus, at the present time, conclusions must be limited to the presence of the remains of a Magdalenian occupation *sensu lato*.

Upper Magdalenian occupation has been cited for the La Blanca and El Caballón caves at Oña (Province of Burgos). However, little is known about these sites given the scarcity of the remains of any industry, and due to the fact that excavations were performed many years ago (Ibero, 1923; Corchón, 2002).

The Duero Basin is home to the Dehesa del Tejado de Béjar (Salamanca), the first site found to show occupation during the Upper Palaeolithic in the study area. This open-air settlement shows only one level of occupation but with very abundant remains of lithic industry, characterised by microlithism. It is clearly assigned to the Late Magdalenian. The most common tools are back bladelets showing abrupt, retouching of their edges (very possibly blades with fine direct retouching). Burins are found in much higher proportion than end-scrapers. This site has also provided a collection of materials that are difficult to explain from a functional viewpoint – nodules or prisms of rock crystal with signs of use that indicate their possible employment as end-scrapers or burins. A small schist plaque was also found with what would appear to be an engraved human-like image (Fabián, 1986, 1997).

The La Peña de Estebanvela site (Province of Segovia) possesses an important archaeological record for the Upper-Late Magdalenian in its middle and lower levels. Not far away, close to the sites at Deza (in the Province of Soria) is the Peña del Diablo 1 site at Cetina (Province of Zaragoza). This site, which has been radiocarbon dated to around just 12,980–12,500 cal BP, and provides a Late Magdalenian assemblage, has been assigned to the Younger Dryas by palynological studies (Utrilla et al., 2006).

The Bolichera Cave at Calcena (Province of Zaragoza), also on an access route to the Meseta, may also be Upper Magdalenian in age. However, the only significant element from this period, found out of context, was a harpoon with a circular cross section and a single row of barbs (Utrilla et al., 2010).

Testimony to the Late Glacial occupation of the Southern Meseta is very scant, and limited to the rock shelters of El Palomar and Molino del Vadico in the Segura Valley at Yeste (Province of Albacete). The upper level (level I) of the sequence at El Palomar has provided rich evidence of Late Magdalenian industry. The bottom layers (D1-6) at Molino del Vadico have also been linked to the Magdalenian, although the absence of bone industry and of radiocarbon determinations to date make is impossible to be more precise (Vega, 1993; Vega and Martín, 2006).

This review has not included sites with rock art due to the difficulty in assigning them a definite age, as the artistic styles are imprecise and cover a very wide chronological range. Consequently, the attributions of a certain Palaeolithic art ensemble to one style or another (and therefore to a chronology) vary depending on the researcher. This is the case, for example, of Cueva de la Griega in Segovia, whose art has been attributed to the Solutrean (transition from Style II to Style III) by Georges Sauvet and Sauvet (1983), whereas Soledad Corchón (1997) assigns it to phases between the final Solutrean and the upper Magdalenian. Similarly, the plaque from Villalba in Soria was published initially as Style III (Jimeno et al., 1990), while other scholars incline for a clearly Magdalenian chronology (Utrilla et al., 2006).

One exception in the area of study is Ojo Guareña Cave System, in Burgos, with radiocarbon determinations that indicate the cave was used in the Magdalenian. Cueva Palomera, which forms part of the cave system, has a group of Palaeolithic rock art in its Hall of Paintings, consisting of bovids, deer and anthropomorphs, among other representations, outlined in black. Their atypical style has made it difficult to establish a date for them. However, several radiocarbon determinations taken of the pigments have assigned the figures to the terminal Magdalenian and Azilian. An earlier date (19,210–18,250 cal BP) for charcoal associated with human footprints in the Galería de las Huellas seems to indicate the cave was in use since the early Magdalenian (Corchón et al., 1996).

3. Magdalenian chronostratigraphy of the Iberian Peninsula's interior

In order to place the Magdalenian archaeological record in the centre of the Iberian Peninsula (Duero, Tajo and Guadiana River Basins, Spanish Central Range and Iberian Mountains) in the chronostratigraphic context of the late Upper Pleistocene with certain precision, the radiocarbon determinations available for this period and geographical area were analyzed. A total of 43 ^{14}C dates have been catalogued for the Magdalenian, from eleven archaeological sites with deposits and rock art (Table 1).

For the northern Meseta (northern side of the Spanish Central Range and eastern side of the Iberian Mountains) 36 ^{14}C dates are available from eight sites: the deposits in the rock shelter of La Peña de Estebanvela (Segovia) has contributed 22 dates, El Portalón de Cueva Mayor (Burgos) and the rock shelters of Alejandre and Vergara (Soria) have each added one date, Cueva del Gato 2, two dates, and the rock shelter of Peña del Diablo 1 (Zaragoza), four dates. A further determination was obtained for the remains of a torch in the Galería de las Huellas and five dates from charcoal pigment in paintings in Cueva Palomera, both in Ojo Guareña Cave System in Burgos.

For the southern Meseta (south side of the Spanish Central Range and Iberian Mountains), only seven dates are available, from three sites: the rock shelter of El Monte (Madrid) with two dates, and Verdelpino and Buendía (Cuenca) with two and three dates respectively.

After compiling these dates and examining their validity, it was decided to rule out one of the dates from the rock shelter of Buendía as it was not synchronic with the dated materials, and two dates from Verdelpino and one from La Peña del Diablo 1 because the standard deviations were greater than 250 years. Finally, to be rigorous in this validity test, for La Peña de Estebanvela, one date was discarded because of the lack of synchronicity and association, and five dates with problems of chronological inversion. However, these dates correspond to the period being studied and may be considered an indication of natural or anthropic processes that took place at that time, and therefore are listed in the compilation (Table 1).

The dates were calibrated with the CalPal-2007-Hulu curve included in the March 2007 version of the CalPal software (Weninger and Jöris, 2004; Weniger et al., 2009 on line), which is practically identical to IntCal-09 (Reimer et al., 2009). Chronological intervals for the calibrated dates at the maximum probability (2σ) were calculated for all the Magdalenian dates from inland Iberia, except for the determination from Buendía rock shelter, which falls outside the period being studied (Table 1).

In order to avoid the over-representation of certain levels in some deposits, which have been dated more than once, for each level the two dates that give the minimum and maximum age were chosen, to place each of these levels in a clearly-defined time range. Using the 25 dates that were selected, CalPal was used to obtain the cumulative probability curve for the calibrated radiocarbon determinations in the centre of the Iberian Peninsula.

