



CHARACTERISTICS OF THE EXTREME RAINFALL EVENT AND CONSEQUENT FLASH FLOODS IN NORTH-EAST PART OF SICILY, ITALY IN OCTOBER 2009

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Abstract

The catastrophic events that occurred on 1st October 2009 in the area of Messina, Sicily highlighted the destructive potential of flash flood and mud/debris flows. More than 40 people were killed and severe property damages (around 300 Million Euro) took place when debris flows, triggered by heavy rainfall, inundated various towns and villages located along the coast.

Main goal of the study here presented is put together available meteorological and hydrological data in order to get better insight into temporal and spatial variability of the rain storm, the soil moisture condition and the consequent flash floods in the catchment of the Giampileri river. The area of the catchment is approximately 10 km², predominantly rural with woods and sparse shrubs in the upper mountainous part, while the areas next to the outlet are highly urbanized. The topography is very rugged and the slope is steep, as is that of a number of its tributaries, some of which are incised into narrow pathways as they approach the main channel. As a consequence, short concentration times are to be expected with fast hydrological response. The area under study has been subjected to unstable weather with high values of precipitation during all the September period. In fact, more than

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40 percent of the annual total precipitation occurred during this period and consequently the catchment was totally saturated at the beginning of the event, as the post event analysis has shown. The event was investigated using observed data from a rain gauge network and hydraulic evidences. Statistical analysis using GEV distribution was performed and rainfall return period (storm severity) was estimated. Further, measured rainfall data and rainfall-runoff modelling were used to analyze the hydrological behaviour and to reconstruct flood and debris hydrographs. Post-flood investigation emphasized the significant importance of the antecedent soil moisture conditions on the hydrological response of the catchment in the occurrences of these kind of phenomena.