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Comparing the predictive capability of landslide susceptibility models in three different study areas using the Weights of Evidence technique

Haydar Hussin (1), Veronica Zumpano (2), Simone Sterlacchini (3), Paola Reichenbach (1), Dan Bălteanu (2), Mihai Micu (2), Gloria Bordogna (3), and Mattia Cugini (4)

(1) CNR-IRPI, Via della Madonna Alta 126, I-06128 Perugia, Italy (haydar.hussin@irpi.cnr.it), (2) Institute of Geography, Romanian Academy, 12 Dimitrie Racovita, Bucharest, Romania (zumpanoveronica@gmail.com), (3) CNR-IDPA, Piazza della Scienza 1, 20126 Milan, Italy, (4) Università degli Studi di Milano, Milan, Italy

Landslide susceptibility models are a key component for quantitative hazard assessments at medium to regional scales. The analysis and the evaluation of susceptibility models prepared for different test sites have been used to verify their flexibility and effectiveness. By comparing models in areas with different physio-graphic, climatic, and geological settings, we have tried to determine the influence of these regional differences on the predictive capability of landslide susceptibility modeling. In this study we used the weights-of-evidence statistical technique, which had been successfully applied in Valtellina di Tirano in Italy for predicting shallow landslide induced debris flow source areas. The results related to the accountability and reliability of the susceptibility models, the combination of conditional factors, the model success rate curves (SRCs), the prediction rate curves (PRCs) and the area under the curves (AUCs) were compared with results from the Fella River study area in the Italian Alps and the Buzau County case study in the Romanian Carpathians, which are also affected by more translational/rotational landslide types. The influence of methods to represent landslide inventories (the point density of source areas and points versus polygons) on the susceptibility modeling was also studied. Different models for each test site have been prepared by combining the available morphometric and geo-environmental factors. Among the morphometric derived conditional landslide factors used were aspect, elevation, flow accumulation, plan and profile curvature and slope; while the geo-environmental factors used were distance to faults, land-cover and geology. The degree of spatial agreement among different patterns of landslide susceptibility maps have been evaluated with an important emphasis on the comparison of different combinations of conditional factors that result in the best prediction of landslide susceptibility for each case study area.