



Department of
Mathematical Sciences

Colloquium

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Friday
Dec 1st, 2017
EMS Building
Room E495
2:00pm



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Variations in the Practical Predictability of Severe Weather Events Due to Model Resolution and Storm Environment

As computing power has increased, numerical weather prediction (NWP) models are routinely being run with finer horizontal grid spacing. Forecasts using NWP models configured with horizontal grid spacing below ~4 km (commonly referred to as convection-allowing models, or CAMs) partially resolve convective-scale circulations, greatly improving the realism of convective precipitation and morphology compared to coarser grid forecasts that parameterize convective overturning. While severe weather forecasts solely based on environmental parameters (e.g. instability and vertical wind shear) have been successful, CAMs allow for the development of forecast guidance based on the direct interrogation of simulated storm intensity to determine where severe storms will occur. To do so, diagnostics related to convective intensity (e.g., updraft speed and vertical vorticity) are filtered to identify extrema; these extrema are used as surrogates for the occurrence of unresolved severe weather hazards, such as tornadoes and hail.

This presentation will first discuss the framework in which severe weather guidance is extracted from deterministic CAM output using surrogate severe weather diagnostics. Then, the practical predictability of severe weather events with lead times of 1-2 days will be investigated over the continental United States using two sets of CAM-based severe weather forecasts. The first set, an 8-year set of daily, real-time, 36-hour, CAM forecasts generated by the National Severe Storms Laboratory will be used to quantify model skill as a function of season, region, and storm environment. The second set, a collection of ~500 retrospective CAM forecasts configured with both 3-km and 1-km horizontal grid spacing will reveal sensitivities in forecast skill due to model resolution. Specific attention will be paid to the forecast sensitivity of convective hazards such as supercells and tornadoes. The presentation will conclude with thoughts on future CAM development, including the use of CAM ensembles and global CAMs to further understand the limits on the practical predictability of convection.

Light Refreshments will be served at 1:30pm in E424A



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