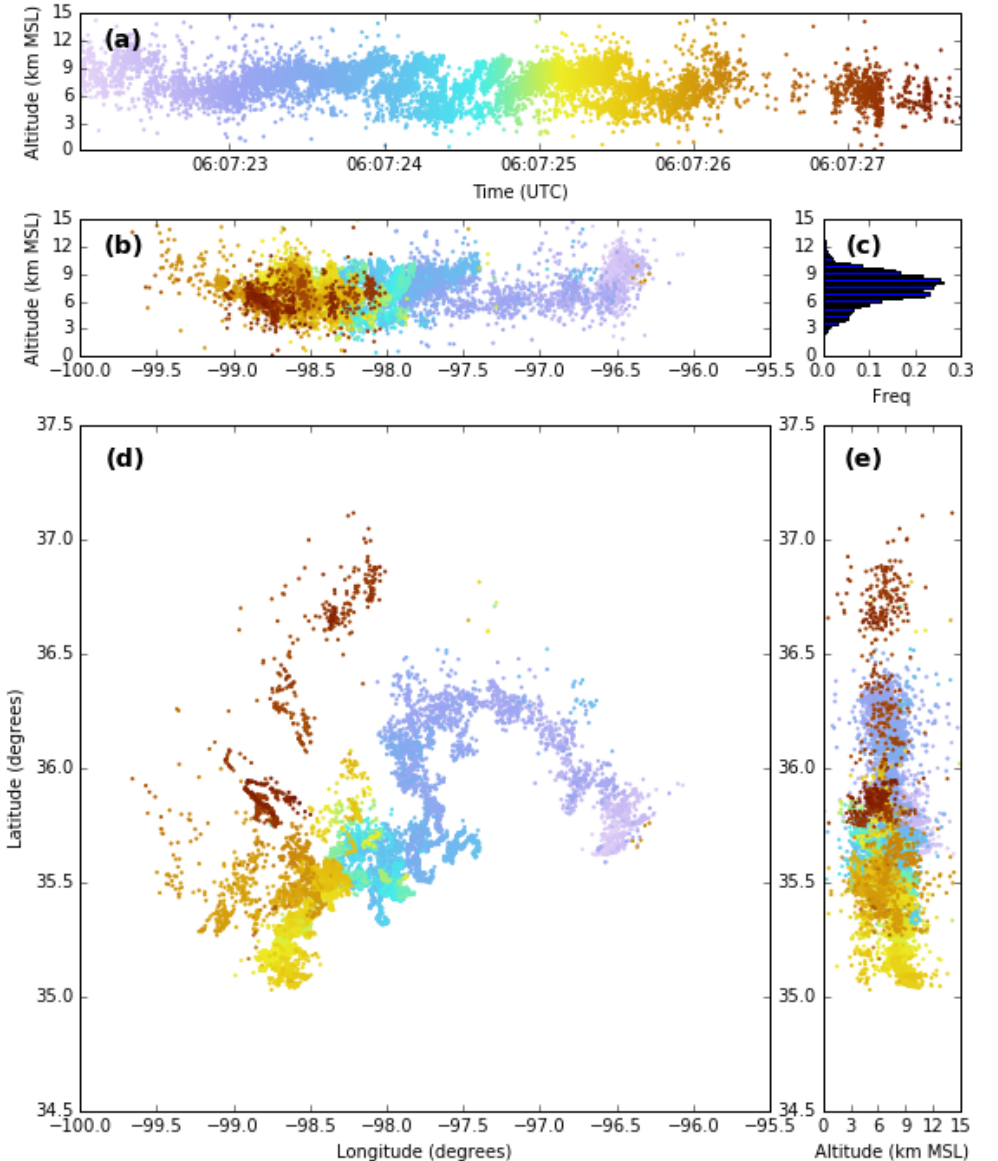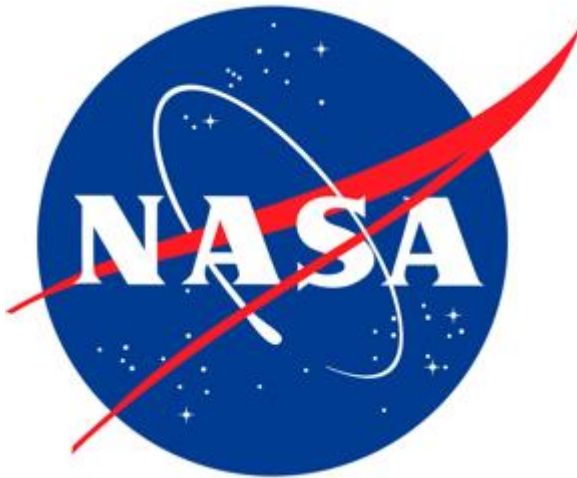# RELAMPAGO Lightning Mapping Array Update

Timothy Lang, NASA MSFC

Contributors: Monte Bateman, Rich Blakeslee, Jeff Burchfield, Larry Carey, Nathan Curtis, Bill Koshak, Chris Schultz

Overview

- GOES-R funding deployment of 11 MSFC LMA stations to Cordoba, Argentina in support of RELAMPAGO/CACTI field campaigns

- Nominal deployment Aug 2018 thru Feb 2019   (6 months) – RELAMPAGO is Nov/Dec 2018

