



Multi-Radar / Multi-Sensor Applications for Severe Weather Warning Operations

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National Weather Center
Norman, Oklahoma



MRMS-Severe

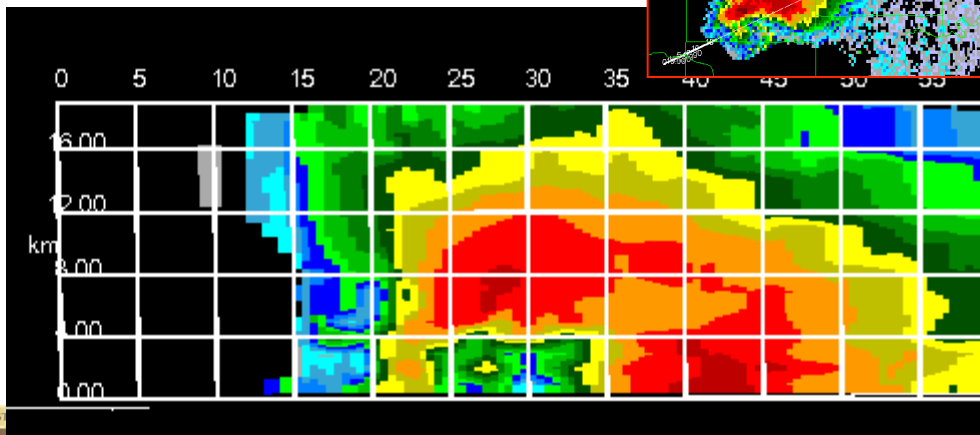
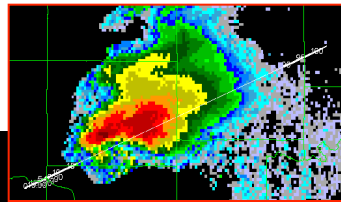
MRMS-Severe

MRMS-Aviation

MRMS-Hydro

• Radars in network supplement each other:

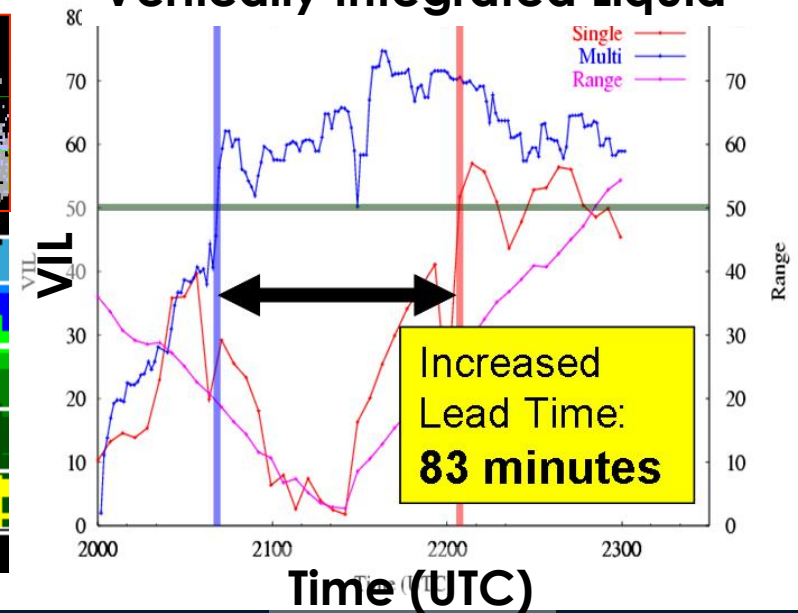
- Overlapping coverage
- Fills in gaps from cones-of-silence and terrain blockage
- Increased sampling frequency
- Seamless, consistent



