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

G. Diaz-Pulido

g.diaz-pulido@griffith.edu.au

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Comments to the ms by N. J. Silbiger and M. J. Donahue “Secondary calcification and dissolution respond differently to future ocean conditions”

I enjoyed reading your manuscript on the effects of OA and warming on dissolution and calcification. It is important that you have demonstrated that dissolution rates are more strongly affected by combined acidification/temperature than calcification rates, which helps us understanding the mechanisms by which elevated CO₂ affects reefs. In fact, our previous CCA research (cited in your ms) showed that dissolution rates were much higher than calcification rates under OA/high temp experiments, in line with

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your results. This is especially related with your discussion on the role of the living tissue in regulating the local pH environment and consequently calcification/dissolution rates. In our recent study (Diaz-Pulido et al, 2014, Nature Communications 5, 3310), we demonstrated the fundamental role of the living pigmented tissue of encrusting coralline algae in regulating mineralogical changes under OA/warming conditions. We suggested that the CCA skeleton that is not protected by (pigmented) living tissue undergoes considerable mineralogical changes and consequently experiences high dissolution; meanwhile the skeleton that is covered/protected by photosynthetic tissue hardly changes (only minor increases in Mg due to high temperature). Perhaps in your paper it is worth expanding on the role of the living tissue of the secondary calcifiers, not only in mediating a possible enhancement of calcification with moderate OA (as you have discussed), but also in regulating dissolution rates. Tissue that is not protected is quickly dissolved and prone to bioeroders.

Sincerely, Guillermo Diaz-Pulido

Interactive comment on Biogeosciences Discuss., 11, 12799, 2014.

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