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Interactive comment on “A novel paleo-bleaching proxy using boron isotopes and high-resolution laser ablation to reconstruct coral bleaching events” by G. Dishon et al.

Anonymous Referee #1

Received and published: 9 July 2015

The authors present an interesting paper documenting the potential use of boron isotopes as a proxy for coral bleaching events in the paleo record. This is a very important topic, specifically for understanding the role of anthropogenic impacts in forcing bleaching events.

The paper is generally well written and results/conclusions are well supported by data presented. Here I suggest a series of minor/moderate changes that would strengthen the manuscript.

Abstract The authors should mention/discuss that understanding the frequency of bleaching events is critical for determining the relationship between natural and an-

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thropogenic causes of these events.

BGD

12, C3466–C3468, 2015

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Introduction The authors provide a pretty brief/incomplete review of the stressors that may cause bleaching events. Please expand. P. 8134 Line 5, authors mention previous papers that have discussed dating of coral bleaching events but not how these events were identified. P. 8135 Line 5, utilize 'ambient' instead of 'surrounding' and 'pH' instead of 'pH level' P. 8135 Line 18, please quantify what you mean by 'beyond the natural vital effect' P. 8135 Line 17-24, is there a citation for when/how this was previously proposed? not clear as written. In general, this section is written very awkwardly, needs to be clarified.

Methods Items that are in the Supplemental table should still be discussed to a greater degree in the text. Please summarize experimental conditions further in your methods section, and use Supplemental Table only as supporting evidence.

Instead of "Experimental Set Up" consider "Experimental Design" or "Coral Culturing" as the heading here

Were salinity, pH, turbidity, held constant in the experiment?

Section 2.1.2 seems slightly out of order. The first sentence of the 2nd paragraph logically belongs at the top of this section.

What was the depth of ablation?

Similar to comment above, the description of Naturally occurring bleaching events should also go before the description of analytical d11B methods.

Section 2.3 I wonder if this entire paragraph belongs in the results/discussion. This methodology relies on the reader being convinced that the d11B proxy works before moving forward to a review of previously published records.

Results This section should be renamed Results and Discussion, or "Discussion" materials should be pulled out as a separate section. P. 8140, paragraph at top of page:

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the question is whether these timescales are environmentally relevant. These results require a discussion of what temporal scales may be resolved in the paleo record, and what events might be missing. This is key to the importance of the proxy.

This may just be a wording preference, but I am not enamored with 'footprint'. Why not... proxy (as used in title), or signature, or indicator, or quantitative threshold? I found myself wanting to replace 'footprint' at every usage with one of these words. Also, in the title you state it is a paleo-bleaching proxy. So, why the "" around every usage: "born bleaching footprint"? I would clarify the language here and be consistent.

Section 3.4 You state that ocean surface pH paleo records exhibit more "acute and radical changes": isn't this a result of sampling resolution or averaging? In the modern ocean these two parameters are very linked in variability, so why wouldn't they be in the paleo record? Also - please be more precise in language - I think you mean to say "variability" and "amplitude" not "acute and radical changes".

For the discussion of the paleo intervals - this is a pretty limited discussion of each of the events. I am not sure if this is tremendously useful - the main point is that these events exist and appear to be related to changes in temperature. I would suggest either a) streamlining this section of the paper so it is a brief review of previous events or b) strengthening this section with a more thorough analysis - why are these events occurring at these times? Might there be other, shorter term events that are missing? How should investigators proceed with utilizing the d11B bleaching proxy?

Conclusions 2nd paragraph of the conclusions seems out of place. I think it should be modified and moved up to be the 1st paragraph of this section. Also, I suggest that the authors include a statement that examination of additional modern, known bleaching events will be necessary to understand the temporal dynamics of when/how these events are recorded in coral skeletons.

Interactive comment on Biogeosciences Discuss., 12, 8131, 2015.

