
Historical Dimensions of Rock Art: Perspectives from ‘Peripheries’

María Cruz Berrocal  & Diego Gárate 

Research on rock art around the world takes for granted the premise that rock art, as a product of the Upper Palaeolithic symbolic revolution, is a natural behavioral expression of Homo sapiens, essentially reflecting new cognitive abilities and intellectual capacity of modern humans. New discoveries of Late Pleistocene rock art in Southeast Asia as well as recent dates of Neandertal rock art are also framed in this light. We contend in this paper that, contrary to this essentialist non-interpretation, rock art is a historical product. Most human groups have not made rock art. Rock art’s main characteristic is its inherent territorial/spatial dimension. Moreover, or probably because of it, rock art is fundamentally associated with food-producing economies. The debate between the cognitive versus social and historical character of rock art is rarely explicitly addressed. In this paper we explore this historical dimension through examples from rock-art corpora worldwide: they provide key case studies to highlight the relevance of addressing the different temporalities of rock-art traditions, their interruptions and, therefore, their historical qualities.

Introduction

Rock-art research constitutes an expansive sub-discipline (Malla 2015; Marymor & Rowe 2021; Rowe 2012) and one of the most popular areas of investigation of the human past. We would like to argue here that, beyond the variety of theories and approaches employed throughout the history of its research (culture-history, structuralism, functionalism; cognitivism; landscape, chronological, iconographic, interpretative, analogical, and art-historical approaches), there is an underlying notion in most research about rock art: that of a pan-human universal activity that emerged with *Homo sapiens*. This is clear in cognitivist approaches (Mithen 1996) that emphasize newly acquired abilities in modern humans, but also in culture-historical frames which take rock art as just part of *culture*, almost a natural human expression that does not need further clarification (e.g. Needham *et al.* 2022). Structuralism (Raphael 1945) and shamanism (Clottes &

Lewis-Williams 1998) have rightly been called into question for their explicitly ahistorical viewpoint in which a number of universal mental configurations play a fundamental role. Specific theoretical findings of functionalism, such as that different categories of art were used for different sorts of function (Davidson 1997), or the social aggregation contexts of rock art (e.g. Conkey 1985; Mithen 1987), could be exceptions to this rule. However, this interpretation has been so successful and pervasive that it has become normative, used as a general explanation that works independently from context. Thus, the historical explanatory potential of functionalism has not been fully developed. Recent post-functional approaches, such as the idea of Palaeolithic visual culture as a *bricolage* process (Conkey & Fisher 2020), call into question the idea that Palaeolithic art can be explained as a monolithic tradition. Conkey and Fisher suggest that ‘the image/object-making may well not be quite so intentional, rule-bound, and archaeo-LOGICAL’ as previously

expected (Conkey & Fisher 2020, 514). While these are welcome additions to the debate, they may lead to an essentialist take on rock art and the people who made it: rock art would not be regulated by socially based institutions, but would be personal, particular actions, just events, ruled only by the individual's impulses and abilities.

In short, most rock-art research is based on the principle that the cognitive ability of art makers is self-explanatory, one necessary step in human evolution: people made rock art because they had developed the cognitive skills/capacities to make it, moving between three and two dimensions (Davidson 2023; Nowell 2015). This is obviously true, but only in the framework of research that emphasizes the 'modernity' of symbolic behaviours this cognitive claim seems to be both necessary and sufficient. This cognitivist approach has also resulted in a conflation of different types of art into alleged traditions of rock-art making (Nowell 2006; Robb 2015; 2020).

Contrary to these underlying assumptions, our premises are 1) that rock art is a category of art that should be treated on its own, due to its inherent spatial dimensions; 2) that rock art can be more confidently related with food-producing societies; and 3) that focusing on the historical dimensions of rock art introduces matters of scale to an extent that processualism never did, allowing us comparative global approaches that frame rock art within complex and non-linear trajectories, including continuity and interruptions. Historicizing rock art is not to reduce it to a particularist phenomenon (in a postprocessualist way), and is not just to explore events, feelings, symbols and life experiences around the images. It is rather a very basic attitude towards rock art as a product of its social conditions of possibility: making rock art is a self-granted capacity only in particular social worlds. In all these senses, rock-art research has escaped historicization, because while most scholars would agree that rock images are a historic product since they belong to a particular historical moment, conceptualizations of rock art as a historically contingent product of particular social formations are underdeveloped.

The widespread implication that rock art is a *universal* signature defining *humanness* since the Pleistocene, as the first manifestation of the cognitive ability and intellectual capacity of so-called anatomically *modern humans* in the Upper Palaeolithic cultural explosion of symbolic and material practices—also called the 'cultural Big-Bang' (White 2000; e.g. Davidson & Noble 1989; Mellars 1989; Mithen 1996; Noble & Davidson 1991; Nowell 2010; Straus 1996;

Kuhn *et al.* 2001; Bar-Yosef 2002; Conard 2003; d'Errico 2003; Floss 2007; Zilhão 2007)—has placed cave art in Europe at the core of any definition of rock art. Also, it has made rock art inherent to being human; and in particular to hunter-gatherer ways of life. Rock art thus tends to be implicitly circumscribed to cultural heritage passed down to, and expanded by, Holocene agriculturalists.

These assumptions have formed a consistent fabric that leaves most world rock art unexplained, i.e. no arguments for the presence of rock art are ever produced. More to the point, underlying cognitivist implications in most rock-art research cannot account for the fact that rock art is lacking in many places and for most of prehistory, and that its practice was often interrupted in the past. These interruptions are indeed regularly detected but rarely considered worth of interpretation, because continuity is emphasized (e.g. Robb 2015; 2020; but see Davidson 2023 for an exception). From this premise, the disappearance of rock art is often interpreted as cultural decline, almost decadence, of a glorious tradition, rather than the result of socio-economic transformation (González-Morales 1997). A prominent example is the European and Mediterranean Palaeolithic rock art, despite some scarce comparative comments on the difference between the end of Pleistocene traditions in Europe and the Middle East (Bar-Yosef 1997). The continuity of European Palaeolithic rock art (Leroi-Gourhan 1965) into the Holocene in the shape of different rock-art corpora is still being sought after (e.g. Bueno-Ramírez & Balbín-Behrmann 2021).

Our goal in this paper is to show specific study cases of rock art around the world and explore what they tell us about rock art and its historical contexts, scarcely considered so far (Conkey 1997, 344; Davidson 2023; Nowell 2006, 244).

Pleistocene rock art and essentialism

The idea that rock art *equals* humanity and humanness remained implicit in rock-art studies even after the very early dates obtained in Australia (Noble & Davidson 1991) shook the Eurocentric narrative of European origins (e.g. Bahn & Vertut 1997; Gamble 1984; Jochim 1983; 1987; Leroi-Gourhan 1965; Mellars 1985; 1989; 2006) that was already under fire (Conkey & Williams 1991; Gamble & Gittins 2004; McBrearty & Brooks 2000, 543).

In our view, recent research has reinforced the biological coupling of rock art with a privileged set of cognitive abilities, rather than expanding the array of potential explanations of this cultural

practice. We will focus on two examples: the debate around Neanderthal authorship of rock-art depictions in different caves in Spain (Hoffman *et al.* 2018a; White *et al.* 2019), and the recently published ancient rock art found in Southeast Asia (Brumm *et al.* 2021; Taçon *et al.* 2014).

Recent Uranium-series dating of calcite crusts in spatial relationship with rock art has been published for some few specific images in the Spanish caves of Ardales, Maltravieso and La Pasiega (Hoffman *et al.* 2018b). Red spots, a hand stencil and a geometric sign were found covered by calcite crust, dated to older than 60,000 years ago. This chronology seems to support the idea of a Neanderthal authorship since there is no *Homo sapiens* presence attested in Europe for this chronology (Slimak *et al.* 2022). The dates, however, have been questioned due to several methodological issues and discrepancy with the previous known archaeological record (Aubert *et al.* 2018a; Pearce & Bonneau 2018; Ramos-Muñoz *et al.* 2022; Slimak *et al.* 2018; White *et al.* 2019). Beyond potential methodological pitfalls, what is of interest here is the way the supporters of the Neanderthal hypothesis have made their case: specifically, through claims that Neanderthals have been historically considered as inferior to modern humans (Hoffmann *et al.* 2018a, b; 2019). Therefore, the fact that they painted the walls of caves would demonstrate that they were cognitively as advanced as anatomically modern humans and therefore fully human. Thus, despite the alleged novelty of the findings, the Neanderthal discussion is in fact pushing back into the deep past the cognitivist and origins paradigm for rock-art research and reinforcing the idea of a unique and continuous trajectory of this practice into subsequent time periods, a type of biological determinism that reproduces the traditional tautological arguments about humanity and rock art.

