



KEYWORDS: *Palaeolithic – Neolithic – Palaeoart – Rock painting – Chronology – Spain*

## CHRONOCULTURAL PROPOSAL FOR THE ATLANTERRA CAVE (CADIZ, SPAIN)

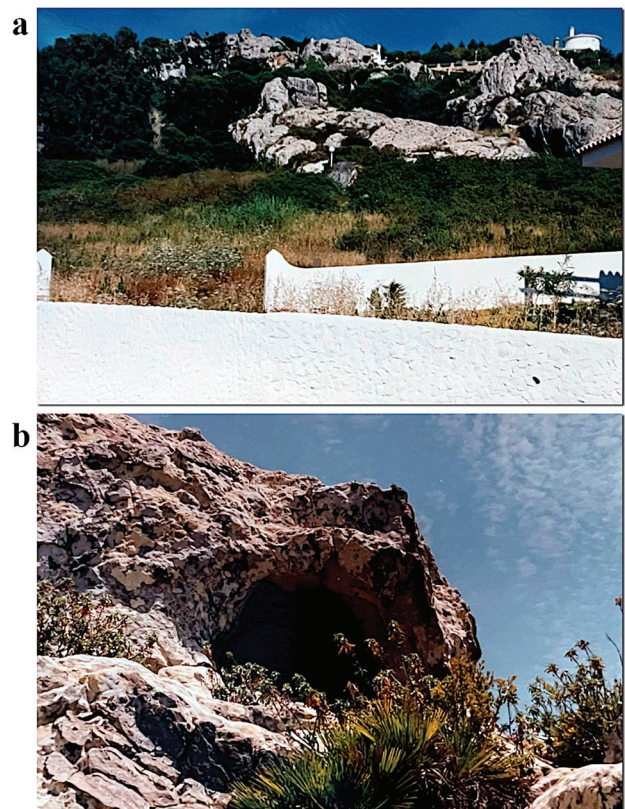
Hugo de Lara López, Martí Mas Cornellà and Mónica Solís Delgado

**Abstract.** The study we carried out in the Atlanterra Cave (Cadiz, Spain) has allowed us to analyse its graphic repertoire's typologies, styles, techniques, and subjects and establish parallels with other cave sites related to and unrelated to its surrounding area. This was achieved through the use of Adobe Photoshop and the plugin DStretch, two digital tools that have been the key to overcoming issues such as the fading of motifs, darkening or irregularities on the rock surface, and superimpositions and infrapositions. Based on these analyses, we have identified three phases: Palaeolithic, early post-Palaeolithic and post-Palaeolithic of typical schematic art.

### 1. Introduction

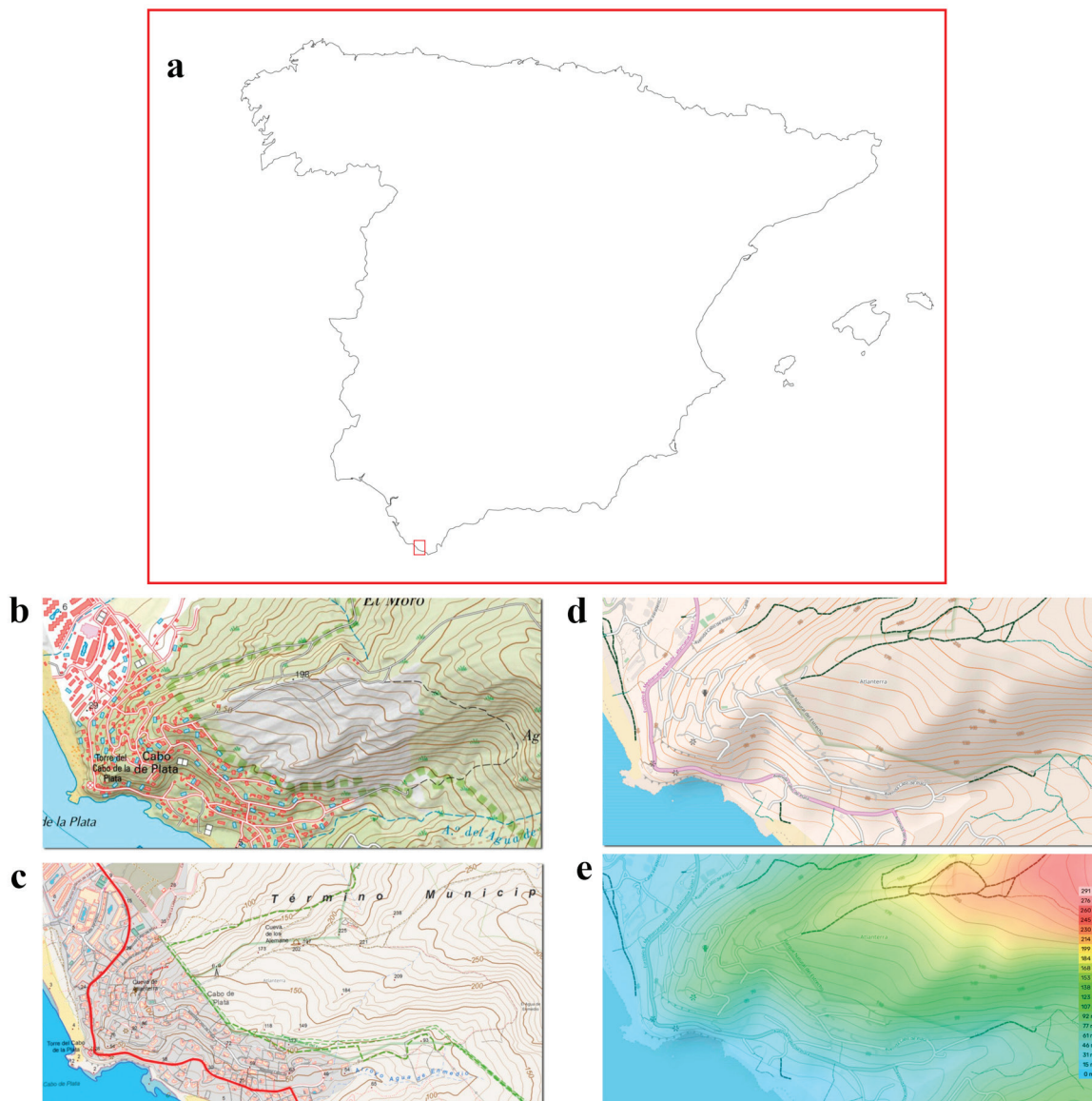
Up until this day, the Atlanterra Cave (Fig. 1) has had a very limited historiography (Zahara de los Atunes, Tarifa, Cadiz, Spain). Since its inception (Topper 1975; Topper and Topper 1988), researchers who have studied the historiography of the cave have focused on both the elements of its graphic repertoire and the vandalism threats it faces (Bergmann 2009). We must not forget, moreover, the existence of punctual and more ambitious works (Fernández 2020–2021, 2022) (Fig. 2). This historiography has primarily comprised minor publications focused on specific aspects of the cave site that have not developed a comprehensive analysis that would address its great complexity. Our monographic study of this cave, based on previous fieldwork (Mas 2002), has revealed unprecedented data that are crucial for understanding not only its graphic repertoire but also the different contexts in which human groups have interacted with the site over time.

One of the main focuses of our study has been the chronocultural proposal that we have developed, which reformulates and deepens the pre-existing knowledge of the cave. The proposal is based on the detailed study of the characteristics of the typologies, styles, techniques, subjects, superimpositions, infrapositions and parallels of the entire graphic repertoire observed in the cave. As a result, we have identified and defined three differentiated phases that contextualise the cave site in a way that had not been possible to confirm until now. These phases not only allow us to understand the sequence of the paintings but also offer a new and unusual perspective that transcends the considerations that had been suggested about this cave site for decades.



**Figure 1.** Original photos of one of the field campaigns directed by Martí Mas Cornellà (Mas 1994). a) Overview of the area around the Atlanterra Cave (in the background). b) Outside view of the Atlanterra Cave without its current barriers.

It should also be noted that our work has allowed us to establish solid connections between the Atlanterra Cave and other archaeological sites on both sides of



**Figure 2.** a) Location of the Atlanterra Cave (Free Vector Maps). b) Topographic representation of the environment where the Atlanterra Cave is located (leaflet, Open Street Map and IGN). c) Topographic survey of the Atlanterra Cave area (leaflet, Open Street Map and Instituto de Estadística y Cartografía de Andalucía (IECA). d) Topographic map of the Atlanterra Cave area (TessaDEM, Open Street Map and CyclOSM). e) Topographic view of the area around the Atlanterra Cave (TessaDEM, Open Street Map and CyclOSM).

the Strait of Gibraltar, which reinforces the importance of this cave site in the Strait (Ramos 2012; Raissouni et al. 2015; Fernández et al. 2019; De Lara 2025).

## 2. Methodology

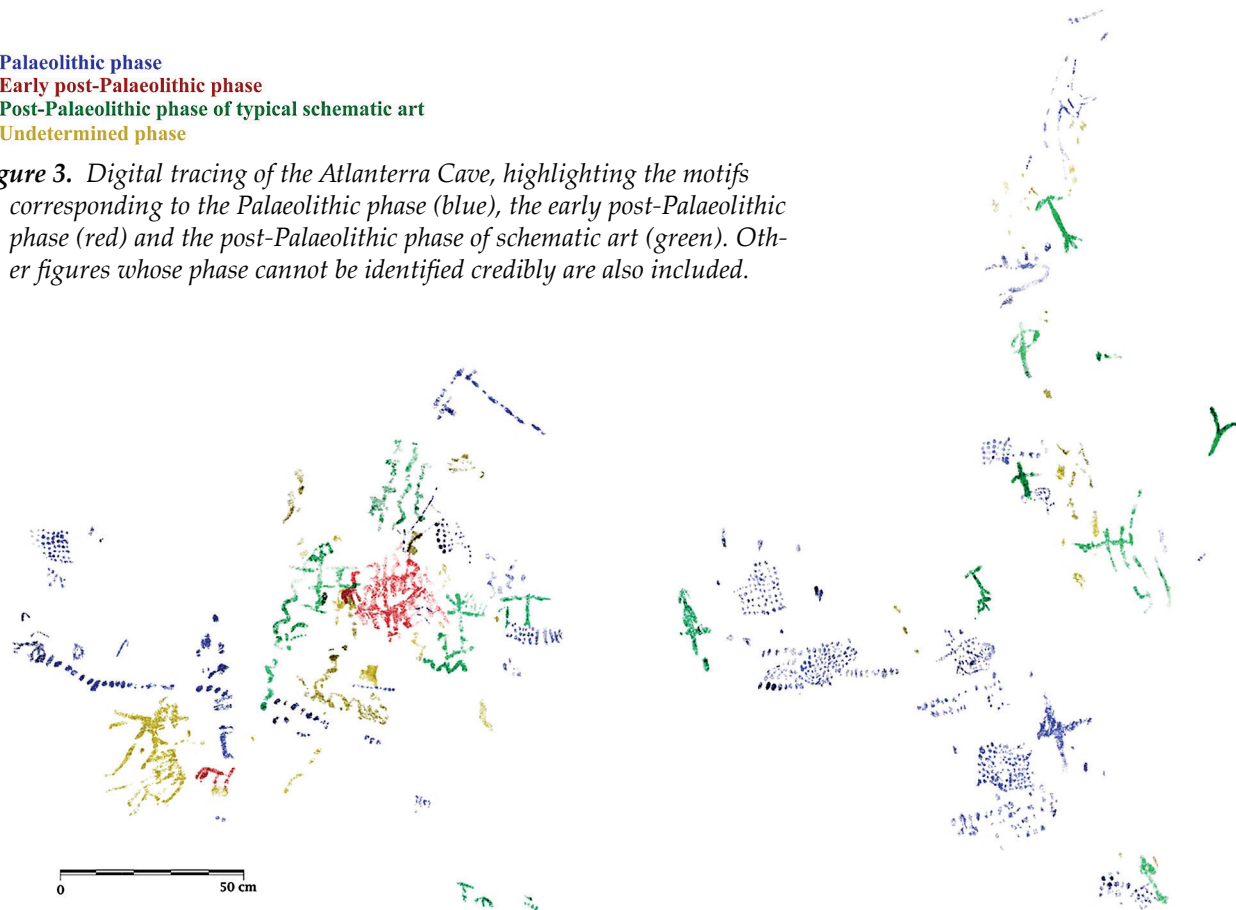
The elaboration of our chronocultural proposal for the Atlanterra Cave is based on an exhaustive analysis of the typologies, styles, techniques, subjects, superimpositions and infrapositions we found in its paintings, from which we have established formal parallels with other archaeological sites, both in the same area and on the neighbouring shore of the Strait of Gibraltar. Our work has allowed us to classify the motifs of the Atlanterra Cave into three different phases: Palaeolithic, early post-Palaeolithic and post-Palaeolithic phases of typical schematic art (Figs 3 and 4). Although

we can not deny there is a certain subjectivity in our classification, especially in the case of dot motifs, we have tried to minimise potential incidences by carrying out an exhaustive analysis of the patinas, comparing these motifs with nearby figures of the same or similar tonality in specific areas of the site, and considering differential erosion. Simultaneously, we have carefully studied the superimpositions, infrapositions and topological parallels with other cave sites.

The use of advanced digital tools, such as Adobe Photoshop and DStretch (Harman 2015), a plugin to ImageJ, has been essential to carrying out this study. They have assisted in the identification and delimitation of motifs, especially in a context marked by fading, darkening, irregularities on the rock surface, complex superimpositions and infrapositions.

