



High-resolution GPR surveys for the study and characterisation of the archaeological site in urban area. The case of Palatino Hill (Rome, Italy)

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To enhance the knowledge of the subsoil of some portion of the Palatino Hill (Rome), and to locate the unknown buried structures below the actual studied levels, a scientific collaboration between La Sapienza University of Roma (Department of Archaeology), the Soprintendenza Archeologica di Roma and the Institute of Technologies Applied to Cultural Heritage (ITABC-CNR) has been developed, starting from 2010 and it is still in progress.

This area is characterised by a sequence of complex buildings, related to its history, from the foundation to the VIII century a.C.

In this complex site, taking into account the results of previous surveys (Piro and Panella, 2005; Cardarelli and Piro, 2005) a new series of GPR surveys employing different frequencies were carried out during the period September 2009 to October 2010, with the aim at first to verify the stability of excavated archaeological remains locating the presence of shallow cavities, and at second to reconstruct the overlapping of archaeological structures in some portion of the Palatino Hill.

For the measurements a GPR SIR3000 (GSSI), equipped with a 500 MHz bistatic antenna with constant offset, a 70 MHz monostatic antenna and a 35 MHz monostatic antenna, were employed. Some signal processing and representation techniques have been used for data elaboration and interpretation.

The horizontal spacing between parallel profiles at the site was 0.5 m, employing the 500 and 70 MHz antennas and 1 m employing the 35 MHz antenna. Radar reflections along the transepts were recorded continuously, with different length, across the ground at 60 scan s-1; horizontal stacking was set to 3 scans. Along each profile markers were spaced every 1 m to provide spatial reference. All radar reflections within the time range 75 ns – 215 ns (two-way-travel time) time window were recorded digitally in the field as 8 bit data and 512 samples per radar scans.

With the aim of obtaining a planimetric vision of all possible anomalous bodies the time-slice representation technique was applied using all field profiles. Time-slices are calculated by creating 2-D horizontal contour maps of the averaged absolute value of the wave amplitude from a specified time value across parallel profiles. Time slice data sets were generated by spatially averaging the squared wave amplitudes of radar reflections in the horizontal as well as the vertical. The data were gridded using a Kriging algorithm that included a search of all data within a 1.0 m radius of the desired point to be interpolated on the grid. Filter was used to remove the background reflections.

Recent archaeological excavations made by University La Sapienza of Rome, during the last year in the “No Man’s Land” area have confirmed the structures individuated with the geophysical methods. This project is still in progress and new surveys, employing integrated geophysical methods, are planned for 2011.

References

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