

Interactive comment on “Impacts of mean dynamic topography on a regional ocean assimilation system” by C. Yan et al.

C. Yan et al.

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This is a review of “Impacts of mean dynamic topography on a regional ocean assimilation system” by C. Yan, J. Zhu and C. A. S. Tanajura. In this manuscript, the authors investigate the sensitivity of the choice of MDT on the assimilation of altimeter data. The results indicated that the MDTs are very important for the assimilation of altimeter data. It is my recommendation that this work is worth of publication after a minor revision.

Major Comments:

1. The results of the manuscript illustrate that it is not easy to use an observation-based MDT in a simple way. A more sophisticated scheme is needed including some

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biascorrection-type algorithm to the observation-based MDT. For instance, the observation-based MDT should be adjusted to have the same spatial mean as the model derived MDTs over the area they cover (see Arthur Vidard, Magdalena Balmaseda, and David Anderson, 2009: Assimilation of Altimeter Data in the ECMWF Ocean Analysis System 3. Mon. Wea. Rev., 137, 1393–1408). The authors should give some discussion about this.

A: Thanks for your comment. The observed MDT is removed by an offset such that it has a spatial mean same as the MDTTS. Moreover, we rerun the experiments using the observed MDT removed by an offset. The corresponding discussions and results are presented in section 3 and section 4.

2. It should be stated clearly in Section 3 if the model used to obtained MDTMOD and MDTTS is the same with the one used in the experiments in Section 4.

A: Thanks for your comment. It is stated in section 4.

3. In Fig. 1, the caption should be detailed. The abbreviation of each MDT should be given first such that “Difference between MDTMOD and MDTTS” could make sense.

A: Thanks for your comment. The caption of figure 1 is modified.

Minor Comments:

1. page 1, line 4, “ARGO” (and hereafter) should be “Argo”.

A: Thanks for your comment. It is modified.

2. page 2, line 24, “Argo”, full name should be given.

A: Thanks for your comment. The full name of Argo is added.

3. page 3, lines 3-5, this sentence needs to be rewritten.

A: Thanks for your comment. It is rewritten as “The assimilation of altimetry data along with conventional observations into an ocean model may reproduce ocean processes

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such as mesoscale circulations, mesoscale eddies, temporal and spatial evolution of eddies, sea level variations, and tropical instability waves (Oschlies and Willebrand, 1996; Carton et al., 1996; Carton et al., 2000; Fujii and Kamachi, 2003; Oke et al., 2005; Oke et al., 2008; Xiao et al., 2008; Xie et al., 2011)."

4. page 3, line 6, the paper (Oschlies and Willebrand, 1996) is missing in the references.

A: Thanks for your comment. It is added.

5. page 3, line 11, "Fisher et al., 1997" should be "Fischer : : :".

A: Thanks for your comment. It is modified.

6. page 3, line 12, the paper (Zheng et al., 2007) is missing in the references.

A: Thanks for your comment. It is added.

7. page 4, line 8, "Bleck et al., 1992" should be "Bleck et al., 2002"

A: Thanks for your comment. It is modified.

8. page 4, line 21, the paper (Teague et al., 1990) is missing in the references.

A: Thanks for your comment. It is added.

9. page 5, line 3, "Where" should be "where".

A: Thanks for your comment. It is modified.

10. page 5, line 22, the paper (Xie and Zhu, 2010) is missing in the references.

A: Thanks for your comment. It is added.

11. page 7 line 13, "the largest differences reach up to 60 cm" should be "the largest difference reaches : : : ?"

A: Thanks for your comment. This sentence is modified.

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12. page 10, line 16, "CTD", full name should be given.

A: Thanks for your comment. The full name is added.

Interactive comment on Ocean Sci. Discuss., 12, 1083, 2015.

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