Department of the Interior
U.S. Geological Survey

LDOPE's read_l2g_lite Tool Documentation

July 4, 2012

read_l2g_lite tool

What is an L2G-Lite file?

The MODIS (Terra and Aqua) V005 level-2G (L2G) products were significantly modified compared to their V004 configuration to reduce their file volumes and enhance their accessibility by users. In V005, the following seven V004 L2Gs were integrated into two new products:

M*D09GHK	Surface Reflectance Daily L2G Global 500m SIN Grid V004
M*D09GQK	Surface Reflectance Daily L2G Global 250m SIN Grid V004
M*D09GST	Surface Reflectance State Daily L2G Global 1km SIN Grid V004
M*DPT1KD	Observation Pointers Daily L2G Global 1km SIN Grid Day V004
M*DPTHKM	Observation Pointers Daily L2G Global 500m SIN Grid Day V004
M*DPTQKM	Observation Pointers Daily L2G Global 250m SIN Grid Day V004
M*DMGGAD	Geolocation Angles Daily L1G Global 1km SIN Grid Day V004

* An asterisk implies Terra and Aqua versions of the MODIS product

The two new products are dubbed "L2G-Lite" and include the following:

M*D09GA Surface Reflectance Daily L2G Global 1km and 500m SIN Grid V005, contains data from the following V004 product sources:

M*09GST	(all SDSs)
M*GGAD	(all SDSs)
M*09GHK	(all SDSs except orb_cov)
M*DPTHKM	(only obscov and iobs_res SDSs)
M*DPT1KD	(no SDSs)

M*D09GQ Surface Reflectance Daily L2G Global 250m SIN Grid V005, contains data from the following V004 product sources:

M*D09GQK	(all SDSs except orb_cov)
M*DPTQKM	(only obscov)

Quality filters in V005 help select observations with the best pixel coverage through their associated minimum blue band values to produce a first layer Science Data Set (sur_refl_b0x_1).

What does the L2G Lite tool accomplish?

The read_L2G_lite tool places the requested observations from any science data parameter (e.g., sur_refl_b01, solar zenith) into different 2D SDSs. The 500 m data are uncompressed based on the num_observations in the 500 m resolution, and 1 km data are uncompressed based on the num_observations in the 1 km resolution. The first layer remains the same as the _01 SDS. The compact layers are uncompressed and output as separate 2D SDSs, each corresponding to a different layer.

What does an L2G-lite file contain?

The L2G-lite HDF file contains the first layer and a compact layer for each dataset:
- o sur_refl_b01 is the first layer
- o sur_refl_b01_c is the compact layer

The L2G-lite file contains both the 1 km and 500 m resolution data (& therefore, 2 num_observation SDSs).

What does the num_observation SDS contain?

The num_observation SDS contains the number of observations at a given grid cell.

Are there instances when a compact layer SDS will not exist?

If only a single resolution exists at a given pixel in a tile, the file is referred to as one_layer_only format, and no compact layer SDS will exist.

Do L2G-lite files contain only one observation per orbit in a given grid cell?

Given no orbital overlaps, the L2G-lite tiles (especially ones closer to the equator) will contain only one observation (one_layer_only format) per orbit at a grid cell. As the orbits begin to overlap at higher latitudes, the tiles will contain two or more observations.

Explain the structure of a compact layer

The compact layer contains additional observations from each grid cell in the order of – row, column – in a single length vector, i.e., if (0, 0) and (0, 1) have 4 and 5 observations respectively, the first observation from each will reside in the first layer SDS, and the additional 3 observations from (0, 0) will include the first 3 observations in the compact layer, and the additional 4 observations from (0, 1) will reside in the next four observations in the compact layer.

Explain the L2G Lite tool's syntax and options with an example

The first layer is the same as the _01 SDS. The compact layers are uncompressed and output as separate 2D SDSs, each corresponding to a different layer.

Tool options:

- –sds: reads in the SDS name with a subscript used to identify the 1st layer or the compact layer.
- –layer: used to input the required observation number or layer number. Layer number is 0-based; hence, layer 0 corresponds to observation 1
- example: to read the first four observations from surface reflectance bands 1, 3, and 4 on MOD09GA_test.hdf, the syntax is as follows:

  - Read_l2g_lite –sds = sur_refl_b01.sur_refl_b03.sur_refl_b04 –layer = 0,1,2,3 –of = test.hdf MOD09GA_test.hdf
  - In this case, the output will contain 3 x 4 = 12 data sets, and the invalid number of layers is ignored.

Further help:

If you have additional questions or concerns about this tool, please contact the LP DAAC:

LP DAAC User Services
U.S. Geological Survey (USGS)
Center for Earth Resources Observation and Science (EROS)
47914 252nd Street
Sioux Falls, SD 57198-0001

Phone Number: 605-594-6116
Toll Free: 866-573-3222
866-LPE-DAAC
Fax: 605-594-6963

Email: **lpdaac@usgs.gov**

Web: **https://lpdaac.usgs.gov**