

CHUVA lightning mapping field campaigns:

First results and contributions to GOES-R and MTG

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CHUVA lightning mapping field campaigns: Cloud processes of the main precipitation systems in Brazil: A contribution to cloud resolving modeling and to the GPM (Global Precipitation Measurement)

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- Improve Rainfall Estimation Using Satellites and/or Radar
- Improve the Skill of Cloud Resolving Models
- Compile a Climatology of the Main Precipitation Systems in Brazil and their physical and microphysical characteristics
- Develop Tools for Nowcasting.

WORKING GROUP-1: CHARACTERISTICS OF THE PRECIPITATING SYSTEMS AS FUNCTION OF THE REGION AND LIFE STAGE (Luiz Machado)

WORKING GROUP-2: PRECIPITATION ESTIMATION – DEVELOPMENT AND VALIDATION ALGORITHM (Daniel Vila)

WORKING GROUP-3: ELETRIFICATION PROCESS: MOVING FROM CLOUDS TO THUNDERSTORMS (Carlos Morales)

WORKING GROUP-4: CHARACTERISTICS OF THE BOUNDARY LAYER FOR DIFFERENT CLOUD PROCESSES AND PRECIPITATION REGIMES (Gilberto Fisch)

WORKING GROUP-5: MODEL IMPROVEMENTS AND VALIDATION, WITH FOCUS IN CLOUD MICROPHYSICS AND AEROSOL INTERACTIONS, FOR SATELLITE PRECIPITATION ESTIMATES IN BRAZIL (Maria Assunção Dias)













Mobile dual-pol X band radar



2 MicroRain radars



10 Disdrometers
(Joss-Waldgel, Thies, Parsival)



15 rain-gages



1 Lidar



2 Radiometers



3 radiosonde sites



... and more:

- Meteorological stations
- Turbulent fluxes
- Soil moisture
- GPS water vapor content
- Solar radiation
- Air quality
- CCN counter



CHUVA-Lightning Mapping Campaigns: CHUVA-GLM Vale do Paraíba



• Goals:

- Besides CHUVA main goals (*precipitation measurements*) ...
- Contribute to **GOES-R GLM** and **MTG LI** activities by collecting total lightning data under MSG coverage:

1) Lightning Location Systems intercomparisons:

- Understand the differences between ground based LLS in respect to TRMM LIS;
- Generate GLM and LI proxy data.

2) Develop multi-sensor and multi-platform algorithms:

- satellite QPE;
- nowcasting of severe weather.





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Deployed total lightning networks :

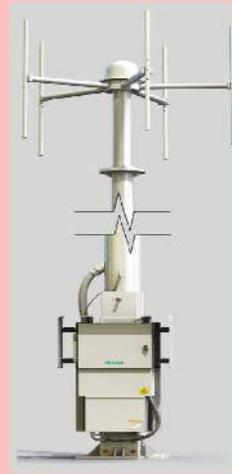
12 LMA sites
(VHF)



7 LINET sites
(VLF-LF)



5 TLS200 sites
(LF-VHF)



7 EN sites
(ELF-LF)



Operational networks :

RINDAT (LF)
STARNET (VLF)
WVLLN (VLF)
GLD360 (VLF)
ATDnet (VLF)
BrasilDAT (ELF-LF)