Additionally, to situate this population sequence in the Meseta precisely within the Upper Pleistocene chronostratigraphic scale currently in use (Björck et al., 1998), with CalPal the cumulative probability curves obtained after calibrating the selected radiocarbon determinations were compared with high resolution

Table 1
Radiocarbon determinations for Magdalenian deposits and rock art in the interior of the Iberian Peninsula. The dates highlighted in bold are those used for the cumulative probability curve in Fig. 2. (* Non-valid date because of lack of synchronicity; ** Non-valid date because of insufficient precision, $\sigma > 250$).

Site	Level	Archaeological context	Lab. Code	^{14}C-Age [BP]	CalAge p (95%)[cal BP(0 = AD 1950)]	Method	Material
Portalón, Cueva Mayor	Level 10 P-1	Upper Palaeolithic	**Beta-209452**	**16980 ± 80**	**20590–20230 cal BP**	AMS	Bone
Galería de las Huellas, Ojo Guareña	Torch	Early Magdalenian	**GIF-1721**	**15600 ± 230**	**19210–18250 cal BP**		Charred torch
Cueva Palomera, Ojo Guareña	Anthropomorphic painting	Magdalenian/Azilian	**GIF-95363**	**10980 ± 160**	**13180–12660 cal BP**		Humic sediment
Cueva Palomera, Ojo Guareña	Anthropomorphic painting	Magdalenian/Azilian	**GIF-95229**	**11130 ± 100**	**13290–12770 cal BP**		Charcoal
Cueva Palomera, Ojo Guareña	Deer painting	Magdalenian/Azilian	**GIF-96136**	**10950 ± 100**	**13090–12690 cal BP**		Charcoal
Cueva Palomera, Ojo Guareña	Deer painting	Magdalenian/Azilian	**GIF-95238**	**11470 ± 110**	**13620–13140 cal BP**		Charcoal
Cueva Palomera, Ojo Guareña	The Sorcerer painting	Magdalenian/Azilian	**GIF-96134**	**11540 ± 100**	**13660–13220 cal BP**		Charcoal
Alejandre	III	Early Magdalenian	**GrN-23448**	**15370 ± 110**	**18930–17850 cal BP**		Charcoal
Vergara	D	Early Magdalenian	**GrN.A-8403**	**14000 ± 100**	**17390–16950 cal BP**		Horse tooth
Gato 2	II	Archaic Magdalenian	**GrA-42226**	**17700 ± 70**	**21440–21040 cal BP**	AMS	Bone
Gato 2	II	Archaic Magdalenian	GrA-30683	18090 ± 90	22030–21350 cal BP	AMS	Charcoal
Gato 2	II	Archaic Magdalenian	GrA-22503	18260 ± 130	22500–21420 cal BP	AMS	Charcoal
Gato 2	II	Archaic Magdalenian	**GrA-22505**	**18650 ± 140**	**22800–22160 cal BP**	AMS	Charcoal
Peña del Diablo 1	1	Late Magdalenian/Azilian	GrN-21012 (**)	11080 ± 540	14230–11550 cal BP	Conventional	Charcoal
Peña del Diablo 1	2	Late Magdalenian/Azilian	**GrN-21014**	**10760 ± 140**	**12980–12500 cal BP**	Conventional	Charcoal
Peña de Estebanvela	PE I	Late Magdalenian	**Beta-290779**	**10640 ± 60**	**12770–12570 cal BP**	AMS	Charred material
Peña de Estebanvela	PE I	Late Magdalenian	Beta-155114	11060 ± 50	13100–12820 cal BP	AMS	Charred material
Peña de Estebanvela	PE I	Late Magdalenian	Beta-155113	11170 ± 50	13280–12920 cal BP	AMS	Charred material
Peña de Estebanvela	PE I	Late Magdalenian	**Beta-287754**	**11330 ± 50**	**13370–13050 cal BP**	AMS	Charred material
Peña de Estebanvela	PE I	Late Magdalenian	Beta-287755 (*)	12220 ± 50	14750–13870 cal BP	AMS	Charred material
Peña de Estebanvela	PE I	Late Magdalenian	Beta-290778 (*)	12400 ± 50	14970–14410 cal BP	AMS	Charred material
Peña de Estebanvela	PE II	Late Magdalenian	**Beta-155116**	**11400 ± 120**	**13580–13020 cal BP**	AMS	Charred material
Peña de Estebanvela	PE II	Late Magdalenian	**Beta-197376**	**11700 ± 70**	**13800–13400 cal BP**	Conventional	Organic sediment
Peña de Estebanvela	PE II	Late Magdalenian	Beta-155115 (*)	9950 ± 40	11650–11170 cal BP	AMS	Charred material
Peña de Estebanvela	PE II	Late Magdalenian	Beta-228872	11530 ± 70	13610–13250 cal BP	AMS	Charred material
Peña de Estebanvela	PE III	Upper Magdalenian	**Beta-232940**	**12070 ± 40**	**14290–13730 cal BP**	AMS	Charred material
Peña de Estebanvela	PE III	Upper Magdalenian	Beta-155710	12270 ± 40	14790–14030 cal BP	AMS	Charred material
Peña de Estebanvela	PE III	Upper Magdalenian	Beta-155118	12360 ± 50	14940–14180 cal BP	AMS	Charred material
Peña de Estebanvela	PE III	Upper Magdalenian	**Beta-232939**	**12440 ± 50**	**15010–14610 cal BP**	AMS	Charred material
Peña de Estebanvela	PE III	Upper Magdalenian	Beta-287757	12180 ± 50	14650–13850 cal BP	AMS	Charred material
Peña de Estebanvela	PE III	Upper Magdalenian	Beta-287756 (*)	12900 ± 60	15610–15330 cal BP	AMS	Charred material
Peña de Estebanvela	PE IV	Upper Magdalenian	Beta-197377 (*)	12260 ± 50	14810–13930 cal BP	AMS	Charred material
Peña de Estebanvela	PE IV	Upper Magdalenian	**Beta-290780**	**12530 ± 60**	**15210–14730 cal BP**	AMS	Charred material
Peña de Estebanvela	PE IV	Upper Magdalenian	Beta-287758 (*)	14410 ± 60	17800–17520 cal BP	AMS	Charred material
Peña de Estebanvela	PE VI	Middle Magdalenian	**Beta-197378**	**14200 ± 50**	**17610–17130 cal BP**	AMS	Charred material
Peña de Estebanvela	PE VI	Middle Magdalenian	**Beta-228871**	**14450 ± 80**	**17840–17520 cal BP**	AMS	Charred material
El Monte		Magdalenian	**Beta-245813**	**13570 ± 70**	**16980–16700 cal BP**		
El Monte		Magdalenian	**Beta-245814**	**14660 ± 80**	**17900–17740 cal BP**		
Buendía	Level N1C	Magdalenian	**Beta-212776**	**14840 ± 50**	**17960–17840 cal BP**	AMS	Charcoal
Buendía	Level N31C	Magdalenian	Beta-212777 (*)	210 ± 40 BP			
Buendía		Magdalenian	**UtC-4006**	**14380 ± 90**	**17850–17290 cal BP**		
Verdelpino	VA	Magdalenian	1-9841 (**)	12930 ± 470	17270–13950 cal BP	Conventional	
Verdelpino	VB	Magdalenian	I-9840 (**)	14000 ± 520	18340–15540 cal BP	Conventional	

palaeoclimate proxies, such as the δ^{18}O GISP2 Hulu Age Model (Grootes et al., 1993; Meese et al., 1994; Wang et al., 2001) and SST MD95-2043 obtained in the Alboran Sea (Cacho et al., 2001).

