

# NASA SPoRT's Pseudo Geostationary Lightning Mapper (PGLM)

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GOES-R Science Week Meeting

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Huntsville, Alabama

# Outline

**What is SPoRT?**

**Current Lightning and GLM Activities**

**What is the Pseudo GLM?**

- Origin
- Why is it being used
- Operational examples

**Conclusions and Future Work**

# The NASA SPoRT Program

**Mission:** Apply unique NASA Earth science research and observations to improve the accuracy of short-term (0-24 hr) weather prediction at the regional and local scale – work mainly with WFOs

## **SPoRT Paradigm**

- Match observations/capabilities to forecast problems
- Develop / assess solution in “testbed”, transition to decision support system
- Conduct training, product assessment and impact
- Do not throw data “over the fence”



<http://weather.msfc.nasa.gov/sport>  
<http://weather.msfc.nasa.gov/sportblog>

# Current Lightning Work

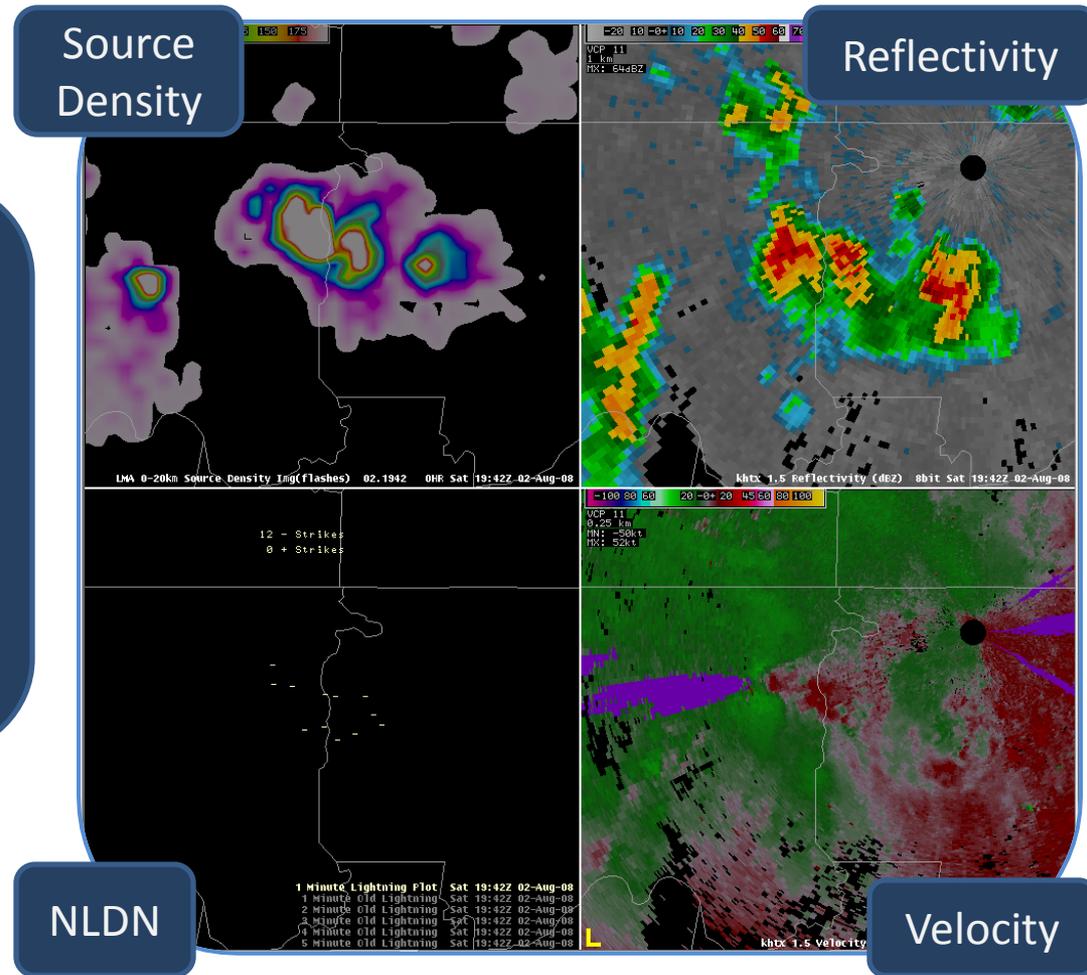
First transition in 2003

- North Alabama Network
- Now work with 5 WFOs
- Use three networks

Producing new training modules

Developing new visualizations

