

Interactive comment on “Low Florida coral calcification rates in the Plio-Pleistocene” by T. C. Brachert et al.

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Review 3 “I fear the authors may have overinterpreted their data”. Answer: We hope we have not overinterpreted our data. We fear this impression may arise because the environmental reconstruction in the manuscript is strongly simplified and summarizes the contents of a companion paper on the environmental constraints of coral growth during the Pliocene and Pleistocene interglacials (<http://www.biogeosciences.net/13/1469/2016/>). - Multiple species of corals (incl. *Diploria*) are combined to generate “big picture” means for modern growth rates. The rationale seems to be that taxa differ not significantly from each other. Does this make sense? Answer: We say “yes”, because most modern studies have described calcification within rather small temperature windows. Within the larger window of the

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geological record, the picture is no more linear and Porites and Orbicella (WA and IP) seem to have similar trends (see also Carricart-Ganivet et al., 2012, PlosOne). - Biggest concern: Huge mismatch in recent/fossil data with regard to number and composition of taxa. Answer: We agree, but this is the data available. We will, as explained elsewhere, use more explicitly the data from recent Solenastrea and Orbicella (which should be compatible) and compare them with our Solenasatrea and Orbicella (n = 2) and Porites (n = 1) separately. - The authors say that no calcification records are available from Orbicella of the reef tract (but co-author Helme published a dataset → Helmle et al., 2011, Nature Communications). There are also other inshore – offshore datasets (Manzello et al., 2015a,b and there is also a comparison of Porites and Orbicella from WA and IP (Carricart-Ganivet et al., 2012). Answer: Yes, we are sorry for this mistake which is an effect of the history of the manuscript. We will re-write the relevant passages of the manuscript. In this respect we will also go more explicitly into the effects of effluxes of saline, nutrient-rich lagoonal water (“inimical bank water”) on calcification. - Why are these corals so well preserved? More discussion on this! Answer: This is a paradox! To our knowledge, the preservation of aragonite corals involves normally an enclosure in an impermeable sediment (e.g. calcareous clay). This is typically the case in “deep-water” sediments and allows for the preservation of azooxanthellate corals (and other biota such as ammonites) in sediments as far back as the Triassic. But the Florida fossils are from more or less porous, unlithified grainy carbonates with variable contents of matrix. We have no clear explanation - suggestions are welcome! - Acute events of cold stress in Florida – resolved in data? More discussion needed. Answer: The resolution of the subannually resolved stable isotope series is not high enough as to resolve events of less than two months in duration. - What is the factor limiting reef development in present-day south Florida and how does this compare with geologic time? Answer: Limiting factors of reef growth in Florida are manifold. We consider extreme temperatures (events or periods of very cold or hot temperatures), efflux of “inimical” bank waters and nutrients the most important. An overview of this subject is given by Manzello et al (2015: J Exp Mar Biol Ecol). We will

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improve this kind of information in the introduction paragraphs. The limitations of reef growth have been described in the companion paper cited above.

Specific comments: 1. Will be checked and modified if necessary. 2. Will be corrected. 3. Why are bulk densities presented instead of annual data? We decided to use bulk density because this is more compatible with bulk isotope values. 4. Will be checked. 5. This was a terminology problem – will be modified. 6. Will be checked and eventually corrected. 7. Error bars will be checked – depends on the data available.

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