According to this cumulative probability curve based on the calibrated radiocarbon determinations (Fig. 2), the Magdalenian occupation in the centre of the Iberian Peninsula took place during the OIS 2, or Last Glacial Maximum (LGM). The earliest evidence comes from Level 2 in Cueva del Gato, with Magdalenian 0 or Archaic materials, whose chronology ranges between 22,800 and 21,040 cal BP, within GS 2c, during the second half of Population Event 1 in the sequence proposed by Gamble et al. (2004), used here. The ^{14}C date from Level 10 (P-1) in El Portalón de Cueva Mayor (Ortega et al., 2008) is an indication of human presence in the northern Meseta around the start of GS 2b, at the end of Population Event 1.

Greater continuity is seen from late GS 2b to the first half of GS 2a, with dates associated with Lower Magdalenian evidence in levels III at Alejandre, N1C at Buendía, VI at La Peña de Estebanvela, d at Vergara and El Monte, as well as the torch fragment from Galería de las Huellas in Ojo Guareña Cave. All of these are within the time range of 19,210–16,700 cal BP, coinciding with Population Event 2 in the LGM.

Coinciding with one of the coldest phases of the LGM, which includes the H1 Event, a gap is seen in the dates, during the second half of GS 2a. Only the date from level VA at Verdelpino corresponds to that time, and because of its low precision, it has not been included in this study.

After this gap, levels IV and III at La Peña de Estebanvela, with Upper Magdalenian materials, correspond to the late GS 2a (Oldest Dryas), during GI 1 (GI 1e or Bölling) and GI 1d (Older Dryas), in a time range between 15,210 and 13,730 cal BP, which coincides with Population Event 3 and the start of Event 4.

A fall in the probability curve of the calibrated dates, between the GI 1d (Older Dryas) and GI 1c, is followed by a new group of dates at the end of GI 1 (Alleröd) for the northern Meseta. These are

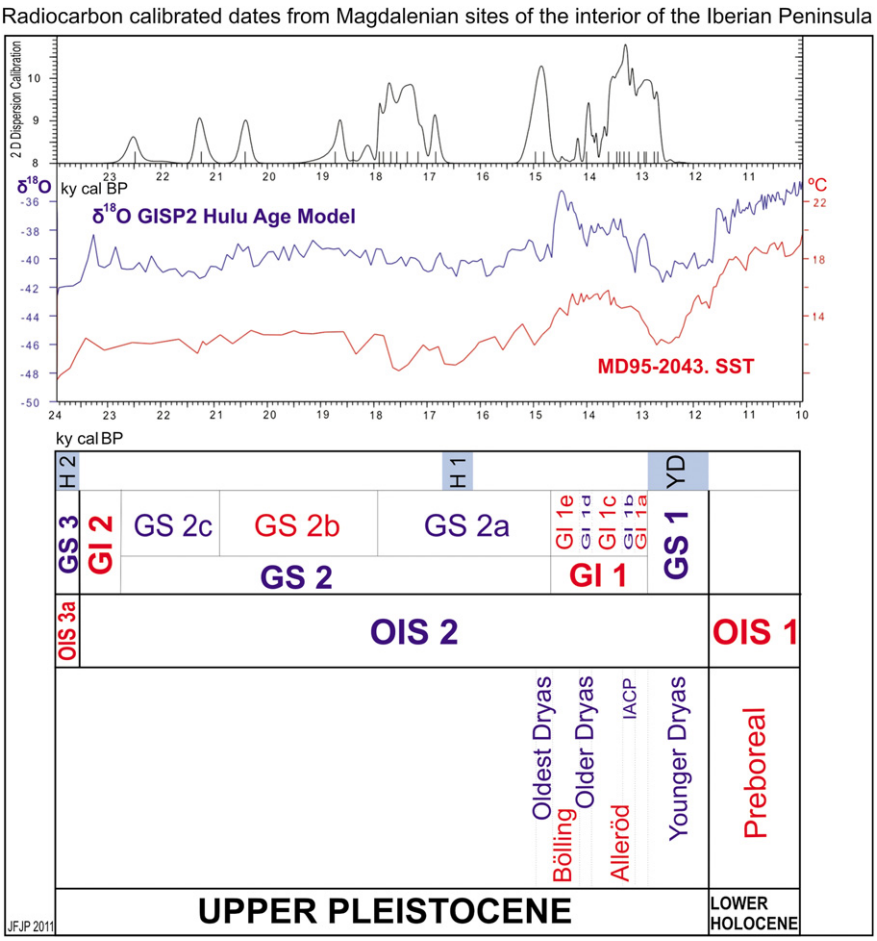

Fig. 2. Chronostratigraphic position and palaeoclimate interpretation of the Magdalenian in the interior of the Iberian Peninsula (IACP: Intra Alleröd Cold Period).

from levels II and I at La Peña de Estebanvela and level 2 at La Peña del Diablo, as well as from the paintings in Cueva Palomera, attributed to the Magdalenian/Azilian, in a time range between 13,400 and 12,500 cal BP, coinciding with the end of Population Event 4 and the start of Event 5.

4. The Magdalenian site of La Peña de Estebanvela

The La Peña de Estebanvela site is a rock shelter located at an altitude of 1065 m in the Sierra de Ayllón on the northern end of Spanish Central Range. It lies on a slope on the right bank of the River Aguisejo, a tributary of the River Riaza which flows into the River Duero. Its archaeological record stretches from the Middle to Late Magdalenian. Research undertaken between 1999 and 2009 has produced large lithic (51,000 pieces) and faunal (64,155 remains of macrofauna) inventories, as well as personal ornaments, bone industry objects, an exceptional collection of portable art objets, and a number of hearths.

