



Landslide susceptibility by spatial analysis of two drainage basins, upper Oltrepo Pavese, Italy.

S. Poli (1,2), S. Sterlacchini (1), F. Zucca (3), C. Meisina (3), S. Frigerio (1,2), M.DeAmicis (2), S.Sironi (1,2), F. Villa (2)

(1) Institute for the dynamic of environmental processes, National Research Council (CNR-IDPA), section of Milan, piazza della Scienza 1, 20126 Milan, Italy, (2) Department of Environmental Sciences (DISAT), University of Milan-Bicocca, piazza della Scienza 1, 20126 Milan, Italy, (3) Department of Earth Sciences, University of Pavia, via ferrata 1, 27100 Pavia, Italy (simone.poli@unimib.it / Phone: +39-02-6448-2854)

The construction of landslides susceptibility maps is just a first step in the procedure of hazard definition. This paper presents a GIS-based modelling approach to derive regional susceptibility maps, characterized by the application of a prediction from one basin to another basin with similar geological, geomorphological and climatic conditions. The likelihood ratio model (LR) was used to derive landslides susceptibility maps in a first basin. The statistics obtained were transferred to another basin. Two basins are located in the southern part of the Region of Lombardy: the Versa and the Scuropasso. The spatial database contained the same landslides conditioning factors for both areas: geological, landuse, and structural thematic map units (faults and overthrusts) and some continuous units directly extracted from a 20 m x 20 m digital elevation model (curvature, slope, aspect, internal relief). The landslides inventory maps, available for the study areas, were somewhat different: two landslides datasets were available for the Versa Basin, the first obtained in 1978, the second in 1999, only a 1999 dataset was available for the Scuropasso Basin.

The 1978 dataset was used to apply the susceptibility model but to the Versa Basin. Many experiments were made, combining differently the conditioning factors that a preliminary analysis revealed their relation with the distribution of the failures. Prediction quality of the Versa susceptibility results were estimated by temporal cross-validation with the Versa 1999 inventory map. The most effective result for the Versa Basin, was applied to the Scuropasso Basin to derive its susceptibility map. The result

was at the end cross-validated by using the Scuropasso 1999 inventory map.

The final susceptibility modelling procedure was found feasible and capable of identifying the newly triggered landslides in both study areas. It was obtained to transfer the statistics from one area to others having in common geo-climatic conditions with a limited number of landslides inventories that did not permit temporal cross-validation. A general framework for applying a susceptibility model, to test it and to transfer it to similar areas is discussed.