



On the scale dependency of the CCFM convection parameterisation

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The Convective Cloud Field Model (CCFM) is a multi-plume convection scheme. First, the scheme determines which types of clouds could exist based on the local environment and large-scale forcing. The actual number of each type of cloud is then calculated based on a predator-prey scheme wherein clouds compete for buoyant energy. The available energy is derived from an assumed equilibrium between large forcing and the cloud work function of individual clouds.

The simulated cloud spectrum depends on the end-of-timestep atmospheric state and the effect of an individual cloud on the atmospheric state. These dependencies introduce scale dependencies in space and time, and impact the suitability of CCFM for the so-called grey zone (where the dynamical scale of convection is no longer significantly smaller than the grid scale).

We will present results from sensitivity tests that explore the scale sensitivity of CCFM, and compare implementations of CCFM in the ECHAM climate model of the Max Planck Institute for Meteorology, Hamburg, Germany and the Unified Model of the UK Met Office.