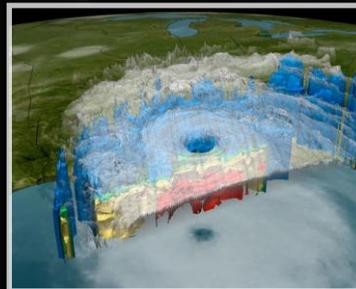
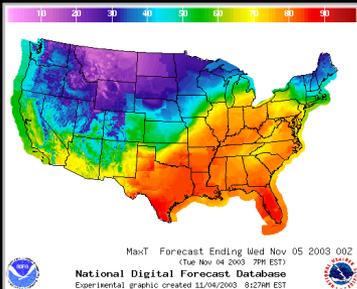
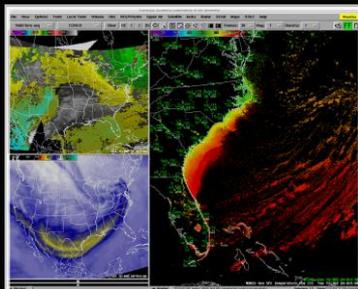


The National Weather Service of the Future: Building a Weather-Ready Nation



Dr. Louis W. Uccellini

Director, National Weather Service

NOAA Assistant Administrator for Weather Services

NCEP Production Suite Review December 2, 2014



Outline

- **Building a Weather-Ready Nation**
- **Model Implementation & Increased Collaboration**
 - **Model Highlights Based on Community Approach**
 - **Network Updates**
 - **National Water Center**
 - **S00-DOH Conference**



NWS Strategic Outcome: A Weather-Ready Nation

Becoming a Weather-Ready Nation is about building **community resiliency** in the face of increasing vulnerability to extreme weather

“Ready, Responsive, Resilient”

REQUIRES NWS TO:

- Fully Integrate our Field Structure:
 - Better Forecasts and Warnings
 - Ensure Consistent Products and Services
- Provide Impact-based Decision Support Services (IDSS)
- Deliver through Multiple and Reliable Dissemination Pathways
- Work with Partners to *gain needed response*; includes embedding NWS in Emergency Operations Centers

WRN

*We now have
Over 1000 WRN Ambassadors*

*Involves entire US Weather Enterprise WORKING TOGETHER
to achieve far-reaching national preparedness for weather events*



NWS Strategic Outcome: Weather-Ready Nation

NWS Strategic Goals

- Improve Weather Impact-Based Decision Support Services
- Improve Water Forecasting Services
- Enhance Climate Services and adapt to climate-related risks
- Improve sector-relevant information in support of economic productivity
- Enable environmental forecast services supporting healthy communities and ecosystems
- Sustain a highly skilled, professional workforce equipped with training, tools, and infrastructure to meet mission

Interdisciplinary/Earth System
Model Approach

1. Water Quality, 2. Food 3. Health



Prediction is what makes NOAA/NWS unique and indispensable!



“Evolving” the National Weather Service

Overarching Goals:

- **Creating an Organization Capable of Change and Innovation**
- **Implementing a Fully Integrated Field Structure providing consistent, accurate, timely and reliable products and services.**

Model Implementation & Increased Collaboration





Model Implementation Schedule

Supported through HFIP and Sandy Supplemental

- **Hurricane Models** (new HWRF run at 3km) – considered to be one of the world’s best
- **High Resolution Rapid Refresh (HRRR) (September 2014)**
 - 3 kilometer resolution
 - Runs every hour
- **Run NWS Global Forecast Systems at higher resolution (13km) out to 10 days (January 2014)**
- **Upgrade all Data Assimilation to 4D Enkf/Hybrid working from new data sets: JPSS, GOES-R, COSMIC 2 [Q1 FY16, FY17]**
- **Ensembles: Higher Resolutions [Q3 FY15, FY16]**
 - Global Ensemble Forecast System (GEFS) (going from 55km to 35 km)
 - Short Range Ensemble Forecast (SREF) (going from 16 km to 12 km)
- **Accelerate Storm Surge Modeling (FY 15)**

