



Impacts of climate change on the population health associated with pluvial disaster

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Many metropolises located in lowlands suffer pluvial inundation disaster more than pluvial flood disaster. During the post-inundation period, some water-borne illnesses would be induced from the polluted area. For improving mitigation strategies, population health risk assessment is an important tool of post-inundation disaster management, especially in the countries suffering tropical cyclones and monsoon with high frequency. Locating in the hot zone of typhoon tracks in the Western Pacific, Taiwan suffers three to five typhoons annually. Furthermore, the trend of 24 global circulation models (GCMs) shows that climate change would enhance rainfall in Taiwan. The purpose of this study is to evaluate the impacts of climate change on the population health associated with pluvial disaster.

This study applies the concept that risk is composed by hazard and vulnerability to assess the risk of the population health associated with pluvial disaster. Stochastic simulation of bi-variate Gamma distribution is developed to downscale the GCMs' monthly data to extreme rainfall event scale in time domain. According to A1B scenario in short-term period of climate change, two-dimensional overland-flow coupled with drainage systems simulation is performed based on a design extreme rainfall event to calculate the impacts of climate change on pluvial hazard to population health, including flood depth, velocity and the duration of flood recession. The environmental vulnerability for population health is carried out according to the factors of resident and environment. The risk matrix is applied to show the risk by composing the inundation hazards and vulnerabilities associated with population health.

The Taipei City, the Capital of Taiwan, is selected as the case study because the highest density of population in Taiwan causes high exposure to the risk of water-borne illnesses. Through assessing the impacts of climate change on the population health associated with pluvial disaster of the Taipei City, the analytical results of pluvial-induced health risk can provide useful information for setting mitigation strategies of post-inundation disaster management.

Keywords: climate change, population health, pluvial disaster.