

Comment on hess-2022-179

Anonymous Referee #1

Referee comment on "Characterizing 4 decades of accelerated glacial mass loss in the west Nyainqentanglha Range of the Tibetan Plateau" by Shuhong Wang et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-179-RC1>, 2022

The manuscript quantified changes in glacier area, surface elevation and mass balance in the WNT over the past 44 years and investigated associated influence factors over 1976-2000 and 2000-2020, based on multi-source remote sensing datasets. It is important to well understand the importance of glacier changes and associated impacts in the WNT, where these glaciers plays a critical role in regulating regional water resources through supplying meltwater to the densely populated Lhasa River basin and Nam Co. Overall, the science of the manuscript is very interesting, and the structure and writing of the manuscript are good, but there are some issues the authors should be considered.

- The key purpose of this study is to provide an internally consistent dataset of glacier area and mass change in the WNT over the past 44 years. What is your purpose for obtaining this dataset? It should be the hydrological impacts of glacier changes in the basin. However, there is no discussion on hydrological impacts of glacier changes on water resources of the basin or Nam Co, so the authors can consider some discussion about the influence of glacier change on hydrology in the WNT. It is very important for the manuscript, also for HESS.
- Glacier outlines: Chinese Glacier Inventory (CGI) I and CGI II are available now. The authors generated new glacier boundaries of this region in the years of 1976, 2000, 2014 and 2020 from Landsat images obtained from various years. How about the differences between your results and previous datasets? What is the main reason why generate a new dataset? The authors may add some discussion or analysis in the manuscript or supplementary material.
- Meteorological data: Please give the elevations of these meteorological stations used in the manuscript.
- As shown in Table 3, the area of debris cover and lake terminating decreases between two periods, but thinning increases. Why? In particular, some current studies confirmed that the spatial expansion and thickening of the debris layer have been observed on different debris-covered glaciers with glacier shrinkage and sustained mass loss (e.g., Stokes et al., 2007; Kirkbride and Deline, 2013; Tielidze et al., 2020; Xie et al., 2020). Just as a matter of interest, what is the reason leading to the reduction of debris cover on glaciers of this region? In addition, between two periods, glacier number increases from 617 and 692 with an area decreasing. What happened?

- The manuscript analyzed glacier area change and surface elevation change for the periods 1976-2000 and 2000-2020, how about the total changes in glacier area and surface elevation change between 1976-2020? The authors may add two figures in the manuscript or supplementary material that show changes between 1976-2020.
- Minor comments:

1) Figure 1: Debris-cover is debris cover, Debris-cover glaciers is Debris-covered glaciers, and other glaciers is right?

2) Some units should be superscript.

3) Some References cited in the manuscript are missing in the Reference list. Please carefully check.