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Identifying and monitoring urban heat island in Bucharest using satellite time series and low cost meteorological sensors

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The present study is focusing on the identification of urban heat island in Bucharest using both remote sensing products and low cost temperature sensors. The urban heat island in Bucharest was analyzed through a network of sensors located in 56 points (47 inside the administrative boundary of the city, 9 outside) 2009-2011. The network lost progressively its initial density, but was reformed during a new phase, 2013-2015. Time series satellite images from MODIS were intersected with the sensors for both phases. Statistical analysis were conducted to identify the temporal and spatial pattern of extreme temperatures in Bucharest. Several environmental factors like albedou, presence and absence of vegetation were used to fit a regression model between MODIS satellite products sensors in order to upscale the temperatures values recorded by MODIS
For Bucharest, an important role for air temperature values in urban environments proved to have the local environmental conditions that leads to differences in air temperature at Bucharest city scale between 3-5 °C (both in the summer and in the winter). The UHI maps shows a good correlation with the presence of green areas. Differences in air temperature between higher tree density areas and isolated trees can reach much higher values, averages over 24 h periods still are in the 3-5 °C range
The results have been obtained within the project UCLIMESA (Urban Heat Island Monitoring under Present and Future Climate), ongoing between 2013 and 2015 in the framework of the Programme for Research-DevelopmentInnovation for Space Technology and Advanced Research (STAR), administrated by the Romanian Space Agency
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