

Solar Dynamics Observatory (SDO)

Extreme Ultraviolet Variability Experiment (EVE): Release notes for version 7 science data products

Level 2 Science Data Products 02/15/21

Table of Contents

Introduction	1
Responsible Data Usage:	2
Reference Publications	2
Level 2 Science Products	2
Naming Convention	3
Level 2 Lines/Bands Products	3
Level 2 Spectra Products	8
Data Processing	9
FITS Definition and Software	9
Explanation and Examples in IDL	10
Data Availability and Data Gaps	14
Version Release Notes	15
Other Notes	16

Introduction

EVE level 2 data files were created at the Laboratory for Atmospheric and Space Physics in Boulder, Colorado for the NASA Solar Dynamics Observatory (SDO) Extreme Ultraviolet Variability Experiment (EVE). The Science Processing and Operations Center (SPOC) is responsible for creating and maintaining access to all

EVE products.

This version change includes updated long - term degradation corrections for MEGS - B and ESP.

This is a new release of EVE Level 2 data products. We have made every effort at verification and validation, but if you have any questions or encounter any problems with the data, please let us know about them.

For access and data product issues please contact Don.Woodraska@lasp.colorado.edu.

For science issues please contact Frank.Eparvier@lasp.colorado.edu.

Responsible Data Usage:

SDO Mission scientific and model results are open to all, however users should contact the PI or designated EVE team member early in an analysis project to discuss appropriate use of instrument data results. Appropriate acknowledgement to institutions, personnel, and funding agencies should be given. Version numbers should also be specified. Pre - prints of publications and conference abstracts should be widely distributed to interested parties within the mission.

Reference Publications

More information about the EVE instrument measurements, and calibrations can be found in these references:

Woods, T. N., F. G. Eparvier, R. Hock, A. R. Jones, D. Woodraska, D. Judge, L. Didkovsky, J. Lean, J. Mariska, H. Warren, D. McMullin, P. Chamberlin, G. Berthiaume, S. Bailey, T. Fuller - Rowell, J. Sojka, W. K. Tobiska, and R. Viereck, "Extreme Ultraviolet Variability Experiment (EVE) on the Solar Dynamics Observatory (SDO): Overview of Science Objectives, Instrument Design, Data Products, and Model Developments", *Solar Physics*, 275, 115 - 143, doi: 10.1007/s11207 - 009 - 9487 - 6, 2012.

https://lasp.colorado.edu/home/eve/files/2011/06/EVE_Overview_SolarPhys.pdf

Hock, R. A., P. C. Chamberlin, T. N. Woods, D. Crotser, F. G. Eparvier, D. L. Woodraska, and E. C.

Woods, "Extreme Ultraviolet Variability Experiment (EVE) Multiple EUV Grating Spectrographs (MEGS): Radiometric Calibrations and Results", *Solar Physics*, 275, 145 - 178, doi: 10.1007/s11207 - 010 - 9520 - 9, 2012.

https://lasp.colorado.edu/home/eve/files/2011/06/Final_Sol_Phy_Hock_1April_2010.pdf

Didkovsky, L., D. Judge, S. Wieman, T. Woods, and A. Jones, "EUV SpectroPhotometer (ESP) in Extreme Ultraviolet Variability Experiment (EVE): Algorithms and Calibrations", *Solar Physics*, 275, 179 - 205, doi: 10.1007/s11207 - 009 - 9485 - 8, 2012.

Level 2 Science Products

Two types of EVE level 2 products are routinely created: **Spectra** (EVS) and **Lines** (EVL). Level 2 spectra are the merged spectral measurements from the two spectrographs, MEGS A and B. The A detector is designed to measure from 6 - 17 nm, and 17 - 37 nm using two filters, while the B detector is designed to measure 37 - 106nm. Level 2 processing stitches these pieces to form one spectrum. This version includes all measured wavelengths spanning 5.8 - 106.2 nm. All level 2 irradiances are adjusted to 1 AU. Level 2 line files contain selected lines derived from the level 2 spectra, ESP diode values and bands that correspond to other SDO instruments and some derived proxies.

