

Colorado Lightning Mapping Array Collaborations

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Outline

- Background Information
- Visiting Scientist Collaboration
- Expected Goals
- Initial Results
- Upcoming Work

Background - SPoRT

SPoRT transitions unique NASA and NOAA observations and research capabilities to the operational weather community to improve short-term weather forecasts.

- Close collaboration with numerous WFOs across the country
- Began in 2002, first products to AWIPS in February 2003 (Total lightning!)

SPoRT Paradigm

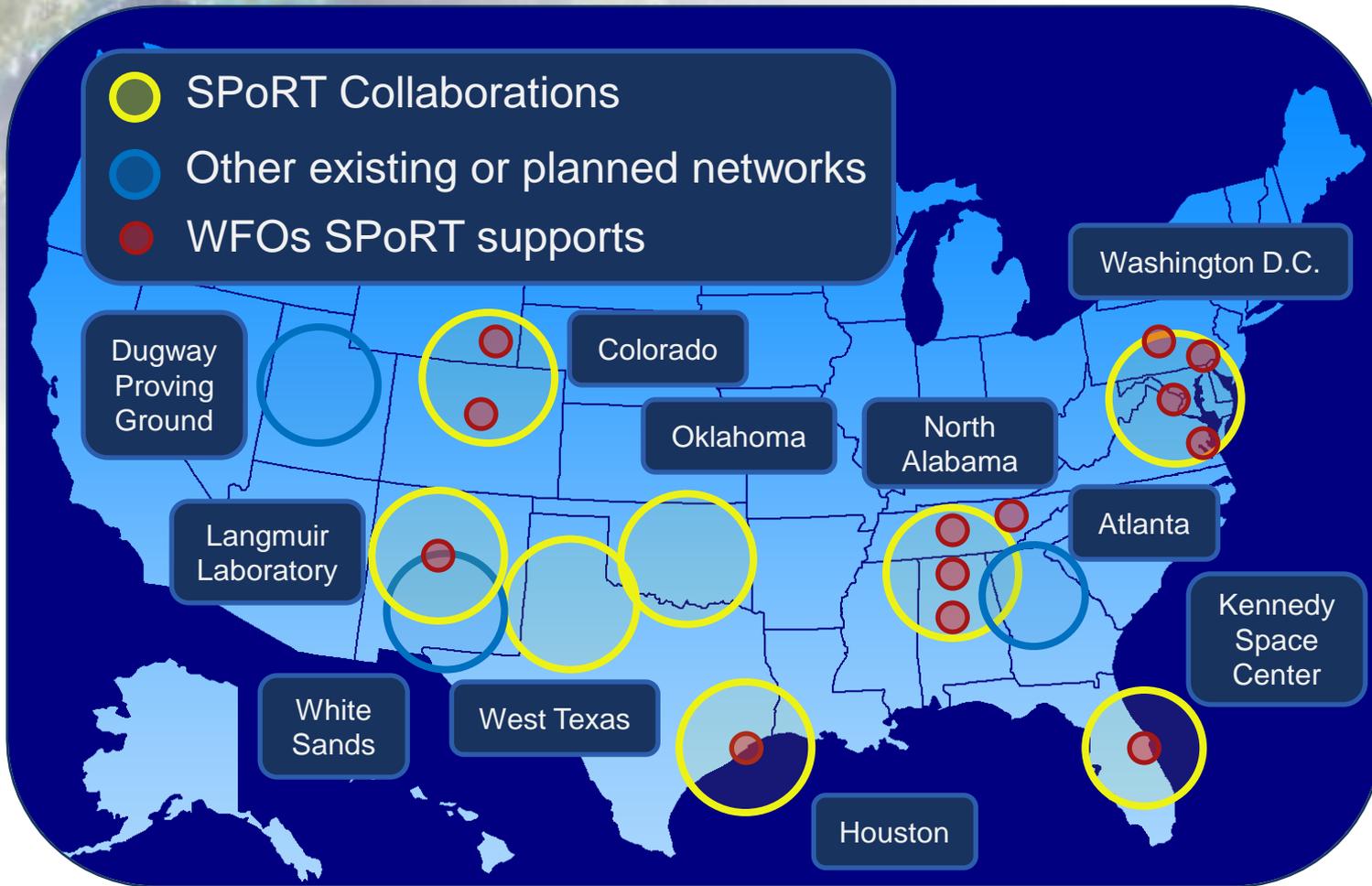
- Match observations to forecast challenges
- Develop and assess solution in “testbed” environment
- Transition solution to decision support system
- Develop/conduct training, product assessment and impact



Benefit

- Demonstrate capability of NASA experimental products to weather applications and societal benefit
- Prepares forecasters for use of data from next generation of operational satellites (NPP/JPSS, GOES-R)

SPoRT and Total Lightning



- Supporting real-time use since 2003
- Working with several data providers
- Core SPoRT activity with the GOES-R Proving Ground
- Visiting scientist program offered opportunity

