

The Transportation Applications Team

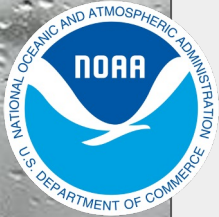
Heather Reeves, PhD
Andrew Rosenow, PhD
Michael Baldwin, PhD

Daniel Tripp, MS
Adam Werkema, MS
Jilliann Dufort, MS

What we do: We develop decision-support tools for the DOT and NWS

Project themes: Road weather, aviation weather, marine weather (in the future)

What we hope to come from this meeting: We want to expand our “team” to include other members of the consortium and widen the scope of what we do





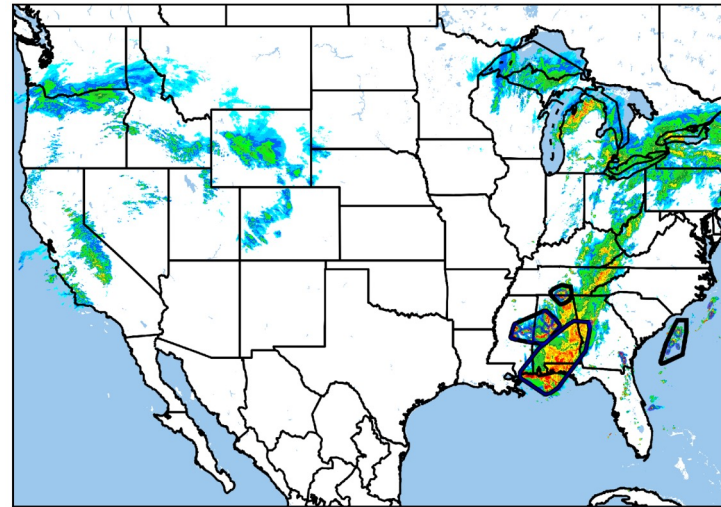
Aviation



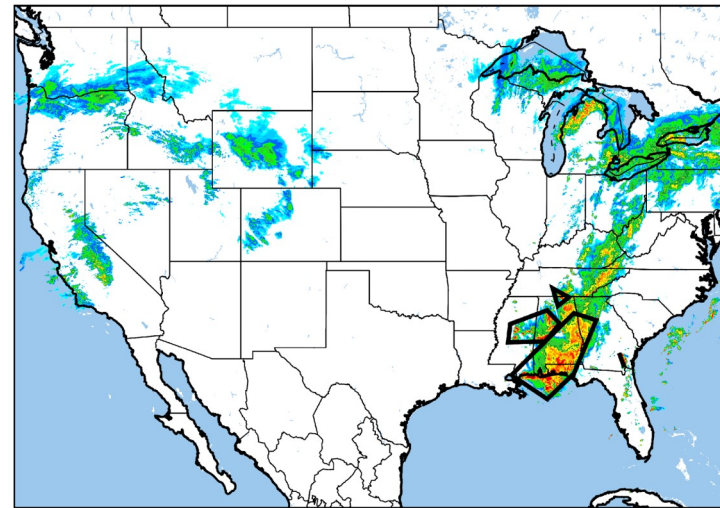
Project 1: Automated Convective Polygons for Aviation Avoidance.

- New algorithm that automatically creates polygons that designate areas dangerous for flight
- Provides a measure of porosity for different flight layers for more effective management of National Air Space (NAS) traffic

