Dear Editor,

We sincerely appreciate your insightful and constructive comments on our manuscript (EGUSPHERE-2025-652). In response to your comments, we have made careful revisions to the last submission. We hope that the revised manuscript now meets the standard of publication at *The Cryosphere*.

Again, we deeply appreciate all your great effort and thoughtful comments that are really helpful for improving our manuscript. Below are our point-by-point responses to your comments. Editor comments are presented in blue, and our responses follow in black.

Comments from the Editor:

1. L116: ICEat-2   ICESat-2.

Response: Done.

2. L139-142: at Line 139 you note that image acquisitions do not exceed 90 days, then at the end of this paragraph you note that intervals range from 3 to 45 days. In light of the latter information, it is not necessary to mention 90 days at all. Also, can the authors provide some comment, is there enough displacement in image displacements of 3 days?

Response: Thanks for this insightful comment. The 0- to 90-day interval was used for initial screening of ITS_LIVE data, whereas the 3- to 45-day range refers to the interval ultimately selected for further analysis. These two filters correspond to the 6260 velocity maps mentioned in this paragraph (Line 138) and the 3295 velocity maps referred to those in Section 4.1 (Line 318), respectively. The two time intervals were used for different purposes, so both are necessary to mention.

For normal glaciers, annual displacements are typically only tens to just over a hundred meters, making three-day displacements difficult to detect with remote sensing images. For example, the Yalong Glacier in the Southeastern Tibetan Plateau moves only about 0.5 m/day (Zhou et al., 2021). In contrast, surge-type glaciers can exhibit significant short-term displacements. During the surge of the Kutiah Glacier, its terminus advanced 12 km within three months (Bhambri et al., 2017), corresponding to an average daily displacement of over 100 m. Under such conditions, three-day displacements are substantial enough to be captured by remote sensing images. Similarly, during the surge of the Yulinchuan Glacier on the northern slope of the Muztagh Range, the maximum velocity reached 13.3 ± 1.5 m/day (Guo et al., 2012), meaning that three-day displacements during the surge are also readily detectable by Landsat and similar images. Furthermore, using an excessively long minimum temporal interval risks missing or underestimating the peak velocity of glacier surges. For example, the peak velocity of the western branch of Karayaylak Glacier in the Pamir region in 2015 lasted only about one week (Zhang et al., 2016). Therefore, using a minimum interval of 3 days in this study seems reasonable.

3. L144: it is mentioned that the data is aggregated into annual and monthly timescales, please provide details and describe how this was done. With regard to annual aggregation, why not simply use the ITS-LIVE annual composite products?

Response: Thanks for raising this issue. The method used in this study to aggregate glacier velocity data to monthly or annual scales is relatively straightforward: for a given pixel in the velocity map, all valid values whose center-date falls within a specific month or year are averaged to represent the mean value in that month or year. We have added this in the manuscript (Line 144–146).

In this study, to better capture velocity variations during the surge of the Kunchhang Glacier, our processing approach differs from the official one. First, we applied a temporal interval filter (3–45 days) prior to velocity analysis, meaning that the velocity maps we used are not identical to the ITS_LIVE annual composite products. Second, while the ITS_LIVE annual composite products employ an error-weighted average to derive annual mean values (http://its-live-data.jpl.nasa.gov.s3.amazonaws.com/documentation/ITS_LIVE-Regional-Glacier-and-Ice-Sheet-Surface-Velocities.pdf), this study directly uses arithmetic means. Therefore, we did not directly use the ITS_LIVE annual composite products.

4. L241: This sentence about Figure 3 should be provided before the figure at the end of the last paragraph.

Response: We have moved Figure 3 to the end of the second paragraph in Section 3.4 (Line 245), ensuring that the figure is introduced before it appears.

5. Figure 4: Please update the colour map used. Stretching the velocity values only over red I find difficult to read, especially for the tributary surge 2004. Figure caption will need to be updated to reflect the new colour map.

Response: We have changed the colour map in Figure 4 from “reds” to “bwr” (blue-white-red), and changed the colour of rectangles to cyan (Fig. R1). The figure caption has now been updated accordingly (Lines 327–328).

