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Investigation of the stochastic nature of solar radiation for renewable resources management

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A detailed investigation of the variability of solar radiation can be proven useful towards more efficient and sustainable design of renewable resources systems. This variability is mainly caused from the regular seasonal and diurnal variation, as well as its stochastic nature of the atmospheric processes, i.e. sunshine duration. In this context, we analyze numerous observations in Greece (Hellenic National Meteorological Service; http://www.hnms.gr/) and around the globe (NASA SSE - Surface meteorology and Solar Energy; http://www.soda-pro.com/web-services/radiation/nasa-sse) and we investigate the long-term behaviour and double periodicity of the solar radiation process. Also, we apply a parsimonious double-cyclostationary stochastic model to a theoretical scenario of solar energy production for an island in the Aegean Sea.

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