Archaeoacoustic analysis of Poggio Rota Stone Circle in Tuscany, Italy

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Abstract – Poggio Rota Stone Circle was discovered in recent times (2004) by an Italian researcher Giovanni Feo, an Etruscan civilization expert. The studies conducted at the site, which also involved researchers from Italian universities assumed that the megaliths of Poggio Rota were built towards the middle of the third millennium BC by the Rinaldone civilization (4000-2000 BC). Poggio Rota Stone Circle is the only existing monument of this kind in Italy in good condition. Another *the Little San Bernardo Cromlech*, in Valle d'Aosta has completely collapsed. An archaeoacoustic approach similar to that used at other stone circles in Portugal was used. We tested this structure to see if any natural sound phenomena or resonance were present, because it is understood that some ancient structures have been specially modeled to influence the mind through the use of sound to create an altered state of consciousness. In previous researches we demonstrated that there is a relationship between mechanical vibrations and brain activity in some ancient temples. The resonance phenomena results of 91Hz obtained by the use of a round drum were of interest, because similar results were also found in Cividale del Friuli Hypogeum in North-Italy and at ancient temples in the UK and Ireland by other researchers. A strong radioactivity inside the stone circle dangerous for human health (until 1,77 µSv/h) was also discovered to be present.

Keywords – archaeoacoustics, Poggio Rota, Rinaldone, stone circle.

1. Introduction

Poggio Rota is the name of a complex of ten megaliths derived from the carving of a tufaceous block in lower Tuscany. The name of this structure is derived from its location, near the village of Pitigliano on a bend of the river Fiora, whose source is from nearby Monte Amiata. This enigmatic structure probably dates back to the Rinaldonian period in Tuscany, around III millenium BC. The Rinaldonian Civilization, proceeded the Etruscan Civilization and had great skills in working with stone carving their homes and tombs in the rock and always located close to water.
The ten megaliths at Poggio Rota were carved from volcanic rock, separated by narrow passageways through which the suns rays could pass. According to archaeoastronomy experts, the Poggio Rota complex was built for the observation of the sun and the stars, here the suns rays are visable through the seasons from the summer to the winter solstice (Fig.1, 2 and 3). Poggio Rota Stone Circle is the only existing monument of this kind in good condition in Italy. Another *Little San Bernardo Cromlech* located in the Valle d'Aosta has completely collapsed.
Our research group (SBRG - Super Brain Research Group), an interdisciplinary team of researchers from various European countries has demonstrated the existence of a relationship between mechanical vibrations induced by natural phenomena and brain activity [2 – 19, 21, 22]. We have also demonstrated that some resonance frequencies (as found by other researchers at ancient Neolithic temples in Ireland and Great Britain [20] and by our research group in Malta and Italy), can have a strong effect on the human brain and in particular frequencies between 80Hz and 120Hz

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[1]. After studying approximately fifty ancient sites between 2010 - 2019 throughout Europe, using technology to detect natural and induced vibrations, we can say with some certainty that there are natural phenomena present (which are not found in the surrounding landscape) which somehow enhances the mystical feel of the place [2 – 19, 21, 22]. Both naturally occurring and man-made resonances, could for example have been utilized to enhance rituals and ceremonies that took place at the sire to produce an altered state of mind. We decided to analyze this ancient structure using an archaeoacoustic approach, because it was only considered to be an ancient astronomical observatory. Our supposition is that it could have served a dual purpose; as a mystical temple and as an observatory, as these two aspects were often connected in the past.

Figure 1 –Poggio Rota Stone Circle from inside.

Figure 2 –Poggio Rota Stone Circle from outside (from West to East).

