

Biogeosciences Discuss., referee comment RC1
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Comment on bg-2021-131

Anonymous Referee #1

Referee comment on "Enhanced bioavailability of dissolved organic matter (DOM) in human-disturbed streams in Alpine fluvial networks" by Thibault Lambert et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-131-RC1>, 2021

The paper is organized and well-written, with a clear analysis of the data. Overall, the findings agree with the literature and advance our understanding of the impacts of land use on DOM composition and lability in watersheds. My only concern is that "terrestrial" PARAFAC components are stable, which led the authors to suggest that terrestrial material is not being significantly consumed/altered (e.g., lines 407-412 of the manuscript). These components can be produced by microbes, so using these as an exclusive metric of whether terrestrial material is being consumed isn't ideal. At the least, the authors should consider literature showing alteration of terrestrial material by microbes and "maintenance" of these PARAFAC components by microbes, e.g., microbes contributing to these components so that net change is zero, while real change is happening. Due to the diversity of compounds contributing to a given optical signature, a more detailed molecular analysis would be needed to more definitively state whether the terrestrial material is being consumed or not. Thus, I would emphasize more caution when noting the degree to which terrestrial material is being altered and how that relates to land use. These are interesting and encouraging results that help illustrate these dynamics across watersheds but the full extent of terrestrial DOM change isn't fully captured with the data in hand.

Some of the specific comments refer to personification of materials, e.g. "whose" when referring to DOM or "their" when referring to carbon.

Specific Comments

Line 21: "whose the size increased with human disturbance"

I suggest changing this to "with relative contribution to the total DOM pool increasing with human disturbance."

Line 29: "determine" should be "determined"

Line 35: "their travel"

I suggest changing this to "transit"

Line 49: "proportion" should be "proportions"

Line 60: "amount" should be "amounts"

Line 72: "results" should be "result"

Line 106: Remove "the" before Lake Geneva

Line 115: "forests" should be "trees"

Line 169: "weights" should be "weight" in the sub-title

Line 223: May be better to refer to the Fluorolog-3 as a spectrofluorometer.

Line 233: "prior the" should be "prior to the"

Line 234: "A eight components" should be "An eight component"

Line 285: "component" should be "components"

Line 340: "recently DOM produced" should be "DOM recently produced"

Line 344: I suggest citing Harfmann et al. 2019 JGR: Biogeosciences here to support this observation

Line 349: "investigate deeper" should be "more deeply investigate"

Line 350: "point" should be "suggest"

Line 351: "amount" should be "amounts"

Line 368: "another" should be "additional"

Line 371: "despites" should be "despite"

Line 375: The similar size of STRC and LTRC pools is intriguing – is there any evidence that the LTRC pool is related to the STRC? Soares et al. 2019 Scientific Reports noted the role of residence time in long-term bioavailability. The discussion could be expanded a bit to consider this with the current dataset.

Line 374: "amount of DOC was" should be "amounts of DOC were"

Line 405: "closed" should be "close"

Lines 407-412: I'm not sure I agree with this. It stands to reason that inland waters are well-suited to degrade terrestrial DOM, as that is a primary input to these systems and heterotrophic bacteria have arguably adapted to utilize this carbon source.

Line 408: "timescale" should be "timescales"

Line 409: "entered in the lake Geneva" should be "in Lake Geneva"

Line 409: Remove "the" before water residence time

Line 418: Add "the" before fluvial continuum

Line 425: I would reference the findings from line 344 and citation mentioned there; this finding is largely dependent on optics which always benefits from links to other literature.

Line 429: "amount" should be "amounts"

Line 439: "effect" should be "effects"