



Characteristics of the extreme rainfall event and consequent flash floods in North-East part of Sicily, Italy in October 2009

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On 1st October 2009, a devastating flooding was caused by a very intense rainfall concentrated over the Messina area in the North-East part of Sicily, Italy. The storm caused severe flash floods in many villages around the city of Messina, such as Gianpileri, Scaletta Zanclea, Altolia Superiore and Molino with forty casualties and significant damage to property, buildings, roads and bridges estimated close to 200 million Euro.

The 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 Gianpileri 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 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 raingauge 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 modeling were used to analyze the hydrological behaviour and to reconstruct flood and debris hydrographs. The study confirmed that post-flood investigation should focus on discharges and hydrological response of the catchment rather than simply analyzing statistical characteristics of rainfall.