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## Estimation and Forecasting of Global Horizontal Irradiance during Dust Storm Case in Asian

The demand of solar surface irradiance has grown enough to put more attention toward prier, accurate and spatial-temporal irradiance information to achieve efficient planning and operation. Therefore, high accurate satellite derived irradiance information has more advantages, due to ground measurements are limited. In this approach, we consider the impact of Asian dust storm outbreaks that significantly influence irradiation, air quality, weather, and climate. Therefore, it is desirable to have qualitative and quantitative information on the time, location, and coverage of these outbreaks at high spatial and temporal resolution. The Indian meteorological geostationary satellite INSAT-3D observes Asia at a temporal resolution of 30 min and a spatial resolution of 1, 4, 8, and 4 km in the visible, middle infrared, water vapour, and thermal infrared (TIR) bands, respectively. TIR observations from the geostationary platform of INSAT-3D allows computation of the infrared difference dust index (IDDI), which gives a quantitative measure of dust loading relative to clear atmosphere. Moreover, due to the high temporal resolution (30 min) of INSAT-3D observations, INSAT-3D derived dust products allow more precise monitoring of dust transportation as compared with dust products derived from polar satellite observations. The estimated and forecasted irradiance is validated with ground measurements of global horizontal irradiance. It is also compared with the Heliosat approach for the retrieval of solar surface irradiance from satellite data. The RMSE of estimated and forecasted irradiance based on the presented approach combined with cloud and dust for day and night is shown.

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