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From space to Earth: The GPR frontiers

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Ground Penetrating Radar (GPR) has become the most important physical technique in Earth investigations, allowing the detection of targets with both very high vertical and horizontal resolution, and has been successfully applied in both different fields and aims of the Earth Sciences. The scope of a geophysical measurement is the detection of the “boundaries” between objects having different values of a specific physical property. The contrast between the searched target and the background should be strong enough to be detected “at distance”, i.e. it should be able to generate a measurable relative spatial variation of a physical quantity at surface. GPR technique uses radio waves to create remotely an electromagnetic image of structures and features buried in the ground. The uses of such a remote sensor are numerous: to test the equipment to its maximum potential under a variety of conditions due to construct roving vehicles for landing on Mars; to reconstruct the evolutionary history of the lava flows in an active volcano; to monitor soil water content for agriculture; to find the lines of walls in archaeological excavations; to examine the wall paintings; to assess the structural stability or damages of buildings; and, also, to help law enforcement to solve crime. The “sensitivity” of the electromagnetic waves makes this instrument very powerful in remotely and non-invasively detecting both terrestrial and extraterrestrial targets.

Biography

Pier Matteo Barone is an adjunct faculty member of the American University of Rome teaching courses on Archaeology, Geophysics, Geoarchaeology, Remote Sensing, and Forensics, as well as courses on the Preservation of Cultural Heritage. He is a recognized expert in Forensic Geoscience employed to testify in criminal and civil cases. He is currently engaged in a three-year research project with the geological institute of CNR investigating marble quarries of the Greco-Roman world. He is an official reviewer in several peer-reviewed international journals, and he published more than 50 papers on peer-reviewed international journals on the above-mentioned topics.

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