

The Gravettian on the Basque Crossroads:  
a glimpse of Palaeolithic territoriality

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Map with the main archaeological sites cited in this text and (background) Font-Robert point from the open-air site of Irrikaitz (Gipuzkoa).

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# The Gravettian on the Basque Crossroads: a glimpse of Palaeolithic territoriality

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## ABSTRACT

In recent decades, the Gravettian in the Basque Country has ceased to be a poorly known bridge between the Aurignacian and the Solutrean and has acquired its own personality. Progress in fieldwork and laboratory studies, the discovery of new sites in rock-shelters and in the open air, changes in the location pattern of the sites, and better knowledge of the lithic raw materials and their spatial distribution have greatly improved our understanding of the period. The main advances made since 1990 are described in this overview. At the present time, we are probably closer to describing territoriality in the Gravettian than for any other technocomplex in the region.

## KEY WORDS

Gravettian,  
historiography,  
radiocarbon,  
lithics.

## RÉSUMÉ

*Le Gravettien au carrefour basque : aperçu de la territorialité paléolithique.*

Dans les décennies récentes, le Gravettien de la région basque a cessé d'être un pont mal connu entre l'Aurignacien et le Solutréen, pour acquérir sa propre autonomie. Des progrès dans les études de terrain et de laboratoire, la découverte de nouveaux sites dans des abris sous roches ou en plein air, des changements dans les modèles de localisation des sites et une meilleure connaissance des matériaux lithiques bruts et de leur répartition spatiale ont permis une meilleure compréhension de cette période. Les principales avancées depuis 1990 sont décrites dans la vue d'ensemble ici présentée. Actuellement, nous sommes probablement plus proche de décrire la territorialité du Gravettien que de tout autre techno-complexe dans la région.

## MOTS CLÉS

Gravettien,  
historiographie,  
datations,  
industrie lithique.

## INTRODUCTION

In a paper published in 2010 (Arrizabalaga & Iriarte-Chiapusso 2010), we highlighted the lack of interest in the Gravettian in northern Spain: “[...] The catalogue of sites has increased in the eastern part of the region and on the Basque Crossroads over the last thirty years, but there has been no parallel increase in general overviews, monographs or doctoral theses devoted to the Gravettian. [...] the Gravettian is failing to develop in historiography, to acquire its own personality apart for representing a chronological bridge between the Aurignacian and the Solutrean [...]”. Since then, the doctoral theses of Pascal Foucher (2004), Aurélien Simonet (2009), Paloma de la Peña (2011), Marcel Bradtmöller (2014), Lucía Martínez (2015) and Aitor Calvo (2019), intensification in fieldwork, and above all the symposium of the Gravettian in northern Spain and neighbouring regions (de Las Heras *et al.* 2013) have improved this state of the art substantially.

The imbalances regarding the Basque Crossroads that were noted in 2010 have been clearly redressed in the last few years:

– The timespan based on new AMS radiocarbon dates have doubled our chronological view of the Gravettian (from the classic 25 000–21 000 BP to nearly 29 000–20 000 BP currently established, in uncalibrated dates).

– No other Upper Palaeolithic period in the Basque Country is represented so consistently by open-air sites (Pelbarte, Prado, Mugarduia Sur, Ametzagaina and Irrikaitz, among the published deposits). These provide a new and complementary image to the one provided by the classic cave sites (Arrizabalaga & Iriarte-Chiapusso 2011a).

– After two decades of almost obsessive studies of the transition from the last Neanderthals to the first modern humans, it seems as if researchers have lost all the interest invested in studies on the end of the Mousterian and the first Early Upper Palaeolithic cultures.

– Several recent publications (Rasilla & Straus 2004; Rasilla & Santamaría 2006, Foucher *et al.* 2008, Foucher 2013, and especially de las Heras *et al.* [coord] 2013) have encouraged a collective reflection on the necessary revitalisation of research on the Cantabrian Gravettian. In fact, we have been able to summarise the main advances in research on the period in the geographic area that we know best, without having to refer to the end of the Aurignacian or the origin of the Solutrean.

The geographic area of study we have chosen is the Basque Crossroads (Arrizabalaga 2005), between the western Pyrenees, the eastern Cantabrian region and the upper Ebro valley, sharing borders with the Aquitaine depression and the northern Castilian plateau. It is a region where very different environments converge, on a route that human groups must have crossed when travelling between the Iberian Peninsula and continental western Europe. This mixed or eclectic nature of the region helps to explain why the Basque archaeological record displays numerous variations from the chronocultural development of neighbouring regions (Arrizabalaga 2007a). Several archaeological reasons support the argument of heterogeneity within the region; at least all those that sustain splitting it into the areas of the Ebro valley, Pyrenean piedmont and the northern Span-

ish coast to create three questionable “natural” regions. In the Gravettian, the relative density of deposits (in the open air, in rock-shelters and in caves), using the same resources (at least lithic materials), affords continuity to this region and allows it to be studied in a different way from the other “natural regions” of which it also forms part or borders on.

## STATE OF THE ART

### *Increase in the number of discoveries and the new distribution map of the sites (Fig. 1)*

It is almost a cliché to speak of the subsidiarity of the Cantabrian Palaeolithic historiographic model (and many others) to the French paradigm. Perhaps less emphasis has been placed, despite its explicatory power, on the evolution in this subsidiary relationship, from the pure mimesis in the early twentieth century to the adaptations made from the 1980s onwards. Indeed, the concept of the Gravettian was not used by French prehistorians until the mid-1950s, and only became widespread in the 1980s and 90s. In the middle of the century, the proposal of the “Perigordian” formulated by D. Peyrony (updated by D. Sonnevile-Bordes), with an important palaeo-ethnographic component, was established in the nomenclature and explanatory models of the French Upper Palaeolithic. Two human groups (one genuinely French and the other formed by Aurignacian people from eastern Europe) were rivals for the use of the area and resulted in Aurignacian-Perigordian interstratification phenomena that were zealously sought in the archaeological record. This underlying model should be borne in mind rather than the use of one or another name from the phase or culture, which is quite trivial. While the succession of the different phases was confirmed, the difficulty in relating the Chatelperronian to the Gravettian (the main branches in the Perigordian *phylum*) and the impossibility of identifying the material record with human groups or races with different origins, the Gravettian displaced the Upper Perigordian in the nomenclature.

This process has had its correlate both in northern Spain as a whole and on the Basque Crossroads. This correlate has generally been in terms of subsidiarity, sometimes of veritable mimesis and hardly ever independently (regarding the Gravettian). The direct participation in Spanish research of prehistorians who contributed to the phyletic definition of the French Upper Palaeolithic (such as H. Breuil in the case of El Castillo, and A. Cheynier in El Pendo) led to the connections made between both models until the mid-twentieth century. The definition of presumed Aurignacian-Perigordian inter-stratification in El Pendo Cave, at the same time as the debate about the French sequences was taking place, is a good example of this mimesis. This situation affected all the periods included in the Upper Palaeolithic at that time until some Spanish and American researchers began to adapt and differentiate the Cantabrian sequence from the canonical model defined for the centre and South of France in the latter half of the century. However, the historiographic development of the Gravettian differed because that period was not the object of specific attention (unlike what occurred, within their different nuances, in the case of the Aurignacian, Solutrean and Magdalenian).

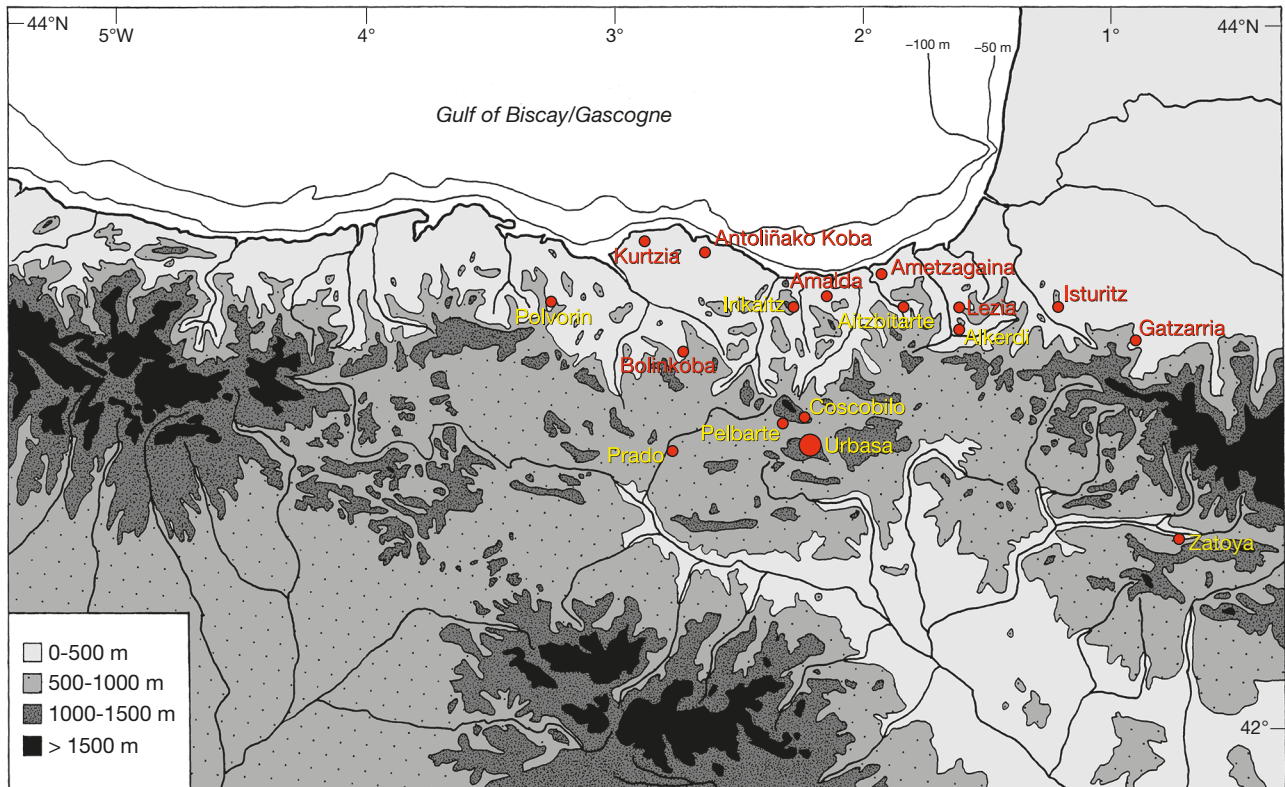


Fig. 1. — Map with the main archaeological sites cited in this text.