2. **Poggio Rota Stone Circle**

Poggio Rota Stone Circle was discovered in recent times (2004) by an Italian researcher Giovanni Feo, an expert of the Etruscan civilization. The studies conducted on the site involving archaeologists from the University of Milan assumed that the megaliths of Poggio Rota were built towards the middle of the third millennium BC by the Rinaldone civilization (4000-2000 BC). It should be noted that the name “Rinaldone” derives from the discovery of artificial cave tombs dug into the rock, called an "oven" in 1903, in the site called "Rinaldone", near Montefiascone, Viterbo area, Lazio region, Italy. In 1938 Minto, noting the similarity of the tombs in southern Tuscany, particularly in the necropolis of Botro del Pelagone (Manciano), Corano (Pitigliano) and Poggio Formica (Pitigliano), was the first to identify a specific cultural aspect of Central Italy, disentangled from that of the remaining peninsula. It was then that Pia Laviosa Zambotti in 1939 speaking for the first time about Rinaldone's culture, which she called "Remedello", was distinct from other Northern Italian cultures.

Earlier researchers who studied this structure observed that during the Summer Solstice, the Sun at sunset "rests" on the central monolith of the complex and then goes "to settle" on a depression offered by the skyline. During the autumnal equinox thanks to the roundness at the base of some monoliths, it was possible to observe the "announcement" of the sunset of the sun about an hour before due to the way the light beams strike the ground.

At the winter solstice sitting on a sort of thrown hollow in a tufaceous rock in a tank on the site, it is possible to observe the Sun reflected in the water, made dark by the foliage that had settled on the bottom. External level a large thick circle carved in the rock also aligned to the equinox (Fig. 3).

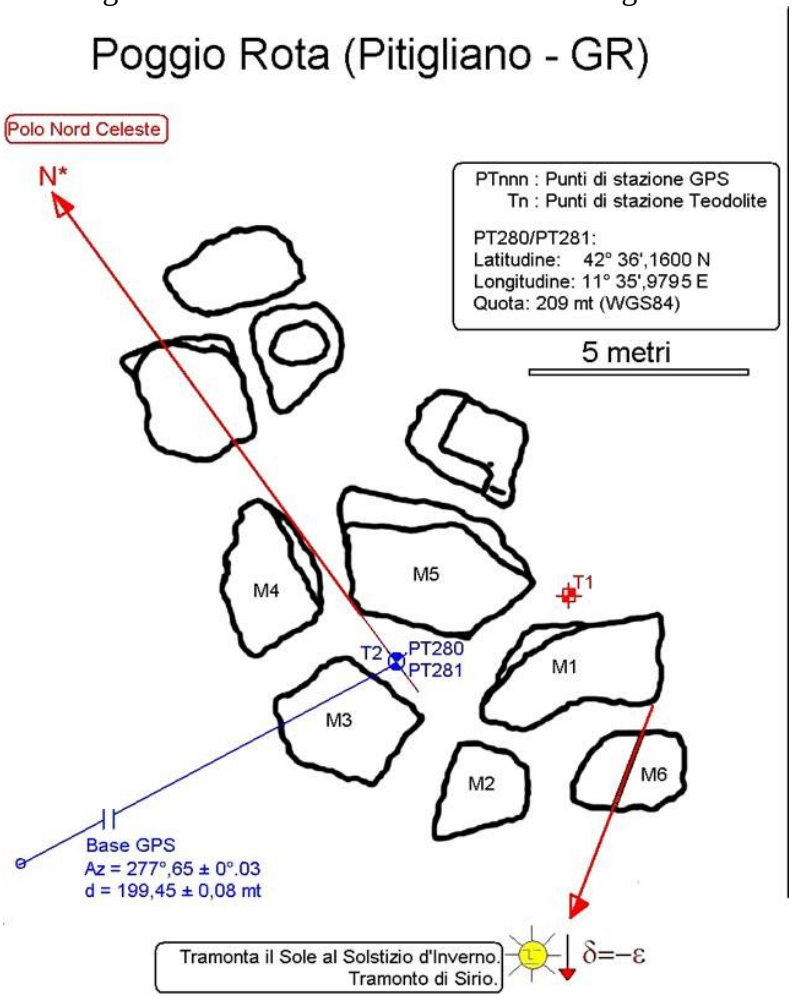

Figure 3 – The astronomical position of the stone circle in respect to the sun (rilevazione Adriano Gaspani).

