



KEYWORDS: *Rock painting – Superimposition – Relative sequence – Patagonia*

REITERATIVE ROCK ART PRODUCTION IN CENTRAL WESTERN PATAGONIA: THE CASE OF CUEVA DE LAS MANOS DEL RÍO PEDREGOSO (AISÉN, CHILE)

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Abstract. We present the analysis results of rock paintings and their relative production sequence at the Cueva de las Manos del río Pedregoso site, a cave in central western Patagonia, southern Chile. We developed a typology of the motifs and propose a relative chronology using Harris's matrices to identify superimpositions. The results suggest several painting episodes evidencing reiterative rock art production, likely covering several millennia. Also, conspicuous attributes of the paintings suggest connections between the site and other distant locations based on analogue emblematic rock art sequences from different timeframes across wider Patagonia.

Introduction

Rock art, in the form of paintings and petroglyphs, represents a conspicuous manifestation of the hunter-gatherer societies that inhabited Patagonia in the 'southern cone' of South America throughout the Holocene (Gradin 1987, 1988; Podestá et al. 2005). As such, rock art is a fundamental line of archaeological evidence for understanding the dynamics of information exchange and the uses of the landscape by human groups in the past (Carden 2009a; Goñi et al. 2019; Re et al. 2021).

As in many areas of the world, precise dating of rock art in Patagonia is elusive, as procuring direct radiocarbon samples is challenging (Hedges et al. 1998; Pettitt and Bahn 2003). Only a handful of direct radiocarbon dates on rock art motifs have been obtained in the region (Brook et al. 2018; Méndez et al. 2023a; Romero et al. 2024). Conversely, stylistic sequences have been fundamental for understanding continuities and transformations in rock art through time (e.g. Gradin et al. 1976; Carden et al. 2018).

In Patagonia, the stylistic sequences of rock art are based on research of some exemplary caves and rockshelters yielding multiple motifs, high formal variability and frequent superimpositions. Localities such as Cueva de las Manos del río Pinturas, Cerro Casa de Piedra 7 and Los Toldos show extended rock art sequences starting roughly in the early Holocene and exhibit redundant painting episodes lasting until recent times (Gradin et al. 1976; Aschero et al. 2005; Aschero and Isasmendi 2018; Carden et al. 2018; Carden and Miotti 2020; Aschero and Schneier 2021, 2023). Research on rock art superimpositions reveals

that the relevance of the act of painting over previous depictions extends beyond the reconstructions of relative production sequences. They show that human intentions varied over time, based on the understanding of the interactions with previous motifs, the links between human groups and specific features of the landscapes, as well as an active role rock art had in the construction of memory among hunter-gatherer groups (Re 2016; Motta 2019; Carden 2022; Aschero and Schneier 2023; Papú 2023).

However, such approaches are uncommon in central west Patagonia (CWP, i.e. Aisén Region, 44° to 49° S, Chile; Fig. 1). Most rock art research in this region has been developed at a basin scale, and only recently it has been discussed in a broader regional perspective (Muñoz and Artigas 2016; Cordero et al. 2019; Muñoz et al. 2021; Méndez et al. 2023a). Conversely, research at a site scale is unusual, and little is known about the transformations of the series of depictions at each site through time. In this context, it is crucial to investigate sites with significant stylistic variability and superimpositions that can provide us with information to interpret relative sequences and improve our understanding of the intentions and effects of the rock art superimpositions in the past.

The above is particularly significant for the broader context of south-central Patagonia because, currently, it is not possible to understand diachronically the role of CWP within the larger processes of landscape transformation and information exchange observed in the rock art throughout the Holocene (Carden 2009a; Goñi et al. 2019). The area has some environmental particularities, such as the presence of the Lago Gen-

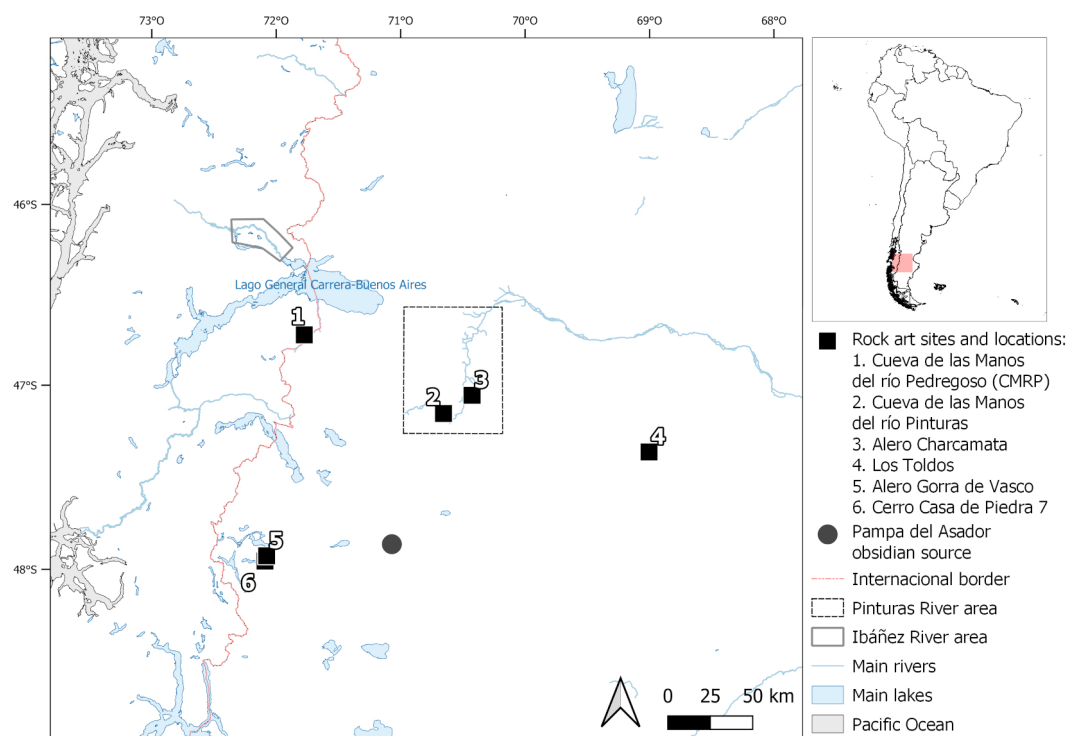


Figure 1. Rock art sites and locations mentioned in the text.

eral Carrera-Buenos Aires (LGC-BA), the bounding of mountain chains (Moreno-Meynard et al. 2022), and the availability of good toolstones (Contreras 2012; Fuenzalida 2022). It would be relevant to understand if the trends here match other areas or if they correspond to local features, as well as to comprehend their relationship with emblematic rock art locations of Patagonia, such as the Pinturas River basin.

An outstanding rock art site in the south of the LGC-BA is Cueva de las Manos del río Pedregoso (CMRP). It is a cave with multiple motifs and superimpositions of paintings, as well as the most significant in terms of formal variability in the area (Niemeyer 1978, 1979). In this work, we present the results of its assessment with emphasis on the formal analysis of the motifs and the patterns of superimpositions using Harris Matrices. The results allow us to propose a relative sequence and discuss it at a macro-regional scale by comparing it with other sites in Patagonia.

Archaeological background

The human occupation of CWP can be described as discontinuous, given that the archaeological records of hunter-gatherers in the studied basins are characterised by abandonment intervals that occasionally last for millennia (Méndez et al. 2018a). High mobility, long distances and marked seasonality are inferred from the occupations spanning the last 12,000 years (Méndez et al. 2018b; 2024). The marginal character of the Andean valleys, distant from the more populated centres of Patagonia, suggests that this area was peopled later and with lower intensity than areas to the east (Borrero et al. 2019). In this context, it is expected that the flows of information within and between

groups were likely interrupted after periods of discontinuity (Méndez et al. 2023b). Hence, the study area is a fertile ground for evaluating forms of inter-generational communication required for landscape learning during such interruptions (Rockman 2009).