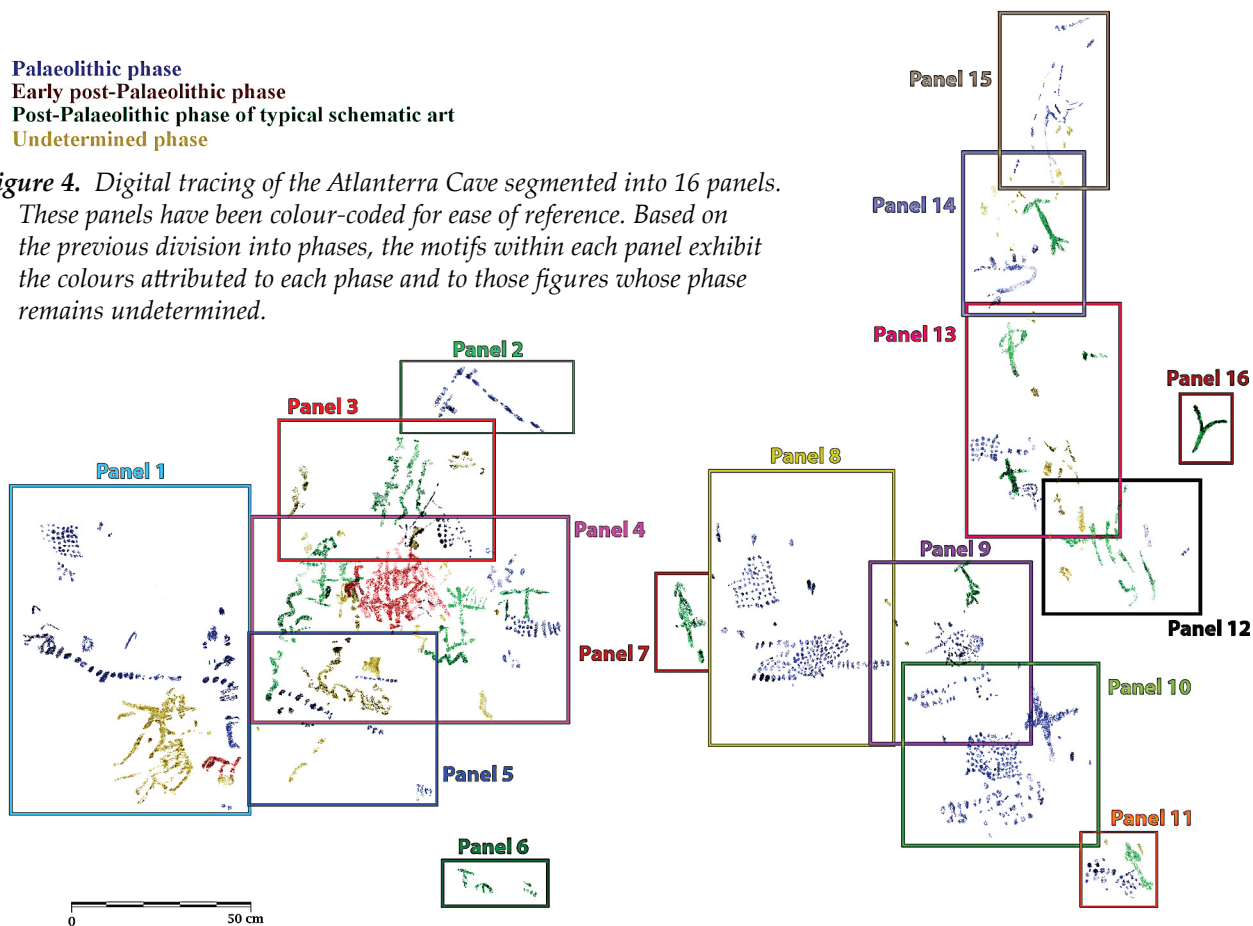
- Palaeolithic phase
- Early post-Palaeolithic phase
- Post-Palaeolithic phase of typical schematic art
- Undetermined phase

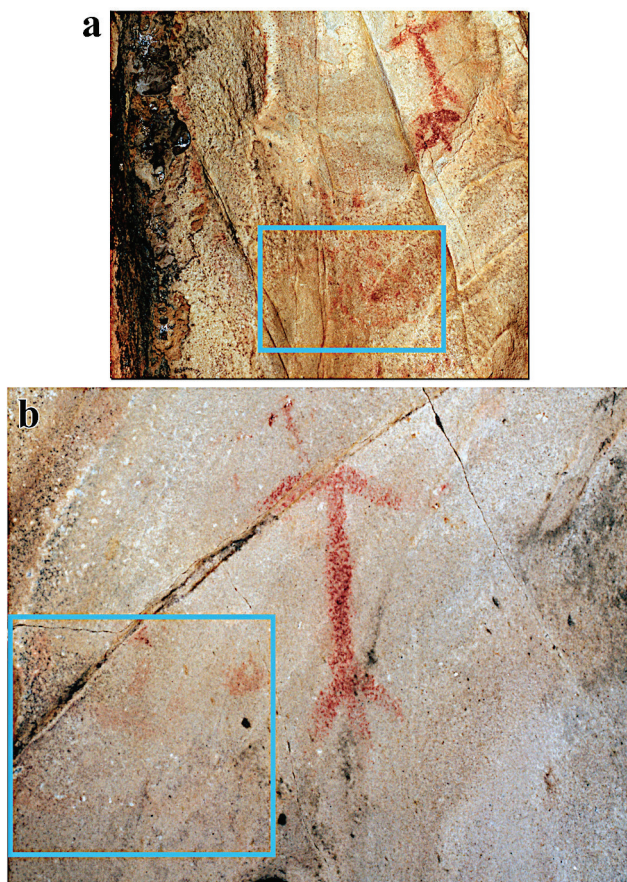
Figure 3. Digital tracing of the Atlanterra Cave, highlighting the motifs corresponding to the Palaeolithic phase (blue), the early post-Palaeolithic phase (red) and the post-Palaeolithic phase of schematic art (green). Other figures whose phase cannot be identified credibly are also included.



- Palaeolithic phase
- Early post-Palaeolithic phase
- Post-Palaeolithic phase of typical schematic art
- Undetermined phase

Figure 4. Digital tracing of the Atlanterra Cave segmented into 16 panels. These panels have been colour-coded for ease of reference. Based on the previous division into phases, the motifs within each panel exhibit the colours attributed to each phase and to those figures whose phase remains undetermined.

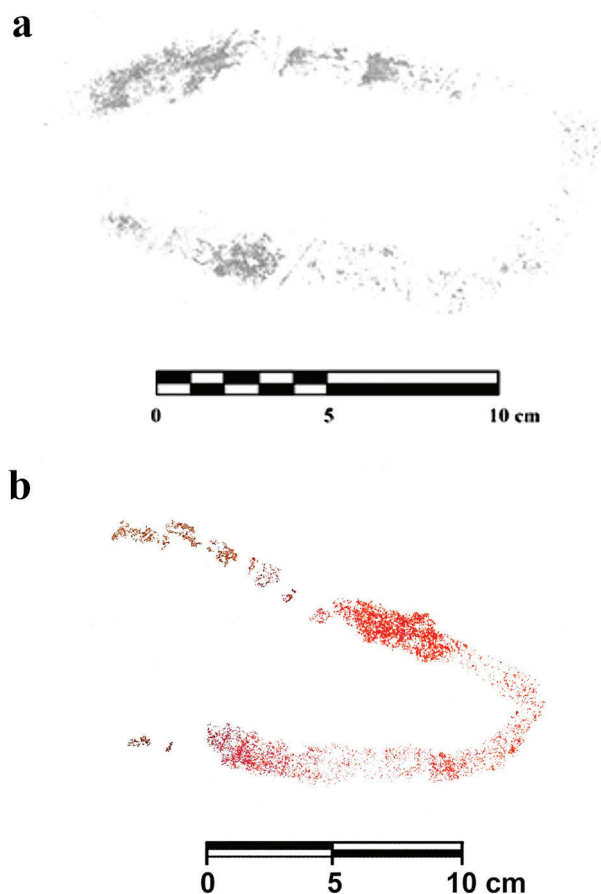




**Figure 5.** Side-by-side comparison between panels 9 and 14. Digital filtering with Photoshop to improve visibility. a) Panel 9. The 'horse' protome 522 is located in the lower middle part of the photo. b) Panel 14. The supposed horse protome 859 is located in the lower left side of the photo.

We have divided this cave site into 16 panels. It is imperative to acknowledge that the segmentation is artificial; rather, it constitutes a response to the necessity of organising the rock surface to facilitate a comprehensive and precise analysis. To delimit these panels, we have considered the dispersion of the graphic elements and the morphology of the surface so that the division would be as organic as possible. However, it must be noted that, as we are unable to recognise the original distribution of the figures in their entirety, this is not an objective division, nor is the numbering of the panels, which starts from the left side of the cave and follows the natural progression of the rock surface. Although there is some degree of randomisation in this selection process, it is our contention that conclusions can be drawn from the delimited panels.

These panels are composed of 896 motifs, which in turn comprise 261 graphic units. The term 'motif' denotes each of the figures individually, whilst the term 'graphic unit' refers to representations comprising isolated and grouped elements, such as dots or barred lines. We may distribute these motifs in 748 'signs' (83.48 % of the total), 121 pigment traces (13.50



**Figure 6.** a) Tracing of the oval sign from sub-area 2.b of the El Castillo Cave (Mingo 2007, 2009, 2010). b) Digital tracing of the supposed horse protome 859 on panel 14 of the Atlanterra Cave.

%), 19 anthropomorphs (2.12 %), 7 zoomorphs (0.78 %) and 1 supposed plant-like motif (0.11 %). An analysis of the graphic units present in those 16 panels shows that the cave harbours 261 graphic units: 121 pigment traces (46.36 % of the total), 113 'signs' (43.30 %), 19 anthropomorphs (7.28 %), 7 zoomorphs (2.68 %) and 1 supposed plant-like motif (0.38 %).

### 3. Chronocultural proposal

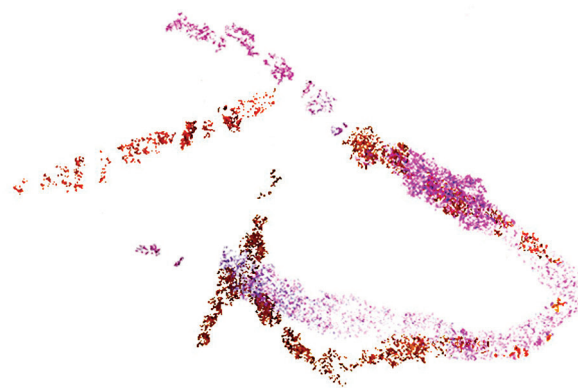
#### 3.1. Palaeolithic phase

The beginnings of the artistic sequence of the Atlanterra Cave (Fig. 5) are interesting since they place the cave site as one of the oldest in the south of the Iberian Peninsula. Before considering the also important 'horse' protome 522 found in panel 9 (Fig. 5a), we believe it is appropriate to address the supposed horse protome 859 in panel 14 (Fig. 5b). This is one of the most faded motifs in the entire cave. Nevertheless, it is not due to its location in a panel with high erosive activity, given that it is located next to the schematic anthropomorph 872, whose pigments have been remarkably preserved. The fading of the supposed horse protome 859 appears to be more advanced than that of the 'horse' protome 522 as it supposes a greater effort to visualise it.

André Leroi-Gourhan observed that, before the emergence of the first style of his diagram of pre-Historic art, there was a prefigurative phase (Leroi-Gourhan 1964: 88), in which 'signs' played a predominant role. However, the chronologies of this prefigurative phase, as proposed by Leroi-Gourhan, are based on very remote moments of rock art, making it difficult to contextualise the Atlanterra Cave and its background. Despite the foregoing hindrances, the idea of a prefigurative phase seems to be valid in rock art. Therefore, we cannot exclude that this phase could have been the beginning of the Atlanterra Cave art if we consider the supposed horse protome 859. This supposed protome exhibits an oval morphology reminiscent of the oval 'signs' from El Castillo Cave (Puente Viesgo, Cantabria, Spain) (González 1987) (Fig. 6), which Alberto Mingo Álvarez (Mingo 2007, 2009, 2010) has indicated could be simplified bison. Within the Atlanterra Cave context, this hypothesis can be proposed as the morphology of the supposed horse protome 859 is reminiscent of a simplified 'horse' protome (Fig. 7). On the other hand, we cannot overlook that its execution, while it may partially align with this hypothesis, could be interpreted as a hybrid of abstract symbolism and figurative, suggesting a transition period between the prefigurative and figurative phases.

There are several approaches to the chronology of the oval 'signs'. Joaquín González Echegaray estimated that the characteristics of the bison from the Hands Panel of the El Castillo Cave confirmed them to be Upper Solutrean (González 1972). Subsequently, César González Sainz considered that the red and yellow outline traces belonged to the oldest phases found in El Castillo (styles III and possibly II of Leroi-Gourhan 1965 and 1995) (González et al. 2003). Considering the existing superimpositions and linking the 'bisons' with the oval 'signs', Alberto Mingo suggested that their execution could oscillate between the Upper Solutrean and early Magdalenian periods (Mingo 2007, 2009 and 2010). It is also worth mentioning the chronology of the Mayenne-Sciences Cave (Thorigné-en-Charnie, France), relevant for the recording oval 'signs', in which the analysis of two samples of a 'horse' figure made it possible to contextualise the cave in the Gravettian period and to link it to Pech Merle and Cougnac (Lot-Quercy, France) (Pigeaud et al. 2003). Regarding the oval motifs present in the Cantabrian Palaeolithic portable art (Spain), María Soledad Corchón Rodríguez considered that the oval subject started in the Upper Solutrean or early Magdalenian periods and then developed during the Magdalenian (Corchón 1986).

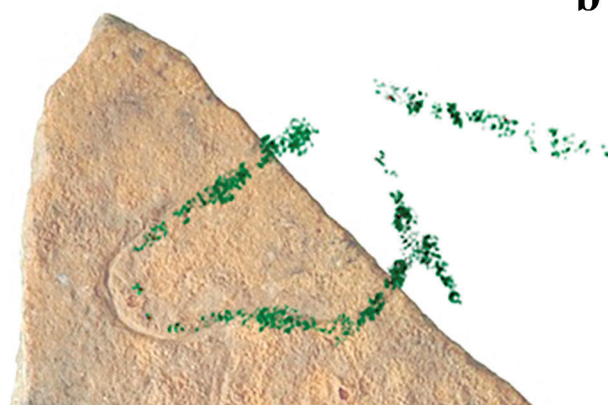
The 'horse' protome 522 could be the oldest figurative motif in the cave, along with the supposed horse protome 859. Its particular typology has proven to be a controversial issue when it comes to establishing parallels that could facilitate the approximation of its context. Moreover, the paucity of sufficient samples in rock art has hindered the number of associations



**Figure 7.** Superimposition of the supposed horse protome 859 (panel 14) on the horse protome 522 (panel 9). Their dimensions have been adjusted to highlight morphological differences. The colour of the supposed horse protome 859 (in purple) has been modified to differentiate it from the horse protome 522.

