Electronic Supplementary Material to: Relationships between Cloud Droplet Spectral Relative Dispersion and Entrainment Rate and Their Impacting Factors*

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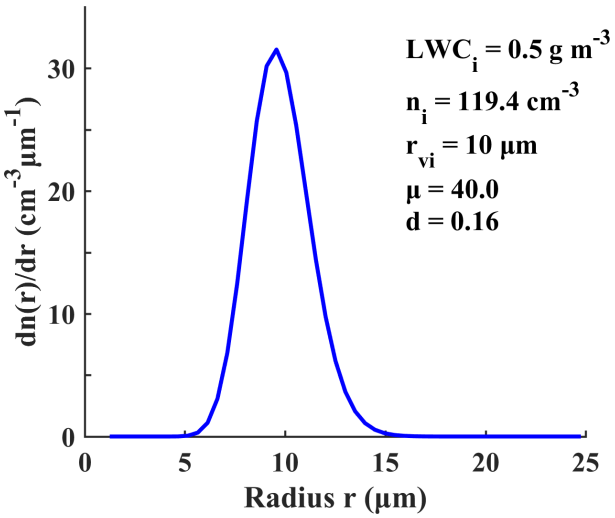

Fig. S1. The initial CDSD with initial liquid water content (LWC_i) of 0.5 g m^{-3}, initial droplet number concentration (n_i) of 119.4 cm^{-3}, initial mean volume radius (r_{vi}) of 10 µm, shape parameter (μ) of 40.0, and relative dispersion (d) of 0.16.

* The online version of this article can be found at https://doi.org/10.1007/s00376-022-1419-5.

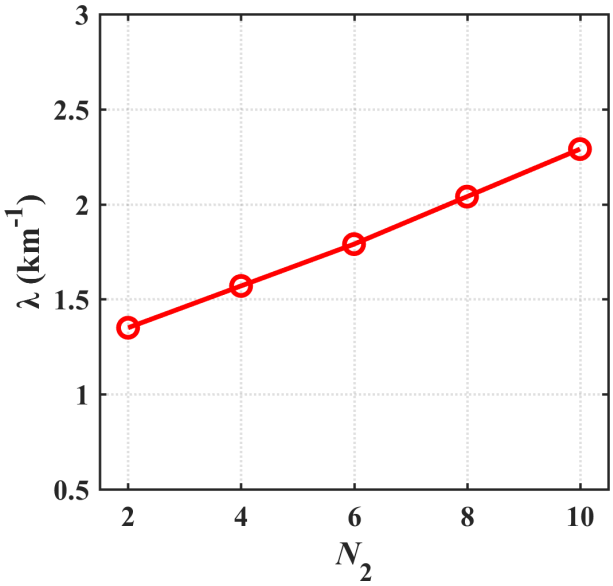

Fig. S2. The relationship of entrainment rate (λ) and entrained environmental air blob numbers of the second entrainment-mixing process (N_2).

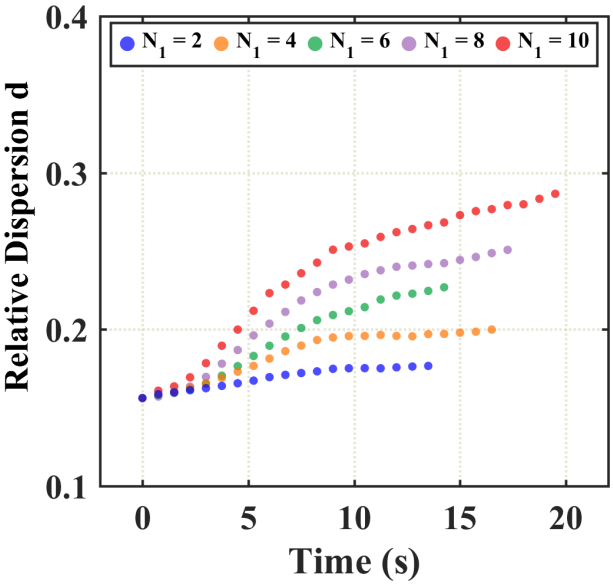

Fig. S3. Temporal evolution of cloud droplet spectral relative dispersion (d) with the entrained environmental air blob number of the first entrainment-mixing process (N_1) equal to 2, 4, 6, 8, and 10.

