



SURE Research Publication Service

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1) Reference of your publication:

Aina, Y. A., Parvez, I. M. and Balogun, A. L. (2017) Examining the effect of land use on the spatiotemporal dynamics of urban temperature in an industrial city: a Landsat imagery analysis. In: *Global Changes and Natural Disaster Management: Geoinformation Technologies*, eds. J. Li and S. Pirasteh, Springer International: Cham, Switzerland, pp. 3-15.

2) Hyperlink to the publication:

https://link.springer.com/chapter/10.1007/978-3-319-51844-2_1

3) Abstract:

The urban heat island (UHI) effect is a human-induced phenomenon that results in higher temperatures in urbanized areas as compared to their surroundings. Yanbu industrial city is one of the highly industrialized cities in Saudi Arabia with petrochemical, energy-intensive activities, and a growing population. So, it is imperative to study the effect of the industrial activities on the changes in temperatures especially in an arid area where such studies are limited. The objective of this study is to decipher the spatiotemporal variations in the temperatures of different land use/land cover types in Yanbu industrial city. Thermal bands of Landsat satellite images were used in the study. Multi-temporal images that spread over a



period of 25 years between 1990 and 2015 were used to extract the land surface temperatures of the study area. Different land use/land cover categories in the study area were identified from IKONOS false color composite image (2012), and a correlation was sought out, between vegetation and surface temperature, using a vegetation index (NDVI). Normalized difference build index (NDBI) was derived in order to analyze the relationship between surface temperature and imperviousness. The results depict the thermal regimes of the area in different LULC types and their variations over time. The NDVI has an inverse relation with temperature whereas the NDBI has a positive relationship with the surface temperature, only in the residential and conservation areas. Urban heat islands are detected in the industrial area with 5–7° higher surface temperature, and urban cool islands are detected in the residential area with 3–5° lower surface temperature.

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