

GOES-17 SEISS SGPS Level 1b (L1b) Data Release
Full Data Quality
January 19, 2022
Read-Me for Data Users

The Peer Stakeholder - Product Validation Review (PS-PVR) for the GOES-17 Space Environment In-Situ Suite (SEISS) Solar and Galactic Proton Sensor (SGPS) L1b Provisional Maturity was held on January 19, 2022. As a result of this review, NOAA has confirmed that the SGPS L1b data are at Full Validation Maturity as of January 19, 2022.

There are two SGPS sensor units mounted on each GOES-R series spacecraft, facing in the spacecraft -X and +X directions. When the spacecraft is not in the yaw-flipped configuration SGPS-X faces west and SGPS+X faces east. Each SGPS unit has three solid-state (silicon detector) telescopes T1, T2, and T3 for measuring 1-25, 25-80, and 80-500 MeV protons, respectively. All three telescopes have the same look direction (i.e., +X or -X). T1 and T2 have 60° (full cone angle) fields of view, and T3 has a 90° field of view. Each unit measures 1-500 MeV proton fluxes in 13 logarithmically spaced differential channels (P1-P10) and >500 proton flux in a single integral channel (P11). The L1b data product is one-second cadence fluxes. The channels generally register counts above backgrounds only during solar energetic particle events, except for P1–P2B which usually measure trapped magnetospheric protons, and channels P10 and P11 which measure galactic cosmic rays.

Full validation maturity, by definition, means:

- Validation, quality assurance, and anomaly resolution activities are ongoing;
- Incremental product improvements may still be occurring;
- Users are engaged and user feedback is assessed;
- Product performance for all products is defined and documented over a wide range of representative conditions via ongoing ground-truth and validation efforts;
- Products are operationally optimized, as necessary, considering mission parameters of cost, schedule, and technical competence as compared to user expectations;
- All known product anomalies are documented and shared with the user community;
- Product is operational.

Users of the GOES-17 SGPS 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 SGPS L1b data prior to declaration of Provisional Maturity should be used. NCEI will reprocess and release the early mission data using up-to-date algorithms and look-up tables.
2. GOES-17 SGPS-X P5 is contaminated with electrons when radiation belt fluxes are elevated. The electron contamination is a small (~1%) contribution to the total P5 flux during a small to moderate solar particle event.

3. There are gaps in L1b data.
4. For additional information on GOES-16 and -17 SGPS measurements see: Kress, B. T., Rodriguez, J. V., Boudouridis, A., Onsager, T. G., Dichter, B. K., Galica, G. E., & Tsui, S. (2021). Observations from NOAA's newest solar proton sensor. *Space Weather*, 19.
<https://doi.org/10.1029/2021SW002750>

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

NCEI contacts for specific information on the SGPS L1b data:

Brian Kress brian.kress@noaa.gov

William Rowland goesr-spaceweatherdata@noaa.gov

NCEI website for GOES-R Space Weather data (provides daily aggregations of SGPS L1b data):

<https://www.ngdc.noaa.gov/stp/satellite/goes-r.html>