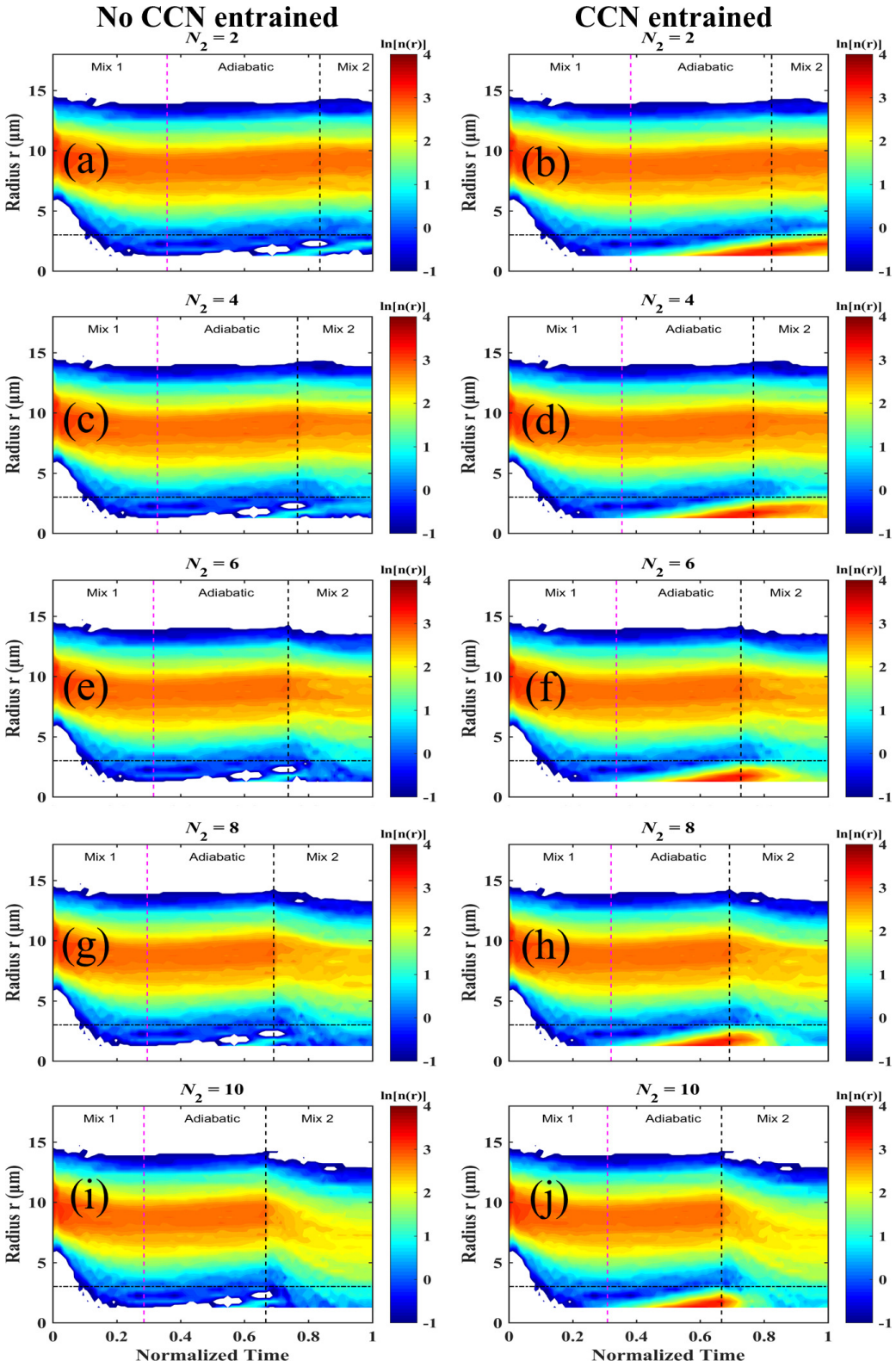

Fig. S4. Temporal evolutions of cloud droplet size distribution for entrained environmental air blob numbers of the second entrainment-mixing process (N_2) equal to 2, 4, 6, 8, and 10. Left: entrained environmental air without cloud condensation nuclei (CCN). Right: entrained environmental air with CCN. The vertical magenta and black lines represent the ending and beginning time of the first and second entrainment-mixing processes, respectively. The horizontal line represents the criterion of small droplets. The first and second entrainment-mixing processes are labeled as "Mix 1" and "Mix 2", respectively, as well as "adiabatic" for the adiabatic ascending process.