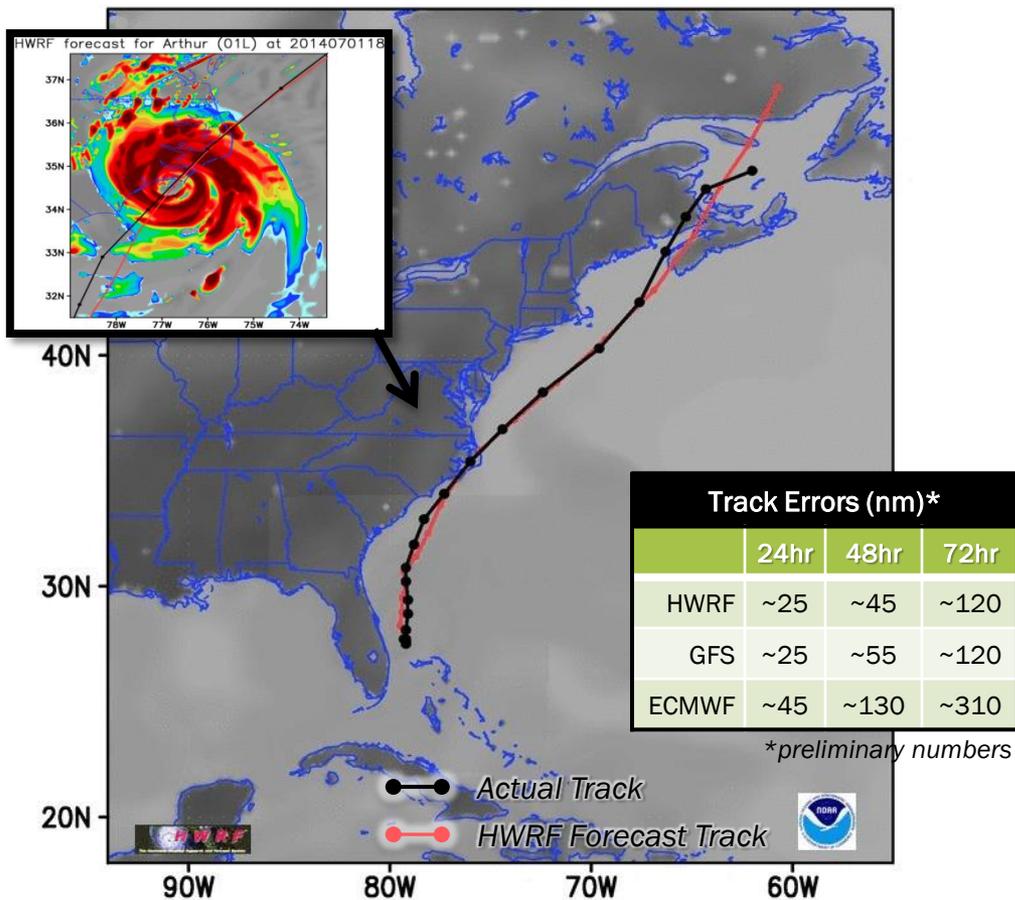
BIG NEWS: IBM upgrade from 200 to 700 Teraflops per machine (January 2015)



