

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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Response to Prof Eyre comments:

Comment 1: "I read this manuscript with great interest. It was nice to see an even treatment of the sediments along with the coral community. I have a few comments I hope you find useful. If you have dissolved oxygen data it would be good to know if benthic productivity and respiration changed in the high pCO₂ treatment. This would give some insight into the processes driving sediment dissolution. Was it due to a change in the sediment p/r (metabolic dissolution) or was it due to the reduced saturation state in the overlying water (environmental dissolution)."

Response 1: O₂ changes were measured during the incubations but we did not detect

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a significant change of pCO₂ on respiration. This information is now included in the manuscript lines 265-268 "Increased dissolution of sediments at high pCO₂ likely was caused by the reduction of the seawater saturation state in the flumes, as we did not detect any difference in respiration and photosynthesis under elevated pCO₂ (results not shown) that could also affect sediment dissolution (Andersson and Gledhill, 2013)."

Comment 2: Was there any surface structure in the sediments in the flume (e.g. ripples) that would drive advective flow?

Response 2: We did not try to recreate surface structures on the sediment but let surface structure of the sediment to naturally regulate itself under the simulated flume water flow and placement of corals.

Comment 3: Can you provide more details on the sediments such as grain size, porosity, permeability, organic matter content, carbonate mineralogy etc.

Response 3: Data on sediment grain size are now included in the manuscript, lines xx in the Materials and Methods lines 155-160 " Sediment grain size of each flume was analyzed in triplicate using sediment sieves. Three vertical cross sections of sand (~600g) were collected from each flume sediment chamber and dried at 60 °C to remove moisture. Sand then was sieved through five separate sediment sieves (149 μm, 420 μm, 840 μm, 3360 μm) yielding six size class fractions for each flume (n = 3).", and in the Results lines 196-199: " Sediment grain sizes in the flumes were similar between flumes and fractionated (by weight) to $5.3 \pm 0.5\% < 149 \mu\text{m}$ grain size, $56.5 \pm 1.4\% > 149 \mu\text{m}$ and $< 420 \mu\text{m}$, $25.9 \pm 0.4\% > 420 \mu\text{m}$ and $< 840 \mu\text{m}$, $10.1 \pm 0.5\% > 840 \mu\text{m}$ and $< 3360 \mu\text{m}$, and $2.2 \pm 0.9\% > 3360 \mu\text{m}$. ". Unfortunately we did not measure any other sand parameter.

Interactive comment on Biogeosciences Discuss., 11, 12323, 2014.

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