

# Update on the Lightning Warning Algorithm

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GOES-R GLM AWG/R3 Science Meeting

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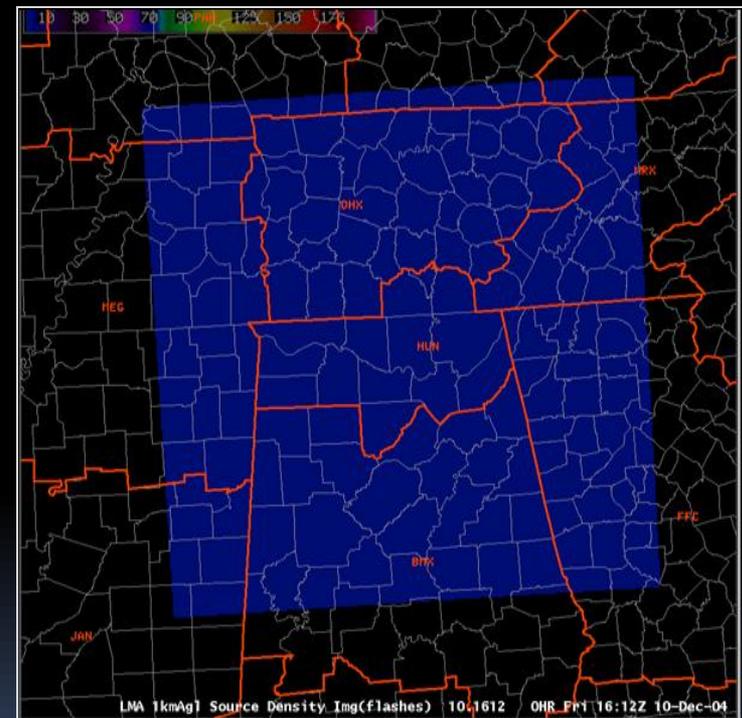
# Lightning Warning Product Goals

- Gridded fields of lightning probability
  - Probability in 5 minute intervals
  - Extend out to 30 minutes
  - Additional probability for cloud-to-ground strikes

# Only Using Lightning Data

- Use data from NALMA for total lightning observations
- Lightning must already be occurring (i.e., not forecasting first lightning)
- NALMA Domain 460 by 460 km
- 10 km resolution

