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Development of a Regional Regression Model for Estimating Annual Runoff in the Hailar River Basin of China

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ABSTRACT

The Hailar River, a first-grade tributary of the Erguna River that borders China and Russia, is the main water source for the local industry and agriculture. However, because there are only 11 flow gauging stations and those stations cannot monitor all runoff paths, it is hard to directly use the existing flow data to estimate the annual runoffs from all subbasins of interest although such estimation is needed for utilization and protection of the water resources in the Hailar River. Thus, this study implemented an indirect approach (i.e., regional regression model) by correlating annual runoff with annual rainfall and water surface evaporation as well as hydrologic characteristics of the 11 subbasins monitored by the gauging stations. The study used 51 years (from 1956 to 2006) data. The results indicated a significant correlation (R2 > 0.87) between annual runoff and the selected subbasin characteristics and showed the model to be robust because the predicted runoffs for the validation period are compatible with the corresponding observed values. In addition, this model was used to estimate the annual runoffs for the subbasins that are not monitored by the 11 flow gauging stations, which adds new information to existing literature.

KEYWORDS

Inner Mongolia, Indirect Estimation, Monsoon Climate, Subbasin Runoff

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