

URABAN HEAT ISLAND BASED GEOINFORMATION

Ornprapa P. Robert and Pand Junkaew

*Department of Environmental Science, Faculty of Science, Silpakorn University,
Thailand, bee@dronprapa.com*

Abstract

Rapid urbanization and population growth has caused land surface cover change in large cities, effecting urban regions to become warmer than their rural areas, referred as urban heat island. Heat island has resulted in increase in consumption of fossil fuels, summertime peak energy demand, greenhouse gas emissions and pollution. Thus, the objective of this study is to investigate the correlation between land surface cover and temperature causing urban heat island. Mae -Sot, Tak province, Thailand was chosen as study area. 20-year period (1991, 1996, 2001, 2006 and 2011) of Landsat 5 TM satellite imagery is employed to interpret land surface cover and temperature. Surface temperature is acquired by thermal band of Landsat 5 TM. Land surface cover changes are classified into vegetation and built-up areas which can be identified by Normalized Difference Vegetation Index (NDVI) and Normalized Difference Built-up Index (NDBI). The results demonstrate that average values (Mean \pm SD) of NDVI, NDBI and temperature are 0.359 ± 0.069 , 0.074 ± 0.108 and 25.9672 ± 3.67 °C, respectively. Pearson correlation coefficient was applied to analyze the correlation between NDVI and surface temperature and between NDBI and surface temperature. The Pearson coefficients of those correlations were found as -0.504 and 0.915, respectively. It can be concluded that vegetation and built-up area change has affected to urban surface temperature within 20-year period of study area.

Keywords: urban heat island; NDVI; NDBI; Landsat 5 TM