

## ***Interactive comment on “Carbonate System Parameters of an Algal-dominated Reef along West Maui” by Nancy G. Prouty et al.***

### **Anonymous Referee #2**

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This is a very interesting and very well-written paper that will definitely be a nice contribution to the field. There are a few major and minor comments below that I feel need to be addressed prior to publication.

My biggest criticism is that the authors did not account for TA and DIC fluxes from the SGD itself. This is an important step to interpret how much of the delta TA or delta DIC is due to reef metabolism. The authors also need to add a data analysis section to the methods and state all their statistical approaches and programs used to analyze the data. The remaining comments are relatively minor.

Line 52: There are other carbonate data for Kahekili (see, Silbiger et al. 2017 Ecology), but it is extremely limited. This is by far the most comprehensive study at this site, but “no field-based measurements” is inaccurate.

C1

Line 81: Change “plants” to calcifying algae

Line 85: This is the first at Kahekili, but not the first to constrain carbonate chemistry in response to SGD (see Richardson et al. 2017 L&O). I would remove this sentence.

Line 124: Put both accuracy and precision of the instruments.

Line 168: Why did you use the TA-pH pairs rather than the TA-DIC pairs for the omega calculations? TA-pH is fine, but TA-DIC has less error propagation for calculating omega and it seems that you have those data.

Line 171: It is not clear which TA, DIC values you are talking about here.

Add a data or statistical analysis section at the end of the methods and discuss how you analyzed your data here. What program did you use for your stats?

What were the TA values coming directly out of the seep?

When calculating delta TA and DIC, the SGD endpoint needs to be taken into account. SGD can have a dramatically different TA and DIC concentrations than seawater (see Nelson et al. 2015 Marine Chem). A good portion of the TA and DIC fluxes are thus likely due to SGD and the remainder after accounting for these fluxes are due to biological processes (e.g., calcification, dissolution, P,R). Examples of studies that have accounted for fluxes of TA and/or DIC from freshwater sources are Paquay et al 2007 Aquatic geochem or Richardson et al. 2017 L&O

Line 234: The TA amplitude could also be indicative of high dissolution rates or a byproduct of the TA flux from the SGD onto the reef.

Line 251: Put this information in the methods and explain how you did the calculation in addition to citing the paper.

Line 290: remove “on the short term” at the end of the sentence. There is no physiology data in this study, so this sentence is a bit of a stretch. It does however look at ecosystem functioning of reefs.

C2

Line 297: add a citation after “environment.”

In the discussion, it would be interesting if the authors compared their results to with other studies that also measured carbonate chemistry at SGD sites (e.g., Nelson et al. 2015 Marine Chem and Richardson et al. 2017). Are the patterns similar or different?

Figures: make the colors more contrasting in the figures so that people printing in black and white can see the differences.

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