TRABAJOS DE PREHISTORIA
75, N.º 1, enero-junio 2018, pp. 146-154, ISSN: 0082-5638
https://doi.org/10.3989/tp.2018.12208

More than horse paintings in Ekain Cave (Deba, Gipuzkoa): Palaeolithic digital engravings in Western Europe

Más que pinturas de caballos en la Cueva de Ekain (Deba, Gipuzkoa): los grabados digitales paleolíticos en Europa Occidental

Blanca Ochoa[a,b], Irene Vigiola-Toña[b], Marcos García-Diez[b,c] y Daniel Garrido-Pimentel[d]

ABSTRACT

Technological advances are enabling the discovery of new caves with rock art and of new graphic units in already known and studied caves. In this framework, a discovery was made in an unexplored gallery in Ekain (Deba, Gipuzkoa), a small passage named La Fontana. Figurative representations (horses) and non-figurative marks (simple strokes) were traced on both walls using digital engraving on decalcified clay. This discovery prompted the re-study of depictions executed with the same technique in the final part of Azkenzaldei gallery, where a new ensemble of representations, mostly non-figurative, was also found. Since it is impossible to date these representations directly, we apply a stylistic analysis to establish their chronology. The comparison with other depictions in the same cave might point towards their execution during advanced phases of the Magdalenian.

RESUMEN

Los avances tecnológicos están permitiendo descubrimientos de cavidades con arte rupestre y de grafías en cuevas ya estudiadas. En este marco se produjo el descubrimiento de una nueva galería en la cueva de Ekain, un conducto de reducidas dimensiones denominado La Fontana. En ambas paredes se documentan caballos y trazos simples ejecutados en trazo digital sobre arcilla. Este descubrimiento motivó el reestudio de figuras ejecutadas con la misma técnica en la galería de Azkenzaldei, donde se localizó un nuevo conjunto de representaciones. En cuanto a la cronología, la imposibilidad de datar directamente las representaciones llevó a aplicar el análisis estilístico. La comparación con figuras de la misma cavidad apunta a que se tratan de grabados ejecutados en fases avanzadas del Magdaleniense.

Key words: Palaeolithic cave art; Basque Country; Upper Palaeolithic; Magdalenian; Digital engravings.

Palabras clave: *Arte parietal paleolítico; País Vasco; Paleolítico superior; Magdaleniense; Grabados digitales.*

1. INTRODUCTION

In recent years, powerful portable lights and new photographic techniques have enabled the discovery of new caves with graphic representations and new depictions in known ensembles. This is contributing towards a more profound understanding of the ensembles, in which not only the more visible figures are identified, but also others that, despite being less "striking" in their appearance, are able to increase our knowledge of Palaeolithic iconographic ensembles.

* This study was financed by the Prehistory Research Group at the Universidad del País Vasco/ Euskal Herriko Unibertsitatea UPV/EHU (IT-622-13) funded by the Basque Government. Some of the co-authors of the study (IVT and BO) have received scholarships from the Basque Government: IVT a Programa Predoctoral grant and BO a Postdoctoral fellowship.

[a] Dept. of Archaeology. Durham University. South Road. Durham, DH1 3LE. United Kingdom.
E-mail: blanca.ochoa@ehu.eus https://orcid.org/0000-0002-8180-0135

[b] Dept. of Geography, Prehistory and Archaeology. University of the Basque Country (UPV-EHU). C/ Tomás y Valiente s/n. 01006 Vitoria. Spain. https://orcid.org/0000-0002-2952-660X

[c] Facultad de Humanidades y Ciencias Sociales, Universidad Isabel I. C/ Fernán González 76. 09003 Burgos. Spain. https://orcid.org/0000-0001-7923-5280

[d] Cuevas Prehistóricas de Cantabria. Sociedad Regional de Educación, Cultura y Deporte. Gobierno de Cantabria. Carretera de las Cuevas. 39670 Puente Viesgo. Cantabria. Spain. https://orcid.org/0000-0002-4931-3548

Recibido 19-V-2017; aceptado 7-X-2017.

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These new discoveries are able to generate new perspectives, such as the possibility of defining the graphic variability of an ensemble or even of a panel, with new elements for a definition of synchronic variability and the different levels of access, perception and use of the figures (García-Diez *et al.* 2016; Ochoa 2017). These analyses may involve greater complexity in the interpretation of rock art, in terms of both chronological definition and social value.

The discovery of a passage in Ekain in the course of the "Ekain Second Canvas" project took place within this context. The new digital engravings found in the final part of Ekain are presented, their significance is discussed as complementary to the art already known, and a preliminary assessment is made of digital engravings in Palaeolithic art.

