

Interactive comment on “Carbonate “clumped” isotope signatures in aragonitic scleractinian and calcitic gorgonian deep-sea corals” by J. Kimball et al.

Anonymous Referee #2

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In this contribution, the authors present traditional O and clumped isotope data from carbonates precipitated by deep-sea corals over a range of temperatures. The authors compare their temperature-dependent Δ_{47} data to existing biogenic and abiotic temperature calibrations. Differences between scleractinian and gorgonian corals are pointed out and discussed, as are similarities and differences among the observed temperature dependences in deep-sea corals and those in existing temperature calibrations.

Overall, in this paper the authors present the data clearly, and although no far-reaching insight is obtained regarding calcification mechanisms in corals, the temperature dependence of carbonate clumped isotope compositions, or the validity of the various

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temperature calibration curves existing in the literature, the new data from corals are exhaustively compared with the existing calibrations, including a consideration of the effect of the acid digestion fractionation used. A nice contribution of the current paper is the schematic diagram showing expected trajectories for the various processes that can cause a deviation from equilibrium O and clumped isotope composition (Figure 10).

As I am no expert on models of coral precipitation, I cannot speak to the accuracy of this aspect of the paper. In terms of the analytical details, the presentation and interpretation of the data, this paper requires only minor modifications prior to publication. Once revised and published, this paper will be a valuable source of isotopic data on disequilibrium isotopic compositions in corals, which may one day inform models of coral mineralization, as well as the validity of the various clumped temperature calibrations.

Minor comments:

1. There are many references that appear in the text but not in the bibliography and vice versa.
2. 19122 line 25: 'mortor' should be mortar.
3. 19123 line 24: 'John' should be Johns.
4. 19126 lines6-8: Why does it matter that this coral was only partly alive ("Mostly dead is partly alive!" - Miracle Max)? When measured in the geologic record, corals are quite dead, yet we are happy to use their isotopic composition to inform problems of interest. I'm not sure I see a reason for excluding this data point.
5. 19127 sentence ending in line 6 is grammatically incorrect.
6. 19130 line 1: 'used' should be uses.
7. 19130 line 7: 'predications' should be predictions.
8. 19131 line 5: The uninitiated do not know what an 'autoline' is. How about 'auto-

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mated sample extraction line'?

9. 19135 line 20: 'effects' should be affects.

10. Data figures 7, 8, 9 are much less well prepared and presented than figures 3-6, in terms of marker sizes, font readability, legend location and readability, etc.

Interactive comment on Biogeosciences Discuss., 12, 19115, 2015.

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