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GPR surveys at the 'Tombs of the Kings', Paphos, Cyprus

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In cultural heritage applications, GPR surveys are either focused on subsoil exploration, related to preventive archeology [1, 2] or aimed at characterizing historical artifacts and structures, in order to support technical choices for their conservation and restoration [3]. The choice of investigating subsoil and artifacts at the same time is, instead, much less frequent. This would be desirable for: i) acquiring information for the study of soil-structure behavior; ii) integrating archaeological knowledge and interpretation with conservation issues, in the holistic logic that animates the debate of heritage Science and Cultural heritage management [4].
This is the case of GPR surveys performed at the necropolis 'Tombs of the Kings', which is part of the Archaeological Park of Kato Paphos, one of the most important archaeological sites of Cyprus, and it is recognized as an UNESCO World Heritage site since 1980.
GPR surveys were carried out at tomb 3 and had a double aim. Underground investigations were performed on the floor of the tomb by means of a MALA GPR system equipped with a 400 MHz shielded antenna and aimed at localizing possible buried structures, such as altars and undiscovered burial recesses. Moreover, several columns of the atrium were investigated by using an IDS GPR system equipped with a 2 GHz shielded antenna in order to gather information on their inner features and to image their structure. More in detail, high frequency GPR surveys aimed at discovering the possible presence of not visible inner cracks and fractures filled with mortar and/or at detecting metallic reinforcement bars, inserted during previous restoration actions.
It is well known that GPR exploits microwave ability of penetrating non-metallic objects and registers into radargrams electromagnetic variations occurring in different media. These variations are visible as hyperbolas and advanced data processing need to obtain easily interpretable images. A GPR data processing chain based on a microwave tomography approach [5], which faces the imaging as a linear inverse scattering problem and provides focused images referred as tomographic images was used.
The tomographic images provided indications concerning the inners features of columns and floor of the tomb.

References

[1] Masini N et al. (2017). Towards an operational use of geophysics for Archaeology in Henan (China): Archaeogeophysical investigations, approach and results in Kaifeng. Remote Sensing 9 (8), 809, doi: 10.3390/rs9080809
[2] Masini N. et al. (2018). Archaeogeophysical based approach for Inca archaeology: overview and one operational application. Survey in Geophysics, doi: 10.1007/s10712-018-9502-2
[3] Masini N. et al. 2010, Integrated Techniques for Analysis and Monitoring of Historical Monuments: the case of S. Giovanni al Sepolcro in Brindisi (Southern Italy), Near Surface Geophysics, 8(5), 423-432.
[4] F Soldovieri, N Masini. (2018) An Open Access Journal of Knowledge, Conservation, and Management of Cultural and Natural Heritage Heritage, Heritage 1 (1), 44-46.
[5] Catapano et al. 2017, Structural Assessment via Ground Penetrating Radar at the Consoli Palace of Gubbio (Italy). Remote Sens., 10, 45.

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