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Earth System Science Data Discussions

Interactive comment on "CARINA TCO_2 data in the Atlantic Ocean" *by* D. Pierrot et al.

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Please find our response to the reviewers' comments below. We want to thank them for their thorough review and their constructive comments, which helped us improve this manuscript and make it clearer for the readers.

General Comments:

The major concern of the reviewer relates to the overall design of this special volume. The CARINA work is such a large effort that publishing everything in one article would be impossible, thus the special issue. It was a consensus decision by the ESSD editors to produce a series of papers on the CARINA quality control efforts discussing each relevant parameter as a stand-alone unit but not repeating details of procedures in each manuscript that are detailed in the overview papers of Key et al., and Tanhua et al. Moreover, the format of each paper is similar. It is felt that this approach provides

the reader both the opportunity to focus on a particular parameter in each manuscript as well as scan through the whole volume with relative ease, if desired. This is why both the introduction and the methods sections are very similar to other papers in the special issue. All the details pertaining to the quality control performed on the data and the inversion methods employed are given in the two overview articles, We believe that this is a sound approach for this volume and therefore do not believe that re-writing the manuscript as a completely independent work is warranted. We agree that the article was a bit confusing at times and we have clarified the text according to the comments of both reviewers. We have also corrected the discrepancies between the text and Table 1.

Regarding the specific comments:

1. see above

2. For the sake of consistency with the other manuscripts in the special issue and the information in the data repository, we wish to retain the "Arctic Mediterranean Seas" denomination. The text has been changed accordingly. See also Key et al. 2010 for some discussion on the terminology.

3. Done.

4. Text has been added

5. We meant that the overall accuracy of the method was limited by the accuracy of the sample volume delivered. We have clarified the text.

6. Done

7. The time component was taken into account in the inversion of the crossover results; a long time between cruise resulted in lower significance for this crossover in the inversion, see Tanhua et al. 2010a. See also response to comment 10 below.

8. Done

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9. Done

10. In order to compare two data sets measured at different points in time, one needs to assume that the waters didn't change during the time separating the two collections. Deeper waters being less affected by variability in general, we felt that selecting depths below 1500m would make that assumption reasonable while still leaving enough data to do the comparisons. We were aware that this assumption is not entirely valid, especially over the time span covered by CARINA and is one of the reasons why we remained conservative in the determination of adjustments.

11. 222km represents 2 degrees of latitude. We added this to the text. This value was adjusted when needed, depending on the region considered.

12. As mentioned in the introduction, there were several parameters considered (TCO2, TALK, pH, O2, Nutrients, CFCs). However, the reviewer is correct that this manuscript only reports on the TCO2 adjustments. The text has been modified.

13. There are 2 different databases: the one used to determine crossovers/offsets and the final product (the adjusted data). The reference cruises are present in the first one but NOT in the second. They were not adjusted but simply present to assure consistency with GLODAP.

14. Done

15. Changed

16. Done

17. The manuscript has been checked for inconsistencies and modified accordingly.

18. The numbers have been corrected. We have changed "-888" to "NC" for "Not Considered" (too few deep water samples to do a meaningful 2nd QC), and -999 to "NA" for Not Available,

19. Done

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20. Corrected

21. Done

22. Corrected

23. We meant “only”. Text has been changed.

24. Done

25. Caption has been changed. See new captions below.

26. Done. See new captions below.

27. Done. See new captions below.

28. It is the order number of the cruises after they are sorted by offset in ascending order. The caption has been modified. See below.

Here are the new proposed captions:

Figure 1. Plot of all the hydrographic stations in CARINA-Atlantic data set (CARINA-ATL). Only about half the stations (stations “with TCO2”) reported TCO2 values (measured or calculated).

Figure 2. Geographical TCO2 data distribution in the CARINA Atlantic data set. Each square is a 5ox5o bin and its color represents the number of TCO2 measurements made in that bin. Bins with no TCO2 measurements are blanked.

Figure 3. Temporal TCO2 data distribution (measured in blue and calculated in red) in the CARINA Atlantic data set.

Figure 4. Adjustment values (dots) and their respective standard deviation (vertical bars) obtained from the two inversion methods used as a function of cruise number (See Table 1). Black dots were obtained with the WLSQ method; red dots were obtained with the WDLSQ method. An explanation of the difference between the two methods is provided in the text.

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Figure 5. Plot of the offsets in TCO2 for all cross-overs before adjustments (black symbols) in ascending order (Number) from left to right. The red symbols are the offsets after adjustments were made.

Interactive comment on Earth Syst. Sci. Data Discuss., 3, 1, 2010.