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The urban tree as a tool to mitigate the urban heat island in Mexico City: a simple phenomenological model.

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Abstract

The urban heat island (UHI) is mainly a nocturnal phenomenon, but it also appears during the day in Mexico City. The UHI may affect human thermal comfort, which can influence human productivity and morbidity in the spring/summer period.

A simple phenomenological model based on the energy balance was developed to generate theoretical support of UHI mitigation in Mexico City focused on the latent heat flux change by increasing tree coverage to reduce sensible heat flux and air temperature. Half-hourly data of the urban energy balance components were generated in a typical residential/commercial neighborhood of Mexico City and then parameterized using easily measured variables (air temperature, humidity, pressure, and visibility). Canopy conductance was estimated every hour in four tree species, and transpiration was estimated using sap flow technique and parameterized by the envelope function method. Averaged values of net radiation, energy storage, and sensible and latent heat flux were around 449, 224, 153, and 72 W m⁻², respectively. Daily tree transpiration ranged from 3.64 to 4.35 L d⁻¹. To reduce air temperature by 1°C in the studied area, 63 large *Eucalyptus camaldulensis* would be required per hectare, whereas to reduce the air temperature by 2°C only 24 large *Liquidambar styraciflua* trees would be required. This study suggests increasing tree canopy cover in the city cannot mitigate UHI adequately but requires choosing the most appropriate tree species to solve this problem. It is imperative to include these types of studies in tree selection and urban development planning to adequately mitigate UHI.

Muchas gracias

Atentamente

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