The lack of an overview and a general reflection on the Gravettian occurred despite the noticeable increase in archaeological deposits susceptible to study. We shall now mention the main publications about the sites, without referring further to most of these citations, as that would make the present account too long. In about 1980 (Barandiarán 1980, 1988b; Barandiarán & Vallespí 1984) the list of Gravettian deposits in the Basque Country was limited practically to the important sequences at Isturitz and Bolinkoba and the poor assemblage from Usategi, unrepresentative levels at Gatzarria, Lezetxiki and Hareguy and open air deposits in a secondary position. Just 25 years later, the situation had changed substantially (Arrizabalaga 2007b), and ten years later the amount of information is considerable.

In Biscay, Bolinkoba has been re-excavated (Iriarte-Chiapusso & Arrizabalaga 2015b) at the same time as a long Gravettian series was documented in Antoliñako Koba (Aguirre 2000, 2006, 2013). The possible presence of Gravettian levels was noted in the re-excavation of El Polvorín Cave (Ruiz-Idarraga & d'Errico 2006, 2007). A sounding in the newly discovered wall art site of Askondo Cave yielded some significant material, especially a fragment of an Isturitzian sagaie [can we say “spear point” for non-specialists?](Gárate & Ríos-Garaizar 2012). Finally, some open-air deposits in the Uribe-Costa area have also been attributed to the Gravettian (Arrizabalaga *et al.* 2015).

In the Province of Álava, where the Upper Palaeolithic was poorly known until a few years ago, some new studies (Sáenz de Buruaga 2004; Barandiarán *et al.* 2007b) include mentions of Gravettian assemblages. Two open-air workshops have been assigned to this technocomplex and associated with the pro-

urement of Urbasa flint at Pelbartte (Sáenz de Buruaga 1996, 2004) and with Treviño flint at the site of Prado (Sáenz de Buruaga *et al.* 2005). The latter workshop was re-excavated by Calvo and Bradtmöller without any clear results in a primary position. No Gravettian occupations in caves or rock-shelters are known, although it is possible that some levels at the base of Epipalaeolithic deposits might be reappraised with that perspective in mind (although an attribution to the Magdalenian is more likely).

Many new sites have been identified in the Province of Gipuzkoa. The debated Level II in Lezetxiki appears to be a Solutrean occupation, with a single diagnostic artefact in its otherwise unfortunate historiographic development (Arrizabalaga *et al.* 2005; Arrizabalaga 2006). In addition to the barely significant unit in Usategi, another residual Gravettian level can be inferred at the base of the Solutrean series in the old excavation at Ermitia (Esparza & Mujika 1999). Systematic excavations have revealed significant Gravettian series in the caves of Amalda (Altuna *et al.* 1990) and Aitzbitarte III, where excavations in outer and inner parts of the cave have resulted in two reports (Altuna *et al.* [coord] 2011, 2017). In the latter case, it should be noted that the record in the inner area of Aitzbitarte III was in a secondary position [?]. Gravettian levels in the open air are still being studied at Iriaitz (Arrizabalaga & Iriarte-Chiapusso 2003, 2008, 2011b) and Ametzagaina (Tapia *et al.* 2009; Calvo *et al.* 2013; Arrizabalaga *et al.* 2014). Research at Aldatxarren Cave is equally still in progress (Sáenz de Buruaga 2007) and some open-air deposits in the Jaizkibel area may also be attributed to the Gravettian (Iriarte-Chiapusso 2004).

The most recent developments have also been important in the Community of Navarre. While in the early 1980s, the only citation was to supposed Gravettian materials among the series from Coscobilo Cave, disturbed by Olazagutía Quarry, well-documented assemblages are now known at the open-air site of Mugarduia South (Barandiarán 1988a; Barandiarán *et al.* 2007a; Barandiarán *et al.* 2013), in Alkerdi Caves (Barandiarán 1996; Cava *et al.* 2009) and probably at Zatoya (Barandiarán & Cava 2001). The attribution of the rock shelter of Legintxiki is less certain because it is based on an appreciation of the fauna at the lowest level in the deposit.

Less updated information appears to be available for the area of the French Basque Country (western part of the Département des Pyrénées Atlantiques) because much of the archaeological heritage in that area is located on private property. Numerous mentions have been made to possible Gravettian materials in the open air (Arambourou 1989, 1990; Barandiarán 1980; Chauchat 1994). In addition to some complementary information about the Gravettian level in Isturitz, which was almost exhausted by Saint-Périer's excavations (Esparza 1995; Simonet 2010; Normand *et al.* 2013), minimal remains of sediment corresponding to the same period were recovered in the cave of Lezia in 1993 (Chauchat 1973; Tapia pers. com.). Some information about the Gravettian level in Gatzarria has been published (Sáenz de Buruaga 1991). A Gravettian level (Couche 7) has been cited at the base of the deposit in the cave of Azkonzilo (Chauchat 2006) but this has not been dated, which hampers the geochronological interpretation of the deposit. Other open-air series susceptible of being attributed to the Gravettian are known, although they all seem to be in secondary position [?] and difficult to interpret. The situation in the neighbouring Département des Landes is quite different because some open-air sites belonging to this period (such as Tercis; Simonet 2004) are acquiring considerable importance.

It can thus be concluded that the distribution map of Gravettian sites in the Basque Country has changed significantly in the last 25 years. While this change has been noticeable in quantitative terms, it is even more striking from the qualitative point of view. The open-air sites, workshops and camps that were unknown to the south of the Pyrenees are now appearing with greater frequency than for other Upper Palaeolithic periods. But another prediction has proved to be true, because flint from outcrops on high ground inland (at an average altitude of about 550 m a.s.l.) has been found at sites in coastal areas. Navarre and especially Álava have ceased to be isolated from the rest of the region in this period.

Consequently, the changes in the spatial and categorical distribution of the sites have suggested a reflection on some aspects often discussed in the literature. It has been stated, for example, that there was apparently a gap in the population of northern Spain, especially in the western part of the region, owing to the small number of sites. We wonder now, after 25 years of fieldwork have multiplied by five the number of sites in the Basque Country, if that claim is also correct in the other parts of the region. It is necessary to consider the criteria used to identify the Gravettian in the case of deposits with small lithic assemblages (for instance, in the open air),

as the preconception of assigning by default assemblages with backed elements to the Magdalenian has resulted in a certain invisibility of the Gravettian.

The expansion of the range of the Gravettian toward inland parts of the region also raises the question of whether the territorial occupation model of the Basque Crossroads can be applied to other areas in the region where the contrast between the coast and interior (or rather, between low and high land) is more marked. The mountain passes connecting Gipuzkoa and Biscay with Álava and Navarre are at only a little above 600 m altitude and would easily be crossed even in stadial conditions to access resources at 500–600 m altitude (such as prey) or at a maximum of 900 m (lithic raw materials). The situation is very different in the western half of Cantabria, in Asturias and Galicia, where mountain passes across the Cantabrian Mountains are often at over 1200 m a.s.l. and lead to areas in the north Castilian plateau at mean altitudes of over 900 m. The common discoveries of flint from outcrops in Urbasa and Treviño in Gravettian deposits in Biscay (e.g., Antoliñako Koba and Bolinkoba) and Gipuzkoa (Irikaitz and others still unpublished) have shown that contacts were common.

The increase in the number of open-air sites (usually workshops) attributed to the period has been stressed (Arrizabalaga & Iriarte-Chiapusso 2011a). The palaeoenvironmental reconstruction of the Upper Pleistocene is outdated some previous simplistic views, in favour of much greater variability, both temporally and spatially. The existence of open-air sites at a time near the Last Glacial Maximum would have been surprising a few years ago but is now seen in a different light (Iriarte-Chiapusso *et al.* 2016). Although the provisional model proposed before 1980 was consistent with the distribution of sites known at that time, the discoveries made since then require this model to be reconsidered, not only in quantitative terms but assessing their effect on the hypotheses put forward in the past.

*The influence of new radiocarbon dates. An end to the “hinge effect”*  
 Since the early 1990s, two convergent circumstances forced substantial modifications to the geochronological framework. These were the application of a new form of radiocarbon dating (by Accelerator Mass Spectrometer) and the interest in systematically dating all the situations of transition between the Middle and Upper Palaeolithic. Whereas the latter was the logical consequence of the new context resulting from the dates obtained in Cueva del Castillo (Cabrera & Bischoff 1989), the former enabled more precise results to be achieved from significantly smaller samples. The consequence was an increase in the number of dates available for Aurignacian units (and also of the late Mousterian), as well as a somewhat older age for the levels thought to correspond to the Aurignacian (Arrizabalaga 2005). Whilst awaiting a more precise definition of the evolved or full Aurignacian south of the Pyrenees, the boundary separating the Aurignacian and Gravettian is now restricted to the time between 29 000 and 28 000 BP uncalibrated. At the other end of the period, there is still a lack of definition (few dates linked to abundant material assemblages) between 20 000 and 19 000 BP uncalibrated. According to

M. de la Rasilla (1989) this would correspond to the time of the Middle Solutrean in northern Spain. The available dates for the present area of study are given in Table 1.

Most of these dates come from Aitzbitarte III, with its two different areas: the inner area with grave conservation problems, and the outer area, where the series appears to be better preserved although all the levels display some chronometric inversion. Apart from this, it can be affirmed that the timespan of 28 000–21 000 BP is well covered by a series of dates with their corresponding material culture, about which no serious doubts or objections can be posed. Thus, the table demonstrates the presence of occupations with Gravettian material culture during those seven millennia. It should be noted that most of the dates in the table were obtained after 1990 using the AMS technique. They imply the end of what used to be called the “hinge effect”, the perverse consequence of the conception of the Gravettian as a poorly understood intermediate phase between the better characterised Aurignacian and Solutrean.

The circumstances of the upper and lower limits of the Gravettian period are different. Seven dates are available for the 29 000–28 000 timespan, younger than the top of Level C3b in Isturitz ( $29\,400 \pm 370$ ), which is clearly Aurignacian. Four of them ( $28\,950 \pm 655$ ,  $28\,530 \pm 645$ ,  $28\,320 \pm 605$  and  $28\,010 \pm 600$ ) come from Levels IV and V from the outer sequence at Aitzbitarte III, above the Aurignacian Level Vb, whose dates go back to about 33 000 at the base of the sequence. The other three dates are a TL determination at Mugarduia South, one from Level Iibam at Zatoya (generically ascribed to the first third of the Upper Palaeolithic) and another date from the top of Level C3b at Isturitz. Four of these require further explanation and in some cases objections to their treatment. Level IV in the outer sequence at Aitzbitarte III contained very few Noailles burins (Altuna 2003), contrasting with their over-representation in the inner sequence at the same cave. Additionally, below this unit, Level V has been dated to the Aurignacian (probably to the ancient Aurignacian). The date at Zatoya corresponds to a very interesting but undiagnostic assemblage that might equally be attributed to a late moment in the Aurignacian (Barandiarán & Cava 2001). The date from Isturitz enters into a contradiction with the first date from the same level. Finally, in the case of Mugarduia South, the timespan of the date is very long (3 616 years), it is not appropriate to compare TL dates with uncalibrated radiocarbon dates, and the authors mention the difficulty in measuring precisely the TL signal in burnt flints from this workshop. In sum, although we believe that the reference of 28 000 BP for the earliest dates belonging to the Basque Gravettian is quite correct, this first millennium is not well defined.

