

AWAY FROM THE EDGES
A New Solutrean Site in Interior Iberia
(Foz do Medal Left Bank, Sabor Valley, Northeast Portugal)

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KEY WORDS: Upper Paleolithic, Solutrean, Laurel leaf points, Last Glacial Maximum, Douro (Duero) Basin, Iberian Peninsula

Recent archaeological work in northeast Portugal has led to the identification of two Upper Paleolithic sites in an area traditionally considered lacking in Old Stone Age evidence: Trás-os-Montes. The new research reveals the existence of the first Upper Paleolithic sequence to the north of the Portuguese Douro (Duero). The Middle Solutrean site of Foz do Medal on the left bank of the Sabor River adds relevant data to the discussion about human adaptations during the Last Glacial Maximum and the gap in knowledge regarding the use of interior territories in the Iberian Peninsula.

THE CONSTRUCTION OF A MAJOR HYDROELECTRIC DAM in the northeast of Portugal motivated a major archaeological survey of a strip of land covering more than 60 km along the Sabor River valley. The study of prehistoric remains in the extensive archaeological project developed in this large area (about 3,500 hectares) is coordinated by the first author.

Initially, with very few known archaeological sites, it was thought that this was a very poor region in terms of Paleolithic occupations, and with the exception of the research undertaken since 1996 in the Côa Valley of the neighboring Beira region (Aubry, ed. 2009), there was an archaeological gap in relation to other Upper Paleolithic contexts in northern Portugal.

However the evidence we have discovered in the Sabor Valley shows the situation to be quite different, bringing to light some of the most exceptional Upper Paleolithic sites to be discovered in Iberia in recent years. Although the study is ongoing, it is now possible to present and discuss some of the results, such as

Journal of Anthropological Research, vol. 71, 2015
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<http://dx.doi.org/10.3998/jar.0521004.0071.405>

the site presented here, the Foz do Medal, Left Bank locus (hereafter FMLB). Data from this site are of the utmost relevance for the discussion of Last Glacial Maximum adaptations in the interior of Iberia, mainly concerning our insufficient knowledge about this vast region and its relation to the densely occupied regions of Cantabrian Spain and Portuguese Estremadura (for the locations of these and other regions, see Straus 2015: fig. 1, in this issue).

REGIONAL SETTING

The Sabor River is located in the Trás-os-Montes region and, like the Côa River to the south, is one of the most important Portuguese tributaries of the Douro (Duero) River. The Sabor has a narrow, V-shaped valley along most of its course. It runs mainly from northeast to southwest, until it reaches the Vilarça Valley (a major tectonic rift feature) and the right bank of the Douro River. The entire region, located on the western edge of the high plains of central Spain, has undergone intensive down-cutting that led to the formation of deep valleys with a very irregular topography. In fact, it is quite common to find differences of 700–800 m between the floor and ridge crests of the Sabor Valley (Silva et al. 1989). Nevertheless, exceptions to this entrenched valley geomorphology exist in some specific points of the valley, mainly as a result of different lithological formations (Silva et al. 1989) as well as local neotectonic activity (Pereira and Azevedo 1995). In these areas the valley becomes broader, and the accumulation of fluvial terraces completely transforms the landscape, forming small benches along the floor of the deep valley. The presence of these platforms creates ideal conditions for human settlement in this otherwise high-relief region. The FMLB site is in one of these areas.

The site is at the confluence of the Medal with the Sabor River (the word “Foz” means “mouth [of a watercourse]” in Portuguese; Figure 1), at the following coordinates: WGS84: 41° 15' 15.49" N and 6° 53' 01.72" W. In this area, both margins of the Medal have evidence of Upper Pleistocene occupations. On the Right Bank terrace we identified a thick sedimentary sequence composed of fine-grained alluvial deposits intercalated with some colluvial contributions.

There is evidence of a long history of human occupations ranging from the Middle Paleolithic up to the Middle Bronze Age (Gaspar et al. 2014). Despite the complexity of the site, we highlight the respectively anterior and posterior Gravettian and Magdalenian occupations as being of greatest importance in relationship to the Solutrean occupation of the left bank locus, presented here, showing that this was a major site throughout Marine Isotope Stage 2—the Last Glacial—despite its relatively inland location. The Magdalenian level is unique since it has evidence of a very dense occupation of about 520m² and an important collection of more than 1,400 fragments of engraved *plaquettes* (stone slabs) (Figueiredo et al. 2014). Both platforms, Left and Right Bank, form a low fluvial terrace along the Sabor, only 9 m above the river level and 165 m above present sea level.