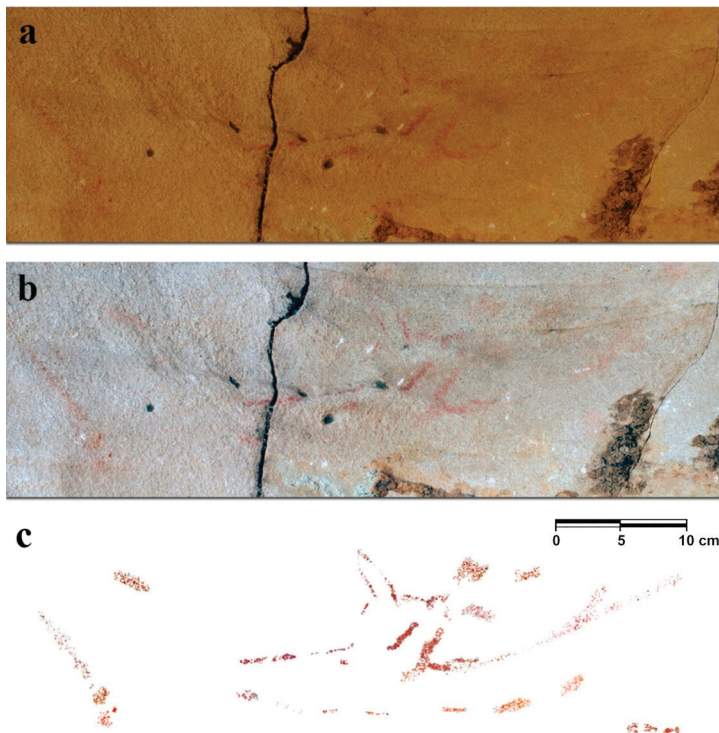


**a**

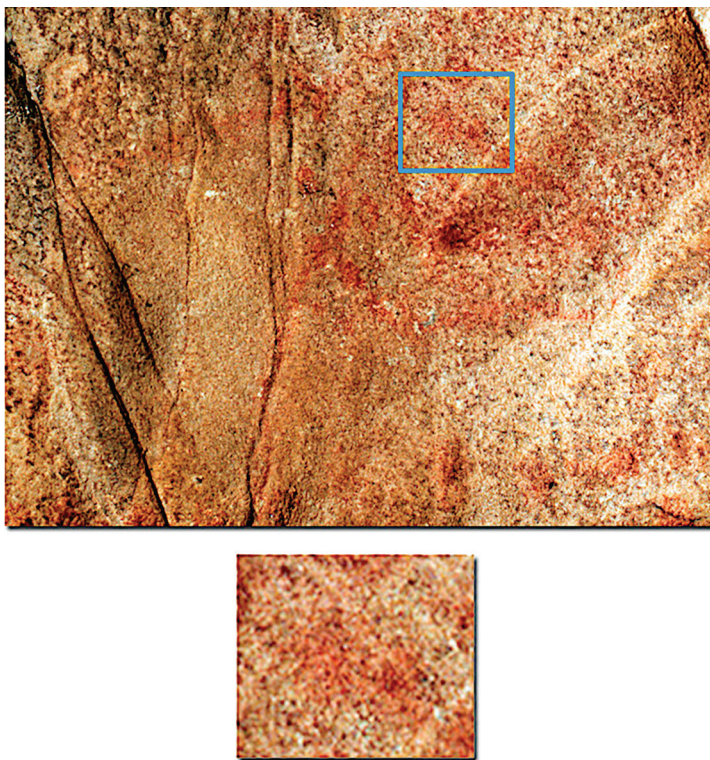


**b**

**Figure 8.** a) Close-up view of the 'horse' head engraved on the A-side of plaque 16,065 from the Parpalló Cave (Gandía, Valencia, Spain) (Museu de Prehistòria de València; Villaverde 1994: Fig. 11). a) Superimposition of the 'horse' protome 522 on the engraving on the A-side of plaque 16,065 from the Parpalló Cave (Gandía, Valencia, Spain). We have matched the engraving and painting sizes to check for morphological correlation. The colour of the 'horse' protome 522 has been replaced to improve visibility.



**Figure 9.** Panel 15. a) Original photo. b) Digital filtering with Photoshop to improve visibility. c) Digital tracing of panel 15.



**Figure 10.** Close-up view of the dots 550 and 551 superimposition on the 'horse' protome 522 in panel 9. Digital filtering with Photoshop to highlight both the 'horse' protome and the dots.

we could make. The A-side of plaque 16,065 from the Parpalló Cave (Valencia, Spain) (Museu de Prehistòria de València; Villaverde 1994: Fig. 11), on the other hand, allowed us to

establish a possible connection between the typology of the Atlanterra 'horse' and the 'horse' from this plaque (Fig. 8). We believe that the contextualisation of the Parpalló plaque, early Solutrean, is in line with our formal analysis of the motif: there is no correlation between the 'duck bill' typology and the more rigid and coarse features that we do find in these two 'horses', which chronologically could be linked to a time prior to this typology or to its very early stages. It is worth saying that the concept of a 'duck bill' typology is in full discussion. Numerous researchers point out that this has become a confusing compilation of many 'horse' protomes, most of them Solutrean, with no coherent characterisation between them all (Hernando 2013; Villaverde 2017; García 2024; García et al. 2024; De Lara 2025).

Another case is the supposed 'deer' protome 883 in panel 15 (Fig. 9), which shows more similarities to the 'horse' protome 522. The two motifs are the only zoomorphs painted with thick line silhouettes; both representations share a morphological structure characterised by their rigidity and coarseness. Although the patina of the supposed deer protome is not as intense as in the case of the 'horse', its advanced level of integration to the surface is undeniable.

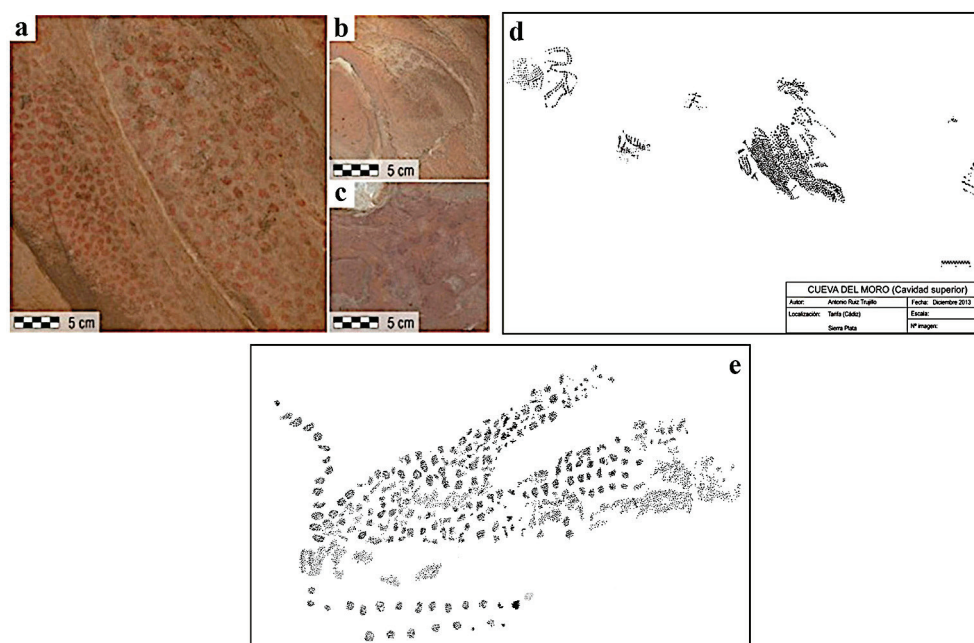
A scattering of dots, which also surrounds certain parts of the motif, is superimposed on the 'horse' protome 522 (Fig. 10). The fading observed in these dots is analogous to the fading seen in the 'horse' protome itself, therefore it can be concluded that the execution of the dots did not occur with a significant time difference. The dots, however, are more recent than the 'horse', as they are superimposed on it.

The graphic patterns formed by dots that have been identified in the Atlanterra Cave demonstrate a noteworthy typological affinity with those documented in the nearby cave site of the Moro Cave (Tarifa, Cadiz, Spain) (Ruiz et al. 2015; Barcia et al. 2023) (Figs 11a, 11b, 11c, 11d and 12). In both cases, there is evidence of simple dot motifs and motifs of greater complexity, which can also be classified into groups with parallel and irregular arrangements. Additionally, the density of the dots varies in both caves: some areas exhibit a high concentration of dots, while others display a greater dispersion. As for their state of preservation, a similar patina covers the dots in both caves, suggesting comparable environmental conditions. However, the preservation of the dot motifs is irregular, even within the same graphic unit. The nearby rock art site of Preti-

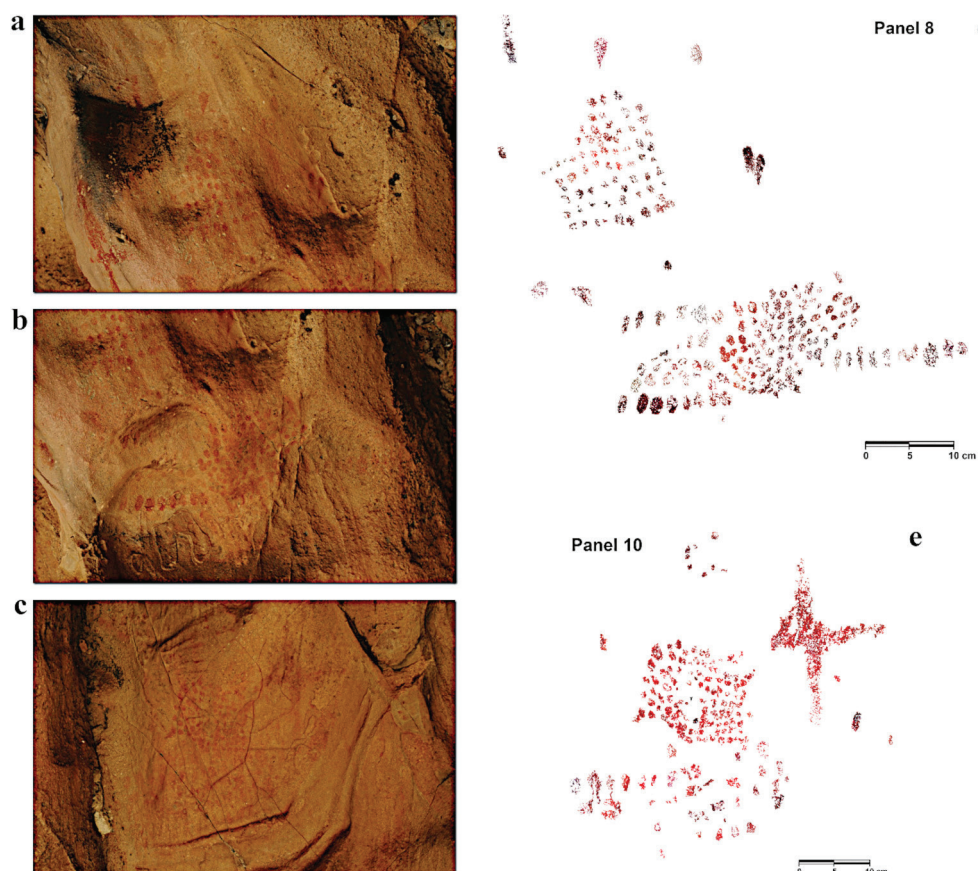
nas Cave, also known as Ladrones I (Benalup-Casas Viejas, Cadiz, Spain), also exhibits a group of dots in panel B that resembles, from a typological perspective, certain complex groups of dots observed in Atlanterra Cave (Figs 11e and 12).

Similarly, we place a special interest in the studies of other nearby cave sites, such as the Palomas Caves (Facinas, Cadiz, Spain) (Solís 2015; Fernández et al. 2021; Mira 2022), as well as other rock art sites in contexts distinct from the Atlanterra Cave, such as the Maltravieso Cave (Cáceres, Spain) (Callejo 1958; Almagro 1960; Ripoll et al. 1999; Collado 2008, 2012; Collado and García 2022a, 2022b), the Escoural Cave (Freguises, Portugal) (Santos et al. 1981; Lejeune 1995; García et al. 2000) or the La Griega Cave (Pedraza, Segovia, Spain) (Almagro 1971; Corchón 2006; Corchón et al. 2012), among others.