3. Materials and methods

Audio recordings were taken following the SBRG Standard for Archaeoacoustics (SBSA) (2-20). In this case the equipment consisted of a high range dynamic recorder, extended in the ultrasound and infrasound field with a sampling frequency rate of 192 kHz (Tascam DR-680 by Japanese TEAC Corporation), and two professional condenser microphones with a wide dynamic range and flat response at different frequencies (Sennheiser MKH 3020, frequency response between 10Hz and 50,000Hz) with shielded cables (XLR Mogami Gold Edition) and gold plated connectors. We placed the microphones in various places inside and around the stone circle for searching any interesting sound at the base of megaliths in contact with the soil. Sometimes, for avoiding magnetic interference we noticed after the first recordings, we inserted the microphones directly in the body of the recorder.

Figure 4 – The operation of archaeoacoustic analysis.

Inside this rock temple we searched for any resonance frequency using our voices and a round frame drum and also the presence of any natural phenomena (Fig. 4). Before recording a spectrum analyzer, Spectran NF-3010 from the German factory Aaronia AG, was used to detect the presence of any electromagnetic phenomena which could influence the results. Praat program version 4.2.1 from the University of Toronto and Audacity open-source program version 2.1.2 for Windows and Linux were used to analyise the audio recordings.

4. Results

In earlier research we demonstrated that at some ancient temples there exists a relationship between mechanical vibrations or other natural phenomena and brain activity [2 – 19, 21, 22]. But in this site the band of frequencies is very large from 6-8Hz to 50Hz at low volume. It is possible to think that a long stay in that site for praying or in meditation may influence the mind, but we cannot be sure because the volume being low is not significant.

The use of the round frame drum gave some interesting results, a strong resonance of 91Hz was discovered when someone played the drum in the space among the megaliths (Fig. 7).

The graphs below represent the sound analysis of the recordings taken inside and outside the stone circle. They show a large peak not different in various standing of recording with a dominant wave

around 8Hz, that is typical of various sites we examined in Europe (Fig. 5 and 6). We can suppose that this frequency originates from underground water, because the behavior of the plot is just this.

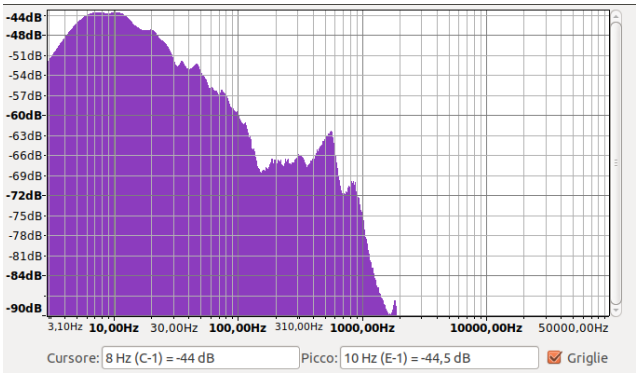

Figure 5 – Graph of sound in the centre of the stone circle with microphones placed in the air. There is a peak with apex around 8-30Hz at -44db.

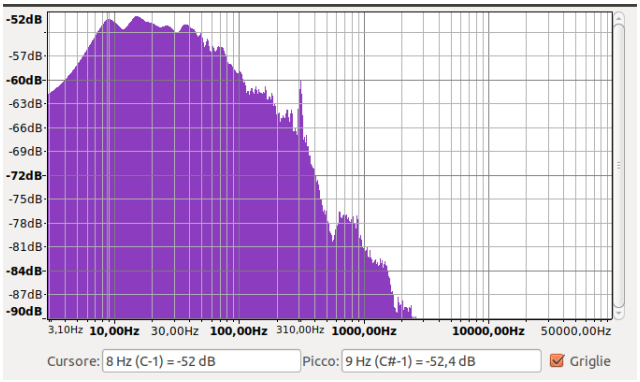

Figure 6 – Graph of sound outside the stone circle with microphones placed in the air. There is a peak with apex around 8-50Hz at -52db.

