



## **A methodological approach to compare landslide occurrences and rainfall events: an application in Calabria (Southern Italy).**

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A methodology based on a comparative analysis of landslides, that occurred over a long period (1921-2009), and climatic data is presented. Landslide data have been extracted from historical archives and newspapers, while the climatic analysis is based on daily rainfall and cumulative elaboration carried out on different time aggregations. This approach has been tested in an area of Calabria (Southern Italy), a region in which landslide damages are very common, especially during autumn-winter season. The analysis of the historical landslide database highlights that, because of unfavourable geological and morphological framework, the phenomena are not necessarily triggered by events characterised by extreme daily rainfall. In this region, in fact, either prolonged rainy periods characterised by low daily intensities or short and intense storms can lead to territorial crises causing damage and victims. In severest cases, the beginning of rainy season is characterised by shallow landslides triggered by intense hourly or daily rainfall, followed by deeper mass movements starting when rainfall, cumulated over several days, reaches critical values typical of different regional sectors.

Moreover, with the aim to take in account the effect of climate change on the distribution of rainfall and landslide events, a statistical analysis of the occurrence of distribution of all the maximum values of shorter duration rainfall (1, 3, 6, 12, 24 hours) has been performed in order to point out possible temporal variation of the number of monthly occurrences during different decades.

The comparative analysis of data concerning landslides and rainfall, recorded during and before the activation of these events, ensured the possibility of setting a reliable device, that supplies a series of typical landslide-scenarios. Such a device can be extended to other study areas and be usefull for civil protection purposes, contributing to early warnings and emergency management.