

Solar Cycle 24 Variability Observed Aura OMI

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The Ozone Monitoring Instrument (OMI, launched on the Aura satellite on July 15, 2004) is designed to measure ozone and other trace gases using backscattered radiance over the wavelength range 265-505 nm. The Sun is observed daily through a separate calibration port. Since OMI uses a 2-D CCD detector with spectral and spatial dispersion, up to 60 individual solar spectra are collected with each measurement. The use of multiple solar diffusers with different duty cycles allows the determination of degradation rates for each diffuser. Instrument throughput changes during the mission are small and well-behaved, as confirmed by repeated observations of Antarctic ice sheets. We therefore assume that gradual changes in observed irradiances from mid-2007 to mid-2009, when long-term solar activity was negligible, can be used to characterize instrument response changes at later times. Using this information, we have estimated solar spectral irradiance variations from 2007 through 2013. We find that between August 2008 and August 2013, the spectral irradiances increase by $0.7(\pm 0.3)\%$ at 265 nm, $0.5(\pm 0.3)\%$ at 300 nm, $0.2-0.3(\pm 0.2)\%$ at 320-380 nm, and $0.1-0.2(\pm 0.1)\%$ at 400-500 nm. The Mg II, Mg I and Ca II line cores change by 6.0, 2.0 and $1.5(\pm 0.5)\%$, respectively. These values are only slightly, by 0.3-0.4% below 300 nm and 0.1-0.2% above 300 nm, larger than NRLSSI model predictions for the same period. We anticipate continued OMI operations through the declining phase of Cycle 24, along with the launch of the follow-on TROPOMI instrument in late 2014.