LTDR Data Products and Formats

Data Products

- Surface Reflectance (AVH09 hdf)
- NDVI (AVH13 hdf)
- Browse (AVB09 and AVB13 jpg)
- Metadata (.met ASCII)

Naming Convention

AVH09C1.A1987123.N09.001.2006339162840.hdf

AVH09 identifies the AVHRR land surface reflectance product
AVH13 identifies the AVHRR NDVI product
C1 indicates compositing interval
C1 = daily product
CM = monthly composite
A1987123 is the year of the observation followed by the day within the year
N09 identifies the satellite, NOAA-7, 9, 11, 14, 16, 17
001 identifies the data product version
2006339 is the year the data were processed followed by the day within year
162840 is the hour, minute, and second the data were processed
.hdf indicates the file is in HDF-EOS

HDF Structure

Surface Reflectance

Surface Reflectance Science Data Sets (SDS)

- SREFL_CH1
- SREFL_CH2
- SREFL_CH3

Surface reflectance for channels 1, 2, 3
(2-byte integer, scaled by 10^4, fill = -9999)

- BT_CH3
- BT_CH4
- BT_CH5

Brightness temperatures for channels 3, 4, 5
(2-byte integer, K, scaled by 10)

- SZEN
- VZEN
- RELAZ

Solar & View zenith angles and relative azimuth
(2-byte integer, degrees, scaled by 100)

- QA

Quality Assessment field
(2-byte integer)

HDF Structure

NDVI

NDVI Science Data Sets (SDS)

- NDVI } Normalized Difference Vegetation Index (2-byte integer, scaled by 10^4)
- QA } Quality Assessment field (same as with SR) (2-byte integer)

Quality Assessment Field

(from most to least significant bit)

Bit Number	Description	Meaning
15	Polar flag: latitude > 60° (land) or > 50° (ocean)	1 = yes, 0 = no
14	Desert flag	1 = yes, 0 = no
13	RHO3 value is invalid	1 = yes, 0 = no
12	Channel 5 value is invalid	1 = yes, 0 = no
11	Channel 4 value is invalid	1 = yes, 0 = no
10	Channel 3 value is invalid	1 = yes, 0 = no
9	Channel 2 value is invalid	1 = yes, 0 = no
8	Channel 1 value is invalid	1 = yes, 0 = no
7	Channels 1 - 5 are valid	1 = yes, 0 = no
6	Pixel is at night (high solar zenith angle)	1 = yes, 0 = no
5	Pixel is over dense dark vegetation	1 = yes, 0 = no
4	Pixel is over sun glint	1 = yes, 0 = no
3	Pixel is over water	1 = yes, 0 = no
2	Pixel contains cloud shadow	1 = yes, 0 = no
1	Pixel is cloudy	1 = yes, 0 = no
0	Pixel is partly cloudy	1 = yes, 0 = no

Data Format Description document on LTDR website under ‘Documents’

