

## Verification of Satellite and Observation Measurements to Build Solar Energy Projects in North Africa

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**Abstract :** The measurements of solar radiation, satellite data has been routinely utilize to estimate solar energy. However, the temporal coverage of satellite data has some limits. The reanalysis, also known as "retrospective analysis" of the atmosphere's parameters, is produce by fusing the output of NWP (Numerical Weather Prediction) models with observation data from a variety of sources, including ground, and satellite, ship, and aircraft observation. The result is a comprehensive record of the parameters affecting weather and climate. The effectiveness of reanalysis datasets (ERA-5) for North Africa was evaluate against high-quality surfaces measured using statistical analysis. Estimating the distribution of global solar radiation (GSR) over five chosen areas in North Africa through ten-years during the period time from 2011 to 2020. To investigate seasonal change in dataset performance, a seasonal statistical analysis was conduct, which showed a considerable difference in mistakes throughout the year. By altering the temporal resolution of the data used for comparison, the performance of the dataset is alter. Better performance is indicate by the data's monthly mean values, but data accuracy is degraded. Solar resource assessment and power estimation are discuses using the ERA-5 solar radiation data. The average values of mean bias error (MBE), root mean square error (RMSE) and mean absolute error (MAE) of the reanalysis data of solar radiation vary from 0.079 to 0.222, 0.055 to 0.178, and 0.0145 to 0.198 respectively during the period time in the present research. The correlation coefficient (R2) varies from 0.93 to 99% during the period time in the present research. This research's objective is to provide a reliable representation of the world's solar radiation to aid in the use of solar energy in all sectors.

**Keywords :** solar energy, ERA-5 analysis data, global solar radiation, North Africa

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