Geoscientific
Model Development
Discussions

Interactive comment on "Development of a real-time on-road emission (ROE v1.0) model for street-scale air quality modeling based on dynamic traffic big data" *by* Luolin Wu et al.

Anonymous Referee #2

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I - General comments

This manuscript aims to present a new modelling approach to represent traffic emissions at street-scale and a first application of this approach within the Guangzhou city.

The relevance of this new methodology is evaluated through the comparison to observations of simulation results of a street-scale air quality model for NO2 and O3.

Finally a first application aiming to quantify the impact of traffic volume change on street-scale photochemistry is analysed.

Its a topic of scientific interest and within the scope of Geoscientific Model Develop-

ment. The presentation of the work is globally very clearly organised, but sometimes too limited to a simple description. A more in depth presentation of some crucial points (see below) would be very useful to improve this manuscript.

II - Detailed Comments

p2 line 39: The authors mention "The real-time traffic data from the road network could be the most precise input data for on-road emission inventories and could significantly improve the spatial and temporal resolution of the inventories."

I believe this is the central point of the work presented. The targeted question is to know if "real" traffic data can help to improve the quality of modelled emissions and then the quality of modelled concentrations.

Of course the first step is to be able to use such data. The work presented shows it is technically possible. The second step is to show that it allows to get reasonable emissions and then reasonable concentrations. The manuscript provides some elements for this second step.

However what is missing in this work, from my point of view, is the demonstration of the interest of the proposed methodology in comparison to previously existing methods. It could have been relevant to compare a simulation with the emissions derived from the new methodology to a simulation with emissions derived from time-averaged data and applying hourly, daily and monthly factors as often applied within Top-Down approaches. Similarly the comparison to spatially-averaged data (at a chosen grid cell scale and per type of ways) would be of interest.

p3 line 4: Strictly speaking it is not the case for all air pollutants. This sentence could be rewritten avoiding this useless generalisation.

p3 line 26: This sentence should be rewritten to clarify what is available currently (it is always possible to develop a model to extend its functionalities).

p4 line 15 and section 2.2: More details on the emission factors building methodolo-

gies would be useful to appreciate their relevance in a near real-time / "instantaneous" framework. Does their temporal representativeness is fully consistent with the fine temporal description of the traffic data? If not, what are the expected impact on the results?

p5 line 33 : The table 2 only shows the global results without any analysis. I guess a comprehensive comparison of the three inventories is beyond the scope of the current paper, however some general considerations and analysis concerning the discrepancies between the three database appears mandatory for this manuscript.

p5 line 35 and followings : The numbers provided in tables should not be recalled in the body text.

p7 line 14-15 : From section 3 I understand the "boundary conditions" are considered to feed the MUNICH runs. It implies that others sources than on-road emissions are implicitly considered.

p8 line 35 : One of the traditional aim of models is to be used for prospective (long term forecast) studies. Could the authors provide some hints on how their methodology could be extended too perform such study?