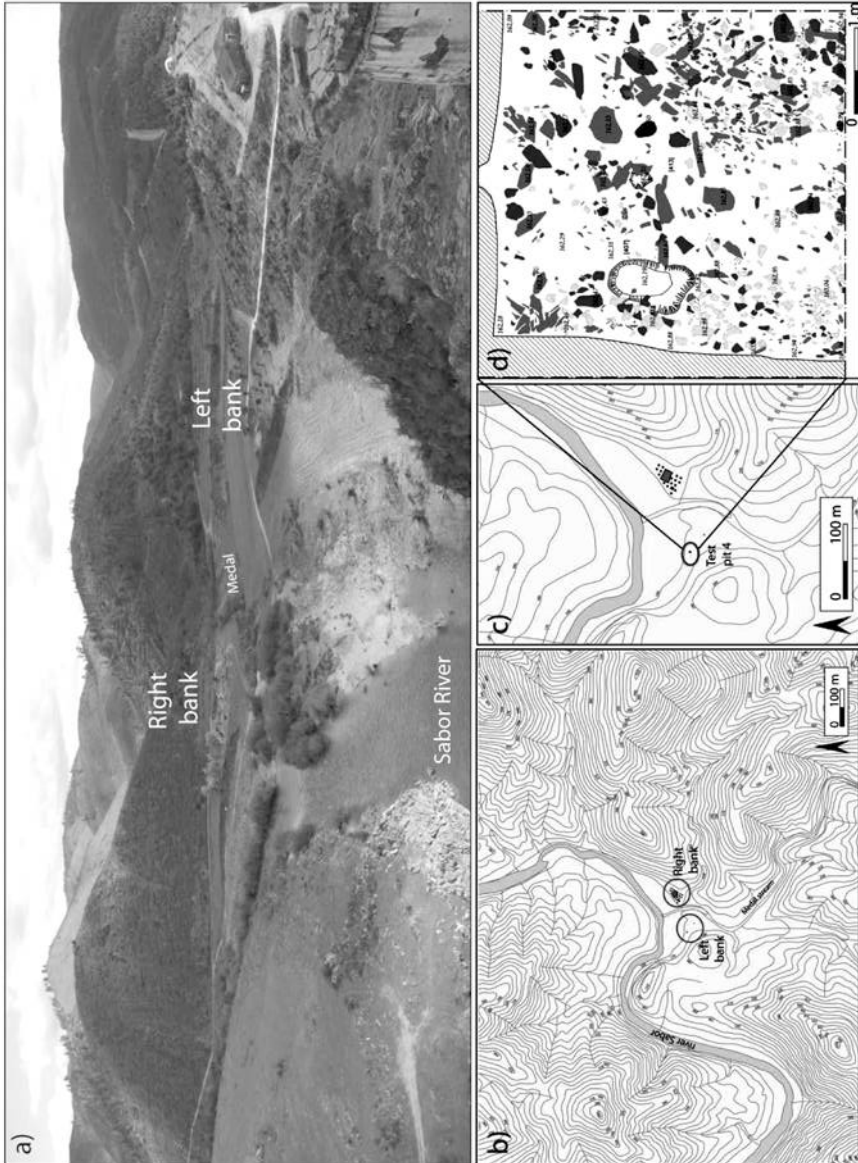


Figure 1. Location of Foz do Medal (Left Bank) on the left margin of the Sabor River (a,b). Note the low elevation of the site, just 9 m above the river level, and its relation to the site on the right bank. (c) Location of test pit 4 and (d) the initial plan of deposit 413. See key in Fig. 2 for material types.

MATERIALS AND METHODS

Since there had been so little evidence of Paleolithic human occupation in the study area, a preliminary geomorphologic study of the Sabor Valley was conducted, leading to the recognition of several areas with high potential for Pleistocene human occupation. That was the case of the FMLB site. No archaeological evidence was visible on the surface; nevertheless two 4 m² test pits (test pit 3 and 4) were excavated to ascertain whether Pleistocene levels were preserved. The excellent initial results from test pit 4 led to its expansion to an excavation totaling 16 m².

The archaeological deposits were excavated in 10 cm artificial levels. All the archaeological material was processed and registered in a data base specifically designed for the project. The sedimentary sequence was recorded by standard geoarchaeological methods (following Miall 1985 for the alluvial deposits). The fieldwork was carried out between 2012 and 2013.

ARCHAEOLOGICAL EVIDENCE

The FMLB Stratigraphic Sequence

Only test pit 4 revealed an Upper Paleolithic occupation. The stratigraphic sequence extended down to bedrock. The sedimentary sequence, mainly alluvial, also includes colluvial slope contributions (Figure 2). From the bottom to the top we observed a series of alluvial deposits, immediately above the bedrock, over a meter thick, composed of fine-grained sand, silt, and mud (facies FI), resulting from overbank depositions. At this phase, the Sabor River course was already identical to the one we can observe today. Above these sediments is a sequence of colluvial slope deposits, sometimes interbedded with small alluvial depositions (again FI). These slope deposits display channel-type structures (between 10 and 30 cm thick) related to several episodes of mass movements. The deposits slope down at 8° to 10° northward toward the river and include medium to large schist and greywacke blocks with orientations and inclinations coherent with mass slope movement. Archaeological levels 413 and 414 are incorporated within this sequence (Figure 2).

Above the colluvial sequence is a very thick (100–150 cm), tabular, fine-grained deposit [403]. Once more we are in the presence of vertical accretion deposits of fine sands and muddy silt (FI), associated with both the Sabor River and the Medal. On top of this stratigraphic sequence is evidence of another episode of slope movements, with some channel-type structures and one last, thick flood deposit (FI and Fm), on top of which lies a very rich organic soil, 20 cm thick, resulting from recent agricultural activity.

The FMLB Solutrean Archaeological Assemblage

The evidence of human presence occurs within layers 413 and 414. There are no preserved faunal remains or charcoal; hence the inability to date the archeological horizon with radiocarbon. Of the 830 artifacts recovered, 782 are knapped

