

Environmental Representations in Rocky Records in National Parks in Southeastern Piauí – Brazil

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Abstract

At the Brazilian parks - Serra da Capivara and Serra das Confusões (Piauí, Brazil), as well as in their adjacent areas, there is a wide concentration of archaeological sites with rock paintings that subsidize several elements of the first human occupations in America as they show and represent many features of their existence and daily life in the multiple ecosystems in the region. Those representations have diversified attributions, which reveal that the daily life of the first inhabitants in the territory was very proactive and dynamic, what could supply indicators that there was history, education, socialization of practices and knowledge, several types of communication, relationships with other ways of life as well as traces of religiosity in ancient times in the history of Brazil. It is possible to recognize in the paintings – to date the numerous phytomorphic and zoomorphic rupestrian registers and their possible interpretations – non-existing species in the region currently and others that are totally extinct; some are so well produced so it is even possible to recognize the gender of the animal through the presence of antlers and other determining features of the species. From analysis and identifications of prehistoric environmental memories that are connected to deeper studies about the flora and fauna in the rock paintings found in the regions that surround the parks of the study, as well as the collection and condensation of information found in the literature, this article aims, besides establishing episodes of the relationship human/ nature, reconstructs traces of the environmental conditions that are relevant to the period when they were performed, and then becoming an environmental indicator variable of past time.

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I-Introduction

The rock records or signs are paintings and/or engravings perpetrated on the rocks, produced by the first inhabitants of Brazil, spread throughout the national territory, some were made in the Park National Serra da Capivara - SCNP and Park National Serra das Confusões and in its surroundings, in the state from Piauí, thousands of years ago (Figure 1).

They give the air that they had the objective of revealing aspects of the history of the first inhabitants of the Northeast region (OLIVEIRA et al, 2018).



Figure 1. *Serra da Capivara and Serra das Confusões - Localization.*

Source: Adapted by Vitor J R Almeida.

This article aims to demonstrate the relationship between the environment in the past and present in the region of the Serra da Capivara and Serra das Confusions National Parks, based on rock art in order to demonstrate the concerns of past human groups with the environment they inhabited.

We are a part of a group that polemicizes questions related to the environment. It comprises a myriad of researchers as climatologists, environmentalists, physicists, chemists, archaeologists, historians, social scientists, and others. We analyze the scientific basis to COUNTERPOSE the poor assumptions and the deprived systematic studies and debates inside the scientific community. We are supported by the ideas we defend.

From fossil evidence related to the appearance of humans, everything that is linked to their actions can be considered as sociocultural construction in line with other beings that seem relevant to the same environment. This last one should be considered in the plural form, as the plurality refers to several spaces, several places, landscapes and interactions among animals, plants, microorganisms, minerals, and other immaterial components and thus, endowed by subjectivity.

Art is part of the human world, and its peculiarities differentiate humans from other beings; it does not make them better, but it distinguishes them. Human beings built their culture, as it was claimed by Lévi-Strauss in 2004 – the culture is a set of universal collective practices. In this way, we understand that without culture there is no humanity, nor nature or environment.

Archaeology has this role as science: rescuing from the unconsciousness of the Earth, revealing the complex and former life forms and how human relationships are found through the archaeological remains, among them the rock art, especially, the paintings.

But what brings us back to rock art? What can it reveal to us as scientific data or as an object of study? Is there any mathematics in the drawings? There is, what we can observe, some premeditated outlines in the drawings and the rocky environment that was chosen by the person. In Figure 2, which was registered in a shelter under a rock in Toca do Baixão do Milho, Serra das Confusões National Park, in the municipality of Caracol, southwest of Piauí, we may observe registers in this type of proposal.



Figure 2. Toca do Baixão do Milho site, in the municipality of Caracol, close to Serra das Confusões.

Source: Luz, 2021.

Serra das Confusões National Park

This Brazilian park is a unit of conservation to fully protect nature, which was created on October 2, 1998, and it is distributed in the municipalities of Alvorada do Gurguéia, Bom Jesus, Brejo do Piauí, Canto do Buriti, Caracol, Cristino Castro, Curimatá, Guaribas, Jurema, Redenção do Gurguéia, Santa Luz and Tamboril do Piauí in the southwest region of Piauí state. It has an area of 823,837 hectares (1), and Serra das Confusões is the largest park in Piauí and in the northeast region of Brazil, which protects a significant sample of the ecosystems that are found in the Caatinga biome.

The archaeological research, in the area at Serra das Confusões, started in the decade of 1990 with a French-Brazilian mission. Although there are just a few studies about it, there is a highlighted area in the bioarchaeology which was studied by Martine Faure, Claude Guérin and Maria Fátima da Luz in 2011 and entitled 'The funeral material at the prehistoric graves at Toca do Enoque (Serra das Confusões National Park).

