Improvements to QPE using GOES visible ABI and model data

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Objective:

Improvements to ScaMPR

(**S**elf-**Ca**librating **M**ultivariate **P**recipitation **R**etrieval):

The GOES-R Rainfall algorithm

•High resolution visible cloud structure

•Cloud-top properties derived from GOES imagery

•NWP model data

Milestones: Year 1

- Obtain SCaMPR software and modify for introduction of new variables.
- Collect initial case studies (current GOES and NMQ).
- Perform enhanced analysis of visible cloud structure for input to SCaMPR
- Extract archived cloud-model output and simulated imagery.
- Perform statistical analysis of added value of new parameters with SCaMPR.
- Compare results with observed and simulated GOES data.

Milestones: Year 2:

- Extend the analysis completed in year 1 to independent cases for further testing of SCaMPR.

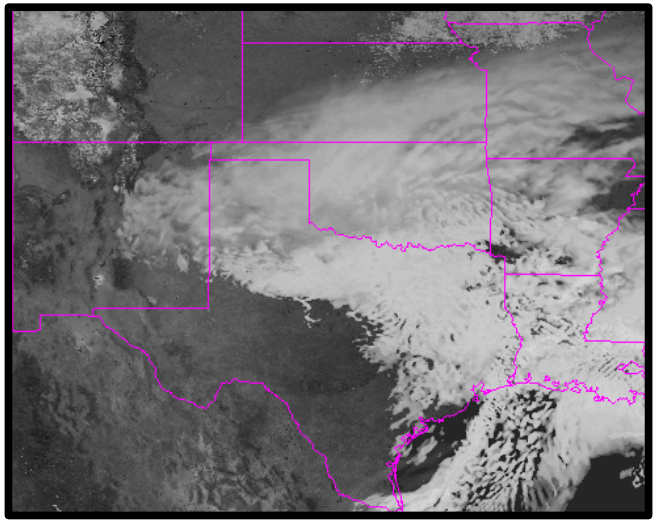
- Setup real time processing of with current GOES data for evaluation of QPE accuracy in site specific areas such as the Tar basin of North Carolina.

- Document and submit results for publication

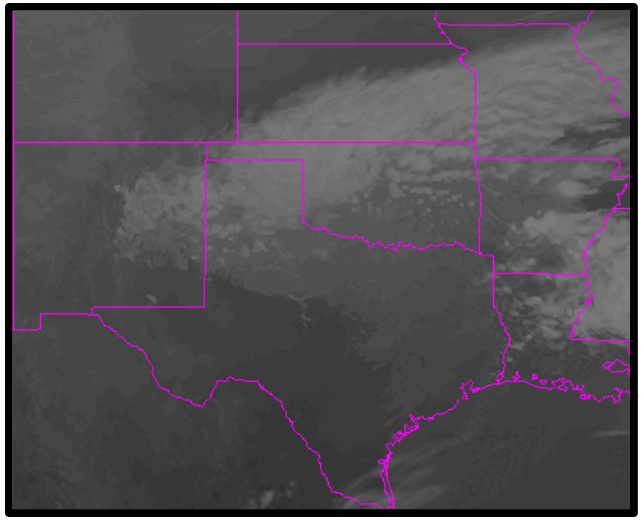
New predictors developed as inputs to SCaMPR:

Devised methods to extract information on precipitation rate versus albedo and Tb from forecast GOES imagery and apply to observed satellite imagery.

