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An estimation of net radiation from global solar radiation in the main regions of Thailand

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Net radiation can be used for different purposes especially for studying the energy or radiation balance, which can be further analyzed to investigate a global warming. In order to utilize these applications, it is necessary to know the amount of net radiation in that area. This can be done by installing a net radiometer for measuring the net radiation. However, there are few monitoring stations of net radiation compared to a global solar radiation in Thailand. Therefore, this research aims to analyze a statistical characteristic of the measured net radiation and to develop a model for estimating the net radiation from the global solar radiation at four solar monitoring stations in the main regions of Thailand, namely Chiang Mai, Ubon Ratchathani, Songkhla and Nakhon Pathom during the year of 2017 to 2021. The results showed that the average net radiation of these stations was between $8-12 \text{ MJ/m}^2$. The relationship between daily and monthly average daily net radiation and global solar radiation was found to be a linear. After that, the developed model was validated by comparing the estimated and measured net radiation. The discrepancy between the calculated net radiation and that obtained from the measurements was presented in terms of root mean square difference (RMSD) and mean bias difference (MBD) ranged from 6.98% to 16.03% and -1.82% to 6.77%, respectively.

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