

Interactive comment on “The influence of seawater pH on U / Ca ratios in the scleractinian cold-water coral *Lophelia pertusa*” by J. Raddatz et al.

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This article presents U/Ca data in *Lophelia pertusa* and deciphers the influence of pH on this ratio. The authors study both intra and inter-colony variability. This is an interesting set of data, but I would like that the discussion goes a little deeper, in particular concerning the variability of U/Ca ratios inside one single specimen.

1) In the part 4.1, I would separate in two sections: one concerning the possible influence of zooxanthellae, and the other one about the intra coral variability. For me, these two things are not exactly on the same plan, as one is about the all coral and the second one concerns the mechanisms of mineralization and the difference between

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the microstructures.

2) The U/Ca data seems to show a decrease of pH in CoC compared to fibres. This is contrary to what is shown by d11B measurements (Blamart et al, 2007, Rollion-Bard et al, 2011a, b). I'd like that the authors discuss this. Moreover, there is also some variability in fibres part (cf. Fig 5). So if one wants to measure U/Ca ratios to reconstruct paleo-pH, what part of the skeleton has to be sampled? The outermost section? This section seems to have a calculated pH inferior to the seawater pH (cf. Fig 5). The coral in this figure shows a variability of calculated pH from 7.8 to ≈ 8.3 . The seawater pH is 7.97 at this site. So the outermost part of fibres gives a lower pH. I'd like that the authors discuss this also.

Minor comments:

-P15713, L3: this is Tanhua and Keeling instead of Tanhua et al -P15713, L12: Dullo 2005 instead of Dullo et al 2005 -P15713, L20, please add Maier et al (2013) -P15713, L25: it was also shown by Blamart et al (2007) -P15715, L15: error is in 1 sigma? Please precise. -P15715, L22: in HCO_3^- , 3 must be in subscript -P15715, L24: what is the error on pH measurements? -P15716, L4-5: please add the errors on T, S and pH measurements -P15716, L10: Fig 4a -P15716, L11: please add that the intra coral U/Ca variability covers the total measurements range for the nine *L. pertusa* - P15716, L14: Please add errors on the calculated pH - P15716, L17, Fig 4b - P15719, L7: "work less hard": could you please more explain? - P15719, L13: please that this is 'some' geochemical models. - P15719, L14: You should add McConnaughey (1989) - P15719, L16-17: this was also shown based on d11B measurements (Rollion-Bard et al., 2003; Blamart et al, 2007; Allison et al, 2010; Rollion-Bard et al, 2011b) - P15720, L5: please add Rollion-Bard et al (2009), Allison et al (2011), Brahmi et al (2012) - P15720, L6-10: If it was performed on the same transect, it would be interesting to see a plot of U/Ca vs Li/Ca or Mg/Ca, and how it compares. If there is a Rayleigh distillation, I suppose that they will correlate negatively as $D(\text{U/Ca}) > 1$ and $D(\text{Mg/Ca}) < 1$.

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Figure 5: Please make a clearer difference between the points performed in CoC and the ones in fibres. Add also the value of seawater pH.

Form et al (2011) is not in the reference list. Doney et al (2009); Raddatz et al (2013b); Rollion-Bard et al (2009) are in the references but not in the text.

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