2. EKAIN: NEW DISCOVERIES

Ekain (Deba, Gipuzkoa), designated as World Heritage by UNESCO in 2008, is one of the best-known rock art sites in northern Spain (Fig. 1). Associated with final phases of the Magdalenian, it exhibits one of the most attractive groups of paintings from the technical and thematic points of view: the panel of horse figures in Zaldei passage. However, there are also numerous fine engravings, more simple drawings and a series of digital engravings in decalcified clay, some of which have been known since the cave was discovered and have been published (Barandiarán and Altuna 1969; Barandiarán 1974; Altuna and Apellániz 1978; Altuna 1997; Altuna and Mariezkurrena 2008). Other digital engravings were recently found in a small passage. This paper presents these new engravings and contextualises those already known in the light of new methodologies.

The work in the cave and the laboratory followed the guidelines proposed by García-Diez and Ochoa (2013). Due to the state of conservation of the graphic units, the nature of the wall and the technique used, in some cases it was not possible to determine for certain whether some lines or grooves are natural or artificial.

3. DESCRIPTION OF THE GRAPHIC UNITS: NEW FINDS AND INTERPRETATION

3.1. Location

The ensemble that has been studied is located in the final part of Ekain, in the innermost part of the passage called Azkenzaldei and in a new side-passage known as La Fontana (Fig. 1). Azkenzaldei is divided into two sectors by large boulders. The first sector contains a series of horses painted in a row (Barandiarán and Altuna 1969: 85), while the second sector is 15 m long to the end of the cave. Altuna and Apellániz (1978: 100-102) had described some figures in this last sector. These have been re-studied, and some new graphic units have been located after surveying all the walls.

La Fontana is a side-passage to the west of the second sector in Azkenzaldei, where no graphic units had been found previously. It is reached after some boulders and to the left of the panel of engravings that were already known. It is a low passage at its start (about 1.1 m) and about 1.2 m wide. It is approximately 4.7 m long and slowly rises over its length. The passage gradually increases in height to 1.8 m at the point where the first engravings are found. The width, however, remains constant along the whole passage. At the end of the passage, where the graphic units are located, the passage reaches a height of 2.6 m. A steep ramp leads off, and ends after about 7 m (Fig. 1).

Altuna and Mariezkurrena informed that, while this part of the cave was being mapped, it was given the name "La Fontana" because of the water that sometimes poured from the passage towards Azkenzaldei. The find of the new engravings was probably due to the relative dryness of the cave walls at the time of the fieldwork.

3.2. Description

3.2.1. Topographic unit: La Fontana

The graphic units are located in two panels opposite each other, in the middle of the passage, just before the start of the steep ramp.

Panel 1: it is on the right-hand wall of the passage. This is a vertical wall, with a generally concave surface, covered by decalcified clay. Five graphic units have been identified (Fig. 2A), for which the technique used was digital engraving with a U-shaped cross-section. Preservation is good in general.

Graphic Unit 1 (Fig. 3A): 2.7 m from the start of the passage and 136 cm above the floor. It represents a horse, formed by its chest, jaw, forehead, ears, mane, start of the cervical-dorsal line and a foreleg. The chest is represented by a double line. The mane was drawn with short parallel vertical lines. The perspective is oblique biangular. It faces left and the level angle is 90º. In total, it is 54 cm high and 53 cm long.

Graphic Unit 2: in contact with the previous graphic unit, on the right-hand wall and 139 cm above the floor. It consists of a curved line with a maximum height of 23 cm and width of 1.5 cm. In terms of the graphic process, it underlies Graphic Unit 1.

Graphic Unit 3 (Fig. 3B): it is located immediately to the left of the previous unit, 70 cm from Graphic Unit 1, on the right-hand wall and 151 cm above the

