Reply to Reviewer Comment #1 from 20 May 2020

General comments

This paper provides a useful update of the number of known surging glaciers in the Pamir, including the identification of several new ones. The dataset is certainly useful, and will help to build on our global knowledge of why some glaciers surge, while others in the same region do not. However, I currently find the text a bit difficult to follow as the paper lacks a clear description of how surging glaciers were identified, and there is a lack of clarity and preciseness in the wording. The authors implicitly assume that the reader will understand what they're referring to in relation to glacier surging, but terms need to be better defined. For example, there needs to be a clearer definition of what a 'typical surge pattern' is (L243), and what is meant by 'opposing patterns of surface elevation change' (L240)

We fully agree that a clear terminology is important and have revised the related sections.

Detailed comments are provided by line number below, and minor language and typograpicali sues are addressed in the attached PDF (make sure to view comments in the PDF to see all of them).

Thank you for the comprehensive review of our study!

Detailed comments

L1: you haven't really demonstrated that the surging glaciers are 'More dynamic than expected', so I would suggest dropping this part of the title. Indeed, you don't determine glacier velocities and so it's hard to say that you've quantified dynamics, and your 186 surging glaciers are less than the 561 presented as possibly surge-type by Sevestre and Benn (2015)

We agree that we should make clearer where the title comes from and have done so. It is indeed not related to flow velocities, but to a) the much higher number of confirmed glacier surges (186 instead of the 90 by Sevestre and Benn (2015), to b) small glaciers (<1 km^2) that also show massive surges, sometimes more than doubling their minimum length and c) the high number of active surges in any year (min 54, mx 120). This means they are much more dynamic than we expected. A related description of point c) has been added to the text.

L14: in the paper it's clear that you use more than just Landsat images to identify surges (e.g., Corona, Bing), so it would useful to mention those other sources here

You are right. This information comes only later in the abstract. We have thus now written here 'are largely based on'.

L15: instead of listing the methods used to analyse satellite imagery (e.g., animations, flicker images), it would be more useful to list the physical characteristics that you used in the satellite imagery to uniquely identify a glacier as surging (e.g., rapid terminus advance, large elevation change)

We have actually not calculated terminus advance rates or elevation changes to apply the suggested criteria ('rapid' or 'large'), but build our basic analysis on the visual interpretation of the three criteria mentioned in L15/16.

L50: for readers unfamiliar with previous literature it would be useful to provide a more complete description of the evidence used to identify surge-type glaciers (e.g., Why are looped moraines associated with surging? What exactly are 'post-surge down-wasting features'?), and references to back up your statements

We agree that some explanations of these terms are useful and have added further references explaining such features (and their changes over time) in more detail. As we have a long Section 4 explaining the characteristic morphologic changes in detail, we would prefer to not further expand the introduction with such details.

L61: I assume that this sentence refers to Pamir surge-type glaciers only? If so, then make this clear.
Yes, indeed. Pamir has been added.

L63: Unclear as to what the 'three instead of six classes' here refers to; needs better description.
We deleted this information – it is only a technical detail and would need a relatively long explanation.

L70-76: this para would seem to fit better in the Discussion than here, as you haven't yet fully described your approach or that of Osipova et al. (1988). Or if you want to leave this text in the intro, then the Osipova et al. (1988) study needs to be much better described at the start of the previous para
We have now extended the text in L61 to better describe what the study by Osipova et al. (1998) has done. We think it is important to have the differences of our approach stated in the introduction, as we want to show why our study is meaningful.

L78-85: unclear as to what 'this inventory (here named GI-1)' refers to. It's also unclear as to whether GI-1 or GI-2 refer to an inventory of all glaciers in the Pamir, or just surging ones? I see later that you provide a better description of these datasets in Section 3.3 (L201-L214), which basically duplicates everything written here, so I think that you should delete or dramatically shorten this earlier text.
We have removed the short descriptions of the various inventories here and just noted that we had to rework them for our purposes.

L92: please provide more detail about the Russian topographic maps so that a reader could find them if they wanted to – e.g., name of publisher, date of publication, name of series
We have added a section 3.4 describing these maps in a traceable manner.
Unfortunately, there is no clear citation option for the maps. But we listed all used maps by their ID and publication date in the supplement.

L100: it would be useful to include labels in Fig. 1 or elsewhere for major features mentioned in the text, such as Mt Kongur and Fedchenko Glacier, as well as country boundaries
We have added new symbols to mark the location of some further features mentioned in the text. We would prefer to avoid showing country boundaries as they are politically sensitive.