The great variety and diversity of material found are associated with the reuse of the same place for multiple burials, which makes Toca do Enoque a peculiar site. The shelter under a rock that is located at Serra das Andorinhas was excavated by Niède Guidon and Fátima Luz (GUIDON, N. and LUZ, M.F, 2009) and it is considered a unique archaeological site due to its presumed richness of funeral dowries found, which comprises adornments and pigments. There was also some research carried out in 2005 by the team Rock Art Conservation of FUMDHAM to register archaeological sites in the park and vicinities - CNSA/IPHAN (GUIDON, 2009), which increased from 12 to more than 100 identified sites in the region, besides excavations and studies in the archaeological site Alto do Capim (SILVA & FONTES, 2014). Our reflections contribute new knowledge about this study, bringing focus to the local rock art, and what may be directly linked to the environmental perception due to the scene that was represented and engraved on the rocks.

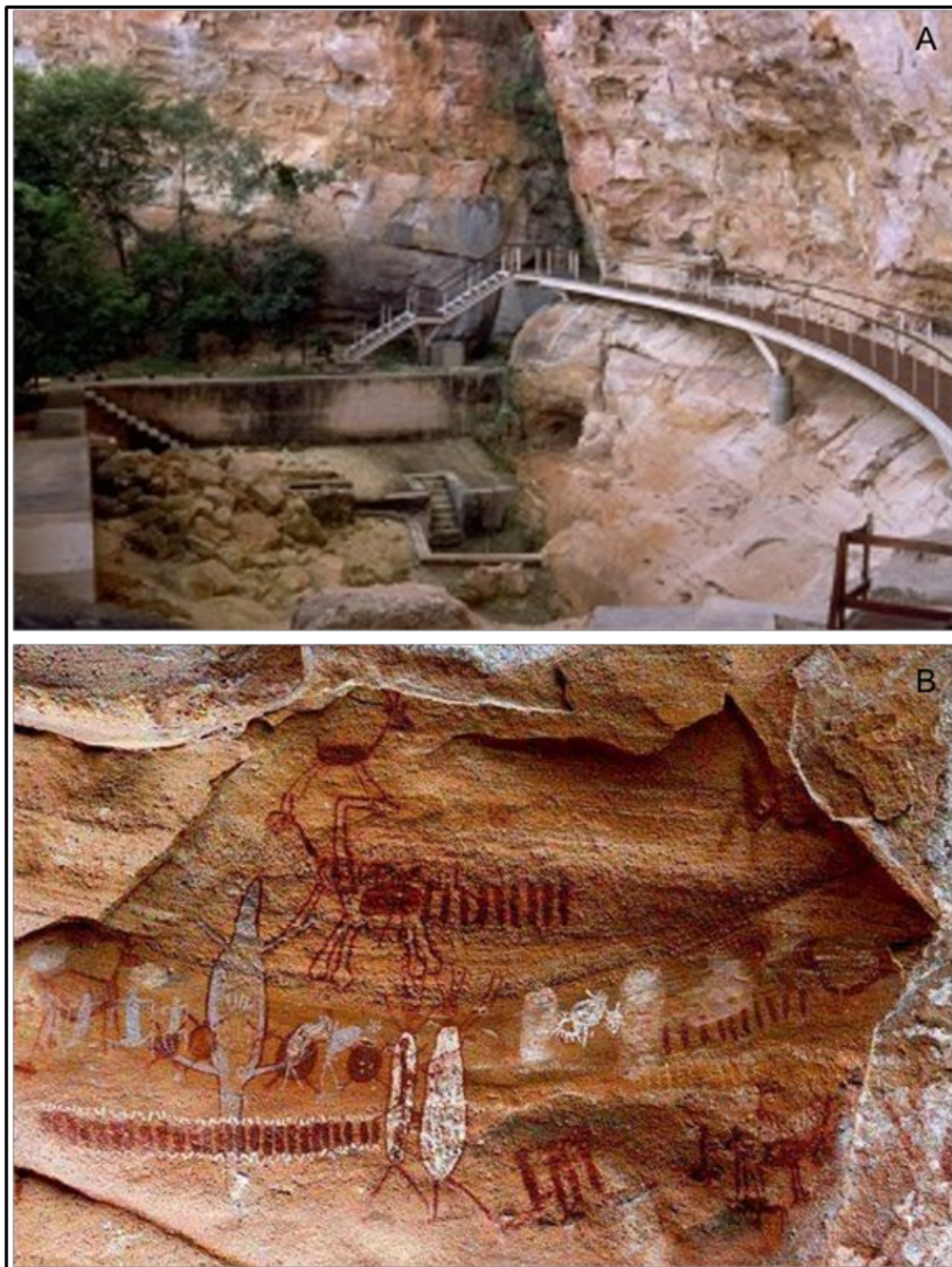
Park National Serra da Capivara – PSNC

This Brazilian park is a unit of conservation of full protection of nature in the Caatinga biome, which was created on June 5, 1979, and it is distributed along the municipalities of São Raimundo Nonato, Coronel José Dias, João Costa and Brejo do Piauí in the southwest region of Piauí, and it is currently managed by ICMBIO. Due to its historical and cultural value, it was recognized as World Cultural Heritage by UNESCO in 1991.

