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NEW ARCHAEOASTRONOMICAL FINDINGS IN THE ALTO BELICE VALLEY (SICILY)

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ABSTRACT

We have recently discovered that, not far (8 km) from the Monte Arcivocalotto megalith (the *Campanaru*, presented at the previous SAEC Conference), on the top of a hill significantly named "Cozzo Perciata" (i.e., in local dialect "Hill of the pierced one"), there is another pierced rock. It collapsed a few decades ago, but a photograph, taken in the late 1960s or in the first half of the 1970s, shows as it was quite similar to the *Campanaru* of Monte Arcivocalotto. Furthermore, the lower part of this rock is still in place: it was thus possible to measure the direction of the hole axis. It was found that it points to the top of the Bronze Age sacred rock of Pizzo Pietralunga, with azimuth of 60.6° and altitude over the horizontal plane of 1.7°: this direction exactly corresponds to the one of the sunrise over the local geographical horizon on the summer solstice of the beginning of the second millennium BC. Direct observations performed during the summer solstice of 2013 have actually shown that the phenomenon is still observable. Also in the case of this pierced rock, there are various ethnographic evidences of the symbolical value of the claimed alignment. Concerning the archaeological evidences, in the area of a few meters around the pierced rock of Cozzo Perciata, fragments of Eneolithic and Early Bronze Age ceramics are visible. Thus, also waiting for further archaeological studies that can finally confirm the contemporary frequentation of the Monte Arcivocalotto, Pizzo Pietralunga and Cozzo Perciata sites, the probability that in this area could be found by chance two similar artificially pierced rocks (the ones of Monte Arcivocalotto and Cozzo Perciata), with different and complementary solstitial alignments (to winter and summer solstices) looks to be totally negligible.

KEYWORDS: Megalith, Archaeoastronomy, Bronze Age, Sicily

1. INTRODUCTION

At the previous SEAC Conference, we presented an imposing megalith, visible from many kilometres of distance, sited near the top of the hill named Monte Arcivocalotto in the Alto Belice Valley in Sicily (Scuderi et al., 2013). It is made by a single sandstone slab, shaped in triangular form with a large circular hole pierced at the centre (see Fig.1). It is known to local people as *u Campanaru* ("The Bell Tower") and it is oriented toward the sunrise of the winter solstice, when the Sun rises at the hole centre, becoming visible from a very large distance. Furthermore, a quadrangular petroglyph is carved on a small step at the bottom of the western side of the megalith, under the hole, and its perimeter is exactly enlighten by the first rays of the rising Sun on the winter solstice. We analyzed the intentionality of these orientation, following the Schaefer's (2006) methodology, reaching the conclusion that the Monte Arcivocalotto megalith is purposely astronomically oriented for cultic and calendric reasons.

We have also shown as this megalith is connected by archaeological evidences to the nearby important Early Bronze Age sacred site of Pizzo Pietralunga (see, e.g. Scuderi et al., 1998), a single, isolated rock pinnacle, about 150 m high, standing over the Belice River plain. It was also shown as, in the same instant when the rising Sun shines from the Monte Arcivocalotto megalith hole, it is seen to touch the top of Pizzo Pietralunga, generating other light effects on a number of man-made structures in the rock (Scuderi et al, 2013). Examining in further details the Monte Arcivocalotto – Pizzo Pietralunga archaeological complex (Scuderi et al., 2014), we concluded that the megalith and the rock pinnacle are connected and that the computation of the composite probability respect to the null hypothesis of the alignments cited above and of the resulting contemporary light effects at the winter solstice sunrise is meaningful. This composite probability is of 6.5 □, essentially ruling out the possibility of chance coincidence (Scuderi et al, 2013).

Figure 1 The megalith of Monte Arcivocalotto.

2. NEW FINDINGS IN THE ALTO BELICE VALLEY

During the current year, a number of new archaeological findings were discovered in the area of the Alto Belice Valley. First, a complex altar, caved in a rock near Pizzo Pietralunga, was discovered (see Fig.2).

