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Discussions

Interactive comment on "An experimental seasonal hydrological forecasting system over the Yellow River basin – Part II: The added valuefrom climate forecast models" *by* Xing Yuan

Anonymous Referee #3

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This is the second of the two-paper series on development of a seasonal hydrological forecast system over the Yellow River basin. This paper focuses on the evaluation of added value of NMME climate forecast over the study region. It also briefly examined the impact of the streamflow postprocessing on forecast skills. Overall, the study is simple and straightforward. The same methods have been used in exact way before over other regions by other researchers. So the key contribution of this study is the application over Yellow river basin. The evaluation is also quite simple with only the anomaly correlation and RMSE skill score as the major metrics. The analysis is straightforward, and the conclusions are mostly well supported. There are a number of places where the statement or conclusion is not properly justified, or the interpretation

of the result needs to be thought over. I suggest a minor (towards major) revision, and my specific comments are listed below. 1. Page 2, line 15: A reference is needed here to support this statement. 2. Page 2 line 16: change "flooding forecast" to "flood forecasting". 3. Page 2, line 25: Is NMME qualified to be called "open source"? Its forecasts are made available to the research community, but the system itself is not open source, is it? 4. Page 3, line 28: If Yellow river basin is HEAVILY managed, I wonder if such activities can be simply represented by a linear regression in the postprocessing procedure. The probability distribution will be highly distorted as the goal of water resource management over the river is to do flood control and irrigation withdraw. Thus observed flow is much more steady (less variant) with less extremes during both dry and wet conditions. Linear regression is typically used between variables that are normally distributed. Can you commend on this? This the linear regression is not suitable here, it needs to be corrected. 5. Page 4, line 31: why don't you use lapse rate correction here when binlinear interpolate the temperature forecast from models? 6. Page 4 line 32: When you say "all ensemble member", are you referring to all members from one individual model or from the entire NMME ensemble? 7. Page 5 linear 10: Again, I don't think the linear regression model is suitable or good enough to represent the human component of the hydrological system. 8. Table 2: Can you actually show how the two time series of streamflow look like, with a QQ plot or scatter plot? The current illustration is not very convincing. 9. Page 5 line 32: change "measures" to "metrics 10. Equation 1: This equation gives a space-time mixed formula for anomaly correlation. Later in the paper, AC is also calculated for individual location, so it is necessary to mention that equation 1 can be simplified for such purpose. 11. Page 6, line 10: What is the impact of having different ensemble members in ESP and NMME on the skill assessment? 12. Figure 1: A pixelited shaded plot probably looks better and easier to read tan the current one. Can you highlight the correlations that are actually statistically significant? 13. Page 6, line 16: I don't agree with this assessment. Most models do show the highest skill for month 1, maybe except GFDL. So the lead time is still quite important, maybe just as important as seasonality. If you think there is not

dependence on lead time, what could be the cause for that? 14. Page 6, line 27: It would be interesting to know how much of the improvement in forecast skill is due to increase in the ensemble size. 15. Figure 2: The current way of plotting makes the 0.5 month value almost invisible. I suggest a pixelited shaded plot. 16. Page 7, line 23: I don't think you cannot draw conclusion like this from Figure 4 although this is likely very true. Statements like this need to be more careful. 17. Page 7, line 32: "less" than what? 18. Page 8, line 25: "representativeness"?? 19. Page 8, line 34: What non-stationary feature are you referring to here? If there is a trend, can you actually tell if it is caused by water withdraw or climate change? 20. Figure 8: Why not show the negative part of SS? 21. Page 10, line 3: IC is important, but not necessary always dominant. 22. Page 10 line 23-25: This conclusion is counterintuitive. Are you saying that if we were to have a perfect land surface model, the climate forecast in hydrological forecasts at long leads would be less useful? 23. Page 10, line 31-32: This addresses a different type of uncertainty. Use of multiple models help to address uncertainties associated with model, not observations. 24. Page 11, line 3: This depends on what type of downscaling method to be used, a dynamic downscaling scheme might not suffer the same. 25. The last paragraph is an interesting discussion, but some of the statements are not directly based on the results of the current research, might need to be revised somehow.

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