

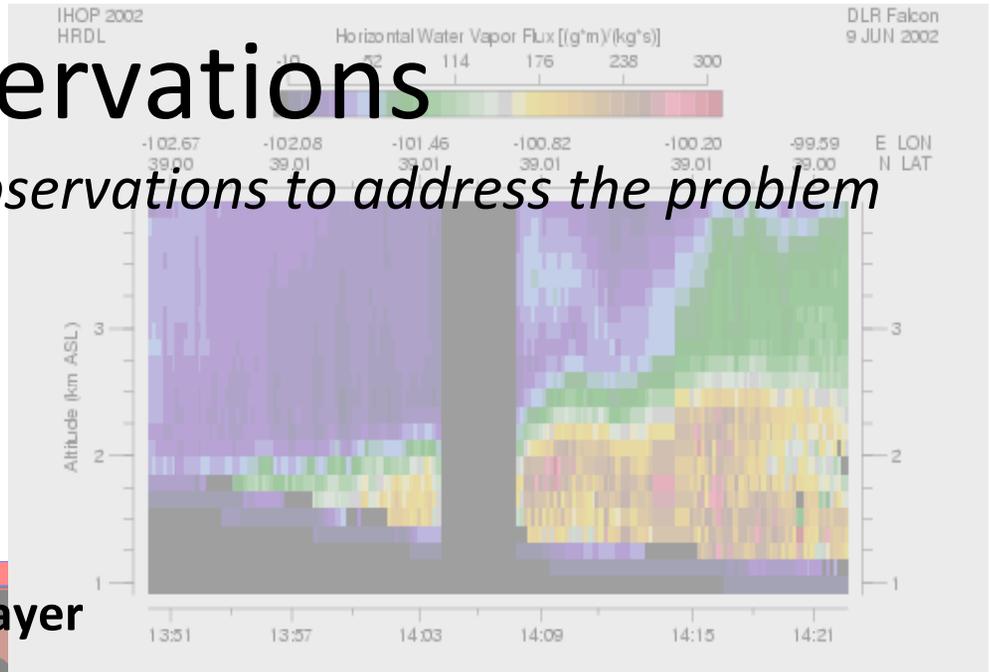
# Strategy for end-to-end improvements to meet grand challenges

- *Real situations*
- *Running all models*
- *Evaluate forecaster application*

- Observation optimization
- High resolution modeling
- Ensemble post-processing/forecast uncertainty
- Science test beds and forecast proving grounds

