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SOIL FEATURES AS POTENTIAL FACTORS OF SHALLOW LANDSLIDES: A CASE STUDY IN CALABRIA, ITALY

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Several studies exist on the effects of chemical and physical weathering processes on different rock types as predisposing factors of landslides. However, role of morphological and physical discontinuities caused by pedogenetic processes on parent rocks as potential triggering factors of shallow landslides and related risk assessment has been poorly investigated. Also sampling strategies for geotechnical or hydrological laboratory analyses can be biased by the lack of detailed information about the soil spatial variability and of a consequent horizon-wise selection of samples from soil profiles. This research focuses on the assessment of shallow landslide susceptibility along the A3 highway section between Cosenza Sud and Altilia in northern Calabria (southern Italy). It is part of a wider project (PON01-01503: "Integrated systems for hydrogeological risk monitoring, early warning and mitigation along the main lifelines"), aimed at hydro-geological risk mitigation and early warning along three highway sections of southern Italy. Based on a detailed geological and geomorphological survey, the main lithological, structural and relief features of the landscape were mapped, with a special emphasis on active, dormant and inactive landslides and their geo-lithological control factors. A soil survey was carried out, focused on the identification of pedological discontinuities as potential factors that might trigger shallow landslides. Many soil profiles, often close to landslide scarps, evidenced significant morphological changes of the parent materials, such as texture, pedogenic structure, dry consistence and moisture, or hydromorphic features caused by transient water-logging conditions, and clay-illuviated horizons. Buried and truncated soils were recognized, overlain by younger soils developed on colluvia, debris flows and detrital slope deposits. Five representative soil profiles were selected and sampled for pedological, geotechnical and hydrological laboratory analyses. Bulk and undisturbed samples were collected for chemical and physical soil analyses, for determining Atterberg limits, cohesive strength, angle of internal friction, water retention curves. The main results showed irregular patterns of pedological (particle size distribution, organic matter content, bulk density), hydrological (water content, pore size distribution) and some geotechnical data (Atterberg limits) along the soil profiles, coherently with field observations.