

Geosci. Model Dev. Discuss., referee comment RC2
<https://doi.org/10.5194/gmd-2021-320-RC2>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on gmd-2021-320

Anonymous Referee #2

Referee comment on "Improving ocean modeling software NEMO 4.0 benchmarking and communication efficiency" by Gaston Irrmann et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-320-RC2>, 2021

The manuscript describes work that is of interest to the broad NEMO user community. Authors develop a new benchmarking framework, implement an automatic optimized domain decomposition and reduce the communication footprint in two bottleneck routines.

Technical/Scientific comments:

- The authors point out that the scalability of global configuration model is limited by the load imbalance due to the special halo exchange required for the north fold. This fact does not seem to be reflected in the design of the domain decomposition algorithm. Would it be appropriate to attempt to address the load imbalance at this stage. Does the proposed domain decomposition algorithm lead to improved load balance? It would be desirable to supplement the text with figure illustrating an example of the algorithm in action.
- The effort to group communications together in one case or remove altogether in the other translates to significant computational gains. Figure 8 shows a frequent occurrence of abnormally slow time steps, with the factor of up to x10. Is it possible to verify that the slowdown occurs for random cores or perhaps is it systematic for a particular core. I would suggest to run the tests of a multiplicity of full electrical groups to avoid other jobs affect the network congestion in your experiments.

Other comments:

- I suggest changing the title to: "Improving Ocean Modelling Software ..";
- L3: ".. actual 4.0 reference .." - what does 'actual' refer to here? wouldn't it be clear to just write ".. 4.0 reference ..";

- L28: ".. developed in a sustainable way by a European consortium .." - what does "sustainable way" mean here, how is it defined? Sustainable in what sense?
- L28: "The constant renewal of the model equations .." - I would suggest to use the term revision or reformulation here;
- L33: ".. and are not necessary experts .." -> ".. and are not necessarily experts ..";
- L36: ".. the actual reference version of the code" - remove "actual";
- L51/2: ".. to provide a proper benchmarking environment" - remove "proper".