

Response to editor for ‘Short and long-term grounding zone dynamics of Amery Ice Shelf, East Antarctica’ - EGUSPHERE-2025-849

Yikai Zhu, on behalf of the authors,

We sincerely thank the editor for the thorough review of our revised manuscript and for confirming that the referees’ comments have been adequately addressed. We also greatly appreciate the additional detailed feedback provided, which has helped us further improve the clarity and precision of the manuscript. Below, we provide a point-by-point response to each of the editor’s comments. Editor’s comments are reproduced in the **Comment** column, with our **Response** listed alongside. The **Line** column refers to the position of the relevant text in the original submission, and the **New line** column indicates where changes were made in the revised version. All modified text is highlighted in blue to clearly indicate revisions made in response to editor’s feedback.

ID	Comment	Line	Response	New line
1	The word “amplitude” is used to as if it meant “tidal displacement.” The two are different- the amplitude is the peak displacement of a periodic signal relative to an equilibrium point- so the tidal amplitude represents the maximum of the tidal displacement relative to some standard value and is always positive. The manuscript should use “tidal displacement” almost everywhere the term “tidal amplitude” is used.		Done. We have revised the manuscript accordingly, replacing “tidal amplitude” with “tidal displacement” throughout the text. In addition, all relevant figure labels and annotations have been updated to reflect this correction, including those in Figure 2s, Figure 4 and Figure S5.	
2	please provide a citation for the MeaSURES dataset	16	Done.	16
3	mischaracterized can be a single word (no hyphen is appropriate)	53	Done.	53
4	“are likely to” is probably an overstatement- “may” or “might” is more appropriate	63	Done. We have replaced “are likely to” with “may”.	64
5	specify “East Antarctic coastline”— the peninsula extends much farther north	95	Done. “AmIS is distinct from other Antarctic ice shelves due to its long, narrow sub-ice-shelf cavity and its location at the northernmost latitude (69°S) of the East Antarctic	96

			coastline, which exposes it to different environmental conditions.”	
6	should be “low rates of basal melt”	96	Done. “Unlike ice shelves in the Amundsen Sea and on the Antarctic Peninsula, AmIS has relatively low rates of basal melt , with modest thickening across the majority of its area and thinning at its most inland reaches”	97
7	“the identical satellite pass” is not clear. “a satellite pass with approximately identical geometry” would be better, particularly if an approximate value were provided for how identical the geometry needs to be.	159	Done. “we therefore difference two ROT displacement fields derived from satellite passes with approximately identical imaging geometry ”	159-160
8	The graphic in figure 1 (and, less clearly, some of the text in 3.4.3) suggests that the entirety of Gillock island experiences tidal displacement. The center of the island has a surface height that is well above flotation, which makes it difficult to see how this could be so. Likewise, panel 1(f) seems to show little or no displacement over the top of the island. What am I missing here?	Figure 1	Done. We agree that the previous version of Figure 1(c) may have incorrectly suggested that tidal displacement – and hence the GZ – extended across the entirety of Gillock Island. This misinterpretation was due to an overestimation of GZ extent in this region, which erroneously included the central, grounded part of the island. In the revised figure, we have corrected this by refining the GZ delineation near Gillock Island and excluded the central part of the island from the GZ. This change better reflects the true spatial extent of tidal response and avoids the previous implication that the island is fully within the GZ.	Figure 1
9	This paragraph belongs in the next section.	218-224	Done. We have moved this paragraph to the end of section 3.2.	293-299

10	The MAGv2 dataset has not been defined. Is this the same as the MeaSURES grounding line defined in the next section?	223	Done. We have now provided the full definition of the MAGv2 dataset as MEaSURES Antarctic GL Version2. To avoid confusion with MEaSURES Antarctic GZ Version1 (MAGZv1) dataset mentioned in the following section, we have renamed MAGv2 to MAGLv2 throughout the text. “we compare our DROT-derived seaward GL position (F_{max}) with the historical GL location from MEaSURES Antarctic GL Version2 (MAGLv2) dataset”	297
11	“is shown to be precise” It would be better to define precise here: for example “is shown to be precise to less than 0.5 km”	242	Done. “The DROT-derived GL’s alignment with the DDInSAR measurements is shown to be precise within 0.5 km, with differences ranging from 0.35 ± 0.14 km to 0.42 ± 0.26 km”	236
12	The expression “mean absolute” of quantity x often means “mean(x)” and is used as a measure of the spread of a distribution. I think in this case, it just means mean(x). Am I correct? If so, please remove the term “absolute”. I would suggest using “mean horizontal separation” or (maybe better) “mean seaward separation”	Table 1	Done. You are correct – in our case, the values represent the mean separation between DROT- and DDInSAR-derived GLs, and are not absolute values in the sense of mean(x). We have therefore removed the word “absolute” to avoid confusion, and revised the term to “mean seaward separation” throughout the text.	Table 1
13	Please explain what is meant by “the recall reached 0.84”	266	Done. We have added a brief explanation of the recall and precision metrics to the main text. “ In addition, we calculated recall and precision to quantify detection performance. Here, recall is defined as the fraction of the MAGZv1 GZ area that is correctly identified by the DROT-derived GZ, while precision refers to the fraction of the DROT-derived GZ area that overlaps with MAGZv1. ”	261-263
14	A quantity on the order of 200-400 m with an uncertainty of ~700 m should have only one significant figure, but two are sometimes permitted. Please change to 460 ± 700 m and -260 ± 760 m.	271-273	Done. “For the landward boundary, the DROT-derived GZ was positioned on average 460 ± 700 m landward relative to the MAGZv1 boundary. For the seaward boundary, the offset was -260 ± 660 m, indicating that the DROT extend farther seaward into the floating ice shelf (Figure S2c.i and c.ii).”	268-269

15	“with boundaries shifted in opposite directions compared to MAGZv1” – This is not very clear- I’d either delete it, or restate that the landward boundary was shifted landward and the seaward boundary was shifted seaward.	274	Done. “These patterns suggest that our DROT-derived GZ results tends to resolve a broader GZ, with landward boundary positioned farther inland and the seaward boundary extending farther into the floating ice shelf compared to MAGZv1.”	271-272
16	Please provide units for a “fraction of a range pixel” and “sub-wavelength” for Sentinel-1.	280	Done. “DROT has a slightly lower measurement sensitivity, typically on the order of 0.2-0.7 m , corresponding to a fraction of the ~2.3 m range pixel in Sentinel-1 images, compared to the sub-wavelength sensitivity (~1-10 mm) of DDInSAR”	288-289
17	See my prior comment on “mean absolute offset”	283	Done.	281
18	Please rewrite with the study name in parentheses (e.g. “we adopt the categorization established in a previous study (Freer et al, 2023)).	297	Done. “we adopt the categorization framework established in a previous study (Freer et al., 2023)”	302
19	no hyphen between active and lakes	380	Done. “A chain of active lakes was discovered beneath Lambert Glacier”	385