

Interactive comment on “New insights into PM_{2.5} chemical composition and sources in two major cities in China during extreme haze events using aerosol mass spectrometry” by M. Elser et al.

Anonymous Referee #1

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This is a very well written paper on demonstrating the usefulness of ME2 in better resolving organic factors using new NR-PM_{2.5} AMS measurements in Beijing and Xian, China. It is often found in unconstrained PMF analysis that the organic factors are not well resolved, with spectral profiles that indicate mixing of the sources. Separation of BBOA and Combustion COA is illustrated and is useful to apportion PAH in these Beijing and Xian datasets. Furthermore, the PM_{2.5} measurements suggest that contributions of supermicron particles during haze can be significant and hence NR-PM₁ may underestimate fine particle concentrations significantly in severe haze. This paper has provided a lot of new novel insights in the analysis of AMS measurements and is suitable for publication in ACP. I just have a few minor questions for the authors to

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consider.

1. The spectral profiles of the unconstrained five factor PMF solutions were compared with those of the average of multiple ambient datasets to illustrate the point of the higher than expected contributions in selected m/z peaks. However, these multiple ambient datasets were likely obtained without the use of ME2. What is the basis of using them as a benchmark for discussing the shortcomings of the unconstrained PMF analysis?
2. The use of eBC/CCOA from the Beijing results for analyzing the Xian results is a good compromise. It may be useful to check if there is literature to discuss the sources of coal used in Xian and Beijing and their neighboring areas.
3. It is clear that the ME2 yield more reasonable spectral profiles. It is useful to show if ME2 and typical unconstrained PMF yield very different results in the apportionment of the OA factors.
4. Sulfate and OOA can be the result of long range transport after formation elsewhere or local formation. If the former, analysis using local RH may not be that useful. While the OOA does not show any RH dependence, it also has a weak diurnal variation. So, it may not be formed locally.

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