NALMA Domain



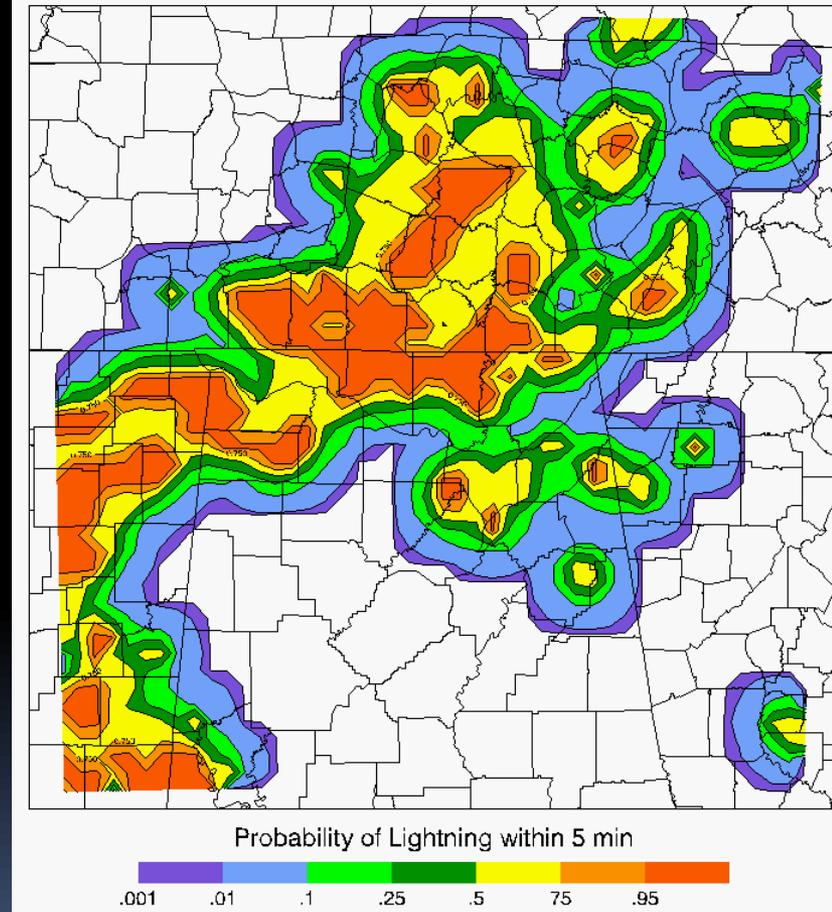
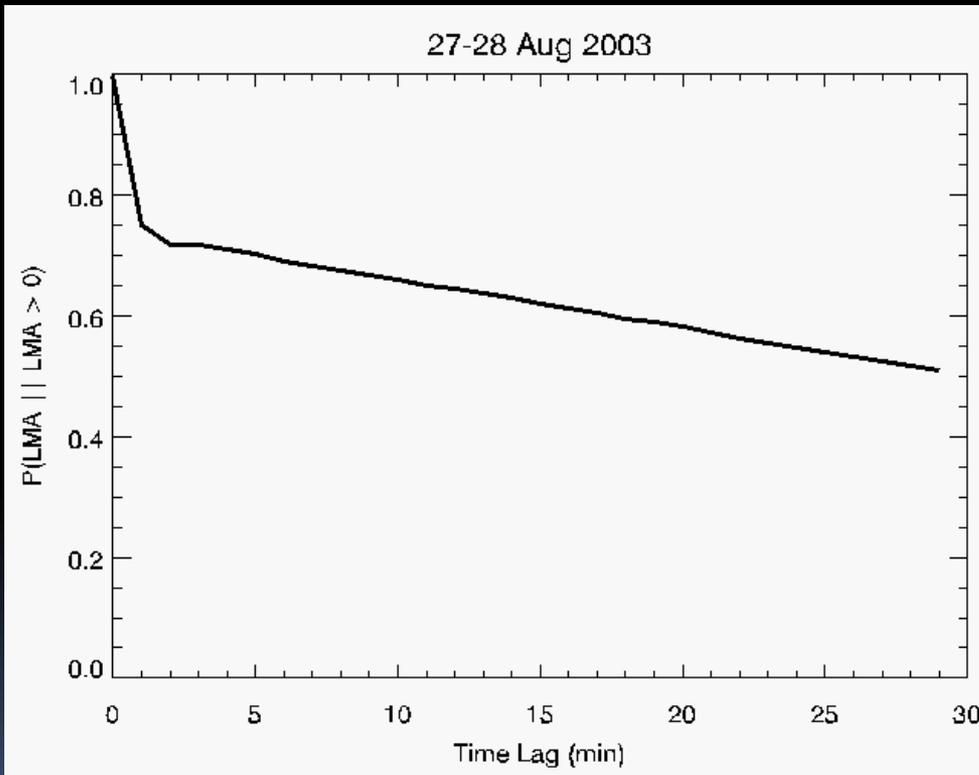
# Current Lightning Warnings

- Current lightning warnings are mostly for locations or regions (KSC, airports)
- Some NWS offices issue “excessive lightning alerts”

