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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Quantifying streamflow and active groundwater storage in response to climate warming in an alpine catchment on the Tibetan Plateau" *by* Lu Lin et al.

Anonymous Referee #2

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The authors investigated streamflow changes and active groundwater storage in response to climate warming in a headwater catchment called Yangbajain in the Lhasa River basin on the Tibetan Plateau. The Mann-Kendall test was applied to detect trends of time series. An existing algorithm was adopted to do baseflow separation. The recession flow analysis method was used to determine active groundwater storage. The authors found out that the increase in streamflow is mainly due to glacier meltwater. The increase of annual baseflow is the main cause of the increase in total streamflow.

The manuscript is well written and easy to follow. However, the originality of the study may be weak. The authors used existing methods to analyze data obtained from vari-

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ous agencies. In addition, there are some severe problems in the current manuscript. These problems are list below.

Major comments:

(1) This study seems like a case study. All methods used are already existed in the literature and the data were obtained from other agencies. In addition, the method of recession flow analysis may not be appropriate in the study area. As a result, the originality of the study may be weak.

(2) The authors used very simple methods to analyze the complicated system of the Yangbajain catchment. The results are hence questionable.

(3) The meteorological station seems to be a bit too far away from the Yangbajain station. The authors should explain why use the data from the meteorological station are reasonable.

(4) For the equations in the manuscript, if the equation is not derived by the authors, then reference(s) should be added.

(5) In Line 249, the authors stated that "during a period without precipitation and evapotranspiration...". Is this assumption reasonable? A period without precipitation may be reasonable but without evapotranspiration is not. The authors did not add references here or provide an explanation.

(6) The authors stated that the conclusion on streamflow increase (Lines 291-293) is in consistence with Prasch et al. (2013). The manuscript by the authors seems similar to Prasch et al. (2013). Please clarify the differences between the manuscript and the paper by Prasch et al. (2013).

Minor comments:

(1) The authors used "runoff" and "streamflow" simultaneously in the manuscript. Are they means the same thing?

(2) Lines 23-24: Delete this sentence. Such kind of information can be put into the "Study area" section.

(3) Line 38: What is the "mm0.79d-0.21" mean?

(4) Line 216: Is this equation belongs to the MK test or derived by the authors for this study specifically? Why the number on the denominator is 18?

(5) Line 212: This is not a new paragraph.

(6) Line 220: This is not a new paragraph and "When" should be "when".

(7) Lines 234, 244, 255: This is not a new paragraph.

(8) Line 238: The authors stated that the recession flow analysis is widely used, however, only one reference was cited in Line 239. Add more references here.

(9) Line 267: Why a threshold of 0.02 mm/day? Is there any physical background or any derivations of this value?

(10) Lines 291-293: The authors attributed the increase in streamflow to accelerated glacier retreat. Is there any contribution of permafrost degradation in the area due to increased air temperature?

(11) Lines 358-359: Same to Line 38, what are these units mean?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2018-541, 2018.

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