



# High Resolution Ensemble Weather Forecasts for Power Generation, Transmission & Load

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# SPC/NSSL Spring Forecast Experiment in the Hazardous Weather Testbed



- Testing and calibration of new forecasting methods in a simulated operational setting
- 5 weeks in spring season
- Collaboration among
  - NOAA research units
  - NOAA operational units
  - Universities
  - Private sector
- Testbed located between the NOAA Storm Prediction Center and Norman National Weather Service Forecast Office





# Vision: Operational Numerical Weather Prediction Systems of the Future

- Increasing resolution – operational models down to 1-km grid spacing
- Ensembles of forecasts run at ~ 3 km over CONUS

## CAPS Storm-Scale Ensemble Forecasts

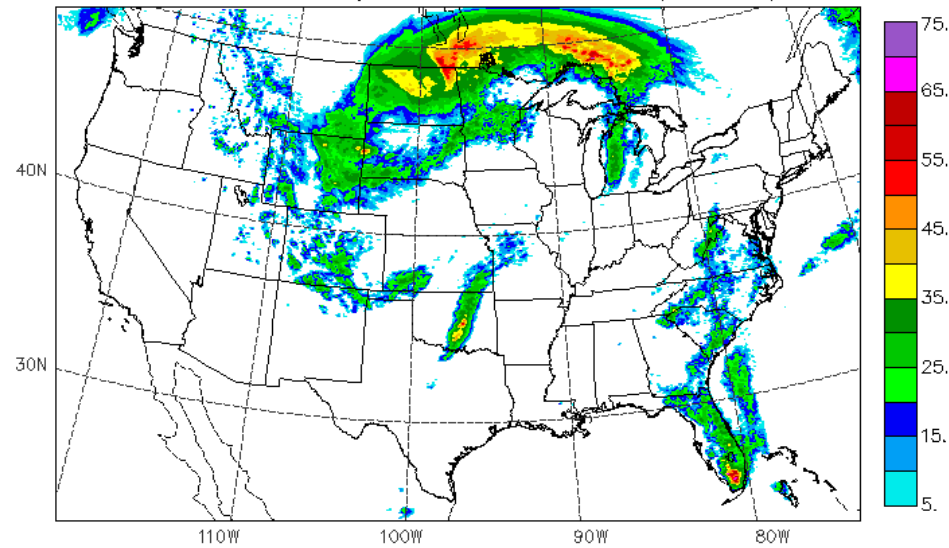
- Run Large Ensemble of Convection-Allowing NWP Forecasts (3 km)
- 25-50 NWP ensemble members run at NSF XSEDE Centers
- Explore new methods for severe weather prediction in 12-60h time frame
- 6-7 weeks in Spring, application to Severe Weather Forecasting
- 4 weeks in Summer, application to Flash Flood Forecasting

## Focus: Primary Ensemble ~20 Members in Spring, 12 Members Summer

- 2014 Darter at NICS (UTenn @ Oak Ridge)
- 2015 Stampede at TACC ( U Texas @ Austin)
- 2016 Stampede at TACC ( U Texas @ Austin)



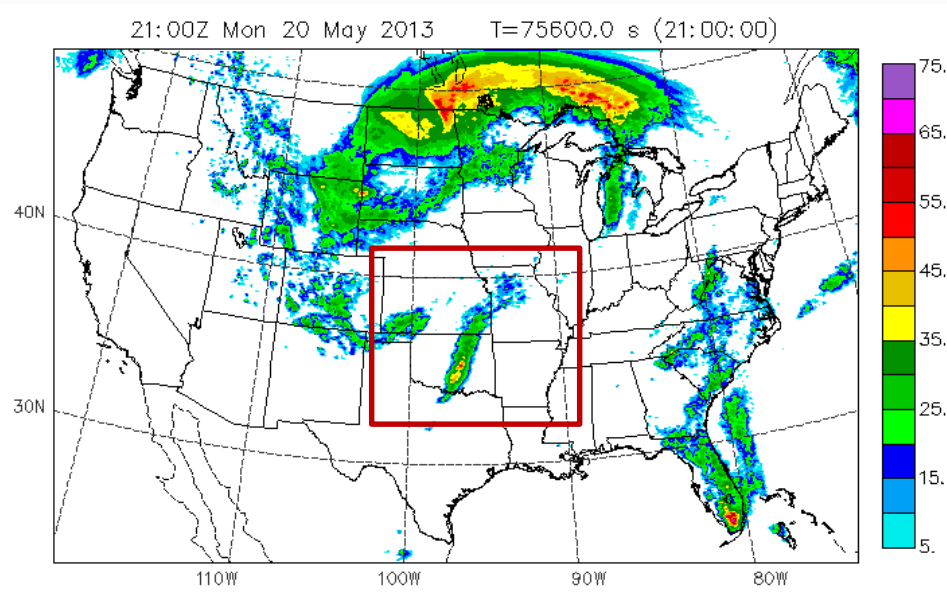
# Sizing the Data



## Full CONUS Data Volumes

	2014	2015-2017
Grid Spacing	4 km	3 km
Domain Size	1163x723x53	1683x1155x53
One Output Time	4.2 GB	9.7 GB
Sub-Hourly Interval	10 min	6 min
Complete Forecast Size Hourly + Sub-hourly 18h-30h	508 GB	1639 GB
For 10 members per day	5.08 TB	16.4 TB
For approx 30 days per season	152 TB	492 TB

