TEXAS TECH UNIVERSITY™

West Texas LMA

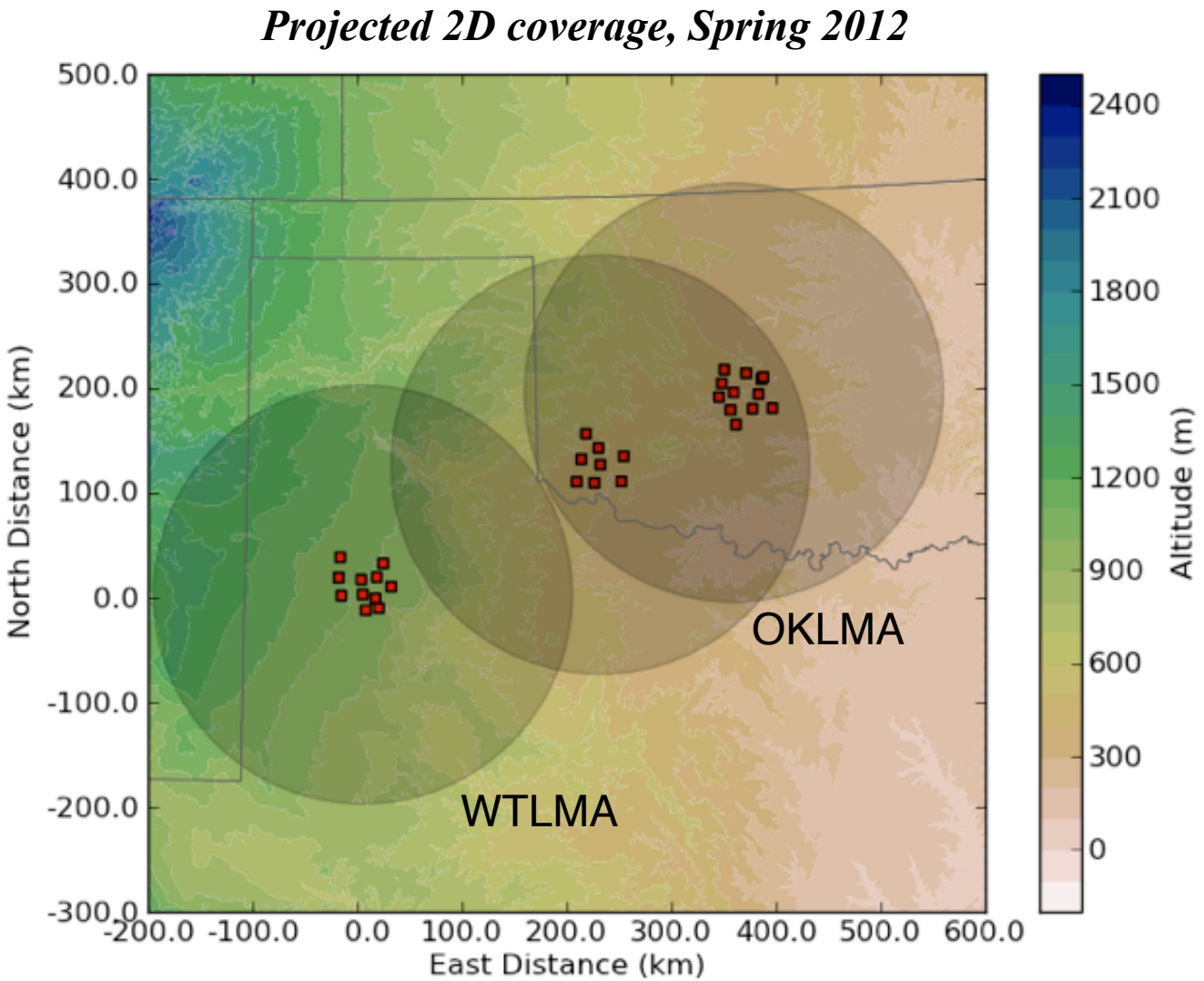
DEPLOYMENT AND OPERATIONS UPDATE

Eric Bruning
TTU Department of Geosciences
Atmospheric Science Group

GLM Science Meeting, Huntsville, AL
19-20 September, 2011

Special thanks to: TTU Wind Science & Engineering, Jerry Guynes, Jeff Livingston, Glenn Allen, Vanna Sullivan, Jennifer Daniel, Stephanie Weiss, Steve Cobb, Justin Weaver, Joe Jurecka, Natalie Gusack, RJ Hill