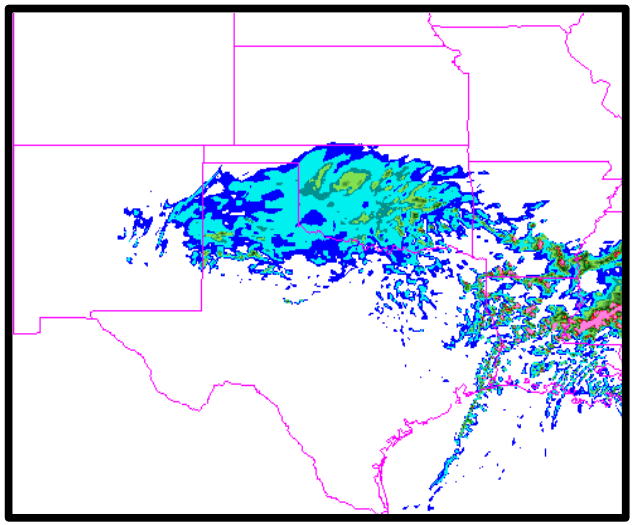
Rain rate associated with Tb and albedo thresholds from nearest NSSL-WRF forecast time: 18 UTC 12 Feb 2013



Forecast Visible Albedo

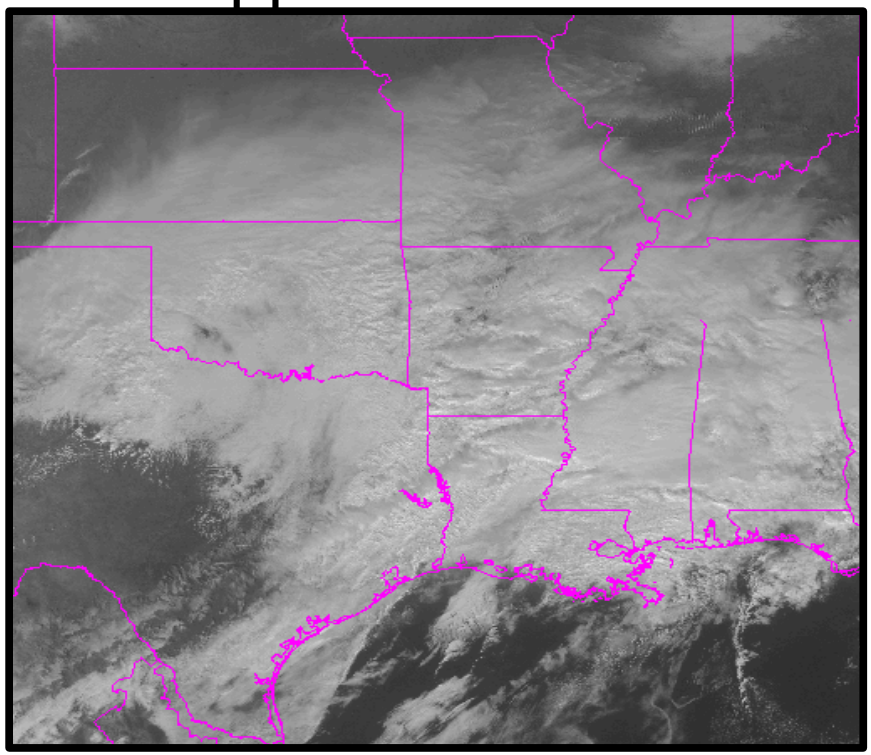


