Lightning Warning Product

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GOES-R3 Science Meeting

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Huntsville, AL

Goal

- Provide gridded fields of probability of lightning within the next 5, 10, 15, 20, 25, 30 minutes
  - Additional probability for cloud-to-ground strikes

Current Lightning Warnings

- Current lightning warnings are mostly for locations or regions (KSC, airports)
- These usually have a watch if lightning occurs within a certain distance (~20 nm) within a specified time (~30 min)
- The watch changes to a warning if lightning occurs within a closer distance (10 nm) and time (~15 min)

GLM Data

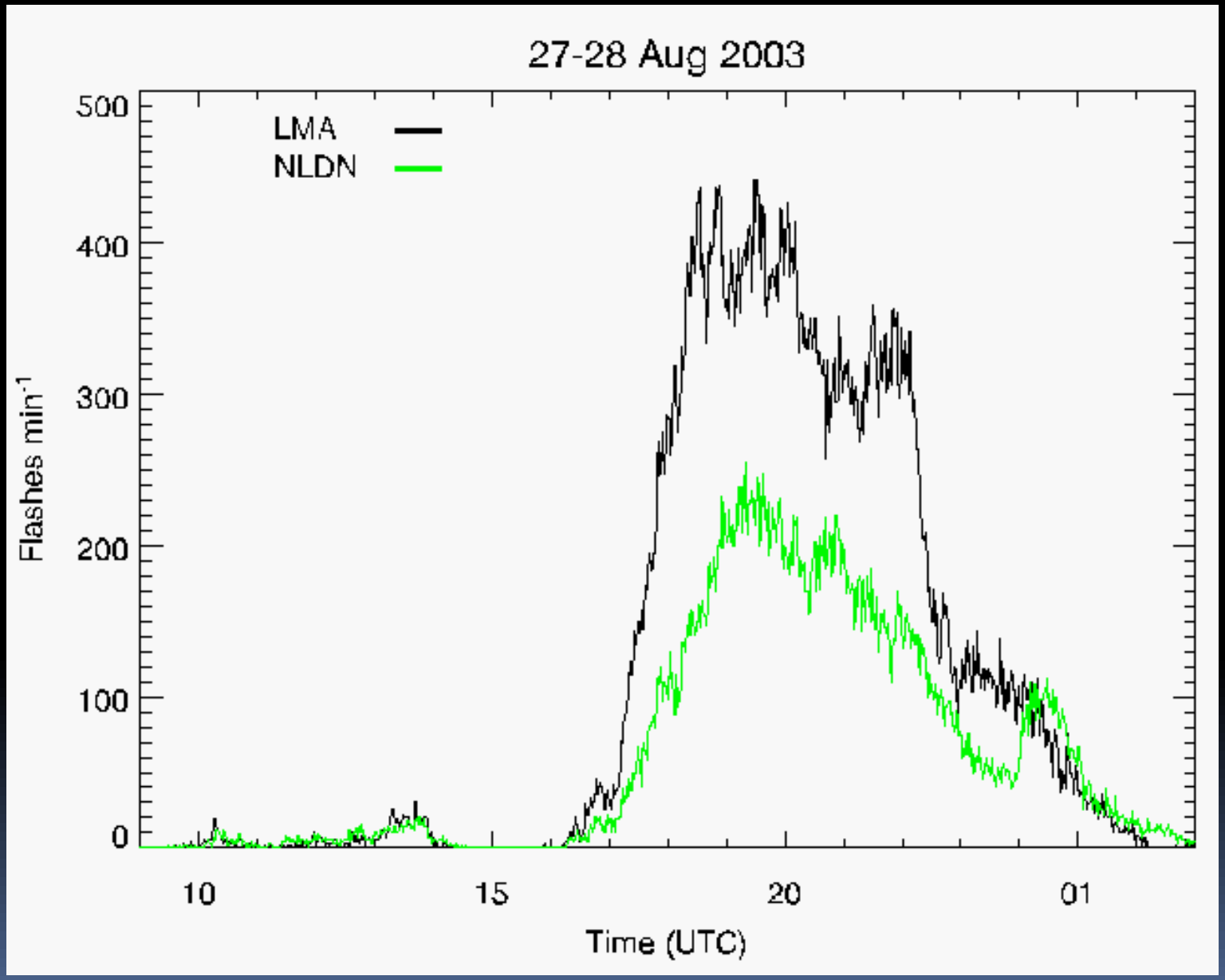
- Lightning must already be occurring (i.e., not forecasting first lightning
- Advect lightning threat downstream (limits to short forecasts (~30 min)
- 10 km resolution

Update Frequency

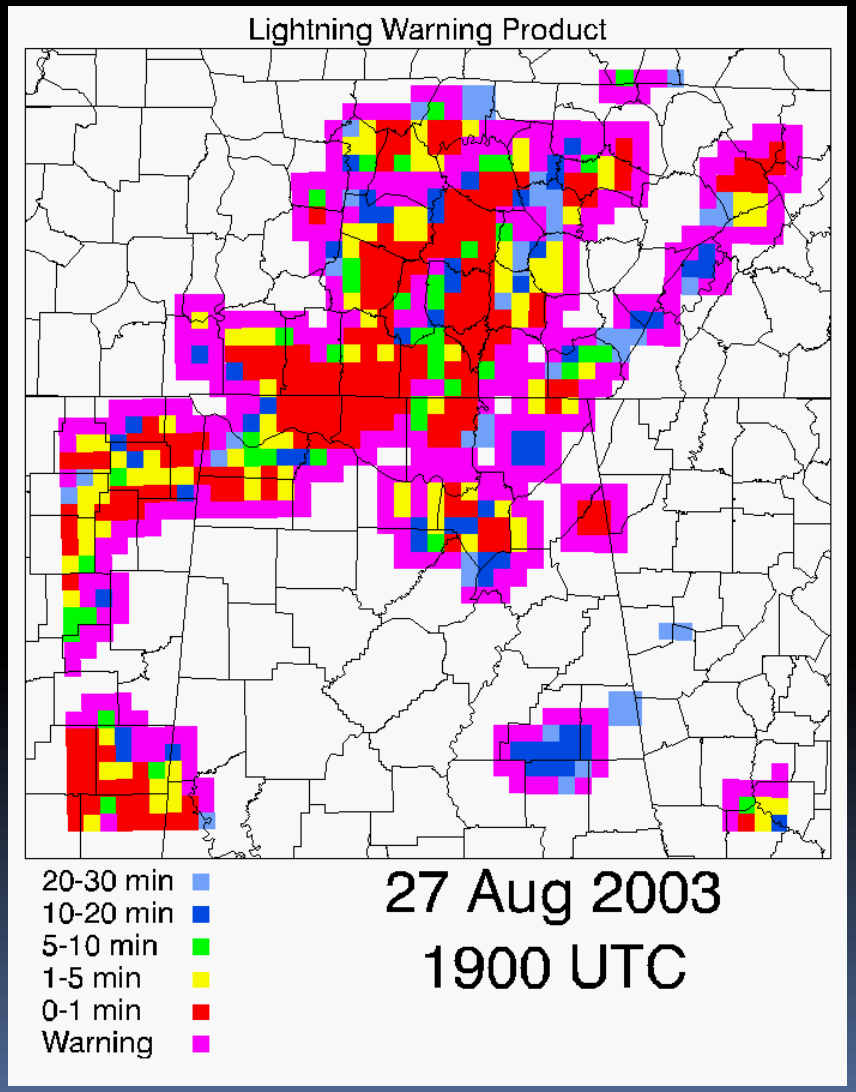
- Every 5 minutes
- Some users may require immediate notification if lightning is observed at a certain location