It is known that the chronology of the settlement in the Americas is still an open problem in worldwide prehistory, besides the questions about the population routes and its paleoanthropology (PARENTI, 2013). It is worth remembering that there have been studies about prehistorical humans in the United States since 1927, as well their behavior in connection to a specific lithic tool – a spearhead – with the date of the material culture of 12,000 years BP, attributed to Clovis Culture (ADOVASIO and PAGE, 2011, p. 135-145).

This site, with sandstone rock formation and large dimensions, and located in the southeast of Piauí state, presents

a series of rock representations with a recognizable topic which is associated with animals, non-humans, and humans, besides the phytomorphic representations, which is an important piece of evidence of the human adaptation to the environment and its resource uses (Figures 3).



Figures 3. *Toca do Boqueirão da Pedra Furada site. A) general view of the shelter and excavation area; B) polychromatic pictorial niche.*

Source: Buco, 2009.

BPF or Pedra Furada, as it is known by archaeologists, has been excavated and studied since the '70s; the action was initially coordinated by Guidon, and continued by Parenti, who excavated the area from 1987 to 1988. Ten years of excavation and consecutive research which were followed by several controversial views (GUIDON 2008). The radiocarbon dating of the Toca do Boqueirão da Pedra Furada (BPF) site supplied a chronostratigraphic column which is comprised of 47 carbon dating (C^{14}) from 50,000 years BP (GIF 9019) to 6,150 years BP (GIF 8108) (FELICE 2002: 147).

The two parks are part of the same archaeological area; therefore, we worked our analysis better with both of them to deepen knowledge, explore, prospect, and write about possible connections between the rock art of different archaeological sites. It seems necessary to understand and connect possible theoretical-methodological contributions that exist between the two parks in the same Piauiense microregion.

All the area at SCNP and around it has been well studied with a multidisciplinary approach since 1974, with registers of Pleistocene paleontological sites (GUÉRIN and FAURE, 2008; 2014) and many other archaeological ones (LOUDEAU and PAGLI, 2014). But especially from 2008, the research of the Franco-Brazilian mission started to be coordinated by Eric Böeda and it has been conducted with the aim to replicate and refine data that originated from BPF and in order to find out new Pleistocene settlement evidence in the region (LAYNE *et al.*, 2013)

Despite the results obtained at BPF during the excavations from 1978 to 1988 that have been published since 2001 (PARENTI, 2001; SANTOS *et al.*, 2002; VALLADAS *et al.*, 2003; CHAVES *et al.*, 2006), most of the current publishing do not consider the data beforementioned. Such publishing prefers to concentrate on criticism of a generic and conjectural set of taphonomy and technological observations, ignoring the existence of the archaeological site itself when considering the settlement issue (VIALOU *et al.*, 2017).

The landscape as representations in rock art study

The landscape category, which has an important tradition for French geography, presents a wide application in several scientific areas. Besides that, the concept of landscape is polysemic and supported by several epistemological views, from insights into material and immaterial dimensions in space dynamics. Furthermore, the landscape can be conceived as a result of the meeting between the world and a point of view, it means, 'inserted in a complex relation of three components – place, look and image' (FIGUEIREDO & LOPES, 2021, p. 2).

Nevertheless, the study of Fagundes *et al.* (2018) points to a methodological path of analysis in which the painting and rock carving are cultural elements of high subjectivity, which compose the landscape complexity that is endowed with

materialized elements as rocks, rivers, vegetation, soil, and immaterialities which can just be understood through the epistemological approach that explores the function perception field and space subjectivity as hermeneutic and phenomenology.

Understanding the cross of phytomorph and zoomorph evidence at the parks Serra da Capivara and Confusões in the state of Piauí, Brazil, permeates the archaeological paleo landscape dimension that was left by people that are not alive anymore, but left a powerful legacy as cultural repertoire that is full of meaning and significations, and they were and they are also susceptible to resignifications by other generations that doodle on registers, evidence that is difficult to date, interpret, making rock art a swampy research territory as Ribeiro warned us (2009).

The pieces of evidence that were left by old inhabitants of the area beforementioned are, besides being simple past registers, resources that allow a connection to an ancestral identity, with history recognition and relations established to the biome around. Trying to understand those relationships better through the assessment of those rock registers is a way to reflect on the attitudes of the society towards nature, noticing the changes that happened and what possibly is appropriate for a 'rescue'.

