

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Comment on hess-2022-44

Anonymous Referee #2

Referee 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.,
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This paper used an isotope-aided hydrological model to assess the water sampling strategy in the mountainous region. Under the background of climate change affecting water resources, the isotope-aided model becomes a very useful method to see how does the water source contribution, especially the glacier-melt water contribution with the temperature change. The accuracy of such a method depends on the input of parameters, and thus the sampling strategy is highly important. The work tried several different sampling strategy and gave suggestions using the sensitivity analysis of existing hydrological model. So I agree the paper to be published, but there are also some points the authors should clarify.

My major comments are:

- 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?
- The conclusion: 'Using a set of glacier meltwater $\delta^{18}\text{O}$ that were 2‰~9‰ lower than the mean precipitation $\delta^{18}\text{O}$ 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.

Laudon, H., Slaymaker, O., 1997. Hydrograph separation using stable isotopes, silica and electrical conductivity: an alpine example. J. Hydrol. 201, 82–101.

Tao Pu, Ke Wang, Yanlong Kong, Xiaoyi Shi, Shichang Kang, Yonghui Huang, Yuanqing He, Shijin Wang, Jeonghoon Lee, Matthias Cuntz, 2020. Observing and modeling the isotopic evolution of snow meltwater on the southeastern Tibetan Plateau. *Water Resources Research*, 56, e2019WR026423. <https://doi.org/10.1029/2019WR026423>.

Altaf Lone, Ghulam Jeelani, R.D. Deshpande, Virendra Padhya, Estimating the sources of stream water in snow dominated catchments of western Himalayas, *Advances in Water Resources*, 10.1016/j.advwatres.2021.103995, 155, (103995), (2021).

- 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.