

PGE04

Version History

TABLE OF CONTENTS:

PGE04 COMBINED	Pages 01-07
MOD_PR04_05	Pages 08-14
MOD_PR04DB	Pages 15-18

PGE04 COMBINED

Version History

This file shows the following:

- (a) What was changed in the PGE
- (b) Why it was changed
- (c) How the output product will be affected by the change
- (d) Date the change was made

v6.0.49 (Based on v6.0.46) 2016-04-10

- See HISTORY.txt v6.0.23 MOD04_3K
- See HISTORY.txt v6.0.26 MOD_PR04_05
- Modified Subroutines Process_land_V6.f and MOD_PR04_V2.f
- Changed Quality flags for Coastal and inland water
- This is a science test.

v6.0.48 (Based on v6.0.46) 2016-03-21

- Modified Subroutines Process_land_V6.f, for Improvement in inland water mask.
- added threshold at wavelength 2.13 to existing NDVI threshold.
- This is a science test

v6.0.47 (Based on v6.0.46) 2015-10-20

- Special Release, modified MOD_PR04_05/GetModisData_MOD04_V2.f to correct L1B radiances before they are used for the aerosol retrievals.
- Added strict in PGE04_LoaderModule.pl
- Branch location /ATMOS/branches/fork/PGE04_V6.0.47/STORE
- Patched GetModisData_MOD04_V2.f (2015-10-21)
- This is a science test

v6.0.46 (Based on v6.0.45) 2015-04-28

- Update to fix MOD_PR04DB failures in 64-bit environment
- See HISTORY.txt v6.0.22 MOD_PR04DB
- Branch location /ATMOS/branches/collection6/STORE

v6.0.45 2015-02-09

- Update to fix errors in 64 bit system. See HISTORY.txt v6.0.21 MOD_PR04DB
- Update to add global doi metadata for MOD05_L2 in night time mode. See
- See HISTORY.txt V6.0.23 MOD_PR04_05

v6.0.44 2014-10-29

- See HISTORY.txt v6.0.21 MOD04_3K

v6.0.43 2014-10-10

=====
- See HISTORY.txt v6.0.20 MOD04_3K
See HISTORY.txt v6.0.20 MOD_PR04DB
See HISTORY.txt v6.0.22 MOD_PR04_05

v6.0.42 (Terra and Aqua)

2014-09-24

=====
MOD_PRLQA:

- added the directory MOD_PRLQA to /STORE/shared_src/land_src
- changed the build_pge04_linux under /STORE/PGE04 to include the building of executable file MOD_PRLQA.exe
- changed the PGE04.ciList under /STORE/PGE04/COMB

PGE04.pl

- added the LUN for MCF File MOD_PRLM_QA.mcf
- added the LUN for Output file MODLM_QA
- included the LUN, description and value for Runtime parameters - MOD_PRLQA
- added the execution of MOD_PRLQA.exe after the other executables
- specified the ESDT to be archived

v6.0.41

2014-08-29

- =====
1. See HISTORY.txt v6.0.19 MOD04_3K
2. See HISTORY.txt v6.0.19 MOD_PR04DB

v6.0.40

2014-07-15

- =====
1. See HISTORY.txt v6.0.18 MOD_PR04DB
2. PGE04.pl:
- Added the following static files:
* gain_modist_412_20140506a.hdf
* gain_modist_470_20140506c.hdf
* xcal_modist_412_20140506a.hdf
* xcal_modist_470_20140506c.hdf
* terra_geozone_table_20140603.hdf

V6.0.39

2014-07-08

- =====
1. Special version to reprocess & archive M*D05_L2 only
-Modified PGE04.pl

V6.0.38 (Based on v6.0.36)

2014-07-07

- =====
(V6.0.37 on 6/18/14, debugging version that archives M*D021KM_RA)
1. See HISTORY.txt v6.0.21 MOD_PR04_05

V6.0.36 (Based on v6.0.35)

2013-12-26

- =====
1. PGE04.pl:
* Updated the PGEVERSION to remove the "PGE04:" prefix

V6.0.35 (Based on v6.0.34)

2013-11-20

- =====
1. See HISTORY.txt v6.0.5 MOD_PRAGG
2. See HISTORY.txt v6.0.14 MOD_PR04CR
3. See HISTORY.txt v6.0.20 MOD_PR04_05
4. See HISTORY.txt v6.0.17 MOD_PR04DB
5. See HISTORY.txt v6.0.18 MOD04_3K
6. PGE04.pl:
* Added the Re-Aggregation step to the process. More specifically when the instrument is Aqua and the MYD02QKM is present then it will Re-Aggregate the MYD021KM file and store it as intermediate product with ESDT MYD021KM_RA without archiving it
* Added the LOCALGRANULEID ESDT name change for the MYD021KM_RA intermediate