- VHF source location data will be posted to GHRC

- Analysis funding requested in FY2019 NASA/NOAA MOU

- GOES-16 has full view of Argentina

- GOES-17 launched 3/1, due to move to West 9/1

- If that move gets delayed, that helps RELAMPAGO LMA

GLM Coverage with Lightning Climatology

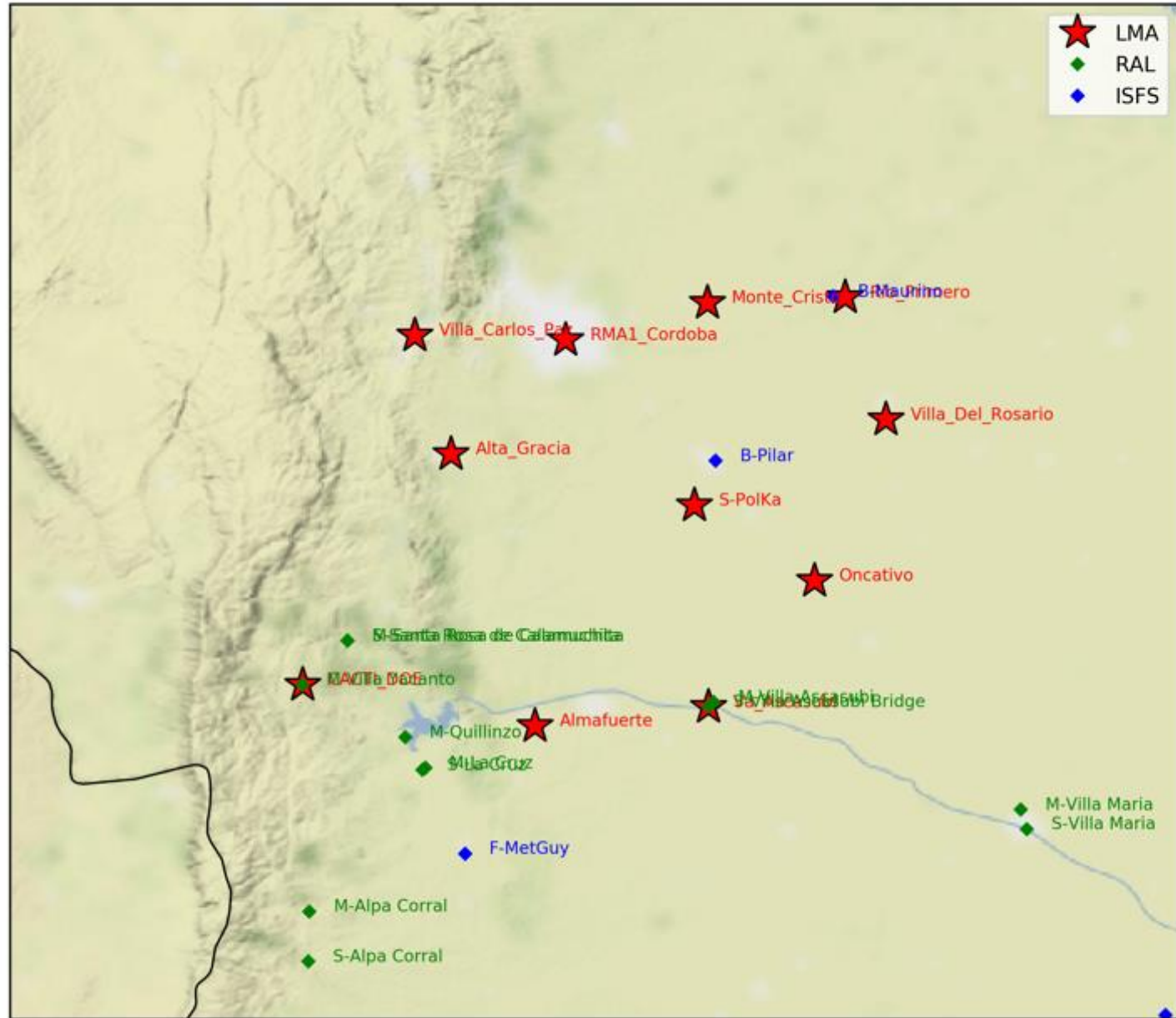Annual Flash Rate

70
50
40
30
20
15
10
8
6
4
2
1
.8
.6
.4
.2
.1
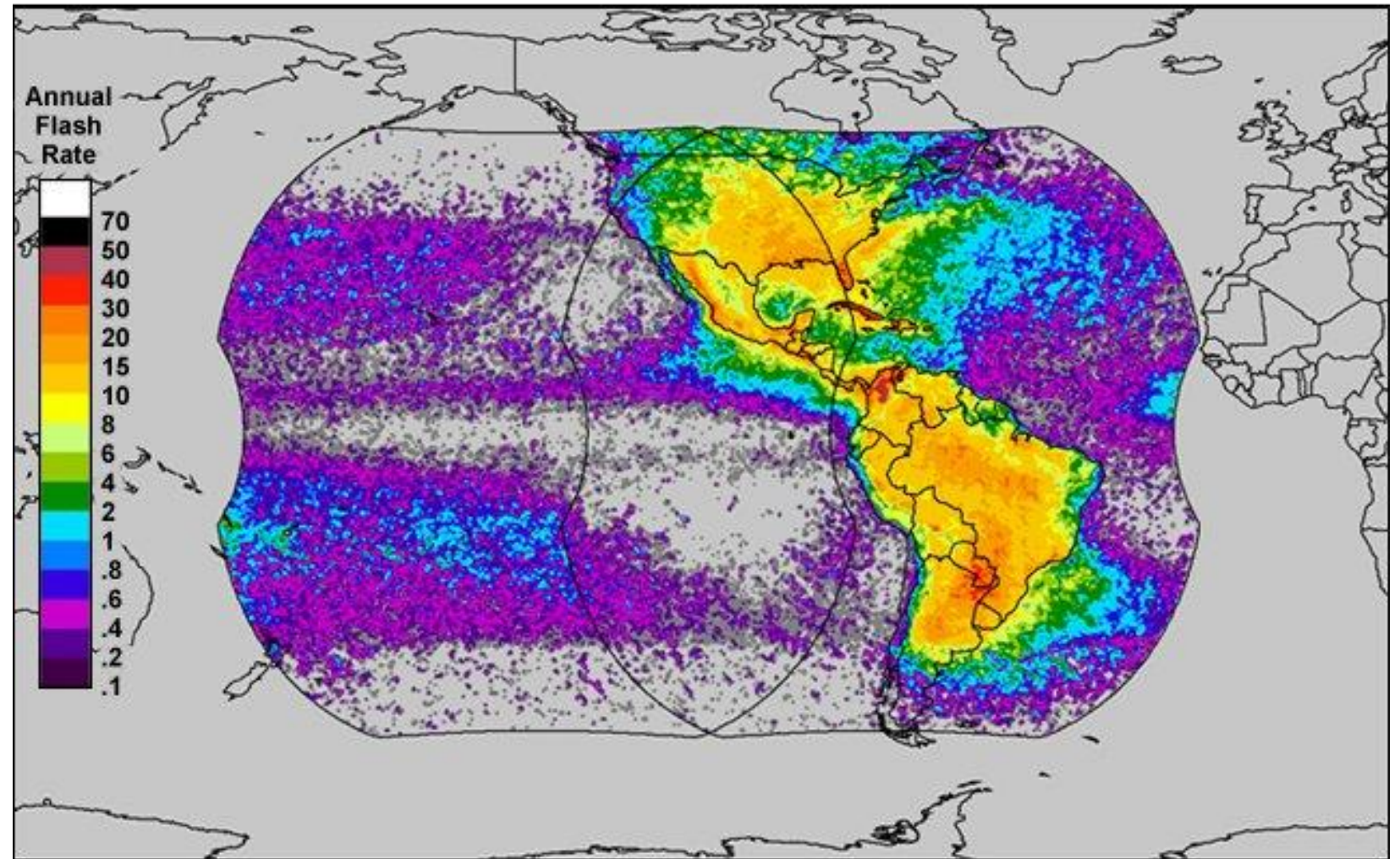
S. J. Goodman et al., The GOES-R Geostationary Lightning Mapper (GLM), Atmospheric Research, Vol. 125–126, 2013, Pages 34-49, ISSN 0169-8095, https://doi.org/10.1016/j.atmosres.2013.01.006.

NASA/Goodman et al. 2013

Planned Network Map
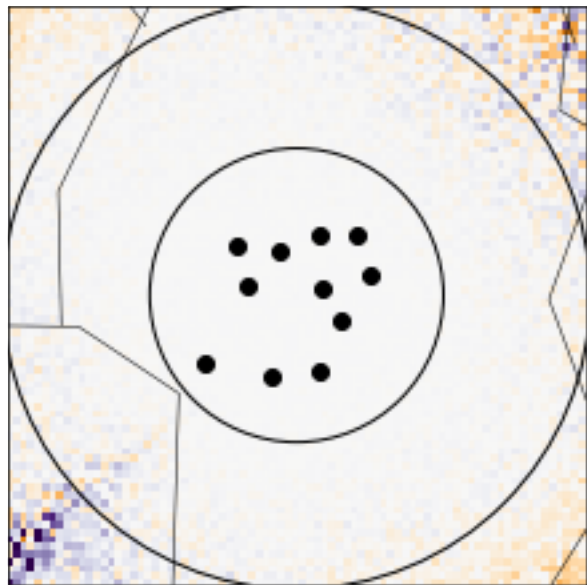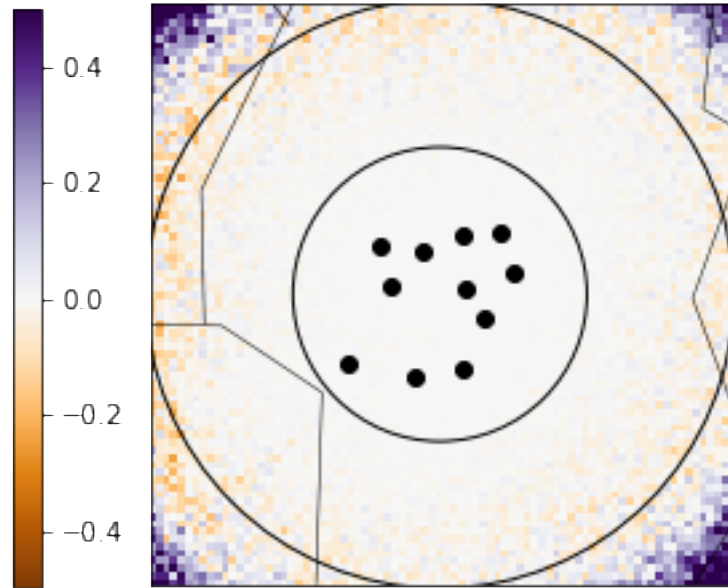

