PA19) Analysis of Solar Irradiance Measurement From a Multi- Filter Radiometer At Kwangju, South Korea.

Ogunjobi K.O, Kim Y. J , He Z , and Ryu. S.Y.
Department of Environmental Science & Engineering,
Kwangju Institute of Science and Technology

Abstract.

Direct-normal, total horizontal and diffuse horizontal irradiance data obtained from a multi-filter rotating shadowband radiometer over seven different wavelength bands (416nm, 515nm, 616nm, 675nm, 870nm and 940nm and the entire spectrum) has been analyzed at Kwangju, South Korea from June 1998 December 2000. The maximum hourly global radiation flux ranged from 0.44 MJ/m^2 to 2.68 MJ/m^2 at around 11:00-12:00 Hr local time while the maximum hourly diffuse radiation flux ranged from about 0.96 MJ/m^2 to 1.37 MJ/m^2. The maximum hourly direct irradiance ranged from 1.42 MJ/m^2 to 2.92 MJ/m^2 from June1998-2000. During the period under consideration, the average monthly global radiation recorded were 13.09 MJ/m^2/day, 10.58MJ/m^2/day and 9.78MJ/m^2/day for years 1998, 1999 and 2000 respectively, while the diffuse irradiance were 6.54 MJ/m^2/day, 5.33 MJ/m^2/day and 5.14 MJ/m^2/day for 1998, 1999 and 2000 respectively. The direct irradiance values at the site were 11.63 MJ/m^2/day, 8.24MJ/m^2/day and 7.75 MJ/m^2/day for 1998, 1999 and 2000 respectively. It was observed that each of the years has its own unique meteorological parameters that affect the quality and quantity of radiation received for each month. The annual average daily fractions of the diffuse to the global radiation (KD) were 0.51, 0.61 and 0.59 for years 1998, 1999 and 2000 respectively. Analysis indicated that the average daily KD ranged from 0.13 to a maximum value of 0.99 in May for irradiance measured at the broadband channel while the maximum and minimum KD value of 0.91 and 0.23 was recorded at wavelength band 870nm and 940nm in January and September respectively. The lowest average daily clearness index (Kt) value recorded was 0.03 in May (Spring) and the annual average daily clearness indexes are 0.45, 0.34 and 0.35 for years 1998, 1999 and 2000 respectively. The frequency of clear days annually at Kwangju is 67.95%, 29.57% and 40.72% for years 1998,1999 and 2000 respectively.