

Dear Ethienne, dear Referees,

thank you for your valuable feedback and specific comments. We revised our manuscript and were able to incorporate most of your comments. Our revised manuscript includes the following main improvements:

- Clarity and comprehensibility of figures, tables and explanations was improved. This was achieved by integrating the equations used, focussing on a consistent terminology (e.g. variable naming), and a more direct language.
- Our Introduction was restructured, is now more precise and more literature is cited.
- Our discussion was rewritten and restructured. The focus is set on the value of our findings for the community and on the potentials we see for future research.
- Meteorological data was integrated in our revision. This first of all improves our method since the transferability to other years where the correction was applied to is now much more robust. Moreover, our method can now be applied on other glaciers more accurately. In our opinion, the presented method of using a present-day UAV survey combined with meteorological data for the retrospective correction of geodetic mass balances is of great interest for the community.
- To compare glaciologic and geodetic mass balances a reanalysis following Zemp et al 2013 must be conducted, which we had included (reanalysis steps 1-4) in our previous manuscript versions. However, because our terminology partly differed from the original, the reader could not fully comprehend the reanalysis steps conducted. To address this issue, we adapted our terminology according to Zemp et al 2013 and directly refer to their reanalysis steps within our manuscript. This should support the interested reader to keep track of individual processing steps. It must be noted, as also stated in our manuscript and in the specific comments (Comment on Line 300), that reanalysis steps 5-6 were not performed, since systematic variations between both data sets were of main interest for the study.
- The results regarding “submergence and emergence” are based on strong assumptions and many potential error sources exist. However, we find that our results (Fig. 09 + 10) are interesting and of potential value for the community. We are now more careful with discussing those findings.

We again thank you for your feedback that strongly improved our results.

Sincerely,

Joschka Geissler + Coauthors.