For an in - depth discussion of EVE instrumentation please visit:

<https://lasp.colorado.edu/home/eve/science/instrument/>

WARNINGS: The MEGS - A detector experienced a capacitor short on May 26, 2014 (day 146) that prevents the detector from working. No solar spectra are measured for wavelengths shorter than 33 nm after that anomaly. MEGS - B has been extended to its shortest possible wavelength of 33.34 nm. EUV spectra are only available when MEGS - B is exposed, usually for 3 hours per day.

Naming Convention

Level 2 products follow this naming convention

`EV?_L2_YYYYDDD_HH_vvv_rr.fit` where:

EV designates this as an EVE product

? is either S (spectrum) or L (lines/bands)

L2 designates this as a level 2 product YYYY is the year

DDD is the day of year (001 - 366)

HH is the UT hour of day (00 - 23)

vvv is the version number (007)

rr is the revision number (01 - 99)

The version number only increments after major software changes or after major calibration updates. These are expected to change after the incorporation of each suborbital rocket calibration flight. When referencing EVE data in scientific papers, users agree to mention this version number.

The revision increments whenever updated information is available. Generally, revision 1 is considered "preliminary". After 30 days, products become "definitive" since no new telemetry can be delivered after this period of time due to finite storage capacity of the SDO ground station. For most days, revision 1 will be the final revision, but newer revisions take precedence over older ones if they exist.

Level 2 Lines/Bands Products

The EVE level 2 line files contain 6 header data units, containing data and corresponding information pertaining to 30 extracted solar emission lines. Each file contains one hour's worth of observations with each observation being reported at the instruments nominal integration time of 10 seconds, except the 4 Hz ESP diode values that are averaged to 10 seconds to correspond with other EVE instrument observations.

The LinesMeta data unit contains information about lines derived from the EVE level 2 spectrum. It contains wavelength information describing the line, line temperature, the line name, line type, and other lines included within the wavelength band of the line as described in the following table.

LinesMeta:

Column Name	Type	Description
wave_center	Float	Center wavelength of line
wave_min	Float	Minimum wavelength of line
wave_max	Float	Maximum wavelength of line
LogT	Float	Log (base 10) temperature of line (K)
Name	String	Line name example (Fe XVIII)
Type	String	Type of line example (F)
Blends	String	Other lines included in this line

The BandsMeta data unit describes the extracted bands from the EVE spectrum that correspond to the 7 AIA spectral bands, two GOES - 14 bands, 4 extracted MEGS spectral bands corresponding to the ESP diodes, two very broad bands used for creating the Q_{EUV} proxy, two MEGS - A broadbands representing each slit, and 3 MEGS - B bands. The BandsMeta data unit is described in the following table.

BandsMeta:

Column Name	Type	Description Name of the band example
Name	String	(AIA_304)
Type	String	SDO instrument example (AIA)
Low_Wavelength_nm	Float	23.2650
High_Wavelength_nm	Float	37.4450

The DiodeMeta data unit contains information about spectral bands derived from EVE level 2 spectra that corresponds to measurements made by EVE diodes from ESP and MEGS P. The diode measurements (ESP and MEGS - P) are averaged down to the 10 - second spectrum cadence from the 4 Hz measurements to create a more convenient way to compare the data to other measurements. The DiodeMeta data unit is described in the following table.

Diode Meta:

Column Name	Type	Description
Name	String	Name of band example (171)
Type	String	SDO instrument example (ESP)

The ESP central quad diode contains information about the center of brightness for the 0.1 - 7 nm bandpass. These are normalized to provide a relative measure of the distribution of irradiance. During flare periods, the difference of flare and pre - flare measurements indicate the flare position.

QuadMeta:

Column Name	Type	Description
Name	String	Name of band example (Q0)
Type	String	SDO instrument example (ESP)

The LinesDataUnits data unit contains unit information for corresponding entries in the LinesData data unit. The contents of the data unit are described in the table below.

