Importance of Subdivision Resolution of Surrogate Models for Emulating Catchment Response and Surcharge - DTU Orbit (09/11/2019)

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State-of-the-art urban drainage modelling applies high-fidelity physically based distributed models. However, high computational demands of such models limit the usage. In this study a conceptual surrogate model is set up to emulate the output of a Mike URBAN model. The surrogate model is a volume-based model, which models discharges from a user-defined compartment to downstream compartment(s) as well as to the surface. Training data is created by extracting steady state volume-discharge points from Mike URBAN and applying a piecewise linear interpolation between the points. Two surrogate models are set up for the Elster Creek catchment in Melbourne, Australia. The first consists of one compartment and the second subdivides this into 17 smaller compartments. Results show that both surrogate models perform very well in emulating the compartment volume and discharge from Mike URBAN. The surcharge is more difficult to model as its behaviour is more dynamic and hence most different from the steady state training data. Increasing compartment resolution shows an overall improvement of all results - especially in capturing surcharge behaviour. The results show that even surcharging urban drainage systems can be modelled sufficiently accurate for many purposes with the proposed surrogate models.

General information
Publication status: Published
Organisations: Department of Environmental Engineering, Urban Water Systems
Contributors: Thrysøe, C., Borup, M., Arnbjerg-Nielsen, K.
Pages: 535-538
Publication date: 2018

Host publication information
Title of host publication: Proceedings of the 11th International Conference on Urban Drainage Modelling
Place of publication: Palermo, Italy
Editor: Mannina, G.
Keywords: Modelling resolution, Conceptual Modelling, Computation Time, Surcharging
Electronic versions:
Proceedings book
Research output: Chapter in Book/Report/Conference proceeding › Article in proceedings – Annual report year: 2018 › Research › peer-review