The Multi-Year Reanalysis of Remotely Sensed Storms: Past, Present, and Future

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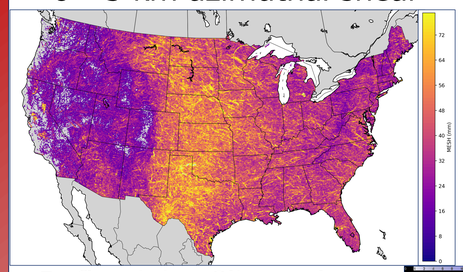
Past

The Multi-Year Reanalysis of Remotely Sensed Storms (MYRORSS) started in 2012. The goal of the project was to reprocess all past WSR-88D radar data with RUC/RAP model analysis into the multi-radar, multi-sensor framework. MYRORSS is currently completed for 1998 – 2011 with a temporal resolution of approximately 5 minutes, a spatial horizontal resolution of 1 degree, and a 35 vertical levels on a staggered grid.

Products of MYRORSS include:

- Composite Reflectivity
- Height of Composite Reflectivity
- 3D Reflectivity CAPPIs
- Reflectivity at 0°C
- Reflectivity at -10°C
- Reflectivity at -20°C
- Reflectivity at lowest altitude
- 0 - 3 km azimuthal shear
- 3 - 6 km azimuthal shear
- Maximum estimated size of hail (MESH)
- Severe hail index
- Vertically integrated liquid
- Vertically integrated ice
- 18 dBZ echo top
- 50 dBZ echo top



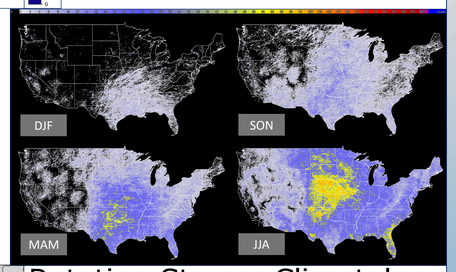
MESH Climatology

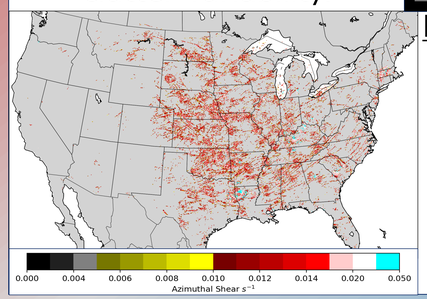
Investigated hourly, seasonal, and monthly trends in MESH.

1998 – 2011 Maximal MESH (left)

Reflectivity Climatology

Investigated seasonal (right) and monthly trends in Reflectivity at -10°C as well as diurnal, geographic, and ground clutter variability.





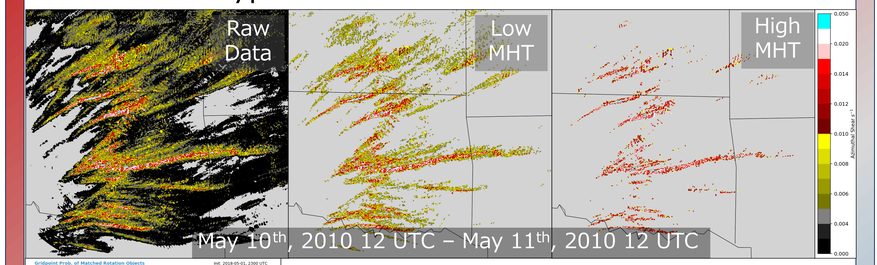
Rotating Storms Climatology

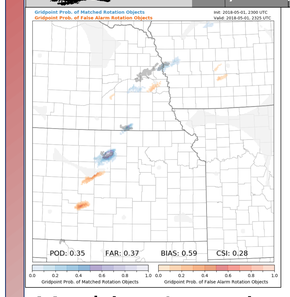
Initial results showed inaccurate range correction within the linear least squares method (LLSD). LLSD was updated in 2017 and azimuthal shear was reprocessed. (Left: 2011)

Present

Quality Control and Research Quality Products

- Finishing QC for reprocessed azimuthal shear.
- Investigating different quality control methods for azimuthal shear to find which values correlate best to certain types of severe weather.