LinesDataUnits:

Column Name	Type	Description
TAI	String	seconds // International Atomic Time seconds since Jan 1, 1958 at center of integration
YYYYDOY	String	NA // 4 - digit year and 3 - digit day of year designator with Jan 1=001
SOD	String	seconds // seconds of the UT day at the center of the integration
FLAGS	String	NA // 0=good, other values indicate data may be suspect
SC_FLAGS	String	NA // 0=good, other value indicate spacecraft events like eclipses, lunar

Line_Irradiance	String	W m ⁻² // Power per unit area at 1 - AU over the integrated line with no background subtraction, MEGS - A provides the spectrum shorter than 37 nm and MEGS - B longer than 37 nm
Line_Precision	String	NA // relative precision
Line_Accuracy	String	NA // relative accuracy
Band_Irradiance	String	Mixed: W m ⁻² or avg counts AIAPixel ⁻¹ second ⁻¹ // Power per unit area at 1 - AU over the integrated band with MEGS - A providing the spectrum shorter than 37 nm and MEGS - B longer than 37 nm, not
Band_Precision	String	NA // relative precision
Band_Accuracy	String	'NA // relative accuracy
Diode_Irradiance	String	W m ⁻² // Power per unit area at 1 - AU measured by the diode
Diode_Stdev	String	NA // relative one - sigma spread of 4 hz integrations over the 10 second window
Diode_Precision	String	NA // relative precision
Diode_Accuracy	String	Relative accuracy of diode measurements
Quad_Fraction	String	NA // fraction of the 0.1 - 7 nm irradiance in each of the quadrant diodes with the sum=1., useful for finding location of center of irradiance
Quad_Stdev	String	NA // relative one - sigma spread of 4 Hz integrations over the 10 second window
Quad_Precision	String	Relative precision of quadrant diode measurements
Quad_Accuracy	String	Relative accuracy of quadrant diode measurements

The LinesData data unit contains the actual science measurements for the observation period for lines, bands and diodes. The diode measurements are averaged to 10 seconds to provide measurements at the same cadence as the line and band measurements.

Linesdata:

Column Name	Type	Description
TAI	Double	International Atomic Time of center of observation
YYYYDOY	Long	Year and day of year of observation
SOD	Double	Seconds of day of the center of observation
FLAGS	Byte	EVE specific flags †
SC_FLAGS	Byte	SDO specific flags †
Line_Irradiance	Float	An array of irradiance values. One value per line. ‡
Line_Precision	Float	An array of precision values. One value per line.
Line_Accuracy	Float	An array of accuracy values. One value per line.
Band_Irradiance	Float	An array of irradiance values. One value per band.
Band_Precision	Float	An array of precision values. One value per band.
Band_Accuracy	Float	An array of accuracy values. One value per band.
Diode_Irradiance	Float	An array of irradiance values. One value per diode. ‡
Diode_Stdev	Float	An array of standard deviation values. One value per diode.
Diode_Precision	Float	An array of precision values. One value per diode.
Diode_Accuracy	Float	An array of accuracy values. One value per diode.
Quad_Fraction	Float	The fractional amount of the diode per total of all quad diodes
Quad_Stdev	Float	The standard deviation of the observations for the diode
Quad_Precision	Float	The precision of the observations for the diode
Quad_Accuracy	Float	The accuracy of the observations for the diode

†

There are two sets of flags included. One is EVE specific flags, and the other is Spacecraft flags. Generally, any flags being set mean some data are missing or possibly suspect. The following tables describe the values for each bit in the flag.

Values in the FLAGS field are the bitwise OR of these values.

Bit 1 (Value 1)	MEGS - A data is missing
Bit 2 (Value 2)	MEGS - B data is missing
Bit 3 (Value 4)	ESP data is missing
Bit 4 (Value 8)	MEGS - P data is missing
Bit 5 (Value 16)	Possible clock adjustment in MEGS - A
Bit 6 (Value 32)	Possible clock adjustment in MEGS - B
Bit 7 (Value 64)	Possible clock adjustment in ESP
Bit 8 (Value 128)	Possible clock adjustment in MEGS - P

Values in the SC_FLAGS field are the bitwise OR of these values.

