Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC3
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Comment on amt-2021-265

Anonymous Referee #3

Referee comment on "Design and characterization of a semi-open dynamic chamber for measuring biogenic volatile organic compound (BVOC) emissions from plants" by Jianqiang Zeng et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-265-RC3, 2021

The authors show the performance of the open chamber that they have constructed for the measurement of VOC fluxes from plants. It is indeed important to characterize the chambers used in such studies. I feel that this manuscript still needs some work before it is ready to be accepted. Here are my comments that complement the other two referees' comments.

MAJOR COMMENTS

I share the concerns of other reviewers regarding the flow control and flow measurement of the outlet lines connected to holes 2 and 3 of the chamber. A better explanation is needed.

Line 148: this statement is incorrect because a PTR-TOF-MS is capable of measuring with time resolutions higher than 1 Hz (e.g., when used for eddy covariance studies it is typically used at 10 Hz). In addition, the PTRMS natively measures mixing ratios instead of concentrations.

Line 256-258: to make the units consistent in the equation(s), either the emission rate E must be expressed as "per minute" or the airflow rate F must be expressed as "per hour". I wonder if this could have an impact on the calculation that the authors perform in this paragraph about the detection capacity of extremely low emission VOCs. In addition, two more comments on the formulas. First, there is no indication on the equations of the unit of reference for the emissions (e.g., leaf area or mass of the plant emitting material), why is that? Second, Equations 1-4 do not account for the effect of water vapor effect (transpiration) on the calculated emission rates (see Niinemets et al 2011, section 3.5). Such a correction would probably look very similar to the correction for losses due to

adsorptive loss (Equation 6 in the main text). What are the thoughts of the authors on that?

Line 357-361: This sentence is not clear to me.

MINOR COMMENTS
Line 64-65: I could find the reference Gu et al 2017 in the reference list.

Line 131. give the brand and model of the fan.

Line 143: "taps" should be "tape", I guess. Also, when referring to Teflon, which is a commercial name, please provide the name of the actual material (PFA, PTFE, etc) for each part involved (fan, wall coating, tubing, ...).

Line 150-151: give the brand and model of the temperature and RH sensors.

Line 157: Marks should be Markes.

Line 220: the pressure unit should probably be bar and not mbar.

Line 436-437: This sentence about the light transmittance here is not needed, the same information and more is in the next paragraph.

Fig 7, line 775. Instead of "fitted changes", it may be better to say something on the lines of "fit lines expressed by the equations shown on the graph".

Fig 8. Please define what "normal" means for sunlight. Probably there is a more precise word to express what the authors mean. Also, I guess the bars n Fig 8b are ranges of values? This should be clarified in the caption, as well as what the error bars mean in Fig. 8a.