Rock art was not produced randomly, as it had a meaning for those who produced it, for example, to portray daily scenes, to show processes and procedures (hunting, rituals, etc.) or even to be used as species of devotional icons. When there are environmental representations, we can more clearly notice the intentions of the ancestors to show pieces of their reality and their relationships with the biome. Places where we can find rock art are real 'libraries' where researchers of several areas can do their reading from such valuable heritage.

The choice of these places to have the registers make us understand that the current sites, which are relics of the past, were the chosen landscape by the paleo society as 'a place for the praxis and socially significative' (TRONCOSO, 2001, p.1). Immersed in Landscape Archaeology, Troncoso (2001) and Fagundes et al (2018) deeply went into the universe of problematization during their research, in which they considered the landscape as a product of the human intervention, and therefore it was historically and socially produced, what preserves in the materiality the rationality of a human group that generated registers connected to their intentions which are linked to the markers of power of that moment, aimed at socializing nature appropriation strategy as well as their symbolic cultural repertoire.

The word *ecology* comes from the Greek '*oikos*', which means 'place to live' (ODUM, 1972). In the literal sense that is exposed by the author, ecology can be considered as "the study of organisms and groups of alive organisms in their environment" (ODUM, 1972, p. 4). This ecosystem view justified the archaeology conception of that period, which considered the natural world in a hierarchical way in 'systems and subsystems that work in a harmonious and homeostatic way' (WORSTEN, 1992, p. 205). However, it has been noticed in studies made, since the end of the 1990s, by ecologists (VITOUSEK et al., 1994) and environmental historians (WORSTEN, 1992; ASDAL, 2003) that the conception of ecosystem has been reassessed and reoriented to understand the ecosystems that are associated to the change components and particularities, what consider the historical dimension of the ecosystem studies (RISSER, 1999). Considering this thought, nowadays it is understood that the environment will never be or has never been in balance (FYFE, 1997).

As a complement, rock art is cultural products that are deposited as spatial shapes in nature, it means, perceptions that were materialized on rocky surfaces that present the possibility to understand the relationship among the society, technological and symbolic systems, and nature as analyzed by Troncoso (2001). Fagundes et al. (2018) highlighted that rock art is a strong indicator that the environment coexists associated with the culture and the landscape category, making it possible to intersect the nature and society dimensions in a dialectic synthesis in which the archaeological imaginary can flow in the search of unimaginable experience reconstitution without the development of this science. It will be partial without the landscape materiality.

It is worth noting that besides the anachronism that permeates any try to interpret rock registers as it is discussed by Justamand et al. (2019), the cosmologies of the Amerindian peoples show as a methodological challenge to understand the role that the phytomorph and the zoomorph have in the reading about the environmental concern of that paleo society. For Viveiros de Castro (2006) nature and culture for the Amerindian peoples do not have any direct correlation with the understanding of those concepts for the Western culture, which also present dichotomy and therefore, they do not sign the same comprehension in the being region.

Through the experience of the forest peoples of our contemporaneity, and with the possibility to outline ancestral comparison with the societies that record components and practices of the geographic space in rocks, it is possible to grasp that the society is not independent of natural geographical objects; the perspective is integrative and non-dichotomous. Limiting the perception of those people to geological, geomorphological, botanic, biological, and hydrographic aspects is reducing the imaginary that is open as new beams of relationships that the Eurocentric view prevents us to see or limit our limiting sight in relation to the rock art interpretation.

This inseparable meeting between materiality and immateriality, objectivity and subjectivity makes reflection susceptible from the landscape in which it synthesizes the meeting among subjects and objects, between the real and the abstract (COSGROVE, 1998). Therefore, the landscape has many layers of meanings, which resulted from time accumulation, so it becomes complex but makes several different types of reading possible. It is in the landscape that the body contacts and experiences the world, living, moving, and building the intelligibility of things. Thus, it is understood that the landscape is a testimony of different humans that lived and left evidence of what was, in the field of ideas as well as in the material dimension (INGOLD, 1993).

There was some sort of meaning deletion of several representations that can be found in rock art by the colonization process, by the time or by the weather. As a consequence, the meaning emptying of those old symbols is an obstacle to promoting their spontaneous appreciation by contemporary society, which entails a lack of interest and mobilization to preserve, distancing from the regional identity and ignorance in relation to their own past.

It is known that it is not up to archaeology to categorically determine the meaning of such graphism, but science is able to appoint interpretation methods as well as mechanisms for the conservation of this heritage, allowing knowledge diffusion regarding the symbols and possible meaning by contemporary society.

