



**Centre de Gestion et  
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Number of pages : 22



**CALXTRACT project :**  
**extraction of multi-sensors data in coincidence  
with CALIPSO**



**Caltrack Product Guide**

	<b>Name</b>	<b>Date</b>	<b>Signature</b>
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<b>Approved by</b>			
<b>For Application</b>			

MODIFICATIONS
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<b><i>Edition</i></b>	<b><i>Revision</i></b>	<b><i>Date</i></b>	<b><i>Revision Purpose</i></b>
1	0	15/05/07	Creation
1	1	31/05/07	Update to reflect changes in the calxtract software v0.3.3 : - correction of the "Echo_hgt" variable - variable "Echo_hgt_Detection_Frequency"  The unit of the Optical Thickness variables has been set as none. In previous revision, it was set as "km"
1	2	18/06/07	Add an "extraction method" paragraph that describes how the data have the variables have been extracted, and the eventual processing applied
1	3	30/07/07	Update to reflect changes in calxtract v0.4.0 - allows to filter in a product (in addition to CALIOP cloud) and ignore the other ones. - Added variables
1	4	14/01/08	Update to reflect changes in calxtract v0.5.0 - gives the possibility of having a CALIOP L1 main subtrack.
1	6	31/08/09	Update to reflect changes in calxtract v0.6.5

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## **1. ABBREVIATIONS AND GLOSSARY**

<b>CALIOP</b>	Cloud Aerosol Lidar with Orthogonal Polarization
<b>CALIPSO</b>	Cloud Aerosol Lidar Infrared Pathfinder Satellite Observations
<b>CALTRACK</b>	The name of the products that constructs the calxtract application
<b>CALXTRACT</b>	The application that produces the caltrack files
<b>CVS</b>	Concurrent Versions System
<b>DPC</b>	Data Product Catalog
<b>HDF</b>	Hierarchical Data Format
<b>IIR</b>	Imaging Infrared Radiometer
<b>OMI</b>	Ozone Monitoring Instrument
<b>PCF</b>	Process Control File. It is an ascii file that contains all the parameters required for a run
<b>WFC</b>	Wide Field Camera

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## **2. INTRODUCTION**

This document describes the content and the structure of the caltrack files. They are produced by the calxtract software, which does the extraction of parameters issued of different sensors (CALIOP, IIR, MODIS, PARASOL, CERES, ECMWF analysis, CLOUDSAT, and more in the future) under the CALIPSO's LIDAR or the CALIPSO Level 1 subtrack. It is possible to filter a product and ignore other products. Caliop clouds (or Caliop L1) will always be present as main subtrack.

### **3. CALTRACK FILES DESCRIPTION**

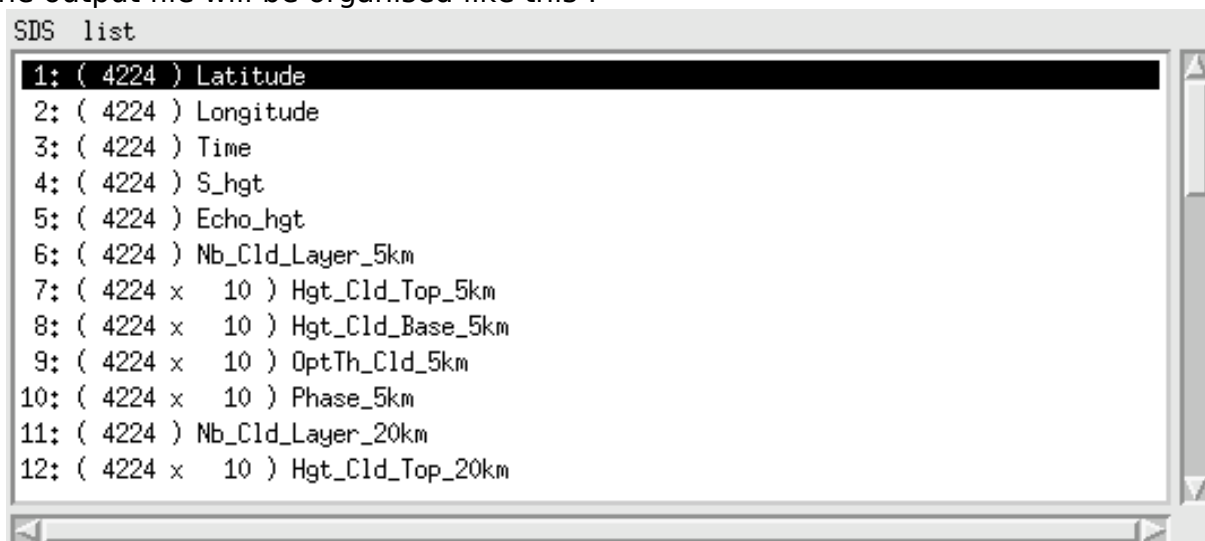
#### **3.1. FILE FORMAT**

The output products will be in a HDF 4 format, where each sds will contain the values of an physical variable along the CALIPSO subtrack.

