

Home

Online Library CP

- Recent Final Revised Papers
- [Volumes and Issues](#)
- Special Issues
- Library Search
- Title and Author Search

Online Library CPD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact  
Factor  
1.450

ISI  
indexed



[Volumes and Issues](#) [Contents of Issue 3](#) [Special Issue](#)

Clim. Past, 3, 387-396, 2007

[www.clim-past.net/3/387/2007/](http://www.clim-past.net/3/387/2007/)

© Author(s) 2007. This work is licensed under a Creative Commons License.

## Application of sediment core modelling to interpreting the glacial-interglacial record of Southern Ocean silica cycling

A. Ridgwell

School of Geographical Sciences, University of Bristol, Bristol, UK

**Abstract.** Sediments from the Southern Ocean reveal a meridional divide in biogeochemical cycling response to the glacial-interglacial cycles of the late Neogene. South of the present-day position of the Antarctic Polar Front in the Atlantic sector of the Southern Ocean, biogenic opal is generally much more abundant in sediments during interglacials compared to glacials. To the north, an anti-phased relationship is observed, with maximum opal abundance instead occurring during glacials. This antagonistic response of sedimentary properties provides an important model validation target for testing hypotheses of glacial-interglacial change against, particularly for understanding the causes of the concurrent variability in atmospheric CO<sub>2</sub>. Here, I illustrate a time-dependent modelling approach to helping understand climates of the past by means of the mechanistic simulation of marine sediment core records. I find that a close match between model-predicted and observed down-core changes in sedimentary opal content can be achieved when changes in seasonal sea-ice extent are imposed, whereas the predicted sedimentary response to iron fertilization on its own is not consistent with sedimentary observations. The results of this sediment record model-data comparison supports previous inferences that the changing cryosphere is the primary driver of the striking features exhibited by the paleoceanographic record of this region.

[Final Revised Paper](#) (PDF, 427 KB) [Discussion Paper](#) (CPD)

Citation: Ridgwell, A.: Application of sediment core modelling to interpreting the glacial-interglacial record of Southern Ocean silica cycling, Clim. Past, 3, 387-396, 2007. [Bibtex](#) [EndNote](#) [Reference Manager](#)



Search CP

Library Search

Author Search

News

- TWO editors of Climate of the Past funded by ERC
- Financial Support for Authors
- New Service Charges

Recent Papers

01 | CP, 03 Nov 2008:  
Forced and internal modes of variability of the East Asian summer monsoon

02 | CPD, 27 Oct 2008:  
The 8.2 ka cooling event related to extensive melting of the Greenland Ice Sheet

03 | CP, 21 Oct 2008:  
Anticyclonic atmospheric circulation as an analogue for the warm and dry mid-Holocene summer climate in central Scandinavia

04 | CPD, 21 Oct 2008: