



Flash floods and debris flow: how the risk could can be better managed? The case of the events in Sicily on October 2009

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Flash floods are phenomena in which the important hydrologic processes are occurring on the same spatial and temporal scales as the intense precipitation. Most of the catchments of the Messina area in the North-East part of Sicily (Italy), are prone to flash flood formation. They are, in fact, small, with a steep slope, and characterised by short concentration times. Moreover, those catchments are predominantly rural in the upper mountainous part, while the areas next to the outlet are highly urbanized with areas that cover not only the floodplain but also the river bed itself as the main roads were previously part of the torrent. This situation involve an high risk of economic losses and human life in case of flash flood in these areas.

In the last years the area around Messina has been interested by severe flash floods and debris flow. The events occurred on 25th October 2007 in the Mastroguglielmo torrent and 1st October 2009 on Racinazzi and Gianpilieri torrents are an example of flash floods and debris flow events that caused not only significant economic damages to property, buildings, roads and bridges but also, for this that concern the 1st October 2009 flash flood, loss of human life.

The main focus of this work is, basing on the post event analysis of the 2009 flash flood event, to try to understand which could be the better preventive measures and mitigation strategies that can be provided for a better risk management in these areas too many times affected by devastating events.

Flood management can be controlled by either structural or non-structural measures. Adoption of a certain measure depends critically on the hydrological and hydraulic characteristics of the river system and the region. Flash flood management includes a number of phases that should be included in any management strategy like prevention, mitigation, preparedness, response and recovery.

Forecasting based on hydrological precursors based on the soil moisture condition at the beginning of an event has been investigated in order to test is this kind of approach can be useful as flash flood forecasting system. This kind of approach, associated with the use of LAM (Limited Area Modelling) approach could, in fact, increase the forecast lead time.

When an efficient flash flood forecasting system can be difficult to apply, a good risk management and some structural action can be contemplated to improve the safety of the people and the properties. In these cases, hazard maps associated to several scenarios that cover the geographical areas which have been flooded and those that could be flooded, can be a practical alternative. These areas shall be shown according to several scenarios and, for each scenarios, the degree of danger will also be provided by expressing the water depth, the flow velocity or the combination of these and the identification of areas which could be subject to bank overflowing and debris flow deposition.