Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2020-545-RC2, 2020
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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Error induced by neglecting subgrid chemical segregation due to inefficient turbulent mixing in regional chemical-transport models in urban environments" *by* Cathy W. Y. Li et al.

**Anonymous Referee #3**

Received and published: 20 November 2020

Error induced by neglecting subgrid chemical segregation due to inefficient turbulent mixing in regional chemical-transport models in urban environments

General comments This study investigates and quantifies the impacts of chemical segregation on chemical reaction simulation which is a highly relevant topic in the field of turbulence-chemistry interaction. The DNS is an appropriate method for this study. The experiments are well designed regarding the strong and heterogeneous emissions. The results are very well organized and interpreted, and implications of the results are properly discussed. A couple of my concerns are appropriately acknowledged or dis-



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Discussion paper

cussed such as the potential influences of multiple chemical reactions, the modeling framework of regional models, and different weather conditions. I only have a few minor comments mostly regarding clarification. Please see below.

Specific comments 1. Figure 2. Can you note the x axis in this figure? 2. Figure 4&5. Is there a particular reason you use Is in Fig. 5 and keff/k in Fig. 4? Could you keep it consistent? 3. Figure 9. I wonder if you run the simulations with the fast chemistry. If so, how different are they from the slow chemistry cases shown here? 4. Equation 1. Please define Fb. 5. Page 8 Line 12. Add the acronym CBL to where the full name first appears. 6. Page 13 Line 4. Can you clarify “interpolated”?

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