file

V6.0.34 (Based on v6.0.33)	2013-11-08
=====	
1. See HISTORY.txt v6.0.13 MOD_PR04CR	
2. See HISTORY.txt v6.0.0 SH_SRC_AT_L2	
3. See HISTORY.txt v6.0.0 SH_SRC_SCRIPTS	
4. See HISTORY.txt v6.0.13 SH_SRC_UW	
V6.0.33 (Based on v6.0.32)	2013-10-15
=====	
1. See HISTORY.txt v6.0.17 MOD04_3K	
2. See HISTORY.txt v6.0.19 MOD_PR04_05	
3. See HISTORY.txt v6.0.2 SH_MCF_PGE04	
4. PGE04.pl:	
* Changed the M*D04_3K.mcf to the new C6 M*D04_3K.006.MCF based on MOD04_L2.006.MCF	
V6.0.32 (Based on v6.0.31)	2013-09-10
=====	
1. See HISTORY.txt v6.0.12 MOD_PR04CR	
V6.0.31 (Based on v6.0.30)	2013-07-29
=====	
1. See HISTORY.txt v6.0.16 MOD_PR04DB	
V6.0.30 (Based on v6.0.29)	2013-07-17
=====	
1. See HISTORY.txt v6.0.15 MOD_PR04DB	
2. See HISTORY.txt v6.0.11 MOD_PR04CR	
3. PGE04.pl:	
* Changed the geozone_table coeff file from geozone_table_20130507.hdf to geozone_table_20130702.hdf	
V6.0.29 (Based on v6.0.28)	2013-06-11
=====	
1. See HISTORY.txt v6.0.14 MOD_PR04DB	
V6.0.28 (Based on v6.0.27)	2013-05-29
=====	
1. See HISTORY.txt v6.0.13 MOD_PR04DB	
2. PGE04.pl:	
- New coeff file:	
* xcal_modist_bxc10d.hdf which replaced xcal_modist_Allbands_reformatted_20121210.hdf	
V6.0.27 (Based on v6.0.26)	2013-05-22
=====	
1. See HISTORY.txt v6.0.18 MOD_PR04_05	
2. See HISTORY.txt v6.0.16 MOD04_3K	
3. See HISTORY.txt v6.0.10 MOD_PR04CR	
V6.0.26 (Based on v6.0.25)	2013-05-14
=====	
1. See HISTORY.txt v6.0.12 MOD_PR04DB	
2. PGE04.pl:	
- New coeff files:	
* geozone_table_20130507.hdf	
V6.0.25 (Based on v6.0.24)	2013-05-14
=====	
1. See HISTORY.txt v6.0.17 MOD_PR04_05	
2. See HISTORY.txt v6.0.15 MOD04_3K	
3. See HISTORY.txt v6.0.9 MOD_PR04CR	
V6.0.24 (Based on v6.0.23)	2013-04-22
=====	

1. See HISTORY.txt v6.0.14 MOD04_3K
2. See HISTORY.txt v6.0.16 MOD_PR04_05

V6.0.23 (Based on v6.0.22) 2013-04-08

1. See HISTORY.txt v6.0.13 MOD04_3K
2. See HISTORY.txt v6.0.15 MOD_PR04_05
3. See HISTORY.txt v6.0.1 SHR_MCF

4. PGE04.pl:

- New coeff files:

- * lookup_land_w0466.v4
- * lookup_land_w0554.v4
- * lookup_land_w0645.v4
- * lookup_land_w2113.v4
- * small_v1c1.dat.v6
- * small_v2c1.dat.v6
- * small_v3c1.dat.v6
- * small_v4c1.dat.v6
- * big_v1c1.dat.v8
- * big_v2c1.dat.v8
- * big_v3c1.dat.v8
- * big_v4c1.dat.v8
- * MODIS_GAS_COEFS_LBL_v1.csv

- New *.MCF files:

- * MOD04_L2.006.MCF, MYD04_L2.006.MCF
- * MOD05_L2.006.MCF, MYD05_L2.006.MCF

V6.0.22 (Based on v6.0.21) 2013-04-02

1. See HISTORY.txt v6.0.11 MOD_PR04DB

V6.0.21 (Based on v6.0.20) 2013-03-29

1. See HISTORY.txt v6.0.10 MOD_PR04DB
2. See HISTORY.txt v6.0.8 MOD_PR04CR
3. See HISTORY.txt v6.0.3 scripts

V6.0.20 (Based on v6.0.19) 2013-03-07

1. See HISTORY.txt v6.0.9 MOD_PR04DB

2. PGE04.pl:

- New coeff files:

- * geozone_table_20130116.hdf
- * xcal_modist_Allbands_reformatted_20121210.hdf
- * MCD12C1.A2004001.005.Global_IGBP_Land_Cover_0.10deg_20121129.hdf
- * xcal_modisa_Allbands_reformatted_20121210.hdf

V6.0.19 (Based on v6.0.18) 2013-02-28

1. See HISTORY.txt v6.0.12 MOD04_3K
2. See HISTORY.txt v6.0.14 MOD_PR04_05

V6.0.18 (Based on v6.0.17) 2013-02-21

1. See HISTORY.txt v6.0.11 MOD04_3K
2. See HISTORY.txt v6.0.13 MOD_PR04_05
3. See HISTORY.txt v6.0.6 MOD_PR04CR
4. See HISTORY.txt v6.0.8 MOD_PR04DB