# Observations

*Infuse the right mix of observations to address the problem*

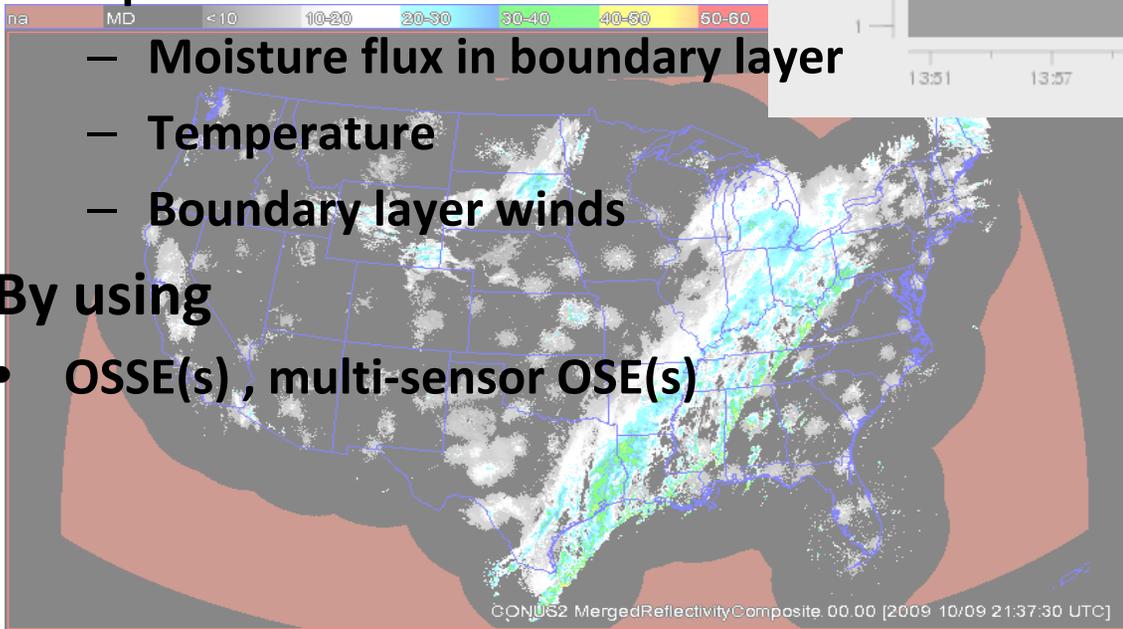


## E.g. Initiation of convection

- Improve observations such as
  - Moisture flux in boundary layer
  - Temperature
  - Boundary layer winds

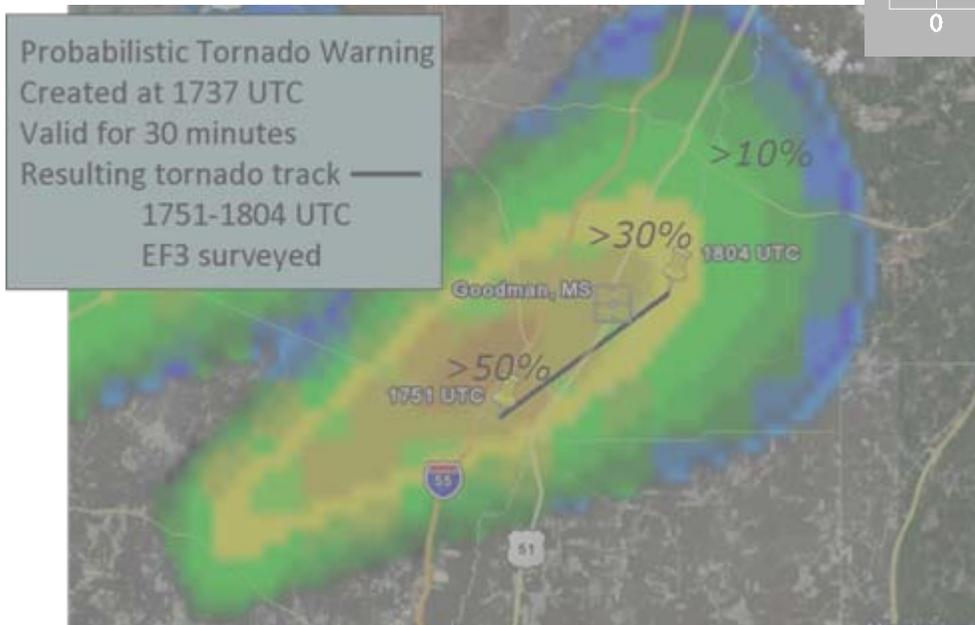
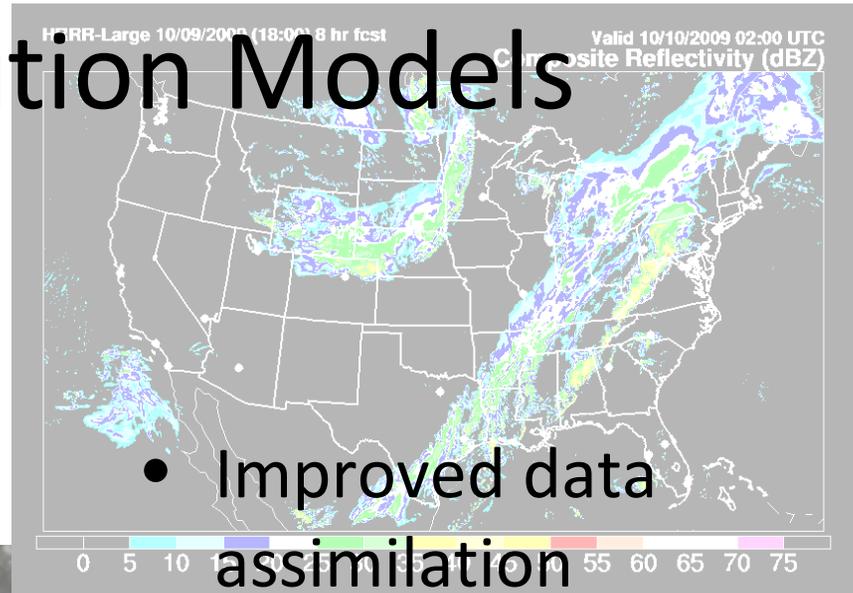
By using