Line	Comment	Referee	Answer
0	Title: is 'the potentials of high-resolution photogrammetry' only relevant for the Otztal Alps? The title might imply so. I would change it: e.g. increased detail of glacier retreat and mass balance using high-resolution photogrammetry in the Ötztal Alps, Austria.	2	Thank you for your valuable suggestion, we discussed your feedback and adapted our title accordingly
0	Abstract: focus on the findings. The abstract needs more polishing and be clearer. The first two sentences can be deleted. In the intro you also focus on the (European) Alps.	2	We polished the abstract according to your feedback, the first sentences were deleted.
11	Perhaps change to "are experiencing i ncreasing mass l oss..."	1	First two sentences have been deleted
11	There is a mix of past and present tense i n the abstract. Ensure you stick to one tense here.	1	Applied
14	take out significant, not needed (and what does it really mean, best to avoid).	2	We now avoid the word "significant" since, as you mention, it was not used appropriately
14	Perhaps change "a significant glacier area" to something I like "a heavily glacierized area"	1	We followed your suggestion and now call it a "heavily glacierized area" . See also comment above
16	sentence starting glacier retreat: : could be changes to: Glacier retreat, extent and surface elevation changes were analyzed for the 25 glaciers in the region, including Vernagtferner. Digital surface models (DSM) were generated from : : : . (Use direct language if possible.) Change ' a correction was established' we used : : : to apply a correction Remove part 'which reveals the potential for a combination' & continue with the next sentence 'Results revealed : : : . '	2	We improved our manuscript similar to your suggestions. We now use direct language where possible.
25	Could be -> were	2	Applied
25	Awkwardly worded. Be clear that you find that the geodetic data can detect l ocal details and deviations better	1	We hope our new version is clearer and more targeted.
32	Add European before Alps. Could add 'hereafter referred to as the Alps' if this is the preference of the authors. Could also add Beniston et al. 2018.	2	We followed your suggestion and added "European Alps, hereafter referred to as the Alps". We added your suggested reference.
42	Comma after geodetic i s unnecessary.	1	Applied
47	. Here it would be nice to add reference to studies on the glacier, e.g. add 'e.g Escher-Vetter et al, 2009.'	2	Applied
48	Here some refs could be added on various methods, the typical method used today by many mass balance investigators are laserscanning. See also later comment. e.g. Belart et al 2020, there are many studies on glacier changes using various methods and there are no references in this section.	2	On your advice, we restructured our introduction. We now mention ALS and refer to Baltsavias 2001 for a comparison of both geodetic methods. We give many other (photogrammetric) references (L49ff)
54	Start the sentence with "By combining" or move "This study presents" to the start of the sentence and end with "allowing the extraction..."	1	Applied
54	It is difficult to assess whether this method is unique when you provide so few references, what is unique about it? Repeated aerial photos and UAC are used in many studies.	2	We are now more specific what is new about our method (L59): Using an UAV survey and meteoroloical data for retrospective correction of geodetic acquisition dates.
56	Why not just write: Suitable data for photogrammetric processing were available from 2009, 2015 and 2018, covering a period of 9 years. The last part of chapter 1 from line 63 should be rewritten, see also comment to line 54.	2	We restructured to Introduction. The last part was rewritten according to your advice.
69	Ensure consistency with numbers, here a dot is used, other times the number i s presented without a dot (e.g. L77).	1	We checked our manuscript accordingly.
75	Could also here add reference to Esche-Vetter et al 2009 or other relevant literature on the glaciological mass balance work.	2	L73; We added the proposed reference.
76	can add map year in parentheses after Today (map year 20xx).	2	Thank you for pointing out this bad wording, corrected! (L74)
97	Use -> used In general in the paper: Use past tense where you describe work done by the authors for the paper, use present tense on published work. Change title of 3.2 to Glaciological mass balance data??	2	We are now consistend with the use of past/present tense. We changed the title if 3.2. according to your suggestion.
105	Please explain what the two numbers i n overlap mean i n the caption.	1	Applied; See Table 1 header (L95)
109	Change to "have been acquired..."	1	Sentence one and two have been merged
109	First sentence already mentioned before. Remove there or here.	2	Sentence one and two have been merged
110	At the same time ->which time. Be specific so we understand what you mean.	2	Clarified.
112	The meters i ce equivalent, or meters water equivalent? I'm not familiar with i ce per water equivalent.	1	This was a typo, corrected

