

Analysis of extreme climate events during 1981 - 2019 across Sri Lanka

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Abstract

Climate change is considered as a global issue with long term inevitable changes in climate. Many parts of Sri Lanka are vulnerable to extreme climatic events. Therefore, this study focuses on the occurrence of extreme temperature and rainfall events in seven selected locations (Mahailuppallama, Hambantota, Batalagoda, Monaragala, Nuwaraeliya, Galle, Katugastota) representing the major Agro-ecological zones of Sri Lanka from 1981 to 2019. Five extreme temperature and precipitation indices were selected based on definitions for extreme climate events by the xxpert team on climate change detection and indices which is jointly established by world metrological organization and the world climate research program. Data quality control was done by using the RClimDex software (version 4.0.2). Extreme climate indices were calculated by RClimDex software package and annual trends of extreme climatic events were analyzed by regression and Mann Kendal tests. Significant positive trends ($p < 0.05$) were observed for warm nights in all the selected locations except Batalagoda which showed a significant negative trend. Hambantota and Katugastota showed a significant positive trend for warm days in many months. A significant decreasing trend of the monthly mean difference between the maximum and minimum temperature was observed at Monaragala. The monthly maximum of daily maximum temperature shows significant positive trends at Hambantota, Galle, and Katugastota. Both positive and negative trends were detected for extremely wet days. Accordingly, Hambantota (September) and Galle (October) showed positive trends whereas Galle (October) and Nuwaraeliya (September) showed negative trends. Very wet day precipitation showed a significant negative trend in Hambantota. Moneragala showed a significant positive trend only in April for very heavy precipitation days while Hambantota and Nuwaraeliya (June) and Batalagoda and Katugastota (July) showed significant negative trends. In contrast to other locations, no precipitation parameter was shown any significant change during the study period at Mahailuppallama. In conclusion, Temperature indices reflectingwarming trends at Batalagoda, Katugasthota, Hambanthota, Galle, Monaragala, and Nuwaraeliya. However, trends of precipitation indices were highly varied in terms of location and months.

Keywords: Climate indices, Extreme events, Mann Kendal, RClimDex

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