**Ocean Science
Discussions**

Interactive comment on "An eddy resolving tidal-driven model of the South China Sea assimilating along-track SLA data using the EnOI" *by* J. Xie et al.

Anonymous Referee #1

Received and published: 17 June 2011

The paper discusses the assimilation of altimeter data into a nested configuration of the HYCOM model in the South China Sea. The model includes tides and thus the coupling between tides and circulation. This poses specific problems for a data assimilation system that are partly addressed in the paper. Only the non tidal component is corrected for through the assimilation procedure (an ensemble optimal interpolation). The assimilation scheme shows some skills. It reduces the RMS of differences between the model forecasts and altimeter data and the RMS differences with independent drifter data. Comparison with temperature profiles shows very limited skill. The paper is well written and is a useful contribution to the ocean data assimilation community. The method has clear limitations (that are partly acknowledged by the authors)

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

and is only a first step towards the development of a proper data assimilation system in a tidal driven ocean model. I believe this paper should be published in OSD but there are several issues (points 3, 4, 8 and 10) that must be addressed by the authors (see below).

1. Page 878: do you use a relaxation towards SST ?

2. Page 879: replace steric height anomaly by sea level anomaly (steric height anomaly is only the part related to temperature and salinity variations).

3. Page 879: please discuss the impact of using an 11 year average of the model simulation. The MDT usually has a large impact on a data assimilation system. In addition, the 11 year mean is not consistent with the mean used for altimeter SLA computation.

4. Page 880: You should discuss the tidal model used to correct altimeter data. This part actually would deserve a much better discussion. One would assume that your tidal corrections in the SCS are better that the ones used to correct altimeter data (this needs first to be assessed and discussed). If this proves to be true, one would thus have expected to use this model to correct the altimeter data.

5. Page 883: Figure 5... This should be better phrased. I cannot figure out what is computed here (what is a running seasonal ensemble from CLS maps ?).

6. Page 886: Correlated errors. The (space) error correlation scale (100 km) is close to the mesoscale signal scale. Please discuss how this impacts the data assimilation.

7. Page 886: see also remark 4. Why not computing directly a new tidal solution from your model run?

8. Page 887: "composing our ensemble from a simulation run with tides...". This is indeed what you should have done. Why is this technically difficult? Please comment. This is a clear limitation of the method. You do not take into account the coupling between tides and circulation (which is actually one of the objectives of the paper).

9. Page 888: What are the RMS differences with respect to assimilated data?

10. Comparison to temperature data. You should (must!) include and discuss other (deeper) depths. Please give also the RMS of the observations (with respect to climatology) (are you better than the climatology ?).

Interactive comment on Ocean Sci. Discuss., 8, 873, 2011.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper