

A new model for forecasting hourly solar radiation

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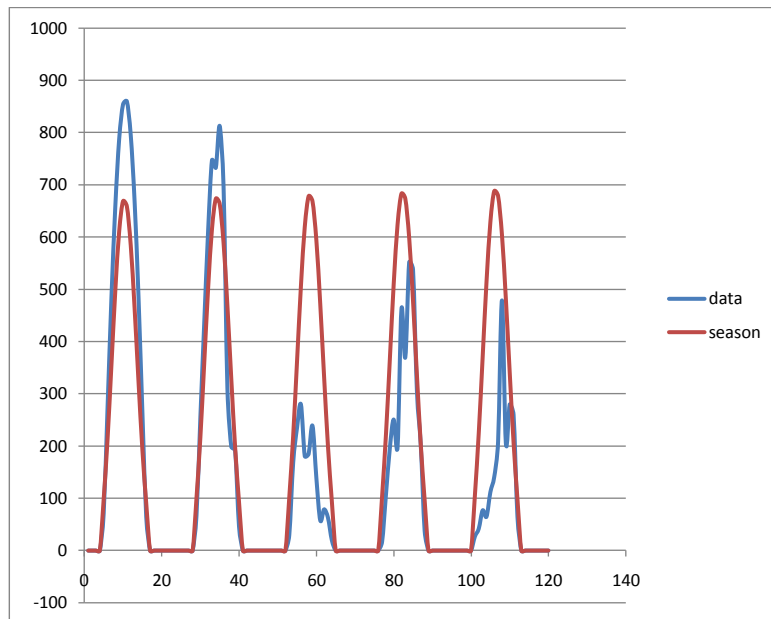


Data

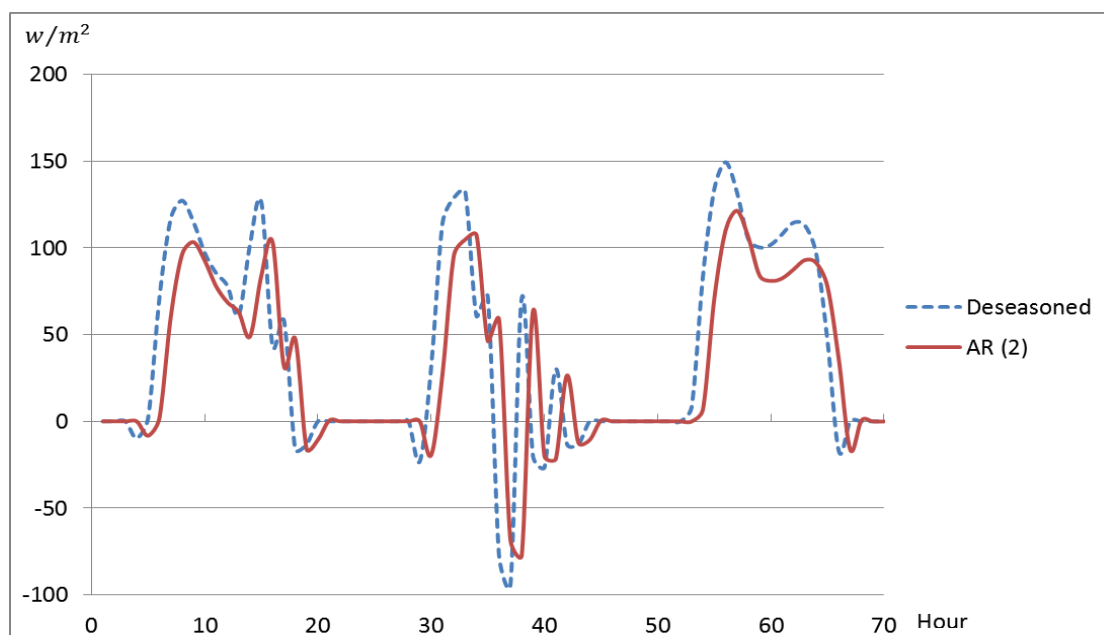
- The global solar radiation data we use in the development is from Mildura in South Australia during the year 2000. We have 8760 (24×365) hourly global radiation values in total.



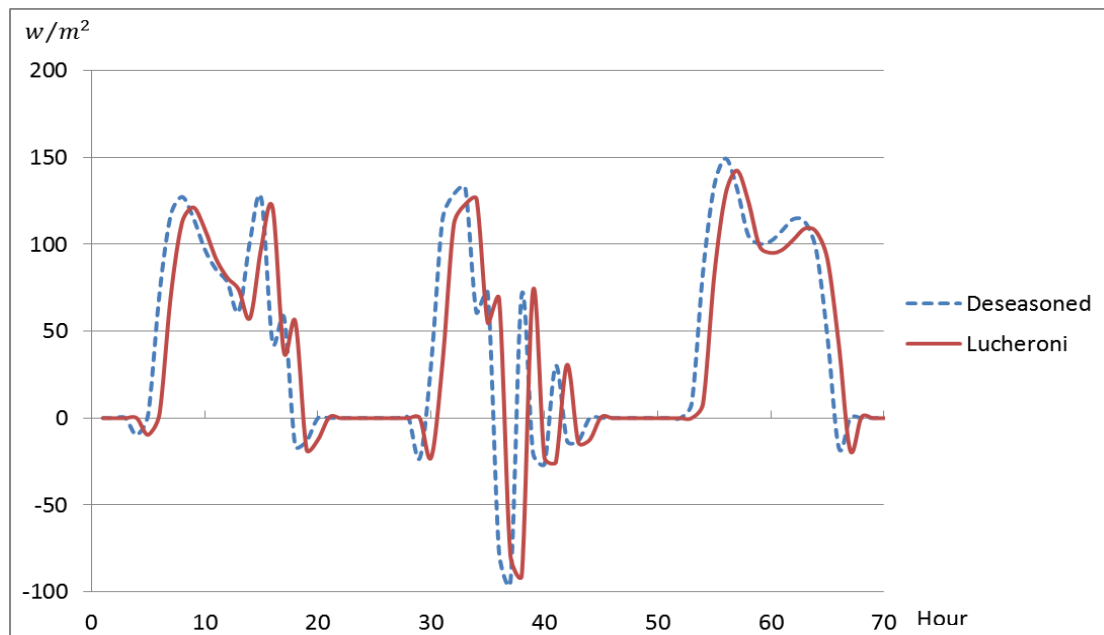
Fourier series and Solar radiation data



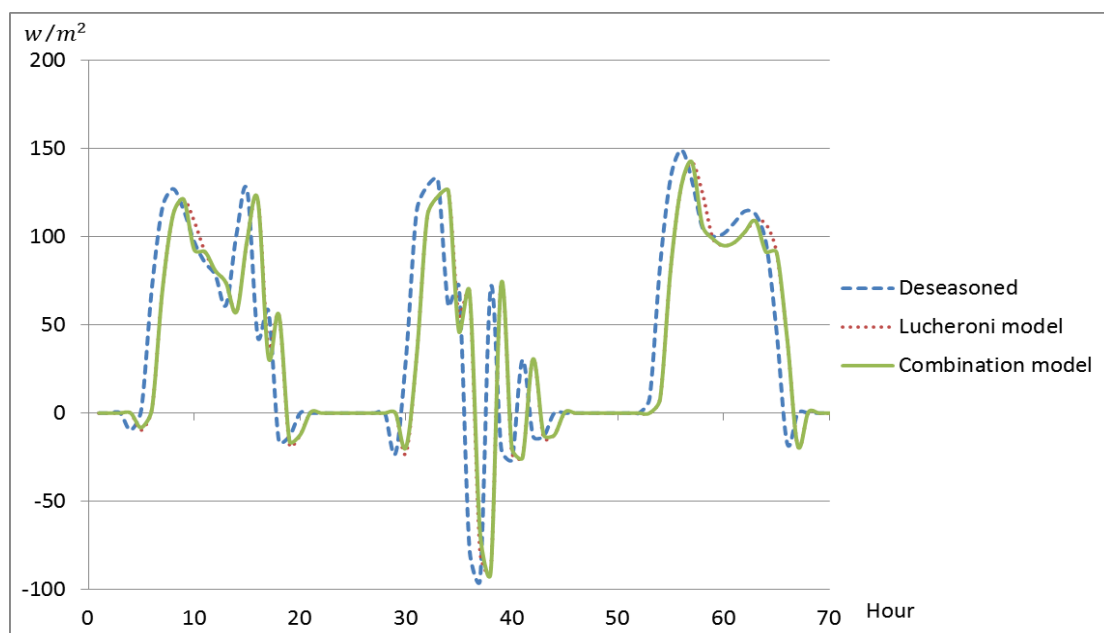
For three days AR(2)



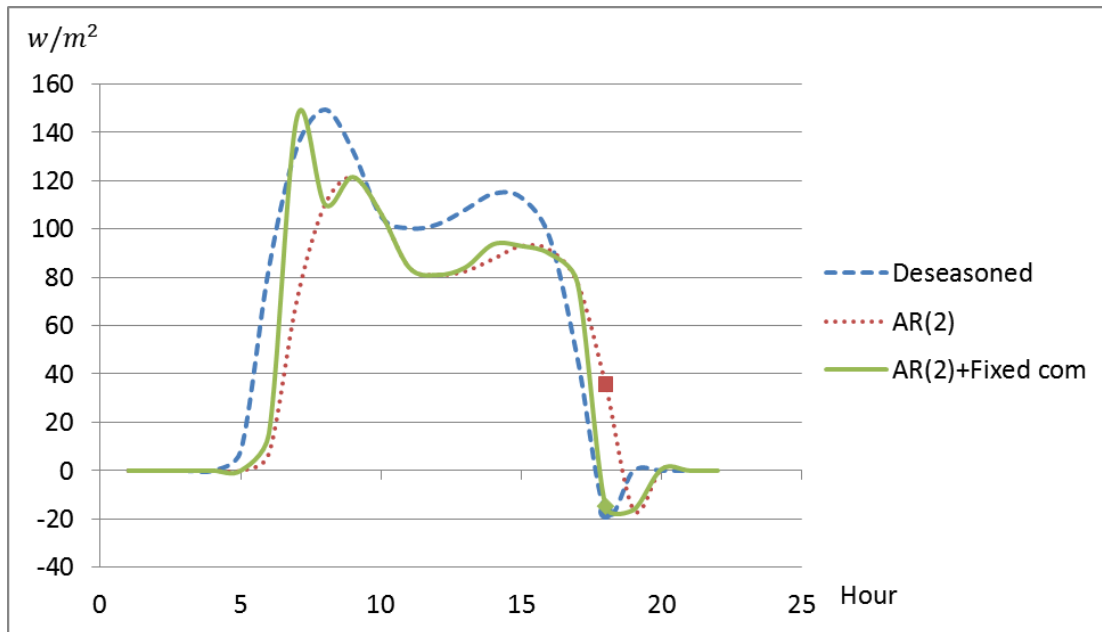
For three days Lucheroni model



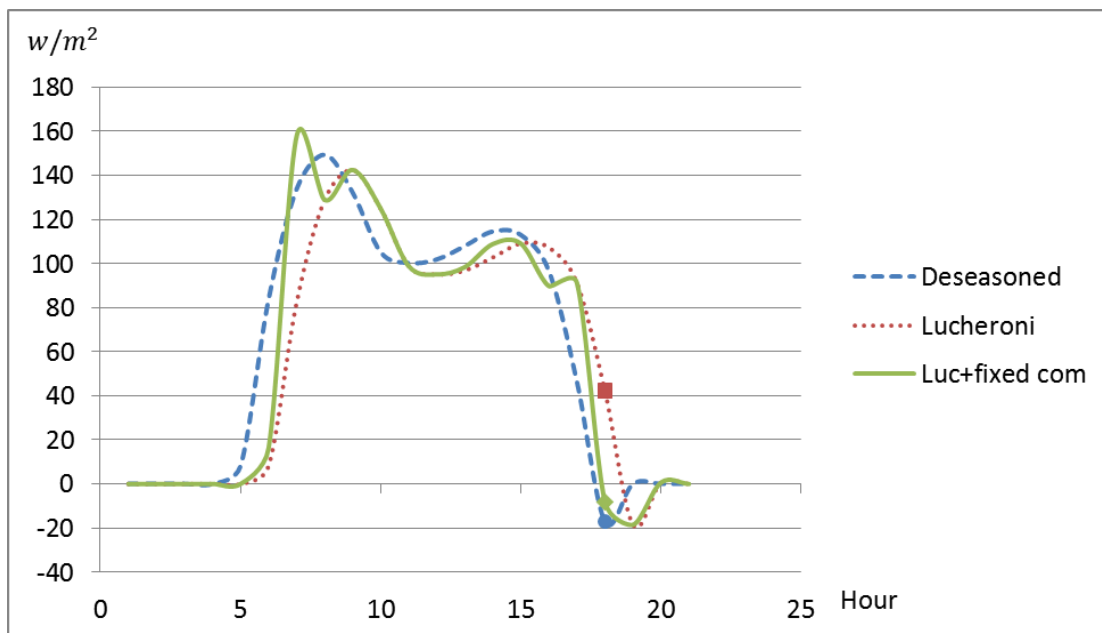
The combination of AR(2) and Lucheroni



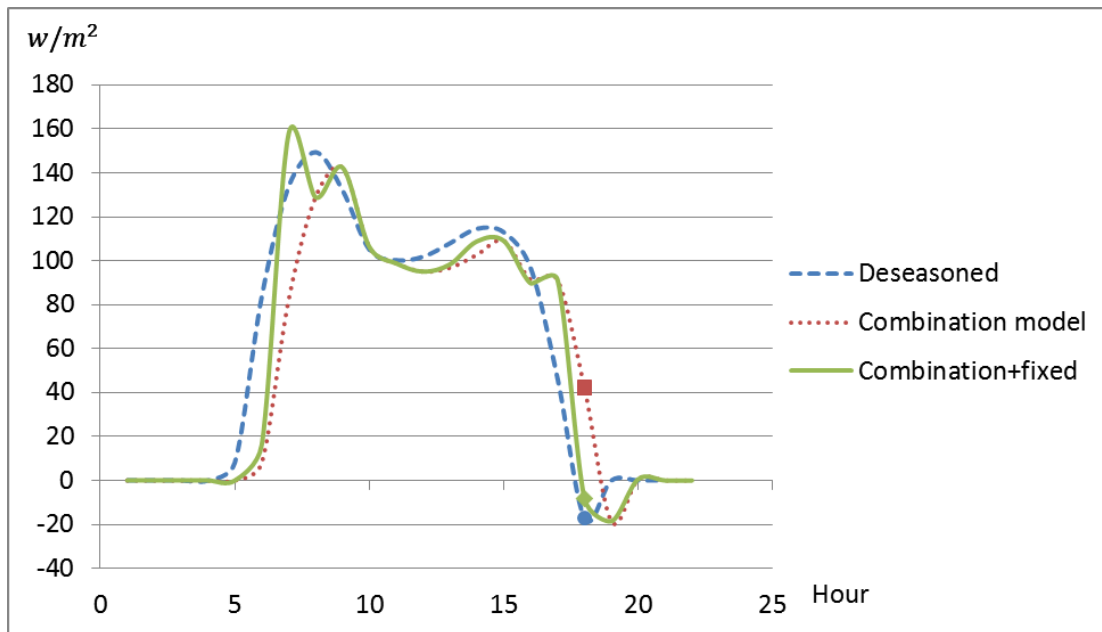
