Satellite Rainfall Retrievals during CHUVA-GLM Experiment: Rainfall Retrievals and Life Cycle Considerations

Daniel Vila[*1,2], Nicolas Viltard[3], and Braga Ramon[1]

[1]Centro de Previsão de Tempo e Estudos Climáticos (CPTEC) – Rodovia Presidente Dutra, Km 40, SP-RJ CEP: 12630-000, Cachoeira Paulista, SP, Brazil

[2]Cooperative Institute for Climate and Satellites (CICS/ESSIC/UMD) – 5825 University Research Court, Suite 4001 College Park, MD 20740-3823 USA, United States

[3]Laboratoire Atmosphères, Milieux, Observations Spatiales (LATMOS) – INSU, Université de Versailles Saint-Quentin-en-Yvelines, Université Pierre et Marie Curie (UPMC) - Paris VI, CNRS : UMR8190 – France

Abstract

This research effort regards the properties of the rain regimes over Brazil and the retrieval of instantaneous rain itself from passive microwave radiometers on board low-orbiting satellites (NOAA-POES, DMSP) and the possible synergy with geostationary satellite information (i.e.; GOES, METEOSAT). This study is conducted in the framework of the CHUVA-GLM campaign (Vale do Paraiba) which is aimed at deploying a series of instruments in various locations over Brazil in order to better characterize the various rainfall regimes.

In the first part of this research, the performance of two different algorithms, the Bayesian Rain retrieval Algorithm Including Neural network (BRAIN) and Goddard Profile algorithm (GPROF), were carried out through a comparison between SSMI/S retrievals and radar data during November 2011 - March 2012 over the Vale do Paraiba region (15 S - 31 S, 37 W - 57 W).

The second part of this work focuses on the possible relationship between Ice Water Path (IWP) retrievals using satellites and the life cycle stage of convective clouds and its possible application on satellite-based rain rate retrievals. The IWP is retrieved using the Microwave Surface and Precipitation Products System (MSPPS), which use high frequency channels (89 and 150 GHZ) from AMSU-B and MHS sensors (NOAA 16-19), while the life cycle stage was retrieved using Forecast and Tracking the Evolution of Cloud Clusters (FORTRACC) algorithm. Preliminary results show that, while convective systems are intensifying (area is expanding and temperature is decaying), larger IWP values tends to be observed. Larger rain rates and convective fraction is also measured for radar retrievals when convection is in the early stage compared with mature systems.

---

[*]Speaker