

## ***Interactive comment on “An experimental seasonal hydrological forecasting system over the Yellow River basin – Part I: Understanding the role of initial hydrological conditions” by Xing Yuan et al.***

**Anonymous Referee #2**

Received and published: 13 April 2016

This manuscript presents a seasonal hydrological forecast system for the Yellow River basin and investigates the contribution of hydrological initial condition and meteorological forcing to the predictability of soil moisture and streamflow over the study region. The topic is suitable for HESS, and the research method is scientifically sound. The manuscript is generally well written with good quality illustrations. It is a good piece of work. But I am a little disappointed with the scientific contribution of this work to our knowledge and understanding about seasonal hydrological forecasting, at least in the way that was presented. This is one of my major concerns. There are also a number of places in the manuscript that needs clarification or justification. Overall, I think a major

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revision is necessary to improve the quality of the paper.

Major concerns This is a solid piece of research work, but there isn't really anything new in terms of research methods or scientific understanding. Several previous studies have adopted the exact same methodology and answered the exact same questions, but just over different basins. So besides applying the same methodology in a forecast system over the Yellow River basin (new to some degree), there is not enough evidence to support the novelty of this research. The authors argue that a new meteorological dataset with higher resolution is used, but it was not demonstrated how this improved resolution actually help with the hydrological forecasting. My other concern is on the revESP approach as a way to estimate the impact of IC uncertainties on hydrological forecasting. Although this approach has been used in several published studies, it is still necessary to point out that this approach significantly overestimates the uncertainty associated with IC as it uses all historical ICs. This is more so than the ESP approach for meteorological forcing. Please note that the meteorological forcing is during the forecast period which is unknown at the time of forecast, but the IC is just not able to be completely observed. The IC is the result of past meteorological conditions that have been observed to a large degree. So cautions need to be raised when interpretation of the results (ESP vs revESP), and some discussion is necessary on this issue in the end. Minor issues 1ijŒ Page 2 line 9: what is a more extreme climate? 2ijŒ Page 2 line 11: Some references are needed to back up this statement. 3ijŒ Page 2 line 12: Some references are needed here, too. 4ijŒ Page 2 line 14: There is a difference between mitigation and adaption. Should seasonal forecast be more helpful with mitigation instead of adaptation? Adaptation usually happens at much longer time scales. 5ijŒ Page 2 line 19: Why Atlantic Ocean? What about other oceans? 6ijŒ Page 4, line 10: regridding usually means changing the spatial resolution of a grid data product. Here the station data is interpolated somehow to a fixed grid, so it is not regridding. It is also necessary to mention how the interpolation is done. 7ijŒ Page 4 line 20: “river is suspended ??” What do you mean by that? I guess what you want to say is that “the riverbed is elevated above the adjacent floodplains due to

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sediment deposition and man-made levees". 8  
Page 5 line 20-21: Do you have a source for these statistics? 9  
Page 7 line 17: "dominant role of IC's for streamflow predictability". See the major concern #2. This interpretation needs to be cautious. 10  
Page 8, line 7: what is a full initialization? 11  
Figure 2: this is useful to show the spatial variation of mean temperature, precipitation and wind. But it is not the most useful ones, for example the wind is never discussed in the study. It is actually necessary to show the seasonal cycle of precipitation (and probably temperature) over the basin, just because you use such information in Figure 8. 12  
Figure 8: why are there a number of small streams showing the max lead time of 6 months all the time?

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-101, 2016.