

Review: Ross et al., Review Article: The Foundation-Patuxent-Academy ice stream system, Antarctica (Manuscript #: egusphere-2025-3625)

We are grateful to the Editor for their assessment of the manuscript following our response to the comments of two reviewers. Here we provide a point-by-point response to the specific comments of the Editor.

Response Editor comments

The MS switches between Bedmap3 and BedMachine v3, and at times I'm not entirely sure why. There are strengths and weaknesses to both, and some higher-level products are based on one or the other, but adding a brief sentence where appropriate explaining the rationale for each selection would be helpful. Further, when using BedMachine, it seems appropriate to now switch the most recent version (v4), given that this version includes IFPA and is arguably more suitable to compare against Bedmap3, which sometimes uses flowline-guided interpolation. Perhaps the differences are small, but Ockenden et al. (2026) specifically highlights this region as one example of where IFPA resolves finer-scale topography that will be of interest to interpreting this region. In some figures, the survey line bias of the roughness in Bedmap3 is particularly distracting (e.g., Figure 7b).

We are grateful to the Editor for pointing out the switching between Bedmap3 and BedMachine v3. We have made the following changes in response to these comments:

1. Figures 3, 5, 7b, and 9 have been updated to BedMachine v4. Figure 7b is improved by the change from Bedmap3 and we are grateful to the Editor for suggesting this. Figure 4b was not changed as the product used (rebounded topography) was a derivative from BedMachine v2. A justification statement for the use of BedMachine v4 has been added to the caption for Figure 7b (*"BedMachine v4 is used here as it demonstrates the smaller scale bed topography across the boundary between Academy and Support Force more effectively than Bedmap3."*).
2. Though BedMachine v4 is now the 'default' bed topography used in the manuscript, Figures 1 and 2 retain Bedmap3. We have added brief statements (i.e. *"Bedmap3 is used in this figure as this product emphasises the deep troughs beneath the FPAS."*) to the figure captions of Figure 1 and 2, justifying the retention of Bedmap3.

Figure 1: Add legend for panel b flowlines. Legends for panels c/d are too small.

Change made - Figure 1 has been updated with larger legends for panels c&d. A legend has also been added to panel b.

Figure 2: Add legend for panels f-i.

Change made – A legend has been added to panels f-i.

Figure 3d: Add legend for panel d.

Change made – A legend has been added to panel d.

Figure 5: PolarGAP Subglacial Highlands

Change made – the label has been changed to ‘PolarGAP’ (from Polargap)

Figure 6: In the legend, make the channel discharge dots bigger and encircle them with a blackline.

Change made – The channel discharge dots have been enlarged and have been encircled. For consistency the same change has been made to Figure 7b.

475: There are a couple of much more recent studies that update Pattyn (2010) in terms of assessing Antarctic basal thermal state in this region: Raspoet & Pattyn 2025 (10.1017/jog.2025.10087) and Seiner et al. 2025 (10.1017/jog.2025.10102)

Change made – the references to the two more recent studies have been added and the reference to Pattyn removed.

Figure 9: In panel a, it would be valuable to the reader to show the modern grounding line as well, and add a legend.

No change made – the modern grounding line is already shown in all panels as a black line. Legends for bed elevation, standard deviation and ice thickness are shown in the figure below their respective panels.

Additional changes made to the manuscript at this stage

1. For consistency with other figures in the manuscript the grounding lines in figures 5 and 9 have been changed to the Bedmap3 grounding line.
2. The black 500 m interval contour lines in Figure 7b were removed after the switch to BedMachine v4. The more detailed topography in that dataset (compared to Bedmap3) meant that the figure was overly cluttered if the contours were retained.
3. Minor changes have been made to the text of figure captions 6 and 9 and to the Acknowledgements.
4. During this step of the revisions we became aware that Figure 3 was not referred to many times in the text. To address this we inserted the following sentence to section 4.1 (lines 254-256 of marked up document): “*The distribution of ice thickness observations (Fig. 3a), and the differences between the bed topography products of Bedmap3 and BedMachine (v4) (Fig. 3c-d), demonstrate the remaining uncertainties associated with bed topography in this area, and other parts of the FPAS catchment.*”
5. Following the switch to Bed Machine v4, this text was removed from the Figure 7 caption: “*Gridding artefacts apparent in the bed data emphasises the ice-penetrating radar survey lines from which the topography dataset was derived,*

illustrating how poorly constrained the bed topography of the boundary zone between Academy Glacier and Support Force Glacier remains.”

Neil Ross
Newcastle University
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