Urban heat waves

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Abstract

Heat waves represent severe meteorological phenomena, which are caused by specific regional weather patterns. Different definitions are available to identify heat waves. They are almost always based on threshold values for the air temperature and, therefore, not impact-related. Using the example of humans, an impact-related definition of heat waves, e.g. by suited threshold values for thermo-physiological assessment indices, could enable that the adaptation and acclimatization of humans to severe heat is considered. Results of climate simulations for different regions worldwide indicate that heat waves will be more frequent and intense as well as longer lasting in the future. Cities contribute to an additional enhancement of this thermal background conditions due to their own development. It is mainly caused by urban land use changes due to the increased demand for commercial and residential space as well as energetic processes related to it. Thus, the impairment of well-being, efficiency and health of the rising urban population, especially risk groups such as infants, sick and elderly people, is increasing during urban heat waves. It reaches an extent that urban planning, especially in cities where the design and population are not adapted to heat waves (e.g. in Central Europe), is facing the challenge to develop long-term local countermeasures against human heat wave stress, which should be based on methods and findings in the field of urban human-biometeorology. The currently available concepts mostly derived from numerical scenario simulations are characterised by a heat-reducing urban design with a higher share of green infrastructure and the effort to comply with the objectives of climate and environment protection, e.g. avoidance of electrical air conditioning systems, especially in cities located in temperate climate zones. The public must put pressure on decision-makers like politicians that the countermeasures are actually implemented in existing and future "hot spots" in cities.