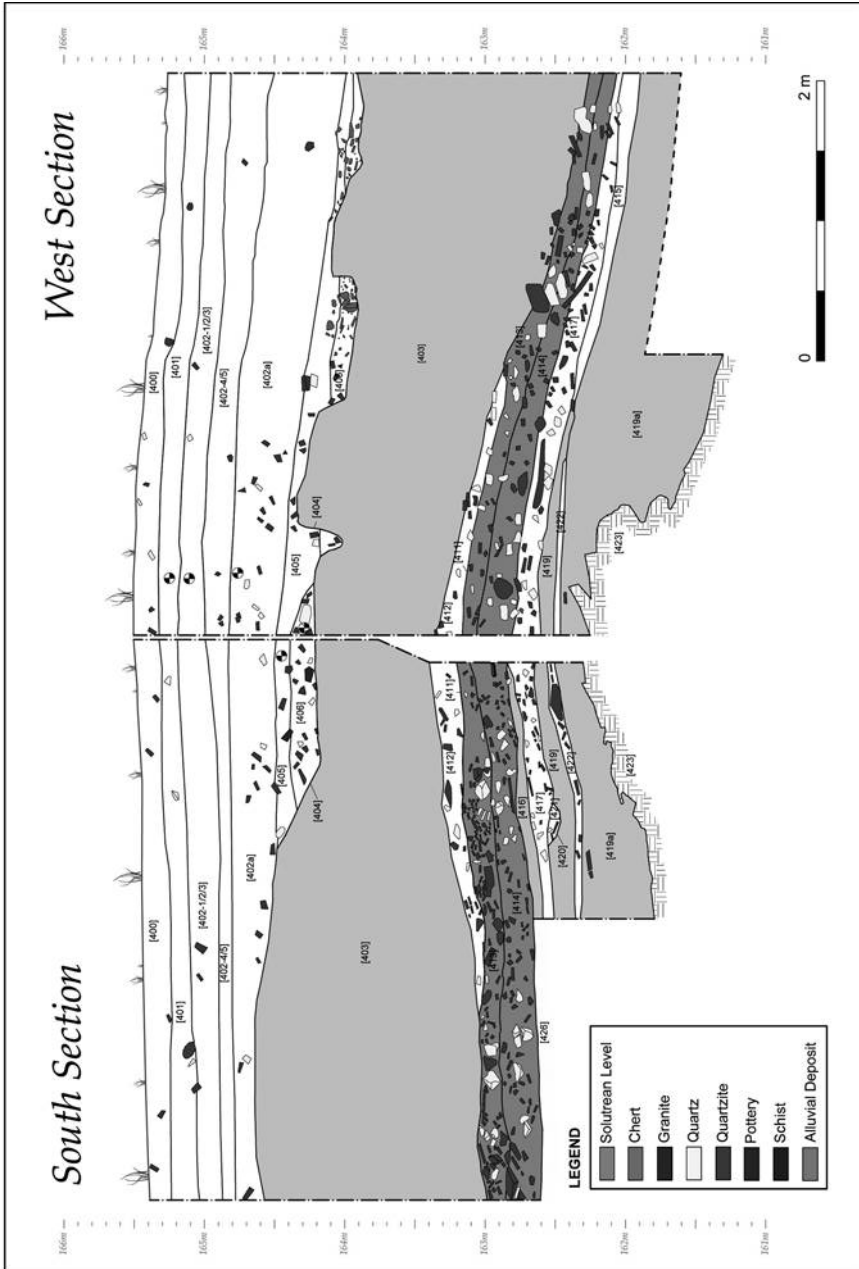


Figure 2. South and West sections of test pit 4. The slope deposits are between the alluvial flood deposits. The archaeological levels are labeled 413 and 414.

stone. Although the assemblage was collected in units we had defined as two different layers during field work, we have established refits between them. Along with the fact that all elements of the reduction sequence are represented in the assemblage, this tells us that the displacement of the cultural remains was in fact of a short distance and was the result of mass slope movement rather than gradual, continuous erosion. No preserved structures were identified, although we did collect 25 cobbles with evidence of thermal alteration (i.e., fire-cracked rocks), mainly quartzite but also greywacke.

In the knapped stone assemblage we were able to identify local as well as regional and even nonlocal siliceous raw materials. Quartzite (42.1%) and quartz (43.3%) were the most common raw materials. Both occur in a wide variety of subtypes (Table 1) as defined by their physical characteristics. In the first group are quartzites with different grain sizes, although the knapping qualities are in general good. The quartz occurs in many varieties, ranging from milk quartz (the most common) to rock crystal and other varieties with poorer knapping qualities. The proportions of quartz and quartzite observed here do not exist in the other Pleistocene occupations at Foz do Medal (Right Bank), where quartz clearly dominates the other types of stone, surpassing 80%.

Two other groups of raw materials are well represented in the assemblage. One consists of hydrothermal siliceous rocks (2.5% of the assemblage, made up of opals, jaspers, lydite, hydrothermal chert, and metaconglomerate in siliceous matrix) formed in association with intrusive veins related to tectonism. The other group comprises the siliceous rocks formed in carbonated environments (9.5% of the assemblage), including several chert types (among which we draw attention to one with gastropod macrofossils, macroscopically related to chert originating in Mucientes, Valladolid, Spain [Fuertes-Prieto et al. 2014]). There are also traces of rhyolite, mafic granulite, amphibolite, schist, and greywacke in the collection (see Table 1). The main raw material source was the gravel deposits along the river margins, since the Sabor River crosses all the allochthonous lithological formations, providing very rich and diverse types of stone in its terrace deposits. This lithological diversity is reflected in the archaeological collections.

The selection of raw materials is clearly related to the reduction strategy and the desired end-product. The reduction sequences seem to be directed mostly to the production of large flakes through simple strategies. The cores indicative of these strategies make up almost 70% of the total. A range of more careful strategies was also identified regarding the production of small flakes, chips, and bladelets, mainly on cherts, hydrothermal siliceous rocks, rock crystal, and milk quartz.

Cobbles of local raw materials were exploited expediently, notably quartzite ones were reduced unifacially (Table 1) by taking advantage of each pebble's natural shape. The resulting flakes tend to be square and are usually larger than 2.5 cm. There are also polyhedral and tested cores among these types of primary cores. The majority of the flakes exhibit cortical or plain butts.

Table 1. Lithic assemblage from Foz do Medal (Left Bank)

	Milky Quartz	Translucent Quartz	Other Quartz	Rock Crystal	Smoky Crystal	Quartzite	Jasperlike Quartzite	Black Quartzite	MC in Siliceous Matrix	Hydrothermal Chert	Chert	Jasper	Opal	Lydite	Greywacke	Schist	Rhyolite	Mafic Granulite	Amphibolite	Granite	Total	
Debitage																						
Flake <2.5cm	68	13	31	8		24	2	4	2		27	3					2	1	2			187
Flake >2.5cm	32	3	17	5	1	112	2	7			4		1		2			4	3			193
Bladelet	1																					1
Fragmented flake	6	2	6	2		28	1	1	1		2											48
Siret accidental break	5		4			20	1	2						1								33
Cores																						
Unifacial			1			24		2				1										28
Bifacial				1		1																2
Bidirectional				1		2					1											4
Unidirectional				1		1																2
Polyhedral						2																2
Splintered	1	1	2	2																		6
Tested				2		5					1											8

Table 1. Continued—

	Milky Quartz	Translucent Quartz	Other Quartz	Rock Crystal	Smoky Crystal	Quartzite	Jasperlike Quartzite	Black Quartzite	MC in Siliceous Matrix	Hydrothermal Chert	Chert	Jasper	Opal	Lydite	Greywacke	Schist	Rhyolite	Mafic Granulite	Amphibolite	Granite	Total	
45° on natural crystal edge				3																		3
Prismatic (2 opposed platforms)											1											1
Prismatic (1 platform)											1											1
On flake		1				1				1												4
Carinated "endscraper"											1											1
Undetermined						1																1
Tools																						
Retouched flake	5	1	1	1		7					8	1					1					26
Retouched blade	1																					1
Retouched chip				1																		1
Retouched fragment						3								1								4
Notch on flake	1		1	1		2					3	1										8
Denticulated flake			1																			1
Burin											2	1										3

