

Response to Anonymous Referee #1

General Comments from Anonymous Referee # 1:

This paper presents the results of what was apparently a considerable effort to refine the marine ecosystem component of the UVic Earth-System Climate Model. Some improvements are clearly demonstrated, most notably the reproduction of the seasonal cycle. Other improvements make sense, even if they have not been demonstrated to clearly improve the simulations (which is not an easy task, given the limitations of available observations).

Overall the presentation is good enough, but I suggest minor revisions (see below) to make the paper more concise and to better display the results. In several places sentences are too long, sometimes with convoluted wording that makes the meaning a little difficult to follow. I had to re-read several sentences to grasp their meaning.

Specific Comments from Anonymous Referee # 1:

The following list is not exhaustive. I suggest that the authors go over the paper thoroughly to make the wording more concise and to correct for grammatical errors.

p. 1137, line 28: For clarity, I suggest adding "and added to the ocean in bioavailable form" after "atmosphere". p. 1138, line 13: "oceans" should be "ocean's" p. 1139, line 7: should read "on a global basis" p. 1140, line 24: "help" should be "helped" p. 1141, line 14: "an error" p. 1148, line 12: "to be negligible" p. 1152, line 8: "correctly simulating of the" should be "the ability to correctly simulate the" 1154, line 19: "with new model" should be "from the new model" line 20: "than with the" should be "than are the patterns from the" (The with is confusing given the preceding "with" in "...more consistent with observations". In other words, the sentence could be taken to mean that the patterns generated by the new model are more consistent with the observations than they are with the old model. However, the intent is to compare the output of each model against the observations.) line 29 (end) "and are the" 1156, line 3: delete "since" line 4: move the comma to before "and" and add "therefore" after "and" 1157, line 12: delete the second "and" 1158, lines 18-19: A more concise wording would be: "Nonetheless, there are a number of reasons for the systematic differences between our model and the reported estimates of PP." 1160, line 20: "the new model" line 28: delete "to do" 1161, lines 2-4: "...that mesozooplankton consume ~10-15% (refs.), and microzooplankton consume ~55-75% (refs.) of oceanic PP." line 19: insert a comma after "high" 1163, line2: "simulated" should be "simulate".

Response: The grammatical errors listed above have been corrected. We have also spent more time going through the manuscript to make sure that our wording is concise and grammatically correct.

lines 13-14: Indeed, the use of a fixed "iron mask" is not ideal, as it seems rather at odds with the goal of simulating changes in the Earth System. I understand that there is no simple and ready alternative, but it does seem that replacing this fixed mask with a superior alternative should be a priority.

Response: We agree that a fixed "iron mask" is not ideal and would like to replace it as soon as a valid alternative is available.

Figure 18: The panels are rather small, especially given that there is so much empty space on the page. Enlarging the figure would make it easier to see. Figures 20, 21, 24: Could these figures not be enlarged somewhat, also?

Response: We agree that the mentioned panels are too small. Our original ones were larger. Figure 18 was intended to fill half a page width-wise (i.e., approximately the same width as Fig. 16) and figures 20, 21, and 24 were intended to be scaled so that they were as wide as the page margins. If the manuscript is accepted for final publication we will work with the typesetters to insure that the figures are enlarged.