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Post-processing of Ensemble Low Flow Forecasts

aizhong ye, Qingyun Duan, John Schaake, Jing Xu, and Yang Lang
Beijing Normal University, China (azye@bnu.edu.cn)

For navigational or water quality control purposes, there is a great need in knowing the likelihood of the river level falling below certain threshold at different lead times. Ensemble streamflow prediction (ESP) is a widely used approach to assess this likelihood. Raw ESP results can be biased in both the ensemble means and spreads. In this study, we applied a Generalized Linear Model (GLM) based post processor to correct these biases. We conducted the probabilistic analysis of post-processed ESP results falling below pre-specified low flow levels at different lead times. Raw ESP forecasts from the 1980-2006 periods by four different land surface models (LSMs) in eight large river basins in the continental United States are included in the analysis. The four LSMs are Noah, Mosaic, VIC and Sacramento models. The major results from this study are: 1) post-processing can improve the accuracy of hydrological forecasts and reduce the uncertainty; and 2) post-processing can help deal with the effect of human activity and climate change.