

Solar eclipse represented in the petroglyphs of Vigirima (Venezuela)

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Abstract

The Vigirima archaeological complex is characterised by the abundant presence of lithic sites whose age is unknown. The land registry of the petroglyphs, the revision of the techniques and styles used in its execution and the classification of the symbols in terms of the figurative characteristics has been done. Using archaeo-astronomic techniques some petroglyphs considered to contain astronomical content have been analysed and it was concluded that they corresponded to the total eclipse of the sun, which took place in 577 AC. Following that, the construction of a cultural model showing the possible significance of the petroglyphs as archetypal expressions of the socio-cultural structure of the ethnic groups who created them, was proposed.

Key Words: ASTRONOMY; HISTORY, PETROGLYPHS, ANCIENT ETHNOLOGY.

Resumen

El complejo arqueológico de Vigirima se caracteriza por la presencia abundante de sitios líticos cuya edad es desconocida. Se ha realizado un registro de las propiedades de los petroglifos, la revisión de las técnicas y estilos utilizados en su ejecución y la clasificación de los símbolos en función de las características figurativas. Usando técnicas arqueo-astronómicas se han analizado algunos petroglifos de contenido astronómico y se concluyó que correspondían al eclipse total de sol, que tuvo lugar en 577 AC. Adicionalmente se propone un modelo cultural que muestra la posible importancia de los petroglifos como expresiones arquetípicas de la estructura socio-cultural de los grupos étnicos que los crearon.

Palabras claves: Astronomía; Historia, petroglifos, etnología antigua.

I. Introduction

The outskirts of the neighbourhood of Vigirima (Tronconero Municipium, Guacara Edo. Carabobo) contain Venezuela's most important lithic sites. This archaeological complex takes up an area of approximately 12 hectares and is made up of the hillside of "Las Rosas" (call Zone C) and two natural promontories (calls mounds A and B). The place referred to as "Piedra Pintada" is located on the geographical coordinates 10° 18' 7.2" Nort, 67° 58' 34" West 474m over sea level (more precisely, the coordinates correspond to the summit of mound B in the sketch, see figure 1).

The Vigirima archaeological complex is characterised by the profusion and variety of its rock formations, expressed through megalithic alignments, rocky piles used in the delimitation of spaces and above all by the existence of 100 rocks with petroglyphs in bas-relief. Despite the many attempts to characterise the archaeology of the basin of the Valencia Lake, the age of the site has not been established and the interpretation of the stony registers is still far from complete; due principally to technical and methodological difficulties (SUJO, 1975 and references therein) Nor does any consensus exist about which ethnic group their creators belonged to. The radiocarbon studies associated with ceramic objects of other sites pertaining to the basin of the Valencia Lake estimate that the first inhabitants were at the dawn of the Christian era. This suggests that the site could be located in the NeoIndio Venezuelan period (Between s.

III to s. VIII) with ethnic groups belonging to the Arawaka linguistic families (CRUXENT & ROUSE, 1961).

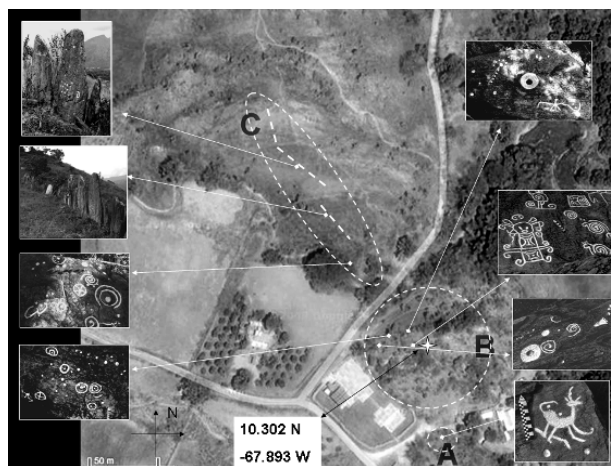


Figure 1: Sketch of the Vigirima archaeological complex (see text for details)

Recent studies of the Vigirima archaeological complex have allowed the establishment of stylistic resemblance between the carvings and the Barracoid style of pottery, corresponding to ethnic groups belonging to the Arawaka and Caribbean linguistic families and the subsequent occupation of the site by groups of

humans archaeologically Valencoid between the 5th and 10th centuries AD (LEON et al., 2000).

