The cave of Atxurra: A new major Magdalenian rock art sanctuary in Northern Spain

Diego Garatea,⁎, Olivia Riverob, Joseba Ríos-Garaizarc, Martin Arriolabengoad, Mª Ángeles Medina-Alcaidee, Juan Francisco Ruiz-Lópezf, Iñaki Intxaurbestr, Sergio Salazarb, Iñaki Libano

a Instituto Internacional de Investigaciones Prehistóricas de Cantabria (IIIPC). Universidad de Cantabria. 39005 Santander, Spain
b Dpto. Prehistoria, Historia Antigua y Arqueología, Universidad de Salamanca, 37008 Salamanca, Spain
c Archaeology Program, Centro Nacional de Investigación sobre la Evolución Humana (CENIEH), Paseo Sierra de Atapuerca 3, 09002 Burgos Spain
d Dpto. Mineralogía y Petrología, Euskal Herriko Unibertsitatea/Universidad del País Vasco, 48940 Leioa, Spain
e Dpto. Geografía, Prehistoria y Arqueología, Euskal Herriko Unibertsitatea/Universidad del País Vasco, 01006 Vitoria-Gasteiz, Spain
f Dpto. de Historia. Universidad de Castilla–La Mancha. 16001 Cuenca, Spain
g Edestiaurre Arkeologia Elkartea, 48650 Barrika, Spain

ARTICLE INFO

Keywords:
Cave art
Archaeological context
Engravings
Magdalenian
Accessibility

ABSTRACT

The discovery of Palaeolithic parietal art in the cave of Atxurra took place within an archaeological surveying project that has been carried out over the last decade in the eastern Cantabrian region. As a consequence of this project, the number of caves with parietal art known in this region has tripled. The case of Atxurra Cave is a remarkable contribution because of the number of parietal representations and the presence of a related external and internal archaeological context. Through this contribution, we present the main data derived from the cave study project that is currently underway, as well as its implications for the reformulation of symbolic interaction during the late Upper Palaeolithic.

1. Introduction

In recent years, research on Palaeolithic parietal art in the north of the Iberian Peninsula has been reactivated to a remarkable extent, especially in the eastern part of the region. It is an area where the density of decorated caves was long thought to be significantly lower than in bordering regions (Central and Western Cantabrian Region, Northern Pyrenees and Périgord), despite its geostrategic position between them, on the natural connection of the Iberian Peninsula with the rest of the Europe.

As a result of the new research, the number of known parietal assemblages has tripled (Fig. 1), from a scant ten to more than thirty, including important Magdalenian sanctuaries such as Aitzbitarte IV, Armintxe and Atxurra (Garate, 2018). The latter site is the main object of study in this publication.

An archaeological excavation project to assess the potential of the remaining deposit was restarted in 2014 under the direction of D. Garate. During the second excavation season in 2015, D. Garate and I. Intxaurbe commenced examining the walls inside the cave and found several decorated panels with dozens of Magdalenian-style engravings (Garate et al. 2016). The decorated sectors appear at a distance of between 186 m and 366 m from the prehistoric access, the entrance of Atxurra, in the upper level of the system, and they are located mainly above side-ledges reached by more or less dangerous climbs. Because of this important discovery, a project for the integral study of the cave is underway, to be carried out between 2016 and 2020.

The aim of this paper is to share the current state of the study in Atxurra Cave, involving different research lines, as an important site for understanding symbolic contacts between populations in Western Europe during the Late Palaeolithic.

2. Materials and methods

2.1. Atxurra Cave

Atxurra Cave is in the municipal district of Berriatua (Basque Country, Spain) on the right bank of the River Lea, at 70 m a.s.l. and 6 km from the modern coastline. It is located in an area with numerous archaeological sites, including such important Late Upper Palaeolithic deposits as Lumentxa, Santa Catalina, Armintxe and Laminak II, among...
2.2. Archaeological survey method

The project has aimed to define the occupations that took place in the cave, document and analyse the rock art, and determine the nature of activities related to the artistic work. This would enable a more global understanding of the different uses and visits made to the interior of the cave by prehistoric groups.

