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COMPOSITE MODELLING APPROACH TO STUDY COMPAUND FLOODING IN COASTAL AREAS

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Abstract

A study has been carried out within the framework of a bilateral project supported by the National Science Fund of Bulgaria and the Ministry of Science & Technologies of the PR of China. Based on a state-of-the-art analysis on the available tools for simulation of coastal flooding in urban & estuarine area a composite modelling approach is suggested, focused on the use of advanced numerical modeling tools, verified by large scale physical model tests, and data from coastal oceanography surveys. Two different numerical tools have been tested: MIKE FLOOD by Bulgarian team and SWASH by Chinese team, for two pilot geographical areas with high risk of coastal flooding: Asparuhovo - Karantina beach in Bulgaria and Beilun city coastal area in China. Flood inundation has been simulated for various scenarios, and relevant water elevation have been calculated and compared for the two different numerical approaches. Results received by both teams have been compared. The strong and weak points of the two approaches have been evaluated. This encourages authors for further research and improvement of the demonstrated approach. Further recommendations on the use of the selected numerical tools, in combination with physical modeling and field observations data (composite modeling approach) are suggested in the paper. The received numerical results can be used to assist flood mapping and flood risk assessment, and therefore contribute to sustainable environmentally sound solutions for protection of coastal and riverside cities against compound flooding.

Keywords

Digital elevation model, Numerical simulations, Model verification, Field measurement data