



Lightning Mapping Array (LMA) Observations in CHUVA: Status Update

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Geostationary Lightning Mapper (GLM) Science Team Meeting,
NSSTC, Huntsville, Alabama
20 September 2011



What is CHUVA?

- CHUVA is a Brazilian-led field component of the Global Precipitation Measurement (GPM) mission that will investigate distinct precipitation regimes in Brazil using a series of regional Intensive Observation Period (IOP) field campaigns.
- The name (which means rain in Portuguese) is derived from the experiment title: **C**loud processes of t**H**e main precipitation systems in Brazil: A contrib**U**tion to cloud resol**V**ing modeling and the the GPM (Glob**A**I Precipitation Measurement).

Participation in CHUVA

São Luiz do Paraitinga Campaign

Target of Opportunity

- Leverage observing assets associated with CHUVA with U.S. supplied portable LMA network and European supplied LINET to generate proxy data for GLM and ABI that include total lightning and SEVIRI (Spinning Enhanced Visible and Infrared Imager).
- Allow GLM and Combined AWG/R3 teams to better address and assess several areas of on-going research
 - Develop/Validate algorithms, applications, and proxy data
 - Assess validation systems performance.
- Intercompare and assess data from multiple lightning networks including LMA, LINET, WWLLN, ENTLN, RINDAT, ATDnet, WSI, GLD360, STARNET.
- Provide total lightning observations in support of the CHUVA campaign.
 - Storm electrification/physics
 - Storm – lightning relationships

Participation in CHUVA

São Luiz do Paraitinga Campaign

Scientific Measurements

- TRMM/LIS and MSG SEVERI (ABI proxy)
- Multiple lightning networks (both short and long range, 2D and 3D).
- Dual-polarization radar
- Electric field change and field mill
- Airplane in-situ microphysics
- Ancillary meteorological data

LMA Hardware



Portable Lightning Mapping Array (LMA) Stations

- Second generation hardware developed by New Mexico Tech.
- LMA measures signals in unused television (TV) band.
- TV Channel 8 at 162 MHz will be used for the São Paulo LMA.
- Picture shows the VHF ground plane antenna and sensor electronics / site computer package.

Partners and Collaborators

GLM Science Team

Richard Blakeslee, NASA (LMA lead)

Larry Carey, [Jeff Bailey](#), UAH (NOAA-funded to deploy LMA)

John Hall, UAH (Web support for real time network operations)

Monte Bateman, USRA (proxy data, other analyses)

[Scott Rudlosky](#), UMD CICS (algorithm and proxy val)

Many others (and other GOES-R teams) (algorithm and proxy val)

InPE (CPTEC, ELAT) and USP

Luiz Machado, InPE/CPTEC (overall CHUVA lead)

[Rachel Albrecht](#), InPE/CPTEC

[Carlos Morales](#), USP (Electrification processes lead)

Osmar Pinto Jr., InPE/ELAT

EUMETSAT MTG Lighting Imager (LI) Science Team

Hartmut Hoeller, DLR (LINET lead) (Collaborator)

Lightning Network Collaborators

World Wide Lightning Location Network (WWLLN)

Bob Holzworth (WWLLN lead)

RINDAT (Brazil network)

Osmar Pinto Jr., InPE/ELAT

Earth Networks Total Lightning Network (ENTLN)

Stan Heckman (formally Weather Bug Total Lightning Network)

STARNET

Carlos Morales, USP

Vaisala (GLD360 and other)

Nikki Hembury, Vaisala

ATDnet

WSI

LMA Approach

- Deploy 12 portable LMA stations in vicinity of São Paulo.
- Employ the DC LMA “modus operandi” – real time operation with internet at all site locations.
- Monitor/manage network remotely from NSSTC, collaborate with local assistance for maintenance/operation issues.
- Data will be processed in Huntsville (with backup in Brazil), and distributed and archived in Huntsville and Brazil.
- Data will be available via Web site and through CHUVA archive.

Network Configuration

São Paul Lightning Mapping Array (SPLMA)



- Network provides 3-D mapping out to 150 km and will overlap with CHUVA radar
- 2-D coverage realized out to 250+ km.
- Sites selected and surveyed (Dec 2009, Jul 2010, Jun 2011).
- Equipment shipped Sep 2011
- Deployment scheduled for Sept-Oct 2011.
- CHUVA IOP is 1 Nov to 23 Dec 2011.
- Plans coming together for extended observations in Jan and Feb 2012.

Current Project Schedule

Calendar Year 2011

February Initiate legal documentation/approval process

- Includes customs and visa documents (can take few months)

July Prepare LMA for shipping (time needed TBD)

Sept Import License granted and LMA shipped

Sept-Oct Deploy LMA (expect/need full month minimum)

- Network checkout will occur simultaneously with deployment

Nov-Dec Network operation (operation will continue ~6 mn)

- CHUVA Intensive Observation Period (1 Nov to 23 Dec 2011)
- Network operations from Oct 2011-April/May 2012

Project Schedule (cont.)

Calendar Year 2012

Jan-April Network operations continue

May End operations

- Exact end date TBD
- De-install and pack-up stations
- Ship LMA back to the United States

Summary

- Equipment just cleared customs in Brazil and will be delivered to USP 20 Sept 2011.
- We will start deploying the network 26 Sept 2011, and will seek to get all stations deployed prior to the start of the IOP.
- Operations will continue through ~ April, 2012 (exact date TBD). We might come out sooner.