

General comments

This is a relevant study that examines the role of ponds in CO₂ and CH₄ exchange of polygon tundra in Lena Delta. This research continues the long-term GHG studies conducted by the group at the Lena Delta. The results indicated that when accounting the ponds, the estimate of the tundra's net uptake of CO₂ decreased by about ten percentage while the pond and tundra had equal CH₄ fluxes, except that there were a CH₄ flux hotspot in the pond's shoreline. Researchers focused on a pond, not the wet polygon centers, that are common but smaller landscape features. An eddy covariance measurement system was placed on the shore of a pond formed when polygons were merged. The setting allowed distinguishing and comparing fluxes from the pond and the surrounding tundra. Moreover, wind sector-based inspection showed that some of the pond's shoreline areas were sites of high CH₄ fluxes. Data are, however, limited temporally and spatially, i.e. comparison of one pond vs tundra and one growing season. Unfortunately, chamber measurements and ebullition measurements to validate the hotspot's areal features were not conducted. EC methods and data analyzes are adequate. I think that the data deserve to be published, but the current manuscript version is premature. Overall, the text needs linguistic and stylistic editing, and to my opinion, the current introduction is simplistic and the descriptions of footprint partitioning and the spatial extrapolation for CO₂ and CH₄ are confusing and wondered why different for the two species. Discussion could be developed to give pointers what the results signify and mean for flux estimation in the area. I am sure that authors can do a rewrite that will improve the manuscript overall, incl. language, presentation of the data analyzes, and emphasizing the significance of the results in larger context. I have listed some detailed comments below.

Specific comments

Check tense throughout the text.

l. 22. About lakes and ponds: I suggest 'potential', because the pond vs lake division is not always used

l. 34. Origins of CH₄: This likely varies between sites as also in the case of CO₂. Sediment mineralization produces gases as well. There are earlier studies to be cited.

l. 67. closed-path or enclosed-path?

Fig 1. Could you provide a photo of the pond?

l. 127 "is shown as a gray shaded area in Figure 1, c and d" >> here and elsewhere the figure citations can be condensed. e.g.cumulative footprint.. (Fig. 1 c-d).

l. 132. I suggest editing the title. What's a bulk model?

l. 151. open water and no photosynthetic activity: I understand, but maybe state here that no or only small photosynthetic activity

l. 156. Would it make more sense to include also CH₄ here?

l. 160. Bulk model? Is this a common expression or should it be clarified?

l.163. in a second step > second, following sentence a bit complicated

l. 181-182. I suggest combining with the previous chapter. Something wrong in the first sentence?

l. 197 > Could add the means as well.

1.210. Could you mark the shoreline sectors on the map?

1. 213-214. to the mat&methods

1. 217-221> belongs to the discussion

1. 222-226. belongs to the mat&met

1. 243. And CH₄?

Fig. 6. please, explain how to interpret the violin plot in terms of distribution along the x-axis?

I would expect similar spatial analysis for CO₂ and CH₄. At least, both method descriptions should appear in the mat & met.

1. 267> that's a good point note. What about differences among the ponds/lakes? Vegetation or not, sediment quality, origin i.e., glacial vs thaw pond etc.

1. 303. One could carry out a measurement campaign in fine spatial resolution applying funnels and/or chambers to capture ebullition fluxes

1. 309. Maybe not to automatically expect smaller or higher emissions from one or another and one should also consider variability in amounts of available substrates and temperature among the different habitats

1. 324. you could emphasis here the fact that you found a hotspot feature and recommend spatially representative measurement and mapping. In this case, near the pond shore.

1. 330. aquatic? do you mean landscape? included lakes and ponds in the landscape balance?