# Methodology

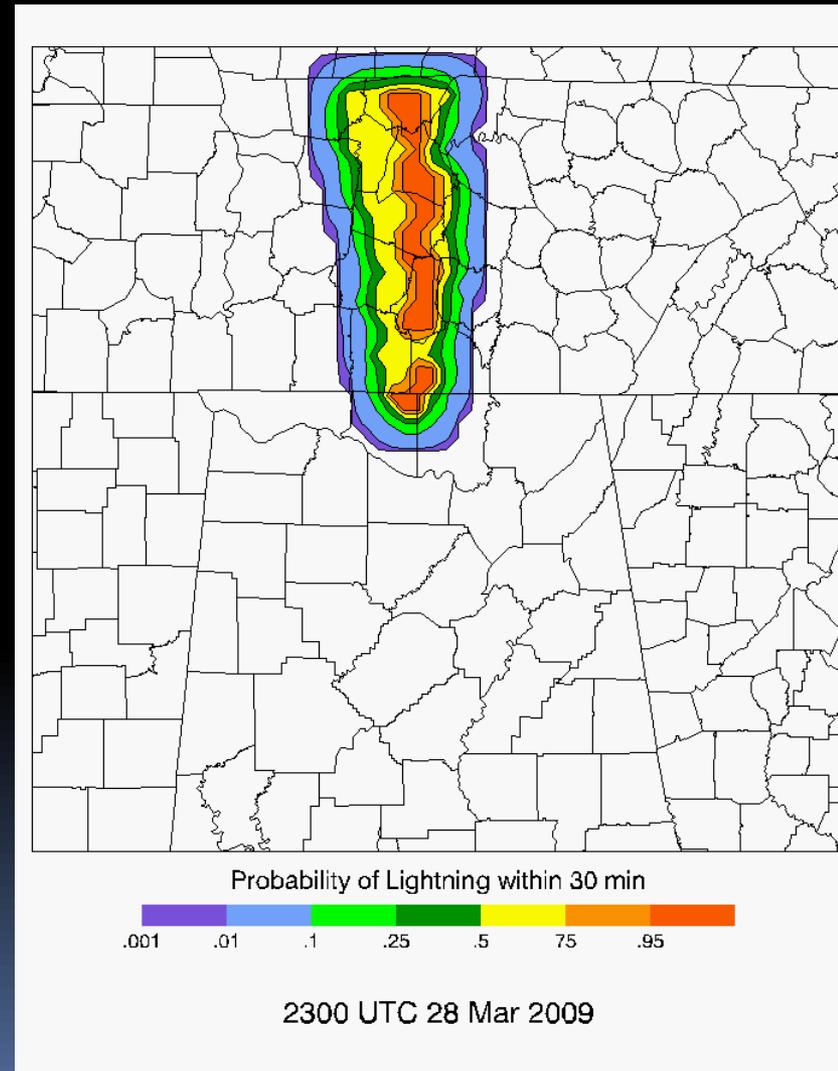
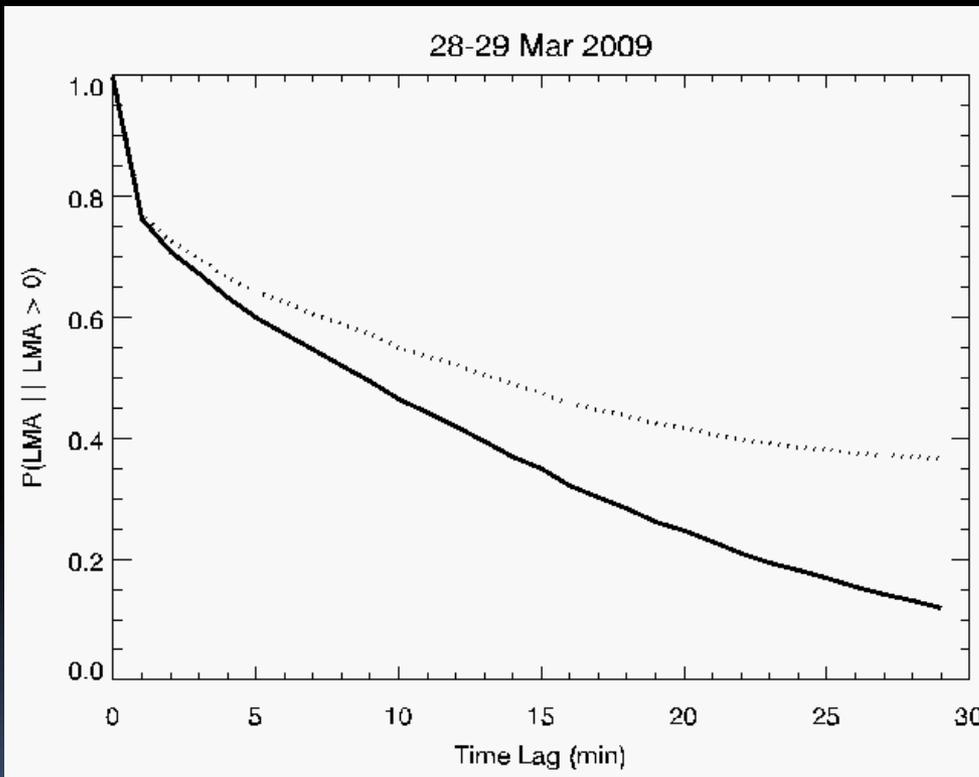
- NALMA sources grouped into flashes
- Only use flashes that have 5 or more LMA sources
- A grid box is incremented by 1 when at least 1 source from a flash occurs in it
- 1 min time resolution
- Also examined NLDN CG data

