

SIMULATION OF WASTEWATER IMPACT ON STREAM TEMPERATURE IN URBAN RIVERS UNDER TIDAL VARIATION

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Urbanization (e.g. population growth and improvement in living standards) cause thermal environment change which is significant in these years. Many studies have been made on thermal environment of atmosphere due to urbanization for more than three decades. Therefore, much fact has been clarified about heat island etc. However urban heat influence not only atmosphere but also hydrosphere as a wastewater. In urban river and coastal area, it is amply anticipated that anthropogenic heat input change thermal environment. In spite of this, little is studied on thermal environment of hydrosphere. Statistic approach has been done by Kinouchi¹⁾. The long-term change in the stream temperature of an urban river system and its relevant factors are reported. However, dynamic simulation has not been made for more comprehensive understanding. In this paper, wastewater impact on stream temperature in lower reaches of Ara River in Japan was quantitatively evaluated using a dynamic simulation model integrated water and energy process.

Firstly, the behavior of stream temperature was reproduced in order to comprehend the actual conditions. At the same time, heat transport and heat balance in lower reaches of Ara River was quantified. The reproduction result show good agreement with observed value. That is to say this dynamic simulation reproduces behavior of stream temperature in urban rivers with a high degree of accuracy.

Next, the results including wastewater input and no wastewater input were compared. It was found from this comparison that wastewater have a great impact on stream temperature in winter. Furthermore, stream temperature increases more than 3 degrees at some locations due to heat input by wastewater in winter.

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