In this context, rock art plays a critical role, given the significant modification it produces over key landscape markers. Rock art, mainly paintings in caves and rockshelters, extends variably across the region (Méndez et al. 2023a). The largest concentration occurs around the LGC-BA, a binational (Chile and Argentina) lake at the centre of the region (46° S). Archaeological research in the areas north and south of the lake shows occupations beginning in the mid-Holocene, with a particular intensity over the last 2000 years (Nuevo-Delaunay et al. 2022; Garvey et al. 2023). The lake's shores and the main river basins have been interpreted as conveyors effectively used for mobility towards western spaces, with notable examples of rock art sites displayed along the way (Moreno-Meynard et al. 2022). One such occupied corridor is the Jeinemeni basin, a south-to-north river draining into the LGC-BA near Chile Chico (Nuevo-Delaunay et al. 2022). Paramount in this river is the CMRP, the site with the highest concentration of rock art in the entire region (Méndez et al. 2023a).

The Cueva de las Manos del río Pedregoso site

The studied site is located in the western Jeinemeni River basin, near the Chile-Argentina border, at 1097 masl (Figs 1 and 2). The site was first mentioned by Junge (1937), a German explorer visiting Patagonia, who identified depictions of guanaco (*Lama guanicoe*), the largest extant ungulate, huemul (Andean deer,

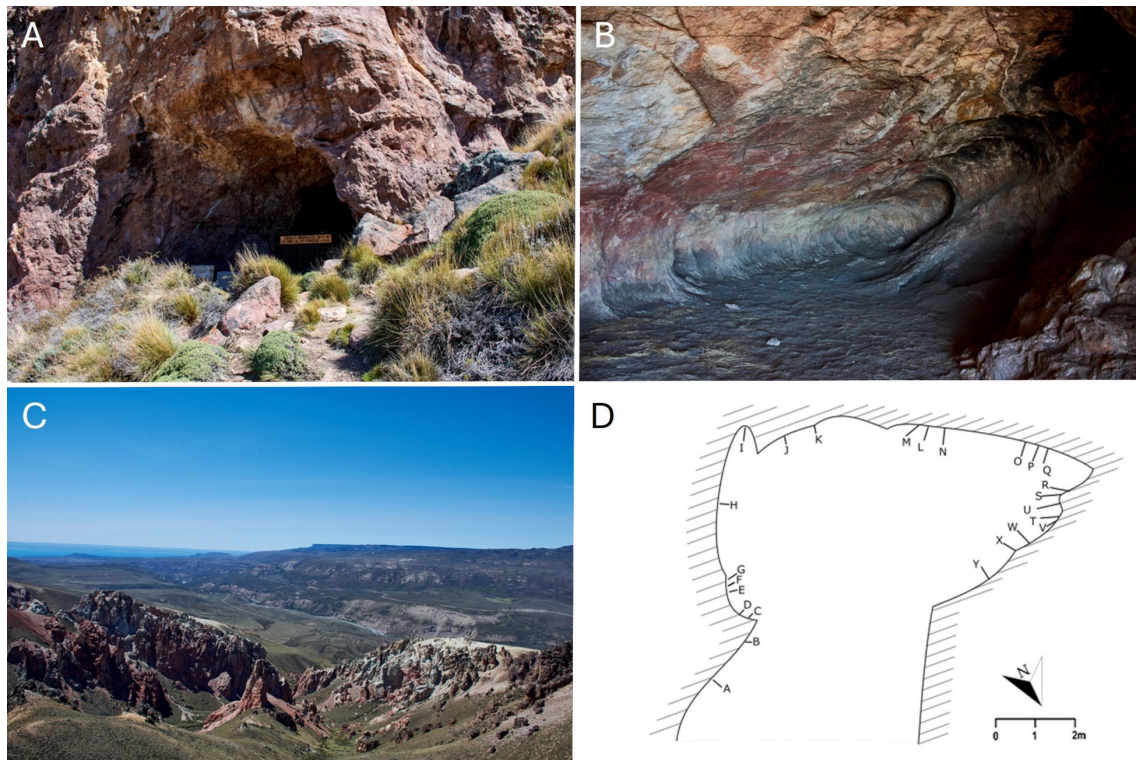


Figure 2. The Cueva de las Manos del Río Pedregoso site. A. general view of the cave; B. inside (west area) view of CMRP; C. site environs; D. distribution of rock art panels in CMRP. Photographs by Javier Carranza.

Hippocamelus bisulcus), humans, geometric figures and hands. Later, Niemeyer (1978, 1979) described several themes spatially organised in 12 groups. He noted that hand stencils (or hands painted in negative) were the most frequent motifs. Hands show several colours, including red, black, white, yellow and green. Although most hands are stencils, there are also hand-prints (or hands painted in positive). Next in frequency are guanacos, which appear in red, white and yellow. Niemeyer observed that some red guanacos were 'deformed' while white ones were organised in rows. Additionally, he reported an anthropomorph, children's footprints and a flightless bird (*Rhea pennata*).

The cave has very low sedimentary deposition, no more than ten centimetres, primarily consisting of ash deposits of volcanic origin (likely the most recent eruption of Hudson volcano). Thus, there is little information on the associated archaeological context of rock art. Some lithic materials were found on the surface, and Bate (1978) studied them. The assemblage includes scrapers, flakes and lithic debris. The raw materials were obsidian, quartzite, chalcedony, basalt and silicified wood, all of which are well represented in both the surface and stratigraphical assemblages recorded along the Jeinemeni basin (Contreras 2012; Méndez et al. 2018b; Fuenzalida 2022).

Despite the low probability of locating a stratigraphic deposit, we completed a test excavation of 100 × 50 cm. We identified features of burnt sediment, lithic debris and zooarchaeological remains of introduced fauna, namely sheep (*Ovis aries*). We obtained two samples for radiocarbon dating (UE3: D-AMS

040161 = 90±23 BP and UE2: D-AMS 040166 = 134±22 BP), which provide a statistically undistinguishable age (average 123±16 BP) of (1σ) of 30–240 cal. BP. Therefore, the archaeological evidence of the site can only be interpreted as a palimpsest buried by a recent deposition and cannot account for the complex history of rock art production on the cave walls.

The motifs at CMRP have been compared with rock art from other locations in Patagonia. Niemeyer observed relations between this site and sites of the Ibáñez River valley, based on the work of Bate (1970, 1971). He also underscored similarities with the depictions from the Pinturas River, an emblematic gorge with several rock art sites located 97 km SE of CMRP (Gradin et al. 1976). Recent studies also address these similarities by analysing specific attributes or motifs to propose regional comparisons (Sade 2016; Cordero et al. 2021; Muñoz et al. 2021; Méndez et al. 2023a). Following Gradin et al. (1976, 1979), some authors have proposed relations between CMRP and the Pinturas River sequence, suggesting a mid-Holocene chronology for certain motifs based on stylistic attributes (Sade 2016; Muñoz et al. 2021).

Recent research has included CMRP in regional discussions, however, the study of motifs has focused mainly on specific traits overlooking the vast stylistic variability of CMRP's rock art (Cordero et al. 2021; Muñoz et al. 2021). Therefore, the available data does not allow us to compare most CMRP rock art with other of Patagonia's stylistic proposals, which are of great chronological significance (e.g. Aschero 1996, 2018; Aschero and Isasmendi 2018). As a result, little

Guanacos					
Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
Other motifs					
Unique type guanaco	Simple lineal motif	Grouped lineal motif	Grouped points forming an arc	Grouped points aligned	Grouped points unaligned
Simple point	Bird track	Hand stencil	Rounded non-figurative motif	Rounded Object stencil	Undetermined motif

Figure 3. Symbology used in Harris diagrams.

is known about the relative sequence of art production at the site and its relationship with the changes in the landscape use by past human groups (e.g. Aschero and Schneier 2023).

Furthermore, a feature of exceptional interest in CMRP is the presence of superimpositions (Niemeyer 1978, 1979; Cordero et al. 2021). Niemeyer (1978, 1979) made some remarks based solely on colour, suggesting that red was the earliest, followed by white. Green and yellow were considered more recent, while black did not have any specific position in the sequence. However, the depicted themes and their formal variability were not considered in analysing superimpositions at a site scale. Hence, a comprehensive study of the site is key for understanding redundancy in art production, the relations between groups of motifs, and the broader connections across regions that share rock art attributes. Our work aims to characterise the rock art of CMRP in terms of its formal and spatial variability, identify its relative sequence and discuss the results within the regional context (Aschero and Schneier 2023).

