The manuscript presented by Zhao and co-authors put forward a glacier mapping tool using Landsat collections and reanalysis data over the Tibetan Plateau (TP).
The manuscript is generally well written and mostly well structured, however I have made some suggestions to try and improve the flow of the manuscript.

Response: Thank you for your careful review of our manuscript and for your many high-quality comments and suggestions. We sincerely appreciate the comments that have helped sharpen this paper. Specific responses to the review comments are presented immediately after the respective review comments.

My main and minor comments can be found below:
Main:
1. Why is RGI 6.0 being used instead of RGI 7.0 which was published in September 2023? I appreciate if analysis had been carried out before the most recent release, however I think it is important the most up to date data products are used in current day studies as I know there can be large differences in glacier extents between version 6.0 and 7.0 and therefore may impact your results significantly. I will leave this to the decision of the handling editor, but I would suggest using RGI 7.0 to ensure at the time of publication, the results reflect the most current version.

Response: Thank you for your kind comment and suggestion. The RGI 6.0 was the latest glacier data when conducting this work. Thus, the validation of our glacier mapping results is mainly based on the RGI 6.0 glacier data.
The quality of RGI 7.0 data is substantially improved in many regions due to the inclusion of newly updated inventory glacier data (RGI 7.0 Consortium, 2023). Thus, in this revision, the RGI 7.0 data is adopted to validate our glacier mapping results. The validation results indicate that the accuracy of our mapped glaciers in 2000 using the latest RGI 7.0 glacier data is higher than that using the RGI 6.0 glacier data, which further confirms the accuracy of our mapped glaciers. This validation will be added in the potential revision.

2. There is no consideration of the poor 'completeness' value in Table 2, particularly for 2010. The F-1 scores for glacier mapping are moderate, I would not consider them strong metrics in support of the method. It is of course fine to have these scores, however, there needs to be consideration of why the scores are this low and how this may impact the results in the discussion.

Response: Thank you for your comment. The target year of RGI glacier data is 2000; thus, the completeness of the mapped glaciers in our study was particularly poor in 2010. This consideration will be added in the potential revision.
Further, 35% of all RGI 6.0 outlines were dated to five or more years away from the target year 2000, while this number is down to 23% in RGI 7.0 (RGI 7.0 Consortium, 2023). In addition, the accuracy of our mapped glaciers in 2000 using the latest RGI 7.0 glacier data is higher than that using the RGI 6.0 glacier data, which further confirms the accuracy of our mapped glaciers. In the potential revision, the comparison results between the mapped glaciers in this study and the RGI 6.0

and RGI 7.0 glacier data will also be added.

3. Each section of the paper (i.e. results, discussion) does not need to have an introductory section of how it is structured and I would suggest deleting them and going straight into the text of the section.

Response: Thank you for your comment and suggestion. These introduction sections will be deleted in the potential revision.

Minor:
4. L17: Would just note what time period this 'slight increase' was

Response: Thank you for your comment. Most glacier areas experienced a decrease from 1990 to 2000, followed by a slight increase from 2000 to 2010. The “slight increase” will be clarified in the potential revision.

5. L19: Would consider stating geographically where these 'zones' are as out of context as they don't mean very much as no lead in from the abstract (i.e. NE of TP)

Response: Thank you for your kind suggestion. The southwestern Tibetan Plateau will replace Zone VIII, and the northwest Tibetan Plateau will replace Zone VI in the potential revision.

6. L35: I get what you mean, but I would rephrase the opening on this paragraph saying 'Glacier change can be measured using variations in...' to be clearer

Response: Thank you for your kind suggestion. This sentence will be revised as follows: Glacier change can be measured using a spectrum of metrics, including variations in area, thickness, volume, surface mass balance, and equilibrium line altitude.

7. L42: Would put the reference for each method after it was referred to i.e., spectral analysis (ref), object-based (ref), etc.

Response: Thank you for your comment. This sentence will be modified as follows: Glaciers are commonly mapped using a variety of techniques, including spectral analysis of optical satellite images (Bolch et al., 2010), object segmentation-based methods (Robson et al., 2015), and supervised machine-learning algorithms (Khan et al., 2020).

8. L46: needs a reference for debris-free glaciers before full stop

Response: Thank you for your kind comment. The reference for debris-free glaciers will be added as follows: Robust and efficient pixel-based multispectral analysis has been particularly effective in accurately delineating debris-free glaciers (Huang et al., 2021).

9. L51: are 'quality' and 'resolution' not the same thing? Also, what type of resolution, spatial or temporal? If both I would suggest stating the limitation of spatio-temporal resolution over the TP.