West Texas LMA



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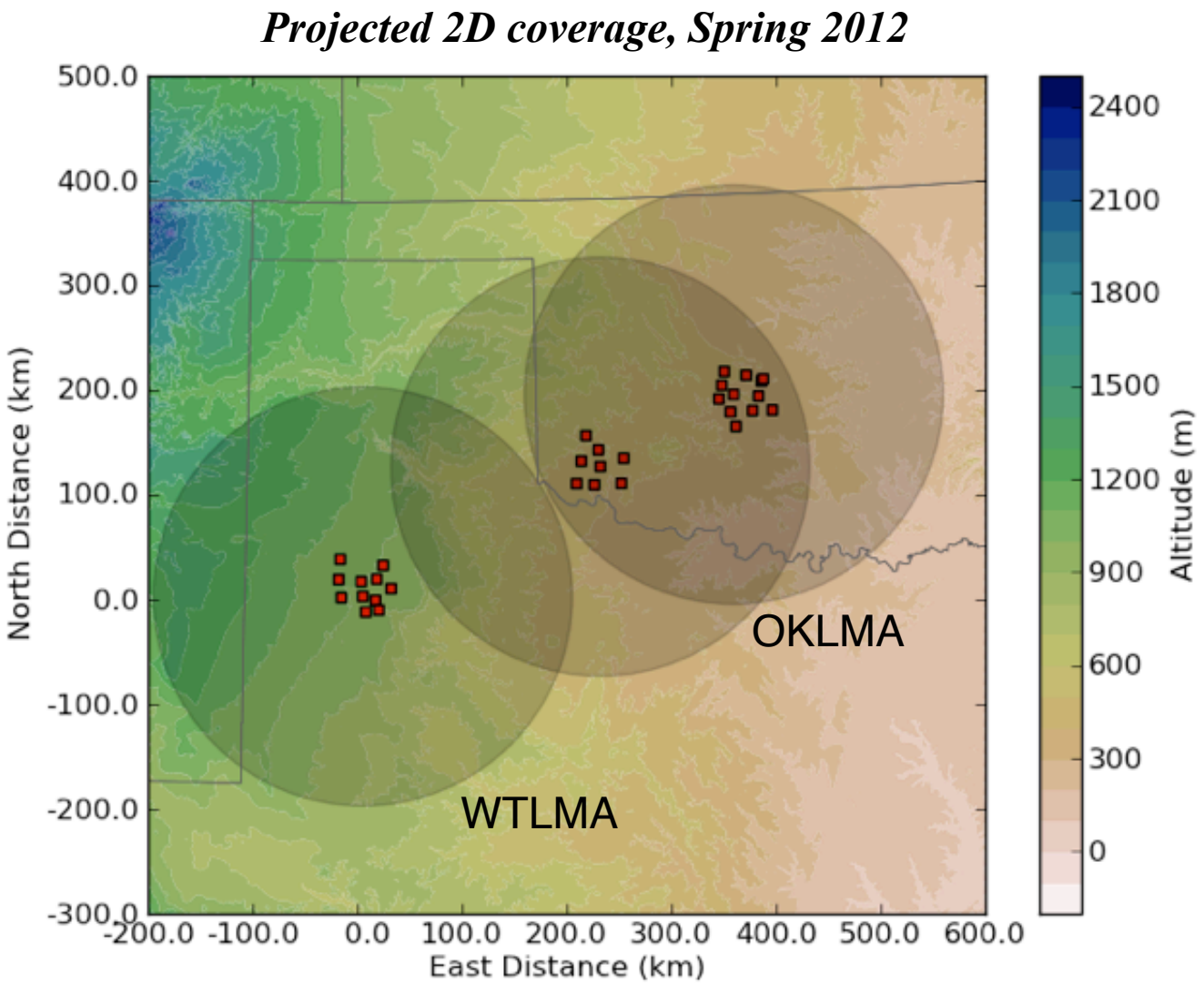
- Unique regional coverage overlaps with OKLMA



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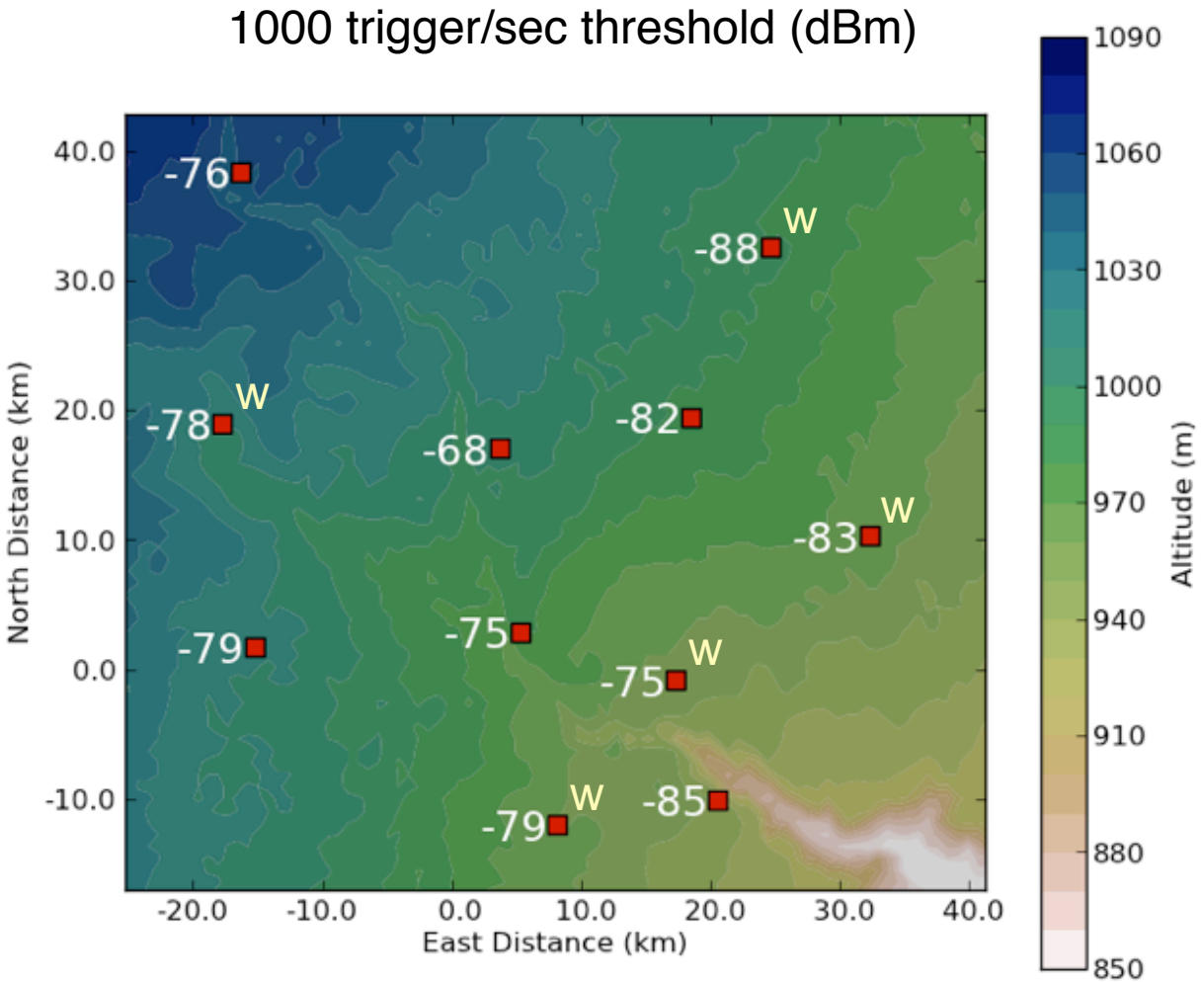
- **11** confirmed sites; good to very good noise levels



