



Time-lapse 2D electrical resistivity tomographies for investigating the Picerno landslide (Basilicata Region, southern Italy)

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The rainwater infiltration into the soil and the increase of pore water pressure in the vadose zone can be considered the main causes of shallow landslides triggering. The standard techniques used to measure the water content of the soil and the piezometric levels in areas of potential instability are the TDR method and the piezometric measurements, respectively. These techniques, while allowing to obtain direct information of the considered parameter, provide a punctual information about the specific hydrological characteristics of the investigated soil.

Recently, the literature reports many examples of applications of indirect methods for the study and the estimate of water content in the first layers of the subsoil. In particular, the 2D electrical resistivity tomography has been applied for obtaining information about the temporal and spatial patterns of water infiltration processes. This paper reports the results obtained in the area affected by the Picerno landslide (Basilicata Region, Southern Italy), which represents one of the test sites of Morfeo project (Monitoraggio e Rischio da Frana mediante dati EO) funded by the Italian Space Agency (ASI). The studied slope has been frequently involved in reactivation phenomena the most recent of which occurred on March 2006.

In the area, we have installed a prototype system for time-dependent analysis of electrical resistivity images and TDR measurements. The geophysical results are opportunely integrated with the piezometric data. The system is composed of a 48-channel cable connected to the georesistivimeter Syscal Pro Switch 48, the electrodes are placed at a distance of 1 m. Two holes used to measure the piezometric level and another four equipped with TDR probes are located along the acquisition profile. The electrical resistivity tomographies and the water content measurements are performed with time intervals selected by considering the rainfall intensity and frequency. The first preliminary result of this experiment are presented and discussed.