Pedra Pintada, Roraima State

The Icon of Parime Lake

SIGEP 012

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ABSTRACT

Type I calc-alkaline granitoids of the Orosirian Period, dated around 1.96 Ga (billion years) are assembled in the geological unit called Pedra Pintada Suite that outcrops in the easternmost portion of the Roraima State. The name given to this geological unit comes from an impressive isolated oval monolith called "Pedra Pintada" (Painted Stone) that contrasts with the large surrounding savanna plain. The origin of its name is related to the great amount of primitive drawings or petroglyphs observed on its surface, which were related to European prehistoric cultures of the Mediterranean. Around these primitive drawings there are histories and legends about the past existence of a great lake named "Parime or Manoa" that would have enabled the execution of drawings on the Pedra Pintada by canoes, since they are found about ten meters above the ground. Around the lake there are also other legendary tales about the city of Manoa and the hunt for treasures of the El Dorado, whose record in old maps of explorers back to the end of the XVI century. The site reveals a stony industry related to the processing of plant resources, with the use of rock chips and scrapers of large dimensions. Pedra Pintada, by its characteristics and its reputation, has appealing to the geoturism and cultural tourism nationally and internationally. Access to the area is currently hindered by the approval of the indigenous São Marcos area. Needs however, for taking action to its protection and warning of the need for its conservation in sustainable basis for tourism.

Keywords: Pedra Pintada, Roraima, El Dorado, Parime Lake, Paleoproterozoic, Archeology.

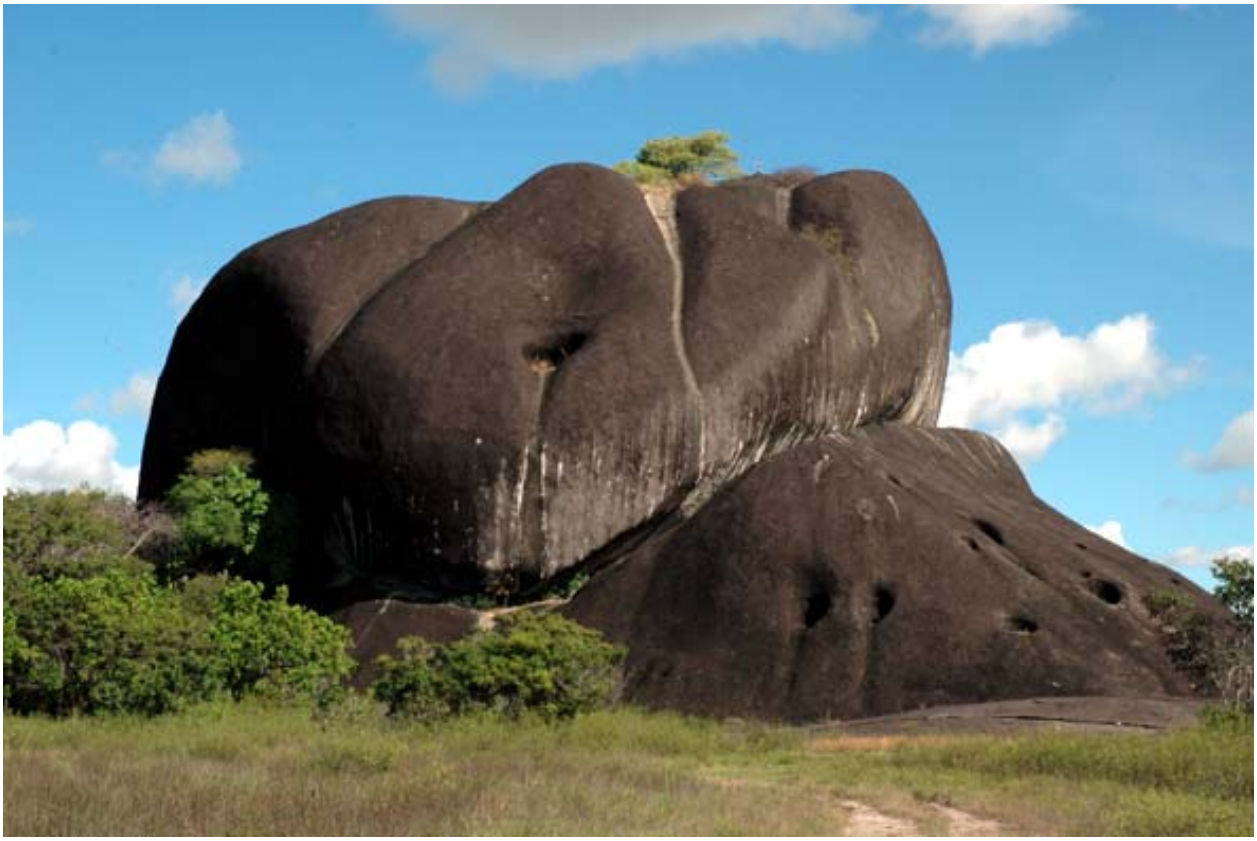

Figure 1 - View of Pedra Pintada, a granitic monolith with a lot of petroglyphs (M.Mora)

Figure 2 - Pedra Pintada site (at right) at the Parimé river margin, approximately 130 km from Boa Vista, capital of the State of Roraima. In the foreground the pillars of the old bridge that crossed the river and allowing easy access to site for tourism (N.Reis).

