Geophysical Research Abstracts
Vol. 20, EGU2018-7190, 2018
EGU General Assembly 2018

Characterization of hillslope deposits for regional landslide prediction modelling

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Physically based approaches for the prediction of rainfall-induced shallow landslides are an intensely debated research topic among the earth sciences community, and many models have been presented thus far. Physically based models are capable of handling all the physical processes occurring during a landslide event. One of the crucial factors that controls the accuracy of the physically-based model predictions is the need for a detailed database of physical and mechanical properties of soil covers for the selected study area. Furthermore, the application of models over large areas is hindered by a poor comprehension of the spatial organization of the required geotechnical and hydrological input parameters.
In this work we characterize the geotechnical and hydrological properties of the hillslope deposits in Tuscany (Italy), with the final aim of providing reliable data to model the occurrence of instability mechanisms affecting the hillslopes at regional scale. Here, the data collected so far, which constitute the first step to build up a regional inventory, are presented and discussed. The retrieved dataset of measurements has been built up by means of an extensive field campaign investigating over 100 sites across the Tuscan region by means of both in situ determinations and laboratory experiments. The specific objectives are: i) to determine the ranges of variation of the geotechnical and hydrogeological parameters that control shallow landslide triggering mechanisms and ii) to investigate a way to spatialize the geotechnical and hydrological data according to physical factors. The data retrieved are considered beneficial in order to improve the reliability of numerical model aimed to simulate the stability of hillslope and assess triggering mechanisms of landslides.