

Interactive comment on “Mobile monitoring of urban air quality at high spatial resolution by low-cost sensors: Impacts of COVID-19 pandemic lockdown” by Shibao Wang et al.

Anonymous Referee #2

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General Comments

This paper presents a mobile monitoring study of CO, NO₂, and O₃ concentrations in a major urban area. The research in this paper is a solid scientific study that adds to the knowledge we have of the variability in air concentrations in large urban areas. Below I detail some specific comments that should be addressed by the authors as well as some technical corrections.

Specific Comments

- Lines 85-90: please provide detailed information on the machine learning algorithm used, including the equations used to calibrate the data, what is considered a “sub-

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stantial deviation” from the national network measurements, how recalibration was conducted if there was a substantial deviation, and how many times recalibration was needed.

- Lines 91-99: explain why you are using a machine learning algorithm. My understanding from your paper is that Figure 2a shows actual measurements, while Figure 2b shows the machine learning air concentration estimates for the mobile sensors compared to actual measurements at the fixed site. The correlations in Figure 2a are much better than those in Figure 2b, which would suggest that there is no need to train an algorithm to develop better estimates of concentrations. Why can't you simply use the measurements from the low-cost sensors for your calibration/validation? Is it because the study data were collected throughout the city, and not just near fixed monitors? If so, perhaps you can do a second calibration using data near fixed monitors, without the machine learning algorithm.

- Lines 128-130: this is a broad statement, and not true of all urban monitors. Can you provide citations to studies or reports that show that the stationary monitors do not have a significant impact from traffic emissions and are representative of urban background air quality?

- Lines 205-206 and Table 1: explain how you are identifying the main source contributions to the hot spots. Is it based on nearby sources and wind direction? Do different sources have different fingerprints (i.e., different relative concentrations of the measured pollutants)? Are there other studies showing that these sources had significant contributions at these locations?

- Lines 334-335: do the observations at fixed monitors support the theory that increased temperature/insolation is the cause of higher O₃ concentrations in P3 as compared to P1?

Technical Corrections

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- Figure 2: both the x- and y- labels on the regression plots are labeled “station.” Please change this to specify which station.
- Figure 5: the resolution isn't good on this figure. Can you re-plot with better resolution? Also, the yellow/orange colors are hard to differentiate in Figure 5b.
- Line 334: ‘insulation’ should be changed to ‘insolation’
- Figure11: this figure is very hard to read. Can it be made a higher resolution or different color scheme?

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1169>, 2020.