112	<p>i) Here you mention firn pits but on line 125 only snow pits; Do you really measure the density of the firn, e.g. going past this year's summer surface? Usually, only snow pits are used for this year's mass balance. Measuring the winter snow in spring or remaining snow in autumn.</p> <p>ii) How is glaciological mass balance interpolated from measurement date to fixed date?</p> <p>iii) Did you use the outlines from 2015 also to reanalyze the mass balance?</p>	2	<p>i) Since density is measured in snow and firn pits, we added "firn" to L125, even though firn is only measured if necessary (e.g. in the case of determining the last accumulation layer)</p> <p>ii) The time difference is usually only a few days between the measurements and the fixed date. For these days we use information from our automatic stations on the glacier to correct for additional melt or accumulation, by scaling the mass balance field according to the data from the automatic stations.</p> <p>iii) We use annual glacier outlines at the beginning of the mass balance period for computing glaciological mass balance.</p>
128	Any citation for this at Vernagtferner? This has certainly been observed at many glaciers, but a couple citations here would be of value.	1	Glaciologic data of the Vernagtferner was used within Zemp et al. (2013). This reference is given in the manuscript.
130	On mm what is the unit? Not water equivalents? What do you mean by error of the raster, you mean mass balance uncertainty in each grid cell? In this section references to work could also be added.	2	<p>i) changed unit to m w.e.</p> <p>ii) clarified. This is the mean error of the interpolated glaciologic raster.</p> <p>iii) The data and error used within this study is part of the study Zemp et al. (2013). This reference is given in the manuscript.</p>
131	Only up to 300-400 mm in the accumulation area? Can this be determined with only 4-5 measurements per year for what should be a 1-3 km ² accumulation area?	1	Yes, from manual measurements in spring we have information on the snow-& firn distribution within the accumulation area. By integrating this information within the glaciologic interpolation, the number of stake readings is sufficient. Our results (Fig. 10), thus the comparison with geodetic data, underline the quality of our interpolation.
132	Add parentheses around (2013). Ensure in-line references match TC style guide.	1	Checked
136	Use past tense on work done for this study/where you describe the work you did. We use-> used (use past tense) is->was, are->were etc	2	See comment on Line 97
144	Fig.2. Full workflow (remove photogrammetric) because it involves more than that. In box instead of 'after huss et al 2013' you can rather write 'using fixed density factor	2	Thank you for your feedback. We corrected the figure accordingly. This figure was further improved, going beyond your comment.
148	Is the ->was	2	Changed
149	(GNSS) -> using GNSS	2	L138, applied
153	is agisoft not state of the art, maybe take-out state of the art in line 152	2	We took out state of the art.
171	Is-> was	2	Applied
173	More details of what? be specific. Of the xxx method or procedure or following. E.g. More details of the xx procedure/method can be found in xxx (year).	2	Applied
176	Remove "additionally".	1	Applied
177	Remove "as well".	1	Applied
177	The details in this gradual change are unclear to me and firn density can be higher than 550. Suggest to rewrite it.	2	We now provide the equation used. This part of the manuscript was clarified and rewritten. L170ff
186	Write out standard deviation SD first time mentioned.	2	Applied
188	Define "SD".	1	Applied, L187
192	Do you mean you use a fixed correlation based on finding in one year? But this will differ from year to year. Why not use meteorological data to estimate mass balance? This is a common approach. You could compare this to model estimates.	2	<p>Thank you for this feedback. The former version of our correction was improved by incorporating meteorological data. Sect. 4.2. describes the new method.</p> <p>We thus use the UAV survey to derive the spatial pattern of our correction and meteorological data for taking into account positive degree day sums of the different periods to be corrected.</p>
231	In general, glaciers have thinned and reduced in size.	2	Applied
240	Nice figure. Add a scale bar?	1	In 3D View, no scale bar can be added.
240	Add in meter (m) after differences. I miss scale bar and glacier outlines. Add name Hintereisferner. There are several glaciers on the map.	2	In 3D View, no scale bar can be added; We added the name and outline of the Hintereisferner
245	Nice figure. Add a scale bar to one of the panels?	1	In 3D View, no scale bar can be added.

