

Interactive comment on “Evaluation of coral reef carbonate production models at a global scale” by N. S. Jones et al.

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Dear Reviewer,

On behalf of myself and my co-authors, I would like to thank you for your comments and for highlighting issues that will improve our manuscript. Please see text below for our initial responses to the points you raise.

Comment 1: *...there is some physiological literature that must be taken into account in the discussion and, probably, in the model construction (e.g. Marshall and Clode, 2004; Colombo-Pallotta et al., 2010).*

C6038

Authors response: We agree, further discussion of the physiological literature is justified and will be included in the revised manuscript. This is a particularly valid point since one of the published models, Silverman^{SST Ω} , incorporates the experimentally-derived temperature-calcification response curve of Marshall and Clode (2004) to modulate calcification rates derived from inorganic calcification (G_i) as calculated from Ω_a . We would like to clarify that the intention of our paper is to evaluate published models to determine which produced the best fit to present day observations of CaCO_3 production. This does not involve model construction. If the scope of our study is unclear, we will need to clarify this.

Comment 2: *...I'm concerned about the so-called Lough^{SST} model. Basically, the authors are using the same line of reasoning of McNeil et al. (2004), which was widely criticized by Kleypas et al. (2005). Lough and Barnes (2000) are Porites growth data in an environmental gradient, not in a time-line gradient. For this, take a look at Worum et al. (2007); Cooper et al. (2008); Tanzil et al. (2009); and Carricart-Ganivet et al. (2012) between others.*

Authors response: We agree - advocating the use of Lough^{SST} alone for future simulations (time-line gradients), similar to McNeil et al. (2004), would be completely inappropriate and there is substantive evidence that calcification rates have fallen in the last two to three decades (e.g. Cooper et al., 2008; De'ath et al., 2009; Cantin et al., 2010; Manzello, 2010; De'ath et al., 2013; Tanzil et al., 2013). This is not our intention and we will emphasize this. Instead, our intention in this manuscript is to evaluate all the models, including Lough^{SST}, spatially across global environmental (temperature) gradients.

Once again, many thanks for your comments.

C6039

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C6040

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C6041

C6042