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A step towards urban building information modeling: Measuring design and field variables for an urban heat island analysis

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Abstract: Digital simulation methods are important for analyzing energy flows. They inform the design and help determine what methods are useful for the remediation of built form to enable energy conservation. The logical requirement therefore is to develop sophisticated energy modeling tools for mitigating some of the most pressing urban problems. Urban areas have a greater density of buildings and paved surfaces that absorb and retain heat from the sun. Typically overall, the relative air temperature is lower in rural areas, increases over suburban districts, and then peaks over urban areas. These higher temperatures increase the need for cooling, especially in summer, making buildings consume more electricity. These are characteristics of the urban heat island effect. Urban scale computer modeling for incident solar radiation can aid in learning about mitigation of the heat island effect through albedo modification and increased vegetation, among other solutions.

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