

Comment on amt-2022-76

Anonymous Referee #2

Referee comment on "Source apportionment resolved by time of day for improved deconvolution of primary source contributions to air pollution" by Sahil Bhandari et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2022-76-RC1>, 2022

The manuscript by Sahil Bhandari et al. presented a new method to conduct source apportionment, which can utilize large datasets collected using long-term monitoring compared to traditional positive matrix factorization approaches that do not resolve the diurnal pattern of factor profiles. In addition, the results showed that the new method resolved a greater diversity of factors compared to the traditional seasonal PMF approach in winter and monsoon seasons. In general, this manuscript is well written, but the following aspects should be fully addressed before it can be considered for publication.

- The authors split the data into six 4-hour time windows, and found the differences of MS and TS of OA factors between new method and traditional positive matrix factorization approaches. My major concern is that are these differences (or the characteristics of MS/TS) affected by time division? For example, what are the differences between the results in 11:00-13:00 LT, 13:00-15:00 LT and 11:00-15:00 LT? The authors need to address such uncertainties in the revised manuscript.
- More information needs to be listed to support source apportionment results in HOA and COA, as the current mass spectra appear to be confusing. What about their correlations with tracer species? In fact, the authors showed the correlations in Fig. S22-23 and S7-S8, but more discussion should be included in the main text. In addition, how about the results of 4/5/6-factor solutions?
- What is the justification for distinguishing between local OOA and regional OOA? Figs. S27-S30 did not support your conclusion in lines 412-414 in my sense.
- What are the correlations of same type of OA factors between the daytime and nighttime? It would be nice to have some comparison of MS of the same type of OA factors between daytime and nighttime. In my sense, the differences in MS between day and night in OA factors are the highlights of this paper. However, the potential differences between day and night and the reasons have not been discussed in depth.
- Zoom the legend in axis in Fig. S22-23 and S7-S8, so that the readers can see them clearly.
- Repeated descriptions: lines 216-217 and lines 159-162.