Response: Thank you for your comment and suggestion. There are some differences between quality and resolution; specifically, the resolution is one type of quality. However, in this study, they both indicate the spatial and temporal resolutions of the glacier mapping on the Tibetan Plateau. However, glacier mapping on the Tibetan Plateau with high spatial-temporal resolutions is limited due to the large amounts of satellite images and the massive computing. To avoid this confusion, this sentence will be revised as follows: Furthermore, limited by the large amounts of satellite images and massive computing, the comprehensive depiction of glacier retreat across the entire Tibetan Plateau, especially at finer temporal and spatial resolutions, remains inadequately characterized.

10. L58: Climate change seems a bit broad here, is it the increasing air temperature? Would clarify

Response: Thank you for your comment and suggestion. The dominant driver of the glacier retreat is the increasing temperature. To avoid this confusion, this sentence will be revised as follows: Climate change, especially the increasing temperature, is recognized to be the dominant driver of the glacier mass balance and the associated area and volume changes.

11. L77: If you state 'numerous studies' I would suggest citing a handful of them as examples

Response: Thank you for your comment. More references will be added in the potential revisions, and the revised sentence is as follows: Despite numerous studies examining glacier variations on the Tibetan Plateau in recent decades (Yao et al., 2012; Neckel et al., 2014; Ye et al., 2017; Bibi et al., 2018; Sun et al., 2018; Latif et al., 2019; Zhang et al., 2021; Xiao et al., 2023), the specific impacts of climate change on glacier retreat have not been thoroughly investigated at a finer resolution.

12. L82-85: not convinced this is required for such a specific structure, think you're fine with just the aims of the paper being highlighted

Response: Thank you for your kind comment and suggestion. These sentences are intended to understand the structure of this article. To avoid this confusion, these sentences will be deleted in the potential revision.

13. L86: Just call it Study Area

Response: Thank you for your comment. This subheading will be revised as “Study Area”.

14. L117: Would call it data and methods instead of materials

Response: Thank you for your comment. This subheading will be revised as “Data and Methods”.

15. L118: This text is not needed - would go straight to 3.1

Response: Thank you for your comment. In the potential revision, this text will be deleted.

16. L124: I would just be careful saying images via GEE catalog are 'open-access' - while they are for individuals, there is commercial cost to access the platform

Response: Thank you for your comment and suggestion. In the potential revision, the “open-access” will be deleted to avoid this confusion, and the revised sentence is as follows: The Landsat data is used via the Google Earth Engine platform, which is attributed to their prolonged data availability period and comparatively high spatial resolution.

17. L124: Would merge these sentences, suggest at start of sentence saying Landsat data is used via GEE

Response: Thank you for your comment and suggestion. In the potential revision, this sentence will be revised as follows: The Landsat data is used via the Google Earth Engine platform, which is attributed to their prolonged data availability period and comparatively high spatial resolution.

18. L158: Figure 2 caption - Is this the total number of Landsat images or the total number used in the study with less than 60% cloud as defined by your study? Would clarify

Response: Thank you for your comment. The number of Landsat images is the total number used in the study with less than 60% cloud. In the potential revision, this sentence will be revised as follows: The number of Landsat images with less than 60% cloud available for each year corresponding to each period of glacier mapping is depicted in Fig. 2. In addition, the caption of Fig. 2 will be revised as follows: Number of Landsat images with less than 60% cloud for each year corresponding to each period of glacier mapping.

19. L162-164: basically, the same as previous, would suggest merging and stating previous studies chose 0.4 as a threshold and therefore it was chosen here

Response: Thank you for your kind comment and suggestion. In the potential revision, this sentence will be revised as follows: Previous studies chose 0.4 as a threshold to extract snow and ice (Scherler et al., 2018; Huang et al., 2021); thus, in this study, a threshold value of 0.4 is set to facilitate the extraction of debris-free glaciers from the Landsat images.

20. L167-169: same applies about thresholding values NDWI, just merge them and say you chose 0.4

Response: Thank you for your kind comment and suggestion. In the potential revision, this sentence will be revised as follows: Many studies have depicted that the NDWI values of the water pixels ranged from 0.4 to 1 (Du et al., 2016; Zhao et al., 2018; Bevington and Menounos, 2022); thus, in this study, an NDWI threshold of 0.4 is adopted to minimize errors associated with the presence of open water in the glacier mapping.