Opportunity and Collaborators

- Visiting Scientist Proposal provides funding for site visits
- Small level of effort, big results
 - Kick-started larger collaboration
- SPoRT would use existing data processing to include the Colorado lightning mapping array
- Numerous benefits
 - Directly with collaborators
 - SPoRT Proving Ground work

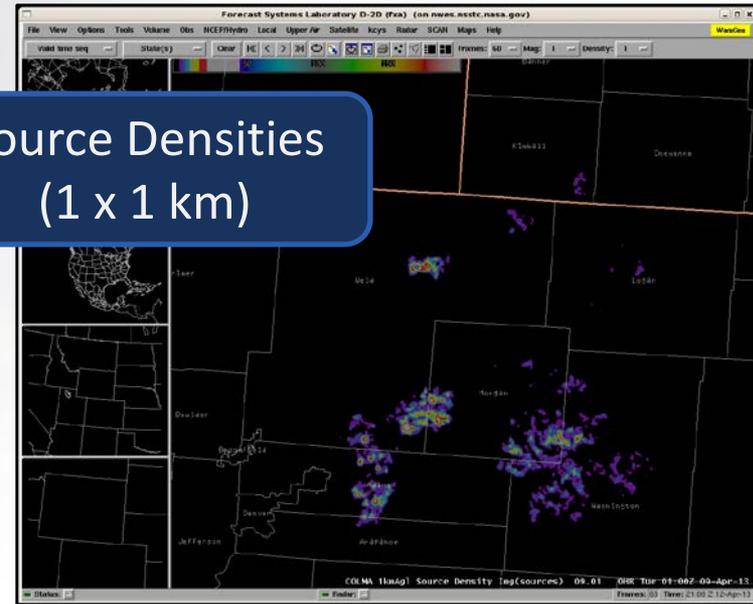
Collaborators

- Colorado State University
 - Steven Rutledge – Owner of LMA
- CIRA
 - Ed Szoke – Liaison to WFOs
- New Mexico Tech
 - Provide raw LMA data
- WFOs Boulder and Cheyenne
 - End users

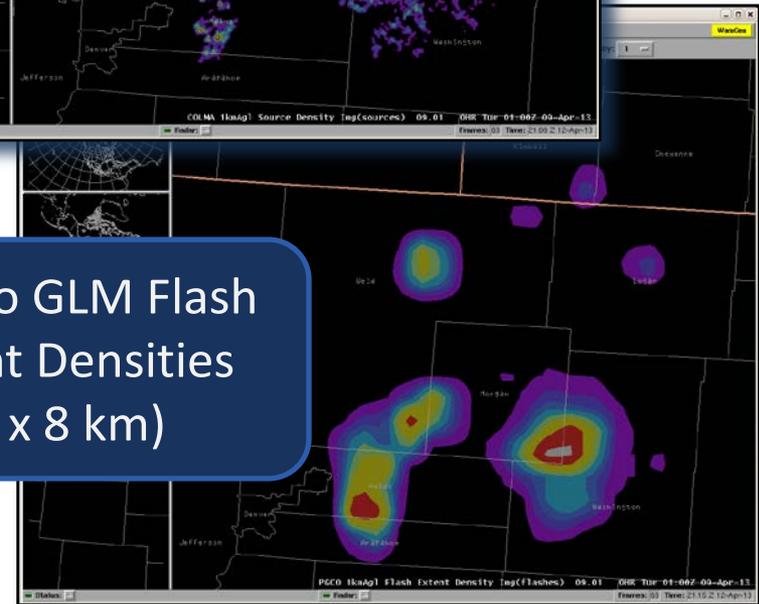
Goals

- Establish collaborations
- Establish data feeds
- Provide science sharing
- Provide training on total lightning
- Identify operational uses
 - Severe weather
 - Lightning safety
 - Fire weather
 - Aviation
- Transition products to collaborative WFO partners
- Collaboration has expanded well beyond initial visit

Source Densities
(1 x 1 km)



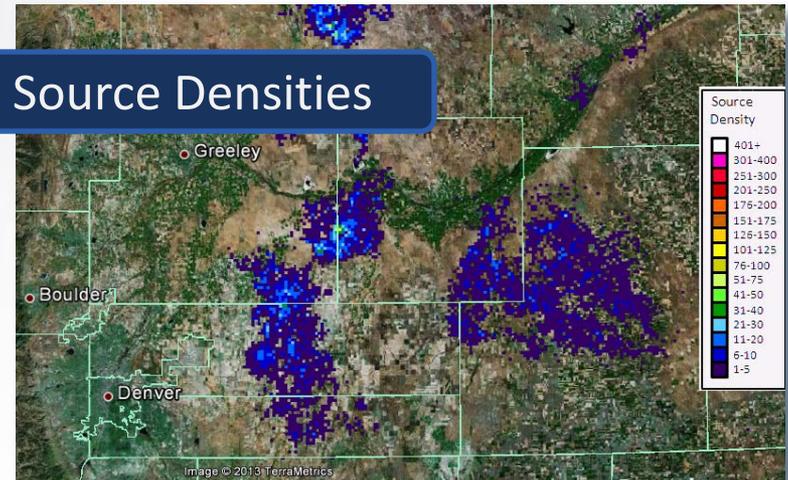
Pseudo GLM Flash
Extent Densities
(8 x 8 km)



