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A gauss-function based approach for flood control capacity assessment of integrated green and grey infrastructure

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Under the background of climate change and rapid urbanization, the risk of urban flood is increasing across the globe. To alleviate the urban flooding problems, the sponge city strategy has been proposed in China. The urban flood control system based on sponge city is gradually formed, which is an integrated system composed of green and grey infrastructure. However, mechanism of the corresponding flood control function and corresponding quantitative assessment of flood control capacity of the integrated green and grey infrastructure is relatively lacking. Based on pilot sponge cities in China, this study summarized and put forward the construction mode of urban inundation control system of sponge city, including source control system, stormwater pipe network system, over-standard stormwater storage and drainage system, etc., identified the mechanism of urban flood control functions of urban flood control system, including detaining, releasing, peak rate cutting, peak rate delaying and discharging the stormwater runoff. Furthermore, a gauss-function based approach for quantitative flood control capacity assessment of integrated green and grey infrastructure was established. This study builds the relationship between the gauss function and mechanism of urban flood control capacity, according to the mathematical meaning of parameters of the gauss function. It provides a new method for urban flood control capacity assessment of the integrated green and grey infrastructure.