To the West of Spanish Cantabria

The Palaeolithic Settlement of Galicia

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BAR International Series 2283
2011

Published by

Archaeopress
Publishers of British Archaeological Reports
Gordon House
276 Banbury Road
Oxford OX2 7ED
England
bar@archaeopress.com
www.archaeopress.com

BAR S2283

To the West of Spanish Cantabria: the Palaeolithic Settlement of Galicia

ISBN 978 1 4073 0860 9

Printed in England by Blenheim Colour Ltd

All BAR titles are available from:

Hadrian Books Ltd
122 Banbury Road
Oxford
OX2 7BP
England
www.hadrianbooks.co.uk

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Chapter 9: The Palaeolithic Settlement of the Monforte Basin (Lugo, Galicia)

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Abstract: *The Monforte de Lemos Basin is a Tertiary depression filled up with Pleistocene sediments. A sequence of nine fluvial surfaces related to the Paleo-Cabe River has been established providing us a relative chronological framework. The archaeological surveys carried out during the last five years have yielded a huge number of Paleolithic findings ranging from Lower to Upper Paleolithic. The discovery of nearly a hundred archaeological points within the basin means that this is an excellent area to study the evolution of settlement patterns and technological progress of the Middle and Upper Pleistocene hunter and gatherer societies. Some of these sites, related to the upper fluvial terraces have Mode 2 Technologies (assemblages with large cutting-tools such As Lamas or Chao Fabeiro), others are defined by the presence of Levallois or discoidal flaking methods (Mode 3 Technology: O Regueiral, As Gandariñas) and finally the Upper Paleolithic assemblages are characterized by the blade technology (Mode 4: Valverde, Áspera).*

Keywords: *Lithic industries, Archaeological surveys, Middle Pleistocene, Upper Pleistocene, Open-air sites, OSL.*

Resumen: *La cuenca de Monforte de Lemos es una depresión terciaria rellena en sus márgenes de sedimentos pleistocenos. A través de estudios geoarqueológicos se ha establecido una secuencia de 9 superficies fluviales relacionadas con el cauce del Paleo-Cabe que proporcionan un buen marco cronológico relativo para el estudio de las ocupaciones paleolíticas. Las intervenciones arqueológicas llevadas a cabo durante los últimos 5 años han proporcionado un gran número de hallazgos paleolíticos que se remontan desde el Paleolítico inferior al Paleolítico superior. El descubrimiento de casi un centenar de puntos arqueológicos en la depresión la convierte en una excelente área para el estudio de la evolución de los patrones de asentamiento y progreso tecnológico de las comunidades de cazadores-recolectores del Pleistoceno medio y superior. Algunos de estos yacimientos, relacionados con los niveles fluviales superiores, presentan industrias adscritas al Modo 2 (conjuntos con grandes objetos configurados como As Lamas o Chao de Fabeiro), otras se definen por la presencia de métodos de talla predeterminados como el Levallois o discoidal (Modo 3: O Regueiral, As Gandariñas) y, finalmente, los conjuntos líticos del Paleolítico superior se caracterizan por la tecnología laminar (Modo 4: Valverde, Áspera).*

Palabras clave: *Industrias líticas, Prospección arqueológica, Pleistoceno medio, Pleistoceno superior, yacimientos al aire libre, OSL.*

Introduction

The Lower Paleolithic research on NW Iberia has focused on the open-air sites linked to the Miño valley, defining two main areas: the outskirts of the city of Ourense and O Baixo Miño, at the mouth of the river Miño. In the latter, a sequence of 8 fluvial terraces with lithic scatters was identified, the higher ones adscribed to the Lower Pleistocene (Giles *et al.* 2000), although most of them can be dated in the Middle Pleistocene, related to the Acheulian sites. This is the only relative sequence available for the Lower and Middle Palaeolithic of NW Iberia. Besides, several sites have been excavated in the middle terraces of the Miño river, the Tertiary depression of Louro and granitic peneplains of Ourense. The only reference to Acheulian finds in the Galician hinterland were the handaxes found in Vilaescura and Os Peares (Cano, 1991).

Due to the casual find of lithic artefacts in the Monforte Basin, since 2006 archaeological surveys were carried out. Monforte the Lemos is a Tertiary Basin where more than 80 Palaeolithic locations were identified. This issue deals with the techno-morphological features of those lithic scatters and, based on the geomorphological data, establishes their relationship with the Quaternary surfaces identified on the Monforte Basin.

Regional context

The Monforte basin, irrigated by the river Cabe, is a Tertiary basin surrounded by higher Paleozoic and Hercinian areas, reaching 600 m. of altitude to the West (Chantada Surface) and 1600 m at the summit of the Courel Ridge to the East. The average height of the Cabe Valley is 290m a.s.l. It is divided in two main sectors by the quartzite outcrops crossing in NE-SW direction of Serra do Moncai. The southern one, the “Depresión de Monforte de Lemos” with an extension of about 175 Km^2 is the focus of our research where the Quaternary deposits are best preserved.

The Monforte Basin has a tectonic origin following the preexisting Hercinian fault lines with a WNW-ESE direction. After a neotectonic episode and a subsequent fluvial reorganization, Pleistocene sediments linked to the paleo-channels and alluvial fans covered the margins of Tertiary silts and clays of lacustrine environment (Olmo 1985). These Quaternary deposits, disposed in a sequence of flat surfaces, are identified as fluvial terraces, glacis and pediments whose sedimentary depth can reach up to five meters (De Groot 1974, Ameijenda this volume).

Though their distribution is widespread along the basin, there is a differential preservation of Quaternary surfaces maybe related to the incidence of the Paleo-Cabe course. Along with the extension of the Pleistocene surfaces, there are some differences regarding to the lithology of the deposits. On the northern part, big and medium sized cobbles of quartzite and quartz are predominant, while in the southern margin subangular and angular quartz and quartzite fragments are more frequent, along with some slate fragments. These differences could be explained by the higher presence of alluvial fans and pediments in the southern basin and the higher influence of fluvial terraces, related to the paleochannel, on the northern part of the Basin, reinforcing the geoarqueological interpretations of those surfaces. These depositional preservation and geological characteristics make the Monforte Basin a unique place in NW Iberia by providing a long sequence of Pleistocene deposits.

Along with its geological characteristics, for its geographical location Monforte plays a strategic role since it is placed on the natural pathway that communicates the inland Galicia to the western Meseta. Besides, it is framed by the two main fluvial systems of NW Iberia (the Miño and Sil rivers) that condition the structural mobility through the territory. For the region we are dealing with, both fluvial courses run along deeply-cut valleys that follow ancient tectonic faults in granitic surfaces, impairing the access to western and northern areas.

According to the least cost routes through the NW Iberia defined by GIS software, the Monforte Basin is placed strategically at the entrance of the routes coming from the western Meseta working as a nodule point from where the routes diverge towards other directions (Figure 1). At the eastern part of the Sil valley some isolated findings were discovered along the basins of Quiroga, A Rúa and Valdeorras (Cano, 2009; Fábregas *et al.*, 2009; Fernández *et al.*, 1996) directly communicating with the Bierzo basin and the western Meseta, where several Lower Paleolithic sites were identified (Castellanos, 1986; Neira and Bernaldo, 1996). Though the Sil valley is the natural pathway, as we get into the NW the topographical features of the Sil riverside (running in deep canyons) prevent the access to the western regions. Thus, an alternative route is defined by the Lor river mouth and the eastern rim of Monforte Basin, where the slopes are much more gradual. From Monforte we can access to the flat granitic surfaces of the Galician hinterland. A second route comes from the Douro valley (Portugal) going through the Verin and Maceda basins, surrounding the Manzaneda Ridge, and finally crossing the Sil river at the south of Monforte.

Once we get into the Basin, it works as a crosspoint from where we can access to the main areas of NW Iberia. Monforte is placed at the threshold of the corridor formed by the hinterland Tertiary basins in a N-S axis, between the Eastern Mountains and the inland granitic peneplains, which finally leads to the Cantabrian Coastline. The presence of Upper Paleolithic sites either on the margin of these basins (Valverde, Betote, Cova da Valiña) or in caves placed at the nearby valleys (Cova Eirós, the rock-shelters of Valadouro) may reinforce the importance of this natural pathway between the Cantabrian coast and the inner part of Galicia, at least during the final Upper Pleistocene (Cano 2008; Fábregas *et al.*, 2009; López 2003; Ramil and Ramil 1996).

