



Numerical prediction of the 4 June 1999 Midwestern U.S. derecho event: An impossible challenge?

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Warm season convective system rainfall forecasts remain a particularly difficult forecast challenge. These events often bring destructive winds, hail, and tornadoes, and produce excessive rainfall responsible for flash flooding. For these events, it generally has been assumed that ensemble forecasts will provide helpful information unavailable in a single deterministic forecast. In this study, the intense derecho event of 4 June 1999 accompanied by many tornadoes and a well-organized band of heavy rainfall across the American Midwest is used to show that for some situations, the predictability even within a 12-24 hour period is so low that a wide range of simulations using different models (Eta, WRF, MM5), different physical parameterizations (boundary layer schemes, convective schemes, explicit microphysical schemes) and initial conditions (Eta and AVN at two times) all fail to provide even a small signal that the event will occur. The failure of a wide range of models and parameterizations to depict the event suggests inadequate representation of the initial conditions. However, a range of different initial conditions also failed to lead to a well-simulated event, suggesting some events are unlikely to be predictable with the current observational network, and ensemble guidance for such cases may provide limited additional information useful for a forecaster.