

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

Anonymous Referee #1

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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 bias-correction-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

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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.

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.
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.

Minor Comments:

1. page 1, line 4, “ARGO” (and hereafter) should be “Argo”.
2. page 2, line 24, “Argo”, full name should be given.
3. page 3, lines 3-5, this sentence needs to be rewritten.
4. page 3, line 6, the paper (Oschlies and Willebrand, 1996) is missing in the references.
5. page 3, line 11, “Fisher et al., 1997” should be “Fischer ...”.
6. page 3, line 12, the paper (Zheng et al., 2007) is missing in the references.
7. page 4, line 8, “Bleck et al., 1992” should be “Bleck et al., 2002”
8. page 4, line 21, the paper (Teague et al., 1990) is missing in the references.
9. page 5, line 3, “Where” should be “where”.
10. page 5, line 22, the paper (Xie and Zhu, 2010) is missing in the references.
11. page 7 line 13, “the largest differences reach up to 60 cm” should be “the largest difference reaches ...” ?
12. page 10, line 16, “CTD”, full name should be given.

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