

## ***Interactive comment on “Environmental controls on the boron and strontium isotopic composition of aragonite shell material of cultured *Arctica islandica*” by Y.-W. Liu et al.***

### **Anonymous Referee #1**

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This article presents B and Sr isotope data in Antarctica islandica to decipher any environmental parameter effects on these proxies. I found the data very interesting, but I think that the discussion should be push forward. I am not sure if the Sr isotopes should be mentioned in the title as nothing was done with these data due to the homogeneity of the samples (or data within errors).

Abstract: I don't consider that  $R^2=0.34$  is "relatively strong". I would only note that there is a correlation. P2932: There is no more ancient reference for the proportions of boron isotopes? P2983, L8: 'It is assumed that marine carbonates...'. It is an assumption that is highly debated and, to my knowledge, there is no definite proof of this. P2983, L10: As it is a acid-base reaction, it is normal that pH of the solution dictates the amount

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of each species. There is no need of reference, here. P2983, L22: please add 'e.g.' before the references listed here. Many other studies used this fractionation factor. You should also remove in the list Kakihana et al (1977) as it was already stated before (L21). P2983, L25: that is strange, here, to have a reference prior to the study of Klochko. Again you could here remove the reference to Klochko et al (2006). You could add here the reference to Rollion-Bard and Erez (2010) as they compared the signification of the two fractionation factors. P2993, L17: Why the seawater d11B values are higher than the one determined by Foster et al (2010)? Could you please here add the literature values for the different standards? P2998, L10: You could also add the reference to Purton et al (1999) who studied the influence of metabolism on Sr/Ca ratios. P2998, section4.3: were the prediction lines calculated using the T and S variations (for the pKB values)? It is not clear for me. The line with alpha of Kakihana et al (1977) must be removed as it was shown that this factor doesn't reflect the theoretical fractionation between boron species. However, you could add the line with the fractionation factor determined by Nir et al (2015). It would be very useful to add the pKB values used to draw the line in Table 1. Idem line 26, this alpha is not used anymore. P2999, L3: You should inverse corals and foraminifera (it would be better relied to the studies cited here). P2999, L17: Please precise here the measured pH L17: I suppose that 'be' is missing in the sentence 'She concluded...'. Why some d11B values are below the predicted line? How it could be explained? You calculated some DpH down to -1.013. It is surprising for a organism precipitating carbonates. Moreover, it seems to not be in agreement with the measured pH. This section really needs more discussion. Why the DpH vs pHsw figure is not in the paper? It really needs to be added.

I don't really understand why the pH increase measured by Stemmer (2013) is not recorded in the d11B values. Is there any fractionation during the boron incorporation that could be envisioned?

Table 3: Please add the errors on the calculated pH(shell) and the DpH. I think that 1

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significant figure is sufficient.

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Interactive comment on Biogeosciences Discuss., 12, 2979, 2015.

**BGD**

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