

Comment on hess-2021-264

Anonymous Referee #2

Referee comment on "Diagnosing the impacts of permafrost on catchment hydrology: field measurements and model experiments in a mountainous catchment in western China" by Hongkai Gao et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-264-RC2>, 2021

Based on the measured data and model experiments, the authors analyzed the influence of different meteorological forcing and terrain distribution on the hydrological process in alpine mountainous areas, which is of great significance for the future development of frozen soil hydrological forecast. However, the story is not clear. Permafrost hydrology is a very complex process. This study only selects the data of one observation station to optimize the model, which I think is unreliable. Moreover, one of the results is that the permafrost impacts on streamflow response mostly at the beginning of the melting season, but I can't find any definite data and scientific insight in the manuscript. As another example, in the manuscript, the descriptions of the topography and landscape heterogeneity are dominant controls on catchment response, what we can learn. Therefore, it is not clear what scientific insight the manuscript provides.Â

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Other comments:

- In introduction, the achievements and shortcomings of the present research should be added, and the research significance of this paper should be explained.
- In the Study site and data section, the introduction to the use of data is somewhat simple, please add basic information.
- In the Study site and data section, how do you handle gaps in data? Please give a supplementary explanation.
- In the Modelling approach section, the authors recommend that the model be appropriately simplified by introducing too much space.
- The author sets all parameters to dynamic in Ex9, and explains how this pattern reflects the difference from other patterns.
- It is suggested that the authors increase the applicability of stepwise modeling in alpine mountains in the discussion section. To verify the feasibility of this paper.
- In the discussion section, the authors can compare and discuss the relevant similar studies in alpine mountains at home and abroad, and analyze the similarities and differences.
- What factors lead to the base flow recession in permafrost regions ?
- The author introduces that the study area is located in the northeast of the Qinghai-

Tibet Plateau. It is suggested that the study area should be added to Fig. 1 to increase the overall readability of the article.

10. The conclusion of the manuscript is just a summary of the results. This section should include the main findings and outcomes of your work and describes how your research will impact the current state of science in the field.

- References have some format errors, please modify them carefully.