Trends of Extreme Rainfall Events in Ratnapura, Sri Lanka

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Extreme weather or climate events can have a major impact on society, the economy and the environment. Karl *et al.* (1999) assessed changes in climate extremes over many parts of the world during the past century. Climatic models project that increasing atmospheric concentrations of greenhouse gases result in changes in frequency, intensity and duration of extreme events, such as more hot days, heat waves, heavy precipitation events, and fewer cold days. Many of these projected changes would lead to increase risk of floods and drought in many regions, and a predominantly adverse impact on ecological systems, socio-economics sectors, and human health. The number of weather-related catastrophic weather events has risen three times faster than the number of non-weather-related events, despite generally enhanced disaster preparedness. Part of these observed upward trends in weather-related losses over the past 50 years is linked to socio-economics factors (e. g. population growth, increased wealth, urbanization in vulnerable areas), and part is linked to regional climatic factors (e.g. changes in precipitation, flooding events) (Intergovernmental panel on climatic change IPCC, 2001).

Sri Lanka being in the tropics is very often affected by extreme weather systems such as floods, droughts, lightning, thunderstorms, cyclones, easterly waves and El Nino. In the island, more intense events in rainfall would result in increasing floods, landslides, mudslides, soil erosion and flood runoff. As a result these would increase the pressure on government and private flood insurance systems and disaster relief. Fewer studies have examined trends in climate extremes, other than changes in mean values and rainfall variability in Sri Lanka.

In this respect it is vital to understand the trends in extreme rainfall events of Sri Lanka. Ratnapura was selected as the study area. It is situated in the wet zone in Sri Lanka. Ratnapura should strengthen its disaster preparedness, as scientists have predicted that the area will experience more frequent heavy rainfall events similar to those that caused major flash floods in 2003. It also needs to formulate adaptive strategies to reduce weather-related loss to life and economy.

The main purpose of this study is to identify the extreme events of rainfall for the period 1971 to 2007 in Ratnapura. This study is entirely based on secondary data, obtained from the Department of Meteorology in Sri Lanka, for the period 1971 to 2007.

The study was carried out through data analysis; daily time-series for the station were first examined visually to identify any obvious outliers, trends and potential discontinuities. Secondly, 95% confidence limit fitted to the trend line to reveal values that do not follow the signal. Some indices which involved arbitrary thresholds, such as the number of days each year with daily rainfall exceeding 25.4 mm were used for the present study. Also, extreme indices which were based on statistical quantities such as the 10th or 90th percentile were applied for the study.