

Dear Andrew Hodson et al.,

Re: tc-2020-11

Thank you again for your most recent revisions. The referees and I favour publication, though with some minor revision. Referee 1 still feels strongly that the data and findings regarding methane fluxes are overstated, and I tend to agree; the flux data are sparse but the Discussion is prominent. R1 provided further detailed comments on the flux estimates and would like to know how the discharge data presented in Table 3 are calculated and the uncertainties, how many measurements were taken, and, importantly, how representative are these estimates of annual flux given the very high variability of methane emissions from one of the pingos as demonstrated in an earlier publication (Hodson et al. 2019)? Given the degree of uncertainty, and if only a few measurements were made, the reader's confidence in the annual methane flux estimates is not high.

The main thing to keep in mind is that investigation of methane flux rates is not a stated purpose or objective in the introduction, nor are flux measurement methods elucidated in the study design, and nor are results presented. Please keep the major findings focused on the stated purpose, which guided the study design, field measurements, analytical work, and results: to investigate how "methane-rich fluids readily escape from beneath permafrost by exploiting the open system pingos that have formed following isostatic uplift and permafrost aggradation in Svalbard's fjord landscape."

It seems that the most obvious choice is to either greatly simplify related Discussion and Conclusions or provide substantially more data and information on methane flux in the manuscript, but you may have another solution. In the former case, please state that the annual methane flux estimates are simply a first-order approximation. Otherwise, annual flux estimation needs to be treated in more detail from start to finish.

In summary, this manuscript will be accepted for final publication subject to treating the lingering concern regarding annual methane fluxes.

I look forward to receiving your revised manuscript.

Best regards,

Peter

Hodson, A. J.; Nowak, A.; Redeker, K. R.; Holmlund, E. S.; Christiansen, H. H.; Turchyn, A. V., Seasonal dynamics of methane and carbon dioxide evasion from an open system pingo: Lagoon Pingo, Svalbard. *Frontiers in Earth Science* 2019, 7, (30)