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Uncertainty reduction of hydrological ensemble forecasts provided by the COSMO-LEPS quantitative precipitation ensemble forecasts

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The principal sources of uncertainty in hydrological forecasts are given by input errors, because of inaccurate rainfall predictions of meteorological numerical models. Many efforts have been devoting since last years to reduce this uncertainty and, now, the ensemble technique seems to be one of the most fruitful in interfacing hydrological and meteorological models.
In the present work a bayesian model has been developed in order to reduce uncertainty in discharge predictions for a medium size catchment (10^3 km2), located in the mountains south of the Po Valley, Italy. The 'a priori' distribution function is given by hydrological TOPKAPI model discharge predictions, obtained introducing meteorological limited-area model COSMO-LAMI rainfall forecats as input. The likelihood function is provided by the analogues discharge predictions provided by the rainfall forecasts of the COSMO-LEPS ensemble members.
First the 'a posteriori' estimations are provided by a Kalman Filter (H_2), then a H_infinity filter has been implemented, because the statistical properties of model errors were unknown.
Statistical analysis of estimation errors and the description of some case studies of flood events occurred during the spring and fall seasons from 2003 to 2007 are reported.