



The role of shading on biometeorological conditions in the historic centre of Prague, Czech Republic.

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Prague is the capital and the largest city of the Czech Republic and its historic centre near the Vltava river is a popular tourist destination. Especially the area along the right bank of the Vltava river, called Náplavka, is one of the most popular locations to visit during the summer months due to many social and cultural events that take place here. However, given the north-south orientation of the Vltava river and the lack of greenery and shade in this area, the question arises as to what extent thermal conditions are comfortable during hot summer days at Náplavka. Many previous studies have shown that the presence of greenery and shade is essential for reducing the heat stress in the streets.

In this study we assessed the effect of shading on biometeorological conditions at eight different measuring sites located along a loop between Charles Square and the Náplavka riverbank. Meteorological parameters (including air temperature, relative humidity, wind speed, Heat Index, Wet-Bulb Globe Temperature) were measured and recorded using the Kestrel 5400 portable tool, every two hours between 8:00 a.m. and 6:00 p.m. CEST on 9 days during summer in 2019 and on 5 days in 2022. In addition, fisheye photographs were taken at each location to quantify the effect of shading. From these data, we calculated advanced thermal comfort indices (Physiologically Equivalent Temperature, Universal Thermal Climate Index) and Sky View Factor (SVF) in the RayMan Pro program. We compared measured data from all sites under different weather conditions between 2019 and 2022, and assessed the evolution of heat stress during the day as a function of shading at each site.

Our results showed that while in the morning Náplavka's biometeorological conditions were most comfortable among all measurement sites, they became most stressful in the afternoon. The analysis of the fisheye images showed that the lack of greenery and shading at Náplavka contributed significantly to the high heat stress levels. Our results suggest that the relocation of day-long events from Náplavka to other locations (e.g. a park at Charles Square) should be considered and/or adequate sun protection should be provided on hot summer days.