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# EQUINOCTIAL MARKERS IN PROTOHISTORIC IBERIAN SANCTUARIES

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## ABSTRACT

This paper summarizes the most relevant results of a thorough archaeoastronomical study conducted since 1997 in several tens of Iberian archaeological sites, most of them located in the southeast of the Iberian Peninsula. We found that a substantial fraction of the sanctuaries studied, all of them dedicated to a feminine goddess, shows a marker of the sunrise or sunset on conspicuous elements of the horizon at the equinoxes or a date very close to it, possibly the temporal midpoint between solstices. This result suggests the existence among the Iberians of rituals associated with seasonality, agrarian festivities of fecundity similar to other well-known ones of the ancient Mediterranean. The earliest chronology of the sanctuaries related to the equinoxes indicates that they became operational around mid-IV BCE, coincident with a period of major ideological changes in the Iberian society and increased Punic influence in the area. The analysis of the results suggests a possible influence of Greco-Punic beliefs on the astronomical aspects of Iberian ritual.

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**KEYWORDS:** Archaeoastronomy, Protohistory, Iberian Peninsula, Iberian Culture, Sanctuaries, Equinox.

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## 1. INTRODUCTION

The Iberians were a group of peoples who inhabited the Iberian Peninsula from the sixth century BCE up to practically the change of the era, by which time the Romans were fully established in their territory. They occupied the Mediterranean facade and part of the centre of the Iberian Peninsula, as well as the French Languedoc region (see Harrison 1988 for an introduction to Spanish protohistory in English). The main Iberian deity was apparently a fertility goddess that also had strong funereal associations. Her iconography is often a more or less direct reflection of the aristocratic Iberian female image, but is also influenced by exogenous models and sometimes represented with attributes of Eastern goddesses such as Astarte, Tanit, Artemis or Demeter (Moneo 2003: 427-439). Iberian sanctuaries were usually in locations that favour the manifestation of the sacred, such as on the top of mountains, within caves or in proximity to springs (see Blázquez 1975: 148-166). They mostly consist of open-air deposits or temples housing a statue of the divinity and a large number of offerings, similar to the Greek *thesauroi*.

## 2. ARCHAEOASTRONOMICAL FIELDWORK IN IBERIAN SITES

Since the end of the 1990s and in collaboration of archaeologists, I have surveyed 33 sanctuaries (27 open-air sites and 6 caves) across the territory once occupied by the Iberian Culture (see Figure 1). The measurements have been made with a theodolite and a precision compass. The typology of the sanctuaries is fairly variable; there are open-air sites without any trace of construction, others consist of urban or isolated rural sacred buildings and there is an important fraction of caves. The fieldwork at each site is based in the measurement of the orientation of the standing constructions, the entrances and main axes of the caves and - in all the cases - the astronomical analysis of the horizon surrounding the sites.

The description of the characteristics of the 33 sanctuaries surveyed would be too wordy to be included in this necessarily brief paper. The information of the different sites can be found in Esteban (2002, 2003, 2013 and 2015), Esteban & Benítez de Lugo Enrich (2016), Esteban & Cortell Pérez (1997), Esteban & Moret (2006), Esteban & Ocharan Ibarra (2016) and Esteban, Rísquez and Rueda (2014). All these papers can be found in the academia.edu webpage of the author.

One of the main results of the survey is that the orientations of the entrances of Iberian temples show a non-random pattern. This pattern has been presented and discussed in Esteban (2003, 2015). In fact,

most of the temples are facing the zone of the horizon where the sun (or moon) rises along the year. As it was discussed by Esteban (2003, 2015), the orientation pattern of the Iberian sanctuaries is different from that shown by Roman, Etruscan or mainland or Aegean Greek temples but similar to that of Punic sanctuaries and Greek temples of Magna Graecia and Sicily.

