

Convection at NSSL: Research Applicable to NextGen

Where is the convection now?

Where will it be?

What are the hazards associated with it?



NSSL 3D/4D Multi-Radar, Multi-Sensor (MRMS) System

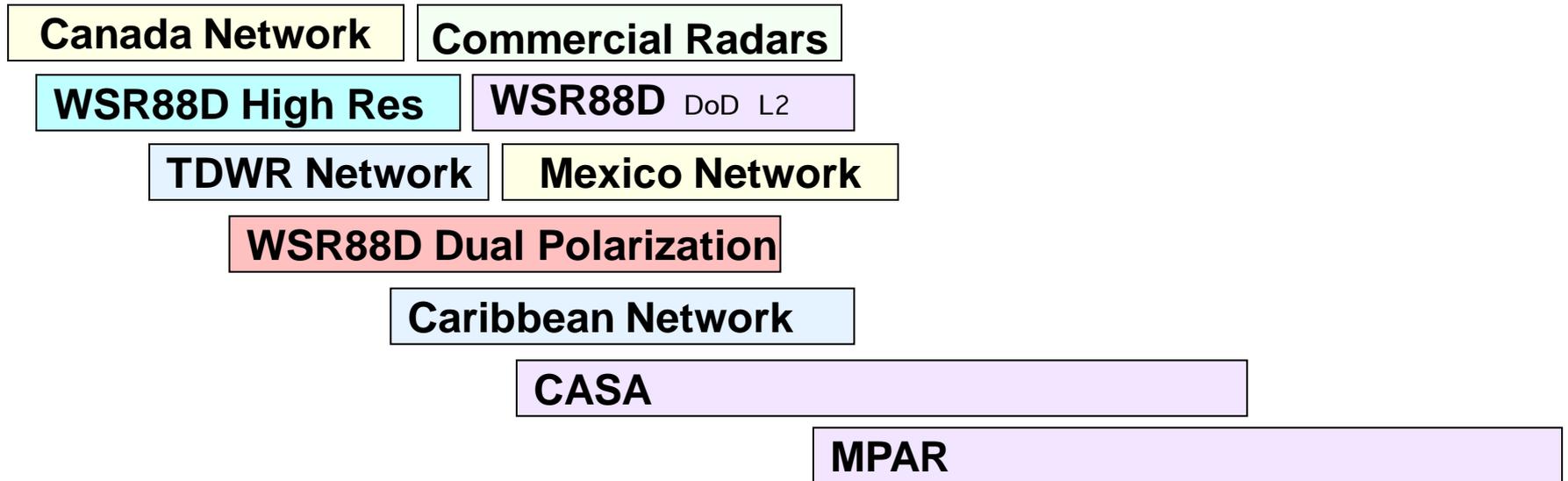
- **Current 3D Multi-Radar, Multi-Sensor product**
 - Ingesting data from national network of WSR-88D radars
 - Grid resolution of 1km x 1km over the CONUS (6200km x 3000km x 20km) with 31 vertical levels
 - Data streaming in from multiple radars and go through an automated QC to remove non-precipitation echoes
 - Integrate with other meteorological data to generate algorithm products (satellite, RUC model analysis, etc)
 - 3D grid and products updated every 5 minutes
 - Severe weather and precipitation products
- **Working with NCEP to transition capability to NWS operations**
- **Future Work**
 - Increasing spatial & temporal resolutions
 - Adding Dual Polarization algorithms for WSR-88D upgrade
 - Adding ingest of other radar networks
 - Automated Quality Control algorithms for non-WSR-88D radars
 - Infrastructure to host other applications