Bit 0 (value 1)	4 - bit obstruction indicator (0 is no obstruction)
Bit 1 (value 2)	4 - bit obstruction indicator (0 is no obstruction)
Bit 2 (value 4)	4 - bit obstruction indicator (0 is no obstruction)
Bit 3 (value 8)	4 - bit obstruction indicator (0 is no obstruction)
Bit 4 (value 16)	Observatory is off - pointed by more than 1 arc minute

If more than one obstruction is taking place, only the highest - numbered one will be indicated.

Obstruction flag values:

Value 0	No obstruction
Value 1	Warmup from Earth eclipse
Value 2	Atmosphere penumbra
Value 3	Atmosphere umbra
Value 4	Penumbra of Mercury
Value 5	Umbra of Mercury
Value 6	Penumbra of Venus
Value 7	Umbra of Venus
Value 8	Penumbra of Moon
Value 9	Umbra of Moon
Value 10	Penumbra of solid Earth
Value 11	Umbra of solid Earth

‡

Lines are integrated from low to high bounds, and the 4 Hz photometer data are averaged down to the same time - scale as the spectrum, nominally 10 seconds. No continuum is subtracted from the line irradiances.

Level 2 Spectra Products

The level 2 spectrum files contain 3 header data units, SpectrumMeta, SpectrumUnits and Spectrum. These data units contain the fully calibrated 10-second spectral irradiance values along with supplemental information.

The SpectrumMeta data unit contains two arrays, one being the center wavelengths of each spectral bin. The other array contains the estimate of accuracy of the irradiance on a per bin basis. Note, the accuracy array will be moved to the Spectrum data unit in future versions.

Spectrum meta:

Column Name	Type	Description
Wavelength	float	3.4
Accuracy	float	0.005

The SpectrumUnits data unit provides information on the units for each element in the Spectrum data unit. The table below describes each entry.

Spectrum data:

Column Name	Type	Description
TAI	STRING	Seconds // International Atomic Time seconds since Jan 1, 1958 at center
YYYYDOY	STRING	NA // 4-digit year and 3-digit day of year designator with Jan 1=001
SOD	STRING	Seconds // seconds of the UT day at the center of the integration
FLAGS	STRING	NA // 0=good, other values indicate data may be suspect
SC_FLAGS	STRING	NA // 0=good, other value indicate spacecraft events like eclipses, lunar
INT_TIME	STRING	Seconds // the duration of the exposure
IRRADIANCE	STRING	$W m^{-2} nm^{-1}$ // Spectral power per unit area per nanometer at 1-AU with M
COUNT_RATE	STRING	Counts s^{-1} // Dark corrected count rate per pixel per second
PRECISION	STRING	NA // relative precision, 0=perfect measurement, 1=signal equals noise, m
BIN_FLAGS	STRING	NA // flag for each spectral bin, 0=good, 255=missing

The Spectrum data unit contains the actual data for the observation period. It holds the irradiance spectrum as well as other values as described in the following table.

Spectrum:

Column Name	Type	Description
TAI	DOUBLE	1.6514172e+09
YYYYDOY	LONG	2010121
SOD	DOUBLE	54000.621
FLAGS	BYTE	0
SC_FLAGS	BYTE	0
INT_TIME	DOUBLE	10.000000

IRRADIANCE	FLOAT	Array[5200]
COUNT_RATE	FLOAT	Array[5200]
PRECISION	FLOAT	Array[5200]
BIN_FLAGS	BYTE	Array[5200]

Data Processing

All data products are generated at LASP, and the Level 2 products described in this document are all publicly available at the EVE website. We caution users to carefully consider their data needs. The level 2 products are free for responsible public use; however, downloading the entire dataset is not a good solution for most users. The 2010 dataset comprises approximately 50 GB spread over about 11,000 files, so the speed of an individual's Internet connection should be considered.