Methods

The recording of rock art was organised at two scales: motif and panel. Motifs were identified in the field by the naked eye and using the Decorrelation Stretch (DStretch) mobile application (Harman 2008). Photographs of each panel and all motifs were taken with a scale, and a Munsell soil colour chart was used to document the colour of each motif.

After the fieldwork, photographs were enhanced using DStretch software to improve their visualisation (Harman 2008; Acevedo and Franco 2012). Digital tracings of each motif were created following the methodology detailed by Domingo et al. (2013). Motifs were classified into types (Francis 2001). First, we distinguish between figurative and non-figurative

motifs. Then, the former were classified as zoomorphic, anthropomorphic, hands and bird tracks. The zoomorphic motifs were assigned to taxa whenever possible and classified based on formal attributes. The motifs identified as guanacos were classified into types based on their shape, size, colour, and schematism. The schematism was organised into three categories: naturalistic, schematic and very schematic. Naturalistic motifs are the guanacos that present some degree of anatomical modelling, details in the representation of the bodies, heads, ears, limbs and tails. Schematic motifs are

guanacos that do not present anatomical modelling and a partial and schematic representation of bodies, heads, ears, limbs and tails. Very schematic motifs are guanacos that only present bodies, necks and limbs without any detail. Additionally, we use colour to classify the motifs because it is a significant attribute in proposing relative rock art sequences in Patagonia (Gradin et al. 1976, 1979; Aschero 2018).

Hands were classified according to their primary technique (stencil or handprint), colour and laterality. Additionally, we assessed their age group according to hand sizes based on measurements of the scaled digital tracings, namely hand length, palm width and middle finger length (Gunn 2006; Carden and Blanco 2016; Guichón and Re 2020). Hand length has been deemed as the most reliable measurement for discriminating between age groups (Carden and Blanco 2016) and was thus considered sufficient for age group assignment. The other two measurements are less reliable and were only considered in combination with another measurement.

The age categories followed Guichón and Re (2020). As such, three groups were considered: infants or individuals under 5 years of age, children or individuals between 6 and 12 years of age, and adolescents/adults or individuals above 13 years of age. Some cases fit into more than one category, and occasionally, hand depictions have deteriorated, thus limiting age estimation with this technique. These were considered undetermined.

Non-figurative motifs were classified according to the number and shape of their elements (Gradin 1978). They were considered simple whenever they consisted of one element or composite if they had more than one element (Gradin 1978). They were also classified according to the form of their elements (lines, circles, rounded shapes and dots).

Finally, superimpositions (sensu Re 2016) were

analysed using Harris's matrices at a panel scale based on the discrimination of defined types and colours (Chippindale and Taçon 1993; Carden and Miotti 2020; Harris and Gunn 2019). In this paper, we present simplified Harris diagrams of the site's main panels, which include the superimpositions of motifs and their distinct types, following the symbology outlined in Figure 3.

The superimpositions within the panels were compared to each other to identify the relative sequential position of the distinct types of motifs. These were then combined to propose a relative sequence at the site. The result was then compared with other published sequences for Patagonia (Gradin et al. 1976; Aschero and Isasmendi 2018; Aschero and Schneier 2023).

Results

The rock art motifs

We identified 25 panels inside the cave (labelled A to Y) (Fig. 2D). Rock art panels extend throughout the cave, but most motifs are concentrated in the rear towards the centre and west areas. The total number of rock art motifs is 226 (Table 1). This includes 49 (21.7%) classified as undetermined because they are concentrations of paint with undefined shapes. Therefore, the total number of 'identified' motifs reaches 177 (78.3%). All motifs are painted; only one was engraved before being painted white (Fig. 4A).

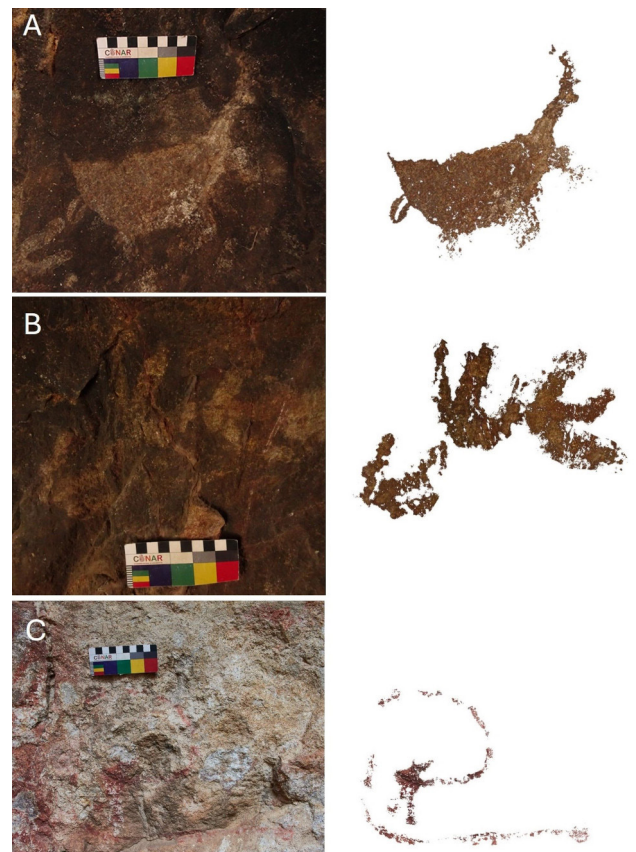
Among the determined depictions, figurative motifs are more frequent than non-figurative ones (Table 1). Most figurative motifs (Fig. 4) are zoomorphic depictions and hands. Also, we identified bird tracks (Fig. 4B) (Carden 2009b) and one anthropomorph, a red schematic figure 'holding a rope' surrounding the body and resembling the action involved in the bola hunting technique, typical of Patagonia (Fig. 4C).

Most zoomorphic figures (N=80; 45.2% of the determined motifs) are depictions of guanacos (Table 1). Most of them are white (N=44; 55%) or red (N=33; 41.3%), with only a few yellow motifs (N=3; 3.8%). These show significant formal variability in schematism, size and shape. An important feature was the presence of an exaggerated abdomen, which is considered a relevant stylistic attribute in Patagonia (Aschero 1996). Considering these features, we classified the guanaco depictions into six descriptive types whenever they included more than one motif (Fig. 5; Table 2). However, this typology accounts for only 52 motifs (65%). The others do not show similarities with other depictions and, therefore, are considered unique (Fig. 6). Such assemblage reflects the outstanding formal variability in the guanaco depictions. We did not recognise any explicit scene between the zoomorphic figures, only that some guanacos are organised in rows (Fig. 5, type 6).

Figure 4. Examples of motifs identified in CMRP: A. engraved and painted zoomorphic motif; B. bird tracks; C. anthropomorph.

General classification	Theme		N	%
Figurative motifs	Zoomorphic	‘Guana-cos’	80	35.4
		Other zoomorphic	6	2.7
	Hands	Hand stencils	32	14.2
		Hand-prints	2	0.9
		Mixed	1	0.4
	‘Bird tracks’		6	2.7
	Anthropomorph		1	0.4
Non-fig-urative motifs	Simple	Dots	2	0.9
		Lines	9	4
		Rounded shapes	9	4
		Other shapes	2	0.9
	Composite	Dots	16	7.1
		Lines	11	4.9
Undetermined			49	21.7
Total			226	100

Table 1. Absolute and relative frequency of motifs identified in CMRP.



