INTISARI

Perubahan iklim Negara Indonesia meningkatkan risiko gelombang panas akibat pengaruh cuaca esktrem. Salah satu faktor pendorong dampak perubahan iklim adalah laju urbanisasi cepat. Urbanisasi di Indonesia mengakibatkan terjadinya perluasan kota yang mendorong dampak Pulau Panas Perkotaan (P3) secara global dan dampak Permukaan Pulau Panas Perkotaan (P4) secara lokal. Analisis P4 dapat dimanfaatkan sebagai langkah pendekatan bagi pemangku kepentingan untuk mengetahui karakteristik distribusi kelas Suhu Permukaan Lahan (SPL) dalam memitigasi dampak P4. Biasanya, analisis ini dilakukan di kota-kota besar. Namun, dalam penelitian ini, analisis dilakukan di Kabupaten Sleman. Penelitian ini dilakukan untuk menganalisis P4 berdasarkan pola penggunaan lahan *Local Climate Zone* (LCZ) di Kabupaten Sleman pada Tahun 2018 – 2022. Kabupaten Sleman dipilih sebagai wilayah perkotaan kabupaten, wilayah terdampak perluasan Kota Yogyakarta, dan adanya fluktuasi pola pengunaan lahan selama 5 tahun terakhir.

Peta LCZ dan SPL digunakan dalam analisis P4. Peta LCZ dibuat berdasarkan klasifikasi parameter *Building Surface Fraction* (BSF), *Impervious Surface Fraction* (ISF), *Pervious Surface Fraction* (PSF), dan tinggi bangunan. Parameter BSF, ISF, dan PSF, diperoleh dari klasifikasi *Land Use Land Cover* citra Sentinel 2 MSI. Kemudian, parameter tinggi bangunan diperoleh dari citra ALOS DSM, DEMNAS, dan data OSM. Peta SPL dibuat berdasarkan data citra Landsat 8/9 USGS selama musim kemarau dan hujan pada Tahun 2018, 2020, dan 2022. Peta SPL diolah menggunakan metode *Mono-Window Algorithm* (MWA). Analisis P4 divisualisasikan dalam bentuk grafik maupun tren SPL setiap musim terhadap kelas LCZ. Analisis diperkuat dengan hasil korelasi serta regresi linier berganda parameter BSF, ISF, PSF, dan tinggi bangunan terhadap nilai SPL.

Hasil klasifikasi LCZ di Kabupaten Sleman didominasi kawasan Kelas 9: *Sparsely built*, dengan luas wilayah 199,88 Km^2 dan Kelas D: *Low plants*, seluas 116,41 Km^2. Parameter paling optimal dalam klasifikasi adalah parameter tinggi bangunan. Meskipun demikian, parameter yang signifikan mempengaruhi nilai SPL adalah parameter BSF dan PSF. Selama tahun pengamatan, tren nilai SPL rerata musim kemarau cenderung lebih tinggi di kelas bangunan LCZ (Kelas 1-10) dibandingkan musim hujan. Sebaliknya, tren nilai SPL musim kemarau lebih rendah di kelas penutup lahan LCZ (Kelas A-G), seperti kawasan hutan dan badan air. Hasil analisis P4 menunjukkan bahwa Kelas 1: *Compact high-rise*, 2: *Compact midrise*, 3: *Compact low-rise*, dan 8: *Large low-rise*, memiliki nilai SPL tinggi.

Kata kunci: Klasifikasi, LCZ, P4, perkotaan kabupaten, SPL

ABSTRACT

Indonesia's climate change increases the risk of heatwaves due to extreme weather impacts. One of the factors driving climate change's impacts is rapid urbanization. Urbanization in Indonesia generates urban sprawl that worsens the Urban Heat Island (UHI) impact globally and the Surface Urban Heat Island (SUHI) impact locally. SUHI analysis can be utilized as an approach step for stakeholders to characterize the distribution of Land Surface Temperature (LST) classes in mitigating SUHI impacts. Usually, this analysis is conducted in big cities. However, in this study, the analysis was conducted in Sleman Regency. The purpose of this research is to analyze SUHI based on Local Climate Zone (LCZ) land use patterns in Sleman Regency in 2018 - 2022. Sleman Regency was chosen as the regency's urban area, the area affected by the urban sprawl of Yogyakarta City, and the fluctuation of land use patterns over the past 5 years.

LCZ and LST maps were used in the SUHI analysis. The LCZ map was created based on the classification of Building Surface Fraction (BSF), Impervious Surface Fraction (ISF), Pervious Surface Fraction (PSF), and building height parameters. The BSF, ISF, and PSF parameters were obtained from the Land Use Land Cover classification of Sentinel 2 MSI imagery. Then, the building height parameter is obtained from the ALOS DSM image, DEMNAS, and OSM data. LST maps were created based on Landsat 8/9 USGS image data during the dry and rainy seasons in 2018, 2020, and 2022. The LST map was processed using the Mono-Window Algorithm (MWA) method. The SUHI analysis was visualized in the form of graphs and LST trends for each season against the LCZ class. The analysis was strengthened by mapping the SUHI risk level, the results of correlation, and multiple linear regression of BSF, ISF, PSF, and building height parameters on LST values.

The results of the LCZ classification in Sleman Regency are dominated by Class 9: Sparsely built, with an area of 199,88 Km^2 and Class D: Low plants, with an area of 116,41 Km^2. The most optimal parameter in the classification is the building height parameter. However, the parameters that significantly affect the LST value are BSF and PSF parameters. During the observation year, the trend of average LST values in the dry season tended to be higher in the LCZ building classes (Classes 1-10) than in the wet season. In contrast, the trend of dry season LST values was lower in LCZ land cover classes (Classes A-G), such as forest and water bodies area. The results of the SUHI analysis shows that Classes 1: Compact high-rise, 2: Compact midrise, 3: Compact low-rise, and 8: Large low-rise, have high LST values.

Keywords: Classification, LCZ, LST, SUHI, urban area