

Comment on acp-2021-959

Anonymous Referee #1

Referee comment on "Measurement report: Ambient volatile organic compound (VOC) pollution in urban Beijing: characteristics, sources, and implications for pollution control" by Lulu Cui et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2021-959-RC1>, 2022

Cui et al. conducted a campaign of comprehensive field observations at an urban site in Beijing. The composition, sources, and secondary transformation potential of VOCs were also identified. Overall, the study is very interesting and shows some new findings. However, the manuscript still suffers from many flaws especially the language expression. Furthermore, section 3.2.1 is not well-organized and needs major revisions. The detailed comments are as follows:

- Why not perform the hourly measurement of VOCs? To the best of my knowledge, the daily resolution for VOCs measurement is too coarse. Especially, the PMF model needs substantial observation data, which ensures the model's reliability.
- The authors need to add the detailed QA/QC of VOCs and other criteria pollutants in section 2.1. The information is very important otherwise the study might be meaningless.
- Section 2.3: Why do you use RF model rather than other decision tree model or chemical transport model (CTM)? The predictive performance of RF model might be worse than GBDT and XGBoost. Meanwhile, CTM is a process-based model, which could clearly explain the contribution of many VOC species to O₃. Moreover, the hyperparameter of RF model should be added.
- Section 2.4: The BS, DISP, and BS-DISP tests should be also added.
- Section 2.5: I think the PSCF analysis is not important in this study and could be removed.
- Section 3.2.1: Why not distinguish the meteorological and emission contributions to each VOC species?
- Section 3.3: The source identification method of each source based on VOC fingerprint should be added in this part. I think this part is too rough and should be rewritten.
- Conclusion is too long and should be shorten and reorganized.
- Data availability: I suggest the authors open the VOC dataset and it is very valuable to some researchers engaged in air quality modelling.
- The English throughout the manuscript should be significantly revised.