Reviewer 1 : please find below our point-by-point response to reviewer #1. 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.

Sallée et al present a fascinating study of trajectories and watermass transport implications from 7 RAFOS-enabled profiling floats on the eastern Weddell Sea continental shelf of Antarctica (Filchner Trough region). The floats operated in a mode similar to floats in the global Argo array but with a 5-day profiling interval (daily profiling in the summer), drifting at 250m or 400m between profiles and receiving RAFOS positions up to 4 times daily, with total float lifetime ranging from 1 to 5 years. Acquiring this dataset is in itself an impressive accomplishment.

We thank the reviewer for their careful reading of the manuscript and for providing such an enthusiastic comment on our work.

--- General Comments ---

The manuscript's presentation of the scientific context, the float experiment and results, and the discussion of implications is well done and informative. Figures are generally clear. In particular, the floats are simultaneously able to illustrate flow pathways and the evolution and variability of layer temperature and thickness along those pathways. Overall, not a lot of changes are needed before publication, although I do have a number of suggestions and questions which the authors may choose to address.

Thank you. We have considered all the comments made by the reviewer, as detailed below.

Although the discussion of pathways and transport mechanisms is interesting and informative, there has not been an attempt to make quantitative estimates of volume or heat transport or diffusive watermass transformations. Clearly any attempt to do this would be subject to some guesses at unmeasured quantities (such as flow width or duration), but even very rough values would be helpful for comparing these observations to numerical models or shipboard or moored measurements.

Although we very much agree with the reviewer that it would be great to have such estimates, we believe we are not in a position to be able to make them. The sparse nature of the float dataset presents significant challenges and limitations for making accurate estimates of the lateral transport of volumetric quantities (like heat). Despite our efforts, we found that deriving a reliable estimate based solely on these float datasets is exceedingly difficult and would be too speculative to be useful. Hence we postpone these questions to future studies that include data-modeling.

In one especially interesting and curious feature of Fig.8 (the comparison of a float's measured trajectory and temperature with the progressive-vector trajectory and temperature from a mooring), the temperature at the float made a sudden change immediately before reaching the mooring. Is there any suggestion of how this might have happened (either through diffusive heating or non-Lagrangian movement of the float)? The change brought the float measurement up to the mooring's temperature just before the closest approach, but the warm temperature had been present at the mooring considerably earlier. Later, the warm patch seems to leave the mooring but the float continues to follow it.

We believe the main reason is due to the non-Lagrangian behaviour of the float. Before reaching the mooring the warm layer is just below 400 m, so that the float does not drift in the warm layer (see Figure 4). Due to the topography rise the warm layer reaches 400 m, roughly at the location of the mooring, so that the float drift starts to sample it from there, and follows it as it continues flowing southward. The warm layer stops being sampled by the mooring at this date because of intermittency of the inflow which is active at the shelf break only in Feb-Apr.

The authors make the intriguing suggestion that ISW could block the heat flux of mWDW toward the FRIS. Is this energetically possible? (Meaning, what is the source of energy maintaining the potential energy barrier of the dense water and accompanying geostrophic front?) Or is this really a statement about a different cause? For example, that the atmospheric cooling that produces the ISW (say close to the ice face) removes all heat before it can reach the cavity? Or simply that the amount of on-shelf mWDW transport and heat flux here are small relative to the West Antarctic shelf?

The idea of this "blocking" is based on layer depths modulated by geostrophic balance: that the ISW lies above the deeper isobaths and the mWDW over shallower isobaths that do not continue into the cavity. Across the shallower layer a front between these water masses exists, due to large-scale heat and freshwater fluxes, and the mWDW is not able to enter the cavity geostrophically.

--- Specific Comments ---

The bathymetry in Fig 1 is difficult to make out against the temperature shading. Would a light color work better? Also some bathymetric contour labels would be helpful. The bathymetry is presented in a more readable form in other panels, but there is no definitive label of any isobath and the colorbar is too finely graded to help. How about making one isobath (e.g. 300m or 400m) thicker than the others to provide at least one clear reference (along with the fixed 100m contour interval).

Accepted. We made the 500m isobath thicker for reference.

