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Interactive comment on "Direct Lagrangian tracking simulation of droplet growth in vertically developing cloud" *by* Yuichi Kunishima and Ryo Onishi

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Thank you for your positive and insightful comments, recommending the acceptance of our manuscript for ACP. We answer your questions one by one below.

Q1: The domain is almost one dimensional. The computational grid for the Navier-Stokes and transport equations is very elongated in the vertical direction. The aspect ratio is more than 12 from Table 2. The number of the grid points in the horizontal direction is only about 10, while more than 76,000 in the vertical direction. In this case, are the fluid variables properly solved? Is it necessary to solve these fluid equations? The fluids could simply be replaced by the one dimensional model.

Answer: As described in subsection 2.2.1, the flow was prescribed as Eq. (1) in the present LCS simulation for KiD warm-1 case, which was designed to minimizes feedback between dynamics and microphysics. In case the flow had been solved explicitly, we would have had to be careful about the influence of the high aspect ratios of computational grids.

Q2: In recent studies of micro physical processes, the importance of the turbulence is stressed. In the present simulation, no turbulence effects are taken into account. Could the authors comment on its effects on the results?

Answer: We believe that the in-cloud turbulence enhances droplet growth in clouds. We will discuss the enhancement quantitatively as a next step.

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Discussion paper