AutoSIG: 2100 UTC 07 Feb 2017

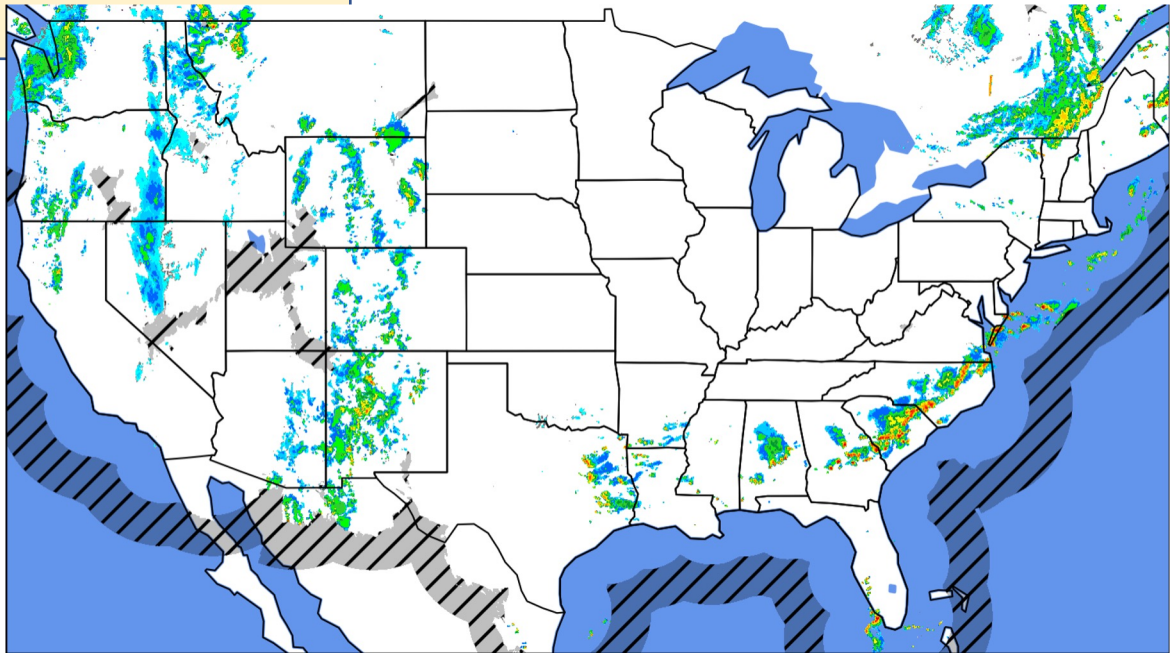


AWC: 2100 UTC 07 Feb 2017



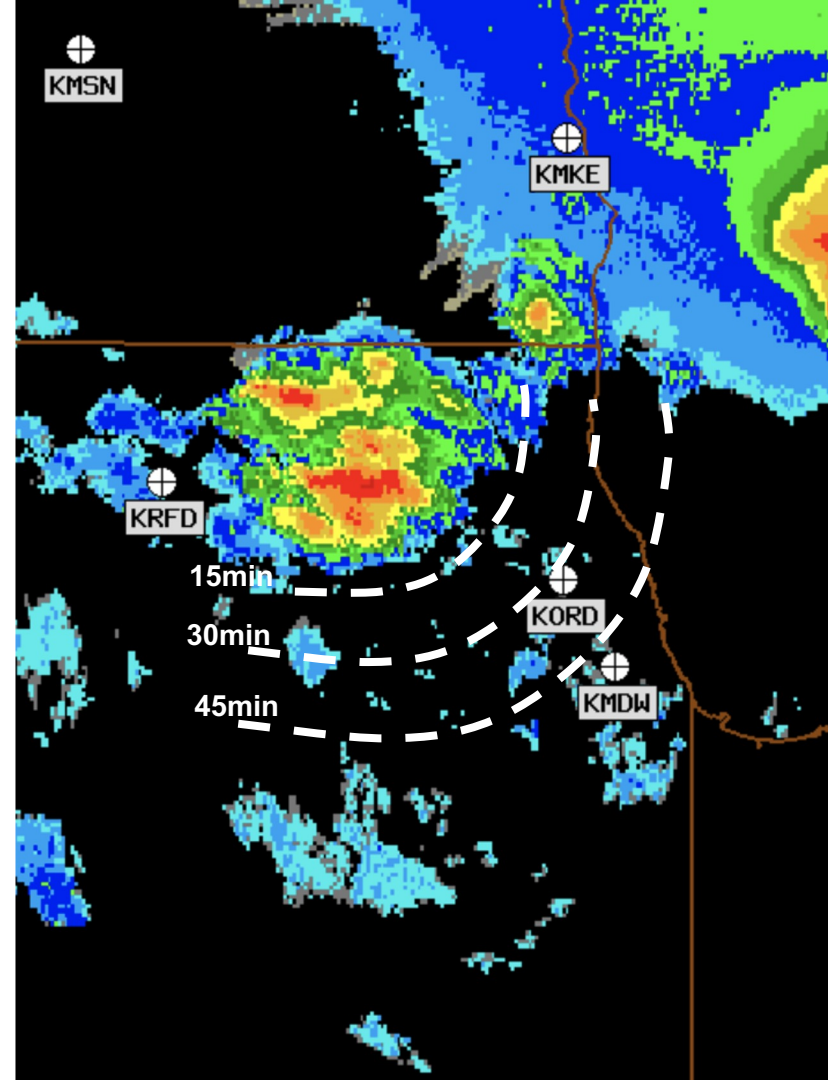
Project 2: Helicopter Emergency Medical Services Tool (HEMS)