In Southeast Asia, the application of the Uranium series dating method (Brumm *et al.* 2021) has led to a shift in scientific knowledge. In spite of problematic experiences concerning methodology (Plagnes *et al.* 2003), the significant number of published dates (around 50) and their consistency are undisputable (see Figure 1), something not yet achieved in Europe. In Sulawesi, calcite layers covering animals and hand stencils painted in nine different sites have been dated. The oldest dates, related to a pig depiction in Leang Tedongnge cave, offer a date older than 45,000 years. In Leang Balangajia cave the estimate is younger than 73,000 years (Aubert *et al.* 2014; 2019; Brumm *et al.* 2021). Similar results have been obtained at six sites in Borneo, using the U/Th dating system; dates are

older than 40,000 years for an animal painting and younger than 51,000 years for a hand stencil in the same panel in Lubang Jeriji Saléh cave in Borneo, always separated from Sulawesi by a significant sea-crossing (Aubert *et al.* 2018b).

These findings could show a homogeneous style for animals that also includes hand stencils—and humans in some cases—probably dating between 50,000 and 44,000 BP. These dates are similar to those available for archaeological sites associated with anatomically modern humans in Island Southeast Asia (Hawkins *et al.* 2017; Kaharudin *et al.* 2020). It seems that the presence of modern humans in the wider region can be attested even earlier (Westaway *et al.* 2017), while the expansion of earlier hominin species would have reached Timor and New Guinea (Shipton *et al.* 2021). Recent research suggests similar imagery sharing the same stylistic features in Australia, where images that appear to have been made according to similar formal conventions in Kimberley IIAP are dated to between 13,000 and 17,000 years ago, using wasp nests as an indirect dating method by ¹⁴C-AMS (Finch *et al.* 2021); Malaysia, where the Gua Tambun rock-shelter shows animals with a convention of infill lines (Taçon *et al.* 2014); and China, where basal rock art in parietal stratigraphy in the Jintsa River is dated older than 5000 years ago (Taçon *et al.* 2012), even around 13,000 in some cases (Wu *et al.* 2022) and, once more, infill lines are used as a formal convention. It could also be possible to track these painting features to the Kosum 1 site, India (Dubey-Pathak & Clottes 2021), although dates are not available for this region yet.

Even if destabilizing to the Eurocentric ‘master narrative’ of origins, these findings have reinforced the idea that rock art emerged during the Pleistocene in association with the global expansion of anatomically modern humans (Aubert *et al.* 2017). Questions such as which were the social contexts of the *construction* of walls, places and landscapes through rock art; if rock art originated in one particular area or in separate, independent processes; if rock-art making lasted uninterruptedly since the earliest chronologies around 50,000 to 17,000 BP or was produced in independent pulses, are mostly missing. Rather, the Southeast Asian corpus of rock art is used to testify to the dominant narrative that implies the *inevitable* character of rock art, almost lying in the biological rather than the social realm.

The old chronologies of rock art in Europe and Southeast Asia, however, set us thinking in a different direction. In Europe, *Homo sapiens* came into

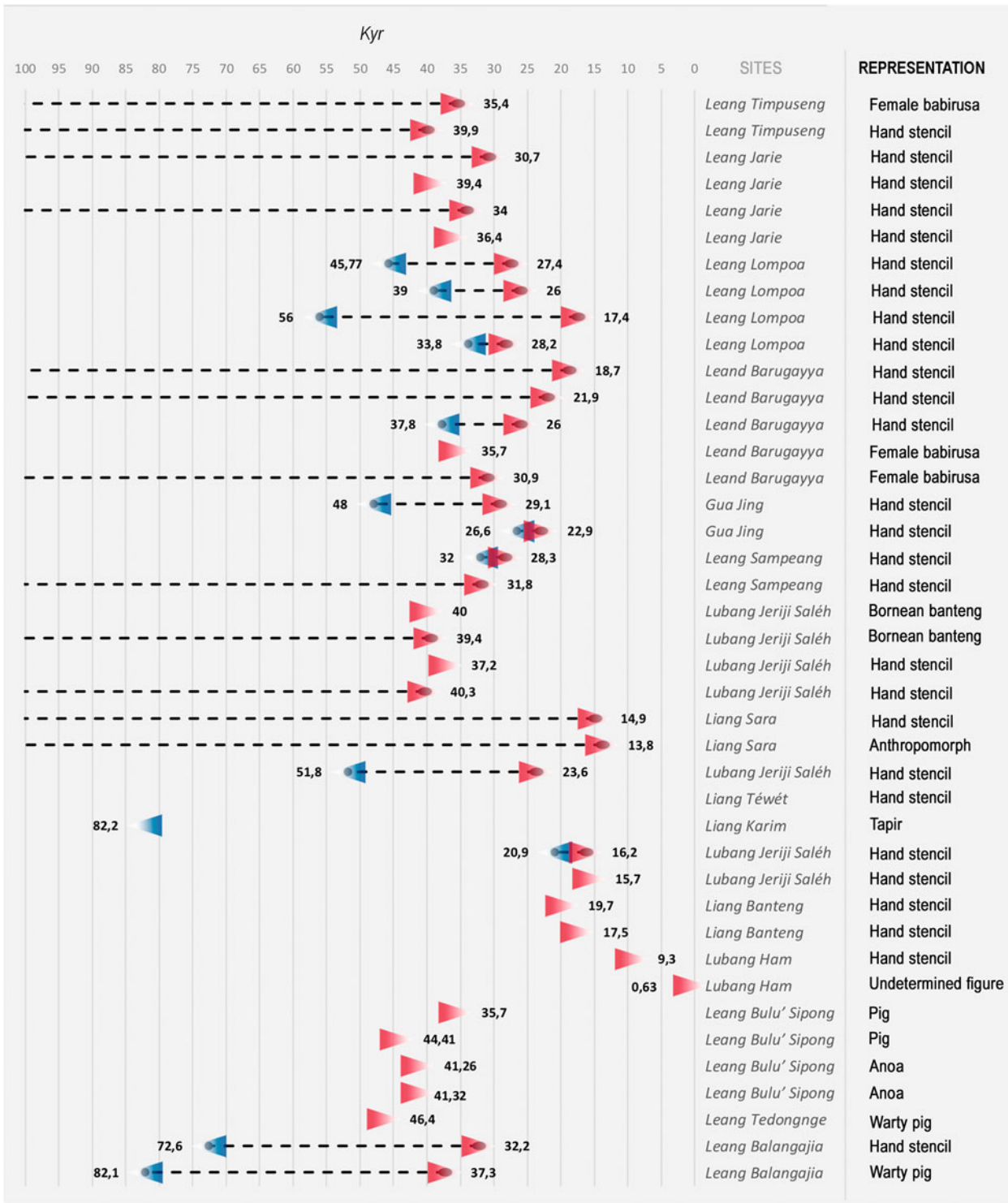


Figure 1. U/Th dating results in Southeast Asia. Intermittent lines are before and after dates for the same representation (dates from Aubert et al. 2014; 2018b; 2019; Brumm et al. 2021).

contact with Neanderthals. In Southeast Asia, they came into contact with either or both *Homo floresiensis* or Denisovans. Rock art seems to have emerged in

contexts of potential cohabitation between *Homo sapiens* and other human species. This is just one way to approach a contextual and historical frame of

Pleistocene rock art, going beyond the 'early-centric' approach to rock art and the biologically based, intellectual abilities of humans.

Holocene traditions

Pleistocene rock art is a very small percentage of the prehistoric rock art preserved across the world. Indeed, Pleistocene rock art is more of an exception than a rule (Renfrew 2009). The fact that Palaeolithic rock art does not seem to present continuity into the Neolithic, generally speaking, leads to the conclusion that, in all likelihood, the general lack of Pleistocene rock-art corpora is not solely due to shortcomings in methodologies or research activity. As John Robb (2015, 640) states, 'there is both a quantum leap in art at the advent of the Neolithic and a steady rise throughout later prehistory'. Robb refers here to all types of prehistoric art, a problematic conflation (see below), but a relevant point as the surprising increase of rock-art making in recent prehistory in many different parts of the world is typically ignored in most discussions (Cruz Berrocal & Millerstrom 2009). In spite of strong historiographical traditions to the contrary, most forager rock art would have been made during the Holocene, largely contemporary with agriculturalist societies which also made rock art (Davidson & Nowell 2021). Two brief examples illustrate this point.

