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Environmental impact evaluation model of dam breach — considering the uncertainty feature of environment

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ABSTRACT

The environmental impact of dam breach has the features of complexity and uncertainty. There is a lack of systematic and comprehensive research on the environmental impact of dam breach in China. Considering such fuzziness of environment evaluation and the lack of precise data, this work chooses the method of multi-index comprehensive evaluation. Targeting to solve the uncertainty problem of weight calculation and evaluation model, this work introduces the statistic cloud theory to calculate the weight and variable fuzzy set theory to evaluate the environmental impact. We select seven environmental impact factors, including channel morphology, vegetation coverage, water and soil environment, biodiversity, human ecology, and industrial pollution, are selected to construct the evaluation index system and construct the value standard of them. The models are applied to the dam of Shaheji Reservoir in China. The results show that the environmental impact degree of the reservoir member an extremely serious grade mostly, reaching 0.589. Compared with the evaluation results already done, the result of the proposed models shows that the models are reasonable and scientific, which provides a new method for environmental impact assessment of dam breach considering the uncertainty feature of the environment.

Keywords: Environmental impact; Dam breach; Cloud theory; Variable fuzzy set

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