

4.15 OPERATIONAL HYDROLOGICAL NOWCASTING: CHAIN COMPARISON APPLIED ON MEDITERRANEAN SMALL CATCHMENTS

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The exposure of the urban areas to flash-floods is particularly significant in Mediterranean coastal cities, generally densely populated. Along the last century severe rainfall events, often associated with intense and organized thunderstorms, produced flash-floods and landslides causing serious damages to urban areas and, in the worst events, also human losses.

The temporal scale of these events is strictly linked to the size of the catchments involved: in the Mediterranean area a great number of catchments that pass through coastal cities have a small drainage area (less than 100 km²), corresponding to very short hydrologic response (in the order of few hours). Meteorological forecasting systems are unable to predict precipitation at the space and time scales of these events, of the order of few km and few hours. Nowcasting techniques generate precipitation forecasts to complement the time series of observations and, thus, extend the predictability limits of the forecasting models in support of real-time flood alert system operations.

The coupling of a precipitation nowcasts with a hydrological model aims to build an operational nowcasting chain that, in real time, can be used as a support to decision for Civil Protection actions. In this work, a comparison between two different nowcasting techniques is carried on. The first one, PhaSt, is operational at the Hydro-Meteorological Monitoring Centre of the Liguria Region, and second, SBMcast, is based on the statistical model String of Beads. At each time step, both generate ensembles of equiprobable future precipitation scenarios on time horizons up to 3 h starting from the most recent radar observations.

The precipitation nowcasting ensembles produced by the two techniques are connected with the hydrological model Continuum and then the comparison is performed on the output of entire hydrological nowcasting chain for some well-known events that affected the Liguria region during 2014 and caused flash-floods and significant losses.