LABORATOIRE TRAVAUX ET RECHERCHES ARCHÉOLOGIQUES
SUR LES CULTURES, LES ESPACES ET LES SOCIÉTÉS
Proceedings of the International Symposium, May 13-15 2009
University Toulouse II - Le Mirail

2011 # 3

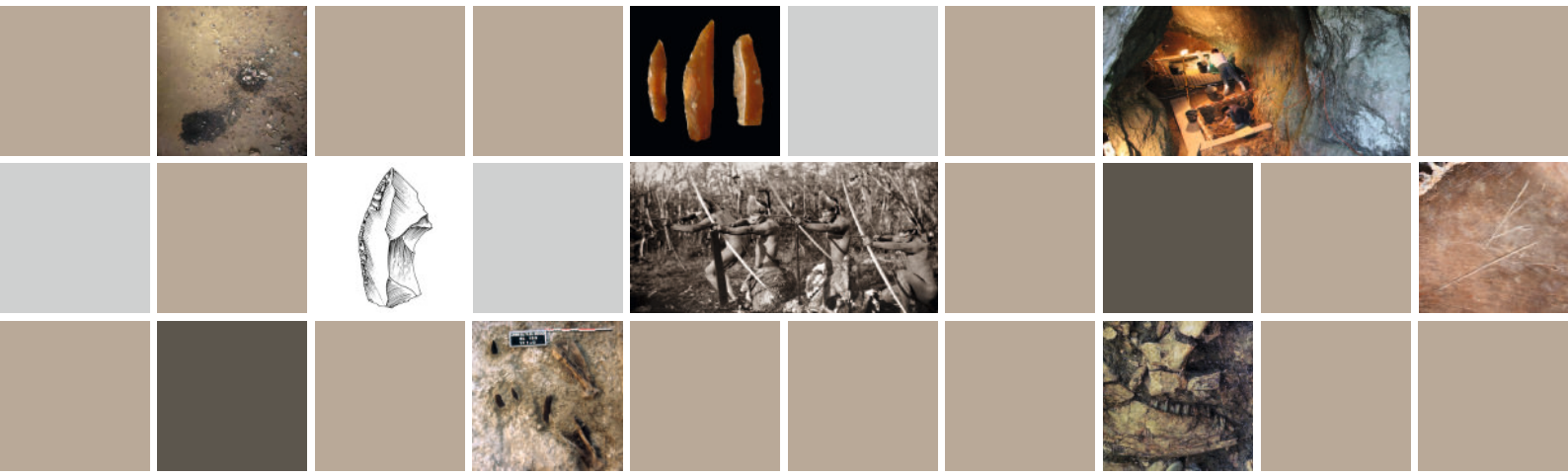
http://www.palethnologie.org
ISSN 2108-6532

edited by

François BON
Sandrine COSTAMAGNO
Nicolas VALDEYRON

HUNTING CAMPS IN PREHISTORY

Current Archaeological Approaches



P@LETHNOLOGY
Bilingual review of prehistory

P@LETHNOLOGY
Bilingual review of prehistory

Review published by the P@lethnologie association, created and supported by the TRACES laboratory, the Ethnologie Préhistorique laboratory, the University of Liège and the Ministry of Culture and Communication.

Director
Vanessa LEA

Editorial committee
François BON
Sandrine COSTAMAGNO
Karim GERNIGON
Vanessa LEA
Monique OLIVE
Marcel OTTE
Michel VAGINAY
Nicolas VALDEYRON

Scientific committee
Michel BARBAZA, university of Toulouse, France
Laurent BRUXELLES, INRAP, France
Jacques CHABOT, university of Laval, Canada
Jesús GONZÁLEZ URQUIJO, university of Cantabria, Spain
Dominique HENRY-GAMBIER, CNRS, France
Jacques JAUBERT, university of Bordeaux, France
Béatrix MIDANT-REYNES, CNRS, France
Karim SADR, university of Witwatersrand, South Africa
Boris VALENTIN, university Paris I, France
Jean VAQUER, CNRS, France
Randall WHITE, university of New York, USA

Editorial office
Karim GERNIGON
Céline THIÉBAUT

Translation
Karim GERNIGON
Hazel KING
Magen O'FARRELL

Layout, graphics
Fabien TESSIER

The contributions should be addressed to:

REVUE P@LETHNOLOGIE
Vanessa LEA, Research associates

TRACES - UMR 5608 of the CNRS
Maison de la recherche
5 allées Antonio Machado
31058 Toulouse cedex 9, FRANCE

Phone: +33 (0)5 61 50 36 98
Fax: +33 (0)5 61 50 49 59
Email: vanessa.lea@univ-tlse2.fr

This event and its proceedings received support from

Article outline

IN THE KINGDOM OF IBEX:

continuities and discontinuities in Late Glacial hunter-gatherer lifeways at Guilanyà (south-eastern Pyrenees)

Jorge MARTÍNEZ-MORENO, Rafael MORA TORCAL

1 - Mountain hunting camps: specific adaptations? 213
2 - Balma Guilanyà: a lost corner in the south-eastern Pre-Pyrenees 215
3 - Late Glacial occupations 216
3.1 - Chrono-climatic data 216
3.2 - Paleo-ecological indicators of a mountainous environment 217
3.3 - Context of the Late Glacial assemblages 217
4 - Faunal assemblages 219
5 - Lithic assemblages 220
6 - In the kingdom of ibex 222
7 - Faunal Perspectives 224
Acknowledgments 225
Bibliographic references 225

To cite this article

Martínez-Moreno J., Mora Torcal R., 2011 - In the kingdom of ibex: continuities and discontinuities in Late Glacial hunter-gatherer lifeways at Guilanyà (south-eastern Pyrenees), in Bon Fr., Costamagno S., Valdeyron N. (eds.), *Hunting Camps in Prehistory. Current Archaeological Approaches*, Proceedings of the International Symposium, May 13-15 2009, University Toulouse II - Le Mirail, *P@lethnology*, 3, 211-227.

IN THE KINGDOM OF IBEX:

continuities and discontinuities in Late Glacial hunter-gatherer lifeways at Guilanyà (south-eastern Pyrenees)

Jorge MARTÍNEZ-MORENO, Rafael MORA TORCAL

Abstract

Hunting camps play an essential role for investigating changing hunter-gatherer behavior during the Late Glacial. In the south-eastern Pyrenees, sites located in mountainous contexts, often interpreted as hunting camps, represent adaptations to demanding environments. These sites form part of emergent strategies associated with specialized systems and are characterized by the presence of a hunting toolkit, monospecific faunal assemblages and the seasonal exploitation of mountain ecosystems. Taken together, these various aspects suggest profound transformations in subsistence practices and social organization.

Here we test the validity of such a scenario for the site of Balma Guilanyà in the western Catalonian Pyrenees. Comparisons of techno-typological trends and faunal assemblages are placed within their chrono-environmental context allowing the question of possible changes in systems developed by the Late Glacial hunter-gatherers who occupied the southern slopes of the Pyrenees to be addressed.

