



International Erasmus Mundus Master in
QUATERNARY AND PREHISTORY



**The Font Major Cave: chronological and morphological
discussions of engravings of Panel 11 Sector 2**

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Abstract

This paper aims to give a chronology to Panel 11 Sector 2 of Font Major Cave located in Catalonia, Spain, by reviewing Magdalenian characteristics, Von Petzinger's geometric signs, and applying stylistic dating. Results agree with the previous study that most of the engravings belong to the Magdalenian period; however, they have yet to determine the chronology; thus, further method is needed. The panel's major representation is loops, a very original typology that cannot be found in any rock art. Loops are discussed regarding their handling, the possibility of children scribbling, and the possibility of the writing system. Loos might be created in a single scheme by children or adults under abstract ideas or concepts, but they cannot be interpreted as a proto-language writing system.

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1 Introduction

1.1 The Font Major Cave

The Font Major cave, originally named la Cova de la Font Major, is part of the karst complex called Coves de l'Espluga, located northeast of the Iberian Peninsula [Figure 1 & 2 (map)]. The karst system is binary, with underground conduits formed from surface water infiltration and an underground conglomeratic aquifer. The conglomerates in the area are associated with the Delta del Montsant fan and fill the southern edge of the Ebro Basin. The hydrographic basin of the karst system spans 37 square kilometers, encompassing part of the Ebro basin and the Prades mountains. The basin's boundary ss of the Panel is defined by the Poblet fault, which separates Paleozoic materials from tertiary ones, resulting in diverse lithologies and structures. Surface water from ravines like Titllar and Tornés infiltrates the karst system, supplemented by autochthonous sources like sinkholes and conduits in the Riudabella bar and La Mata exo-karst forms. These geological features make the Font Major cave a well-developed example of karst in conglomerates, ranking third longest in Catalonia and seventh longest in the world (Fontanals & Igniaco, 2012).

The cave, UTM coordinating N(X): 341.354 and N(Y): 4.584.707, is 411 m above sea level with a known route of almost 4 km. The current entrance of the cave is located in the north of Espluga de Francolí, 70 m from the Francolí River and the Font Major. It develops eastward through the town's subsoil with only 10-15 m depth (Salas, 2022a).

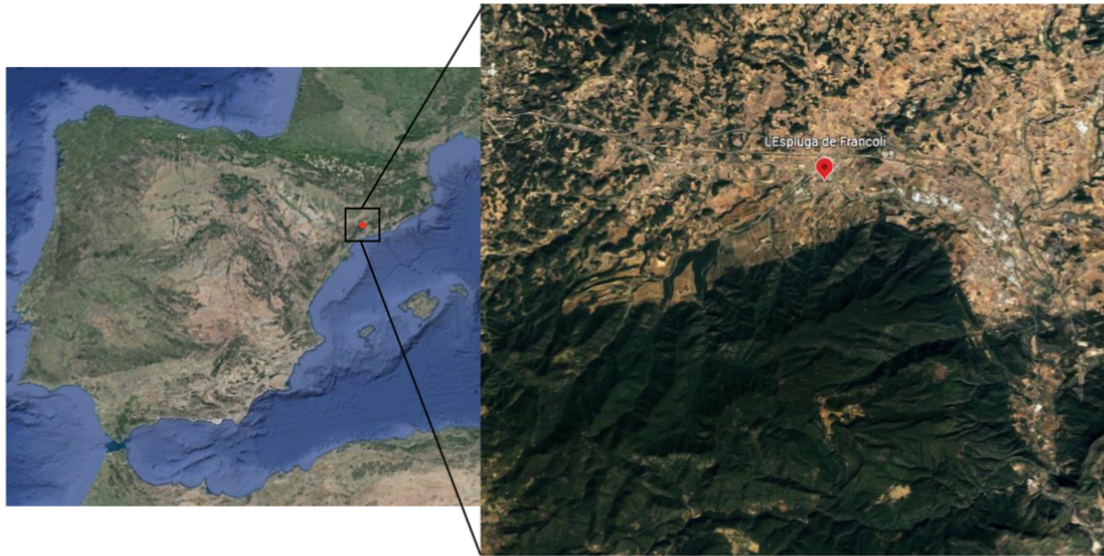


Figure 1. Location of the Font Major Cave (Institut Cartogràfic i Geològic de Catalunya)

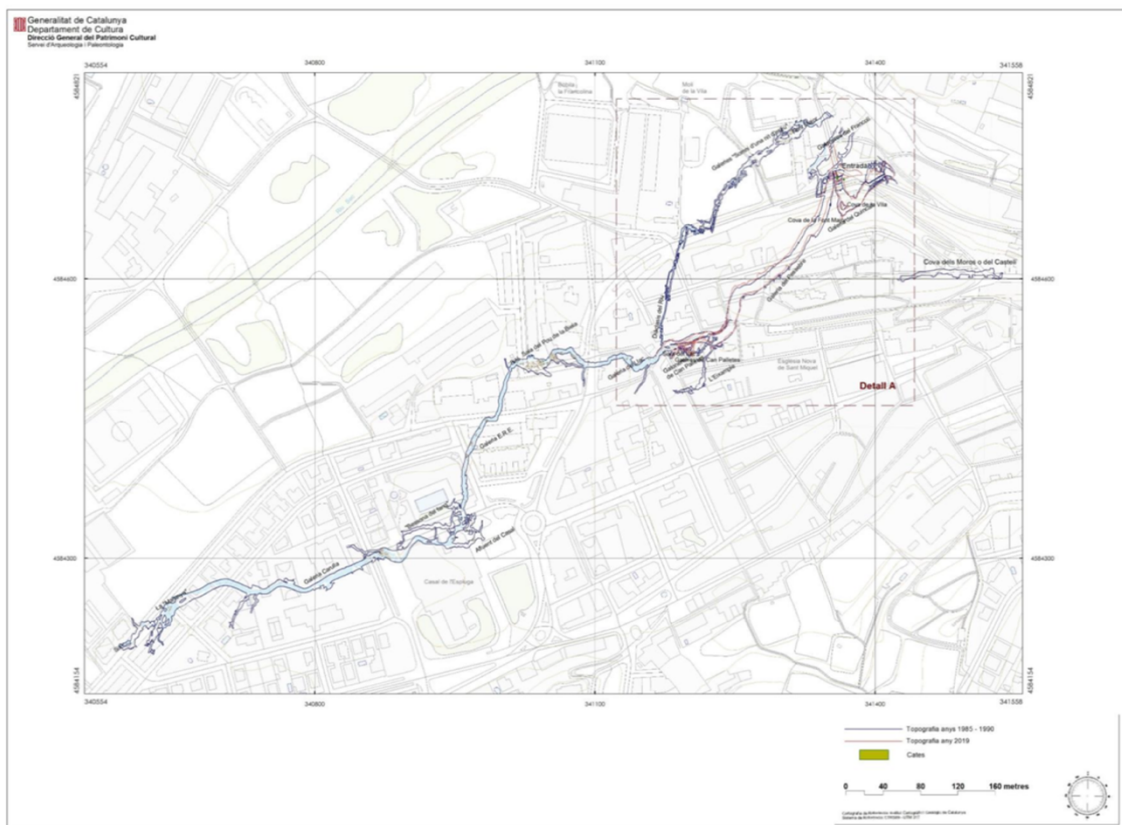


Figure 2. Map of Font Major Cave (Generalitat de Catalunya: Departament de Cultura)

In 1853, the Font Major cave was rediscovered after drilling in the Cal Palletes urban area. However, this led to explorations, looting, and sediment removal for industrial

purposes; thus, until 1963, cave access was restricted to only scientific purposes. In 1956, it was recognized as an archaeological site due to the discovery of a Neolithic funerary site by Salvador Vilaseca. Vilaseca continued documenting archaeological findings up to the 1960s, from the Bronze Age to the Medieval period. In the 1990s, four archaeological interventions took place, discovering materials from the Middle Paleolithic to the Epipaleolithic period but requiring more contextualization. In 2011, a preventive archaeological excavation by IPHES (Institut Català de Paleoecologia Humana i Evolució Social) revealed well-stratified archaeological materials dating back to the late Cardinal Neolithic period. In 2019, another campaign was conducted, further revealing Paleolithic and recent prehistoric materials. Later, from 2019 to 2020, GRESEPIA (Grup de Recerca Seminari de Protohistòria i Arqueologia) intervened in protohistoric levels of the Sala del Llac, possibly associated with votive practices from the 8th to 6th centuries BCE, as part of a broader project on paleoenvironmental evolution and prehistoric settlement in the Francolí, Gaià, Siurana rivers, and Camp de Tarragona streams (Salas, 2022b; Vergès & Viñas, 2020).

The study of the rock art ensemble, conducted in 2020, was significant research. It led to the location of 263 graphic records, consisting of 374 units, distributed over 36 panels spread across the five sectors into which the Gatones de cal Palletes have been divided. The 374 units are composed of 364 Paleolithic engravings, six paintings (four red finger markings and two black strokes) of Paleolithic characters, and three groups of engravings that form part of a complex unit of undetermined chrono-cultural assignment. Stylistic analysis revealed that most engravings were done during the Upper Paleolithic, especially in the Magdalenian period. However, some elements may be slightly earlier or later, such as Neolithic or even more recent times (Fontanals et al., 2020).

All the representations are located in dark spaces, and artificial light sources are required. Furthermore, where series exist, it is difficult to access, and conduits extend for 60 m. The figures were engraved on the layers of lower Oligocene marls that are interspersed with calcareous conglomerates, which are sandy silts, a relatively soft support that adds fragility to the preservation of the ensemble (Salas, 2022b).

The classification of graphic elements shows that non-figurative records are the majority of the ensemble, and more than 50 figurative units, mainly horses and deer, have also been documented. Partial afterward modifications and modern graffiti sometimes overlap with the prehistoric engravings observed. Additionally, some of the engravings have been destroyed or affected by the flames of carbide lamps (Fontanals et al., 2020; Vergès & Viñas, 2020).

1.2 Panel 11 Sector 2

Panel 11 Sector 2 (P11-S2) [Figure 3] is located in the Galeria Est and the Galeria del Pou de Cal Palletes in a semi-enclosed space with the dimensions of 155 x 56 x 70 cm. However, the engravings are concentrated in a 130 x 60 cm area, 10 cm high from the ground (Salas, 2022b).

This paper will discuss the dating and how it the Panel 11 Sector 2 was made, using several approaches.



Figure 3. Photographic model of Panel 11 Sector 2 (Salas, 2022b)

2 Previous study of Panel 11 Sector 2

This panel has been studied by Salas, M., PhD student at Institut Català de Paleoecologia Humana i Evolució Social (IPHES). In this section, her previous study will be summarised.

The panel was documented using photogrammetry (Nikon D750 DSLR camera). Further 3D data was obtained using Agisoft Metashape Professional 1.6. Also, laser scanning (Shining 3D EinScan Pro 2X Plus laser scanner) with the 3D model processed using Geometric Wrap 2017.0.0.111 (Salas, 2022b) [Figure 4].

It is divided into seven areas for detailed 3D views and analyzed to record the graphic units and their relationships accurately. The process involved importing images into a drawing program for layer-based analysis and reviewing tracings through direct observation. The final composition was unified using orthophoto references despite some unavoidable deformation (Salas, 2022b).

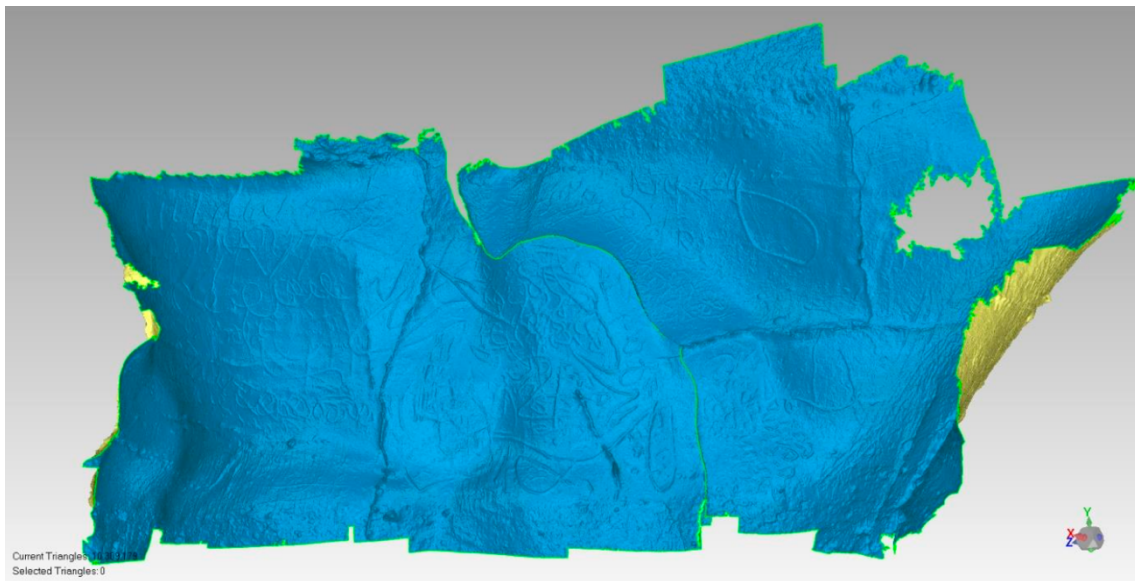


Figure 4. Laser scanner model of Panel 11 Sector 2 (Salas, 2022b)

For the analysis, the panel is divided into three zones: Zone 1, Zone 2, and Zone 3, according to the support's natural relief [Figure 5]. The engravings are located full field in Zone 1 and 2, while in Zone 3 they are mainly concentrated on the left, which is structured according to the morphology of the support [Figure 6]. It consists of 272 graphic elements, cataloged into 21 typologies with their own sub-typologies by Salas under the cataloging proposal by Dr. Ramon Viñas for the rock art ensemble [Figure 7 (graphic units)]. All engravings of this panel correspond to non-figurative geometric representation, except for a single recognizable figurative element described as a quadruped, which may be a goat. The most represented structure in all zones is the "Loop"

typology, with 25.74%, including 70 isolated loop forms and 5 groups with a total of 18 loops in connected series [Figure 8]. In Zone 1, the loops are connected, while in Zones 2 and 3, they tend to be more isolated. In addition, distributions of representations differ in zones: while in Zone 1 the engravings run horizontally, in Zones 2 and 3 they are more organized vertically or without an evident pattern, with many overlaps (Salas, 2022b).



*Figure 5. Three zones defined by Salas (2022b). From left: Zone 1 (orange), Zone 2 (blue), Zone 3 (green).
(Salas, 2022b)*



Figure 6. Topographic record of Panel 11 Sector 2 (Salas, 2022b).



Figure 7. Topographic record of Panel 11 Sector 2 with the enumeration of the graphic units (Salas, 2022b).

TIPOLOGÍA	Nº	%
"B"	1	0,37
"L"	1	0,37
"P"	1	0,37
"U"	19	6,99
"V"	8	2,94
Agrupamiento	9	3,31
Anguloso	10	3,68
Bucle	70	25,74
Círculo	2	0,74
Cuadrúpedo	1	0,37
Curvado	38	13,97
Inscripción	2	0,74
Ondulado	9	3,31
Ovalado	2	0,74
Rectangular	3	1,10
Rectilíneo	66	24,26
Romboide	1	0,37
Semicírculo	1	0,37
Sinuoso	17	6,25
Triangular	4	1,47
Zig-Zag	7	2,57
Total	272	

Figure 8. Identified typologies of P11-S2 with the recognized units of each category (No.) and their percentage with respect to the total (%) (Salas, 2022b).

Further, Salas (2022b) creates two basic analytic categories to catalog the representations: **graphic unit**, which refers to individual graphic concepts characterized by presenting an evident continuity of the stroke, either by entering into physical contact and/or by the formal aspect, and **graphic set**, which refers to the grouping of graphic units by the formal aspect and the dimensional and morphological values of the layout.

The grouping of graphic units was based on similarities in formal aspects, outline characteristics, and superimpositions, primarily using high-resolution 3D laser scan models for precise measurements. The execution order of engravings was identified by observing superimpositions and reviewed with the 3D model. A new methodology using Morphometric Geometry was applied to analyze groove sections and identify the tools used, with a tentative test to ensure realistic archaeological results (Salas, 2022b).

Moreover, Salas (2022b) grouped the panel into ten graphic sets based on the formal analysis and the characteristics of the lines:

Group A: located in the upper part of Zone 1. The lines have a width of 6.4-11 mm and a depth of 0.9-1.6 mm, with black pigment inside the groove. It consists of graphic unit 1. The engraving states, "vui dia 14 dugy --- de 1199" [Translation: today day 14 --- of 1199] in Catalan language [Figure 9].