when the fixed component replaces some of the predictions
in the AR(2) model



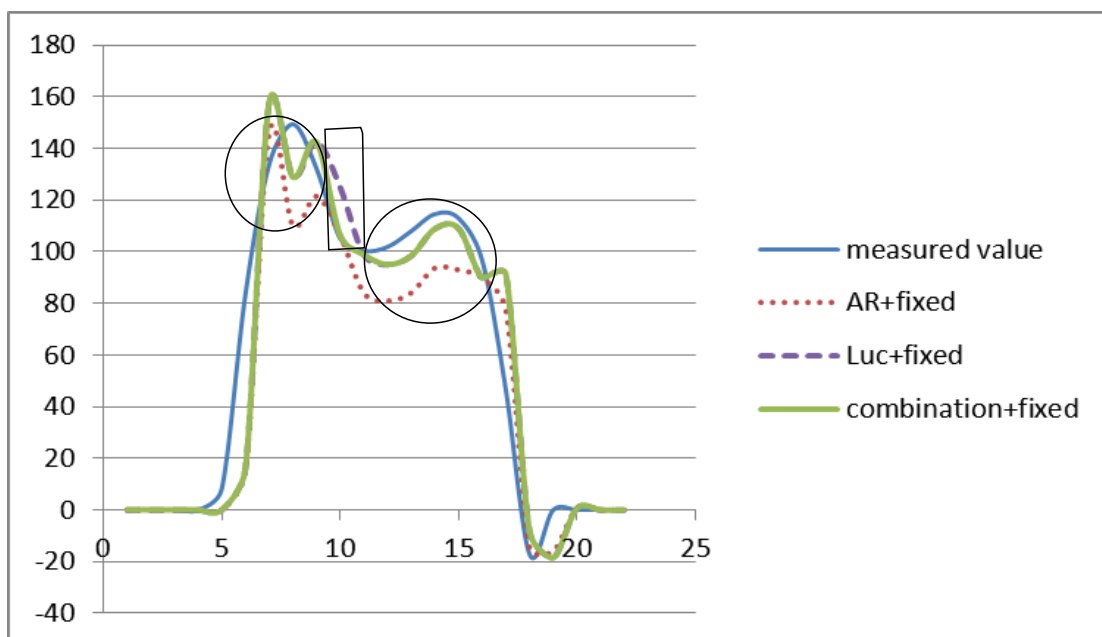
when the fixed component replaces some of the predictions
in the Lucheroni model