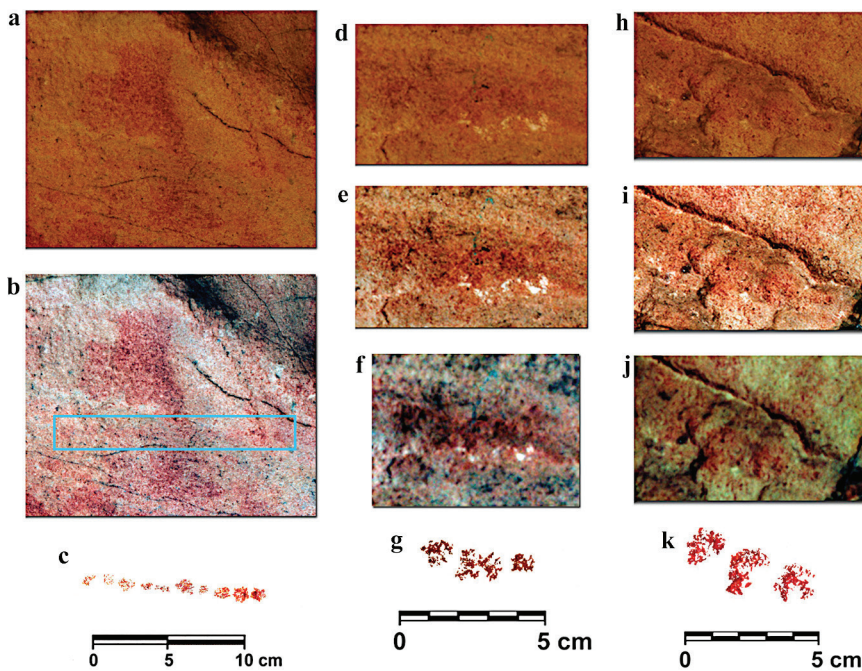
We have paid close attention to large simple groups and complex groups because, especially in the case of the complex ones, they are the most common in both the Moro Cave and the Atlanterra Cave. Despite not being as common, there are instances of smaller simple groups in the latter cave composed of small dots whose characteristics indicate a Palaeolithic



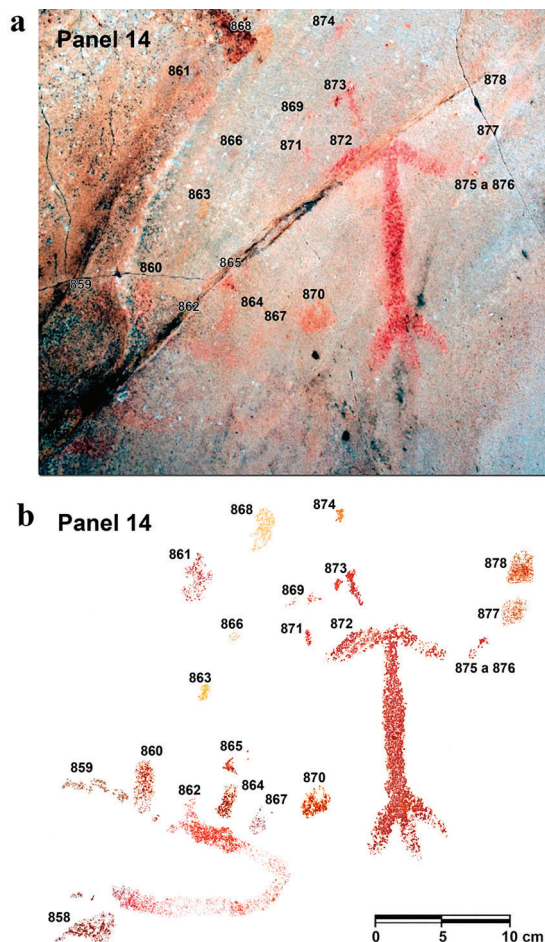
**Figure 11.** a, b, c and d: dots in the Moro Cave, identified in the 1990s and visible to the naked eye. a) Large composition on the upper floor panels (Barcia et al. 2023). b) Small but uniform composition on the lower floor, next to Panel A (Barcia et al. 2023). c) Single group of dots on the lower floor, under Panel A (Barcia et al. 2023). d) Tracing of the upper part of the Moro Cave (Ruiz et al. 2015). e) Tracing of the group of dots in panel B of the Pretinas or Ladrones I Cave (Mas 2000).



**Figure 12.** a) Upper part of panel 8. Comparison between the patina and the fading of the dots with the elements in panel 7. Original photo. b) Dots on the lower part of panel 8 demonstrate an irregular preservation pattern within the same group. Original photo. c) Panel 10. Demonstration of the irregular preservation pattern and the patina over dots and other motifs. Original photo. d) Digital tracing of panel 8. e) Digital tracing of panel 10.



**Figure 13.** a, b and c: Close-up view of panel 5 where the group of dots from 249 to 258 is located. Original photo. b) Digital filtering with Photoshop. c) Digital tracing of the group of dots from 249 to 258. d, e, f and g: Group of dots from 235 to 238 in panel 5. d) Original photo. e and f) Digital filtering with Photoshop to improve visibility. g) Digital tracing of the group of dots from 235 to 238. h, i, j and k: Group of dots from 260 to 262 in panel 5. h) Original photo. i and j) Digital filtering with Photoshop to improve visibility. k) Digital tracing of the group of dots from 260 to 262 in panel 5.



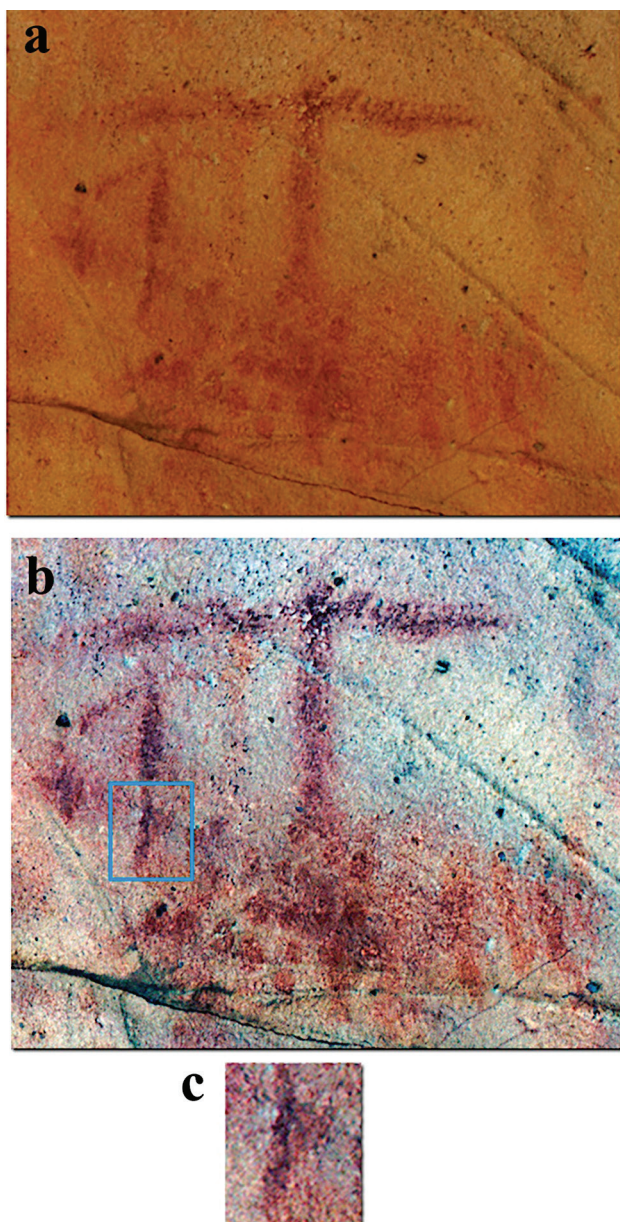
the group of dots 875 and 876. A notable exception, however, is the schematic anthropomorph 872, which, as previously mentioned, preserves a rather intense pigmentation (Fig. 14). This panel could, therefore, be contextualised in the Palaeolithic period, except some isolated elements such as the schematic anthropomorph 872.

Compound graphic units of the Atlanterra Cave show a close conceptual relationship among them. This relationship is limited to their previously analysed arrangement and interaction with other motifs. Panels 4 and 13 illustrate this dynamic. In the case of panel 4, the schematic anthropomorph 188 is superimposed on the dot 190, which is part of the group of dots from 189 to 209. The pigments of this anthropomorph, as well as those of the neighbouring anthropomorph 212, have been preserved with greater intensity (Fig. 15). A similar situation is observed in panel 13, where the schematic anthropomorph 813 appears to be superimposed on the group of elements 814, located near the group of dots from 815 to 832. There even seems to be a possible point of contact between this anthropomorph and the dots to the left of this group (Fig. 16). The difference in pigment preservation between this anthropomorph and the other elements is remarkable, as the dots have faded to the point where it is difficult to identify them individually, even after applying digital processing techniques. In addition, it is important to note that the group of dots from 189 to 209 in

**Figure 14.** a) Digital filtering with Photoshop. Some numbers may present a white outline to ensure comfortable visibility. b) Digital tracing of panel 14.

origin. We would like to emphasise the group of dots from 249 to 258 in panel 5 (Figs 13a, 13b and 13c), which manifest as an almost imperceptible small simple group. This motif stands in marked contrast to the other elements of the same panel, where we observe very worn dots but with quite intense pigmentation. Moreover, two additional small simple motifs are present in this panel, though they are challenging to discern: one comprising the group of dots from 235 to 238 (Figs 13d, 13e, 13f and 13g) and another consisting of the group of dots from 260 to 262 (Figs 13h, 13i, 13j and 13k).

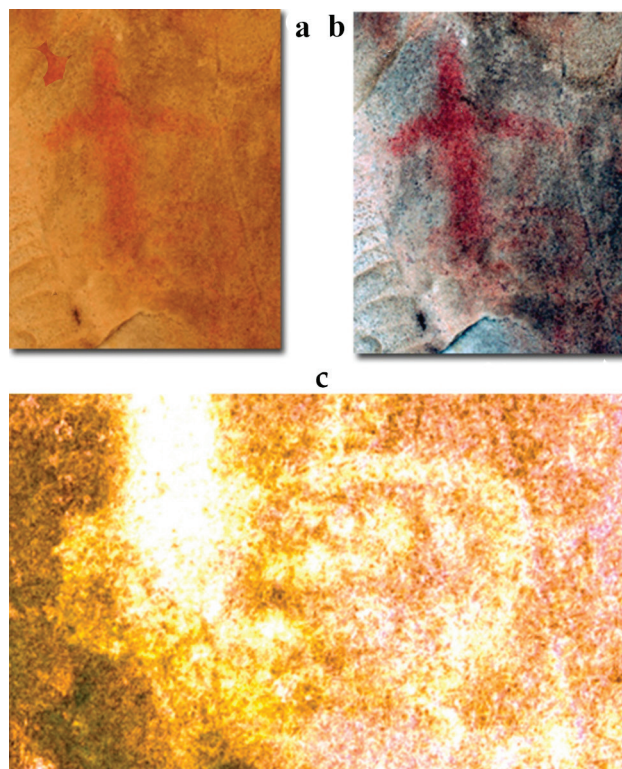
Returning to panel 14, the presence of ochre pigment has been detected in the small dot 863 and in certain parts of 868, despite minimal visibility even after the implementation of digital processing techniques. Most of the elements in this panel show a marked deterioration in their pigments, as in the case of the supposed horse protome 859, the barred lines 860 and 864, the dots 866 and 870, and



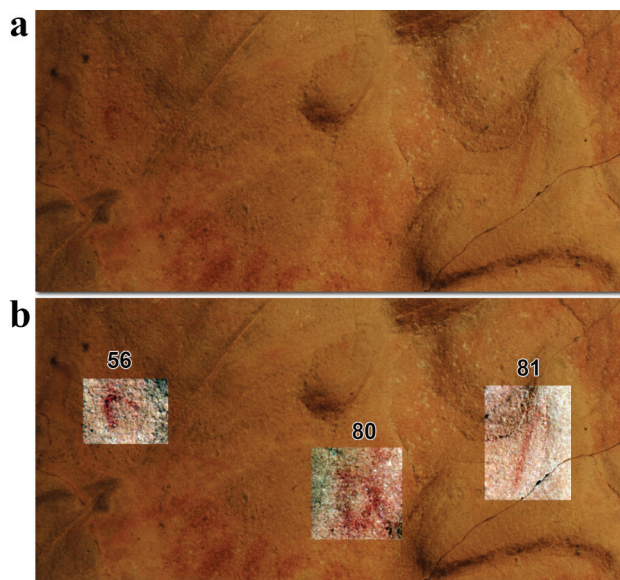
**Figure 15.** Superimposition of the schematic anthropomorph 188 on the dot 190 in panel 4. a) Original photo. b) Digital filtering with Photoshop. c) Close-up view of the superimposition.

panel 4 and from 815 to 832 in panel 13, to which we refer, represent graphic units of similar typology since they both form complex irregular groups.

The circle 'sign' 80 in panel 1, whose lines are rough and uneven, is very faded and has such a thick patina that the motif looks like an imperfection on the rock surface. However, after observing it carefully and carrying out the appropriate digital analyses, we have been able to delimit the morphology of the 'sign'. The inverted U 'sign' 56 and the elongated curved 'sign' 81 present a similar situation, though not as extreme. These three motifs are close to the simple group of dots from 59 to 77, which, as mentioned above, we believe to be Palaeolithic graphic units. However, the fading of these 'signs' is much more pronounced than that of the dots, proving the antiquity of the 'signs' (Fig. 17).

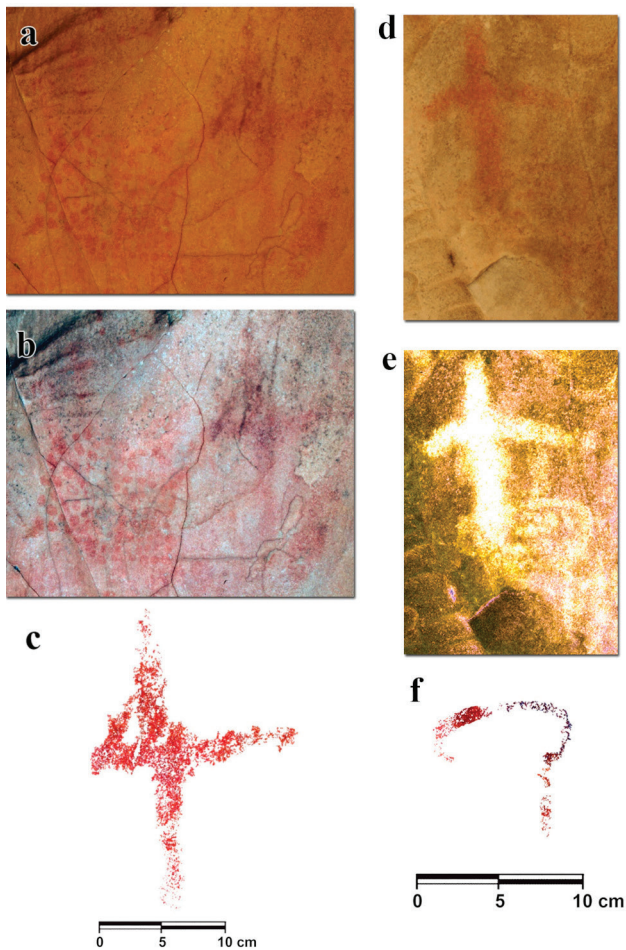


**Figure 16.** Schematic anthropomorph 813 next to the dots from 815 to 832 and to the oval part of the group of elements 814 in panel 13. a) Original photo. b) Digital filtering with Photoshop. c) Digital filtering with DStretch to improve the visibility of the dots.