Numerical Model Verification

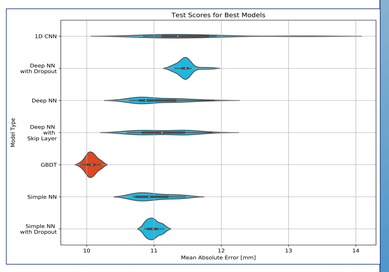
Various versions of quality controlled azimuthal shear are used to verify storm objects within numerical models.

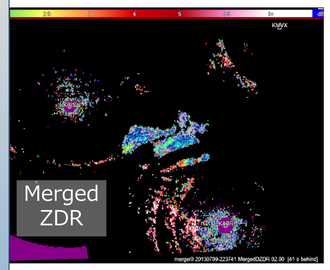
Left: Example of matched and false alarm objects for 1 May 2018

Machine Learning Applications

MRMS vertical profiles are used to train and test different machine learning models to predict hail size (right).

Come to talk 7A.3 tomorrow for more





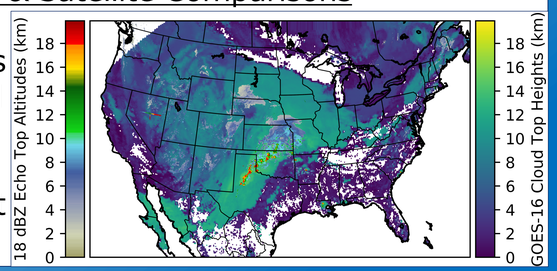
Merged Dual-Pol Products and 3D Azimuthal Shear

Investigating different merging techniques to find best settings for merging dual-pol products and creating 3D azimuthal shear.

Come to poster #1036 tomorrow for more

Radar & Satellite Comparisons

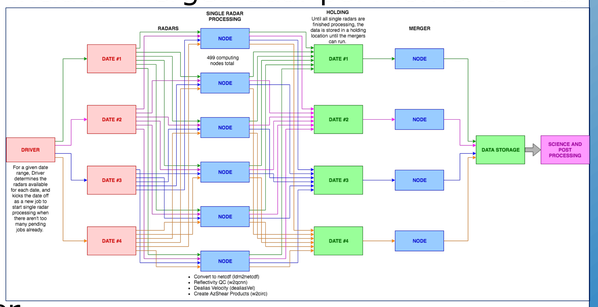
Statistical analysis of MRMS Echo Tops and GOES16 Cloud Top Heights can help identify storms in areas not covered by radar.



Future

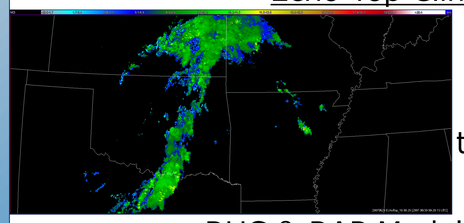
MYRORSS V2.0: the Dual-Pol Era

- 2012 – Present
- 2-minute output versus current 5-minute output
- New products include merged dual-pol moments and 3D azimuthal shear.
- Increased processing power by utilizing the University of Oklahoma's supercomputer.



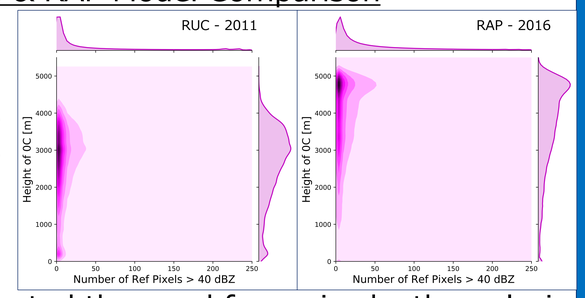
- Differences between using a supercomputing system compared to a distributing computing system have resulted in a complete code rewrite.

Echo Top Climatology



Investigating echo tops will give a spatial and temporal distribution of the strongest storms and their depths.

RUC & RAP Model Comparison



Recent work has shown a difference in the distributions of the heights of 0°C from the RUC and RAP models. This discovery has created the need for an in-depth analysis of the differences between the models and the differences that would occur in the MRMS products.

Collaboration

Have an idea how to use this dataset? Contact us at myrorss-L@lists.ou.edu and if you want to fill out a form to stay up to date: https://bit.ly/2IWECjN

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