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DIURNAL ASYMMETRY IN TEMPORAL RESPONSE OF SURFACE AIR TEMPERATURE AT SILIGURI, WEST BENGAL, INDIA

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Abstract

The objective of present study is to explore the diurnal asymmetry in temporal response of surface air temperature in Siliguri Municipal Corporation (SMC). Three groups of parameters namely seasonal and annual mean maximum temperature, seasonal and annual mean minimum temperature, and mean seasonal and mean annual temperature were computed based on daily maximum and daily minimum gridded temperature data available for the period between 1950 and 2020 at grid resolution of 1°x1° from the official India Meteorological Department (IMD) Pune website. Three grid points are found to be located around SMC and the input data available from them were interpolated to get the spatial average value for SMC. The trend analysis was done using Modified Mann-Kendall test for autocorrelated time series, otherwise Mann-Kendall test was applied. The Buishand test was applied to detect the change point for normally distributed series and otherwise it was done by Pettitt's test. The result shows that although the annual mean temperature is significantly (p<0.05) increasing at the rate 0.004^0C per year for the whole study period, there is a diurnal asymmetry in the temperature response. The rise in daytime temperatures is more pronounced during monsoon and post-monsoon seasons than in other seasons, but the rise in nighttime temperatures began in post-1980s and prior to that it had just opposite trend. Siliguri, here, is considered as the locational reference point in space i.e., present study did not intend to explore the spatial variation across urban and rural areas and hence the current findings are applicable over a wide area in and around SMC, irrespective of rural urban effect differences.

Keywords: MK test, Pettitt test, Kernel smoothing, Warming in Siliguri

Introduction

The warming effect of surface air temperature was first felt in higher latitude of northern hemisphere with more pronounced response in minimum temperature during winter and thereafter it spread over