

Interactive comment on “Effect of carbonate chemistry manipulations on calcification, respiration, and excretion of a Mediterranean pteropod” by S. Comeau et al.

Anonymous Referee #1

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GENERAL COMMENTS This note seeks to assess which carbonate system parameter impacts the calcification of the pteropod species *Creseis acicula*. The authors compare the calcification, oxygen consumption and ammonia excretion of individuals at various pHT and alkalinity levels (achieved by bubbling with CO₂ gas mixtures or the addition of HCl). Understanding which environmental parameter associated with ocean acidification impacts the physiology of sensitive organisms is valuable for our predictions of which ecosystems will be most affected by anthropogenically changing carbonate chemistry.

One of my major concerns with the paper is that the analysis of the results relied upon

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regressions that combined all the treatments and analyzed the factors of the carbonate chemistry system separately. Multiple factors may have synergistically interacted on the physiology of the animals, a fact which was not measured by this method. Perhaps a more appropriate approach would be to do a multi-factored analysis (it would be best to consult a statistician, but I think a factorial ANOVA using dependent factors would be a good approach) to determine how much each of the parameters effects the oxygen consumption, ammonia excretion and calcification rates, since the carbonate chemistry parameters and entangled and the measurements are available for analysis.

The discussion seems overly brief. Although this particular species of pteropod is not likely to experience undersaturated conditions in the Mediterranean, some discussion of its oceanic range (which is relatively cosmopolitan) and its likelihood of experiencing undersaturated conditions elsewhere (I believe it is documented to be found at depth or to diel migrate in regions where undersaturation may occur) would strengthen the relevance of the paper. Furthermore, is there reason to believe that other species of pteropods would have a completely different sensitivity to different carbonate chemistry parameters? Does the literature indicate that there are species specific differences or rather that phylogenetically similar organisms (family level) will respond to carbonate chemistry parameters in a similar fashion? How broadly applicable do you think this sensitivity would be?

SPECIFIC COMMENTS

Page 6172, Line 4: It would be useful to have greater background on the hypotheses which explain the recent contradictory results.

Page 6175, Lines 19-23: A summary of the results of these temperate and tropical studies would be useful.

Page 6174, Line 1: Some background on the importance of studying physiological processes other than calcification would be useful. A sentence or two about the putative mechanisms by which acidification modifies physiology would be sufficient.

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Page 6173, Line 7: What is the mesh size and diameter of the plankton net?

TECHNICAL CORRECTIONS

The manuscript needs a great deal of technical correction. I suggest that the authors have a native English speaker or a copyeditor proofread the manuscript prior to publication.

Interactive comment on Biogeosciences Discuss., 9, 6169, 2012.

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