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HEPEX post-processing intercomparison experiment

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The Hydrological Ensemble Prediction Experiment, HEPEX, is an initiative bringing together researchers and practitioners who are interested in advancing hydro-meteorological ensemble predictions and their applications. The initiative began in 2004 and has continued with a growing and active community under the co-leadership of John Schaake (USA) and Jutta Thielen (JRC).

In 2011 HEPEX started an intercomparison experiment for post-processing techniques. Post-processing is concerned with the removal of biases and improved accounting for uncertainty in "raw" hydrologic predictions, whether single-valued, ensemble or probabilistic in nature. This includes bias correction of meteorological ensemble forecasts to be used as input to hydrological models (forecasts of precipitation and temperature) and bias correction of hydrological predictions (hydrological model outputs) to be used as input to hydraulic models or water-management tools.

The main goal of the post-processing intercomparison experiment is to prompt in-depth analyses of the wide range of post-processing methods proposed in the literature. The aim is to understand their working, their potential value for end-users of hydrological forecasts, and their limitations. In doing so, verification methods also need to be discussed, including their potential to identify particular types of bias.

The intercomparison experiment includes two different post-processing scenarios. One scenario uses post-processing techniques to account for only the predictive uncertainty of the hydrologic model simulations (scenario based on observed atmospheric forcing). The second scenario uses post-processing techniques to account for the total predictive uncertainty of hydrologic ensemble forecasts (scenario based on forecast atmospheric forcing). For both scenarios, datasets were prepared and made available. Streamflow discharge observations and hydrologic model simulation data produced by the Model Parameter Estimation Experiment (MOPEX) Tucson Workshop are used for Scenario 1, while scenario 2 uses Hindcasts of Ensemble Streamflow Predictions (ESP) produced by the NWS California Nevada River Forecast Center (CNRFC).

The detailed set-up of the intercomparison experiment will be presented, together with preliminary results from the HEPEX workshop held in June 2011 at Delft. The first contributions to the HEPEX post-processing intercomparison experiment pointed out several issues to improve the design of the experiment and further advance on the topic.

In ongoing work, the post-processing and verification teams are updating the experimental design and defining the verification metrics to be applied. Input from the broader hydrological forecasting community is welcome.