LMA Map

LMA station locations are red stars

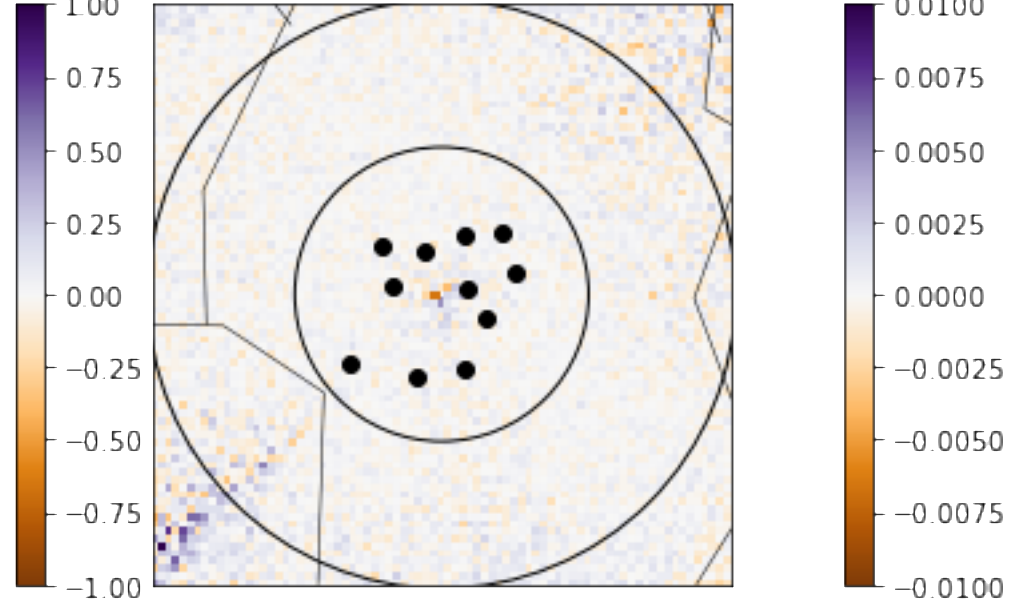Final network configuration will be driven primarily by logistical concerns
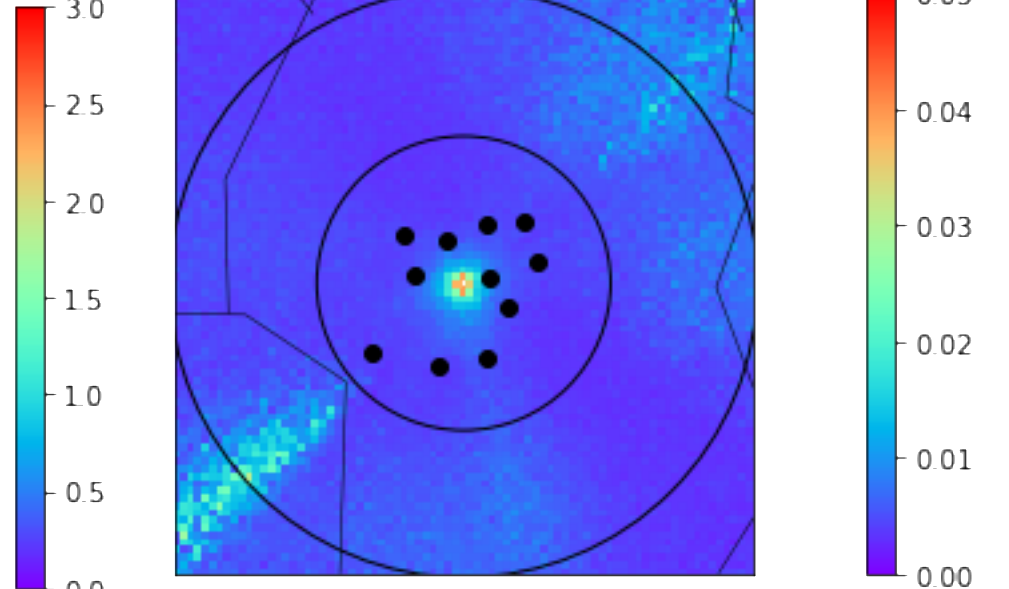
Range

