

Project: Solar Orbiter SWA

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1 Introduction

1.1 Purpose and Scope

This Data Product Definition Document (DPDD) describes the format and content of the Solar Wind Analyser (SWA) science data. It includes descriptions of the data products and associated metadata, including the data format, content, and any generation pipeline systems. These products will be stored and distributed from the Solar Orbiter Science Archive (SOAR) of the SOC.

The specifications described in this DPDD apply to all SWA science products submitted to ESA's Solar Orbiter SOC for further archival and exploitation. This document only includes descriptions of science products delivered by the SWA science pipelines run by SWA. It does not address the Low Latency data which is described in [RD9].

1.2 Reference Documents

The documents listed below form a part of this document, to the extent specified and described herein.

Ref.	No	Title
RD1		CDF User's Guide v3.5, available from http://cdf.gsfc.nasa.gov
RD2	SOL-SGS-OTH-004-TPL_DPDD	Solar Orbiter SWA Data Product Description Document template
RD3	SOL-SGS-TN-0006	SOC Engineering Guidelines for External Users
RD4	ESA/SRE(2011)14	Solar Orbiter definition study report (Red Book)
RD5	SO-SWA-MSSL-RQ-010	Solar Orbiter SWA Scientific Operations, Algorithms and Processes Requirements Document
RD6	SOL-SGS-ICD-0004	Solar Orbiter Interface Control Document for Low Latency Data CDF Files
RD7	SOL-SGS-TN-0009	Metadata Definition for Solar Orbiter Science
RD8	SOL-SGS-PL-0009	Solar Orbiter Archive Plan
RD9	SO-SWA-MSSL-IF-005	SWA Low Latency Data Product Description Document
RD10	SOL-SGS-ICD-002	Data Producer to Archive ICD (DPAICD)
RD11	http://doi.org/10.1051/0004-6361/202038245	Instrument paper in A&A: The Solar Orbiter Solar Wind Analyser (SWA) Suite

1.3 Acronyms, Abbreviations and Terms

Abbreviation	Meaning
CCSDS	Consultative committee for space data systems
cdf	Common data format
CME	Coronal Mass Ejection
DPU	Data Processing Unit
EAS	Electron Analyser System
ESAC	European Space Astronomy Centre
FIP	First Ionisation Potential
FOV	Field of view
HIS	Heavy Ion System
LL	Low Latency
LLDPDD	Low Latency Data Product Definition Document
MHD	Magneto-Hydro-Dynamics
MOC	Mission Operations Centre
NM	Normal Mode
OBT	On board time
PAS	Proton Analyser System
PHA	Pulse Height Analysis
RPW	Radio Plasma Wave
S/C	Spacecraft
SCET	Space craft elapsed time
SEGU	Solar Orbiter engineering guidelines for external users
SOAR	Solar Orbiter Archive
SOC	Spacecraft Operations Centre
SSMM	Solid State Mass Memory
SWA	Solar Wind Analyser
TBC	To Be Confirmed
TBD	To Be Determined
TOF	Time of Flight
UTC	Universal coordinated time
VA	Virtual Appliance
VDF	Velocity Distribution Function
SOAR	Solar Orbiter Archive
OT	Operations Team at MSSL

2 SWA Instrument Description

2.1 Science Objectives

The overarching objective of SWA is to provide the comprehensive in situ measurements of the solar wind, which are critical if we are to establish the fundamental physical links between the Sun's highly dynamic and inhomogeneous magnetised atmosphere and the solar wind in all its quiet and disturbed states.

This critical step requires comprehensive in-situ measurements of the various constituents of the solar wind plasma including high time resolution velocity distributions of solar wind ions and electrons and composition up to suprathermal energies – for example, the measurement of heavy ion charge states reflect coronal temperatures at their source. These measurements are vital if we are to discover the fundamental links between e.g. solar eruptions, shocks and the suprathermal ions that are the seed populations of hazardous solar particle events.

The SWA sensors will sample comparatively pristine solar wind plasma at the closest ever distances to the Sun, but also assess their radial evolution. This will provide key information on the evolution of the solar wind with distance from the Sun, providing a separation of those processes which are inherent in the solar wind itself from those which play a role in the formation of the wind near to the Sun. Furthermore, the SWA will for the first time measure the near-Sun solar wind at higher latitudes revealing the latitudinal dependence of these near-Sun phenomena as the spacecraft climbs out of the ecliptic. Solar Orbiter will thus extend our direct measurements of space plasmas into a new realm that will transform our view of the connections from the solar atmosphere into the solar wind, and help us project this understanding to other stellar environments. For further details see RD5.

SWA consists of four separate sensors, 2 Electron Analysers (EAS), a Proton/Alpha sensor (PAS) and a Heavy Ion Sensor (HIS). These sensors are connected to the central Data Processing Unit (DPU) that packets the sensor data and transmits them to the SSMM.

2.2 SWA Operational Modes

The SWA sensors can each be operated in a variety of operational modes. These modes are sensor independent, meaning that each sensor can be a different mode from the other two sensors. The available modes are detailed below.

2.2.1 Normal Mode

The default operating mode of all the SWA sensors is the 'Normal Mode'. In this mode the full 3d data set from each sensor will be sent to the SSMM at the default cadence.

2.2.2 Burst Mode

In 'Burst Mode', EAS, HIS and PAS data will be sent to the SSMM at higher cadences. This applies to various data types, not just Normal Mode. This is explained in detail below.

2.2.3 Triggered Mode

This mode only applies to EAS. During Normal mode, the full, 1 second, 3d data is stored on a rolling buffer that can hold 5 minutes of data. Upon receipt of a 'trigger' from the RPW instrument. The entire, 5 minute buffer will be frozen and sent to the SSMM.

2.2.4 Engineering Mode

All the SWA sensors have the ability to perform some calibration/engineering work. This data is intended to monitor the 'health' of the sensors in order to maintain the optimum sensor configuration. In the event of sensor faults, the engineering mode data can be used in fault diagnosis.

2.3 Calibration

2.3.1 On-ground Calibration

2.3.1.1 EAS On-ground Calibration

The SWA-EAS instrument has been integrated and calibrated in a number of different phases. In the first phase, MCP pre-selection and characterisation of the MCPs were carried out at LPP, followed by characterisation and performance of the integrated detector and readout subsystem. This included a detailed characterisation of the front-end readout ASICs and a determination of temperature response of the subsystem. Following the integration of the full SWA-EAS FM, the primary phase of the FM ground calibration activity was carried out at UCL/MSSL, where a full calibration of both SWA-EAS sensor heads was performed using dedicated electrical ground support equipment (EGSE) to rotate the sensor within an electron beam of known energy set up in the laboratory's LEPIC (Low Energy Plasma Instrument Calibration) vacuum chamber. The purpose of this activity was to determine the sensor performance parameters, including the sensor k-factors, relative geometric factors, and the energy and angular response.

2.3.1.2 PAS On-ground Calibration

The PAS on-ground calibration has been performed on the EQM, PFM and the FS using a large diameter, 300eV - 10 keV, He++beam.

The resulting calibration data file contains the following:

$A(ie, iel, iaz)$ The effective aperture in cm^2 for each energy, $ie = [0\dots 95]$, each elevation, $iel = [0\dots 8]$, and each azimuth direction, $iaz = [0\dots 10]$. Thus this is a (96, 9, 11) array. Note that these values already contain cosines since they are the results of the measurement. They also contain the detector efficiency as a function of the energy and individual CEM properties. These values may be updated in flight.

$\Delta E(ie, iel, iaz) / E$ The unit-less energy resolution. It is also a (96, 9, 11) array. These values will also be updated in flight if the stepping voltages in the PAS sequencer are modified.

$\Omega(ie, iel, iaz)$ The solid angle resolution in steradians (sr). It is also a (96, 9, 11). These values will be updated in flight if the stepping voltages in the PAS sequencer are modified.

$E(ie, iel, iaz)$ The energy per charge in electronvolts (eV). It is also a (96, 9, 11). These values will be updated in flight if the stepping voltages in the PAS sequencer are modified.

$Elev(ie, iel, iaz)$ The elevation angles, rad. It is also a (96, 9, 11). These values will be updated in flight if the stepping voltages in the PAS sequencer are modified.

$Az(iaz)$ Azimuth angles in radians (rad). This is an array of 11 values.

$\Delta W(ie, iel, iaz)$ The integrating velocity volume in ($\text{cm}^3 \text{ sr} / \text{s}^3$). This volume is defined by the measurement scheme rather than the calibration.

For the onboard moments calculation special tables will be included in the calibration data to include:

- Proton velocity value which depends on energy bin index ie

$$V_{ie} = 13.85e5 \sqrt{E_{ie}^{AV}}$$

Here E_{ie}^{AV} is the $E(ie, iel, iaz)$ averaged over Elevation and Azimuth

- Elevation angle which depends on elevation bin number iel

$$Elev_{iel} = \sum_{ie, iaz} \frac{Elev_{ie, iel, iaz}}{99.0}$$

- Sines and cosines of the main directions, calculated from Az_{iaz} and $Elev_{iel}$
 $\text{Sin}(Az_{iaz}), \text{Cos}(Az_{iaz}), \text{Sin}(Elev_{iel}), \text{Cos}(Elev_{iel})$

- The Count to partial density conversion factor :

$$CN_{ie,iel,jaz} = \frac{\Delta W_{ie,iel,jaz}}{GV_{ie,iel,jaz} V_{ie,jal,jaz}^4}$$

Here, $GV_{ie,iel,jaz} = \frac{A_{ie,iel,jaz} \Omega_{ie,iel,jaz} \Delta V_{ie,iel,jaz}}{V_{ie}}$ and is the “velocity” geometrical factor in cm²sr

2.3.1.3 HIS On-ground Calibration

SWA-HIS has been characterised at both subsystem and instrument levels, with subsystem testing taking place at UMICH, SwRI, UNH, GFSC, and IRAP. SWA-HIS has been calibrated at the instrument level at three different facilities, during four test sessions. Overall, during these test sessions, a number of aspects of sensor performance were assessed. These included the following: aliveness of the sensor; communication at various speeds; co-incidence logic; energy, elevation, and azimuth acceptance and resolution; TOF and energy resolution for various species; TOF and energy range; constant fraction discrimination thresholds on detectors; operation at high fluxes; and proton and alpha rejection capability. More details can be found in the SWA Instrument paper (RD11).

2.3.2 In-flight Calibration

2.3.2.1 EAS In-flight Calibration

The EAS in-flight calibration procedure varies the CEM HV and registers the CEM counts. The HV value that corresponds to the plateau of CEM counts is used as a nominal CEM HV until a next CEM gain adjust. This calibration is run by the DPU with a special engineering mode. The results of this are returned as a Low Latency product.

2.3.2.2 PAS In-flight Calibration

The PAS in-flight calibration consists of two parts:

1. CEM gain adjustment. This procedure varies the CEM HV and registers the CEM counts. The HV value that corresponds to the plateau of CEM counts is used as a nominal CEM HV until a next CEM gain adjust. To perform this calibration the DPU starts the “CEM Calibration” procedure. The results of this are returned as a Low Latency product.
2. HVPS levels calibration. This procedure provides a check of the HVPS optics voltages stability. To perform this calibration the DPU sets PAS to the “Ready_To_Science” state and then sends the “Engineering scheme” command. The results are packeted in the regular PAS HK packet.

2.3.2.3 HIS In-flight Calibration

3 DATA GENERATION AND ANALYSIS PROCESS

The SWA science products are produced by the SWA Instrument Team. The data generation and analysis process is described in this section.

Science data received by the SOC from the SWA team are made available to end users through the Solar Orbiter archive following the policies described in the Archiving Plan [RD8].

The procedure for delivery of the Science data from the SWA Instrument Team to the SOC will be fully compliant with the IT-SOC Science Data Delivery ICD (TBW).

3.1 Scientific Measurement

3.1.1 EAS

Each of the 2 EAS sensors measure electrons distributed over a spectrum of 64 energies, a 360° azimuthal range of 32 anodes and a 90° altitudinal range of 16 elevations, every second. Individually, each EAS will produce [64,32,16] arrays of data every second. Used together, the 2 EASs provide a full, 3d velocity space distribution covering the 4π space surrounding the EAS instrument every second.

The EAS instrument can operate in various modes or states that will return different subsets of the original 3d data. These are:

- **Normal Mode:** The two EAS sensors each send their respective sampling of the 3D VDF to the DPU every second. The DPU stores these data in a 5-minute rolling buffer. Every 100 seconds one full $64 \times 32 \times 16$ 3d distribution from each EAS is compressed and sent to the SSMM.
- **Single Strahl:** Every 100 seconds (offset by 50 seconds from the selection above) a single energy bin slice of the full 3d distribution of each EAS is compressed and sent to the SSMM for telemetry as a low-latency data product. The data array dimensions for this product are thus $2 \times 1 \times 32 \times 16$.
- **Burst Mode:** On command, the SWA DPU will place the EAS sensors into burst mode. The DPU will steer the SWA measurements with reference to the magnetic field unit vector provided by the MAG instrument over the Service 20 'Inter Instrument Communication' feed at 0.125 second cadence. In response, the EAS sensor whose central plane of field of view passes closest to the magnetic field direction makes measurements at only 2 elevations (but full energy and azimuth). These 2 elevations are chosen such that one set of observations includes the direction along the B-field direction, and the other along the anti-parallel direction. Given that only 2 elevations are sampled in this mode, the resulting $1 \times 64 \times 32 \times 2$ array of data can be captured every 0.125 second and transmitted to the DPU for addition to the SSMM and the telemetry stream. These data product can be reassembled on the ground to provide a measurement of the 2D pitch angle

distribution of electrons (with some gyrophase information) at 0.125 second cadence.

- **Triggered Mode:** Autonomously, and following the receipt of a trigger flag over the Service 20 'Inter Instrument Communication' feed, the SWA/DPU will freeze the rolling buffer containing 5 minutes of 1-second-cadence, samples of the full 3d velocity distribution from each SWA/EAS sensor. The DPU will transmit the resulting 300 samples of $2 \times 64 \times 32 \times 16$ data arrays to the SSMM for inclusion in the SWA telemetry stream. It is expected that the trigger flag will be set by the RPW instrument in response to an autonomous evaluation of whether combined in situ data suggests the passage of an event of scientific interest (e.g. an interplanetary shock) passed the spacecraft in the previous 5 minute period.
- **Onboard partial moments:** Every 4 seconds the DPU selects the 3D VDF measurements from each sensor and performs a partial moment calculation (over 3 subsets of energy range and 2 angular ranges for each sensor) and adds the resulting 168 parameters to the SSMM for inclusion in the telemetry stream. Optionally, in the event of low counts, the DPU will add 4 consecutive measurements from EAS and then perform the moment calculation.

The relationship between the EAS modes and states and the DPU is illustrated in Figure 3.1 below.

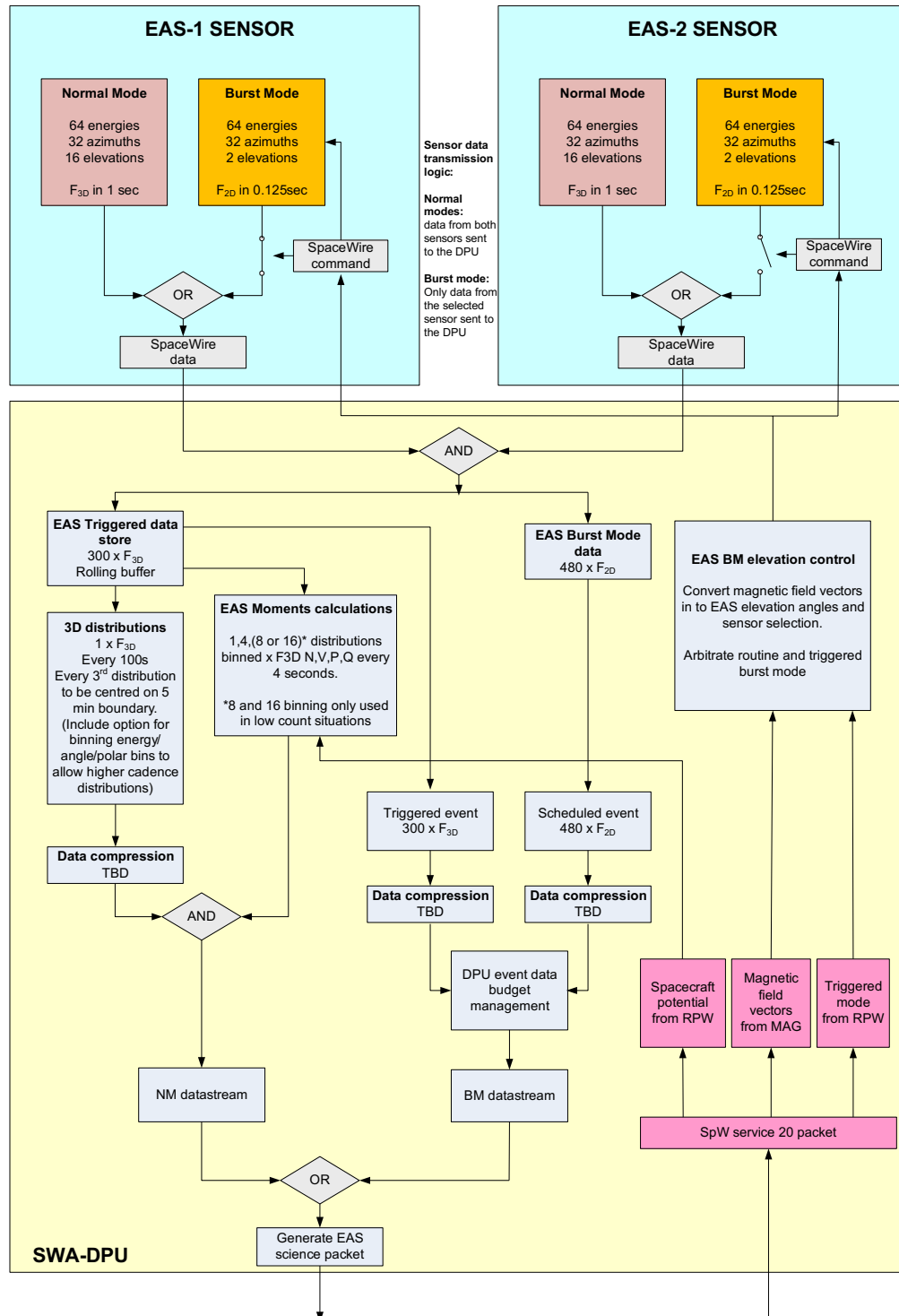


Figure 3.1: SWA EAS data flow within the sensors and DPU

The DPU will use the full 3d velocity space distributions from both EASs and create a set of on-board electron moments every 4 seconds that are transmitted to the SSMM. The

scheme for generation of the onboard moments from EAS by the DPU is shown in Figure 3.2 below.

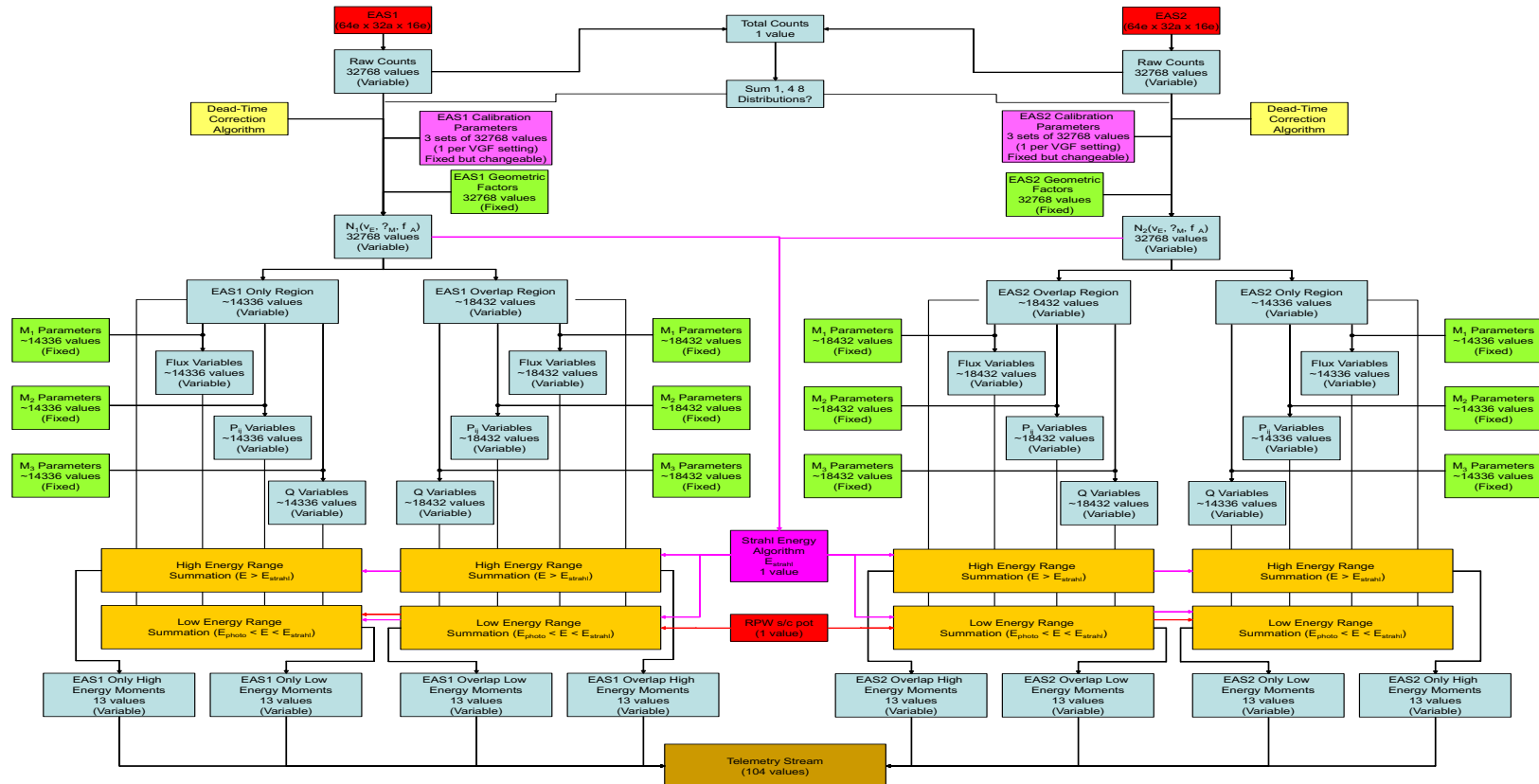


Figure 3.2: EAS Moment generation scheme

Together with the Housekeeping from each EAS, there are also various engineering modes that allow instrument health monitoring and fault diagnosis to be performed on a semi-regular basis (~1 per week, for a limited duration) in order to ensure that the sensor is maintained in optimum configuration.

3.1.2 PAS

The Proton-Alpha Sensor (PAS) is designed to continuously determine the 3D distribution functions of the dominant ions of the solar wind, from 200 eV to 20 KeV, without mass and charge selection. In practice, this concerns mostly the proton and alpha populations. These measurements are used to calculate the density, speed, pressure and temperature tensors of the main component of the solar wind.

At full resolution, PAS measures the 3D ion distribution function, in the form of arrays of 96 energies, 11 azimuth angles and 9 elevation angles, in about ~1 second. The energy and the angle of elevation are selected by imposing different high voltages to the electrodes of the deflection system and the electrostatic analyzer. The 11 azimuthal angles correspond to the 11 detectors of the instrument (channeltron').

In "burst" mode, the measurement rate can reach up to 20 Hz. The phase space sampling is then reduced, for example by 24 energies and 5 deflections, which allows to increase the time cadence of distribution functions measurements. An algorithm (peak tracking procedure) is used to select the peak of the distribution and to center sampling around this peak.

The different types of sampling are programmed in the form of cyclograms. They define the operation of the instrument over periods of several days. In normal mode, the functions are measured every 4 s with, every 300 s, a short burst mode of 9 s (SnapShot). 'Long' burst mode is also acquired every day, consisting in 300 s of continuous sampling at high cadence. The sampling frequency during burst or snapshots is generally of 4 distributions / s (4 Hz analysis).

3.1.2.1 PAS frames and samplings

3.1.2.1.1 Frames and bins location

Figure 3.3 shows the Elevation and angle angles relatively to PAS. Figure 3.4 shows the same in the spacecraft frame. Note the solar orbiter frame corresponds to the RTN Heliocentric frame most of the time with $XRT\ N = -XSC$, $YRT\ N = -YSC$.

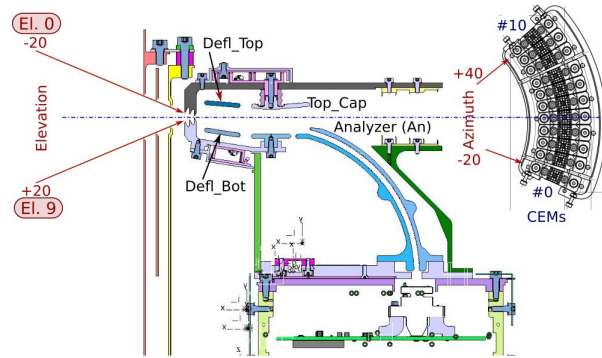


Figure 3.3: Elevation and azimuth bins and angles in the PAS analyzer frame. The CEMs plane (detector plane) is shown from the Analyzer.

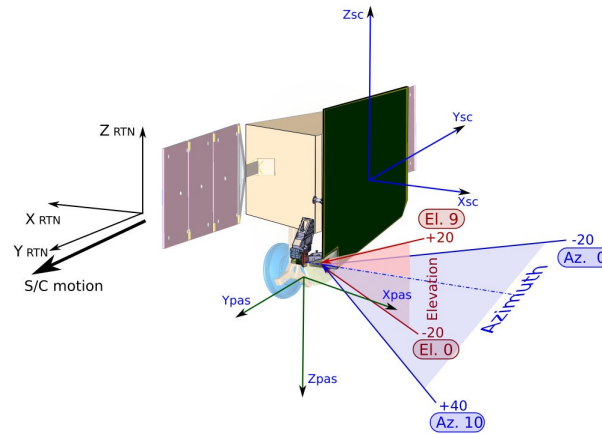


Figure 3.4: Elevation and azimuth bins in the Solar Orbiter frame.

Thus the **ion velocity** unit vector corresponding to the given bin is calculated as follows: For the PAS frame:

$$X = -\cos(El) \cdot \cos(Az)$$

$$Y = -\cos(El) \cdot \sin(Az)$$

$$Z = \sin(El)$$

For the Solar Orbiter (SFR) frame:

$$x^{SF} = -\cos(El) \cdot \cos(Az)$$

$$y^{SF} = \cos(El) \cdot \sin(Az)$$

$$z^{SF} = -\sin(El)$$

3.1.2.1.2 PAS sampling organization

PAS performs the energy-elevation sweep as shown in Figure 3.5. PAS keeps a constant energy while sweeping the elevations. During the sweeping along one elevation bin, PAS accumulates counts in all 11 azimuth bins simultaneously. The result of a complete energy-elevation sweep is a matrix of [11 azimuth, 9 elevations, 96 energies] counts (called 'sampling'). The real sweeps do not cover the full energy-elevation range when 'reduced sampling' are programmed. The reduced sampling may consist of, for example, [11 azimuth, 3 to 7 elevations, 10 to 73 energies]). Supporting information are provided about the start/number of the energy steps and the elevation bins. Since a "peak tracking" procedure runs permanently, the position of the energy x elevation window inside the 9 x 96 frame can change at any time.

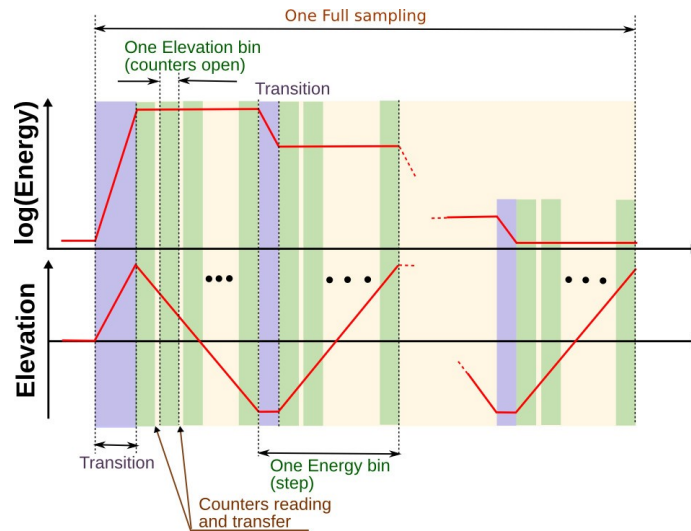


Figure 3.5: PAS measurements scheme

Normally the PAS cyclogram is looking as shown in Figure 3.6. PAS produce one sampling per 4 s. Every 100 s PAS measure a 'full 3D' distribution (96 energies x 9 elevations x 11 azimuths) to apply the peak tracking procedure and adapt the energy/elevation window to the solar wind velocity vector. Each 300s PAS performs fast measurements called "SnapShot". PAS provides "K" number of samplings per second without gaps. These fast cadence snapshots start with a full 3D sampling (to determine the peak of the

distribution) and continue with a variable number of reduced sampling, for a total duration of 9 s. The most classically used snapshot is; 1 full 3D + 8x4 reduced samplings (for example, 48 energies and 5 elevations). The long fast measurements, called “Burst Mode” is performed by the ground TC. The nominal duration of the “Burst Mode” is 300s.

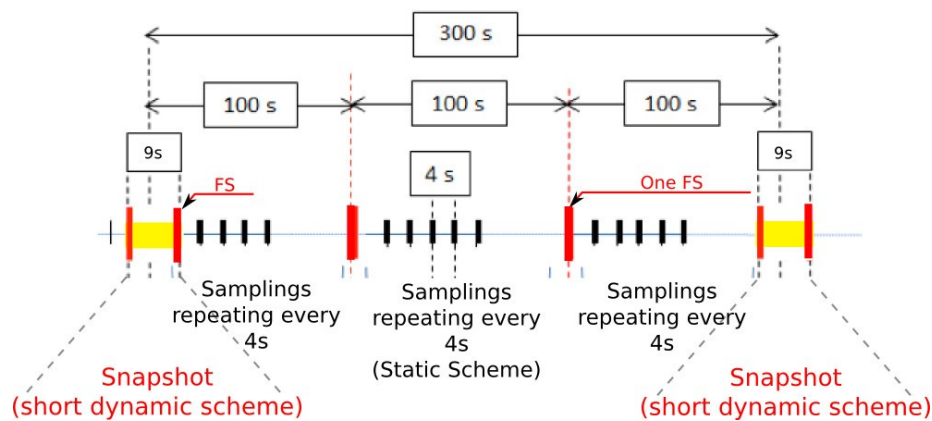


Figure 3.6: PAS Normal mode implementation

3.1.2.2 Caveats

For the moment (16th Oct 2020) the PAS L2 data caveats are as follows:

1. 3D velocity distribution function and 1D differential energy flux are not optimal and are noisy inside the energy range [300 - 500] eV. The geometrical factor of the instrument is decreasing for these energies and a statistical count noise can cause perturbed VDF values.
2. 3D velocity distribution function and 1D differential energy flux could be irrelevant for energies below 300 eV. The geometrical factor of the instrument is very small here and it cannot be determined with a sufficient accuracy.
3. In relation with (1), ground calculated density and pressure tensor are not optimal and are noisy inside the solar wind velocity range [260 - 380] km/s.
4. In relation with (2), ground calculated density and pressure tensor are irrelevant for the solar wind velocity below 260 km/s.

The PAS sensor measures protons and alpha particles distributed over a spectrum of 96 energies, a 66° azimuthal range of 11 anodes and a 45° altitudinal range of 9 elevations, every second. PAS can produce [96,11,9] arrays of data every second.

The relationship between the PAS modes and states and the DPU is illustrated in Figure 3.7 below.

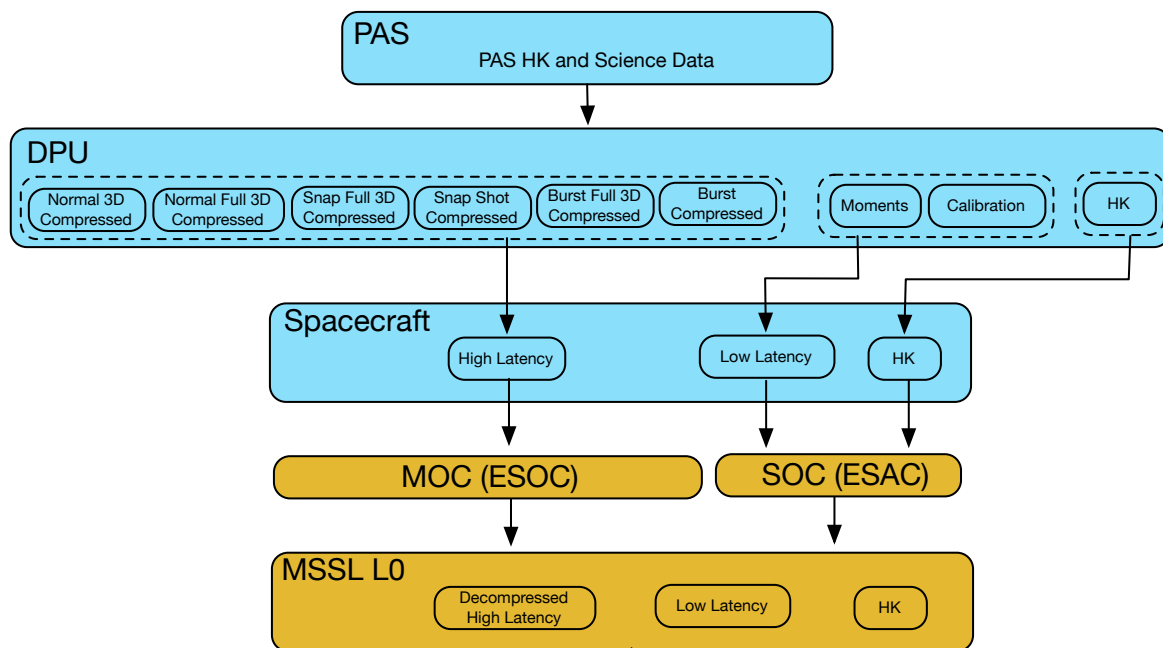


Figure 3.7 SWA PAS data flow within the sensors and DPU

From the normal 3D distributions, SWA DPU will calculate a set of proton/alpha moments every four seconds. The PAS moment product will consist of a single density value, a 3-element velocity vector, and 6 terms from a 9-element pressure tensor. Twenty-five PAS moment products will be packeted into one ccscs packet with the appropriate headers and sent to the SSMM LL01 packet store.

In order to ensure that the sensor is maintained in optimum configuration, the raw PAS data can also contain engineering mode data that allows instrument health monitoring of temperatures and voltages, and fault diagnosis to be performed on a semi-regular basis (~1 per week, for a limited duration). Some of this data will be compressed, packeted with header and sent to the SSMM LL01 packet store. The engineering mode data in the Low Latency packets will be used by the PAS team only. There will be no requirement of the SOC team to process this data.

3.1.3 HIS

The HIS sensor is a time-of-flight – energy (TOF-E) ion mass spectrometer which measures ions up to 56 amu, identifying them by both mass and charge. The E/q, time-of-flight (TOF) and total energy of ion are measured, along with elevation and azimuthal angle from which they arrived. These measurements are grouped together for a single ion in ion event (PHA) words. (PHA refers to “pulse-height analysed” and is the historic name for ion event words.)

The number of ion event words telemetered for each energy scan is fixed but configurable, based on available resources. Typically, far more events can be measured than can be downlinked, so a sampling algorithm is employed to select the sample sent to the ground. This algorithm works as follows:

1. All ion event words from an E/q scan are divided into 5 priority ranges, based on their average abundance in the solar wind. Priority ranges are defined by large Energy-TOF boxes, defined separately for each E/q.
2. Events are chosen at random from each of these ranges, with the more events selected from ranges containing less abundant ions. In cases where there are insufficient events present in a given range, that number is added to those to be taken from the next range (and so on).
3. The number of events in each range, subdivided by E/q and angle, are recorded to correct the weighting of telemetered ion event words for the effect of the sampling algorithm. For example, if the on-board count (priority rate) for a given E/q step and elevation bin is 10, but only 5 of these ion event words were included in telemetry, then each event word counts for 2 in further processing.

HIS will return several types of data packet that are described in the following sections. The rates of these packets will depend on the operating mode:

- **Normal Mode.** In Normal mode, HIS returns packets every 30 seconds.
- **Normal Low Cadence Mode (Normal LC).** In Normal mode, HIS returns packets every 300 seconds.
- **Burst Mode.** In Burst mode, HIS returns packets every 4 seconds.

There is also an engineering mode that allows instrument health monitoring and fault diagnosis to ensure that the sensor is maintained in optimum configuration.

In order make maximum use of the variable data volume throughout the mission, i.e. to “fly the telemetry (TM) corridors” properly, HIS needs more data rate options than the those defined above. The new set of HIS mode – data combinations+ data products is given in the following table (originals in **bold**). Each is built off an original mode by including additional data products into telemetry. Since these products are assembled by the flight software anyway, the power used is that same as for the original mode on which a new mode is based. The housekeeping data rate is set independently, so it is not tied to any of these combinations.

Mode – Data Combination	Ratio to Normal (target)	Rate (kbits/s)	Name
Normal LC	0.1	0.53	SWA_HIS_LOW_1TENTH SWA_HIS_LOW_BURST_1TENTH
Normal LC + 1 full VDF + 1.5x PHAs	0.25	1.32	SWA_HIS_LOW_QUARTER SWA_HIS_LOW_BURST_QUARTER
Normal LC + 1 full VDF + 2x PHAs	0.50	2.68	SWA_HIS_LOW_HALF SWA_HIS_LOW_BURST_HALF
Normal LC + 1 full VDF + 4x PHAs	0.66 (1.0)	3.44	SWA_HIS_LOW_2THIRDS SWA_HIS_LOW_BURST_2THIRDS
Normal	1.0	5.3	SWA_HIS_NORMAL SWA_HIS_NORMAL_BURST
Normal + 1 full VDF	2.1	11.33	SWA_HIS_NORMAL_2X SWA_HIS_NORMAL_BURST_2X
Normal + 1 full VDF + 2.2x PHAs	3.0	15.90	SWA_HIS_NORMAL_3X SWA_HIS_NORMAL_BURST_3X
Normal + 3 full VDFs + 2x PHAs	5.1	26.79	SWA_HIS_NORMAL_5X SWA_HIS_NORMAL_BURST_5X
Burst	10.1	52.13	N/A

Table 2: Suggested names for HIS operational modes for inclusion into SOOP Kitchen.

3.1.4 SWA L0 Data

The data described above are returned in individual CCSDS packets. Once on the ground, these packets are de-commutated and uncompressed to form the L0 raw data packets. These files are still in CCSDS format and are saved in binary format.

The MSSL Operations team is responsible for retrieving the raw CCSDS data and creating the L0 binary packets. The process used to create these data files is a simple C code that searches on the data type, subtype and SID. If the data is compressed it is passed through an uncompressor before being grouped into appropriate files. Table 3.1 shows how the data files are grouped together.

3.1.4.1 SWA PAS L0 data specificity

PAS L0 data is constituted from a single binary file, grouping together all PAS ccscs telemetry packets (Housekeeping, Science data, In-flight calibration), corresponding to the list given in Table 3.1.

Moreover, the PAS L0 data processing software is able to filter out all ccscs packet that are not relative to PAS, and should handle L0 binary files containing all SWA telemetry packets (PID 95..99), and no special filtering by MSSL is possible.

SWA L0 Data filename	Possible Contents Type, SubType, SID, SCOS_ID
solo_L0_swa-dpu-REP_[YYYYMMDD]_V01.bin	200, 248, 0, YIA58970 200, 249, 0, YIA58166 200, 250, 0, YIA58900 200, 251, 0, YIA58901 200, 252, 0, YIA58902 200, 253, 0, YIA58903 201, 200, 0, YIA58904 202, 200, 0, YIA58905 203, 200, 0, YIA58906
solo_L0_swa-dpu-HK_[YYYYMMDD]_V01.bin	3, 25, 11, YIA58200 3, 25, 14, YIA58211 3, 25, 15, YIA58998 3, 25, 20, YIA58216 3, 26, 4, YIA58204 3, 26, 5, YIA58205 3, 26, 6, YIA58206 3, 26, 7, YIA58207 3, 26, 8, YIA58208 3, 26, 9, YIA58209 3, 26, 10, YIA58210 3, 26, 12, YIA58214 3, 26, 13, YIA58215
solo_L0_swa-eas1-NM_[YYYYMMDD]_V01.bin	21, 3, 0, YIA58703 21, 6, 1, YIA58704 21, 3, 2, YIA58708 (Uncompressed) 21, 6, 3, YIA58709 (Uncompressed)
solo_L0_swa-eas1-SS_[YYYYMMDD]_V01.bin	21, 6, 8, YIA58712 21, 6, 9, YIA58713 (Uncompressed)
solo_L0_swa-eas1-TM_[YYYYMMDD]_V01.bin	21, 3, 5, YIA58716 (Uncompressed) 21, 3, 6, YIA58720 (Uncompressed) 21, 6, 7, YIA58724 (Uncompressed) 21, 3, 10, YIA58717 21, 3, 11, YIA58721 21, 6, 12, YIA58725
solo_L0_swa-eas1-ENG_[YYYYMMDD]_V01.bin	21, 3, 13, YIA58917 21, 3, 14, YIA58927 (Uncompressed) 21, 3, 14, YIA58946 (Uncompressed) 21, 3, 15, YIA58929 (Uncompressed) 21, 3, 15, YIA58948 (Uncompressed)

	21, 6, 16, YIA58931 (Uncompressed) 21, 6, 16, YIA58950 (Uncompressed) 21, 3, 17, YIA58920 21, 3, 17, YIA58940 21, 3, 18, YIA58921 21, 3, 18, YIA58942 21, 6, 19, YIA58922 21, 6, 19, YIA58944
solo_L0_swa-eas1-HK_[YYYYMMDD]_V01.bin	3, 25, 1, YIA58201
solo_L0_swa-eas2-NM_[YYYYMMDD]_V01.bin	21, 3, 30, YIA58701 21, 6, 31, YIA58702 21, 3, 32, YIA58706 (Uncompressed) 21, 6, 33, YIA58707 (Uncompressed)
solo_L0_swa-eas2-SS_[YYYYMMDD]_V01.bin	21, 6, 38, YIA58710 21, 6, 39, YIA58711
solo_L0_swa-eas2-TM_[YYYYMMDD]_V01.bin	21, 3, 35, YIA58714 (Uncompressed) 21, 3, 36, YIA58718 (Uncompressed) 21, 6, 37, YIA58722 (Uncompressed) 21, 3, 40, YIA58715 21, 3, 41, YIA58719 21, 6, 42, YIA58723
solo_L0_swa-eas2-ENG_[YYYYMMDD]_V01.bin	21, 3, 43, YIA58918 21, 3, 44, YIA58947 (Uncompressed) 21, 3, 44, YIA58926 (Uncompressed) 21, 3, 45, YIA58928 (Uncompressed) 21, 3, 45, YIA58949 (Uncompressed) 21, 6, 46, YIA58930 (Uncompressed) 21, 6, 46, YIA58951 (Uncompressed) 21, 3, 47, YIA58923 21, 3, 47, YIA58941 21, 3, 48, YIA58924 21, 3, 48, YIA58943 21, 6, 49, YIA58925 21, 6, 49, YIA58945
solo_L0_swa-eas2-HK_[YYYYMMDD]_V01.bin	3, 25, 2, YIA58202
solo_L0_swa-eas-MOM_[YYYYMMDD]_V01.bin	21, 3, 20, YIA58727
solo_L0_swa-eas-BM_[YYYYMMDD]_V01.bin	21, 6, 4, YIA58726 (Uncompressed) 21, 6, 4, YIA58889 (Uncompressed)

solo_L0_swa-pas_[YYYYMMDD]_V01.bin	3, 25, 3, YIA58203 21, 3, 192, YIA58700 21, 6, 193, YIA58705 21, 3, 194, YIA58977 (Uncompressed) 21, 6, 195, YIA58978 (Uncompressed) 21, 3, 196, YIA58979 (Uncompressed) 21, 3, 197, YIA58986 (Uncompressed) 21, 6, 198, YIA58987 (Uncompressed) 21, 3, 199, YIA58980 21, 3, 200, YIA58988 21, 3, 201, YIA58989 21, 3, 202, YIA58981 (Uncompressed) 21, 3, 203, YIA58990 (Uncompressed) 21, 6, 204, YIA58991 (Uncompressed) 21, 3, 205, YIA58982 21, 3, 206, YIA58992 21, 6, 207, YIA58993 21, 3, 208, YIA58883 (Uncompressed) 21, 3, 208, YIA58983 (Uncompressed) 21, 3, 209, YIA58884 (Uncompressed) 21, 3, 209, YIA58994 (Uncompressed) 21, 6, 210, YIA58885 (Uncompressed) 21, 6, 210, YIA58995 (Uncompressed) 21, 3, 211, YIA58886 21, 3, 211, YIA58984 21, 3, 212, YIA58887 21, 3, 212, YIA58996 21, 6, 213, YIA58888 21, 6, 213, YIA58997 21, 6, 214, YIA58985 21, 6, 215, YIA58729
solo_L0_swa-his-TEST_[YYYYMMDD]_V01.bin	21, 3, 191, YIA58968 (normal) 21, 3, 191, YIA58969 (burst)
solo_L0_swa-his-CONFIG_[YYYYMMDD]_V01.bin	21, 3, 128, YIA58800 (normal) 21, 3, 128, YIA58801 (burst)
solo_L0_swa-his-PHA_[YYYYMMDD]_V01.bin	21, 6, 128, YIA58808 (normal) 21, 6, 128, YIA58809 (burst)
solo_L0_swa-his-MATRIX_[YYYYMMDD]_V01.bin	21, 6, 129, YIA58802 (normal) 21, 6, 129, YIA58803 (burst)
solo_L0_swa-his-VDF_[YYYYMMDD]_V01.bin	21, 6, 130, YIA58806 (normal) 21, 6, 130, YIA58807 (burst)
solo_L0_swa-his-PRIO_[YYYYMMDD]_V01.bin	21, 6, 131, YIA58804 (normal) 21, 6, 131, YIA58805 (burst)
solo_L0_swa-his-LL_[YYYYMMDD]_V01.bin	21, 6, 132, YIA58810 (normal) 21, 6, 133, YIA58811 (burst) 21, 6, 134, YIA58812 (burst)

solo_L0_swa-his-HK_[YYYYMMDD]_V01.bin	3, 25, 100, YIA58213 3, 25, 101, YIA58212 3, 25, 102, YIA58184

Table 3.1 Level L0 grouping of raw packets

3.2 Data Flow Overview

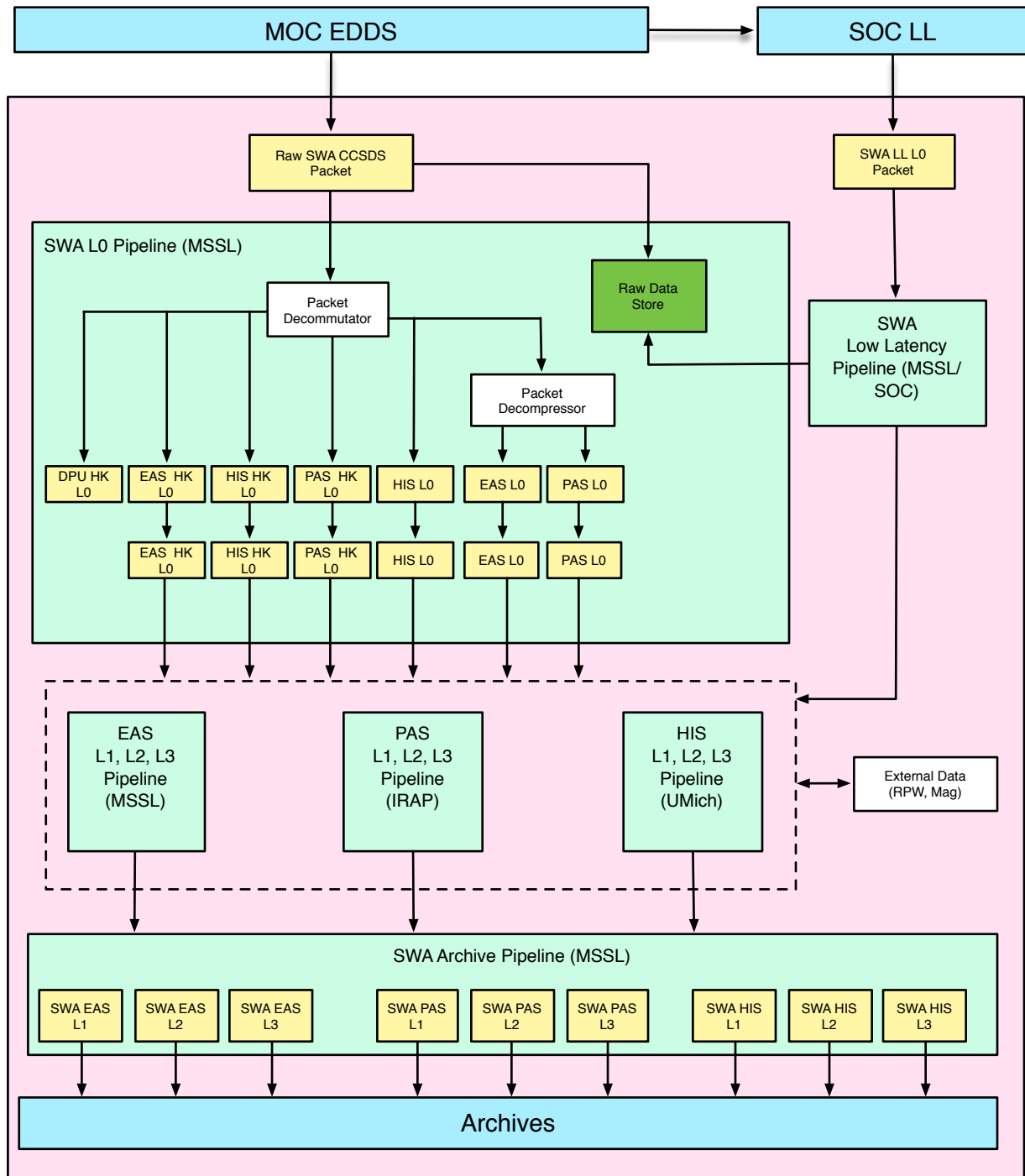


Figure 3.8. SWA data flow schematic

The SWA data processing flows from the MOC data delivery service through a series of processing pipelines and back out to the SOC archive and other archives as illustrated in Figure 3.8

In Figure 3.8 there are six distinct pipelines, shaded green:

1. SWA L0 Pipeline: This is located at MSSL. It retrieves the data from the EDDS and performs a first unpack, decommutating the ccscs packets into relevant files for HIS, PAS and EAS. If a packet has been compressed on-board, it will be uncompressed in this pipeline. The decommutated and uncompressed ccscs packet files are grouped together in 24 hour files and stored at MSSL. They are available to the wider SWA team.
2. SWA Low Latency Pipeline: This pipeline is identical to the SWA pipeline hosted as a virtual machine at SOC. This pipeline will take SOC raw data and produce L0 .cdf files. These will be stored in the MSSL L0 data store.
3. PAS/HIS/EAS L1, L2, L3 Pipeline: These pipelines are hosted at the relevant institute. The pipeline will be fed the L0 data and produce the L1, L2 and L3 data products. These pipelines may also use external data. The higher level products will then be piped back to MSSL where they will be archived.
4. SWA Archive Pipeline: This pipeline simply takes the higher level data products and sends them to the relevant external archives.

3.3 Data Generation

The following sections describe the process used to produce the data products described in section 4.

3.3.1 SWA L1 Data

The SWA L1 data is the uncalibrated, uncompressed L0 data in CDF format. The individual sensor teams are responsible for generating SWA L1 data from the L0 packets. These CDF files will have the ccstds header data and the ccstds science data combined.

3.3.1.1 SWA EAS L1 Data

MSSL is responsible for generating the SWA EAS L1 data from the L0 source. The EAS L1 data products are, for each EAS, as follows:

- Normal Mode Spectra in counts, one set for each EAS sensor. The angular bin directions are in the EAS sensor reference frames.
- Burst Mode spectra in counts, from one sensor viewing the magnetic field direction. The angular bin directions are in the relevant EAS sensor frame.
- Triggered Mode Spectra in counts, one set for each EAS sensor. The angular bin directions are in the EAS sensor reference frames. This data is at the highest cadence of 1 3d sweep per second for a period of 5 minutes.
- Partial moments calculated on board (6 sets per EAS sensor) in physical units. The frame references are the EAS sensor reference frames.
- Engineering mode data.

3.3.1.2 SWA PAS L1 Data

IRAP is responsible for generating the SWA PAS L1 data from the L0 source. The PAS L1 data products are as follows:

- PAS 3D spectra: unique dataset merging data from various modes (Normal mode, Burst mode and Snapshots). The angular bin directions are in PAS frame. Data records are in chronological order, but with a variable time-resolution, depending on various modes.
- Onboard moments in physical units. In the PAS frame of reference.
- Engineering data: housekeeping parameters, in physical values (Volt, mA, deg.C)
- Inflight Calibration data.

All Data products are made as CDF files according to “SOL-SGS-TN-0009 Metadata Definition for Solar Orbiter Science Data”. As well as being stored in the SWA Master Repository at MSSL with the L0 data. These files will also be stored in CDPP data archive. These files will also be converted to NetCDF format to fit the AMDA tool spec.

3.3.1.3 SWA HIS L1 Data

UMich is responsible for generating the L0 HIS data from the L0 source. This data will be in CDF format. SWA HIS L1 data products are as follows:

- Ion Event (PHA) words. Individual ion event data, containing full information on incident angles (elevation and azimuth), E/q, TOF and SSD energy in digital units. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints. These are downselected for telemetry, so that only a subset are sent to the ground.
- Priority Rates: The full counts (not downselected) of PHA events within a priority range, as a function of E/q and elevation. See below for description of typical use. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints.
- Sensor rates. Counts of unclassified ion event words on the HIS detectors (start MCP, stop MCP, SSD) as a function of E/q, integrated over incident angles, TOF and Energy. Includes full counts of events subject to decimation. Sensor rates also include two coincidence rates: (A) the number of events with a valid TOF and energy (triple coincidence), and (B) a count of those with only a valid TOF (double coincidence). These rates are primarily used to evaluate the performance of the instrument, rather than for science. In particular, they can be used for calculation of ion detection efficiency in-flight [von Steiger et al., 2000]. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints.
- Decimation Rates. Counts of ion event words in each of three TOF ranges as a function of E/q. In order to reduce the processing load in on-board processing caused by light ions and low-TOF noise sources, only a fraction (1 in N) of those events are transmitted to the HIS C&DH board from the HV bubble (i.e. decimated). Separate decimation ranges in E/q and TOF are included for alpha particles, protons and low-TOF events caused by accidental coincidences. The fraction transmitted is commandable, from typically 1 in 4 for alphas to zero for low-TOF noise events.
- Rate-Based Velocity Distribution Functions (VDFs): Counts of ion event words for a set of ions subdivided by E/q, elevation and azimuth for a selection of on-board

classified ions. Selection of ions to include He^{2+} , C^{5+} , O^{6+} , and Fe^{10+} . Additional ions and charge states may be produced according to science needs and as counting statistics allow. Since these counts are not subject to the effect of the priority sampling algorithm, they represent the best possible statistics. However, because species are separated simply by boxes and no peak overlap removal is performed (see below), the counts are not as accurately assigned to a given species as they would be if formed on the ground. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints.

- **Matrix Rates:** Counts of ion event words within a specified Energy-TOF range, classified and counted onboard, for each E/q step. Summed over incident angle. HIS has 32 such species boxes intended to roughly select counts of ion event words measured for particular ion species. Classification transforms E/q, TOF and energy into the two dimensions of Energy and TOF. Classification is primarily used for other data products (below and in low-latency). This data product is not in telemetry for most instrument data rates. If resources allow, the following ions may be included are He^{2+} , O^{6-7+} , C^{4-6+} , and Fe^{10+} . Additional ions and charge states may be produced according to science needs and as counting statistics allow. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints.

This data product is not currently being produced for any instrument data configuration. If resources allow, the following ions may be included are He^{2+} , O^{6-7+} , C^{4-6+} , and Fe^{10+} . Additional ions and charge states may be produced according to science needs and as counting statistics allow.

- **Low-latency Data.** Two rate spectra plus two rate ratios packaged into a single packet. Rate spectra are rate-based VDFs collapsed along both angle dimensions, so that they are only separated by E/q. These packets are handled separately from other science data and are downlinked at high-priority, at essentially the same intervals as housekeeping data.

All Data products are made as CDF files according to “SOL-SGS-TN-0009 Metadata Definition for Solar Orbiter Science Data”. As well as being stored at MSSL, these files shall be stored in NASA’s Space Physics Data Facility (SPDF) data archive.

Illustrations of the higher-level data product flow for EAS and PAS are shown in Figure 3.9 and Figure 3.10 below.

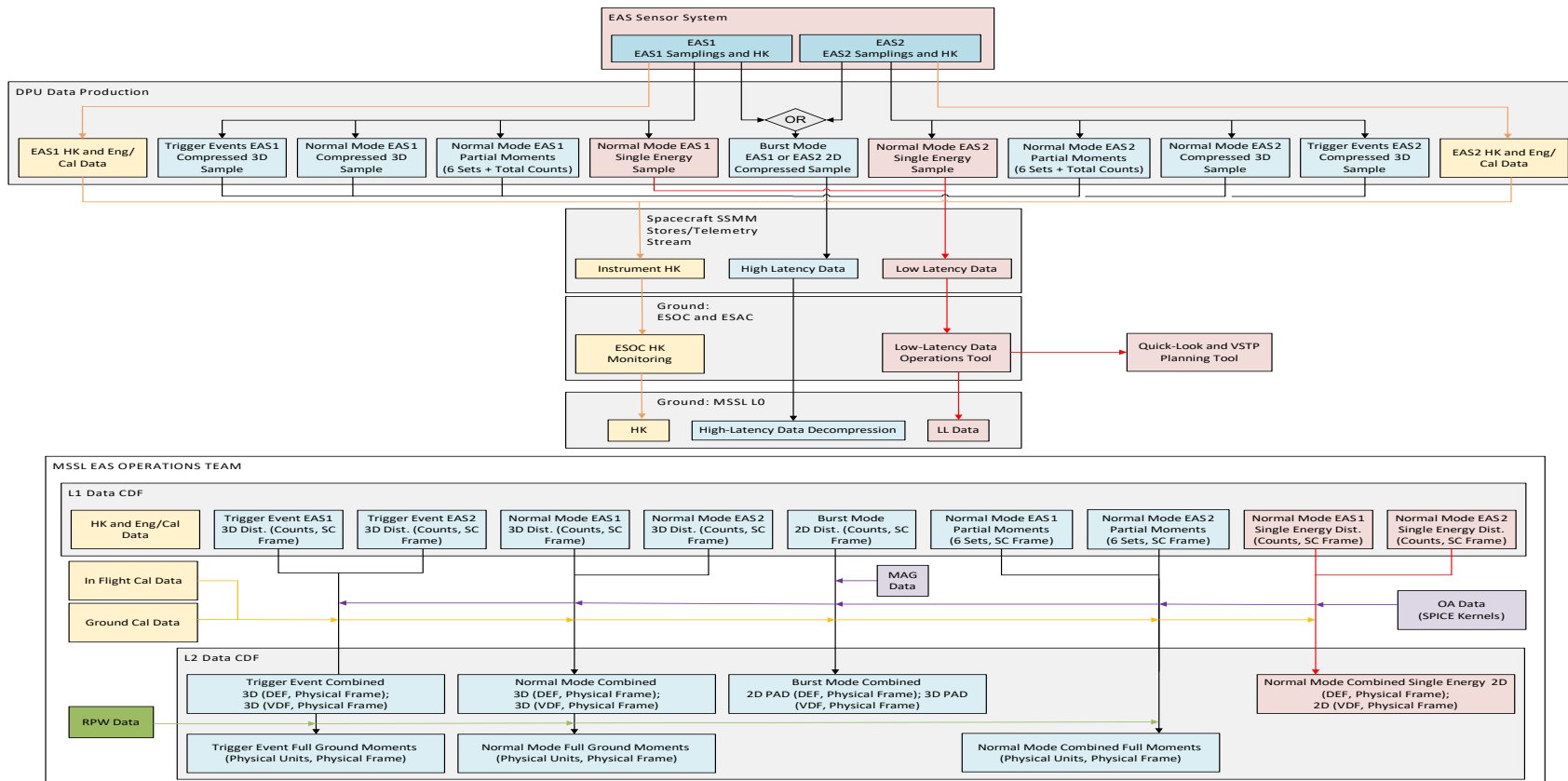


Figure 3.9 Illustration of the SWA-EAS higher level data flow

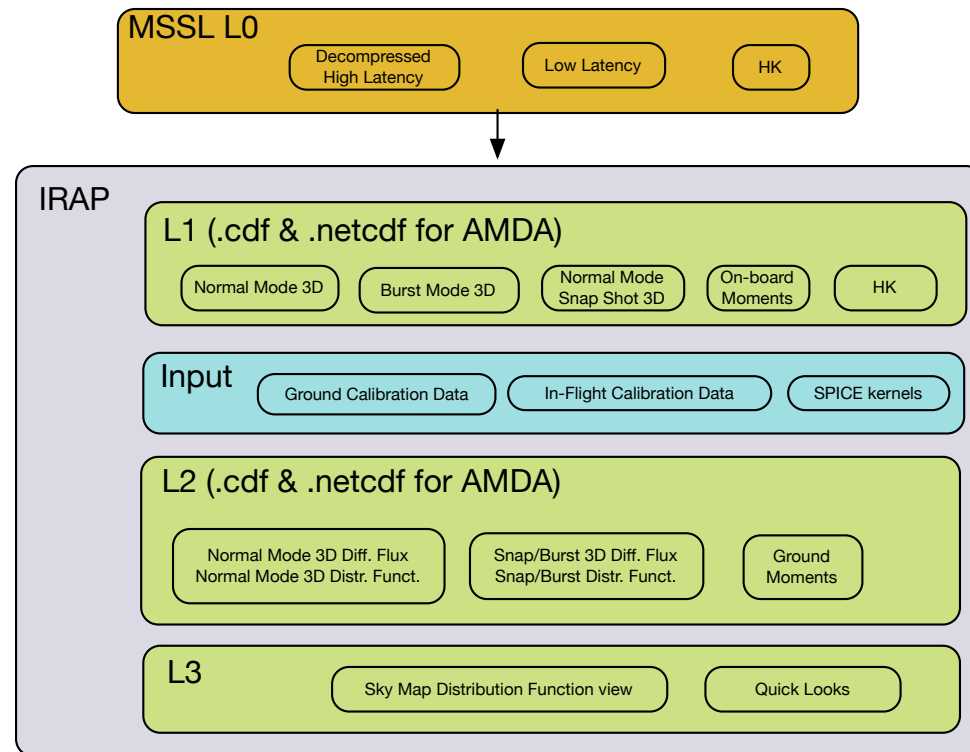


Figure 3.10 Illustration of the SWA-PAS higher level data flow

3.3.2 SWA L2 Data

3.3.2.1 SWA EAS L2 Data

The MSSL Operations team is responsible for generating SWA EAS L2 data. The generation of the full set of SWA EASA L2 data products requires a number of auxiliary files including:

- L0 data products;
- EAS Ground Calibration files;
- EAS Flight Calibration files (Obtained from L0 engineering/cal data);
- Spacecraft orbit and attitude information files (e.g. SPICE kernels);
- Spacecraft potential data from the RPW instrument;
- Magnetic field direction associated with each burst mode sample from the MAG instrument.