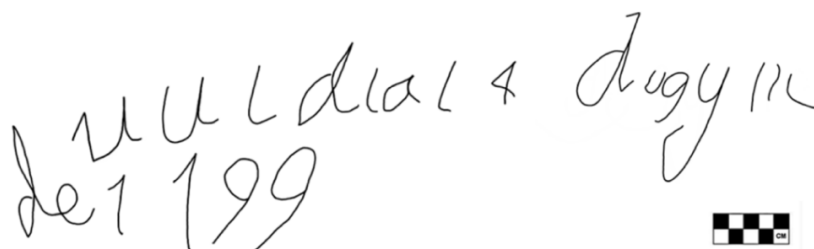


Figure 9. Topographic record of Group A (Salas, 2022b)

Group B: located across the entire field in Zone 1. The lines have a width of 4.4-5.2 mm and a depth of 0.6-0.7 mm. It consists of graphic units of no. 2-4, 6-9, 13-16, 29-39, 103, 215, 217, 219, 220, and 222 [Figure 10].



Figure 10. Topographic record of Group B (Salas, 2022b)

Group C: located in the central part of Zone 1 and 2. The lines have a width of 4.1-4.4 mm and a depth of 0.2-0.5 mm. It consists of graphic units of no. 18, 19, 21, 65-67, 79, 90, 93, 175, 204, 224, 255, and 256 [Figure 11].

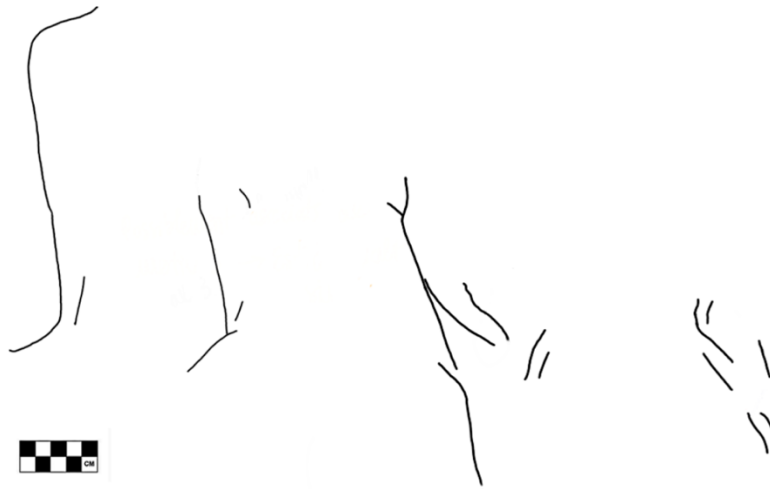


Figure 11. Topographic record of Group C (Salas, 2022b)

Group D: located in the entire Zone 2 and the left side of Zone 3. The lines have a width of 7.1-8.7 mm and a depth of 1.4-1.6 mm. It consists of graphic units of no. 12, 42–53, 57, 60, 63, 64, 68–77, 80–89, 91, 92, 94–102, 104–120, 122–174, 176, 177, 179, 181–189, 191–203, 205–214, 216, 218, 221, 223, 225–249, 251–254, 257–264, 268, 271, 272, 278 and 283. This group shows a notable superposition of the graphic units [Figure 12].



Figure 12. Topographic record of Group D (Salas, 2022b)

Group E: located in Zone 1 and Zone 2. The lines have a width of 3.4-4 mm and a depth of 0.2-0.3 mm. It consists of graphic units of no. 22-27 and 78 [Figure 13].



Figure 13. Topographic record of Group E (Salas, 2022b)

Group F: located in Zone 1 and Zone 3. The lines have a width of 10.8-11.7 mm and a depth of 1-1.4 mm. It consists of graphic units of no. 5, 178, and 277 [Figure 14].



Figure 14. Topographic record of Group F (Salas, 2022b)

Group G: located in Zone 1 and Zone 3. The lines have a width of 16.2-17 mm and a depth of 1.3-1.7 mm. It consists of graphic units of no. 28 and 190 [Figure 15].



Figure 15. Topographic record of Group G (Salas, 2022b)

Group H: located in the upper part of Zone 3. The lines have a width of 6-6.7 mm and a depth of 1-1.4 mm. It consists of graphic units of no.262, which has been engraved "Anto Oll -- e," supposed to be a name [Figure 16].

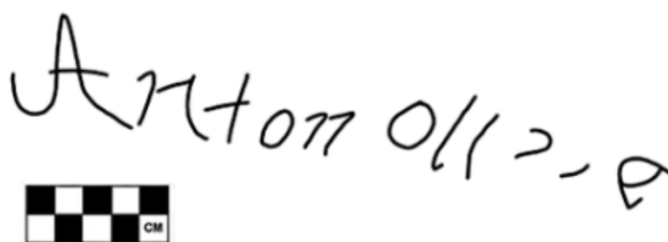


Figure 16. Topographic record of Group H (Salas, 2022b)

Group I: located in Zone 2. The lines have a width of 6.8-8 mm and a depth of 0.6-1.3 mm. It consists of graphic units of no.10, 40, 41, 54-56, 58, 59, 61, 62, 265, and 266 [Figure 17].



Figure 17. Topographic record of Group I (Salas, 2022b)

Group J: located in Zone 1. The lines have a width of 6.8-6.9 mm and a depth of 0.4-0.8 mm. It consists of graphic units of no. 11. It shares the formal characteristics of Group G, which are large elements and highly eroded lines [Figure 18].



Figure 18. Topographic record of Group J (Salas, 2022b)

Salas (2022b) mentioned that the panel contains fine rectilinear elements, occasionally intersecting and forming sinuous shapes. Similar elements have also been identified in other sections of Cova de la Font Major. These elements have yet to be counted as graphic units in P11-S2 since it is still being determined whether they are of anthropic origin, the result of faunal activity, or a combination of both.

Next, Salas (2022b) arrived at concluding the execution order based on graphic sets according to the superpositions, the analysis of the internal spatial distribution of the panes, and the philological criteria [Figure 19 & 20].

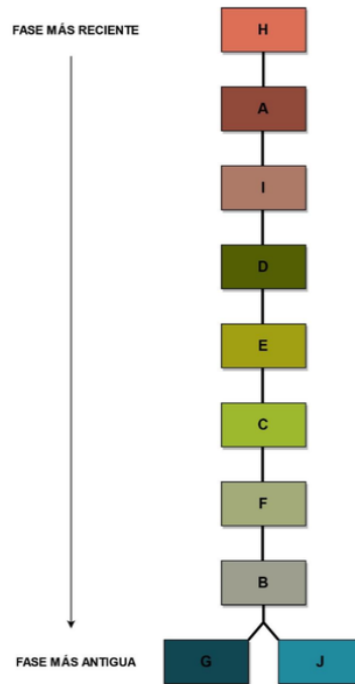


Figure 19. Order of execution of the engravings of P11-S2 based on the graphic sets. The top is more recent, down to the oldest (Salas, 2022b).



Figure 20. The order of execution is reflected in the color tones assigned to graphic sets (Salas, 2022b).

Salas (2022b) applied Geometric Morphometrics to examine the tools used to create engravings on P11-S2. The PCA analysis of 70 sections from 10 sampled inscriptions showed a heterogeneous data distribution. The analysis identified three section distribution trends: differences along the X-axis, Y-axis, and both axes. The graphical units exhibited varying degrees of symmetry and depth. Confidence ellipses and CVA analysis highlighted that most graphs overlapped, except for two isolated ones, indicating distinct morphological characteristics. In other words, while most engravings showed some overlap, the two appeared distinct based on their overall shape and depth of the lines, suggesting that there is promise for Geometric Morphometrics as a tool to study the tools and techniques used by past societies.

However, Salas (2022a & 2022b) added that the results of Geometric Morphometrics analyzed engravings made with a single tool, but found variations in their form throughout the design. This suggests that factors beyond the tool itself influence the engravings' shape; for example, the morphological variability of the sections is due to the various hand positions during the engraving of the closed graphic units. Although this variability cannot be solely attributed to hand position, other factors such as the plasticity of the medium, the pressure applied, the direction of the incision, the engraver's handedness, or the tool's characteristics may also play a role. Thus, she proposed further experiments to analyze linear engravings with a consistent direction to minimize hand position influence. Moreover, an experimental archaeology program should be conducted to test her ideas and confirm the effectiveness of using Geometric Morphometrics to identify engraving tools.

In her paper (Salas, 2022b), she also used Stylistic Parallel to discuss chronological approximation and chrono-cultural insertion of P11-S2, mainly focusing

on loop typology. She gave examples of several prehistoric Iberian arts with similar representations and pointed out that most of the panel's engravings could belong to the Magdalenian period.

In the end, Salas (2022b) highlighted the uniqueness of Panel 11 Sector 2 and the significance of the discovery of the Cova de la Font Major in northeastern Spain. It stands out in Catalonia for its numerous, varied, and high-quality engravings depicting over 360 zoomorphic figures. It is considered the first rock art sanctuary in northeastern Iberia, suggesting the potential existence of similar sites that could expand the understanding of Paleolithic art in the Mediterranean region.

This paper will use the identifications, numbering, graphic units, and graphic sets that Salas (2020b) has created.

3 Magdalenian culture

As mentioned previously, the majority of representations of Panel 11 Sector 2 have been agreed to belong to the Magdalenian Culture. In this chapter, the chronology and characteristics of Magdalenian art have been reviewed and compared with the P11-S2.

3.1 Definition of Magdalenian

The Magdalenian are the Late Upper Paleolithic hunter-gatherer communities that occupied northern and western Europe from 11,000 to 17,000 years ago. The classic Magdalenian is concentrated in southern France and northern Spain, where the name is

taken from the rock shelter of La Madeleine in the Dordogne Valley of southwest France. Magdalenians led a semi-settled life amidst abundant food sources, including reindeer, wild horses, bison, and fish. They lived in caves, rock shelters, or substantial dwellings in winter and tents during summer. The period saw a significant population increase, with French population estimates rising from 15,000 in Solutrean times to over 50,000 in Magdalenian times. The culture's decline coincided with the warming climate at the end of the Würm Glacial Period, which led to the scarcity of herd animals. The subsequent Azilian culture was much simpler, reflecting a decrease in available resources and the leisure time that had allowed for the rich cultural expressions of the Magdalenian period (Darvill, 2008; The Editors of Encyclopedia Britannica, 2023).

The Magdalenian stone industry is distinguished by small geometrically shaped tools, such as triangles and semilunar blades, likely mounted into bone or antler handles for use. It also includes burins, scrapers, borers, backed bladelets, and shouldered and leaf-shaped projectile points. Additionally, bone was used extensively to craft wedges, adzes, hammers, spearheads with link shafts, barbed points and harpoons, eyed needles, and jewelry. Other artistic productions, such as rock art, flourished during this period, starting with simple line drawings and evolving into highly naturalistic and detailed engravings and carvings. Later, Magdalenian art featured remarkable cave engravings and polychrome paintings, exemplified by sites like Altamira in Spain (Darvill, 2008; The Editors of Encyclopedia Britannica, 2023).

3.2 Dating and characteristics of Magdalenian rock art

According to González (2007), dating Magdalenian cave art in Cantabrian Spain relies on:

- **Superimpositions:** The series of overlapping figures found on cave walls in a few key sites, such as La Peña del Candamo, Tito Bustillo, Llonín, Altamira, El Castillo, La Pasiega, and La Garma Lower Passage, help establish timelines. These main cave art centers were used extensively during the Upper Paleolithic, contrasting with other sites featuring fewer and more stylistically uniform depictions. This method is limited as it requires finding caves with these layers and often only provides relative dating (earlier vs. later).
- **Mobile Art analogy:** Comparing motifs and techniques of cave paintings to decorated objects found in archaeological layers with established dates allows for chronological ordering. Thus, identical themes represented in both forms provide significant insights. This is currently considered the most reliable method; however, variability in mobile art challenges the idea of strictly defined phases.
- **Radiocarbon Absolute Dating:** Primarily used for the Magdalenian period. This method directly dates organic materials associated with the artwork.

Superimpositions and mobile art analogy are the most effective for the later Magdalenian period. Caves like La Peña del Candamo or Altamira show evidence of repeated use over a long period, making them valuable reference points for dating other cave art. Another method, the correlation of stratigraphic sequences, yields good results for pre-Magdalenian periods but is less effective for Magdalenian, with limited successful applications in cases like the Cueva del Mirón.

González (2007) mentioned that naturalistic yet simplified depictions of hind's heads with striated chins and necks were a common motif in the early Magdalenian period, and highly schematic figures of ibex viewed from the front are identifiable from the middle Magdalenian period and become especially frequent in the late and final Magdalenian

(13,300-11,600 BP) in Cantabrian Spain. Other motifs, such as lines on mobile artifacts and "tectiforms" on cave walls, are less common and standardized, making their identification more controversial. This includes combinations of longitudinal and oblique lines, scalariform compositions, and similar patterns.

What González (2007) concluded for Cantabrian Spain is that Magdalenian art can be divided into two stages with noticeable changes in iconography (animals and signs) and possibly in stylistic aspects (less clear in cave paintings), especially in parietal art. The significant transition between these stages is not between the Middle and Late Magdalenian (around 13,000 BP) as previously thought, but instead at the end of the Early Magdalenian and the beginning of the Middle Magdalenian (around 14,7000-14,200 BP). During this period, decorated objects in stone, bone, and antler became more common, and large animal compositions, particularly of bison, appeared more frequently. This contrasts with the earlier, more dispersed figures of the early Magdalenian [Figure 21].

Early vs. Middle Magdalenian (González, 2007)

Early Magdalenian	Middle Magdalenian
Less artwork overall, with some large compositions (mainly Peña de Candamo and Llonín).	Significant increase in artwork.
More depictions of hinds, with a balance of bison, ibex, reindeer, horses, stags, and aurochs.	More decorated objects and cave paintings with large animal compositions.
Specific Cantabrian abstract signs (quadrilateral, oval, classic claviform).	Increased focus on bison, ibex, and reindeer, with fewer hinds.
	Horse, stag, and auroch depictions remain stable.
	Shift in abstract signs to "late claviforms" similar to those found in the Ariège region.

Figure 21. Characteristics of Early and Middle Magdalenian by González (2007).

3.3 Comparison of Magdalenian characteristics and the Panel 11 Sector 2

In Panel 11 Sector 2 there is one possible quadruped animal with a highly schematic profile of head and neck; the rest of the engravings are abstract signs and alphabets observed in Group A and H. The alphabet does not belong to the Magdalenian period, so it will not be discussed in this section.

As mentioned in the previous section, the key images of Magdalenian art are naturalistic yet simplified depictions of hind's heads with striated chins and necks or highly schematic figures of ibex viewed from the front. The high schematic profile of a quadruped animal (graphic unit no.190) of P11-S2 [Figure 22] is similar to other images that can be observed in other Magdalenian caves, such as Altamira Cave, Las Chimeneas Cave, and El Castillo Cave [Figure 23, 24, 25]. It does not fully follow the trend of Magdalenian naturalistic art but still has a similar reference to a very simplified animal profile. However, it must be considered that the variability of iconographic languages (= styles) is very wide within the same chronological and cultural ranges; no. 190 is more schematic or unfinished, it makes it difficult to ascribe a chronology from how it looks and cannot be determined as Magdalenian culture.

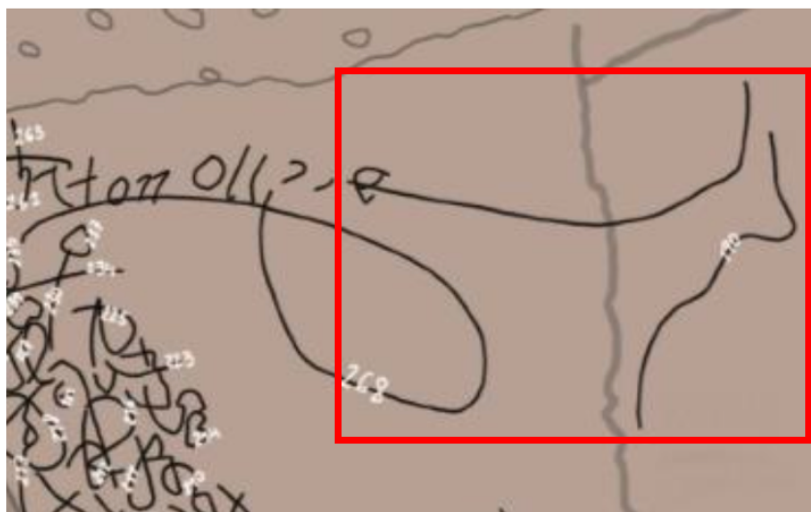


Figure 22. Graphic unit no. 190. A single recognizable figurative element described as a quadruped (Salas, 2022b).



Figure 23. Zoomorphic figure from Altamira Cave, Spain.



Figure 24. Zoomorphic figures from Las Chimeneas Cave, Spain.



Figure 25. Zoomorphic figure from El Castillo Cave, Spain.