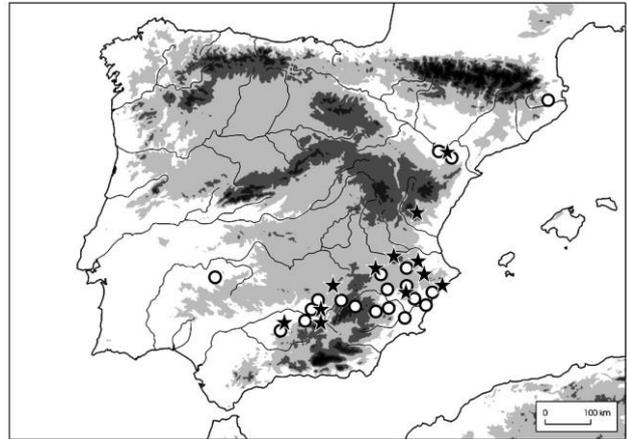


Figure 1. Location of the Iberian sanctuaries studied in our fieldwork campaigns. Black stars represent the sites that show equinoctial markers.

The most remarkable result of the archaeoastronomical fieldworks in Iberian sanctuaries is the discovery of equinoctial markers in 12 of them, a 36% of the surveyed sites (see Figure 1). This result clearly indicates that equinoxes or dates close to them were milestones of the Iberian ritual. The markers have been found in an extended geographical area, in sites located in the present-day provinces of Teruel, Valencia, Ciudad Real, Albacete, Alicante, Jaén and Córdoba.

We find other possible astronomical relations in an important fraction of the sanctuaries that do not show equinoctial markers. Three of them show temples oriented close to the sunrise at equinoxes and four are oriented to the solstices. Five show solstitial markers over topographic features and one (perhaps up to three) may be related to Venus setting at its southernmost position (see Table 1 of Esteban 2013). Finally, eight of the surveyed sanctuaries do not show apparent astronomical relations.

## 3. THE EQUINOCTIAL MARKERS

The feature that defines a sanctuary having an equinoctial marker is that the sunrise - or sunset in fewer cases - at the equinoxes or a date very close to them occurs exactly on a topographic feature of the horizon surrounding the site. The peak of a distant mountain is the most common topographic feature. In some of these sanctuaries that contain a temple,

the building is also oriented to the equinox, as in the cases of Sant Miquel de Lliria, La Malladeta, Cerro de las Cabezas or Cerro de San Cristóbal. Another kind of marker is based on illumination effects at equinox sunset – as in the case of the cave-sanctuary of La Lobera in Castellar (Esteban, Rísquez and Rueda 2014) – or at sunrise – as in the entrance sanctuary of Puente Tablas (Jaén; Pérez Gutiérrez et al., these proceedings).

One of the important aspects to elucidate is the exact astronomical target of the markers. Although we generically call them “equinoctial markers”, this may not be strictly true. Our modern concept of equinox is defined as one of the two moments of the tropical year when the centre of the solar disc crosses the celestial equator. This is an abstract concept that only has a practical sense within the framework of a geometric model of the celestial sphere. It is thought that Babilonian or Greek astronomers discovered the concept of the equinox in the IV or II centuries BCE. At the same time or even somewhat later when our Iberian sanctuaries were actually in use.

Another possibility of defining something similar to the equinox is using the concept of the temporal midpoint between solstices (hereinafter TMPS; also known as “megalitic equinox”, introduced by Alexander Thom, 1967). This corresponds to the day just in the middle between the exact dates of summer and winter solstices. Because the Earth’s orbit is not circular, this day does not coincide with the equinox. It occurs between one or two days after spring equinox or before the autumn equinox. The declination of the sun is between  $+0.3^\circ$  and  $+1^\circ$  (see Ruggles 1997) in the moment of the sunrise closer to the TMPS. Therefore, the TMPS permits to divide the year in four equal parts that coincide with our seasons at intermediate latitudes, and seems to be a much simpler and intuitive concept with more practical utility than the equinox.

