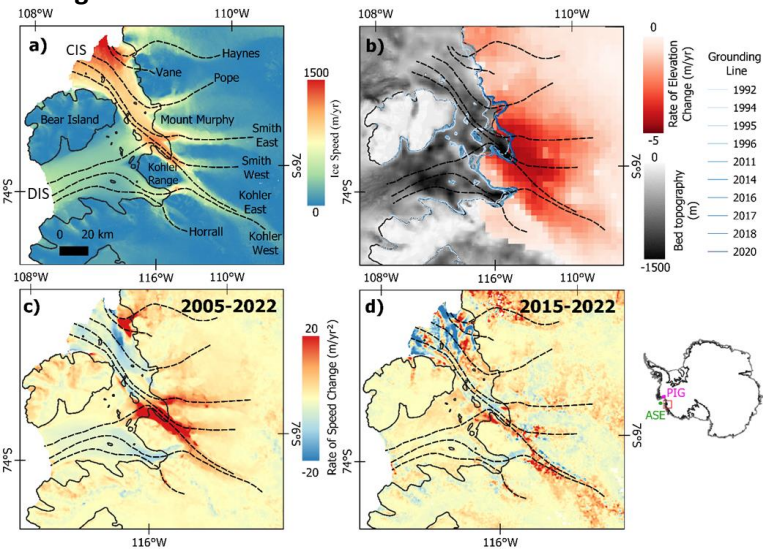


Response to Editors Comments - Speed-up, slowdown, and redirection of ice flow on neighbouring ice streams in the Pope, Smith and Kohler region of West Antarctica

Response to Editor:

We thank the editor for their time and effort in reviewing our paper, “Speed-up, slowdown, and redirection of ice flow on neighbouring ice streams in the Pope, Smith and Kohler region of West Antarctica”, submitted for publication in the cryosphere. We welcome the positive feedback and insightful comments which we have endeavoured to fully address in this resubmitted revision, and we hope you agree this improves the manuscript. We have incorporated the majority of the suggestions made, and in the limited cases where we have not, we have provided a detailed description of the justification for each decision. The changes are highlighted in the manuscript. Please see below a point-by-point response to the editors comments, where all line numbers refer to the revised manuscript file.

| Line | Comment | Response |
|---------------|---|---|
| 19 | Add ice | Edit Line 19: “ice sheet” |
| Fig 1 | Add Crosson and Dotson Labels to ice shelves | <p>Edit Figure 1:</p>  <p>Edit Fig 1 Caption: Crosson Ice Shelf (CIS) and Dotson Ice Shelf (DIS)</p> |
| Fig 1 Caption | Remove space 2015 - 2022 | Edit Figure 1 Caption: “2015-2022” |
| Fig 1 Caption | Correct the panel lettering | <p>Edit Figure 1 Caption: “(B) Rate of elevation change for 1992 to 2023 (red) (Shepherd et al., 2019) and grounding line locations from 1992 to 2020 (blue) (Milillo et al., 2022; Rignot et al., 2016). (C) Observed rate of speed change over the full 17.5-year study period, from 2005/05/01 to 2022/05/30. (D) Observed rate of speed change during the Sentinel-1 period from 2015/06/01 to 2022/05/31. Measurements are superimposed on BedMachine bedrock topography (Morlighem et al., 2017).”</p> |
| 92 | Is threshold the correct word here? Factor? | To maintain consistency with other published work using the same method we have kept the threshold terminology. |
| 139 | Repetition | Edit Line 138: We used our ice velocity measurements to fit a linear trend in each pixel to calculate the rate of change in ice speed from all speed data (MeASURES and Sentinel-1) 2005 to 2022 and for the Sentinel-1 period 2015-2022 across the PSK region (Fig. 1b and 1c). |
| 186 | Fig. 4 should be Fig. 5 please check all numbering | Edit L186: “(Fig. 5).” |
| Fig 5 Caption | You use capital letters here please check all figure captions for consistency | Edit Figure Caption 2: “ Figure 2: (A) Sentinel-1 SAR derived average 2015 to 2022 ice speed over the PSK region. The 2011 grounding line location (solid black line) (Rignot et al., 2016) , the location of the 8 flow line profiles (dashed black lines) and |

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| | | the intersection 2.5 km buffer (purple circles) are also shown. (B) Observed ice speed from 2005 to 2022 at the 2011 grounding line (Rignot et al., 2016) of Dotson and Crosson Ice Shelves in the Amundsen Sea Sector of West Antarctica. The x-axis is shown as distance from the grounding line, with positive values indicating the inland section of the profile on the ice sheet, and negative values indicating seaward locations. Also shown are the intersections of flow lines (black vertical lines), the bed topography (brown shading) and ice surface elevation and thickness (grey shading) from BedMachine (Morlighem et al., 2017) . Observed speed along the flowlines (C) Horrell (D) Kohler West, (E) Kohler East, (F) Smith West, (G) Smith East, (H) Pope, (I) Vane and (J) Haynes.” |
| 208 | Focused? | Edit Line 208: “focused” |
| 222 | It’s difficult to reconcile these percentages with the 51% reported in the conclusion. I assume the numbers are, ok? A few words to make sure readers are not puzzled and can reconcile them? | We have included the signal sign to match the results description which hopefully makes it clearer. Edit line 223: “We note periods of rapid speed-up 2005 to 2011 with an average speed difference across all ice streams of 14 % and during 2014-2017 (12 %) were interrupted by periods of slow down between 2011-2013 (-4 %) and 2017-2020 (-2 %) (Fig. 3a); the timing and relative magnitude of these speed fluctuations vary between ice streams, but the absolute magnitude of the speed change is similar across the region (Fig. 1).” |
| 241 | Maybe Miles and Bingham (2024) is relevant to cite here or just below? | Edit Line 244: (Miles and Bingham, 2024) |
| 264 | I did not find the two parts of this sentence easy to articulate. Not sure what the second member really means | Edit Line 264: “To our knowledge the redirection of ice flow from one ice stream to another has not been observed directly on ~15-year timescales, although, it may have occurred at glacier and ice cap scales.” |
| 285 | Delete “ | Edit Line 285: Removed. |
| 292 | Elsewhere in the article you focus on the acceleration of PIG (when discussing “damage”). Maybe provide the time period of speed reduction to avoid confusion | Edit Line 292: “At Pine Island Glacier, the rapid reduction in ice velocity in response to the cold-water intrusion in 2012 to 2013” |
| 295 | The ASE acronym was defined indeed but a long time ago. Consider spelling out. | Edit Line 295: “Amundsen Sea Embayment (ASE)” |
| Supplementary | Fig S2: it was not clear from the legend why you have two series of velocity maps from 2015-2022 and then 2005-2016. I suggest splitting this figure in two figures with the relevant explanation of the source in the legends (be careful to change the ref to these figures in the main). | Edit Fig S2 Caption: First shown are the Sentinel-1 ice speed maps 2015-2022 followed by the MeASUREs dataset 2005-2016. |

| | | |
|---------------|--|---|
| Supplementary | Also in the supplement you mention “We know from IMBIE studies that any difference in the spatial and temporal domain of different datasets can result in differences between them.” Did IMBIE really look into details at the differences in velocity products? (I thought not, but I may be wrong). If not, no need to mention IMBIE here. | Edit: Removed. |
| Equation S1. | Ref to a text book? Cuffey and Patterson? | Edit: (Cuffey and Patterson, 2010) |