2014: Improved Forecasts & Products

Hurricane WRF Model & New Storm Surge Graphics

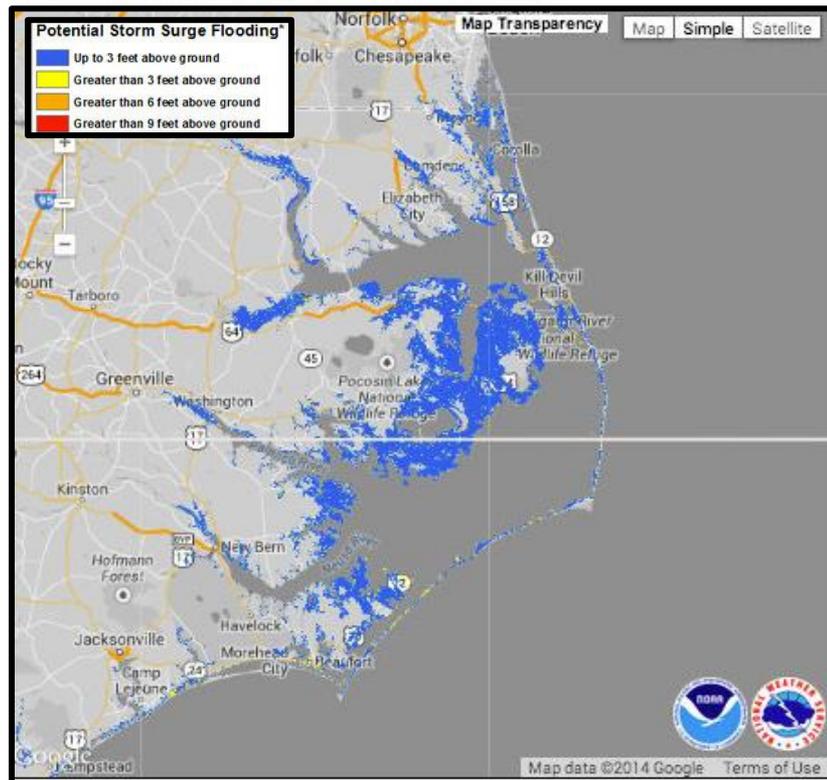
HWRW Forecast Track & Forecast Radar Reflectivity for Hurricane Arthur (18z 01 JUL '14)



Hurricane Arthur Potential Storm Surge Mapping

'Best Guess, Worst Case Scenario'

NHC Experimental Potential Storm Surge Flooding Map
 Tropical Storm ARTHUR (2014) Advisory 7
 From 11 AM EDT Wednesday July 02 to 04 PM EDT Saturday July 05



