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Geophysical prospecting for preventive archaeology: case study on Paestum (southern Italy) archaeological site.

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Nowadays there is a growing attention to novel applications of geophysical methods in solving hydrogeological and environmental problems. Prospecting methods based on integrated multiple non-invasive geophysical techniques have proved to be very useful tools in supporting preventive archaeological studies. In this way it is possible to reduce the uncertainty in the interpretation of the results by combining the results of more investigations from different techniques. This approach makes it possible to obtain some clues about the presence of archaeological finds buried in the soil. It goes without saying that information about location and depth of archaeological structures obtained by different geophysical surveys can greatly help in bring to light archaeological structures avoiding unnecessary excavations and destructions, cutting time and back costs and steering future explorations. Starting from these preliminary remarks, this work aims to illustrate the use of integrated geophysical methods in bring to light structures in the archaeological area of the ancient Greek colony of Paestum (southern Italy). In this site high resolution geophysical surveys were carried out for the detection of buried bodies in some areas subject to the adjustment intervention and to the setting of road infrastructures.
The structural complexity present in the subsoil has suggested the implementation of integrated geophysical investigations based on Magnetometry, GPR and ERT, in order to obtain as much information as possible on the area for which any previous geophysical information was available.
In the investigated site, about 3000 m2 wide, magnetic measurements were acquired by means of the vapour caesium magnetometer Geometrics G-858 with gradiometric configuration along 1 m spaced parallel survey lines. GPR profiles with a SIR System-2000 of Geophysical Survey System Inc., equipped with a 200 MHz monostatic antenna were also performed. A total of 75 parallel profiles were made across the site, according to a criterion of regular acquisition along a rectangular mesh grid.
On the basis of the results from magnetometric and GPR surveys, ERT arrays in correspondence of areas with stronger anomalies were performed. Three geoelectrical tomographies using a 48-channel georesistivimeter Syscal R2 (Iris Instruments), with multi-electrode array Wenner–Schlumberger and 0.5 m electrode distance were obtained.
The cross-correlated analysis of data obtained from magnetometer, electromagnetic, and geoelectrical surveys provided information with very high detail, allowing for planning and executing the excavations, from which archaeological findings of particular interest emerged.