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Analysis for improving the passive cooling of building's surroundings through the creation of green spaces in the urban built-up area

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Abstract

This paper focuses on the assessment of a microclimate in a city canyon in Vienna, accurately the Vienna Karlsplatz. In this canyon, there are several environments. The goal of this study was to inquire weather it makes an identifiable difference if an urban place is planted or not. This study was a comprehensive in situ investigation. The air temperature and relative humidity were tested in two places, with the first one being surrounded by greenery, and the other one by "asphalt/concrete". The thermal behavior was recorded and analyzed over various heat waves. After analyzing the complete period, two extreme heat waves of three days were singled out and analyzed in detail.

Finally, this investigation is completed by an analysis of the environmental impact of a greenery in the middle of a city at summertime. It shows that the effect of temperature reduction can have a positive impact on the buildings surrounding. It is mainly the night cooling that shows the most temperature differences. Therefore, greenery in the city has a powerful impact on the role of passive cooling of a building surrounding and consequently of buildings cooling if the building ventilation behavior is correctly followed.

Keywords

Passive cooling, urban heat island, vegetation, analysis

Research Highlights

- Microclimate in a city canyon in Vienna over a summer heat wave were investigated in detail

- Environmental impact of a green space in the urban area at summertime was analyzed

- Comparison between planted and asphalted areas shows a positive effect, mainly during the night.

- A lot of greenery in the city has a positive powerful impact in the cooling role of a building surroundings.

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