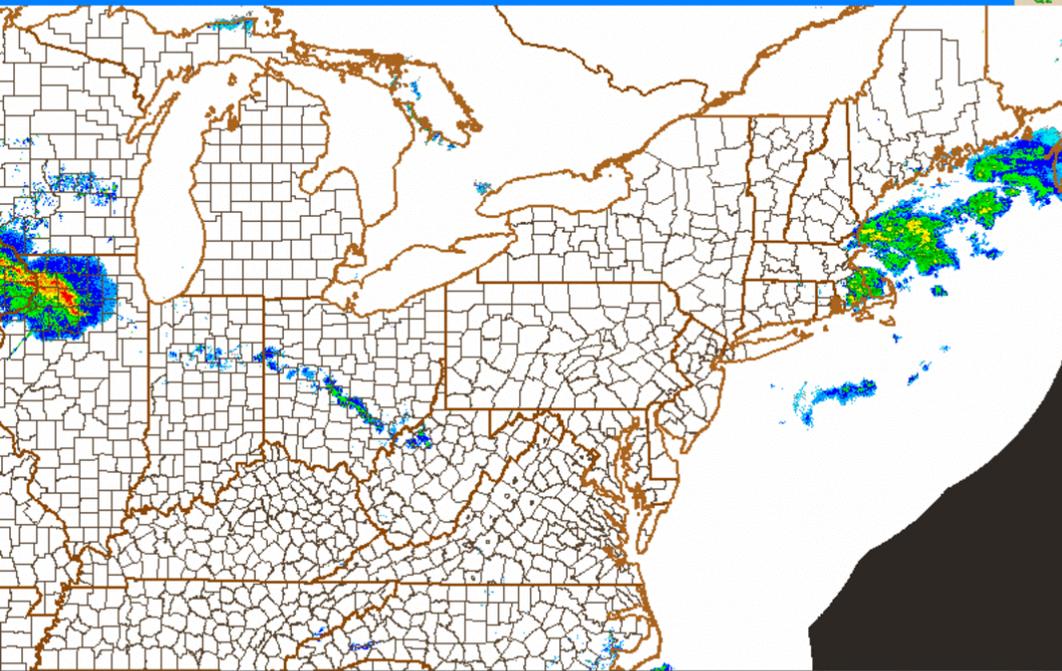


HRRR Svr Wx: Derecho Forecast

Reflectivity Observations

Composite Reflectivity
Derived From Mosaic3D

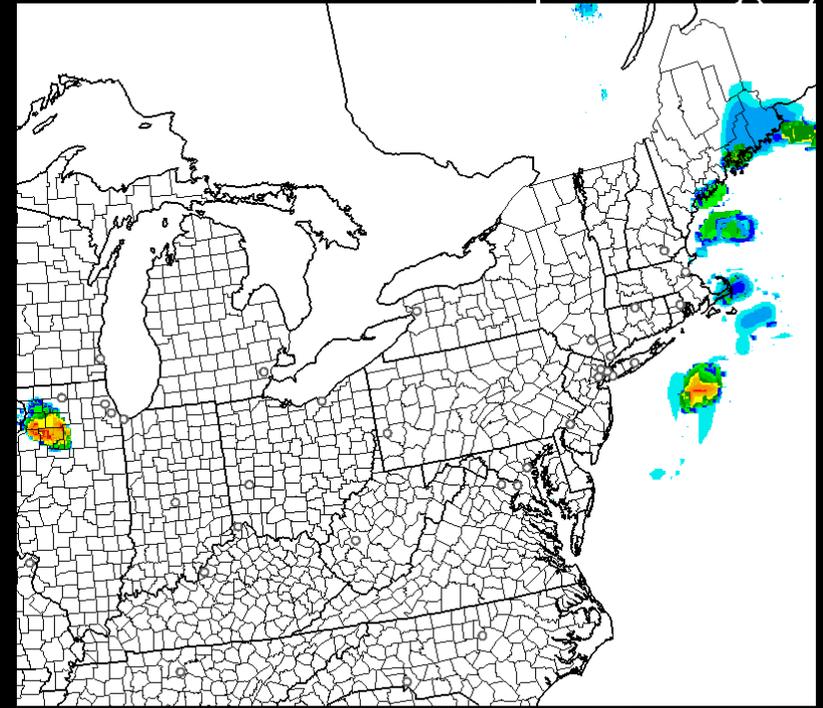
Valid At:
06/29/2012 15:00:00 UTC



HRRR 15 UTC 29 June 2012

HRRR 06/29/2012 (15:00) 00:00 hr fcst - Experimental

Valid 06/29/2012 15:00 UTC
Composite Reflectivity (dBZ)





