

## ***Interactive comment on “CARINA TCO<sub>2</sub> data in the Atlantic Ocean” by D. Pierrot et al.***

### **Anonymous Referee #2**

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#### General Comments:

This article needs major revision (or even resubmission after reorganizing). I understand that the authors paid good effort to provide new TCO<sub>2</sub> data set with better self-consistency and accuracy by a combination of several analyses. However, I am really not sure if this manuscript is worth publishing as an independent article because it seems that many parts of it are duplicated with Key et al. (2009) and Tanhua et al. (2009). I wonder where the scientific/technical originality (or improvements from the latter) of this article is. In addition, some parts of the text seem to be poorly organized and even erroneous or at least inconsistent with the table, which made the authors' context more unclear. The examples given in the figures are not helpful for understanding the authors' points. I think the authors should consider resubmission after major rewriting with better clarification of their aim and points to be published. Also, more detail of the inversion and crossover analyses, hopefully with better illustrations

C4

of the results, is highly desired.

#### Specific Comments:

1. P3-4. Omit the general introduction about the CARINA project because that was already given elsewhere. The authors should prepare better-focused, clearer introduction to their own topic.
2. P4, L5: I recommend using “Arctic Ocean” instead of “Arctic Mediterranean Seas” according to the IHO's recommendation. The authors also use the former in some parts of the article.
3. P5, L5: Spell out GLODAP here. (i.e. not in LL22-23 of P8)
4. P6, LL10-11: Give more explanation why it is precise but inaccurate.
5. P6, LL13-14. I do not understand the sentence starting with “This approach”. What do the authors mean by “by which .. could be dispensed.”? Also, omit “Adaptions of”.
6. P6, L15. A period (“.”) should be added at the end of the sentence.
7. P7, L25: Why only “in space”? Give reasonable explanation for neglecting time difference.
8. P7, L28: Insert “respectively” between “would” and “be”. The original text can read that one constant offset was assumed for all cruises.
9. P8, L1: for instance depth, -> depth, for instance,
10. P8, L3: Why below 1500m?
11. P8, L7: Why 222km?
12. P8, L9: I do not understand “each parameter” because I think that the authors analysed only TCO<sub>2</sub>. Am I wrong?
13. P8. L24: were -> had originally been?

C5

14. P9, L2: Insert a comma after “cruises”. I think the punctuation manner should be improved in some other parts, too.
15. P9, L4: data sets -> cruises?
16. P9, L11: Insert “was” before “listed”.
17. P9, LL22-24 (see also Table 1 and its caption): The authors should fully review the manuscript (not only in this part) to assure consistency between the text and Table 1. Which columns are “adjustment” and which are “standard deviations”? The term “adjustment” is unclearly used and sometimes even confused with “adjustment flag”.
18. P10, LL6-11: Are the authors sure with the numbers of the cruises in each category?: namely, 20, 16, 44, and 17. At least the latter three numbers seem to be inconsistent with Table 1. Also, I think “-999” and “-888” are just special numbers, with no numerical significance, to call readers’ attention. They should not be “adjustment values”.
19. P11, L20: was (the first one) -> were?
20. P13, L13: Is the unit of the second number correct?
21. P13, L17: Spell out OACES.
22. P14: adj(.)-> adjustment? (in three sentences) Also, “Was” in L4 should be “was”. A period should be added at the end of L13.
23. P14, L16: What do the authors mean by “just”?
24. Table 1: As aforementioned, the content should be reexamined and the caption should be improved. Do not use “centered alignment” for the numerical columns. Give units of the numbers, in the caption.
25. Figure 1: Explain the symbols in the caption. “With TCO2” -> “With measured TCO2”?

C6

26. Figure 3. Explain the lines in the caption.
27. Figure 4: Explain the colors in the caption.
28. Figure 5: What is “number” on the horizontal axis?

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C7