This manuscript presents idealized simulations of a heavy-rain convective cloud. The author uses a bin microphysics scheme along with a variety of experiments on environmental controls of the rain amount and intensity. The author shows that a more unstable temperature lapse rate leads to larger raindrops and thus larger rain intensity, while a moister subcloud layer leads to more raindrops of moderate sizes and thus larger rain amounts. The interplay of environmental parameters with well-resolved microphysics from a bin scheme is very interesting, along with the comprehensive experiments performed. The paper reads mostly well, apart from some minor formatting issues detailed below. I believe the paper will be fit for publication in ACP once they are addressed.

◦ Some more details on the model setup and the details of the microphysics scheme would be of interest to the readers. Are the experiments limited to warm-rain microphysics? What are the parameterizations chosen for the collision kernel, the breakup scheme, and the evaporation of rain?

◦ l. 103: "For the boundary-layer turbulence process, (Deardorff, 1980) scheme,": For the boundary-layer turbulence scheme (Deardorff, 1980),

◦ l. 104: "based on a heavy-rain-produced convective": heavy rain-producing

◦ Figure 2 is difficult to read. The symbols shown in the legend are not the same as the ones on the plot. I would recommend using one color per experiment and one line style per temperature plotted, or some other clearly unambiguous scheme.

◦ l. 108: "Based on observational relationships obtained in Unuma (2025).": this sentence is missing a verb.

◦ l. 112: What is "the height of the temperature lapse rate"? Do you mean "magnitude"?

◦ section 2.3: please consider remplacing the bin numbers, which are not very useful to the readers not already intimate with the scheme used, with the actual sizes.

◦ l. 131: What is a a "momentum technique"? Do you mean moment?

◦ l. 152: "When the R calculation, the data within $\pm 50\%$ of the raindrop-fall velocity formula of Atlas et al. (1973) are used.": Can you clarify what this means?

◦ l. 165 states "when the temperature lapse rate is high (TLR-U)", while l. 182 states instead "when the temperature lapse rate was low (TLR-U)": which one is it?

◦ l. 206: "In the horizontal distribution, the spread of total rainfall increases with stronger vertical shear, suggesting that the statistical value tends to be higher." I don't understand what "the statistical value" refers to.

◦ l. 207: What does "vertical flow" refer to?

◦ The center column presenting the CTRL experiment is missing on Figure 9.

◦ Likewise, it would be interesting to show the CTRL experiment on Figure 10.

◦ l. 247: "vertical shear is sensitive to the time required for rainfall intensity to reach its peak and to its maximum intensity.": Isn't it the other way around, that the time of peak rainfall is sensitive to vertical shear?

◦ l. 249: what does "sensitivity to the speed of convective clouds" refer to?

◦ l. 259: "the height of N_w": the magnitude of N_w.

◦ l. 307: "In this regard, this study succeeded in deciphering signals derived from limited observational data": I do not believe this is true. The author does not present observational data in this manuscript.