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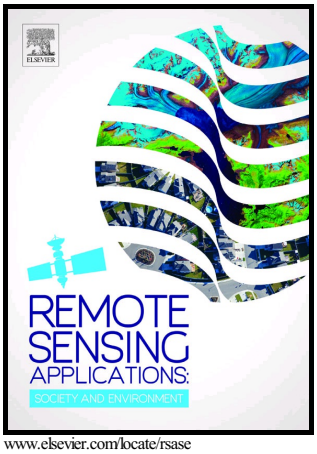

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ASSESSMENT OF GREEN PARKS COOLING EFFECT ON ABUJA URBAN MICROCLIMATE USING GEOSPATIAL TECHNIQUES

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Abstract: *The aim of this study is to assess green parks cooling effect on Abuja urban microclimate using geospatial techniques. This was achieved through the following objectives namely; (a) to determine the effects of vegetation growth on LST distribution, (b) to determine the relationship between cooling effect intensity (PCI) and buffer distances from the selected parks, (c) to quantify the PCI intensity of the green parks on the surrounding area, and (d) to determine the effects of urban park size and complexity on PCI intensity. The thermal band 10 and 11 of Landsat 8 OLI/TIRS satellite imageries acquired on 29th November, 2017 were utilized in retrieving LST data for all the selected parks while high resolution (0.7 m) QuickBird imagery acquired in 2017 was used to map urban parks in the study area. LSTs at different urban parks vary across different buffer distances from the parks outer boundaries. For example, Zone 6 Neighbourhood Park with the smallest area and perimeter as well as the highest park complexity recorded the highest mean LST of 31.46°C while Millennium Park with the largest park size and lowest complexity recorded the lowest mean temperature of 29.49°C across the buffer zones. Findings from this study showed that the PCI intensity increased as distance from the parks boundaries increased, except in some buffer zones outside the park boundaries where there were likelihood of the influence of other factors like presence of high density trees or water body. It was revealed that Abuja Recreational Park was 2.04°C cooler than its surrounding area at 350 m buffer zone. Findings from this study revealed that the mean LSTs inside the green parks (i.e. Millennium Park, Abuja Recreational Park and Zone 6 Neighbourhood Park) were 27.87°C, 29.25°C and 30.66°C respectively. The results from this study showed that urban park area and perimeter had a positive non-linear relationship with PCI intensity up to 300 m buffer region, indicating that larger parks increased PCI intensity and mitigate UHI effects. It was shown that urban park shape had a strong negative relationship with PCI intensity (R^2= -0.86) which suggested that PCI intensity would decrease with an increase in the complexity of the park shape. That is, the larger the ratio of the perimeter/area, the more complex the urban park shape will be. Consequently, results revealed that urban park size and shape were the most critical factors for mitigating UHI effect. These findings can deepen the understanding of PCI formation and provide useful and practical information for urban planners and urban designers about how to design green spaces with stronger cooling effects to mitigate UHI phenomenon within the hot and humid cities in Nigeria.*

Keywords: Urban Heat Island, LST, Park Cooling Intensity, Regression Analysis