



Relationship between soil moisture statistics and landslide occurrence

Anne Felsberg (1), Gabrielle J. M. De Lannoy (1), and Rolf H. Reichle (2)

(1) KU Leuven, Soil and Water Management, Earth and Environmental Sciences, Belgium (anne.felsberg@kuleuven.be), (2) Global Modeling and Assimilation Office, NASA Goddard Space Flight Center, Greenbelt, MD, USA

Hydrological triggering of landslides is strongly connected to the water content of the soil. Existing landslide models mostly rely on antecedent rainfall indices (ARI) as a proxy for soil moisture conditions, with threshold values of triggering for example at the 95th percentile of historical ARI. This study moves away from using proxy data such as the ARI and towards using soil moisture as well as ground water data, in order to obtain more precise knowledge on the connection of soil water conditions and landslide triggering.

Detailed information on time and location of many hydrologically triggered landslides is recorded within the Global Landslide Catalog (GLC) from 2006 onwards. Percentiles of soil moisture and ground water can hence be calculated for the moment of landslide occurrence. Results will be evaluated for different soil moisture products, ranging from reanalysis data on a coarse scale (MERRA-2, M36) to land surface model results on a finer scale (NASA Catchment Land Surface Model (CLSM), ~9 km), but also for different microwave-based soil moisture retrievals (e.g. SMOS or ASCAT) and data assimilation products (SMAP L4, ~9 km). Differences in soil moisture statistics between the various products will help with choosing the most adequate one for predicting landslide probability in the future. We will also analyze whether patterns and connections with environmental conditions such as climate regime, vegetation or depth to bedrock are explanatory for the observed soil moisture statistics and their relationship to landslides.