The cooling effect of urban green spaces as a contribution to mitigating urban heat. A case study in Lisbon.

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Abstract

This study analyses the influence of a small green space (0.24 ha) in the surrounding atmospheric environment of a densely urbanised area in Lisbon. Itinerant measurements of weather parameters (temperature, relative humidity, wind speed and solar and infra red radiation) were carried out along a pre-selected path from inside the garden Teófilo de Braga to the surrounding streets, with different orientations and solar exposure. It was found that the garden was cooler than the surrounding areas, either in the sun or in the shade, being these differences higher in hotter days and in relation to the mean radiant temperature (Tmrt). The higher difference found corresponded to 6.9ºC of air Temperature and TMRT and it occurred between the shaded site inside the garden and the sunny site in a E-W oriented street in the southern part of the studied area. The deep shade inside the garden, due to the tall trees and the tall buildings around it, the intense evapotranspiration, the dense urbanisation around the green space and the low wind speed are the potential factors that explain these differences.

In a context of climate change, with the expected increase in temperature, dryness and intensity of heat waves, the cooling effect of green spaces can be an important contribution to the mitigation of the Urban Heat Island and Global Warming adverse effects.

Keywords: Green Areas; Urban Heat Island, Park Cool Island, Mitigation; Global Warming