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Comment on egusphere-2022-510

Anonymous Referee #1

Referee comment on "Ocean Modeling with Adaptive {RE}solution (OMARE; version 1.0) – refactoring the NEMO model (version 4.0.1) with the parallel computing framework of JASMIN – Part 1: Adaptive grid refinement in an idealized double-gyre case" by Yan Zhang et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-510-RC1, 2022

I find the approach proposed in the manuscript to be of interest for the journal. It follows the now discussed road of separation of concerns, whereby the code part dealing with numerical algorithms and the part dealing with the infrastructure (mesh, parallelization) are separated and treated in different ways. However, the manuscript in its present form misses the goal: one expects that the material of the manuscript describing a modeling approach will be sufficient for a reader to learn how to use the approach. I do not see that this goal is reached.

The text on lines 165 - 190 shortly describes how the JASMIN is involved, but I doubt a reader can get any understanding of what and why is done. Moreover, it is not at all clear how to use JASMIN in conjunction with the updated code. How the JASMIN environment can be installed, how code is compiled, etc. The description should be essentially extended and be such that those who are willing to follow author's approach can do it.

The manuscript devotes more than a half of its volume to the description of simple test configuration, going into too much detail, which is hardly optimal. The test case remains the test case, and one can only learn that the approach proposed by the authors is working, yet not without drawbacks related to one-way nesting (the development of errors on fine-coarse boundary). I do not think that this test case is well suited to demonstrate the need of adaptivity. Figure 11 shows clearly that small-scale turbulence occupies 3/4 domain on full mesh, and it occupies only pieces where the resolution is refined in b and c. It is different from the initial phases in Fig. 9 and 10, but 5 or 20 days is a too short time for turbulence to equilibrate, and this transient phase is of no interest (it depends on coarse initial conditions, and does not model any reality). So the conclusion here is that dynamic adaptivity is an interesting, but perhaps not very needed possibility as concerns eddying flows. Static refinement might be doing the work, and one will take a decision where to resolve based on one interest. I foresee, however, one direction, where dynamic refinement still might be of interest -- the simulations of seasonal course of variability. Submesoscale eddies might be suppressed in warm seasons, and a coarser mesh will be sufficient for mesoscale. My recommendation are to make the experimental part more

compact. One can hardly learn anything from detailed description of particular eddy features or the comparison of transects (Fig. 13, 14), and there is very little sense in Fig. 9 and 10.

Please also check the text: there are numerous cases when plural/singular and some terms (e.g. kinematics) are used inappropriately.