

In this document, we respond to the final comments and suggestions of the reviewer Evan Miles one by one. The new text that has been added to the manuscript, is added in italics and in red below.

I'd like to congratulate the authors on a nicely structured and well-presented study, which was a pleasure to read. In their manuscript revision, the authors have carefully addressed all my comments (and those of the other reviewers). They have consequently made careful adjustments to their methods and throughout the manuscript text. I have a few minor comments below that have no impact on the calculations, discussion, or conclusions. I am very happy to recommend the manuscript for publication following these technical corrections.

We would like to thank reviewer Evan Miles for his (final) comments and suggestions which were really appreciated.

Specific comments:

[RC1.1] L52. Suggest 'do therefore not' -> 'therefore do not'

We updated the text in the manuscript.

[RC1.2] L96. Suggest 'both glaciers disconnected' to 'the glaciers disconnected' as the glaciers are disconnecting from one another rather than from a third body

Done

[RC1.3] L112-113. A bit awkward – '...has been measured twice [], and again in 2020...' perhaps simplify to '... has previously been measured twice []' as the new measurements are described in

Done

[RC1.4] L208-214. I'd recommend some basic depiction of the new measurements in an Appendix (Table?) or Supplementary Material, or you could indicate transects or spot measurement locations in Figure 3c. Perhaps mention these data in the Code and Data Availability statement -> I guess they have been or will be submitted to GlaThiDa?

We added the transect in Figure 3c. The data might be submitted eventually to the GlaThiDa.

[RC1.5] L209. Suggest 'considerable effect for' -> 'considerable effect on'

We changed this in the text.

[RC1.6] L290. A small detail, but Brun et al (2018) tested different sizes of Gaussian filter for this calculation. What size Gaussian do you use?

We added this information in the manuscript:

“with a 25-pixel kernel size (50 m)”

[RC1.7] L408. The ratio correction works since the surveyed area is almost entirely within the ablation area. However, if your survey area was the entire glacier, the net flux divergence would be zero by definition, and the ratio approach would set flux divergence to zero everywhere – not ideal! I don't think you need to recalculate with a different method, though; instead, perhaps just remind the reader of the survey domain 'To provide for conservation of mass _within our survey area_'

Thank you for this useful remark. We added this in the manuscript.

[RC1.8] Figure 6 is referenced before figure 5.

We decided to keep the current order because it follows the order of the text and results more.

[RC1.9] Table 2. Could you additionally indicate the number of GVPs?

Done

[RC1.10] L473. It looks like the coregistration of the 2017-2018 DEM pair is slightly inferior to the other pairs (looks like the 2017 DEM might be shifted). I don't think this is a problem but it's worth keeping in mind in the discussion and your uncertainty testing – this was your first UAV survey in the area and had the least constraint from control points, so this is not surprising. My main question from this is – what level of uncertainty to ascribe to the DEM-differencing? To me it looks like 20cm is ample for 2018-2019 and 2019-2020, while a higher value is needed for 2017-2018. It is not surprising that this is slightly higher than you might derive from Table 2, but these domains

are to some degree the worst-case for repeat surveys (steep slopes), entirely independent from the GCPs, and this metric includes the uncertainty from each of 2 surveys. The only change to make is that in the uncertainty section you should make reference to these results to justify the chosen perturbation for dh/dt

We added a reference to Table 2.

[RC1.11] Figure 6. Nice depiction of the results before and after flow-correction.

Thank you

[RC1.12] L515 and 516. Possibly broken internal cross-reference links to Figure 7?

Thank you for remarking this. We added the reference in the manuscript.

[RC1.13] L521-525 could go into methods after current L320

We agree that this part could be replaced to the method section, but we decided to keep the present structure, as it fits also with the current presentation of the results.

[RC1.14] L534. The contours are for velocity ($m\ yr^{-1}$ rather than m), right?

Correct. We rectified this in the document.

[RC1.15] L618, 630, 631. Broken cross-reference to a Figure

We added the correct references.

[RC1.16] Figure 12. Nice! It would be very interesting to quantify the mean or median absolute deviation of differences, and possibly the mean error ablation error from a simple linear fit to stakes; these would be relatively simple numbers to put in the text ~L668

Thank you for this suggestion. We fully agree that this is very interesting and we added this in the manuscript:.

*“The mean of the differences corresponds to 0.56 m i.e. yr⁻¹, which is specifically caused by the western side of the Morteratsch glacier with a thick layer of debris (see Figure 2 and Figure 12). The simple linear fit would overestimate the ablation in the surveyed area with 2.4 * 10⁶ m³.”*

[RC1.17] L712. The qualitative description here is fine, but it would be nice to have a basic numerical justification to support the findings. Perhaps you could indicate a representative MAE for the THIZ/THIL setups here as for the discussion in 5.2.

Done

[RC1.18] L739. I'd recommend to give the actual value here (PM average).

Done

[RC1.19] L786-787. Can you provide the values here?

Done

“Concerning Vadret Pers, the MAE and SEE were quite similar (0.52 and 0.62 m i.e. yr⁻¹ respectively) while for Vadret da Morteratsch, the MAE and SEE were considerably higher (1.08 and 1.22 m i.e. yr⁻¹ respectively).”

[RC1.20] L789. The method can certainly be applied, but may not be as robust

We agree with the reviewer. We will test the method additionally on other glaciers. The method can also be tested on other glaciers where sufficient data is available (examples are mentioned in the manuscript)