Table 1. Continued—

	Milky Quartz	Translucent Quartz	Other Quartz	Rock Crystal	Smoky Crystal	Quartzite	Jasperlike Quartzite	Black Quartzite	MC in Siliceous Matrix	Hydrothermal Chert	Chert	Jasper	Opal	Lydite	Greywacke	Schist	Rhyolite	Mafic Granulite	Amphibolite	Granite	Total	
Borer											1										1	
Endscraper	2	1									2											5
Scraper	1																					1
Truncated bladelet				1																		1
Laurel leaf	1																					1
Pickaxe						2																2
Splintered piece			3	1							1											5
Unifacial worked pebble						1																1
Waste products																						
Flake fragment	45	2	31	1	38	4	2	8	2	1											2	136
Core fragment					3																	3
Chip	8		2			1					8	1										20
Chunk	3		3		23	1	1	1			1					1						34

More careful reduction strategies, which were applied to the better-quality raw materials, were used to obtain small flakes, chips, and bladelets. Among the most representative are the prismatic cores, with one or two platforms explored sequentially, on chert (Figure 3:1), and quartz crystal cores exhibiting a 45° striking platform, using the crystals' natural edges as guides for the chipping (Figure 3:2 and 3). The latter strategy was identified in the Sabor Valley throughout the entire Upper Paleolithic sequence by our research and also in the C \hat{o} a region (Gameiro 2009; Klaric 2009) and in the Solutrean of Galicia (Lombera Hermida et al. 2012). In all cases the desired products were bladelets. The blanks resulting from the cores in the assemblage are residual, although their reduction sequence is well documented, which could mean they were exported as barbs—possibly unretouched. Splintered cores on quartz, from which small chips were obtained, are also present in the assemblage. Only one carinated “endscraper” core for the production of bladelets, made of chert, was identified.

Core-shaping and rejuvenation products, such as core flanks and platform renewal flakes, are almost absent. Owing to the nature of the raw materials exploited—predominantly quartzite and quartz—a great number of waste products is expected (Table 1). However, some of the chips (less than 1 cm in length) could have been the desired products, mainly from bipolar splintered cores.

Chert, milky quartz, and jasper flakes were often used in the making of tools such as retouched flakes, endscrapers, dihedral burins, notches, a denticulated flake, and a borer (Figure 3). A truncated bladelet on rock crystal and a fragment of a retouched blade are the only exceptions among the tool blanks (Figure 3).

One proximal fragment of a Solutrean laurel leaf, shaped on a milky quartz blank through bifacial retouching, was found. This point can be included in subtype C (Zilh \hat{a} o 1997, after Smith 1966). We also identified a series of 15 thin flakes whose butts had been prepared by either abrasion or faceting (some with plain retouch scars on the dorsal face), which are probably related to the shaping of leaf points (Figure 3:10, 11, 15, 16, and 17). The majority of these flakes are on local hydrothermal siliceous rocks, although two are on carbonated chert and one on lydite. Some also preserve the ventral surface of the initial blank used for the leaf point, which means that large flakes were used to some degree. Besides the objects linked to leaf point technology, others display characteristic plain invasive retouch (Figure 3:5).

One interesting feature of this assemblage is the presence of macrolithic components in quartzite. Two pickaxes (Figure 3:18) and one unifacially worked pebble were recovered, all exhibiting use-wear traces. Along with these, four tested cobbles (three in quartzite and one in milky quartz) were identified; all display heavy impact marks in the edges. Elongated, flat pebbles were typically selected for producing these heavy-duty tools.

Only three simple hammerstones were found, one in quartz and the others in quartzite. The presence of ten anvils, in quartzite, greywacke, and schist can be linked to the bipolar technique applied to the splintered cores.

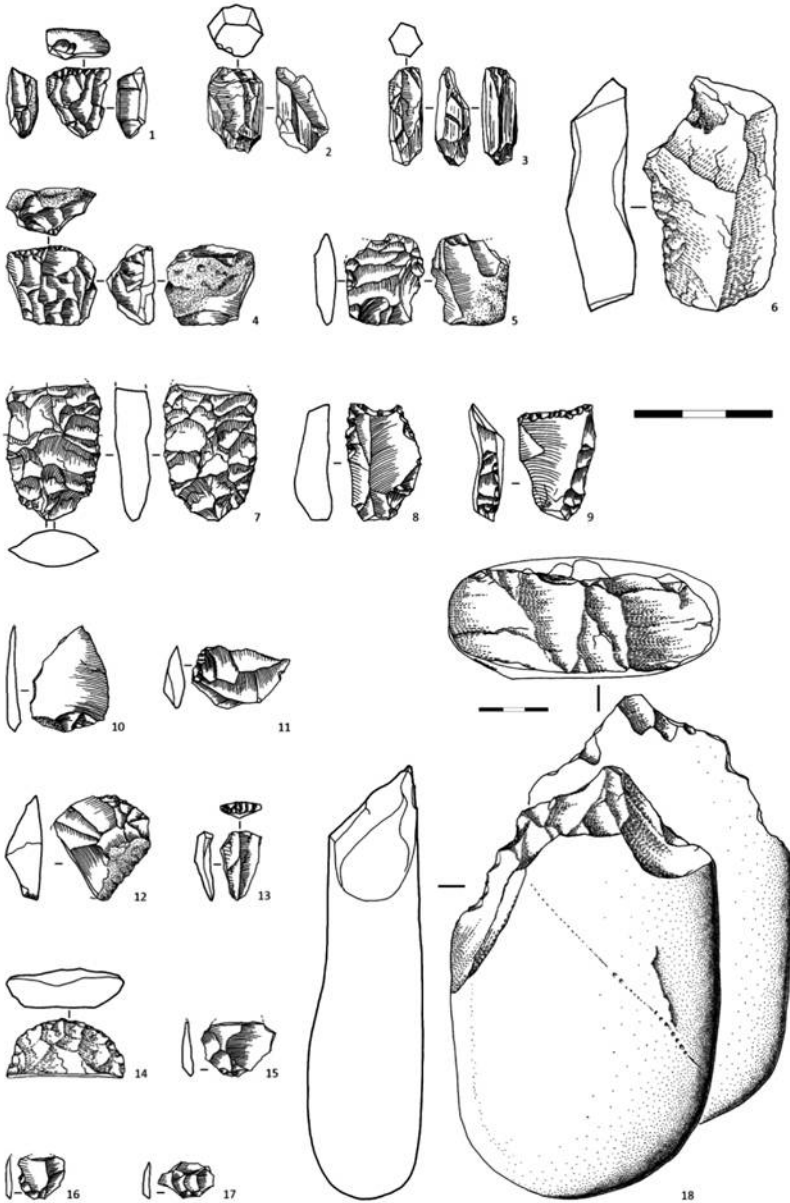


Figure 3. Selected lithic artifacts. (drawing by Fernanda Sousa).

