

Comment on egusphere-2024-2060

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1 General Comments

I greatly enjoyed reading this revised manuscript, and found the amendments made to the abstract, introduction, and discussion to greatly improve the clarity of the work. The considerable efforts which the authors made in these revisions, and in further experiments to answer questions raised in the initial reviews, add to the quality of the work and allow the significance of their results to shine more apparently to the reader.

I feel that the responses to the initial review are more than satisfactory, and feel much more confident in recommending this paper to be accepted for publication. In my re-reading of the paper, I found no major outstanding research questions which were unaddressed. However, I did find myself distracted by inconsistencies in formatting which I have flagged below. Most of these comments do not reflect on the scientific quality of the manuscript, and I do not think the manuscript needs further referee review.

2 Specific Comments

The following comments are minor spots which caught my attention as places where the manuscript could be improved.

1. The sentence starting on line 64 and ending in “quantifying the relative contributions of these processes on grounding line retreat and mass loss is essential” could be stronger and less vague if it specified explicitly what this knowledge is essential to. This comment is a question of motive and subjective writing style, and does not require correction.
2. The text does not always clearly distinguish between the “Vincennes Bay ice shelves” (i.e. line 48) and the “Vanderford Glacier ice shelf” (i.e. line 410). Figure 1 shows a region of connected floating ice labeled as the “Vincennes Bay ice shelf” (singular) with no specific label for the “Vanderford Glacier ice shelf.” Elsewhere, the term “Vincennes Bay ice shelves” (plural) is used, and it is not clear whether this term is used to refer to all of the ice shelves in the study domain. In some places, it is implied that the plural “Vincennes Bay ice shelves” does not include the Underwood Glacier ice shelf (line 353). The language used does not prevent understanding the broader results and implications, but was somewhat confusing when trying to really read in depth. Minor edits to clarify this language and make it consistent with the labeling in Fig. 1 would be helpful.
3. Lines 69–71 use a numbered itemization to present the research questions. These could be dropped, which I think would improve the flow of the sentences without sacrificing clarity. Additionally, on line 73, “we are able to infer” can be replaced with simply “we infer,” which is more direct. These comments are a question of subjective writing style, and do not require correction.
4. Figure 3 contains the word “bold” in bold font, which I found unnecessary and slightly distracting. Consider formatting in regular font.
5. Some figures, specifically Fig. 5 and Fig. 9, have labels with a much smaller font size that is difficult to read without zooming in. While I did not find this to be a significant obstacle, it does negatively affect the presentation quality of the paper.

3 Technical Corrections

The following corrections affect the presentation quality of the manuscript, which I think would benefit greatly from attention to these details. For technical corrections, I have followed the style set forth at <https://www.the-cryosphere.net/submission.html>. In instances where style recommendations are not clear, I have flagged issues of inconsistency in style within the manuscript.

1. Volume above floatation in gigatonnes

The clarification of units in the figure captions, while helpful, does not resolve the fact that volume cannot be measured in units of mass. While I agree that gigatonnes are a helpful unit to use for the purposes of comparison with other studies, the measure describes mass above floatation, not volume. All of the analysis appears to use mass above floatation, and it is incorrect and unnecessary to call it a volume. The IPCC reports, when using units of gigatonnes, refer to changes in mass.

2. Inconsistently hyphenated words

Compound words such as “ice shelf,” “ice front,” “ice sheet,” and so on, are inconsistently hyphenated throughout the paper. As open and closed constructions are both valid, and TC does not appear to provide a clear style guide, the authors should choose one and stick with it for all instances of the word.

There should also be consistency in the way attributive constructions of compound words are written. For example, if “sea level” becomes “sea-level” when used as a modifier (i.e. “sea-level rise,” line 29), then all instances of open compound words should be hyphenated when used as modifiers. Examples where modifiers are not hyphenated are “grounding line retreat” (i.e. line 2), “ice front positions” (Fig. 4 caption, line 8).

In addition, there are inconsistencies when compound words have hyphenated modifiers. The best construction makes it clear that the modifier applies to the entire compound word. For example, “sub-ice shelf” (i.e. line 4) is not the most clear construction. An open compound of “ice shelf” should become “sub-ice shelf” with an en dash. A closed compound of “ice-shelf” should become “sub-ice-shelf” with two hyphens.