The results obtained by the use of a round frame drum are very interesting, because this is not commonly found and is different to the spectrum of frequencies normally produced by that type of drum in free air (fig. 7).

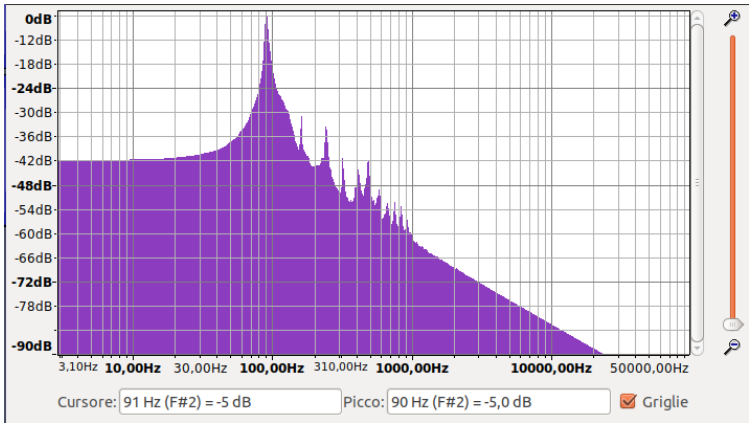

Figure 7 – Graph of sound taken during the hitting of the drum. It is very evident a frequency of resonance at 91Hz.

We found a similar resonance frequency of 94Hz in a chamber of Cividale del Friuli Hypogeum in Friuli (North-East Italy) and in Hal Saflieni Hypogeum in Malta, but jut a little different (70Hz and 104Hz). Because theses structure were built in the same period by different civilizations, but most likely with the same technical knowledge, we can suppose that these similar resonance frequencies

were not by chance. Frequencies between 80-120Hz has a strong effect on the human brain which has been shown in laboratory tests on volunteers. So we propose that this site may have had another use.
Strong radioactivity was also discovered inside the stone circle, at a level dangerous for human health (1,77 µSv/h) (Fig. 8). In Italy the natural background varies from 0,04 to 0,35 µSv/h and the alarm threshold is set to 0,4 µSv/h. Values above 0,60 µSv/h reveal the presence of a radioactive source. This can explain why there are no other ancient remains around this site like houses or other structures.

Figure 8 – Inside the stone circle there is a really dangerous radioactivity for human health (until 1,77 µSv/h).

Also outside the stone circle the radioactivity is very high, even if less than inside (0,63 µSv/h) which indicates a strong radioactivity of the entire zone (Fig. 9).

Figure 9 – Also outside the stone circle the radioactivity is very high (until 1,77 µSv/h).

5. Discussion and Conclusions

It is very important to realize the relationship between this stone circle and the people who built them. Archaeoacoustics should not only analyze the acoustic properties of the site, but also supply other evidence of the past in those situations where there is no documented history. The archaeoacoustic analysis of the Poggio Rota Stone Circle provides some evidence to support the hypothesis that the decision to reshape the huge blocks of magmatic rock, was not accidental. The disposition of megaliths was certainly for astronomical references. The fact that these same megaliths also create particular resonances cannot be by chance given the similarity to other neolithic structures. It is therefore conceivable that this technology based on the knowledge of the

relationship between mind and sound, was the common heritage of various civilizations that inhabited the Mediterranean basin at that time. Consequently, it is conceivable that there were cultural exchanges between those populations. Also these results must be considered as preliminary, the research must therefore be extended and deepened in the years to come, but we have to be aware that any researchers who study this site should remain there as short as possible, because of the radioactivity.

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