Preparing for AWIPS II



# Current GLM Activities

The screenshot shows a presentation slide titled "Geostationary Lightning Mapper: Summary" from the NASA SPoRT's Pseudo GLM Training Module. The slide features a central map of the Earth showing the GLM domain for GOES-East or West Positions, with a color scale for "Flashes km<sup>-2</sup> yr<sup>-1</sup>". The slide is divided into several sections:

- Nowcast and Climate Applications in one sensor:**
  - Sub radar volume scan times
  - Full disc domain
  - Coverage in data sparse regions
  - Geostationary
- Where are we now?**
  - Launch in several years
  - Necessitates the pseudo GLM

Additional text on the slide includes "GLM Domain for GOES-East or West Positions" and "OTD + LIS lightning climatology (1995-2005)". The slide is presented in a Mozilla Firefox browser window with a sidebar containing a table of contents and a navigation bar at the bottom.

Funded as part of GOES-R Proving Ground and Risk Reduction

Spring Program Participant

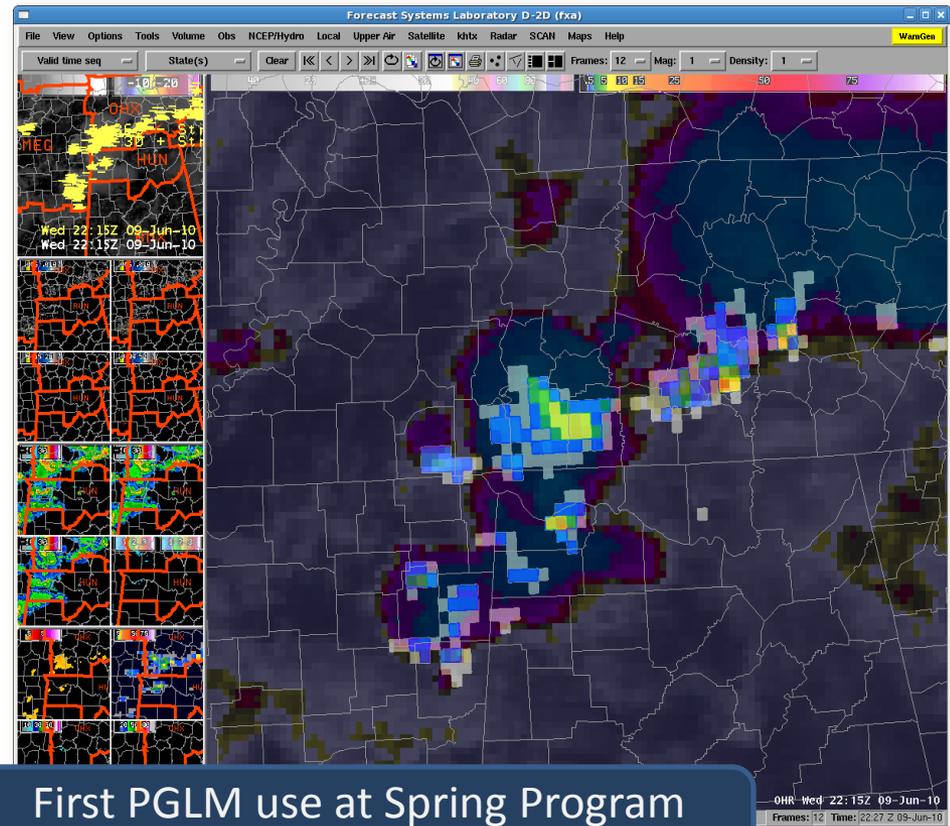
Prepare forecasters for GLM

- Start with Pseudo-GLM (PGLM)
- Providing data
- Providing training
- Eventually GLM proxy