2.2.1. Habitat excavation

In order to define more precisely the known archaeological sequence, the section was cleaned up and a test pit with a surface area of 2 m² was excavated. This was performed by squares and arbitrary spits adapted to the stratigraphy, in a method which had proved effective at such other sites as Arlanpe (Rios-Garaizar et al., 2013). The archaeological remains (lithic objects and identifiable faunal remains) that could be identified or were larger than 3 cm were located with X, Y, Z coordinates using a Leica® TS02 Power-7 laser total station. As each remain was collected, it was assigned a consecutive record number according to the square and spit.

2.2.2. Parietal surveying

This consists of a detailed inspection of all potential art surfaces: floors, walls and ceilings. Different LED illumination systems were employed to identify paintings and engravings and the cave was sectorized in order to organise the survey. The rock art record was made at different levels. Firstly, panel sketches were drawn to obtain a first reading of parietal motifs. Secondly, individual technical datasheets were used to note down all the graphic motif information (identification, measurements, techniques) and the surface characteristics (constitution, shape, taphonomic alterations). Finally, 2D and 3D digital methods were used to record the rock art panels and the graphic units.

2.2.3. Digital recording methods

For the 3D reconstruction of parietal motifs, the remote sensing recording technique selected was close-range photogrammetry because of its flexibility in reconstructing 3D panels at different scales, the high accuracy of the results and the production of fast deliverables as a low-cost solution. Agisoft PhotoScan Pro 1.4.5 was the software selected to process the images. However, the difficulties involved in documenting such fine engravings over large surfaces, as in the panel on the Ledge of the Horses (11 m long) required a specific documentation methodology to overcome the limitations of this technique (Rivero et al., 2019a) (Fig. 3). This took place in three phases. First a general model of the decorated wall was obtained with uniform frontal lighting. This allowed precise restitution of the wall. The second model concentrated on the documentation of the carved evidence. This used raking light to highlight the engravings, allowing their reliable restitution. Lastly, both models were fused using the topographic coordinates. In this way, the final product integrated the graphic restitution of the engraved representations with the model of the wall.

2.2.4. Inner archaeological context

Detailed and interdisciplinary analysis of the palaeo-speleological remains on the preserved palaeo-floors on the high ledges in the cave...
provides valuable information about the “use-life” of the cave during the past. Preferentially, we focused on remains stemming from human activities. We also recorded remains derived from animal activity. They merit attention because they might have some direct or indirect relationship with the human use of a cave (Clottes, 1993), or as traces of the internal frequentation of bears. The methodology for the study consisted of several steps (Garate et al., 2015, Medina-Alcaide et al., 2018b). The data gathering included the division of the cave space into sectors according to its geomorphology, the detailed inspection of surfaces (working with portable microscopes Dino-lite® 10x-460x), the cataloguing of remains, their geolocation, their photographic documentation, sampling the superficial remains, conducting archaeological tests in singular sites and the “flotation” of extracted sediments. Additionally, a photogrammetric survey of some palaeo-floors was made with a GIGAPAN EpicPRO. Taking into account the diversity of the archaeological remains, the examination of the inner archaeological context must use an interdisciplinary approach to reach an overall understanding of the specific activities that may have been carried out in each sector, apart from graphic activity. We have included anthracology (wood charcoal), micromorphology (palaeo-floors), use-wear analysis (flint tools), radiocarbon dating (organic material), etc.

