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Hazard assessment of superficial landslides: application in the Iafrate Creek basin (Cervinara, Campania Region, Italy) for evaluating spatial hazard and landslide intensity

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Fast moving superficial landslides, as debris and mud flows, that have affected the Italian territory in the last decade (i.e. Piedmont, 1994; Versilia, 1996, Sarno, 1998; north-western Italian Alps, 2000), due to their triggering and evolution kinematics are the most dangerous in terms of human life losses. Such landslides are characterised by a troublesome spatial and temporal forecasting for an objective difficulty in recognising diagnostic geomorphological features of past phenomena as well as for most of them are first-time landslides. The Law 267/98 has constituted an important changing in land planning policies in Italy for the adoption of special measures in the detection of areas at very high landslide risk (R4). Nevertheless, due to the temporal limits envisaged for the detection of areas at risk, the technical rules related to the Law address, as main concern, the analysis in such areas affected by acting or dormant landslides. This approach tends to underestimate the impact of first-generation landslides over the socio-economic setting. In this work a methodology is proposed that permits to define a landslide risk analysis, with reference to first-time landslides.

The methodology is firstly addressed to a preliminary phase of the *landslide triggering susceptibility* analysis.This phase concerns two distinct approaches: the site analysis, that requires the detection of landslide predisposing factors by means of a field survey carried out on the past landslides listed in an inventory and mapped on a geo-

morphologic map. Subsequently the analysis of macro-area is carried out on selected areas that is aimed to the validation, calibration and spatialisation of the predisposing factors in such areas with the same geological and geomorphological features. A susceptibility triggering map for re-activation phenomena and first-time landslides is the result of this preliminary phase.

The following phase of the methodology involves the definition of the *landslide hazard*. To this aim an high resolution DEM of the area for simulating and reconstructing the landslide potential crown zone, body track and depositional area is firstly performed. Subsequently the landslide intensity is evaluated taking into account the velocity and the mobilised volumes of the past landslides. Finally, a particular attention is paid in the zonation of the potential accumulation areas by taking into account the size of the large blocks carried down by the past landslides occurred in the area. This methodology has been applied in the test area of Iafrate Creek (Cervinara - AV), in which the previous analysis of landslide susceptibility has been performed.