Flood alert forecast and mapping: test and validation of two hydrological stress indices over Italy

Annalina Lombardi (1), Barbara Tomassetti (1), Valentina Colaiuda (1), and Marco Verdecchia (2)

(1) CETEMPS - University of L'Aquila, CETEMPS - Center of Excellence, Department of Physical and Chemical Sciences, Italy (annalina.lombardi@aquila.infn.it), (2) Dept. of Physical and Chemical Sciences, University of L'Aquila, L'Aqula, Italy

One of the most challenging features in developing flood forecasting models is represented by the difficulty to establish a river discharge threshold, beyond which a flood event is expected to occur.

In order to overcome this complication, two different hydrological stress indices have been proposed and tested on a case-study base, aiming at localizing fluvial segments where hydrological criticalities are most likely to occur.

Several severe weather case studies on the Italian Peninsula have been simulated by the CHyM hydrological model, in order to investigate the indices capability in predicting both the correct timing and localization of fluvial floods on different catchments, characterized by different physiographical characteristics and simulated in different spatial resolution, depending on the basin extension.

The validation of the two indices has been carried out using the available data providing the locations and the timing of the selected severe events, such as Civil Protection, Environmental Agencies and Firefighters reports on damages, news on media and the POLARIS, COPERNICUS-EMS and LAND-deFeND projects database. The operational activities are carried out forcing CHyM hydrological model with observed and forecasted precipitation scenario. In order to validate the method we also analyzed cases where the meteorological forecast was enough accurate to efficiently predict hydrological alarm state. Particular emphasis is given to the possibility to use the proposed approach for operational hydrological alarm mapping over Italy.