Keywords

Hunting camp, Balma Guilanyà, Late Glacial, Azilian, Southern Pyrenees.

1- Mountain hunting camps: specific adaptations?

The exploitation of mountain ecosystems has been considered as one of the characteristics associated with the dispersal of anatomically modern humans. The occupation of different mountain zones from the beginning of the Glacial Maximum provides evidence for the colonization of uninhabited European regions at the end of the Pleistocene (Gamble *et al.*, 2004), a phenomenon which is not without difficulties and requires genuine planning: "*the main problems mountainous areas present to colonization are the fragmentation of plants habitats, the effect of altitude on tree foods such as nuts, and the response by animals to be small in both body and herd size. Mountains can be rich habitats but very demanding in terms of planning and scheduling to decide which species to take, when and how move people around. Compare to large herds of large bodied animals in the diverse communities in the plateaux and plains, these can be expensive environment to exploit*" (Gamble, 1994: 192). We fully agree with the idea whereby these environments were attractive for procuring both animal and vegetal resources, however access would have been restricted to small seasonal windows.

How hunter-gather groups overcame logistical problems (influencing both technological and subsistence spheres, as well as social relations between hunter-gatherer populations at the Pleistocene / Holocene transition), tied to the occupation of these environments, structure our discussions concerning different mobility systems. The development of this research, building on the work of L. Binford, maintains that mobility is an adaptive mechanism determined by environmental conditions. Consequently, subsistence practices are organized as a function of the availability of different resources and their spatio-temporal distribution. Ethnoarchaeological observations have identified two classic examples: foragers and collectors, concepts which have become common in the study of hunters both past and present (Binford, 1980, 1982, 1983; Kelly, 1995).

In this regard, L. Straus has considered mountain kill-sites connected to the specialized hunting of ibex or izard as archaeological signatures of collector strategies in the sense originally proposed by Binford (1982). Not only do such systems imply growing organizational complexity, these specialized strategies identified in Cantabria as well as on the northern slopes of the Pyrenees from the beginning of the Pleniglacial (Straus, 1992) also signify socio-cultural changes amongst hunter-gatherer groups.

In this article we investigate the significance of this type of site in the south-eastern Pyrenees, an area for which information still remains rare. In fact, the general history of human occupation in these mountains is still poorly understood (Utrilla, Montes, 2007). While certain indications exist, such as the site of Montlleó on the Cerdan Plateau occupied during the Pleniglacial, in our opinion, the conquest of mountainous areas is better represented by the Andorran site of Balma Margineda (Guilaine, Martzluff, 1995; Guilaine *et al.*, 2007) and Balma Guilanyà in the south-eastern Pre-Pyrenees (Martínez-Moreno *et al.*, 2007, 2009, 2010). These sites have yielded certain features connected to strategies developed by hunter-gatherers to repeatedly exploit these ecosystems during a period of climatic amelioration associated with the Bölling / Alleröd. The objective here is to examine the socio-economic implications of such features recognized in the Late Glacial sequence from Guilanyà and compare this information with available data from the lower levels of Margineda (Guilaine *et al.*, 2007). These sites share elements which allow hypotheses to be drawn concerning possible changes in the organization of hunter-gatherer groups that periodically expanded into the southern Pyrenees (figure 1).

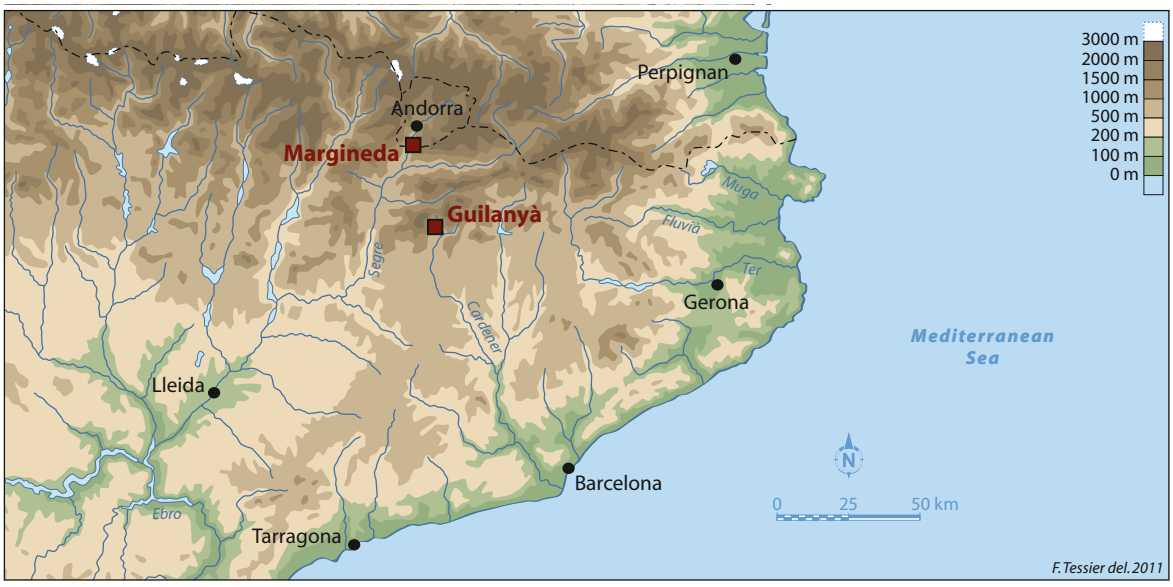


Figure 1 - Location of the sites of Guilanyà and Margineda.

2 - Balma Guilanyà: a lost corner in the south-eastern Pre-Pyrenees

The site of Balma Guilanyà (X = 385087, Y = 4660546, Z =1157) lies in the Serra de Busa, the first rocky foothills of the Solsona Pre-Pyrenees (Llieda, Catalonia) at the interface of the Cadi mountain range and the most eastern area of the Ebro Bassin. Its high altitude (greater than 1 100 m) presents the image of an isolated area lost in the mountains with no clear justification for its occupation (Martínez-Moreno *et al.,* 2008, 2009). However, this image is contradicted by several different forms of archaeological and chronological evidence attesting to repeated human occupations during the Late Glacial and early Holocene.

The rock shelter was discovered during construction of a forestry path that destroyed a wall of Eocene conglomerates exposing a 3 m profile (figure 2). The sedimentary sequence is composed of two sandy clay levels separated by rockfall from the shelter. Systematic excavations between 2001 and 2007 uncovered Mesolithic occupations (levels C1 and C) within the upper sedimentary unit and a Late Upper Paleolithic level (E) in the lower one. Numerous test pits also demonstrated the presence of occupations underlying this unit (levels EJ and K, Martínez-Moreno *et al.,* 2006; Casanova *et al.,* 2007). Recent reconstruction of the mountain road in 2008 allowed us to access this part of the archaeological sequence (Martínez-Moreno, Mora, 2009).

