

EGU21-5419, updated on 03 Dec 2022

<https://doi.org/10.5194/egusphere-egu21-5419>

EGU General Assembly 2021

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Error assessment of traffic emission estimates using novel mobility datasets.

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The COVID-19 pandemic led to widespread reductions in mobility and induced observable changes in the atmosphere. Recent work has employed novel mobility datasets as a proxy for trace gas emissions from traffic, yet there has been little work evaluating these emission numbers.

We systematically compare mobility datasets from TomTom and Apple to traffic data from local governments in seven diverse urban and rural regions to characterize the magnitude of errors in emissions that result from using those mobility datasets as a proxy for traffic. We observe differences in excess of 60% between these mobility datasets and local traffic data, which result in large errors in emission estimates. These differences are in part driven by the usage of different baselines and the neglect of seasonality, but mainly they are caused by the individual representations of the datasets. The relationship varies strongly depending on time and region and therefore no general functional relationship between mobility data and traffic flow over all regions can be determined. Future work should be cautious when using these mobility metrics for emission estimates. Further, we use the local government data to identify actual emission reductions from traffic in the range of 7-22% in 2020 compared to 2019 for our study regions. Our full analysis is summarized in Gensheimer et al. (2020).

Gensheimer, J., Turner, A., Shekhar, A., Wenzel, A., & Chen, J. (2020). What are different measures of mobility changes telling us about emissions during the COVID-19 pandemic? *Earth and Space Science Open Archive*, 11. Retrieved from doi: 10.1002/essoar.10504783.1