

# Accepted Manuscript

Research papers

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PII: S0022-1694(17)30882-X

DOI: <https://doi.org/10.1016/j.jhydrol.2017.12.054>

Reference: HYDROL 22465

To appear in: *Journal of Hydrology*

Received Date: 6 July 2017

Revised Date: 19 December 2017

Accepted Date: 20 December 2017

Please cite this article as: Hailegeorgis, T.T., Alfredsen, K., High spatial-temporal resolution and integrated surface and subsurface Precipitation-Runoff modelling for a small stormwater catchment, *Journal of Hydrology* (2017), doi: <https://doi.org/10.1016/j.jhydrol.2017.12.054>

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## High spatial-temporal resolution and integrated surface and subsurface Precipitation-Runoff modelling for a small stormwater catchment

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### Summary

Reliable runoff estimation is important for design of water infrastructure and flood risk management in urban catchments. We developed a spatially distributed Precipitation-Runoff (P-R) model that explicitly represents the land cover information, performs integrated modelling of surface and subsurface components of the urban precipitation water cycle and flow routing. We conducted parameter calibration and validation for a small (21.255ha) stormwater catchment in Trondheim City during Summer-Autumn events and season, and snow-influenced Winter-Spring seasons at high spatial and temporal resolutions of respectively 5mx5m grid size and 2 minutes.

The calibration resulted in good performance measures (Nash-Sutcliffe efficiency, NSE = 0.65-0.94) and acceptable validation NSE for the seasonal and snow-influenced periods. The infiltration excess surface runoff dominates the peak flows while the contribution of subsurface flow to the sewer pipes also augments the peak flows. Based on the total volumes of simulated flow in sewer pipes ( $Q_{sim}$ ) and precipitation (P) during the calibration periods,

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