Measurement and analysis of high resolution surface temperature in Tokyo area

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1. Introduction
Satellite images of thermal band are usually used to analyze the effect of heat island. The resolution of the satellite is not high enough, for example, 60 m in the case of Landsat ETM+. High-resolution images are preferable to analyze the urban thermal characteristics. In this study, high-resolution thermal images of taken from a helicopter were analyzed.

2. Study data
Thermal images were taken in the day and the night of August 9th, 2007. The study area is the center of Tokyo and the courses of the flight were shown in Fig. 1. The resolution of the thermal images was about two meters. Because one thermal image taken at a time is small (320x240 pixels each), they are synthesized into one image (about 5000 pixels square). About 250 small images were geometrically corrected and were mapped to make one image by using ArcGIS (ESRI, Inc.).

4. Results
We calculated the temperature difference from thermal images of the daytime and the nighttime. As an example, the aerial photo (Fig. 2) and the temperature difference (Fig. 3) of the outer garden of Imperial Palace are shown. The temperature difference is large on the surfaces of road and buildings and is small on the surfaces of vegetation area water.
These images can show the detailed characteristics of urban heat island.