A study of Urban Heat Island relating "Local Climate Zones" using Landsat Images – The Case of Kathmandu Valley-

Abstract

Local Climate Zone (LCZ) classification has been extensively used to classify urban and rural landscapes in cities, including urban temperature studies. The urban heat island (UHI) in Kathmandu valley (Kathmandu, Bhaktapur, and Lalitpur), has been analyzed and standardized focusing on the Local Climate Zones (LCZs). LCZs classify the landscape into homogeneous types based on structural type, land surface cover, materials used, and human activities. This standard classification has made urban studies more meaningful and easy to compare the results with various cities globally. The LCZ map for Kathmandu was created using Landsat images, Google Earth, and SAGA-GIS software for both March 2013 and March 2019. Landsat 8 TM/ETM+/OLI imagery was used to estimate LST. For the estimation of LST algorithm was used considering emissivity. The result shows that the difference within the built-up scheme is around 2-4 °C whereas the difference between Building and Land cover types on the comparison is around 5-10 °C. The difference between the Building and Land cover type on comparison suggests that there is the presence of the UHI effect in Kathmandu valley.

Keywords—Local Climate Zones (LCZ), Land Surface Temperature, Urban Heat Island