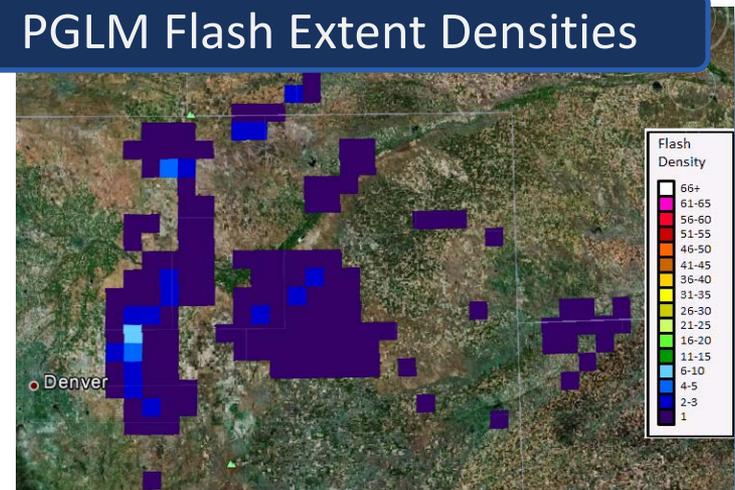
Initial Forecast Office Results

- VSP trip occurred in mid-March
- Data initially available in April
- 2013 season was demonstration year
- Had to address technical issues
 - AWIPS I format at Cheyenne
 - AWIPS II program evaluation at Boulder
- Provided a Google Earth display of total lightning
- Meant fewer opportunities to use, but generated interest

