

Geosci. Model Dev. Discuss., referee comment RC1  
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## **Comment on gmd-2021-320**

Anonymous Referee #1

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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-RC1>, 2021

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Review of MS No. gmd-2021-320 "Improve Ocean Modelling Software NEMO 4.0 benchmarking and communication efficiency" by Gaston Irrmann et al.

### *General comments:*

Improving the computational efficiency of open-source community ocean models, such as NEMO v4.0, is of great benefits to climate modelling and operational ocean forecasting. This manuscript reports recent contributions through the collaboration of numerical modelling and HPC experts in several aspects: (1) the creation of a benchmark (BENCH) configuration for testing the model efficiency; (2) the automatic definition of "optimal" domain decomposition; and (3) code modifications to reduce the communications among subdomains in two bottleneck routines. I believe the work described in this manuscript are valuable for both model developers and users.

In my review, I did not dig in all the technical details described in this manuscript because I am not an expert in parallel computing. For this, please consider this as a partial review. My focus is on the presentation aspect, as I find the manuscript is rather difficult to read due mainly to the writing style that makes the presentation neither concise nor accurate. There are many long sentences that are not easy to follow. There are also numerous grammar mistakes or typos throughout the manuscript. I will give some examples in the following "Specific comments" and "Technical corrections", but the list is far from being complete. I suggest that the manuscript needs a thorough revision/editing before being accepted for publication in a journal for broader readers.

### *Specific comments:*

L39-41: Due to the way of writing, many sentences in the manuscript have unclear meanings that are difficult for a reader to understand. Here is an example: "This is why the incremental approach we follow is addressing and facilitating the future addressing of the problem of inter and intra node MPI communication cost. We assume that its reduction is and will stay worthwhile, independently of hardware evolution". Here, I find it is hard to follow the exact meaning of "incremental approach", "future addressing", "its reduction" and "is and will stay". Here is my attempt to revise these sentences: "Thus, the work of this study focuses on the reduction the MPI communication cost, for both inter-mode and intra-node. We expect that the need for such reduction will continue in future, independent of hardware evolution". Do authors agree that this makes easier to read? If yes, I suggest they make the effort to check and revise the whole manuscript.

*Technical corrections:*

L5: "straights" should be "straight"

L14: "tests" should be "test"

L15: quantify

L28: "constant renewal of the model equations" may be rephrased as "constant improvement of the model physics"

L60: "In their figure 4" or "In their Figure 4"? Please check the journal format, and use the same format throughout the manuscript.

L82: "lower or equal than" to "lower than or equal to"

L85: "Note that we could imagine that in a few cases", can you simply write "Note that in a few cases"?

L103: "Until revision 3.6 included" meaning is not clear

L108-116: "process" and "processes" - can the wording be revised to make the meaning more clear?

L162: "in (Maisonnavé and Masson, 2019)" should be "in Maisonnavé and Masson (2019)"

L172: extra "the"

L175: level(s), let(s)

L184: "can be used band be used"?

L188: "in such a was"?

L189: "corresponds approximately of (to)"

L195: "have" be "has"

L214: "prevent to test is"?

L269-270: "we" or "they"?

L339: "with use here with with"?

L342: "on the second an before"?

L400: "are diminished by a third"?

Fig.8 caption: "North-Atlantic", somewhere in text is "West Atlantic"

Title of section 4: "Conclusions and discussion"

L481: "is maybe"?

L494: "strait" be "straight"?