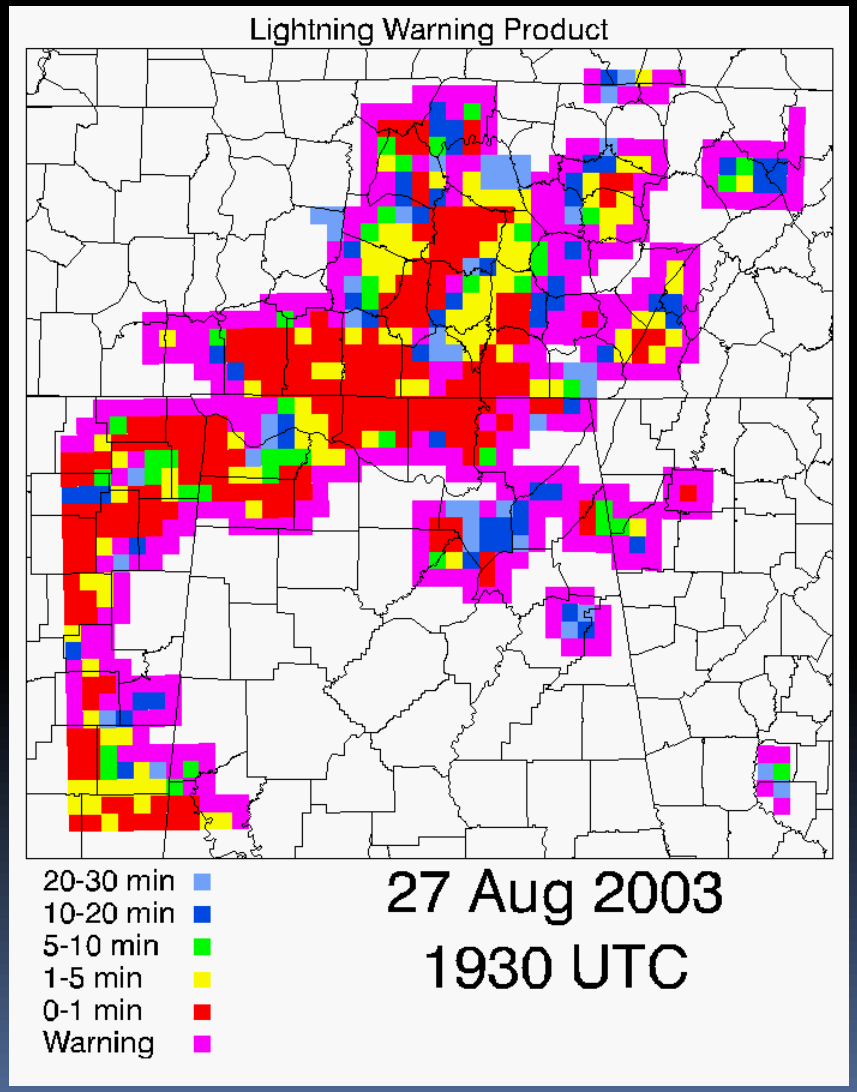
27-28 August 2003 Case Study

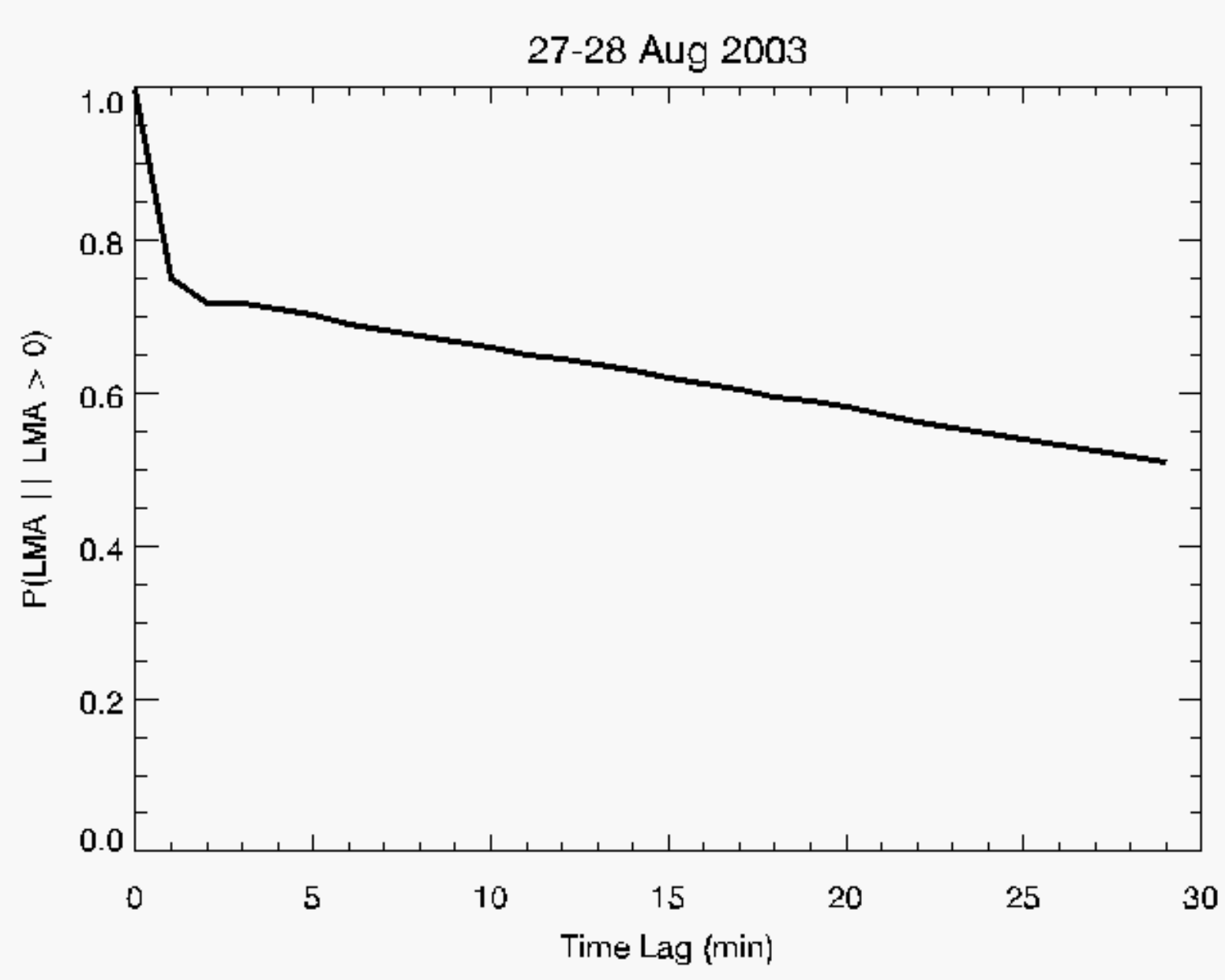
- 10 km resolution grid
- 1 min time resolution
- Grouped sources into flashes
- A grid point ‘lit up’ when at least 1 source from a flash occurred
- NLDN
- Little storm movement occurred on this day


