LYFE CYCLE CHARACTERISTICS OF PRECIPITATING SYSTEMS OVER PARAIBA VALLEY, BRAZIL: PRELIMINARY RESULTS OF GLM-CHUVA EXPERIMENT

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Evaluate the effect clouds microphysics on electrification process during life cycle of precipitating systems
MOTIVATION:
Data Description:

XPOL Radar

Experiment: Chuva-GLM-Vale
(Nov/2011 to Mar/2012)
DATA DESCRIPTION:

(1) Xpol Radar:
   (a) dBZ
   (b) ZDR
   (c) CORR
   (d) KDP

(2a) LMA (*VHF Sources)
(2b) Rindat (*CG e *PC)
(2c) Weather Bug (*IC,*CG e *PC)
RANFAIL CAPPI

1. Rainfall Rate > 1 mm/h
2. Size > 8 km2

Spatial Distribution of Rainfall and Lightning

Diurnal Cycle of Rainfall and Lightning

Microphysical and electrical analyses

PART (A)

PART (B)

Statistical Analyses

FORTRACC

PART (C)
2674 Systems identified and the majority are small systems with duration ~25 min

Maximum expansion happen 3 h before of precipitation peak
LYFE CYCLE OF SIZE AND PRECIPITATION

- Systems initial expansion as predictor parameter of maximum size and duration
- Maximum precipitation happen before maturation of systems
SPATIAL DISTRIBUTION OF PRECIPITATION AND LIGHTNING

Maximum close SP
Moderate correlation between lightning and rainfall

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LYFE CYCLE OF SIZE AND PRECIPITATION

Maximum rainfall the 18 UTC

-Maximum electrical activity the 18 UTC
-Maximum positive CG lightning 1 h after
Lightning is associated with large ice oriented vertically not mixed.
Vertical Profile Radar (VPR):

**PART (A)**
- Average Profile by Class of Electrical Discharge

**PART (B)**
- STRATI
- CONVEC

**PART (C)**
- Fortracc-Sat. (cloud)
- Fortracc-R(Rainfall)
- Fortracc-DE(Lightning)

**Cluster Analysis**
- f=f(dBZ,KDP,ZDR,Corre,TH)

**Track And Spatial Scale**

**Life Cycle Analysis**
- Lma
- -CG
- +CG
- -PC
- +PC
- IC

**Legend**
- dBZ
- KDP
- ZDR
- Corr
- VIL
- DVIL
- ET30
- ET30-E0
- MAXREF
- ALTMAX
CONCLUSIONS:

(A) Improve the understanding of the microphysical and electrical charge structure effect on electrification process during life cycle of precipitating systems.

(B) Evaluate the preferential regions of lightning formation inside the clouds in positive and negative thunderstorms.

(C) Understanding the effect of electrical charge center on the physical characteristics of lightning (channel length, type, peak current).
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THANK YOU FOR YOUR ATTENTION