The output files will have a name that has been set in the configuration file :

For more details on the HDF format (link to the official page, reading tools and more), you may refer to the ICARE hdf description page : [http://www.icare.univ-lille1.fr/howto\\_hdf/](http://www.icare.univ-lille1.fr/howto_hdf/)

The output file will be organised like this :



```
SDS list
1: ( 4224 ) Latitude
2: ( 4224 ) Longitude
3: ( 4224 ) Time
4: ( 4224 ) S_hgt
5: ( 4224 ) Echo_hgt
6: ( 4224 ) Nb_Cld_Layer_5km
7: ( 4224 x 10 ) Hgt_Cld_Top_5km
8: ( 4224 x 10 ) Hgt_Cld_Base_5km
9: ( 4224 x 10 ) OptTh_Cld_5km
10: ( 4224 x 10 ) Phase_5km
11: ( 4224 ) Nb_Cld_Layer_20km
12: ( 4224 x 10 ) Hgt_Cld_Top_20km
```


### **3.2. VARIABLES**

#### **3.2.1. Product summary**

<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
<b>Common to all caltrack unit products</b>			
Latitude	Latitude	°north [-90,90]	float32
Longitude	Longitude	°east [-180,180]	float32
Time	Time, using the TAI 93 convention	seconds	float64
<b>CALIOP L1</b>			
CAL_LID_L1_Total_Attenuated_Backscatter_532	The Total Attenuated Backscatter signal at 532nm	km-1.sr-1	float32[583]
CAL_LID_L1_Perpendicular_Attenuated_Backscatter_532	The perpendicular component of the attenuated backscatter at 532nm	km-1.sr-1	float32[583]
CAL_LID_L1_Attenuated_Backscatter_1064	The Attenuated Backscatter signal at 1064nm	km-1.sr-1	float32[583]
CAL_LID_L1_Molecular_Number_Density	The Molecular Number Density	molecules.m <sup>-3</sup>	float32[33]
CAL_LID_L1_Temperature	The Temperature for each meteo level	°C	float32[33]
CAL_LID_L1_Pressure	The Pressure for each meteo level	mb	float32[33]
CAL_LID_L1_Ozone_Number_Density	The Ozone Number Density	molecules.m <sup>-3</sup>	float32[33]
CAL_LID_L1_Relative_Humidity	The relative humidity for each meteo level	%	float32[33]
CAL_LID_L1_Land_Water_Mask	The Land Water Mask	unitless	int8
CAL_LID_L1_Tropopause_Height	The height of the tropopause	Km	float32
CAL_LID_L1_Tropopause_Temperature	The temperature of the tropopause	°C	float32
<b>PARASOL L1</b>			
P3L1_Input_Index	Index [i_row,icol] of the coincident Pixel in the input product. See in the file attribute to know which is this file	unitless	int16[2]
P3L1_Number_Available_Viewing_Direction	Number of available viewing directions Ndir in the following 1<=id<=Ndir	unitless	uint8

<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
P3L1_Solar_Azimuth_Angle	Solar Azimuth Angle	°	uint8
P3L1_Pixel_Quality_Index	Pixel Data Quality Index for each direction. Also known as DQX	unitless	uint16
P3L1_Solar_Zenith_Angle	Solar Zenith Angle for each direction	°	uint16
P3L1_View_Zenith_Angle_670P2	View Zenith Angle for filter 670P2, for each direction	°	uint16[16]
P3L1_Relative_Azimuth_Angle_670P2	Relative Azimuth Angle for filter 670P2, for each direction	°	uint16[16]
P3L1_Delta_Thetav_Cosphi	Relative variation of viewing geometry between the filters, for each direction. See the appendix C of the PARASOL Level-1 Product Data Format and User Manual for details	°	int8[16]
P3L1_Delta_Thetav_Sinphi	Relative variation of viewing geometry between the filters, for each direction. See the appendix C of the PARASOL Level-1 Product Data Format and User Manual for details	°	int8[16]
P3L1_Normalized_Radiance_443NP	Normalized Radiance for Channel 443NP, for each direction	unitless	int16[16]
P3L1_Normalized_Radiance_490P	Normalized Radiance for Channel 490P, for each direction	unitless	int16[16]
P3L1_Normalized_Radiance_1020NP	Normalized Radiance for Channel 1020NP, for each direction	unitless	int16[16]
P3L1_Normalized_Radiance_565NP	Normalized Radiance for Channel 565NP, for each direction	unitless	int16[16]
P3L1_Normalized_Radiance_670P	Normalized Radiance for Channel 670P, for each direction	unitless	int16[16]
P3L1_Normalized_Radiance_763NP	Normalized Radiance for Channel 763NP, for each direction	unitless	int16[16]
P3L1_Normalized_Radiance_765NP	Normalized Radiance for Channel 765NP, for each direction	unitless	int16[16]
P3L1_Normalized_Radiance_865P	Normalized Radiance for Channel 865P, for each direction	unitless	int16[16]
P3L1_Normalized_Radiance_910NP	Normalized Radiance for Channel 910NP, for each direction	unitless	int16[16]
P3L1_Q_Stokes_490P	Second component of Stokes vector (Q) for Channel 490P, for each direction	unitless	int16[16]

