

عنوان مقاله:

Potential impact of global warming on river runoff coming to Jor reservoir, Malaysia by integration of LARS-WG with artificial neural networks

محل انتشار:

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خلاصه مقاله:

Background: Changes in temperature and precipitation pattern seriously affect the amount of river runoff coming into Dam Lake. These changes could influence the operating conditions of reservoir systems such as Jor hydropower reservoir system (Malaysia) with the total capacity of 150 MW. So, it is necessary to analyze the effect of changes in weather parameters on the river runoff and consequently, the hydropower production. Methods: In this research, LARS-WG was used to downscale the weather parameters such as daily minimum temperature, maximum temperature, and precipitation based on one of the general circulation sub-model (HADCM3) under three emission scenarios, namely, A1B, A2, and B1 for the next 50 years. Then, the artificial neural network (ANN) was constructed, while rainfall and evapotranspiration were used as input data and river runoff as output data to discover the relationship between climate parameters and runoff at the present and in the future time. Results: It was revealed that the monthly mean temperature will increase approximately between 0.3- 0.7°C, while the mean monthly precipitation will vary from -22% to +22% in the next 50 years. These changes could shift the dry and wet seasons and consequently, change the river runoff volume. In most months, the results of models integration showed reductions in river runoff. Conclusion: It can be concluded that the output of hydropower reservoir system is highly dependent on the river runoff. So, the impacts of climate changes should be considered by the reservoir operators/ managers to reduce these impacts and secure water supplies.

کلمات کلیدی:

Climate change, Neural Networks, Malaysia, Weather, Temperature

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