278	Why compare two different elevation bins?	1	We compare the elevation bins of the maximum volume loss. Since the elevation of the maximum volume loss increased, we compare two different elevation bins. We clarified the phrasing.
278	Should "Million" be lowercase? Change all instances if so.	1	Applied
288	add (geodetic) after photogrammetric.Regarding this comparison, has a proper reanalysis of the data been carried out (ref. Zemp et al., 2013) for instructions. Have the outlines of 2015 been used in the mass balance calculations? This could be discussed.	2	i) For Reanalysis Zemp see Comment to L300 ii) The outlines of 2015 have been used for mass balance calculations, following Fischer et al. (2015). We now provide formulas used: See Eq. 2;
291	is-> was	2	Applied
300	Is this tested against the procedure in Zemp et al (2013)? Should be referred to in this paragraph (the reference is in the paper but not referred to or used here).	2	We applied Reanalysing Steps 1-4 according to Zemp et. al (2013). Systematic and random error of the geodetic error was derived following Nuth and Kääb (2011). Systematic and random error of glaciologic data was assumed to be 0.1 m w.e. a ⁻¹ . This is according to Zemo et. al 2013 since the glaciologic data was used within Zemp et. al (2013). Reanalysing steps 5+6 (Zemp et. al 2013) were not applied, since the systematic error revealed by comparing geodetic and glaciologic data was of main interest for this study. This is now clarified within the manuscript.
313	Suggest changing to "... , neglecting debris-covered areas within the glaciological interpolation led to an..."	1	we added a few lines, going more into depth regarding debris cover - both in the results and in the discussion
313	How was this debris cover value determined? (0.1m± 0.08w.e.a-1(0.8±0.6%). I suggest adding a few lines to the results and discussion on debris cover to better detail what you found. E.g. "...debris covered area experiences x.xx m of ablation on average versus x.xx m of proximal ice. This suggests that xxxx."	1	Method is better described now in L213; FYI: We determine debris cover using the variation raster.; See also comment above
317	do not only: : ., something is missing. Do you mean to connect the next sentence? Then rephrase.	2	Rephrased
318	is there a difference between photogrammetric and geodetic since, why not use geodetic?	2	We understand photogrammetric as a subordinate term of geodetic, because it is possible to determine geodetic mass balances also with non-photogrammetric sensors (eg ALS). We improved this within our manuscript by using the word photogrammetric where we directly refer to our dataset (eg Sect. Data Acquisition). Whenever we write about mass balances, we use the word geodetic. This should improve the comprehensibility of our paper, since geodetic is the standard term used in the context of glacier mass balances.
325	Shorten the y-axis label and correct spelling and capitalization errors. Move x axis elevation labels to the top or bottom away from data points.	1	Applied
349	How do your results from these two periods compare with other regional estimates of mass balance?	1	We now compare our result of the Hintereisferner with WGMS-data. The comparison was added to the discussion. L370ff
352	Change to "quadrupled".	1	Applied
353	I suggest to also add the full period, could be good to have results for full period,better for density conversion as well	2	We added the full period. The geodetic mass balance data of all glaciers and all periods is now provided in the Appendix A and will also be submitted to WGMS
359	Exceed? It's hard to keep track of your comparisons of glaciological and geodetic mass balances. I recommend being explicit, rather than "greater than" "exceed", "lower", "higher" etc., use more positive or more negative, or express as more mass loss vs. less mass loss. Or if you stick with greater, lesser, etc, be sure to explain what each means here and use the same terms to discuss throughout. I found myself looking at figures and re-reading sections often to determine which method measured greater mass loss over given altitudes or time periods.	1	We must admit that we were not consistent with the diction of our comparisons in our submitted manuscript. In our revised manuscript we are now more explicit by only using "more negative" or "less positive" etc... In our opinion, this improved the readability of our comparisons.
374	The potential for using photogrammetry such as this has been shown in multiple studies for a long time, and the authors should cite such studies. This is not novel. Would rewrite	2	This section was rewritten. L370ff