3. Results

We have divided the current results according to the three areas of archaeological study of the cave. Although the project is at an advanced stage, all the results are based on partial data. However, they allow a first characterization of the archaeological content of the cave:

3.1. Entrance occupation site

The excavation in the entrance of Atxurra (2014–2015) covered a surface area of 1.5 m² affecting the northern section left by Barandiarán. Here a 1.5 m sequence with VIII stratigraphic units has been defined (Fig. 4). The lowermost archaeological occupations occurred during the Noaillan Gravettian (Unit VI). Later occupations are attributed to the Lower Magdalenian with microlithic triangles (Units V and IV), including a sub unit with intense occupation and hearths (Unit IVb). Finally, Late Magdalenian occupations (Unit II) include a 6 cm
thick carbonous layer (Iib) that evidences the presence of hearths.

The review of Barandiaran’s excavation materials (Rios-Garaizar et al., 2019) and the evidence collected in the 2014–15 section recovery excavation suggest that the entrance was intensely occupied during the Lower Magdalenian. During the Late Magdalenian, there is also evidence of continuous occupation, but less intense than in the Lower Magdalenian.

3.2. Armiña ephemeral occupation

In 2016 and 2017 several tests and a 6 m² excavation were performed in the main hall of Armiña. At the top of the stratigraphic sequence were several sterile units (Ia-Ic, II) that sealed Unit III, containing a few transported bones, flint fragments and charcoal fragments, and Unit IV where an ephemeral occupation dating to the Late Magdalenian (14,722–14,059 cal BP) has been identified. This occupation is characterized by the presence of a small hearth, an ochre stain and few lithic and faunal remains. This ephemeral occupation has been interpreted as an Inner Archaeological Context (IAC) with a non-utilitarian purpose, despite its proximity to the current entrance to the cave, which was probably sealed during the occupation (Rios-Garaizar et al., submitted).

3.3. Rock art ensemble

From 1881 until the discovery of the Palaeolithic rock art, the cave has been open to all kinds of visitors. Thousands of people have entered during this time and more than 800 graffiti have been documented, including historical ones from the 19th century but also recent ones during those 134 years. Because of this vandalism, the archaeological heritage of the cave has been partially damaged. Fortunately, most of the rock art is in hidden sectors, away from the route followed by those visitors. However, some of the decorated walls had been erased, hindering a correct reading of the Palaeolithic traces.

Currently 19 decorated places are known with depictions of different animals, especially bison, horses and ibex, but also hinds, aurochs and a composite animal with bear and reindeer features. All of them are finely incised on the limestone walls and, in some cases, also painted in black. To date, 113 animals have been identified, corresponding to a Late Magdalenian style.

Evidence of Palaeolithic rock art has been identified in Atxurra Cave over a distance of 180 m, beginning 186 m from the entrance in use during the late Magdalenian. That would have been the present entrance of Atxurra Cave as the excavation in the first chamber in Armiña Cave has shown that the entrance of that cave would have been practically blocked or very difficult in the Upper Palaeolithic (Rios-Garaizar et al., submitted).

The sectors with parietal art and archaeological remains end near a narrowing of the passage caused by flowstone. However, a further section of the cave about 400 m long can be reached through a small gap 4 m above the cave floor. The absence of archaeological remains in this passage and the conclusions of the geomorphological study indicate that this gap would have been blocked, or it would have been extremely difficult to squeeze through it, until it was opened up at some point between the 1930s and 60s (Arriolabengoa et al., submitted).

Access to the decorated part of the cave is quite difficult from Atxurra entrance. After the entrance hall with the archaeological deposit, the inner part of the cave is entered through a small window. A ramp then connects with Armiña Cave on a lower level. By going round the side of the ramp along a steep ledge, the passage continues with a low irregular roof until it decreases in height at the start of a crawl several metres long. The geomorphologic study of the cave stresses that this is the part of the cave that has changed most since the Upper Palaeolithic. The floor is formed by a series of phases of detritic and lithochemical sedimentation up to 30 cm thick, and therefore this passage would have been relatively more comfortable in the Upper Palaeolithic (Arriolabengoa et al., submitted).

