Geophysical Research Abstracts
Vol. 21, EGU2019-11777-2, 2019
EGU General Assembly 2019

Research on Analytical Method for Risk Analysis of Reservoir Flood Control Forecast Operation

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Due to the usage of forecasting information, the reservoir flood control forecast operation method makes the reservoir more effective in regulating floods than the conventional method. However, it is necessary to conduct risk analysis on the forecast operation method considering the uncertainty of the forecasting information. It is difficult for the traditional risk analysis method to balance complexity, accuracy and application range. Inspired by the risk analysis method based on the law of total probability (MLTP), we propose an analytical method based on integral thought (AMIT) for risk analysis of reservoir flood control forecast operation. AMIT introduces the concept of hazard domain, and the risk analysis results can be obtained easily by computing the integral of the risk factor's joint probability density function (pdf) over the hazard domain. Dahuofang Reservoir, which is located in the Hunhe River Basin, northeastern of China, is used as a case study. Though the risk analysis results of the two methods mentioned above are almost equal, the result obtained from AMIT is more concise than that from MLTP. The method developed in this paper can be used to analyze the risk of combined events, providing richer information and more decision-making support for reservoir managers. Furthermore, AMIT is also applicable to the risk analysis of other similar areas.