Training Module Used for the Spring Program

# Origin of the Pseudo GLM

- Came from 2009 Spring Program
- No viable product to demonstrate
- Used “smeared” source density
  - Or standard source density
  - AWG proxy not available
- Needed 3 things
- Flash-based product
  - GLM resolution
  - Make for all ground networks



First PGLM use at Spring Program (2010) and overlaid on IR image

# What Is the Pseudo GLM?

Uses only ground-based data

- GLM is optical based
- PGLM not trained with LIS

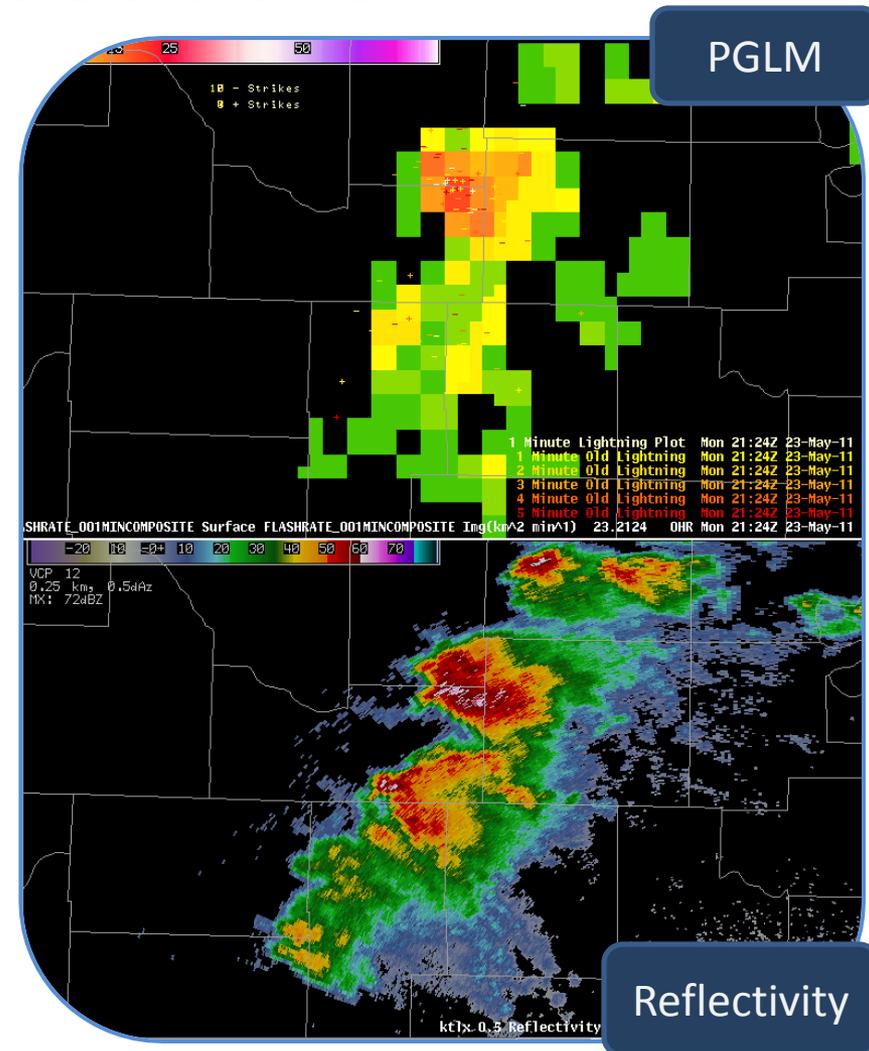
Flash extent density

- Uses GLM resolution
