Modelling overland flow concentration in urban area with structural and geometric effects

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Recently, urban flooding has become an important issue due to heavy rainfall and rapid urbanization. For urban flooding, the drainage of stormwater is essential in inundation analysis, including the concentration of overland flow and the transportation in sewer system. However, in the past, the concentration of overland flow has not been well examined, especially under the influence of building structures. In the past, the overland flow in urban area is hard to calculate and causing lots of computation time. Currently, two-dimensional hydraulic models become an important tool for flood planning and management. In this study, we compare two hydraulic numerical models based on grid cell. So, we can flow pattern of overland flow in urban area for better understanding. First one is FLO-2D, which uses full dynamic wave momentum equation to predict the progression of a flood hydrograph. The second model is GSSHA, a physically-based, distributed model, which uses diffusive wave equation as governing equation to execute numerical simulation. With these two hydraulic models, this study focuses on how the constructions affect the water flow during the flood and whether they can be an important factor to influence the drainage system in urbanized area.

Keywords: urban flooding simulation, two-dimensional hydraulic model, influence of buildings, rainfall-runoff model, FLO-2D, GSSHA