6 High Speed Video Cameras



8 Field-Mills



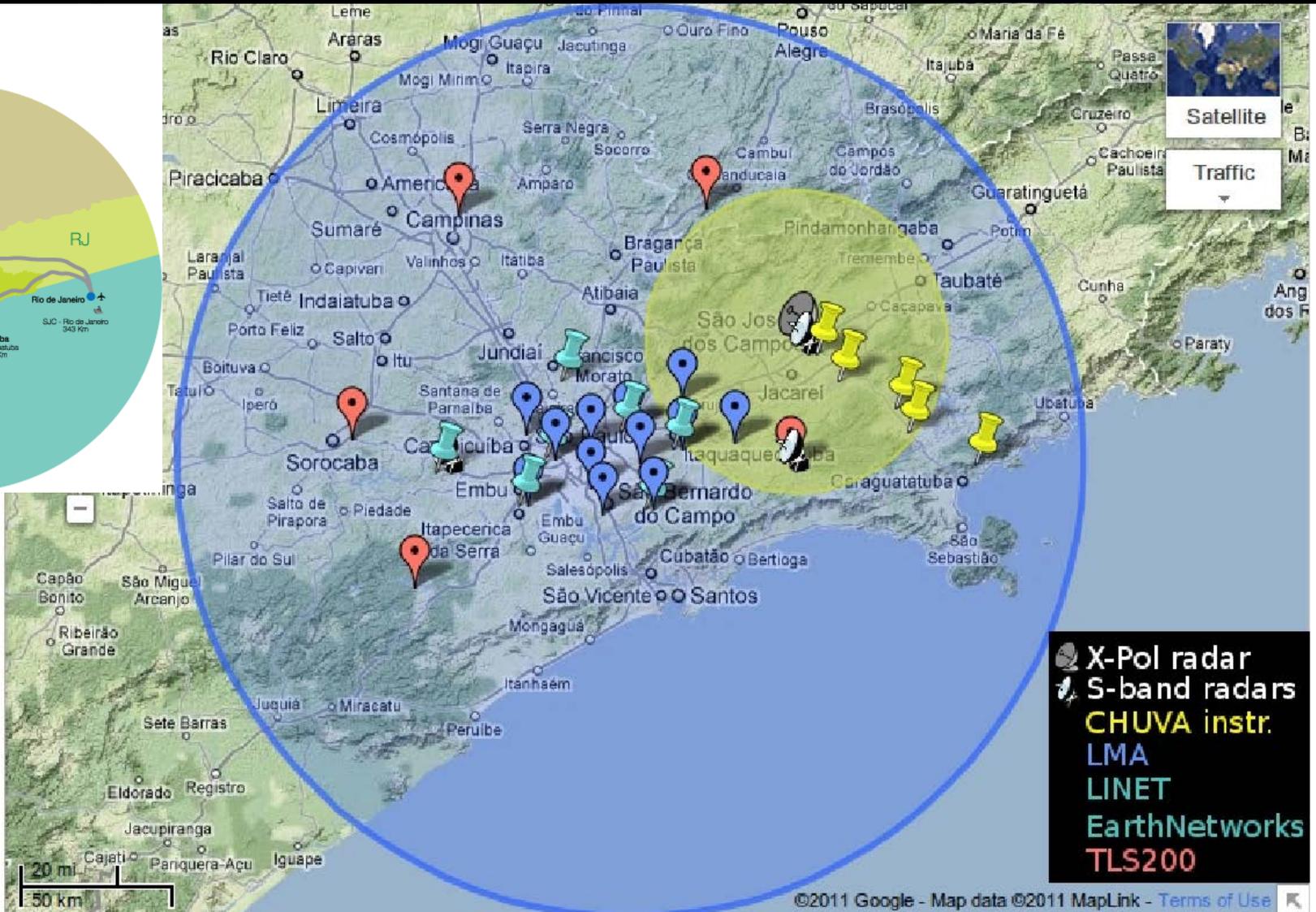
Satellite Observations :

GOES-12
MSG
TRMM





CHUVA-Lightning Mapping Campaigns: CHUVA-GLM Vale do Paraíba





CHUVA-Lightning Mapping Campaigns: CHUVA-GLM Vale do Paraíba



1) Lightning Location Systems intercomparisons:

- 16 LIS overpasses with lightning flashes during CHUVA

Orbit #	Date	Time (UTC)	Time (LST)
80095	12/7/2011	20:13	17:07
80202	12/14/2011	17:00	13:54
80207	12/14/2011	23:33	20:27
80482	1/1/2012	15:02	11:56
80767	1/19/2012	23:02	19:56
80843	1/24/2012	20:02	16:56
81062*	2/7/2012	20:08	17:02
81077	2/8/2012	19:12	16:06
81108*	2/10/2012	19:00	15:54
81123	2/11/2012	18:04	14:58
81169	2/14/2012	16:55	13:49
81230~	2/18/2012	14:50	11:44
81362	2/27/2012	3:12	0:06
81576	3/11/2012	20:46	17:40
81591*	3/12/2012	19:50	16:44
81825*	3/27/2012	19:01	15:55
* - Good cases			
~ - False LIS flash			