V6.0.17 (Based on v6.0.16) 2012-11-28

1. See HISTORY.txt v6.0.10 MOD04_3K
2. See HISTORY.txt v6.0.12 MOD_PR04_05
3. See HISTORY.txt v6.0.5 MOD_PR04CR

V6.0.16 (Based on v6.0.15)	2012-09-07
=====	
1. See HISTORY.txt v6.0.7 MOD_PR04DB	
V6.0.15 (Based on v6.0.14)	2012-08-30
=====	
1. See HISTORY.txt v6.0.6 MOD_PR04DB	
V6.0.14 (Based on v6.0.13)	2012-08-25
=====	
1. See HISTORY.txt v6.0.5 MOD_PR04DB	
V6.0.13 (Based on v6.0.12)	2012-08-10
=====	
1. See HISTORY.txt v6.0.4 MOD_PR04DB	
2. PGE04.pl:	
* Removed the following LUN coeff files:	
- 412005 (r865_glob.bin)	
- 412009 (r470_glob_ref\$instflag.bin)	
- 412010 (r470_glob_back_ref\$instflag.bin)	
- 412011 (r650_glob_ref\$instflag.bin)	
- 412012 (r650_glob_ref2\$instflag.bin)	
- 412013 (r470_glob_ref2\$instflag.bin)	
- 412014 (r470_glob_back_ref2\$instflag.bin)	
- 412102 (r412_glob_*.bin)	
- 412104 (r470_glob_*.bin)	
- 412105 (r470_glob_*.bin)	
- 412106 (r470_glob_*.bin)	
- 412108 (r650_glob_*.bin)	
- 412109 (r650_glob_*.bin)	
- 412110 (r650_glob_*.bin)	
* Replaced the following LUN coeff files:	
- 412001 TERPRS.DAT with surface_pressure_20110406.hdf	
- 412006 terrain_flag_glob\$instflag.bin with seasonal_deserts_table_20110901.hdf	
- 412007 terrain_flag_glob_new\$instflag.bin with geozone_table_20120607.hdf	
- 412008 r412_glob_ref\$instflag.bin with dbdt_regions_20120430.hdf	
- 412301 xcal_modist_rvs_m12_m13_WITHglintNorm_tfit.hdf with xcal_modist_Allbands_reformatted_C006.hdf	
- 412100 r412_glob_'. \$v[1 2]. '\$instflag.bin with aqua_modis_surfdb_'. \$season.'_20110913.hdf"	
- 412101 r412_glob_'. \$v[1 2]. '_back\$instflag.bin with aqua_modis_surfcoeffs_'. \$season.'_20120215.hdf	
* Added the following coeff files:	
- 412304 MCD12C1.A2004001.005.Global_IGBP_Land_Cover_0.10deg_20120319.hdf	
- 412305 xcal_modisa_Allbands_reformatted_C006.hdf	
- 412306 nvalx21um4sfc.hdf	
- 412307 landcover_20120417.hdf	
- 412400 aqua_modis_brdfbase_20120229.hdf	
V6.0.12 (Based on v6.0.11)	2012-08-09
=====	
1. See HISTORY.txt v6.0.4 MOD_PR04CR	
2. See HISTORY.txt v6.0.9 MOD04_3K	
3. See HISTORY.txt v6.0.3 MOD_PR04DB	
4. See HISTORY.txt v6.0.11 MOD_PR04_05	
V6.0.11 (Based on v6.0.10)	2012-05-10
=====	
1. See HISTORY.txt v6.0.10 MOD_PR04_05	
2. See HISTORY.txt v6.0.8 MOD04_3K	
V6.0.10 (Based on v6.0.9)	2012-03-14
=====	
1. See HISTORY.txt v6.0.9 MOD_PR04_05	
V6.0.9 (Based on v6.0.8)	2012-02-22
=====	
1. See HISTORY.txt v6.0.7 MOD04_3K	

2. See HISTORY.txt v6.0.8 MOD_PR04_05

V6.0.8 (Based on v6.0.6) 2012-01-28

- 1. See HISTORY.txt v6.0.6 MOD04_3K
- 2. See HISTORY.txt v6.0.7 MOD_PR04_05
- 3. See HISTORY.txt v6.0.2 MOD_PR04DB
- 4. See HISTORY.txt v6.0.3 MOD_PR04CR
- 5. PGE04.pl:
 - * Changed the SDPTK from v5.2.9 to v5.2.16

V6.0.7 (Based on v6.0.5) 2011-08-24

- 1. See HISTORY.txt v6.0.6 MOD_PR04_05

V6.0.6 2011-07-20

- 1. See HISTORY.txt v6.0.5 MOD_PR04_05
- 2. See HISTORY.txt v6.0.5 MOD04_3K

V6.0.5 2011-04-05

- 1. See HISTORY.txt v6.0.4 MOD_PR04_05
- 2. See HISTORY.txt v6.0.4 MOD04_3K
- 3. See HISTORY.txt v6.0.1 MOD_PR04CR
- 4. See HISTORY.txt v6.0.1 MOD_PR04DB
- 5. PGE04.pl:
 - Updated the following static files:
 - * lookup_land_w0466.v2 to lookup_land_w0466.v3
 - * lookup_land_w0553.v2 to lookup_land_w0553.v3
 - * lookup_land_w0645.v2 to lookup_land_w0645.v3
 - * lookup_land_w2119.v2 to lookup_land_w2119.v3
 - Added the following static files:
 - * small_v4c1.dat.v4
 - * big_v4c1.dat.v6

V6.0.4 2010-09-30

- 1. See HISTORY.txt v6.0.3 MOD04_3K
- 2. See HISTORY.txt v6.0.3 MOD_PR04_05

V6.0.3 2010-09-23

- 1. See HISTORY.txt v6.0.2 MOD04_3K
- 2. See HISTORY.txt v6.0.2 MOD_PR04_05
- 3. PGE04.pl:
 - * Changed the static directory for the following LUNs: 407520, 407530, 407540, 407580, 407590, 407600 to PGE04/collection6
 - * Switched LUN file 407520 to point to: small_v1c1.dat.v4
 - * Switched LUN file 407530 to point to: small_v2c1.dat.v4
 - * Switched LUN file 407580 to point to: big_v1c1.dat.v6
 - * Switched LUN file 407590 to point to: big_v2c1.dat.v6

V6.0.2 2010-06-21

- 1. Fixed a bug to eliminate MOD04_3K files if empty.