The set of SWA EAS L2 data products includes the following:

- Normal mode full onboard moment set for electrons in physical units and relevant heliospheric frame (produced by appropriately combining partial moments data with reference to the spacecraft potential from RPW) - at 4 second time resolution;
- Normal mode combined 3D electron distributions expressed as a distribution function with physical units and in a relevant heliospheric frame. These are produced by appropriately combining spectra from the 2 sensors. Time resolution 100 seconds;
- Normal mode combined 3D electron distributions expressed as a differential energy (number) flux and in a relevant heliospheric frame. These are again produced by appropriately combining spectra from the 2 sensors. Time resolution 100 seconds;
- Trigger event combined 3D electron distributions expressed as a distribution function with physical units and in a relevant heliospheric frame. These are produced by appropriately combining spectra from the 2 sensors. Time resolution 1 second for a 5 minute period;
- Trigger event combined 3D electron distributions expressed as a differential energy (number) flux and in a relevant heliospheric frame. These are again

produced by appropriately combining spectra from the 2 sensors. Time resolution 1 second for a 5 minute period;

- Burst mode combined 2D electron pitch-angle distributions expressed with physical units and in a frame defined by the magnetic field direction. These are produced by appropriately rebinning the data from 2 elevation scans with respect to the field direction. Time resolution 0.125 seconds for a limited (few minute) period;
- Burst mode combined 2D electron pitch-angle distributions expressed as a differential energy (number) flux and in a frame defined by the magnetic field direction. These are produced by appropriately rebinning the data from 2 elevation scans with respect to the field direction. Time resolution 0.125 seconds for a limited (few minute) period;
- Normal mode combined single energy angle-angle electron distributions expressed as a distribution function with physical units and in a relevant heliospheric frame. These are produced by appropriately combining spectra from the 2 sensors. Time resolution 100 seconds;
- Normal mode combined single energy angle-angle electron distributions expressed as a differential energy (number) flux and in a relevant heliospheric frame. These are produced by appropriately combining spectra from the 2 sensors. Time resolution 100 seconds;
- Ground-calculated electron moments generated from the normal mode combined 3D electron distributions, in physical units and relevant heliospheric frame (produced with reference to the spacecraft potential from RPW) - at 100 second time resolution;
- Ground-calculated electron moments generated from the trigger events combined 3D electron distributions, in physical units and relevant heliospheric frame (produced with reference to the spacecraft potential from RPW) - at 1 second time resolution over a 5 minute period;

Again, all L2 data products described above will be stored, with appropriate metadata, within CDF files according to “SOL-SGS-TN-0009 Metadata Definition for Solar Orbiter Science Data”. These files will be stored in the SWA Master Repository at MSSL, along with the L2 data from the other SWA sensors and the auxiliary data generated from the mission. A number (all, subject to discussion?) of these data files will be submitted to the official ESA Solar Orbiter Archive, to the NASA NSSDC archive and the CDPD data archive in France following PI review and approval.

These files may be converted by the MSSL team to appropriate format (e.g. NetCDF format to fit the AMDA tool spec.) as requested by the archives.

3.3.2.2 SWA PAS L2 Data

IRAP is responsible for generating the SWA PAS L2 data and will produce 3 PAS L2 products:

1. 3D velocity distribution function
2. 1D energy differential flux
3. Ground moments

In this section the CDF variables are shown in bold.

3.3.2.2.1 3D velocity distribution function data

The 3D velocity distribution function CDF file consists of 3D arrays (variable “**vdf**”) of [11 azimuth, 9 elevations, 96 energies] of the ion number density in the phase space expressed in $s^3 \cdot m^{-6}$. Since the instant sampling may cover just a part of the full angular-energy range, the data record contains also the start and number of the elevation bins (“**start_elevation**”, “**nb_elevation**”), the start and number of the azimuth bins (“**start_CEM**”, “**nb_CEM**”), and the start and number of the energy bins (“**start_energy**”, “**nb_energy**”). The user shall use only records of the categories (variable “**Info**”) as follows:

- 1: Normal sampling, one “**vdf**” each 4 sec
- 2: Snapshot sampling, “**nb_K**” VDFs per second
- 3: Burst sampling, “**nb_K**” VDFs per second

3.3.2.2.2 1D Differential Energy Flux

1D Differential Energy flux CDF file contain original velocity distribution function integrated over elevation and azimuth and converted to the differential energy flux. The value is expressed in $cm^{-2} \cdot s^{-1} \cdot eV/eV$. Since the instant sampling may cover just a part of the full energy range, the data record contains also the start and number of the energy bins (“**start_energy**”, “**nb_energy**”). User shall use only records of the categories (variable “**Info**”) as follows:

- 1: Normal sampling, one “**eflux**” each 4 sec
- 2: Snapshot sampling, “**nb_K**” **efluxs** per second
- 3: Burst sampling, “**nb_K**” **efluxs** per second

3.3.2.2.3 PAS Ground Moments

Ground moments contain the number density, the velocity vector, the pressure tensor and the temperature of the proton peak, extracted from the 3D VDF. User shall use only records of the categories (variable “**Info**”) as follows:

- 1: Normal sampling, one measurement each 4 sec
- 2: Snapshot sampling, “**nb_K**” measurements per second
- 3: Burst sampling, “**nb_K**” measurements per second

The “**validity**” flag shows the data quality. Do not use the data labeled as “1” since the number density and the pressure could be too low. Use the data labeled “2” with attention because the data could be noisy.

The full description are in the Tables below.

All Data products are made as CDF files according to “SOL-SGS-TN-0009 Metadata Definition for Solar Orbiter Science Data”. As well as being stored at MSSL, the PAS L2 files shall be stored in CDPD data archive after a PI review and approvement. These files shall be converted also to NetCDF format to fit the AMDA tool spec.

All PAS L2 data can be delivered to ESAC archive after a PI review and approvement.

3.3.2.3 SWA HIS L2 Data

UMich is responsible for generating the SWA HIS L2 data. To produce the SWA HIS L2 data, the following auxiliary files are required:

- L0 data products
- HIS Ground Calibration files
- HIS Flight Calibration files (Obtained from L0)
- Spacecraft orbit and attitude information files (e.g. SPICE kernels)

UMich will provide the following SWA HIS L2 data products. These are the same products as L1 but in physical units:

- Ion Event (PHA) Words: Full information about measured ion events in physical units, including E/q (keV/e), time-of-flight (ns), total energy (keV) and elevation (degrees) and azimuth (degrees). Three weights are included to convert PHA count to Phase Space Density (s^3m^6); one weight accounts for detector efficiency, one accounts for prioritization scheme effects, and one accounts for

unit conversion. These are the primary science data product from HIS and make up the bulk of HIS telemetry volume in Normal and Normal Low Cadence modes.

- Priority Rates: Total counts of ion event words in each priority range, divided by E/q and elevation angle bin. (Duplicate of L1 version.) These rates are used to correct the weighting of telemetered ion event words for the effect of the sampling algorithm. For example, if the priority rate for a given E/q step and elevation bin is 10, but only 5 of these ion event words were included in telemetry, then each counts for 2 in further processing;
- Sensor Rates: L1 Sensor Rates converted to differential flux units, $(\text{cm}^2 \text{ s sr keV})^{-1}$.
- Decimation Rates: Duplicate of L1 version since conversion to flux units does not makes sense.
- Matrix rates: L1 Matrix Rates converted to flux units, $(\text{cm}^2 \text{ s})^{-1}$.
- Rate-Based Velocity Distribution Functions: L1 Rate-Base Velocity Distribution Functions converted to differential flux units, $(\text{cm}^2 \text{ s sr keV})^{-1}$.

3.3.3 SWA L3 Data

The SWA team may generate further L3 data products as required. At present these are still TBD, except for HIS (see below). Possible data products that can be further generated from the L1 or L2 and auxiliary data files might include:

- EAS Pitch Angle Distributions generated from the Normal Mode 3D distributions with reference to the magnetic field direction (time resolution 100secs);
- EAS Pitch Angle Distributions generated from the Trigger event 3D distributions with reference to the magnetic field direction (time resolution 1 second for a 5 minute period);
- EAS Moments over reduced energy ranges (e.g. by appropriately combining partial moment data to provide a quantification of the plasma characteristics in only the strahl energy range – time resolution 4 seconds – or by moment integration performed on L2 normal mode 3D distributions over a limited energy range – time resolution 100 seconds);
- PAS All sky maps

In the case of SWA HIS, the Level 3 data is the main composition data. The most accurate and scientifically useful data products are formed via a peak overlap removal algorithm to assign counts to individual ion species in ground processing [von Steiger et

al., 2000; Shearer et al., 2014}. This algorithm uses a forward model to predict the peak center location of each of the >75 analyzed ions in time-of-flight -- energy space at each E/q step. This forward model, which includes estimated peak width as well center, is developed from ground calibration and in-flight accumulated data. A set of two-dimensional Gaussian curves is formed from these centers and widths and provides an initial estimate of count vectors assigned each species. A maximum-likelihood estimation method (MLE) then shuffles counts among these vectors to remove overlap in the statistically optimal way. Events at each pair of incident angle bins are processed independently to preserve distributions in these dimensions. Count vectors from all angle bins are then recombined and converted to phase-space density ($\text{s}^3 \text{ km}^{-6}$) to form 3D velocity distribution functions (VDFs). Moments of density, velocity and temperature are then computed from these VDFs and used to produce the following data products from SWA/HIS:

- **Elemental Abundances:** Sum of all ion densities for a particular element as a ratio to those of oxygen.
- **Ionic Charge States:** Density ratios for specified ion pairs or average charge state, computed as density-weighted average
- **Charge State Distributions:** Normalized distribution of all charge states analyzed for specified element.
- **Kinetic Properties:** Moments of velocity distribution functions for specified ions. Includes density (cm^{-3}), bulk velocity (km s^{-1}) and temperature (K).
- **Velocity Distributions:** Phase space density ($\text{s}^3 \text{ km}^{-6}$) in instrument frame, binned according to speed, incident angles (elevation and azimuth).

These are summarized in Table 3.2 below.

Data Product	Time Resolutions ¹
Elemental Abundances	
Fe/O	30s, 300s, 4s ²
C/O	30s, 300s, 4s ²
He/O	30s, 300s, 4s ²
Mg/O	30s, 300s
Si/O	30s, 300s
Ne/O	30s, 300s
S/O	>300s ³
N/O	>300s
Ionic charge states	
O ⁷⁺ /O ⁶⁺	30s, 300s, 4s ²
C ⁶⁺ /C ⁴⁺	30s, 300s, 4s ²

C^{5+}/C^{4+}	30s, 300s, 4s ²
$\langle Q_O \rangle$	30s, 300s, 4s ²
$\langle Q_C \rangle$	30s, 300s, 4s ²
$\langle Q_{Fe} \rangle$	30s, 300s, 4s ²
Ionic Charge State Distributions	
$Q_i(O), i = 5, \dots, 8$	30s, 300s
$Q_i(C), i = 4, \dots, 6$	30s, 300s
$Q_i(Fe), i = 6, \dots, 20$	30s, 300s
$Q_i(Si), i = 6, \dots, 12$	30s, 300s
$Q_i(Ne), i = 8, \dots, 10$	30s, 300s
$Q_i(Mg), i = 5, \dots, 12$	30s, 300s
$Q_i(N), i = 5, 6$	30s, 300s ³
$Q_i(S), i = 6, \dots, 14$	30s, 300s ³
Kinetic properties (n, v_{bulk}, T)	
He^{2+}	30s, 300s, 4s ²
C^{5+}	30s, 300s, 4s ²
O^{6+}	30s, 300s, 4s ²
Fe^{10+}	30s, 300s, 4s ²
Velocity Distributions⁴	
He^{2+}	30s, 300s, 4s ²
C	30s, 300s, 4s ²
O^{6+}	30s, 300s, 4s ²
Fe^{10+}	30s, 300s, 4s ²

Table 3.2 SWA-HIS Level 2 derived data products in physical units

Note 1: These are the possible time resolutions. For some periods in the solar wind, the highest time-resolution will not provide data with sufficient statistical accuracy. The best, most scientifically useful averaging intervals will be determined based on the counting accuracy achievable.

Note 2: Data at this resolution corresponds to HIS Burst mode, which can only be run on average 1% of the time due to telemetry constraints.

Note 3: These elements are more difficult to resolve. Appropriate time resolutions will be determined in flight.

Note 4: Additional charge states may be produced during periods of high counting statistics.

MSSL will define a set of appropriate physical reference frames in which to produce and store the data (or produce one in which manipulations to other frames (e.g. using SPICE kernels) is straightforward for the community.

There are two coordinate reference systems that SWA can use to represent L2 data. Both are used for STEREO mission. SWA team shall define which coordinate system we will use for L2/L3 data products:

Solar-Orbit (SO), X is the line connection Solar Orbiter and the Sun center, Y is in the plane of the S/C orbit towards the SC velocity vector.

*Solar-Equator-Spacecraft (SES) that equals to STEREO **HGRN/RTN** : X axis points from Sun center to the spacecraft, and the Y axis is the cross product of the solar rotational axis and X, and lies in the solar equatorial plane (towards the West limb).*

3.4 Validation

The following sections describe the process by which the data products are validated.

3.4.1 Instrument Team Validation

Upon ingestion of the raw CCSDS telemetry at MSSL, initial testing will be performed on the raw data. This will include:

- SID counter tests to ensure all packets are present.

3.4.2 SOC Validation

The SOC will check the data types that the SWA team intends to archive. The SOC might also perform spot checks on contents of the files. The exact procedure in which this routine check will take place is still TBD.

4 Data Product Descriptions

SWA data products are formatted in accordance with the rules outlined in [RD7]. This section provides details on the filenames, formats and metadata for each of the products included in the SWA science data.

Level	Source	Data Type	Format and Metadata content
L0	IT	"Raw" data, unpacked and uncompressed data	Decommutated and uncompressed CCSDS metadata reflect the information that was available in the TM packets only.
L1	IT	"Engineering" data, uncalibrated	CDF, metadata follows Solar Orbiter standard for L1
L2	IT	"Calibrated" data, science quality	CDF, metadata follows Solar Orbiter standard for L2 (see Section Solar Orbiter Metadata Standard): full attitude information in WCS

			coordinate frame and time in UTC.
<i>L3</i>	<i>IT</i>	<i>Higher-level data</i>	<i>Data format as appropriate. The format of Level-3 data, calibration data and ancillary data can be chosen depending on the type of data product and the objectives. However, as much as possible standard formats should be used (MPEG, FITS, JPEG2000, CDF, PNG, ...).</i>
CAL	IT	Calibration data	Data format as appropriate. <i>Not all calibration data are necessarily open to the scientific community.</i>
ANC	IT/SOC	Ancillary data	Data format as appropriate. <i>Not all ancillary data are necessarily open to the scientific community.</i>
PLN	SOC	Planning data	Files related to mission planning issued by the SOC, for example the E-FECS (see E-FECS ICD). <i>Not all planning files are necessarily open to the scientific community</i>
LLo1	SOC	LL engineering data, output of LL pipeline	CDF, metadata follow Solar Orbiter standard, with some specifics for LL-01 data: time in OBT, attitude in instrument detector reference frame.
LLo2	SOC	Operational LL data, enhanced with S/C HK	CDF, metadata follow Solar Orbiter standard, with some specifics for LL-02 data : time in UTC, attitude in WCS coordinate frame.
LLo3	SOC	Visualisation of operational LL data, in "quicklook" format	'Quicklook' data in PNG or JPEG2000 (details TBC). This level is also used for LL data products derived from (multiple) LLo2 products.

Note that we do not specify a level for LL TM that has been fully processed and calibrated by the instrument team. These should be classified as 'L2'. Higher level, derived data products are part of 'L3' data.

4.1 Primary Products Format

The SWA instrument uses the CDF format for its science data products. This section describes the format and record structure of each of the science data file types.

The filename will follow this format:

solo_[DataLevel]_swa-[Sensor]-[DataType]_[StartEpoch- EndEpoch]_[Version].cdf

An example of this is:

solo_L0_swa-eas-NM_YYYYMMDDTHHMMSS- YYYYMMDDTHHMMSS_V01.cdf

Where StartTime and EndTime are the coarse seconds from the first and last SCET. It is expected that these files will cover 86400 second periods.

4.1.1 L0 – Raw data product

4.1.1.1 EAS L0 data products

EAS Level-0 data files are created by decommutating and decompressing CCSDS telemetry data packets for EAS. CCSDS telemetry data is the only required input. Below is detailed description of EAS L0 files.

4.1.1.1.1 EAS normal mode electron counts

This file contains the Normal Mode Electron Counts data product from EAS[12]. The file format is .cdf.

Filename: solo_L0_swa-eas[12]-NMc_[StartTime-EndTime]_V???.cdf

Expected data volume and time resolution: This file contains the data between the start time and end times mentioned in the file name. The start and end times are spacecraft elapsed time (SCET) at 1 second coarse resolution, from the reference point (1 Jan 2000 TBC). The time resolution of the file is nominally 100 seconds. It contains electron counts in 16 bit format covering 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single 24 hour period approximately. In this case there will be 864 records per day.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L0>Level 0 Data
Descriptor	1	SWA-EAS[12]-NMc
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA L0 swa-eas[12]-NMc
Logical File id	1	solo_L0_swa-eas[12]-NMc_yyyymmddTHMMSS- yyyymmddTHMMSS V01
Logical Source Description	1	SWA-EAS[12] Nominal Mode 3D counts data
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	NMc>Nominal Mode Counts
Level	1	L0>Level 0 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron- Analyser-System

Variables



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_SCET	CDF_EPOCH	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12]_SCET			
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS[12] observation			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_EPOCH	1900-01-01 00:00:00.000			
LABLAXIS	CDF_CHAR	Spacecraft Elapsed Time (Ticks)			
UNITS	CDF_CHAR	s			
VALIDMIN	CDF_EPOCH	2010-01-01 00:00:00.000			
VALIDMAX	CDF_EPOCH	2039-12-31 23:59:59.999			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_EPOCH	2010-01-01 00:00:00.000			
SCALEMAX	CDF_EPOCH	2039-12-31 23:59:59.999			
VAR_TYPE	CDF_CHAR	support data			
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_NM_C_Data	CDF_UINT4	1	32768	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SWA_EAS[12]_NM_C_Data			
CATDESC	CDF_CHAR	EAS[12] Nominal mode 3D electron distribution counts			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Electron Counts			
UNITS	CDF_CHAR	Counts/Accum			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
DEPEND_0	CDF_CHAR	SWA_EAS[12]_SCET			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_Mode	CDF_UINT4	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12]_Mode			
CATDESC	CDF_CHAR	The EAS[12] Mode data			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS[12]_Mode			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			



VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA_EAS[12]_Full3DValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Full 3D Validity			
CATDESC	CDF_CHAR	The Validity flags related to whole EAS[12] 3D data set			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Full 3D validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA_EAS[12]_ElevationValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation Validity			
CATDESC	CDF_CHAR	The Validity flags associated with each of the 16 elevations			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Elevation validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA_EAS[12]_DataValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Validity			
CATDESC	CDF_CHAR	The Validity flags associated with each energy count for the 16 elevations			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Data validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Quality			
CATDESC	CDF_CHAR	EAS[12] Data Quality flag			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS[12] data quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	4			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	4			
VAR_TYPE	CDF_CHAR	support_data			

4.1.1.1.2 EAS single strahl electron counts

This file contains the single strahl electron counts data product from EAS[12]. The file format is .cdf.

Filename: solo_L0_swa-eas[12]-SSc_[StartTime-EndTime]_V??.cdf

Expected data volume and time resolution: This file contains the data between the start time and end time mentioned in the file name. The start and end times are spacecraft elapsed time (SCET) at 1 second coarse resolution, from the reference point (1 Jan 2000 TBC). The time resolution of the file is nominally 100 seconds. It contains electron counts in 16 bit format covering 1 energy, 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single 24 hour period approximately. In this case there will be 864 records per day.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L0>Level 0 Data
Descriptor	1	SWA-EAS[12]-SSc
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	Solo L0 swa-eas[12]-SSc
Logical File id	1	solo_L0_swa-eas[12]_SSc_yyyymmddTHHMMSS- yyyymmddTHHMMSS_V01
Logical Source Description	1	SWA-EAS[12] Single Strahl data
Rules of Use	1	Consult with MSSL-UCL before using



Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MM:SS
Mods	1	V01 First Version
Data Product	1	SSc>Single Strahl Counts
Level	1	L0>Level 0 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_SCET	CDF_EPOCH	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12]_SCET			
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS[12] observation			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_EPOCH	1900-01-01 00:00:00.000			
LABLAXIS	CDF_CHAR	Spacecraft Elapsed Time (Ticks)			
UNITS	CDF_CHAR	s			
VALIDMIN	CDF_EPOCH	2010-01-01 00:00:00.000			
VALIDMAX	CDF_EPOCH	2039-12-31 23:59:59.999			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_EPOCH	2010-01-01 00:00:00.000			
SCALEMAX	CDF_EPOCH	2039-12-31 23:59:59.999			
VAR_TYPE	CDF_CHAR	support_data			
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_Mode	CDF_UINT4	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12]_Mode			
CATDESC	CDF_CHAR	The EAS[12] Mode data			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS[12]_Mode			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_DataValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12]_Data Validity			
CATDESC	CDF_CHAR	The Validity flags associated with each energy count for the 16 elevations			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			



FORMAT	CDF_CHAR	I10
LABLAXIS	CDF_CHAR	Data validity flag
VALIDMIN	CDF_UINT4	0
VALIDMAX	CDF_UINT4	65535
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_UINT4	0
SCALEMAX	CDF_UINT4	65535
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_EnergyID	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] EnergyID			
CATDESC	CDF_CHAR	The EAS[12] Energy used for Strahl collection			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	255			
FORMAT	CDF_CHAR	I3			
LABLAXIS	CDF_CHAR	EAS[12] Mode			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	255			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	255			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_SSc_Data	CDF_UINT4	1	512	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Single Strahl Data			
CATDESC	CDF_CHAR	Single strahl data from EAS[12]			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Electron Counts			
UNITS	CDF_CHAR	Counts/Accum			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
DEPEND_0	CDF_CHAR	SWA_EAS[12]_SCET			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Quality			
CATDESC	CDF_CHAR	EAS[12] Data Quality flag			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS[12] data quality			
VALIDMIN	CDF_UINT4	0			

VALIDMAX	CDF_UINT4	4
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_UINT4	0
SCALEMAX	CDF_UINT4	4
VAR_TYPE	CDF_CHAR	support_data

4.1.1.1.3 EAS Triggered Mode Counts

This file contains the triggered mode electron counts data product from EAS[12]. The file format is .cdf.

Filename: solo_L0_swa-eas[12]-TMc_[StartTime-EndTime]_V??.cdf

Expected data volume and time resolution: This file contains the data between the start time and end times mentioned in the file name. The start and end times are spacecraft elapsed time (SCET) at 1 second coarse resolution, from the reference point (1 Jan 2000 TBC). The time resolution of the file is nominally 1 second for 5 minutes. It contains electron counts in 16 bit format covering 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single triggered event. In this case there will be 300 records per event.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L0>Level 0 Data
Descriptor	1	SWA-EAS[12]-TMc
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA L0 swa-eas[12]-TMc
Logical File id	1	solo_L0_swa-eas[12]-TMc_yyyymmddTHMMSS- yyymmddTHMMSS_V01
Logical Source Description	1	SWA-EAS[12] Trigger Mode 3D counts data
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	TMc>Trigger Mode Counts
Level	1	L0>Level 0 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron- Analyser-System

Variables

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_SCET	CDF_EPOCH	1	1	T	F



Attribute Name	Data Type	Value
FIELDNAM	CDF_CHAR	EAS[12] SCET
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS[12] observation
DISPLAY_TYPE	CDF_CHAR	time series
FILLVAL	CDF_EPOCH	1900-01-01 00:00:00.000
LABLAXIS	CDF_CHAR	Spacecraft Elapsed Time (Ticks)
UNITS	CDF_CHAR	s
VALIDMIN	CDF_EPOCH	2010-01-01 00:00:00.000
VALIDMAX	CDF_EPOCH	2039-12-31 23:59:59.999
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_EPOCH	2010-01-01 00:00:00.000
SCALEMAX	CDF_EPOCH	2039-12-31 23:59:59.999
VAR_TYPE	CDF_CHAR	support data
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_Tmc_Data	CDF_UINT4	1	32768	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SWA_EAS[12]_Tmc_Data			
CATDESC	CDF_CHAR	EAS[12] Trigger mode 3D electron distribution counts			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Electron Counts			
UNITS	CDF_CHAR	Counts/Accum			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
DEPEND_0	CDF_CHAR	SWA_EAS[12]_SCET			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_Mode	CDF_UINT4	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Mode			
CATDESC	CDF_CHAR	The EAS[12] Mode data			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS1 Mode			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY



SWA_EAS[12]_Full3DValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Full 3D Validity			
CATDESC	CDF_CHAR	The Validity flags related to whole EAS[12] 3D data set			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Full 3D validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ElevationValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation Validity			
CATDESC	CDF_CHAR	The Validity flags associated with each of the 16 elevations			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Elevation validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_DataValidity	CDF_UINT4	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Validity			
CATDESC	CDF_CHAR	The Validity flags associated with each energy count for the 16 elevations			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Data validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_RPW_HRTBT	CDF_EPOCH	1	1	T	F



Attribute Name	Data Type	Value
FIELDNAM	CDF_CHAR	RPW Heartbeat
CATDESC	CDF_CHAR	The RPW Heartbeat data coming in from S20 packet
DISPLAY_TYPE	CDF_CHAR	time series
FILLVAL	CDF_REAL8	1900-01-01 00:00:00.000
LABLAXIS	CDF_CHAR	RPW Heartbeat (Time)
UNITS	CDF_CHAR	s
VALIDMIN	CDF_REAL8	2010-01-01 00:00:00.000
VALIDMAX	CDF_REAL8	2039-12-31 23:59:59.999
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL8	2010-01-01 00:00:00.000
SCALEMAX	CDF_REAL8	2039-12-31 23:59:59.999
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_RPW_ShkTrigQlty	CDF_UINT4	1	1	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] RPW Shock Trigger Quality			
CATDESC	CDF_CHAR	RPW Shock Trigger quality flag coming in from S20 packet			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	RPW Shock Trigger quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_RPW_Pot	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	RPW Potential			
CATDESC	CDF_CHAR	RPW potential coming in from S20 packet - set to zero if PA is zero			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I5			
LABLAXIS	CDF_CHAR	RPW Potential data			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	Linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
DEPEND_0	CDF_CHAR	SWA_EAS[12]_RPW_HRTBT			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_RPW_PA	CDF_UINT1	1	1	F	F
Attribute Name	Data Type	Value			

FIELDNAM	CDF_CHAR	EAS[12] RPW PA
CATDESC	CDF_CHAR	RPW Potential Availability flag coming in from S20 packet
DISPLAY_TYPE	CDF_CHAR	time series
FILLVAL	CDF_UINT1	4294967294
FORMAT	CDF_CHAR	I10
LABLAXIS	CDF_CHAR	RPW Potential Availability Flag
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	65535
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	65535
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] RPW TF	CDF_UINT1	1	1	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] RPW TF			
CATDESC	CDF_CHAR	RPW Trigger Flag coming in from S20 packet			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT1	255			
FORMAT	CDF_CHAR	I3			
LABLAXIS	CDF_CHAR	RPW Trigger Flag			
VALIDMIN	CDF_UINT1	0			
VALIDMAX	CDF_UINT1	2			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT1	0			
SCALEMAX	CDF_UINT1	2			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Quality			
CATDESC	CDF_CHAR	EAS[12] Data Quality flag			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS[12] data quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	4			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	4			
VAR_TYPE	CDF_CHAR	support_data			

4.1.1.1.4 EAS Burst Mode Counts

This file contains the Burst mode electron (pitch angle) counts data product from EAS. The file format is .cdf.

Filename: solo_L0_swa-eas-padc_[StartTime-EndTime]_V???.cdf

Expected data volume and time resolution: This file contains the data between the start time and end times mentioned in the file name. The start and end times are spacecraft elapsed time (SCET) at 1 second coarse resolution, from the reference point (1 Jan 2000 TBC). The time resolution of the file is nominally 0.125 second. It contains electron counts in 16 bit format covering 64 energies, 32 anodes and 16 deflectors for each time-stamp. In this case the number of records vary depending on the telemetry availability.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L0>Level 0 Data
Descriptor	1	SWA-EAS-padc
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA L0 swa-eas-padc
Logical File id	1	solo_L0_swa-eas-padc_yyyymmddTHHMMSS- yyyymmddTHHMMSS_V01
Logical Source Description	1	SWA-EAS Electron Pitch Angle counts data
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MM:SS
Mods	1	V01 First Version
Data Product	1	padc>Pitch Angle Distribution Counts
Level	1	L0>Level 0 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron- Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS SCET	CDF EPOCH	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SCET			
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS observation			
DISPLAY TYPE	CDF_CHAR	time series			
FILLVAL	CDF EPOCH	1900-01-01 00:00:00.000			
LABLAXIS	CDF_CHAR	Spacecraft Elapsed Time (Ticks)			
UNITS	CDF_CHAR	s			
VALIDMIN	CDF EPOCH	2010-01-01 00:00:00.000			
VALIDMAX	CDF EPOCH	2039-12-31 23:59:59.999			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF EPOCH	2010-01-01 00:00:00.000			
SCALEMAX	CDF EPOCH	2039-12-31 23:59:59.999			



VAR_TYPE	CDF_CHAR	support data
VAR_NOTES	CDF_CHAR	The EAS time tag is from the centre of the acquisition interval which is 1 sec

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS PAD Data	CDF_UINT4	1	4096	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS PAD Data			
CATDESC	CDF_CHAR	EAS electron pitch angle distribution counts			
DISPLAY_TYPE	CDF_CHAR	Spectrogram			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Electron Counts			
UNITS	CDF_CHAR	Counts/Accum			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
DEPEND_0	CDF_CHAR	SWA EAS SCET			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS Mode	CDF_UINT4	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Mode			
CATDESC	CDF_CHAR	The EAS Mode data			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS1 Mode			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS Validity	CDF_UINT4	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Validity			
CATDESC	CDF_CHAR	The Validity flags associated with energies			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Full 3D validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			



VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_EASUsed	CDF_UINT1	1	1	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS sensor used			
CATDESC	CDF_CHAR	The EAS sensor use for Pitch Angle data collection			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_UINT1	255			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS			
VALIDMIN	CDF_UINT1	0			
VALIDMAX	CDF_UINT1	3			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT1	0			
SCALEMAX	CDF_UINT1	3			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_ElevationUsed	CDF_UINT1	1	1	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Elevation used			
CATDESC	CDF_CHAR	The EAS Elevation used for Pitch Angle data collection			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_UINT1	255			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Elevation			
VALIDMIN	CDF_UINT1	0			
VALIDMAX	CDF_UINT1	16			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT1	0			
SCALEMAX	CDF_UINT1	16			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_MagDataUsed	CDF_UINT4	1	4	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	MAG vector			
CATDESC	CDF_CHAR	The MAG vector used to calculate pitch angles collected			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	F14.4			
LABLAXIS	CDF_CHAR	Full 3D validity flag			
UNITS	CDF_CHAR	nT			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
SI_CONVERSION	CDF_CHAR	1E+09>T			

VAR_TYPE	CDF_CHAR	support_data

4.1.1.1.5 EAS Onboard Partial Moments

This file contains onboard calculated partial electron moments from both EAS1 and EAS2. The file format is .cdf.

EAS onboard partial moments are calculated over three energy ranges in two sensor look directions. The three energy ranges are low, core-halo and strahl energy ranges. The look directions are one sensor only and two sensor overlap look directions.

This data product contains variables to describe SCET, data validity, summed distributions usage, spacecraft potential, 78 Moments values and 12 Moments Sums for each sensor. The 78 moments values come from three energy ranges in two sensor look directions. The two sensor look directions are one sensor only look direction and overlap with other sensor direction.

Filename: solo_L0_swa-eas-OnbPartMoms_[StartTime-EndTime]_V?? .cdf

Expected data volume and time resolution: This file contains the data between the StartTime and EndTime in the file name. The start and end times are spacecraft elapsed time (SCET) at 4 second resolution, from the reference point (1 Jan 2000 TBC). The time resolution of the file is nominally 4 seconds.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L0>Level 0 Data
Descriptor	1	SWA-EAS-OnbPartMoms
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA L0 swa-eas-padc
Logical File id	1	solo_L0_swa-eas- OnbPartMoms _yyyymmddTHHMMSS-yyyymmddTHHMMSS V01
Logical Source Description	1	SWA-EAS Onboard Partial Moments
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	OnbPartMoms>Onboard Partial Moments
Level	1	L0>Level 0 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron- Analyser-System



Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_SCET	CDF_EPOCH	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 SCET			
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS1 observation			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_EPOCH	1900-01-01 00:00:00.000			
LABLAXIS	CDF_CHAR	Spacecraft Elapsed Time (Ticks)			
UNITS	CDF_CHAR	s			
VALIDMIN	CDF_EPOCH	2010-01-01 00:00:00.000			
VALIDMAX	CDF_EPOCH	2039-12-31 23:59:59.999			
SCALETYPE	CDF_CHAR	linear			
SCALEMIN	CDF_EPOCH	2010-01-01 00:00:00.000			
SCALEMAX	CDF_EPOCH	2039-12-31 23:59:59.999			
VAR_TYPE	CDF_CHAR	support data			
VAR_NOTES	CDF_CHAR	The EAS1 time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_SCET	CDF_EPOCH	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 SCET			
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS2 observation			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_EPOCH	1900-01-01 00:00:00.000			
LABLAXIS	CDF_CHAR	Spacecraft Elapsed Time (Ticks)			
UNITS	CDF_CHAR	s			
VALIDMIN	CDF_EPOCH	2010-01-01 00:00:00.000			
VALIDMAX	CDF_EPOCH	2039-12-31 23:59:59.999			
SCALETYPE	CDF_CHAR	linear			
SCALEMIN	CDF_EPOCH	2010-01-01 00:00:00.000			
SCALEMAX	CDF_EPOCH	2039-12-31 23:59:59.999			
VAR_TYPE	CDF_CHAR	support data			
VAR_NOTES	CDF_CHAR	The EAS2 time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_dataValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 Data Validity			
CATDESC	CDF_CHAR	The Validity flags associated with EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	i10			
LABLAXIS	CDF_CHAR	EAS1 validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYPE	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			



SCALEMAX	CDF_UINT4	65535
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_dataValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 Data Validity			
CATDESC	CDF_CHAR	The Validity flags associated with EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS1 validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_SumEAS1	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Summed EAS1 distributions			
CATDESC	CDF_CHAR	This flag indicates if 4 successive 3D distributions are summed to calculate Moments			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS1 Summed flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_SumEAS2	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Summed EAS2 distributions			
CATDESC	CDF_CHAR	This flag indicates if 4 successive 3D distributions are summed to calculate Moments			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS2 Summed flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			



VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_SCPotential	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Spacecraft Potential			
CATDESC	CDF_CHAR	Spacecraft Potential used to discard lowest energies - needs conversion.			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Spacecraft Potential			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_SumMoms	CDF_UINT4	1	12	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 Moment Sums			
CATDESC	CDF_CHAR	The partial sum of the EAS1 Moments			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS1 Partial Sum			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_SumMoms	CDF_UINT4	1	12	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 Moment Sums			
CATDESC	CDF_CHAR	The partial sum of the EAS2 Moments			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS2 Partial Sum			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY



SWA_EAS1_onlyLowEne_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_onlyLowEne_Density			
CATDESC	CDF_CHAR	Number density from EAS1 only look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1_OnlyLowEne_N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm^-3			
SI_CONVERSION	CDF_CHAR	1E-06>m^-3			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyLowEne_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_onlyLowEne_Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS1 only look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_SPEED_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s^-1			
SI_CONVERSION	CDF_CHAR	1E+03>m s^-1			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyLowEne_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_onlyLowEne_Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS1 only look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			

LABLAXIS	CDF_CHAR	EAS1 OnlyLowEne P
VALIDMIN	CDF_REAL8	1E-6
VALIDMAX	CDF_REAL8	1E+3
SCALETYP	CDF_CHAR	Log
SCALEMIN	CDF_REAL8	1E-6
SCALEMAX	CDF_REAL8	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	nPa
SI_CONVERSION	CDF_CHAR	1E-09>P
REPRESENTATION_1	CDF_CHAR	REP_EAS_PRES_1
REPRESENTATION_2	CDF_CHAR	REP_EAS_PRES_2

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyLowEne_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyLowEne Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS1 only look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyCoreHalo_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyCoreHalo Density			
CATDESC	CDF_CHAR	Number density from EAS1 only look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1 OnlyCoreHalo N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			

UNITS	CDF_CHAR	cm ⁻³
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyCoreHalo_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyCoreHalo Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS1 only look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS VEL LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP VEL LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyCoreHalo_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyCoreHalo Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS1 only look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1 OnlyCoreHalo P			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	nPa			
SI_CONVERSION	CDF_CHAR	1E-09>P			
REPRESENTATION_1	CDF_CHAR	REP EAS PRES 1			
REPRESENTATION_2	CDF_CHAR	REP EAS PRES 2			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyCoreHalo_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyCoreHalo Heat Flux			

CATDESC	CDF_CHAR	Heat Flux from EAS1 only look direction in CoreHalo range
COORDINATE_SYSTEM	CDF_CHAR	EAS1
DISPLAY_TYPE	CDF_CHAR	time series
DEPEND_0	CDF_CHAR	SWA EAS1 SCET
FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABL_PTR_1	CDF_CHAR	EAS HFlux LABEL
VALIDMIN	CDF_REAL8	1E-05
VALIDMAX	CDF_REAL8	1E+05
SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	1E-05
SCALEMAX	CDF_REAL8	1E+05
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²
REPRESENTATION_1	CDF_CHAR	REP HFlux LABEL

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS1 onlyStrahl N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyStrahl Density			
CATDESC	CDF_CHAR	Number density from EAS1 only look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS1 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1 OnlyStrahl N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS1 onlyStrahl v	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyStrahl Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS1 only look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS1 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS VEL LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			

SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	-10000.0
SCALEMAX	CDF_REAL8	+10000.0
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	km s ⁻¹
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyStrahl_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyStrahl Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS1 only look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS1 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1 OnlyStrahl P			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	nPa			
SI_CONVERSION	CDF_CHAR	1E-09>P			
REPRESENTATION_1	CDF_CHAR	REP_EAS_PRES_1			
REPRESENTATION_2	CDF_CHAR	REP_EAS_PRES_2			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyStrahl_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyStrahl Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS1 only look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS1 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA_EAS1_overlapLowEne_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapLowEne_Density			
CATDESC	CDF_CHAR	Number density from EAS1 only look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1_overlapLowEne_N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm^-3			
SI_CONVERSION	CDF_CHAR	1E-06>m^-3			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA_EAS1_overlapLowEne_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapLowEne_Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS1 overlap look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s^-1			
SI_CONVERSION	CDF_CHAR	1E+03>m s^-1			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA_EAS1_overlapLowEne_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapLowEne_Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS1 overlap look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			

FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	EAS1 overlapLowEne P
VALIDMIN	CDF_REAL8	1E-6
VALIDMAX	CDF_REAL8	1E+3
SCALETYP	CDF_CHAR	Log
SCALEMIN	CDF_REAL8	1E-6
SCALEMAX	CDF_REAL8	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	nPa
SI_CONVERSION	CDF_CHAR	1E-09>P
REPRESENTATION_1	CDF_CHAR	REP EAS PRES 1
REPRESENTATION_2	CDF_CHAR	REP EAS PRES 2

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS1 overlapLowEne H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 overlapLowEne Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS1 overlap look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS1 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS1 overlapCoreHalo N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 overlapCoreHalo Density			
CATDESC	CDF_CHAR	Number density from EAS1 overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS1 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1 overlapCoreHalo N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			



SCALEMAX	CDF_UINT4	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	cm ⁻³
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapCoreHalo_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapCoreHalo_Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS1_overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapCoreHalo_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapCoreHalo_Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS1_overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1_overlapCoreHalo_P			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	nPa			
SI_CONVERSION	CDF_CHAR	1E-09>P			
REPRESENTATION_1	CDF_CHAR	REP_EAS_PRES_1			
REPRESENTATION_2	CDF_CHAR	REP_EAS_PRES_2			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapCoreHalo_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			

FIELDNAM	CDF_CHAR	EAS1 overlapCoreHalo Heat Flux
CATDESC	CDF_CHAR	Heat Flux from EAS1 overlap look direction in CoreHalo range
COORDINATE_SYSTEM	CDF_CHAR	EAS1
DISPLAY_TYPE	CDF_CHAR	time series
DEPEND_0	CDF_CHAR	SWA EAS1 SCET
FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL
VALIDMIN	CDF_REAL8	1E-05
VALIDMAX	CDF_REAL8	1E+05
SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	1E-05
SCALEMAX	CDF_REAL8	1E+05
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS1 overlapStrahl N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 overlapStrahl Density			
CATDESC	CDF_CHAR	Number density from EAS1 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS1 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1 overlapStrahl N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS1 overlapStrahl V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 overlapStrahl Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS1 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS1 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			

VALIDMAX	CDF_REAL8	+10000.0
SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	-10000.0
SCALEMAX	CDF_REAL8	+10000.0
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	km s ⁻¹
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapStrahl_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapStrahl Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS1 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1_overlapStrahl_P			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	Data			
UNITS	CDF_CHAR	nPa			
SI_CONVERSION	CDF_CHAR	1E-09>P			
REPRESENTATION_1	CDF_CHAR	REP_EAS_PRES_1			
REPRESENTATION_2	CDF_CHAR	REP_EAS_PRES_2			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapStrahl_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapStrahl Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS1 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS1_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	Data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapLowEne_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapLowEne Density			
CATDESC	CDF_CHAR	Number density from EAS2 overlap look direction in low energy range			
COORDINATE SYSTEM	CDF_CHAR	EAS2			
DISPLAY TYPE	CDF_CHAR	time series			
DEPEND 0	CDF_CHAR	SWA_EAS2_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS2_overlapLowEne_N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR TYPE	CDF_CHAR	Data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapLowEne_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapLowEne Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS2 overlap look direction in low energy range			
COORDINATE SYSTEM	CDF_CHAR	EAS2			
DISPLAY TYPE	CDF_CHAR	time series			
DEPEND 0	CDF_CHAR	SWA_EAS2_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR 1	CDF_CHAR	EAS VEL LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR TYPE	CDF_CHAR	Data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION 1	CDF_CHAR	REP VEL LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapLowEne_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapLowEne Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS2 overlap look direction in low energy range			
COORDINATE SYSTEM	CDF_CHAR	EAS2			
DISPLAY TYPE	CDF_CHAR	time series			
DEPEND 0	CDF_CHAR	SWA_EAS2_SCET			

FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	EAS2 overlapLowEne P
VALIDMIN	CDF_REAL8	1E-6
VALIDMAX	CDF_REAL8	1E+3
SCALETYP	CDF_CHAR	Log
SCALEMIN	CDF_REAL8	1E-6
SCALEMAX	CDF_REAL8	1E+3
VAR_TYPE	CDF_CHAR	Data
UNITS	CDF_CHAR	nPa
SI_CONVERSION	CDF_CHAR	1E-09>P
REPRESENTATION_1	CDF_CHAR	REP EAS PRES 1
REPRESENTATION_2	CDF_CHAR	REP EAS PRES 2

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS2 overlapLowEne H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 overlapLowEne Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS2 overlap look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS2 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	Data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP HFlux_LABEL			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS2 overlapCoreHalo N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 overlapCoreHalo Density			
CATDESC	CDF_CHAR	Number density from EAS2 overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS2 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS2 overlapCoreHalo N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			



SCALEMAX	CDF_UINT4	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	cm ⁻³
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapCoreHalo_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapCoreHalo_Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS2_overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS2_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapCoreHalo_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapCoreHalo_Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS2_overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS2_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS2_overlapCoreHalo_P			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	nPa			
SI_CONVERSION	CDF_CHAR	1E-09>P			
REPRESENTATION_1	CDF_CHAR	REP_EAS_PRES_1			
REPRESENTATION_2	CDF_CHAR	REP_EAS_PRES_2			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapCoreHalo_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			



FIELDNAM	CDF_CHAR	EAS2 overlapCoreHalo Heat Flux
CATDESC	CDF_CHAR	Heat Flux from EAS2 overlap look direction in CoreHalo range
COORDINATE_SYSTEM	CDF_CHAR	EAS2
DISPLAY_TYPE	CDF_CHAR	time series
DEPEND_0	CDF_CHAR	SWA EAS2 SCET
FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL
VALIDMIN	CDF_REAL8	1E-05
VALIDMAX	CDF_REAL8	1E+05
SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	1E-05
SCALEMAX	CDF_REAL8	1E+05
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS2 overlapStrahl N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 overlapStrahl Density			
CATDESC	CDF_CHAR	Number density from EAS2 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS2 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS2 overlapStrahl N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	Data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS2 overlapStrahl V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 overlapStrahl Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS2 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA EAS2 SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			

VALIDMAX	CDF_REAL8	+10000.0
SCALETYP	CDF_CHAR	Log
SCALEMIN	CDF_REAL8	-10000.0
SCALEMAX	CDF_REAL8	+10000.0
VAR_TYPE	CDF_CHAR	Data
UNITS	CDF_CHAR	km s ⁻¹
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapStrahl_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapStrahl Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS2 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS2_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS2_overlapStrahl_P			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	Data			
UNITS	CDF_CHAR	nPa			
SI_CONVERSION	CDF_CHAR	1E-09>P			
REPRESENTATION_1	CDF_CHAR	REP_EAS_PRES_1			
REPRESENTATION_2	CDF_CHAR	REP_EAS_PRES_2			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapStrahl_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapStrahl Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS2 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS2_SCET			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	Data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL			

4.1.1.2 PAS L0 data

This PAS L0 data is a single file, constituted of a sequence of ccstds telemetry data packets.

This file shall provide at least all the telemetry products relative to PAS, as listed in Table 3.1, covering a whole 24H period.

Some additional telemetry packets are accepted, like TCs and TC's acknowledgments, SWA memory dump, SWA events...

PAS data processing software is also able to filter out telemetry packets not related to PAS, and should accept as input a single file with the complete SWA telemetry, i.e. all packets with PID in range [95, 99]

The file format should be;

- a binary file, composed of a sequence of ccstds telemetry packets
- an Ascii file, composed of a sequence a lines, corresponding to the hexadecimal dump of a individuals telemetry packets. Each line may start with a timestamp, in ISO format (yyyy-mm-ddThh:mm:ss.xxxZ)

Filename:

solo_L1_swa-pas-tm_yyyymmdd_V01.bin
solo_L1_swa-pas-tm_yyyymmdd_V01.ascii

4.1.1.3 HIS L0 data

HIS L0 data products to be defined...

4.1.2 L1 – Raw data products

Description of the process used to obtain this type of data

4.1.2.1 EAS L1 data products

EAS Level-1 data is made at MSSL using the Level-0 data files. Below is detailed description of EAS L1 data.

4.1.2.1.1 EAS normal mode electron counts

This file contains the Normal Mode 3D Electron Counts data product from EAS[12]. The file format is .cdf.

Filename: solo_L1_swa-eas[12]-NM3D_[StartTime-EndTime]_V?? .cdf

Expected data volume and time resolution: This file contains the data between the start time and end time in the file name. Time tags are of CDF_TIME_TT2000 type. The time resolution of data in these files is nominally 100 seconds but can be 10 or 400 seconds if EAS is working in high cadence mode or low cadence mode, respectively. It contains electron counts from the sensor referenced in the filename covering 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single 24 hour period approximately in case of nominal (100s) or low cadence (~400s) modes. As the file size of EAS 3D data in high cadence is too big, these files will cover 6-hour of observations.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L1>Level 1 Data
Descriptor	1	SWA-EAS[12]-NM3D
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA_L1_swa-eas[12]-NM3D
Logical File id	1	solo_L1_swa-eas[12]-NMc_yyyymmddTHMMSS- yyymmddTHMMSS V01
Logical Source Description	1	SWA-EAS[12] Nominal Mode 3D counts data
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	NM3D>Nominal Mode 3D data
Level	1	L1>Level 1 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron- Analyser-System

Variables

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF_TIME TT2000	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] EPOCH			
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_INT8	-9223372036854775807			
LABLAXIS	CDF_CHAR	EPOCH			
UNITS	CDF_CHAR	ns			
VALIDMIN	CDF_INT8	1577836800000000000			

VALIDMAX	CDF_INT8	1893456000000000000
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_INT8	1577836800000000000
SCALEMAX	CDF_INT8	1893456000000000000
SI_CONVERSION	CDF_CHAR	1>1e+09 s
VAR_TYPE	CDF_CHAR	support_data
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SCET			
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS[12] observation			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_REAL8	-1E31			
LABLAXIS	CDF_CHAR	Spacecraft Elapsed Time (Ticks)			
UNITS	CDF_CHAR	s			
VALIDMIN	CDF_REAL8	1577836800.0			
VALIDMAX	CDF_REAL8	1893456000.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	1577836800.0			
SCALEMAX	CDF_REAL8	1893456000.0			
SI_CONVERSION	CDF_CHAR	1>1 s			
VAR_TYPE	CDF_CHAR	support_data			
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] ELEVATION	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation			
CATDESC	CDF_CHAR	The bin-centred elevation angles of the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	-45.0			
VALIDMAX	CDF_REAL8	45.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	-45.0			
SCALEMAX	CDF_REAL8	45.0			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] ELEVATION delta_upper	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta upper			



CATDESC	CDF_CHAR	Upper half width of elevation bin
FORMAT	CDF_CHAR	f14.4
UNITS	CDF_CHAR	Degrees
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] ELEVATION_delta_lower	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta lower			
CATDESC	CDF_CHAR	Lower half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] AZIMUTH	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth			
CATDESC	CDF_CHAR	The bin-centred azimuthal angles of the EAS[12] sensor			
DEPEND 0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Azimuthal Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	0.0			
VALIDMAX	CDF_REAL8	360.0			
SCALETYP	CDF_CHAR	Linear			
SCALEMIN	CDF_REAL8	0.0			
SCALEMAX	CDF_REAL8	360.0			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] AZIMUTH_delta_upper	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth upper delta			
CATDESC	CDF_CHAR	Upper half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] AZIMUTH_delta_lower	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth lower delta			



CATDESC	CDF_CHAR	Lower half width of azimuth bin
FORMAT	CDF_CHAR	f14.4
UNITS	CDF_CHAR	Degrees
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy			
CATDESC	CDF_CHAR	The bin-centred Energy values of the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Energy			
UNITS	CDF_CHAR	ElectronVolts			
VALIDMIN	CDF_REAL8	0.1			
VALIDMAX	CDF_REAL8	6000.0			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	0.1			
SCALEMAX	CDF_REAL8	6000.0			
SI_CONVERSION	CDF_CHAR	1.60217646E-19>J			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY_delta_upper	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy upper delta			
CATDESC	CDF_CHAR	Upper half width of energy bin			
DEPEND_0	CDF_CHAR	EPOCH			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	ElectronVolts			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY_delta_lower	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy lower delta			
CATDESC	CDF_CHAR	Lower half width of energy bin			
DEPEND_0	CDF_CHAR	EPOCH			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	ElectronVolts			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_NM3D_Data	CDF_REAL8	3	16, 64, 32	T	T, T, T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SWA_EAS[12]_NM3D_Data			



CATDESC	CDF_CHAR	EAS[12] Nominal mode 3D electron distribution counts	SCALEMAX
DISPLAY_TYPE	CDF_CHAR	Spectrogram	
FILLVAL	CDF_REAL8	-1E31	
FORMAT	CDF_CHAR	f14.4	
LABLAXIS	CDF_CHAR	Electron Counts	
UNITS	CDF_CHAR	Counts/Accum	
VALIDMIN	CDF_REAL8	0.1	
VALIDMAX	CDF_REAL8	65535.0	
SCALETYP	CDF_CHAR	Log	
SCALEMIN	CDF_REAL8	0.1	
DEPEND_0	CDF_CHAR	EPOCH	
DEPEND_1	CDF_CHAR	SWA EAS[12] ELEVATION	
DEPEND_2	CDF_CHAR	SWA EAS[12] ENERGY	
DEPEND_3	CDF_CHAR	SWA EAS[12] AZIMUTH	
COORDINATE_SYSTEM	CDF_CHAR	EAS[12]	
VAR_TYPE	CDF_CHAR	Data	

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] Mode	CDF_UINT4	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Mode			
CATDESC	CDF_CHAR	The EAS[12] Mode data			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS[12] Mode			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] Full3DValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Full 3D Validity			
CATDESC	CDF_CHAR	The Validity flags related to whole EAS[12] 3D data set			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Full 3D validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support data			



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ElevationValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation Validity			
CATDESC	CDF_CHAR	The Validity flags associated with each of the 16 elevations			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Elevation validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_DataValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Validity			
CATDESC	CDF_CHAR	The Validity flags associated with each energy count for the 16 elevations			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Data validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EAS[12]_TO_SRF	CDF_REAL8	2	3,3	F	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS[12] frame to spacecraft reference frame			
FORMAT	CDF_CHAR	f14.5			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Quality			
CATDESC	CDF_CHAR	EAS[12] Data Quality flag			
DEPEND_0	CDF_CHAR	EPOCH			

DISPLAY TYPE	CDF CHAR	time_series
FILLVAL	CDF UINT4	255
LABLAXIS	CDF CHAR	EAS[12] data quality
VALIDMIN	CDF UINT4	0
VALIDMAX	CDF UINT4	4
SCALETYP	CDF CHAR	linear
SCALEMIN	CDF UINT4	0
SCALEMAX	CDF UINT4	4
VAR_TYPE	CDF CHAR	support_data

4.1.2.1.2 EAS[12] single strahl electron counts

This file contains the single strahl electron counts data product from EAS[12]. The file format is .cdf.

Filename: solo_L1_swa-eas[12]-SSc_[StartTime-EndTime]_V??.cdf

Expected data volume and time resolution: This file contains the data between the start time and end times mentioned in the file name. Time tags are of CDF_TIME_TT2000 type. The time resolution of data in this file is nominally 100 seconds. It contains electron counts from the sensor referenced in the file name covering 1 energy, 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single 24 hour period approximately.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L1>Level 1 Data
Descriptor	1	SWA-EAS[12]-SSc
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	Solo_L1_swa-eas[12]-SSc
Logical File id	1	solo_L1_swa-eas[12]_SSc_yyyymmddTHHMMSS-yyyymmddTHHMMSS_V01
Logical Source Description	1	SWA-EAS[12] Single Strahl data
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	SSc>Single Strahl Counts
Level	1	L1>Level 1 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF TIME TT2000	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS[12] EPOCH			
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid			
DISPLAY_TYPE	CDF CHAR	time series			
FILLVAL	CDF INT8	-9223372036854775807			
LABLAXIS	CDF CHAR	EPOCH			
UNITS	CDF CHAR	ns			
VALIDMIN	CDF INT8	1577836800000000000			
VALIDMAX	CDF INT8	1893456000000000000			
SCALETYP	CDF CHAR	linear			
SCALEMIN	CDF INT8	1577836800000000000			
SCALEMAX	CDF INT8	1893456000000000000			
SI_CONVERSION	CDF CHAR	1>1e+09 s			
VAR_TYPE	CDF CHAR	support data			
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS[12] SCET			
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS[12] observation			
DISPLAY_TYPE	CDF CHAR	time series			
FILLVAL	CDF REAL8	-1E31			
LABLAXIS	CDF CHAR	Spacecraft Elapsed Time (Ticks)			
UNITS	CDF CHAR	s			
VALIDMIN	CDF REAL8	1577836800.0			
VALIDMAX	CDF REAL8	1893456000.0			
SCALETYP	CDF CHAR	linear			
SCALEMIN	CDF REAL8	1577836800.0			
SCALEMAX	CDF REAL8	1893456000.0			
VAR_TYPE	CDF CHAR	support data			
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_Mode	CDF_UINT4	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS[12] Mode			
CATDESC	CDF_CHAR	The EAS[12] Mode data			
DEPEND_0	CDF CHAR	EPOCH			
DISPLAY_TYPE	CDF CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF CHAR	I10			
LABLAXIS	CDF CHAR	EAS[12] Mode			

VALIDMIN	CDF_UINT4	0
VALIDMAX	CDF_UINT4	65535
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_UINT4	0
SCALEMAX	CDF_UINT4	65535
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation			
CATDESC	CDF_CHAR	The bin-centred elevation angles of the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	-45.0			
VALIDMAX	CDF_REAL8	45.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	-45.0			
SCALEMAX	CDF_REAL8	45.0			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION_delta_upper	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta upper			
CATDESC	CDF_CHAR	Upper half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION_delta_lower	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta lower			
CATDESC	CDF_CHAR	Lower half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_AZIMUTH	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth			

CATDESC	CDF_CHAR	The bin-centred azimuthal angles of the EAS[12] sensor
DEPEND_0	CDF_CHAR	EPOCH
FILLVAL	CDF_REAL8	-1E31
FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	Azimuthal Angle
UNITS	CDF_CHAR	Degrees
VALIDMIN	CDF_REAL8	0.0
VALIDMAX	CDF_REAL8	360.0
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL8	0.0
SCALEMAX	CDF_REAL8	360.0
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] AZIMUTH delta_upper	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth upper delta			
CATDESC	CDF_CHAR	Upper half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] AZIMUTH delta_lower	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth lower delta			
CATDESC	CDF_CHAR	Lower half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] ENERGY	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy			
CATDESC	CDF_CHAR	The bin-centred Energy value used to obtain the single strahl from the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Energy			
UNITS	CDF_CHAR	ElectronVolts			
VALIDMIN	CDF_REAL8	0.1			
VALIDMAX	CDF_REAL8	6000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	0.1			
SCALEMAX	CDF_REAL8	6000.0			



SI_CONVERSION	CDF_CHAR	1.60217646E-19>J
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_DataValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Validity			
CATDESC	CDF_CHAR	The Validity flags associated with each energy count for the 16 elevations			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Data validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_SSc_Data	CDF_REAL8	2	32, 16	T	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Single Strahl Data			
CATDESC	CDF_CHAR	Single strahl data from EAS[12]			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Electron Counts			
UNITS	CDF_CHAR	Counts/Accum			
VALIDMIN	CDF_REAL8	0.1			
VALIDMAX	CDF_REAL8	65535.0			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	0.1			
SCALEMAX	CDF_REAL8	65535.0			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	SWA_EAS[12]_AZIMUTH			
DEPEND_2	CDF_CHAR	SWA_EAS[12]_ELEVATION			
COORDINATE_SYSTEM	CDF_CHAR	EAS[12]			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EAS[12]_TO_SRF	CDF_REAL8	2	3, 3	F	T, T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS[12] frame to spacecraft reference frame			
FORMAT	CDF_CHAR	f14.5			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Quality			
CATDESC	CDF_CHAR	EAS[12] Data Quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS[12] data quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	4			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	4			
VAR_TYPE	CDF_CHAR	support data			

4.1.2.1.3 EAS Triggered Mode Counts

This file contains the triggered mode 3D electron counts data product from EAS[12]. The file format is .cdf.