One of the first equinoctial markers we found was at the Iberian settlement of El Amarejo (Bonete, Albacete; Esteban 2002), located on a flat-topped hill. The sanctuary is just on the eastern edge of the settlement, with a clear and impressive view of the eastern horizon. Although the presence of a temple has not been clearly established, the sacred element of the site is a ritual deposit in the form of a well of about four metres depth. The deposit is located exactly in the east edge of the hill. The contents of the deposit indicate that the sanctuary was dedicated to a goddess protector of the traditional feminine activities. The highest and most conspicuous feature of the horizon is mountain Chinar, at a distance of about 3 km and a height of about 200 m above the surrounding plain. Figure 2 shows the sunrise as seen from the ritual deposit at the autumnal equinox of 2004. We can see that the sun

appeared at the bottom of the northern slope of the peak and climbed over the slope as it went up in the sky. This striking “sun-climbing” phenomenon cannot be seen in the same way one day before or after the equinoxes. However, at the TMPS, where the centre of the sun is around  $\delta \approx +0.5^\circ$ , the sun rises about a solar diameter northerly touching slightly the slope when going up in the sky. As we see, in El Amarejo, the preferred astronomical event would seem to be the equinox, as long as the proper foresight of the phenomenon is the exact position of the ritual deposit. Considering the closeness of mountain Chinar, displacements of the foresight of about few metres may change the date of the striking “sun-climbing” event. The archaeologist that excavated the sanctuary of El Amarejo found that the offerings of the ritual deposit were burned and distributed in apparently periodical layers of ashes inside the well. The most common vegetal offerings were acorns and their degree of growth indicated that they were collected still unripe at the beginning of autumn. Therefore, this independent clue suggests that the ritual was probably held at autumnal equinox or a date very close to it. The spectacularity of this marker suggests that the ritual associated with this phenomenon might have a public dimension, perhaps related to pilgrimage activities – attested in other Iberian sanctuaries – to present offerings to the divinity and to witness the sunrise at the precise day of the ritual.

The sanctuary of Tossal de Sant Miquel (Lliria, Valencia; Esteban and Moret 2006) is a temple inside a relatively large Iberian settlement situated on a hill. In contrast to the rest of the buildings of the village, the temple is oriented very close to the east-west direction, and its entrance is facing east (see Figure 3). The slope of the hill falls rather steeply in front of the entrance and the line of sight of the temple was – perhaps deliberately – free of buildings, allowing one to see the distant eastern horizon from the sanctuary. From the temple, the sunrise at the TMPS takes place just on the top of a distant and isolated small hill of the horizon (indicated in Figure 3). The entrance and the long axis of the temple are facing exactly towards that point. It is interesting to note that the southern half of the east horizon is a featureless coastal flat plain and that the aforementioned hill is the first topographic feature that the sun touches when coming from its southernmost position at winter solstice. The sunrise is produced at the south edge of the hill at the exact dates of the equinoxes, but on the top of the hill at TMPS. Therefore, we consider that the marker is actually more precise indicating the TMPS than the equinox. The precision of the marker and its lack of spectacularity – in contrast to what happens in El Amarejo, for example – indicates that it should be bet-

ter used as a practical tool for pinpointing the calendar and not for a public ritual.

