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Different integrated geophysical approaches to investigate archaeological sites in urban and suburban area.

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Geophysical methods are frequently used in archaeological prospection in order to provide detailed information about the presence of structures in the subsurface as well as their position and their geometrical reconstruction, by measuring variations of some physical properties. Often, due to the limited size and depth of an archaeological structure, it may be rather difficult to single out its position and extent because of the generally low signal-to-noise ratio. This problem can be overcome by improving data acquisition, processing techniques and by integrating different geophysical methods. In this work, two sites of archaeological interest, were investigated employing several methods (Ground Penetrating Radar (GPR), Electrical Resistivity Tomography (ERT), Fluxgate Differential Magnetic) to obtain precise and detailed maps of subsurface bodies. The first site, situated in a suburban area between Itri and Fondi, in the Aurunci Natural Regional Park (Central Italy), is characterized by the presence of remains of past human activity dating from the third century B.C. The second site, is instead situated in an urban area in the city of Rome (Basilica di Santa Balbina), where historical evidence is also present. The methods employed, allowed to determine the position and the geometry of some structures in the subsurface related to this past human activity. To have a better understanding of the subsurface, we then performed a qualitative and quantitative integration of this data, which consists in fusing the data from all the methods used, to have a complete visualization of the investigated area. Qualitative integration consists in graphically overlaying the maps obtained by the single methods; this method yields only images, not new data that may be subsequently analyzed. Quantitative integration is instead performed by mathematical and statistical solutions, which allows to have a more accurate reconstruction of the subsurface and generates new data with high information content.