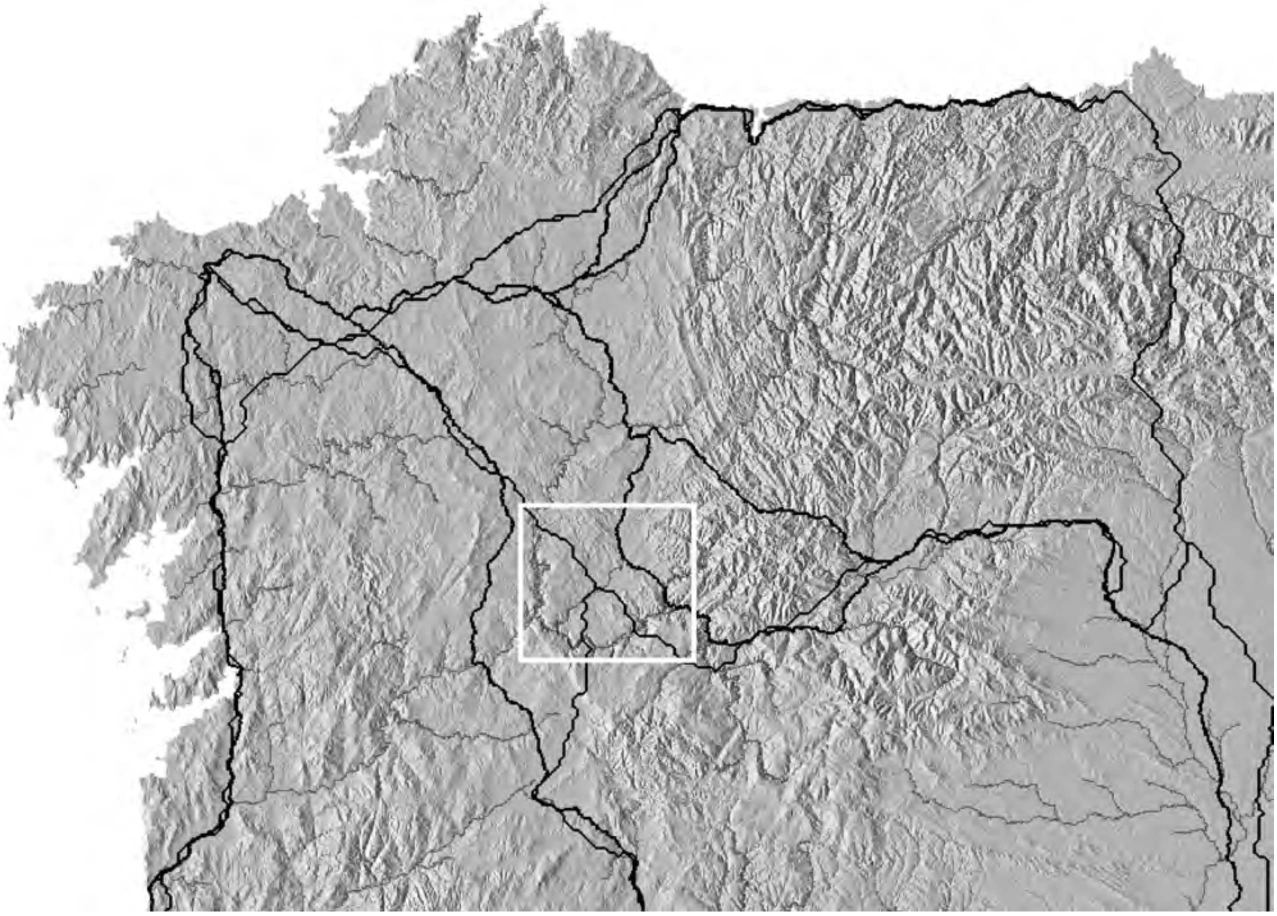

Figure 1: Least cost natural paths on NW Iberia (GRASS v.6.3 based on DEM 90m)

Following the Cabe mouth that heads to the Miño Valley we can get into the Ourense region and its granitic peneplains where several Paleolithic sites were studied (López 2001; Vázquez 1973; Villar 1997). As for the other cases, the presence of isolated findings at Sober and Os Peares, located at the southwestern border of Monforte Basin, may point out to the persistence of this route (Cano 1991). The Miño valley, once its course widens, works as a route that directly communicates with the Atlantic coast, where we can assert an important human settlement during the Paleolithic (Cano *et al.*, 1997; Meireles 1996).

Finally, we can define another route going through the plains of O Saviñao and passing through the northern margin of Serra do Faro which leads to the valley of the river Ulla. In contrast to the aforementioned areas, the absence of research programs in this sector prevents us from making a reliable assessment of the importance of this natural pathway. The unique reference next to this route is the Lower Paleolithic site of Pedras, located in a small basin in the granitic plain of O Saviñao, 2 km away from the river Miño (Fábregas *et al.* 2009).

The presence of several Paleolithic sites and findings along these regions and routes strengthens the consistence and traditional significance of these pathways during the Middle and Upper Pleistocene and can be used as good references in order to explain the first settlement of NW Iberia and its relation to the neighboring areas, such as the Northern Meseta, Portugal and the Cantabrian Coast. Sadly, the scarcity of absolute dates and research programs prevent us from establishing a good chronological framework.

Along with the geographical location of the Monforte basin, paleoenvironmental proxies based on geomorphological data have shown that, due to their low elevation, the mean temperatures of the Monforte Basin and Sil valley during the glacial periods would be milder than those in the surrounding areas and comparable to those recorded at the coast (Valcárcel *et al.* 1998). Consequently, the Monforte Basin could be regarded as a refuge area during the glacial periods while the mountain and inland region, with drier and colder conditions, would be covered by glacial sheets and herbaceous steppes (Gómez *et al.* 2008; Pérez and Valcarcel 1997; Ramil *et al.* 2005-2006; Vidal *et al.* 1999). The confluence of these geological, geographical and topographical characteristics could explain the high intensity of hominid settlement identified at the Monforte Basin during the Middle and Upper Pleistocene.

Archaeological surveys

The study area we have chosen is focused on the Monforte Basin, the largest sedimentary depression of the region (de Groot 1974; Olmo 1985; Santanach 1994). Based on previous geological data, aerial photography, topographic and morphometric analysis Tertiary, Pleistocene and Holocene surfaces were identified within Monforte's basin (Ameijenda this volume). As we stated before, the spread of these deposits is quite variable on the different sectors of the basin, conditioning the spatial distribution and density of the archaeological sites. We must take into account some handicaps, such as the dense vegetation and climatic conditions of the region that decrease the extension of the surveying area and the visibility of the surface scatters. While the bottom valley is covered by different agricultural exploitations which have a long term use (mainly grassland), the margins of the Basin are partially covered by forest and therefore there is no chance of walking along newly plowed fields. Another factor is the low perceptivity of the artifacts as they are made on local raw materials and dispersed over the conglomerate surfaces that define these Quaternary deposits. Nevertheless, the spatial distribution and topographical characteristics of the archaeological sites allow us establishing the criteria that define the settlement patterns of these Paleolithic societies and its evolution during the Middle and Upper Pleistocene.

The Palaeolithic sites of Monforte basin

Since the Palaeolithic research programs on NW Iberia were traditionally focused on the lower Miño Basin, on our study area the only reference to a Paleolithic artifact was a quartzite handaxe found by a schoolboy at Vilaescura in the mid-twenties. Lately, the numerous findings made by a local *amateur* (Jose Antonio Peña) pointed out to the real importance of the Paleolithic settlement on the Basin and led to the start of a research program (Fábregas *et al.*, 2007; de Lombera *et al.*, 2008; Rodriguez *et al.* 2008). Field works carried out since 2006 have allowed the localization of more than eighty surface lithic scaters, ranging from sites with squares of artifacts to others with just an isolated finding, and dating from the Lower to the Upper Paleolithic. Their technical features and roundness show a great homogeneity on each dispersal, probably pointing out to the synchronicity of the artifacts and their common origin and *in loco* position.

Along with the field surveys, some test-pits were done on those locations whose artefact densities might indicate the presence of archaeological sites in stratigraphical context. These works were carried out at the sites of As Lamas and Valverde at the Monforte Basin, and Pedras at the granitic peneplain of O Saviñao (Fábregas *et al.*, 2009; 2010). Besides, other findings in stratigraphic context were made on the sites of O Regueiral, and Áspera (Monforte de Lemos) (Fábregas *et al.*, 2007; Rodríguez *et al.*, 2008). The study of these provides us with further data on the sedimentary, technological and chronological characteristics of the Quaternary surfaces where those findings were made.

The 51.25% of the archeological points identified on the Basin have less than 6 artifacts, and 20% have yielded more than 20 artifacts *per site*, some of them reaching hundreds of elements. Although their artifact densities cannot be compared to those identified at other Iberian areas (Castellanos 1986, Diez 2000, Santonja and Pérez 2000-2001, Rodríguez de Tembleque 2005), namely because of the handicaps discussed above, we must take into account the reduced area of the fields surveyed (usually less than 1 Ha) preventing us from checking larger areas and recovering more artifacts. The scarcity of lithic objects in some of the points, the fact that about 25% of them don't come from systematic research, and the small size of plowed fields prevent us from getting a detailed understanding of the site functionality, but, indeed, some trends about technological aspects and settlement patterns can be outlined. Since the technological and geological characteristics of the main lithic assemblages are described in other publications (Fábregas *et al.*, 2007, 2008, 2009, 2010; de Lombera *et al.*, 2006, 2008; Rodríguez *et al*, 2008), in this paper we endeavor to study the technological and raw material procurement strategies on the Monforte basin.

According to the geoarchaeological analysis a relative chronology of the Quaternary surfaces and related sites could be established. Based on the topography and morphometry of Pleistocene deposits (considering fluvial terraces, glacis and pediments), 7 erosional levels were identified on the different margins of the Basin (Ameijenda 2008). Their geomorphological position, along with the technological characteristics of the lithic assemblages, allow us to achieve a chronological framework for the human settlement of the Basin (Figure 2).

