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Intercomparison of streamflow postprocessing techniques: first results of a HEPEX community experiment

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Hydrological ensemble forecasts comprise uncertainties originating from multiple sources. Often, they are characterized by biases in the mean, spread or higher moments of their associated probability distributions. These biases may be unconditional or conditional upon several factors, such as the magnitude of the observed or forecast variable, season, or forecast lead time, and may be manifest in either the volume or timing of streamflow. The different biases may be more or less critical for practical applications ranging from flood prediction to reservoir regulation, which often require (or assume) unbiasedness. To some degree, statistical post-processors can correct for these biases. They include a broad range of statistical techniques that may target particular types of bias or a range of unconditional and conditional biases. For example, when viewed conditionally upon the forecast variable, a common aim is to produce sharp forecasts that are also reliable, i.e. have an appropriate amount of spread to accommodate forecast errors. Post-processing techniques also vary in whether they lump together all sources of bias and uncertainty or address the meteorological and hydrologic uncertainties separately. In the last couple of decades, several postprocessing techniques have been developed and tested for hydrological prediction. Applied to single-valued (deterministic) predictions as well as to multi-scenario (ensemble or multi-model) predictions for short- to long-term forecasts, they have however rarely been examined together, within an extensive and coherent inter-comparison framework. In order to promote a better understanding of the strengths and weaknesses of several of those techniques, and whether the choice of technique really matters, an inter-comparison was initiated in June 2012 under the auspices of the Hydrologic Ensemble Prediction Experiment HEPEX (van Andel et al., 2013). This experiment is fully described at http://www.hepex.org/. The inter-comparison comprises several phases. The first phase is concerned with estimating the hydrologic uncertainties separately from the forcing uncertainties. Verification of the first results submitted by several participants is performed with the Ensemble Verification System (EVS; Brown et al., 2010) and the scope for assessing the strengths and weaknesses of different post-processors with multiple verification metrics is discussed.

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van Andel, S. J., A. Weerts, J. Schaake, and K. Bogner (2013) Post-processing hydrological ensemble predictions intercomparison experiment. Hydrological Processes, Special Issue: Hydrological Ensemble Prediction Systems (HEPS), 27(1): 158-161.