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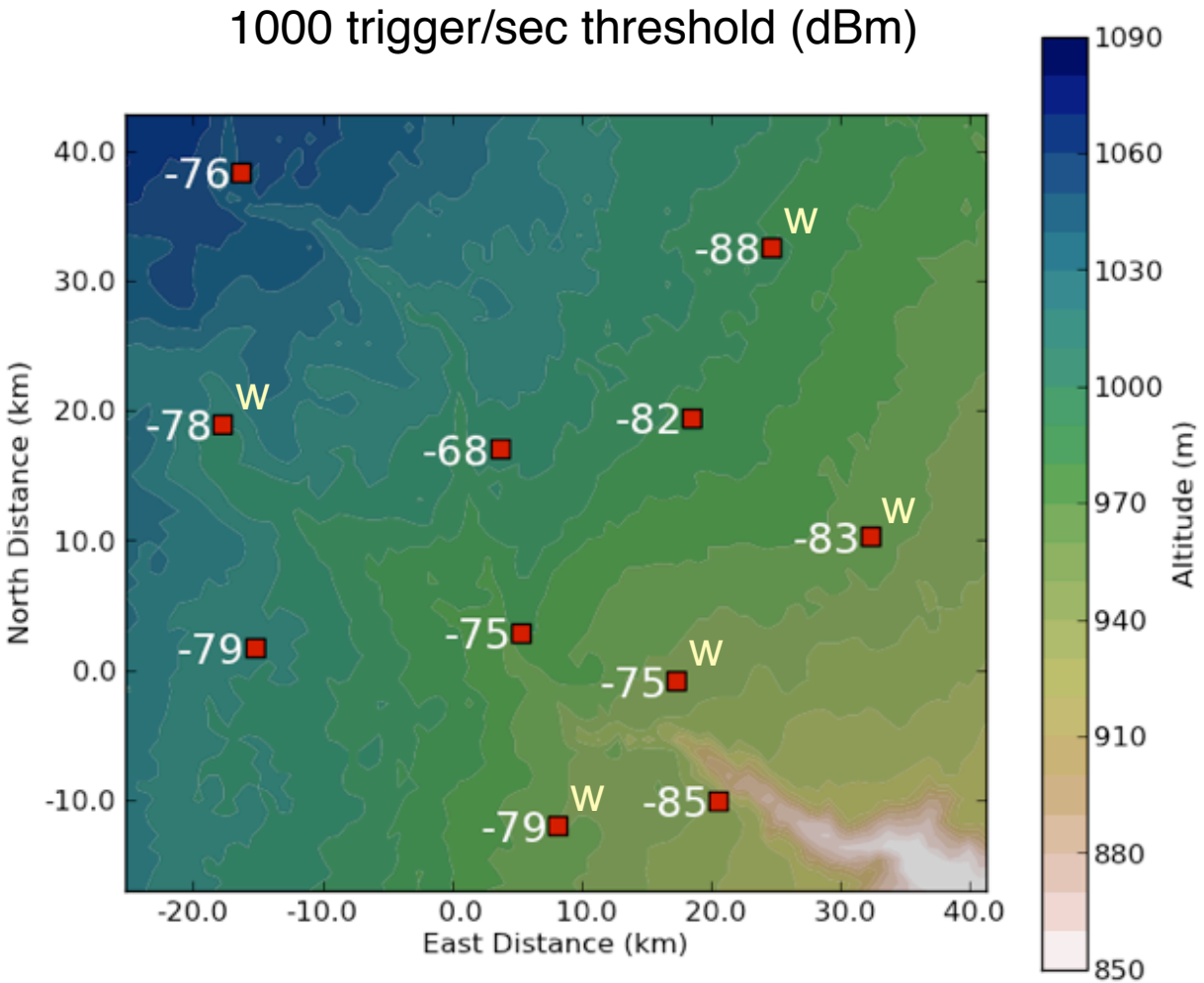
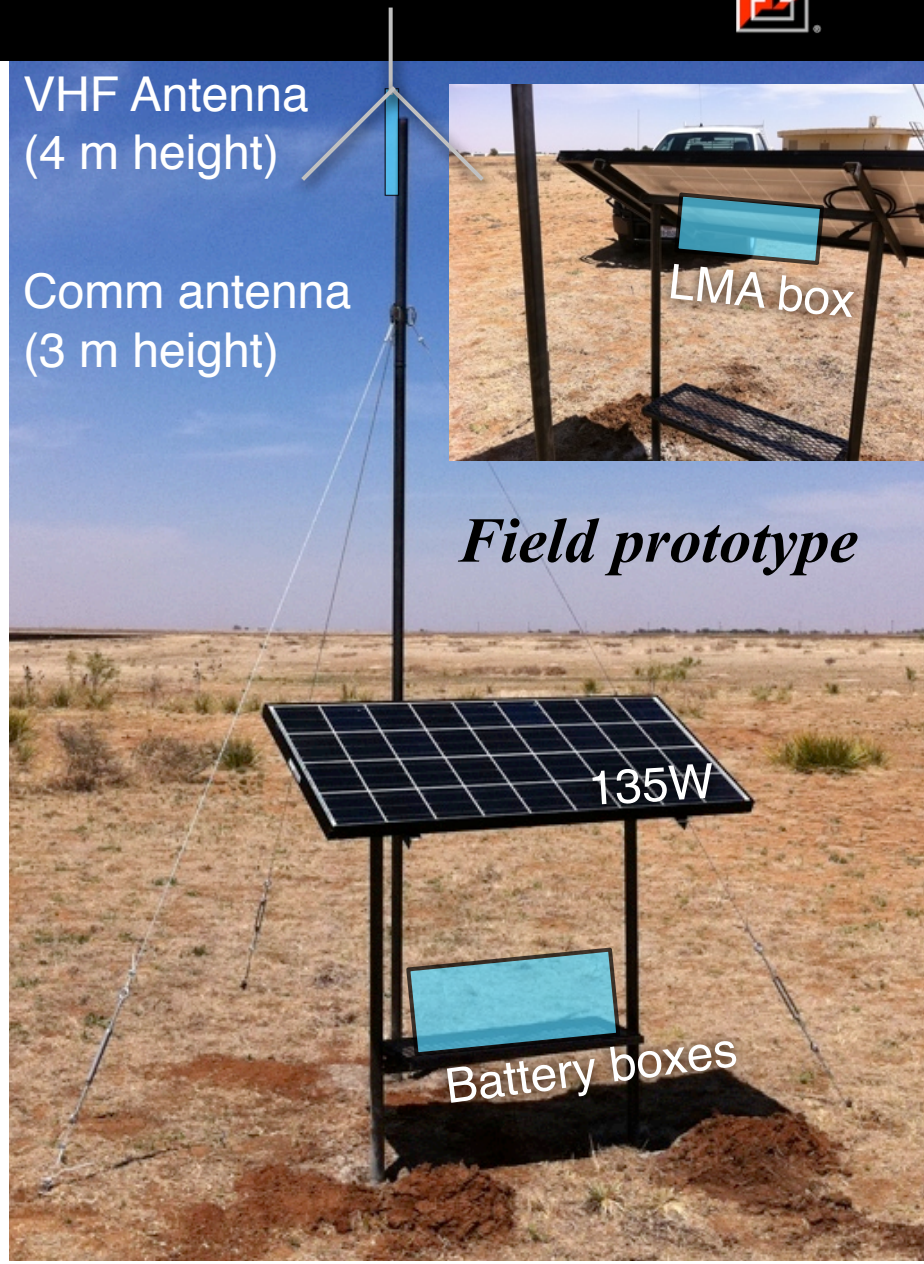
- Unique regional coverage overlaps with OKLMA
- **11** confirmed sites; good to very good noise levels
- Wireless internet links ready at 5 of 11 sites