FITS Definition and Software

The EVE Level 2 products are stored in the scientific format called FITS as binary tables. FITS was first introduced in 1979. As one of the oldest scientific data formats, it continues to be widely used and expanded.

FITS reference: FITS: A Flexible Image Transport System, Wells, D. C., Greisen, E. W., and Harten, R.

H., Astronomy & Astrophysics Supplement Series, 44, 363 - 370, 1981.

https://adsabs.harvard.edu/cgi-bin/nph-bib_query?bibcode=1981A%26AS...44..363W&db_key=AST&high=3db47576cf05627

FITS Binary Table reference: Binary Table Extension to FITS, Cotton, W. D., Tody, D. B., and Pence, W. D., Astronomy & Astrophysics Supplement Series, 113, 159 - 166, 1995.

https://adsabs.harvard.edu/cgi-bin/nph-bib_query?bibcode=1995A%26AS..113..159C&db_key=AST&high=3db47576cf06210

Additional detailed documentation is available on - line.

https://fits.gsfc.nasa.gov/fits_documentation.html

Standard reader software is available from GSFC for many different languages. A graphical program called "fv" is useful for browsing the contents without writing any programs.

<https://heasarc.gsfc.nasa.gov/docs/software/ftools/fv/>

LASP provides an IDL function called `eve_read_whole_fits.pro` which allows easy

reading of any EVE data product that is in FITS format. `read_whole_fits.pro` may be downloaded [here](#).

For IDL, you may also use `mrdfits.pro` available at:

<https://idlastro.gsfc.nasa.gov/mrdfits.html>

<https://idlastro.gsfc.nasa.gov/fitsio.html>

Explanation and Examples in IDL

Level 2 data products are stored in FITS format and may be read by a variety of software, see the documentation section at

https://lasp.colorado.edu/eve/data_access/index.html for more details. LASP provides an IDL function called `eve_read_whole_fits.pro` which allows easy reading of any EVE data product that is in FITS format. The software `eve_read_whole_fits.pro` may be downloaded [here](#).

We will use the function in the following examples.

To read in a level 2 data product, provide the function with the desired filename.

```
IDL> data = eve_read_whole_fits( 'EVS_L2_2013300_00_005_01.fit.gz' )
```

To see a list of the structure tag names, run the following command:

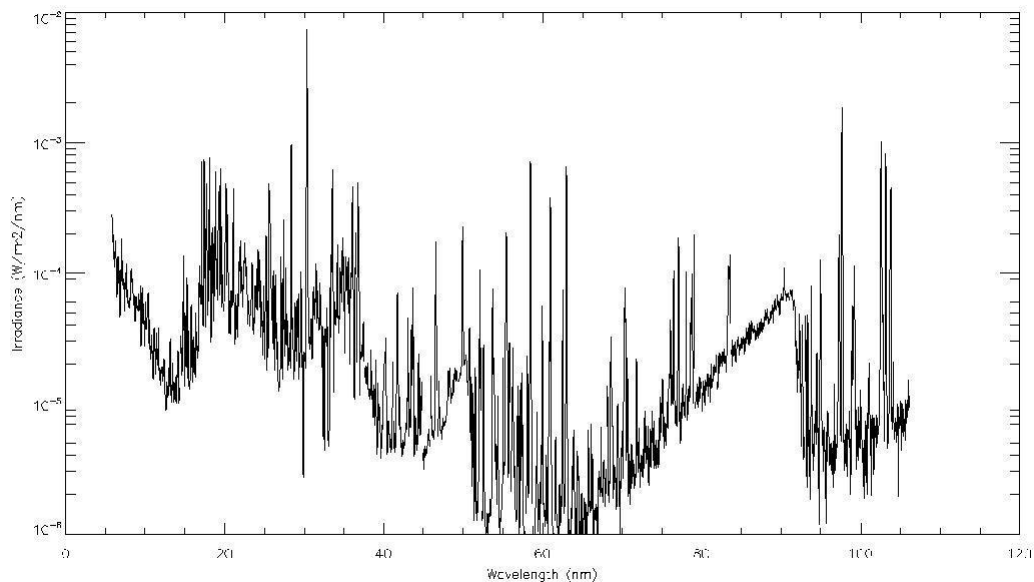
```
IDL> help, data, /structure
```

```
** Structure <d4bdb568>, 8 tags, length=24394824, data length=24391220, refs=1:
PRIMARY          LON          G          0
PRIMARY_HEAD     STR          ING          Array[5]
SPECTRUMMETA     UCT          -> <Anonymous> Array[5200]
SPECTRUMMETA_HEADER STRIN     G          Array[27]
SPECTRUMUNITS    UCT          -> <Anonymous> Array[1]
SPECTRUMUNITS_HEADER STRIN     G          Array[41]
SPECTRUM         STRUCT     -> <Anonymous> Array[360]
SPECTRUM_HEAD   STR          ING          Array[93]
```