# Lightning Probability Maps

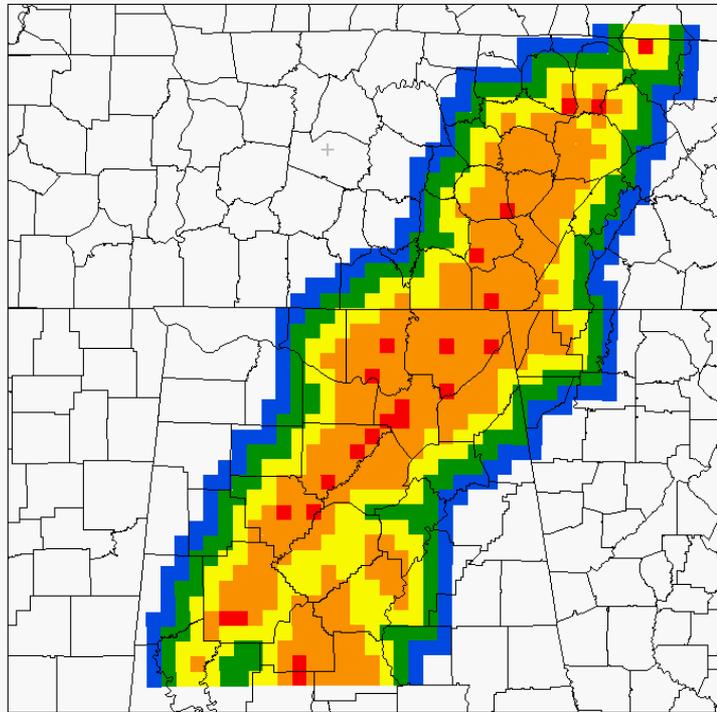


1930 UTC 27 Aug 2003

# Lightning Probability Maps



# Alternate Display



06 February 2008  
1130 UTC

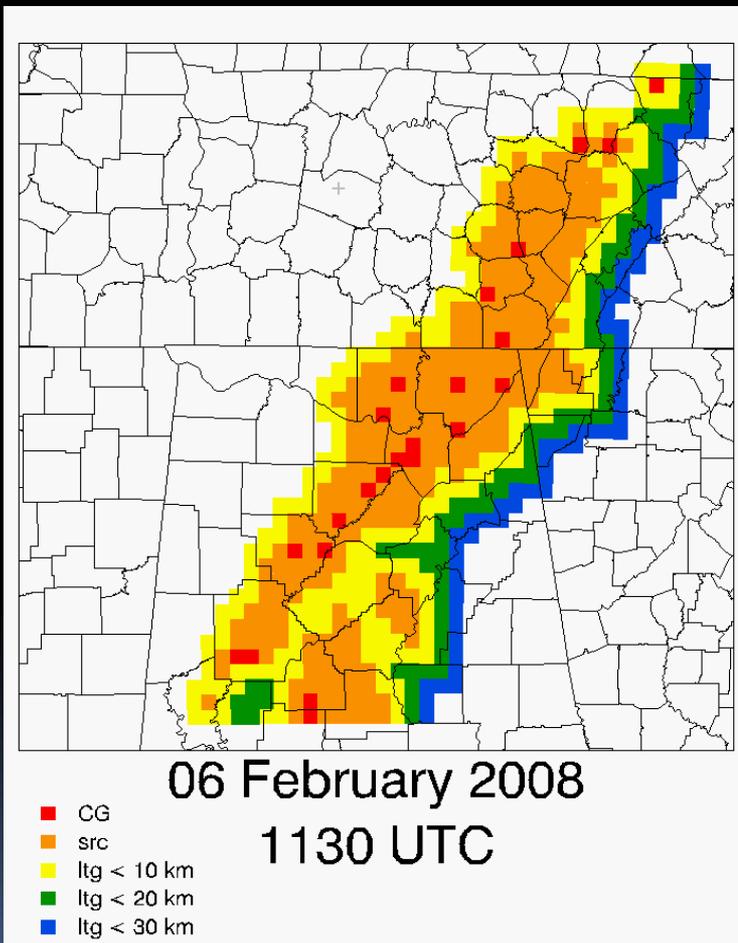
- CG
- src
- Itg < 10 km
- Itg < 20 km
- Itg < 30 km

