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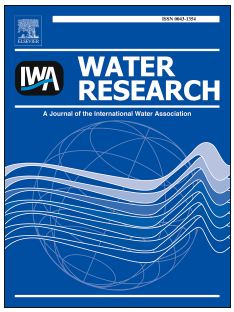

Enhancing future resilience in urban drainage system: Green versus grey infrastructure

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Enhancing future resilience in urban drainage system: green versus grey infrastructure

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Abstract:

In recent years, the concept transition *from fail-safe to safe-to-fail* makes the application of resilience analysis popular in urban drainage systems (UDSs) with various implications and quantifications. However, most existing definitions of UDSs resilience are confined to the severity of flooding, while uncertainties from climate change and urbanization are not considered. In this research, we take into account the functional variety, topological complexity, and disturbance randomness of UDSs and define a new formula of resilience based on three parts of system severity, i.e. social severity affected by urban flooding, environmental severity caused by sewer overflow, and technological severity considering the safe operation of downstream facilities. A case study in Kunming, China is designed to compare the effect of green and grey infrastructure strategies on the enhancement of system resilience together with their costs. Different system configurations with green roofs, permeable pavement and storage tanks are compared by scenario analysis with full consideration of future uncertainties induced by