

Responses to Editor Comment

Comments from the reviewer are given in black.

Author responses are in red, and **amendments to the manuscript are given in bold red.**

We firstly want to thank the Editor for both their contribution to the reviews and for managing the whole submission process. Their expertise have been very helpful in improving and finalising the manuscript.

Figure 1: A' is not visible. Consider adding a semi-transparent box. The same holds for Figure 4b.

Thanks for pointing this out! **We have slightly move the location of the A' marker and made them bold. The updated version can be seen in Figure E1. We have also made the transects and labels white in the Figure 4b, these can be seen in Figure E2.**

Figure 6d: The labels "thickness" and "melt" are misleading because it is the anomaly that is shown (thickness cannot be negative). Change labels to include "anomaly".

Thanks for highlighting this. **We have updated the figure to have 'anomaly' after each of the variable labels. The updated version can be seen in Figure E3.**

l 144: The RACMO SMB is > 5 km grid and hence undersamples ice-shelf channels. There is some evidence that the surface mass balance is asymmetric across the channels and this can contribute to ice-shelf channel migration away from steady-state flowlines (<https://doi.org/10.1029/2020JF005587>). In your case this is likely a minor effect because the inferred ocean induced melt rates are much larger than the surface accumulation rates. Nevertheless, it could add to the differential signal that you see in Figure 7. Feel free to include this reference or to this disregard it, both is fine with me b/c it is a comparatively minor add-on.

Thanks for this suggestion. We think the suggested point is of value to the paper and has been included. **On lines 190-193, we have added: 'We also note that the RACMO SMB data have relatively low spatial resolution compared to the width of channels, leading to undersampling across the channels. Although some evidence suggests that SMB can vary asymmetrically across Channels (Drews et al., 2020), this is unlikely to affect our results, as the basal melt signal is much larger than the SMB signal.'**

l 268: A possibly relevant reference for density variability across ice-shelf channels is <https://doi.org/10.5194/tc-10-811-2016> . We found some evidence that firn density may be elevated in ice-shelf channels because of ice layers which form as a consequence of by surface melt water collecting in the surface depressions. Feel free to include this reference or to this disregard it, both is fine with me b/c it is a comparatively minor add-on.

Thanks for the suggestion here, we also think this point is of value to the manuscript. **Lines 268-271 now read: 'Channelised structures are also under-represented on the ice surface due to bridging stresses (Wearing et al., 2021; Drews, 2015) and kilometre-scale gradients in ice density (Dutrieux et al., 2013) potentially driven by surface melt-water pooling in channels and increasing the firn density (Drews et al., 2016).'**

l 463: In view of the re-review this sentence appears to be part of an older version:

"Concentrating melt within channels promotes the formation of deeper keels compared to scenarios with spatially uniform melting, thereby increasing the likelihood of grounding."

I agree with the reviewer who mentioned that this type of framing is misleading. Please rephrase as suggested in your response, so that it becomes more clear that you refer to an otherwise spatially uniform melt rate that would make the ice shelf overall thinner (independent of ice-shelf channel keels).

Thanks for pointing this out. We had update the phrasing of this point in the Results section but missed it here in the Discussion. **We have now updated this to say: 'If the ice shelf was to experience spatially uniform melting, the deepest part of the ice base would be shallower than the keel associated with channelised melt. Hence, a channel-keel geometry increases the likelihood of grounding.'**

Data availability needs to be stronger in the next step. Make sure that DOIs are available, otherwise this may delay final publication.

The DOIs are being created by the Polar Data Centre. We expect them to be ready in 2 weeks. **Once available, we will include them in the manuscript.**

