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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Cloud droplet diffusional growth in homogeneous isotropic turbulence: bin microphysics versus Lagrangian superdroplet simulations" *by* Wojciech W. Grabowski and Lois Thomas

Anonymous Referee #2

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Comments to the manuscript with ID number "acp-2020-1106"

General comments:

The authors of this manuscript compared the Eulerian binning method and Lagrangian superdroplet approach in simulating the condensation process of cloud droplet driven by turbulence. They concluded that the Lagrangian superdroplet approach is able to represent fluctuations better, which is consistent with previous works as discussed in this manuscript. This detailed comparison between the two numerical method could

help contribute to a better understanding of modelling the condensation process.

However, in my opinion, the so called "ill-posedness of the initially monodisperse droplet size distribution for the bin microphysics." described in this manuscript could be avoided by testing different initial droplet-size distributions. I would recommend the publication of this manuscript after the authors carefully address this problem and other few comments listed below.

Specific comments:

L.24: turbulence integral time scale; L.145: Could the authors use mathematical symbols in equations all across the manuscript (e.g. Eq.1 and 2) to improve the readability of the manuscript? L.280: Kolmogorov slope. L.412: What is the equation to calculate C_d? L.630: What is the difference between the two plots at the lower panels?

Technical corrections:

L.13: by applying L.96: based on L.102: point-by-point L.412: due to L.545: High L.575: . . .show the expected . . . L.585: macro L.613: being present. What is q_c 40/N?

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