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Interactive comment on "Response of *Halimeda* to ocean acidification: field and laboratory evidence" *by* L. L. Robbins et al.

Anonymous Referee #2

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GENERAL COMMENTS This paper presents a study of the effects of pH on the crystal morphology and abundance in calcifying green algae of the genus Halimeda. The study is based on observational data for archived algae sampled in 1966-1967 and in 2008, and an aquarium experiment using CO2 dosing to set pH levels at 7.5 and 8.1 representing present-day and late-century CO2 levels for a fuel-aggressive IPCC scenario (i.e. A1FI). The paper is generally well written and the questions posed are interesting. However, the study's conclusions are not well supported by its data. Firstly, differences in pH between 1967 and 2008 are unlikely to be as drastic as the differences between the high and low CO2 treatments in the experiment, hence there is likely to be a mismatch between the observational and the experimental study which places limitations on the conclusions. Secondly, the authors do not present any data on environmental conditions at the historical sampling sites. I suspect parameters

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other than pH (e.g. nutrients, freshwater, temperature?) would have varied also, and could be confounding the pattern. Unless good environmental field data can be made available to align the field and laboratory components, I suggest the authors revise the paper to a note and present the experimental data only. One important point here, though, is that the experimental design is very sparse, since it (to judge from the photograph) consisted of one aquarium per treatment only . The authors will therefore have to argue strongly that no other variables than pH could possible explain the observed response. Lastly, the comparison of responses at the extreme ends of the present-day (pH \sim 8.1) and projected ocean-acidification spectrum (pH \sim 7.5) leaves little room for interpretation of physiological processes at intermediate pH values which are likely to occur during the most of this century.

Interactive comment on Biogeosciences Discuss., 6, 4895, 2009.