

Spatiotemporal Variations of Land Cover/Use and Sustainable Urban Heat Island (UHI) Mitigation Strategies: A Case Study of Chinese Bay Megacities

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Rapid urbanization significantly affects the urban thermal environment in the context of global climate change. The assessment of surface urban heat island (SUHI) and development of mitigation strategies in megacities have become frontier issues on human health and urban sustainability. In this study, taking of the three Chinese bay megacities, we attempt to 1) disclose the relationship between land surface temperature (LST) and land cover using remote sensing quantified analysis, 2) to clarify the mechanism and characteristics of SUHI formation based on bi-temporal patterns and variations of land cover, and 3) to sustainably regulate and optimize the urban environment and further create urban planning and policies for relieving urban thermal effect. The study target is Guangzhou metropolitan area (GMA), Hangzhou metropolitan area (HMA) and Shanghai Metropolitan area (SMA) in China. The result of this study indicated remarkably different characteristics, arrangement, and variations among different bay thermal environments. Overall, spatial layouts and changes in the thermal environment of these three megacities were substantially identical with their land cover pattern and tendency. Although land covers significantly influenced the LST as a whole, the different areas had different magnitudes of SUHI coming from different land cover compositions and differentials. The results would provide a valuable reference to disentangle spatiotemporal variation of the bay urban thermal environments, and the urbanization-induced land covers temperature dynamics. This study would contribute to the development of future SUHI mitigation solutions.

Keywords: Land Cover/Use , Urban Heat Island (UHI), Mitigation Strategies