Dr. Qiang Wang

Topic editor

Geoscientific Model Development

Re: gmd-2021-95

Dear Dr. Qiang Wang

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.

Minor comments

1. 1) Starting from line 929, "One reviewer raised the concern on the uncertainty in the observational datasets (EN4) and suggested to add one or two more observation-based datasets to reproduce some of our results here."
This should not be the motivation to check different datasets. The reason is that the data quality can influence your findings. The current text does not read like a paper, rather like a reply letter to reviewers. Please adjust this paragraph, and also pay attention to the choice of location for adding this paragraph. The discussion should end with a clear message.
Response: In the new revised version, we changed the first couple of sentences of this added paragraph as "*As mentioned above, the EN4 should not be taken as the truth. Factors such as mapping methods and data ingested impact the resulting quality of those objective-analysis products and may alter our conclusions here consequently. As a preliminary test of robustness, we compared ...*". (Lines#963–965). This paragraph ends with "*Nonetheless, this preliminary test shows that our primary conclusions are unlikely to be altered when choosing different observational-based datasets for comparisons*". (Lines#974–975).

As for the location of this paragraph, we kept it unchanged after careful comparisons and thinkings. The reason for keeping unchanged is that this paragraph is an additional (further) discussion that is not directly related to the main body of this manuscript, different from the prior discussions in this sense. The last paragraph is more as a reminding message to both the users and model developers.

2. In both the abstract and conclusion section, readers expect to see a clear message about the improvement (if any) and deterioration (if any) of the new ofes version versus the old one. They should be clear enough to readers without requiring to read the main sections. Statements about comparison of one single version versus observations are not enough. They can be additional information, but not enough as the main conclusions. Model users want to know whether they should use the new version or not, for what purpose it would be better to use the new version, for what purpose the old version is preferred?
Response: We revised the abstract by adding "*This work suggests that OFES1 provides a reasonable multi-decadal estimate of global and basin-integrated warming trends above 700 m, except for the top 300 m for the Pacific Ocean and between 300–700 m for the Indian Ocean. Although the estimates of the global OHC during 1960–2016 are consistent with observations between 700–2000 m, caution is warranted while examining the basin-wide multi-decadal OHC variations using OFES1. The seemingly suboptimal OHC estimate based on OFES2, suggests that any conclusions on long-term climate variations derived from OFES2 might suffer from large drifts, necessitating audits*". (Lines#23–29).

Correspondingly, we added a third primary point in the conclusion section, as "*Overall, the global and basin-integrated OHC estimates for the period 1960–2016 were reasonable for the top 700 m upon considering the OFES1 results. Below 700 m, multi-decadal climate changes derived from the OFES1 need careful evaluations even though the estimates of global OHC between 700–2000 m are highly correlated with observations. The notable differences between OFES2 and EN4 suggest that attention is clearly warranted while concluding on multi-decadal climate changes based on OFES2.*" (Lines#938–942).

3. I do see that English should be improved from place to place. Please use this chance to improve the English thoroughly.

Response: This new revised manuscript was improved by Elsevier language editing services.

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ELSEVIER

The following article was edited by Elsevier Language Editing Services:

"Comparison of ocean heat content from two eddy-resolving hindcast simulations with OFES1 and OFES2"

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Date: 10-Nov-2021
Serial number: LE-225253-B564D39913C6