Referee 1

The revised version of the manuscript improved a lot! Unfortunately, I still think, although it already has been turned down a little bit in the revised manuscript, the interpretation of the phosphorus distribution is still overemphasized in the paper. As now also recognized by the authors, the foraminiferal cells have been fixed, using a phosphate buffer as medium. In addition, traditional TEM-fixing and drying methods are not appropriate, if the authors are looking for soluble content in vesicles, like acidocalcisomes. I am not even opposed that some careful speculations about the P-rich spots go into the discussion. But why does have to be so prominent that it is even mentioned in the abstract? Phosphorus isn´t even the main scope of this paper, since the study focused on sulfur. If the authors really want to prove that, I would suggest to repeat the experiment without using the phosphate buffer for fixation and if they indeed observe the same patterns, they could write a nice separate paper on the P-distributions.

A bit similar I see the interpretation about the P-patterns in the shell. I could play the devils advocate and hypothesize that the P-rich endmembers are also the result of the fixation in the phosphate buffer. I really think the discussion about the P distribution is way too long.

Thank you for your second review of our submitted document. In order to address your concern about the interpretations of the P data, we have removed most of the interpretations based on our observations for the distribution of P in the cytoplasm and mostly based our remaining interpretations on published studies, because it is nonetheless relevant for Ca and Mg and show the multiple interactions between those elements in the cell. We have also moved a section from the discussion to the method sections (section 3.3), because it seemed indeed more logical to point the limitations of the buffer solution from the beginning, and thus tune down our interpretations. This has the added benefit to put much less emphasis on P in the discussion. Finally, we have also further nuanced the conclusions about P in the test. The co-occurrence of S, Mg and P within and around the POS has already been observed in foraminifera that have not undergone chemical fixation, including well preserved Quaternary fossils (see Figure 5 in Lemelle et al., 2020). Beyond the POS, phosphorus has also been shown to be present in the calcitic layers, albeit in smaller quantities than within and around the POS (Lemelle et al., 2020), which supports our observations, and thus our interpretations.

Regardless, we also further nuanced our interpretation of P distribution within the test, as can be seen in the new version of the abstract, discussion and conclusion.

Accordingly, we modified the title of the new version of the document.

Other minor points:
There are number missing on the axis, where the correlation between P and CN is shown. This makes it hard to see how strong the influence actually is. It would be also good to label the individual graphs with letters, if 12 graphs are show in one figure!

We have added the numbers on the axes and made sure the labels would show up more clearly.

Formulations like “moderately significant correlations” (below figure 1 in the response letter) are inappropriate, if no statistical test for significance has been performed.

This sentence is not used in the present version of the document.

Referee 2

After careful reading of the revised manuscript, I am mostly satisfied with the response of the authors to my commentary. They explained more clearly the method and result section, and have toned down certain parts of the discussion and conclusion sections. The discussion is now more nuanced, and more fitting to the data presented

Thank you for your supportive comment. We appreciate yours feedbacks on both versions of the text, which helped us clarify some important parts of the interpretations.

I would like the author to spend a little bit more time to format / finalize certain figures, and then the manuscript would be suitable for publication. Please make sure the formatting is consistent between figure (lettertype, text size, placement and formatting of panel labels), both for the manuscript as for the supplement. Also make sure to upload the figures in the best resolution, e.g. the text on fig 3 for instance is rather pixelated.

We have corrected the figures to avoid the issues you pointed
comments in specific:
“- Figure 1: I appreciate the additions to Fig 1 in the revised manuscript. Looking into detail into this figure, however, I do think it is a bit messy. The scalebars should be better aligned, and in the corner, the names more clearly (maybe in bold?). I am a bit confused of panel B, what are we looking at here? Also, panel 1 shows a full specimen, the others a polished section of a specimen? – I understand that certain specimens were not fixed, but maybe this can be cleared up with a better description. Also, the layout of the figure is not great, panel B is slightly offset at the top compared to panel A, and the labelling of the panels in not consistent in formatting compared to other figures (no brackets around the letter)”

We have corrected the layout, added the brackets and clarified the figure caption, with additional explanations in order to explicit what each panel shows. We also changed panel c to show instead a better view of the specimen.

- 345-346: ‘but the highest values are not systematically reached in all profiles, and this trend is most clearly visible in profiles 2 and 3, compared to profiles 1 and 4.’ Where can we find the trends per profile, which figure / supplement?

We have added a reference to fig. S6 in the text

- Figure 4: ‘TrendC’ = ‘Trend C’. Only indicate in top panels? (maybe on purpose?). If applicable to all panels, maybe add it as a legend? The purple numbers are transitions between trends, but I do not really see the logic. Purple numbers missing in topleft panel.

We have corrected the figure, using your comments and suggestions. However, we left it in every panel in order to help the reader to associate the R2 values and the trends.

- Caption figure 5: Where is profile 1 in figure 4? Figure ‘ shows the combined 4 profiles, right?

Thank you for spotting this mention to profile 1, which was not relevant in this figure caption, and thus removed.

- Bug in the text of figure 7? And several lines are introduced by error?

That is odd, and is now longer present in the version of the validated pdf. Our apologies for this bug, we hope it won’t happen this time.

- Figure 8, label panel (f) is missing brackets

Corrected, thank you!

- Supplement: there is two figure S6

The last figure is now Fig S7.

- Typos 153: microalgae

The word here is singular, so we think that our spelling is correct.