**Figure 17.** The inverted-U 'sign' 59, the circle 'sign' 80 and the elongated, curved 'sign' 81 close to the simple group of dots from 59 to 77 in panel 1. a) Original photo. b) Digital filtering with Photoshop to highlight the 'signs'. The numbers present a white outline to ensure good visibility.

A substantial challenge arises when groups of elements are analysed. As most elements cannot be interpreted, it is difficult to conduct a typological analysis. Thus, comparing them with other elements that we

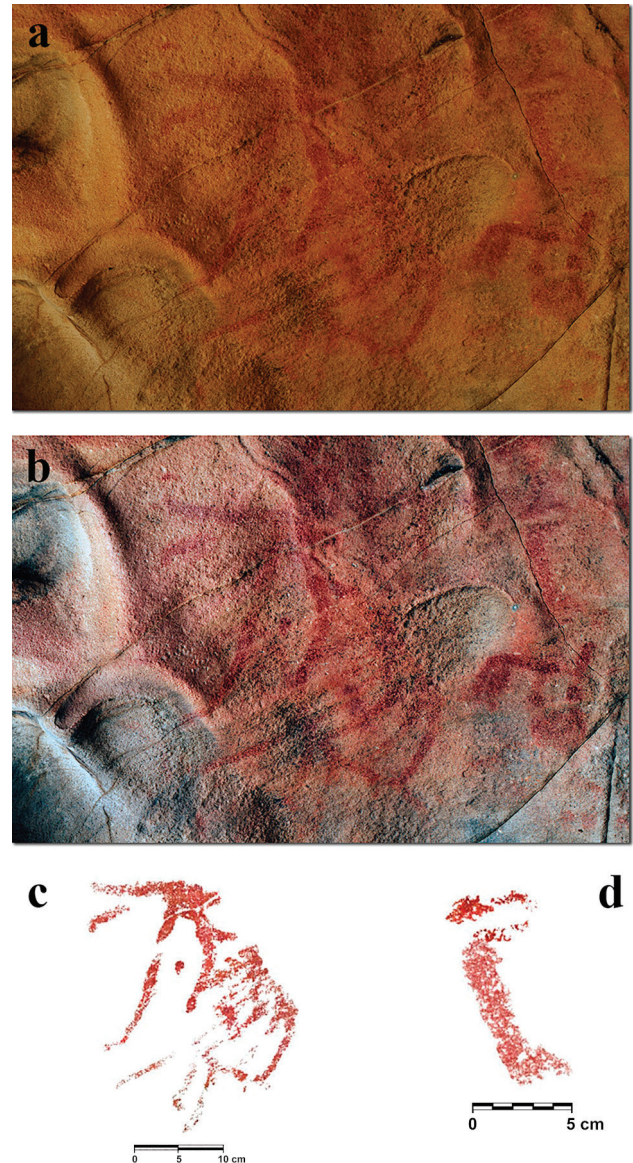


**Figure 18.** a, b and c: Group of elements 720 close to the group of dots from 582 to 690 in panel 10. a) Original photo. b) Digital filtering with Photoshop. c) Digital tracing of the group of elements 720. d, e and f: Group of elements 814 close to the schematic anthropomorph 813 and the group of dots from 815 to 832 in panel 13. d) Original photo. e) Digital filtering with Photoshop. f) Digital tracing of the group of elements 814.

have been able to date in a phase of the chronological sequence, with some degree of certainty, is our main tool for making an educated estimate. In the Atlanterra Cave, two groups of elements cannot be interpreted but show strong Palaeolithic characteristics. This is the case of the group of elements 720 in panel 10 (Figs 18a, 18b and 18c) and the group of elements 814 in panel 13 (Figs 18d, 18e and 18f).

On the one hand, the group of elements 720 in panel 10 is located right under the 'horse' protome 522 and the surrounding dots in panel 9. The majority of the motifs in panel 10 are composed of dots whose preservation exhibits similarities with those in panel 9 and which, therefore, may share a similar contextual relationship. The group of elements 720 displays a more advanced deterioration and patina in comparison to the group of dots from 582 to 690, thereby ruling out the possibility of a later execution (Figs 18a, 18b and 18c).

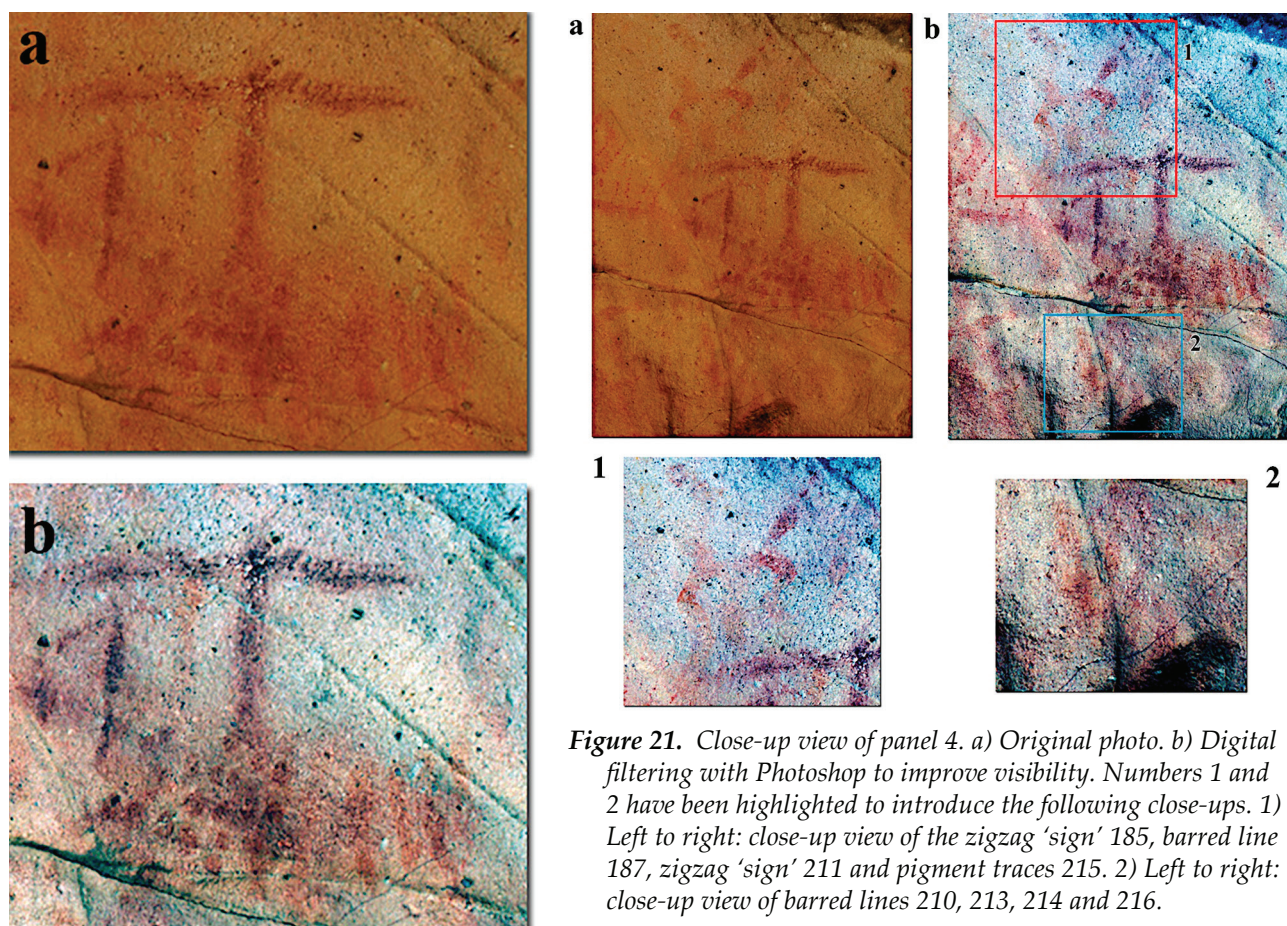
On the other hand, the group of elements 814 in



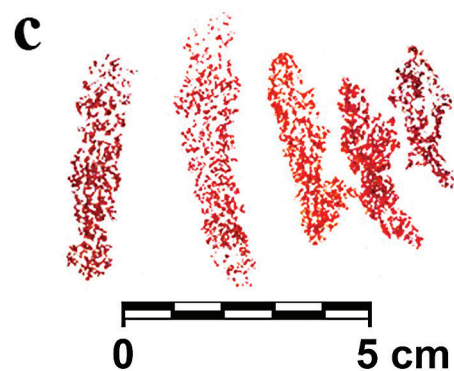
**Figure 19.** Group of elements 82 and 97 in panel 1. a) Original photo. b) Digital filtering with Photoshop. c) Digital tracing of the group of elements 82. d) Digital tracing of the group of elements 97.

panel 13, in conjunction with the group of dots from 815 to 832, can only be discerned on the rock surface, suggesting extreme deterioration. Furthermore, the schematic anthropomorph 813, which is evidently related to them, is in a considerably better state of preservation. This may indicate that it was executed much later (Figs 18d, 18e and 18f).

Panel 1, for its part, comprises two groups of elements. One of them is the group of elements 97, which is covered by a thick patina. It exhibits a certain degree of harmony with other elements in this panel ascribed to the Palaeolithic phase and it is in contrast with the undetermined quadruped 98 (Fig. 19). The second group of elements is number 82, whose pigments are much more faded than those of the quadruped 98 located next to it, but less than other motifs such as the group of elements 97 (Fig. 19). In the group of



**Figure 21.** Close-up view of panel 4. a) Original photo. b) Digital filtering with Photoshop to improve visibility. Numbers 1 and 2 have been highlighted to introduce the following close-ups. 1) Left to right: close-up view of the zigzag 'sign' 185, barred line 187, zigzag 'sign' 211 and pigment traces 215. 2) Left to right: close-up view of barred lines 210, 213, 214 and 216.



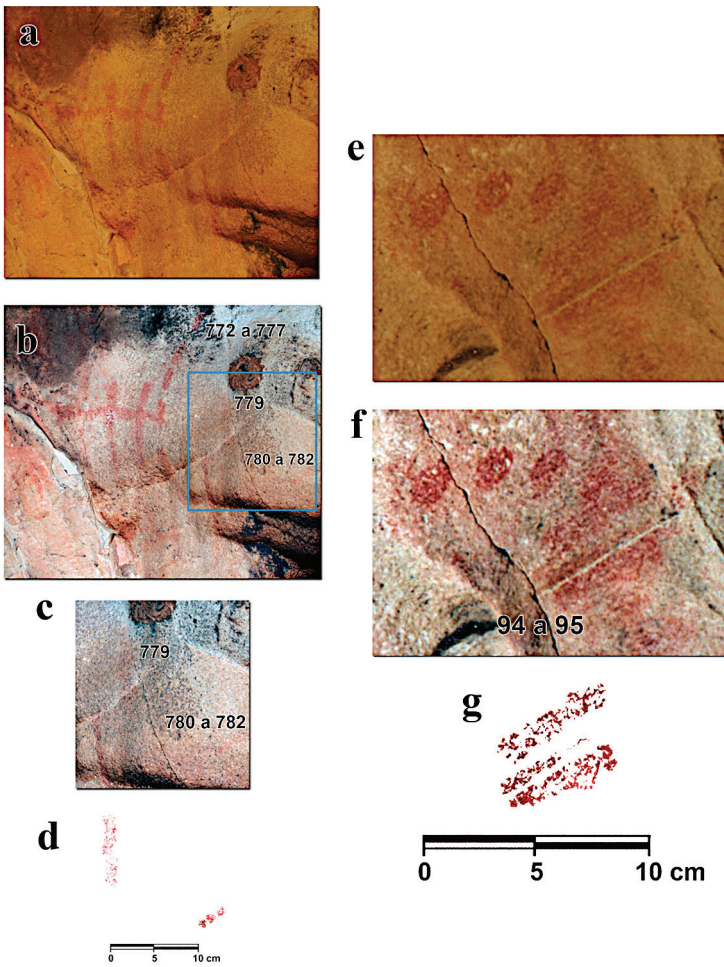
**Figure 20.** Group of barred lines from 217 to 222 next to the group of dots from 189 to 209 and the schematic anthropomorphs 188 and 212 in panel 4. a) Original photo. b) Digital filtering with Photoshop. c) Digital tracing of the group of barred lines from 217 to 222.

elements 82, we can observe certain areas with high levels of pigmentation, while other areas seem to demonstrate reduced intensity and significant discolouration. The motif appears to predate the undetermined quadruped 98 in terms of the patina and the fading of pigments. However, determining a precise phase remains challenging because it is not possible to interpret this group of elements, nor are there parallels that could establish a pattern.