Figure 2 The altar carved in a rock near to Pizzo Pietralunga.

A staircase, carved in the rock and visible in the foreground of the picture, leads to the top, where a number of basins, some of which connected to each other, are excavated. This artifact is presently under study, but its presence itself underlines the importance of this worship place.

Furthermore, a grave containing Bronze Beaker Culture ceramics, was discovered under the Monte Arcivocalotto megalith, at the foot of the ~20 m cliff that plunges to valley, on the NE side of the *Campanaru*.

Last, a group of four stones, possibly artificially positioned, were discovered on

the top of Pizzo Pietralunga by means of an ortho-photograph taken by a kite: their meaning is presently under study**.** However, the most important finding is by far the one of a second pierced rock.

3. THE COZZO PERCIATA SITE

Actually, we have recently discovered that, 8 km far from Monte Arcivocalotto and 6 km from Pizzo Pietralunga, on the top of a hill significantly named "Cozzo Perciata" (i.e., in local dialect "Hill of the pierced one"), there is another astronomically oriented megalith.

The site of Cozzo Perciata, (37 ° 53' 03.37" North - 13 ° 09' 33.83" East) is located on two natural terraces and on a slight slope, on a portion of the Jato Valley presently well maintained and planted with vineyards and olive groves. Morphologically, the area shows slightly low-lying areas and ranges of hills of medium height. The prehistoric settlement is placed under a list of sandstones, whose flap is part of a torrential river bed that carries its water in the river Balletto (also named Pietralunga) and just down the hill takes the name of Perciata River.

Both on the ridge and, to a greater extent, on the plateau to the South-East, prehistoric fragments are found, mainly dating since the late Neolithic to the Bronze Age, while a few sporadic fragments are attributable to the Iron Age. The area of dispersion of the fragments is about 5,000 m^2 wide, although a large part of the archaeological area has undergone a re-use in other historical periods.

Fragments of the Bell Beaker Culture were also recovered in the site but mainly a countless number of fragments belonging to Castellucciano and pre - Castellucciano, a culture of the initial phase of the Early Bronze Age, widespread mainly in the south-eastern Sicily and temporally placed between 2200 BC and 1400 BC (see, e.g., Castellana, 1997;). Since the presence of the Bell Beaker culture in Sicily is attested from 2900 BC to 2300 BC, lasting for a few more centuries in insulated sites (Giannitrapani, 2009), the contemporary presence of Bell Beaker and Castellucciano ceramic typologies strongly support the datation of the site between the end of the 3rd Millennium and the beginning of the 2nd Millennium BC.

In the rocky ridge to the West of the site at least one, but probably more, pseudo-tholos tomb with dromos input was discovered. At the top of this tomb, there is an emblem with relative cupmark (symbol of fertility and life): that grave is similar to those identified in Pietralunga.

Due to the type of materials and the connection with the sites of Monte Arcivocalotto and Pietralunga, the Cozzo Perciata settlement probably belongs to the Pietralunga complex that would seem to have the site of Monte Arcivocalotto as its hegemonic center.

4. THE COZZO PERCIATA MEGALITH

In the side of Cozzo Perciata that declines to the East, at 471 m above sea level, there is a heap of stones, resulting from the collapse of a perforated plate, but until our recent study it had not been clear his function or cultural horizon of belonging. It collapsed in very recent time, it is said because a lightning. However, living witnesses state that it was quite similar to the *Campanaru* of Monte Arcivocalotto, as it is demonstrated by a picture taken in the late 1960s or in early 1970s (see Fig.3).

Figure 3 The megalith of Cozzo Perciata before the collapse.

Given the ruined state of the Cozzo Perciata stone, its dimensions are difficult to measure, though the remains and the old picture clearly show that they were very similar to the ones of the Monte Arcivocalotto megalith (triangular in shape, of about 4 m length and about 3 m height,

with roughly triangular section, of about 1.5 m thickness at ground level, and a central circular hole of about 2 m of diameter). However, the lower part of the hole of the Cozzo Perciata megalith is perfectly preserved and, as in the Monte Arcivocalotto *Campanaru*, nearly perfectly circular. The hole axis is thus easily measurable with the same techniques used for the other megalith (see Fig.4).

