

**Solar Rotational Modulations of Spectral Irradiance and Correlations with the Variability of Total Solar Irradiance**

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In the present paper, we characterize the solar rotational modulations of spectral solar irradiance (SSI) and compare them with those of TSI. Since 2003 to present, daily measurements from SORCE enable us to identify solar rotational modulation of TSI and SSI at wavelengths between 120 to 2400 nm, over one hundred cycles. The SORCE measured solar irradiances are analyzed using the EEMD (Ensemble Empirical Mode Decomposition) method to determine the phase and amplitude of 27-day solar rotational variation in TSI and SSI. The mode decomposition clearly identifies 27-day solar rotational variations in SSI, and there is robust wavelength and time dependence in the phase of the rotational mode relative to that of TSI. The rotational variations of VIS and NIR are in-phase with that of TSI, but the modes in UV region are not always in-phase with that of TSI when the phase shifts between those of UV and VIS exist. While it is questionable that the visible (VIS) to near infrared (NIR) portion of the solar spectrum has yet be observed with sufficient accuracy and precision to determine the 11-year solar cycle variations, the short-term variation independent of the two solar cycles in which they are embedded, show distinct solar rotational modulations at each wavelength. The phases of the rotational modes obtained from SORCE SSI are compared with those from SATIRE-S SSI. The comparison is in good agreement in UV ( $\lambda < 400$  nm) and NIR (700 nm  $< \lambda < 400$  nm) regions.