

MODELLING RUNOFF FROM PERMEABLE SURFACES IN URBAN AREAS

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ABSTRACT

Climate change and urbanization increases the pressure on combined sewer systems in urban areas resulting in increased combined sewer overflows, degraded water quality in receiving waters, and changing stream flows. Permeable surfaces are increasingly used to combat the challenges regarding runoff to combined sewer systems. The variation in urban soil characteristics together with the initial conditions before a rainfall event are important factors effecting the infiltration process and consequently runoff characteristics. In this study SWMM is used to evaluate the initial moisture content contribution to runoff in urban soils using Horton and Green Ampt infiltration models. A sensitivity analysis was carried out to get an improved understanding of the consequences of choosing the incorrect parameter values for urban soils. A case study from Baden-Baden was used to evaluate how permeable surfaces are contributing to the runoff based on initial soil moisture content using the STORM model. The initial soil moisture content is critical for urban flood management and flood risk analysis based on urban hydrological models. Awareness of urban permeable surfaces and how they contribute to the rainfall-runoff cycle and the importance of suitable parameter values for urban soil characterization are therefore essential.

Keywords: Permeable surface; SWMM; STORM; Initial Soil Moisture; Urban Soils; Hydrological Modelling; Urban Drainage