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IMPACT OF LAND USE ON URBAN WATER-LOGGING DISASTER: A CASE STUDY OF BEIJING AND NEW YORK CITIES

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Abstract

Urban water-logging disasters are induced by multiple causes, such as land use structure, limited capacity of drainage system, climate change and lack of enforcement. Significant increase of impervious surface area is the main cause of urban water-logging disaster in big cities like Beijing. This article takes Beijing "7.21" storm and New York hurricane "Sandy" as examples, and explains the cause of urban water-logging from the perspective of land use structure. In this study, the infiltration and retention capacity for various land use types and regional total retention storage capacity are analysed based on the Landsat TM satellite imagery of Beijing City and New York City in 2011. To estimate the impact of the land use structure, a comparison of retention capacity and runoff in two regions has been carried out using precipitation and runoff data. The results show that the significant increase of impervious surface decreases the retention capacity and becomes the main cause of urban water-logging disaster. Waters is a major factor in retention capacity, while green and cultivated land can enhance the retention effect. Reducing impervious surface, protecting waters and increasing green fields can be implemented in combination with other structural best management practice (BMPs) to control and prevent urban water-logging disaster.

Key words: land use structure, retention, runoff, water-logging

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