- Updating the FAA HEMS mosaic to compute a 0-4 km AGL composite reflectivity (example image on right)
- Areas of poor coverage are flagged
- This new radar mosaic will be a part of Multi-Radar Multi-Sensor (MRMS) system



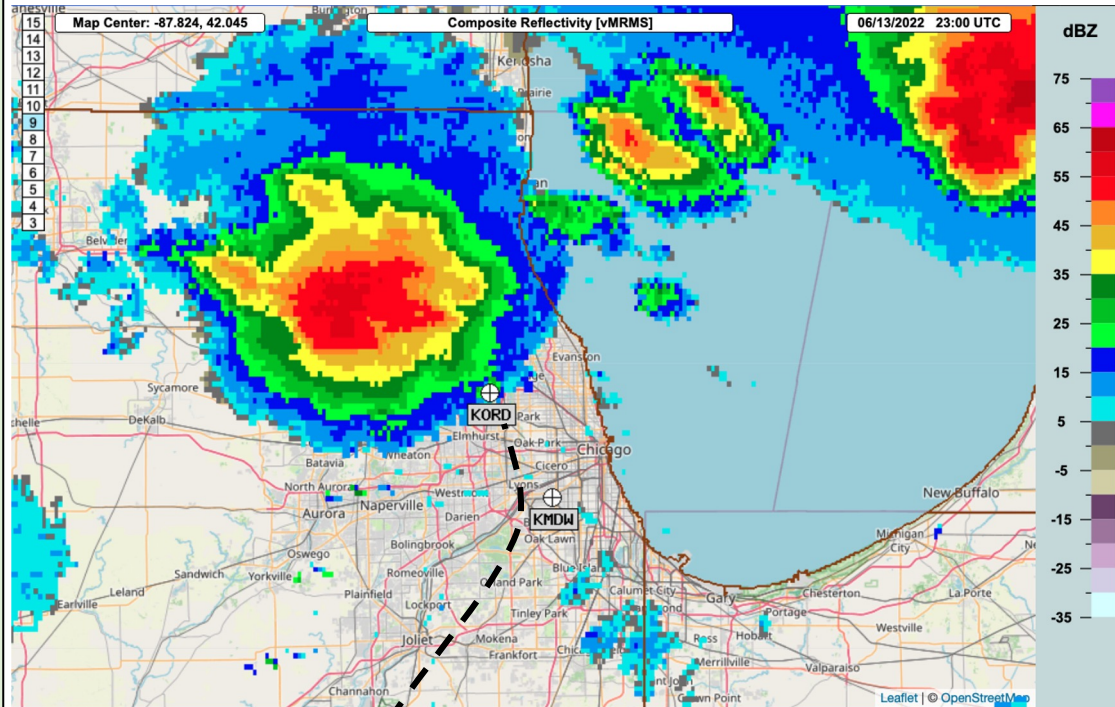
Project 3: Vicinity Thunderstorms Evaluation

- Investigating whether ASOS stations underreport Vicinity Thunderstorms (VCTS) compared to the National Lightning Detection Network (NLDN)
- Evaluate whether MRMS 1-hr lightning probability can be used as a nowcast for VCTS and TS



***Where do we want to go from here?
We'd like to partner on projects
that...***

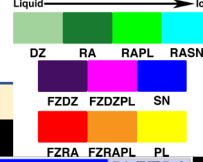
- Develop decision support tools for aviation
- Explore probabilistic guidance for the aviation community
- Investigate the social science behind aviation decision making
- Improve weather guidance for low-altitude flight (e.g. UAS, UAM, etc.)
- Exploit agent-based modeling to assess how well new technology can improve efficiency and safety in the NAS