Most of the archaeological findspots are located on the middle levels (N4 and N5) while their presence on the other levels, except N1, is more scarce. Taking into account the technological characteristics of the lithic collections, Mode 2 sites are placed on the middle and upper levels (N3-N7), which are related to the Middle Pleistocene surfaces, while the Mode 3 sites are located on the Upper Pleistocene lower surfaces (N1). The presence of Mode 3 and even Mode 4 lithic assemblages on older levels need not to be controversial since the concurrence of Lower and Middle Paleolithic occupational landscapes shows the similarities of settlement patterns between these two periods, as we shall see later. On the other hand, the presence of Mode 2 lithic industries on Upper Pleistocene surfaces might be explained by the effects of postdepositional processes (Figure 3).

Technological evolution

The oldest evidences of the Basin, according to the morphotechnical features and sedimentary context, are all located at the parish of Chao de Fabeiro (N7), on the northern rim, where five lithic scatters were discovered. On this site, 26 quartzite artifacts (only one of them on quartz) were recovered. Among them handaxes are present along with *Choppers* and *Chopping-tools* made on quartzite cobbles. The configuration strategies are focused

Erosional Levels	*Height*	*Mode 2*	*Mode 3*	*Mode 4*	*Indet*	*TOTAL*
N1	0-5m	1	2		2	**5**
N2	5-12,5m	1				**1**
N3	12,5-20m	2				**2**
N4	20-40m	5	1		6	**12**
N5	40-60m	4	4	1	2	**11**
N6	60-80m				2	**2**
N7	>80m	4				**4**
Alluvial fan	-	2	7		4	**13**
Paleozoic	-		1	4	4	**9**
Tertiary	-	2		1	2	**5**
Slope	-	2	1		1	**4**
Indet	-	2	1	3	20	**26**
TOTAL		***25***	***17***	***9***	***43***	***94***

Figure 2: Erosional levels and technological adscription of the archaeological sites.

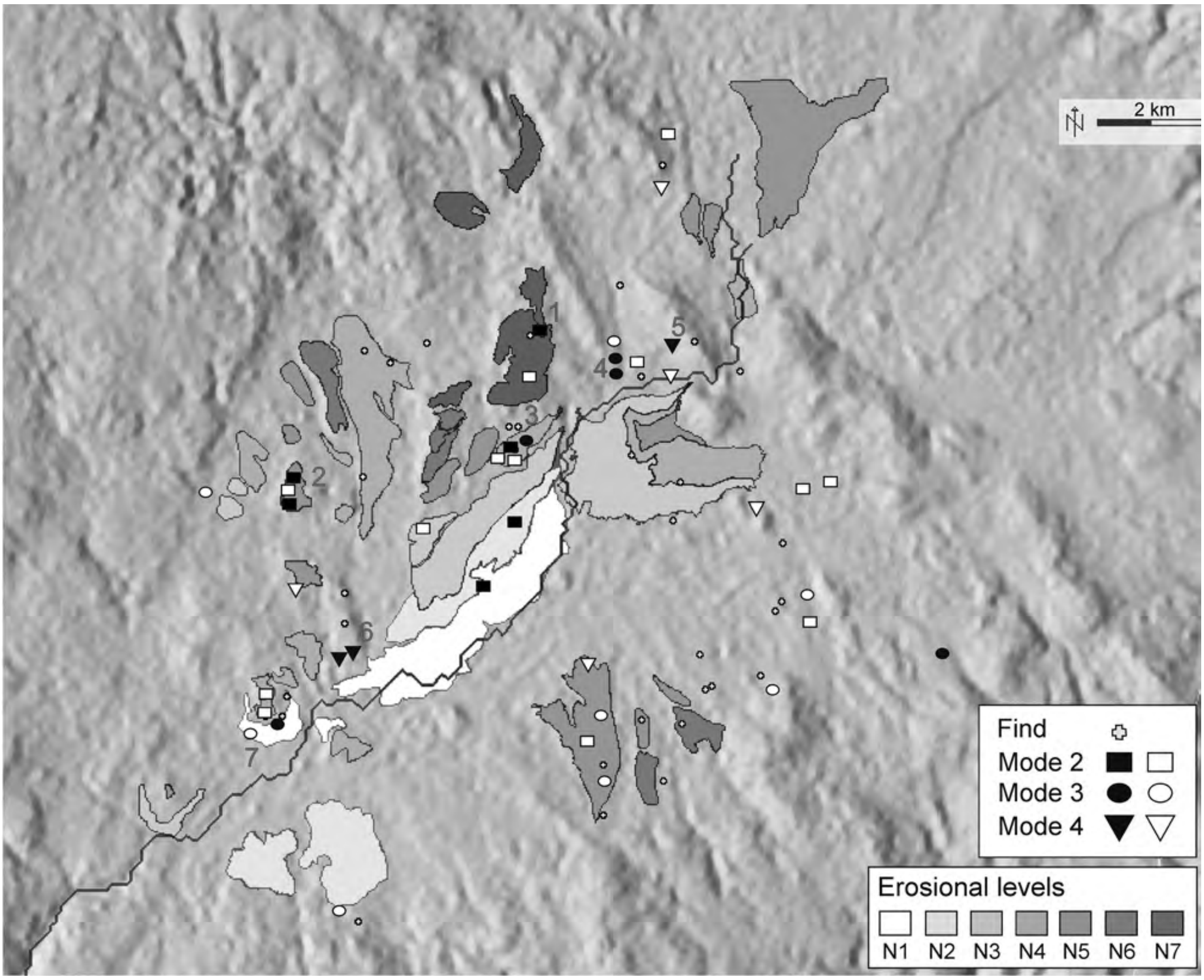

Figure 3: Monforte Basin archaeological sites and erosional levels. The dark symbols refer to higher density sites. 1: Chao Fabeiro; 2: Chao Vilar; 3: As Lamas; 4: O Regueiral; 5: Valverde; 6: Costa Grande; 7: San Mamede.

on the production of core-tools, reaching the 50%, one of the highest percentages in the whole area. Reduction sequences are not so complex, as the longitudinal and orthogonal methods are predominant over the centripetal ones. The presence of handaxes, *Choppers* and orthogonal and longitudinal reduction sequences points out to an adscription to the Mode 2 technocomplex (Figure 4 and 5).

Nevertheless, most of the Mode 2 sites are located on the middle surfaces (erosional levels N5-N4). Related to the N5

		Hammers	**Cores**			**Configurated tools**				**Flaking products**				
Sites	***Tech. Mode***	***nb***	***1GNBE***	***2GNBE***	***NBE***	***1GNBC***	***2GNBC***	***F2GNB***	***NBC***	***PB***	***FPB***	***PB Frag.***	***Frag***	***TOTAL***
A Regueira	Mode 2		1			1	3			8	1			14
A Vide/Casar	Mode 2		14		1	5	2			3				25
As Gándaras	Mode 2		2	1		3	6			2				14
As Gandariñas	Mode 3			2			5			8				15
As Lamas	Mode 2		45	6	3	65	69		7	35				230
As Lamas Cata 2 NII	Mode 3		1	1			2			19		4	2	29
As Lamas Cata 2 NIII	Mode 2		3	1		2	2			14		5	3	30
As Lamas Vertedoiro	Mode 2		1	1		4	3			1		1		11
Áspera	Mode 4		2				1		1	2				6
Bóveda	Mode 2		2			3	2		1	5				13
Chao Fabeiro	Mode 2		3	2		8	7			4				24
Chao Vilar I	Mode 2		6			3	5			8	1	1		24
Chao Vilar II	Mode 2		8	1			2			6			1	18
Chao Vilar III	Mode 2		5			3	1	1		10				20
Costa Grande-I	Indet		3	3			3			101	6	2	4	122
Costa Grande-III	Mode 4	2	1	3	2		2			61	6	1	1	79
Costa Grande-IV	Mode 4		1		1		1			19	1			23
Finca Danone (AL)	Mode 2		2	1		2	4			3	1	1		14
Gándara Chá	Mode 3	1	2	2		1	1			24			1	32
Gullade	Mode 2		2	2			3		1	4				12
Gullade I	Mode 3					1	1			6		1		9
Gullade III	Mode 3		1				5			8				14
O Bao-I	Mode 3		1				1			8	2			12
O Regueiral	Mode 3		2	1	1	4	7			9	8			32
O Regueiral II	Mode 3		1			1	4			15	1	1		23
O Regueiral-III	Mode 3						2			5				7
Outeiriño	Mode 2		4			2	3			4	1			14
Pedras	Mode 2	1	1	1		1	3	1		13	2	3	1	27
Pedrouzo de Mourelos	Mode 4?						4			6	1			11
San Mamede	Mode 3		3	1			9			18	5	1		37
Sobrado	Mode 3?						1			11				12
Susao	Mode 3		2				1			16	2			21
Valverde	Mode 4	1	10	3			12	1		37	3	6	2	75
TOTAL		5	129	32	8	109	177	3	10	493	41	27	15	1049

Figure 4: Main archaeological sites and lithic categories.