L107: provide the elevation of Fedchenko weather station
Added.

L123: clarify what's meant by 'possibly cycle'. E.g., do you mean length of the active surge phase?
Done, it refers to the duration of a full surge cycle i.e. from one surge to the next.

L156: it would be useful to provide an estimate of the resolution of the 'very high-resolution satellite images' that you refer to in this section
The resolution is in general not known as the sensor is not known. For the purpose of this study we use 'higher than a few m'.

L182: note that the GDEMv2 has now been superseded by GDEMv3: https://asterweb.jpl.nasa.gov/gdem.asp. This is for informational purposes; there isn't a need to complete new analyses using it, unless it can improve your results.

Thank you very much for this hint. We checked the results of the topo parameter calculations with the GDEMv3 and noticed that e.g. the maximum heights improved a lot. The GDEMv2 as well as the AW3D30 had some issues in high altitudes. For the analysis, the change of the DEM has only a small impact but we decided to recalculate everything nevertheless.

L188/189: I assume that you mean 15 km x 180 km here? This is a very different meaning to 15 x 180 km2 (=2700 km2!). Also for 130 x 130 km2 (= 16,900 km2!)
Yes, fully agreed. We have now corrected it.

L195: there are three clauses here (gain/loss, lower/upper, active/quiescent), so it's ambiguous as to what exactly you're referring to for each one
It is just linear: the names before the dash belong together and those after the dash. However, we have rewritten it for clarity.

L216-L268: what I'm missing in this section (and the paper in general) is a clear definition of how you distinguished surging glaciers from non-surging glaciers? You mention things such as changes in surface elevation, but by exactly how much does a glacier have to change to be classified as surging? Similarly, how quickly does a glacier terminus have to advance? Exactly what changes in surface characteristics indicate a surge? The current explanation is quite general, and doesn't provide enough detail for a reader to go back and unambiguously identify the same glaciers that you did as surging. Several of the comments below provide specific questions in relation to this.
We fully agree that our description is vague in this regard, as we have not worked with absolute values but visual interpretation. And this is often based on a combination of different criteria rather than a single one (as described in Section 4.1). In consequence, other analysts might come to different conclusions for individual glaciers. Using absolute values has two major challenges: a) they cannot be determined for all glaciers and b) other analysts might prefer using different thresholds (as there is no clear definition) for deciding if they see a surge or just an advancing terminus. Due to this, their sample would also be a different one. Point (a) has to consider that not all glaciers that surge do also advance and that flow velocities can only be calculated for larger glaciers and when suitable images are available. Even if we would have velocities and maybe even if a dense time series would be available for each glacier, the problem and the consequences would remain, we have to subjectively interpret and decide on what we see. Hence, the problem of distinguishing surges from usual advances is just transferred to a different level rather than solved. We would thus prefer sticking to the criteria we have presented. All datasets used are freely available and can be analysed in the same way by others. We acknowledge that our selection might be different then but think that only a few glaciers (5-10%) are critical in this regard.

L227: it would be useful to list the period over which the Osipova et al. (1998) and Sevestre and Benn (2015) 'confirmed' glaciers relate to, so that it's clear how they relate to the period covered by your inventory
We here only refer to the assignment of classes. The datasets considered in Sevestre and Benn (2015) are the same as in Osipova et al. (1998). They used a variety of sources (aerial and satellite imagery) covering the period 1945-1991.

L240: clarify what you mean by 'opposing patterns of surface elevation change' – e.g., Along the glacier length? Within just the ablation zone? Over a multi-year period?
This mass transfer pattern is likely one of the best criteria to differentiate surges from advances, as it is usually not observed for the latter. We have now clarified what we mean. It is meant along the glacier but not related to a specific period or location of the glacier.

L243: explain what the 'typical surge pattern' is

We have now added a description of the term "typical surge pattern" in the sentence before.

L244: clarify what you mean by 'limited changes of the terminus'. E.g., Changes in terminus extent? Figure 3 shows that there were marked changes in the elevation of some termini, but I don't think that you're referring to that here
We clarified the sentence. It refers to the limited/missing change in the terminus position.

L257: explain how you differentiated between 'surges' and regular 'advances'
We added a sentence explaining the criteria to deselect a surging glacier.