27-28 Aug 2003
LMA
NLDN
Flashes min-1
500
400
300
200
100
0
10
15
20
01
Time (UTC)

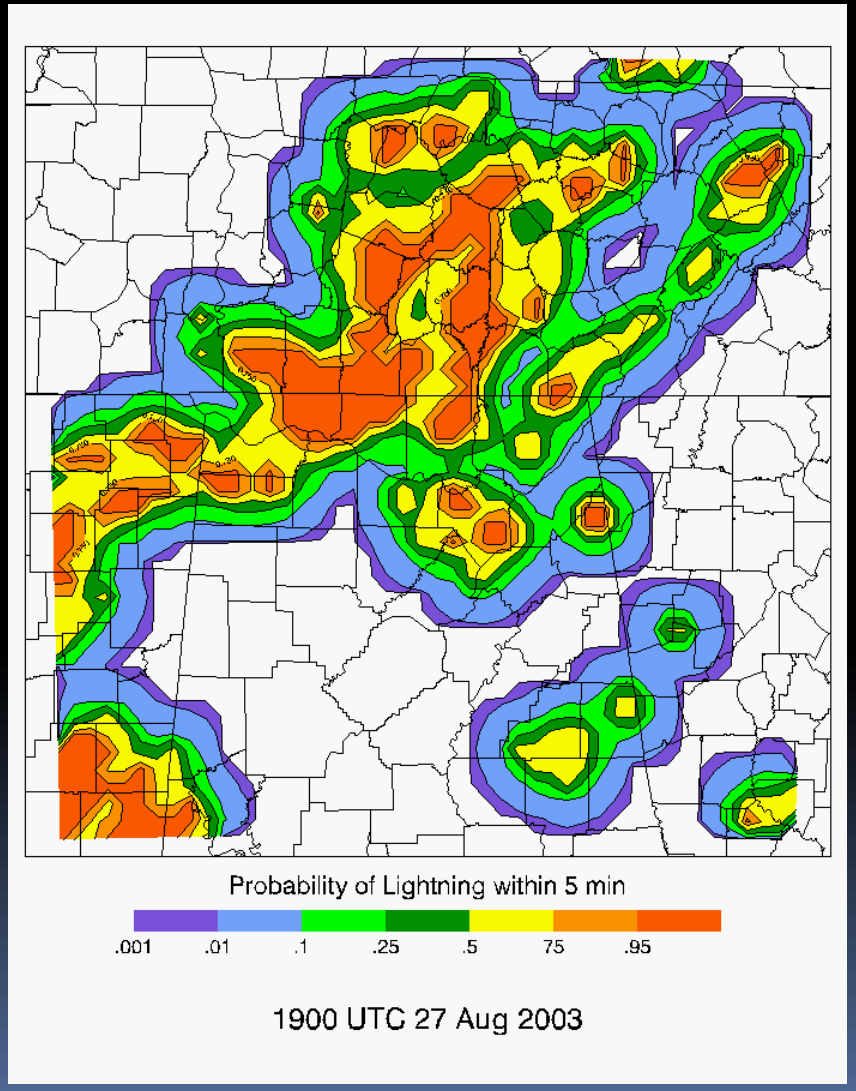
Lightning Warning