Figure 23 (Ministerio de Cultura, <https://www.cultura.gob.es/mnaltamira/cueva-altamira/arte.html>)

Figure 24 (Meisterdrucke, <https://www.meisterdrucke.es/impresion-art%C3%ADstica/Prehistoric/550830/Dos-ciervos%2C-de-las-Cuevas-de-Altamira%2C-c.15000-a.C..html>)

Figure 25 (González & Cacho, 2003)

On the other hand, abstract art is the oldest known cave painting, a red-ochre disk or dot discovered at the El Castillo Cave in Spain, dating at least 39,000 BCE. Altamira Cave, also in Spain, is one of the representatives of Magdalenian culture. It has two abstract symbols (claviforms) dating at least 34,000 BCE [Figure 26]. Then, it took four thousand years after creating abstract art for Stone Age artists to start painting animal images. Abstract symbols indeed dominate parietal art, especially in the Franco-Cantabrian region, both in age and quantity. However, they were ignored by early archaeologists because they were not considered as important as figurative cave art (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

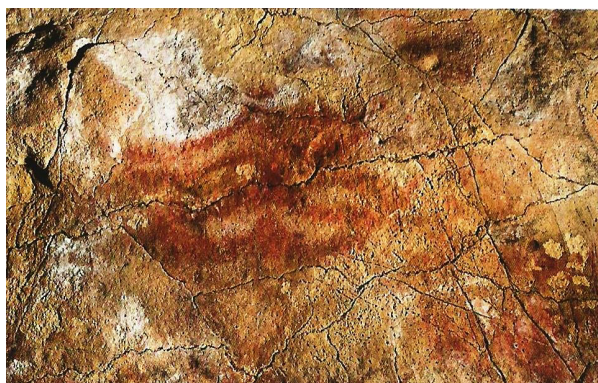


Figure 26. Horizontal claviforms from Altamira Cave (RockArtBlog, <https://rockartblog.blogspot.com/2019/08/claviform-symbols.html>).

The majority of representations in panel P11-S2 are abstract signs, which will be discussed in the following chapter.

4 Dating and discussion of abstract art

4.1 Von Petzinger's Geometric signs

Paleoanthropologist Genevieve von Petzinger investigated 146 Upper Paleolithic caves and rock shelters, mainly in France but also in Spain, Italy, and Portugal. This led to the discovery of symbol trends in European Prehistory. She proposed the most significant 32 geometric signs of Ice Age Europe (Von Petzinger, 2016) [Figure 27].

Von Petzinger observed that the most prevalent symbol in Ice Age caves in France is the line, present in 70 percent of the sites and spanning all periods from 30,000 to 10,000 BC. The following most common symbols are the open angle and the dot, both found in 42% of the sites. Most of the other symbols appear in about 20% of the caves. Furthermore, she mentioned that almost three-quarters of all the main prehistoric abstract signs were introduced during the earliest phase of the Upper Paleolithic Aurignacian era (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

In this chapter, the signs that appear in the P11-S2, from Von Petzinger's 32 geometric signs perspective, will be discussed, together with the distribution, dating, and other prehistoric cave examples.

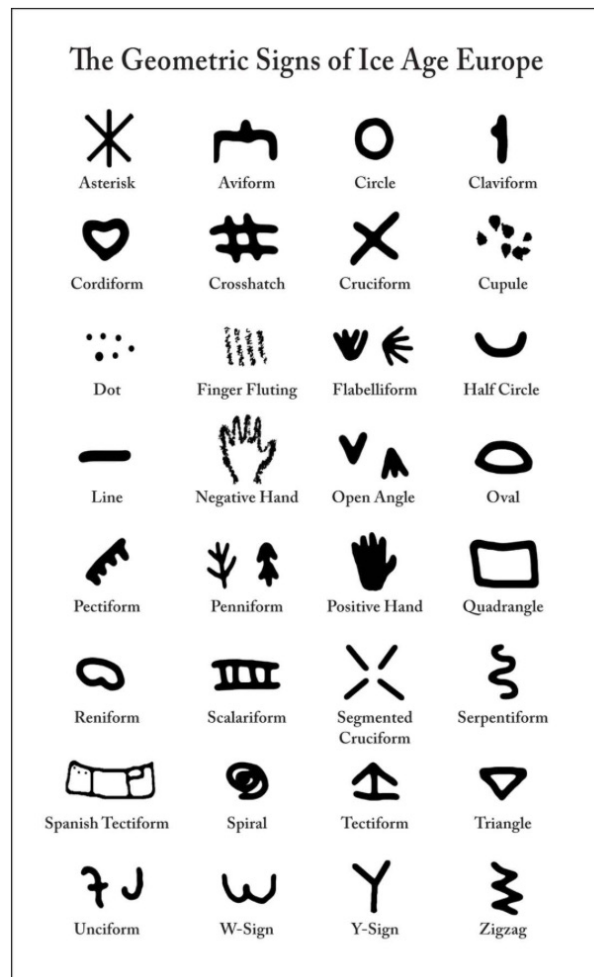


Figure 27. Von Petzinger's 32 geometric signs (Von Petzinger, 2016).

Circle

There are two circles in P11-S2, covering 0.74% of the engravings (Salas, 2022b). The circle shape is distributed widely, notably in southwest France and the Pyrenees. The majority of circle signs were created during the Aurignacian era. Their occurrence then

declined during the Gravettian and Solutrean periods before rising again in the Magdalenian period (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

Circles appears:

- Abri Castanet, Sergeac, Dordogne.
- Abri Cellier, Tursac, Dordogne.
- Erberua Cave, Hautes-Pyrenees.
- Lascaux Cave, Montignac, Dordogne.
- Les Trois Freres Cave, Hautes-Pyrenees
- Roucadour Cave Art, Quercy, Lot.

Half-Circle (Semicircle)

There is one half-circle in P11-S2, covering 0.37% of the engravings (Salas, 2022b). It has been used consistently throughout the Aurignacian, Gravettian, Solutrean, and Magdalenian periods, and it is distributed widely except in northern France (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

Half-Circle appears:

- Cognac Cave, Gourdon, Lot.
- La Baume-Latrone Cave, Sainte-Anastasie, Gard.
- Lascaux Cave, Montignac, Dordogne.
- Mas d'Azil Cave, Le Mas-d'Azil, Ariège

Oval

There are two ovals in P11-S2, covering 0.74% of the engravings (Salas, 2022b). Ovals are the fourth most common sign type, appearing at about 30 percent of French sites. During the Aurignacian and Gravettian periods, ovals were primarily found in the southwest (Dordogne), and then they shifted to the southeast during the Solutrean period. In the Magdalenian period, ovals were again predominantly concentrated in southwest France. It appeared throughout the Ice Age and disappeared around 11,000 BCE (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

Oval appears:

- Abri Blanchard Sergeac, Dordogne.
- Abri du Colombier II, Vallon-Pont-d'Arc, Ardeche.
- Le Fourneau du Diable Cave, Bourdeilles, Dordogne.
- Mayenne-Sciences Cave, Thorigne-en-Charnie, Mayenne.
- Sombre Cave, Saint-Martin-d'Ardeche, Ardeche.

Pectiform (comb-shape)

There is one pectiform in P11-S2.

Most of the pectiforms were created during the Magdalenaian; none are found in the Aurignacian or Solutrean in France. It has to be noted that the timings were probably different in Spain (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

Pectiform appears:

- Blombos Cave, South Africa.
- Etzeberri Cave, Camou-Cihigue, Pyrenees-Atlantiques.

- La Pileta Cave, Benaolan, near Ronda, Malaga, Spain.
- La Roque Cave, Peyzac le Moustier, Dordogne.
- Lascaux Cave, Dordogne.
- Les Fieux Cave, Miers, Lot.
- Marsoulas Cave, Haute-Garonne, Midi-Pyrenees.

Quadrangle

There are four quadrangles, including rectangular and rhomboid, in the P11-S2, covering 1.47% of the engravings (Salas, 2022b).

Initially, quadrangles appeared mainly in the Dordogne region of southwestern France. Later, they spread further south to the Ardèche and the Pyrenees in French region. Quadrangle-type signs were painted and engraved throughout all periods of the Upper Paleolithic, with the highest frequency occurring during the Aurignacian (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

Quadrangle appears:

- La Sudrie Cave, Villac, Dordogne.
- Montgaudier Cave, Montbron, Charente.
- Roucadour Cave, Themines, Lot.
- El Castillo, Cantabria
- La Pasiega, Cantabria
- Altamira Cave, Cantabria

Triangle

There are four triangles in P11-S2, covering 1.47% of the engravings (Salas, 2022b).

Triangles occur widely in Europe, in all periods of the Upper Paleolithic, and with especially high frequency in the Magdalenian era (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

Triangle appears:

- Chauvet, Ardeche Valley, Rhone-Alpes.
- La Mouthe Cave, Les Eyzies-de-Tayac-Sireuil, Dordogne.
- Margot Cave, Thorigne-en-Charnie, Mayenne, Pays de la Loire.
- Pair-Non-Pair Cave, Prignac-et-Marcamps, Gironde.
- Sainte-Eulalie Cave, Espagnac, Lot.

W-sign

There are three W-signs in P11-S2.

In France, the first W-signs appeared at Chauvet Cave in the Aurignacian. They also appeared in the Gravettian, Solutrean, and Magdalenian eras (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

W-sign appears:

- Chauvet Cave, Ardeche Valley, Rhone-Alpes.
- Les Cuzoul-des-Brasconies, Blars, Lot.

Zigzag

There are 7 zigzags in P11-S2, covering 2.57% of the engravings (Salas, 2022b).

Zigzag is one of the oldest motifs; for example, it can be observed in Bolombos Cave engravings (c. 75,000 BCE). In France, it showed up in Solutrean and Magdalenian sites (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

Zigzag appears:

- Cosquer Cave, Calanque de Morgiou, Marseille.
- Le Cuzoul-des-Brasconies, Cabrerets, Lot.
- Pergouset Cave, Saint-Gery, Lot.
- Grotte Christian, Lot.
- Catal Huyuk Neolithic Archeological Site, Anatolia, Turkey

Open-Angle

There are 37 open-angles in P11-S2, including U-shape, V-shape, and angled, covering 13.61% of the engravings (Salas, 2022b).

Open-angles are among the earliest signs observed in Bolombos Cave engravings (c.75,000 BCE). They were slightly more common during the Aurignacian period, but their use declined in the Gravettian period before regaining popularity in the Solutrean and, especially, the Magdalenian periods (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

Open-Angle appears:

- Blombos Cave, South Africa.
- Cosquer Cave, Calanque de Morgiou, Marseille.
- Massat Cave, Ariège, Pyrenees.

- Saint-Cirq Cave, Saint-Cirq-du-Bugue, Dordogne.

Line

There are 83 lines in P11-S2, including straight lines, curved lines, and wavy lines (lines between straight and curved), covering 44.48% of the engravings (Salas, 2022b).

Serpentiform (wavy line/curvilinear zigzag)

There are nine wavy lines in P11-S2, covering 3.31% of the engravings (Salas, 2022b).

In France, serpentiform appeared for the first time in the Aurignacian period and was most common in the Magdalenian period (ENCYCLOPEDIA OF STONE AGE ART, n.d.).

Serpentiform appears:

- Abri Pataud, Les Eyzies-de-Tayac-Sireuil, Dordogne.
- Grande Grotte d'Arcy-sur-Cure, Yonne.
- Grotte du Cheval Foix, Ariège

Salas (2022b) cited the Paleolithic "signs" classified by G. Sauvet, S. Sauvet, P. Casado, Leroi-Gourhan, and A. Włodarczyc (2014) [Figure 28] in her paper, pointing out that certain graphic units of P11-S2 present similar morphology. This suggests that the signs can be dated back to the Paleolithic, but it does not mention in which period of the Paleolithic age.

CLÉS	ESPAÑA	PIRINEOS	DORDOÑA	OTRAS REGIONES
 IIIa				
 IIIb				
 IIIc				
 Va				
 Vb				
 Vc				
 IXa				
 IXb				
 IXc				
 XI				

Figure 28. Classification of "signs" (Sauvet & Włodarczyk, 1977).

Based on the information presented, most signs can have origins in the Paleolithic period, especially the Upper Paleolithic period or, more precisely, the Magdalenian era. This assumption partially agrees with Salas (2022b), concluding that groups B, C, E, F, and I could be associated with a stylistic chronology between the middle-upper Solutrean and the Upper Magdalenian.

However, the most representative typology of this panel is a loop, which appears 70, times covering 25.74% of the total engravings. Loops of P11-S2 are so original that, so far, there is no way to find similar motifs or morphology in rock art evidence.

4.2 Stylistic dating

The stylistic approach's basic idea is to treat parietal representations as primary archaeological documents, examining them for insights into prehistoric populations' cognitive processes and social dynamics (Petrognani & Robert, 2020). It aims to provide a chronology by comparing stylistic schemes with other sites or art references that have dating.

Von Petzinger and Nowell (2011) expand this method more broadly; they compared 142 physical locations and 156 identified periods of activity from the whole of France to reconsider the stylistic approach to dating French Paleolithic cave art.

Following their method, this paper tries to list Spanish sites and give P11-S2 a dating under the stylistic framework. It does not include every site in Spain; 193 records based on the EuroPreArt (n.d.) database are considered here [Table 1].

49.2% of Spanish sites with rock art are in open air or shelter, followed by open-air sites at 33.6%. 62.2% of the descriptions are paintings, and 33.1% are engravings. 49.2% of representations belong to the Neolithic period, followed by the Neolithic-Bronze Age (15.5%) and the Epipaleolithic-Copper Age (12.4%) [Figure 29].

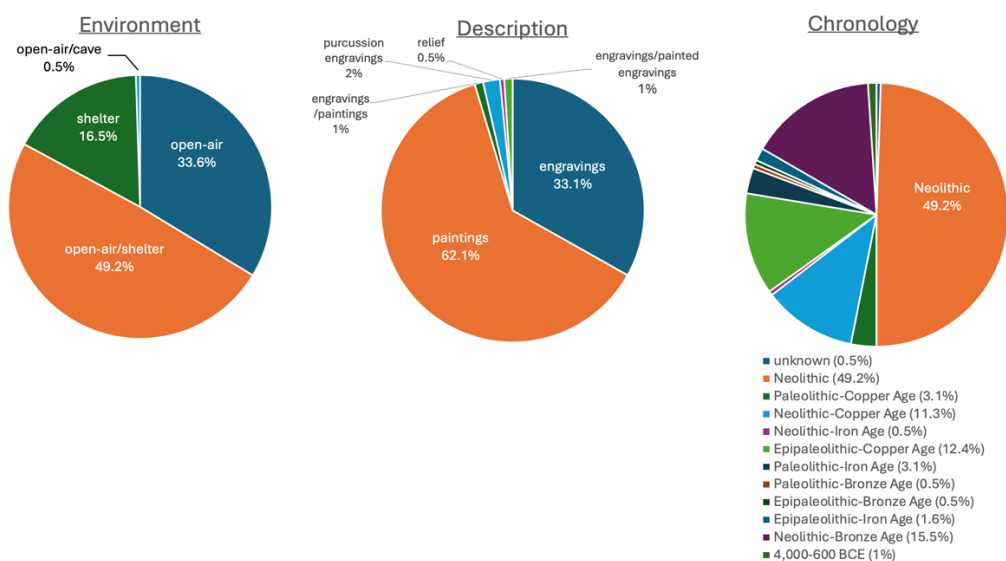


Figure 29. Percentages of 193 Spanish rock art sites based on the EuroPreArt (n.d.) database.

As the statistical tendency of those with signs and lines, P11-S2 belongs to the Neolithic.

However, applying this method needs to be reconsidered in the P11-S2 case. The reasons are:

- The database of EuroPreArt is old; it does not include recent significant discoveries and research, which require updates.
- The database's chronology was divided into larger scales, not into stylistic chronologies such as Magdalenian or Gravettian.
- The database did not provide the dating method; thus, it may not be relevant as evidence to be compared.
- Abstract signs and lines are considered unuseful in the past; there is a high possibility that they did not include or record them.

Therefore, to successfully apply stylistic dating, it is necessary to create a new database of Spanish Prehistoric parietal art. This would be the next task for further research with this method.

5 Discussions of loop typology

In this chapter, the loops of the Panel 11 Section 2 will be discussed from several perspectives.

5.1 Previous discussion

The initial researcher of Panel 11 Sector 2, Salas (2022b), mentioned several pieces of evidence that resemble the panel's loop typology. She cited Magdalenian decorated

antler rods ("baguettes") that are found in Northern Spain [Figure 30], Chalcolithic Cave named the Grotta dei Cervi in Italy [Figure 31], and Hal Saflieni Hypogeum's rock art in Malta dating Neolithic, during 5950 and 395 BP [Figure 32]. Furthermore, she concluded that loops begin to be recorded in Group B and reappear in Group D. Group B is associated with a possible Paleolithic motif (graphic unit no.30). Group D, as she presents, is more recent than Group B. Thus, she terminated that P11-S2's loop typology is unique and might belong to Magdalenian era.



Figure 30. Magdalenian decorated antler rods from Northern Spain.



Figure 31. Grotta dei Cervi, Italy (Ingravallo, 2007).



