



On the feasibility of using satellite-based soil moisture data for rainfall-induced landslide prediction

Luca Ciabatta, Stefano Luigi Gariano, Massimo Melillo, Maria Teresa Brunetti, Silvia Peruccacci, and Luca Brocca

Research Institute for Geo-Hydrological Protection, Perugia, Italy (luca.ciabatta@irpi.cnr.it)

Soil moisture plays a key role in many fields, such as drought management, weather forecasting, agriculture and natural hazards assessment. For the latter, soil moisture is used beneficially in hydrological modeling for flood hazard mitigation while for landslides assessment its use is very rare. Satellite-based products are available at high temporal and spatial resolution, providing accurate estimates of soil moisture over large areas. In this study, soil moisture data obtained through the Advanced SCATterometer (ASCAT) are used to investigate the role of satellite-derived soil moisture observations on the possible occurrence of landslides in Italy. To this end, a catalogue of more than 1000 shallow landslides occurred in Italy during the period 2007-2015 and the rainfall ground observations from 600 rain gauges are used. The rainfall events that likely triggered every landslide have been identified by manual inspection of the pluviographs, considering standardized criteria. The soil moisture conditions prior the precipitation event and the total rainfall amount are used to identify the triggering conditions for the Italian territory. The analysis provided promising results, although the coarse spatial resolution (12.5 km) could limit the capabilities of the remotely sensed information of defining the correct soil saturation conditions. The use of higher soil moisture products, e.g. Sentinel-1 derived data, could improve the performance of such approach, and will be presented at the conference.