Altitude

Azimuth
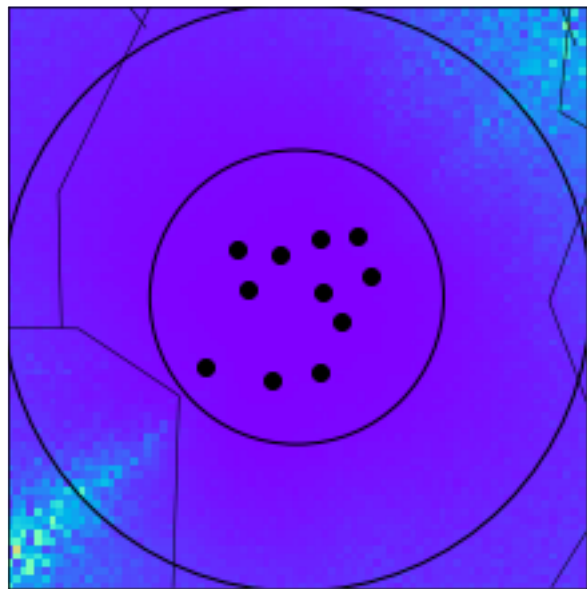
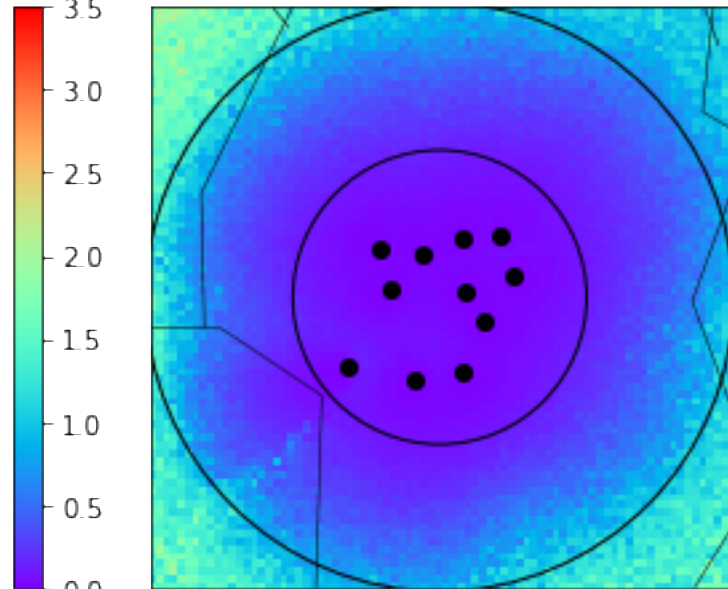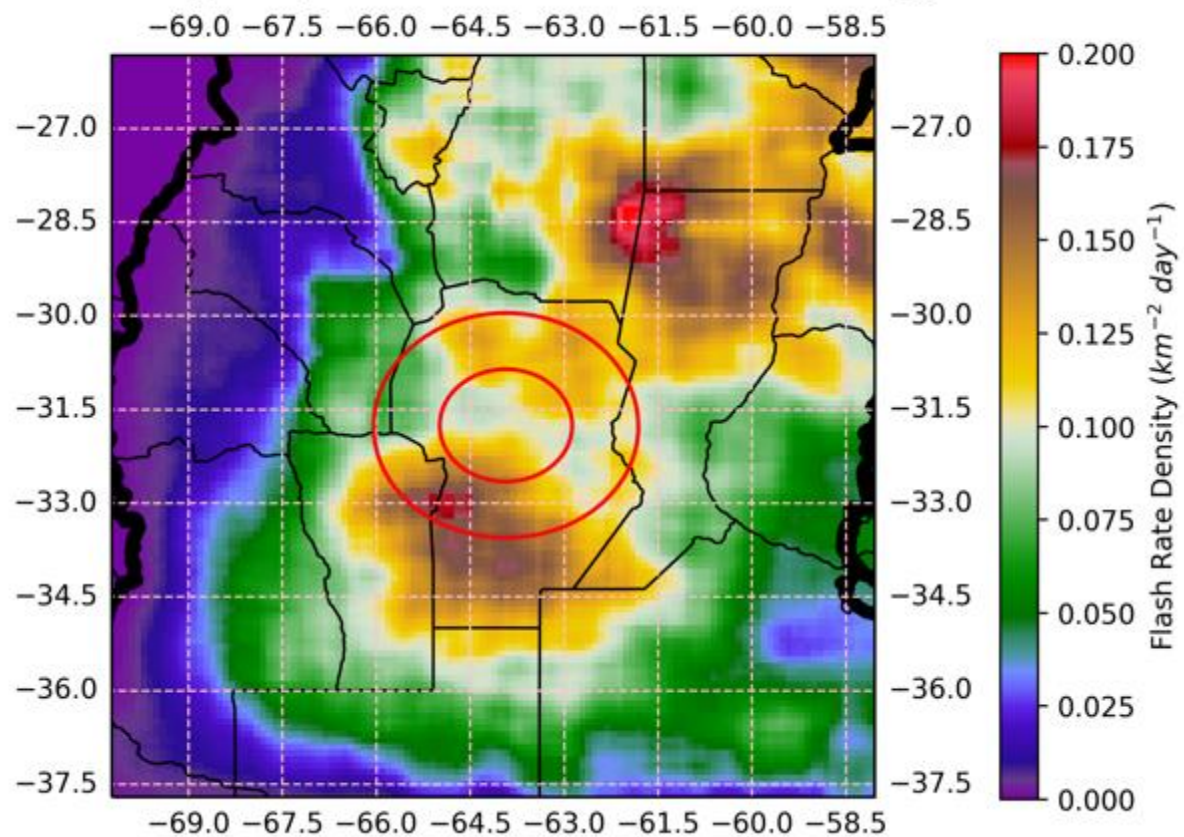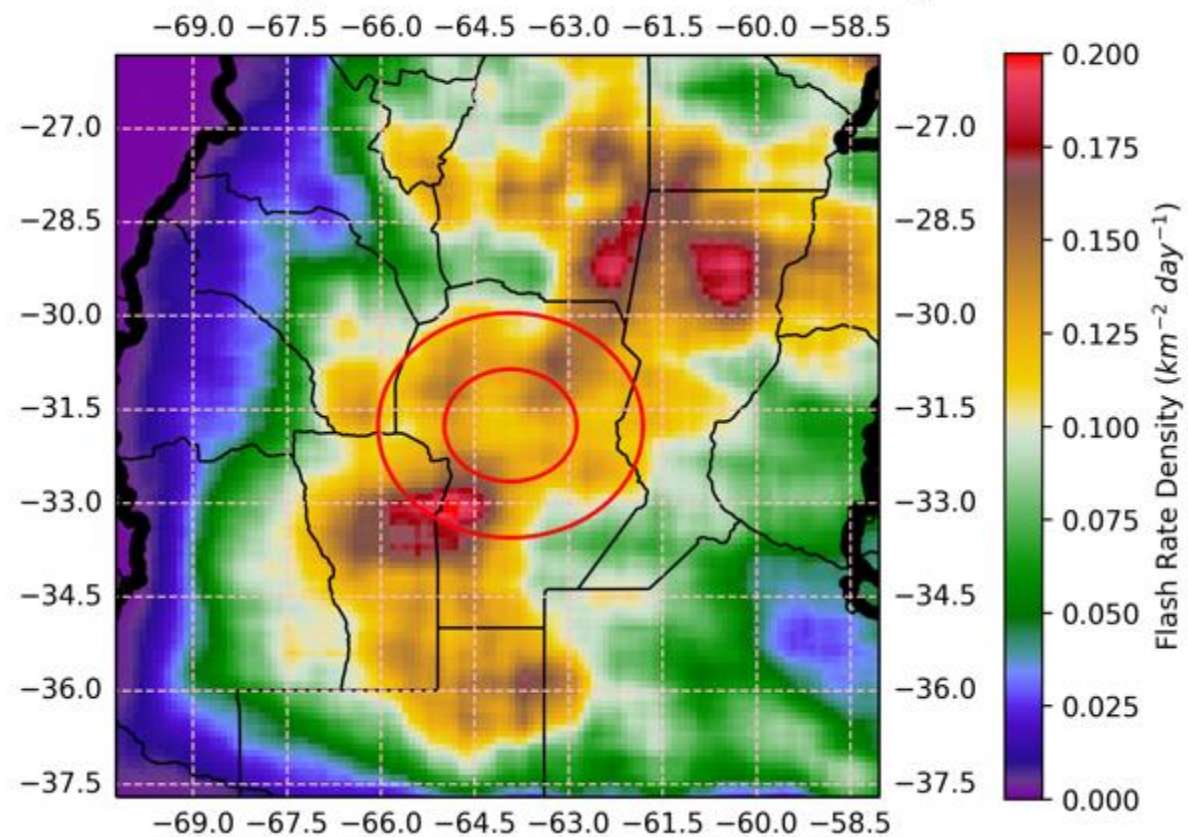LMA Range Rings and LIS-OTD November Climatology

