

High-Resolution Rapid Refresh: From Research to Operations

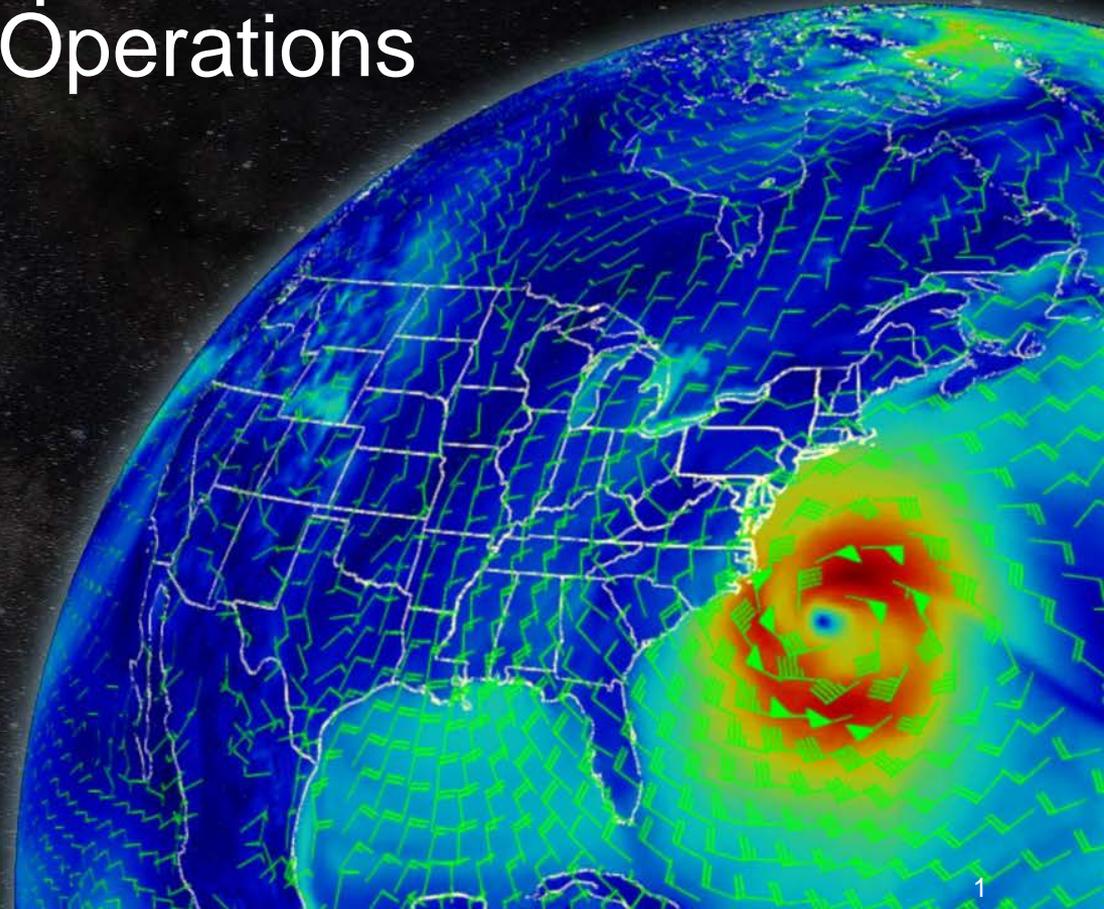
Curtis Alexander

CIRES

Performing work for NOAA/ESRL/GSD



GSD Science Review
3-5 Nov 2015

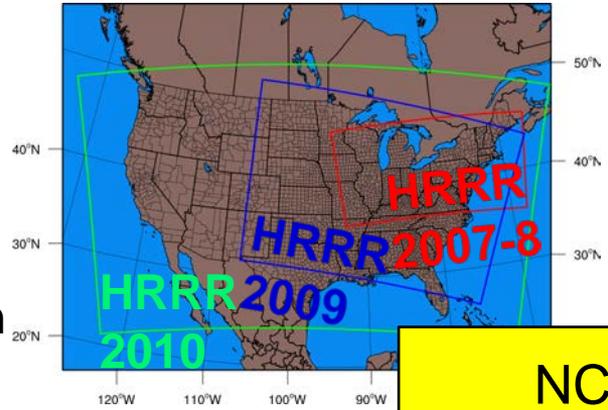


HRRR Path to Operations

High Performance Computers

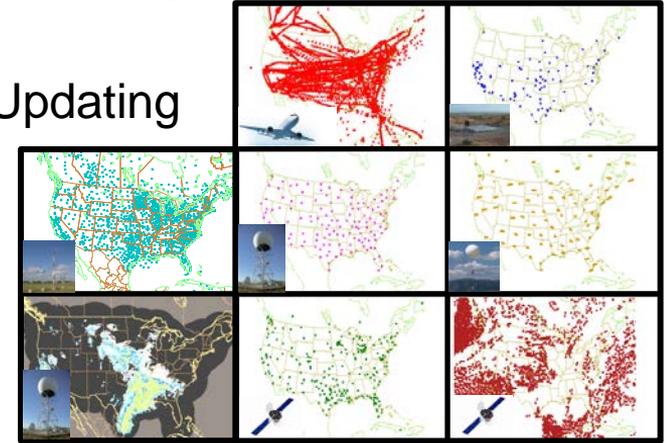


Larger Domain



