

Reviewer 1 : please find below our point-by-point response to reviewer #2. We copied reviewer comments in black. Our response is in orange. Citations from the manuscript are indicated in orange italicised text, and line numbers correspond to line numbers in the new version of the manuscript.

I'm quite satisfied with the author's responses to my review. I'm happy to recommend publication after addressing the minor typographic and clarifying issues listed below. The figures in particular are beautiful. I also really appreciate that the authors clearly separate their description of the observations from their interpretations of the meaning of those observations. Overall I think this is tightly argued and well presented piece of work on an important region.

We thank the reviewer for their positive comment on our revision. We have considered all the minor comments made by the reviewer, as detailed in our responses below.

10, omit "via"

Accepted

54, "time series"

Accepted

55, "flow onto the continental shelf and subsequently southward" would be better

Accepted

59, I think that the authors are saying that the western pathway is estimated to contribute about 1/2 of the heat that is delivered to the FRIS; in this case, the "at the shelf break" could be omitted for clarity, or some other slight rewording

Accepted - "at the shelf break" dropped.

59, please provide a reference for the asserting beginning "CTD observations..."

Accepted. Janout et al., 2021 added.

67, I believe what is meant here is "Thus far, mWDW has only been observed at the ice front near 79 S once, in 2013". It's a little unclear what the "only" is intended to mean.

Reworded: Thus far, mWDW has been observed at the ice front near 79°S only once in 2013

75, "sea ice"

Accepted

77, "water masses"

Accepted

80, Argo floats would not be suitable for a shelf study because of their typically deep profile depth, so it would be better to simply say "Autonomous instruments"

Rejected. Argo floats have been used in continental shelf studies, including the present study.

89, "infer" or "triangulate" would be better than "provide"

Accepted.

92, I think what the authors are meaning to say is that the approach taken in the present study is similar to that taken in a recent study in a different region, but that is not coming through in the current wording.

Reworded.

100, since you've already introduced the term Small Trough, perhaps use it here?

Accepted.

101, "but never directly measured" is better

Accepted.

109, "sea ice"

Accepted.

136, "transmitted a frequency-modulated signal" (no with) is better

Accepted.

140 and afterward, since TOA is used to refer to multiple times of arrive, I believe it should be written as TOAs in almost all cases (line 148 and 149 are exceptions)

Accepted.

150, "unrealistic records were removed", "time series"

Accepted.

151, please specify the bandwidth of the LOESS filter for reproducibility

It is already mentioned in the sentence: "removing frequencies higher than once per day"

157, "position was estimated" or "inferred", not "computed"

Accepted.

164, it is not clear if "smoothed trajectories obtained from ..." is referring to the process just described. It would be better to just say it like that. "raw TOA" is confusing because it sounds like you are now referring to a different processing

Accepted. We removed the part of the sentence "with their smoothed trajectories obtained from the 24-hour low-pass filtered raw TOAs" to avoid confusion.

165, "time series"

Accepted.

175, "hydrographic"

Accepted.

177, Can you reword this without saying layers twice?

Accepted.

183, "sea-ice-covered" I believe

Accepted.

184, six hours is not the frequency; it is the sampling interval.

Accepted.

186, "open ocean"; "transmitting" is better than "emitting"

Accepted.

193, "the Small Trough"

Accepted.

217, "and a recirculation"

Accepted.

222, "regime of recirculation mWDW on the eastern shallow continental shelf" is better

Accepted.

225 & 226, "water mass"

Accepted.

232, "appears to be more efficient... compared to" is better

Accepted.

242, "time series"

Accepted.

245, "mWDW range"

Accepted.

248, "that this region is the site of" or "that in this region there is" are better, since it is not the region that poses.

Accepted.

250, "that is dominated by"

Accepted.

256, "over the eastern flank of the Filcher trough" can be omitted.

Accepted.

258, ", however, "

Accepted.

259, ", hence turbulence mixing, "

Rejected, we prefer turbulent mixing.

275, "with a timescale" is probably what is meant hear, as "within" would mean two months or less

Accepted.

278, "available" is better than "existing"

Accepted.

286, semicolon should be "and". "in which" would be better than "where" as it would clarify that you are explaining the meaning of the mode change.

Accepted.

292, "were" is better than "got"

Accepted.

299, "water masses"

Accepted.

300, "sea-ice-covered"

Accepted.

308, "directly observed" is better than "demonstrated"

Accepted.

314, "Limitations... do not"

Accepted.

323, "out of the trough" can be omitted

Rejected. We prefer being clear here.

329, perhaps emphasize at the end of this sentence that there would then be a associated impact on the heat fluxes to the base of the ice shelf.

Accepted.

332, "recirculating" is better than "convoluted"; the latter is more often used to denote logically muddled than physically wiggly

Accepted.

334, It is not clear what "irregular positioning" means since "positioning can mean the act of inferring a position"; perhaps "available positions" is what is meant.

Accepted.

345, ", however, ". "motion along"

Accepted.

346, "hence turbulent mixing, "

Accepted.

349, "first Lagrangian observations over the Filchner–Ronne ice shelf were acquired" is I think what is meant.

Accepted.

351, "sea ice". The phrase after the colon is awkward and would be better phrases as "an eastern passage...", and a western passage..."

Accepted.

359, "time scale". "up to four years" is all that can be said based on the data, not "up to at least".

Accepted.

373, "float data" not "floats data"

Accepted.

375, "Float" is not capitalized.

Accepted.

388, journal name capitalization

390, missing journal name

394, journal name capitalization

403, missing journal name

433, article title capitalization

448, Southern Ocean

466, journal name capitalization

477, missing journal name, tech report details, or link

486, article title capitalization

497, missing journal name

Thank you. The references have been checked.

Table 1, Please indicate whether the time given is UTC, local time, etc.

Accepted.

Figure 1, "thence" needs to be unpacked into more words to explain the deeper contours. "Lambert" should be capitalized.

Accepted. We clarified thence.

Figure 2, what does "maximum" mean here? I believe you mean that for all position fixes associated two or more TOA records, the distance from the float to the farthest sound source is reported, but that's coming through at the moment.

Accepted. We clarified by removing maximum.

Figure 3, a minor point, the cross are not very visible; small black dots or filled circles might be better. No hyphen after "S" in "T-S diagram". "estimated as the maximum profile depth" would be better than "inferred from the profile depth." Is the colorbar axis in the right panel the same as that used in the left panel? I'm seeing a lot more dark blue on the right than I would expect to see based on the left, suggesting perhaps the colorbar axes not the same. In this and future maps, heavy gray lines are float tracks while light gray lines are isobaths corresponding to changes in the shading color. You might suppress the latter as they are not really needed; otherwise, in this and following maps, please clarify that it is the heavy gray lines that are float tracks.

Accepted some of the minor comments. Note that the heavy gray line is the isobath contour as described in the caption "with contours as in Fig. 1".

Figure 4, the meaning of "for" in "for the ISW" and "for the mWDW" is not clear. Something like, e.g. "marking a typical value for" would be better. Second to last sentence, I believe "colored circles" should be "colored triangles".

Accepted. We clarified : The cyan contours are the -1.9°C isotherm, corresponding to the definition of ISW, and the red contours are the 27.75kg m^{-3} isopycnal, corresponding to the definition of mWDW.

Figure 8, in the last sentence, the construction "black (mooring) and green (float) circles is confusing; it would be better to first tell us about the black circles and then about the green circles.

Accepted. We reworded to avoid confusion.