Currently it is the main reference site for research into the Magdalenian of the Meseta. Its stratigraphic sequence has been subjected to a full chronostratigraphic control and the series of radiocarbon determinations, the largest in the area of study, has enabled progress to be made in the definition of a chronological framework for the late Upper Pleistocene in the region.

4.1. Chronology and stratigraphic sequence

Six levels have been identified from the base to the top of the site's stratigraphic sequence that can be chronoculturally attributed to the Middle Magdalenian (VI and V), the Upper Magdalenian (IV and III) and Late Magdalenian (II and I) (Cacho et al., 2007) (Fig. 3).

The position of the stratigraphic sequence on the overall chronostratigraphic scale of the late Upper Pleistocene (Björck et al., 1998) has been fixed by using the procedure described above for the interior of the Iberian Peninsula. Chronostratigraphically, its sedimentological characteristics and the available conventional and calibrated radiocarbon dates situate the stratigraphic sequence at La Peña de Estebanvela within OIS 2 (Shackleton and Opdike, 1973) or the last moments of the late Upper Pleistocene, which includes the end of Greenland Stadial 2 (GS2) and Greenland Interstadial 1 (GI1) (Björck et al., 1998).

The La Peña de Estebanvela sequence starts with sedimentation at level VI during the interval 17,770–17,190 cal BP, at the start of GS2a, a cold period before the slight warming that preceded the Heinrich 1 event (H1). An interval of 2000 years corresponding to GS2a, a cold period that warmed towards more temperate times, is then appreciated for which no radiocarbon dates is available. Level V, which remains undated but which shows apparent continuity with level VI, might also fall within this period.

Seven radiocarbon dates are available for levels IV and III, which show accumulated probability curves for the calibrated ages that almost completely overlap. These suggest a wide chronology indicating a time range for the sedimentation of both levels which, in calibrated dates with the largest probability, can be quantified as spanning 1200 years between 15,150 and 13,890 cal BP. Thus, these levels were probably laid down during a single event somewhere between the last cold moment of GS2a (Oldest Dryas), the first half of GI 1e (Bölling), and the cold period of GI 1d (Older Dryas). That

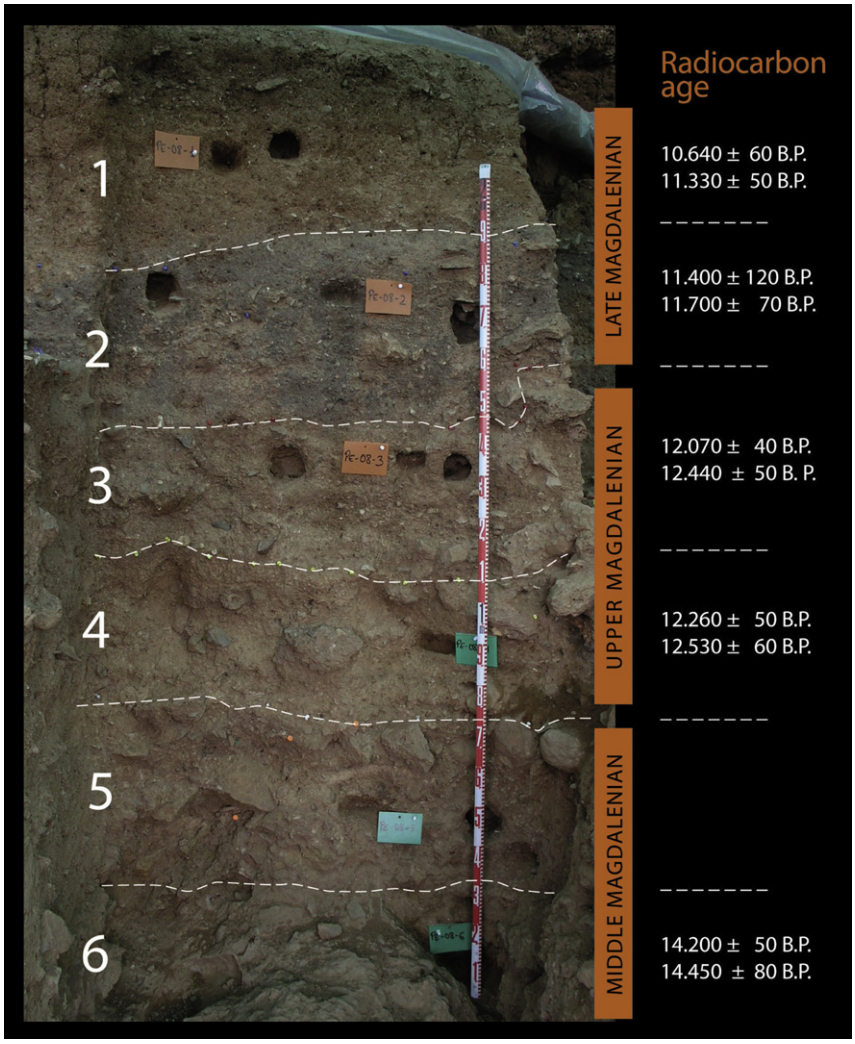

Fig. 3. Stratigraphic sequence at La Peña de Estebanvela.

said, the characteristics of the sediments and the geographic and topographic situation of the site suggest the sedimentation of both levels occurred during the temperate GI 1e.

The calibrated dates for levels IV/III show minimum overlap with those of level II. This suggests a stratigraphic hiatus between levels III/II related to a lack of sedimentation rather than any erosional phase (there being no evidence of any erosion). This period of no sedimentation or of any is represented by the inflexion observed in the accumulated probability curve between the calibrated dates for levels IV/III, and III/II. The absence of sedimentation and of any signs of human activity at the site occurred during the cold GI 1d (Older Dryas).

The radiocarbon dates (calibrated with the maximum probability) for level II situate it between 13,720 and 13,100 cal BP, during the warm GI 1c period (Alleröd). Level I developed between 13,300 and 12,610 cal BP, between the cold GI 1b (Inner Alleröd Cold Period or IACP) and the start of the cold GS 1 period (Younger Dryas). A certain overlap was seen between the calibrated date intervals for levels II and I of some 200 years, suggesting that level I was, to a certain degree, deposited in continuity with level II, with no erosive phase that might have eliminated any of the record.

Finally, following the sedimentation of level I, postdepositional processes of cold characteristics, occurring during GS I (Younger Dryas) was responsible for the cryoturbation affecting levels I and II.

