

Abstract

This study estimates the total solar radiation potential over Nairobi City. Several theoretical models based on the initial work of Angstrom have been used to estimate the global solar radiations on a horizontal surface for the city, using bright sunshine hours for the period 2004–2014. The models were developed using the 2004–2012 sunshine hours data and validated by comparing with measured values for 2013 and 2014. Dependencies of the models were tested using Mean Bias Error, Root Mean Square Error, the Nash–Sutcliffe Equation and t-statistics. The result of clearness index for Nairobi shows that the sky is clear all year round except during the June-July-August season where KT is less than 0.5. Most models tested in the current studies were able to adequately estimate daily mean monthly global radiation from sunshine duration with Akinoglu and Ecevit model giving the best estimation.