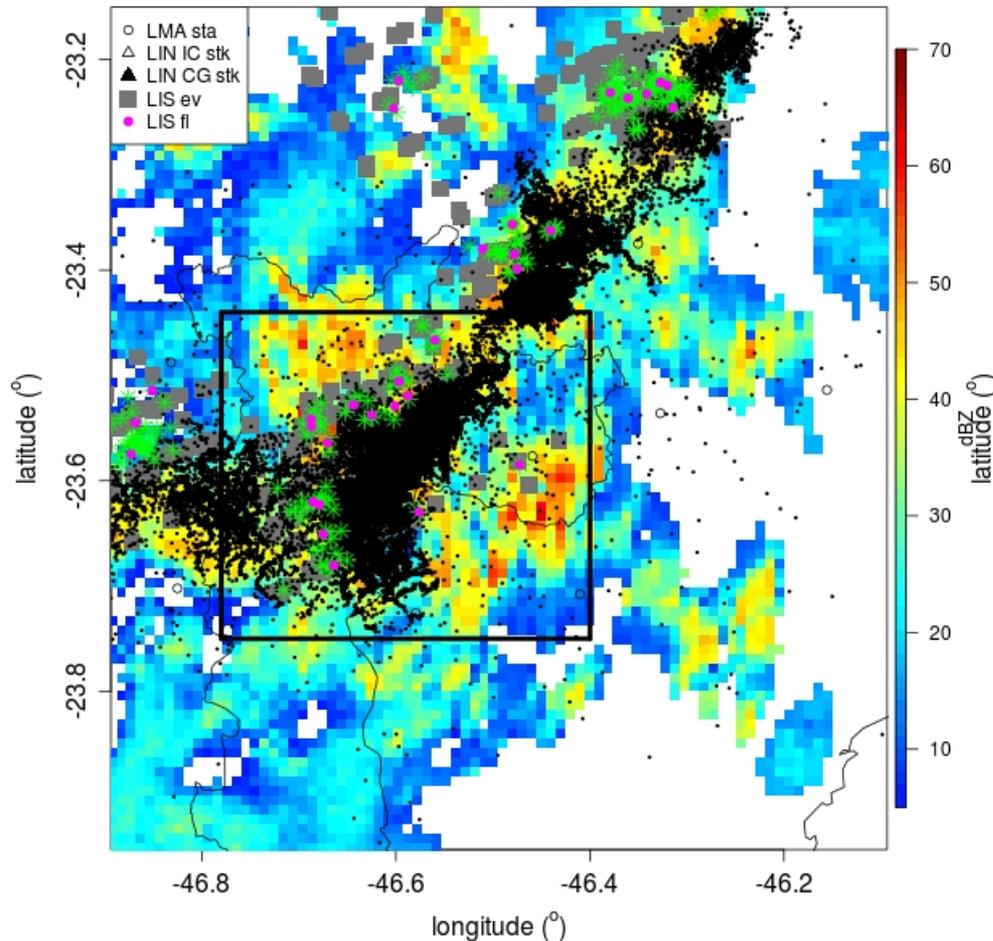
CHUVA-Lightning Mapping Campaigns: CHUVA-GLM Vale do Paraíba