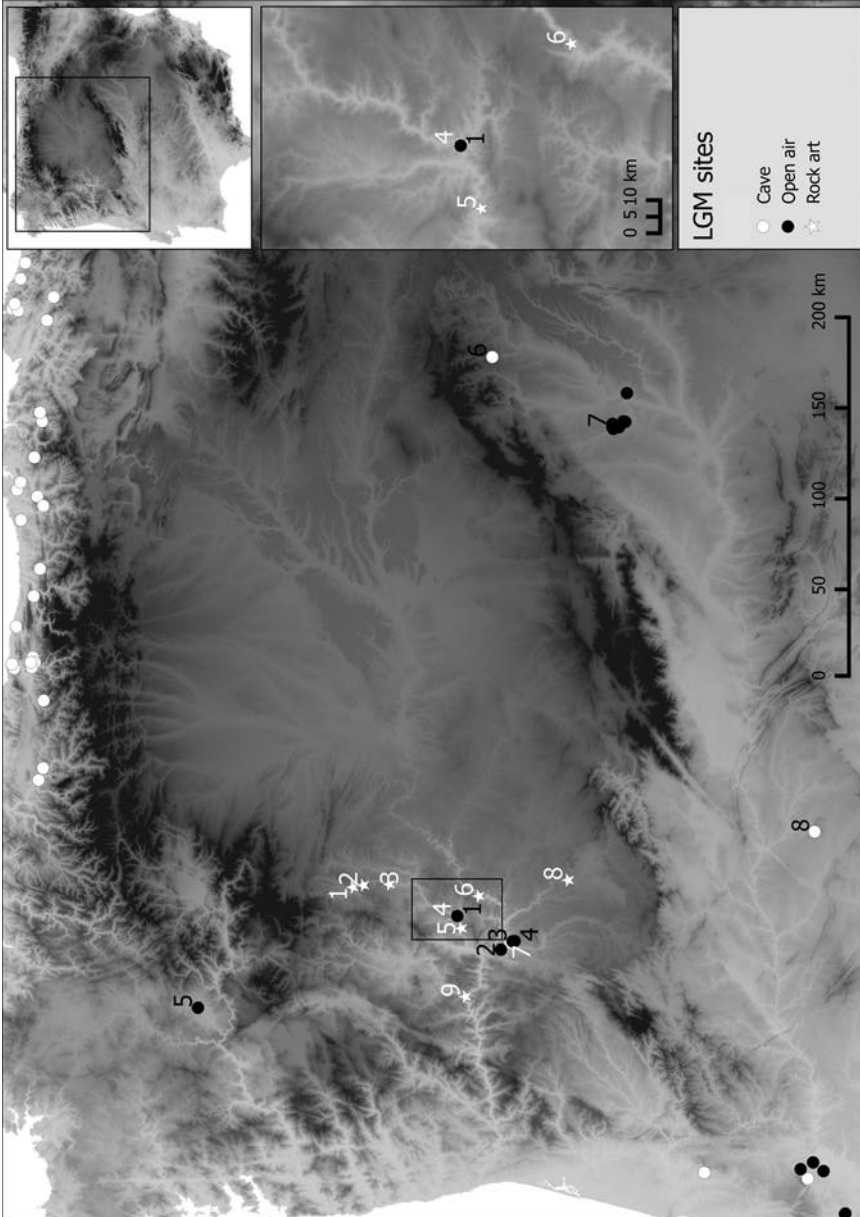
1. Prismatic core, chert; 2 and 3. 45° striking platform on natural edge, rock crystal; 4. Bipolar core, chert; 5. Bifacially retouched flake, chert; 6. Retouched flake, milky quartz; 7. Laurel leaf point (proximal fragment), milky quartz; 8. Multiple borer, chert; 9. Retouched flake, chert; 10 and 11. Thin flakes, chert; 12. Endscraper, chert; 13. Truncated bladelet, rock crystal; 14. Endscraper fragment, milky quartz; 15 and 17. Thin flakes, chert; 16. Thin flakes, lydite; 18. Pickaxe, quartzite pebble

Figure 4. Location of Foz do Medal (Left Bank) in relation to other LGM sites mentioned in text.

- 1. Foz do Medal (Left Bank)
- 2. Cardina 1
- 3. Olga Grande 4
- 4. Olga Grande 14
- 5. Valverde
- 6. Peña Capón
- 7. Las Delicias
- 8. Maltravieso

Rock art sites:

- 1. Sampaio
- 2. Pousadouro
- 3. Fraga Escrevida
- 4. Foz do Medal (Right Bank)
- 5. Ribeira da Sardinha
- 6. Carneiro (Mazouco)
- 7. Cóa Valley
- 8. Siega Verde
- 9. Abrigo da Foz do Tua



DISCUSSION AND CONCLUSIONS

Given its geographical proximity (about 35 km in a straight line), the Cõa Valley provides the best regional framework with which to compare the FMLB site material, despite the stratigraphic issues which led to the creation of a diachronic sequence based mainly on leaf point typology, using as references the data from Portuguese Estremadura (Zilhão 1997). According to Aubry (2009), the two phases of the Solutrean in the Cõa valley are 5a and 5b: Middle and Upper Solutrean, respectively. The 5a phase (Middle Solutrean) is limited to a fragment of a laurel leaf and another possible fragment of a unifacial point from the site of Cardina I (Upper/Evolved 4, levels 8 and 7, respectively) and also the tip of a unifacial point from the Olga Grande 14 site (U/E 2b, level 5). On the other hand, the 5b phase (Upper Solutrean) is well represented at Olga Grande 4 (U/E 1, 2a, and 2b) and Olga Grande 14 (U/E 1 and 2) with a series of short, invasively retouched, Cantabrian-type shouldered points (Aubry 2009:352–54), although erosion and postdepositional geomorphological phenomena have strongly affected the archaeological remains (Aubry 2009:354). Despite this problem, a TL date of 20.7 ± 1.3 kya was obtained for U/E 4, level 8 at Cardina I (Mercier et al. 2009).

The laurel-leaf points (mainly Smith's subtype C) are index fossils for the Middle Solutrean in Portuguese Estremadura, coexisting with unifacial points, as seen in the site of Vale Almoinha (Zilhão 2013). However the chronological value of these assessments can be questioned because of the vicissitudes of sampling, especially among small assemblages, and since points can have either different chronological meanings in different regions or no chronological value at all if their differences result from merely functional factors, as has been argued for the Cantabrian region (e.g., Straus 1983; Straus and Clark 1986; see also Cascalheira 2013). In fact, assemblages similar to Vale Almoinha can be seen at the base of some Upper Solutrean levels in well-preserved sequences of northern Spain, as well as in other Upper Solutrean sites of Portuguese Estremadura (Corchón and Cardoso 2005).

