

Dr. Qiang Wang

Topic editor

Geoscientific Model Development

Re: gmd-2021-95

Dear Dr. Qiang Wang and reviewer,

Thank you for handling and reviewing our manuscript entitled “Comparison of ocean heat content from two eddy-resolving hindcast simulations with OFES1 and OFES2” to be considered for publication in the GMD. We appreciate your very constructive comments and have addressed accordingly.

I. Response to reviewer#2

Minor comments

1. The uncertainty in observational dataset should be tested and bring into serious attention. It is well-known the observation is not perfect, it will add a non-negligible error when comparing with models. I would rather suggest to include 1-2 other data products to test the robustness of the results, I don't think you need to replicate all results, just test several your key results will be sufficient.

Response: In the new revised version, we added another two observational-based datasets. The first one is the most up-to-date EN4 version, EN4.2.2 with bias corrected following Gouretski and Reseghetti (2010), we called it G10; and the second is the temperature dataset from the Institute of Atmospheric Physics (Cheng and Zhu, 2016), we called it IAP. We calculated and compared the temporal revolution (Fig. S10) and spatial trend distribution (Fig. S11) between EN4 and G10 and IAP. Overall, these three datasets show high similarities but certain differences can be identified, especially between IAP and other two. This is consistent with previous studies that the mapping method may produce large differences in the state estimate. A discussion can be found li lines#929–939 of the clean version of the revised manuscript.

2. Maybe I missed something, but how the uncertainty range in the new figures (Fig.5, 6 for example) is estimated?

Response: The linear trend was calculated using the multiple linear regression using least squares, and we used the 95% confidence level (lines# 190–192 of the clean version of the revised manuscript).

3. Line 156-157: which version of EN4, it gives several options (corresponds to different bias correction methods).

Response: We used the EN4.2.1, with bias corrected following Levitus et al (2009). Lines# 100–101 of the clean version of the revised manuscript.

4. Fig.8-11 and other figures and section 3.2. I'm wondering why 10-year rolling trends were used. It seems not be able to remove ENSO. I would suggest using 15-year rolling if you want to see the low-frequency signals.

Response: We did not make it clear enough. The rolling trend was used to compare these three datasets in each 10-year window with rolling method, in order to see whether any improvements of the two OFES datasets with time. This was not intended to focus on the low-frequency signals. Lines# 310–311 of the clean version of the revised manuscript.