The need to establish protocols in urban heat island work

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Abstract

The paper makes a case for the adoption of common methods in urban heat island (UHI) research and its application. Strict attention to issues of scale, experimental design, site classification, instrument exposure and metadata could greatly improve the present situation. Too often lack of simple scientific rigour leads to sloppy or erroneous measurement or modeling efforts, and misdirected attempts to ameliorate urban thermal climates. It seems the scientific value of much UHI work is compromised by lack of rigour in the design and conduct of experimental work. Most critical is explicit recognition of scale because that underpins conceptualization of the study question, sets the size of the scalar source area for temperature, guides interpretation of the data, establishes the time and space scales of any modeling framework and sets the usefulness of the results in practical applications.

A review of the literature on observed UHI shows that experimental design, choice of sites, exposure of instruments and documentation of metadata often leave much to be desired. The many descriptive studies are not matched by those looking at UHI processes at the different scales so models may be missing relevant processes or ignore significant interactions with other scales. Further, some models have been tested against data from the wrong scale of UHI. Finally, the practical application of UHI results faces difficulties because users, who are often not UHI specialists, may misconstrue the applicability of the data to their needs.

The resolution of these problems may be surprisingly uncomplicated. It mainly requires those involved in UHI work to truly appreciate the significance of scale in urban climates and to carry that understanding through all aspects of a study uniformly.