

## **The Surface Urban Heat Island in large Mediterranean cities during the last decade: annual characteristics and trends based on EO data**

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**Abstract:** The Surface Urban Heat Island (SUHI), defined as the Land Surface Temperature (LST) difference between urban and suburban areas, is among the major effects of the built environment, with consequences to local climate conditions, human health and well – being. The day and night time SUHI at 25 cities around the Mediterranean, with over 1,000,000 population each, was studied based on LST measurements from the Moderate Resolution Imaging Spectroradiometer (MODIS). Annual average LSTs were computed based on the 8 – day mean MODIS LST product, at 1 km × 1 km spatial resolution, covering all the Mediterranean countries from 2001 to 2012. In each city, an appropriate buffer zone was created including both the main urban and suburban areas. The urban environment was separated from the suburban based on the MODIS Land Cover Type product, available on an annual basis. Results include time series of the annual average urban LST, suburban LST and SUHI, and the corresponding changes (in degrees Celsius per decade) during the studied period. The SUHI intensity can reach several degrees Celsius, while its sign depends on the city location and the surrounding land cover types; positive signs are observed in Southern European cities, while negative ones dominate in Northern Africa. Signs and intensities of changes are also mixed, highlighting the importance of involving high spatial resolution satellite observations in the study of SUHI.

