

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

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We are very grateful to the Referees for their support and thoughtful reviews of our manuscript.

With regards to the the overall recommendations made by the Referees and overarching points:

* All four Referees voiced some concerns about the degree to which an exact parallel could be drawn between the temperature-growth relationship devised originally by Eppley, and the (carbonate chemistry) environmental controls on (phyto)planktic calcification. The general recommendations were to lessen the parallels and/or more signifi-

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cantly caveat the application of the Eppley curve for representation temperature-growth response in ocean carbon cycle models. In our revision, we have done both, and have now substantially adjusted how the potential for analogy is presented and discussed. In particular, we now: (1) Have re-written the abstract to remove any explicit parallel to calcification ‘optima’ and formation of an Eppley curve like response, but instead keep our stated proposition to one of analogy to a overall net (ecosystem) response of carbonate production. (2) Have explicitly discussed in detail which aspects a direct Eppley curve analogy fails (e.g., reasons for an above-optimum decrease in calcification, paucity of experimental results to date demonstrating the existence of an optimum). (3) Have removed Figure 2, which encapsulated the explicit temperature-growth to CO₂-calcification analogy in the original manuscript. (4) Now present the section discussing calcification and the Eppley curve in terms of a “thought experiment”.

* Related to the above and addressing some concerns of Referee #1 (Christoph Heinze) and Referee #2 (Marion Gehlen), we have now adjusted the title to reflect the change in emphasis in the paper away from anything that might be construed as a hard ‘recommendation’ to more a conceptual analysis as well as explicitly addressing a comment by Referee #3: ‘From Laboratory Manipulations to Earth System Models: Scaling Calcification Impacts of Ocean Acidification’. Throughout the text we have also tempered the ‘recommendation’ aspect of our model parameterization inferences.

* Finally, several of the Referees were critical of our choice of the ‘CO₂’ change facet of ocean acidification to focus on. In the original manuscript we did in fact state that this was purely “illustrative”. However, we have throughout the manuscript now either listed multiple carbonate chemistry changes (that may be relevant) or simply write ‘carbonate chemistry’ as a generic descriptor of the nature of ocean acidification perturbation.

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