



The detectability of archaeological structures beneath the soil using the ground penetrating radar technique

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The traditional excavation tools applied to Archaeology (i.e. trowels, shovels, bulldozers, etc.) produce, generally, a fast and invasive reconstruction of the ancient past. The geophysical instruments, instead, seem to go in the opposite direction giving, rapidly and non-destructively, geo-archaeological information. Moreover, the economic aspect should not be underestimated: where the former invest a lot of money in order to carry out an excavation or restoration, the latter spend much less to manage a geophysical survey, locating precisely the targets.

Survey information gathered using non-invasive methods contributes to the creation of site strategies, conservation, preservation and, if necessary, accurate location of excavation and restoration units, without destructive testing methods, also in well-known archaeological sites [1]-[3].

In particular, Ground Penetrating Radar (GPR) has, recently, become the most important physical technique in archaeological investigations, allowing the detection of targets with both very high vertical and horizontal resolution, and has been successfully applied both to archaeological and diagnostic purposes in historical and monumental sites [4].

GPR configuration, antenna frequency and survey modality can be different, depending on the scope of the measurements, the nature of the site or the type of targets. Two-dimensional (2D) time/depth slices and radargrams should be generated and integrated with information obtained from other buried or similar artifacts to provide age, structure and context of the surveyed sites.

In the present work, we present three case-studies on well-known Roman archaeological sites in Rome, in which GPR technique has been successfully used. To obtain 2D maps of the explored area, a bistatic GPR (250MHz and 500MHz antennas) was applied, acquiring data along several parallel profiles.

The GPR results reveal the presence of similar circular anomalies in all the investigated archaeological sites. In particular, in the Domus Aurea, in the Domitian Stadium, and in the San Cesario in Palatio church, the processing of the GPR data highlights not only the presence of Roman circular bases/insoles of pillars not yet brought to the light, but also their structural disposition and geometry.

These three examples show that GPR technique is a valid support which, in exhaustive way, can underline the unexpected presence of ancient structures beneath the soil, also in well-known archaeological sites.

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