WMO DA Symposium:

The Variational Version of the Local Analysis and Prediction System (LAPS):
Hot-start Data Assimilation of Convective Events

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Abstract

The Local Analysis and Prediction System (LAPS) pioneered hotstart data assimilation two decades ago. About 150 groups use LAPS worldwide for analyzing and predicting convective weather events. The traditional, mostly uni-variate analysis scheme in LAPS has been reformulated and the basic variables are now assimilated using a modern variational scheme with a state-of-the-art multigrid numerical computational technique. The new variational LAPS uses reflectivity and analyzed clouds in a hot-start analysis with vertical velocity and humidity. Numerical forecasts initialized with LAPS demonstrate an advantage in the 0-3 hour lead time range over forecasts initialized with more traditional, operationally available analysis products and are competitive with simple statistical nowcasting schemes such as persistence and advection. Ongoing and planned development work will also be reviewed. The performance of LAPS will be demonstrated through case studies of various severe convective weather events, including the Windsor Tornado (2008), cases from the Experimental Warning Program of the Hazardous Weather Testbed (HWT) of NOAA, and real time CONUS scale analyses and forecasts.