Among the well-known different rock-art traditions in the southern zone of Africa (Smith & Ouzman 2004), the San tradition ascribed to hunter-gatherer societies is the most abundant and best researched, normally assumed to be the inheritance of an ancient past, which means different time spans for different scholars (e.g. Le Quellec 2016 on the 'chronophobic' debate), especially because of the strong imbrication of rock-art research in South Africa with ethnographic evidence from the nineteenth and twentieth centuries. In any case, dating is still uncertain.

In 1999, Jerardino and Swanepoel published the then oldest minimum age of alleged wall paintings at Steenbokfontein Cave (Western Cape, South Africa) at 3600 BP, based on marine shell contained in the archaeological sediment. The paintings had been made on slabs that fell off the wall, and while the authors assumed that they were made prior to collapse, there is nothing in the evidence to indicate such a relative chronology. Indeed, the preserved paintings on the walls are completely different from the paintings on the slabs. Thackeray (1983) published spalls containing traces of paint in deposits

dating as far back as 10,000 years BP while Walker (2012) also provided another such example of painted rock spalls potentially dating to 10,000 cal. BP. This kind of indirect dating, and the evidence provided, do not allow for any assessment of the dates. They seem to be discarded from the discussion at this point (see Le Quellec's (2016) synthesis of all the dates for South African paintings).

In the Cederberg Mountains of the Western Cape Province, South Africa, Van der Merwe *et al.* (1987) obtained one AMS direct radiocarbon date on a painting from Sonia's Cave Upper, Boontjieskloof, Clanwilliam district: 500 ± 140 cal. BP. In the Drakensberg Escarpment of KwaZulu-Natal, South Africa, Mazel and Watchman (1997) obtained a date from a plant fibre embedded within paint at Esikolweni Shelter in the Natal Drakensberg, dating to 330 ± 90 cal. BP. Further samples from carbon-bearing oxalate from Barnes Shelter (1060 ± 65 BP), Main Caves North (spanning 2310 ± 70 BP to 2900 ± 80 BP, with two dates, 2900 and 2760 BP, obtained from crusts overlying the same motif), Highmoor 1 (2310 ± 70 BP), White Elephant Shelter (1930 ± 65 BP) and Maqonqo Cave (3720 ± 100 BP) were published later (Mazel & Watchman 2003). The latest date, for Barnes Shelter, derives from oxalates covering the paint. The earliest date, for Maqonqo Cave, derives from the base of the encrustation and the authors assume that the 'painting overlying the crust date is probably hundreds of years younger than the crust itself, and in all probability postdates 3700 years ago' (Mazel & Watchman 2003, 66). Bonneau *et al.* (2014) published three AMS dates obtained from black pigments from RSA TYN2 (Nomansland, South Africa) spanning from 2072 ± 28 BP and 2100 ± 40 BP. More recently, Bonneau *et al.* (2017) have reported direct AMS ^{14}C dating of rock paintings at three sites in the Thune Dam (southeastern Botswana), five sites in the Metolong Dam (western Lesotho) and six sites in the Maclear District (Drakensberg, South Africa's Eastern Cape Province). Results show 12 dates for the paintings of Lesotho ranging from 300 ± 65 cal. BP to 5700 ± 2000 cal. BP. The authors discard most of the dates and synthesize the chronology of Lesotho rock art as '2326–965 cal. BP' (Bonneau *et al.* 2017, 331). For the Maclear District of South Africa they synthesize 22 dates ranging from 124 ± 23 cal. BP to 2690 ± 100 cal. BP as dates of '2998–2381 cal. BP'. For Botswana, they see dates from the site TD12 as the oldest evidence for extant painting on rock-shelter walls anywhere in southern Africa (Bonneau *et al.* 2017). They obtained nine dates ranging from 1250 ± 80 BP to 4500 ± 260 cal. BP but synthesize them as '5723–

4420 cal. BP'. That is, they take the oldest of the dates obtained, which shows a standard deviation of ± 260 years, to make their case. The next oldest date they obtained is 3060 ± 30 cal. BP, a much more acceptable date from a methodological point of view, yet still the oldest date for the south of Africa so far. Thus, most of the dates obtained so far are around 2000 years ago or younger.

The questions of when and how food-producing economies arose in the southern part of Africa are equally unclear so far. Sadr (2015) contends that livestock appeared in southern Africa over 2000 years ago, and while the exact mechanisms are not clear (a large migration from East Africa, trade down-the-line among hunter-gatherer communities, a long history of diverse small-scale population movements), he proposes two 'infiltration' episodes, one along the Atlantic seaboard and a second through the Limpopo River Basin. Overall, he prefers to speak of multiple, small-scale infiltrations of domestic animals (and food producing) into southern Africa. Recent research has confirmed the presence of domesticated sheep at the site of Spoegrivier (Namaqualand, South Africa) dated to 2105 ± 65 BP (Coutu *et al.* 2021). Their sampling focused on the oldest domestic specimens recognized so far, but has not been systematic, and the authors indeed point out the problems for identification of domesticated *versus* wild fauna. Sadr (2015) gathers more chronological information of domestic livestock in the Leopard Cave (Namibian coast), with dates between 2270 ± 40 and 2190 ± 40 cal. BP, Toteng 1 (Kalahari Drainage) with dates of 2070 ± 40 cal. BP and 2020 ± 40 cal. BP, and Blombos (southern coast of South Africa), with a date of 1960 ± 50 cal. BP. Other innovations such as particular lithic features appear to have preceded the appearance of livestock in these areas.

Given the evidence, it is legitimate to suppose that large-scale processes such as those pointed out by Sadr may have been at stake here, for a longer time-span than the archaeological appearance of deposits of domestic sheep seems to suggest. This would imply a long familiarity of foragers at least with particular elements of a food-producing system. Indeed, the general contemporaneity of rock art and the evidence of livestock so far is quite striking, and tends to dispute the idea that the makers of the rock art were completely alien to food production.

In South America, extremely old dates from Serra da Capivara (Piauí, Brazil) have been called into question (Steelman *et al.* 2002). Although scholarship assumes that rock art dates back to the early Holocene, the available dates are scarce

(Troncoso *et al.* 2017). Neves *et al.* (2012) have presented the 'oldest, indisputable testimony of rock art in the Americas' (2012, 3) so far: a petroglyph engraved on the bedrock in Lapa do Santo (Brazil) dated by the ^{14}C method of a stratigraphic layer to 'a minimum age of $9,370 \pm 40$ BP (cal. BP 10,700 to 10,500) ... the figure was found approximately 30 millimeters below a hearth dated to $9,470 \pm 50$ BP (cal. BP 11,060 to 10,580)' (2012, 2).

The samples pertaining to the dating of the petroglyph are not accurately identified in the text (Neves *et al.* 2012, supplementary table S1) and no information is provided for the origin of the date on 'charred material'. The published dates are consistent, but at least in one case an older date appears higher in the stratification. The petroglyph, on the other hand, was found in an exceptional location within the shelter, potentially at the height of the floor. It stands so far as a unique, isolated and unspecific depiction in the context of the Nordeste Tradition of rock art (Morales 2002), whose dates have been limited to *c.* 3000–2000 cal. BP (Rowe & Steelman 2003), based on the best studied area, the Serra da Capivara. That is, there are no parallels for this depiction so far.

All other old dates for South American rock art are also based on different forms of indirect dating. In the best-known case, Hornillos 2 (Argentina), ^{14}C dates of *c.* 11,000–10,000 cal. BP were obtained from an archaeological layer where a wood carving of a camelid and grinding stones with pigments were recovered (Yacobaccio *et al.* 2012). This would imply that the found mortars were directly related with the making of the paintings, and that pigments were not used for any other activity. This is also the case in the recent example of Motumachay (Pérez Maestro & Bueno Ramírez 2022). In another well-known case, the site of Inca Cueva (Argentina), the chronological assessment (10,600–8900 cal. BP) was proposed based on the assumption that the dated stratum (9900 ± 200 , 9230 ± 70 , $10,620 \pm 140$, 9650 ± 110 cal. BP; no identification of the charcoal samples is provided), was the floor when the paintings were executed (Podestá & Aschero 2012). The remaining evidence is based on painted flakes within the stratum. Since these shelters were used recurrently for most of the Early and Middle Holocene and are the scenario of periodic water overflow, this kind of indirect association may remain underdetermined. Recently, rock art from Huenul 1 Cave in Patagonia (Argentina) has been directly dated starting at 8200 cal. BP (Romero-Villanueva *et al.* 2024). This is a more accurate date, yet reinforcing a mid-Holocene chronology.