INTRODUCTION

Pedra Pintada, by its characteristics and reputation, has appealing to the geoturism and cultural tourism nationally and internationally (Figs. 1 and 2). It occupies the indigenous area of São Marcos, which in turn, keeps border with another indigenous area, the Raposa-Serra do Sol (Fig. 3). The São Marcos area was homologated by the Decree nº 312 of 1991. Is an area of around 654.110,30 hectares, that according to the CIMI - Indigenous Missionary Council (2005) congregates Macuxi Indians of the Caribbean linguistic family.

The Pedra Pintada site is located in a savanna area, being common the presence of extensive outcrops of rocks covered, in part, by a thin layer of soil. The savanna covers an extensive plain surface including a lot of hills and isolate mountains, where is common the process of weathering developed into the granitic and volcanic rocks.

Countless residual landforms occur such as fields of blocks, isolated hills, small alignments of mountain ranges and inselbergs. In the middle and lower courses of the Parimé River, where the Pedra Pintada is located, there are a larger concentration of flood areas and the presence of numerous lakes (CPRM, 2002).

Two high mountain ranges named Tabaco and Tarame are located at the southwest portion of the site and to the north and northeast other mountains are known as Machado, Balde, Grande and Marapinima. To the east, other smaller and distal rock expositions are the mountain ranges of Cupim, Aruanã, Salgado and Mauá.

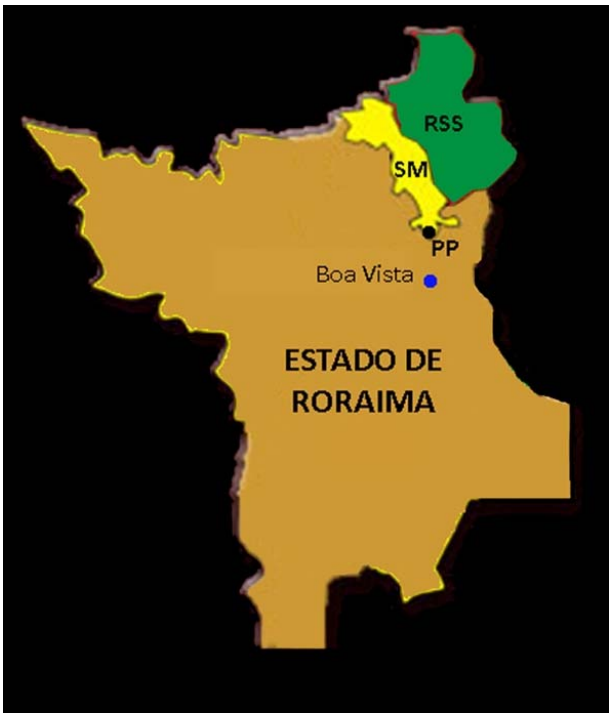

Figure 3 – Location map of the Pedra Pintada geological site and São Marcos (SM) e Raposa-Serra do Sol (RSS) indian reserves.

LOCATION

The Pedra Pintada site (Lat. 03º52'44"N; Long. 60º53'52"W) is located approximately 130 km from the city of Boa Vista, whose main access is the BR-174 road, heading north from Boa Vista to Vila Pacaraima towards the border with Venezuela. Near the Km 119, a 11 km long gravel road (RR-400) leads to the Parimé River (Fig.4).

The way to the Pedra Pintada monolith crosses the Parimé River, a condition only allowed using a traction vehicle in the summer period and during the months of January and February. A few years ago a small bridge supported by steel cables allowed the access to the site throughout the year, however a large full of the river that occurred in the late 90s came to demolish their structure (Fig. 5).

