

New Total Lightning Visualizations

Expanding Utility and Usability

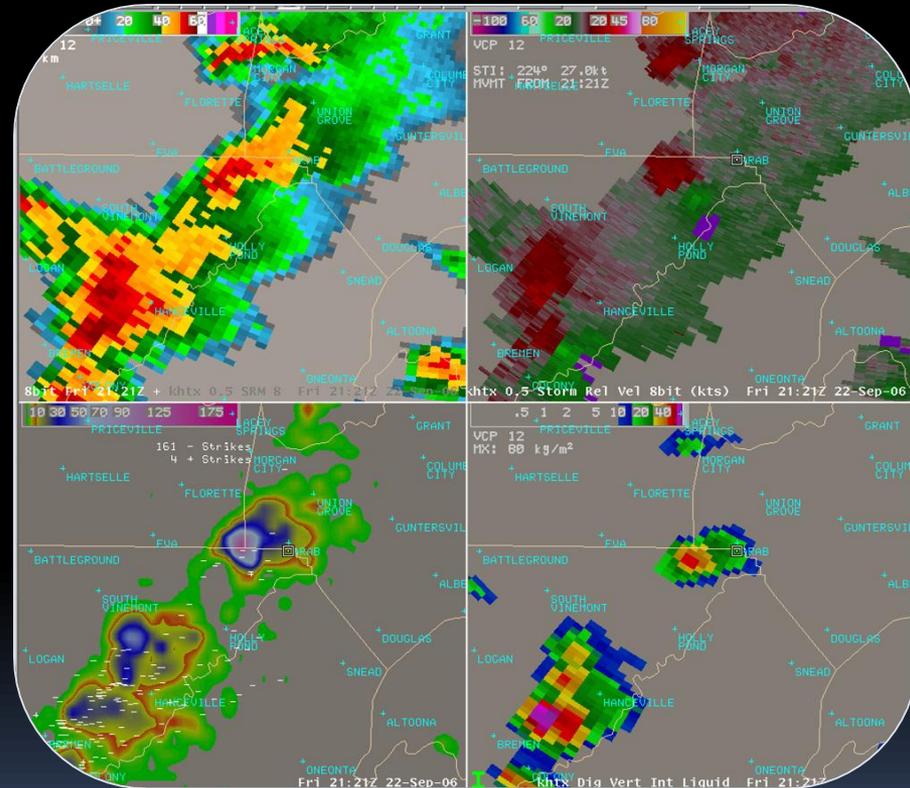
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Southern Thunder Workshop, Norman, OK 11-14 July 2011



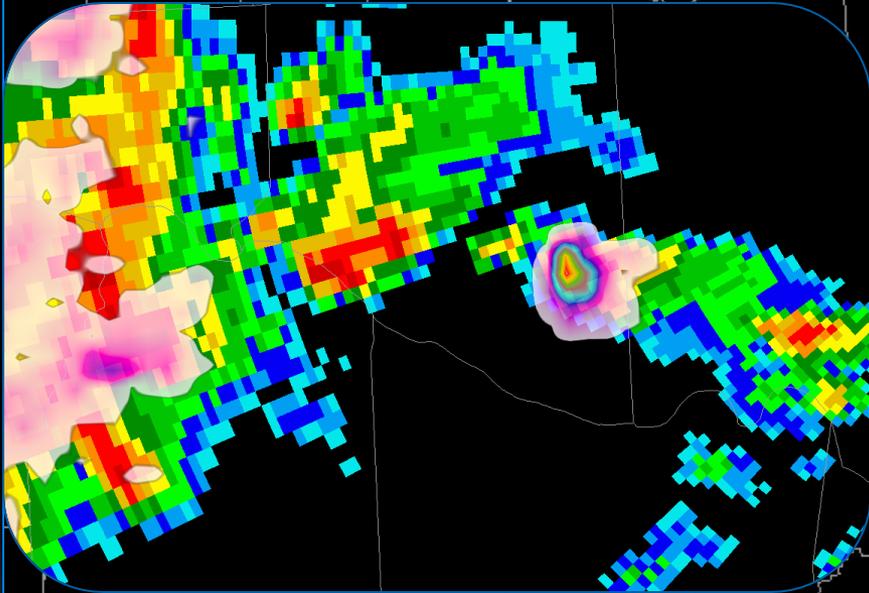
Objectives

- Available in decision support tools
- Synthesize data
 - “At a glance” analysis
- Complement existing tools
 - Radar
 - Vertically Integrated Ice
- Expand Utility