- Shows location of last 5 min of CG and IC activity
- Shows nearby pixels (within 10, 20, and 30 km of lightning activity)
- Any Lightning occurring within next 30 minutes:
  - POD 0.94
  - CSI 0.59
  - FAR 0.39

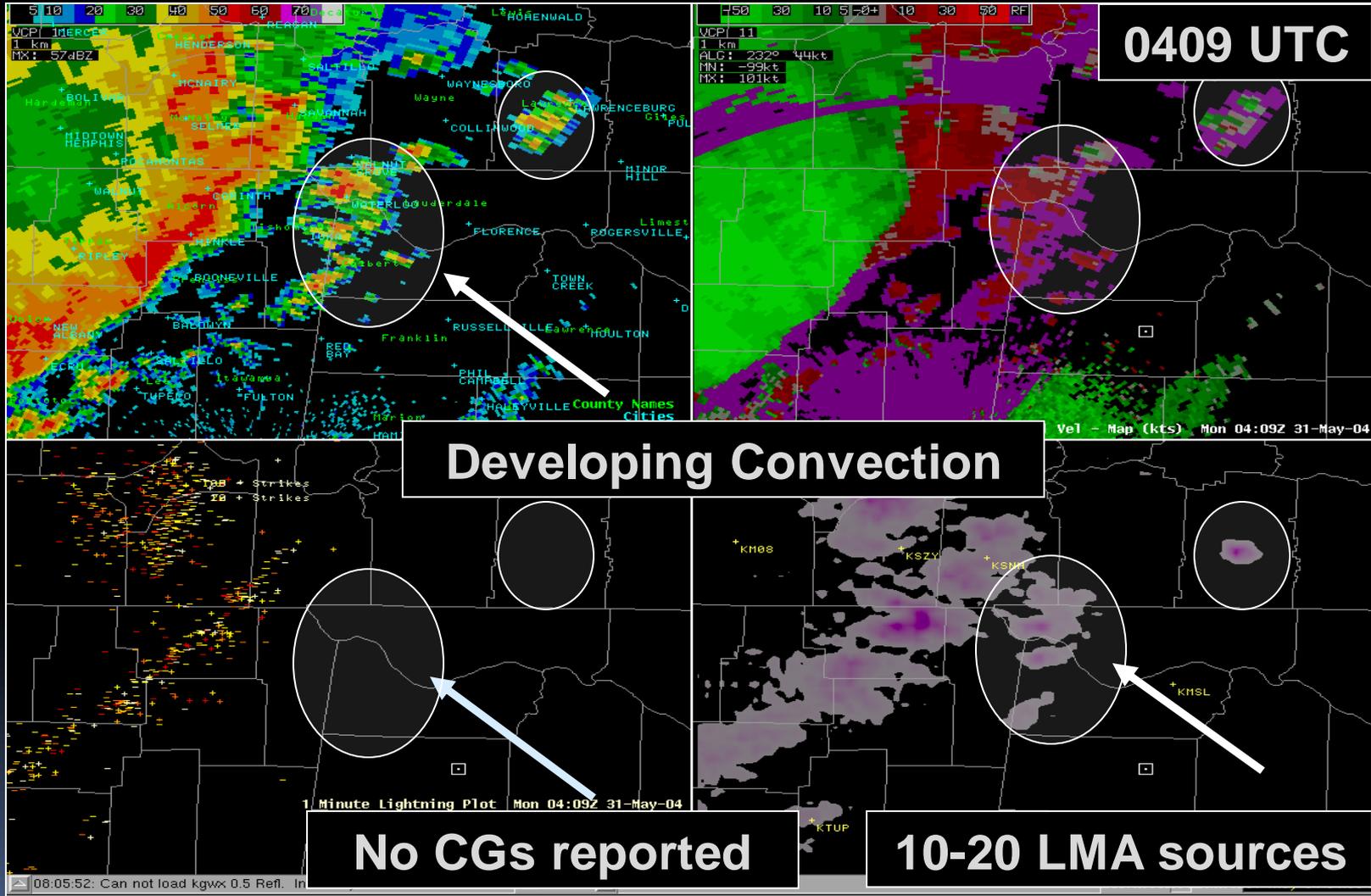
# Alternate Display

Add Line Motion Information:

