**Earth System
Science Data
Discussions**

Interactive comment on "Arctic Ocean data in CARINA" *by* S. Jutterström et al.

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The data synthesis presented in this manuscript is going to be very useful, particularly as the Arctic Ocean is becoming more accessible to researchers and more data will finally be collected. The synthesis is particularly timely as many data from IPY are now being worked up and published.

However, there are a lot of errors in the paper, and the statistical analysis used to check for offsets between the cruises is very unclear. My expertise in statistics is not sufficient to properly evaluate the validity of the MLR approach to this problem or whether it has been appropriately applied, and at least one other reviewer who is able to do that is required. On the other hand, I am very familiar with a couple of the data sets used in the synthesis, and the paper contains a number of rather significant errors (on the level of where the cruise went). This is not a good sign for the accuracy of the information

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presented about the cruises with which I am not familiar, and the authors need to take much more care in making sure that the details are accurate. The requirement for accuracy is very high for a paper like this, because it will become a fundamental reference, and many people will not dig further to the primary references and data documentation to confirm the information.

Specific comments follow.

The individual data sets used need to be referenced properly in the reference list, giving credit to the teams of scientists who collected them. The header information on the CDIAC web site for each data set gives the appropriate citation for each data set and those citations should be used in the reference list.

Data coverage and parameter measured:

– The website link for the data isn't working. However, it was not hard to track down the data elsewhere on the CDIAC website, so I suggest simply pointing people to CDIAC and not trying to be more specific.

– Shouldn't the parameters be included here?

– The longitude range is ambiguous, because 180 E and 180 W are the same longitude, implying that there is not actually any coverage. Something like "0-360 E" would be more appropriate.

Tables:

– Errors in Tables 1-3 indicate that all the information still needs to be confirmed. The information with CDIAC appears to be more complete and accurate. It should at least be possible to fill in the missing information for cruises in which the coauthors of this paper were involved. Other specific examples of which I am aware are given below.

– The institute abbreviations need to be defined.

– It would be helpful to carry the cruise numbers from Table 1 over to Tables 2 and 3.

Table 1:

– Cruise 18RD19990827 was also the in North Water Polynya, not the Arctic Ocean.

– Cruise 18RD19990827, which is listed in Table 1 and on Figure 3 as having been included in the secondary quality control has no samples from deeper than 2500 m. There is one set of samples (1 TCO2 and 1 A_T) from 2319 m, but all the rest are shallower than that. That cruise is also not discussed in section 3. Other cruises listed in Table 1 as having undergone secondary quality control but that don't appear in Table 4 or in the discussion are: 18RD19990827, 18SN1997-831, 32H120040910, 32PZ20020715, 320620030705, 77DN20010717, and 90AQ19940706.

Table 2:

– It is not clear how the country and institute have been assigned to the specific parameters for collaborative projects (and that should be explained somewhere in the captions or footnotes). With regards to 18RD19980404, IOS was not involved in the field work or the analyses, but I did take responsibility for pulling the data together, merging them with the 1999 data set (18RD19990827), and conducting quality control on them. All of the data were initially archived at IOS. However, Doug Wallace was responsible for the inorganic carbon program on the 1998 expedition, and he was at Brookhaven National Laboratory, in the US, at the time.

– The institute with which Peter Jones and Kumiko Azetsu-Scott are affiliated in Canada is the Bedford Institute of Oceanography, not 'SIO' (which is generally taken to represent Scripps Institution of Oceanography).

– Cruise 06AQ19930806 is listed here as having no TCO_2 data and in Table 4 as having no oxygen data, neither of which is accurate.

Table 3 – The nutrient data for both 18RD19980404 and 18RD19990827 were collected by Jean-Éric Tremblay (note the spelling of his initials) at McGill University in Canada, while the Oxygen data were by Kirk Cochran at SUNY Stony Brook, in the US.

Table 4 – All of the uncertainties should have the same the number of significant figure. As the table is now, the uncertainties for inorganic carbon, oxygen, and salinity have 2 significant figures, while those for the nutrients have only 1. The uncertainties also need to be defined in the table caption.

Page 284, Line 2 – There is no reason for the "c" in the Tanhua et al. (2009) reference.

Pages 284-5:

– The notation on the α-coefficients in the MLR equations implies that they're all the same (i.e. that α_1 has the same value in all 9 equations). The optimum values for each coefficient in each basin should also be given. Any dramatic offset in those coefficients from what would be expected biogeochemically would also provide an additional check on the validity of using the MLR method in this way.

– The description of the MLR approach to identifying offsets between the cruises is too cryptic. While reading the rest of the paper, I eventually decided that MLR equations were fit for all the cruises in each basin and then values were calculated from those MLR equations for each data point in each cruise and compared to the measured values to identify any offsets. If that is true, it needs to be clarified better, and if it is not true, it definitely needs to be clarified.

– I am also uncomfortable with the fact that the predicting parameters in the equations are not necessarily independent. The equations used may give a better fit, but does that really mean that they are the best equations to use for identifying outlying cruises?

Figures 4-11:

– The equations above the figures need to be defined better. While the functions are presumably those given on pages 284-5, it is not clear what the two numbers are.

– Define the percentiles represented and the red crosses.

Page 286, line 20 – The primary author(s) of the North Atlantic paper should be iden-

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tified here, even though the manuscript is still only in preparation, to help readers find that paper when it is eventually published.

Section 3.2 – The text, as well as the equations above Figures 7 and 8, imply that alkalinity was fit using only salinity, but section 2 says that potential temperature, silicate, and either nitrate or phosphate were also used.

Page 287, line 20 – "...suggest **an offset** for..."

Section 3.5.4, 2nd paragraph – The equation and plot for NO_3 from 06AQ19930806 without AOU should be shown to strengthen the case for an adjustment. Alternatively, plot cruise 06AQ19930806 in Figure 11 after correcting the oxygen data as recommended in section 3.4.3, which should then show the nitrate offset, if both adjustments really are appropriate.

Page 292, line 8 – "...concentrations for 06AQ19930806 **need** to be..."

Interactive comment on Earth Syst. Sci. Data Discuss., 2, 281, 2009.

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