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Biogeosciences Discussions

Interactive comment on "A gender bias in the calcification response to ocean acidification" *by* M. Holcomb et al.

Anonymous Referee #1

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General comments The authors present the results of an experiment describing the effects of nutrients and pCO2 on the growth rates of the zooxanthellate and azooxanthellate coral species Astrangia poculata at two different temperature regimes. Sadly, the paper lacks direction and a clear definition and execution of research objectives. Contrary to the suggestion of the title, the experiment was not designed to test for the interacting effects of gender and ocean acidification on coral growth and it was not the objective of the study to test this.

Specific comments The main finding of this study shows that elevated levels of pCO2 resulted in reduced coral calcification. This phenomenon is well established for various species. A similar study by the same authors was published in 2010 in the Journal of Experimental Marine Biology and Ecology. Using the same species Holcombe et

al. (2010) showed that nutrients can ameliorate the negative effects of elevated pCO2 on calcification (growth) of A. poculata. This is in contrast to the results presented here showing no significant effect of nutrient addition coral growth for zooxanthellate and azooxanthellate corals. As mentioned by the authors themselves in the discussion however, the results are likely to be confounded by flawed experimental conditions due to increased nutrient levels in the control treatment during their experiment. Furthermore, the experiment was carried out at two different temperature regimes. Since the experimental temperatures of 16oC and 24oC appear to fall within the normal range of sea surface temperatures in this area during spring/autumn and summer respectively (Nixon et al. 2004). I do not understand the significance of the choice of these temperatures. In particular, I fail to see the relevance of the combination 16oC and elevated pCO2. Due to the inevitable rise in sea surface temperature, wouldn't it have been more appropriate to choose a temperature closer to the thermal tolerance limit of the species?

As such the paper adds little new information to advance our current understanding of the effects of ocean acidification on coral growth.

Nonetheless the observation indicating differential physiological responses to ocean acidification conditions between gender is novel and without doubt merits further exploration. Unfortunately, the amount of replicates in this study are very low and the data is unbalanced, which makes the unambiguous interpretation of the results difficult. The data for coral growth between gender were pooled for zooxanthellate and azooxanthellate corals. This clearly defeats a major objective of this study, namely to assess the relative importance of the symbiosis for coral growth under ocean acidification conditions.

The findings on gender effects in corals are important and should be made known to the scientific community.

Interactive comment on Biogeosciences Discuss., 8, 8485, 2011.