Preliminary observations of the Mesolithic and first Upper Paleolithic assemblages have already been published (Casanova *et al.,* 2007; Martínez-Moreno, Mora, 2009) along with stable isotope results for certain herbivore remains and 3 human bones from the Late Glacial level E (García-Guixé *et al.*, 2009). In this article we present information concerning the lower levels recovered during the earliest excavations. Despite the preliminary nature of these observations, it is still to propose several hypotheses, to be tested in the future, regarding possible changes in subsistence organization, as well as in the social sphere of the Late Glacial hunter-gatherer groups who occupied this part of the southern Pyrenees.



Figure 2 - View of the Balma Guilanyà.

3 - Late Glacial occupations

3.1 - Chrono-climatic data

A series of 12 ^{14}C dates calibrated at 2σ using CalPal-2007 (Weninger *et al.*, 2007) allows the sites chrono-climatic context to be described more precisely (table 1). Here we have adopted chronozones with limits between climatic events based on the GICC05 ice core chronology (Andersen *et al.*, 2006). The coherence of the radiocarbon dates establishes that the rock shelter was occupied during the Holocene (C1 and C) and the Bölling / Alleröd with levels K and EJ assigned to the GI-1e chronozone and level E corresponding to the G1-1a event (figure 3). Thirty isolated human remains were recovered from level E and have been attributed to an infant, a young female and an adult with two direct dates confirming the antiquity of the specimens (García-Guixé *et al.*, 2009). The chronological hiatus signaled in the radiocarbon series (see García-Guixé *et al.,* 2009; Martínez-Moreno, Mora 2009) correlates with the Younger Dryas climatic crisis (or GS-1) and suggests the site to have been abandoned during this period.

Tableau 1 - Radiometric dates of Balma Guilanyà. The calibration intervals (2σ) are based on the CalPal-2007$_{HULU}$ model (Weninger *et al.*, 2007). Dated samples: isolated charcoal (C), Corylus shel (Cor), collagen from the human bone (CHB).

Level	Reference	BP	σ	Method	#	$\delta^{13}C$	cal BP (95%)	CHRONOZONE	CHRONO-CULTURE
K	*Beta-247708*	12310	40	AMS	C	-23,9	14850-14090	GS-2a/GI-1e	
EJ	Beta-185066	12180	50	AMS	C	-24,5	14650-13850	GI-1e/GI-1d	
E	UBAR-367	11460	230	CONV	C	-25,7	13810-12890	GI-1c$_1$/GI-1a	
E	*Beta-247706*	11110	40	AMS	C	-23,6	13110-12910	GI-1a	AZILIAN
E-HB	*Ua-34297*	11095	195	AMS	CHB	-19,6	13380-12660	GI-1c$_1$/GI-1a	
E	Beta-210729	10940	50	AMS	Cor	-26,4	12990-12710	GI-1a	
E-HB	*Ua-34298*	10195	255	AMS	CHB	-19,9	12830-10990	GI-1a/GS-1/PB	
C1	Beta-210728	9840	50	AMS	Cor	-25,5	11360-11160	PB	
C	Beta-186168	9410	60	AMS	C	-21,4	10810-10490	PB	
C	UBAR-368	8970	430	CONV	C	-24,8	11250-9050	B	MESOLITHIC
C	Beta-185064	8680	50	AMS	C	-26,2	9790-9510	B	
C	Beta-210730	8640	50	AMS	Cor	-24,3	9740-9500	B	

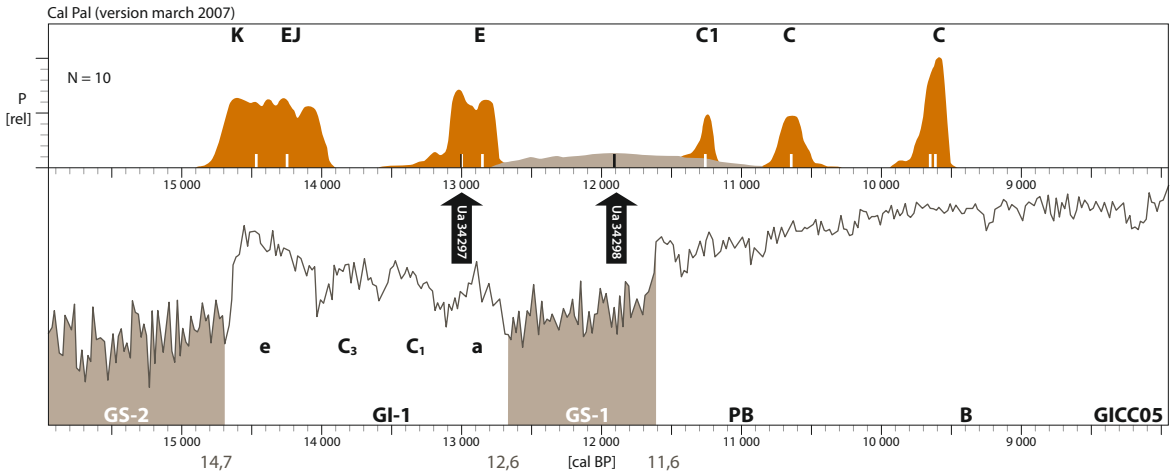


Figure 3 - Probability distribution of selected dates from the radiometric series (see Garcia-Guixé *et al.*, 2009). We can observe the position of the lower levels (K and EJ) in the GI-1e chrono-zone, and the level E associated with GI-1a (Allerod), and the Holocene occupations (C1 and C). The dates obtained from the collagen of the human bone are indicated. For the GS-2/GI-1, G1-1/GS-1 and GS-1/PB chronometric limits, we follow the GICC05 glaciological model (Andersen *et al.*, 2006).

3.2 - Paleo-ecological indicators of a mountainous environment

Plant biomarkers identified in the anthracological analysis demonstrate the spread of forest cover composed exclusively of *Pinus sylvestris* from the beginning of G1-1e. The appearance of a mixed forest combining *Pinus* and thermophiles (*Acer*, *Buxus, Corylus, Pomoidae* and *Prunus*) with the onset of the Preboreal illustrates the expansion of temperate Holocene conditions into mountain ecosystems south of the Pyrenees (Allué, pers. comm.). This preliminary data is consistent with the conclusions of C. Heinz and P. Marinval for Margineda (Guilaine, Martzluff, 1995; Guilaine *et al.*, 2007). Furthermore, deciduous taxons recognized in the Holocene material from Guilanyà suggests the collection of soft or dry fruits.

In the absence of animal biomarkers, the reconstructed faunal spectrum presents a biased image of the complexity of these ecosystems, however it is not without interest. Small carnivores such as lynx (*Lynx* sp.) and fox (*Vulpes vulpes*) are found alongside rabbit (*Oryctolagus cuniculus*) in all chronozones. A detailed taphonomic analysis is still required to verify if the latter were indeed human prey and not introduced by carnivores. The importance of this question is underscored by the role played by rabbit in the subsistence of groups around the Western Mediterranean (Aura *et al.*, 2002).

