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Atmospheric Measurement Techniques Discussions

Interactive comment on "Measuring OVOCs and VOCs by PTR-MS in an urban roadside microenvironment of Hong Kong: relative humidity and temperature dependence, and field inter-comparisons" *by* Long Cui et al.

Anonymous Referee #3

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Review. Measuring OVOCs and VOCs by PTR-MS in an urban roadside microenvironment of Hong Kong: relative humidity and temperature dependence, and field inter-comparisons by Long Cui et al.

The authors have applied a suite of techniques to measure VOC and OVOC at a roadside site in Hong Kong and have compared the data to those generated by a PTR-MS. Measurements of formaldehyde are examined in detail and a method has been developed to address the RH and T dependence of the calibration for future studies. This approach seems reasonable. OVOCs measured by PTR-MS are compared with

a DNPH method and aromatics measured by PTR-MS are compared to in-situ GC-FID and canister samples. Besides my question regarding the fitting method below, the comparison has been done well enough, very much along the line of previous groups.

However, I cannot help feeling though that there is an opportunity missed here. Surely the GC-FID also measured the OVOC (i.e. not just the aromatics)? Can their peaks not be calibrated by carbon number and compared with the PTR-MS/DNPH/can methods as well? The result would be an assessment/validation of the in-situ GC-FID measurement of OVOC which could be of use to the group in future measurement campaigns where the PTR-MS is not available. Moreover, do the canister data not deliver values of acetone, propanal and acetaldehyde for comparison? This again would be an interesting comparison extension to this study. There has been much discussion of potential canister artifacts previously but they may compare well under the conditions where ozone is low.

One of the greatest problems in sampling and measuring OVOC will be ozone as it can make OVOC (and remove reactive alkenes) when trapped in canisters or concentrators. If ozone was measured at this site is would be very interesting to compare the degree of fit with ozone levels. Most city roadside sites show low ozone, due to the titration of NO, but in the afternoon it is likely that ozone levels will increase as photochemical production and down-mixing kick in. This would mean correlation could be expected to deteriorate later in the afternoon if ozone reactions become important. Examining this influence of local ozone of the quality of fit would be a very interesting addition to this paper. It is likely to impact the GC and DNPH methods more than the PTR-MS.

For the correlation plots a simple y=mx+c form is used. This assumes that the x-axis parameter is correct and without error. More appropriate in this case would be to use orthogonal distance regression to account for error in both axes, since the DNPH method will also contain errors to some degree.

The PTR-MS accuracy is given as 20% and the precision as "about 10%". Since this

paper is an instrumental comparison I think it is necessary to expand on this and explain where the 20% comes from and the measurement precision of each species. Likewise the GC-FID accuracy and precision is given as the same as for the PTR-MS, but without explanation. How these figures arrived at should be given in more detail.

The potential interference of ozone may be an explanation of the relatively poor fit of PTR-MS vs DNPH for acetaldehyde (and also acetone) in figure 9 (D and E). It might be illuminating to color the points as a function of daily average ozone (if available).

Minor points. Introduction, line 4. Perhaps a more relevant reference concerning the human health impacts would be Lelieveld et al. (doi:10.1038/nature15371).

“Special attention has been paid on the characteristics” should be “paid to”

Section 2.2, give details of the particulate filter (i.e. material, pore size, how often changed).

Section 2.4 line 20. What were these strict QA/QC procedures? If necessary give the reference where they are detailed directly afterwards.

Section 3.3. line 2, was glyoxal measured, perhaps it can contribute to mass 59?

Section 3.3 line 3 “benzens” should be benzenes

Figure 8 Xaxis label is misspelt “Measuremeasured”

Conclusions, line 24, filed should be field.

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