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Validation of Spatial Prediction Models for Landslide Hazard Mapping

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Abstract. This contribution discusses the problem of providing measures of significance of prediction results when the predictions were generated from spatial databases for landslide hazard mapping. The spatial databases usually contain map information on lithologic units, land-cover units, topographic elevation and derived attributes (slope, aspect, etc.) and the distribution in space and in time of clearly identified mass movements. In prediction modelling we transform the multi-layered database into an aggregation of functional values to obtain an index of propensity of the land to failure. Assuming then that the information in the database is sufficiently representative of the typical conditions in which the mass movements originated in space and in time, the problem then, is to confirm the validity of the results of some models over other ones, or of particular experiments that seem to use more significant data. A core point of measuring the significance of a prediction is that it allows interpreting the results. Without a validation no interpretation is possible, no support of the method or of the input information can be provided. In particular with validation, the added value can be assessed of a prediction either in a fixed time interval, or in an open-ended time or within the confined space of a study area. Validation must be of guidance in data collection and field practice for landslide hazard mapping.

Key words: Validation, spatial data, prediction models, future landslide hazard, quantitative models, visualization, ranking, interpretation of prediction results

1. Introduction

This contribution deals with the issue of generating predictions from spatial databases for landslide hazard mapping. In particular, it discusses the problem of providing measure of significance of prediction results. For instance, if we consider a spatial database containing maps of lithologic units, of land cover units, of topographic elevation and derived attributes (slope, aspect, etc.) and of the distribution in space and in time of clearly identified mass movements, we can transform the multi-layered database into an aggregation of functional] values to obtain an index of propensity of the land to failure (Chung *et al.*, 1995, Carrara *et al.*, 1995, Leroi, 1996, Chung and Fabbri, 1998, 1999, Jibson *et al.*, 1998). Assuming then that the information in the database is sufficiently representative of the typical conditions in which the mass movements originated (in space and in time), we can generate