Hydrology and
Earth System
Sciences
Discussions

Interactive comment on "Relative effects of statistical preprocessing and postprocessing on a regional hydrological ensemble prediction system" *by* Sanjib Sharma et al.

Anonymous Referee #2

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This review is for manuscript HESS-2017-514: Relative effects of statistical preprocessing and postprocessing on a regional hydrological ensemble prediction system, authored by Sanjib Sharma, Ridwan Siddique, Seann Reed, Peter Ahnert, Pablo Mendoza, and Alfonso Mejia. The manuscript is easy to follow. It presents some interesting results. In this work, a spatially distributed hydrological model is included in the study. Two postprocessors: an autoregressive model with a single exogenous variable and quantile regression, are comparatively evaluated. Below are my general and specific comments.

General Comments:

I was intrigued by reading the statement "postprocessing alone performs similar, in terms of the relative mean error, skill, and reliability, to the more involved scenario that includes both preprocessing and postprocessing" in the Abstract (page 1, lines 24-25). This is one of the major conclusions of the work. However, further reading reveals that the results do not fully support this conclusive statement, for the following reasons: (1) Figures 5 and 6 show appreciable performance gains of S6 over S5 for 5 cases out of 8. One can see that S6 outperforms S5 in terms of forecast lead times by 12 hours to 3 days. (2) The closeness of the results for the other cases (i.e., (e) and (f)) between S5 and S6 can be explained by the closeness of the raw GEFS and preprocessed GEFS precipitation, as shown in Figure 3. (3) The verification appears to be only conducted for large observed events without considering large forecast events, which can generate false-alarms. In short, I find this conclusion is inaccurate and can be misleading.

How are the GEFS precipitation and temperature downscaled to force the HR-RDHM? A description should be provided.

Specific Comments:

Page 1, Line 12: Do you mean "Is comprised of " by "is comprised by"?

Page 1, Line 28: In "The intersection of climate variability and change, increased exposure from expanding urbanization, and sea level rise are increasing", what do you mean by "The intersection of climate variability and change"?

Page 2, Line 6: In "for research purposes, meet specific regional needs, and/or real-time forecasting applications", do you mean "to meet . . ."?

Page 3, line 21: Shouldn't it be U.S. Middle Atlantic region?

Page 5, line 16: "Also, HCLR has been shown to outperform other widely used preprocessors (Yang et al., 2017)". Should be more specific here since the paper only compares the HCLR and BMA.

Page 6, line 31: "6-hourly" is a typo.

Page 7, line 23: "QR has similar skill performance in streamflow and normal space". This sentence is not clear to me. Do you mean that QR has similar skill performance in the streamflow space as well as normal space?

Page 8, line 15: How many events result from this threshold? Is the sampled climatological probability distribution derived from the observed data? If so, will your conclusions still hold if events corresponding to forecasts with large magnitudes and high probabilities also included in the verification?

Page 10, line 33: "QR displays better reliability than ARX(1,1) across lead times, basins, and seasons". By what measure(s)?

Page 11, line 36: "reinforcing the fact that preprocessing may have little effect on the flood forecasts". See the General Comments.

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