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Impact of urbanization on flood of Shigu creek in Dongguan city

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Abstract: Shigu creek is a highly urbanized small watershed in Dongguan City. Due to rapid urbanization, quick flood response has been observed, which posted great threat to the flood security of Dongguan City. Flood forecasting is one of the most important measures for mitigating watershed flood disaster. Distributed hydrological model is a new generation flood forecasting model, and also big data driven model, but current models are mainly used in scientific studies. Seldom models have been used in real world flood forecasting because of a few challenges, such as big data processing and data quality control, parallel computing and supercomputing. In this paper, the Liuxihe model is employed to simulate the flood processes of Shigu creek, a highly urbanized small watershed that is a very typical watershed in Dongguan City. Liuxihe model is a physically based distributed hydrological model, DEM downloaded from the website freely is used to set up the structure of Liuxihe model in Shigu creek, and the soil type and land use type are used to derive the model parameters physically. The characteristics of urbanization of Shigu creek from 1987-2015 were analyzed.Precipitation from 3 storms was collected and used to simulate the flood processes. The results show that the Liuxihe model could be used for the flood forecasting of Shigu creek. With the improvement of the urbanization rate, the runoff coefficient and the peak flow are increasing.
Keywords: Urban flood; Distributed hydrological model; Urbanization; Remote sensing; Land use/cover