Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2018-973-RC1, 2019

Atmospheric Chemistry and Physics Discussions

Interactive comment on "The impact of measures to reduce road dust, evaluated for a street canyon in Helsinki" *by* Ana Stojiljkovic et al.

Anonymous Referee #1

Received and published: 13 February 2019

This paper has used road dust emission models to investigate the impact of studded tyre use on PM10 concentrations. The science is sound and the paper warrants publication once the following have been addressed:

Introduction In the Introduction it is mentioned that non-exhaust emissions are one of the most important causes of high roadside PM10 concentrations for several decades. However not details their overall contribution is given. Recent figures from the European Environment Agency state that ". In 2016, the non-exhaust emissions of PM2.5 constituted 42 % of emissions from the road transport sector, compared with 17 % in 2000 (for PM10, the contribution increased from 30 % in 2000 to 60 % in 2016)". https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-air-pollutants-8/transport-emissions-of-air-pollutants-6

Traffic data It's not clear what traffic speed was used in the models. A number of mentioned (weekday daytime, night-time, weekly and monthly). Given that emissions are speed dependent this is important. If there's increased braking and accelerating) this results in additional wear of both the tyre and the road surface. As such would one solution to reduce PM10 concentrations be a lower speed limit? It is noted that it is acknowledge that the NORTRIP model does not account for congested driving conditions but what likely error does this introduce?

Meteorological data How is snowfall taken into account with total precipitation?

Road maintenance data Are the roads washed during the summer? Street cleaning is shown in Table 3 but not Figure 3 Does snow ploughing have any impact?

The road dust emission model NORTRIP Need to justify why the amount of suspendable material in sand was set to 2%.

Evaluation of the vehicular exhaust emissions Given that the paper relates to PM10 emissions why not use PM10 emissions instead of those ofr PM2.5?

Results and discussion To save any confusion for readers specify seasons as winter (1 Jan to 14 March etc) Comparison of predicted and measured PM10 concentrations State the statistical significance of R2 values.

General discussion There should be some consideration of alternatives to road salt given the numerous papers which have highlighted the environmental impact of it. Studless winter tyres are becoming more popular – should Finland make this on option? There should be a discussion about the impact of different road surfaces on PM10 emissions (e.g. concrete, more durable asphalt). It is also important to highlight that the wear of the road surface increases with moisture level. Additionally after salting the road surface remains wet for longer periods and so road wear increases.

Typographical Check the spelling of "tyres" as in some places there is "tires". I would also prefer the use of "roads" rather than "pavements"

The road dust emission model FORE The model uses empirical reference emission factors which depend on the . . .. (note factors and depend)

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