Biogeosciences Discuss., 9, C2118–C2119, 2012
www.biogeosciences-discuss.net/9/C2118/2012/

Biogeosciences Discussions

Interactive comment on "Light and temperature effect on δ^{11}B and B/Ca ratios of the zooxanthellate coral *Acropora* sp.: results from culturing experiments" *by* D. Dissard et al.

Anonymous Referee #2

Received and published: 26 June 2012

This paper presents experiments and data of interest to the ongoing debate about the use of B-isotopes as proxy for ocean pH variations. In particular, the experiments address question of whether light and temperature can affect B isotopes and the B/Ca ratio in the coral skeleton independent of water pH.

The answer appears to be 'yes'. Dissard et al. reports that changes in light intensities under constant temperature conditions can induce B isotopic variations in the coral skeleton equivalent to pH variations on the order of 0.05 units and temperature can induce changes equivalent of 0.02 pH units under constant light conditions.

I have no problem accepting the quality of the data and the experiments as such.

These are difficult to do. Instead, my reading of the manuscript makes me wonder how relevant these conclusions really are. What are the natural pH variations at a given site and how big are they compared to the B isotope effects (and hence potential bias in pH reconstructions) considered here?

If one looks at the recent publication by Hofmann et al: (Hofmann GE, Smith JE, Johnson KS, Send U, Levin LA, et al. (2011) High-Frequency Dynamics of Ocean pH: A Multi-Ecosystem Comparison. PLoS ONE 6(12): e28983. doi:10.1371/journal.pone.0028983) it seems clear that most sites will be characterized by substantial natural pH variations, on daily to monthly timescales, at least on the same order as the equivalent B isotope effects reported by Dissard et al. It seems to me that light and temperature variations are not the most prominent of the problems that paleo-pH reconstructions from B isotopes in coral skeletons face.

This is further illustrated in Figs 3 and 5 where coral samples subjected to stress plot completely off the trend defined by 'non-stressed' samples. Such stress effects are certainly playing a role under natural conditions on the reef, where the corals are subject to many 'disturbing' processes.

For these reasons alone the most questionable aspect of this otherwise well-written paper is the first line of the abstract that states that 'B isotopic composition of marine (bio-)carbonates has been established as a reliable proxy for paleo-pH'.

I would encourage the authors to modify the paper taking these considerations into account.

Interactive comment on Biogeosciences Discuss., 9, 5969, 2012.