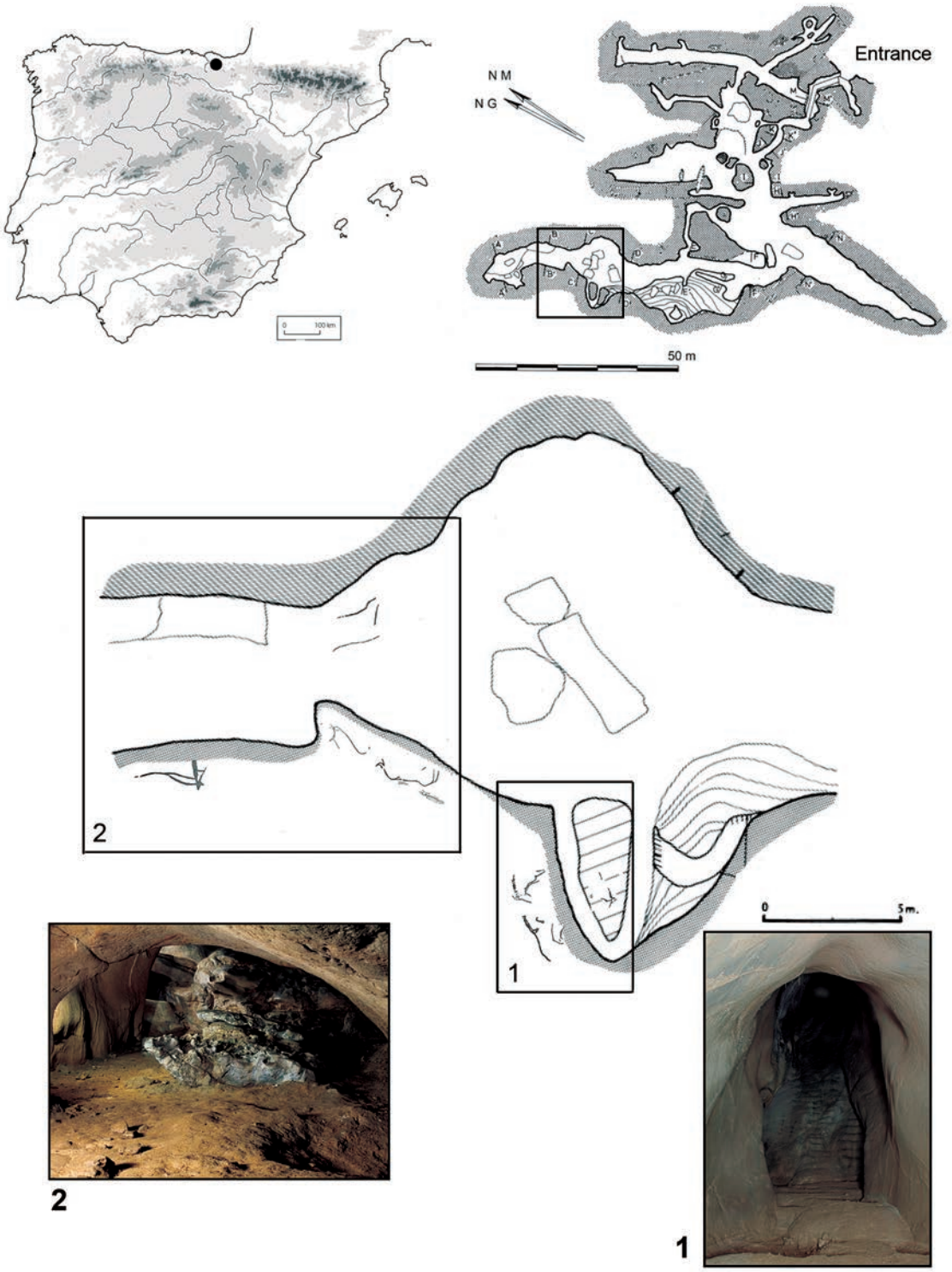

Fig. 1. Ekain: map with the location, topography showing the location of the two studied areas —La Fontana and Azkenzaldei (modified from Altuna and Apellaniz 1978)— and detail of the topography with the placement of the figurative depictions in La Fontana (1) and Azkenzaldei (2) with pictures of the galleries (in colour in the electronic version).

Fig. 2. Composition of Panel 1 (A) of La Fontana and Panel 1 (B) of Azkenzaldei (Fig. 1, numbers 1 and 2 respectively).

floor. It represents a horse, formed by its chest, start of the jaw, ears, mane, cervical-dorsal line and croup. It has a V-shaped internal division at its withers; the three lines representing the mane were drawn from top to bottom. The perspective of representation is oblique biangular. It faces right and the level angle is 90º. It is 24 cm high and 60 cm wide.

Graphic Unit 4 (Fig. 3C): below and 40 cm to the left of the previous unit, on the right-hand wall, 128 cm above the floor. It represents a possible horse, consisting of its chest, start of the jaw, forehead, cervical-dorsal line and foreleg. It is in absolute profile. It faces left with a level angle of 110º. It is 26 cm high and 26 cm wide.

Graphic Unit 5: below and 14 cm to the left of the previous unit, on the right-hand wall and 103 cm above the floor. This linear representation consists of three curved lines. In total, it is 13 cm high and 6.5 cm wide.

Panel 2: this consists of two graphic units on the left-hand wall of the passage, executed by simple digital engraving. The wall is vertical with a decalcified clay surface. The state of conservation is deficient due to its having been rubbed against recently.

Graphic Unit 6: located opposite Unit 5 in Panel 1 and 122 cm above the floor. It consists of a straight line, in total 18 cm high and 1 cm wide.