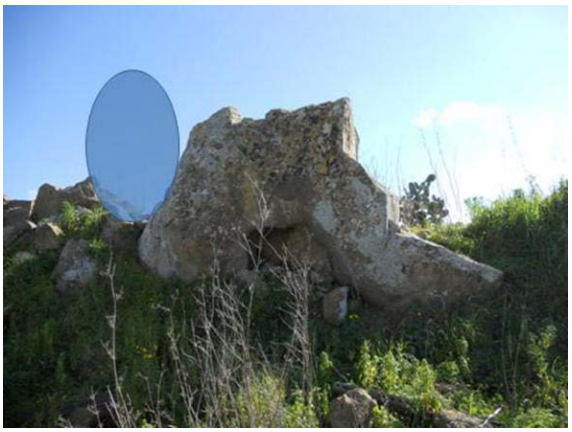

Figure 4: The remains of the Cozzo Perciata megalith. The shape of the original hole is shown.

As in the case of the Monte Arcivocalotto megalith, two position of the observer were obvious: the first one, immediately in front of the hole, on the edge of the cliff SE of the slab, where there is room just for a single observer; the second, at the foot of the hill and down in the valley, up to a very large distance.

Measurements were made with a precision bearing compass (Optical compass model DQL-6) on January 8th 2013. The measurements were corrected for the local magnetic declination (2° 25′ E) by using accurate GPS (Magellan model Explorist GC, having an instrumental uncertainty, translated in linear units, of ±20 m) coordinates and comparison with IGM (Italian Military Geography Institute) cartography and geo-referenced satellite images.

It was found that from the first observing point, the top of Pizzo Pietralunga is seen under an astronomical azimuth of 60.6° and an altitude of 1.7°, with a ±30 arcmin of uncertainty (corresponding to a declination of 23.9°±1.5°): this direction exactly corresponds to the one of the sunrise at the summer solstice in 2000 BC over the local geographical horizon, as computed using the high precision program SOLEX V11.0 (Vitagliano, 2011), modelling the N-body dynamics of the Solar System. Of course, this figure does not allow to assign a date to the monument; however, it is worth to note that this date is compatible with the one given by the ceramic fragments recovered in the area.

Under the Cozzo Perciata rock too a grave, containing Bronze Age ceramics, including fragments of Bell Beaker Culture, was discovered. It is worthwhile to emphasize that, while the presence of this culture is well documented in the area of Palermo and in the lower valley of Belice (see, e.g., Tusa, 2001), the Cozzo Perciata, Monte Arcivocalotto and Pietralunga sites are the only ones in the Alto Belice area where Bell Beaker Culture ceramics have been found to date. This data strongly supports the association of these three sites.

Looking through the hole of the megalith of Cozzo Perciata from the first observing point at the dawn of summer solstice, rising Sun touch the top of Pizzo Pietralunga and then, from the bottom of the valley, the Sun is seen to rise inside what remains of the rock hole (see Fig.5)

Figure 5: The Sun rising inside the remains of the Cozzo Perciata megalith on the summer solstice 2012.

The declination window from the first observing point is obviously quite large, due to the large size of the hole. However, the fact that at down of the summer solstice the first sunray light exactly the peak of

Pizzo Pietralunga, at a distance of 6 km (see Fig.6), strongly supports the hypothesis that the searched target was actually the direction of the sunrise on this day.

Figure 6: The Sun rising inside the remains of the Cozzo Perciata megalith light the peak of Pizzo Pietralunga (evidenced by the arrow) exactly at the down of the summer solstice 2012.

