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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Carbonaceous aerosols at urban influenced sites in Norway" *by* K. E. Yttri et al.

Anonymous Referee #1

Received and published: 9 January 2009

Review of the manuscript acpd-2008-0398, titled 8220;Carbonaceous aerosols at urban influenced sites in Norway8221;.

The work by Yttri et al. presents the concentrations of elemental carbon (EC), organic carbon (OC), water-insoluble organic carbon (WINSOC) and water-soluble organic carbon (WSOC) in Southern Norway. Furthermore, the authors estimate the impact of residential wood burning to ambient particulate organic matter in three environments. The results and findings of this study bring some light in current knowledge on carbonaceous aerosols in Scandinavia. Thus, the reviewer can recommend the paper for publication in ACP after a careful revision. The general scientific evaluation of the manuscript is below and it is followed by the general and specific comments as well as technical corrections.

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Interactive Discussion
Discussion Paper

1) Does the paper address relevant scientific questions within the scope of ACP? Yes.

2) Does the paper present novel concepts, ideas, tools, or data? Yes - novel data.

3) Are substantial conclusions reached? Yes.

4) Are the scientific methods and assumptions valid and clearly outlined? Mostly yes.

5) Are the results sufficient to support the interpretations and conclusions? Mostly yes.

6) Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Partly not - see specific comments.

7) Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Partly not - see specific comments.

8) Does the title clearly reflect the contents of the paper? The title should be rephrased in more fluent English.

9) Does the abstract provide a concise and complete summary? Yes.

10) Is the overall presentation well structured and clear? Yes.

11) Is the language fluent and precise? English language should be revised.

12) Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes.

13) Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Some of the paragraphs should be condensed.

14) Are the number and quality of references appropriate? Mostly yes - see also point 7 above.

15) Is the amount and quality of supplementary material appropriate? Yes (there is no supplementary material).

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General comments

1. The particle samples of this study have been collected in series at three sampling sites (curbside/Oslo: Sept 9 to Oct 3, 2002; urban background/Oslo: Nov 21 to Dec 14, 2001; suburban/Elverum: Jan 30 to Mar 15, 2002 and Mar 22 to June 28, 2002). This rise up a few questions: How long was the gap between sampling and analysis? May the chemical composition of PM sample have changed during the long storage?

2. One objective of the study is "to address the spatial and seasonal variation of the carbonaceous sub-fractions". How is it possible to investigate the spatial variation on a basis of this dataset, since the sampling campaigns have been carried out sequentially, not simultaneously in different sampling sites? In addition, the seasonal variation can only be investigated at the suburban site (Elverum). These things should be made clear in the paper. How well do the selected sampling periods represent the actual season (winter Jan 30 to Mar 15, summer Mar 22 to June 28)? See also early fall and late fall (p. 19498, r 2).

Specific comments (p and r indicates the page number and row of the ACPD paper)

P 19490, r 8: One reference should be added in urban studies carried out in Scandinavia: Sillanpää M. et al. (2005) Organic, elemental and inorganic carbon in particulate matter of six urban environments in Europe. Atmos. Chem. Phys. 5, 28698211;2879, 2005.

P 19491, r 11-15: Unfortunately, the reviewer is not familiar with the inlets used in this study and he had no access to the report made by Marsteen and Schaug (2007). For the interpretation of the results, it is interesting to know how much the PM10 concentrations based on NILU-PM10 and GENT- PM10 inlets deviate from that of the reference method (defined in CEN 12341). Regression lines and correlation coefficients from the report are sufficient data here.

P 19491, r 21-22: The NILU-SFU dichotomous sampler collects the coarse particles

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(PM2.5-10) on the "initial filter" and the fine particles (PM2.5) on the "second filter". If the reviewer understood correctly, the fine particles go through the "initial filter", which cause the upper cutoff size of the fine particles. If this is the case, the cutoff size must be sensitive for the loading of initial filter. Could the filter loading explain partly the surprising finding described in section 3.2 (page 19496, rows 23-29)?

P 19491-2, section 2.2.1: The number of the samples collected during each sampling campaign should be given either in text or in one of Tables. Were the samples collected also during weekends? (According to Figure 2, 2 to 4 samplings were carried out in a week.)

P 19491-2, section 2.2.1: Since the sampling methods vary to some extent between both the sampling campaigns and different analysis, the uncertainties of presented results should be estimated in the paper.

P 19492, r 1: The "QBT approach" should be described in more detail. Teflon filters were hardly analyzed with the TOT.

P 19492, section 2.2.3: What was the upper cutoff size in samplings for potassium analysis?

P 19498-19501, section 3.3.2: The authors are recommended to compare their results to those published recently by Saarikoski et al. (2008) Sources of organic carbon in fine particulate matter in northern European urban air. Atmos. Chem. Phys., 8, 6281-6295, 2008

P 19503-19504, section 3.4: The authors are recommended to compare their results to those published recently by Timonen et al. (2008) Size distributions, sources and source areas of water-soluble organic carbon in urban background air. Atmos. Chem. Phys., 8, 5635-5647, 2008

P 19516, Table 3: How have the particulate WINSOC and WSOC been determined? Are they intentionally labelled "particulate" indicating the positive-artefact-corrected re-

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sults? However, it is assumed that the WINSOC and WSOC have not been corrected for positive sampling artefact, and therefore "particulate" and subscript "P" should be removed from these two OC fractions.

P 19518 and P 19524: Are Table 5 and Figure 4 necessary for the paper?

Technical corrections (P and r indicates the page and row number of the ACPD paper)

P 19489, r 5-7: The sentence is unclear. Check and revise it.

P 19489, r 9: "negative" should be "adverse".

P 19489, r 11: "predicted" should be "assumed".

P 19489, r 13-15: "Along with black carbon ... the carbonaceous aerosol ..." rephrase the sentence.

P 19490, r 19: "the spatial and seasonal variation" see the general comment 1 and revise accordingly.

P 19492, r 27: "semi volatile" should be "volatile and semivolatile"

P 19496, r 9: Start new paragraph from "A pronounced seasonal variation...".

P 19496, r 22: "semi volatile" should be "semivolatile"

P 19497, r 1: "during favorable" could be for example "under certain"

P 19497, r 15-16: Rephrase the sentence "The aerosol content..."

P 19497, r 18: Rephrase "here we find".

P 19499, r 5: "wood" should be written as a subscript (compare row 1 above)

P 19499, r 12-13: Rephrase "the change in concentrations level says little about any change in emissions"

P 19499, r 23: Rephrase "Results for daily mean temperature, not shown, are similar"

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P 19499, r 26: Rephrase "... for the case of Potassium against Tmin for PM2.5. Even here ..."

P 19499, r 24 and P 19500, r 2: "both size fractions" should be "both PM size fractions"

P 19500, r 1 and P 19500, r 11: Replace "good"

P 19500, r 10: Rephrase "... implying that the changes in levoglucosan alone are more than sufficient to explain the variations in TCp."

P 19500, r 22-23: "over 99

P 19501, r 25: Rephrase "caution should be used"

P 19501, r 27, P 19503, r 24 and P 19505, r 3: Replace "Still"

P 19502, r 6: "was" should be "were"

P 19502, r 12: revise "which both"

P 19514, P 19516: Modify Table 1 and 3 so that they are more legible.

P 19518: Give the values of slope and intercept in two significant numbers.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 19487, 2008.