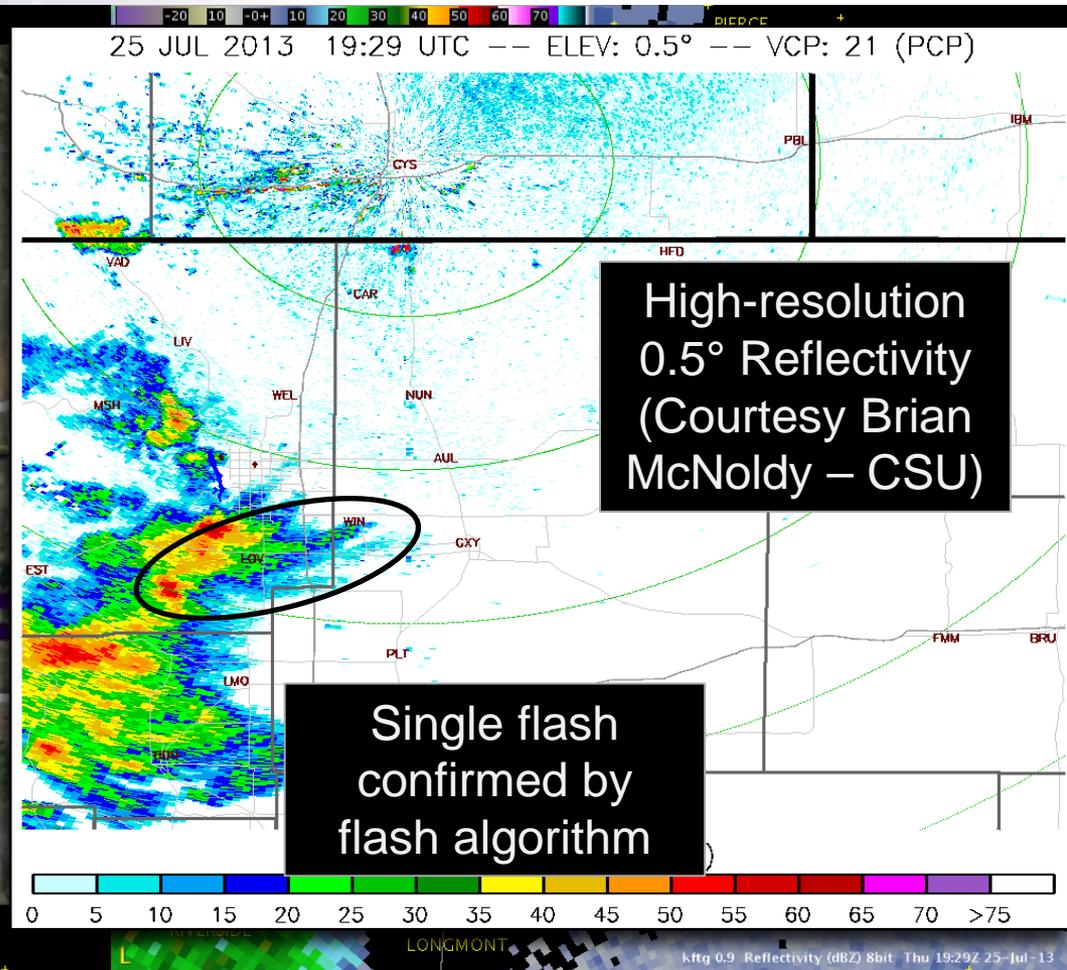
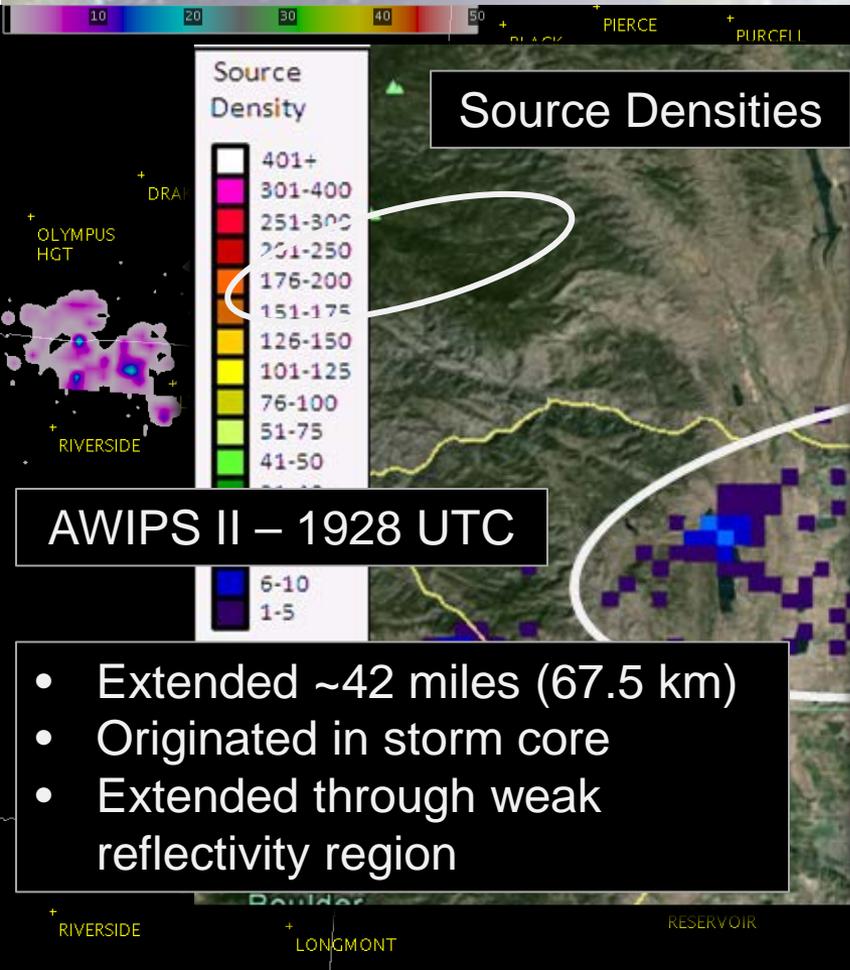
Source Densities



PGLM Flash Extent Densities



2013 Long Flash Example



Denver Tornado Example

(Example Courtesy of Edward Szoke – CIRA)

- A non-supercell tornado formed over Denver International Airport (DIA) along the DCVZ early afternoon of 18 June
- First opportunity to utilize total lightning data from the Colorado LMA network (available at BOU WFO via the web on a large screen display)



