The authors explored the hypothesis that some droplets reside longer at cloud top and grow larger due to radiative cooling, leading to a broadening in droplet size distributions in stratocumulus clouds. I find it very interesting and worth publishing for ACP if the minor concerns below are properly treated.

Answer: We thank you very much for your suggestions and positive comments. Please find below our answer to the raised concerns.

Concerns

1) Further explain required for the sentence in Lines 244-246. It is not clear why Re independency can be expected for high Re.

Answer: In many flows, turbulent mixing statistics become independent of the Reynolds number when the Reynolds numbers are high enough. In this limit, mixing statistics do not significantly change by further resolving smaller scales. We have added a reference to Dimotakis(2005), where Reynolds number independency for turbulent mixing is explained in detail.

2) about Subsection 4.2: I understand that the authors distribute Lagrangian droplets at t=0, while residence-time counting started at t=6.6t*. Please specify how to set the initial (i.e., at t=0) positions of Lagrangian droplets. Are they initially uniformly distributed?

Answer: We initiate the Lagrangian droplets at random positions inside the cloud. For 10^9 droplets, the distribution seems quite homogeneous. The description of the initial position of the Lagrangian droplets has been improved. Page 4, line 22, now reads:

We initially place each Lagrangian droplet at a random position inside the cloud (defined by $\ell > 0$)

Page 7, line 33 reads:

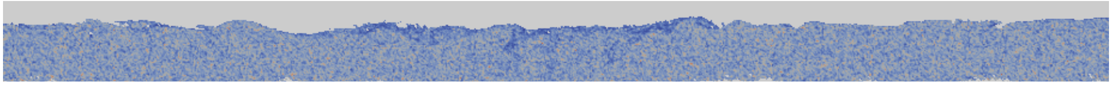
The Lagrangian droplets are initiated at the beginning of the simulation at $t=0$.

3) Correct the sentence in Line 334. The decay time actually increases for 0.6t*<t_res<0.9t* in Fig 3(b).

Answer: Fig 3(b) shows 1/t_res, which increases in the interval 0.6t*<t_res<0.9t*. Consistently, t_res decreases. We have added a short text to avoid this misunderstanding:

($1/\tau_\mathrm{res}$ increases)

4) about Fig. 4: The authors explain "Long-resident droplets can be found everywhere but they clearly prefer the downdraft regions (Lines 360-361)". But I guess that all the droplets, including convective droplets, prefer the downdraft regions, which are horizontally converging regions. Please additionally show the distribution of convective droplets (short residence times) to prove that the preference is really only for long residence droplets. By the way, are there any green colors in the figure? I cannot find any.



Answer: This figure shows a cross section of the droplet number density at cloud top (from blue to red). The number density is very homogeneous and only decreases in the regions where dry air converges, and droplets evaporate (top center of the plot). Droplet number density does not increase in the flow-convergence regions because the flow is fully incompressible and because the droplets behave as tracers. Droplets can accumulate in regions with low vorticity or high strain rate only when particle inertia is sufficiently large (Shaw 2003).

There are some green regions in the plot, but depending on your resolution you need to zoom in it to see them.

5) about Fig 5: Not really clear why t=83min data is to be compared with the observation. For example, t=30min data does not really agree with the observation. I would suggest weakening the claims "a remarkable similitude between observations and simulations (Line 389)" and "The measured DSD matches almost perfectly our measurements for droplets around the mean size (Line 484 in Conclusion)".

Answer: Following your advice, we have relaxed the first claim to "good similitude between observations and simulations". In the line 484 we refer to the last step of the simulations for which the similitude is indeed striking. We state that this similitude is probably by chance, but the similar broadening is still significant. In the new version of the manuscript we write more precisely that we refer only to the last step of the simulations (page 17, line 1):

The measured DSD matches almost perfectly our measurements for droplets around the mean size at the last time step of the simulations. The perfect agreement is to some degree by chance,

Technical corrections:
1) Line 253: remove "x1 O x2".
2) Line 354: eddy hopping, not eddy hoping

Answer: Corrected.