376	Cut superfluous language. Here remove "As a result, for instance," and start the sentence with "We were able..."	1	Applied
382	Why not calculate the height change for this dead ice body as an example if you're going to mention it here? Nice little advertisement of the detail and value of high resolution digital photogrammetry. You could even compare this to the mass loss on the toe of the glacier if desired.	1	Thank you for your nice idea. We derived the volume change for the Dead-Ice body and mention it within our discussion. See L381
383	The dead ice body is not indicated in figure 4. Should be marked with a letter or number to help the reader.	2	We added a letter to fig 4. See also comment above.
387	See comment to line 374/375- This is already stated. Again, it is not new to use photogrammetry to study glacier changes. I miss also a comparison with lidar studies, pros and cons using aerial photogrammetry versus lidar. Could be a good addition.	2	Thank you for your input. However, we decided that a comparison between the geodetic measurement methods (photogrammetric vs. LiDAR) should not be part of our paper. This would go beyond the scope of this paper and since no lidar data was available for this publication this comparison would only be theoretical. Additionally, there are already publications that make such comparisons. (check Baltsavias et al., 2001)
392	Insert "the" to make it "the SD".	1	Applied
403	Could use for the full period.	2	Thank you for your comment that showed us, that this sentence had to be clarified. L393
409	Again, this applies only for that year and not the two other years. Here you should justify it by comparing met data and mass balance conditions for the three mapping years/dates. You mention it, but you are not using it. It must be meteorological data you could check and refer to.	2	We now integrate meteorological data within our temporal correction. Thank you for pointing this out. See comment on Line 192
420	I am not sure it is representative for more than that year and that glacier. See comment above.	2	Thank you for your feedback. We agree, that our correction function is only valid for the Vernagtferner. This is why we suggest to conduct an UAV survey in order to get correction functions that are valid for other glaciers. In our revised manuscript we are now including meteorological data. This improved method is now also valid for different years and periods. See comment on line 192
433	What do you mean with great importance for future studies?	2	We are now more specific where we see the potential for future studies L446ff
433	Useless? I think not, and you have just proved that they can be used, provided a correction. Instead end with something like "therefore require correction using geodetic survey data or other methods".	1	This was a misunderstanding. See comment above.
452	Do you find that this is a proper reanalysis according to Zemp et al 2013 or should this be conducted, this is unclear to me. Here you can refer to 'reanalysis' and how others have used such data, there are several papers in the cryosphere (and other journals) on this topic. just search 'reanalysis'.	2	See comment on Line 300
469	I'm not sure of the value of this line, or why this is relevant here. Did the study at all address this topic?	1	This line addresses the fact, that the UAV survey presented in this paper did not cover the entire glacier area. For future studies, we recommend covering the entire glacier. This line was rewritten.
Chap 3.1	The first paragraph sounds like introduction and could be merged there.	2	Thank you for your feedback. We agree that this paragraph should not have been part of the Data Acquisition section. Merged to Introduction and Discussion
data availab	The geodetic mass balance data is not available in a table in the paper. I suggest having a table in the paper that lists all the 25 glaciers with surface elevation change, area of the mapping years and geodetic mass balance for the full period (9 yrs), and perhaps subperiods (e.g. in supplement). Adding a table in the paper gives users the chance to use the data further. Table could be accompanied with a figure in the paper showing the changes and glacier outlines. The tabular data could be submitted to WGMS, they store such data. In data availability thus add 'Geodetic mass balance data will be submitted to WGMS.'	2	We now provide the areas, surface changes, and geodetic mass balances of all glaciers for all periods in the appendices. They will also be submitted to the WGMS. We changed the Data Availability section accordingly.
Fig 1	Instead of (Esri et al, 2020): Image source: ESRI (2020). The frame of lower left figure is partly visible. Decimal separator: change ',' in figures and tables to dot '.' Yields throughout	2	We changed the decimal separator and the citation of the image source. In the new version, the frame of the lower right figure is now visible.
Fig 10	instead of a-e why not use a shortening of the glacier names?	2	Applied, thank you for your advice that makes our figure more intuitive.