As described above, the wavelength information is stored in the `data.spectrummeta` structure. Knowing that MEGS B samples infrequently, we will use index 310 in this example to plot a full spectra. To plot the spectra, issue the following command:

```
IDL > plot, data.spectrummeta.wavelength , data.spectrum[310].irradiance,
YRANGE=[1.0e-6, 1.0e-2], /YLOG, charsize = 1.5, xtitle = "Wavelength (nm)",
ytitle = "Irradiance (W/m^2/nm)"
```

This command should produce a plot similar to:



Processing the lines, bands and diode file is similar to processing the spectrum files as shown below. To read in the lines file for 2013 day 300 hour 17, issue the following command:

```
IDL> data = eve_read_whole_fits( 'EVL_L2_2013133_16_006_01.fit.gz' )
```

To see a listing of tags in the structure, run the following command:

```
IDL> help, data, /structure
```

```
** Structure <29878a8>, 14 tags, length=331416, data length=329252, refs=1:
```

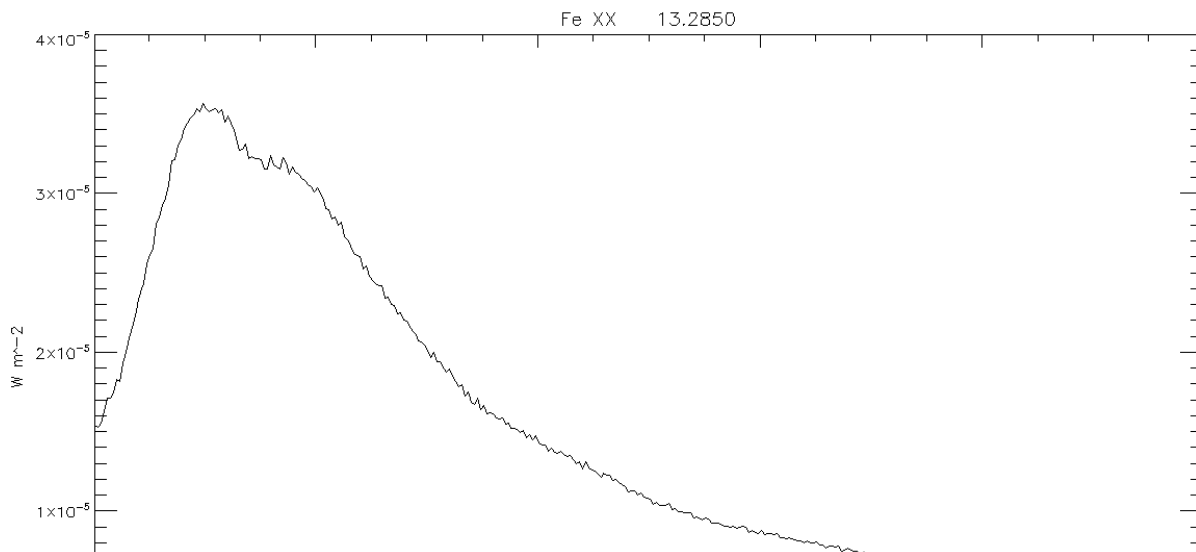
```

PRIMARY          LONG          0
PRIMARY_HEAD     STRING        Array[5]
                 -> <Anonymous>
LINESMETA        STRUCT        Array[39]
LINESMETA_HEAD  ER
                 STRING        Array[48]
                 -> <Anonymous>
BANDSMETA        STRUCT        Array[20]
BANDSMETA_HEAD  ER
                 STRING        Array[28]
                 -> <Anonymous>
DIODEMETA        STRUCT        Array[6]
DIODEMETA_HEAD  ER
                 STRING        Array[27]
                 -> <Anonymous>
QUADMETA         STRUCT        Array[4]
QUADMETA_HEADER STRING        Array[27]
                 -> <Anonymous>
LINESDATA        STRUCT        Array[360]
LINESDATA_HEAD  ER
                 STRING        Array[124]
                 -> <Anonymous>
LINESDATAUNITS  STRUCT        Array[1]
LINESDATAUNITS_HEADER
                 STRING        Array[59]