LMA Range Rings and LIS-OTD December Climatology
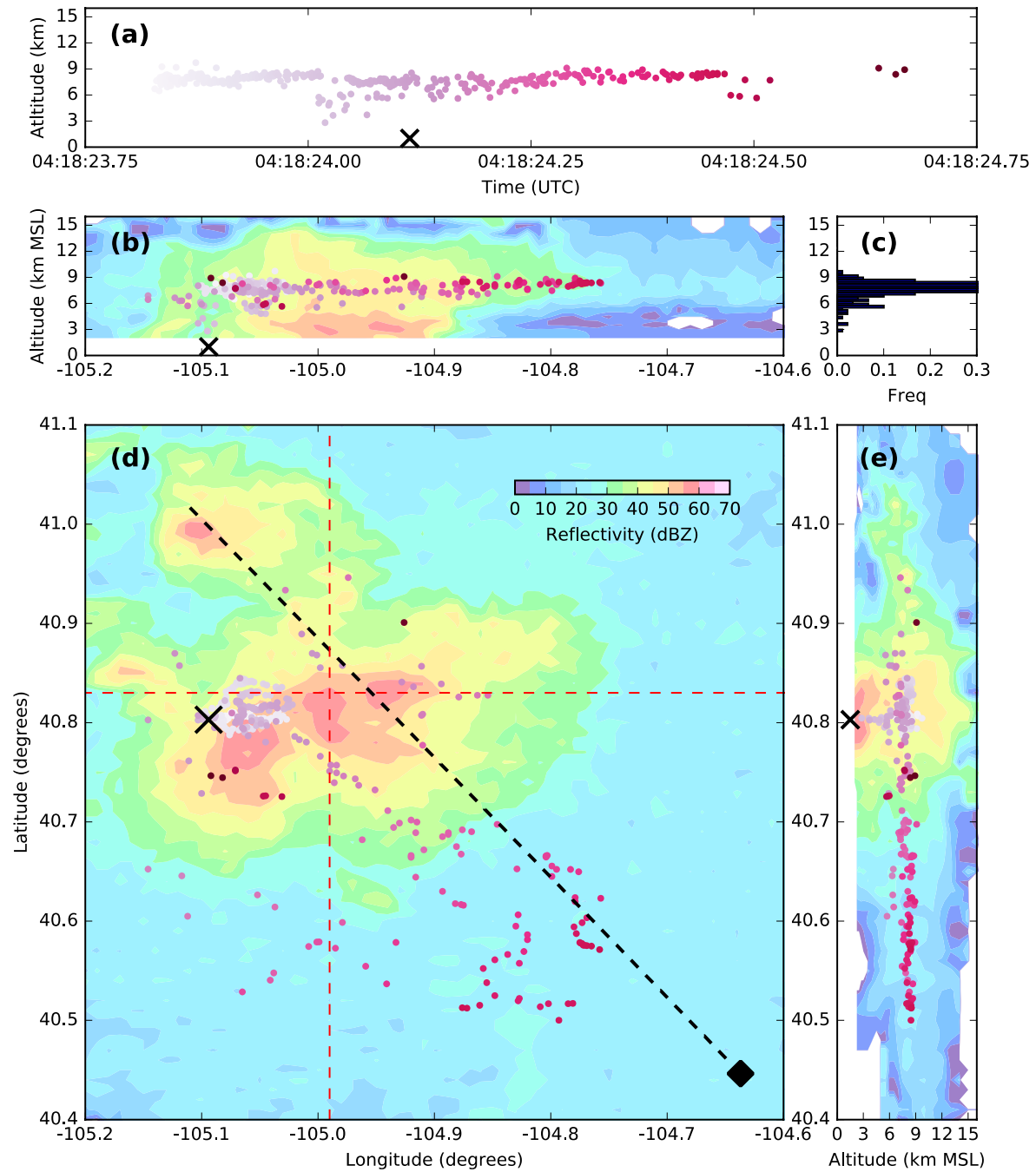
Example LMA Station

VHF antenna

GPS antenna behind pole
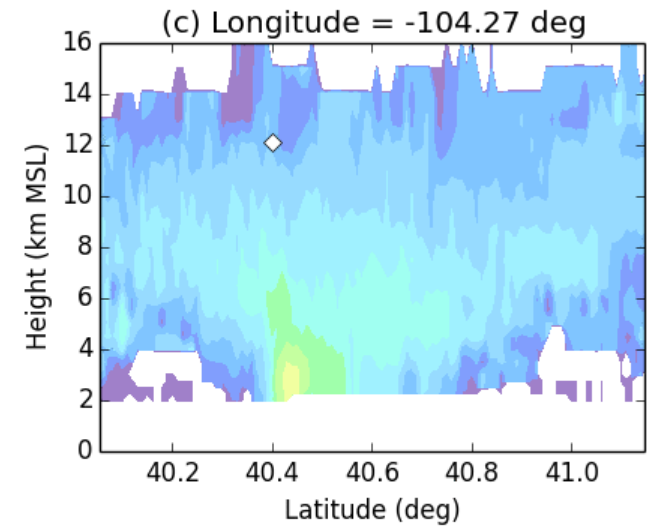
Communications antenna

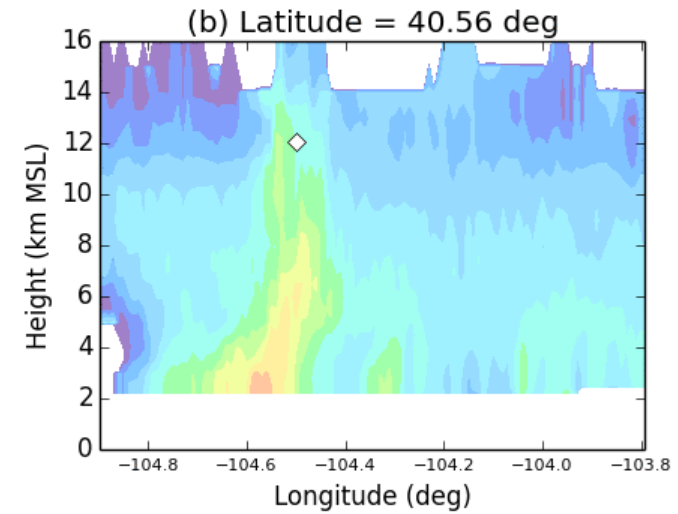Electronics & batteries behind panel

Solar panel

LMA data example
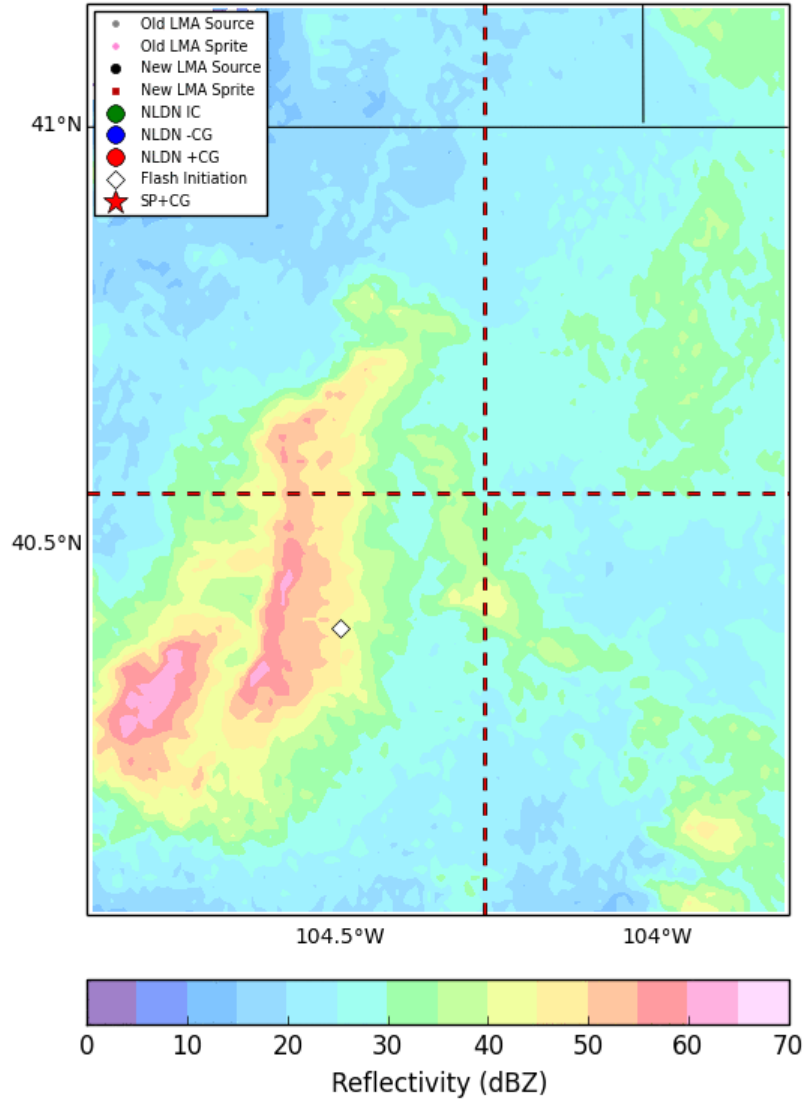
LMA data example

6/8/2012, 05:00:21.371 UTC, Elapsed Time = 0.00 sec

Legend:
- Old LMA Source
- Old LMA Sprite
- New LMA Source
- New LMA Sprite
- NLDN IC
- NLDN -CG
- NLDN +CG
- Flash Initiation
- SP+CG

