

Land use/land cover changes and the relationship with land surface temperature using landsat and MODIS imageries in Cameron Highlands, Malaysia

ABSTRACT

Mountainous regions are more sensitive to climatic condition changes and are susceptible to recent increases in temperature. Due to urbanization and land use/land cover (LULC) issues, Cameron Highlands has been impacted by rising land surface temperature (LST) variation. Thus, this study was carried out to explore the impact of the LULC change on LST in the Cameron Highlands from 2009 to 2019 using remote sensing images acquired from Landsat 7 ETM+, Landsat 8 Operational Land Imager (OLI/TIRS), and Moderate Resolution Imaging Spectroradiometer (MODIS) 11A Thermal sensors. A split-window algorithm was applied to Landsat 8 images (2013–2019) to derive the LST. Air temperature data of the study area were also obtained to cross-validate data sources. Based on the validation results, the accuracy of LULC and LST outputs were more than 94.6% and 80.0%, respectively. The results show that the current trend of urban growth continues at a rate of 0.16% per year, and the area experienced an LST increase of 2 °C between 2009 and 2019. This study is crucial for land planners and environmentalists to understand the impacts of LULC change on LST and to propose appropriate policy measures to control development in Cameron Highlands.

Keyword: Land use; Landsat; Land surface temperature; Climate change; Deforestation