<p>Fig 11 here – could show the results spatially on a map, easier to see. I miss the names on location figure 1 or in the other figures.</p>	<p>2</p>	<p>Thank you for your feedback. We followed your suggestions by integrating a map of all glacier outlines in figure 11.</p> <p>We also plotted the bars spatially on a map. However, this reduces the ability of the reader to compare the magnitudes of the geodetic mass balances since they are i) not aligned and ii) smaller. Thus, we decided to remain with our bar diagram.</p>
<p>Fig 5 Outlines not velar/easy to read. Lacks scale bar and legend. Add name(s).</p>	<p>2</p>	<p>Thank you for your comment and your feedback. We considered your suggestions. Please note, that in 3D View, no scale bar can be added. We added a legend and thickened the outlines.</p>
<p>Fig 6 Readability of the figure could be improved to be clearer and sharper. Avoid grey background. Use black font. Replace</p>	<p>2</p>	<p>We improved readability following your advices.</p>
<p>Fig 7 Maybe it would be better to just show surface elevation changes or changes before and after correction.</p>	<p>2</p>	<p>Thank you for your feedback on this figure. We modified the plot on the top left, so that the reader can now see the surface changes of the Vernagtferner before and after the correction. For the volume change, we decided to remove data and only show the regression. This simplifies the figure and increases understandability.</p>
<p>Fig 9 it is not unproblematic to compare it that directly for shorter time periods due to submergence/emergence and density issues.</p>	<p>2</p>	<p>We discussed your feedback on this figure. This comparison of glaciologic and geodetic mass balance data is of great importance for our paper, since</p> <p>i) it shows that the glaciologic mass balance data and our correction has weaknesses within the accumulation area</p> <p>ii) allows an estimate of dynamic processes (see fig. 10)</p> <p>However, we are aware that other sources of error exist (e.g. density conversion). We discuss this within our discussion</p>
<p>Discussing emergence and submergence needs to be handled with caution absent stake observations of emergence and submergence, or model estimates of emergence and submergence. Given the magnitude of emergence and submergence, which is generally less than 0.5 meters, and the uncertainty in glaciological and geodetic mass balance, determining a change in, or even magnitude of vertical ice velocity is questionable. Further, as you indicate, the elevation of maximum volume loss, the rate of mass loss has increased and the ELA has increased. All three of these factors would trend towards a higher elevation where submergence occurs. Lacking more specific data or a more rigorous approach, I suggest caution in drawing conclusions from your estimates of emergence and submergence velocity. Are GPS surveys conducted for the ablation stakes? If so there are a few methods from which you can estimate emergence and submergence velocities (Beedle Vincent 2020). If such data exist, then they must be incorporated here.</p>		<p>Thank you for your feedback. We now discuss emergence and submergence with more caution. GPS-Data is currently not available for the Vernagtferner.</p>
<p>The coregistration procedure is not well described. In L159-160 you state that "The horizontal shift lies between 10 and 20 cm depending on the acquisition year and thus within the ground resolution of the images". Is this the pre-coregistration horizontal shift? This also sounds a bit small, if this is pre-coregistration, that's excellent. You also state that "Based on this mean vertical shift over stable ground, all DSMs except for the reference DSM were adjusted in height relative to the reference DSM of 2015." Does this mean that the coregistration was only vertical? Robust coregistration algorithms now exist to implement the method detailed in Nuth and Kääb (2011). Should this be tested? This method removes not only vertical but also horizontal and rotational bias. Your Figure 6 and section 5.1.2 detail these errors well. Perhaps this is enough, I'm just curious why a full coregistration wasn't used, but having the error well described is sufficient.</p>		<p>Thank you for your comment on the coregistration. Yes, this horizontal shift given is the "pre-coregistration horizontal shift". As you say, this value is excellent and we thus decided to only perform a vertical co-registration.</p> <p>As you mention, we describe the remaining errors within our accuracy assessment. We also added a paragraph in discussion where we mention that the (admittedly small) rotational errors may be addressed if a horizontal and rotational coregistration would have been performed. L385ff</p>

For your altitude-related density function, additional explanation is required. This sounds like a good idea, but the particulars aren't clear enough. Over the ablation zone is the density held at 900 kg m³? Or does the density start to change prior to the equilibrium line? Klug et al. (2018) mapped snow/firn as one unit and ice as one unit and assigned a density to each. Pelto et al. (2019) mapped snow, firn and ice separately and assigned a density to each. If I'm reading this correctly, your function is only applied over the equilibrium line, i.e. holding density at 900 for the ice area, and 550 for snow, but using the linear function around the equilibrium line. This is unclear. If so, I think this an excellent approach. Also, does your method take into account the annual (or average) ELA position during each interval or a fixed ELA for the entire period?

