

Interactive comment on “Value of medium range weather forecasts in the improvement of seasonal hydrologic prediction skill” by S. Shukla et al.

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Received and published: 18 June 2012

The paper deals with medium range predictions and the potential improvements such forecasts can provide on the seasonal forecast horizon. I enjoyed reading the paper and found it very interesting. I have a very low number of comments (I will not repeat the once which are equivalent to the once by the previous reviewer).

Thank you! We appreciate reviewer's thoughtful comments.

1) My only major comment is that I would have liked to see a comparison with seasonal forecasts. Such forecasts should be in between the forecasts used and the raw ESP (in terms of quality) and would have made a nice addition.

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Response: We did not show a comparison of seasonal climate forecasts with ESP because various other studies have done this (such as Wood et al., 2002 and 2005). In general those studies concluded that most of the hydrologic forecast skill came from the knowledge of the IHCs, and the seasonal climate forecasts do not add much skill beyond that. Nonetheless we are currently in the processes of working with collaborators at NOAA's Climate Prediction Center to investigate the performance of the most recent hindcasts of NCEP's Climate Forecast System version-2 relative to ESP. We now mention the previous studies in our interpretation of the results.

Minor comments: 2) P1833 "There is no such proxy available for evaluation of forecasted monthly mean soil moisture". Please qualify as there is a plethora of satellite based monthly mean soil moistures of varying quality. Your approach is sensible, but needs a better justification.

Response: While various satellite based soil moisture products exist, they don't coincide fully with our period of analysis. Furthermore, and perhaps more importantly, the satellite products are only for a few cm of the soil column, whereas the soil moisture of interest to us is total column. And, the entire field of satellite soil moisture is evolving, and frankly the products are not yet to the extent that we consider them usable for model diagnosis.

Nevertheless we have revised that sentence and acknowledged the existence of satellite based soil moisture data.

3) P1834 The 0.5 degree resolution is the native grid of the observed data set. Please add this resolution to p1833, after Maurer et al (2002).

Response: Done.

4) P1834, Section 2.1.3 Please explain and discuss the spatial and temporal patterns of figure 2 and 3.

Response: We have added a paragraph in the section 2.1.3 summarizing the patterns

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of MRF forecast skill.

5) P1835/ L1 You state the advantages of using the ensemble mean. Please, add some words of cautions w.r.t. ensemble mean. The ensemble mean will have a lower activity, show less extremes and not the same straightforward physical interpretation as individual ensemble traces.

Response: The focus of the bias correction of the MRFs is to improve the seasonal flow forecast skill and not the short term flow forecast for this analysis. As noted by the reviewer, the timing of events or the exact distribution of precipitation over individual days was not the emphasis of the approach but rather the total 14-day accumulated precipitation with a realistic daily sequence. More details on this choice have been added at page 1835 lines 5-10 in order to clarify the bias correction details, the focus on the 14-day mean errors and deterministic approach in order to answer both reviewers' comments.

6) P1836, Figure 4: what do you mean by skill not significant (not significant different from 0??).

Response: We mean that given the degree of freedoms in our sample the correlation value was lower (in absolute value) than required to reject a null hypothesis of the correlation being zero (significance level 5%).

7) P1840 4. Discussion Please revise the first sentence of discussion as I found it difficult to understand.

Response: That sentence has been revised.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 1827, 2012.

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