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Hydrological extremes in Calabria (Italy): the potential of historical data for predicting rainfall/damage scenarios

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A Damaging Hydrogeological Event (DHE) is made of two components: a Rainfall Event and a subsequent Damage Event, resulting from floods and landslides triggered by rainfall. The characteristics of both events depend on climatic, geomorphological and anthropogenic factors. In fact, depending on both rivers and slopes conditions, the same rain amount either can or cannot cause damage. Moreover, damage occurrence also depends on the geographical distribution of damageable elements such as population, lifelines and urbanized sectors. In this paper, a methodology based on a chart, which considers indicators of both the Damage (Dscore) and the daily Rainfall values (Rscore) recorded in a study area, has been applied to classify the severity of DHEs. In particular, the methodology was applied to a series of 30 DHEs which occurred in Calabria (southern Italy) between 1981 and 2010. According to the chart, the events were classified into four types: ordinary events, having low Dscore and Rscore values; extraordinary events, with high Rscore values but low Dscore values; catastrophic events, characterized by non-exceptional rainfall (low Rscore) and severe damage (high Dscore); major catastrophic events, obtained by high Dscore and Rscore values. The objective of this study was the production of a chart that will enable an objective classification of the severity of the DHEs that the media accounts and first or second-hand personal accounts fail to provide.