

Interactive comment on “Marine geochemical data assimilation in an efficient Earth System Model of global biogeochemical cycling” by A. Ridgwell et al.

Anonymous Referee #3

Received and published: 26 October 2006

Review of Ridgwell et al., Biogeosciences

The authors describe the implementation of a very simple carbon cycle model into the GENIE Earth System model. The authors consider phosphate as the only limiting nutrient and calcite export is linked to organic matter export by a Redfield ratio. Silica cycling is not considered. The authors also describe the implementation of the carbon isotopes ^{13}C and ^{14}C . Finally, the model parameters of the carbon cycle formulations are estimated using an Ensemble Kalman Filter approach to minimize deviations between modeled and data-based fields of phosphate and alkalinity. Results are also presented for CFC-11 and anthropogenic carbon.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

The paper is well-written and easy to read. I recommend its publications.

Specific comments

1) I am somewhat disappointed that the authors have not taken to effort to develop a somewhat more comprehensive marine biogeochemical cycle including other nutrients. Simple parameterization are found in the literature, e.g. the work by Maier-Reimer.

2) Modelled uptake of CFC-11 and anthropogenic carbon is substantially ($> 50\%$) over-estimated. This raises doubts on the quality of the surface-to-deep ventilation rate simulated by the model. In turn, this raises doubts on the magnitude of the simulated nutrient input into the euphotic zone and simulated export production. Should the ocean transport parameters not been recalibrated to match data-based metrics of ventilation time scale tracers such as CFC-11 or radiocarbon?

3) I believe that the mismatch between simulated ventilation time scale tracers (CFCs and anth. Carbon) should be part of the conclusion section.

Interactive comment on Biogeosciences Discuss., 3, 1313, 2006.

BGD

3, S665–S666, 2006

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper