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Exploring the Role of Soil Moisture Conditions for Rainfall Triggered Landslides on Catchment Scale: the case of the Ialomita Sub Carpathians, Romania

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Like in many parts of the world, landslides represent in Romania recurrent phenomena that produce numerous damages to the infrastructure every few years. The high frequency of landslide events over the world has resulted to the development of many early warning systems that are based on the definition of rainfall thresholds triggering landslides. In Romania in particular, recent studies exploring the temporal occurrence of landslides have revealed that rainfall represents the most important triggering factor for landslides. The presence of low permeability soils and gentle slope degrees in the Ialomita Subcarpathians of Romania makes that cumulated precipitation over variable time interval and the hydraulic response of the soil plays a key role in landslides triggering. In order to identify the slope responses to rainfall events in this particular area we investigate the variability of soil moisture and its relationship to landslide events in three Subcarpathians catchments (Cricovul Dulce, Bizididel and Vulcana) by combining in situ measurements, satellite-based radiometry and hydrological modelling. For the current study, hourly soil moisture measurements from six soil moisture monitoring stations that are fitted with volumetric soil moisture sensors, temperature soil sensors and rain gauges sensors are used. Pedotransfer functions will be applied in order to infer hydraulic soil properties from soil texture sampled from 50 soil profiles. The information about spatial and temporal variability of soil moisture content will be completed with the Level 2 soil moisture products from the Soil Moisture and Ocean Salinity (SMOS) mission. A time series analysis of soil moisture is planned to be integrated to landslide and rainfall time series in order to determine a preliminary rainfall threshold triggering landslides in Ialomita Subcarpathians.