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Earth System Science Data Discussions

Interactive comment on "Nordic Seas dissolved oxygen data in CARINA" *by* E. Falck and A. Olsen

Anonymous Referee #1

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The present manuscript deals with presenting results from a quality control (QC) applied to oxygen data from the Nordic Seas. It is one of a series of papers related to the CARINA project aiming at setting up a database of carbon and carbon-relevant data for the Arctic, Atlantic, and Southern Ocean. This is an important effort to make oceanic storage of carbon, its variability, and associated uncertainties assessable. Therefore, I strongly recommend to publish the results, but in the present form, this manuscript needs to be revised. About three fourths of the abstract contain statements related to the CARINA project in general. Only the part starting in line 16 (p. 538) is directly related to the manuscript. Nothing is said about applied methods or the fact that some cruises/time series stations could not be evaluated. Out of 35 cruises available for the Nordic Seas region 32 cruises delivered oxygen data. Out of this number 26 could be quality-controlled and of these cruises 4 had to be adjusted. I fully accept that this paper is one of a series of CARINA papers, and this may lead to repetitions, but page

540 and large fractions of page 541 are almost fully identical to contents presented in other CARINA papers. And these particular contents rather refer to CARINA in general than to the oxygen QC of the Nordic Seas data. In contrast, when it comes to describing the QC methods applied to the oxygen data, the authors rely too much on the fact that potential readers know the content of the cited methodological papers. As is mentioned in the 'Introduction' section, the QC itself consists of a primary and a secondary QC. Though the manuscript deals with the secondary QC it would be of interest to learn as well about the primary QC and the respective outcome, and I suggest to provide a few more details. The secondary QC, which is the focus of this manuscript, was applied by evaluating results derived from a crossover and inversion analysis. At present it is hardly possible for the reader to understand these methods and rationales behind without going back to the original papers. Though I understand that there is a particular paper dealing with quality control methods applied to CARINA data, I would expect a small summary of the methods with particular emphasis on the oxygen analysis for the Nordic Seas. For example, Tanhua et al. (2009) note that the crossover analysis was carried out either on pressure, temperature or density surfaces. It is unclear what has been done in the present manuscript, since any details are completely missing. Section 2 is entitled "Data provenance and structure", but this title is a bit misleading, since no information is provided concerning the real data provenance. From the title one would also expect to get information about data origin. It should be noted that number in brackets inserted after the expocode denote CARINA cruise numbers. Please, provide more information on how those cruises were handled that had CTDOXY data only. Which cruises were affected, and what is the effect on the QC results? Concerning the results presented in figure 2, it is unclear to me, why on the one hand side stations have been excluded from the analysis because they were located inside an eddy (cruise 128), but the single anomalous station of cruise 129 (flagged 3 by the data originator) was included. Please explain the rationale behind. It would be helpful to have some more details about, how the uncertainties were derived. Figure 3 is nice in principal, but actually does not add much information that is used in the text.

It is only mentioned twice (page 544, lines 6 and 11), and in the respective context the focus is on the location of a few particular cruise rather than on the respective data range shown in Figure 3.

Specific comments

p. 541, line 11: reference 'Olafsson and Olsen (2009) is missing

p. 542, line 16: please, define 'vicinity'

p. 542, line 23: please, be more precise on 'special region'

p. 543, lines 1-4: Please, provide details. What period is considered when talking about a decreasing oxygen trend in the deep Greenland Sea, as was reported by Blindheim and Rey (2004)?

p. 543, lines 17-18: earlier on this pages rationales are given why CARINA cruises 129, 130, 135, 91, 116 should be considered in more details. This is not the case for the cruises 176, 120,121, 122. It may be a matter of properly structuring the contents of page 543.

p. 544, line 20: please, be more precise on 'seems OK' and 'if not a bit high', what is the criterion for this decision?

References section: please, list references in alphabetical order. Reference 'Jeansson et al. (2009) is listed twice. Reference 'Olafsson and Olsen (2009)' is missing.

Figure 1: It would be helpful if data from those positions that could not be evaluated, are highlighted in a different color. Also adding bathymetric lines would be of interest, since it is easier to distinguish between the shelf regions, the ridges, and the deep basins. Please, also indicate which stations are excluded from QC due to shallow water depth? The data distribution shown in Figure is obviously the full data set, but according to the text only stations having data at levels deeper than 1900m were considered in the crossover and inversion analysis. This should be displayed separately in the figure.

Figure 2: Dashes are missing in the labels of cruises 134, 136, 176. Therefore, CARINA IDs and expocodes are mixed in these cases.

Table 1+2: Please, use only two digits in your 'recommendations', 'adjustments' and 'covariance' values. Footnote of Table 1: use capital letters for 'Carina'

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