WTLMA: Hardware Status

Deployment timeline

- 11 custom-welded solar stands, guyed antenna poles, and fencing, solar panels, batteries, wireless radios & antennas are ready
- NMT will deliver electronics, central processor, and VHF antennas on 30 September
- Network operational this fall



COMMUNICATIONS AND DATA PROCESSING

- < 1 km between field sites and schools, etc. with Internet.
  - *5.8 GHz (802.11a) directional antennas*
- LMA processor / RAID at TTU's 24/7 central server facility
  - *AWIPS- and web-ready product generation*
  - *Backup RAID and research processor at HPCC facility*
- Data supplied through existing TTU LDM feed to NSSL HWT, SPoRT, and optionally NWS Lubbock.
  - *Latency and throughput already verified for real-time data*
  - *Participation in National Lighting Jump Field Test*

FORECAST OFFICE INTERACTION

- GOES-R / COMET project with Lubbock NWS office (*Steve Cobb*)
  - *Develop and provide training (lightning-meteorology links from recent papers)*
    - Location and extent of flashes relative to sub-cell storm structure provides best link between lightning and deep forecaster understanding of how storms work
    - Provide detailed grounding in expected electrical behavior for different storm modes and conceptual models
  - *Product generation and operations support*
    - Ingest of flash extent density, median flash footprint, other new products
    - AWIPS localization for new products already underway (J. Jurecka)
    - Post-event discussions: utility of products and training
- Jennifer Daniel's (MS student, NWS volunteer) thesis work will evaluate McCaul WRF lightning threat over WTLMA
  - *Hopefully using ensemble probabilities*
- Intro to LMA at NWS Lubbock aviation weather workshop, Oct 11