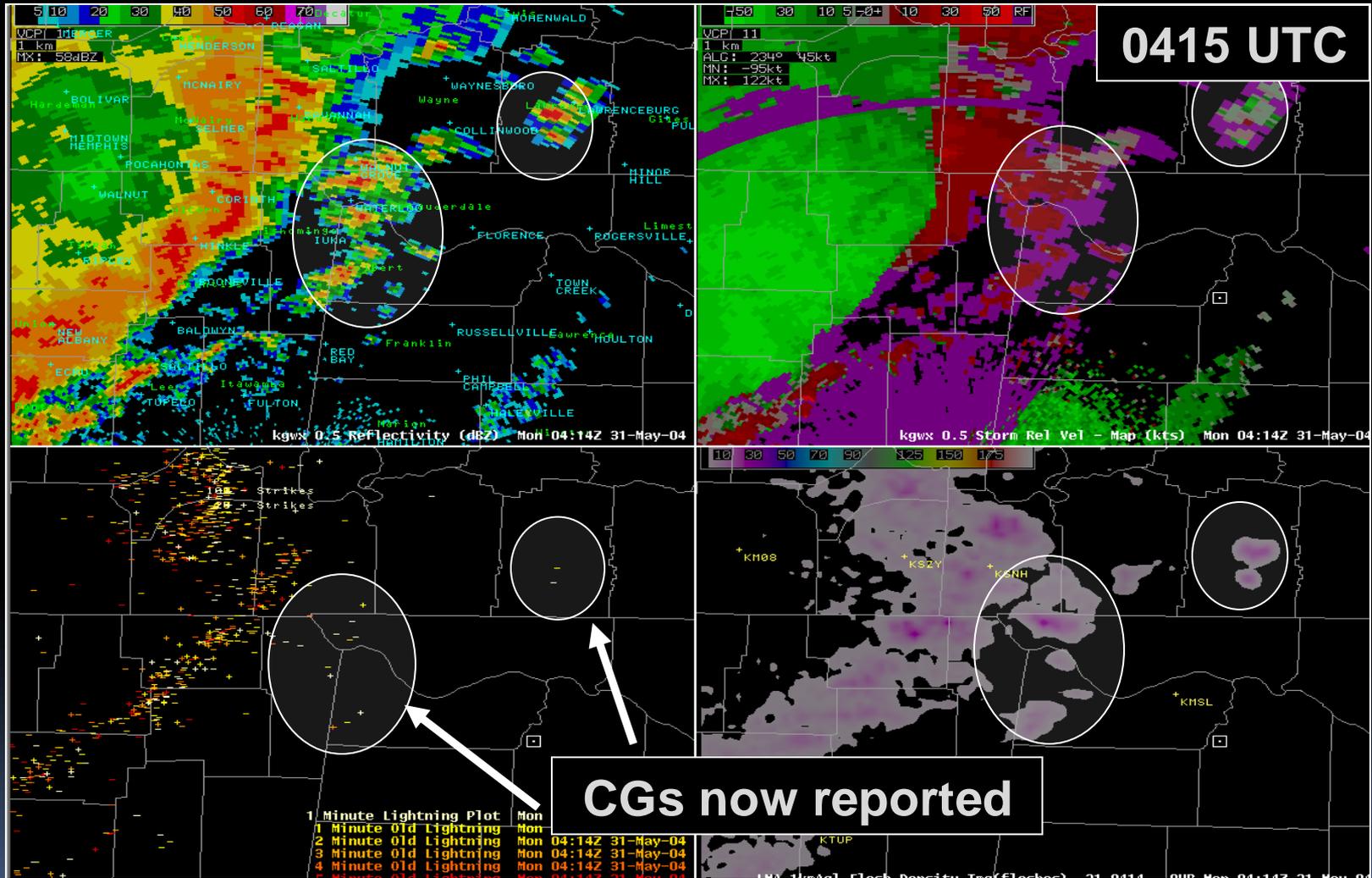
- Lightning occurring within next 30 minutes:
  - POD 0.92
  - CSI 0.69
  - FAR 0.26
- CG within next 30 minutes
  - POD 0.95
  - CSI 0.12
  - FAR 0.88