```

In this example we plot the He II line which is at index number 9 in the line_irradiance array.

```
IDL> plot, data.LINESDATA.SOD / 3600.0,
data.LINESDATA.LINE_IRRADIANCE[d1], xtitle='Hours of
day', ytitle=(strsplit(data.LINESDATAUNITS.LINE_IRRADIANCE, '//', /extract)
[0], title=data.LINESMETA[d1].NAME+
'+STRTRIM(data.LINESMETA[d1].WAVE_CENTER, 2), yrange=[0.0, 4.0e-5], xmargin=[12,3],
xstyle=1, Charsize = 1.5
```



View https://lasp.colorado.edu/eve/data_access/wp-content/eve_data/software/Three Steps For EVE Data.pdf for a description on how to download and read EVE level 2 data.

The metadata regarding the line name, wavelength ranges, temperature, and other useful information are contained in the linesmeta. These can be accessed to generate a table as follows:

```
IDL> for i=0,n_elements(data.linesmeta)-1 do print,data.linesmeta[i].name,
data.linesmeta[i].wave_center, data.linesmeta[i].logt, i
Fe XVIII  9.39260      6.81000      0
Fe VIII   13.1240      5.57000      1
Fe XX    13.2850      6.97000      2
Fe IX    17.1070      5.81000      3
Fe X     17.7243      5.99000      4
Fe XI    18.0407      6.07000      5
Fe XII   19.5120      6.13000      6
Fe XIII  20.2044      6.19000      7
Fe XIV   21.1331      6.27000      8
He II    25.6317      4.75000      9
Fe XV    28.4150      6.30000     10
He II    30.3783      4.70000     11
Fe XVI   33.5410      6.43000     12
Fe XVI   36.0758      6.43000     13
Mg IX    36.8076      5.99000     14
S XIV    44.5700      6.44000     15
Ne VII   46.5221      5.71000     16
Si XII   49.9406      6.29000     17
Si XII   52.1000      6.28000     18
```

O III	52.5795	4.92000	19
He I	53.7000	3.84000	20
O IV	55.4370	5.19000	21
Fe XX	56.7870	6.96000	22
He I	58.4334	4.16000	23
Fe XIX	59.2240	6.89000	24
O III	59.9598	4.92000	25
Mg X	60.9800	6.10000	26
Mg X	62.4943	6.05000	27
O V	62.9730	5.37000	28
O II	71.8535	4.48000	29
Fe XX	72.1560	6.96000	30
Ne VIII	77.0409	5.81000	31
O IV	79.0199	5.19000	32
O II	83.5500	4.52000	33
H I	94.9700	3.84000	34
H I	97.2537	3.84000	35
C III	97.7030	4.84000	36
H I	102.572	3.84000	37
O VI	103.190	5.47000	38

Note that this line list differs from the version 6 line list. The lines between 33.5410 nm and 36.8076 nm are now measured by MEGS - B after the MEGS - A for the entire mission. We believe there is uncorrected degradation in MEGS - A for at least the 36.8076 nm emission line and the time series shows a step.

