

Messenger GRS PDS Data Viewer

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1) Overview

The MSGR GRS PDS DataViewer is a software tool for browsing and displaying Messenger GRS PDS data files in tabular or graphical format, and Messenger GRS PDS label and format files in text format.

The tool reads MSGR GRS PDS EDR and CDR files on your system. PDS files may be acquired through the PDS Geosciences Node. Data files are checked for correct byte length, and label and data files are checked to make certain there is one label file for each data file. Files that are non-matching or have incorrect byte length are flagged. A tree structure of the PDS files on your system is displayed. Files may be opened from this tree display which then updates up to 7 additional tabs which include

- 1) A Label File Display
- 2) A Format File Display which represents the format file for the chosen label or dat file
- 3) A Table Display of the data from the corresponding dat file
- 4) An Engineering graph tab which is activated if the dat file is an engineering file allowing graphical representation of any of the 41 engineering channels. Data may be displayed in MET or UTC time and values displayed in Raw, Eng, or Smoothed values.
- 5) A Gamma Spectrum and Data tab which is activated if the dat file is a GRS_CRA*****.DAT. This tab allows graphical display of any of 58 channels or a graphical display of the gamma corrected spectrum data in UTC or MET time. Spectra may be graphed singly, or as summed or averaged spectra.
- 6) An Anticoincidence Spectrum and Data tab which is activated if the dat file is a GRS_CAC*****.DAT. This tab allows graphical display of any of 58 channels or a graphical display of the corrected anticoincidence spectrum data in UTC or MET time. Spectra may be graphed singly, or as summed or averaged spectra.
- 7) A Shield Spectrum and Data tab which is activated if the dat file is a GRS_CSH*****.DAT. This tab allows graphical display of any of 34 channels or a graphical display of the shield spectrum data in UTC or MET time. Spectra may be graphed singly, or as summed or averaged spectra.

2) Obtaining MSGR GRS PDS CDR / EDR files

Messenger GRS PDS EDR and CDR files may be obtained through the NASA PDS Geosciences Node at

<http://geo.pds.nasa.gov/missions/messenger/grns.htm>

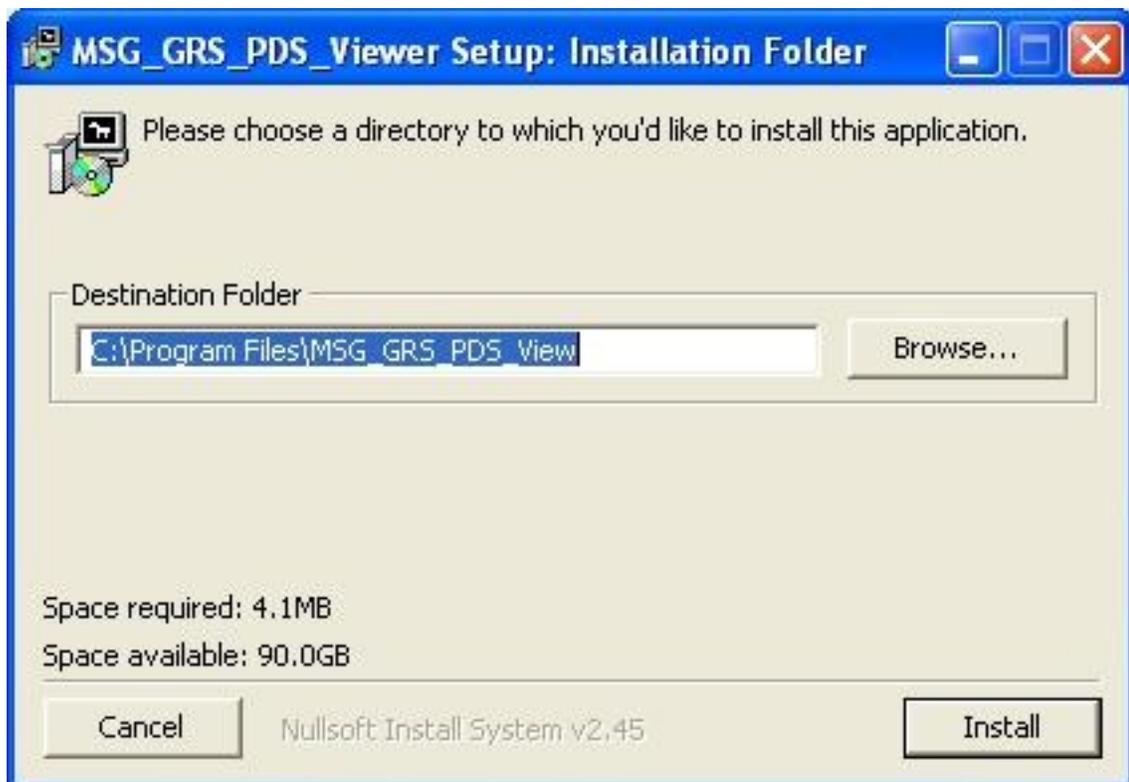
At this location, the Mercury Orbital Data Explorer may be used to search and download data products.

<http://ode.rsl.wustl.edu/mercury/>

The PDS files may be placed anywhere on your system. You will point the PDS Data Viewer to the location of your PDS files on startup / initialization. As with the NASA PDS data structure, the corresponding label (.lbl) and data (.dat) files must remain in the same folder.

3) Installation / Setup

Run (double click) the Setup_MSG_GRS_PDS.exe file. This will install the software on your system under a default folder at C:\Program Files\MSG_GRS_PDS_View or another location you may specify. A Start Menu Icon and an desktop Icon for launching will also be created at installation. Installation requires roughly 4.1MB of disk space.



