Biogeosciences Discuss., 8, C2932–C2935, 2011
www.biogeosciences-discuss.net/8/C2932/2011/

Biogeosciences Discussions

Interactive comment on "Oceanic controls on the primary production of the northwest European continental shelf under recent past and potential future conditions" *by* J. Holt et al.

Anonymous Referee #1

Received and published: 8 September 2011

Oceanic controls on the primary.....
by J.Holt et al.

In the work a number of different simulations have been done, and are discussed with the focus on change in primary production as a consequence of climate change.The paper is interesting and well written, but even if the different simulations are forced with outputs from a climate model (IPSL), the work is merely a sensitivity study. To only use one prediction of climate change is not a very robust approach - this is also one of the main conclusions from the Ensemble project where the IPSL is taken from. The project recommends instead that to make more robust conclusions in a study like

this, repeated studies with forcing from a number of different models should be used. On the other hand, the main conclusions in the manuscript is drawn from the fact that the nutrient open boundary conditions changes, and this has a great impact on the on-shelf primary production (realtionship between A1B and A1Bb). This conclusion confirms other studies that the North Sea inflow partly controls the primary productivity over large areas. The inclusion of other shelf seas in the same context makes the work well worth publishing. However, I suggest a slightly change in focus away from climate change and more towards sensitivity and a pure discussion on the oceanic controls.

Some more specific remarks:

1. Title: this should already be reflected in the title with removal of: under recent, past.....
2. page 8385, line 17: A detailed analysis..... Please provide some in the present work
3. page 8388, line 8. What about a decrease. Even if the HadRM3 simulation gave an increase, this might be different with other forcings
4. page 8388, line 20. ....focus on the first of these drivers..... It is of course a more pleasant job to limit the study to one driver, but since the other two also would have an impact they should not be completely left out. Please add some thoughts about their influence on the results in the discussion.
5. page 8391, line 18. Yes, it is rather a *sensitivity* study.
6. page 8392, line 15. There are also periods with net inflow to the Baltic, but I understand that in the present set-up there will always be a northward flow. Will this have any impact on the results??

7. page 8393, line 2. From the other text I understand that only the atmospheric forcing are used (6 hourly) to force the Polcoms-ERSEM. Are these monthly fields used to anything??

8. page 8394. I have problems with the validation. What has really been done? Is this a comparison of mean values over the areas, or is the seasonal cycle included through a comparison of monthly means. Please explain better. What about the cost function. Is this the mean of monthly cost functions? What about the standard deviation used in the cost function. Is it over the full annual cycle, is it monthly, or has the seasonal signal been removed somehow??

9. page 8397, line 5. It is perhaps unbalanced with the open ocean, but not necesserily unnnatural.

10. page 8397, 2nd para. What is said here, and what is the main conclusion from the work, is that it is the available nutrients that is important. Table 2 is an attempt to give a budget.I would like to see a better balanced budget (including the A1Bb simulation) where the importance of the different terms is discussed in relation to the change in primary production. I also think the Table should be refined (separating North Sea, Irish Sea,...).

11. page 8398, line 26-29. This is only speculations. Provide some estimates to strengthen the hypothesis.

12. page 8403, line 14-17 + page 8404, line 8-10. This dependency (different volume flux regions) is also discussed by Kauker and von Storch (2000) and Hjollo et al (2009).

13. Discussion. Please add a paragraph discussing the use of only one climate model, and the impact this will have when discussing the results in a possible climate framework

S.S. Hjollo et al. 2009. Journal of Marine Systems 78, 180 − 192

Kauker, F., von Storch, H., 2000. J. Phys. Oceanogr. 30, 3039 − 3049

Interactive comment on Biogeosciences Discuss., 8, 8383, 2011.