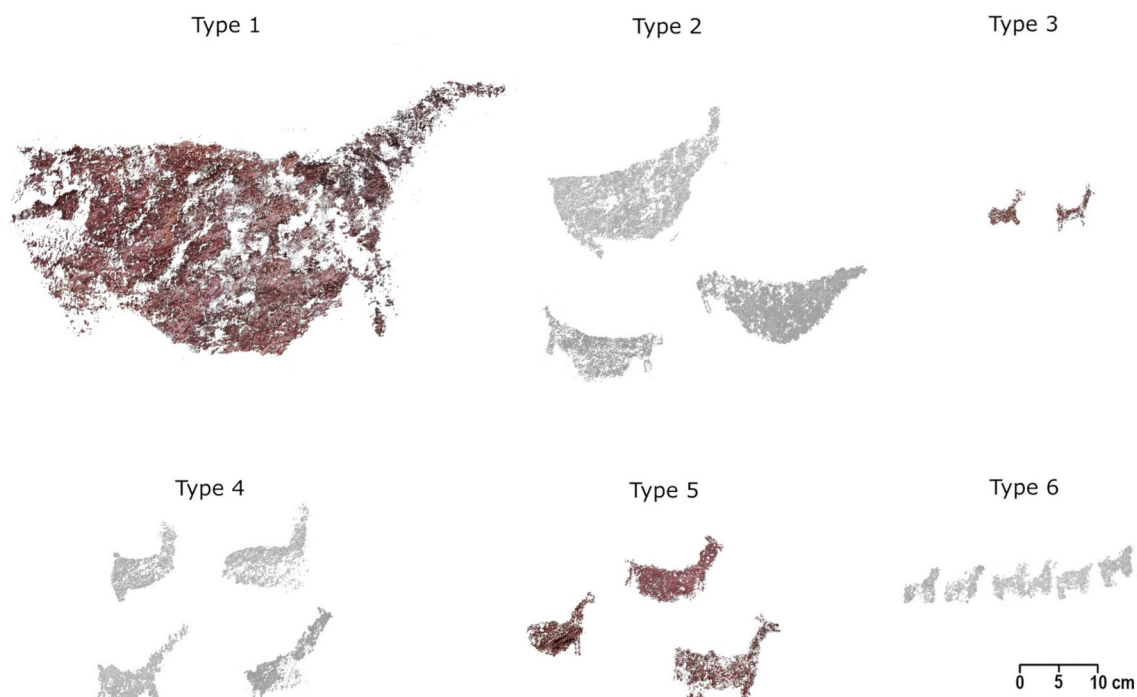


Figure 5. Typology of guanacos of the site CMRP. Type 1: naturalistic red; type 2: naturalistic white type; type 3: schematic red type, very small size; type 4: schematic white type; type 5: schematic red type; type 6: very schematic white type.

Type of guanaco depiction	Main features	N
1	Naturalistic, red, large size (around 50×30 cm), exaggerated abdomen.	5
2	Naturalistic, white, small to medium size (from 6.3×13.1 cm to 17.9×23.6 cm), exaggerated abdomen.	8
3	Schematic, red, very small size (around 4.5×7 cm), flat abdomen.	4
4	Schematic, white, small size (from 5.4×8.2 cm to 11.9×13.5 cm), flat and exaggerated abdomen.	10
5	Schematic, red, small size (4.8×9.2 to 11.2×13.3 cm), flat and exaggerated abdomen.	9
6	Very schematic, white, camelids, very small in size (2.5×4 to 7.7×12 cm).	16

Table 2. Main features of the types of guanacos identified in CMRP.

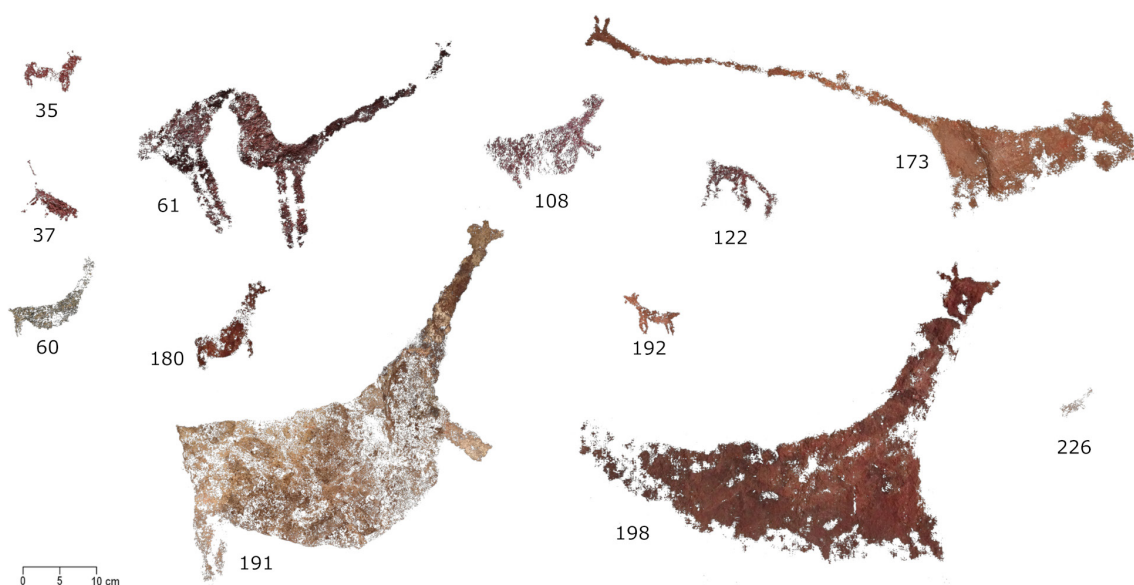


Figure 6. Unique guanaco depictions identified in CMRP.

Regarding the hand motifs (35; 19.8% of the total determined motifs), most are stencilled (N=32; 91.4%) and appear in different frequencies depending on their colour: red (N=17; 48.6%), yellow (N=5; 14.3%), white (N=5; 14.3%), black (N=3; 8.6%) and green (N=2; 5.7%) (Fig. 7). Within this group we classified a black finger stencil (Fig. 7A). There are only two white handprints (5.7%) (Fig. 7B) and one motif that was likely the mixture of a red handprint and white stencil. One red hand stencil has a delineated portion (Fig. 7C). Only 17 (48.6%) hands were preserved enough to be measured. However, ten (28.6%) have sizes that fit into more than one category and could correspond either to children or adolescents/adults. Also, six (17.1%) motifs fit only into the adolescent/adult category and one (2.9%) into the infant group (Fig. 7D).

Non-figurative motifs (N=49; 27.7% of the determined motifs) are both simple (N=22; 44.9%) and composite (N=27; 55.1%) (Fig. 8). Within the simple motifs, most of them are lines (N=9; 18.4%) and rounded figures (N=9; 18.4%). These were likely the stencils of objects with oval or rounded shapes (Fig. 8A), a technique that has been described elsewhere in the region (Sade et al. 2015). On the other hand, composite motifs are primarily combinations of dots (N=16; 32.7%) or lines (N=11; 22.4%) (Fig. 8B and C). Some of these groups of figures are organised in different directions. In the case of motifs formed by lines, the most common ones are parallel lines (N=8; 16.3%) (Fig. 8C). On the other hand, dots can be organised in curved or straight lines (N=13; 26.5%) (Fig. 8B) or are shown distributed without a clear pattern (N=3; 6.1%).