Wild boar (*Sus scrofa*) and red deer (*Cervus elaphus*) are found sporadically throughout the sequence and most likely represent human prey. Red deer seems to take on a greater importance beginning with the Preboreal period during which roe deer (*Capreolus capreolus*) is also present. The identification of horse (*Equus ferus*) in the Boreal material indicates that this species persisted on the southern side of the Pyrenees at the end of the Pleistocene. However, the most common species is ibex (*Capra pyrenaica*) which is present in monospecific assemblages especially during the Late Glacial, while the more diversified Holocene assemblages see a preponderance of deer and other indicators of forested environments. This scenario matches that observed at La Margineda where from the Holocene onwards a significant increase can be observed in species associated with forested landscapes (Guilaine *et al.*, 2007).

3.3 - Context of the Late Glacial assemblages

These preliminary observations allow us to consider the Late Glacial sequence as a temporal unit that is both ecologically and archaeologically homogeneous but which nonetheless witnesses significant changes with the arrival of Holocene climatic conditions.

A 9 m² test pit dug in 2008 allowed us to address possible continuities and or discontinuities in the lower part of the deposits. Despite weak environmental data, its attribution to the Bölling / Alleröd phase suggests a certain stability in ecological conditions (figure 3). While this hypotheses requires confirmation, such a context is interesting as any perceived changes permit us to examine whether or not they are connected to the technical sphere, subsistence practices or social organization. Three archaeological levels (E, EJ and K) provide evidence for an undetermined number of visits spanning a period made evident by the series of radiocarbon dates: levels K and EJ correspond to GI-1e with level E falling in chronozone GI-1a or Alleröd-1 (Andersen *et al.*, 2006). While sedimentary conditions conducive to the accumulation of material limit resolution, the vertical distribution of the remains suggests that the lower levels K and EJ are less dense than level E (figure 4).

In other words, the lower levels can be connected to more sporadic occupations with level E containing evidence for much more frequent occupations of the site. This qualitative assessment implies differences in the rhythm and timing of the formation of the deposits and the assemblages contained within. This also correlates with changes seen in the composition of these assemblages.

In the lower levels the quantity of osseous remains seems more important and certain variations are evident in the composition of the lithic techno-complexes, two aspects which deserve greater attention.

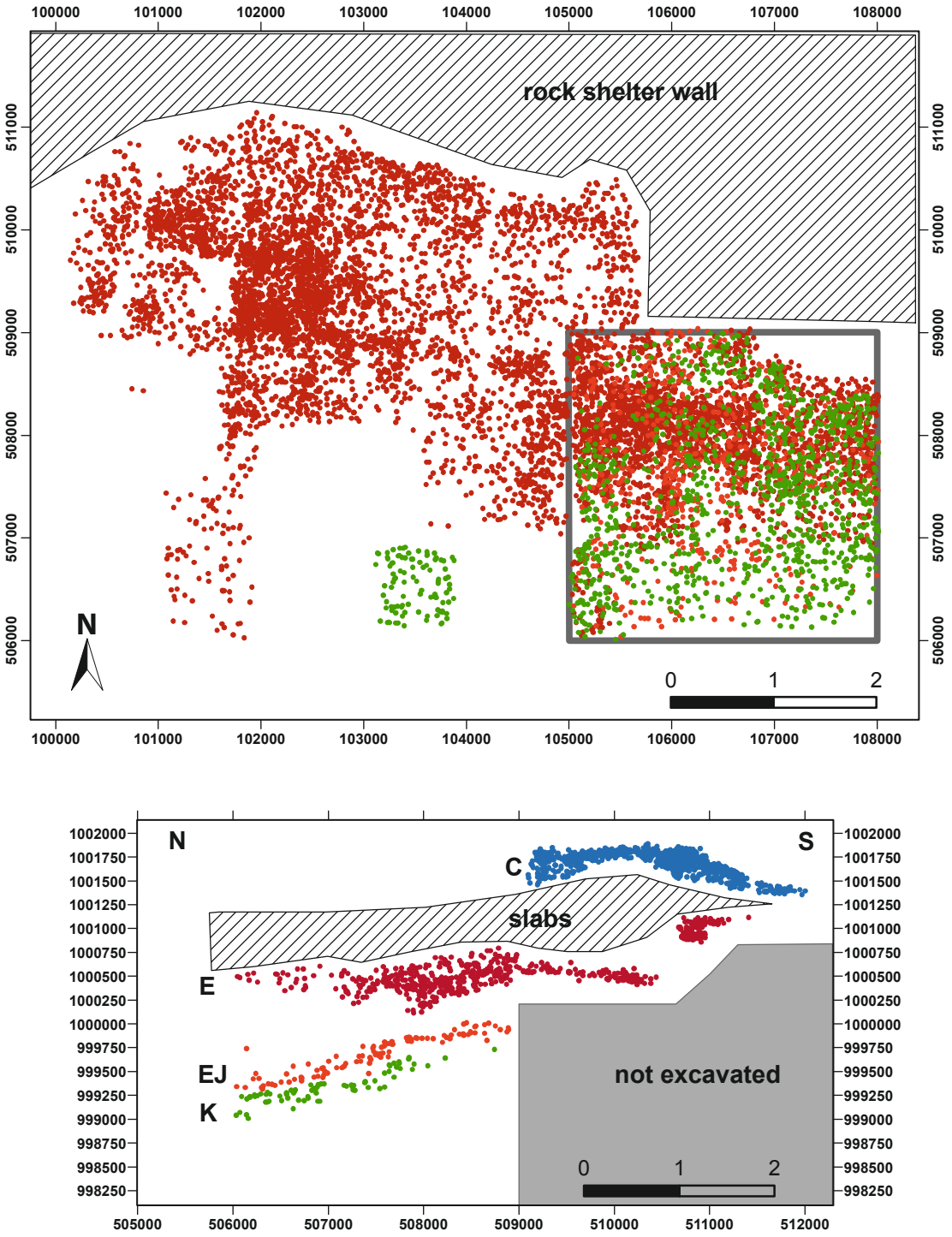


Figure 4 - Horizontal and vertical dispersions of the coordinates of the archaeological levels. The position of the sondage of 2008 is indicated on the map. In the vertical section (lower part), we see the Holocene level materials (C) and the fallen ledge that sealed the Late Glacial levels. We can observe the difference in the density of coordinates in level E and the lower levels, EJ and K. Vertical projection on the X axis = 105.000-105.500 mm.

4 - Faunal assemblages

The Late Glacial levels are dominated by ibex and can therefore be considered as monospecific assemblages. Nevertheless, this should be approached with caution given the lack of information concerning the number of remains and individuals present as well as more detailed studies examining the role of rabbit. Despite these limitations, a number of points can still be made.

Ibex dental remains recovered from a relatively limited area (9 m^2) nonetheless demonstrate the presence of at least ten individuals in the lower levels (K and EJ). These almost exclusively adult individuals present relatively significant signs of attrition. The absence of milk teeth and the presence of well-developed horn cores suggests that adult males may have been essentially targeted (figure 5). These assemblages are mainly composed of long bone shafts with articular extremities being under-represented. Carpals, tarsals and phalanges although present, are not abundant. Shoulder girdles, pelvic bones and axial skeletal elements are rare. The combination of these factors makes it difficult to estimate the number of individuals present or calculate the male:female ratio solely from post-cranial remains. Long bones, although heavily fragmented due to post-depositional destruction, still retain butchery and percussion marks which are abundant on shaft fragments despite the effects of different post-depositional processes. Burned bones are rare.

