

Dear editor,

Please find our answers to your comments in *italics* below.

In addition, we identified a sentence where we by mistake had written that the warm inflow contributing to the HSSW production occurs east of FT – this should have been west of the FT (Nicholls et al. 2009) and we have corrected that.

Best regards, Elin Darelius and coauthors

Line 46: you introduced mWDW in Line 45, so also use that to start the following sentence (with MWDW), and remove the 'strongly modified' in Line 47 but rather say by how much, or to what degree that referred to mWDW was cooled.

*I start the sentence with "MWDW" as suggested and give the mWDW temperature observed in the Ronne Ice Shelf cavity (-1.4C)*

Line 56: COSMUS expedition (no dash - )

*Corrected*

Line 58 .... in the AABW production → for the AABW production ....

*Corrected*

Line 59: I like to ask to change 'dramatically' to something quantifiable e.g. a 10 or 20-fold.

*I now write that the melt rates may increase by more than an order of magnitude*

Line 59-60: remove the 2<sup>nd</sup> 'possibility', e.g. just cut ... the possibility ... in Line 60.

*Corrected*

Line 61: the observed changes in the WDW temperature

*Corrected*

Line 65: still add a reference to the ARGO program in the main text body too, eg also include World Ocean Database and the Coriolis project (<http://www.coriolis.eu.org>) in section 2.1,

*Corrected*

Line 65 In Figures 3, 4 and 5 add unit degree ° for locations, i.e. °W (in Figure text/legends and captions)

*Corrected*

Caption Fig 6: the part: [a-b](#) is a zoom-in of the highest temperatures at Mslope Add to that: a-b) a zoom-in of the temperature range 0.1 to 0.85°C (i.e. the range that is shown there).

*Corrected*

End of caption Fig 6: add the unit for EKE (EKE values, which are not normalized) in the Caption

*Corrected*

Figure 7: Given also the comment of R1, Prof. Dr. Heywood, this mooring temperature record upstream indeed does not show WDW, but mWDW, when  $-1.6^{\circ}\text{C} < T < 0^{\circ}\text{C}$  (or defined  $< -0.5^{\circ}\text{C}$ )?

One can point out in the text when referring to Fig. 7 that one sees intermittently mWDW and ISW there (and not WDW). It will also help the reader to know what the (generally defined) divide is between WDW and mWDW properties in the literature; you could provide that already when introducing the water masses.

*The temperature range of WDW ( $0 < T < 0.9^{\circ}\text{C}$ , Gammelsrød et al. 1994) is now given in the introduction, and we explain when introducing Fig. 7 that the mooring is alternatingly surrounded by mWDW and cold shelf waters / ISW.*

Also, in subsection 4.1 the title to start with may be mWDW (instead of WDW)?

*Corrected*

Also, Line 141: is it

mWDW or WDW or both? This (if you speak about mWDW or WDW, or both) could be checked and improved generally throughout the ms to clarify (e.g already from the introduction, see also my comment above about Line 46).

*Here it would be both mWDW and WDW – we have gone through the ms and corrected our somewhat sloppy use of mWDW/WDW, so that it should now agree with the definition of WDW given in the introduction.*

Allowed references: for final publication, you cannot refer to a paper submitted (or in preparation, or almost submitted). For a final accepted publication in Ocean Science all references need to be published already, accepted for publication, or available as a preprint with a doi. Hence, the reference Darelus et al., 2023b and the sentence where this is referred to needs to be removed or modified.

*The reference to Darelus et al (2023b) has been removed.*

Data availability

Please make sure to make the data from mooring Mslope available when submitting the final ms version and add doi/reference in the Data availability statement.

*The CTD data from 2021 are now available for download from Pangaea (Tippenhauer et al. 2023) and the doi is given in the Data availability statement. The mooring data (M\_slope) are submitted to Pangaea.de but there is a waiting list (of several months!) and we have not yet obtained a doi. We now write this in the data availability section, and that until published there, the data can be obtained from the authors on request.*

## References

- Gammelsrød, T. et al. 1994. "Distribution of Water Masses on the Continental Shelf in the Southern Weddell Sea." In *The Polar Oceans and Their Role in Shaping the Global Environment, Geophysical Monograph 84*, eds. O.M. Johannessen, R. D. Muench, and J. E. Overland. American Geophysical Union.
- Nicholls, K. W. et al. 2009. "Ice-Ocean Processes over the Continental Shelf of the Southern Weddell Sea, Antarctica: A Review." *Reviews of Geophysics* 47: 1–23.
- Tippenhauer, S. et al. 2023. "Physical Oceanography Based on Ship CTD during POLARSTERN Cruise PS124." <https://doi.org/10.1594/PANGAEA.957614>.