

Author Response to second round of reviews of "Brief Communication: Representation of heat conduction into the ice in marine ice shelf melt modeling"

June 11, 2025

We, the authors, thank the Editor and the two Reviewers for taking their time to review our manuscript. Below we answer their comments individually. The reviewers comments are in italic font and our answers will be in regular font.

1 Report 1 (Referee #3)

1.1 General comment

I thank the authors for their efforts in response to my previous comments. I have very few new comments and suggestions, and I'm happy to see this published after the authors have taken the comments below into consideration.

We thank the reviewer for their comments and the endorsement of our article. Below we address their comments.

1.2 Specific comment

- Lines 115-117: *The map (Figure 3) does not show overestimates of melt rate due to approximation B. It is likely pretty close to what is shown (approximation A), but it's not the same.*

Thank you for this comment. We rephrase the sentence accordingly to accommodate the nuances in the differences of the estimates made using the different approximations.

1.3 Technical corrections

- Figure 1: *The figure caption says the dashed lines in (b) and (c) are temperature profiles approximated from "Eq. (2B)", but the legend in the figure has the dashed lines as "Approx C". Also, the figure caption says the dotted lines in (b) and (c) are approximated from "(2C)", but the legend in the figure has the dotted lines as "Approx B".*

Thank you for this important comment. There was clearly a mix-up in the figure caption and we rectified the mistake.

- Figure 2: *There are a few changes necessary in the figure caption. In the second line, "The blue line" should be "The dashed blue line". In the third line, "the dashed orange line" should be "the solid orange line" or "the orange line". In the third line, "and the green line" should be "and the dashed green line".*

Thank you for this important comment. As above, there was clearly a mix-up in the figure caption and we rectified the mistake.

- Line 86: *Suggest changing "In the most part of RIS" to "Under most of RIS".*

Thank you for the comment. We adapted the suggestion in the new manuscript.

- Line 108: *Should "i.e." be "e.g." here?*

Thank you for the comment. We adapted the suggestion in the new manuscript.

- Line 137: *The link given is outdated. When I clicked on this link, I was auto-transferred to the new one, but the authors should update the link listed here if making other changes to the manuscript.*

- Line 138: *The code in the repository looks like it is for older versions of the figures (at least Figs. 1 and 2) than what is shown here.*

Thank you for the comments. We will update the link and the scripts for publication.

2 Report 2 (Referee #4)

I have only two minor revisions to suggest, both involving the caption to figure 2.

We want to thank the reviewer for taking the time to read through our manuscript. We will address their comments individually below.

- Figure 2 - Caption *"The blue line is the full analytical solution provided by Holland and Jenkins (1999), the dashed orange line...." Blue and orange are switched in the figure.*

Thank you for this important comment. There was clearly a mix-up in the figure caption and we rectified the mistake.

- Figure 2 - Caption *"Simulated average melt rate from identical MITgcm ocean simulations..." I would suggest a brief reference to what the simulations are of to help orientate the reader. " ocean simulations of an idealised, 2d Greenland fjord-like domain (Wiskandt et al., 2023).... " or similar.*

Thank you for this important comment. We added the clarification and reference as suggested.