Figure 32. Hal Saflieni Hypogeum's rock art. Malta, Neolithic

Figure 30 (RMN-Grand Palais, Musée d'Archeologie Nationale et Domaine, St-Germain-en-Laye, <https://www.donsmaps.com/baquettes.html>)

Figure 32 (Locanda La Gelsomina, <https://www.locandalagelsomina.com/the-latest/the-mystical-site-of-al-saflieni-the-hypogeum>)

5.2 Resemblance rock art

This section aims to introduce similar engravings worldwide without limiting the area inside Spain and the timeline to seek the chronological possibility.

In Chile, there are similar rock art engravings at Río Hurtado Valley, Norte Chico. The research team examines nine rock art sites, analyzing engravings, particularly mask-like motifs. These representations dated ca. 600 CE and are compared to other sites, leading to the identification of a unique "Hurtado Style" similar to the previously defined "Limarí Style." The research also explores the relationship between the engravings and other cultural artifacts (stones, ceramics, shells, metal objects) but finds no direct connection. The purpose of the rock art remains unclear. However, the authors suggest possible shamanistic practices (Ballereau et al., 1999) [Figure 33].

Some engravings from the site can be similar in the sense of the combinations of curved lines and circles with density, although the Río Hurtado Valley's one looks more organized. In contrast, the P11-S2 looks more disorganized, with much overlap. There is a geographical distance between Spain and Chile, and only part of the engravings looks akin, although this brings up the new perspective of P11-S2's chronology and the possibility of shamanism purposes.



Figure 33. Rock art engravings at Río Hurtado Valley, Norte Chico, Chile (Ballereau et al., 1999)

In Portugal, there is a similar rock engraving in the sense of circle symbols in density and overlapping at Serra da Abuceira.

The rock art is inscribed on flat schist stones and features various markings, primarily footprints, indentations, and human-like representations. They observed traces from various periods, from prehistory through the Roman era to the first half of the 20th century. According to the research team, the patterns suggest religious motivations tied to fertility cults and water deities, as evidenced by Roman-era inscriptions dedicated to Piscis and Neptune and place names like Alva, Alvôco, Alvoaça, and Serpins. These ancient traditions persisted through pilgrimages centered around water, the moon, and the sun, continuing into the 20th century with St. John's celebrations aligned with the summer solstice full moon (Ribeiro et al., 2022; Ribeiro & Joaquineto, 2015) [Figure 34].

Again, the representations of Serra da Abuceira look more organized than the P11-S2. This brings up the possibility of overlappings caused by repeated single schemes over time.

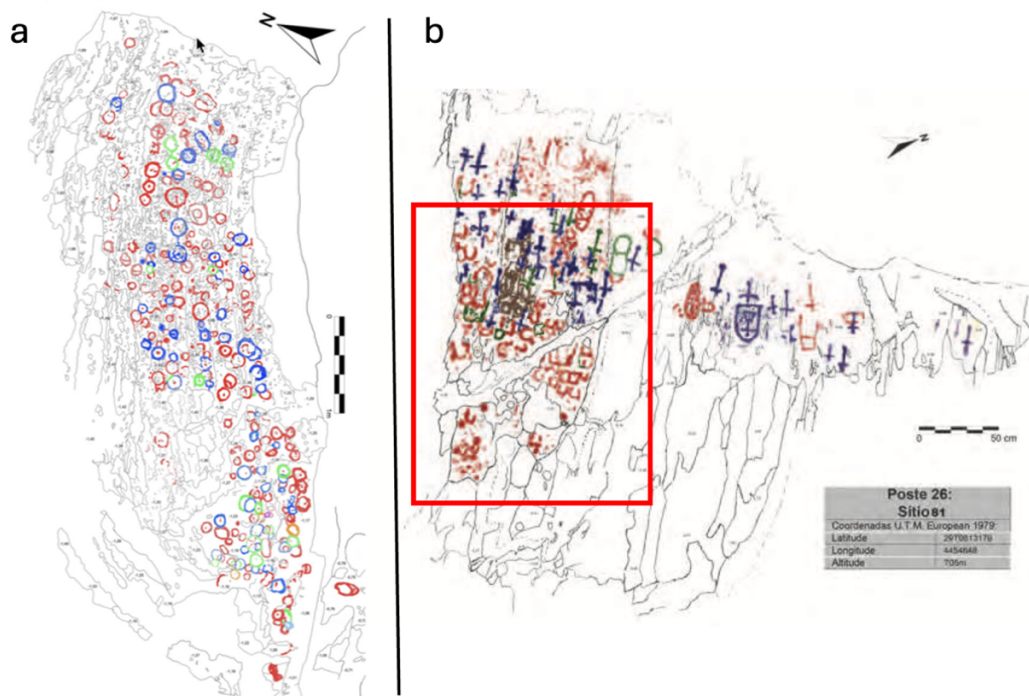


Figure 34. Rock art engravings at Serra da Abuceira, Portugal (a: Ribeiro et al., 2022, b: Ribeiro & Joaquinito, 2015)

5.3 Handling of loop creation

This chapter intends to test how loops of P11-S2 are made. Since the surface of P11-S2 is soft and the lines are wider in general, there is a possibility of engraving loops with a human finger. Therefore, here, an archaeological experiment has been carried out.

The objective of the experiment is to see the morphology of loops and the width of the lines made by human fingers. Because the Font Major cave is protected and restricted

from entering or researching, loops are made on a clay surface that is as soft as the original base instead of the actual rock surface.

Four participants, two male and two female, all right-handed, drew three loops on the prepared clay surface using their fingers. They had to draw three loops in four conditions: from left to right continuously, from right to left continuously, from left to right discontinuously, and from right to left discontinuously. The reason for doing four different ways is to know if direction will affect the lines. Furthermore, the original loops have several morphologies, thinking that making participants draw loops continuously and discontinuously might affect the morphology of loops [Figure 35].



Figure 35. Variables of the experiment.

Four clay panels, using natural modeling clay, were prepared on a flat surface using a hand. Since the original rock panel's surface was naturally smooth, the surface was smoothed using a bamboo stick. Prepared panels were 25 to 30 cm high, 10 to 15 cm wide, and 4 to 11 mm thick.

The first panel was done by a right-handed male in their twenties. The second one is for a right-handed female in their twenties, the third is for a right-handed male in their seventies, and the fourth is for a right-handed female in their thirties.

In the end, several characteristics of the lines were observed. The line made by the ball of the finger has lines of 6 to 10 mm wide. Instead, the line made by nails or fingertips

had narrow lines of 1 to 3 mm. The depth of all the lines was approximately 0.3 to 2 mm. Participants tend to use their nails to draw when they reach the upper tip of the loop in left-to-right conditions. And the left side of the loop in right-to-left conditions. Both led to thinner and/or deeper lines. The shape of lines that connect loops tends to be curvier in continuous loops and more V-shape in discontinuous loops. Loop's morphology did not significantly differ from right to left or left to right action. Some lines left a trace of fingerprints or lines, but this will not happen on a rock surface [Figure 36].



Figure 36. Result of the experiment.

Compared with the loops from P11-S2, Group B, the left side loops of the panel have lines 4.4 to 5.2 mm wide and 0.6 to 0.7 mm deep. Group D, the right side loops from the panel have lines 7.1 to 8.7mm wide and 1.4 to 1.6 mm deep (Salas, 2022b). The lines from the experiment using the ball of fingers are wider than the original lines. However,

Group D's line can fit in the range of experimental lines. Conversely, regarding depth, Group B's line fits in the range of experimental lines, but Group D has deep lines [Table 2]. The result did not clearly show the possibility of using a finger. Furthermore, it has to consider the difference between clay and original rock surfaces and the effects of time and the environment. Nonetheless, it left the scope of considering finger use.

The morphology of the experiment loops illustrates that each loop of P11-S2 might have been made in a single, continuous act, whether from right to left or left to right way.

Table 2. Width and deepness of loops' lines from P11-S2 vs experiment result.

	Width of lines	Deepness of lines
P11-S2 Group B	4.4 – 5.2 mm	0.6 – 0.7 mm
P11-S2 Group D	7.1 - 8.1 mm	1.4 – 1.6 mm
Experiment Result (made by a ball of finger)	6.0 – 10 mm	0.3 – 2.0 mm

5.4 Possibility of children's scribbling

Reflecting that Panel 11 Sector 2 is 60 cm high, 10 cm above the ground, and some parts of the cave have very narrow routes, especially the room where P11-S2 has a very thin entrance, and the disorganized loops; there is a possibility of engravings made by a child or children [Figure 37].



Figure 37. Examples of children's scribbling.

(a: Live Healthy Live Well, <https://livehealthyosu.com/2023/06/08/your-childs-art-is-communicating-more-than-you-may-realize/>)

(b: Mosaic, <https://mosaicearlyed.com/parents-family/every-scribble-tells-a-story/>)

(c&d: Bartel, <https://www.bartelart.com/arted/wallscribblers.html>)

According to Lowenfeld (Lowenfeld & Brittain, 1987), children have stages of artistic development. He built a theory about how children, on average, grow and develop in art. The basic assumptions are:

- **Universality:** This developmental stage theory applies to all children worldwide, regardless of race, socioeconomic status, or cultural background.
- **Invariability:** Children progress through each stage sequentially, with no stage skipped.

- **Fluidity:** Each stage is characterized by flexibility and overlap, allowing for movement between different aspects within the same stage (e.g., color, space, human figure).
- **Individual Differences:** While children generally follow the same sequence, the pace of development may vary slightly, with exceptionally gifted children potentially progressing more rapidly.
- **Fixed Progression:** The developmental stages cannot be rushed or accelerated.

There are six stages of development: Scribbling Stage (ages 2-4), Pre-Schematic Stage (ages 4-7), Schematic Stage (ages 7-9), Drawing Realism Stage (ages 9-12), Pseudo-naturalistic Stage (ages 12-14), and Crisis of Adolescence (ages 14-17) [Figure 38].

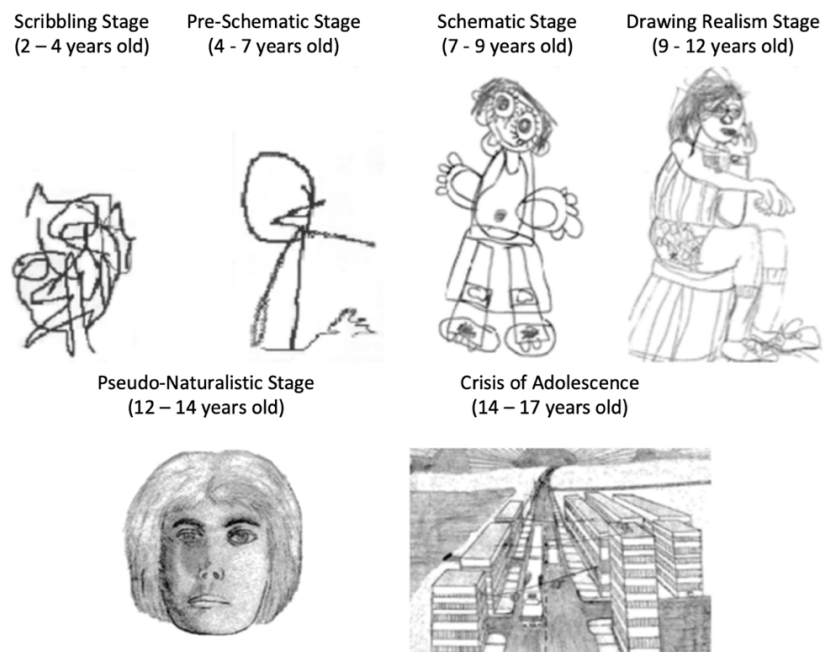


Figure 38. Six stages of artistic development by Lowenfeld (1987)

The Scribbling Stage has three sub-stages:

- **Disordered:** Primarily focused on physical movement and bodily sensations.

- **Controlled:** Involving both mental planning and physical (psycho-motor) execution.
- **Naming:** Emphasizing imaginative expression through artistic endeavors.

No subject matter exists in the first two sub-stages, especially not what adults might imagine children are conceiving. The scribbling itself can be considered the "subject matter." In the naming sub-stage, only the subject matter in which children identify themselves should be regarded as the actual topic of their artwork.

In the Pre-Schematic Stage, children start to depict "recognizable" objects in their drawings. Their representations continue to evolve as they seek a clear concept of form or a symbol to represent the object (Lowenfeld & Brittain, 1987).

The representations of P11-S2, especially the loops, can belong to children's scribbling, as mentioned in Lowenfeld's stages of Scribbling Stage and/or Pre-Schematic Stage. Moreover, assuming that they engraved loops with their fingers, the width of lines can be thinner than the adult's line, referring to 7.3's experiment. However, it should be noted that the cave shape and P11-S2's room environment, such as the ground's position or height, might have changed over time.

5.5 Possibility of writing behavior

5.5.1 Morphological comparison with existed scripts

Loops of the P11-S2, especially of Group B [Figure 39], resemble alphabets or a language since they are written horizontally in sequence.

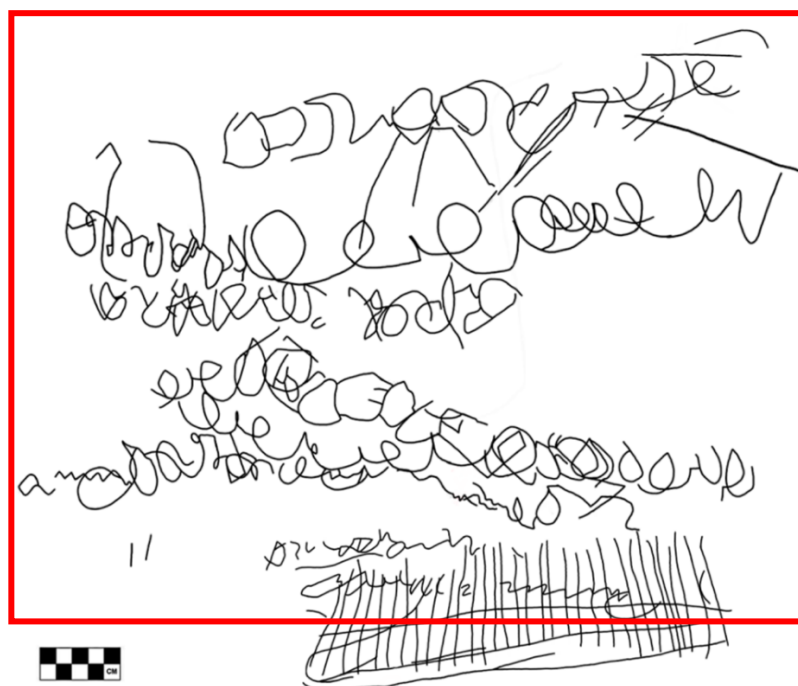


Figure 39. P11-S2 Group B's loops (Salas, 2022b).

This chapter will thus discuss whether the loops of P11-S2 could be a writing behavior or a possibility of proto-language.

First, the loops were morphologically compared with the writing systems of Europe throughout history.

Anderson (2022), a researcher in the Department of Linguistics at the University of California, researched and listed the world's writing systems. According to him, there are 37 scripts in Europe [Table 3].

Compared with the P11-S2 loops morphologically, none of them looked alike, especially in the sense of connected loops.

For example, Georgian [Figure 40], Armenian [Figure 41], Caucasian Albanian [Figure 42], Glagolitic [Figure 43], and Vithkuqi [Figure 44] partially have circle loop-

like scripts. However, none of these letters are written connected to each other, such loops of Group B do.

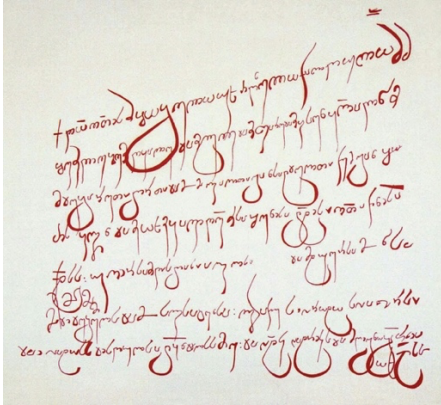


Figure 40. Mkhedruli inscription from 11th century, West Georgia.

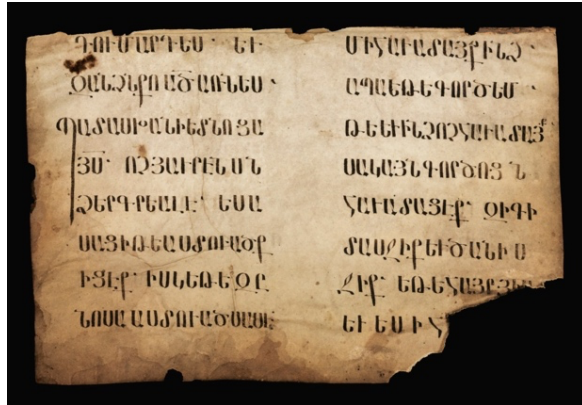


Figure 41. The Gospel of John in Armenian from 9th-12th century.