DIA tornado on the airport grounds

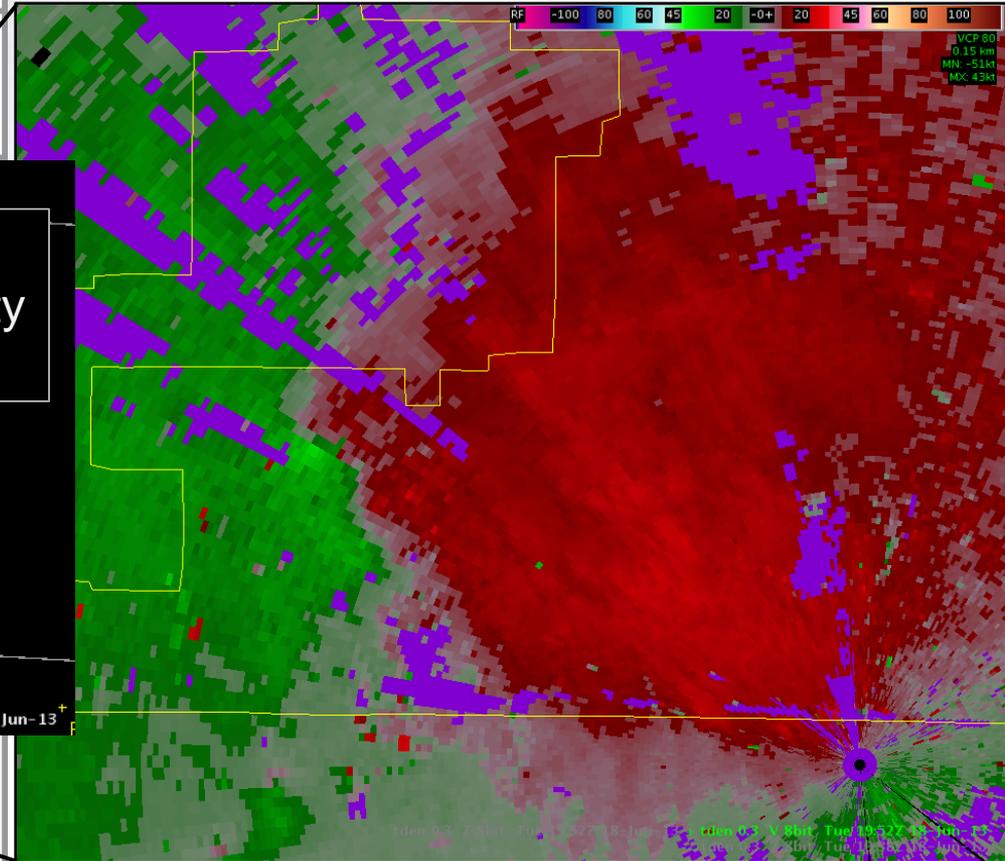
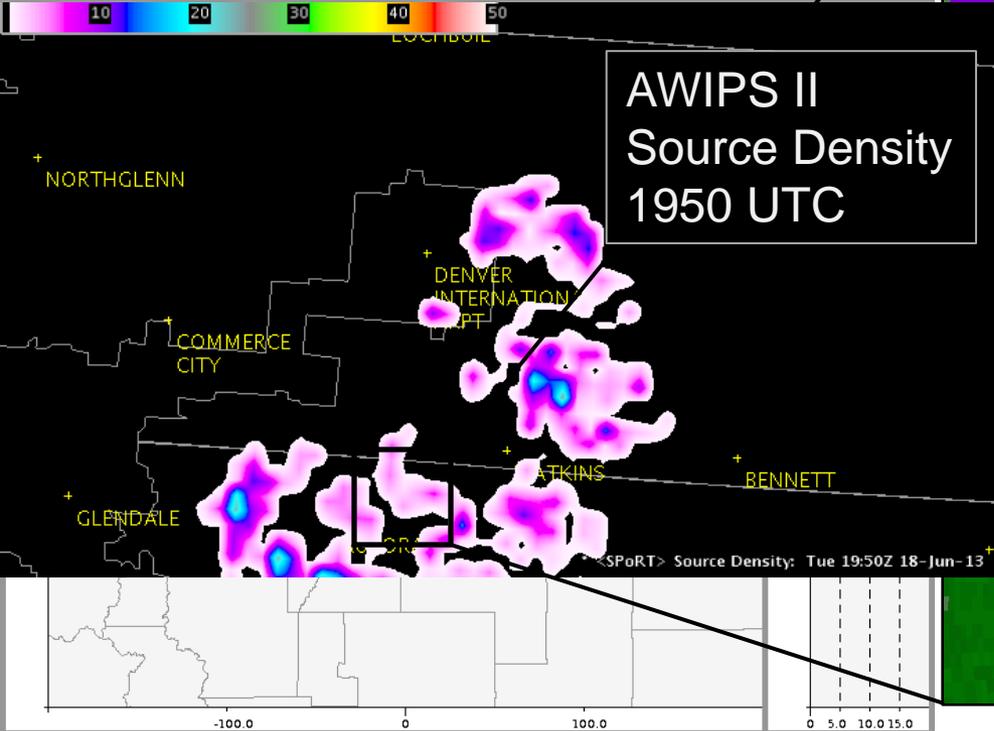
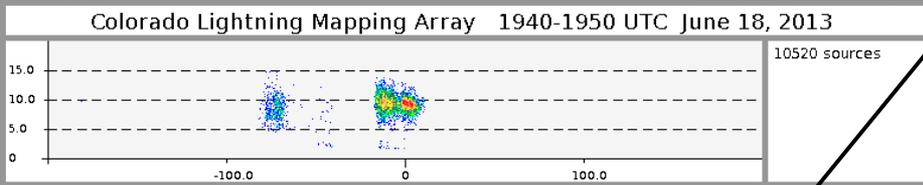


Tornado track courtesy of forecaster Dave Barjenbruch

Denver Tornado Example

COLMA display 1940-50 UTC (from NMT)

