

Interactive comment on “Towards high resolution mapping of 3-D mesoscale dynamics from observations: preliminary comparison of retrieval techniques and models within MESCLA project” by B. Buongiorno Nardelli et al.

Anonymous Referee #2

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Review of

Towards high resolution mapping of 3D mesoscale dynamics from observations: preliminary comparison of retrieval techniques and models within MESCLA project.

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This discussion paper presents a series of techniques for mapping the 3-D mesoscale dynamics from satellite and in-situ observations, and then estimating vertical veloci-

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ties based on these gridded fields. The 3-D reconstruction techniques used in this analysis have all been developed and analysed in previous studies (eg ARMOR 3D, Guinehut et al., 2012; and the mEOF-reconstruction, Buongiorno Nardelli and Santoleri, 2005). The vertical velocity calculation is based on the QG omega equation (eg Tintoré et al., 1991). The originality of this present paper is to compare these different vertical reconstruction techniques with each other, and with the outputs of an ocean general circulation model with assimilation (the Mercator $\frac{1}{4}^\circ$ global model and $1/12^\circ$ North Atlantic model). Although this could be a valid objective for a research paper, unfortunately there is very little interpretation or discussion of the results in the present paper. As such it is not suitable for publication, in its present form.

1. Does the paper address relevant scientific questions within the scope of OS?

The question of how well the different vertical reconstruction techniques and the models can represent the ocean's vertical velocity field could be informative, even though there is no intercomparison with fine-scale in-situ data estimates, and the errors in the reconstruction fields will have a large impact on the vertical velocity field.

2. Does the paper present novel concepts, ideas, tools, or data?

No. The 3-D reconstruction techniques used in this analysis have all been developed and analysed in previous studies (eg ARMOR 3D, Guinehut et al., 2012; and the mEOF-reconstruction, Buongiorno Nardelli and Santoleri, 2005). The vertical velocity calculation is based on the QG omega equation (eg Tintoré et al., 1991).

3. Are substantial conclusions reached?

No. The paper lacks discussion and interpretation of all of the case studies that are presented.

4. Are the scientific methods and assumptions valid and clearly outlined?

The scientific methods and assumptions are based on previous analyses, and only a brief overview is provided - the details of these methods are not fully explained.

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5. Are the results sufficient to support the interpretations and conclusions?

No. Although an overview of the different case studies is presented, the results are poorly analysed, there is not much description of the Figures, and very little interpretation and discussion of the results.

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

No. The methods are mainly described in other publications, and the overview given in this discussion paper does not allow the reader to understand the details of the technique.

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

Yes – the references to previous studies is provided, and the “originality” presented here is in comparing the different techniques.

8. Does the title clearly reflect the contents of the paper?

Yes.

9. Does the abstract provide a concise and complete summary?

The abstract covers the philosophy behind this study, but does not give any information on the results of this discussion paper, to quantify how well the different 3D reconstruction techniques perform in different regions, test cases, etc.

10. Is the overall presentation well structured and clear?

No. There are many case studies which are listed but not discussed, and the lack of background on the different reconstruction techniques means that it is difficult to piece together the different case study results.

11. Is the language fluent and precise?

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The english is reasonable good, however, the lack of background and discussion content means that the paper is quite difficult to read. There are many acronyms mentioned, which create unwieldy sentences. As an example, see the SST description on p 1051 lines 15-24.

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

Yes – ok.

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

Yes – a number of case studies listed in sections 5.1 and 5.2 are never presented. In section 5.1, the differences between the 5 configurations are not explained in a dynamical or statistical sense. Figure 2 is not explained adequately, for example, what is the explained variance for the 3 cases presented here? All of the results section should be worked on to improve the discussion and interpretation.

14. Are the number and quality of references appropriate?

Yes – although they are used mainly to introduce the work, and not to interpret the results.

15. Is the amount and quality of supplementary material appropriate? N/A.

Interactive comment on Ocean Sci. Discuss., 9, 1045, 2012.

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