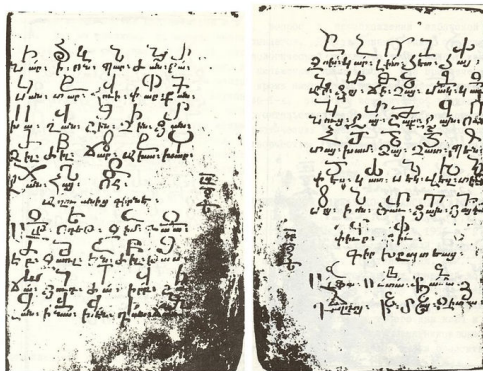


Figure 42. Matenadaran MS 7117 introducing Caucasian Albanian, 15th century.



Figure 43. Glagolitic script on reproduction of the Baška tablet dating c.1100 AD (Oštarić, 2018).

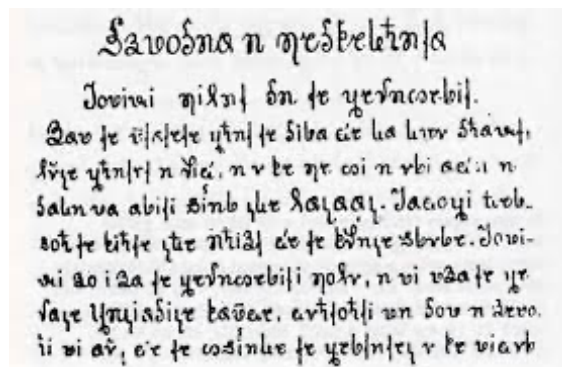


Figure 44. The 1845 edition of Veqilharxhi's primer in Vithkuqi (Everson, 2017).

Figure 40 (TPTQ, <https://www.typotheque.com/articles/georgian-alphabet-writing-and-typography>)

Figure 41 (People of Ar, <https://www.peopleofar.com/2018/07/10/tracing-the-oldest-armenian-script/>)

Figure 42 (*Obscure Histories*, <https://www.obscurehistories.org/post/the-mystery-of-caucasian-albania>)

Considering geography, in Iberia, there were scripts called Northern and Southern Paleohispanic, or the so-called "Southwestern script." Those were used to write local Pre-Roman languages during protohistorical times from the end of the Bronze Age down to the early moments of Roman occupation of the territory (Valério, 2008). Those scripts, however, have a linear morphology, and the alphabets are not connected to each other [Figure 45]. They have a different form from P11-S2 loops.

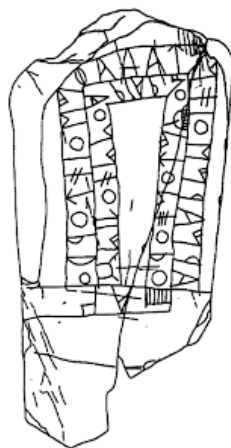


Figure 45. Paleohispanic script on the Stele of Mestras (Correia, 1996)

Considering the human migration from Africa to Europe, P11-S2 loops were also morphologically compared to 37 African scripts listed by Anderson (2022) [Table 3]. Adlam script, used for the Fulani language in Guinea (ScriptSource, n.d.), has a joining font style [Figure 46]. Although it was invented in the 1980s (Anderson, 2022), and continuous loops like the P11-S2's were not observed.

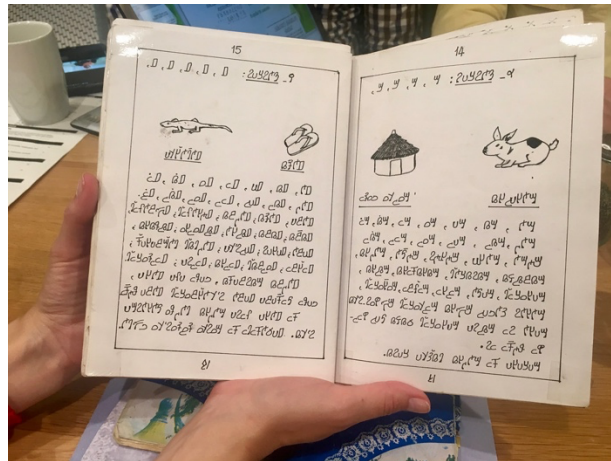


Figure 46. Adlam teaching book of 1990s (Coles, 2019)

N'ko script, used in West Africa, also has a joining font style [Figure 47]. However, it was created by Soloman Kante in 1949, and continuous loops like the P11-S2's were not observed.

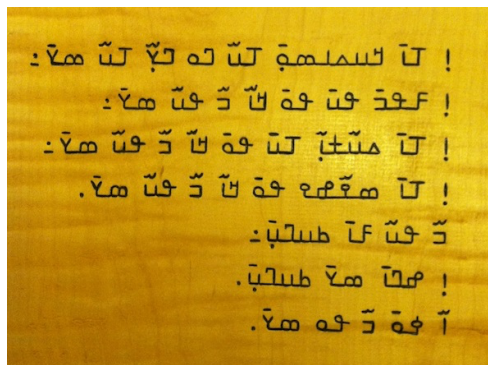


Figure 47. N'ko script (Brookes, 2011)

In the Vai script, used in West Africa, some of the syllables have a loop form [Figure 48], but each syllable is written independently, not connecting like the P11-S2 Group B. Furthermore, this script was invented by Momolu Duwalu Bekele in 1830 (Kelly, 2022).

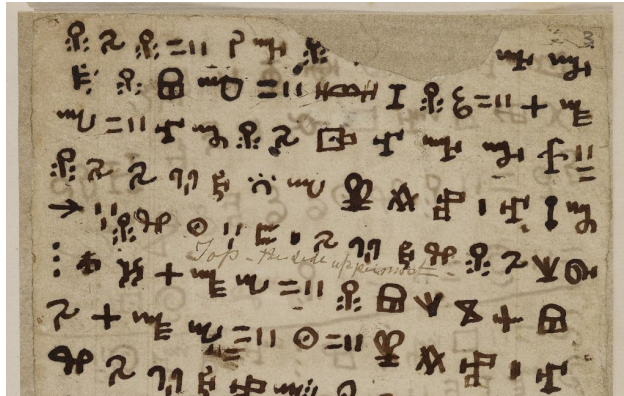


Figure 48. Handwritten example of Vai script dates to around 1850 (Kelly, 2022)

The Hieratic alphabets, ancient cursive writing, have a similar morphology to engravings from Group D [Figure 49 & Figure 50]. Nevertheless, Hieratics is written either vertically or horizontally from right to left (The Editors of Encyclopaedia Britannica, 1998), not in a disorder like Group B.



Figure 49. Group D of P11-S2 (Salas, 2022b).



Figure 50. The Edwin Smith papyrus written in Hieratics script in ancient Egypt around 1600 B.C.

Figure 50

(Scriptsource, https://scriptsource.org/cms/scripts/page.php?item_id=script_detail_use&key=Egyh)

Except for the Hieratic, the rest of the writing systems have originated recently, which does not correlate to P11-S2's chronology.

Considering the origin of writing, the morphological comparison of scripts expands to the Middle East region, where the first writing system, the cuneiform, was born. The loops of P11-S2 were likewise compared with 34 scripts listed by Anderson (2022) [Table 3].

Curves and circles of Elymaic partially look like representations of Group D [Figure 51]. However, assuming it is Elymaic, the frequency of other alphabets's appearance is so low that the series of letters will not make sense.

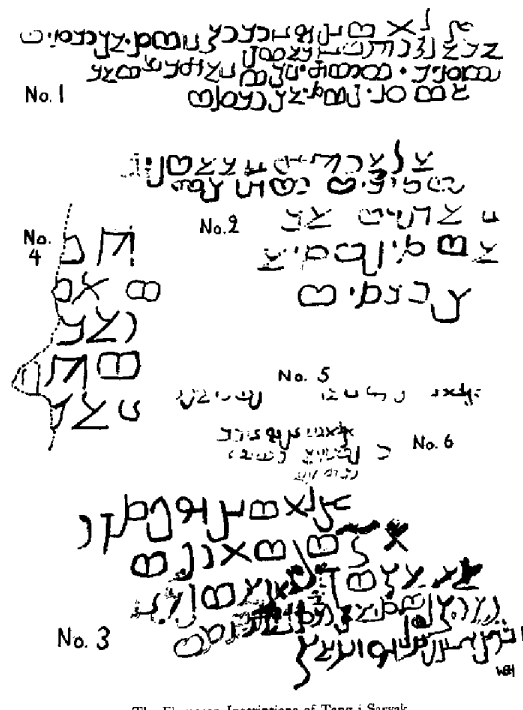


Figure 51. Renderings of Elymaic inscriptions made by W. B. Henning (Pandey, 2017).

On a more global scale, there are other loop-like scripts, like Karani [Figure 52], Khamti [Figure 53], Myanmar [Figure 54], or Tai Tham [Figure 55]. However, considering the chronology and the geography, it seems like there is no correlation with P11-S2.

5.5.2 Proto-language

Assuming the loops of P11-S2 belong to the Magdalenian period, can loops be proto-language?

According to Mithen (2007), the reality of proto-language has been discussed under two camps of theories: it was compositional in character or holistic.

Compositional theory states that proto-language consisted of basic vocabulary but lacked complex grammar, while the holistic approach thinks it consisted of complete, indivisible utterances rather than separate words, and a language evolved when holistic utterances were broken into smaller units (words) that could be recombined to create new meanings (Mithen, 2007).

Mithen added a new idea of the state of preto-language in his book (2007), 'HmMMMM,' which stands for holistic, manipulative, multi-modal, musical, and mimetic. Language itself still carries traces of "HmMMMM," particularly in the use of onomatopoeia, vocal imitation, and formulaic phrases, which are pre-stored multi-word units that bypass grammatical construction. Although a language is now primarily compositional, the frequent use of formulaic phrases suggests an evolutionary history rooted in holistic communication.

Thus, the existence of proto-language and the concept of vocabulary is determinant. How about a writing system?

The earliest script, Mesopotamian cuneiform, was invented in Sumer c. 3200 BC (Schmandt-Besserat, 2014). The birth of language is due to human memory limitations, and it became necessary to create a new and unified system of reference, enabling oral information to be preserved and recovered later in spoken form (André-Salvini, 1995).

The oldest writing system is Mesopotamian cuneiform; is it possible that they are proto-language writing systems in such old age as the Magdalenian period?

According to (Von Petzinger, n.d.), the geometric signs found in Upper Paleolithic art likely represent abstract ideas or concepts important to those who created them, though their exact meanings may never be deciphered. The repetition and intentional selection of specific signs over 20,000 years across France suggest these symbols held significant meaning. While some speculate that these signs were an early form of writing, the evidence suggests they were more likely a foundational step toward physical communication, possibly iconographic or ideographic. The abstract nature of these signs makes them challenging to interpret, but they offer strong evidence of our ancestors' complex thinking and communication abilities. Thus, those signs are not considered a fully developed writing system similar to those in later cultures, complete with structural elements like grammar and sentence composition.

Under this theory, the engravings, especially the loops of P11-S2, might have significant meaning for their creators. However, they are not necessarily to be interpreted as a proto-language writing system but as representatives of abstract ideas or concepts that were important to those who created them.

6 Conclusion

Panel 11 Sector 2 (P11-S2), located in the Font Major cave, consists of 272 graphic elements. Salas (2022b) previously studied it, and she divided the engravings into A—J groups, concluding that most of them were engraved in Magdalenian chronology, specifically in the middle or upper phases between 14,500 and 12,000 years BP.

This paper thus defines and mentions the characteristics of Magdalenian art and compares them with those of the panel. The only recognizable figurative element (graphic unit no. 190) and Ice Age Europe's geometric signs proposed by Von Petzinger (2016) fulfill the characteristics and tendencies of the Magdalenian period.

The stylistic dating method, which provides a chronology by comparing stylistic schemes with other sites or art references that have dating, is carried out with 193 Spanish rock art. It illustrates that most of the Spanish rock art belongs to the Neolithic period, suggesting P11-S2 could also belong to it. However, this method lacks reliance since the original database is old and only provides large scales of chronology without mentioning the dating methods. Therefore, it is necessary to create a new database of Spanish Prehistoric parietal art to apply stylistic dating successfully.

Furthermore, the primary representation of P11-S2 is the loop typology, which cannot be found in any other rock art. Hence, this paper aims to interpret the loops.

First, rock art with a similarity was searched worldwide, but none of them exactly resembled the loops of P11-S2.

Then, the handling of loop creation was observed by an experiment using human fingers and clay panels to see if human fingers made the loops and, if so, what the loops looked like. It did not clearly show the possibility of using a finger, but the result suggests that loops of P11-S2 might have been made in a single, continuous act, whether from right to left or left to right way.

The possibility of children's scribbling is mentioned since engravings are made in disorder, like the artistic developmental stages of the scribbling stage or the pre-schematic stage proposed by Lowendeld (1987), and the panel is 60 cm high, 10cm above the ground.

Lastly, loops were discussed whether it is a writing behavior. Loops were morphologically compared with existing scripts from all ages in Europe, Africa, and the Middle East regions. However, none of them had a connected loop-like writing system observed in P11-S2.

The possibility of proto-language was also discussed. It concluded that the engravings, especially the loops of P11-S2, might have significant meaning for the creators, but they are not necessarily to be interpreted as a proto-language writing system.

This paper thus generally agrees that the engravings of Panel 11 Sector 2 were made during the Magdalenian period. Many methods have been applied, although the representations of Panel 11 Sector 2 are so original that it is difficult to give a specific chronology or interpretation. Further dating methods, such as C14 dating, might confirm more detailed chronology, and further research about paleolithic abstract signs might allow us to explore the mystery of loops.

7 Annexes

7.1 Table 1. List of Spanish Rock Art. Data from EuroPreArt (n.d.). Y stands for yes.

no.	Location	Name of Site	Environment	Description	Chronology	Total Number of Figures	Line	Anthropomorphic	Zoomorphic	Finger	Sign	Reference
1	Alconchel	Rock LXXXVI "La Antena"	open-air	engravings	unkown	1	many straight lines					CERRATO LEYTON F.-NOVILLO GONZÁLEZ V., 2000 . <i>Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica)</i> , in <i>Revista de Estudios Extremeños</i> , Centro de Estudios Extremeños , Badajoz , pag. 91-98
2	Tivisa	Barracada de font viella, cova del cingle	open-air/shelter	paintings	Neolithic	1		1				BELTRAN MARTINEZ, ANTONIO, 1968 . "Avance al estudio de las pinturas rupestres levantinas en la provincia de Tarragona: estado de la cuestión" , in <i>Boletín Arqueológico Tarraconense LXVII-LXVIII (II) (97-104) (1966-68)</i> , Real Sociedad Arqueológica Tarraconense , Tarragona , pag. 173-182
3	Tivisa	Barracada de font viella, cova del PI	open-air/shelter	paintings	Neolithic	17		1			Y	BELTRAN MARTINEZ, ANTONIO, 1968 . "Avance al estudio de las pinturas rupestres levantinas en la provincia de Tarragona: estado de la cuestión" , in <i>Boletín Arqueológico Tarraconense LXVII-LXVIII (II) (97-104) (1966-68)</i> , Real Sociedad Arqueológica Tarraconense , Tarragona , pag. 173-182
4	Tivisa	Barracada de font viella, cova del ramat	open-air/shelter	paintings	Neolithic	11			9			BELTRAN MARTINEZ, ANTONIO, 1968 . "Avance al estudio de las pinturas rupestres levantinas en la provincia de Tarragona: estado de la cuestión" , in <i>Boletín Arqueológico</i>

										Tarraconense LXVII-LXVIII (II) (97-104) (1966-68) , Real Sociedad Arqueológica Tarraconense , Tarragona , pag. 173-182
5	Cieza	Barranco de los Grajos, cueva de los Grajos	open-air/shelter	paintings	Neolithic	68	40	17	Y	BELTRAN MARTINEZ, ANTONIO, 1969 . La Cueva de los Grajos y sus pinturas rupestres, en Cieza (Murcia) , in Anejo de Caesaraugusta. Monografías Arqueológicas VI , Seminario de Prehistoria y Protohistoria. Facultad de Filosofía y Letras. Universidad de Zaragoza , Zaragoza , pag. 87
6	Dos Aguas	Abrigo de Cinto ventana	open-air/shelter	paintings	Neolithic	23	6	10	Y	JORDA CERDA, FRANCISCO et alii, 1951 . Las pinturas rupestres de Dos Aguas (Valencia) , Servicio de Investigación Prehistórica/Servei d'Investigació Prehistórica , Valencia , pag. 39
7	Dos Aguas	Barranco Cinto ventana, cueva de la cocina	open-air/cave	engravings	Neolithic	1		sequence of lines		PERICOT GARCIA, LUIS, 1946 . "La cueva de la Cocina (Dos Aguas)" , in Archivo de Prehistoria Levantina II (1945) , Servicio de Investigación Prehistórica/Servei d'Investigació Prehistórica , Valencia , pag. 39-71
8	Villafranca del Cid	Barranco de Calabazas, Covaticas del mas de Rambla	open-air/shelter	paintings	Neolithic	12	10	1	Y	MESADO OLIVER, NORBERTO et alii, 1988 . "Las pinturas rupestres de la "Covatina del Tossalet del Mas de la Rambla" Vilafranca, Castellón" , in Lucentum VII-VIII , Universidad de Alicante , Alicante , pag. 35-56
9	Cretas	barranco de Calapata, Peñasco dels Gascons	open-air/shelter	paintings	Neolithic	5	1	2		BOSCH GIMPERA, PERE, 1924 . "Les Pintures del Barranc del Calapatà de Cretes (Baix Aragó)" , in Butlletí de l'Associació Catalana d'Antropologia Etnologia i Prehistoria II , Barcelona , pag. 131-146
10	Cretas	Barranco de Calapata, Roca dels Moros	open-air/shelter	paintings	Neolithic	3		3		BOSCH GIMPERA, PERE, 1924 . "Les Pintures del Barranc del Calapatà de Cretes (Baix Aragó)" , in Butlletí de l'Associació Catalana d'Antropologia Etnologia i Prehistoria II ,