4.2. Palaeoenvironmental framework

The palaeoenvironmental information available varies throughout the sequence, primarily owed to the more extensive excavation undertaken of levels I, II and III. For example, 16 micromammal taxa (an erinaceimorph, three soricomorphs, four chiropterans, seven rodents and a lagomorph) have been recorded for the site. However, level I is the only one with a good enough record to allow any palaeoenvironmental inferences to be made. This level is characterised by its diversity, which includes 15 of the taxa reported for the site. It also has the greatest minimum number of individuals (NMI = 56).

The remaining levels have few taxa and small NMI values: 2 taxa and NMI = 2 for level II, 6 taxa and NMI = 18 for level III, and 3 taxa and NMI = 3 for level IV, and 3 taxa and NMI = 6 for level VI. The assemblage of micromammals present in level I suggests that the climate was damp and temperate, similar to that of the present day (level I is the only level for which sufficient information exists for such inferences to be drawn).

The presence in level I of *Eliomys quercinus* and *Apodemus sylvaticus* indicates the existence of wooded areas. *Myotis myotis* and *Barbastella barbastellus*, which are also present, are commonly considered forest bat species, though they also inhabit open woodland and plains with some tree cover. Level I also contain taxa such as *Erinaceus europaeus*, *Crocidura russula*, *Rhinolophus*

ferrumequinum and *Plecotus auritus - Plecotus austriacus*, which can be thought of as ecotonic species although they can live in both wooded area and open areas with vegetation. They are commonly found at the edge of woodland where there are bushes and prairie. *Microtus arvalis–Microtus agrestis*, *Microtus duodecimcostatus* and *Oryctolagus cuniculus* are also present; these species show a preference for areas with abundant herbaceous or shrubby vegetation. *Microtus oeconomus*, in contrast, prefers very damp soils with much vegetation or the edges of watercourses. *Arvicola sapidus*, which is typically riparian, lives at the water's edge where there is abundant herbaceous or shrubby riverside vegetation. These latter species are also represented in level I.

The above association suggests an environment with a watercourse and abundant plant cover with wooded areas, along with areas of landscape transition, mostly open but with abundant vegetation such as woodland borders, shrubby areas and dry prairie. In fact, it was probably quite similar to that seen today (although perhaps with more plant cover) at the site, where the River Aguisejo, lined by riparian woodland, provides all the types of environment described above. Indeed, all the micromammalian taxa found in level I are present in the area today, except for *M. oeconomus*. The herpetological sample also suggests climatic conditions similar to those of the present for level I (Sanchiz and Barbadillo, 2007).

None of the species found in level I suggest the climate that reigned when it was deposited was any more rigorous than it is today. In fact, some of the level's species are of a marked thermophilic nature, such as *A. sylvaticus* and *E. quercinus*, and others show preference for a Mediterranean climate, such as *C. russula*, *M. duodecimcostatus* and *O. cuniculus* (the most abundant mammal in level I) (Sesé, 2007; Laplana et al., 2011). *M. oeconomus* is nowadays a Eurosiberian species, but it is only indicative of cold climates when abundant, as seen in some Upper Pleistocene sites of the Cantabrian Range (Sesé, 2005). At La Peña de Estebanvela, *M. oeconomus* is in fact represented in levels I, III, IV and VI (although by just one individual in the first three and two in the last).

The plant remains found at La Peña de Estebanvela are consistent with other palaeoenvironmental information. The use of plant resources at the site is based on wood charcoal analysis and phytoliths. Other plant remains – pollen and non woody plant macroremains such as fruits or seeds – are very poorly preserved or completely absent from the samples. The finding of charcoal suggests the continuous exploitation of the river vegetation in the vicinity of the site. Level I show the highest diversity in terms of woodland formations (Fig. 4).

During the Middle Magdalenian (17.840–17.130 cal BP) *Salix* (willow) wood was used in a hearth along with hazel and pine. Phytolith analysis might suggest a significant use of grasses. Despite the large number of wood fragments analysed for the Upper Magdalenian (15.210–13,730 cal BP), almost all of them (95.6%) have been assigned to *Salix*. Other taxa are sporadic (*Pinus, Alnus, Corylus,* Ericaceae, Pomoideae). The phytoliths for this period (levels IV and III) include a limited presence of wood compared to grasses. The human selection of these fuels and raw materials suggest that, during the Middle and Upper Magdalenian (levels V, IV and III), grass formations may have been very important around the site, while woodland was restricted. Trees (willows, alders and hazels) would have concentrated along watercourses together with pine, which is present throughout the sequence. Open shrubby–thorny vegetation was also present, as shown by the sporadic use of heathers (Ericaceae) and Pomoideae. However, according to phytolith analysis of the hearths in level III, wood might have been used as fuel to a greater extent than in level II.

During the Late Magdalenian (13,800–12,570 cal BP, levels II and I) wood fuel involved a greater diversity of taxa. Oak and thorny species typical of oak forest margins, rock communities, and shrub formations of heathers and Leguminosae are all present. This diversity may respond to an increase in woodland as a consequence of favourable climatic conditions, but may also reflect a probable widening of the site's catchment area and/or of the activities carried out there. Phytoliths from the upper levels are consistent with wood charcoal, in agreement with grasses decreasing and trees increase in importance. However, the hearths of level II show high content of grasses, something that might be related to the specific activities carried out in or around them.

4.3. Territoriality and seasonality

Zooarchaeological and taphonomic analyses have shown that the Magdalenian groups that occupied La Peña de Estebanvela exploited the different habitats around the site, such as open areas where *Equus ferus* and *Equus hydruntinus* was to be found, wooded areas with *Capreolus capreolus*, *Cervus elaphus* and *Lynx pardinus*, rocky areas with *Capra pyrenaica*, and mountainous areas with *Rupicapra pyrenaica* (Fig. 5).