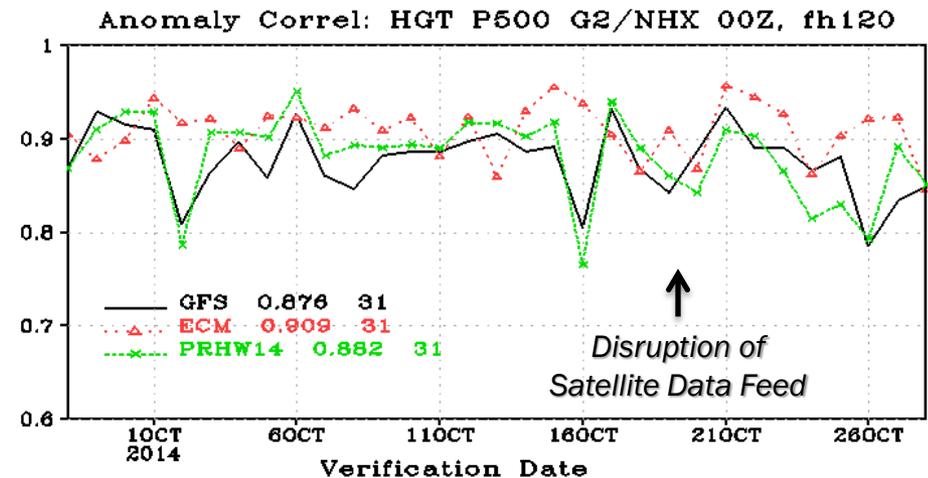
GFS Improvements

Improvements in

- **Resolution:** 13km to 10 days (vs. 23km to 8 days)
- **Observations:** hourly GOES & EUMETSAT winds, SSM/IS, etc
- **Algorithms:** data assimilation
 - higher res EnKF with better spread
- **Model Physics:**
 - cloud-radiation interaction
 - land characteristics (hi-res topography, SST and sea ice analysis, and initial snow conditions)
 - boundary layer physics

Benefits

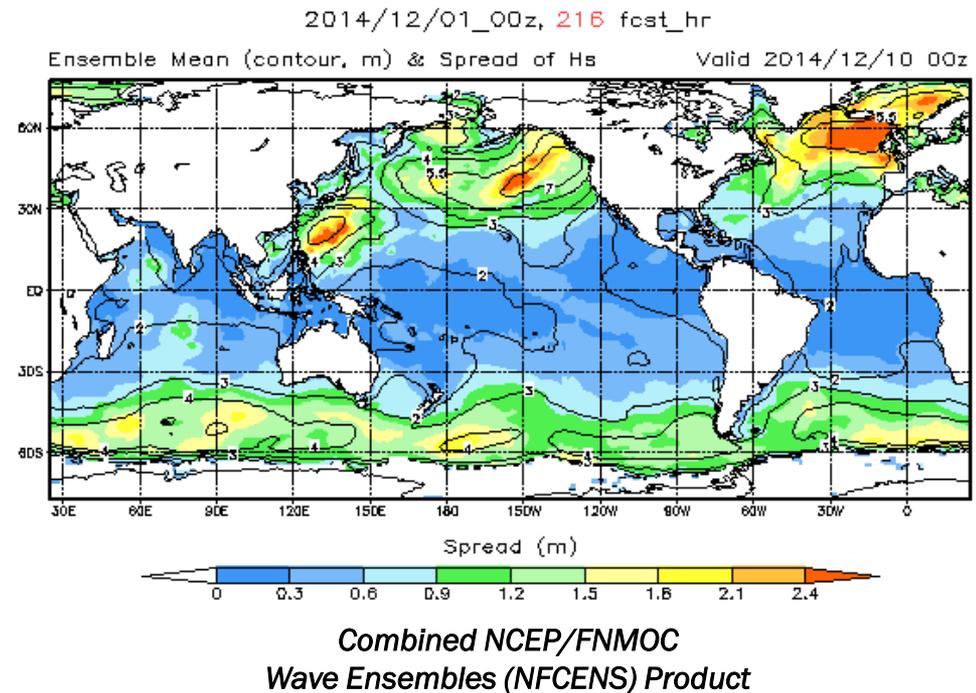
- Resolve smaller scale features
- Improved
 - 500mb height anomaly correlations
 - Precipitation forecasts
 - Tropical storm track & intensity





