

Biogeosciences Discuss., author comment AC2
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Reply on RC2

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.,
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Thanks for the positive feedback. We appreciate your thoughtful comments.

Please note that we are not concluding from our study that “the sequential stoichiometric treatments conducted over the two rounds of experiments counterbalanced the controls imposed by hydrologic transport.” Evidence of our position on this includes the fact that we first introduced the idea in section 3.4 of the Results and Discussion, where we carefully stated that “Within this context, the constant respiration that we observed in our study *may have resulted from* counterbalanced interactions between flow reductions, which decreased surface transient storage and the amount of biomass connected to the stream, and an increase in metabolic activity likely prompted by the removal of nutrient limitations from our sequential additions of N, N+C, N+P, and C+N+P (Figure 7)”. As stated, we seek to explore a plausible explanation for our results instead of providing a conclusion supported by our data. That is also why Figure 7 is a conceptual schematic. Finally, in the Conclusions section, we stated, “Interestingly, our *results suggest* that the sequential stoichiometric treatments that we conducted over the two rounds of experiments counterbalanced the controls imposed by hydrologic transport, consistently resulting in insignificant changes in stream respiration between rounds and treatments.”.

One of the difficulties of our field experiments is that respiration, nutrient uptake, and discharge fluctuations co-occurred in a changing stream system. Thus, it is challenging to link two of these quantities conclusively and uniquely. If we had done only Raz injections with changing discharges, we would have missed the role of stoichiometry. If we had only injected nutrients, we would have missed respiration. If discharge had not changed, we would have missed its role in controlling respiration and uptake. There have been laboratory experiments in flasks where discharge does not change (or exist), and they suggest that stoichiometry controls metabolism. Field experiments show that discharge impacts biological activity by controlling residence times. However, ours is one of the first attempts at understanding how they all interact together in a changing stream system. Even though our study is not perfect, we believe that it provides key contributions and sets a precedent for a new generation of all-inclusive field experiments seeking to understand the co-evolution of ecological and hydrological processes.

With these considerations in mind, we will further clarify any unclear language before the final version is published.

Thanks, again.

