EMS Annual Meeting Abstracts,
Vol. 6, EMS2009-450, 2009
9th EMS / 9th ECAM

9th EMS Annual Meeting
9th European Conference on Applications of Meteorology
High resolution meteorology
- applications and services

Evaluation of length scales on the transition from shallow to deep convection over land using a spectral method

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Several large scale numerical models have difficulty in reproducing the diurnal cycle of precipitation on tropical regions. The maximum of rainfall is usually forecasted several hours earlier than it occurs. Recent studies have shown that the problem is associated with the parameterization of convection processes, which are triggered too early. In reality, the initial phase of the diurnal cycle of precipitation over land in the tropics is characterized by a smooth transition from shallow to deep convection, rather than by the abrupt transition that most current models produce. In order to develop a new parameterization that is able to alleviate this bias, it is necessary to understand how the typical length scales of the flow behave throughout the transition between convection regimes. In this work we performed several simulations of this process using the non-hydrostatic model MesoNH in LES mode. We used a spectral method to compute the integral turbulent length scale associated with some key variables, and tested its sensitivity to model resolution and domain size. Some preliminary results about the role of precipitation processes in the evolution of these length scales are also discussed.