Additionally, there are motifs with irregular shapes (Fig. 8D), and one seems to be a stain made by blowing

paint directly on the wall. Non-figurative motifs are mostly red (N=35; 71.4%) and less often white (N=12; 24.5%) and black (N=1; 2%). Only one motif combines

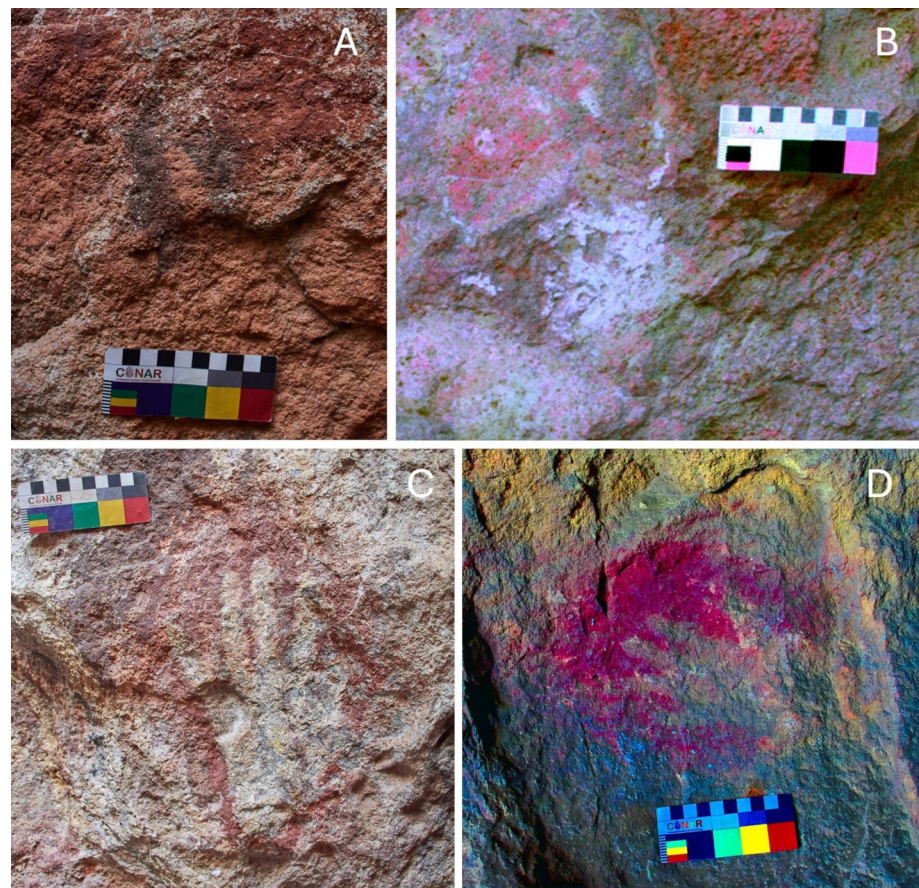


Figure 7. Examples of depictions of hands. A. black finger stencil; B. white handprint; C. red delineated hand stencil; D. red stencil of a child's hand.

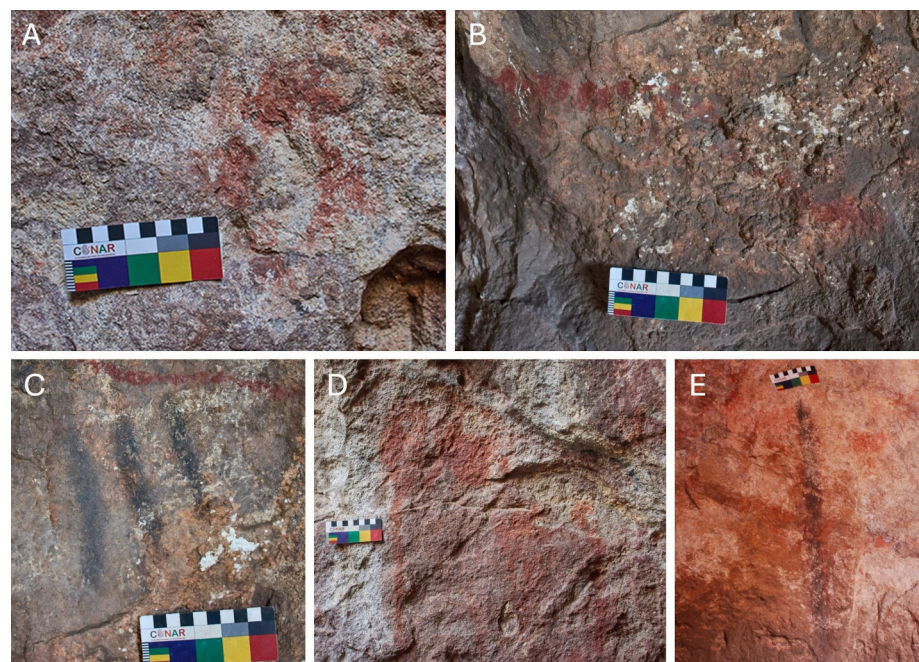


Figure 8. Examples of non-figurative motifs. A. stencil of a rounded object; B. composite dots; C. parallel lines; D. motifs of irregular shape; E. black and red linear motif.

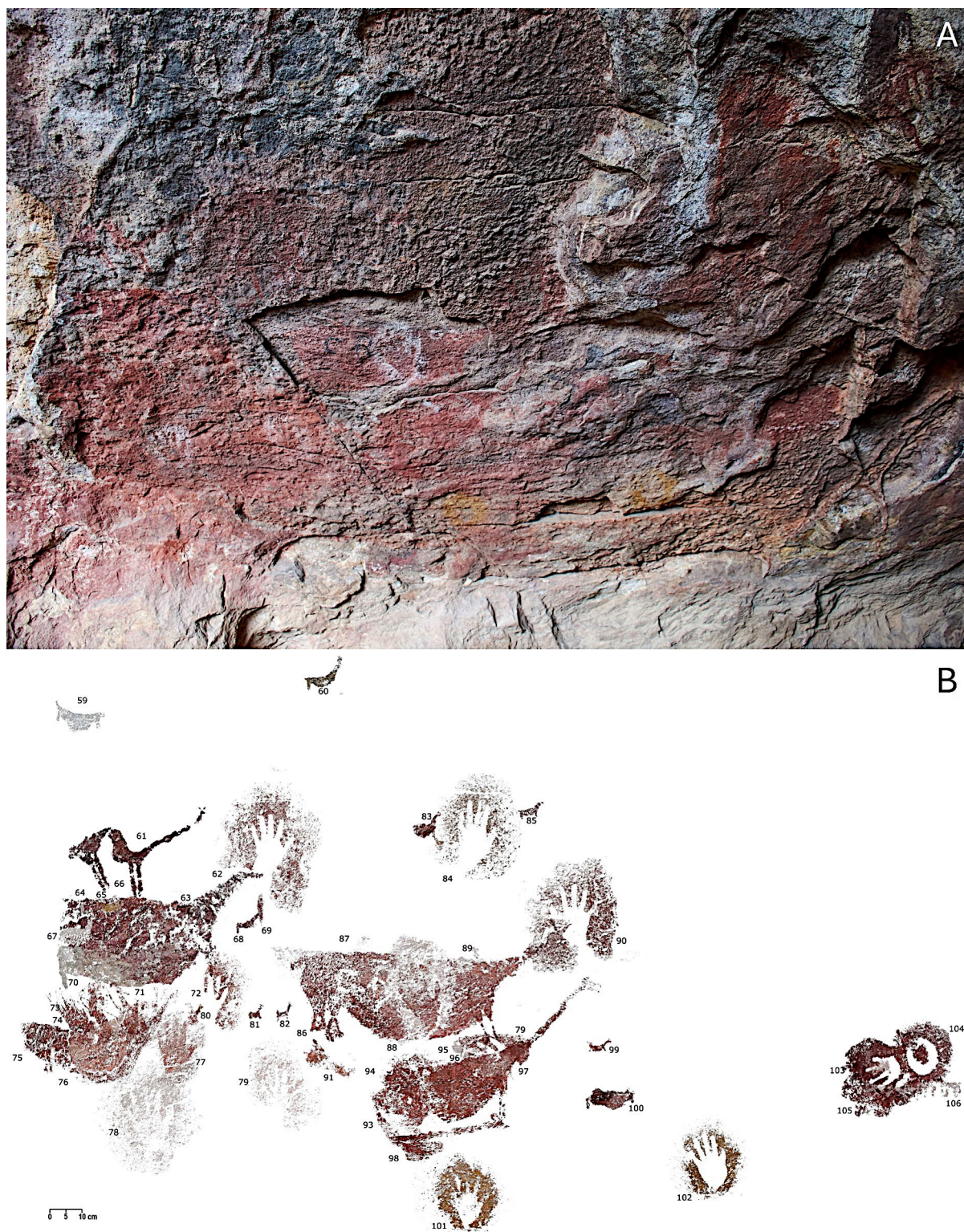


Figure 9. Panel L of CMRP; A. photograph and B. digital tracing.

red and black colours (Fig. 8E).

