Characterization of lightning distribution associated to convective systems along their life cycle over Brazilian region
Lightning Occurrence Relative to Meteorology

Wendell R. G. Farias[1], Thomas Fioleou[1] (CEMADEN/National Early Warming and Monitoring Centre for Natural Disaster, Rodovia Presidente Dutra, Km 40, Cachoeira Paulista, 12630-000, SP, Brazil; wendell.farias@cemaden.gov.br), Enrique V. Mattos[2], (INPE/Center for Weather Forecasts and Climate Studies, Rodovia Presidente Dutra, km 40, Cachoeira Paulista, 12630-000, SP, Brazil) and Izabelly C. Costa[1]

Convective systems can have natural hazard consequences, such as strong wind drafts, lightning, heavy rainfalls, hail, and flooding. Hence, a better understanding of their life cycles can help us in a nowcasting perspective. There are many tools to analyses the physical parameters of Mesoscale Convective Systems (MCS) life cycle. To identify and track MCS from IR geostationary data, was used a new algorithm called TOOCAN (Tracking Of Organized Convection Algorithm through a 3 dimensional segmentatioN). This algorithm is based on an iterative process of 3D segmentation (2D+time) of the IR imagery in order to associate the convective core of a MCS to its anvil cloud in the spatiotemporal domain. This new approach provides an effective threshold/overlap method and morphological characterization of the MCSs through their entire life cycles. The study of the lightning characteristics associated to MCSs will be performed over the entire 2012 year by combining in space and time the lightning data (cloud-to-ground and intra-cloud) derived from Brazilian lightning network with the convective systems identified by the TOOCAN algorithm from the IR data of GOES-12.

The analyze of lightning characteristics associated to the convective systems along their life cycles, will be shown for different class of MCS, combining MCS parameters with lightning data to characterize the lightning behavior along the MCS life cycle in order to verify how lightning (peak current, polarity, and flash rate) is characterized at different seasons, period of the day and intensity during all phases of MCSs studied.