

*Review of Lambert and Burgard: "Brief Communication: Sensitivity of Antarctic ice-shelf melting to ocean warming across basal melt models."*

*The Cryosphere Discussion, Paper: 10.5194/egusphere-2024-2358*

The revised manuscript of Lambert and Burgard analyses the sensitivity of five different basal ice shelf melting parameterisations to an idealised warming of 1 °C and 2 °C, while the five analysed and widely used basal melting parameterisations differ in complexity.

The authors of the revised manuscripts have taken up almost all raised issues and suggestions by the reviewers. However, I would like to suggest some last-minute changes.

**I recommend the publication of the manuscript after very minor corrections.**

## General comments

The manuscript addresses the basal melting enhancement for increased ocean temperatures. In the revised manuscript, the authors have performed an additional simulation for a warming of 2 °C. Since the brief communication shall be concise, the authors may summarise very general information about the reference and the two warming scenarios of 1 °C or 2 °C in a simple table. What do the authors think about the following example? The information could be provided as supplementary material if space is an issue.

Model	M (m yr <sup>-1</sup> )	M <sub>10</sub> (m yr <sup>-1</sup> )	DA	Scenario
Observation	0.60	2.00	3.3	Reference
Quad.	0.60	2.04	6.7	Reference
	2.03	?	?	+1 °C
	?	?	?	+2 °C
PICO	0.60	1.23	2.1	Reference
	?	?	?	+1 °C
	?	?	?	+2 °C
Plume	0.60	2.04	3.4	Reference
	?	?	?	+1 °C
	?	?	?	+2 °C
Laddie	0.58	2.42	4.2	Reference
	?	?	?	+1 °C
	?	?	?	+2 °C
N. N.	0.46	0.78	1.7	Reference
	?	?	?	+1 °C
	?	?	?	+2 °C

As a supplement material, you may provide the spatial melting response to the 2 °C warming, like Figure 2 of the 1 °C warming.

## Specific comments

### Main document

Line 2–3/L 2–3: The authors may mention both warming scenarios in the abstract, e.g., "to an idealised sub-thermocline 1 °C and 2 °C warming ... ."

L 72: Please drop the "e.g." because you use a specific implementation. You may write: "We use the implementation by Burgard et al. (2022) but include an .... ."

L 15: You may add: "... currently remain rare and computationally too expensive to run ... ."

L 133: What is the unit of the  $K$  value? Please add the unit.

L 138: What is the unit of the turbulent heat exchange ( $y^*_\tau$ ) value? Please add the unit.

L 142: I am unsure about the style guide of Copernicus journals, but should there be a space between the number and the following unit?

L 165: If the provided numbers in Figure 1 are taken, the deep amplification factor for PICO is 2.1. Please double-check.

L 187: As before, the authors may also add here the factor by writing: "... the lowest deep amplification (1.7), which is a ... ."

L 193: Should it be: "These sensitivities have a factor between 1.7 (PICO) and 5.5 (Quadratic) higher than the ice-shelf average values."?

L 226: The authors may rephrase "Quantitatively, however, the intermodel spread is very large" to "Quantitatively, however, the intermodel spread is considerably large."

L 279.: The authors may add a sentence summarising the results for 2 °C: "For 2 °C, the increases range from xx % to xx %, with a mean of xx %."