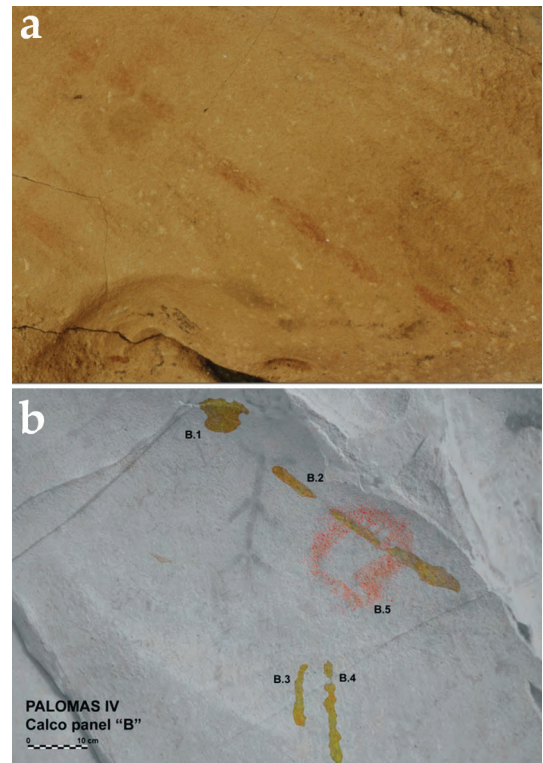
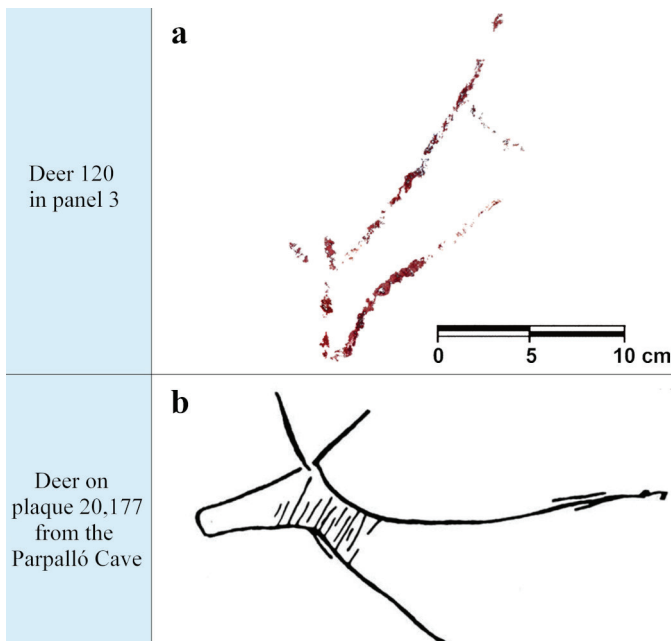
We also consider that the group of barred lines from 217 to 222 in panel 4, which is next to the dots from 189 to 209 and the schematic anthropomorphs 188 and 212, may have been executed during this phase (Fig. 20). As illustrated in the figure, barred lines are the most poorly preserved motifs in this area of the panel, as they are almost imperceptible. In contrast, the aforementioned group of dots was found to be chromatically analogous and marginally better preserved than the group of barred lines. The schematic anthropomorphs, for their part, belong to another phase in the cave and preserve their pigments with a certain degree of solidity, which distinguishes them from the other two groups. Other faded barred lines can be found in panel 4. For example, the barred line 187 (Fig. 21.1), which is located between the also very faded zigzag 'signs' 185 and 211, whose complete motifs are almost imperceptible, and the barred lines 214, 213 and 216 (Fig. 21.2). The barred line 210 has managed to retain the greatest amount of pigment, although the patina covering it is also very thick (Fig. 21.2).

The single barred line 779 in panel 12 is a similar case. It is almost imperceptible, as is the case of the nearby group of dots from 780 to 782, which contrasts sharply with the group of elements 769 and the curved group of barred lines from 772 to 777 (Figs 22a, 22b, 22c and 22d). This is also the case, although not as extreme, with the group of barred lines 94 and 95 in panel 1, whose preservation also contrasts with most of the elements in panel 1 (Figs 22e, 22f and 22g).

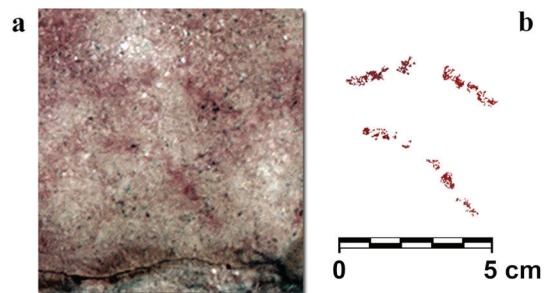
The group of barred lines from 105 to 112 in panel 2, whose patina suggests a relevant antiquity (Fig. 23a), would belong to this phase. Moreover, from a techno-morphological point of view, we could point out typological parallels with the sup-



**Figure 22.** a, b, c and d: Panel 12. The numbers present a white outline to ensure good visibility. a) Original photo. b) Digital filtering with Photoshop. c) Close-up view of barred line 779 and the group of dots from 780 to 782. d) Digital tracing of barred line 779 and the group of dots from 780 to 782. e, f and g: Group of barred lines 94 and 95 in panel 1. e) Original photo. f) Digital filtering with Photoshop. g) Digital tracing of the group of barred lines 94 and 95.



**Figure 23.** a) Group of barred lines from 105 to 112 in panel 2. b) Tracing of panel B of the Palomas IV Cave (Mira 2022).



**Figure 24.** Undetermined zoomorph protome 176 in panel 4. a) Digital filtering with Photoshop. b) Digital tracing of the undetermined zoomorph protome 176.

posed vertical thick line b.4 in panel B of Palomas IV (Fig. 23b), which is considered to be Palaeolithic and which, after careful study, we believe could be a group of barred lines.

The undetermined zoomorph protome 176 in panel 4 (Fig. 24) could be dated to a time between the 'horse' protome 522 and the 'deer' protome 120. As previously mentioned, Julián Martínez García pointed out that its characteristics could place it in the Middle Solutrean period (Martínez 2009: 249, 2012: 242). The pigment traces that

**Figure 25.** Side-by-side comparison between the 'deer' protome 120 in the Atlanterra Cave (a) and the 'deer' from the plaque 20,177 from the Parpalló Cave (b) (Villaverde 1994: Fig. 245).

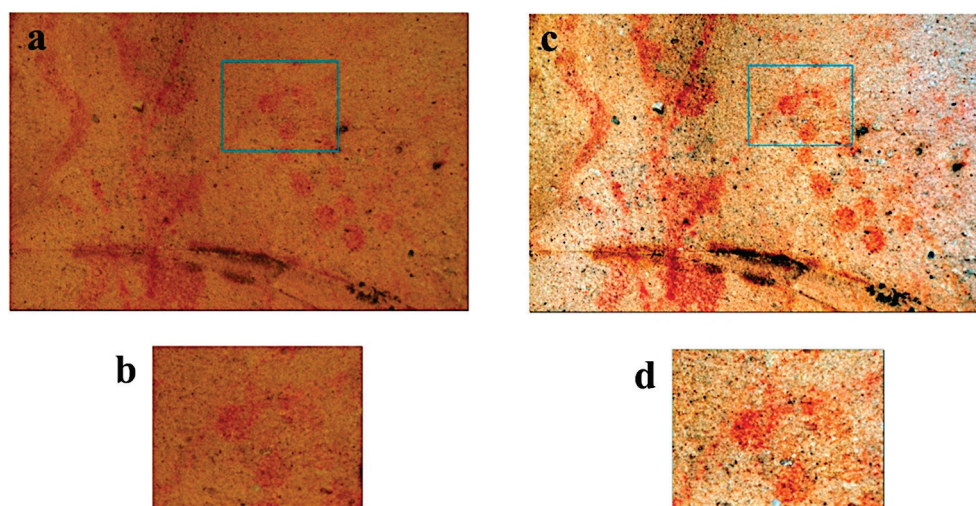
seem to construct the animal's neck and head exhibit a notable level of roughness despite its fine lines. This observation suggests that, typologically, the motif falls somewhere between the roughness of the 'horse' protome 522 and the delicacy of the 'deer' protome 120.

The 'deer' protome 120 in panel 3 could be attributed to the final moments of the Palaeolithic phase of the Atlanterra Cave. The proposed classification links this element to the Upper Magdalenian period on the basis of both

its characteristics (Mas 2002) and the great number of similarities with the plaque 20,177 from the Parpalló Cave (Villaverde 1994: Fig. 245; Martínez 2009: 249; Martínez 2012: 242) (Fig. 25).

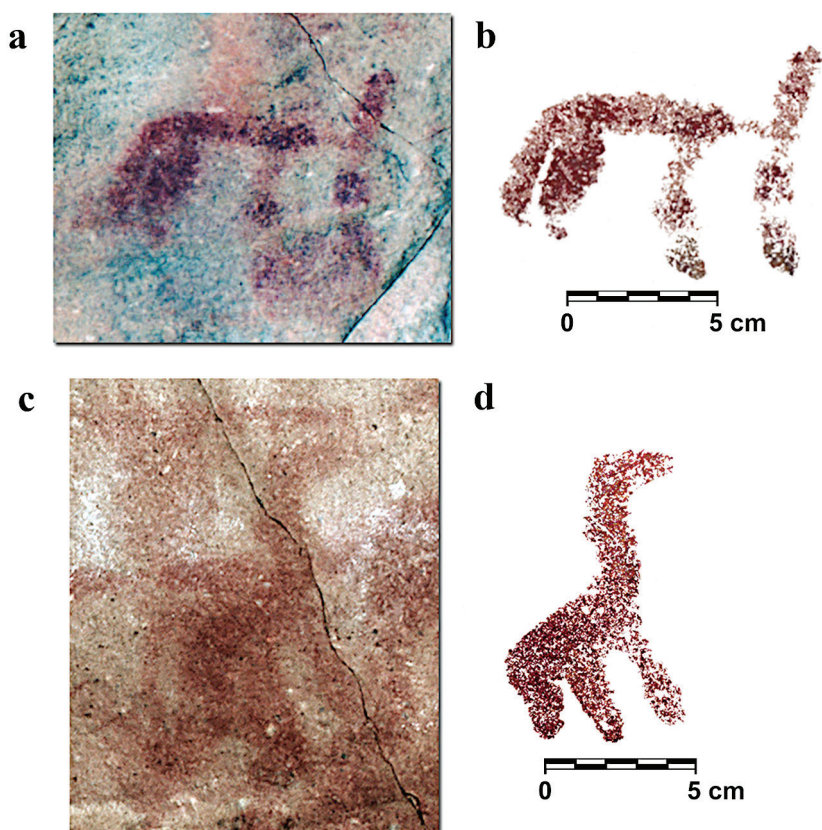
The 'deer' protome 120 appears to be infraposed to one of the dots of the group of dots from 123 to 154, to its right side (Fig. 26). The dot seems to be touching the line that makes up the lower part of the zoomorph's neck where the fading is greater. We note, all the same, that there is a strong resemblance between the dots and the 'deer': their chromatism, pigment preservation and patina are rather similar. Consequently, these dots should not have been executed much later than this zoomorph, probably also during the Upper Magdalenian period, the transition to the Epipalaeolithic period, or potentially within the Epipalaeolithic period, as evidenced by the technique observed in the Tajo de las Figuras Cave (Mas 2005). The circumstances that associate the zoomorph and the dots are analogous to those that connect the 'horse' protome 522 and the dots superimposed on it and surrounding it. In addition, the typology of this graphic unit of dots is conceptually similar to the Palaeolithic groups of dots we have analysed before. This would suggest that this graphic unit of dots is typologically Palaeolithic, even though it may have not been executed during this phase.

Regarding the zoomorphic fig-

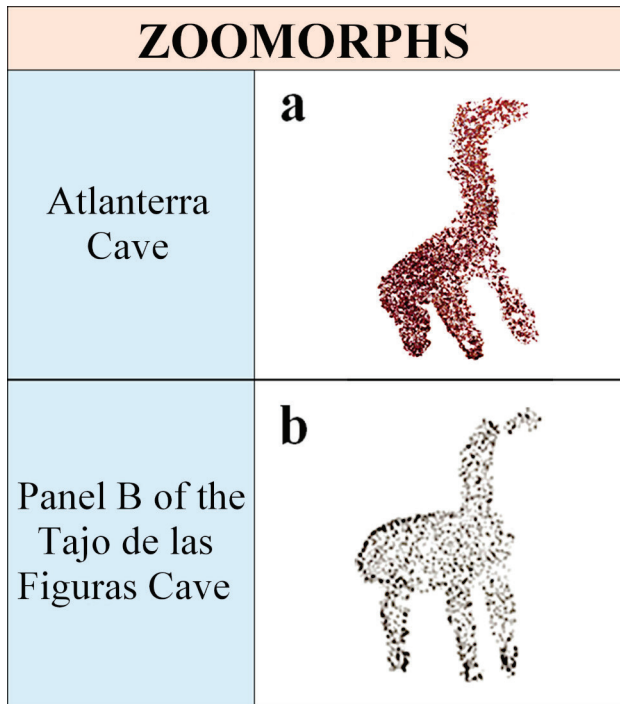


**Figure 26.** Group of dots from 123 to 154 superimposed on the 'deer' protome 120 in panel 3. a) Original photo. b) Close-up view of the superimposition on the original photo. c) Digital filtering with Photoshop. d) Close-up view of the superimposition on the digitally filtered photo.

ures, we have resorted to the parallels that we have considered the most prominent. Nevertheless, we also bear in mind the also interesting motifs existing in cave sites in contexts distinct from the Atlanterra Cave, such as the Pileta Cave (Benaoján, Malaga, Spain) (Giménez 1951, 1958; Sanchidrián 1997; Villaverde 2005), the



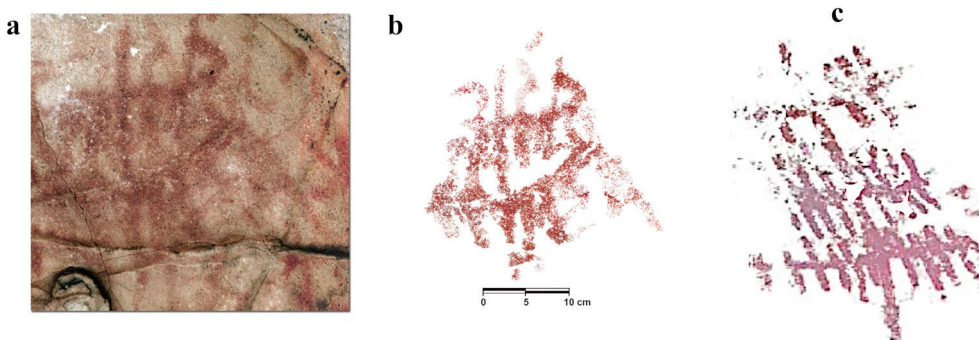
**Figure 27.** Schematic zoomorphs with a naturalistic tendency in the Atlanterra Cave. a and b: Undetermined quadruped 98 in panel 1. a) Digital filtering. b) Digital tracing. c and d: Supposed bird or quadruped 170 in panel 4. c) Digital filtering. d) Digital tracing.



