



Contribution ID: 377

Type: Poster Presentation

Solar Metrology at the Fort Hare institute of Technology, Alice, South Africa

Tuesday, 4 July 2017 17:10 (1h 50m)

The sun is the major source of energy on the planet and is at the center of all the other energy sources. The energy generated by the sun is more than enough to take care of the earth's energy needs. Knowledge of the solar characteristics for a particular location is very important to different fields of study, amongst which are solar photovoltaic systems. The existing literature on solar characterization of various locations, deals mainly with locations in the Northern hemisphere. Applying the same procedures to locations in the southern hemisphere can be very cumbersome and confusing at times.

Therefore, the aim of this work is to do an in-depth analysis of the solar characteristics at the Fort Hare Institute of Technology located in the Southern hemisphere. The parameters examined include; variations in the solar altitude, zenith angle, azimuth angle, sunrise time, sunset time, solar noon, direct, diffuse and reflected solar insolation, solar declination, equation of time, solar analemma and air mass ratio for a period of one year. Furthermore, an analysis of the yearly weather patterns such as rainfall, wind speed and direction, ambient temperature and relative humidity were also examined. Existing mathematical models from literature were used to do the analyses and a real time simulation was developed on an excel spreadsheet to for the various parameters to see how they each change at various hours of the day for the entire year. This calculated data were then superimposed on data measured by a recently installed, comprehensive Solar Measurement Station. The science of the solar measurement or solar metrology forms the basis for the paper.

Summary

Solar Metrology, Solar Altitude, Solar Noon, Solar Analemma

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

MSc

Main supervisor (name and email) and his / her institution

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

Yes

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Session Classification: Poster Session 1

Track Classification: Track F - Applied Physics