QPE

Flash Flood

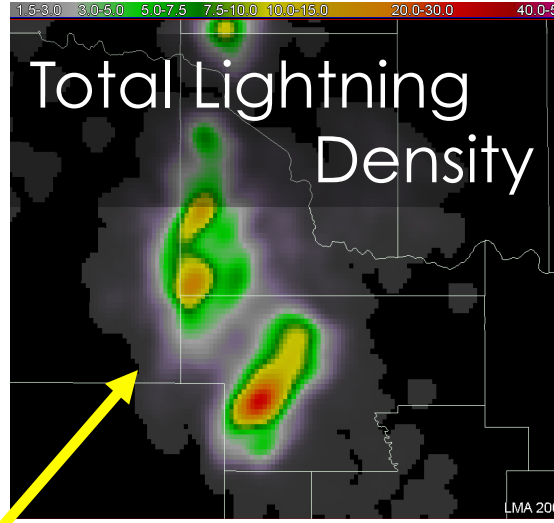
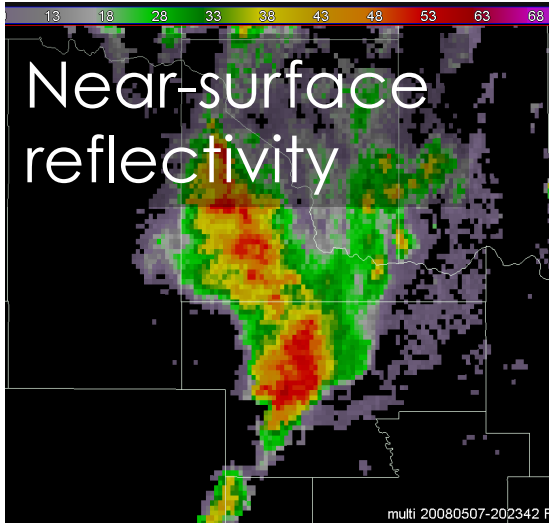
Vertically Integrated Liquid



MRMS-Severe

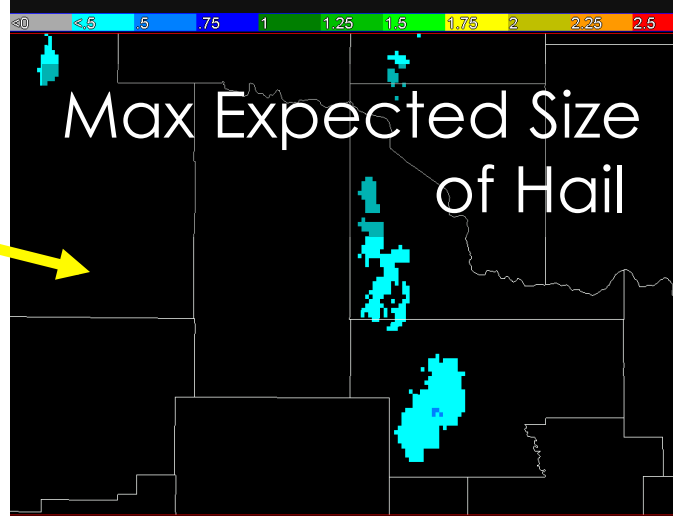
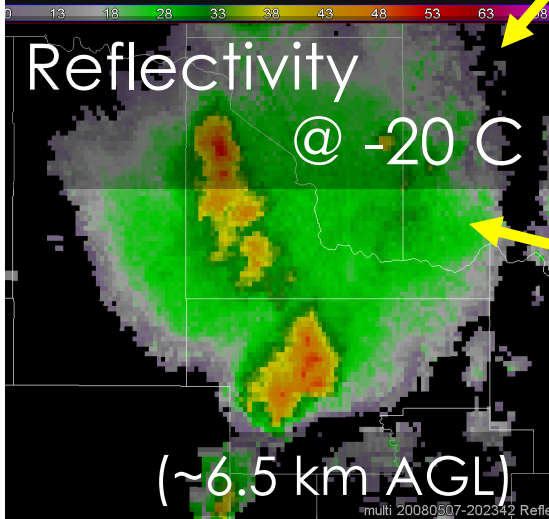
- 2001 – present: WDSS-II available at select NWSFOs
 - Visiting NSSL scientists 2002-2004
- 2005 – present: CONUS real-time WDSS-II system (w/ SPC)
- 2006 – present: Severe Hazards Analysis and Verification Experiment
- 2008 – present: Hazardous Weather Testbed
 - Focus in 2009/10/13/14
 - AWIPS2 integration
- 2008 – present: licensing to private sector
 - e.g. 50% of US TV market





