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Ocean Science Discussions

Interactive comment on "Remote detection of water property changes from a time series of oceanographic data" *by* A. Henry-Edwards and M. Tomczak

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We appreciate the comments from the two reviewers and used them to improve the clarity of the manuscript. In detail, our response to reviewers' comments is as follows:

Anonymous Referee #2:

The aim of our research is to find ways to monitor changes of water mass properties in remote regions from observations taken in more accessible ocean areas. This required the development of an entirely new method for water mass analysis. Rather than encumbering our paper on the data collected at the Bermuda Atlantic Time Series station with lengthy explanations of the new method, we decided that it is better to devote one paper exclusively to a detailed description of the method.

The major points raised by this referee are (1) a lack of clarity in the description of the

iterative process, (2) lack of detail on the quadratic programming technique, and (3) doubts about the importance of weights.

Ad (1) We rewrote the section “Page 405 lines 14-16 Ĕ” to describe the iteration process more clearly.

Ad (2) We added a paragraph to include the essence of the Quadratic Programming method. Although the method is familiar to numerical oceanographers, it is not usually known by oceanographers working in water mass analysis, and a brief statement about its essence is justified.

Ad (3) The issue of correct weight selection is closely related to the way in which quadratic programming finds solutions through iteration. We added a paragraph about the importance of weight selection at the end of the paper to make this clear.

Another query of the referee relates to the difference in the number of iterations applied to solutions shown in figures 3, 4 and 5 of the paper. We clarified this by adding text in the discussion of the figures.

Anonymous Referee #3:

This referee has a number of specific comments, which we address in sequence.

“The mixing equations shown on page 404 .Ĕinclude the amount of remineralized material Ĕ” We write the equations in the most general form, although the synthetic data used in the development of the method do not include remineralization, which is of no consequence for the testing of the quadratic programming method. We followed the referee’s suggestion and eliminated the term “pseudo age” and also changed the nomenclature for the Redfield ratio terms as suggested.

“Weighting the parameters” We disagree with the referee that the choice of weights is critical in OMP analysis but support the referee when it comes to the best choice of weights. OMP analysis allows an objective best choice of weights - see the references quoted by the referee. The situation is entirely different in TROMP analysis. We outline

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this in the revised manuscript in response to the comments from referee 2, which apply here as well.

“Synthetic data” We changed our water mass nomenclature to emphasise their synthetic nature.

“References” The reference to the ARGO system has been removed as unnecessary. We included references for Redfield et al. (1963) and Helland-Hansen (1918).

Interactive comment on Ocean Science Discussions, 2, 399, 2005.