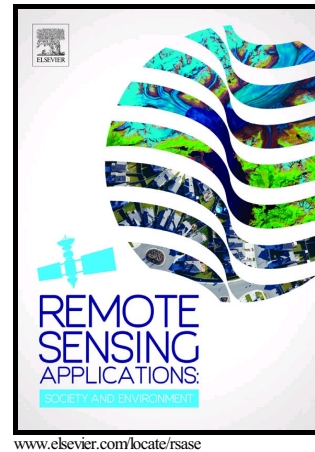


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Impact of green roof on micro climate to reduce Urban Heat Island

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Abstract

Urbanization is changing climatic patterns in our environment. It is impacting the temperature profile of the region, the rainfall pattern, the albedo, relative humidity and the radiation pattern. (Santamouris 2013). This micro-scale environment is adversely affected due to concretization, urban activity and increase in vehicular density (Battista.et.al, (2016)). Urban areas temperature profiles become distinctly different than outskirts of urban agglomerations leading to clear delayering of temperature profiles. Because of these changes in micro scale environment macro climate is also getting affected (Akbari.et.al., (2016)).

Heat island forms when the temperature difference between urban area and rural area temperature is significant. It can occur any time year-round during the day and night. (Oke 2003). The temperature differences are often largest during calm, clear evenings because rural areas cool off faster at night than cities. Surface materials used in urban areas retain much of the heat stored in roads, buildings and other structures. (Weng 2004). This study investigates the UHI phenomenon and outdoor thermal environment at micro scale level in Mumbai metropolitan area in India by using ENVI-met software. It also studies measures to mitigate the effect of heat island impact by various percentages of greening the study areas to come up with recommendations on the extent of such mitigation measures that need to be undertaken. Vertical walls and also dense urban vertical cover or forests are recommended to reduce the effect of Urban Heat Island Effect. (Gunawardena et al., 2017).

Key Words: Urban Heat Island (UHI), LST, Urbanization, Concretizing, land use and land cover.

Introduction:

For tropical cities, in warm climates or temperate climates, the UHI increases due to concretization, anthropogenic activities like vehicular usage and the increasing use of energy for air conditioning in the summertime. (Rizwan.et.al., (2008)). Higher urban temperatures lead to formation of urban smog in the atmosphere. (Battista.et.al, (2016)). At night when the temperature is high in the areas, the UHI effect exacerbates heat stress. High-density compact

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