MMM SEMINAR SERIES

For how long can we predict the weather? – Insights into atmospheric predictability using global cloud-resolving models

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A tremendous increase in computing power has heralded the era of global cloud-resolving models—providing the means for simulating Earth's atmosphere more realistically than ever before. Global cloud-resolving models are able to seamlessly predict the weather from local to global scales; however, the predictability limits of atmospheric flow have not been comprehensively quantified, provoking questions about what forecast problems are potentially tractable. To address this issue, forecast error growth was investigated within the context of a global high-resolution "identical twin" experiment based on the Model for Prediction Across Scales (MPAS). Here, the error is defined as the difference between a 20-day "nature run" (20 October–9 November 2012) and a simulation whose initial condition was perturbed with small-amplitude noise, but is otherwise identical. For the first time, this experiment is able to shed light on the error growth process from convective to planetary scales. The existence of multiple scale-dependent error growth regimes seems to confirm the radical idea that the global atmosphere has a finite limit of predictability between 2–3 weeks, no matter how small the initial error. However, error growth characteristics differ between the tropics and extratropics, and between the troposphere and stratosphere. Large-scale motions in the tropics remain predictable for over 20 days, implying that tropical weather phenomena may have longer predictability than currently thought.

SPECIAL DAY & TIME

This seminar will be webcast live at:
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Wednesday, 19 April 2017, 1:30 PM
Refreshments 1:15 PM
NCAR-Foothills Laboratory
3450 Mitchell Lane
Bldg. 2, Main Auditorium, Room 1022