Comment on acp-2021-533

Anonymous Referee #2

Referee comment on "Hyperfine-resolution mapping of on-road vehicle emissions with comprehensive traffic monitoring and an intelligent transportation system" by Linhui Jiang et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-533-RC2, 2021

This paper established a high spatial resolution bottom-up on-road vehicle emission inventory using measured traffic fluxes, vehicle-specific categories, and speeds over the Xiaoshan District in the Yangtze River Delta (YRD) region. The effectiveness of traffic control strategies was investigated based on the hyperfine on-road vehicle emission dataset.

The importance of controlling the mobile sources on the synergy effect of PM2.5 and O3 abatement draws more and more attentions in recent years. However, the uncertainties in current mobile source emission inventory propagates large biases to the model simulation results and final control measures development. As a modeler, I am excited to see that using on-site measurement and big data technology is able to establish such fine resolution mobile source emission inventory. It can also improve the accuracy of model simulations significantly.

This paper is good in general and within the scope of Atmospheric Chemistry and Physics. I recommend for publication once the comments expressed below are addressed.

General comments:

- The author needs to add some discussions regarding how to put this hyperfine on-road vehicle emission into the air quality models. Is it feasible and cost effective to build a nation-wide hyperfine on-road vehicle emission using the same method established in this study?
- The author needs to add some discussions on the uncertainties of the hyperfine on-road vehicle emission established in this study. It seems that the vehicle emission activities can be greatly improved, what about emission factors. The method used in this study

divides vehicles into 6 categories. Does it include and separate gasoline and diesel vehicles, and does it take vehicle age into account?

Specific comments:

- In section 3.6, the author compared the newly established on-road vehicle emission inventory with those from MEIC and HTAP inventories at regional scale. Is it possible to add some comparisons with localized refined emission inventory, as well as with the measured vehicle emission factors in the literature?
- The caption in Figure 1 needs to be simplified, no necessary to explain the method again.
- In the line 211, the author takes ICC values of 0.75 ~ 1 as the reflection of large and systematic spatial differences. What is the basis for this range? More explanation is needed.
- More quantitative findings from this study need to add into conclusion part in section 4.