

Assessing the capability of HEC-RAS coupled 1D-2D model through comparison with 2-dimensional flood models

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Abstract

Recent studies show the possibility of more frequent extreme events as a result of the changing climate. These weather extremes, such as excessive rainfall, result to debris flow, river overflow and urban flooding, which post a substantial threat to the community. Therefore, an effective flood model is a crucial tool in flood disaster mitigation. In recent years, a number of flood models has been established; however, the major challenge in developing effective and accurate inundation models is the inconvenience of running multiple models for separate conditions. Among the solutions in recent researches is the development of the combined 1D-2D flood modeling. The coupled 1D-2D river flood modeling allows channel flows to be represented in 1D and the overbank flow to be modeled over two-dimension. To test the efficiency of this approach, this research aims to assess the capability of HEC-RAS model's implementation of the combined 1D-2D hydraulic simulation of river overflow inundation, and compare with the results of GERIS and FLUMENS 2D flood model. Results show similar output to the flood models that had used different methods. This proves the applicability of the HEC-RAS 1D-2D coupling method as a powerful tool in simulating accurate inundation for flood events.

Keywords: Flood modeling, HEC-RAS

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