Some depicted themes reported by previous researchers were not observed. This is the case of children's feet stencils (Niemeyer 1978, 1979). Also, zoomorphic motifs lack the bifid antlers characteristic of huemuls; therefore, we found no grounds for Junge's (1937) claim of such animals.

The superimpositions

Of the 177 determined motifs, 69 (39%) are involved in superimpositions. Most of them are located at the centre and west areas of the cave and on the panels with the largest concentrations of motifs (L, R, S, T and Y, Fig. 2D). Although Niemeyer observed an ordered sequence based on colours, we do not observe any clear pattern for such sequential organisation.

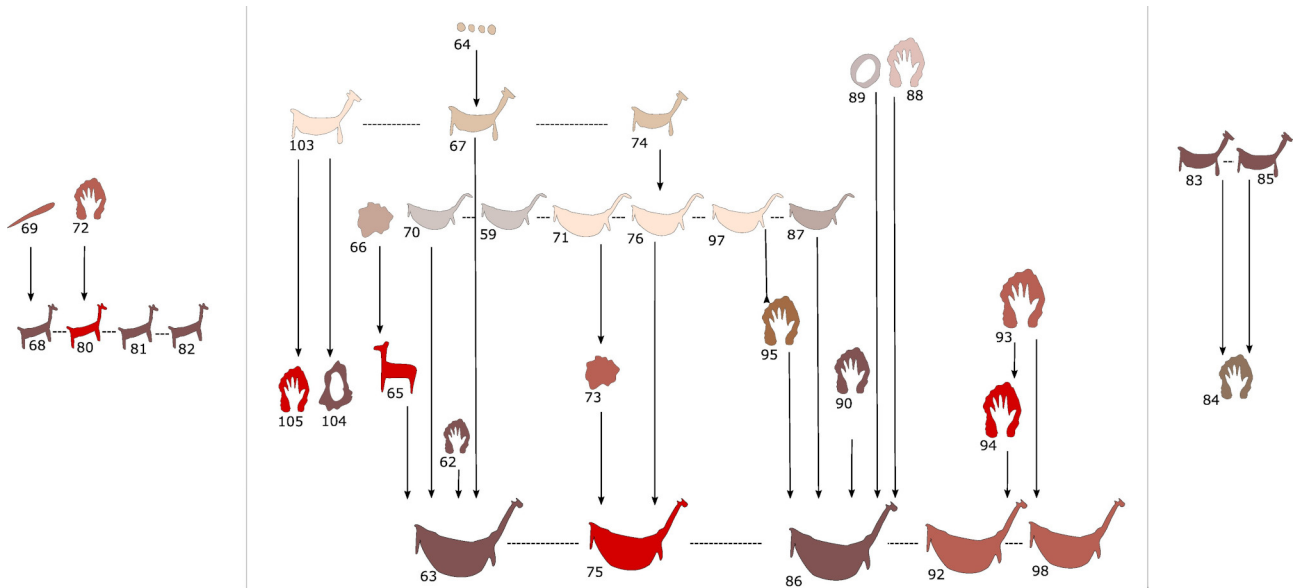


Figure 10. Simplified Harris's diagram of panel L (showing only motifs involved in superimpositions).

The same is the case with superimpositions between different themes. Nonetheless, occasional patterns of superimpositions are observed whenever colour, theme, and typology are combined, especially in the case of depictions of guanacos, thus arguing in favour of a more complex combination of factors involved in the sequence of depicting events.

Most superimpositions are observed on panel L (Fig. 9). This panel has 48 motifs, and 33 of them are involved in superimpositions. Here, guanacos of type 1 (motifs #63, 75, 86, 92 and 98) extend over a large portion of the panel and show several overlapping motifs (Fig. 10). Among them are guanacos of type 2 (motifs #70, 71, 76 and 87) and type 4 (motif #67). Also, a guanaco of type 2 (#71) overlaps an undetermined red motif (#73) and a red hand stencil (#95). Conversely, guanacos of type 3 (#68 and 80) were painted directly on the rock. One of them (#68) is overlapped by a red non-figurative motif (#69) while another (#80) is overlapped by a red hand stencil (#72). Guanacos of type 4 are observed above a red hand stencil (#79 and 83), a red object stencil (#105) and a guanaco of type 2 (#76). Additionally, guanacos of type 5 (#83 and 85) were painted over the yellow hand stencil of an adolescent/adult (#84).

Other superimpositions observed on the panel include red hand stencils (#93 and 94) overlapping each other, two white non-figurative motifs (#64 and 89) that overlap guanacos of type 1 (#86) and 4 (#67), and a white hand stencil (#88) overlying a guanaco of type 1 (#86). Additionally, some hand stencils (#77 and 78) and an undetermined motif (#73) may be involved in superimpositions, but based on our observations, it is not entirely clear. Therefore, they were excluded from the analysis of the relative sequence. Finally, motifs that are not involved in superimpositions include guanacos of type 2 (#59 and #70) and type 3 (#81 and 82), unique yellow (#60) and red guanacos (#61 and

#99), white (#79) and yellow hand stencils (#101 and 102) and an undetermined red motif (#100).

Significant superimpositions are also observed in the west area of the cave. Here, several panels were described based on their orientations, though some motifs extend over more than one. Therefore, superimpositions are also observed in the combination of panels (R, S, T and U, Fig. 11).

On these panels, guanacos of types 4 (#146) and 6 (#159, 160 and 161) are recorded as being overlapped by red dots (#162 and 147). Additionally, a type 4 guanaco (#172) is overlapped by a white bird track (#176), a green hand stencil (#183), a unique red guanaco (#180) and a white hand stencil (#179). Other superimpositions include a black hand stencil (#154) over white motifs, including a unique white guanaco (#155), white dots (#148) and an undetermined white motif (#165). In this area, we also observed a unique red guanaco (#173) that overlaps a unique white guanaco (#151) and an undetermined white motif (#152). Lastly, two unique white and red guanacos (#151 and 173) overlay a black lineal motif (#150).

The last panel where we identified superimpositions between different types of guanacos is panel Y (Fig. 12). Here, guanacos of types 2 (#215), 4 (#220) and one unique type (#214) are overlapped by red dots (#221), a unique white guanaco (#217) and white dots (#218). The white dots also overlap undetermined red and white motifs (#213 and 223).

Discussion

Painting episodes in Cueva de las Manos del río Pedregoso

The combination of the formal variability and the superimpositions of motifs suggests a sequence of at least eight painting episodes (*sensu* Carden and Miotti 2020) in CMRP. The most significant stylistic attribute of the episodes is the change in features of the guanaco depictions over time. Other themes, such as hand