Browse Products

AVB09C1.1997361.N14.001.20070114221.RHO2.jpg

- Grayscale browse of channel 2 surface reflectance

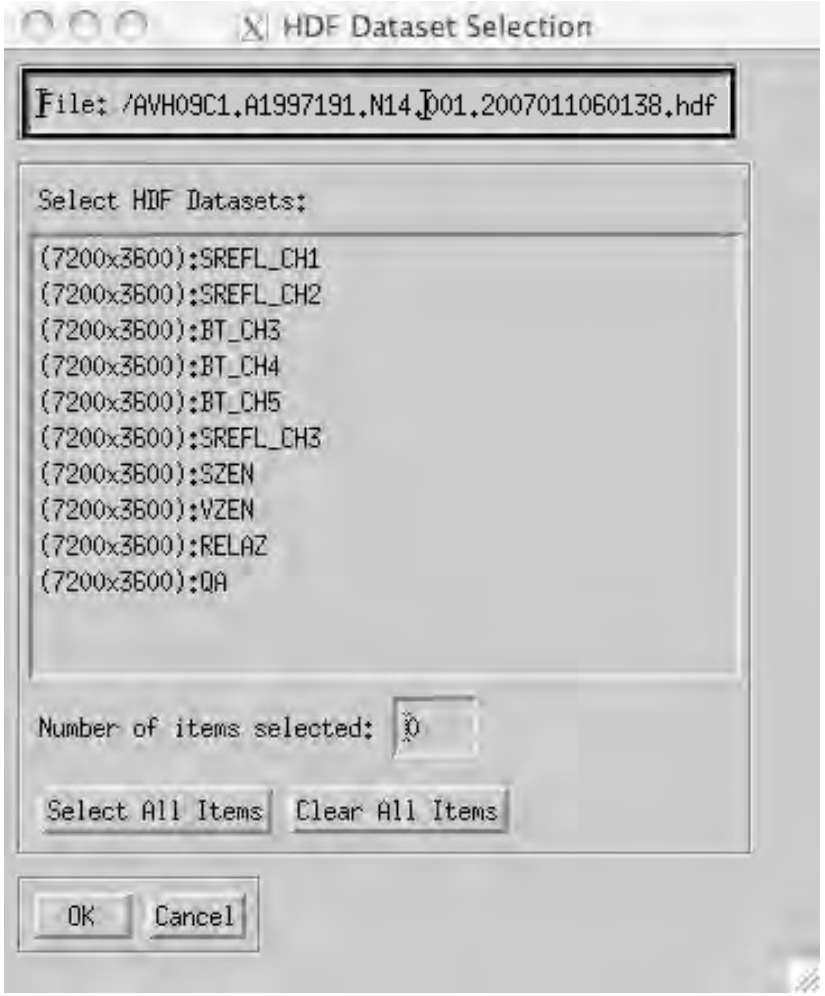
AVB13C1.1997361.N14.001.20070114221.NDVI.jpg

- Color browse of NDVI

Sample Metadata File

```
Process=LTDR_GAPS
ProcessVersion=2.1
PFIIVersion=3.5.14
Satellite=NOAA-14
Instrument=AVHRR
InputDataType=GAC
ProductionDate=2007-01-10T11:42:21.000000Z
ESDT=AVH09C1
LocalGranuleId=AVH09C1.A1997361.N14.001.2007010114221.hdf
RangeBeginningDate=1997-361
RangeBeginningTime=00:00:00.0000
RangeEndingDate=1997-361
RangeEndingTime=23:59:59.9999
PercentMissingData=4.47
PercentValidDaytimeData=85.73
PercentValidDaytimeLand=27.58
PercentValidClearDaytimeLand=3.55
PercentValidDaytimeLandInCloudShadow=0.00
PercentValidClearDaytimeWater=6.67
PercentValidDaytimeWaterInCloudShadow=0.00
```

Example: Opening in ENVI



-All SDS arrays are 7200 x 3600 CMG

-Linear lat/long array (0.05° resolution)

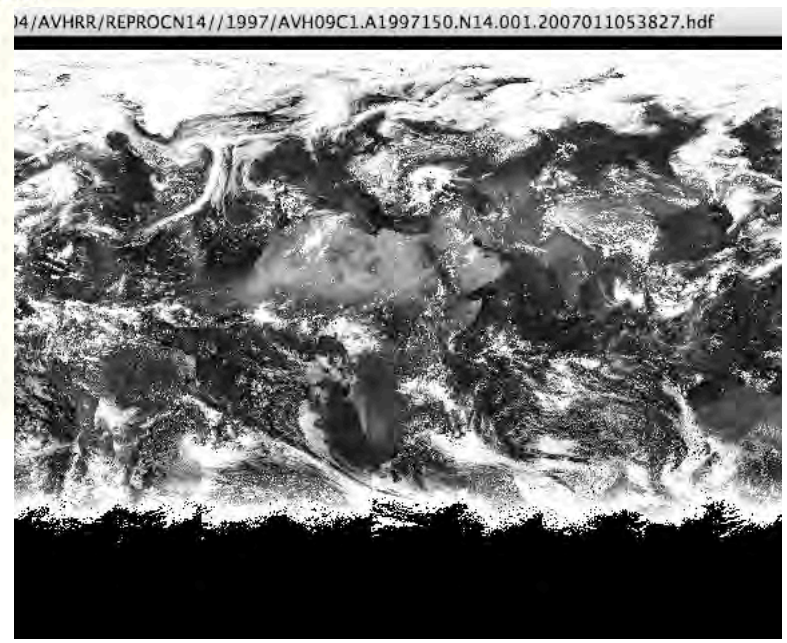
Using ‘imager’ to Display Products

```
ltdr% imager -f AVH09C1.A1997150.N14.001.2007011053827.hdf
N resolutions found = 1
Reading SREFL_CH1...
Reading SREFL_CH2...
Reading BT_CH3...
Reading BT_CH4...
Reading BT_CH5...
Reading SREFL_CH3...
Reading SZEN...
Reading VZEN...
Reading RELAZ...
Reading QA...
Routine lin_scale_data(), scaling Surface Reflectance 640 nm (unitless)
between -598.000000 and 7500.000000
```