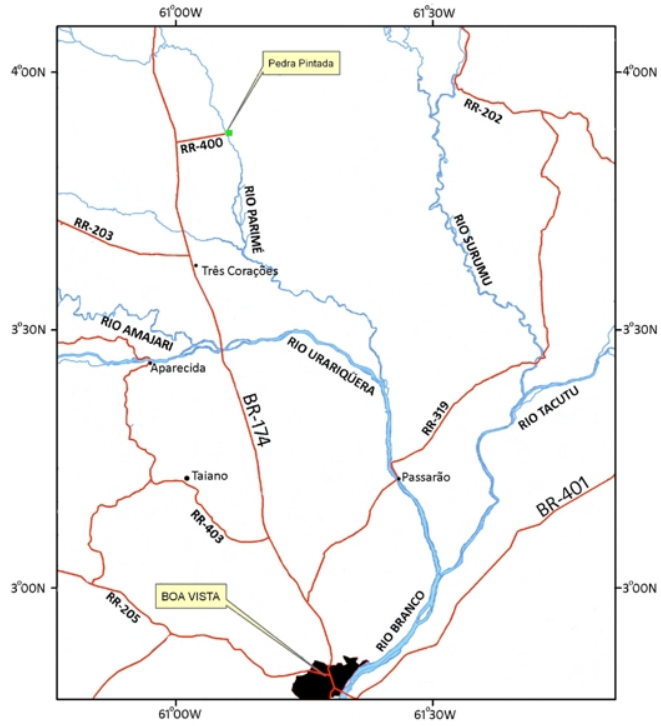

Figure 4 – Location map of the Pedra Pintada and main road from Boa Vista, Roraima.

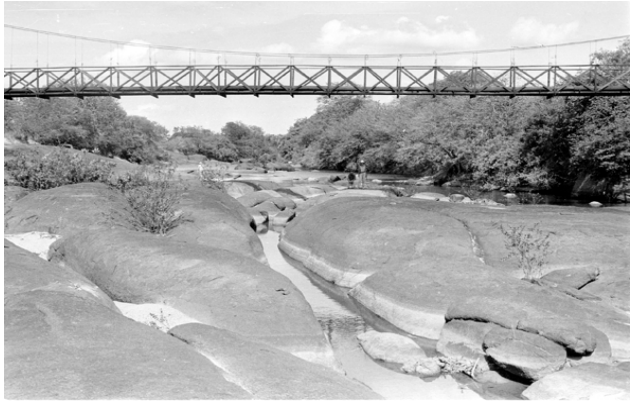

Figure 5 – Historical photograph of the old bridge over Parimé River in 1996 (N.Reis)

El Dorado, Manoa and the Parime Lake

The *El Dorado* (from Spanish "The Golden "), *Manoa* (from achaua "lake") or *Manoa del Dorado* (Manoa of the Golden) is a legend that began in the 1530s with the history of a chief or priest of the Colombian muiscas Indians which was covered with gold dust and dived into a lake. The narrative of the golden man was later transformed into the place or city of this legendary headman with great richness in gold. Despite working the gold, the golden cities coveted by the Spanish conquerors or important mines to justify so much gold did not exist. In the search for more gold, the conquerors always moved further east. Thus, the source of large volumes of gold and the existence of an "El Dorado" coexisted through the report of historians and expeditions that went out looking for it.

The attraction to the "El Dorado" occurred in the late sixteenth century with the advancement of expeditions from the Andes to the east, from the Orinoco (Venezuela) to the south and from the Essequibo (Guyana) to the west until the Guayana Province where today Roraima is located. These raids would follow, in case, the route of pre-Columbian paths. The "El Dorado" was described as an area located on the northern edge of the Amazon Region, near a lake surrounded by mountains, where treasures - gold and precious stones – were hidden by the Inca people during their refugee through the Spanish invasion. These mountains were gradually being recognized as those of the Pakaraima mountain range, part of the border between Brazil, Venezuela and Guyana.

According the myth created around the end of the century XVI, the golden city, now called Manoa, would be located in this mountainous region on the margins of a great lake called Parime where the Indians lived. Their "tuxauas" (chiefs) ordered to guard the treasures in their graves, as well as inside the lake. Thus, the region became focus of expedition's routes for hunting of the treasure during the XVI and XVII centuries.

The expeditions have fostered reports and tales that reflected largely, mismatched and pictorial facts, devoid of evidence that really the city of Manoa or Lake Parime exist.

Under such circumstances, the facts described in that period promoted their dissemination through

the cartographic design of some maps prepared in that period.

One of these early maps was due to Thomas Hariot in 1595 and later Henricus Hondius in 1599 (Figure 6). The name "Parime Lake" or "Parime Lacus" employed in the Hondius' version for the Manoa Lake appears later in more than a set of ten of maps throughout century XVII and until middle of century XVIII (Miceli, 2002) on the Equator line (*Aequinoctialis Linea*), in a place where today is the Roraima State.

Thus, it turns out that in almost all of them always appears the indication of a city situated on the margins of this lake, called "Manoa" or "Manoa ó El Dorado" (Manoa or El Dorado).

This fact brought on the interest for the search of the El Dorado in lands of Roraima. Nevertheless, the existence of this great lake in the past is still not confirmed for lack of geological evidences. Is it worth to note that the name "Parime" is also linked with the actual Parimé River that runs through the region where the lake would have existed, and with the name "Parima", a region of Roraima at the border of Venezuela which has a history of intense mining activity of gold in the early 90s of last century.