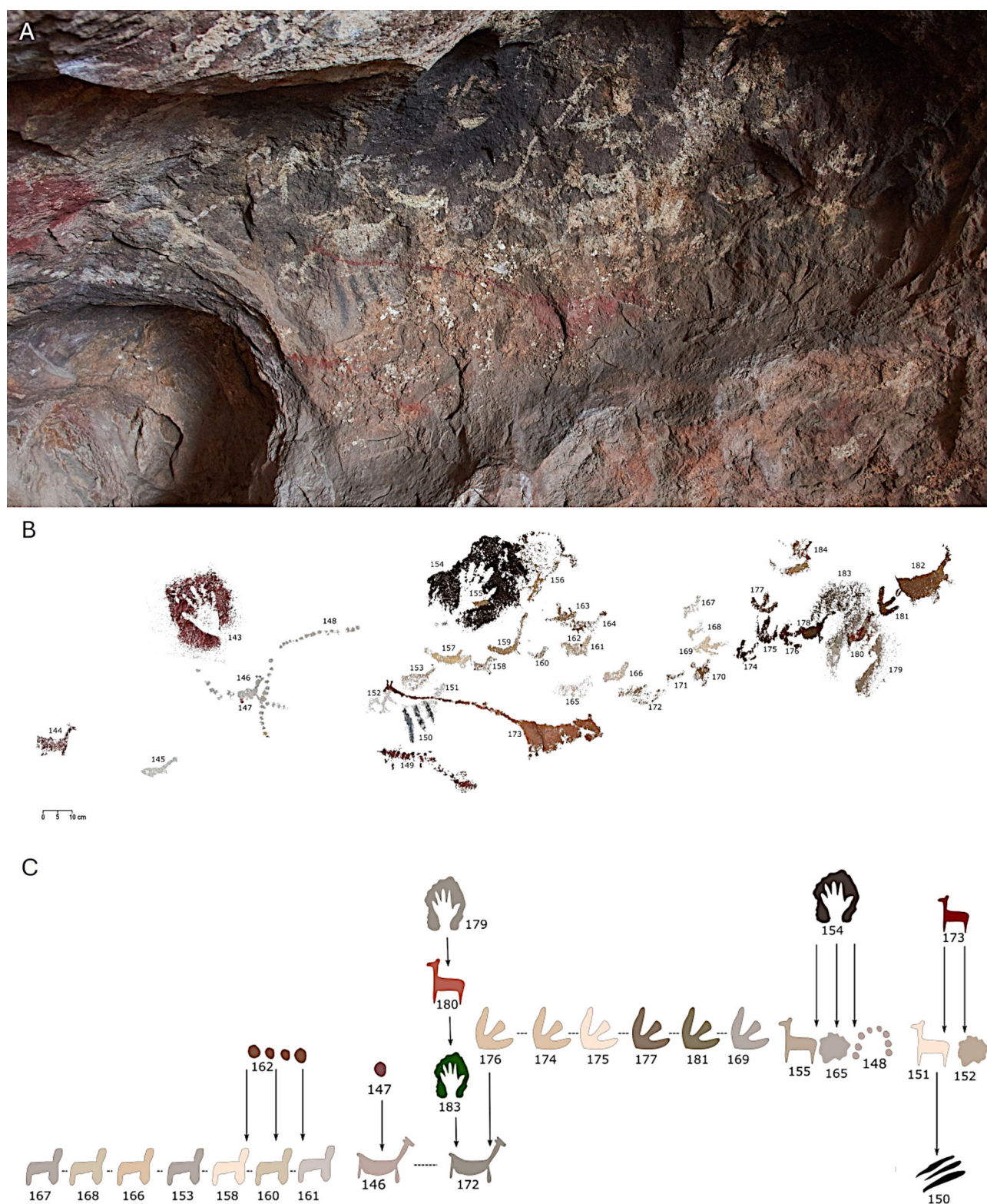


Figure 11. Panel R, S, and T of CMRP; A. photograph; B. digital tracing; and C. simplified Harris diagram.

stencils, were painted throughout the sequence and showed little variability, while other motifs do not have a clear position in the relative sequence due to the lack of discernible stratigraphic relations.

Our interpretation of the sequence of CMRP indicates a first painting episode characterised by guanacos of type 1 located on the rear of the cave in its central panel (L). Two red hand stencils painted over

the heads of type 1 guanacos were probably related to that same episode. The type 1 guanacos show formal similarities with motifs of the vestibule of the Cueva de las Manos del río Pinturas site (Santa Cruz, Argentina). Gradín first classified these guanacos in group B, with a suggested mid-Holocene age (Gradín et al. 1979). Recently, these were reinterpreted by Aschero and colleagues (Aschero 2018; Aschero and Schneier 2023)

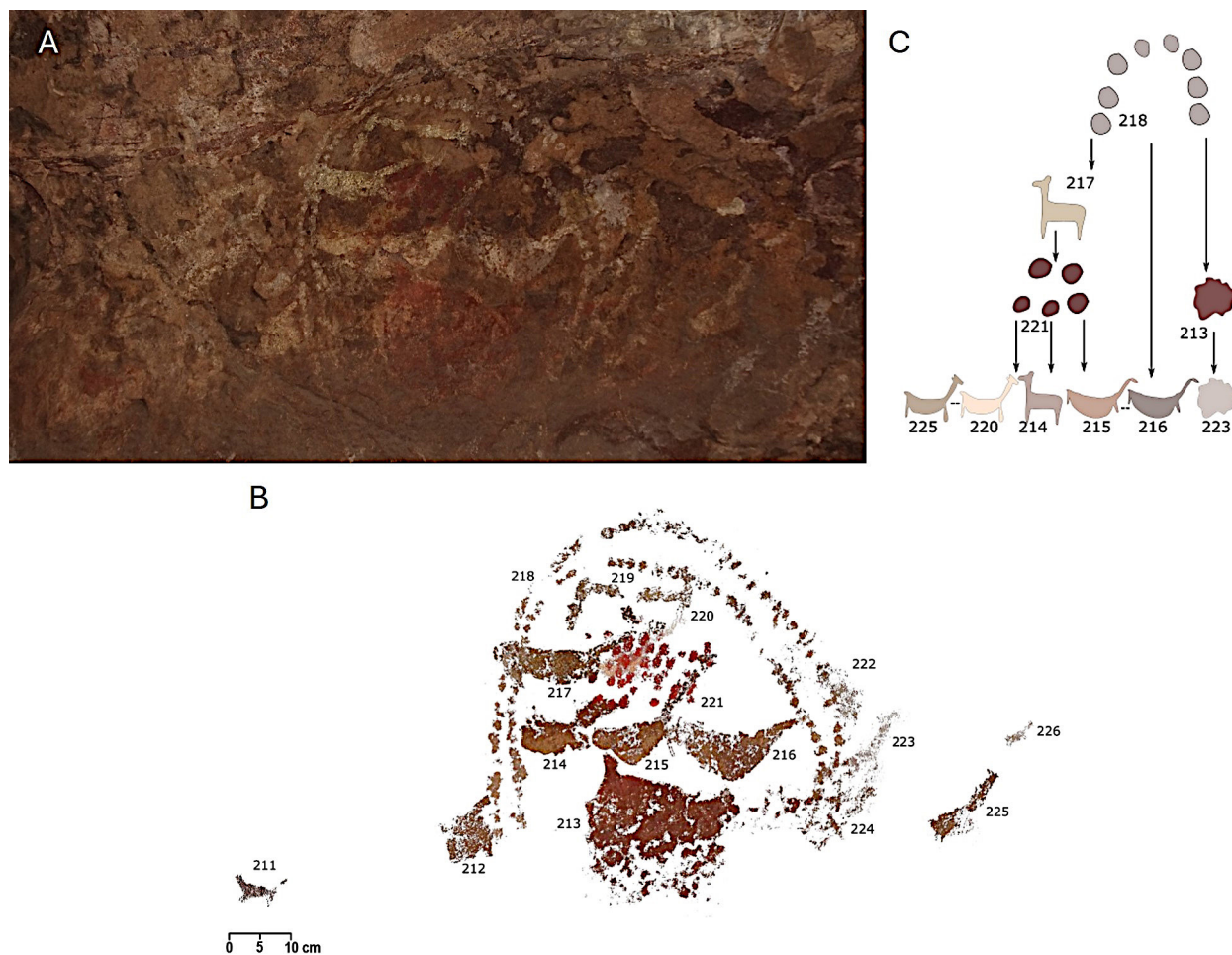


Figure 12. Panel Y of CMRP; A. photograph; B. digital tracing; and C. simplified Harris diagram.

as part of hunting scenes of group A (styles A2 and A3), an assemblage of an early Holocene chronology (Gradin et al. 1976, 1979; Aschero et al. 2019). In CMRP, such guanacos are in a static posture and do not depict any actions, so we do not consider them part of scenes (following Gallardo 2009). Nonetheless, their stylistic similarity suggests that the type 1 guanaco from CMRP and those painted on the Cueva de las Manos vestibule could be coeval. The use of red paint has been also observed at the beginning of rock art sequences at other sites in Patagonia (Carden et al. 2018).

On the other hand, type 3 guanacos have an undetermined temporal relationship with type 1 guanacos. A relative early chronology within the site may explain their location in the centre of the panel and their stratigraphic relationship below red hand stencils. They are not part of the depiction of any explicit action, but some are placed in a row, showing formal associations as some of the depictions of the Paredón de las Escenas from the Cueva de las Manos site (Aschero and Schneier 2023: 92).