L258: provide details about the 'indirect evidence' you refer to here
We added the term of "indirect evidence" to the explanation sentence mentioned above.

L275: please indicate how the reader can access the attribute table. I assume that this relates to a shapefile? However, I can't find a shapefile to download from the URL provided in section 8 (unless this will be added once this paper has been accepted for publication?)
The attribute table is part of the shapefile that has been submitted to Pangaea from where it will be available once the paper is accepted. For easy access, the three datasets are also provided as supplemental material (csv).

L285-L290 & L718: there seems to be an offset in timing between what's described in the text compared to the Figure 5 caption. In the text it says that the surge of glacier (2) is in Fig. 5a, but the figure caption says it starts in Fig. 5b. The text says that glacier (3) starts surging in Fig. 5b, but the figure caption says that it starts in Fig. 5c. Please make these consistent!
Yes, thank you for spotting this. We changed the caption and added a link to the text for further description.

L302: somewhere in this section please provide a description of the difference between 'advancing', 'internal' and 'combined' surges
To be less confusing, we have added two sentences describing the difference between the three types.

L312: please state the date used for the area in km2, and whether the area is varied for GI-3min and GI-3max.
We have now better explained the dates of the attributes. We also mentioned that values vary due to the minimum and maximum extent of the glacier. The respective dates vary for each glacier and can be checked via the minimum/maximum extent in the attribute table. However, the date of the DEM is always the same, resulting in related inaccuracies.

L319-L320: please include these place names in Fig. 6 so that the reader can understand what's being referred to
We have added now region numbers to Fig. 6 (and names in the caption of Fig. 6) and refer to this figure for locations.

L347: please provide some information as to how the aspect was calculated. E.g., how was the aspect defined for glaciers which dramatically change their orientation along their length, such as when as they join a main valley from a tributary valley.
We have added in section 4.3 a reference describing how topographic information (incl. mean aspect) has been calculated for all glaciers (it is the arithmetic average of all DEM cells covered by the respective glacier).

L355: the axis labels on Fig. 9 indicate median elevation, rather than mean elevation. Please make sure that wording is consistent, and check elsewhere.
Thank you for spotting; the mean elevation in the text has been changed.

L366-367: as with earlier comment, make sure that place names you refer to here are shown on a map (e.g., Mustagh, Petr Alervogo west)
Added to Fig. 6.

L394: please provide information as to how you determined surge duration. You didn't determine glacier velocities in your study, so how can you know how long a surge lasted for?
We have added to former L282 that surge duration has been calculated by subtracting the 'surge start' year from the 'surge end' year. These are calculated as described in former L277-282. Velocity data cannot be used for this as they (a) can not be calculated for all glaciers (too small, clouds, missing scenes) and (b) are less clear in interpretation (e.g. residual movement after the surge, seasonal fluctuations), i.e. threshold values for the start and end of a surge are not defined (see also reply to L216).

L406-L416 & L690: I can't follow the text here and don't understand what Table 4 is trying to show or how the numbers were calculated. What does DEM 1, 2 and 3 refer to? What does Tongue, Type, Duration and Distance refer to? My guess is something related to the description in Section 4.1, but I can't tell what. I also don't understand why glaciers without terminus advance aren't included here, when they're included everywhere else. Please completely rewrite this section.
Thank you for spotting, the 'DEM' in Table 4 makes no sense indeed and has been deleted. The numbers in the table are just the counting of classes presented in former L301-304. The purpose is to just give a generalized overview of major surge characteristics to illustrate their variability. The 30 glaciers (198-168) with internal surges do not show a terminus change and are thus not included in the 'Distance' row.

L419-L430: it would be useful to add a figure or table to help illustrate what is being discussed in this para
We have decided to only provide here some short notes about interesting findings rather than figures showing the related data, as these would require additional scientific discussions beyond the nature of a data description paper in ESSD.

L427: provide specific example(s)
This statement has now been removed as it was related to a calculation error (that did not happen with GDEMv3).

L430: provide the reference numbers of the glaciers being referred to here
Values have been recalculated (see reply before) and the respective glaciers are now identified by their number.

L453: I don't understand what 'handed flexible' means. This section is also difficult to follow as you haven't clearly described how you identified surges earlier in the paper (comments for L216-L268)
Agreed, see reply to L216 comment. This 'flexible handling' was required due to the different evidences available for each glacier. It certainly resulted in a subjective interpretation that can be questioned by other analysts. However, as surges are not yet defined by objective criteria (and maybe never will be as they might depend on glacier-specific characteristics), we think this is the best approach we can currently apply. So we here just confirm that it is really difficult to differentiate between surges and advances and this is just our best estimate.

