

Estimation of discharge at small forest watersheds in Ibaraki Prefecture by using the SWAT model

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Prediction and evaluation of the impact of forest operations on water and nutrient cycle in forest watershed are required recently. Whereas the SWAT model has been used for estimating discharge at large watersheds consisting of agricultural land, the application of the SWAT model to forest watersheds is expected due to the high versatility of the model. To evaluate the applicability of the SWAT model to small forest watershed, this research used the SWAT model to reproduce daily discharge at small forest watersheds in Ibaraki Prefecture from 2008 through 2011. The watersheds of the Tsukuba and Katsura research sites are 3.79 and 61.7 ha, respectively. In the model calculations, actual observed soil data (soil thickness, hydraulic conductivity, saturated hydraulic conductivity) were used. As a result, the parameters for curve number, canopy maximum water storage, and groundwater had to be calibrated to fit the observed discharge at both sites. In addition, at Tsukuba and Katsura research site, it was necessary to calibrate the average slope aspect and average slope length, respectively. These results indicated that adjusting the gradient parameters was important for applying the SWAT model to the forest watersheds with steep slopes which widely distribute in Japan.

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