OTHER RESEARCH CONNECTIONS

- Proposed participation in DC3 experiment
  - *Regional 3D LMA coverage increases chances of targetable storms*
  - *Plan to run 2-3 km WRF ensemble over TX/OK domain (leverages DOE data assimilation project for wind energy)*
- Duke Univ. sprite camera and LF antenna for DARPA study
  - *High speed sprite obs over OKLMA from 15th floor of Overton Hotel*
  - *Opportunity for high speed tower strike footage under WTLMA*
- Hosting LASA antenna

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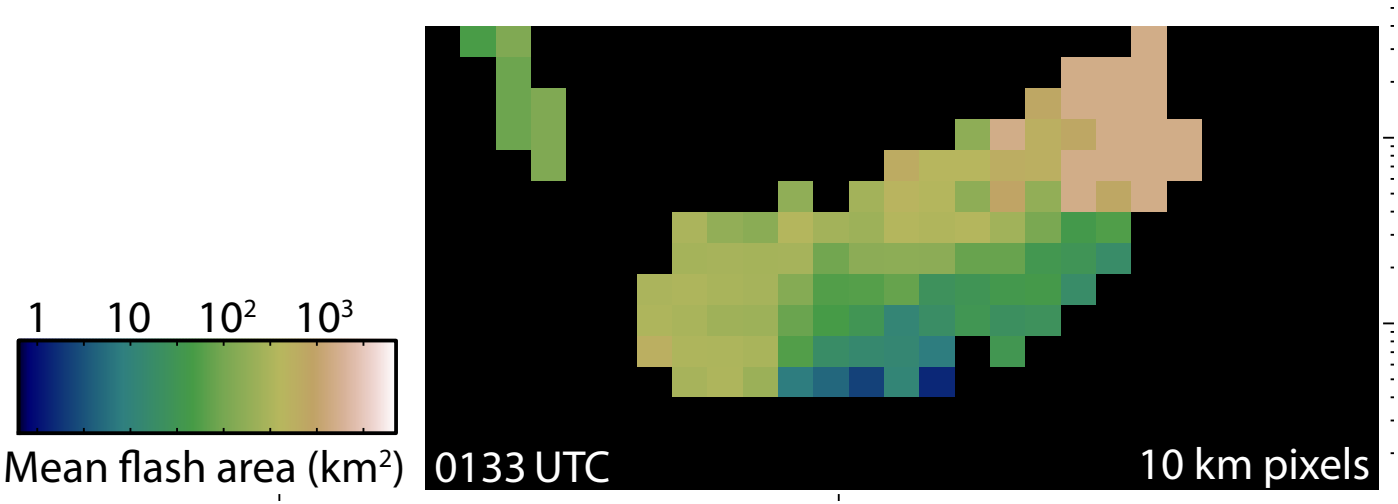
  - *Hypothesis:*
    - If the spatial structure of turbulent kinetic energy (TKE) and electrostatic energy are controlled by the same large eddy dynamics, dimensional analysis can suggest some combination of flash parameters that will have the same spectral shape as TKE.

FLASH SIZE STATISTICS

2004-05-30, 0133-0134 UTC, Geary, OK HP supercell



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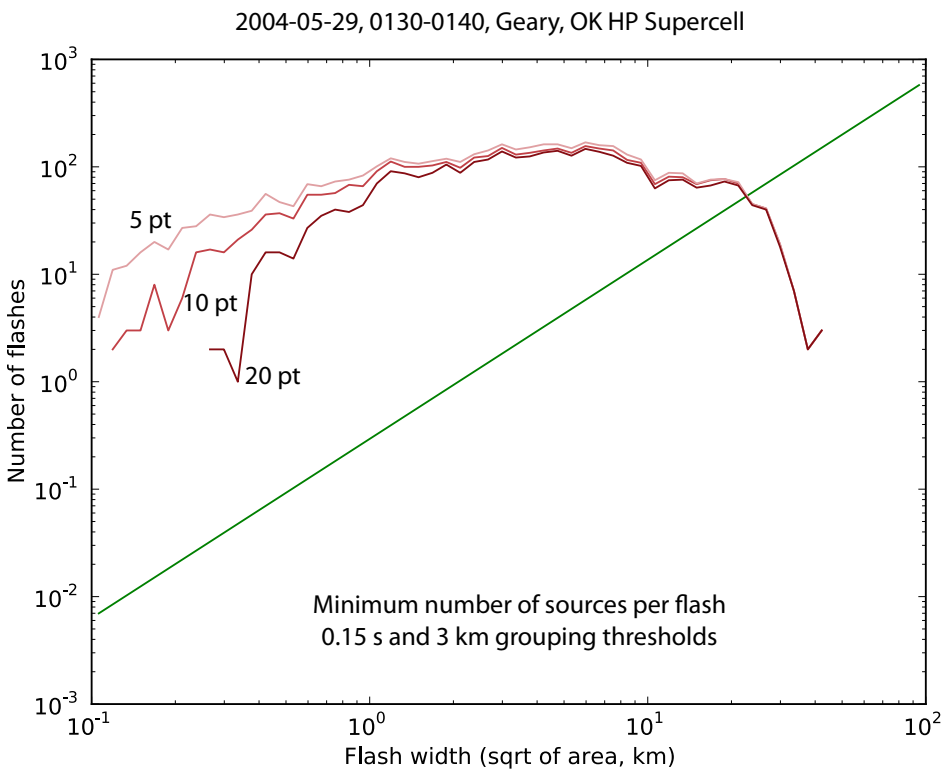

