Hydrology and
Earth System
Sciences
Discussions

Interactive comment on "Reconstructed natural runoff suggests imbalance in water scarcity between upstream and downstream regions of China's river basins" *by* Xinyao Zhou et al.

Anonymous Referee #2

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Reconstructed natural runoff suggests imbalance in water scarcity between upstream and downstream regions of China's river basins Here, the authors presented a framework for quantifying the change in water scarcity at major river basins of China. Although, the study is interesting the methodology is not new and the manuscript is poorly written. For publishing purpose, the entire manuscript should be presented in a high quality format. The details of methodology is also not clear. In addition, the authors did not provide equal importance for all the objectives mentioned in the study. I am including the comments here, Introduction The introduction should be improved with proper citations and sentences which shows the importance of the current study. Page 2 second paragraph is confusing. The sentences should be clear. Please add

references for "A recent study has shown that the impact of anthropologic interventions on water scarcity is not always negative". Line 21 – 22 (page 2) is confusing. Please correct the sentence. Line 26 is not clear. Please rewrite the entire paragraph. Page 3. The presentation of objectives is poor and not clear. Please write with specific reasoning. In addition, the sentence "The answers will provide experiences and lessons for global water resources management" is not matching here. Overall, the introduction is too short and not clearly written. Please provide more information on the importance of water scarcity analysis by using different indices such as, water stress and water shortage. Please try to link the importance of Fu-Budyko in water scarcity analysis in a river basin scale. Materials and methods The manuscript needs more explanation on methodology section. Starting the paragraph with 'because' is not recommended. In table 1 provide the lat/lon for gage locations. Need more explanation on the section Hydrological data reliability. Line 29 – please replace e.g. by such as. Page 4. The sentence "The steeper the catchment, the smaller was the parameter" is not clear. Need more explanation on the catchment parameter (theta) used in the study? The equation 1 shows the Fu – Budyko frame work, and it is a function of aridity index. But the authors did not mention it here. But in page 5 authors introduced the AI (aridity index). It will make confusion to the readers. Please rewrite the section accordingly. Expand the unit mm/a (line 13). Hargreaves is not a suitable method for quantifying the potential ET hence it is only based on Tmax and Tmin. Please mention the drawback in the manuscript. What does the value 17.8 indicates in the equation 2. Be more specific. The line 23 – 27 is not clear. Please rewrite. Page 5. Line 2 – 3. What is the basis of this classifications? Include references. The trend analysis section is not clear. Need more explanation including the equations used. Line 12 – 13 is not clear. Rewrite. Line 17 Populations or population Line 10 – 19 please rewrite. The definition of WW is confusing. Please explain the Qnat and Qobs more specifically. Page 6. Is it population count data or population data? Please rewrite the section 'water stress and shortage'. Overall, the methodology section is not clearly written and confusing for the readers. Please improve the section.

Results The first sentence is not clear. What does the term sustainability indicates. Why did the authors calculate the correlation between observed and natural runoff? Need a clear explanation for this section. Page 6. The line 15 – 18 is not written well. Please improve the writing quality. Page 7. Line 18 shows that the authors selected only 9 large river basins for analysis. Please explain the reasons. The explanation for the questions "How did the imbalance in surface water scarcity develop between upstream and downstream regions? and What do we learn from China's water management strategies?" are not sufficient in the manuscript. Explain how the model framework is performing for different regions such as, snow regions in the manuscript. The discussion on percentage decrease in surface water withdrawal is not clear. Please explain the possible reasons. Page 9. Line 26 – 29 is not clear. The discussion section is not sufficient and well written.

Please also note the supplement to this comment:
https://www.hydrol-earth-syst-sci-discuss.net/hess-2018-364/hess-2018-364-RC2-supplement.pdf