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Geoscientific Model Development Discussions
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Interactive comment on "Multi-grid algorithm for passive tracer transport in NEMO ocean circulation model: a case study with NEMO OGCM (version 3.6)" *by* Clément Bricaud et al.

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It is a well written manuscript, and I am happy to recommend it for the journal. Surely, the central part of the manuscript deals with just the coarsening procedure. However, there are many accompanying issues such as vertical diffusivity, isoneutral slope, vertical cell size, etc., which have to be addressed simultaneously with coarsening; namely the description of how they are addressed is the most valuable part of the manuscript. No numerical operator is accurate at the grid scale, so that advection of numerous tracers at the original resolution in reality only kills computational resources without making tracers any more accurate compared to the case when they are advected with

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reasonably coarsened velocities. One still needs extra resolution for ocean dynamics to reduce overall dissipation, but the effective resolution, as mentioned in the manuscript is much coarser than the grid scale. I think the approach proposed in the manuscript is a very good way to limit overuse of computational resources, especially given the present tendency of moving to 1/4 or 1/12 degree resolution in climate research.

Some minor points:

General: In many figures the axes or legends are hardly readable, the font size has to be increased.

line 2 running models is expensive or cost of .... is large line 7 allows to –> allows someone to (also several times in the text) line 43 remove 'also' 54 inferior to –> smaller than

Formula 2 and 3 — explain that i,j are the horizontal and k vertical indices

103 akin –> scalar

135 edit

160 the HR buoyancy?? What is coarsened N^2 or isoneutral density?

187 jpk/HR

193 called to memory –> made available?

214 upfront? – just omit 215 or 225 close 236 This sentence can be omitted 249 Is e_max just equatorial resolution? 260 Why eddy? 270 adjust semicolumn 282 adjust ,as 303 plays on important role on? Just omit. ...resolution influences ... 338 remove 'propose' here and in several other places. You do not propose, you already did. 377 performance 390 as much resources as 410 one grid point — does it also mean that the third order upwind schemes are not allowed? Of course this will not be a limitation in future.

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