V6.0.1 2010-06-06

- 1. See HISTORY.txt v6.0.1 MOD04_3K
- 2. See HISTORY.txt v6.0.1 MOD_PR04_05

V6.0.0 2010-04-26

Note: This version of PGE was based on v51.0.11

- 1. PGE04.pl:
 - * Added the MOD04_3K step to produce 3Km MOD04_L2 products.

- * Added the following LUNs: 405502 for MOD04_3K.mcf, 405503 for MOD04_3Q.mcf
405002 for MOD04_3K hdf output file, 405003 for MOD04_3Q output file
- * Set the Collection to '006'
- 2. See HISTORY.txt v6.0.0 in MOD04_3K
- 3. See HISTORY.txt v6.0.0 in SHR_MCF
- 4. See HISTORY.txt v6.0.0 in MOD_PR04CR
- 5. See HISTORY.txt v6.0.0 in MOD_PR04_05

MOD_PR04_05 Version History

This file shows the following:

- (a) What was changed in science code
- (b) What was changed in the process
- (c) Why it was changed
- (d) How the output product will be affected by the change
- (e) Date the change was made.

V6.0.26 (Based on 6.0.23) 04/10/2016

=====

- Modified Subroutines Process_land_V6.f and MOD_PR04_V2.f added quality flag for coastal and inland water. This is a science test.

V6.0.25 (Based on 6.0.23) 03/21/2016

=====

- Modified Subroutines Process_land_V6.f, for Improvement in inland water mask. added threshold at wavelength 2.13 to existing NDVI threshold
- This is a science test

V6.0.24 (Based on 6.0.23) 10/20/2015

=====

- Updated code GetModisData_MOD04_V2.f for testing only. It applies a correction to L1B radiances before they are used for the aerosol retrievals.

V6.0.23 02/06/2015

=====

- Updated code to add global DOI metadata for MOD05_L2 in night time mode modified MOD05_Process_Night.f and MOD_PR04_V2.f file

V6.0.22 10/10/2014

=====

- Updated value of DOI metadata for Near Real Time processing.

V6.0.21 (Based on v6.0.20) 07/07/2014

=====

- 1. Use of original MYD021KM radiances (instead of MYD021KM_RA)
 - Modified cirrus_fileoc.f, MetaData_MOD05_V2.f, MOD05_CORR_fileoc_V2.f mod05_fileoc_V2.f and MOD_PR04_PR05_V2.f

V6.0.20 (Based on v6.0.19) 11/20/2013

=====

- 1) Modified the code so when it detects the argument 1 in the command line it will seek for the Re-Aggregated product MYD021KM_RA with LUN 430001 and use that instead of MYD021KM.

V6.0.19 (Based on v6.0.18) 10/15/2013

=====

- 1) Added the doi PSAs for Night granules on M*D05_L2 products.

V6.0.18 (Based on v6.0.17) 05/22/2013

=====

- 1) SDS for Land sea flag was changed to include Coastal area separately. Now Land sea flag has 3 categories
 - Ocean =0
 - Land and intermittent water and coastal pixels less than 50% = 1
 - Coastal pixels in 10 by 10 box > 50% =2
- 2) Degraded the quality of retrievals to zero if there are more than 50% coastal pixels in 10* 10 box (LAND ONLY)

V6.0.17 (Based on v6.0.16) 05/14/2013

=====

- 1) Cleaned some subroutines of redundant variables which were not used.
- 2) Quality_Assurance_Land 3 Byte information was added/changed.

(1st bit snow information (0 or 1) : 2nd and 3rd bit information is about ancillary data(GDAS etc).
Snow Flag based on Aerosol snow detection(Rong-rong) and MOD35 (snow/ice flag)
If set to 1 it is indication of at least 10% of snow pixels in 10 * 10 KM box.
Aerosol snow mask is quite strict and seems to work wellbut may fail sometimes.It is just diagnostics.

V6.0.16 (Based on v6.0.15) 04/22/2013

=====

1) There is a switch in NDVI (function of 1.24 and 2.1 MVI dependence). There was an error in Function of NDVI(called MVI in subroutine Process_land.v6.f)

V6.0.15 (Based on v6.0.14) 04/08/2013

- =====
- 1) Change of GAS correction scheme (Ocean and Land both)
Line-By-Line-Radiative Transfer Model version 12.2 (LBLRTM_v12.2) is used to calculate the down welling transmittance (uplooking geometry) for H2O and O3 using 52 ECMWF GFS profiles for the two gases respectively.
Transmittance was calculated for Terra and Aqua channels separately.
Transmittance was integrated over the Relative Spectral Response (RSR) function of each detector in a given channel; separately for Terra and Aqua Channels.
The mean transmittance from Terra and Aqua was used calculate the gas corrections coefficients for H2O and O3 respectively.
The US76 Standard Atmosphere in the LBLRTM_v12.2 is used to calculate the climatological optical depths for H2O, O3 and Dry Gas. a) We replaced hard coded numbers for above Gas correction with read in file.
- 2) Spatial interpolation on wind speed (Ocean algorithm only)
This change calculates the wind speed at each 10 km ocean retrieval box by spatially interpolating the wind speeds of the surrounding grid cells. This change eliminates the problem of having discontinuities in AOD at the edge of a 1x1 lat/lon grid cell due to a sharp change in wind speed, and therefore, wind speed correction.
- 3) New Lookup table (Ocean and Land both)
a) Band "characteristic" wavelengths recalculated, resulting in slight differences. Old = filter function weighted wavelengths (= sensor centroid); New = solar irradiance, filter function weighted wavelengths (= TOA centroid).
MODIS Band #, units of nm: B3: 466-->466; B4: 553-->554; B1: 645-->645; B2: 855-->856; B3: 1243-->1241; B6: 1632-->1628; B7: 2119-->2113
b) Corresponding slight changes in assumed sea-level Rayleigh Optical Depth (ROD) Old = ROD calculated based on single characteristic wavelength; New = ROD integrated over filter function Matters only for selected MODIS bands: B3: 0.1926 --> 0.1914; B4: 0.0951 --> 0.0943; B1: 0.0509 --> 0.0508.
c) All other assumptions same: (See note for v6.0.4)
- 4) Ozone will be read from GDAS file. NCEP TOAST file will not be used.
Subroutines changed are:
MOD_PR04_PR05_V2.f mod04_file_open_V2.f, mod04.inc, MOD_PR04_V2.f
- 5) Modified modis_grib_driver_1.c. It is now fetched from the local directory.
- 6) Changed MOD_PR04_05.mk to include the new modis_grib_driver_1.c location.

