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Understanding the different lightning detection technologies: A contribution from CHUVA-GLM field campaign

C. Morales (1), R.I Albrecht (2), S. Goodman (3), H. Hoeller (4), J. Bailey (5), R. Blakeslee (5), S. Rudlosky (5), J. Hall (5), E.M. Anselmo (1), J.R Neves (1), and M. Lacerda (6)

(1) University of Sao Paulo, Atmospheric Science, São Paulo, Brazil (morales@model.iag.usp.br), (2) Instituto de Pesquisas Espaciais - INPE, Cachoeira Paulista, Brazil, (3) NOAA/NESDIS GOES-R Program Office, USA, (4) DLR-Institut fuer Physik der Atmosphaere, Germany, (5) MSFC/NASA, Hunstville, Alabama, USA, (6) Universidade Federal do Mato Grosso do Sul - UFMS, Campo Grande, Brazil

CHUVA is a Brazilian research program that is characterizing the main precipitating systems observed in Brazil as a support for Global Precipitation Measurement (GPM) mission. CHUVA conducts a series of field campaigns in the time frame of 2010-2013 that sample raining systems from maritime to continental regime in polluted and clean environments. From November of 2011 through March of 2012, CHUVA is hosting a field program at Vale do Paraiba, southeast of Brazil, where NOAA and EUMETSAT deployed 12 LMA and 7 LINET antennas respectively to gather lightning measurements to support the development of algorithms that will be employed by GOES-R and Third Generation Meteosat satellites. Due to this opportunity, other lightning detection systems have been invited to participate in this campaign. As a result, for the first time it will be possible to gather coincident measurements from 10 different lightning detection technologies, i.e. a) VHF: LMA and TLS200 Vaisala; b) VLF: WWLLN, STARNET, Vaisala GLD360, WSI and ATDNet; c) VLF/LF: RINDAT, LINET; c) ELF/VLF/LF/VHF: Weather Bug. As each system uses different frequencies, detection (sky/ground waves or line of sight, electrical and magnetic fields) and methodology for location (TOA, ATD and interferometry) it is expect that each system observes different parts of the lightning flash. Thus taking the opportunity that LMA measures most of the lightning sources associated to all atmospheric discharges, this study will concentrate on describing what each technology measures/detects in respect to LMA source over selected thunderstorms.