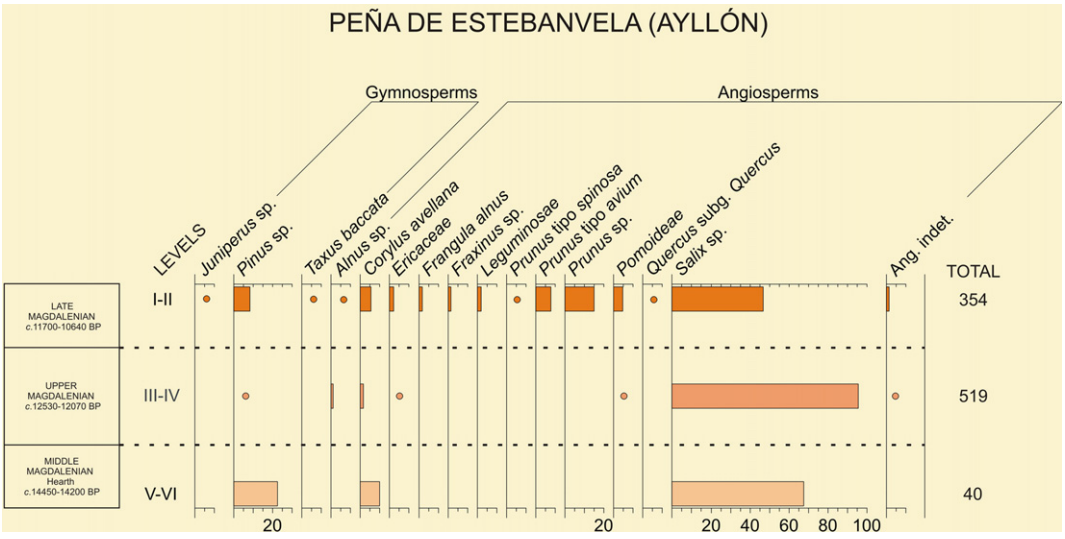

Fig. 4. Anthracological diagram for La Peña de Estebanvela.

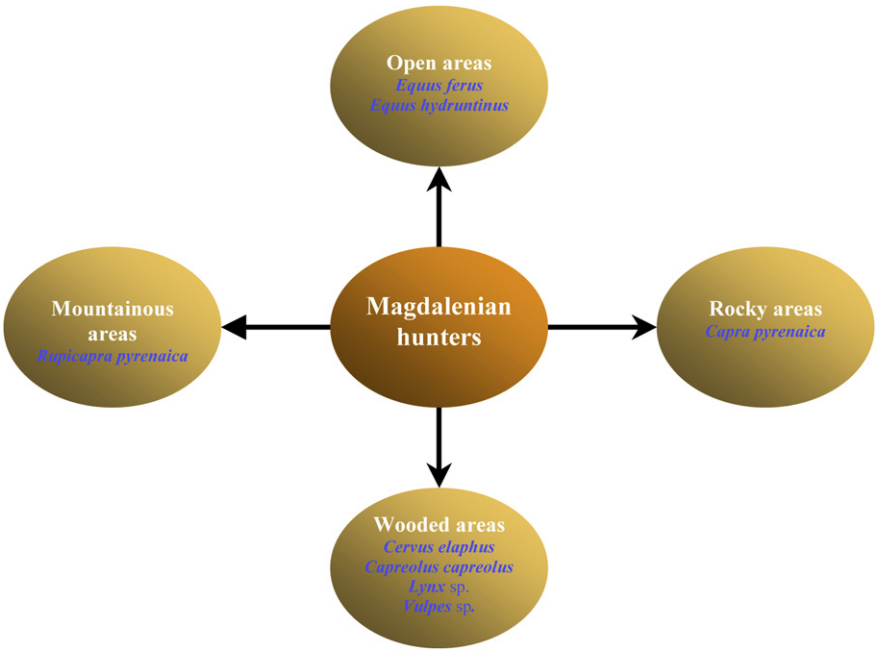

Fig. 5. Habitats exploited by Magdalenian groups at La Peña de Estebanvela.

The animal taxa predominating in the upper levels (I–III), with a larger archaeological record, are the lagomorphs, and ibex among the large mammals, with horse as the second most abundant species. Red deer, chamois, roe deer and wild boar are less common and appear together with some carnivores like lynx.

The anatomical profiles examined plus the taphonomic data show that hunted animals were transported whole to the site, independent of their size, suggesting they were all captured within a 10 km radius. They were then butchered and consumed, as certain cutting and percussion marks on certain bones testify (Yravedra, 2007). The scarcity of burnt bones (with hardly any thermal alterations) suggests that the meat was probably cooked off the bone. The fat on the axial bones and epiphyses appears, therefore, not to have been used. There appears to have been no system for the elimination of waste.

Ungulates aged 4–6 years appear to have been preferentially hunted, along with a few infant and juvenile specimens. This selective hunting pattern afforded the advantages of better meat quality as well as implying the capture of young individuals with poorer means of defence, owing to their solitary life without group protection.

The ungulate remains of levels I, II and III suggest these animals were hunted during the spring and early summer (coinciding with birthing when they were most vulnerable) and autumn (during the mating season when aggregations were greatest). This pattern of usage of the rock shelter is repeated throughout its sequence (Yravedra, 2007).

The charcoal fragments identified indicate the use of wood, mainly willow, as domestic fuel. The dominance of willow charcoal indicates the intensive and recurrent exploitation of the riparian habitat. Although no fruits were identified, the Magdalenian occupants of the site (at least in level I) would have had access to a large variety of fruits such as cherries, hazelnuts and crabapples, which may have formed part of their diet. Fish were also taken, as shown by the presence of brown trout (*Salmo trutta*) vertebrae in levels I–VI (Perea and Doadrio, 2007). Birds were probably also consumed although no cut marks or any other direct signs of human impact on their remains have been identified (Sánchez Marco, 2007).

Other anthracological remains recovered at the site suggest the use of certains plant resources for other purposes unconnected with subsistence; for example, young willow or hazel wands may have been weaved for basketry.

4.4. Archaeological record

The *chaînes opératoires* identified in the lithic assemblage show no significant differences throughout the sequence. Lithic production was oriented toward the production of flint blades (flint was available within a 20 km radius), although some quartzite and rock crystal elements have also been found.

The strategies for reducing the cores focused on the preparation and later exploitation of planes via parallel or convergent extractions using one or two striking platforms. This resulted in the production of prismatic-shaped cores. Sometimes extractions were performed on convex or carinated fronts, which produced pyramidal cores. A third alternative involved a reduction process which began with either of these two kanpping systems and finished by incorporating successive fronts and platforms. This latter system was in some cases linked to the more opportunist production of blades, but also to a desire to make use of the cores until no longer possible.

Among the retouched assemblages, bladelets tools are, together with short end-scrapers, the most common tools in levels I and II (Fig. 6). The upper level also contains a significant number of long blades with scalariform retouching; this is quite characteristic of the Late Magdalenian in certain sites in southern France (Escalon de Fonton and Onoratini, 1979; Célérier, 1998). In level III, and even more so in level IV, burins begin to become more common, although end-scrapers – now long end-scrapers – are still more common. Most common of all are single and double backed bladelets showing fine, direct retouching. Finally, in the two lower levels, a change is seen in the typological composition as burins become more abundant than end-scrapers. Together with a greater variety in the choice of raw materials, this is an indication of a process of techno-typological transformation that can only be adequately assessed when the record of levels V and VI becomes better known.