4) System Requirements

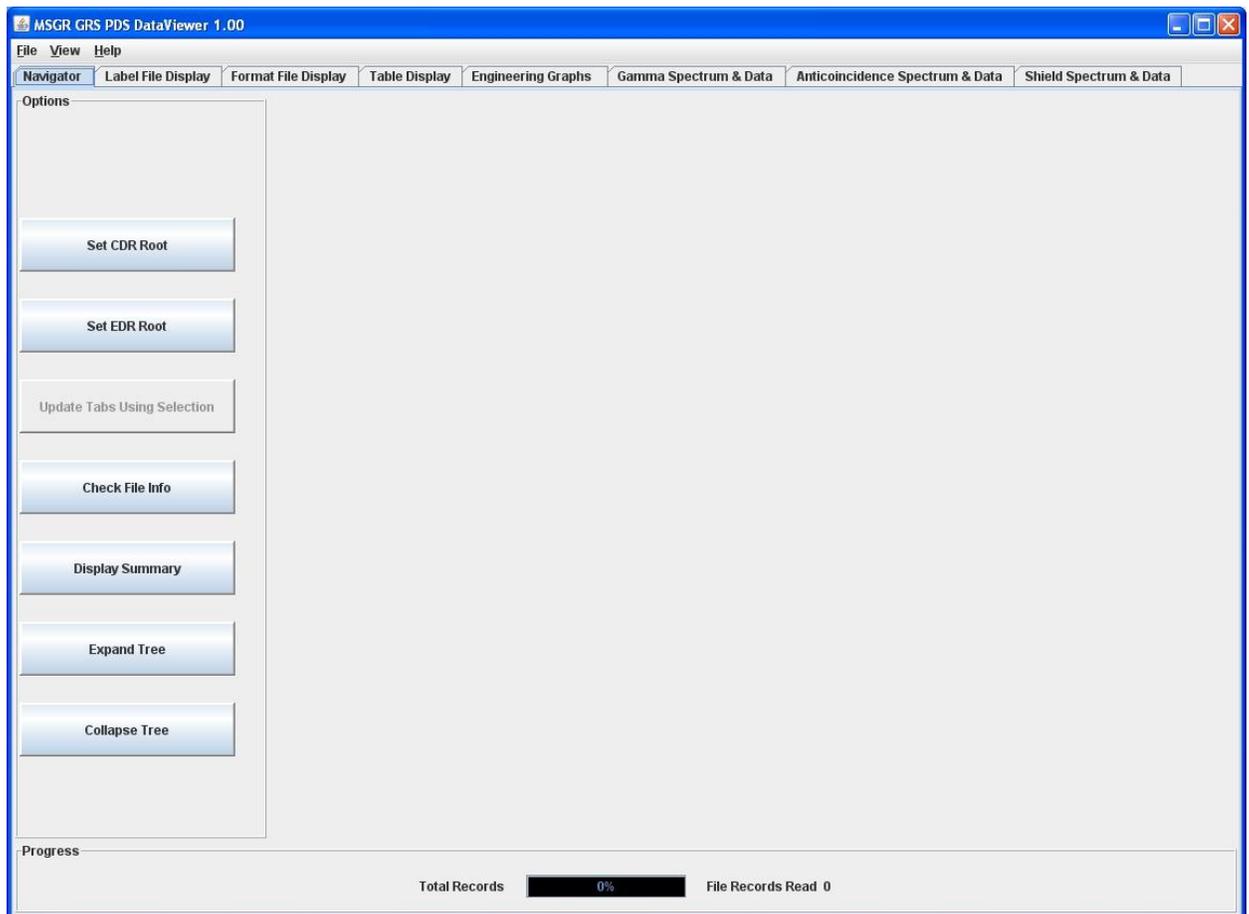
This software can be run from a Windows based system that has Java 1.6 or greater installed. You may download the Java Runtime environment for Windows free at

http://java.com/en/download/inc/windows_upgrade_xpi.jsp

If your system does not have Java installed, you must install Java prior to installing the MSGR GRS PDS Data Viewer software. Intel and 100% compatible processors are supported by Java. A Pentium 166MHz or faster processor with at least 64MB of physical RAM is recommended. You will also need a minimum of 98MB of free disk space to install Java.

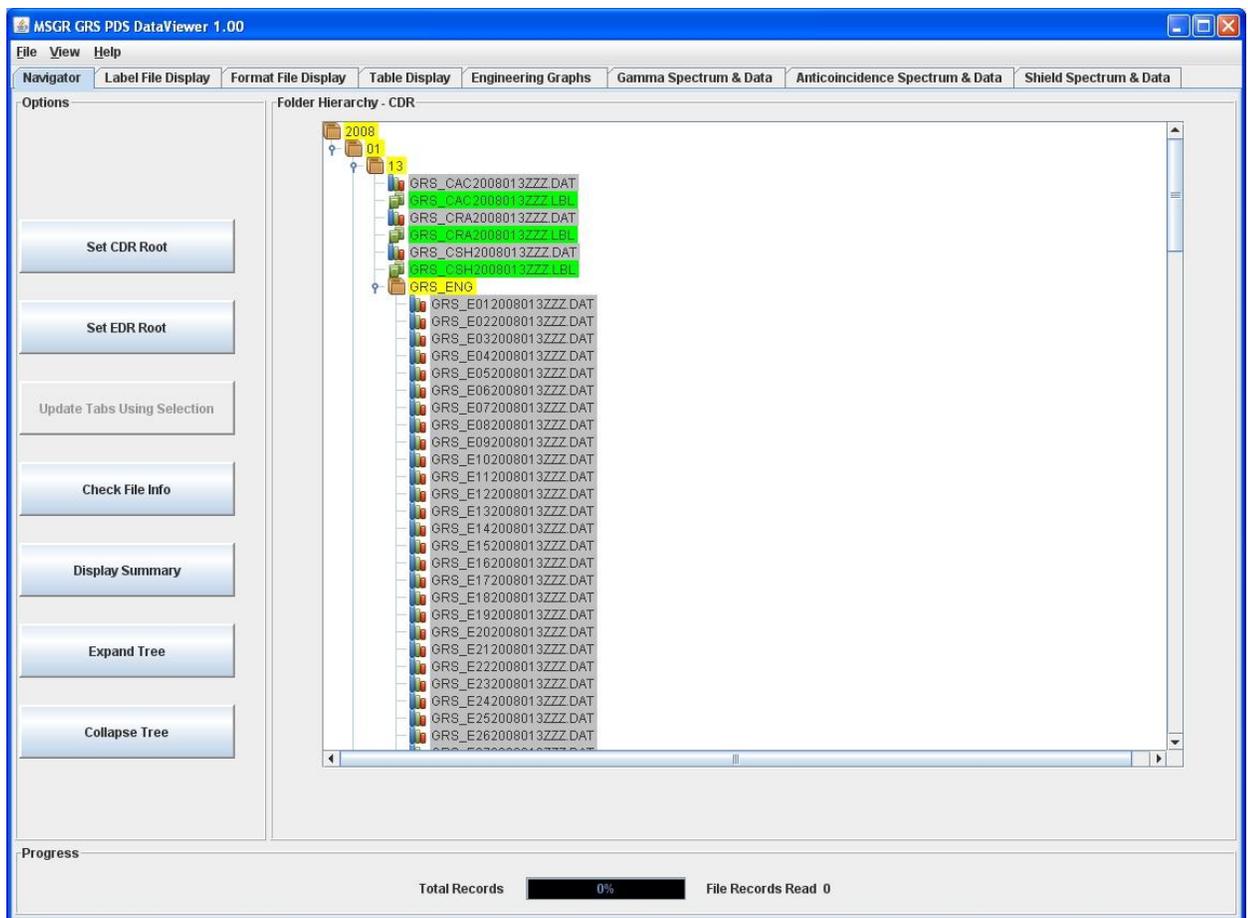
5) Main Navigator Screen Options

Upon launching the program from the Start Menu or your desktop Icon, the main navigator tab will open as follows:



