

Interactive comment on “Temporal variation of VOC fluxes measured with PTR-TOF above a boreal forest” by Simon Schallhart et al.

Anonymous Referee #3

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Schallhart and colleagues present VOC flux measurements at the SMEAR II station in Southern Finland. The measurements reported are interesting to the biogenic VOC flux community, however, some more work needs to be done to be able to accept this manuscript for publication. In addition, the language should be edited throughout the manuscript in order to improve sentence structure and thus text readability. Some issues that deserve attention are shown in the list below.

P1L13 Correct ‘only a three’ to ‘only three’

P1L1-2 This sentence needs some English editing

P2L5 “seems” should be “seem”

P3L37-39 rephrase

C1

P4L17-25 It is not clear to me what is the advantage of the second step, because the second and third steps seem almost the same thing. Please clarify the reason why those steps were taken.

P5L6 Can the authors list the values of average correction factors for day and night separately?

P5L19 why the period of 21 days from 04 to 24 May is shown when only a period of 9 days was used?

P6L25-26 confusing sentence

P6L24-P7L34 Sections 3.1.2 and 3.1.3 should be rewritten to emphasize readability

P7L10 does this “highest total emission” refer to the maximum “average daytime emission”? Please clarify since it is difficult to discern from the (higher) 9.69 nmol/m²s shown on P7L13.

P7L36-P8L38 There are many other recent studies that, either with PTR-TOF or PTR-Quad, reported VOC fluxes that would give a more complete view to your discussion. Some of these studies report what fraction of the assimilated carbon was released as VOCs. In addition, some studies report VOC fluxes from monoterpene-emitting conifer species, which may be more relevant to your study. Some examples:

- McKinney et al (2011) <https://doi.org/10.5194/acp-11-4807-2011>

- Misztal et al (2011) <https://doi.org/10.5194/acp-11-8995-2011>

- Kalogridis et al (2014) <https://doi.org/10.5194/acp-14-10085-2014>

- Seco et al (2015) <https://doi.org/10.1111/gcb.12980>

- Juráň et al (2017) <https://doi.org/10.1016/j.agrformet.2016.10.005>

- Seco et al (2017) <https://doi.org/10.1016/j.agrformet.2017.02.007>

P9L5 Should the text “12 more compounds” be interpreted as 12 compounds exhibiting

C2

SLP fluxes not found with the TOF-only EC analysis?

P9L22 Figure 8 shows indeed that fluxes for monoterpenes, isoprene and acetone were comparable. However, Table 3 lists the slope of the fit between the fluxes calculated with both methods and the slopes for all compounds (including monoterpenes) except acetone are far away from 1. The authors should further discuss this discrepancy, in addition to what is already discussed in P10L4-10. Also please rephrase the last sentence because from the text it seems that monoterpene and methanol were correlated with each other, when Fig 9 shows that what was correlated were the fluxes calculated with EC and SLP.

P10 section 3.4 the contamination from butanol used in CPCs is a major problem for the attempt to report butene fluxes. Since the authors have concluded that most of the signal of CH₄H₉⁺ is from butanol, the results and discussion section relating to butene should be omitted. I would recommend still having part of the manuscript dedicated to explaining what happened with butanol so other researchers can keep this contamination in mind for future experiments. Also, have the authors quantified the capacity of the forest (e.g. the fluxes measured on the eastern side of the forest) to take up butanol?

P10L28 How many compounds showed fluxes? Here and in section 3.2 the authors say 25, but in section 3.1 they say 22. Please be consistent.

P11L6-8 A good reference for this final sentence is Rinne et al 2016 <https://doi.org/10.1016/j.atmosenv.2016.02.005>

Fig 10 caption: "butanol using aerosol instruments" is confusing

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