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Sewer Network Tracing to Support Model Calibration and Validation

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Abstract

Sewer network hydraulic monitoring is predominantly undertaken with velocity and / or depth sensors recording data at fixed locations. Tracing in sewer networks can be used to collect additional information about the network hydraulics to better understand travel times and therefore velocities between monitoring locations, Fig. 1. The collected data can be used for source localisation (Sonnenwald *et al*., 2023) and to quantify mixing and dispersion. Tracing in sewer networks can be challenging due to the constituents of the wastewater and potential for ragging of instruments. This paper presents details of a cost-effective technique for sewer tracing using Rhodamine WT as a tracer, with in-situ tethered fluorometers directly measuring concentrations (PME, 2024). This has been successfully applied to studies in UK and Denmark, revealing discrepancies between model predicted and measured travel times, Fig. 2. Practical considerations in performing successful field studies will be highlighted and a summary of findings presented.

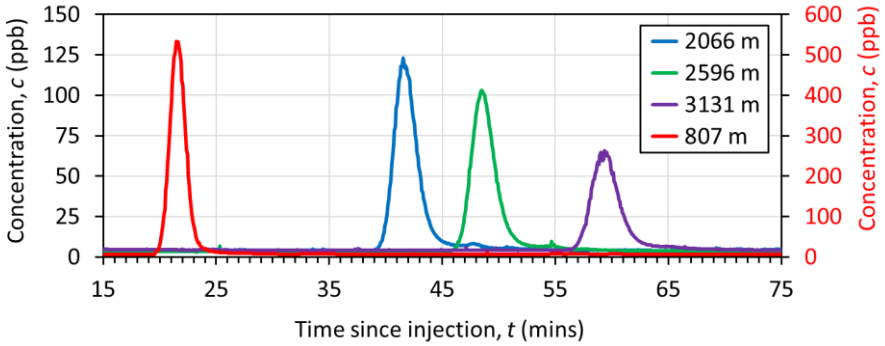

Figure 1. Location 1- Example of raw data collected from sewer system. Key denotes distance from tracer injection, 807 m data plotted on secondary y-axis.

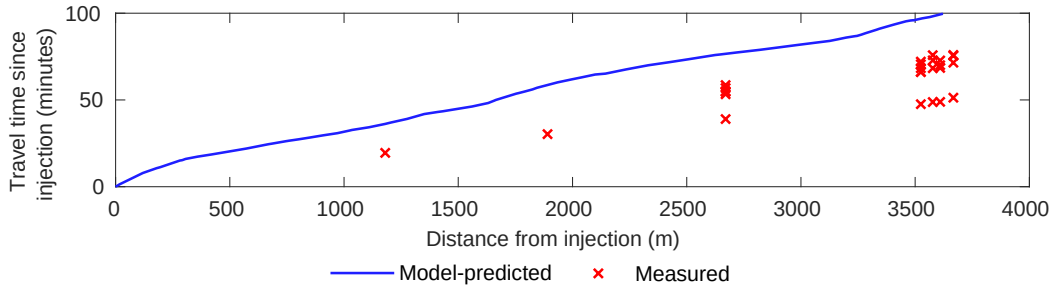

Figure 2. Location 2 - Comparison between measured and model-predicted travel times.

References

PME (2024) “Cyclops-7 Sees Oversea Sewer Systems“ Case Study description, PME, https://www.pme.com/case-studies/pmes-cyclops-7-sees-oversea-sewer-systems

Sonnenwald, F., Shuttleworth, J., Bailey, O., Williams, M., Frankland, J., Rhead, B., Mark, O., Wade, M.J., & Guymer, I. (2023). Quantifying Mixing in Sewer Networks for Source Localization. ASCE Journal of Environmental Engineering, 149(5), DOI: 10.1061/JOEEDU.EEENG-7134