Examples: Multi-sensor data fields

- Show physical relationships between data fields from multiple sensors

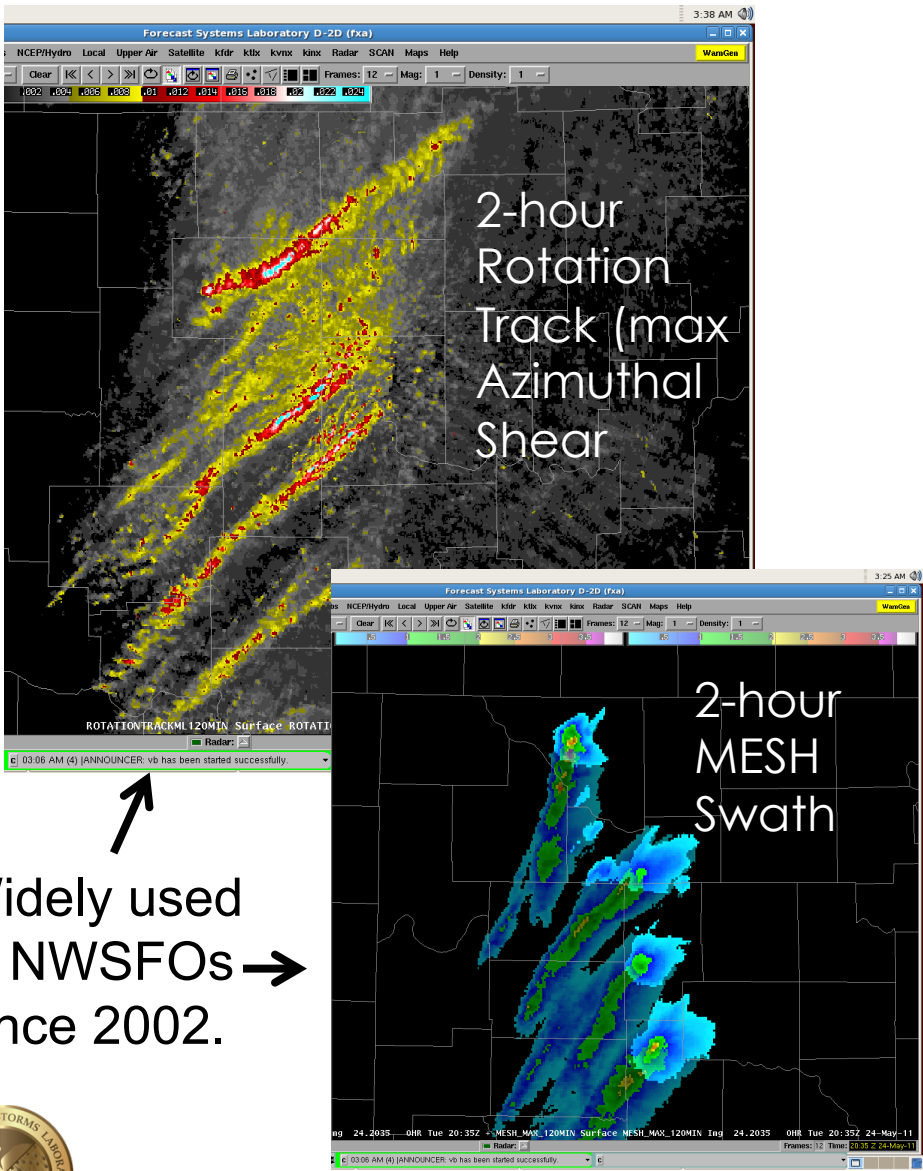


- Storm tracks and trends can be generated at any spatial scale, for any data fields





Initial Operating Capability at NCEP



Widely used in NWSFOs since 2002.

- Rotation Tracks
- Maximum Estimated Size of Hail (MESH) and MESH Swath
- Vertically Integrated Ice/Liquid (VII & VIL)
- Thickness of Reflectivity Core
- Echo Top - 18, 30, 50, 60 dBZ
- Isothermal Reflectivity
- Composite Reflectivity
- Reflectivity At Lowest Altitude (RALA)
- CG Lightning Density
- Lightning Probability