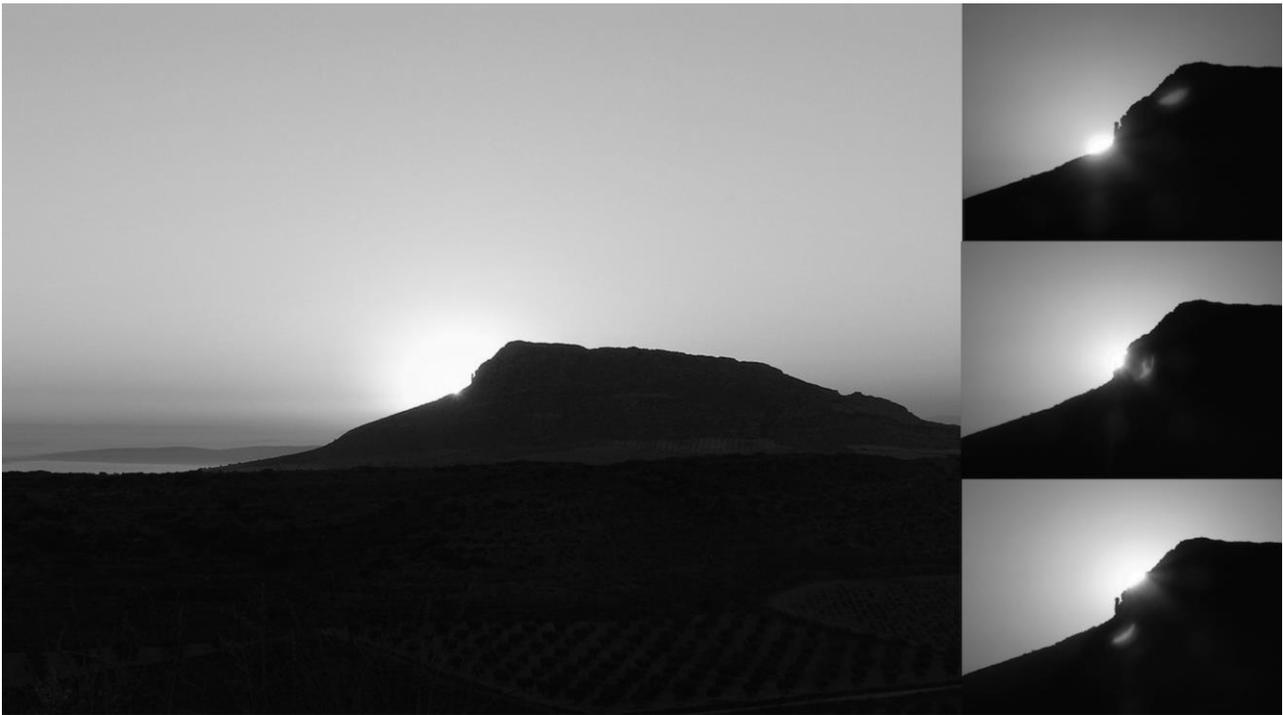


Figure 2. Sunrise at the Iberian sanctuary of El Amarejo (Bonete, Albacete) on the autumnal equinox of 2004, September 21<sup>st</sup>. The Sun had a declination of  $= +0^{\circ}09'$ . Left photograph shows a general view of mountain Chinar at the moment that the first sunrays emerge behind it. The three photographs on the right show a sequence of the solar path just after sunrise.



Figure 3. Left: plan of the Iberian settlement of Tossal de Sant Miquel de Lliria (adapted from Bonet 1992). The circle indicates the position of the urban temple (department no. 14). Right: View of the east horizon from the temple. The long arrow indicate the orientation of the north wall of the temple, which is facing due east, just to a small hill (indicated by the short arrow) where the sunrise at the TMPS takes place.

Similar markers of the sunrise at dates close to the equinoxes on the top of non-conspicuous hills have been found in La Carraposa (Rotglá i Corbera, Valencia; Pérez Ballester and Borredá Mejías, 2004), La Serreta (Alcoi, Alicante; Esteban and Cortell Pérez 1997), Cueva Negra (Fortuna, Murcia; Esteban and Ocharan Ibarra, in preparation), Cerro de las Cabezas (Valdepeñas, Ciudad Real, Esteban and Benítez de Lugo Enrich 2016) and Torreparedones (Morena López and Abril Hernández, 2013). On the other hand, at El Pajarillo (Huelma, Jaén, Esteban *et al.*, in preparation) and Cueva del Moro (Ayora, Valencia; Esteban and Ocharan Ibarra, in preparation) the equinoctial markers are related to the sunset instead of the sunrise. This may be related to the different character of these two sites with respect to the other Iberian sanctuaries with equinoctial markers. El Pajarillo is interpreted as a rural *heroon* or a funerary monument and Cueva del Moro is a cave-sanctuary. It is interesting to note that other cave-sanctuary with clear relation with the equinox, Cueva de la Lobera at Castellar (Esteban, Rísquez and Rueda 2014) is also related to the sunset at equinoxes or TMPS. Perhaps, this fact may be due to the chthonic aspects of the cult at the Iberian cave-sanctuaries and the *heroon* of El Pajarillo.