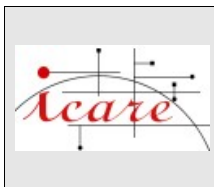


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<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
P3L1_Q_Stokes_670P	Second component of Stokes vector (Q) for Channel 670P, for each direction	unitless	int16[16]
P3L1_Q_Stokes_865P	Second component of Stokes vector (Q) for Channel 865P, for each direction	unitless	int16[16]
P3L1_U_Stokes_490P	Third component of Stokes vector (U) for Channel 490P, for each direction	unitless	int16[16]
P3L1_U_Stokes_670P	Third component of Stokes vector (U) for Channel 670P, for each direction	unitless	int16[16]
P3L1_U_Stokes_865P	Third component of Stokes vector (U) for Channel 865P, for each direction	unitless	int16[16]
<b>MODIS MYD021KM</b>			
MYD021KM_Input_File_Index	Index of the input file where the coincidence has been found. See in the file attributes to see the list of files	unitless	int16[2]
MYD021KM_Input_Pixel_Index	Index [i_row,icol] of the coincident Pixel in the input granule	unitless	int16
MYD021KM_EV_250_Aggr1km_RefSB_Band1	Earth View 250M Aggregated 1km Reflective Solar Bands Scaled Integers of channel n°1 (0.645µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_250_Aggr1km_RefSB_Band2	Earth View 250M Aggregated 1km Reflective Solar Bands Scaled Integers of channel n°2 (0.865µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_500_Aggr1km_RefSB_Band3	Earth View 500M Aggregated 1km Reflective Solar Bands Scaled Integers of channel n°3 (0.469µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_500_Aggr1km_RefSB_Band4	Earth View 500M Aggregated 1km Reflective Solar Bands Scaled Integers of channel n°4 (0.555µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_500_Aggr1km_RefSB_Band5	Earth View 500M Aggregated 1km Reflective Solar Bands Scaled Integers of channel n°5 (1.240µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_500_Aggr1km_RefSB_Band6	Earth View 500M Aggregated 1km Reflective Solar Bands Scaled Integers of channel n°6 (1.640µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_500_Aggr1km_RefSB_Band7	Earth View 500M Aggregated 1km Reflective Solar Bands Scaled Integers of channel n°7 (2.130µm)	W/m <sup>2</sup> /µm/sr	uint16



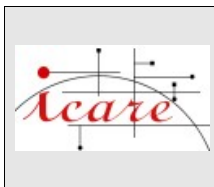
<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
MYD021KM_EV_1KM_RefSB_Band8	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°8 (0.4125µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band9	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°9 (0.443µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band10	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°10 (0.488µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band11	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°11 (0.541µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band12	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°12 (0.551µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band13LO	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°13LO (0.667µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band13HI	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°13HI (0.667µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band14LO	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°14LO (0.678µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band14HI	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°14HI (0.678µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band15	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°15 (0.748µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band16	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°16 (1.3005µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band17	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°17 (0.905µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band18	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°18 (0.936µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_RefSB_Band19	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°19 (0.940µm)	W/m <sup>2</sup> /µm/sr	uint16



