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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Contribution of Potential Evaporation Forecasts to 10-day streamflow forecast skill for the Rhine river" *by* Bart van Osnabrugge et al.

Anonymous Referee #2

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Review of "Contribution of Potential Evaporation Forecasts to 10-day streamflow forecast skill for the Rhine River"

This manuscript describes an investigation in the role of potential evapotranspiration (PET) forecasts in generating 10 ensemble streamflow forecasts. The authors show that there is skill in ECMWF PET forecasts, and that this influences the state variables of the hydrological model, but that there is only limited effect streamflow forecasts. This is an important topic that does not appear to have been evaluated from a forecasting perspective previously and therefore is material worthy of publication. Overall, I think the manuscript is well structured and presents the material in a logical man-

ner. However, I believe there are a couple of technical issues that need to be carefully considered. The manuscript could also do with some copy editing.

In two places the authors (page14 line 13-15; page 19 paragraph 1) that authors make comment on the performance of forecasts for low observed values, on occasion contrasting the performance with forecasts for high observed values. The figures presented do not provide any information about the performance of forecasts for low observed values at all, only for all data (when P(X<x) is near zero) and for increasingly high observed values (when P(X<x) takes high values. To provide insight into the forecast performance of low values the figures need to be generated using (P(X>x), rather than P(X<x). Given that there are differences in the soil stores using the different forecasts PET forcing, then I would have expected there to be differences identified in streamflow forecasts for low flow conditions, and believe that some additional analysis that exclusively evaluates the low flow performance of forecasts needs to be undertaken and presented to support the statements that are made.

All forecast verifications presented in the manuscript are conditioned on observations. While this type of analysis is has been reported by several other authors, e.g. (Brown et al., 2012; Verkade et al., 2013) there are difficulties when interpreting this type of analysis that are very nicely described by (Lerch et al., 2017). When a forecast is issued, a forecast user only has knowledge of the forecast and not the observation. Therefore an analysis of forecast performance conditioned on observations cannot provide forecast users with an understanding of how well a given forecast may perform. A more robust approach, which can be directly interpreted by forecast users, is to condition the performance evaluation on the forecasts rather than the observations.

Editorial suggestions: Page 2 line 14: "monthly potential evaporation climatology forcing"

Page 3 line 12 "For this study the precipitation dataset is used which has been was derived by . . ."

Page 3 line 17 “correction for height elevation using”

Page 6 line 21 lambda is spelt out rather than using the symbol.

Page 8 line 9 question mark in reference

Page 9 line 8 “both scores have no fixed limit upper bound”

Figure 5 caption – remove “benchmarked against sample climatology” as these are raw CRPS scores.

There are many other examples where editing is required.

References:

Brown, J. D., Seo, D.-J., and Du, J.: Verification of Precipitation Forecasts from NCEP’s Short-Range Ensemble Forecast (SREF) System with Reference to Ensemble Streamflow Prediction Using Lumped Hydrologic Models, J. Hydrometeorol., 13, 808-836, 2012.

Lerch, S., Thorarinsdottir, T. L., Ravazzolo, F., and Gneiting, T.: Forecaster’s Dilemma: Extreme Events and Forecast Evaluation, Statist. Sci., 32, 106-127, 2017.

Verkade, J. S., Brown, J. D., Reggiani, P., and Weerts, A. H.: Post-processing ECMWF precipitation and temperature ensemble reforecasts for operational hydrologic forecasting at various spatial scales, Journal of Hydrology, 501, 73-91, 2013.

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