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Use of the ensemble COSMO-LEPS for hydrologic forecasts in the Warning Operational Center of Emilia Romagna (Italy)

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Emilia-Romagna region has a 14.000 Km2 area within the Po Basin, with a total catchment of about 70.000 Km2. Here extreme hydrological events, including floods and flash floods, are expected to become more severe in the next future due to climate variability and anthropic driven climate change, with ground effects linked both to the environmental and the social system. The Warning Operational Center for hydrological event management of Emilia Romagna was created in 2005. The basic tool of this Center is an operational forecasting and modeling system referred to as FEWSPo. The FEWSPo system allows the combination of three different hydrological-hydraulic chains with several meteorological inputs (forecasted - based on COSMO model - and others - radar QPE and observed). Discharge measurements, the observation networks and historical data are used for correction and cross validation of the forecasts. The hydrological and meteorological ensembles are used to estimate separately meteorological and hydrologic-hydraulic uncertainties. The following issues are analyzed:
- the applications of the 3-5 days forecast, given by COSMO LEPS input;
- the coupling, for shorter ranges (12-18 hours), of ensemble informations with higher resolution, deterministic inputs.
Long term forecasts have larger uncertainties; on the flip side they:
- have a high range of possible actions;
- need not so much timeliness or action detail;
- give opportunity to implement low-cost actions.
It is shown that the optimal action flow in the forecast window, to better operate in forecasting and alerting, should be based on a number of case studies, also described by tables and qualitative comparisons, looking for a well informed decision making and the improvement of flood preparedness and crisis management for river basins.