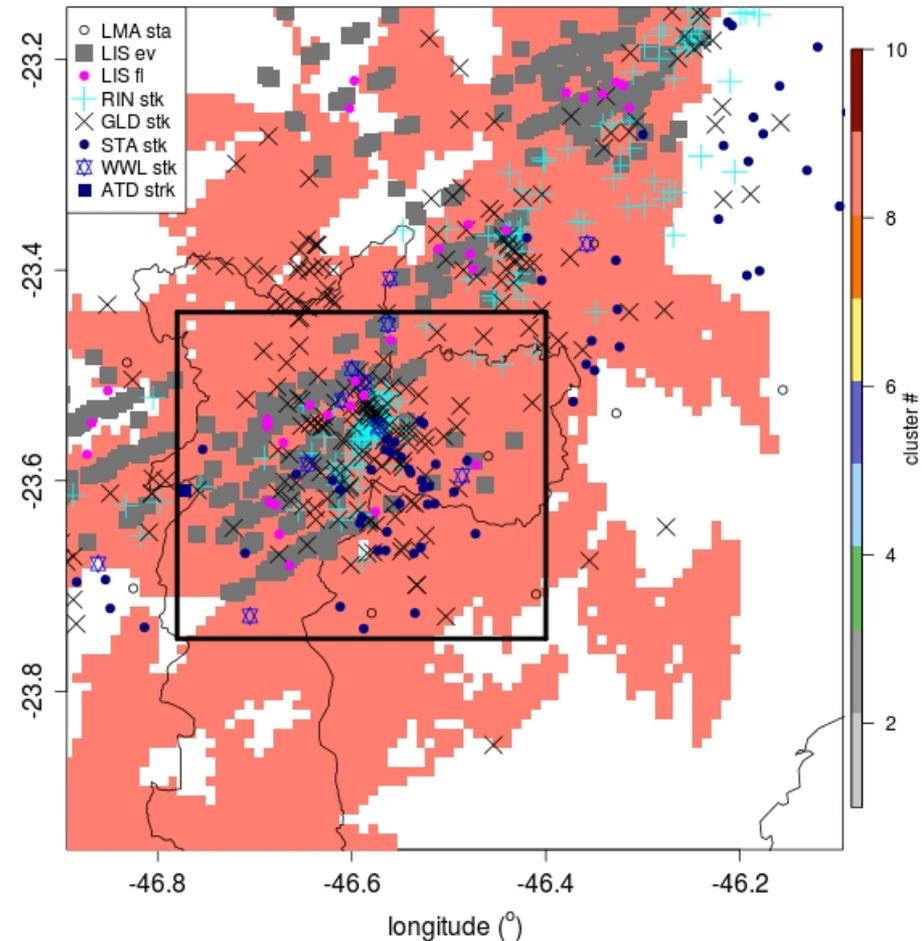
TRMM LIS overpass: **2012-02-10 case** (~100 seconds)

TRMM LIS orbit #81108 (2012-02-10 19:00UTC) - Radar time: 1900UTC (SR)