Ocean

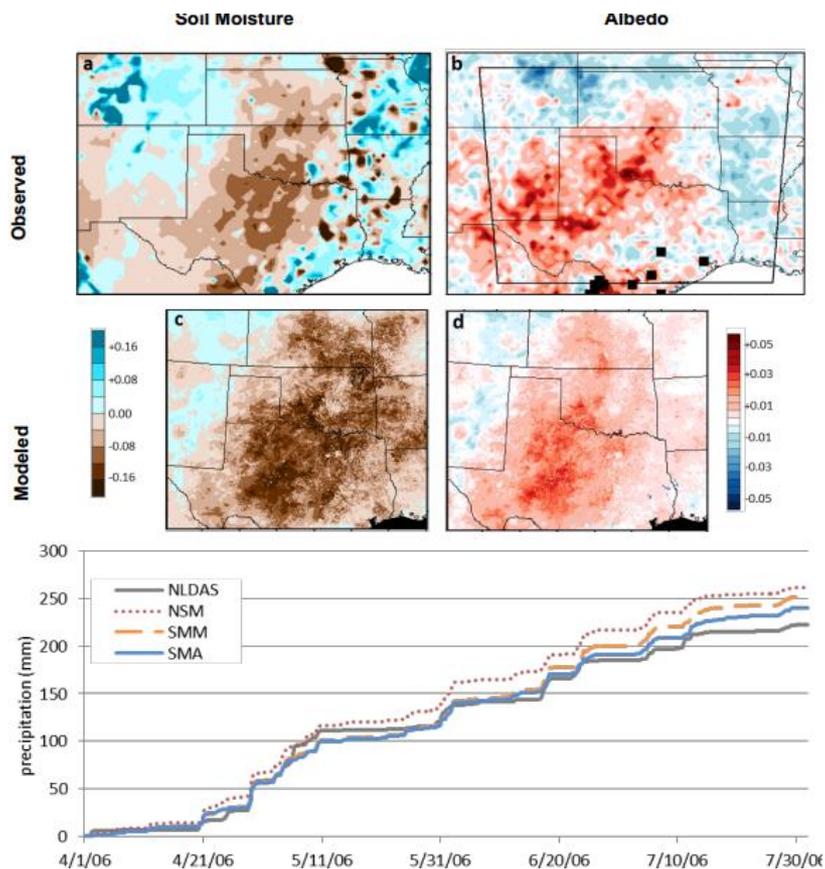
- Community modeling approach
- Hycom Ocean Model
 - Also provides boundary condition to NOS coastal models
- NRL – NCODA
- WaveWatch III / Navy Wave Model Ensemble System (NFCENS)





Joint Center for Satellite Data Assimilation (JCSDA)