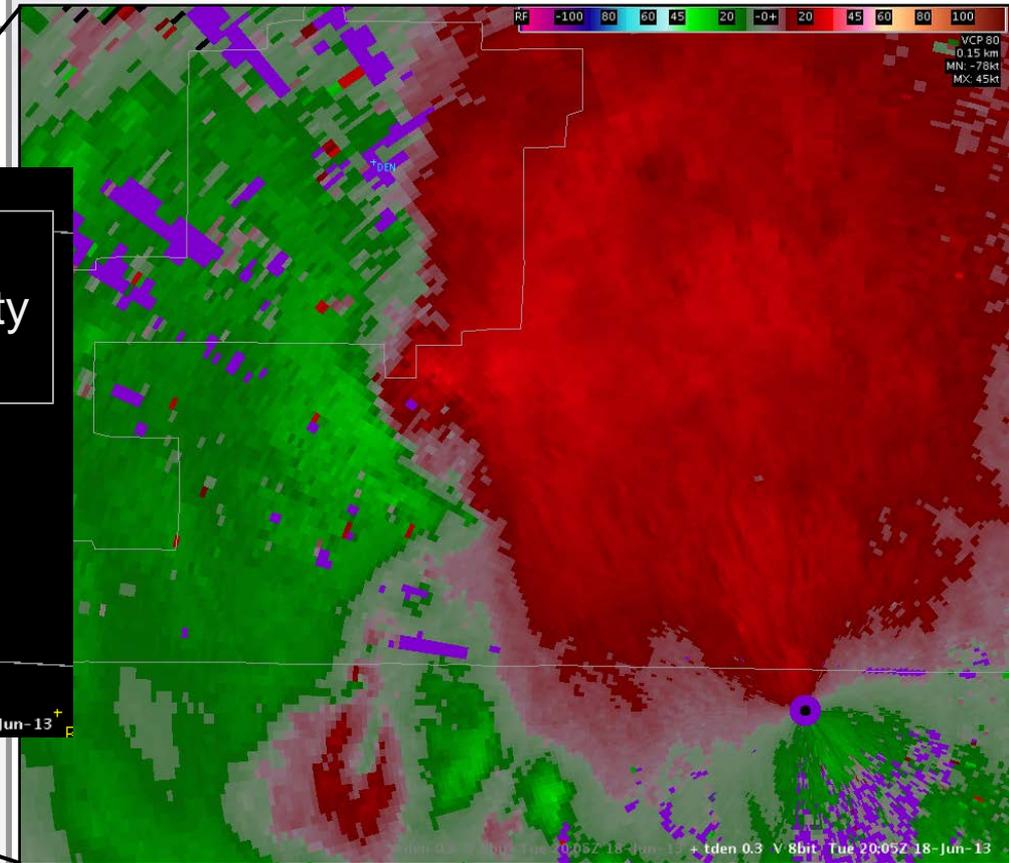
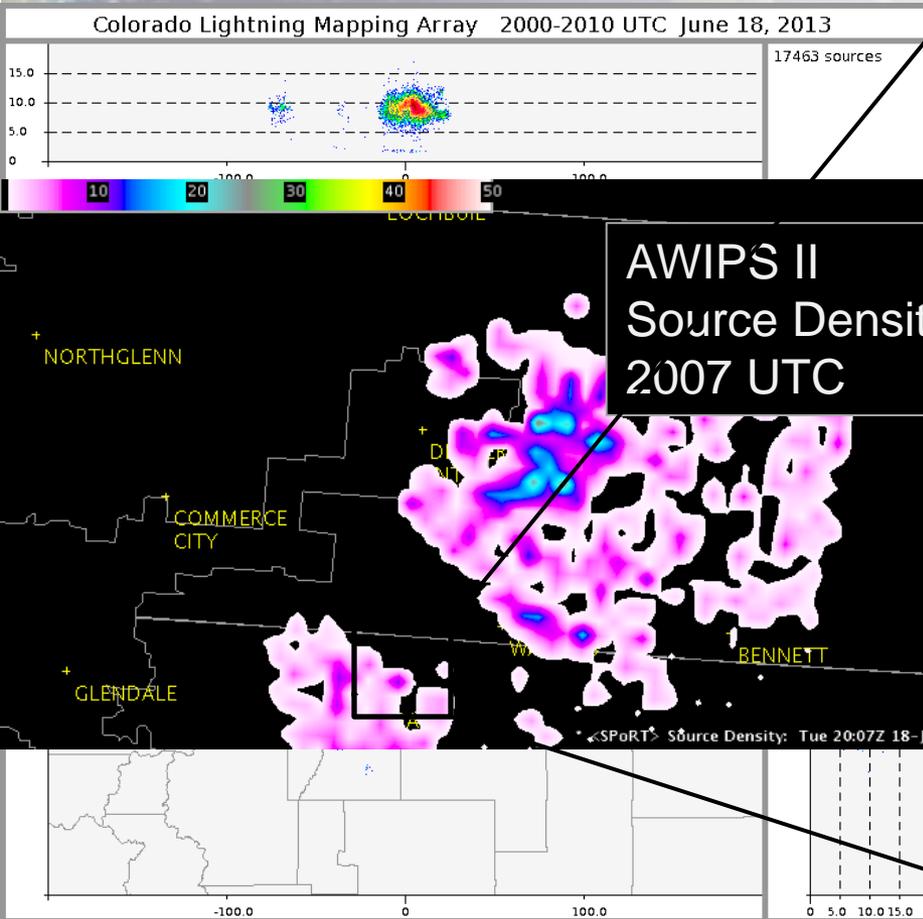
Velocity at 0.3° from TDWR at 1952 UTC



