Improvement of flood simulation accuracy based on the combination of hydraulic model and error correction model

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Abstract

   In this study, a hydraulic flow model and an error correction model are combined to improve the flood simulation accuracy. First, the hydraulic flow model is calibrated by optimizing the Manning's roughness coefficient that considers spatial and temporal variability. Then, an error correction model were used to correct the systematic errors of the calibrated hydraulic model. The error correction model is developed using Artificial Neural Networks (ANNs) that can estimate the systematic simulation errors of the hydraulic model by considering some state variables as inputs. The input variables are selected using parital mutual information (PMI) technique. It was found that the calibrated hydraulic model can simulate flood water levels with good accuracy. Then, the accuracy of estimated flood levels is improved further by using the error correction model. The method proposed in this study can be used to the flood control and water resources management as it can provide accurate water level eatimation.

Keywords : Hydraulic model, Errir correction, Artificial neural network (ANN), Partial mutual information (PMI), Han River

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