



Frequency of “Disastrous Hydrogeological Events” in Northern Calabria from historical information

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Disastrous Hydrogeological Events (DHEs) can be defined as the complex of landslide and flood phenomena induced by either heavy or prolonged rainfall. As these latter can simultaneously trigger different types of phenomena, DHEs represent multiple-hazard events, which commonly cause huge economic losses and damage in many areas of the Earth. Owing to its geological, geomorphological and climatic characteristics, Calabria is frequently hit by disastrous hydrogeological events. The ASICal database (Italian acronym for Historically Flooded Areas in CALabria) has recently been implemented, by collecting historical information on landslides and floods occurred during the past centuries, and on related damage (the database is accessible on-line at <http://www.camilab.unical.it>). In the present study, historical and hydrologic information concerning DHEs occurred in Northern Calabria (Cosenza province) have been analysed in detail, aiming at exploring the climatic conditions which characterised the main hydrogeological crises. Rainfall data recorded at n.88 rain gauges, uniformly distributed in the study area, have first been statistically analysed, aiming at characterising the most severe rainfall periods. Moreover, the series of the principal damaging events has been reconstructed, and the spatial distribution of damage plotted. Despite it is only a sub-sample of the “complete” history of damage actually suffered in Northern Calabria, this series can be assumed as representative of the most severe damaging events, and it can be compared with the results of the hydrologic analysis. Events have been classified on the base of the severity of damage; rainfall occurred before each event has then been analysed in terms of cumulative values, in order to assess its exceptionality. By considering the results of historical analyses, villages’ territories have been classified on the base of frequency of damage. Rainfall periods responsible of principal damaging events have also been typified (in

terms of intensity and duration), and their return periods assessed. For each village, the most recurrent phenomena and vulnerated sites/elements have then been recognised. Performed analyses can be helpful in defining scenarios and strategies for risk management in the study area.