If we extrapolate the chronological sequence for Estremadura built by Zilhão (1997, 2013) to the Cõa region (Aubry 2009), we would arguably include the FMLB site in the Middle Solutrean (in the absence of chronometric dates).

The lithic technology during the Portuguese Estremadura Middle Solutrean is characterized by thin blade production, using unidirectional single-platform or double opposed platforms on sequential or alternating prismatic cores. The platforms were carefully prepared using microfacetting, and the products were used as blanks for the unifacial points. There are also a large number of splintered pieces created during the production of chips to be mounted in composite weapons or tools whose shafts or handles were made of wood or antler. Initial flakes from this reduction sequence were retouched into endscrapers. Laurel leaf points were shaped from nodules and belong to a different reduction sequence (Zilhão 1997, 2013). Blade production at the FMLB site was very limited, if it existed at all, although splintered pieces for bladelet and chip production are present, as they

are in Foz do Medal (Right Bank) levels. Other strategies for bladelet and chip production include the use of rock crystal cores, which are also found not only in what is thus far the single credible Solutrean site in Galicia (Lombera Hermida et al. 2012) but also in other assemblages of different ages in the Côa Valley (Gameiro 2009; Klaric 2009) and in every other Upper Paleolithic occupation in the Sabor Valley (unpublished data).

During the Last Glacial Maximum (LGM), around 20 kya, Iberia was a climatic refuge for human populations in southwestern Europe as its relatively moderate environmental conditions, contrasting with the much colder northern Europe, allowed prehistoric groups to survive (Straus 2013). The known LGM sites are concentrated in the coastal regions of Iberia—namely the Cantabrian region, Mediterranean Spain, and Portuguese Estremadura. This pattern has been interpreted as suggesting the existence of refugia inside the greater Iberian refuge: in other words, some regions with intensive human presence and others with ephemeral human use or none at all (Straus 2013). However, recent findings in areas traditionally considered to have been unoccupied during this period raise new questions about this scenario (Figure 4).

In Galicia, recent research has led to the discovery of the first known Solutrean presence in the northwestern corner of Iberia, at the Valverde site (Lombera Hermida et al. 2012). In the Meseta region of New Castile and the Madrid Basin, new data show that the center of Spain was occupied at some time(s) during the LGM *sensu lato* (Alcaraz-Castaño et al. 2012, 2013). A recently dated archaeological level at Maltravieso cave (Cáceres) demonstrates a human presence in Spanish Extremadura right after the LGM (Canals et al. 2010). Research in the Algarve region has revealed the existence of the Solutrean technocomplex in the southwestern corner of Iberia (Casalheira et al. 2012). And in the vicinity of the Sabor Valley, the research conducted in the Côa Valley after the discovery of the open-air Paleolithic rock art sites in the 1990s documented Solutrean assemblages in the Douro Basin, at the geographical transition to the high plains of the Spanish Meseta (Aubry, ed. 2009).

Since these finds some specialists have contested the idea of peripheral Iberian refugia, proposing instead that during the entire Paleolithic period, including in colder periods, the interior of Iberia was occupied in a way similar to the Cantabrian or Mediterranean regions of Spain and mid-Atlantic Portugal. They claimed that climate cannot be considered an absolute limiting factor because human groups have in fact often shown great adaptive capacities. This means that the differences in site density between regions could be related to the insufficiency of archaeological investigation in the areas that are currently poorly represented, as well as to site visibility and effects of postdepositional processes (Cacho et al. 2010). Some suggest that taphonomic processes are more important than demography for explaining the uneven distribution of sites in southwestern Europe and that many depositional hiatuses and palimpsests are to be expected in Solutrean sites because of LGM climatic oscillations (Zilhão 2013).

Nevertheless, the recent finds in Algarve, Galicia, Huesca, Spanish Extremadura, and the Portuguese Douro Basin can be added to the existing picture of Iberia during the LGM by linking the densely occupied regions (Portuguese Estremadura, the Cantabrian coast, and the Mediterranean margins of Spain) (Straus 2012:31–32). From this perspective, the additional regions of Solutrean habitation that have recently been placed on the map are also considered refugia, although some population gaps are still perceived as real, despite visibility or research limitations (Straus 2013). This would be the case of the center of Spain, since, it is argued, this and other inhospitable regions would be occupied only during brief warmer and essentially more humid periods (Straus 2012:34) or used as paths between refuges (Straus 2013).

Detailed studies of raw material acquisition at C \hat{o} a region sites (Aubry et al. 2009, 2012) show that, during the Upper Paleolithic, hunter-gatherers exploiting this area obtained nonlocal siliceous rocks from distant sources, such as Portuguese Estremadura and the western Meseta, either through direct procurement, embedded in a group's foraging rounds, or by trade. These mobility patterns, which lasted throughout the entire Upper Paleolithic to greater or lesser degrees, suggest the existence of social networks linking distant territories (Aubry et al. 2012). Consequently the presence of 14 objects (5 cores, 5 flakes and 4 tools) in the Solutrean levels of FMLB manufactured on what was macroscopically identified as Mucientes chert from the Valladolid region of Old Castile (about 180 km east-northeast of our site via the Duero Valley) (Fuertes-Prieto et al. 2014) is of great relevance because it lends support to the existence of such social networks during the LGM, connecting peripheral territories with the interior of Iberia. In fact, these networks may have been even larger in colder periods, with travel being easier in treeless landscapes and more constrained during warmer times (Zilh \hat{a} o 2013:211).

