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Investigation of Flood Inundation Probability in Taiwan

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Taiwan is located at a special point, which is in the path of typhoons from northeast Pacific Ocean. Taiwan is also situated in a tropical-subtropical transition zone. As a result, rainfall is abundant all the year round, especially in summer and autumn. For flood inundation analysis in Taiwan, there exist a lot of uncertainties in hydrological, hydraulic and land-surface topography characteristics, which can change flood inundation characteristics. According to the 7th work item of article 22 in Disaster Prevention and Protection Act in Taiwan, for preventing flood disaster being deteriorating, investigation analysis of disaster potentials, hazardous degree and situation simulation must be proceeded with scientific approaches. However, the flood potential analysis uses a deterministic approach to define flood inundation without considering data uncertainties. This research combines data uncertainty concept in flood inundation maps for showing flood probabilities in each grid. It can be an emergency evacuation basis as typhoons come and extremely torrential rain begin. The research selects Hebauyu watershed of Chiayi County as the demonstration area. Owing to uncertainties of data used, sensitivity analysis is first conducted by using Latin Hypercube sampling (LHS). LHS data sets are next input into an integrated numerical model, which is herein developed to assess flood inundation hazards in coastal lowlands, base on the extension of the 1-D river routing model and the 2-D inundation routing model. Finally, the probability of flood inundation simulation is calculated, and the flood inundation probability maps are obtained. Flood Inundation probability maps can be an alternative of the old flood potential maps for being a regard of building new hydraulic infrastructure in the future.