

Wiparat Thongdet 2012: Application of Penman, Penman - Monteith and Rutter Model for Estimating Evapotranspiration of Hill Evergreen Forest at Huai Kog Ma Watershed, Doi Pui, Chiang Mai Province. Master of Science (Watershed and Environmental Management), Major Field: Watershed and Environmental Management, Department of Conservation. Thesis Advisor: Assistant Professor Sakhan Teejuntuk, Ph.D. 103 pages.

This study was the application of mathematical model coupling the Penman, Penman - Monteith and Rutter's model to estimate evapotranspiration of a hill evergreen forest at Huai Kog Ma, Doipui, Chiang Mai province, northern of Thailand. The results obtained from the model were compared with that measured from the Eddy -Correlation method. Nash and Sutcliffe's parameter showing efficiency of the model (NSE) was employed for calibration and verification of the model. The results were summarized as follows.

The accuracy of model calibration showed that rainfall intercepted water derived from the Rutter's model based on 10 minute data was equal to 0.8858 which was approximate to using 30 minute that was equal to 0.8890. Average NSE of transpiration estimation based on Penman and Penman - Monteith model using 10 minute data was equal to 0.3965 which was higher than using 30 minute (0.3181). Model verification has shown lower accuracy both for rainfall interception and transpiration estimation. NSE using 10 minute data was around 0.5130 – 0.8981 or 0.7661 by average which was lower than using 30 minute data that was equal to 0.8654 – 0.9559 or 0.9141 by average. Verification of transpiration model shows similar result as that from the interception model. NSE using 30 minute data was around 0.1395 – 0.5361 or equal to 0.3596 by average which was higher than the result using 10 minute data that NSE was around 0.266 - 0.4916 or 0.3433 by average. Estimated evapotranspiration of 2008 from the model based on 10 minute data is equal to 1,261.97 mm/year or 2.82 – 4.52 mm/day while using 30 minute was equal to 1,024.39 mm/year or 1.86 – 4.63 mm/day.

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