

Interactive comment on “Impact of atmospheric and terrestrial CO₂ feedbacks on fertilization-induced marine carbon uptake” by A. Oschlies

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Short comment about “Impact of atmospheric and terrestrial CO₂ 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⁻¹ (on p4503 line 12) a typo for 1.0? “Lab weeds” under optimum

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conditions seldom surpass 1.2-1.3 day⁻¹ and a rate of 10 day⁻¹ seems a little unusual, especially at 0°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 μatm. That is, atmospheric pCO₂ decreases by between 0.07-0.1 μatm 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 μatm y⁻¹ over 10-15,000 years; i.e. at about 0.01-0.02 μatm y⁻¹.

This is to say nothing of the fact that at 10 and 100 years the modelled changes in pCO₂ are even larger: ~1 μatm y⁻¹ over 1-10 year and 0.2-0.5 μatm y⁻¹ over year 10-100.

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

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