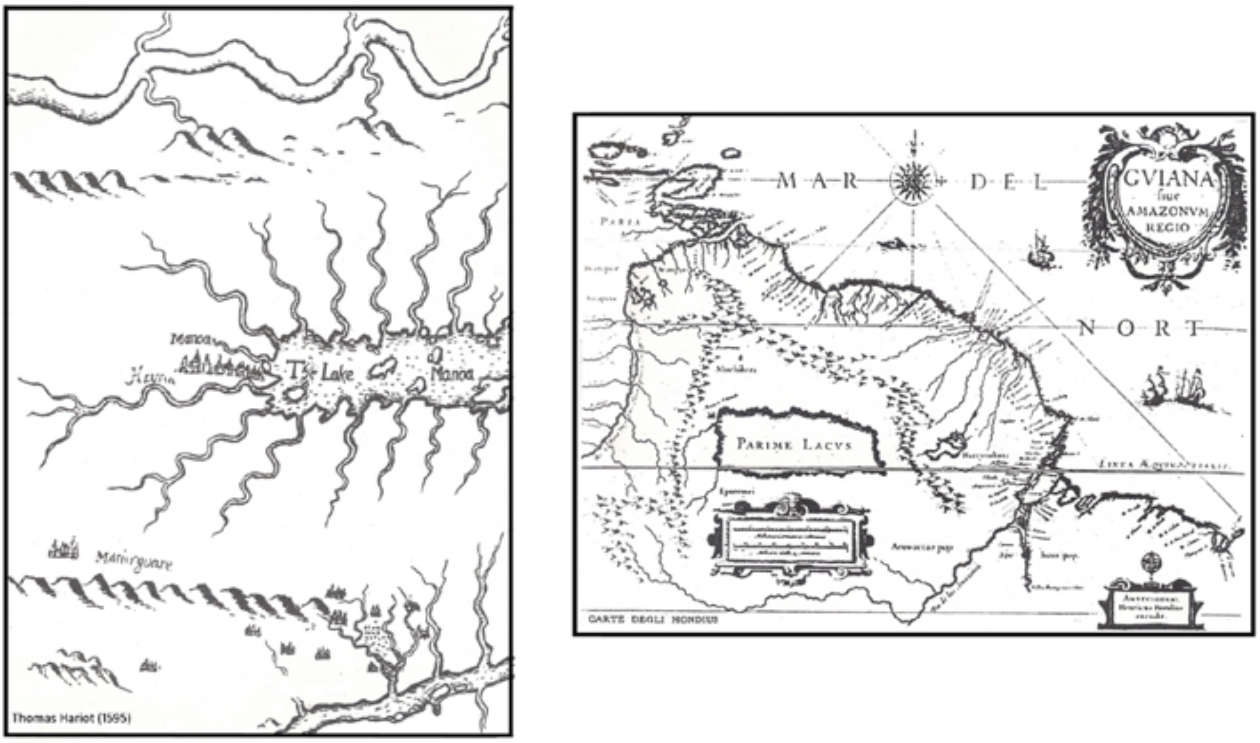

Figure 6 – Maps designed by Thomas Hariot (at left) and Henricus Hondius (at right) in the XVI century showing the Manoa or Parime lakes and the city of Manoa or El Dorado at the left side of the lake.

The Pedra Pintada and Parime Lake

The support of new historians and sympathizers (researchers, artists, etc.) to those ancient reports about the existence of a great lake in the savanna lands of Roraima, as proposed by Stevenson (1994), promoted new ideas and hypotheses.

One is about the Pedra Pintada site, a 30 m high, 100 m long and 30 m wide monolith (Homet, 1959) formed by a huge oval rocky body located on the margins of the Parimé River, whose main attraction, apart from its curious morphological feature contrasting with the extensive savannah area, is the abundance of rock paintings, which in turn, gives the name of "Pedra Pintada" (Painted Stone) (Figure 7). A study of these paintings has led Homet to make a parallel with European prehistoric culture of the Mediterranean Region.

The presence of a great lake, the "Parime or Manoa", enabled the support for the hypotheses about the use of canoes by the indigenous people for the rock paintings in higher places and now lie 10 meters high. The extinction of this large body of water would have occurred gradually, generating at present, a large number of lakes within the savanna region.

The names of rivers and mountains that appear in the drawing of Hariot were later incremented by the study of Stevenson (1994) with the support of geologists in search of an evidence of the existence of the lake, having the Pedra Pintada as the main focus of the investigation.