Factoring In AWIPS II

Source Densities (Interpolated)



NALMA and Radar in AWIPS II

Source Densities
(Not Interpolated)

- Mandatory with WFOs
- AWIPS II Advantages
 - More fidelity
 - More options
 - More flexibility
- SPoRT has fully functional plug-in

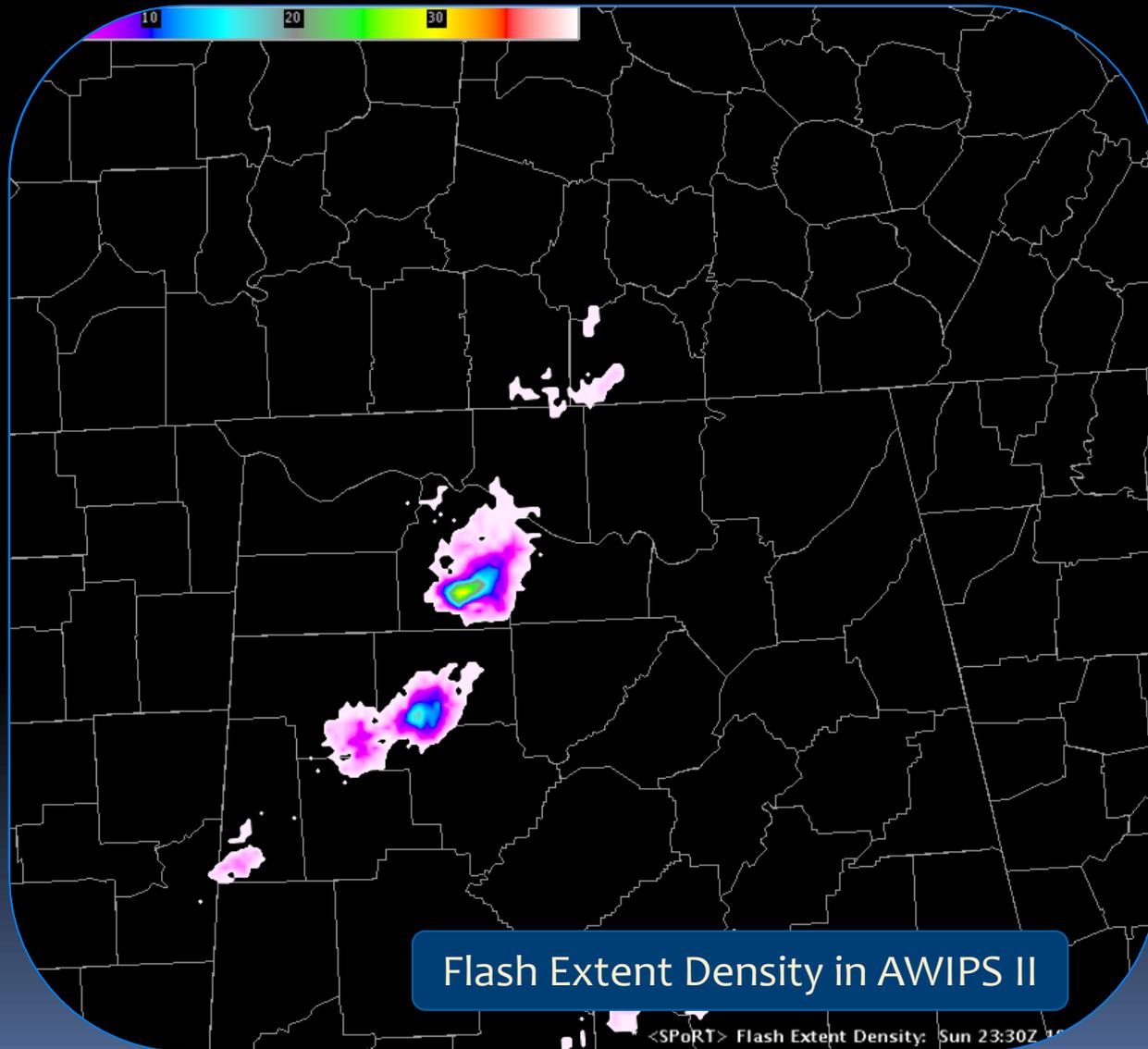
Importance of Visualizations

