Predicting Flood Inundation and Risk Using Geographic Information System and Hydrodynamic Model

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Abstract

This study aims to develop an integrated approach to obtain flood inundation and risk information for flood emergency planning using geographic information systems (GIS) and hydrodynamic modeling (MIKE21). Hydrologically corrected digital elevation models (DEM) were created using specific spatial interpolation method, then used to prepare bathymetry inputs to the hydrodynamic modeling. The outputs from the model were then transferred back to a GIS for flood risk assessment and visualization. Flood maps, snapshots and animations at desired time steps were generated for informed decision marking for government and insurance industry. ARC/INFO GIS is used for data preparation, integration and analysis, and specific Arc Macro Language (AML) and C++ programs have been developed for the data conversion and integration. This study shows that integration of GIS and hydrodynamic modeling is an efficient way to obtain flood information for emergency planning and evaluation of the degree of risk posed to a local community.