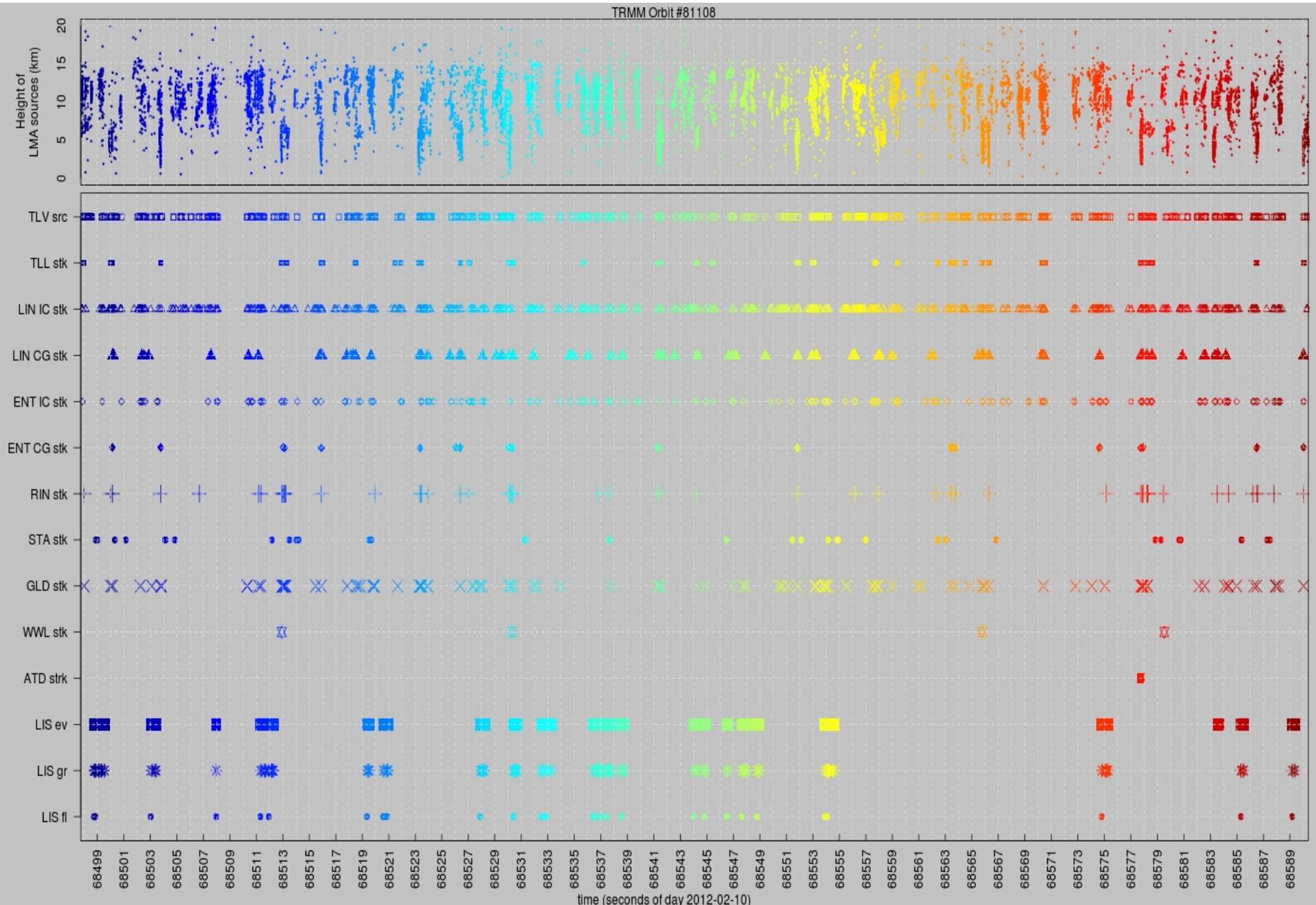
Radar Reflectivity



LIS + other networks

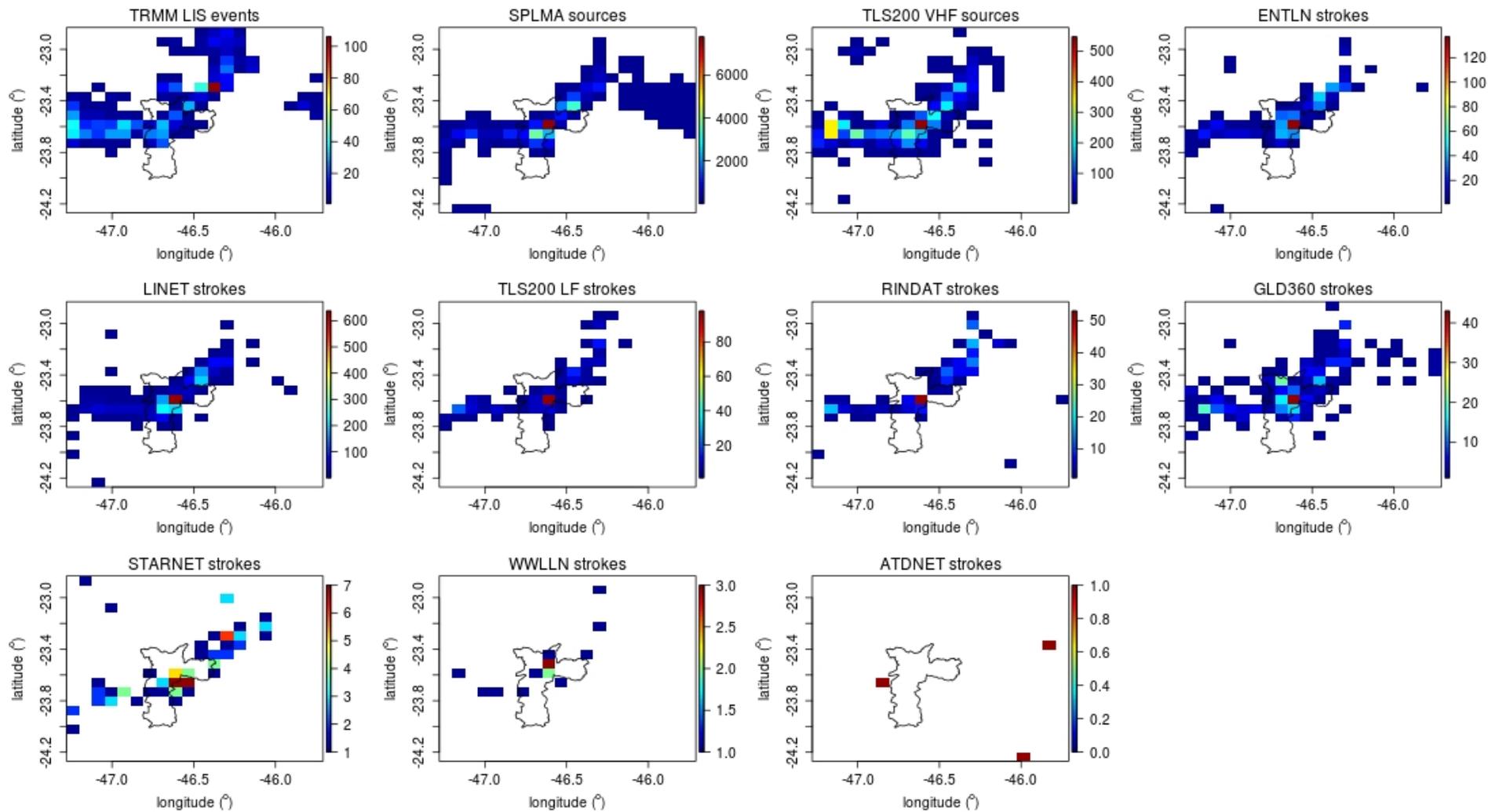


TRMM LIS overpass: 2012-02-10 case (~100 seconds)



TRMM LIS overpass: 2012-02-10 case (~100 seconds)

CHUVA GLM proxy data (data gridded to GLM FOV) - TRMM LIS orbit 81108: 2012-02-10 19:00





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2) Nowcasting: *Interactions with Brazilian Weather Forecast Offices*

6-minute LMA source density plots overlapped with radar, satellite and NWP

“Having the LMA source density helped us to determine and monitor which convective cells were growing and active. It was nice to have an updated image every 1 minute. Also we did not had radar data for a few days, so we used LMA as a “radar-like” product. We are excited to know that GOES-R will provide this type of data over Brazil.”

Centro de Gerenciamento de Emergencias (CGE)

“When the radar was off, we used LMA to monitor the storms and issue warnings. It would be nice to have some decision making tool for severe weather using this kind of data. GOES-R will definitely improve our work.”

Centro de Monitoramento e Alerta de Desastres Naturais (CEMADEN)