Also on the subject of bathymetry, I'm curious whether the floats drifting at 400m ever got stuck on the bottom during their drift phase. From counting the number of 100m-interval contours on the shelf east of Filchner Trough (e.g., in Fig.3), most of the shelf appears to be shallower than 300m. However, the depth-time plots in Fig.4 show water mostly between

400m and 500m on the shelf. Does the float-inferred bathymetry actually match the mapped contours? Or is the shallowest contour shown not the 100m one?

The floats drifted with the currents, which itself is steered by the bathymetry. So, the floats stayed above the seafloor, deeper than 400 m, even if sometimes they were very close to 400 m, as shown in Fig 4.

I suspect that a T-S diagram would help clarify some of the discussion of watermasses and layers. And coloring by or otherwise indicating variations in latitude or water depth might be a good way to illustrate the location, density range, and T-S characteristics of the ISW and mWDW watermasses and the front between the two.

We appreciate the suggestion of adding a T-S-diagram and added a second panel to Figure 3 with a T-S-diagram of all the profiles taken by the floats, color-coded by the water depth.

In addition, it would be useful to mark some candidate isopycnals (e.g., important ones for mWDW and/or ISW) on the depth-time plots (figs 4,5,7).

In the time-depth plots, we added the 27.75 isopycnal, as suggested in Figure 4 and 5. They now contain the contour of the ISW and mWDW, which are the water masses discussed in this paper. Regarding Figure 7, the focus of the figure is ISW so we prefer keeping only the -1.9°C isotherm, consistent with the definition of ISW used in panel a of the same figure.

Ending the Fig.4 trajectories on the shelf but continuing the timeseries off the shelf is confusing (and it is difficult to tell whether this is a choice that has been made deliberately or due to a lack of GPS data). Is there at least an approximate trajectory or direction of the floats that left the shelf (12682 and 12703) that could be indicated? They must have reached the surface at some point to send the data back.

We agree that it is unfortunate that not all CTD profiles can be geographically located. However, even if the location is not available for the whole extent of the CTD time series, we would still like to include the extended CTD time series to show, e.g., that floats 12684 and 12679 remained within the ISW layer at least throughout one year, which can be inferred from the observed water masses. It is true that the floats have surfaced at some point to transmit the CTD data; however, this has usually happened after the floats have drifted out of the study area, or beyond the single year shown here.

To avoid confusion, we have now drawn a vertical line in the time-depth plots where the last TOA position is available, and thus the trajectories in the map.

--- Minor Comments/Typos ---

l.9 typo: Pobservations

Accepted. Corrected.

l.202-210. The description of the southern float trajectories is interesting in it's comparison to the behavior of the eastern floats but should also re-iterate the fact that these floats parked at a different depth (250m) than the others (400m).

Accepted. Corrected.

Line 215: *"Compared to the persistent southward trajectories on the eastern plateau, the trajectories of these two floats that are parked at 200 m (shallower than the eastern plateau floats) within the Filchner Trough show a strong eddying pattern and recirculation within the Filchner Trough."*

Fig.3 caption lists different colors for the floats than the legend in the figure. Which is correct? (I'm guessing it's the legend.)

Corrected. We removed the color description from the caption.

Fig.4 mentions float 12672 but probably means 12682

Corrected.

"Hovmoller diagram" is usually not what a timeseries of vertical profiles is called (at least in oceanography). Not sure whether there's a definitive definition, though. "Depth vs. time" or "profile timeseries" seems more common for the types of plots shown in Figs 4, 5, and 7. Usually Hovmoller is reserved for horizontal distance vs. time (and in particular as a way to emphasize wave propagation that might be seen in an animation of 2D structures changing in time).

Accepted. We changed to "Profile timeseries"

Fig.6 shows temperature on the 27.75 isopycnal (mWDW). Can this isopycnal be added to Figs 4+5?

As described in our response above, we have now added the 27.75 isopycnal, as suggested, in Figure 4 and 5. They now contain the contour of the ISW and mWDW, which are the water masses discussed in this paper.

Fig.7 shows ISW layer thickness. Mention the definition of this layer as water colder than -1.9C in the caption.

The caption explicitly says: "*The colored filling of the symbols show the thickness of the ISW layer (only if any ISW present), taken as the bottom water mass below the surface freezing point (-1.9°C).*"