



Use of soil moisture maps in probabilistic framework for flash flood forecasting

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Flood forecasting is a rather complicated task, particularly in those catchments which are prone to flash flood formation or for which the response time is of the order of few hours and, even brief anticipation are important and welcomed. In this context, some kind of hydrological precursors can be considered to improve the effectiveness of the emergency actions (i.e. early flood warning). Now, in literature has been widely recognized how soil moisture is an important factor in flood formation, because the runoff generation is strongly influenced by the antecedent soil moisture conditions of the catchment. The basic idea of the work here presented is to use soil moisture maps derived in a probabilistic framework (i.e. these maps provide the probability to produce a flooding if the catchment has a certain degree of saturation) to define a first alert phase in flash flood forecasting chain.

In order to fit the procedure also for ungauged or partially gauged small-medium size catchments, the Antecedent Precipitation Index based on the measured antecedent n days rainfall API $_n$ has been used a proxy of soil moisture conditions of the catchments under study.

The overall goal of this paper has been therefore to investigate, for a given river basin, the potential of API index as a proxy for monitoring hydrological conditions, by coupling the antecedent n days rainfall with the antecedent soil moisture condition in probabilistic terms.

Application of the proposed methodology is carried out with reference to the river basin in Sicily, Italy.