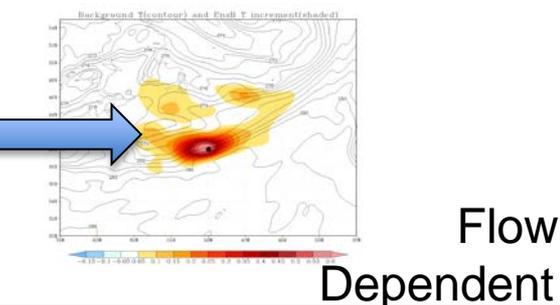
High Density Observations

Frequent Updating



**NCEP
Operational
30 Sep 2014**

Advanced Obs Assimila Gridpoint Statistical Interp

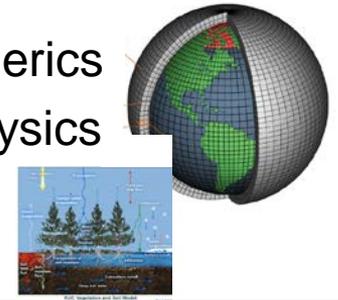


Flow
Dependent

Advanced Model: Advanced Research WRF

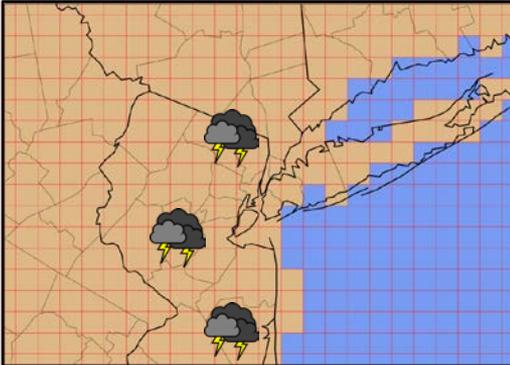
WRF
Community
Physics/Chemistry
Development