(b) Latitude = 40.56 deg

(c) Longitude = -104.27 deg

Reflectivity (dBZ)

GLM/LMA data examples
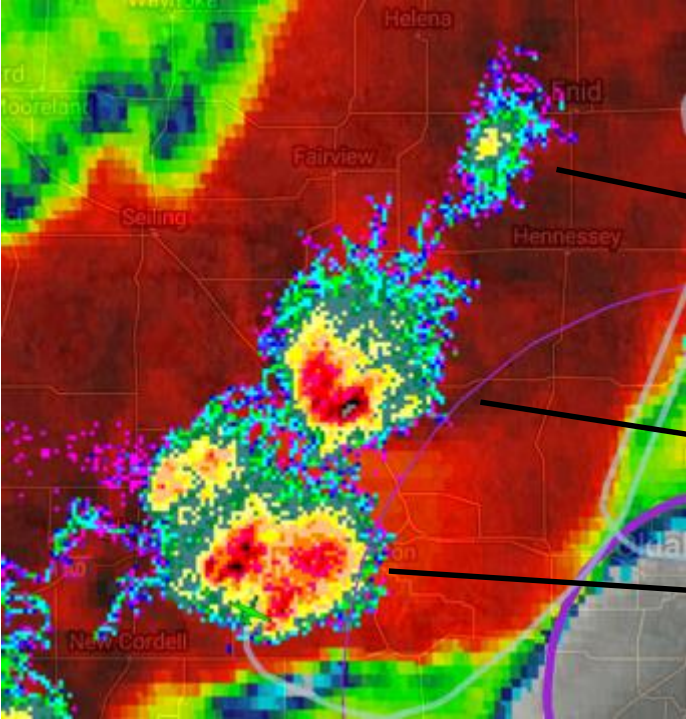
LMA source density
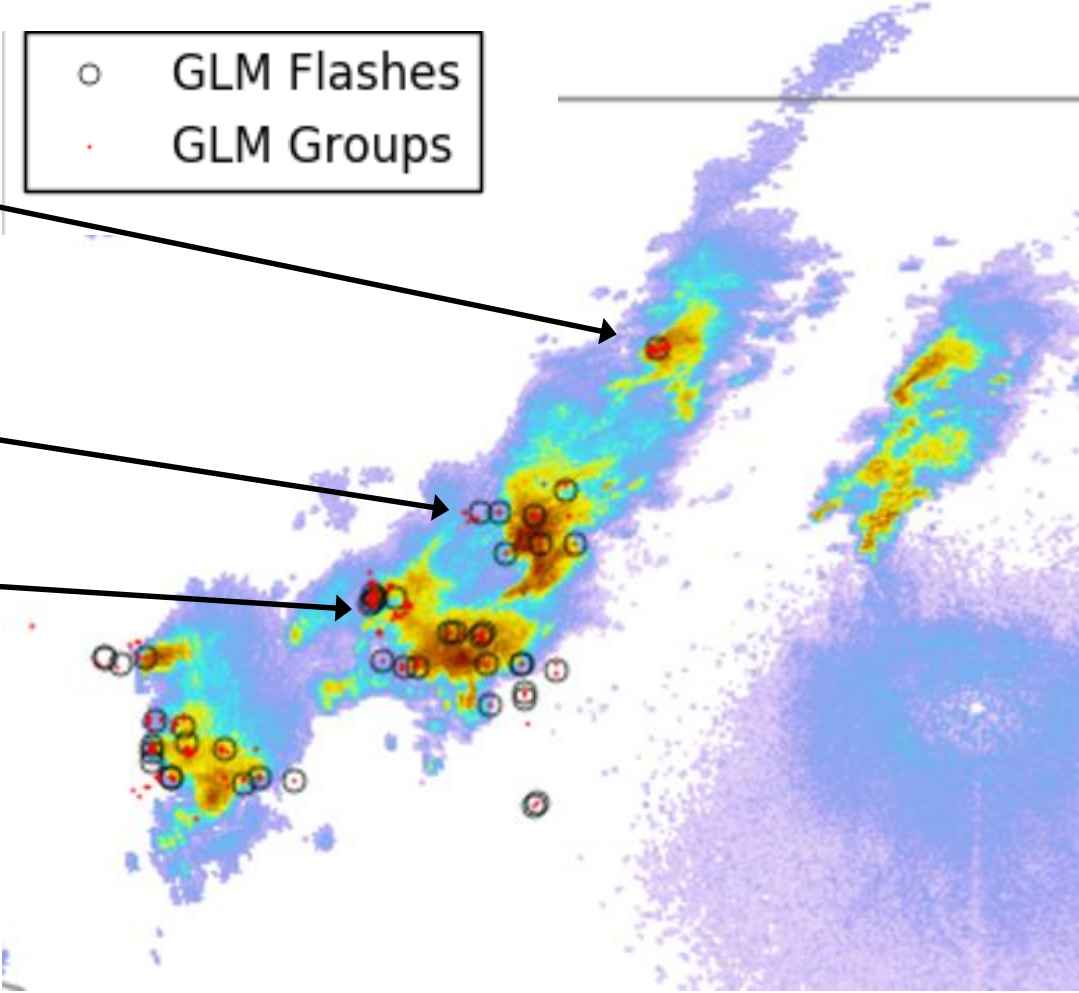
Radar with GLM flashes/groups

