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LANDSLIDE HAZARD PREDICTION IN THE NORTH-EASTERN APENNINES (ITALY)

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In order to assess the landslide hazard nearby the Pergola town (North-Eastern Apennines, Italy) a ground survey at a scale of 1:10,000 was performed for an extent of about 370 km^2 (Carmignani, 2001) and a GIS of landslides was built. A statistical analysis of the data allowed to observe that correlation exists among landslide occurrence and characters of causal factors (lithology, engineering geology, elevation, slope, aspect, relation of bedding orientation to slope face -RBS- and land use) in the main scarp. Consequently, considering the morphological, lithological and anthropic characters recognised for the actual landslides, it was assumed that new landslides could develop more probably in those stable area characterised by similar characters. Based on this assumption, a geostatistical analysis was then performed. The spatial analysis of the GIS allowed to obtain the unique condition regions (Chung et al., 1995) and the statistics of the relationships among causal factors and landslides. Afterwards, for every unique condition region, the susceptibility to development of new occurrences (favourability mapping) was calculated by utilising the certainty factor (CF; Chung & Fabbri, 1993) algorithm. For those landslides area where crown was mapped in the field, the main scarp was regarded to as occurrence; for all the others, a buffer around the highest point of displaced material was taken into account (Disperati et al., 2002). Different favourability maps were obtained processing various combinations of causal factors both for slides (175 occurrences) and flows (464 occurrences).
The spatial accuracy assessment (Chung, 1999) allowed to select the most suitable combinations of causal factors: half of the occurrences were randomly chosen (test dataset) and their location within the favourability maps, obtained using the other portion of occurrences (training dataset), were analysed. The higher the number of test dataset landslides occurring in the areas characterised by high CF values, the

better the combination of causal factors. This relationship was quantitatively represented through prediction rate charts. Results suggest that engineering geology can be regarded to as the main factor controlling the development of flows, while the combination engineering geology + land use + RBS provides the best prediction rate. On the other hand, the combination engineering geology + slope provides the best prediction rate for slides.

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