

## MODIS Cloud Imager Data (MODIS CID)

MODIS Cloud Imager Data (CID\_MODIS) from the EOS spacecraft is a Level-1B data set with nineteen of the MODIS channels. CID\_MODIS consists of two or more data sets. The first is the Level-1B data set, which contains the calibrated radiances; and the second is the companion Geolocation data set. The sizes listed in the following data description reflect the estimated number of scan line records (200) in 5 minutes of data. The files are written in Hierarchical Data Format (HDF) and are composed of Scientific Data Sets (SDS) and Vdatas.

The MODIS Level-1B HDF Structure Summary, [Table 1](#), lists the types and names of HDF structures contained in the Level-1B product along with the names of the structures. A complete listing of parameters for the Level 1B data product can be found in [Table 2](#) through [Table 3](#). The MODIS Geolocation HDF Structure Summary, [Table 4](#), lists the names and types of HDF structures contained in the geolocation product. A complete listing of the parameters for the MODIS Geolocation product can be found in [Table 4](#) and [Table 5](#). For more information on the MODIS Project, see [Reference 6](#).

It is assumed that only Earth-viewing radiances and uncertainties and any information needed to interpret these values from the Level-1B product will be sent to the LaRC DAAC. The channels currently requested by the CERES Science Team are

Channels	Micron	Resolution (km)	Channels	Micron	Resolution (km)
Channel 1	0.645	0.25 & 1	Channel 26	1.38	1
Channel 6	1.64	1	Channel 27	6.7	1
Channel 7	2.13	1	Channel 28	8.55	1
Channel 17	0.91	1	Channel 31	11.0	1
Channel 18	0.93	1	Channel 32	12.0	1
Channel 19	0.94	1	Channel 33	13.3	1
Channel 20	3.75	1	Channel 34	13.6	1
Channel 23	4.0	1	Channel 35	13.9	1
Channel 24	4.46	1	Channel 36	14.2	1
Channel 25	4.52	1			

**Level:** 1B  
**Type:** Ancillary  
**Frequency:** 1 per 5.0-Min

**Portion of Globe Covered**  
**File:** Satellite Swath  
**Record:** .25 - 1.0-km by .25 - 1.0-km

**Time Interval Covered**  
**File:** 5.0-Min  
**Record:** Instantaneous

**Portion of Atmosphere Covered**  
**File:** Satellite Altitude

MODIS CID-1



Table 1. MODIS Level-1B HDF Structure Summary

HDF Name	HDF Structure Type	Num Records	Table Number	Size (bytes)
MODIS Core Metadata	HDF Annotations	1	<a href="#">Reference 6</a>	10 000
MODIS Archive Metadata	HDF Annotations	1	<a href="#">Reference 6</a>	10 000
MODIS Product Specific Metadata	HDF Annotations	1	<a href="#">Reference 6</a>	10 000
MODIS Swath Data	Vdata Structure	1	<a href="#">Table 2</a>	72
MODIS Level 1-B SDS	SDSs	1 .. 1044	<a href="#">Table 3</a>	294 693 396
<b>Total MODIS Level-1B Bytes/File:</b>				294 723 468

