

## ***Interactive comment on* “Seasonal shifts in export of DOC and nutrients from burned and unburned peatland-rich catchments, Northwest Territories, Canada” by Katheryn Burd et al.**

### **Anonymous Referee #1**

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I recommend this paper for publication with minor revisions. This paper was enjoyable and provided a good comparison across DOC, N and P yields from a disturbed and undisturbed catchments with ~60% peatland cover using several different lines of evidence and analyses. The authors used fluorescence indices, <sup>14</sup>C dating of DOC, DOC, P and N to assess quantity (yields) and composition (DOC quality) of aqueous export from each catchment. The authors highlight the importance of catchment dynamics using end-member analysis, hysteresis, radiocarbon dating and by quantifying runoff and solute yields. Monitoring during spring freshet were shown as critically important to accurately characterize DOC and nutrient yields. The final conclusions stated in the manuscript suggest that climate change will alter DOC composition, and

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DOC and TN yield more than wildfire. Although the study is interesting and illuminating in many respects, sentences are long and sometimes difficult to follow. Making some sentences (a few indicated below) more concise and targeted would clarify important messages for the reader. There are no details about the fire in the disturbed Notawohka peatland (areal extent, severity/depth of burn) and this information would help contextualize the effects of wildfire on catchment yields. The omission of details about the specifics of wildfire occurrence in the Notawohka catchment is striking and should be included in the manuscript if this catchment is being directly compared to an 'undisturbed' catchment in each analysis. Specific comments: P3, L7-8: "Immediacy of links between terrestrial and aquatic biogeochemistry..." could be rewritten for clarification P3, L10-11: Same as above. Very important message but lacks clarity. P3, L16: "generally cause increased..." – May not be the best word. P3, L17-19: Awkward phrasing. Unclear. P5, L2: "mesic in wetness"? Page 5, L5: What does "carry fire well" mean? Page 7, L6: Reference for stannous chloride method Page 9, L5: What percentage of the peatland complex? Page 9, L21: "...stored dark and cool" – Odd phrase. Page 12: Figures a), b), d), f) – Difficult to decipher symbols. Page 15: b) – is it possible to get some transparency because superposition of data points blocks data pattern c) & d) the shading is confusing. Technical corrections (typos): Page 2, L24: change order of references according to date to coincide with rest of paper Page 3, L7: mean to means (typo), possibly change "...contributing sources.." to "...sources contributing to..." Page 9, L8: Remove "," after "stream water samples..." Page 9, L16: Add colon after "occasions in 2017:..." Page, L18: Add period after "for 4 h). " Page 9, L21: "stored dark and cool" sounds awkward. Page 3, L22: remove "," in the sentence "...the permafrost, i.e. the active layer, (Gibson..." add comma (Gibson et al., In review)," Page 3, L23: Add "a" after "...this region may exhibit a characteristic response..." Page 10, L15: Reference for Scotty Creek catchment weather could be improved. Page 14, L25: Remove 'shifts' after A254 ?

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