GLM Flashes

GLM Groups
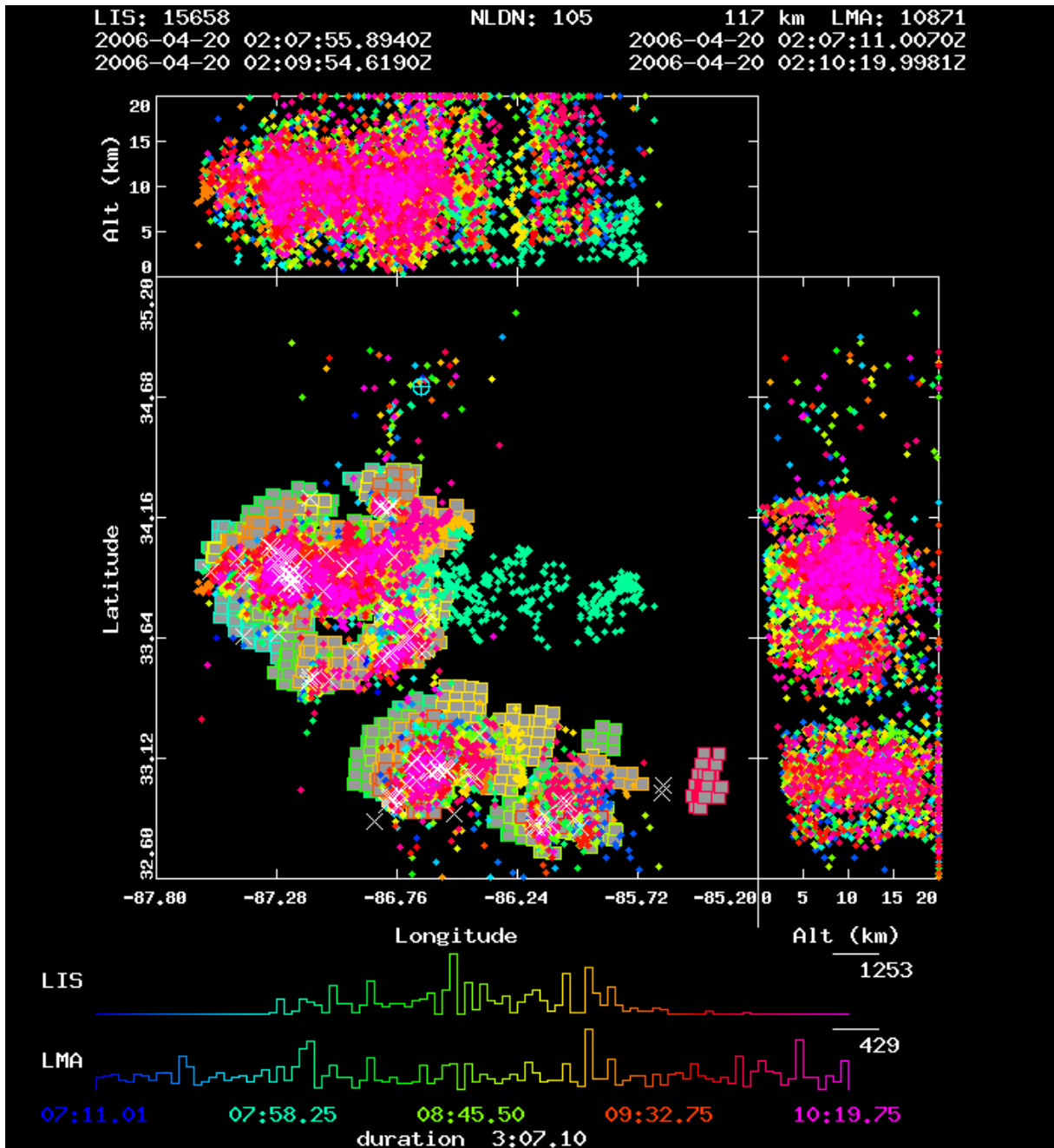
Lightning Imaging Sensor (LIS) and LMA Analysis Example

- Dots = LMA sources
- Squares = LIS events
- Xs = NLDN Cloud-to-Ground (CG) flashes