With the available information, the definition of the end of the Gravettian, from about 20 000 BP or even 21 000 BP is more difficult. The dates in the period between the two dates for Level V at Amalda ( $19\,000 \pm 340$  to  $17\,880 \pm 390$  BP) are hard to contextualise and would match more closely the middle or upper Solutrean (just as the base of Aitzbitarte IV was assigned to the Solutrean) than the Final Gravettian, to which Amalda Level V was attributed. Certain objections can also be made to the use of the dates from Ekain (20 900

$\pm 450$ ), where the sample practically lacked an archaeological context, Mugarduia South ( $20\,240 \pm 2597$ ), because of the TL technique, Grotte du Phare ( $19\,000 \pm 350$ ), again without a context, and Lezetxiki ( $19\,340 \pm 780$ ) which is hardly compatible with the material characterisation of the Level IIIa that it came from (Falgüeres *et al.* 2006).

Other important Gravettian sequences in the Basque Country have not added further dates to this reconstruction. This is sometimes because of particular circumstances, as in the case of Irrikaitz, where the sedimentary matrix and its contents basically appear to correspond to an interglacial period in the lower Pleistocene (probably the Holstein interglacial). Other sites are susceptible to sampling and will provide information in the future as their excavation has been re-started. The new open-air sites (Pelbarte, Prado and Ametzagaina) will be hard to date, because their primary context is unknown and thus they lack elements to correct the TL signal, as occurred when dating burnt flint at Mugarduia South. Dates are missing for the area north of the Pyrenees, particularly the sites of Isturitz, Lezia and Gatzarria, as they would complete the regional framework with important information. It is possible that this will be achieved, at least at Isturitz, in the course of new excavations of the deposit.

In order to obtain a full understanding of the geochronology, the radiocarbon dates (not the TL ones) have been calibrated with the programme CalPal 2007. The results do not modify the situation greatly apart from the new position of the TL dates for Mugarduia South in accordance with the calibrated dates, as all the other dates are brought forward about three or four millennia. As for the oldest boundaries of the period, the earliest date for Aitzbitarte III, the lower level in Zatoya and even the oldest at Mugarduia South are not too far from the chronological boundary of the Gravettian. At the top of the sequence, the sample from Level VIII at Ekain, with an age of over 23 000 cal BC, seems to mark a boundary above which the material characterisation of the Gravettian becomes less clear.

Therefore, while acknowledging the significant imbalance caused by the dates for Amalda (Altuna *et al.* 1990) and above all for Aitzbitarte III (Altuna 1992, 2002, 2011a, b) within the geochronological framework, a new timespan is being established for the Basque Gravettian, between at least 21 000 and 28 000 BP uncalibrated. Information for another three millennia (29 000–28 000 and 21 000–19 000 BP) should be examined carefully in the future. It seems prudent to assess Amalda Level V separately, whether the reference to a supposed Final Gravettian (or Proto-Magdalenian) is accepted or, on the contrary, it is regarded as a Solutrean level without diagnostic artefacts. The latter hypothesis would allow the start of the Basque Solutrean sequence to be dated at about 19 000 BP uncalibrated, which would be quite coherent on a wider regional scale. The final scheme includes about 50 dates obtained with three analytical methods (conventional C14, AMS and TL) for different kinds of samples. They draw a quite full picture covering eight millennia and create a geochronological framework for the Basque Gravettian that is able to overcome the “hinge effect”.

### *A new palaeoenvironmental framework*

Because Level II at Lezetxiki has been excluded from the list of deposits in the area of study assignable to the Gravettian, the volume of data for palaeoenvironmental analysis has become quite limited. Detailed information is available for Level VI at Amalda (since we have expressed our doubts about Level V, attributed to the Proto-Magdalenian or Final Gravettian) because it has been published in full (Altuna *et al.* [ed] 1990). Some isolated palaeoenvironmental information (interpretation of palaeontological or sedimentological proxies) has been reported for the sequences at Aldatxarren and Antoliñako Koba, within their respective research projects. The publications of these reports, the excavations in progress at other sites and the analysis of the base levels at Ekain and levels with little significant material (such as Usategi) will provide a more solid basis of palaeoenvironmental data than is available today. Indeed, it is no exaggeration to say that the present state of the art is truly poor and does not permit much more than a description of a few indicators. In quantitative terms, 26 series are susceptible to analysis (two units at Isturitz, Bolinkoba, Amalda and Aitzbitarte III, and one at Usategi, Gatzarria, Antoliñako Koba, Askondo, Polvorín, Pelbarte, Prado, Ermittia, Ekain, Irikaitz, Ametzagaina, Aldatxarren, Jaizkibel, Mugarduia sur, Alkerdi, Zatoya, Lezia and Azkonzilo), but only three have been studied and published in detail (Amalda, Aitzbitarte III and Bolinkoba), while a further seven offer solid analytical potential. If this information is contrasted with the sequences with an adequate geochronological model, the impression is even more dismal. It is therefore clear that any general reconstruction of a palaeoenvironmental framework for the seven millennia established above must necessarily be provisional and open to immediate modifications.

The pollen study of Amalda (Dupré 1988, 1990) indicates very humid and not very cold conditions for Level VI, with a few hazel trees and a moderate presence of pine, whereas the samples belonging to Level V reflect the coldest climate in the whole sequence in this cave. The sedimentological analysis for the same cave (Areso *et al.* 1990) adds some nuances to this view: Level VI is described as very cold and very humid, especially in its lower part, while Level V is thought to reflect significant amelioration between the very cold levels VI and IV. The environmental proxies represented by the large mammal remains (Altuna 1990) suggest very cold and humid conditions for Level VI compared with a Level V that is more temperate and drier. Therefore this record seems to agree most closely with the sedimentological study than the pollen one. In contrast, the microfauna (Pemán 1990) appears to support the palynological study because Level VI is regarded as very humid but not as cold as the previous level, whereas Level V is drier and colder.

As stated above, two monographs (Altuna *et al.* 2011, 2017) published the results of the outer and inner sequences at Aitzbitarte III. Also as explained above, the results from the outer sequence, in the 2013 monograph, can be considered substantially valid but numerous evidence, published or not (such as the pollen study, which was never published) show that the inner sedimentary deposit and its archaeologi-

cal contents are in a secondary position and therefore lack much interest. Indeed, referring to this area, in the first publication, the director of the fieldwork wrote: “[...] The area where the smoke appeared is particularly humid and in wet weather acts as a sinkhole and it can clearly be seen how the base of its sediment is being emptied towards [Aitzbitarte] Cave II [...]. We opened up a new excavation in the proximity of this sinkhole, finding an extraordinary deposit which would provide work for several years [...]” (Altuna 2011b: 19, fig. 3). Consequently here we shall refer exclusively to the outer sequence.

Several palaeoenvironmental studies were performed for the outer series at Aitzbitarte III. Quantitative sedimentology contributes very coherent results for the whole sequence, with persistent high humidity and low temperatures (Levels VI, IV and I) or very cold conditions (Levels V, III and II). The palynological analysis only achieved results between the top of Level VI and Levels V and IV, but these are coherent with the sedimentology in that they indicate high levels of humidity and extreme cold. A very slight amelioration is only detected in sub-level Va. The species hunted by the occupants of the cave are also indicative of a cold steppe-like landscape, with a predominance of large bovines and a small proportion of reindeer (Levels Va, IV, III and II). The identification of arctic fox in Level III and rock ptarmigan in Level Va points in the same direction. The small mammals also attest to open vegetation, with few trees and high humidity.

The recent excavation at Bolinkoba (Iriarte-Chiapusso & Arrizabalaga 2015b) has helped us to understand the results of T. Aranzadi and J.M. Barandiarán's fieldwork in 1932–33. We now appreciate better the circumstances of the record that affected over 90% of the volume of sediment in the deposit. However, only a few cubic centimetres remained of the original Level VI, which has had to be subdivided into three layers: Upper 2, Gravettian; Lower 2, Evolved Aurignacian; 3, Mousterian. The minimal Gravettian remains allowed a sedimentological study that detected a notable drop in temperature and less humidity. The conservation of pollen in this level is very deficient. The microvertebrates, however, indicate certain amelioration compared with the previous level, because some woodland species appear again. As can be seen, the contribution of recent studies to the palaeoenvironmental record has not brought significant advances.

From the epistemological perspective, the new finds of Gravettian deposits in the open air has produced a major change in our outlook, also from the environmental point of view. Apart from the discovery of new records to be studied, the very presence of human groups camping in the open air in quite high places (such as Urbasa, a plateau at 900m a.s.l.) at a time when the climate is thought to be periglacial is cause for reflection (Iriarte-Chiapusso *et al.* 2016). Pollen studies have been performed at two such sites, Mugarduia South and Ametzagaina. The latter (Tapia *et al.* 2009) is very near the modern coastline, at 100m a.s.l., but this is not the case for Mugarduia South (Iriarte-Chiapusso 2013). In the first place, the palynological analyses are surprising because they suggest clearly temperate conditions. However, in a region



with numerous caves in which to take shelter, the second conclusion is more striking. The fact that the cave records indicate a periglacial environment and open-air camps more favourable conditions invites a reflection on the complementary nature of the different dwelling sites, the true extension of the Gravettian (up to ten millennia) and our schematic view of its environmental conditions. Obviously, if the environment was used in this complementary way, the information will be biased should we only study cave sites.

The results obtained at the other sites are not systematic or coherent as a whole. Information about the large mammals in different Gravettian levels suggest steppe vegetation with little woodland and moderate to extreme cold. Most other preliminary reports also propose predominantly cold conditions. We must therefore wait until this information is completed with data from other forms of analysis, provided that a common protocol for environmental sampling begins to be applied systematically.

#### *The use of biotic and abiotic resources*

The mechanisms of the use of the environment in the peninsular Basque Gravettian are known in some detail (Castaños 1986; Altuna 1990). Biotic resources were exploited with a relatively high degree of specialisation, although the same species was not always the objective. More mountainous locations such as Bolinkoba and Amalda were used for the intensive hunting of ibex and chamois respectively, whereas recent excavations at Aitzbitarte III reveal a preference for large bovines. River fishing for salmonids was also documented at Amalda.

