Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2018-478-RC1, 2018

Biogeosciences Discussions
Open Access
EGU

Interactive comment on "Dissolved organic matter characteristics of deciduous and coniferous forests with variable management: different at the source, aligned in the soil" *by* Lisa Thieme et al.

Anonymous Referee #1

Received and published: 26 November 2018

The manuscript presents a study on quantities and qualities of DOM in decisive water fluxes (throughfall, stemflow, litter leachates and subsoil solutions) of temperate forests in dependence of tree species composition and forest management. The large data set available (26 individual sites, four years of sample collection) is mostly well evaluated, summarized and presented by the authors. The manuscript thus can make a significant contribution to research on biogeochemical nutrient cycling in such ecosystems. It contains a bulk of detailed information about how individual properties of DOM change along the water pathways, which provides insights into processes controlling the nutrient cycles. The conclusion that transformation processes in mineral soils cause an alignment of the properties of DOM from different sources is interesting and can help

Printer-friendly version

Discussion paper

to built novel conceptual models about the C cycle of terrestrial ecosystems.

Yet, one major shortcoming of the manuscript is that the properties of the soils of the study sites are not well described. There is some information about parent material and soil type given in the supplementary material, however, in my opinion a study on DOM in subsoil requires more detailed information about soil properties that may strongly affect the movement of DOM such as soil texture, mineral composition of the reactive clay fraction and pH (i.e., properties known to determine the chemistry of sorption processes). Hence, the focus of the discussion is a bit too much on biological factors of DOM movement, while the geo-chemical controls of soil processes should be covered a bit more. In case the data on soil mineralogy and chemistry are not available, I suggest to (at least) enhance the discussion on basis of available literature about how differences or similarities in geo-chemical factors between sites might have influenced the results of the present study. For instance, a decrease in highly oxidized compounds (page 15, line 21) might be explained by binding of the carboxyl-groups to positively charged surfaces of Al-/Fe-oxides at acidic pH values. In my view, the conclusion that the alignment of the composition of DOM is due to biotransformation and "interaction with the soil solid phase" needs support by considerations about such processes.

In addition to this major comment I only have a few more minor comments:

- Page 3, Line 27: The hypotheses could be stated more precisely, i.e., currently a broad predicition is made ("DOM changes systematically") without any consideration about the main mechanisms. How and why should the composition and biodegradability of DOM change along the water pathway? How and why should tree species and forest management affect these changes? - Page 3, Line 30: I suggest to briefly explain the ForMI here so that the readers can gain a better understanding of the study approach. - Page 4, Line 17: The work of Fischer et al. is not given in the reference list. - Results section: Although it is not the focus of the manuscript, it may be interesting to briefly summarize the magnitude of the temporal differences in DOC concentrations in the text (e.g., between the years and over the vegetation period); it is not clear to

Printer-friendly version

Discussion paper

me whether the temporal differences are mirrored in the standard deviations shown in Figure 1?

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2018-478, 2018.

Printer-friendly version

Discussion paper