Turkish Journal of Physics

Turkish Journal

of

Physics

# Empirical Correlations of Global Solar Radiation with Meteorological data for Onne, Nigeria

Louis E. AKPABIO[1], Sunday O. UDO[2], Sunday E. ETUK[1]
[1]Department of Physics, University of Uyo, Uyo-NIGERIA
e-mail: leabio2002@yahoo.com
[2]Department of Physics, University of Calabar, Calabar-NIGERIA

Keywords
Authors

phys@tubitak.gov.tr

Scientific Journals Home Page

**Abstract:** Multiple linear regression models were developed to estimate the monthly average daily global solar radiation using ten parameters during a period of sixteen years (1984 to 1999) for Onne, Nigeria; the extraterrestrial radiation, average daily temperature, ratio of minimum and maximum daily temperature, relative humidity, ratio of sunshine duration, solar declination, average soil temperature, average pan evaporimeter, average rain fall and average daily dew. Even though up to ten variable correlations has been developed; the results showed that eight variable correlations with the highest value of correlation coefficient R gives the best result when considering the error terms (mean percentage error (MPE), mean bias error (MBE), root mean square error (RMSE)) and it has a percentage error within the range of --3.85% to 3.91%. This correlation equation is given as $H = - 7.489 + 0.316\ H_{\circ} + 0.236\ T - 7.000\ \theta + 6.758$ \times $10^{-2} RH + 17035\ n/N + 4.444$ \times $10^{-2}\delta - 0.177\ ST + 674.342\ EV$, where H, $H_o$, T, $\theta$, RH, n/N, $\delta$, St and EV are the global solar radiation, extraterrestrial radiation, temperature, ratio of minimum and maximum temperature, ratio of shine duration, declination, soil temperature and pan evaporimeter. The developed correlation can use for estimating global solar radiation of locations within the rainforest climatic zone of southern Nigeria.

---

Turk. J. Phys., **28**, (2004), 205-212.
Full text: pdf
Other articles published in the same issue: Turk. J. Phys.,vol.28,iss.3.