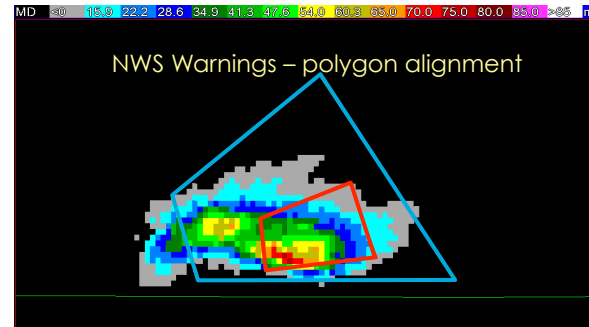


MRMS-Severe Best Practices Experiment

- Collaboration w/ NWS Warning Decision Training Branch
- Forecasters issued warnings with and without MRMS data in controlled setting

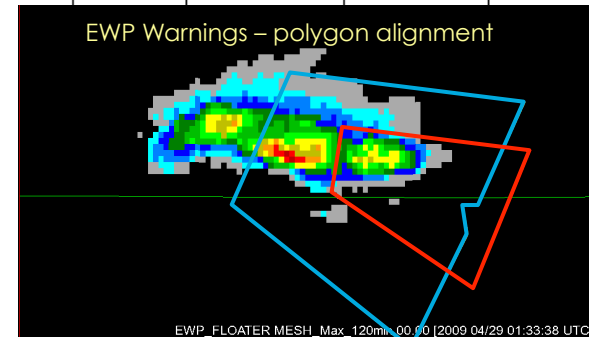
Results:

- Improved warning polygon alignment and precision
- Faster storm diagnosis
- Improved lead time to first severe report

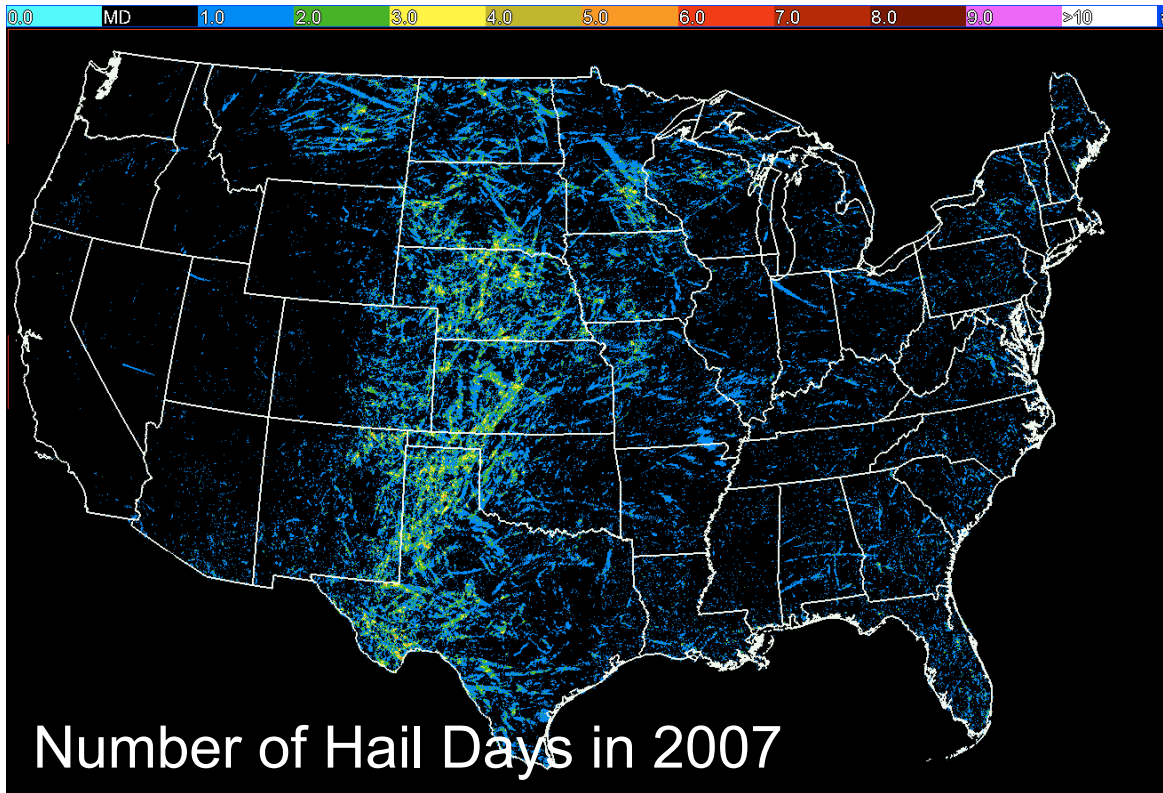


Donavon Technique (All Storms) Timed Test Worksheet (0100-0130Z)