The people of the past, who were the producers of the art that is studied at this moment, do not live in those places anymore. However, there is a new society that has to be awakened to fulfill the mission and preserve the heritage, understanding its importance and value. Besides that, a new biome continues existing in those places, with new vegetal species, new animal species, new climate reality and new relationships between the human being and nature, but with noticeable connections to the *modus vivendi* of the ancestral peoples.

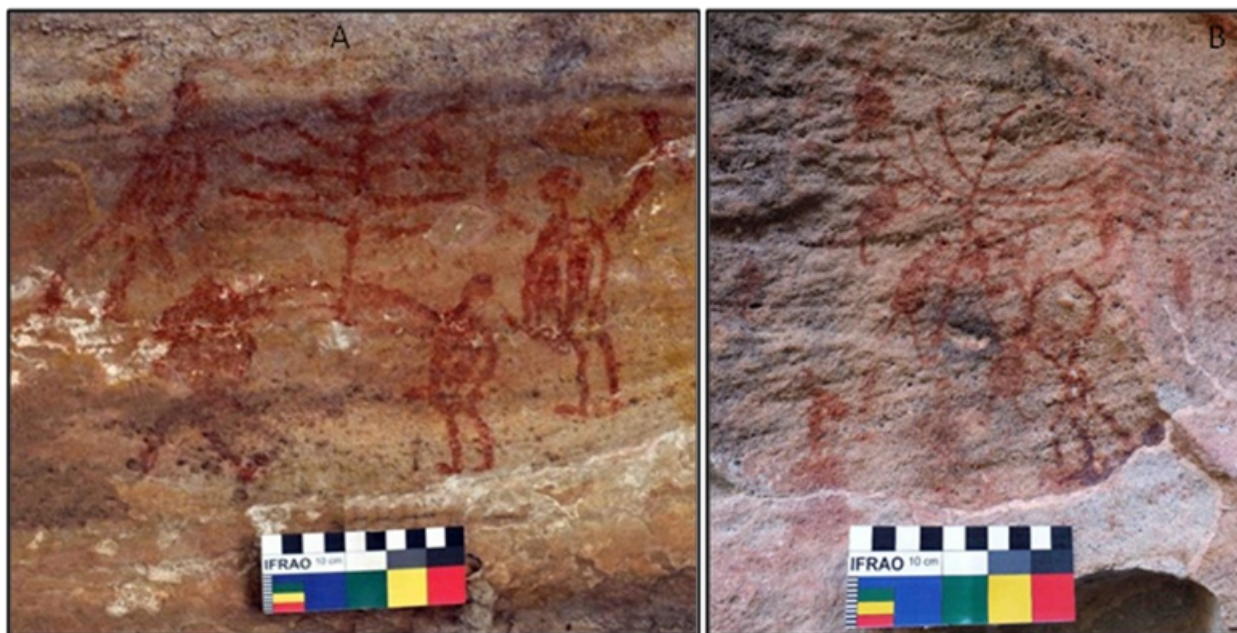
Specifically, in the piauiense backlands and in the surrounding regions to the sites described here, there are some dwellers who still keep common habits to ancient peoples, for example, hunting, collection, gathering and intimate relationships with their place of origin. Reflecting on this makes us notice the still existing links between the past and the present, through the customs, the relationships with nature and the local landscape.

Phytomorphic and Zoomorphic Representations

Rock art (rock engraving and painting) is one of the archaeological pieces of evidence that generates more doubts than certainties in the life of archaeologists, which promotes the development of hypotheses and interpretations about it. Many archaeologists argue that those types of evidence would help to try to tell the history of our ancestors, hunter-gatherer groups (which is more rooted in the popular concept – the hunting scene). Others consider the time accounting, astronomy or even the geographical location as ‘maps of villages’ (BUCO et al. 2010). Therefore, in each case, there could be different purposes. With those pieces of evidence, it is possible to observe the relationship between human beings and the environment from the moment they were looking for raw material: ochre (denomination that is used by archaeologists for iron oxide), goethite and hematite, and others to perform painting and engraving on more resistant rocks. The choice of place and what to present on the rocky wall would be linked, in some cases, to the environment as discussed by Fagundes et al. (2018).

Regarding the rock supports, these representations are often studied as simple images, representations, or iconography, obliterating the material aspects of those visual manifestations. For the archaeological taphonomy, this information is important because the weathering process is an almost non-existing analysis factor for rock art in Brazil, which is more developed in other countries, but they form through a different process, and they deteriorate through the universal weathering process.

The phytomorph artwork is the one in which pictures can be observed that seem to be vegetation and in the representative structure of the rocky walls; they are in the shapes of trees, leaves and/ or branches which can be observed at Serra da Capivara as well as Serra das Confusões (Figures 4 and 5). It is possible to reflect somehow on the vegetable importance for the basic sense of subsistence as well as for other aspects of the daily life of individuals.