We clarified our altitude-related density function and provide the equation used. This should answer your questions. But for your information: You have correctly understood our density-function. The ELA used for the density function is the mean ELA altitude of the respective period. L168ff

Section 4.2. Your correction method is robust for 2018, nice Figure 3. I wonder whether a degree day function could be employed to reproduce the melt you observe in 2018, and then apply that function to the other two periods to adjust or produce a curve just like in 2018? Perhaps too much work for the small adjustment, but might be simple if there is some local temperature data. The correction method is one of the main selling points of your manuscript. I would suggest exploring a simple DDF or similar approach. If it proves reliable, this would greatly improve the applicability of your results. As you mention, using photogrammetric surveys to assess glaciological mass balance is challenging, because of time differences. By providing a simple framework to apply a present-day UAV survey to other time periods where none exist would be of great value and interest to the community (at least for relatively modern air photos).

Thank you for this helpful comment. We now apply a simple DDF approach in the context of our correction. L194 - L205 By doing so we improved not only the transferability of our method but also the results itself. As you say, the relatively simple method presented in this paper for using present-day UAV surveys for retrospective correction of geodetic mass balance data is of great value to the community. We underline this also within our discussion. L399-L419

The discussion is too wordy and redundant. Some sections could be combined and streamlined. Too often the discussion is restating the results section. The discussion should then better discuss questions raised by the reviewers and other under explained details

The discussion was completely rewritten and structured. We use more direct language and thus reduce superfluous language.

<p>The study would benefit from improving the explanations...</p>	<p>2</p>	<p>Thank you for your feedback. Following the specific comments, we improved readability, understandability of our explanations, figures and tables. In general, for an easier understanding, we are consistent with our choice of colours: Blue Period 15-18, Red Period 09-15; Orange Period 09-18. We checked all our figures so that they follow the terminology of the manuscript.</p>
<p>...figures</p>	<p>2</p>	<p>Fig 1: We changed the decimal separator and the citation of the image source. In the new version, the frame of the lower right figure is now visible. Fig 2: This figure was modified, since the integration of meteorological data changed our methodology Fig 3: Axis and equation were renamed so that they match with the equations in the manuscript. A black outline improves the quality of this figure. Fig 4: We added the names of the highest summit and the name and outline of the Hintereisferner. Fig 5: We thicken the outlines, changed colours, added a legend and added the names of the glacier as well as a summit. This clearly improves visibility and understandability of this figure. Fig 6: The revised figure is now clearer and sharper. We avoid grey background and use black font. Fig 7: We changed the axis names following the terminology of the manuscript. Added corrected geodetic data for the Vernagtferner. Line style and colour are match throughout all four plots: Dotted: Corrected geodetic data, blue: period 15-18, red: period 09-15 Fig 8: We changed the axis names following the terminology of the manuscript. Fig 9: We changed the axis names following the terminology of the manuscript. Fig 10: Instead of using a-e we now use abbreviations of the accumulation area names following the specific comments.. This increases understandability. Fig 11: Here we added a map of all glaciers within the study area. This allows the reader to visually link geodetic mass balances and glacier extend, location etc and increases the understanding of our study area.</p>
<p>...and tables</p>	<p>2</p>	<p>Table 1: We added the units in the header. Explanation is given on the overlap. Table 2: This table was completely revised including the new terminology of the manuscript. This improves understandability.</p>
<p>More references could have been made to existing literature on similar studies (both on elevation changes and geodetic mass balance assessments).</p>		<p>We added the following literature on elevation changes and geodetic mass balance assessments. Belart et al., 2019; Jaenicke et al., 2006; Magnússon et al., 2016; Mayer et al., 2017, Gudmundsson and Bauder, 1999</p>
<p>The manuscript would have benefited from clearer writing, it is sometimes difficult to understand what the authors mean</p>		<p>We have completely revised our manuscript and tried to improve its comprehensibility. For instance, see comments on Line 105, 177, 313, 318, 359</p>