**Figure 28.** Comparison of the two zoomorphs. a) Supposed bird or quadruped 170 in panel 4 of the Atlanterra Cave. b) 'Bird' with a naturalistic tendency or a quadruped with bird-like features 63 of the Tajo de las Figuras Cave (Mas 2000).

Nerja Cave (Nerja, Malaga, Spain) (Jordá 1985, 1986; Sanchidrián 1998), the Ardales Cave (Ardales, Malaga, Spain) (Cantalejo et al. 2004; Maura 2005, 2011; Espejo and Cantalejo 2006), the El Cantal Caves (Rincón de la Victoria, Malaga, Spain) (Cantalejo et al. 2006), the Maltravieso Cave (Callejo 1958; Almagro 1960; Ripoll et al. 1999; Collado 2010; Collado and García 2022a, 2022b), the Escoural Cave (Santos et al. 1981; Lejeune 1995; García et al. 2000), the La Griega Cave (Almagro 1971; Corchón 2006; Corchón et al. 2012), and the open-air rock art ensembles all over the Guadiana, Tagus and Douro Valleys (De Balbín et al. 1996; Collado 2008; Garcés and Oosterbeek 2015; Reis and Vázquez 2019), among others.

The techniques used in motifs and graphic units of



**Figure 29.** a) Digital filtering of the supposed plant-like motif 174 in panel 4. b) Digital tracing of the supposed plant-like motif 174. c) Supposed plant-like motif in panel 2 of sector 1 in the Palomas I Cave (Solís 2015).

this phase are: fine lines (2–5 mm), thick lines (0.6–0.9 cm), very thick lines (2–3 cm), fine line silhouettes (2–5 mm), thick line silhouettes (0.8–2 cm), and, employed to execute dots, finger painting and dabbing. These techniques can appear together; for example, fine lines may be used in conjunction with thick lines, thick lines with very thick lines, and finger painting with dabbing. Among the various techniques applied during this phase, finger painting predominates the rest of them. Likewise, if not exclusive, dabbing could be the most common technique used during this phase, judging by the features of the dots in the Atlanterra Cave and the studied relationship between dabbing and Palaeolithic art (De Balbín and Alcolea 1994; Múzquiz 1994; Apellániz and Calvo 1999; Sauvet et al. 2008; González and Ruiz 2010; González 2022).

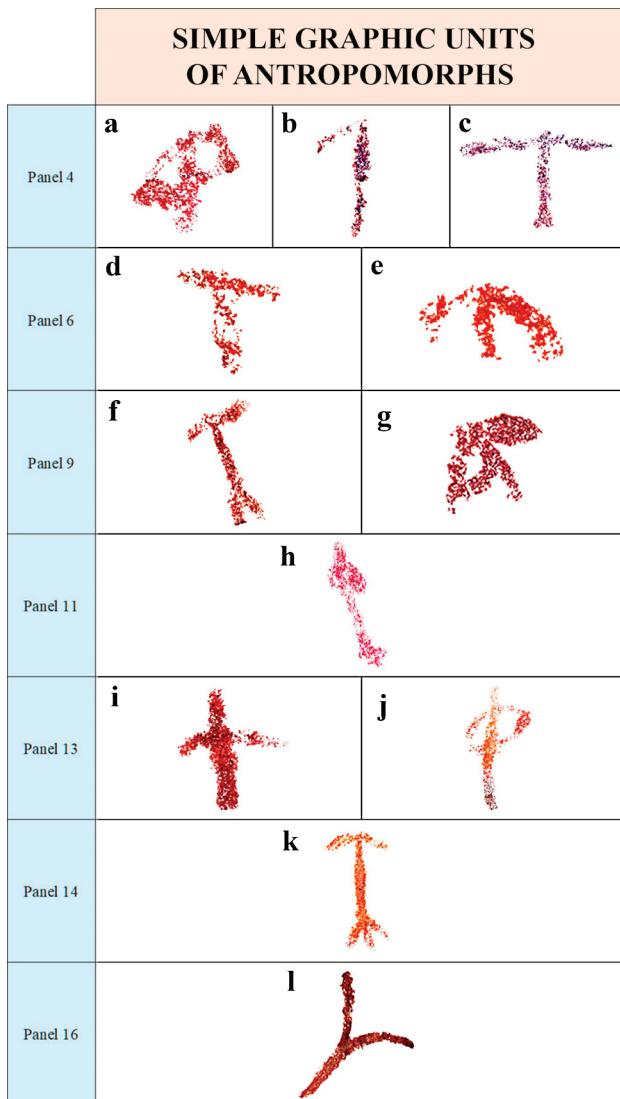
### 3.2. Early post-Palaeolithic phase

After the Palaeolithic phase, Atlanterra cave art seems to have continued its development through a brief early post-Palaeolithic phase, whose context may align with the Lower Holocene period. This phase features a supposed plant-like motif and two schematic zoomorphs with a naturalistic tendency. The predominance of thick lines (0.6–1.9 cm) is a distinguishing feature of this phase.

The two zoomorphs align with post-Palaeolithic typologies, and they are both schematic with a naturalistic tendency: on the one hand, the undetermined quadruped 98 in panel 1 (Figs 27a and 27b) and, on the other, the bird or quadruped with bird-like features 170 in panel 4 (Figs 27c and 27d). Both motifs preserve naturalistic characteristics that remain even after the simplifications associated with the post-Palaeolithic period. We may identify these characteristics on the head, neck or ears, and the limbs, which are spread apart in the case of the front legs and close together in the case of the hind legs, of the undetermined quadruped 98, and on the neck and head of the supposed bird or quadruped 170 in panel 4. In this regard, it is important to note that since the publication of Henri Breuil's seminal studies on the rock art of the Iberian Peninsula at the beginning of the last century (Breuil 1914, 1917, 1920, 1925, 1926; 1933–1935; Breuil and Burkitt 1929), there

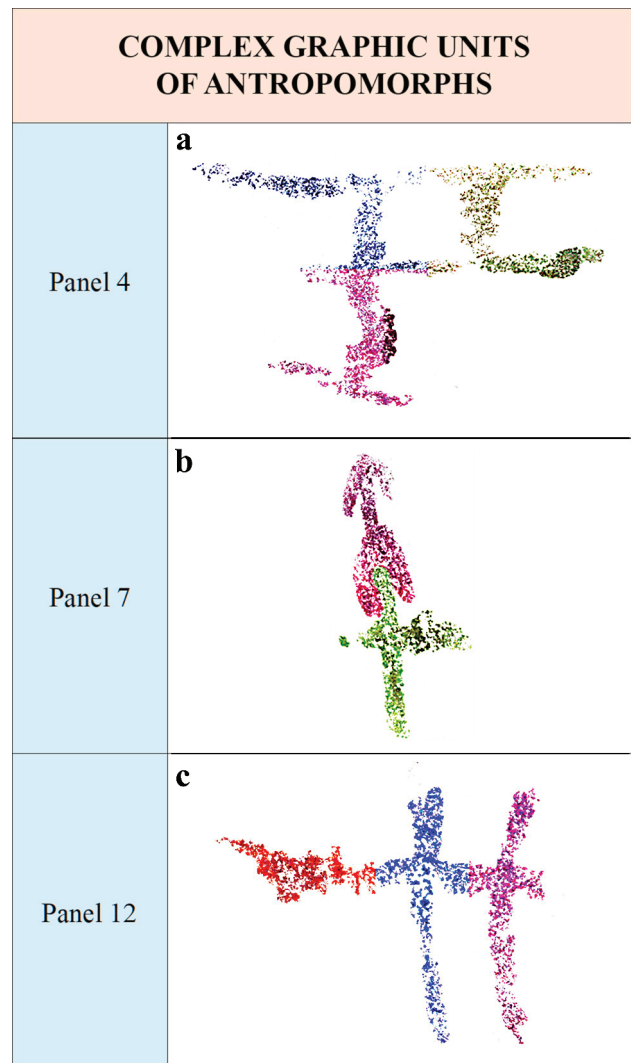
has been an intense debate on the different degrees of schematism present in the figurative schematic graphic repertoires, which has continued to the present day (Acosta 1965, 1968, 1983, 1984; Bécares 1983; Mas 2000; Solís 2015; Fernández 2022; De Lara 2025).

A comparison is proposed between the



**Figure 30.** Simple graphic units of anthropomorphs in the cave. Arranged in panels and numbered (ascending order). a) Phi-shaped anthropomorph 167 (Bécares 1983). b) Swallow-shaped anthropomorph 188, partially preserved (Bécares 1983). c) Cruciform anthropomorph 212 (Bécares 1983). d) T-shaped anthropomorph 267 (Bécares 1983). e) Anchor-shaped anthropomorph 268 (Bécares 1983). f) Mixed anthropomorph 565 (Bécares 1983). g) Incomplete phi-shaped anthropomorph 566 (Bécares 1983). h) Anthropomorph with an undetermined typology 765 (Bécares 1983). i) Swallow-shaped anthropomorph 813 (Bécares 1983). j) Phi-shaped anthropomorph 837 (Bécares 1983). k) Mixed anthropomorph 872 (Bécares 1983). l) Y-shaped anthropomorph 892.

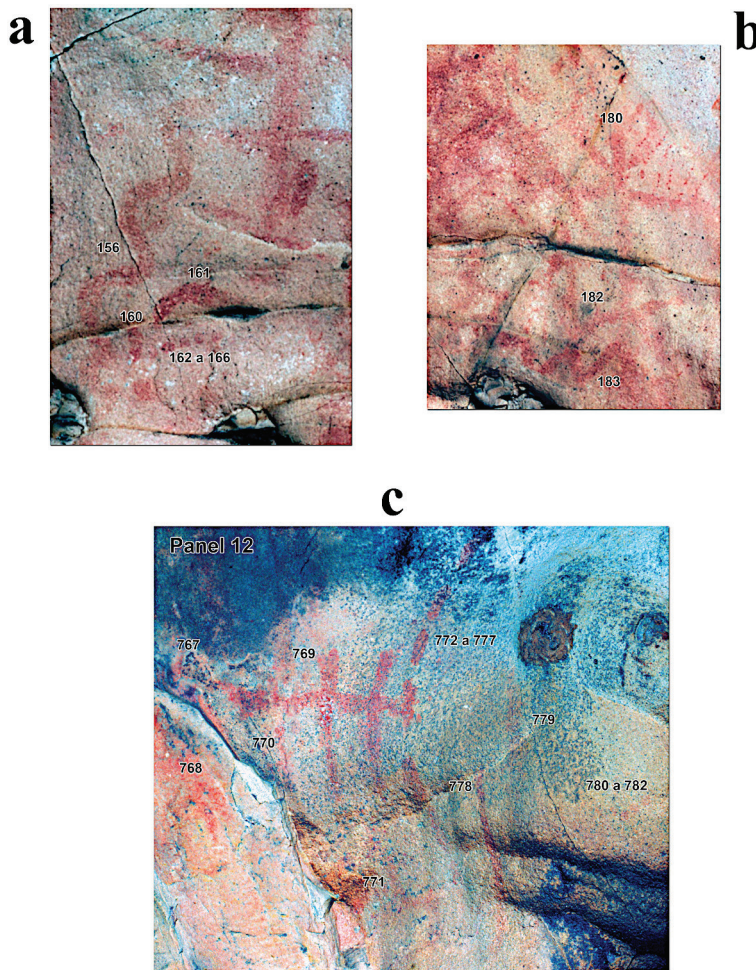
supposed bird or quadruped 170 of the Atlanterra Cave and the schematic zoomorph with a naturalistic tendency 63 in panel B of the Tajo de las Figuras Cave, which Martí Mas described as a bird with a naturalistic tendency or a quadruped with bird-like features from the Lower Holocene phase (Mas 2000) (Figs 28a and 28b). In the case of the Atlanterra Cave, the zoomorph would also be integrated into the early



**Figure 31.** Complex graphic units of anthropomorphs in the cave. Arranged in panels and numbered (ascending order). A diverse colour scheme was implemented to facilitate identification. a) Group of elements 159: three double T-shaped anthropomorphs (Bécares 1983). b) Group of elements 274: two anthropomorphs (Bécares 1983). c) Group of elements 769: a double pectiniform motif (Bécares 1983).

post-Palaeolithic phase in line with the undetermined quadruped 98. Subsequently, a phase dominated by the typical schematic figures would develop, altogether abandoning the naturalistic tendencies.

Plant motifs are unusual in the schematic post-Palaeolithic art context, but this does not mean that they have not been 'identified' before in this period (Acosta 1965, 1968; Alonso and Viñas 1977; Viñas 1982; Fortea and Aura 1987). The supposed plant-like motif 174 in the Atlanterra Cave exhibits some parallel morphology with the supposed plant-like motif in panel 2 of sector 1 in the Palomas I Cave (Solís 2015), which was attributed to the early post-Palaeolithic phase of this site (Fig. 29). It is important to note that the interpretation of this complex group of elements as a plant-like motif is a possibility that is proposed based on the



**Figure 32.** Digital filtering to improve the visibility of panels 4 and 12. The numbers present a white outline to ensure comfortable visibility. a) Meandering sign 156, barred line 160, curved sign 161 and group of dots from 162 to 166 in panel 4. b) Group of elements 180, 182 and zigzag motif 183 in panel 4. c) Lines 771 and 778 close to the other elements in panel 12.

large number of elongated and crossed elements that conceptually coincide with other motifs such as the one previously mentioned.

