Using a precipitation nowcasting algorithm and 3DVAR assimilation in a cloud resolving Numerical Weather Prediction system to enhance a hydrometeorological nowcasting chain

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The use of the best input for an hydrometeorological chain is one of the key elements to improve the discharge prediction in the framework of early warning system. This fact gains in importance in a region such as Liguria Region, where the presence of many catchments with very small drained area and response time in the order of few hours make the prediction of severe events a critical point.

The work main scope is to exploit both observations and modelling sources to improve the discharge prediction in small catchments with lead time of 2-8 hours. To pursue this aim in this study the output from the nowcasting technique PhaSt, a spectral-based nowcasting procedure, is used together with the rainfall prediction of WRF NWP model with an hourly cycling 3DVAR data assimilation procedure to produce rainfall scenarios; the continuous distributed hydrological model Continuum, transforms these latter in streamflow scenarios. The connection between the forecasting models outputs is performed through the so called blending technique, that tries to combine the rainfall fields according to their reliability function of the lead time. The blending has been modified with respect to the standard application using the information retrieved from the NWPS about the total volume on the domain considered and in terms of location of the rainfall structures. The whole chain is applied on some case events of 2014 all over Liguria Region, northern Italy.