

TSIS SIM Release Notes for Version 1, Level 3 data product

TSIS SIM data Version 1 appears in three locations on the LISIRD website (see http://lasp.colorado.edu/lisird/data/tsis_ssi_24hr/), on the TSIS website (see: <http://lasp.colorado.edu/home/tsis/data/>) and on the NASA DAAC (see: <https://disc.gsfc.nasa.gov/datasets/>) An IDL reader for the ASCII formatted data present on the TSIS web site is available at: http://lasp.colorado.edu/home/sorce/data/lasp.colorado.edu/sorce/file_readers/read_lasp_ascii_file.pro

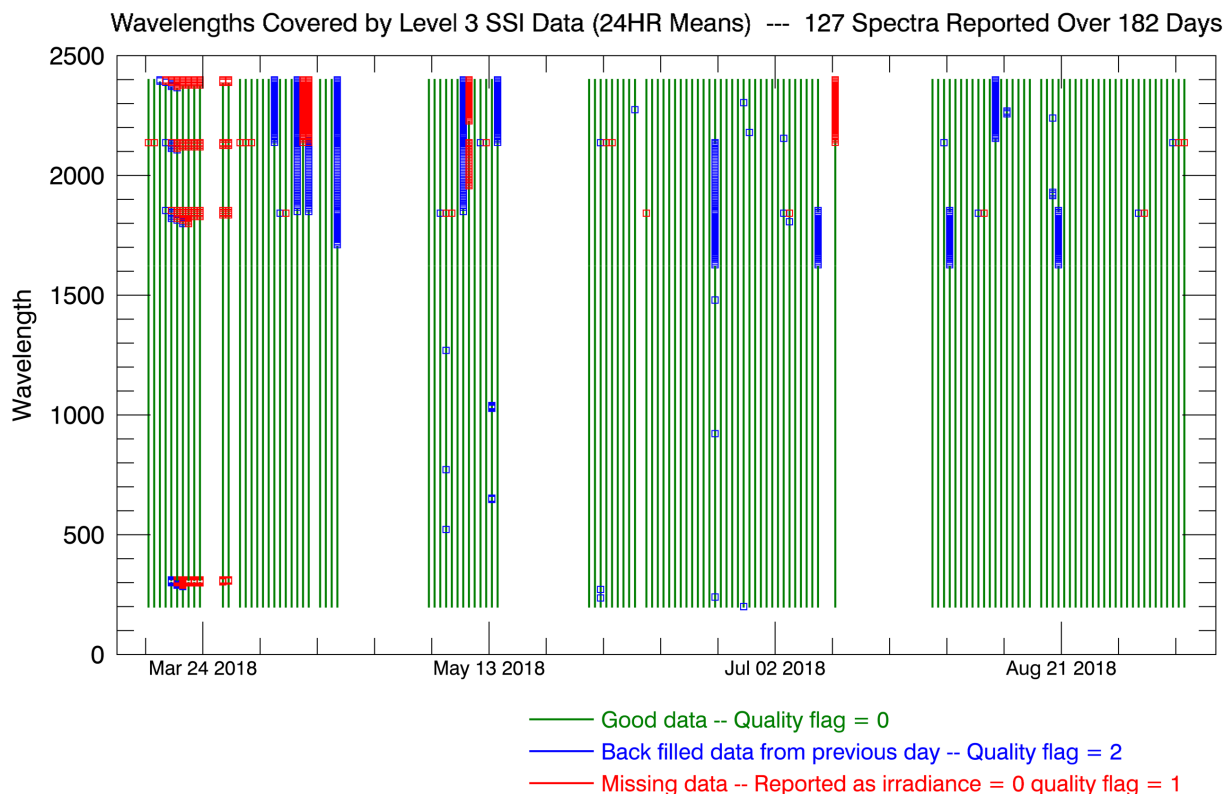
Note: As of the release of this document data is still pending release on LISIRD and the DAAC.

Table 1 gives a description of available time and spectral range for the data. A data latency of 4-14 days will occur for the processing of instrument degradation correction. The data latency is driven by the cadence at which observations on the back up channel, which are used in the degradation correction model, are obtained.

Table 1: Time and spectral range of the dataset.

| Time Range | Wavelength Range (nm) |
|----------------------|-----------------------|
| 2018/03/14 - present | 200-2400 |

Temporal gaps in acquiring TSIS SIM data have occurred due to a number of factors. These factors include ISS operational activities (i.e. orbit boost), ISS anomalies (i.e. power outages), and ISS obstructions that occur at extreme beta angles. The ISS obstructions can result in partial or complete loss of spectra for a given day. A partial loss of spectra occurs when shortened data collection time periods preclude observations of the full solar spectrum. Early in the mission, spectral gaps also occurred due to an error in instrument planning and



operations. That error has since been fixed. Figure 1 shows the TSIS SIM data acquisition record. Colored points indicate portions of the spectrum that are missing (indicated in the data record with a quality flag = 1) or that have been backfilled from the previous day (indicated in the data record with a quality flag = 2). Backfilling is never done when temporal gaps in the data exceed 1 day.

As of 9/14/18 TSIS SIM data is available on 70% of days since the beginning of nominal operations. We anticipate reducing the impact of temporal gaps in the future after the development of a separate instrument operations plan that will operate under extreme beta angle conditions.

Definition of Uncertainties

Instrument Uncertainty (in $\text{Watts/m}^2/\text{nm}$) is a pre-launch measure of instrument uncertainty with contributions from component and unit-level instrument laboratory characterizations and calibrations with the final end-to-end full spectrum validation of the measured irradiances against a NIST-traceable cryogenic radiometer performed in LASP's Spectral Radiometer Facility. Reported uncertainties for Version 1 represent an upper limit to the calibration accuracy for each spectral band pending the resolution of an additional correction in the polarization dependence of the entrance slit transmission discovered after SIM launch.

Measurement Precision (in $\text{Watts/m}^2/\text{nm}$) is derived from a measure of the on-orbit variance in the scan-to-scan repeatability in the observed spectral irradiances. This value is an upper limit of measurement precision.

Measurement Uncertainty (in $\text{Watts/m}^2/\text{nm}$) is a metric of the overall on-orbit uncertainty. It has contributions from instrument uncertainty, uncertainty due to post-processing of data (including correction of instrument degradation), and uncertainty due to differences between observed irradiances for the 3 separate SIM channels. This quantity is currently not populated in Version 1 release pending the necessary on-orbit completion of the full, three interchannel calibration activity and analysis (scheduled for October 2018).