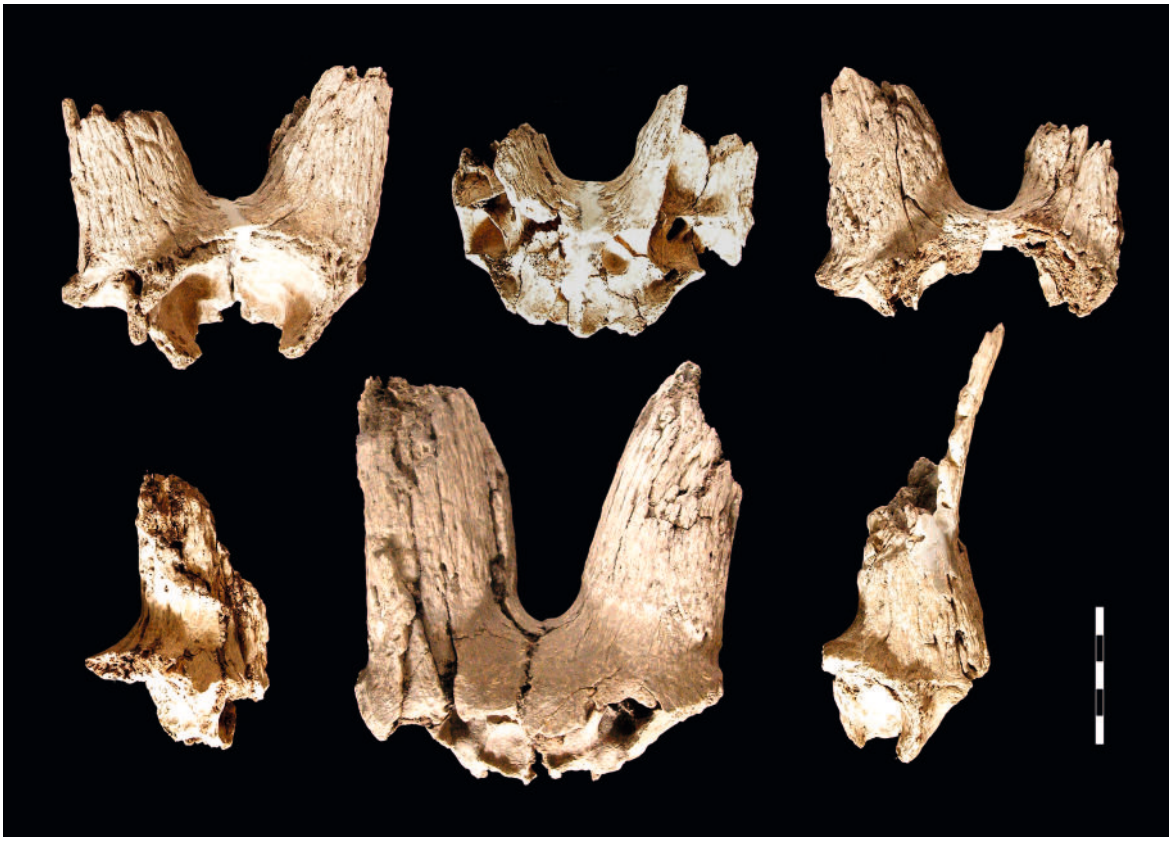


Figure 5 - Cranial bones found in the lower levels of the Late Glacial sequence.

These preliminary observations shed light on activities such as the extraction of meat, the recuperation of marrow and selective carcass transport patterns focusing on limbs rather than elements the axial skeleton. The presence of filleting and percussion marks may be connected to the over-representation of long bone fragments. Despite these limitations, the regular consumption of animals within the rock shelter seems likely, however we cannot rule out the transport of certain parts of the carcass elsewhere. Although this characterization is based on still preliminary observations, it does seem that ibex were slaughtered during different events with the presence of horn cores reflecting a focus on groups of adult males. The confirmation of this hypothesis depends on the ongoing zooarchaeological analysis.

5 - Lithic assemblages

Lithic assemblages recovered from the Late Glacial levels all share certain features. These flake-based industries are associated with a typologically limited variety of microliths characterized by a combination of micro-endscrapers and backed points. These artifacts derive from expedient unipolar knapping strategies (Martínez-Moreno, Mora, 2009) involving not only flint, but also limestone, quartzite and quartz. While these latter raw materials were collected from the base of the cliff where the rock shelter is located, flint is available in the local geological formations (Parcerisas *et al.*, 2003). Certain tools, particularly those in flint, may derive from more distant sources. The importance of locally available raw materials increases through the sequence in concert with the manufacture of heavy duty tools in more durable stones. The assemblages show little typological diversity and domestic tools are represented by short microlithic endscrapers associated with scrapers, notches, denticulates and splintered pieces mainly manufactured from local raw materials. Flint microliths comprise laterally or bilaterally backed points which include curved points and trifacial points with thick backs that may not necessarily have been made on bladelets (certain were made on fragments). The presence of breaks and bending fractures on the pointed extremities suggests their use as projectiles, similar to what S. Philibert (2002) has described for Margineda (figure 6).

In level E the importance of domestic tools (scrapers, notches and denticulates) increases in concert with evidence for more complete knapping activities represented by a significant unmodified flake component, flake fragments and *micro-débitage*. In the lower levels, such evidence is relatively rare, in fact, retouched pieces and other artifacts seemed to have been introduced as finished products. This generally more specialized aspect contrasts with the more generalized character of level E. The limited typological variability (points and micro-endscrapers) documented in levels K and EJ (chronozone GI-1e) continues in level E which correlates with chronozone GI-1a. These variations in toolkit composition can be interpreted as resulting from an intensification and diversification of activities carried out on the site (Casanova *et al.,* 2007).

In chrono-cultural terms, these assemblages can be assigned to the Azilian techno-complex (Martzluff, 1994, 2009; Barbaza, Lacombe, 2005; Martínez-Moreno, Mora, 2009), despite the absence of type fossils such as harpoons with perforated bases and painted pebbles. Radiocrabon dates from levels K and EJ at Guilyanà suggest that this cultural tradition appeared before the Alleröd. Furthermore, this attribution is in accordance with the trajectory of the earliest assemblages from Margineda (layers 12 and 10) which are older than layer 8 (containing 'classic' Azilian harpoons) dated by ^{14}C to the Alleröd chronozone (Guilaine *et al.*, 2007).

