



Balanced Dynamics and the Madden-Julian Oscillation

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Tropical convection is difficult to understand and even more difficult to predict, in part because of the interplay between the convection itself and the large scale circulations. Predictability is possible, however, if the scales of convective disturbances are large enough that they are influenced by vorticity anomalies in the environment. Ooyama, in 1982, discussed this idea in the context of mature tropical cyclones, in a process he referred to as "cooperative intensification". Recently, Raymond et al. (2015) revisited Ooyama's ideas and addressed the question of whether other less extreme types of tropical disturbances could be a response to a nonlinear form of "balanced dynamics". If so, they argued that these types of disturbances would have potential for predictability (and therefore would also be parameterizable). In terms of time scales, disturbances which occur on scales longer than the time to establish balance, are candidates for predictability based on the potential for moist convection to evolve as a balanced response to large scale vorticity anomalies.

In this talk, I'll revisit some of Ooyama's and Raymond's ideas regarding balance dynamics, and discuss how we would look for signatures of balanced dynamics in convective systems. I'll also discuss the mechanism by which a vorticity anomaly can modulate and strengthen a developing convective system, and address the question of whether the Madden-Julian Oscillation is a candidate for a convective disturbance under the influence of balanced dynamics. Finally, I discuss how these concepts can potentially be used to evaluate and diagnose global models that have varying degrees of skill in simulating tropical disturbances (and the MJO in particular).

*This seminar will be webcast live at:
<http://ucarconnect.ucar.edu/live>*

*Recorded seminar link can be viewed here:
<https://www.mmm.ucar.edu/events/seminars>*

SPECIAL DATE--RESCHEDULED FROM 18 MAY 2017

Wednesday, 24 May 2017, 3:30 PM

Refreshments 3:15 PM
NCAR-Foothills Laboratory
3450 Mitchell Lane
Bldg. 2, Main Auditorium, Room 1022