Filename: solo_L1_swa-eas[12]-TM3D_[StartTime-EndTime]_V???.cdf

Expected data volume and time resolution: This file contains the data between the start time and end times mentioned in the file name. The time tags are of CDF_TIME_TT2000 type. The time resolution of the file is nominally 1 second. For a given trigger received from RPW instrument, EAS saves 3D data for 5 minutes immediately prior to the trigger. It contains electron counts from the sensor referenced in the file name covering 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that a file will cover 24-hours and will contain 3D data for all triggers for that 24-hours..

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L1>Level 1 Data
Descriptor	1	SWA-EAS[12]-TM3D
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA_L1_swa-eas[12]-TM3D
Logical File id	1	solo_L1_swa-eas[12]-TM3D_yyyymmddTHHMMSS-yyymmddTHHMMSS_V01
Logical Source Description	1	SWA-EAS[12] Trigger Mode 3D counts data
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL



Generation date	1	YYYY-MM-DDTHH:MM:SS
Mods	1	V01 First Version
Data Product	1	TM3D>Trigger Mode 3D data in Counts
Level	1	L1>Level 1 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF_TIME TT2000	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] EPOCH			
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_INT8	-9223372036854775807			
LABLAXIS	CDF_CHAR	EPOCH			
UNITS	CDF_CHAR	ns			
VALIDMIN	CDF_INT8	1577836800000000000			
VALIDMAX	CDF_INT8	1893456000000000000			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_INT8	1577836800000000000			
SCALEMAX	CDF_INT8	1893456000000000000			
SI_CONVERSION	CDF_CHAR	1>1e+09 s			
VAR_TYPE	CDF_CHAR	support data			
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_EPOCH	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] SCET			
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS[12] observation			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_REAL8	-1E31			
LABLAXIS	CDF_CHAR	Spacecraft Elapsed Time (Ticks)			
UNITS	CDF_CHAR	s			
VALIDMIN	CDF_REAL8	1577836800.0			
VALIDMAX	CDF_REAL8	1893456000.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	1577836800.0			
SCALEMAX	CDF_REAL8	1893456000.0			
VAR_TYPE	CDF_CHAR	support data			
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY

SWA_EAS[12]_ELEVATION	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation			
CATDESC	CDF_CHAR	The bin-centred elevation angles of the EAS[12] sensor			
FILLVAL	CDF_REAL8	-1E31			
DEPEND_0	CDF_CHAR	EPOCH			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	-45.0			
VALIDMAX	CDF_REAL8	45.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	-45.0			
SCALEMAX	CDF_REAL8	45.0			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION_delta_upper	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta upper			
CATDESC	CDF_CHAR	Upper half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION_delta_lower	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta lower			
CATDESC	CDF_CHAR	Lower half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_AZIMUTH	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth			
CATDESC	CDF_CHAR	The bin-centred azimuthal angles of the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Azimuthal Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	0.0			
VALIDMAX	CDF_REAL8	360.0			



SCALETYP	CDF CHAR	linear
SCALEMIN	CDF REAL8	0.0
SCALEMAX	CDF REAL8	360.0
VAR TYPE	CDF CHAR	support data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA EAS[12] AZIMUTH delta upper	CDF REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth upper delta			
CATDESC	CDF_CHAR	Upper half width of azimuth bin			
FORMAT	CDF CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA EAS[12] AZIMUTH delta lower	CDF REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth lower delta			
CATDESC	CDF_CHAR	Lower half width of azimuth bin			
FORMAT	CDF CHAR	f14.4			
UNITS	CDF CHAR	Degrees			
VAR TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA EAS[12] ENERGY	CDF REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy			
CATDESC	CDF_CHAR	The bin-centred Energy values of the EAS[12] sensor			
DEPEND 0	CDF CHAR	EPOCH			
FILLVAL	CDF REAL8	-1E31			
FORMAT	CDF CHAR	f14.4			
LABLAXIS	CDF CHAR	Energy			
UNITS	CDF CHAR	ElectronVolts			
VALIDMIN	CDF REAL8	0.1			
VALIDMAX	CDF REAL8	6000.0			
SCALETYP	CDF CHAR	log			
SCALEMIN	CDF REAL8	0.1			
SCALEMAX	CDF REAL8	6000.0			
SI CONVERSION	CDF CHAR	1.60217646E-19>J			
VAR TYPE	CDF CHAR	support data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA EAS[12] ENERGY delta upper	CDF REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy upper delta			
CATDESC	CDF_CHAR	Upper half width of energy bin			



DEPEND_0	CDF_CHAR	EPOCH
FORMAT	CDF_CHAR	f14.4
UNITS	CDF_CHAR	ElectronVolts
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY_delta_lower	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy lower delta			
CATDESC	CDF_CHAR	Lower half width of energy bin			
DEPEND_0	CDF_CHAR	EPOCH			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	ElectronVolts			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_TM3D_Data	CDF_REAL8	3	16,64,32	T	T,T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SWA_EAS[12] TM3D Data			
CATDESC	CDF_CHAR	EAS[12] Trigger mode 3D electron distribution counts			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Electron Counts			
UNITS	CDF_CHAR	Counts/Accum			
VALIDMIN	CDF_REAL8	0.1			
VALIDMAX	CDF_REAL8	65535.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	0.1			
SCALEMAX	CDF_REAL8	65535.0			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	SWA_EAS[12]_ELEVATION			
DEPEND_2	CDF_CHAR	SWA_EAS[12]_ENERGY			
DEPEND_3	CDF_CHAR	SWA_EAS[12]_AZIMUTH			
COORDINATE_SYSTEM	CDF_CHAR	EAS[12]			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_Mode	CDF_UINT4	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Mode			
CATDESC	CDF_CHAR	The EAS[12] Mode data			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS1 Mode			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			



SCALEMIN	CDF_UINT4	0
SCALEMAX	CDF_UINT4	65535
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_Full3DValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Full 3D Validity			
CATDESC	CDF_CHAR	The Validity flags related to whole EAS[12] 3D data set			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Full 3D validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ElevationValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation Validity			
CATDESC	CDF_CHAR	The Validity flags associated with each of the 16 elevations			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Elevation validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_DataValidity	CDF_UINT4	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Validity			
CATDESC	CDF_CHAR	The Validity flags associated with each energy count for the 16 elevations			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Data validity flag			
VALIDMIN	CDF_UINT4	0			



VALIDMAX	CDF_UINT4	65535
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_UINT4	0
SCALEMAX	CDF_UINT4	65535
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_RPW_TF	CDF_UINT4	1	1	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12]_RPW_TF			
CATDESC	CDF_CHAR	RPW Trigger Flag coming in from S20 packet			
DEPEND_0	CDF_CHAR	SWA_EAS[12]_RPW_HRTBT			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	RPW Trigger Flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EAS[12]_TO_SRF	CDF_REAL8	2	3,3	F	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS[12] frame to spacecraft reference frame			
FORMAT	CDF_CHAR	f14.5			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Quality			
CATDESC	CDF_CHAR	EAS[12] Data Quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS[12] data quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	4			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	4			
VAR_TYPE	CDF_CHAR	support_data			

4.1.2.1.4 EAS Burst Mode Counts

This file contains the electron counts data collected for pitch angles calculated on-board from magnetic field vector received from the MAG instrument from the EAS sensor that is in magnetic field direction.. The file format is .cdf.

Filename: solo_L1_swa-eas-padc_[StartTime-EndTime]_V???.cdf

Expected data volume and time resolution: This file contains the data between the start time and end time in the file name. The time tags are of CDF_TIME_TT2000. The time resolution of the file is 0.125 second. It contains electron counts from an EAS sensor covering 64 energies, 32 anodes and 2 deflectors for each time-stamp. The file size and number of records will vary depending on availability of telemetry.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L1>Level 1 Data
Descriptor	1	SWA-EAS-padc
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA L1 swa-eas-padc
Logical File id	1	solo_L1_swa-eas-padc_yyyymmddTHHMMSS- yyyymmddTHHMMSS V01
Logical Source Description	1	SWA-EAS Electron Pitch Angle counts data
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	padc>Pitch Angle Distribution Counts
Level	1	L1>Level 1 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron- Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF TIME TT2000	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] EPOCH			
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_INT8	-9223372036854775807			



LABLAXIS	CDF CHAR	EPOCH
UNITS	CDF CHAR	ns
VALIDMIN	CDF INT8	1577836800000000000
VALIDMAX	CDF INT8	1893456000000000000
SCALETYP	CDF CHAR	linear
SCALEMIN	CDF INT8	1577836800000000000
SCALEMAX	CDF INT8	1893456000000000000
SI CONVERSION	CDF CHAR	1>1e+09 s
VAR_TYPE	CDF CHAR	support_data
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	SCET			
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS observation			
DISPLAY_TYPE	CDF CHAR	time_series			
FILLVAL	CDF REAL8	-1E31			
LABLAXIS	CDF CHAR	Spacecraft Elapsed Time (Ticks)			
UNITS	CDF CHAR	s			
VALIDMIN	CDF REAL8	1577836800.0			
VALIDMAX	CDF REAL8	1893456000.0			
SCALETYP	CDF CHAR	linear			
SCALEMIN	CDF REAL8	1577836800.0			
SCALEMAX	CDF REAL8	1893456000.0			
VAR_TYPE	CDF CHAR	support_data			
VAR_NOTES	CDF_CHAR	The EAS time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS PAD Data	CDF REAL8	3	2, 64, 32	T	T, T, T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS PAD Data			
CATDESC	CDF_CHAR	EAS electron pitch angle distribution counts			
DISPLAY_TYPE	CDF CHAR	Spectrogram			
FILLVAL	CDF REAL8	-1E31			
FORMAT	CDF CHAR	f14.4			
LABLAXIS	CDF CHAR	Electron Counts			
UNITS	CDF CHAR	Counts/Accum			
VALIDMIN	CDF REAL8	0.1			
VALIDMAX	CDF REAL8	65535.0			
SCALETYP	CDF CHAR	log			
SCALEMIN	CDF REAL8	0.1			
SCALEMAX	CDF REAL8	65535.0			
DEPEND_0	CDF CHAR	EPOCH			
DEPEND_1	CDF CHAR	SWA EAS ELEVATION			
DEPEND_2	CDF CHAR	SWA EAS ENERGY			
DEPEND_3	CDF CHAR	SWA EAS AZIMUTH			
VAR_TYPE	CDF CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_ELEVATION	CDF_REAL8	1	2	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Elevation			
CATDESC	CDF_CHAR	The bin-centred elevation angles of the EAS sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	-45.0			
VALIDMAX	CDF_REAL8	45.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	-45.0			
SCALEMAX	CDF_REAL8	45.0			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION_delta_upper	CDF_REAL8	1	2	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta upper			
CATDESC	CDF_CHAR	Upper half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION_delta_lower	CDF_REAL8	1	2	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta lower			
CATDESC	CDF_CHAR	Lower half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_AZIMUTH	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Azimuth			
CATDESC	CDF_CHAR	The bin-centred azimuthal angles of the EAS sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Azimuthal Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	0.0			



VALIDMAX	CDF_REAL8	360.0
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL8	0.0
SCALEMAX	CDF_REAL8	360.0
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_AZIMUTH_delta_upper	CDF_REAL8	1	32	F	T
Attribute Name	Data_Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth upper delta			
CATDESC	CDF_CHAR	Upper half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_AZIMUTH_delta_lower	CDF_REAL8	1	32	F	T
Attribute Name	Data_Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth lower delta			
CATDESC	CDF_CHAR	Lower half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_ENERGY	CDF_REAL8	1	64	T	T
Attribute Name	Data_Type	Value			
FIELDNAM	CDF_CHAR	EAS Energy			
CATDESC	CDF_CHAR	The bin-centred Energy values of the EAS sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Energy			
UNITS	CDF_CHAR	ElectronVolts			
VALIDMIN	CDF_REAL8	0.1			
VALIDMAX	CDF_REAL8	6000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	0.1			
SCALEMAX	CDF_REAL8	6000.0			
SI_CONVERSION	CDF_CHAR	1.60217646E-19>J			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY_delta_upper	CDF_REAL8	1	64	T	T
Attribute Name	Data_Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy upper delta			
CATDESC	CDF_CHAR	Upper half width of energy bin			



DEPEND 0	CDF_CHAR	EPOCH
FORMAT	CDF_CHAR	f14.4
UNITS	CDF_CHAR	ElectronVolts
VAR TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY_delta_lower	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy lower delta			
CATDESC	CDF_CHAR	Lower half width of energy bin			
DEPEND 0	CDF_CHAR	EPOCH			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	ElectronVolts			
VAR TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_Mode	CDF_UINT4	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Mode			
CATDESC	CDF_CHAR	The EAS Mode data			
DEPEND 0	CDF_CHAR	EPOCH			
DISPLAY TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS1 Mode			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS Validity	CDF_UINT4	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Validity			
CATDESC	CDF_CHAR	The Validity flags associated with energies			
DEPEND 0	CDF_CHAR	EPOCH			
DISPLAY TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Full 3D validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_EASUsed	CDF_UINT1	1	1	T	T



Attribute Name	Data Type	Value
FIELDNAM	CDF_CHAR	EAS sensor used
CATDESC	CDF_CHAR	The EAS sensor use for Pitch Angle data collection
DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time series
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I10
LABLAXIS	CDF_CHAR	EAS
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	3
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	3
VAR_TYPE	CDF_CHAR	support data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS ElevationUsed	CDF_UINT1	1	1	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Elevation used			
CATDESC	CDF_CHAR	The EAS Elevation used for Pitch Angle data collection			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT1	255			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	Elevation			
VALIDMIN	CDF_UINT1	0			
VALIDMAX	CDF_UINT1	3			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT1	0			
SCALEMAX	CDF_UINT1	3			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS MagDataUsed	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	MAG vector			
CATDESC	CDF_CHAR	The MAG vector used to calculate pitch angles collected			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	F14.4			
LABLAXIS	CDF_CHAR	Full 3D validity flag			
UNITS	CDF_CHAR	nT			
VALIDMIN	CDF_REAL8	-65535.0			
VALIDMAX	CDF_REAL8	65535.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	-65535.0			
SCALEMAX	CDF_REAL8	65535.0			
SI_CONVERSION	CDF_CHAR	1E+09>T			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
EAS TO SRF	CDF_REAL8	2	3,3	F	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS-SRF Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix that will transform EAS[12] data to spacecraft reference frame			
FORMAT	CDF_CHAR	f14.4			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
EAS TO MAG	CDF_REAL8	2	3,3	F	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS-MAG Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix that will transform EAS[12] to MAG instrument frame			
FORMAT	CDF_CHAR	f14.4			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Quality			
CATDESC	CDF_CHAR	EAS[12] Data Quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS[12] data quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	4			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	4			
VAR_TYPE	CDF_CHAR	support data			

4.1.2.1.5 EAS Onboard Partial Moments

This file contains on-board calculated partial moments from both EAS1 and EAS2 sensors. The file format is .cdf.

Filename: solo_L1_swa-eas-OnbPartMoms_[StartTime-EndTime]_V???.cdf

Expected data volume and time resolution: This file contains the data between the start time and end time in the file name. Time tags are of CDF_TIME_TT2000 type. The time resolution of the file is 4 seconds. On-board partial moments are only calculated when EAS sensors are operating in either nominal cadence or low cadence modes. A file covers full 24-hours and contains approximately 21,600 records.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L1>Level 1 Data
Descriptor	1	SWA-EAS-OnbPartMoms
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA L1 swa-eas-OnbPartMoms
Logical File id	1	solo_L1_swa-eas-OnbPartMoms _yyyymmddTHHMMSS-yyyymmddTHHMMSS V01
Logical Source Description	1	SWA-EAS Onboard Partial Moments
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	OnbPartMoms>Onboard Partial Moments
Level	1	L1>Level 1 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron- Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF TIME TT2000	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 EPOCH			
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid			
DISPLAY TYPE	CDF CHAR	time series			
FILLVAL	CDF_INT8	-9223372036854775807			
LABLAXIS	CDF_CHAR	EAS1 EPOCH			
UNITS	CDF_CHAR	ns			
VALIDMIN	CDF_INT8	1577836800000000000			
VALIDMAX	CDF_INT8	1893456000000000000			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_INT8	1577836800000000000			
SCALEMAX	CDF_INT8	1893456000000000000			
SI_CONVERSION	CDF_CHAR	1>1e+09 s			
VAR TYPE	CDF_CHAR	support data			
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_EPOCH	1	1	T	F



Attribute Name	Data Type	Value
FIELDNAM	CDF_CHAR	EAS1 SCET
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS1 observation
DISPLAY_TYPE	CDF_CHAR	time_series
FILLVAL	CDF_REAL8	-1E31
LABLAXIS	CDF_CHAR	Spacecraft Elapsed Time (Ticks)
UNITS	CDF_CHAR	s
VALIDMIN	CDF_REAL8	1577836800.0
VALIDMAX	CDF_REAL8	1893456000.0
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL8	1577836800.0
SCALEMAX	CDF_REAL8	1893456000.0
VAR_TYPE	CDF_CHAR	support_data
VAR_NOTES	CDF_CHAR	The EAS1 time tag is from the centre of the acquisition interval which is 1 sec

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
EPOCH 1	CDF TIME TT2000	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 EPOCH			
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_INT8	-9223372036854775807			
LABLAXIS	CDF_CHAR	EAS2 EPOCH			
UNITS	CDF_CHAR	ns			
VALIDMIN	CDF_INT8	1577836800000000000			
VALIDMAX	CDF_INT8	1893456000000000000			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_INT8	1577836800000000000			
SCALEMAX	CDF_INT8	1893456000000000000			
SI CONVERSION	CDF_CHAR	1>1e+09 s			
VAR_TYPE	CDF_CHAR	support_data			
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SCET 1	CDF EPOCH	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 SCET			
CATDESC	CDF_CHAR	Elapsed time of the onboard clock at the time of EAS2 observation			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_REAL8	-1E31			
LABLAXIS	CDF_CHAR	Spacecraft Elapsed Time (Ticks)			
UNITS	CDF_CHAR	s			
VALIDMIN	CDF_REAL8	1577836800.0			
VALIDMAX	CDF_REAL8	1893456000.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	1577836800.0			
SCALEMAX	CDF_REAL8	1893456000.0			



VAR_TYPE	CDF_CHAR	support_data
VAR_NOTES	CDF_CHAR	The EAS2 time tag is from the centre of the acquisition interval which is 1 sec

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_dataValidity	CDF_UINT4	1	1	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 Data Validity			
CATDESC	CDF_CHAR	The Validity flags associated with EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS1 validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYPE	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_dataValidity	CDF_UINT4	1	1	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 Data Validity			
CATDESC	CDF_CHAR	The Validity flags associated with EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH 1			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS1 validity flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYPE	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_SumEAS1	CDF_UINT4	1	1	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Summed EAS1 distributions			
CATDESC	CDF_CHAR	This flag indicates if 4 successive 3D distributions are summed to calculate Moments			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS1 Summed flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYPE	CDF_CHAR	linear			



SCALEMIN	CDF_UINT4	0
SCALEMAX	CDF_UINT4	65535
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_SumEAS2	CDF_UINT4	1	1	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Summed EAS2 distributions			
CATDESC	CDF_CHAR	This flag indicates if 4 successive 3D distributions are summed to calculate Moments			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH 1			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS2 Summed flag			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_SCPotential	CDF_REAL8	1	1	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Spacecraft Potential			
CATDESC	CDF_CHAR	Spacecraft Potential used to discard lowest energies			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	F14.4			
LABLAXIS	CDF_CHAR	Spacecraft Potential			
VALIDMIN	CDF_UINT4	-100.0			
VALIDMAX	CDF_UINT4	100.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	-100.0			
SCALEMAX	CDF_UINT4	100.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	Volts			
SI_CONVERSION	CDF_CHAR	>			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_SumMoms	CDF_UINT4	1	12	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 Moment Sums			
CATDESC	CDF_CHAR	The partial sum of the EAS1 Moments			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS1 Partial Sum			



VALIDMIN	CDF_UINT4	0
VALIDMAX	CDF_UINT4	65535
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_UINT4	0
SCALEMAX	CDF_UINT4	65535
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_SumMoms	CDF_UINT4	1	12	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 Moment Sums			
CATDESC	CDF_CHAR	The partial sum of the EAS2 Moments			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH 1			
FILLVAL	CDF_UINT4	4294967294			
FORMAT	CDF_CHAR	I10			
LABLAXIS	CDF_CHAR	EAS2 Partial Sum			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	65535			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	65535			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyLowEne_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyLowEne Density			
CATDESC	CDF_CHAR	Number density from EAS1 only look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1 OnlyLowEne N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyLowEne_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyLowEne Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS1 only look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			

DEPEND_0	CDF_CHAR	EPOCH
FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL
VALIDMIN	CDF_REAL8	-10000.0
VALIDMAX	CDF_REAL8	+10000.0
SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	-10000.0
SCALEMAX	CDF_REAL8	+10000.0
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	km s ⁻¹
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyLowEne_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyLowEne Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS1 only look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1 OnlyLowEne P			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	nPa			
SI_CONVERSION	CDF_CHAR	1E-09>P			
REPRESENTATION_1	CDF_CHAR	REP_EAS_PRES_1			
REPRESENTATION_2	CDF_CHAR	REP_EAS_PRES_2			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyLowEne_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyLowEne Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS1 only look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			



SCALEMIN	CDF_REAL8	1E-05
SCALEMAX	CDF_REAL8	1E+05
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyCoreHalo_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyCoreHalo Density			
CATDESC	CDF_CHAR	Number density from EAS1 only look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1 OnlyCoreHalo N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyCoreHalo_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyCoreHalo Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS1 only look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS VEL LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyCoreHalo_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			

FIELDNAM	CDF_CHAR	EAS1 onlyCoreHalo Pressure
CATDESC	CDF_CHAR	Pressure tensor from EAS1 only look direction in CoreHalo range
COORDINATE_SYSTEM	CDF_CHAR	EAS1
DISPLAY_TYPE	CDF_CHAR	time series
DEPEND_0	CDF_CHAR	EPOCH
FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	EAS1 OnlyCoreHalo P
VALIDMIN	CDF_REAL8	1E-6
VALIDMAX	CDF_REAL8	1E+3
SCALETYP	CDF_CHAR	Log
SCALEMIN	CDF_REAL8	1E-6
SCALEMAX	CDF_REAL8	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	nPa
SI_CONVERSION	CDF_CHAR	1E-09>P
REPRESENTATION_1	CDF_CHAR	REP_EAS_PRES_1
REPRESENTATION_2	CDF_CHAR	REP_EAS_PRES_2

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyCoreHalo_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyCoreHalo Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS1 only look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyStrahl_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyStrahl Density			
CATDESC	CDF_CHAR	Number density from EAS1 only look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			

LABLAXIS	CDF_CHAR	EAS1 OnlyStrahl N
VALIDMIN	CDF_UINT4	1E-9
VALIDMAX	CDF_UINT4	1E+3
SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_UINT4	1E-9
SCALEMAX	CDF_UINT4	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	cm ⁻³
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyStrahl_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyStrahl Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS1 only look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyStrahl_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 onlyStrahl Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS1 only look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1 OnlyStrahl P			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	nPa			
SI_CONVERSION	CDF_CHAR	1E-09>P			
REPRESENTATION_1	CDF_CHAR	REP_EAS_PRES_1			



REPRESENTATION 2	CDF_CHAR	REP_EAS_PRES 2

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_onlyStrahl_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_onlyStrahl_Heat_Flux			
CATDESC	CDF_CHAR	Heat_Flux_from_EAS1_only_look_direction_in_Strahl_range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapLowEne_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapLowEne_Density			
CATDESC	CDF_CHAR	Number_density_from_EAS1_only_look_direction_in_low_energy_range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1_overlapLowEne_N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapLowEne_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapLowEne_Velocity			
CATDESC	CDF_CHAR	Bulk_velocity_from_EAS1_overlap_look_direction_in_low_energy_range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			

DISPLAY TYPE	CDF CHAR	time_series
DEPEND 0	CDF CHAR	EPOCH
FILLVAL	CDF REAL8	-1E+31
FORMAT	CDF CHAR	f14.4
LABL PTR 1	CDF CHAR	EAS VEL LABEL
VALIDMIN	CDF REAL8	-10000.0
VALIDMAX	CDF REAL8	+10000.0
SCALETYP	CDF CHAR	log
SCALEMIN	CDF REAL8	-10000.0
SCALEMAX	CDF REAL8	+10000.0
VAR TYPE	CDF CHAR	data
UNITS	CDF CHAR	km s ⁻¹
SI CONVERSION	CDF CHAR	1E+03>m s ⁻¹
REPRESENTATION 1	CDF CHAR	REP VEL LABEL

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA EAS1 overlapLowEne P	CDF REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS1 overlapLowEne Pressure			
CATDESC	CDF CHAR	Pressure tensor from EAS1 overlap look direction in low energy range			
COORDINATE_SYSTEM	CDF CHAR	EAS1			
DISPLAY TYPE	CDF CHAR	time_series			
DEPEND 0	CDF CHAR	EPOCH			
FILLVAL	CDF REAL8	-1E+31			
FORMAT	CDF CHAR	f14.4			
LABLAXIS	CDF CHAR	EAS1 overlapLowEne P			
VALIDMIN	CDF REAL8	1E-6			
VALIDMAX	CDF REAL8	1E+3			
SCALETYP	CDF CHAR	Log			
SCALEMIN	CDF REAL8	1E-6			
SCALEMAX	CDF REAL8	1E+3			
VAR TYPE	CDF CHAR	data			
UNITS	CDF CHAR	nPa			
SI CONVERSION	CDF CHAR	1E-09>P			
REPRESENTATION 1	CDF CHAR	REP EAS PRES 1			
REPRESENTATION 2	CDF CHAR	REP EAS PRES 2			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA EAS1 overlapLowEne H	CDF REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS1 overlapLowEne Heat Flux			
CATDESC	CDF CHAR	Heat Flux from EAS1 overlap look direction in low energy range			
COORDINATE_SYSTEM	CDF CHAR	EAS1			
DISPLAY TYPE	CDF CHAR	time_series			
DEPEND 0	CDF CHAR	EPOCH			
FILLVAL	CDF REAL8	-1E+31			
FORMAT	CDF CHAR	f14.4			
LABL PTR 1	CDF CHAR	EAS HFlux LABEL			
VALIDMIN	CDF REAL8	1E-05			
VALIDMAX	CDF REAL8	1E+05			

SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	1E-05
SCALEMAX	CDF_REAL8	1E+05
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapCoreHalo_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapCoreHalo_Density			
CATDESC	CDF_CHAR	Number density from EAS1_overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1_overlapCoreHalo_N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapCoreHalo_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapCoreHalo_Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS1_overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapCoreHalo_P	CDF_REAL8	1	9	T	T



Attribute Name	Data Type	Value
FIELDNAM	CDF_CHAR	EAS1 overlapCoreHalo Pressure
CATDESC	CDF_CHAR	Pressure tensor from EAS1 overlap look direction in CoreHalo range
COORDINATE_SYSTEM	CDF_CHAR	EAS1
DISPLAY_TYPE	CDF_CHAR	time series
DEPEND_0	CDF_CHAR	EPOCH
FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	EAS1 overlapCoreHalo P
VALIDMIN	CDF_REAL8	1E-6
VALIDMAX	CDF_REAL8	1E+3
SCALETYP	CDF_CHAR	Log
SCALEMIN	CDF_REAL8	1E-6
SCALEMAX	CDF_REAL8	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	nPa
SI_CONVERSION	CDF_CHAR	1E-09>P
REPRESENTATION_1	CDF_CHAR	REP EAS PRES 1
REPRESENTATION_2	CDF_CHAR	REP EAS PRES 2

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapCoreHalo_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapCoreHalo Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS1_overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s^-1 cm^-2			
SI_CONVERSION	CDF_CHAR	1E-03>J s^-1 m^-2			
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapStrahl_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 overlapStrahl Density			
CATDESC	CDF_CHAR	Number density from EAS1 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			

FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	EAS1_overlapStrahl N
VALIDMIN	CDF_UINT4	1E-9
VALIDMAX	CDF_UINT4	1E+3
SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_UINT4	1E-9
SCALEMAX	CDF_UINT4	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	cm ⁻³
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapStrahl_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapStrahl Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS1 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapStrahl_P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapStrahl Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS1 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1_overlapStrahl P			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	nPa			
SI_CONVERSION	CDF_CHAR	1E-09>P			



REPRESENTATION 1	CDF_CHAR	REP_EAS_PRES_1
REPRESENTATION 2	CDF_CHAR	REP_EAS_PRES_2

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_overlapStrahl_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1_overlapStrahl Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS1 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_onlyLowEne_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_onlyLowEne Density			
CATDESC	CDF_CHAR	Number density from EAS2 only look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH_1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS2_OnlyLowEne_N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_onlyLowEne_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_onlyLowEne Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS2 only look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			

DISPLAY TYPE	CDF CHAR	time series
DEPEND 0	CDF CHAR	EPOCH 1
FILLVAL	CDF REAL8	-1E+31
FORMAT	CDF CHAR	f14.4
LABL PTR 1	CDF CHAR	EAS VEL LABEL
VALIDMIN	CDF REAL8	-10000.0
VALIDMAX	CDF REAL8	+10000.0
SCALETYP	CDF CHAR	log
SCALEMIN	CDF REAL8	-10000.0
SCALEMAX	CDF REAL8	+10000.0
VAR TYPE	CDF CHAR	data
UNITS	CDF CHAR	km s ⁻¹
SI CONVERSION	CDF CHAR	1E+03>m s ⁻¹
REPRESENTATION 1	CDF CHAR	REP VEL LABEL

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS2_onlyLowEne_P	CDF REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS2 onlyLowEne Pressure			
CATDESC	CDF CHAR	Pressure tensor from EAS2 only look direction in low energy range			
COORDINATE_SYSTEM	CDF CHAR	EAS2			
DISPLAY TYPE	CDF CHAR	time series			
DEPEND 0	CDF CHAR	EPOCH 1			
FILLVAL	CDF REAL8	-1E+31			
FORMAT	CDF CHAR	f14.4			
LABLAXIS	CDF CHAR	EAS2 OnlyLowEne P			
VALIDMIN	CDF REAL8	1E-6			
VALIDMAX	CDF REAL8	1E+3			
SCALETYP	CDF CHAR	Log			
SCALEMIN	CDF REAL8	1E-6			
SCALEMAX	CDF REAL8	1E+3			
VAR TYPE	CDF CHAR	data			
UNITS	CDF CHAR	nPa			
SI CONVERSION	CDF CHAR	1E-09>P			
REPRESENTATION 1	CDF CHAR	REP EAS PRES 1			
REPRESENTATION 2	CDF CHAR	REP EAS PRES 2			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS2_onlyLowEne_H	CDF REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS2 onlyLowEne Heat Flux			
CATDESC	CDF CHAR	Heat Flux from EAS2 only look direction in low energy range			
COORDINATE_SYSTEM	CDF CHAR	EAS2			
DISPLAY TYPE	CDF CHAR	time series			
DEPEND 0	CDF CHAR	EPOCH 1			
FILLVAL	CDF REAL8	-1E+31			
FORMAT	CDF CHAR	f14.4			
LABL PTR 1	CDF CHAR	EAS HFlux LABEL			
VALIDMIN	CDF REAL8	1E-05			
VALIDMAX	CDF REAL8	1E+05			



SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	1E-05
SCALEMAX	CDF_REAL8	1E+05
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_onlyCoreHalo_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 onlyCoreHalo Density			
CATDESC	CDF_CHAR	Number density from EAS2 only look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH 1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS1 OnlyCoreHalo N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_onlyCoreHalo_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 onlyCoreHalo Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS2 only look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH 1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS VEL LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP VEL LABEL			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_onlyCoreHalo_P	CDF_REAL8	1	9	T	T



Attribute Name	Data Type	Value
FIELDNAM	CDF_CHAR	EAS2 onlyCoreHalo Pressure
CATDESC	CDF_CHAR	Pressure tensor from EAS2 only look direction in CoreHalo range
COORDINATE_SYSTEM	CDF_CHAR	EAS2
DISPLAY_TYPE	CDF_CHAR	time series
DEPEND_0	CDF_CHAR	EPOCH_1
FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	EAS2 OnlyCoreHalo P
VALIDMIN	CDF_REAL8	1E-6
VALIDMAX	CDF_REAL8	1E+3
SCALETYP	CDF_CHAR	Log
SCALEMIN	CDF_REAL8	1E-6
SCALEMAX	CDF_REAL8	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	nPa
SI_CONVERSION	CDF_CHAR	1E-09>P
REPRESENTATION_1	CDF_CHAR	REP EAS PRES 1
REPRESENTATION_2	CDF_CHAR	REP EAS PRES 2

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_onlyCoreHalo_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 onlyCoreHalo Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS2 only look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH_1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_onlyStrahl_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 onlyStrahl Density			
CATDESC	CDF_CHAR	Number density from EAS2 only look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH_1			
FILLVAL	CDF_REAL8	-1E+31			

FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	EAS2 OnlyStrahl N
VALIDMIN	CDF_UINT4	1E-9
VALIDMAX	CDF_UINT4	1E+3
SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_UINT4	1E-9
SCALEMAX	CDF_UINT4	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	cm ⁻³
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS2_onlyStrahl V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 onlyStrahl Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS2 only look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH 1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS2_onlyStrahl P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 onlyStrahl Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS2 only look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH 1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS2 OnlyStrahl P			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	nPa			
SI_CONVERSION	CDF_CHAR	1E-09>P			



REPRESENTATION 1	CDF_CHAR	REP_EAS_PRES_1
REPRESENTATION 2	CDF_CHAR	REP_EAS_PRES_2

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_onlyStrahl_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 onlyStrahl Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS2 only look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH_1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapLowEne_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapLowEne Density			
CATDESC	CDF_CHAR	Number density from EAS2 overlap look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH_1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS2_overlapLowEne_N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapLowEne_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapLowEne Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS2 overlap look direction in low energy range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			

DISPLAY TYPE	CDF CHAR	time_series
DEPEND 0	CDF CHAR	EPOCH 1
FILLVAL	CDF REAL8	-1E+31
FORMAT	CDF CHAR	f14.4
LABL PTR 1	CDF CHAR	EAS VEL LABEL
VALIDMIN	CDF REAL8	-10000.0
VALIDMAX	CDF REAL8	+10000.0
SCALETYP	CDF CHAR	log
SCALEMIN	CDF REAL8	-10000.0
SCALEMAX	CDF REAL8	+10000.0
VAR TYPE	CDF CHAR	data
UNITS	CDF CHAR	km s ⁻¹
SI CONVERSION	CDF CHAR	1E+03>m s ⁻¹
REPRESENTATION 1	CDF CHAR	REP VEL LABEL

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA EAS2_overlapLowEne_P	CDF REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS2_overlapLowEne Pressure			
CATDESC	CDF CHAR	Pressure tensor from EAS2 overlap look direction in low energy range			
COORDINATE_SYSTEM	CDF CHAR	EAS2			
DISPLAY TYPE	CDF CHAR	time_series			
DEPEND 0	CDF CHAR	EPOCH 1			
FILLVAL	CDF REAL8	-1E+31			
FORMAT	CDF CHAR	f14.4			
LABLAXIS	CDF CHAR	EAS2_overlapLowEne_P			
VALIDMIN	CDF REAL8	1E-6			
VALIDMAX	CDF REAL8	1E+3			
SCALETYP	CDF CHAR	Log			
SCALEMIN	CDF REAL8	1E-6			
SCALEMAX	CDF REAL8	1E+3			
VAR TYPE	CDF CHAR	data			
UNITS	CDF CHAR	nPa			
SI CONVERSION	CDF CHAR	1E-09>P			
REPRESENTATION 1	CDF CHAR	REP EAS PRES 1			
REPRESENTATION 2	CDF CHAR	REP EAS PRES 2			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA EAS2_overlapLowEne_H	CDF REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS2_overlapLowEne Heat Flux			
CATDESC	CDF CHAR	Heat Flux from EAS2 overlap look direction in low energy range			
COORDINATE_SYSTEM	CDF CHAR	EAS2			
DISPLAY TYPE	CDF CHAR	time_series			
DEPEND 0	CDF CHAR	EPOCH 1			
FILLVAL	CDF REAL8	-1E+31			
FORMAT	CDF CHAR	f14.4			
LABL PTR 1	CDF CHAR	EAS HFlux LABEL			
VALIDMIN	CDF REAL8	1E-05			
VALIDMAX	CDF REAL8	1E+05			

SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	1E-05
SCALEMAX	CDF_REAL8	1E+05
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapCoreHalo_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapCoreHalo_Density			
CATDESC	CDF_CHAR	Number density from EAS2_overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH_1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS2_overlapCoreHalo_N			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapCoreHalo_V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapCoreHalo_Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS2_overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH_1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapCoreHalo_P	CDF_REAL8	1	9	T	T



Attribute Name	Data Type	Value
FIELDNAM	CDF_CHAR	EAS2 overlapCoreHalo Pressure
CATDESC	CDF_CHAR	Pressure tensor from EAS2 overlap look direction in CoreHalo range
COORDINATE_SYSTEM	CDF_CHAR	EAS2
DISPLAY_TYPE	CDF_CHAR	time series
DEPEND_0	CDF_CHAR	EPOCH_1
FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	EAS2 overlapCoreHalo P
VALIDMIN	CDF_REAL8	1E-6
VALIDMAX	CDF_REAL8	1E+3
SCALETYP	CDF_CHAR	Log
SCALEMIN	CDF_REAL8	1E-6
SCALEMAX	CDF_REAL8	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	nPa
SI_CONVERSION	CDF_CHAR	1E-09>P
REPRESENTATION_1	CDF_CHAR	REP EAS PRES 1
REPRESENTATION_2	CDF_CHAR	REP EAS PRES 2

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapCoreHalo_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapCoreHalo Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS2_overlap look direction in CoreHalo range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH_1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_Hflux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s^-1 cm^-2			
SI_CONVERSION	CDF_CHAR	1E-03>J s^-1 m^-2			
REPRESENTATION_1	CDF_CHAR	REP_Hflux_LABEL			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS2_overlapStrahl_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 overlapStrahl Density			
CATDESC	CDF_CHAR	Number density from EAS2 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH_1			
FILLVAL	CDF_REAL8	-1E+31			

FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	EAS2 overlapStrahl N
VALIDMIN	CDF_UINT4	1E-9
VALIDMAX	CDF_UINT4	1E+3
SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_UINT4	1E-9
SCALEMAX	CDF_UINT4	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	cm ⁻³
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS2 overlapStrahl V	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 overlapStrahl Velocity			
CATDESC	CDF_CHAR	Bulk velocity from EAS2 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS2			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH 1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS2 overlapStrahl P	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 overlapStrahl Pressure			
CATDESC	CDF_CHAR	Pressure tensor from EAS2 overlap look direction in Strahl range			
COORDINATE_SYSTEM	CDF_CHAR	EAS1			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH 1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	EAS2 overlapStrahl P			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	nPa			
SI_CONVERSION	CDF_CHAR	1E-09>P			



REPRESENTATION 1	CDF CHAR	REP EAS PRES 1
REPRESENTATION 2	CDF CHAR	REP EAS PRES 2

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA_EAS2_overlapStrahl_H	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2_overlapStrahl Heat Flux			
CATDESC	CDF_CHAR	Heat Flux from EAS2 overlap look direction in Strahl range			
COORDINATE SYSTEM	CDF_CHAR	EAS2			
DISPLAY TYPE	CDF_CHAR	time series			
DEPEND 0	CDF_CHAR	EPOCH 1			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL PTR 1	CDF_CHAR	EAS HFlux LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION 1	CDF_CHAR	REP HFlux LABEL			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
EAS1_TO_SRF	CDF_REAL8	2	3,3	F	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS1 frame to spacecraft reference frame			
FORMAT	CDF_CHAR	f14.5			
VAR TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
EAS2_TO_SRF	CDF_REAL8	2	3,3	F	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS2 Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS2 frame to spacecraft reference frame			
FORMAT	CDF_CHAR	f14.5			
VAR TYPE	CDF_CHAR	support data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
QUALITY FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 Data Quality			
CATDESC	CDF_CHAR	EAS1 Data Quality flag			
DEPEND 0	CDF_CHAR	EPOCH			
DISPLAY TYPE	CDF_CHAR	time series			
FILLVAL	CDF_UINT4	255			

LABLAXIS	CDF CHAR	EAS1 data quality
VALIDMIN	CDF UINT4	0
VALIDMAX	CDF UINT4	4
SCALETYP	CDF CHAR	linear
SCALEMIN	CDF UINT4	0
SCALEMAX	CDF UINT4	4
VAR_TYPE	CDF CHAR	support data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG_1	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS2 Data Quality			
CATDESC	CDF CHAR	EAS2 Data Quality flag			
DEPEND_0	CDF CHAR	EPOCH_1			
DISPLAY_TYPE	CDF CHAR	time series			
FILLVAL	CDF UINT4	255			
LABLAXIS	CDF CHAR	EAS2 data quality			
VALIDMIN	CDF UINT4	0			
VALIDMAX	CDF UINT4	4			
SCALETYP	CDF CHAR	linear			
SCALEMIN	CDF UINT4	0			
SCALEMAX	CDF UINT4	4			
VAR_TYPE	CDF CHAR	support data			

4.1.2.2 PAS L1 products

IRAP is responsible for generating the SWA PAS L1 data form the L0 source.

The PAS L1 data products are as follows:

- PAS 3D spectra: unique dataset merging data from various modes (Normal mode, Burst mode and Snapshots). The angular bin directions are in PAS frame. Data records are in chronological order, but with a variable time-resolution, depending on various modes.
- Onboard moments in physical units. In the PAS frame of reference.
- Engineering data: housekeeping parameters, in physical values (Volf, mA, deg.C)
- Inflight Calibration data.

All Data products are made as CDF files according to “SOL-SGS-TN-0009 Metadata Definition for Solar Orbiter Science Data”.

4.1.2.2.1 PAS 3D spectra

Filename: solo_L1_swa-pas-3d_yyyymmdd_V01.cdf

Global attributes



Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L1>Level 1 Data
Descriptor	1	SWA-PAS-3d
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	solo L1 swa-pas-3d
Logical File id	1	solo L1 swa-pas-3d yyyymmdd V01
Logical Source Description	1	SWA-PAS 3D counts data
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MM:SS
Mods	1	V01 First Version
Data Product	1	3D>3D Counts
Level	1	L1>Level 1 Data
Instrument	1	SWA-PAS>Solar-Wind-Analyser Proton-Analyser-Sensor

Variables

Variable name	Variable type	Dimensions	Record vary
Epoch	CDF_TIME_TT2000	[]	True
Duration	CDF_FLOAT	[]	True
CCSDS_coarse_time	CDF_UINT4	[]	True
CCSDS_fine_time	CDF_UINT2	[]	True
SCET_coarse_time	CDF_UINT4	[]	True
SCET_fine_time	CDF_UINT2	[]	True
SOURCE	CDF_UINT1	[]	True
SAMPLE	CDF_INT2	[]	True
NB_SAMPLE	CDF_INT2	[]	True
FIRST_ENERGY	CDF_INT2	[]	True
NB_ENERGY	CDF_INT2	[]	True
FIRST_ELEVATION	CDF_INT2	[]	True
NB_ELEVATION	CDF_INT2	[]	True
NB_CEM	CDF_INT2	[]	True
INFO	CDF_UINT1	[]	True
SCHEME	CDF_UINT1	[]	True
FULL_3D	CDF_UINT1	[]	True
COMPRESSED	CDF_UINT1	[]	True
MAX_CNT_ENERGY	CDF_INT2	[]	True

MAX_CNT_ELEVATION	CDF_INT2	[]	True
MAX_CNT_CEM	CDF_INT2	[]	True
NB_K	CDF_INT2	[]	True
K	CDF_INT2	[]	True
COUNTS	CDF_UINT2	[11, 9, 96]	True
Energy_table	CDF_REAL4	[96]	False
Energy_delta_plus	CDF_REAL4	[96]	False
Energy_delta_minus	CDF_REAL4	[96]	False
CEM_table	CDF_REAL4	[11]	False
CEM_table_delta	CDF_REAL4	[11]	False
Elevation_table	CDF_REAL4	[9]	False
Elevation_table_delta	CDF_REAL4	[9]	False

Detailed variable attributes

Variable name	Epoch	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Default time
FIELDNAM	CDF_CHAR	Epoch
FILLVAL	CDF_TIME_TT2000	9999-12-31 23:59:59.999999
LABLAXIS	CDF_CHAR	Epoch
UNITS	CDF_CHAR	ns
VALIDMIN	CDF_TIME_TT2000	2000-01-01 00:00:00:000000
VALIDMAX	CDF_TIME_TT2000	2029-12-31 23:59:59.999000
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
MONOTON	CDF_CHAR	INCREASE
TIME_BASE	CDF_CHAR	J2000
TIME_SCALE	CDF_CHAR	Terrestrial Time
REFERENCE_POSITION	CDF_CHAR	Rotating Earth Geoid
DELTA_PLUS_VAR	CDF_CHAR	Duration

Variable name	Duration	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Acquisition duration
FIELDNAM	CDF_CHAR	Duration
FILLVAL	CDF_FLOAT	-1,00E+31
LABLAXIS	CDF_CHAR	Duration
UNITS	CDF_CHAR	s
VALIDMIN	CDF_FLOAT	0.0
VALIDMAX	CDF_FLOAT	60.0

VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
MONOTON	CDF_CHAR	INCREASE
TIME_BASE	CDF_CHAR	J2000
TIME_SCALE	CDF_CHAR	Terrestrial Time

Variable name	CCSDS_coarse_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	CCSDS coarse time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	CCSDS_coarse_time
FILLVAL	CDF_UINT4	4294967295
FORMAT	CDF_CHAR	I8
LABLAXIS	CDF_CHAR	CCSDS_coarse_time
UNITS	CDF_CHAR	s
VALIDMIN	CDF_UINT4	0
VALIDMAX	CDF_UINT4	4294967294
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	CCSDS_fine_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	CCSDS fine time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	CCSDS_fine_time
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	CCSDS_fine_time
UNITS	CDF_CHAR	1/65536 s
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SCET_coarse_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	SCET coarse time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	SCET_coarse_time

FILLVAL	CDF_UINT4	4294967295
FORMAT	CDF_CHAR	I8
LABLAXIS	CDF_CHAR	SCET_coarse_time
UNITS	CDF_CHAR	s
VALIDMIN	CDF_UINT4	0
VALIDMAX	CDF_UINT4	4294967294
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SCET_fine_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	SCET fine time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	SCET_fine_time
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	SCET_fine_time
UNITS	CDF_CHAR	1/65536 s
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SOURCE	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Source (0: Normal, 1: Snapshot, 2: Burst, 3: Trigger)
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	Source
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I1
LABLAXIS	CDF_CHAR	Source
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	15
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SAMPLE	
Attribute name	Data type	Value

CATDESC	CDF_CHAR	Current sample
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	SAMPLE
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	SAMPLE
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	1000
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	NB_SAMPLE	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Number of samples
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	NB_SAMPLE
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	SAMPLE
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	1000
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	FIRST_ENERGY	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	First energy bin
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	EN_FIRST
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	FIRST_ENERGY
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	96
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	NB_ENERGY	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Number energy bins
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	EN_NUM
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	EN_NUM
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	96
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	FIRST_ELEVATION	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	First elevation bin
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	EL_FIRST
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	EL_FIRST
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	9
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	NB_ELEVATION	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Number elevation bins
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	EL_NUM
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	EL_NUM
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0

VALIDMAX	CDF_INT2	9
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	NB_CEM	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Number CEM
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	EL_NUM
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	EL_NUM
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	9
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	INFO	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Info
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	INFO
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	INFO
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	7
VALIDMAX	CDF_UINT1	11
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SCHEME	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Scheme
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	SCHEME
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3

LABLAXIS	CDF_CHAR	INFO
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	15
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	FULL_3D	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Full 3D
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	FULL_3D
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	INFO
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	COMPRESSED	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Compressed data
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	COMPRESSED
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	COMPRESSED
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	MAX_CNT_ENERGY	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Max count energy bin
DEPEND_0	CDF_CHAR	Epoch

FIELDNAM	CDF_CHAR	MAX_CNT_ENERGY
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	MAX_CNT_ENERGY
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	96
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	MAX_CNT_ELEVATION	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Max count elevation number
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	MAX_CNT_ELEVATION
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	MAX_CNT_ENERGY
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	9
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	MAX_CNT_CEM	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Max count CEM
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	MAX_CNT_CEM
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	MAX_CNT_ENERGY
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	11
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	NB_K

Attribute name	Data type	Value
CATDESC	CDF_CHAR	Number of sub-sampling per second
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	NB_K
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	NB_K
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	8
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	K	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Current sub-sampling
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	K
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	NB_K
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	8
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	COUNTS	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	3D counts
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	COUNTS
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	COUNTS
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data

SCALETYP	CDF_CHAR	linear

Variable name	Energy_table	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Center of energy bins
FIELDNAM	CDF_CHAR	Energy table
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	Energy_table
UNITS	CDF_CHAR	eV
VALIDMIN	CDF_REAL4	0.0
VALIDMAX	CDF_REAL4	40000.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
DELTA_PLUS_VAR	CDF_CHAR	Energy_delta_plus
DELTA_MINUS_VAR	CDF_CHAR	Energy_delta_minus

Variable name	Energy_delta_plus	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Energy bins delta plus values
FIELDNAM	CDF_CHAR	Energy delta plus
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	Energy_table
UNITS	CDF_CHAR	eV
VALIDMIN	CDF_REAL4	0.0
VALIDMAX	CDF_REAL4	40000.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	Energy_delta_minus	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Energy bins delta minus values
FIELDNAM	CDF_CHAR	Energy table delta minus
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	Energy_table
UNITS	CDF_CHAR	eV
VALIDMIN	CDF_REAL4	0.0



VALIDMAX	CDF_REAL4	40000.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	CEM_table	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Center of CEM bins
FIELDNAM	CDF_CHAR	CEM_table
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	CEM_table
UNITS	CDF_CHAR	deg
VALIDMIN	CDF_REAL4	-90.0
VALIDMAX	CDF_REAL4	90.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
DELTA_PLUS_VAR	CDF_CHAR	CEM_table_delta
DELTA_MINUS_VAR	CDF_CHAR	CEM_table_delta

Variable name	Elevation_table	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Center of elevation bins
FIELDNAM	CDF_CHAR	Elevation table
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	Elevation_table
UNITS	CDF_CHAR	deg
VALIDMIN	CDF_REAL4	-90.0
VALIDMAX	CDF_REAL4	90.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
DELTA_PLUS_VAR	CDF_CHAR	Elevation_table_delta
DELTA_MINUS_VAR	CDF_CHAR	Elevation_table_delta

Variable name	CEM_table_delta	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	CEM_table_delta
FIELDNAM	CDF_CHAR	CEM_table_delta
FILLVAL	CDF_REAL4	-1,00E+31

FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	CEM_table_delta
UNITS	CDF_CHAR	deg
VALIDMIN	CDF_REAL4	0.0
VALIDMAX	CDF_REAL4	45.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	Elevation_table_delta	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Delta elevation
FIELDNAM	CDF_CHAR	Elevation_table_delta
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	Delta elevation
UNITS	CDF_CHAR	deg
VALIDMIN	CDF_REAL4	0.0
VALIDMAX	CDF_REAL4	45.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

4.1.2.2.2 PAS onboard moments

Filename: solo_L1_swa-pas-mom_yyyymmdd_V01.cdf

Global metadata

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L1>Level 1 Data
Descriptor	1	SWA-PAS-MOM
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	solo_L1_swa-pas-mom
Logical File id	1	solo_L1_swa-pas-mom_yyyymmdd_V01
Logical Source Description	1	SWA-PAS Onboard calculated moments
Rules of Use	1	Consult with MSSL-UCL before using



Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MM:SS
Mods	1	V01 First Version
Data Product	1	MOM>Onboard calculated moments
Level	1	L1>Level 1 Data
Instrument	1	SWA-PAS>Solar-Wind-Analyser Proton-Analyser-Sensor

Variables

Variable name	Variable type	Dimensions	Record vary
Epoch	CDF_TIME_TT2000	[]	True
Half_interval	CDF_FLOAT	[]	False
CCSDS_coarse_time	CDF_UINT4	[]	True
CCSDS_fine_time	CDF_UINT2	[]	True
SCET_coarse_time	CDF_UINT4	[]	True
SCET_fine_time	CDF_UINT2	[]	True
Sample	CDF_INT2	[]	True
Validity	CDF_UINT1	[]	True
sum_PAS	CDF_UINT1	[]	True
Density	CDF_REAL4	[]	True
Velocity	CDF_REAL4	[3]	True
Pressure	CDF_REAL4	[6]	True

Detailed variable attributes

Variable name	Epoch	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Default time
FIELDNAM	CDF_CHAR	Epoch
FILLVAL	CDF_TIME_TT2000	9999-12-31 23:59:59.999999
LABLAXIS	CDF_CHAR	Epoch
UNITS	CDF_CHAR	ns
VALIDMIN	CDF_TIME_TT2000	2000-01-01 00:00:00:000000
VALIDMAX	CDF_TIME_TT2000	2029-12-31 23:59:59.999000
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
MONOTON	CDF_CHAR	INCREASE
TIME_BASE	CDF_CHAR	J2000
TIME_SCALE	CDF_CHAR	Terrestrial Time
REFERENCE_POSITION	CDF_CHAR	Rotating Earth Geoid

Variable name	CCSDS_coarse_time	
Attribute name	Data type	Value

CATDESC	CDF_CHAR	CCSDS_coarse_time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	CCSDS_coarse_time
FILLVAL	CDF_UINT4	4294967295
FORMAT	CDF_CHAR	I8
LABLAXIS	CDF_CHAR	CCSDS_coarse_time
UNITS	CDF_CHAR	s
VALIDMIN	CDF_UINT4	0
VALIDMAX	CDF_FLOAT	1.8446744e+19
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	CCSDS_fine_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	CCSDS_fine_time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	CCSDS_fine_time
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	CCSDS_fine_time
UNITS	CDF_CHAR	1/65536 s
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SCET_coarse_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	SCET_coarse_time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	SCET_coarse_time
FILLVAL	CDF_UINT4	4294967295
FORMAT	CDF_CHAR	I8
LABLAXIS	CDF_CHAR	SCET_coarse_time
UNITS	CDF_CHAR	s
VALIDMIN	CDF_UINT4	0
VALIDMAX	CDF_FLOAT	1.8446744e+19
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SCET_fine_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	SCET_fine_time
DEPEND_0	CDF_CHAR	Epoch

FIELDNAM	CDF_CHAR	SCET_fine_time
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	SCET_fine_time
UNITS	CDF_CHAR	1/65536 s
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	sample	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	sample # over 25 possibles
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	sample / 25
FILLVAL	CDF_INT2	-32767
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	sample
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	25
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	validity	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	validity flag (0 = OK)
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	validity
FILLVAL	CDF_INT2	254
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	sample
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	255
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	sum_PAS	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	summation type
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	sum PAS
FILLVAL	CDF_INT2	255

FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	sample
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_INT2	0
VALIDMAX	CDF_INT2	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	density	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	density
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	density
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	density
UNITS	CDF_CHAR	particles cm ⁻³
VALIDMIN	CDF_REAL4	0.0
VALIDMAX	CDF_REAL4	10000.0
VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear

Variable name	velocity	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	velocity
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	velocity
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	velocity
UNITS	CDF_CHAR	km/s
VALIDMIN	CDF_REAL4	-100000.0
VALIDMAX	CDF_REAL4	100000.0
VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear

Variable name	pressure	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	pressure tensor
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	pressure
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	pressure

UNITS	CDF_CHAR	J.cm ⁻³
VALIDMIN	CDF_REAL4	0.0
VALIDMAX	CDF_REAL4	1,00E+30
VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear

4.1.2.2.3 PAS engineering data

Filename: solo_L1_swa-pas-hsk_yyyymmdd_V01.cdf

Global attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L1>Level 1 Data
Descriptor	1	SWA-PAS-HSK
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	solo_L1_swa-pas-hsk
Logical File id	1	solo_L1_swa-pas-hsk_yyyymmdd_V01
Logical Source Description	1	SWA-PAS Housekeepings
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	HSK>Housekeepings
Level	1	L1>Level 1 Data
Instrument	1	SWA-PAS>Solar-Wind-Analyser Proton-Analyser-Sensor

Variables

Variable name	Variable type	Dimensions	Record vary
Epoch	CDF_TIME_TT2000	[]	True
SID_counter	CDF_UINT2	[]	True
CCSDS_coarse_time	CDF_UINT4	[]	True
CCSDS_fine_time	CDF_UINT2	[]	True
SCET_coarse_time	CDF_UINT4	[]	True
SCET_fine_time	CDF_UINT2	[]	True
V_MON_C	CDF_REAL4	[]	True
V_MON_L	CDF_REAL4	[]	True
I_MON_C	CDF_REAL4	[]	True
I_MON_L	CDF_REAL4	[]	True
T_MON_C	CDF_REAL4	[]	True
T_MON_L	CDF_REAL4	[]	True
T1_HEATHER	CDF_REAL4	[]	True
T2_HEATHER	CDF_REAL4	[]	True
PLUS_24_V_CEM_OUT	CDF_REAL4	[]	True
PLUS_5_V_CEM_OUT	CDF_REAL4	[]	True
PLUS_12_V_HT_OUT	CDF_REAL4	[]	True
MINUS_12_V_HT_OUT	CDF_REAL4	[]	True
PLUS_4V_FPGA_OUT	CDF_REAL4	[]	True
2V5_FPGA_OUT	CDF_REAL4	[]	True
TEMP_DCDC	CDF_REAL4	[]	True
TEMP_FPGA	CDF_REAL4	[]	True
HK_I_PLUS_24V_CEM	CDF_REAL4	[]	True
HK_I_PLUS_5V_CEM	CDF_REAL4	[]	True
HK_I_PLUS_12V_HT	CDF_REAL4	[]	True
HK_I_MINUS_12V_HT	CDF_REAL4	[]	True
HK_I_PLUS_5V_FPGA	CDF_REAL4	[]	True
HK_I_PLUS_28V_PRI	CDF_REAL4	[]	True
HK_I_2V5_FPGA	CDF_REAL4	[]	True
T3_HEATHER	CDF_REAL4	[]	True
TEMP_HVPS	CDF_REAL4	[]	True
TEMP_EA	CDF_REAL4	[]	True
HK_MHV_POS	CDF_REAL4	[]	True
HK_MHV_NEG	CDF_REAL4	[]	True
HK_ANL	CDF_REAL4	[]	True
HK_TOP_DEFL	CDF_REAL4	[]	True
HK_TOP_CAP	CDF_REAL4	[]	True
HK_BOT_DEFL	CDF_REAL4	[]	True
HEATER_HK_CHANNEL_SELECT	CDF_UINT1	[]	True
OP_HEATER_ON	CDF_UINT1	[]	True
SEQ_STATE_RUNNING	CDF_UINT1	[]	True



UPLOADED	CDF_UINT1	[]	True
PRE_AMP_1_OVER_CURRENT	CDF_UINT1	[]	True
PRE_AMP_2_OVER_CURRENT	CDF_UINT1	[]	True
HV_DISABLE	CDF_UINT1	[]	True
HV_AIRSAFE	CDF_UINT1	[]	True
MEMORY_ERROR_COUNT	CDF_UINT1	[]	True
IDLE_1	CDF_UINT1	[]	True
IDLE_2	CDF_UINT1	[]	True
ANALYSER_GAIN	CDF_UINT1	[]	True
BOTTOM_DEF_GAIN	CDF_UINT1	[]	True
TOP_DEF_GAIN	CDF_UINT1	[]	True
TOP_CAP_GAIN	CDF_UINT1	[]	True
BOTTOM_DEF_SIGN	CDF_UINT1	[]	True
TOP_DEF_SIGN	CDF_UINT1	[]	True
TOP_CAP_SIGN	CDF_UINT1	[]	True
SEQ_INTERNAL_STATUS	CDF_UINT2	[]	True