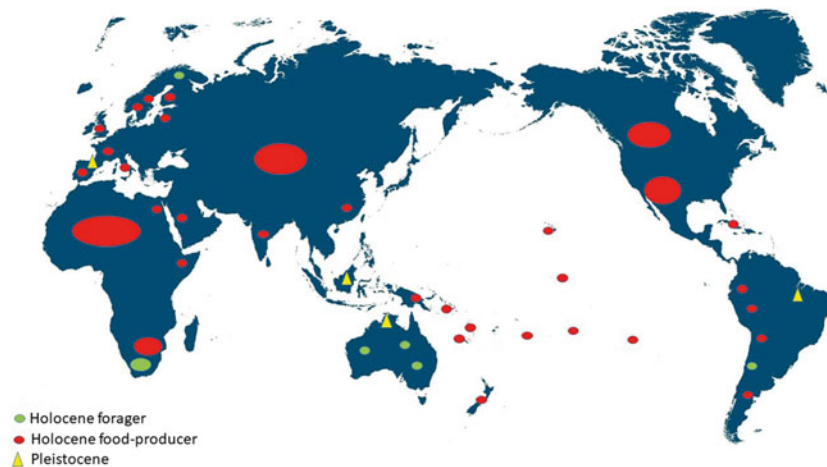


Figure 2. Pleistocene hunter-gatherer rock art versus Holocene rock art from hunter-gatherer and food-producing societies (authors' own elaboration, based on Anati 1984; Bednarik 2012; Fritz et al. 2017).

Other lines of evidence for the late Pleistocene/early Holocene chronology of rock-art paintings in the region are based on the alleged depiction of extinct fauna (Morcote-Ríos *et al.* 2021; Paunero 2012). The timing of the extinctions of megafauna, as well as the landscape implications involved, are still uncertain. Interestingly enough, Morcote-Ríos *et al.* (2021) relate this early human presence (and rock-art making) with potential early management of forest resources, which would have had an enduring impact on establishing the tropical forest. In this context, the authors suggest that rock-art making would have been a strategy to create a cultural landscape related to territorial control, ritual practice and the development of social networks. If early Holocene dates for rock art are finally confirmed, it could be the case that the artists did not belong to hunter-gatherer societies (in the more traditional and limited sense), but were plant managers and even pre-domesticators. For the South Andes, widely accepted chronologies for widespread rock-art making have been assigned to a chronological horizon of *c.* 3000 and 1000 BCE, associated with increasing social complexity, demographic growth, the appearance of specialized technologies, the intensification of practices of exploitation of plant resources and a reduction in the mobility of these populations (see Troncoso *et al.* 2017). Direct dates on rock art for South America so far go back only to *c.* 1600 BCE in La Placa 5 and Covacha Pintada (North Central Chile) (Troncoso *et al.* 2015).

Despite the long-standing epistemological significance of early, well-preserved and aesthetically striking (to Western eyes) cave art of the European Upper Palaeolithic, it turns out that a significant

number of rock-art corpora and traditions in the world (Fig. 2) have relatively recent dates, mostly well after the early Holocene, and were made by food-producing societies (Cruz Berrocal & Millerstrom 2009). It could be possible to argue against this that this situation is simply due to the much more widespread distribution of farmers. But we argue that this prevalence of farmers' rock art is not only a function of demography, but has to do with particular social and historical conjunctions. In this context, the known interruptions of the traditions of rock-art making are extremely significant.

A discontinuous history

The continuity/discontinuity of rock-art making during the European Palaeolithic is not well understood (Davidson 2023); at this point, it is not possible to confirm if it was constantly made throughout the entire period or periodically abandoned for millennia. As Conkey and Fisher (2020) rightly point out, there is something fundamentally wrong in looking at it as an uninterrupted practice over millennia and continent-wide. However, this is the way in which many archaeologists, anthropologists, and art historians have approached rock art since the end of the nineteenth century. This explains, for instance, the persistence (until recently) of monolithic theories about the meaning of rock images, such as shamanism.

To counteract the acritical universalist view of rock art as a mere product of enlarged cognitive abilities, one valuable research approach is to study the many discontinuities in rock-art making. They make visible those features that are potentially

unsustainable or dysfunctional in a process of social change. The examination, rather than avoidance, of the discontinuities (Davidson 2023) may highlight the great social significance (to the artists, to the observers, to those who could know but not observe) of rock art in particular contingent historical contexts; traditional teleological narratives built on linearity, uniformitarian principles and ahistorical implicit assumptions, can be weakened. This strategy puts the emphasis on ‘negative evidence’ or ‘absence’, a very particular kind of data that usually go under the radar. A focus on the temporal and geographical discontinuities of rock art, what we might call the ‘presence of absence’, is a null hypothesis that challenges the existence of rock-art making as a given. The Pacific provides an example.

In Taiwan, the alleged cradle of Austronesian expansion (e.g. Blust 2019), only four rock-art sites are known—in Wanshan, in the south Central Mountains. Moreover, they feature only weak and unclear connections to the large rock-art corpus to the east (O’Connor *et al.* 2015). Jalandoni *et al.* (2019) have shown that only sporadic rock art is to be found in Micronesia. In the Central Pacific, a striking scarcity of rock-art sites exists in Fiji, Tonga and Samoa (Cruz Berrocal & Millerstrom 2013). The pattern of rock-art location on these islands (specifically Fiji) is unusual, showing in most cases just one rock-art site per island, which highly contrasts with the impressive number of sites in the east and western Pacific. Cruz Berrocal and Millerstrom have argued that the existence of a unique rock-art site does not diminish its potential social significance, but enlarges it; also, that ‘the existence of a shared iconography throughout Oceania is undeniable. But the “Fijian rock art gap” argues for a chronologically independent origin of rock art making in Near and Remote Oceania’ (Cruz Berrocal & Millerstrom 2013, 164). This implies that ‘rock art making would be the product of particular, independent historical conjunctures, used as part of different cultural and social strategies in every archipelago’ (Cruz Berrocal & Millerstrom 2013, 164).

Wilson and Ballard (2018, 26–7) contend that there are deeper connections between rock-art assemblages in Near and Remote Oceania based on their formal similarities, and propose a ‘widespread availability of a regional suite of motifs and their accompanying social grammars, which are sustained, communicated and transmitted between and across multiple symbolic media, and then applied in particular locations, as geological circumstances permit, to durable rock surfaces’. In our view, there is no contradiction between the idea of a gap or

discontinuity in rock-art making, the independent ‘invention’ of rock art in different chronologies and archipelagos, and the social availability of symbols and grammars (Cruz Berrocal & Millerstrom 2013; see also Jalandoni *et al.* 2019). Iconography and meanings may have been passed down through different material means such as carving in wood, bone or stone, tattoo, pottery and barkcloth, as Wilson and Ballard propose (2018, 18). Rock art just seems to belong in a much more specific social and historical context and should not necessarily be reduced to a lineal practice. It was made only under certain circumstances, that we might well try to understand. The availability of an iconographic repertoire does not by itself explain the making of the rock art.

Discussion

As Robb (2015; 2020) has rightly pointed out, prehistoric rock-art making has rarely been examined from a global perspective seeking to determine some general patterns about its social significance. Rock-art studies have tended to emphasize an alleged pan-human symbolic heritage, related to human language and cognition (Davidson 2023), as well as cultural continuity (regardless of the media and the different historical conjunctures involved). Art has been observed as a default cultural practice, implying cultural inertia. As some authors have pointed out (e.g. Moro Abadía & González Morales 2004; 2013), portable and other types of art have been documented in many different kinds of contexts as well as in different spaces and times. But rock art is not such a widespread and universal phenomenon. The more rock-art research (as a discipline) conflates all kinds of artistic representation into one tradition, the more this approach obscures the socially and historically relevant information that is the very context for its making.

An example lies in Robb (2015, 637)’s consideration of ‘art from the early Upper Palaeolithic at around 40,000 B.C. through the Mesolithic, Neolithic, Copper, Bronze, and Iron Ages’ as one tradition of art in prehistoric Europe (see also Fritz *et al.* 2017; Sandars 1985). By emphasizing a great variety of social functions of art, Robb’s (2015) perspective has the advantage of counteracting a widespread anti-historicism. However, it is equally important to keep in mind that such a holistic approach tends also to emphasize artificial continuities and may miss the nuances among different forms of rock image making. This perspective also introduces unnecessary ambiguity, as demonstrated by the treatment that Robb gives to Levantine rock

art: since it does not match any of the patterns he offers for Neolithic art, he contends that ‘a particularist historical explanation is probably needed’ for this artistic corpus (Robb 2015, 643). This suggests that the ‘macro-traditions’ that he describes do not then require a historical explanation.

