

CHAPTER 1

INTRODUCTION

The lightning is one of the key natural disasters which causes a lot of damages including life losses and property such as computers, communication systems, power transmission and distribution systems, etc., worth of millions of rupees, every year [1]. Therefore it has been a major requirement to find a solution to prevent lightning hazards, or at least to detect or forecast lightning so that safety precautions can be taken in advance.

The lightning flash can reach an object mainly in three modes; *i.e.* as a direct strike, side-flash, or potential transfer [2]. Therefore precautions should be taken for protection from all of these. The most effective method for protection from direct lightning is installation of lightning arresters, which is costly even for a usual building. But majority of the Sri Lankans are not in a position to afford for lightning arresters.

A number of precautionary steps have been proposed for protection from lightning hazards in [2], [3]. Those steps are as follows.

- (i). Keep electrical instruments disconnected from the main power supply.
- (ii). Television antennas should be disconnected from the television sets and the antenna socket should be placed close to the earth outside the house. Best precaution is to connect the antenna to an earthed conductor.
- (iii). As far as possible, avoid handling or touching electrical instruments like refrigerator, electric iron, metal frame, TV, and radio.
- (iv). Avoid touching or standing close to tall metal structures, wire fences and metal clothes lines.
- (v). Limit the use of telephones when a thunderstorm is overhead. Best advice is not to touch the telephone in such instances.
- (vi). Find shelter in a safe place to avoid exposing yourself to the open air. If the time interval between lightning flash and hearing thunder becomes less than 15 seconds, move quickly to a protected location, as there is immediate danger of a lightning strike nearby.

- (vii). Try to avoid loitering in open areas like paddy fields, tea estates or play grounds. Specially avoid working in open air holding metal tools like mamoty, knife and iron rods. If this cannot be avoided, crouch down, singly, with feet together. Footwear or a layer of any non-absorbing material, such as plastic sheet, will offer some protection against ground currents.
- (viii). Do not seek shelter under or near isolated tall trees and in high grounds. If the vicinity of a tree cannot be avoided, seek a position just beyond the spread of the foliage.
- (ix). By sitting down or lying down, reduce the effective height of the body.
- (x). If you are in an open boat, keep a low profile. Additional protection is gained by anchoring under relatively high objects such as jetties and bridges, provided that no direct contact is made with them.
- (xi). Avoid riding horses or bicycles, or riding in any open vehicle such as a tractor.
- (xii). Avoid swimming or wading.

Most of these precautionary steps can be implemented effectively if an early warning system is available at a reasonable cost. Therefore, it has been a long waiting requirement to develop a lightning detector, which meets the characteristics of lightning in Sri Lanka, at an affordable cost.

Observations show that ground flashes begin after some time from the begening of cloud flashes, in oceanic tropic countries like Sri Lanka. This characteristic can be used to predict a thunderstorm beforehand in Sri Lanka. Characteristics of lightning observed in Sri Lanka are discussed in detail in the background study.