L461: I'm unclear whether the 'additional minimum and maximum extents' were included in your database? You say that your study period covers 1988-2018, but this statement suggests that you also included data from earlier times.
We described that we used Corona and Hexagon data to check back surface features. We also used this high-resolution dataset to derive outlines for minimum or maximum extents. However, we agree that it is inconsistent to mix 1968 outlines with later surge outlines. Thus, we changed the affected outlines to the maximum/minimum extent of the 1988-2018 period and recalculated the length changes.

L503: how many of the glaciers you identify as surge-type overlap with the 561 identified as possibly surge-type by Sevestre and Benn (2015)?
The overlap with this sample is 79.5% (147 glaciers). Further there was a small confusion with numbers. We corrected the number from SB15 to 820. We mention the numbers of the respective classes and percentages in the next sentences. The 561 refer to the catalogue of Osipova et al. (1998). Furthermore, Osipova et al (1998) mentioned a second sample containing 845 glaciers of all possible classes they applied. Thus, the sample/numbers of Sevestre and Benn (2015) seems to be a mix of both.

L504-L506: please define what categories 3, 2 and 1 refer to here. On L226 you indicate that confirmed = 1, probable = 2 and possible = 3, but here it seems that the sequence is reversed. For example, your statement that 'the 51 most reliably classified (3) surge-type glaciers' suggests that category 3 refers to confirmed surges.
Thank you for spotting. There is indeed some confusion with the numbers as the categorization presented in the RGI differ from those presented in the paper by Sevestre and Benn (2015). We have now looked at this again and revised all numbers.

L510-L511: as with earlier comments, I don't know where these regions are as they aren't labelled on any of your maps
Indeed, this is difficult to follow without a map. We have now marked these regions in a revised version of Fig. 6.

L534: in addition to the electronic dataset I would like to see a printed Table included in the paper (either in the main text or as supplementary material) that lists the basic characteristics for each glacier. E.g., ID number, latitude, longitude, elevation, aspect, surge timing. This would enable the paper to stand alone if access to the electronic resource is ever lost, and make it easier for the reader to follow the descriptions provided in the text.
We have now also provided a csv file in the supplement.

L709: Provide dates for the DEMs mentioned here. Would also be useful to add a comment in the caption as to why the elevation changes don't line up with some glacier outlines (e.g., 80)
Yes, agreed. We have added the dates of the outlines and DEMs.

L713: the white outlines are difficult to see in the figure; please use a different colour!
Agreed, they are now marked in green.

L714: please provide a date for the base image used in this figure, as well as the ID numbers/names of the glaciers shown
We added the date of the base image.

Reply to Reviewer Comment #2 from 10 June 2020

General comments

The paper describes a new inventory of surging glaciers in the Pamir Mountains derived using optical satellite images and based on existing studies. This is a valuable research and can be used as a basis for further studies of surge dynamics. In line with the objectives of the journal, the paper presents the data accessible in an open repository. To fulfil the catchy title, a more detailed discussion of how the region/the glaciers are more dynamic than expected would be desirable.

We agree that the title is on the catchy side but think it is justified for the presented observations. For example, we could nearly double the number of confirmed surges, observed massive surges for glaciers <1 km^2, identified several glaciers surging twice, and revealed a large variability in surge behaviour. We have not listed these points explicitly to justify the title as we think this would come across a bit strange. However, we have added some of these findings in the conclusions to get the arc closed.

Apart from the minor comments below I see two major issues which have to be clarified before publication: In the introduction the authors point out the importance of discriminating between surge-type and surging glaciers and state that their study deals with surging glacier, i.e. glaciers actively surging during the observation period defined from 1988 to 2018. But there is an inconsistency within the inventory when they map maximum and minimum extents including images back to 1968. I guess this is the reason for the "strongest advance" (l. 414) at Garmo Glacier, which judging from a time lapse in Google Earth did not advance more than 6 km during the observation period 1988-2018. Guessing from Figure 3 the maximum extent was mapped in the 1968 Corona image, but this extent would refer to an earlier surge and thus is an "indirect evidences" for a surge-type glacier. As the authors explicitly study surging glaciers, properties should be restricted to the observation period (1988-2018).

