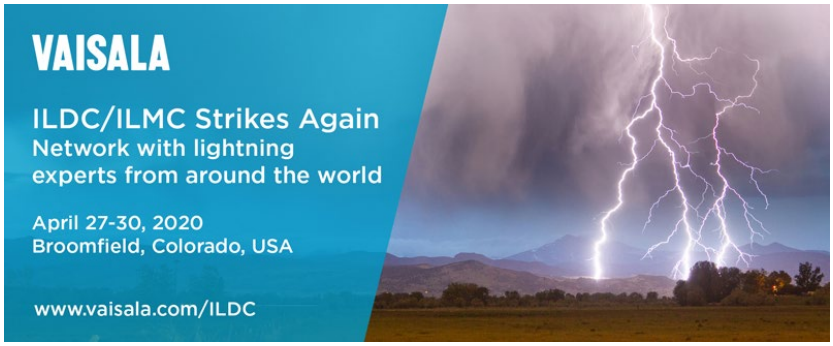

TETRA-II ground level observations of energetic photons associated with lightning

Authors

Dr. Samer Alnussirat - Louisiana State University

Prof. Michael Cherry - Louisiana State University

Dr. Donald Pleshinger - Louisiana State University

Ms. Deirdre Smith - Louisiana State University

Dr. Jill Trepanier - Louisiana State University

Abstract

The TGF and Energetic Thunderstorm Rooftop Array (TETRA-II) at ground level has detected 33 bursts of X- and gamma-rays from thunderstorms over the period Oct. 2015 – Sep. 2019 in three different locations. Arrays of BGO scintillators are located on the Louisiana State University in Baton Rouge, Louisiana; at the University of Puerto Rico at Utuado, Puerto Rico; and at the Centro Nacional de Metrologiá de Panamá (CENAMEP) in Panama City, Panama. Additionally, an array of 10 high energy resolution LaBr scintillation detectors installed at LSU. An overview of the observed msec- and sub-msec-scale duration bursts along with their time series, energy information and relation to lightning is presented. Events are compared with weather data, including lightning maps, cell base-reflectivity, and echo top heights, to study the structure of the storm at the time of the bursts. Finally, Monte-Carlo simulations are performed to examine the characteristics of downward-directed events from various altitudes and compared to the TETRA-II ground-based observations.

Topic Areas

Lightning Physics, Characteristics and Measurements

Submission Format

Oral