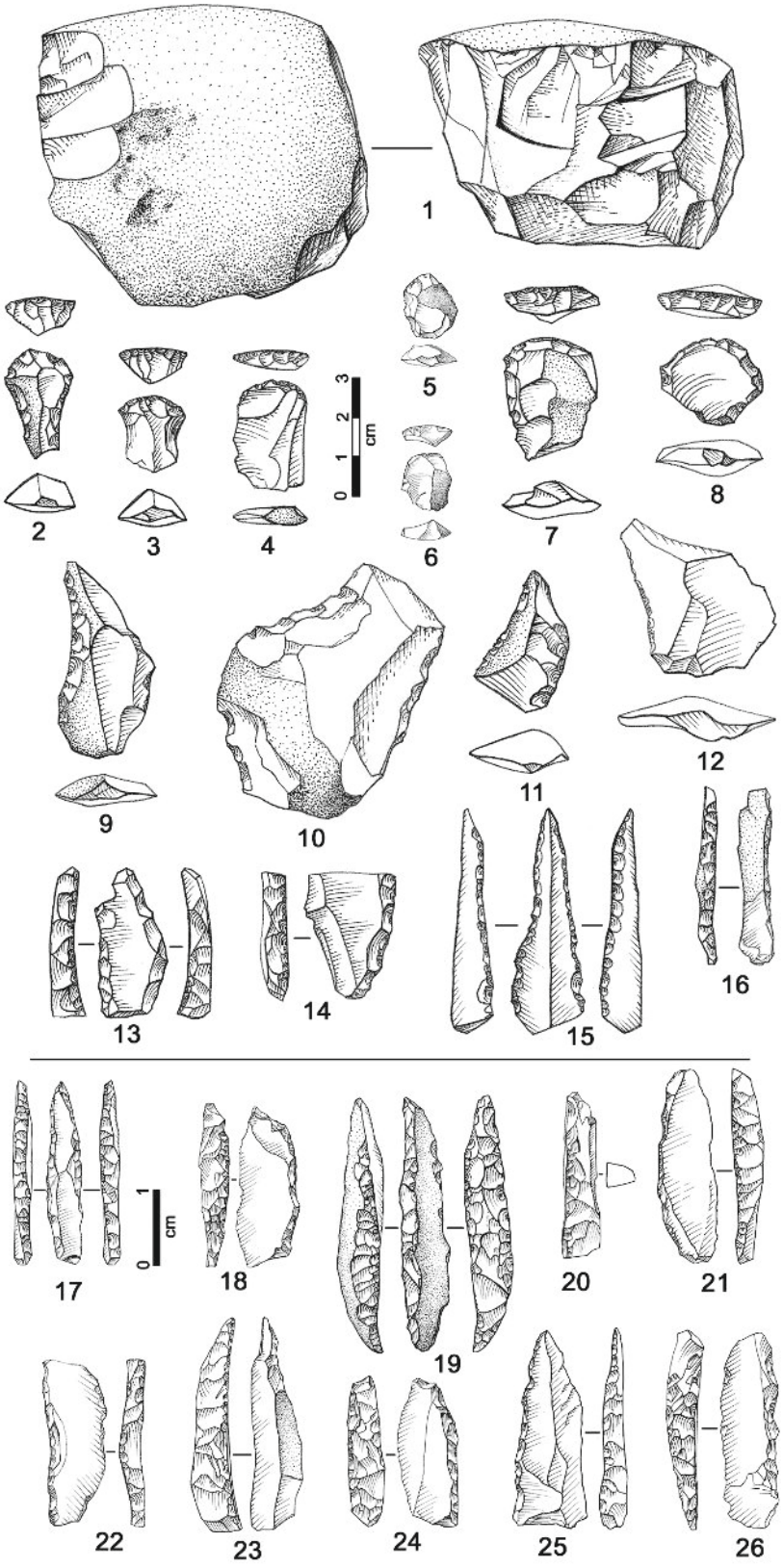


Figure 6 - Selection of artifacts recovered in level K (GI-1e) in which micro-endscrapers coexist with domestic tools (upper part) with mono and bilateral points, curved backs and robust microlithic pieces. Some display fractures that could correspond to impacts (drawings: Mónica López).

6 - In the kingdom of ibex

The image of Guilanyà as a lost corner tucked away in a valley of the northern slopes of the Pyrenees is not in accordance with repeated occupations documented during the climatic amelioration of the Bölling/Alleröd which, although interrupted during GS-1, begin again with the Preboreal and continue during the Boreal (Martínez-Moreno *et al.*, 2007). The motivation underlying the repeated occupation of the rock shelter and its surroundings may be related to the proximity of the Plana de Busa. This high plateau (1 500 asl) of 6 km^2, found in the first foothills of the Pre-Pyrenees is less than 1 km from the site. In fact, such a topographic position would suggest constant snow cover in these mountains and around the site from the end of october until april. This factor creates a strongly seasonally determined window of occupation spanning the early spring through to the autumn. Such a seasonal constraint has been recognized in other mountainous regions in the south of Western Europe.

At the same time, certain features indicate these repeated occupations to represent the existence of a complex organizational system. Raw material provisioning patterns identified in the Azilian layers of La Margineda (layers 10 and 8) involve the transport of flint from the Ebro Valley (Noguera outcrops (Lleida) and 'Tarragone flint' (Conca de Barbera) for the manufacture of microliths (Lacombe, 2007). These materials demonstrate connections between the southern Ebro Basin and the axial zone of the Pyrenees with the Segre River forming the corridor connecting these two regions separated by more than 100 km. A preliminary assessment of the raw material from Guilanyà shows the introduction of flint from Noguera and the possible presence of 'Tarragona flint', however these observations remain to be validated by more detailed analyses.

Further indications are provided by marine shell ornaments: 6 *Cyclope* sp. were recovered from the Late Glacial levels K and EJ with 8 *Dentalium* sp. (2 complete specimens), 1 *Columbella rustica* and 1 *Nassarius incrassatus* documented from level E (Martinez-Moreno *et al.,* 2010) (figure 7). *Dentalium* and *Cyclope* have also been reported from the Azilian levels of Margineda (Guilaine *et al.*, 2007). Despite our understanding of the evolution of the Mediterranean coastline during the Late Glacial remaining imprecise, the presence of these species nonetheless indicate transport distances greater than 100 km (Martinez-Moreno, Mora, 2009).

Exotic materials such as marine shell ornaments and exogenous flint suggest that the site ought not to be considered as an isolated spot lost in the Pre-Pyrenees. We suspect that the groups who climbed up to Guilanyà were integrated within a large scale social network connecting the Pyrenean mountain chain with the Ebro Basin. The sites of Font Voltada, Filador, Picamoixons, Cativera (Conca de Barbera) and Parco (Noguera) are found not far from sources of exogenous flint documented at Margineda and have yielded assemblages composed of points and microlithic endscrapers normally attributed to the micro-laminar Epipaleolithic (Fortea, 1973). As at Guilanyà (level E) and Margineda (layer 8), the chronometric intervals of certain levels from these sites place these assemblages within the Alleröd 1 chronozone (13 200-12 800 cal BP, calibrated at 2σ). These similarities suggest that the assemblages represent the southern expression of the Azilian south of the Pyrenees (Martínez-Moreno, Mora, 2009), however their relation with the techno-cultural development on the northern slopes of the Pyrenees, a key region for the definition of the Azilian itself (Simmonet, 1976), requires further investigation.