V6.0.14 (Based on v6.0.13) 02/28/2013

- =====
- 1) Changed the dimension of some two dimensional arrays to single dimension arrays for L3 joint histogram Processing. L3 expects single dimension array.
Following 3 SDS's were changed to single dimension using "Average" value.
a) Angstrom_Exponent_1_Ocean
b) Angstrom_Exponent_2_Ocean
c) Optical_Depth_Ratio_Small_Ocean_0.55micron
New Added SDS

- A)Effective_Optical_Depth_0p55um_Ocean
- 2) Quality_Assurance_Land
Quality_Assurance_Land has been changed from 5 bytes to 6 Bytes to accomodate Joint Dark target and Deep blue Quality flag for L3 processing
- 3) Minimum Solar zenith angle for whole Granule is set to 84 deg which was 75.0 degrees.
Subroutines changed are:
Fillvalue_MOD04_V2.f,mod04.inc,mod04_out_V2.f,MOD_PR04_PR05_V2.f,
MOD_PR04_V2.f,Process_ocean_V2.f,mod04_get_spec_info.f

V6.0.13 (Based on v6.0.12) 02/21/2013

- 1) Changed MOD_PR04_05.mk to make it compile with gfortran and SDPTK.v5.2.17 also deactivated the following source files from build since they were not necessary and they were causing problems in the run process:
read_modisdep_V2.f, modis_io_gen_temp_openf.f, MOD_PR06CD_V2.f, Process_mod06cd_V2.f, cirrus_fileoc.f, GetModisDat_cirrus_V2.f
- 2) Eliminated double declarations from source files: Process_ocean_V2.f, MOD_PR04_V2.f, Process_land_V6.f
- 3) Replaced the PAUSE statement with the STOP statement on Process_ocean_V2.f source file
- 4) Changed the format statement on: Process_land_V6.f source file.
- 5) Reassigned the DataSize variable on GetModisData_MOD04_V2.f since the compiler would loose the value
- 6) Changed the GetModisData_MOD05_V2.f when the BYTE_SET function was called since the gfortran did not like when the argument of that function was a return from another function.
- 7) Added the BUF_SST and BUF_MPH10 write of arrays since the SDS of the output would be empty on mod04_out_V2.f.

V6.0.12 (Based on v6.0.11) 11/28/2012

- 1) Replaced Land sea flag which was passed on from MOD35 by Landseafalg directly from MOD03.
- 2) Made minor additions to attributes
Subroutines changed are GetModisData_MOD04_V2.f,MOD_PR04_V2.f,
mod04_get_spec_info.f

v6.0.11 (Based on v6.0.10) 08/09/2012

- 1) Added the PSA values: identifier_product_doi, identifier_product_doi_authority
- 2) Added the global metadata: identifier_product_doi, identifier_product_doi_authority

v6.0.10 (Based on v6.0.9) 05/10/2012

- 1) Modifications to gas correction scheme.
- 2) Aerosol Cloud mask changes to Land & Ocean Land... spatial standard deviation of .47 channel used to call back some pixels identified as cloudy by the .47 stdev * reflectance test. Ocean... 1.38 threshold to call 1.38/1.24 test is lowered from .01 to .005. Using C006 MOD035 instead of C005 MOD035 (revised bit 18 test).
- 3)Threshold to base quality of ocean retrievals based on the least squares fitting error has been raised from 3.0 to 3.7 v6.0.10

v6.0.9 (Based on v6.0.8) 03/14/2012

- 1. A bug fix has been made to Subroutine Process_land_V6.f to change the order of Quality flag for cirrus and number of pixels.

v6.0.8 (Based on v6.0.7) 02/22/2012

- 1.A bug fix has been made to Subroutine MOD_PR04_V2.f to account for correct interpolation between the Windspeeds for Ocean Look up tables

v6.0.7 (Based on v6.0.5) 01/28/2012

- =====
1. Changed the MOD_PR04_05.mk to compile with SDPTK.v5.2.16:
 - * Added the necessary libraries -lsz -ldl
 - * Modified the libhdf5.so to libhdf5.a
 2. A bug fix has been made to Subroutine MOD_PR04_V2.f.
This fix will allow negative optical depths into SDS named Optical-Depth_Land_And_Ocean and also populate the SDS Land_Ocean_Quality_flag with these extra data points.
 3. Updated and corrected some of the attributes of SDS's.
Short name change was made to
 "Cloud_Condensation_Nuclei_Ocean" to "PSML003_Ocean"
 "Cloud_Distance_Land_Ocean" to "Cloud_Pixel_Distance_Land_Ocean"
 "Average_Cloud_Distance_Land_Ocean" to "Average_Cloud_Pixel_Distance_Land_Ocean"

v6.0.6 (Based on v6.0.4)

