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Correlational Analysis of Urban Greenery and Urban Heat Island Effect in Central Sydney

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ABSTRACT: Large scale modification of natural landscapes in cities causes the city centres to be up to 8°C warmer than their peri-urban surroundings. This phenomenon is known as the Urban Heat Island (UHI) effect. Under investigation is to what extent does the amount and distribution of urban greenery correlate to the magnitude of urban heat in Sydney? This paper aims to study the effect of urban greenery on overall surface temperature of five high-density precincts in Central Sydney. The investigation is based on remote sensing data of air-borne and Landsat 7– ETM+ thermal bands from 2008-2009 and is focused on the correlations between tree canopy, grass cover and the surface layer UHI effect. Results indicate that higher ratio of urban greenery and particularly the tree canopy can effectively mitigate the sUHI effect in precinct scale. This cooling effect is more in hotter summer days. Scattered tree canopy distribution can result to less cooling effect in colder winter days. As such, an increase in the tree canopy is the most effective strategy to adapt the built environment to the summer sUHI effect in Central Sydney while it will not significantly alter the winter minimum temperatures. Research outcomes provide evidence-based support for vitality of green infrastructures for future-proofing urban precincts to climate change as well as evidence for mitigation and adaptation outputs of such urban greening.

Keywords: Urban Heat Island, Green Infrastructures, Urban Precinct, Tree Canopy