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Discussions

Interactive comment on "Quantifying fugitive gas emissions from an oil sands tailings pond with open-path FTIR measurements" *by* Yuan You et al.

Anonymous Referee #2

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This manuscript is difficult to review. Some key materials are in the supplementary file but that file resembles more an internal research note than a polished document for publication. Further complicated my reading is the fact that this manuscript overlaps, in terms of topic, methods and data, with another AMT manuscript currently under review. I felt like I were actually reviewing three papers instead of one. It took me a lot of effort to piece together a storyline from the information scattered across these three documents. For this reason, I recommend that the authors undertake a complete rewrite, with the aim of producing a stand-alone, coherent paper.

The open-path FTIR is subject to density effects due to vertical temperature and humidity gradients. Because they are stronger for gases of lower concentration, ratio-ing the uncorrected molar concentration gradients will not eliminate these effects. I am not

sure that I trust their flux values without correcting for these effects.

You seem to rely on eddy-covariance methane flux and concurrent measurement of methane concentration gradient to obtain fluxes of other trace gases from the modified Bowen ratio method. How did you get the gradient CH_4 flux then? The gradient CH_4 flux was biased low in comparison with the eddy-covariance flux. Were other fluxes similarly biased (due to a limited fetch). Can you estimate the "true" emission fluxes of the tailings pond via footprint modeling?

The section on methanol CH_3OH should be enhanced. What was the average flux? Did the flux vary with environmental conditions?

The section on comparison with published fluxes is a bit superficial. The reader is interested in knowing if your emission numbers are representative of a typical tailings pond. Also a solid comparison will require footprint correction to your gradient fluxes.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2020-257, 2020.