

Interactive comment on “Particle size distribution and particle mass measurements at urban, near-city and rural level in the Copenhagen area and Southern Sweden” by M. Ketzel et al.

M. Ketzel et al.

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We thank the two referees for taking the time to review our paper, the pleasant comments to our work and the detailed suggestions.

Specific comments by referee #1:

We agree, Figure 11 is a bit tricky. We have tried various ways of plotting and this version was our consensus. The main point is to show the contributions from each level indicating to the potential for reduction measures. Plotting absolute bars, which we also tried, makes the comparison between the four different species harder to follow. We now rephrased the figure caption in the revised manuscript to help the reader to comprehend the picture.

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The wrong Figure number in last paragraph of 3.6 was corrected.

General comments by referee #2:

We have reduced the use of 'we' in the revised manuscript.

Specific comments by referee #2:

Page 5517 Line 7-9. The period when all stations were operating was added into the text: 27 September - 1 October; 11 - 22 October; 25 - 29 October and 4 - 6 November.

Page 5517 Start line 20 All DMA were build and calibrated (for the loss and broadening parameters of the transfer function) at the Lund University. The Danish DMPS are intercompared on a regular basis, showing very good agreement between the instruments, typically 5-15% difference in the total number concentrations. The performance of the DMPS systems at the background sites is regularly checked by comparing the total number concentration estimated by integrating the size distribution and the number concentration given by the CPC operating alone. These values should agree within a few percent. The performance in the time series plots (Fig.3.) and also the agreement for larger particle sizes (Fig.5) do not show signs of larger systematic differences between VVHL and the Danish stations other than can be explained by the different location of the station.

Page 5519 Line 7-11. We have analysed meteorological data from a mast at the VVHL site. The mast height is smaller than the surrounding forest and therefore the data show a clear influence from the forest canopy and do not represent the regional wind flow; for instance the average wind speed at VVHL is only 0.8 m/s compared to 3.8 m/s and 3.6 m/s at HCOE and LVBY respectively. We are confident that the regional wind flow is very similar at all three stations. This is also supported by the very similar wind direction dependence of the particle volume (ToV) in Fig. 7. In the moment we are working on an analysis of longer parallel measurements from VVHL and HCOE. For this we will analyse data from a meteorological station in Sweden to clarify differences

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in the regional meteorology.

Page 5520 Line 15-28. We rephrased the text.

Page 5522 Line 2-3. Both NO and NO_x data are available. We use here the NO_x data to avoid the influence of the NO - NO₂ conversion that depends on the amount of available ozone. NO_x can be regarded as inert at the urban scale and is affected by emissions and dilution in a similar way as particle concentrations. NO is not inert and the NO concentrations depend on the ozone levels.

Page 5524 Line 19. Deleted

Page 5525 Line 27-28. Sentence moved to experimental.

Page 5526 Line 13. ToN stands always for the total number in the measured size interval 10-700nm. At street and urban locations this number is dominated by the ultrafine fraction (size <100nm). The text has been rephrased and made consistent.

Page 5527 Line 15. The lowest observed concentrations (night hours) are found in the range of 5-10ppb for NO_x and 3000-6000 # cm⁻³ for ToN (Fig.10). The intercept in the regression lines indicates that there is a regional background for ToN of 2000-3000 # cm⁻³ that is present even if one could reduce the NO_x concentrations to zero by switching off the NO_x sources.

The revised manuscript will be submitted soon to the ACP Editors.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 5513, 2003.

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