Figures 4. Pictorial scenes comprised of anthropomorphs around a tree A) Toca do Baixão das Mulheres I; B) Toca do Estevo III or Toca da Onça, SCNP Serra da Capivara.

Source: Oliveira, 2018.



Figure 5. Bichromatic pictorial scene comprised of felines (jaguars), trees and anthropomorphs at Toca da Pedra Uma, at SCNP Serra da Capivara.

Source: Buco, 2009.

The zoomorph artwork is the one that at first is not difficult to identify, even though it is done preliminarily, and they represent the fauna. There are plenty of such registers with a large diversity of species in Piauí at Serra da Capivara as well as at Serra das Confusões (Figures 6 and 7).



Figures 6. Rock art at Toca do Martiliano, SCNP. A) Figure of birds with open arms that is known as Thunderbird; B) Pictorial composition made with an anthropomorph and a bird.

Source: Oliveira, 2018.



Figure 7. Pictorial panel at Toca do João Arsena which highlights the overlaying of several figures on a large zoomorph (cervid).

Source: Buco, 2009.

The fieldwork and the research done by Almeida (2011) allowed us to establish that rock painting can be more considered as an instrument in the reconstruction of an environment in the past time. This statement could be reached through comparisons, analysis, and interpretations of zoomorph rock painting. As an example, Almeida, Etchebehere and Rampaneli (2017) indicate that the paleontological evidence dating of *Blastocerus dichotomus* (Figure 8) (KINOSHITA *et al.*, 2014), fauna that is represented in several rock registers in the park (CAMPOS & BUCO, 2021), allowed to infer that the region of the study, from 20 to 25 thousand B.P., was wetter than currently, with floodplains and flooded areas. This paleoenvironmental characterization matches the data of paleoclimate and paleo vegetation that were studied by Santos (2007), which establish that there was retraction start of rainforests 18,000 YR B.P.



Figure 8. Pictorial representation of the 'White-Tailed Deer' on an isolated panel at Toca do Paraguaio.

Source: Buco, 2012

In other archaeological sites which are located in the Piauiense territory, we can also find the recurrence of phytomorphic, zoomorphic and biomorphic representations, which reinforces the hypothesis that such elements had certain importance for the ancient inhabitants in this territory, to the point when they portrayed themselves in their rock art. The presence of scenes with human beings around trees, which are interpreted as rituals, gives us an idea that ancient peoples of those zones fostered a relationship of respect and devotion to the trees and to the native biome. The same relationship of respect, intimacy and sacralization can be noticed in the scenes of interaction among men and animals, especially the images that portray biomorphs: men with antlers, winged men, and other similar ones.

Connections between two parks

The zoomorph and phytomorph representations on rock art at Serra da Capivara and Confusões seem to differ in quantitative and technical terms. We can find the characteristic low-relief figures at Serra das Confusões, with more straight lines. Despite the geographical proximity, maybe the rock art production was made by different human groups or in different periods, but with similar motivations for their artistic representations, both bring common images of the local landscape, including plants and animals.

Serra das Confusões

TOCA DO ENOQUE SITE

At Toca do Enoque, we can observe the presence of red painting with zoomorph, anthropomorphic and geometric representations (Figures 9).



Figures 9. rock painting at Toca do Enoque. A) zoomorph (saurids); B) zoomorph (tortoise?); C) zoomorph (anteater?); D) zoomorph (birds?).

Source: Felipe Soares, 2009.

PEDRAS DAS ANDORINHAS SITE

At the Pedras das Andorinhas site, we can observe the presence of engravings and paint in red and white with zoomorph representations (Figure 10A), phytomorph (Figure 10B) and geometric ones.

