Interactive comment on “Impact of atmospheric and terrestrial CO\textsubscript{2} feedbacks on fertilization-induced marine carbon uptake” by A. Oschlies

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Received and published: 17 June 2009

Short comment about “Impact of atmospheric and terrestrial CO\textsubscript{2} feedbacks on fertilization-induced marine carbon uptake by A. Oschlies”. BGD 6, 4493-4525, 2009.

by Doug Mackie University of Otago, New Zealand.

This is not a review of the paper; it is simply some short comments and questions that occurred to me while reading the manuscript.

Maximum phytoplankton growth rates: Is the maximum phytoplankton growth rate assumed of 10.0 day\textsuperscript{-1} (on p4503 line 12) a typo for 1.0? “Lab weeds” under optimum
conditions seldom surpass 1.2-1.3 day\(^{-1}\) and a rate of 10 day\(^{-1}\) seems a little unusual, especially at 0\(^{\circ}\)C. Are there reported measurements to support this growth rate?

Carbon Inventory: The rate of change of pCO2 (e.g. Table 3) seems a little high. For example, in Table 3, all models (except ATCO2 const) show a decrease in pCO2 at 1000 years of between 65 and 90 \(\mu\)atm. That is, atmospheric pCO2 decreases by between 0.07-0.1 \(\mu\)atm y\(^{-1}\). My interpretation of the EPICA and Vostok data (though temporal resolution is coarse) suggests such rapid changes have not occurred previously; at the onset of glaciations pCO2 appears to decrease relatively smoothly by about 100 \(\mu\)atm y\(^{-1}\) over 10-15,000 years; i.e. at about 0.01-0.02 \(\mu\)atm y\(^{-1}\).

This is to say nothing of the fact that at 10 and 100 years the modelled changes in pCO2 are even larger: \(\sim\)1 \(\mu\)atm y\(^{-1}\) over 1-10 year and 0.2-0.5 \(\mu\)atm y\(^{-1}\) over year 10-100.

Are there reported data or models supporting these rates of drawdown?

Interactive comment on Biogeosciences Discuss., 6, 4493, 2009.