Landslides hazard mapping integrating remote sensing and geo-morphological data in the Sorrentina Peninsula coastal areas

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The densely inhabited Campania region (Southern Italy) is affected by numerous and dangerous landslides. In particular, the coastal area of Sorrentina Peninsula is one of the zones most subjected to two types of landslides: volcanoclastic debris flows and rock fall. The first type occurs during intensive or persistent precipitations and on significant hillslopes where carbonatic bedrock is covered by pyroclastic deposits related to the Somma-Vesuvius and Phlegrean Fields explosive activity. The second type could be triggered by seismic events and occurs in areas where outcropping bedrock with steep slopes (e.g. the cliffs) is subjected to coastal erosion generating cliff instability.

In order to improve the landslides hazard zonation in the Sorrentina Peninsula coastal area, we show a multidisciplinary approach to identify the areas more prone to generate such types of landslide. Our approach involves the analyses of ERS (temporal span between 1992-2000), Envisat (2003-2010), and COSMO-SkyMed (2013-2015) SAR data elaborated applying multi-temporal InSAR techniques to obtain the ground displacement maps and the relative displacement time series, integrated by means of GPS data. These maps were used to identify the instability areas and subsequently investigated by field survey, airborne photogeological interpretation and morphometric elaborations derived from airborne Lidar information. In addition, the land cover mapping was obtained using satellite high-medium resolution data. The analysis was performed in a GIS environment allowing to identify the main parameters that influence the slope instability and to obtain the landslide hazard map. finally, the comparison with the landslides historical database provides the different landslides susceptibility degrees classes.