A local verification study of convective allowing model performance during convective events in eastern New York and western New England

Part II: Environmental Breakdown

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Use of Convective Allowing Models (CAMs) in an operational capacity has become increasingly popular over the last several years. Several studies have been conducted to analyze the performance of CAMs across a wide variety of spatial and temporal scales. This presentation is the second part of a two-part presentation describing a collaborative CAM evaluation study recently completed by staff at the Albany, New York National Weather Service (NWS ALY) office and students at the State University of New York (SUNY) at Albany. Part I of the study presented the results from subjective evaluations of CAM performance regarding the coverage, timing, and overall evolution of convection as depicted by both the High Resolution Rapid Refresh (HRRR) model and the 3 km North American Mesoscale (NAM) nest model. This Presentation concentrates on the relationship between model performance and characteristics of the convective environment across eastern New York and western New England.

Data from the Storm Prediction Center (SPC) mesoanalysis archive were used to determine the maximum mixed-layer convective available potential energy (MLCAPE) and 0–6 km bulk shear values during each of the 32 cases outlines in Part I that had a severe weather and / or flash flood report. Null events were not included in Part II of this study. Next, environments were classified according to the Sherburn and Parker (2021) criteria as being either high shear high CAPE (HSHC), high shear low CAPE (HSLC), low shear high CAPE (LSHC), or low shear low CAPE (LSLC). The same forecaster evaluations from Part I were used to assess CAM performance in the aforementioned environments. Preliminary results show that the 3 km NAM depicted reasonable coverage for HSLC and HSHC events, but coverage was overdone for LSHC events. The HRRR showed a small high bias for HSLC events, but a large under-forecast error of convective coverage for both the LSHC and HSHC events. Both CAMs were too slow with the timing of convection in all environments, but the slow bias was most noticeable for LSHC environments, especially in the HRRR. Forecaster evaluations indicated that the overall forecast convective evolution was best simulated for HSLC events, followed by HSHC events. LSHC events received the lowest forecaster grades for both CAMs. An investigation of whether changing the CAPE/shear thresholds utilized impacted the results will also be presented.