

Interactive comment on “Characteristics of Water Masses in the Atlantic Ocean based on GLODAPv2 data” by Mian Liu and Toste Tanhua

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As a novice in this field, I am very honored to be guided by the predecessors. Especially Matthias Tomczek, he gave me valuable guidance to this manuscript, and pointed out my shortcomings. We read the comments carefully and made the following modifications according to his suggestion. The attachment is the PDF version, the comments and our revisions are marked with different fonts and colors.

Interactive comment on Ocean Sci. Discuss., https://doi.org/10.5194/os-2018-139, 2019.

C1

Reply to the comments by Reviewer 1, Matthias Tomczek

The paper uses the most comprehensive ocean database to objectively define source water types for the Atlantic Ocean.
The paper is put sloppily together and will require a careful reading by someone not too close to the original manuscript to iron out the many grammatical errors and other inconsistencies.

We have now rewrote the manuscript and did careful reading to iron out the many language errors.

I do not consider it the role of the reviewer to do that, but here are a few pointers as to what has to be done:

a) The reference "Schaffer, A.J., JACOBSEN, A.W., Mikulicz's syndrome: a report of ten cases. American Journal of Diseases of Children 34, 327-346, 1927" has no place in an oceanography paper. I assume that, in an effort to be as comprehensive on the history of water mass analysis as possible, the author meant "Jacobsen, J. P. (1927) Eine graphische Methode zur Bestimmung des Vermischungskoeffizienten im Meer. Gerlands Beiträge zur Geophysik. 16, 404-412" and went astray in his Google search.

Thanks for pointing this error out. Reference now removed.

b) "The ocean is thus composed a large number of water masses" misses the word "of", and similar with many sentences.

Corrected (line 41)

c) "Source water type" is sometimes abbreviated as SWT, sometimes as STW.

We went through the manuscript and corrected to it now is always "SWT".

d) "Based on the work of (Pollard and Pu, 1985)" should be "Based on the work of Pollard and Pu (1985)", and similar with many citations.

We went through the manuscript and corrected the citations. (line 276)

Turning to the scientific content of the paper, it may be noted that there are basically two approaches to derive objective definitions of water masses and their source water types. Assuming no knowledge of the situation under study one might try cluster analysis and discover the relevant source water types from that. If, on the other hand, sufficient information is available to predict the source water regions with certainty one might proceed with an analysis of the parameter distributions in the preselected source water regions and derive the source water types from that. Given the large amount of information available for the Atlantic Ocean the paper rightly proceeds along the second path.

We agree with this assessment, and the intention of our work was not to redefine the water masses in the Atlantic Ocean, but rather to use the information already available and base the work on that. In several instances, water masses has in the past been differently defined and/or named so we tried to put this information in the paper as well.

Unfortunately, the paper does not fully grasp one of the basics of water mass theory, namely the distinction between water masses formed by subduction and water masses formed by winter-time deep convection. The water masses of the deep ocean are mostly formed by winter-time deep convection.

Fig. 1.

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