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on the applicability of temperature based models for the estimation of global solar radiation on SAURAN weather stations

Access to clean energy is essential to promote green economic growth, reduces climate change, increase green employment opportunities, support the provision of social services, and generally promote human development. Solar energy is one of important renewable energy source to supply major part of world's energy demand and can reduce the use of the fossil fuels. The knowledge of solar radiation at a particular area is a key issue for different solar energy applications and installation of solar energy technologies. Photovoltaic as a solar energy conversion system is sensitive to sunlight and ambient temperature. However, for the efficient functioning and better performance of renewable energy systems, the information of solar radiation and its components at a particular location in the ground is very essential. The study focused on evaluation and the applicability of the two temperature-based models i.e. Hagreaves & Samani and Annandale. The statistical analysis results showed that the coefficient of determination is 0.9720. The MBE and RMSE are 0.0020 and 0.0115 respectively. The models were used to compute estimated global solar radiation which finally showed a good relationship compared to the observed data. The study was based on the Southern African Universities Radiometric Network (SAURAN) research stations: University of Venda-Vuwani and Stellenbosch University. The global radiation, maximum and minimum temperatures were obtained from the SAURAN data and they were used in different temperature-based models to estimate the global solar radiation. The global solar radiation and the number of days were plotted against each other. The results showed which models were suitable for the two stations selected and the measured and estimated global solar radiation were compared.

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yes

Level for award
 (Hons, MSc,
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Hons

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