

## ***Interactive comment on “Significant long-term increase of fossil fuel CO<sub>2</sub> uptake from reduced marine calcification” by A. Ridgwell et al.***

### **Anonymous Referee #1**

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### **Comments on “Significant long-term increase of fossil fuel CO<sub>2</sub> uptake from reduced marine calcification” by A. Ridgwell et al.**

The paper brings interesting results. It would be logical to emphasize more the connection to the submitted GBC paper. The title is somehow misleading; I prefer the running title which includes “CO<sub>2</sub>- calcification feedback”. It is generally well written but occasionally too short. Referencing “for more details see...” is partly incorrect and, thus, disappointing.

#### **Specific remarks:**

p1765 l. 12 is referred as eq.1 but it is no eq. In the given form it suggests spontaneous crystallization. Dependence on POC export should be mentioned here, not 2 pages later.  
p.1766 1st par. Make a few words about construction of the cost function and the essentials of

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“Levenberg-Marquardt algorithm”.

is there any reason to repeat that  $1-1=0$ ?

To what extent is the ensemble biased by the Zhong and Mucci data?

1.9: At values  $0 < \eta < 1$  as given in the table the smallest value gives the strongest sensitivity near  $\Omega=1$ .

1.17 explain shortly what you mean by EnKF. The given reference in 1.20 just contains “we use the same Kalman filtering as in ...” Or give reference to Annan in ocean modeling here.

p.1767 1.5 “tuned tightly”: It is not clear to me how the ensemble members differ in input parameters and which processes are used for tuning.

1.22 Isn't the neglect of sediments a step backwards from your previous work?

p.1768 1. 15 Mention also the number for organic export p.1769 1.9: “invariably” is an invalid generalization.

p.1770 1.5: A few words about inhibiting effects of rising Revelle (buffer) factor wouldn't be obsolete.

p.1771 1.11 Changes in POC production may feed back quite different from changes in POC penetration.

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Interactive comment on Biogeosciences Discuss., 3, 1763, 2006.

**BGD**

3, S909–S910, 2006

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