

ABSTRACT

EMPIRICAL ANALYSIS OF TEMPERATURE CHANGE IN SRI LANKA DURING THE LAST 140 YEARS (1870-2010)

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Climatologists and meteorologists in Sri Lanka observe that ground temperature measurements in many weather stations have risen and people are experiencing more episodes of warmer weather. Sri Lanka is a country vulnerable to warming or rise in temperature; in particular its economic development is mostly dependent on agriculture, which can be severely affected by large and abrupt changes in temperature. This study was carried out to detect and characterize changes in surface temperature in the last 140 years, as a precursor of climate change in Sri Lanka. Daily maximum and minimum temperature data collected at twelve synoptic stations from 1871 to 2010 were analyzed using statistical techniques to quantify the rate of change. Normal daily, monthly, seasonal, and annual minimum and maximum temperatures significantly increased at differential rates in different climate zones in the country. On the average, the highest rate of warming during the nights of 1.8 °C/century happened in the high elevation areas in Nuwaraeliya where climate is generally cool and wet while the lowest rate of 0.33 °C/century happened in the urban Colombo area. Both the highest and lowest change in daytime temperature was observed in the coastal areas; the highest at 1.65 °C around the Galle and the lowest at -0.32 °C/century at Baticloa areas. The most uneven change in temperature was observed in the coastal areas, plausibly due to the effects of sea breeze. Anomalies or differences of normal annual, seasonal, monthly and daily minimum and maximum temperature from baseline or reference minimum and maximum temperature values resulted in significant warming at all the synoptic weather stations. The temperature extremes, which were computed absolutely and relatively, also showed that the number of cool nights have generally decreased while the number of warm days have increased; climate in Sri Lanka have been warming during the period from 1871 to 2010. Accelerated warming occurred in the later part of the century during 1961-1950 compared that occurred in 1911-1960. Both the southwest and northeast monsoons influence the warming trends in the country. All in all, more warm nights and hot days had been occurring in various parts of the country.