



Human-biometeorological comfort assessment in relation to synoptic scale atmospheric circulation in Bucharest and Prague

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This study examines the spatial differences and the thermal variability of the urban heat island (UHI) in Bucharest (Romania) and Prague (Czech Republic) by applying thermal indices as Physiologically Equivalent Temperature (PET) and Universal Thermal Climate Index (UTCI). Hourly data collected from the synoptic WMO meteorological stations which monitor the climate of Bucharest and Prague were analysed over the period 1961-2016. The study reports on (1) influence of the urban environment on the human-biometeorology and (2) comparison of the UHI characteristics as derived from air temperature and thermal indices (3) influence of the synoptic scale atmospheric circulation on the human-biometeorological comfort in the two selected cities. Previous studies already demonstrated that UHI and intra-urban variability were better emphasized using thermal biometeorological indices rather than air temperature. Usually, such studies focus on distinct urban areas, while comparison of more distant cities are less approached. The “Grosswetterlagen” weather-type classification have been used the period 1981-2016, and correlated with the UHI intensity in Bucharest and Prague, as derived by PET and air temperature. For Bucharest, the nighttime PET-based assessment of the UHI was in average 2.4°C and maximum exceeded 12.0°C, while the air temperature assessment revealed an average difference between urban and peri-urban stations of 1.1°C, and maximum of 8.7°C. Similar patterns and order of difference was obtained for Prague, but with less intensity due to the size of the city and different synoptic conditions prevailing. Both PET and air temperature revealed an increased UHI intensity along 1961-2016 in the two cities, very likely due to the intensified urbanisation within the city centre.