

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

**Anonymous Referee #3**

Received and published: 21 June 2009

This study investigates the potential effect of decreasing pCO<sub>2</sub> over the last 40 years on aragonite production by the calcareous green algae *Halimeda* sp. Authors compared the apical crystal morphology of past and recently sampled algae. To support their conclusions, recent samples were maintained in laboratory under different pH conditions and compared. The study is quite limited and the results presented here seem to not support the conclusions raised by the authors. Referee 1 made an excellent job in the revision of this ms. I just would like to add few more comments on it. Regarding the comparison of old and recent samples, my major concern is the lack of data concerning the different environmental parameters at the collection site, while it is widely known that algae calcification and photosynthesis are mostly governed by temperature, light and nutrient concentrations as well as their seasonal changes. Therefore, excluding the eventual effect of a pCO<sub>2</sub> change (very limited during the last 40 years as pointed

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out by Referee 1), much more modifications in the crystal morphology could have been induced by the other environmental parameters previously cited, for which the authors did not present any record. In addition, the very limited number of specimens used in this study, as honestly recognised by the Authors, might have masked the biological variability. In a similar way, although high pCO<sub>2</sub> seems to have an effect on *Halimeda opuntia* (but not for *H. tuna*) the experimental design was not strong enough (only one tank used) and replicates (a few).

Specific comments Title: too vague. Abstract: L6-8 “The West Florida shelf is a natural laboratory. . . .” is useless. L17-19 The statement “However, individual species showed decreased inorganic. . . .” is not really true since Fig. 7 show that only *H. incrassata* (b) CaCO<sub>3</sub> decreased with time, but the observation was not supported by the statistic.

Mat and Met: P4899 L9: How historical samples were preserved? Was the preservation procedure the same for recent samples? If not, could the different methods be the cause of the differences found in this study? P4899 L23: “Four adult. . . .” each pH treatment or two per pH? P4899 L24: “The plant was immersed for 45 min in a Alizarina Red solution.” Did the solution mark the algae? These results were not presented and discussed. Why? P4900 L12: “Specimens were then allowed to grow for a period of 3 weeks” Any reference or previous study on the calcification rates of this species? P4900 L18: Please add pH variations measured in the tanks during the experiment. P4901 L5: how many samples form each treatment did the Authors examine using SEM?

Figures Fig. 2. It is useless in this form Fig. 3. It is not really necessary for the scope of this paper. Fig. 5. Authors must use the same scale for the four panels in order to facilitate direct comparisons between species. Fig. 6. X-axis, recent sampling: is Feb 08 replicated two times? Please, add the number of replicates Fig. 8. Same as Fig 5. Fig. 10. It is not really necessary for the scope of this paper.