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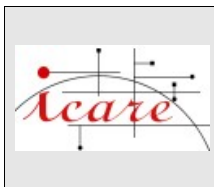
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<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
MYD021KM_EV_1KM_RefSB_Band26	Earth View 1KM Reflective Solar Bands Scaled Integers of channel n°26 (1.375µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band20	Earth View 1KM Emissive Bands Scaled Integers of channel n°20 (3.750µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band21	Earth View 1KM Emissive Bands Scaled Integers of channel n°21 (3.959µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band22	Earth View 1KM Emissive Bands Scaled Integers of channel n°22 (3.959µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band23	Earth View 1KM Emissive Bands Scaled Integers of channel n°23 (4.050µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band24	Earth View 1KM Emissive Bands Scaled Integers of channel n°24 (4.465µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band25	Earth View 1KM Emissive Bands Scaled Integers of channel n°25 (4.515µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band27	Earth View 1KM Emissive Bands Scaled Integers of channel n°27 (6.715µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band28	Earth View 1KM Emissive Bands Scaled Integers of channel n°28 (7.325µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band29	Earth View 1KM Emissive Bands Scaled Integers of channel n°29 (8.550µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band30	Earth View 1KM Emissive Bands Scaled Integers of channel n°30 (9.730µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band31	Earth View 1KM Emissive Bands Scaled Integers of channel n°31 (11.030µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band32	Earth View 1KM Emissive Bands Scaled Integers of channel n°32 (12.020µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band33	Earth View 1KM Emissive Bands Scaled Integers of channel n°33 (13.335µm)	W/m <sup>2</sup> /µm/sr	uint16



<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
MYD021KM_EV_1KM_Emissive_Band34	Earth View 1KM Emissive Bands Scaled Integers of channel n°34 (13.635µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band35	Earth View 1KM Emissive Bands Scaled Integers of channel n°35 (13.935µm)	W/m <sup>2</sup> /µm/sr	uint16
MYD021KM_EV_1KM_Emissive_Band36	Earth View 1KM Emissive Bands Scaled Integers of channel n°36 (14.235µm)	W/m <sup>2</sup> /µm/sr	uint16
<b>CLOUDSAT 1B-CPR</b>			
CS_1B_CPR_Input_File_Index	Index of the input file where the coincidence has been found. See in the file attributes to see the list of files	unitless	int16
CS_1B_CPR_Input_Profile_Index	Index of the coincident profile	unitless	int16
CS_1B_CPR_Range_to_intercept	Range to the CPR boresight intercept with the geoid	Km	float32
CS_1B_CPR_Range_to_first_bin	Range to first bin is the distance between the satellite and the starting bin number of the ray in meters	m	float32
CS_1B_CPR_ReceivedEchoPowers	Echo Power is the calibrated range gate power in watts, made in-flight and averaged	W	float32[125]
<b>CALIOP L2 05kmCLay</b>			
CAL_LID_L2_05KMCLAY_DEM_Surface_Elevation	Surface Elevation read from the Digital Elevation Model (DEM)	Km	float32
CAL_LID_L2_05KMCLAY_Lidar_Surface_Elevation	Lidar Echo Ground Elevation	Km	float32
CAL_LID_L2_05KMCLAY_Surface_Elevation_Detection_Frequency	Lidar Echo Surface Detection Frequency	unitless	uint8
CAL_LID_L2_05KMCLAY_Number_Layers_Found	Number of Cloud Layers Found	Layer	int8
CAL_LID_L2_05KMCLAY_Layer_Top_Altitude	Cloud Layer Top Altitude	Km	float32[10]
CAL_LID_L2_05KMCLAY_Layer_Base_Altitude	Cloud Layer Base Altitude	Km	float32[10]
CAL_LID_L2_05KMCLAY_Feature_Classification_Flags	Cloud Layer feature classification flags	unitless	uint16[10]
CAL_LID_L2_05KMCLAY_Feature_Optical_Depth_532	Cloud Layer Optical Depth at 532nm	unitless	float32[10]