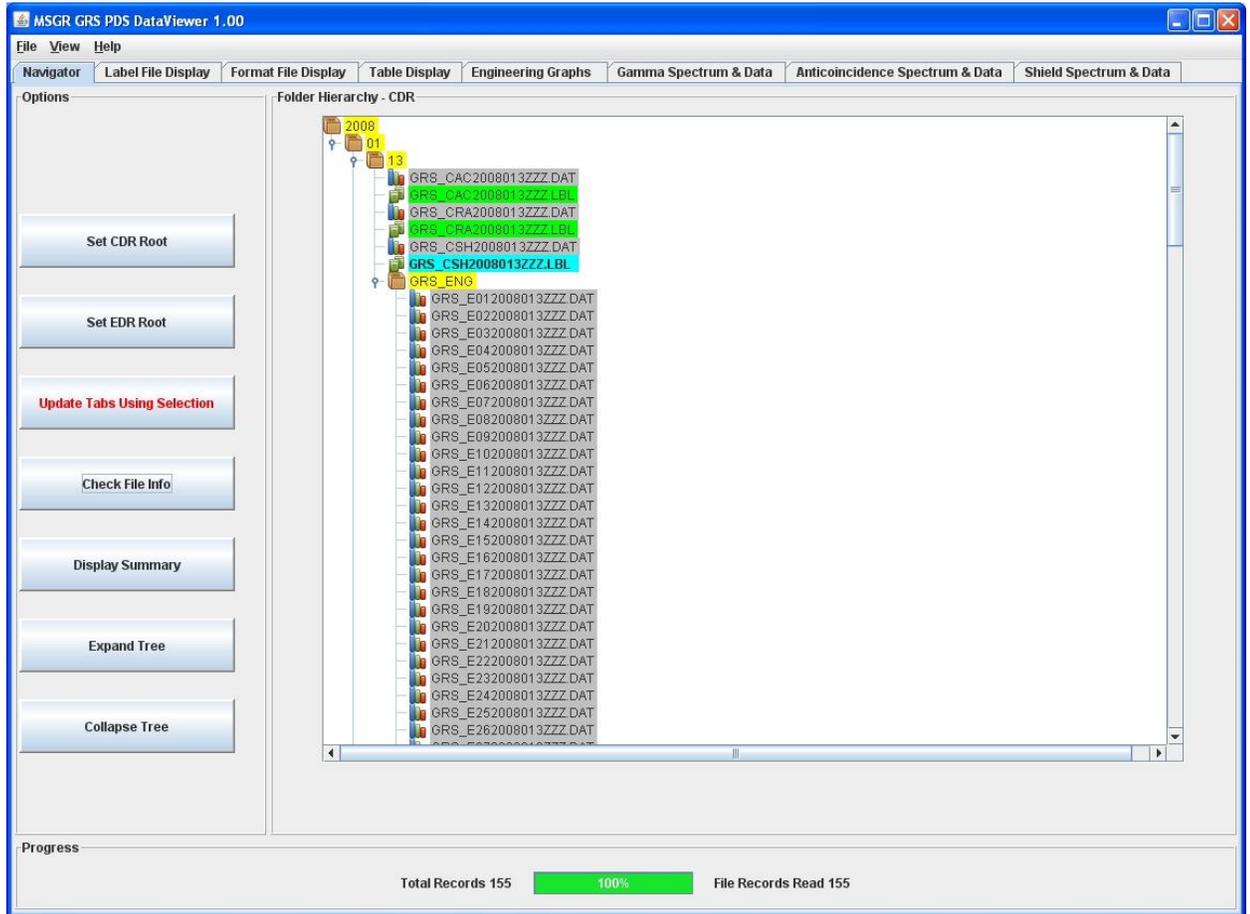
a) Opening and displaying an Archive

To begin, open a CDR archive by clicking on the “Set CDR Root button” Navigate to the top level folder that contains all of your CDR files and click on “Open” Your PDS files will be checked for correct byte length, and also that each dat file has a corresponding lbl file. A Tree structure will be displayed representing your PDS CDR files, as follows:

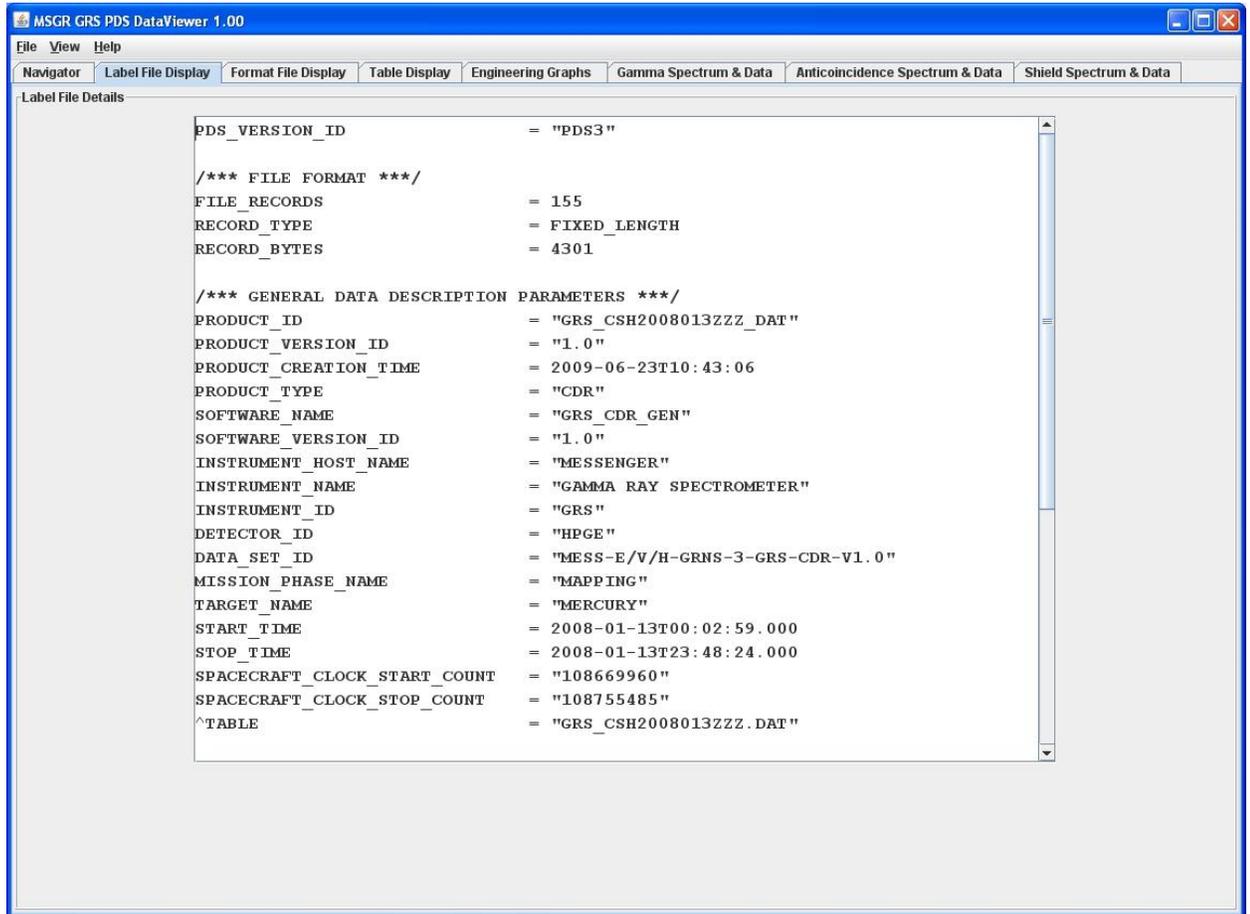


Folders are represented in yellow, dat files in grey, and lbl files in green. Any files represented in red have either incorrect byte length, no matching dat or lbl file, or have an incorrect naming convention as defined by the current SIS document.

Click once on any lbl file (it will turn blue) and activate the “Update Tabs Using Selection” button, then click on Update Tabs to load the data file(s) associated with the particular label. The progress bar at the bottom will show the progress by the number of records read.



