



Landslide triggering rainfall thresholds estimation using hydrological modelling of catchments in the Ialomita Subcarpathians, Romania

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This work focuses on the hydro-meteorological analysis for landslide triggering rainfall thresholds estimation in the Ialomita Subcarpathians. This specific area is a complex geological and geomorphic unit in Romania, affected by landslides that produce numerous damages to the infrastructure every few years (1997, 1998, 2005, 2006, 2010, 2012 and 2014). Semi-distributed ModClark hydrological model implemented in HEC HMS software that integrates radar rainfall data, was used to investigate hydrological conditions within the catchment responsible for the occurrence of landslides during the main rainfall events. Statistical analysis of the main hydro-meteorological variables during the landslide events that occurred between 2005 and 2014 was carried out in order to identify preliminary rainfall thresholds for landslides in the Ialomita Subcarpathians. Moreover, according to the environmental catchment characteristics, different hydrological behaviors could be identified based on the spatially distributed rainfall estimates from weather radar data. Two hydrological regimes in the catchments were distinguished: one dominated by direct flow that explains the landslides that occurred due to slope undercutting and one characterized by high soil water storage during prolonged rainfall and therefore where subsurface runoff is significant.

The hydrological precipitation-discharge modelling of the catchment in the Ialomita Subcarpathians, in which landslides occurred, helped understanding the landslide triggering and as such can be of added value for landslide research.