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Atmospheric Measurement Techniques Discussions

Interactive comment on "A technique for rapid source apportionment applied to ambient organic aerosol measurements from the Thermal desorption Aerosol Gas chromatograph (TAG)" *by* Yaping Zhang et al.

Anonymous Referee #2

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This paper has introduced a very interesting approach of using GC/MS data for source apportionment. I agree with the authors that this approach should be of interest for other measurement techniques. However, I suggest more discussions about the following issues to help readers better understand this new approach, the PMF analysis of the TAG (GC/MS) data and sampling methods.

1) Correction for positive sampling artifacts. In this paper, the gas-phase inference on OA sampling was corrected for by subtracting organics collected downstream of a Teflon filter (vapors) from organics collected through a bypass line (vapors+particles).

Does the consistency in the PMF analysis of different data inputs suggest that this approach of correction for positive sampling artifacts is sufficient for source apportionment or to correct for gas-phase interference on OA sampling?

2) Organics measured by AMS and GC/MS. The thermal desorption temperature is 310°C for GC/MS and ~600°C for AMS. Worton et al. (2014) has reported that GC/MS with the desorption temperature of 300°C only recover about 60% of organics collected in a traffic tunnel. Does this suggest that organics desorbed at 310°C can represent the variation of low-volatility organics?

D. R. Worton et al., Lubricating Oil Dominates Primary Organic Aerosol Emissions from Motor Vehicles. Environ. Sci. Technol. 48, 3698-3706 (2014).

3) Response factors of binned organics. The response factors of organic compounds are influenced by their functional groups, volatility and organic loadings. For quantification of individual species, the response factors of different compounds can be corrected for by internal standards. Have the variations in response factors of binned mass spectra been accounted for during the PMF analysis? Or these variations won't influence the results of the PMF analysis significantly?

4) On-line derivatization. This paper has shown that the PMF analysis of binned mass spectra in the retention time basis can resolve the SV-OOA and MV-OOA factors well. Do the authors think that the missing factor of cLV-OOA in the results from the PMF analysis of binned mass spectra can be identified by applying derivatization?

5) Comparison between the TAG-Binning method and the TAG-integration method. The strong correlations were not found for all PMF factors in results from PMF analysis of these two data formats. The binning method also provides limit chemical information compared to the TAG-integration method (Organic-tracer method). Do the authors think which one is a better method to identify major OA components for further emission controls?