At this point, the data within the GRS_CSH2008013ZZZ.DAT file is ready for exploration. Clicking on the Label File Display Tab will display the LBL file as follows:



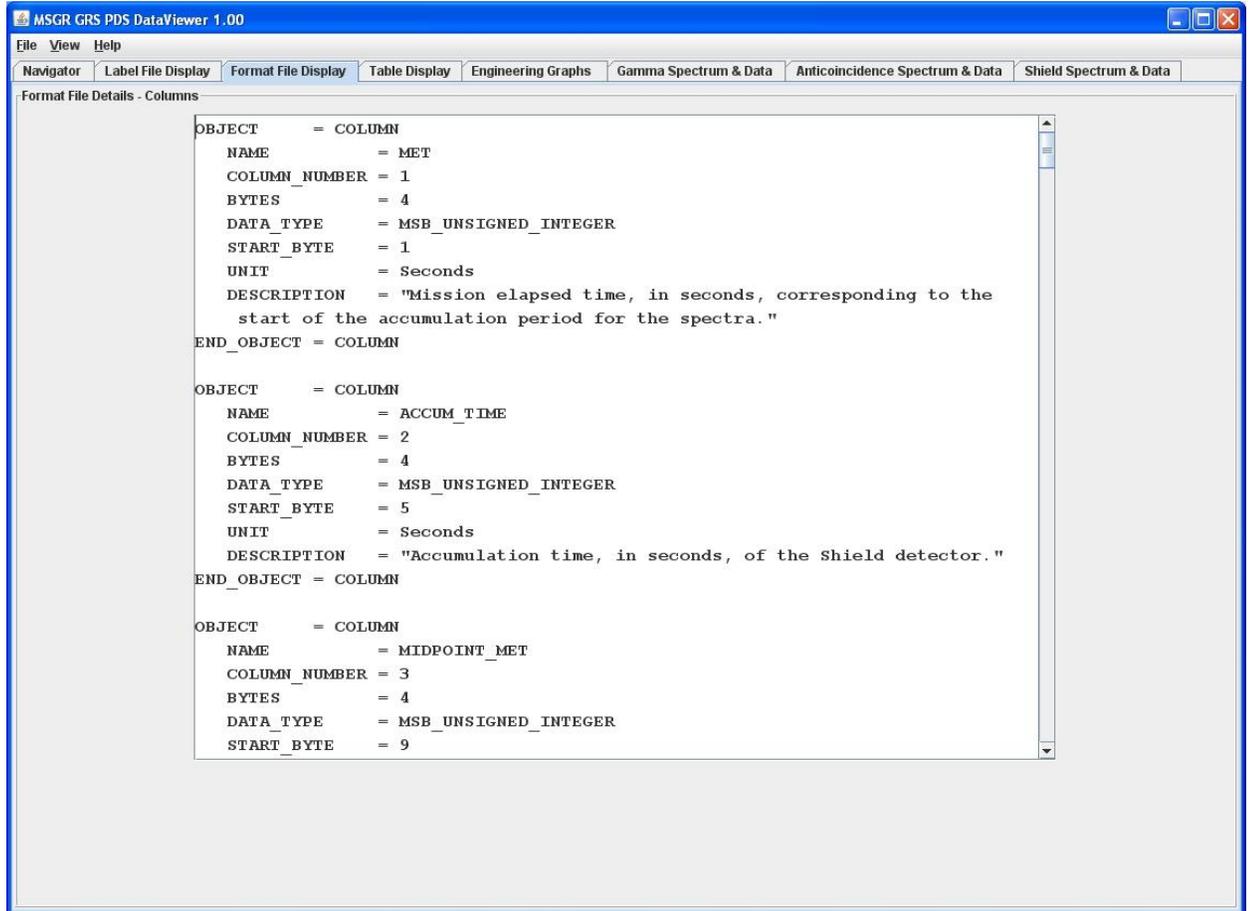
The screenshot shows a software window titled "MSGR GRS PDS DataViewer 1.00". The window has a menu bar with "File", "View", and "Help". Below the menu bar is a tabbed interface with several tabs: "Navigator", "Label File Display", "Format File Display", "Table Display", "Engineering Graphs", "Gamma Spectrum & Data", "Anticoincidence Spectrum & Data", and "Shield Spectrum & Data". The "Label File Display" tab is selected, and the main area shows the following text:

```
PDS_VERSION_ID           = "PDS3"

/*** FILE FORMAT ***/
FILE_RECORDS              = 155
RECORD_TYPE               = FIXED_LENGTH
RECORD_BYTES              = 4301

/*** GENERAL DATA DESCRIPTION PARAMETERS ***/
PRODUCT_ID                = "GRS_CSH2008013ZZZ_DAT"
PRODUCT_VERSION_ID        = "1.0"
PRODUCT_CREATION_TIME     = 2009-06-23T10:43:06
PRODUCT_TYPE              = "CDR"
SOFTWARE_NAME              = "GRS_CDR_GEN"
SOFTWARE_VERSION_ID       = "1.0"
INSTRUMENT_HOST_NAME      = "MESSENGER"
INSTRUMENT_NAME           = "GAMMA RAY SPECTROMETER"
INSTRUMENT_ID             = "GRS"
DETECTOR_ID               = "HPGE"
DATA_SET_ID               = "MESS-E/V/H-GRNS-3-GRS-CDR-V1.0"
MISSION_PHASE_NAME        = "MAPPING"
TARGET_NAME                = "MERCURY"
START_TIME                 = 2008-01-13T00:02:59.000
STOP_TIME                  = 2008-01-13T23:48:24.000
SPACECRAFT_CLOCK_START_COUNT = "108669960"
SPACECRAFT_CLOCK_STOP_COUNT = "108755485"
^TABLE                     = "GRS_CSH2008013ZZZ.DAT"
```

Clicking on the Format File Display Tab will display the corresponding Format File .fmt as follows:



Clicking on the Table Display Tab will display the data in tabular form as follows. Scrollbars are used to scroll up and down records and across the data columns.

Clicking and dragging with the mouse will highlight any number of records you wish to select and Using Ctrl-A, Ctrl-C, tabular record data may be copied into Excel.