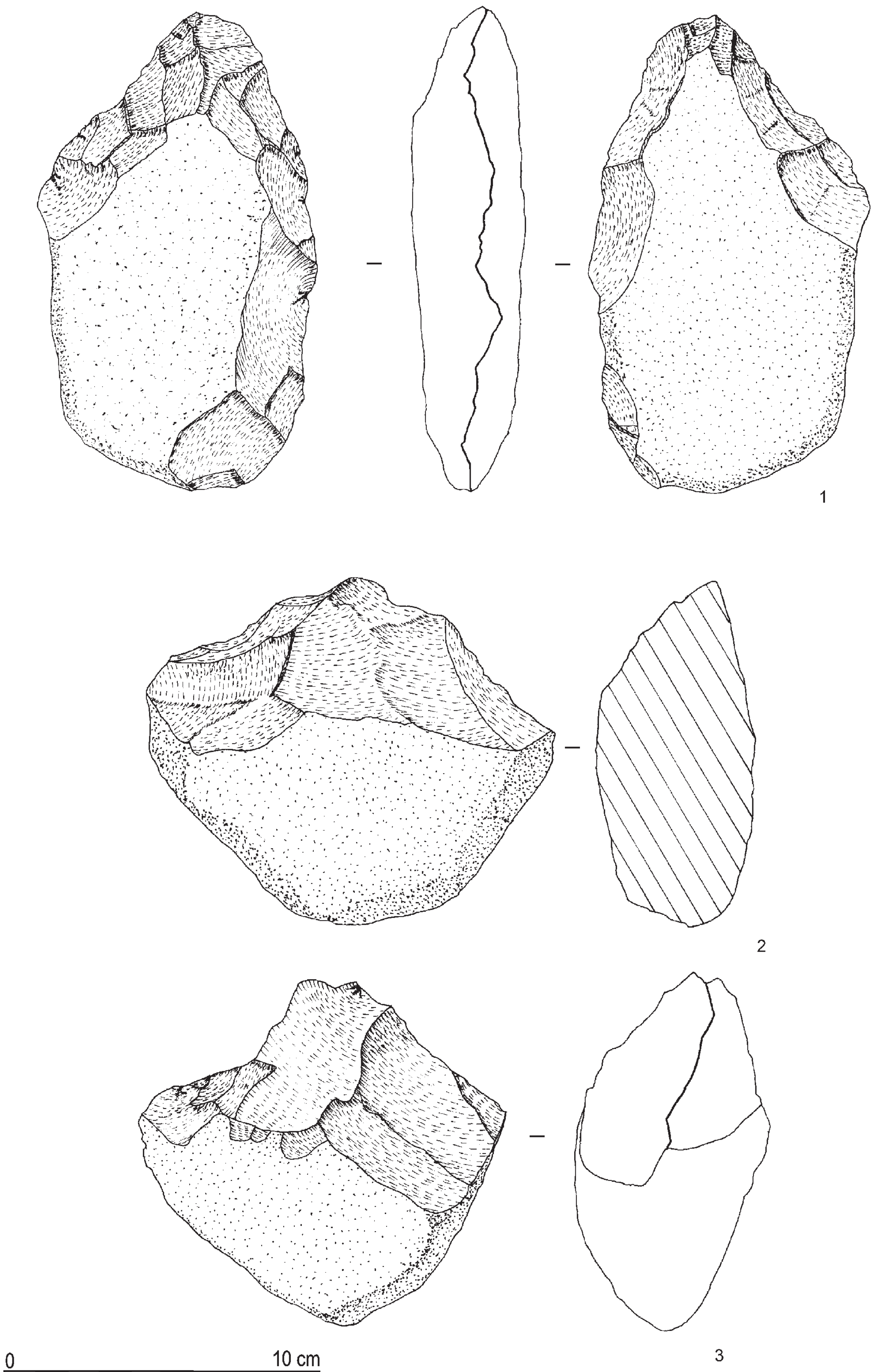

Figure 5: Lithic materials of Chao Fabeiro.

surfaces, the dispersals of Chao Vilar (I-II and III), lying on a flat surface in the western sector, are the most important reaching 62 elements among the three lithic assemblages (Fábregas *et al*, 2009) (Figure 4 and 6). The N4 erosional level is where the majority of Mode 2 sites are located, some of them placed over the T5 (T+50m) of the Cabe river. At the site of As Lamas, on a surface of 24 Ha, five archaeological points were discovered, yielding more than 230 lithic objects, adding to those recovered by Jose Antonio Peña. In 2009, field works at the Test Pit II revealed the existence of at least two archaeological levels related to the colluviums that covered the fluvial sediments, dated by OSL in 39866±3554 BP (Level III) and 38947±3150 BP (Level II) (Fábregas *et al.* 2007, 2010). While the first level (N-II) was related to a Middle Paleolithic occupation, the second one (N-III) yielded stone artifacts whose technical features and surface alterations (oxides) were very similar to those recovered during survey (Figure 6). Their presence on a final Upper Pleistocene colluvium must be regarded as the product of an erosive episode that destroyed ancient sediments during Heinrich 4, due to harder environmental conditions in this period. The dating of the fluvial sediments will give us maximum ages for these findings. Finally, on the N3 surfaces, other Mode 2 lithic assemblages were identified, such as the site of As Gándaras.

On these sites the presence of large cutting-tools, medium and large sized flaking products and the occurrence of orthogonal and centripetal reduction sequences increases with respect to Chao Fabeiro. Configuration strategies are focused on the production of large-cutting tools such as handaxes, cleavers and thriedrical pics which can reach the 70% of the tools, and whose mean dimensions are 121x85x41 mm. Most handaxes are made on pebbles (1GNBC: 55.7%) while the handaxes made on flakes (2GNBC) only amount to the 33% of the collection. In other cases, the type of the initial matrix cannot be determined. Only 36.3% of handaxes present trimming and regularizing of the edge and they usually show a high degree of cortex on their surfaces, especially on the basis and laterals of the implements. In just few cases soft-hammer percussion can be asserted. On light-duty tools the retouching sequences are restricted to a small portion of the flake´s edges creating lateral diedrical and denticulate morphologies dominating the sidescraper (17.9%) and denticulate (13.2%) morphotypes over the notches, becs and end-scrapers (Figure 6).

Regarding the reduction sequences, the Unifacial/Bifacial Unidirectional and the centripetal are the most frequent, followed by the orthogonal method. The presence of the discoidal method on these sites is minimal (only 5% of the cores and few flaking products). The Levallois method has only been identified in one core at Chao Vilar-II. Taking into account the raw material used (quartzite cobbles) and its availability, cores are knapped using natural striking platforms and their reduction sequences are not very long (60-70% of cores are abandoned at initial or middle stages of reduction). Reduction sequences often profit from the natural shape and volume of the initial matrix, conditioning the disposal of the removals. Only on discoidal, Levallois and some centripetal cores, their volumetric management becomes more complex. Flakes usually present a high degree of cortex on the dorsal faces and facetted striking platforms are rare (only 3%). As we are dealing mostly with surface findings we cannot make a direct relation among cores and flakes, but their technical features point out to the technical homogeneity of these dispersals. The variability among these sites might be explained by their functionality and their origin from surface collection. For instance, those lithic assemblages recovered during systematic surveys have a higher presence of flakes (Figure 7).

Mode 3 Paleolithic sites are mostly located at the Erosional Level 1 and 2, but also in Level 5. The most important are O Regueiral, O Regueiral-II, As Gandariñas, Susao, San Mamede, Mañente, Gullade I and III and the lithic assemblage recovered at the Level II identified at the Test Pit II from As Lamas (Fábregas *et al.*, 2007; 2009; 2010). Their technological characteristics are different from those aforementioned, as large cutting-tools are almost absent, while light duty-tools play a more important role, and the reduction strategies are dominated by the centripetal and discoidal methods. The only archaeological records on stratigraphic context were identified at the sites of O Regueiral and As Lamas (Test Pit II). At the first, situated on an alluvial fan, 32 artifacts were recovered, some of them amidst a colluvium dated by OSL at 69446±5472 BP (MIS 4). Next to it, two more scatters were identified within a radius of 300 m (Regueiral-II and III) with an assemblage of 30 lithics that shares the same technical features with those of O Regueiral-I (Fábregas *et al.*, 2009) (Figure 8). At the site of As Lamas (Test Pit II), the Level-II was dated on 38947±3150 BP BP (MIS 3). In this case, the archaeological level is linked to the Upper colluvium but the roundness and size of the stone implements suggest a primary context of deposition (Fábregas *et al.*, 2010).

