

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

Anonymous Referee #2

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Review of "Nordic Seas dissolve oxygen data in CARINA" by E. Falck and A. Olsen

This paper presents oxygen data for the Nordic Seas from the CARINA data set with crossover analysis. I think the work is valid and original. I question why the Nordic Seas oxygen data needs a separate paper, both from the Arctic oxygen data and from the Nordic Seas salinity and other measured variables. However, the work is solid and I would recommend publication with some changes, enumerated below.

- It should be made clear why a separate paper is needed for Nordic Sea oxygen. The vague statement that there are different data distributions and basins are more or less separate in the Arctic is not enough. Conditions within the Nordic Seas themselves can be different as the ridge cruises attest. It is not so much the measured values that are important in crossover analysis, but the differences between measurements of values of ocean parameters at depths where they are deemed to be more or less constant.

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Temperature and salinity changes in the Nordic Seas could and should be a valuable tool in assessing the differences between cruises in the oxygen data. The authors do use the salinity data to confirm their views on the oxygen data for one cruise. Why are the temp, sal, and o₂ not analyzed and presented together for the Nordic Seas?

- It is not acceptable to state as the authors do that it is almost certain that some CTD oxygen data were reported as Winkler titrated oxygen values. The difference between the two can be large, especially if the CTD oxygen sensor is not carefully calibrated. There are not that many cruises in the Nordic Seas CARINA data set. Many of them are by one or the other of the authors of this paper. Many of the rest are by Francisco Rey. In the text the authors note that they have communicated with F. Rey so information is being exchanged. Effort should be made to ensure that all the oxygen data are of known method.

- It is not clear from the method or recommendations why the given cruises were singled out to be considered further. It appears that some other cruises have a larger or similar adjustment. Why single out the given cruises? It would also be helpful if Figure 2 had some marking for the cruises that are mentioned for further consideration (maybe darken the grid lines for these cruises).

- Accepting the authors cruise analysis, the data can be made consistent within the Nordic Seas. The authors mention that 5 of the given cruises extend into the Atlantic Ocean. Does crossover analysis with Atlantic Ocean cruises confirm the results given for the Nordic Seas? If they do not, can the full CARINA oxygen dataset be called internally consistent?

- Please discuss the magnitude of the correction with regards to the error of measurement for the Winkler method. Is the correction larger than the error of measurement, and if not, why apply the corrections? It would be helpful to have the corrected and uncorrected data in different colors on figure 3.

- From the text, page 544, lines 20-21, the authors appear to attribute cruise 128 to

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Norway/UoB, but Table 1 assigns this cruise to Norway/IMR. If the cruise is from Norway/IMR does it still have equipment problems? Please elaborate on the equipment problems. Old equipment does not necessarily give bad results. For which cruises was the bad equipment employed? When was it replaced? Assuming the same equipment was used on earlier cruises, what can be said about the quality of the earlier cruise data?

- There should be some indication in the merged CARINA data files of which cruises have been corrected and by how much. Is there such indication?

- The crossover results in figure 2 show 2 periods in the data, the pre-1995 data which has no clear pattern and the 1995-2003 data which show a consistent crossover correction above 1.0 with 4 anomalously < 1.0 correction cruises. The consistency of the data 1995 - 2003 allow for crossover corrections. The inconsistency of the data pre-1995 do not allow for correction, since there is no a priori set of correct cruises. Can the Nordic Seas CARINA data be called internally consistent if some are corrected and others quality cannot be judged? Can the crossover analysis even be valid if the baseline (depths > 1900 meters) is changing?

Interactive comment on Earth Syst. Sci. Data Discuss., 2, 537, 2009.