

Fractal pattern caused by convection structure -Earth Science observed in Experiments of milk coffee-

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When a droplet of coffee with a higher density was put on the surface of the milk with a lower density, the fractal pattern, drawn by coffee on the surface of milk, was formed spontaneously. The fractal pattern was generated in a sinking process of the coffee solution into the milk after the coffee droplet spread at the surface of milk. The convection between the center of the container and the wall causes the formation of the fractal pattern. In order to change the structure of the convection, we controlled an aspect ratio r/h , where r and h are the radius of the container and the depth of the milk, respectively. In the experimental condition of $r < h$, the fractal pattern emerged. On the other hand, the cell pattern was formed in the experimental condition of $r > h$. The convection structure changes around at $r \sim h$. This result shows that the selection of the surface pattern such as the fractal pattern and the cell pattern owes to the convection structure. This dynamics which occurs in the milk coffee is similar to that of the formation of the cloud. We consider the pattern formation of the cloud with a macro scale through the experiments of the milk coffee which is a behavior.

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