Dados cartográficos ©2012

Radar Banda X (Canal 2Km) - Chuva: 2012-02-14 18:30



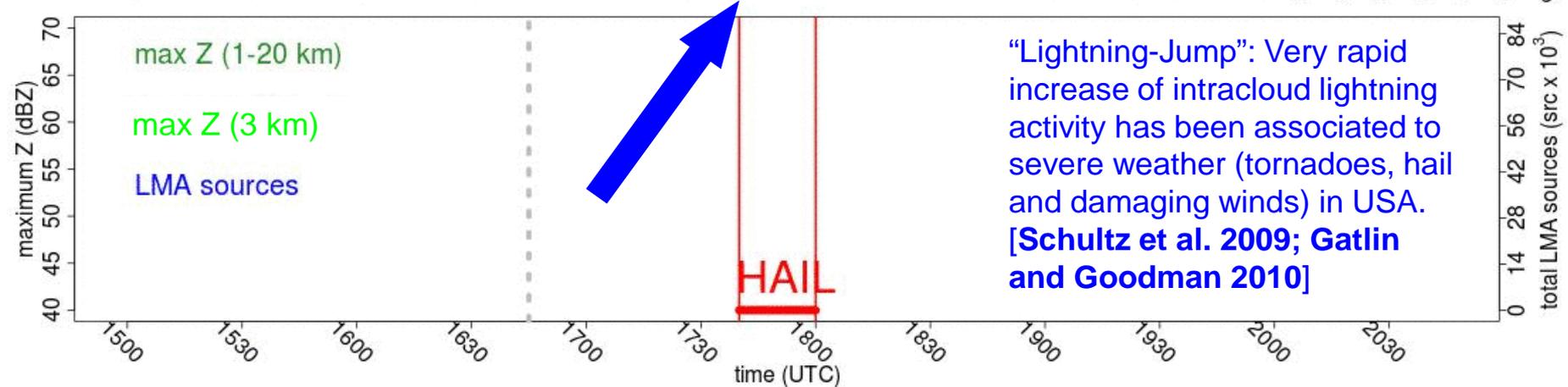
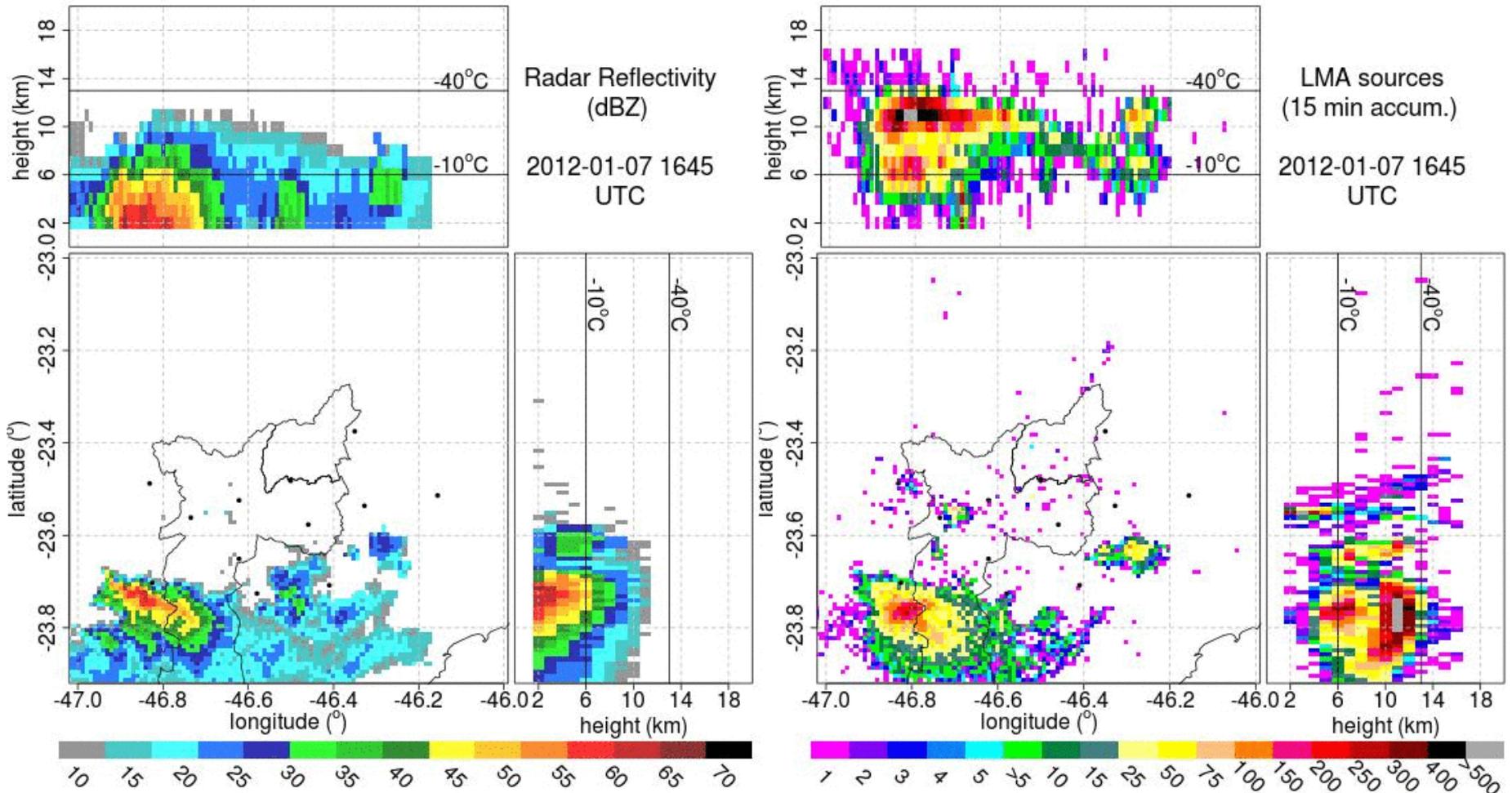
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2) Nowcasting: *“Lightning-jump” for tropical severe weather?*

- PRELIMINARY RESULTS (20+ cases during CHUVA-GLM Vale do Paraíba):
- 07 January 2012: hail, damaging winds and flooding were reported in São Paulo and Guarulhos.







CHUVA-Lightning Mapping Campaigns: CHUVA-GLM Vale do Paraíba



For all of those that collaborated with us:

THANK YOU!



EACH



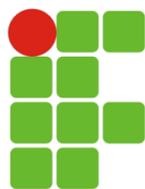
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EXTREMA
PORTAL DE MINAS



PREFEITURA DA CIDADE DE
SÃO PAULO

<http://chuvaproject.cptec.inpe.br/>