Start: AWIPS2 Clock (Z)	Storm ID	Melting Level	50 dBZ Height	Thickness (50 dBZ Hgt - Melting Level)	Warn ?	Time Elapsed
hh:mm	#	ft	ft	ft	Y/N	mm:ss
0055	1	13 000	34 540	N/A	Y	02:38
0058	2	13 000	N/A	23 230	Y	00:37



What's Next?



- Multi-Year Reanalysis of Remotely Sensed Storms (MYRORSS)

- 15+ years of storm statistics
- FACETs / Probabilistic Hazard Information
- Data Mining

Improvements:

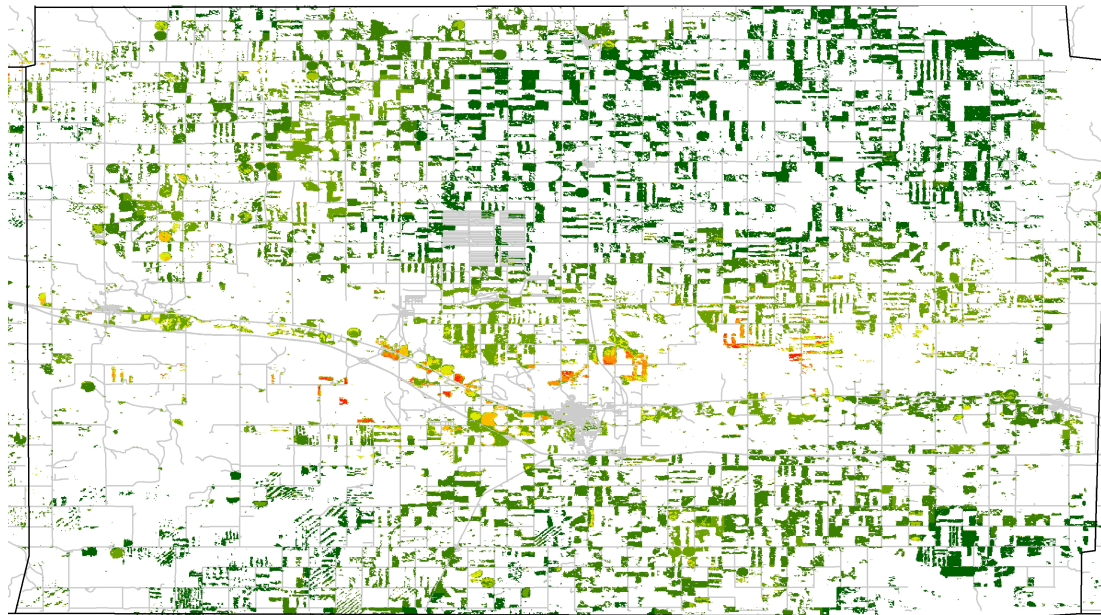
- Rotation Tracks
- Lightning Jump
- Tornado Debris Signature
- Hail size estimates

MRMS & MYRORSS are foundational to the effort to improve NWS warning services

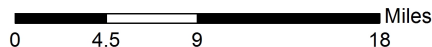
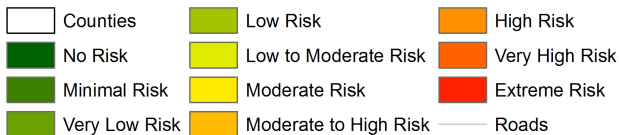


What's Next?

Risk Assessment for Wheat Streak Mosaic Virus From Hail Damage:
Cheyenne County, NE 2011 (from 2010 hail events)



Legend



Provisional Product - Subject to Change
Created By Anthony Nguy-Robertson
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Center for Advanced Land Management Information Technologies
University of Nebraska-Lincoln
Geographic Coordinate System: WGS 1984
Datum: WGS 1984

- Extensive collaboration with the NWS and private sector since 2001.
- Additional user base:
 - Emergency management – FEMA, Red Cross
 - Academia
 - Agriculture
 - Ornithology (bird migration)
 - Insurance / Reinsurance

