

Comment on acp-2022-468

Anonymous Referee #3

Referee comment on "Comprehensive characterization of particulate intermediate-volatility and semi-volatile organic compounds (I/SVOCs) from heavy-duty diesel vehicles using two-dimensional gas chromatography time-of-flight mass spectrometry" by Xiao He et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-468-RC2>, 2022

This work collected the particulate intermediate-volatility and semi-volatile organic compounds (I/SVOC) from heavy-duty diesel vehicles (HDDVs) by conducting chassis dynamometer tests. They analyzed the particulate I/SVOCs using two-dimensional gas chromatography time-of-flight mass spectrometry (GC GC-ToF-MS), speciated the unresolved complex mixtures (UCMs), and reported the emission factor (EF) distribution under diverse driving conditions. Besides, they examined the gas-particle (g-p) partitioning of different compound categories and addressed how the sampling artifacts would affect the quantification of organic compounds. Overall, I think the paper is worthy of publication and meets the interest of the reader of this journal. Suggestions and comments are provided below:

- We know that oxygenated groups, i.e., hydroxyl and carboxylic groups, are not well detected in GC-MS without derivatization with MSTFA. How would you detect those oxygenated compounds without the derivatization and guarantee the recoveries in particular?
- In section 3.3, when addressing the I/SVOC distribution, the criteria of O:C ratio of 0.3, 0.4, and 0.5 are deployed. Could you explain why the specific numbers are used?
- Line 101, it is mentioned that three replicated experiments are conducted. What is the repeatability of the measurements, e.g., reporting the standard deviation? Readers may be interested in the repeatability to confirm the robustness of the methods.
- It seems that many categories, such as O-I/SVOCs, do not have authentic standards. How are these I/SVOCs identified and quantified? The authors should address these compound categories' identification in the main text or in the supporting information.
- The uncertainty assessment of the emission factors should be presented to convince the reader of the quantification method, either in the main text or the supporting information.
- Fig 2 shows that the "phenol benzylic alcohol" is the most abundant O-I/SVOC species. Could you give some example compounds of this category, and what are the implications with abundant emission of these compounds?
- Line 340, please check throughout the main text and keep "GC × GC" uniform.

