

Interactive comment on “Aerosol hygroscopicity and CCN activation kinetics in a boreal forest environment during the 2007 EUCAARI campaign” by K. M. Cerully et al.

D. Rose

d.rose@mpic.de

Received and published: 8 July 2011

The discussion paper by Cerully et al. presents a very interesting data set of cloud condensation nuclei (CCN) measurements in the boreal forest. I would like to contribute a couple of comments and questions concerning the experimental setup and procedures (Sect. 2.2, p 15037):

1.) You write that the supersaturation in the CCNC is held constant over a period of 3 min. Every 36 s the particle size is changed (first 20 s discarded, 16 s data recording), so that you are able to select 5 different particle sizes. When do you allow the supersaturation in the CCNC to get settled? From experience in lab and field experiments, I

C6099

know that the supersaturation in the CCNC usually requires a certain settling time until it reaches the set value (Rose et al., 2008: “Shifting from one supersaturation level to another requires approximately 0.5–3.5 min, depending on the size of the step . . .”) and other studies have come to the same conclusion (e.g., Moore et al., 2010). Since you increase the supersaturation in steps of 0.2 % I would expect a settling time of ~2 min. If you start your measurements immediately after the supersaturation change, how can you be sure that the supersaturation in the instrument is as high as you assume?

2.) Why do you need to discard data measured at 20 nm and 100 nm? I understand that for 20 nm particles you might not reach full activation with your highest supersaturation, but for 100 nm particles I would expect that you can observe a full spectrum from zero to full activation.

3.) Please clarify at which flow rates you operated your instruments. If you run both the DMA and the CCNC with 1 L min⁻¹ aerosol flow, there seems no flow left for the CPC.

References:

Moore, R. H., Nenes, A., and Medina, J.: Scanning mobility CCN analysis: A method for fast measurements of size-resolved CCN distributions and activation kinetics, *Aerosol Sci. Tech.*, 44, 861–871, 2010.

Rose, D., Gunthe, S. S., Mikhailov, E., Frank, G. P., Dusek, U., Andreae, M. O., and Pöschl, U.: Calibration and measurement uncertainties of a continuous-flow cloud condensation nuclei counter (DMT-CCNC): CCN activation of ammonium sulfate and sodium chloride aerosol particles in theory and experiment, *Atmos. Chem. Phys.*, 8, 1153–1179, doi:10.5194/acp-8-1153-2008, 2008.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 15029, 2011.