

Quantification and Effects of Diode Detector Degradation in the *SORCE SIM* Instrument

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Degradation of the diode detectors in the *SORCE SIM* instrument due to cumulative solar exposure represents a significant portion of the total degradation experienced by *SIM*. Quantifying and correcting the effects of this diode degradation is essential for producing a consistent, long-term solar irradiance data record. This degradation is calculated by comparing diode irradiance to irradiance measured by the ESR detector, which does not degrade on orbit. In this comparison, we assume the same prism degradation for both the diode and ESR. Once the prism degradation is corrected, the residual difference between the diode and ESR is attributed to the diode degradation.

The ESR data for this comparison is obtained via a special observing activity called an ESR full scan. During the primary mission of *SORCE*, these full scans were taken regularly. When day-only operations began, full scans were not taken. We obtained new ESR full scan data in December 2018 and June 2019. Using this new full scan data, the diode degradation correction has been recalculated for *SIM* Version 26 data. This new diode degradation correction removes incorrect trends from previous versions of the *SIM* data and represents an improved understanding of the ESR-diode comparison algorithm.

Additional ESR full scan observations are planned for December 2019. This new data will be used for recalculation of the diode degradation correction for Version 27 of the *SORCE SIM* data, to be released in 2020.