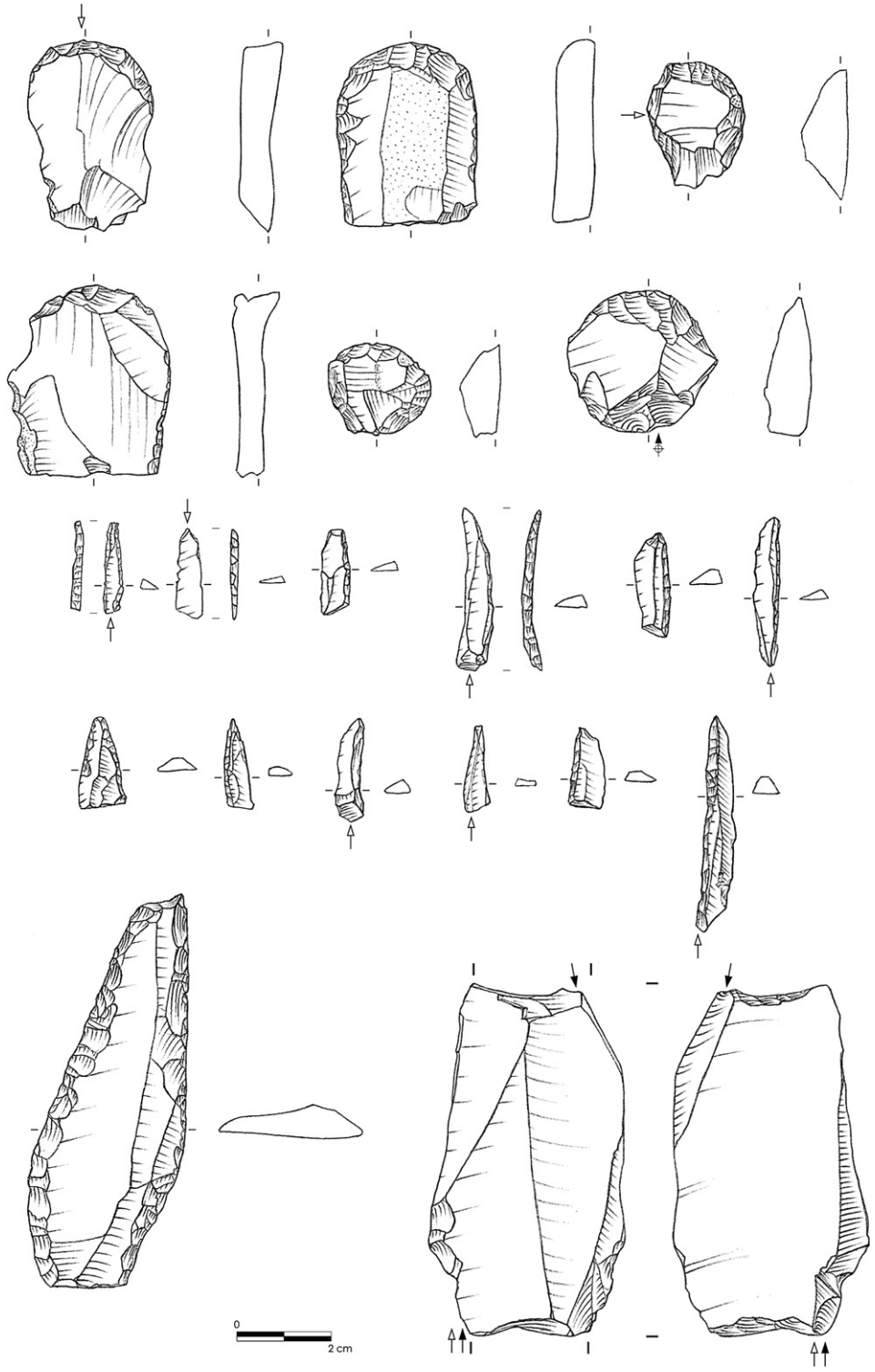

Fig. 6. Lithic assemblages in Levels I and II at La Peña de Estebanvela.

The bone industry is relatively scarce; the elements found are nearly always fragmented and preferentially involve the use of bone rather than antler. Among the most common are domestic tools such as punches and needles. In the latter case, use-wear marks in the perforation and the shaft indicate their intensive use, probably working animal skins. The scant presence of spear points throughout the sequence might be due to the manufacture of such tools from other, less easily preserved material, such as wood. It may also be that the hunting strategies used did not require them.

4.5. Personal ornaments and portable art

A total of 53 objects of personal ornaments have been found, all except one of them from the upper part of the sequence (8 in level I, 9 in level II, 35 in level III and 1 in level IV) The absence of this kind

of object in the lower levels must be connected to the small amount of sediment that has been excavated. All these personal ornaments were made from gastropods (*Cyclope neritea, Trivia arctica, Trivia pulex, Littorina obtusata, Nassarius reticulatus, Theodoxus fluviatilis*), except for three red deer atrophied canines and another made from sepiolite. Traceological analysis revealed notable wear suggesting the constant use of these items (Fig. 7).

A collection of 43 portable art objects were also found in the upper levels; small flat and elongated stones, mostly of schist. The decoration is geometric and made with fine incisions; it includes scaliforms and zigzags, but the most characteristic motif in the ensemble consists of two series of parallel lines, opposite each other and perpendicular to the long axis of the stone (Fig. 8). Only two stones are exceptions to the use of exclusively geometric decoration, as they exhibit figures of horses, in one case superimposed on the geometric patterns (Cacho et al., 2007).

4.6. The sequence at La Peña de Estebanvela, in the context of the Magdalenian of the Iberian Peninsula

It is not easy to contextualise the occupations at La Peña de Estebanvela within the chronocultural sequence of the Iberian Peninsula's interior given the scant archaeological data available at this time, despite the progress made in research in recent years.

The sequence begins with level VI, the radiocarbon dates for which suggest a Middle Magdalenian age. Similar dates have been recorded for level 5d at the Vergara rock shelter (Deza, Province of Soria) with which it can be associated as its industry is typologically very similar to that in the lower levels at La Peña de Estebanvela. The lithic assemblage at the rock shelter of Alejandre could also be associated with level VI at La Peña de Estebanvela, although it has a slightly older determination (Utrilla and Blasco, 2000: 21).

