Additions to the GLM proxy data set from CHUVA measurements

Monte G. Bateman, Science and Technology Institute/USRA
Steven J. Goodman, NOAA/NESDIS
Richard J. Blakeslee, NASA/MSFC
Rachel I. Albrecht, DSA/CPTEC/INPE
Jeffrey C. Bailey and Douglas M. Mach, University of Alabama-Huntsville

The Geostationary Lightning Mapper (GLM) is scheduled to launch aboard GOES-R in 2016. All the data handling systems and processing software need to be tested long before launch, hence the need for a realistic, high-fidelity proxy dataset.

The best analog for GLM is the existing Lightning Imaging Sensor (LIS) aboard the TRMM satellite. The LIS is an optical sensor, but is in Low Earth Orbit (LEO), limiting its view time of a particular storm to about 80 s. A Lightning Mapper Array (LMA) is a high detection-efficiency system, but is an RF detection system with short range (a few hundred km). So the task for generating GLM proxy data was to build a mapping from LMA to GLM using LIS for guidance.

A comparison study was done to develop a database of characteristics that could be mapped between RF and optical lightning sensors. This comparison study showed that the number of events detected by LIS was correlated to the altitude of flash (higher flashes transmit more light out the top of the cloud).

In order to realistically generated optical lightning flashes, we needed to know how detected events (pixels) are distributed in size, shape, and time. This allows us to generate realistic flashes.

The proxy pixels were then fed to the Lightning Cluster-Filter Algorithm (LCFA) and proxy flashes were generated. These were compared to the original LMA flashes that were used originally. The final comparison showed that the GLM proxy data are indeed high-fidelity, holding the information content of the original LMA flashes at 85%. This has shown to be sufficient for data users such as the Lightning Jump Algorithm to use the proxy data and work correctly.

The CHUVA program brought us Brazilian LMA measurements to add to the ensemble for generating proxy data. Comparisons will be presented between previous datasets and those collected during CHUVA.