- GLM flash output
- Used in 2010 and 2011

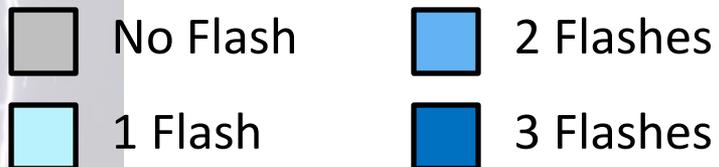
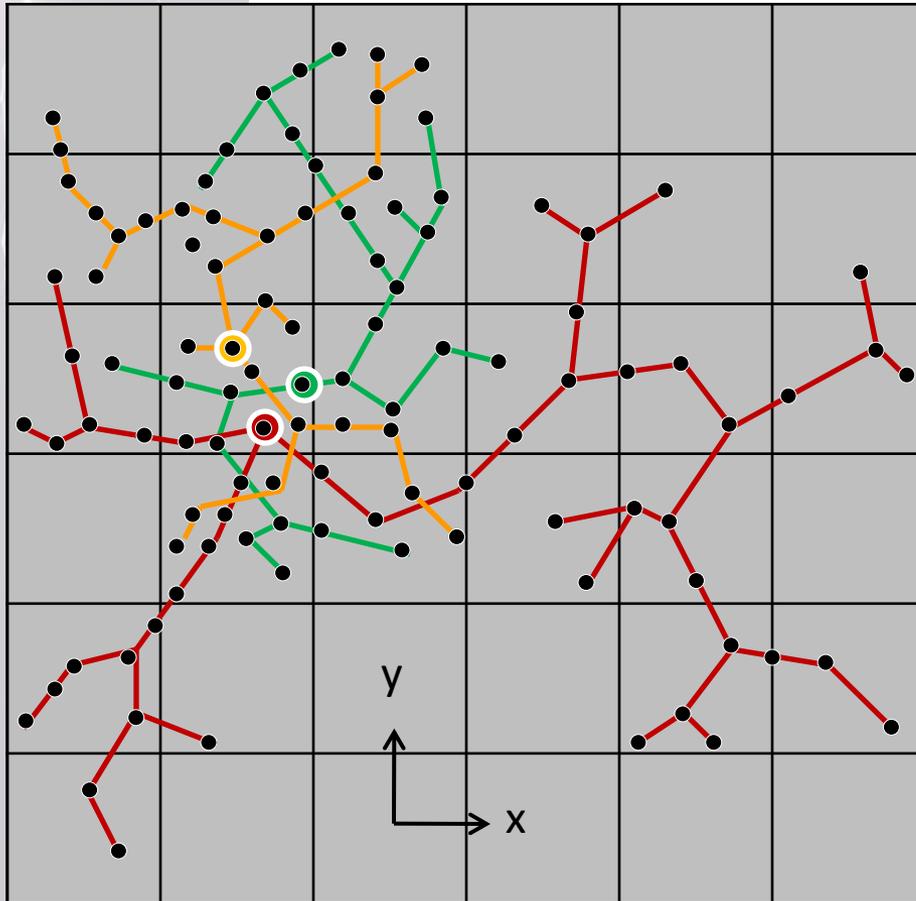
Collaboration with NSSL

- SPoRT sends raw data
- NSSL processes locally

Endorsed/funded by Proving Ground



# Making the PGLM



Start with raw sources

Algorithm recreates flashes

- First find initiation points
- Match sources to flashes

Place flashes on a grid

- Count how many flashes in each 8 km box
- Flash only counted once per box

Final product is the Pseudo GLM flash extent density

# Why Use the PGLM?

PGLM is NOT a GLM proxy

What is the point then?

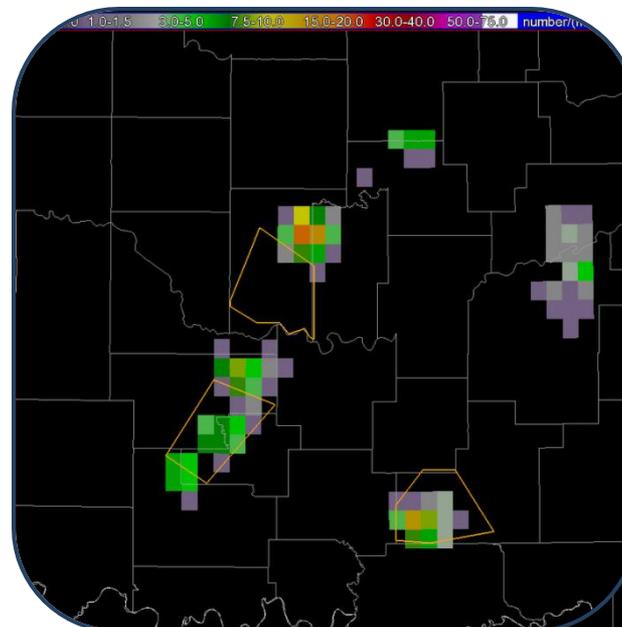
Demonstration tool

- Work with select end users
- Total lightning and GLM learning
- Easy to implement