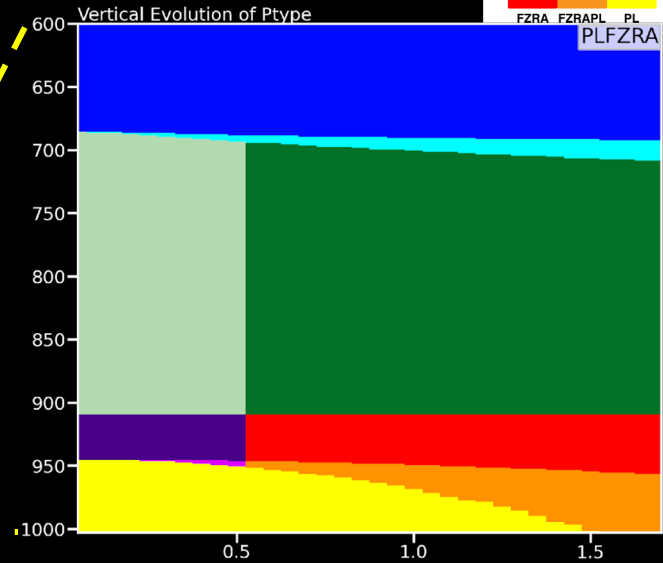
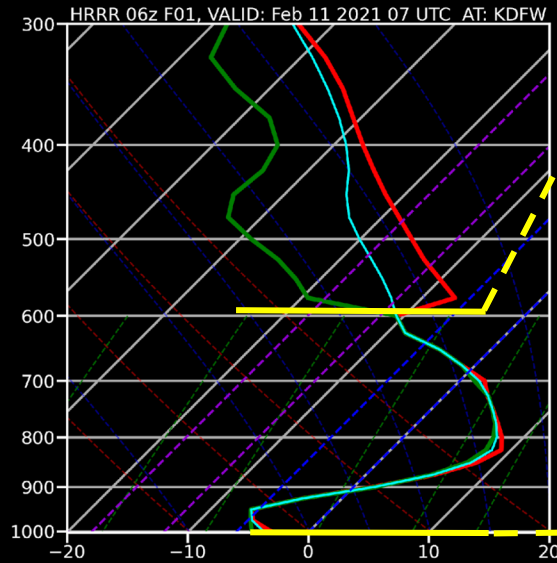
Winter





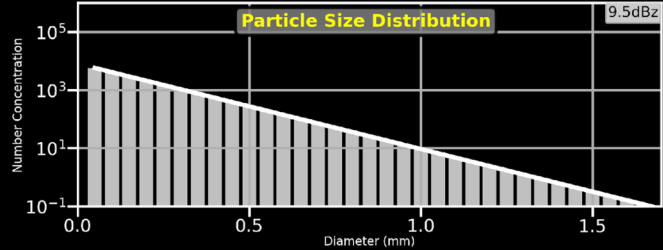
Project 4: Precipitation Phase Diagnosis Using Spectral Bin Microphysics

- New algorithm that provides 3D diagnosis in lowest 10 kft
- Discriminates between FZDZ/FZRA in support of emergent FAA restrictions
- Portable to N-Sharp where forecasters can modify inputs to correct for NWP biases (see graphic at right)



