



Assessment of surface urban heat island over East Asia using the land surface temperature data retrieved from COMS data

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Rapid industrialization and urbanization in the East Asian region resulted in the enhancement of urban heat island (UHI) and surface UHI (SUHI). UHI is affected by many factors such as city size, city function, city form, population, geographic location, time and weather condition. UHI is generally studied by two ways: 1) measuring the UHI in air temperature through weather station networks and 2) measuring the UHI in land surface temperature through the use of airborne or satellite remote sensing. Ground observation temperature data have the advantage of a high temporal resolution, but quantitative and detailed analysis about spatio-temporal variations of UHI are limited due to the irregular distribution in space. Satellite remote sensing data, on the other hand, have higher spatial coverage and provide periodic information.

In this study, we investigated the spatio-temporal variations of SUHI over mega cities over the East Asian region, such as Seoul, Tokyo and Beijing, using the LST retrieved from the first Korean geostationary satellite, COMS (Communication, Oceanic, and Atmospheric Satellite) data. Also the seasonal and diurnal variations of SUHI under various weather conditions will be presented.

The COMS LST data clearly showed that the spatial distribution of LST over the East Asian region, in particular, with warm LST over the mega cities. The spatio-temporal variations of SUHI are clearly dependent on the time of day, season, geographic location and local environment. In general, the SUHI shows a strong diurnal variation in summer irrespective of the geographic location of mega cities, whereas, the diurnal variation of SUHI is not strong in other seasons. The maximum SUHI (> 10 degree Celsius) of three mega cities occurred at mid-day in summer, unlike the that of UHI. The daytime SUHI also shows a strong seasonal variation, greater in summer than winter irrespective of the geographic location of mega cities, but no distinct seasonal variation in SUHI during nighttime.