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Atmospheric Measurement Techniques Discussions

Interactive comment on "Measuring long chain alkanes in diesel engine exhaust by thermal desorption PTR-MS" *by* M. H. Erickson et al.

Anonymous Referee #1

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My apologies for the tardy review. I find the manuscript generally well written and covering an important topic of recent interest, the development and improvement of IVOC measurements for air quality monitoring purposes. The new technique developed by the authors is described comprehensively so that I have only a few comments that may help improving the manuscript. I suggest publishing with minor changes.

1. The authors used a comparatively unusual injection technique of neat chemicals via extremely low flow syringe pumps. It would be of interest to readers why this technique, which according to the authors showed some difficulties, was chosen instead of injecting calibration standard diluted samples, e.g. in pentane (which would have remained undetected), which are commercially available.

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2. Sampling lines need to be heated and are ideally made from inert materials when transporting low vapor pressure compounds. The authors identified using electropolished stainless steel and Sulfinert tubing, but did not identify the temperature ("heat traced", line 24, page 6009m also line 25, page 6011) used, unless it is the same mentioned later, namely 80 deg C (line 24, page 6010). Please clarify. In addition, explain why 80 deg C was chosen. Our experience is that much higher temperatures are generally needed for quantitative transmission of >C12 species through inert tubing, and that a significant "tubing lag" to the signal can be expected at temperatures below 100 deg C.

3. Connected to 2., please specify more PTR-MS operational parameters, particularly pressure and temperature. At too low drift tube T, again, the low vapor pressure species are expected to show memory and carry over effects. These have to be characterized in order for ambient measurements to be time resolved and the data be quantitative.

4. Quantification is an issue. If the response factor ("sensitivity") can be reproduced for a certain set of PTR-MS parameters and tubing temperatures etc., an ambient measurement under identical conditions should be quantitative if the sensitivity is representative of the ambient mix. This was not demonstrated in the manuscript with some actual ambient data. Could that be included? If the sensitivity is not representative for whatever reason, a more sophisticated approach would be necessary, which would then have to include, e.g., transmission efficiency of the PTR-MS (possibly the reason for the mass response cutoff observed by the authors).

5. To which extent could the result in Figure 6 be caused by the fact that sampling was carried out through a chamber and Teflon filter (section 2.3, page 6011), which could have caused deposition of higher molecular weight species onto the chamber walls and filter surface ?

6. The engines used in the study are comparatively old. How may this have affected the results qualitatively and/or quantitatively? Are modern diesel exhaust particulate

AMTD
6, C2214–C2216, 2013

filters known to cause a significant reduction in higher MW (I)VOCs? A statement about representativeness would be helpful.

7. I suggest removing some repetition from the manuscript, some times present within the same sentence.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 6005, 2013.