

Atmos. Chem. Phys. Discuss., referee comment RC1  
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## Comment on acp-2021-189

Anonymous Referee #1

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Referee comment on "Measurement report: Emissions of intermediate-volatility organic compounds from vehicles under real-world driving conditions in an urban tunnel" by Hua Fang et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-189-RC1>, 2021

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In urban areas IVOCs are among the most important and yet least understood precursors to secondary organic aerosols. Tunnel test is a widely adopted approach to characterize vehicle emissions of air pollutants as it can obtain results representing real-world emissions with a large number of driving vehicles involved. This study is the first tunnel test conducted to characterize vehicular emission of IVOCs. As the field campaign was carried out in a very busy urban tunnel with traffic flows of over 30,000 vehicles per day, the results from this study are valuable and implicative for the emission reduction of IVOCs, which is of great importance for SOA to further alleviate air pollution due to fine particles in urban areas. The data quality is good with available QA/QC procedures, and the manuscript is well written and organized. I recommend its publication in the form of "measurement report" in ACP after addressing the following comments.

Specific comments:

Lines 75-79: the sentences are a little confusing, rewrite it.

Lines 88-91: "For this reason, IVOC emission factors derived from vehicle tests in the US have been used to update China's emission inventories with the inclusion of IVOCs (Liu et al., 2017). It is unknown whether the borrowed emission factors could well reflect the vehicular emissions of IVOCs in China.", consider to change as " As IVOC emission factors derived .....(Liu et al., 2017), it is unknown.....".

Lines 125-126: "classify the vehicle types", change to "classify vehicles into different fuel types".

Lines 129-131: "...a gas chromatography / mass selective detector (GC/MSD; Agilent, 7890 GC/5975 MSD, USA) with a capillary column (Agilent, HP-5MS, 30 m × 0.25 mm × 0.25 μm)." Should be "...a gas chromatography / mass selective detector (GC/MSD; 7890 GC/5975 MSD, Agilent Technologies, USA) with a capillary column (HP-5MS, 30 m × 0.25 mm × 0.25 μm, Agilent Technologies, USA)."

Line 143: the retention time → the retention times; of n-alkane → of a n-alkane

Line 148: in the 11 bins

Line 169: "occurs" → "occurred"

Lines 171-172: "IVOCs detected in the second tube only accounted for  $2.6 \pm 1.4\%$  of the total in the two tubes, indicating no breakthrough during the sampling": as 2.6% detected in the second tube, why no breakthrough?

Line 181: of a give species

Line 192: 76.3% on average

Line 193: a percentage of → an average percentage of

Line 204: change "diesel" to "DVs"

Line 217 "<http://www.mee.gov.cn/>": it just directs to the web site of MEE, but not to the specific documents with the relevant information. Try to be more specific or you need cite other appropriate references.

Lines 225-226: "GVs still share a much larger portion than the China V and VI ones in the on-road fleets (<http://www.mee.gov.cn/>)." Change to "...ones in China's on-road fleets (<http://www.mee.gov.cn/>...)", as mentioned above, the website address should be more specific so that the readers can easily find information about fleet compositions in China.

Lines 231-233: "The speciated IVOCs consist of n-alkanes, b-alkanes and PAHs.

Naphthalene dominated the quantified PAHs, accounting for  $56.82 \pm 1.21\%$  of total PAHs emissions." change to "Among the speciated IVOCs (Table S1), naphthalene dominated the quantified PAHs, accounting for  $56.82 \pm 1.21\%$  of total PAHs emissions."

Line 243: bins

Lines 244-245: "The mass ratios of IVOCs in each bin to the n-alkane in the same bin ranges 9.0-15.8 (Table S2). As n-alkanes are more easily and routinely quantified, the relationships of..." rewrite to "The mass ratios of IVOCs to the n-alkane in the bins ranged 9.0-15.8 (Table S2). As n-alkanes can be more easily and routinely quantified, the relationships of..."

Line 248: consider changing to "as the results here were obtained for a fleet dominated by GVs"

Line 274: "totalled" à "totaled"

Line 291: "ontained in a tunnel" à "obtained from this study in a tunnel"

4. Conclusions and implications: in this part the authors present many emission estimates and percentages, some of which cannot be directly figured out by the readers. Better added some explanations in the supporting information about these.

Line 306: "revealed complex and different results", it should be more specific.

Line 339: "on-road diesels are comparable to the non-road diesel engines" change to "on-road diesel vehicles are comparable to that for non-road diesel engines".