

Interactive comment on “Molecular characterization of organic matter mobilized from Bangladeshi aquifer sediment: tracking carbon compositional change during microbial utilization” by Lara E. Pracht et al.

Anonymous Referee #1

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The terms and samples collected are unclear to me.

1. Page 2. The term aquifer sediments is in my opinion a misnomer. A lake can have sediments, or an ocean, but I don't see how an aquifer can have sediments. I presume that this is an unconsolidated matrix aquifer consisting of sand and clay particles they must have been deposited by water. But I don't think it is accurate to call the aquifer matrix sediments any more. That said, this aquifer needs to be described better, please.

C1

2. Page 2 and 3. What is aquifer-recharge water? How do you collect pond recharge water and rice field recharge water? (page 3). Please define and describe these terms.

3. How does recharge water (pond or rice field) differ from sediment pore water? I am sorry but I find this confusing.

4. What in reference to these terms above is mobilized SOC?

5. Page 2. How do you know that it's the mobilized SOC that is reacting and not the SOC in place? And if you don't use the terms sediments any more can you call this aquifer matrix organic material?

6. OC degradation proceeds from large molecules to smaller ones and then to methane and CO₂. page 2. Do you contradict this later saying that larger molecules are more reactive and smaller ones accumulate?

7. page 3 top of page. In addition to what? On the bottom of the last page you didn't describe what you were doing in the field?

8. page 3, line 5. really? None of the DOC from rice field recharge (what's that) reacted?

9. page 3 line 22. Did these samples come from Neumann's 2014 incubation? How were they preserved all that time? Or was another similar incubation done?

10. page 2, line 19. aquifer recharge waters. Define how you collect this?

11. page 6. line 30. Concentration and character of OC mobilized off aquifer sediment into sediment porewater differed from DOC in aquifer recharge. Do you mean DOC that comes off the aquifer matrix material relative to that from ponds and lakes flowing down? How old is the aquifer matrix material? How old is this aquifer? Wouldn't you expect this?

12. I don't understand how the numbers relate to the pools in line 31 page 6 to line 1 page 7.

C2

13. How do collect mobilized SOC? Is this different from sediment porewater?

14. The figures are awfully small and dense. It would help tremendously if the figure captions were on the same page as the figures. Why is this not allowed?

15. I am uncertain what the x axis are in Fig. 1 B, C, and E.

16. I am uncertain what the x axis is in fig 3, --> 0, 1, 2, 3??? 0, 1? I thoguth these were day 1 to 18? The figure caption may be accurate but it is too dense.

17. fig. 4, see comment 16.

18. Conclusions. Lines 15-20, page 11. I don't follow this, seems like a lot of methane is being formed in this aquifer already. What are you warning would happen if this pool of SOC was destabilized in situ? And what does this mean, to destabilize it in situ?

Overall, pretty confusing paper, confusing terms, with confusing figures.

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