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1 Spatial modelling of slide phenomena integrating multitemporal remote sensing and GIS to terrain stability mapping

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A common aspiration of many geomorphologists is to assess the landslide susceptibility of a landscape through some sort of calibrated analysis. To this end, a new methodology to generate a terrain stability map using a GIS-based model applied to the Aggia watershed (Umbria region, central Italy) is presented.

The concept of integrated terrain stability mapping requires designing a database as a basis for further analysis and natural hazard assessment. Once a landslide and terrain inventory is completed using multitemporal aerial photographs, parameters relevant to the natural hazard phenomena need to be identified. This blend formed the basis of a semi-quantitative and promising approach in order to model the spatial distribution of shallow landslides combining a mechanistic infinite slope stability model with a steady-state hydrology model. The modelling is calibrated towards the automatic analysis of the GIS-derived geomorphic parameters (slope, aspect, drainage), the lithology and the land cover. Each of these parameters is delineated on a numerical grid over the study area. The primary output of the model is a stability index where the numerical value is used to groups and categorized the terrain stability at each grid location producing a stability classification map of the study area. As a result the fi-

nal spatial distribution of the stability index shows to be governed by relationships between diagnostic features and the landslide phenomena itself, based on Bayesian logistic regression that make a simple assessment of this effect in the presence of random effects.