- Essentially different products
- Can be just different color curves
- Provide alternate analyses
 - Requires caution
 - Too many will not allow use in a timely fashion
- Expand utility
 - More than lightning jumps
 - Improved lightning safety
 - Better support to public

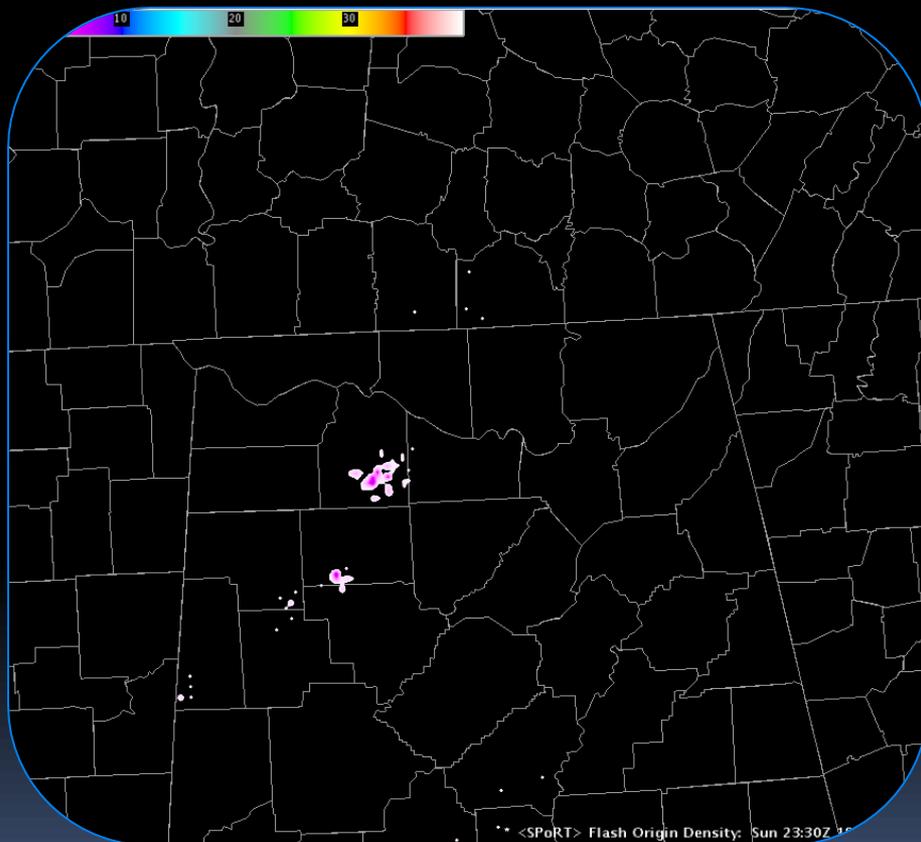
Source Densities (Emphasis)



