



Urban climatology: The state of the field.

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Urban areas create distinctive climates at a hierarchy of scales due to their form (materials and geometry) and functions (emissions of waste heat and materials). Globally, cities are the foci of human activities and of investment in infrastructure. The majority of cities are located at low elevations, close to coasts and along river banks. As a consequence, urban areas are responsible for the majority of greenhouse gas emissions and are important drivers of anthropogenic climate change. At the same time, they are particularly vulnerable to projected changes such as sea-level rise, atmospheric warming and precipitation changes. Increasingly, mitigation and adaptation strategies designed to tackle global climate change are focussing on cities as a critical scale for intervention. However, much of this work has a macro-scale perspective and does not consider the micro-scale urban setting that generates the urban climates that citizens experience. It is at this scale that the form of buildings, their relative placement, the location of parks, traffic flows, etc. generate a myriad of microclimates that humans respond to. The field of urban climatology focuses its attention on the processes that generate these climates and has amassed a considerable body of knowledge on the relationship between urban landscapes and the urban climate effect. An understanding of the scales of climate changes and their interactions is essential if actions at one scale are not to generate undesirable outcomes at another.

The growing relevance of these issues was addressed in a WMO Inter-regional CLIPS (Climate Information and Prediction Services project) workshop on Urban Climatology, which was held on 6-10 September 2010 in Pune, India. The event was organised by the International Association for Urban Climates and brought together urban climate experts to produce a syllabus on the current state of knowledge in the field of urban climatology. The topics included:

1. The urban climate effect on airflow, temperature and precipitation,
2. The urban energy budget and its measurement
3. Modelling the urban climate at the micro- and meso-scale
4. Biometeorology, architecture and urban design
5. Global climate change and cities

The materials generated by the workshop are to be published by the WMO and should provide a wide exposure to urban climate issues. This paper will present an overview on the state of knowledge in the field of urban climatology drawing upon the materials presented at the CLIPS workshop and highlight areas where gaps remain.