Instead, we suggest that a functionalist approach should, more than any other approach, emphasize the formal differences between different types of art, their specific performative power, social senses (not meanings), and historical contexts. Universalist assumptions (mostly based on cognitive ability) fail to provide explanations for the discontinuities in rock-art making and the fact that in many parts of the world, many social formations did not make rock images. To put it bluntly, most human groups did not make rock images most of the time. When they did, it was generally a relatively recent activity in terms of human evolution, potentially correlating in the Pleistocene with complex landscapes of human cohabitation, while the bulk of rock-art making worldwide was made by members of farming communities: so far, leaving aside the potential exception of Australia—which may or may not show consistent endurance through time—no rock-art traditions anywhere in the world show continuity between Pleistocene and Holocene societies. In other words, all Holocene rock art emerges anew. Maybe in somewhat counter-intuitive fashion, rock-art making must be aligned with the Neolithization process or an intensive management of the land, as a general rule.

Robb (2015, 640) highlights that

expressing something that was previously fluid or ephemeral in durable materials or fixed places is not a trivial change; a change of material medium changes the historical characteristics of an idea, its network of relations, its attachment to persons, its reproducibility, durability, circulation, and controllability.

A plethora of works support the idea that rock art is deeply related to questions of territoriality, the added sense of *place*, place making and living (e.g. Acevedo *et al.* 2019; Chippindale & Nash 2003; Cruz Berrocal 2005; Davidson 2023; Fairén Jiménez 2006; Hartley & Vawser 1998; Martínez García 1998; Millerstrom 1997; Nash & Chippindale 2002; Rosenfeld 1997; Santos Estévez 1998; Santos Estévez & Criado Boado 1998; Troncoso *et al.* 2018; Wilson & Ballard 2018) which makes it different from other types of expressive and material corpora.

Indeed, stressing the fundamental non-portable essence of rock art and its associated spatial logic

may be essential to this discussion. Rock art has a performative potential to configure mental maps and movement, linked with emerging monumentalization and, fundamentally, with the social life of the community. As a social and contingent strategy of being in a landscape, rock art deserves specific research that highlights the non-tautological nature of this proposal. An example of this approach is found in the recent study of Levantine rock art of the Mediterranean basin of the Iberian peninsula. Until recently categorized as hunter-gatherer rock art, its location was considered to be random, as it would have been linked with symbolic behavior, ideologically driven and not subject to material constraints. The analysis of location patterns of more than 700 sites offered a highly structured landscape made visible by rock art, at the same time showing a close integration of the Mediterranean coast and interior mountains. This association was not evident through settlement and material culture studies. The focus on location allowed a completely different understanding of the rock art in the context of the Neolithization process (Cruz Berrocal 2005; Cruz Berrocal & Vicent García 2007). This example shows that, by considering rock art as a historical, territorially based kind of archaeological record, contextualized new useful knowledge may be generated.

The function of rock art as a space builder to manipulate, appropriate and ‘make’ the world was an acquired, historically developed human ability, deeply related to socio-political organization. Indeed, the landscape and territorial dimensions of rock art must be linked to social complexity and the potential construction of *powerscapes*. Again, a recent example may illustrate this point. Robb (2015) sees rock art in the Bronze and Iron Age in Europe as an ‘egalitarian art’, made with openly accessible materials, little spatial restriction, a low entry threshold in terms of the skills and techniques required and a low ceiling for social distinction, because it is highly visible. Robb states that rock-art making would have been participatory and accumulative rather than exclusionary, governed by a single master design or associated with personal status, therefore lying ‘somewhere between performative ritualized gestures and props and informal narrative graffiti’ (Robb 2015, 647). This kind of openly social and political account of rock art is welcome; yet alternative interpretations exist. Although enticing, the idea that rock art in these periods escaped the control of a social institution is not so evident. Made in a context of emerging social complexity, we can legitimately wonder if the apparent accessibility and comprehensibility of rock images

can alternatively be interpreted as degrees of inclusion in the political process and not as its absence. It is also possible to imagine that the relatively easy access to these sites and images might be related to the need to convey a message, not least the message of who was entitled to make the rock art. The rock-art panels that Robb studies are not palimpsests; rather, they show structure and potentially a limited number of episodes of image-making. Even if rock art was subject to a 'low ceiling for social distinction' and freedom for movement (Robb 2015, 647), its political significance would still be clear, as the other side of the same coin. Therefore, while we cannot necessarily calibrate the role of rock art in a given political context, we can infer its significance.

Prehistoric art, a very patterned manifestation at many different scales, and specifically in terms of the landscape dimension, is more economically explained as a regulated and organized activity, rather than as an individual endeavour. Rock art as a social institution (Cruz Berrocal 2005), where control was exerted over which, by whom, when and how the depictions were made, cannot be separated from its politics—as proposed for cave art of northern Spain (Gárate 2008). A nice contrast can be offered by much later medieval rock art, characterized by a clear absence of patterns which points to a private, individual practice, and not so much to an institutionalized (and therefore, politically charged) activity.

Conclusion

That rock art is not always and not generally of very ancient date does not diminish its relevance. On the contrary, by placing the burden of proof on the existence of rock art, not its absence, and by performing historical large-scale research that shows where, when and under what circumstances rock art emerged, we can start to explore fully its potential to provide historical clues as to the people who made it. By not conflating incommensurable forms of material culture, by stressing different logics, and by focusing on the discontinuity of rock art, its gaps and interruptions, we can resize its social and historical significance. This is all embedded in the much-needed historical approach to rock art research that we advocate, a critical turn already undertaken in other disciplines—including archaeology—that escapes naïve superfluous notions of history that solidified monolithic narratives of traditions and origins, missing the ways in which rock art shows aspects of the social formations that made it, that

are not necessarily visible through other materialities.

Acknowledgements

We warmly thank Oscar Moro Abadía, Margaret Conkey, Jo MacDonald and Iain Davidson for their insights and support. MCB was funded by the program STAR2-Santander Universidades and Ministry of Education, Culture and Sports, in the frame of the Program Campus de Excelencia Internacional, call CEI 2015 of the project Cantabria Campus Internacional.

María Cruz Berrocal
 Instituto de Ciencias del Patrimonio,
 CSIC
 Edificio Fontán
 bloque 4 Monte Gaiás, s/n
 15707 Santiago de Compostela
 Spain

Email: maria.cruz-berrocal@incipit.csic.es

Diego Gárate
 IIIPC, Universidad de Cantabria
 Instituto Internacional de Investigaciones
 Universidad de Cantabria
 Avenida de los Castros
 39005 Santander
 Spain
 Email: diego.garate@unican.es

References

- Acevedo, A., D. Fiore & A. Ferrari, 2019. Rock art landscapes. A systematic study of images, topographies and visibility in south-central Patagonia (Argentina). *Journal of Anthropological Archaeology* 56, 101101.
- Anati, E., 1984. The state of research in rock art. A world report presented to UNESCO. *Bollettino del Centro Camuno di Studi Preistorici* 21, 13–56.
- Aubert, M., A. Brumm, M. Ramli, *et al.*, 2014. Pleistocene cave art from Sulawesi, Indonesia. *Nature* 514(7521), 223–7.
- Aubert, M., A. Brumm & P.S.C. Taçon, 2017. The timing and nature of human colonization of Southeast Asia in the Late Pleistocene – a rock art perspective. *Current Anthropology* 58, S553–S566.
- Aubert, M., A. Brumm & J. Huntley, 2018a. Early dates for 'Neanderthal cave art' may be wrong. *Journal of Human Evolution* 125, 215–17.
- Aubert, M., P. Setiawan, A.A. Oktaviana, *et al.*, 2018b. Palaeolithic cave art in Borneo. *Nature* 564(7753), 254–7.
- Aubert, M., R. Lebe, A.A. Oktaviana, *et al.*, 2019. Earliest hunting scene in prehistoric art. *Nature* 576, 442–5.

