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Atmospheric Measurement Techniques Discussions

Interactive comment on "A method for extracting calibrated volatility information from the FIGAERO-HR-ToF-CIMS and its application to chamber and field studies" *by* Thomas J. Bannan et al.

Anonymous Referee #3

Received and published: 22 September 2018

The manuscript, 'A method for extracting calibrated ... ' describes a method of using a series of PEG compounds to calibrate the FIGAERO for determining vapor pressures of detected compounds. The work presents a useful concept that can be used by a growing number of research groups that use the FIGAERO and similar techniques to normalize (or standardize) measurements of the volatility of OA components. The manuscript is succinct, which is nice, but some potentially major details are missing. Please address/clarify the below issues that may affect the applicability of the presented concept, after which the manuscript can be considered for publication.

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Discussion paper

A series of PEG compounds was used as calibrants to connect literature VP values of the PEG compounds to FIGAERO Tmax values. The calibration curve as defined by equation 1 is not shown on figure 4. It would appear to me that a simple exponential curve does not fit the observed values well. Please include the calibration curve on figure 4, and discuss potential reasons for the deviation from the calibration curve.

The PEG compounds on figure 3 exhibit different desorption profiles, that is, some are much broader than others. Why? How were the PEG compounds introduced? Injected? Individually or together? Same heating ramp rate for each PEG? Are the four thermograms of each PEG of the same amount introduced? Have the authors tried injecting widely ranging amounts of a PEG compound? How much does the amount introduced affect the Tmax value? The amount of OA present can affect the Tmax values, as reported by many FIGAERO users. This issue can severely affect the applicability of the presented technique, thus the Tmax dependence on OA loading needs to be addressed carefully. Also, please consider plotting signal versus temperature, not time on figure 3.

I am particularly concerned with the concept of Tmax for compounds like PEG 4, 5, and 8, all of which show very broad desorption profiles. For these species in particular, the amount introduced, heating ramp rate, etc. can affect Tmax values greatly. Perhaps consider reporting the temperature at which half the mass comes off the filter, as opposed to Tmax.

There is brief mention of alpha-pinene oxidation, but no figures are shown and no results discussed. Please elaborate.

minor manually extracted? line 26 page 4

line 46 page 5, "very good"? quantify how good, R value, slope, etc?

line 26 page 2, not Teflon (specific to DuPont product), report specific compound like PFA or PTFE

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line 25 page 4, change "form" to from

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