

Interactive comment on “Comparing SOA volatility distributions derived from isothermal SOA particle evaporation data and FIGAERO-CIMS measurements” by Olli-Pekka Tikkanen et al.

Anonymous Referee #1

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In this manuscript, Tikkanen et al. compare SOA volatility derived from two different analyses: isothermal evaporation data and PMF applied to FIGAERO-CIMS data. Volatility is a critical property of organic aerosol, and I agree with the authors that the volatility data from FIGAERO-CIMS measurements have been under-utilized. This manuscript focuses on the comparison of the FIGAERO-CIMS PMF volatility data to isothermal evaporation data; the details of the FIGAERO-CIMS PMF volatility analysis are described in another manuscript currently under review (Buchholz et al., 2019 <https://www.atmos-chem-phys-discuss.net/acp-2019-926/>). It seems to me that this manuscript can only be accepted if Buchholz et al., 2019 is also accepted. I also request that my specific comments below be addressed before publication of this

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manuscript.

1. The authors use data from previously conducted experiments in which SOA was formed from alpha-pinene and ozone/OH. By varying experimental conditions, the SOA produced had low, medium or high O:C. Here, the authors only use experiments when the SOA formed had low or medium O:C. This choice is currently not explained or justified in the manuscript. In my opinion, the dataset utilized here is fairly limited, and the analysis would benefit from inclusion of these additional high O:C data. For example, overall the authors find that the agreement between the two volatility analyses is better for intermediate O:C than for low O:C, and I am curious about the agreement at high O:C.

2. The main takeaways from the manuscript should be clarified. The authors state in the abstract that “FIGAERO-CIMS measurements analyzed with the PMF method are a promising method for inferring organic compounds’ volatility distribution”. The more detailed results point to the method working better under some conditions than others. It would be useful if the authors could make more concrete recommendations for future use of this method (PMF applied to FIGAERO-CIMS data) to obtain information on organic aerosol volatility.

Editorial comments: There are several typographical and grammatical errors in the manuscript. I include a list of examples below:

Line 19: “volatility distributions derived the two ways are comparable within reasonable assumption”

Line 233: “and only evaporated th at different conditions”

Line 311: “To investigate the observed discrepancy more detailed”

Line 376: “In this section we compare $VD_{PMF,opt}$ of the fresh samples to VD_{PMF} of the RTC sample to study are the two VD comparable.”

Line 521-522: “thermogram data is good estimating the volatility distribution of organic

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aerosols”

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-927>, 2019.