Numerics
Physics



Convection-Allowing Grid Scale

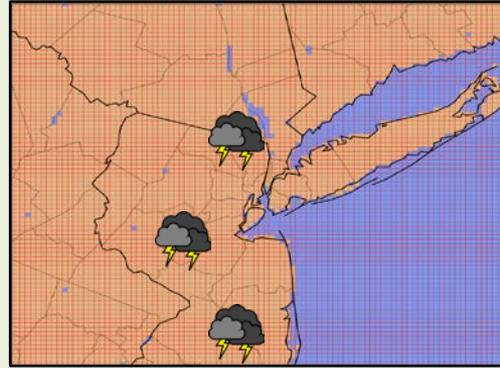
13.5 km RAP
Parameterized Convection



6 hr Reflectivity Fcst



3 km HRRR
Explicit Convection



6 hr Reflectivity Fcst

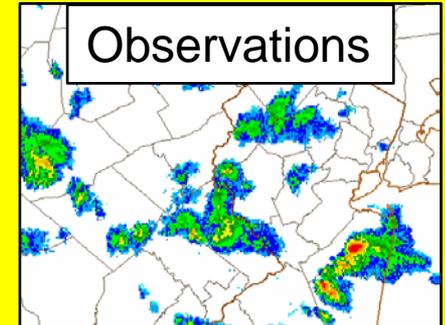


Effective initial
conditions from radar
data assimilation

More accurate storm
structure

Better airline flight
planning

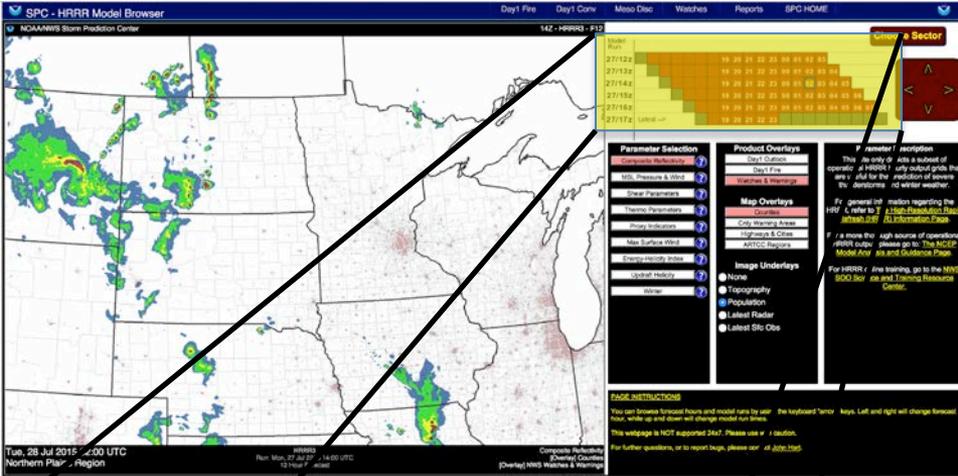
Observations



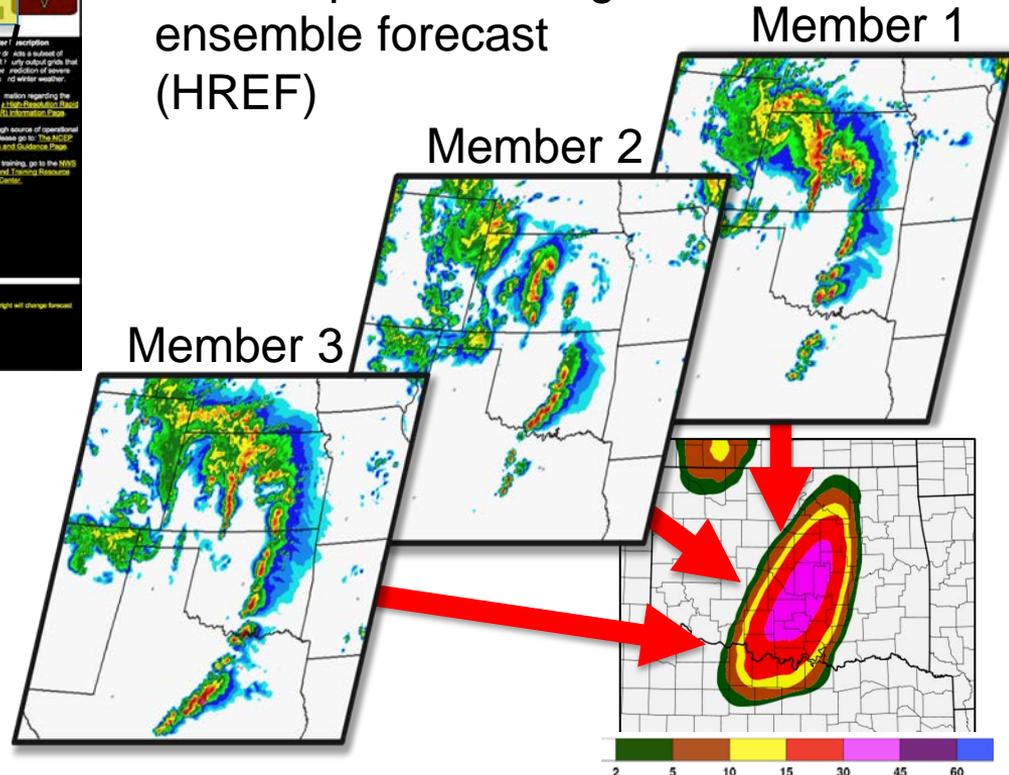
FAA 2010 Savings Estimate: 10,000 delay hours (6% of annual) \$26.8 million

