Interactive comment on "Glacial lake inventory of High Mountain Asia (1990–2018) derived from Landsat images" *by* Xin Wang et al.

Anonymous Referee #2

This manuscript firstly introduces glacial lake inventory across the entire High Mountain Asia at two time periods using manual mapping on 30 m Landsat images. The sharing data are crucial to further water resource assessment or glacier hazard risk, even current lake data are not perfect, however, this is a big step toward data sharing at such a large-scale. I am sure more and better glacial lake data will be shared or updated by this team or other research group in the future, inspired by this original report. Before recommending this manuscript to be published in ESSD, I would like to suggest some necessary revision.

General comments:

1. Currently, the authors give a wrong link to download the sharing data that is unavailable or need a registered account to download the data, it is

not convenient. Actually, I find it is okay to directly download without any registration at http://www.crensed.ac.cn/portal/metadata/706ce17f-1684-4e8d-bf5e-7d517e03693c, so, why not replace with this link in the text?

2. There are many reference errors in the current text that have to be corrected carefully, I did not find all of them out, the authors have to go through. Such as, Yang et al., 2019 in the text but not listed in the reference section, P19-L24, Chaohai L, wrong surname, the same to P20-L1, L4, P21-L20, P23-L10.

3. A technical question, how do you distinguish non-glacial lakes within 10-km of reference glaciers with defined glacial lake? For example, the 2010 Ataabad landslide-dammed lake. In the alpine area of HMA, there are many landslide-dammed lakes that have no relationship with glaciology but are mainly supplied by glacier meltwater. Could you provide more detailed information about this?

4. About the minimum mapping unit, how do you consider selecting 0.0054 km2 as a threshold value? Currently written as "the minimum glacial lake area recorded was set at 0.0054 km2 (e.g., 3–4 pure 10 lake water body pixels with approximately 12 mixed boundary pixels) because a lake area covering 11 fewer than three pure lake water pixels could possibly have an error of >100 %", I am confused by this writing. My understanding is that it is difficult to digitize 3-4 pixels by manual interpretation. Otherwise, it is 6 pixels, equaling to 0.0054 km2 using Landsat images.

5. I suggest writing a further revision plan in the end of this draft to point out the shortage of current glacial lake data. Actually, the data have been published in a data sharing platform, and some errors exist inevitably in terms of two times manually vectorization for the same lake, for example, induced by wrongly digitizing, maybe operated by different operatives. Do you have any plan to update the data? Once the data updated where to share? In what kind of ways?

6. I also suggest authors to polish the language once again, and some sentences are arduous to follow.

Specific comments: P1-L26, update the link

P2-L25, recognizing→revealing

P3-L6, Yang et al., 2019, not listing in the reference; L18, a Landsat imagery series?

P4-L5, only Antarctic? What about Arctic? L8 "the primary source of both lake basin formation", I think no relationship.

P5-L13, suggest revise as circa 1990 and circa 2018

P6-L19, 20, what scale do you keep while an operator did computer screen vectorization of mixed pixels?

P7-L12, -0.1 of NDWI to extract lake extent? Generally, this value is greater than 0.

P9-L3, Weicai et al.,?

P10-L3, 10 km from modern glacier terminals? Or glacier extent? L12-15, given a reasonable classification of lakes, why did not you take this? L19-22, it is not clear what your point is? "because of the lack of sufficient amounts of remote sensing data with appropriate resolution." L23, two types: glacier-fed lakes and non-glacier-fed lakes? The significance becomes very limited by too simple classification system. Maybe more types, such as pro-connected lake and supraglacial lake, be cataloged. But being cautious, once you modified the data, meaning that you have to update the sharing data on the platform online.

P13-L14,15, why did not you record the date of used images? Only recorded the month and year?

P14-L21, Narrate the accuracy of Trimble GeoXH6000 for a better understanding about the validation.

P16, Figure 6, suggest adding a scale bar for each subset.

P16-L13 The HMA glacial lakes are located within the elevation range of 1600–6300

m. while, P17-L110, L11, maximum distribution elevation of 6078 m in 1990 rising to 6247 m in 2018. Maybe use the relatively accurate value of elevation.

P17, Back up to previous error, in Figure 7, the maximum X axis value is 6000 m, so you miss your lakes with maximum elelevation.

P18, L1, L2, How to prove that no observable trends were discovered in Karakoram and Western Kun Lun, Western Himalaya?

P18, suggest adding a section about the shortage and updating plan for this data, putting before Data availability

P18, replacing the existing link

P18, rewrite the sentences in L23-26, it is unclear. "Lake area expanded most in the higher elevation bands during 1990–2018. The data set has been developed as basic data for cryosphere hydrology research; however, it is expected that it could support practical utilization and management of water resources and assessment of glacier-related hazards in the HMA region"

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