

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

**D. Pierrot et al.**

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Please find our response to the reviewers' comments below. We want to thank them for their thorough review and their constructive comments, which helped us improve this manuscript and make it clearer for the readers.

1. We have modified the text
2. Since these details are actually given in Key et al, 2010, we refer the reader to the corresponding manuscript.
3. As stated in the text, the method we used of determining offsets by looking at crossovers does not allow us to determine if the offset has a trend with time or space. However, we believe, based on our experience with our own oceanographic datasets and analyses, that in the majority of cases, the offsets are caused by errors in cali-

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brations or systematic biases, which are not time dependent on the scale of a cruise. Drifts do sometimes occur but are generally less than biases and, unlike biases, they can be detected and corrected without the need for standards.

4. The peer reviewed reference is mentioned in the text (Johnson et al, 2001)
5. These criteria for the choices are outlined in another article of the CARINA special issue (see Tanhua et al., 2010a) .This paper has been referenced in our manuscript
6. The text has been changed
7. The text is changed
8. Here, we refer to a significance which has been determined empirically by the estimation of the uncertainty of the measurements and the methods we employed to determine the adjustments. Throughout the CARINA effort we were very cognizant of maintaining the integrity of the original analyses and felt that offsets of less than 4  $\mu\text{mol/kg}$  could be caused by, for instance, temporal changes. Applying an adjustment that is lower than our estimated uncertainty in the offsets was therefore not done.
9. The text has been clarified. The adjustment was not applied repeatedly but rather the inversion was performed a second time on the adjusted data to confirm that the adjustments actually produced a more consistent data set. This approach of looking at the residuals from the 2nd inversion identified some problems that were helpful in assessing the quality and offsets in cruises.
10. We are unclear by what the reviewer refers to as “General Method”. If it concerns the method of performing an inverse least-square routine on offsets determined at crossovers, it is previously referenced in the text (see Johnson et al. ,2001)
11. The reasons are presented in the individual descriptions for each cruise in section 4.7. The text has been changed.
12. From the different plots that we created (TCO<sub>2</sub> vs depth at each crossover, cor-

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rections vs crossover for each cruise, etc) and our oceanographic knowledge of the region where each cruise took place, we discussed amongst the CARINA participants whether the correction calculated by the inverse least-square method appeared reasonable. All the plots that we used in the decisions are available on line through the CDIAC website.

13. The paragraph has been re-written

14. Done

15. Value is added to the text

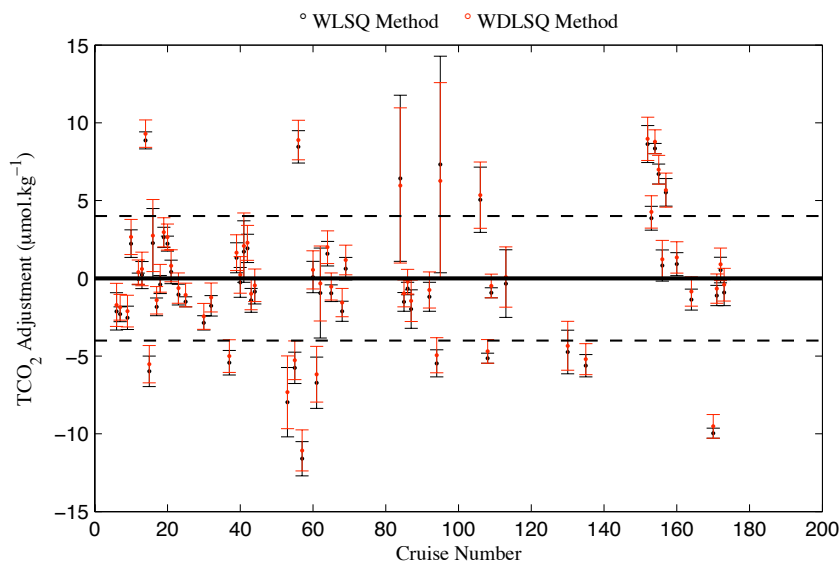
16. See Figures attached.

