Calibration of two Alarm Indexes for Flood Alarm Mapping

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One of the main problem in the operational use of hydrologic model deals with the difficulties to actually calibrate or validate the prediction of the flow discharge because of the lack of observed discharge time series especially for small rivers.

To overcome this difficulties two different alarm indexes have been checked to test the possibility of an operational flood alert mapping based on the simulations of an hydrological model. Cetemps HYdrological Model (CHYM) is a distributed grid-based model, one of the main feature of such model being the possibility to ingest different data sources to rebuild the precipitation field at hydrological scale. A first and most empirical CHYM flood alert mapping index is calculated as the ratio of the total drained rain and the total drained area of each grid point at a fixed time interval; such time interval corresponding to the average runoff time for the whole upstream basin for the selected grid point. A further approach consists in the comparison between the maximum discharge predicted by the model for each grid point and the hydraulic radius of the channel, the latter is calculated for as a function of the total area drained by each elementary cell. The alarm-values of these alarm indexes have been calibrated using 15 different case studies affecting Italian territory in the last years. Detailed analysis show that the proposed indexes allow the possibility to efficiently select the timing and the location where floods are observed to occur. The performances of different indexes for the different case studies are reported and the possibility to use these different approaches in an integrated system for operational flood alert mapping is also emphasized.