MSGR GRS PDS DataViewer 1.00

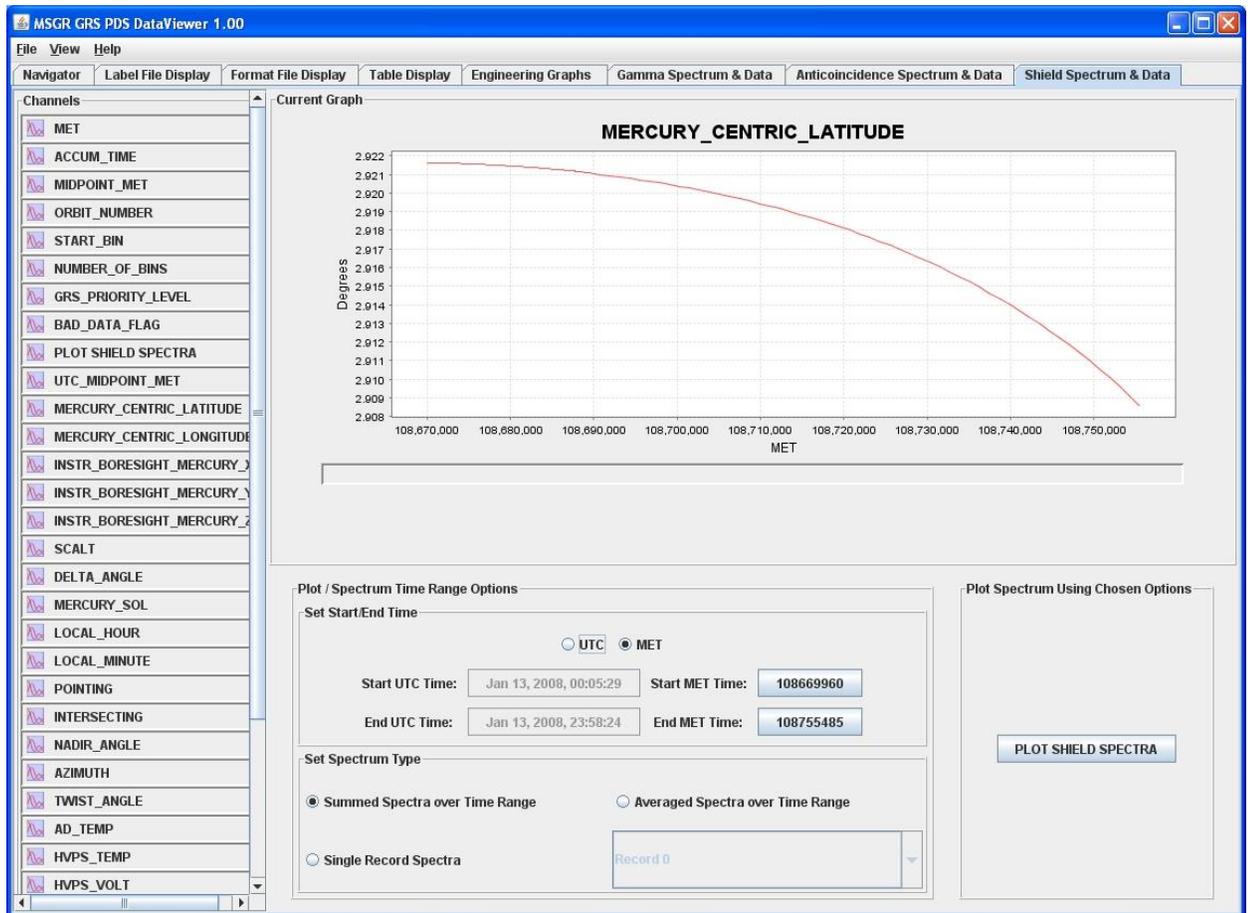
File View Help

Navigator Label File Display Format File Display **Table Display** Engineering Graphs Gamma Spectrum & Data Anticoincidence Spectrum & Data Shield Spectrum & Data

Current Data Displayed

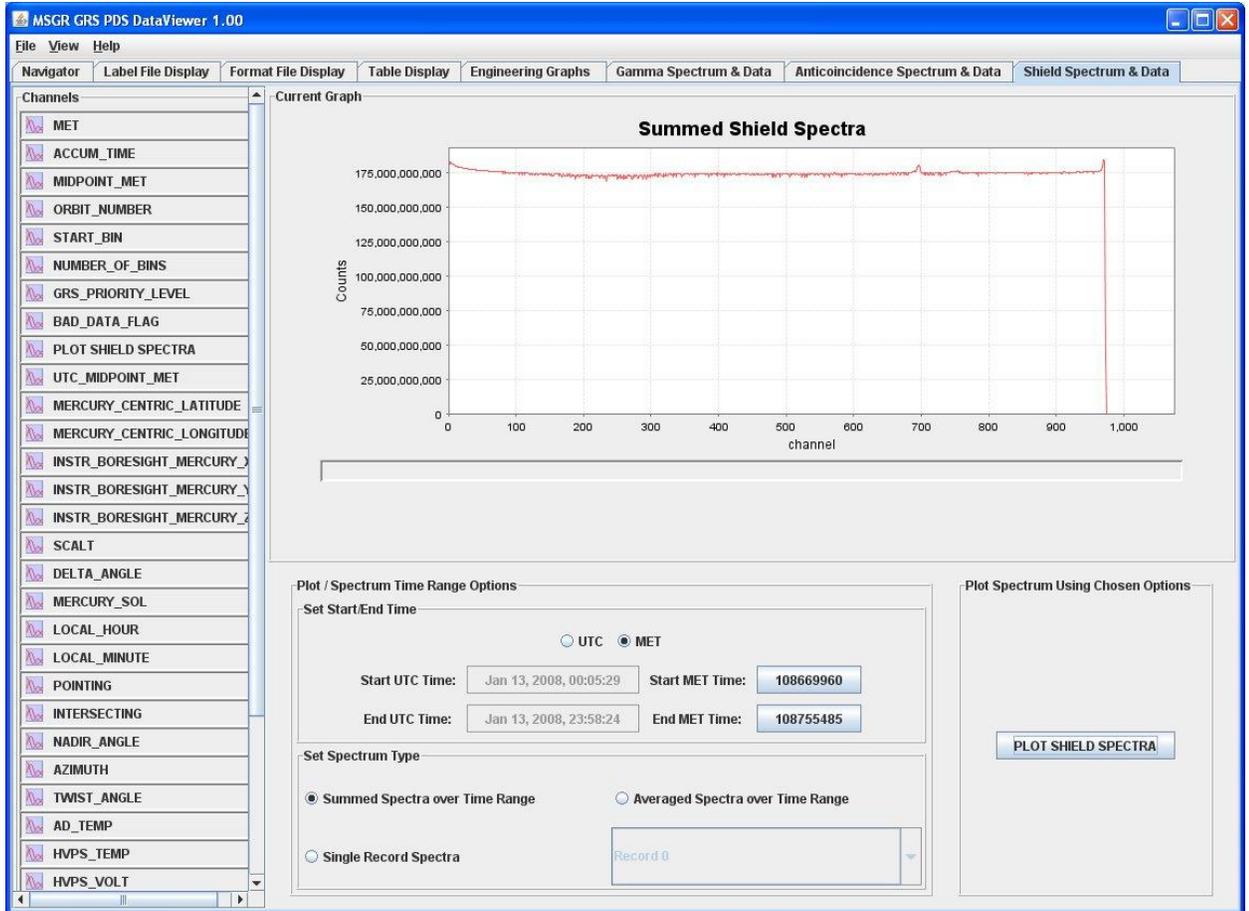
GRS_CSH2008013ZZZ.dat Channel	MET	ACCUM_TL	MIDPOINT	ORBIT_NU	START_BIN	NUMBER	GRS_PRI	BAD_DATA	CAL_SH	CAL_SH	CAL_SH	CAL_SH
	108669960	300	108670110	0	0	1024	0	0	1115815936	1184008704	1170130944	117681456
	108670260	300	108670410	0	0	1024	0	0	1117257728	1184070144	1170339840	117674700
	108670560	300	108670710	0	0	1024	0	0	1115815936	1184111616	1170470912	117669476
	108670860	300	108671010	0	0	1024	0	0	1114636288	1184062976	1170812928	117671014
	108671160	300	108671310	0	0	1024	0	0	1116078080	1184056320	1170659328	117685452
	108671460	300	108671610	0	0	1024	0	0	1116733440	1184115712	1170524160	117662516
	108671760	300	108671910	0	0	1024	0	0	1117389800	1183890944	1170577408	117663334
	108672060	300	108672210	0	0	1024	0	0	1117850944	1184105472	1170382848	117686272
	108672360	300	108672510	0	0	1024	0	0	1116209152	1183975424	1170452480	117661081
	108672660	300	108672810	0	0	1024	0	0	1114112000	1184065536	1170569216	117665382
	108672960	300	108673110	0	0	1024	0	0	1114112000	1184118784	1170163712	117678387
	108673260	300	108673410	0	0	1024	0	0	1117913088	1184039424	1170776064	117665587
	108673560	300	108673710	0	0	1024	0	0	1117913088	1184032256	1170507776	117653296
	108673860	300	108674010	0	0	1024	0	0	1115684864	1184078336	1170360320	117676851
	108674160	300	108674310	0	0	1024	0	0	1116078080	1184129536	1170470912	117669580
	108674460	300	108674610	0	0	1024	0	0	1116209152	1183821824	1170798592	117686784
	108674760	300	108674910	0	0	1024	0	0	1116209152	1184079360	1170913280	117662310
	108675060	300	108675210	0	0	1024	0	0	1113587712	1184070144	1170339840	117677977
	108675360	300	108675510	0	0	1024	0	0	1116884512	1184057344	1170575360	117658112
	108675660	300	108675810	0	0	1024	0	0	1115160576	1184006144	1170202624	117656676
	108675960	300	108676110	0	0	1024	0	0	1116340224	1183973376	1170294784	117653094
	108676260	300	108676410	0	0	1024	0	0	1116340224	1184009728	1170403328	117675212
	108676560	300	108676710	0	0	1024	0	0	1116995584	1184043520	1170663424	117651251
	108676860	300	108677010	0	0	1024	0	0	1116078080	1184021504	1170313216	117648486
	108677160	300	108677310	0	0	1024	0	0	1114898432	1184027136	1170210816	117666304
	108677460	300	108677610	0	0	1024	0	0	1112014848	1184045568	1170360320	117663539
	108677760	300	108677910	0	0	1024	0	0	1114636288	1184069120	1170026496	117666916
	108678060	300	108678210	0	0	1024	0	0	1116733440	1184070144	1170456576	117657396
	108678360	300	108678510	0	0	1024	0	0	1117257728	1184016896	1170771968	117655244
	108678660	300	108678810	0	0	1024	0	0	1115947008	1183993856	1170298880	117639884
	108678960	300	108679110	0	0	1024	0	0	1117850944	1184053248	1170100224	117658521
	108679260	300	108679410	0	0	1024	0	0	1115947008	1183944192	1170216960	117658931
	108679560	300	108679710	0	0	1024	0	0	1117257728	1183925248	1170513920	117658931
	108679860	300	108680010	0	0	1024	0	0	1115422720	1184039936	1170444288	117660566
	108680160	300	108680310	0	0	1024	0	0	1116602368	1184072704	1170202624	117671321
	108680460	300	108680610	0	0	1024	0	0	1113063424	1184056320	1170522112	117629440
	108680760	300	108680910	0	0	1024	0	0	1114898432	1184014848	1170362368	117667840
	108681060	300	108681210	0	0	1024	0	0	1116340224	1183905280	1170089984	117654937
	108681360	300	108681510	0	0	1024	0	0	1116471296	1184001536	1170601984	117670297
	108681660	300	108681810	0	0	1024	0	0	1116340224	1184039424	1170085888	117680332
	108681960	300	108682110	0	0	1024	0	0	1117913088	1184173568	1170237440	117657702
	108682260	300	108682410	0	0	1024	0	0	1115160576	1184027136	1170255872	117664666

