

## Spatial and temporal changes of lightning incidents in Sri Lanka

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### Abstract

Due to lightning and lightning related shocks, in Sri Lanka, over 50 deaths per year are reported (Sri Lanka Meteorology Department, 2007). Properties worth more than 2.5 million USD are damaged in the power, communication and industrial sectors and at domestic level (Lightning Research Group, University of Colombo, 2008). This amount does not take into account the billions of indirect losses due to the downtime caused by the damaged and malfunctioning equipment and loss of data in the microprocessors. The equipment damage is on the increasing trend for the last few decades, may be, due to the wide spread of the use of electronics and extension of the national power grid into rural areas. In addition to these losses, some researchers argue that the lightning is the most influencing factor for the decrease in the number of domesticated elephants in Sri Lanka. Most often these animals are subjected to step potentials or side flashes as they are tied to trees and wooden stubs by iron chains.

The main objective of this study is to examine the spatial pattern of lightning incidents during the different rainy seasons in Sri Lanka and expansion of the probable areas were examined.

The data, number of thunder days were collected for last 30 year period from the Metrological Department of Sri Lanka since number of lightning incidents is not recorded owing to technical limitations. This was the main limitation of the data set utilized for this study.

Both, GIS as well as statistical analysis were applied to achieve the set objectives. In order to examine the trend of the lightning occurrences, Time-series analysis was established in two different levels; National level and Metrological observatory level. Spatial interpolation and some Geostatistical techniques were adopted to examine the spatial pattern of lightning incidents in Sri Lanka.

The results depict that there is a very clear spatial dichotomy among the lightning incident areas and there is a very significant relationship between the number of thunder days and the different rainy seasons; two inter-monsoon periods are very critical especially for the wet zone of the country when compared to the monsoon periods.

Key words: Lightning, Spatial Interpolation, Geostatistics