



Contribution ID: 291 Contribution code: S1 Physics Innovation

Type: Oral Presentation

A model for estimating global spectral solar radiation under all-sky conditions for Nakhon Pathom station Thailand

Friday, June 24, 2022 4:00 PM (15 minutes)

Global spectral solar irradiance is of importance for various solar energy applications such as photovoltaic systems and selective surfaces of flat plate solar collectors. In this study, a model for estimating global spectral solar irradiance under all-sky conditions for Nakhon Pathom station (13.82°N , 100.04°E) Thailand was developed. The model expresses the global spectral solar irradiance under all-sky conditions as a multiplication of two functions. The first function is a global spectral solar irradiance under clear sky condition and the second function is an expression of a cloud modification factor. This factor is a function of satellite-derived cloud index. To obtain the first and the second functions, global spectral solar irradiance was measured at Nakhon Pathom station in Thailand for the year 2017-2019 using a spectroradiometer (EKO, model MS-710). Ancillary data such as aerosol optical depth and precipitable water were obtained from an AERONET sunphotometer installed at the same station. The validation of the model was carried out using an independent data set from the same station for the year 2020. It was found that the global spectral solar irradiance from the measurement and that calculated from the model were in reasonable agreement, with the discrepancy in terms of root mean square difference (RMSD) and mean bias difference (MBD) of 12.39% and -0.64%, respectively.

Primary author: KHAKHU, Sunisa (Department of Physics, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand)

Co-authors: Dr MASIRI, Itsara (Department of Physics, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand); Dr WATTAN, Rungrat (Department of Physics, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand); Prof. JANJAI, Serm (Department of Physics, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand)

Presenter: KHAKHU, Sunisa (Department of Physics, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand)

Session Classification: S1 Physics Innovation