

Author Response:

We thank Dr. Silverman for posting a very helpful comment on the paper. In the revised paper, we included a brief section on the approach used by Silverman et al., 2009. In the original paper and revised paper, we estimate the preindustrial calcification rate. Given that there are many caveats and uncertainties (also discussed in the text) in this approach, the Bermuda data suggest that calcification has decreased to less than 20% of the preindustrial calcification rate during the spring period, but not at other times during the year. Thus, for a mean annual state, the Bermuda reef has not yet transitioned, but for parts of the year it appears to have done so. In the revised paper we have also specifically commented on the results of Silverman et al., 2009.

Our response to the comment by Dr. Silverman is presented in indented Arial font for ease of review in the supplement.

Interactive comment on "The interaction of ocean acidification and carbonate chemistry on coral reef calcification: evaluating the carbonate chemistry Coral Reef Ecosystem Feedback (CREF) hypothesis on the Bermuda coral reef" by N. R. Bates et al.

J. Silverman

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Dear authors I would like to point out a few inaccuracies regarding your citation of Silverman et al P. 7653, L.:3-6 - "Due to the seasonality of carbonate chemistry on the Bermuda coral reef, the critical thresholds for initiation of coral decalcification are not sharp transitions as 5 suggested by Silverman et al. (2009), but relatively extended transitions that potentially extend over a period of many years". Silverman et al. used model output of monthly averages over an annual cycle at each $p\text{CO}_2$ stabilization level to calculate the monthly average gross calcification rates of each coral reef. The "decalcification" of the coral reef was then considered to occur when the annual average gross calcification was equal to or less than 20% of the Pre Industrial calcification rate. This transition level was defined by the percentage of PIR gross calcification offset by dissolution of CaCO_3 in the reef. Hence, while individual corals may continue to calcify albeit at a very slow rate the reef frame work would be losing CaCO_3 due to related or perhaps unrelated dissolution processes (inorganic or biogenic dissolution). In addition I thought that the reduction in coral growth rate that you measured between 1959 and 1999 (33%) is similar to the calculated reduction using the relations of Silverman et al. (2009). You could use these measurements to verify the relation between gross calcification, temperature and $\Omega(\text{arag})$ proposed by Silverman et al. (2009).