Forecast 11 micron Tb

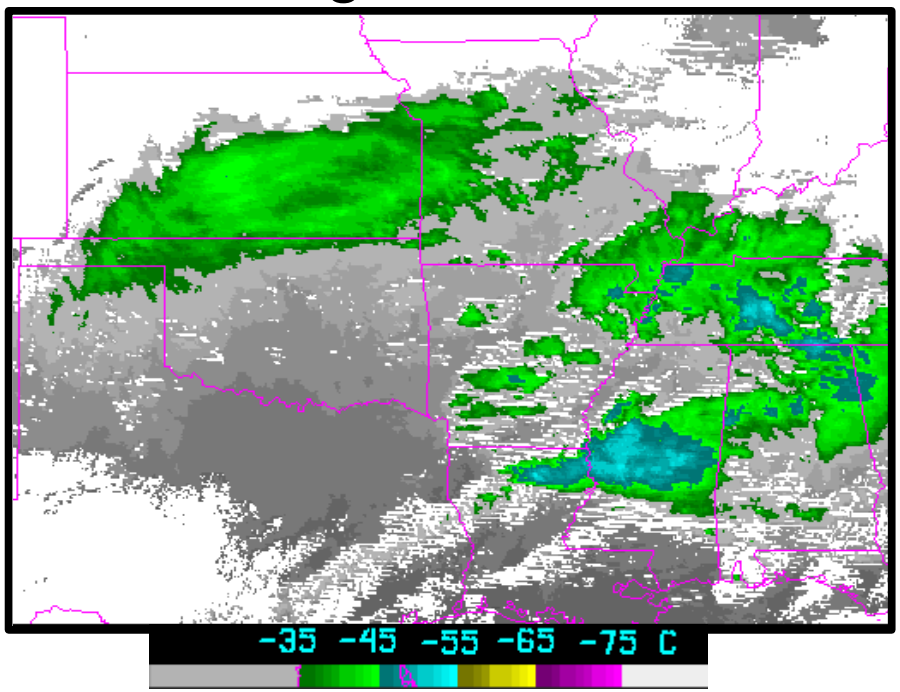


Forecast Precipitation Rate

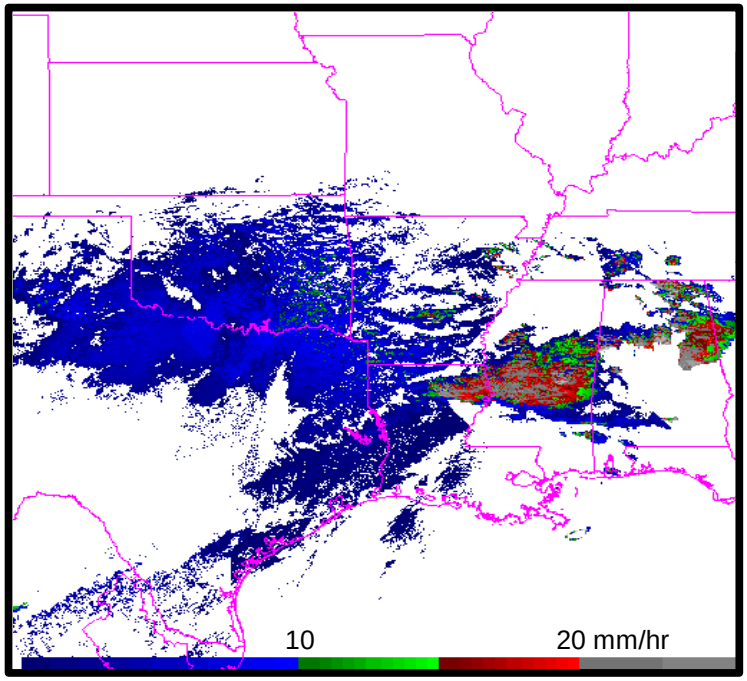
Applied to Observed GOES-13 images: 1815 UTC



