Miyamoto, Y., S. Nishizawa, and H. Tomita, 2020: Impacts of number of cloud condensation nuclei on two-dimensional moist Rayleigh convection. *J. Meteor. Soc. Japan*, **98**, 437-453.
https://doi.org/10.2151/jmsj.2020-023

Plain Language Summary: The impacts of number of cloud condensation nuclei (CCN) on moist Rayleigh convection were examined by using a simple 2D fluid model with a double moment microphysics model. The effect is most prominent in the initially formed convection, whereas the convection in the quasi-steady state does not significantly depend on the number of CCN. It is suggested that the former convection forms by local buoyancy, while the latter is largely influenced by boundaries.

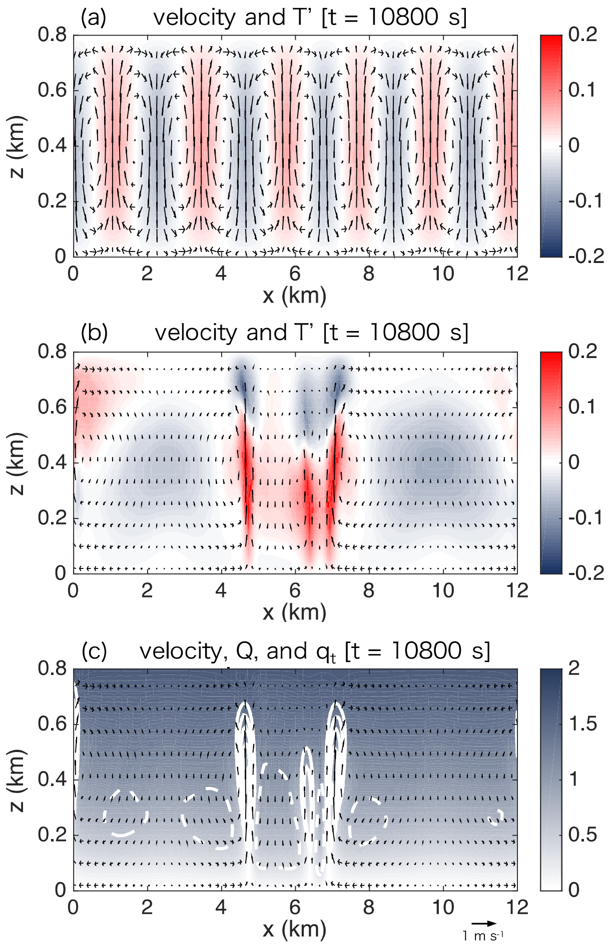

Figure 1 (left). Cross sections of temperature deviation (shading), and velocity (vector) at the end of the simulation in the (a) dry experiment and (b) moist experiment. (c) Same as (b), but for the diabatic heating rate Q (contour) and total condensate q_t (shading). The contour interval of Q is 10^{-1} K h^{-1}. The sections cover 20% of the numerical domain, that is, up to x = 12.

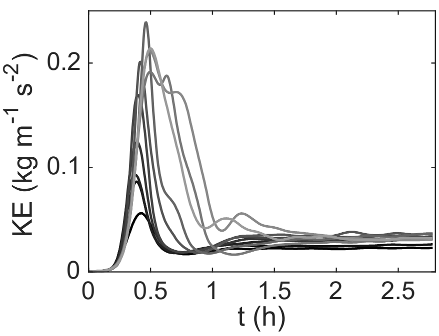

Figure 2 (below). Time series of domain-averaged kinetic energy in the sensitivity-to-CCN experiments. A darker color represents less CCN; i.e., the darkest gray line corresponds to CCN = 10 cc^{-1}.

- The number of CCN affects convective cells initially formed in simulations, whereas the cells during the quasi-steady state are not sensitive.
- The overall impacts of incorporating a double-moment cloud microphysics are to reduce the integrated kinetic energy and number of convective cells (increase the distance between the cells).