GLM/LMA Analysis Example

- Lightning Jumps in Severe Weather

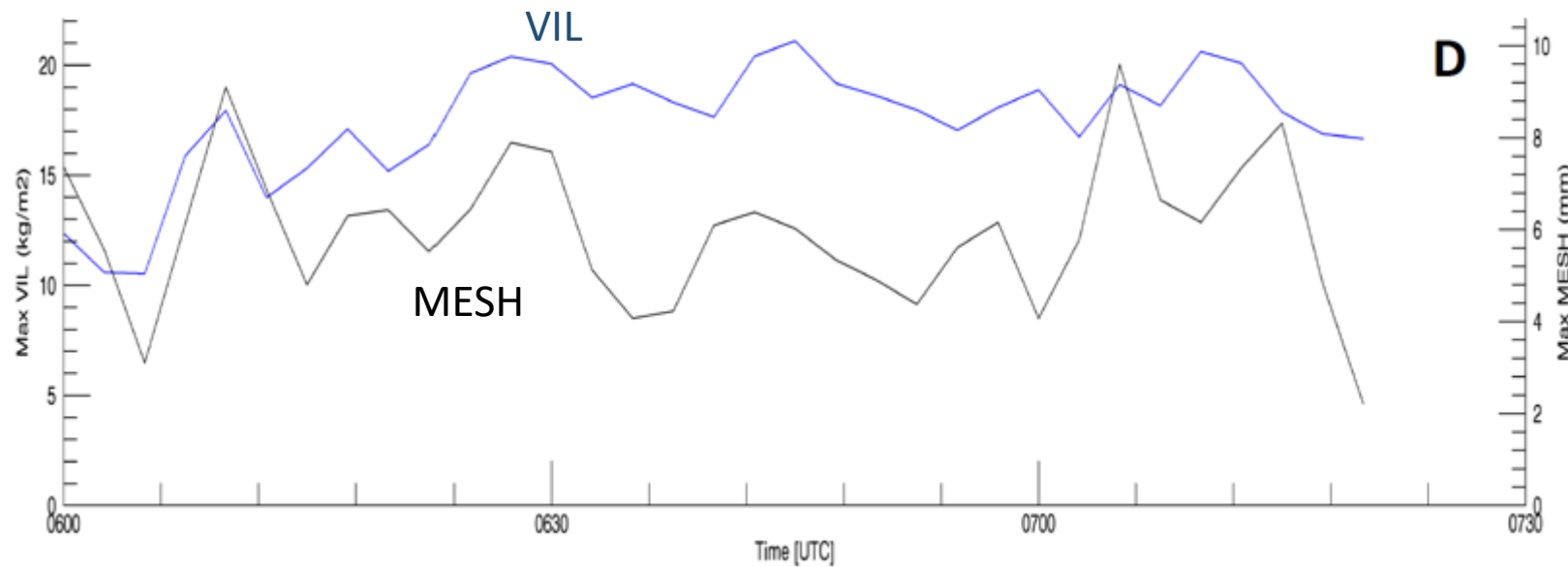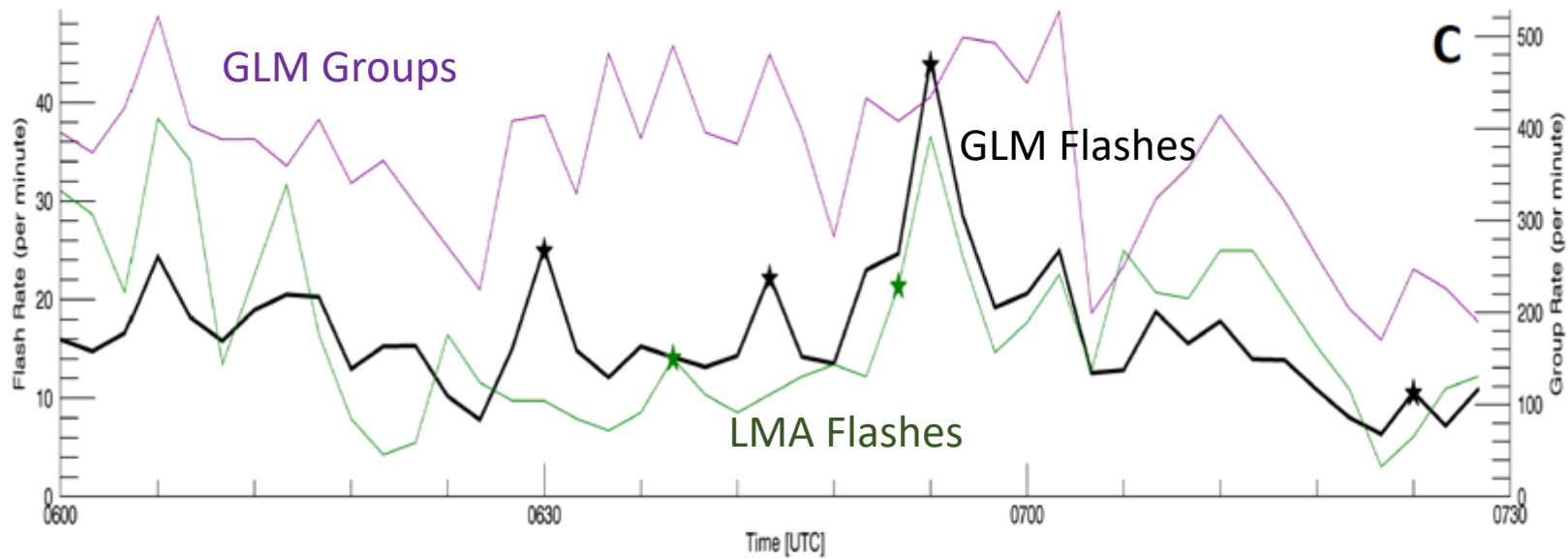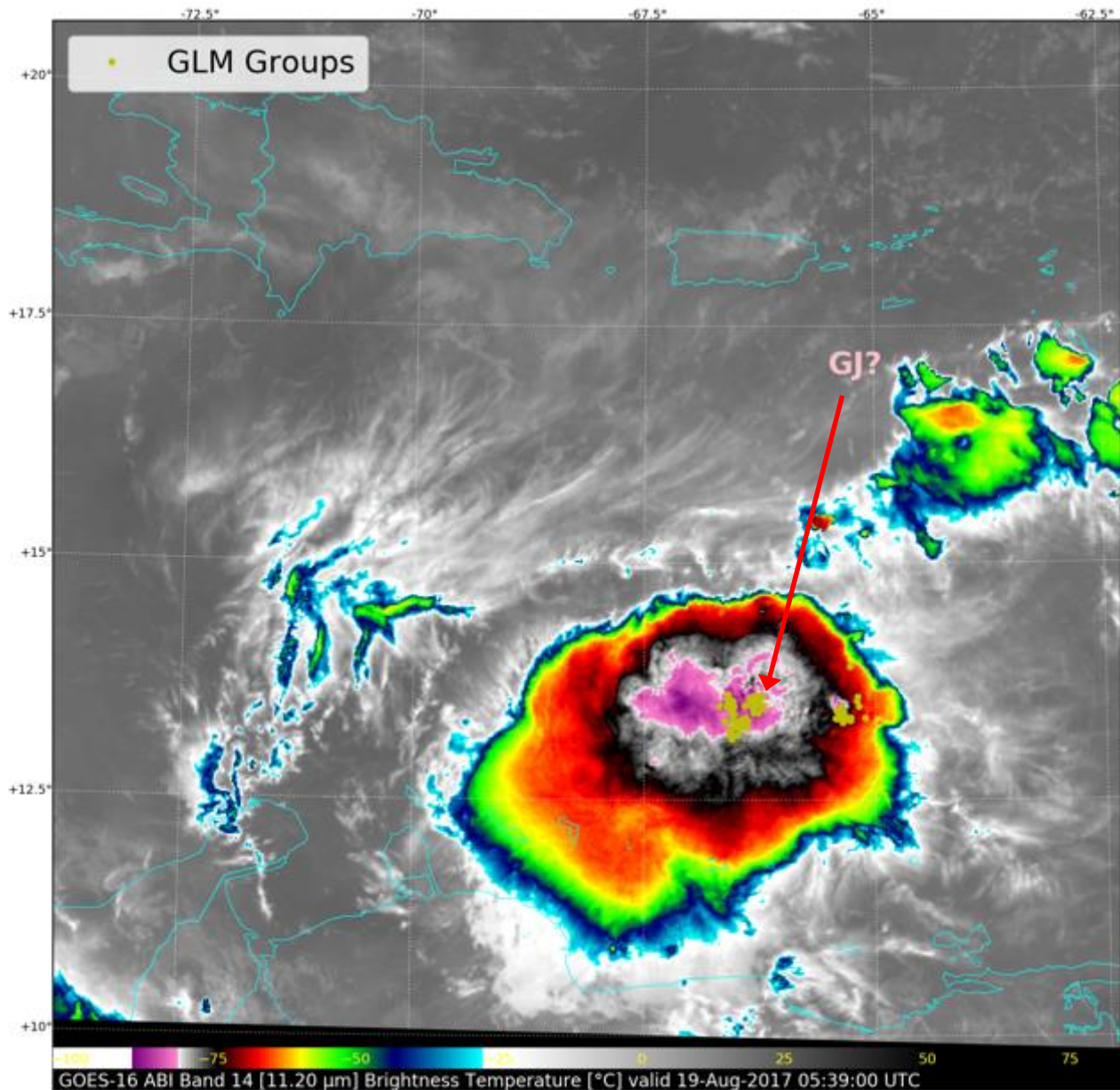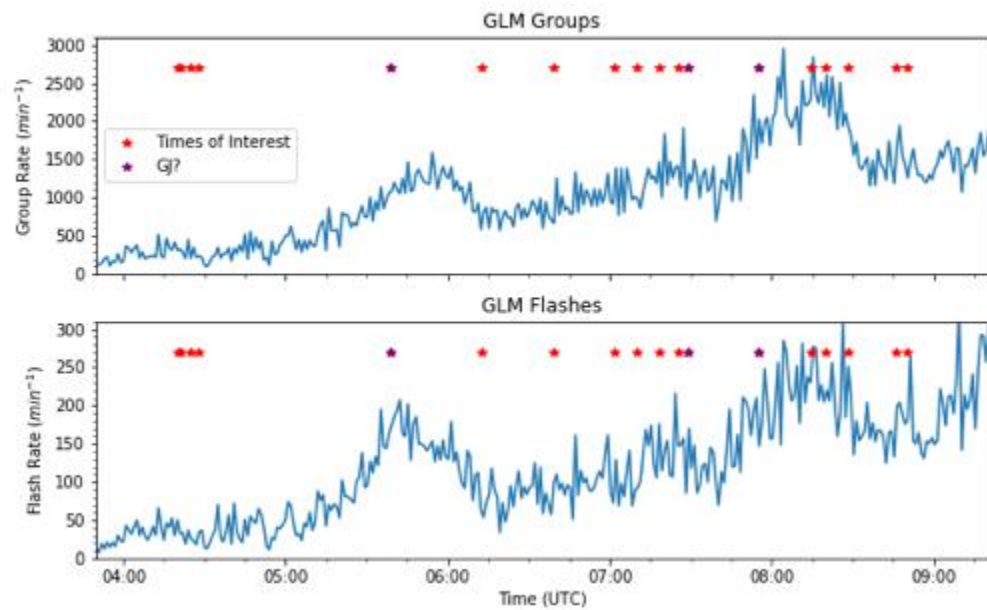- 17 May 2017, OK MCS

Curtis et al., 2018: An Analysis of the Lightning Jump Algorithm Using Geostationary Lightning Mapper Flashes, ILDC/ILMC, Fort Lauderdale, FL

GLM/ABI data example

Planning – On Schedule

- Working closely with NSF-funded lightning investigators (Deierling, Carey, Bitzer, Marshall)

- Information Gathering and Documentation – Shipping List, Procurements List, Export Control, Importation Docs

- Site survey completed November 2017 – Also leveraging S-PolKa, DOW, and Hydrometeorology surveys

- Coordination with Argentinian colleagues (esp. Eldo Avila)

- Participation in regular RELAMPAGO calls and in-person meetings

Planning (Continued)

- Currently performing inventory of LMA stations that will be sent to field, identifying items that need purchase. These include: stands, antennas, batteries, and solar panels.

- Evaluating potential CloudGate communications solutions. Near-real-time imagery (2D) may be possible, but is currently TBD. No promises.

- INVAP quote status

- Need US/Argentina agreement specific to RELAMPAGO to export!!!