‘imager’ Displays

pixel values

```
Row 1048, column 1656, current resolution 1 -->
Surface Reflectance 640 nm (unitless)   *                                  881  (0.088100)
Surface Reflectance 860 nm (unitless)                                      2878  (0.287800)
Brightness Temperature 3.75 microns in Degree K                            2997  (299.700004)
Brightness Temperature 11.0 microns in Degree K                            2909  (290.900004)
Brightness Temperature 12.0 microns in Degree K                            2878  (287.800004)
Surface Reflectance 3.75 microns (unitless)                                645  (0.064500)
Solar Zenith Angle in Degree                                               2124  (21.240000)
View Zenith Angle in Degree                                                5354  (53.539999)
Relative Azimuth in Degree                                                 -20511  (-205.109995)
QA                                                                   128  (0000000010000000)
QA ----- polar flag (latitude over 60 degrees (land) or 50 degrees (ocean))   0  (0.000000)
QA ----- desert flag                                                       0  (0.000000)
QA ----- RH03 value is invalid                                             0  (0.000000)
QA ----- Channel 5 value is invalid                                        0  (0.000000)
QA ----- Channel 4 value is invalid                                        0  (0.000000)
QA ----- Channel 3 value is invalid                                        0  (0.000000)
QA ----- Channel 2 value is invalid                                        0  (0.000000)
QA ----- Channel 1 value is invalid                                        0  (0.000000)
QA ----- Channels 1 - 5 are valid                                          1  (1.000000)
QA ----- Pixel is at night (high solar zenith)                             0  (0.000000)
QA ----- Pixel is over dense dark vegetation                               0  (0.000000)
QA ----- Pixel is over sunglint                                            0  (0.000000)
QA ----- Pixel is over water                                               0  (0.000000)
QA ----- Pixel contains cloud shadow                                       0  (0.000000)
QA ----- Pixel is cloudy                                                   0  (0.000000)
QA ----- Pixel is partly cloudy                                            0  (0.000000)
```



GODDARD SPACE FLIGHT CENTER

+ NASA Homepage

LTDR Product Search Tool

LTDR Product Selection

Product Type:

- ☐ AVH09C1 (AVHRR reflectance - daily)
- ☐ AVH09C2 (AVHRR reflectance - 8day) (Not available)
- ☐ AVH09CM (AVHRR reflectance - Monthly) (Not available)
- ☐ AVH13C1 (AVHRR NDVI - daily)
- ☐ AVH13C2 (AVHRR NDVI - 8day) (Not available)
- ☐ AVH13CM (AVHRR NDVI - Monthly) (Not available)

Satellite (NOAA):

- ◉ 07 (June 25, 1981 to February 1, 1985)
- ○ 09 (January 4, 1985 to November 7, 1988)
- ○ 11 (November 8, 1988 to December 31, 1994)
- ○ 14 (April 21, 1985) to December 31, 2000)
- ○ 16 (Not available)
- ○ 17 (Not available)
- ○ 18 (Not available)