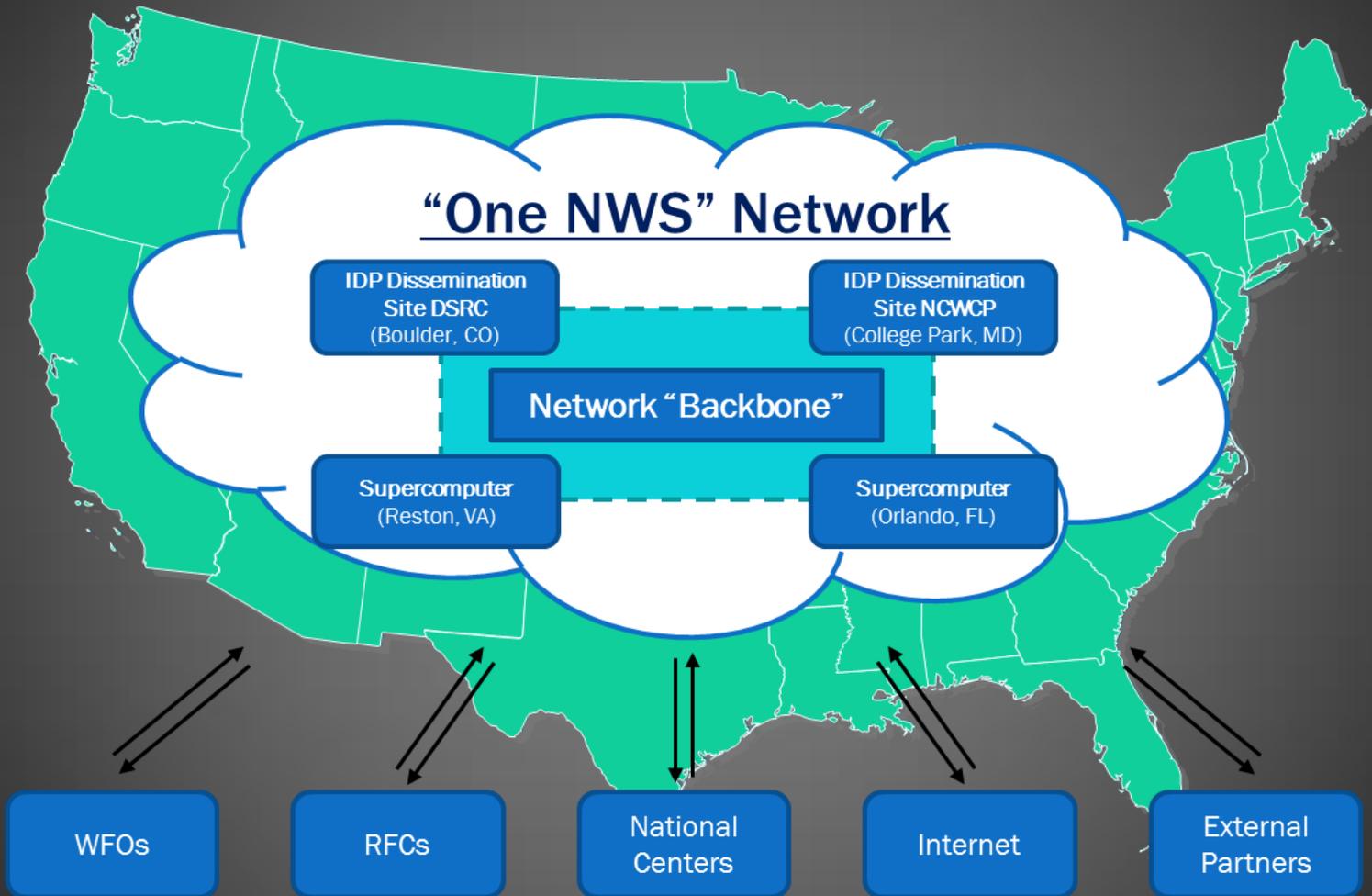
Soil Moisture Feedback During Drought: NU-WRF



Zaitchik et al (2013)

- Getting ready for JPSS & GOES-R
- Working with the larger research community
 - GPM
 - SMAP
- ← • Land-atmosphere coupling in WRF
- Community Radiative Transfer Model (CRTM)

NWS Network Updates



The future One-NWS network will consolidate all operational networks (OPSnet, Regional, etc.) under a single managed network.

Establishing the National Water Center

May 2015: Initial Operating Capability



MISSION: Deliver state-of-the-science, summit-to-sea, treetop-to-bedrock hydrologic analyses, forecast information, and decision support services to address the Nation's growing water resources challenges.

Location: Tuscaloosa, AL

Co-located Partners: *visiting scientists and*

Impact: Revolutionize
'Total Water Prediction'