The cave continues in a larger passage with hardly any side-passages, with an irregular floor with boulders and changes in height, before reaching the last connection with the end of the lower passage, Armiña Cave. The passage then increases in size, particularly in height. Hibernation pits dug by Ursus spelaeus show that the present floor in this area has not changed since prehistoric groups visited it. However, the lithology of the walls in this area (stratified limestone with flint nodules) favours collapses, as shown by the accumulations of clasts in some places.

The decorated panels start in this area and over the next 180 m of the cave. The passage is narrower, with a variable height of 3 to 4 m, with small side-ledges and hanged chambers. The parietal decoration tends to be in those places, and therefore is not visible from the usual route through the cave but only reached by some quite difficult and occasionally dangerous climbs. A study of the state of the cave when it was frequented and decorated by late Magdalenian groups has determined the accessibility of the decorated parts of the cave at that time.

**Fig. 4.** Section N of the 2014–2015 excavation (J. Rios-Garaizar). I(a,b) - Holocene; II(a,b,c,d) - Upper Magdalenian; III- Middle Magdalenian; IV(a,b) - Lower Magdalenian; V - Lower Magdalenian; VI - Gravettian; VII - Paleontological; VIII - Sterile.
generally stigmas or non-erative number of representations (up to a maximum of 30 graphic units, more potential spaces which are less demanding. concentrations of graphic activity, even though the cave offers many more potential spaces which are less demanding.

Of the 19 decorated areas mentioned above, most contain a moderate number of representations (up to a maximum of 30 graphic units, generally stigmas or non-figurative lines and at most ten figurative units or animals). In addition, red stains are found in two sectors. However, three areas of the cave accumulate large numbers of animal figures, with dense concentrations of engravings superimposed on one another over several metres.

3.3.1. Alcove of the claw marks

On the right-hand wall, 216 m from the entrance, at least two dozen animal figures appear on calcite flowstone covered by bear claw marks and in an adjacent suspended passage. These mainly represent bison, ibex and horses, all of them engraved (Fig. 5). They are extremely difficult to access, as these figures are located 5 m above the floor of the passage, at the top of a practically vertical wall. They can be reached by climbing up a series of exposed ledges and steps. The geomorphologic study has concluded that the artists must have followed a similar route, as the speleothems separating this area from a proximate sector (Hall of the Bison) already existed in the Upper Palaeolithic (Arriolabengoa et al., submitted).

3.3.2. Hall of the bison

Located on the right-hand wall as the continuation of the previous sector, 221 m from the entrance, this is a semi-circular space with a low roof. Several panels are found on the left of the chamber, with engravings and remains of black paint, representing at least twelve bison (Fig. 6), horses, and more exceptionally, a stag in frontal perspective. Despite its proximity to the previous sector, access is easier up a gentler climb from the main passage.

3.3.3. Ledge of the horses

Also on the right-hand wall, at the end of the decorated part of the cave, 330 m from the Palaeolithic entrance, this is on a natural platform, initially 4 m above the floor of the passage although this decreases to about 2.5 m at the end. The ledge is about 1.5 m wide, allowing access to a wall about 12 m long. About 84 graphic units have been identified in two panels. They include about 50 animal engravings, many of them superimposed and overlapping. Among the most outstanding figures are two horses, easily viewed as they were drawn by scraping, several large bison, a discreet group of hinds and about twelve ibex, two of them in frontal perspective (Fig. 7). The ledge can be reached by climbs of moderate difficulty at either end, although access is easiest from the side furthest from the entrance.

3.4. Inner archaeological context

More than 700 archaeological remains have been documented in different sectors in the inner context of Atxurra Cave. These remains have their origin in the different activities carried out by the palaeo-groups inside the cave, such as artificial lighting (wood charcoal and other combustion residues) and the execution of the Palaeolithic art, for example, flint tools found at the foot of some decorated walls. Other types of evidence have been also recorded, such as possible stigmas of the extraction of some of the natural flint nodules that are present in the cave, and probably ancient anatomical prints on the clay floor (Fig. 8). These prints are usually preserved in high zones of the passage, and are patinated, but as the cave was heavily frequented in the last century, it is difficult to ensure their Palaeolithic chronology.