As in El Amarejo, there are some Iberian sanctuaries that show striking equinoctial markers on conspicuous topographic features of the horizon that may indicate rituals with possible public dimension. These are the urban shrine at Cerro de San Cristóbal (Mazaleón, Teruel; Esteban and Chavarría Fores, in preparation) and La Malladeta (La Vila Joiosa, Alicante; Esteban and Espinosa Ruiz, in preparation).

The sanctuary of La Malladeta shows perhaps the most striking equinoctial marker found so far in an Iberian sanctuary. It is located on the top of a sea-shore promontory, with a perfect view of the horizon and surrounded by a complex of auxiliary buildings distributed on the slopes of the promontory, which have been interpreted as warehouses and temporal dwellings perhaps related to periodical celebrations. There are few surviving walls of what is supposed to be the temple but, toward the east, these walls are oriented facing the distant Isle of Benidorm (Figure 4). Several campaigns of in situ observations made by the archaeologist Antonio Espinosa and local photographers of Fotocine La Villa, have revealed that the sunrise at the TMPS takes place over the southern slope of the isle (see Figure 5). Moreover, at the equinoxes, the sun does not touch the isle. For us, this fact is a strong argument to propose that the TMPS was the most probable astronomical target of the marker. Very close to the temple building, just at its east side, the excavations have discovered an open-air area plenty of ashes and

dedicated to cremation rituals (Moratalla *et al.* 2014). In addition, the excavations have revealed an abnormal large number of lucernes at the sanctuary, indicating that nocturnal activities were commonly carried out at the site (Espinosa and Marcos 2014). We speculate that the lucernes might be used to illuminate gatherings held before dawn to witness the TMPS sunrise. All these archaeological and astronomical elements suggest the celebration of public rituals at and before the spectacular sunrise at the TMPS.

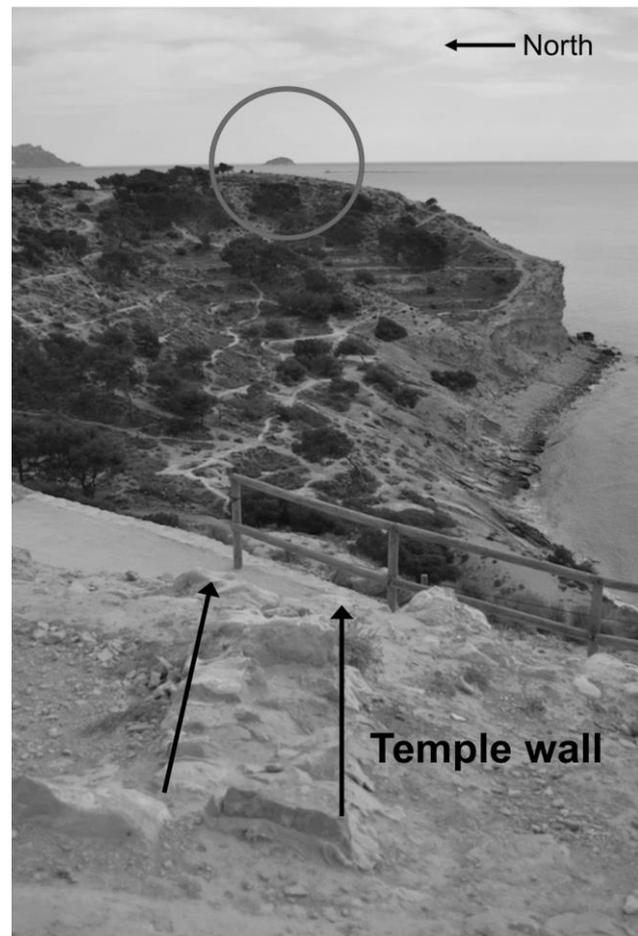
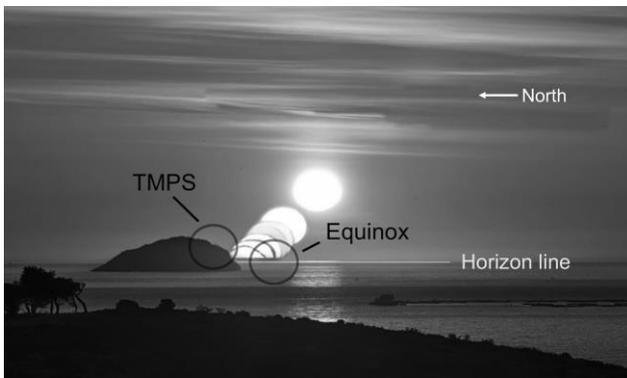