Furthermore, as the distance from the megalith increases, the declination window of the hole become increasingly narrow, until, from the bottom of the valley, it shrinks to a few degrees, as it is evidenced by the fact that the hierophany is visible only for a few days around the summer solstice.

This hypothesis is also supported by the present day folklore. Actually, as it is attested by living witnesses, this second pierced rock too was named by local people as u Campanaru or even, in Sicilian, "A petra unni nasci u suli" ("The stone where the Sun rises"). The same witnesses states that, up to a few decades ago, the rise of the Sun inside the hole of this rock was the signal of the beginning of harvesting time.

5. CONCLUSIONS

The existence of this second *Campanaru*, also waiting for further archaeological studies that can finally confirm the contemporary frequentation of the Monte Arcivocalotto, Pizzo Pietralunga and Cozzo Perciata sites, clearly proofs that we are dealing with an astronomically oriented megalithic complex.

The fact that in this area two coeval and analogous monuments (artificially pierced rocks of similar shape) with solstitial alignments, in azimuth and eight, different and complementary (to the winter and summer solstices) manifestly demonstrates that here, probably between the Eneolithic and the Early Bronze Age, a civilization developed, that used a solar calendar and invented a simple, but effective, technology to materialize it.

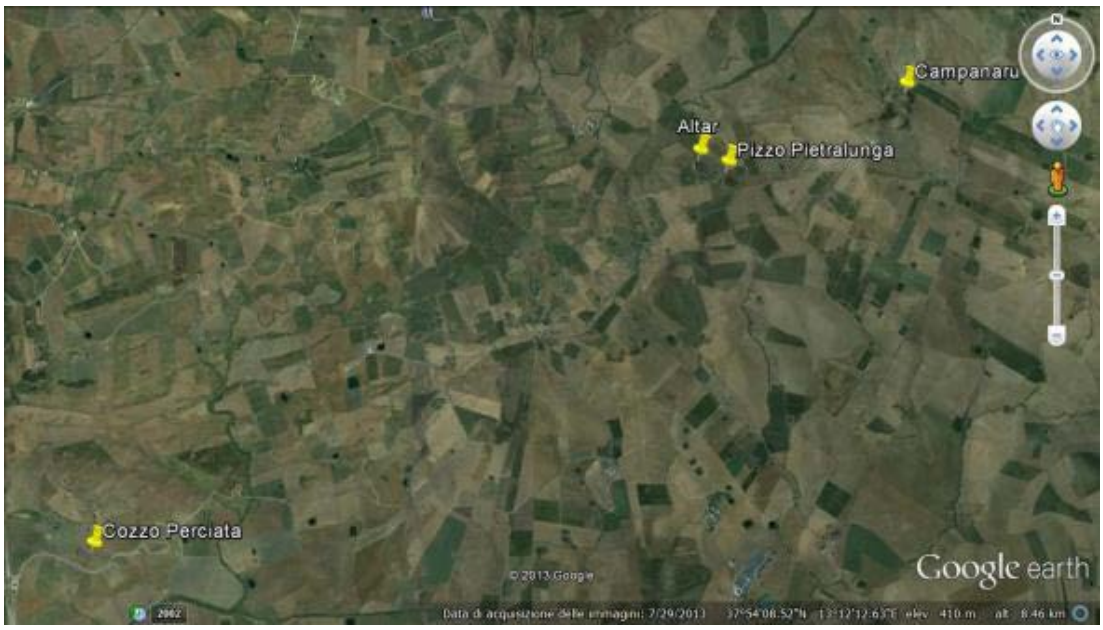

Figure 7: Google Earth map showing the position of the sites cited in the text.

Table. 1: geographical coordinates of the sites cited in the text

Site	Latitude	Longitude
Campanaru	37°55′ 10.23″ N	13°14′ 16.56″ E
Pizzo Pietralunga	37°54' 47.99" N	13° 13' 13.76" E
Pietralunga altar	37° 54' 51.75" N	13° 13' 13.91" E
Cozzo Perciata	37° 53' 03.37" N	13° 09' 33.83" E

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