										Barcelona , pag. 131-146
11	Vandellos	Barranco de Gasea, Cova de L'escoda	open-air/shelter	paintings	Neolithic	4	1	2		ALONSO TEJADA, ANNA et alii, 1989 . Els pintors prehistòrics de Vandellòs , Ajuntament de Vandellòs-L'Hospitalet de l'Infant , Vandellòs , pag. 21
12	Bicorp	Barranco de Hongares, Cuevas de la Araña	open-air/shelter	paintings	Neolithic	121	40	55	Y	HERNANDEZ PACHECO, EDUARDO, 1924 . Las pinturas prehistóricas de las Cuevas de la Araña (Valencia) , in Comisión de Investigaciones Paleontológicas y Prehistóricas 34 , Museo Nacional de Ciencias Naturales , Madrid , pag. 215
13	Alcoy	Barranco de la Cova Foradada, Cuevas de la Sarga	open-air/shelter	paintings	Neolithic	52	18	12	Y	BELTRAN MARTINEZ, ANTONIO et alii, 1974 . Las pinturas rupestres prehistóricas de La Sarga (Alcoy), El Salt (Penàguila) y El Calvari (Bocairente) , Servicio de Investigación Prehistórica/Servei d'Investigació Prehistòrica , Valencia , pag. 56
14	Alvarracin	Barranco de la fuente del cabrerizo	open-air/shelter	engravings	Neolithic	2		2		BELTRAN MARTINEZ, ANTONIO et alii, 1995 . "Innovations in the Levantine paintings of Albarracín" , in International Newsletter on Rock Art 10 , Comité International d'Art Rupestre (C.A.R. - ICOMOS) , Foix , pag. 9-10
15	Ares del Maestre	barranco de la Gasulla	open-air/shelter	paintings	Neolithic	278	141	65	Y	RIPOLL PERELLO, EDUARDO, 1963 . <i>Pinturas rupestres de la Gasulla (Castellón)</i> , in <i>Monografías de Arte Rupestre. Arte Levantino 2</i> , Instituto de Prehistoria y Arqueología. Diputación Provincial de Barcelona/Institut de Prehistòria i , Barcelona , pag. 59
16	Ares del Maestre	barranco de la Gasulla	open-air/shelter	paintings	Neolithic	282	172	55		RIPOLL PERELLO, EDUARDO, 1963 . <i>Pinturas rupestres de la Gasulla (Castellón)</i> , in <i>Monografías de Arte Rupestre. Arte Levantino 2</i> , Instituto de Prehistoria y Arqueología. Diputación Provincial de Barcelona/Institut de Prehistòria i ,

									Barcelona , pag. 59
17	Cueva de Vinroma	Barranco de la valltorta, Abrigo calçaes del mata	open-air/shelter	paintings	Neolithic	9	6	3	VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 189
18	albocacer	Barranco de la valltorta, Abrigo de montegordo	open-air/shelter	paintings	Neolithic	1	1		VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 189
19	Tirig	Barranco de la Valltorta, Abrigo de Rull	open-air/shelter	paintings	Neolithic	5	3	1	VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 189
20	Cuevas de Vinroma	Barranco de la Valltorta, Abrigo de tolls Alts	open-air/shelter	paintings	Neolithic	5	2		VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 190
21	Tirig	Barranco de la Valltorta, Abrigo del Arco	open-air/shelter	paintings	Neolithic	2	1	1	VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 191
22	Tirig	Barranco de la Valltorta, Abrigo mas d'en Josep	open-air/shelter	paintings	Neolithic	16	4	8	VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 192
23	Cueva de Vinroma	Barranco de la Valltorta, Abrigo de la Saltadora	open-air/shelter	paintings	Neolithic	112	54	45	VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 193
24	Albocacer	Barranco de la Valltorta, Cingle de Tolls Del Puntal	open-air/shelter	paintings	Neolithic	7	4	2	VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 194
25	Cueva de Vinroma	Barranco de la Valltorta, Cueva	open-air/shelter	paintings	Neolithic	14	9	3	VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona ,

		alta del Llidoner							pag. 195
26	Tirig	Barranco de la Valltorta, Cueva de Cavalls	open-air/shelter	paintings	Neolithic	53	22	16	VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 196
27	Albocacer	Barranco de la Valltorta, Cueva Grande del Puntal	open-air/shelter	paintings	Neolithic	9	2	4	VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 197
28	Tirig	Barranco de la Valltorta, Cuevas del Civil	open-air/shelter	paintings	Neolithic	118	78	19	VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 198
29	Millares	Barranco de las Cañas	open-air/shelter	paintings	Neolithic	6	1	4	VILLAVERDE BONILLA, VALENTIN et alii, 1981 . "Dos nuevas estaciones de arte rupestre levantino en Millares (Valencia)" , in Archivo de Prehistoria Levantina XVI , Servicio de Investigación Prehistórica/Servei d'Investigació Prehistórica , Valencia , pag. 307-318
30	Dos Aguas	Barranco de las Letras, Abrigo de la Pareja	open-air/shelter	paintings	Neolithic	2	2		JORDA CERDA, FRANCISCO et alii, 1951 . <i>Las pinturas rupestres de Dos Aguas (Valencia)</i> , Servicio de Investigación Prehistórica/Servei d'Investigació Prehistórica , Valencia , pag. 39
31	Dos Aguas	Barranco de las Letras, Abrigo del Ciervo	open-air/shelter	paintings	Neolithic	37	14	7	JORDA CERDA, FRANCISCO et alii, 1951 . <i>Las pinturas rupestres de Dos Aguas (Valencia)</i> , Servicio de Investigación Prehistórica/Servei d'Investigació Prehistórica , Valencia , pag. 40
32	Ares del Maestre	Barranco de les Dogues	open-air/shelter	paintings	Neolithic	32	28		PORCAR RIPOLLES, J.BAUTISTA, 1953 a . "Las pinturas rupestres del Barranco de Les Dogues" , in Archivo de Prehistoria Levantina IV (2) , Servicio de Investigación Prehistórica/Servei d'Investigació Prehistórica , Valencia ,

											pag. 75-80
33	Perello	Barranco de les Nines, Cova de Cabra Feixet	open-air/shelter	paintings	Neolithic	13	3	6			BELTRAN MARTINEZ, ANTONIO, 1968 . "Avance al estudio de las pinturas rupestres levantinas en la provincia de Tarragona: estado de la cuestión" , in Boletín Arqueológico Tarraconense LXVII-LXVIII (II) (97-104) (1966-68) , Real Sociedad Arqueológica Tarraconense , Tarragona , pag. 173-18
34	albocacer	Barranco de Matamoros, Covacho del Puntal	open-air/shelter	paintings	Neolithic	14	7	5	Y		VIÑAS VALLVERDU, RAMON (dir.), 1982 . La Valltorta. Arte rupestre del Levante Español , Ediciones Castell , Barcelona , pag. 189
35	Ares del Maestre	Barranco de Molero	open-air/shelter	engravings/paintngs	Neolithic	5	1	1			BELTRAN MARTINEZ, ANTONIO, 1965 . "Nouveautés dans les peintures rupestres du levant espagnol: El Racó de Gasparo et le Racó de Molero (Ares del Maestre, Castellón)" , in Préhistoire Ariégeoise XX , Sociéte Préhistorique Ariège-Pyrénées , Tarascon-sur-Ariège , pag. 117-127
36	Vandellos	Barranco de Villiplanes, Reco d'En Perdigo	open-air/shelter	paintings	Neolithic	6	4				ALONSO TEJADA, ANNA et alii, 1989 . Els pintors prehistòrics de Vandellòs , Ajuntament de Vandellòs-L'Hospitalet de l'Infant , Vandellòs , pag. 21
37	Ares del Maestre	Barranco del Cirerals	open-air/shelter	paintings	Neolithic	4			Y		SARRIA BOSCOVICH, ELISA, 1983 . "Las pinturas del Barranc del Cirerals. Ares del Maestre (Castellón de la Plana)" , in Zephyrus XXXVI , Universidad de Salamanca , Salamanca , pag. 255-258
38	Dos Aguas	Barranco del Falon, Covecha de las Cabras	open-air/shelter	paintings	Neolithic	10	4	2			JORDA CERDA, FRANCISCO et alii, 1951 . Las pinturas rupestres de Dos Aguas (Valencia) , Servicio de Investigación Prehistórica/Servei d'Investigació Prehistórica , Valencia , pag. 39
39	Montblanch	Barranco del Llord,	open-	paintings	Neolithic	9	1	4			GARCIA DIEZ, MARCOS et alii, 2000 . "Elementos de análisis

		Abrigo del Mas del Llor	air/shelter								para el estudio del grafismo rupestre de "estilo levantino" y "estilo esquemático": aproximación a las pinturas de la zona de Montblanc (Tarragona, España)", in Arkeos 7 , Instituto Politécnico de Tomar , Tomar , pag. 145-188
40	Montblanch	Barranco del Llor, Abrigo del Mas Ramon de Besso	open-air/shelter	paintings	Neolithic	14	4	2	Y	GARCIA DIEZ, MARCOS et alii, 2000 . "Elementos de análisis para el estudio del grafismo rupestre de "estilo levantino" y "estilo esquemático": aproximación a las pinturas de la zona de Montblanc (Tarragona, España)", in Arkeos 7 , Instituto Politécnico de Tomar , Tomar , pag. 145-189	
41	Montblanch	Barranco del Llor, Portell de les Lletres	open-air/shelter	paintings	Neolithic	14	1	1	Y	GARCIA DIEZ, MARCOS et alii, 2000 . "Elementos de análisis para el estudio del grafismo rupestre de "estilo levantino" y "estilo esquemático": aproximación a las pinturas de la zona de Montblanc (Tarragona, España)", in Arkeos 7 , Instituto Politécnico de Tomar , Tomar , pag. 145-190	
42	Alacon	Barranco del Mortero, Abrigo de Borriquillos	open-air/shelter	paintings	Neolithic	28	8	12		BELTRAN MARTINEZ, ANTONIO et alii, 1998 . Las pinturas rupestres de la cabecera del Barranco del Mortero. Alacón (Teruel) , in Colección "Parque Cultural del río Martín" , Diputación General de Aragón , Teruel , pag. 71	
43	Alacon	Barranco del Mortero, Abrigo de los Trepadores	open-air/shelter	paintings	Neolithic	39	32	2		BELTRAN MARTINEZ, ANTONIO et alii, 1998 . Las pinturas rupestres de la cabecera del Barranco del Mortero. Alacón (Teruel) , in Colección "Parque Cultural del río Martín" , Diputación General de Aragón , Teruel , pag. 72	
44	Alacon	Barranco del Mortero, Abrigo de Miniaturas	open-air/shelter	paintings	Neolithic	32	9	4		BELTRAN MARTINEZ, ANTONIO et alii, 1998 . Las pinturas rupestres de la cabecera del Barranco del Mortero. Alacón (Teruel) , in Colección "Parque Cultural del río Martín" , Diputación General de Aragón , Teruel , pag. 73	
45	Alacon	Barranco del	open-	paintings	Neolithic	40	19	13		BELTRAN MARTINEZ, ANTONIO et alii, 1998 . Las pinturas	

		Mortero, Covacho	air/shelter								rupestres de la cabecera del Barranco del Mortero. Alacón (Teruel), in Colección "Parque Cultural del río Martín", Diputación General de Aragón, Teruel, pag. 74
		Ahumado									
46	Albarracin	Barranco del Navazo	open-air/shelter	paintings	Neolithic	18	5	13			PIÑÓN VARELA, FERNANDO, 1982. Las pinturas rupestres de Albarracín (Teruel), in Monografía del Centro de Investigaciones y Museo de Altamira 6, Centro de Investigaciones y Museo de Altamira, Santander, pag. 241
47	Albarracin	Barranco del Pajarejo	open-air/shelter	paintings	Neolithic	5		4			PIÑÓN VARELA, FERNANDO, 1982. Las pinturas rupestres de Albarracín (Teruel), in Monografía del Centro de Investigaciones y Museo de Altamira 6, Centro de Investigaciones y Museo de Altamira, Santander, pag. 242
48	Ayora	Barranco del Sordo	open-air/shelter	paintings	Neolithic	9		2	3	Y	ANONIMO, ..., 1976. "Copia de las pinturas rupestres del "Abrigo del Barranco del Sordo", en término de Ayora", in La labor del Servicio de Investigación Prehistórica y su Museo en el año 1974, Servicio de Investigación Prehistórica/Servei d'Investigació Prehistórica, Valencia, pag. 113-114
49	Puebla de Benifasar	Barranco dels Rosegadors, Cueva del Polvorin	open-air/shelter	paintings	Neolithic	103		62	24		VILASECA ANGUERA, SALVADOR, 1949. "Las pinturas rupestres de la Cueva del Polvorin (Puebla de Benifazá, Castellón)", in Informes y Memorias 17, Ministerio de Educación Nacional, Madrid, pag. 7-42
50	albacacer	Barranco Fondo, Cingle de la Ermita	open-air/shelter	paintings	Neolithic	20		11	4	Y	VIÑAS VALLVERDU, RAMON (dir.), 1982. La Valltorta. Arte rupestre del Levante Español, Ediciones Castell, Barcelona, pag. 189
51	Castellote	Barranco Gomez, Abrigo de la Vacada	open-air/shelter	paintings	Neolithic	66		16	36		
52	Benasal	Barrancos del Monlleo, Raco de	open-air/shelter	paintings	Neolithic	24		11	7		

Nando										
53	Borriol	Castellon de la Plana	open-air/shelter	paintings	Neolithic	3	1			PORCAR ROIG, JOAN, 1932 . "La pintura rupestre de La Joquera" , in Boletín de la Sociedad Castellonense de Cultura XIII , Castellón , pag. 228-236
54	Villar del Humo	Cabecera Barranco de Marmalo, Castellon de los Machos	open-air/shelter	engravings	Neolithic	3	1	2		ROMERO SAIZ, MIGUEL, 1998 . La maravillosa tierra de Pabovi. La pintura rupestre en los abrigos rocosos de Villar del Humo , in Editor: Miguel Romero Saiz , Cuenca , pag. 253
55	Albarracin	Callejones Cerrados, Abrigo del Arquero	open-air/shelter	paintings	Neolithic	1	1			PIÑON VARELA, FERNANDO, 1982 . Las pinturas rupestres de Albarracín (Teruel) , in Monografía del Centro de Investigaciones y Museo de Altamira 6 , Centro de Investigaciones y Museo de Altamira , Santander , pag. 241
56	Ares del Maestre	Cercanias Barrabco de la Gasulla, Raco de Gasparo	open-air/shelter	paintings	Neolithic	6	3	2		BELTRAN MARTINEZ, ANTONIO, 1965 . "Nouveautés dans les peintures rupestres du levant espagnol: El Racó de Gasparo et le Racó de Molero (Ares del Maestre, Castellón)" , in Préhistoire Ariégeoise XX , Sociéte Préhistorique Ariège-Pyrénées , Tarascon-sur-Ariège , pag. 117-127
57	Alpera	Cerro del Bosque, Cueva de la Vieja	open-air/shelter	paintings	Neolithic	131	56	49	Y	ALONSO TEJADA, ANNA et alii, 1990 . Las pinturas rupestres de la Cueva de La Vieja , Ayuntamiento de Alpera , Alpera , pag. 61
58	Ayora	Cerro del Bosque, Cueva de las Tortosillas	open-air/shelter	paintings	Neolithic	10	1	7		
59	Alpera	Cerro del Bosque, Cueva del Queso	open-air/shelter	paintings	Neolithic	17	1	12	Y	ZUAZO Y PALACIOS, JULIAN, 1915 b . "Pinturas rupestres de Alpera" , in Zuazo, J. (1915): La Villa de Montealegre y su cerro de los Santos. Imprenta de los Hijos de Gómez Fuentenebro , Imprenta de los Hijos de Gómez

