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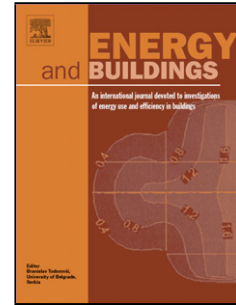
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Three Decades of Urban Heat Islands and Mitigation Technologies Research

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ABSTRACT

Although the urban heat island (UHI) phenomena phenomenon has been documented over a century ago, the effect of the urban heat island on urban climate and environment during the summer have only been the focus of research over the last three decades. One main characteristics of the recent research has been to evaluate the summertime effects of UHI on energy use, air pollution, outdoor ambient temperature, and citizen health. The second aspect of the recent research has been the development and evaluation of materials to counter the effects of summertime UHI. This paper provides a selective representation (by topic) review of the research on the development and evaluation of mitigation measures, including: cool roofs, cool pavements, and urban vegetation.

Keywords: Urban Heat Island
Cool Roofs
Cool Pavements
Urban vegetation

1 Introduction

Urban population is increasing rapidly because increasing birthrate and the migration of the rural population into the cities caused by expectations for a better life, local conflicts and lack of resources in the country areas (Santamouris, 2001). According to a United Nations report, in 2011 about four billion people lived in cities; the number of urban dwellers are expected to grow to over 60% of the earth population by 2050 (United Nations, 2011) In addition, the urban areas experience a very significant change of its biophysical attributes, known as urban sprawl, combined with a significant change of land use (Chrysoulakis et al., 2013). Earlier studies have shown that loss of green spaces and application of paving, in combination with a very high increase of the released anthropogenic heat, have affected the urban climate, resulted in a serious environmental degradation and have increased significantly the urban ecological footprint (Lee et al., 2008; Oke, 1988).

The magnitude of the ambient temperature increase caused by the global climate change is forecasted by the Intergovernmental Panel on Climate Change in its recent report (Edenhofer et al., 2014; IPCC, 2014).

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