17. See Figures attached.

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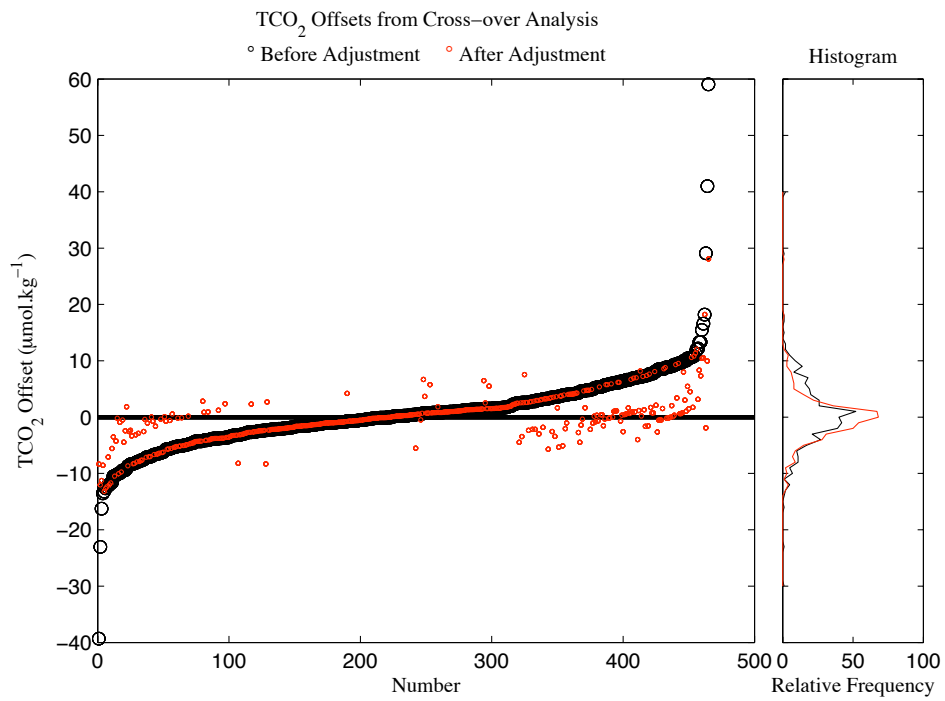
Interactive comment on Earth Syst. Sci. Data Discuss., 3, 1, 2010.

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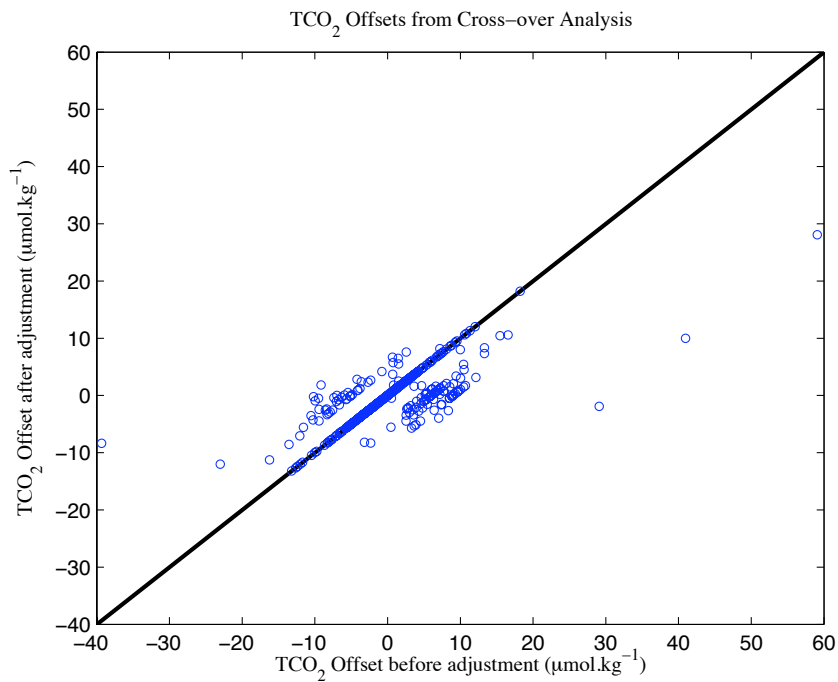
**Fig. 1.** Figure 4. Adjustment values (dots) and their respective standard deviation (vertical bars) obtained from the two inversion methods used as a function of cruise number (See Table 1).....

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**Fig. 2.** Figure 5. Plot of the offsets in TCO<sub>2</sub> for all cross-overs before adjustments (black symbols) in ascending order (Number) from left to right. The red symbols are the offsets after adjustments were made

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**Fig. 3.** Figure 5bis. xy plot

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