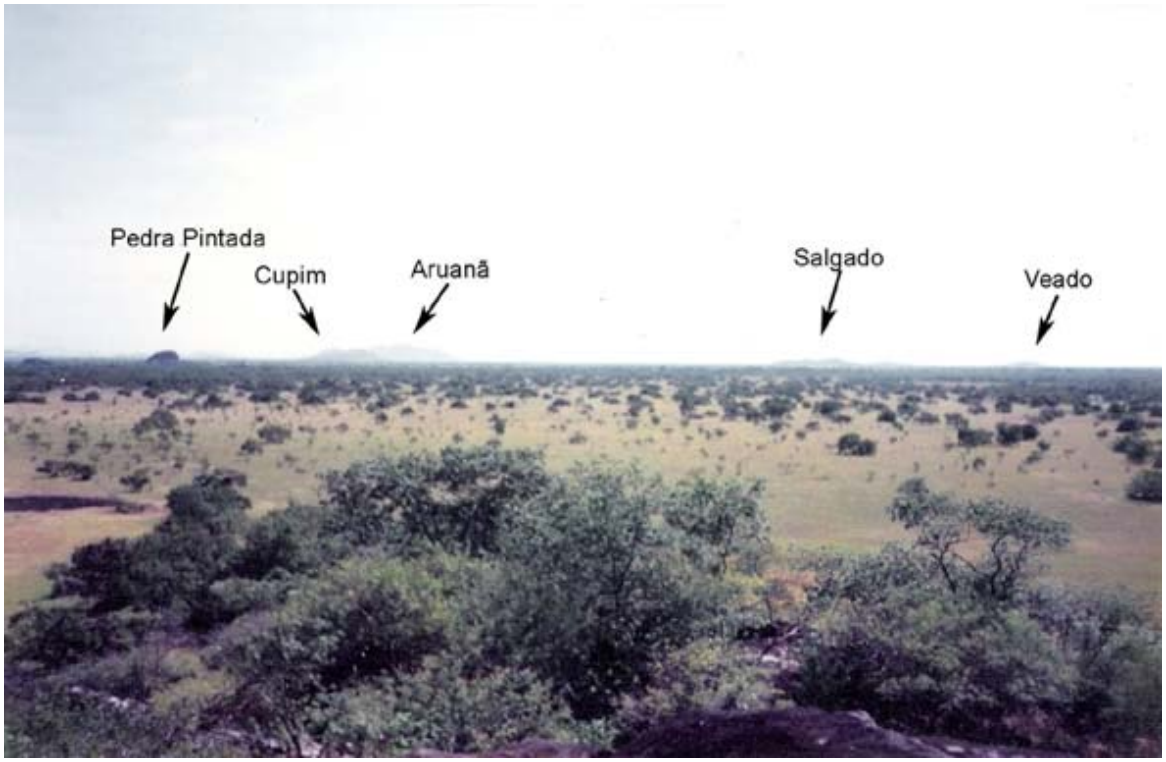

Figure 7 – Rocky sites along the savanna (the "General Field") and Pedra Pintada site at left (N.Reis).

SITE DESCRIPITION

Geological setting of the Pedra Pintada Site

Roraima State occupies the southwest portion of the Guyana Shield, in turn, located at north of the Amazonian Craton (Fig. 8).

The geology of Roraima State comprises a variety of types of granitoids, which have been reported to variable tectonic frameworks. One of these granitoids are represented by the Pedra Pintada Suite having as type-area the Pedra Pintada site, firstly described by Fraga *et al.* (1996). In this area the granitoids show tectonic contacts with volcanic rocks of the Surumu Group.

Figure 8 – The Amazonian Craton and location of related Guiana and Central Brazil shields

According to Reis & Fraga (1996), both granitoids and volcanics, closely related in age, show similar calc-alkaline signature indicating a comagmatic relationship, which are suggestive of a single tectonic environment for the plutonism and the volcanism in this portion of the Guyana Shield.

The Pedra Pintada suite includes (hornblende)-biotite granodiorites and monzogranites with subordinate quartz diorites, tonalites and syenogranites. They are generally grayish and high magnetic rocks, although pinkish types have been described in some rocky bodies. Rounded mafic enclaves are common and sometimes include alkali feldspar crystals similar to those of the host rock, suggestive of the coexistence of acidic and basic magmas (Fig. 9). It show affinities with typical granites of high-K calc-alkaline and I type suites in a post-collisional environment (Fraga *et al.*, 1996; 1997; Fraga and Araújo, 1999; Haddad *et al* 1999; Fraga *et al.*, 2008), although a relationship with Andean arc in pre-collision type environment has been proposed (CPRM, 2003)..

Figure 9 – Macroscopic feature of the Pedra Pintada granitoid indicating the coexistence of magmas (N.Reis).

Ages of 2005 ± 45 Ma (Pb-evaporation, Almeida *et al.* 1997) and 1958 ± 11 Ma (U-Pb SHRIMP, *apud* Reis *et al.* 2003) were displayed for a monzogranite from the type-area of Pedra Pintada and for a granodiorite of Orocaima Mountain, respectively. The 1.96 Ga confirms the age of crystallization in the Orosirian period along the Paleoproterozoic, while the oldest has been interpreted as a Transamazonian heritage. At present, the Pb-evaporation age of 2009 ± 2 Ma and 1985 ± 1 Ma were obtained for the Suite (CPRM, 2008) and reinforces the same considerations to the Orocaima-Pedra Pintada area.

