

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2022-217

Anonymous Referee #2

Referee comment on "Reproducible and Relocatable Regional Ocean Modelling: Fundamentals and practices" by Jeff A. Polton et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2022-217-RC2>, 2022

In "Reproducible and relocatable regional ocean modelling: Fundamentals and practices", authors Polton et al present the case for documenting and sharing regional models and methodologies for regional modelling. They advocate for reproducibility, standardized assessment and rewarding those that produce the repos and documentation. This case is not difficult to make and they make it well. In the second part of the paper, they discuss three specific examples and many of the decisions and pitfalls in configuring these regional models. I recognized many of the latter from my experience and think that this section will be of great use for new modellers. I include below under details some more ideas based on my experience.

These two sections built a great deal of expectation for the three worked examples. The concept of working examples that researchers can follow along through steps as they build their regional domain is excellent. They can try the method on the example, test that they can replicate it before they try their own. This process separates method problems from local problems: wonderful.

However, when I examined one of the examples: SEVERN-SWOT I was disappointed. As someone not having access to the ARCHER2 machine, it was not possible for me to set up and run this example.

E.g. 1) Reading the pdf[1], we quickly come to making the new regional model domain from the larger AMM15 domain. The AMM15 coordinates file location is given as a directory on archer2. I know I can get this file from the NEMO site (or could in the past) but new people will not necessarily know this.

E.g. 2) As the Severn is an estuary I was particularly interested in the river forcing. There is nothing about the river forcing in the pdf but I did find a README[2] under inputs/rivers

on the github page. However, again, it points to a file on archer and I do not know another source for it.

Not only can I not make the SEVERN-SWOT regional example following along with the pdf, I don't think I could even get a working final SEVERN-SWOT model going.

I know the authors intend for their models to be reproducible beyond the boundaries of their computer system. However, it's always the details and generally the big input/forcing files where the intention meets reality. Here, however, as a demonstration of the principle, I had hoped to find the exception. I don't think it would be hugely difficult to make this example accessible to the greater audience. It will take careful review and perhaps putting some of the larger files on a website.

Details:

Line 257 xarray repeated

Line 248 workflows.... that abstract (no s on abstract)

Line 405 important to ensure that straits are not connected on the diagonal only (no flow that way) and that important islands have not been remove. Using (and keeping) a script (even a complicated one) to manipulate your bathymetry means that it is reproducible.

Line 562 such as biogeochemistry (s missing on as)

Line 605 spell out MJO

Line 633 10 m is very deep for mixing freshwater in my coastal experience. Plumes (Rhine, Columbia etc) are not 10 m thick

Line 704 input files (no s on input)

Line 730 in strong tidal mixing areas, with good vertical resolution, the vertical CFL number can also be a problem

Line 916 this scheme exists (no s on scheme)

Line 957 and on: this level of detail, mentioning specific variables, is much higher than other sections of the paper, I suggest abstracting it to match the rest of the paper.

Line 970 source needs (s on need)

Line 998 and on: Lagrangian (with a capital as Lagrange was a person)

General quibble: The paper stresses consistent boundary conditions, river forcing, atmospheric forcing. I agree that consistent helps avoid some bizarre errors. However, the coastal ocean is very much a receiver of forcings and accurate forcing can be really key for some processes in any given region.

[1] <https://github.com/JMMP-Group/SEVERN-SWOT/wiki> or SEVERN-SWOT_Apr22.pdf from <https://zenodo.org/record/6470007>

[2]<https://github.com/JMMP-Group/SEVERN-SWOT/tree/v0.1.0/INPUTS/RIVERS>