Abiotic resources, above all flint (Arrizabalaga 1998), were used in a much more standardised pattern. The three main Basque outcrops, Urbasa, Treviño and littoral Flysch, were used systematically during the Gravettian in such a way that the flint type nearest each site tends to be predominant (Tarrío 2006). Preliminary results for Irrikaitz indicate the presence of flint from north of the Pyrenees from Chalosse, while at Antoliñako Koba some flint flakes are of the Bergeracois type. Similarly, flint from north of the Pyrenees, from the Tercis and Chalosse outcrops in the Landes, has been found in small percentages in the assemblage at Mugarduia South. It is thought to have been brought by “[...] those who repeatedly went up to the plateau to work on these Urbasa outcrops [...]” (Barandiarán *et al.* 2007a: 24). The trend observed in Aurignacian assemblages (for example, at Isturitz) for the procurement range of raw materials to be extended to both sides of the Pyrenees appears to have been confirmed and enlarged during the Gravettian. The study at Ametzagaina (Arrizabalaga *et al.* 2014) supports the evidence of different raw material studies: the Basque Country displays a pattern in the form of an hourglass, with one triangle to the north-east centred in the French Basque Country and its sources (Isturitz, Lezia and Gatzarria) which penetrates as far as the north-east of Gipuzkoa (Ametzagaina and Aitzbitarte III) and northern Navarre (Alkerdi); while the opposite triangle covers most of the Iberian Basque Country. In the continental sector, most of the flint in the assemblages is local (Tercis, Chalosse, Bidache and Gaintzurizketa), with a small proportion of peninsular varieties (Kurtzia, Urbasa

and Treviño). The exact opposite occurs at peninsular sites (Antoliñako Koba, Bolinkoba, Irrikaitz and Amalda).

The importance of the management of raw materials in the daily life of this Upper Palaeolithic period, and even in the articulation of this Palaeolithic space, is demonstrated by the fact that four of the five open-air sites that are known (Prado, Pelbarte, Mugarduia Sur and Ametzagaina) are located near outcrops of high-quality flint and appear to have been workshops. It can thus be deduced that workshops were often positioned near the outcrops to avoid costly investment in time and labour transporting the raw material to more stable camps.

#### *Material culture and the technotypological evolution of lithic and osseous assemblages. The supposed unity of the Gravettian*

The characterisation of Gravettian industrial assemblages on the Basque Crossroads has to face the great qualitative imbalance (few remains of osseous industry compared with a constant lithic record) and quantitative differences (a large assemblage at Isturitz and many smaller assemblages at most other sites). These imbalances are aggravated by the fact that important assemblages that might be capable of influencing our knowledge of the regional Gravettian are still awaiting publication. However, after the detailed publication of the new excavations at Bolinkoba, Mugarduia Sur and Aitzbitarte III, the situation is considerably better than a few years ago (Arrizabalaga & Peña 2013).

Artefacts made from hard animal matter are not too significant on the Iberian side of the Pyrenees in the Gravettian, unlike the situation beginning in the Solutrean (Mujika 1991). Just as occurs in the ancient Aurignacian with the split-based points, only Isturitzian sagaies are found (at Usategi, Bolinkoba, Askondo and Aitzbitarte III) even in such small assemblages as Usategi (Ríos-Garaizar & Gárate 2014). They are by far the most characteristic object, including the fact that the tool is named after a site in the continental Basque Country that has yielded about two-thirds of the known examples of this index fossil. Other elements found less frequently include some other types of points (other sagaies and punches), and bone smoothers and retouchers. Objects of adornments, like atrophied deer canines and pierced *Littorina* and *Nassa* shells, only appear in significant numbers at Bolinkoba (except at Isturitz). These types of tools therefore appear in very different numbers to the North and South of the Pyrenees, particularly because of the large assemblages at Isturitz. It is again difficult to attribute the assemblage from Zatoya Level IIBam culturally; it contains different kinds of sagaies, with both circular and flat cross-sections.

In contrast, our knowledge of lithic industry has changed substantially in recent years. Until barely twenty years ago, numerous assemblages assigned first to the Upper Aurignacian (as at Bolinkoba) and later to the Gravettian (Level II at Lezetxiki, finally attributed to the Solutrean, and Levels IV and V at Amalda) had included large numbers of the so-called Noailles burins. They were frequent in the assemblages but not predominant (10.4% in Levels V and VI at Bolinkoba; 3.7% in Level II at Lezetxiki; 19% in Level VI and 13.9% in Level V at Amalda). In the neighbouring region of Cantabria, Level 4 in Cueva Morín yielded a mere 0.5% of these tools, a frequency

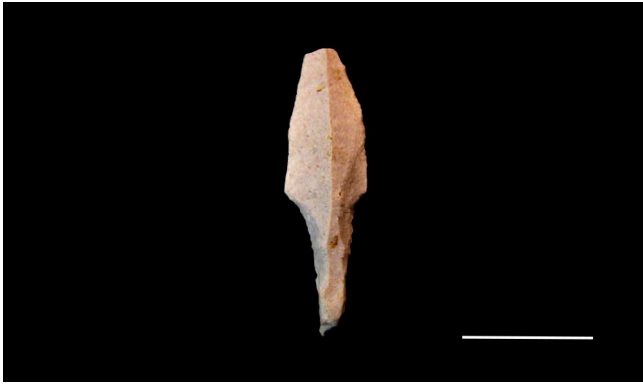


FIG. 2. — Font-Robert point from the open-air site of Irikaitz (Gipuzkoa). Scale bar: 2 cm.

resembling the percentages in non-Gravettian levels where the burins had filtered from other occupations or appeared fortuitously (0.3 % in Level IIIa at Lezetxiki and in Level V at Labeko Koba, and 0.7 % in Level 1 in Cueva del Polvorín). The only level in which this characteristic element is very probably predominant (as deduced from recent sampling and quantification of unscreened sediment) was at Isturitz, where a number of several hundreds of thousands of Noailles burins has been estimated for this level (Normand, pers. comm.). No data are available for the inner excavation at Aitzbitarte III, where several thousand Noailles burins were collected, but once again it should be noted that the reconstruction of the sequence in the cave is based on the recent excavations in the outer part, where hardly any of these burins were found. At Antoliñako Koba (Aguirre 2000), the representation of retouching mode B (which includes other varieties as well as the Noailles sub-type) in the Gravettian assemblage Lab+upper Lmbk reaches 35% of the assemblage. It can therefore be said that the regional Gravettian often includes discreet percentages of Noailles burins, but they are rarely predominant and the name of Noailles (McCollough 1971) attributed to these assemblages is less pertinent than, for example, the name of Dufourian applied to Proto-Aurignacian series in which those bladelets often reach more significant percentages within the lithic assemblages.

In any case, it should be acknowledged that there are few modern fully precise studies of the lithic assemblages. Because the re-excavations at Santimamiñe and Isturitz have discarded the existence of remains of Gravettian levels, the lithic assemblages from Amalda, Aitzbitarte III, Antoliñako Koba, Aldatxarren, Mugarduia Sur and Irikaitz and the new excavation at Bolinkoba should provide the most reliable data. Some of the latest results from those sites will be described briefly.

In Level VI at Amalda (Arrizabalaga 1995), the only definite Gravettian level in this cave, apart from the Noailles burins, the rest of the assemblage consists of numerous backed elements (LD, LDT and PD), truncated pieces and substrate elements (basically sidescrapers and flakes with simple retouching).

The old excavation at Bolinkoba isolated two Gravettian levels (VI and V) that could reasonably be merged owing to their similarity. Together with the Noailles burins there are others (not very abundant in any case), above all the dihe-

dral sub-types. In this order, blades and bladelets with simple retouching, truncated pieces, endscrapers and backed bladelets represent the main artefacts in the rest of the assemblage.

A sample of the Gravettian series from the Luebaki sounding at Irikaitz, with a surface area of 6 m<sup>2</sup>, contains 51 retouched artefacts, of which nearly half (22) are burins, including eight characteristic Noailles burins, a busqué type, and one with a tertiary modification of the edge (Le Raysse type), while the others consist equally of burins on truncations and dihedral types. Backed elements are second in numerical importance, with nine pieces, consisting of three points (one broken, probably of the La Font-Robert type; Fig. 2) and six bladelets. The other tools in this sample are dominated by the category of splintered pieces (7), followed in decreasing order by objects with simple retouching (3), truncated pieces (3), endscrapers (2), becs (2), denticulates (2) and a burin-endscraper. The only anomaly compared with other assemblages thought to be Gravettian (some of which are quite proximate, such as Amalda) is the small number of endscrapers and the relative over-representation of burins.

The open-air assemblage at Ametzagaina displays a similar range of tools as Irikaitz, with an over-representation of burins (of which only one part is of the Noailles type) and scarcity of endscrapers. In this case, the circumstances of the site (in a secondary position, in the open air) may be the reason for the scarcity of small backed elements. A variety of the Gravettian has been proposed for Aldatxarren Cave (Sáenz de Buruaga 2007), with abundant truncated pieces and bi-truncated bladelets in the form of proto-geometric artefacts.

The case of Antoliñako Koba has been mentioned above, and the assemblage is a good point of reference but still only published in part. In the Lab+upper LMBK assemblage, the second category after the burins are the denticulates (18.8%), followed at a distance by the R (mainly bladelets and flakes with simple retouching). The LD (backed bladelets) only represent 8% of the published assemblage, and the PD and PDT amount to 2.7%.

At Zatoya, because a small surface area of Unit IIbam was excavated, the assemblage consists of only 26 retouched artefacts, of which substrate elements are noticeably abundant (27% denticulates and 11.5% sidescrapers). Backed bladelets, endscrapers and burins are the most important tools in the rest of the assemblage.

Finally, Mugarduia South (Barandiarán *et al.* 2013) is an open-air workshop and therefore has yielded a relatively low density of tools. However, it is the largest lithic assemblage that has been published in the area of study; with over 2100 retouched artefacts. The predominant tools are backed elements (over 26%). Many of these perfectly match the classic definition of a La Gravette point. Burins do not reach 5% of the assemblage, compared with 17% of endscrapers, 9.5% of truncated pieces and 3.6% of perforators, all of which usually tend to be less frequent than burins. Once again, the proportion of substrate pieces (12% sidescrapers and nearly 15% denticulates) is noticeably higher than is usual in these more recent sites.

To sum up, the information that is appearing about the material assemblages from new excavations appears to modify the

traits determined by old collections, affected by the biased selection of materials (Bolinkoba and Isturitz) or which have been re-situated chronologically (such as Level VII at Santimamiñe and Lezetxiki Level II). Except at Isturitz and perhaps Zatoya (as observed regarding its Level IIbam), the osseous industry is not too varied. The lithic assemblages display significantly greater entropy than was initially suspected and it is difficult to position the characteristics of the different collections on the diachronic axis. The emblematic value of Noailles burins can be nuanced. Although they appear in other periods in small numbers (especially in the Solutrean), in general they are not as abundant as might be expected and they continue to appear from 28 000 BP to some time after the Gravettian. More importantly, some industrial characterisations that were previously unknown (and still require confirmation and precise quantification) seem to be emerging, as proposed by the publications of Mugardua South and Aldatxarren.

