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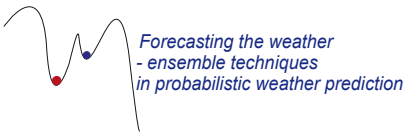


# Post-processing approaches for hydrological ensemble prediction: a comparative study on two hydrological forecasting chains

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It is well known that the potential economic value of probabilistic forecasts is a topic of special importance for users vulnerable to climatic and hydrological risks at different scales: agriculture and irrigation, navigation, public safety, energy companies, etc. The general aim of this study is to investigate the use and integration of ensemble weather forecasts (precipitation and temperature) in hydrology to explore the probabilistic framework for hydrological forecasting. We present a comparative study of two chains of hydrological ensemble predictions, which are currently being developed and tested in several French river basins to improve operational flood forecasting and forecasting of inflows to water reservoirs. These chains are based on two different lumped rainfall-runoff models, driven by the same ensemble weather prediction system (50 perturbed members of ECMWF-EPS from 2005 to 2008). Two different post-processing approaches were applied to improve the reliability of hydrological forecasts: the best member method proposed by Roulston and Smith (2003) and an empirical approach based on hydrological model errors. The impact of these two approaches was investigated over 15 catchments in France, with different sizes and hydrological characteristics. The results show that both methods improve the reliability of hydrological forecasts. Besides, forecast skill can also be improved when precipitation ensemble predictions are combined with an analog forecasting approach where analogy is searched in a historical archive for each ensemble member. The study also revealed new challenges in improving, understanding and using hydrological ensemble forecasts in an operational context for decision-making.