Depending on what type of data is loaded from the Navigator panel, a graphing tab specific to the data type will enable allow graphical representation of the data. In the example here, we loaded a GRS_CSH (Shield data) file. Clicking therefore on the Shield Spectrum & Data tab allows graphical displays of the data and spectra as follows:



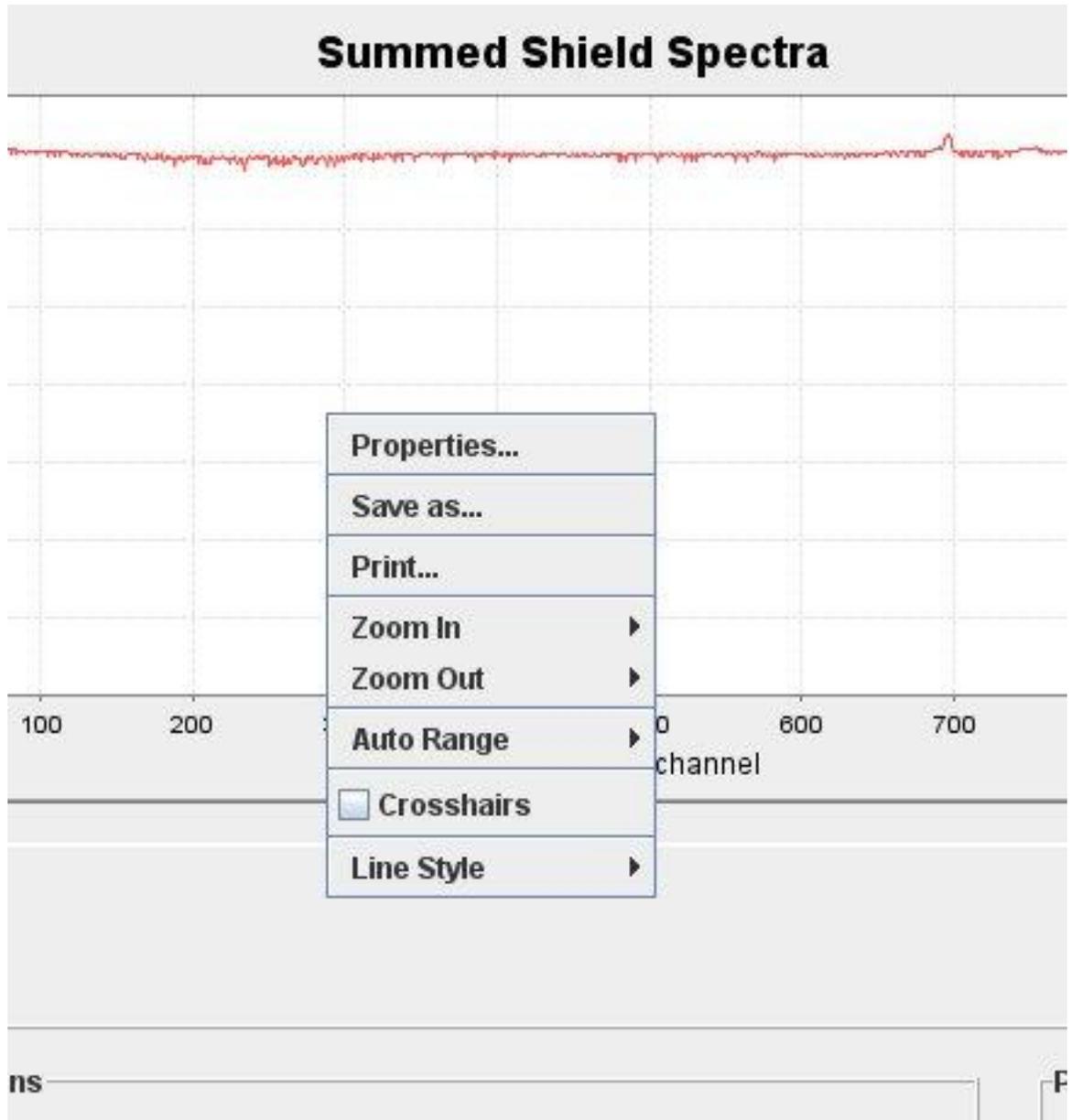
Each of the data channels may be displayed in either MET or UTC time. The Start and End Times may be adjusted to view a smaller section of the data.

