Test-tube model for rainfall

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I shall describe experiments on a test-tube model for rainfall, in which a steady rate of temperature change of partially miscible liquids induces periodic cycles of turbidity and droplet precipitation. The droplet growth is modelled by a period of Ostwald ripening, followed by a finite-time runaway growth of droplet sizes due to larger droplets sweeping up smaller ones. The predictions of this theory are in good agreement with the experiment. They are the first example of a complete quantitative description of a rainfall cycle. In a more general context, the theory is a benchmark model for rainfall, applicable to warm clouds in a convectively stable atmosphere. The analysis of the experiment was done in collaboration with T. Lapp and J. Vollmer, Max-Planck-Institute for Dynamics and Self-Organization, Goettingen.