
Landslide susceptibility modelling for Iasi County, Romania

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Abstract

Iasi County is located in the hilly area of Eastern Romania (Moldavian Plateau), at the contact between two plateau areas (Suceava Plateau and Central Moldavian Plateau) with altitude up to 400 m, and a lowland hilly area with altitude up to 200 m and dominated by clayey and sandy deposits with sandstones and limestones caprocks. In this lowland area landslides have a long history, with evidences of Upper Pleistocene and Lower Holocene landslides, the magnitude of landslide becoming smaller toward the present day, mainly because of the dryness of the climate.

The study area is populated with several urban concentrations and mainly with rural settlements. Forest covers the south part of the county, in the higher areas.

The landslide inventory used for fitting the statistical models contained over 15 000 landslides, delineated from LiDAR and high resolution aerial imagery from Google Earth and Bing maps archives. Single event landslides were mapped, were all the components of a landslide were identified (crown/scarp, flanks, tip/toe). These landslides happened in the last 200-300 years. Beside this inventory, used for model fitting, a separate inventory was prepared, with landslide events that happened in the last 60 years, containing 200 landslides, which was used for validation of the statistical model.

Several methods (AHP, multivariate and machine learning statistical methods) were used for fitting spatial models of landslide susceptibility using DEM derived variables, land use, geology and previous old/relict landslides for slope facets, delineated using hydrological criteria.

The machine learning statistical methods gaved the best results, both considering the model fitting and the validation using the last 60 years events inventory.

Keywords: landslide susceptibility modelling, Iasi County, Romania, statistical models, landslide inventory

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