Reply on RC2

Yi Nan et al.

Author comment on "Assessing the influence of water sampling strategy on the performance of tracer-aided hydrological modeling in a mountainous basin on the Tibetan Plateau" by Yi Nan et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2022-44-AC2, 2022

1. Data input. I did not see the description on the water isotopes original data. So what is the variability of precipitation isotopes? And how about snow-melt, glacier-melt and groundwater?

Response 1: Thanks for your questions. We will add the average value and standard deviation of $\delta^{18}O$ in precipitation and stream water in the Table 1. The isotope data of other water bodies was not collected in the field work, which was a limitation of this study.

2. The conclusion: 'Using a set of glacier meltwater δ18O that were 2‰~9‰ lower than the mean precipitation δ18O resulted in only small changes in the model performance and the quantifications of contributions of runoff components' was inconsistent to the existing findings. Most of the previous studies attach great importance to glacier melt and snow-melt water isotope change, because they think this will lead to great bias of hydrograph separation (See the following references). Please discuss more on this.

Response 2: Thanks for your comment. Most of the hydrograph separation works were based on the end-member mixing approach, which was applied in a short time scale, and was more dependent on the absolute isotope composition of each runoff component. However, this work applied the tracer-aided hydrological model in a longer time scale, where the temporal variability of isotope composition played a more important role than its absolute value, on the parameter calibration. Consequently, when the temporal variability of isotope composition of each water source was reproduced properly, the glacier melt $\delta^{18}O$ value in a reasonable range would have little influence on the model performance. We will clarify this more clearly in the revised manuscript.

3. The authors gave some suggestions on the sampling. For example, they concluded 'It is highly recommended to increase the number of stream water sampling sites rather than spending resource on extensive sampling of stream water at a sole site for multiple years'. But I think this is highly up to the research purpose. If one wants to see the seasonal variation of water source contribution related to climate change, the conclusion should be inverse. So I suggest the authors to draw the conclusion more seriously, or add some

preconditions.

Response 3: Many thanks for your suggestion. We agree with you that the water sampling strategy is highly related to the research purpose. The sampling strategy proposed in this study is mainly aimed at capturing sufficient hydrological variability for establishing a tracer-aided hydrological model. We will make this clearer in the conclusion in the revised manuscript.