

Review of manuscript egusphere-2024-128 "Uncertainty in the projected Antarctic contribution to sea level due to internal climate variability" by J. Caillet et al.

General comments:

The submitted manuscript investigates the impact of internal climate (oceanic and atmospheric) variability in projections of Antarctica's sea-level contribution until year 2100. For this purpose the authors run standalone ice-sheet simulations applying output from a selection out of ensemble simulations of three CMIP6 climate models. Besides quantifying the relevance of the internal climate variability for sea-level projections, the authors also give recommendations for future ice-sheet projections. I deem the study a valuable contribution to the Earth System modeling community, especially the ice-sheet modeling community.

I find the manuscript clearly written, well structured and mostly understandable. The figures illustrate the findings well. The methodology seems consistent and the conclusions plausible. I would like to mention that my assessment is limited regarding some oceanic mechanisms described in the study (which I refer to in my specific comments) and details of the applied metrics in Sect. 4.3. They seem plausible but I didn't have the time to dig deeper into the details.

I would support the publication of the manuscripts after my few points below have been addressed.

Specific comments:

The last sentence of the abstract seems a bit detached from the rest of the abstract. Maybe a different introduction of the sentence would help for a smoother reading.

L28: Is there a typo: "of" instead of "on"?

L50: Why SPP2-4.5?

L56: drivers

L82: Which friction law is it? I don't see the necessity to write the law down here but a reference to the equation would be helpful.

L120: What's the sense of these abbreviations?

L164-166: I am not able to follow the causal chain. Which location do the authors mean by "there" at the end of the sentence (I guess the Eastern Ross Sea)? I am not an expert on such oceanic mechanisms/patterns and personally would be glad to get a clearer explanation.

L179: Again, as a non-specialist regarding the ocean: What does it mean when you state "Both IPSL-CM6A-LR and UKESM1-0-LL seem to be prone to convection"?

L224-225: "On average, the amplitude of SLC variability relative to the atmosphere is 3.4 times higher than that relative to the ocean." This sentence is not entirely clear to me and I would appreciate if the authors could briefly explain what is exactly meant. How is this finding deduced? Is it shown in a figure which could be referenced here?

L258-259: How is this finding deduced? If I am right it can be seen from Fig. 6a?