

Interactive comment on “The Rock Geochemical Model (RokGeM) v0.9” by G. Colbourn et al.

D. Archer (Referee)

d-archer@uchicago.edu

Received and published: 7 August 2012

The modeling is nice work and definitely worthy of publication. I haven't read the 2012 in-press paper which by the way it was described might have more of the results than this manuscript does, which reads like a model description and output data archive. This paper comes across as a sort of supplemental material section, it needs to be finished off properly to stand up on its own.

The results need to be boiled down. How can you generalize your results: The answers are there within the main part of the text but they should be summarized in the conclusions section and in figures if possible. What have you learned about the real world from your modeling?

Perhaps this could go in the direction of calculating the sensitivity of the uptake time (which no one has done since Sunquist) to various input parameters. For your readers

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to compare runs against each other would require close work across multiple (slow-loading) figures. Wouldn't some other graphical form of summarizing the data work better, if it could put multiple runs on a single page? Comparing the apparent e-folding time scales of the different runs would also give the text of the paper a way to make the suite of runs useful to the reader.

The discussion section is mainly about limitations of the model which is reasonable I guess but seemed out of place, and future work, which has no place in a paper I don't think.

Pg 2009. "Once alkalinity builds up from sediment dissolution you get an equal and opposite reaction to terrestrial neutralisation in the ocean, leaving the system to equilibrate with an atmospheric 5 pCO₂ that is elevated relative to its pre-perturbation state." No one is going to understand whatever it is you mean by this sentence or the rest of the paragraph.

Pg 2011, I'd leave out the Raymo paragraph, since you're dismissing it in one line anyway, why bring it up?

Pg 2011 "However, recent work is ambiguous as to whether there have been significant variations of weathering on glacial-interglacial timescales (Foster and Vance, 2006)." If this is the basis of your model, the criticism of it (which isn't all that recent, 2006) should be explained, not just mentioned

Pg 2015, Model development section. I'd leave that to supplemental material. Kind of shocked to see a password in a scientific publication.

2021, paragraph beginning line 20. This is kind of out of nowhere, and I think other models get slightly different numbers anyway.

Figures 3, 6, 9, 13, and 22 are hugely data intensive, beyond all need. They take forever to load. Their underlying data should be subsampled. Other similar figures do not have this problem.

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Interactive comment on Geosci. Model Dev. Discuss., 5, 2007, 2012.

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5, C518–C520, 2012

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