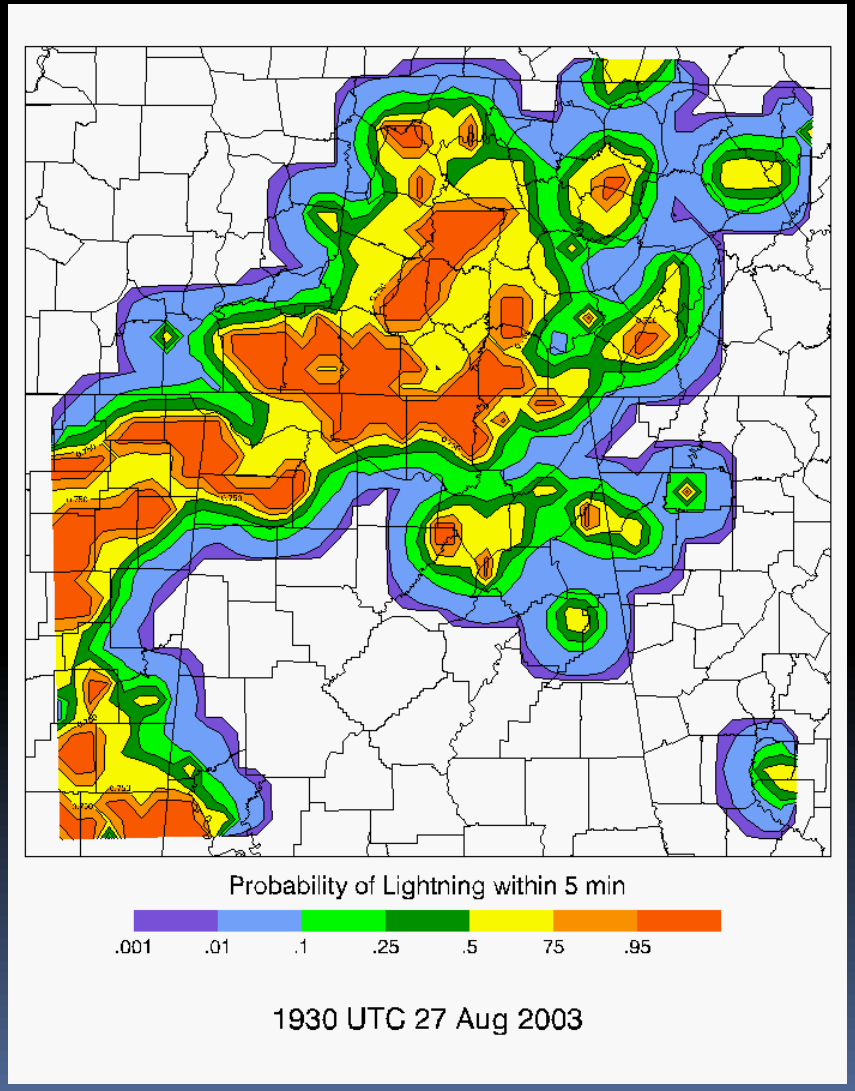


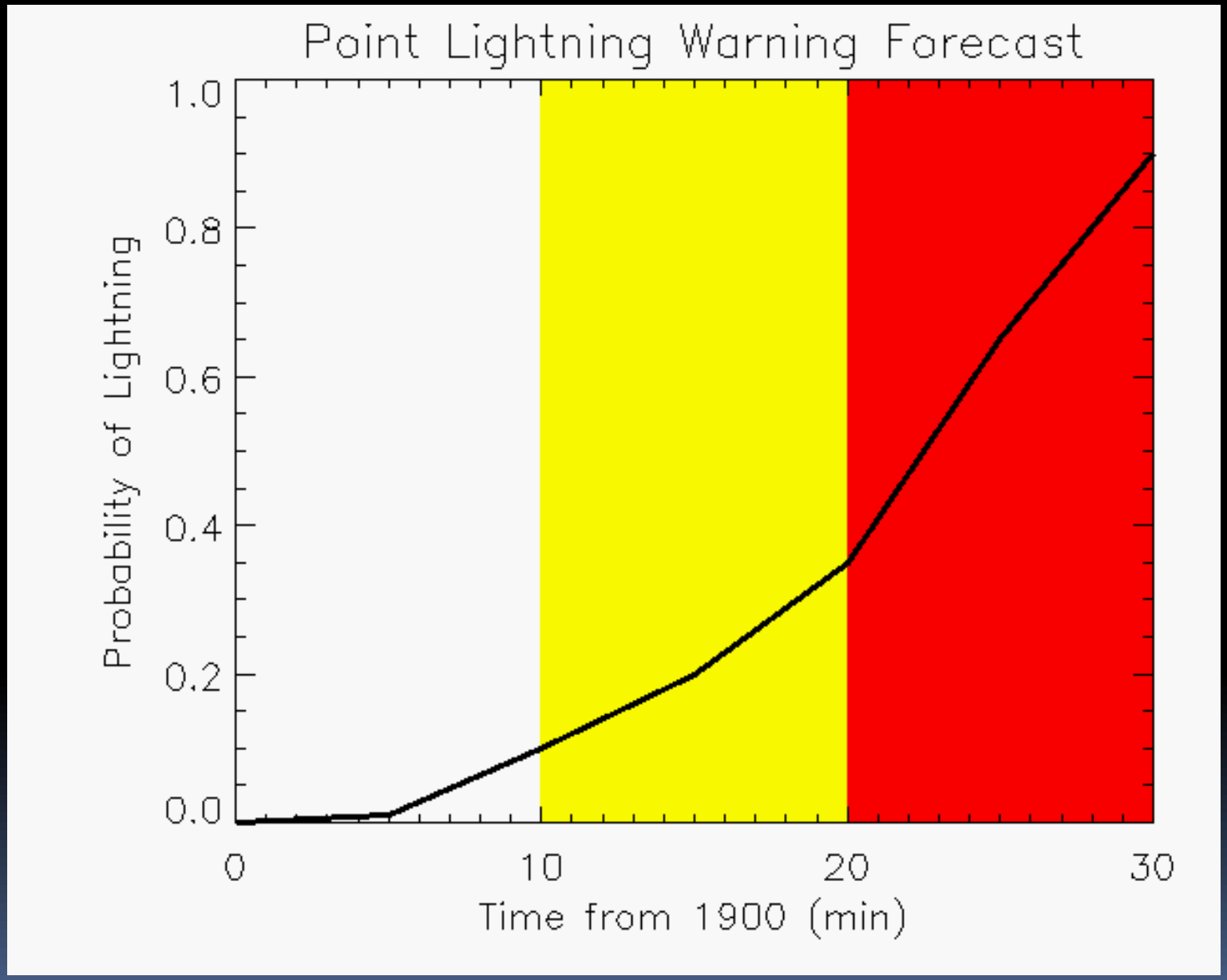



27-28 Aug 2003
P(LMA || LMA > 0)
1.0
0.8
0.6
0.4
0.2
0.0
0
5
10
15
20
25
30
Time Lag (min)