- Bahn, P.G. & J. Vertut, 1997. *Journey Through the Ice Age*. London: Weidenfeld & Nicolson.
- Bar-Yosef, O., 1997. Symbolic expression in later prehistory of the Levant: why are there so few?, in *Beyond Art: Pleistocene image and symbol*, eds M. Conkey, O. Soffer, D. Stratmann & N.G. Jablonski. San Francisco (CA): California Academy of Sciences, 161–87.
- Bar-Yosef, O., 2002. The Upper Paleolithic revolution. *Annual Review of Anthropology* 31, 363–93.
- Bednarik, R., 2012. Dating and taphonomy of Pleistocene rock art, in *L'art pléistocène dans le monde/Pleistocene art of the world/Arte pleistoceno en el mundo. Actes du Congrès IFRAO, Tarascon-sur-Ariège, septembre 2010 – Symposium 'Art pléistocène dans les Amériques'*, ed. J. Clottes. Tarascon-sur-Ariège: Société préhistorique Ariège-Pyrénées.
- Blust, R., 2019. The Austronesian homeland and dispersal, *Annual Review of Linguistics* 5(1), 417–34.
- Bonneau, A., F. Brock, T. Higham, D. Pearce & M. Pollard, 2014. Date la plus ancienne obtenue par la méthode du radiocarbone appliquée directement aux pigments de l'art rupestre sud-africain [The earliest date obtained by radiocarbon dating applied directly to pigments of South African rock art]. *Paléo*, numéro spécial 2014, 61–2.
- Bonneau, A., D. Pearce, P. Mitchell, et al., 2017. The earliest directly dated rock paintings from southern Africa: new AMS radiocarbon dates. *Antiquity* 91, 322–33.
- Brumm, A., A. Oktaviana, B. Burhan, et al., 2021. Oldest cave art found in Sulawesi. *Science Advances* 7, eabd4648.
- Bueno-Ramírez, P. & R. de Balbín-Berhmann, 2021. The end of the Ice Age in southern Europe: Iberian images in the Palaeolithic to Post-Palaeolithic transition. *Comptes Rendus Palevol* 20(44), 897–929.
- Chippindale, C. & G. Nash (eds), 2003: *The Figured Landscapes of Rock-Art. Looking at pictures in place*. Cambridge: Cambridge University Press.
- Clottes, J. & D. Lewis-Williams, 1998. *The Shamans of Prehistory: Trance and magic in the painted caves*. New York (NY): Harry N. Abrams.
- Conard, N.J., 2003. Palaeolithic ivory sculptures from southwestern Germany and the origins of figurative art. *Nature* 426, 830–32.
- Conkey, M.W., 1985. Ritual communication, social elaboration, and the variable trajectories of Paleolithic material culture, in *Prehistoric Hunter-gatherers. The emergence of cultural complexity*, eds T.D. Price & J.A. Brown, 299–323. London: Academic Press.
- Conkey, M., 1997. Beyond art and between the caves: thinking about context in the interpretative process, in *Beyond Art: Pleistocene image and symbol*, eds M. Conkey, O. Soffer, D. Stratmann & N.G. Jablonski. San Francisco (CA): California Academy of Sciences, 343–68.
- Conkey, M.W. & R.A. Fisher, 2020. The return of the bricoleur? Emplotment, intentionality, and tradition in Paleolithic art. *Journal of Archaeological Method and Theory* 27, 511–25.
- Conkey, M.W. & S. Williams, 1991. Original narratives: the political economy of gender in archaeology, in *Gender at the Crossroads of Knowledge*, ed. M. DiLeonardo. Berkeley (CA): University of California Press, 102–39.
- Coutu, A.N., A.J. Taurozzi, M. Mackie, T.Z.T. Jensen, M.J. Collins & J. Sealy, 2021. Palaeoproteomics confirm earliest domesticated sheep in southern Africa ca. 2000 BP. *Scientific Reports* 11, 6631.
- Cruz Berrocal, M., 2005. *Paisaje y arte rupestre. Patronos de localización de la pintura levantina* [Landscape and rock art. Location patterns of Levantine painting]. Oxford: Archaeopress.
- Cruz Berrocal, M. & J.M. Vicent García, 2007. Rock art as an archaeological and social indicator: the neolithisation of the Iberian Peninsula. *Journal of Anthropological Archaeology* 26, 676–97.
- Cruz Berrocal, M. & S. Millerstrom, 2009. Introduction to rock art and food producing societies, a systematic association, in *Proceedings of the Global Rock Art IFRAO Conference (Piauí, Brasil, 2009)*, vol. 4. (FUNDHAMENTOS IX.) São Raimundo Nonato: Fundação Museu do Homem Americano, 1359–64.
- Cruz Berrocal, M. & S. Millerstrom, 2013. The archaeology of rock art in Fiji: evidence, methods and hypotheses. *Archaeology in Oceania* 48, 154–65.
- d'Errico, F., 2003. The invisible frontier: a multiple species model for the origin of behavioural modernity. *Evolutionary Anthropology* 12, 188–202.
- Davidson, I., 1997. The power of pictures, in *Beyond art: Pleistocene image and symbol*, eds M. Conkey, O. Soffer, D. Stratmann & N.G. Jablonski. San Francisco (CA): California Academy of Sciences, 128–58.
- Davidson, I., 2023. Humans making history through continuities and discontinuities in art. *Cambridge Archaeological Journal* 33(4), 637–54.
- Davidson, I. & W. Noble, 1989. The archaeology of perception. Traces of depiction and language. *Current Anthropology* 30(2), 125–55.
- Davidson, I. & A. Nowell, 2021. Introduction. Behind the scenes – did scenes in rock art create new ways of seeing the world?, in *Making Scenes: Global perspectives on scenes in rock art*, eds I. Davidson & A. Nowell. Oxford: Berghahn Books, 1–15.
- Dubey-Pathak, M. & J. Clottes, 2021. Turtles in central Indian rock art. *International Newsletter of Rock Art* 89, 19–31.
- Fairén Jiménez, S., 2006. *El paisaje de la Neolitización: Arte rupestre, poblamiento y mundo funerario en las comarcas centro-meridionales valencianas* [The landscape of Neolithization: cave art, settlement and the funerary world in the Central-Southern Valencian counties]. Alacant: Universidad de Alacant.
- Finch, D., A. Gleadow, J. Hergt, et al., 2021. Ages for Australia's oldest rock paintings. *Nature Human Behaviour* 5, 310–18.