Spectra may be plotted by choosing the spectra type (single, summed, or averaged) and clicking on the button to plot the spectra.



b) Graphing Options

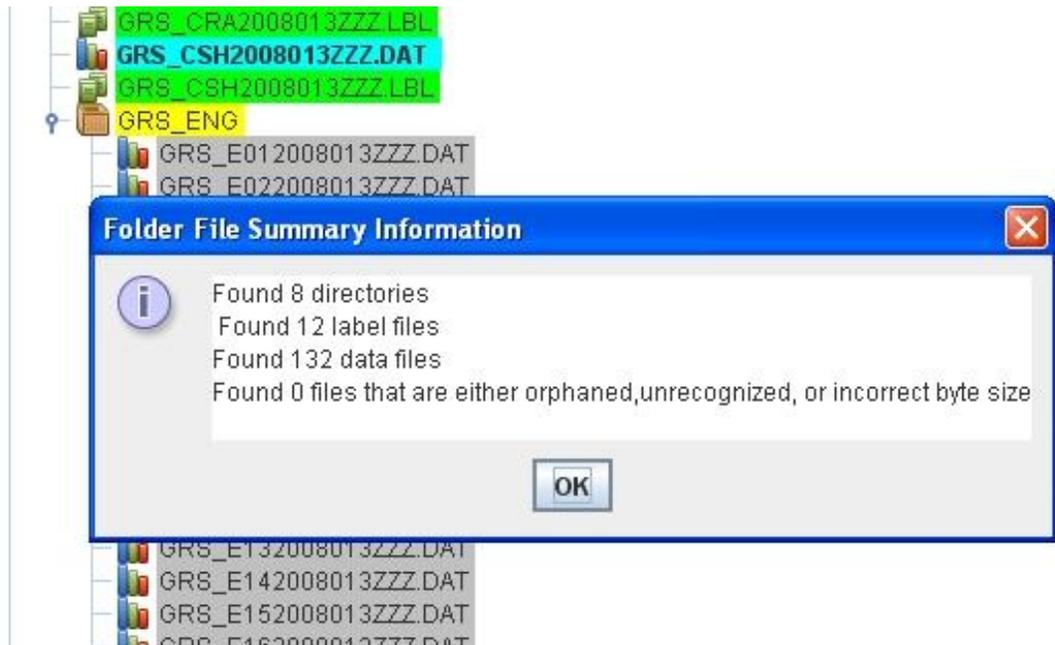
Right clicking on a graph will bring up the graphing options window as follows:



A graph may be zoomed in also clicking / dragging a selection with the mouse and zoomed out by clicking / dragging leftward with the mouse.

c) Displaying File or Summary Info

Clicking on Check File Info will display the information on the current highlighted (blue) file.



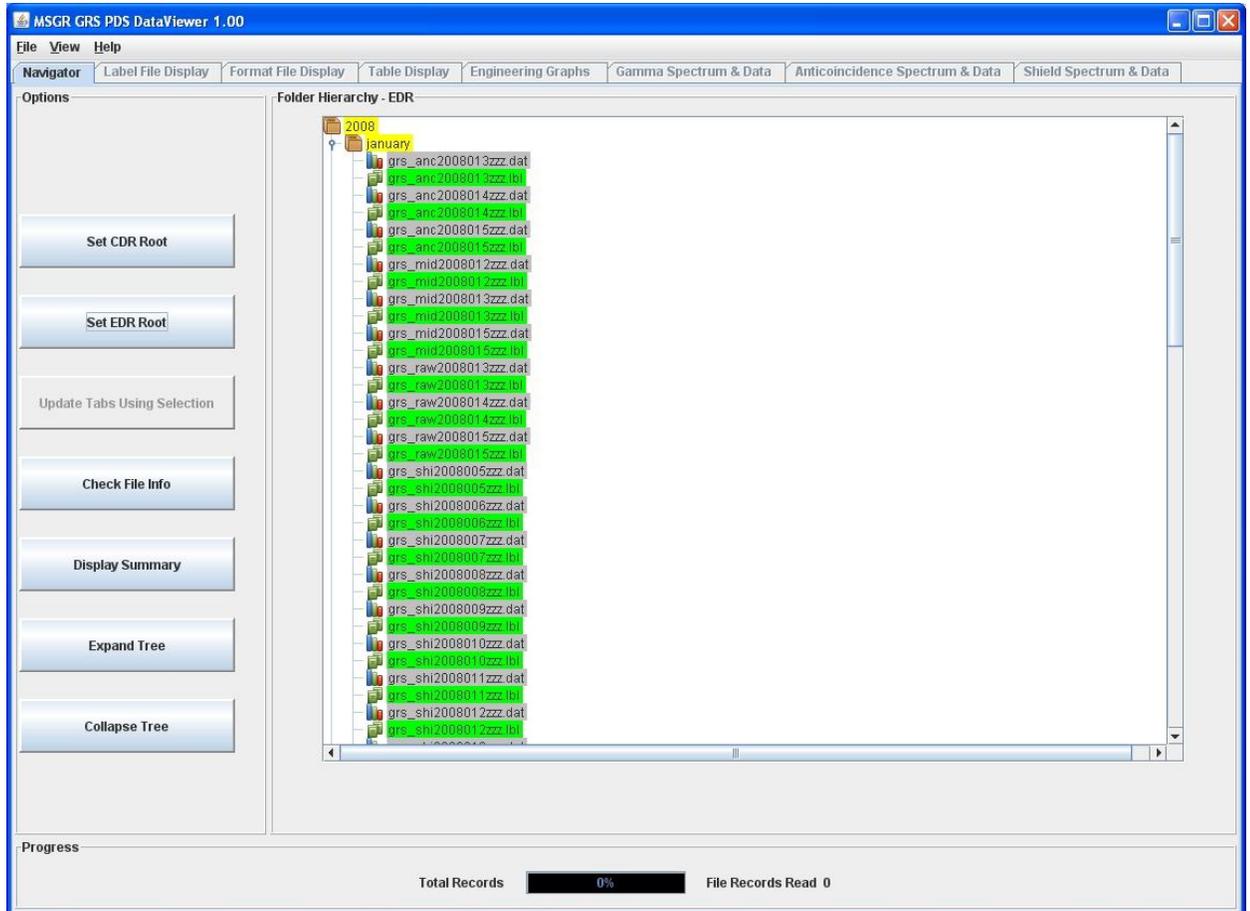
d) Expanding or Collapsing Tree Hierarchy

Clicking on expand tree / collapse tree, expands or collapses the tree hierarchy view in the navigator window.

