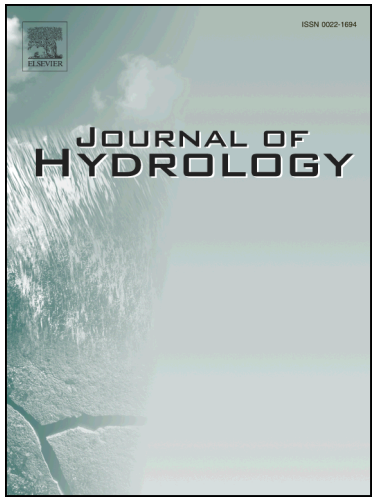

Research papers

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Unstructured mesh adaptivity for urban flooding modelling

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Abstract

Over the past few decades, urban floods have been gaining more attention due to their increase in frequency. To provide reliable flooding predictions in urban areas, various numerical models have been developed to perform high-resolution flood simulations. However, the use of high-resolution meshes across the whole computational domain causes a high computational burden. In this paper, a 2D control-volume and finite-element flood model using adaptive unstructured mesh technology has been developed. This adaptive unstructured mesh technique enables meshes to be adapted optimally in time and space in response to the evolving flow features, thus providing sufficient mesh resolution where and when it is required. It has the advantage of capturing the details of local flows and wetting and drying front while reducing the computational cost. Complex topographic features are represented accurately during the flooding process. For example, the high-resolution meshes around the buildings and steep regions are placed when the flooding water reaches these regions.

In this work a flooding event that happened in 2002 in Glasgow, Scotland, United Kingdom has been simulated to demonstrate the capability of the adaptive unstructured mesh flooding

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