Atmos. Chem. Phys. Discuss., 11, C13667–C13668, 2011
www.atmos-chem-phys-discuss.net/11/C13667/2011/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "A closure study of cloud condensation nuclei in the North China Plain using droplet kinetic condensational growth model" *by* F. Yang et al.

Anonymous Referee #2

Received and published: 29 December 2011

General Comment This work performs a CCN closure study using observations with a CCN counter over the North China Plain, a kinetic growth model that simulates the CCN counter, and an equilibrium model. Effects from kinetics, solubility, mixing state, accommodation coefficients, and counter residence time etc are examined. The paper contains useful and interesting results, but can be further improved. I recommend its publication after addressing the following points.

1. A major deficiency is that the equations provided are not sufficient for a complete understanding of the treatment of mixing state. Key equations are needed that are associated with internal mixing (ammonium sulfate shell plus insoluble core) and the

external mixing model. Also, what is so special about the mass fraction = 0.6? Table 1 indicates that further decrease of the solubility may lead to the conclusion of internal mixing better than external mixing.

2. There are much less data points in Fig 4 compared to the Figs 1-3. Why? If some averaging is made, it needs to be described.

3. Based on the discussion, scatter or differences can arise from several factors such as kinetic effect, solubility, mixing state, and mass accommodation coefficient. How about their relative importance? A comparative study should be useful, and effects of size truncation, the counter detectable radius and residence time should be included in the relative importance study.

4. The aerosol measurements used have an upper truncation radius of 375nm; however, larger particles likely exist in nature. Neglect of larger particles in calculation will lead to underestimation of CCN, other things being equal. Examination of potential effect of this size truncation, together with the other factors, is in order.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 28969, 2011.

ACPD

11, C13667–C13668, 2011