

Urbanization and its impacts on land surface temperature pattern in medium size city, Kota Kinabalu for the years 1991, 2011 and 2018

ABSTRACT

Land surface temperature (LST) is a key earth surface parameter on local, regional and global scales. Rapid urbanization is changing the existing patterns of land cover (LC) globally which increases the LST, which increasing LST and the urban heat island (UHI) phenomenon, namely urban areas where the atmosphere temperature is significantly higher than surrounding rural areas. The UHI has a negative impact on the life quality of the local population as thermal discomfort, summer thermal shock, health, energy consumption, photochemical smog and worsening of the air quality. The output of this study area very useful and important for correct and sustainable urban planning. This study aims to investigate the selected Normalized Difference Built Index (NDBI) and urban expansion and its impacts on land surface temperatures in Kota Kinabalu from 1991, 2011 and 2018. Normalized Difference Built Index (NDBI) is an urban impervious surface index that represents the intensity of the urban built-up area and is an important analytical tool in characterizing land development, urbanization, and land surface parameters. This study has three major steps. Firstly, we generated the LST from thermal band Landsat 5 and Landsat 8 and the second major step is to generate the NDBI map and land cover Kota Kinabalu for the years 1991, 2011 and 2018. Third, the LST was associated with the Kota Kinabalu map NDBI and land cover 1991, 2011 and 2018 and LST was discussed. The result shows that the intensity of the Surface Urban Heat Island (SUHI) continue to increase and spatial distribution was different between the 3 selected years. The SUHI was mainly focused in the center of the city in 1991 but expanded to near suburban in 2011 and 2018. One there hand results show A strong positive relationship between LST and NDBI. Finally, the results provide a future guideline for policymakers and urban planners working toward a healthy and sustainable Kota Kinabalu City. Besides that, the findings of this study can improve the understanding of SUHI and their impact in Kota Kinabalu and assists the policymakers to formulate countermeasures for mitigating SUHI effects.