



3D Landslides Susceptibility Analysis in Romanian Subcarpathians

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Most of the present day studies make use the 2.5D raster data formats for the landslide susceptibility analysis at regional scales. This data format has some disadvantages when geological and lithological settings are spatial discretized, hence these disadvantages propagate in the landslides susceptibility analysis and especially where only surface lithology is used. The main disadvantage when using 3D data models for the assessment of landslide susceptibility at regional scales is represented by the quality of the geological and lithological information that is available for a depth of no more than 100m. In order to mitigate this, a sufficient number of boreholes is required and sometimes is not available. In order to overcome the lack of borehole data, our approach was to make use of the present-day geological maps at scales ranging from 1:25,000 to 1:50,000 and to generate a geological 3D model up to a depth of 100m. The geological model was generated based on expert knowledge interpretations and geological cross sections provided on these geological maps. Using the 3D geological model a more complex 3D model was generated for the landslide susceptibility analysis that also contains information from other predictor factors like slope gradient, land-cover and land-use. For the landslide susceptibility analysis instead of using map algebra equations on classic pixel based data sets, the equations were adapted for 3D data models and map algebra equations on voxels. The test sites are located in the areas of Romanian Subcarpathians. The Romanian Subcarpathians are located to the exterior of the Carpathians. They consist of a large variety of rocks, flysch-type deposits in the inner part and molasse deposits in the outer part, ranging from a Cretacic-Paleogene to a Quaternary age. While some parts of the Subcarpathians have a basic geology, with a monoclinical geological structure, other parts like the Curvature Subcarpathians, present a complex folded and faulted structure. The region is highly affected by a wide range of slope and channel processes.