

Interactive comment on “Ocean acidification accelerates dissolution of experimental coral reef communities” by S. Comeau et al.

S. Comeau et al.

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Comment 1: "First, I need to highlight the fact that I am not a coral biologist and have no practical experience with the used methods. As a consequence, my report focusses on general experimental procedures. The most interesting part of the manuscript is the use of artificial “controlled” communities to evaluate the impact of ocean acidification on net calcification. This is an under-used methodological approach and a nice alternative to natural analogs and/or in situ mesocosms with the potential to better understand the mechanisms behind the response at the community level. From my limited expertise, I do not see any major problem with the manuscript and only have a few comments/questions:"

Response 1: We thank Sam Dupont for his useful comments and we are glad that
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someone outside of the coral scientific community finds our approach interesting.

Comment 2: - Can you provide some information on the natural variability experienced by these communities in the field? That would help putting the tested scenarios into context.

Response 2: Back reef communities in Moorea are exposed to relatively constant pH with diel variations of ~ 0.1 unit. This information is provided in the manuscript lines 122-124" To match the natural diel variation in pH in the back reef of Moorea (Hofmann et al., 2011; Comeau et al., 2014a) pH was maintained 0.1 unit lower at night (from 18:00 to 6:00) than during the day."

Comment 3: - Please provide a Table with the seawater chemistry over the course of the experiment. Also include statistics to demonstrate that you have significant differences between treatments. Provide graphs if necessary to illustrate the variability.

Response 3: As suggested a table (Table 1) presenting the carbonate chemistry is now included in the manuscript. Statistics on the pCO₂ treatments are now provided lines 170-176 " Mean pCO₂ in the four flumes during the 8-week incubation was $456 \pm 21 \mu\text{atm}$ and $451 \pm 21 \mu\text{atm}$ in the ambient treatments, and $1329 \pm 28 \mu\text{atm}$ and $1306 \pm 41 \mu\text{atm}$ in the high pCO₂ treatments (\pm SE, $n = 42$). pCO₂ differed between treatments (repeated measure ANOVA, $F_{1,232} = 734.38$, $p < 0.001$), but there was no difference within treatments ($F_{2,232} = 0.16$, $p = 0.852$). Communities were maintained in conditions within the flumes that were super-saturated with respect to aragonite, as $\Omega_{\text{arag}} \sim 3.5$ under ambient conditions, and ~ 1.6 in the high pCO₂ treatment. ". However, we do not believe that a graph representing the carbonate chemistry will be insightful since variability of pCO₂ was very limited (se $\sim 30 \mu\text{atm}$, Table 1).

Comment 4: Full statistics should be better presented in the results (provide model, F and p values for tested parameters (pCO₂ and replicate).

Response 4: As suggested more details on the statistics are now presented.

Comment 5: - At the end of the Results, it is claimed that coralline algae experienced high mortality. Information on "health" of all tested species should be provided and presented at the beginning of the result section.

Response 5: Thank you for these recommendations, a "health" section is now included in the Results, lines 177-182 " No Pocillopora spp. and Montipora spp. colonies died during the 8-week treatments, but 10% of the Porites pooled across flumes died by the end of the experiment, regardless of treatment, because of an outbreak of corallivorous nudibranchs feeding on this taxon (Phestilla spp.). Coralline algae (~ 70%) died at the end of the incubation, which was likely due to sediment abrasion. No difference in mortality or bleaching was observed between treatments for corals and calcified algae."

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