

Interactive comment on “Nordic Seas total alkalinity data in CARINA” by A. Olsen

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Reply to Dr. Chierici's comments on “Nordic Seas total alkalinity data in CARINA” by A. Olsen.

I would first of all like to thank Dr. Chierici for taking time to carefully read the manuscript and for providing comments. This furnishes me with an excellent opportunity to improve the manuscript.

In the following I will go through the Dr. Chierici comments one – by –one. The comments are given in italics and my response in regular font. Each comment has been numbered by myself

Specific comments:

1. *Abstract Row 1: Specify more what Carbon means here. Is CARINA database in-*

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cluding all carbon parameters isn't it mainly dissolved inorganic carbon compounds and not organic carbon? That should be made clear.

To specify I will replace “water column data of carbon and carbon relevant . . .” with “water column data of inorganic carbon and carbon relevant . . .”

2. It is confusing to include the Southern Ocean and the AMS data in the abstract when they are not presented in this particular paper. Refer to these other studies in introduction.

I will include specific references to the papers dealing with the quality check in the SO region, the Atlantic region and the Arctic Ocean (Not the AMS, the Nordic Seas is part of the AMS – along with the Arctic Ocean, as has been also specified in the revised abstract) in the introduction as requested.

3. Row 15: Was SO data quality check also controlled separate from the others? Data coverage and Parameters

The abstract of the papers included in the CARINA special issue provides a general introduction to CARINA, in addition to the summary of the specific findings reported in the papers. This is why the Southern Ocean, for instance, is mentioned. To follow up on Dr. Chierici's comment I will edit the abstract and include the following (to be inserted after “control” at line 8 page 310:

The quality control was carried out separately in each of the three CARINA regions: the Arctic Mediterranean Seas (AMS), the Atlantic (ATL) and the Southern Ocean (SO). The AMS was further split up into the Arctic Ocean and Nordic Seas during the QC. The quality control of the different parameters in the different regions is described in the series of papers in this special issue of ESSD, with this contribution focusing on the Nordic Seas alkalinity data.

I do not understand what is meant with “Data coverage and Parameters” here.

4. Table 1: Cruises 117 and 119 states that no CRM was used to correct ALK. This

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is not true. CRM correction was performed 19970623 when CRM value was available for that batch (23). This was performed also for DIC see reference Chierici, M., Drange, H., Anderson, L.G., Johannessen, T, 1999. Inorganic carbon fluxes through the boundaries of the Greenland Sea based on in situ observations and water transport estimates, *Journal of Marine Systems* 22, 295-309,

I would like to thank Dr. Chierici for making me aware of this. To follow up on this comment I obtained a data file, which included the results of the analyses of CRM (L. Anderson and M. Chierici, personal communication). These data confirmed that the version of the data included in CARINA had not been corrected for offsets determined through analyses of CRM. They moreover indicated a mean offset of $-11.5 \pm 4.2 \mu\text{mol kg}^{-1}$ over the whole cruise, not significantly different from the $-15.5 \mu\text{mol kg}^{-1}$ determined from my analyses. In the manuscript I will add the following to section 4.2: “After the secondary QC had been completed a data file which included the results of the analyses of CRM was obtained (L. Anderson and M. Chierici, personal communication). These indicated a mean offset of $-11.5 \pm 4.2 \mu\text{mol kg}^{-1}$ over the whole cruise, not significantly different from the $-15.5 \mu\text{mol kg}^{-1}$ determined from my analyses. “

Regarding cruise no 119, these had already been discarded because of poor precision, and the CRM issue has not been further pursued.

5. *Page 314 Chapter 3.1. There have been published papers on metadata, and accuracy and precision studies have been described in the ESOP 1994 and 1995 cruises named in Table 1. Miller et al., 1999 DSRII should be referenced since they have made a first interannual variability check for the GSDW. Also verifies that the AT data for 117 and 119 was CRM corrected.*

In the CARINA project we have decided to collect all cruise specific references in the cruise summary table available at http://cdiac.ornl.gov/oceans/CARINA/Carina_table.html. This is because this table can be updated if missing references are found, and because it should be the

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central data and metadata repository. It quickly becomes overwhelming to include all of these references in the individual CARINA papers as well. I therefore encourage Dr. Chierici (and everybody else) to go through the Cruise Summary Table at CDIAC and report any missing references so that they can be included here.

6. 3.2.1. *Redundant repetition of the reference Tanhua et al., 2009b. Explain the source and use of the method and reference clearly but do not overdue it. Perhaps use a table summarizing the important feature, application, use and source of each method and assign abbreviations that is then used in the text.*

In response to the comments 9-12 of reviewer 1, I have completely revised this section to provide further details on the crossover an inversion approach. Please see reply to these comments of reviewer 1 for the revised text. This information is not suitable for a table.

7. 4.2. *The reason for the 19940224 data needed correction of 15 was likely due to Carinadatabase has for some reason not used the CRM corrected data set in the database. I am not sure how to address this, a note?*

Please see reply to comment 4.

Add reference: Miller, L.A., Chierici, M., Johannessen, T., Noji, T.T., Rey, F., Skjelvann, I, Seasonal dissolved inorganic carbon in the Greenland Sea and implications for atmospheric CO₂ exchange, DSR II, 46, 1473-1496, 1999.

Please see reply to comment 5.

Interactive comment on Earth Syst. Sci. Data Discuss., 2, 309, 2009.

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