

THE HEAT ISLAND IN KYOTO CITY

-THERMAL INERTIA OF THE URBAN AREA AND THE RURAL AREA-

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1. THE HEAT ISLAND IN KYOTO CITY

Meteorological observations have been done in Kyoto city. The atmospheric temperature and the net radiation were measured at about 1.5 km horizontal resolution for two weeks in each observational period. These observations were done in each season (4 times a year) for two years.

The results show clear heat island in all seasons at night on a fine day. Its intensity was strongly correlated with the overnight average of net radiation, indicating that the heat island is caused by the difference in the thermal response rather than the artificial discharge of heat, because it does not depend on the net radiation or the weather.

The area thermal inertia [I_{area}] around some observational sites were estimated from the thermal response to some rapid changes of the net radiation at night caused by the appearance of the cloud. The estimated values in the urban area are 3 to 4 times larger than those in the suburbs (Figure 1). This indicates that the thermal inertia of the surface and the large scale asperity constitute the area thermal inertia.

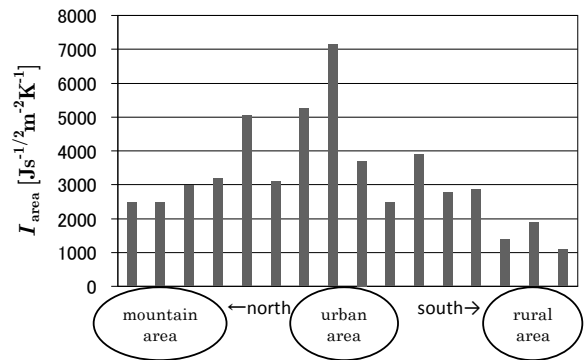


Figure 1 I_{area} of each study site

2. THERMAL INERTIA OF THE URBAN AREA AND THE RURAL AREA

The thermal inertia [I] of the surface has been targeted. Until now, there was no example that I of the surface of the urban area and the rural area which exist in the fields were measured by the unific technique. It was difficult to compare the thermal inertia of the surface in a city and the suburbs. So, the technique of the ability to measure I of the surface has been newly developed. The method is giving fixed thermal flux on the surface, and measuring a temperature of the surface. Measurement apparatus was created by the halogen lamp and the radiation thermometer. After some various basic experiments and improvement, it has become possible to carry out measurement which has sufficient reproducibility. The surfaces of the urban area and the rural area have measured using this technique. The results show that I of surface in the urban area is 2 times higher than in the rural area (Figure 2). This indicates that both the thermal inertia of the surface and the large scale asperity are the key factors of the heat island phenomenon in Kyoto-city.

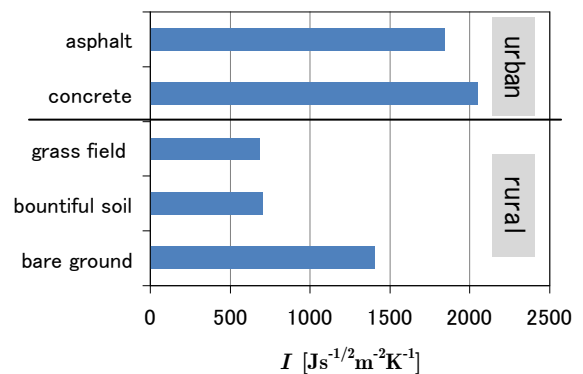


Figure 2 I of the urban area and the rural area