



Evolution of Urban Drainage Networks in DAnCE4Water

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ABSTRACT

To identify possible transition strategies for urban water DAnCE4Water (Dynamic Adaptation for eNabling City Evolution for Water) models the complex coherences between societal system, urban environment and the urban water system under different scenarios like climate changes, changes in the societal needs and urban changes. DAnCE4Water uses three modules to describe the urban system. In this paper the authors focus on the linkage between the urban development module and the bio-physical module. By coupling the urban environment with the urban water infrastructure it is possible to investigate adaptation strategies under consideration of a dynamically evolving urban water system. In this paper the authors develop a model to dynamically expand the urban drainage networks, by mimicking a real world planning process. The planning process is split up into two stages; first the bio-physical module layouts the main trunks; second new populated areas are connected via a secondary pipe network to the main trunks. The approach has been tested on Scotchman's Creek a urban catchment within Melbourne, Australia. The urban dynamic has been reconstructed based on the construction age of the drainage pipe. These results have been used as input for the bio-physical module. The authors could successfully evolve the urban drainage network by using the two stage planning process. The presented method is the basis for further applications of DAnCE4Water for predicting future development of urban areas.

KEYWORDS

agent based modelling, dynamic networks, DAnCE4Water, urban development