These remains are distributed in fourteen different sectors, especially in the high ledges of the decorated sector in the upper gallery, between 143 and 365 m from the entrance. Seven of them only contain archaeological remains, without Palaeolithic rock art. In contrast, twelve spaces only contain rock art and no archaeological remains. These sectors are located in the lower part of the gallery, where preservation is conditioned by continuous human presence during the last century and periodic floods. Just like the rock art, the archaeological remains are not distributed homogeneously in the different sectors and most of them are located in the three areas already cited:
3.4.1. “Alcove of the claw marks”

We have found about thirty wood charcoal fragments, up to 1 cm long in their maximum axis, on the surface level, in the clay floor. These remains are linked to the underground lighting activities. The scattered and random distribution of charcoal remains, together with the absence of other combustion residues (ash, rubefaction), indicates that their origin would be a mobile lighting system such as a wooden torch. However, black marks derived from the use of torches have not been recorded on the walls and the ceiling of the sector, despite the narrow dimensions. The anthracological analysis indicates a preference for angiosperm wood and especially of deciduous oak for lighting in this sector. In addition, in the first section of this space there is a cave bear hibernation pit with superimposed charred remains. This indicates that the prehistoric frequentation occurred after the temporary presence of this animal. Also, the Palaeolithic engravings are superposed on bear claw marks on flowstone in this sector.

3.4.2. “Hall of the bison”

We have found six bone fragments, mainly of cave bears, and nine scattered wood charcoal remains, up to 1 cm long in the maximum axis. Charred wood of deciduous oak and juniper has been identified in the wood charcoal analysis. A sandstone pebble with signs of abrasion, possible anthropic impacts and combustion residues has also been identified. This has been provisionally interpreted as a portable lamp, through an interdisciplinary analysis. The small dimensions of this hall explain the preference for a small and controlled flame like that produced by this type of lighting system.

3.4.3. “Ledge of the horses”

In this ledge the palaeo-surface used by the artist who engraved the walls has been extraordinarily well-preserved. Many charcoal remains (probably residue of wood torches) and some flint tools were identified on the surface, and during the excavation of 7.85 m² in 2016 hundreds of charcoal remains and more lithic tools, chips and fragments were recovered. Also five areas of reddened clay have been identified, and the presence in some of them of charcoal and ashes suggest that they were fixed fires used probably for lighting. The anthracological analysis indicates that the combustion material used for lighting this area comes from deciduous oak and juniper wood, with a marginal addition of willow wood and Scots pine. In addition, the preliminary analysis of the abandoned lithic tools (burins, retouched blades) suggests that they were used for engraving the limestone wall.

4. Discussion

Although Atxurra Cave has been vandalized over a long period of time; it has incredibly preserved a unique rock art ensemble formed by around one hundred animal engravings and an enormous amount of interior archaeological context remains. This discovery provides very relevant information about artistic activities on the Iberian side of the Pyrenees during the Upper Magdalenian, and about other palaeo-speleological incursions.

Firstly, the new study of the historic excavation area (1934–35) has verified the existence of a very long occupation sequence, from the early Gravettian to the Final Upper Magdalenian. In this way, it would be the longest Upper Palaeolithic occupation of the eight known to date in the basin of the River Lea.

Considering the current state of the research of the rock art, and without finishing the surveying work in some decorated areas, the ensemble located in the cave consists of engraved animal figures (and some painted in black), engraved non-figurative lines and some stains in red and black. Thematically, the ensemble is similar to other recent Magdalenian sites in Cantabrian Spain, the Pyrenees and Périgord region (Sauvet and Wlodarczyk, 2001), with a predominance of figures of bison and horses. However, the large number of ibex figures, at the same level as the other two principal themes, is noteworthy. This relates the site with two recent Magdalenian ensembles in the west of Cantabrian Spain: El Bosque (Fortea, 1996) and Covarón (Arias and Pérez, 1994), which include numerous ibex figures (in these cases painted in black), but also with Niaux (Clottes, 2010) and Trois-Frères (Bégouën and Breuil, 1956) in the Pyrenees, with tens of engraved and painted ibex figures.

