

Biogeosciences Discuss., referee comment RC1  
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## Comment on bg-2022-149

Anonymous Referee #1

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Referee comment on "Biogeochemical processes captured by carbon isotopes in redox-stratified water columns: a comparative study of four modern stratified lakes along an alkalinity gradient" by Robin Havas et al., Biogeosciences Discuss.,  
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The manuscript by Havas et al. presents an extensive biogeochemical dataset of the water column and surficial sediment from four alkaline stratified Mexican lakes. The authors put great emphasis on measuring carbon speciation in the lake in order to obtain a better understanding of the role of DOC on the overall carbon dynamics. They argue that the lakes used in their study can be used as modern analogues of the stratified freshwater Oceans on early Earth.

The methodology is very well described and shows the great care that the authors took to obtain pristine samples. I would have liked to see a bit more detail on the description of the Ion Chromatography, but this is rather a personal taste. Overall, this section is well written and does not leave much to be desired.

The results part is absolutely excessive and requires a major revision. I can fully understand the authors, after having spent so much time in the field and the lab to collect and analyze these samples, one really wants to do justice to every single data point. However, this is absolutely overwhelming for the readers. It is just not necessary to explain every curve or datapoint in every single dataset. Nobody will be able to memorize just a tiny fraction of it. The figures are very nice, although in the current manuscript the axis labels are too tiny, I really had to zoom in to read them. With such nice figures the authors should instead focus on the take-home messages. What are the most important observations that one can make from these data? All the readers need to know are those facts that will carry them through the discussion. There is much more information in the data, but they only distract from the main story.

That brings me to the discussion, and that is also a complete overkill. Given the huge high-quality dataset that is presented here, the authors fell into the trap in trying to present multiple stories in one manuscript. I've read it twice and still failed to see how the different sub-chapters in the discussion connect to each other. Maybe they do, maybe

they don't, I really couldn't tell. Overall, I would strongly recommend to cut out parts of the discussion and put them into a separate manuscript. This is just too much. If you want to keep everything together, then shorten it considerably and make this story more understandable. I really think that there is a good story (or several stories) in the dataset, but currently it is hidden underneath a thick layer of distracting (albeit correct) information.

It does not make sense to make a detailed correction of this manuscript, it needs a thorough revision first. In closing I recommend major revision. This is great work that should be published, but not in its current shape