Graphic Unit 7 (Fig. 3D): located 55 cm to the left from the previous unit, on the left-hand wall and 139 cm above the floor. It represents a horse, formed by its chest, start of the jaw, forehead, ears, mane, croup and foreleg. It faces right with a level angle of 90º. The perspective of representation is straight biangular. In total, it measures 38 cm high and 55 cm wide.

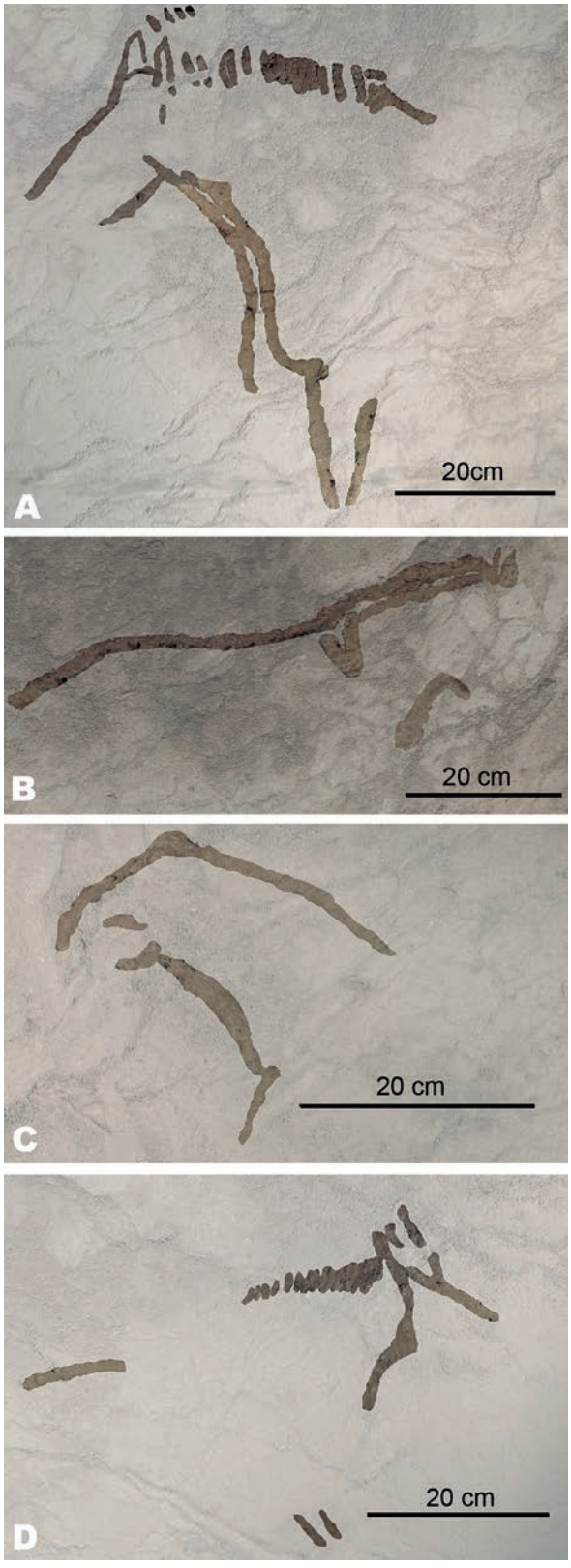

Fig. 3. Figurative depictions of La Fontana (Fig. 1 number 1): Graphic Unit 1 (A), Graphic Unit 3 (B), Graphic Unit 4 (C), Graphic Unit 7 (D).

3.2.2. Topographic unit: Azkenzaldei (second sector)

Panels 1 and 2 are located on the west (Panel 1) and east walls (Panel 2) of the cave passage, as far as a bend in the wall (Fig. 1). Six graphic units are found in barely four metres of wall. The decalcified clay surface is concave and vertical, apart from in the case of Graphic Unit 8 and the two units on the east wall (Graphic Units 12 and 13), which are situated on the transition to the cave roof. Panel 1 corresponds to Group V.63-64 as published by J. M. Barandiarán and J. Altuna (1969: 378) and mentioned in subsequent publications with the same catalogue number (Altuna and Apellániz 1978; Altuna 1997). The state of conservation is deficient due to its having been rubbed against recently. The technique used in all graphic units is simple digital engraving with a U-shaped cross-section (Panel 1, Fig. 2B)

Graphic Unit 8 (Fig. 4A): located 3.65 m from the start of the passage and 175 cm above the floor. It is a linear representation consisting of four lines that tend to a sinuous form. The lines are parallel and discontinuous on the right. The height of the Graphic Unit is 16 cm and the width is 105 cm.