NSSL 3D/4D MRMS: Future Research Activities

Seamless Integration of Radar Advances, Systems, and Networks

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
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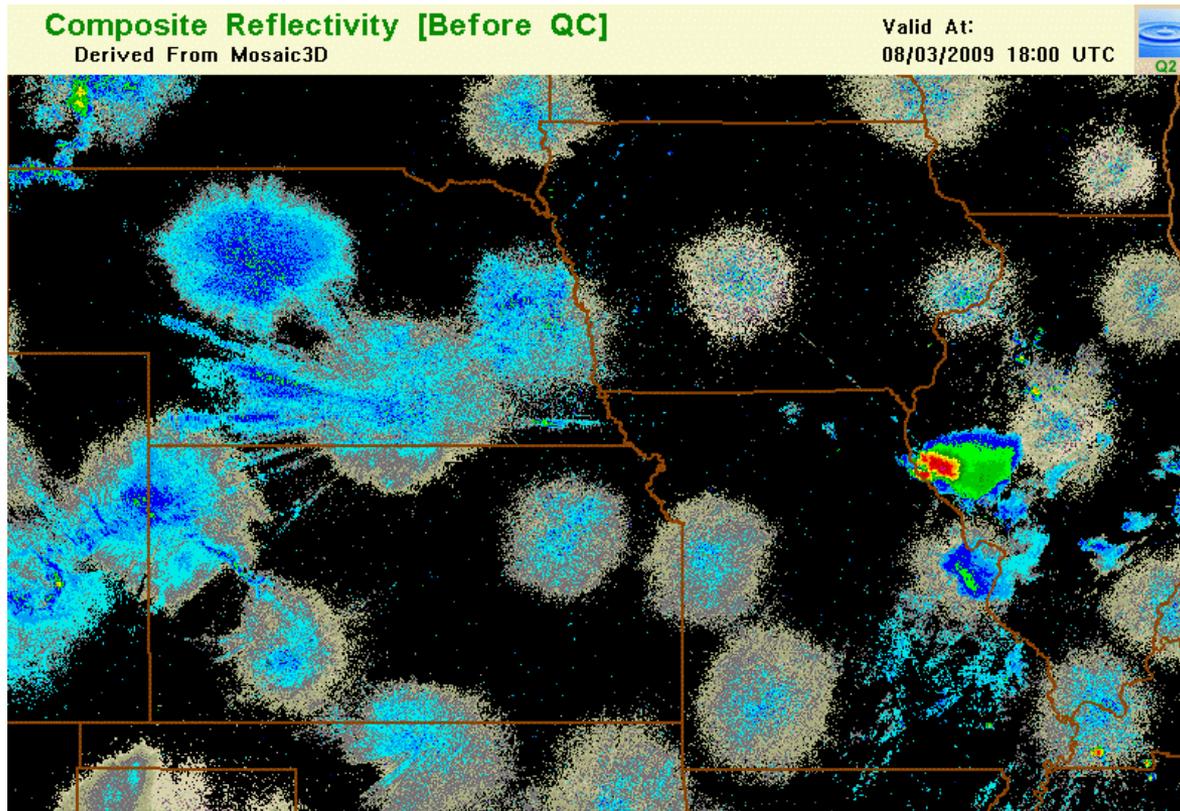


North America Resolution and Refresh Rate

1-km/5-min → 1-km/2-min → 500-m/2-min → 500-m/1-min → 250-m/1-min



Heavy Emphasis on QC (loop)



WSR-88D Network

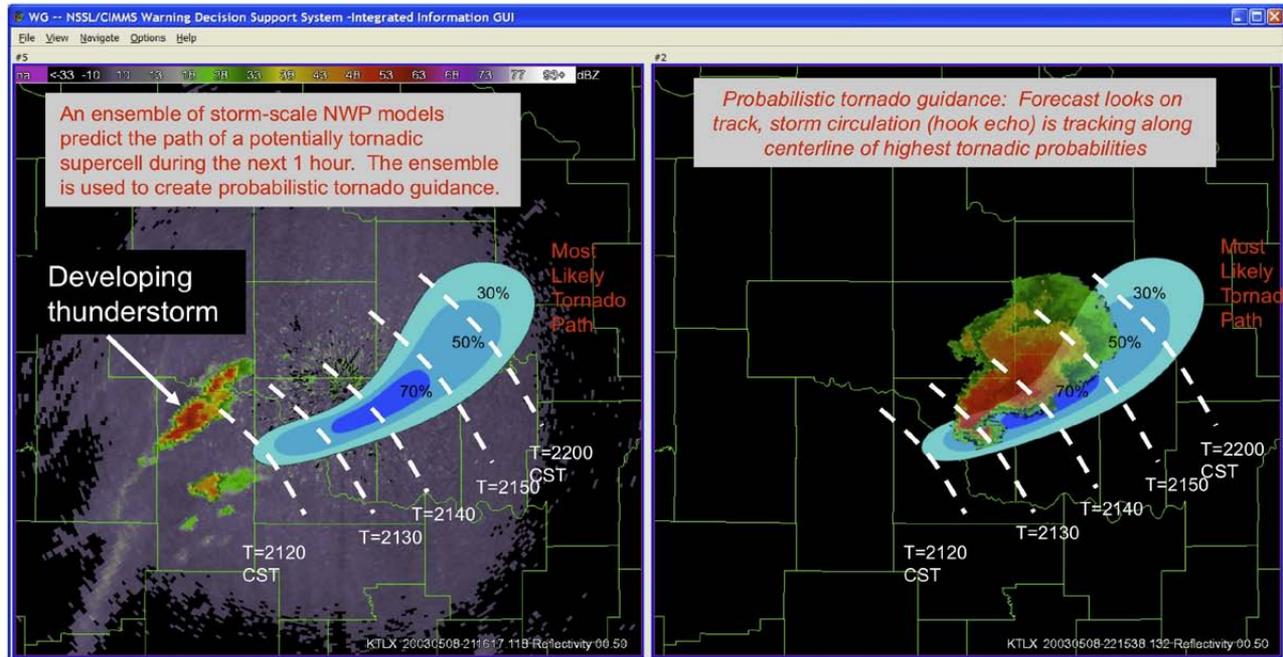
Uniform Components / Uniform processing
Clear air returns / Biological contamination
Test patterns / Radar interference
Calibration issues / Sun spikes / AP clutter

Other Radar Networks

May require QC training for each type of radar (or each individual radar)
Other wavelengths may require dealing with attenuation
Sensitivity & Calibration issues
Non-standard scanning strategies



Warn-on-Forecast: A probabilistic convective-scale analysis and forecast system



- High-resolution 3-d analysis produced every 5 min
- 1-h ensemble forecasts produced every 5 min
 - Provides probabilities of hazardous weather
- Assimilation of **all** available observations



Research Timeline

