[Research Title]

Research on the Heat Risk Related to Urban Heat Islands Using Population Flow Data and a Thermal Simulator

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[Abstract]

There are concerns about the various effects associated with climate change, and in recent years, the heat in cities has increased and health hazards such as heat stroke have become more common. The Intergovernmental Panel on Climate Change (IPCC) report (AR6/WG2, February 2022) states that "the interaction between changing urban forms and exposures and vulnerabilities can result in risks and losses arising from climate change in cities and settlements." The "Action Plan for Heat Stroke Countermeasures" (approved by the Cabinet on May 30, 2023) sets a goal of halving the number of deaths due to heat stroke by 2030. It is necessary to establish a method for assessing the risk of heat in cities as soon as possible and to reflect this in the heat countermeasures for climate-resilient urban development promoted by national and local governments.

The aim of this study was to determine how many people in cities are exposed to heat. This research consists of two sub-themes. In Sub-Theme 1, a method for estimating the expansion of population flow data using mobile phone signals was developed, and the movement and retention of people on each street was databased. In addition, a calculation method for a database of artificial exhaust heat generated from buildings and road traffic was created to contribute to Sub-Theme 2.

In Sub-Theme 2, we conducted a supercomputer analysis of temperature and humidity, wind, radiation, and heat index using a thermal simulator, and succeeded in reproducing the actual heat index in the city with high resolution. In addition, by creating and aggregating the heat index and the regional distribution of the number of outdoor residents and pedestrians, they were compiled as a method for assessing heat risk in cities.

[References]

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