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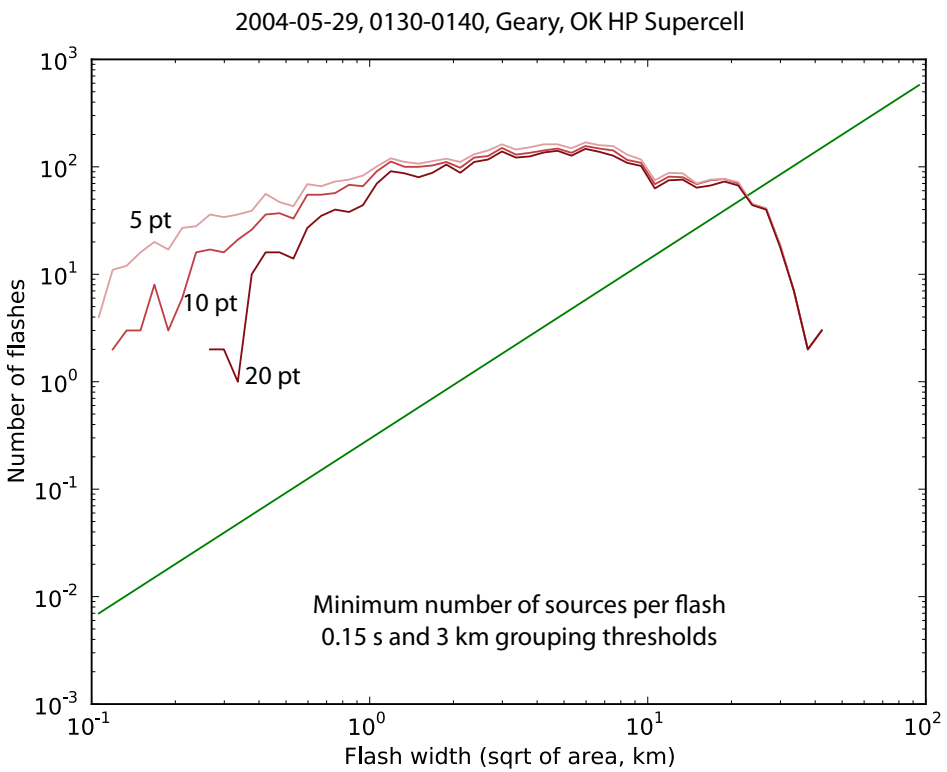