Graphic Unit 9 (Fig. 4D): located below and to the right of the previous unit and 146 cm above the floor. It was previously classified as a possible rhinoceros. (Altuna and Apellániz 1978; Altuna 1997).

This zoomorphic figure is possibly a bison, formed by its forehead, horns, hump, cervical-dorsal line, croup, tail, rump and groin. It faces right with a level angle of 90º. The perspective of representation is uniangular. In total, it is 48 cm high and 106 cm long.

Graphic Unit 10 (Fig. 4B): 100 cm to the right of the previous unit and 137 cm above the floor. It was previously classified as a possible rhinoceros (Altuna and Apellániz 1978; Altuna 1997).

This zoomorphic figure is a cervid, possibly a stag represented by its forehead, antlers (lower tines, main beam and crown tine), cervical-dorsal line, croup and rump. The perspective of representation is oblique biangular. It faces right with a level angle of 120º. It is 45 cm high and 98 cm long.

Graphic Unit 11: 60 cm to the right of the previous unit and 122 cm above the floor. This is a curved linear representation, 12 cm high and 5 cm wide.

Panel 2**:** located opposite the previous panel. The clay wall is sub-vertical and the surface is sinuous and rough, with irregularities. The state of conservation is deficient due to recent finger marks and to parts of the clay surface breaking off. The two graphic units were executed by simple digital engraving; the groove has a U-shaped cross-section. They were previously identified by J. Altuna and J. M. Apellániz (1978: 102, V.64 bis) and mentioned in a later publication with the same catalogue number (Altuna 1997), when it was classified as an engraved line.

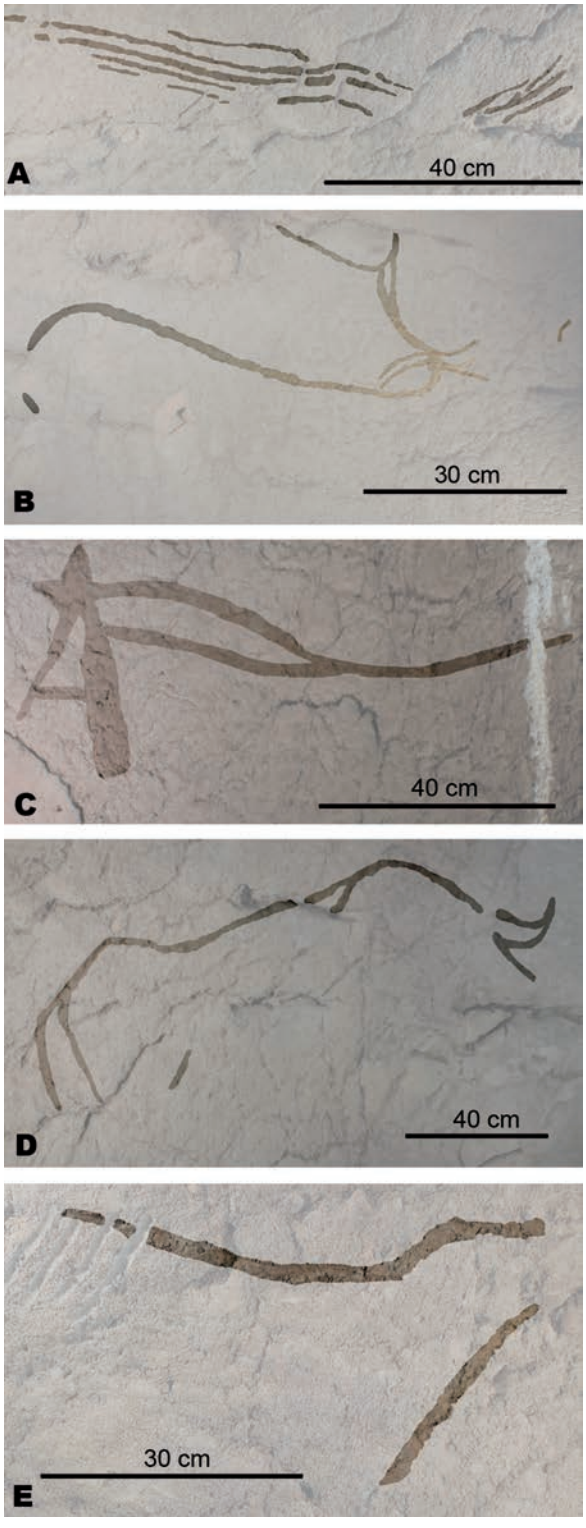

Fig. 4. Figurative depictions of Azkenzaldei (Fig. 1 number 2): Graphic Unit 8 (A), Graphic Unit 9 (D), Graphic Unit 10 (B), Graphic Unit 12 (E), Graphic Unit 18 (C).