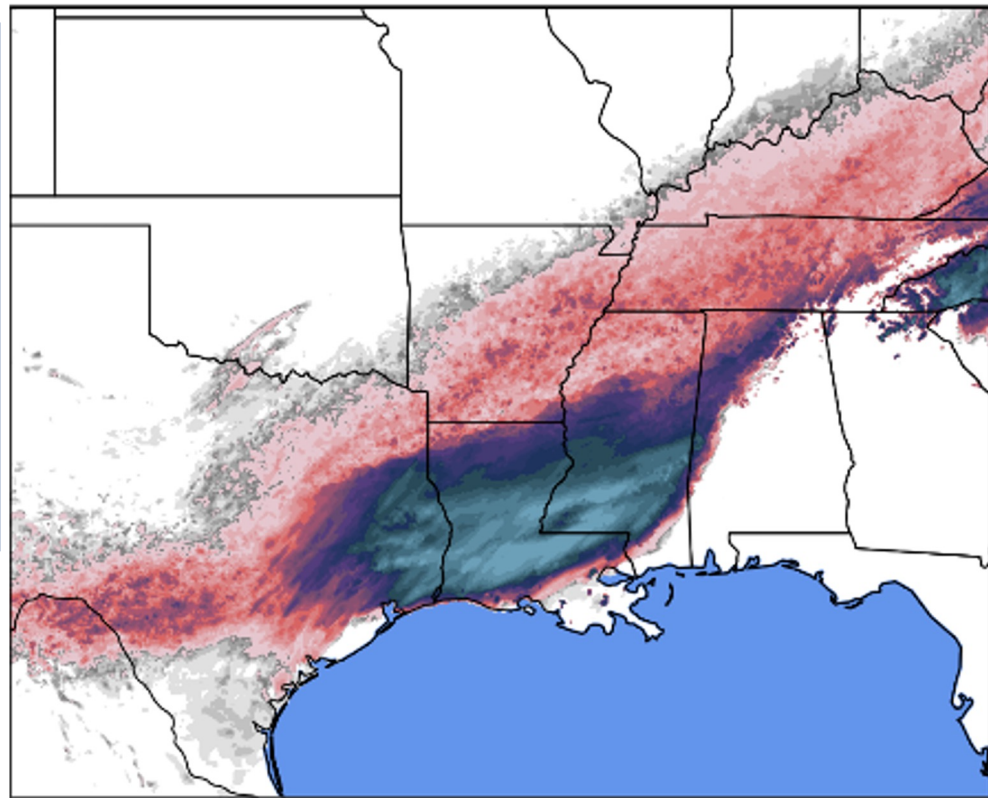
----- Ptype Diagnostics -----

*** Surface ***
 Surface Classification: = PLFZRA
 Liquid Water Fraction: = 0.5%
 Surface Temp: = -3.0°C
 Surface Wetbulb: = -3.6°C
 Surface Dewpoint: = -4.7°C
 *** Elevated ***
 Precip Top: = 600.0 hPa
 Warm Nose Max Temp: = 9.2°C



Project 5: National Gridded Ice Analysis

- Create a CONUS-wide gridded analysis for ice accumulation with the Freezing Rain Accumulation Model (FRAM)
- Adding FRAM to the Multi-Radar Multi-Sensor (MRMS) system
- Perform a retrospective statistical assessment of algorithm performance

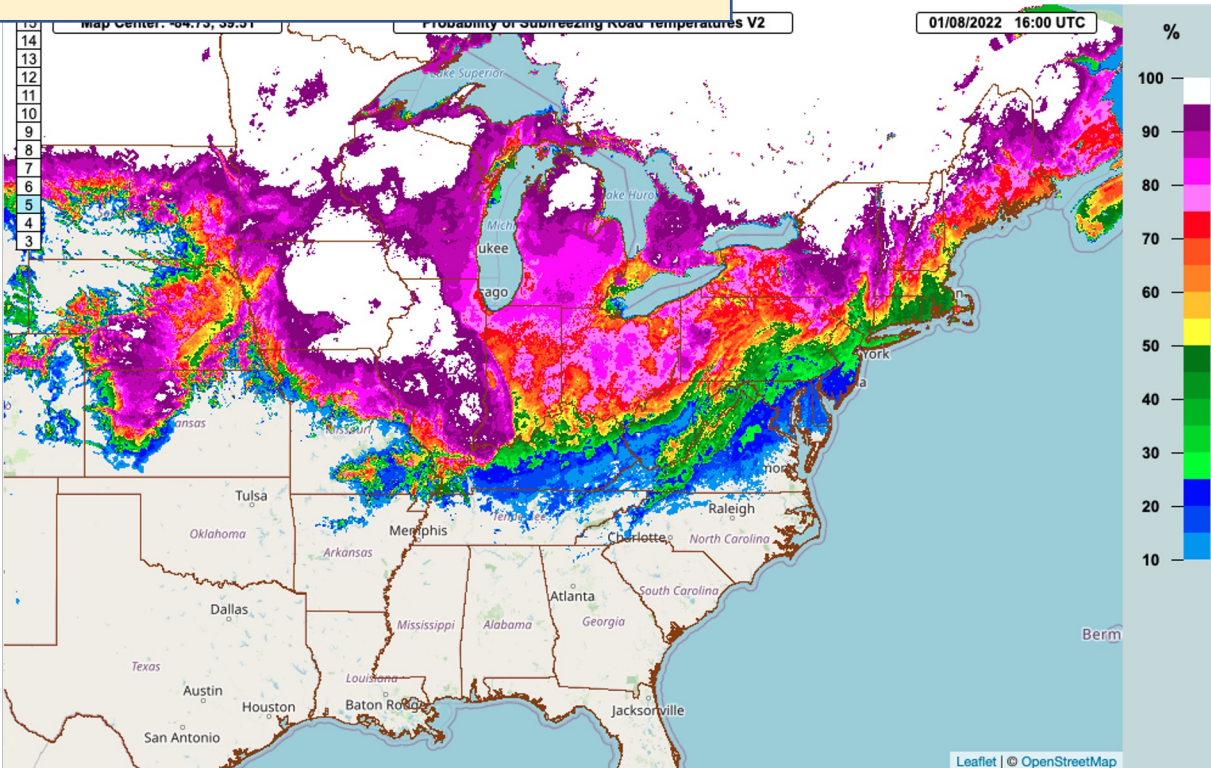


Project 6: LSR Investigation

- Examining the viability of Local Storm Reports (LSRs) for verification and improvement of the Freezing Rain Accumulation Model (FRAM)

