Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2020-316-RC2, 2020

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Retrieving tropospheric NO_2 vertical column densities around the city of Beijing and estimating NO_x emissions based on carMAX-DOAS measurements" *by* Xinghong Cheng et al.

Anonymous Referee #1

Received and published: 19 July 2020

General Remarks: The manuscript present the results of observing NO2 emission measurements in Beijing based on the Car MAX-DOAS technology. Through 19 times of city-circle-around Car-MAX-DOAS experiments, the author showed the potential of Car MAX-DOAS measurement technology in atmospheric monitoring. This observation method can be effectively used for dynamic monitoring of urban NO2 emissions. However, the database the authors use for the conclusions is relatively weak. So some revisions are needed to consider this manuscript for publication in ACP. Major concerns: 1. Line 24-25, "typically larger NO2 VCD at the southern parts of the 6th Ring

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Road than at the northern parts". According to Figures 5 and 6, the NO2 VCD at the southern parts and northern parts were not typically different in January. 2. Since each measurement time was different, from 2 to 2.5 hours (sometimes nearly 3 hours), the author should introduce the traffic situation during the measurement and analyze the impact on the measurement results. 3. The author should introduce the NOx emission sources in Figure 1 and analyze the influence on the measurement. 4. The results of Car Max- DOAS measurement show that NOx emission in heating season is nearly three times as much as that in non heating season, which is obviously higher than that calculated by MEIC inventory estimate. Since central heating is adopted in Beijing urban area, the author should analyze heating season NOx sources in detail, and evaluate the contributions to the measurement results. Minor comments: 1. Abstract, here it is more appropriate to use "different months" instead of "different seasons". 2. Line 43, "less than" instead of "smaller than" 3. Line 54-56, "NO and NO2 (together denoted as NOX) form primarily in combustion processes, and the conversion between NO and NO2 in the atmosphere is very rapid" is well known and meaningless here 4. Please unify the format of "Car-MAX-DOAS" in the manuscript. For example: line 90 "car-MAX-DOAS", line 94 "Car-MAX-DOAS", line 101 "car MAX-DOAS", line 190 "car MAX-DOAS" et al. 5. Line 147, "the roof of a car" instead of "the roof a car".

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