Thank you for the authors' efforts in improving the manuscript. This version of the paper shows improvement compared to the previous one. However, I still believe that the current paper is not yet suitable for publication in HESS. In my opinion, the novelty of the proposed contributions is insufficient, and the reliability of the conclusions remains inadequate.

The authors emphasize the development of a new hydrological model that considers snow and seasonally frozen ground. However, in my view, the approach of simply coupling empirical formula-based modules into a hydrological model is not sufficiently innovative. Extensive research has already been conducted on this issue in the Tibetan Plateau region, as the authors themselves have also mentioned. Moreover, several existing models, such as the VIC model (Cuo et al., 2015), CLM4.5 (Yang et al., 2018), GIPL2.0 (Qin et al., 2017a), WEB-DHM (Song et al., 2020), and GBEHM (Gao et al., 2018), provide more comprehensive descriptions of snow and seasonally frozen ground modules. The authors repeatedly highlight that the model developed in this study requires fewer input data, thereby emphasizing its applicability in data-scarce regions. However, the input data required by this model are essentially the same as those required by the aforementioned physically based models, primarily including topographic data, vegetation data, and meteorological input data. On the contrary, due to the simplified representation of physical processes in the model, more reference data are needed for parameter calibration. Therefore, I do not consider the simplicity of the model's physical description to be an advantage.

Additionally, the authors primarily demonstrate the model's accuracy through the performance of streamflow simulations. However, this is far from sufficient for a study on hydrological processes in high-mountain basins, where multiple processes contribute to the overall dynamics. Given that the focus of the paper is on analyzing the impacts of snow and frozen ground on streamflow, detailed validation of these two critical intermediate processes is essential. However, such validation is currently lacking. For the snow module, the authors only use remotely sensed snow depth data for calibration and validation. However, the accuracy of these data remains uncertain, as it is well known that remote sensing of snow depth in the complex terrain of the

Tibetan Plateau is subject to significant uncertainties. I recommend that the authors use more authoritative MODIS snow cover data to conduct a more comprehensive validation of the snow module results. As for the frozen ground module, the current validation is mainly limited to the start dates of freeze-thaw cycles (the results do not appear to be very satisfactory, and the authors have not provided quantitative metrics). There is a notable lack of validation for key physical variables, such as soil temperature and soil moisture (both ice and liquid water). I suggest that the authors collect in-situ measurements from the study region or validate their results against more authoritative remote sensing or reanalysis soil data to enhance the reliability of their findings.

Finally, numerous studies have already investigated the hydrological effects of snow and frozen ground at large basin scales, ranging from basin-scale (e.g., Cuo et al., 2015; Qin et al, 2017b; Song et al., 2022; Wang et al., 2023a, 2023b) to the entire Tibetan Plateau. Therefore, I recommend that the authors compare some of their conclusions with those of previous studies, rather than simply stating that research in this area is lacking. Furthermore, I find the current conclusions to be insufficiently in-depth. For example, the critical processes of how changes in soil ice and liquid water in frozen ground affect streamflow are not thoroughly discussed.

References

Cuo, L., Zhang, Y., Bohn, T. J., et al. (2015). Frozen soil degradation and its effects on surface hydrology in the northern Tibetan Plateau. Journal of Geophysical Research: Atmospheres, 120(16). .

Gao, B., Yang, D. W., Qin, Y., et al. (2018). Change in frozen soils and its effect on regional hydrology, upper Heihe basin, northeastern Qinghai-Tibetan Plateau. Cryosphere, 12(2), 657-673. doi:10.5194/tc-12-657-2018.

Qin, Y., Wu, T., Zhao, L., et al. (2017a). Numerical Modeling of the Active Layer Thickness and Permafrost Thermal State Across Qinghai-Tibetan Plateau. Journal of Geophysical Research: Atmospheres, 122(21), 11,604-611,620. doi:https://doi.org/10.1002/2017JD026858.

Qin, Y., Yang, D. W., Gao, B., et al. (2017b). Impacts of climate warming on the frozen *ground and eco-hydrology in the Yellow River source region, China. Science of The Total Environment, 605, 830-841. doi:10.1016/j.scitotenv.2017.06.188.*

Song, L., Wang, L., Li, X., et al. (2020). Improving Permafrost Physics in a Distributed Cryosphere-Hydrology Model and Its Evaluations at the Upper Yellow River Basin. Journal of Geophysical Research-Atmospheres, 125(18). doi:10.1029/2020jd032916.

Song, L., Wang, L., Zhou, J., et al. (2022). Divergent runoff impacts of permafrost and seasonally frozen ground at a large river basin of Tibetan Plateau during 1960–2019. Environmental Research Letters, 17(12), 124038. doi:10.1088/1748-9326/aca4eb.

Wang, T., Yang, D., Yang, Y., et al. (2023a). Pervasive Permafrost Thaw Exacerbates Future Risk of Water Shortage Across the Tibetan Plateau. Earth's Future, 11(10), e2022EF003463. doi:https://doi.org/10.1029/2022EF003463.

Wang, T., Yang, D., Yang, Y., et al. (2023b). Unsustainable water supply from thawing permafrost on the Tibetan Plateau in a changing climate. Science Bulletin, 68(11), 1105-1108. doi:https://doi.org/10.1016/j.scib.2023.04.037.

Yang, K., Wang, C., & Li, S. (2018). Improved Simulation of Frozen-Thawing Process in Land Surface Model (CLM4.5). Journal of Geophysical Research: Atmospheres, 123(23), 13,238-213,258. doi:https://doi.org/10.1029/2017JD028260.