

Interactive comment on “From laboratory manipulations to earth system models: predicting pelagic calcification and its consequences” by A. Ridgwell et al.

A. Ridgwell

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Just a quick comment in advance of a full reply, if only to prove that at least one of the authors still has a pulse and that sometimes some ‘open discussion’ is possible in the ‘open discussion’ phase of BGD ;) Although having said that it is almost 8 weeks up so totally my fault for not writing anything sooner ...

Thank you for your comments Christoph, I will not comment on the specifics in this short note, but would like to say that in general I am happy to accept your overall criticisms. With hindsight, some of the wording could indeed be seen as ‘over-egging’ the proposal for the curve – we did not intend to make anything like a hard recommendation at this

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stage; as you point out, it is still very early days of having any real clue how the pelagic calcification system will go in the future. Personally, I am very happy to follow many of your suggestions, e.g. toning down the modelling 'recommendation' and adding further discussion of drawbacks to such an approach etc. I might also adjust the title – conference abstract titles have been worded ending with a question mark, which may also be appropriate here for the paper and would highlight the 'question' about reconciling experimental observations (and models).

I look on our proposed curve primarily as a conceptual framework for trying to make some sense of apparently conflicting experiments. Whether this would end up an appropriate model formulation, time will only tell. However, I could argue that no parameterization yet employed in models and used to make future predictions bears any great resemblance to the results coming out of culture studies. One thus could go as far as to argue that no calcification change should be incorporated in models at all (at least for the near future), although I do not favor this path and previous studies (such as yours) are clearly exploring possible future consequences rather than making hard predictions, so there is nothing 'wrong' with what has been done to date. Our curve is a different look at the pelagic system from a modelling/global CaCO₃ production viewpoint, and one which we believe (obviously!) has some potential for leading to further insights.

I would, however, take issue about that we cannot 'learn much' for using such a curve, and despite your criticism of the Eppley curve in general (and for temperature-dependence of growth), I know of no global ocean carbon cycle model (at least, OGCM-based) that does not use it in some form, or uses an analogous encapsulation of complex plankton (successional) changes that cannot be resolved explicitly for a variety of computational and lack of basic physiological characterization knowledge reasons. Our curve makes predictions about possible future calcifier and ecosystem responses to ocean acidification; predictions that can potentially be tested against observed differences in ecosystem structure across saturation gradients in the modern ocean. (Ev-

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ididently, this thus needs to be expanded on in a revised paper.)

Will try and write a detailed reply before the discussion phase ends ... perhaps Ulf would give me 2 more weeks if we are close to the closure ... ?

andy

Interactive comment on Biogeosciences Discuss., 6, 3455, 2009.

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