This is indeed an inconsistency we have internally discussed as well. There is certainly a benefit when the provided min/max glacier extents relate to the largest observed values but it comes with the caveat of a partly extended and thus inconsistent time period. We favoured the benefit (of the dataset) over the caveat (for the paper) and agree that it would then be required to better explain this decision. We now decided to adjust the maximum extents to those observed during 1988-2018 and then have the same temporal 'keyhole' view for all glaciers to keep the consistency.

The second issue is a technical one referring to the data files in the repository. Checking the maximum advance of 6665 m mentioned above I found that this number was given for another glacier (see comment l. 414 below). Likewise other large advances in the attribute table do not correspond to glaciers showing a large advance in their outlines. I suspect an error in the attribute table Gl-3min.dbf. Should I be mistaken I apologise in advance. With respect to the data structure in the inventory, I suggest to add a detailed description of the columns as another supplement. Most columns are self-explanatory, but not all. The correspondence between the paper and the data in the repository can be improved by adding the column names when describing e.g. the classification scheme on page 9. The order of the columns (dist_class dur_class srg_type tongue) in the data file (GI-3min.dbf) should be the same as used to form srg_code to be more comprehensible.

We fully agree. Unfortunately, there was an error when merging different shapefiles to the final inventory file that we did not notice. It is the 'advance' column only that was incorrectly matched. We will update the attribute table and also make sure that the columns are in the same order as used for the surge code. We further recalculated the topographic parameters

using the most recent version of the ASTER GDEM v3 instead of the v2. We already evaluated GDEMv3 and it is indeed far better than the former version and the used AW3D30 DEM.

Detailed comments

l. 10 What are "capable data"?
Maybe a bit confusing. We changed it to valuable.

l. 82 glacier names or glacier's names
We changed it to glacier's name.

l. 113 Insert glacier in "mean elevations" and check the numbers, they are not thesame as in the cited paper.
We here referred only to the dataset presented in this publication rather than the publication itself. This has now been clarified.

l. 154 From Figure 1, it's not only west of Fedchenko. Maybe you could say west of lake Karakul.
Yes, this is better and has been changed.

l. 154 I suggest "with a resolution of up to 6 m" instead of "up to a resolution of 6 m".
Agreed and changed.

l. 161 Give more information on the sources within GE and bing.
For GE we meanwhile only see 'Maxar technologies' as a source and Bing Maps does also not report specifics about the images.

l. 224 "Their inventory", which one?
It refers to the inventory of Osipova et al. (1998), which is addressed in the sentence before.

l. 235 What are the "slightly different samples"?
We have now better described this. It refers to the decision on the specific scenes to be animated. Sometimes changes are almost invisible with a yearly step size, but with more years in between changes appear.

l. 242 delete "c."
We would prefer to keep the "c." as it is not clear to which year the AW3D30 DEM refers to.

l. 258 Which "indirect evidence" did you introduce to the classification?
Including features such as "surface structures" is the indirect evidence in this case. We have added this information.

l. 292 Check this sentence, esp. the two occurrences of the expression "own surge"
We changed one "own surge" to make it clearer which glacier and surge is meant.

l. 308 "medium distance": Shouldn't code 2123 mean long distance?
Yes you are right. We changed it.

l. 313 Give elevation data source here again. How is the aspect sector derived? Explain for readers not familiar with glacier inventories or give reference.
We included a reference that describes how the parameters were calculated.

l. 317 186 surging glaciers: In Gl-3min there are 198 glaciers, in Gl-3max 202. What is the reason for different numbers?
Glaciers are differently separated from their "main glaciers". This is possible because the often deformed surface structures reveal the "terminus" of the glacier even when pushing into another glacier. In the minimum extent it was often not possible to find a proper separation line.

l. 317 What are "spatially distinct surges"? In your data you have repeated surges forindividual glaciers. So, do you mean temporally distinct?
This means that within one glacier entity (where it is impossible to divide the glacier into two or several individual glaciers) two or more probably independent surge regions/systems exist. The related individual surges are mentioned in the attribute table. We have now better explained this.

l. 319 It is difficult to relate the geographic description to the map, because the names are given in none of the figures.
Yes, this has also been noted by reviewer one. We have now added the names of the mentioned regions to Fig. 6.

l. 328 and 332 Combine sentence about small glaciers into one.
We combined the sentences.

l. 330 You should mention here, that the tributary Bivachny is a surging glacier.
Yes, included.

