Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC1
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Comment on acp-2021-533

Shunxiang Huang (Referee)

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-RC1, 2021

The manuscript by Jiang et al. establishes an urban on-road vehicle-specific emission inventory, which makes an important technological breakthrough and is central to urban ozone and particular matter pollution control.In particular, this study proposes a hyperfine-resolution bottom-up model framework built upon a series of valuable ITS facilities and algorithms, like radar velocimeters, surveillance cameras, and the image recognition algorithm.To my knowledge, this is the first time for investigating urban on-road emissions with a resolution up to several meters. The authors much have gone a long way towards such findings.Consequently,an unprecedentedemission map is obtained in this study. Therein, widespread and persistent emission hotspots emerged. They are of significantly sharp small-scale variability, up to 8 ~ 15 times within individual hotspots, attributable to distinct traffic fluxes, road conditions, and vehicle categories.

Overall, this work is novel, important, and well-written. I recommend its acceptance for publication afterminor revisions.

General Comments:

Line 394. The authors conclude with severalfinal important implications of this work. For the public, as pointed by the authors, "the hyperfine-resolution emission inventory can alter personal behaviour, much as real-time traffic navigation data now inform

individualdriving patterns.”. However, policymakers still question how this hyperfine-resolution emission inventory would help improve air quality and address exposure misclassification.Hence, the discussions would be more insightful if the authors could make this clearer. I believethe chemical transport model (CTM) might be a key link.

Specific comments:

Line 113:What is the exact period of the “rush hours”? As appearing for the first time,it has to be specified.

Line 171:Does “during the morning and evening rush hours” mean the same as “during the morning and afternoon rush hours” (Line 113)?If so, please unify the definitions.

Line 159: Please give brief definitions for the “light-duty vehicles (LDVs), middle-duty vehicles(MDVs), heavy-duty vehicles (HDVs), light-duty trucks (LDTs), middle-duty trucks (MDTs), and heavy-duty trucks (HDTs)?”

Line 222: The “overall” should be deleted.

Figure 8: This picture lacks the description of the abscissa.Is that the number of weekdays?

Please also note the supplement to this comment:
https://acp.copernicus.org/preprints/acp-2021-533/acp-2021-533-RC1-supplement.pdf