Ocean Sci. Discuss., 8, C129–C131, 2011
www.ocean-sci-discuss.net/8/C129/2011/

Ocean Science Discussions

Interactive comment on "Numerical modelling of POC yearly dynamics in the southern Baltic under variable scenarios of nutrients, light and temperature" *by* L. Dzierzbicka-Glowacka et al.

Anonymous Referee #1

Received and published: 20 April 2011

General remarks

Based on several experimental simulations with a 1D POC model the authors conclude that an increase in POC concentration of about 70-90% is expected in 2050 compare to average concentration in (1965-1998) in the southern Baltic Sea. The future projections of nutrient concentrations, temperature and PAR are based on trends in historical data with a reference to (Renk, 2000). To me, this manuscript raises several questions and concerns with the most critical stated below.

Q1: The simulations where made using several assumptions about the future change in temperature, PAR, wind and nutrients. Are these assumptions realistic? How where

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

these trends calculated? To my understanding it is purely an extrapolation of the trends in the period (1965-1998), or a part of this period (this is not clear). Is this really a realistic projection of future changes? It is assumed that the nutrient concentration (or nutrient loading, not clear) will increase 1% per year. What is then the concentration in 2050, is it realistic (not presented)?

Q2: Are the POC concentration estimated with a transient simulation over all years?

Q3: How is the ecological model coupled to the physical model? A short description is presented at page 680 but why and how are the physical fields interpolated? I looked in (Dzierzbicka-Glowacka et. al. 2010) for a clearer description but found instead an almost identical text at page 629.

Q4: The model is validated at Gdansk Deep in (Dzierzbicka-Glowacka et. al. 2010) but the manuscript lacks model observation comparison at Bornholm Deep and Gotland Deep. At page 686 there is a short discussion about the models ability to simulate PP and POC. The authors claim that PP and POC agrees well with experimental data for the period 1965-1998 and 2010 with two references. However, one of them are from 1984 and could not possibly been compared to observations in 2010 or 1998. Have I misunderstood something? The other reference is again (Dzierzbicka-Glowacka et. al. 2010). This reference does validate POC concentrations for the year 2007 and 2008 in Gdansk Deep but no model-observation comparison of PP is to be found.

Detailed remarks

1) In the introduction it is mention that trends and average values of nutrient concentrations, temperature and PAR are used in the simulations. But in section “Scenarios of future changes” it is only mentioned that temperature and chlorophyll trends has been provided from this dataset.

2) How are the average wind speed and direction calculated?

3) At page 681: “In the first step of our study, the calculations were made assuming

OSD

8, C129–C131, 2011

the following". What is the next step in the study? Are the presented results based on more assumptions than these? If so they should be explained.

4) The authors make a distinction between surface water (0-1 meter depth) and upper layer (0-10 meter depth). What is the reason for this and why is the surface layer only presented in Gdansk Deep? Also, these definitions are first mentioned in section "Scenarios of future changes" but defined later in the text.

Interactive comment on Ocean Sci. Discuss., 8, 675, 2011.