GOES-19 SUVI Level 1b (L1b) Data Release
Provisional Data Quality
25 February 2025
Read-Me for Data Users

The GOES-R Peer Stakeholder - Product Validation Review (PS-PVR) for the GOES-19 Solar Ultraviolet Imager (SUVI) Extreme Ultraviolet Imagery (EUV) L1b Provisional Maturity was held on 25 February 2025. As a result of this review, NOAA has confirmed that the GOES-19 SUVI L1b data are at Provisional Validation Maturity as of 25 February 2025.

SUVI data consist of solar images in six extreme-ultraviolet passbands — 94 Å, 131 Å, 171 Å, 195 Å, 284 Å, and 304 Å — with a variety of exposure times and filters in place to ensure each image set captures the full dynamic range of solar phenomena. SUVI images have a pixel resolution of 1280×1280 pixels, each with an angular resolution of 2.5 arcsec per pixel, for a total field of view of 53.3 arcmin square. Some corners of each passband are obscured by instrumental vignetting.

SUVI files come in two varieties: netCDF and Flexible Image Transport System (FITS). In both cases, image metadata provide the image navigation information necessary to locate and orient the Sun with respect to well-known astronomical coordinate systems. For both file formats, these metadata follow the World Coordinate System (https://fits.gsfc.nasa.gov/fits_wcs.html) conventions for FITS files. Users who are unfamiliar with these conventions are highly encouraged to review "Coordinate Systems for Solar Image Data" (Thompson, 2006), which is linked from this page.

Images are reported in units of radiance ($W/m^2\ str^{-1}$), but care must be taken to handle the data array appropriately. In netCDF files, users should be sure to apply the 'scale_factor' and 'add_offset' attributes. In FITS files, users should apply the BSCALE and BZERO FITS keywords following the standard convention for each file format. Some FITS and netCDF readers may apply these corrections by default.

Provisional validation means:

- Validation activities are ongoing and the general research community is now encouraged to participate.
- Severe algorithm anomalies are identified and under analysis. Solutions to anomalies are in development and testing.
- Incremental product improvements may still be occurring.
- Product performance has been demonstrated through analysis of a small number of independent measurements obtained from other sun-observing EUV instruments.
- Product analysis is sufficient to establish product performance relative to expectations.
- Documentation of product performance exists that includes recommended remediation strategies for all anomalies and weaknesses. Any algorithm changes associated with severe anomalies have been documented, implemented, and tested.
- Testing has been fully documented.
- Product is ready for operational use and for use in comprehensive calibration/validation activities and product optimization.

Users of the GOES-19 SUVI L1b data bear responsibility for inspecting the data and understanding the known caveats prior to use. Below is the list of caveats that have been identified and are under analysis. Solutions are in development and testing:

1. No GOES-19 SUVI L1b data prior to declaration of Provisional Maturity (25 February 2025) should be used. NCEI will reprocess and release the early mission data using a revised ground processing algorithm and look-up tables.
2. Some metadata entries in SUVI L1b files may be incorrect or incomplete. The EFF_AREA and INSTRESP keywords are known to be inaccurate and a fix is in the works.
3. The location of Sun center specified by the CRPIX1 and CRPIX2 keywords could be erroneous in the event of special SUVI or spacecraft operations such as yaw flips. Users should validate that this information is correct before performing calculations that require accurate information in these fields.
4. Spikes in the images resulting from particle impacts with the SUVI camera can, in some cases, cause significant contamination in the radiometric signal. These spikes are marked in the data quality flag image extension.
5. The GOES-19 platform location presently is specified in Earth-Centered Earth-Fixed (ECEF) coordinates by the OBSGEO-X, -Y, and -Z keywords. Users requiring platform location in heliocentric coordinate systems can refer to Hapgood (1992; http://dx.doi.org/10.1016/0032-0633(92)90012-D) for information on coordinate conversions.
6. Some users may encounter compatibility issues between some netCDF readers and FITS standard keywords that include a hyphen such as DATE-OBS when they appear in the netCDF version of SUVI L1b files. Users are encouraged to contact NCEI to report such problems and for guidance on possible workarounds.
7. There is a known image rotation error that causes the CROTA FITS keyword to have an uncharacterized uncertainty on the order of ±0.25° degrees. The only solution is retrospective analysis. NCEI plans to generate a reprocessed set of SUVI L1b data products that will include a correction for this effect.

Users are encouraged to contact the GOES-R SUVI team in the event they have questions or encounter difficulties with SUVI files. The NCEI website provides additional information and access to SUVI L1b files https://doi.org/10.7289/V5FT8J93.

Contact for further information: OSPO User Services at SPSD.UserServices@noaa.gov

NCEI contacts for specific information on the SUVI L1b data:

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