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Comment on acp-2022-828

Anonymous Referee #2

Referee comment on "Vehicular ammonia emissions: an underappreciated emission source in densely populated areas" by Yifan Wen et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-828-RC2>, 2023

During the past years, PM_{2.5} pollution have been reduced substantially, while the occasionally occurred heavy PM_{2.5} episodes and its driving forces still need to be explored. One of non-common sense hotspots is the role of NH₃. The relative importance of traffic sources to NH₃ emissions is still under debate.

Base on emission measurement data throughout different cities in China, this study developed high-quality traffic emission inventory of vehicular NH₃ emissions. This work can give a better insight into the absolute value and relative importance of vehicular NH₃ emissions in different regions, seasons and population densities in China. According to the results, they show that the significant role of on-road NH₃ emissions in populated areas have been underappreciated, which is quite important in terms of the atmospheric chemistry and air quality implications.

Overall, this manuscript is well organized and presented with some new insights on NH₃ emissions and its contribution, thus, I think this paper is suitable for publishing in ACP after well addressing the following comments, questions and suggestions.

- As shown in Fig. 2, NH₃ emissions from gasoline vehicles have already declined since 2010 while emissions from diesel vehicles grew significantly since 2014. What's the most possible trend in total on-road NH₃ emissions in the near future under the joint effects of vehicle growth and turnover?
- I witnessed an overall higher level of EFs estimated from remote sensing than dynamometer measurements in Fig. 1. What's the possible reason? Some discussion should be added.
- Why the shares of vehicular NH₃ emissions in total anthropogenic NH₃ emissions show a large difference between the urban areas Shanghai and Beijing? More detailed discussion is required to quantitatively address the uncertainty (e.g., NH₃ emissions from residential or industrial sectors).
- This paper mainly focused on emission inventory but didn't reach to the real impacts on

air quality. I understand that the scope of this paper may not be stretched further, but still wonder whether there's any evidence for the air quality impacts of on-road NH₃ emissions in urban areas?

- The significance, shortage and implications of this study is suggested to be added in the Conclusions sections.