PREDICTABILITY OF INDIVIDUAL MASS MOVEMENTS FROM SPATIAL DATABASES FOR HAZARD MAPPING

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ABSTRACT

Predictive models of landslides hazard have been developed from databases that provide the spatial information to characterize the typical geomorphologic settings of the trigger areas of specific types of mass movements. The integration of several layers of spatial data such as DEM derivates, lithology, land use and the distribution of groups of landslide trigger zones belonging to particular dynamic types and the known time interval allows to apply analytical strategies to validate the results of predictions. Two ways of evaluating prediction patterns are: (i) the analysis of prediction-rate curves, and (ii) the stability-sensitivity characterization of the prediction images.

Because the problem of generating a prediction is less critical than the one of understanding its significance, the following strategy is applied in this contribution. First a separation of "good" predictor layers is obtained by an evaluation technique based on empirical validation. Then, the separation of "good" predictor mass movements is generated by iteratively excluding one mass movement from the prediction model. This is to validate its predictability by the remainder of the mass movements used to generate the prediction. The result of this strategy is a measure of how much each mass movement contributes to a prediction. A study of the "bad" predictors provides criteria to understand the information content of the database. Such a process represents a form of data mining that allows not only to extract information from very large databases but also to understand the significance and usability of what we have as available data.

Two case studies in central Italy and Portugal are using hazard mapping databases of different resolution and geological complexity. These application areas are used to discuss the interpretation of predictability of the mass movements and the consequent hazard susceptibility representation.