

Anonymous Referee #1

AR_1

I. 97 13% of the total dataset (I assume total refers to the 1981-2024, but as phrased the 13% is only for the data before 1993; whereas Fig. 3 suggests that it is the total number of ME data, that were collected in 1984-2000). Why separate this from the later period 1993-2010 (line 98, for which the 40% cited is only relative to the 1993-2010 data collection period). It would likely be wise to unify the way to report the data for each CTD type and period. Personally, I would cite ME CTD use for the total period 1984 to 2010.

Revised and corrected

AR_2

On Fig. 4: I assume that the two profiles shown on each plot are for the up and down profiles respectively. They should be shown with different line sets (for example full and hyphenated), as well as different colors for T and S. Actually, this raises the question on whether the profiles stored are only the downward profiles, or are both the downward and upward profiles stored (and if so separately?)

Figure 2 was revised according to the suggestions. In BaRDO, descending CTD profiles are generally stored. However, in some cases, ascending profiles are also stored. Information indicating whether a profile corresponds to an ascent or a descent is stored in a specific field within the station table. The original data, which can be used for subsequent reprocessing (if required), remains stored in a file structure.

AR_3

I. 140, add a reference to the mismatches for SBE19 data (it has been described in different papers, as well as ways to minimize it through signal processing). If I understand correctly, here the choice is made to flag the data (through the spikes, gradient and density inversion QC1), and not try to minimize the effect.

During station processing, all possible efforts were made to correct or minimize the occurrence of spikes in the SBE19 data through signal processing using different parameter settings. Nevertheless, in several cases, spikes could not be entirely removed without modifying the original profile structure. Consequently, the affected levels were flagged (e.g., through spike, gradient, and density inversion tests) instead of editing the profiles by interpolation.

AR_4

I. 174: 'The structure of the database tables...'

Revised and corrected

AR_5

In Fig. 6, last line of stations. I believe what is meant is TempScaleID

The last line ("TempScaleID") was checked and found to be correctly displayed.

AR_6

I. 190-192: interestingly, non SBE instrument data are also processed with the standard Sea-Bird data processing. Is there some specific choices that had to be made, which are dependent on each instrument?

In most cases, standard routines such as filter, alignctd, and loopedit were applied using different parameter settings depending on the instrument and environmental conditions. For example, for the ME CTD, conductivity filters with time constants between 0.25 and 0.5 s and a pressure filter of 0.15 s were applied, together with alignctd values similar to those used for the SBE19 (e.g., -0.63 s). In the case of the NV CTD, larger values were used for the pressure filter, in many cases up to 1.0 s.

AR_7

Table 2 column 'calibration date'. I am not sure that I fully understand what is reported. For example, SBE19, 1268 reported 'Jan 1993-Dec 1997". Does it mean that there were two calibration dates in jan 1993 and dec 1997. (in that case, probably title of column should be 'Calibration dates'. For ME and NBIII/V, only year (or years) reported, not a month. Does it mean that there were no known months. Also, near the end, 6214/4687 or 6218/4684, no date (means that there was no calibration, even when the sensors were provided?)

Table 2 was completed and clarified accordingly. In particular, the column title was revised to "Calibration dates". For the ME and NBIII/V instruments, information regarding the calibration months is not available, and therefore only the corresponding years are reported.

AR_8

I. 207: How are 'outliers' identified here? (and are they or not included when calculating Q1 and Q3 quartiles?)

Outliers were identified using values lying more than $1.5 \times \text{IQR}$ from the first and third quartiles. Quartiles (Q1 and Q3) were calculated using the complete dataset, including the values identified as outliers.

AR_9

In 3.2.1: these comparison of pairs of sensors are interesting. It would be probably even more useful to know whether some (small) systematic differences could be identified, and whether they could have been corrected. For example, on Fig. 7, one

gets a sense (maybe wrong) that 4727 would tend to have positive T difference compared to other sensors. On the other hand, an information that is not provided in Fig. 7 and in the chapter, is how far in time were these comparisons of sensors done relative to when calibration is provided (of course, one can imagine that it is highly variable, but maybe it would be valuable to select in the comparisons only pairs of sensors that have not been recently been calibrated).

We agree that this is a very interesting and valuable point. However, a detailed assessment of possible systematic biases between individual sensors, including their relationship with calibration timing and potential corrections, is beyond the scope of the present dataset description paper.

AR_10

3.3 I am not 100% sure that the notion of spike is clearly defined. How does one define a spike (isolated data point relative to the average of what is below or above? Or a certain thickness...). I am aware that it is in the V1.5 version of the software used, but more explanations are needed. Otherwise, one does not understand which flag is activated, and why. Also, Figure 10 shows a huge number of flags in Temp in the spring-summer season (in particular November). What is it about? Seeing after on Figure 11, where flagged temperature points happen, I am tempted to say that I don't think that in most cases there is something 'wrong' that would need to be flagged in this season. In the example plotted it seems to be temperature inversions or spikes in the thermocline, which can happen for a whole host of natural reasons. On the other hand, if not present in SBE9plus (or on XBT profiles in the same region), this raises a question on the quality of the SBE19 profiles (maybe the pressure-dependent averaging, or temperature-lag corrections?). I also wondered whether the difference in flagged levels mentioned between SBE19 and SBE9plus is for "≠Total". It would be more instructive to have it reported separately for Temp and Sal data.

Regarding the first point, the software documentation effectively defines a spike as:

$$|V_2 - (V_3 + V_1)/2| - |V_1 - V_3|/2 > V_threshold$$

that is, based on the difference between a given value and the values immediately above and below it.

