The concept of radiative-convective equilibrium (RCE) is the simplest and arguably the most elegant model of a climate system, regarding it as a statistically one-dimensional balance between radiative and convective heat transfer. In spite of this, RCE is seldom studied and poorly understood today. Recent advances in cloud-system-resolving numerical models have made it possible to explicitly simulate such states, simulating the convective plumes themselves rather than representing them parametrically. The simulations reveal a startling phenomenon: Above a critical surface temperature, moist convection spontaneously aggregates into a single cluster, in a non-rotating system, or into multiple tropical cyclones on a rotating planet. I will discuss the physics of this important phase transition and what it might imply about weather and climate.

Link to colloquium videos and announcement page: [http://www.atmos.colostate.edu/dept/colloquia.php](http://www.atmos.colostate.edu/dept/colloquia.php)