The Surumu volcanism and the Pedra Pintada plutonism were gathered in the Orocaima Event by Reis *et al.* (2000). The first one has been dated by Schobbenhaus *et al.* (1994) of 1966 ± 9 Ma (U-Pb conventional) in the Tabaco Mountain, a place surrounding the Pedra Pintada site, and by Santos *et al.* (2003) of 1984 ± 9 Ma (U-Pb SHRIMP) from the western portion of the State. Other areas in Roraima comprise related granitoid rocks as in the Trairão River and Orocaima and Urubu Mountains (CPRM 1999; 2008).

The morphology of the Pedra Pintada site as a monolithic feature comes from a long-term weathering. The rounded shape is related to a spheroidal exfoliation process when the rock surface wears out by time forming chips like onion peels, exposing it as large blocks or boulders perfectly rounded.

The extreme wear occurs at the edges of the blocks of rock, turning it increasingly rounded. The exfoliation occurs in massive rocks and often forming fields of rounded blocks in the vicinity of the mountains and massifs. The erosion promotes the gradual removal of the layer of soil (result of rock weathering) exposing boulders and blocks with different sizes on the ground. It is an

autochthonous process with no displacement of the block, which in turn, remains *in situ*.

Archeology of the Pedra Pintada Site

The first disclosure of rock paintings of the Pedra Pintada site was dealt by the French researcher and writer Marcel F. Homet, whose publication "Die Söhne der Sonne" (The Sons of the Sun) was originally published in German in 1958.

Since then, few archaeological works were carried on in Roraima, including only one archaeological digging in 1985 by Peter Mentz Ribeiro. These studies were developed in the vicinity of Boa Vista and in northeast portion of the State, extending to the border with Guyana and including the main tributaries of the Branco, Takutu, Urariquera, Surumu and Cotingo rivers (Ribeiro 1997).

Of the 53 visited sites, mostly in plowed areas, a total of 33 revealed markings as paintings and engravings. Noteworthy are the shelters of Pedra Pintada and Mauá, both in granitoid rock with tens of markings (Fig. 10).

Figure 10 – Pedra Pintada site and great amount of dark reddish petroglyphs (at right). At left symbols and ornaments identified by Marcel Homet.

During the diggings of the Pedra Pintada site were obtained two radiocarbon dating to pre-ceramic levels: 3,000 ± 160 BP, between 80 and 90 cm and 3,950 ± 130 BP, from 1.0 to 1.10 m. The ages correspond to intermediate strata of the sedimentary layer, since the base of the digging reached 1.60 meters.

The lithic industry of the period reveals tools related to the processing of plant resources, such as seeds, grains and fruits. They are beaters as crushers, grinders and pestles made usually of sandstone or basalt pebbles. The lithic consists of chips and some large scrapers. Other evidences were burials, polished tips of bone, mineral dye and wildlife traces (Ribeiro 1997).

In the interval of 1.0 -1.10 m, dated approximately of 4,000 BP, it was collected a granite plate from the granitic face of the Pedra Pintada site with a content of reddish paint marks, similar to those observed in the vertical faces of the rocky body. According to Ribeiro (1997), this finding suggests that the first inhabitants of the area were those who carried out the cave paintings.

The archaeological studies in Roraima were never resumed and at present the collection is exhibited at the Integrated Museum of Roraima.

Similar rupestrian art from minor sites have been recorded in the surroundings of Jauari Creek, far west from the Pedra Pintada site, and from the Perdiz and Urubu mountains further east.

SYNOPSIS ON THE ORIGIN, GEOLOGICAL EVOLUTION AND IMPORTANCE OF THE SITE

The Pedra Pintada site is considered the type-area for the Pedra Pintada Suite, a geological unit including dark to light grayish and pinkish granitoids represented by (hornblende)-biotite granodiorites and monzogranites with subordinated quartz diorites, tonalites and syenogranites (CPRM, 2008).

In the context of the Amazonian Craton evolution, the Pedra Pintada Suite take part of the Tapajós-Parima Province (2100-1870 Ma) corresponding to the accretion of a new crust to the cratonic nucleus represented by the Central Amazon Province of Archean age (CPRM, 2003). The geochemical and geological characteristics of the Suite are similar to those observed in high-K calc-alkaline granitoids from post-collisional environment (Fraga *et al.* 1996; 1997; Araújo & Fraga 1999; Haddad *et al.* 1999; Fraga *et al* 2008). In this way, Fraga *et al.* (2008) postulated its emplacement processed after the last peak of the metamorphism of the Cauarane-Coeroeni Belt (Fig. 11).

Some ideas have been postulated to the geomorphic processes of the northern portion of Roraima. According to Reis *et al.* (2002), the area of Pedra Pintada site with contour lines around 280-110 meters (relation to the Sea Level) corresponds to the Rupununi Surface (McConnell, 1968) with an evolution processed along the Miocene-Pliocene (23 to 2.5 Ma). This surface is a result of alternating periods of quiescence and tectonic uplift whose denudation occurred in that time.

