

Biogeosciences Discuss., referee comment RC2
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Comment on bg-2022-19

Anonymous Referee #2

Referee comment on "Organic matter transformations are disconnected between surface water and the hyporheic zone" by James C. Stegen et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2022-19-RC2>, 2022

In the submitted work, the authors compared the number of biotic and abiotic transformations occurring between river DOM and hyporheic zone sediment DOM to investigate the OM transformation and chemical differences/similarities in the two DOM groups in the hydrologic connectivity. The number of the transformations was counted by molecular-level composition of DOM analyzed by FT-ICR-MS. The study is very interesting. However, there are several concerns/questions about the methodology and the arguments in the manuscript. (1) As the authors mentioned, FT-ICR-MS has its inherent limitations due to the short range of MW (200-1000 Da) and ionization effects. Therefore, the number of the transformations inferred from the measured chemical composition may not represent all that might occur in the total DOM pool of samples. The authors need to state this limitation and potential changes in the conclusions/arguments. (2) If the previous concern could be well resolved, it would be OK to compare the number of transformations between river and sediment DOM. However, I am still not sure about that between abiotic and biotic transformation in a given DOM group because some biotic (or abiotic) transformation processes may depend more on the limited analytical window of FT-ICR-MS than others. (3) River DOM composition is affected by diverse sources with different chemical composition, while sediment DOM can be relatively homogeneous because of infiltration effect in sub-surface followed by strong interactions with mineral surfaces. Please compare the chemical diversity of DOM between the two groups and add this aspect in the discussion, if acceptable. As a minor comment, I suggest the text in line 97-99 to be removed or moved somewhere else because the conclusive remark is not appropriate in the introduction section.