On the south face of the Spanish Central Range, and quite close to La Peña de Estebanvela, lies the Jarama II site (Valdesotos, Province of Guadalajara). No radiocarbon dates are available for this site. Its archaeological record is not significant enough for it to be contextualised in the regional sequence (Adán and Jordá Pardo, 1989). The Del Monte rock shelter (Vellón, Province of Madrid) has radiocarbon dates close to those of the lowest level of La Peña de Estebanvela, and its industry could be assigned to the Early – Middle Magdalenian (Vega et al., 2008). However, a more precise assessment can only come after the results for this site are published.

The Southern Meseta is also home to two other sites (in the Province of Cuenca) which, according to radiocarbon date, might be considered contemporaneous with level VI of La Peña de Estebanvela: those of Buendía and Verdelpino (level Vb). However, their lithic assemblages differ in the high number of burins and the presence of bladelets with fine direct retouch, a type that is absent in level VI at La Peña de Estebanvela (Moure and López, 1979; Cacho and Pérez Marín, 1997; De La Torre et al., 2007).

Fig. 7. Personal ornaments (*Trivia arctica*) from level III at La Peña de Estebanvela.

Fig. 8. Decorated plaquette from level II at La Peña de Estebanvela. Scale in cm.

The human occupations at La Peña de Estebanvela represented by levels III and IV can be assigned Upper Magdalenian, according to the radiocarbon determinations. This is supported by the lithic took kit, which shows a slow increase in the proportion of burins compared with end-scrapers. No parallels are currently known in the Meseta for the industries in these levels.

Levels I and II appear to belong to the same cultural moment and show a lithic assemblage characterised by many bladelets tools along with the significant presence of points, followed by end-scrapers (usually short). This, along with the large proportion of long retouched blades (as seen in the Late Magdalenian of the Perigord, Languedoc and Provence in France) (Escalon de Fonton and Onoratini, 1979; Célérier, 1998) – and in particular the presence of needles (which are not found in the Azilian archaeological record), strongly suggests these levels belong to the Magdalenian. These levels overlap chronologically with the Early Azilian in other areas of Europe.

La Peña del Diablo 1, in the Henar Valley (Cetina, Zartagoza), has provided radiocarbon dates (Utrilla et al., 2006) that are contemporary with those from levels I and II at La Peña de Estebanvela. Its lithic assemblage is significantly different from that at Estebanvela, as burins predominate over end-scrapers; although backed bladelets are also numerous there, the points do not acquire the same weight as in level I at La Peña de Estebanvela. The lithic assemblage at Dehesa del Tejado (Béjar, Salamanca) could belong to the same time (Fabián, 1986, 1997), but the site lacks a geoarchaeological context and radiocarbon determinations. There is an absence of detailed technological studies of assemblages attributable to this time in the Magdalenian, which could be used to make comparisons with the data provided by La Peña de Estebanvela.

4.7. Spatial organisation and functionality of the site

The spatial study made from the record obtained in the latest excavation seasons has detected certain concentrations of materials

that are of certain interest for understanding the spatial organization of the site. The clearest concentration is doubtlessly a structure with a half-moon shape discovered in level III, in the central part of the site (Quadrats E8–E9). Several cores were found together with debris and small flakes, and because of this spatial distribution, the structure has been interpreted as a knapping area (Ortega, in press).

Earlier publications have described three hearth structures, excavated at La Peña de Estebanvela in the eastern sector of level II, assigned to the terminal Magdalenian (Cacho et al., 2007). These are three hearths in pits with a flat base surrounded by stones. Two of them are a little over a metre in diameter with a depth of 10–15 cm filled with ashes. Few lithic or faunal remains have been found inside these combustions structures. This is the main reason for ruling out their use in domestic activities such as cooking or treating lithic raw materials. However, the presence of a large number of quartzite, quartz and limestone cobbles with thermal fractures attesting to their heating inside the combustion structure, indicates these hearths were used as heat accumulators (Fig. 9).

Another significant find to understand the spatial organisation at La Peña de Estebanvela has been a concentration of flint in the same eastern sector of the rock shelter, but in level III. This was found in a contact area between a compact and sterile calcareous sediment (possibly the altered rock base of the rock shelter) and the archaeological deposit. It should be noted that the sterile sediment had been deliberately cut away in this sector. The pieces of flint were found practically piled up, in a small surface area of about 25 cm^2. The whole ensemble consisted of the same type of high-quality opaline flint, which is quite unusual among the lithic raw materials at the site. The pieces were mainly large cores, little used apart from one or two extractions, and large decorticating flakes which can be re-fitted. This concentration is interpreted as a place where a reserve of raw material was stored (Fig. 10).

Fig. 10. Hoard of flint in level III at La Peña de Estebanvela.

5. Final remarks

The picture of the Iberian Peninsula's interior during the Magdalenian remains somewhat sketchy, partly because of the few studies undertaken on the Upper Palaeolithic. However, the finds made in recent years, the large number of radiocarbon dates available, and palaeoenvironmental inferences etc., are now allowing a better understanding of the pattern of occupation of this territory.

The evidence suggests that the study area was occupied throughout the Magdalenian, as were the regions surrounding it (the Cantabrian Range, the Mediterranean Basin and the Atlantic coastal regions). The area was occupied not just during climatologically warmer periods (such as that associated with level II at La Peña de Estebanvela, at least according to its micromammal and herpetological remains), but also during cold periods, as shown by the Alejandre and Vergara rock shelters (Dryas I).

Only the La Peña de Estebanvela site provides information on how the territory was exploited. It would appear that the site was used time and again for the hunting of ungulates and some carnivores and for fishing trout.

Fig. 9. Hearth in level II at La Peña de Estebanvela.

The clearest evidence of the contacts these Magdalenian groups in the interior of the Iberian Peninsula maintained with other geographical areas has been found at La Peña de Estebanvela, where a significant number of marine gastropod shells have been found, made into objects of personal ornaments. These shells come from Atlantic and Mediterranean shores. This implies the movement of these Meseta Magdalenian groups to the places where the shells were gathered, or they were acquired through exchange networks with other groups living in the coastal areas.

Further evidence of contacts is seen in the portable art found at the rock shelter, whose most characteristic decorative motif is often found at sites in the French Pyrenees, like Gourdan (Haute Garonne), Espelugues (Haute Pyrenées), Dufaure (Landes) and Rhodes (Ariège) even more distant, or even further from the Meseta, as at Pages (Lot) and. Similarity is also seen in portable art from more distant sites, such as Rochedane near the Swiss border. This suggests the existence of long-distance contacts with these Magdalenian groups south of the Duero Valley. Certainly, it would seem to reflect a symbolism common to Magdalenian groups in Western Europe at the end of the Pleistocene, despite major differences in regional ecology.

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