

Review of “First Eddy Covariance Flux Measurements of Semi Volatile Organic Compounds with the PTR3-TOF-MS”, Fischer et al., AMT (2021)

This paper presents observations of concentrations and EC fluxes of several biogenic VOC above a boreal forest. Measurements are acquired with a new instrument that has much higher sensitivity than its predecessors. They also use a novel inlet design that minimizes contact of sample gas with instrument surfaces. Measurements from a 3-week period in the spring are analyzed to demonstrate instrument performance and highlight the potential of the new capabilities. The paper is generally well written and the number and style of figures is appropriate. Publication is recommended after consideration of the following, mostly minor, critiques.

General Comments

Sections 4.5 and 4.6 deal with data quality and uncertainties. Possibly it makes more sense to present these before the discussion of specific fluxes in Sect. 4.1-4.4.

Specific Comments

L87: It is stated that the inlet mounting was meant to minimize flow distortion. And later on L145, it is stated that the “anemometer deviation” is < 2 cm/s. What does this mean, precisely, and how was it determined? Were any tests carried out to confirm that flow distortion does not influence fluxes (e.g., comparing heat and momentum spectra/cospectra with the inlet flow on/off)? Also, is there potential systematic bias associated with such large sensor separation?

L119 – 121: This sentence might be more appropriate for the introduction.

Figure 2: An actual photograph of the inlet/sonic setup, if available, would be helpful.

L274 – 278 and 295 – 303: This is stated in the introduction and does not need to be reiterated here. Deletion or shortening suggested.

L372: Is this a lower limit for the Bcary emission rate, since it does not account for deposition of the oxidation products?

L388 – 392 – all of this description is more appropriate for the figure caption. Discussion here should focus on what the figure means, not the visual elements.

Figure 6: It would be helpful to see this type of plot for all the fluxes (and maybe diel average mixing ratio, too?).

L423 – 426: The exact same sentences, or nearly so, appear earlier in the manuscript (295 – 303).

Sect. 4.5: It would also be instructive to see the power spectra, either in the main text or supplement.

Figure 8: Would it be possible to add the w' – temperature lag correlations for comparison? These lag peaks seem very wide.

Technical Comments

L33: "critical"

L51: "predicted that"

Figure 1: I am somewhat confused by the cartoons. What is the "measurement container" box meant to show? And the "inlet box", which seems to appear opposite of the stated inlet orientation?

L102: "empirical"

L105: "expected"

L149: What is the brand or manufacturer of the blower?

L351: it seems like pmol would be a more convenient unit here.

Figure 4: why are concentrations shown in cps instead of pptv or similar mixing ratio units?

L421: "of the number of averaged samples"