Contribution ID: **134**   Type: **Oral Presentation**

GLOBAL SOLAR RADIATION ESTIMATION USING TEMPERATURE DATA FOR NWANEDI ARC STATION OF VHEMBE DISTRICT, SOUTH AFRICA.

Wednesday, 5 July 2017 10:00 (20 minutes)

In developing countries like South Africa the global solar radiation and its components is not available for all locations due to the lack of weather station and the cost of establishing them. Thus there is a dire need of using different theoretical models for the estimation of global solar radiation using different climatological parameters at a given locations. In this study, two temperature based model developed by Clemence and Hargreaves & Samani were employed to estimate global solar radiation from the temperature data measured at Nwanedi ARC station. The models studied were calibrated using five years temperature data. Estimated values were compared with measured values in terms of statistical evaluation indicators like the coefficient of determination (R2), mean percentage error (MPE), mean bias error (MBE) and root mean square error (RMSE). The statistical analysis showed that the models assessed were well suited to accurately estimate the solar potential at Nwanedi area. The two equations used are:

1. $H = (1.233 H_0 \Delta T + 10.593 T_{max} - 0.713 T_{max} \Delta T + 16.548)^* 0.0418$
2. $H = H_0 K_r (\sqrt{\Delta T})$

were H_0 is the extraterrestrial radiation, T_{max} is the daily maximum temperature, ΔT is the difference between the daily maximum and minimum temperature and h is the global solar radiation

Keywords: Solar radiation, temperature, extraterrestrial radiation

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Session Classification: Theoretical and Computational Physics 1

Track Classification: Track G - Theoretical and Computational Physics