Atmos. Chem. Phys. Discuss., 9, C3941–C3943, 2009
www.atmos-chem-phys-discuss.net/9/C3941/2009/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Cloud condensation nuclei measurements in the eastern Mediterranean marine boundary layer: CCN closure and droplet growth kinetics" *by* A. Bougiatioti et al.

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Received and published: 18 August 2009

Response to comments of U.Pöschl

We would like to thank Dr. Pöschl for his positive feedback and insightful comments. Our responses follow.

Specific comments

1)Water vapour supersaturation and calibration of the CCN counter

The corrections for the particle shape for the calibration with NaCl of the CCN counter were made, by multiplying the Dp50 with the 1.08 factor. The resulting supersaturations

were 0.21, 0.38, 0.51, 0.66 and 0.73%. The closure was recalculated and most of the overprediction bias at higher supersaturations was accounted for (from 7 to 0.6%). The scatter however still remains at $\sim$8%.

1.1)Could you specify the achieved precision/variability?

The relative variability between calibrations at the lower supersaturations did not exceed 1%; for the highest supersaturation it did not exceed 3%.

In Fig.2b error bars are shown but their meaning is not specified.

The error bars stand for the variability between calibrations of the calculated supersaturation of the instrument. This is now specified in the manuscript.

1.2) Please specify your assumptions about particle shape, and please refer to earlier studies addressing and characterizing this effect and the resulting uncertainties.

This is addressed.

1.3) I would suggest to calculate/estimate the overall uncertainty of water vapour supersaturation.

Fig. 2a shows examples of activation curves obtained throughout the campaign (for a flow rate of 0.5 lpm and ΔT=15K); application of Köher theory to the observed D_p50 yields an instrument supersaturation of 0.73$\pm$0.03% (the supersaturation uncertainty is obtained from the observed range in D_p50 in the calibrations). Figure 2b shows supersaturation versus the instrument operating temperature difference, ΔT (Deleted section in former version of manuscript). The uncertainty is quoted in the text as well.

2) Characterisation of the CCN activity of the investigated aerosols:

2.1)It might be useful to calculate and show time series and/or whisker plot and/or tables showing the average values and temporal variability of one of the several parameters that are available and frequently used for efficient comparison and modeling of different CCN measurement results: equivalent soluble fraction, kappa or rho_ion.

Good point! The “kappa” hygroscopicity parameter is now calculated for the timeseries, and presented in Figure 7.

2.2) I would suggest to compare the results of this study directly to those of other studies performed with the same or different types of instrumentation and with the same or different ways of predicting CCN concentrations.

Good point. The studies cited have been expanded (including those referenced), and the results of this study is placed within their context.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 10303, 2009.