Where We Are Now



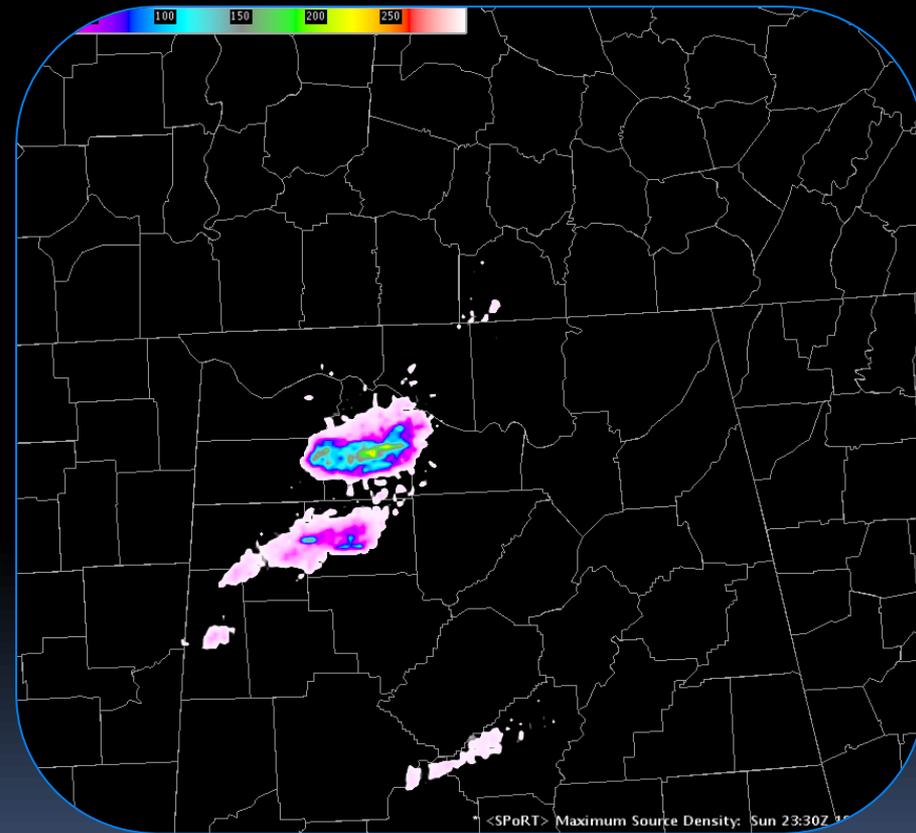
Flash Origin Density



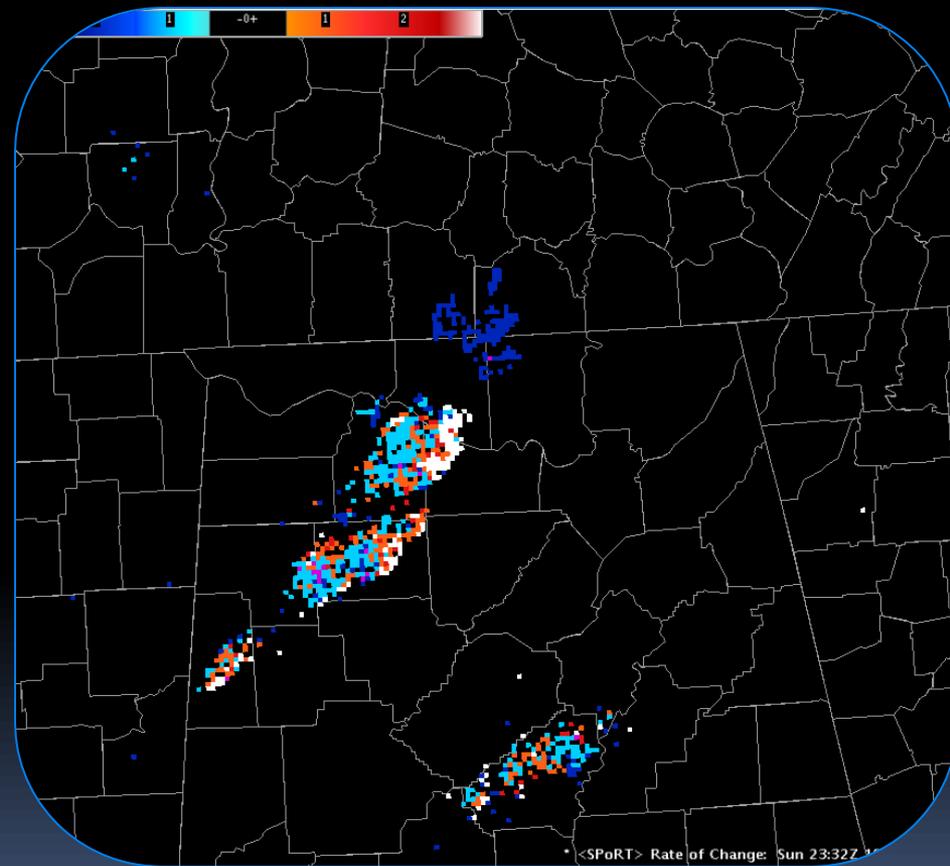
- Also Flash Initiation Density
- Emphasize storm cores
- Less cluttered than others
- Lose spatial data
- Greatly benefited by AWIPS II
- Variant used at Spring Program