FEMA



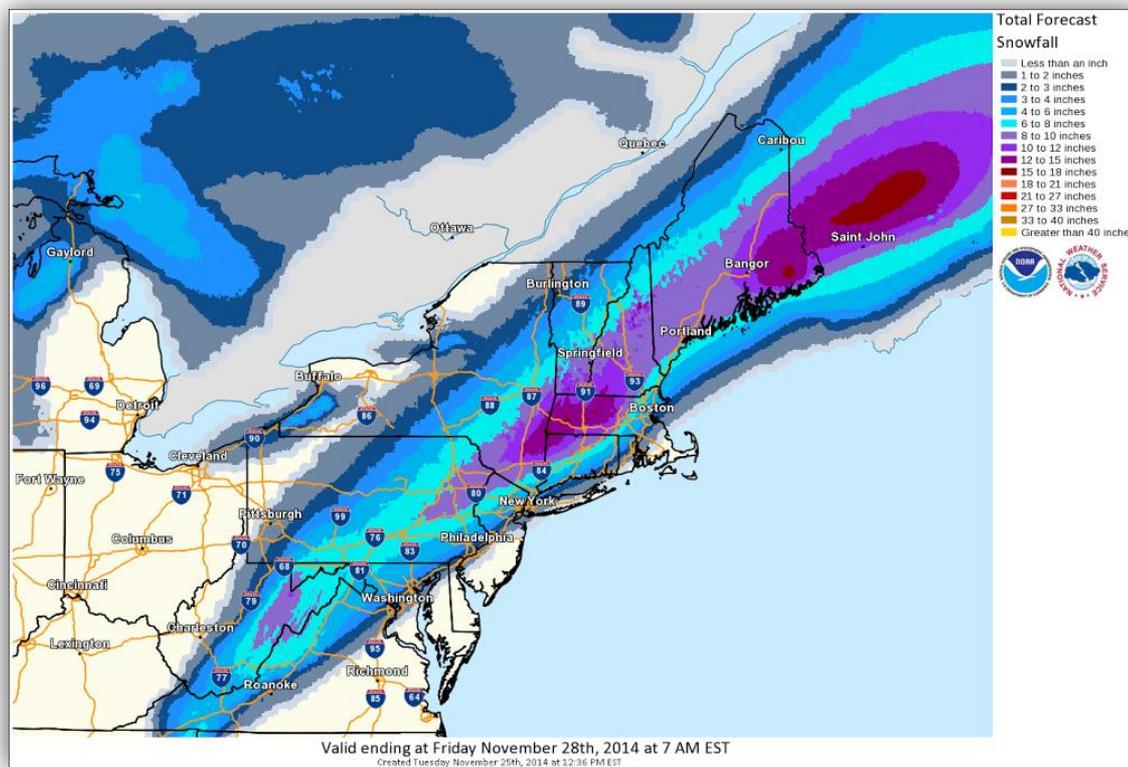


NCEP & Field Collaboration

Thanksgiving Travel 2014



Watch-Warning Map



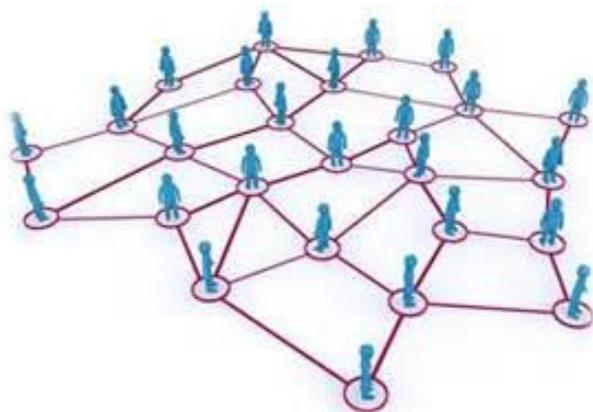
WPC Snowfall Map



SSD & S00-DOH Collaboration



- Over 135 fields offices, 6 Regions, and 9 National Centers – all with brilliant science minds working on projects
- Future SSD & S00-DOH relationship will take advantage of our existing resources by connecting them - rather than working solely on individual projects





SOO-DOH Conference

WHEN: September 14-18, 2015

WHERE: NCWCP

WHO: All SOOs, DOHs, SSD chiefs, Regional Directors, Training staff (KC, Norman, DC), STI Representatives from NCEP, and others

WHAT: Build connections among field representatives and with centers/headquarters, re-focus on new direction for SOO-DOH Program



2014 WCM Conference



2014 WCM Conference



Vision Becoming Reality

- *Science-based service organization* directed toward Building A Weather-Ready Nation.
- AOP/Budget planning directed toward creating an organization capable of change that supports and advances the NWS mission through a fully integrated field structure.
- NOAA/NWS/NCEP/Community modeling advances will provide a key foundation for moving the NWS forward as we build a Weather-Ready Nation.

THANK YOU!

