



A study of the Athens Urban Heat Island effect during the 2009 THERMOPOLIS campaign

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Measurements of air temperature in the urban canopy layer were performed during July 2009 in 29 sites in Athens. These allowed for the mapping of the daily spatiotemporal evolution of the Urban Heat Island in Athens. City districts to the east were the hottest during the afternoon, while being among the coolest during the early morning hours. While during the early morning some coastal sites were the hottest, the “heat plume” slowly moved to the center of the city until 14:00 – 15:00 moving then further east during the afternoon. Satellite-derived Land Surface Temperature (LST) data from AATSR, ASTER, AVHRR and MODIS for the pixels corresponding to the T(air) ground stations showed that LST can be up to 5 K lower than the respective T(air) (during late afternoon/nighttime), while it can be up to 15 K higher (during the rest of the day).

For each station, timeseries of T(air) and the corresponding LST timeseries (i.e. the LST for the satellite pixel where each station lies within) show that generally late afternoon AATSR LST acquisitions agree very well with T(air) for all stations and all days, i.e. for Athens the AATSR LST afternoon retrieval is a very good approximation of T(air). The same holds for the AVHRR LST late afternoon acquisitions. The MODIS late afternoon/early morning LST data agree also fairly well (although not as good as AATSR and AVHRR) with T(air) for most stations and most days, in all cases the difference being < 4 K.