GUVI Level 1B Spectrograph Data

Overview

The GUVI Data Processing Payload Operations Center will routinely create scientific data products that are available for distribution via the web. In order for the data to be of use to scientists, industry and the public, rapid, efficient, and accurate operational algorithms have been developed to produce environmental parameters. Data from the GUVI instrument is processed on the ground to generate data products at the different levels.

Level 1B is a "virtual" data product file and it contains uncompressed instrument data, using a simple constrained maximum error compression algorithm that achieves modest compression factors, and has been calibrated to convert to units of radiance within the specified "color" of the GUVI data (Rayleighs/color).

Data Definition for L1B Spectrograph Data Products

Spectrographic Level 1B (BDR) Data File

The data in this file has been calibrated.

- per file

Data Item	NetCDF Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	
Header	Global Attributes	N/A	2,030	N/A	N/A
Total size			2,030		

- data per file

Data Item	NetCDF Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Spectrograph mode wavelengths	Wavelengths	Float	14*176 *4		Angstroms (Å)
Spectrograph mode radiance data calibration errors	RadianceCalibrationError	Float	4*5*14		Percent
Spectrograph	ResponsivityCtsPerRayleig	Float	4*5*14		Counts per

mode responsivity	h				Rayleigh
Total			10,416		

- data **per scan (**2.71 s integration time**)**

Data Item	NetCDF Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	
Day of Year	DOY	Short	2	1...366	
Time since start of day	Time	Integer	4		Milliseconds
Input rate for detector being used	InputRate	Integer	4		N/A
Output rate for detector being used	OutputRate	Integer	4		N/A
Detector Number Utilized	Detector	Byte	1	1...2	N/A
Slit position	Slit	Byte	1	0 = closed, 1 = wide, 2 = medium, 3 = narrow, 4 = unknown	N/A
Mirror start position	MirrorStartPosition	Short	2	0...420	
Dark count pixels (4)	DarkCountPixels	Short	2*4		
Background count pixels (21)	BackgroundPixels	Short	2*21		
TIMED satellite geographic latitude	TIMEDLatitude	Float	4	-90...+90	Degrees
TIMED satellite geographic latitude	TIMEDLongitude	Float	4	0...360	Degrees
TIMED satellite geographic latitude	TIMEDAltitude	Float	4	0...700	km
Total			80		

- data per **scan (**integration time**)** and per along track **pixels** index (14)

Data Item	NetCDF Variable Name	Data Type	Field Size (Bytes)	Range or Nominal Value	Units
Data quality indicator, per pixel	DQIpixel	Short	2	Bit 7: 1 = Limb pixel 0 = Disk pixel	N/A

				Bit 6: 1 = Scan mirror position data invalid, using inferred position. 0 = Scan mirror position known, and value is correct in L1A file. Bit 5: 1 = Geolocation error. 0 = Correct geolocation Bit 4: 1 = PVAT coverage error - PVAT file does not cover time for this scan. 0 = PVAT data available for this scan time. Bits 0-3 Unused	
Data quality indicators, per color	DQIcolor	Short	2*5	Bit 7: 1 = Negative Radiance, 0 = positive Bit 6: 1 = Zero Radiance, 0 = non-zero Bit 5: 1 = Calibration failure, 0 = No calibration failure Bits 0 - 4 Unused	

Pixel latitude (dayside referenced piercepoint or tangentpoint) - geographic coordinates	PixelLatitude	float	4	-90..90	Degrees
Pixel longitude (dayside referenced pierce point or tangentpoint)- geographic coordinates	PixelLongitude	Float	4	0...360	Degrees
Pixel altitude – geographic coordinates	PixelAltitude	Float	4	0…600	km
Pixel nightside latitude (night reference piercepoint latitude)	PixelNightLatitude	Float (Nan if Limb pixel)	4	-90…+90 or NaN	Degrees
Pixel nightside longitude (night referenced piercepoint longitude)	PixelNightLongitude	Float (Nan if Limb Pixel)	4	0...360 or Nan	Degrees
Pixel nightside reference altitude	PixelNightAltitude	Float	4	0…600	Km
Pixel solar zenith angle - day	PixelSolarZenithAngle	Float	4	0...180	Degrees
Pixel solar zenith angle - night	PixelNightSolarZenithAngle	Float	4	0...180	Degrees
Decompressed spectrograph pixel data	PixelData	Float	4*176		Counts per integration period
Pixel data decompression errors	PixelDataDecompError	Float	4*176		Counts per integration period
Individual pixel spectra	PixelSpectra	Float	4*176		Rayleighs per angstrom (R/Å)
Individual pixel spectra statistical	PixelSpectraStatError	Float	4*176		Rayleighs per

errors, 1-sigma					angstrom (R/Å)
Raw counts in each imaging color	RadianceCounts	Float	4*5		Counts per integration period
Decompression Errors in each imaging color over an integration period	RadianceCountsDecompError	Float	4*5		Counts per integration period
Statistical error, 1-sigma, in each imaging color over an integration period	RadianceCountsStatError	Float	4*5		Counts per integration period
Spectrograph mode radiance data of each of 5 colors	RadianceData	Float	4*5		Rayleighs (R)
Spectrograph mode radiance data counting statistical errors, 1-sigma, for each of 5 colors	RadianceDataStatError	Float	4*5		Rayleighs (R)
1216 background (scattered light)	Background1216	Float	4*5		Rayleighs (R)
1304 background (scattered light)	Background1304	Float	4*5		Rayleighs (R)
Long background (scattered light)	BackgroundLong	Float	4*5		Rayleighs (R)
Dark background	BackgroundDark	Float	4*5		Rayleighs (R)
Total			2,688		
Total (14)			37,362		

Total Spectrograph Level 1B data file:

Header: 2030 bytes
Data per file: 10,416 bytes
Data per scan: 80 bytes * (100 min. orbit / 2.71 sec. int. time) = 177,121 bytes
Data per scan over all along-track pixels:
37,362 bytes *(100 min. orbit /2.71 sec. int. time) = 82,720,295 bytes

Total: 82,898,665 bytes = ~ 83 Mbytes per orbit