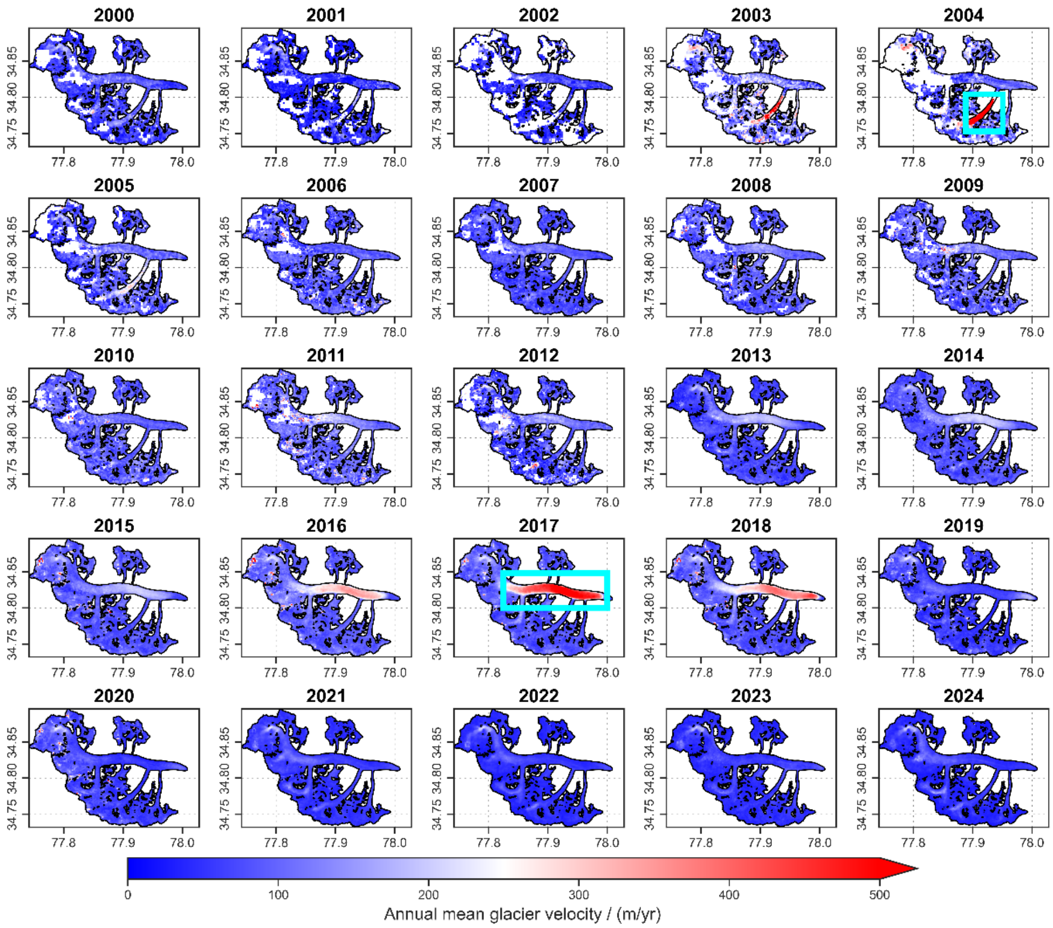

Figure R1: updated Figure 4. Redder colours indicate higher glacier velocities, while bluer colours indicate lower velocities. The cyan rectangles in the 2004 and 2017 panels mark the extent of the identified glacier surges.

6. L385: when you are describing surface lowering, please make sure that you are reporting these as negative values. You note a elevation decline of 1.6, but make this -1.6 so that it is clearer to the reader that the elevation is lowering at this time. Check throughout the manuscript to be consistent.

Response: We have changed all negative elevation change values in the manuscript to negative numbers (Lines 371, 375, 387, and 419).

7. The figure caption for Figure 7 should include a statement about the data presented, if it is openly available from the Hugonnet paper, then the authors need to make that clear in the caption.

Response: Elevation change maps shown in panels (a)–(d) were sourced from Hugonnet et al. (2021a). The map in panel (e) shows the elevation difference between our GF-7 DEM and an ASTER DEM acquired around 2020. We have removed the citation in Line 392 and revised the caption for Figure 7 to specify the data sources of the elevation change maps (Line 408–409).

8. L436: 'glacier extent' should be 'the glacier extent'

Response: Done.

9. Figure 9: The colour of the text needs to be updated on this figure, so that it is easier to read when it is placed over the glacier outlines. Also, make sure that the figure labels: (a), (b) (c)… are all placed in the top left corner of each pane, rather than at the bottom.

Response: We have placed the figure labels of panels (a)–(f) to the top left corner of each panel. We also tried different colours of the text but with poor results. Adding a background to the text has now made it all clearly readable (Fig. R2).