Figure 4. View of the east horizon from the sanctuary of La Malladeta. The arrows indicate the orientation of one of the remaining walls of the temple, which is facing due east, just to the Isle of Benidorm (at the centre of the circle), where the sunrise at the TMPS takes place (see Figure 4).

As we can see, most of the results of this study suggest that the TMPS was the most probable target of the Iberian equinoctial markers. In this sense, there is revealing epigraphic evidence from the cave-sanctuary of Cueva Negra (Fortuna, Murcia), one of the sites where we have found a possible marker of the TMPS. The cave has several Latin inscriptions dated from I CE painted in their walls. Four of the inscriptions give dates and of those only two are complete. These two inscriptions tell about ritual activities made precisely at the same date: March 27<sup>th</sup>

(Stylow and Mayer 1996; Velázquez and Espigares 1996) that would correspond to March 26<sup>th</sup> in the Gregorian calendar, a date closer to the TMPS – that would correspond to March 24<sup>th</sup> at I CE – than to the equinox.

It seems clear that the existence of astronomical markers on topographic elements of the horizon should be a decisive criterion for placing some Iberian sanctuaries, especially those located in isolated environments like La Malladeta, La Carraposa or El Amarejo, for example. In the case of the urban temple of Sant Miquel de Lliria, the visibility of the marker would determine the orientation and place of the building and also the fact that the area located opposite the facade was free of buildings (Esteban and Moret, 2006).



**Figure 5.** Sunrise from the Iberian sanctuary of La Malladeta at March 21<sup>st</sup>, 2013. The declination of the sun was  $\delta = +0^{\circ}18'$ . The sunrise at the equinox does not touch the Isle of Benidorm. In the TMPS, the sun emerges at the south slope of the isle.

Another aspect of special interest is the comparison of the chronology of our sanctuaries. The four sanctuaries that show earlier dating: El Amarejo, Cueva de La Lobera, Coimbra del Barranco Ancho and La Malladeta indicate that they became operational around mid-IV BCE, while others as La Serreta, La Carraposa and Sant Miquel de Lliria, have later chronologies, between III and II BCE (see Esteban 2013 for references). The absence of sanctuaries of this kind with earlier dating could be indicating the date *post quem* such rituals appeared in the Iberian world. This moment could be related to ideological changes in the society and/or the effect of alien influences. According to different authors, the beginning of the IV BCE was a moment of consolidation of the aristocratic system and territorial expansion of the Iberian urban settlements, as well as the emergence of an ideological model based on the figure of a heroized ancestor (e.g. Rueda, 2011).

All excavations carried out in the sanctuaries showing equinoctial markers, show clear evidences that they were dedicated to a fertility goddess (see references in Esteban 2013). In this context, it seems

clear that the rites celebrated in the sanctuaries should be related to seasonality and the cycles of nature. Festivities related to agricultural fertility were common in the ancient Mediterranean, such as those dedicated to the "resurrection" or *egersis* of Melkart that were held in Tyre – and perhaps also in Gades, the westernmost Phoenician city, in south Spain – which, according to some authors might have taken place the new moon nearest the spring equinox (Cohen, 1993: 401). Among the most famous celebrations of antiquity were those related to the Greek goddess Demeter, whose Great Mysteries at Eleusis were represented in early autumn (Espejo Muriel, 1995: 95). These mysteries represented the annual growth cycle through the myth of the descent and return of Kore from the underworld. A similar mythic narrative, where the protagonist is a possible hero-god of vegetation may also be represented in the reliefs of the Iberian funerary monument of Pozo Moro (Moneo, 2003: 416). The symbol of the natural cycle of death and resurrection might be inspired in the annual solar motion on the celestial sphere. Throughout the year, the sun changes its position of sunrise and sunset on the horizon as well as the maximum height that can reach at noon. It is around the equinoxes when the equilibrium is reached: the day has the same duration that night, sunrise and sunset occur at almost equidistant points to the solstices. These astronomical moments could symbolically represent the moments of death and descent of the divinity to the underworld – autumnal equinox – and her subsequent rebirth or return to earth – spring equinox. The presence of illumination effects at those dates in the cave-sanctuary of Cueva de La Lobera (Esteban, Rísquez and Rueda 2014) seems also to agree with this relation of the goddess and her ascent/descent to the underworld.

