



The SORCE Solar Irradiance Monitor: limitations in a two instruments model

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The Spectral Irradiance Monitor (SIM) instrument on board the Solar Radiation and Climate Experiment (SORCE) mission has been taking daily Solar spectral irradiance (SSI) measurements since April 2003.

It is critical to accurately track the instrument changes over time to be able to measure the small SSI variations with the solar cycle over the wavelength range covered by SIM (220-2400nm). The instrument degradation is composed of both changes in responsivity of the detectors exposed to space environment and changes in the transmission of the optics caused by induced UV photo-polymerization of outgassed material inside the instrument. The changes in diode responsivity is tracked by comparing measurements with the electrical substitution radiometer (ESR) detector which has been shown to be extremely stable over time. The degradation of the optics is monitored by taking solar measurements from two identical instruments at different time cadence and inferring the effect of cumulative solar exposure at each wavelength.

We present the limitations we have encountered with the two instrument method of tracking degradation. We'll also present the TSIS-SIM 3-instrument model and the proposed observing plan as well as future instrument potential improvements based on lessons-learned from SORCE SIM observations.