Chrono-cultural questions aside, the repeated occupation of Guilanyà provides information relevant to the organization of Late Glacial hunters south of the Pyrenees. The groups who penetrated into the Pyrenees (La Margineda) or exterior sub-mountainous zones of the Pre-Pyrenees (Guilanyà) in order to intercept ibex, provisioned themselves with flint, either directly or indirectly by exchange, from the Ebro Basin from which they manufactured at least part of their hunting toolkit. These subtle clues suggest the existence of a social network connecting the Ebro Basin and the Pyrenees, a hypothesis that merits further exploration (Martínez-Moreno, Mora, 2009).



Figure 7 - Marine ornaments recovered from the Late Glacial levels: *Dentalium* sp. *Nassarius*, *Columbella rustica* and *Cyclope* sp.

Ibex horn corns recovered from Guilanyà seem to indicate that these hunters moved around the high Busa Plateau (1 500 meters above sea level) which was regularly frequented by herds of male ibex, principally during the summer months. This temporally predictable phenomenon explains the repeated occupation of the site. Nevertheless, changes can be observed in both the techno-complexes and faunal assemblages.

The lower levels (K and EJ) date to the GI-1e chronozone and have yielded lithic assemblages with a heavy emphasis on points and endscrapers coupled with the absence of evidence (scarce knapping waste) for *in situ* tool production. The quantity of ibex remains demonstrates the slaughter and partial on-site consumption of this prey. These combined attributes suggest that specialized tasks were carried out at the site and does not exclude the possibility that they were undertaken by hunters who visited the site with the intention of hunting these animals. In this sense, the site possessed an extractive character associated with the acquisition and initial processing of prey. Such a scenario poses questions as to the number of animals acquired during a single hunting episode and therefore the rates in which prey was introduced to the site, elements which are essential to testing hypotheses concerning the storage of food resources and their transport to other locations.

Similar intentions are visible in Guilanyà level E (chronozone G1-1a) with the slaughter of ibex being once again the main reason for the site's occupation. However, certain elements such as the greater representation of domestic tools (scrapers, denticulates, notches, splintered pieces) and the presence of an expedient flake and pebble based tool kit associated with points and endscrapers suggests changes and or an intensification of activities carried out on the site. The discovery of human remains, including those of women and children (Garcia-Guixé *et al.*, 2009), is consistent with this domestic character which departs from what was described for the lower levels. This is reminiscent of the situation with layer 8 of Margineda where the presence of specialized hunting equipment alongside domestic tools and more expedient artifacts highlights the importance of domestic activities (Philibert, 2002).

7 - Future Perspectives

Ibex hunting was the main activity carried out during repeated occupations at Guilanyà and we believe that it was integrated within a network that connected these mountains with the Ebro Basin. In this respect, Guilanyà could indicate the construction of a 'social landscape' that emerged in the north-eastern Iberian Peninsula during the Late Glacial and which we have defined here as forming part of the 'Azilian expansion' (Martínez-Moreno *et al.*, 2007; Martínez-Moreno, Mora, 2009). The acquisition of ibex as the ultimate objective of the occupations supposes a suite of decisions, knowledge and practices transmitted and repeated across the climatic amelioration of the Bölling/Alleröd into the early Holocene. Previously, we had stressed that climatic conditions mitigated the access of hunters to this area and that the climatic crisis of the Younger Dryas may have led to the site's abandonment (Martínez-Moreno *et al.*, 2006a, 2007). However, this abandonment is not necessarily tied to the technical limitations of these groups, but may also derive from the absence of ibex on the high plateau during this cold period. This phenomenon illustrates divergent trajectories visible between Guilanyà and the site of Margineda which was occupied during the same climatic crisis (layer 7 and layer 6 base) (Guilaine *et al.*, 2007). The isolated nature of these valleys, the dearth of known archaeological sites and a misunderstanding of the ecological dynamics of this region during the Pleistocene represent several elements which still must be born in mind when considering the rhythms of human settlement on the southern slopes of the Pyrenees.

Guilanyà also brings to light certain changes in subsistence strategies of these groups. Here we have proposed a possible evolution in the functional status of the site based on its extractive character and the presence of specialized lithic assemblage during GI-1e which gave way to domestic occupations with lithic assemblages possibly indicating an increase in activities during GI-1a. These modifications emerged during the same climatic cycle and within possibly very similar general ecological conditions. At the same time and despite differences in assemblage composition, they correspond to the same techno-complex or techno-cultural tradition. It remains to be seen if these transformations are connected to a different socio-economic organization that could indicate a recomposition of the social sphere of these Late Glacial hunter-collectors. In accepting these premises, we are well aware of amount of work the remains to be done in order to test this hypothesis.

Acknowledgments

The 'prehistoric hunting camps' colloquium provided an excellent forum for discussing a global phenomenon with an extraordinary temporal depth. We would like to thank François Bon, Sandrine Costamagno and Nicolas Valdeyron for their interest in this work. Michel Martzluff shared with us his considerable knowledge of the Azilian in the Pyrenees. The Guilanyà family has allowed us to work in the rock shelter since 1992.

This work was financed by the *Servei d'Arqueología i Paleontología-Generalitat de Catalunya* and the *Institut d'Estudis Ilerdencs-Diputació de Lleida* and forms part of the *Asentamiento humano en el Pirineo Oriental durante el Pleistoceno Superior y el Holoceno* project of the *Ministerio de Educación y Ciencia* (HUM2007-60317/HIST). This article is a publication of the *Cultura material i comportament humà* group. Administrative imperatives require us to mention the marginal support of the *AGAUR-Generalitat de Catalunya*. Rafael Mora would like to recognize the support of the *ICREA-Academia* program.

Jorge MARTÍNEZ-MORENO
Centre d'Estudis del Patrimoni Arqueológic de la Prehistoria
Facultat de Lletres. Universitat Autonoma de Barcelona
08193 Bellaterra, SPAIN
jorge.martinez@uab.cat

Rafael MORA TORCAL
Centre d'Estudis del Patrimoni Arqueológic de la Prehistoria
Facultat de Lletres. Universitat Autonoma de Barcelona
08193 Bellaterra, SPAIN
Programme ICREA-Academia
rafael.mora@uab.cat

Bibliographic references

Andersen K., Svensson A., Johnsen S., Rasmussen S., Bigler M., Röthlisberger R., Ruth U., Siggaard M., Peder J., Dahl D., Vinther B., Clausen H., 2006 - The Greenland Ice Core Chronology 2005, 15-42 ka, Part 1: constructing the time scale, *Quaternary Science Reviews*, 25, 3258-3267.

Aura J. E., Villaverde V., Pérez M., Martínez R., Guillem P., 2002 - Big game and small prey: Paleolithic and Epipaleolithic economy from Valencia (Spain), *Journal of Archaeological Method and Theory*, 9, 215-268.

Barbaza M., Lacombe S., 2005 - L'azilien pyrénéen : une culture originale ?, in Jaubert J., Barbaza M. (dir.) *Territoires, déplacements, mobilité, échanges durant la préhistoire*, Toulouse, CTHS, 421-427.

