Statistical post-processing of hydrological forecasts using Bayesian model averaging

Mehrez El Ayari (1), Stephan Hemri (2), and Sándor Baran (1)

(1) University of Debrecen, Faculty of Informatics, Debrecen, Hungary, (2) Federal Office of Meteorology and Climatology MeteoSwiss, Zürich-Airport, Switzerland

Accurate and reliable probabilistic forecasts of hydrological quantities like runoff or water level are beneficial to various areas of society. Probabilistic state-of-the-art hydrological ensemble prediction models are usually driven with meteorological ensemble forecasts. Hence, biases and dispersion errors of the meteorological forecasts cascade down to the hydrological predictions and add to the errors of the hydrological models. The systematic parts of these errors can be reduced by applying statistical post-processing. For a sound estimation of predictive uncertainty and an optimal correction of systematic errors, statistical post-processing methods should be tailored to the particular forecast variable at hand. Former studies have shown that it can make sense to treat hydrological quantities as bounded variables. In this paper a doubly truncated Bayesian model averaging (BMA) method [1] is introduced, which generalizes the truncated normal BMA model for wind speed calibration [2]. The proposed approach allows for flexible post-processing of multi-model ensemble forecasts of water level. A case study based on water level for a gauge of river Rhine, reveals a good predictive skill of doubly truncated BMA compared both to the raw ensemble and the reference ensemble model output statistics approach [3].

References

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