

Interactive comment on “Investigation of molar volume and surfactant characteristics of water-soluble organic compounds in biomass burning aerosol” by A. Asa-Awuku et al.

Anonymous Referee #2

Received and published: 4 May 2007

General Comments:

This paper uses a new technique known as Koehler Theory Analysis (KTA) to determine the average molecular weight for the hydrophilic and hydrophobic components of a real biomass burning aerosol and to suggest a ratio of hydrophobic to hydrophilic compounds to be 1:3. The CCN activity of water soluble organics fractionated into hydrophilic and hydrophobic components with analysis of the effects of inorganic salt was also performed. The paper demonstrates that KTA may be applied to complex aerosols which holds potential to be of great importance in constraining GCM parameters regarding the aerosol indirect effect. Sensitivity and error analysis on the system

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are thorough and useful. This is an important paper demonstrating the effectiveness of KTA and offering insight into the nature of biomass burning aerosols.

Specific Comments:

It would be useful to know more about the collection of the biomass burning aerosol: How far from the burning was the sampling made? How long was the collection and what was the volumetric flow rate collected? What was the total mass collected on the filters and would the authors suggest longer collection for future research studies? Is there any additional data on the collected aerosol such as size distribution or particle concentration?

While the study did detailed analysis of error for many parts, the reviewer believes it is necessary for a study dependent on such small quantities to report on some control runs. At a minimum, the authors should have performed the full study on a clean filter with no sample, running thru each step and reporting on the contaminant background which can not be removed from the analysis. It would also be of great use to generate an aerosol with a known mix of 2 hydrophilic/hydrophobic compounds of known composition and pure CCN activity to compare final results and again assess inherent contamination errors in the system.

P3597, line 1: What was the RH exiting the two dryers and do the authors know that the particles were dry versus metastable solutions? What errors would this create in the analysis if there were residual water on the aerosols?

Technical Corrections:

P3590, line 14: remove the comma after “found that.”?

P3590, line 24: use IPCC, 2007 if possible.

P3593, line 18: how warm was the bath and how much water was used?

P3594, line 6: are 3-4 carbon dicarboxylic acids really considered hydrophobic? This

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does not seem right.

P3595, line 9: "In ALL samples" would read better if correct.

P3596, line 7 and P3601, line 14: how dilute is 'infinite' and how does an 'infinitely dilute' solution differ from pure water?

P3600, line 2: remove the word "not" as this reads the same as part a)

P3608, line 4-5: this seems unclear. Please rephrase or elaborate.

P3616: Table 5 is mentioned before Table 4, please switch these tables to fall inline with the text.

P3621: Was Table 9 ever referred to in the text? Please do so.

P3623: Figure 2 does not photocopy well - consider removing unnecessary shading and patterns from the instruments and titles.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 3589, 2007.

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