

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

Anonymous Referee #2

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The paper written by Schallhart et al. describes VOCs fluxes above a boreal forest by using PTR-TOF and PTR-Quad instruments coupled with eddy covariance technique and indirect gradient method, respectively.

- 1) The fluxes are measured during 9 days in April and May and 21 days during June. I doubt, if only 9 days of months are enough to represent the whole month.
- 2) Page 2 line 34: Surroundings are described in paper published in 2005 and 2010. Please add at least current (2013) leaf area index, tree density, when the trees were planted or how old are the trees.
- 3) Page 2 line 35: I would not use “climatological mean temperature” but rather mean annual air temperature. From which years is the mean computed should be added.

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Similarly for precipitation. Additionally the mean should cover the measured period. As there is (page 2 line 36) Pirinen et al., (2012 cited), it seems that the mean is only until 2012. However you measured in 2013.

- 4) Page 3 Line 9: There should be: data “were” analysed
- 5) Page 3 Line 28: Since here the rest should be in discussion section. It has no relationship to the measurement setup.
- 6) Page 4 Line 40: When your lines were heated and the effect was negligible, why to write about that? I would omit those sentences on lines 37-40.
- 7) Page 5 Lines 5-6: It is clear that the response time cannot be used in other studies. Do not need to be mentioned.
- 8) Page 5 Line 15 and afterwards: How could butane emissions dominated the flux, when the emissions are possibly originating artificially nearby the tower? This is a big problem and you should omit all the measured butane flux in here and in all the tables and graphs, since it is not product of the forest, as you conclude at page 10 line 31. Similarly, how you could calculate the C release caused by BVOCs, when you count artificial butane in there? Please recalculate all the values, where butane was used and all the graphs (figure 3, 4, 6, 7) and tables (table 1). The discussion section and results should be rephrased based on the new data without the butane flux.
- 9) Page 7 Line 30: Check supplement of M. Müller et al. (2015), doi:10.5194/acpd-15-31501-2015-supplement. The 99.0201 amu could be C₄H₃O₃.
- 10) Page 7 Line 32: 89.0386 amu could be C₃H₅O₃.
- 11) Page 8 Line 8: I do not see sense in comparing 24 h flux, measured in different periods of year at different plant ecosystems. Authors conclude that 8 hours flux by Kaser et al. (2013a) could not be compared to the 24 h net fluxes. Then why to put 8 h flux in Table 2?

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12) Page 8 Line 21: Toluene fragment contribute to the carbon flux. That would mean, that toluene is produced by vegetation, however that is no longer discussed in all manuscript. Authors should bring more convincing results about toluene being released by Scots pine forest or give explanation how can be toluene emitted being anthropogenic. Check also figure 4, where is toluene emission and recalculate that.

13) Page 8 Line 22-25: I would add the study conducted by Juran et al. (2017), doi: 10.1016/j.agrformet.2016.10.005, since they identified portion of carbon released by BVOC to GPP on Norway spruce forest. I find that more close to forest in Finland than the mentioned papers here dealing with other ecosystems covered by very different trees.

14) Page 9 Line 9: Why there is such vertical difference between the two inlets? The footprints are very different than and thus the results are not comparable.

15) Page 9 Line 18: How is possible, that PTR-TOF has not detected those three compounds and less sensitive PTR-Quad has?

16) Page 9 Line 22: The correlation between monoterpene and methanol fluxes with each other at Fig 9 is rather bad than good. Similarly, R2 in Table 3 for acetonitrile, acetaldehyde, acetone and toluene suggests that there is no correlation at all. I doubt that the data were post-processed correctly or the instrument was working fine. Could you give explanation about that?

17) Page 9 Line 9: It might be useful to show transmission curve to check how certain is to calculate the sensitivities.

18) Table 3: Rephrase “educated guesses”

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