

## **What We've Learned from *SORCE* — Solar Cycle Maximum to Minimum**

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The total solar irradiance (TSI) and solar spectral irradiance (SSI) from 0.1 nm to 34 nm and from 115 nm to 2400 nm have been measured by NASA's Solar Radiation and Climate Experiment (SORCE), which launched in January 2003. The Sun is the dominant external forcing for climate change, thus the solar irradiance and its variability are critical input for studies of the energetics of Earth's atmosphere, surface, and oceans. This talk will provide an overview of the solar irradiance and its variability as a function of time and wavelength during the SORCE mission starting with the high solar activity typical of solar maximum in 2003 to the low solar minimum-like activity in 2007. The dominant temporal variations are due to flares (minutes-hours), active region evolution and solar rotation (days-weeks), and solar cycle magnetic evolution (months-years). The variations in wavelength are dependent on where in the solar atmosphere the emissions arise. The photospheric emissions, which dominate in the near infrared, visible, and near ultraviolet ranges, vary by about 0.1% over the 11-year solar cycle and are characterized by dark sunspots and bright faculae. The emissions from the solar chromosphere and transition region are easily identified in the extreme ultraviolet and far ultraviolet ranges, and their solar cycle variations of 20% to 300% are associated with the evolution of bright plage and active network features on the Sun. Finally, coronal emissions, which dominate in the X-ray and the lower part of the extreme ultraviolet range, vary by factors of 5 to 1000 over the solar cycle.

SORCE Web / Data Site: <http://lasp.colorado.edu/sorce/>.