08/24/2011

- =====
1. Changed a coefficient to multiply input Band #3 radiance by 0.98 in file MOD_PR04_V2.f

v6.0.5

07/20/2011

- =====
1. Subroutine Changed.....
 Fillvalue_MOD04_V2.f
 GetModisData_MOD04_V2.f
 MOD_PR04_V2.f
 Process_land_V6.f
 Process_ocean_V2.f
 mod04.inc
 mod04_land.inc
 mod04_out_V2.f
 Land
 1. Added 3 Ocean color channels for NPP research group as an experimental data. 412(Modis channel8),443(Modis channel 9) and 3.75 (Modis channel 15). Changed SDS's are "Mean_Reflectance_Land" and "STD_Reflectance_Land". These SDS's will have data for 10 wavelengths instead of 7.
 2. SDS "Number_Pixels_Used_Land" has values for 10 wavelengths instead of 2 .
 3. "Optical_Depth_Land_And_Ocean" now requires QAC = 3.
 4. Small bug fixes (Pixel dimension, Loop changeÉ NPP Science team found the problem)
 5. Took out some subroutines which were not used (computing Vandelei reflectance parameters)
- Ocean:
1. Added 3 Ocean color channels for NPP research group as an experimental data. 412(Modis channel8),443(Modis channel 9) and 3.75 (Modis channel 15). Changed SDS's are "Mean_Reflectance_Ocean" and "STD_Reflectance_Ocean". These SDS's will have data for 10 wavelengths instead of 7.
 2. SDS "Number_Pixels_Used_Ocean" has values for 10 wavelengths instead of 1 .
 3. Quality flag for "Optical_Depth_Land_And_Ocean" for Ocean has been set to 1, 2 & 3.
 4. Quality flag is set to 3 if Aerosol content is enough to retrieve AOD, but not enough signal to retrieve size.

v6.0.4

04/05/2011

- =====
1. Subroutine Changed.....
 mod04_file_close_V2.f
 mod04_file_open_V2.f
 mod04_land.inc
 mod04.inc
 MOD_PR04_V2.f
 Process_land_V6.f
 Process_ocean_V2.f
 2. SDS's Added
 SDS_Topo_Altitude
 SDS_NCEP_Wspeed

SDS_Sea_Sunlint_Flag

Land:

Changed Look up table A) introduced depolarization correction (rho-factor) for Rayleigh, B) increased number of zenith quadrature angles

LAND....

lookup_land_w0466.v3

lookup_land_w0553.v3

lookup_land_w0645.v3

lookup_land_w2119.v3

Small format changes for reading the look up table(Process_land_V6.f)

Ocean:

1. Added a change to turn off the Co2 correction for Ocean. Ocean Lookup table already has Co2 accounted for channels 1.24 ,1.64 and 2.119

2. Added 14 meter/sec Wind Speed to Ocean Look up table.

small_v4c1.dat.v4

big_v4c1.dat.v6

3. Changed Quality flag to 3 when reflectance at 0.865 um is less than threshold (Aerosol content is too low) and optical depth is set to zero

v6.0.3

09/30/2010

Interpolation Routines added.

Ocean:

We have added interpolation routines to interpolate for windspeed.

Windspeed is calculated from NCEP Windspeeds.

We use 2, 6 and 10 Meter/sec Lookup tables and interpolate fo

v6.0.2

09/23/2010

Look up tables in ocean algorithms have been changed...

Ocean:

Two Look tables have been updated and changes made to Ocean algorithm software to incorporate two extra wind speeds(2m and 10m/second).

We have changed Ocean algorithm to incorporate changes to Sediment mask because of bad channel 1.69 in collection 6.

Updated OCEAN TABLES

small_v1c1.dat.v4

small_v2c1.dat.v4

small_v3c1.dat.v4

big_v1c1.dat.v6

big_v2c1.dat.v6

big_v3c1.dat.v6

mod04.inc has been changed to incorporate change in lookup tables.

Land:

Subroutines that were stalling the runs of M[*]D04_L2/M[*]D04_L2 have been removed.

v6.0.1

05/24/2010

Look up tables in Land and ocean algorithms have been changed...

#Differences between C006 LUT and C005

Land:

A) Corrected for reciprocity. The C5 LUT had a problem with "Layers VS Levels". Atmospheric "Transimssions" had been calculated for the bottom "layer" rather than the bottom "level" (sea level) Now Tup and Tdown are consistent

B) Corrected for Rayleigh Optical Depth (ROD). The C5 LUT assumed values for ROD that were consistent with those assumed over ocean (Zia Ahmad) but not exactly consistent with weighted center wavelengths (see below).

C) Two extra solar zenith angles have been added: 78° and 84°.

Ocean:

- A) Corrected for Rayleigh Optical Depth (ROD). The C5 LUT assumed ROD values that were computed (offline) using outdated formula. For C6 LUT, the assumed ROD are consistent with Bodhaine et al., 1999, and that computed by 6S (Vermote) MODIS filter function. RODs changed by up to 0.003 depending on band.
- B) Two extra solar zenith angles have been added: 78° and 84°.

Table of RODs

Wavelength	C5	C6
0.466	0.1954	0.1926
0.553	0.0963	0.0951
0.645	0.0520	0.0509
0.855	0.0165	0.0163
2.119	0.0004	0.0004

Tables have been changed by version numbers.

