

Interactive comment on “Secondary calcification and dissolution respond differently to future ocean conditions” by N. J. Silbiger and M. J. Donahue

Anonymous Referee #1

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This study investigates a largely ignored problem: the increase of dissolution under OA (and global warming). So far, most of the studies have focused on the response of individual organisms but only few studies have look at the other side of reef calcification (i.e. dissolution). The manuscript is well written and the methods clearly described. I only have few concerns/comments that are listed bellow.

Comments: - P12802-I-16: One problem with TA anomaly when looking at bioerosion is that it measures only the "chemical dissolution". The breaking of CaCO₃ structure is also important and it would have been nice to do buoyant weight measurements to quantify the overall decrease in weight of rubbles (i.e. how much is dissolved vs how much is broken in smaller pieces).

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- P12804: What were the flow rates in the mesocosms?

- P12804-I-19: Please provide \sim sizes of the rubbles. How was the homogeneity of the rubbles determined? I guess dissolution of old rubbles would be different than the one of "young" rubbles?

- P12804-I-19: Why were the incubations not replicated? 24h incubations are easy to replicates and could have inform on temporal changes.

-P12805-I-10. I guess the TA changes in the mesocosms were very limited. Were the errors associated with measurements small enough to be sure to detect a change in calcification? Maybe you should provide the range of TA changes during incubations.

-P12808-I-5: What do you mean by normalized to DIN? Do you mean that TA was corrected for the changes in NH_4^+ etc? Please clarify.

-P12808-I-11: A change in TA in $\text{mmolCaCO}_3 \text{ m}^{-2} \text{ h}^{-1}$? Reformulate this sentence.

-P12808-I-11: Rates are normalized in $\text{mmol CaCO}_3 \text{ m}^{-2} \text{ h}^{-1}$, does m^{-2} represents the surface of the mesocosms, surface of the rubble, etc? Clarify.

-P12809-I-10: What about the exchanges with the atmosphere? Were the tanks sealed? If not, exchanges with the atmosphere could have lead to under/over-estimations of photosynthesis and respiration.

-P12811-I-14: Provide details on the response of NCP.

-P12812-I-12: Are the normalization the same? If in the present study the rates are normalized by the actual surface of the rubbles (which needs to be clarified, see above) it might be different than the study of Yates and Halley who normalized by planar surface...

-P12813-I-2-14: I am really not convinced by this explanation for two reasons. - What was the importance of the CCA? Most of the photosynthesis was likely due to turf algae and not to calcify algae. - In addition the authors mention themselves later "non-

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photosynthesizing invertebrates in the community (such as bivalves) might be dominating the calcification signal in these conditions." In contrast I think that the second hypothesis makes much more sense and should be developed.

-P12814-l-7-15: I agree with this paragraph but it would be important to specify that this is true for an ecosystem dominated by rubbles. In an ecosystems with very high coral cover, the story would likely not be the same...

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