#### *Evidence of symbolic behaviour attributable to the period*

First of all, the list of human remains attributed to the Gravettian has increased in recent decades. In addition to the dubious testimony at Isturitz (about a hundred human remains in the Upper Palaeolithic sequence, with little stratigraphic control over their provenience), a tooth was found at Alkerdi (Cava *et al.* 2009) and two more at Aitzbitarte III (de la Rúa *et al.* 2013). The list is growing, but not the informative value on ritual practices because none of these remains can be associated with funerary customs during the Gravettian.

The outlook is similar regarding graphic behaviour on both walls and portable surfaces. It has been mentioned above that the repertory of Isturitzian sagaies has increased twofold in the peninsular Basque Country with the discoveries at Aitzbitarte III and Askondo (Ríos-Garaizar & Gárate 2014). In portable art, an interesting figurative engraving has been found in Antoliñako Koba (Aguirre 2013; Ochoa *et al.* 2018). However, apart from the debatable TL dates of deep engravings in the entrance of Venta Laperra Cave (Arias *et al.* 1999), all the dates for possible Gravettian wall art in the area of study refer to contextual elements, as at Askondo (Gárate & Ríos-Garaizar 2012) and Danbolinzulo (unpublished). These sometimes corroborate (Askondo) and other times question (Danbolinzulo) the Gravettian age normally attributed to red dotted paintings.

#### SUMMARY: SOME THREADS TO BE WOVEN TO CREATE A PICTURE OF THE GRAVETTIAN AT THE BASQUE CROSSROADS

The question of whether we are able to draw a new image of the Basque, or Cantabrian, Gravettian is evidently rhetorical. Like any other prehistoric period, or any other geographic area, it is perfectly susceptible to occasional reappraisals in the light of new findings. Instead, we have focused on another line of thought. In the last three decades, a large body of evidence has accumulated (the types of sites, the number of absolute dates,

the analytical methods, the understanding of transport of raw materials, and even in the more traditional interpretation of industrial assemblages). These cannot be simply added to the previous state of knowledge but advocate a degree of *tabula rasa* over the previous situation. However, bearing in mind how much information about the Gravettian has changed in a small region in relatively few years, we must remain open to successive modifications in our state of opinion, or, to put it in other words, more ready to quickly assimilate the changes that are proposed. At one time, it might have seemed that the provisional nature of our conceptualisations was not so temporary, and the impression of the Gravettian fixed in the 1980s would represent the definitive characterisation of the culture. We now see that this has not been the case and to make progress we really must accept the principle of provisionality as a guideline, because changes in the middle term in the course of fieldwork and through new analytical techniques are unforeseeable.

At the present time, the map of Gravettian sites is the most complete within the whole Upper Palaeolithic, because all types of occupations are known: in caves, rock-shelters and the open air; aggregation sites, hunting posts, camps, workshops, and rock art presumably produced in the period of very sporadic or more iterated use. The numerical chronology appears to be better established than before, even if the initial and final millennia still overlap with the previous and subsequent periods. The ways in which biotic and abiotic resources were exploited appear to have laid the foundations for the rest of the Upper Palaeolithic, based on profound knowledge of the possibilities offered by the region (sources of lithic raw materials, hunting, fishing and gathering resources). Osseous and lithic toolkits were fully integrated into the overall framework extending from the Dordogne in France to Galicia in northern Spain in a display of the defining characteristics of the Gravettian world. It was an extremely polymorphic culture, within a curious consistency maintained for nearly ten millennia. The practical absence of human remains in primary position or direct dates for portable and wall art suggest two possible lines of research for the coming years. Thus, in the case of the Gravettian, we have progressed so much in the last three decades that, despite starting in a very unfavourable position, we can reach further than for any other Upper Palaeolithic technoculture. In addition to the unusual concentration of finds, this is because we have been able to reorientate our way of thinking toward the reconstruction of a complex culture rather than the individual study of sites.

We are therefore now able to propose some general approaches. In our opinion, we should forget the debate about whether the Gravettian represents the final step toward the consolidation of leptolithic industries, formally linked with the advanced Aurignacian (as the new geochronological map seems to suggest) or an advance toward what several millennia later would become the material basis of the Solutrean (as can be imagined through the diachronic study of material culture). Instead, we should concentrate on studying and describing what we call the Gravettian as a cultural construct separate from the periods that preceded

and followed it, completely putting to one side the subsidiary nature that has been attributed to it. It is obviously necessary to continue increasing the amount of data available to reconstruct the Gravettian by locating and excavating new sites, obtaining further radiocarbon determinations and performing more analytical studies. This will enable us to understand environmental changes, the ways in which the resources were used, the new technologies and aspects of complex behaviour. However, this work, while it is essential, is not enough in 2019. At the same time, we must maintain a critical and generalist approach to the Basque Gravettian within a wider framework, comparing it to the whole of the northern Iberian Peninsula, the Pyrenean world (on both sides of the mountains), Aquitaine and Périgord and the Dordogne. The exhaustive analysis of the immediate region cannot be incompatible with its comparison and framing within a wider geographic area, or even for a chronological period that nearly doubles the timespan that was regarded as the most likely length thirty years ago.

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### REFERENCES

- AGUIRRE M. 2000. — El paleolítico de Antoliñako Koba (Gautegiz-Arteaga, Bizkaia) secuencia estratigráfica y dinámica industrial. Avance de las campañas de excavación 1995-2000. *Illunzar* 4: 39-81.
- AGUIRRE M. 2006. — Antoliñako koba (Gautegiz-Arteaga). *Arkeoikuska: Investigación Arqueológica* 2005: 80-84.
- AGUIRRE M. 2013. — Ocupaciones gravetienses de Antoliñako koba: aproximación preliminar a su estratigrafía, cronología e industrias in DE LAS HERAS C., LASHERAS J. A., ARRIZABALAGA A. & RASILLA M. DE LA (eds), *Pensando el Gravetiense: nuevos datos para la Región Cantábrica, en su contexto peninsular y pirenaico*. Centro de Publicaciones. Ministerio de Educación, Madrid: 229-242.
- ALTUNA J. 1972. — *Fauna de Mamíferos de los yacimientos prehistóricos de Guipúzcoa*. Tesis doctoral. *Munibe (Antropología Arkeologia)* 24 (1-4): 1-498.
- ALTUNA J. 1984. — Historia de las excavaciones. Descripción del yacimiento. Resumen estratigráfico del relleno. Utilización del espacio. Dataciones absolutas, in ALTUNA J. & MERINO J. M. (eds), *El yacimiento prehistórico de la cueva de Ekain (Deba, Guipúzcoa)*. Eusko Ikaskuntza, San Sebastián: 17-45 (Colección Barandiarán; 1).
- ALTUNA J. 1990. — Caza y alimentación procedente de macromamíferos durante el Paleolítico de Amalda, in ALTUNA J., BALDEÓN A. & MARIEZKURRENA K. (dirs), *La Cueva de Amalda (Zestoa, País Vasco). Ocupaciones paleolíticas y postpaleolíticas*. Eusko Ikaskuntza, San Sebastián: 149-192.
- ALTUNA J. 1992. — Dataciones de radiocarbono para el Perigordense Superior del País Vasco. *Munibe (Antropología Arkeologia)* 44: 31, 32.
- ALTUNA J. 2002. — Cueva de Aitzbitarte III (Errenteria). *Arkeoikuska: Investigación Arqueológica* 2001: 128-130.
- ALTUNA J. 2003. — Cueva de Aitzbitarte III (Errenteria). *Arkeoikuska: Investigación Arqueológica* 2002: 116-118.
- ALTUNA J. 2011a. — Aitzbitarte III situación. Descripción del valle y de la cueva. Historia de las excavaciones recientes. Descripción del relleno (zona de entrada) dataciones de Radiocarbono, in ALTUNA J., MARIEZKURRENA K. & RÍOS-GARAIAR J. (coords), *Ocupaciones humanas en Aitzbitarte III (País Vasco) 33.600- 18.400 BP (Zona de entrada a la cueva)*. Publicaciones Gobierno Vasco, Vitoria-Gasteiz, EKOB, 5: 23-38.
- ALTUNA J. 2011b. — Las cuevas de Aitzbitarte (Landarbaso, Rentería) Situación e historia de las investigaciones, in ALTUNA J., MARIEZKURRENA K. & RÍOS-GARAIAR J. (coords), *Ocupaciones humanas en Aitzbitarte III (País Vasco) 33.600- 18.400 BP (Zona de entrada a la cueva)*. Publicaciones Gobierno Vasco, Vitoria-Gasteiz, EKOB 5: 11-21.
- ALTUNA J., BALDEÓN A. & MARIEZKURRENA K. (dirs) 1990. — *La Cueva de Amalda (Zestoa, País Vasco). Ocupaciones paleolíticas y postpaleolíticas*. Eusko Ikaskuntza, San Sebastián, 276 p.
- ALTUNA J., MARIEZKURRENA K. & RÍOS-GARAIAR J. (coords) 2011. — *Ocupaciones humanas en Aitzbitarte III (País Vasco) 33.600-18.400 BP (Zona de entrada a la cueva)*. EKOB 5. Gobierno Vasco, Vitoria-Gasteiz, 536 p.
- ALTUNA J., MARIEZKURRENA K., RÍOS-GARAIAR J. & SAN EMETERIO A. (coords) 2017. — *Ocupaciones humanas en Aitzbitarte III (País Vasco) 26.000-13.000 BP (Zona Profunda de la cueva)*. EKOB 8. Gobierno Vasco, Vitoria-Gasteiz, 466 p.
- ARAMBOUROU R. 1989. — Préhistoire autour de Saint Jean-de-Luz (France). *Munibe (Antropología Arkeologia)* 41: 29-44.
- ARAMBOUROU R. 1990. — Préhistoire en Pays Basque Nord et Sud des Landes. *Munibe (Antropología Arkeologia)* 42 : 91-96.
- ARESO P., ARANZASTI M., OLASKOAGA M. & URIZ A. 1990. — Sedimentología de la cueva de Amalda, in ALTUNA J., BALDEÓN A. & MARIEZKURRENA K. (dirs), *La Cueva de Amalda (Zestoa, País Vasco). Ocupaciones paleolíticas y postpaleolíticas*. Eusko Ikaskuntza, San Sebastián: 33-48.
- ARIAS P., CALDERÓN T., GONZÁLEZ-SÁINZ C., MILLÁN A., MOURE A., ONTAÑÓN R. & RUIZ R. 1999. — Dataciones absolutas para el arte rupestre paleolítico de Venta Laperra (Carranza, Bizkaia). *Kobie, Paleoantropología* 25: 85-93.
- ARRIZABALAGA Á. 1995. — *La industria lítica del Paleolítico Superior Inicial en el Oriente Cantábrico*. Tesis Doctoral, Universidad del País Vasco, Vitoria-Gasteiz, 1000 p.
- ARRIZABALAGA Á. 1998. — El aprovisionamiento en materias primas líticas durante la génesis del Leptolítico: el Cantábrico oriental. *Rubricatum* 2: 97-104.
- ARRIZABALAGA Á. 2005. — Últimos neandertales y primeros cromañones. Perspectivas desde la Encrucijada vasca, in MONTES-BARQUÍN R. & LASHERAS J. A. (eds), *Neandertales Cantábricos: Estado de la Cuestión*. Vol. 20. Monografías del Museo Nacional y Centro de Investigación de Altamira, Madrid: 557-575.
- ARRIZABALAGA Á. 2006. — Lezetxiki (Arrasate, País Vasco). Nuevas preguntas acerca de un antiguo yacimiento, in CABRERA V., BERNALDO DE QUIROS F. & MAILLO J. M. (eds), *En el centenario de la Cueva de El Castillo: el caso de los Neandertales*. Centro Asociado de la UNED-Cantabria, Santander: 291-310.
- ARRIZABALAGA Á. 2007a. — Frontières naturelles, administratives et épistémologiques. L'unité d'analyse dans l'Archéologie du Paléolithique (dans le cas basque), in CAZALS N., GONZÁLEZ J. & TERRADAS X. (coords), *Frontières naturelles et frontières culturelles dans les Pyrénées préhistoriques*. Universidad de Cantabria, Santander: 27-37.
- ARRIZABALAGA Á. 2007b. — Veintisiete años después del Auriñaciense y Perigordense en el País Vasco. Nuevas investigaciones de campo acerca del Paleolítico superior inicial en el País Vasco. Homenaje a Ignacio Barandiarán Maestu. *Veleia* 24-25, vol. 1: 425-443.
- ARRIZABALAGA Á., ALTUNA J., ARESO P., FALGUÉRES C., IRIARTE M.J., MARIEZKURRENA K., PEMAN E., RUIZ-ALONSO M., TARRIÑO A., URIZ A. & VALLVERDÚ J. 2005. — Retorno a Lezetxiki

