
Subject: Ortho-rectified radiance image from HDF swath data
Posted by [Sean Hartling](#) on Tue, 10 Nov 2015 17:54:54 GMT
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Hello,

Does anyone have any advice on how to create an ortho-rectified ENVI data file that is geolocated from the lat/longs of HDF swath data?

Here is the code I am working with. I understand there are some outdated routines (which may be my problem) but I can't seem to figure it out. Any advice would be greatly appreciated.

```
PRO GeoTASO_hdf5_classic_VIS_projection
  compile_opt idl2
;
;e = ENVI(/HEADLESS)
; First restore all the base save files. This programs uses some ENVI routines
envi, /restore_base_save_files
; Initialize ENVI and send all errors and warnings to the file batch.txt
envi_batch_init, log_file='batch.txt'
;
file_path = 'C:\Users\Sean\Desktop\Ball\'
file = file_path + 'GeoTASO_L1B_20150216_20140813_11-25-30_067_VIS.he5'
;
; Use a graphical user interface for viewing and reading HDF5 files.
; Result = H5_BROWSER(file)
; Define file dimentions
exponent = intarr(1033, 99, 1072)
Mantissa = intarr(1033, 99, 1072)
L_lambda = fltarr(1033, 99, 1072)
lat = fltarr(1033, 99)
lon = fltarr(1033, 99)
Solar_Zenith_Angle = fltarr(1033, 99)
Sensor_refl = fltarr(1033, 99, 1072)
surface_refl = fltarr(1033, 99, 1072)
; sample, row, spectral bands
;Dimensions: [1033, 99, 1072]
;
; Open the file
file_id = H5F_OPEN(file)
; Accessing the datasets.
; This is located within '\SWATHS\').
; We could also have used H5G_OPEN to open up the group first.
;
; open, read and close radiance information
dataset_id_exponent= H5D_OPEN(file_id,
'/HDFEOS/SWATHS/Radiance/DataFields/RadianceExponent')
exponent = H5D_Read(dataset_id_exponent) ; read teh file
```

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H5D_CLOSE, dataset_id_exponent ; Close identifiers so we don't leak resources.
dataset_id_Mantissa= H5D_OPEN(file_id,
'/HDFEOS/SWATHS/Radiance/DataFields/RadianceMantissa')
Mantissa = H5D_Read(dataset_id_Mantissa)
; Open up the dataspace associated with the Mantissa image.
; dataspace_id = H5D_GET_SPACE(dataset_id_Mantissa)
H5D_CLOSE, dataset_id_Mantissa
; Calculate the radiance
Radiance = Mantissa*10.^(Exponent)
;
; open, read and close geolocation information
dataset_id_lat= H5D_OPEN(file_id, '/HDFEOS/SWATHS/Radiance/GeolocationFields/Latitude')
lat = H5D_Read(dataset_id_lat) ; read the file
H5D_CLOSE, dataset_id_lat ; Close identifiers so we don't leak resources.
dataset_id_lon= H5D_OPEN(file_id,
'/HDFEOS/SWATHS/Radiance/GeolocationFields/Longitude')
lon = H5D_Read(dataset_id_lon)
H5D_CLOSE, dataset_id_lon
;
; open, read and close Earth Sun Distance (ESD) information
; just one value, 1.5155510e+011
dataset_id_ESD= H5D_OPEN(file_id,
'/HDFEOS/SWATHS/Radiance/GeolocationFields/EarthSunDistance' )
Earth_Sun_Distance = H5D_Read(dataset_id_ESD) ; read the distance file in meters
ESD = Earth_Sun_Distance*6.68458712*10.^(-12) ; should be in astronomical units
H5D_CLOSE, dataset_id_ESD ; Close identifiers so we don't leak resources.
; print, Earth_Sun_Distance
;
; read solar zenith angle (SZA)
dataset_id_SZA= H5D_OPEN(file_id,
'/HDFEOS/SWATHS/Radiance/GeolocationFields/SolarZenithAngle' )
Solar_Zenith_Angle = H5D_Read(dataset_id_SZA)
SZA = !pi*Solar_Zenith_Angle/180 ; convert degrees to radian
H5D_CLOSE, dataset_id_SZA
;
; Convert photon radiance Lq(nm) to spectral radiance L_lambda(um)
h = 6.626*10.^(-34) ; Planck's constant in Joule per second J s
c = 2.99*10.^8 ; Speed of light in m/s
Wavelength_index = FINDGEN(1072) + 1.0
Wavelength = 0.279772*Wavelength_index + 404.68 - 3 ; wavelengths in VIS (nm)
;lambda = 550. ; Wavelength in nm
lambda = Wavelength*10.^(-9); Wavelength in meters
;Lq = 1.86*10.^13 ; extracted radiance value from GeoTASO image in Photons/(s cm^2 sr nm)
; convert the units of radiance to standard units
Lq = Radiance/(10.^(-4)*10.^(-3)) ; radiance in W/(m^2 sr um) <-- 1cm sq = 10.^(-4) sq m; nm =
10.^(-3) um
; read the solar constant for each wavelengths
ESUN=5000

```

```

; now calculate radiance
FOR k=0, n_elements(lambda)-1 DO BEGIN
  L_lambda[*,*,k]= Lq[*,*,k] * ((h*c)/lambda[k]) ; spectral radiance in W/(m^2 sr um)
  Sensor_refl[*,*,k] = !pi*L_lambda[*,*,k]*(ESD)^2/(ESUN*cos(SZA))
  ; surface_refl= Sensor_L_lambda[*,*,k]/((ts*tv)+(1-sp))
ENDFOR
;
; use IDL routines to write the radiance file into a directory
Outputfile = 'C:\Users\Sean\Desktop\Ball\Out\Radiance_6.dat'
OpenW, Lun, Outputfile, /GET_LUN
WriteU,lun,L_lambda
Free_lun, Lun
;
; extract the lon/lat of the the first pixel
lo0 = lon[0] ; longitude of the first pixel
la0 = lat[0] ; latitude of the first pixel
;print, la0, lo0
;
units = envi_translate_projection_units('Degrees')
ps = [0.00007735D, 0.00246768D] ; Set the pixel size in degree (default)
mc = [0D, 0D, lo0, la0] ;and map tie point, -90.5597, 38.7053
map_info = envi_map_info_create(/geographic, mc=mc, ps=ps, units = units)

;create the header of file
ENVI_SETUP_HEAD, fname=outputfile, $
  ns=1033, nl=99, nb=1072, $
  interleave=0, data_type=4, $
  Sensor_type=Sensor_type, $
  map_info=map_info,$
  WAVELENGTH_UNIT=1, WL=Wavelength, $
  offset=0, /write, /open
; close the batch mode
;Envi_Batch_Exit
END

```