l. 347 "mean aspect sector distribution": Explain in few words what this is.
We have now written 'the frequency distribution of aspect sectors' to be clearer.

l. 355 "scatter plot showing mean elevation vs. mean aspect", Figure 9 reads: "Meanaspect vs. median glacier". Is it mean or median elevation?
It should indeed be median elevation. Thank you for spotting.

l. 363 Mean or median? If different elevation averages are used, explain why.
Median is correct here.

l. 381 Revise sentence structure.
Done.

l. 382 surge duration: But all glaciers in the file have years associated. Do you mean the ones that started before 1988?
With surge durations we refer to the duration of the active surge phase from the start to the end year given in the attribute table. Glaciers with surges starting before 1988 and ending after 2018 are not included in this number.

l. 392-394 But Fig. 13a only lists the 27 surges that started in 1989. Adapt either text or label of the first bin.
We have added a sentence to better explain what is shown in Fig 13a.

l. 398 Replace "started in 1989 or later and ending in 2017 or before (black bars "with" started after 1988 and ending before 2018 (grey"
Yes, that makes it easier to understand and has been changed.

l. 402 Out of curiosity: Do these 9 glaciers have something else in common? Size, aspect, elevation...
No, they are all very different.

l. 414 See above. Check the advance of Garmo (80). While the outline in Gl-3max seems to be the maximum since 1968 it is not an advance during the study period you defined as 1988-2018. I looked for this advance in the file Gl-3min (arg_adv_m) and found it given for glacier 198 (Kuokuosele Glacier). Garmo (80) has an advance of only 509 m in the file. Furthermore, I had a look on other large advances and they don't coincide with glaciers that have large differences between their minimum and maximum extents. Maybe I got something wrong, but I strongly recommend checking the attributes in your data files.
Thank you for spotting this inconsistency. Something went wrong during digital data merging for the attribute table. We reworked the dataset completely.

l. 476 "real number of surging glaciers" Following your distinction in the introduction, these would be surge-type glaciers.
Yes, indeed (changed).

l. 495 How did you assign the class for multiple surges of the same glacier for criteria D and E when they fall in different classes? The most extreme one?
We assigned the class of the main trunk of the glacier. This has now been clarified it in the text.

l. 523 see line 317 and adapt line 17 in the abstract
This is now explained (see L317) and has been rewritten in L17.

l. 526 see line 382
This has now been clarified in line 382.

l. 528 "central ... mountain ranges": But you say there is a gap in central Pamir (l. 320).
Yes correct. We have now changed L320 and deleted "central Pamir".

l. 529 What is special about a descend of more than 800 m? In line 424 you say:"≈1300 m further down at their maximum extent." How does this match?
Thank you for spotting this. 855 m is the observed maximum, more than 800 m is reached by 3 glaciers. We corrected the respective sentences in the text.

l. 580 In Finaev et al. (2016) give full details: 9(3):88-105, doi:10.15356/2071-9388_03v09_2016_06
We added the missing information.

l. 632 In Osipova (2015): Ice and Snow, 55(1), in Russian. Add "in Russian" where applicable.
Added.

l. 633 Ice and Snow, 50(4)
Changed

l. 687 Table 3: In the introduction you say you map surging and not surge-type glaciers. Which ones do you list in the table?
It is also only the surging glaciers. We changed it in the table.

l. 690 Table 4: Refer to criteria B-E in 4.2. What does DEM refer to?
This was a mistake. We revised the table.

l. 691 "distance criterion" instead of "duration criteria"?
We changed it.

l. 710 Fig. 3: Better give the years of elevation difference than the data source or both.
We added the periods.

l. 715 Fig. 4: Give type of Image: Landsat 8, panchromatic?
It is the Corona image. We added the credits to the caption.

l. 747 Fig. 12: What is the additional value of this figure? There is no meaningful pattern that can be interpreted with the glaciers listed by their IDs, but individual glaciers cannot be examined either. Which glacier ID is it? There are 198 glaciers in Gl-3min.
This figure should reveal that there is no temporal clustering of surges for neighbouring glaciers (consecutive IDs often refer to neighbouring glaciers). It should also reveal the high variability of surge durations and has also been used for glacier surges in the Karakoram by Bhambri et al. (2017). Unfortunately there was an old version oft he figure included in the manuscript with 146 entries only. Now the correct figure with 198 entries is shown.