

ASTER 열적외선 이미지를 이용한 열섬 현상 탐지: 뉴저지를 사례로

Using ASTER TIR imagery to identify Heat Islands: A case study of New Jersey

Gwang yong Choi (Geography Dept., Rutgers University, tribute@eden.rutgers.edu)

David W. Gwynn (Geography Dept., Rutgers University, dgwynn@att.net)

David A. Robinson (Geography Dept., Rutgers University, drobins@rci.rutgers.edu)

The ability to detect urban heat islands in satellite imagery is a function of spatial, spectral, and temporal resolutions. Imagery from the satellite-mounted Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) sensor acquired since December 1999 allows us to view the Earth at a higher spectral resolution in the thermal infrared (TIR) portion of the electromagnetic spectrum than most other satellite systems (e.g., AVHRR, Landsat TM). At present, interpolated maps of surface air temperature are derived from data collected by a series of networked meteorological stations across the state (i.e., the New Jersey Mesonet system), which are assembled and distributed by the Office of New Jersey State Climatologist. Recent TIR data from ASTER promises to provide more detailed coverage of surface skin temperature patterns across the state, at a relatively higher spatial resolution (i.e., 90 m). In an attempt to ascertain the utility of ASTER data for identifying heat islands, we compared the ability of its five TIR bands (8.125-8.457 μm , 8.457-8.825 μm , 8.925-9.275 μm , 10.25-10.95 μm , and 10.95-11.65 μm) to differentiate temperatures on the ground in central New Jersey in a daytime summer scene. These results were compared to interpolated surface air temperature maps derived from hourly data collected at weather stations around the state. Preliminary results suggest that Band 12 (8.925-9.275 μm) captures surface skin temperature variations across the state best. The identification of heat islands in highly developed urban areas around the state (e.g., Camden and Elizabeth) in ASTER imagery correlates with Mesonet data and long term climate data.