

Comment on **essd-2022-265**

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Referee comment on "Interdecadal glacier inventories in the Karakoram since the 1990s" by Fuming Xie et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-265-RC2>, 2022

Summary

This study presented a new glacier inventory for four time periods (1990, 2000, 2010, 2020) covering the Karakoram and surrounding region (upper Shyok basin) using Landsat satellite imagery and reported insignificant area loss in the study area. The manuscript is very well-written and nicely structured. I have given some minor suggestions for improvement. The important issue is an outline of the Karakoram region. The present study modified the extent of Karakoram (L131) presented by Bhambri et al. (2017) but did not mention the reasons for this change. Bhambri et al. (2022) recently reported no international standardization on the Karakoram extent. Therefore, consistency in the spatial extent of the Karakoram region is needed to quantify, analyze, and compare databases of natural and cultural resources for scientific investigation on a common platform and harmonization of scientific studies. Comparing glacier numbers and area statistics with previous studies is impractical (section 4.1) as all the studies on Karakoram glaciers have different area coverage. Bhambri et al. (2022) provided a most appropriate digital outline of the Karakoram region based on two decades (1920s and 1930s) long discussions and descriptive enumerations of the Royal Geographical Society (RGS) and the Survey of India (SoI). I suggest using this most common outline (open access) for the extent of the Karakoram and using the same outline to extract previous glacier inventory data on the same platform for comparison and modify section 4.1. If you do not want to use this outline, for the sake of harmonizing scientific studies, you can change the title to "Interdecadal glacier inventories in the Karakoram and the surrounding region since the 1990s".

Suggestions

L41-42 Uncertainty is the same ± 3.68 in two sentences. If it is the same, write accordingly. You can write ± 3.7 .

L50 Present results in single-digit after the point ($23.4 \pm 28.8 \text{ km}^2$). Please carefully check the entire manuscript. In some places, it is single-digit (e.g., L300), and in others in double-digit.

L59 Most glaciological studies usually avoid referring to countries' names for the Karakoram region. If you mention Pakistan in the first sentence of the introduction, then India and China must also be mentioned for the sake of neutrality. If you like, you can refer to the contested nature of this particular mountain region with different territorial claims between the different nation-states in a very general way. This is one aspect which creates continuous problems for ground truthing and field measurements. See Baghel and Nüsser (2015).

L89 "Moreover, the presented areas of glacier coverage differ partially substantially for the different available inventories (Bolch, 2019; Bolch et al., 2019)." Here you can mention Bhambri et al. (2022).

L91 "delineation with the exclusion of glacierized areas in glaciated areas steeper than 40° ." Here two terms, 'glacierized' and 'glaciated', are used, and I could not understand them. Please see Cogley et al. (2010) for these terms.

L133 "The data were identified and processed using Google Earth Engine." For image processing or glacier mapping?

L153 for Karakoram boundary modified.... Please see my comment above.

L175 Bolch et al. (2010) used TM3/TM5 band ratio instead of NDSI. Therefore, Bolch et al. (2010) TM3/TM5 band ratio threshold must be different from NDSI.

L201 Please omit etc.

L218 Double space between can be

L223 Double space between developed processing

L293 This paper was published in 2006 (Granshaw and G. Fountain, 2017). Please check.

L394 between 0 "and" 50°

L414 "Karakoram boundary used by us is a little different from that in previous studies (Bolch et al., 2019; Bolch et al., 2012)," I don't think this is little difference. Also, please see my suggestions for the Karakoram boundary above.

L438 Scherler et al., (2018)

I hope this will help.

References

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