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Interactive comment on "Ba, B, and U element partitioning in magnesian calcite skeletons of Octocorallia corals" *by* T. Yoshimura et al.

Anonymous Referee #2

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Overall quality of the discussion paper ("general comments") This study reports on trace elemental ratios (Ba/Ca, B/Ca, and U/Ca) in Octocorallia deep sea corals with high-magnesium calcite skeletal mineralogy, different from aragonite corals in the surface oceans commonly used to environmental reconstructions where Ba/Ca is generally considered an upwelling and/or terrigenous input proxy, B is a potential pH proxy, and U/Ca is a temperature proxy. Studies with octocorals are in their infancy and the results from this study will be an important contribution. However, the results as summarized in the abstract are unclear. Ba/Ca reflects seawater Ba/Ca, pH or carbonate ion, and is a nutrient proxy? I think they mean B/Ca is a pH proxy and Ba/Ca is a nutrient proxy, thus a typo in abstract. There is no mention of boron results in the abstract yet it warrants mention in the title? U is mentioned in the last sentence only in relation to Ba/Ca. The focus of the paper is clearly Ba/Ca, I suggest focusing on that trace

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element to make the paper clearer.

However, upon further review of the paper, I found a duplication of results between two papers in review with the same journal. The inclusion of δ18O and δ13C data were found for this paper (Table 1), this data is presented in another paper currently in discussion in the same journal (Mechanism of O and C isotope fractionation in magnesian calcite skeletons, Biogeosciences Discuss., 12, 389–412, doi:10.5194/bgd-12-389-2015, 2015). Table 1 is same in both papers and Table 2 is largely duplicated. Figure 2 presents the same data for δ13Cdic as the Figure 1 in the other paper. The other paper is not cited in any of the relevant captions except Figure 3 nor in the methods and the first mention of the other paper is in the results section 3.2. Additionally, the other paper has a B/Ca vs. δ18O figure that seems like it was in this paper at one point. The magnesium data in Table 1 is presented first in another paper by the authors (Yoshimura, T., Tanimizu, M., Inoue, M., Suzuki, A., Iwasaki, N., and Kawahata, H.: Mg isotope fractionation in biogenic carbonates of deep-sea coral, benthic foraminifera, and Hermatypic coral, Anal. Bioanal. Chem., 401, 2755–2769, 2011) but is not reference in the table caption but it is mentioned in the methods section. The authors probably did not mean to do anything egregious but they should clearly state there is a companion paper reporting on the same data at the start of this paper. I suggest either combining the papers, since δ18O and δ13C are central to their interpretations presented in this paper, or develop two papers as a part one and part two that it clearly show the two papers are related like “13C and 18O isotopic disequilibrium in biological carbonates: I. Patterns and II. In vitro simulation of kinetic isotope effects (McConnaughey, 1989a, b). The second option will clearly tie the two papers together in the same journal.

Individual scientific questions/issues ("specific comments"): One specimen examined is a bamboo coral, Keratoisis sp. where as the others are precious corals of Corallium sp. These corals belong to the same subclass, Octocorallia but differ in families and morphologies. I would suggestion caution and/or additional support to include the

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bamboo coral in this study or include in the discussion the possibility of a species effect. Early work with isotopes in ahermatypic corals found differences between coral families and order (Weber, 1973a) and differences in trace elements in hermatypic corals has been found at the genus level between corals in close proximity and same reef environmental conditions (DeLong et al., 2011). Table 1 shows there are differences between oxygen and carbon isotopes and trace element ratios between C. konojoi and P. japonicum at the same site and water depth. It is unclear if there is a species effect (Weber, 1973b) among deep sea corals at the same location and environmental conditions but the authors should consider this.

Technical corrections: There are many technical issues to list but I withhold a detailed list until the paper structure of the two papers can be resolved.

δ18O is sometimes referred to δ18 in the text and abstract, this may be an issue with special character but other occurrences are correct.

Table 2 Should p-value for B/Ca and U/Ca be the same is both occurrences? One is 0.000 and the other is 0.6092.

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