Maximum Density

- Max observation of lightning for each grid point for period of time
- “Poor man’s” trending product
 - Compare to current obs
 - Is a jump occurring?
- Great lightning safety tool
 - Spatial extent of lightning over time
- Variant used at Spring Program



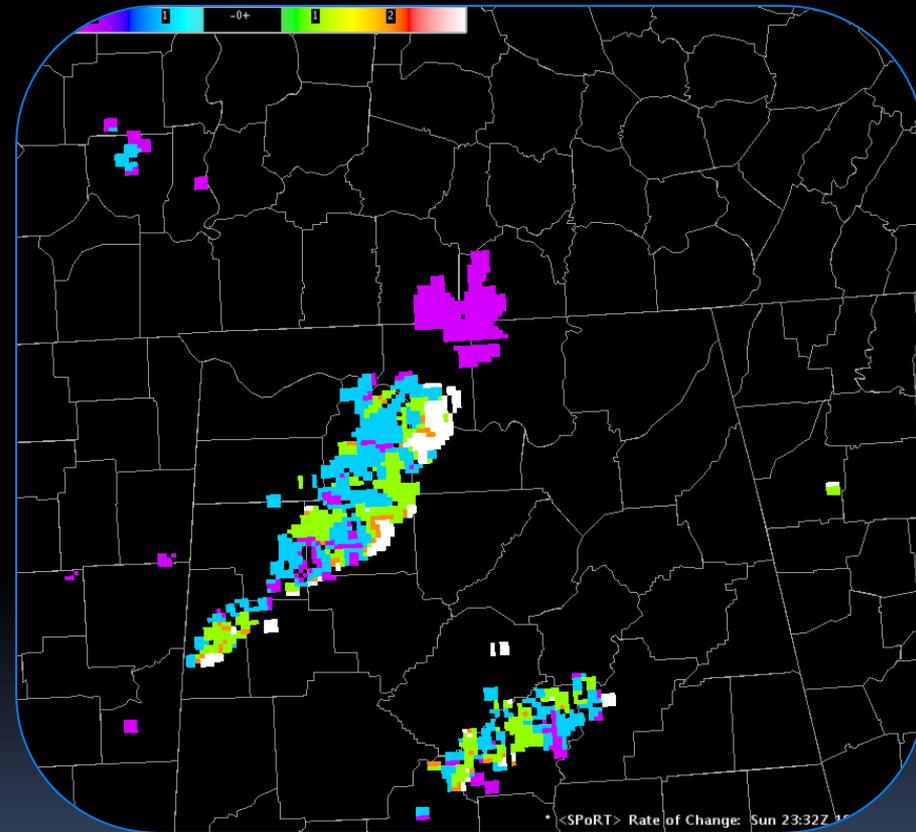
Rate of Change



- Simplistic take on Lightning Jump Algorithm (LJA)
- Gives standard deviation from base value for each grid point
- Requires no cell tracker
- Interesting, but flags storm advection

Improved Rate of Change

- Similar to Rate of Change product
- Try to account for advection
- Baseline uses surrounding grid boxes
- Little better than the original Rate of Change visualization



