Geophysical Research Abstracts
Vol. 20, EGU2018-2424, 2018
EGU General Assembly 2018

Integrating ERT, GPR and Magnetic data for the identification of buried structures: examples in the south-eastern part of Rome and its surroundings (Latium, central Italy)

Francesco Smriglio (1), Salvatore Piro (), and Enrico Papale ()

(1) Dipartimento Scienze della Terra, Università Sapienza Roma (Italy), (2) CNR - ITABC, Cultural Heritage Department, Monterotondo Scalo, Italy (salvatore.piro@itabc.cnr.it)

Noninvasive geophysical methods play a key role in near surface geophysical investigations because they allow toobtain clear information about geometrical and physical characteristics of buried target. Among them, Electrical Resistivity Tomography (ERT), Ground Penetrating Radar (GPR) and Magnetic method find wide applications in the location of buried structures, like archeological remains, and underground natural or artificial cavities.
All methods measure the variations of single physical parameters, therefore if these are used singularly, they could not permit a complete location and characterization of anomalous bodies.
In this work, we applied these methods in two different sites. The first located in a public park (the so called Parco della Caffarella, close to the Via Appia Antica, Rome, Italy) in which hazardous cavity network, quarried by Romans, has known. The second is located in a small town about 70 Km far from Rome named Magliano Sabina in which archeological graves are already known. The results obtained during the surveys of these sites, employing Ground Penetrating Radar (GPR), Electrical Resistivity Tomography (ERT) and Fluxgate Differential Magnetic (FDM) to obtain precise and detailed maps of subsurface bodies, are presented and discussed.
With the aim to have a better understanding of the subsurface and to obtain a complete visualization of the investigated area, we performed different integrated approaches of these data, which consists in fusing the data from all the employed methodsWe applied both qualitative and quantitative integration methods in order to overcome the problem of low S/N ratio which is very common in near surface surveys.
The aim of this work is to verify if different integrated methods which are most used in other scientific disciplines can be used to effectively combine different geophysical data sets. The results, even if strictly dependent to the geologic frameworks of the investigated areas, encourage us to pursuit our research.

References

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