

## Spatial and Temporal Variation of Temperature Trends in Last Century of Sri Lanka

U.S. Meegahakotuwa<sup>1\*</sup> and K.W.G. Rekha Nianthi<sup>1</sup>

<sup>1</sup>*Department of Geography, University of Peradeniya, Peradeniya, Sri Lanka*

The climate of Sri Lanka is characterized as tropical monsoonal. Temperature is one of the main elements in the tropical climate. Spatial differences observed in air temperature over Sri Lanka are mainly due to altitude, rather than latitude. The mean annual temperatures in Sri Lanka manifest largely homogeneous temperatures in the lowlands and rapidly decrease with altitude towards the Central Highlands. The mean annual temperature varies from 27 °C in the Coastal Lowlands to 16 °C at Nuwaraeliya (1900 m) in the Central Highlands. The objective of this study was to examine the spatial variation of temperature trends of Sri Lanka in the last century. The study was based on mean annual temperature data for the period from 1916 to 2015 at 15 meteorological stations distributed all over the island. The data were obtained from the Department of Meteorology, Colombo. The temperature trends over the last 100-year period were estimated using the Linear Regression analysis. The Mann-Kendall statistical test was applied to identify significant or non-significant monotonic trends. Spatial interpolation was done to prepare the temperature trend map for whole Sri Lanka using Radial Basis Functions Method in ArcGIS 10.2.

The results revealed that, the trends of mean annual temperatures have been increasing in all meteorological stations. Out of the 15 stations, 13 displayed statistically significant ( $P < 0.0001$ ) increasing trends. The rate of the increment annual temperature for the 1916 - 2015 period was in the order of 0.009 °C per year (0.9 °C per century) in Sri Lanka. The highest increasing trends were noticed in and around Anuradhapura, i.e. 0.016 °C per year. Two other increasing trends were noticed in two clusters, one in Nuwaraeliya in the Central Highlands and another in Colombo in Western Coastal Lowlands. Mean annual temperature increment was higher in Dry Zone (0.01 °C per year) than that of the other two zones, i.e. Wet and Intermediate. The trend value of Intermediate Zone was 0.009 °C per year and the Wet Zone value was 0.008 °C per year. Reasons for the increase of temperature in Sri Lanka can possibly be the impact of global warming and the influences from El-Nino phenomena. Observed increasing trends of temperature can negatively impact on the human activities and natural environmental processes of Sri Lanka.

*Keywords:* Temperature, Trend, Variation, Significant, Interpolation