Graphic Unit 12 (Fig. 4E): located opposite Graphic Unit 2 in Sector II, 167 cm above the floor. This zoomorphic figure is possibly a horse, formed by its chest, cervical-dorsal line, withers, back, and start of the croup. It is represented in absolute profile. It is 33 cm high and 55 cm long.

Graphic Unit 13: 25 cm below the previous unit, 152 cm above the floor. This line possibly represents a sinuous cervical-dorsal line. The total length of the line is 74 cm.

After a bend in the wall where Panel 1 is placed, a hollow contains Panel 3, and after this, a more or less straight wall displays a further three panels. The technique used in all of the panels was simple digital engraving.

Panel 3: the clay wall is sub-vertical and vertical, with a flat, rough surface. Its preservation is deficient due to its having been rubbed against recently.

Graphic Unit 14: located on the bend in the wall, above and 105 cm to the right of Graphic Unit 11, 183 cm above the floor. This is a curved linear representation, 30 cm high and 16 cm wide.

Graphic Unit 15: 70 cm below and to the right of the previous unit, 137 cm above the floor. This curved linear representation is 9 cm high and 38 cm wide.

Panel 4, Graphic Unit 16: 300 cm to the right of the previous unit and 143 cm above the floor. The clay wall is vertical with a slightly convex rough surface. The state of conservation is good. This is a sinuous linear representation, 3.2 cm high and 15 cm wide.

Panel 5, Graphic Unit 17: 135 cm to the right and slightly higher than the previous unit, 145 cm above the floor. The clay wall is vertical, with a convex rough surface. The state of conservation is good. This sinuous linear representation is 2.5 high and 18 cm wide.

Panel 6, Graphic Unit 18 (Fig. 4C): 190 cm to the right of the previous unit and 155 cm above the floor. The clay wall is vertical with a sinuous rough surface. The state of conservation is good. This zoomorphic figure is possibly a horse formed by its forehead, ears, mane and start of the cervical-dorsal line. The perspective of representation is straight biangular and it faces towards the left. An area has been rubbed in the jaw area. The horse is 34.5 cm high and 86 cm long.

3.3. Assessment

The engravings drawn on decalcified clay are located in two different areas: in the Azkenzaldei and La Fontana passages, in the final part of the cave. A total of 18 graphic units have been documented (13 are new discoveries). The technique used was digital engraving in decalcified clay. The grooves display a U-shaped cross-section, which is quite marked in some cases and less clear in others.

The figures in La Fontana are characterised by: a) manes drawn with small lines (*hachures*) in Units 1 and 3, creating a double mane; b) incomplete figures, in three cases limited to the fore-quarters and in one case to the upper half of the body; and c) open muzzle in the cases where the head was represented. They also display some morpho-stylistic particularities: a) in Graphic Unit 1, the chest is modulated, and represented with two lines; b) in Graphic Units 1 and 4, the intersection between chest and foreleg is modulated; c) the jaw is enlarged in Unit 7, and d) Unit 3 displays a triangular shape at its withers creating a quartering (Fig. 2A).

The graphic units drawn on decalcified clay in the second sector of the passage are characterised by being incomplete, in all cases limited to the upper part of the body. As different species are represented, stylistic comparisons are difficult, but they all display modulated lines and the correct position of the limbs. The bison is characterised by its pronounced hump, with a dividing line at the end, two superimposed horns in uniangular perspective, and a slightly raised tail. The stag has a modulated cervical-dorsal line, and antlers in which the lower tines, main beam and upper tines are represented. The most complete horse in Azkenzaldei displays very similar characteristics to those of the horses in La Fontana: double mane (although drawn with single lines) and very similar ears to those in Graphic Units 1 and 3. Additionally, the jaw is enlarged, as in Graphic Unit 7.

No numerical dates have been obtained to determine the age of these representations. In addition, the figures are incomplete, which hinders the formal-stylistic analysis. In an internal comparison, bearing in mind the whole iconographic ensemble in the cave, the figures display very similar conventions to those represented in other passages, especially in the case of the horses, whose internal dividing lines and manes greatly resemble many of the examples in Zaldei passage. The bison, previously interpreted as a rhinoceros, is also similar to other bison in the cave as regards the modulated cervical-dorsal line and prominent hump.

In sum, for the groups of figurative digital engravings in Azkenzaldei and La Fontana passages, it can be said that some of them display the same stylistic conventions as other graphic units in Ekain.

