

ABSTRACT

Implementation of an Automated Lightning Detection Network for Sri Lanka

This report describes a project that was carried out to implement a lightning detection network consisting of several wide-band magnetic direction finding (DF) stations in Sri Lanka. The research work revealed that the DF stations are highly sensitive to the geometric placement of the stations with respect to each other as well as to the absorption and re-radiation of the lightning generated EM fields by the external objects in the vicinity of the station sites. Monte-Carlo simulations were utilized to obtain the optimum locations for implementing the DF stations to provide the highest accuracy. Simulation shows that the two-station strike position reconstruction error can be greatly minimized by using data from the third station.

During the period covered by the grant, data from the DF stations installed at the observation sites maintained by the Department of Meteorology at Colombo, Ratnapura, Kandy and the University research station at Hambanthota were analyzed. Through this research work, for the first time, the activities of lightning ground flashes over Sri Lanka and in the area of the Indian Ocean were obtained [10]. The data were also utilized to calculate the first ever results for the average peak current in the first return stroke of negative CG flashes for Sri Lanka [11], characteristics and seasonal variations of negative and positive flashes as well as the characteristics of subsequent strokes in lightning flashes [15].