

Modeling flood and inundation in the lower ha thanh river system, Binh dinh province, vietnam

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ABSTRACT

Kon – Ha Thanh River basin is the largest and the most important river basin in Binh Dinh, a province in the South Central Coast of Vietnam. In the lower rivers, frequent flooding and inundation caused by heavy rains, upstream flood and or uncontrolled flood released from upstream reservoirs, are very serious, causing damage to agriculture, socio-economic activity, human livelihood, property and lives. The damage is expected to increase in the future as a result of climate change. An advanced flood warning system could provide achievable non-structural measures for reducing such damages. In this study, we applied a modelling system which intergrates a 1-D river flow model and a 2-D surface flow model for simulating hydrodynamic flows in the river system and floodplain inundation. In the model, exchange of flows between the river and surface floodplain is calculated through established links, which determine the overflow from river nodes to surface grids or vice versa. These occur due to overtopping or failure of the levee when water height surpasses levee height. A GIS based comprehensive raster database of different spatial data layers was prepared and used in the model that incorporated detailed information about urban terrain features like embankments, roads, bridges, culverts, etc. in the simulation. The model calibration and validation were made using observed data in some gauging stations and flood extents in the floodplain. This research serves as an example how advanced modelling combined with GIS data can be used to support the development of efficient strategies for flood emergency and evacuation but also for designing flood mitigation measures.

Keywords: River floodplain and inundation, hydrodynamic model, advanced flood warning system, Kon – Ha Thanh river basin, Binh Dinh, Vietnam.

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