

Identifying hydrological pre-conditions and rainfall triggers of slope failures at catchment scale for 2014 storm events in the Ialomita Subcarpathians, Romania

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This paper addresses a regional scale analysis of the rainfall induced landslides for 2014 storm events based on detailed hydro-meteorological data set in the Ialomita Subcarpathians. This area is located in the western part of the Curvature Subcarpathians, a complex geological and geomorphic units in Romania. The high temporal frequency of landslide events in the last decades (1997, 1998, 2005, 2006, 2010, 2012 and 2014) leads us to considerer that these processes play a major role in the evolution of this area's landscape where the most frequent landforms are: slumps, earth flows, mudflows and complex movements. The rainy period between April-August 2014 induced numerous flash-floods and landslides in this specific area that resulted to severe economic losses estimated to € milion in Dambovita County. Spatially distributed rainfall during the main storm events estimated from adjusted radar-based precipitation was used to investigate the hydro-meteorological conditions that triggered or not landslides in the Ialomita Subcarpathians. Hydrological preconditions were assessed by hourly in situ soil moisture measurements at local scale and hydrological modelling at regional scale. ModClark semi distributed model implemented in HEC HMS software that integrates radar data was used to analyse catchment response to the main rainfall event that resulted to landslides in 2014. Analysis between rainfall, soil moisture conditions and direct runoff was performed for identifying the contribution of the hydro-meteorologic conditions to landsliding process in the Ialomita Subcarpathians. A detailed landslide inventory based on field mapping and visual interpretation of satellite and aerial images was completed with information from local authorities and mass media. Despite the limited number of landslide events, this study allows a detailed insight of understanding the influence of rainfall in landslide occurrence in this specific area.