

Interactive comment on “Dynamics, chemical properties and bioavailability of DOC in an early successional catchment” by U. Risse-Buhl et al.

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Overall this manuscript presents a study that is of interest to the readers of Biogeosciences. The authors present a novel study of the DOM characteristics and bioavailability of a recently constructed stream and pond ecosystem. The quality of the methods is excellent for the most part and the study is well written. The title accurately reflects the content of the manuscript.

The abstract seems a little misleading. The authors state in the manuscript that “the ^{13}C signature of the DOC (-25 to -30 ‰ indicates that recent organic matter derived from C3 plants and microbial exudates was a substantial fraction of the DOC pool”, but the abstract states that “The ^{14}C age and ^{13}C NMR spectra suggest that DOC was partly mobilized from charred organic matter of the Quaternary substrate” and does

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not additionally state that there are modern inputs, especially that there are substantial modern inputs to the DOM pool in the pond sample.

A map showing the location of the upwelling, downwelling, and perched water sample sites would enhance the manuscript and help readers better understand the study site.

The differences between Chicken Creek and literature of other “early-successional” catchments in the DOC discussion section may deserve a little more attention. The site of this study seems like it is really a “constructed” or “reclaimed” system and has some important differences than the natural systems from the cited literature. It seems like the high DOC and more modern source of the DOM in Chicken Creek could be due to differences between constructed versus natural early-successional catchments. The effects of dumping are mentioned on page 1029, line 12-14 and there may be much more surface area for sorption or leaching of aquatic DOM to/from the soil and also more surface area for microbial colonization in an area that has been disturbed and then re-constructed compared to a recently de-glaciated ecosystem.

It is unclear what “these conclusions” are on page 1029, line 1. Based on the previous paragraph there are two different relationships between ^{14}C age and DOM bioavailability discussed: older ^{14}C age leads to greater DOM bioavailability page 1028, line 20 or that older ^{14}C ages lead to greater turnover times page 1028, line 24. It is not clear which relationship the authors are suggesting predominates in the Chicken Creek catchment.

The SUVA₂₅₄ values for the soil solution may be influenced by the presence of iron (Weishaar et al., 2003) since the value is above 5 and the groundwater may be in contact with iron containing minerals since the authors state that there are “iron oxide deposits indicating reducing conditions”. The authors do not draw any particularly strong conclusions from the SUVA values and may want to consider removing that or discussing it in more detail in the context of metal interference. It seems that the aromaticity could be calculated from the ^{13}C NMR and used in the NMDS instead of

the SUVA₂₅₄ values.

In the NMDS plot of Figure 6 there are two mis-matches between the abbreviations used in the caption and the figure. I do not see any "ip" samples plotted in the figure, but there are unidentified "-il-" samples in the figure. Those differences should be reconciled. I assumed that the il samples were pond water microbial community samples. Also, the caption states that there should be "ug" samples and they are labelled "gw" in the figure.

Technical Corrections:

Line 27, page 1028 should be revised to read "carries" instead of "carryies"

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