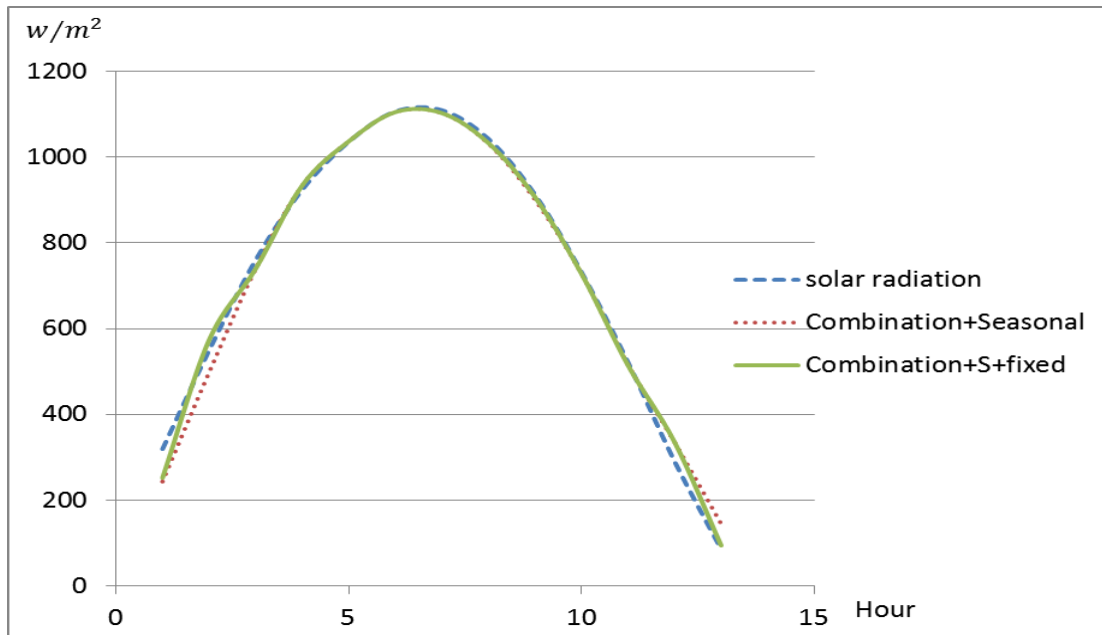
when the fixed component replaces some of the predictions
in the combination model



