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Catchment characterization through hydrograph rising limb analysis: results from a laboratory experiment

Valentijn Pauwels (1) and Remko Uijlenhoet ()

(1) Monash University, Department of Civil Engineering, Clayton, Australia (valentijn.pauwels@monash.edu), (2) Wageningen University & Research, Hydrology and Water Resources, Wageningen, The Netherlands (remko.uijlenhoet@wur.nl)

It is generally acknowledged that the best way to estimate catchment-scale hydraulic properties is a hydrograph recession analysis. However, a number of relatively recent publications have highlighted a number of discrepancies between the theoretical requirements of these analyses and the in-situ conditions. One source of information that has generally been overlooked is the rising limb of the hydrographs. Pauwels and Troch [2010] derived a mathematical expression for this rising limb, valid for short times. More specifically, a direct relationship between the discharge and the square root of time was found. The objective of this presentation is to evaluate the validity of this relationship using laboratory experiments. Two small-scale model aquifers were installed in the Wageningen University & Research Rainfall Simulator, and were subjected to varying intensities of rainfall, under different aquifer slopes [Pauwels and Uijlenhoet, 2018]. In all cases, the theoretical relationship was confirmed. The obtained recharge rates were found to be realistic. The overall results of these experiments confirm the hydrograph rising limb expression of Pauwels and Troch [2010], and suggest the potential use of the hydrograph rising limbs for catchment characterization.

References

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