Regarding the reduction sequences, centripetal and discoidal cores (both with a percentage of 17.6%) are the most common at the assemblages, rather than orthogonal or longitudinal methods which present lower values (10%). Some cores and products on fine grained quartzite can be related to the Levallois method as they show hierarchization on the reduction of the surfaces and predetermination of the final products. Nevertheless, the Levallois presence in Monforte is quite restricted while discoidal products are more frequent, specially linked to the final reduction stages of small quartz cores. The lithic assemblages are dominated by flakes, on which the centripetal disposal of the scars on dorsal faces and the presence of dihedral and facetted striking platforms (average values of 24% and 9%, respectively) increases with respect to Mode 2 sites. The size of the lithic implements decrease, with mean values ranging from 33.2x34.4x13.8mm at the site of Susao to 57.2x54.1x13.8mm in O Regueiral. The configuration sequences are focused at the production of light-duty tools (2GNBC) (Figure 7), dominating the group of denticulates

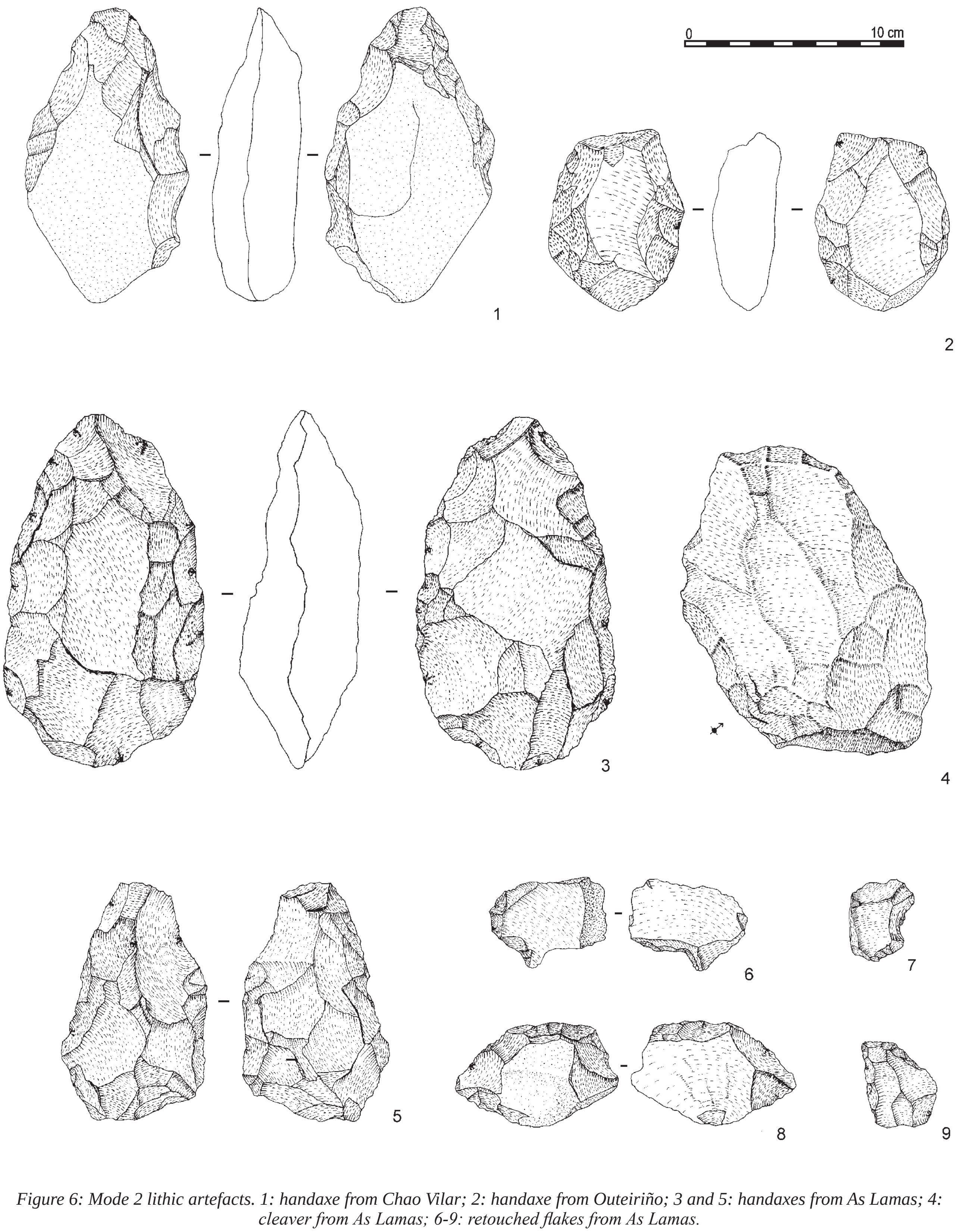

Figure 6: Mode 2 lithic artefacts. 1: handaxe from Chao Vilar; 2: handaxe from Outeiriño; 3 and 5: handaxes from As Lamas; 4: cleaver from As Lamas; 6-9: retouched flakes from As Lamas.

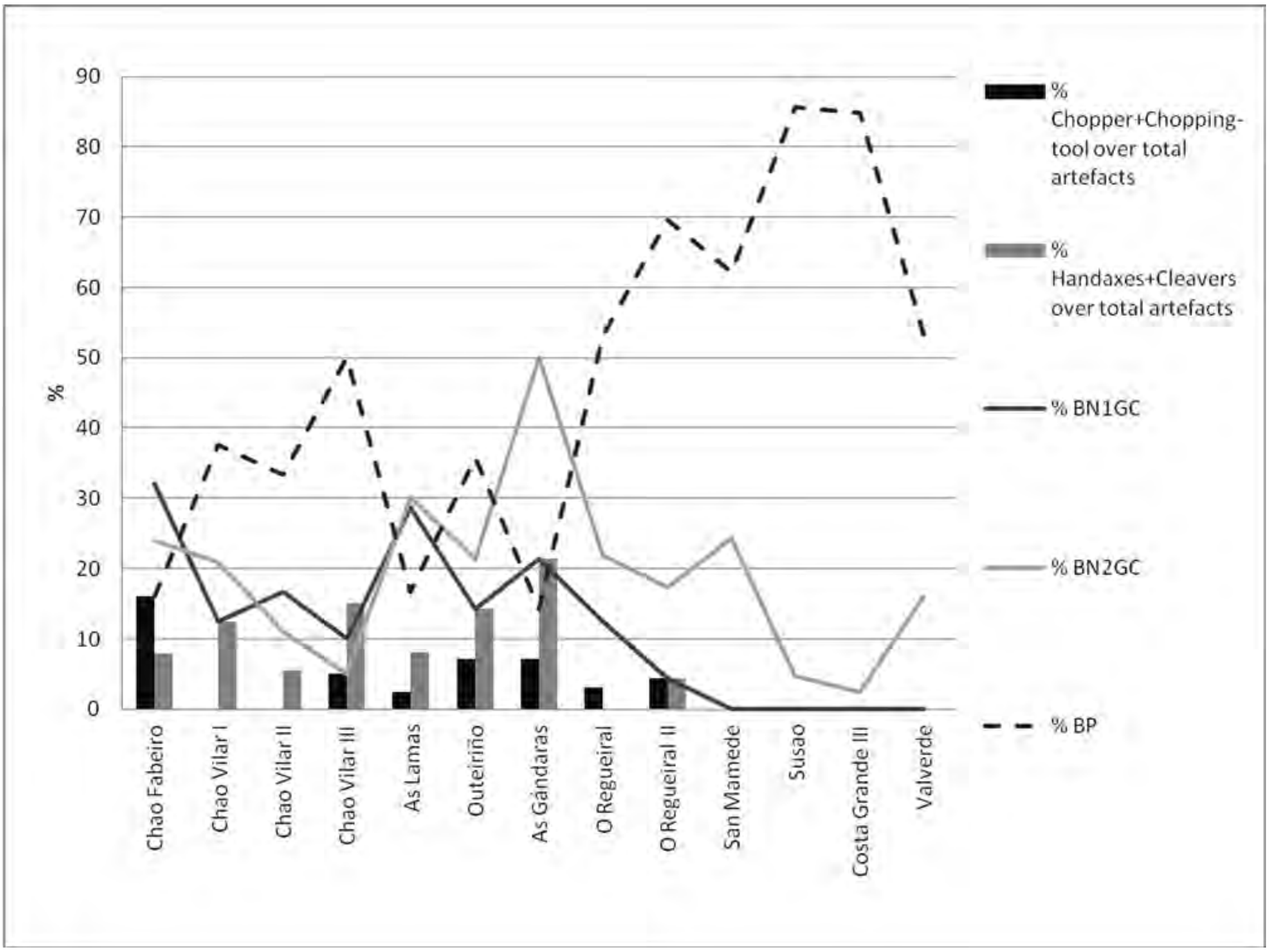

Figure 7: Frequencies of the lithic categories in the main archaeological sites.

(denticulate, notches: 45.5%) over the sidescrapers (27.2%) and other tools such as endscrapers and points. Some large cutting-tools such as handaxes can be present but their number is quiet restricted (v.g. Gullade-I or O Regueiral-II).

Finally, at the sites of Valverde, Costa Grande-III, Áspera and Pedrouzos de Mourelos, Mode 4 lithic assemblages were discovered. Unlike the Lower and Middle Paleolithic sites, these are placed on high locations and not on Quaternary surfaces. Their lithic assemblages are characterized by the presence of blade technology and a wider variety of raw materials, especially crystal quartz and flint. The most important site is Valverde, placed on a slope at 350m a.s.l. Archaeological works yielded more than one thousand lithic objects made on quartz, fine-grained quartzite, rock crystal (14.7%) and flint (6.7%) (Fábregas *et al.*, 2008; Rodriguez *et al.*, 2008). Their technical features: blade and microblade cores and products, as well as backed points and blades and fragments of leaf-shaped points, speak of an evolved stage of the Upper Paleolithic (Figure 9). Along with these specific Upper Paleolithic *chaines operatoires* made on good quality raw materials (rock crystal, fine-grained quartzite and flint) the bipolar and discoidal methods are focused on the production of small and medium sized quartzite and quartz implements having good lateral edges. This kind of differential management of the material resources is also identified at the Upper Paleolithic locations in the Foz Côa valley (Aubry 1998) as well as in other Mode 4 sites of Northwest Iberia (de Lombera and Rellán,2010).