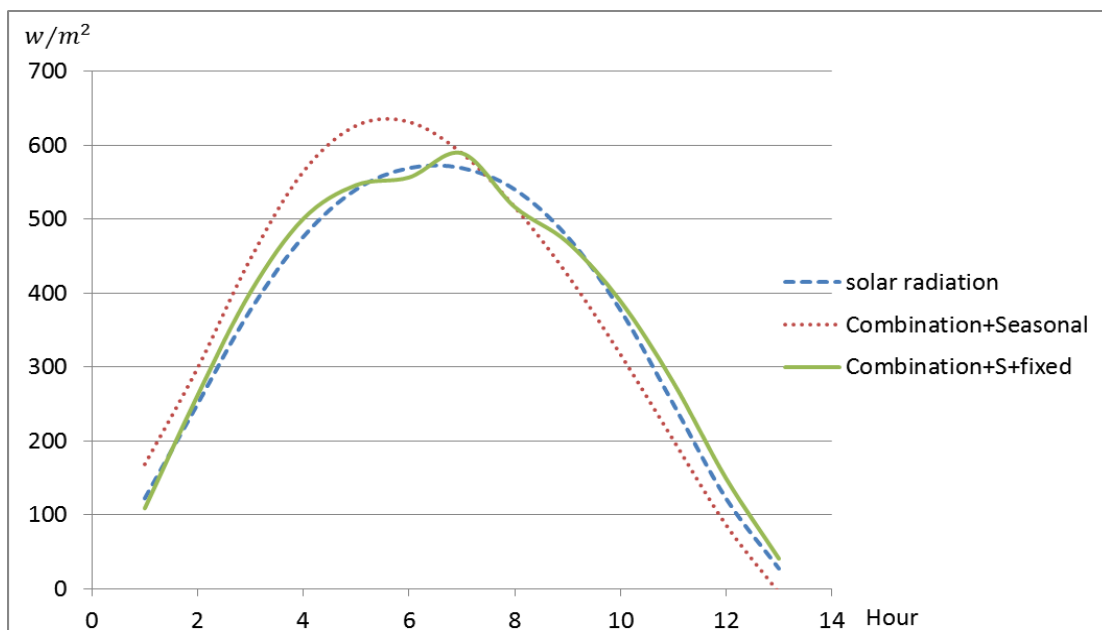
Comparison of AR(2) model with fixed component and
combination model with fixed component



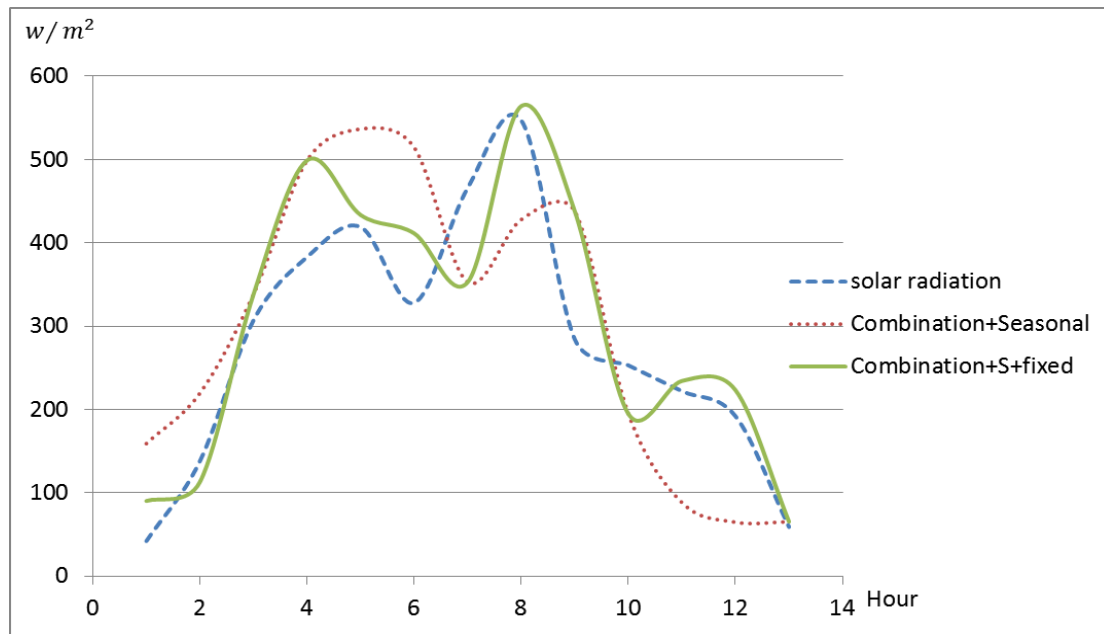
First day, a very clear day on the 4th of January 2000, Mildura



Second day, an overcast day, but with no obvious clouds blocking the sun on the 24th of January 2000, Mildura



Third day, the following day, 25th of January 2000, which was an overcast day with clouds blocking the sun intermittently.



Future work

- In the future, prediction accuracy of the proposed model can be further tested using global solar radiation data on different time scales and for different locations, as well as applied to other types of data, such as wind energy data.

- Thank you for your time.