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Integration of DInSAR techniques and near-surface geoelectrical surveys for studying ground instability phenomena: the case-study of Lucanian Apennine (Southern Italy).

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We propose the integration of satellite remote sensing and ground-based geophysical methodologies for investigating ground instability phenomena in the Lucanian Apennine chain (Basilicata Region, Southern Italy). The Differential Interferometric Synthetic Aperture Radar (DInSAR) technique referred as Small Baseline Subset (SBAS) algorithm, and the near surface Electrical Resistivity Tomography (ERT) methodology have been jointly applied for detecting and characterising surface deformation processes at different time-spatial scales. The SBAS procedure has been applied for analysing the time dynamics of ground instabilities over large areas. The ERT methodology allows us to reconstruct in depth and with high-resolution imaging techniques the geometry and the physical properties of the subsurface in the areas where deformations have been previously detected via the DInSAR survey . The Lucanian Apennine chain, being an area of more recent orogenesis still subjected to appreciable and differential neo-tectonic uplifting, shows a wide spectra of ground instability phenomena with a predominance of mass movements markedly predisposed and tightly controlled by the geostructural characters (rotational and translational slides, earth and mudflows, deep-seated gravitational slope phenomena, etc.). The integrated approach allowed us to investigate the time-dependent changes of a complex gravitational deformation process, which affects Maratea Valley located on the Thyrrenian coast of

Basilicata Region and to detect unknown (or only partially known) the ground instability phenomena, such as land subsidence, which involves the urban area of Satriano di Lucania, located close to Potenza town (Basilicata Region, Italy). Our findings, combined with geological and geomorphologic surveys, permit to better localize the deformed areas, to estimate the intensity of the deformation, to characterize the geological structures interested by the deformation and to reconstruct with high-resolution imaging techniques their subsurface geometry.