Geosci. Model Dev. Discuss.,
https://doi.org/10.5194/gmd-2019-363-RC2, 2020

Geoscientific Model Development Discussions
Open Access
EGU

Interactive comment on "Evaluation of global ocean–sea-ice model simulations based on the experimental protocols of the Ocean Model Intercomparison Project phase 2 (OMIP-2)" *by* Hiroyuki Tsujino et al.

Anonymous Referee #2

Received and published: 2 March 2020

The manuscript describes overall results of ocean model intercomparision organized in the framework of OMIP-2. After the development of new surface boundary forcing dataset (JRA55-do; Tsujino et al. 2018), the performance of various ocean model simulations forced by this new dataset is now reported here.

Under the same protocol proposed by the authors, eleven state-of-the-art global ocean models are forced by not only newly developed JRA55-do atmospheric dataset but also previously referred CORE forcing. This design makes it possible for the authors to clearly evaluate what stems from the difference from the surface forcing and what is

Printer-friendly version

Discussion paper

from inter-model differences.

In previous OMIP-1 comparisons, the CORE forcing by Large and Yeager (2009) was developed for surface forcing dataset. This dataset has been widely used for ocean model community but not updated after 2009, therefore, its replacement by newly developed JRA55-do is awaited. The results reported here provide us with the solid evidence that new JRA55-do dataset is good enough to replace CORE forcing as a new forcing dataset for global ocean simulations. The manuscript also presents timely and valuable assessment about the overall performance of the state-of-the-art global ocean models.

Although the manuscript demonstrates the overall performance of global ocean simulations rather than detail analysis about specific topics, such documentation fits the scope of GMD and the ocean model and related communities will benefit from the results reported in this manuscript very much. Therefore, I can recommend the publication of this manuscript in GMD after minor revision. I have several comments which I hope will be useful for the authors to revise the manuscript before its publication.

Specific comments

Line144: “absolute wind vector”–> “wind vector”

Line157-163: It was difficult for me to understand the content of this paragraph. The authors appear to point out the possibility of weak bias of wind in JRA55, but its reasoning provided here is not clear. Is this related to the adjustment method of wind discussed in Sun et al. (2019)?

Line240-248: I think that the content of this paragraph appears to focus merely on a technical issue of the model and is not very useful.

Line295-296: In Figure 5, improvement from OMIP1 to OMIP2 can be found generally around the Eastern boundary regions of both Pacific and Atlantic basins. Therefore, rather specifically referring to Benguela region, the sentence here could be modified

such as “It is also the case for the Eastern boundary region in the Atlantic basin, but the warm bias is somewhat exacerbated offshore in OMIP-2”.

Line323-325. This sentence is not clear. Do the authors just describe slight difference between OMIP-1 and OMIP-2 in (northern) equatorial Pacific area?

Line335-336: How about mentioning about the largest difference in the Arctic Ocean? (This seems related to salinity difference there)

Line444-445: It would be better to replace the word “hiatus” by “slowdown”.

Section 6 (Line492-525): Many figures are prepared for this section (Figs. 25-31) with very short description provided. It is nice to see improvement from OMIP-1 to OMIP-2 in some statistics here but it appears better that the authors focus on the key result in the main text and most of the figures will be moved to Appendix.

Line573-574: “will be therefore become”–>”will therefore become”

Interactive comment on Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2019-363, 2020.

Printer-friendly version

Discussion paper