<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
CAL_LID_L2_05KMCLAY_Phase	Cloud Layer Thermodynamic Phase, as read in the feature classification flags 0=undefined 1=ice 2=water 3=mixed	unitless	uint8
<b>CALIOP L2 05kmALay</b>			
CAL_LID_L2_05KMALAY_Number_Layers_Found	Number of Aerosol Layers Found	Layer	int8
CAL_LID_L2_05KMALAY_Layer_Top_Altitude	Aerosol Layer Top Altitude	Km	float32[8]
CAL_LID_L2_05KMALAY_Layer_Base_Altitude	Aerosol Layer Base Altitude	Km	float32[8]
CAL_LID_L2_05KMALAY_Feature_Classification_Flags	Aerosol layer feature classification flags	unitless	uint16[8]
CAL_LID_L2_05KMALAY_Layer_Top_Temperature	Aerosol Layer Top Temperature	°C	float32[8]
CAL_LID_L2_05KMALAY_Layer_Base_Temperature	Aerosol Layer Base Temperature	°C	float32[8]
CAL_LID_L2_05KMALAY_Layer_Top_Pressure	Aerosol Layer Top Pressure	hPa	float32[8]
CAL_LID_L2_05KMALAY_Layer_Base_Pressure	Aerosol Layer Base Pressure	hPa	float32[8]
CAL_LID_L2_05KMALAY_Feature_Optical_Depth_532	Aerosol Layer Optical Depth at 532nm	unitless	float32[8]
<b>CALIPSO IIR L2 Track</b>			
CAL_IIR_L2_Brightness_Temperature_12_05	Brightness Temperature at 12µm	K	float32
CAL_IIR_L2_Brightness_Temperature_10_60	Brightness Temperature at 10,6µm	K	float32
CAL_IIR_L2_Brightness_Temperature_08_65	Brightness Temperature at 8,65µm	K	float32
CAL_IIR_L2_Effective_Particle_Size	Size of the Particles at 5km Resolution	µm	float32
CAL_IIR_L2_Particle_Shape_Index	Particle Shape Index	unitless	int8
CAL_IIR_L2_Ice_Water_Path	Ice Water Path	%	float32
<b>PARASOL OC2</b>			
P3L2TOGC_Input_Index	Index [i_row,icol] of the coincident Pixel in the input product. See in the file attribute to know which is this file	unitless	int16[2]



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<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
P3L2TOGC_Pixel_Confidence_Data	Pixel confidence data indicator	unitless	uint32
P3L2TOGC_Fit_Quality	Quality of the fit : $IQ = (1 - DL_{moy}/2E-3) > 0$	unitless	uint8
P3L2TOGC_Solar_Zenith_Angle	Solar Zenith Angle	°	uint16
P3L2TOGC_Aerosol_OD_865	Aerosol Optical Thickness at 865nm	unitless	uint16
P3L2TOGC_Aerosol_OD_670	Aerosol Optical Thickness at 670nm	unitless	uint16
P3L2TOGC_Aerosol_Angstrom_Coefficient	Aerosol Angström Coefficient	unitless	uint16
P3L2TOGC_Single_Scattering_Albedo_865	Single Scattering Albedo at 865nm	unitless	uint8
P3L2TOGC_Aerosol_Scattering_Asymmetry_Factor	Aerosol Scattering Asymmetry Factor	unitless	uint8
P3L2TOGC_Aerosol_Index	Aerosol Index	unitless	uint16
P3L2TOGC_Aerosol_Effective_Radius	Aerosol Effective Radius	µm	uint8
P3L2TOGC_Fine_Mode_Effective_Radius	Fine Mode Effective Radius	µm	uint8
P3L2TOGC_Large_Mode_Effective_Radius	Large Mode Effective Radius	µm	uint8
P3L2TOGC_Fine_Mode_OD_865	Fine Mode Optical Thickness at 865nm	unitless	uint16
P3L2TOGC_Fine_Mode_OD_670	Fine Mode Optical Thickness at 670nm	unitless	uint16
P3L2TOGC_Fine_Mode_Angstrom_Exponent	Fine Mode Angström Exponent	unitless	uint16
P3L2TOGC_Spherical_Coarse_Mode_OD_865	Optical Thickness of Spherical Coarse Mode at 865nm	unitless	uint16
P3L2TOGC_Non_Spherical_Coarse_Mode_OD_865	Optical Thickness of Non-Spherical Coarse Mode at 865nm	unitless	uint16
P3L2TOGC_Relative_Contribution_Non_Spherical_Part_Coarse_Mode	Relative Contribution of Non-Spherical Particles in Coarse Mode	unitless	uint8
P3L2TOGC_Refractive_Index_Fine_Mode	Refractive Index of Fine Mode, only for Fine Mode Optical Thickness at 865nm > 0.02	unitless	uint8
P3L2TOGC_Refractive_Index_Coarse_Mode	Refractive Index of Coarse Mode, only for Spherical Coarse Mode at 865nm > 0.02	unitless	uint8
P3L2TOGC_Log_Backscattering_Coefficient_565	Logarithm of the Backscattering Coefficient at 565nm	unitless	uint16

