

Interactive comment on “Technical note: Interferences of volatile organic compounds (VOC) on methane concentration measurements” by Lukas Kohl et al.

Lukas Kohl et al.

lukas.kohl@mun.ca

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(please see our complete formatted response to reviewers in the attached pdf)

>General >The paper by Kohl et al. describes cross sensitivities of several volatile organic compounds on methane measurements when using different optical analysers. I consider the results of the paper of major interest to all those monitoring methane fluxes in the field or laboratory from ecosystems and biological systems that are known to release VOC at substantial amounts. I found the manuscript to be well written and structured. The results are clearly presented and discussed in a straightforward manner, providing the scientific community with important information about how emissions

C1

of VOC released from the biosphere might interfere with measurements of methane when using state of the art optical measurement systems. I recommend publication of the manuscript as a Technical Note in Biogeosciences after minor revisions. I have only a few comments which I hope the authors might consider in their revised manuscript.

>R1.1: I would suggest using ppmv/ppbv/pptv (parts per million/billion/trillion by volume) throughout the whole manuscript instead of ppm/ppb/ppt.

Changed throughout the manuscript.

>R1.2 Furthermore, the correct expression for ppmv would be mole fraction. However, I also understand if the authors would like to keep the more commonly used term “concentration”.

Changed to ‘mixing ratio’ throughout the manuscript. We kept the more commonly used term ‘concentration’ in the title.

>R1.3 As water vapour might substantially affect measurements of methane (both concentrations and stable carbon isotopes) when using optical analyzers I would suggest to add a few sentences how the authors have dealt with this issue during their investigations in the field and in the laboratory.

Laboratory measurements: Water was removed from the pressurized air used for the laboratory experiments (SMC membrane dryer) and water contents remained <0.2% absolute humidity throughout the experiment. Water vapour therefore did not affect CH₄ concentration or stable carbon isotope measurements. Field measurements: Both analysers quantified water concentrations and used these concentrations to correct CH₄ concentrations. No carbon isotope values were measured during the field measurements reported in this manuscript.

>R1.4 Please add some information what are typical emission rates of some VOC released from vegetation/trees in the field and put them into relation with the amounts that have been applied in the laboratory study.

C2

Changed as requested. Thanks for this suggestion; we think that this adding such information strengthened the paper a lot. Typical VOC emission rates and estimates for mixing ratios reached during chamber closures are now provided in the new Tables 1 and 4. Overall, the mixing ratios employed in our experiment are above those likely to occur in soils and stem chambers, but below those likely found in shoot chambers.

>R1.5 Figure 4: There are too many subfigures included and for some subfigures it is rather difficult to decipher the information. Please revise and split into two or three figures to increase readability.

Changed as requested. We removed three panels and split Fig. 4 into two figures (new Figs. 4 and 5)

>Technical corrections >R1.6 Page 5, line 6, Results: add CH₄ after 7 μg...

Changed (p5 L9).

>R1.7 Page 5, line 25, Results: something is wrong with this sentence, revise

Changed (p5 L29).

>R1.8 Page 6, line 23: change “weres” to “were”

Changed (p6 L29).

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2019-102/bg-2019-102-AC1-supplement.pdf>

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2019-102>, 2019.