Pattanasak Sanmart 2007: Study of Hydrologic Characteristics in Yom River Basin by HEC-HMS Mathematical Model. Master of Engineering (Water Resources Engineering), Major Field: Water Resources Engineering, Department of Water Resources Engineering. Thesis Advisor: Associate Professor Suwatana Chittaladakorn, Ph.D. 173 pages.

The objective of this research is to determine the hydrologic characteristics for daily discharge prediction and to find parameters related to the Yom River Basin using the HEC-HMS mathematical model. The input data of this model comprises daily rainfall, monthly evaporation and initial condition data. The outputs of model are the daily discharge hydrograph of stream in the studied basin. Other resulting components are also included the quantities of stream base flow and rainfall excess. For model calibration and verification, the simulated hydrographs are compared with the data observed from related gauging stations during the years 1988-2005.

The calibration results showed the parameter values of CN, Ia, SCS lag, initial flow, recession ratio, threshold flow, Muskingum K, and Muskingum X in the ranges as follows : 35.02 - 76.93, 235.213 - 485.36 mm., 0.325 - 0.813, 21.55 - 383.11 hr., 0.017 - 6.240 cms., 0.278 - 0.986, 0.226 - 11.817 cms., 3.67 - 24.06 hr., and 0.10 - 0.364, respectively. Comparing the results of outflow hydrograph of main stream with the recorded data, it was found the differences of annual discharge and peak discharge of 10.23% and 7.27%, respectively. For sensitivity analysis, it was found that the parameter of curve number (CN) is the most influencing to the change in flowing runoff in term of peak discharge, while the time to peak (Tp) would effect to the shape of hydrograph. The relationships between time to peak (Tp) and physical catchment characteristic ($LLc / \sqrt{S}$) and the relationships between peak discharge per area (Qp/A) and time to peak could be expressed by the equations of $Tp = 0.1899(LLc / \sqrt{S})^{0.5122}$ and $Qp/A = 1.4469(Tp)^{0.5923}$, respectively. From these results, it could be further used for daily discharge estimation in the Yom River basin appropriately.

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