

Interactive comment on “Impact of diurnal temperature fluctuations on larval settlement and growth of the reef coral *Pocillopora damicornis*” by Lei Jiang et al.

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General comments: The authors present a comprehensive assessment of the role of diurnally fluctuating temperatures on growth, settlement, and bleaching response of larvae from the coral *Pocillopora damicornis*. The study is quite sound and represents an important contribution to the field. Most coral thermal stress studies use static temperature exposures, hence a movement in the field to more realistic natural thermal profiles is desperately needed. Yet we still lack a fundamental understanding of the different responses of corals to static or variable temperatures in the same study. This research begins to fill in that gap and the manuscript is technically sound and

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well-presented. There are a few minor comments that should be addressed prior to publication as well as an additional reference that should be integrated into the discussion on growth (see line-by-line comments below). Also, while the writing is generally sound, there are a few instances of misuse of the word "the" and singular/plural errors that may be resolved by additional editing of the language. All in all, I think this is a sound paper that makes an important and needed contribution to the literature.

Specific line-by-line comments: Line 197. Siebeck found brightness and saturation to be indicative of bleaching, why was only saturation used?

Section 2.7 Please specify the software used for statistical tests and copies of code (as supplementary information) if possible.

Line 250-252. Confusing wording. Please clarify that both the elevated 31 °C stable and 30-33 °C fluctuating treatments induced bleaching while the control and 28-31 °C fluctuating treatments did not.

Lines 327-332. Would add discussion of the increased growth and survival in the higher temps. They may have decreased in color saturation but were not "stressed" according to the other metrics. There could also be a confound wherein a faster growing colony might pale simply because it's growing faster than the Symbiodinium are dividing so its not losing cells, just diluting pigment. The photographic technique here does not allow for analysis of cell loss and it's unclear over how much area saturation was measured (i.e. how many pixels) and whether it was normalized to surface area or polyp number to account for size differences.

Section 4.4 Please see Buddemeier et al 2008 A modeling tool to evaluate regional coral reef responses to changes in climate and ocean chemistry. Limnology and Oceanography Methods. Particularly their meta-analysis in Figure 2. An alternative explanation may simply be a decreasing slope of the temperature x calcification relationship at higher temperatures as you approach the optimum (Buddemeier Fig. 2), wherein the corals are not calcifying linearly within the temperature fluctuation (i.e. at

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temperatures above the mean they're not growing much faster and they are growing slower at temperatures below the mean thus resulting in overall decreased calcification in comparison to 31 stable).

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