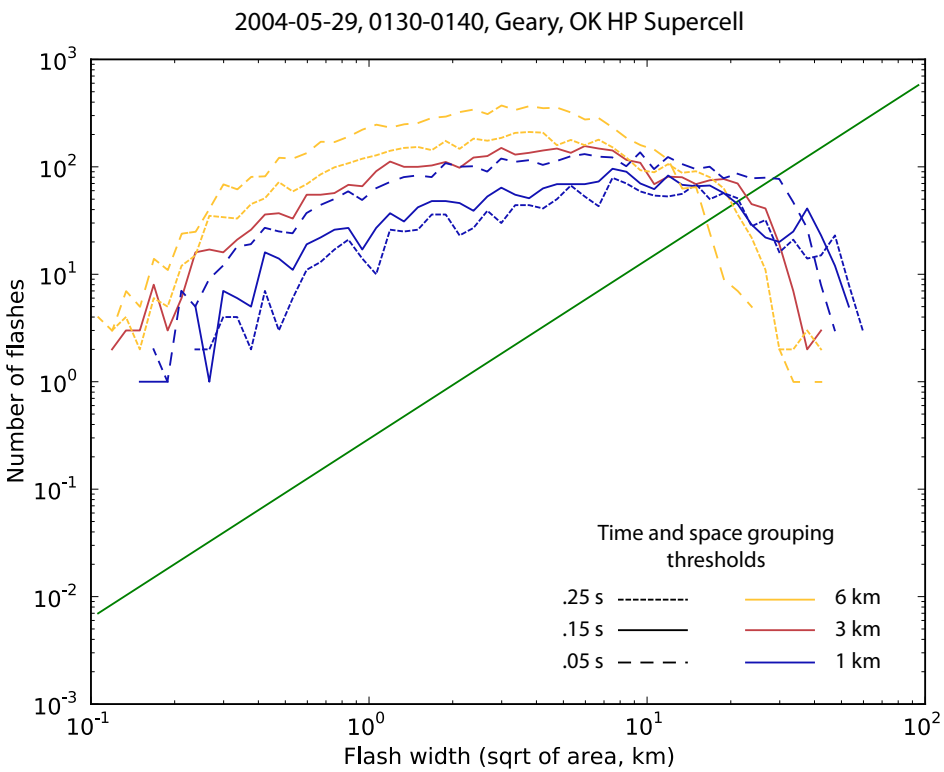

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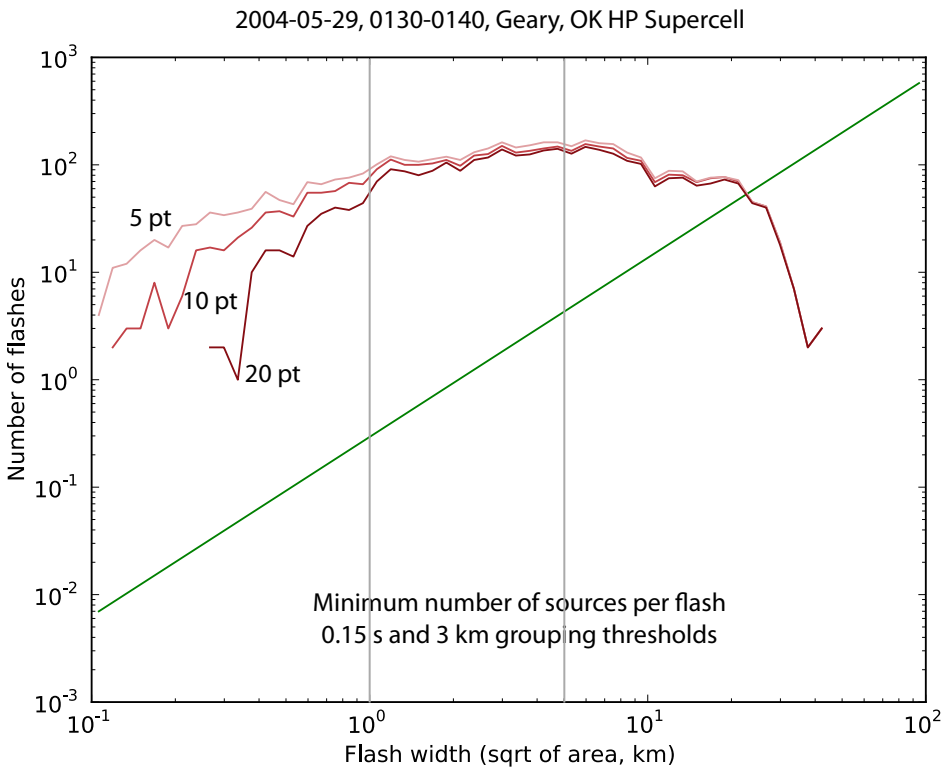
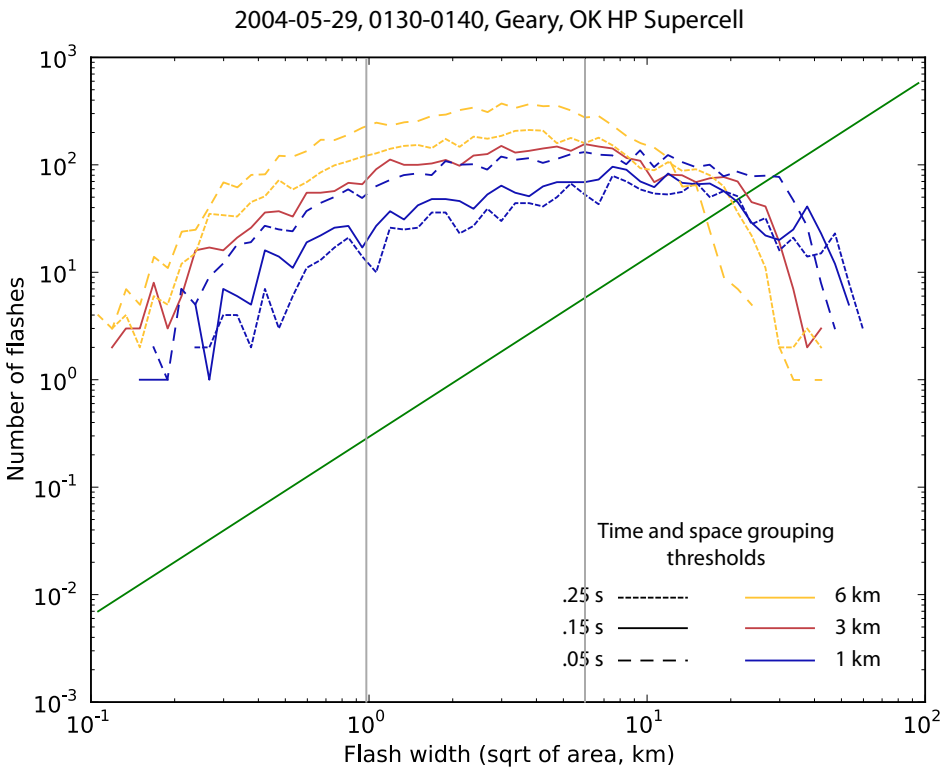
  - *Slope of spectra seem stable for flash widths from 1-5 km, 5-20 min sources*





