

## Abstract

The land use land cover (LULC) changes significantly affect the thermal profile of urban areas. This study investigated the effect of LULC changes on thermal profile of Sialkot city in Pakistan during 1989 to 2030. Satellite imagery was processed and maximum likelihood classification was done to produce LULC maps for years 1989, 2000, 2009 and 2020. Prediction of the LULC was done for year 2030 using CA-Markov model. The thermal bands were also processed for the same time periods to compute land surface temperature (LST) of the city. Similar prediction model was used to predict LST in future (2030). The LULC analysis revealed 4.14% increase in the built-up area and 3.43% decrease in the vegetation cover of the city during 1989 to 2020. Both land covers are expected to change in future (year 2030) by +1.31% (built-up) and -1.1% (vegetation). Area of waterbodies and barren land also decreased over time. These LULC changes were found affecting the LST of the study area. The transformation of vegetation cover into built-up area resulted in increases in LST. An increase of 4.5°C (summer) and 5.7°C (winter) in the mean LST of Sialkot was observed during 1989 to 2020 and it is further expected to increase in 2030. The unplanned urbanization caused serious environmental issues and climate change impacts on Sialkot District. That is important to properly plan and manage the area for the coming generations to have a healthier and sustainable place to breathe in. This study also suggests policy implications for reducing human impact on the local climate of the study area.