

Ph.D. thesis:

Development of flood prediction models for the Huong and Vu Gia - Thu Bon river basins in Central Vietnam.

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Abstract

The main objective of this Ph.D. project is development and application flood prediction models to simulate and predict flooding and to investigate the potential impacts of climate change on the flow in Huong and Vu Gia - Thu Bon river basins in Central Vietnam. WetSpa model is used to simulate and predict river flow in the upstream subcatchments and HEC-RAS model is applied to simulate flow and water profiles in the downstream flood planes. Simulation results show that simulated hydrographs are generally in good agreement with the observations. The predicted water profiles are used for 3D flood mapping in the flood plane of Huong river basin. An operational flood forecasting system is developed for the Vu Gia - Thu Bon river basin and tested for the October-November 2008 flood events. The results highlight that the system can be confidently used in operational flood forecasting. Statistical downscaling approach is applied to synthesise the future precipitation and temperature scenarios for the Huu Trach catchment, located in Huong river basin. The synthesised future scenarios are used as an input to WetSpa model for simulating future streamflow. The downscaling results show that temperature will become gradually warmer and precipitation will be less than in the future periods. The streamflow simulated with the WetSpa model indicates that streamflow will decrease in future periods.