Detailed variable attributes

Variable name	Epoch	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	Default time
FIELDNAM	CDF_CHAR	Epoch
FILLVAL	CDF_TIME_TT2000	9999-12-31 23:59:59.999999
LABLAXIS	CDF_CHAR	Epoch
UNITS	CDF_CHAR	ns
VALIDMIN	CDF_TIME_TT2000	01/01/1990 00:00
VALIDMAX	CDF_TIME_TT2000	2029-12-31 23:59:59.999000
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
MONOTON	CDF_CHAR	INCREASE
TIME_BASE	CDF_CHAR	J2000
TIME_SCALE	CDF_CHAR	Terrestrial Time
REFERENCE_POSITION	CDF_CHAR	Rotating Earth Geoid

Variable name	SID_counter	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	SID_COUNTER
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	SID_COUNTER
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	SID_COUNTER
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65535
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	CCSDS_coarse_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	CCSDS_coarse_time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	CCSDS_coarse_time
FILLVAL	CDF_UINT4	4294967295
FORMAT	CDF_CHAR	I8
LABLAXIS	CDF_CHAR	CCSDS_coarse_time
VALIDMIN	CDF_UINT4	0
VALIDMAX	CDF_UINT4	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	CCSDS_fine_time	
Attribute name	Data type	Value

CATDESC	CDF_CHAR	CCSDS_fine_time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	CCSDS_fine_time
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	CCSDS_fine_time
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SCET_coarse_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	SCET_coarse_time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	SCET_coarse_time
FILLVAL	CDF_UINT4	4294967295
FORMAT	CDF_CHAR	I8
LABLAXIS	CDF_CHAR	SCET_coarse_time
VALIDMIN	CDF_UINT4	0
VALIDMAX	CDF_UINT4	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SCET_fine_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	SCET_fine_time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	SCET_fine_time
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	SCET_fine_time
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	V_MON_C	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS CEM High Voltage channeltron 4->10
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	V_MON_C
FILLVAL	CDF_REAL4	-1,00E+31

FORMAT	CDF_CHAR	F8.3
LABLAXIS	CDF_CHAR	V_MON_C
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	800.0
VALIDMAX	CDF_REAL4	2500.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL4	100.0
SCALEMAX	CDF_REAL4	3000.0

Variable name	V_MON_L	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS CEM High Voltage channeltron 1-3-11
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	V_MON_L
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	F8.3
LABLAXIS	CDF_CHAR	V_MON_L
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	800.0
VALIDMAX	CDF_REAL4	2500.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL4	100.0
SCALEMAX	CDF_REAL4	3000.0

Variable name	I_MON_C	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS CEM current channeltron 4->10
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	I_MON_C
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	F8.3
LABLAXIS	CDF_CHAR	I_MON_C
UNITS	CDF_CHAR	mA
VALIDMIN	CDF_REAL4	50.0
VALIDMAX	CDF_REAL4	220.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL4	0.0
SCALEMAX	CDF_REAL4	300.0

Variable name	I_MON_L	

Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS CEM current channeltron 1-3-11
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	I_MON_L
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	F8.3
LABLAXIS	CDF_CHAR	I_MON_L
UNITS	CDF_CHAR	mA
VALIDMIN	CDF_REAL4	0.0
VALIDMAX	CDF_REAL4	120.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL4	0.0
SCALEMAX	CDF_REAL4	200.0

Variable name	T_MON_C	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS CEM board temperature channeltron 4->10
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	T_MON_C
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	F8.3
LABLAXIS	CDF_CHAR	T_MON_C
UNITS	CDF_CHAR	deg.C
VALIDMIN	CDF_REAL4	-50.0
VALIDMAX	CDF_REAL4	65.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL4	-100.0
SCALEMAX	CDF_REAL4	100.0

Variable name	T_MON_L	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS CEM board temperature channeltron 1-3-11
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	T_MON_L
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	F8.3
LABLAXIS	CDF_CHAR	T_MON_L
UNITS	CDF_CHAR	deg.C
VALIDMIN	CDF_REAL4	-50.0
VALIDMAX	CDF_REAL4	65.0

VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL4	-100.0
SCALEMAX	CDF_REAL4	100.0

Variable name	T1_HEATHER	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS CEM Operationnal heater temp1
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	T1_HEATHER
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	T1_HEATHER
UNITS	CDF_CHAR	deg.C
VALIDMIN	CDF_REAL4	-1,00E+30
VALIDMAX	CDF_REAL4	-1,00E+30
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	T2_HEATHER	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS CEM Operationnal heater temp2
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	T2_HEATHER
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	T2_HEATHER
UNITS	CDF_CHAR	deg.C
VALIDMIN	CDF_REAL4	-1,00E+30
VALIDMAX	CDF_REAL4	-1,00E+30
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	PLUS_24_V_CEM_OUT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS +24V CEM voltage
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	PLUS_24_V_CEM_OUT
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	PLUS_24_V_CEM_OUT
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	21.0

VALIDMAX	CDF_REAL4	30.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	PLUS_5_V_CEM_OUT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS +5V voltage
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	PLUS_5_V_CEM_OUT
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	PLUS_5_V_CEM_OUT
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	4.0
VALIDMAX	CDF_REAL4	6.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	PLUS_12_V_HT_OUT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS +12V voltage
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	PLUS_12_V_HT_OUT
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	PLUS_12_V_HT_OUT
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	10.0
VALIDMAX	CDF_REAL4	16.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	MINUS_12_V_HT_OUT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS -12V voltage
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	MINUS_12_V_HT_OUT
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	MINUS_12_V_HT_OUT
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	10.0
VALIDMAX	CDF_REAL4	16.0
VAR_TYPE	CDF_CHAR	support_data

SCALETYP	CDF_CHAR	linear

Variable name	PLUS_4V_FPGA_OUT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS +4V FPGA voltage
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	PLUS_4V_FPGA_OUT
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	PLUS_4V_FPGA_OUT
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	3.0
VALIDMAX	CDF_REAL4	4.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	2V5_FPGA_OUT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS +2.5V FPGA voltage
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	2V5_FPGA_OUT
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	2V5_FPGA_OUT
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	1.3
VALIDMAX	CDF_REAL4	3.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	TEMP_DCDC	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS DC/DC board temperature
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	TEMP_DCDC
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	TEMP_DCDC
UNITS	CDF_CHAR	deg.C
VALIDMIN	CDF_REAL4	-50.0
VALIDMAX	CDF_REAL4	60.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	TEMP_FPGA	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS FPGA board temperature
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	TEMP_FPGA
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	TEMP_FPGA
UNITS	CDF_CHAR	deg.C
VALIDMIN	CDF_REAL4	-50.0
VALIDMAX	CDF_REAL4	55.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_I_PLUS_24V_CEM	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS +24V CEM current
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_I_PLUS_24V_CEM
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_I_PLUS_24V_CEM
UNITS	CDF_CHAR	mA
VALIDMIN	CDF_REAL4	5.0
VALIDMAX	CDF_REAL4	50.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_I_PLUS_5V_CEM	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS +5V current
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_I_PLUS_5V_CEM
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_I_PLUS_5V_CEM
UNITS	CDF_CHAR	mA
VALIDMIN	CDF_REAL4	0.5
VALIDMAX	CDF_REAL4	100.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_I_PLUS_12V_HT	
Attribute name	Data type	Value

CATDESC	CDF_CHAR	PAS +12V current
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_I_PLUS_12V_HT
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_I_PLUS_12V_HT
UNITS	CDF_CHAR	mA
VALIDMIN	CDF_REAL4	40.0
VALIDMAX	CDF_REAL4	80.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_I_MINUS_12V_HT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS -12V current
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_I_MINUS_12V_HT
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_I_MINUS_12V_HT
UNITS	CDF_CHAR	mA
VALIDMIN	CDF_REAL4	30.0
VALIDMAX	CDF_REAL4	70.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_I_PLUS_5V_FPGA	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS +5V FPGA current
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_I_PLUS_5V_FPGA
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_I_PLUS_5V_FPGA
UNITS	CDF_CHAR	mA
VALIDMIN	CDF_REAL4	25.0
VALIDMAX	CDF_REAL4	50.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_I_PLUS_28V_PRI	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS +28V primary current
DEPEND_0	CDF_CHAR	Epoch

FIELDNAM	CDF_CHAR	HK_I_PLUS_28V_PRI
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_I_PLUS_28V_PRI
UNITS	CDF_CHAR	mA
VALIDMIN	CDF_REAL4	120.0
VALIDMAX	CDF_REAL4	450.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_I_2V5_FPGA	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS +2.5V FPGA current
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_I_2V5_FPGA
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_I_2V5_FPGA
UNITS	CDF_CHAR	mA
VALIDMIN	CDF_REAL4	100.0
VALIDMAX	CDF_REAL4	180.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	T3_HEATHER	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS MB Operational Heater (Transistor) Temperature
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	T3_HEATHER
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	T3_HEATHER
UNITS	CDF_CHAR	deg.C
VALIDMIN	CDF_REAL4	-1,00E+30
VALIDMAX	CDF_REAL4	-1,00E+30
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	TEMP_HVPS	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS HV Temperature Analyzer Entry
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	TEMP_HVPS

FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	TEMP_HVPS
UNITS	CDF_CHAR	deg.C
VALIDMIN	CDF_REAL4	-50.0
VALIDMAX	CDF_REAL4	55.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	TEMP_EA	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS Temperature HV EA board
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	TEMP_EA
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	TEMP_EA
UNITS	CDF_CHAR	deg.C
VALIDMIN	CDF_REAL4	-1,00E+30
VALIDMAX	CDF_REAL4	-1,00E+30
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_MHV_POS	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS HV MHV positive voltage monitor
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_MHV_POS
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_MHV_POS
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	6000.0
VALIDMAX	CDF_REAL4	6500.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_MHV_NEG	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS HV MHV negative voltage monitor
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_MHV_NEG
FILLVAL	CDF_REAL4	-1,00E+31

FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_MHV_NEG
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	6000.0
VALIDMAX	CDF_REAL4	6500.0
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_ANL	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS HV Analyzer voltage monitor
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_ANL
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_ANL
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	-1,00E+30
VALIDMAX	CDF_REAL4	-1,00E+30
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_TOP_DEFL	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS HV Top deflector voltage monitor
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_TOP_DEFL
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_TOP_DEFL
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	-1,00E+30
VALIDMAX	CDF_REAL4	-1,00E+30
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_TOP_CAP	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS HV Top plate voltage monitor
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_TOP_CAP
FILLVAL	CDF_REAL4	-1,00E+31

FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_TOP_CAP
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	-1,00E+30
VALIDMAX	CDF_REAL4	-1,00E+30
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HK_BOT_DEFL	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PAS HV Bottom deflector voltage monitor
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HK_BOT_DEFL
FILLVAL	CDF_REAL4	-1,00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	HK_BOT_DEFL
UNITS	CDF_CHAR	V
VALIDMIN	CDF_REAL4	-1,00E+30
VALIDMAX	CDF_REAL4	-1,00E+30
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HEATER_HK_CHANNEL_SELECT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	HEATER HK CHANNEL SELECT
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HEATER_HK_CHANNEL_SELECT
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	HEATER HK CHANNEL SELECT
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	OP_HEATER_ON	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	OP HEATER ON
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	OP_HEATER_ON
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3



LABLAXIS	CDF_CHAR	OP HEATER ON
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SEQ_STATE_RUNNING	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	SEQ STATE RUNNING
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	SEQ_STATE_RUNNING
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	SEQ STATE RUNNING
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	UPLOADED	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	UPLOADED
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	UPLOADED
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	UPLOADED
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	PRE_AMP_1_OVER_CURRENT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PRE AMP 1 OVER CURRENT
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	PRE_AMP_1_OVER_CURRENT
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	PRE AMP 1 OVER CURRENT
UNITS	CDF_CHAR	unitless

VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	PRE_AMP_2_OVER_CURRENT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	PRE AMP 2 OVER CURRENT
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	PRE_AMP_2_OVER_CURRENT
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	PRE AMP 2 OVER CURRENT
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HV_DISABLE	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	HV_DISABLE
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HV_DISABLE
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	HV_DISABLE
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	HV_AIRSAFE	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	HV_AIRSAFE
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	HV_AIRSAFE
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	HV_AIRSAFE
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254

VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	MEMORY_ERROR_COUNT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	MEMORY_ERROR_COUNT
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	MEMORY_ERROR_COUNT
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	MEMORY_ERROR_COUNT
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	IDLE_1	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	IDLE_1
FIELDNAM	CDF_CHAR	IDLE_1
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	IDLE_1
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	IDLE_2	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	IDLE_2
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	IDLE_2
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	IDLE_2
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	ANALYSER_GAIN	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	ANALYSER_GAIN
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	ANALYSER_GAIN
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	ANALYSER_GAIN
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	BOTTOM_DEF_GAIN	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	BOTTOM_DEF_GAIN
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	BOTTOM_DEF_GAIN
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	BOTTOM_DEF_GAIN
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	TOP_DEF_GAIN	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	TOP_DEF_GAIN
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	TOP_DEF_GAIN
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	TOP_DEF_GAIN
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	TOP_CAP_GAIN	
Attribute name	Data type	Value

CATDESC	CDF_CHAR	TOP CAP GAIN
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	TOP_CAP_GAIN
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	TOP CAP GAIN
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	BOTTOM_DEF_SIGN	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	BOTTOM DEF SIGN
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	BOTTOM_DEF_SIGN
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	BOTTOM DEF SIGN
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	TOP_DEF_SIGN	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	TOP DEF SIGN
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	TOP_DEF_SIGN
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	TOP DEF SIGN
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	TOP_CAP_SIGN	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	TOP CAP SIGN
DEPEND_0	CDF_CHAR	Epoch

FIELDNAM	CDF_CHAR	TOP_CAP_SIGN
FILLVAL	CDF_UINT1	255
FORMAT	CDF_CHAR	I3
LABLAXIS	CDF_CHAR	TOP CAP SIGN
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SEQ_INTERNAL_STATUS	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	SEQ INTERNAL STATUS
FIELDNAM	CDF_CHAR	SEQ_INTERNAL_STATUS
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	SEQ INTERNAL STATUS
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

4.1.2.2.4 PAS inflight calibration files

Filename: solo_L1_swa-pas-cal_yyyymmdd_V01.cdf

Global metadata



Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L1>Level 1 Data
Descriptor	1	SWA-PAS-CAL
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	solo_L1_swa-pas-cal
Logical File id	1	solo_L1_swa-pas-cal_yyyymmdd_V01
Logical Source Description	1	SWA-PAS Inflight calibrations
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MM:SS
Mods	1	V01 First Version
Data Product	1	CAL>Inflight calibrations
Level	1	L1>Level 1 Data
Instrument	1	SWA-PAS>Solar-Wind-Analyser Proton-Analyser-Sensor

Variables

Variable name	Variable type	Dimensions	Record vary
Epoch	CDF_TIME_TT2000	[]	True
CCSDS_coarse_time	CDF_UINT4	[]	True
CCSDS_fine_time	CDF_UINT2	[]	True
SCET_coarse_time	CDF_UINT4	[]	True
SCET_fine_time	CDF_UINT2	[]	True
START	CDF_UINT2	[]	True
FINAL	CDF_UINT2	[]	True
CURRENT	CDF_UINT2	[]	True
ACQUISITION	CDF_UINT2	[]	True
NB_ACQUISITION	CDF_UINT2	[]	True
STEP	CDF_UINT2	[]	True
MAX_EN	CDF_UINT2	[]	True
MAX_EL	CDF_UINT2	[]	True
MAX_CEM	CDF_UINT2	[]	True
MAX_COUNT	CDF_UINT2	[]	True

Detailed variable attributes

Variable name	Epoch	
Attribute name	Data type	Value

CATDESC	CDF_CHAR	Default time
FIELDNAM	CDF_CHAR	Epoch
FILLVAL	CDF_TIME_TT2000	9999-12-31 23:59:59.999999
LABLAXIS	CDF_CHAR	Epoch
UNITS	CDF_CHAR	ns
VALIDMIN	CDF_TIME_TT2000	2000-01-01 00:00:00:000000
VALIDMAX	CDF_TIME_TT2000	2029-12-31 23:59:59.999000
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
MONOTON	CDF_CHAR	INCREASE
TIME_BASE	CDF_CHAR	J2000
TIME_SCALE	CDF_CHAR	Terrestrial Time
REFERENCE_POSITION	CDF_CHAR	Rotating Earth Geoid

Variable name	CCSDS_coarse_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	CCSDS_coarse_time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	CCSDS_coarse_time
FILLVAL	CDF_UINT4	4294967295
FORMAT	CDF_CHAR	I8
LABLAXIS	CDF_CHAR	
VALIDMIN	CDF_UINT4	4294967294
VALIDMAX	CDF_UINT4	4294967294
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	CCSDS_fine_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	CCSDS_fine_time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	CCSDS_fine_time
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	CCSDS_fine_time
VALIDMIN	CDF_UINT2	65534
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SCET_coarse_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	SCET_coarse_time
DEPEND_0	CDF_CHAR	Epoch

FIELDNAM	CDF_CHAR	SCET_coarse_time
FILLVAL	CDF_UINT4	4294967295
FORMAT	CDF_CHAR	I8
LABLAXIS	CDF_CHAR	SCET_coarse_time
VALIDMIN	CDF_UINT4	4294967294
VALIDMAX	CDF_UINT4	4294967294
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	SCET_fine_time	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	SCET_fine_time
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	SCET_fine_time
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	SCET_fine_time
VALIDMIN	CDF_UINT2	65534
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	START	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	START
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	START
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	START
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	FINAL	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	FINAL
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	FINAL
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	FINAL



UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	CURRENT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	CURRENT
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	CURRENT
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	CURRENT
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	ACQUISITION	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	ACQUISITION
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	ACQUISITION
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	ACQUISITION
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	NB_ACQUISITION	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	NB_ACQUISITION
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	NB_ACQUISITION
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	NB_ACQUISITION
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT2	0

VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	STEP	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	STEP
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	STEP
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	STEP
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear

Variable name	MAX_EN	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	MAX_EN
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	MAX_EN
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	MAX_EN
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data

Variable name	MAX_EL	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	MAX_EL
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	MAX_EL
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	MAX_EL
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data

Variable name	MAX_CEM	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	MAX_CEM
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	MAX_CEM
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	MAX_CEM
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data

Variable name	MAX_COUNT	
Attribute name	Data type	Value
CATDESC	CDF_CHAR	MAX_COUNT
DEPEND_0	CDF_CHAR	Epoch
FIELDNAM	CDF_CHAR	MAX_COUNT
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	MAX_COUNT
UNITS	CDF_CHAR	unitless
VALIDMIN	CDF_UINT2	0
VALIDMAX	CDF_UINT2	65534
VAR_TYPE	CDF_CHAR	support_data

4.1.2.3 HIS L1 products

HIS L1 products directly reflect data produced on the spacecraft, decompressed, decoded and unpacked into CDF variables.

NOTE: HIS L1 VDF and HK data are still being finalized and not yet publicly available.

4.1.2.3.1 HIS L1 Sensor Rate Data

Filename: solo_L1_swa-his-rates_yyyymmdd_V01.cdf

Global metadata

Name	Entry	Value
Acknowledgement	1	Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C.
Data_product	1	Rates> Rates data for HIS instrument
Data_type	1	rates_l1

Data_version	1	01
Descriptor	1	SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor
Discipline	1	Space Physics>Interplanetary Studies
File_naming_convention	1	"source_descriptor_datatype_yyyyMMdd
Generated_by	1	SO-HIS SOC, University of Michigan
Generation_date	1	20200611
HTTP_LINK		
Instrument_type	1	Particles (space)
LEVEL	1	1
LINK_TEXT		
LINK_TITLE		
Logical_file_id	1	solo_L1_swa-his-rates_00000000_v01
Logical_source	1	solo_L1_swa-his-rates
Logical_source_description	1	solo_L1_swa-his-rates
Mission_group	1	Solar Orbiter
MODS	1	Initial Release 6/18/2020.
OBS_ID		
PI_affiliation	1	SWRI
PI_name	1	S. Livi
Project	1	SOLO>Solar Orbiter
Rules_of_use	1	Confidential, for use only within HIS team. Not for publication.
Software_version	1	00.00.00
SOOP_NAME		
SOOP_TYPE		
Source_name	1	SOLO>Solar Orbiter
spase_DatasetResourceID		
TARGET_CLASS	1	Sun
TARGET_NAME	1	Interplanetary_medium
TARGET_REGION	1	Solar Wind
TEXT	1	Rate data for HIS instrument
	2	Counts of unclassified ion event words on the HIS detectors (start MCP, stop MCP, SSD) as a function of E/q, integrated over incident angles, TOF and Energy. Includes full counts of events subject to decimation. Rates also include two coincidence rates, the number of events with a valid TOF and energy (triple coincidence), and a count of those with only a valid TOF (double coincidence). These rates are primarily used to evaluate the performance of the instrument, rather than for science. In particular, they can be used for calculation of ion detection efficiency in-flight [von Steiger et al., 2000]. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints.
	3	Level 1 data are unvalidated and requires substantial processing to use for publication.
TIME_MAX	1	
TIME_MIN	1	
Time_resolution	1	4 sec, 30 sec, or 300 sec

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF_TIME_TT2000	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Default time			



FIELDNAM	CDF_CHAR	EPOCH
FILLVAL	CDF_TIME_TT2000	9999-12-31T23:59:59.999999999
LABLAXIS	CDF_CHAR	EPOCH
MONOTON	CDF_CHAR	INCREASE
REFERENCE_POSITION	CDF_CHAR	Rotating Earth Geoid
SCALETYP	CDF_CHAR	linear
TIME_BASE	CDF_CHAR	J2000
TIME_SCALE	CDF_CHAR	Terrestrial Time
UNITS	CDF_CHAR	ns
VALIDMAX	CDF_TIME_TT2000	2049-12-31T23:59:59.999000000
VALIDMIN	CDF_TIME_TT2000	1990-01-01T00:00:00.000000000
VAR_NOTES	CDF_CHAR	Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_REAL8	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SCET			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SCET			
FILLVAL	CDF_REAL8	-1.00E+31			
FORMAT	CDF_CHAR	E12.2			
LABLAXIS	CDF_CHAR	SCET			
SCALEMAX	CDF_REAL8	8.00E+12			
SCALEMIN	CDF_REAL8	5.00E+12			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	milliseconds			
VALIDMAX	CDF_REAL8	1.00E+14			
VALIDMIN	CDF_REAL8	0			
VAR_NOTES	CDF_CHAR	Mission elapsed time in spacecraft clock ticks. Note: These are effected by environmental conditions and do not match Earth-based seconds. Beginning of accumulation.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
ACCUM_SECONDS	CDF_REAL8	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	ACCUM_SECONDS			

DEPEND_0	CDF_CHAR	EPOCH
FIELDNAM	CDF_CHAR	ACCUM_SECONDS
FILLVAL	CDF_REAL8	-1.00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	ACCUM_SECONDS
SCALEMAX	CDF_REAL8	0.3
SCALEMIN	CDF_REAL8	0.003
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	seconds
VALIDMAX	CDF_REAL8	0.3
VALIDMIN	CDF_REAL8	0.003
VAR_NOTES	CDF_CHAR	Accumulation time in seconds for each E/q and elevation step
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	QUALITY_FLAG			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	QUALITY_FLAG			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	QUALITY_FLAG			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	0=good, 1=caution, 2=bad			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_BITMASK	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	QUALITY_BITMASK			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	QUALITY_BITMASK			

FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	QUALITY_BITMASK
SCALEMAX	CDF_INT2	32
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	31
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Not yet fully implemented. 0:No Issue, 1:Proton Avoidance Triggered, 2:No PHAs Telemetered in Range (range 6/7 prior to August 2020), 4:Elevation Step(s) not represented, 8:Saturation of Input Buffer, 16: Buffer Over Ran.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
MODE	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Mode. 0: Normal Science, 1: Burst 1, 2: Burst 2, 3: Low Cadence.			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	MODE			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	MODE			
SCALEMAX	CDF_INT2	5			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	3			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Normal: Full E/q range in nominal 30 sec scan, Burst1: E/q range optimized for slower solar wind in nominal 4 sec scan, Burst2: E/q range optimized for faster solar wind in nominal 4 sec scan, Low Cadence: Full E/q range in nominal 300 sec scan.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
COMPRESSION_CODE	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Compression Code Bitmask			
DEPEND_0	CDF_CHAR	EPOCH			



FIELDNAM	CDF_CHAR	COMPRESSION_CODE
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	COMPRESSION_CODE
SCALEMAX	CDF_INT2	2100
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2047
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Compression code bitmask. 0 = Lossy A, 1 = Lossy C. Bits: 0:SSD, 1:Priorities, 2:Starts, 3:Stops, 4:Double Coincidence, 5:Triple Coincidence, 6:Low TOF, 7:Alpha Decimation, 8:Proton Decimation, 9:Position A Singles, 10:Position B Singles.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
STEP_TABLE	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Step table			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	STEP_TABLE			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	STEP_TABLE			
SCALEMAX	CDF_INT2	18			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	15			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Science Configuration Packet's HV Sweep Scan Control Table Identification Number			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
MAIN_ENABLES	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Main enables			

DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	MAIN_ENABLES
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	MAIN_ENABLES
SCALEMAX	CDF_INT2	1100
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	1023
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Bitmask for enabled rates. 1 = Enabled, Bit1 = Least Significant Bit. Bit 1: SSD Rate, 2: Priority, 3: Start, 4: Stop, 5: Double Coincidence, 6: Triple Coincidence, 7: Low TOF Decimation, 8: Alpha Decimation, 9: Proton Decimation, 10: Position A, 11: Position B.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SSD_ENABLES	CDF_UINT4	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD enables			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	SSD_ENABLES			
FILLVAL	CDF_UINT4	4294967295			
FORMAT	CDF_CHAR	I5			
LABLAXIS	CDF_CHAR	SSD_ENABLES			
SCALEMAX	CDF_UINT4	1E10			
SCALEMIN	CDF_UINT4	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT4	2147483647			
VALIDMIN	CDF_UINT4	0			
VAR_NOTES	CDF_CHAR	Bitmask for enabled SSD rates. 1 = Enabled, Bit1 = Least Significant Bit.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY



PRIORITY_ENABLES	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority enables			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PRIORITY_ENABLES			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PRIORITY_ENABLES			
SCALEMAX	CDF_INT2	260			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	255			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Bitmask for enabled Priority rates. 1 = Enabled, Bit1 = Least Significant Bit.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
START_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Start dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	START_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	START_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Start Rate			
VAR_TYPE	CDF_CHAR	support_data			



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
STOP_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Stop dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	STOP_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	STOP_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Stop Rate			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
DC_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Double coincidence dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	DC_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	DC_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Double Coincidence Rate			
VAR_TYPE	CDF_CHAR	support_data			



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
TC_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Triple coincidence dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	TC_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	TC_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Triple Coincidence Rate			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
LOW_TOF_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Low TOF dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	LOW_TOF_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	LOW_TOF_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Low TOF Rate			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PROTON_DEC_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Proton decimation dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PROTON_DEC_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PROTON_DEC_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Proton Decimation Rate			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
ALPHA_DEC_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Alpha decimation dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	ALPHA_DEC_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	ALPHA_DEC_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Alpha Decimation Rate			



VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
POS_A_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Position A dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	POS_A_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	POS_A_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Position A Rate			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
POS_B_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Position B dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	POS_B_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	POS_B_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			



VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Position B Rate
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SSD_DIMENSIONS	CDF_INT2	1	3	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	SSD_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SSD_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of SSDs and Number of E/q Steps and Number of Elevation Steps			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_DIMENSIONS	CDF_INT2	1	3	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PRIORITY_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PRIORITY_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			

VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Number of Priority Ranges and Number of E/q Steps and Number of Elevation Steps
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
START_RATE	CDF_INT4	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Start rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	START_RATE			
FILLVAL	CDF_INT4	-2147483648			
FORMAT	CDF_CHAR	I12			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_INT4	1E9			
SCALEMIN	CDF_INT4	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Counts			
VALIDMAX	CDF_INT4	80000000			
VALIDMIN	CDF_INT4	0			
VAR_NOTES	CDF_CHAR	Number of counts on Start MCP detector. Dimensions are maximum possible sizes. Consult START_DIMENSIONS for actual sizes in data.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
STOP_RATE	CDF_INT4	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Stop rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ_STEP			
DEPEND_2	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	STOP_RATE			
FILLVAL	CDF_INT4	-2147483648			
FORMAT	CDF_CHAR	I12			

LABL_PTR_1	CDF_CHAR	EOQ_LABELS
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS
SCALEMAX	CDF_INT4	1E9
SCALEMIN	CDF_INT4	0
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	Counts
VALIDMAX	CDF_INT4	80000000
VALIDMIN	CDF_INT4	0
VAR_NOTES	CDF_CHAR	Number of counts on Stop MCP detector. Dimensions are maximum possible sizes. Consult STOP_DIMENSIONS for actual sizes in data. When only one elevation step, DEPEND_2 should be ELEVATION_SUMMED.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
DC_RATE	CDF_INT4	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Double coincidence rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	DC_RATE			
FILLVAL	CDF_INT4	-2147483648			
FORMAT	CDF_CHAR	I12			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_INT4	1E9			
SCALEMIN	CDF_INT4	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Counts			
VALIDMAX	CDF_INT4	80000000			
VALIDMIN	CDF_INT4	0			
VAR_NOTES	CDF_CHAR	Number of double coincidence events that have a start signal with a corresponding stop signal. Dimensions are maximum possible sizes. Consult DC_DIMENSIONS for actual sizes in data.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
TC_RATE	CDF_INT4	2	64 16	T	T T



Attribute Name	Data Type	Value
CATDESC	CDF_CHAR	Triple coincidence rate
DEPEND_0	CDF_CHAR	EPOCH
DEPEND_1	CDF_CHAR	EOQ
DEPEND_2	CDF_CHAR	ELEVATION
DISPLAY_TYPE	CDF_CHAR	spectrogram
FIELDNAM	CDF_CHAR	TC_RATE
FILLVAL	CDF_INT4	-2147483648
FORMAT	CDF_CHAR	I12
LABL_PTR_1	CDF_CHAR	EOQ_LABELS
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS
SCALEMAX	CDF_INT4	1E9
SCALEMIN	CDF_INT4	0
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	Counts
VALIDMAX	CDF_INT4	80000000
VALIDMIN	CDF_INT4	0
VAR_NOTES	CDF_CHAR	Number of triple coincidence events that have a start signal with a corresponding stop and energy signals. Dimensions are maximum possible sizes. Consult TC_DIMENSIONS for actual sizes in data.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
LOW_TOF_RATE	CDF_INT4	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Low TOF rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION_SUMMED			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	LOW_TOF_RATE			
FILLVAL	CDF_INT4	-2147483648			
FORMAT	CDF_CHAR	I12			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_SUMMED_LABELS			
SCALEMAX	CDF_INT4	1E9			
SCALEMIN	CDF_INT4	0			
SCALETYP	CDF_CHAR	linear			



UNITS	CDF_CHAR	Counts
VALIDMAX	CDF_INT4	80000000
VALIDMIN	CDF_INT4	0
VAR_NOTES	CDF_CHAR	Number of double coincidence events below low TOF threshold. Dimensions are maximum possible sizes. Consult LOW_TOF_DIMENSIONS for actual sizes in data.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PROTON_DEC_RATE	CDF_INT4	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Proton decimation rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION_SUMMED			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	PROTON_DEC_RATE			
FILLVAL	CDF_INT4	-2147483648			
FORMAT	CDF_CHAR	I12			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_SUMMED_LABELS			
SCALEMAX	CDF_INT4	1E9			
SCALEMIN	CDF_INT4	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Counts			
VALIDMAX	CDF_INT4	80000000			
VALIDMIN	CDF_INT4	0			
VAR_NOTES	CDF_CHAR	Number of double coincidence events within proton TOF range. Dimensions are maximum possible sizes. Consult PROTON_DEC_DIMENSIONS for actual sizes in data.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ALPHA_DEC_RATE	CDF_INT4	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Alpha decimation rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION_SUMMED			
DISPLAY_TYPE	CDF_CHAR	spectrogram			

FIELDNAM	CDF_CHAR	ALPHA_DEC_RATE
FILLVAL	CDF_INT4	-2147483648
FORMAT	CDF_CHAR	I12
LABL_PTR_1	CDF_CHAR	EOQ_LABELS
LABL_PTR_2	CDF_CHAR	ELEVATION_SUMMED_LABELS
SCALEMAX	CDF_INT4	1E9
SCALEMIN	CDF_INT4	0
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	Counts
VALIDMAX	CDF_INT4	80000000
VALIDMIN	CDF_INT4	0
VAR_NOTES	CDF_CHAR	Number of double coincidence events within alpha TOF range. Dimensions are maximum possible sizes. Consult ALPHA_DEC_DIMENSIONS for actual sizes in data.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
POS_A_RATE	CDF_INT4	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Position A rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	POS_A_RATE			
FILLVAL	CDF_INT4	-2147483648			
FORMAT	CDF_CHAR	I12			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_INT4	1E9			
SCALEMIN	CDF_INT4	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Counts			
VALIDMAX	CDF_INT4	80000000			
VALIDMIN	CDF_INT4	0			
VAR_NOTES	CDF_CHAR	Number of counts on Position A detector. Dimensions are maximum possible sizes. Consult POS_A_DIMENSIONS for actual sizes in data.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
POS_B_RATE	CDF_INT4	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Position B rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	POS_B_RATE			
FILLVAL	CDF_INT4	-2147483648			
FORMAT	CDF_CHAR	I12			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_INT4	1E9			
SCALEMIN	CDF_INT4	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Counts			
VALIDMAX	CDF_INT4	80000000			
VALIDMIN	CDF_INT4	0			
VAR_NOTES	CDF_CHAR	Number of counts on Position B detector. Dimensions are maximum possible sizes. Consult POS_B_DIMENSIONS for actual sizes in data.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SSD_RATE	CDF_INT4	3	32 64 16	T	T T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	SSD			
DEPEND_2	CDF_CHAR	EOQ			
DEPEND_3	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	SSD_RATE			
FILLVAL	CDF_INT4	-2147483648			
FORMAT	CDF_CHAR	I12			
LABL_PTR_1	CDF_CHAR	SSD_LABELS			
LABL_PTR_2	CDF_CHAR	EOQ_LABELS			
LABL_PTR_3	CDF_CHAR	ELEVATION_LABELS			

SCALEMAX	CDF_INT4	1E9
SCALEMIN	CDF_INT4	0
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	Counts
VALIDMAX	CDF_INT4	80000000
VALIDMIN	CDF_INT4	0
VAR_NOTES	CDF_CHAR	Number of counts on each solid state detector. Dimensions are maximum possible sizes. Consult SSD_DIMENSIONS for actual sizes in data. SSDs 30 and 31 were not populated with physical detectors. In contrast, SSD 29 was disabled in software and will likely remain so. Any signals in these elements are due to electronic noise and not from real particles. When only one elevation step, DEPEND_2 should be ELEVATION_SUMMED.
VAR_TYPE	CDF_CHAR	data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_RATE	CDF_INT4	3	8 64 16	T	T T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	PRIORITY			
DEPEND_2	CDF_CHAR	EOQ			
DEPEND_3	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	PRIORITY_RATE			
FILLVAL	CDF_INT4	-2147483648			
FORMAT	CDF_CHAR	I12			
LABL_PTR_1	CDF_CHAR	PRIORITY_LABELS			
LABL_PTR_2	CDF_CHAR	EOQ_LABELS			
LABL_PTR_3	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_INT4	1E9			
SCALEMIN	CDF_INT4	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Counts			
VALIDMAX	CDF_INT4	80000000			
VALIDMIN	CDF_INT4	0			
VAR_NOTES	CDF_CHAR	Number of events in each priority range. 0: double coincidence PHAs (pickup ions), 1: Fe, 2: Mg, Si, S, 3: CNO (except O6+), 4: O6+, 5: Alphas, 6: Protons, 7: Error (low or unrealistically long			



		TOFs). Dimensions are maximum possible sizes. Consult PRIORITY_DIMENSIONS for actual sizes in data.
VAR_TYPE	CDF_CHAR	data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EOQ	CDF_FLOAT	1	64	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	E/q step			
FIELDNAM	CDF_CHAR	EOQ			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	EOQ			
SCALEMAX	CDF_FLOAT	80			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	log			
UNITS	CDF_CHAR	keV/e			
VALIDMAX	CDF_FLOAT	80			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	E/q steps spanning the range 0.50 to 75.1 keV/e. Value is midpoint of step. Lower bound is EOQ value minus EOQ_DELTA, and upper bound is EOQ value plus EOQ_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
EOQ_LABELS	CDF_CHAR	10	1	64	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	E/q Labels				
FIELDNAM	CDF_CHAR	EOQ_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EOQ_DELTA	CDF_FLOAT	1	64	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	E/q step delta			
FIELDNAM	CDF_CHAR	EOQ			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	EOQ			



SCALEMAX	CDF_FLOAT	80
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	log
UNITS	CDF_CHAR	keV/e
VALIDMAX	CDF_FLOAT	80
VALIDMIN	CDF_FLOAT	0
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in EOQ variable. Lower bound is EOQ value minus EOQ_DELTA, and upper bound is EOQ value plus EOQ_DELTA.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
EOQ_DELTA_LABELS	CDF_CHAR	10	1	64	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	E/q Delta Labels				
FIELDNAM	CDF_CHAR	EOQ_DELTA_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ELEVATION	CDF_FLOAT	1	16	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Elevation step			
FIELDNAM	CDF_CHAR	ELEVATION			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	ELEVATION			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	-25			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Degrees			
VALIDMAX	CDF_FLOAT	20			
VALIDMIN	CDF_FLOAT	-25			
VAR_NOTES	CDF_CHAR	The elevation range is nominally -20 to +16 deg, with +/-3 degree uncertainty. These values are subject to change after in-flight calibration. Value is the midpoint of the elevation bin. Lower bound is ELEVATION value minus ELEVATION_DELTA, and upper bound is ELEVATION value plus ELEVATION_DELTA.			



VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_LABELS	CDF_CHAR	10	1	16	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Elevation Labels				
FIELDNAM	CDF_CHAR	ELEVATION_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_DELTA	CDF_FLOAT	1	16	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Elevation step delta			
FIELDNAM	CDF_CHAR	ELEVATION_DELTA			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	ELEVATION_DELTA			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	-25			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Degrees			
VALIDMAX	CDF_FLOAT	20			
VALIDMIN	CDF_FLOAT	-25			
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in ELEVATION variable. Lower bound is ELEVATION value minus ELEVATION_DELTA, and upper bound is ELEVATION value plus ELEVATION_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_DELTA_LABELS	CDF_CHAR	10	1	16	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Elevation delta labels				
FIELDNAM	CDF_CHAR	ELEVATION_DELTA_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY



ELEVATION_SUMMED	CDF_FLOAT	1	16	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Elevation step when summed to one bin			
FIELDNAM	CDF_CHAR	ELEVATION_SUMMED			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	ELEVATION			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	-25			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Degrees			
VALIDMAX	CDF_FLOAT	20			
VALIDMIN	CDF_FLOAT	-25			
VAR_NOTES	CDF_CHAR	This variable is used when elevation is summed. The elevation range is nominally -20 to +16 deg, with +/-3 degree uncertainty. These values are subject to change after in-flight calibration. Value is the midpoint of the ELEVATION bin. Lower bound is ELEVATION value minus ELEVATION_DELTA, and upper bound is ELEVATION value plus ELEVATION_DELTA. Only the first element is used; all others are fill.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_SUMMED_LABELS	CDF_CHAR	10	1	16	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Elevation labels when summed to one bin				
FIELDNAM	CDF_CHAR	ELEVATION_SUMMED_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_SUMMED_DELTA	CDF_FLOAT	1	16	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Delta for elevation step when summed to one bin			
FIELDNAM	CDF_CHAR	ELEVATION_SUMMED_DELTA			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	ELEVATION_SUMMED_DELTA			
SCALEMAX	CDF_FLOAT	20			



SCALEMIN	CDF_FLOAT	-25
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	Degrees
VALIDMAX	CDF_FLOAT	20
VALIDMIN	CDF_FLOAT	-25
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in ELEVATION variable. Lower bound is ELEVATION value minus ELEVATION_DELTA, and upper bound is ELEVATION value plus ELEVATION_DELTA. Only the first element is used; all others are fill.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_SUMMED_DELTA_LABELS	CDF_CHAR	10	1	16	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Labels for elevation delta when summed to one bin				
FIELDNAM	CDF_CHAR	ELEVATION SUMMED DELTA LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SSD	CDF_FLOAT	1	32	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD			
FIELDNAM	CDF_CHAR	SSD			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	SSD			
SCALEMAX	CDF_FLOAT	70			
SCALEMIN	CDF_FLOAT	-40			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Degrees			
VALIDMAX	CDF_FLOAT	70			
VALIDMIN	CDF_FLOAT	-36			
VAR_NOTES	CDF_CHAR	The azimuth range is nominally -33 to +66 degrees, with +/- 3 degree uncertainty. These values are subject to change after in-flight calibration. Value is			



		the midpoint of the azimuth bin. Lower bound is SSD value minus SSD_DELTA, and upper bound is SSD value plus SSD_DELTA.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
SSD_LABELS	CDF_CHAR	10	1	32	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	SSD Labels				
FIELDNAM	CDF_CHAR	SSD_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SSD_DELTA	CDF_FLOAT	1	32	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD Delta			
FIELDNAM	CDF_CHAR	SSD_DELTA			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	SSD_DELTA			
SCALEMAX	CDF_FLOAT	35			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Degrees			
VALIDMAX	CDF_FLOAT	31			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in the SSD variable. Lower bound is SSD value minus SSD_DELTA, and upper bound is SSD value plus SSD_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
SSD_DELTA_LABELS	CDF_CHAR	10	1	32	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	SSD delta labels				
FIELDNAM	CDF_CHAR	SSD_DELTA_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				



Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PRIORITY	CDF_INT2	1	8	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority			
FIELDNAM	CDF_CHAR	PRIORITY			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PRIORITY			
SCALEMAX	CDF_INT2	9			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	7			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	0: double coincidence PHAs (pickup ions), 1: Fe, 2: Mg, Si, S, 3: O6+, 4: CNO (except O6+), 5: Alphas, 6: Protons, 7: Error (low or unrealistically long TOFs).			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_LABELS	CDF_CHAR	10	1	8	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Priority Labels				
FIELDNAM	CDF_CHAR	PRIORITY_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PRIORITY_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PRIORITY_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			

UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	127
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Version number of the priority boundaries. These define the 8 priorities, numbered 1-7, used to prioritize which PHAs are downlinked.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SPECIES_BOX_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Species Box Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SPECIES_BOX_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SPECIES_BOX_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	127			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Version number of the species boxes. These define 32 boxes in E/Q - TOF - E space which are set to the locations of counts for individual ion species.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SSD_THRESHOLD_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD Threshold Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SSD_THRESHOLD_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SSD_THRESHOLD_VERSION			
SCALEMAX	CDF_INT2	128			



SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	127
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Version number of the set of SSD thresholds (1 master and 30 trim) used to collect the data. These settings affect the sensitivity of HIS and the noise allowed into the onboard event processing through the SSD subsystem. Version numbers are given only to sets of values used for science data collection, not for testing.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PROD_CONF_TBL_NUM	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Product Configuration Table Number			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PROD_CONF_TBL_NUM			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	Prod Conf Tbl Num			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	127			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Product configuration table number used during data collection. This table sets the dimensions of rate products produced onboard.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PA_HVPS_SET_POINT	CDF_FOAT	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	PA HVPS set point			
DEPEND_0	CDF_CHAR	EPOCH			

FIELDNAM	CDF_CHAR	PA_HVPS_SET_POINT
FILLVAL	CDF_FLOAT	-1.0e+31
FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	PA_HVPS_SET_POINT
SCALEMAX	CDF_FLOAT	0
SCALEMIN	CDF_FLOAT	-32
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	kV
VALIDMAX	CDF_FLOAT	0
VALIDMIN	CDF_FLOAT	-31
VAR_NOTES	CDF_CHAR	This is the voltage setting for the PA HVPS, e.g. -10 kV, -25 kV. Note: It is not the reading of the on-board voltage monitor for this supply. Valid [0, -30 kV].
VAR_TYPE	CDF_CHAR	support_data

4.1.2.3.2 HIS L1 PHA Data

Filename: solo_L1_swa-his-pha_yyyymmdd_V01.cdf

Global metadata

Name	Entry	Value
Acknowledgement	1	Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C.
Data_product	1	pha> Pulse Height Analysis data for HIS instrument
Data_type	1	pha_l1
Data_version	1	01
Descriptor	1	SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor
Discipline	1	Space Physics>Interplanetary Studies
File_naming_convention	1	"source_descriptor_datatype_yyyyMMdd
Generated_by	1	SO-HIS SOC, University of Michigan
Generation_date	1	20200611
HTTP_LINK		
Instrument_type	1	Particles (space)
LEVEL	1	1
LINK_TEXT		
LINK_TITLE		
Logical_file_id	1	solo_L1_swa-his-pha_00000000_v01
Logical_source	1	solo_L1_swa-his-pha
Logical_source_description	1	solo_L1_swa-his-pha
Mission_group	1	Solar Orbiter
MODS	1	Initial Release 6/18/2020.

OBS_ID		
PI_affiliation	1	SWRI
PI_name	1	S. Livi
Project	1	SOLO>Solar Orbiter
Rules_of_use	1	Confidential, for use only within HIS team. Not for publication.
Software_version	1	00.00.00
SOOP_NAME		
SOOP_TYPE		
Source_name	1	SOLO>Solar Orbiter
spase_DatasetResourceID		
TARGET_CLASS	1	Sun
TARGET_NAME	1	Interplanetary_medium
TARGET_REGION	1	Solar Wind
TEXT	1	Pulse Height Analysis data for HIS instrument
	2	Ion Event (PHA) words. Individual ion event data, containing full information on incident angles (elevation and azimuth), E/q, TOF and SSD energy in digital units. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints."
	3	Level 1 data are unvalidated and requires substantial processing to use for publication.
TIME_MAX	1	
TIME_MIN	1	
Time_resolution	1	4 sec, 30 sec, or 300 sec

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
EPOCH	CDF_TIME_TT2000	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Default time			
FIELDNAM	CDF_CHAR	EPOCH			
FILLVAL	CDF_TIME_TT2000	9999-12-31T23:59:59.999999999			
LABLAXIS	CDF_CHAR	EPOCH			
MONOTON	CDF_CHAR	INCREASE			
REFERENCE_POSITION	CDF_CHAR	Rotating Earth Geoid			
SCALETYP	CDF_CHAR	linear			
TIME_BASE	CDF_CHAR	J2000			
TIME_SCALE	CDF_CHAR	Terrestrial Time			
UNITS	CDF_CHAR	ns			
VALIDMIN	CDF_TIME_TT2000	1990-01-01T00:00:00.000000000			
VALIDMAX	CDF_TIME_TT2000	2049-12-31T23:59:59.999000000			
VAR_NOTES	CDF_CHAR	Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval.			
VAR_TYPE	CDF_CHAR	support_data			



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_REAL8	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SCET			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SCET			
FILLVAL	CDF_REAL8	-1.00E+31			
FORMAT	CDF_CHAR	E12.2			
LABLAXIS	CDF_CHAR	SCET			
SCALEMAX	CDF_REAL8	8.00E+12			
SCALEMIN	CDF_REAL8	5.00E+12			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	milliseconds			
VALIDMAX	CDF_REAL8	1.00E+14			
VALIDMIN	CDF_REAL8	0			
VAR_NOTES	CDF_CHAR	Mission elapsed time in spacecraft clock ticks. Note: These are effected by environmental conditions and do not match Earth-based seconds. Beginning of accumulation.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
ACCUM_SECONDS	CDF_REAL8	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	ACCUM_SECONDS			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	ACCUM_SECONDS			
FILLVAL	CDF_REAL8	-1.00E+31			
FORMAT	CDF_CHAR	E12.2			
LABLAXIS	CDF_CHAR	ACCUM_SECONDS			
SCALEMAX	CDF_REAL8	0.3			
SCALEMIN	CDF_REAL8	0.003			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	seconds			
VALIDMAX	CDF_REAL8	0.3			
VALIDMIN	CDF_REAL8	0.003			
VAR_NOTES	CDF_CHAR	Accumulation time in seconds for each E/q and elevation step.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_INT2	1	0	T	



Attribute Name	Data Type	Value
CATDESC	CDF_CHAR	QUALITY_FLAG
DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	QUALITY_FLAG
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	QUALITY_FLAG
SCALEMAX	CDF_INT2	3
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	0=good, 1=caution, 2=bad
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_BITMASK	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	QUALITY_BITMASK			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	QUALITY_BITMASK			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	QUALITY_BITMASK			
SCALEMAX	CDF_INT2	1100			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	1023			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Not yet fully implemented. 0:No Issue, 1:Multi-SSD flag set, 2:No matching priority rate, 4:PHA outside priority rate range, 8:No matching count for PHA in priority range, 16:Bad Start MCP, 32:Uncalibrated TOF, 64:Priority Table Invalid, 128:Low Quality SSD Trim Calibration, 256:Peak on Edge of Priority Range, 512:Bad SSD Assignment.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
MODE	CDF_INT1	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Mode. 0: Normal Science, 1: Burst 1, 2: Burst 2, 3: Low Cadence.			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	MODE			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	MODE			
SCALEMAX	CDF_INT2	5			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	3			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Normal: Full E/q range in nominal 30 sec scan, Burst1: E/q range optimized for slower solar wind in nominal 4 sec scan, Burst2: E/q range optimized for faster solar wind in nominal 4 sec scan, Low Cadence: Full E/q range in nominal 300 sec scan.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
NUM_PHA	CDF_UINT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Number of PHA telemetered			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	NUM_PHA			
FILLVAL	CDF_UINT2	65535			
FORMAT	CDF_CHAR	I5			
LABLAXIS	CDF_CHAR	NUM_PHA			
SCALEMAX	CDF_UINT2	33000			
SCALEMIN	CDF_UINT2	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT2	32767			
VALIDMIN	CDF_UINT2	0			
VAR_NOTES	CDF_CHAR	Number of PHA telemetered in this scan			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PROTON_DECIMATION_LEVEL	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Proton Decimation Level			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PROTON_DECIMATION_LEVEL			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PROTON_DEC_LVL			
SCALEMAX	CDF_INT2	20			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	15			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Proton Decimation Level. One in 2^N protons are retained when decimation is enabled, where N is the proton decimation level.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ALPHA_DECIMATION_LEVEL	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Alpha Decimation Level			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	ALPHA_DECIMATION_LEVEL			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	ALPHA_DEC_LVL			
SCALEMAX	CDF_INT2	20			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	15			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Alpha Decimation Level. One in 2^N protons are retained when decimation is enabled, where N is the alpha decimation level.			



VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PHA_EOQ_STEP	CDF_INT1	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS E/q index of each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_EOQ_STEP			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_EOQ_STEP			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	63			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	E/q index corresponding to the E/q - elevation pair in the HV Step table			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PHA_AZIMUTH_BIN	CDF_INT2	1	0		T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS azimuth bin for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_AZIMUTH_BIN			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_AZIMUTH_BIN			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	63			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Azimuth bin derived from the Start MCP position			



VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_ELEVATION_BIN	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS elevation angle bin for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_ELEVATION_BIN			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_ELEVATION_BIN			
SCALEMAX	CDF_INT2	18			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	15			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Elevation angle bin corresponding to the E/q - elevation pair in the HV Step table			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_TOF_BIN	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS TOF bin for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_TOF_BIN			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_TOF_BIN			
SCALEMAX	CDF_INT2	512			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	511			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Time-Of-Flight bin			



VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_SSD_ENERGY_BIN	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS SSD energy bin for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_SSD_ENERGY_BIN			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_SSD_ENERGY_BIN			
SCALEMAX	CDF_INT2	512			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	511			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Solid State Detector Energy Bin. Represents total ion energy after post-acceleration.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_DETECTOR_ID	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS SSD ID			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_DETECTOR_ID			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_DETECTOR_ID			
SCALEMAX	CDF_INT2	32			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	31			
VALIDMIN	CDF_INT2	0			

VAR_NOTES	CDF_CHAR	ID of Solid State Detector on which ion was measured. Also contains azimuthal angle information, complementing that which is derived from the Start MCP.
VAR_TYPE	CDF_CHAR	data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_DECIMATION_CLASSIFICATION	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS decimation classification			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
SCALETYP	CDF_CHAR	linear			
FIELDNAM	CDF_CHAR	PHA_DECIMATION_CLASSIFICATION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_DECIMATION_CLASSIFICATION			
SCALEMAX	CDF_INT2	4			
SCALEMIN	CDF_INT2	-1			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	3			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Decimation range, if any, into which ion TOF is classified			
VAR_TYPE	CDF_CHAR	data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_PRIORITIZATION_RANGE	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS prioritization range			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_PRIORITIZATION_RANGE			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_PRIORITIZATION_RANGE			
SCALEMAX	CDF_INT2	8			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				



VALIDMAX	CDF_INT2	7
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	The prioritization range that the ion is classified into according to its E/q, SSD energy and TOF bins. 0: double coincidence PHAs (pickup ions), 1: Fe, 2: Mg, Si, S, 3: O6+, 4: CNO (except O6+), 5: Alphas, 6: Protons, 7: Error (low or unrealistically long TOFs).
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PHA_MULTI_SSD	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS multi-SSD flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_MULTI_SSD			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_MULTI_SSD			
SCALEMAX	CDF_INT2	2			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	1			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Indicates signal on multiple SSDs during ion measurement			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PRIORITY_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PRIORITY_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			



UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	127
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Version number of the priority boundaries. These define the 8 priorities, numbered 1-7, used to prioritize which PHAs are downlinked.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SPECIES_BOX_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Species Box Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SPECIES_BOX_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SPECIES_BOX_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	127			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Version number of the species boxes. These define 32 boxes in E/Q - TOF - E space which are set to the locations of counts for individual ion species.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SSD_THRESHOLD_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD Threshold Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SSD_THRESHOLD_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SSD_THRESHOLD_VERSION			
SCALEMAX	CDF_INT2	128			

SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	127
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Version number of the set of SSD thresholds (1 master and 30 trim) used to collect the data. These settings affect the sensitivity of HIS and the noise allowed into the onboard event processing through the SSD subsystem. Version numbers are given only to sets of values used for science data collection, not for testing.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
PA_HVPS_SET_POINT	CDF_FLOAT	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	PA HVPS set point			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PA_HVPS_SET_POINT			
FILLVAL	CDF_FLOAT	-1.0e+31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	PA_HVPS_SET_POINT			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	-32			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	kV			
VALIDMAX	CDF_FLOAT	0			
VALIDMIN	CDF_FLOAT	-31			
VAR_NOTES	CDF_CHAR	This is the voltage setting for the PA HVPS, e.g. -10 kV, -25 kV. Note: It is not the reading of the on-board voltage monitor for this supply. Valid [0, -30 kV].			
VAR_TYPE	CDF_CHAR	support_data			

4.1.2.3.3 HIS L1 VDF Data



Filename: solo_L1_swa-his-vdf_yyyymmdd_V01.cdf

Global metadata

Name	Entry	Value
Acknowledgement	1	Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C.
Data_product	1	vdf>VDF data for HIS instrument.
Data_type	1	vdf_l1
Data_version	1	01
Descriptor	1	SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor
Discipline	1	Space Physics>Interplanetary Studies
File_naming_convention	1	"source_descriptor_datatype_yyyyMMdd
Generated_by	1	SO-HIS SOC, University of Michigan
Generation_date	1	20200611
HTTP_LINK		
Instrument_type	1	Particles (space)
LEVEL	1	1
LINK_TEXT		
LINK_TITLE		
Logical_file_id	1	solo_L1_swa-his-vdf_00000000_v01
Logical_source	1	solo_L1_swa-his-vdf
Logical_source_description	1	solo_L1_swa-his-vdf
Mission_group	1	Solar Orbiter
MODS	1	Initial Release 6/18/2020.
OBS_ID		
PI_affiliation	1	SWRI
PI_name	1	S. Livi
Project	1	SOLO>Solar Orbiter
Rules_of_use	1	Confidential, for use only within HIS team. Not for publication.
Software_version	1	00.00.00
SOOP_NAME		
SOOP_TYPE		
Source_name	1	SOLO>Solar Orbiter
spase_DatasetResourceID		
TARGET_CLASS	1	Sun
TARGET_NAME	1	Interplanetary_medium
TARGET_REGION	1	Solar Wind
TEXT	1	VDF data for HIS instrument.
	2	Counts of ion event words for a set of ions subdivided by E/q, elevation and azimuth. Selection of ions to include He2+, C5+, O6+, and Fe10+. Additional ions and charge states may be produced according to science needs and as counting statistics allow. Since these counts are not subject to the effect of the priority sampling algorithm, they represent the best possible statistics. However, because species are separated simply by boxes and no peak overlap removal is performed (see below), the counts are not as accurately assigned to a given species as they would be if formed on the ground. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints.



