

Atmos. Chem. Phys. Discuss., referee comment RC1  
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## **Comment on acp-2021-355**

Anonymous Referee #2

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Referee comment on "The regional impact of urban emissions on air quality in Europe: the role of the urban canopy effects" by Peter Huszar et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-355-RC1>, 2021

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### **Review of "The regional impact of urban emissions on air quality in Europe: the role of the urban canopy effects"**

Huszar and co-authors investigated how the urban emission impact (UEI) is modulated by the urban canopy meteorological forcing (UCMF) for present day climate conditions (2015-2016) using three regional climate-chemistry models; this experiment was designed for 5 selected central European cities. The urban emissions induced changes were analysed for near surface concentrations of NO<sub>2</sub>, O<sub>3</sub> and PM<sub>2.5</sub>. The authors performed multiple experiments differing in including/excluding both the effect of UCMF and the impact of the urban emissions highlighting the importance of vertical eddy transport, which is considered to be a dominating driver of the regional footprint of urban emissions. This study concludes that the urban canopy and all the resulting effects on meteorological processes should be properly accounted for in regional models when the transport of pollutants from urban areas is studied and the impact of such emissions is quantified.

Novelty and significance:

This research provides evidence related to the importance of meteorological changes resulting from urbanization, which should to be included in regional model studies in order to better quantify the regional footprint of urban emissions.

Yet, more analysis and discussion are needed for certain topics of the paper.

Specific comments/suggestions are listed below.

## I. Scientific suggestions on the main text

### General:

- Regarding the choice of cities, the justification is vague; what is to be highlighted for each city?
- Please provide additional explanations about why the focus was on NO<sub>x</sub>, PM<sub>2.5</sub> and O<sub>3</sub>.
- Please provide details about policy relevance of this work.
- Revise the term "fingerprint".

### Specific comments:

Page 4, 118-121, harmonise the info in this paragraph with the info provided in the abstract.

Page 6, 191, please summarise the experimental design e.g. in a table.

Page 8, 250, please provide more details about model validation, for ozone in particular.

Page 9, 255, please provide the name of emission model.

Page 13, 399, DJF ozone is missing, please provide an explanation.

## II. Typing errors

Page 3, 59, replace "ammonia(" with "ammonia ("

Page 6, 167, replace ",the" with ", the"

Page 8, 242, replace "models" with "model"

Page 11, 341, replace "therefor" with "therefore"

Page 11, 353, replace "and4" with "and 4"

Page 11, 356, replace "PM" with "PM2.5"

Page 12, 363, replace "and6" with "and 6"

Page 12, 366, replace "maxima" with "maximum"

Page 13, 399, replace Fig/ 7" with "Fig. 7"

Page 14, 455, delete the "." from "at.."

Page 16, 499, replace "depend" with "depends"

Page 16, 520, replace "and" with "an"

Page 18, 563, "." is missing