

Phenomenology and microphysical model of the Catatumbo Lightning (Maracaibo Lake, Venezuela)

Topics: Lightning Physics- Cloud Electrification Processes

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The intense atmospheric electrical activity that takes place almost continuously in south of Lake Maracaibo (Venezuela) is commonly known as “the Catatumbo Lightning” or “Maracaibo Lighthouse”, during almost the whole year; this is the maximum hot spot in the data of World Wide Lightning Location Network (WWLLN). The area of occurrence has not changed since it was first reported by Lope de Vega (1534) it's the delta of the rivers Bravo and Catatumbo inside the National Park “Juan Manuel swamps”, with three hundred thousand hectares of swamps. The phenomenon characterized by repeated and intermittent lightnings (until 48 flashes per minute for several hours) even during the dry season, was described by naturalists Humboldt and Codazzi, in the eighteenth century. We present a synthesis of the expeditions in the decade 1997-2013 to locate the epicenters of two highly localized regions and the phenomenology of intra cloud lightning. Also we elaborated an microphysical model of the electrification in the thundercloud, that incorporates the influence of methane, emitted by swamps and oil deposits in the region, as aerosol with self-polarization electrical (pyroelectric) and we conclude that the methane increases the electric displacement vector, inside the clouds, and facilitates the charge separation process. This project has been funded through the Strategic Project FONACIT 2011-000326: Characterization of Transient Phenomena in the Lower Troposphere., Ministry of Science and Technology of the Bolivarian Republic of Venezuela.

Keywords: Catatumbo Lightning, intra cloud lightning, pyroelectric aerosols