	3	Level 1 data are unvalidated and requires substantial processing to use for publication.
TIME_MAX	1	
TIME_MIN	1	
Time_resolution	1	4 sec, 30 sec, or 300 sec

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF_TIME_TT2000	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Default time			
FIELDNAM	CDF_CHAR	EPOCH			
FILLVAL	CDF_TIME_TT2000	9999-12-31T23:59:59.999999999			
LABLAXIS	CDF_CHAR	EPOCH			
MONOTON	CDF_CHAR	INCREASE			
REFERENCE_POSITION	CDF_CHAR	Rotating Earth Geoid			
SCALETYP	CDF_CHAR	linear			
TIME_BASE	CDF_CHAR	J2000			
TIME_SCALE	CDF_CHAR	Terrestrial Time			
UNITS	CDF_CHAR	ns			
VALIDMIN	CDF_TIME_TT2000	1990-01-01T00:00:00.000000000			
VALIDMAX	CDF_TIME_TT2000	2049-12-31T23:59:59.999000000			
VAR_NOTES	CDF_CHAR	Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_REAL8	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SCET			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SCET			
FILLVAL	CDF_REAL8	-1.00E+31			
FORMAT	CDF_CHAR	E12.2			
LABLAXIS	CDF_CHAR	SCET			
SCALEMAX	CDF_REAL8	8.00E+12			
SCALEMIN	CDF_REAL8	5.00E+12			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	milliseconds			
VALIDMAX	CDF_REAL8	1.00E+14			



VALIDMIN	CDF_REAL8	0
VAR_NOTES	CDF_CHAR	Mission elapsed time in spacecraft clock ticks. Note: These are effected by environmental conditions and do not match Earth-based seconds. Beginning of accumulation.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
ACCUM_SECONDS	CDF_REAL8	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	ACCUM_SECONDS			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	ACCUM_SECONDS			
FILLVAL	CDF_REAL8	-1.00E+31			
FORMAT	CDF_CHAR	E12.2			
LABLAXIS	CDF_CHAR	ACCUM_SECONDS			
SCALEMAX	CDF_REAL8	0.3			
SCALEMIN	CDF_REAL8	0.003			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	seconds			
VALIDMAX	CDF_REAL8	0.3			
VALIDMIN	CDF_REAL8	0.003			
VAR_NOTES	CDF_CHAR	Accumulation time in seconds for each E/q and elevation step.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	QUALITY_FLAG			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	QUALITY_FLAG			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	QUALITY_FLAG			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			



VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	0=good, 1=caution, 2=bad
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_BITMASK	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	QUALITY_BITMASK			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	QUALITY_BITMASK			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	QUALITY_BITMASK			
SCALEMAX	CDF_INT2	32			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	31			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Not yet implemented.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
MODE	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Mode. 0: Normal Science, 1: Burst 1, 2: Burst 2, 3: Low Cadence.			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	MODE			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	MODE			
SCALEMAX	CDF_INT2	4			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	3			
VALIDMIN	CDF_INT2	0			



VAR_NOTES	CDF_CHAR	Normal: Full E/q range in nominal 30 sec scan, Burst1: E/q range optimized for slower solar wind in nominal 4 sec scan, Burst2: E/q range optimized for faster solar wind in nominal 4 sec scan, Low Cadence: Full E/q range in nominal 300 sec scan.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
VDF_ION_ID	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Ion ID			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	VDF_ION_ID			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	VDF_ION_ID			
SCALEMAX	CDF_INT2	32			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	31			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	This VDF was created out of ion event (PHA) words with this ID, which is the result of on-board classification from E/q, SSD energy and TOF bins. Selection of ions to include He2+ and O6+.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
VDF_DIMENSIONS	CDF_INT2	1	3	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	VDF dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	No_plot			
FIELDNAM	CDF_CHAR	VDF_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	VDF_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			



SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	64
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Size of each VDF dimension. Can change with data configuration.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
VDF_HISTOGRAM	CDF_UINT4	3	64 16 32	T	T T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Rate-based VDF Histogram			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION			
DEPEND_3	CDF_CHAR	AZIMUTH			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	VDF_HISTOGRAM			
FILLVAL	CDF_UINT4	4294967295			
FORMAT	CDF_CHAR	I12			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS			
LABL_PTR_3	CDF_CHAR	AZIMUTH_LABELS			
SCALEMAX	CDF_UINT4	80000000			
SCALEMIN	CDF_UINT4	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	counts per second			
VALIDMAX	CDF_UINT1	80000000			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Counts of ion event (PHA) words for a specific ion subdivided by E/q, elevation and azimuth. See ION_ID for details			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EOQ	CDF_FLOAT	1	64	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	E/q step			
FIELDNAM	CDF_CHAR	EOQ			
FILLVAL	CDF_FLOAT	-1E31			

FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	EOQ
SCALEMAX	CDF_FLOAT	80
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	log
UNITS	CDF_CHAR	keV/e
VALIDMAX	CDF_FLOAT	80
VALIDMIN	CDF_FLOAT	0
VAR_NOTES	CDF_CHAR	E/q steps spanning the range 0.50 to 75.1 keV/e. Value is midpoint of step. Lower bound is EOQ value minus EOQ_DELTA, and upper bound is EOQ value plus EOQ_DELTA.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
EOQ_LABELS	CDF_CHAR	5	1	64	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	E/q Labels				
FIELDNAM	CDF_CHAR	EOQ_LABELS				
FORMAT	CDF_CHAR	A5				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EOQ_DELTA	CDF_FLOAT	1	64	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	E/q step delta			
FIELDNAM	CDF_CHAR	EOQ			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	EOQ			
SCALEMAX	CDF_FLOAT	80			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	log			
UNITS	CDF_CHAR	keV/e			
VALIDMAX	CDF_FLOAT	80			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in EOQ variable. Lower bound is EOQ value minus EOQ_DELTA, and upper bound is EOQ value plus EOQ_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			



Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
EOQ_DELTA_LABELS	CDF_CHAR	5	1	64	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	E/q Delta Labels				
FIELDNAM	CDF_CHAR	EOQ_DELTA_LABELS				
FORMAT	CDF_CHAR	A5				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ELEVATION	CDF_FLOAT	1	16	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Elevation step			
FIELDNAM	CDF_CHAR	ELEVATION			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	ELEVATION			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	-25			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Degrees			
VALIDMAX	CDF_FLOAT	20			
VALIDMIN	CDF_FLOAT	-25			
VAR_NOTES	CDF_CHAR	The elevation range is nominally -20 to +16 deg, with +/-3 degree uncertainty. These values are subject to change after in-flight calibration. Value is the midpoint of the elevation bin. Lower bound is ELEVATION value minus ELEVATION_DELTA, and upper bound is ELEVATION value plus ELEVATION_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_LABELS	CDF_CHAR	6	1	16	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Elevation Labels				
FIELDNAM	CDF_CHAR	ELEVATION_LABELS				
FORMAT	CDF_CHAR	A6				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY

ELEVATION_DELTA	CDF_FLOAT	1	16	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Elevation step delta			
FIELDNAM	CDF_CHAR	ELEVATION_DELTA			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	ELEVATION_DELTA			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	-25			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Degrees			
VALIDMAX	CDF_FLOAT	20			
VALIDMIN	CDF_FLOAT	-25			
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in ELEVATION variable. Lower bound is ELEVATION value minus ELEVATION_DELTA, and upper bound is ELEVATION value plus ELEVATION_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
AZIMUTH	CDF_INT2	1	32	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Azimuth			
FIELDNAM	CDF_CHAR	AZIMUTH			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	6			
LABLAXIS	CDF_CHAR	AZIMUTH			
SCALEMAX	CDF_INT2	33			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	31			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Azimuth bin. Can be derived from either Start MCP position or SSD ID.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY



AZIMUTH_LABELS	CDF_CHAR	3	1	32	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Azimuth Labels				
FIELDNAM	CDF_CHAR	AZIMUTH_LABELS				
FORMAT	CDF_CHAR	A3				
VAR_TYPE	CDF_CHAR	meta_data				

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PRIORITY_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PRIORITY_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	127			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Version number of the priority boundaries. These define the 8 priorities, numbered 1-7, used to prioritize which PHAs are downlinked.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SPECIES_BOX_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Species Box Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SPECIES_BOX_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SPECIES_BOX_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				



VALIDMAX	CDF_INT2	127
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Version number of the species boxes. These define 32 boxes in E/Q - TOF - E space which are set to the locations of counts for individual ion species.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SSD_THRESHOLD_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD Threshold Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SSD_THRESHOLD_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SSD_THRESHOLD_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	127			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Version number of the set of SSD thresholds (1 master and 30 trim) used to collect the data. These settings affect the sensitivity of HIS and the noise allowed into the onboard event processing through the SSD subsystem. Version numbers are given only to sets of values used for science data collection, not for testing.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PA_HVPS_SET_POINT	CDF_FLOAT	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	PA HVPS set point			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PA_HVPS_SET_POINT			
FILLVAL	CDF_FLOAT	-1.0e+31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	PA_HVPS_SET_POINT			

SCALEMAX	CDF_FLOAT	0
SCALEMIN	CDF_FLOAT	-32
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	kV
VALIDMAX	CDF_FLOAT	0
VALIDMIN	CDF_FLOAT	-31
VAR_NOTES	CDF_CHAR	This is the voltage setting for the PA HVPS, e.g. -10 kV, -25 kV. Note: It is not the reading of the on-board voltage monitor for this supply. Valid [0, -30 kV].
VAR_TYPE	CDF_CHAR	support_data

4.1.2.3.4 HIS L1 Housekeeping Data

Filename: solo_L1_swa-his-hk_yyyymmdd_V01.cdf

Global metadata

Name	Entry	Value
Acknowledgement	1	Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C.
Data_product	1	hk>HK data for HIS instrument
Data_type	1	hk_l1
Data_version	1	01
Descriptor	1	SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor
Discipline	1	Space Physics>Interplanetary Studies
File_naming_convention	1	"source_descriptor_datatype_yyyyMMdd
Generated_by	1	SO-HIS SOC, University of Michigan
Generation_date	1	20200611
HTTP_LINK		
Instrument_type	1	Particles (space)
LEVEL	1	1
LINK_TEXT		
LINK_TITLE		
Logical_file_id	1	solo_L1_swa-his-hk_00000000_v01
Logical_source	1	solo_L1_swa-his-hk
Logical_source_description	1	solo_L1_swa-his-hk
Mission_group	1	Solar Orbiter
MODS	1	Initial Release 6/18/2020.
OBS_ID		
PI_affiliation	1	SWRI
PI_name	1	S. Livi
Project	1	SOLO>Solar Orbiter

Rules_of_use	1	Confidential, for use only within HIS team. Not for publication.
Software_version	1	00.00.00
SOOP_NAME		
SOOP_TYPE		
Source_name	1	SOLO>Solar Orbiter
spase_DatasetResourceID		
TARGET_CLASS	1	Sun
TARGET_NAME	1	Interplanetary_medium
TARGET_REGION	1	Solar Wind
TEXT	1	Housekeeping data for HIS instrument.
	2	Level 1 data are unvalidated and requires substantial processing to use for publication.
TIME_MAX	1	
TIME_MIN	1	
Time_resolution	1	Variable. Usually 1 sec, 30 sec, or 60 sec.

All the variables in the HK CDF have the following attributes:

Attribute Name	Data Type	Value
DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	Time_series
UNITS	CDF_CHAR	
SCALEMAX	Varies (see below)	Matches VALIDMAX (see below)
SCALEMIN	Varies (see below)	0
VALIDMIN	Varies (see below)	0

The following table three tables summarize all the variables in the HK CDF. The first table lists all the variables with their data types, dimensions, and validmax. The second table defines the dimensions for those variables which are not scalars. The third table gives the VAR_NOTES for all the variables that have them, which is most.

	Variable_Name	Data_type	DIMS	SIZES	VALIDMAX
1	AC_LINK_EN	CDF_UINT1			1
2	AC_LINK_ERR	CDF_UINT1			1
3	ALPHA_DEC1 DECR_THRESH_REG	CDF_INT4			65535
4	ALPHA_DEC1 INCR_REG	CDF_UINT1			15
5	ALPHA_DEC1 INCR_THRESH_REG	CDF_INT4			65535
6	ALPHA_DEC1 LEVEL_REG	CDF_UINT1			15
7	ALPHA_MAX_VAL_REG	CDF_UINT2			1023
8	ALPHA_MIN_VAL_REG	CDF_UINT2			1023
9	ANODE_STIM_DELAY	CDF_UINT1			31
10	ANODE_STIM_ON	CDF_UINT1			1
11	ANODE_STIM_RATE	CDF_UINT1			7
12	ASIC_ADC_WAIT	CDF_UINT1			15
13	ASIC_CONF_REG	CDF_INT8	1	8	4294967295
14	ASIC_CS_MON	CDF_UINT1			1
15	ASIC_OUT_OF_SYSTEM_EN	CDF_UINT1			1
16	ASIC_PARITY	CDF_UINT1			1
17	ASIC_REG_SWITCH	CDF_UINT1			1
18	ASIC_RESET	CDF_UINT1			1
19	ASIC_STIM_DELAY	CDF_UINT1			31

20	ASIC_STIM_ON	CDF_UINT1			1
21	ASIC_STIM_RATE	CDF_UINT1			7
22	ASIC_TP_RATE	CDF_UINT1			7
23	ASIC_WRITE_REG	CDF_UINT1			1
24	BOARD_ID	CDF_UINT1			1
25	CCSDS_REJ_MESSAGE_CNT	CDF_UINT1			15
26	CDH_BOARD_TEMP	CDF_INT4	1	3	4095
27	CDH_CPU_TEMP	CDF_INT4	1	3	4095
28	CDH_GROUND	CDF_INT4	1	3	4095
29	CDH_OPTO_LINK_RX_EN	CDF_UINT1			1
30	CDH_OPTO_LINK_RX_RATE	CDF_UINT1			3
31	CDH_OPTO_LINK_STAT_A	CDF_UINT1			1
32	CDH_OPTO_LINK_STAT_B	CDF_UINT1			1
33	CDH_OPTO_LINK_TX_POWER	CDF_UINT1			7
34	CDH_OPTO_LINK_TX_RATE	CDF_UINT1			3
35	CDH_OPTO_RX_CLOCK_SYNC_ERR_CNT	CDF_INT4			65535
36	CDH_OPTO_RX_CRC_ERR_CNT	CDF_INT4			65535
37	CDH_OPTO_RX_HDR_ERR_CNT	CDF_INT4			65535
38	CDH_OPTO_RX_SIDE	CDF_UINT1			1
39	CDH_P1_5V	CDF_INT4	1	3	4095
40	CDH_P1_8V	CDF_INT4	1	3	4095
41	CDH_P3_3V_ADC_V	CDF_INT4	1	3	4095
42	CDH_P5V_DAC_V	CDF_INT4	1	3	4095
43	CDH_SWEEP_DAC_EN_LATCHED	CDF_UINT1			15
44	CDH_SWEEP_STATE	CDF_UINT1			7
45	CDH_WDOG_EN	CDF_UINT1			1
46	CDH_WDOG_STATUS	CDF_UINT1			1
47	CHECKSUM	CDF_INT4			65535
48	CMD_ACC_CNT	CDF_INT2			255
49	CMD_ACC_LAST_SERVICE	CDF_INT2			255
50	CMD_ACC_LAST_SUBSERVICE	CDF_INT2			255
51	CMD_ACC_SSC	CDF_UINT2			16383
52	CMD_POL_BOT_DEF	CDF_UINT1			1
53	CMD_POL_TOP_DEF	CDF_UINT1			1
54	CMD_POL_TOP_PLATE	CDF_UINT1			1
55	CMD_REJ_CNT	CDF_UINT1			1
56	CMD_REJ_LAST_SERVICE	CDF_UINT1			1
57	CMD_REJ_LAST_SUBSERVICE	CDF_UINT1			1
58	CMD_REJ_SSC	CDF_UINT2			16383
59	CMD_RNG_ANALYZER	CDF_UINT1			1
60	CMD_RNG_BOT_DEF	CDF_UINT1			1
61	CMD_RNG_TOP_DEF	CDF_UINT1			1
62	CMD_RNG_TOP_PLATE	CDF_UINT1			1
63	CMD_VAL_ANALYZER	CDF_UINT2			4095
64	CMD_VAL_BOT_DEF	CDF_UINT2			4095
65	CMD_VAL_MAIN	CDF_UINT2			4095
66	CMD_VAL_OFFSET	CDF_UINT2			4095
67	CMD_VAL_PA	CDF_UINT2			4095
68	CMD_VAL_SSD	CDF_UINT2			4095
69	CMD_VAL_START_A	CDF_UINT2			4095
70	CMD_VAL_START_B	CDF_UINT2			4095
71	CMD_VAL_START_CFD	CDF_UINT2			4095
72	CMD_VAL_START_MCP	CDF_UINT2			4095

73	CMD_VAL_STOP_A	CDF_UINT2			4095
74	CMD_VAL_STOP_B	CDF_UINT2			4095
75	CMD_VAL_STOP_CFD	CDF_UINT2			4095
76	CMD_VAL_STOP_MCP	CDF_UINT2			4095
77	CMD_VAL_TOP_DEF	CDF_UINT2			4095
78	CMD_VAL_TOP_PLATE	CDF_UINT2			4095
79	COINC_TIMING_ASIC_SHAPE	CDF_INT2			255
80	COINC_TIMING_ASIC_WINDOW	CDF_INT2			255
81	COINC_TIMING_POS_TIMEOUT	CDF_INT2			255
82	COINC_TIMING_TOF_TIMEOUT	CDF_INT2			255
83	CONNECTION_TEST_CNT	CDF_UINT1			15
84	CPU_WDOG_EN	CDF_UINT1			1
85	CPU_WDOG_STATUS	CDF_UINT1			1
86	DSCB_ADC_EN	CDF_UINT1			1
87	DSCB_ADC_WAITS	CDF_INT4			65535
88	DSCB_ASIC_CONTROL_STATE_MACHINE	CDF_UINT1			3
89	DSCB_ASIC_FLAG	CDF_UINT1			1
90	DSCB_ASIC_V_MON	CDF_INT4	1	3	4095
91	DSCB_ASIC_READ_OUT_STATE_MACHINE	CDF_UINT1			3
92	DSCB_ASIC_TEMP	CDF_INT4	1	3	4095
93	DSCB_ASIC_WRITE_STATE_MACHINE	CDF_UINT1			3
94	DSCB_AZIMUTHAL_SEL	CDF_UINT1	1	3*	1
95	DSCB_CMD_NAKS	CDF_INT4			65535
96	DSCB_COINC	CDF_UINT1			3
97	DSCB_COMM_ACTIVE	CDF_UINT1			1
98	DSCB_DOUBLE_BIT_EDAC	CDF_INT4			65535
99	DSCB_DSCB_TEMP	CDF_INT4	1	3	65535
100	DSCB_DSIB_TEMP	CDF_INT4	1	3	65535
101	DSCB_FPGA_BASE	CDF_INT2			255
102	DSCB_FPGA_REV	CDF_INT2			255
103	DSCB_HK_RATE	CDF_UINT1			7
104	DSCB_HV_AUTO_RESET_EN	CDF_UINT1			1
105	DSCB_HV_EN	CDF_UINT1			1
106	DSCB_HV_LIMITED	CDF_UINT1			1
107	DSCB_HV_MON_EN	CDF_UINT1			1
108	DSCB_HVPS_TEMP	CDF_INT4	1	3	65535
109	DSCB_INIT_BIT	CDF_UINT1			1
110	DSCB_MCP_BIAS_EN	CDF_UINT1			1
111	DSCB_MCP_BIAS_I_LIMIT_EN	CDF_UINT1			1
112	DSCB_MCP_BIAS_I_TRIP	CDF_UINT1			1
113	DSCB_MCP_BIAS_V_LIMIT_EN	CDF_UINT1			1
114	DSCB_MCP_BIAS_V_TRIP	CDF_UINT1			1
115	DSCB_OFFSET_I_MON	CDF_INT4	1	3	4095
116	DSCB_OFFSET_V_MON	CDF_INT4	1	3	4095
117	DSCB_OPTO_RX_CLOCK_SYNC_ERR_CNT	CDF_INT4			65535
118	DSCB_OPTO_RX_CRC_ERR_CNT	CDF_INT4			65535
119	DSCB_OPTO_RX_DATA1_ERR_CNT	CDF_INT4			65535
120	DSCB_OPTO_RX_DATA2_ERR_CNT	CDF_INT4			65535
121	DSCB_OPTO_RX_HDR_ERR_CNT	CDF_INT4			65535
122	DSCB_P1_5V	CDF_INT4	1	3	4095
123	DSCB_P3_3V	CDF_INT4	1	3	4095

124	DSCB_P3_3V_ADC_REF	CDF_INT4	1	3	4095
125	DSCB_P5V_ADC_REF_MON	CDF_INT4	1	3	4095
126	DSCB_P5V_DAC_REF_MON	CDF_INT4	1	3	4095
127	DSCB_POS_START	CDF_UINT1			15
128	DSCB_POS_START_ADD_SUB	CDF_UINT1			1
129	DSCB_POS_START_SEL	CDF_UINT1			1
130	DSCB_POS_STOP	CDF_UINT1			15
131	DSCB_POS_STOP_ADD_SUB	CDF_UINT1			1
132	DSCB_POS_STOP_DUAL_SEL	CDF_UINT1			1
133	DSCB_POS_STOP_SEL	CDF_UINT1			1
134	DSCB_RATES_EN	CDF_UINT1			1
135	DSCB_INIT_REG	CDF_INT2			255
136	DSCB_RESET_DECI_LEVEL	CDF_UINT1			1
137	DSCB_RESET_FSW	CDF_UINT1			1
138	DSCB_RESET_POR	CDF_UINT1			1
139	DSCB_RESET_WDOG	CDF_UINT1			1
140	DSCB_SINGLE_BIT_EDAC	CDF_INT4			65535
141	DSCB_SSD_I_MON	CDF_INT4	1	3	4095
142	DSCB_SSD_TEMP	CDF_INT4	1	3	4095
143	DSCB_SSD_V_MON	CDF_INT4	1	3	4095
144	DSCB_START_MCP_I_MON	CDF_INT4	1	3	4095
145	DSCB_START_MCP_TEMP	CDF_INT4	1	3	4095
146	DSCB_START_MCP_V_MON	CDF_INT4	1	3	4095
147	DSCB_STARTUP_POWER	CDF_UINT1			7
148	DSCB_STARTUP_RX_A_EN	CDF_UINT1			1
149	DSCB_STARTUP_RX_B_EN	CDF_UINT1			1
150	DSCB_STARTUP_TX_A_EN	CDF_UINT1			1
151	DSCB_STARTUP_TX_B_EN	CDF_UINT1			1
152	DSCB_STOP_MCP_I_MON	CDF_INT4	1	3	4095
153	DSCB_STOP_MCP_TEMP	CDF_INT4	1	3	4095
154	DSCB_STOP_MCP_V_MON	CDF_INT4	1	3	4095
155	DSCB_SWEEP_OVER	CDF_UINT1			1
156	DSCB_SYSTEM_FSM	CDF_UINT1			7
157	DSCB_TOF_START	CDF_UINT1			15
158	DSCB_TOF_START_ADD_SUB	CDF_UINT1			1
159	DSCB_TOF_STOP	CDF_UINT1			15
160	DSCB_TOF_STOP_ADD_SUB	CDF_UINT1			1
161	DSCB_V_I_MON_REF	CDF_INT4	1	3	4095
162	DSCB_WDOG_CNT	CDF_INT2			255
163	DSCB_WDOG_ON	CDF_UINT1			1
164	EAIS_PORT_TEMP	CDF_INT4	1	3	4095
165	ENERGY_ASIC_ACQ_TP	CDF_UINT1			1
166	EVENT_ERR_CNT	CDF_INT2			255
167	FDIR_DSCB_AUTOMATIC_LIMIT	CDF_UINT1			1
168	FDIR_DSCB_COMM_LOSS	CDF_UINT1			1
169	FDIR_DSCB_DOWNLINK_UNDETERMINED	CDF_UINT1			1
170	FDIR_DSCB_NOT_RUNNING	CDF_UINT1			1
171	FDIR_DSCB_REG_INIT	CDF_UINT1			1
172	FDIR_EMERGENCY_FAST_SAFE	CDF_UINT1			1
173	FDIR_LEVEL	CDF_UINT1			15
174	FDIR_NOMINAL_SLOW_SAFE	CDF_UINT1			1
175	FDIR_RED_LIMIT	CDF_UINT1			1

176	FDIR_RESERVED	CDF_UINT1			1
177	FDIR_SCIENCE_AUTO_MODE_FAIL	CDF_UINT1			1
178	FDIR_SOLAR_ARRAY_STEERING_START	CDF_UINT1			1
179	FDIR_SOLAR_ARRAY_STEERING_STOP	CDF_UINT1			1
180	FDIR_TASK_TIMEOUT	CDF_UINT1			1
181	FDIR_THRUSTER_FIRING_START	CDF_UINT1			1
182	FDIR_THRUSTER_FIRING_STOP	CDF_UINT1			1
183	FDIR_YELLOW_LIMIT	CDF_UINT1			1
184	FPGA_STEP_TBL	CDF_UINT1			3
185	FPGA_STEP_TBL_DATA_ELEV_INDEX	CDF_UINT1			15
186	FPGA_STEP_TBL_E_Q_INDEX	CDF_UINT1			63
187	FPGA_STEP_TBL_ELEV_INDEX	CDF_UINT1			15
188	FPGA_SWEEP_TBL_ROW	CDF_UINT1			127
189	FPGA_SWEEP_TBL_SIDE	CDF_UINT1			1
190	FPGA_SWEEP_TBL_DATA_SIDE	CDF_UINT1			1
191	HK_EN	CDF_UINT1			1
192	HV_DISABLED	CDF_UINT1			1
193	HV_I_LIM_PERSISTENCE	CDF_INT2			255
194	HV_LIMITED	CDF_UINT1			1
195	HV_V_LIM_PERSISTENCE	CDF_INT2			255
196	HVPS_ANALYZER	CDF_UINT2	1	3	4095
197	HVPS_ANALYZER_POL	CDF_UINT1	1	3	1
198	HVPS_ANALYZER_RNG	CDF_UINT1	1	3	1
199	HVPS_BOT_DEF	CDF_UINT2	1	3	4095
200	HVPS_BOT_DEF_POL	CDF_UINT1	1	3	1
201	HVPS_BOT_DEF_RNG	CDF_UINT1	1	3	1
202	HVPS_HV_MAIN_N	CDF_UINT2	1	3	4095
203	HVPS_HV_MAIN_N_POL	CDF_UINT1	1	3	1
204	HVPS_HV_MAIN_N_RNG	CDF_UINT1	1	3	1
205	HVPS_HV_MAIN_P	CDF_UINT2	1	3	4095
206	HVPS_HV_MAIN_P_POL	CDF_UINT1	1	3	1
207	HVPS_HV_MAIN_P_RNG	CDF_UINT1	1	3	1
208	HVPS_N12V_I	CDF_INT4	1	3	4095
209	HVPS_P12V_I	CDF_INT4	1	3	4095
210	HVPS_TOP_DEF	CDF_UINT2	1	3	4095
211	HVPS_TOP_DEF_POL	CDF_UINT1	1	3	1
212	HVPS_TOP_DEF_RNG	CDF_UINT1	1	3	1
213	HVPS_TOP_PLATE	CDF_UINT2	1	3	4095
214	HVPS_TOP_PLATE_POL	CDF_UINT1	1	3	1
215	HVPS_TOP_PLATE_RNG	CDF_UINT1	1	3	1
216	INTEGRATION_TIME	CDF_UINT4			131071
217	INTER_INST_INFO_CNT	CDF_UINT2			1023
218	IRAP_HV_ON	CDF_UINT1			1
219	IRAP_HVPS_TEMP	CDF_INT4	1	3	4095
220	LAST_ERR_CODE	CDF_INT2			255
221	LAST_MACRO_ACC_CMD_CNT	CDF_UINT1			127
222	LAST_MACRO_ACC_SERVICE	CDF_INT2			255
223	LAST_MACRO_ACC_SUBSERVICE	CDF_INT2			255
224	LAST_MACRO_CALLER	CDF_UINT1			127
225	LAST_MACRO_CMD_CNT	CDF_UINT1			127
226	LAST_MACRO_I_WAIT	CDF_INT4			65535
227	LAST_MACRO_REJ_CMD_CNT	CDF_UINT1			127
228	LAST_MACRO_REJ_SERVICE	CDF_INT2			255

229	LAST_MACRO_REJ_SUBSERVICE	CDF_INT2			255
230	LAST_MACRO_SEL	CDF_UINT1			127
231	LAST_MACRO_TOTAL_CMDS	CDF_UINT1			127
232	LOW_TOF_CUT_OFF_REG	CDF_UINT2			1023
233	LVPS_12V_DC_DC_TEMP	CDF_INT4	1	3	4095
234	LVPS_5V_DC_DC_TEMP	CDF_INT4	1	3	4095
235	LVPS_AC_LINK_I	CDF_INT4	1	3	4095
236	LVPS_AC_LINK_TEMP	CDF_INT4	1	3	4095
237	LVPS_AC_LINK_V	CDF_INT4	1	3	4095
238	LVPS_N12V_OUTPUT_I	CDF_INT4	1	3	4095
239	LVPS_N12V_OUTPUT_V	CDF_INT4	1	3	4095
240	LVPS_N5V_OUTPUT_I	CDF_INT4	1	3	4095
241	LVPS_N5V_OUTPUT_V	CDF_INT4	1	3	4095
242	LVPS_P12V_OUTPUT_I	CDF_INT4	1	3	4095
243	LVPS_P12V_OUTPUT_V	CDF_INT4	1	3	4095
244	LVPS_P3_3V_DC_DC_TEMP	CDF_INT4	1	3	4095
245	LVPS_P3_3V_OUTPUT_I	CDF_INT4	1	3	4095
246	LVPS_P3_3V_OUTPUT_V	CDF_INT4	1	3	4095
247	LVPS_P5V_OUTPUT_I	CDF_INT4	1	3	4095
248	LVPS_P5V_OUTPUT_V	CDF_INT4	1	3	4095
249	MACRO_STATUS	CDF_UINT1	1	64	1
250	MASTER_SWEEP_EN	CDF_UINT1			3
251	MASTER_SWEEP_EN_STATUS	CDF_UINT1			3
252	MISSING_SPACEWIRE_TIME_CODE	CDF_UINT1			1
253	MODE_CHANGE_REASON	CDF_UINT1			3
254	MRAM_WR_EN	CDF_UINT1			1
255	OFFSET_EN	CDF_UINT1			1
256	OFFSET_I_EN_LIM	CDF_UINT1			1
257	OFFSET_I_TRIG	CDF_UINT1			1
258	OFFSET_V_EN_LIM	CDF_UINT1			1
259	OFFSET_V_TRIG	CDF_UINT1			1
260	OP_MODE	CDF_UINT1			9
261	OPTO_RX_A_EN	CDF_UINT1			1
262	OPTO_RX_A_EN_INIT	CDF_UINT1			1
263	OPTO_RX_B_EN	CDF_UINT1			1
264	OPTO_RX_B_EN_INIT	CDF_UINT1			1
265	OPTO_RX_LOOPBACK	CDF_UINT1			1
266	OPTO_RX_RATE	CDF_UINT1			3
267	OPTO_RX_SIGNAL_QUALITY	CDF_UINT1			1
268	OPTO_RX_SYNCED	CDF_UINT1			1
269	OPTO_TX_A_EN	CDF_UINT1			1
270	OPTO_TX_A_EN_INIT	CDF_UINT1			1
271	OPTO_TX_B_EN	CDF_UINT1			1
272	OPTO_TX_B_EN_INIT	CDF_UINT1			1
273	OPTO_TX_EN	CDF_UINT1			1
274	OPTO_TX_POWER	CDF_UINT1			7
275	OPTO_TX_POWER_EN	CDF_UINT1			1
276	OPTO_TX_RATE	CDF_UINT1			3
277	OPTO_TX_READY	CDF_UINT1			1
278	OSC_ADJ_POS_START	CDF_INT2			255
279	OSC_ADJ_POS_STOP	CDF_INT2			255
280	OSC_ADJ_TOF_START	CDF_INT2			255
281	OSC_ADJ_TOF_STOP	CDF_INT2			255

282	PA HV_ON	CDF_UINT1			1
283	PA HVPS_TEMP	CDF_INT4	1	3	4095
284	PA HVPS_V_MON	CDF_INT4	1	3	4095
285	PACKET_SUB_TIME	CDF_INT4			65535
286	PACKET_WHOLE_TIME	CDF_INT8			4294967296
287	POS_CAL_DONE	CDF_UINT1			1
288	PROCESSOR_IDLE_PERCENTAGE	CDF_UINT1			100
289	PROTON_AVOIDANCE_STATUS	CDF_UINT1			1
290	PROTON_DEC1_DECR_THRESH_REG	CDF_INT4			65535
291	PROTON_DEC1_INCR_REG	CDF_UINT1			15
292	PROTON_DEC1_INCR_THRESH_REG	CDF_INT4			65535
293	PROTON_DEC1_LEVEL_REG	CDF_UINT1			15
294	PROTON_MAX_VAL_REG	CDF_UINT1			1023
295	PROTON_MIN_VAL_REG	CDF_UINT1			1023
296	QUALITY_BITMASK	CDF_INT4			1
297	QUALITY_FLAG	CDF_INT2			2
298	SAFETY_CHECKING_STATUS_CDH	CDF_UINT1			1
299	SAFETY_CHECKING_STATUS_DSCB	CDF_UINT1			1
300	SAFING_STATUS_CDH_MON_RED	CDF_UINT1	1	40	1
301	SAFING_STATUS_CDH_MON_YEL	CDF_UINT1	1	40	1
302	SAFING_STATUS_DSCB_MON_RED	CDF_UINT1	1	24	1
303	SAFING_STATUS_DSCB_MON_YEL	CDF_UINT1	1	24	1
304	SEQ_CNT	CDF_INT4			65535
305	SSD_EN	CDF_UINT1			1
306	SSD_I_EN_LIM	CDF_UINT1			1
307	SSD_I_TRIG	CDF_UINT1			1
308	SSD_V_EN_LIM	CDF_UINT1			1
309	SSD_V_TRIG	CDF_UINT1			1
310	START_ANODE_A_OSC_CNT	CDF_INT4			65535
311	START_ANODE_B_OSC_CNT	CDF_INT4			65535
312	START_COLLECTION	CDF_UINT1			1
313	START_MCP_EN	CDF_UINT1			1
314	START_MCP_I_EN_LIM	CDF_UINT1			1
315	START_MCP_I_TRIG	CDF_UINT1			1
316	START_MCP_V_EN_LIM	CDF_UINT1			1
317	START_MCP_V_TRIG	CDF_UINT1			1
318	START_STIM_DELAY	CDF_UINT1			31
319	START_STIM_EXT	CDF_UINT1			1
320	START_STIM_ON	CDF_UINT1			1
321	START_STIM_RATE	CDF_UINT1			7
322	START_TOF_OSC_CNT	CDF_INT4			65535
323	STOP_MCP_EN	CDF_UINT1			1
324	STOP_MCP_I_EN_LIM	CDF_UINT1			1
325	STOP_MCP_I_TRIG	CDF_UINT1			1
326	STOP_MCP_V_EN_LIM	CDF_UINT1			1
327	STOP_MCP_V_TRIG	CDF_UINT1			1
328	STOP_TOF_OSC_CNT	CDF_INT4			65535
329	SWEEP_DATA_A_ACTIVE	CDF_UINT1			1
330	SWEEP_DATA_B_ACTIVE	CDF_UINT1			1
331	SWEEP_EDAC_EN	CDF_UINT1			1
332	SWEEP_EDP	CDF_UINT1			1
333	SWEEP_EN_ANALYZER	CDF_UINT1			1
334	SWEEP_EN_BOT_DEF	CDF_UINT1			1

335	SWEEP_EN_TOP_DEF	CDF_UINT1			1
336	SWEEP_EN_TOP_PLATE	CDF_UINT1			1
337	SWEEP_SCRUBBING_EN	CDF_UINT1			1
338	SWEEP_TBL_POINTER_SEL	CDF_UINT1			1
339	SYSTEM_MODULE_VERIFY	CDF_UINT1			1
340	TIME_CODE_CNT	CDF_INT2			255
341	TIME_MESSAGE_CNT	CDF_INT2			255
342	TOF_CAL_DONE	CDF_UINT1			1
343	TOF_CAL_EN	CDF_UINT1			1
344	TOF_START_SEL	CDF_UINT1			1
345	TOF_STIM_DELAY	CDF_UINT1			31
346	TOF_STIM_EXT	CDF_UINT1			1
347	TOF_STIM_ON	CDF_UINT1			1
348	TOF_STIM_RATE	CDF_UINT1			7
349	WDOG_RESET_CNT	CDF_UINT1			127

	Variable_Name	Dim Siz e	Meaning of Dimension
13	ASIC_CONF_REG	8	Register Number
27	CDH_BOARD_TEMP	3	Ave, Min, Max
28	CDH_CPU_TEMP	3	Ave, Min, Max
29	CDH_GROUND	3	Ave, Min, Max
40	CDH_P1_5V	3	Ave, Min, Max
41	CDH_P1_8V	3	Ave, Min, Max
42	CDH_P3_3V_ADC_V	3	Ave, Min, Max
43	CDH_P5V_DAC_V	3	Ave, Min, Max
91	DSCB_ASIC_V_MON	3	Ave, Min, Max
93	DSCB_ASIC_TEMP	3	Ave, Min, Max
95	DSCB_AZIMUTHAL_SEL	3	Select Number
100	DSCB_DSCB_TEMP	3	Ave, Min, Max
101	DSCB_DSIB_TEMP	3	Ave, Min, Max
109	DSCB_HVPS_TEMP	3	Ave, Min, Max
116	DSCB_OFFSET_I_MON	3	Ave, Min, Max
117	DSCB_OFFSET_V_MON	3	Ave, Min, Max
123	DSCB_P1_5V	3	Ave, Min, Max
124	DSCB_P3_3V	3	Ave, Min, Max
125	DSCB_P3_3V_ADC_REF	3	Ave, Min, Max
126	DSCB_P5V_ADC_REF_MON	3	Ave, Min, Max
127	DSCB_P5V_DAC_REF_MON	3	Ave, Min, Max
142	DSCB_SSD_I_MON	3	Ave, Min, Max
143	DSCB_SSD_TEMP	3	Ave, Min, Max
144	DSCB_SSD_V_MON	3	Ave, Min, Max
145	DSCB_START_MCP_I_MON	3	Ave, Min, Max
146	DSCB_START_MCP_TEMP	3	Ave, Min, Max
147	DSCB_START_MCP_V_MON	3	Ave, Min, Max
153	DSCB_STOP_MCP_I_MON	3	Ave, Min, Max
154	DSCB_STOP_MCP_TEMP	3	Ave, Min, Max
155	DSCB_STOP_MCP_V_MON	3	Ave, Min, Max
162	DSCB_V_I_MON_REF	3	Ave, Min, Max
165	EAIS_PORT_TEMP	3	Ave, Min, Max

197	HVPS_ANALYZER	3	Ave, Min, Max
198	HVPS_ANALYZER_POL	3	Ave, Min, Max
199	HVPS_ANALYZER_RNG	3	Ave, Min, Max
200	HVPS_BOT_DEF	3	Ave, Min, Max
201	HVPS_BOT_DEF_POL	3	Ave, Min, Max
202	HVPS_BOT_DEF_RNG	3	Ave, Min, Max
203	HVPS_HV_MAIN_N	3	Ave, Min, Max
204	HVPS_HV_MAIN_N_POL	3	Ave, Min, Max
205	HVPS_HV_MAIN_N_RNG	3	Ave, Min, Max
206	HVPS_HV_MAIN_P	3	Ave, Min, Max
207	HVPS_HV_MAIN_P_POL	3	Ave, Min, Max
208	HVPS_HV_MAIN_P_RNG	3	Ave, Min, Max
209	HVPS_N12V_I	3	Ave, Min, Max
210	HVPS_P12V_I	3	Ave, Min, Max
211	HVPS_TOP_DEF	3	Ave, Min, Max
212	HVPS_TOP_DEF_POL	3	Ave, Min, Max
213	HVPS_TOP_DEF_RNG	3	Ave, Min, Max
214	HVPS_TOP_PLATE	3	Ave, Min, Max
215	HVPS_TOP_PLATE_POL	3	Ave, Min, Max
216	HVPS_TOP_PLATE_RNG	3	Ave, Min, Max
220	IRAP_HVPS_TEMP	3	Ave, Min, Max
234	LVPS_12V_DC_DC_TEMP	3	Ave, Min, Max
235	LVPS_5V_DC_DC_TEMP	3	Ave, Min, Max
236	LVPS_AC_LINK_I	3	Ave, Min, Max
237	LVPS_AC_LINK_TEMP	3	Ave, Min, Max
238	LVPS_AC_LINK_V	3	Ave, Min, Max
239	LVPS_N12V_OUTPUT_I	3	Ave, Min, Max
240	LVPS_N12V_OUTPUT_V	3	Ave, Min, Max
241	LVPS_N5V_OUTPUT_I	3	Ave, Min, Max
242	LVPS_N5V_OUTPUT_V	3	Ave, Min, Max
243	LVPS_P12V_OUTPUT_I	3	Ave, Min, Max
244	LVPS_P12V_OUTPUT_V	3	Ave, Min, Max
245	LVPS_P3_3V_DC_DC_TEMP	3	Ave, Min, Max
246	LVPS_P3_3V_OUTPUT_I	3	Ave, Min, Max
247	LVPS_P3_3V_OUTPUT_V	3	Ave, Min, Max
248	LVPS_P5V_OUTPUT_I	3	Ave, Min, Max
249	LVPS_P5V_OUTPUT_V	3	Ave, Min, Max
250	MACRO_STATUS	64	Macro Number
284	PA_HVPS_TEMP	3	Ave, Min, Max
285	PA_HVPS_V_MON	3	Ave, Min, Max
301	SAFING_STATUS_CDH_MON_RED	40	0:LVPS_AC_LINK_TEMP
			1:LVPS+-12V_TEMP
			2:LVPS_+3.3V_TEMP
			3:LVPS+-5V_TEMP
			4:PA_TEMP
			5:C&DH_TEMP
			6:C&DH_CPU_TEMP
			7:IRAP_HVPS_TEMP
			8:LVPS_AC_LINK_I
			9:LVPS_AC_LINK_V
			10:LVPS-12V_V
			11:OP_THERM1
			12:C&DH+1.8V_CPU_V

			13:+1.5V_FPGA_V
			14:LVPS+12V_V
			15:LVPS_+3.3V_I
			16:IRAP_HVPS_MAIN_N
			17:IRAP_HVPS_DEF_TOP
			18:IRAP_HVPS_DEF_BOT
			19:EAIS_PORT_TEMP
			20:IRAP_HVPS_GEOM
			21:IRAP_HVPS_MAIN_P
			22:IRAP_HVPS_ANAL
			23:IRAP_HVPS_TOP_PLAT
			24:PA_HVPS_V
			25:OP_THERM2
			26:C&DH+5V_DAC_V
			27:C&DH+3.3V_ADC_V
			28:C&DH_GROUND
			29:IRAP_HVPS+12V_I
			30:IRAP_HVPS-12V_I
			31:IRAP_HVPS_MAIN_N2
			32:PA_HVPS_V2
			33:LVPS-5V_I
			34:LVPS-12V_I
			35:LVPS+3.3V_V
			36:LVPS+5V_I
			37:LVPS+5V_V
			38:LVPS-5V_V
			39:LVPS+12V_I
302	SAFING_STATUS_CDH_MON_YEL	40	Same as SAFING_STATUS_CDH_MON_RED
303	SAFING_STATUS_DSCB_MON_RED	24	0:STARTMCPVMON
			1:STOPMCPVMON
			2:MCPBIASVMON
			3:SSDVMON
			4:OFFSETVMON
			5:STARTMCPIMON
			6:STOPMCPIMON
			7:MCPBIASIMON
			8:STOP_TEMP
			9:DSCB_TEMP
			10:+5V_DAC_REF_MON
			11:+3.3V_ADC_REF
			12:+5V_ADC_REF_MON
			13:ASIC_V_MON
			14:+3.3V
			15:+1.5V
			16:SSDIMON
			17:OFFSETIMON
			18:V_IMON_REF
			19:HVPS_TEMP
			20:DSIB_TEMP
			21:SSD_TEMP
			22:ASIC_TEMP
			23:START_TEMP

304	SAFING_STATUS_DSCB_MON_YEL	24	Same as SAFING_STATUS_DSCB_MON_YEL

	Variable_Name	VAR_NOTES
1	AC_LINK_EN	0 = Disabled:1 = Enabled
2	AC_LINK_ERR	Monitors Voltage Regulator Input Undervoltage, 0:OK 1>Error
3	ALPHA_DECI_DECR_THRESH_REG	Invalid when DSCB_COMM_ACTIVE is 0
4	ALPHA_DECI_INCR_REG	Invalid when DSCB_COMM_ACTIVE is 0
5	ALPHA_DECI_INCR_THRESH_REG	Invalid when DSCB_COMM_ACTIVE is 0
6	ALPHA_DECI_LEVEL_REG	Invalid when DSCB_COMM_ACTIVE is 0
7	ALPHA_MAX_VAL_REG	Invalid when DSCB_COMM_ACTIVE is 0
8	ALPHA_MIN_VAL_REG	Invalid when DSCB_COMM_ACTIVE is 0
9	ANODE_STIM_DELAY	Invalid when DSCB_COMM_ACTIVE is 0
10	ANODE_STIM_ON	Invalid when DSCB_COMM_ACTIVE is 0
11	ANODE_STIM_RATE	Invalid when DSCB_COMM_ACTIVE is 0
12	ASIC_ADC_WAIT	Invalid when DSCB_COMM_ACTIVE is 0
13	ASIC_CONF_REG	Invalid when DSCB_COMM_ACTIVE is 0
14	ASIC_CS_MON	Invalid when DSCB_COMM_ACTIVE is 0
15	ASIC_OUT_OF_SYSTEM_EN	Invalid when DSCB_COMM_ACTIVE is 0
17	ASIC_REG_SWITCH	Invalid when DSCB_COMM_ACTIVE is 0
18	ASIC_RESET	Invalid when DSCB_COMM_ACTIVE is 0
19	ASIC_STIM_DELAY	Invalid when DSCB_COMM_ACTIVE is 0
20	ASIC_STIM_ON	Invalid when DSCB_COMM_ACTIVE is 0
21	ASIC_STIM_RATE	Invalid when DSCB_COMM_ACTIVE is 0
22	ASIC_TP_RATE	Invalid when DSCB_COMM_ACTIVE is 0
23	ASIC_WRITE_REG	Invalid when DSCB_COMM_ACTIVE is 0
24	BOARD_ID	0 = EM:1 = FM
25	CCSDS_REJ_MESSAGE_CNT	0-15
26	CDH_BOARD_TEMP	Ave, Min, Max
27	CDH_CPU_TEMP	Ave, Min, Max
28	CDH_GROUND	Ave, Min, Max
29	CDH_OPTO_LINK_RX_EN	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
30	CDH_OPTO_LINK_RX_RATE	0 = 781.3 Kb/s:1 = 1.563 Mb/s:2 = 3.125 Mb/s:3 = 6.25 Mb/s Invalid when DSCB_COMM_ACTIVE is 0
31	CDH_OPTO_LINK_STAT_A	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
32	CDH_OPTO_LINK_STAT_B	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
33	CDH_OPTO_LINK_TX_POWER	Defined in C&DH spec Invalid when DSCB_COMM_ACTIVE is 0
34	CDH_OPTO_LINK_TX_RATE	0 = 781.3 Kb/s:1 = 1.563 Mb/s:2 = 3.125 Mb/s:3 = 6.25 Mb/s Invalid when DSCB_COMM_ACTIVE is 0
35	CDH_OPTO_RX_CLOCK_SYNC_ERR_C NT	Stops counting at 65535, must be cleared by command Invalid when DSCB_COMM_ACTIVE is 0
36	CDH_OPTO_RX_CRC_ERR_CNT	Stops counting at 65535, must be cleared by command Invalid when DSCB_COMM_ACTIVE is 0

37	CDH_OPTO_RX_HDR_ERR_CNT	Stops counting at 65535, must be cleared by command Invalid when DSCB_COMM_ACTIVE is 0
38	CDH_OPTO_RX_SIDE	0 = A:1 = B
39	CDH_P1_5V	Ave, Min, Max
40	CDH_P1_8V	Ave, Min, Max
41	CDH_P3_3V_ADC_V	Ave, Min, Max
42	CDH_P5V_DAC_V	Ave, Min, Max
43	CDH_SWEEP_DAC_EN_LATCHED	cdh sweep dav enables latched
44	CDH_SWEEP_STATE	cdh sweep state
45	CDH_WDOG_EN	0 = Disabled:1 = Enabled
46	CDH_WDOG_STATUS	0 = Nominal:1 = Watchdog Timeout
47	CHECKSUM	CRC of packet (covering application data)
48	CMD_ACC_CNT	0-255
49	CMD_ACC_LAST_SERVICE	0-255
50	CMD_ACC_LAST_SUBSERVICE	0-255
51	CMD_ACC_SSC	0-16383
52	CMD_POL_BOT_DEF	0 = POSITIVE:1 = NEGATIVE
53	CMD_POL_TOP_DEF	0 = POSITIVE:1 = NEGATIVE
54	CMD_POL_TOP_PLATE	0 = POSITIVE:1 = NEGATIVE
55	CMD_REJ_CNT	0-255
56	CMD_REJ_LAST_SERVICE	0-255
57	CMD_REJ_LAST_SUBSERVICE	0-255
58	CMD_REJ_SSC	0-16383
59	CMD_RNG_ANALYZER	0 = LOW_RANGE:1 = HIGH_RANGE
60	CMD_RNG_BOT_DEF	0 = LOW_RANGE:1 = HIGH_RANGE
61	CMD_RNG_TOP_DEF	0 = LOW_RANGE:1 = HIGH_RANGE
62	CMD_RNG_TOP_PLATE	0 = LOW_RANGE:1 = HIGH_RANGE
63	CMD_VAL_ANALYZER	commanded value analyzer
64	CMD_VAL_BOT_DEF	commanded value bottom deflector
65	CMD_VAL_MAIN	commanded value Main
66	CMD_VAL_OFFSET	commanded value Offset
67	CMD_VAL_PA	commanded value PA
68	CMD_VAL_SSD	commanded value SSD
69	CMD_VAL_START_A	commanded value Start A
70	CMD_VAL_START_B	commanded value Start B
71	CMD_VAL_START_CFD	commanded value Start CDF
72	CMD_VAL_START_MCP	commanded value Start MCP
73	CMD_VAL_STOP_A	commanded value Stop A
74	CMD_VAL_STOP_B	commanded value Stop B
75	CMD_VAL_STOP_CFD	commanded value Stop CDF
76	CMD_VAL_STOP_MCP	commanded value Stop MCP
77	CMD_VAL_TOP_DEF	commanded value top deflector
78	CMD_VAL_TOP_PLATE	commanded value top plate
	COINC_TIMING_ASIC_SHAPE	Invalid when DSCB_COMM_ACTIVE is 0
	COINC_TIMING_ASIC_WINDOW	Invalid when DSCB_COMM_ACTIVE is 0
	COINC_TIMING_POS_TIMEOUT	Invalid when DSCB_COMM_ACTIVE is 0
	COINC_TIMING_TOF_TIMEOUT	Invalid when DSCB_COMM_ACTIVE is 0
79	CONNECTION_TEST_CNT	connection test count
84	CPU_WDOG_EN	0 = Disabled:1 = Enabled
85	CPU_WDOG_STATUS	0 = Nominal:1 = Watchdog Timeout
86	DSCB_ADC_EN	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0

	DSCB_ADC_WAITS	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_ASIC_CONTROL_STATE_MACHINE	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_ASIC_FLAG	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_ASIC_READ_OUT_STATE_MACHINE	Invalid when DSCB_COMM_ACTIVE is 0
87	DSCB_ASIC_TEMP	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
91	DSCB_ASIC_V_MON	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_ASIC_WRITE_STATE_MACHINE	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_AZIMUTHAL_SEL	Invalid when DSCB_COMM_ACTIVE is 0
93	DSCB_CMD_NAKS	Stops counting at 65535, must be cleared by command Invalid when DSCB_COMM_ACTIVE is 0
96	DSCB_COINC	0 = Normal Mode / TOF Only:1 = Energy Mode (Energy and TOF):2 = Energy Only (No TOF):3 = Either Mode (TOF or Energy) Invalid when DSCB_COMM_ACTIVE is 0
97	DSCB_COMM_ACTIVE	0 = Disabled:1 = Enabled. Set if FSW state machine is in RUNNING state and DSCB Opto-Link is communicating.
98	DSCB_DOUBLE_BIT_EDAC	Stops counting at 65535, must be cleared by command Invalid when DSCB_COMM_ACTIVE is 0
99	DSCB_DSCB_TEMP	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
100	DSCB_DSIB_TEMP	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_FPGA_BASE	Invalid when DSCB_COMM_ACTIVE is 0
101	DSCB_FPGA_REV	Detector Section FPGA Revision Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_HK_RATE	Invalid when DSCB_COMM_ACTIVE is 0
103	DSCB_HV_AUTO_RESET_EN	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
105	DSCB_HV_EN	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
106	DSCB_HV_LIMITED	0 = UNLIMITED:1 = LIMITED-AIRSAFE Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_HV_MON_EN	Invalid when DSCB_COMM_ACTIVE is 0
107	DSCB_HVPS_TEMP	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_INIT_BIT	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_INIT_REG	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_MCP_BIAS_EN	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_MCP_BIAS_I_LIMIT_EN	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_MCP_BIAS_I_TRIP	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_MCP_BIAS_V_LIMIT_EN	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_MCP_BIAS_V_TRIP	Invalid when DSCB_COMM_ACTIVE is 0
109	DSCB_OFFSET_I_MON	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
116	DSCB_OFFSET_V_MON	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
117	DSCB_OPTO_RX_CLOCK_SYNC_ERR_CNT	Stops counting at 65535, must be cleared by command Invalid when DSCB_COMM_ACTIVE is 0
118	DSCB_OPTO_RX_CRC_ERR_CNT	Stops counting at 65535, must be cleared by command Invalid when DSCB_COMM_ACTIVE is 0

119	DSCB_OPTO_RX_DATA1_ERR_CNT	Stops counting at 65535, must be cleared by command Invalid when DSCB_COMM_ACTIVE is 0
120	DSCB_OPTO_RX_DATA2_ERR_CNT	Stops counting at 65535, must be cleared by command Invalid when DSCB_COMM_ACTIVE is 0
121	DSCB_OPTO_RX_HDR_ERR_CNT	Stops counting at 65535, must be cleared by command Invalid when DSCB_COMM_ACTIVE is 0
122	DSCB_P1_5V	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
123	DSCB_P3_3V	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
124	DSCB_P3_3V_ADC_REF	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
125	DSCB_P5V_ADC_REF_MON	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
126	DSCB_P5V_DAC_REF_MON	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_POS_START	Invalid when DSCB_COMM_ACTIVE is 0
127	DSCB_POS_START_ADD_SUB	0 = ADD:1 = SUBTRACT Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_POS_START_SEL	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_POS_STOP	Invalid when DSCB_COMM_ACTIVE is 0
129	DSCB_POS_STOP_ADD_SUB	0 = ADD:1 = SUBTRACT Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_POS_STOP_DUAL_SEL	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_POS_STOP_SEL	Invalid when DSCB_COMM_ACTIVE is 0
132	DSCB_RATES_EN	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_RESET_DECI_LEVEL	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_RESET_FSW	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_RESET_POR	Invalid when DSCB_COMM_ACTIVE is 0
135	DSCB_RESET_WDOG	0=NONE:1=TIMEOUT Invalid when DSCB_COMM_ACTIVE is 0
140	DSCB_SINGLE_BIT_EDAC	Stops counting at 65535, must be cleared by command Invalid when DSCB_COMM_ACTIVE is 0
141	DSCB_SSD_I_MON	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
142	DSCB_SSD_TEMP	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
143	DSCB_SSD_V_MON	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
144	DSCB_START_MCP_I_MON	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
145	DSCB_START_MCP_TEMP	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
146	DSCB_START_MCP_V_MON	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_STARTUP_POWER	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_STARTUP_RX_A_EN	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_STARTUP_RX_B_EN	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_STARTUP_TX_B_EN	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_STARTUP_TX_B_EN	Invalid when DSCB_COMM_ACTIVE is 0
147	DSCB_STOP_MCP_I_MON	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0

153	DSCB_STOP_MCP_TEMP	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
154	DSCB_STOP_MCP_V_MON	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_SWEEP_OVER	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_SYSTEM_FSM	Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_TOF_START	Invalid when DSCB_COMM_ACTIVE is 0
155	DSCB_TOF_START_ADD_SUB	0 = ADD:1 = SUBTRACT Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_TOF_STOP	Invalid when DSCB_COMM_ACTIVE is 0
159	DSCB_TOF_STOP_ADD_SUB	0 = ADD:1 = SUBTRACT Invalid when DSCB_COMM_ACTIVE is 0
161	DSCB_V_I_MON_REF	Ave, Min, Max Invalid when DSCB_COMM_ACTIVE is 0
	DSCB_WDOG_CNT	Invalid when DSCB_COMM_ACTIVE is 0
162	DSCB_WDOG_ON	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
164	EAIS_PORT_TEMP	Ave, Min, Max
	ENERGY_ASIC_ACQ_TP	Invalid when DSCB_COMM_ACTIVE is 0
	ENERGY_ASIC_PARITY	Invalid when DSCB_COMM_ACTIVE is 0
165	EVENT_ERR_CNT	Count of (5,2) event error messages
167	FDIR_DSCB_AUTOMATIC_LIMIT	0 = Not Occurred:1 = Occurred. DSCB automatic limit monitoring tripped.
168	FDIR_DSCB_COMM_LOSS	0 = Not Occurred:1 = Occurred. DSCB communications failed (not receiving Write ACK, not receiving Read response, not receiving anything, watchdog timeout on higher link speeds).
169	FDIR_DSCB_DOWNLINK_UNDETERMINED	0 = Not Occurred:1 = Occurred. DSCB failing downlink speed test.
170	FDIR_DSCB_NOT_RUNNING	0 = Not Occurred:1 = Occurred. DSCB not reaching run state after timeout.
171	FDIR_DSCB_REG_INIT	0 = Not Occurred:1 = Occurred. DSCB register initialize/update failed (on startup or before entering a science mode).
172	FDIR_EMERGENCY_FAST_SAFE	0 = Not Occurred:1 = Occurred. Emergency Safe - Loss of S20, pending power down, or thruster firing preceding turnoff.
173	FDIR_LEVEL	0 = None:1 = Thruster Firing Start:2 = Red Limit:3 = Emergency Fast Safe:4 = Yellow Limit:5 = Nominal Slow Safe:6 = Solar Array Steering Start:7 = DSCB Automatic Limit:8 = Task Timeout:9 = DSCB Not Running:10 = DSCB Downlink Undetermined:11 = DSCB Register Initialization:12 = DSCB Communications Loss:13 = Science Auto-Mode Fail:14 = Thruster Firing Stop:15 = Solar Array Steering Stop
174	FDIR_NOMINAL_SLOW_SAFE	0 = Not Occurred:1 = Occurred. Nominal Slow Safe - Long HV Rampdown.
175	FDIR_RED_LIMIT	0 = Not Occurred:1 = Occurred. Analog monitor red limit fail - expectation is that all HV comes down quickly, hence higher priority than S20 loss and thruster firing.
176	FDIR_RESERVED	0 = Not Occurred:1 = Occurred.

