Natural Hazards
and Earth System
Sciences

Discussions

Interactive comment on "Data Assimilation of
Argos profiles in North-west Pacific Model" *by*
Z. Wang et al.

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wang_zhaoyi@163.com

Thanks for reviewers' comments of the manuscript. We will pay more attention to the writing approaches of the revised context.

Major comments:

The background error covariance matrix B is very important for the performance of the assimilation system. We are sorry for not providing a detailed description of B in the manuscript. In the data assimilation system, the background-error covariance matrix is decomposed into horizontal correlations and vertical covariances. Horizontal correlations are modeled using four iterations of a first-order recursive. The Empirical Orthogonal Functions (EOFs) is used to represent the vertical component of the background-error covariance matrix. The EOFs are calculated from daily simulations,

which contain multivariates of sea surface height, temperature and salinity from 1995-2005 at full model resolution. There are 100 vertical levels for B. Some figures will be provide in the latest revised manuscript.

Main steps in the model are as follows: first compute the misfits between simulations and observations when the model runs; then run the data assimilation system while collect the increments matrix; at last, use the increments matrix to correct the initial condition of the model for next day's running. In the manuscript, EN4 and MGDSST are used for comparisons, since misfits are computed before the assimilation, observations can be independently used in the system. Therefore, Argo profiles and EN4 can be used as independent observations; while MGDSST cannot be used as independent observation because it has been relaxed into the model. So we consider replacing MGDSST with GHRSST. In order to validate the performance of the DA system, we will add a section to discuss the performances of forecast and hindcast using the initial conditions with or without assimilation.

I'm sorry for the figure caption confusion. There is a great change in Bohai sea and Japan sea in July as shown in Figure 3.1, where the difference reachesto2.5°C. We will point out the regions where the model is consistent with observations. For the caption of Fig 3.1(a), it is Analysis Fields of SST, not the MGDSST. For the caption of Fig 3.1, we will pay more attentions to the description of it. Thanks for your detailed comments again.

Minor comments:

1. We have used "Argo" instead of "Argos".

2. The assimilation window is daily.

3. We will use GHRSST instead of MGDSST for comparison.

4. The caption has been changed to surface.

5. We are not clear about the reason why. We will make several experiments to discuss

about that.

6. The experiment without assimilation has been added to Fig. 3.2.

7. We will limit the depth of Fig.3.3-3.4 to 1000m.

8. We will re-plot the Fig. 3.5-3.6 and add the specific date. For the Fig. 3.7-3.8, they are related to whole column. A clearer description will be given in the revised manuscript.

That's all. Thanks very much for the reviewer's comments again.

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