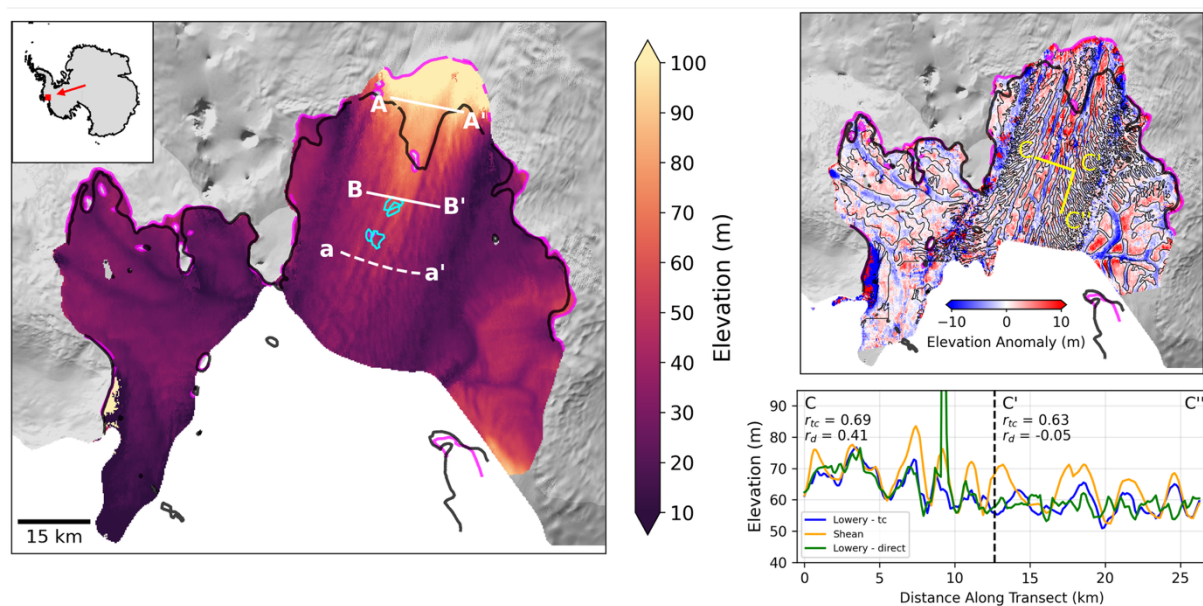


Figure E1: Updated version of Figure 1 with bold labels in (a).

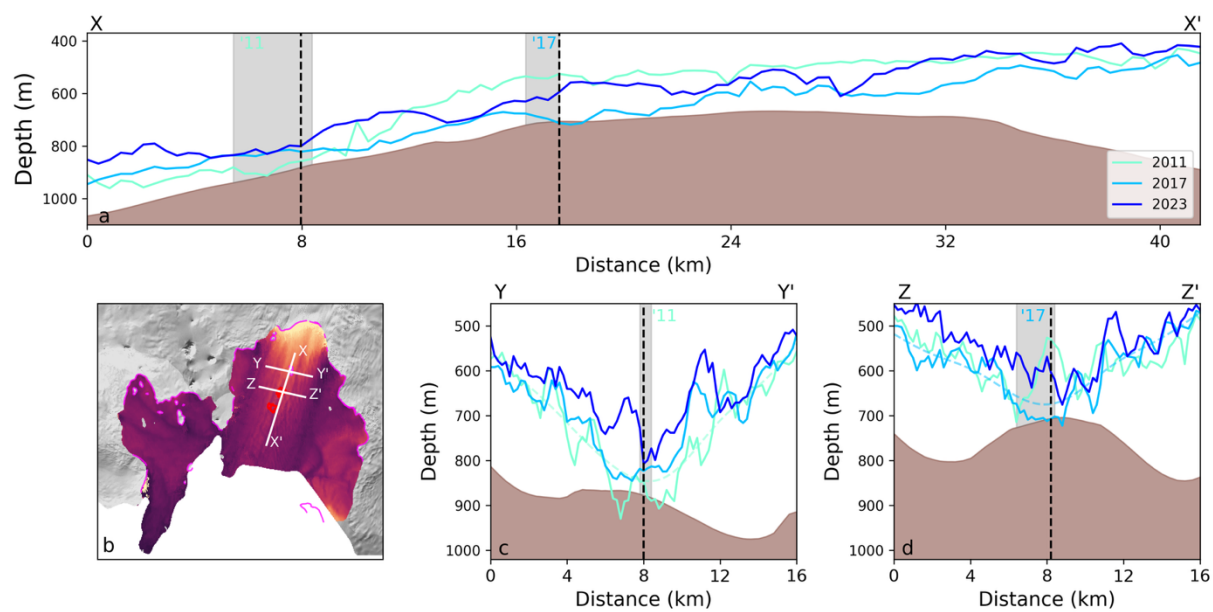


Figure E2: Updated version of Figure 4 with the labels in white in (b).

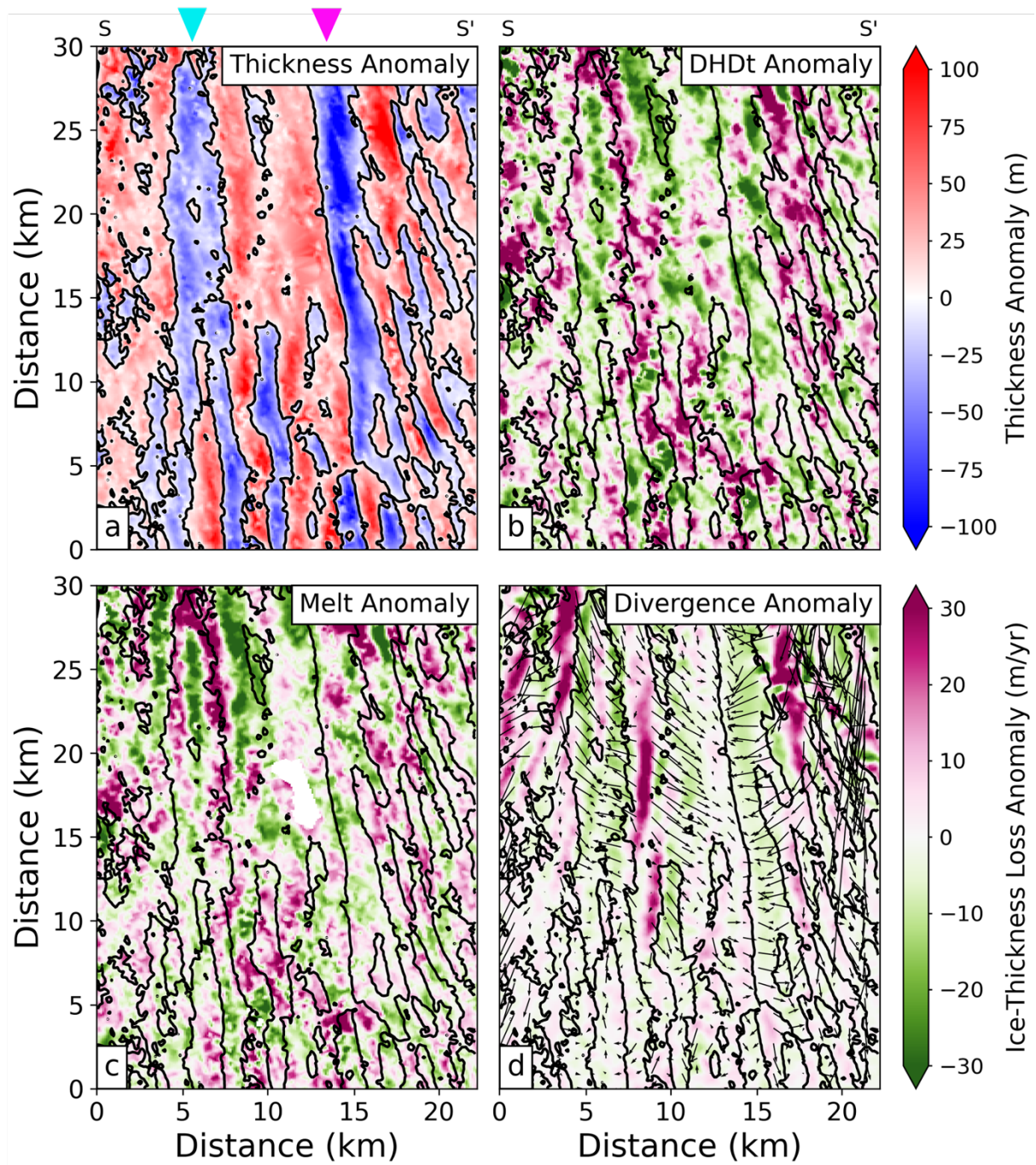


Figure E3: Updated version of Figure 6 with 'anomaly' added to each of the variable labels.