Following the Pinturas river sequence and considering its proximity and the formal similarities with CMRP art, it could be hypothesised that painting started at CMRP during the early-to-mid Holocene. Nonetheless, other archaeological evidence does not support such a suggestion because dated human

occupation in the basin is no earlier than 4000 cal BP (Mengoni et al. 2019; Nuevo-Delaunay et al. 2022). Therefore, an early Holocene chronology, though possible, remains in need of further research.

A second painting episode is characterised by red hand stencils overlapping type 1 and type 3 guanacos in panel L. Red hand stencils also overlap each other. The stratigraphic relations show that red hand stencils are among the earliest motifs painted in CMRP. However, their chronology remains uncertain because they have been suggested to belong to different periods in CWP and in wider Patagonia (Lucero and Mena 2000; Carden et al. 2018; Cordero et al. 2019).

The third episode includes type 2 guanacos that overlap type 1 guanacos and red hand stencils in panel L. This episode might also include type 5 camelids overlapping red hand stencils. Some guanacos of type 2 and 5 are found on other panels (H, M, R, X and Y) in the east and west areas; therefore, paintings expanded to new cave areas during this episode. Additionally, type 2 camelids are the earliest white motifs and show the beginning of the use of this colour in the recognised sequence.

Type 2 guanacos also show formal similarities with guanaco depictions of the Pinturas River sequence. Such is the case of guanacos of group B1, first defined by Gradin et al. (1979) and later reassessed by Aschero

and Isasmendi (2018) as Charcamata style, after the homonymous site of the same basin (Gradin 1994). The stratigraphic relationship of guanacos of types 1 and 2 in CMRP is consistent with the stratigraphic relationships observed in Cueva de las Manos (Aschero and Schneier 2023). The Charcamata style has been suggested to be of a mid-Holocene age, which, again, lacks directly dated archaeological context in our study area.

Episode 4 of CMRP includes type 4 guanacos, which overlap type 2 ones on panel L, while episode 5 includes diverse motifs such as a green hand stencil (#183), red composite dots (#221) and white bird tracks (#174, #175, #176 and #177). Therefore, from episode 5 onwards, we observe more significant formal variability in motifs and a wider diversity of colours, including green.

Episode 6 does not include guanacos of the proposed typology, instead, it is characterised by two unique guanacos, in red (#180) and white (#217), overlapping previous motifs. Episode 7 includes a white hand stencil of an adolescent/adult (#179) and white composite dots overlapping previous motifs (#218).

Regarding episodes 5 and 6, their stratigraphic position and types of motifs, such as white hand stencils, composite dots and white bird tracks, resemble attributes of the sequences of the Pinturas River and the Los Toldos site, making it possible to hypothesise a late Holocene chronology for this episode (Gradin 1983; Carden et al. 2018; Carden and Miotti 2020).

Finally, episode 8 includes a black hand stencil (#154) painted over white dots (#148). Although it is not possible to determine its specific chronology, another black hand stencil was radiocarbon dated to 3160–3370 cal BP in the Cueva de Punta del Monte site, 146 km N of CMRP (Méndez et al. 2023a). Therefore, a late Holocene age agrees with the most recent painting episodes in the cave.

Cueva de las Manos del río Pedregoso in the regional context

Following the proposed chronology for the rock art sequence of the Pinturas River, the paintings at CMRP may have begun as early as the early-to-mid Holocene. Besides the Pinturas River, other locations with rock art of the early Holocene age are Cerro Casa de Piedra 7 in the Burmeister Lake area (Aschero et al. 2005) and Los Toldos in the Central Plateau, both situated in the Santa Cruz Province (Podestá et al. 2005; Carden et al. 2018). The strong similarities between CMRP and Cueva de las Manos del río Pinturas suggest a significant degree of connection between these relatively close sites from the beginning of both rock art sequences. In this context, CMRP could have been part of an early extended network of marking the landscape that included sites northwest of the Santa Cruz Province (Aschero and Schneier 2023).

CWP has been deemed a marginal area, occupied discontinuously from more populated easterly nodes, by hunter-gatherer groups who extended territorial

reaches at the onset of the Holocene (Borrero et al. 2019). The movement of people and the transport of high-quality tool stones, such as black obsidian from the Pampa del Asador source, more than 150 km south of Jeinemeni (also in the Santa Cruz Province), were already in place since the early Holocene (Méndez et al. 2018b). This suggests that CWP was involved in exchange, circulation and information networks by the time of the first installation at redundantly occupied sites and areas.

Similarities with other rock art sites are also observed during intermediate painting episodes of CMRP, particularly by the presence of type 2 guanacos, which resemble those of groups B and B1, as defined by Gradin et al. (1979). Analogous depictions are found also in other areas of Patagonia, including Cerro Casa de Piedra 7 (Aschero et al. 2005) and even in spaces further to the east, like the Central Plateau (Paunero et al. 2005; Podestá et al. 2005; Carden et al. 2009a). Such similarities suggest connections within a broader space of Patagonia during the mid-Holocene, an idea also suggested by Muñoz et al. (2021). Besides, obsidian and goods of personal ornamentation, such as shell beads, appear in sites of CWP during this period, suggesting an enhancement in ties linking distant areas across the region (Hammond et al. 2024).

Human occupation of the Jeinemeni basin has been characterised by discontinuity, contrasting with a more stable presence in the areas to the east (Gradin et al. 1976; Nuevo-Delaunay et al. 2022). Though CMRP provided adequate sheltered space and shows redundancy in terms of painting episodes, it markedly contrasts with sites to the east, such as those in Pinturas or El Deseado Massif, where painting episodes occurred in the context of other activities and higher sediment deposition (Carden et al. 2018; Aschero and Schneier 2023). More recent painting episodes suggest diversifying the depictions and using a wider array of colours, attesting to a more intense rock art production during the late Holocene. Although such characteristics could be partially influenced by preservation bias, the more diverse assemblage during the late Holocene aligns with the increase in human use of the area over the last 3000 years, both at a basin as well as a regional scale (Nuevo-Delaunay et al. 2022; Méndez et al. 2023b). This pattern is also evident in other areas of Patagonia (Acevedo 2023). Larger networks suggestive of the flow of a wider variety of goods, practices and information are suggested at this point, including new sets of material items shared alongside rock art production (Méndez et al. 2017).

Despite not being associated with any relative chronology within the CMRP sequence, the anthropomorph (#52) of panel J is worth noting. A depiction of an individual involved in bola hunting (in black) was reported at the Gorra de Vasco site, near the Belgrano Lake (Aschero et al. 2005; Podestá et al. 2005). Such motif was classified as part of the Cerro de los Indios B style, with a proposed chronology of c. 3500–3200

BP (Aschero and Isasmendi 2018).

Finally, although measurements of the hands at CMRP were limited, it is possible to observe that adolescents/adults and at least one infant visited the site, as stencils are a direct trait of the individual involved in the execution of the painting. Some of the earlier hands could correspond to adolescents/adults, and the chronology of the infant is undetermined. Infants and children's hand depictions are observed in different spaces and chronologies across Patagonia, including areas characterised by logistic and seasonal use (Cordero et al. 2019; Guichón and Re 2020). Therefore, the identification of different age groups is compatible with the seasonal and discontinuous use of the studied region.

Conclusions

The CMRP site features an extensive sequence of painting events, as reflected in the formal variability of the motifs, the colours and the superimpositions. Based on similarities with several sites from south-central Patagonia, it is feasible to conceive that CMRP was involved within larger networks of rock art production, information flows and the transport of exotic goods since the early-to-mid-Holocene. The site was repeatedly visited and painted, indicating that such networks evolved over time, including a wider diversity of materials and ideas, as the ties among mobile hunter-gatherers were strengthened. The evidence described for CMRP shows some emblematic motifs characteristic of the rock art sequences of broader Patagonia in the westernmost reaches of the territories occupied by hunter-gatherers. Although stylistic attributes provide information related to the relative chronology of the rock art, it still constitutes a preliminary scheme until direct radiocarbon dates on rock art motifs increase and associated archaeological contexts are excavated to contrast and complement the information.

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