Atmos. Chem. Phys. Discuss., 10, C3369–C3370, 2010
www.atmos-chem-phys-discuss.net/10/C3369/2010/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "The validity of the kinetic collection equation revisited – Part 2: Simulations for the hydrodynamic kernel" *by* L. Alfonso et al.

Anonymous Referee #2

Received and published: 31 May 2010

The manuscript deals with the kinetic collection equation (KCE) and the mass conservation problem of the runaway growth of single droplets. Aim of the authors is to prove numerical criteria for the validity time of the KCE. As analytical solutions for the KCE are rare and only valid for special cases, this is done by comparing the results obtained with the KCE with results obtained with Monte Carlo Simulations for warm clouds.

Rating:

Over all it is a very well written paper. The methods and results are physically sound and original. The findings of the author advance our present knowledge in this field. Solving the KCE can be still rather cumbersome. I have only a few points that need to be improved. Therefore I rate the manuscript to be accepted after minor revisions. Very well done!

Minor points:

1) Introduction: The authors should point out here in which cases/models the problem of the runaway growth of single drops occurs mainly.

2) Are the authors familiar with the findings of Straub et al. 2010, Journal of Atmospheric Sciences, 67, p. 576-588 ?

3) Estimation of the validity time p. 6227, line 10: The authors take the collision efficiencies from Hall (1980), which are basically very good for this purpose. There are one or two typos in his efficiency table, as far as I recall, leading to some sort of "wiggle" in the collision efficiencies. A correction can be found in Kerkweg, et al 2003: On the cloud processing of aerosol particles: an entraining air parcel model with two-dimensional spectral cloud microphysics and a new formulation of the collection kernel. QJRMS. 129, Part A, 587, 1-18

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 6219, 2010.