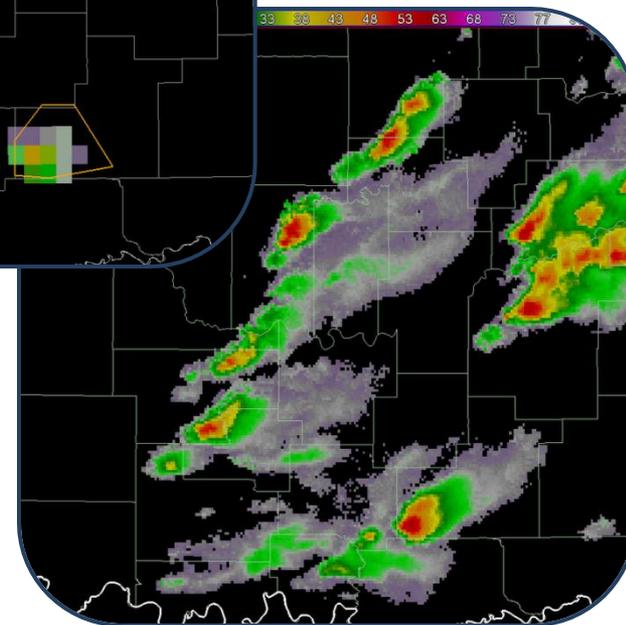
Focus of discussion

- How to use lower resolution
- Develop operational plans

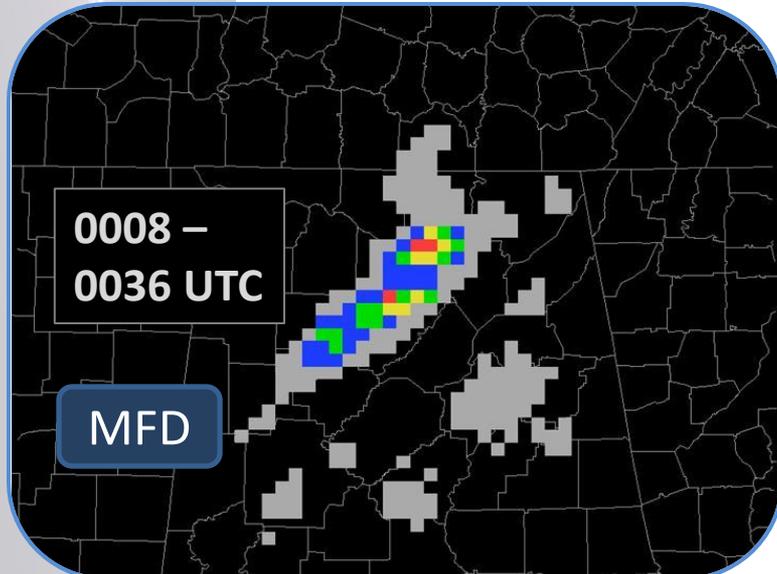
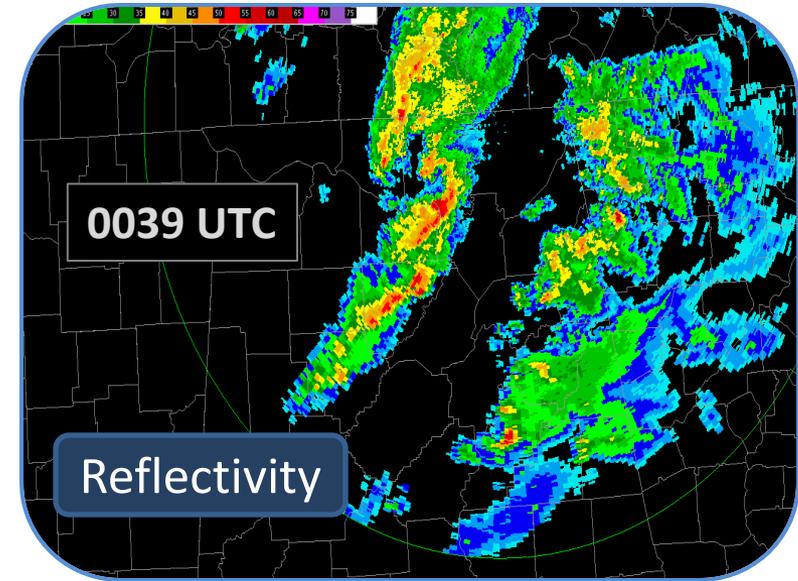
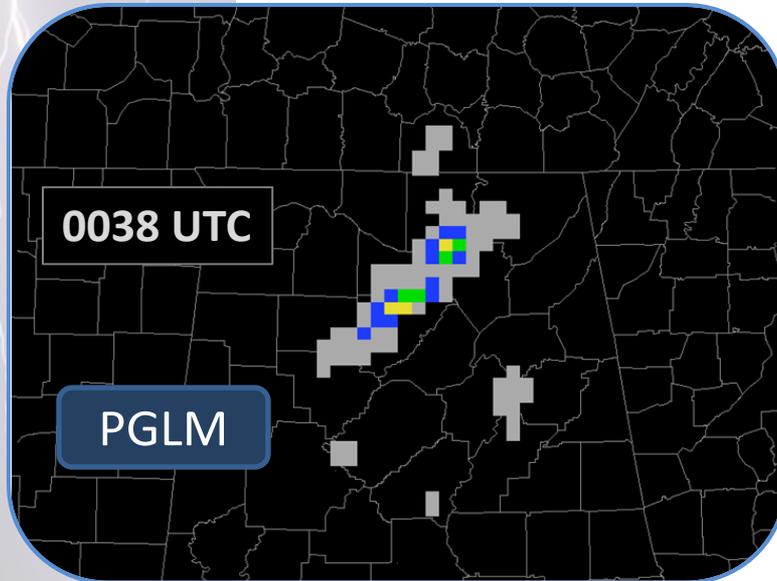
SPoRT can produce this 24/7



