Geophysical Research Abstracts
Vol. 19, EGU2017-12460, 2017
EGU General Assembly 2017

Hydrological-oriented verification for ensemble forecasting systems: the case of the PIT diagram

François Bourgin (1), Maria-Helena Ramos (2), Charles Perrin (2), and Benjamin Renard (3)

(1) Ifsttar, Geotechnical engineering, environment and risks, Bouguenais, France (francois.bourgin@ifsttar.fr), (2) Irstea, HBAN, Antony, France, (3) Irstea, HHLY, Villeurbanne, France

The most common way to communicate uncertainty in streamflow predictions for water resources and risk management is through the use of ensemble scenarios or prediction intervals. While the advantages of probabilistic flow forecasting for decision-making are recognized, the evaluation of the quality of ensemble-based or probabilistic forecasts remains a challenge.
Reliability is a fundamental attribute when evaluating the quality of probabilistic flow predictions. It is related to the statistical coherence of the associated uncertainty estimates. Reliable predictions are thus important for users who take actions based on prediction intervals (e.g., reservoir inflow volume forecasts) or on the forecast probability of a given critical event (e.g., exceedance of a flood threshold). However, forecast systems are usually developed to serve many users and, in general, they are evaluated without considering the user's specific decision-making problem. This means that a forecasting system must be reliable in all situations (for normal, high or low flows; for peak flow probabilities or volume probabilities of occurrence), regardless of the event of interest for the user. At the same time, users are often interested in knowing if a forecasting system performs well for their case of application. Application-focused evaluations of the quality of a forecast are thus also important to enhance the usefulness of a forecasting system.
Here, we investigate the specificities of hydrological-oriented verification of reliability that is commonly assessed with the Probability Integral Transform (PIT) diagram. We applied an ensemble forecasting system to a large set of catchments in France to assess the impact of conditioning strategies used to stratifying the data on the evaluation of forecast performance. For example, we considered separating low and high flows, or focusing on rainfall-driven or recession parts of the hydrographs. We show that the use of conditioning strategies can avoid an unduly optimistic evaluation of forecast quality and help identifying avenues for improving a forecasting system.