<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
P3L2TOGC_Log_Backscatteri ng_Coefficient_1020	Logarithm of the Backscattering Coefficient at 1020nm	unitless	uint16
<b>PARASOL LS2</b>			
P3L2TLGC_Input_Index	Index [i_row,icol] of the coincident Pixel in the input product. See in the file attribute to know which is this file	unitless	int16[2]
P3L2TLGC_Land_Water_Indic ator	Land (100), Water (0) or Mixed (50) Indicator	unitless	uint8
P3L2TLGC_Pixel_Confidence_ Data	Pixel confidence data indicator	unitless	uint32
P3L2TLGC_Aerosol_OD_865	Aerosol Optical Thickness at 865nm	unitless	uint16
P3L2TLGC_Aerosol_Model_R efractive_Index	Aerosol Model Refractive Index (Real Part)	unitless	uint8
P3L2TLGC_Aerosol_Model_A ngstrom_Coefficient	Aerosol Model Angström Coefficient	unitless	uint8
P3L2TLGC_Aerosol_Index	Aerosol Index	unitless	uint16
P3L2TLGC_Fixed_Model_OD_ 865	Fixed Model Optical Thickness at 865nm	unitless	uint16
P3L2TLGC_Quality_Index_Vie wing_Geometry	Quality Index for Viewing Geometry (0:bad ; 1:excellent)	unitless	uint16
P3L2TLGC_Quality_Index_Pol arized_Reflectance_Fit	Quality Index for Polarized Reflectance Fit (0:bad ; 1:excellent)	unitless	uint8
<b>PARASOL RB2</b>			
P3L2TRGB_Input_Index	Index [i_row,icol] of the coincident Pixel in the input product. See in the file attribute to know which is this file	unitless	int16[2]
P3L2TRGB_Cloud_Cover	cloud cover, defined as the number of cloudy pixels divided by the total number of pixels	unitless	uint8
P3L2TRGB_Directional_Cloud _Cover	Directional Apparent Cloud Cover	unitless	uint8
P3L2TRGB_Cloud_Oxygen_Pr essure	mean cloud oxygen pressure (expected to be close of the cloud middle pressure)	hPa	uint8
P3L2TRGB_Cloud_Oxygen_Pr essure_Angular_Stddev	Angular Standard Deviation of the Cloud Oxygen Pressure	hPa	uint8
P3L2TRGB_Cloud_Rayleigh_P ressure	mean cloud Rayleigh pressure (expected to be close of the cloud top pressure)	hPa	uint8
P3L2TRGB_Cloud_Rayleigh_P ressure_Angular_Stddev	Angular Standard Deviation of the Cloud Rayleigh Pressure	hPa	uint8

<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
P3L2TRGB_Cloud_Optical_Thickness	linear mean cloud optical thickness (670 nm over land and 865 nm over ocean)	unitless	uint16
P3L2TRGB_Cloud_Optical_Thickness_Stddev	Relative Spatial Standard Deviation of Cloud Optical Thickness	%	uint8
P3L2TRGB_Cloud_Phase	Cloud Phase	unitless	uint8
P3L2TRGB_Water_Vapor_Column	Water Vapor Column, based on clear pixel measurements	g/cm <sup>2</sup>	uint8
P3L2TRGB_Mean_Albedo	Mean albedo at 670 nm over land and 865 nm over ocean, aka avis	unitless	uint16
P3L2TRGB_Albedo_Spatial_Stddev	Relative spatial standard deviation of the albedos (based on the direction-means), aka rsd_avis	%	uint8
P3L2TRGB_Albedo_Angular_Stddev	Relative angular standard deviation of the albedos (based on the spatial-means), aka rad_avis	%	uint8
P3L2TRGB_Surface_Type_Index	Surface type indicator, aka tmc [0] : 100% water [10] : > 90% water [50] : mixed [90] : > 90% Land [100] : 100% Land	%	uint8
P3L2TRGB_Cos_Solar_Zenith_Angle	Cosine of the Solar Zenith Angle for central pixel, aka mus	unitless	uint8
P3L2TRGB_Scene_Albedo_Angular_Stddev	Relative Angular standard deviation of the Scene Albedo, aka rad_ascvis	%	uint8
P3L2TRGB_Optical_Thickness_Homogeneity_Coef	Homogeneity coefficient of the optical thickness : $\tau^*/\tau$ where $\tau$ is the scene mean optical thickness, and $\tau^*$ is the optical thickness derived from the scene mean reflectance, aka eps_tau	unitless	uint8
<b>MODIS MYD04_L2</b>			
MYD04_Input_File_Index	Index of the input file where the coincidence has been found. See in the file attributes to see the list of files	unitless	int16
MYD04_Input_Pixel_Index	Index [i_row,icol] of the coincident Pixel in the input granule	unitless	int16
MYD04_Optical_Depth_Land_And_Ocean	Aerosol Optical Thickness at 0.55 micron for both ocean (best) and land (corrected) with best quality data(Quality flag=3)	unitless	int16