21. L171: 'Therefore' does not fit here as does not follow the previous sentence

Response: Thank you for your comment. In the potential revision, this sentence will be revised as follows: Based on prior research and preliminary analysis of the surface temperature of the reference RGI 7.0 glaciers, a threshold for surface temperature (derived from the thermal band) is set at -1 °C (Shugar et al., 2020).

22. L173-174: the final paragraph is just repetition of values you've defined - suggest deleting

Response: Thank you for your kind suggestion. To avoid thisrepetition, this sentence will be deleted in the potential revision.

23. L183: What holes? What do you mean 'filled'? Interpolated? Would clarify

Response: Thank you for your comment. These holes may be a part of the mapped individual glaciers. Limited by the spatial resolution of the used Landsat images and the processing errors, there may be some holes in the mapped individual glacier. In this study, these holes smaller than 0.01 km² are filled according to previous studies (Bevington and Menounos, 2022); as such, a more complete glacier mapping can be obtained. To avoid this confusion, this sentence will be revised as follows: Limited by the spatial resolution of the used Landsat images, there may be some errors and holes in the mapped individual glacier. In this study, polygons with an area less than 0.05 km² are excluded, and holes smaller than 0.01 km² are filled according to previous studies (Bevington and Menounos, 2022).

24. L185: sentence does not make sense - what do you mean 'validated using reference debris-free glaciers'?

Response: Thank you for your comment. The mapped glaciers in this study are debris-free glaciers; thus, the accuracy of the mapped debris-free glaciers is validated using reference RGI 7.0 debris-free glaciers. These reference glaciers are derived by removing the debris-covered portions from the RGI 7.0 dataset, with the debris regions sourced from Scherler et al. (2018). In the potential revision, this sentence will be revised as follows: The mapped glaciers in this study are debris-free glaciers; thus, the accuracy of the mapped debris-free glaciers is validated using reference RGI 7.0 debris-free glaciers. These reference glaciers are derived by removing the debris-covered portions from the RGI 7.0 dataset, with the debris regions sourced from Scherler et al. (2018).

25. L253: Can Fig 3 be made bigger?

Response: Thank you for your comment and suggestion. In the potential revision, Fig. 3 will be made bigger.

26. L255-258: Delete introductory

Response: Thank you for your comment. In the potential revision, this paragraph will be deleted.

27. L275: Figure 4. Would suggest having the map as a) at the top of the figure then having panels b-i stacked. The lettering order seems a little confusing

Response: Thank you for your comment and suggestion. In the potential revision, the order will be re-sorted alphabetically.

28. L287: What do you mean the glaciers mapped between 2000 and 2005 'exhibit greater consistency'?

Response: Thank you for your comment. Fig. 5 depicts the comparison results of glacier mapping in 2000, 2005, and 2010 and the reference RGI 6.0 debris-free glaciers. It describes that the glaciers mapped in 2000 and 2005 exhibit greater consistency compared to those in 2010, with this trend being particularly pronounced in Zone III. In the potential revision, the latest RGI 7.0 will be used as the reference glaciers, and the comparisons between the mapped glaciers in this study and the RGI 7.0 glaciers will be depicted.

29. L300: Table 2 metric scores - see main comment 2

Response: Thank you for your comment. The target year of RGI glacier data is 2000; thus, the completeness of the mapped glaciers in our study was particularly poor in 2010. This consideration will be added in the potential revision. Further, 35% of all RGI 6.0 outlines were dated to five or more years away from the target year 2000, while this number is down to 23% in RGI 7.0 (RGI 7.0 Consortium, 2023). Thus, the accuracy of our mapped glaciers in 2000 using the latest RGI 7.0 glacier data is higher than that using the RGI 6.0 glacier data, which further confirms the accuracy of our mapped glaciers. In the potential revision, the comparison results between the mapped glaciers in this study and the RGI 6.0 and RGI 7.0 glacier data will also be added.

30. L400: I think Fig.10 and above text is more results than discussion. Would suggest moving to results. Do you have any numbers for the total area difference between the two methods? Would add to the argument of the AGEI method

Response: Thank you for your comment and suggestion. In the potential revision, the comparison results of the mapped glacier using the AGEI method and the minimum NDSI method will be moved to the results section, and the quantitative comparison between these two methods will also be added in the results section.

31. L405: Would refrain from starting discussion sentences 'Fig X', if wanting to directly refer to the figure, place in brackets at the end of the sentence

Response: Thank you for your kind suggestion. In the potential revision, this sentence will be revised as follows: The distinct regional variations in glacier area changes, with the most pronounced retreat observed in the Himalayas and the southeastern Tibetan Plateau (see Fig. 4).