

Fig. 21: We placed the microphones close to the limestone floor near the base of pillar n.18.



Fig. 22: The plot of the sound coming from underground in the enclosure D. There is an important peak at 22Hz at almost 43db of volume.

Conclusion

As we showed in our research the vibration we found at Xaghra Stone Circle are not strange when viewed within in a panorama of other sacred sites across Europe and Asia. Two of the most famous ancient sites in the world have similar characteristics.

As we also wrote before, Archaeoacoustics provides a way to offer new interpretations on anthropological questions pertaining to ancient architecture and populations. After our investigation of the Ggantija compound we can confirm that the location where the site is based, has all the characteristics of an ancient sacred site of the remote past. The possibility to reach an altered state of mind by natural phenomena, existing in this location, acting on brain wave activity in particular conditions is very high. We can say that especially if the ancient people tried to reach it during rituals in underground cavities where vibrations had the maximum power. There are also various scientific papers which confirm the connection between brain activity and natural physical phenomena (Debertolis et al 2012 - 2016).

We can conclude the Xaghra Stone Circle was probably the most important nucleus of the ancient sacred location in Ggantija compound. The high number of vibrations perceived in an audible band suggest the idea that through these phenomena the ancient population was able to influence the perception of the human body to obtain different states of consciousness without the use of drugs or other chemical substances making their rituals very impressive. Our research demonstrates that archaeoacoustics with its effect on the human body, appears to be an interesting new method for reanalysing ancient sites in order to re-discover a forgotten method that effects the emotional sphere of human consciousness. Modern recording technology is now able to give greater clarity to the origin of many interesting phenomena, reaffirming the aura of legends that pervades some sacred places.

Acknowledgment

Our warmest thanks go to the Maltese institution Heritage Malta for giving us access to the Ggantija Temple for our research, and in particular, our gratitude goes to Dr. Daphne Caruna, curator of the archaeological site, who assisted us during our surveys.

The authors are very grateful for the support received by non-profit scientific organization Super Brain Research Group (SBRG) for the develop of this archaeoacoustic research.

References

- I.A. Cook, S.K. Pajot, A.F. Leuchter: "Ancient Architectural Acoustic Resonance Patterns and Regional Brain Activity", Time and Mind, Volume 1, Number 1, March 2008, pp. 95-104 (10).
- P. Debertolis, H.A. Savolainen: "The phenomenon of resonance in the Labyrinth of Ravne (Bosnia-Herzegovina). Results of testing", Proceedings of ARSA Conference (Advanced Research in Scientific Areas), Bratislava (Slovakia), December, 3-7, 2012, pp. 1133-1136.
- P. Debertolis, N. Bisconti: "Archaeoacoustics in ancient sites" Proceedings of the "1st International Virtual Conference on Advanced Scientific Results" (SCIECONF 2013), Žilina (Slovakia) June, 10-14, 2013, pp. 306-310.
- P. Debertolis, N. Bisconti: "Archaeoacoustics analysis and ceremonial customs in an ancient hypogeum", Sociology Study, Vol.3 no.10, October 2013, pp. 803-814.
- P. Debertolis, G. Tirelli, F. Monti: "Systems of acoustic resonance in ancient sites and related brain activity". Proceedings of Conference "Archaeoacoustics: The Archaeology of Sound", Malta, February 19-22, 2014, pp. 59-65.
- P. Debertolis, D. Gullà, F. Richeldi: "Archaeoacoustic analysis of an ancient hypogeum using new TRV camera (Variable Resonance Camera) technology", Proceedings of the "2nd International Virtual Conference on Advanced Scientific Results" (SCIECONF 2014), Žilina (Slovakia) June, 9 - 13, 2014, pp. 323-329.

