

Biogeosciences Discuss., referee comment RC2
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Comment on bg-2021-25

Anonymous Referee #2

Referee comment on "Sedimentation rate and organic matter dynamics shape microbiomes across a continental margin" by Sabyasachi Bhattacharya et al.,
Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-25-RC2>, 2021

General Comments:

In this manuscript, Bhattacharya et al., investigate and compare microbial community structure, metagenomes and metatranscriptomes in sediments below perennial and seasonal oxygen minimum zones in the Arabian Sea. They report the difference in community structure between the two as well as varying biogeochemical processes determined by -omics data and physiochemical and isotope data. Specifically, the perennial OMZ sediments exhibited cryptic methane cycle and high abundance of methanogens, ANME, SRB, and acetogens in surface sediments. Authors also incorporated physiochemical and geochemical data to help explain these processes and main environmental drivers of the community differences and I really appreciate this approach. Sampling and methodological approach were rigorous, well executed, and generated a plethora of thought-provoking and really valuable data. However, the manuscript is way too long and thus very difficult to get through. It also includes a lot of redundant information between the methods, results, and discussion sections (results in discussion/discussion in results). The main findings are difficult to follow due to the length of text and not very informative data presentation. Additionally, extensive lists of taxa make the manuscript really long and disturb the flow (without really bringing much valuable information). Seems like metatranscriptome results (arguably one the most interesting parts of this study) are buried in text and not represented in figures. On the other hand, diversity data, which is valuable but not as captivating, is discussed at lengths and displayed in a large panel figure. I think the manuscript needs to be condensed and only the really interesting, major findings should be discussed and highlighted. I understand that sifting through so much data and determining what really matters is difficult, but I think it is a necessity so that this manuscript is comprehensible and thought-provoking. Figures should also be improved and better represent the compelling data the authors have here, but these data are buried in text.

Specific Comments:

Line 53-58: please shorten this sentence or break it up, it is hard to follow

Line 67: maybe co-exist instead of co-founded?

Line 78-81: I am not sure this statement is true; I feel like there has been plenty of research done on this globally

Line 160: "DNA for metagenomic analysis was extracted"

Line: 225-250: This is so much text and it's hard to follow/keep track of. Maybe present in a table in SI? The manuscript is already so voluminous...

Line 270-280: I don't think it is necessary to describe and discussion diversity indices at such length.

Line 312: have you checked GTDB for ANME?

Lines 497-508: At this point I am lost in the jargon and equations.

Line 612: The discussion specifically needs to be shortened and to the point. I think it will greatly improve the manuscript.

Fig 3: See my general comments above. Is this figure necessary in the main text? Diversity is important but with the amount of data in this study I think transcriptome results or a map showing metabolic pathways would be much better to display here.

Fig 5: I am not sure this is the best way to represent your data

Fig 6: Thank you for including geochemical data!