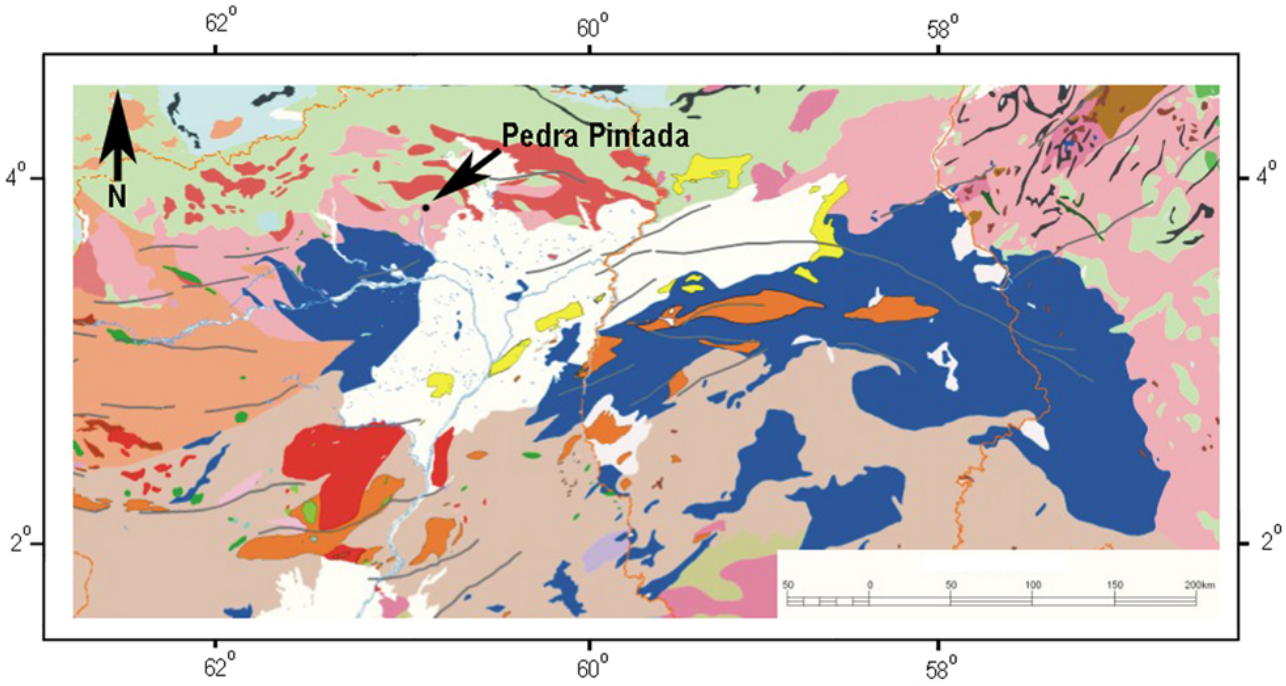

Figure 11 – Cauarane – Coeroeni Belt represented by supracrustal rocks with amphibolite to granulite facies and ages ranging around 2.00 Ga (dark blue) and post collisional granitoids with ages at the interval of 1.98 – 1.96 Ga, exemplified by the Pedra Pintada Suite in Roraima State (light pink) and where the monolith comes from (see arrow). Adapted from Fraga *et al.* (2008).

The main areas of silting of that surface appear in the lower course of the Urariquera River and in the Amajari, Parimé and Cauaruau rivers forming a huge alluvial plain with approximately 2.0 km wide, whose main feature is the meandering pattern of the courses of the rivers and the formation of extensive wetlands during the rainy season. Thus, it is possible to admit to the Pedra Pintada site a testimony of a denudation surface in which the erosional processes are still happening, exposing similar rocky bodies with bulging and oval forms and varied dimensions (Fig. 7).

Unlike other rocky exposures, the Pedra Pintada site brings together a great collection of rock paintings, which provides notoriety as a geological and archaeological site.

Without the old bridge over the Parimé River, destroyed by the action of rainfalls during the 90s, besides the destruction of a plate indicating the archaeological site on the BR-174 junction, the site remains in situation of isolation and abandonment. In view of all the remarkable wealth of geological and archaeological approaches that the location reveals, it must be rescued in the form of revitalization of the site through the implementation of ecotourism in the Pedra Pintada region, a savanna area rich in natural landscapes and scenic beauty, formed by lakes and mountains.

MEASURES OF PROTECTION

In the first half of the 80s, Pedra Pintada was listed as a heritage site by the Roraima Government giving it the name of "Archaeological Site of Pedra Pintada".

Archaeological sites are defined and protected by the law of number 3,924/61 and are considered a national heritage. The archaeological heritage listing is managed by SPHAN/IBPC – Historical and Artistic Heritage Secretary / Brazilian Institute of Cultural Heritage, exceptionally for scientific or environmental interest.