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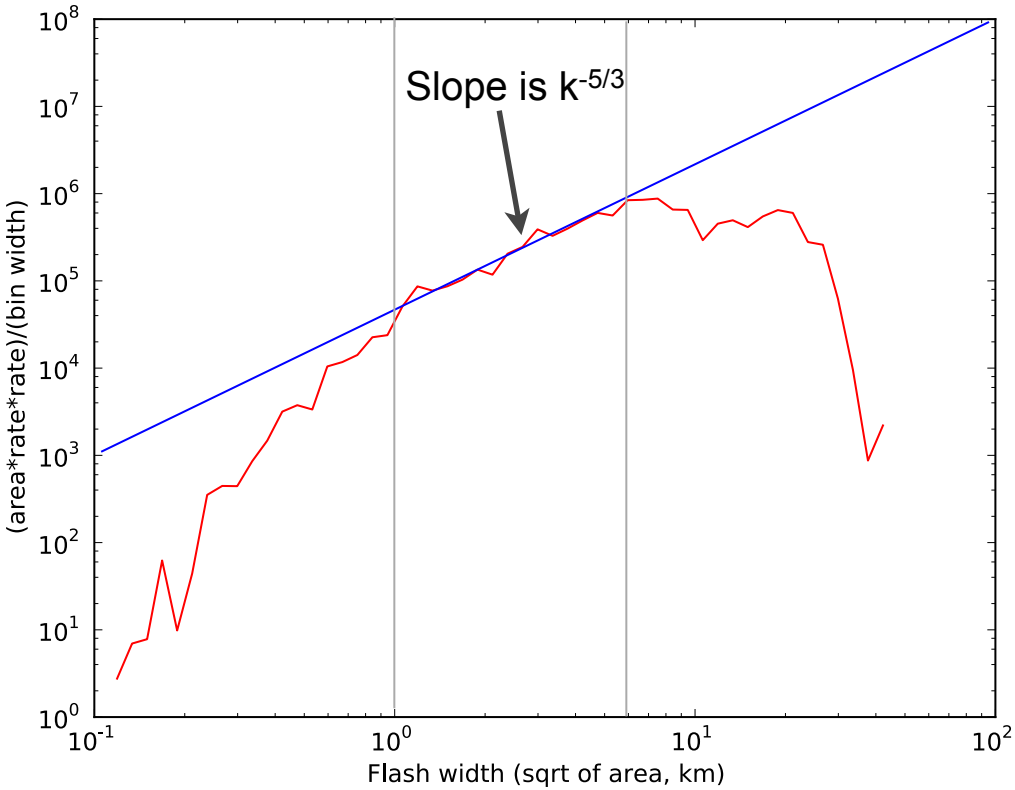

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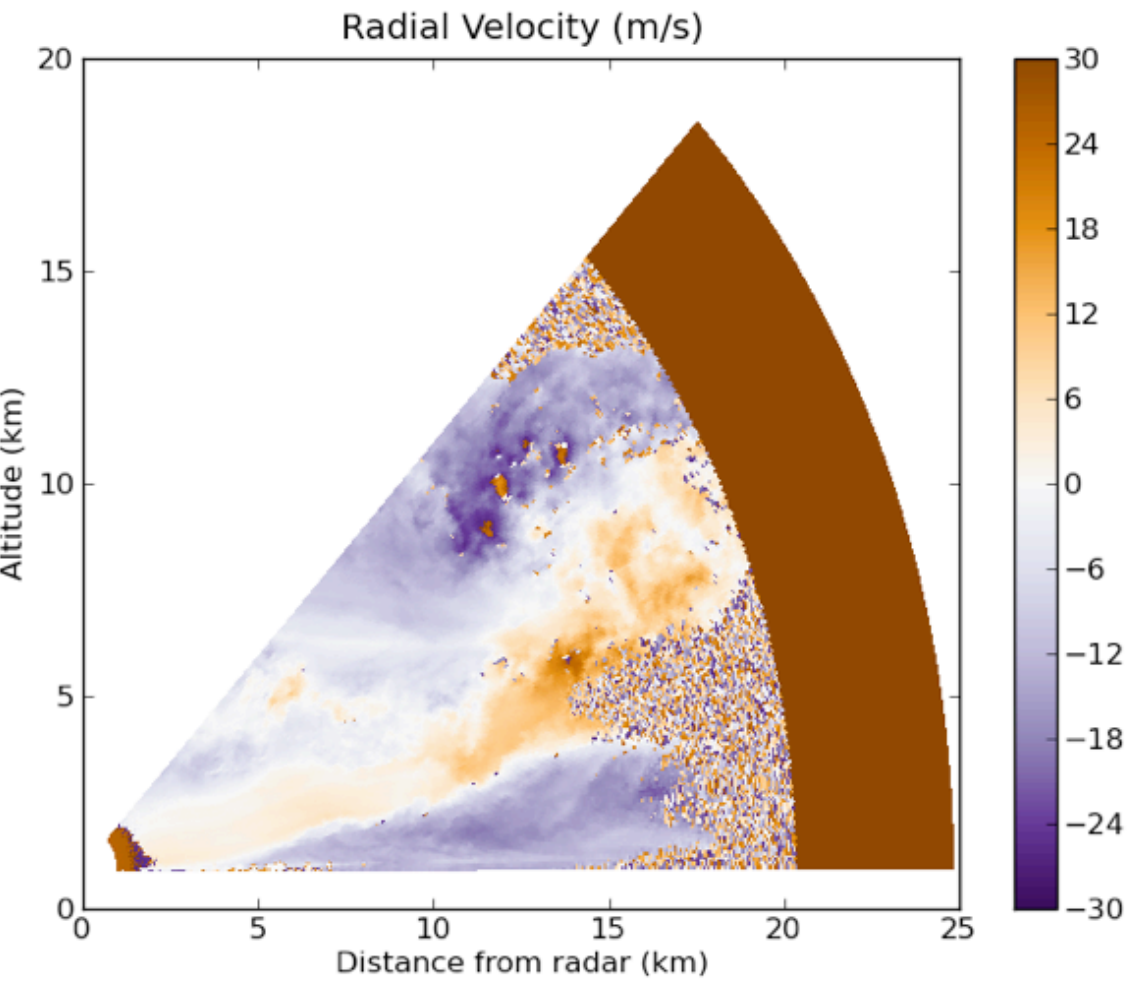

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- Would like to validate link between eddy structure and flash extent, using velocity data from high-res doppler radar and lidar vertical cross-sections

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