Paper 201

Comparative Experimental Study on the Cooling Effects of Different Urban Greening Models on Mitigating the Urban Heat Island Effect

The Urban Heat Island (UHI) effect is a common environmental issue associated with urbanization, characterized by significantly higher temperatures in urban areas compared to surrounding rural regions. This phenomenon leads to increased energy consumption, deteriorating air quality, and adverse impacts on public health. Urban greening has been widely recognized as a sustainable and cost-effective strategy to mitigate the UHI effect by improving urban microclimates through shading, evapotranspiration, and surface albedo enhancement.

Urban green spaces vary in form, including point-type greening (e.g., pocket parks), linear greening (e.g., roadside greenbelts), and area-type greening (e.g., large parks and green roofs). Each greening model differs in vegetation type, spatial configuration, and coverage density, which directly influence its cooling efficiency and ability to moderate urban thermal environments. However, there remains a lack of quantitative comparative studies on the effectiveness of different greening models in UHI mitigation.

This study aims to conduct a comparative experimental analysis of various urban greening configurations. Typical urban sites will be selected and categorized into representative green space models. Using infrared thermography, drone-based remote sensing, and on-site meteorological monitoring, key environmental parameters such as land surface temperature, air temperature, relative humidity, and thermal comfort indices will be measured during peak summer periods.

By analyzing the spatial-temporal cooling patterns and the mechanisms of different greening strategies, the study will identify which models offer the most effective heat mitigation. The results will provide valuable data for optimizing urban green infrastructure planning, enhancing urban climate resilience, and guiding the development of low-carbon, livable cities.