Repositories of any nature, origin or purpose, testimony of ancient indigenous culture, are considered archaeological sites:

a) The sites in which are positive traces of occupation by the Paleo-Amerindians;
b) The sites identified as graveyards, graves or long-drawn places or "ceramic stations";
c) The sites with rock paintings, markings or places and other traces of Paleo-Amerindians activities.

Once the site is located within the São Marcos indigenous area, the access is fully monitored by FUNAI - National Indian Foundation that monitors and grants visits and makes the management of the indigenous lands, preventing the predatory actions by non-indigenous within its limits.

Some years ago the access to the site was done by a bridge over the Parimé River. The lack of protection effect gradually some acts of vandalism as scrawls and doodles in the indigenous drawings.

At this time there was a sign at the intersection of roads BR-174 and RR-400 stating the location of the "Archaeological Site of Pedra Pintada". The hostility created between indigenous and non-indigenous occupants brought the isolation of the place, nowadays guarded by a wire fence and a notice prohibiting entry and stating that it is an indigenous land.

Without access by the old bridge and without the awareness that it is an archaeological site through public information, the site remains in isolation and neglect conditions.

Under such constraints the consolidation of the geological and archaeological site claims to its revitalization. In turn, residents of the São Marcos area could be ahead of this cultural heritage, exploiting the visit in sustainable basis for tourism.

FUNAI has implemented projects and workshops with indigenous communities with the proposal of their needs with regard to the promotion of knowledge and sustainable use of biodiversity resources. In this respect, similar direction to geodiversity could provide a better interaction between the indigenous community and the proposed geological site also enabling the improvement of ecotourism partnerships in the Pedra Pintada site, a savannah rich area with natural landscapes and scenic beauty formed by lakes and mountains, as stated above.

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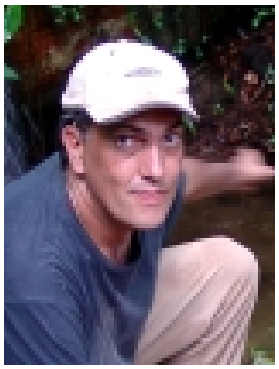
Acknowledgements

To Marcelo Mora by disposing of scenic shots of the Pedra Pintada site.

BIOGRAPHICAL NOTES OF AUTHORS

NELSON REIS – Born in Petrópolis, RJ (1953) and graduated in Geology from UFRRJ (6/1977). Works in the Geological Survey of Brazil - CPRM for 30 years, participating in many important geological mapping projects and mineral exploration in Roraima. His greatest scientific contribution (of more than 50 published works as an author) is in the stratigraphy of the Roraima Supergroup. He was coordinator of NA.20-Boa Vista Sheet for the Geological Map of Brazil Scale 1:1.000.000 (CPRM, 2004). He was collaborator in the Brazil - Venezuela and Central Roraima Ecologic-Economic Zoning (1999; 2002) and also coordinator of the books "Contribution to Amazon Geology" (2003) and "Geology and Mineral Resources" for the GIS-Amazonas (CPRM, 2006). Occupied the Geology and Mineral Resources Management CPRM- Manaus for six years (2002-2008).

CARLOS SCHOBBENHAUS – Geologist by the Federal University of Rio Grande do Sul-UFRGS (1964) and Doctor *rer. nat.* by the Albert-Ludwigs University, Freiburg/Germany (1993). Took part in the execution of major Brazilian and South American integration projects of geology and mineral resources featuring Geological Map of Brazil Scale 1:1.000.000 (CPRM, 2004), Geological Map of Brazil (DNPM, 1981 and CPRM, 2001), Geological Map of South America (CGMW / DNPM / CPRM / UNESCO, 2000/2001) and coordinator of the books "Geology of Brazil" (DNPM, 1981) and "Geology, Tectonics and Mineral Resources of Brazil" (CPRM, 2003). He is vice-president for South America of the Commission for the Geological Map of the World-CGMW and founding-member and President of the Brazilian Commission of Geological and Palaeobiological Sites-SIGEP. At present, performs his professional activities in the CPRM.



FERNANDO COSTA – Born in Belo Horizonte, MG (1965), bachelor in History and Archaeology and graduated in Archaeology by the Natural History Museum of UFMG (1996). A master's degree in Archaeology (2002) by the Faculty of Philosophy, Letters and Human Sciences of São Paulo University-USP with the theme "Analysis of lithic industries in the confluence area of the Negro and Solimões Rivers, Amazonas". He has developed his doctoral thesis on the lithic pre-ceramic industries in Central Amazon by the Museum of Archaeology and Ethnology (MAE/USP). It's collaborator since 1999 of the Central Amazon Project by USP which were identified over 200 archaeological sites in the Amazon. Also participated in scientific activities at archaeological sites in Minas Gerais (Peruaçu Valley and Lagoa Santa) and Santa Catarina (Florianópolis) States.