SolarSoft

SolarSoft and IDL users may wish to download the EVE SolarSoft software package. It is available at our web site by browsing the Data Access page.

https://lasp.colorado.edu/eve/data_access/index.html

Additional information about SolarSoft can be found through the LMSAL website, <https://www.lmsal.com/solarsoft>.

Note that the EVE SolarSoft package can be run in IDL without SolarSoft.

Data Availability and Data Gaps

Daily calibrations are performed that last a total of about 30 minutes; however, the channel calibrations are staggered so that one of the science channels is always observing the Sun during the daily calibration. These daily calibrations allow for EVE to directly measure dark signals on the detectors to track changes. For the CCDs, the flatfield LEDs are also used. On Sundays, a slightly longer calibration is performed to increase statistics.

Two annual eclipse outage periods of about 3 weeks occur as the spacecraft orbit aligns with the Earth and Sun. These can last up to 72 minutes each day. After longer eclipses (10+ minutes), some thermal settling causes a wavelength shift on MEGS - A that is not yet corrected. Around the 2 eclipse seasons, additional off - pointing maneuvers are performed including EVE cruciform scans (9 hours), EVE FOV maps (~2 hours), plus maneuvers for the other instruments and the guide telescopes.

The spacecraft is also subject to being blocked by the moon, but this is infrequent. Other infrequent activities include momentum management, and station - keeping thruster firings.

CCD bakeouts have occurred earlier in the mission in attempts to recover instrument sensitivity for MEGS - B. The first bakeout started on June 16 (day 167), 2010 and continued through June 18 (day 169), 2010. The second CCD bakeout was much longer lasting from September 23 (day 266) through September 28 (day 271), 2010. After each bakeout, there is a period of several days where the detectors change rapidly, and this is not corrected in version 3. No future bakeouts will be scheduled.

To minimize the degradation on the MEGS B detector, MEGS B only observes the sun for 3 hours per day and the timing of the observation has changed throughout the mission. When not observing the Sun, the MEGS B portion of the spectra is filled with - 1.0 when MEGS - A data is available. After the MEGS - A anomaly when no MEGS - B data are available, the spectra file is no longer generated (missing MEGS - A and MEGS - B). The lines/bands file is generated because the ESP data remains continuously available.

Detailed daily information is provided in the Science Operations Mission Log and is available at this location:

https://lasp.colorado.edu/eve/data_access/evewebdata/EVE_sciopslog.htm

Data availability can be assessed using the calendars on the EVE web site for the

particular product and year of interest. This link is for level 2 data for 2017. Green cells indicate data is available.

https://lasp.colorado.edu/eve/data_access/evewebdata/misc/eve_calendars/calendar_level2_2017.html

Version Release Notes

Other Notes

The spectra bins should not be used individually for analysis due to the possibility of small - scale wavelength shifts. Rather, users should integrate over the features of interest. MEGS - A (5 - 37 nm) is the most sensitive to these small wavelength shifts.

Since the MEGS - A 30.4 line has suffered detector burn - in and filter degradation, the line shape itself is being adjusted. This is likely to affect attempts to observe Doppler shifts. We recommend using the count rate spectrum to investigate the incredibly small line shifts.

The MEGS - P Lyman - alpha diode measurement is susceptible to low energy particles.

Our initial attempt to remove the low energy particle noise using the dark diode needs refinement. Rather than exclude this measurement, we filter it based on those periods of increased particle noise. Therefore, the MEGS - P Lyman - alpha measurement is sometimes very complete. The Lyman - alpha measurement uses the same filter mechanism as MEGS - B, so it is also operating with the same reduced - exposure scenario. The periods of high potential large contributions from particles are fixed to earth's magnetic field, so the UT time shifts about 3:56 each day.