

## Spatial Distribution of air temperature and the surrounding environment in Tsukuba city (IV)

\*Ryota KARUBE<sup>1</sup>

1.Namiki Secondary School

### Background

I knew that urban heat island occurred last year in the central area of Tsukuba city because minimum temperature was higher than suburbs part, and a diurnal range was small. Therefore, I intended to investigate the characteristic.

### Definition of the urban heat island

It is the phenomenon that the temperature of the urban area becomes higher than the that of the penumbra. when we drew a distribution map of the temperature, a high temperature level was distributed over the shape such as the island around a city.

### Purpose of the study

It is to investigate clarifying the relationship between temperature in Tsukuba city and surrounding environmental from observation using the Stevenson screen, a characteristic of the urban heat island in the central area of Tsukuba city from movement observation.

### Method of the study

- The relationship between temperature in Tsukuba city and surrounding environment
- I set up a data logger for temperature measurement to the Stevenson screen of eight elementary and junior high schools in Tsukuba city and measured temperature. I expressed data of the minimum temperature that temperature difference was easy to appear of the day when the highest temperature appeared and date of the National Land Numerical Information use in the scatter diagram in total afterwards.
- Making of the detailed temperature distribution of the urban area
- I moved and observed it to know the distribution of detailed temperature. I tied stick with Wireless Thermo Recorder RTR-502 to a bicycle with white plastic tape, rode the bicycle along the route decided beforehand, and measured temperature every ten seconds. At the same time, I recorded the position using GPS. I arranged the observed temperature data and corrected temporal axes. I made a synthetic figure of the temperature distribution with the plot tool.

### Result of the study

- The relationship between temperature in Tsukuba city and surrounding environment
- I found that minimum temperature tended to be lower as the ratio of field became big, and to be higher as the ratio of building site became big.
- Detailed temperature distribution of the urban area
- As a result of having composed data of the 5-day movement observation, I was able to reproduce outbreak of the urban heat island that was similar to a same temperature diagram. In a center and the suburbs part, I found that temperature suddenly changes in spite of distance not being far very much. Temperature is high at the spot where there are many building sites ,and temperature is low at the spot where there are many a field and for agricultural use ground. In the central area of Tsukuba city, I found that temperature lowers suddenly on the spot with a pond and the park.

### Summary of the study

- 1 The factor to lower minimum temperature is a field and another for an agricultural use place. On the other hand, the factor to higher minimum temperature is a building site and other sites.
- 2 In the thing that I move early in the morning and observe of the winter season, I can confirm

outbreak of the urban heat island in the central area of Tsukuba city.

3The movement observation can obtain the result that is similar to observation using Steevenson screen and watch detailed temperature distribution, so there is beneficial.

4 The temperature respond sensitively to the land use, and the small structure such as a park and the pond affects the temperature.

Keywords: Urban heat island, Tsukuba city, Geographic Information System, Moving observation, Steevenson screen

