

GEOGRAPHIA POLONICA
VARIA



DISTRIBUTION OF UNIVERSAL THERMAL CLIMATE INDEX (UTCI) IN WARSAW

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The Universal Thermal Climate Index (*UTCI*) is a new measure of heat/cold stress in humans caused by ambient meteorological conditions. The index was developed in the frame of COST Action 730. The index is defined as the air temperature of the reference condition causing the same model response as the actual conditions. The offset, i.e. the deviation of the *UTCI* from air temperature depends on the actual values of air and mean radiant temperature, wind speed, and humidity (expressed as water vapour pressure or relative humidity).

Each meteorological variable considered by the *UTCI* is influenced by two groups of factors. The first group represents the general features of weather depending on the season, geographical location, and atmospheric circulation. The second group deals with local features of land use and relief which significantly modify meteorological variables in comparison to standard meteorological stations.

The maps show the *UTCI* distribution in the area of Warsaw. Different weather scenarios are noted (defined for the Warszawa-Okęcie meteorological station). Two upper maps present *UTCI* values during moderate air temperature (20°C),

wind speed (4 m·s⁻¹) and relative humidity (50%). The pictures differ depending on cloud cover. On cloudy days, *UTCI* values within the range 13.5-22.0°C predominate (they represent the 'no thermal stress' category). The same stress category but with a higher *UTCI* range (22-26°C), also occurs in urbanised areas. On sunny days, urbanised areas are characterised by the 'moderate heat stress' category or *UTCI* (26-32°C).

Extremely cool weather is represented by cloudy conditions with low air temperature (10°C), strong wind (8 m·s⁻¹) and moderate humidity (50%). Universal Thermal Climate Index values represent 'slight' and 'moderate cold stress' categories (from -13 to 9°C). Only in forests can 'no thermal stress' (*UTCI* 9-13.5°C) be experienced. Extremely hot weather is represented by sunny day with an air temperature of 30°C, weak wind (2 m·s⁻¹) and high humidity (80%). In such conditions, *UTCI* varied within the range of 'moderate heat stress' at forested river banks, and by 'strong heat stress' in the forests up to 'extreme heat stress' in industrial districts. 'Very strong heat stress' is typical for both densely and not-densely, built-up areas in Warsaw.

