

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2021-279

Anonymous Referee #2

Referee comment on "ECOSMO II(CHL): a marine biogeochemical model for the North Atlantic and the Arctic" by Veli Çağlar Yumruktepe et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-279-RC2>, 2021

The paper presents a description and evaluation of a new configuration of the biogeochemical model ECOSMO II (ECOSMO II(CHL)) in which they have included chl in the three functional phytoplankton types as prognostic variables. Furthermore, the paper presents a comparison of model experiments using three different parameter sets. In the appendix, the authors have also included a comparison between ECOSMO II and ECOSMO II(CHL) in a configuration where the models are coupled to the 1d physical model GOTM.

The paper is well written and the methodology ambitious. However, I would like to have seen a larger focus on the comparison between ECOSMO II and ECOSMO II(CHL). Furthermore, apart from two sentences (451-453) I find no discussion on why EXP1 seems to perform better for nitrate and phosphate (Fig 3 and Table 2) than EXP 2 and 3. I find that the paper could be published in GMD after some minor revisions.

Specific comments

Lines 123-126: F (Eq (4)) is not explained.

Lines 139-144. What limited the concentrations from becoming too small before you added this? Also, you state that: "The minimum concentration at which the loss terms are calculated are...". Should it say: "The minimum concentration at which the loss terms are switched off"?

Fig.3: It is not obvious to me that EXP2 and 3 perform better than EXP1. It looks the opposite from this figure.

Line 320: Is it not the net primary production your extracting? You don't explicitly model respiration so what you model is gross primary production (photosynthesis) minus respiration i.e. the net?

Line 350: Please insert full names of functional types and their abbreviations in the caption.

Lines 388-389: What is the reason for the difference in N/P ratios in the Barents sea between WOA and model, I guess mostly as a result of the difference in nitrate in this area?

Fig. A1: It would be interesting to see a plot comparing ECOSMOII and ECOSMOII(CHL) to observations so as to get a clearer view of the benefits of variable C:Chl ratios.

Technical comments:

Line 105: "...the a single sediment layer" remove "a".

Line 112: "...addition on" replace "on" with "to"

Line 122, Eq. (4): Specify index of summation.

Lines 241-242, Eqs (8) and (9). Add index of summation.

Line 265: Fig3: Change text to explain line colors. It now states: solid, dashed, dotted.

Line 258: Remove one "Fig." from reference to figure 4