Despite the recent advances concerning the ancient ethnology of the Vigirima archaeological complex, important unknowns concerning the chronology and significance of the petroglyphs still remain. The objective of the current work is not to signal a free interpretation of the contents, nor to emphasise the representation of deities, rather it is to record some of the Vigirima petroglyphs by means of archaeo-astronomic techniques and suggest the contextual significance, which motivated their creators.

II Archaeological Context

All the petroglyphs were etched in bas-relief. The petroglyphs don't show remains of any pigmentation, so in order to increase the photographic contrast (see figures) the grooves on the substrata have been emphasised using a watery calcium hydroxide solution, which is both removable and innocuous. The profile of the grooves on the rock, which forms the substrata, shows a lithic work by erosion. The substrata are made up of metamorphic rocks with a hardness of between 3 and 4 on the Mohs scale. The grooves could have been made with hexagonal quartz crystal in which emerged in abundance in the region and whose hardness (7 degree Mohs scale) is greater than that of the substrata; particularly as the majority of the grooves have a depth of between 1 and 1.5 cm and a width of less than 2 cm, a typical range of the size of the quartz crystal prevalent in the region. Also, microscopic examination of the grooves shows the presence of quartz micro crystals encrusted in the substrata. In the most elaborate petroglyphs (see figure 3), the edge of the grooves shows a U-shaped hollow, suggesting either polishing or additional erosion. Some of these rocks show artificially cut edges, presumably made by the perforation of consecutive orifices, as shown by one rock of incomplete lithic work found in the mound B (Figure 2).



Figure 2: Rupestrian Work. Left: Cutt and rock carvings example (Zona B). Right: Menhires alignment (zona C). The Archaeoastronomy significance until can't to be demonstrated, but it is very possible .

Demonstrating the technique of copying a carving on a sample of substrata of virgin rock using a quartz crystal found in the region, took some 30 minutes to etch a curved groove 15 cm in length and two additional connected points. The rocks of metamorphic schist that serve as the substrata are of variable thickness and weigh around 300 kg. They were also intentionally placed in a horizontal position or slanted to form cirques and artificial piles.

As regards design and form, the petroglyphs found have largely realistic and naturalistic content predominated by zoomorph representations (for examples see figures 3). What stand out in

the figurative sense are the profound formal similarities between the Vigirima petroglyphs and the prehispanic styles of the Basin of the Valencia Lake belonging to the Barrancoide pottery series (DELGADO et al., 1999 and references therein). The morphological analysis of the carvings shows the tendency of their creators to reflect elements (both natural and cultural) of their surrounding environment. It is important to emphasise that in the majority of the petroglyphs the representations are of a naturalist-realist type with a predominance of zoomorph representations.

The "mound" C, consists of the ramp leading down from the top of the hill Las Rosas. The petroglyphs are there more dispersed and in smaller numbers than in previous mounds. An alignment lithic, or megalithic formations, with three branches descend the slope (Figure 2 right). The rocks of this alignment show evidence of cutting and percussion. Its astronomical significance could not verified yet.

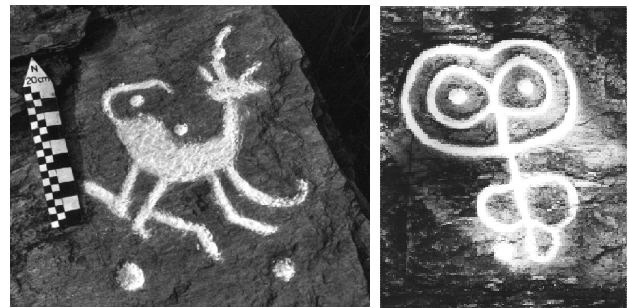


Figure 3: Bas-relief plane with design zoomorph: Left: deer (zona A) and, right: owl (Zona B)

III Archaeoastronomical Significance

It is worth mentioning a group of symbols, etched in various rocks, characterised by the use of simple geometric figures such as dots, circles, semicircles and lines. One interpretation is their association with the sun, half moon and constellations, which could recall a possible and ancient eclipse of the sun. The rock carvings of astronomic character in figures 4, 5, 6 and 7 could represent a sun total eclipse.