OCEAN....

big_v2c1.dat.v6

small_v2c1.dat.v4

LAND....

lookup_land_w0466.v2

lookup_land_w0553.v2

lookup_land_w0645.v2

lookup_land_w0855.v2

lookup_land_w2119.v2

aerosol_land_map.v3

mod04_land.inc and mod04.inc has been changed to incorporate change in lookup tables.

v6.0.0

04/2010

=====

1) Over land:

- A) Modify maps for assigning aerosol models over land:

Due to a lack of sensitivity to aerosol absorption, the over-land retrieval must assume aerosol type.

For C005, aerosol type was assigned, based on a global map of AERONET aerosol climatology. For C006, these map boundaries has been modified based on AERONET climatology collected since 2005.

- B) Modify surface reflectance parameterization:

The aerosol retrieval must make assumptions as to surface reflectance boundary conditions.

In C005, surface reflectance parameterization was based on small set of collocated MODIS and AERONET, and shown to have dependence on surface type, vegetation condition (NDVI), and scattering angle.

For C006, the global parameterization will be modified to correct systematic biases in particular locations.

- C) Deleted SDSs:

Optical_Depth_Small_Land,

Mean_Reflectance_Land_All,

Standard_Deviation_Reflectance_Land_All,

Path_Radiance_Land,

Error_Path_Radiance_Land,

Critical_Reflectance_Land,

Error_Critical_Reflectance_Land,

QualityWeight_Path_Radiance_Land,

QualityWeight_Critical_Reflectance_Land

Quality_Assurance_Crit_Ref_Land

- D) Renamed SDSs:

ÒCloud_Fraction_LandÓ becomes ÒAerosol_Cloud_Fraction_LandÓ

2) Over ocean:

There are no significant changes to the basic aerosol retrieval algorithm, although QA "Confidence" flags have been modified

- A) Renamed SDSs:

Cloud_Fraction_Ocean becomes Aerosol_Cloud_Fraction_Ocean

3) Applies to both land and ocean:

A) Expansion of retrieval over higher solar zenith angles.

Based on sensitivity studies of radiative transfer, prior to MODIS launch on Terra (pre-1999), aerosol retrieval was limited to cases where solar zenith angle (solzen) was less than 72°. Relaxation of the threshold to solzen < 84°, greatly increases MODIS coverage in higher latitude/lower sun conditions.
Look up table has been modified for both Land and ocean

B) Examine aerosols in the proximity of clouds

Cloud mask and distance to the nearest cloud is calculated and presented for every 500 m cloud-free pixel that allows better control of cloud contamination in the basic aerosol products.

This information is also summarized statistically at the 10 km product resolution, and will be available for both land and ocean.

C) Introduce an integer QA flag Simple flag (0-3) that represents QA Confidence flags.

d) A flag to discriminate Land and ocean based on MOD35.

D) New SDS's:

These SDS's will be added to L2:

Land_Sea_Flag (10 km resolution)

Cloud_Distance_Land_Ocean (500 m resolution),

Aerosol_Cldmsk_Land_Ocean (500 m resolution)

Average_Cloud_Distance_Land_Ocean (10 km resolution)

Land_Ocean_Quality_Flag (10 km resolution)

MOD_PR04DB Version History

This file shows the following:

- (a) What was changed in the process
- (b) Why it was changed
- (c) How the output product will be affected by the change
- (d) Date the change was made

V6.0.22	2015-04-28
=====	
- Updated find_v_aqua.f and find_v_terra.f to fix errors in 64 bit system	
- This is a more robust fix compared to V6.0.21	
V6.0.21	2015-02-03
=====	
- Updated find_v_aqua.f and find_v_terra.f to fix errors in 64 bit system	
V6.0.20	2014-10-10
=====	
- Updated value of DOI metadata for Near Real Time processing.	
V6.0.19	2014-08-29
=====	
Updated surface characterization over N.Africa for Terra.	
V6.0.18	2014-07-15
=====	
- Enabled Terra branch of the processing code.	
- Refactored to provide separate Terra and Aqua processing paths after data and table initialization.	
- Refactored Terra correction code into it's own module and removed existing code in DeepBlue.f90.	
- Updated RVS and polarization correction tables to customized versions based on txc13i (the latest from OBPG).	
- Terra-specific zone table added, terra_geozone_table_20140603.hdf.	
- Removed old input tables that are no longer used.	
- Added uncertainty estimate coefficients for Terra.	
V6.0.17	2013-11-20
=====	
1) Modified the code so when it detects the argument 1 in the command line it will seek for the Re-Aggregated product MYD021KM_RA with LUN 430001 and use that instead of MYD021KM.	
V6.0.16	2013-07-29
=====	
- Fixed aggressive dust detection at high elevations.	
- Updated logic for aerosol model selection.	
V6.0.15	2013-07-17
=====	
- Updated valid_range attribute on AOD_550_Dark_Target_Deep_Blue_Combined.	
- Updated surface characterization in tropical Sahel.	
- Updated pressure corrections over some N.Africa locations	
- Better dust detection outside of desert regions.	
V6.0.14	2013-06-11
=====	
- Improved snow and cloud filtering at high latitudes.	
- Improved AE performance when reflectances are saturating AOT lookup table.	
V6.0.13	2013-05-29
=====	

- Updated to latest Ocean Color RVS and polarization correction tables (txc10d) for Terra.

V6.0.12 2013-05-14

- Updated surface characterization in winter in tropical Sahel.

V6.0.11 2013-04-02

- Changed the code so it does not process for Solar Zenith Angles greater to what it is set on the Dark Target step.

