



Hydrogeophysical monitoring of water infiltration processes

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Non-invasive subsurface monitoring is growing in the last years. Techniques like ground-penetrating radar (GPR) and electrical resistivity tomography (ERT) can be useful in soil water content monitoring (e.g., Vereecken et al., 2006). Some problems remain (e.g. spatial resolution), but the scale is consistent with many applications and hydrological models. The research has to provide even more quantitative tools, without remaining in the qualitative realm. This is a very crucial step in the way to provide data useful for hydrological modeling.

In this work a controlled field infiltration experiment has been done in August 2009 in the experimental site of Grugliasco, close to the Agricultural Faculty of the University of Torino, Italy. The infiltration has been monitored in time lapse by ERT, GPR, and TDR (Time Domain Reflectometry).

The sandy soil characteristics of the site has been already described in another experiment [Cassiani et al. 2009a]. The ERT was performed in dipole-dipole configuration, while the GPR had 100 MHz and 500 MHz antennas in WARR configuration. The TDR gages had different lengths. The amount of water which was sprinkled was also monitored in time. Irrigation intensity has been always smaller than infiltration capacity, in order not to have any surface ponding.

Spectral induced polarization has been used to infer constitutive parameters from soil samples [Cassiani et al. 2009b]. 2D Richards equation model (Manzini and Ferraris, 2004) has been then calibrated with the measurements.

References.

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