Dear Reviewer,

Many thanks for your extremely useful comments.

Summary: The paper nicely describes a valuable dataset of XBT observations across the Southern Ocean from New Zealand to the Ross Sea, Antarctica. These data cover 1994 to 2024 along the PX36 Ship of Opportunity (SOOP) line. The quality of the data is described and suitable QC procedures followed to improve the dataset for end users. Depth corrections have been applied appropriately. The authors have done an excellent job in summarising the data collected and presenting examples of the use with eddy and front identification using complimentary datasets such as satellite altimetry and Argo datasets. I recommend publication after some corrections to improve the manuscript (see below) and access to the data could be improved given the current situation post-hurricane in the USA where the NCEI servers are difficult to access. Similarly, publication of some code to access and display the data would be useful to go along with the manuscript.

We accepted all the proposed suggestions to improve the manuscript as detailed below.

Introduction: I recommend including reference to the GOOS Ship of Opportunity program (SOOP) and the SOOPIP (Ship of Opportunity Implementation Panel) in the manuscript. Certainly the authors are part of these programs and the data makes a significant contribution to the SOOP program.

Reference to the GOOS SOOP and SOOPIP have been added in the Introduction.

Line 109, suggest the reference should be Cowley et al 2013 as it refers to depth and temperature variations over time.

Done.

Table 2 contains Hanawa 1995 FRE values for the T7 probe, not manufacturer FRE as stated in the title. If the Hanawa FRE is used, please include in reference. Also confusion over which FRE the non-corrected Depth values use in the dataset (see comments in the data section below).

Many thanks for your suggestion. The revised Table 2 contains only the physical characteristics of the XBT probes used in this study (Sippican T5 and T7). The FRE coefficients provided by the manufacturer were removed from the table to prevent potential confusion for the readers. A full description of the FRE used in this study (i.e., Hanawa et al., 1995) is now discussed in Section 2.3 (XBT data biases correction).

Line 155. Suggest including Cowley & Krummel with Parks et al reference.

Done.

Line 187, 202, 206: Suggest 'log sheets' or similar in place of 'launch clipboards'.

Done.

Line 208. Grammar: 'resulted the most correspondent' perhaps should be ' corresponded'

Done.

Line 230. Grammar: 'unusally' should be 'unusual'

Done.

Line 276-277. The reference for nodc has an out-of-date table. I think the authors have used the most recent update for the Cheng correction, but these tables do not contain that update. Perhaps the authors can ask Cheng to provide a link to the latest tables. Also, the second link to iap data is to the global ocean dataset, not the XBT correction tables.

Many thanks for your suggestion. The manuscript has been improved with the correct (direct) links as follows: “A full description of the methodology is available at https://www.ncei.noaa.gov/products/xbt-corrections (see CH Correction Method); the update tables of applied coefficients are available at http://www.ocean.iap.ac.cn/ftp/images_files/CH14_description/CH14_table1_update2023.txt and http://www.ocean.iap.ac.cn/ftp/images_files/CH14_description/CH14_table2_update2023.txt”.

Line 302. What is 'SBdy'?

Modified to “Southern boundary of the ACC”

Line 319. Grammar: please check the sentence as it could be improved to make clearer the author's meaning.

Sentence modified as follows: "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)."

Section 2. I think you need a subsection here describing how you created the section plots. What algorithms did you use to make these? Are the section data available for the user to download? Can you include the code in a python notebook or similar so the user can create them?

Thank you for your comment. The format and labels of the presented XBT dataset are specifically designed to ensure compliance with Ocean Data View (ODV), enabling seamless upload and ease of use.

The interpolated section data are not available for direct download. However, to enhance reproducibility, additional details about the parameters used to create the ODV interpolated temperature section have been included in the manuscript. Finally, based on your helpful suggestion

and provided code, we have also added a Python script for basic data visualization (i.e., latitudinal temperature section and vertical temperature profiles).

Data comments:

I am unable to download the data via https, but was able to access files via ftp (although this is a bit slow). There is some difficulty accessing the servers at NCEI. Can you provide an alternative route to the data? Perhaps a Zenodo link or another DOI to the full dataset (one link) would be useful in addition to the individual NCEI links.

Data are now fully restored at NCEI repository. Additional efforts to ensure continuous availability are under way at NCEI after their servers have been severely impacted by Hurricane Helene in September 2024. Moreover, an improved version (3.0) of the XBT dataset will be soon available, including corrected products, detailed information about the applied FRE coefficients and additional metadata (following EMODnet guidelines).

I reviewed the xbt_araon_XXXIV_all_qc.txt file.

1. Fall Rate Coefficients listed in the file (manufacturer T7 coefficients) do not match the ones in the paper (Hanawa 1995 coefficients). Please check which coefficients were used as this will make a difference to the Cheng 2014 corrections applied.

The Fall Rate Equation coefficients used for temperature and depth bias correction (i.e., Hanawa et al., 1995 coefficients) are now reported in each XBT file, as suggested by Cheng et al. (2014). However, the coefficients provided by the manufacturer are also provided in the metadata, allowing anyone who wishes to recalculate the corrections in a different way than using Cheng et al. (2014).

Actually, all the XBT files include:

a- the time elapsed since the probe's release;

b- the depth derived from the elapsed time using the Manufacturer Fall Rate Equation Coefficients;

c- the depth derived from the elapsed time using the Hanawa et al. (1995) Fall Rate Equation Coefficients;

d- the depth corrected applying Cheng et al. (2014) to "c", using Hanawa et al. (1995) Fall Rate Equation Coefficients;

e- the temperature measured by the probe;

f- the temperature corrected following Cheng et al. (2014) with Hanawa et al. (1995) coefficients

2. Label 'Bot. Depth [m]' is not the bottom depth, but the XBT maximum depth reached.

Label 'Bot. Depth [m]' (ODV compliant label) is now described in the XBT file as "Maximum reached depth of the XBT probe".

3. I loaded up the data and plotted it using Python and found the quality flags are well applied, however there are some bad data remaining (hit bottoms and some leakage) in a few of the profiles. Generally, the QC looks acceptable for the one file I reviewed.

Additional visual check was provided for identifying remaining bad data.

4. It would be very helpful and enhance the paper if you could provide some code to read and plot the data for the users. A python notebook would be very helpful. Below is the basic code I used to load and look at the data. You could expand on this.

Many thanks for your basic code. We expanded on that one to provide a Python code for a basic visualization of the data, including a latitudinal temperature section and a scatter plot showing the vertical temperature profiles.