- (Arrasate, País Vasco): nuevas perspectivas de la investigación, in SANTONJA M., PÉREZ-GÓNZALEZ A. & MACHADO M. J. (eds), *Geoarqueología y Patrimonio en la Península Ibérica y el entorno mediterráneo*. Adema, Soria: 63-80.
- ARRIZABALAGA Á., CALVO A., ELORRIETA I., TAPIA J. & TARRIÑO A. 2014. — Where to and what for? Mobility patterns and lithic resources management among Gravettian hunter-gatherers in the western Pyrenees. *Journal of Anthropological Research* 70: 233-261. <http://www.jstor.org/stable/24393754>
- ARRIZABALAGA Á., CALVO A., DOMINGUEZ-BALLESTEROS E., GARCIA-IBAIBARRIAGA N. & IRIARTE-CHIAPUSSO M. J. 2015. — Ganando altura. Tránsito, explotación y campamento de cazadores-recolectores en los espacios de montaña de la Encrucijada vasca. *Arqueología y Prehistoria del Interior peninsular (ARPI)* 03 (Extra): 44-55.
- ARRIZABALAGA Á. & IRIARTE-CHIAPUSSO M. J. 2003. — El yacimiento arqueológico de Irikaitz (Zestoa, País Vasco). Descripción del depósito y caracterización industrial de su nivel IV, in FLOR G. (ed.), XI Reunión Nacional de Cuaternario. Aequa, Oviedo: 205-210.
- ARRIZABALAGA Á. & IRIARTE-CHIAPUSSO M. J. 2008. — Irikaitz (Zestoa, País Vasco). Tafonomía dun depósito pleistocénico ao aire libre. Homenaje a Xosé María Álvarez Blázquez. *Estudios sobre Paleolítico* 2: 139-162.
- ARRIZABALAGA Á. & IRIARTE-CHIAPUSSO M. J. 2010. — *El Gravetiense en la encrucijada. Actualización de la información y propuesta de lectura para el caso vasco*. Cuaternario y Arqueología: Homenaje a Francisco Giles Pacheco. Asociación Profesional del Patrimonio Histórico-Arqueológico de Cádiz, Cádiz: 133-146.
- ARRIZABALAGA Á. & IRIARTE-CHIAPUSSO M. J. 2011a. — Les gisements archéologiques gravettiens de plein air dans le Pays Basque péninsulaire: un phénomène émergent, in NGOUTAS N., KLARIC L., GUILLERMIN D. & PESSESE P. (dirs), *À la recherche des identités gravettiennes: actualités, questionnements et perspectives*. Société préhistorique française, Paris: 197-206.
- ARRIZABALAGA Á. & IRIARTE-CHIAPUSSO M. J. 2011b. — Lower and Upper Palaeolithic settlements in Irikaitz (Zestoa, Basque Country, Spain). Deconstruction of a Pleistocene archaeological site in the eastern Cantabrian Range. *Cuaternario y Geomorfología* 25 (1-2): 105-120.
- ARRIZABALAGA Á. & PEÑA P. DE LA 2013. — El registro de la industria lítica como base para una organización del Gravetiense cantábrico, in DE LAS HERAS C., LASHERAS J. A., ARRIZABALAGA Á. & RASILLA M. DE LA (eds), *Pensando El Gravetiense: Nuevos Datos Para La Región Cantábrica En Su Contexto Peninsular Y Pirenaico*. Ministerio de Educación, Madrid: 347-368 (Monografías Del Museo Nacional y Centro de Investigación de Altamira; 23).
- ARRIZABALAGA Á., RIOS-GARAZAR J. & ÁLVAREZ-ALONSO D. 2015. — The Past is Out There. Open air Palaeolithic sites and new research strategies in the Cantabrian region (northern Iberia). *Quaternary International* 364: 181-187. <https://doi.org/10.1016/j.quaint.2014.07.051>
- BARANDIARÁN I. 1980. — Auriñaciense y Perigordense en el País Vasco: Estado Actual. *Munibe (Antropología Arkeologia)* 32: 325-333.
- BARANDIARÁN I. 1988a. — Actividad arqueológica en Navarra. 1986-1987: Yacimiento de Mugarduia Sur (Urbasa). Campaña de 1987. *Trabajos de Arqueología Navarra* 7 : 319-325.
- BARANDIARÁN I. 1988b. — *Prehistoria: El Paleolítico. Historia General de Euskal Herria*. Editorial Auñamendi, Donostia, 624 p.
- BARANDIARÁN I. 1996. — *Le Paléolithique supérieur au Pays Basque et dans le Bassin de l'Èbre. Le Paléolithique supérieur européen. Bilan quinquennal 1991-1996*. UISPP, Forli: 319-322.
- BARANDIARÁN I. 1999. — La cueva de Isturitz (Pyrénées-Atlantiques). Memoria de la campaña arqueológica de excavaciones en la Sala de Saint-Martin del 1 al 30 de julio de 1999. D. F. S. de fouilles programmées. Non publié, conservé au Service Régional de l'Archéologie d'Aquitaine, 46 p., 54 figs, 5 annexes.
- BARANDIARÁN I. & VALLESPÍ E. 1984. — Prehistoria de Navarra. *Trabajos de Arqueología de Navarra* 2: 1-253.
- BARANDIARÁN I. & CAVA A. 2001. — El Paleolítico superior de la cueva de Zatoya (Navarra) actualización de los datos en 1997. *Trabajos de Arqueología de Navarra* 15: 5-99.
- BARANDIARÁN I., FORTEA J. & HOYOS M. 1996. — El Auriñaciense tardío y los orígenes del Gravetiense: el caso de la región cantábrica, in Proceedings of the XIII International Congress of Prehistoric and Protohistoric Sciences. Forli, Colloquia 6. The Upper Palaeolithic. A.B.A.C.O. Edizioni, Forli: 263-293.
- BARANDIARÁN I., BENÉITEZ P., CAVA A. & MILLÁN M. A. 2007a. — El taller gravetiense de Mugarduia sur (Navarra) identificación y cronología. *Zephyrus* 60: 15-26.
- BARANDIARÁN I., CAVA A. & ALDAY A. 2007b. — Ocupaciones de altura e interior durante el Tardiglaciario: la Llanada alavesa y sus estribaciones montañosas, in MAILLO J. M. & BAQUEDANO E. (eds), *Miscelánea en homenaje a Victoria Cabrera*. Vol. 1. Museo Arqueológico Regional, Madrid: 534-550.
- BARANDIARÁN I., CAVA A. & AGUIRRE M. (eds) 2013. — *El taller de sílex de Mugarduia Sur. Una ocupación de Urbasa (Navarra) durante el Gravetiense*. Veleia Anejos series, maior 13. Servicio Editorial de la Universidad del País Vasco, Bilbao, 690 p.
- BRADTMÖLLER M. 2014. — *Höhlenlager des Gravettien. Muster jungpaläolithischer Höhlennutzung am Beispiel des Gravettien Nordspaniens*. Verlag Dr. Kovač, Hamburg, 516 p.
- CABRERA V. & BISCHOFF J. L. 1989. — Accelerator <sup>14</sup>C dates for Early Upper Paleolithic (basal Aurignacian) at El Castillo Cave (Spain). *Journal of Archaeological Science* 16 (6): 577-584. [https://doi.org/10.1016/0305-4403\(89\)90023-X](https://doi.org/10.1016/0305-4403(89)90023-X)
- CALVO A. 2019. — *The Gravettian in the Western Pyrenees: Dynamics of Procurement and Technological Management of Lithic Raw Materials*. PhD Dissertation. Universidad del País Vasco, Vitoria (unpublished).
- CALVO A., TAPIA J., ARRIZABALAGA Á. & IRIARTE-CHIAPUSSO M. J. 2013. — El yacimiento de Ametzagaina (Donostia, País Vasco). Un campamento gravetiense al aire libre en el Cantábrico, in DE LAS HERAS C., LASHERAS J. A., ARRIZABALAGA A. & RASILLA M. DE LA (coords), *Pensando el Gravetiense: nuevos datos para la Región Cantábrica, en su contexto peninsular y pirenaico*. Centro de Publicaciones. Ministerio de Educación, Madrid: 229-240.
- CASTAÑOS P. 1986. — *Los Macromamíferos del Pleistoceno y Holoceno de Vizcaya. Faunas asociadas a los yacimientos arqueológicos*. Tesis Doctoral inédita, Universidad del País Vasco, Leioa, 593 p.
- CAVA A., ELORRIETA I. & BARANDIARÁN I. 2009. — El Gravetiense de la cueva de Alkerdi (Urdax, Navarra): análisis y contexto de su industria lítica. *Munibe (Antropología Arkeologia)* 60: 51-80.
- CHAUCHAT C. 1973. — La grotte Lezia à Sare, quelques nouvelles données. *Bulletin du Musée basque de Bayonne* 61: 155-166. <https://bmb.bilketa.eus/69/f37>
- CHAUCHAT C. 1994. — La station préhistorique de Lestaulan, quartier de Maignon, à Bayonne (Pyrénées Atlantiques). *Munibe (Antropología Arkeologia)* 46 : 3-22.
- CHAUCHAT C. 2006. — La grotte d'Azkonzilo à Irissary (Pyrénées-Atlantiques, in CHAUCHAT C. (ed.), *Préhistoire du Bassin de l'Adour*. Izpegi, Pau: 101-130.
- DE LA PEÑA P. 2011. — *Sobre la unidad tecnológica del Gravetiense en la Península Ibérica: implicaciones para el conocimiento del Paleolítico superior inicial*. Tesis Doctoral, Universidad Complutense de Madrid, 838 p. (unpublished).
- DE LAS HERAS C., LASHERAS J. A., ARRIZABALAGA Á., RASILLA M. DE LA (coords) 2013. — *Pensando el Gravetiense: nuevos datos para la Región Cantábrica, en su contexto peninsular y pirenaico*. Centro de Publicaciones. Ministerio de Educación, Madrid, 619 p. (Monografías del Museo y Centro de Investigación de Altamira; 26).
- DUPRÉ M. 1988. — Palinología y Paleoambiente. Nuevos datos españoles. Referencias. *Trabajos Varios* 84: 1-160. <http://mupreva.org/pub/115/va>

