

LAND SURFACE TEMPERATURE AND SURFACE URBAN HEAT ISLAND CHARACTERISTICS AND TRENDS IN 17 MEDITERRANEAN CITIES

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ABSTRACT: The Land Surface Temperature (LST) and Surface Urban Heat Island (SUHI) characteristics and trends in 17 large cities around the Mediterranean were analyzed for the period 2001-2012. LST data from the Moderate Resolution Imaging Spectroradiometer (MODIS), on board NASA's Terra satellite, available on an 8-day average and $1 \text{ km} \times 1 \text{ km}$ spatial resolution, were used for this purpose. The analysis included estimation of the annual average LST on a pixel basis, using the smoothing spline technique, and linear regression analysis for the assessment of LST trends during the period examined. For the evaluation of corresponding SUHI averages and trends, an innovative randomization approach was used, whereby peri-urban pixels were randomly selected, and their average was used along with the urban LST average for the computation of SUHI values. Discrimination between urban and non-urban pixels was based on ESA's GlobCOVER product. Results showed increasing LST trends in almost all cities, of the order of $0.4^\circ\text{C decade}^{-1}$, which in some cases exceed $0.7^\circ\text{C decade}^{-1}$. In SUHI trends, while mixed signs are found, a correlation with LST trends is also apparent. Examination of urban infrastructure and development factors during the same period also revealed correlations with SUHI trends, which can be used to explain differences among cities.

