

Review of "Size-resolved source apportionment of particulate matter in urban Beijing during haze and non-haze episodes" by Tian and co-authors.

Tian et al. present size-resolved chemical composition of aerosol particles during haze and non-haze episodes in Beijing. In addition a source apportionment analysis is performed to the data. The authors present valuable data, however, the data treatment is unclear and need to be clarified before publication in ACP. The English grammar needs to be revised by a native.

P 9411- L 2: The references of Paatero and Tapper, (1994) or Paatero (1997) are probably more appropriate to refer to the PMF technique.

Paatero, P., Tapper, U., 1994. Positive matrix factorization: a nonnegative factor model with optimal utilization of error estimates of data values. *Environmetrics* 5, 111-126.

Paatero, P., 1997. Least square formulation of robust non-negative factor analysis. *Chemometrics and Intelligent Laboratory Systems* 3, 23-35.

P 9412 – L 14: Change the section title to "PM mass concentrations and chemical composition".

P 9419 – L 23: Other runs of the PMF model did not result in additional sources or different sources between size fractions? The use of both size fractions is not providing additional insights, since the same sources were identified in both fractions...

P 9420 – L 3: Rephrase this statement. This is confusing since this source is named as SIA.

P 9420 – L 8: As concentrations

P 9421 – L 5: Add a reference about K⁺ as a tracer for biomass burning.

P 9421: It would be interesting to study the seasonality of the sources identified in both fractions. This exercise can offer additional insight into the results.

P 9424 – L23: All anthropogenic-related sources increased during haze days except industrial pollution. Do the authors have any explanation for this?

P 9422 – L 14: How the results shown in Figure 7 are obtained? The PMF analysis was performed in the fine and coarse fractions, how is then extrapolated to 11 size fractions?

P 9423 – L 21: The section title "Back trajectory cluster analysis"

P 9425 – L 12: The different chemical constituents are included in the fine or coarse particles. This sentence needs to be rephrased.

Figures:

- Improve the readability of all figures.

- Y axis: units should be between brackets, e.g. ($\mu\text{g}/\text{m}^3$) instead of $/\mu\text{g}/\text{m}^3$.

Figure 5: Include the % of species in this graph and include comments about this in the manuscript.

Figure 6: Apart of the relative contribution (%) of each source to each fraction, show the mass concentration of the sources in $\mu\text{g}/\text{m}^3$. It might be the case of a source increasing its contribution from haze to non-haze days but not its absolute mass concentration, for example.