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Comment

***Interactive comment on “Marine ecosystem
community carbon and nutrient uptake
stoichiometry under varying ocean acidification
during the PeECE III experiment” by
R. G. J. Bellerby et al.***

R. G. J. Bellerby et al.

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Author response to referees’ comments on the paper “Marine ecosystem community carbon and nutrient uptake stoichiometry under varying ocean acidification during the PeECE III experiment by R.G.J. Bellerby, K.G. Schulz, U. Riebesell, C. Neill, G. Nondal, T. Johannessen, and K.R. Brown

We would first like to thank the reviewers for highlighting deficiencies in our explanation and suggesting approaches and interpretations which have strengthened the paper.

Anonymous referee #1

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The referee asked for more precise statistical analysis. We have now performed analyses on the data at the individual enclosure level to determine significance of the CO₂ dependence of the relationships for stoichiometry, net community production and calcification. The statistical analysis has strengthened our original interpretation of the results and no contradictions to our original conclusions have been found.

The referee wanted a deeper discussion on ecosystem community carbon and nutrient uptake stoichiometry and asked if we had any indications that secondary production and maybe other bacteria related parameters remained the same among the treatments. We have elaborated on the potential role of bacterial activity in regulated and responding to the organic carbon and nutrient cycling in the mesocosms and incorporated applicable references from the special issue that deal specifically with this topic.

We have included now recognition of the uncertainty surrounding the role of benthic organisms on the walls of the enclosures and their influence on biogeochemical cycling.

Anonymous referee #2

The referee was concerned about the apparent mixed message on the response of calcification of *Emiliana Huxleyi* to changes in the carbonate system during the experiment. We have clarified the message. We see no statistically significant difference in net community calcification between the different CO₂ scenarios. This is indeed different to that found by Delille et al. (2005). We discuss the differences between the experiments regarding cell numbers and relate them to those found in natural blooms. We also show that, even with an order of magnitude less calcification in the PeECE experiment compared to the Delille study, if the same CO₂ sensitivity was present, we would have picked up the signal with the precision of the AT methodology employed. We discuss the possible causes of this different treatment response.

Now we have stated that calcification was indifferent to initial CO₂ concentration, the referee would like to see in more detail why the response was so different to the Delille study. We feel that this is outside the scope of the present paper although we recognise

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that this is an important study to undertake. Accordingly, a study is underway where we will perform detailed meta-analysis of experimental results on calcification from a multitude of experiments, both laboratory and mesocosm on single species and natural plankton assemblages which may highlight important processes relevant to the PeECE experiment.

The referee wanted the section 4.4. to be shortened or removed. This is in contrast to referee 1 who wanted it embellished. We have chosen to keep the section as it integrates the significance of the experimental results and describes their potential significance to wider ocean processes and climate feedbacks.

Changes to the document further to the response to the referees

An additional author has been added to the paper after the incorporation of the statistical analyses.

Interactive comment on Biogeosciences Discuss., 4, 4631, 2007.

BGD

4, S2901–S2903, 2008

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