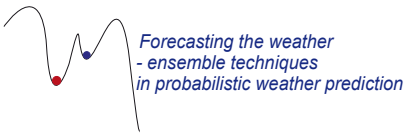
EMS Annual Meeting Abstracts
Vol. 8, EMS2011-430, 2011
11th EMS / 10th ECAM



A climatology of equilibrium and non-equilibrium convection

G.C. Craig (1), M. Zimmer (2), C. Keil (1), and H. Wernli (3)

(1) Institut für Meteorologie, LMU, München, Germany (george.craig@lmu.de), (2) Deutscher Wetterdienst , Offenbach, Germany, (3) Institute for Atmospheric and Climate Science, ETH Zurich, Zurich, Switzerland

Two scenarios are commonly recognised for the control of cumulus convection by larger scales in atmosphere: equilibrium convection, where the rate of convective mass flux or precipitation is controlled by large-scale creation of instability, and non-equilibrium or triggered convection, where convection is restricted by the need to overcome an inhibition energy. In this presentation, the two scenarios will be described, and simple parameter, the convective timescale τ_c, based on the ratio of CAPE and precipitation rate, is introduced to classify convection in observations or high-resolution numerical models. A statistical analysis of this timescale, using observational data from radiosonde ascents, rain gauges, and radar for seven warm seasons in Germany, reveals that the equilibrium and non-equilibrium regimes can be regarded as extremes of a continuous distribution. The two regimes characterize very different interactions between the large-scale flow and convection. The quality of precipitation forecasts from a non-hydrostatic regional weather prediction model with parameterized convection differs substantially for the two regimes, with strong overestimations and too large precipitation objects for the non-equilibrium events. (Ref: M. Zimmer, G. C. Craig, H. Wernli and C. Keil, 2011: Classification of precipitation events with a convective response timescale. *Geophys. Res. Lett.,* **38,** L05802, doi:10.1029/2010GL046199.)