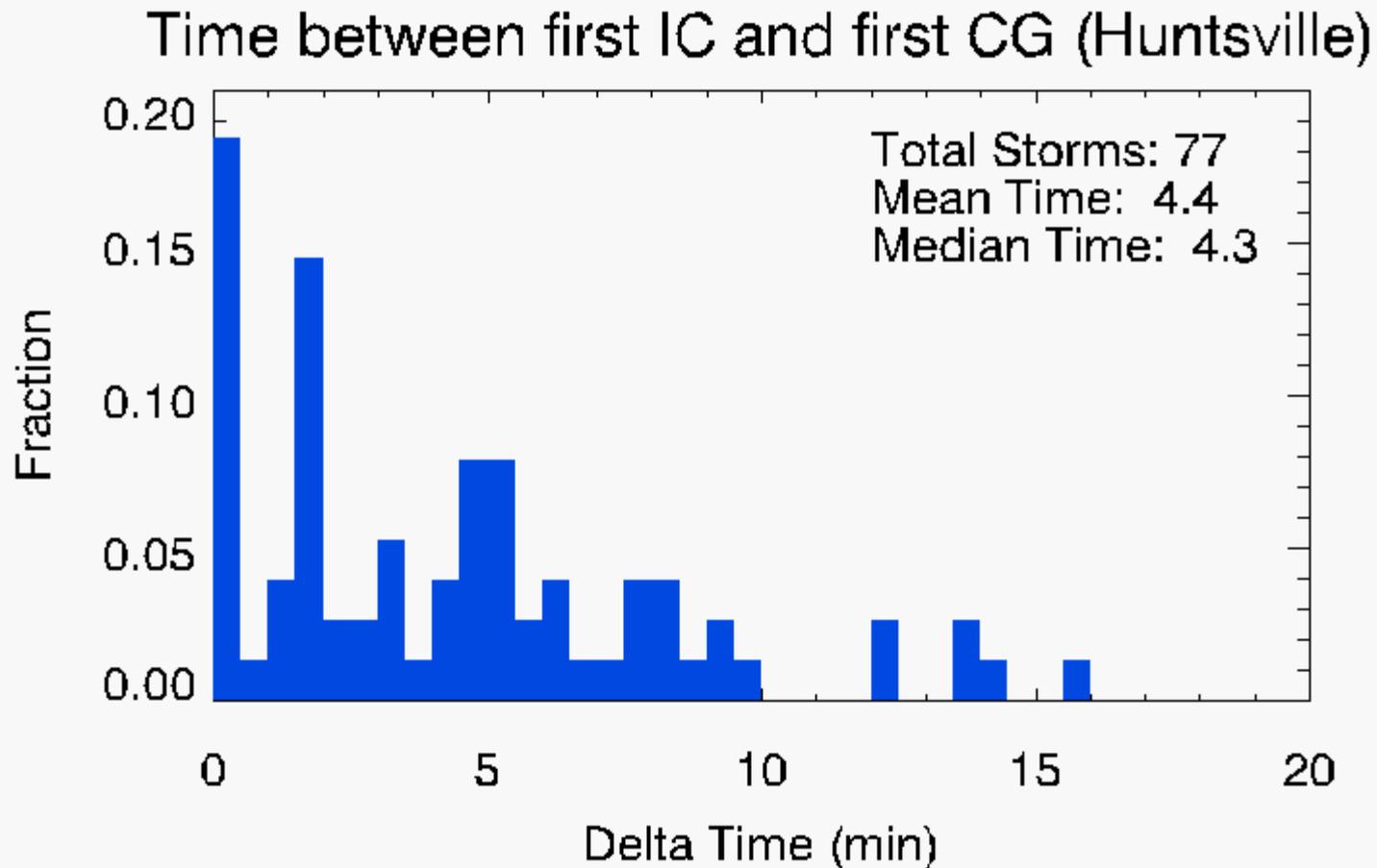
# Cloud-to-Ground Lead Time



# Cloud-to-Ground Lead Time

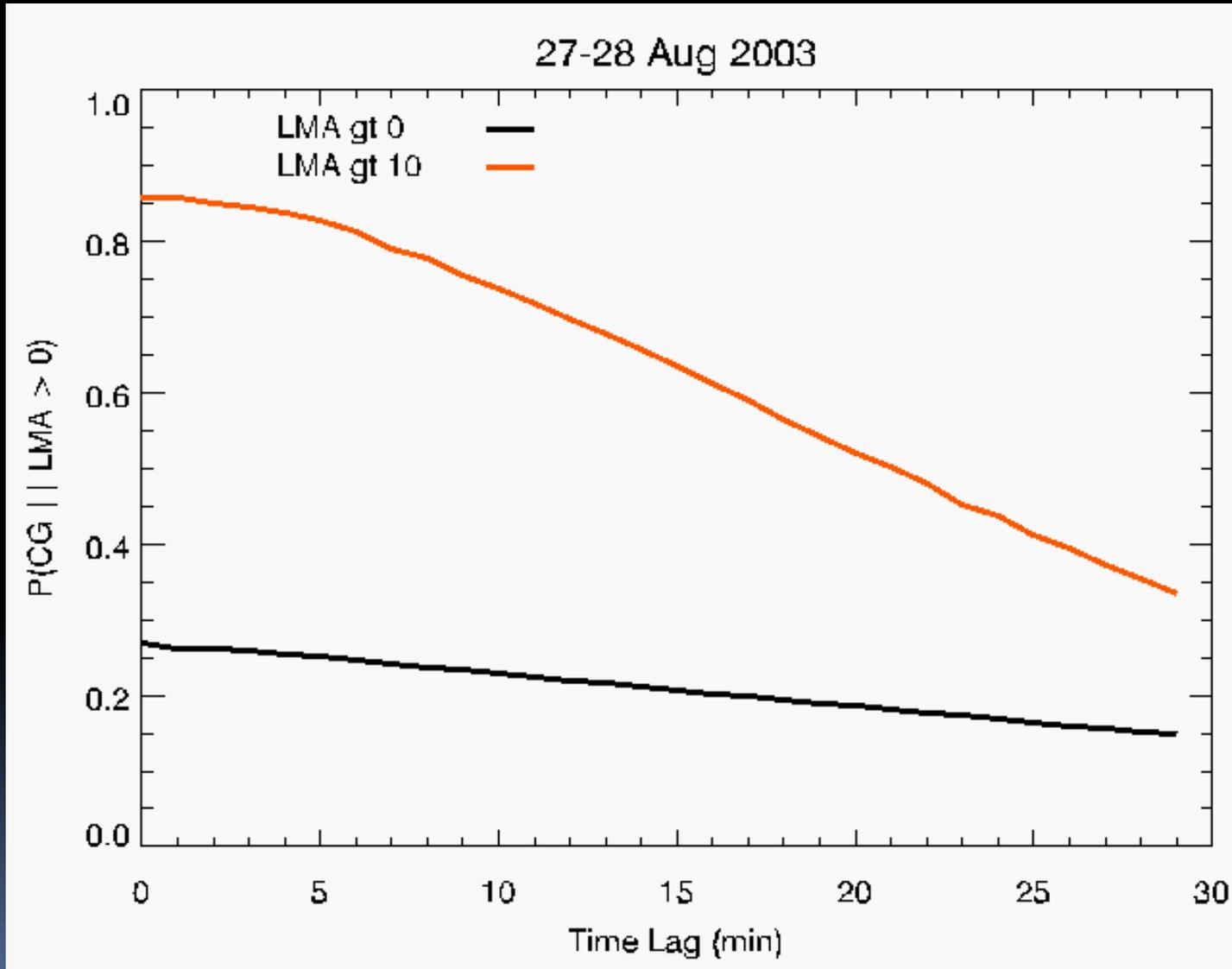


# 1<sup>st</sup> IC to 1<sup>st</sup> CG Time



# Probability of CG given LMA

Probability of CG Activity Given  
Grid Box Has LMA Lightning Now



# Plans

- Incorporate cell tracking algorithm
  - Currently looking at algorithms
- Investigate parameters for lightning nowcasting
  - Total number of flashes
  - Area of storm
  - Peak flash density within the cell

# Plans

- Use GLM proxy data
- Investigate alternate methods to best provide the information to the end user (visualizations)
- Provide displays to NWS
- Estimate first lightning probability
  - Model
  - Satellite
  - Radar

# Lightning Warning Map