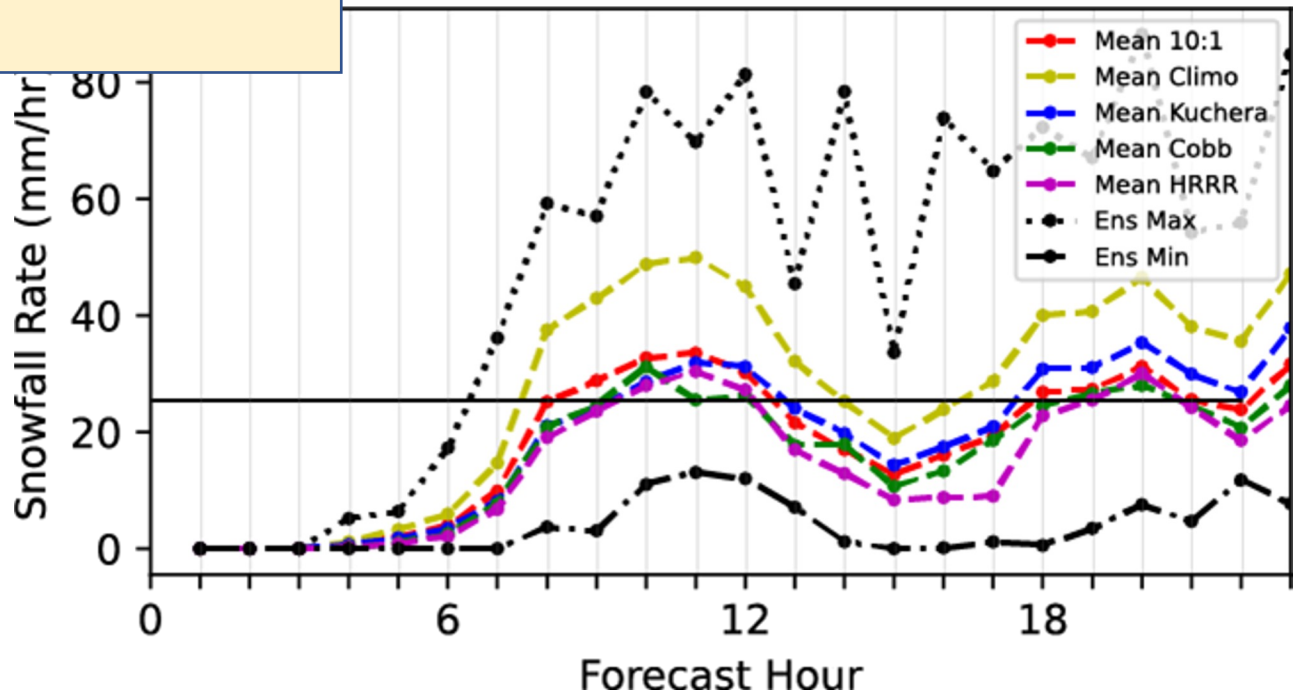
Project 7: Probabilistic Guidance for Sub-freezing Road Surfaces

- Developed a machine-learned algorithm for subfreezing roads
- Provides probabilities for if the road is above/below freezing
- Runs on HRRR model data and is a nowcasting product in the MRMS system



Project 8: Snow Rate

- Investigated Snow-to-Liquid Ratio (SLR) relationships in relation to probabilistic snow forecasting
- Looking at creating snow rate forecasting guidance
- Working on ways to diagnose snow rate in real-time that update quickly, as heavy snow has short average durations



Where do we want to go from here? We'd like to partner on projects that...

- Develop verification tools for winter (e.g. precipitation type, snow rates, ice accumulations, etc.)
- Consider societal impacts and controls on human decision making in the face of hazardous winter precipitation.
- Explore new winter tools that leverage MRMS data
- Develop probabilistic decision support tools for winter weather

Winter

- Precipitation Phase Diagnosis Using Spectral Bin Microphysics
- National Gridded Ice Analysis
- Probabilistic Guidance for Sub-freezing Road Surfaces
- Local Storm Report Investigation
- Snow Rate



Transportation Applications Team Future Work/Collaborations



Aviation

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