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[Abstract Title]

Analysis of Population Exposure to Extreme Precipitation in Hubei Province under the Climate Change Scenarios

[Abstract]

In the context of global warming, extreme precipitation events occur frequently, and the disaster risks induced by them are increasing. Based on the historical disaster data of Hubei province, this paper constructed a regression model between disaster lose rate, rainstorm intensity and Per Capita Gross National Product. Then selected daily precipitation data under RCP4.5 and RCP8.5 scenarios along with population and GDP data under the corresponding SSPs paths, we analyzed the temporal and spatial distribution characteristics and changes of extreme precipitation events, population and population exposure at different periods in Hubei province. The results show that:
(1)There is a significant ($p < 0.01$) correlation between the disaster loss rate with rainfall intensity and per capita GDP, and constructing the disaster rate model can evaluate the population exposure more accurately.
(2)Extreme precipitation events in Hubei province decreased from southeast to northwest in space, and the overall intensity increased with time.
(3)The population of Hubei province is generally scattered between east and west, the total population increases first and then decreases, the total number under SSP3 path is always higher than SSP2 path. The per capita GDP presents a

pattern of decreasing distribution around Wuhan city, and it grows rapidly over time, the value of SSP2 path is always higher than SSP3.

(4)The high value center of population exposure to extreme precipitation in Hubei province develops southward and eastward with time. Meanwhile, as the rapid growth of per capita GDP, the level of fortification will greatly increase and total population decline, so the total exposure will decreases with time. Under the scenario of RCP8.5, the exposure density and total exposure of the population under extreme precipitation are always higher than that under RCP4.5, and the gap will increase in the medium term in the future.

[Keywords]

extreme precipitation; RCPs; disaster lose rate model; population exposure; Hubei province