

The RAL Seminar Series



NCAR

On the Structure of Errors affecting Radar-based Quantitative Precipitation Estimation (QPE) and very short-term Forecasting (QPF)

by

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Foothills Lab Building 2, Room 1001

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Assimilation of radar-based quantitative precipitation estimation (QPE) and forecasting (QPF) products in numerical weather prediction (NWP) and hydrological models requires a description of the structure of errors affecting these products. Because such information isn't broadly available, some simplifications are typically assumed, which can limit the performance of numerical prediction systems. Research into the errors affecting radar-based QPE can be described in two primary ways: A characterization of errors based on (1) comparing radar estimates with rain gauge measurements, and (2) analyzing the impact of each individual source of error affecting the radar observation and rainfall retrieval. Here, both approaches have been explored, revealing that typical assumptions about the radar QPE errors may not be fully valid. Similarly, radar-based nowcasts obtained with Lagrangian persistence methods suffer from an inability to capture changes in the precipitation field that are not related to advection. We have started exploring the systematic and random components of QPF errors. Based on descriptions of the structure of such errors, we are generating ensemble QPE and nowcasting products, which enables incorporation of a probabilistic component for observations and nowcasts, while maintaining the structure of precipitation fields. Some preliminary applications of these methods for discharge forecasting will be shown.