A STATISTICAL ANALYSIS OF THE MONTHLY MEAN MAXIMUM AIR TEMPERATURE IN COLOMBO, SRI LANKA

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ABSTRACT

The present study was carried out to fit a mathematical model to describe the variation pattern of monthly mean maximum air temperature in Colombo in order to predict the future values. Monthly mean maximum temperature values for a period of over 35 years were used for the analysis. Time series statistical methods were considered to study the trend and seasonal, cyclic and irregular components. The long term pattern in the variation of monthly mean maximum temperature in Colombo appears to be dominated by a pronounced seasonal effect. The highest seasonal effect was found to be in March. It was found that the temperature of a particular month depends on the lagged temperature values of the two preceding months.

The model

$$\hat{x}_t = \hat{s}_t + 12.8 + 0.367(x_{t-1} - \hat{s}_{t-1}) + 0.214(x_{t-2} - \hat{s}_{t-2}) + 0.000567 * t$$

where $\hat{x}_t$ = the estimated temperature at time t,

$\hat{s}_{t-k}$ = the estimated seasonal factor at time t-k for k = 0, 1, 2 and

x_{t-k} = observed mean maximum air temperature value at time t-k for k = 1, 2

could be effectively used to predict the monthly mean maximum air temperature in Colombo.

The present analysis indicates that the mean maximum temperature in Colombo increases at a rate of 0.175 ^{0}C per decade, which is less than the rate of increase in the mean global temperature.

Key words: Time series analysis, trend, seasonal variation, cyclic variation, residuals, decomposition method.