Denver Tornado Example

COLMA display 2000-2010 UTC

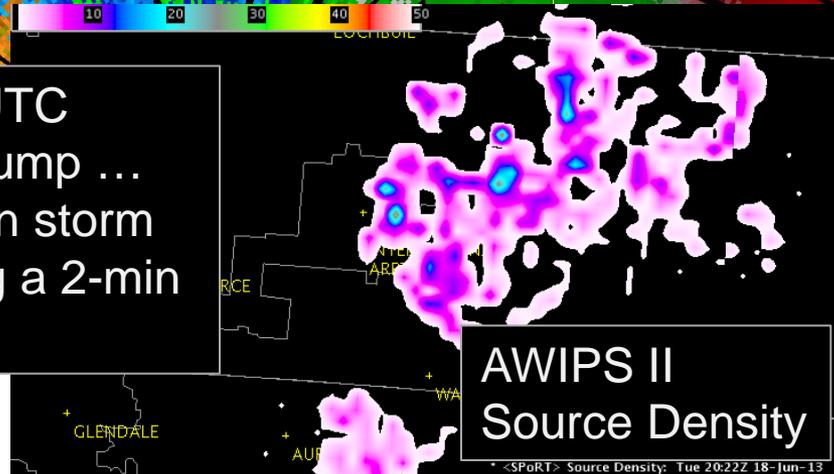
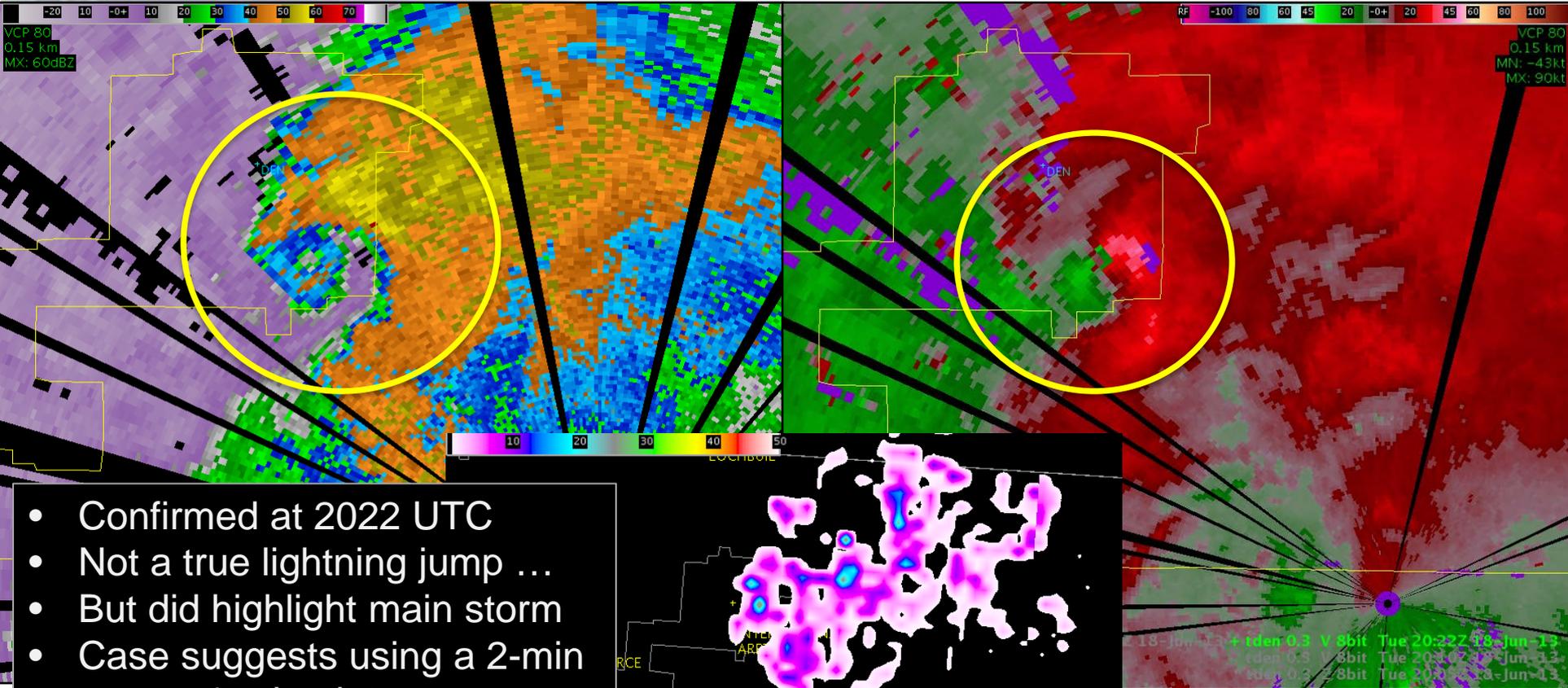
Velocity at 0.3° from TDWR at 2005 UTC



