Geoscientific
Model Development
Discussions

Interactive comment on "A skill assessment of the biogeochemical model REcoM2 coupled to the finite element sea-ice ocean model (FESOM 1.3)" *by* V. Schourup-Kristensen et al.

Anonymous Referee #1

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A skill assessment of the biogeochemical model REcoM2 coupled to the finite element sea-ice ocean model (FESOM 1.3)

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1 Overall comments

Schourup-Kristensen et al present a skill assessment of the finite element global ocean model FESOM coupled with the biogeochemical model REcoM2. They focus in par-

ticular to the Southern Ocean. They compare results to a number of datasets but no formal comparisons to other model results.

Overall the paper contains some excellent results and the model shows reasonable skill at the global skill. The authors acknowledge the weaknesses in the model and which variables are not adequately represented. The paper is suitable for publication in GMD and to my knowledge is the first global FE-biogeochemical model to date. This represents a significant result.

I have a few suggestions to hopefully improve the manuscript.

2 Suggestions

The authors claim to compare their results to other models. Whilst this is true in that they cite how their results compare to other models in the literature, there is no formal comparison to other models, not any graphical comparison within this paper (i.e. replotting results to the same scale as used in previous studies). I think they should strengthen the comparison to other models - it's vital to put their results in context.

The writing is disjointed, with many one sentence paragraphs throughout, particularly in the results and discussion sections: e.g. "In the Southern Ocean, the spatial distribution of iron in the model is reasonable, but it tends towards low values (Table 2)." This makes it difficult to read and place the results in context of the literature they cite.

A more thorough description of the FESOM model is required in section 2. Which function space is used for these simulations? What timestepping method and what was dt? I don't think the current description, which does cite relevant literature, is not sufficient for a reader not familiar with FESOM to evaluate the output fully.

Which bathymetry data were used in this study? Which coastline data was used?

Although the authors correctly indicate the strength of unstructured mesh ocean models, they have not used the capabilities here. I think this needs to be explained. I assume this is the first step in a larger project where the unstructured mesh will play a more important part.

3 Minor corrections

- Equation A1 - SMS(C) should that be C_{SMS}? Or should C_{SMS} be SMS(C) as per the rest of the equations?

- Appendix A: "...tracers than in a model based in..." based on?

- Appendix A: I'm not why a quota approach means you need more tracers?

- Figure 4: Font is far too small.

- Figure 6, 13: font for the axes and correlation coefficients is very small.

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