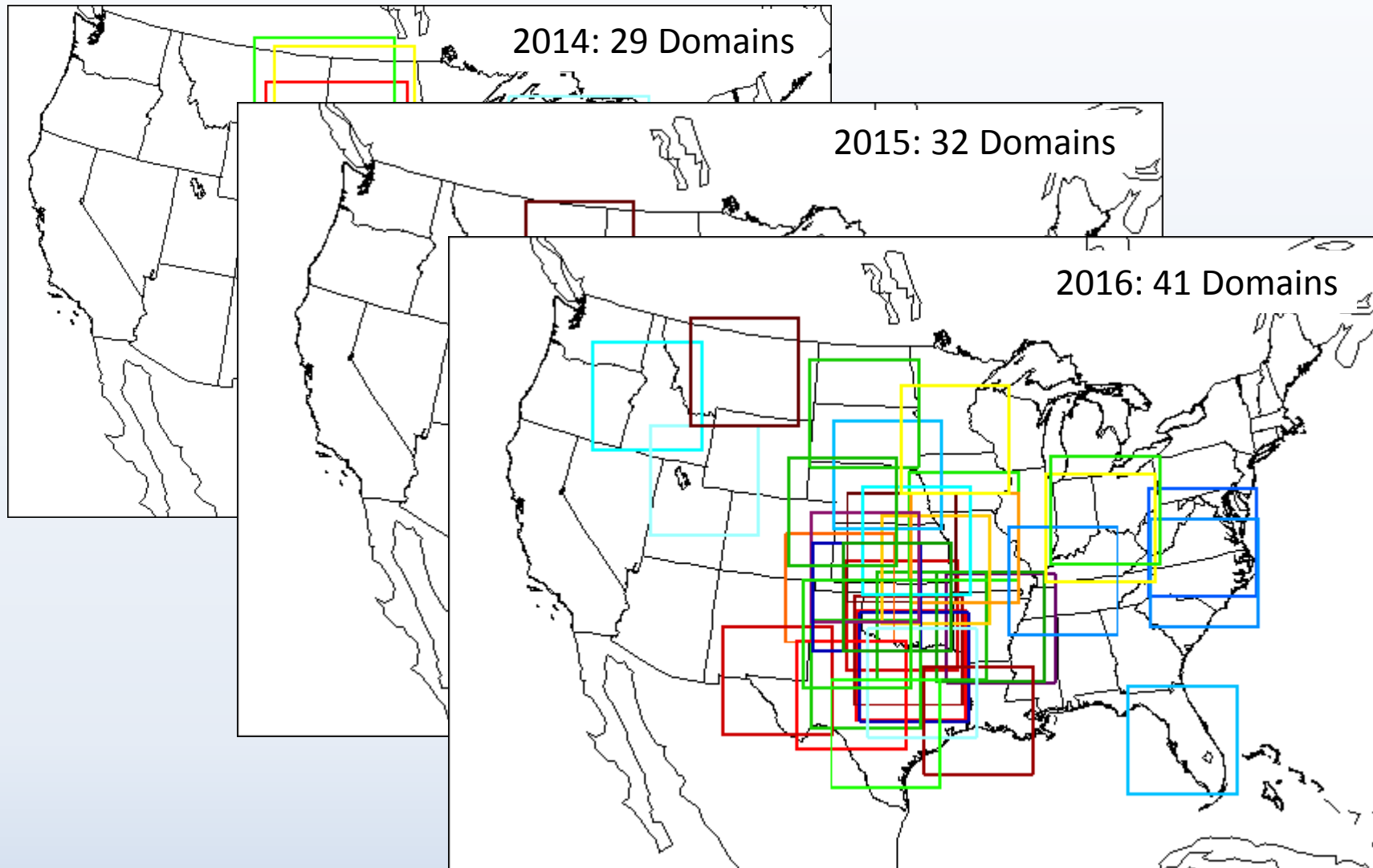
# Sub Domain Data Set



Selected Subdomain of the Day  
203 x 203 x 53

	2014	2015-2016
Grid Spacing	4 km	3 km
Sub-Domain	203x203x53	203x1155x53
Sub-Domain Size	800 x 800 km	600 x 600 km
Output for one time	111.5 MB	111.5 MB
Sub-Hourly Interval	10 min	6 min
Sub-hourly 18h-30h Only	8.2 GB	13.5 GB
4 members per day	32.8 GB	54 GB
Approx 30 Days	984 GB	1.62 TB

# Sub-Domains



Domains chosen from prior day's forecast and/or early morning examination of 2D reflectivity from control forecast.

# Questions?



2016 HWT Visualizations Online

[http://www.caps.ou.edu/~kbrews/hwt\\_2016](http://www.caps.ou.edu/~kbrews/hwt_2016)

CAPS HWT & HMT Ensemble Forecasts Online

[http://www.caps.ou.edu/~fkong/sub\\_atm/spring16.html](http://www.caps.ou.edu/~fkong/sub_atm/spring16.html)



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