

PEMANFAATAN CITRA MULTISPEKTRAL DALAM ANALISIS SUHU PERMUKAAN DI KOTA SURAKARTA

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INTISARI

Surakarta merupakan pusat perekonomian kawasan Subosukowonosraten dengan tingkat PDRB 5,7% tahun 2023. Posisi Surakarta sebagai pusat perekonomian menyebabkan proses urbanisasi cukup tinggi. Urbanisasi mampu menciptakan dinamika penggunaan lahan yang pada umumnya konversi lahan vegetasi menuju lahan terbangun. Dinamika konversi lahan yang signifikan dalam konteks area urban menimbulkan degradasi lingkungan, salah satunya peningkatan suhu permukaan. Perlu dilakukan kajian spasial terkait pola penggunaan lahan terhadap distribusi suhu permukaan Kota Surakarta untuk mengetahui pola distribusi penggunaan lahan, pola distribusi suhu permukaan beserta korelasi dari penggunaan lahan terhadap sebaran suhu permukaan Kota Surakarta. Analisis pola dan korelasi dapat dilakukan melalui citra penginderaan jauh multispektral untuk mengamati distribusi dan dinamika penggunaan lahan beserta distribusi suhu permukaan dalam konteks spasial.

Pengolahan data penginderaan jauh dalam analisis suhu permukaan dilakukan menggunakan metode *single channel algorithm* untuk mengekstraksi data citra Landsat 8 TIRS band 10 menjadi data suhu permukaan serta klasifikasi metode *supervised classification* untuk mengetahui pola penggunaan lahan berdasarkan data Citra Landsat 8 OLI. Analisis korelasi penggunaan lahan terhadap suhu permukaan dilakukan melalui regresi linear *by feature Geographically Weighted Regression* (GWR) untuk mengetahui kekuatan hubungan dua variabel secara spasial dan metode statistik *by features zonal statistics as table* untuk mengetahui sebaran suhu permukaan tiap kelas penggunaan lahan.

Pola penggunaan lahan didominasi kelas lahan terbangun mencakup area dengan tutupan objek kedap air seperti bangunan, jalan, dan pedestrian. Pola distribusi berdasarkan hasil *moran's* terdistribusi *clustering* sangat kuat dan melemah di tahun 2024, dimana pada tahun 2024 pola penggunaan lahan secara visual lebih heterogen akibat peningkatan prosentase kelas lahan terbuka, badan air dan vegetasi. Distribusi suhu permukaan memiliki pola *clustering* dengan titik *cold spot clustering* di bagian utara dan barat Kota Surakarta, dominasi distribusi pada kelas *hot spot* yang merupakan hasil statistik suhu permukaan tinggi. Hasil regresi menunjukkan adanya korelasi penggunaan lahan terhadap suhu permukaan, dimana suhu permukaan tertinggi pada dua tahun pengamatan pada kelas lahan terbangun dengan jenis atap metal atau lahan terbangun tanpa *canopy cover*.

Kata kunci : Penggunaan Lahan, Tutupan Lahan, Suhu Permukaan Lahan, Klasifikasi Terbimbing, Algoritma Kanal Tunggal, Regresi Terbobot Geografis.

UTILIZATION OF MULTISPECTRAL IMAGERY IN THE ANALYSIS OF SURAKARTA SURFACE TEMPERATURE

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ABSTRACT

Surakarta is the economic center of the Subosukowonosraten region with a GRDP level of 5.7% in 2023. Surakarta's position as an economic center causes a high urbanization process. Urbanization is able to create land use dynamics that generally convert vegetation land to built-up land. The significant dynamics of land conversion in the context of urban areas cause environmental degradation, one of which is the increase in surface temperature. It is necessary to conduct a spatial study related to the pattern of land use on the distribution of surface temperature in Surakarta City to determine the pattern of land use distribution, the pattern of surface temperature distribution and the correlation of land use to the distribution of surface temperature in Surakarta City. Pattern and correlation analysis can be done through multispectral remote sensing images to observe the distribution and dynamics of land use and surface temperature distribution in a spatial context.

Remote sensing data processing in surface temperature analysis is carried out using the single channel algorithm method to extract Landsat 8 TIRS band 10 image data into surface temperature data and supervised classification method to determine land use patterns based on Landsat 8 OLI image data. Correlation analysis of land use to surface temperature was conducted through linear regression by feature Geographically Weighted Regression (GWR) to determine the strength of the relationship between two variables spatially and statistical methods by features zonal statistics as table to determine the distribution of surface temperature for each land use class.

The land use pattern is dominated by the built-up land class, which includes areas with impermeable object cover such as buildings, roads, and pedestrians. The distribution pattern based on the results of Moran's distributed clustering is very strong and weakens in 2024, where in 2024 the land use pattern is visually more heterogeneous due to an increase in the percentage of open land classes, water bodies and vegetation. Surface temperature distribution has a clustering pattern with cold spot clustering points in the north and west of Surakarta City, the dominance of distribution in the hot spot class which is the result of high surface temperature statistics. Regression results show a correlation between land use and surface temperature, where the highest surface temperature in the two years of observation is in the class of built-up land with metal roof type or built-up land without canopy cover.

Keywords : Land Use Land Cover, Land Surface Temperature, Supervised Classification, Single Channel Algorithm, Geographically Weighted Regression.