- Floss, H., 2007. L'art mobilier aurignacien du Jura Souabe et sa place dans l'art paléolithique [Aurignacian parietal art of Jura Souabe and its position in Palaeolithic art], in *Les chemins de l'art aurignacien en Europe/Das Aurignacien und die Anfänge der Kunst in Europa: Colloque international/Internationale Fachtagung, Aurignac 16–18 septembre 2005* [The Aurignacian and the beginnings of art in Europe], eds H. Floss & N. Rouquerol. Aurignac: Musée-forum d'Aurignac, 295–316.
- Fritz, C., G. Tosello, M. Barbaza & G. Pinçon, 2017. *L'art de la préhistoire* [Prehistoric art]. Paris: Citadelles & Mazenod.
- Gamble, C., 1984. Regional variation in hunter-gatherer strategy in the Upper Pleistocene in Europe, in *Hominid Evolution and Community Ecology*, ed. R. Foley. London: Academic, 237–60.
- Gamble, C. & E. Gittins, 2004. Social archaeology and origins research: a Paleolithic perspective, in *A Companion to Social Archaeology*, eds L. Meskell & R. Preucel. Malden (MA): Blackwell, 96–118.
- Gárate, D., 2008. Las pinturas zoomorfas punteadas del Paleolítico Superior cantábrico: hacia una cronología dilatada de una tradición gráfica homogénea [The Cantabrian Upper Palaeolithic dotted zoomorphic paintings: towards an extended chronology of a homogenous graphic tradition]. *Trabajos de Prehistoria* 65(2), 29–47.
- González-Morales, M., 1997. When the beasts go marchin' out! The end of Pleistocene art in Cantabrian Spain. in *Beyond Art: Pleistocene image and symbol*, eds M. Conkey, O. Soffer, D. Stratmann & N. Jablonski. San Francisco (CA): California Academy of Sciences, 189–99.
- Hartley, R. & A.M.W. Vawser, 1998. Spatial behaviour and learning in the prehistoric environment of the Colorado River drainage (south-eastern Utah), western North America, in *The Archaeology of Rock Art*, eds C. Chippindale & P. Taçon. Cambridge: Cambridge University Press, 185–211.
- Hawkins, S., S. O'Connor, T.R. Maloney, et al., 2017. Oldest human occupation of Wallacea at Laili Cave, Timor-Leste, shows broad-spectrum foraging responses to late Pleistocene environments. *Quaternary Science Reviews* 171, 58–72.
- Hoffmann, D.L., C.D. Standish, M. Garcia-Diez, et al., 2018a. U-Th dating of carbonate crusts reveals Neandertal origin of Iberian cave art. *Science* 359, 912–15.
- Hoffmann, D.L., C.D. Standish, A.W.G. Pike, et al., 2018b. Dates for Neanderthal art and symbolic behavior are reliable. *Nature Ecology & Evolution* 2(7), 1044.
- Hoffmann, D.L., C.D. Standish, M. Garcia-Diez, et al., 2019. Response to Aubert et al.'s reply 'Early dates for "Neanderthal cave art" may be wrong'. *Journal of Human Evolution* 125, 215–17.
- Jalandoni, A., P. Taçon & R. Haupt, 2019. A systematic quantitative literature review of Southeast Asian and Micronesian rock art. *Advances in Archaeological Practice* 7(4), 1–12.
- Jerardino, A. & N. Swanepoel, 1999. Painted slabs from Steenbokfontein Cave: the oldest known parietal art in southern Africa. *Current Anthropology* 40(4), 542–8.
- Jochim, M., 1983. Palaeolithic cave art in ecological perspective, in *Hunter Gatherer Economy in Prehistory*, ed. G. Bailey. Cambridge: Cambridge University Press, 212–19.
- Jochim, M., 1987. Late Pleistocene refugia in Europe, in *The Pleistocene Old World: Regional perspectives*, ed. O. Soffer. Boston (MA): Springer, 317–32.
- Kaharudin, H., A. Alifah, L. Ramadhan & S. Kealy, 2020. A review of archaeological dating efforts at cave and rockshelter sites in the Indonesian archipelago. *Journal of Indo-Pacific Archaeology* 44, 80–112.
- Kuhn, S.L., M.C. Stiner, D.S. Reese & E. Güleç, 2001. Ornaments in the earliest Upper Paleolithic: new results from the Levant. *Proceedings of the National Academy of Sciences* 98, 7641–6.
- Le Quellec, J.-L., 2016. Rock art in southern Africa: new developments (2010–2014), in *Rock Art Studies: News of the world V*, eds P. Bahn, N. Franklin, M. Strecker & E. Devlet. Oxford: Archaeopress, 75–87.
- Leroi-Gourhan, A., 1965. *Préhistoire de l'art occidental* [Prehistory of western art]. Paris: Lucien Mazenod.
- Malla, B.L. (ed.), 2015. *Bibliography on World of Rock Art*. New Delhi: Indira Gandhi National Centre for the Arts.
- Martínez García, J., 1998. Abrigos y accidentes geográficos como categorías de análisis en el paisaje de la pintura rupestre esquemática. El sudeste como marco [Shelters and geographical features as categories of analysis in the landscape of schematic rock painting. The southeast as a framework]. *Arqueología Espacial* 19–20, 543–61.
- Marymor, L. & M.W. Rowe, 2021. Bibliography of rock art dating: 2012–2020. *Rock Art Research* 38(1), 101–16.
- Mazel, A.D. & A.L. Watchman, 1997. Accelerator radiocarbon dating of Natal Drakensberg paintings: results and implications. *Antiquity* 71, 445–9.
- Mazel, A.D. & A.L. Watchman, 2003. Dating rock paintings in the uKhahlamba-Drakensberg and the Biggarsberg, KwaZulu-Natal, South Africa. *Southern African Humanities* 15, 59–73.
- McBrearty, S. & A.S. Brooks, 2000. The revolution that wasn't: a new interpretation of the origin of modern human behavior. *Journal of Human Evolution* 39, 453–563.
- Mellars, P., 1985. The ecological basis of social complexity in the Upper Palaeolithic of south-west France, in *Prehistoric Hunter-gatherers: The emergence of social complexity*, ed. T.D. Price & J.A. Brown. New York: Academic Press, 271–97.
- Mellars, P., 1989. Major issues in the emergence of modern humans. *Current Anthropology* 30, 349–85.
- Mellars, P., 2006. The ecological basis of Upper Palaeolithic cave art. *Zona Arqueológica* 7, 2–11.

- Millerstrom, S., 1997. Carved and painted rock images in the Marquesas Islands, French Polynesia. *Archaeology in Oceania* 32, 181–96.
- Mithen, S.J., 1987. Looking and learning: Upper Paleolithic art and information gathering. *World Archaeology* 19, 297–327.
- Mithen, S.J., 1996. *The Prehistory of the Mind: The cognitive origins of art, religion and science*. New York (NY): Thames & Hudson.
- Morales, R., 2002. *The Nordeste Tradition: Innovation and Continuity in Brazilian Rock Art*. PhD dissertation, Virginia Commonwealth University.
- Morcote-Ríos, G., F.J. Aceituno, J. Iriarte, M. Robinson & J. Chaparro-Cárdenas, 2021. Colonisation and early peopling of the Colombian Amazon during the Late Pleistocene and the Early Holocene: new evidence from La Serranía La Lindosa. *Quaternary International* 578, 5–19.
- Moro Abadía, O. & M.R. González Morales. 2004. Towards a genealogy of the concept of 'Paleolithic mobiliary art'. *Journal of Anthropological Research* 60(3), 321–39.
- Moro Abadía, O. & M.R. González Morales, 2013. Paleolithic art: a cultural history. *Journal of Archaeological Research* 21, 269–306.
- Nash, G. & C. Chippindale (eds), 2002. *European Landscapes of Rock-art*. London: Routledge.
- Needham, A., I. Wisher, A. Langley, M. Amy & A. Little, 2022. Art by firelight? Using experimental and digital techniques to explore Magdalenian engraved plaque use at Montastruc (France). *PLoS ONE* 17(4), e0266146.
- Neves, W.A., A.G.M. Araujo, D.V. Bernardo, R. Kipnis & J.K. Feathers, 2012. Rock art at the Pleistocene/Holocene boundary in eastern South America. *PLoS ONE* 7(2), e32228.
- Noble, W. & I. Davidson, 1991. The evolutionary emergence of modern human behaviour: language and its archaeology. *Man* 26(2), 223–53.
- Nowell, A., 2006. From a Paleolithic art to Pleistocene visual cultures. *Journal of Archaeological Method and Theory* 13(4), 239–49.
- Nowell, A., 2010. Defining behavioral modernity in the context of Neandertal and anatomically modern human populations. *Annual Review of Anthropology* 39(1), 437–52.
- Nowell, A., 2015. Learning to see and seeing to learn: children, communities of practice and Pleistocene visual cultures. *Cambridge Archaeological Journal* 25(4), 889–99.
- O'Connor, S., J. Louys, S. Kealy & M. Mahrta, 2015. First record of painted rock art near Kupang, West Timor, Indonesia, and the origins and distribution of the Austronesian painting tradition. *Rock Art Research* 32(2), 193–201.
- Paunero, R.S., 2012. Arte rupestre pleistoceno de Santa Cruz, Patagonia, Argentina [Pleistocene rock art of Santa Cruz, Patagonia Argentina], in *L'art pléistocène dans le monde/Pleistocene art of the world/Arte pleistoceno en el mundo. Actes du Congrès IFRAO, Tarascon-sur-Ariège, septembre 2010* – *Symposium 'Art pléistocène dans les Amériques'*, ed. J. Clottes. Tarascon-sur-Ariège: Société préhistorique Ariège-Pyrénées.
- Pearce, D.G. & A. Bonneau, 2018. Trouble on the dating scene. *Nature Ecology & Evolution* 2, 925–6.
- Pérez Maestro, C. & P. Bueno Ramírez, 2022. Lugares significativos en el paisaje de la prehistoria centroandina: grafías rupestres pintadas y contextos de la cuenca del río Loco, Perú [Significant places in the landscape of Central Andean prehistory: painted rock carvings and contexts in the Loco river basin, Peru]. *Antípoda: Revista de Antropología y Arqueología* 49, 3–36.
- Plagnes, V., C. Causse, M. Fontugne, H. Valladas, J.-M. Chazine & L.H. Fage, 2003. Cross dating (Th/U-¹⁴C) of calcite covering prehistoric paintings in Borneo. *Quaternary Research* 60, 172–9.
- Podestá, M.M. & C.A. Aschero, 2012. Evidencias tempranas del arte rupestre de los cazadores-recolectores de la Puna (NO de la Argentina) [Early evidence of hunter-gatherer rock art from the Puna (NW of Argentina)], in *L'art pléistocène dans le monde/Pleistocene art of the world/Arte pleistoceno en el mundo. Actes du Congrès IFRAO, Tarascon-sur-Ariège, septembre 2010 – Symposium 'Art pléistocène dans les Amériques'*, ed. J. Clottes. Tarascon-sur-Ariège: Société préhistorique Ariège-Pyrénées.
- Ramos-Muñoz, J., P. Cantalejo, J. Blumenröther, et al., 2022. The nature and chronology of human occupation at the Galerías Bajas, from Cueva de Ardales, Malaga, Spain. *PLoS ONE* 17(6), e0266788.
- Raphael, M., 1945. *Prehistoric Cave Paintings*. (Bollingen Series IV.) New York (NY): Pantheon Books.
- Renfrew, C., 2009. Situating the creative explosion: universal or local?, in *Becoming Human: Innovation in prehistoric material and spiritual culture*, eds C. Renfrew & I. Morley. Cambridge: Cambridge University Press, 74–92.
- Robb, J., 2015. Prehistoric art in Europe: a deep-time social history. *American Antiquity* 80(4), 635–54.
- Robb, J., 2020. Art (pre)history: ritual, narrative and visual culture in Neolithic and Bronze Age Europe. *Journal of Archaeological Method and Theory* 27, 454–80.
- Romero-Villanueva, G., M. Sepúlveda, J. Cárcamo-Vega, A. Cherkinsky & M.E. de Porrás, 2024. Earliest directly dated rock art from Patagonia reveals socioecological resilience to mid-Holocene climate. *Science Advances* 10(7). DOI: 10.1126/sciadv.adk4415
- Rosenfeld, A., 1997. Archaeological signatures of the social context of rock art production, in *Beyond Art: Pleistocene image and symbol*, eds M. Conkey, O. Soffer, D. Stratman & N. Jablonski. San Francisco (CA): California Academy of Sciences, 289–300.
- Rowe, M.W., 2012. Bibliography of rock art dating. *Rock Art Research* 29(1), 118–31.
- Rowe, M.W. & K.L. Steelman, 2003. Comment on 'some evidence of a date of first humans to arrive in Brazil'. *Journal of Archaeological Science* 30, 1349–51.

