

Interactive comment on “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” by D. Rose et al.

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We thank Simon Clegg and Anthony Wexler for the helpful comments, which are highly appreciated and will be taken into account upon revision of the manuscript as detailed below.

If the uncertainty of water activity calculations with the Aerosol Inorganics Model (AIM, <http://www.aim.env.uea.ac.uk/aim/aim.html>; Clegg et al., 1998 a,b) for dilute aqueous solutions of ammonium sulfate and sodium chloride is not higher than 10^{-5} (ACPD,

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7, S4180–S4183, 2007), then the AIM can indeed be regarded and should be used as an accurate reference for the parameterization of water activity in Köhler model calculations of the CCN activation of these substances.

Test calculations with an AIM-based Köhler model (model AP3 in the revised manuscript) showed that changes of water activity by 10^{-5} correspond to relative changes of critical water vapor supersaturation on the order of only 0.06–0.2% for dry solute particle mass equivalent diameters of 20 to 200 nm. This is clearly less than the statistical measurement uncertainty of the investigated cloud condensation nuclei counter under stable operating conditions (1–2%).

This information will be included, and the AIM-based Köhler model will be used as a reference in the revised manuscript. Many thanks also for providing the Fortran model code, with which we have obtained the same results as with the online AIM.

References:

Clegg, S. L., Brimblecombe, P., and Wexler, A. S.: A thermodynamic model of the system $\text{H}^+ - \text{NH}_4^+ - \text{SO}_4^{2-} - \text{NO}_3^- - \text{H}_2\text{O}$ at tropospheric temperatures, *J. Phys. Chem. A*, 102, 2137–2154, 1998a.

Clegg, S. L., Brimblecombe, P., and Wexler, A. S.: A thermodynamic model of the system $\text{H}^+ - \text{NH}_4^+ - \text{Na}^+ - \text{SO}_4^{2-} - \text{NO}_3^- - \text{Cl}^- - \text{H}_2\text{O}$ at 298.15 K, *J. Phys. Chem. A*, 102, 2155–2171, 1998b.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 7, 8193, 2007.

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