

Assessing the Effects of Land Use Spatial Structure on Urban Heat Island Using New Launched Remote Sensing in Shenzhen, China

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Abstract : Urban heat island (UHI) has attracted attention around the world since they profoundly affect human life and climatological. Better understanding the effects of landscape pattern on UHI is crucial for improving the ecological security and sustainability of cities. This study aims to investigate how landscape composition and configuration would affect UHI in Shenzhen, China, based on the analysis of land surface temperature (LST) in relation landscape metrics, mainly with the aid of three new satellite sensors launched by China. HJ-1B satellite system was utilized to estimate surface temperature and comprehensively explore the urban thermal spatial pattern. The landscape metrics of the high spatial resolution remote sensing satellites (GF-1 and ZY-3) were compared and analyzed to validate the performance of the new launched satellite sensors. Results show that the mean LST is correlated with main landscape metrics involving class-based metrics and landscape-based metrics, suggesting that the landscape composition and the spatial configuration both influence UHI. These relationships also reveal that urban green has a significant effect in mitigating UHI in Shenzhen due to its homogeneous spatial distribution and large spatial extent. Overall, our study not only confirm the applicability and effectiveness of the HJ-1B, GF-1 and ZY-3 satellite system for studying UHI but also reveal the impacts of the urban spatial structure on UHI, which is meaningful for the planning and management of the urban environment.

Keywords : urban heat island, Shenzhen, new remote sensing sensor, remote sensing satellites

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