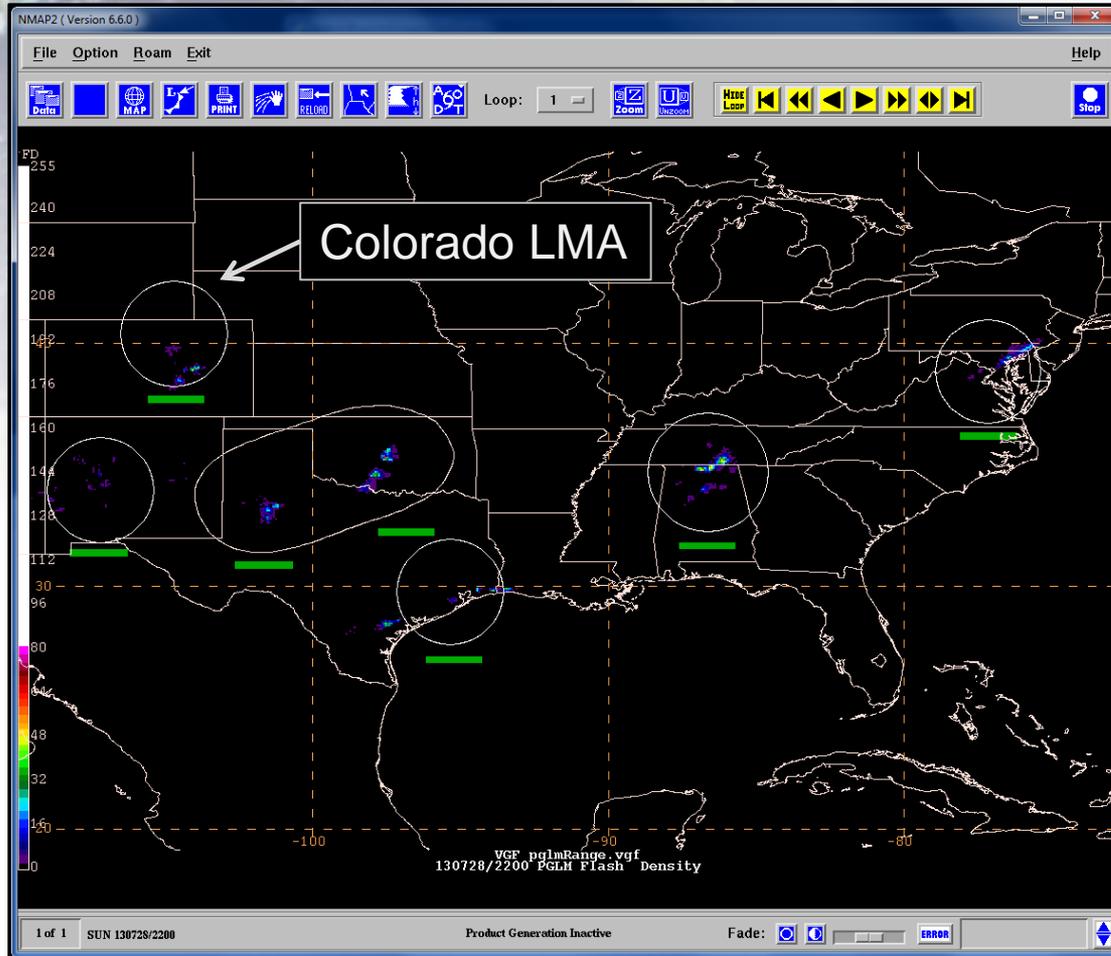
Denver Tornado Example

Reflectivity at 0.3° from TDWR: 2022 UTC

Velocity at 0.3° from TDWR: 2022 UTC



Other Results



- Colorado LMA incorporated into the PGLM mosaic
 - Supports Aviation Weather Center (AWC) and Storm Prediction Center
- Used for 2013 Proving Ground Evaluations
 - HWT's Spring Program
 - AWC's Summer Experiment

Future Work

- WFO Boulder has completed AWIPS II performance evaluation
 - ATAN for SPoRT's LMA plug-in approved for Boulder
 - Boulder will join Huntsville and Houston with AWIPS II
- Prepare for a 2014 evaluation
 - In concert with other LMA partners
- Continued use with National Center partners
- New visiting scientist proposal
 - Expand to aviation use
 - CWSU Denver
- Available for 2014 Proving Ground activities
 - HWT Spring Program
 - AWC Summer Experiment
 - OPG's test of the total lightning tracking tool
- Continued availability for National Centers



Questions

Thank-you for your attention

Additional Questions?

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