Date/Time Range

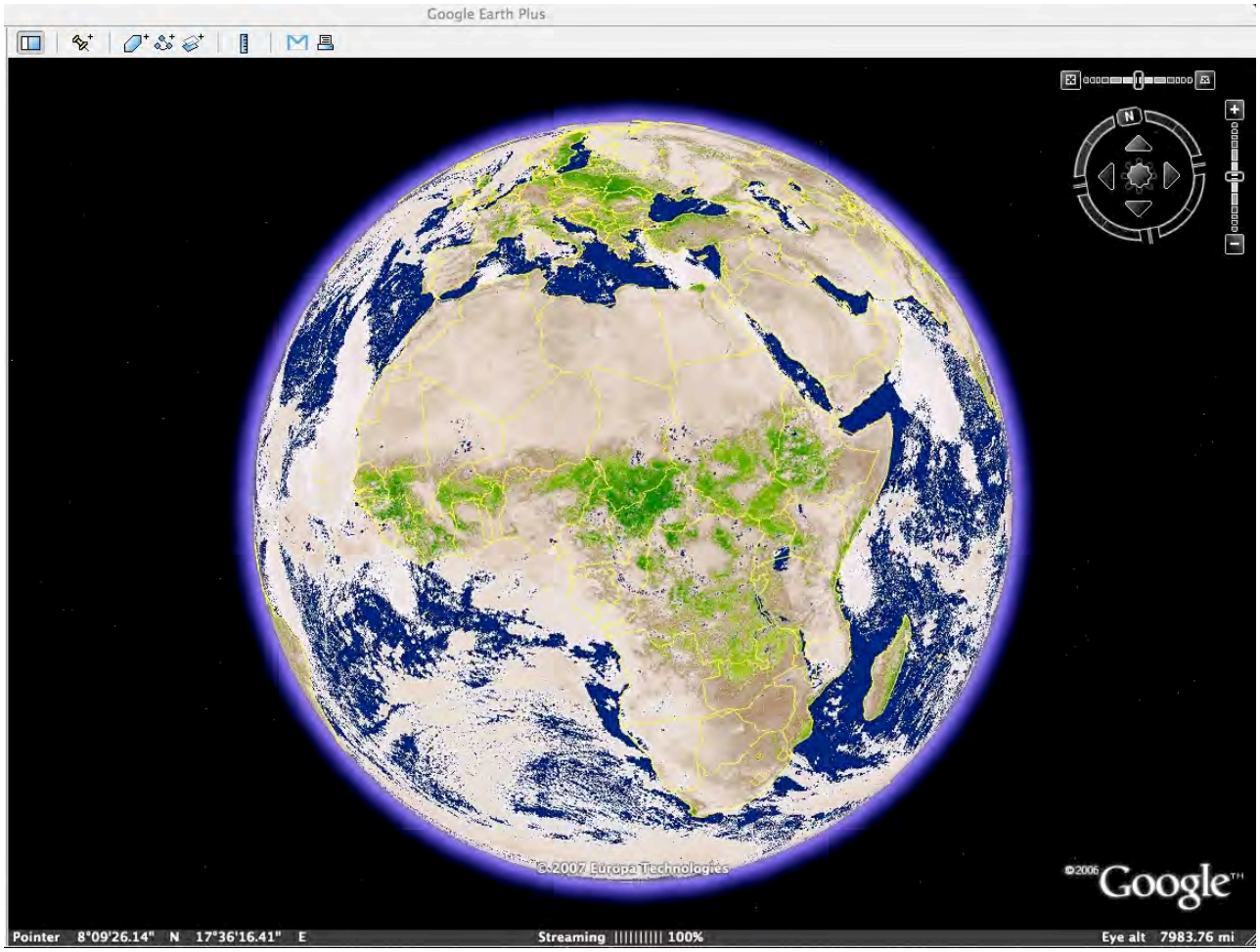
From:			To:		
Month	Day:	Year:	Month:	Day:	Year:
Jan	01	1980	Dec	31	2004

Product Download Options

Display browse images

Return list of browse images and FTP link to download each product

Get file list for FTP

Only returns list of filenames for rapid FTP download

NDVI Browse in Google Earth