Convective self-aggregation in a large square domain

Shuhei, Matsugishi[*1]

1 Atmosphere and Ocean Research Institute, The University of Tokyo, Kashiwa, Japan

*Correspondence to: matsugishi@aori.u-tokyo.ac.jp

There are many organized cloud systems in the tropics. These cloud systems release a large amount of latent heat and play an important role in the atmospheric general circulation. Thus, it is important to advance our knowledge about cloud organization for better understanding the variability of the tropical weather systems and their roles in the global circulation. It is useful to consider cloud organization under simple environment, such as under the radiative convective equilibrium(RCE). In RCE simulation, convection spontaneously organizes without extra forcing. It is referred as convective self-aggregation.

The purpose of this study is to understand the spatial scales of the self-organized cloud systems and how interact hierarchical structure of clouds in this organized cloud systems. Larger simulation domain is needed to be enable to represent the large-scale circulation spontaneously created and interactions of clouds with multiple scales within it. Here I conducted about 5000 km square domain RCE simulation. In this simulation, like a small domain self-organization studies, the wet area becomes to form one cell within about 40 days. Individual clouds form several clusters with the horizontal scale about several hundred kilometers in the moist patch with thousand kilometers. Oscillating behavior of those clusters is observed in units of days. Horizontal scale of self-aggregation also fluctuates.

Key words: Self-aggregation, RCE, Convection, Horizontal scale