

Biogeosciences Discuss., editor comment EC1  
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## Comment on bg-2021-23

Jianming Xu (Editor)

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Editor comment on "Microbial labilization and diversification of pyrogenic dissolved organic matter" by Aleksandar I. Goranov et al., Biogeosciences Discuss.,  
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Please find the comment from one of reviewer, as following.

This work investigated the molecular changes of water extracted chars (pyDOM) during microbial degradation using FT-ICR-MS and other methods. The topic is interesting and the manuscript is well written. But I have some major comments about the discussion about the role of ROS in the transformation of pyDOM.

Major comments:

- The author said this is a parallel study of the same samples (Bostick et al., 2020a), and "Over the 96-day incubation, up to 48% of the carbon was respired to CO<sub>2</sub> following first-order kinetics," However, this study only incubated 10 days. The DOC loss or mineralization is very important in the biodegradation of DOM, but I did not see any contents about this in results or discussions in this paper.
- My biggest concern: The results and discussions about "Radical oxygenation as a potential source of molecular diversity" contained too many over-interpretations. Only the results of FT-ICR MS cannot support the obtained conclusions. (1) no data about the detection of ROS were present in this study. In addition, the control experiment by addition of ROS inhibitors during incubation was lacking. (2) the conclusions like "the bio-produced formulas could be classified as products of oxygenation reactions, likely driven by ROS species such as the hydroxyl radical ( $\bullet\text{OH}$ )" obtained by the KMD analysis using oxygen (O) series (eg. Figure 4) are severe over-interpretation of the FT-ICR MS data. There is no evidence to support that  $\text{C}_c\text{H}_h\text{O}_{o+1}$  is produced from  $\text{C}_c\text{H}_h\text{O}_o$  via oxygenation by hydroxyl radical ( $\bullet\text{OH}$ ) attacks. Combined (1) and (2), no evidence support the conclusions about the pathway of radical oxygenation of pyDOM.

Minor comments:

- m was converted to square, eg. line 150, line 469
- Figure 1: Present bio-resistant formulas in Figure 1?

