

Wang et al. present a revised manuscript that addresses many of the comments in my previous review. I appreciate the authors works, and I am satisfied by the responses. Overall, I support publication. There is one remaining comment that I would appreciate if the authors could address, as I believe it will help clarify a question that I posed in my initial review. I've also made a number of comments on the new content in the SI that I think will help to clarify the material.

Main Comment

Lines 359 - 362 : This new text is confusing, and I believe this was added to address comments 5 and 8 of my previous review. Admittedly, my initial questions may have not been clear. In my previous review, I asked whether Figures 7a-b could provide information about the effects of the after treatment process on VOC profiles. I presumed that the comparison between cold-start emissions and hot-start emissions were sufficient to address this question. Really, my aim was to hear more from the authors about the source of VOC emissions, and I think the authors now effectively address this at lines 346-349 with the discussion of unburnt fuel.

In the new text, the authors point to Figures 7c-d to argue that the after treatment process has little effect on VOC profiles. I do not agree that these panels provide strong evidence for this conclusion. Figure 7d shows significant scatter, and the correlation coefficient derived from these data seem to be driven by a select number of high emission VOCs. Furthermore, after re-reading this section, this new text conflicts with the statement at lines 375-377, which suggest that the "after-treatment device for diesel vehicles may effectively reduce emissions of some heavier VOC species."

I think this can be resolved by simply removing the text at lines 359 - 362. Ultimately, I don't think this text adds much to the discussion. I appreciate the efforts by the authors to address my comments.

Comments on Supplement:

Lines 46 - 55 in the Supplement: This information is really useful to the reader in order to understand how the emission control technologies have changed under different standards. I think this section should be elevated to the main text. A good place for this could be at line 121 after the description of the LPG vehicles.

Line 26: Please add "the" between "of" and "determining"

Line 35: "Content" should be "contain"

Line 37 - 39: Wording is a little awkward, would suggest rephrasing as "... have been recently introduced in China, which applies to light-duty vehicles using gasoline and diesel fuel"

Line 49: Would suggest re-wording “upgrading of emission standard” to say “stricter emission standards”

Line 74: I believe “cycle” should be plural

Line 96 - 97: This reads awkwardly. I suggest revising to read “ Here, the limit of detection for VOC mixing ratios were calculated and applied to estimate the limit of detection for emission factors”

Line 98: Would suggest removing “kind of”

Line 99-102: I don’t follow what is written here - are the authors saying that the mass spectra is below the limit of detection for most measurements? I don’t fully understand why one vehicle is used here to infer the LOD/Signal ratio here.

Line 106 - 112: I’m not sure why the discussion of C₁₆H₂₂O₄H is included here. If the authors do not believe this compound is a part of the tailpipe emissions, then I would remove this from the discussion. If this compound is of interest for other reasons (i.e., some sort of plasticizer?) then I believe the authors should provide some discussion. But to my eye, this seems to be a part of the dynamometer system and can be reasonably discarded.

Line 144-146: This reads a bit awkwardly - I would suggest saying “The average rate constant for C₁₄ aromatics has not been reported, so we assume a rate constant similar to representative C₁₂ aromatics”