

Interactive comment on “Sex-associated variations in coral skeletal oxygen and carbon isotopic composition of *Porites panamensis* in the southern Gulf of California” by R. A. Cabral-Tena et al.

Anonymous Referee #1

Received and published: 10 December 2015

General comments: This is an interesting paper that follows from the authors' earlier work (Cabral-Tena et al, 2013) which demonstrated that growth rates differed between male and female colonies of *Porites panamensis* in the southern Gulf of California. Here, they demonstrate that there are also significant differences between male and female colonies in the stable isotopic signatures of $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ and present two possible explanations for these differences in this gonochoric brooding coral species. Aside from the differences associated with sex, the study adds to our understanding of the isotopic tracers and their relationships with environmental parameters and

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growth characteristics. The findings also have implications for isotopic analyses and their environmental interpretation for gonochoric brooding species such as *P. panamensis* though the vast majority of massive *Porites* used in paleoclimatic reconstructions are gonochoric spawners rather than brooders (Baird et al. 2009). Although, as the authors indicate, gonochoric spawning requires less energy than brooding, it would be interesting to know whether there are also growth and isotopic differences in the commonly used massive species such as *P. lobata* and *P. lutea*. This study may be a prompt for either the authors or others to undertake such a comparison as evidence for such differences would have implications for paleoclimatic reconstructions from massive coral records. Overall, I consider this study to be sound and worthy of publication after some minor changes (mostly for clarification). The paper could also benefit from a final editing by someone with English as their first language but generally the writing is clear.

Specific comments: Page 18796, lines 2-3: delete 'near'; add (SST) after 'temperature'.

Page 18796, line 6: 'lesser extent' than what?

Page 18796, lines 7-8: make it clear that these growth differences refer to the gonochoric brooding coral *P. panamensis*.

Page 18796, line 9: replace 'assess this difference' with 'test this'.

Page 18796, line 11: add country after 'La Paz'.

Page 18796, line 12: photosynthetically active radiation (PAR).

Page 18796, line 18: change 'implies' to 'could introduce'.

Page 18796, lines 25-26: again make it clear that these findings relate to one gonochoric brooding species though they may have implications for commonly used gonochoric spawning species such as *P. lobata* and *P. lutea*.

Page 18797: lines 2-4: Make it clear that this does not refer to all corals, only certain

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species; also it is not only their growth that is affected by environmental conditions but that materials (isotopic and trace elements) are incorporated into the skeleton during growth.

Page 18797, line 8: delete 'changes'.

Page 18797, line 9: change 'events' to 'variability and change'.

Page 18797, line 11: change 'from' to 'with'.

Page 18797, line 19: change 'estimate' to 'measure'; I am not necessarily convinced that $\delta^{13}\text{C}$ has been as easy to interpret as $\delta^{18}\text{O}$.

Page 18798, line 15: 'upwelling events that bring nutrients to surface waters'.

Page 18798, line 21: be consistent throughout ms, here 'vital effect', elsewhere 'Vital effect'; 'constant along the growth'.

Page 18799, line 20: replace 'recording was' with 'measurements were'.

Page 18800, line 4: what year were the colonies collected? Also, what was the approximate size of the colonies? Are these the same 10 colonies from La Paz presented in Cabral-Tena et al (2013)? If so, then say so.

Page 18800, line 15: replace 'labelled' with 'identified as'.

Page 18800, line 17: replace 'labelled' with 'identified as'.

Page 18801, line 1: replace 'placed in' with 'located on'.

Page 18801, line 20: delete 'equal'.

Page 18801, lines 21-22: What is meant by 'different sampling resolutions' when they were all sampled at 1 mm resolution? Is it sampling resolution in relation to different linear extension rates of the samples?

Page 18801, line 23 to Page 18802, line 2: suggest move this description of statistical

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analyses to separate section of Materials and Methods.

Page 18802, line 2: 'linear'.

Page 18802, lines 4-15: provide the temporal resolution of the various data sets (e.g. daily, weekly or monthly?) and the time periods they cover.

Page 18802, line 10: indicate the time period of this comparison and temporal resolution of the data.

Page 18802, lines 15-18: delete first sentence and add the description of the Regime shift change software to the suggested new section on statistical analyses.

Page 18802, lines 21-24: Please provide details of the years covered by each of the colony growth and isotopic records. Could provide this in a Supplementary Table, possibly with all the annual growth and isotopic data?

Page 18802, Results: Please make it clear throughout the Results what the temporal resolution of the data being compared is e.g. annual, monthly, seasonal? Also whether time series or average colony values are being compared.

Page 18803, lines 6-7: Unclear what 'strongly correlated between sexes' means – what is being correlated here? Also, suggest using 'significantly' rather than 'strongly'.

Page 18803, line 15: Refer to Fig. 1b.

Page 18804, line 2: 'correlate with'.

Page 18804, lines 4-5: Delete first sentence and add period covered to second sentence.

Page 18804, lines 10-11: 'small seasonal variation' – compared to what?

Page 18805, line 4: here and elsewhere change 'strong' to 'significant'.

Page 18805, line 6: delete 'Table 4'.

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Page 18805, lines 17-25: Please make it clear what the temporal resolution of these different studies is, and how they compare to this study. High correlation coefficients can always be obtained when simply correlating two annual cycles (see Lough 2004. *Palaeo Palaeo Palaeo* 204: 115-143).

Page 18806, line 19: 'depleted in nutrients'.

Page 18808, line 14: 'fast extension rates' – fast compared to what? Compare to other reported average *Porites* spp. linear extension rates?

Page 18808, line 16: 'are more enriched than in male'.

Page 18809: line 6: 'associated with colony'.

Page 18811, line 8: delete 'would'.

Page 18812, lines 6-9: Suggest emphasise that this study based on a gonochoric brooder and that the majority of paleoclimatic reconstructions from massive Indo-Pacific *Porites* spp. have been based on gonochoric spawners. Thus a fruitful area of future research would be to determine whether the sex differences the authors have identified are also characteristic of gonochoric spawners such as *P. lobata* and *P. lutea*.

Page 18820, Table 1: Indicate years covered by each series.

Page 18821, Table 2: Indicate temporal resolution of data and also time period covered by correlations.

Page 18822, Table 3: Indicate temporal resolution of data and also time period covered by correlations.

Page 18823, Table 2: Indicate temporal resolution of data and also time period covered by correlations.

Page 18824, Figure 1: Explain the shift in the rainfall mean in the figure caption.

Page 18826, Figure 3: Is this based on all annual data for all years from each colony?

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If so, make this clear in figure caption.

Page 18827, Figure 4: Is this based on all annual data for all years from each colony?

If so, make this clear in figure caption.

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