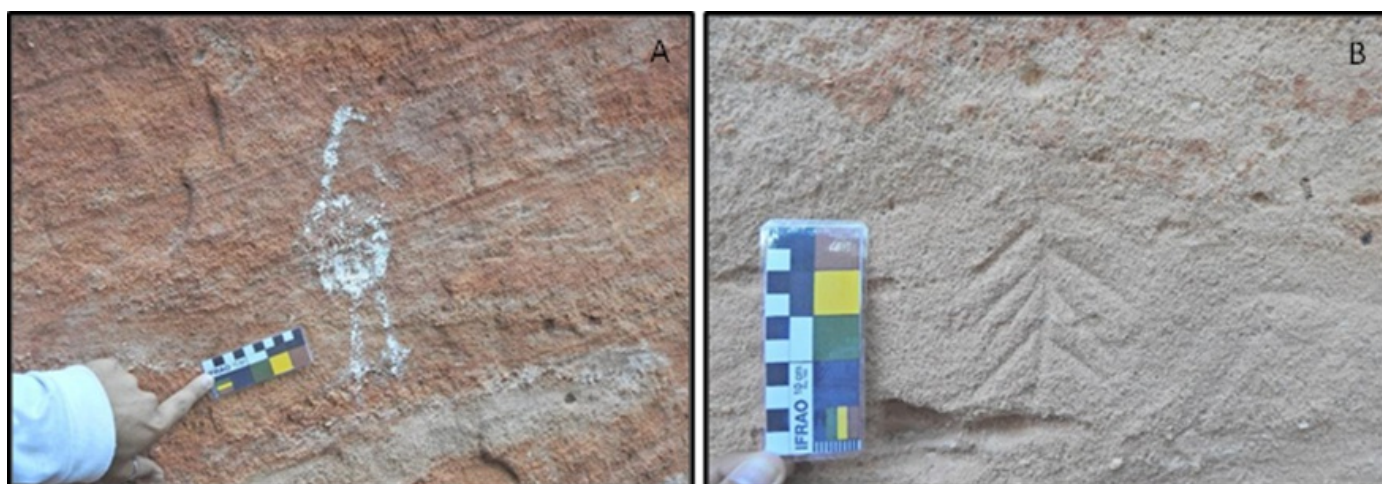


Figure 10. Rock painting at the Pedras das Andorinhas site. A) zoomorph (bird?) in white; B) engraved phytomorph.

Source: Felipe Soares, 2019.

TOCA DAS MÃOS DO CAPIM SITE

At the Toca das Mãos do Capim site, we can observe the presence of engraving and painting in red and white with phytomorph and geometric representations (Figure 11).



Figure 11. Phytomorph rock engraving at Toca das Mãos do Capim site.

Source: Felipe Soares, 2019.

TOCA DOS COMPADRES SITE

Toca dos Compadres site, which is located at Serra das Confusões in the municipality of Guaribas, is characterized as a shelter under rocks with several pieces of rock engraving and painting in red with geometric, zoomorph representations (Figures 12 and 13), and anthropomorph and phytomorph ones (Figure 14) and dots.



Figure 12. zoomorph rock art (anteater) made with red painting (external traces) and engraving (eye) at Toca dos Compadres site.

Source: Felipe Soares, 2019.



Figure 13. zoomorph rock painting (birds?) with red painting at Toca dos Compadres site.

Source: Felipe Soares, 2019.

