

Interactive comment on “Source apportionment of volatile organic compounds in the north-west Indo–Gangetic Plain using positive matrix factorisation model” by Pallavi et al.

Anonymous Referee #2

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The article titled “Source apportionment of volatile organic compounds in the north-west Indo–Gangetic Plain using positive matrix factorisation model” by Pallavi et al., is generally well written and contains some useful information. VOC source apportionment studies are sparse in India, and this study could encourage more such studies in future which is required to understand the VOCs impact on air quality. However, on many occasions, authors seem to over-interpret the results and have drawn some rather farfetched conclusions. I would recommend publication provided my concerns are being addressed satisfactorily.

Abstract:

C1

Numbers can be presented in a better way for ease of reading. Authors can put the percentage contribution of different factors/parameters in the parenthesis beside them.

Methods:

Sec 2.3: Line 20, why 20%? Please explain and incorporate in the manuscript as well.

Line 20, more than 50% of the measured species (18 of 32) are weak, isn't that going to influence the robustness & reliability of the PMF output?

Line 24, Why the authors chose to remove missing values instead of replacing them with some other values as mentioned in the literature? Is this the standard practice? what is the % of missing values in the total sampled points?

Sec 3.3

Line 1-3, $R = 0.4$ is not a good correlation, at best it can be termed as moderate. Please rewrite the explanation on why fire count is the best tracer for factor 2.

Sec 3.7

Line 7, in PM_{2.5}, 2.5 should be subscript

Line 7, I don't think the way SOA being calculated enable the authors to make such strong quantitative assertion about the SOA contribution to PM_{2.5} in Mohali. At best, the adopted method can provide a qualitative and comparative assessment of SOA production efficiency among different PMF factors. I would suggest to remove or modify line 6-8 to reflect this.

Sec 3.8

I am not sure about the utility or purpose of this section. Are authors trying to use this comparison as another tool for PMF results validation? Or to suggest which inventory is better? Every emission inventory is developed based on some underlying assumptions and approximations. I would rather be very surprised if a single site based study can

C2

reproduce or match the emission inventory values. It is quite expected that differences will be there and even a perfect match doesn't necessarily validate emission inventories or the PMF results, especially in a complex source environment as in India. Several assumptive statements were made to explain the mismatch/less match between PMF results and emission inventory values. So, based on this comparison one can't really assert which inventory is better or more representative than others. Authors should remove or rephrase the section to reflect those concerns.

Figures:

I want to see Q/Qexp plot in SI.

Fig. 7: Why the evening peaks in Car & Two-wheeler contributions are significantly more pronounced than morning hours?

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-343>, 2019.