4. A VIEW OF PALAEOLITHIC DIGITAL ENGRAVINGS

As it is impossible to date the representations engraved with a finger in decalcified clay owing to the absence of organic matter and overlying calcite growth, their chronology must be approached by comparing them with the rest of the ensemble. In accordance with

the main characteristics of these motifs in Ekain, a detailed comparative analysis should include the study of other digital engravings in order to seek similarities in the technique, but also to investigate other criteria, such as the type of representation, format, etc.

Digital engravings tend to be formed by grooves with a U-shaped cross-section, generally of the same width as the finger used to produce them and as deep as allowed by the plasticity, relative hardness and thickness of the clay layer and the pressure applied (GRAPP 1993; Bougard 2010). The consistency of the surface impedes the application of colouring matter, and therefore both techniques are rarely combined. In general, the pigment would not adhere to the surface and, if it did, the clay would dull the pigment and significantly reduce the brightness of the colour.

The geographic distribution of the use of this technique in Palaeolithic figurative motifs is quite wide: it covers an area from northern Spain and the Pyrenees to southwest France, where most of the figurative and non-figurative examples are found, and it also extends to the east of France and the southern Iberian Peninsula (Fig. 5).

In southern Iberia, this technique has only been documented in Ardales Cave, where all such depictions have been classified in a pre-Magdalenian phase (Cantalejo 2006). In northern Spain, corresponding to the same chronology, it has been cited in four caves: Quintanal, Hornos de la Peña, La Clotilde and Altamira (Cartailhac and Breuil 1906; Alcalde del Río, Breuil and Sierra 1911; Ripoll 1957; ACDPS 2010), where ten graphic units were drawn. In the same geographic area, but attributed on stylistic criteria to the Magdalenian, it is known in another four caves: Ekain, Covaciella, Las Chimeneas and El Bosque (González-Echegaray 1974; García-Diez *et al.* 2015; Ochoa 2017).

In France, five caves display figurative engravings dated in pre-Magdalenian periods: Pech Merle, Chauvet, Vacheresse, Ker de Massat, Gargas and Bara-Bahau (Barrière 1976; Leroi-Gourhan 1984; Barrière 1990; Clottes 2010; Lorblanchet 2010). Finally, digital engravings have been attributed to the Magdalenian at eight sites: Tuc d'Audoubert, Ker de Massat, Rouffignac, Bedeilhac, Montespan, Erberua, Oxocelhaya and Etxeberri (Barriere 1982, 1990; Laplace *et al.* 1984; Laplace and Larribau 1984; Larribau and Prudhomme 1984; Leroi-Gourhan 1984; Begoüen *et al.* 2009; Bougard 2010).

Over 240 figurative graphic units have been documented in 22 caves distributed across the Iberian Peninsula and the south of France. Most sites display between one and five digital engravings, and very few possess between five and fifty, while only Rouffignac has over fifty figures drawn with this technique. In this preliminary analysis, 83.3% of the engravings are drawn with a single line. In contrast, 15.7% of the engravings combine the digital engraved lines (single and multiple) with incised lines and sometimes with black paint. The range of complementary techniques is especially noticeable in the French ensembles.

A wide variety is seen in the choice of subject matter, with the most numerous animals being mam-