- P. Debertolis, N. Bisconti: "Archaeoacoustics analysis of an ancient hypogeum in Italy", Proceedings of the Conference "Archaeacoustics: The Archaeology of Sound", Malta, February 19-22, 2014, pp. 131-139.
- Debertolis P., Tentov A., Nikoli ć D., Marjanovi ć, Savolainen H., Earl N. (2014). Archaeoacoustic analysis of the ancient site of Kanda (Macedonia). Proceedings of the 3rd Conference ARSA (Advanced Research in Scientific Areas), Žilina (Slovakia), December, 1-5, 2014, pp. 237-251.
- P. Debertolis, F. Coimbra, L. Eneix: "Archaeoacoustic Analysis of the HalSaflieni Hypogeum in Malta", Journal of Anthropology and Archaeology, Vol. 3 (1), 2015, pp. 59-79.
- P. Debertolis, D. Gullà: "Archaeoacoustic analysis of the ancient town of Alatri in Italy", British Journal of Interdisciplinary Science, September, Vol. 2, (3), 2015, pp. 1-29.
- P. Debertolis, M. Zivić: "Archaeoacoustic analysis of Cybele's temple, Roman Imperial Palace of Felix Romuliana, Serbia", Journal of Anthropology and Archaeology, Vol. 3 (2), 2015, pp. 1-19.
- P. Debertolis, D. Nicolić, G. Marianović, H. Savolainen, N. Earl, N. Ristevski: "Archaeoacoustic analysis of Kanda Hill in Macedonia. Study of the peculiar EM phenomena and audio frequency vibrations", Proceedings of the 4th Conference ARSA (Advanced Research in Scientific Areas), Žilina (Slovakia), November 9-13, 2015, pp.169-177.
- P. Debertolis, N. Earl, M. Zivić: "Archaeoacoustic Analysis of Tarxien Temples in Malta", Journal of Anthropology and Archaeology, Vol. 4 (1), June 2016, pp. 1-22.
- P. Debertolis, D. Gullà: 'Preliminary Archaeoacoustic Analysis of a Temple in the Ancient Site of Sogmatar in South-East Turkey. Proceedings of Conference 'Archaeoacoustics II: The Archaeology of Sound', Istanbul (Turkey), Oct 30-31 Nov 1, 2016, pp. 137-148.
- P. Debertolis, D. Gullà: "New Technologies of Analysis in Archaeoacoustics", Proceedings of Conference 'Archaeoacoustics II: The Archaeology of Sound', Istanbul (Turkey), Oct 30-31 Nov 1, 2015, pp. 33-50.
- P. Debertolis, D. Gullà: "Healing aspects identified by archaeoacoustic techniques in Slovenia", Proceedings of the '3rd International Virtual Conference on Advanced Scientific Results' (SCIECONF 2016), Žilina (Slovakia), June 6-10, 2016, pp. 147-155.
- P. Debertolis, D. Gullà, F. Piovesana: "Archaeoacoustic research in the ancient castle of Gropparello in Italy", Proceedings of the 5th Conference ARSA (Advanced Research in Scientific Areas), Žilina (Slovakia), November, 7-11, 2016, pp. 98-104.
- N. Grima: "The Xaghra Hypogeum". The Malta Independent. 10 January 2010, archived from the original on 29 August 2015.
- R.G. Jahn, P. Devereux, M. Ibison: "Acoustical Resonances of Assorted Ancient Structures", J. Acoust. Am Soc Vol.99 No.2, February 1996 pp.649-658.
- I. Liritzis, E. Bousoulegka, A. Nyquist, B. Castro, F. M. Alotaibi, A. Drivaliari: "New evidence from archaeoastronomy on Apollo oracles and Apollo-Asclepius related cult", Journal of Cultural Heritage, 2017, in press.
- G. F. Serio, M. Hoskin, F. Ventura, "The orientations of the temples of Malta", Journal for the History of Astronomy, No.23, pp. 107-119, 1992.
- Serpelloni E., Vannucci G., Pondrelli S., Argnani A., Casula G., Anzidei M., Baldi P., Gasperini P. (2007). Kinematics of the Western Africa-Eurasia plate boundary from focal mechanisms and GPS data. Geophysical Journal International, vol. 169, issue 3, June, pp. 1180-1200.
- V. Tandy, T. Lawrence: "The ghost in the machine", Journal of the Society for Psychical Research, April 1998, 62 (851): 360–364.
- J. S. Tagliaferro: "Malta, archeologia e storia", Perseus, 2007, p. 29.
- A. van Tubergen, S. van der Linden: "A brief history of spa therapy", Ann Rheum Dis, 2002, No. 61, pp.273–275.