DESIREX 2008: Study of the Urban Heat Island in Madrid (Spain)  
José A. Sobrino *  
* University of València – Global Change Unit (GCU)

Abstract

From June 23rd to July 6th of 2008 was developed in Madrid the experimental campaign of DESIREX 2008 (Dual-use European Security IR Experiment 2008), in order to study the Urban Heat Island (UHI) effect. The project was funded by the European Space Agency (ESA) and different European groups were working acquiring data during the campaign.

Different parameters were measured, as air temperature, surface temperature, wind speed, wind direction, emissivity and reflectivity of the urban surfaces and also of the rural ones. These measures were taken daily using fixed masts, car transects and calibration/validation points. Thirty flight lines were performed during the campaign, covering the urban area of Madrid and its surroundings with the Airborne Hyperspectral Scanner (AHS), that gives a total length of roughly 1000 km along track recorded data, at different flight altitudes and spatial resolutions, from 2.4 to 6.9 m. In addition to the airborne acquisitions and within the same time period, high and low spatial resolution spaceborne images were acquired: ASTER/TERRA, TM/Landsat, AATSR/ENVISAT, AVHRR/NOAA, MODIS/TERRA-AQUA, SEVIRI/MSG2.

This paper shows the results and conclusions obtained from the analysis of all the dataset. Results included mainly generation of emissivity and land surface temperature (LST) maps over urban areas, relationships between land use and LST, a database of spectral emissivity for different urban surfaces, and a temporary study of the evolution of the UHI effect.