Equinoctial markers similar to those discussed herein – especially those found at Sant Miquel de Lliria and La Malladeta, where we have the combination of orientation of a temple and equinoctial marker – have been found in the temple of Apollo at Maktar (Tunisia). This temple was built over an ancient Libyan-Punic sanctuary dedicated to Baal Hammon and reused in Roman times as the temple of the sun god Apollo (Esteban, 2003). Another very similar example is the temple C of the Greek-Punic city of Selinunte, where Belmonte and Hoskin (2002: 203-206) found that the building points to a striking conical mountain located just to the east. This temple is dated around the early VI BCE – being a possible precedent of the Iberian cases – and was dedicated to Saturn in Roman times.

It is interesting to note that the geographical distribution of the Iberian sanctuaries showing equinoctial marker is very similar to that presented by the

Iberian tower-form monuments studied by López Pardo (2006: 199), which coincides, in turn, with the areas of more intense Punic influence in the Iberian Peninsula. After the defeat of the Punic general Himilco, during the attempted conquest of Syracuse in the early IV BCE, Carthage suffered heavy political upheavals affecting even religion (Prados Martínez, 2008: 39). As discussed by Prados Martínez (2008: 230) at that time, there was an increase in the sensitivity of the Punics to the concept of underworld that some authors associate to the introduction of the Greek cults of Demeter and Kore at Carthage (Ribichini and Xella, 1994: 39) as atonement for the aforementioned Punic defeat in Sicily. The two goddesses worship was widespread in Sicily and Magna Graecia where, according to Diodorus (XIV, 63) two annual festivals in spring and autumn were held in their honour. One of the most common kinds of offerings of this worship were terracotta figurines of female busts emerging from the ground, also present in many Iberian sanctuaries in the area in question (see Ruiz de Arbulo, 2000). All these archaeological and historical evidences seem to favour a possible Greek-Punic inspiration for the use of equinoctial markers in Iberian ritual.

The aforementioned characteristics of the equinoctial markers inclines us to think that the pinpointing of the Iberian calendar was made tracking the position of solar risings and settings over topographic features of the horizon, using something known as an "horizon calendar", a technique developed by

different cultures of the world (Ruggles, 1999: 152). This possibility recalls us the controversy about the existence of priests or priestess in Iberian religion. It is clear that the use of astronomical markers and to fix the exact dates of celebrations through horizon calendars need personnel in charge of the follow-up of the sun position along the year. As we said before, the equinoctial markers seem to appear at IV BCE, a moment of socio-ideological changes in the Iberian Culture and the emergence of a more popular forms of worship. The control of the ritual and seasonal calendar by the observation of the celestial bodies should provide the aristocratic elites with a demonstration of having some divine power as guarantors of the welfare of the community. In the cave-sanctuary of Cueva de La Lobera, we noted the resemblance between the shape of the projected patch of light at equinox sunset and the typical representation of the Iberian goddess (Esteban, Rísquez and Rueda 2014). There is evidence that the shape of the opening that projects the patch of light at La Lobera was manipulated. Therefore, the illumination phenomenon could be recreated with the purpose of producing a convenient atmosphere for the ritual. Moreover, it may be interpreted as an intentional dramatization of the appearance of the goddess in a moment of annual renewal of nature. The study of the interconnection between astronomy, ideology, and ritual as an interdisciplinary field of research seems to have an exciting future.

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