

# ***Interactive comment on* “Hydrological and Runoff Formation Processes Based on Isotope Tracing During Ablation Period in the Third Polar Region” by Zong-Jie Li et al.**

## **Anonymous Referee #1**

Received and published: 23 November 2019

Review of Li et al.,

This manuscript presents a meaningful insight into the hydrological processes in permafrost-affected cold areas. The authors carried out solid experimental works and got valuable isotopic data for understanding the hydrological processes. The influence factors on stable isotopes in water were analyzed and the contributions of each runoff component were quantified, which makes this manuscript worth publishing.

However, there are still some moderate to major issues that need to be improved before published on HESS. The written English needs to be improved thoroughly, and some results were not presented in a clear way. A colleague who has English as first

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language would be helpful to read through the manuscript and edit it. Besides, most results can be derived from data directly, but the reason and deeper phenomenon were not addressed enough. Last, there are still some technical issues on the calculation processes. I would outline them in detail below.

Major/Moderate issues: 1) There are a few errors about language, data or figure. Please check the text thoroughly, and I only list some obvious examples here: a. Some figures are not referred correctly in the main text (e.g., L369, Fig. 6 should be Fig. 5), and the title and description of some figures are wrong (e.g., L1371, the title and description of Fig. 6 should be for Fig. 5). b. L641: The proportion of supra-permafrost in the last three periods are same as precipitation, and the total proportion of all the sources in these three periods are not one. c. Fig. 1a: The red star represents river water, but there is no red star in the map. 2) Some concepts are not adequately clarified, making the result confusing. It would be better to clarify the exact time period of the initial/total/final ablation period in 2016 and ablation in 2017 and 2018. It would also be helpful to map the range of mainstream, the glacier permafrost area and the permafrost area. 3) There are paragraphs of words describing the number itself in main text (e.g., L274-302, L462-485), but they provide little useful information and make the result confusing. It would be better to list the numbers in a table and only give important conclusion, implication or explanation in the main text. 4) The “anti-effect” (anti-altitude effect, the negative correlation between isotope and temperature/evaporation) is an interesting phenomenon worth exploring. The discussion about this still lacks detail. How did meteorological factors influence each source directly and indirectly, and finally resulted in the negative correlation? 5) The 4.3 section seems to be a review of hydrological significance of permafrost, rather than a discussion. Please discuss more about the implication of your result, e.g., what kind of significance can you find or confirm according to your data. 6) The conclusion section is too detailed. Please just present the most importation finding here, rather than list so many numbers.

Minor issues: 1) Title: Better to use the source regions of Yangtze river, rather than

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Third Polar Region 2) L33: “The effects of altitude” on what? Please clarify. 3) L108: “because it is affected by this”, please rewrite. 4) L140-L145: the sentence is too long, please simplify 5) L149-151: How does the result of this article benefit the rational development? Please tell some implications of the results in the discussion section. 6) L161: Please use Salween River and Lantsang River 7) L227: Please use the full name in title 8) L298: “was different than”? 9) L410-L412: Please discuss in more details about the comprehensive influence 10) L437: What do you mean by “river water in different types of water”? 11) L458-L461: The sentence “Owing to . . .” does not has a main clause, please rewrite. 12) L481: I think there should not be a “so” here. 13) L498: I notice that the average contribution here is an arithmetic mean value, which is not reasonable. I think an amount-weighted value will be better. 14) L588-L590: “evaporation process” in L588 and “evaporation loss” in L590 are repeating. 15) L600: I think you are analyzing the stable isotopes in river water. But the river water were not sampled continuously according to the Method section. Please make it clear. 16) L647-L651: same as 13), please use amount-weighted value. 17) L711: What do you mean by “different ablation periods and strong ablation periods”? 18) Figures: Again, please check the name of figures and make sure that they are referred to correctly in main text. 19) Fig7: Please add an error bar to represent the range of isotope in water during each period. 20) Fig11: Is it really necessary to use 5 subfigures? I think they are a same figure apart from the proportion.

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