Binford L. R., 1980 - Willow smoke and dogs'tail: hunter-gatherer settlement systems and archaeological site formation, *American Antiquity*, 45, 4-20.

Binford L. R., 1982 - The archaeology of place, *Journal of Anthropological Archaeology*, 1, 5-31.

Binford L. R., 1983 - *In Pursuit of the Past. Decoding the Archaeological Record*, Londres, Tames & Hudson.

Casanova J., Martínez-Moreno J., Mora R., 2007 - Traçant l'ocupació dels Pirineus: Balma Guilanyà i els caçadors-recol.lectors del Tardiglacial i l'Holocé antic al Prepririneu Oriental, *Tribuna d'Arqueologia*, 59-83.

Fortea J., 1973 - *Los complejos microlaminares y geométricos del Epipaleolítico mediterráneo español*, Salamanca, Universidad de Salamanca.

Fullola-Pericot J. M., Soler N., 2004 - El Paleolític superior a Catalunya, *Fonaments*, 10-11, 97-132.

Gamble C., 1993 - *Timewalkers. The prehistory of global colonization*, London, Penguin.

Gamble C., Davies W., Pettit P., Richards M., 2004 - Climate change and evolving diversity in Europe during last Glacial, *Phil. Trans. R. Soc. London (B)*, 359, 243-254.

García-Guixé E., Martínez-Moreno J., Mora R., Núñez M., Richards M. P., 2009 - Human and animal stable isotope analysis from late Upper Palaeolithic site of Balma Guilanyà, Southeastern Pre-Pyrenees, Spain, *Journal of Archaeological Science*, 36, 1018-1026.

Guilaine J., Martzluff M., 1995 - *Les excavacions a la Balma de la Margineda (1979-1991), Volum I-III*, Andorre, Ministère des affaires sociales et culturelles.

Guilaine J., Barbaza M., Martzluff M., 2007 - *Les excavacions a la Balma de la Margineda (1979-1991), Volum IV*, Andorre, Ministère des affaires sociales et culturelles.

Kelly R. L., 1995 - *The Foraging Spectrum. Diversity in hunter-gatherer lifeways*, Smithsonian Institution Press.

Lacombe S. , 2007 - Aproximació petroarqueologica del silex dels nivells azilians de la balma de la Margineda in Guilaine J., Barbaza M., Martzluff M. (dir.), *Les excavacions a la Balma de la Margineda (1979-1991)*, *Volum IV*, Andorre, Ministère des affaires sociales et culturelles, 540-574.

Mangado X., Mercadal O., Fullola-Pericot J. M., Esteve X., Langlais M., Nadal J., Estrada A., Bergadà M., 2006 - Montlleó (La Cerdanya, Lleida), un yacimiento magdaleniense de alta montaña al aire libre en los Pirineos catalanes, *O Paleolítico. Actas do IV Congresso de Arqueología Peninsular,* Faro, Universidad de Algarve, vol. 2, 471-480.

Martzluff M., 1994 - *Filiations et mutations des industries lithiques au début de l'Holocène dans les Pyrénées catalanes : Épipaléolithique-Mésolithique et Néolithique ancien à la Balma de la Margineda (Andorre) et en Roussillon (France, Pyrénées-Orientales)*, Thèse de doctorat, Perpignan, université de Perpignan.

Martzluff M., 2009 - L'Azilien Pyrénéen entre Garonne et Èbre : un état de la question, in Fullola J. M., Valdeyron N., Langlais M. (dir.), *Els Pirineus i les àrees circumdants durant el Tardiglacial. Mutacions i filiacions tecnoculturals, evolució paleoambiental (16000-10000 BP)*, Puigcerda, XIV Colloque international d'archéologie de Puigcerda, Hommages à Georges Laplace, 375-422.

Martínez-Moreno J., Mora R., Casanova J., 2006 - Balma Guilanyà y la ocupación de la vertiente sur del Prepirineo del Noreste de la Península Ibérica durante el Tardiglaciar, in Sanchidrián J. L., Márquez A. M., Fullola J. M. (dir.), *La cuenca Mediterránea durante el Paleolítico Superior*, Nerja Fundación, 444-457.

Martínez-Moreno J., Martzluff M., Mora R., Guilaine J., 2006b - D'une pierre deux coups : entre percussion posée et plurifonctionnalté. Les poids des comportements « opportunistes » dans l'Épipaléolithique-Mésolithique pyrénéen, in Astruc L., Bon Fr., Léa V., Milcent P.-Y., Philibert S. (dir.), *Normes techniques et practiques sociales. De la simplicité des outillages Pré et Protohistoriques*, Antibes, CEPAM, 147-160.

Martínez-Moreno J., Mora R., Casanova J., 2006c - El Mesolítico de los Pirineos surorientales: una reflexión sobre el significado de las « facies de fortuna » del Postglaciar, in Alday A. (dir.), *El Mesolítico de muescas y denticulados en la cuenca del Ebro y el litoral mediterráneo peninsular*, Gasteiz, 163-192.

Martínez-Moreno J., Mora R., Casanova J., 2007 - El contexto cronométrico y tecno-tipológico durante el Tardiglaciar y Postglaciar de la vertiente sur de los Pirineos Orientales, *Revista d'Arqueologia de Ponent*, 16-17, 7-44.

Martínez-Moreno J., Mora R., 2009 - Balma Guilanyà (Prepirineo de Lleida) y el Aziliense en el noreste de la Península Ibérica, *Trabajos de Prehistoria*, 66 (2), 45-60.

Martínez-Moreno J., Mora R., Casanova J., 2010 - Lost in the mountains?: marine ornaments in the Mesolithic of the northeast of the Iberian Peninsula, in Álvarez-Fernández E., Carvajal D. (dir.), *Not only food. Marine, Terrestrial and Freshwater Mollusc in Archaeological Sites,* Donostia, Munibe (« Suplemento » 31), 100-109.

Parcerisas J., Mora R., Pallarés M., Martínez-Moreno J., 2003 - Balma Guilanyà (Navès, Solsonès), *Jornades d'Arqueologia i Paleontologia-2000, Comarques de Lleida,* Barcelona, Generalitat de Catalunya, 73-90.

Philibert S., 2002 - *Les derniers « sauvages » Territoires économiques et systèmes techno-fonctionnels mésolithiques*, Oxford, Archaeopress (« BAR International Series » 1969).

Simonnet R., 1976 - Les civilisations de l'Épipaléolithique et du Mésolithique dans les confins pyrénéens de la Gascogne et Languedoc, in de Lumley H. (dir.), *La Préhistoire française*, Paris, CNRS, 1412-1419.

Straus L. G., 1992 - *Iberia before the Iberians. Stone Age Prehistory of Cantabrian Spain*, Alburquerque, University New Mexico Press.

Utrilla P., Montes L., 2007 - La période 19 000-14 000 BP dans le bassin de l'Èbre, *Bulletin de la société préhistorique française*, 104, 797-807.

Weninger B., Jöris O., Danzeglocke U., 2007 - *CalPal - University of Cologne Radiocarbon Calibration Program Package*, http://www.CalPal.de.