Atmos. Chem. Phys. Discuss., 7, S7819–S7820, 2007
www.atmos-chem-phys-discuss.net/7/S7819/2007/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Cloud condensation nuclei activity at Jeju Island, Korea in spring 2005" *by* M. Kuwata et al.

Anonymous Referee #3

Received and published: 20 December 2007

The paper presents a very interesting comparison of measured CCN behaviour and a detailed discussion of the ability to achieve closure using Kohler theory. The presentation of kohler theory, the assumptions employed and implications thereof are presented in a good amount of detail. Rather than making bold assumptions regarding the nature of the organic fraction and thus, its treatment in theoretical calculations, the authors provide us with extreme cases from which to draw appropriate conclusions. The overall conclusions suggest that chemical composition was more important for the number of activated CN at lower super-saturations and that aerosol number size distribution was important for higher super-saturations.

I think the level of detail provided in the paper is such that no major changes are required prior to publication. I have only one general and one minor comment to make.

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Section 3 experiment.

In the first section you mention using the ideal solution approximation in calculating Dcrit of atmospheric particles. This, in some respects, is justified for ambient particles, particularly when one cannot elucidate on the exact chemical composition. Im a little concerned about using the ideal approximation for calibration purposes to ensure consistency. You have indeed mentioned the use of a robust osmotic coefficient calculation to provide a measure of uncertainty in the estimation of SS in the CCN counter. However, wouldnt it be more scientifically sound to use this value, compare with measured CCN behaviour for ammonium sulphate particles and then obtain an estimate of the uncertainty?. Besides, the mixed systems you study in the atmosphere are likely to have different non-ideal characteristics than pure ammonium sulphate. By comparing ambient measurements with an idealised kohler theory framework, you can still infer important results as to the applicability of neglecting a full thermodynamic treatment and this would not effect the scientific quality of your work. I would always stress the need for using the most accurate theoretical frameworks wherever possible.

Section 4.

Page 15813 – line 4- change corresponds to correspond

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 15805, 2007.

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