Earth System
Dynamics
Discussions

Interactive comment on "Projecting Antarctica's contribution to future sea level rise from basal ice-shelf melt using linear response functions of 16 ice sheet models (LARMIP-2)" *by* Anders Levermann et al.

Anonymous Referee #2

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The study uses a linear response function method earlier used by (Levermann et al. 2014) to estimate the basal melting of ice sheet models in response to a range of external forcing from anthropogenic emissions. Instead of 5 ice sheet models used in the earlier study, it has been extended to 16 Ice sheet models.

Though the methodology was adopted earlier, it would be interesting to understand the response across the many state-of-the-art ice sheet models.

Below are the general and specific comments.

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General Comments:

1. The authors expect the reader to have a clear understanding of Levermann et al. 2014. A summary of the work would be excellent.

2. Some details in the abstract are not referenced in the text, e.g., the Paris Agreement (citation and a brief description would be excellent)

3. Section 2.6 Validity of Linearity assumption." The authors fail to clarify upon what they mean by "The alpha values are generally close to zero, which represent linearity."

Line-by-line comments:

Page 2 Line 19: "For the so-called business-as-unusual.." - please rephrase

Page 2 Line 23: "Paris Climate Agreement" - Missing citation. Do not see any reference related to this later in the text.

Page 3 Line 7: Clausisus-Clapeyron law - missing citation

Page 3 Line 28-29: "The advantage here is that we can investigate the response of the models to the full range of uncertain forcing and combine this for all the different ice sheet models. That is the main contribution this study is trying to make" - Please combine the sentences.

Page 3 Line 30: In addition - missing comma

Page 3 Line 33: "It is important to note that in this study" - missing comma

Page 3 Line 35: "In any case whenever the term Antarctic contribution to sea-level rise is used this refers to the sea-level relevant ice loss induced from basal ice shelf melting only." - please rephrase may be "In this study, .."

Page 3 Line 40: "The only thing that changed is the ice sheet models." - Unclear sentence

Page 4 Line 21-23: "Although there are other possibilities, this approach preserves

the forcing structure as provided by the ocean models which is why we selected it." - please rephrase

Page 5 Line 37-38: Does it mean that the configuration was set up for each region illustrated in Figure 2. rather than the whole region of the Antarctic and presenting results for various sectors? If for each region, then what about the influence of boundaries between the regions?

Page 6 Line 2: "A number of modeling groups ..." - please include citations, a brief description about the modeling groups

Page 6 Line 3: "... beyond the scope" - it would be nice to have a brief description with citations.

Page 6 Line 8: "That however might sound worse than it is." - please rephrase

Page 7 Line 11: "The alpha values are, however, generally close to zero, which represents linearity" - Any references to substantiate the assumption or what does the author mean by saying "generally close to zero."

Page 7 Line 21: "While some models show an instantaneous ice loss response, most models exhibit a more gradual increase of the ice loss over time." - Please include a bit more detail, which is which.

Page 8 Line 3 "are started" - were started

Page 8 Line 10-14: Isn't it better use the model estimates that fall within the uncertainty range of observation to derive conclusions? Can you substantiate the reason for using all the models? It would be nice to see the total from the models whose estimates fall within the uncertainty range of observation.

Page 8 Lin 31: "Overall" insert a comma

Page 9 Line 39: "... compared to what might occur in reality." It would be nice to include details on some other studies for comparison.