Atmos. Chem. Phys. Discuss., 6, S3897–S3900, 2006
www.atmos-chem-phys-discuss.net/6/S3897/2006/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "The density of humic acids and humic like substances (HULIS) from fresh and aged wood burning and pollution aerosol particles" *by* E. Dinar et al.

E. Dinar et al.

Received and published: 18 October 2006

Specific comments:

Page 7836, line 2: However the density and shape of the particles affect their lifecycle and transport, the size of the particles has more important effect on these processes.

Response: This is now stated in the paper. We included "size" in the abstract and weakened the expression "dominate all" to "affect".

Page 7845, line 19: Please give more detailed information how did you determine the uncertainty of the measurements.

Response: see response #4 in the reply to Referee #1.

Page 7846, line 3: Please include the reference for the calculation of the aromaticity and average molecular weight into the text. Could you give an estimate on the uncertainty of the aromaticity and molecular weight calculations, which based on absorption measurements? Using the equations reported in Dinar et al. (2006b), the higher molecular weight will result higher aromaticity. Is it not possible that compounds with equal molecular weight contain different amount of aromatic rings?

Response: The separation method, its application and limitations are thoroughly discussed in two previous papers ((Dinar, et al., 2006a; Dinar, et al., 2006b) hence we do not find it necessary to repeat these discussions in this paper. It is true that the separation procedure is not at the nominal cutoff, but is a convolution of various properties such as charges, hydrophobicity etc. However, we have confidence in the separation procedure and the UV correlations for the fulvic acids, as the calculation for the CCN activity, which we have performed before, scale nicely with the estimated molecular weights. We added a section (2.2) that directs the reader to the relevant publication. See reply to Referee #1.

Table 2: If the fractions F1, F2, etc. represent the same fractions as in the Dinar et al. (2006b) paper, what is the reason of the differences between the calculated and expected (based on the nominal molecular weight cut-offs of the membranes) number averaged molecular weight? Is it not possible that other fractionation effects occur during the filtration procedure?

Response: It is of course possible, as discussed in the literature and in our previous papers. We did not find it necessary to include this discussion in again in this paper, and we now reference it. The CCN calculations performed in Dinar et al (ACP, 2006) show that there is a separation based on average molecular weight. Obviously each fraction contains a distribution of molecular weight and the UV correlation only gives an estimate of the average number. However, please note that the results are in the range of previous studies and are also consistent with CCN activation measurements and modeling.

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Comments to the figures: I suggest replacing the lines, which guide the eye to regression lines.

Response: We prefer not to make regression analysis to the correlations which are not necessary linear, since there is no direct physical or chemical model that explains these correlations.

Technical corrections: The references should be revised: Hoffer et al (2005) paper is published on the ACP website, and the authors do not give the reported confidence interval for their density measurement.

Response: This is now fixed.

There are some typist's error in the manuscript: Page 7836, line 23: The abbreviation ˇ DSubS" and ˇ DSS" are introduced but not used in the manuscript.

Response: We deleted the abbreviations.

Page 7846, line 10: The reference to the C/O measurements and acidity measurements is missing.

Response: It was calculated from the elemental analysis. The results are given in Table 3 with the reference.

Page 7848, line 9: practices should be particles.

Response: The typo is corrected.

Page 7860: average molecular weight Mn should be number averaged molecular weight, MN.

Response: The error was corrected.

Figure 1: Please use larger fonts - they are difficult to read on a printout.

Response: Done

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Figure 2: The unit (V) of the DMA voltage is missing. What is the meaning of the dynamic shape factor if its value is less than 1?

Response: We added the unit. We have changed the axis to 1/S. The negative values are a result of the experimental statistic error of ś 2%. We have added a sentence in the legend explaining this issue.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 7835, 2006.