

Investigation of Short Time Scale Variation of Solar Radiation Spectrum in UV, PAR, and NIR Bands due to Atmospheric Aerosol and Water Vapor

Abstract

Long terms variation of solar insolation had been widely studied. However, its parallel observations in short time scale is rather lacking. This paper aims to investigate the short time scale evolution of solar radiation spectrum (UV, PAR, and NIR bands) due to atmospheric aerosols and water vapors. A total of 25 days of global and diffused solar spectrum ranges from air mass 2 to 6 were collected using ground-based spectrometer with shadowband technique. The result shows that variation of solar radiation is the least in UV fraction, followed by PAR and the most in NIR. Broader variations in PAR and NIR are associated with the short time scale fluctuations of aerosol and water vapors. The corresponding daily evolution of UV, PAR, and NIR fractions implies that aerosol and water vapors variation could also be responsible for the deviation pattern in the Langley-plot analysis..