

A comparative time series analyses on temperature change in Colombo city based on Landsat satellite data

S.J. Chathuranga* and Thilantha Dammalage

Department of Cartography, Photogrammetry, Remote Sensing and GIS, Faculty of Geomatics, Sabaragamuwa University of Sri Lanka.

***Corresponding author: janakasjc@gmail.com**

Abstract

More than half of the human population lives in cities and most of the cities are growing in size at a phenomenal rate. Micro climate effect, urban heat island (UHI) effect and changes to local hydro meteorological processes occur due to the urbanization driven land use changes. This study attempts investigate the urban temperature changes in Colombo city due to its urbanization. Landsat 5, 7 and 8 satellite images are used between years 2000 to 2015 time period. Several algorithms are applied to retrieve surface temperature from Landsat data. Land use classification is done under built up, green and water to identify the land use changes in the same time period. Three separate study areas are selected which are urban, suburban and rural. Threshold value is used to overcome the obstacle of finding higher temperature area due to seasonal and climate changes. This threshold value for higher temperature in the urban area of a satellite image is calculated with respect to suburban and rural areas in the same satellite image. The results indicate increasing in the higher temperature area and built up area, decreasing in green and water areas with the time. A significant increase in higher temperature areas are shown since year 2010 that is mainly due to rapid urbanization in Colombo city since year 2010.

Keywords: Urbanization, Surface temperature, Colombo, Landsat