

Urban drainage models for flood forecasting: 1D/1D, 1D/2D and hybrid models

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ABSTRACT

Lead time between rainfall prediction results and flood prediction results obtained by hydraulic simulations is one of the crucial factors in the implementation of real-time flood forecasting systems. Therefore, hydraulic simulation times must be as short as possible, and simulation results should produce accurate spatial and temporal flood modelling results. This paper presents the hybrid model concept which consists of a new type of model in which 1D/1D and 1D/2D approaches are combined together in order to take advantage of the benefits and overcome the drawbacks of each approach. The models used in this paper consist of a sewer network and an overland flow drainage system in both 1D/1D and 1D/2D approaches. The 1D/1D model is used as the reference model to generate the other models. The results presented in this paper suggest that the 1D/2D models are not yet suitable to be used in real-time flood prediction applications due to the long simulation time it requires, while on the other hand, the hybrid models show a considerable reduction in simulation time, without compromising the simulation results, i.e. flow and water depth accuracy.

KEYWORDS

Urban drainage models; hybrid models; pluvial flooding; surface flooding; flood forecasting