

Interactive comment on “Using biogeochemical data assimilation to assess the relative skill of multiple ecosystem models: effects of increasing the complexity of the planktonic food web” by Y. Xiao and M. A. M. Friedrichs

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Response to Reviewer #2:

We appreciate Reviewer #2's input on this manuscript, and hope that we've fully addressed the comments/questions provided.

Referee overview: In this paper the authors assess the ability of five ecosystem model variants to predict surface chlorophyll and particulate organic carbon. The five variants differ in their degree of complexity ranging from a simple 1P1Z food web to more com-

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plex 3P2Z food web. Satellite-derived chlorophyll and particulate organic carbon are assimilated at four different sites on the continental shelf of the Mid-Atlantic Bight. A cross validation is then performed at five independent sites. An additional experiment is performed where 20% random noise is added to the satellite data prior to the assimilation. The authors found that the moderately complex model (2P2Z) was associated with the highest model skills. The resulting optimal parameters after noise was added to the satellite derived chlorophyll data were nearly identical for all variants except for the most complex one (3P2Z). The paper is well presented and written, the scientific approach and methods valid and described sufficiently for traceability. The authors give proper credit to related work and indicate the novelty of their study.

Major comments:

Comment: The biggest problem of this paper is the fact that a lot of the background on the method used is in a paper that has not gone through a peer review process yet. The paper by Xiao and Friedrichs (2014) is not yet published yet referenced several times in the paper. It may be best to wait until that paper has been accepted before publishing this one.

Response: We are pleased to report that Xiao and Friedrichs (2014) is currently accepted by JGR and should be published online soon.

Comment: The title should include the term Mid-Atlantic Bight or something similar since the results are not cross-validated outside this area.

Response: It's rather lengthy, but we have changed the title to: Using biogeochemical data assimilation to assess the relative skill of multiple ecosystem models in the Mid-Atlantic Bight: effects of increasing the complexity of the planktonic food web

Comment: This leads me to my next comment: why did the authors focus on this area only? Why not try to cross-validate in other regions?

Response: This region was selected because the initial and boundary conditions for

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the model state variables were provided by a corresponding 3D model implementation (Hofmann et al., 2008; 2011) of this region. We chose the MAB rather than the South Atlantic Bight or the Gulf of Maine, which were also included in the 3D implementation, because we felt that the fields provided by the 3D model were most skillful in the MAB.

Minor comments:

P487, L15: define MAB

Response: This has been corrected.

P491, L7: fall bloom not Fall bloom

Response: This has been corrected.

Figure 1: why did you choose these sites? Why are all the DA sites in coastal waters? Why not several CV sites in the open ocean?

Response: We were primarily interested in whether the model could reproduce observations on and off the MAB continental shelf, so we chose some DA sites in relatively shallow shelf waters (~50-100m) and some DA sites near the shelf break (~600-800m). We tried to place the CV sites in a wide range of depths, between ~20m to > 2000m (Figure 1).

Figure 2: the text on these figures is hard to read

Response: The text may be difficult to read because the size of the figure is small. We will inquire with the typesetter as to whether they would like to put Figure 2a and 2b on separate pages, so the text is larger in each figure.

Interactive comment on Biogeosciences Discuss., 11, 481, 2014.