PGLM used  
for warning  
in Spring  
Program

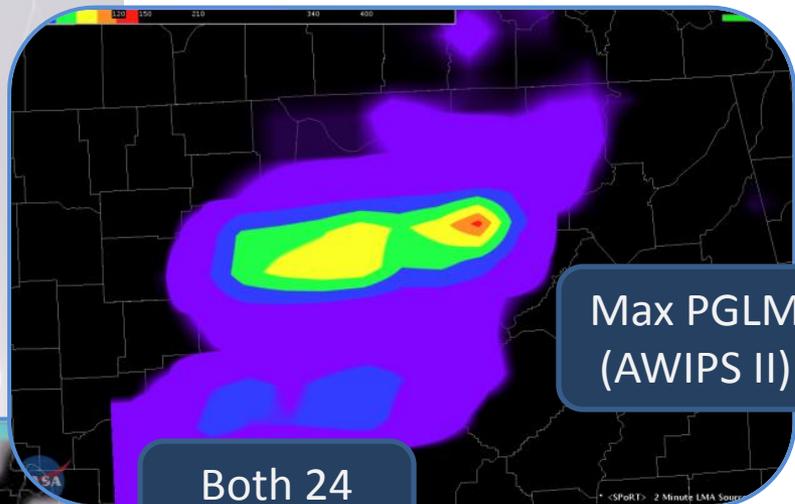


# Example Maximum Flash Density



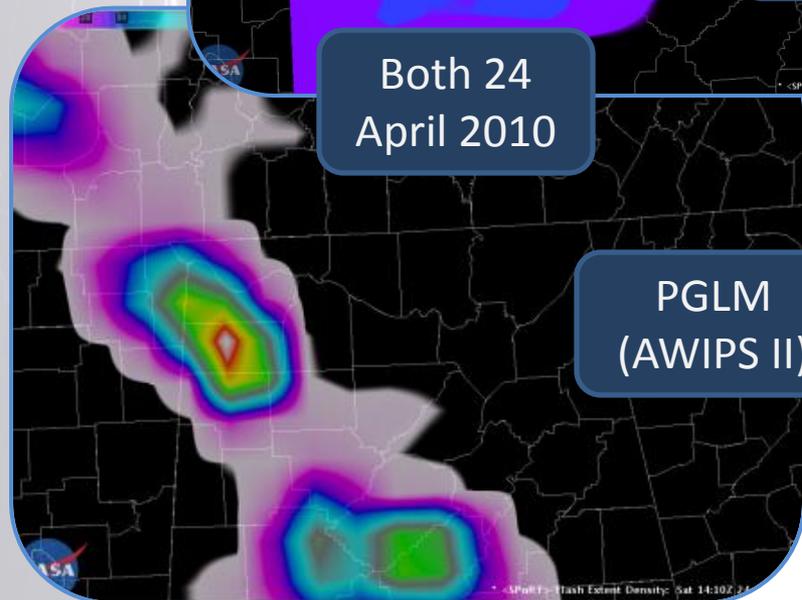
- Compare PGLM to MFD
  - What has changed?
- MFD shows lightning cores
- Shows spatial extent
  - Lightning safety

# Other PGLM Uses



Max PGLM  
(AWIPS II)

