Development and application of assessment methods to quantify human-biometeorological conditions in the study area Stuttgart

Ch. Ketterer and A. Matzarakis

University of Freiburg, Chair of Meteorology and Climatology, Freiburg, Germany
(andreas.matzarakis@meteo.uni-freiburg.de)

The study area Stuttgart is located in one of the warmest regions in Germany and the population suffers under extreme thermal conditions during summer, which is enhanced by the local topography as the centre of Stuttgart is located in a sink-like basin. During summer the meteorological conditions in the state capital are characterized by low wind speed, less precipitation as well as high air temperature and air humidity. To assess the thermal sensation of humans the integral effect of different meteorological parameters (air temperature, air humidity, wind speed, radiation fluxes) and thermal-physiology has to be considered using thermal indices based on the human energy balance as the Physiologically Equivalent Temperature (PET) or the Universal Thermal Climate Index (UTCI).
One aim of the city planners is to reduce the frequency of heat stress occurring. Therefore, locations, where heat stress occurs frequent can be detected using micro-climate models like RayMan and ENVI-met. Furthermore, a bioclimate map of the thermal index PET is planned to be developed to support the city planners in Stuttgart. The PET map is calculated for Stuttgart on the basis of single point measurements using different mathematical-statistical downscaling methods. These methods and the results are presented in this contribution.

This analysis is part of the transnational cooperation project within the Central Europe Programme „Development and application of mitigation and adaptation strategies and measures for counteracting the global urban heat island (UHI) phenomenon".