

Interactive comment on “Humic surface waters of frozen peat bogs (permafrost zone) are highly resistant to bio- and photodegradation” by Liudmila S. Shirokova et al.

Isabelle Laurion

isabelle.laurion@ete.inrs.ca

Received and published: 28 February 2019

I enjoyed reading this interesting piece of work. You address an important paradigm. Here are a few comments for you to consider.

You wrote in the abstract that your results indicate the "Low importance of biodegradation and photolysis on DOC processing –and CO₂ evasion– in surface waters of permafrost-affected peatland regions", and I agree that your results indicate that these processes are not converting much DOC into CO₂ independently, but in order to affirm this fully, I think you would need to test both processes at the same time, just as they occur in surface waters. Can you really exclude (just by looking at the limited effects

C1

on SUVA) that there is no production of biolabile photoproducts that may involve CO₂ production?

I think that Rose Cory (referred to at lines 454-457) included partial oxydation in these percentages, that is, the production of smaller molecules (other than CO₂). And you did measure a loss of color (SUVA) in some treatments. It would be interesting to discuss this further.

To explain the observed high dissolved CO₂ in waters concurrent to low photo & biomineralization, you could also raise the potential for dark DOM chemical oxidation that can be important in iron-rich organic-rich waters facing redox oscillation. Have a look at this paper: Page et al. 2012. EST 46:1590-7.

It would be useful to clarify the time delay between water sampling and experiments. It seems different for PDOC and BDOC experiments. Even if water has been filtered onto 0.2 μm, if there is a few days of delay, bacterial regrowth could affect DOM composition, and thus what's left for the biolability assays when incubations started. Maybe this could be acknowledged.

It is unclear if DIC has been measured in PDOC and BDOC experiments, but we assume it was only measured in situ since there are no results otherwise presented.

Microscopic counts of bacterial cells (along the experiments) will be much more useful than the uncommon CFU counts, which is largely affected by culturing conditions and ignore the many uncultivable bacteria.

I hope these helps and best wishes in the following steps.

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2018-528>, 2019.

C2