

Emerging Urban Heat Islands in the New Capital Region of Andhra Pradesh, India - A Satellite based Evaluation

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Abstract Satellite-based estimation and evaluation of urban heat islands (UHI) are latest in the field of urban micro climate and environmental management. UHI is one of the serious upcoming climatological issues regarding the development of cities. Conversion of the vegetative area into the impervious surface is the root cause of this problem of development of urban heat. Large-area coverage, quick process, more economical, less energy and other requirements are the attractive features of the satellite-based studies. The present study deals with the formation of UHI in the new capital region of Andhra Pradesh, a recently formed state in India in the year 2015. Satellite images of Landsat-8 are procured and processed to develop LULC and land surface temperature (LST) images. Field data of about 100 points, collected in the study area is also used in this work and the classification accuracy obtained is about 93%. From LULC and LST images it was concluded that the capital region is experiencing severe UHI phenomenon. The two big cities Vijayawada and Guntur are emerged as hot spots. High and low LST obtained are 58⁰C and 23⁰C respectively. The corresponding areas of hot and cold regions were estimated and presented. The outcome of this research can be used as a scientific basis for urban planners in urban planning and management as well as to increase the community awareness in urban heating effect. Urban greening is an essential measure to be adopted by the urban planners to protect the citizens from the ill effects of UHI.

Keywords *Urban Heat Island; Land Surface Temperature; Landsat-8; Land Use; Land Cover*

1. Introduction

Urban heat island is an upcoming serious issue which causes discomfort to the city dwellers and increases the power consumption because of the increased requirements of cooling, etc. Increased heat waves also result in the rise of the death toll, particularly old age people. Urban heat island is also connected to other micro climatological factors like humidity, rainfall, etc. Large scale conversion of forests and agricultural lands into impervious surfaces comprising roads, buildings and other infrastructure amenities is the main cause to this issue. The conversion of vegetative land into impervious land is changing the energy budget and responsible for excess heat development. Normally green areas with vegetation receive sunlight and utilize in the process of photosynthesis, and the energy will be converted into mass in the form of carbohydrates. Whereas the rocky area or