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Effect of impervious surface area and vegetation changes on mean surface temperature over Tshwane metropolis, Gauteng Province, South Africa

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Abstract:

The Tshwane Metropolis, Gauteng Province, South Africa, continues to experience rapid urbanization as a result of population growth. This has led to the conversion of natural lands into large man-made landscapes i.e., increase in impervious surfaces and a decrease in vegetative cover. This land use or land cover changes are also thought to affect the climate of the Tshwane metropolis as is evidenced by heat waves in 2013 and 2014. This paper describes how vegetation and impervious surface area (ISA) or built up areas were classified from Landsat 8 LDCM, 2013, and Landsat 7 ETM+, 2003 images using thematic spectral indices and mean surface temperatures derived from the thermal bands. The linear relationship between the two land cover types and surface temperature (LST) derived from the thermal bands was also examined. The results of this research reveal that the ISA increase has occurred due to urban sprawl and this have contributed to increase in surface temperature.