

Reply to the reviewers comments to the manuscript “Water Masses in the Atlantic Ocean: Characteristics and Distributions” by Mian Liu and Toste Tanhua

Kiel, December 8, 2020

We thank the reviewer for the patience with us and for the helpful comments to improve the manuscript.

I did yet another thorough read-through of the manuscript and corrected the manuscript for language and style. No changes to the content was done during this step, and all changes are available in the track-changes mode.

Comment made by the reviewer in the pdf:

Page 7. The reason this happens is that the individual sample properties outside the input SWTs to the OMP formulation. This is now explained in the text, and is eluted to in more detail in the same section.

Page 8: Corrected the double up of SA, and went through the manuscript to be consequent with the use of SA vs. S, and CT vs T. when appropriate (for instance not when we refer to a previous work that use different units). We also checked the capitalization of Absolute Salinity and Conservative Temperature

Comments to the manuscript:

We highly appreciate the insight on the more general expressions for this kind of inversions. We have indeed not done a comprehensive study of the effect of any errors in the prior assumptions. We do touch on it when we discuss the general approach taken making this study useful for the basin-scale distribution of water masses. That is, we do not take into account temporally changing properties of the SWTs, for instance.

To make this clear we have added the following sentence on page 6, end of section 2.3.1. “The solution is dependent on, and sensitive to, the prior assumptions of the properties of the SWTs. Here we have not explicitly explored this sensitivity, but note that a common difficulty in OMP analysis is to properly define the SWT properties, and that this study provide a generally applicable set of SWT properties for the major water masses in the Atlantic Ocean.”