- OSSE(s), multi-sensor OSE(s)



Simulating future operational scenarios and measuring impact on our product

# High Resolution Models

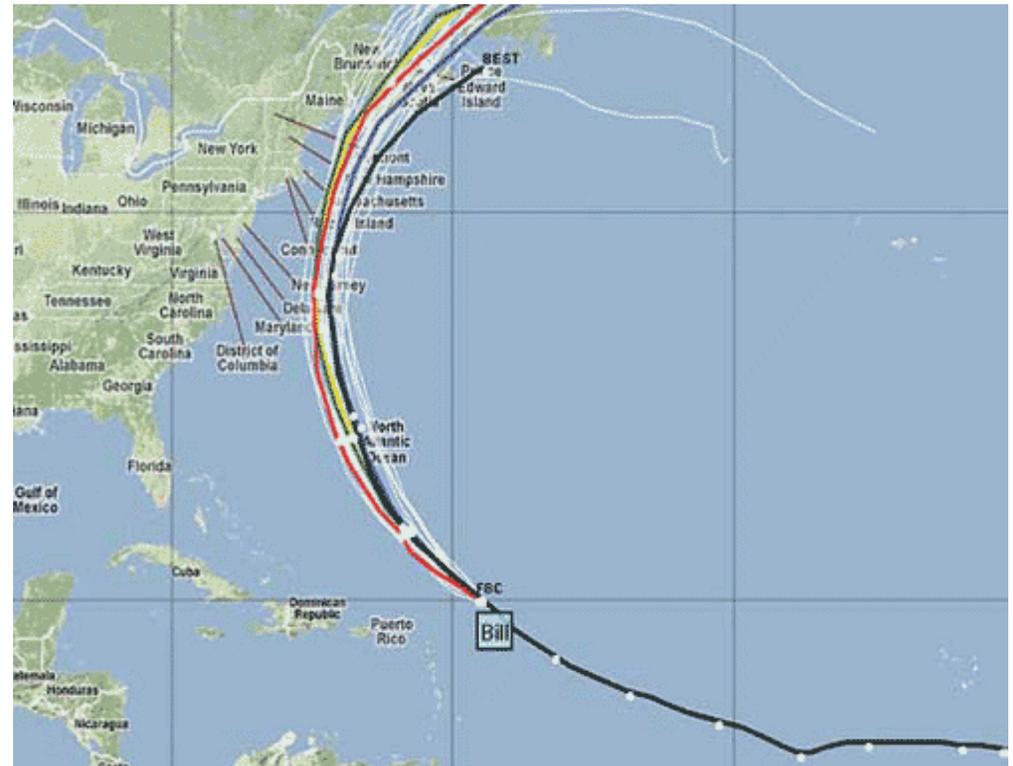


- High resolution storm resolving models
- Cloud resolving capability

Simulating future operational scenarios and measuring impact on our product

# Ensembles

- Initial state perturbations
- Multiple assimilation systems
- Multiple dynamic cores
- Different combinations of physics packages
- Post processing



Simulating future operational scenarios and measuring impact on our product

# Testbeds and Proving Grounds

- Real-time end-to-end testbeds with
  - Obs explosion
  - Nested forecasts



- Operational Proving Grounds
  - Clinical tests w/forecasters in blind experiment(s)
  - Tools and capabilities— what matters, where's uncertainty, how to add value
  - Evaluate forecast applications
  - Community/Stakeholder outreach to communicate forecast and uncertainty

# Strategy Forward

- Assemble OAR/NWS group to lay out strategy/plans
- Demonstration Project (e.g., NY) – Operational simulation facility
- Assess relevant OAR research lab capabilities
- Align activities/funding
- Enlist operational partners (e.g. FAA, DOE)
- Seek concurrence of AA(s)

# Backup Slides