There are too many cases of these words to reference all of them here, but these issues occur in the main text, captions, figures, and abstract, and should be consistent. At the very least, there should be consistency for a given compound word in how it is written when it is a standalone noun, when it is the modifier, and when it is modified.

3. Hyphens as ranges

Per the TC style guide, un-spaced en dashes should be used to denote ranges, but only in cases where no confusion with “*a* minus *b*” is possible. A range of numbers should be specified as “*a* to *b*” or “*a*.. *b*.”

For example, on line 190:

10 - 100 m yr⁻¹

should instead read:

10 to 100 m yr⁻¹

And on line 48:

Fig. 2a-b

should instead read:

Fig. 2a–b

These ranges appear throughout the main text, captions, and tables, and should be amended.

4. Inconsistent capitalization in figure headings

Some figure and table headings and labels are in title case, while others are in sentence case. In some figures, these are inconsistent across similar labels and headings. These should be

consistent, and in sentence-style capitalization (i.e. capitalize the first word and proper nouns only). For example, in Fig. 1, “Ice Surface Velocity” and “Vincennes Bay Ice Shelf” are in title case, while “TG basin” and “VB basin” are in the correct sentence case. This issue occurs in Figs. 1–8, 10, and Table 1.

Additionally, “ x ” and “ y ” are coordinate system variables, and should be treated as mathematical characters when used as axis labels, not as text characters which would be capitalized.

Small typos

Eq. 4 Missing space in “if $z_b \geq 0$ ”

line 12 Spaced en dashes should be used for syntactic constructions. “. . . grounding line – more than twice current estimates – are needed. . .,” instead of “. . . grounding line - more than twice current estimates - are needed. . .”

lines 30 and 514 The word “glaciers” in “Totten and Vanderford Glaciers’ flow configurations” should not be capitalized, as the plural no longer refers to a unique entity.

lines 36 and 101 The phrases “marine ice sheet instability” and “shelfy-stream approximation” are not a proper nouns and should not be capitalized, even though their abbreviations are.

lines 48, 189, 355, Fig. 4 caption lines 2 and 3 The character for a negative number is not the same as a text hyphen. For example, on line 48, “-9 to 34 m yr⁻¹” should read “-9 to 34 m yr⁻¹.” I tried to find all instances of this issue, but it may occur elsewhere as well.

line 71 The word “observed” seems to be missing the noun it is meant to modify, and could be replaced with “observed retreat” or simply “observations.”

line 121 In general, mathematical symbols such as n are typeset in italics.

line 150 Hyphen in “freely evolve.”

Fig. 2, lines 3 and 4 The words “green” and “red” should not be capitalized.

Fig. 3 The experiment names are typeset in roman, but in other figures and main text are typeset in italics.

line 169 Consider using “e.g.” here, as the list presents representative examples rather than a clarification or restatement.

line 214 Typesetting letters using the default math mode as opposed to italics can sometimes produce incorrect spacing: VAF versus VAF . This spacing issue is reproduced elsewhere as well.

line 255 Figure reference uses semicolon (“Fig. 5f; Fig. 7d”) which is inconsistent with the form of the other figure references used (i.e. “Fig. 5f and Fig. 7d”).

Fig. 6 and 7, lines 2 and 4 “Grounding line flux,” “grounding line retreat”, and “ice volume” should not be capitalized where they do not begin a sentence.

Fig. 6 and 7, line 4 SI and SI-accepted units (i.e. “gigatonne”) must be written out when they are not accompanied by numbers.

Fig. 7 Figure caption is overlapping the page number.

line 353 The construction “Vincennes Bay / Underwood ice shelves” should either be written as “Vincennes Bay and Underwood ice shelves,” or, if appropriate, to simply “Vincennes Bay ice shelves.”

line 358 Everywhere else in the paper “Vanderford Glacier ice shelf” is used as opposed to “Vanderford ice shelf.”

line 364 Here, “e.g.” is followed by a comma. This is the familiar usage to me in American English, but “i.e.” and “e.g.” are used without commas everywhere else in the paper.

line 389 To be consistent with the typesetting of other ranges in the paper, the units should appear once, after the second number (i.e. “25–30 %”, not “25 % - 30 %”).

line 428 The clause containing “retreat from reduced buttressing forces may be observed at Vanderford Glacier over coming decades” does not need commas.

line 429 Should read “Antarctic Surface Water,” not “Antarctica Surface Water.”

line 453 Extra space before semicolon, after “calving laws.”

line 454 Missing coma after “perturbation period.”