Experimental study of sprinkling water to mitigate urban heat island impact as an application of groundwater use

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Recently it is important to consider prudently utilizing groundwater by reason of rising groundwater level in metropolitan. One of the most promising utilization may be the sprinkling with groundwater on street and the parking lots in order to suppress the urban heat island effect. The purpose of this study is measurement of the temperature decreases by sprinkling on the ground surface paved with asphalt.

We conducted field experiment on a summer day at the Rinku town (Izumisano City, Osaka Prefecture, Japan) parking lots to evaluate the influences of sprinkling on around air and ground surface paved with asphalt. The measurement time was about 13:00 to 18:00, 27th, Aug 2003. In this experience, a hundred and two thermistors were set three dimensionally, viz. on the two vertical planes (3.5 meters in height, 16 meters in width) crossed each other. The sprinkler was set up at the point to 2 meters distant from the intersection. The sprinkling was repeated over 15 times in total, within circular area of 10 meters in diameter. The meteorological observation instrument was also set as reference at the point 16 meters distant from the location of the sprinkler.

The result obtained is that the temperature decreases of each height and surface are following. At the height of 0.4 meter the temperature decreases is about 5.7 degrees in centigrade scales, at the height of 0.9 meter is about 5.3 degrees, at the height of 1.7 meters is about 4.7 degrees, at the height of 2.6 meters is about 4.2 degrees and at the height of 3.5 meters is about 3.3 degrees.

Hereafter, it may be important to measure in practically the decreases of temperature due to sprinkling in the city.