- DUPRÉ M. 1990. — Análisis polínico de la cueva de Amalda, in ALTUNA J., BALDEÓN A. & MARIEZKURRENA K. (dirs), *La Cueva de Amalda (Zestoa, País Vasco). Ocupaciones paleolíticas y post-paleolíticas*. Eusko Ikaskuntza, San Sebastián: 49-51.
- ESPARZA X. 1995. — *La cueva de Isturitz. Su yacimiento y sus relaciones con la Cornisa Cantábrica durante el Paleolítico superior*. UNED, Madrid, 228 p. (Colección Aula Abierta; 82).
- ESPARZA X. & MUJICA J. 1999. — Reflexiones en torno a la estratigrafía de Ermitia (Deva, Guipúzcoa). XXIV Congreso Nacional de Arqueología, Murcia, Vol. 1: 61-69.
- FALGUÉRES C., YOKOYAMA Y. & ARRIZABALAGA A. 2005/2006. — La Geocronología del yacimiento pleistocénico de Lezetxiki (Arrasate, País Vasco). Crítica de las dataciones existentes y algunas nuevas aportaciones, in Homenaje a Jesús Altuna. *Munibe (Antropología Arkeologia)* 57 (2): 93-106.
- FOUCHER P. 2004. — *Les industries lithiques du complexe Gravettien-Solutréen dans les Pyrénées: techno-typologie et circulation des matières siliceuses de part et d'autre de l'axe Pyrénées-Cantabres*. Université de Toulouse II-Le Mirail, Toulouse (unpublished).
- FOUCHER P. 2013. — Synthèse chrono-culturelle sur le Gravettien des Pyrénées: constat et réflexions sur la stabilité régionale des traditions techniques, in DE LAS HERAS C., LASHERAS J. A., ARRIZABALAGA A. & RASILLA M. DE LA (coords), *Pensando el Gravetiense: nuevos datos para la Región Cantábrica, en su contexto peninsular y pirenaico*. Centro de Publicaciones. Ministerio de Educación, Madrid: 151-169.
- FOUCHER P., SAN JUAN-FOUCHER C., SACCHI D. & ARRIZABALAGA A. 2008. — Le Gravettien des Pyrénées. *Paleo* 20: 331-356. <https://doi.org/10.4000/paleo.1604>
- GARATE D. & RÍOS-GARAIZAR J. (dirs) 2012. — *La cueva de Askondo (Mañaria, Bizkaia). Arte parietal y ocupación humana durante la Prehistoria*. Bizkaiko Arkeologi Indusketak 2, Diputación Foral de Bizkaia, Bilbao, 154 p.
- IRIARTE-CHIAPUSSO M. J. 2004. — Monte Jaizkibel (Hondarribia). III Campaña. *Arkeoikuska: Investigación Arqueológica* 2003: 157-160.
- IRIARTE-CHIAPUSSO M. J. 2013. — La secuencia paleoambiental del taller gravetiense al aire libre de Mugarduia sur: la contribución de la Palinología, in BARANDIARÁN I., CAVA A. & AGUIRRE M. (eds), *El taller de sílex de Mugarduia Sur. Una ocupación de Urbasa (Navarra) durante el Gravetiense*. Veleia Anejos series, maior 13. Servicio Editorial de la Universidad del País Vasco, Bilbao: 87-98.
- IRIARTE-CHIAPUSSO M. J. & ARRIZABALAGA A. 2015a. — El yacimiento arqueológico de Bolinkoba (Abadiño, Bizkaia). Crónica de las investigaciones en la cavidad. Secuencia estratigráfica y cronología numérica, in IRIARTE-CHIAPUSSO M. J. & ARRIZABALAGA A. (dirs), Bolinkoba (Abadiño) y su yacimiento arqueológico. Arqueología de la Arqueología para la puesta en valor de su depósito, a la luz de las excavaciones antiguas y recientes. *Spite of Paleoantropología, Bizkaiko Arkeologia Indusketak* 6: 5-88.
- IRIARTE-CHIAPUSSO M. J. & ARRIZABALAGA A. (dirs) 2015b. — Bolinkoba (Abadiño) y su yacimiento arqueológico. Arqueología de la Arqueología para la puesta en valor de su depósito, a la luz de las excavaciones antiguas y recientes. *Spite of Paleoantropología, Bizkaiko Arkeologia Indusketak* 6: 1-192.
- IRIARTE-CHIAPUSSO M. J., GARCÍA-IBAIBARRIAGA N. & ARRIZABALAGA A. 2016. — The Contribution of Open-Air Sites to the Environmental Reconstruction of the Gravettian at the Basque Crossroads (North Iberia). *Quaternary International* 412: 54-65. <https://doi.org/10.1016/j.quaint.2016.01.048>
- MARIEZKURRENA K. 1990. — Dataciones Absolutas para la Arqueología Vasca. *Munibe (Antropología Arkeologia)* 42: 287-304.
- MARTÍNEZ L. 2015. — *El Gravetiense en el sector occidental cantábrico y sus conexiones pirenaicas*. Tesis Doctoral. Universidad de Oviedo (unpublished).
- MCCOLLOUGH M. C. 1971. — *Perigordian facies in the Upper Palaeolithic of Cantabria*. PhD Thesis, University of Pennsylvania, Michigan (unpublished).
- MUJICA J. 1991. — La industria ósea del Paleolítico Superior y Epipaleolítico del Pirineo Occidental. Tesis Doctoral inédita, Universidad de Deusto, Bilbao (unpublished).
- NORMAND C., GOUTAS N., LACARRIÈRE J. & SIMONET A. 2013. — El Gravetiense de la cueva de Isturitz: nuevas investigaciones, nuevos datos, in DE LAS HERAS C., LASHERAS J. A., ARRIZABALAGA A. & RASILLA M. DE LA (coords), *Pensando el Gravetiense: nuevos datos para la Región Cantábrica, en su contexto peninsular y pirenaico*. Centro de Publicaciones. Ministerio de Educación, Madrid: 171-194.
- OCHOA B., GARCÍA-DIEZ M., MAÍLLO-FERNÁNDEZ J. M., ARRIZABALAGA A. & PETTIT P. 2018. — Gravettian Figurative art in the western Pyrenees: Stratigraphy, Cultural context and Chronology. *European Journal of Archaeology* 22 (2): 168-184. <https://doi.org/10.1017/ea.2018.31>
- PEMÁN E. 1990. — Los micromamíferos de la cueva de Amalda y su significado. Comentarios sobre *Pliomys lencki* (Heller 1930) (*Rodentia Mammalia*), in ALTUNA J., BALDEÓN E. A. & MARIEZKURRENA E. (dirs), *La Cueva de Amalda (Zestoa, País Vasco). Ocupaciones paleolíticas y postpaleolíticas*. Eusko Ikaskuntza, San Sebastián: 225-238.
- RASILLA M. DE LA 1989. — Secuencia y cronoestratigrafía del Solutrense Cantábrico. *Trabajos de Prehistoria* 46: 35-46. <https://doi.org/10.3989/tp.1989.v46.i0.585>
- RASILLA M. DE LA & SANTAMARÍA D. 2006. — El Gravetiense del Abrigo de Cueto de la Mina (Posada de Llanes, Asturias), in MAILLO J. M. & BAQUEDANO E. (eds), *Miscelánea en homenaje a Victoria Cabrera*. Vol. 1. Museo Arqueológico Regional, Madrid: 406-420.
- RASILLA M. DE LA & STRAUS L. G. 2004. — El poblamiento en la región cantábrica en torno al Último Máximo Glacial: Gravetiense y Solutrense, in FANO M. (ed), *Las sociedades del Paleolítico en la región cantábrica*. Diputación Foral de Bizkaia, Bilbao: 209-241.
- RÍOS-GARAIZAR J. & GARATE D. 2014. — Actualisation de l'inventaire des pointes de type Isturitz de la région cantabrique. *Paleo* 25: 233-245. <https://doi.org/10.4000/paleo.2811>
- RÚA C. DE LA, HERVELLA M., IZAGUIRRE N., ALONSO S., MARIEZKURRENA E. & ALTUNA J. 2013. — Los dientes humanos del Gravetiense reciente de la cueva de Aitzbitarte III (Rentería, Gipuzkoa), in DE LAS HERAS C., LASHERAS J. A., ARRIZABALAGA A. & RASILLA M. DE LA (coords), *Pensando el Gravetiense: nuevos datos para la Región Cantábrica, en su contexto peninsular y pirenaico*. Centro de Publicaciones. Ministerio de Educación, Madrid: 451-458.
- RUIZ-IDARRAGA R. & D'ERRICO F. 2006. — Cueva de El Polvorin (Valle de Carranza). *Arkeoikuska: Investigación Arqueológica* 2005: 92-95.
- RUIZ-IDARRAGA R. & D'ERRICO F. 2007. — Cueva de El Polvorin (Valle de Carranza). II Campaña. *Arkeoikuska: Investigación Arqueológica* 2006: 136-137.
- SÁENZ DE BURUAGA A. 1991. — *El Paleolítico Superior de la Cueva de Gatzarria (Zuberoa, País Vasco)*. Anejos de Veleia, Series Maior 6.3. Euskal Herriko Unibertsitatea, Vitoria, 486 p.
- SÁENZ DE BURUAGA A. 1996. — La antigüedad prehistórica, in RIVERA A. (coord.), *Álava. Nuestra Historia*. El Correo Español, Vitoria-Gasteiz: 33-56.
- SÁENZ DE BURUAGA A. 2004. — Las primeras manifestaciones del Paleolítico superior antiguo en Araba y la explotación de las materias primas silíceas: algunas reflexiones. *Estudios de Arqueología Alavesa* 21: 1-16.
- SÁENZ DE BURUAGA A. 2007. — Cueva de Aldatxarren (Mendaro). *Arkeoikuska: Investigación Arqueológica* 2006: 168-175.
- SÁENZ DE BURUAGA A., GARCÍA-ROJAS M. & RETOLAZA I. 2005. — Aproximación a la interpretación tecno-tipológica del conjunto industrial de tradición gravetiense de Prado (Burgeta, Araba). *Estudios de Arqueología Alavesa* 22: 51-68.
- SIMONET A. 2004. — L'atelier de taille gravettien de Tercis (Landes). Approche technologique, économique et sociologique: Étude

