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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.

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Reply to reviewer # 2:

First, we would like to thank the anonymous referee for his/her comments that will improve the quality of our paper. Our revised version will include several of his/her suggestions.

Minor points:

1) It is expected to obtain a runaway droplet for N0»1 (the initial number of particles is large) and the kernel K(x,y) increases sufficiently rapid with x and y. When it occurs, there is a significant mass gap between the largest and second largest occupied bin. In astrophysical applications was demonstrated that the runaway growth occurs if the two

body coalescence kernel rises faster than linearly in the mass of the heavier particle. This is, for example the case of the product kernel K(x,y)=C$x \times y$, and in general the case of the kernels K(x,y)$\sim$xˆα, where x is the mass of the heavier particle α>1 (superlinear kernels: See Malyshkin and Goldman, 2000). According to Jeon (1999), for kernels of the form K(x,y)=(xy)ˆα, with α>1 gelation (runaway growth) begins immediately. A discussion of this point will be included in the introduction of the revised version, as suggested by the reviewer.

2) In our paper the collision efficiencies were taken from Hall (1980), as stated by the reviewer they are good for the purpose of our work. According to Kerkweg et al. (2003) there is "the rather unrealistic slope for collector drops of radius 70 μm at the radius ratio of 0.9". The runaway droplets (larger drops) obtained in the simulations are in the range from 25 to 40 μm. More recent studies that develop new parameterizations for calculating collision efficiencies (Straub et al, 2010), specially the modifications to Hall collection efficiencies proposed in Kerweg et al. (2003) will be considered in follow up studies. In the revised version the corresponding references to these studies will be included.

References:

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