Over the past thirty years it has emerged that the solar irradiance varies on all timescales, but how irradiance varies by wavelength is poorly understood. It is becoming clear that the impact of solar variation on Earth’s climate is not simply limited to the total radiative forcing but that different regions of the spectrum affect the atmosphere and hydrosphere in different ways and may have complex feedback systems. To reliably model these, the primary input, that of spectral radiative forcing, must be well understood and cover climate-length periods. This can only be achieved by modeling and extending the short set of data available.

With the launch of the Solar Radiation and Climate Experiment (SORCE) in 2003, the Spectral Irradiance Monitor (SIM) onboard SORCE has been continuously observing the spectral irradiance variations at all wavelengths from 200-1600nm. This has provided the first observed spectral trends on scales longer than a solar rotation and can be used to test irradiance models.

We compare the SIM data from April 2004 to November 2009 with the SATIRE model reconstructions, which use SOHO/MDI continuum and magnetogram images to reconstruct total and spectral solar irradiance. While comparisons with the Total Irradiance Monitor (TIM), also onboard SORCE, and short-term detrended spectral regions show good agreement, the long-term trends in certain wavelength bands do not. The reason for the discrepancy is not clear and here we present the results and discuss problems that lie in both the observation and model alike.