Ocean Sci. Discuss., 6, C1211–C1213, 2012
www.ocean-sci-discuss.net/6/C1211/2012/

Ocean Science Discussions

Interactive comment on "An algorithm for estimating Absolute Salinity in the global ocean" *by* T. J. McDougall et al.

T. J. McDougall et al.

trevor.mcdougall@csiro.au

Received and published: 22 November 2012

Final Author Comment

This paper has now been substantially re-written. It now justifies more convincingly the choice of Absolute Salinity to describe the Thermophysical properties of seawater.

The paper is essentially a description of how the computer software of TEOS-10 works when it ingests Practical Salinity and spits out Absolute Salinity.

Reply to Referee #1

1. The paper has been substantially rewritten, addressing this issue of clarity of purpose.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

2. We agree with tis comment, and have addressed these further issues regarding clarity.

3. At the present time it is not possible to describe the effect that dissolved organics have on the density of seawater or the Absolute Salinity. We know that the concentration of DOC is about 65uM in surface waters in the North Atlantic and in standard seawater. It decreases to values as low as 35uM in deep waters. One would expect this to decrease the density of seawater, but it is difficult to determine the value. Part of this difficulty is trying to take out all the DOC of a sample of seawater without changing its composition. So, as we stand today, the expected decrease in density and Absolute Salinity is buried into the correlations with silicate.

4. The motivation for taking Absolute Salinity as the salinity argument of the Gibbs function has been substantially improved since this OSD paper was submitted in later 2008. Since then the work of Pawlowicz (2010) and Pawlowicz et al. (2011) has been published and the distinctions between four different types of absolute salinities have been described. This section of the present paper has been substantially improved.

5. We have been more consistent with out use of these words.

6. Yes, done.

7. OK

8. We have improved this description.

9. We have addressed this issue of uncertainty by adding a comparison with the method of estimating Absolute Salinity Anomaly of Pawlowicz et al. (2011) in Figures 10 and 11.

10. Fixed.

11. This density data is not published in any other paper, so it is included here, as all the other density measurements appeared in their own papers.

OSD

6, C1211–C1213, 2012

12. We have retained the presentation of the figures as they were, mainly because David Jackett who prospered these figures has died, and it would be a significant undertaking to spin up on this data analysis again and so change the figures.

Reply to Anonymous Referee #2

13. The abstract has been changed to remove the equation.

14. The meaning of Standard Composition is defined better now, and its detailed description can be found in the TEOS-10 Manual (IOC et al. (2010)).

15. Fixed

16. Unlike the density data from other ocean basins, the present paper is the only place that this data will be published.

17. Fixed

18. The Baltic Sea is the only marginal sea that is treated specially to date in the spatial algorithm to evaluate Absolute Salinity. As more inputs for major rivers are included, regional and coastal areas could then be treated in a special manner as well. A recent paper on this issue of defining appropriate salinity measures for Limnological applications is

Pawlowicz R. and R. Feistel, 2012: Limnological applications of the Thermodynamic Equation of Seawater 2010 (TEOS-10), Limnol. Oceanogr.: Methods, 10, 2012, 853-867.

Interactive comment on Ocean Sci. Discuss., 6, 215, 2009.