

Dear Christian,

Thank you very much!

Below you will find our responses to all technical corrections from reviewer 2.

Best Regards

Ann-Sofie

### Points of clarification

L. 143 – Please add a brief justification for the 30m filtering threshold. It seems that this might filter out the advection of some large crevasses, but as the authors indicate later, these are not the focus of the study.

We have added the following sentence: “This might filter out the advection of some large crevasses. However, since the REMA mosaic of Dotson is composed of REMA strips from mainly 2015 and 2016 this should mostly affect strips from the early years, if at all.”

L. 219 – is the “fourth criterion” referenced here described in the previous sentence that begins with “Likewise”? If so, please add “(iv)” somewhere in that sentence.

Typo left from the original version of the manuscript. “fourth criterion” has been changed to “third criterion”.

L. 223 – Please add a brief description of how the “yearly median DEM” is produced. Is this the same as the yearly mosaics shown in Fig. 3 and Fig. 4E?

Have added the following sentence: “The yearly median DEM is the median of all overlapping REMA DEM strips per year, with July 1st defined as the first day of the year.”

L. 224 – Please add a brief clarification on how the tri-yearly linear trend is defined. Based on the later references to it and Fig. 6, it seems like the 2010/11-2014/15 map in Fig. 6d, for example, is produced from all possible combinations of yearly mosaics in that time period.

In Section 4.3 on the Eulerian elevation change, the following sentence has been added: This implies that both the tri-yearly and entire study period trends are produced from all strips available in the period considered.

At the end of Section 4.5 on Lagrangian elevation change and basal melt rate the following sentence has been added: “As for the Eulerian elevation change (Sect. 4.5), this implies that both the tri-yearly and entire study period trends are produced from all strips available in the period considered and that some pixels may not have data from all years considered.”

L. 261-264 – Please consider adding a brief statement on accounting for the flow-shifting of ice across the grounding line. Do you consider the vertical component of velocity there as the ice flows down steep slopes?

As mentioned in that paragraph and the following paragraph, we use the second displacement (i.e. feature tracking) to align features not well aligned after the surface velocity displacement.

We have chosen not to add a statement on accounting for the flow-shifting of ice across the grounding line, since we believe that it might lead to confusion here due to its complexity and its limited relevance for this particular study. The flow-shifting of ice across the grounding line is not straight forward because the grounding line, in reality, is a grounding zone which is constantly influenced by the dynamic ocean. Therefore, we believe that adding

a brief statement to something which instead needs an entire study, may lead to confusion and disturb the flow of the paper.

L. 353 – Please indicate what the distance 10-15 km refers to (I assume it is distance along cross-section B-BB)

(10-15 km) has been changed to (distances 10-15 km of the B-BB cross section)

### Typographical suggestions

L. 154 – consider "...related to surface processes, monthly surface mass balance values ( $M_s$  in eq. (4)) are obtained..."

Changed

L. 164 – "This also means that we have applied..." → "This also means that we apply" for tense consistency

Changed

L. 187 – Consider "...regardless of tides etc." → "...regardless of variations in sea level"

Changed

L. 193 – I don't think the sentence beginning with "Possible implications..." is needed.

Sentence deleted

L. 216 – "1 and 2" → "(i) and (ii)" for consistency. Why is criterion (ii) self-referenced here?

Changed to "(i)". The self-referencing of criterion (ii) is a typo and has been removed.

L. 217 – "...sufficient amount of REMA..." → "...sufficient number of REMA..."

Changed

L. 269 & 282 – add "eq." with "(4)"

Changed

L. 278 - → "...DEM mosaics is then obtained..."

Changed

L. 309 - → "...eastern zone"

Changed

L. 342 - → "Dotson Main Channel" for consistency

Changed