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Impact of Aerosols and Major Dust Events on the Efficiency of Photovoltaic Panels (PV) in Saudi Arabia

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ABSTRACT

During the last decade, the Kingdom of Saudi Arabia invested in harvesting solar energy. Saudi Arabia has a unique geographic location making it one of the top global regions receiving solar irradiance. Many factors, however can impact photovoltaic (PV) panels efficiency including natural and anthropogenic aerosols loading, concentration, lifetime, and deposition. In this study, we investigate how aerosols and major dust events could affect the efficiency of PV panels and its expansion as a promising source of renewable energy in Saudi Arabia. A modeling study is presented to illustrate the impact of dust and aerosols on the efficiency of PV power grids in Saudi Arabia and some selected parts of the Arabian Peninsula. Aerosols optical properties available from high resolution satellite data are used as the model input. Future work of predicting solar irradiance is discussed over certain geographic locations in Saudi Arabia.