										Fuentenebro , Madrid , pag. 4-14
60	Alacon	Cerro Felio, Concavidad del Durmiente	open- air/shelter	paintings	Neolithic	26	21			ORTEGO Y FRIAS, TEOGENES, 1948 . "Nuevas estaciones de arte rupestre aragonés. 'El Mortero' y 'Cerro Felio' en el término de Alacón (Teruel)", in Archivo Español de Arqueología 21 , Dpto.de Historia Antigua y Arqueología. C.E.H. (C.S.I.C.) , Madrid , pag. 3-37
61	Alacon	Cerro Felio, Covacho Ahumado	open- air/shelter	paintings	Neolithic	12	6	3		ORTEGO Y FRIAS, TEOGENES, 1948 . "Nuevas estaciones de arte rupestre aragonés. 'El Mortero' y 'Cerro Felio' en el término de Alacón (Teruel)", in Archivo Español de Arqueología 21 , Dpto.de Historia Antigua y Arqueología. C.E.H. (C.S.I.C.) , Madrid , pag. 3-38
62	Alacon	Cerro Felio, Covacho de la Tia Mona	open- air/shelter	paintings	Neolithic	15	8	3		ORTEGO Y FRIAS, TEOGENES, 1948 . "Nuevas estaciones de arte rupestre aragonés. 'El Mortero' y 'Cerro Felio' en el término de Alacón (Teruel)", in Archivo Español de Arqueología 21 , Dpto.de Historia Antigua y Arqueología. C.E.H. (C.S.I.C.) , Madrid , pag. 3-39
63	Alacon	Cerro Felio, Covacho Inferior del Garroso	open- air/shelter	paintings	Neolithic	15	8	1	Y	ORTEGO Y FRIAS, TEOGENES, 1948 . "Nuevas estaciones de arte rupestre aragonés. 'El Mortero' y 'Cerro Felio' en el término de Alacón (Teruel)", in Archivo Español de Arqueología 21 , Dpto.de Historia Antigua y Arqueología. C.E.H. (C.S.I.C.) , Madrid , pag. 3-40
64	Alacon	Cerro Felio, Cueva de Eduvigis	open- air/shelter	paintings	Neolithic	8		4	Y	ORTEGO Y FRIAS, TEOGENES, 1948 . "Nuevas estaciones de arte rupestre aragonés. 'El Mortero' y 'Cerro Felio' en el término de Alacón (Teruel)", in Archivo Español de Arqueología 21 , Dpto.de Historia Antigua y Arqueología. C.E.H. (C.S.I.C.) , Madrid , pag. 3-41
65	Alacon	Cerro Felio, Cueva	open-	paintings	Neolithic	48	18	22		ORTEGO Y FRIAS, TEOGENES, 1948 . "Nuevas estaciones de

		del Garroso	air/shelter							arte rupestre aragonés. 'El Mortero' y 'Cerro Felio' en el término de Alacón (Teruel)", in Archivo Español de Arqueología 21 , Dpto.de Historia Antigua y Arqueología. C.E.H. (C.S.I.C.) , Madrid , pag. 3-42
66	Alacon	Cerro Frlio, Fronton de los Capridos	open-air/shelter	paintings	Neolithic	26	18	8		ORTEGO Y FRIAS, TEOGENES, 1948 . "Nuevas estaciones de arte rupestre aragonés. 'El Mortero' y 'Cerro Felio' en el término de Alacón (Teruel)", in Archivo Español de Arqueología 21 , Dpto.de Historia Antigua y Arqueología. C.E.H. (C.S.I.C.) , Madrid , pag. 3-43
67	Alacon	Cerro Frlio, Fronton de los Leporidos	open-air/shelter	paintings	Neolithic	23		17		ORTEGO Y FRIAS, TEOGENES, 1948 . "Nuevas estaciones de arte rupestre aragonés. 'El Mortero' y 'Cerro Felio' en el término de Alacón (Teruel)", in Archivo Español de Arqueología 21 , Dpto.de Historia Antigua y Arqueología. C.E.H. (C.S.I.C.) , Madrid , pag. 3-44
68	Mazaleon	Cuenca del Rio Matarraña, Abrigo de las Caidas del Salbime	open-air/shelter	paintings	Neolithic	6	2	1		PEREZ TEMPRADO, LORENZO et alii, 1954 . "Las Caidas del Salbime, Mazaleón (Teruel), nuevo yacimiento bajoaragonés con arte rupestre", in Caesaraugusta 4 , Institución "Fernando el Católico" , Zaragoza , pag. 31-40
69	Alconchel	Guadiana River, Rock XCII "Heineken"	open-air	engravings	Paleolithic-Copper Age	100				CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-98
70	Alconchel	Guadiana River, Rock XCIII "Panadero"	open-air	engravings	Neolithic-Copper Age	2				CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños ,

								Badajoz , pag. 91-99
71	Alconchel	Guadiana River, Rock XCIX "La vaca"	open-air	engravings	Neolithic-Copper Age	3		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-100
72	Alconchel	Guadiana River, Rock C "Espejo"	open-air	engravings	Neolithic-Copper Age	27		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-101
73	Alconchel	Guadiana River, Rock CI "Pachi"	open-air	engravings	Neolithic-Copper Age	11		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-102
74	Alconchel	Guadiana River, Rock CII "Petra"	open-air	engravings	Neolithic-Copper Age	3		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-103
75	Alconchel	Guadiana River, Rock CIII "Brandy103"	open-air	engravings	Neolithic-Copper Age	1		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-104
76	Alconchel	Guadiana River,	open-air	engravings	Neolithic-Copper	7		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los

		Rock CIV "Víbora"			Age			petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-105
77	Alconchel	Guadiana River, Rock CV "Kaa"	open-air	engravings	Neolithic-Copper Age	1		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-106
78	Alconchel	Guadiana River, Rock CVI "Trío"	open-air	engravings	Neolithic-Copper Age	41		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-107
79	Alconchel	Guadiana River, Rock CVII "Los Cangrejos"	open-air	engravings	Paleolithic-Copper Age	32		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-108
80	Alconchel	Guadiana River, Rock CVIII "No"	open-air	engravings	Neolithic-Copper Age	3		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-109
81	Alconchel	Guadiana River, Rock CVIIX "Comecocos"	open-air	engravings	Neolithic-Copper Age	47		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista

								de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-110
82	Alconchel	Guadiana River, Rock CX "Ciervichi"	open-air	engravings	Neolithic-Copper Age	1		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-111
83	Alconchel	Guadiana River, Rock CXI "El Chamán de la Peca"	open-air	engravings	Neolithic-Copper Age	2		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-112
84	Alconchel	Guadiana River, Rock CXII "Carus"	open-air	engravings	Neolithic-Copper Age	6		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-113
85	Alconchel	Guadiana River, Rock CXIII "Ufff"	open-air	engravings	Neolithic-Copper Age	3		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-114
86	Alconchel	Guadiana River, Rock CXIV "El Palo al Sur"	open-air	engravings	Neolithic-Copper Age	5		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-115

87	Alconchel	Guadiana River, Rock CXV "Petrus"	open-air	engravings	Neolithic-Copper Age	23				CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-116
88	Alconchel	Guadiana River, Rock CXVI "La playa"	open-air	engravings	Neolithic-Copper Age	21				CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-117
89	Jumilla	La Alqueria, Cueva del Peliciego	open- air/shelter	paintings	Neolithic	13	10		Y	FORTEA PEREZ, FCO. JAVIER, 1975 . "Las pinturas rupestres de la Cueva del Peliciego o de los Morceguillos (Jumilla, Murcia)" , in Ampurias/Empúries XXXVI (1974-75) , Diputación Provincial de Barcelona/Diputació de Barcelona , Barcelona , pag. 21-39
90	Bezas	las Tajadas, Abrigo Contiguo a Paridera de las tajadas	open- air/shelter	paintings	Neolithic	2		2		BELTRAN MARTINEZ, ANTONIO, 1986 . El arte rupestre en la provincia de Teruel , in Cartillas Turolenses 5 , Instituto de Estudios Turolenses , Teruel , pag. 60
91	Bezas	las Tajadas, Abrigo del Huerto de las tajadas	open- air/shelter	paintings	Neolithic	4		2	Y	BELTRAN MARTINEZ, ANTONIO, 1986 . El arte rupestre en la provincia de Teruel , in Cartillas Turolenses 5 , Instituto de Estudios Turolenses , Teruel , pag. 61
92	Bezas	las Tajadas, Pariderade las tajadas	open- air/shelter	paintings	Neolithic	5	1	3		BELTRAN MARTINEZ, ANTONIO, 1986 . El arte rupestre en la provincia de Teruel , in Cartillas Turolenses 5 , Instituto de Estudios Turolenses , Teruel , pag. 62
93	Ares del Maestre	Misa de Villaroches, Peña de Vilaroches	open- air/shelter	paintings	Neolithic	3		3		

94	Yecla	Monte Arabi, Cantos de la Visera	open- air/shelter	paintings	Neolithic	100	8	66	Y	BREUIL, HENRI, 1915 . "Les peintures rupestres d'Espagne VI. Nouvelles roches peintes de la région d'Alpera (Albacete)" , in L'Anthropologie 26 , Librairies de l'Académie de Médecin , Paris , pag. 329-331
95	Yecla	Monte Arabi, Cueva del Mediodia	open- air/shelter	paintings	Neolithic	19	7	1	Y	BREUIL, HENRI, 1915 . "Les peintures rupestres d'Espagne VI. Nouvelles roches peintes de la région d'Alpera (Albacete)" , in L'Anthropologie 26 , Librairies de l'Académie de Médecin , Paris , pag. 329-332
96	Alconchel	Molino Manzaney, Rock XIII "Botella Verde"	open-air	engravings	unknown/Neolithic- Iron Age	13	many			CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-98
97	Alconchel	Molino Manzaney, Rock XIX "Punta de Flecha"	open-air	engravings	Neolithic-Copper Age	37			Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-99
98	Alconchel	Molino Manzaney, Rock XVI "El Pectiniforme Solitario"	open-air	engravings	Epipaleolithic- Copper Age	1				CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-100
99	Alconchel	Molino Manzaney, Rock XVII "la Tela"	open-air	engravings	Neolithic-Copper Age	1				CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños ,

								Badajoz , pag. 91-101
100	Alconchel	Molino Manzaney, Rock XVIII "Nube Negra"	open-air	engravings	Neolithic-Copper Age	11	Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-102
101	Alconchel	Molino Manzaney, Rock L "Conflictivo"	open-air	engravings	Paleolithic-Iron Age	8	Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-103
102	Alconchel	Molino Manzaney, Rock LXXIII "Tanios"	open-air	engravings	Paleolithic-Bronze Age	21	Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-104
103	Alconchel	Molino Manzaney, Rock XC "La Bellota"	open-air	engravings	Epipaleolithic-Iron Age	7	Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-105
104	Alconchel	Molino Manzaney, Rock XCI "Las Espadas"	open-air	engravings	Paleolithic-Copper Age	15	Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-106
105	Alconchel	Molino Manzaney,	open-air	engravings	Epipaleolithic-	16	Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los

		Rock XIV "Juliana"			Copper Age					petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-107
106	Alconchel	Molino Manzaneez, Rock XL "Gran Capullo"	open-air	engravings	Epipaleolithic-Copper Age	60			Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-108
107	Alconchel	Molino Manzaneez, Rock XV "Esquinera"	open-air	engravings	Paleolithic-Copper Age	6	2		Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-109
108	Alconchel	Molino Manzaneez, Rock XXX "Grolling"	open-air	engravings	Epipaleolithic-Copper Age	31	9		Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-110
109	Alconchel	Molino Manzaneez, Rock XXXII "La Merienda"	open-air	engravings	Epipaleolithic-Copper Age	1			circles	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-111
110	Alconchel	Molino Manzaneez, Rock XXXII "El Celo"	open-air	engravings	Paleolithic-Iron Age	1			circle	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista

									de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-112
111	Alconchel	Molino Manzanec, Rock XXXIX "El Cráneo"	open-air	engravings	Epipaleolithic- Copper Age	2	2		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-113
112	Alconchel	Molino Manzanec, Rock XXXVI "El Bicho"	open-air	engravings	Epipaleolithic- Copper Age	1		1	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-114
113	Alconchel	Molino Manzanec, Rock II "Año"	open-air	engravings	Epipaleolithic- Copper Age	1		circle	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-115
114	Alconchel	Molino Manzanec, Rock X "Juntoañete"	open-air	percussion engravings	Epipaleolithic- Copper Age	3		3 wavy lines	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-116
115	Alconchel	Molino Manzanec, Rock CXVII "La Losa"	open-air	engravings	Paleolithic-Iron Age	4		Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-117

116	Alconchel	Molino Manzanéz, Rock CXXII "Ojos Tristes"	open-air	engravings	Paleolithic-Iron Age	8	8 circles		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-118
117	Alconchel	Molino Manzanéz, Rock I "L'uno"	open-air	percussion engravings	Epipaleolithic- Copper Age	-			CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-119
118	Alconchel	Molino Manzanéz, Rock LXXXIV "K2"	open-air	engravings	Epipaleolithic- Copper Age	1	circle		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-120
119	Alconchel	Molino Manzanéz, Rock LXXXV "La Sombra"	open-air	engravings	Epipaleolithic- Copper Age	3	Y		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-121
120	Alconchel	Molino Manzanéz, Rock LXXXVII "La Noticia"	open-air	engravings	Paleolithic-Iron Age	4	Y		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-122
121	Alconchel	Molino Manzanéz, Rock XI "ñete"	open-air	engravings	Paleolithic-Iron Age	4	many straight	Y	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las

						lines			inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-123
122	Alconchel	Molino Manzanec, Rock XX "El descalzo"	open-air	engravings	Epilaeolithic-Iron Age	8		3 circles	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-124
123	Alconchel	Molino Manzanec, Rock XXI "orejon"	open-air	engravings	Epipaleolithic- Copper Age	7		2	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-125
124	Alconchel	Molino Manzanec, Rock XXII "El Globo"	open-air	engravings	Paleolithic-Copper Age	5			CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-126
125	Alconchel	Molino Manzanec, Rock XXIII "La Garrota"	open-air	engravings	Epipaleolithic-Iron Age	1		bar	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-127
126	Alconchel	Molino Manzanec, Rock XXIV "La Oculta"	open-air	engravings	Epipaleolithic- Copper Age	1		1	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños ,

								Badajoz , pag. 91-128
127	Alconchel	Molino Manzaney, Rock XXIX "sorpresa"	open-air	engravings	Epipaleolithic- Copper Age	2		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-129
128	Alconchel	Molino Manzaney, Rock XXV "El Escurrido"	open-air	engravings	Epipaleolithic- Copper Age	1		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-130
129	Alconchel	Molino Manzaney, Rock XXVI "El Boceto"	open-air	engravings	Paleolithic-Copper Age	14	16 circles	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-131
130	Alconchel	Molino Manzaney, Rock XXVIII "El rectángulo"	open-air	engravings	Epipaleolithic- Copper Age	5	4 circles, 1 rectangle	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-132
131	Alconchel	Molino Manzaney, Rock III "Primer"	open-air	engravings	Epipaleolithic- Copper Age	2	2 circles	CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-133
132	Alconchel	Molino Manzaney,	open-air	engravings	Epipaleolithic-	8		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los

		Rock IV "tenis"			Copper Age					petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-134
133	Alconchel	Molino Manzaner, Rock IX "pocacosa"	open-air	engravings	Epipaleolithic- Copper Age	2	2			CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-135
134	Alconchel	Molino Manzaner, Rock V "el queso"	open-air	engravings	Epipaleolithic- Copper Age	1		oval		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-136
135	Alconchel	Molino Manzaner, Rock VI "loro"	open-air	engravings	Epipaleolithic- Copper Age	1				CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-137
136	Alconchel	Molino Manzaner, Rock VII "El Aro"	open-air	engravings	Epipaleolithic- Copper Age	2	1	circle		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista de Estudios Extremeños , Centro de Estudios Extremeños , Badajoz , pag. 91-138
137	Alconchel	Molino Manzaner, Rock VIII "Gadget"	open-air	engravings	Epipaleolithic- Copper Age	3		Y		CERRATO LEYTON F.- NOVILLO GONZÁLEZ V., 2000 . Los petroglifos de la rivera del Guadiana a su paso por las inmediaciones de Cheles. (Noticia arqueológica) , in Revista

138	Serradilla	Monfragüe's Natural Park, Site XXXIV "La Poltrona"	shelter	paintings	Neolithic-Bronze Age	54	3	
139	Serradilla	Monfragüe's Natural Park, Site XXXV "quemado"	shelter	paintings	Neolithic-Bronze Age	11	Y	
140	Serradilla	Monfragüe's Natural Park, Site XL "alvarillo"	shelter	relief	Neolithic-Bronze Age	88		
141	Serradilla	Monfragüe's Natural Park, Site XXXII "cueva del enigma"	open- air/shelter	engravings/paintngs	Neolithic-Bronze Age	57		
142	Serradilla	Monfragüe's Natural Park, Site XXXIII "La Niebla"	shelter	paintings	Neolithic-Bronze Age	95		
143	Serradilla	Monfragüe's Natural Park, Site XXXIX "El Enebro"	shelter	painted engravings	Neolithic-Bronze Age	24		
144	Serradilla	Monfraüe's Natural Park, Site XXXVIII "El Boquerón"	shelter	paintings	Neolithic-Bronze Age	4	2	
145	Serradilla	Monfragüe Site I "Pectisol"	shelter	paintings	Neolithic-Bronze Age	2		COLECTIVO BARBAÓN, 1997 . <i>Pinturas rupestres en Monfragüe</i> , Not published
146	Serradilla	Monfragüe Site II	shelter	paintings	Neolithic-Bronze	6		COLECTIVO BARBAÓN, 1998 . <i>Pinturas rupestres en</i>

