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Sensitivity of drop size distributions inside an idealized cloud to variations in initial conditions

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The microphysical processes inside a warm cloud were simulated using the Kinematic Driver model. This tool is designed to constitute a common advection platform for performing comparisons relating to different cloud microphysics schemes or different configurations of the same scheme. A bin parameterization was used to explicitly obtain the evolution of the drop size distribution. In the performed simulations, the vertical velocity was defined as a time-dependent, sine function. As initial conditions, vertical profiles of potential temperature and water vapor mixing ratio were used. The effects on the size distributions when varying the initial conditions and the aerosol content were evaluated in the phase space constituted by the parameters of the corresponding gamma function. The evolution of the system in this space, as a function of height, showed remarkable sensitivity to the tested variations. The ability of the gamma space to characterize the state of the microphysical system and its evolution is highlighted.