



The influence of terrain units in landslide susceptibility assessment: a case study in the Abadia Basin (Portugal)

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The fit to data of a model and its prediction capability are nowadays major aims within landslide susceptibility assessment studies. When using GIS tools and data-driven approaches in modelling landslide susceptibility, several different terrain units have been used worldwide (e.g., unique conditions terrain units, slope units, grid-cells units, administrative divisions, etc.). However, many times the choice of terrain units to be used for modelling purposes is made according to computation facilities and not considering the agreement that should exist among the terrain unit type and the objectives of the work. Additionally, little work has been made on the evaluation of adjustment between different types of terrain units and both data and models for landslide susceptibility assessment. The major aim of this study is to assess the weight of the step of terrain unit type selection on the final results of landslide susceptibility modelling in the test site of the Abadia basin, located 35 km north of Lisbon (Portugal). In this study we apply two statistically-based landslide susceptibility models: the Information Value Method (bivariate) and the Logistic Regression Analysis (multivariate). The prediction methods are performed using rotational slides (44 cases) and shallow translational slides (49 cases) that were identified in the study area and introduced into a GIS database. The modelling process is applied separately for each type of landslide and using always the same thematic layers representing landslide predisposing factors (e.g. slope, aspect, transverse slope profile, lithology, land use and vegetation cover). Each landslide susceptibility model is applied over three different types of terrain units that are frequently used in landslide susceptibility studies: grid-cell units, slope

units, and unique conditions resulting from the overlapping of lithology and slope. The influence of the chosen terrain unit in the assessment of landslide susceptibility is evaluated by computing and comparing the success-rates and areas under the curve for each model. Finally, the results obtained are critically compared, considering different possible applications of the produced landslide susceptibility maps.

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