Strategy for a better environment based on a benchmark simulation model for integrated urban wastewater systems

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URBAN WASTEWATER SYSTEM

CATCHMENT

SEWER NETWORK

WASTEWATER TREATMENT PLANT

RECEIVING WATER SYSTEM
INTRODUCTION

BSM-UWS

BSM-UWS characteristics

Area: 550 ha
PE: 80 000
Average dry weather flow (m$^3$/d): 19 000 m$^3$/d
Total storage volume: 22 000 m$^3$
River length: 30 km
CASE 1: INTEGRATED CONTROL

Modifying the bypass at WWTP based on river water quality
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Modifying the bypass at WWTP based on river water quality

**WWTP bypass**

- Flow rate (m$^3$.d$^{-1}$)
  - 0.0
  - 5.0e+3
  - 1.0e+4
  - 1.5e+4
  - 2.0e+4

**River stretch at WWTP effluent**

- NH$_4^+$ (g N.m$^{-3}$)
  - 0.0
  - 1.0
  - 2.0
  - 3.0
  - 4.0
CASE 2: INFLUENT GENERATION

Influent generation for Henriksdal WWTP, Stockholm
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Influent generation for Henriksdal WWTP, Stockholm

Calibration results for the influent flow rate at Henriksdal WWTP at 15 min intervals (left) and daily average values (right) for the year 2012.
CASE 2: INFLUENT GENERATION

Influent generation for Henriksdal WWTP, Stockholm

Weekly average influent COD (left) and NH$_4$-N (right) concentrations predicted by the model (blue) compared to the weekly composite measurements (grey) at Henriksdal WWTP for the year 2012.
CASE 3: NEW MODEL DEVELOPMENT

Modelling heat transfer in sewer system
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Modelling heat transfer in sewer systems

Modelled temperature variation

Change in temperature with sewer length

- Input
- Output (10 km)

Temperature (°C)

Time [d]

Temperature (°C)

Sewer length (km)

- in
- 5 km
- 10 km
- 15 km
- 20 km

- 20.0
- 19.0
- 18.1
- 17.3
- 16.6
THANK YOU