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Recent Results Obtained at the Lightning Observatory in Gainesville, Florida

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Abstract

The Lightning Observatory in Gainesville (LOG), Florida, was established in 2004 primarily for measuring electric and magnetic fields produced by lightning. Over the years, the experimental setup has undergone upgrades, modifications, expansions, and relocation. It is currently located on the roof of the five-story New Engineering Building on the University of Florida campus. The LOG includes a glass cupola providing over a 180° unobstructed view of the horizon. The cupola houses digitizing oscilloscopes, computers, and high-speed video cameras, with the various sensors and associated electronics being located nearby on the roof. The sensors currently include wideband electric field antennas, electric field derivative (dE/dt) antennas, magnetic field derivative (dB/dt) antennas, and energetic radiation detectors. The focus of this paper is on the optical records acquired in 2018, when the LOG instrumentation was set to trigger on close lightning (within about 6 km of LOG). Images obtained with three high-speed video cameras, MegaSpeed, Phantom, and FLIR, will be presented. The MegaSpeed HHC-X2 (visible range) camera was equipped with a fish-eye lens and operated at 1000 fps with 1 ms exposure time and no dead time. The Phantom V310 (visible range) camera was equipped with a wide-view lens (10.5 mm focal length) and operated at 20,000 fps with 47.39 μ s exposure time and 2.61 μ s dead time. The FLIR X6900sc (infrared range, 3.0-5.0 μ m) camera operated at 1004 fps with 0.8 ms exposure time and 196 μ s dead time. A total of 75 events (lightning flashes) were recorded by the high-speed cameras. Among them, 22 events were recorded in both visible and infrared ranges, 8 events only in the infrared range, and 45 events only in the visible range.

Topic Areas

Lightning Physics, Characteristics and Measurements

Submission Format

Oral