A natural spectacle such as a total eclipse of the sun would cause, by its very unexpected and temporary nature, a need for communication and recording. A calculation of the astronomical position allows a contrast of the relative position of the planets and brightest stars (connected points of the rock carving) with the apparent position of the sun and the moon during the eclipse for the geographical longitude and latitude of the Vigirima archaeological complex.

At the site of the rock carving in figure 6; with a geographical location of 10° 18' 7.2" N, 67° 58' 34" W and 529 m over sea level; only four total eclipses of the sun between the years 100 BC and the 10th century AC were produced, as well as twenty partial eclipses of the sun (OPPOLZER, 1962). The majority of the eclipses took place very early in the morning or very late in the afternoon (as the total solar eclipse occurred on november 17 of the year 765), which made observing them difficult due to the east and west horizons being invisible from this place because of the surrounding mountain range, and the expectation

should be less likely that such eclipses occurred mid-morning, at midday or mid-afternoon. As well, the month of July is characteristically a period of drought in the region making the observation of the phenomenon more feasible. This allows one to establish that the connected points correspond to the total eclipse of the sun, which occurred in this region on 1 July, 577, between 11:27 and 12:51; and which had a maximum duration of 51.2 seconds. Also in this eclipse the sun height above the horizon is 72° and the acimut is 42.4°, see figure 8. If we accept that the figures correspond to a total eclipse of the sun visible in this place between the 5st and 10th centuries of our age, and by the harmony of the relative positions of the connected points relation to the stars of the first magnitude and of the planets in relation to the eclipsed sun, then they could only refer to that which happened in the year 577, We can see in Figure 5 the representation of Venus, very close to the sun eclipsed, this unusual eclipse, was represented by the aborigines, as a "second" sun under the sun-moon pair, Obviously the distribution of points on the rock does not exactly match the stars map, it can be expected that the representation rupestrian, occurred subsequent to the phenomenon observed.



Figure 4: Mythical Representation Left Abstract Representation (Zona B) ¿the sun corona during the total eclipse?. Right: Petroglyphs call "Piedra Pintada" (Zona B) Do they represent the slow-moving snails from the sun and the moon before the eclipse?

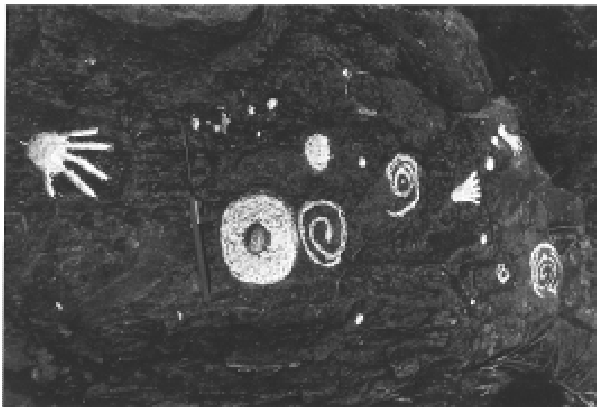


Figure 5: Eclipse Total of the Sun (zona C). The caliper is the 15 cm longitude in Nort direction. Notice the footprint, in symbolic traveling though the sky. Note the representation of a very remarkable point about the sun eclipsed, could be from Venus.

One should highlight as well that the studies about the ancient ethnology of the basin of Valencia have found no evidence of permanent human settlements prior to the first or second century (DELGADO et al. 2005; FALCON et al. 2000), then the total solar eclipse of 124 AC and 237AC would be eliminated. The inhabitants of the Vigirima complex would have abandoned the settlement hundreds of years before, prior to the

arrival of the Spanish conquerors in the basin of Valencia lake (CRUXENT & ROUSE, 1961).

