

## ***Interactive comment on “Biodegradability of dissolved organic carbon in permafrost soils and waterways: a meta-analysis” by J. E. Vonk et al.***

**Anonymous Referee #1**

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8355, L2-8: The 2nd and 3rd sentences are repetitive – I suggest they are combined. 8356, L2: How might the lengthening of the arctic summer (thaw period) manifest itself in terms of degradation of the less biodegradable DOC? 8357, L11: DOC is not solely composed of lower molecular weight compounds – fulvic and humic acids would not be described as low MW. Rewrite the sentence and redefine. 8359, L11: It is unlikely that this smaller category (<250km<sup>2</sup>) includes much headwater stream data. Such a wide category in terms of catchment size will contain a whole range of stream orders. Many of these catchments <250km<sup>2</sup> would be called rivers, rather than streams! 8364, L11: The effect of incubation time. I would also have expected to see calculated BDOC loss rates as part of their meta-analysis - this is very easy to do and is something that readers could relate to. Since incubation time is such an important influence on BDOC loss rates, this section on “effects of incubation time” is at best a rather crude/rapid  
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analysis. 8364, L12-13: This is as would be expected (fraction of BDOC removed decreases with time) – but presumably you have the data to show this actually occurs, rather than saying “likely decreases”? 8364, L11-17: Direct the reader to the relevant tables/figures to support these various statements; this will help the readability of this part of the text. 8365, L9: Please explain to the reader what is “unique” about the composition of permafrost DOM? This has been mentioned several times and is an important assumption behind some of the authors conclusions/interpretations. 8366, L6: I would like to see some clear statements about the relative importance of yedoma-derived versus non-yedoma-derived DOC in the circum-arctic regions. As recognised by the authors there are clearly large gaps in the what is known/not-known about BDOC from the circum-arctic. Are there any specific studies from sites with non-yedoma-derived DOC? 8368, L22 and L27: as commented earlier these are not “small streams”, in fact these are classed as “streams” rather than small streams on 8358. 8371, L10-18: The DOC incubation protocol outlined above recommends a maximum incubation time of 28 days. Presumably this will have to be modified (lengthened) for less labile DOC, particularly in areas without continuous permafrost? 8374, L3: Is this a DOC or BDOC incubation protocol? A clear statement is needed.

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