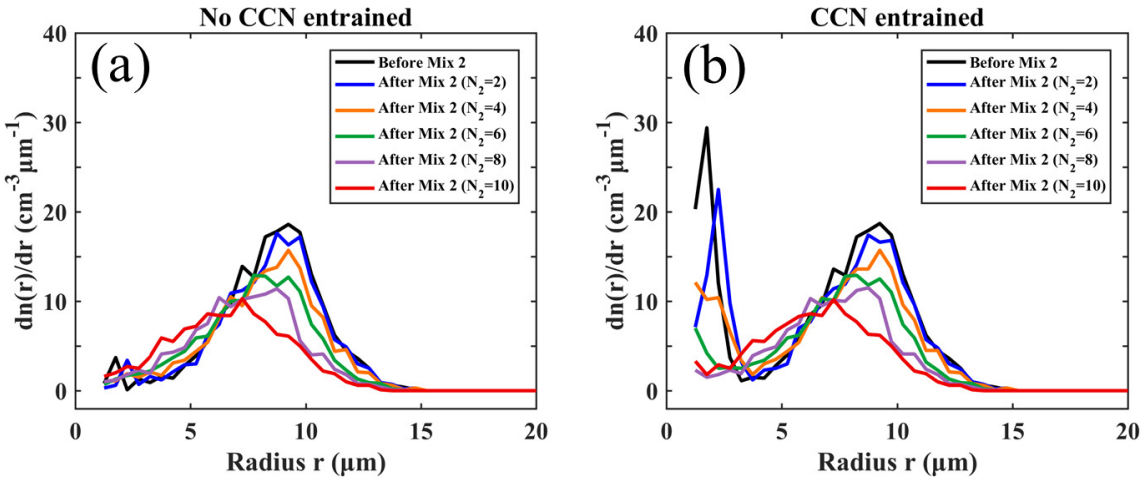

Fig. S5. The cloud droplet size distributions just before and after the second mixing processes when the entrained environmental air blob number of the second entrainment-mixing process (N_2) is equal to 2, 4, 6, 8, and 10. Left: entrained environmental air without cloud condensation nuclei (CCN). Right: entrained environmental air with CCN.

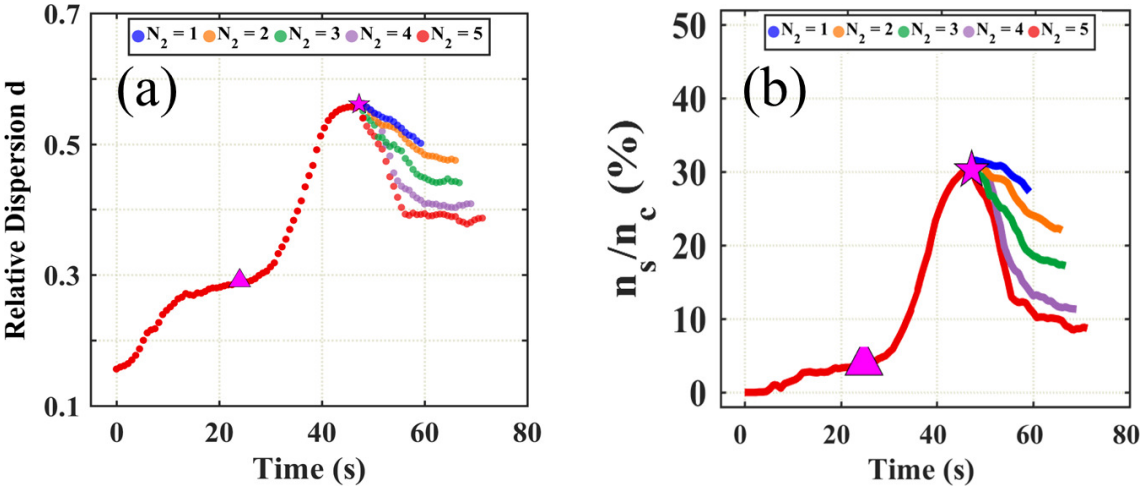

Fig. S6. Temporal evolutions of relative dispersion (a) and the ratio of (b) small droplet number concentration (n_s) to total droplet number concentration (n_c) for entrained blob size (l) equal to 1 m. The entrained environmental air blob numbers of the second entrainment-mixing process (N_2) equal 2, 4, 6, 8, and 10. The triangle and pentagram represent the ending of the first entrainment-mixing process and the beginning of the second entrainment-mixing process, respectively.