



A new methodology for deterministic landslide risk assessment at the local scale

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The present paper discusses the formulation of a methodology that is being developed for regional landslide risk assessment within geologically complex areas and some preliminary results of its application at the intermediate scale (i.e. between the regional and the slope scale). In particular, the methodology is the subject of an on-going multidisciplinary research project, which aims at the assessment of the landslide hazard, of the corresponding vulnerability of structures and of their exposition, involving different expertises. As such, both the landslide hazard and the structure vulnerability assessments are meant to be based upon the knowledge of the failure mechanisms and to benefit from scientific knowledge in the fields of both geotechnical engineering and structural mechanics. At the same time, the exposure of the elements at risk is to be investigated according to analyses of the socio-economical context where the risk is being evaluated. In the present paper only the work relating to landslide hazard is presented. This work aims at the further development of Quantitative Landslide Hazard Assessment, QHA, following a deterministic approach. As such, it is aimed at exporting the geo-mechanical interpretation of slope stability and landslide mechanisms from the slope scale (site-specific) to the regional scale.

The results of such a methodology will be implemented in a GIS system and reported in guidelines. As concerns the landslide hazard assessment, the proposed methodology involves two interconnected working phases, the first one at regional scale and the second one at town scale. During the first phase, an analytical database of all the factors affecting the slope equilibrium is created and a geo-hydro-mechanical classification of the soil masses is defined together with the definition of the main landslide typologies present in the region. Thereafter, the connections existing among the sets of internal factors of landslides, which characterise the geo-hydro-mechanical classes, the external factors and the landslide typologies are recognised and formulated. These connections may be recognized as result of phenomenological studies, limit equilibrium analyses of the slopes, in-situ monitoring and numerical modelling of the landslide processes. The application of the procedure to the hazard assessment within a given portion of the region represents the second phase of the methodology. The research work is developed with reference to a test-site area, the Daunia region, located at the eastern margin of the southern Apennines, which is a portion of the chain belt along the subduction zone between the African and the Euro-Asiatic plates, where slopes are made up of tectonised and fissured soils and rocks. Here, frequent and intense landsliding involve the slopes extensively and repeatedly, restraining urban development. The research is currently investigating the applicability of the deterministic methodology to the landslide hazard assessment of the urban territories in the region.