177	FDIR_SCIENCE_AUTO_MODE_FAIL	0 = Not Occurred:1 = Occurred. Automatically changing a science mode (Burst to Normal, or restarting from an uncorrectable error) failed. Possible reasons are DSCB communication fail (its own FDIR) or a corruption and failed decompression of priorities lookup table.
178	FDIR_SOLAR_ARRAY_STEERING_START	0 = Not Occurred:1 = Occurred.
179	FDIR_SOLAR_ARRAY_STEERING_STOP	0 = Not Occurred:1 = Occurred. Solar Array Steering End - Return to Science.
180	FDIR_TASK_TIMEOUT	0 = Not Occurred:1 = Occurred. Software tasks have timed out. Likely no science data being generated.
181	FDIR_THRUSTER_FIRING_START	0 = Not Occurred:1 = Occurred
182	FDIR_THRUSTER_FIRING_STOP	0 = Not Occurred:1 = Occurred. Thruster Firing Exit - Return to Science.
183	FDIR_YELLOW_LIMIT	0 = Not Occurred:1 = Occurred. Analog monitor yellow limit fail.
184	FPGA_STEP_TBL_DATA_ELEV_INDEX	0-15
186	FPGA_STEP_TBL_E_Q_INDEX	0-63
187	FPGA_STEP_TBL_ELEV_INDEX	0-15
188	FPGA_SWEEP_TBL_ROW	0-127
189	FPGA_SWEEP_TBL_DATA_SIDE	0 = A:1 = B
	HK_EN	Invalid when DSCB_COMM_ACTIVE is 0
191	HV_DISABLED	0 = ENABLED:1 = DISABLED
	HV_I_LIM_PERSISTENCE	Invalid when DSCB_COMM_ACTIVE is 0
193	HV_LIMITED	0 = UNLIMITED:1 = LIMITED-AIRSAFE
	HV_V_LIM_PERSISTENCE	Invalid when DSCB_COMM_ACTIVE is 0
195	HVPS_ANALYZER	Ave, Min, Max When SWEEP_EN_ANALYZER is 1, AVG set to fill and MIN/MAX might be swapped. AVG also set to fill when not between MIN/MAX (can happen at end of sweeping). Also, if associated Polarity or Range values vary over avg/min/max, then the avg here is set to fill and the min/max values here may be suspect.
197	HVPS_ANALYZER_POL	0: positive; 1: negative. Ave, Min, Max.
198	HVPS_ANALYZER_RNG	0: low; 1: high. Ave, Min, Max.
199	HVPS_BOT_DEF	Ave, Min, Max When SWEEP_EN_BOT_DEF is 1, AVG set to fill and MIN/MAX might be swapped. AVG also set to fill when not between MIN/MAX (can happen at end of sweeping). Also, if associated Polarity or Range values vary over avg/min/max, then the avg here is set to fill and the min/max values here may be suspect.
200	HVPS_BOT_DEF_POL	0: positive; 1: negative. Ave, Min, Max.
201	HVPS_BOT_DEF_RNG	0: low; 1: high. Ave, Min, Max.
202	HVPS_HV_MAIN_N	Ave, Min, Max
203	HVPS_HV_MAIN_N_POL	0: positive; 1: negative. Ave, Min, Max.
204	HVPS_HV_MAIN_N_RNG	0: low; 1: high. Ave, Min, Max.
205	HVPS_HV_MAIN_P	Ave, Min, Max
206	HVPS_HV_MAIN_P_POL	0: positive; 1: negative. Ave, Min, Max.
207	HVPS_HV_MAIN_P_RNG	0: low; 1: high. Ave, Min, Max.
208	HVPS_N12V_I	Ave, Min, Max
209	HVPS_P12V_I	Ave, Min, Max
210	HVPS_TOP_DEF	Ave, Min, Max When SWEEP_EN_TOP_DEF is 1, AVG set to fill and MIN/MAX might be swapped. AVG also set

		to fill when not between MIN/MAX (can happen at end of sweeping). Also, if associated Polarity or Range values vary over avg/min/max, then the avg here is set to fill and the min/max values here may be suspect.
211	HVPS_TOP_DEF_POL	0: positive; 1: negative. Ave, Min, Max.
212	HVPS_TOP_DEF_RNG	0: low; 1: high. Ave, Min, Max.
213	HVPS_TOP_PLATE	Ave, Min, Max When SWEEP_EN_TOP_PLATE is 1, AVG set to fill and MIN/MAX might be swapped. AVG also set to fill when not between MIN/MAX (can happen at end of sweeping). Also, if associated Polarity or Range values vary over avg/min/max, then the avg here is set to fill and the min/max values here may be suspect.
214	HVPS_TOP_PLATE_POL	0: positive; 1: negative. Ave, Min, Max.
215	HVPS_TOP_PLATE_RNG	0: low; 1: high. Ave, Min, Max.
216	INTER_INST_INFO_CNT	0-1023
218	IRAP_HV_ON	0 = Off; 1 = On
219	IRAP_HVPS_TEMP	Ave, Min, Max
220	LAST_ERR_CODE	Last (5,2) EID, minus SWA offset
221	LVPS_12V_DC_DC_TEMP	Ave, Min, Max
234	LVPS_5V_DC_DC_TEMP	Ave, Min, Max
235	LVPS_AC_LINK_I	Ave, Min, Max
236	LVPS_AC_LINK_TEMP	Ave, Min, Max
237	LVPS_AC_LINK_V	Ave, Min, Max
238	LVPS_N12V_OUTPUT_I	Ave, Min, Max
239	LVPS_N12V_OUTPUT_V	Ave, Min, Max
240	LVPS_N5V_OUTPUT_I	Ave, Min, Max
241	LVPS_N5V_OUTPUT_V	Ave, Min, Max
242	LVPS_P12V_OUTPUT_I	Ave, Min, Max
243	LVPS_P12V_OUTPUT_V	Ave, Min, Max
244	LVPS_P3_3V_DC_DC_TEMP	Ave, Min, Max
245	LVPS_P3_3V_OUTPUT_I	Ave, Min, Max
246	LVPS_P3_3V_OUTPUT_V	Ave, Min, Max
247	LVPS_P5V_OUTPUT_I	Ave, Min, Max
248	LVPS_P5V_OUTPUT_V	Ave, Min, Max
249	MACRO_STATUS	0: dormant; 1: running
250	MASTER_SWEEP_EN	3 = CONTINUOUS; 2 = END_TABLE; 1 = END_ROW; 0 = STOPPED
251	MASTER_SWEEP_EN_STATUS	3 = CONTINUOUS; 2 = END_TABLE; 1 = END_ROW; 0 = STOPPED
252	MISSING_SPACEWIRE_TIME_CODE	0 = Received; 1 = Missed
253	MODE_CHANGE_REASON	0 = None; 1 = Auto Timed Transition; 2 = Command / Macro; 3 = Failure
254	MRAM_WR_EN	0 = Disabled; 1 = Enabled
	OFFSET_EN	Invalid when DSCB_COMM_ACTIVE is 0
255	OFFSET_I_EN_LIM	0 = Disabled; 1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
257	OFFSET_I_TRIG	0=OK; 1=TRIPPED Invalid when DSCB_COMM_ACTIVE is 0
258	OFFSET_V_EN_LIM	0 = Disabled; 1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
259	OFFSET_V_TRIG	0=OK; 1=TRIPPED Invalid when DSCB_COMM_ACTIVE is 0

260	OP_MODE	0 = Off:1 = Boot:2 = Boot Maintenance:3 = Safe:4 = LV Engineering: 5 = HV Standby:6 = Normal Science:7 = Burst Science:"8 = Pre-Burst:9 = Pre-Normal
	OPTO_RX_A_EN	Invalid when DSCB_COMM_ACTIVE is 0
261	OPTO_RX_A_EN_INIT	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
	OPTO_RX_B_EN	Invalid when DSCB_COMM_ACTIVE is 0
263	OPTO_RX_B_EN_INIT	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
265	OPTO_RX_LOOPBACK	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
266	OPTO_RX_RATE	0 = 781.3 Kb/s:1 = 1.563 Mb/s:2 = 3.125 Mb/s:3 = 6.25 Mb/s Invalid when DSCB_COMM_ACTIVE is 0
267	OPTO_RX_SIGNAL_QUALITY	0 = HIGH:1 = RISE_GT_FALL:2 = FALL_GT_RISE:3 = FREQ_MISMATCH Invalid when DSCB_COMM_ACTIVE is 0
268	OPTO_RX_SYNCED	0 = UNSYNC:1 = SYNCED Invalid when DSCB_COMM_ACTIVE is 0
	OPTO_TX_A_EN	Invalid when DSCB_COMM_ACTIVE is 0
269	OPTO_TX_A_EN_INIT	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
	OPTO_TX_B_EN	Invalid when DSCB_COMM_ACTIVE is 0
271	OPTO_TX_B_EN_INIT	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
273	OPTO_TX_EN	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
	OPTO_TX_POWER	Invalid when DSCB_COMM_ACTIVE is 0
274	OPTO_TX_POWER_EN	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
276	OPTO_TX_RATE	0 = 781.3 Kb/s:1 = 1.563 Mb/s:2 = 3.125 Mb/s:3 = 6.25 Mb/s Invalid when DSCB_COMM_ACTIVE is 0
	OPTO_TX_READY	Invalid when DSCB_COMM_ACTIVE is 0
	OSC_ADJ_POS_START	Invalid when DSCB_COMM_ACTIVE is 0
	OSC_ADJ_POS_STOP	Invalid when DSCB_COMM_ACTIVE is 0
	OSC_ADJ_TOF_START	Invalid when DSCB_COMM_ACTIVE is 0
	OSC_ADJ_TOF_STOP	Invalid when DSCB_COMM_ACTIVE is 0
277	PA_HV_ON	0 = Off:1 = On
283	PA_HVPS_TEMP	Ave, Min, Max
284	PA_HVPS_V_MON	Ave, Min, Max
285	PACKET_SUB_TIME	Sub-Seconds timestamp of when the packet accumulation ended and the last data sample was collected
286	PACKET_WHOLE_TIME	Seconds timestamp of when the packet accumulation ended and the last data sample was collected
287	POS_CAL_DONE	0: IN_PROGRESS, 1: DONE Invalid when DSCB_COMM_ACTIVE is 0
288	PROCESSOR_IDLE_PERCENTAGE	0-100
289	PROTON_AVOIDANCE_STATUS	0 = INACTIVE:1 = ACTIVE
	PROTON_DEC1 DECR THRESH REG	Invalid when DSCB_COMM_ACTIVE is 0
	PROTON_DEC1 INCR REG	Invalid when DSCB_COMM_ACTIVE is 0
	PROTON_DEC1 INCR THRESH REG	Invalid when DSCB_COMM_ACTIVE is 0
	PROTON_DEC1 LEVEL REG	Invalid when DSCB_COMM_ACTIVE is 0

	PROTON_MAX_VAL_REG	Invalid when DSCB_COMM_ACTIVE is 0
	PROTON_MIN_VAL_REG	Invalid when DSCB_COMM_ACTIVE is 0
290	QUALITY_BITMASK	0:No Issue
297	QUALITY_FLAG	0=good, 1=caution, 2=bad
298	SAFETY_CHECKING_STATUS_CDH	0 = Disabled:1 = Enabled
299	SAFETY_CHECKING_STATUS_DSCB	0 = Disabled:1 = Enabled
300	SAFING_STATUS_CDH_MON_RED	0 = NORMAL:1 = SAFED
301	SAFING_STATUS_CDH_MON_YEL	0 = NORMAL:1 = SAFED
302	SAFING_STATUS_DSCB_MON_RED	0 = NORMAL:1 = SAFED
303	SAFING_STATUS_DSCB_MON_YEL	0 = NORMAL:1 = SAFED
	SSD_EN	Invalid when DSCB_COMM_ACTIVE is 0
304	SSD_I_EN_LIM	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
307	SSD_I_TRIG	0=OK:1=TRIPPED Invalid when DSCB_COMM_ACTIVE is 0
308	SSD_V_EN_LIM	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
309	SSD_V_TRIG	0=OK:1=TRIPPED Invalid when DSCB_COMM_ACTIVE is 0
	START_ANODE_A_OSC_CNT	Invalid when DSCB_COMM_ACTIVE is 0
	START_ANODE_B_OSC_CNT	Invalid when DSCB_COMM_ACTIVE is 0
	START_COLLECTION	Invalid when DSCB_COMM_ACTIVE is 0
	START_MCP_EN	Invalid when DSCB_COMM_ACTIVE is 0
310	START_MCP_I_EN_LIM	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
315	START_MCP_I_TRIG	0=OK:1=TRIPPED Invalid when DSCB_COMM_ACTIVE is 0
316	START_MCP_V_EN_LIM	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
317	START_MCP_V_TRIG	0=OK:1=TRIPPED Invalid when DSCB_COMM_ACTIVE is 0
	START_STIM_DELAY	Invalid when DSCB_COMM_ACTIVE is 0
318	START_STIM_EXT	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
	START_STIM_ON	Invalid when DSCB_COMM_ACTIVE is 0
	START_STIM_RATE	Invalid when DSCB_COMM_ACTIVE is 0
	START_TOF_OSC_CNT	Invalid when DSCB_COMM_ACTIVE is 0
	STOP_MCP_EN	Invalid when DSCB_COMM_ACTIVE is 0
320	STOP_MCP_I_EN_LIM	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
325	STOP_MCP_I_TRIG	0=OK:1=TRIPPED Invalid when DSCB_COMM_ACTIVE is 0
326	STOP_MCP_V_EN_LIM	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
327	STOP_MCP_V_TRIG	0=OK:1=TRIPPED Invalid when DSCB_COMM_ACTIVE is 0
	STOP_TOF_OSC_CNT	Invalid when DSCB_COMM_ACTIVE is 0
328	SWEEP_DATA_A_ACTIVE	0 = Inactive:1 = Active
330	SWEEP_DATA_B_ACTIVE	0 = Inactive:1 = Active
331	SWEEP_EDAC_EN	0 = Disabled:1 = Enabled
332	SWEEP_EDP	0 = INACTIVE:1 = ACTIVE
333	SWEEP_EN_ANALYZER	0 = STATIC:1 = SWEEP
334	SWEEP_EN_BOT_DEF	0 = STATIC:1 = SWEEP

335	SWEEP_EN_TOP_DEF	0 = STATIC:1 = SWEEP
336	SWEEP_EN_TOP_PLATE	0 = STATIC:1 = SWEEP
337	SWEEP_SCRUBBING_EN	0 = Disabled:1 = Enabled
338	SWEEP_TBL_POINTER_SEL	0 = DATA:1 = SCAN
	SYSTEM_MODULE_VERIFY	Invalid when DSCB_COMM_ACTIVE is 0
339	TIME_CODE_CNT	0-255
341	TIME_MESSAGE_CNT	0-255
342	TOF_CAL_DONE	0: IN_PROGRESS, 1: DONE Invalid when DSCB_COMM_ACTIVE is 0
343	TOF_CAL_EN	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
	TOF_START_SEL	Invalid when DSCB_COMM_ACTIVE is 0
	TOF_STIM_DELAY	Invalid when DSCB_COMM_ACTIVE is 0
346	TOF_STIM_EXT	0 = Disabled:1 = Enabled Invalid when DSCB_COMM_ACTIVE is 0
	TOF_STIM_ON	Invalid when DSCB_COMM_ACTIVE is 0
	TOF_STIM_RATE	Invalid when DSCB_COMM_ACTIVE is 0

4.1.3 L2 – Science data products

Detailed description of the content and format of the calibrated data products.

4.1.3.1 EAS L2 data products

EAS Level-2 data is generated at MSSL and requires the following inputs:

1. EAS Level-1 Science data files
2. Ground calibration files
3. Onboard calibration files
4. SPICE kernels

Below is detailed description of EAS L2 data descriptions.

4.1.3.1.1 EAS normal mode electron 3D distribution

This file contains the Normal Mode Electron 3D distribution function data product from EAS[12] in the unit specified in the file name. The filename format is .cdf.

Filename: solo_L2_swa-eas[12]-nm3d-[unit]_[StartTime-EndTime]_V??.cdf

Expected data volume and time resolution: This file contains the data between the start time and end times mentioned in the file name and in the units mentioned by [unit]. The timetags in this file are of CDF_TIME_TT2000 type. The time resolution of data in this file is nominally 100 seconds but can also contain either 10 or 400 seconds resolution when EAS[12] is operated in high or low cadence, respectively. Each file contains 3D electron distribution in one of the following units: phase space density (psd) or differential number flux (dnf) or differential energy flux (def) and has data collected for 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that a file will cover 1



single 24 hour period for when EAS is operated in nominal or low cadence modes. For high cadence EAS data, a six-hour files will be provided.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L2>Level 2 Data
Descriptor	1	SWA-EAS[12]-NM3D-[unit]
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA_L2_swa-eas[12]-NM3D
Logical File id	1	solo_L2_swa-eas[12]-NM3D-[unit]_yyyymmddTHHMMSS-yyyymmddTHHMMSS V01
Logical Source Description	1	SWA-EAS[12] Nominal Mode 3D psd/dnf/def data
Rules of Use	1	Current best quality data – see caveats file or contact SWA/EAS team for information on use
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MM:SS
Mods	1	V01 First Version
Data Product	1	NM3D-[unit]>Nominal Mode 3D in one of psd/dnf/def units
Level	1	L2>Level 2 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
EPOCH	CDF TIME TT2000	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS[12] EPOCH			
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_INT8	-9223372036854775807			
LABLAXIS	CDF_CHAR	EPOCH			
UNITS	CDF_CHAR	ns			
VALIDMIN	CDF_INT8	1577836800000000000			
VALIDMAX	CDF_INT8	1893456000000000000			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_INT8	1577836800000000000			
SCALEMAX	CDF_INT8	1893456000000000000			
SI_CONVERSION	CDF_CHAR	1>1e+09 s			



VAR_TYPE	CDF_CHAR	support data
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] ELEVATION	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation			
CATDESC	CDF_CHAR	The bin-centred elevation angles of the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	-45.0			
VALIDMAX	CDF_REAL8	45.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	-45.0			
SCALEMAX	CDF_REAL8	45.0			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] ELEVATION delta_upper	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta upper			
CATDESC	CDF_CHAR	Upper half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] ELEVATION delta_lower	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta lower			
CATDESC	CDF_CHAR	Lower half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] AZIMUTH	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth			
CATDESC	CDF_CHAR	The bin-centred azimuthal angles of the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			



LABLAXIS	CDF_CHAR	Azimuthal Angle
UNITS	CDF_CHAR	Degrees
VALIDMIN	CDF_REAL8	0.0
VALIDMAX	CDF_REAL8	360.0
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL8	0.0
SCALEMAX	CDF_REAL8	360.0
VAR_TYPE	CDF_CHAR	support data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_AZIMUTH_delta_upper	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth delta upper			
CATDESC	CDF_CHAR	Upper half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_AZIMUTH_delta_lower	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth delta lower			
CATDESC	CDF_CHAR	Lower half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy			
CATDESC	CDF_CHAR	The bin-centred Energy values of the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Energy			
UNITS	CDF_CHAR	ElectronVolts			
VALIDMIN	CDF_REAL8	0.1			
VALIDMAX	CDF_REAL8	6000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	0.1			
SCALEMAX	CDF_REAL8	6000.0			
SI_CONVERSION	CDF_CHAR	1.60217646E-19>J			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY_delta_upper	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			



FIELDNAM	CDF_CHAR	EAS[12] Energy delta upper
CATDESC	CDF_CHAR	Upper half width of energy bin
FORMAT	CDF_CHAR	f14.4
UNITS	CDF_CHAR	ElectronVolts
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY_delta_lower	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy delta lower			
CATDESC	CDF_CHAR	Lower half width of energy bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	ElectronVolts			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_NM3D-[unit]_Data	CDF_REAL8	3	16,64,32	T	T,T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SWA_EAS[12]_NM3D-[unit]_Data			
CATDESC	CDF_CHAR	EAS[12] Nominal mode 3D electron distribution in phase space density			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Electron flux			
UNITS	CDF_CHAR	s ³ km ⁻⁶ for psd m ⁻² s ⁻¹ sr ⁻¹ eV ⁻¹ for dnf eV m ⁻² s ⁻² sr ⁻¹ eV ⁻¹ for def			
VALIDMIN	CDF_REAL8	0.1			
VALIDMAX	CDF_REAL8	65535.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	0.1			
SCALEMAX	CDF_REAL8	65535.0			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	SWA_EAS[12]_ELEVATION			
DEPEND_2	CDF_CHAR	SWA_EAS[12]_ENERGY			
DEPEND_3	CDF_CHAR	SWA_EAS[12]_AZIMUTH			
COORDINATE_SYSTEM	CDF_CHAR	Solar Ecliptic			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EAS[12]_TO_SRF	CDF_REAL8	2	3,3	T	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS[12] frame to Spacecraft reference frame			
FILLVAL	CDF_REAL8	-1.0E+31			
FORMAT	CDF_CHAR	f14.6			

VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
EAS[12] TO RTN	CDF_REAL8	2	3,3	T	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS[12] frame to RTN frame			
FILLVAL	CDF_REAL8	-1.0E+31			
FORMAT	CDF_CHAR	f14.6			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Quality			
CATDESC	CDF_CHAR	EAS[12] Data Quality flag			
DISPLAY TYPE	CDF_CHAR	time series			
DEPEND 0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS[12] data quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	4			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	4			
VAR_TYPE	CDF_CHAR	support_data			

4.1.3.1.2 EAS single strahl electron distribution

This file contains the calibrated single strahl electron distribution data product from the EAS and in unit specified in the filename. The file format is .cdf.

Filename: solo_L2_swa-eas[12]-ss-[unit]_[StartTime-EndTime]_V??.cdf

Expected data volume and time resolution: This file contains the single strahl data between the start time and end times mentioned in the file name and in the units mentioned by [unit] in the file name. The time tags are in CDF_TIME_TT2000 format. One file contains Electron fluxes provided in one of the units of psd, dnf and dpf. The time resolution of the file is nominally 100 seconds. It contains strahl electron distribution for one energy from 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single 24 hour period approximately.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter



Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L2>Level 2 Data
Descriptor	1	SWA-EAS[12]-SS-[unit]
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	Solo_L2_swa-eas[12]-SS-[unit]
Logical File id	1	solo_L2_swa-eas[12]_SS-[unit]_yyyymmddTHHMMSS-yyyymmddTHHMMSS V01
Logical Source Description	1	SWA-EAS[12] Single Strahl data in Phase Space Density
Rules of Use	1	Current best quality data – see caveats file or contact SWA/EAS team for information on use
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	SS-[unit]>Single Strahl - [psd/dnf/dpf]
Level	1	L2>Level 2 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF TIME TT2000	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] EPOCH			
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid			
DISPLAY_TYPE	CDF_CHAR	time series			
FILLVAL	CDF_INT8	-9223372036854775807			
LABLAXIS	CDF_CHAR	EPOCH			
UNITS	CDF_CHAR	ns			
VALIDMIN	CDF_INT8	1577836800000000000			
VALIDMAX	CDF_INT8	1893456000000000000			
SCALETYPE	CDF_CHAR	linear			
SCALEMIN	CDF_INT8	1577836800000000000			
SCALEMAX	CDF_INT8	1893456000000000000			
SI_CONVERSION	CDF_CHAR	1>1e+09 s			
VAR_TYPE	CDF_CHAR	support data			
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] ELEVATION	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation			

CATDESC	CDF_CHAR	The bin-centred elevation angles of the EAS[12] sensor
DEPEND_0	CDF_CHAR	EPOCH
FILLVAL	CDF_REAL8	-1E31
FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	Elevation Angle
UNITS	CDF_CHAR	Degrees
VALIDMIN	CDF_REAL8	-45.0
VALIDMAX	CDF_REAL8	45.0
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_REAL8	-45.0
SCALEMAX	CDF_REAL8	45.0
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION_delta_upper	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta upper			
CATDESC	CDF_CHAR	Upper half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION_delta_lower	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta lower			
CATDESC	CDF_CHAR	Lower half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_AZIMUTH	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth			
CATDESC	CDF_CHAR	The bin-centred azimuthal angles of the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Azimuthal Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	0.0			
VALIDMAX	CDF_REAL8	360.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	0.0			
SCALEMAX	CDF_REAL8	360.0			
VAR_TYPE	CDF_CHAR	support_data			



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_AZIMUTH_delta_upper	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth delta upper			
CATDESC	CDF_CHAR	Upper half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_AZIMUTH_delta_lower	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth delta lower			
CATDESC	CDF_CHAR	Lower half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy			
CATDESC	CDF_CHAR	The bin-centred Energy value used to obtain the single strahl from the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Energy			
UNITS	CDF_CHAR	ElectronVolts			
VALIDMIN	CDF_REAL8	0.1			
VALIDMAX	CDF_REAL8	6000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	0.1			
SCALEMAX	CDF_REAL8	6000.0			
SI_CONVERSION	CDF_CHAR	1.60217646E-19>J			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_SS-[unit] Data	CDF_REAL8	2	32, 16	T	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Single Strahl Data			
CATDESC	CDF_CHAR	Single strahl data from EAS[12]			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Electron flux			

UNITS	CDF_CHAR	s ³ km ⁻⁶ for psd m ⁻² s ⁻¹ sr ⁻¹ eV ⁻¹ for dnf eV m ⁻² s ⁻² sr ⁻¹ eV ⁻¹ for def
VALIDMIN	CDF_REAL8	0.1
VALIDMAX	CDF_REAL8	65535.0
SCALETYP	CDF_CHAR	Log
SCALEMIN	CDF_REAL8	0.1
SCALEMAX	CDF_REAL8	65535.0
DEPEND 0	CDF_CHAR	EPOCH
DEPEND 1	CDF_CHAR	SWA EAS[12] AZIMUTH
DEPEND 2	CDF_CHAR	SWA EAS[12] ELEVATION
COORDINATE_SYSTEM	CDF_CHAR	Solar Ecliptic
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EAS[12] TO SRF	CDF_REAL8	2	3,3	T	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS[12] frame to Spacecraft reference frame			
FILLVAL	CDF_REAL8	-1.0E+31			
FORMAT	CDF_CHAR	f14.6			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EAS[12] TO RTN	CDF_REAL8	2	3,3	F	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS[12] frame to RTN frame			
FILLVAL	CDF_REAL8	-1.0E+31			
FORMAT	CDF_CHAR	f14.6			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Quality			
CATDESC	CDF_CHAR	EAS[12] Data Quality flag			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND 0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS[12] data quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	4			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	4			
VAR_TYPE	CDF_CHAR	support_data			

4.1.3.1.3 EAS Triggered Mode 3D distribution

	Title: SWA Low Latency Data Product Description Document Version J Doc. No. SO-SWA-MSSL-IF-006 Page 255 of 413

This file contains the triggered mode 3D electron distribution function data product from the EAS in the units specified in the file name. The file format is .cdf.

Filename: solo_L2_swa-eas[12]-tm3d-[unit]_[StartTime-EndTime]_V??.cdf

Expected data volume and time resolution: This file contains the data between the start time and end times mentioned in the file name in the units mentioned by [unit]. The timetags in this file are of CDF_TIME_TT2000 type. Time resolution of data provided in these files is 1second. Each file contains 3D electron distribution in one of the following units: phase space density (psd) or differential number flux (dnf) or differential energy flux (def) and has data collected for 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that a file will cover all trigger data in a given 24 hour period. Each trigger data set is of 5 minutes.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L2>Level 2 Data
Descriptor	1	SWA-EAS[12]-TM3D-[unit]
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA_L2_swa-eas[12]-TM3D-[unit]
Logical File id	1	solo_L2_swa-eas[12]-TM3D-[unit]_yyyymmddTHHMMSS-yyyymmddTHHMMSS_V01
Logical Source Description	1	SWA-EAS[12] Trigger Mode 3D data in psd/dnf/def
Rules of Use	1	Current best quality data – see caveats file or contact SWA/EAS team for information on use
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	TM3D-[unit]>Trigger Mode 3D in Phase Space Density
Level	1	L2>Level 2 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF_TIME_TT2000	1	1	T	F
Attribute Name	Data Type	Value			

FIELDNAM	CDF_CHAR	EAS[12] EPOCH
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid
DISPLAY_TYPE	CDF_CHAR	time series
FILLVAL	CDF_INT8	-9223372036854775807
LABLAXIS	CDF_CHAR	EPOCH
UNITS	CDF_CHAR	ns
VALIDMIN	CDF_INT8	1577836800000000000
VALIDMAX	CDF_INT8	1893456000000000000
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_INT8	1577836800000000000
SCALEMAX	CDF_INT8	1893456000000000000
SI_CONVERSION	CDF_CHAR	1>1e+09 s
VAR_TYPE	CDF_CHAR	support data
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation			
CATDESC	CDF_CHAR	The bin-centred elevation angles of the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	-45.0			
VALIDMAX	CDF_REAL8	45.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	-45.0			
SCALEMAX	CDF_REAL8	45.0			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION_delta_upper	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta upper			
CATDESC	CDF_CHAR	Upper half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ELEVATION_delta_lower	CDF_REAL8	1	16	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta lower			



CATDESC	CDF_CHAR	Lower half width of elevation bin
FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	Elevation Angle
UNITS	CDF_CHAR	Degrees
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] AZIMUTH	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth			
CATDESC	CDF_CHAR	The bin-centred azimuthal angles of the EAS[12] sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Azimuthal Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	0.0			
VALIDMAX	CDF_REAL8	360.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	0.0			
SCALEMAX	CDF_REAL8	360.0			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] AZIMUTH delta_upper	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth delta upper			
CATDESC	CDF_CHAR	Upper half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] AZIMUTH delta_lower	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth delta lower			
CATDESC	CDF_CHAR	Lower half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] ENERGY	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy			

CATDESC	CDF_CHAR	The bin-centred Energy values of the EAS[12] sensor
DEPEND_0	CDF_CHAR	EPOCH
FILLVAL	CDF_REAL8	-1E31
FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	Energy
UNITS	CDF_CHAR	ElectronVolts
VALIDMIN	CDF_REAL8	0.1
VALIDMAX	CDF_REAL8	6000.0
SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	0.1
SCALEMAX	CDF_REAL8	6000.0
SI_CONVERSION	CDF_CHAR	1.60217646E-19>J
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY_delta_upper	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy delta upper			
CATDESC	CDF_CHAR	Upper half width of energy bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	ElectronVolts			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY_delta_lower	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy delta lower			
CATDESC	CDF_CHAR	Lower half width of energy bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	ElectronVolts			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_TM3D-[unit] Data	CDF_REAL8	3	16,64,32	T	T,T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SWA_EAS[12] TM3D-psd Data			
CATDESC	CDF_CHAR	EAS[12] Trigger mode 3D electron distribution in psd/dnf/def			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Electron flux			
UNITS	CDF_CHAR	s ³ km ⁻⁶ for psd m ⁻² s ⁻¹ sr ⁻¹ eV ⁻¹ for dnf eV m ⁻² s ⁻² sr ⁻¹ eV ⁻¹ for def			
VALIDMIN	CDF_REAL8	0.1			
VALIDMAX	CDF_REAL8	65535.0			

SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	0.1
SCALEMAX	CDF_REAL8	65535.0
DEPEND_0	CDF_CHAR	SWA_EAS[12] EPOCH
DEPEND_1	CDF_CHAR	SWA_EAS[12] ELEVATION
DEPEND_2	CDF_CHAR	SWA_EAS[12] ENERGY
DEPEND_3	CDF_CHAR	SWA_EAS[12] AZIMUTH
COORDINATE_SYSTEM	CDF_CHAR	EAS[12]
VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EAS[12] TO_SRF	CDF_REAL8	2	3,3	T	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS[12] frame to Spacecraft reference frame			
FILLVAL	CDF_REAL8	-1.0E+31			
FORMAT	CDF_CHAR	f14.6			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EAS[12] TO RTN	CDF_REAL8	2	3,3	F	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS[12] frame to RTN frame			
FILLVAL	CDF_REAL8	-1.0E+31			
FORMAT	CDF_CHAR	f14.6			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Data Quality			
CATDESC	CDF_CHAR	EAS[12] Data Quality flag			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS[12] data quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	4			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	4			
VAR_TYPE	CDF_CHAR	support_data			

4.1.3.1.4 EAS Burst Mode (pitch angle data)

This file contains the onboard selected electron pitch angle data rebinned on the ground using calibrated magnetic field data. The file format is .cdf.

	Title: SWA Low Latency Data Product Description Document Version J Doc. No. SO-SWA-MSSL-IF-006 Page 260 of 413

Filename: solo_L2_swa-eas-pad-[unit]_[StartTime-EndTime]_V??.cdf

Expected data volume and time resolution: This file contains the onboard selected pitch angle data between the start time and end time mentioned in the file name and in units of either psd, dnf or def mentioned by *unit*. The time tags are of CDF_TIME_TT2000 format. The time resolution of the file is nominally 0.125 seconds for 10 minutes, nominally, but the duration of the data varies depending on telemetry availability. It contains electron pitch angle data for 64 energies, 32 pitch angles from 2 deflectors for each time-stamp. The amount of data in this file depends on the telemetry available.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L2>Level 2 Data
Descriptor	1	SWA-EAS-pad-[unit]
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA_L2_swa-eas-pad-[unit]
Logical File id	1	solo_L2_swa-eas-pad-[unit]_yyyymmddTHHMMSS-yyyymmddTHHMMSS_V01
Logical Source Description	1	SWA-EAS Electron Pitch Angle data in psd/dnf/def
Rules of Use	1	Current best quality data – see caveats file or contact SWA/EAS team for information on use
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	pad-[unit]>Pitch Angle Distribution in psd/dnf/def
Level	1	L2>Level 2 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF_TIME_TT2000	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] EPOCH			
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid			

DISPLAY_TYPE	CDF_CHAR	time series
FILLVAL	CDF_INT8	-9223372036854775807
LABLAXIS	CDF_CHAR	EPOCH
UNITS	CDF_CHAR	ns
VALIDMIN	CDF_INT8	1577836800000000000
VALIDMAX	CDF_INT8	1893456000000000000
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_INT8	1577836800000000000
SCALEMAX	CDF_INT8	1893456000000000000
SI_CONVERSION	CDF_CHAR	1>1e+09 s
VAR_TYPE	CDF_CHAR	support data
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_PAD-[unit] Data	CDF_REAL8	3	2,64,32	T	T,T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS pitch angle Data			
CATDESC	CDF_CHAR	EAS electron pitch angle distribution in psd/dnf/def			
DISPLAY_TYPE	CDF_CHAR	Spectrogram			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	PAD-[unit]			
UNITS	CDF_CHAR	s ³ km ⁻⁶ for psd m ⁻² s ⁻¹ sr ⁻¹ eV ⁻¹ for dnf eV m ⁻² s ⁻² sr ⁻¹ eV ⁻¹ for def			
VALIDMIN	CDF_REAL8	0.1			
VALIDMAX	CDF_REAL8	65535.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	0.1			
SCALEMAX	CDF_REAL8	65535.0			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	SWA EAS ELEVATION			
DEPEND_2	CDF_CHAR	SWA EAS ENERGY			
DEPEND_3	CDF_CHAR	SWA EAS AZIMUTH			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_ELEVATION	CDF_REAL8	1	2	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Elevation			
CATDESC	CDF_CHAR	The bin-centred elevation angles of the EAS sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	-45.0			
VALIDMAX	CDF_REAL8	45.0			



SCALETYP	CDF CHAR	linear
SCALEMIN	CDF REAL8	-45.0
SCALEMAX	CDF REAL8	45.0
VAR TYPE	CDF CHAR	support data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] ELEVATION delta upper	CDF_REAL8	1	2	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta upper			
CATDESC	CDF_CHAR	Upper half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VAR TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] ELEVATION delta upper	CDF_REAL8	1	2	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Elevation delta lower			
CATDESC	CDF_CHAR	Lower half width of elevation bin			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Elevation Angle			
UNITS	CDF_CHAR	Degrees			
VAR TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS AZIMUTH	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Azimuth			
CATDESC	CDF_CHAR	The bin-centred azimuthal (Pitch angles) angles of the EAS sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Azimuthal Angle			
UNITS	CDF_CHAR	Degrees			
VALIDMIN	CDF_REAL8	0.0			
VALIDMAX	CDF_REAL8	360.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	0.0			
SCALEMAX	CDF_REAL8	360.0			
VAR TYPE	CDF_CHAR	support data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS[12] AZIMUTH delta upper	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth delta upper			
CATDESC	CDF_CHAR	Upper half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			



VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_AZIMUTH_delta_lower	CDF_REAL8	1	32	F	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Azimuth delta lower			
CATDESC	CDF_CHAR	Lower half width of azimuth bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	Degrees			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_ENERGY	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Energies			
CATDESC	CDF_CHAR	The bin-centred Energy values of the EAS sensor			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Energy			
UNITS	CDF_CHAR	ElectronVolts			
VALIDMIN	CDF_REAL8	0.1			
VALIDMAX	CDF_REAL8	6000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	0.1			
SCALEMAX	CDF_REAL8	6000.0			
SI_CONVERSION	CDF_CHAR	1.60217646E-19>J			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY_delta_upper	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy delta upper			
CATDESC	CDF_CHAR	Upper half width of energy bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	ElectronVolts			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS[12]_ENERGY_delta_lower	CDF_REAL8	1	64	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS[12] Energy delta lower			
CATDESC	CDF_CHAR	Lower half width of energy bin			
FORMAT	CDF_CHAR	f14.4			
UNITS	CDF_CHAR	ElectronVolts			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_EasUsed	CDF_UINT4	1	1	T	F

Attribute Name	Data Type	Value
FIELDNAM	CDF_CHAR	EAS sensor used
CATDESC	CDF_CHAR	The EAS sensor used for Burst data collection
DEPEND_0	CDF_CHAR	EPOCH
FORMAT	CDF_CHAR	I1
LABLAXIS	CDF_CHAR	EAS used
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT2	1
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT2	1
VAR_TYPE	CDF_CHAR	support data
VAR_NOTES	CDF_CHAR	0:EAS1; 1:EAS2

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EAS_TO_SRF	CDF_REAL8	2	3,3	T	T,T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS-SRF Rotation Matrix			
CATDESC	CDF_CHAR	The rotation matrix to go from EAS[12] frame to Spacecraft reference frame			
FILLVAL	CDF_REAL8	-1.0E+31			
FORMAT	CDF_CHAR	f14.6			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS Data Quality			
CATDESC	CDF_CHAR	EAS Data Quality flag			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS data quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	4			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	4			
VAR_TYPE	CDF_CHAR	support data			

4.1.3.1.5 EAS Onboard Moments

This file contains the onboard calculated electron moments data product from EAS. The file format is .cdf.

Filename: solo_L2_swa-eas-onbmoms_[StartTime-EndTime]_V??.cdf

Expected data volume and time resolution: This file contains the onboard calculated electron partial moments data combined on the ground to produce one single moments

	Title: SWA Low Latency Data Product Description Document Version J Doc. No. SO-SWA-MSSL-IF-006 Page 265 of 413

between the start time and end times mentioned in the file name. The start and end times are in UT. The time resolution of the file is nominally 4 seconds. In this case there will be a maximum of 21600 records in the file.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L2>Level 2 Data
Descriptor	1	swa-eas-onbmoms
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	SWA_L2_swa-eas-onbmoms
Logical File id	1	solo_L2_swa-eas-onbmoms yyyymmddTHHMMSS-yyyymmddTHHMMSS V01
Logical Source Description	1	SWA-EAS Onboard calculated Moments
Rules of Use	1	Consult with MSSL-UCL before using
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	onbmoms>Onboard Moments
Level	1	L2>Level 2 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF TIME TT2000	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS[12] EPOCH			
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF INT8	-9223372036854775807			
LABLAXIS	CDF CHAR	EPOCH			
UNITS	CDF CHAR	ns			
VALIDMIN	CDF INT8	1577836800000000000			
VALIDMAX	CDF INT8	1893456000000000000			
SCALETYP	CDF CHAR	linear			
SCALEMIN	CDF INT8	1577836800000000000			
SCALEMAX	CDF INT8	1893456000000000000			
SI_CONVERSION	CDF CHAR	1>1e+09 s			
VAR_TYPE	CDF_CHAR	support_data			



VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS Density	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Electron Density			
CATDESC	CDF_CHAR	Electron Number Density			
COORDINATE_SYSTEM	CDF_CHAR	Solar Ecliptic			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.5			
LABLAXIS	CDF_CHAR	Density			
VALIDMIN	CDF_REAL8	0			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	0			
SCALEMAX	CDF_REAL8	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E+06>m ⁻³			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS_SRF Velocity	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SWA EAS_SRF Velocity			
CATDESC	CDF_CHAR	Electron bulk velocity in Spacecraft reference frame			
COORDINATE_SYSTEM	CDF_CHAR	SOLO-SRF			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS VEL LABEL			
VALIDMIN	CDF_REAL8	-2000.0			
VALIDMAX	CDF_REAL8	+2000.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_REAL8	-2000.0			
SCALEMAX	CDF_REAL8	+2000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP VEL LABEL			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS RTN Velocity	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SWA EAS_SRF Velocity			
CATDESC	CDF_CHAR	Electron bulk velocity in RTN reference frame			
COORDINATE_SYSTEM	CDF_CHAR	SOLO-RTN			



DISPLAY TYPE	CDF CHAR	time series
DEPEND 0	CDF CHAR	EPOCH
FILLVAL	CDF REAL8	-1E+31
FORMAT	CDF CHAR	f14.4
LABL_PTR 1	CDF CHAR	EAS_VEL_LABEL
VALIDMIN	CDF REAL8	-2000.0
VALIDMAX	CDF REAL8	+2000.0
SCALETYP	CDF CHAR	linear
SCALEMIN	CDF REAL8	-2000.0
SCALEMAX	CDF REAL8	+2000.0
VAR TYPE	CDF CHAR	data
UNITS	CDF CHAR	km s ⁻¹
SI CONVERSION	CDF CHAR	1E+03>m s ⁻¹
REPRESENTATION 1	CDF CHAR	REP_VEL_LABEL

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS_SRF_Pressure	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SWA EAS_SRF_Pressure			
CATDESC	CDF_CHAR	Electron Pressure tensor in spacecraft reference frame			
COORDINATE_SYSTEM	CDF_CHAR	SOLO-SRF			
DISPLAY TYPE	CDF_CHAR	time series			
DEPEND 0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Pressure			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF_CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	nPa			
SI CONVERSION	CDF_CHAR	1E-09>P			
REPRESENTATION 1	CDF_CHAR	REP_EAS_PRES_1			
REPRESENTATION 2	CDF_CHAR	REP_EAS_PRES_2			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS RTN_Pressure	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	SWA EAS RTN_Pressure			
CATDESC	CDF_CHAR	Electron Pressure tensor in RTN reference frame			
COORDINATE_SYSTEM	CDF_CHAR	SOLO-RTN			
DISPLAY TYPE	CDF_CHAR	time series			
DEPEND 0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Pressure			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			



SCALETYP	CDF CHAR	Log
SCALEMIN	CDF REAL8	1E-6
SCALEMAX	CDF REAL8	1E+3
VAR TYPE	CDF CHAR	data
UNITS	CDF CHAR	nPa
SI_CONVERSION	CDF CHAR	1E-09>P
REPRESENTATION_1	CDF CHAR	REP EAS PRES 1
REPRESENTATION_2	CDF CHAR	REP EAS PRES 2

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS1_SRF Heatflux	CDF REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	SWA EAS1_SRF Heatflux			
CATDESC	CDF_CHAR	Electron Heat Flux in spacecraft reference frame			
COORDINATE SYSTEM	CDF CHAR	SOLO-SRF			
DISPLAY TYPE	CDF CHAR	time series			
DEPEND_0	CDF CHAR	EPOCH			
FILLVAL	CDF REAL8	-1E+31			
FORMAT	CDF CHAR	f14.4			
LABL_PTR_1	CDF CHAR	EAS HFlux LABEL			
VALIDMIN	CDF REAL8	1E-05			
VALIDMAX	CDF REAL8	1E+05			
SCALETYP	CDF CHAR	log			
SCALEMIN	CDF REAL8	1E-05			
SCALEMAX	CDF REAL8	1E+05			
VAR TYPE	CDF CHAR	data			
UNITS	CDF CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF CHAR	REP_HFlux_LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS1_RTN Heatflux	CDF REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	SWA EAS1_RTN Heatflux			
CATDESC	CDF_CHAR	Electron Heat Flux in RTN reference frame			
COORDINATE SYSTEM	CDF CHAR	SOLO-RTN			
DISPLAY TYPE	CDF CHAR	time series			
DEPEND_0	CDF CHAR	EPOCH			
FILLVAL	CDF REAL8	-1E+31			
FORMAT	CDF CHAR	f14.4			
LABL_PTR_1	CDF CHAR	EAS HFlux LABEL			
VALIDMIN	CDF REAL8	1E-05			
VALIDMAX	CDF REAL8	1E+05			
SCALETYP	CDF CHAR	log			
SCALEMIN	CDF REAL8	1E-05			
SCALEMAX	CDF REAL8	1E+05			
VAR TYPE	CDF CHAR	data			
UNITS	CDF CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF CHAR	REP_HFlux_LABEL			



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
REP_VEL_LABEL	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Velocity			
CATDESC	CDF_CHAR	The vector representation for the velocity vector ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
REP_HFlux_LABEL	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Heat flux			
CATDESC	CDF_CHAR	The vector representation for the Heat flux vector ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
REP_EAS_PRES_1	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Rows of Pressure Tensor			
CATDESC	CDF_CHAR	The vector representation for the rows of the pressure tensor ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
REP_EAS_PRES_2	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Columns of the Pressure Tensor			
CATDESC	CDF_CHAR	The vector representation for the columns of the pressure tensor ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 Data Quality			
CATDESC	CDF_CHAR	EAS1 Data Quality flag			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS1 data quality			

VALIDMIN	CDF_UINT4	0
VALIDMAX	CDF_UINT4	4
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_UINT4	0
SCALEMAX	CDF_UINT4	4
VAR_TYPE	CDF_CHAR	support_data

4.1.3.1.6 Normal Mode EAS Ground Moments

This file contains the ground calculated electron moments data product from EAS Nominal mode electron distributions. The file format is .cdf.

Filename: solo_L2_swa-eas-NM-GrndMoms_[StartTime-EndTime]_V??.cdf

Expected data volume and time resolution: This file contains electron moments data between the start time and end times mentioned in the file name. The start and end times are in UT. The time resolution of data in this file follows the resolution of nominal mode electron distributions.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L2>Level 2 Data
Descriptor	1	SWA-EAS-NM-GrndMoms
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind
Mission Group	1	Solar Orbiter
Logical Source	1	solo_L2_swa-eas-NM-GrndMoms
Logical File id	1	solo_L2_swa-eas-NM-GrndMoms _yyyymmddTHHMMSS-yyyymmddTHHMMSS_V01
Logical Source Description	1	SWA-EAS Onboard calculated Moments
Rules of Use	1	Current best quality data – see caveats file or contact SWA/EAS team for information on use
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MM:SS
Mods	1	V01 First Version
Data Product	1	NM-GrndMoms>Normal Mode - Ground Moments
Level	1	L2>Level 2 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF_TIME TT2000	1	1	T	F



Attribute Name	Data Type	Value
FIELDNAM	CDF_CHAR	EAS[12] EPOCH
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid
DISPLAY_TYPE	CDF_CHAR	time_series
FILLVAL	CDF_INT8	-9223372036854775807
LABLAXIS	CDF_CHAR	EPOCH
UNITS	CDF_CHAR	ns
VALIDMIN	CDF_INT8	1577836800000000000
VALIDMAX	CDF_INT8	1893456000000000000
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_INT8	1577836800000000000
SCALEMAX	CDF_INT8	1893456000000000000
SI_CONVERSION	CDF_CHAR	1>1e+09 s
VAR_TYPE	CDF_CHAR	support data
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA EAS SCPotential	CDF_REAL8	1	1	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Spacecraft Potential			
CATDESC	CDF_CHAR	Spacecraft Potential used to discard lowest energies			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	F14.4			
LABLAXIS	CDF_CHAR	Spacecraft Potential			
VALIDMIN	CDF_UINT4	-100.0			
VALIDMAX	CDF_UINT4	100.0			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	-100.0			
SCALEMAX	CDF_UINT4	100.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	Volts			
SI_CONVERSION	CDF_CHAR	>			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Electron Density			
CATDESC	CDF_CHAR	Electron Number Density			
COORDINATE_SYSTEM	CDF_CHAR	Solar Ecliptic			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Density			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			

SCALETYP	CDF CHAR	log
SCALEMIN	CDF UINT4	1E-9
SCALEMAX	CDF UINT4	1E+3
VAR TYPE	CDF CHAR	data
UNITS	CDF CHAR	cm ⁻³
SI CONVERSION	CDF CHAR	1E-06>m ⁻³

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_Velocity	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	Electron bulk Velocity			
CATDESC	CDF CHAR	Bulk velocity of electrons			
COORDINATE SYSTEM	CDF CHAR	Solar Ecliptic			
DISPLAY TYPE	CDF CHAR	time series			
DEPEND 0	CDF CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF CHAR	f14.4			
LABL PTR 1	CDF CHAR	EAS VEL LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR TYPE	CDF CHAR	data			
UNITS	CDF CHAR	km s ⁻¹			
SI CONVERSION	CDF CHAR	1E+03>m s ⁻¹			
REPRESENTATION 1	CDF CHAR	REP VEL LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_Pressure	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	Electron Pressure			
CATDESC	CDF CHAR	Electron Pressure tensor			
COORDINATE SYSTEM	CDF CHAR	Solar Ecliptic			
DISPLAY TYPE	CDF CHAR	time series			
DEPEND 0	CDF CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF CHAR	f14.4			
LABLAXIS	CDF CHAR	Pressure			
VALIDMIN	CDF_REAL8	1E-6			
VALIDMAX	CDF_REAL8	1E+3			
SCALETYP	CDF CHAR	Log			
SCALEMIN	CDF_REAL8	1E-6			
SCALEMAX	CDF_REAL8	1E+3			
VAR TYPE	CDF CHAR	data			
UNITS	CDF CHAR	nPa			
SI CONVERSION	CDF CHAR	1E-09>P			
REPRESENTATION 1	CDF CHAR	REP EAS PRES 1			
REPRESENTATION 2	CDF CHAR	REP EAS PRES 2			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_Heatflux	CDF_REAL8	1	3	T	T



Attribute Name	Data Type	Value
FIELDNAM	CDF_CHAR	Electron Heat Flux
CATDESC	CDF_CHAR	Electron Heat Flux
COORDINATE_SYSTEM	CDF_CHAR	Solar Ecliptic
DISPLAY_TYPE	CDF_CHAR	time_series
DEPEND_0	CDF_CHAR	EPOCH
FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABL_PTR_1	CDF_CHAR	EAS_HFlux_LABEL
VALIDMIN	CDF_REAL8	1E-05
VALIDMAX	CDF_REAL8	1E+05
SCALETYP	CDF_CHAR	log
SCALEMIN	CDF_REAL8	1E-05
SCALEMAX	CDF_REAL8	1E+05
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²
REPRESENTATION_1	CDF_CHAR	REP_HFlux_LABEL

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
REP_VEL_LABEL	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Velocity			
CATDESC	CDF_CHAR	The vector representation for the velocity vector ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR_TYPE	CDF_CHAR	support data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
REP_HFlux_LABEL	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Heat flux			
CATDESC	CDF_CHAR	The vector representation for the Heat flux vector ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR TYPE	CDF_CHAR	support data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
REP_EAS_PRES_1	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Rows of Pressure Tensor			
CATDESC	CDF_CHAR	The vector representation for the rows of the pressure tensor ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR TYPE	CDF_CHAR	support data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY

REP EAS PRES 2	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Columns of the Pressure Tensor			
CATDESC	CDF_CHAR	The vector representation for the columns of the pressure tensor ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 Data Quality			
CATDESC	CDF_CHAR	EAS1 Data Quality flag			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS1 data quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	4			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	4			
VAR_TYPE	CDF_CHAR	support_data			

4.1.3.1.7 Trigger Mode EAS Ground Moments

This file contains the ground calculated electron moments data product from EAS Trigger mode electron distributions. The file format is .cdf.

Filename: solo_L2_swa-eas-TM-GrndMoms_[StartTime-EndTime]_V??.cdf

Expected data volume and time resolution: This file contains electron moments data between the start time and end times mentioned in the file name. The start and end times are in UT. The time resolution of data in this file is 1 second and the number of records depend on the number of triggers on a given day.

Global Attributes

Name	Entry	Value
Project	1	Solar Orbiter
Project	2	Cosmic Visions
Source Name	1	SOLO>Solar Orbiter
Discipline	1	Space Physics>Interplanetary Studies
Data Type	1	L2>Level 2 Data
Descriptor	1	SWA-EAS-TM-GrndMoms
Data Version	1	01
Software Version	1	01.00.00
PI Name	1	C. J. Owen
PI Affiliation	1	MSSL-UCL, University College London, UK
Instrument Type	1	Plasma and Solar Wind



Mission Group	1	Solar Orbiter
Logical Source	1	solo_L2_swa-eas-TM-GrndMoms
Logical File id	1	solo_L2_swa-eas-TM-GrndMoms _yyyymmddTHHMMSS-yyyymmddTHHMMSS V01
Logical Source Description	1	SWA-EAS ground calculated Moments
Rules of Use	1	Current best quality data – see caveats file or contact SWA/EAS team for information on use
Generated by	1	MSSL-UCL
Generation date	1	YYYY-MM-DDTHH:MN:SS
Mods	1	V01 First Version
Data Product	1	NM-GrndMoms>Trigger Mode - Ground Moments
Level	1	L2>Level 2 Data
Instrument	1	SWA-EAS>Solar-Wind-Analyser-Electron- Analyser-System

Variables

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
EPOCH	CDF TIME TT2000	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF CHAR	EAS[12] EPOCH			
CATDESC	CDF_CHAR	Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid			
DISPLAY_TYPE	CDF_CHAR	time_series			
FILLVAL	CDF_INT8	-9223372036854775807			
LABLAXIS	CDF_CHAR	EPOCH			
UNITS	CDF_CHAR	ns			
VALIDMIN	CDF_INT8	1577836800000000000			
VALIDMAX	CDF_INT8	1893456000000000000			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_INT8	1577836800000000000			
SCALEMAX	CDF_INT8	1893456000000000000			
SI_CONVERSION	CDF_CHAR	1>1e+09 s			
VAR_TYPE	CDF_CHAR	support data			
VAR_NOTES	CDF_CHAR	The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SWA_EAS_SCPotential	CDF_REAL8	1	1	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Spacecraft Potential			
CATDESC	CDF_CHAR	Spacecraft Potential used to discard lowest energies			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	F14.4			
LABLAXIS	CDF_CHAR	Spacecraft Potential			
VALIDMIN	CDF_UINT4	-100.0			

VALIDMAX	CDF_UINT4	100.0
SCALETYP	CDF_CHAR	linear
SCALEMIN	CDF_UINT4	-100.0
SCALEMAX	CDF_UINT4	100.0
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	Volts
SI_CONVERSION	CDF_CHAR	>

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_N	CDF_REAL8	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Electron Density			
CATDESC	CDF_CHAR	Electron Number Density			
COORDINATE_SYSTEM	CDF_CHAR	Solar Ecliptic			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABLAXIS	CDF_CHAR	Density			
VALIDMIN	CDF_UINT4	1E-9			
VALIDMAX	CDF_UINT4	1E+3			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_UINT4	1E-9			
SCALEMAX	CDF_UINT4	1E+3			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	cm ⁻³			
SI_CONVERSION	CDF_CHAR	1E-06>m ⁻³			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_Velocity	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Electron bulk Velocity			
CATDESC	CDF_CHAR	Bulk velocity of electrons			
COORDINATE_SYSTEM	CDF_CHAR	Solar Ecliptic			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_VEL_LABEL			
VALIDMIN	CDF_REAL8	-10000.0			
VALIDMAX	CDF_REAL8	+10000.0			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	-10000.0			
SCALEMAX	CDF_REAL8	+10000.0			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	km s ⁻¹			
SI_CONVERSION	CDF_CHAR	1E+03>m s ⁻¹			
REPRESENTATION_1	CDF_CHAR	REP_VEL_LABEL			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS_Pressure	CDF_REAL8	1	9	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Electron Pressure			



CATDESC	CDF_CHAR	Electron Pressure tensor
COORDINATE_SYSTEM	CDF_CHAR	Solar Ecliptic
DISPLAY_TYPE	CDF_CHAR	time series
DEPEND_0	CDF_CHAR	EPOCH
FILLVAL	CDF_REAL8	-1E+31
FORMAT	CDF_CHAR	f14.4
LABLAXIS	CDF_CHAR	Pressure
VALIDMIN	CDF_REAL8	1E-6
VALIDMAX	CDF_REAL8	1E+3
SCALETYP	CDF_CHAR	Log
SCALEMIN	CDF_REAL8	1E-6
SCALEMAX	CDF_REAL8	1E+3
VAR_TYPE	CDF_CHAR	data
UNITS	CDF_CHAR	nPa
SI_CONVERSION	CDF_CHAR	1E-09>P
REPRESENTATION_1	CDF_CHAR	REP EAS PRES 1
REPRESENTATION_2	CDF_CHAR	REP EAS PRES 2

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SWA_EAS1_Heatflux	CDF_REAL8	1	3	T	T
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Electron Heat Flux			
CATDESC	CDF_CHAR	Electron Heat Flux			
COORDINATE_SYSTEM	CDF_CHAR	Solar Ecliptic			
DISPLAY_TYPE	CDF_CHAR	time series			
DEPEND_0	CDF_CHAR	SWA_EAS_EPOCH			
FILLVAL	CDF_REAL8	-1E+31			
FORMAT	CDF_CHAR	f14.4			
LABL_PTR_1	CDF_CHAR	EAS_Hflux_LABEL			
VALIDMIN	CDF_REAL8	1E-05			
VALIDMAX	CDF_REAL8	1E+05			
SCALETYP	CDF_CHAR	log			
SCALEMIN	CDF_REAL8	1E-05			
SCALEMAX	CDF_REAL8	1E+05			
VAR_TYPE	CDF_CHAR	data			
UNITS	CDF_CHAR	erg s ⁻¹ cm ⁻²			
SI_CONVERSION	CDF_CHAR	1E-03>J s ⁻¹ m ⁻²			
REPRESENTATION_1	CDF_CHAR	REP_Hflux_LABEL			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
REP_VEL_LABEL	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Velocity			
CATDESC	CDF_CHAR	The vector representation for the velocity vector ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY

REP_HFlux_LABEL	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Heat flux			
CATDESC	CDF_CHAR	The vector representation for the Heat flux vector ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
REP_EAS_PRES_1	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Rows of Pressure Tensor			
CATDESC	CDF_CHAR	The vector representation for the rows of the pressure tensor ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
REP_EAS_PRES_2	CDF_CHAR	1	3	F	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	Vector Representation for Columns of the Pressure Tensor			
CATDESC	CDF_CHAR	The vector representation for the columns of the pressure tensor ['x','y','z']			
FORMAT	CDF_CHAR	A1			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	1	1	T	F
Attribute Name	Data Type	Value			
FIELDNAM	CDF_CHAR	EAS1 Data Quality			
CATDESC	CDF_CHAR	EAS1 Data Quality flag			
DISPLAY_TYPE	CDF_CHAR	time_series			
DEPEND_0	CDF_CHAR	EPOCH			
FILLVAL	CDF_UINT4	255			
LABLAXIS	CDF_CHAR	EAS1 data quality			
VALIDMIN	CDF_UINT4	0			
VALIDMAX	CDF_UINT4	4			
SCALETYP	CDF_CHAR	linear			
SCALEMIN	CDF_UINT4	0			
SCALEMAX	CDF_UINT4	4			
VAR_TYPE	CDF_CHAR	support_data			

4.1.3.2 PAS L2 Products

IRAP will produce the L2 CDF following files:

- 3D ion distributions expressed as distribution
solo_L2_swa-pas-3d-flux_yyyymmdd_V01.cdf
- 3D ion distributions expressed as differential flux
solo_L2_swa-pas-3d-flux_yyyymmdd_V01.cdf
- Ground calculated H+ moments
solo_L2_swa-pas-mom_yyyymmdd_V01.cdf

4.1.3.2.1 PAS 3D ion distribution (differential flux)

Filename: solo_L2_swa-pas-eflux_yyyymmdd_V01.cdf

Item	Value	Dim.	Type	Date
VARIABLE	Epoch		CDF_TIME_TT2000	True
CATDESC	Epoch encoded as Terrestrial Time on rotating Earth geoid, ns since J2000			
DISPLAY_TYPE	time_series			
FIELDNAM	Epoch			
FILLVAL	-9.22337203685478E+018			
FORMAT	I			
LABLAXIS	Epoch			
SCALEMAX	9.22337203685478E+018			
SCALEMIN	-9.22337203685478E+018			
SCALETYP	linear			
SI_CONVERSION	1.0E-9>s			
UNITS	ns			
VALIDMAX	9.22337203685478E+018			
VALIDMIN	-9.22337203685478E+018			
VAR_TYPE	Data			
VARIABLE	Half_interval		CDF_REAL4	True
CATDESC	Acquisition half interval			
DEPEND_0	Epoch			
DISPLAY_TYPE	time_series			
FIELDNAM	Half_interval			
FILLVAL	-1			
FORMAT	F4.2			
LABLAXIS	Half-interval			
SCALEMAX	10			
SCALEMIN	-10			
SCALETYP	linear			
SI_CONVERSION	1.0s			

UNITS	s			
VALIDMAX	60			
VALIDMIN	-60			
VAR_TYPE	metadata			
VARIABLE	SCET		CDF_REAL8	True
CATDESC	Elapsed time on the onboard clock			
DEPEND_0	Epoch			
DISPLAY_TYPE	time_series			
FIELDNAM	SCET			
FILLVAL	-1E+031			
FORMAT	f14.3			
LABLAXIS	SCET			
SCALEMAX	4294970000.0			
SCALEMIN	0.0			
UNITS	Ticks			
VALIDMAX	4294970000.0			

Item	Value	Dim.	Type	Date
VALIDMIN	0.0			
VAR_TYPE	support_data			
VARIABLE	Info		CDF_UINT1	True
CATDESC	Info 0:Ground 1:Normal 2:Snapshot 3:Burst 4:Engineering 5:Calib			
DEPEND_0	Epoch			
FIELDNAM	Info			
FILLVAL	255			
FORMAT	I3			
LABLAXIS	Info			
SCALETYP	linear			
UNITS	unitless			
VALIDMAX	11			
VALIDMIN	7			
VAR_TYPE	support_data			
VARIABLE	start_energy		CDF_INT2	True
CATDESC	Start energy bin			
DEPEND_0	Epoch			
FIELDNAM	start_energy			
FILLVAL	-32768			
FORMAT	I5			
LABLAXIS	Start energy			

SCALETYP	linear			
UNITS	unitless			
VALIDMAX	96			
VALIDMIN	0			
VAR_TYPE	support_data			
VARIABLE	nb_energy		CDF_INT2	True
CATDESC	Number energy bins			
DEPEND_0	Epoch			
FIELDNAM	nb_energy			
FILLVAL	-32768			
FORMAT	I5			
LABLAXIS	Number energy			
SCALETYP	linear			
UNITS	unitless			
VALIDMAX	96			
VALIDMIN	0			
VAR_TYPE	support_data			
VARIABLE	start_elevation		CDF_INT2	True
CATDESC	Start elevation bin			

Item	Value	Dim.	Type	Date
DEPEND_0	Epoch			
FIELDNAM	start_elevation			
FILLVAL	-32768			
FORMAT	I5			
LABLAXIS	Start elevation			
SCALETYP	linear			
UNITS	unitless			
VALIDMAX	9			
VALIDMIN	0			
VAR_TYPE	support_data			
VARIABLE	nb_elevation		CDF_INT2	True
CATDESC	Number elevation bins			
DEPEND_0	Epoch			
FIELDNAM	nb_elevation			
FILLVAL	-32768			
FORMAT	I5			
LABLAXIS	Number elevation			
SCALETYP	linear			
UNITS	unitless			
VALIDMAX	9			
VALIDMIN	0			
VAR_TYPE	support_data			
VARIABLE	start_CEM		CDF_INT2	True

CATDESC	Start CEM			
DEPEND_0	Epoch			
FIELDNAM	start_CEM			
FILLVAL	-32768			
FORMAT	I5			
LABLAXIS	Start CEM			
SCALETYP	linear			
UNITS	unitless			
VALIDMAX	1			
VALIDMIN	0			
VAR_TYPE	support_data			
VARIABLE	nb_CEM		CDF_INT2	True
CATDESC	Number CEM			
DEPEND_0	Epoch			
FIELDNAM	nb_CEM			
FILLVAL	-32768			
FORMAT	I5			
LABLAXIS	Number CEM			
SCALETYP	linear			
UNITS	unitless			
VALIDMAX	11			
VALIDMIN	0			
VAR_TYPE	support_data			

Item	Value	Dim.	Type	Date
VARIABLE	nb_K		CDF_INT2	True
CATDESC	Number of sub-samplings per second			
DEPEND_0	Epoch			
FIELDNAM	nb_K			
FILLVAL	-32768			
FORMAT	I5			
LABLAXIS	Number K			
SCALETYP	linear			
UNITS	unitless			
VALIDMAX	8			
VALIDMIN	0			
VAR_TYPE	support_data			
VARIABLE	K		CDF_INT2	True
CATDESC	Current sub-sampling			
DEPEND_0	Epoch			
FIELDNAM	K			
FILLVAL	-32768			
FORMAT	I5			
LABLAXIS	K			
SCALETYP	linear			

UNITS	unitless			
VALIDMAX	8			
VALIDMIN	0			
VAR_TYPE	support_data			
VARIABLE	PAS_to_RTN	3x3	CDF_REAL8	True
CATDESC	PAS to RTN transformation matrix			
COORDINATE_SYSTEM	SOLO_SWA_PAS			
TARGET_SYSTEM	SOLO_SUN_RTN			
DEPEND_0	Epoch			
FIELDNAM	PAS_to_RTN			
FILLVAL	-1E+031			
FORMAT	E10			
LABLAXIS	PAS to RTN			
SCALETYP	linear			
UNITS	None			
VAR_TYPE	support_data			
VARIABLE	vdf	11x9x96	CDF_REAL4	True
CATDESC	Distribution function			
DEPEND_0	Epoch			
DEPEND_1	Azimuth			
DEPEND_2	Elevation			
DEPEND_3	Energy			
FIELDNAM	vdf			
FILLVAL	-1E+031			
FORMAT	E10			
LABLAXIS	VDF			