Furthermore, Atxurra Cave contains some compositions found in other recent Magdalenian caves, like the slender hinds in a line (in the great panel in Sector J) (Fig. 9A and B), present in Sovilla (central Cantabrian Spain) (González Sáinz et al., 1993) (Fig. 9C) and Ker de Massat (central/eastern Pyrenean region) (Barrière, 1990) (Fig. 9D). In the latter cave, a large panel displays the same composition as Atxurra’s main panel in Sector J, relating both ensembles very closely: firstly, there are some hinds in line, surrounded by horses and hairy bison; all of them “presided” by an ibex composition (one of them in frontal view) in the central/upper zone.

The stylistic conventions in the animal figures allow their correlation with others located in different regional contexts (Rivero and Sauvet, 2014). The bison’s horns and legs perspective in two planes is usual in recent Magdalenian chronologies (ca. uncal 14,500–11,700 BP) in Cantabrian Spain, Pyrenees and Périgord region (Fortea et al., 2004). The horse figures also display some particular Recent Magdalenian conventions, like small lines representing the hair in the haunches, as in a portable figure from Linar Cave (Central Cantabrian Spain) (De las Heras et al., 2008) and one from El Polvorín Cave (Eastern Cantabrian Spain) (Ruiz Idarraga, 2009) or the ventral M quartering, representing different tones of the pelage (Vázquez, 2017). Other conventions seen in the animal figures in Atxurra are the indications of pelage and internal anatomical details, like ears, eyes, etc. Equally noteworthy is the abundance of “wounded” animals –with projectile-
like linear motives and/or inverted "V" motifs inside them -, especially bison (one with almost twenty projectiles in it), but also ibex. Similarly, the presence of animals in frontal view - two ibex and a deer - is relevant, as it is a convention with a very precise chronological attribution in portable art (Barandiaran Maestu et al., 2013; Rivero et al., 2014; Utrilla, 1987). Therefore, taken together, the figures display remarkable internal coherence that can be attributed, without reservation, to the final moments of the Upper Palaeolithic and in particular to the cultural period of the Upper Magdalenian (ca. uncal. 13,000–11,700 BP) (Fig. 10).

Technically, engraving is almost exclusive, in different variants -incised, scraped, etc.-, sometimes combined with black paint, very poorly preserved. In the larger animal figures, multiple engraved thin lines usually form the outline, and a single line represents internal anatomical details (ears, eyes, etc.). Besides, some figures have scraped zones to depict internal quartering, and some hind figures have striated zones in the head and chest zone. This last convection is usual in Cantabrian Lower Magdalenian figures (Utrilla, 1979), but also in other chronological contexts, as in our case (Fig. 9A) (Rivero et al., 2019b). In some parts of the cave, rubbing spots are observed in red, possibly related to prehistoric underground progression (Medina-Alcaide et al., 2018a) but in no case do they form figurative motifs. Finally, there are some depictions in black (without engraved lines), at least two horses and two bison, but much deteriorated (like all the painted motifs in the cave).

