



## **A generalized Dynamic Overflow Risk Assessment (DORA) for urban drainage RTC**

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### **ABSTRACT**

An innovative generalized approach for integrated real time control of urban drainage systems is presented. The Dynamic Overflow Risk Assessment (DORA) strategy tries to minimize the expected overflow risk by considering (i) the water volume presently stored in the drainage network, (ii) the expected runoff volume (calculated by radar-based rainfall forecast models) and (iii) the estimated uncertainty of the runoff forecasts. The inclusion of uncertainty allows a more confident use of Real Time Control (RTC). Overflow risk is calculated by a flexible function which allows prioritization of the discharge points according to their sensitivity. DORA was tested on an example inspired by a catchment in the city of Aarhus (Denmark). By using a simple conceptual model, a statistical analysis of the performance of DORA was performed. Compared to a traditional local control approach, DORA contributed to reduce Combined Sewer Overflow loads and to optimize the flow discharged to the wastewater treatment plant. Also, the inclusion of forecasts and their uncertainty contributed to further improve the performance of drainage systems. The results of this paper will contribute to a wider usage of global RTC methods in the management of urban drainage networks.

### **KEYWORDS**

Integrated urban water management, Model Predictive Control, Overflow risk, Real Time Control, Uncertainty