

Home

Online Library HESS

- Recent Final Revised Papers
- Volumes and Issues**
- Special Issues
- Library Search
- Title and Author Search

Online Library HESSD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact
Factor
2.270

ISI
indexed

ARCHIVED IN

PORTICO

[Volumes and Issues](#) [Contents of Issue 4](#)

Hydrol. Earth Syst. Sci., 13, 481-489, 2009
www.hydrol-earth-syst-sci.net/13/481/2009/

© Author(s) 2009. This work is distributed
under the Creative Commons Attribution 3.0 License.

Staged cost optimization of urban storm drainage systems based on hydraulic performance in a changing environment

M. Maharjan, A. Pathirana, B. Gersonius, and K. Vairavamoorthy
UNESCO-IHE Institute for Water Education, P.O. Box 3015, 2601 DA Delft, The Netherlands

Abstract. Urban flooding causes large economic losses, property damage and loss of lives. The impact of environmental changes, mainly urbanization and climatic change, leads to increased runoff and peak flows which the drainage system must be able to cope with to reduce potential damage and inconvenience. Allowing for detention storage to compliment the conveyance capacity of the drainage system network is one of the approaches to reduce urban floods. Contemporary practice is to design systems against stationary environmental forcings – including design rainfall, landuse, etc. Due to the rapid change in the climate- and the urban environment, this approach is no longer appropriate, and explicit consideration of gradual changes during the life-time of the drainage system is warranted. In this paper, a staged cost optimization tool based on the hydraulic performance of the drainage system is presented. A one dimensional hydraulic model is used for hydraulic evaluation of the network together with a genetic algorithm based optimization tool to determine optimal intervention timings and responses over the analysis period. The model was applied in a case study area in the city of Porto Alegre, Brazil. It was concluded that considerable financial savings and/or additional level of flood-safety can be achieved by approaching the design problem as a staged plan rather than one-off scheme.

[Final Revised Paper](#) (PDF, 992 KB) [Discussion Paper](#) (HESSD)

Citation: Maharjan, M., Pathirana, A., Gersonius, B., and Vairavamoorthy, K.: Staged cost optimization of urban storm drainage systems based on hydraulic performance in a changing environment, Hydrol. Earth Syst. Sci., 13, 481-489, 2009. [Bibtex](#) [EndNote](#) [Reference Manager](#)

 Copernicus Publications
The Innovative Open Access Publisher

Search HESS

Library Search

Author Search

News

- New Service Charges
- Financial Support for Authors
- ISI Impact Factor: 2.270

Recent Papers

01 | HESSD, 28 Apr 2009:
Integrating field and numerical modeling methods for applied urban karst hydrogeology

02 | HESSD, 28 Apr 2009:
Analyzing the relationship between peak runoff discharge and land-use pattern – a spatial optimization approach

03 | HESSD, 27 Apr 2009:
Dynamically vs. empirically downscaled medium-range precipitation forecasts