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Lightning Campaigns

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COHMEX

The COoperative Huntsville Meteorological EXperiment was conducted in the vicinity of Huntsville, Alabama during June-July, 1986. The objectives of this field experiment were to investigate the morphology, dynamics, microphysics, and electrical evolution of storms and the relation of storm electrical activity to precipitation and dynamical processes. The primary instrumentation used in quantifying storm electrification included the ER-2 LIP, 4-station MSFC lightning direction finder network, NCAR research radars, and T-28 field mills.

ABFM

Airborne Field Mill (ABFM) Project, summer 1990, 1991; winter 1992 in the vicinity of Kennedy Space Center, Florida. The purpose of this study was to determine when weakly convective or layered cloud systems are electrified and to produce remote sensing tools to predict the electrification. The study was designed to address the existing launch commit criteria for electrified clouds that had the potential to cause triggered lightning discharges. An instrumented Lear 28/29 jet was used to penetrate developing cumulus clouds and measure the vector electric field and some simple cloud parameters. The airborne measurements were compared to radar to determine some of the conditions necessary for cumulus cloud electrification.

CaPE

The Convection and Precipitation/Electrification field experiment was conducted between 8 July and 18 August 1991 in east central Florida in the vicinity of Cape Canaveral. The objectives of this field experiment were to 1) identify relationships between co-evolving wind, water, and electric fields within convective clouds and 2) determine the meteorological and electrical conditions in which natural and triggered lightning can/cannot occur. Research instruments included the ER-2 LIP, NCAR research radars, KSC field mill network, and KSC LDAR.

- [CaPE Homepage](#)

STORM FEST

The U. S. Weather Research Program, formerly the STormscale Operational and Research Meteorology (STORM) program, conducted an experiment called the STORM-FEST (Fronts Experiment Systems Test) from 1 February to 15 March 1992. The objectives were to study the mesoscale structure and dynamics of wintertime fronts, associated precipitation, and severe weather over the Central U.S. with the latest observing systems. During this program, the Lightning Instrument Package (LIP) was flown aboard the ER-2 high altitude aircraft.

TOGA COARE

The Tropical Ocean Global Atmosphere Coupled Ocean-Atmosphere Response Experiment (TOGA COARE) was designed to improve our understanding of the coupled ocean-atmosphere system. A coordinated study of thunderstorms and lightning was conducted during the intensive 4-month observing period November 1992 to February 1993. A network of cloud-to-ground lightning sensors was installed with sites on Kapingamarangi Atoll and near the towns of Rabul and Kavieng, Papua New Guinea. Electrical measurements were also made from the NASA ER-2 and DC-8 airplanes.

- [TOGA COARE Data Center](#)

CAMEX

The first two CAMEX field studies were conducted at Wallops Island, Virginia during September 1993, and 21 August to 2 September 1995. The third in the series of CAMEX field studies (CAMEX-3) occurred during August and September 1998. CAMEX-3 was devoted to the study of Atlantic hurricane tracking and intensification using NASA-funded aircraft remote sensing instrumentation. The NASA ER-2 Lightning Instrument Package (LIP) was used to measure the DC and transient (i.e., lightning) electric fields, optical pulses, and atmospheric conductivity as the aircraft flies over the tops of storms. These data will be used to 1) investigate lightning-storm relationships and 2) provide validation for the TRMM mission.

- [CAMEX Homepage](#)

MCTEX

The Maritime Continent Thunderstorm Experiment (MCTEX) was conducted from 13 November to 10 December 1995 over the Bathurst and Melville Islands (the "Tiwi Islands"), located approximately 50 km off the coast of Australia's Northern Territory. This international experiment was designed to study the vigorous life cycle dynamics, microphysics, and lightning produced by these island thunderstorms. The characteristics of these thunderstorms were obtained with a 4-station cloud-to-ground lightning network, surface electric field instruments, and a doppler radar.

- [MCTEX Homepage](#)

TEFLUN

In the spring of 1998, the ER-2 LIP was flown in a 4 week field campaign called the TExas FLorida UNderflight (TEFLUN) experiment in support of validation of the Tropical Rainfall Measuring Mission (TRMM). This field campaign focused on the U.S. Gulf Coast and especially on the priority TRMM ground validation (GV) sites in Texas and Florida.

- [TEFLUN Homepage](#)

Tropical ``Ocean" Field Campaign (Kwajalein)

In the summer of 1999, there are plans to conduct a tropical ocean campaign in the vicinity of Kwajalien Atoll in the Republic of the Marshall Islands (RMI). During this program, the convective aspects of the northern component of the ITCZ which occurring in the central Pacific Ocean will be investigated. The Lightning Instrument Package (LIP) will fly on the NASA DC-8, and cloud-to-ground lightning measurements will be obtained from a three station ALDF network operated by Aeromet, Corporation. For TRMM ground truth, MSFC is looking at the possibility of modifying the existing systems or expanding the coverage of the network.

- [TRMM - Kwajalein Homepage](#)

Tropical ``Land" Field Campaign (Brazil)

During January and February 1999, tropical land campaign was conducted during the wet season in Brazil to coincide with the wet phase of the Large-scale Biosphere_atmosphere (LBA) experiment. The experiment was to focus on the convection occurring in the rain forest region of Rhondonia (11 S, 62 W) in Brazil. Plans include the implementation of a dual Doppler radar and a four station Advanced Lightning Direction Finder (ALDF) network. The network is located in the vicinity of Ji Parana and will begin to collect data for a TRMM validation field campaign. The lightning network will continue to operate for a minimum of 12-18 months with the assistance of Brazilian scientists.

- [TRMM Ground Validation in Brazil](#)

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