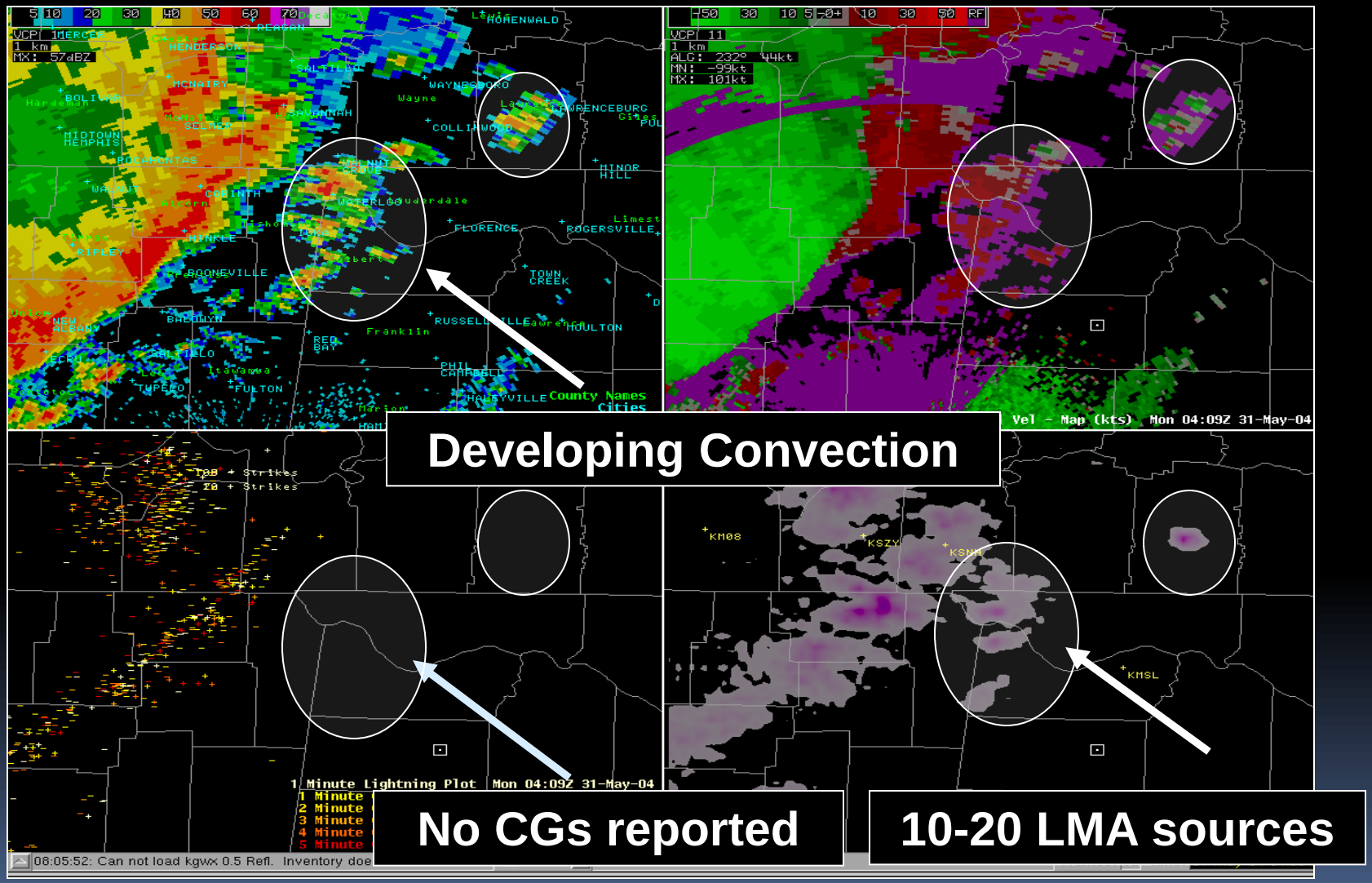
Lightning Probability Maps



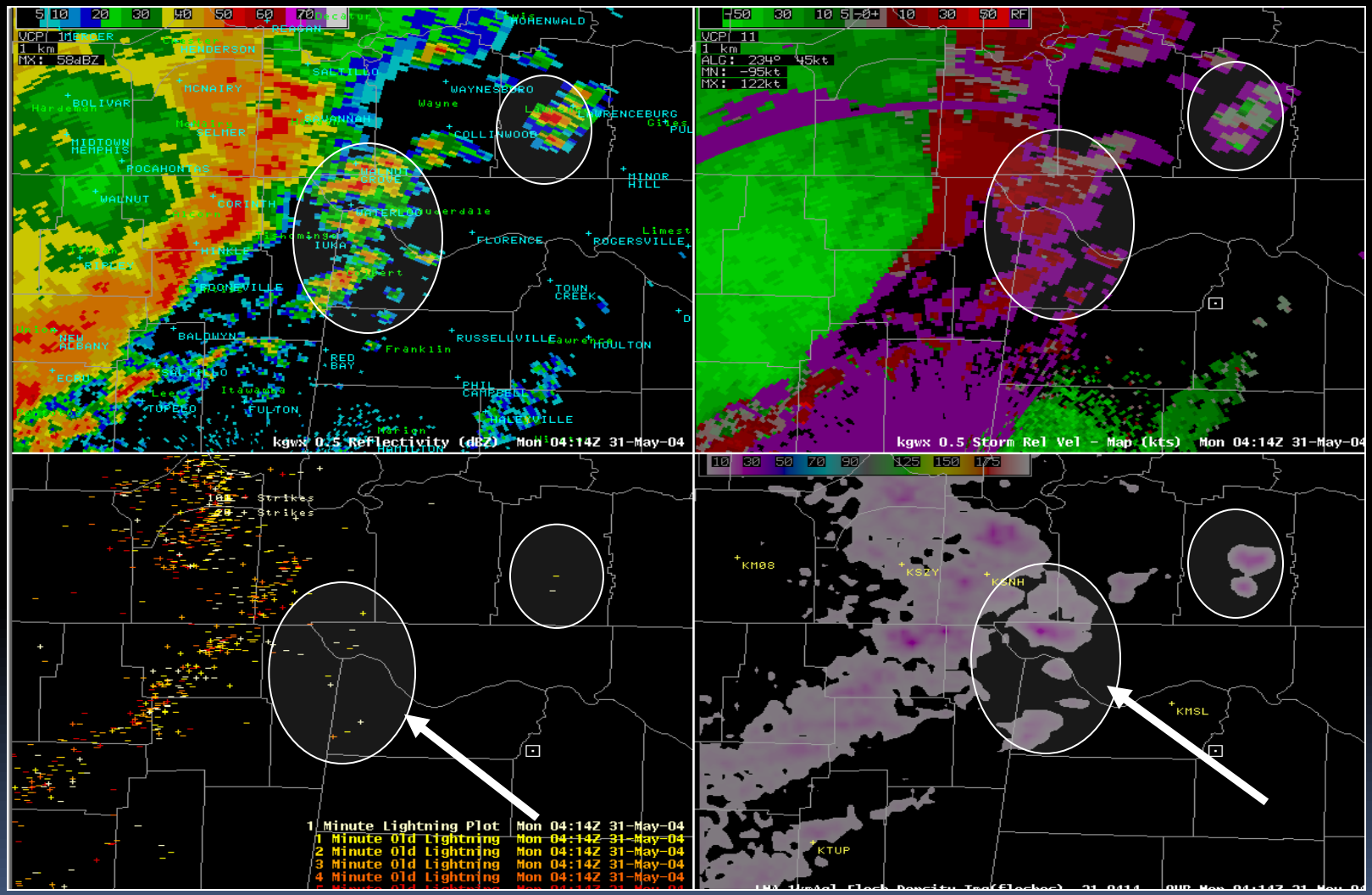


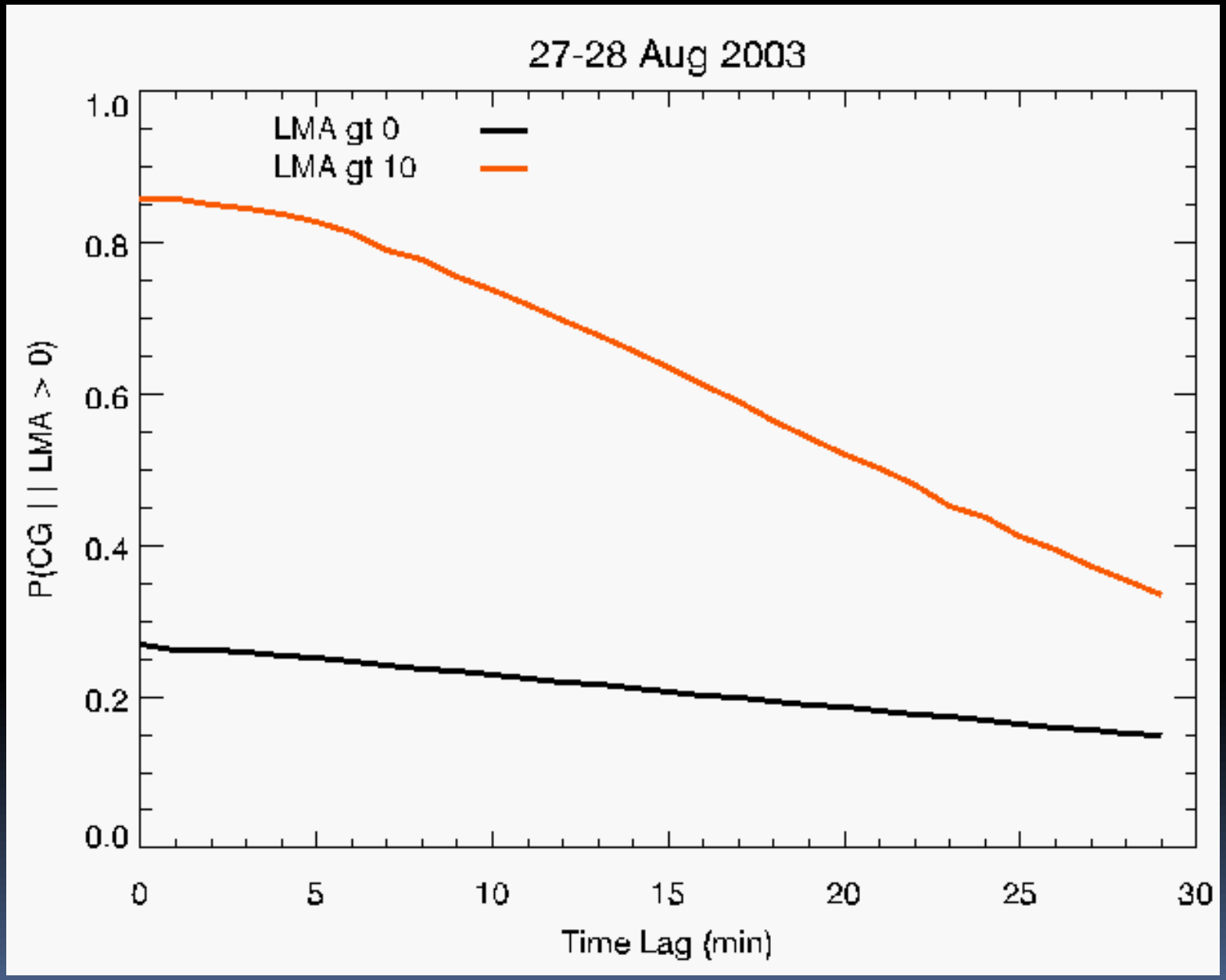

Point Lightning Warning Forecast
Probability of Lightning
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
Time from 1900 (min)

Cloud-to-Ground Lead Time



Cloud-to-Ground Lead Time




27-28 Aug 2003
LMA gt 0
LMA gt 10
P(CG || LMA > 0)
1.0
0.8
0.6
0.4
0.2
0.0
0
5
10
15
20
25
30
Time Lag (min)

Additional Data

- Time trend the lightning
- Estimate first lightning probability
  - Model
  - Satellite
  - Radar
- Estimate CG probability
  - NLDN
  - Flash discrimination algorithm