



Using urban runoff simulations for addressing climate change impacts on urban runoff quality in a Swedish town

Matthias Borris¹, Maria Viklander¹, Anna-Maria Gustafsson¹, Jiri Marsalek²

¹Department of Civil, Environmental and Natural Resources Engineering, Luleå University of Technology, 97187 Luleå, Sweden. E-Mail: matthias.borris@ltu.se; maria.viklander@ltu.se; anna-maria.gustafsson@ltu.se

²National Water Research Institute, Environment Canada, 867 Lakeshore Rd., Burlington ON, Canada L7R 4A6. E-mail: jiri.marsalek@ec.gc.ca

ABSTRACT

The effect of climate change on urban stormwater quality was studied by means of computer simulations conducted with the Stormwater Management Model (SWMM) for common climate change scenarios developed for northern Sweden. The simulation results showed that stormwater quality depended on rainfall characteristics; a climate scenario implying increased rainfall depths and intensities produced higher pollutant loads carried by stormwater, but reduced concentrations, particularly for medium to high intensity storm events. This type of stormwater quality response was explained by pollutant supply limited transport processes and the resulting dilution of such pollutants. Medium intensity events showed the highest sensitivity to climatic changes, since such events strongly affected the contributions of pervious surfaces. This has significant implications for stormwater management, because those relatively frequent events generally carry a high percentage of the annual pollutant load.

KEYWORDS

Climate change, rainfall characteristics, stormwater runoff quality modeling