



Rainfall thresholds for the possible initiation of shallow landslides in the Italian Alps

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Rainfall induced shallow landslides are frequent events in the Italian Alps. In this very large area, shallow landslides, including soil slips and debris flows, cause damage every year, including human and economic losses. To foster the currently limited ability to forecast the occurrence of shallow landslides in Italy, the Italian National Department for Civil Protection is funding a research project aimed at defining the regional and sub-regional rainfall conditions that can result in landslides in Italy. In this work, we report preliminary results of this project for the Italian Alps, northern Italy. We have compiled a catalogue of about 350 rainfall events that have resulted in landslides – mostly shallow landslides – in the Italian Alps in the 12-year period 2000-2011. For the purpose, we searched national and local newspapers, technical reports and historical sources, to collect new information on the occurrence of rainfall-induced landslides in the study area. National and regional databases with hourly and sub-hourly rainfall measurements were used to reconstruct the cumulated amount (E) and the duration (D) of the rainfall responsible of the documented slope failures. The catalogue represents the largest collection of chronicles-derived information on rainfall events with landslides in the Italian Alps. Adopting a consolidated statistical approach for the definition of rainfall thresholds and the associated uncertainties, we defined new sets of ED rainfall thresholds for possible landslide occurrence in the Italian Alps. The new thresholds are compared with similar thresholds in the same general area. We expect the results of our study to improve the ability to forecast shallow landslides in the Italian Alps and, more generally, in the wider Alpine region.