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Climate data on local scale as base for the heat-resilient urban development in the cities of Dresden and Erfurt / Germany

Valeri Goldberg, Astrid Ziemann, and Christian Bernhofer

Technische Universität Dresden, Department of Hydro Sciences, Chair of Meteorology, PF 1117, Tharandt, Germany (valeri.goldberg@tu-dresden.de)

One of the prominent effects of climate change, especially in big cities with compact structuring, is the growing frequency and duration of heat waves. This trend attenuates the positive effects of urban open spaces and leads to a decline of life quality of residents in city districts and buildings with special heat exposure. Against this background new research questions occur including conservation and improvement of life quality and attractiveness of districts from the perspective of residents.
In the joint project "HeatResilientCity (HRC)", scientist and municipal agents are dealing with this problem in close cooperation with housing companies and municipal utilities as well as energy suppliers from private sector.
The sub-project of TU Dresden will provide climate projections on the scale of city districts in Dresden and Erfurt. For this reason, data from the regional climate model Cosmo-CLM (German Weather Service) for the periods 1981-2010 and 2021-2050 are superposed with a "local offset" regarding Urban Heat Island (UHI) of the chosen city district. This offset is derived from statistical relationship between regional model output and local overwarming of the city district which depends on parameters of urban structure like sky view factor, topography, degree of sealing, building height and road width. Such relationships are to be found by use of established approaches from literature, simulations with micro-scale climate models like ENVI-met an SOLWEIG, as well as by measurements.
To investigate effects of a changed city planning (e.g., densification of buildings and change of proportion of green spaces) on the bioclimatic conditions, the thermal exposure of residents during summer heat waves will be determined using thermal indices (like PET, UTCI) and the output of the models mentioned above. The simulation data will be evaluated by measurements and they will be freely usable for public and non-commercial purposes.
As one result of the project HRC, user-oriented and spatially differentiated climate data for city planning and district management (from regional to local scale) for Dresden and Erfurt will be provided.
The method to provide climate data on the scale of city districts will be presented here, as well as first results of model simulations with ENVI-met and SOLWEIG, and results of comparing measurements in a city district of Dresden in hot periods of summer 2018.