Biogeosciences Discuss., 8, C1336–C1337, 2011
www.biogeosciences-discuss.net/8/C1336/2011/

Biogeosciences Discussions

Interactive comment on "Seasonal and interannual variability of physical and biological dynamics at the Shelfbreak Front of the Middle Atlantic Bight: nutrient supply mechanisms" *by* R. He et al.

Anonymous Referee #1

Received and published: 31 May 2011

General Comments:

The paper utilizes a coupled three-dimensional circulation and size-structured biological model to investigate biological variability and the associated physical-biological forcing processes. The model successfully captures the observed features and provides some insightful dynamic correlations between the variation of biological field and unique physical forcing in MAB. The paper is well organized and written and is acceptable to publish in Biogeosciences. With this positive recommendation, I also suggest authors to response to my following questions and comments.

Specific Comments:

P. 1562, line 1. The sentence "In winter, surface chlorophyll concentrations decline again compared to the fall" is not accurate. The model actually missed the decline shown in MODIS data (see Figure 2).

Subsection 4.1.2. High NO3 concentrations in both 2004 and 2005 are induced by stronger mixing, as stated in the paper. However, there was a two-month lag between the NO3 and phytoplankton in 2005, while no lag existed in 2004. Why? How is this related to the one-month lag stated before?

P. 1567. How are MLD and BBL defined and obtained?

P. 1567, lines 20-21. Why the flux is quantified by TKE while it can be easily obtained from the model? The inclusion of cross-shelf velocity is not proper in the flux estimation.

P. 1569, line 6. The unit for each term is needed in Figure 13.

Subsections 4.2 and 4.3. The analyses in 4.2 first attribute the NO3 variation to upstream advection and to BBL convergence, but their relative contributions to the NO3 are not well explained in the paper. The term balance in NO3 equation supposedly will provide the answer, but it fails to do so. Instead, it shows that HADV and VADV cancel each other, given the impression that both upstream advection and vertical motion induced by BBL convergence are not important in NO3 variation. It may be worthy checking the term calculation, particularly regarding to advection terms.

Interactive comment on Biogeosciences Discuss., 8, 1555, 2011.