<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
MYD04_Optical_Depth_Ratio_Small_Land_And_Ocean	Ratio of small mode optical depth at 0.55 micron	unitless	int16
MYD04_Effective_Optical_Depth_Best_Ocean	Aerosol Optical Thickness at 7 bands for best solution for 0.47, 0.55, 0.66, 0.86, 1.24, 1.63, 2.13 um	unitless	int16[7]
MYD04_Angstrom_Exponent_1_Ocean	Angstrom Exponent for 0.55 and 0.86 micron	unitless	int16[2]
<b>MODIS MYD05_L2</b>			
MYD05_Input_File_Index	Index of the input file where the coincidence has been found. See in the file attributes to see the list of files	unitless	int16[2]
MYD05_Input_Pixel_Index	Index [i_row,icol] of the coincident Pixel in the input granule	unitless	int16
MYD05_Water_Vapor_Near_Infrared	Total Column Precipitable Water Vapor - Near Infrared Retrieval	cm	int16
MYD05_Water_Vapor_Infrared	Total Column Precipitable Water Vapor - Infrared Retrieval	cm	int16
MYD05_Water_Vapor_Correction_Factors	Aerosol Correction Factor for Water Vapor - Near Infrared Retrieval	unitless	int16
MYD05_Quality_Assurance_Infrared	Run time QA flags	unitless	int8[5]
MYD05_Quality_Assurance_Near_Infrared	Run time QA flags	unitless	int8
MYD05_Cloud_Mask	MODIS Cloud Mask, First Byte	unitless	int8
<b>MODIS MYD06_L2</b>			
MYD06_Input_File_Index	Index of the input file where the coincidence has been found. See in the file attributes to see the list of files	unitless	int16[2]
MYD06_Input_Pixel_Index	Index [i_row,icol] of the coincident Pixel in the input granule	unitless	int16
MYD06_Brightness_Temperature_Band_29	Brightness Temperature of Channel n°29 (8.550µm)	K	int16
MYD06_Brightness_Temperature_Band_31	Brightness Temperature of Channel n°31 (11.030µm)	K	int16
MYD06_Brightness_Temperature_Band_32	Brightness Temperature of Channel n°32. (12.020µm)	K	int16
MYD06_Brightness_Temperature_Band_33	Brightness Temperature of Channel n°33 (13.335µm)	K	int16
MYD06_Brightness_Temperature_Band_34	Brightness Temperature of Channel n°34 (13.635µm)	K	int16

<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
MYD06_Brightness_Temperature_Band_35	Brightness Temperature of Channel n°35 (13.935µm)	K	int16
MYD06_Brightness_Temperature_Band_36	Brightness Temperature of Channel n°36 (14.235µm)	K	int16
MYD06_Cloud_Optical_Thickness	Cloud Optical Thickness two-channel retrieval using band 7 and either band 1, 2, or 5	unitless	int16
MYD06_Cloud_Water_Path	Column Water Path two-band retrieval using band 7 and either band 1, 2, or 5	g/m <sup>2</sup>	int16
MYD06_Cloud_Top_Pressure	Cloud Top Pressure	hPa	int16
MYD06_Number_Clear_Pixel	Number of Clear Pixels (of 1km) at 5km resolution. Read in the Cloud_Mask_1km dataset	nb_pixels	int8
MYD06_Number_Cloudy_Pixel	Number of Cloudy Pixels (of 1km) at 5km resolution. Read in the Cloud_Mask_1km dataset	nb_pixels	int8
MYD06_Number_Indetermined_Pixel	Number of Indetermined Pixels (of 1km) at 5km resolution. Read in the Cloud_Mask_1km dataset	nb_pixels	int8
MYD06_Cloud_Effective_Radius	Cloud Particle Effective Radius two-channel retrieval using band 7 and either band 1, 2, or 5 (specified in Quality_Assurance_1km)	µm	int8
MYD06_Cloud_Phase_Optical_Properties	Cloud Phase Determination Used in Optical Thickness/Effective Radius Retrieval		int16
MYD06_Cloud_Multi_Layer_Flag	Cloud Multi Layer Identification From MODIS Shortwave Observations		int16
MYD06_Cloud_Fraction	Cloud Fraction		int8
MYD06_Cloud_Mask_5km	MODIS Cloud Mask at 5km, First Byte		int8
MYD06_Cloud_Mask_1km	MODIS Cloud Mask at 1km, L2 MOD06 QA Plan		int8
MYD06_Quality_Assurance_5km	Quality Assurance at 5x5 Resolution		int8
MYD06_Quality_Assurance_1km	Quality Assurance at 1x1 Resolution		int8
<b>CLOUDSAT 2B-GEOPROF</b>			
CS_2B_GEOPROF_Input_File_Index	Index of the input file where the coincidence has been found. See in the file attributes to see the list of files	unitless	int16

