Atmospheric Chemistry and Physics Discussions

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Comment on acp-2021-592

Anonymous Referee #1

Referee comment on "Declines and peaks in NO_2 pollution during the multiple waves of the COVID-19 pandemic in the New York metropolitan area" by Maria Tzortziou et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-592-RC2, 2021

Declines and peaks in NO2 pollution during the multiple waves of the COVID-19 pandemic in the New York metropolitan area

Maria Tzortziou, Charlotte F. Kwong, Daniel Goldberg, Luke Schiferl, Róisín Commane, Nader Abuhassan, James J. Szykman, Lukas C. Valin

This paper presents an extensive study of declines and peaks in NO_2 levels durng different phases in the COVID-19 pandemic in New York city. Columns of NO_2 from TROPOMI observations and PGN for four stations in the New York metropolitan area are presented for periods pre- and post-pandemic. These observations shown changes in NO_2 columns up 36%. Additionally, model simulations of air masses and meteorological information are combined with PGN and TROPOMI observations in order to evaluate impact of NO_2 pollution in the New York metropolitan area during the multiple waves of the COVI-19 pandemic.

The topic of this work fits well within the scope of ACP. The manuscript is well structured and well written. However, the main concern is about the lack of evidence of decrease solely to lockdown periods during pandemic but not to as a general reduction NO2 emissions in New York. Would be possible to evaluate this decrease during lockdown as consequence of only mobility reduction in New York city and not as result of decreasing tendency of general reduction of NOx emission as suggest other studies (e.g. Zangari et al., 2020) by comparing with earliest years?

I recommend acceptance to ACP after addressing the comments above and few minor comments below.

Additional comments:

L179-180: Please add reference for OMI and SCIAMACHY instruments.

L247: Similar to the comment above, have you checked the NO_2 amounts for earliest years thatn 2018 for PGN or any satellite observation?

L273: Would possible to generate a similar figure to SI-2 but comparing with 2018?

L276: Are you comparing tropospheric NO2 columns with total columns from ground based measurements? Or are both tropospheric columns?

L284: Would be possible to repeat the same figure for OMI or GOME-2 NO2 observations but including earliest years to confirm real reduction to COVID-19 lockdown and not a combination of other factors?

L288: Already Manhathan and Queens present a significan reuction for 2018 in comparison 2019 before pacdemic lockdown, e.g. June-September and October 2018 and January 2019?

L290: Figure 3, TROPOMI columns are very low and difficult to observe the reduction in NO2 columns. What is the detection limit of NO2 trospospheric columns from TROPOMI?

L331: Can be possible to quantify the increase or decrease of Nox emission due to only energy sector? It is clear that contribution from transportation sector is reduced, but energy sector, specially dosmestic consumption probably has an significant increase due to the COVID-19 lockdown.

L340: Decrease of power demand/usage in New York city is associated to?

Figure 6: Please check the title display of subfigures.

Line 409: It would be worth to add a figure showing this data in the supplementary material.

L427: Would be possible to add the location of the power plants in the maps similar to Figure 1?

L448-448: Please add a figure if it is possible in the supplementary material for the matched of TCNO2 in 23 and 25 April.

References:

Shelby Zangari, Dustin T. Hill, Amanda T. Charette, Jaime E. Mirowsky, Air quality changes in New York City during the COVID-19 pandemic,
Science of The Total Environment, Volume 742, 2020,
https://doi.org/10.1016/j.scitotenv.2020.140496.