Raw material procurement

As we have seen, the Paleolithic sites of Monforte show the standard *demarche* of Middle and Upper Pleistocene hominid technology in a concrete geographical region. Parallel to it, raw material procurement strategies change according to the technological improvements and new needs. As we are dealing with a restricted area with a limited lithological offer, human communities alleviate this constriction by either a more careful choice of those raw materials more fitting to the technical requirements or widening their economic territory by the discovery of new lithic resources and/or by the reinforcement of the exchange networks (de Lombera *et al.*, 2008; de Lombera and Rodríguez, 2010) (Figure 10).

In Lower Paleolithic sites quartzite is the most frequently

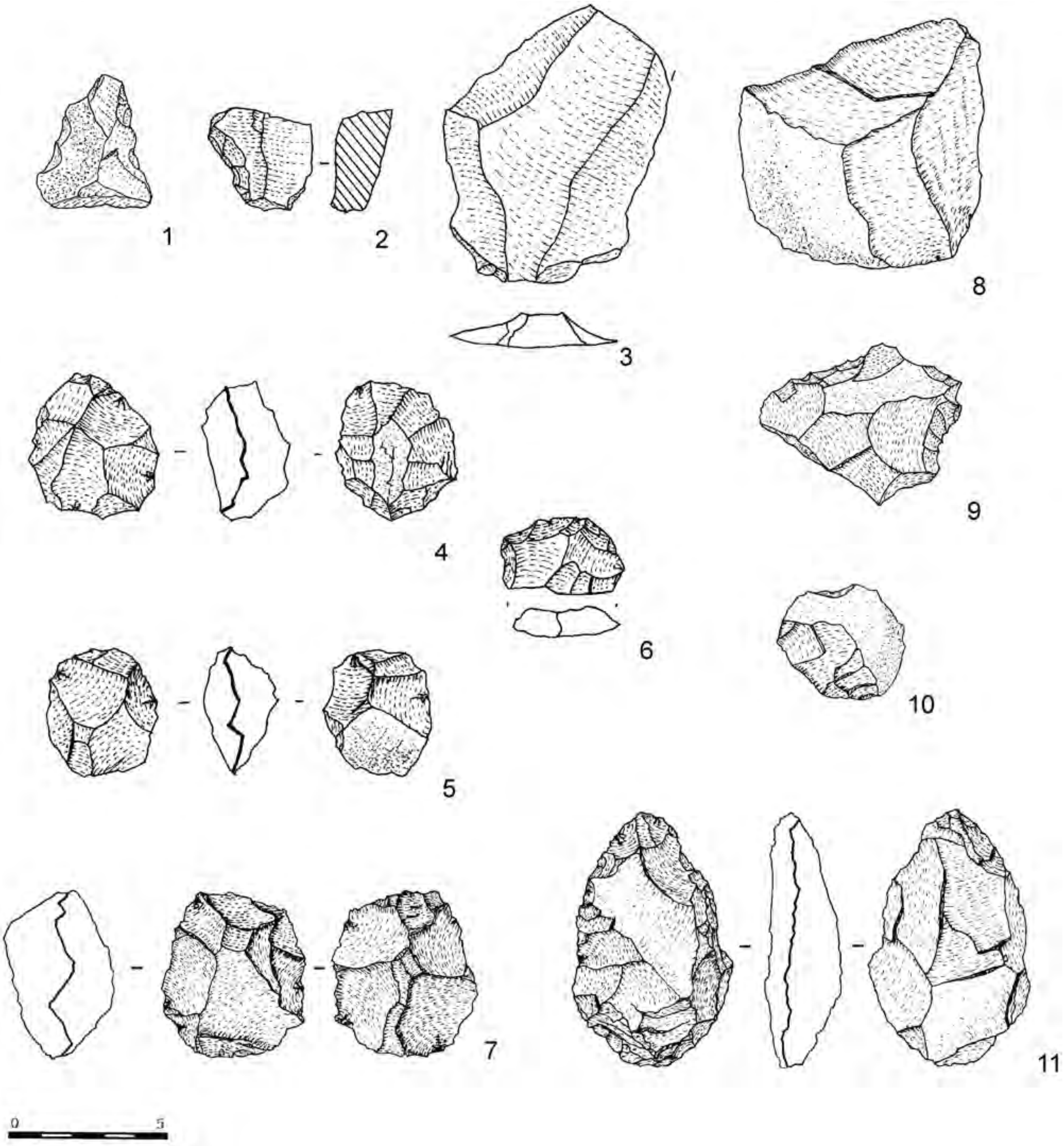

Figure 8: Mode 3 lithic artefacts. 1-2: retouched flakes, As Gandariñas; 3-4: flake and discoidal core, Gándara Chá (Quiroga); 5-6: discoidal core and retouched flake, Gullade-III; 7-11: discoidal core, flakes and retouched flakes, O Regueiral.

used raw material followed by quartz. The presence of "neocortex" in almost all the lithics suggests the exploitation of secondary deposits of Quaternary age along the Basin (fluvial terraces, alluvial fans, conglomerates). Since the artifact scatters are lying directly on these surfaces, an immediate and opportunistic access to raw material can be asserted. Quartzite pebbles are of low/medium quality with a coarse/medium granulometry, scarce compactness and the presence of internal flaws but, because of their size, are commonly used on the manufacture of heavy-duty tools. Medium and big-sized quartz pebbles are also present in these fluvial formations but they usually present numerous internal flaws and oxides that impair good knapping control during reduction sequences. Though at first sight it seems to be an opportunistic strategy there is a clear selection of the quality and volumetric characteristics of the pebbles available on conglomerates and riversides in accordance with their final objectives. Tabular and flat quartzite pebbles are selected for the manufacture of handaxes, since they present a good natural morphology for the bifacial reduction. On the other hand, quartz and fine-grained

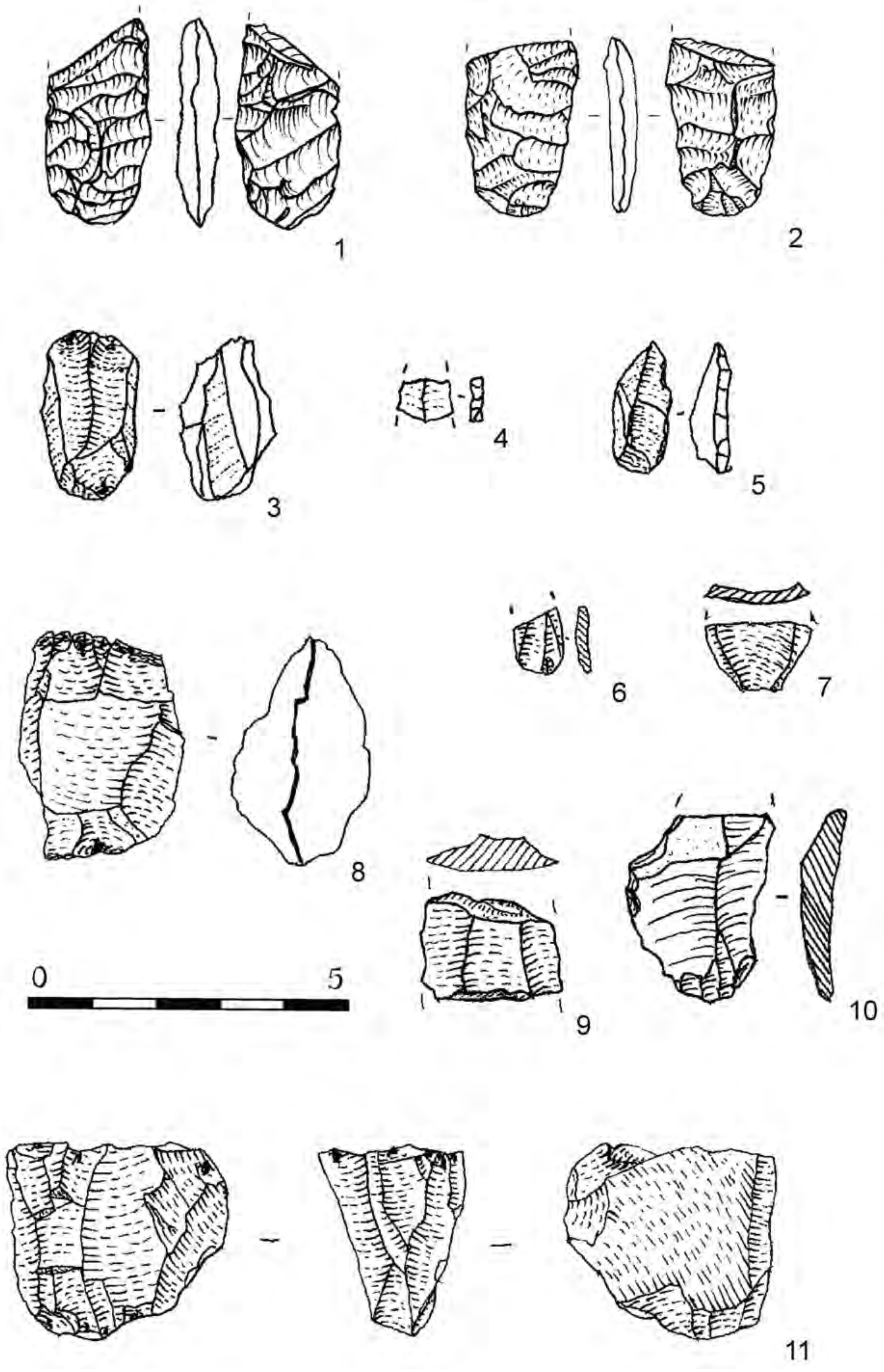

Figure 9: Mode 4 artefacts. Valverde site (1-10): 1-2: leaf-point fragments; 3: microblade core on crystal quartz; 4-5: backed elements; 6, 7, 9: blade and bladelet fragments; 8: quartz bipolar core; 10: flint flake; 11: Áspera. Blade core on quartzite.

