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The application of a reduced complexity model to forecast the flooding patterns of an anastomosing river system

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Many numerical hydraulic models have been invented for different purposes of hydraulic study. The 1D, 2D, and even 3D models, with the inherit limitations, can be used to calculate the hydraulic features of a very simple (i.e. a single straight reach) to a very complicated (i.e. multi-channels with meandering characteristics) river system. One of the most important input data for those numerical hydraulic models is the geometry of the river system. However, such a geometry data is not easy, if not possible, to fully obtain especially in the case of a remote area of a developing country. In addition, to build a 1D, 2D or 3D hydraulic model for a very complicated river system like an anastomosing one is quite challenging and sometimes it is impossible to develop a model even. Therefore, to estimate the flooding patterns of such a river system due to different scenarios of upstream discharge, a reduced complexity model is used with very limitation of input data (i.e. the assumption of river bathymetry due to satellite images (e.g. the STRM), different scenarios of real upstream discharges). The results of the model are tested against the remote sensing images and fieldtrip data to examine the accuracy of the applied model's results in terms of estimating the flooding extends in the study area from different upstream discharges. Finally, suggestions are given to the application of such a model for estimating the flooding pattern especially in the case of the lack of geometry data.

Keywords: Reduced complexity model, anastomosing river system, river geometry, satellite images.