On the other hand, the high percentage of flagged temperature levels during spring may indeed be related, as suggested, to density inversions produced by thermocline spikes and, clearly, to the large proportion of stations acquired with the SBE19 CTDs. In these instruments, even after applying corrections with different lag values, spikes cannot always be completely removed. Therefore, following a conservative criterion, these levels were kept flagged instead of being modified or interpolated. Ultimately, it is up to the user to decide whether or not to include these flagged data in a specific analysis.

We apologize if this was not sufficiently clear in the manuscript. An additional bibliographic reference providing a detailed description of the applied QC procedures has been included in the revised version.

The flagged levels are already reported separately for temperature, salinity, and total flags. However, the analysis was not further discriminated according to CTD model (e.g., SBE19 and SBE9plus).

AR_11

I. 328: I am not sure that I understand the last part of the sentence.

“On the other hand, during cold months (June to October), when the vertical stratification substantially decreases, the percentage of levels marked is less than the total % of levels for each month.”

The sentence was revised and rewritten for clarity.

AR_12

Fig. 10: labels missing on vertical scale (possibly, 1 2, 3,...%), and is the scale the same for Sal and Temp marks?. What is meant by the black dots ‘Total’ that are sometimes less than the sum of Sal and Temp Marks (such as in Nov to May)

The missing labels on the vertical scale were added. The text and figure caption were revised to clarify. In Figure 10, the black dots (“Total”) represent the percentage of sampled levels for each month relative to the complete dataset, and not the total number of flagged levels.

AR_13

Table 4 : What is meant by Gradient in threshold (it should be in /bar or /dbar or /m?).

Gradient thresholds expressed in units per dbar. The sentence was rewritten.

Dr. Alexey Mishonov,

We appreciate your positive feedback on the BaRDO database and its value as a regional contribution. We are particularly grateful for your appreciation of the considerable effort made by the INIDEP team in compiling, organizing, and documenting the information contained in this database.

AM_1

We are grateful for highlighting the presence of Argentine oceanographic data from BaRDO in the World Ocean Database (WOD).

Indeed, INIDEP bottle and CTD data collected before 1999 were incorporated into the WOD under catalogue accession numbers 0089784, 0020559, 0115150, and 0143331.

Following your suggestion, we have added a clarification in the manuscript indicating that part of the BaRDO holdings has been contributed to the WOD, and we have included the corresponding reference.

It should be noted that this contribution corresponds only to a subset of the BaRDO database and does not represent the complete collection described in this manuscript.

We would like to clarify that the Argentine data contributed to the WOD originate from BaRDO and correspond to the same quality-controlled records presented in this publication. Therefore, for the subset of data transferred to the WOD, both databases contain the same underlying information.

AM_2

Fig.1: Please add explanation for 'ZCP' abbreviation found in line 27 to the Fig.1 capture

Revised and corrected

AM_3

Fig.2: Please use English for the axis's titles (e.g., Station Counts and Year).

Revised and corrected

AM_4

Fig.5: The comparison with very old climatology (WOA01) is mentioned here. I would recommend to use WOA23 (refs below) for QC2 Climatology checks.

We thank the reviewer for this suggestion. The QC2 climatological checks described in the manuscript correspond to the procedures originally applied during the quality-control process of the dataset, which relied on the climatological reference available at that time. To ensure consistency throughout the entire dataset, the same quality-control criteria and reference climatology were applied to all observations included in this version of the database.

We agree that the use of a more recent climatology, such as WOA23, would be beneficial. In fact, we are currently working on a new version of the dataset in which not only a more up-to-date climatological reference is being implemented, but the thresholds used in the different profile quality-control tests are also being revised and adjusted based on the experience gained from previous dataset releases.

Since the objective of this manuscript is to document the procedures applied to the dataset version described herein, the original QC methodology has been retained in the manuscript.

AM_5

Table 2: I believe the very right empty column in this table could be removed

This error had already been identified during the revision process and has been corrected in a newer version of the manuscript prepared in response to comments from another reviewer. The corrected table will be included in the revised manuscript submitted to the journal.

AM_6

Table 3: Since used QCF are recommended by the international body (GTSP/IODE) and not invented by authors, the reference should be added to reflect the source of this QCF scheme.

This reference has already been completed into a revised version of the manuscript prepared in response to comments from another reviewer and will be included in the next submitted version.

AM_7

Table 4: Please use standard notation for Density, e.g., 'kg m⁻³'

Revised and corrected

AM_8

Fig.9: Please add a title for 3rd pie-chart – it's unclear what it represents – total? Or something else?

We thank you for this observation. The third pie chart has been labeled as "**Total**", and the corresponding text has been updated accordingly to clarify that it represents the entire dataset.

AM_9

Fig. 10: Marking needs to be added for 'levels [%]' axis – is it not clear what is %% of sampled data is flagged: 1, 2, 3%... or 10, 20, 30% or else?

The figure has already been revised during the review process, and the axis markings have been added in the updated version.

AM_10

Fig. 11: It would be more understandable if TS profiles will be shown as a line-with-dots not just dots.

We thank you for this suggestion. To improve the readability of the TS profiles, **a thin line connecting the data points has been added to Figure 11.**

AM_11

Lines 338-349: comparison with more up-to-date climatology (e.g., WOA23 instead of Levitus 2005 – see refs below) could be more appropriate and interesting since lots of data have been added after WOA05.

As explained in our response to the previous comment on QC2 climatological checks, the methodology described in the manuscript reflects the procedures originally applied to this dataset version and was kept unchanged to ensure consistency across the entire data collection. We agree that the use of WOA23 would be more appropriate for future releases, particularly given the significant increase in available observations since WOA05.

AM_12

Finally, we thank you for your careful review of the references and for pointing out these citation inconsistencies. **The references have been revised and corrected in the manuscript.**