Atmos. Chem. Phys. Discuss., 11, C13222–C13224, 2011
www.atmos-chem-phys-discuss.net/11/C13222/2011/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aerosol chemical composition at Cabauw, the Netherlands as observed in two intensive periods in May 2008 and March 2009" *by* A. A. Mensah et al.

Anonymous Referee #2

Received and published: 15 December 2011

This manuscript focuses on presenting AMS data obtained during two different time periods (May 2008,March 2009) in Cabauw Netherlands. Speciated mass concentration time trends are shown and comparisons with SMPS measurements are used to derive a dependence of the AMS CE on nitrate content. The AMS mass concentrations measured by the AMS are also compared to a MARGA instrument as well as a thermal desorption proton transfer reaction mass spectrometer (TD-PTR-MS).

While the measurements are of interest, in principle, I do not think this manuscript can be published in its current state. The analysis presented in this manuscript is weak and does not provide enough new information to justify publication on its own. The

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

information in this manuscript (the mass concentrations and chemical composition information) could be included as part of a larger overview paper, but to be published on its own it requires more detailed analysis. With additional major revisions, and new discussion and analysis, however, this work could be publishable.

Suggested Major Revisions include

1) Currently, a key weakness of this manuscript is that it does not go beyond the analysis of total organic AMS data to include organic PMF analysis or at least at a minimum, a mass spectral organic tracer analysis (m/z 57, m/z 44, etc..). This is now a routine procedure for AMS analysis, and it would provide key information and context to help understand the differences in the organic aerosol between the two campaigns.

2) More context and comparison of why the aerosol composition between the two campaigns differ from each other (more details on differences in source influence, comparisons with tracers etc.). Context would also be provided by comparisons with any previous measurements in the area as well. Brief mention is made about the different meterological periods observed during the two campaigns, but not enough information is available to really conclude anything about how/why composition really varies. The diurnal cycles which are reported do not contain enough useful information to really tease apart any useful details.

3) A detailed report of the variation in CE with nitrate for different ambient measurements has been reported by Middlebrook et al. (A.M. Middlebrook, R. Bahreini, J.L. Jimenez, and M.R. Canagaratna. Evaluation of Composition-Dependent Collection Efficiencies for the Aerodyne Aerosol Mass Spectrometer using Field Data. Aerosol Science and Technology, 46, 258–271, 2012). This work should be referenced and the CE formulation proposed here should be compared with what is reported in that work. Is the NO3 fraction used in this formulation equal to NO3/ total AMS mass or NO3/ inorganic AMS Mass.

4) The smoothing of the size distributions reported in figure 5 seems too much and

ACPD
11, C13222–C13224, 2011

removes all the information necessary to understand the level of noise in this data. Why is the data smoothed so much? I recommend simply showing the average of the data without such extensive smoothing.

5) I think the comparisons between the AMS and TD-PTR-MS measurements are the most interesting portion of this paper and they could be discussed in more detail. Why, for example, does the relative agreement between the org from AMS and TD-PTR-MS differ between the first and second part of figure 8? Does this change in relative agreement correlate with change of aerosol organic chemical composition?

Other comments

p. 27676, line 5-10: Is there a correlation between the excess ammonium that is observed and either chloride or oxidized organic species?

Figure 2: It would be useful to report the average loading for the two time periods as well.

The authors should give a brief description of what is known about the quantification capabilities of the MARGA. What scaling factors are needed and what is the uncertainty in MARGA numbers?

Figure 5, it would be useful to see what the fractional contribution of the different species was as a function of size. It is interesting to note that there is considerable nitrate in the larger size distributions. Is all this nitrate ammonium nitrate? It could be useful also to see how the m/z 30 and m/z 46 that are used to obtain nitrate mass concentrations vary with respect to each other as a function of size.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 27661, 2011.

ACPD

11, C13222–C13224, 2011