		"La Estrecha"			Age				Monfragüe , Not published
147	Serradilla	Monfragüe Site III "El Cajón"	shelter	paintings	Neolithic-Bronze Age	28			COLECTIVO BARBAÓN, 1999 . Pinturas rupestres en Monfragüe , Not published
148	Serradilla	Monfragüe Site IV "liquenoso"	shelter	paintings	Neolithic-Bronze Age	104		Y	COLECTIVO BARBAÓN, 2000 . Pinturas rupestres en Monfragüe , Not published
149	Serradilla	Monfragüe Site IX "la Pajarita"	shelter	paintings	Neolithic-Bronze Age	150		Y	COLECTIVO BARBAÓN, 2001 . Pinturas rupestres en Monfragüe , Not published
150	Serradilla	Monfragüe Site V "el ciempiés"	shelter	paintings	Neolithic-Bronze Age	120		Y	COLECTIVO BARBAÓN, 2002 . Pinturas rupestres en Monfragüe , Not published
151	Serradilla	Monfragüe Site VI "cueva de cancho"	shelter	paintings	Epipaleolithic- Bronze Age	233			COLECTIVO BARBAÓN, 2003 . Pinturas rupestres en Monfragüe , Not published
152	Serradilla	Monfragüe Site VIII "el duro"	shelter	paintings	Neolithic-Bronze Age	2		2	COLECTIVO BARBAÓN, 2004 . Pinturas rupestres en Monfragüe , Not published
153	Serradilla	Monfragüe Site X "Oculado"	shelter	engravings/painted engravings	Neolithic-Copper Age	98			COLECTIVO BARBAÓN, 2005 . Pinturas rupestres en Monfragüe , Not published
154	Serradilla	Monfragüe Site XXXVI "Del Silencio"	shelter	paintings	Neolithic-Bronze Age	15		finger spots	COLECTIVO BARBAÓN, 2006 . Pinturas rupestres en Monfragüe , Not published
155	Serradilla	Monfragüe Site XXII "Cueva del fraile"	shelter	paintings	Neolithic-Bronze Age	97			COLECTIVO BARBAÓN, 2007 . Pinturas rupestres en Monfragüe , Not published
156	Villar del Humo	Peña del escrito	open- air/shelter	paintings	Neolithic	53			ROMERO SAIZ, MIGUEL, 1998 . <i>La maravillosa tierra de Pabovi. La pintura rupestre en los abrigos rocosos de Villar del Humo</i> , in <i>Editor: Miguel Romero Saiz</i> , Cuenca , pag. 25
157	Albarracin	Pinares de la Cocinilla del Obispo	open- air/shelter	paintings	Neolithic	8		8	BELTRAN MARTINEZ, ANTONIO et alii, 1995 . " <i>Innovations in the Levantine paintings of Albarracín</i> " , in <i>International Newsletter on Rock Art 10</i> , Comité International d'Art

										Rupestre (C.A.R. - ICOMOS) , Foix , pag. 9-10
158	Albarracin	Pinares de la Losilla, Abrigo de las Varias Figuras	open-air/shelter	paintings	Neolithic	5	2	3		BELTRAN MARTINEZ, ANTONIO et alii, 1995 . <i>"Innovations in the Levantine paintings of Albarracín"</i> , in <i>International Newsletter on Rock Art 10</i> , Comité International d'Art Rupestre (C.A.R. - ICOMOS) , Foix , pag. 9-10
159	Albarracin	Pinares de la Losilla, Abrigo de los Dos Caballos	open-air/shelter	paintings	Neolithic	3		2		BELTRAN MARTINEZ, ANTONIO et alii, 1995 . <i>"Innovations in the Levantine paintings of Albarracín"</i> , in <i>International Newsletter on Rock Art 10</i> , Comité International d'Art Rupestre (C.A.R. - ICOMOS) , Foix , pag. 9-11
160	Albarracin	Pinares de la Losilla, Abrigo del Ciervo	open-air/shelter	paintings	Neolithic	1		1		BELTRAN MARTINEZ, ANTONIO et alii, 1995 . <i>"Innovations in the Levantine paintings of Albarracín"</i> , in <i>International Newsletter on Rock Art 10</i> , Comité International d'Art Rupestre (C.A.R. - ICOMOS) , Foix , pag. 9-12
161	Albarracin	Pinares de la Losilla, Abrigo del Medio Caballo	open-air/shelter	paintings	Neolithic	27	4	17	Y	BELTRAN MARTINEZ, ANTONIO et alii, 1995 . <i>"Innovations in the Levantine paintings of Albarracín"</i> , in <i>International Newsletter on Rock Art 10</i> , Comité International d'Art Rupestre (C.A.R. - ICOMOS) , Foix , pag. 9-13
162	Albarracin	Prado de la Losilla, Cueva de Doña Clotilde	open-air/shelter	paintings	Neolithic	35	12	8	Y	BELTRAN MARTINEZ, ANTONIO et alii, 1995 . <i>"Innovations in the Levantine paintings of Albarracín"</i> , in <i>International Newsletter on Rock Art 10</i> , Comité International d'Art Rupestre (C.A.R. - ICOMOS) , Foix , pag. 9-14
163	Albarracin	Prado del Tormon, Abrigo de las Olivanas	open-air/shelter	paintings	Neolithic	35	10	21	Y	BELTRAN MARTINEZ, ANTONIO et alii, 1995 . <i>"Innovations in the Levantine paintings of Albarracín"</i> , in <i>International Newsletter on Rock Art 10</i> , Comité International d'Art Rupestre (C.A.R. - ICOMOS) , Foix , pag. 9-15
164	Albarracin	Prado del Tormon, Ceja de	open-air/shelter	paintings	Neolithic	1		1		BELTRAN MARTINEZ, ANTONIO et alii, 1995 . <i>"Innovations in the Levantine paintings of Albarracín"</i> , in <i>International</i>

		Park, Site XXX "La lluvia"			age						Parque Natural de Monfragüe (Cáceres) , Cáceres
174	Serradilla	Monfragüe Natural Park, Site XXI "La garganta III"	shelter	paintings	Neolithic-Bronze age	5					RUBIO ANDRADA, M., 1991 . <i>La pintura rupestre en el Parque Natural de Monfragüe (Cáceres) , Cáceres</i>
175	Serradilla	Monfragüe Natural Park, Site XIII "el charco"	shelter	paintings	Neolithic-Bronze age	37					RUBIO ANDRADA, M., 1991 . <i>La pintura rupestre en el Parque Natural de Monfragüe (Cáceres) , Cáceres</i>
176	Serradilla	Monfragüe Natural Park, Site XIV "el límite"	shelter	paintings	Neolithic-Bronze age	55			zigzag		RUBIO ANDRADA, M., 1991 . <i>La pintura rupestre en el Parque Natural de Monfragüe (Cáceres) , Cáceres</i>
177	Serradilla	Monfragüe Natural Park, Site XV "Tumbao"	shelter	paintings	Neolithic-Bronze age	1					RUBIO ANDRADA, M., 1991 . <i>La pintura rupestre en el Parque Natural de Monfragüe (Cáceres) , Cáceres</i>
178	Serradilla	Monfragüe Natural Park, Site XI "La Ventana"	shelter	paintings	Neolithic-Bronze age	6	6				RUBIO ANDRADA, M., 1991 . <i>La pintura rupestre en el Parque Natural de Monfragüe (Cáceres) , Cáceres</i>
179	Serradilla	Monfragüe Natural Park, Site XII "Los Simpsons"	shelter	paintings	Neolithic-Bronze age	59					RUBIO ANDRADA, M., 1991 . <i>La pintura rupestre en el Parque Natural de Monfragüe (Cáceres) , Cáceres</i>
180	Serradilla	Monfragüe Natural Park, Site XVII "el Barquito"	shelter	paintings	Neolithic-Bronze age	71					RUBIO ANDRADA, M., 1991 . <i>La pintura rupestre en el Parque Natural de Monfragüe (Cáceres) , Cáceres</i>
181	Serradilla	Monfragüe Natural Park, Site XVIII "Las Medusas"	open-air	paintings	4,000-600 BCE	79	Y	3		comb, U-shape, angle, etc.	

182	Serradilla	Monfragüe Natural Park, Site XIX "La Garganta I"	open-air	engravings/painted engravings	4,000-600 BCE	1					
183	Villar del Humo	Rambla del Anear, Abrigo de Selva Pascuala	open- air/shelter	paintings	Neolithic	29	17	8		ROMERO SAIZ, MIGUEL, 1998 . La maravillosa tierra de Pabovi. La pintura rupestre en los abrigos rocosos de Villar del Humo , in Editor: Miguel Romero Saiz , Cuenca , pag. 253	
184	Villar del Humo	Rambla del Anear, Peñascos en Fuente de Selva Pascuala	open- air/shelter	paintings	Neolithic	2			1	ROMERO SAIZ, MIGUEL, 1998 . La maravillosa tierra de Pabovi. La pintura rupestre en los abrigos rocosos de Villar del Humo , in Editor: Miguel Romero Saiz , Cuenca , pag. 254	
185	Alcañiz	Val del Charco del Agua Amarga, Cueva del Charco del Agua Amarga	open- air/shelter	paintings	Neolithic	73	41	16	1	ROYO GUILLEN, JOSE IGNACIO et alii, 1999 . <i>Val del Charco del Agua Amarga (Alcañiz, Teruel). Un modelo para la protección y difusión del Arte Rupestre Aragonés</i> , Ayuntamiento de Alcañiz , Alcañiz , pag. 74	
186	Ladruñan	Valle del Rio Guadalope, Abrigo del Arquero del Pudial	open- air/shelter	paintings	Neolithic	9	4		1	1	BELTRAN MARTINEZ, ANTONIO, 1986 . <i>El arte rupestre en la provincia de Teruel</i> , in <i>Cartillas Turolenses 5</i> , Instituto de Estudios Turolenses , Teruel , pag. 60
187	Ladruñan	Valle del Rio Guadalope, Abrigo del Torico del Pudial	open- air/shelter	paintings	Neolithic	1			1		BELTRAN MARTINEZ, ANTONIO, 1986 . <i>El arte rupestre en la provincia de Teruel</i> , in <i>Cartillas Turolenses 5</i> , Instituto de Estudios Turolenses , Teruel , pag. 60
188	Ladruñan	Valle del Rio Guadalope, Friso Abierto del Pudial	open- air/shelter	paintings	Neolithic	7	4		1		BELTRAN MARTINEZ, ANTONIO, 1986 . <i>El arte rupestre en la provincia de Teruel</i> , in <i>Cartillas Turolenses 5</i> , Instituto de Estudios Turolenses , Teruel , pag. 61
189	Alcaine	Valle del Rio Martin, Abrigo de	open- air/shelter	paintings	Neolithic	82	21	31		3	BELTRAN MARTINEZ, ANTONIO, 1986 . <i>El arte rupestre en la provincia de Teruel</i> , in <i>Cartillas Turolenses 5</i> , Instituto de

		la Cañada de Marco								Estudios Turolenses , Teruel , pag. 62
190	Mazaleon	Valle del Rio Matarraña, Abrigo dels Secans	open-air/shelter	paintings	Neolithic	1				BELTRAN MARTINEZ, ANTONIO, 1954 . "Las pinturas de 'Els Secans', Mazaleón", in <i>Caesaraugusta 4</i> , Institución "Fernando el Católico" , Zaragoza , pag. 189
191	Cogul	Valle del Rio Set, Covacho de Alfes	open-air/shelter	paintings	Neolithic	2		2		CONDE BEGOUEN,, 1913 . "Une excursion aux fresques préhistoriques de Cogul près Lérida (Espagne)", in <i>Notes d'archéologie préhistorique</i> , Toulouse , pag. 1-8
192	Cogul	Valle del Rio Set, Covacho de Cogul	open-air/shelter	paintings	Neolithic	46	16	19	2	ALMAGRO BASCH, MARTIN, 1952 . <i>El covacho con pinturas rupestres de Cogul (Lérida)</i> , Instituto de Estudios Ilerdenses , Lérida , pag. 93
193	Villar del Humo	Vallejo de Marmalo, Barranco de Marmalo	open-air/shelter	paintings	Neolithic	18	2	8	6, including zigzag	ROMERO SAIZ, MIGUEL, 1998 . La maravillosa tierra de Pabovi. La pintura rupestre en los abrigos rocosos de Villar del Humo , in Editor: Miguel Romero Saiz , Cuenca , pag. 253

7.2 Table 3. List of scripts that are compared with P11-S2 loops. Data from Anderson (2022).

Script (Alphabetical Order)	Usage period
Europe (37 scripts)	
Armenian	406 - today
Braille Patterns	1821 - today
Caucasian Albanian	5c - ?
Cirth	1930s - today
Cypriot Syllabary	-11c - -3c
Cypro-Minoan	-16c - -11c
Cyrillic	890s - today
Duployan	1860 - today
Elbasan	1761
Gabelsberger Shorthand	1871 – 1924?
Georgian	5c - today
Glagolitic	862 - 1893
Gothic	4c – 9c
Greek	-8c - today
Gregg Shorthand	1888 - today
Hamnosys	1985 - today
International Phonetic Alphabet	1886 - today
Latin	-7c - today
Linear A	-18c - -15c
Linear B	-14c - -12c
Moon	1845 - today
Northern Paleohispanic	-5c – 1c
Ogham	5c – 7c
Old Hungarian	9c - today
Old Italic	-8c - -1c
Old Permic	1376 – 17c
Phaistos Disc	-18c - -14c
Pitman Shorthand	1837 - today
Runic	1c – 19c
Shavian	1960s - today
Shavian Quikscript	1960s - today
Southern Paleohispanic	-7c – 1c
Tengwar	1930s - today

Todhri	1795 - 1805
Veso Bey	Late 18c – early 19c
Visible Speech	1867 – 20c
Vithkuqi	19c
Africa (37 scripts)	
Adlam	1980s -today
Bagam	1910 – late 20c
Bamum	1896 - today
Bassa Bah	1907 - today
Beria	1980s - today
Bété	1956 - today
Borama	1933 – today?
Coptic	4c - today
Demotic	-650 – 6c
Egyptian Hieroglyphs	-33c – 1c
Ethiopic	-4c - today
Fula Ba (Fula 2)	1963 - 1970
Fula Dita (Fula 1)	1958 - 1970
Garay (Wolof)	1961 - today
Hieratic	-29c – 2c
Isibheqe Sohlamvu	20c – today?
Kaddare	1952 - today
Kpelle	1930s - today
Loma	1930s - today
Luo	2009 - today
Mandombe	1978 - today
Masaba	1930 - today
Medefaidrin	1930s - today
Mende Kikakui	1920 - today
Meroitic Cursive	-3c - 4c
Meroitic Hieroglyphs	-3c – 4c
Mwangwego	1979 - today
N’ko	1949 - today
Numidian	-2c – 3c
Nwagu Aneke Igbo	1960s - 1991
Old Bamum	1896 – 20c
Osmanya	1920 - 1973

Raina Kama (Hausa 2)	1990s - 1999
Salifou Hausa (Hausa 1)	1998 - 2004
Tafi (Hausa 3)	1977 - 2011
Tifinagh	3c - today
Vai	1830 - today
Middle East (34 scripts)	
Anatolian Hieroglyphs	-15c - -7c
Arabic	6c - today
Avestan	6c - today
Book Pahlavi	7c - 9c
Byblos	-18c - -15c
Carian	-7c - -3c
Cuneiform	-23c - -1c
Early Dynastic Cuneiform	-29c - -23c
Elymaic	-3c - 5c
Hatran	-98 - 240
Hebrew	-3c - today
Imperial Aramaic	-8c - -4c
Inscriptional Pahlavi	2c - 5c
Inscriptional Parthian	2c - 292
Linear Elamite	-23c - -19c
Lycian	-5c - -3c
Lydian	-8c - -3c
Mandaic	2c - today
Manichaean	3c - 10c
Nabataean	-2c - 4c
Old North Arabian	-550 - 4c
Old Persian	-525 - -4c
Old South Arabian	-8c - 7c
Palmyrene	-1c
Phoenician	-12c - -2c
Proto-Cuneiform	-33c - -29c
Proto-Elamite	-33c - -29c
Proto-Sinaitic	-18c - -15c
Psalter Pahlavi	6c - 7c
Samaritan	-3c - today
Sidetic	-5c - -3c

Syriac	6c - today
Ugaritic	-14c - -12c
Yezidi	? - today

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