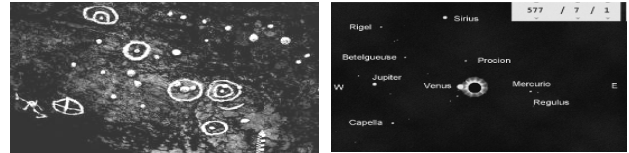


Figure 6: The Eclipse Total of the Sun (zona B). Notice the shaman in extreme left of the petroglyphs, in position of the ancient astronomy amateur observer. The rupestrian representation does not match exactly the stars map, there is not a photography of the sky but a memory.

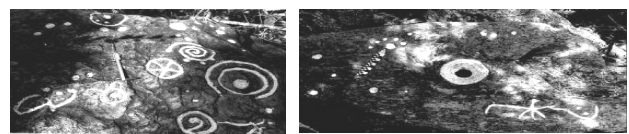


Figure 7: Astronomical Characters (zona C). Notice the bird nocturnal representation and the spiral emulative of the rotations. Eclipse (Zona B) Notice the bole central, traveling the rock of the 14 cm thickness, and the bird nocturnal

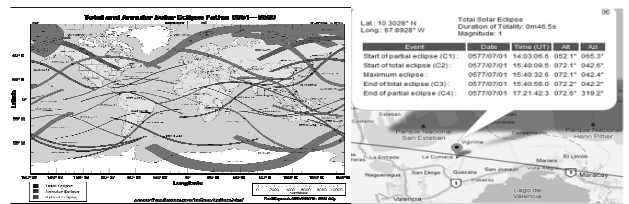


Figure 8: Path and circumstances of the total solar eclipse of 577-07-01.

The mythical representation of the Sun God, followed by two snails: male and female, can evoke fertility. But also, the slow movement in the sky (of the Sun and the Moon) before occur the maximum of the eclipse. After during of the maximum, the brightness of the solar corona, would be represent as the ceremonial headdress of the sun-god.

In this vein, may establish an association between the content categories of petroglyphs (signs), its general and specific significant in four cosmological worlds (see accompanying table 1).

It is clear that the work represented in rock art would serve, at a level even higher as a cohesive tribal society, moderately hierarchical, and the world associated cosmogonic deities (celestial category) would suprasocial that role identity allow the temporal continuity of the group, by reference to ancient events both natural and cultural.

Table 1: Cosmogonic Worlds

CATEGORY	SIGN	SPECIFIC SIGNIFICANT	GENERAL SIGNIFICANT
CELESTIAL	Astrological	Gods	SPIRITUAL
MITICA	Ritual-ceremonial	Chaman	CULTURAL
HUMAN	Anthropomorphous	Man	LABOR
ANIMAL	Zoomorph	Habitat	NATURAL

IV Conclusions

In general, the figurative features of this archaeological complex seem to indicate the importance of representing the surrounding natural world (fauna, natural phenomena, etc.). The high frequency of representations of nature at a figurative level, in comparison with the anthropomorphic representations, seem to indicate the priority of the natural world above that of the cultural world, and suggests a society with a close dependence of the individual on nature. In such an egalitarian tribal organisation, the shaman (chief-priest) would have had an important role as a mediator between man-nature and the woman as a symbol of the reproduction of the human force of work.

In the ancient Arawaks, the contemplation of the total solar eclipse, must lead to the need of communication and recording, employing the techniques and means at their disposal: the

engraved rocks. A phenomenon so unique and spectacular as a solar eclipse happened at noon, had to have a mark on the collective memory and shamanic practices associated with the myth of creation.

A systematic determination of the form of the Vigirima petroglyphs and the pottery styles La Cabrera and El Palito, provides information about two phenomenal expressions, distinct in the materials and techniques used, but in a united state of conscience, reflecting the same cultural view of the surrounding world.

To be exact, this formal relationship would permit registering the Vigirima archaeological complex between the years 200 and 700 of our era. (FALCON et al., 2000; DELGADO et al., 2000) The chronological coincidence is surprising being derived firstly from the art stylistic analysis, and that obtained secondly by the use of astro-archaeological techniques. The latter would seem to be of greater specificity and certainty, being founded exclusively in physical evidence.

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