<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
CS_2B_GEOPROF_Input_Profile_Index	Index of the coincident profile	unitless	int16
CS_2B_GEOPROF_Height	Height of range bin in Reflectivity/Cloud Mask above reference surface (~ mean sea level)	m	int16[125]
CS_2B_GEOPROF_CPR_Cloud_mask	Each CPR resolution volume is assigned 1 bit mask value: 0 = No cloud detected 1 = likely bad data 5 = likely ground clutter 5-10 = weak detection found using along track integration 20 to 40 = Cloud detected .. increasing values represents clouds with lower chance of a being a false detection	unitless	int8[125]
CS_2B_GEOPROF_Gaseous_Attenuation	Gaseous attenuation	dBZe	int16[125]
CS_2B_GEOPROF_Radar_Reflectivity	Radar reflectivity factor Ze is calculated with the echo power and other input data as described in Li and Durden (2001)	dBZe	int16[125]
<b>CLOUDSAT 2B-CLDCLASS</b>			
CS_2B_CLDCLASS_Input_File_Index	Index of the input file where the coincidence has been found. See in the file attributes to see the list of files	unitless	int16
CS_2B_CLDCLASS_Input_Profile_Index	Index of the coincident profile	unitless	int16
CS_2B_CLDCLASS_Height	Height of range bin in Reflectivity/Cloud Mask above reference surface (~ mean sea level)	m	int16[125]
CS_2B_CLDCLASS_cloud_scenario	Algorithm outputs (cloud type and different flags) are combined into a 16 bit cloud_scenario	unitless	int16[125]
<b>OMI-CLDO2</b>			
omi_cldo2_cloud_fraction	Effective cloud fraction clipped between 0.0 and 1.0	unitless	float32
omi_cldo2_cloud_pressure	Effective cloud pressure	hPa	int16
<b>OMI-NO2</b>			
omi_no2_cloud_fraction	Effective cloud fraction	unitless	int16
omi_no2_cloud_pressure	Effective cloud pressure	hPa	int16

<b>Name</b>	<b>Description</b>	<b>Unit</b>	<b>Type</b>
omi_no2_ColumnAmountNO2Trop	NO2 tropospheric column density	molec/c m <sup>2</sup>	float32
omi_no2_ColumnAmountNO2TropStd	Precision of the NO2 tropospheric column density	molec/c m <sup>2</sup>	float32
<b>OMI-CLDRR</b>			
omi_cldrd_cloud_fraction	Cloud Fraction for O3	unitless	float32
omi_cldrd_cloud_pressure	Cloud Pressure for O3	hPa	float32
omi_cldrd_rad_cloud_fraction	Radiative Cloud Fraction	unitless	float32

### **3.2.2. Fill Values**

The values used to represents absent or dummy ones (also called Fill Values) depend of the type of the variable.

<b>Type</b>	<b>Fill Value</b>
float32	-inf
float64	-inf
int8	-128
uint8	255

#### **4. REFERENCES**

<b><i>Title</i></b>	<b><i>Version</i></b>	<b><i>Link</i></b>
HDF 4 reference manual	4.2r1	<a href="http://hdf.ncsa.uiuc.edu/doc.html">http://hdf.ncsa.uiuc.edu/doc.html</a>
HDF 4 user guide	4.2r1	<a href="http://hdf.ncsa.uiuc.edu/doc.html">http://hdf.ncsa.uiuc.edu/doc.html</a>
CALIPSO DPC	3.0	<a href="http://eosweb.larc.nasa.gov/PRODOCS/calipso/DPC/">http://eosweb.larc.nasa.gov/PRODOCS/calipso/DPC/</a>
MODIS file specifications		<a href="http://modis-atmos.gsfc.nasa.gov/MOD06_L2/spec.html">http://modis-atmos.gsfc.nasa.gov/MOD06_L2/spec.html</a>
CERES DPC	R4V1	<a href="http://earth-www.larc.nasa.gov/ceresdoc/DPC/DPC_current/DPC.html">http://earth-www.larc.nasa.gov/ceresdoc/DPC/DPC_current/DPC.html</a>
PARASOL Level 2 Product. Data Format and User Manual	Ed1Rev 1	<a href="http://www-icare.univ-lille1.fr/fr/parasol.php">http://www-icare.univ-lille1.fr/fr/parasol.php</a>
Cloudsat Data Products Handbook		<a href="http://www.cloudsat.cira.colostate.edu/cloudsat_documentation/">http://www.cloudsat.cira.colostate.edu/cloudsat_documentation/</a>
OMI Data description website		<a href="http://disc.sci.gsfc.nasa.gov/Aura/data-holdings/OMI/">http://disc.sci.gsfc.nasa.gov/Aura/data-holdings/OMI/</a>