

RESEARCH PAPER:

The evaluation of heat island effect in various cities in Ganga-Yamuna Doab region using modis land surface temperature product

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SUMMARY

MODIS satellite provides the reflected spectral signature from earth surface for the 36 spectral bands, which are used as input for preparing the various thematic map of world on different scales *i.e.*, daily NDVI (greenness), snow and ice products, Land cover, reflectance, land surface temperature etc. In present study the Land Surface Temperature (LST) product was used to characterize the Urban Heat Island (UHI) for few of the cities in doab region of Yamuna and Ganga. It was based on comparing the day and night time LST images of these cities in the region for June 2006. Results suggested that Urban Heat Island phenomena is well established in Delhi, and also for even in small city like Aligarh, and Agra. In the Delhi region, the night time UHI factor for land surface temperature ranged (6-8 °C), while for the day time the range of UHI factor was surprising high (4-12 °C). The small city like Aligarh showed that the day time UHI factor ranged (4 - 8 °C), while in night time it ranged (4 - 6 °C). In the Agra city the UHI factor during night time ranged (5 – 5.5 °C), while in day time UHI factor was about 3 – 6 °C.

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Higher temperature in centre urban cities than that in suburbs is called urban heat island (UHI). This effect is mainly contributed by the densely built-up area in cities along with local climate and land use. The continuous increase in built-up along with engulfing of the green areas between two built up areas resulting in higher intensity of UHI effect in the cities. It results increase in atmospheric temperature in summer time which causes various type of physiological disorders for the vulnerable population of the society specially for children and old persons. UHI effect leads to heat-related diseases and even deaths during summer. It can cause physiological disruption, heat strokes, organ damage which may lead to even death, especially prone populations such as the elderly and children. The continuous exposition of the human body above 40 °C temperature causes heatstroke and related disorders. The continuous high temperature may cause acute renal failure, coagulation

disorders, metabolic acidosis, respiratory alkalosis, acute hepatic necrosis, rhabdomyolysis, hypoelectrolytaemia and leukocytosis (Sharma, 2006a; Bouchama *et al.*, 2007; Sriramachari, 2004; Sharma, 2006 b). The impact of increase in urban environment temperature due to urban heat island along with global warming may cause to increase in heat related problem in coming future. The early mitigation of this problem needed the study of the urban heat island in all size of cities, which were presently conducted only in big cities.

It is important to understand and forecast the different stages of the heat island effect intensity and their development in different stages in different cities. UHI studies require numbers of the meteorological stations at various places in the cities to observe the temporal and spatial variation in atmosphere characteristics. The maintenance and establishing of these stations require logistics, finances and man power; therefore these