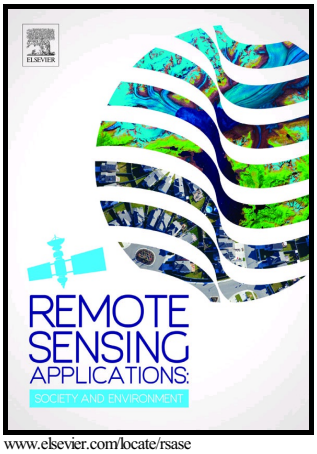
Author's Accepted Manuscript

Anthropogenic Heat Flux in English Bazar Town and its Surroundings in West Bengal, India

Sk. Ziaul, Swades Pal



www.elsevier.com/locate/rsase

PII: S2352-9385(17)30237-9
DOI: https://doi.org/10.1016/j.rsase.2018.06.003
Reference: RSASE148

To appear in: *Remote Sensing Applications: Society and Environment*

Received date: 30 October 2017
Revised date: 24 April 2018
Accepted date: 7 June 2018

Cite this article as: Sk. Ziaul and Swades Pal, Anthropogenic Heat Flux in English Bazar Town and its Surroundings in West Bengal, India, *Remote Sensing Applications: Society and Environment,* https://doi.org/10.1016/j.rsase.2018.06.003

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Anthropogenic Heat Flux in English Bazar Town and its Surroundings in West Bengal, India

Sk. Ziaul, Research Scholar, Deptt. of Geography, University of Gour Banga, Mokdumpur, Malda 732103, West Bengal, India
e-mail: skziaul87@gmail.com

Swades Pal*, Assistant Professor, Deptt. of Geography, University of Gour Banga, Mokdumpur, Malda 732103, West Bengal, India
e-mail: swadeshpal82@gmail.com

* Corresponding Author

Abstract

Increasing use of energy consumption, carbon emission, thermal uncomfortability in densely populated metropolitan centre is not only an emerging challenge but also in the meso and micro level towns. The present work wants to investigate is the anthropogenic heat flux as additional heat in radiation energy balance carried an important role to alter the thermal environment of the English Bazar town and its peripheral areas? Is this heat flux increasing over advancing of time? Is this heat flux distinguishable over different land use/ land covers? Calculated anthropogenic heat flux from remotely sensed satellite data reveals that maximum anthropogenic heat flux is increased from 54.52 W/m^2 to 188 W/m^2 in between 1990 to 2017. Core urban area, commercial units, high rise densely populated built up areas discharge maximum anthropogenic heat flux (>120 W/m^2). Clear heat flux gradient is observed from urban mainland to peripheral sub urban areas. Natural units like vegetated areas, water bodies are recorded zero anthropogenic heat flux. Increasing trend of anthropogenic heat addition to the urban climate will make the situation more uncomfortable in coming days and therefore, stress should be given on clean technologies and use of solar energy to slacken down thermal annoyance.

Keywords

Anthropogenic heat flux, English Bazar Town, Growing energy consumption, Change in net radiation and Thermal uncomfortability.

1. Introduction

The twenty-first century is considered as the century of the urban because of the population explosion in cities as well as rapid urbanization over the world. Nowadays the countries in the south block are witnessed of impetuous urban growth. It was estimated that in between 2000 and 2015, an average 0.2 million people will be added in the urban population and about 91% of this figure will be in cities located in developing countries (UNHABITAT 2012). The global proportion of urban population has increased from 28.3% in 1950 to 50% in 2010 at an unprecedented speed (World Bank, 2011) and as per UNFPA (2007), it is expected that the urban population will be reached to 80% by 2033. Like other developed and developing countries, India is also witnessed such rapid urbanization. The urban population of India has increased from 17.35% in 1951 to 31.2% in 2011 (Census, 2011). The projected population of three major metropolitan cities of India e.g. Mumbai, Delhi and Kolkata is about 25 million, 16 million, and 16 million, respectively, while Chennai, Bengaluru and Hyderabad will have 10 million each (Roy, 2012 and Datta, 2006). Similar trend is also found in case of meso level town of India. Host of the scientists (Wang et al., 2016, Poumanyvong and Kaneko, 2010; Zhang and Lin, 2012) rightly reported that the rapid urban growth is caused for the high consumption of energy and CO_2 emissions. York et al. (2003) established that the population had a unitary elastic effect on CO_2 and also on the energy footprint, which is responsible to change the thermal environment to some extent in the form of anthropogenic heat discharge (Feng et al., 2012). Besides these, according to Amiri et al. (2009) Urban Heat Island (UHI) is triggered due to decrease of vegetation cover (Feng, 2012) and increase of impervious surface material like concrete and asphalt (Connors et al., 2013; Hasanlou & Mostofi, 2015; Pal and Ziaul, 2016; Ziaul and Pal, 2018). Human metabolism, vehicle, energy consumption in the building, including electricity and

Accepted manuscript

Download English Version:

https://daneshyari.com/en/article/8866309

Download Persian Version:

https://daneshyari.com/article/8866309

Daneshyari.com