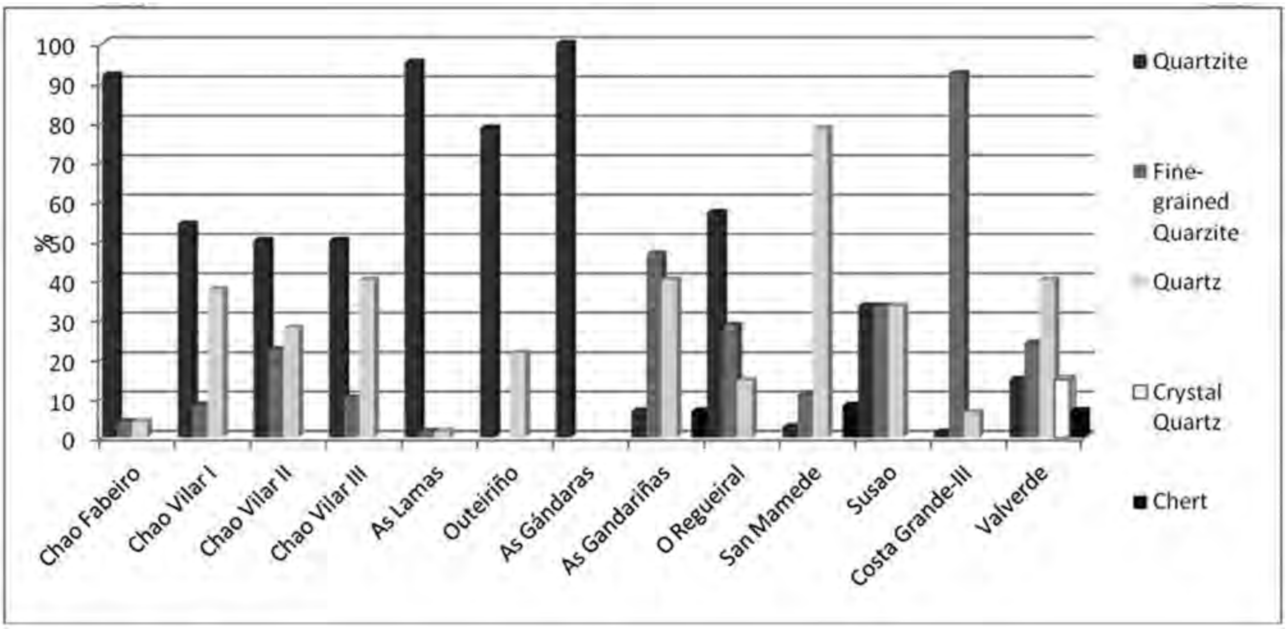

Figure 10: Raw materials and archaeological sites.

quartzite are preferred for flaking production and retouched tools of smaller size.

In Mode 3 sites the presence of fine-grained quartzite, more homogeneous, increases as a response to the more demanding reduction methods (Levallois and discoidal) and the higher standardization of light-duty tools. Quartz is also more employed on the production of small flakes and tools. Hence, unlike the Mode 2 sites, at Middle Paleolithic assemblages there seems to be a more intensive selection on the quality of the raw materials, promoting the fine-grained texture and the internal homogeneity as we can see on quartz artifacts where the NN variety (no grain/no plane) is more common than in Mode 2 sites, but without changing the type of raw material resources (fluvial and alluvial deposits). But the selection of raw material is not enough to explain these differences between Lower and Middle Paleolithic sites. We must bear in mind the geographical situation of the Mode 3 artifact dispersals (Figure 3). They are mostly placed on the margins of the Basin, far from the Quaternary surfaces where quartzite pebbles are and linked to the southern alluvial fans in which quartz and fine grained quartzite are more frequent. The farther we get from the fluvial valley the more frequent quartz is on the lithic assemblages. But these geographical or lithological conditions cannot be considered the main factors in raw material procurement strategies since the presence of fine-grained quartzite and quartz is also high on those sites located on the Quaternary surfaces, such as San Mamede or Mañente, or in the northern sector (O Regueiral I-II and III).

Finally, in Mode 4 sites, the raw material procurement strategies change according to the new technological requirements. Blade technology demands a high degree of knapping control both during the initial configuration of the core and the reduction sequences. While in other Upper Paleolithic sites of Iberian Peninsula this fact leads to a sharp increase in the number of flint implements, its scarcity in NW Iberia implies an important change of raw material management. Human response to this handicap is made in different ways: Firstly by the introduction of new raw materials especially those cryptocrystalline and fine-grained, including flint or other siliceous rocks. This implies a more intensive exploitation of the local resources and territory, searching for supplementary materials such as rock crystal or argillite which were practically absent in the Middle and Lower Paleolithic sites. For the first time at Monforte Basin we can record the exploitation of primary resources at the quartzite outcrops of Costa Grande-III, where several flakes and cores were recovered. Recent studies applying XRD analysis have demonstrated that the fine-grained quartzite of Valverde came from the Costa Grande outcrops (Ordovicic Quartzite), suggesting the latter´s interpretation as a workshop for the procurement of raw material and its close relation to the Valverde campsite (Fábregas *et al.,* 2009; de Lombera *et al.,* 2008; Veiga 2010). Hence, the intensification of local resources seems enough to palliate the technical needs, but it is complemented by the presence of alloctonous flint too. Given the high mobility of the Upper Paleolithic societies of western Iberia (*cf.* Aubry and Mangado 2003), the existence of exchange networks reaching the Cantabrian Coast cannot be ruled out as, for instance, the *Dentalium* shells from Valdavara seem to suggest (Fábregas *et al,* 2009; Vaquero *et al,* 2009).

The Chronological context

As we have seen, most of the Monforte open-air sites can be adscribed to the Mode 2 technocomplex, or Acheulian. Although the absolutes dates obtained in the Monforte sites are placed at the final Upper Pleistocene (O Regueiral, As

Lamas), they are related to colluvial deposits containing Middle Paleolithic (O Regueiral, As Lamas Level II) and reworked Lower Paleolithic (As Lamas Level III) assemblages. The geoarchaeological work carried out at the Monforte Basin has allowed us to reconstruct a relative chronology framework according to the features of the Quaternary surfaces and the technological interpretations of the lithic assemblages recovered there.

In Galicia several Lower Paleolithic sites have been recorded, most of them linked to the middle and lower Miño Basin. The oldest evidences are those of the Lower Miño fluvial terraces related to the highest levels (T8+80m; T7+72-65m), dated by the researchers as Lower Pleistocene (Cano *et al.* 1997; Giles *et al.* 2000) where some lithic artifacts were recovered, though not in a clear stratigraphic context. Nevertheless, at the middle terraces (T4+32-42 m and especially, the T3+28-19m) several Lower Paleolithic (Acheulian) locations were identified, some of them in stratigraphic context such as Portomaior (Méndez *et al.* 2007, Méndez 2008). In nearby granitic peneplains and tertiary Depressions other Acheulian sites have been discovered since 1960 such as those from Chan do Cereixo (Middle Acheulian, Garrido, 1978; Villar 2009) or As Gandaras de Budiño (Late Acheulian, Aguirre 1964; Echaide 1971). Following the course of the Miño river, another region of especial interest is situated at the outskirts of Ourense with other Middle (A Chaira) and Late Acheulian sites (Pazos, cf. A Piteira) located on the granitic peneplains (de Lombera 2005; Rodriguez 1976; Villar 1997, 1998, 1999). Finally, just on the Cantabrian Coast, the site of Louselas, discovered in the 1980s, has yielded an interesting assemblage adscribed to the Middle Acheulian (Ramil and Ramil 2008; Rodríguez 1983).

This site list shows to that the first human occupation of NW Iberia took place, to the latest, in the Middle Pleistocene (Figure 11). The lower Miño basin is directly communicated with the Portuguese coast, where other Middle Pleistocene assemblages were identified close to the Galician border (Marinho) though with some technical features, such as the predominance of unifacial reduction and pebble tools over handaxes and cleavers (Meireles, 1996). These are chronologically framed at the MIS 7 (Oosterbeek *et al* 2010), or even earlier, but no absolute datings are available as yet.

The oldest evidence from Portugal comes from the cave of Galeria Pesada where human remains and Acheulian artifacts (handaxes and cleavers) were found in a Middle Pleistocene deposit dated in 241+30/-20 Ky (Marks *et al.* 2002). At the Lower Tagus valley some sites related to the basal T4 fluvial terrace, dated by IRSL to ≥280-136 Ky, where found with Lower Paleolithic industries such as Monte Famaco, Ribeira da Ponte da Pedra, or Vale do Forno (Martins *et al.* 2009). According to the absolute datings and technological features of the lithic assemblages the first human settlement of central Portugal should be no older than MIS 8-9 (Oosterbeek *et al.* 2010).