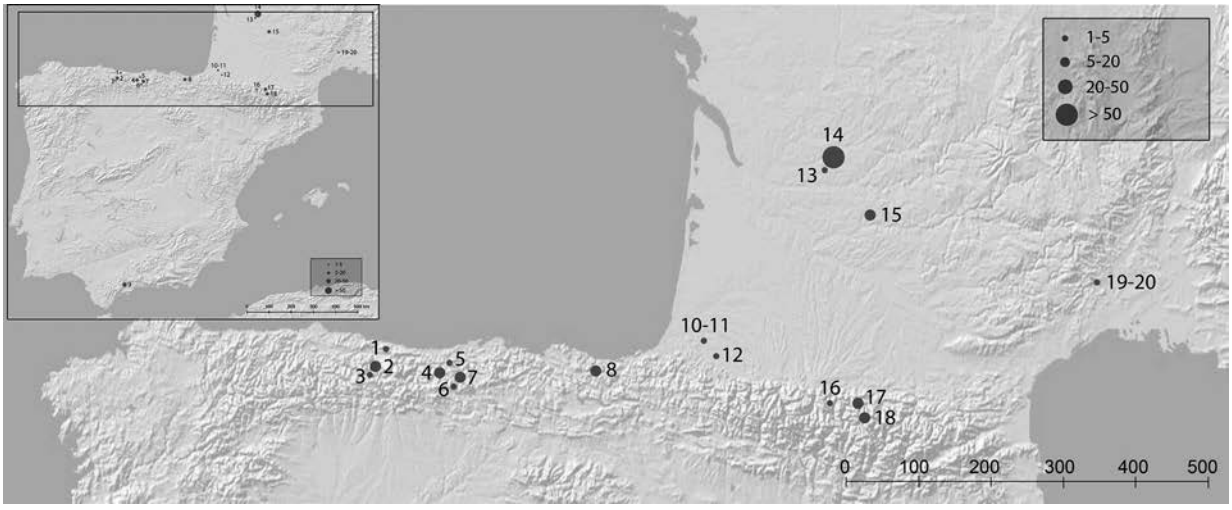

Fig. 5. Distribution of caves with figurative digital engravings in the Iberian Peninsula and Southwest France: 1. Quintanal, 2. Covaciella, 3. Bosque, 4. Clotilde, 5. Altamira, 6. Hornos de la Peña, 7. Chimeneas, El Castillo, 8. Ekain, 9. Ardales, 10. Oxocelhaya, 11. Erberua, 12. Etxeberriko Karbia, 13. Bara-Bahau, 14. Rouffignac, 15. Pech-Merle, 16. Montespan, Gargas, 17. Tuc d'Audoubert, 18. Ker-de-Massat, 19. Chauvet, 20. Vacheresse. The size of the dot indicates the number of graphic units per cave.

moths, cervids, bovines, horses and caprids. In their spatial distribution, in southern Spain only cervids are known; in northern Spain, bovines, ibex and horses are most numerous; while in France, mammoths, horses, bison and rhinoceroses are the most frequent motifs. Most of the animals (75%) are represented incomplete.

The corpus of digital engravings shows that in most cases, this technique was used to produce non-figurative depictions, which are often poorly defined and difficult to interpret. One of the most frequent designs consists of very intricate sinuous and curved lines, usually produced with the movement of several fingers at the same time, which have been called *macaroni* or finger tracings/flutings (Breuil 1952; Bednarik 1986; Sharpe and Van Gelder 2006). These non-figurative engravings sometimes form isolated groups and in other cases are clearly associated with Upper Palaeolithic motifs attributed to different periods. In general, they therefore tend to be assigned, *a priori*, to different chronological phases.

The wide, formally undefined nature of the finger-engraved lines means that in most cases few details of animal anatomy are represented, which implies that the figures tend not to be naturalistic and are classified as simple compositions. This has resulted in ensembles being assigned to significantly different chronologies. Chronological attribution is also hindered by difficulties in comparing the same subject matter represented with different techniques: engraving with a finger or with incision, or even black or red paintings. The characteristics of the groove or line itself often condition the formal and stylistic interpretation.

Figurative graphic units represented with the finger-engraving technique mostly seem to use the stylistic conventions and characteristic subject matter of the period or geographic area in which they were produced. As other techniques were often used in the same site, as in the case of Ekain, this suggests that the particular use of this technique would be determined by the characteristics of the surface to which they had to adapt in order to produce the graphic units in the place chosen by the artists or with the conventions of a group at a certain time.

CONCLUSIONS

Digital engraving was not an especially frequent technique in Palaeolithic art, although both linear motifs and animals were represented. The particularities of the lines produced sometimes conditions the stylistic perception of the figurative motifs and also therefore their association with other painted or incised graphic units.

In the case of the new engravings in Ekain, however, formal and stylistic elements allow them to be linked with paintings in the same cave. Therefore, the engravings in Azkenzaldei and La Fontana can be considered another part of the iconographic ensemble of the human groups who painted and engraved at least the most important panels in the cave. In this case study, stylistically similar motifs represented with various technical procedures are distributed in different parts of the cave. This may imply that the different techniques do not necessarily signify an element of chronological divergence.

The compilation of figurative representations on decalcified clay does not appear to indicate, according to the attributions proposed and in the absence of numerical dates, that digital engraving was a technique restricted to a particular period in the Upper Palaeolithic. These attributions will be gradually verified. In the cases of sites in which digital engravings co-exist with figures produced with other technical procedures, it will be necessary to assess formal and stylistic affinities in order to establish the possible degree of temporal synchrony and define their complementary nature. It is possible that the digital technique was a graphic procedure in cases in which a clay surface did not allow the application of pigments. However, this should not be taken as the only explanation, as in other cases it seems that digital engraving was the intentional and premeditated technique and may even have resulted in a chromatic effect through a contrast in colour between the clay surface and the groove. This effect would have been more noticeable at the time of engraving the figure.

ACKNOWLEDGEMENTS

The study was carried out with the authorisation of the Diputación de Gipuzkoa and with access granted by the Cultural Heritage Centre of the Basque Government. The authors would like to thank A. Llamosas and C. Olaetxea for their availability. They are also grateful to J. Altuna and K. Mariezkurrena for information about the name of La Fontana passage and their observations about the interpretation of the graphic units in Azkenzaldei.

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