The new evidence from the FMLB site can be interpreted in different ways. Its "semi-peripheral" (Straus 2012:32) position between the western Atlantic margin of Iberia and the Meseta's high plains, as with C \hat{o} a, can be seen as proof of contacts between populations from these two Douro areas and people from the Cantabrian region, as might be suggested by the exclusive use of Cantabrian-type Upper Solutrean shouldered points in the C \hat{o} a Valley, in contrast to the presence of both Cantabrian and Mediterranean shouldered point types (and of Mediterranean tanged points—absent from northern Portugal and Cantabria) in Portuguese Estremadura sites (Fullola and Zilh \hat{a} o 2009; Zilh \hat{a} o 2013:211). Conversely, the position of the C \hat{o} a and Sabor sites could be seen as a mere overlap in the logistical territories of Portuguese Estremadura and the Northern Meseta of Spain, meaning that this part of the Douro Basin would only occasionally be occupied and could function as an aggregation area where economic, social, and symbolic activities would take place (Aubry et al. 2012). This hypothesis is coherent with the presence of large amounts of rock art (Aubry et al. 2012), not only in the C \hat{o} a Valley but also in the Sabor Valley and adjacent areas (e.g., Mazouco) (see Figure 4).

The contacts between western “Iberians” and the northern Meseta during the Upper Paleolithic, including the LGM, are documented here mainly through raw material source analysis. Increased understanding as to whether this inner region of Portugal was permanently inhabited during the LGM or was only exploited occasionally for raw materials and/or used as a path to other territories requires further research.

Based on the Sabor Valley experience, one problem that should be taken into account is site visibility. In the Foz do Medal case, the site was identified by test pit excavation at an open-air location, at the bottom of the valley, under thick sedimentary deposits with no visible archaeological materials on the surface. On the other hand, open-air assemblages in areas with high chert acquisition cost, where people used mainly local quartz and quartzite and where there are frequently major macrolithic components, are difficult to attribute typologically to the Upper Paleolithic and are thus easily misinterpreted (as Early Holocene, for example), especially when found on the surface. Given the importance of the results obtained by the few research projects done to date in “empty” areas, we believe that similar approaches in the future would greatly increase the number of known LGM sites in the Iberian interior.

NOTE

The study of the prehistoric archaeological record in the Sabor Valley is coordinated by the first author (Rita Gaspar), who is in charge of that aspect of the Plano do Salvaguarda do Património (PSP—Plan for Cultural Heritage Preservation). This project is conducted under the general contractor for the Baixo Sabor Dam (Empreitada Geral do Aproveitamento Hidroelétrico do Baixo Sabor—AHBS), sponsored by the Portuguese Electric Company (EDP) and executed by Baixo Sabor, ACE, which is a consortium of ODEBRECHT/Bento Pedrosa Construções, S.A. and LENA Construções. The PSP is carried out under the purview of the Environmental Department of the AHBS, coordinated by A. Fernandes, composed by the following team: J. Sastre (Protohistory), S. Pereira (Roman period), L. Fontes (Middle Ages), F. Santos (Cilhades), P. Dordio (Traditional architecture), S. Figueiredo (Rock Art), S. Antunes (Watching brief), S. Lainho (Restoration and Conservation). The Neoépica-Arqueologia e Património team collaborated in the fieldwork at the FMLB site. This text was extensively edited by L. G. Straus.

REFERENCES CITED

- Alcaraz-Castaño, M., J. Alcolea González, R. Balbín Behrmann, M. García Valero, J. Sainz de los Terreros and J. Baena Preysler. 2013. Los orígenes del Solutrense y la ocupación pleniglaciario del interior de la Península ibérica: Implicaciones del nivel 3 de Peña Capón (valle del Sorbe, Guadalajara). *Trabajos de Prehistoria* 70(1):28–53.
- Alcaraz-Castaño, M., M. López-Recio, M. Roca, F. Tapias, I. Rus, J. Baena, J. Morín, A. Pérez-González and M. Santonja. 2012. Nuevos datos Sobre el yacimiento paleolítico de Las Delicias: Un taller solutrense en el valle del Manzanares (Madrid, España). *Espacio, Tiempo y Forma, serie I, Prehistoria y Arqueología* 5:427–46. <http://dx.doi.org/10.5944/etfi.5.2012.5352>

- Aubry, T. 2009. "Abordagem tipológica dos conjuntos líticos: contribuição para a definição da sequência crono-estratigráfica de ocupação humana do Vale do Côa," in *200 séculos da história do Vale do Côa: Incursões na vida quotidiana dos caçadores-artistas do Paleolítico*. Edited by Thierry Aubry, pp 348–56. Trabalhos de Arqueologia 52. Lisbon: Igespar.
- , ed. 2009. *200 séculos da História do vale do Côa: Incursões na vida quotidiana dos caçadores-artistas do Paleolítico*. Trabalhos de Arqueologia 52. Lisbon: Igespar.
- Aubry, T., X. Mangado, and J. Sampaio. 2009. "Estudo do aprovisionamento em matérias-primas," in *200 séculos da história do Vale do Côa: Incursões na vida quotidiana dos caçadores-artistas do Paleolítico*. Edited by T. Aubry, pp 131–69. Trabalhos de Arqueologia 52. Lisbon: Igespar.
- Aubry, T., L. Luis, J. Mangado Llach, and H. Matias. 2012. We will be known by the tracks we leave behind: Exotic lithic raw materials, mobility and social networking among the Côa Valley foragers (Portugal). *Journal of Anthropological Archaeology* 31(4):528–50. <http://dx.doi.org/10.1016/j.jaa.2012.05.003>
- Cacho, C., J. Martos, J. Jordá, J. Yravedra, B. Avezuela, J. Valdivia, and I. Martín. 2010. "El Paleolítico superior en el interior de la Península Ibérica: Revisión crítica y perspectivas de future," in *El Paleolítico superior peninsular: Novedades del siglo XXI*, pp. 115–36. Barcelona.
- Canals, A., A. Rodríguez-Hidalgo, L. Peña, E. Mancha, M. García-Díez, S. Bañuls, I. Euba, J. López-García, N. Barrero, L. Bermejo, F. García, D. Mejías, M. Modesto, A. Morcillo, V. Aranda, and E. Carbonell. 2010. "Nuevas aportaciones al Paleolítico superior del suroeste peninsular: La cueva de Maltravieso, más allá del santuario extremeño de las manos," in *El Paleolítico superior peninsular: Novedades del siglo XXI*, pp. 199–218, Barcelona.
- Cascalheira, J. 2013 "O Solutrense em Portugal: Novidades do século XXI," in *Arqueologia em Portugal—150 anos*, Edited by J. M. Arnaud, A. Martins, C. Neves, pp. 269–76. Lisboa: AAP.
- Cascalheira, J., N. Bicho, J. Marreiros, T. Pereira, M. Évora, M. Cortés, J. Gibaja, F. Regala, C. Gonçalves, and P. Monteiro. 2012. "Vale Boi (Algarve, Portugal) and the Solutrean in Southwestern Iberia," *Espacio Tiempo y Forma, serie I, Prehistoria y Arqueología* 5:455–67. <http://dx.doi.org/10.5944/etfi.5.2012.5376>
- Corchón, M., and J. Cardoso. 2005. Reflexiones sobre el Solutrense portugués: A propósito de la industria paleolítico superior de Correio-Mor (Loures). *Zephyrus* 58:89–110.
- Figueiredo, S. S., L. Nobre, R. Gaspar, J. Carrondo, A. Cristo-Ropero, J. Ferreira, M. J. Silva, and F. J. Molina. 2014. Foz do Medal terrace: An open-air settlement with Paleolithic mobile art. *International Newsletter on Rock Art* 68:12–20.
- Fullola, J., and J. Zilhão. 2009. "La cuestión de la ocupación de las áreas interiores ibéricas en el contexto del Paleolítico superior peninsular," in *200 séculos da história do Vale do Côa: Incursões na vida quotidiana dos caçadores-artistas do Paleolítico*. Edited by T. Aubry, pp. 15–17. Trabalhos de Arqueologia 52. Lisbon: Igespar.
- Fuertes-Prieto, M., A. Neira-Campos, E. Fernández Martínez, F. Gómez-Fernández, and E. Alonso-Herrero. 2014. "Mucientes chert" in the Northern Iberian Plateau (Spain). *Journal of Lithic Studies* 1(1):117–35. <http://dx.doi.org/10.2218/jls.v1i1.785>

