Reply on RC1

Jancoba Dorley et al.

Author comment on "Physical and stoichiometric controls on stream respiration in a headwater stream" by Jancoba Dorley et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2022-214-AC1, 2022

Thanks for the feedback. We appreciate your thoughtful comments.

With respect to your Main Comments:

1) We will add a more detailed description of the key parts of the model and the tracer breakthrough curves in a supplementary file.

2) In Knapp et al. (2017), we showed that reach-scale and local-scale datasets provide relative and non-unique descriptions of solute transport processes in a stream ecosystem. In this study, both reaction and transient storage timescales are reach-scale inferences from the tracer breakthrough curves. Given the model that we are using, we have no objective way of describing or differentiating between single or multiple excursions, and that is beyond the scope of our work. We simply attempt to quantify timescales based on long-established metrics.

Knapp, J. L. A., González-Pinzón, R., Drummond, J. D., Larsen, L. G., Cirpka, O. A., and Harvey, J. W.(2017), Tracer-based characterization of hyporheic exchange and benthic biolayers in streams, Water Resour. Res., 53, 1575– 1594, doi:10.1002/2016WR019393.

3) Thanks for your suggestions to provide alternative plausible reasons to explain our results. We will carefully incorporate your feedback with the references suggested.

4) Please understand that any model choice taken is subject to criticism by reviewers depending on their experience and preferences. Therefore, as reviewers and authors, we need to trust modeling choices unless there are known fatal flaws. While thinking about ways to analyze these data over the four years that we have been working on this project, we never considered that choosing the transient storage model and TASCC for our analysis was wrong. In fact, that was part of the proposal that we submitted and got funded to carry out this project. Thus, while we value your input, based on our collective experience, we consider our modeling to be reasonable and current.

With respect to the Specific Comments, we will incorporate them before our final version is ready.

Thanks, again.