LOCATION OF THE URBAN HEAT ISLAND EFFECT BY ESTIMATING THE EARTH'S SURFACE TEMPERATURE. Practical application in Peninsular Spain

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Abstract (300 word limit)

The urban heat island effect is a thermal phenomenon origin that hinders the dissipation of heat in cities during the night due, mainly, to urban densification, the materiality of the city itself, thermal systems, as well as the current socioeconomic behaviour of citizens. Its knowledge is necessary to provide the basis for guiding action to reduce vulnerability and increase the resilience of cities to climate change.
The objective of this work has been the location of areas with the greater vulnerability to be affected by heat island effect in Spain as well as the determination of temperature variation, by means of a methodology implemented in a free and open source Geographic Information System. The spectral bands provided by the Thermal Infrared Sensor (TIRS) of the Landsat 8 satellite have been processed, for which it has been necessary to have, for each capital, 2 annual images (summer and winter) of the last 3 years. The methodology is based on 6 phases in which two Qgis plugins have been used in version 2.18, Semi Automatic-Classification Plugin (ASCP) and Land Surface Temperature (LST): (i) atmospheric image correction, (ii) conversion of Digital Numbers (DN) to Radiance, (iii) conversion of Radiance to Brightness Temperature, (iv) calculation of the Normalized Difference Vegetation Index (NDVI), (v) estimation of Land Surface Emissivity (LSE), and (vi) calculation of Land Surface Temperature (LST). As a result of the process developed, a raster layer has been obtained with land surface temperature values for each of the 282 satellite images, which has made it possible to estimate, by means of subsequent statistical treatment, the surfaces most prone to suffering from the heat island effect.
This work makes an important scientific contribution by providing climate change researchers and practitioners with information that will enable them to make climate change assessments and predictions.

Image

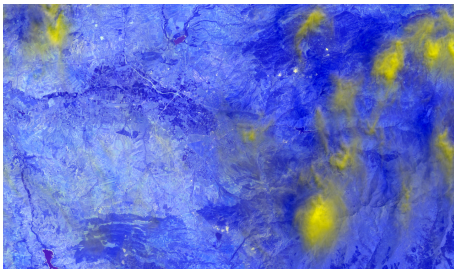


Image 1. Lansat 8. Summer 2017

Recent Publications (minimum 5)

1. Cuenca-Moyano, G.M., Bonolli, M., Valverde-Palacios, I. (2018) Environmental assessment of masonry mortars made with natural and recycled aggregates 10.1007/s11367-018-1518-9
2. Martín-Morales, M., Cuenca-Moyano, G.M., Valverde-Espinosa, I., Valverde-Palacios, I. (2017) Effect of recycled aggregate on physical-mechanical properties and durability of vibro-compacted dry-mixed concrete hollow blocks 10.1016/j.conbuildmat.2017.04.013
3. Sánchez-Roldán, Z., Martín-Morales, M., Valverde-Palacios, I., Valverde-Espinosa, I., Zamorano, M (2016) Study of potential advantages of pre-soaking on the properties of pre-cast concrete made with recycled coarse aggregate 10.3989/mc.2016.v66.i321
4. Carpio, M., Martín-Morales, M., Zamorano, M. (2015) Document Comparative study by an expert panel of documents recognized for energy efficiency certification of buildings in Spain 10.1016/j.enbuild.2015.04.022
5. Cuenca-Moyano, G.M., Martín-Morales, M., Valverde-Palacios, I., Valverde-Espinosa, I., Zamorano, M (2014) Influence of pre-soaked recycled fine aggregate on the properties of masonry mortar 10.1016/j.conbuildmat.2014.07.098



Biography (150 word limit)

M. Martín-Morales (1969/03/21, Granada-Spain) is senior lecturer at University of Granada. This author became an assistant lecturer in 1995, a lecturer in 2005 and an associate professor in 2014. Graduate in Technical Architecture (1991), Graduate in Geography (1998), and PhD in Civil Engineering (2013) at the University of Granada, Spain. She has previously worked in Morales and Polo Architectural Office, as specialist in construction material in TEXSA, SA and in the Fundación Empresa-Universidad de Granada, in Granada-Spain. Currently she is the Head of the Department of Building Construction and teaches Bachelor and Master courses related with construction materials in the Department of Building Construction in the University of Granada. Her research field is in energy efficient and in the development of new materials and its constructive applications with the incorporation of construction and demolition waste, residual biomasses and their ashes, geopolymers and alkali activated cements.

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