Interactive comment on “Environmental and biological controls on Na/Ca ratios in scleractinian cold-water corals” by Nicolai Schleinkofer et al.

Anonymous Referee #1

Received and published: 11 March 2019

The manuscript by Schleinkofer et al reports Na/Ca, Mg/Ca and Sr/Ca measurements in three cold-water corals. Their variations (mainly for Na/Ca) are discussed in view of the potential environmental and biological controls. Globally, the manuscript is well-written and easy to follow. Nevertheless, I think that the text could be shorten particularly in the introduction and improve in some explanations.

My comments are the following:

- L23: please add the error
- L48-63: I am not convinced that this part is really useful for the rest of the study.
- L142: Specify here that the study of Branson et al (2015) is on foraminifera
- L151: How this "0.18 mmol/mol" is calculated? Or is it measured?
- L172: Why the measured Sr/Ca ratio is clearly higher than the admitted ratio?
- L174: Why do you mean by "accuracy amounts"? How was it calculated?
- L189: Please define ‘COC-like’
- L190: Is there any relation between the increase and the species?
- L200: Please indicate the errors on the measurements
- L211: “As the P-values [...] in all these regressions.” I do not understand this sentence. Please explain.
- L222-224: the temperature is given with too many significant figures
- L225: “Inorganic distribution coefficient is”. Please correct. Please specify the temperature for the inorganic coefficient.
- L234: Please add the errors
- L239: There is only one study of Mg/Ca ratio in L. pertusa?
- L247: same remark
- L252: Please add the errors. One dot has to be removed in this sentence.
- L255: Please add the errors
- L257: Please correct the title
- L267: Is there any reference for the influence of kinetics on Na?
- L268: Is there any evidence for this concentration in the ECF? If there are some Ca2+/H+ pumps as stated by some authors, it would change the [Ca2+] of the ECF.
- L274-275: I do not understand. As it was explained before, you constrained your calculation to have a mean [Ca] of ≈10 mmol/mol. So of course, the calculations will give a mean [Ca] close to 10 mmol/mol. Could you please better explain your point here?
- L308: I do not agree about this elevation of pH in the COC as the d11B values are lower in the COC than in fibres.
- L312: This combination of different compartments with kinetic effects was already proposed in Meibom et al (2008) and Rollion-Bard et al (2010).
- L336-338: Are these kinetics effects higher for Mg than for Sr?
- L354-355: Please remove the sentence about foraminifera
- L363-365: Is there any optimum of growth with T and/or pH? If yes, why is it not detectable on the relationships of Na/Ca and Mg/Ca with these parameters?
- L382-388: In these studies, what is
the difference in Sr/Ca ratios between COC and fibres? Why the possible contribution of COC could be problematic for Sr/Ca and not for Mg/Ca and Na/Ca? - L445-L447: Please be consistent in the writing of Na+/K+-ATPase - L487-488: Previously some calculations were done with [Na]=455 mmol/mol. So what are the implications of a much lower [Na]ECF is your previous calculations? - L494-496: I am not convinced by the calculation of the Mg concentration in the ECF as I explained above - L501-502: As far as I know, Mg has an inhibitory role in the precipitation of calcite and not aragonite. Could you please add some references and more explain? - L514: "and" is in italic. Please correct. - L536-537: Please add references to Robinson et al (2014) and Rollion-Bard and Blamart (2014) as these two studies reviewed the geochemical differences between COC and fibres - L542: Why only this in situ technique? Are other techniques like EPMA and SIMS not suitable? - L574: Na/Mg instead of Mg/Na to be consistent - L581: Could it be also easier to measure Na than Li? - L589: Please specify that it is for cold-water corals. For tropical corals, please cite the study of Swart (1981)

Figure 1: What is the significance of the different symbols? I do not see the five areas.

Figure 2: Please add a picture of the sample that was measured for the location of COC and COC-like

Figures 3c, 4c, 4b and 4c: Why the averages are not represented in these figures?

Figure 6: Rollion-Bard and Blamart (2015) instead of Rollion-Bard et al (2015)

Figure 8: Why the value of Rollion-Bard and Blamart (2015) is not reported here?

Table 1: I do not understand the two temperatures of the lines 4

Please add a Table with the entire dataset.


C3