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Short Term Correlations between Solar Spectral Irradiance and Total Solar Irradiance Variability

As the sun cycles through Solar Minimum to Solar Maximum, the TSI (Total Solar Irradiance) fluctuates based on the presence of sunspots or facular brightening areas on the face of the sun directed towards Earth. While these changes may result in a dip (sunspots) or rise (facular brightening) in TSI, more noticeable changes are observed in the SSI (Solar Spectral Irradiance), which provides information about the solar emission of Ultraviolet, Visible, and Infrared wavelengths. Using data from SIM (Spectral Irradiance Monitor) and TIM (Total Irradiance Monitor) as part of the SORCE project and then using SOHO images corresponding to peak solar activity, SSI and TSI were compared over specific periods of about three weeks starting from January 2004 to present time. Two facular brightening days, one sunspot day, and a reference day of a quiet sun were selected for each of these comparisons. Moreover, the SIM data from 200 nm to 1600 nm was contrasted with data from Judith Lean's SSI models, also on a short term time frame. Although the integrated SSI between SIM data and Judith Lean's models is generally consistent, the spectral irradiance values vary, at some points up to .2%. SIM data and Judith Lean's SSI models were compared using different time of year and wavelength range parameters in order to fully capture the minute differences between the two data sets.