### 3.3. Post-Palaeolithic phase of typical schematic art

This phase would mark the conclusion of the naturalistic tendencies in the Atlanterra Cave. All changes could signify a conceptual transformation in human groups and, concurrently, an evolution of human behaviour and societal structures. The predominant motifs during this phase consist of the schematic anthropomorphs found in the Atlanterra Cave, whose typologies are rooted in the typical Iberian schematic art (Acosta 1965, 1968; Bécares 1983) (Figs 30 and 31). Comparing these typologies with the schematic art of the region and beyond has allowed us to find clear parallels and, together with the analysis of the motifs themselves, to contextualise them in the third and last phase of the site (Acosta 1965, 1968; Bécares 1983; Hernández et al. 1988; Muñoz 1988–1989; Martínez

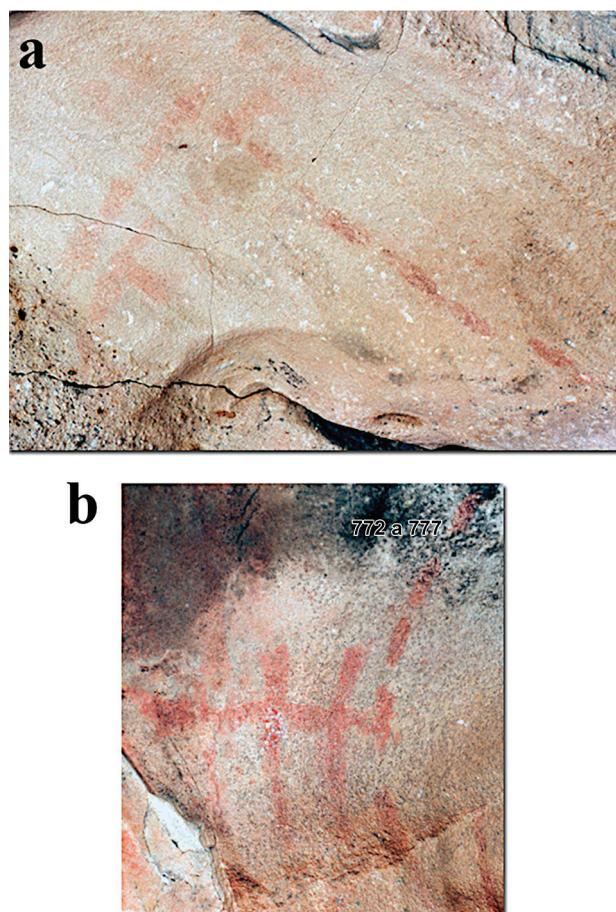
1999; Mas 2000; Torregrosa and Galiana 2001; Guillem and Martínez 2006; Collado and García 2015; Solís 2015, 2022).

A diverse symbolic graphic repertoire would emerge in this phase, in line with the corpus of post-Palaeolithic Iberian art. In this regard, the presence of meandering 'signs' and at least one line and one zigzag 'sign' (Fig. 32) is also evident. This hypothesis, which is supported by the local and external parallels demonstrated herein, is based on the similar or better preservation of these motifs in comparison to others ascribed to this post-Palaeolithic phase. Thus, the curved 'sign' would be part of this phase (Fig. 32a). It is noteworthy to mention line 771 in panel 12, which, despite its faded state, exhibits a technical execution analogous to that of the other elements attributed to the post-Palaeolithic phase of typical schematic art (Fig. 32c). Its poor state of preservation can be attributed to an application with little pigment load that tends to disappear as the line descends. This results in a variation in the tone in relation to other post-Palaeolithic elements, although there is, at the same time, a certain chromatic affinity with them and a patina that is strikingly similar to the rest of the figures. This example illustrates the problem that not all the faded motifs must be much older than the others; therefore, as we have done in all cases, a thorough analysis of both their patina and technical execution is necessary to ascertain the true age of the elements. Moreover, it is probable that the generally simple and not very dense groups of dots, whose preservation resembles other post-Palaeolithic motifs found in proximity, can also be included in this phase (Fig. 32a).

Likewise, some of the barred lines of the site would be included in this phase, despite forming graphic units analogous to those observed in the Palaeolithic phase. An example of this phenomenon is the curved group of barred lines from 772 to 777 in panel 12, which presents a conceptual unity similar to the group of barred lines from 105 to 102 in panel 2 (Fig. 33). However, a discernible affinity was identified between the group of barred lines from 772 to 777 and the group of elements 769, composed of two schematic anthropomorphs, which suggest a congruence in temporal frames.

We then analysed the groups of elements attributed to this period. In panel 3, we observed the group of elements 119 superimposed on the 'deer' protome 120. The group of elements 116 and the meandering 'sign' 118 exhibit notable parallels with the group of elements 119 in several aspects, including the colours, the irregular preservation of their pigments and the painting techniques employed. Additionally, the

**Figure 33.** Digital filtering of panels 2 and 12 with Photoshop. a) Group of barred lines from 105 to 112 in panel 2. b) Group of barred lines from 772 to 777 in panel 12. The numbers present a white outline to ensure comfortable visibility.



pigment traces 155 are superimposed on the 'deer' protome 120 as well (Fig. 34).

Further analyses on these groups allowed us to identify the group of elements 180 in panel 4, whose painting techniques, comparative preservation and patina appear to associate it with this post-Palaeolithic phase (Fig. 32b). A similar observation can be made about the group of elements 182, located in the space beneath the group of elements 180. Given the presence of matching characteristics with the other elements, we may assume it to be part of this phase (Fig. 32b).

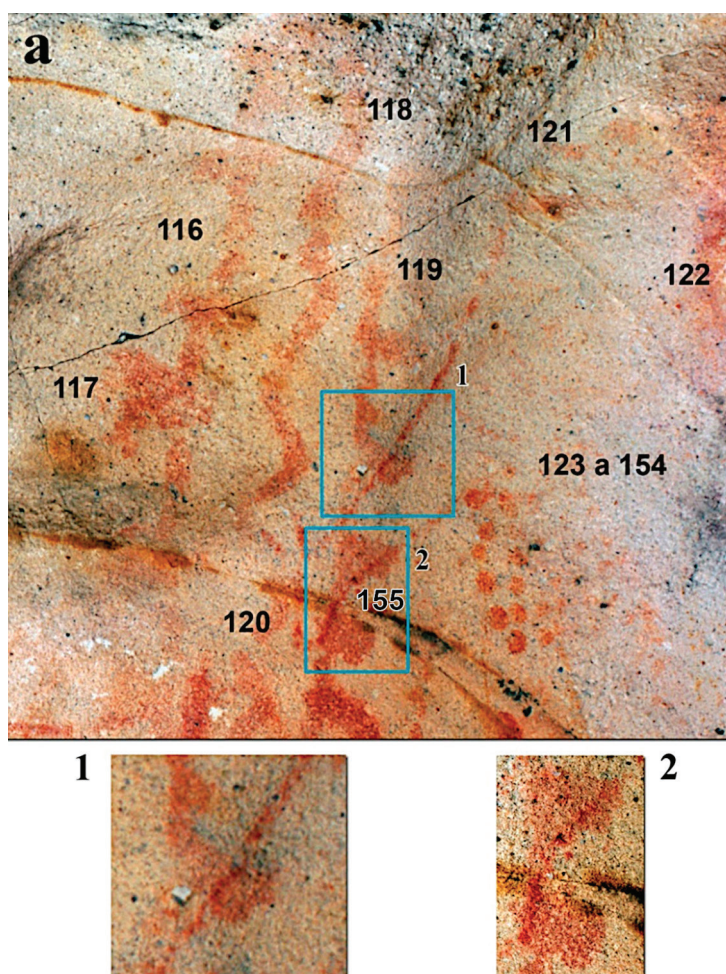
However, the group of element 244 in panel 5 is more controversial. The motif in question is in close proximity to the groups of the nearly imperceptible dots from 235 to 236, from 249 to 258, and from 260 to 262 we have already studied (Fig. 35). The significant disparity in pigment preservation between this group of elements and those mentioned above may point to a later execution of the group of elements 244 with respect to the other related elements. Nonetheless, due to the distinct nature of their typology, we cannot confirm their chronology definitively, based solely on parallels.

The techniques employed during this phase include thick lines (0.6–0.9 cm), the predominant technique; finger painting, used to execute dots; and mixed lines, a combination of thin lines with thick lines.

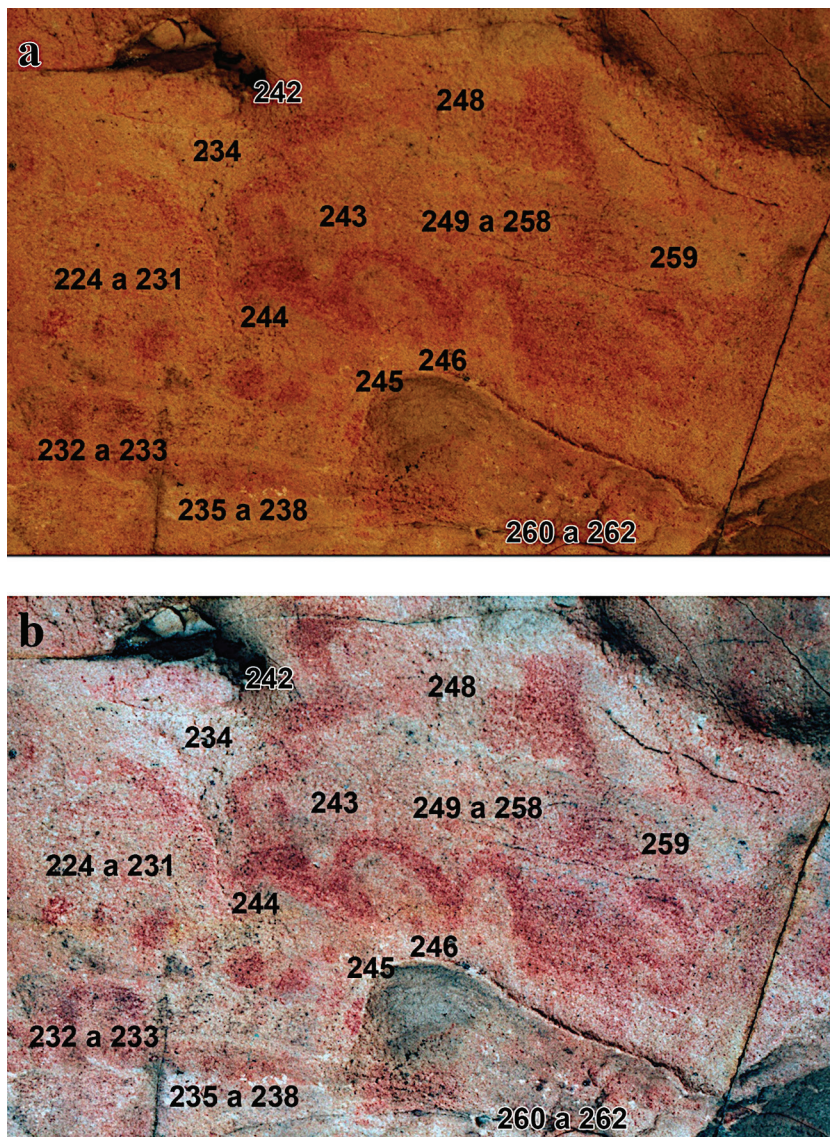
#### 4. Conclusions

Our study of Atlanterra Cave identified three phases that suggest that this cave art content has accumulated in a sequence over a long period.

The initial phase is the Palaeolithic phase. Our findings confirm that the period during which this phase developed would be longer than previously estimated. This phase is characterised by the presence of complex and dense groups of dots, simple groups of parallel lines of different lengths, individual lines, groups of barred lines, groups of elements, one line, one elongated curved motif, one circle motif, one inverted-U motif, one zigzag



**Figure 34.** Superimpositions in panel 3. a) Digital filtering of panel 3. Number 155 has a white outline for better visibility. 1) Close-up view of the superimposition of the group of elements 119 on the 'deer' protome 120. 2) Close-up view of the superimposition of the pigment traces 155 on the 'deer' protome 120.



**Figure 35.** Panel 5. Some numbers present a white outline to ensure better visibility. a) Original photo. b) Digital filtering to improve visibility.

and five zoomorphs. Among the zoomorphs, we were able to find two 'horse' protomes (859 and 522), two 'deer' protomes (120 and 883) and a supposed undetermined quadruped protome (176). In addition, this phase is characterised by a diverse array of techniques, including numerous techniques that are exclusive to this period.

Secondly, the early post-Palaeolithic phase: a relatively brief period during which we observe the last naturalistic vestiges of the previous phase in the form of two schematic zoomorphs with a naturalistic tendency and at least one supposed plant-like motif. From a technical standpoint, this phase is very limited, as only the presence of thick lines has been identified.

Finally, the post-Palaeolithic phase of typical schematic art. This period marked a significant shift from the previous subjects used in the motifs; all traces of that naturalistic approach disappeared in favour of the human being, who assumed a central role in

the iconography of the cave. This conceptual transformation in the human groups may have developed in tandem with the evolution of human behaviour and societal structures. Regarding the graphic repertoire in this phase, we identified several simple and complex graphic units of anthropomorphs, which underwent a significant simplification process that culminated in the Y-shaped anthropomorph, meandering lines, at least one zigzag, individual lines, groups of barred lines, groups of elements, one curved 'sign' and simple, not very dense, groups of dots. The techniques employed during this phase may not be as varied as those utilised in the Palaeolithic phase, although they do incorporate a new technique that is distinct from the preceding ones: a combination of thin lines with thick lines.

The distribution of the representations belonging to the three different phases shows us the broad presence of Palaeolithic motifs dispersed across most of the rock surface utilised. Most figures from the later phases adapt to the spaces already occupied during the Palaeolithic phase, either coming into contact with the previous representations or being situated close to them. The motifs of the early post-Palaeolithic phase are concentrated specifically on the left side of the site (panels 1 and 4). Superimpositions emerge not only as a means of imposing themselves in the space but also as a way

of reinterpreting or reusing the meaning of the figures. This phenomenon has been previously discussed in the context of the anthropomorph 813 and the group of elements 814 in panel 13. In numerous instances, when the motifs of the post-Palaeolithic phase of typical schematic art are compared to the Palaeolithic ones, it can be observed that the former acquires a significant size with respect to the latter, probably in an attempt to enhance the iconography of the new culture in a place previously dominated by the Palaeolithic practices.

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