

Interactive comment on “Dissolved organic carbon, major and trace element in peat pore water of sporadic, discontinuous and continuous permafrost zone of Western Siberia” by Tatiana V. Raudina et al.

Anonymous Referee #1

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Raudina and colleagues present an interesting and detailed study on pore-water sample data along an extensive latitudinal gradient in Western Siberia. The amount of data they have generated is substantial, but the way it is presented is reader-friendly by using a clear text structure and good statistical techniques. I was also glad to see an extensive and, to my knowledge, very complete and broad list of references throughout the text.

I certainly support publication of this manuscript, I think it adds valuable insights into the link between soils and aquatic systems, and potentially changing release pathways

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upon future/ongoing permafrost thaw. I only have a few minor suggestions for revisions and a few thoughts to perhaps elaborate on:

Content: - Abstract: I would propose to either replace the final sentence, or add another one, something along the lines of line 510-512 (conclusions) to create an ending that is a bit more general - line 101: you here write that the precipitation gradient is from 400 to 460 mm but in Table 1 it ranges between 363 and 594mm? - is it possible to add one-two lines on the difference in origin for the two micro-landscapes you sketch out in Figure 2? - section 2.2: can you add some references for this method? - line 147-148: how many of the analyses did not show a good agreement? - lines 215-216: did you also consider comparing latitudinal gradients for mounds only, or for hollows only (instead of the average values per site independent of topography)? - section 4.1: I am wondering: can the difference in DOC mounds vs. hollows also somehow be related to the (seasonal) timing of thaw? (Do the mounds thaw later than the hollows?) And hence the period of unfrozen exchange of constituents in the soil with porewater? Also, in line 379 you briefly mention that the chemical composition of peat between hollows and mounds may be different and could cause the differences in major and TE. Can this different chemical composition of peat not also play a role for the difference in DOC content between mounds and hollows? - line 257-259: this is an interesting statement and reference, but could you elaborate a bit more on how this relates to the above two sentences? - line 325-328: if DOC, Fe and Al are dominating colloidal carriers, why do none of the trace elements correlate to DOC? - lines 330-336: you present quite a lot of specific information/knowledge here, can you provide a bit better explanation so that more readers can follow? - lines 378-384: the difference in peat chemical composition is an important point, can you elaborate on this a bit more, also with respect to DOC patterns? - line 440-446: this is also an interesting paragraph, that I think you can expand a bit more. E.g., what can be the consequences of the correction for general (upscaling) calculations that are now made in literature? - line 467-468: I do not understand why the share of spring runoff from the mounds to rivers and lakes will decrease? And, perhaps related to this, have you considered any future

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changes in precipitation patterns and/or general wetting/drying of the region? - line 474-476: here you present two scenarios that are presented as (i) OR (ii), but isn't it much more likely that both (i) AND (ii) will occur? - line 481: you write "proportion of mounds between 20 and 50%", is that a proportion of the total landscape? Or a proportion of the total elements? Please explain. - line 490-492: the fact that this study contradicts a dominating paradigm is something that can come forward a bit more, in my opinion, such as in the conclusions and/or in the abstract. - is there a reason why you measured SUVA280 and not the more commonly used SUVA254?

Tables and figures: - Table 1: write "latitude" instead of "GPS", and perhaps add the abbreviations for the regions (Tz, Ur, etc.) behind the site names - Figure 1: I think the panel with the actual map can be improved for increased readability, for example: enlarge picture, add either a vegetation map or biome map, or permafrost zonation map (instead of red lines) on the background (instead of the currently-used rather vague colours). Additionally, is it possible to add site maps with more detailed, high-res sampling locations of the different samples? - Figure 2: What is the vertical white line (with a dashed line in it) that crosses panel B through the left polygon? - Figure 3, 4, and 5: write "linear" instead of "liner". Also, it may be good to indicate the boundaries between the sporadic-discontinuous and discontinuous-continuous permafrost zones with vertical thin dashed lines?

Text edits/spelling: - Title: write "elements" instead of "element"? - line 55: "arctic" - line 156: "landscapes" - line 211: "pore waters" - I personally think ALT "rise" is not an ideal way of putting it, I would prefer to use ALT deepening or ALT thickening - Line 305-307: add "respectively" after this sentence - line 440: I suggest to write "our obtained results" - line 450: "in accordance" - line 464 and 466: "on the one hand" and "on the other hand" (not "from") - Olefeldt should be spelled throughout the manuscript with "dt"

In general, the language is quite good but I think the manuscript can benefit from a quick native-speaker check because particularly the use of articles ("the" and "a") is

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often left out where it is required, and sometimes vice versa.

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