

Interactive comment on “Spatial-temporal changes in river runoff and terrestrial ecosystem water retention under 1.5 °C and 2 °C warming scenarios across China” by Ran Zhai et al.

Anonymous Referee #1

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The manuscript investigated the impacts of global warming on river runoff and terrestrial ecosystem water retention under two climate scenarios. Overall, I feel the paper is well-written and presents interesting results. However, some detailed explanations and more analysis are needed. Finally, I'd recommend the paper for publication after substantial improvements have been made to address the following concerns (major revision).

Comments: 1. The authors should present the full name of some abbreviations for the first occurrence. For example, "GCMs", "ECHAM6-3-LR, MIROC5, NorESM1-HAPPI, and CAM4-2degree" (Pages 2 Line 30, Page 3 Line 1). 2. Page 4 Line: "showed"

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should be "shows". 3. Do Figs. 2 and 3 show the changes in temperature and precipitation under the two warming scenarios relative to the baseline period (2006-2015)? In addition, "all the four GCMs" in Figs. 2e and 2j is the average mean of the four GCMs? Please make them clear. 4. Page 6 Line 20: "Fig. 2a, d, f, i" should be "Figs. 2a, d, f, i". The same for the whole manuscript. 5. Compared to the mean value, the projections of hydrological extremes are more important. However, the explaining for the reason of the changes in Q10 and Q90 and the differences between 1.5 and 2.0 warming scenarios were not presented. 6. Fig. 10 showed the Pearson correlations between river runoff and maximum and minimum temperatures, since the last two climate variables were the input of the VIC model. However, the manuscript mainly discussed the mean temperature in Section 3. In addition, wind speed was not mentioned in Sections 2 and 3. 7. The Spearman correlation coefficients did not represent the contributions of the input climate variables. The authors should use other statistical methods, such as partial correlations or multi-regression method, to investigate the contribution of each climate variable on the river runoff and TEWR. 8. The description in Section 4.3 did not provide any useful information for the readers. It is better to evaluate the performances of the VIC model driven by GCM ensemble simulations using ground-based or satellite-based observations between 2006 and 2015.

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