Dear Reviewer,

Many thanks for your extremely useful comments.

Very useful paper presenting XBT data collected in under sampled region of the South Ocean over 30 years of fields expeditions. Please see my remarks to the main text of the manuscript in the supplemented file.

We accepted all the suggestions provided in the supplemented file to improve the manuscript. Changes are described in the point by point reply below.

Line 127: "sampling rate" changed to "sampling interval"

Line 138: Zamak is a family of alloys primarily composed of zinc along with aluminium, magnesium, and copper. The name "Zamak" is an acronym derived from the German words for its constituent metals: Zink (zinc), Aluminium (aluminium), Magnesium, and Kupfer (copper). This information is included in the caption.

Line 205: As suggested, "elevations" is changed to "depth".

Table 4: As suggested, we use the term "range" in place of "threshold". The ranges were defined through the use of ARGO data collected in the study area between 2004 and 2023 as reported in the text.

Line 302: "SBdy" changed to "Southern boundary of the ACC".

Figure 4: As suggested, data points have been added to the plot, as well as the section map. Please note that all the XBT sections have been improved using new interpolation parameters as detailed below.

Lines 318-321: Sentence rephrased as "This is highly desirable in regions significantly influenced by topographic steering, such as the area south of New Zealand, where the presence of the Campbell Plateau strongly affects the ACC path (Figure 5)."

Lines 339-341: Sentence improved as suggested: "The eddy is characterized by a maximum negative temperature anomaly (eddy's core) of about -4°C compared to the surrounding water."

Figures 5 and 7: Fronts contour lines have been improved.

My concerns are about section plots presented. I recommend to review the interpolation parameters used for section plots presented in the 'Supporting Information' document, in order to avoid some artefacts, which I believe are caused by too small search radius set during section creation. It is also important to use same interpolation setting for all section and provide this information (i.e. horizontal search radius and vertical search radius used for interpolation in ODV) in the text.

It also will be helpful to add a profiles markers on the section plots as well as section boundaries set in ODV for each section (this will allow to access spatial limits during interpolation).

It will be useful to have plots in the 'Supporting Information' document numbered individually (like S1-1, ..., S1-35), - it will make reference to some individual plot more convenient. As for now all 36

section plots are referred to as Fig S1, therefore, below, I use page numbers to refer to some particular plots.

Remarks to the section plots in the 'Supporting Information' document:

I believe some of the features on the plots appears as result of using too short horizontal search radius, so interpolation algorithm is only using data from one profile not taking into account its neighbors . Provided that distance between profiles (n) is about ~20 km, I would recommend to employ 3n value, i.e. ~60km. I only mention few pages/section plots below, but these remarks are related to all section plots - there are many gaps in the stations position which could be the cause for the interpolation artefacts now existing everywhere.

As suggested, all the section plots have been reviewed using the same interpolation parameters in ODV. The adopted zonal interpolation is now based on a spatial weighting model that utilizes three temperature profiles (3-n values): a central reference profile, an upstream profile, and a downstream profile considering a maximum influence range of 60 km along the zonal direction and 20 m along the depth. This information is also provided in the 'Supporting Information' document.

Additionally, profile markers and section boundaries have been added to the plots.

As requested, plots in the 'Supporting Information' document are now numbered individually.