Historical and autumn-winter 2008/09 rainfall events in Calabria (southern Italy): rainfall scenarios triggering shallow and rapid landslides

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Shallow and rapid landslides are often caused by precipitation, especially when the rainfall has exceptional intensity and/or persistence characterized by a series of successive "single rainfall events". "Single event" indicates the sequence of rainy days preceded and followed by null data of rainfall. An event can be composed of either a single day or more consecutive days with rain heights unlike null values.

In the period November 2008 - January 2009, Calabria (Southern Italy) was characterized by diffuse precipitation, causing widespread landslides. Various infrastructures and urban centres were affected, suffering significant damages or destruction. The present work identifies and characterizes each "single rainfall event" for the abovementioned period. In particular, the distributions of accumulated rainfall event and of the daily maximum data have been estimated for each event.

Moreover, other historical rainfall events, which produced hydrogeological disasters with losses and deaths in Calabria, have been selected and characterized in a similar way: October 1951, December 1951, October 1953, November 1959, December 1972 - March 1973, September 2000.

The statistical comparison between the last event and the hystorical ones has shown that the precipitation scenarios in 2008-2009 have been more severe than the historical events when cumulative rainfall is taken into account.

On a regional scale, the comparative analysis of landslide events and rainfall characteristics could highlight triggering scenarios of shallow and rapid landslide events.