Anonymous referee # 2

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

General comments:

1) **About the critical time:**

In general, for concentrations larger than 30-40 cm^{-3}, smaller critical times must be obtained. For kernels proportional to the product of the masses, Malyshkin and Goldman (2000) demonstrated that the critical time decreases as a power of the logarithm of the initial number of particles $\tau_{critical} \sim 1/\log(N_0)$. For kernels relevant to cloud physics, we have a similar situation (a decrease in the time of occurrence of the phase transition as the number of particles in the initial distribution increases), although in this case, an analytical expression is not available such as that found by Malyshkin and Goldman (2000).

For the hydrodynamic kernel considering 40 monomers in the initial distribution (20 droplets of 17 μm in radius, and 10 droplets of 21.4 μm), the critical time was found about 1310s. Therefore, in the analyzed case the number of drops in the initial bidisperse spectrum was set equal to 30 drops. This suggests that for droplet concentrations in the range of 50-100 drops per cm^3 the sol-gel transition time will be much lower. For example, the critical time was calculated for the hydrodynamic kernel considering 50 droplets (a total of 70 monomers) in the initial distribution (30 droplets of 17 μm in radius, and 20 droplets of 21.4 μm). The critical time was estimated from Monte Carlo simulations by calculating the maximum of the standard deviation for the largest droplet mass and was found equal to 750 sec.

This problem was analyzed in detail in Alfonso et al. 2013 by using more realistic initial conditions. For example, for a turbulent cloud considering a cloud volume of 1 cm^3 and an initial bi-dispersed droplet distribution with 150 droplets of 10 μm in radius, and another 150 droplets of 12.6 μm in radius, the critical time was found equal to 1000 sec., confirming that for bidisperse initial distributions with concentrations greater than 40 cm^{-3} critical times would be obtained in the order of 1000 s.

2) On the Smoluchowski equation:

As discussed in the paper (see Discussion and conclusions):

1) The KCE it is not expected to be accurate when the initial numbers of particles (N_0) is small. Then, in systems of small populations the results of the kinetic deterministic equations approach may differ substantially from the stochastic means at the large end of the droplet size distribution.
2) Additionally, the KCE can fail even for $N_0 \gg 1$ if $K(i,j)$ increases sufficiently rapidly with i and j. Then, there is a transition from a continuous droplet distribution to a continuous distribution *plus* a raindrop embryo (sol-gel transition). As a results, the KCE fails to conserve the total mass of the system.

Therefore, even for larger droplet concentrations the KCE may fail. As suggested by the referee, in the revised version we will make more emphasis on this problem.

Referee Comments:

1. Section 2 presents the numerical method used, which was already described in a previous paper. It could be removed from this manuscript, together with Figs. 1 and 2.

Yes, as the referee pointed out, the method was already described in more detailed in a previous paper. We included this section, with a simulation (with only 5 particles) for the purpose of demonstrating the method. As the system in this case has only 6 possible configurations, it is much easier to explain the details of the algorithm.

2. "Standard deviation of the mass of the largest droplet" defined by Eq. (11) is in fact standard deviation of mass divided by mean mass. It should rather be called the relative standard deviation.

The corresponding modifications will be made on the revised version.

3. Boxes with text in Fig. 3 and their respective "arrows" only blur the image. The same information is given in the caption.

The figure will be modified accordingly.

4. From my understanding, Figs. 4, 5, 8 and 9 present histograms of mass concentration of droplets within given size range (bin). Presenting them with continuous lines makes them seem like density distributions.

Actually, Figs. 4, 5, 8 and 9 present the expected values for each droplet mass (see Eq.7), that is, discrete droplet size distributions obtained from the master equation. In some of the figures, this distributions are compared with the equivalent size distributions obtained from the discrete kinetic collection equation (KCE).

5. Label on horizontal axes on Figs. 4 and 5 is "bin number", while on Figs. 8 and 9 it is "droplet radius". Is it the same thing?

Yes, it is the same thing. In Figures 8 and 9 we display the droplet radius for the corresponding bin-number.

6. Legend in Fig. 4(b) is titled "Master Equation", while one on Fig. 4(a) has no title. Do both figures present solutions of the master equation?

Yes, both figures present solutions of the master equation. The legend will be modified accordingly in order to avoid confusions.