

Interactive comment on “Winter and summer time size distributions and densities of traffic-related aerosol particles at a busy highway in Helsinki” by A. Virtanen et al.

Anonymous Referee #3

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Review on "Winter and summer time size distributions and densities of traffic-related aerosol particles at a busy highway in Helsinki" by Virtanen et al.

General

The manuscript is based on a dataset obtained from an urban measurement site, located next to a highway in Helsinki. Number size distribution measurements are frequently available so far, the advantages of this campaign are that measurements have been performed at two distances and in parallel the particles density has been obtained for two size ranges. The data have been analysed in detail and results are shown in this

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study. Thus, the manuscript is worth to be published at ACP, however a few changes need to be done before.

As already pointed out by the other referees the quality of written English needs to be improved significantly. It should be corrected by e.g. a native speaker, I will not mention each error in language here. Many of them are already listed by referee #5.

Specific comments

Introduction: The motivation is not sufficiently presented. What is new in your study? What is different compared to former studies? Why are these data needed such as density? They are not available yet but that's no reason that they are needed.

Instrumentation: More information about the ELPI would be useful, type, company... I think ELPI measures aerodynamic diameter like other impactors, this should be mentioned here as well. How do you compare it later with the mobility diameter?

Results: The measurement period of two weeks in summer and winter are relatively short. Are they representative for the whole season? How was the meteorological situation? Typical for summer/winter? What about traffic counts, they are probably available for a longer period. Fig.2: It is not really clear how the background values have been calculated: how many days have been used? During what time of the day? There were obviously not enough data to calculate the average diurnal variation? p.556, l.25 mixing height should be correctly height of mixing layer p.556, l.10-20 I recommend comparing the numbers with other studies! They don't say very much without comparison. What kind of diameter is used for the ELPI here? Is it corrected to Stokes diameter?

p.558, l.24-29: The differences in mixing processes between summer and winter should be considered. They may also have a significant influence on concentration in the different size ranges. p.559, l.5-19: Again, different mixing processes (mainly vertical mixing) have an influence on the measured number size distribution in summer

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and winter. p.559, l.20-29: Did you do any comparison between the nano SMPS and long SMPS? That would be helpful if you try to compare both systems directly. The correction using an additional total counter is one way but it would be helpful to know the reasons behind. Did you correct any losses like diffusion? Are the lengths of the inlet lines of both systems comparable? p.560, l.14: What means 'typical measured SMPS size distribution'? The best way would be to calculate an average over a representative period, but the authors should at least mention the way how they define typical. p.561, l.11: ..'Aitken and accumulation modes, which are characteristic for urban aerosol'.. I don't really understand the meaning. Why should Aitken and accumulation mode particles be characteristics and nucleation mode particles not? Usually the concentration of nucleation particles dominates the whole number concentration.

Conclusions: This section contains again the abstract more or less; maybe you call it summary. But it does not contain any conclusions. In parallel to the introduction (motivation), here could be added where the results could be used or what is really new. It has not been published yet does not mean that somebody will ever use it. I wish the authors would change the section in this way and draw some real conclusions.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 549, 2006.

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