Limited To Only Two Dimensions

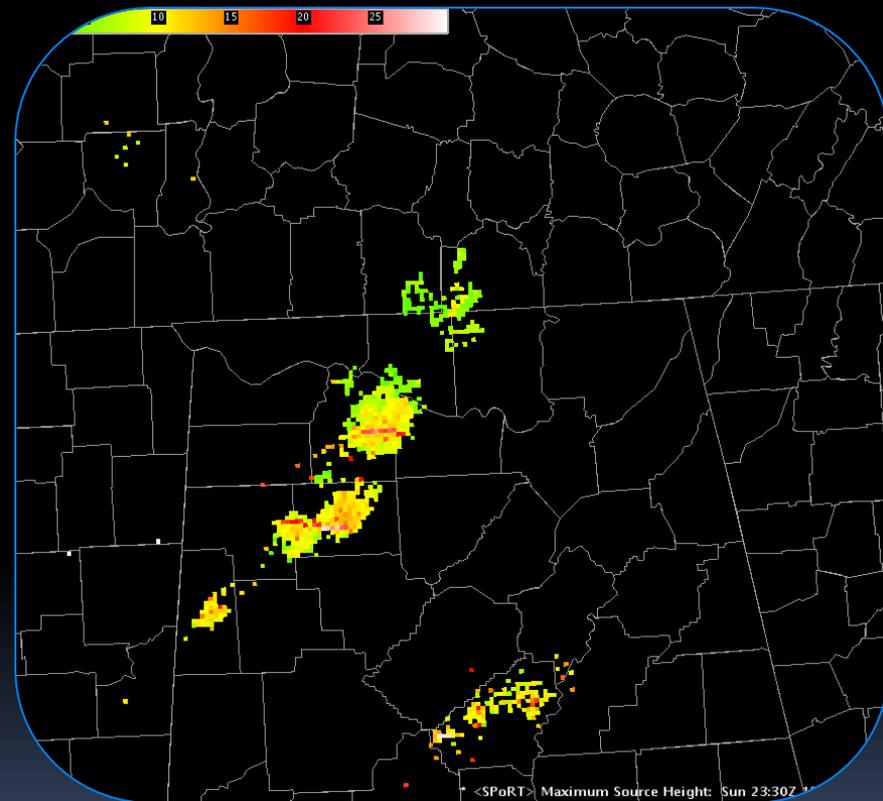


AWIPS I Cross Section

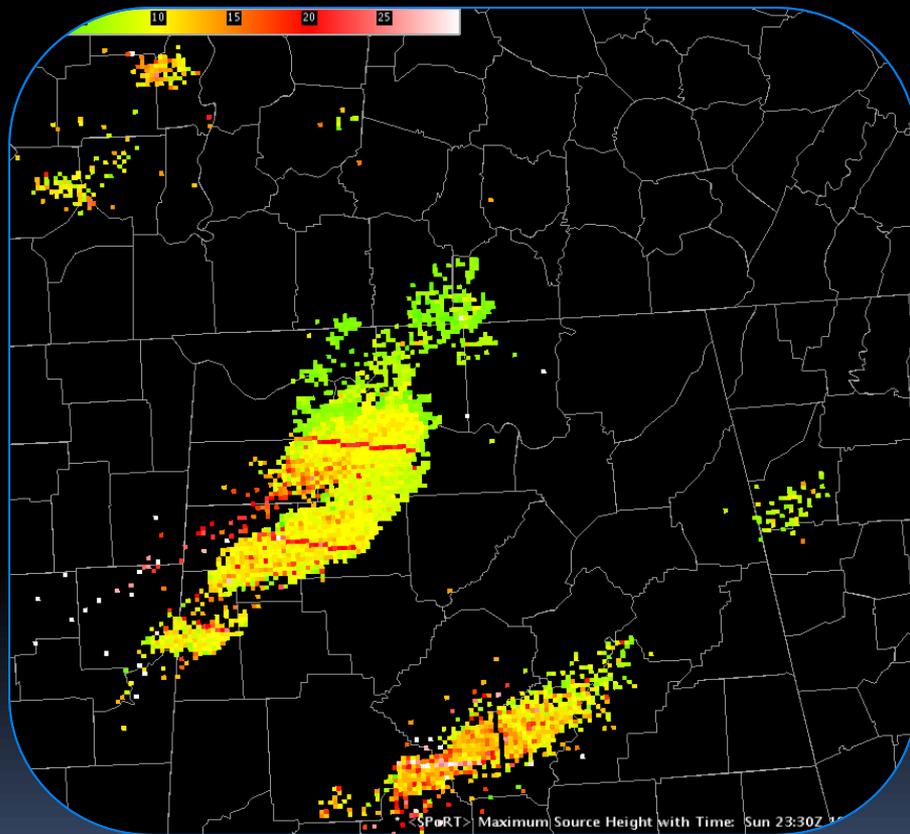
- Ground-based total lightning has 3D component
- AWIPS I is too slow to use
- AWIPS II has ability, but usable?
 - How fast easy will it be?
- Not usable with GLM data
 - May gain ideas to use GLM
- Can we incorporate height data?

