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Atmospheric Measurement Techniques Discussions



# *Interactive comment on* "An *in situ* gas chromatograph with automatic detector switching between Vocus PTR-TOF-MS and EI-TOF-MS: Isomer resolved measurements of indoor air" *by* Megan S. Claflin et al.

**Anonymous Referee #1**

Received and published: 14 August 2020

This paper presents a new instrument taking advances of both chromatographic and direct MS methods and two different ionization systems having therefore high potential for producing new kind data future air chemistry studies. Manuscript is clearly suitable for AMT. The method is well-described. Detection limits are low enough not just for indoor/urban air, but also for measurements of ambient air at more remote sites. Here results from indoor air measurements were presented showing the great potential of the instrument. I recommend publishing with minor changes.

Specific comments:



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Line 109: The range of compounds is not this large if you use the trap at 20C. For very light VOCs, like ethane and ethane, breakthrough volume even at -30C is quite low. Please, correct this.

Line 199-200: Did you flush whole 5 ml/min into the column or did you have some split? What was your desorption efficiency?

Line 245: You calibrated your system with 2 ppb standard and sampling of time of 1 to 6 min.. Lowest calibration corresponds the ambient air concentration of 333 pptv, which is clearly higher than your detection limit. Did you test the linearity of your calibration curve with lower concentrations? Sometimes with TD systems curve is not linear with lower concentration for all compounds (due to the incomplete desorption or other losses in the system). At least camphene results in Fig. S1 give some indication on this.

Section 2.7: You have quite long inlet line (3.4m) for this low flow (30 ml/min). Maybe for future prototypes you will increase the flow to enable the quantitative measurement of more sticky compounds as well.

Section 2.8: Could you add a chromatogram (calibration and indoor air) maybe as a supplement? It is very nice if with this short chromatogram, you are able to separate so many different compounds.

Section 2.8.: Did you detect any blank/background for any of the measured compounds? Degradation of Tenax TA results often to some blank (e.g benzene).

Table 1: Could you also give precision and uncertainty of these systems in this table or in some other part of the paper?

Table 2: Even though you are able to detect some compounds (e.g. methanol, acetaldehyde etc.) I doubt their measurements are not quantitative. I would expect high breakthrough of them from the cold trap. Also some other molecules may have high losses in TD. If you have some results that show they are quantitative, please present

it. If not, maybe you could mention more clearly that GC can also be used just for identification of these compounds and maybe RT-Vocus can be used for quantification of some of them?

Line 342: Benzaldehyde has often quite high background in TD-GC runs (possibly due to degradation of Tenax TA). Even though it does not matter here, it could be more appropriate to use some other compounds as an example.

Section 3.4: Did you detect this compound with RT-Vocus? If so, please, show the results. This would prove that this is not coming from the TD system.

Is DMSD known to have some health effects?

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