

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2020-1308

Anonymous Referee #2

Referee comment on "Downscaling system for modeling of atmospheric composition on regional, urban and street scales" by Roman Nuterman et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1308-RC2>, 2021

General comments: This paper proposes a downscaling modelling system for prediction of weather and atmospheric composition from the regional scale down to street scale, by running a computational fluid dynamics model. This is an interesting topic, and the study is relevant, making the purpose of the research an important work within the scope of the Atmospheric Chemistry and Physics journal. The paper is well written and structured, however more detailed the results could be presented, strengthen the discussion. Overall, the discussion of results could be improved providing information on the main findings of the work, how they compare with papers already published. In my opinion, some improvements and clarifications need to be made before publication. Specific comments:

1. Is there a "double-counting" of the urban processes in the CFD simulations, considering that those simulations are initialized with meteorological fields from HIRLAM model with activated BEP module?
2. Are those emissions provided by TNO and used in CAMx simulations the most updated emissions for all the SNAPs?
3. Which kind of k-epsilon turbulence schemes are available in M2EU model? In addition, which schemes are available for meshing?
4. Authors mentioned that "the horizontal and vertical extent of the computational domain is 500 x 500 x 100 m." There is a lack of information about the dimensions of the domain (e.g. height of the tallest building in the domain). Did the authors follow the COST Action 732 guidelines?
5. Authors should provide a figure plotting the mesh to be more specific about this information "the horizontal and vertical numerical grids with local refinement of grid-cells ranging from 1 m at the Jagtvej 130 Street to 5 m near the domain's boundaries was used." How about the distance between the boundaries and the build-up area? Again, are you considering the COST Action guidelines or similar?
6. "The Jagtvej Street emission inventory was derived from hourly traffic counts (Berkowicz et al., 2004) and emissions for different types of road-vehicles (Chao et al., 2018)." Therefore, I am assuming you are only considering the road traffic emissions for the M2EU simulations. Am I right?