

07/15/2020

Dear Editor,

Thank you for your positive response. We really appreciate your smooth handling of the review process. We have updated the manuscript by considering all of your editorial suggestions (see below). We hope that you will find the revised version suitable for publication.

On behalf of co-authors,
Surendra Adhikari
Jet Propulsion Lab, Caltech.

Response to the Editor's comments.

To the authors,

You have done an excellent job responding to the reviewers' comments, which were also quite thorough. I believe the quality of the manuscript and its clarity have improved substantially. The method is now easy to understand and clearly structured. I only have minor revisions to suggest before publication.

Thank you for your kind words. We also believe that the revised manuscript is substantially improved both in terms of clarity and content. We truly appreciate thorough and constructive comments from all three reviewers.

P3L14: "We generally consider ice domains as part of the land, except where they float on the oceanic water as ice shelves." <= This sentence seems a bit unnecessary. If you define the ice domains as in the previous sentence, then you do not need to "consider" them one way or another. I would suggest deleting this sentence, but in the previous sentence modify "or the ocean" to be "or floating on the ocean".

Agreed. We have now deleted the quoted sentence and revised the previous sentence as suggested.

P4, Fig. 1 caption: blue sheds => blue shading [two times]

Done.

P6L30: This sentence sounds a bit strange to me: "Such a region, when physically connected to the ocean by oceanic water, can take up water and contribute to sea-level fall." <= According to your equations, this would only be true when the region is floating, and then H_F would necessarily be zero. Correct? I think I understand the sentiment, but perhaps rephrasing is needed.

The Sector D in Figure 2a, for example, has negative H_F but is still part of the grounded (not floating) ice. Had it been in "contact" with ocean water, this region would have already been floated and become part of floating ice. But because it is "shielded" by the ice that has positive H_F (Sector B between Sectors D and C), it cannot really float. When ice sheet disintegrates, for instance, Sector D (unlike the floating portions of the ice sheet, aka ice shelf or Sector C) can take up oceanic water (because it has "negative" potential) and contribute to sea-level fall. We have now rewritten lines 23-30 on page 6. We hope that it is clearer. Please let us know if you want to do one more iteration on this.

P9L30: "More importantly, the change in ice thickness in this regime can affect the interior-ice sheet dynamics via modulation of buttressing force (e.g., Gudmundsson et al., 2019) and may amplify the future sea-level change." <= Perhaps add that this is not treated here for clarity, or even remove the sentence as it is outside the scope.

Agreed. To avoid the potential confusion, we have now removed this sentence and the cited reference. This, in fact, improves the flow of the write-up.

P11, Fig. 3 caption: Mislabeled reference to panel (e) as (d).

Done.

P11, Fig. 3e: Consider label change from “Improvement to the HAF method [%]” to something more objective like “Relative difference with HAF method [%]”.

Agreed. We have changed the label as suggested. We have also added the x-axis labels “year [AD]” in panels d and e.

P14L2: bookkeeping the => bookkeeping of the

Done.

Best regards,
Alex