- Sadr, K., 2015. Livestock first reached southern Africa in two separate events. *PLoS ONE* 10(8), e0134215.
- Sandars, N.K., 1985. *Prehistoric Art in Europe* (2nd edn). Harmondsworth: Penguin.
- Santos Estévez, M., 1998. Los espacios del arte: el diseño del panel y la articulación del paisaje en el arte rupestre gallego [The spaces of art: panel design and the articulation of the landscape in Galician rock art]. *Trabajos de Prehistoria* 55(2), 73–88.
- Santos Estévez, M. & F. Criado Boado, 1998. Espacios rupestres: del panel al paisaje [Rock art spaces: from panel to landscape]. *Arqueología espacial* 19–20, 579–95.
- Shipton, C., S. O'Connor & S. Kealy, 2021. The biogeographic threshold of Wallacea in human evolution. *Quaternary International* 574, 1–12.
- Slimak, L., J. Fietzke, J.M. Geneste & R. Ontañón, 2018. Comment on 'U-Th dating of carbonate crusts reveals Neandertal origin of Iberian cave art'. *Science* 361(6408), 1371.
- Slimak, L., C. Zanolli, T. Higham, *et al.*, 2022. Modern human incursion into Neandertal territories 54,000 years ago at Mandrin, France. *Science Advances* 8(6), eabj949.
- Smith, B., & S. Ouzman, 2004. Taking stock. Identifying Khoekhoen herder rock art in Southern Africa. *Current Anthropology* 45(4), 499–526.
- Stelman, K.L., R. Rickman, M.W. Rowe, T.W. Boutton, J. Russ & N. Guidon, 2002. AMS radiocarbon ages of an oxalate accretion and rock paintings at Toca do Serrote da Bastiana, Brazil, in *Archaeological Chemistry*, ed. K. Jakes. Washington (DC): American Chemical Society, 22–35.
- Straus, L.G., 1996. Continuity or rupture; convergence or invasion; adaptation or catastrophe; mosaic or monolith: views on the Middle to Upper Paleolithic transition in Iberia, in *The Last Neandertals, the First Anatomically Modern Humans*, eds E. Carbonell & M. Vaquero. Tarragona: Universidad Rovira i Virgili, 203–18.
- Taçon, P.S.C., M. Aubert, G. Li, *et al.*, 2012. Uranium-series age estimates for rock art in southwest China. *Journal of Archaeological Science* 39, 492–9.
- Taçon, P.S.C., N.H. Tan, S. O'Connor, *et al.*, 2014. The global implications of the early surviving rock art of greater Southeast Asia. *Antiquity* 88, 1050–64.
- Thackeray, A.I., 1983. Dating the rock art of southern Africa. *South African Archaeological Society, Goodwin Series* 4, 21–6.
- Troncoso, A., F. Armstrong & M. Basile, 2017. Rock art in Central and South America: social settings and regional diversity, in *The Oxford Handbook of the Archaeology and Anthropology of Rock Art*, eds B. David & I.J. McNiven. <https://doi.org/10.1093/oxfordhb/9780190607357.013.53>
- Troncoso, A., F. Armstrong & G. Nash (eds), 2018. *Archaeologies of Rock Art. South American perspectives*. London: Routledge.
- Troncoso, A., F. Moya, M. Sepúlveda & J.J. Carcamo, 2015. First absolute dating of Andean hunter-gatherer rock art paintings from North Central Chile. *Archaeological and Anthropological Sciences* 9, 223–32.
- Van der Merwe, N.J., J. Sealy & R. Yates, 1987. First accelerator carbon-14 date for pigment from a rock painting. *South African Journal of Science* 83, 56–7.
- Walker, N., 2012. The rock art of the Matobo Hills, Zimbabwe. *Adoranten* 2012, 38–59.
- Westaway, K.E., J. Louys, R.D. Awe, *et al.*, 2017. An early modern human presence in Sumatra 73,000–63,000 years ago. *Nature* 548, 322–5.
- White, R., 2000. Un big bang socioculturel: une nouvelle façon d'appréhender le monde est née voici 40,000 ans [A socio-cultural big bang: a new way of understanding the world began 40,000 years ago]. *La Recherche hors série* 4, 10–16.
- White, R., G.I., Bosinski, R. Bourrillon, *et al.*, 2019. Still no archaeological evidence that Neanderthals created Iberian cave art. *Journal of Human Evolution* 144, 102640.
- Wilson, M. & C. Ballard, 2018. Rock art of the Pacific: context and intertextuality, in *The Oxford Handbook of the Archaeology and Anthropology of Rock Art*, eds B. David & I.J. McNiven. DOI: 10.1093/oxfordhb/9780190607357.013.41
- Wu, Y., Y. Jiao, X.P. Ji, *et al.*, 2022. High-precision U-series dating of the late Pleistocene–early Holocene rock paintings at Tiger Leaping Gorge, Jinsha River valley, southwestern China. *Journal of Archaeological Science* 138, 105535.
- Yacobaccio, H., P. Solá, S. Alonso, *et al.*, 2012. Pinturas rupestres del Pleistoceno/Holoceno en la Puna de Atacama (Jujuy, Argentina) [Pleistocene/Holocene cave paintings in the Puna de Atacama (Jujuy, Argentina)], in *L'art pléistocène dans le monde/Pleistocene art of the world/Arte pleistoceno en el mundo. Actes du Congrès IFRAO, Tarascon-sur-Ariège, septembre 2010 – Symposium 'Art pléistocène dans les Amériques'*, ed. J. Clottes. Tarascon-sur-Ariège: Société préhistorique Ariège-Pyrénées.
- Zilhão, J., 2007. The emergence of ornaments and art: an archaeological perspective on the origins of 'behavioral modernity'. *Journal of Archaeological Research* 15, 1–54.

Author biographies

María Cruz Berrocal is a Scientific Researcher at the Instituto de Ciencias del Patrimonio (INCIPIT-CSIC) in Santiago de Compostela, Spain. Her work addresses how rock art ingrains in the social and historical dynamics that led to the Neolithization and subsequent processes of increasing social complexity, landscape use and construction, in the Iberian peninsula and the Pacific.

Diego Gárate is a lecturer at Universidad de Cantabria (IIIPC), Spain. He directs numerous archaeological projects in decorated caves in Spain and France and investigates in Chauvet and La Garma. He has participated in the recent discovery of a dozen new caves in northern Spain, including Askondo, Lumentxa, Atxurra and Aitzbitarte.