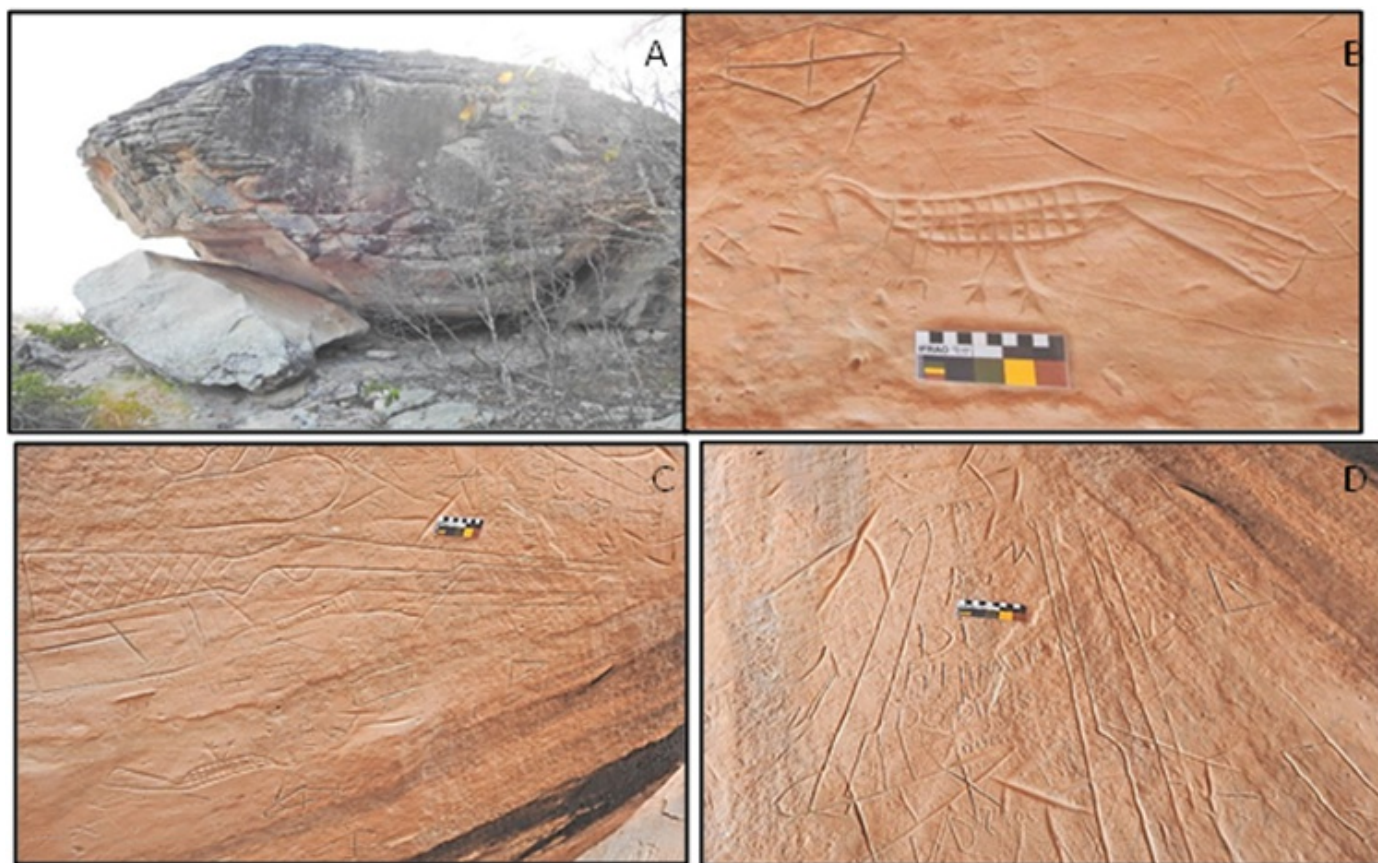


Figure 14. engraving and rock painting (phytomorph) at Toca dos Compadres site.

Source: Felipe Soares, 2019.

TOCA DO VANDALISMO DAS CONFUSÕES SITE

Toca do Vandalismo das Confusões site distinguishes itself as an isolated rocky block (Figure 15A) which has geometric engraving and rectilinear incisions, and zoomorph, (Figure 15B) which are associated with contemporary engraving with representations of firearms (Figure 15C), bladed weapon (Figure 15D), masculine and feminine genital organs.



Figures 15. *Toca do Vandalismo das Confusões* archaeological sites. A) the red circle shows the place of rock engraving; B) Zoomorph rock engraving (bird?); C) Firearm rock engraving; D) Bladed weapon rock engraving.

Source: Felipe Soares, 2019.

Thus, as it was mentioned by James Lovelock, another author of the environmental thought contributes to this discussion. Garret Hardin, in his classic essay of 1968, 'The Tragedy of the Commons', states that human beings enjoy nature increasingly more commonly, having, therefore, generalized exploration that ends up in tragedy. Thereby, it is possible to observe the archaeological evidence that aims to express the nature that composes natural interaction where nature serves the human beings, and the possibility of crisis establishes in the socioenvironmental link in case there is an asymmetry in this relation.

The indigenous people: environment and rock art

Brazil is the holder of the largest biodiversity in the world, which is comprised of its six natural biomes with characteristics and separate lives: Amazon, Caatinga, Pampa, Atlantic Forest, Pantanal, and Scrubland. According to Instituto Brasileiro de Geografia e Estatística – IBGE, a large part of this immense wealth is inserted in the indigenous territories, which are somehow guarded by the native people. It has been found some evidence of rock art in Serra do Roncador, which has been little studied in the indigenous territory of Pimentel Barbosa, Mato Grosso, Brazil.

Until today, science has not been able to solve the riddle and to establish the absolute truth about human creation and existence. It also has doubts about the capacity of creating and producing the beforementioned art as a register of the way of living due to the geometric and mathematical features found, as well as in other ancient cultures in the world, such as Mayan, Incan and Egyptian.

Final considerations

Much before 1,500, the first inhabitants of Brazil tried to represent useful aspects of their daily life, so in the past, those ancestral beings with other ways of life had different ways of seeing, acting, and thinking so they registered such facts on rocks. Giving the due importance, reverence, they registered their knowledge about the environment which is, doubtless, the great message left by that population that was living on *terras brasilis*. The two Piauiense parks, as well as other regions in the country and in the world, present enough conditions to be the ancestor memory repositon which we can support on.

The paths are memory as well as environmental traces due to the recognition of certain plant species that through a creative process lead to the process of negotiation reinvention with the environment and then forming a new way of life. Societies are not recovered by archaeology, but there are questions about which elements were considered to maintain botanical preferences.

There is the emergence and importance of realising, debating and reflecting on the environment, and then it is necessary to create, act, and move towards sustainability between humanity and surrounding areas.

Knowledge is absorbed while studying and uncovering groups that lived and moved along the territories where the population is currently, especially from the Brazilian parks Serra da Capivara and Serra das Confusões which offer resources and material to reflect and understand the human groups and their territories at issue, what maybe may change our ways to deal with the environment.

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