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Atmospheric Measurement Techniques 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

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Discussion paper

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 CH4 flux then? The gradient CH4 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 CH3OH 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.

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