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Interactive comment on “Calculations of automatic chamber flux measurements of methane and carbon dioxide using short time series of concentrations” by N. Pirk et al.

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We once again thank Prof. Kowalski for his comment on our study, but we think that some parts of our previous reply to Ana López Ballesteros have been misunderstood.

First of all, the penultimate paragraph of page C5639, which derives a flux underestimation of 0.9%, describes the effect of a constant humidity of 75% RH at 10 °C. This hypothetical example does not represent the effect put forth by Prof. Kowalski since it assumes no change in the water vapor concentration. In the Supplement to our comment C5638, we have provided ample examples that estimate the effect of changing humidity in the chamber headspace.

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Besides, the assumption that the only relevant gas exchange is evaporation cannot hold as soon as the chamber headspace gas has reached 100% RH since condensation limits any further humidity increase. At this point the magnitude of the evaporation flux does not play any role any more – be it 180 or 50 W m⁻². Due to the high ambient (initial) humidity at our sites, the maximal possible error caused by the change of the water vapor concentration is therefore limited. We would like to emphasize that our error estimates follow from scenarios that are realistic to the sites in this study, in contrast to scenarios with unlimited evaporation that ignore processes such as condensation.

To specify the context of our findings, we propose to explicitly mention the northern wetland locations of our sites in the abstract, i.e. "We used more than 50 000 such flux measurements of CH₄ and CO₂ from five field sites located in peat forming wetlands ranging from 56 to 78 °N to calculate fluxes with different models."

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