

Spatiotemporal variation in heatwaves and urban heat island intensity in Bangladesh

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Utilising ground-based long-term temperature data, space time variability of heatwaves across Bangladesh is demonstrated. The excess heat factor (EHF) is derived by using daily maximum and minimum temperatures of Bangladesh between 1993 and 2022, and five heatwave types were characterised. The results revealed that duration of heatwave events in the country are aggravating with time.

This work extended to understand intensity of surface urban heat islands (SUHI) in five major cities of the country using timeseries (2000-2019) infrared images. The results showed that daytime SUHI intensities are higher than nighttime. As expected, urban cores of five cities exhibited elevated temperature however the intensity of SUHI is highly pronounced in Dhaka and Chittagong during both day and night. Trends of SUHI in these cities showed that daytime heat island is increasing in four of five cities. However, Rajshahi has a statistically significant increasing trend during nighttime while three cities had insignificant positive trends. Khulna, on the other hand, showed a decreasing trend in regards nighttime SUHI. Population, lack of greenness and anthropogenic forcing are major determinants of SUHI in these cities.

Canopy layer heat island (CUHI) in Dhaka was examined through in-situ measurements which demonstrated that the presence of CUHI throughout the year. The cooling potential of rooftop garden revealed that the efficacy of rooftop garden in reducing environmental temperature is highly visible in winter. However, its efficiency reduced significantly during the pre-monsoon months, possibly because of widespread use of air conditions. The study put forward some mitigative measures including the development of urban climate map.

Short bio:

Ashraf Dewan, an environmental geographer, is an academic in the School of Earth & Planetary Science at Curtin University, Australia. He extensively utilises geospatial intelligence to examine a wide range of environmental issues, both at local and global scales, including climate risk management.