

Ecological Risks of Geological Disasters

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EDITORIAL

Geological disasters not only jeopardise the ecological security of urban agglomerations, but also represent a major threat to citizens' lives and property. The study develops a three-dimensional ecological risk assessment model based on "hazard-vulnerability-exposure," uses an information value model to assess hazard, landscape indices to analyse vulnerability, and nighttime light data to indicate population exposure, and then quantifies the watershed-scale ecological risks of geological disasters and their patterns. The findings reveal that geological disasters pose mostly medium ecological threats, with a declining tendency from southeastern coastal areas to northwestern inland areas. The three aspects of hazard, susceptibility, and exposure combine to form eight patterns of ecological risk. The combination of an elevation of 600–800 m, a slope of 5° – 15° , a southwest aspect, NDVI of 0.4–0.6, lithology of metamorphic rocks, land use type of farmland, multi-year average precipitation of >1600 mm, distance to river of less than 200 m, and distance to fault of less than 1000 m increases the likelihood of geological disasters. According to the study, ecological hazards of geological catastrophes are highest in the southeast and lowest in the northwest, and are the highest when the high vulnerability and high exposure patterns are combined, out of the eight patterns that are dominated by high population exposure. Therefore, ecological risk assessment over geological disasters in the urban

agglomeration in the Fujian Delta region provides support for decision-making on local ecological protection and administration more effectively. As a result, the study uses the urban agglomeration in the Fujian Delta region in a mountainous environment as the study area and geological disasters as the object of study, beginning with disaster breeding environment, disaster-bearing body, and exposure response to develop a three-dimensional ecological risk assessment model. It uses an information value model to assess the risk of geological disasters, landscape indices to assess vulnerability, and nighttime light data to indicate population exposure, comprehensively assessing the ecological risks of geological disasters in the region from the perspectives of spatial distribution, spatial aggregation, and pattern combinations. The study aims to enrich theories and indicator systems on ecological risk assessment of geological disasters, discuss prevention strategies against ecological risks of geological disasters in the future development of the urban agglomeration, and provide a theoretical foundation for the control of natural disaster risk, based on watershed-scale ecological risk combination patterns. The research examines the ecological risk of geological disasters, focusing on hazard, susceptibility, and population exposure in order to develop an evaluation indicator system.

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Received: June 09, 2021; **Accepted:** June 23, 2021; **Published:** June 30, 2021

Citation: Chen W (2021) Ecological Risks of Geological Disasters. J Geol Geophys. S3:e004.

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