Source Height Display

- Use 3D LMA observations
- Plot altitudes of highest sources
- Get sense of updraft strength
- Lose actual density information
- Can we combine height and obs?



Variant Height Products

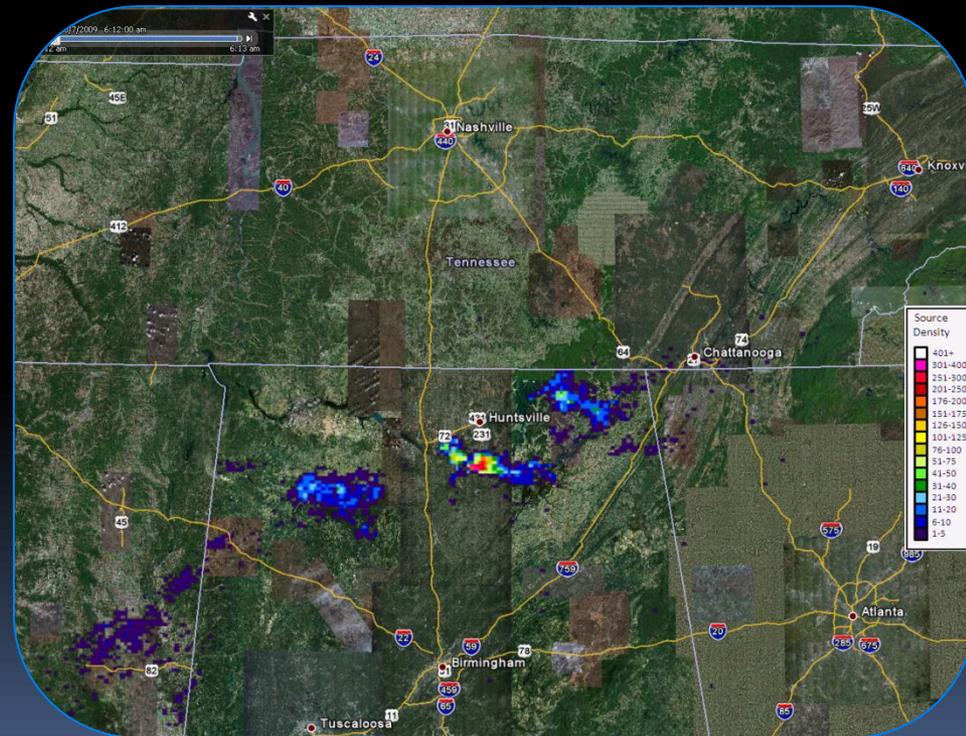


Max Source Height (30 min)

- Average source height
 - Better core observation
- Maximum height with time
 - Like the max density
- Height rate of change
 - (not shown)
 - Like the rate of change
 - Benefit from cell tracker

End Goals

- Products and visualizations need “at a glance” utility
 - Need to be viable in time sensitive warning decision situations
- All of these ideas can be applied to the following
 - Warning decision support
 - Lightning safety
 - GLM risk reduction
- All require training!
- Some cases for non-AWIPS work
 - Google Earth displays
 - Support real-time research
 - Support emergency managers



Summary

- These are test ideas
 - Working with partners to determine best to transition
- Some already used by the Spring Program
 - Variants based on SPoRT's Pseudo-Geostationary Lightning Mapper
- Lightning can support more than just lightning jumps and severe weather
- Determine how best to combine lightning observations with other data
 - Feedback requesting time series plot and an IC – CG ratio product
 - GOES-R era bringing even more data
 - Improved computing bringing more models
 - Need to avoid overloading end users

Questions?

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Spare Images

