CGD SEMINAR

DATE: Tuesday, 13 February 2018

TIME: 11 a.m.

LOCATION: NCAR, 1850 Table Mesa Drive
Mesa Lab, Main Seminar Room

TITLE: Parameterization of Organized Convection for GCMs

SPEAKER: Mitch Moncrieff, NCAR

ABSTRACT:

Moist convection is parameterized in all GCMs, but little progress has been made with organized convection parameterization. This slow progress contrasts with the major advances in our knowledge of organized convection processes, especially mesoscale convective systems (MCS) based on field-campaign and satellite measurements, cloud-system resolving modeling and theoretical-dynamical studies. A new approach is needed because the transport properties of organized convection differ substantially from cumulus mixing, the workhorse of traditional convective parameterizations. This talk describes a dynamical system approach: multiscale coherent structure parameterization (MCSP) based on Lagrangian conservation principles and nonlinear analytic models. Its observational and physical basis is demonstrated using the examples of summertime orogenic systems over the U.S. continent and year-round multiscale organization in the tropics. A MCSP prototype implemented in CAM5.5 shows an encouraging proof-of-concept. For instance, its upscale properties affects the large-scale distribution of precipitation; the effects of heating and momentum transport are remarkably distinct; the precipitation bias is improved in the tropical western Pacific, equatorial Africa, and the ITCZ regions; the amplitude of Kelvin waves is increased; the MJO has a more realistic wavenumber 1 – 5 range. The next steps in the development of the organized convection parameterization will be described. In summary, organized convection parameterization is a frontier issue in its own right, and for addressing the fundamental and practical challenge of the global water and energy system.

Live webcast: http://ucarconnect.ucar.edu/live

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