Biogeosciences Discuss., 12, C151–C153, 2015
www.biogeosciences-discuss.net/12/C151/2015/

Biogeosciences
Discussions
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Interactive comment on "Mechanism of O and C isotope fractionation in magnesian calcite skeletons of *Octocorallia* corals and an implication on their calcification response to ocean acidification" *by* T. Yoshimura et al.

Anonymous Referee #1

Received and published: 11 February 2015

The authors have analyzed a suite of octocoral skeletons for O and C isotopes and find that they have compositions lighter than the DIC in the surrounding seawater. Ok - no surprise there. They then attempt to calculate what the isotopic composition of the skeletons should have been in equilibrium with DIC in the seawater, taking into account the depth (which affects temperature, growth rate, nutrition, etc.), Mg/Ca ratio of the skeleton (which apparently affects the isotopic fractionation factor for O, although this is not very convincing judging from Fig. 3) and come to the conclusion that the skeletal isotopic ratios are not controlled by environmental parameters. Ok - no surprise there.

They then proceed to weave this together into a conclusion about how pH affects the contribution of DIC to the skeleton. But this is really not very solid. I simply cannot follow this discussion or its logic and it seems to me that there is a complete lack of evaluation of uncertainty factors throughout the paper.

I think that much of my confusion can be ascribed to a language barrier, but sentences such as these leave me at loss:

Abstract: ... contribution of isotopically heavy DIC from seawater THROUGH the skeleton and pericellular channels... (probably the authors mean TO the skeleton through the channels)

Page 397, around line 10:

Despite the large habitat depth range represented by these corals, however, the variations in the isotope ratios were greater at some depths than they were between the surface and the deepest depths. The supposed relationship between water depth and higher pH or CaCO3 saturation state of the extracytoplasmic calcifying fluid (ECF), calcification would be enhanced and growth rates would be higher, but the variation in local habitat characteristics and individual corals can account for the large variation in growth rates and 18O and 13C at certain depths.

Bottom of page 397: ... has a significantly low delta-11B, corresponding to a theoretical pH of ca. 0.3 ... !?!?!?

Page 398: everything is mixed up: octocorals, scleratinian corals and foraminifera, for which the biomineralization mechanisms are entirely different.

Page 400, line 10: Although seawater acidification definitely causes significant declines in intra-cellular pH in coral calcifying cells and extracellular pH in the calcifying fluid at the tissue–skeleton interface (Ries, 2011a; Venn et al., 2013), corals exert stronger physiological control on their calcifying fluid pH by the ability to up-regulate pH at the site of calcification (McCulloch et al., 2012b; Venn et al., 2013).

In general, it is really not because I do not want to, but I am not able understand what the authors are writing and so I have no choice but to recommend rejection until a more concise version might eventually be produced.

Interactive comment on Biogeosciences Discuss., 12, 389, 2015.