Item	Value	Dim.	Type	Date
SCALETYP	linear			
UNITS	s ³ m ⁻⁶			
VALIDMAX	1			
VALIDMIN	0			
VAR_TYPE	data			
VARIABLE	Energy	96	CDF_REAL4	False
CATDESC	Center of energy bins			
DELTA_PLUS_VAR	delta_p_Energy			
DELTA_MINUS_VAR	delta_m_Energy			
FIELDNAM	Energy			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Energy			
SCALETYP	linear			
UNITS	eV			
VALIDMAX	40000.0			
VALIDMIN	0.0			

VAR_TYPE	support_data			
VARIABLE	delta_p_Energy	96	CDF_REAL4	False
CATDESC	Delta plus energy bins			
FIELDNAM	delta_p_Energy			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Delta plus energy			
SCALETYP	linear			
UNITS	eV			
VALIDMAX	40000.0			
VALIDMIN	0.0			
VAR_TYPE	support_data			
VARIABLE	delta_m_Energy	96	CDF_REAL4	False
CATDESC	Delta minus energy bins			
FIELDNAM	delta_m_Energy			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Delta minus energy			
SCALETYP	linear			
UNITS	eV			
VALIDMAX	40000.0			
VALIDMIN	0.0			
VAR_TYPE	support_data			
VARIABLE	Azimuth	11	CDF_REAL4	False
CATDESC	Center of CEM bins (azimuth)			
DELTA_PLUS_VAR	delta_Azimuth			
DELTA_MINUS_VAR	delta_Azimuth			
FIELDNAM	Azimuth			
FILLVAL	-1E+031			

Item	Value	Dim.	Type	Date
FORMAT	E12.2			
LABLAXIS	Azimuth (CEM)			
SCALETYP	linear			
UNITS	deg			
VALIDMAX	90.0			
VALIDMIN	-90.0			
VAR_TYPE	support_data			
VARIABLE	Elevation	9	CDF_REAL4	False
CATDESC	Center of elevation bins			
DELTA_PLUS_VAR	delta_Elevation			
DELTA_MINUS_VAR	delta_Elevation			
FIELDNAM	Elevation			
FILLVAL	-1E+031			

FORMAT	E12.2			
LABLAXIS	Elevation			
SCALETYP	linear			
UNITS	deg			
VALIDMAX	45.0			
VALIDMIN	-45.0			
VAR_TYPE	support_data			
VARIABLE	delta_Azimuth	11	CDF_REAL4	False
CATDESC	Delta Azimuth (CEM)			
FIELDNAM	delta_Azimuth			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Delta Azimuth			
SCALETYP	linear			
UNITS	deg			
VALIDMAX	45.0			
VALIDMIN	0.0			
VAR_TYPE	support_data			
VARIABLE	delta_Elevation	9	CDF_REAL4	False
CATDESC	Delta elevation table			
FIELDNAM	delta_Elevation			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Delta elevation			
SCALETYP	linear			
UNITS	deg			
VALIDMAX	45.0			
VALIDMIN	-45.0			
VAR_TYPE	support_data			
VARIABLE	Full_azimuth	11x9	CDF_REAL4	False
CATDESC	Full definition azimuth table			
FIELDNAM	Full_azimuth			
FILLVAL	-1E+031			

Item	Value	Dim.	Type	Date
FORMAT	E10			
LABLAXIS	Full Azimuth			
SCALETYP	linear			
UNITS	None			
VALIDMAX	-180.0			
VALIDMIN	180.0			
VAR_TYPE	support_data			
VARIABLE	Full_elevation	11x9	CDF_REAL4	False
CATDESC	Full definition elevation table			

FIELDNAM	Full_elevation			
FILLVAL	-1E+031			
FORMAT	E10			
LABLAXIS	FULL_EL_TABLE			
SCALETYP	linear			
UNITS	deg			
VALIDMAX	-90.0			
VALIDMIN	90.0			
VAR_TYPE	support_data			

4.1.3.2.2 PAS 3D ion (distribution function)

Filename: solo_L2_swa-pas-vdf_yyyymmdd_V01.cdf

Item	Value	Dim.	Type	Date
VARIABLE	Epoch		CDF_TIME_TT2000	True
CATDESC	Epoch encoded as Terrestrial Time on rotating Earth geoid, ns since J2000			
DISPLAY_TYPE	time_series			
FIELDNAM	Epoch			
FILLVAL	-9.22337203685478E+018			
FORMAT	I			
LABLAXIS	Epoch			
SCALEMAX	9.22337203685478E+018			
SCALEMIN	-9.22337203685478E+018			

SCALETYP	linear			
SI_CONVERSION	1.0E-9>s			
UNITS	ns			
VALIDMAX	9.22337203685478E+018			
VALIDMIN	-9.22337203685478E+018			
VAR_TYPE	Data			
VARIABLE	Half_interval		CDF_REAL4	True
CATDESC	Acquisition half interval			
DEPEND_0	Epoch			
DISPLAY_TYPE	time_series			
FIELDNAM	Half_interval			
FILLVAL	-1			
FORMAT	F4.2			
LABLAXIS	Half-interval			
SCALEMAX	10			

SCALEMIN	-10			
SCALETYP	linear			
SI_CONVERSION	1.0s			
UNITS	s			
VALIDMAX	60			
VALIDMIN	-60			
VAR_TYPE	metadata			
VARIABLE	SCET		CDF_REAL8	True
CATDESC	Elapsed time on the onboard clock			
DEPEND_0	Epoch			
DISPLAY_TYPE	time_series			
FIELDNAM	SCET			
FILLVAL	-1E+031			
FORMAT	f14.3			
LABLAXIS	SCET			
SCALEMAX	4294970000.0			
SCALEMIN	0.0			
UNITS	Ticks			
VALIDMAX	4294970000.0			
VALIDMIN	0.0			
VAR_TYPE	support_data			
VARIABLE	Info		CDF_UINT1	True
CATDESC	Info 0:Ground 1:Normal 2:Snapshot 3:Burst 4:Engineering 5:Calib			
DEPEND_0	Epoch			
FIELDNAM	Info			
FILLVAL	255			
FORMAT	I3			
LABLAXIS	Info			
SCALETYP	linear			
UNITS	unitless			
VALIDMAX	11			
VALIDMIN	7			
VAR_TYPE	support_data			
VARIABLE	start_energy		CDF_INT2	True
CATDESC	Start energy bin			
DEPEND_0	Epoch			
FIELDNAM	start_energy			
FILLVAL	-32768			

FORMAT	I5			
LABLAXIS	Start energy			
SCALETYP	linear			
UNITS	unitless			
VALIDMAX	96			
VALIDMIN	0			
VAR_TYPE	support_data			
VARIABLE	eflux	96	CDF_REAL4	True
CATDESC	Energy Flux (Omni-directional)			
DEPEND_0	Epoch			
DEPEND_1	Energy			
FIELDNAM	eflux			
FILLVAL	-1E+031			
FORMAT	E10			
LABLAXIS	eflux			
SCALETYP	log			
UNITS	cm-2 s-1 eV/eV			
VALIDMAX	1			
VALIDMIN	0			
VAR_TYPE	support_data			
VARIABLE	Energy	96	CDF_REAL4	False
CATDESC	Center of energy bins			
DELTA_PLUS_VAR	delta_p_Energy			
DELTA_MINUS_VAR	delta_m_Energy			
FIELDNAM	Energy			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Energy			
SCALETYP	linear			
UNITS	eV			
VALIDMAX	40000.0			
VALIDMIN	0.0			
VAR_TYPE	support_data			
VARIABLE	delta_p_Energy	96	CDF_REAL4	False
CATDESC	Delta plus energy bins			

FIELDNAM	delta_p_Energy			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Delta plus energy			
SCALETYP	linear			
UNITS	eV			
VALIDMAX	40000.0			
VALIDMIN	0.0			

VAR_TYPE	support_data			
VARIABLE	delta_m_Energy	96	CDF_REAL4	False
CATDESC	Delta minus energy bins			
FIELDNAM	delta_m_Energy			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Delta minus energy			
SCALETYP	linear			
UNITS	eV			
VALIDMAX	40000.0			
VALIDMIN	0.0			
VAR_TYPE	support_data			

4.1.3.2.3 PAS ground calculated moments

Filename: solo_L2_swa-pas-grnd-mom_yyyymmdd_V01.cdf

Item	Value	Dim.	Type	D
VARIABLE	Epoch		CDF_TIME_TT2000	T
CATDESC	Epoch encoded as Terrestrial Time on rotating Earth geoid, ns since J2000			
DISPLAY_TYPE	time_series			
FIELDNAM	Epoch			
FILLVAL	-9.22337203685478E+018			
FORMAT	I			
LABLAXIS	Epoch			
SCALEMAX	9.22337203685478E+018			
SCALEMIN	-9.22337203685478E+018			
SCALETYP	linear			
SI_CONVERSION	1.0E-9>s			
UNITS	ns			
VALIDMAX	9.22337203685478E+018			
VALIDMIN	-9.22337203685478E+018			
VAR_TYPE	Data			
VARIABLE	Half_interval		CDF_REAL4	T
CATDESC	Acquisition half interval			
DEPEND_0	Epoch			
DISPLAY_TYPE	time_series			
FIELDNAM	Half_interval			
FILLVAL	-1			

FORMAT	F4.2			
LABLAXIS	Half-interval			
SCALEMAX	10			
SCALEMIN	-10			
SCALETYP	linear			
SI_CONVERSION	1.0s			
UNITS	s			
VALIDMAX	60			
VALIDMIN	-60			
VAR_TYPE	metadata			
VARIABLE	SCET		CDF_REAL8	T
CATDESC	Elapsed time on the onboard clock			
DEPEND_0	Epoch			
DISPLAY_TYPE	time_series			
FIELDNAM	SCET			
FILLVAL	-1E+031			
FORMAT	f14.3			
LABLAXIS	SCET			
SCALEMAX	4294970000.0			
SCALEMIN	0.0			
UNITS	Ticks			
VALIDMAX	4294970000.0			
VALIDMIN	0.0			
VAR_TYPE	support_data			
VARIABLE	Info		CDF_UINT1	T
CATDESC	Info 0:Ground 1:Normal 2:Snapshot 3:Burst 4:Engineering 5:Calib			
DEPEND_0	Epoch			
FIELDNAM	Info			
FILLVAL	255			
FORMAT	I3			
LABLAXIS	Info			
SCALETYP	linear			
UNITS	unitless			
VALIDMAX	11			
VALIDMIN	7			
VAR_TYPE	support_data			
VARIABLE	validity		CDF_UINT1	T

CATDESC	Validity flag : 1,2,3 (the bigger, the better)			
DEPEND_0	Epoch			
FIELDNAM	Validity			
FILLVAL	254			
FORMAT	I3			
LABLAXIS	Validity			
UNITS	unitless			
VALIDMIN	0			
VALIDMAX	255			
VAR_TYPE	support_data			
SCALETYP	linear			
VARIABLE	N		CDF_REAL4	T
CATDESC	Density			
DEPEND_0	Epoch			
FIELDNAM	Density			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Density			
UNITS	particles cm ⁻³			
VALIDMIN	0.0			
VALIDMAX	10000.0			
VAR_TYPE	data			
SCALETYP	linear			
VARIABLE	V_SRF	3	CDF_REAL4	T
CATDESC	Velocity in SRF frame			
DEPEND_0	Epoch			
FIELDNAM	V_SRF			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	V (SRF)			
UNITS	km/s			
VALIDMIN	-100000.0			
VALIDMAX	100000.0			
VAR_TYPE	data			
SCALETYP	linear			
VARIABLE	V_RTN	3	CDF_REAL4	T
CATDESC	Velocity in RTN frame			
DEPEND_0	Epoch			
FIELDNAM	V_RTN			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Velocity (RTN)			
UNITS	km/s			

VALIDMIN	-100000.0			
VALIDMAX	100000.0			
VAR_TYPE	data			
SCALETYP	linear			
VARIABLE	P_SRF	6	CDF_REAL4	T
CATDESC	Pressure tensor in SRF frame			
DEPEND_0	Epoch			
FIELDNAM	P_SRF			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Pressure (SRF)			
UNITS	J.cm ⁻³			
VALIDMIN	0.0			
VALIDMAX	1E+030			
VAR_TYPE	data			
SCALETYP	linear			
VARIABLE	P_RTN	6	CDF_REAL4	T
CATDESC	Pressure tensor in RTN frame			
DEPEND_0	Epoch			
FIELDNAM	P_RTN			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Pressure (RTN)			
UNITS	J.cm ⁻³			
VALIDMIN	0.0			
VALIDMAX	1E+030			
VAR_TYPE	data			
SCALETYP	linear			
VARIABLE	TxTyTz_SRF	3	CDF_REAL4	T
CATDESC	Temperature components (Tx, Ty, Tz) in SRF frame			
DEPEND_0	Epoch			
FIELDNAM	TxTyTz_SRF			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	TxTyTz (SRF)			
UNITS	eV			
VALIDMIN	-100000.0			
VALIDMAX	100000.0			
VAR_TYPE	data			
SCALETYP	linear			
VARIABLE	TxTyTz_RTN	3	CDF_REAL4	T
CATDESC	Temperature components (Tx, Ty, Tz) in RTN frame			
DEPEND_0	Epoch			
FIELDNAM	TxTyTz_RTN			

FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	TxTyTz (RTN)			
UNITS	eV			
VALIDMIN	-100000.0			
VALIDMAX	100000.0			
VAR_TYPE	data			
SCALETYP	linear			
VARIABLE	T		CDF_REAL4	T
CATDESC	Temperature			
DEPEND_0	Epoch			
FIELDNAM	T			
FILLVAL	-1E+031			
FORMAT	E12.2			
LABLAXIS	Temperature			
UNITS	eV			
VALIDMIN	0.0			
VALIDMAX	1E+030			
VAR_TYPE	data			
SCALETYP	Linear			

4.1.3.3 HIS L2 products

NOTE: HIS L2 VDF and HK data are still being finalized and not yet publicly available.

4.1.3.3.1 HIS L2 Sensor Rate Data

Filename: solo_L2_swa-his-rates_yyyymmdd_V01.cdf

Global metadata

Name	Entry	Value
Acknowledgement	1	Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C.
Data_product	1	Rates> Rates data for HIS instrument
Data_type	1	rates_l2
Data_version	1	01
Descriptor	1	SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor
Discipline	1	Space Physics>Interplanetary Studies
File_naming_convention	1	"source_descriptor_datatype_yyyyMMdd
Generated_by	1	SO-HIS SOC, University of Michigan
Generation_date	1	20210216
HTTP_LINK		
Instrument_type	1	Particles (space)
LEVEL	1	2
LINK_TEXT		

LINK_TITLE		
Logical_file_id	1	solo_L2_swa-his-rates_00000000_V01
Logical_source	1	solo_L2_swa-his-rates
Logical_source_description	1	solo_L2_swa-his-rates
Mission_group	1	Solar Orbiter
MODS	1	Initial Release 2/16/2021.
OBS_ID		
Parents	1	CDF>solo_L2_swa-his-rates_yyyyMMdd_Vxx.cdf
PI_affiliation	1	SWRI
PI_name	1	S. Livi
Project	1	SOLO>Solar Orbiter
Rules_of_use	1	These Level 2 data require substantial processing for most applications. Users are encouraged to use Level 3 data, which provide the most relevant data products for scientific research. See Data Product Description Document for more information. Contact SWA/HIS team for more information as needed.
Software_version	1	00.00.00
SOOP_NAME		
SOOP_TYPE		
Source_name	1	SOLO>Solar Orbiter
spase_DatasetResourceID		
TARGET_CLASS	1	Sun
TARGET_NAME	1	Interplanetary_medium
TARGET_REGION	1	Solar Wind
TEXT	1	Rate data for HIS instrument in physical units. Some corrections for instrument characteristics and measurement techniques have been applied. Per Data Product Description Document, efficiency corrections have not been applied.
	2	Counts of unclassified ion event words on the HIS detectors (start MCP, stop MCP, SSD) as a function of E/q, integrated over incident angles, TOF and Energy. Includes full counts of events subject to decimation. Rates also include two coincidence rates, the number of events with a valid TOF and energy (triple coincidence), and a count of those with only a valid TOF (double coincidence). These rates are primarily used to evaluate the performance of the instrument, rather than for science. In particular, they can be used for calculation of ion detection efficiency in-flight [von Steiger et al., 2000]. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints.
TIME_MAX	1	
TIME_MIN	1	
Time_resolution	1	4 sec, 30 sec, or 300 sec

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF_TIME_TT2000	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Default time			
FIELDNAM	CDF_CHAR	EPOCH			
FILLVAL	CDF_TIME_TT2000	9999-12-31T23:59:59.999999999			
LABLAXIS	CDF_CHAR	EPOCH			



MONOTON	CDF_CHAR	INCREASE
REFERENCE_POSITION	CDF_CHAR	Rotating Earth Geoid
SCALETYP	CDF_CHAR	linear
TIME_BASE	CDF_CHAR	J2000
TIME_SCALE	CDF_CHAR	Terrestrial Time
UNITS	CDF_CHAR	ns
VALIDMAX	CDF_TIME_TT2000	2049-12-31T23:59:59.999000000
VALIDMIN	CDF_TIME_TT2000	1990-01-01T00:00:00.000000000
VAR_NOTES	CDF_CHAR	Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_REAL8	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SCET			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SCET			
FILLVAL	CDF_REAL8	-1.00E+31			
FORMAT	CDF_CHAR	E12.2			
LABLAXIS	CDF_CHAR	SCET			
SCALEMAX	CDF_REAL8	8.00E+12			
SCALEMIN	CDF_REAL8	5.00E+12			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	milliseconds			
VALIDMAX	CDF_REAL8	1.00E+14			
VALIDMIN	CDF_REAL8	0			
VAR_NOTES	CDF_CHAR	Mission elapsed time in spacecraft clock ticks. Note: These are effected by environmental conditions and do not match Earth-based seconds. Beginning of accumulation.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
ACCUM_SECONDS	CDF_REAL8	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	ACCUM_SECONDS			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	ACCUM_SECONDS			
FILLVAL	CDF_REAL8	-1.00E+31			

FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	ACCUM_SECONDS
SCALEMAX	CDF_REAL8	0.3
SCALEMIN	CDF_REAL8	0.003
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	seconds
VALIDMAX	CDF_REAL8	0.3
VALIDMIN	CDF_REAL8	0.003
VAR_NOTES	CDF_CHAR	Accumulation time in seconds for each E/q and elevation step
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	QUALITY_FLAG			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	QUALITY_FLAG			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	QUALITY_FLAG			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	0=good, 1=caution, 2=bad			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_BITMASK	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	QUALITY_BITMASK			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	QUALITY_BITMASK			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	QUALITY_BITMASK			



SCALEMAX	CDF_INT2	32
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	31
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Not yet fully implemented. 0:No Issue, 1:Proton Avoidance Triggered, 2:No PHAs Telemetered in Range (range 6/7 prior to August 2020), 4:Elevation Step(s) not represented, 8:Saturation of Input Buffer, 16: Buffer Over Ran.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
MODE	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Mode. 0: Normal Science, 1: Burst 1, 2: Burst 2, 3: Low Cadence.			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	MODE			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	MODE			
SCALEMAX	CDF_INT2	4			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	3			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Normal: Full E/q range in nominal 30 sec scan, Burst1: E/q range optimized for slower solar wind in nominal 4 sec scan, Burst2: E/q range optimized for faster solar wind in nominal 4 sec scan, Low Cadence: Full E/q range in nominal 300 sec scan.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
COMPRESSION_CODE	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Compression Code Bitmask			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	COMPRESSION_CODE			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			



LABLAXIS	CDF_CHAR	COMPRESSION_CODE
SCALEMAX	CDF_INT2	2100
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2047
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Compression code bitmask. 0 = Lossy A, 1 = Lossy C. Bits: 0:SSD, 1:Priorities, 2:Starts, 3:Stops, 4:Double Coincidence, 5:Triple Coincidence, 6:Low TOF, 7:Alpha Decimation, 8:Proton Decimation, 9:Position A Singles, 10:Position B Singles.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
STEP_TABLE	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Step table			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	STEP_TABLE			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	STEP_TABLE			
SCALEMAX	CDF_INT2	18			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	15			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Science Configuration Packet's HV Sweep Scan Control Table Identification Number			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
MAIN_ENABLES	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Main enables			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	MAIN_ENABLES			



FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	MAIN_ENABLES
SCALEMAX	CDF_INT2	1100
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	1023
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Bitmask for enabled rates. 1 = Enabled, Bit1 = Least Significant Bit. Bit 1: SSD Rate, 2: Priority, 3: Start, 4: Stop, 5: Double Coincidence, 6: Triple Coincidence, 7: Low TOF Decimation, 8: Alpha Decimation, 9: Proton Decimation, 10: Position A, 11: Position B.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SSD_ENABLES	CDF_UINT4	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD enables			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	SSD_ENABLES			
FILLVAL	CDF_UINT4	4294967295			
FORMAT	CDF_CHAR	I5			
LABLAXIS	CDF_CHAR	SSD_ENABLES			
SCALEMAX	CDF_UINT4	1E10			
SCALEMIN	CDF_UINT4	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT4	2147483647			
VALIDMIN	CDF_UINT4	0			
VAR_NOTES	CDF_CHAR	Bitmask for enabled SSD rates. 1 = Enabled, Bit1 = Least Significant Bit.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_ENABLES	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority enables			



DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	PRIORITY_ENABLES
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	PRIORITY_ENABLES
SCALEMAX	CDF_INT2	260
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	255
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Bitmask for enabled Priority rates. 1 = Enabled, Bit1 = Least Significant Bit.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
START_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Start dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	START_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	START_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Start Rate			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
STOP_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Stop dimensions			

DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	STOP_DIMENSIONS
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	STOP_DIMENSIONS
SCALEMAX	CDF_INT2	65
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	64
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Stop Rate
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
DC_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Double coincidence dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	DC_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	DC_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Double Coincidence Rate			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
TC_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Triple coincidence dimensions			



DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	TC_DIMENSIONS
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	TC_DIMENSIONS
SCALEMAX	CDF_INT2	65
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	64
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Triple Coincidence Rate
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
LOW_TOF_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Low TOF dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	LOW_TOF_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	LOW_TOF_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Low TOF Rate			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PROTON_DEC_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			

CATDESC	CDF_CHAR	Proton decimation dimensions
DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	PROTON_DEC_DIMENSIONS
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	PROTON_DEC_DIMENSIONS
SCALEMAX	CDF_INT2	65
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	64
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Proton Decimation Rate
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
ALPHA_DEC_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Alpha decimation dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	ALPHA_DEC_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	ALPHA_DEC_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Alpha Decimation Rate			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
POS_A_DIMENSIONS	CDF_INT2	1	2	T	T

Attribute Name	Data Type	Value
CATDESC	CDF_CHAR	Proton decimation dimensions
DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	POS_A_DIMENSIONS
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	POS_A_DIMENSIONS
SCALEMAX	CDF_INT2	65
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	64
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Position A Rate.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
POS_B_DIMENSIONS	CDF_INT2	1	2	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Proton decimation dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	POS_B_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	POS_B_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VAL.DMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of E/q Steps and Number of Elevation Steps for Position B Rate			
VAR_TYPE	CDF_CHAR	support_data			



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SSD_DIMENSIONS	CDF_INT2	1	3	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	SSD_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SSD_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of SSDs and Number of E/q Steps and Number of Elevation Steps			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_DIMENSIONS	CDF_INT2	1	3	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority dimensions			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PRIORITY_DIMENSIONS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PRIORITY_DIMENSIONS			
SCALEMAX	CDF_INT2	65			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	64			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Number of Priority Ranges and Number of E/q Steps and Number of Elevation Steps			
VAR_TYPE	CDF_CHAR	support_data			



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
START_RATE	CDF_FLOAT	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Start rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	START_RATE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_FLOAT	2.5E9			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	counts per second			
VALIDMAX	CDF_FLOAT	2.04E9			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	Number of counts on Start MCP detector. Dimensions are maximum possible sizes. Consult START_DIMENSIONS for actual sizes in data.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
STOP_RATE	CDF_FLOAT	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Stop rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ_STEP			
DEPEND_2	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	STOP_RATE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_FLOAT	2.5E9			



SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	counts per second
VALIDMAX	CDF_FLOAT	2.04E9
VALIDMIN	CDF_FLOAT	0
VAR_NOTES	CDF_CHAR	Number of counts on Stop MCP detector. Dimensions are maximum possible sizes. Consult STOP_DIMENSIONS for actual sizes in data. When only one elevation step, DEPEND_2 should be ELEVATION_SUMMED.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
DC_RATE	CDF_FLOAT	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Double coincidence rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	DC_RATE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_FLOAT	2.5E9			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	counts per second			
VALIDMAX	CDF_FLOAT	2.04E9			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	Number of double coincidence events that have a start signal with a corresponding stop signal. Dimensions are maximum possible sizes. Consult DC_DIMENSIONS for actual sizes in data.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
TC_RATE	CDF_FLOAT	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Triple coincidence rate			
DEPEND_0	CDF_CHAR	EPOCH			

DEPEND_1	CDF_CHAR	EOQ
DEPEND_2	CDF_CHAR	ELEVATION
DISPLAY_TYPE	CDF_CHAR	spectrogram
FIELDNAM	CDF_CHAR	TC_RATE
FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABL_PTR_1	CDF_CHAR	EOQ_LABELS
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS
SCALEMAX	CDF_FLOAT	2.5E9
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	counts per second
VALIDMAX	CDF_FLOAT	2.04E9
VALIDMIN	CDF_FLOAT	0
VAR_NOTES	CDF_CHAR	Number of triple coincidence events that have a start signal with a corresponding stop and energy signals. Dimensions are maximum possible sizes. Consult TC_DIMENSIONS for actual sizes in data.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
LOW_TOF_RATE	CDF_FLOAT	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Low TOF rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION_SUMMED			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	LOW_TOF_RATE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_SUMMED_LABELS			
SCALEMAX	CDF_FLOAT	2.5E9			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	counts per second			
VALIDMAX	CDF_FLOAT	2.04E9			
VALIDMIN	CDF_FLOAT	0			

VAR_NOTES	CDF_CHAR	Number of double coincidence events below low TOF threshold. Dimensions are maximum possible sizes. Consult LOW_TOF_DIMENSIONS for actual sizes in data.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PROTON_DEC_RATE	CDF_FLOAT	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Proton decimation rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION_SUMMED			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	PROTON_DEC_RATE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_SUMMED_LABELS			
SCALEMAX	CDF_FLOAT	2.5E9			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	counts per second			
VALIDMAX	CDF_FLOAT	2.04E9			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	Number of double coincidence events within proton TOF range. Dimensions are maximum possible sizes. Consult PROTON_DEC_DIMENSIONS for actual sizes in data.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
ALPHA_DEC_RATE	CDF_FLOAT	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Alpha decimation rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION_SUMMED			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	ALPHA_DEC_RATE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			

LABL_PTR_1	CDF_CHAR	EOQ_LABELS
LABL_PTR_2	CDF_CHAR	ELEVATION_SUMMED_LABELS
SCALEMAX	CDF_FLOAT	2.5E9
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	counts per second
VALIDMAX	CDF_FLOAT	2.04E9
VALIDMIN	CDF_FLOAT	0
VAR_NOTES	CDF_CHAR	Number of double coincidence events within alpha TOF range. Dimensions are maximum possible sizes. Consult ALPHA_DEC_DIMENSIONS for actual sizes in data.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
POS_A_RATE	CDF_FLOAT	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Position A rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	POS_A_RATE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_FLOAT	2.5E9			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	counts per second			
VALIDMAX	CDF_FLOAT	2.04E9			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	Counts/sec on Position A detector. Dimensions are maximum possible sizes. Consult POS_A_DIMENSIONS for actual sizes in data.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY

POS_B_RATE	CDF_FLOAT	2	64 16	T	T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Position B rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	EOQ			
DEPEND_2	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	POS_B_RATE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	EOQ_LABELS			
LABL_PTR_2	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_FLOAT	2.5E9			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	counts per second			
VALIDMAX	CDF_FLOAT	2.04E9			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	Counts/sec on Position B detector. Dimensions are maximum possible sizes. Consult POS_B_DIMENSIONS for actual sizes in data.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SSD_RATE	CDF_FLOAT	3	32 64 16	T	T T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	SSD			
DEPEND_2	CDF_CHAR	EOQ			
DEPEND_3	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	SSD_RATE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	SSD_LABELS			
LABL_PTR_2	CDF_CHAR	EOQ_LABELS			
LABL_PTR_3	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_FLOAT	2.4E9			

SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	counts per second
VALIDMAX	CDF_FLOAT	2.04E9
VALIDMIN	CDF_FLOAT	0
VAR_NOTES	CDF_CHAR	Number of counts on each solid state detector. Dimensions are maximum possible sizes. Consult SSD_DIMENSIONS for actual sizes in data. SSDs 30 and 31 were not populated with physical detectors. In contrast, SSD 29 was disabled in software and will likely remain so. Any signals in these elements are due to electronic noise and not from real particles. When only one elevation step, <u>DEPEND_2</u> should be <u>ELEVATION_SUMMED</u> .
VAR_TYPE	CDF_CHAR	data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_RATE	CDF_FLOAT	3	8 64 16	T	T T T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority rate			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	PRIORITY			
DEPEND_2	CDF_CHAR	EOQ			
DEPEND_3	CDF_CHAR	ELEVATION			
DISPLAY_TYPE	CDF_CHAR	spectrogram			
FIELDNAM	CDF_CHAR	PRIORITY_RATE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	PRIORITY_LABELS			
LABL_PTR_2	CDF_CHAR	EOQ_LABELS			
LABL_PTR_3	CDF_CHAR	ELEVATION_LABELS			
SCALEMAX	CDF_FLOAT	2.5E9			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	counts per second			
VALIDMAX	CDF_FLOAT	2.04E9			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	Number of events in each priority range. 0: double coincidence PHAs (pickup ions), 1: Fe, 2: Mg, Si, S, 3: CNO (except O6+), 4: O6+, 5: Alphas, 6: Protons, 7: Error (low or unrealistically long TOFs). Dimensions are maximum possible sizes. Consult PRIORITY_DIMENSIONS for actual sizes in data.			
VAR_TYPE	CDF_CHAR	data			



Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EOQ	CDF_FLOAT	1	64	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	E/q step			
FIELDNAM	CDF_CHAR	EOQ			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	EOQ			
SCALEMAX	CDF_FLOAT	80			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_FLOAT	80			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	E/q steps spanning the range 0.50 to 75.1 keV/e. Value is midpoint of step. Lower bound is EOQ value minus EOQ_DELTA, and upper bound is EOQ value plus EOQ_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
EOQ_LABELS	CDF_CHAR	10	1	64	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	E/q Labels				
FIELDNAM	CDF_CHAR	EOQ_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EOQ_DELTA	CDF_FLOAT	1	64	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	E/q step delta			
FIELDNAM	CDF_CHAR	EOQ			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	EOQ			
SCALEMAX	CDF_FLOAT	80			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	log			



UNITS	CDF_CHAR	keV/e
VALIDMAX	CDF_FLOAT	80
VALIDMIN	CDF_FLOAT	0
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in EOQ variable. Lower bound is EOQ value minus EOQ_DELTA, and upper bound is EOQ value plus EOQ_DELTA.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
EOQ_DELTA_LABELS	CDF_CHAR	10	1	64	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	E/q Delta Labels				
FIELDNAM	CDF_CHAR	EOQ_DELTA_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ELEVATION	CDF_FLOAT	1	16	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Elevation step			
FIELDNAM	CDF_CHAR	ELEVATION			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	ELEVATION			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	-25			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_FLOAT	20			
VALIDMIN	CDF_FLOAT	-25			
VAR_NOTES	CDF_CHAR	The elevation range is nominally -20 to +16 deg, with +/-3 degree uncertainty. These values are subject to change after in-flight calibration. Value is the midpoint of the elevation bin. Lower bound is ELEVATION value minus ELEVATION_DELTA, and upper bound is ELEVATION value plus ELEVATION_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			



Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_LABELS	CDF_CHAR	10	1	16	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Elevation Labels				
FIELDNAM	CDF_CHAR	ELEVATION_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_DELTA	CDF_FLOAT	1	16	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Elevation step delta			
FIELDNAM	CDF_CHAR	ELEVATION_DELTA			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	ELEVATION_DELTA			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	-25			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Degrees			
VALIDMAX	CDF_FLOAT	20			
VALIDMIN	CDF_FLOAT	-25			
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in ELEVATION variable. Lower bound is ELEVATION value minus ELEVATION_DELTA, and upper bound is ELEVATION value plus ELEVATION_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_DELTA_LABELS	CDF_CHAR	10	1	16	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Elevation delta labels				
FIELDNAM	CDF_CHAR	ELEVATION_DELTA_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_SUMMED	CDF_FLOAT	1	16	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Elevation step when summed to one bin			

FIELDNAM	CDF_CHAR	ELEVATION_SUMMED
FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	ELEVATION
SCALEMAX	CDF_FLOAT	20
SCALEMIN	CDF_FLOAT	-25
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	Degrees
VALIDMAX	CDF_FLOAT	20
VALIDMIN	CDF_FLOAT	-25
VAR_NOTES	CDF_CHAR	This variable is used when elevation is summed. The elevation range is nominally -20 to +16 deg, with +/-3 degree uncertainty. These values are subject to change after in-flight calibration. Value is the midpoint of the ELEVATION bin. Lower bound is ELEVATION value minus ELEVATION_DELTA, and upper bound is ELEVATION value plus ELEVATION_DELTA. Only the first element is used; all others are fill.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_SUMMED_LABELS	CDF_CHAR	10	1	16	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Elevation labels when summed to one bin				
FIELDNAM	CDF_CHAR	ELEVATION_SUMMED_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_SUMMED_DELTA	CDF_FLOAT	1	16	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Delta for elevation step when summed to one bin			
FIELDNAM	CDF_CHAR	ELEVATION_SUMMED_DELTA			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	ELEVATION_SUMMED_DELTA			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	-25			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Degrees			



VALIDMAX	CDF_FLOAT	20
VALIDMIN	CDF_FLOAT	-25
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in ELEVATION variable. Lower bound is ELEVATION value minus ELEVATION_DELTA, and upper bound is ELEVATION value plus ELEVATION_DELTA. Only the first element is used; all others are fill.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	Number Element s	DIM S	SIZE S	R_VAR Y	D_VAR Y
ELEVATION_SUMMED_DELTA_LABELS	CDF_CHAR	10	1	16	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Labels for elevation delta when summed to one bin				
FIELDNAM	CDF_CHAR	ELEVATION SUMMED DELTA LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SSD	CDF_FLOAT	1	32	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD			
FIELDNAM	CDF_CHAR	SSD			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	SSD			
SCALEMAX	CDF_FLOAT	70			
SCALEMIN	CDF_FLOAT	-40			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_FLOAT	70			
VALIDMIN	CDF_FLOAT	-36			
VAR_NOTES	CDF_CHAR	The azimuth range is nominally -33 to +66 degrees, with +/- 3 degree uncertainty. These values are subject to change after in-flight calibration. Value is the midpoint of the azimuth bin. Lower bound is SSD value minus SSD_DELTA, and upper bound is SSD value plus SSD_DELTA.			



VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
SSD_LABELS	CDF_CHAR	10	1	32	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	SSD Labels				
FIELDNAM	CDF_CHAR	SSD_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SSD_DELTA	CDF_FLOAT	1	32	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD Delta			
FIELDNAM	CDF_CHAR	SSD_DELTA			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	SSD_DELTA			
SCALEMAX	CDF_FLOAT	35			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Degrees			
VALIDMAX	CDF_FLOAT	31			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in the SSD variable. Lower bound is SSD value minus SSD_DELTA, and upper bound is SSD value plus SSD_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
SSD_DELTA_LABELS	CDF_CHAR	10	1	32	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	SSD delta labels				
FIELDNAM	CDF_CHAR	SSD_DELTA_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY

PRIORITY	CDF_UINT1	1	8	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority			
FIELDNAM	CDF_CHAR	PRIORITY			
FILLVAL	CDF_UINT1	255			
FORMAT	CDF_CHAR	I3			
LABLAXIS	CDF_CHAR	PRIORITY			
SCALEMAX	CDF_UINT1	10			
SCALEMIN	CDF_UINT1	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	7			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	0: double coincidence PHAs (pickup ions), 1: Fe, 2: Mg, Si, S, 3: O6+, 4: CNO (except O6+), 5: Alphas, 6: Protons, 7: Error (low or unrealistically long TOFs).			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_LABELS	CDF_CHAR	10	1	8	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Priority Labels				
FIELDNAM	CDF_CHAR	PRIORITY_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PRIORITY_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PRIORITY_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	127			



VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Version number of the priority boundaries. These define the 8 priorities, numbered 1-7, used to prioritize which PHAs are downlinked.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SPECIES_BOX_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Species Box Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SPECIES_BOX_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SPECIES_BOX_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	127			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Version number of the species boxes. These define 32 boxes in E/Q - TOF - E space which are set to the locations of counts for individual ion species.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SSD_THRESHOLD_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD Threshold Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SSD_THRESHOLD_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SSD_THRESHOLD_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			



UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	127
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Version number of the set of SSD thresholds (1 master and 30 trim) used to collect the data. These settings affect the sensitivity of HIS and the noise allowed into the onboard event processing through the SSD subsystem. Version numbers are given only to sets of values used for science data collection, not for testing.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PROD_CONF_TBL_NUM	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Product Configuration Table Number			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PROD_CONF_TBL_NUM			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	Prod Conf Tbl Num			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	127			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Product configuration table number used during data collection. This table sets the dimensions of rate products produced onboard.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PA_HVPS_SET_POINT	CDF_FOAT	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	PA HVPS set point			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PA_HVPS_SET_POINT			
FILLVAL	CDF_FLOAT	-1.0e+31			

FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	PA_HVPS_SET_POINT
SCALEMAX	CDF_FLOAT	0
SCALEMIN	CDF_FLOAT	-32
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	kV
VALIDMAX	CDF_FLOAT	0
VALIDMIN	CDF_FLOAT	-31
VAR_NOTES	CDF_CHAR	This is the voltage setting for the PA HVPS, e.g. -10 kV, -25 kV. Note: It is not the reading of the on-board voltage monitor for this supply. Valid [0, -30 kV].
VAR_TYPE	CDF_CHAR	support_data

4.1.3.3.2 HIS L2 PHA Data

Filename: solo_L2_swa-his-pha_yyyymmdd_V01.cdf

Global metadata

Name	Entry	Value
Acknowledgement	1	Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C.
Data_product	1	pha> Pulse Height Analysis data for HIS instrument
Data_type	1	pha_l2
Data_version	1	01
Descriptor	1	SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor
Discipline	1	Space Physics>Interplanetary Studies
File_naming_convention	1	"source_descriptor_datatype_yyyyMMdd
Generated_by	1	SO-HIS SOC, University of Michigan
Generation_date	1	20200611
HTTP_LINK		
Instrument_type	1	Particles (space)
LEVEL	1	2
LINK_TEXT		
LINK_TITLE		
Logical_file_id	1	solo_L2_swa-his-pha_00000000_v01
Logical_source	1	solo_L2_swa-his-pha
Logical_source_description	1	solo_L2_swa-his-pha
Mission_group	1	Solar Orbiter
MODS	1	Initial Release 1/27/2021.
OBS_ID		
Parents	1	CDF>solo_L2_swa-his-pha_yyyymmdd_V01.cdf



PI_affiliation	1	SWRI
PI_name	1	S. Livi
Project	1	SOLO>Solar Orbiter
Rules_of_use	1	These Level 2 data require substantial processing for most applications. Users are encouraged to use Level 3 data, which provide the most relevant data products for scientific research. See Data Product Description Document for more information. Contact SWA/HIS team for more information as needed..
Software_version	1	00.00.00
SOOP_NAME		
SOOP_TYPE		
Source_name	1	SOLO>Solar Orbiter
spase_DatasetResourceID		
TARGET_CLASS	1	Sun
TARGET_NAME	1	Interplanetary_medium
TARGET_REGION	1	Solar Wind
TEXT	1	Pulse Height Analysis data for HIS instrument in physical units. Some corrections for instrument characteristics and measurement techniques have been applied. Per Data Product Description Document, efficiency corrections have not been applied.
	2	Ion Event (PHA) words. Individual ion event data, containing full information on incident angles (elevation and azimuth), E/q, TOF and SSD energy in digital units. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints."
	3	Level 1 data are unvalidated and requires substantial processing to use for publication.
TIME_MAX	1	
TIME_MIN	1	
Time_resolution	1	4 sec, 30 sec, or 300 sec

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF_TIME_TT2000	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Default time			
FIELDNAM	CDF_CHAR	EPOCH			
FILLVAL	CDF_TIME_TT2000	9999-12-31T23:59:59.999999999			
LABLAXIS	CDF_CHAR	EPOCH			
MONOTON	CDF_CHAR	INCREASE			
REFERENCE_POSITION	CDF_CHAR	Rotating Earth Geoid			
SCALETYP	CDF_CHAR	linear			
TIME_BASE	CDF_CHAR	J2000			
TIME_SCALE	CDF_CHAR	Terrestrial Time			
UNITS	CDF_CHAR	ns			
VALIDMIN	CDF_TIME_TT2000	1990-01-01T00:00:00.000000000			
VALIDMAX	CDF_TIME_TT2000	2049-12-31T23:59:59.999000000			



VAR_NOTES	CDF_CHAR	Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_REAL8	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SCET			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SCET			
FILLVAL	CDF_REAL8	-1.00E+31			
FORMAT	CDF_CHAR	E12.2			
LABLAXIS	CDF_CHAR	SCET			
SCALEMAX	CDF_REAL8	8.00E+12			
SCALEMIN	CDF_REAL8	5.00E+12			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	milliseconds			
VALIDMAX	CDF_REAL8	1.00E+14			
VALIDMIN	CDF_REAL8	0			
VAR_NOTES	CDF_CHAR	Mission elapsed time in spacecraft clock ticks. Note: These are effected by environmental conditions and do not match Earth-based seconds. Beginning of accumulation.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ACCUM_SECONDS	CDF_REAL8	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	ACCUM_SECONDS			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	ACCUM_SECONDS			
FILLVAL	CDF_REAL8	-1.00E+31			
FORMAT	CDF_CHAR	E12.2			
LABLAXIS	CDF_CHAR	ACCUM_SECONDS			
SCALEMAX	CDF_REAL8	0.3			
SCALEMIN	CDF_REAL8	0.003			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	seconds			
VALIDMAX	CDF_REAL8	0.3			
VALIDMIN	CDF_REAL8	0.003			



VAR_NOTES	CDF_CHAR	Accumulation time in seconds for each E/q and elevation step.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	QUALITY_FLAG			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	QUALITY_FLAG			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	QUALITY_FLAG			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT1	2			
VALIDMIN	CDF_INT1	0			
VAR_NOTES	CDF_CHAR	0=good, 1=caution, 2=bad			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_BITMASK	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	QUALITY_BITMASK			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	QUALITY_BITMASK			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	QUALITY_BITMASK			
SCALEMAX	CDF_INT2	1100			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	1023			
VALIDMIN	CDF_INT2	0			



VAR_NOTES	CDF_CHAR	Not yet fully implemented. 0:No Issue, 1:Multi-SSD flag set, 2:No matching priority rate, 4:PHA outside priority rate range, 8:No matching count for PHA in priority range, 16:Bad Start MCP, 32:Uncalibrated TOF, 64:Priority Table Invalid, 128:Low Quality SSD Trim Callibration, 256:Peak on Edge of Priority Range, 512:Bad SSD Assignment.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
MODE	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Mode. 0: Normal Science, 1: Burst 1, 2: Burst 2, 3: Low Cadence.			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	MODE			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	MODE			
SCALEMAX	CDF_INT2	4			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	3			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Normal: Full E/q range in nominal 30 sec scan, Burst1: E/q range optimized for slower solar wind in nominal 4 sec scan, Burst2: E/q range optimized for faster solar wind in nominal 4 sec scan, Low Cadence: Full E/q range in nominal 300 sec scan.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
NUM_PHA	CDF_UINT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Number of PHA telemetered			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	NUM_PHA			
FILLVAL	CDF_UINT2	65535			
FORMAT	CDF_CHAR	I5			
LABLAXIS	CDF_CHAR	NUM_PHA			
SCALEMAX	CDF_UINT2	35000			
SCALEMIN	CDF_UINT2	0			



SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT2	32767
VALIDMIN	CDF_UINT2	0
VAR_NOTES	CDF_CHAR	Number of PHA telemetered in this scan
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PHA_EOQ_STEP	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS E/q index of each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_EOQ_STEP			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_EOQ_STEP			
SCALEMAX	CDF_INT2	61			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	63			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	E/q index corresponding to the E/q - elevation pair in the HV Step table			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PHA_EOQ	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS E/q f each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_EOQ			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	PHA_EOQ			
SCALEMAX	CDF_FLOAT	80			
SCALEMIN	CDF_FLOAT	0			



SCALETYP	CDF_CHAR	log
UNITS	CDF_CHAR	keV/e
VALIDMAX	CDF_FLOAT	75.0
VALIDMIN	CDF_FLOAT	0.5
VAR_NOTES	CDF_CHAR	E/q corresponding to the E/q - elevation pair in the HV Step table
VAR_TYPE	CDF_CHAR	data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_AZIMUTH_BIN	CDF_INT2	1	0		T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS azimuth bin for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_AZIMUTH_BIN			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_AZIMUTH_BIN			
SCALEMAX	CDF_INT2	64			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	63			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Azimuth bin derived from the Start MCP position			
VAR_TYPE	CDF_CHAR	data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_AZIMUTH	CDF_FLOAT	1	0		T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS azimuth for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_AZIMUTH			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	PHA_AZIMUTH			
SCALEMAX	CDF_FLOAT	70			
SCALEMIN	CDF_FLOAT	-35			



SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	Degrees
VALIDMAX	CDF_FLOAT	88.0
VALIDMIN	CDF_FLOAT	-39.26
VAR_NOTES	CDF_CHAR	Azimuth angle derived from the Start MCP position
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PHA_ELEVATION_BIN	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS elevation angle bin for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_ELEVATION_BIN			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_ELEVATION_BIN			
SCALEMAX	CDF_INT2	18			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	15			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Elevation angle bin corresponding to the E/q - elevation pair in the HV Step table			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PHA_ELEVATION	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS elevation angle for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_ELEVATION			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	PHA_ELEVATION			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	-25			



SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	Degrees
VALIDMAX	CDF_FLOAT	15.8
VALIDMIN	CDF_FLOAT	-20.2
VAR_NOTES	CDF_CHAR	Elevation angle corresponding to the E/q - elevation pair in the HV Step table
VAR_TYPE	CDF_CHAR	data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_TOF_BIN	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS TOF bin for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_TOF_BIN			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_TOF_BIN			
SCALEMAX	CDF_INT2	512			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	511			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Time-Of-Flight bin			
VAR_TYPE	CDF_CHAR	data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_TOF	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS TOF for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_TOF			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	PHA_TOF			
SCALEMAX	CDF_FLOAT	350			
SCALEMIN	CDF_FLOAT	0			



SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	ns
VALIDMAX	CDF_FLOAT	323.694
VALIDMIN	CDF_FLOAT	1.764
VAR_NOTES	CDF_CHAR	Time-Of-Flight
VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_SSD_ENERGY_BIN	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS SSD energy bin for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_SSD_ENERGY_BIN			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_SSD_ENERGY_BIN			
SCALEMAX	CDF_INT2	512			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	511			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Solid State Detector Energy Bin. Represents total ion energy after post-acceleration.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_SSD_ENERGY	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS SSD energy for each PHA			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_SSD_ENERGY			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	PHA_SSD_ENERGY			
SCALEMAX	CDF_FLOAT	1000			
SCALEMIN	CDF_FLOAT	-110			



SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	keV
VALIDMAX	CDF_FLOAT	977.854
VALIDMIN	CDF_FLOAT	-102.4
VAR_NOTES	CDF_CHAR	Solid State Detector Energy. Represents total ion energy after post-acceleration.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_DETECTOR_ID	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS SSD ID			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_DETECTOR_ID			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_DETECTOR_ID			
SCALEMAX	CDF_INT2	32			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	31			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	ID of Solid State Detector on which ion was measured. Also contains azimuthal angle information, complementing that which is derived from the Start MCP.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_DETECTOR_ANGLE	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS SSD ANGLE			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_DETECTOR_ANGLE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	PHA_DETECTOR_ANGLE			



SCALEMAX	CDF_FLOAT	70
SCALEMIN	CDF_FLOAT	-35
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	Degrees
VALIDMAX	CDF_FLOAT	66.6
VALIDMIN	CDF_FLOAT	-34.15
VAR_NOTES	CDF_CHAR	Angle of Solid State Detector on which ion was measured. Also contains azimuthal angle information, complementing that which is derived from the Start MCP.
VAR_TYPE	CDF_CHAR	data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_DECIMATION_CLASSIFICATION	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS decimation classification			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
SCALETYP	CDF_CHAR	linear			
FIELDNAM	CDF_CHAR	PHA_DECIMATION_CLASSIFICATION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_DECIMATION_CLASSIFICATION			
SCALEMAX	CDF_INT2	4			
SCALEMIN	CDF_INT2	-1			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	3			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Decimation range, if any, into which ion TOF is classified			
VAR_TYPE	CDF_CHAR	data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_PRIORITIZATION_RANGE	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS prioritization range			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_PRIORITIZATION_RANGE			
FILLVAL	CDF_INT2	-32768			



FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	PHA_PRIORITIZATION_RANGE
SCALEMAX	CDF_INT2	8
SCALEMIN	CDF_INT2	-1
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	7
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	The prioritization range that the ion is classified into according to its E/q, SSD energy and TOF bins. 0: double coincidence PHAs (pickup ions), 1: Fe, 2: Mg, Si, S, 3: O6+, 4: CNO (except O6+), 5: Alphas, 6: Protons, 7: Error (low or unrealistically long TOFs).
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PHA_MULTI_SSD	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS multi-SSD flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_MULTI_SSD			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PHA_MULTI_SSD			
SCALEMAX	CDF_INT2	2			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	1			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Indicates signal on multiple SSDs during ion measurement			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PHA_PRIORITY_WEIGHT	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS PHA Priority Weight			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			

FIELDNAM	CDF_CHAR	PHA_PRI_WEIGHT
FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	PHA_PRI_WEIGHT
SCALEMAX	CDF_FLOAT	8500000
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	
VALIDMAX	CDF_FLOAT	8126464
VALIDMIN	CDF_FLOAT	1
VAR_NOTES	CDF_CHAR	The weight of this PHA word after correcting for the effects of sampling for inclusion in telemetry. Should be used for all instead of 1 whenever PHA words are histogrammed.
VAR_TYPE	CDF_CHAR	data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PHA_PRIORITY_WEIGHT_DELTA	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	HIS PHA Priority Weight Delta			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	PHA_PRI_WEIGHT_DELTA			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	PHA_PRI_WEIGHT_DELTA			
SCALEMAX	CDF_FLOAT	300000			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_FLOAT	262144			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	The uncertainty of the priority weight as a result of compression in telemetry, where the lower bound in the weight is the priority weight minus the delta and the upper bound in the weight is the priority weight plus the delta.			
VAR_TYPE	CDF_CHAR	data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PROTON_DECIMATION_LEVEL	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Proton Decimation Level			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PROTON_DECIMATION_LEVEL			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PROTON_DEC_LVL			
SCALEMAX	CDF_INT2	18			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	15			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Proton Decimation Level. One in 2^N protons are retained when decimation is enabled, where N is the proton decimation level.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ALPHA_DECIMATION_LEVEL	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Alpha Decimation Level			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	ALPHA_DECIMATION_LEVEL			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	ALPHA_DEC_LVL			
SCALEMAX	CDF_INT2	18			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	15			
VALIDMIN	CDF_INT2	0			



VAR_NOTES	CDF_CHAR	Alpha Decimation Level. One in 2^N protons are retained when decimation is enabled, where N is the alpha decimation level.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
PRIORITY_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Priority Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PRIORITY_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	PRIORITY_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	127			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Version number of the priority boundaries. These define the 8 priorities, numbered 1-7, used to prioritize which PHAs are downlinked.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SPECIES_BOX_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Species Box Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SPECIES_BOX_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SPECIES_BOX_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				

VALIDMAX	CDF_INT2	127
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Version number of the species boxes. These define 32 boxes in E/Q - TOF - E space which are set to the locations of counts for individual ion species.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
SSD_THRESHOLD_VERSION	CDF_INT2	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD Threshold Version			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	SSD_THRESHOLD_VERSION			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SSD_THRESHOLD_VERSION			
SCALEMAX	CDF_INT2	128			
SCALEMIN	CDF_INT2	-1			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	127			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Version number of the set of SSD thresholds (1 master and 30 trim) used to collect the data. These settings affect the sensitivity of HIS and the noise allowed into the onboard event processing through the SSD subsystem. Version numbers are given only to sets of values used for science data collection, not for testing.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
PA_HVPS_SET_POINT	CDF_FLOAT	0		T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	PA HVPS set point			
DEPEND_0	CDF_CHAR	EPOCH			
FIELDNAM	CDF_CHAR	PA_HVPS_SET_POINT			
FILLVAL	CDF_FLOAT	-1.0e+31			

FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	PA_HVPS_SET_POINT
SCALEMAX	CDF_FLOAT	0
SCALEMIN	CDF_FLOAT	-32
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	kV
VALIDMAX	CDF_FLOAT	0
VALIDMIN	CDF_FLOAT	-31
VAR_NOTES	CDF_CHAR	This is the voltage setting for the PA HVPS, e.g. -10 kV, -25 kV. Note: It is not the reading of the on-board voltage monitor for this supply. Valid [0, -30 kV].
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EOQ_DELTA	CDF_FLOAT	1	64	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	E/q step delta			
FIELDNAM	CDF_CHAR	EOQ			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	EOQ			
SCALEMAX	CDF_FLOAT	80			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	log			
UNITS	CDF_CHAR	keV/e			
VALIDMAX	CDF_FLOAT	80			
VALIDMIN	CDF_FLOAT	0			
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in EOQ variable. Lower bound is EOQ value minus EOQ_DELTA, and upper bound is EOQ value plus EOQ_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
EOQ_DELTA_LABELS	CDF_CHAR	10	1	64	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	E/q Delta Labels				
FIELDNAM	CDF_CHAR	EOQ_DELTA_LABELS				



FORMAT	CDF_CHAR	A10
VAR_TYPE	CDF_CHAR	meta_data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_DELTA	CDF_FLOAT	1	16	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Elevation step delta			
FIELDNAM	CDF_CHAR	ELEVATION_DELTA			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	ELEVATION_DELTA			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	-25			
SCALETYP	CDF_CHAR	linear			
UNITS	CDF_CHAR	Degrees			
VALIDMAX	CDF_FLOAT	20			
VALIDMIN	CDF_FLOAT	-25			
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in ELEVATION variable. Lower bound is ELEVATION value minus ELEVATION_DELTA, and upper bound is ELEVATION value plus ELEVATION_DELTA.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
ELEVATION_DELTA_LABELS	CDF_CHAR	10	1	16	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	Elevation delta labels				
FIELDNAM	CDF_CHAR	ELEVATION_DELTA_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SSD_DELTA	CDF_FLOAT	1	32	F	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	SSD Delta			
FIELDNAM	CDF_CHAR	SSD_DELTA			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			

LABLAXIS	CDF_CHAR	SSD_DELTA
SCALEMAX	CDF_FLOAT	35
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
UNITS	CDF_CHAR	Degrees
VALIDMAX	CDF_FLOAT	31
VALIDMIN	CDF_FLOAT	0
VAR_NOTES	CDF_CHAR	Delta is from the midpoint in the SSD variable. Lower bound is SSD value minus SSD_DELTA, and upper bound is SSD value plus SSD_DELTA.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	Number Elements	DIMS	SIZES	R_VARY	D_VARY
SSD_DELTA_LABELS	CDF_CHAR	10	1	32	F	T
Attribute Name	Data Type	Value				
CATDESC	CDF_CHAR	SSD delta labels				
FIELDNAM	CDF_CHAR	SSD_DELTA_LABELS				
FORMAT	CDF_CHAR	A10				
VAR_TYPE	CDF_CHAR	meta_data				

4.1.3.3.3 HIS L2 VDF Data

Filename: solo_L2_swa-his-vdf_yyyymmdd_V01.cdf

[TO BE ADDED]

4.1.3.3.4 HIS L2 Housekeeping Data

Filename: solo_L2_swa-his-hk_yyyymmdd_V01.cdf

Global metadata

Name	Entry	Value
Acknowledgement	1	Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C.
Data_product	1	hk>HK data for HIS instrument
Data_type	1	hk_l2
Data_version	1	01
Descriptor	1	SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor
Discipline	1	Space Physics>Interplanetary Studies
File_naming_convention	1	"source_descriptor_datatype_yyyyMMdd

Generated_by	1	SO-HIS SOC, University of Michigan
Generation_date	1	20200611
HTTP_LINK		
Instrument_type	1	Particles (space)
LEVEL	1	2
LINK_TEXT		
LINK_TITLE		
Logical_file_id	1	solo_L2_swa-his-hk_00000000_v01
Logical_source	1	solo_L2_swa-his-hk
Logical_source_description	1	solo_L2_swa-his-hk
Mission_group	1	Solar Orbiter
MODS	1	Initial Release 11/24/2020.
OBS_ID		
Parents	1	CDF>solo_L2_swa-his-hk_yyyyMMdd_Vxx.cdf
PI_affiliation	1	SWRI
PI_name	1	S. Livi
Project	1	SOLO>Solar Orbiter
Rules_of_use	1	These Level 2 data require substantial processing for most applications. Users are encouraged to use Level 3 data, which provide the most relevant data products for scientific research. See Data Product Description Document for more information. Contact SWA/HIS team for more information as needed.
Software_version	1	00.00.00
SOOP_TYPE		
Source_name	1	SOLO>Solar Orbiter
space_DatasetResourceID		
TARGET_CLASS	1	Sun
TARGET_NAME	1	Interplanetary_medium
TARGET_REGION	1	Solar Wind
TEXT	1	Housekeeping data for HIS instrument.
	2	For details see Telemetry Definitions Document, 15164-TELDEF-01.
	3	Level 1 data are unvalidated and requires substantial processing to use for publication.
TIME_MAX	1	
TIME_MIN	1	
Time_resolution	1	Variable. Usually 1 sec, 30 sec, or 60 sec.

All the variables in the HK CDF have the following attributes:

Attribute Name	Data Type	Value
DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	Time_series
SCALEMAX	Varies (see below)	Based on VALIDMAX (see below)
SCALEMIN	Varies (see below)	Based on VALIDMIN (see below)

The following table summarizes all the variables in the HK CDF. It lists all the variables with their data types, units, validmin, and validmax. The dimensions and sizes can be found in the first table in the section on HIS L1 Housekeeping Data. Tables that define the dimensions for those variables which are not scalars and which give the VAR_NOTES for

all the variables that have them can also be found in the section on HIS L1 Housekeeping Data.

