Atmospheric Chemistry and Physics Discussions

Interactive Comment

Interactive comment on "Technical Note: Analytical formulae for the critical supersaturations and droplet diameters of CCN containing insoluble material" *by* H. Kokkola et al.

A. Nenes (Editor)

nenes@eas.gatech.edu

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Comments

The authors derive an analytical solution for the critical diameter of Köhler particles including an insoluble core. This is a useful result for theoretical studies and aerosol-cloud interaction parameterizations and is well within the scope of ACP. I recommend publication, provided that the following comments are addressed:

1. The authors state in the abstract that formulas for critical supersaturation and diameter is provided, but only an expression for critical diameter is given. True, it is just a matter of substituting Equation (5) into (1), but it would be very nice to have an explicit

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expression for critical supersaturation.

2. As the soluble fraction decreases, does the critical supersaturation approach the Kelvin limit $\frac{A}{D_{p,o}}$?

3. Related to the point above, one of the authors have recently published a paper in ACP on adsorption activation (Sorjamaa and Laaksonen, 2007) which describes the CCN behavior of insoluble material that adsorbs water. At which point should the current work be used vs. adsorption activation?

4. Khvorostyanov and Curry (2007) have also discussed the issue of insoluble aerosol and extensions of classical Köhler theory to account for it. Can the authors comment on how the two studies complement each other?

5. line 5, page 17969: write $B/D_p^3 - D_{p,o}^3$ as $\frac{B}{D_p^3 - D_{p,o}^3}$

References

Sorjamaa R, Laaksonen A, The effect of H_2O adsorption on cloud-drop activation of insoluble particles: a theoretical framework, ACP, 6175-6180, 2007

Khvorostyanov VI and Curry JA, Refinements to the Kohler's theory of aerosol equilibrium radii, size spectra, and droplet activation: Effects of humidity and insoluble fraction, JGR, 112, 2007

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 17967, 2007.