Regarding the western Meseta, the closer references are those lithic scatters of the Leon province (Castellanos 1986) and isolated finds of Ponferrada (Neira and Quirós 1996). We must bear in mind the similarity of the surface finds of the Bernesga river and those identified in Monforte Basin. In the former, a sequence of 5 fluvial terraces were identified (T5+85-90; T4+70-75; T3+55-60; T2+40; T1+8-10), containing Mode 2 assemblages. According to the techno-tipological features, these are adscribed to the Middle Acheulian (Castellanos 1986). It is worth mentioning the larger occurrence of pebble tools over the handaxes on the higher terrace (T5), a feature similar to that identified in Monforte´s Chao Fabeiro sites. No absolute datings are available, and the dated Acheulian assemblages closer to Galicia are those identified at Galeria (Atapuerca, Burgos) (Carbonell *et al.* 1998; Ollé *et al.* 2005), previously dated at 317±60 BP by ESR (Falgueres *et al.* 2001) and now put back to ca. 450Ky old (ISRL, TL) (Berger *et al.* 2008). On the Meseta eastern rim, the ESR dates of the Lower Complex of Ambrona have yielded a minimum age of 366-314 Ky (ca. 350Ky), framed in the MIS 9-11 (Falgueres *et al.* 2006).

The Lower Paleolithic of the Cantabrian region is quite problematic since few and ambiguous absolute datings are available. The oldest evidence from the western rim is the scarce lithic assemblage of the Level V of Cabo Busto (Rodríguez 1999, 2001). According to its geomorphological situation it has been adscribed to the MIS 9-11. Further to the East, the oldest absolute dates come from level VII of Lezetxitki (Gipuzkoa), though not without controversy since the lithic assemblages are adscribed to the Middle Palaeolithic (Baldeón 1993). This level is commonly adscribed to the final moments of the MIS 6 (Montes 2003; Rodriguez and Arrizabalaga 2004). Apart from these sites other open-air sites with late Acheulian assemblages have been recorded along the Cantabrian Coast such us Bañugues, the upper fluvial terraces of the river Nalón (T+90), Llagú, La Verde, Rostrío, Irikaitz and the surrounding area of Altamira Cave (Arrizabalaga *et al.* 2001, 2008; Rodriguez 2002; Montes, 2003). Lower Palaeolithic lithic assemblages have also been found in cave deposits, some of them dated, at least, in the MIS 5, such as Castillo 26 (Blackwell *et al.* 1992; Cabrera 1984) and El Pendo, although the latter is considered a disturbed deposit (Montes 2003). The same kind of artifacts are also found in the caves of Covalejos (lower levels), El Linar and the exterior talus of La Garma (Garma A), though no absolute datings are available (Montes 2003).

According to these authors, there seem to exist two different episodes of human colonization: a first represented by the evidence of Cabo Busto (Level V), and maybe La Garma A and Irikaitz, of Middle Pleistocene chronology (Rodriguez and Arrizabalaga 2004, 53). And a second moment, related to Late Acheulian industries, during the early stages of the MIS 5. Based on the presence of Middle Acheulian industries at Louselas (the westernmost site of the Cantabrian Coast) (Ramil and Ramil 2008; Rodríguez

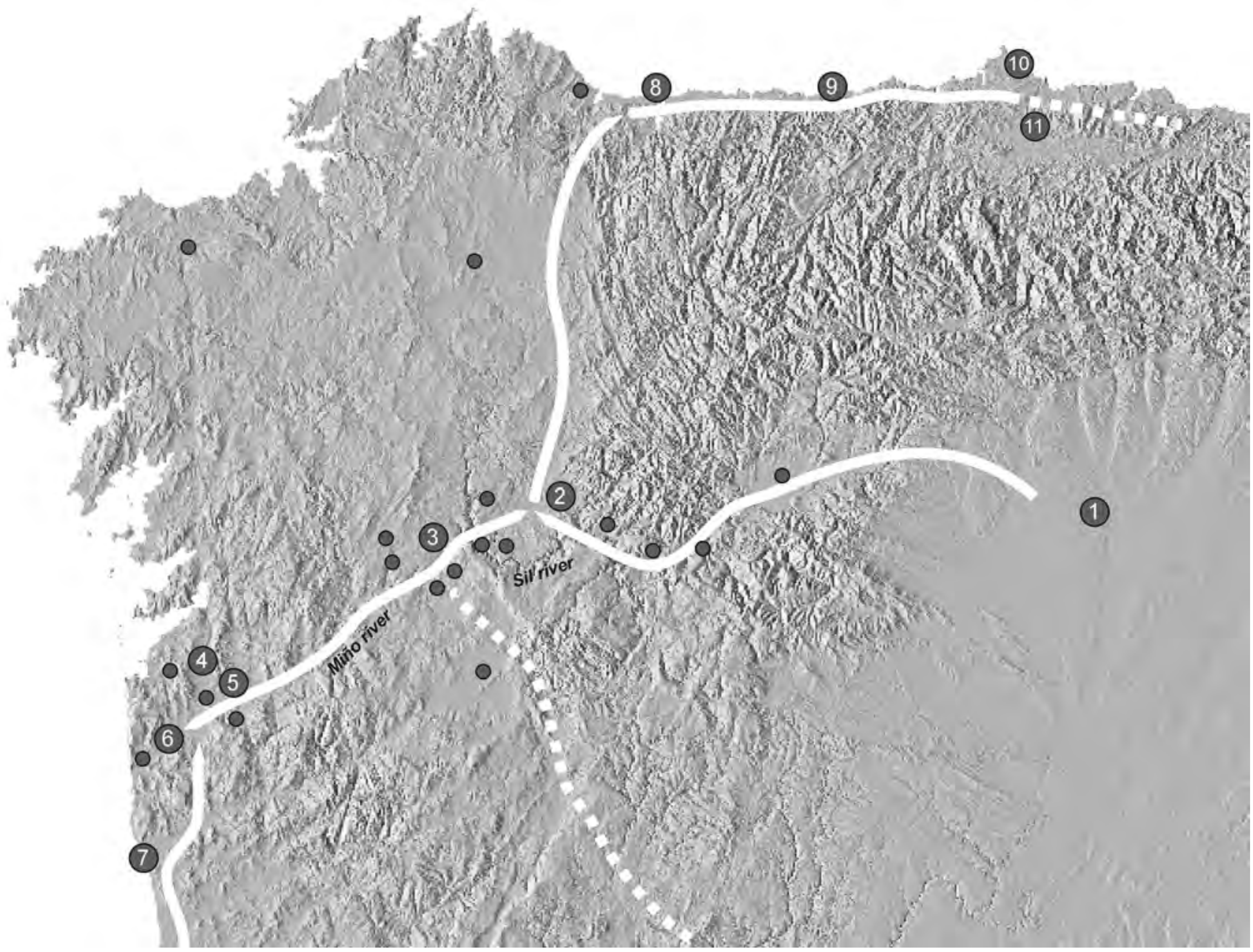

Figure 11: Main Lower Palaeolithic sites and possible paths across NW Iberia. 1: León. Bernesga valley; 2: Monforte de Lemos; 3: Ourense (Pazos, A Chaira, A Piteira); 4: As Gándaras de Budiño; 5: Portomaior; 6: Lower Miño fluvial terraces; 7: Portuguese Atlantic coast (Caminha); 8: Louselas; 9: Cabo Busto; 10: Bañugues; 11: Paredes. Points, other archaeological sites.

1983) and the industries of the Level V of Cabo Busto (Asturias), Rodriguez Asensio proposed a West-East colonization of the Cantabrian Coast (Rodriguez 1983), thence forward reinforced by the discoveries made on the Miño fluvial sequence by Cano *et al.* (1997) (Rodriguez 2002).

The scanty absolute datings from Lower Paleolithic sites of the Cantabrian Coast and Galicia makes difficult to go deeper into the first human settlement of this region. If we take into account the western Iberian context, the oldest Acheulian evidences are located in the Northern Meseta (Galería, Atapuerca) while in the Portuguese area few dates are available. In this sense, and taking into account the morpho-technical similarities between the western Meseta and Monforte sites and its geographical proximity (communicated by the Sil Valley), the Monforte Mode 2 industries could be explained by a western dispersal during the Middle Pleistocene (MIS 11-9?). A second path could be along the Atlantic Coast, communicated by the Miño river, where other Middle Pleistocene sites have been identified. Following Rodriguez Asensio´s proposals during MIS 7-6 (second episode), at least for the Acheulian assemblages, the human dispersal would then spread to the east along the Cantabrian Coast.

No matter if we consider westbound or eastbound dispersals within NW Iberia, according to the lower Paleolithic sites distribution, the Monforte de Lemos Depression plays an important role since it is a crossroad between the Atlantic and Cantabrian areas. It is necessary to obtain new absolute datings through radiometric methods (OSL, TL, ISRL…) in order to have a good chronological framework for NW Iberia that could help in the understanding of the first human settlement of Galicia and its relation to the adjacent regions, including perhaps a key role in the settlement of the Cantabrian Coast.

Acknowledgments

The archaeological surveys in Monforte de Lemos Basin were done with the founding of the Spanish ‘Ministerio de Ciencia e Innovación’ (research projects HUM2007-63662 and HAR2010-21786/HIST), and from the ‘Concello de Monforte de Lemos’. ALH has been supported by a pre-doctoral grant from Cátedra Atapuerca Foundation.

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