Axurrá Cave also conserves an exceptional inner archaeological context closely related to the rock art because of its location. The huge size of the ensemble (with more than 700 remains) provides significant information about the prehistoric activities that took place in the deep zones of the cave, particularly the artistic production, since flint tools used to make the engravings have been discovered. In addition, numerous remains are related to the illumination in the cave. The use of three different prehistoric lighting systems has been identified: wooden torches (scattered charcoal), a portable lamp and fixed fires. Juniper and oak wood was the main wood fuel collected for this activity. In the nearest regional context, these types of wood have been found in the deep zones of other caves with Palaeolithic rock art, such as Morgota Cave (Medina-Alcaide, 2015) or Ondaro (Ruiz-Alonso, 2018). The combination of oak and juniper wood is suitable for the lasting production of the flame. The former has a high caloric value and this produces long-term combustion. The latter intensifies the combustion due to its resin content, it is consumed slowly, and, unlike other conifers, it produces a small amount of smoke (Perlès, 1977). Both species were available in the immediate surroundings of Atxurrá Cave when the engravings were drawn (Iriarte, 2011, Uzquiano et al., 2016).

Fig. 9. A and B. Engraved hinds in the composition on the Ledge of the Horses (O. Rivero, D. Garate, I. Intxaurbe, S. Salazar). C. Engraved hinds in the main panel in Sovilla Cave (González Sáinz et al., 1993) D. Engraved hinds in one of the main panel in the cave of Ker de Massat (Barrière, 1990).
5. Conclusions

Although the study of Atxurra Cave has not concluded, it can be affirmed that it is one of the most important sanctuaries of engravings (in addition to some paintings in black and a few red stains) in eastern Cantabrian Spain, because of its size (with at least 113 animal figures, mostly bison, ibex, horses, but also some hinds, a deer, and a composite animal with features of reindeer and bear), its stylistic features, and the archaeological context associated with it.

Some of the depictions, especially the ibex and the deer in frontal view, indicate a chronology in the Upper Magdalenian for this synchronous ensemble, contemporaneous with a level found in the habitat site at the entrance, and the ephemeral occupation of Armiña (interpreted as an inner archaeological context). This convention (animals in frontal view) links this rock art ensemble with others located above all in Cantabrian Spain, but also in the Pyrenees and Périgord region.

The location of most of the art is peculiar, because of its difficult access. Some areas are almost 2 m over the path (the ledges), small areas (very narrow galleries) and zones elevated in very high parts of the cave (e.g. Alcove of the Claw Marks). This demonstrated the ability of Palaeolithic groups to enter deep inside the caves and it indicates the criteria of selection of decorated spaces at that time (in the case of Atxurra, they chose the most complicated areas, which challenges some traditional rock art models).

Despite the frequentation of the cave and vandalism (especially the large graffiti on all the walls), the cave has preserved some zones with a large number of archaeological remains on the floor, because of their location (on high platforms, above the most usual path). Over 700 archaeological remains consist mostly of scattered charcoal fragments, but also lithic industry in flint, fixed fire remains, a sandstone lamp, and probable anatomical prints in the patinated clay. These provide valuable information about the illumination or the objects used to make the art.

All in all, Atxurra provides an excellent opportunity for the study of Upper Palaeolithic art, and especially to investigate the activities of Upper Magdalenian societies not related with daily subsistence, like the exploration and frequentation of difficult and dangerous zones in a cave, and the production of a large ensemble of rock art inside.

Acknowledgements

The authors wish to thank the Cultural Heritage Service of the Diputación Foral de Bizkaia for funding the four-year multidisciplinary study project (2016–2020) “Study of rock art in Atxurra Cave” directed by Dr Diego Garate. The present study has been carried out within the framework of this project. We would also like to thank the University of Xián Jiantong for analyzing and carrying out the dating of the uranium series of samples, as well as Gim-Geomatics for the 3D model of the cave and the following researchers have collaborated in fieldworks: M. Cobo, J. Cobos, I. de la Fuente, S. Gálvez, M. García-Bustos, P. García-Bustos, X. Gezuraga, A. Mateo, J. Moreno, R.M. Ruiz, J. Tapia, A.J. Torres and J. Vizcaíno. In addition, some results in this paper have been partially funded by the research project of the Spanish Ministry “Learning and developing of artistic skills in anatomically modern humans: a multidisciplinary approach” HAR2017-87739-P, led by Olivia Rivero.

References