Both 24  
April 2010

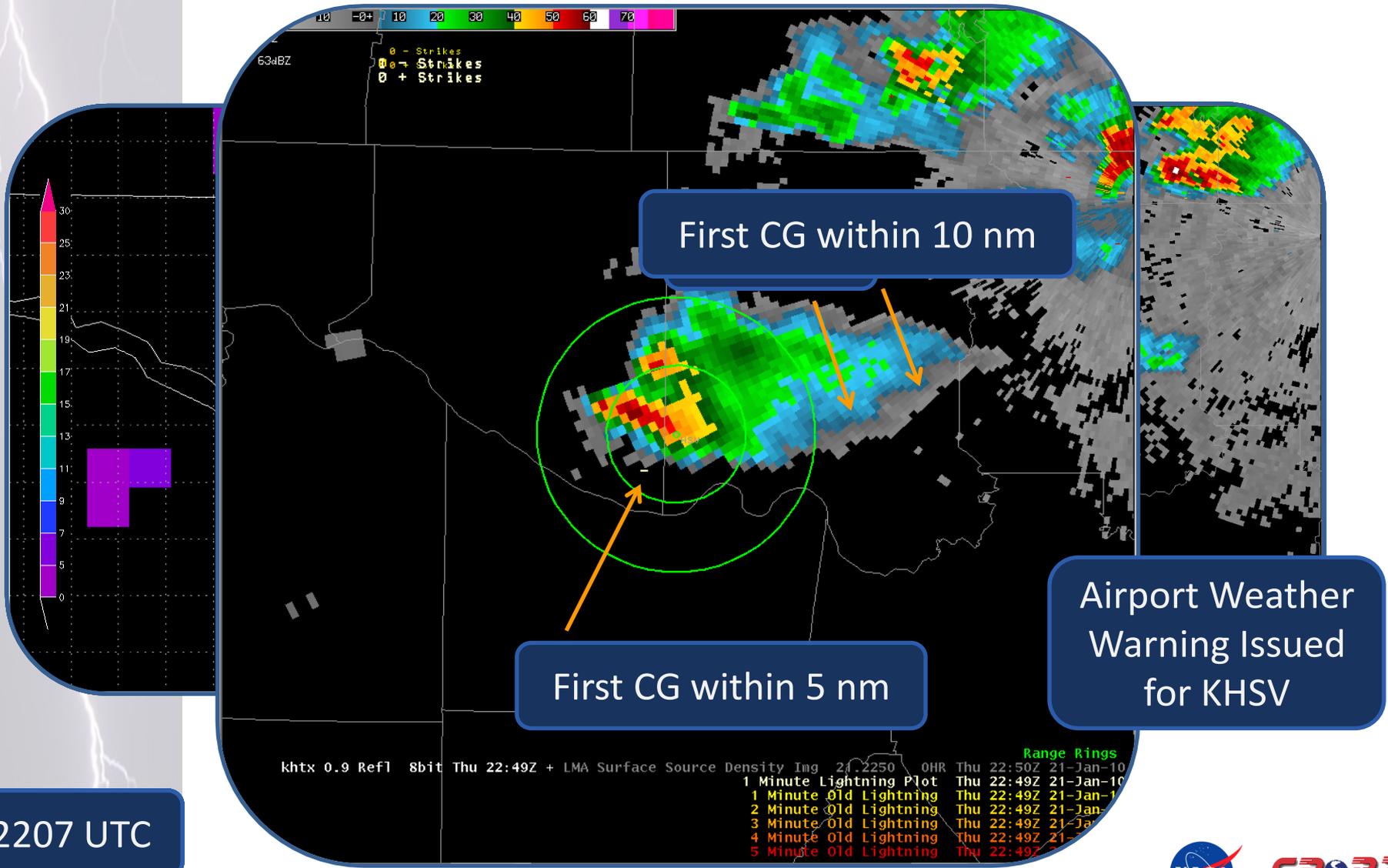


PGLM  
(AWIPS II)

Tool for new visualizations

- Integrate with other tools
- New products
  - Max density
  - Flash initiation density
  - Others?
- Transitioned to AWIPS II
  - Future decision support
  - Aid with AWG proxy

# Operational Example



# Looking Forward

The PGLM is a Demonstration tool

- Stop-gap until AWG proxy
- Available for any network
- Train about total lightning
- Train about the GLM

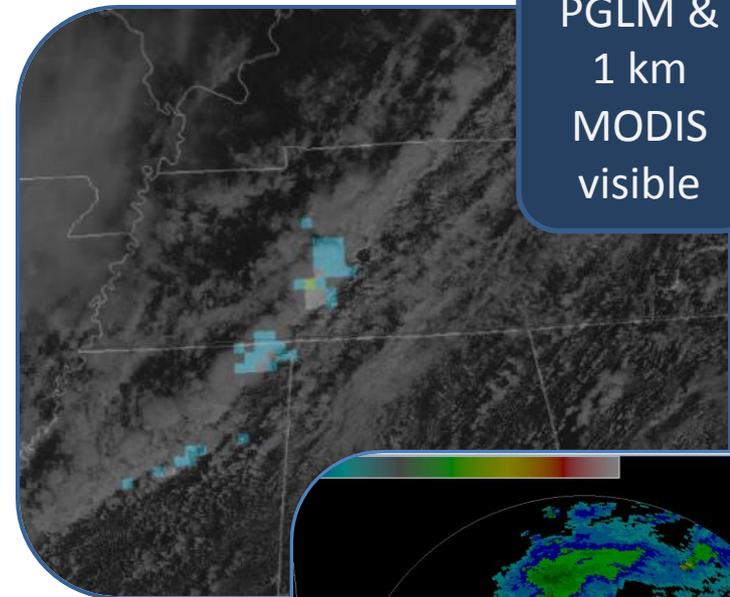
Discussion for development

- Led to maximum density product

Technical aid

- AWIPS II development
- Operational procedures

Spring Program feedback positive



PGLM &  
1 km  
MODIS  
visible



PGLM Flash  
Initiation  
and  
Reflectivity

# Questions

## E-mail

- [geoffrey.stano@nasa.gov](mailto:geoffrey.stano@nasa.gov)

## SPoRT Webpage

- [weather.nasa.gov/sport](http://weather.nasa.gov/sport)

# Outline