- de l'industrie lithique de deux concentrations dites «à pièces à dos» et «à grandes lames». Maîtrise de Préhistoire, Université de Toulouse-Le Mirail (unpublished).
- SIMONET A. 2009. — Les gravettiens des Pyrénées. Des armes aux sociétés. Thèse de Doctorat, Université de Toulouse (unpublished).
- SIMONET A. 2010. — Typologie des armatures lithiques gravettiennes de la grotte d'Isturitz (Pyrénées-Atlantiques, France). BAR International Series 2156, Oxford. <https://hal.archives-ouvertes.fr/hal-02021719>
- TAPIA J., ARRIZABALAGA Á., IRIARTE-CHIAPUSSO M. J. & CALVO A. 2009. — El campamento gravetiense de Ametzagaina (Donostia, País Vasco). Un avance a su estudio arqueológico. *Munibe (Antropología Arkeologia)* 60: 101-117.
- TARRIÑO A. 2006. — *El sílex en la cuenca Vasco-Cantábrica y Pirineo Navarro: caracterización y su aprovechamiento en la Prehistoria*. Universidad del País Vasco, Madrid, 228 p. (Monografías del Centro de Investigación y Museo de Altamira; 21).
- TURQ A., NORMAND C. & VALLADAS H. 1999. — *Saint-Martin-d'Arberoue: Grotte d'Isturitz, Bilan Scientifique 1998*. Direction régionale des Affaires culturelles, Service régional de l'Archéologie, Bordeaux, 133 p.

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APPENDICES

APPENDIX 1. — Numerical dates concerning the Gravettian in the Basque Crossroads.

Muestra	Referencia	Método	Soporte	Fecha (CalPal 2007)		Nivel	Referencia
				Fecha BP	Cal. BC		
Mugarduia sur	MAD-4272	TL	Sílex	34.862 ± 3344		Gravetiense	Barandiarán <i>et al.</i> 2007
Aitzbitarte III	Ua-18467	AMS	Hueso	31.210 ± 860	33.377 ± 890	Va (ext.) Gravetiense antiguo	
Isturitz	Beta-136049	AMS	Hueso	29.400 ± 370	31.787 ± 396	C3b. Techo. Auriñaciense	Turq <i>et al.</i> 1999
Aitzbitarte III	Ua-18466	AMS	Hueso	28.950 ± 655	31.356 ± 650	IV (ext.) Gravetiense	Altuna 2002
Zatoya	GrN-23999	C14	Hueso	28.870 +760 -690	31.288 ± 716	IIbam. Primer tercio Pal. Sup.	Barandiarán & Cava 2001
Aitzbitarte III	Ua-37962	AMS	Hueso	28.530 ± 645	31.115 ± 665	Va (ext.) Gravetiense antiguo	Altuna 2011a
Aitzbitarte III	Ua-18465	AMS	Hueso	28.320 ± 605	30.925 ± 621	IV (ext.) Gravetiense	Altuna 2002
Isturitz	Beta-136048	AMS	Hueso	28.290 ± 240	30.759 ± 360	C3b. Techo. Auriñaciense	Barandiarán 1999
Mugarduia sur	MAD-4274	TL	Sílex	28.024 ± 3616		Gravetiense	Barandiarán <i>et al.</i> 2007
Aitzbitarte III	Ua-21160	AMS	Hueso	28.010 ± 600	30.765 ± 512	Vb (ext.) Auriñaciense evol.	Altuna 2011a
Aitzbitarte III	Ua-18464	AMS	Hueso	27.580 ± 550	30.342 ± 483	IV (ext.) Gravetiense	Altuna 2002
Amalda	I-11664	C14	Hueso	27.400 ± 1100	30.098 ± 1041	VI. Gravetiense	Altuna <i>et al.</i> 1990
Amalda	I-11665	C14	Hueso	27.400 ± 1000	30.106 ± 953	VI. Gravetiense	Altuna <i>et al.</i> 1990
Antoliñako Koba	GrN-23786	C14	Hueso	27.390 ± 320	30.114 ± 277	Lmbk sup. Gravetiense	Aguirre 2000
Aitzbitarte III	Ua-24966	AMS	Hueso	27.165 ± 520	29.845 ± 490	Va (ext.) Gravetiense antiguo	Altuna 2011a
Alkerdi	GrN-20322	C14	Hueso	26.470 + 530 -490	29.248 ± 465	Gravetiense	Barandiarán 1996
Aitzbitarte III	Ua-24967	AMS	Hueso	26.350 ± 475	29.057 ± 465	Va (ext.) Gravetiense antiguo	Altuna 2011a
Aitzbitarte III	Ua-37961	AMS	Hueso	26.260 ± 480	28.978 ± 465	IV (ext.) Gravetiense antiguo	Altuna 2011a
Bolinkoba	Beta-426854	AMS	Hueso	25.950 ± 120	30580-29805	2 sup. Gravetiense	Iriarte-Chiapusso & Arrizabalaga 2015a
Aitzbitarte III	Ua-11148	AMS	Hueso	25.815 ± 475	28.885 ± 460	IV (ext.) Gravetiense antiguo	Altuna 2011a
Aitzbitarte III	Ua-2244	AMS	Hueso	25.380 ± 430	28.422 ± 551	VI (int.) Gravetiense	Altuna 1992
Aitzbitarte III	Ua-2245	AMS	Hueso	24.920 ± 410	27.832 ± 490	VI (int.) Gravetiense	Altuna 1992
Aitzbitarte III	I-15208	C14	Hueso	24.910 ± 770	27.737 ± 899	V (int.) Gravetiense	Altuna 1992
Aitzbitarte III	Ua-2627	AMS	Hueso	24.635 ± 475	27.475 ± 680	VI (int.) Gravetiense	Altuna 1992
Aitzbitarte III	Ua-2626	AMS	Hueso	24.545 ± 415	27.403 ± 648	VI (int.) Gravetiense	Altuna 1992
Aitzbitarte III	Ua-11146	AMS	Hueso	24.240 ± 365	27.115 ± 490	IV (ext.) Gravetiense antiguo	Altuna 2011a
Aitzbitarte III	Ua-2628	AMS	Hueso	23.830 ± 345	26.801 ± 477	VI (int.) Gravetiense	Altuna 1992
Askondo	Beta-303671	AMS	Hueso	23.760 ± 110	26.645 ± 117	Contexto de arte	Gárate & Ríos-Garaizar 2012
Aitzbitarte III	Ua-2243	AMS	Hueso	23.230 ± 330	25.843 ± 556	V (int.) Gravetiense	Altuna 1992
Aitzbitarte III	Ua-24963	AMS	Hueso	22.580 ± 295	24.672 ± 305	III (ext.) Gravetiense reciente	Altuna 2011a
Aitzbitarte III	Ua-24965	AMS	Hueso	22.420 ± 290	24.567 ± 312	IV (ext.) Gravetiense antiguo	Altuna 2011a
Ermittia	Ua-4522	AMS	Hueso	21.185 ± 295	23.398 ± 462	V. Solutreo-Gravetiense	Esparza & Mujika 1999
Aitzbitarte III	Ua-1917	AMS	Hueso	21.230 ± 130	23.336 ± 372	VI (int.) Gravetiense	Altuna 1992
Bolinkoba	Beta-302981	AMS	Hueso	21.020 ± 90	25570-25185	2 sup. Gravetiense	Iriarte-Chiapusso & Arrizabalaga 2015a
Ekain	I-13005	C14	Hueso	20.900 ± 450	23.075 ± 648	VIII. Würm III/IV	Altuna 1984
Aitzbitarte III	Ua-11147	AMS	Hueso	20.405 ± 130	22.277 ± 211	III (ext.) Gravetiense reciente	Altuna 2011a
Aitzbitarte III	Ua-11149	AMS	Hueso	20.290 ± 260	22.145 ± 250	III (ext.) Gravetiense reciente	Altuna 2011a
Mugarduia sur	MAD-4273	TL	Sílex	20.240 ± 2597		Gravetiense	Barandiarán <i>et al.</i> 2007



## APPENDIX 2. — Main sites cited in the text.

Muestra	Referencia	Método	Soporte	Fecha BP	Fecha (CalPal 2007) Cal.BC	Nivel	Referencia
Grotte du Phare	Gif-6777	C14	Carbón	19.900 ± 350	21.866 ± 484	¿?	Mariezkurrena 1990
Aitzbitarte III	Ua-37959	AMS	Hueso	19.765 ± 220	21.625 ± 467	II (ext.) Gravetiense/ Solutrense	Altuna 2011a
Aitzbitarte III	Ua-18463	AMS	Hueso	19.515 ± 235	21.427 ± 230	III (ext.) Gravetiense reciente	Altuna 2011a
Aitzbitarte III	Ua-37960	AMS	Hueso	19.400 ± 210	21.295 ± 235	III (ext.) Gravetiense reciente	Altuna 2011a
Lezetxiki	I-6144	C14	Hueso	19.340 ± 780	21.190 ± 965	IIIa. Auriñaciense	Altuna 1972
Aitzbitarte III	Ua-24964	AMS	Hueso	19.230 ± 230	21.035 ± 287	III (ext.) Gravetiense reciente	Altuna 2011a
Amalda	I-11663	C14	Hueso	19.000 ± 340	20.851 ± 451	V. Perigordiense VII	Altuna 1990
Aitzbitarte III	Ua-11150	AMS	Hueso	18.400 ± 215	20.385 ± 342	III (ext) Gravetiense reciente	Altuna 2011a
Aitzbitarte IV	GrN-5993	C14	Hueso	17.950 ± 100	19.668 ± 367	VIII. Base del Solutrense	Altuna 1972
Amalda	I-11372	C14	Hueso	17.880 ± 390	19.507 ± 631	V. Perigordiense VII?	Altuna 1990
Ermittia	Ua-4521	AMS	Hueso	17.725 ± 165	19206 ± 367	V. Solutrense	Esparza & Mujika 1999
Azkonzilo	GifA-96562	AMS	Hueso quem.	16.470 ± 130	17.835 ± 326	Couche 5binf. Solutrense medio?	Chauchat 2006