



## **Impact of the use of two different hydrological models on scores of hydrological ensemble forecasts**

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The aim of this study is two-fold. Firstly, a comparative analysis is conducted to assess the quality of streamflow forecasts issued by two different modelling conceptualizations of catchment response, both driven by the same weather ensemble prediction system. Secondly, the results are jointly investigated with a view to providing guidance on the operational use of ensemble forecast products for flood warning at national hydrologic forecasting services. The study is based on weather forecasts from the ensemble prediction system PEARP of Météo-France, which was originally developed to better predict high impact storms in France. PEARP forecasts are based on the global spectral ARPEGE model zoomed over France. Initial perturbations are generated by the singular vector technique. The model runs 11 perturbed members for a forecast range of 60 hours. In this study, the two hydrological modelling approaches used are: 1) the coupled physically-based hydro-meteorological model SAFRAN-ISBA-MODCOU developed at Météo-France and based on a fully distributed catchment model, and 2) the GRPE forecasting system developed at Cemagref and based on a lumped soil-moisture-accounting type rainfall-runoff model. Both models were set up and tested on about 1000 catchments in France. For this study, a common subset of about 250 gauging stations representative of a wide range of upstream areas and hydro-meteorological conditions was selected. The discharges simulated by both systems are compared over an 18-month period (March 2005-September 2006). Skill scores are then computed for the first two days of forecast range and the performance of both hydrologic ensemble forecasting systems is assessed. The results of this experiment are examined with a focus on the setting up of a fully operational product in real-time hydrological forecasting. The combined use of forecasts issued by different systems is a demand of French operational forecasting service to better guide flood warning actions. This study endeavours to meet such a challenge.