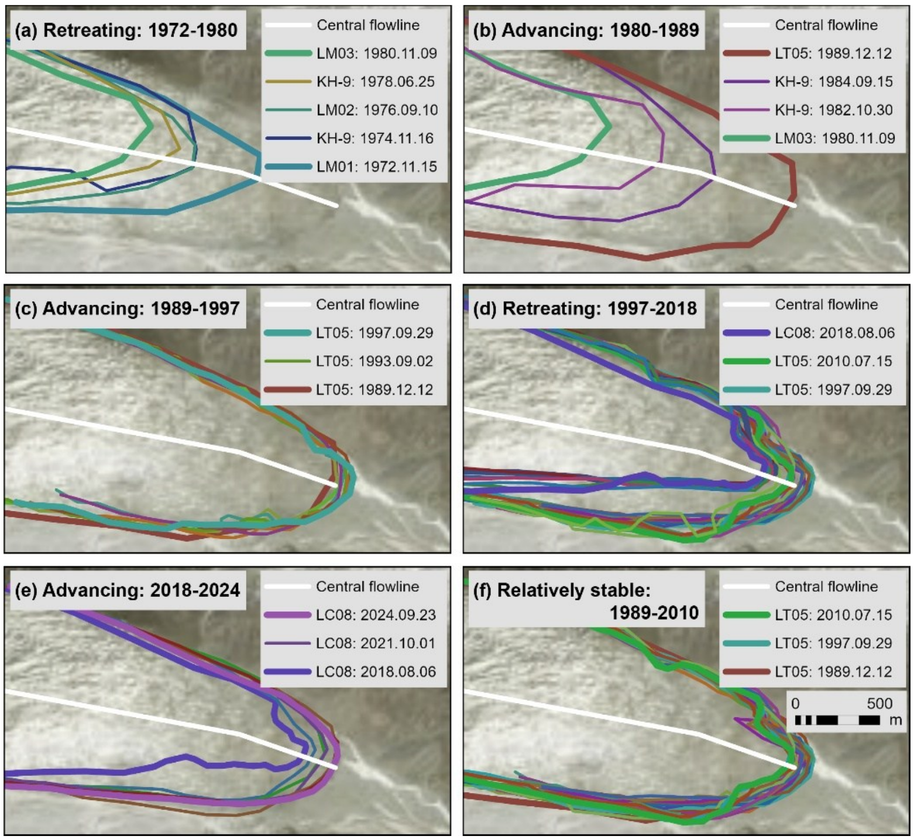

Figure R2: updated Figure 9

10. L462: corroborated by the ASTER

Response: Done.

11. L487: change additional context to more context

Response: We have changed “additional context” to “more context” (Line 490).

12. Figure 11, for (a) and (b) move the labels to the top-left side of the map

Response: We have moved the labels of panels (a) and (b) to the top-left side of the map (Fig. R3).

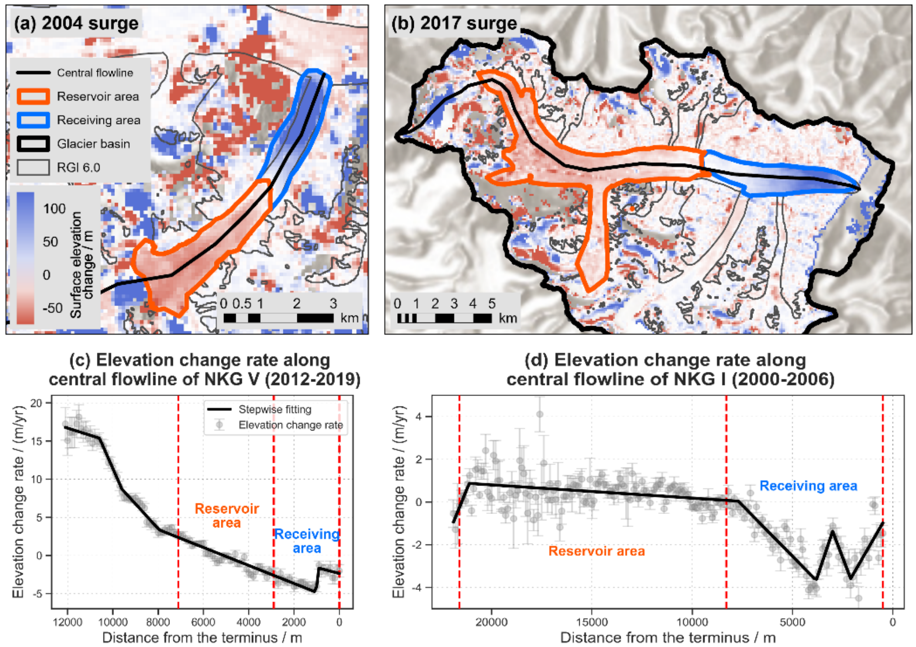

Figure R3: Figure 11 with adjusted labels for panels (a) and (b)

13. L593: After the initiation of the 1980 surge

Response: Done.

References

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