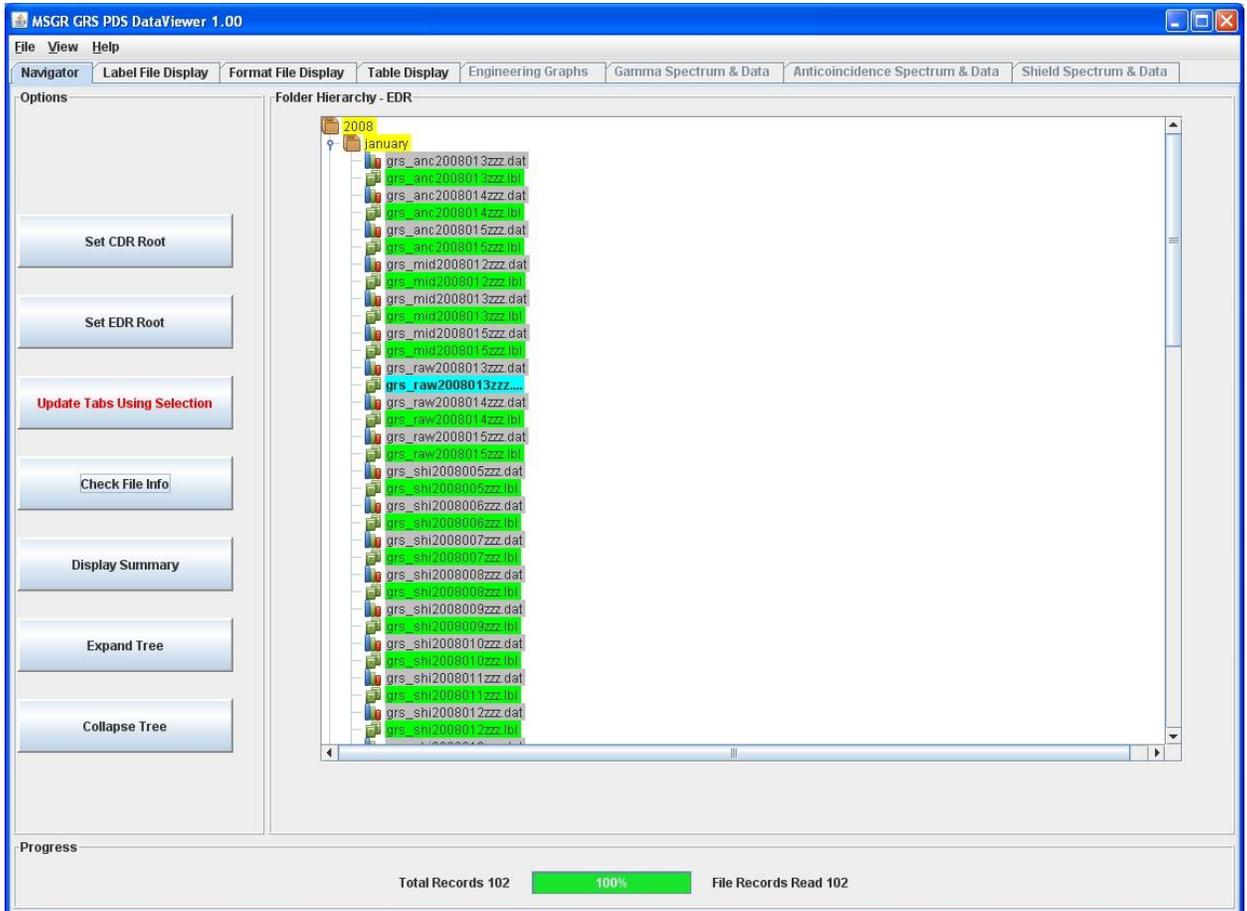
6) Displaying EDR Files

To begin, open an EDR archive by clicking on the “Set EDR Root button” Navigate to the top level folder that contains all of your EDR files and click on “Open” Your PDS files will be checked for correct byte length, and also that each dat file has a

corresponding lbl file. A Tree structure will be displayed representing your PDS EDR files, as follows:

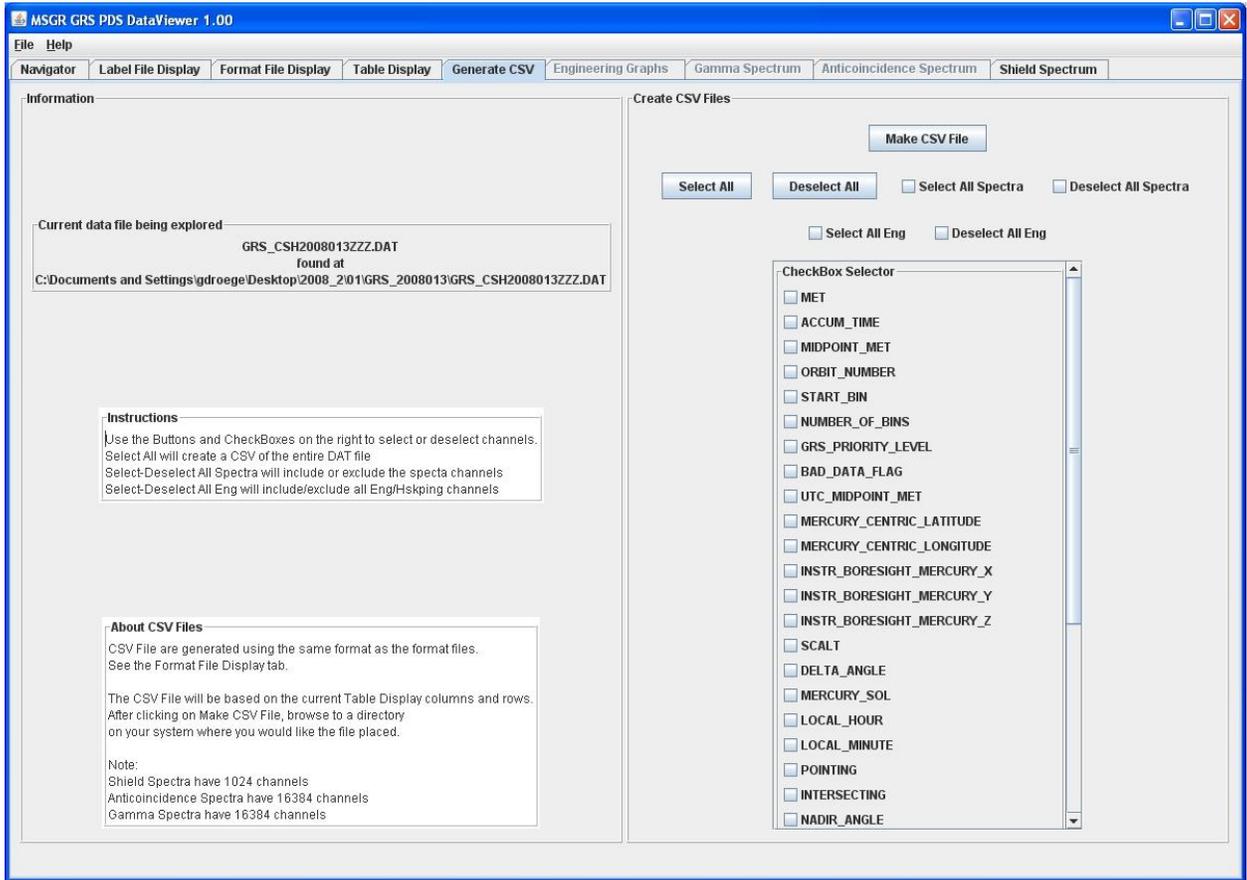


Then just like with the CDR files, click on any lbl file and hit Update Tabs Using Selection to load the corresponding data file.



As above, this activates the label, format and table displays for the EDR data file. There is no support currently for graphical display of EDR data files.

7) Generating CSV Files



A new tab called “Generate CSV” allows you to generate a csv file from the current .dat file being explored. Click on Make CSV File and browse to a directory to save the file generated. The csv format will match the format file for the data type being written.