	Variable_Name	Data_type	UNITS	VALID-MIN	VALID-MAX
1	AC_LINK_EN	CDF_UINT1		0	1
2	AC_LINK_ERR	CDF_UINT1		0	1
3	ALPHA_DECI_DECR_THRESH_REG	CDF_INT4		0	65535
4	ALPHA_DECI_INCR_REG	CDF_UINT1		0	15
5	ALPHA_DECI_INCR_THRESH_REG	CDF_INT4		0	65535
6	ALPHA_DECI_LEVEL_REG	CDF_UINT1		0	15
7	ALPHA_MAX_VAL_REG	CDF_UINT2		0	1023
8	ALPHA_MIN_VAL_REG	CDF_UINT2		0	1023
9	ANODE_STIM_DELAY	CDF_UINT1		0	31
10	ANODE_STIM_ON	CDF_UINT1		0	1
11	ANODE_STIM_RATE	CDF_UINT1		0	7
12	ASIC_ADC_WAIT	CDF_UINT1		0	15
13	ASIC_CONF_REG	CDF_INT8		0	4294967295
14	ASIC_CS_MON	CDF_UINT1		0	1
15	ASIC_OUT_OF_SYSTEM_EN	CDF_UINT1		0	1
16	ASIC_REG_SWITCH	CDF_UINT1		0	1
17	ASIC_RESET	CDF_UINT1		0	1
18	ASIC_STIM_DELAY	CDF_UINT1		0	31
19	ASIC_STIM_ON	CDF_UINT1		0	1
20	ASIC_STIM_RATE	CDF_UINT1		0	7
21	ASIC_TP_RATE	CDF_UINT1		0	7
22	ASIC_WRITE_REG	CDF_UINT1		0	1
23	BOARD_ID	CDF_UINT1		0	1
24	CCSDS_REJ_MESSAGE_CNT	CDF_UINT1		0	15
25	CDH_BOARD_TEMP	CDF_FLOAT	C	-68	125
26	CDH_CPU_TEMP	CDF_FLOAT	C	-68	125
27	CDH_GROUND	CDF_INT4		0	4095
28	CDH_OPTO_LINK_RX_EN	CDF_UINT1		0	1
29	CDH_OPTO_LINK_RX_RATE	CDF_UINT1		0	3
30	CDH_OPTO_LINK_STAT_A	CDF_UINT1		0	1
31	CDH_OPTO_LINK_STAT_B	CDF_UINT1		0	1
32	CDH_OPTO_LINK_TX_POWER	CDF_UINT1		0	7
33	CDH_OPTO_LINK_TX_RATE	CDF_UINT1		0	3
34	CDH_OPTO_RX_CLOCK_SYNC_ERR_CNT	CDF_INT4		0	65535
35	CDH_OPTO_RX_CRC_ERR_CNT	CDF_INT4		0	65535
36	CDH_OPTO_RX_HDR_ERR_CNT	CDF_INT4		0	65535
37	CDH_OPTO_RX_SIDE	CDF_UINT1		0	1
38	CDH_P1_5V	CDF_FLOAT	V	0	3.3
39	CDH_P1_8V	CDF_FLOAT	V	0	3.3
40	CDH_P3_3V_ADC_V	CDF_FLOAT	V	0	13.2
41	CDH_P5V_DAC_V	CDF_FLOAT	V	0	13.2
42	CDH_SWEEP_DAC_EN_LATCHED	CDF_UINT1		0	15
43	CDH_SWEEP_STATE	CDF_UINT1		0	7
44	CDH_WDOG_EN	CDF_UINT1		0	1
45	CDH_WDOG_STATUS	CDF_UINT1		0	1

46	CHECKSUM	CDF_INT4		0	65535
47	CMD_ACC_CNT	CDF_INT2		0	255
48	CMD_ACC_LAST_SERVICE	CDF_INT2		0	255
49	CMD_ACC_LAST_SUBSERVICE	CDF_INT2		0	255
50	CMD_ACC_SSC	CDF_UINT2		0	16383
51	CMD_POL_BOT_DEF	CDF_UINT1		0	1
52	CMD_POL_TOP_DEF	CDF_UINT1		0	1
53	CMD_POL_TOP_PLATE	CDF_UINT1		0	1
54	CMD_REJ_CNT	CDF_UINT2		0	255
55	CMD_REJ_LAST_SERVICE	CDF_UINT2		0	255
56	CMD_REJ_LAST_SUBSERVICE	CDF_UINT2		0	255
57	CMD_REJ_SSC	CDF_UINT2		0	16383
58	CMD_RNG_ANALYZER	CDF_UINT1		0	1
59	CMD_RNG_BOT_DEF	CDF_UINT1		0	1
60	CMD_RNG_TOP_DEF	CDF_UINT1		0	1
61	CMD_RNG_TOP_PLATE	CDF_UINT1		0	1
62	CMD_VAL_ANALYZER	CDF_FLOAT	kV	-5.56	0
63	CMD_VAL_BOT_DEF	CDF_FLOAT	kV	-5.56	5.56
64	CMD_VAL_MAIN	CDF_FLOAT	kV	0	6.25
65	CMD_VAL_OFFSET	CDF_FLOAT	kV	0	2
66	CMD_VAL_PA	CDF_FLOAT	kV	0	33.48
67	CMD_VAL_SSD	CDF_FLOAT	V	0	250
68	CMD_VAL_START_A	CDF_FLOAT	V	0	250
69	CMD_VAL_START_B	CDF_FLOAT	V	0	5
70	CMD_VAL_START_CFD	CDF_FLOAT	V	0	5
71	CMD_VAL_START_MCP	CDF_FLOAT	kV	0	5
72	CMD_VAL_STOP_A	CDF_FLOAT	V	0	5
73	CMD_VAL_STOP_B	CDF_FLOAT	V	0	5
74	CMD_VAL_STOP_CFD	CDF_FLOAT	V	0	5
75	CMD_VAL_STOP_MCP	CDF_FLOAT	kV	0	5
76	CMD_VAL_TOP_DEF	CDF_FLOAT	kV	-5.56	5.56
77	CMD_VAL_TOP_PLATE	CDF_FLOAT	kV	-5.56	5.56
78	COINC_TIMING_ASIC_SHAPE	CDF_INT2		0	255
79	COINC_TIMING_ASIC_WINDOW	CDF_INT2		0	255
80	COINC_TIMING_POS_TIMEOUT	CDF_INT2		0	255
81	COINC_TIMING_TOF_TIMEOUT	CDF_INT2		0	255
82	CONNECTION_TEST_CNT	CDF_UINT1		0	15
83	CPU_WDOG_EN	CDF_UINT1		0	1
84	CPU_WDOG_STATUS	CDF_UINT1		0	1
85	DSCB_ADC_EN	CDF_UINT1		0	1
86	DSCB_ADC_WAITS	CDF_INT4		0	65535
87	DSCB_ASIC_CONTROL_STATE_MACHINE	CDF_UINT1		0	3
88	DSCB_ASIC_FLAG	CDF_UINT1		0	1
89	DSCB_ASIC_MONASIC_V_MON	CDF_FLOAT	V	0	5
90	DSCB_ASIC_READ_OUT_STATE_MACHINE	CDF_UINT1		0	3
91	DSCB_ASIC_TEMP	CDF_FLOAT	C	-67.18	124.2
92	DSCB_ASIC_WRITE_STATE_MACHINE	CDF_UINT1		0	3
93	DSCB_AZIMUTHAL_SEL	CDF_UINT1		0	1
94	DSCB_CMD_NAKS	CDF_INT4		0	65535
95	DSCB_COINC	CDF_UINT1		0	3
96	DSCB_COMM_ACTIVE	CDF_UINT1		0	1
97	DSCB_DOUBLE_BIT_EDAC	CDF_INT4		0	65535

98	DSCB_DSCB_TEMP	CDF_FLOAT	C	-67.18	124.2
99	DSCB_DSIB_TEMP	CDF_FLOAT	C	0	125
100	DSCB_FPGA_BASE	CDF_INT2		0	255
101	DSCB_FPGA_REV	CDF_INT2		0	255
102	DSCB_HK_RATE	CDF_UINT1		0	7
103	DSCB_HV_AUTO_RESET_EN	CDF_UINT1		0	1
104	DSCB_HV_EN	CDF_UINT1		0	1
105	DSCB_HV_LIMITED	CDF_UINT1		0	1
106	DSCB_HV_MON_EN	CDF_UINT1		0	1
107	DSCB_HVPS_TEMP	CDF_FLOAT	C	-67.18	124.2
108	DSCB_INIT_BIT	CDF_UINT1		0	1
109	DSCB_INIT_REG	CDF_INT2		0	255
110	DSCB_MCP_BIAS_EN	CDF_UINT1		0	1
111	DSCB_MCP_BIAS_I_LIMIT_EN	CDF_UINT1		0	1
112	DSCB_MCP_BIAS_I_TRIP	CDF_UINT1		0	1
113	DSCB_MCP_BIAS_V_LIMIT_EN	CDF_UINT1		0	1
114	DSCB_MCP_BIAS_V_TRIP	CDF_UINT1		0	1
115	DSCB_OFFSET_I_MON	CDF_FLOAT	mA	0	11.9
116	DSCB_OFFSET_V_MON	CDF_FLOAT	kV	0	2.5
117	DSCB_OPTO_RX_CLOCK_SYNC_ERR_CNT	CDF_INT4		0	65535
118	DSCB_OPTO_RX_CRC_ERR_CNT	CDF_INT4		0	65535
119	DSCB_OPTO_RX_DATA1_ERR_CNT	CDF_INT4		0	65535
120	DSCB_OPTO_RX_DATA2_ERR_CNT	CDF_INT4		0	65535
121	DSCB_OPTO_RX_HDR_ERR_CNT	CDF_INT4		0	65535
122	DSCB_P1_5V	CDF_FLOAT	V	0	5
123	DSCB_P3_3V	CDF_FLOAT	V	0	5
124	DSCB_P3_3V_ADC_REF	CDF_FLOAT	V	0	5
125	DSCB_P5V_ADC_REF_MON	CDF_FLOAT	V	0	10
126	DSCB_P5V_DAC_REF_MON	CDF_FLOAT	V	0	10
127	DSCB_POS_START	CDF_UINT1		0	15
128	DSCB_POS_START_ADD_SUB	CDF_UINT1		0	1
129	DSCB_POS_START_SEL	CDF_UINT1		0	1
130	DSCB_POS_STOP	CDF_UINT1		0	15
131	DSCB_POS_STOP_ADD_SUB	CDF_UINT1		0	1
132	DSCB_POS_STOP_DUAL_SEL	CDF_UINT1		0	1
133	DSCB_POS_STOP_SEL	CDF_UINT1		0	1
134	DSCB_RATES_EN	CDF_UINT1		0	1
135	DSCB_RESET_DECI_LEVEL	CDF_UINT1		0	1
136	DSCB_RESET_FSW	CDF_UINT1		0	1
137	DSCB_RESET_POR	CDF_UINT1		0	11mA
138	DSCB_RESET_WDOG	CDF_UINT1		0	1
139	DSCB_SINGLE_BIT_EDAC	CDF_INT4		0	65535
140	DSCB_SSD_I_MON	CDF_FLOAT	mA	0	11.9
141	DSCB_SSD_TEMP	CDF_FLOAT	C	-67.18	124.2
142	DSCB_SSD_V_MON	CDF_FLOAT	V	0	250
143	DSCB_START_MCP_I_MON	CDF_FLOAT	mA	0	66.17
144	DSCB_START_MCP_TEMP	CDF_FLOAT	C	-67.18	124.2
145	DSCB_START_MCP_V_MON	CDF_FLOAT	kV	0	5
146	DSCB_STARTUP_POWER	CDF_UINT1		0	7
147	DSCB_STARTUP_RX_A_EN	CDF_UINT1		0	1
148	DSCB_STARTUP_RX_B_EN	CDF_UINT1		0	1
149	DSCB_STARTUP_TX_A_EN	CDF_UINT1		0	1

150	DSCB_STARTUP_TX_B_EN	CDF_UINT1		0	1
151	DSCB_STOP_MCP_I_MON	CDF_FLOAT	mA	0	66.17
152	DSCB_STOP_MCP_TEMP	CDF_FLOAT	C	-67.18	124.2
153	DSCB_STOP_MCP_V_MON	CDF_FLOAT	kV	0	5
154	DSCB_SWEEP_OVER	CDF_UINT1		0	1
155	DSCB_SYSTEM_FSM	CDF_UINT1		0	7
156	DSCB_TOF_START	CDF_UINT1		0	15
157	DSCB_TOF_START_ADD_SUB	CDF_UINT1		0	1
158	DSCB_TOF_STOP	CDF_UINT1		0	15
159	DSCB_TOF_STOP_ADD_SUB	CDF_UINT1		0	1
160	DSCB_V_I_MON_REF	CDF_FLOAT	V	0	5
161	DSCB_WDOG_CNT	CDF_INT2		0	255
162	DSCB_WDOG_ON	CDF_UINT1		0	1
163	EAIS_PORT_TEMP	CDF_FLOAT	C	-50	340
164	ENERGY_ASIC_ACQ_TP	CDF_UINT1		0	1
165	ENERGY_ASIC_PARITY	CDF_UINT1		0	1
166	EVENT_ERR_CNT	CDF_INT2		0	255
167	FDIR_DSCB_AUTOMATIC_LIMIT	CDF_UINT1		0	1
168	FDIR_DSCB_COMM_LOSS	CDF_UINT1		0	1
169	FDIR_DSCB_DOWNLINK_UNDETERMINED	CDF_UINT1		0	1
170	FDIR_DSCB_NOT_RUNNING	CDF_UINT1		0	1
171	FDIR_DSCB_REG_INIT	CDF_UINT1		0	1
172	FDIR_EMERGENCY_FAST_SAFE	CDF_UINT1		0	1
173	FDIR_LEVEL	CDF_UINT1		0	15
174	FDIR_NOMINAL_SLOW_SAFE	CDF_UINT1		0	1
175	FDIR_RED_LIMIT	CDF_UINT1		0	1
176	FDIR_RESERVED	CDF_UINT1		0	1
177	FDIR_SCIENCE_AUTO_MODE_FAIL	CDF_UINT1		0	1
178	FDIR_SOLAR_ARRAY_STEERING_START	CDF_UINT1		0	1
179	FDIR_SOLAR_ARRAY_STEERING_STOP	CDF_UINT1		0	1
180	FDIR_TASK_TIMEOUT	CDF_UINT1		0	1
181	FDIR_THRUSTER_FIRING_START	CDF_UINT1		0	1
182	FDIR_THRUSTER_FIRING_STOP	CDF_UINT1		0	1
183	FDIR_YELLOW_LIMIT	CDF_UINT1		0	1
184	FPGA_STEP_TBL	CDF_UINT1		0	3
185	FPGA_STEP_TBL_DATA_ELEV_INDEX	CDF_UINT1		0	15
186	FPGA_STEP_TBL_E_Q_INDEX	CDF_UINT1		0	63
187	FPGA_STEP_TBL_ELEV_INDEX	CDF_UINT1		0	15
188	FPGA_SWEEP_TBL_ROW	CDF_UINT1		0	127
189	FPGA_SWEEP_TBL_SIDE	CDF_UINT1		0	1
190	FPGA_SWEEP_TBL_DATA_SIDE	CDF_UINT1		0	1
191	HK_EN	CDF_UINT1		0	1
192	HV_DISABLED	CDF_UINT1		0	1
193	HV_I_LIM_PERSISTENCE	CDF_INT2		0	255
194	HV_LIMITED	CDF_UINT1		0	1
195	HV_V_LIM_PERSISTENCE	CDF_INT2		0	255
196	HVPS_ANALYZER	CDF_FLOAT	kV	-7.326	7.326
197	HVPS_ANALYZER_POL	CDF_UINT1		0	1
198	HVPS_ANALYZER_RNG	CDF_UINT1		0	1
199	HVPS_BOT_DEF	CDF_FLOAT	kV	-7.326	7.326
200	HVPS_BOT_DEF_POL	CDF_UINT1		0	1
201	HVPS_BOT_DEF_RNG	CDF_UINT1		0	1

202	HVPS HV MAIN N	CDF_FLOAT	kV	-8.25	8.25
203	HVPS HV MAIN N POL	CDF_UINT1		0	1
204	HVPS HV MAIN N RNG	CDF_UINT1		0	1
205	HVPS HV MAIN P	CDF_FLOAT	kV	-8.25	8.25
206	HVPS HV MAIN P POL	CDF_UINT1		0	1
207	HVPS HV MAIN P RNG	CDF_UINT1		0	1
208	HVPS N12V I	CDF_FLOAT	A	-0.132	0
209	HVPS P12V I	CDF_FLOAT	A	0	0.132
210	HVPS TOP DEF	CDF_FLOAT	kV	-7.326	7.326
211	HVPS TOP DEF POL	CDF_UINT1		0	1
212	HVPS TOP DEF RNG	CDF_UINT1		0	1
213	HVPS TOP PLATE	CDF_FLOAT	kV	-7.326	7.326
214	HVPS TOP PLATE POL	CDF_UINT1		0	1
215	HVPS TOP PLATE RNG	CDF_UINT1		0	1
216	INTEGRATION TIME	CDF_UINT4		0	131071
217	INTER INST INFO CNT	CDF_UINT2		0	1023
218	IRAP HV ON	CDF_UINT1		0	1
219	IRAP HVPS TEMP	CDF_FLOAT	C	-67.18	124.2
220	LAST ERR CODE	CDF_INT2		0	255
221	LAST MACRO ACC CMD CNT	CDF_UINT1		0	127
222	LAST MACRO ACC SERVICE	CDF_INT2		0	255
223	LAST MACRO ACC SUBSERVICE	CDF_INT2		0	255
224	LAST MACRO CALLER	CDF_UINT1		0	127
225	LAST MACRO CMD CNT	CDF_UINT1		0	127
226	LAST MACRO I WAIT	CDF_INT4		0	65535
227	LAST MACRO REJ CMD CNT	CDF_UINT1		0	127
228	LAST MACRO REJ SERVICE	CDF_INT2		0	255
229	LAST MACRO REJ SUBSERVICE	CDF_INT2		0	255
230	LAST MACRO SEL	CDF_UINT1		0	127
231	LAST MACRO TOTAL CMDS	CDF_UINT1		0	127
232	LOW TOF CUT OFF REG	CDF_UINT2		0	1023
233	LVPS 12V DC DC TEMP	CDF_FLOAT	C	-67.18	124.2
234	LVPS 5V DC DC TEMP	CDF_FLOAT	C	-67.18	124.2
235	LVPS AC LINK I	CDF_FLOAT	A	-0.028	0.24
236	LVPS AC LINK TEMP	CDF_IFLOAT	C	-67.18	124.2
237	LVPS AC LINK V	CDF_FLOAT	V	0	29.14
238	LVPS N12V OUTPUT I	CDF_FLOAT	A	-0.125	-0.016
239	LVPS N12V OUTPUT V	CDF_FLOAT	V	-14.03	0
240	LVPS N5V OUTPUT I	CDF_FLOAT	A	-0.11	-0.0007
241	LVPS N5V OUTPUT V	CDF_FLOAT	V	-6.02	0
242	LVPS P12V OUTPUT I	CDF_FLOAT	A	0	0.11
243	LVPS P12V OUTPUT V	CDF_FLOAT	V	0	14.49
244	LVPS P3 3V DC DC TEMP	CDF_FLOAT	C	-67.18	124.2
245	LVPS P3 3V OUTPUT I	CDF_FLOAT	A	0	1.145
246	LVPS P3 3V OUTPUT V	CDF_FLOAT	V	0	3.99
247	LVPS P5V OUTPUT I	CDF_FLOAT	A	0	0.1114
248	LVPS P5V OUTPUT V	CDF_FLOAT	V	0	6.07
249	MACRO STATUS	CDF_UINT1		0	1
250	MASTER SWEEP EN	CDF_UINT1		0	3
251	MASTER SWEEP EN STATUS	CDF_UINT1		0	3
252	MISSING SPACEWIRE TIME CODE	CDF_UINT1		0	1
253	MODE CHANGE REASON	CDF_UINT1		0	3
254	MRAM WR EN	CDF_UINT1		0	1

255	OFFSET_EN	CDF_UINT1		0	1
256	OFFSET_I_EN_LIM	CDF_UINT1		0	1
257	OFFSET_I_TRIG	CDF_UINT1		0	1
258	OFFSET_V_EN_LIM	CDF_UINT1		0	1
259	OFFSET_V_TRIG	CDF_UINT1		0	1
260	OP_MODE	CDF_UINT1		0	9
261	OPTO_RX_A_EN	CDF_UINT1		0	1
262	OPTO_RX_A_EN_INIT	CDF_UINT1		0	1
263	OPTO_RX_B_EN	CDF_UINT1		0	1
264	OPTO_RX_B_EN_INIT	CDF_UINT1		0	1
265	OPTO_RX_LOOPBACK	CDF_UINT1		0	1
266	OPTO_RX_RATE	CDF_UINT1		0	3
267	OPTO_RX_SIGNAL_QUALITY	CDF_UINT1		0	1
268	OPTO_RX_SYNCED	CDF_UINT1		0	1
269	OPTO_TX_A_EN	CDF_UINT1		0	1
270	OPTO_TX_A_EN_INIT	CDF_UINT1		0	1
271	OPTO_TX_B_EN	CDF_UINT1		0	1
272	OPTO_TX_B_EN_INIT	CDF_UINT1		0	1
273	OPTO_TX_EN	CDF_UINT1		0	1
274	OPTO_TX_POWER	CDF_UINT1		0	7
275	OPTO_TX_POWER_EN	CDF_UINT1		0	1
276	OPTO_TX_RATE	CDF_UINT1		0	3
277	OPTO_TX_READY	CDF_UINT1		0	1
278	OSC_ADJ_POS_START	CDF_INT2		0	255
279	OSC_ADJ_POS_STOP	CDF_INT2		0	255
280	OSC_ADJ_TOF_START	CDF_INT2		0	255
281	OSC_ADJ_TOF_STOP	CDF_INT2		0	255
282	PA_HV_ON	CDF_UINT1		0	1
283	PA_HVPS_TEMP	CDF_FLOAT	C	-67.18	124.2
284	PA_HVPS_V_MON	CDF_FLOAT	kV	-46.2	0
285	PACKET_SUB_TIME	CDF_INT4		0	65535
286	PACKET_WHOLE_TIME	CDF_INT8		0	4294967296
287	POS_CAL_DONE	CDF_UINT1		0	1
288	PROCESSOR_IDLE_PERCENTAGE	CDF_UINT1		0	100
289	PROTON_AVOIDANCE_STATUS	CDF_UINT1		0	1
290	PROTON_DEC1_DECR_THRESH_REG	CDF_INT4		0	65535
291	PROTON_DEC1_INCR_REG	CDF_UINT1		0	15
292	PROTON_DEC1_INCR_THRESH_REG	CDF_INT4		0	65535
293	PROTON_DEC1_LEVEL_REG	CDF_UINT1		0	15
294	PROTON_MAX_VAL_REG	CDF_UINT1		0	1023
295	PROTON_MIN_VAL_REG	CDF_UINT1		0	1023
296	QUALITY_BITMASK	CDF_INT4		0	65535
297	QUALITY_FLAG	CDF_INT2		0	255
298	SAFETY_CHECKING_STATUS_CDH	CDF_UINT1		0	1
299	SAFETY_CHECKING_STATUS_DSCB	CDF_UINT1		0	1
300	SAFING_STATUS_CDH_MON_RED	CDF_UINT1		0	1
301	SAFING_STATUS_CDH_MON_YEL	CDF_UINT1		0	1
302	SAFING_STATUS_DSCB_MON_RED	CDF_UINT1		0	1
303	SAFING_STATUS_DSCB_MON_YEL	CDF_UINT1		0	1
304	SEQ_CNT	CDF_INT4		0	65535
305	SSD_EN	CDF_UINT1		0	1
306	SSD_I_EN_LIM	CDF_UINT1		0	1

307	SSD_I_TRIG	CDF_UINT1	0	1
308	SSD_V_EN_LIM	CDF_UINT1	0	1
309	SSD_V_TRIG	CDF_UINT1	0	1
310	START_ANODE_A_OSC_CNT	CDF_INT4	0	65535
311	START_ANODE_B_OSC_CNT	CDF_INT4	0	65535
312	START_COLLECTION	CDF_UINT1	0	1
313	START_MCP_EN	CDF_UINT1	0	1
314	START_MCP_I_EN_LIM	CDF_UINT1	0	1
315	START_MCP_I_TRIG	CDF_UINT1	0	1
316	START_MCP_V_EN_LIM	CDF_UINT1	0	1
317	START_MCP_V_TRIG	CDF_UINT1	0	1
318	START_STIM_DELAY	CDF_UINT1	0	31
319	START_STIM_EXT	CDF_UINT1	0	1
320	START_STIM_ON	CDF_UINT1	0	1
321	START_STIM_RATE	CDF_UINT1	0	7
322	START_TOF_OSC_CNT	CDF_INT4	0	65535
323	STOP_MCP_EN	CDF_UINT1	0	1
324	STOP_MCP_I_EN_LIM	CDF_UINT1	0	1
325	STOP_MCP_I_TRIG	CDF_UINT1	0	1
326	STOP_MCP_V_EN_LIM	CDF_UINT1	0	1
327	STOP_MCP_V_TRIG	CDF_UINT1	0	1
328	STOP_TOF_OSC_CNT	CDF_INT4	0	65535
329	SWEEP_DATA_A_ACTIVE	CDF_UINT1	0	1
330	SWEEP_DATA_B_ACTIVE	CDF_UINT1	0	1
331	SWEEP_EDAC_EN	CDF_UINT1	0	1
332	SWEEP_EDP	CDF_UINT1	0	1
333	SWEEP_EN_ANALYZER	CDF_UINT1	0	1
334	SWEEP_EN_BOT_DEF	CDF_UINT1	0	1
335	SWEEP_EN_TOP_DEF	CDF_UINT1	0	1
336	SWEEP_EN_TOP_PLATE	CDF_UINT1	0	1
337	SWEEP_SCRUBBING_EN	CDF_UINT1	0	1
338	SWEEP_TBL_POINTER_SEL	CDF_UINT1	0	1
339	SYSTEM_MODULE_VERIFY	CDF_UINT1	0	1
340	TIME_CODE_CNT	CDF_INT2	0	255
341	TIME_MESSAGE_CNT	CDF_INT2	0	255
342	TOF_CAL_DONE	CDF_UINT1	0	1
343	TOF_CAL_EN	CDF_UINT1	0	1
344	TOF_START_SEL	CDF_UINT1	0	1
345	TOF_STIM_DELAY	CDF_UINT1	0	31
346	TOF_STIM_EXT	CDF_UINT1	0	1
347	TOF_STIM_ON	CDF_UINT1	0	1
348	TOF_STIM_RATE	CDF_UINT1	0	7
349	WDOG_RESET_CNT	CDF_UINT1	0	127

4.1.4 L3 – Higher level data products

4.1.4.1 EAS L3 data products

TBD

solo_L3_swa-eas-NMpa_[StartTime-EndTime]_V01.cdf
solo_L3_swa-eas-TMpa_[StartTime-EndTime]_V01.cdf
solo_L3_swa-eas-MOMred_[StartTime-EndTime]_V01.cdf

4.1.4.2 PAS L3 data products

4.1.4.3 HIS L3 data products

4.1.4.3.1 HIS L3 Composition Data

Filename: solo_L3_swa-his-comp-{cadence}_yyyymmdd_V01.cdf

Global metadata

Name	Entry	Value
Acknowledgement	1	Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C.
Data_product	1	L3>Level 3 data for HIS instrument
Data_type	1	L3>Level 3 Data
Data_version	1	01
Descriptor	1	SWA-HIS-COMP-{cadence}>Solar Wind Analyzer-Heavy Ion Sensor, Composition {cadence} Resolution
Discipline	1	Space Physics>Interplanetary Studies
File_naming_convention	1	"source_descriptor_datatype_yyyyMMdd
Generated_by	1	SO-HIS SOC, University of Michigan
Generation_date	1	20200611
HTTP_LINK		
Instrument_type	1	Particles (space)
LEVEL	1	L3>Level 3 Data
LINK_TEXT		
LINK_TITLE		
Logical_file_id	1	solo_L3_swa-his-comp-{cadence}_yyyymmdd_V01
Logical_source	1	solo_L3_swa-his-comp
Logical_source_description	1	solo_L3_swa-his-comp
Mission_group	1	Solar Orbiter
MODS	1	Initial Release 4/07/2021.
OBS_ID		
Parents	1	CDF>solo_L2_swa-his-pha_yyyyMMdd_Vxx.cdf
	2	CDF>solo_L2_swa-his-rates_yyyyMMdd_Vxx.cdf
PI_affiliation	1	SWRI
PI_name	1	S. Livi
Project	1	SOLO>Solar Orbiter
Rules_of_use	1	This data is appropriate for general scientific use. Users are encouraged to read the Data Product Description Document and pay attention to the quality flag. Contact the SWA/HIS team for more information and questions about the data.
Software_version	1	01.00.00
SOOP_NAME		



SOOP_TYPE		
Source_name	1	SOLO>Solar Orbiter
spase_DatasetResourceID		
TARGET_CLASS	1	Sun
TARGET_NAME	1	Interplanetary_medium
TARGET_REGION	1	Solar Wind
TEXT	1	Level 3 data for HIS instrument.
	2	Time series measurements of the elemental abundance, charge state composition, and kinetic properties of heavy ions in the solar wind.
TIME_MAX	1	yyyy-MM-ddThh:mm:ssZ
TIME_MIN	1	yyyy-MM-ddThh:mm:ssZ
Time_resolution	1	30sec, 5min, 10min, 30min, 1hr, or 2hr

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPOCH	CDF_TIME_TT2000	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Default time			
FIELDNAM	CDF_CHAR	EPOCH			
FILLVAL	CDF_TIME_TT2000	9999-12-31T23:59:59.999999999			
LABLAXIS	CDF_CHAR	EPOCH			
MONOTON	CDF_CHAR	INCREASE			
REFERENCE_POSITION	CDF_CHAR	Rotating Earth Geoid			
SCALEMAX	CDF_TIME_TT2000	2040-01-01T00:00:00.000000000			
SCALEMIN	CDF_TIME_TT2000	2020-02-10T00:00:00.000000000			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-9>Second			
TIME_BASE	CDF_CHAR	J2000			
TIME_SCALE	CDF_CHAR	Terrestrial Time			
UNITS	CDF_CHAR	ns			
VALIDMIN	CDF_TIME_TT2000	1990-01-01T00:00:00.000000000			
VALIDMAX	CDF_TIME_TT2000	2049-12-31T23:59:59.999000000			
VAR_NOTES	CDF_CHAR	Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ACCUM_SECONDS	CDF_REAL8	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Accumulation time			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			



FIELDNAM	CDF_CHAR	ACCUM_SECONDS
FILLVAL	CDF_REAL8	-1.00E+31
FORMAT	CDF_CHAR	E12.2
LABLAXIS	CDF_CHAR	ACCUM_SECONDS
SCALEMAX	CDF_REAL8	7000
SCALEMIN	CDF_REAL8	0
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	1.0>Second
UNITS	CDF_CHAR	seconds
VALIDMAX	CDF_REAL8	(varies with cadence of file)
VALIDMIN	CDF_REAL8	0.025
VAR_NOTES	CDF_CHAR	The summed accumulation time for this time step, equal to the total measurement time for each elevation step throughout the accumulated scans, less measurement time from elevation steps that have not passed quality filtering.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	QUALITY_FLAG			
FILLVAL	CDF_UINT1	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	QUALITY_FLAG			
SCALEMAX	CDF_UINT1	3			
SCALEMIN	CDF_UINT1	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	0=good, 1=caution, 2=bad			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_BITMASK	CDF_UINT2	1	0	T	
Attribute Name	Data Type	Value			

CATDESC	CDF_CHAR	Quality bitmask
DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	QUALITY_BITMASK
FILLVAL	CDF_UINT2	65535
FORMAT	CDF_CHAR	I5
LABLAXIS	CDF_CHAR	QUALITY_BITMASK
SCALEMAX	CDF_UINT2	32
SCALEMIN	CDF_UINT2	0
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT2	65534
VALIDMIN	CDF_UINT2	0
VAR_NOTES	CDF_CHAR	Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
AZIMUTH_SOURCE	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Azimuth source			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	AZIMUTH_SOURCE			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	AZIMUTH_SOURCE			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	1			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	0 = Azimuth from SSD Detector; 1 = Azimuth from the position on the Start MCP			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY

SW_TYPE	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Solar wind type			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	SW_TYPE			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SW_TYPE			
SCALEMAX	CDF_INT2	5			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	3			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Solar wind type. 0:Streamer, 1:Coronal hole, 2:CME, 3:Unidentified			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
NUMBER_OF_SCANS	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Number of scans			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	NUMBER_OF_SCANS			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	NUMBER_OF_SCANS			
SCALEMAX	CDF_INT2	250			
SCALEMIN	CDF_INT2	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	20			
VALIDMIN	CDF_INT2	1			
VAR_NOTES	CDF_CHAR	Number of scans accumulated for data products.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
HE2_DENS	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	He++ density			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE2_DENS			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	HE2_DENS			
SCALEMAX	CDF_FLOAT	1E2			
SCALEMIN	CDF_FLOAT	1E-4			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3			
UNITS	CDF_CHAR	1/cm^3			
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	He++ density			
VAR_TYPE	CDF_CHAR	data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
HE2_DENS_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	He++ density error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE2_DENS_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	HE2_DENS_ERR			
SCALEMAX	CDF_FLOAT	1E2			
SCALEMIN	CDF_FLOAT	1E-4			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3			
UNITS	CDF_CHAR	1/cm^3			
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			

VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
HE2_DENS_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	He++ density quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE2_DENS_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	6			
LABLAXIS	CDF_CHAR	HE2_DENS_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
HE2_TH_SPEED	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	He++ thermal speed			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE2_TH_SPEED			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	HE2_TH_SPEED			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			

SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3
UNITS	CDF_CHAR	km/s
VALIDMAX	CDF_UINT1	9.999E4
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	He++ thermal speed
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
HE2_TH_SPEED_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	He++ thermal speed error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE2_TH_SPEED_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	HE2_TH_SPEED_ERR			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3			
UNITS	CDF_CHAR	km/s			
VALIDMAX	CDF_UINT1	9.999E4			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
HE2_TH_SPEED_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	He++ thermal speed quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE2_TH_SPEED_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			



LABLAXIS	CDF_CHAR	HE2_TH_SPEED_QF
SCALEMAX	CDF_INT2	3
SCALEMIN	CDF_INT2	-2
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
HE2_SPEED	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	He++ speed			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE2_SPEED			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	HE2_SPEED			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s			
UNITS	CDF_CHAR	km/s			
VALIDMAX	CDF_UINT1	9.999E4			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	He++ speed			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
HE2_SPEED_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	He++ speed error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE2_SPEED_ERR			
FILLVAL	CDF_FLOAT	-1E31			



FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	HE2_SPEED_ERR
SCALEMAX	CDF_FLOAT	2E3
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s
UNITS	CDF_CHAR	km/s
VALIDMAX	CDF_UINT1	9.999E4
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
HE2_SPEED_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	He++ speed quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE2_SPEED_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	HE2_SPEED_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
C5_DENS	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon 5 density			
DEPEND_0	CDF_CHAR	EPOCH			

DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	C5_DENS
FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	C5_DENS
SCALEMAX	CDF_FLOAT	1E2
SCALEMIN	CDF_FLOAT	1E-4
SCALETYP	CDF_CHAR	log
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3
UNITS	CDF_CHAR	1/cm^3
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Carbon 5 density
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C5_DENS_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon 5 density error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C5_DENS_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C5_DENS_ERR			
SCALEMAX	CDF_FLOAT	1E2			
SCALEMIN	CDF_FLOAT	1E-4			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3			
UNITS	CDF_CHAR	1/cm^3			
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C5_DENS_QF	CDF_INT2	1	0	T	



Attribute Name	Data Type	Value
CATDESC	CDF_CHAR	Carbon 5 density quality flag
DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	C5_DENS_QF
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	C5_DENS_QF
SCALEMAX	CDF_INT2	3
SCALEMIN	CDF_INT2	-2
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C5_TH_SPEED	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon 5 thermal speed			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C5_TH_SPEED			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C5_TH_SPEED			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s			
UNITS	CDF_CHAR	km/s			
VALIDMAX	CDF_UINT1	9.999E4			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Carbon 5 temperature			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C5_TH_SPEED_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon 5 thermal speed error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C5_TH_SPEED_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C5_TH_SPEED_ERR			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s			
UNITS	CDF_CHAR	km/s			
VALIDMAX	CDF_UINT1	9.999E4			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C5_TH_SPEED_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon 5 thermal speed quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C5_TH_SPEED_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	C5_TH_SPEED_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			



VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C5_SPEED	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon 5 speed			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C5_SPEED			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C5_SPEED			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s			
UNITS	CDF_CHAR	km/s			
VALIDMAX	CDF_UINT1	9.999E4			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Carbon 5 speed			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C5_SPEED_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon 5 speed error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C5_SPEED_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C5_SPEED_ERR			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s			
UNITS	CDF_CHAR	km/s			
VALIDMAX	CDF_UINT1	9.999E4			
VALIDMIN	CDF_UINT1	0			



VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
C5_SPEED_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon 5 speed quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C5_SPEED_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	C5_SPEED_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
O6_DENS	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen 6 density			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O6_DENS			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	O6_DENS			
SCALEMAX	CDF_FLOAT	1E2			
SCALEMIN	CDF_FLOAT	1E-4			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3			

UNITS	CDF_CHAR	1/cm^3
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Oxygen 6 density
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O6_DENS_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen 6 density error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O6_DENS_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	O6_DENS_ERR			
SCALEMAX	CDF_FLOAT	1E2			
SCALEMIN	CDF_FLOAT	1E-4			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3			
UNITS	CDF_CHAR	1/cm^3			
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O6_DENS_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen 6 density quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O6_DENS_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	O6_DENS_QF			
SCALEMAX	CDF_INT2	3			

SCALEMIN	CDF_INT2	-2
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
O6_TH_SPEED	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen 6 thermal speed			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O6_TH_SPEED			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	O6_TH_SPEED			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3			
UNITS	CDF_CHAR	km/s			
VALIDMAX	CDF_UINT1	9.999E4			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Oxygen 6 thermal speed			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
O6_TH_SPEED_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen 6 thermal speed error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O6_TH_SPEED_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			

LABLAXIS	CDF_CHAR	O6_TH_SPEED_ERR
SCALEMAX	CDF_FLOAT	2E3
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3
UNITS	CDF_CHAR	km/s
VALIDMAX	CDF_UINT1	9.999E4
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O6_TH_SPEED_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen 6 thermal speed quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O6_TH_SPEED_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	O6_TH_SPEED_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O6_SPEED	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen 6 speed			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O6_SPEED			

FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	O6_SPEED
SCALEMAX	CDF_FLOAT	2E3
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s
UNITS	CDF_CHAR	km/s
VALIDMAX	CDF_UINT1	9.999E4
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Oxygen 6 speed
VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
O6_SPEED_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen 6 speed error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O6_SPEED_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	O6_SPEED_ERR			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s			
UNITS	CDF_CHAR	km/s			
VALIDMAX	CDF_UINT1	9.999E4			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
O6_SPEED_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen 6 speed quality flag			



DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	O6_SPEED_QF
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	O6_SPEED_QF
SCALEMAX	CDF_INT2	3
SCALEMIN	CDF_INT2	-2
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
FE10_DENS	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron 10 density			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE10_DENS			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	FE10_DENS			
SCALEMAX	CDF_FLOAT	1E2			
SCALEMIN	CDF_FLOAT	1E-4			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3			
UNITS	CDF_CHAR	1/cm^3			
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Iron 10 density			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
FE10_DENS_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			

CATDESC	CDF_CHAR	Iron 10 density error/uncertainty
DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	FE10_DENS_ERR
FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	FE10_DENS_ERR
SCALEMAX	CDF_FLOAT	1E2
SCALEMIN	CDF_FLOAT	1E-4
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	1.0E-6>1/Meter^3
UNITS	CDF_CHAR	1/cm^3
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
FE10_DENS_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron 10 density quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE10_DENS_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	FE10_DENS_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
FE10_TH_SPEED	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron 10 thermal speed			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE10_TH_SPEED			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	FE10_TH_SPEED			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s			
UNITS	CDF_CHAR	km/s			
VALIDMAX	CDF_UINT1	9.999E4			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Iron 10 thermal speed			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
FE10_TH_SPEED_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron 10 thermal speed error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE10_TH_SPEED_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	FE10_TH_SPEED_ERR			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s			
UNITS	CDF_CHAR	km/s			
VALIDMAX	CDF_UINT1	9.999E4			
VALIDMIN	CDF_UINT1	0			



VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
FE10_TH_SPEED_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron 10 thermal speed quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE10_TH_SPEED_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	FE10_TH_SPEED_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
FE10_SPEED	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron 10 speed			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE10_SPEED			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	FE10_SPEED			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s			
UNITS	CDF_CHAR	km/s			

VALIDMAX	CDF_UINT1	9.999E4
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Iron 10 speed
VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
FE10_SPEED_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron 10 speed error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE10_SPEED_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	FE10_SPEED_ERR			
SCALEMAX	CDF_FLOAT	2E3			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR	1.0E-3>m/s			
UNITS	CDF_CHAR	km/s			
VALIDMAX	CDF_UINT1	9.999E4			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
FE10_SPEED_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron 10 speed quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE10_SPEED_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	FE10_SPEED_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			



SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O_CHARGE_DIST	CDF_FLOAT	1	4	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen charge distribution			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	O_CHARGES			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O_CHARGE_DIST			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	O_CHARGE_LABELS			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Oxygen charge distribution for charges 5, 6, 7, 8			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O_CHARGE_DIST_ERR	CDF_FLOAT	1	4	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen charge distribution error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O_CHARGE_DIST_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	O_CHARGE_DIST_ERR			

SCALEMAX	CDF_FLOAT	1
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 5, 6, 7, 8.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O_CHARGE_DIST_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen charge distribution quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O_CHARGE_DIST_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	O_CHARGE_DIST_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C_CHARGE_DIST	CDF_FLOAT	1	3	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon charge distribution			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	C_CHARGES			

DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	C_CHARGE_DIST
FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABL_PTR_1	CDF_CHAR	C_CHARGE_LABELS
SCALEMAX	CDF_FLOAT	1
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Carbon charge distribution for charges 4, 5, 6
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C_CHARGE_DIST_ERR	CDF_FLOAT	1	3	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon charge distribution error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C_CHARGE_DIST_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C_CHARGE_DIST_ERR			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 4, 5, 6.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C_CHARGE_DIST_QF	CDF_INT2	1	0	T	

Attribute Name	Data Type	Value
CATDESC	CDF_CHAR	Carbon charge distribution quality flag
DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	C_CHARGE_DIST_QF
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	C_CHARGE_DIST_QF
SCALEMAX	CDF_INT2	3
SCALEMIN	CDF_INT2	-2
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
FE_CHARGE_DIST	CDF_FLOAT	1	15	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron charge distribution			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	FE_CHARGES			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE_CHARGE_DIST			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	FE_CHARGE_LABELS			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Iron charge distribution for charges 6 through 20			
VAR_TYPE	CDF_CHAR	data			



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
FE_CHARGE_DIST_ERR	CDF_FLOAT	1	15	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron charge distribution error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE_CHARGE_DIST_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	FE_CHARGE_DIST_ERR			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 6 through 20.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
FE_CHARGE_DIST_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron charge distribution quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE_CHARGE_DIST_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	FE_CHARGE_DIST_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			



VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SI_CHARGE_DIST	CDF_FLOAT	1	7	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Silicon charge distribution			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	SI_CHARGES			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	SI_CHARGE_DIST			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	SI_CHARGE_LABELS			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Silicon charge distribution for charges 6 through 12			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SI_CHARGE_DIST_ERR	CDF_FLOAT	1	7	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Silicon charge distribution error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	SI_CHARGE_DIST_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	SI_CHARGE_DIST_ERR			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				



VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 6 through 12.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SI_CHARGE_DIST_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Silicon charge distribution quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	SI_CHARGE_DIST_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SI_CHARGE_DIST_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
NE_CHARGE_DIST	CDF_FLOAT	1	4	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Neon charge distribution			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	NE_CHARGES			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	NE_CHARGE_DIST			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	NE_CHARGE_LABELS			
SCALEMAX	CDF_FLOAT	1			



SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Neon charge distribution for charges 6 through 9
VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
NE_CHARGE_DIST_ERR	CDF_FLOAT	1	4	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Neon charge distribution error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	NE_CHARGE_DIST_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	NE_CHARGE_DIST_ERR			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 6 through 9.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
NE_CHARGE_DIST_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Neon charge distribution quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	NE_CHARGE_DIST_QF			
FILLVAL	CDF_INT2	-32768			

FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	NE_CHARGE_DIST_QF
SCALEMAX	CDF_INT2	3
SCALEMIN	CDF_INT2	-2
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
MG_CHARGE_DIST	CDF_FLOAT	1	7	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Magnesium charge distribution			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	MG_CHARGES			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	MG_CHARGE_DIST			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	MG_CHARGE_LABELS			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Magnesium charge distribution for charges 6 through 12			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
MG_CHARGE_DIST_ERR	CDF_FLOAT	1	7	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Magnesium charge distribution error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			

FIELDNAM	CDF_CHAR	MG_CHARGE_DIST_ERR
FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	MG_CHARGE_DIST_ERR
SCALEMAX	CDF_FLOAT	1
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 6 through 12.
VAR_TYPE	CDF_CHAR	support_data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
MG_CHARGE_DIST_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Magnesium charge distribution quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	MG_CHARGE_DIST_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	MG_CHARGE_DIST_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
N_CHARGE_DIST	CDF_FLOAT	1	2	T	T
Attribute Name	Data Type	Value			

CATDESC	CDF_CHAR	Nitrogen charge distribution
DEPEND_0	CDF_CHAR	EPOCH
DEPEND_1	CDF_CHAR	N_CHARGES
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	N_CHARGE_DIST
FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABL_PTR_1	CDF_CHAR	N_CHARGE_LABELS
SCALEMAX	CDF_FLOAT	1
SCALEMIN	CDF_FLOAT	0
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Nitrogen charge distribution for charges 5 and 6
VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
N_CHARGE_DIST_ERR	CDF_FLOAT	1	4	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Nitrogen charge distribution error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	N_CHARGE_DIST_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	N_CHARGE_DIST_ERR			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 5 and 6.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
N_CHARGE_DIST_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Nitrogen charge distribution quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	N_CHARGE_DIST_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	N_CHARGE_DIST_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
S_CHARGE_DIST	CDF_FLOAT	1	9	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Sulphur charge distribution			
DEPEND_0	CDF_CHAR	EPOCH			
DEPEND_1	CDF_CHAR	S_CHARGES			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	S_CHARGE_DIST			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABL_PTR_1	CDF_CHAR	S_CHARGE_LABELS			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			



VAR_NOTES	CDF_CHAR	Sulphur charge distribution for charges 6 through 14
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
S_CHARGE_DIST_ERR	CDF_FLOAT	1	4	T	T
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Sulphur charge distribution error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	S_CHARGE_DIST_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	S_CHARGE_DIST_ERR			
SCALEMAX	CDF_FLOAT	1			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 6 through 14.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
S_CHARGE_DIST_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Sulphur charge distribution quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	S_CHARGE_DIST_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	S_CHARGE_DIST_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				

UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O7_O6_RATIO	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	O7/O6 element ratio			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O7_O6_RATIO			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	O7_O6_RATIO			
SCALEMAX	CDF_FLOAT	1E3			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	O7/O6 Element Ratio			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O7_O6_RATIO_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	O7/O6 element ratio error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O7_O6_RATIO_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	O7_O6_RATIO_ERR			
SCALEMAX	CDF_FLOAT	1E3			
SCALEMIN	CDF_FLOAT	1E-2			



SCALETYP	CDF_CHAR	log
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
O7_O6_RATIO_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	O7/O6 element ratio quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O7_O6_RATIO_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	O7_O6_RATIO_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
C6_C4_RATIO	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	C6/C4 element ratio			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C6_C4_RATIO			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			

LABLAXIS	CDF_CHAR	C6_C4_RATIO
SCALEMAX	CDF_FLOAT	1E3
SCALEMIN	CDF_FLOAT	1E-2
SCALETYP	CDF_CHAR	log
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	C6/C4 Element Ratio
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
C6_C4_RATIO_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	C6/C4 element ratio error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C6_C4_RATIO_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C6_C4_RATIO_ERR			
SCALEMAX	CDF_FLOAT	1E3			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
C6_C4_RATIO_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	C6/C4 element ratio quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			

FIELDNAM	CDF_CHAR	C6_C4_RATIO_QF
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	C6_C4_RATIO_QF
SCALEMAX	CDF_INT2	3
SCALEMIN	CDF_INT2	-2
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C6_C5_RATIO	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	C6/C5 element ratio			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C6_C5_RATIO			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C6_C5_RATIO			
SCALEMAX	CDF_FLOAT	1E3			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	C6/C5 Element Ratio			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C6_C5_RATIO_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	C6/C5 element ratio error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			

DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	C6_C5_RATIO_ERR
FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	C6_C5_RATIO_ERR
SCALEMAX	CDF_FLOAT	1E3
SCALEMIN	CDF_FLOAT	1E-2
SCALETYP	CDF_CHAR	log
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
C6_C5_RATIO_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	C6/C5 element ratio quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C6_C5_RATIO_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	C6_C5_RATIO_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O_AVE_CHARGE	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen average charge			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O_AVE_CHARGE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	O_AVE_CHARGE			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Oxygen average charge			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O_AVE_CHARGE_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen average charge error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O_AVE_CHARGE_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	O_AVE_CHARGE_ERR			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			



VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
O_AVE_CHARGE_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Oxygen average charge quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	O_AVE_CHARGE_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	O_AVE_CHARGE_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C_AVE_CHARGE	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon average charge			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C_AVE_CHARGE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C_AVE_CHARGE			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			



VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Carbon average charge
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C_AVE_CHARGE_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon average charge error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C_AVE_CHARGE_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C_AVE_CHARGE_ERR			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C_AVE_CHARGE_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon average charge quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C_AVE_CHARGE_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	C_AVE_CHARGE_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			

SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
FE_AVE_CHARGE	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron average charge			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE_AVE_CHARGE			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	FE_AVE_CHARGE			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	0			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Iron average charge			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
FE_AVE_CHARGE_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron average charge error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE_AVE_CHARGE_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	FE_AVE_CHARGE_ERR			
SCALEMAX	CDF_FLOAT	20			
SCALEMIN	CDF_FLOAT	0			



SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
FE_AVE_CHARGE_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron average charge quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE_AVE_CHARGE_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	FE_AVE_CHARGE_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
FE_O_ABUN	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron/Oxygen abundance			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE_O_ABUN			
FILLVAL	CDF_FLOAT	-1E31			



FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	FE_O_ABUN
SCALEMAX	CDF_FLOAT	1E1
SCALEMIN	CDF_FLOAT	1E-2
SCALETYP	CDF_CHAR	log
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Relative elemental abundance of iron with respect to oxygen computed over iron charge states 6-20 to oxygen charge states 5-8.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
FE_O_ABUN_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron/Oxygen abundance error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	FE_O_ABUN_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	FE_O_ABUN_ERR			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
FE_O_ABUN_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Iron/Oxygen abundance quality flag			

DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	FE_O_ABUN_QF
FILLVAL	CDF_INT2	-32768
FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	FE_O_ABUN_QF
SCALEMAX	CDF_INT2	3
SCALEMIN	CDF_INT2	-2
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
C_O_ABUN	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon/Oxygen abundance			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C_O_ABUN			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C_O_ABUN			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Relative elemental abundance of carbon with respect to oxygen computed over carbon charge states 4-6 to oxygen charge states 5-8.			
VAR_TYPE	CDF_CHAR	data			



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C_O_ABUN_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon/Oxygen abundance error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C_O_ABUN_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	C_O_ABUN_ERR			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
C_O_ABUN_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Carbon/Oxygen abundance quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	C_O_ABUN_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	C_O_ABUN_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			



VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
HE_O_ABUN	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Helium/Oxygen abundance			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE_O_ABUN			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	HE_O_ABUN			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Relative elemental abundance of helium with respect to oxygen computed over oxygen charge states 5-8.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
HE_O_ABUN_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Helium/Oxygen abundance error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE_O_ABUN_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	HE_O_ABUN_ERR			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				



VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
HE_O_ABUN_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Helium/Oxygen abundance quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	HE_O_ABUN_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	HE_O_ABUN_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
MG_O_ABUN	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Magnesium/Oxygen abundance			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	MG_O_ABUN			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	MG_O_ABUN			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			



SCALETYP	CDF_CHAR	log
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Relative elemental abundance of magnesium with respect to oxygen computed over magnesium charge states 5-12 to oxygen charge states 5-8.
VAR_TYPE	CDF_CHAR	data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
MG_O_ABUN_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Magnesium/Oxygen abundance error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	MG_O_ABUN_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	MG_O_ABUN_ERR			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
MG_O_ABUN_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Magnesium/Oxygen abundance quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	MG_O_ABUN_QF			
FILLVAL	CDF_INT2	-32768			

FORMAT	CDF_CHAR	I6
LABLAXIS	CDF_CHAR	MG_O_ABUN_QF
SCALEMAX	CDF_INT2	3
SCALEMIN	CDF_INT2	-2
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SI_O_ABUN	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Silicon/Oxygen abundance			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	SI_O_ABUN			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	SI_O_ABUN			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Relative elemental abundance of silicon with respect to oxygen computed over silicon charge states 6-14 to oxygen charge states 5-8.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SI_O_ABUN_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Silicon/Oxygen abundance error/uncertainty			

DEPEND_0	CDF_CHAR	EPOCH
DISPLAY_TYPE	CDF_CHAR	time_series
FIELDNAM	CDF_CHAR	SI_O_ABUN_ERR
FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	SI_O_ABUN_ERR
SCALEMAX	CDF_FLOAT	1E1
SCALEMIN	CDF_FLOAT	1E-2
SCALETYP	CDF_CHAR	log
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
SI_O_ABUN_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Silicon/Oxygen abundance quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	SI_O_ABUN_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	SI_O_ABUN_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			



Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
NE_O_ABUN	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Neon/Oxygen abundance			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	NE_O_ABUN			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	NE_O_ABUN			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Relative elemental abundance of neon with respect to oxygen computed over neon charge states 6-9 to oxygen charge states 5-8.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
NE_O_ABUN_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Neon/Oxygen abundance error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	NE_O_ABUN_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	NE_O_ABUN_ERR			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			



VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
NE_O_ABUN_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Neon/Oxygen abundance quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	NE_O_ABUN_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	NE_O_ABUN_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

Variable Name	Data type	DIMS	SIZES	R_VARY	D_VARY
S_O_ABUN	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Sulphur/Oxygen abundance			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	S_O_ABUN			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	S_O_ABUN			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			

SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Relative elemental abundance of sulphur with respect to oxygen computed over sulphur charge states 6-14 to oxygen charge states 5-8.
VAR_TYPE	CDF_CHAR	data

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
S_O_ABUN_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Sulphur/Oxygen abundance error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	S_O_ABUN_ERR			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	S_O_ABUN_ERR			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.			
VAR_TYPE	CDF_CHAR	support_data			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
S_O_ABUN_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Sulphur/Oxygen abundance quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	S_O_ABUN_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			



LABLAXIS	CDF_CHAR	S_O_ABUN_QF
SCALEMAX	CDF_INT2	3
SCALEMIN	CDF_INT2	-2
SCALETYP	CDF_CHAR	linear
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_INT2	2
VALIDMIN	CDF_INT2	0
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
N_O_ABUN	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Nitrogen/Oxygen abundance			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	N_O_ABUN			
FILLVAL	CDF_FLOAT	-1E31			
FORMAT	CDF_CHAR	E10.3			
LABLAXIS	CDF_CHAR	N_O_ABUN			
SCALEMAX	CDF_FLOAT	1E1			
SCALEMIN	CDF_FLOAT	1E-2			
SCALETYP	CDF_CHAR	log			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_UINT1	9999			
VALIDMIN	CDF_UINT1	0			
VAR_NOTES	CDF_CHAR	Relative elemental abundance of nitrogen with respect to oxygen computed over nitrogen charge states 5-6 to oxygen charge states 5-8.			
VAR_TYPE	CDF_CHAR	data			

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
N_O_ABUN_ERR	CDF_FLOAT	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Nitrogen/Oxygen abundance error/uncertainty			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	N_O_ABUN_ERR			

FILLVAL	CDF_FLOAT	-1E31
FORMAT	CDF_CHAR	E10.3
LABLAXIS	CDF_CHAR	N_O_ABUN_ERR
SCALEMAX	CDF_FLOAT	1E1
SCALEMIN	CDF_FLOAT	1E-2
SCALETYP	CDF_CHAR	log
SI_CONVERSION	CDF_CHAR	
UNITS	CDF_CHAR	
VALIDMAX	CDF_UINT1	9999
VALIDMIN	CDF_UINT1	0
VAR_NOTES	CDF_CHAR	Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error.
VAR_TYPE	CDF_CHAR	support_data

Variable Name	Data type	DIMS	SIZES	R VARY	D VARY
N_O_ABUN_QF	CDF_INT2	1	0	T	
Attribute Name	Data Type	Value			
CATDESC	CDF_CHAR	Nitrogen/Oxygen abundance quality flag			
DEPEND_0	CDF_CHAR	EPOCH			
DISPLAY_TYPE	CDF_CHAR	time_series			
FIELDNAM	CDF_CHAR	N_O_ABUN_QF			
FILLVAL	CDF_INT2	-32768			
FORMAT	CDF_CHAR	I6			
LABLAXIS	CDF_CHAR	N_O_ABUN_QF			
SCALEMAX	CDF_INT2	3			
SCALEMIN	CDF_INT2	-2			
SCALETYP	CDF_CHAR	linear			
SI_CONVERSION	CDF_CHAR				
UNITS	CDF_CHAR				
VALIDMAX	CDF_INT2	2			
VALIDMIN	CDF_INT2	0			
VAR_NOTES	CDF_CHAR	Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented			
VAR_TYPE	CDF_CHAR	support_data			

4.1.5 CAL – Calibration data products

4.1.6 ANC – Ancillary data products



5 SWA Data products matrix

Product Name	Description	Descriptor	Free field	Level
solo_L0_swa-eas[12]-NMc_[StartTime-EndTime]_V???.cdf	Full 3D VDF	swa-eas[12]-NMc		L0
solo_L0_swa-eas[12]-SSc_[StartTime-EndTime]_V???.cdf	Single Energy 2D VDF (Low Latency)	Swa-eas[12]-SSc		L0
solo_L0_swa-eas[12]-TMc_[StartTime-EndTime]_V???.cdf	Full 3D VDF in trigger mode	Swa-eas[12]-TMc		L0
solo_L0_swa-eas-padc_[StartTime-EndTime]_V???.cdf	Onboard selected Pitch angle distributions	Swa-eas-padc		L0
solo_L0_swa-eas-OnbPartMoms_[StartTime-EndTime]_V???.cdf	On board Electron Moments (4s)	Swa-eas-OnbPartMoms		L0
solo_L0_swa-pas-tm_yyyymmdd_V01.bin	PAS Level 0 telemetry data in CCSDS binary format	Swa-pas-tm		L0
solo_L0_swa-pas-tm_yyyymmdd_V01.ascii	PAS Level 0 telemetry data in CCSDS Hex format	Swa-pas-tm		L0
solo_L1_swa-eas[12]-NM3D_[StartTime-EndTime]_V???.cdf	EAS Full 3D VDFs	Swa-eas[12]-NM3D		L1
solo_L1_swa-eas[12]-SSc_[StartTime-EndTime]_V???.cdf	Single Energy 2D VDF (Low Latency)	swa-eas[12]-SSc		L1



Product Name	Description	Descriptor	Free field	Level
solo_L1_swa-eas[12]-TM3D_[StartTime-EndTime]_V??.cdf	Full 3D VDF in trigger mode	swa-eas[12]-TM3D		L1
solo_L1_swa-eas-padc_[StartTime-EndTime]_V??.cdf	Onboard collected electron Pitch angle distributions	swa-eas-padc		L1
solo_L1_swa-eas-OnbPartMoms_[StartTime-EndTime]_V??.cdf	On board Electron Moments (4s)	swa-eas-OnbPartMoms		L1
solo_L1_swa-pas-3d_yyyymmdd_V??.cdf	3D VDFs	swa-pas-3d		L1
solo_L1_swa-pas-mom_yyyymmdd_V??.cdf	PAS onboard moments	swa-pas-mom		L1
solo_L1_swa-pas-hsk_yyyymmdd_V??.cdf	PAS House keeping	swa-pas-hsk		L1
solo_L1_swa-pas-cal_yyyymmdd_V??.cdf	PAS calibration data	swa-pas-cal		L1
solo_L1_swa-his-pha_yyyymmdd_V??.cdf	Pulse height analysis data	swa-his-pha		L1
solo_L1_swa-his-vdf_yyyymmdd_V??.cdf	HIS VDF data	swa-his-vdf		L1
solo_L2_swa-eas[12]-NM3D-[unit]_[StartTime-EndTime]_V??.cdf	EAS[12] 3D VDFs in scientific units	swa-eas[12]-NM3D-[unit]		L2
solo_L1_swa-eas[12]-SS-[unit]_[StartTime-EndTime]_V??.cdf	EAS[12] Strahl data in scientific units	swa-eas[12]-SS-[unit]		L2
solo_L2_swa-eas[12]-TM3D-[unit]_[StartTime-EndTime]_V??.cdf	EAS[12] 3D VDFs at 1 second resolution in scientific units	swa-eas[12]-TM3D-[unit]		L2
solo_L2_swa-eas-pad-[unit]_[StartTime-EndTime]_V??.cdf	EAS Pitch angle data in scientific units	swa-eas-pad-[unit]		L2



Product Name	Description	Descriptor	Free field	Level
solo_L2_swa-eas-OnbMoms_[StartTime-EndTime]_V??.cdf	EAS Onboard partial moments combined appropriately on the ground	swa-eas-OnbMoms		L2
solo_L2_swa-eas-NM-GrndMoms_[StartTime-EndTime]_V??.cdf	EAS ground calculated moments from NM3D data	swa-eas-NM-GrndMoms		L2
solo_L2_swa-eas-TM-GrndMoms_[StartTime-EndTime]_V??.cdf	EAS ground calculated moments from TM3D data	swa-eas-TM-GrndMoms		L2
solo_L2_swa-pas-eflux_yyyymmdd_V??.cdf	PAS omni-directional flux	swa-pas-eflux		L2
solo_L2_swa-pas-grnd-mom_yyyymmdd_V00.cdf	PAS ground calculated moments	swa-pas-grnd-mom		L2
solo_L2_swa-pas-vdf_yyyymmdd_V00.cdf	PAS velocity distribution functions	swa-pas-vdf		L2
solo_L3_swa-his-comp_yyyymmdd_V01.cdf	HIS Ion Compositions	swa-his-comp		L3