Visible

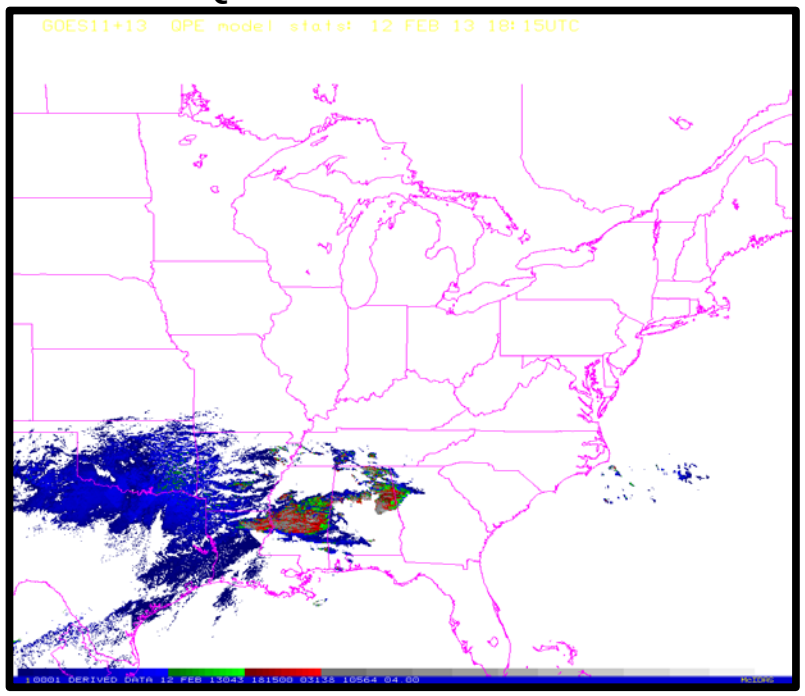


11 micron BT

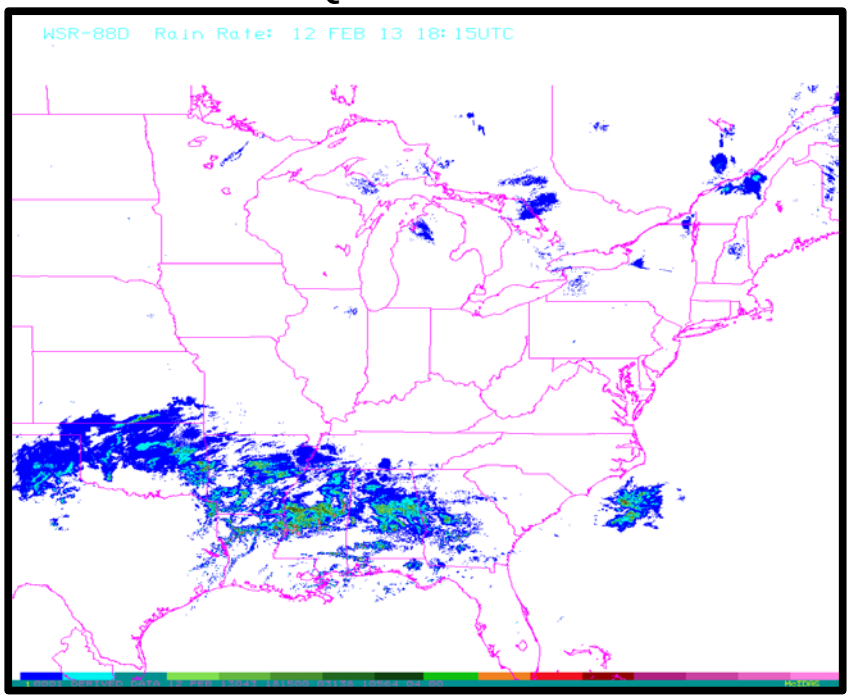


QPE based on WRF Statistics

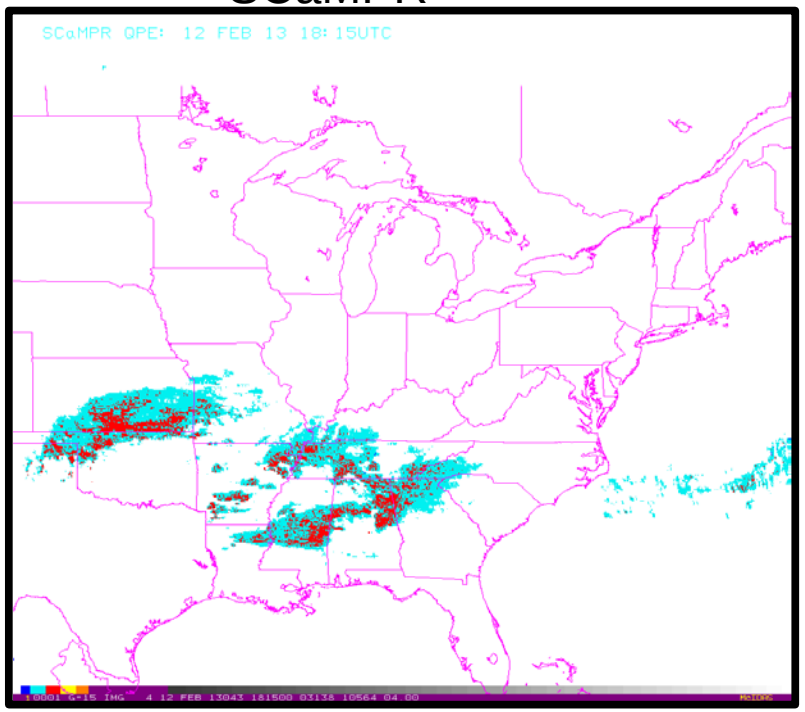
QPE Model Stats



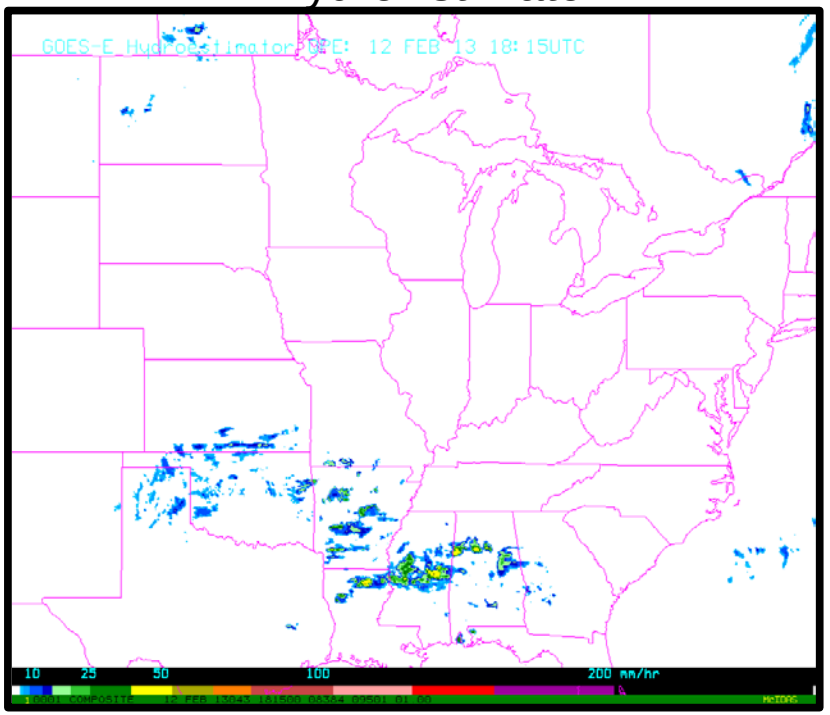
NMQ: Radar



SCaMPR



HydroEstimator



Development and assessment tool:

Web based real time GOES imagery with overlays of cloud-top products,observed (radar: NMQ) and derived QPE

08 February 2013

http://www.nssl.noaa.gov/~rabin/vis_1km/08feb13/loopprec_us_2.html

http://www.nssl.noaa.gov/~rabin/dendritic_img/east/08feb13/vis6_over.html

http://www.nssl.noaa.gov/~rabin/dendritic_img/east/08feb13/vis6_over2.html

12 February 2013

http://www.nssl.noaa.gov/~rabin/vis_1km/12feb13/loopprec_us_2.html

http://www.nssl.noaa.gov/~rabin/dendritic_img/east/12feb13/vis6_over.html

http://www.nssl.noaa.gov/~rabin/dendritic_img/east/12feb13/vis6_over2.html

Winter Storms: Inferring areas of dendritic ice growth

http://www.nssl.noaa.gov/~rabin/dendritic_img/east

25 February 2013

http://www.nssl.noaa.gov/~rabin/dendritic_img/east/25feb13/vis6_over.html

http://www.nssl.noaa.gov/~rabin/dendritic_img/east/25feb13/vis6_over2.html

Future Plans

- Use of Optical Depth from forecast model and GOES product
- Incorporation of QPE product into SCaMPR
- Quantitative Statistical Evaluation Tool
- Testing and validation in all seasons