

Spatial Investigations of Surface Urban Heat Islands in 10 Chinese Metropolises: A Perspective from Land Cover/Use Composition

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The surface urban heat islands (SUHI) phenomenon emerges as a source of multiple environmental issues and climate crises, as well as exacerbates the urban ecosystem services and geo-health. The urban climate situations and environmental qualities in Chinese metropolises cannot be neglected. This study focuses on spatially evaluating the influence of land cover/use composition on the SUHI in ten populated Chinese cities using Landsat data. The thermal performances of different Chinese metropolises were examined based on satellite monitoring. The thermal behaviors of land cover/use types were also identified at a spatial scale using diverse quantitative methods. Besides, it was assumed in this study that the formations of SUHI patterns in these ten metropolises were mainly attributed to land cover/use composition and population gathering. The patterns and characteristics of the thermal field in Chinese metropolises were spatial-sensitive. Their spatial causality among SUHI, land cover/use composition, and population were investigated based on spatial regression models. The differentials and convergences of multiple Chinese thermal environments were depicted. The SUHI intensity was the strongest and most varied in the metropolis of Suzhou. SUHI in the Harbin metropolis was weaker than other metropolises. Waterbody plays a significant role in the thermal environments of Suzhou, Wuhan, and Tianjin. Findings from this study would strive for relieving SUHI and improving urban thermal regimes in Chinese metropolises, and inspire the urban planners and decision-makers for urban sustainability in China.

Keywords: Surface Urban Heat Islands (SUHI), Land use/cover, Chinese Metropolises