- Gameiro, C. 2009. “Utensílios e suportes microlíticos do Magdalenense Final no Vale do Côa: O exemplo da U.E. 4 do Fariseu,” in *200 séculos da história do Vale do Côa: Incursões na vida quotidiana dos caçadores-artistas do Paleolítico*. Edited by T. Aubry, pp. 256–68. *Trabalhos de Arqueologia* 52. Lisbon: Igespar.
- Gaspar, R., J. Carrondo, L. Nobre, Z. Rodrigues, and G. Donoso. 2014. Espaço para a morte: O terraço da Foz do Medal (Vale do Sabor, Nordeste de Portugal) durante a Idade do Bronze. *Estudos do Quaternário* 10:59–72.
- Klaric, L. 2009. “Les systèmes de production de supports d’armatures et leur place dans la gestion des ressources lithiques: Une voie privilégiée pour la compréhension des sociétés gravettiennes de la Vallée du Côa,” In *200 séculos da história do Vale do Côa: Incursões na vida quotidiana dos caçadores-artistas do Paleolítico*. Edited by T. Aubry, pp. 247–56. *Trabalhos de Arqueologia* 52. Lisbon: Igespar.
- Lombera Hermida, A., X.-P. Rodríguez Álvarez, X. Rabuñal Gayo, A. Ameijenda Iglesias, F. Martínez Gómez, M. Soares Remiseiro, A. Pérez Alberti, and R. Fábregas Valcarce. 2012. El yacimiento de Valverde (Monforte de Lemos, Lugo, Galicia, España) y las primeras evidencias de poblamiento en el Pleniglacial del NO de la Península ibérica. *Espacio, Tiempo y Forma, serie I, Prehistoria y Arqueología* 5:363–82. <http://dx.doi.org/10.5944/etfi.5.2012.5379>
- Mercier, N., H. Valladas, L. Froget, J.-L. Joron, J.-L. Reyss, and T. Aubry. 2009. “Application des méthodes de la luminescence à la datation d’occupations paléolithiques de la Vallée du Côa,” in *200 séculos da história do Vale do Côa: Incursões na vida quotidiana dos caçadores-artistas do Paleolítico*. Edited by T. Aubry, pp. 343–56. *Trabalhos de Arqueologia* 52. Lisbon: Igespar.
- Miall, A. 1985. Architectural element analysis: A new method of fácies analysis applied to fluvial deposits. *Earth Science Reviews* 22:261–308. [http://dx.doi.org/10.1016/0012-8252\(85\)90001-7](http://dx.doi.org/10.1016/0012-8252(85)90001-7)
- Pereira, D. I., and T. M. Azevedo. 1995. Evolução quaternária do Graben da Vilarça (Trás-os-Montes, NE Portugal), *Caderno Lab. Xeolóxico de Laxe* 20:123–37.
- Pereira, E., A. Ribeiro, J. Almeida, and P. Castro. 2008. *Carta geológica de Portugal, Folha 11-B (Mogadouro), escala 1:50 000*, 2º edition. Lisbon: IGEO.
- Silva, A. F., J. A. Rebelo, and M. L. Ribeiro. 1989. *Notícia explicativa da Folha IIC – Torre de Moncorvo*. Lisboa: Serviços Geológicos de Portugal.
- Smith, P. 1966. *Le Solutréen en France*. Bordeaux: Delmas.
- Straus, L. G. 1983. *El Solutrense Vasco-Cantabrico: Una nueva perspectiva*. Monografías 10. Madrid: Centro de Investigación y Museo de Altamira.
- . 2012. El Solutrense: 40 años de reflexiones por un arqueólogo norteamericano. *Espacio, Tiempo y Forma, serie I, Prehistoria y Arqueología* 5:27–36. <http://dx.doi.org/10.5944/etfi.5.2012.4768>
- . 2013. “Qu’est-ce que ‘le Solutréen’?” in *Le Solutréen . . . 40 ans après Smith ’66*, pp. 27–36. 47^e Supplément à la Revue Archéologique du Centre de la France. Chambray-Les-Tours: ARCHEA, FERACF.
- . 2015. The human occupation of southwestern Europe during the Last Glacial Maximum: Solutrean cultural adaptations in France and Iberia. *Journal of Anthropological Research* 71:465–92. <http://dx.doi.org/10.3998/jar.0521004.0071.401>
- Straus, L. G., and G. A. Clark. 1986. *La Riera Cave*. Anthropological Research Papers 36, Tempe: Department of Anthropology, Arizona State University.

- Zilhão, J. 1997. *O Paleolítico superior na Estremadura Portuguesa*. Lisbon: Edições Colibri.
- . 2013. “Seeing the leaves and not missing the forest: A Portuguese perspective of the Solutrean,” in *Pleistocene foragers on the Iberian Peninsula: Their culture and environment*. Edited by A. Pastoors and B. Auffermann, pp. 201–16. *Wissenschaftliche Schriften des Neanderthal Museums* 7. Mettmann.