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To What Degree Does Variability of Historical Rainfall Series Influence Extreme Event Statistics of Sewer System Surcharge and Overflows?

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Key words

Historical rainfall series; MOUSE LTS; sewer system surcharge; CSO volumes; extreme events statistics.

Extended abstract

In 1997 a research and monitoring station has been established as a part of the intercepting sewer from Frejlev, a small town of 2000 inhabitants 7 kilometers southwest of Aalborg, Denmark (Schaarup-Jensen et al., 1998). Consequently, a number of long dry and wet weather flow time series from this catchment today are available.

In some of the investigations related to wet weather conditions the object has been the determination of central parameters in the surface description of the Frejlev catchments (Thorndahl *et al*., 2006, Schaarup-Jensen *et al*., 2005). Figure 1 represents results from these simulations, namely the extreme event statistics of combined sewer overflow (CSO) volumes from the Frejlev CSO structure based on 2 operations of the MOUSE LTS model (Jakobsen *et al*., 2001). Both simulations are based on a 33 year long Danish rainfall series but they diverge according to different values of the so-called reduction factor (ϕ) of 0.90 and 0.45 representing “the code of practice value in Denmark” and a catchment calibrated value respectively.

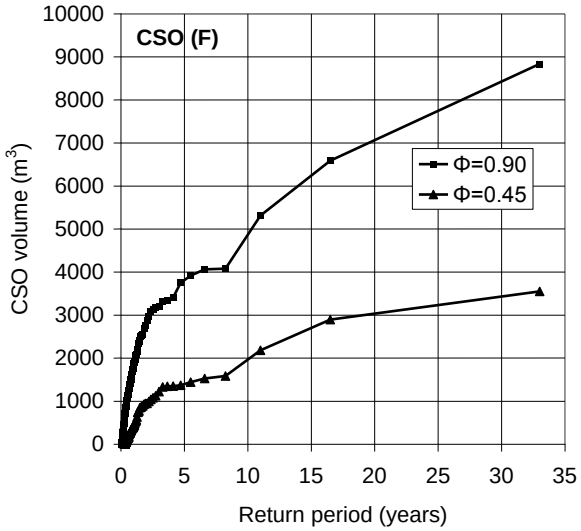

Figure 1. *CSO volumes as a function of (average) return period. ϕ is the reduction factor*.

This leads to the conclusion, that otherwise identical MOUSE LTS simulations based on two different values of ϕ clearly indicate, that uncertainties related to central catchment input parameters of rainfall runoff models to a great extend are influencing extreme event statistics of e.g. CSO volumes.

In this article the authors will focus on the selection of rainfall series for such MOUSE LTS simulations in order to investigate if the selection of rainfall series influence the uncertainties

related to extreme event statistics of CSO volumes or sewer system surcharge in the same manner as e.g. the above mentioned reduction factor.

So far the investigations on this issue have included 8 close positioned rainfall gauges at different locations in the city of Aalborg within a radius of 10 km. including 2 gauges in the Frejlev catchment. Using these 8 rainfall series for MOUSE LTS simulations according to ϕ = 0.45 (a catchment calibrated version of MOUSE) lead to the extreme event statistics of Frejlev CSO volumes illustrated in figure 2.

According to this figure, the choice of rainfall series for this type of simulations is of similar importance to the uncertainties of extreme event statistics of e.g. CSO volumes - as the choice of central catchment parameters.

Further investigations on this issue will be performed in the following months and presented in a paper at the 11ICUD conference in Edinburgh in August-September 2008.

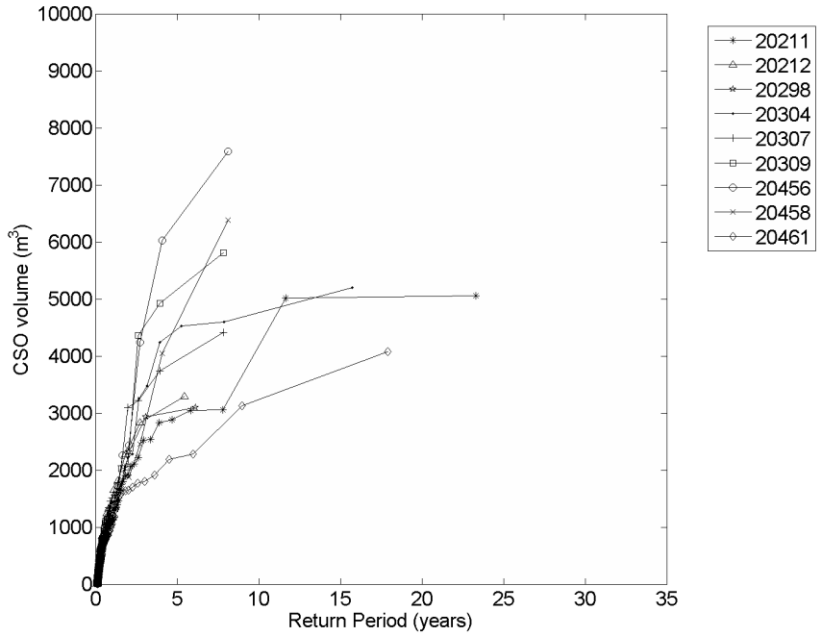

Figure 2. *CSO volumes as function of (average) return period. Numbers refer to local rainfall series in the municipality of Aalborg used in MOUSE LTS simulations on the Frejlev catchments*.

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