Hourly-Updating Forecasts

Storm Prediction Center HRRR Browser



Time-lagged ensemble development
Probabilities for hazard likelihood
First-step towards high resolution
ensemble forecast
(HREF)



Hourly run-to-run consistency
Increases forecaster confidence

Hourly run-to-run trends
Provides situational awareness

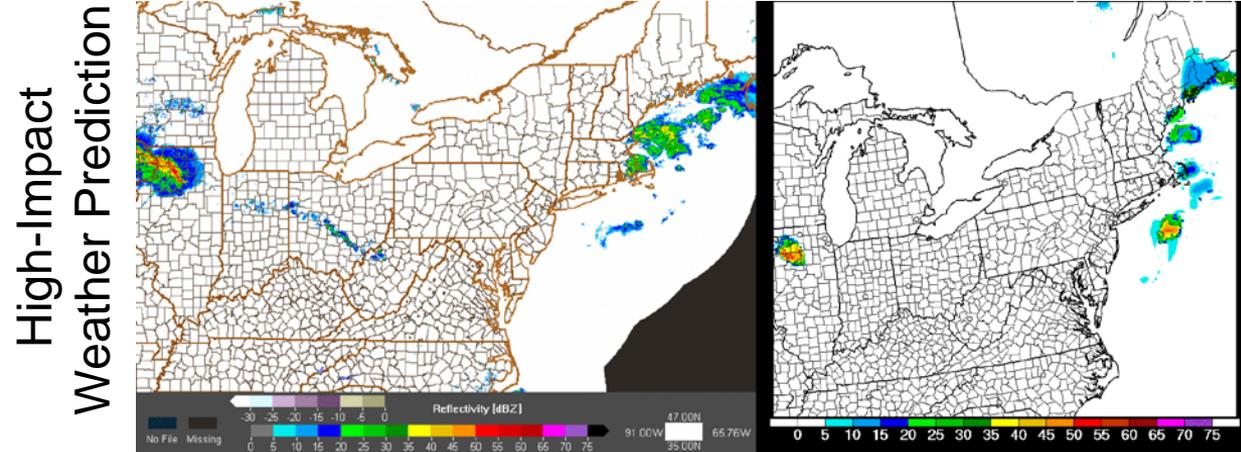
Summary and Future

Development and operational implementation of the first convection-allowing (3-km) hourly-updating numerical weather model

- Situational awareness for severe, aviation, energy, hydrological communities
- Community resiliency, reduces hazard impacts towards Weather-Ready Nation

29 June 2012 Obs

HRRR 15 UTC Forecast



Continue development to
make forecasts better
...see poster

Evolve from a deterministic (single-model) to a convection-allowing forecast ensemble to provide forecast uncertainty