Public justification (visible to the public if the article is accepted and published):
Dear Andrew Hennig and co-authors,

Thank you for having replied to the comments from the two reviewers. I think that the manuscript is now easier to read and clearer on the methods and results. There are nonetheless still a few minor points to address before publication as you can see below.

Best regards,

Nicolas Jourdain

Dear Dr. Jourdain,

Thank you for your thoughtful and detailed comments. We have revised the manuscript as described below, and hope that these changes will satisfy the requirements for publication.

Comments:

- L. 60: expand GMW.
Corrected

- L. 237 and caption of Fig. 4: I don't get why negative sea ice melt fractions would indicate regions of net sea ice formation. I would argue that it results from sea ice formation, possibly during previous months, but not necessarily that this location experiences net annual sea ice formation. Sea-ice formation and associated convection can indeed produce a signal in the subsurface and be followed by the opposite signal closer to the surface during the sea-ice melting season, whatever the sign of the annual net balance between sea ice melt and sea ice formation.
We have clarified the text here, more clearly describing the signals of sea ice melt and vs sea ice formation.

- Figs 3-4: given that the meteoric water fraction and the sea ice melt fraction are defined in [0-1] with no unit in equations 1-3, you need to clarify the g/kg by adding something like "g/kg, i.e., g of meteoric water per kg of seawater" in the captions.
Captions expanded to include g of meteoric water/sea ice melt per kg of seawater.

- The caption and labels of Fig. 4 would be clearer with "sea ice melt fraction" than with "sea ice melt".
Captions expanded to include g of meteoric water/sea ice melt per kg of seawater

- L. 268-270 "These results are consistent with recent studies showing an increase in basal melt through the 1990s, followed by relative stability and interannual variability from 2000 through 2020, with interannual variability that is larger than the increasing trend in meteoric water content". Please provide references for this. If you look at the hydrographic estimates of ice shelf melt rates summarised in Fig. 4 of Joughin et al. (2021), basal melt seems significantly higher in ~2009 than in the early 2000s. And 1994 appears as an average year, so what would explain such

low meteoric water column inventory for 1994?

Joughin, I., Shapero, D., Dutrieux, P. and Smith, B. (2021). Ocean-induced melt volume directly paces ice loss from Pine Island Glacier. Science advances, 7(43), eabi5738.
We have added a reference to Flexas et al., (2022) here, and expanded on the discussion in addressing your later comments re: L. 438-442.

- L. 275-276: replace “where icebergs are exported out of the study area” with “where icebergs melt out of the study area”.
Corrected

- L. 358: “show mixing clear mixing lines”.
Corrected

- L. 422: “we have estimate” -> we have estimated?
Corrected

- L. 438-442: Things are a bit less clear than what is suggested in this sentence. Some of the first references do not clearly support stable ice-shelf melt rates. It is not clear to me which part of Paolo et al. (2018) supports this statement. No melt rates were estimated by Dotto et al. (2019). You should probably cite Paolo et al. (2023) that shows some trend. Then, you pick up the modelling study of Flexas et al. (2022), but other models show different variability. Check for example Fig. S4 of Naughten et al. (2022).

Naughten, K. A., Holland, P. R., Dutrieux, P., Kimura, S., Bett, D. T. and Jenkins, A. (2022). Simulated twentieth century ocean warming in the Amundsen Sea, West Antarctica. Geophysical Research Letters, 49, e2021GL094566.

Paolo, F. S., Gardner, A. S., Greene, C. A., Nilsson, J., Schodlok, M. P., Schlegel, N.-J., and Fricker, H. A. (2023). Widespread slowdown in thinning rates of West Antarctic ice shelves, The Cryosphere, 17, 3409–3433.

We have removed the references to Dotto et al. (2019) and Paolo et al. (2018) here and expanded this section, discussing our results more explicitly in contrast to other studies, including Naughten et al. (2022) and Joughin et al. (2021). [L446-460 in revised manuscript].

- L. 490-491, in the conclusion: it may be worth reminding that a large part of the local precipitation is likely exported by sea ice without entering the ocean surface layer.
A sentence has been added here describing the export of precipitation on sea ice

- L. 706: “at had”
Corrected

- L. 749-750 “likely the resulted”.
Corrected