V6.0.10 2013-03-29

- Removed check on granule-level check on minimum SZA. Due to combined DT/DB product, we must process all granules.
- Changed fill value of Deep Blue integer QA SDS to 0 rather than -9999 to match bit versions.
- Removed usage of maxiidx and maxjidx in modis.f90 when dealing with DT/DB data sets otherwise, some data would be skipped.
- Removed retrieval conditions flag from output.

V6.0.9 2013-03-07

- Cleaned out old input tables.
- Fixed issue with cloud filter causing over screening of aerosols in East China.
- Better detection of volcanic plumes.
- Added filter to better detect snow.
- Better surface characterization over Arabian peninsula and tropical Sahel.
- Aerosol models updated over Sahel, India, eastern China.
- Correct some errors related to the dateline.
- Added DB/DT combined usefulness and QA flag to Quality_Assurance_Land SDS, byte 6
- Fixed issue where D* would be too large.
- Added checks for invalid measurements on 1.38um and 2.1um bands.
- Fixed many issues where uninitialized variables were being used, needed for gfortran conversion.
- Fixed consistency issue when a cloud was detected in one band but not the others.
- More consistent calculation of AE.
- Better characterization of urban areas in US.

V6.0.8 2013-02-21

- Changed the MOD_PR04DB.mk so it compiles and runs with gfortran and SDPTK.v5.2.17.
- Renamed hdf.f90 to hdf2.f90 since it would have conflict with the hdf.f90 from the HDF library.
- Broke some lines to another line on DeepBlue.f90, modis_surface.f95, MOD04_MetaDataUpdate.f90, modis.f90 since the compilation would not work.
- Made changes on find_v_aqua.f as indicated by the developer.
- Eliminated multiple variable declarations on: find_v_aqua.f, find_v_terra.f, modis.f90
- Changed the following coeff files to little endian:
 - * TABLE.MODIS.le
 - * surface_pressure_20110406.hdf
 - * nvalx_412table.bin.le
 - * nvalx_470table.bin.le
 - * nvalx_650table.bin.le

V6.0.7 2012-09-07

- Added checks in DeepBlue.f90, modis.f90, and set_limits() in modis_surface.f90 to check for fill-valued latitude and longitude data before using.
- Merged in some new surface adjustments over Libya.

V6.0.6

2012-08-30

- Fixed issue when reading the surface fit coefficients input table where incorrect starting indices were passed to sfrdata() in readLER5() when granule contained the dateline.
- Fixed issue when reading the surface fit coefficients input table where incorrectly sized array was passed to sfrdata() in readLER5() and readLER2() when granule contained the dateline.
- Fixed issue where some QA flags around clouds were not reset to QA=1 at the edge of the granules.
- Fixed issue in aero_412_abs() and aero_470_abs() in find_v_aqua.f and all aero_*(*) in find_v_vegset.f where indices could go out of the bounds of the aerosol LUT when interpolating over very highly reflective surfaces close to the end of the table.

V6.0.5

2012-08-25

- Bug fixes regarding some failures on the operations.
- Fix in resetting the QA flag when close to clouds.

V6.0.4

2012-08-10

- The Deep Blue algorithm has been thoroughly updated for Collection 6.
- [1] Deep Blue now retrieves aerosol properties over dark, vegetated surfaces in addition to bright land.
 - [2] Major upgrades of surface characterization through new surface tables and AERONET-derived BRDF models.
 - [3] Improved aerosol microphysical models.
 - [4] Improved cloud screening.
 - [5] New integer QA data set to simplify access by end users.
 - [6] New "Best Estimate" data set already filtered by QA to ease access by end users.
 - [7] New per cell estimated uncertainty data set for aerosol optical depth at 550nm.
 - [8] New data set combining Dark Target and Deep Blue aerosol optical depth data at 550nm.

Structure of M?D04_L2 output product changed significantly. All science data changed significantly as well.

V6.0.3

2012-08-09

- Changed the NUM_PSA in MOD04_MetaDataUpdate.f90 to 15 since the doi would be written in a wrong PSA index.
- Added the PSA values: identifier_product_doi, identifier_product_doi_authority
- Added the global metadata: identifier_product_doi, identifier_product_doi_authority

V6.0.2

2012-01-28

1. Changed the MOD_PR04DB.mk to compile with SDPTK.v5.2.16:
 - * Added the necessary libraries -lsz -ldl
 - * Modified the libhdf5.so to libhdf5.a

V6.0.1

2011-04-05

Two New SDS's are created. They are combined Dark Target & Deep Blue 'Dark_Target_Deep_Blue_Combined_Aerosol_Optical_Depth'..... Optical Depth from Deep Blue & Dark TAget at 0.55 um)
'Dark_Target_Deep_Blue_Combined_Aerosol_Optical_Depth_Case' Gives the Quality of the combined product

Dark_Target_Deep_Blue_Combined_Aerosol_Optical_Depth is based on the Quality of Deep target & Deep Blue optical depth retrievals at 0.55 um.

If Quality flag for Both Dark Target & Deep blue is 3 the optical depth has

average value derived from both and QA=3
If Quality flag for Deep blue is greater than dark target and Deep blue
quality is least 2 Deep blue optical depth is used QA=2
If Quality flag for Dark Target is greater than Deep blue and dark target
quality is least 3 Dark Target optical depth is used QA=1
If Quality flag for Dark Target is less than 3 than Deep blue is less than
2 Fill value is used QA=0

QA values are put in SDS 'Dark_Target_Deep_Blue_Combined_Aerosol_Optical_Depth_Case'

V6.0.0

2010-04-27

=====
1. Reusing v51.0.11 in collection 6.