

Response to reviewer #4 comments on “Use of water isotopes and chemistry to infer the type and degree of exchange between groundwater and lakes in an esker complex of northeastern Ontario, Canada” by Boreux et al.

In black: reviewer’s comments.

In blue: our answers and/or what we added or changed in the manuscript.

I am reviewing this manuscript for the second time. I believe the authors have sufficiently responded to my previous requests, and thus recommend acceptance after minor revisions. This is an interesting manuscript, and I think the results will be a useful contribution to both hydrologists working in northern latitudes and practitioners working in the study region.

Below are several detailed comments for the authors to address. While I would happily review this manuscript one more time, I believe these changes can be made without further peer review.

We thank the reviewer for reading the manuscript one more time and for his/her additional comments. These comments helped us to further improve the manuscript. We followed the majority of the reviewer's comments and suggestions when we prepared the third revised version of this manuscript.

L29: “The hydraulic midline” is a bit of an ambiguous term. I would encourage authors to remove it from the abstract and then define it later in the manuscript before using it.

We agree with the reviewer that this terminology is ambiguous for an abstract. We removed the term from the abstract and defined it further in the manuscript as suggested below in the comments.

L60: Authors may want to consider citing Thorslund et al., 2018 Thorslund, J., M.J. Cohen, J.W. Jawitz, G. Destouni, I.F. Creed, M.C. Rains, P. Badiou, and J. Jarsjö, 2018. Solute Evidence for Hydrological Connectivity of Geographically Isolated Wetlands. *Land Degradation & Development* 29:3954–3962.

We cited Thorslund et al. (2018) as suggested.

L73: “To as” appears to be a typo

This was adapted in the text as suggested.

L95: Authors should define groundwater connectivity.

We defined “groundwater connectivity” as suggested.

L97: Authors use multiple terms to describe “tracers”. These terms should be clearly defined, then implemented consistently throughout.

We clarified what we meant by “tracers” as suggested.

Fig 1. When this goes to print, authors should make sure the text is large enough to be useful.

We increased the front size as suggested. We also took the liberty to add colours to all the figures in the manuscript for more clarity as well.

L175: While this metric is certainly useful, I’m not sure that it’s appropriate to call it watershed slope, as the actual lake’s watershed is certainly larger than the delineated 100m buffer.

We replaced watershed slope with the term “perimeter slope” throughout the manuscript.

L291: Here, while I understand the utility of calculating E/I ratios of springs and rivers for comparison, the assumptions of the approach breaks down. If nothing else, authors should at least make a statement indicating as much.

We agree with the reviewer that E/I ratios of springs and rivers were included only by way of comparison. We made a clarification as suggested.

L305: The authors should justify using E/I ratio and f values as equivalents.

We justified this as follows: “While E/I ratios and f values are two metrics calculated with different formulas, they can be compared equivalently as they both represent the mass balance of the lakes in dimensionless ratios of water losses versus available lake water.”

L514: Consider citing Spence et al., 2019: Spence, C., G. Ali, C.J. Oswald, and C. Wellen, 2019. An Application of the T-TEL Assessment Method to Evaluate Connectivity in a Lake-Dominated Watershed after Drought. JAWRA Journal of the American Water Resources Association 55:318–333.

We thank the reviewer for the suggestion. However, after reading the paper, we did not think the citation related enough to the argument we are trying to make at line 514. Therefore, the citation was not included.

L542: See comment above, please define hydraulic midline.

The midline was defined as “the boundary between the groundwater recharge and discharge areas”.

L554: What do you mean by “lithology” here?

We replaced the word “lithology” with “surficial geology” for more clarity as suggested.

L650: While I appreciate the authors attempt at showing p-values here [which I would encourage them to keep], it seems like the p-value threshold here [$p < 0.05$] has little relevance when comparing across metrics.

We changed “isotopic values are influenced by” to “isotopic values may be influenced by” to highlight the fact that the p-values are not significant in the strictest sense.

L673: What do the authors mean by “this”

We clarified that sentence in the manuscript.

L676: Sentence should be re-written [maybe into multiple sentences?] for clarity.

We clarified that sentence in the manuscript.

L685: Again, please rewrite and be more specific.

We clarified that sentence in the manuscript.

L741: It feels like the authors are overstepping their bounds here a bit. In my opinion, our role as scientist is not to tell policy makers and practioners what to do. More appropriately, I argue that our role is to provide information about how different actions will affect management outcomes. Thus, instead of saying “managers should implement policy XYZ,” I would encourage authors to say something like “In order to obtain ABC outcome, policy makers should consider implementing practice XYZ because....”

We took the reviewer’s remark into account and adapted the paragraph accordingly.

Note: we additionally took the liberty to 1) do some reordering in the reference citation in the manuscript, 2) to add a handful of new references, some of them recently published and 3) to check the consistency of the citations in the reference section.