Table 2. MODIS Level-1B Swath Data Vdata

Field Name	Description	Field Num	Num Records	Data Type	Units	Range
Scan Number	Scan number	1	1	32-bit integer	N/A	1 .. 200
Complete Scan Flag	1 = Complete scan , 0 = Incomplete scan	2	1	32-bit integer	N/A	0 .. 1
Total Frames	Total number of frames in scan	3	1	32-bit integer	N/A	TBD
EV_Frames	Total number of earth view frames	4	1	32-bit integer	N/A	TBD
SD_Frames	Total number of solar diffuser frames	5	1	32-bit integer	N/A	TBD
SRCA_Frames	Total number of SRCA frames	6	1	32-bit integer	N/A	TBD
BB_Frames	Total number of blackbody frames	7	1	32-bit integer	N/A	TBD
SV_Frames	Total number of space view frames	8	1	32-bit integer	N/A	TBD
Scan Type	Type of scan (day, night, mixed)	9	1	8-bit character	N/A	N/A
Scan Start Time	Start time of scan	10	1	64-bit float	TBD	TBD
Mirror Side	TBD	11	1	8-bit integer	N/A	1 .. 2
Scan Data Presence	TBD	12	1	32-bit integer	TBD	TBD
Missing Packets	TBD	13	1	32-bit integer	TBD	TBD
Packets with Bad CRC	TBD	14	1	32-bit integer	TBD	TBD
Discarded Packets	TBD	15	1	32-bit integer	TBD	TBD
Moon in SV Port	TBD	16	1	8-bit integer	TBD	0 .. 1
On-Orbit Maneuver	TBD	17	1	8-bit integer	TBD	0 .. 1
No. SV Outliers	TBD	18	1	32-bit integer	TBD	0 .. 15
No. BB Outliers	TBD	19	1	32-bit integer	TBD	0 .. 15
No. thermistor outliers	TBD	20	1	32-bit integer	TBD	0 .. 12



Table 3. MODIS Level-1B Science Data Sets

SDS Name	Description	Rank	Dimensions	Data Type	Units	Range
Latitude	Subset of the geodetic latitude	2	{2000, 271} scan x pixel	32-bit float	deg	-90 .. 90
Longitude	Subset of the geodetic longitude	2	{2000, 271} scan x pixel	32-bit float	deg	-180 .. 180
Dimensions	Values of the various dimensions in the product	1	{45}	32-bit integer	N/A	N/A
Slope_and_Offset	Values needed to convert scaled instrument data to radiances	2	{38, 8} band x scale quantity	32-bit float	N/A	N/A
SD sector Pixel quality	Solar diffuser pixel quality	3	{200, 30, 10} scan x SD frame x track	16-bit integer	TBD	TBD
SRCA sector Pixel quality	SRCA pixel quality	3	{200, 40, 10} scan x SRCA frame x track	16-bit integer	TBD	TBD
BB sector Pixel quality	Blackbody pixel quality	3	{200, 50, 10} scan x BB frame x track	16-bit integer	TBD	TBD
SV sector Pixel quality	Space view pixel quality	3	{200, 30, 10} scan x SV frame x track	16-bit integer	TBD	TBD
Earth sector Pixel quality	Earth View pixel quality	3	{200, 1354, 10} scan x EV frame x track	16-bit integer	TBD	TBD
EV_250_RefSB	Band 1 radiances at 1/4 km resolution	3	{1, 8000, 5416} band x scan x pixel	16-bit integer	W m <sup>-2</sup> sr <sup>-1</sup> μm <sup>-1</sup>	TBD
EV_250_RefSB_Uncert_Indexes	Band 1 uncertainty indexes at 1/4 km resolution	3	{1, 8000, 5416} band x scan x pixel	8-bit integer	N/A	TBD
EV_250_Aggr1km_RefSB	Band 1 radiances at 1 km resolution	3	{1, 2000, 1354} band x scan x pixel	16-bit integer	W m <sup>-2</sup> sr <sup>-1</sup> μm <sup>-1</sup>	TBD
EV_250_Aggr1km_RefSB_Uncert_Indexes	Band 1 uncertainty indexes at 1 km resolution	3	{1, 2000, 1354} band x scan x pixel	8-bit integer	N/A	TBD
EV_500_Aggr1km_RefSB	Band 6, 7 radiances at 1 km resolution	3	{2, 2000, 1354} band x scan x pixel	16-bit integer	W m <sup>-2</sup> sr <sup>-1</sup> μm <sup>-1</sup>	TBD
EV_500_Aggr1km_RefSB_Uncert_Indexes	Band 6, 7 uncertainty indexes at 1 km resolution	3	{2, 2000, 1354} band x scan x pixel	8-bit integer	N/A	TBD
EV_1KM_RefSB	Band 17, 18, 19, 26 radiances at 1 km resolution	3	{4, 2000, 1354} band x scan x pixel	16-bit integer	W m <sup>-2</sup> sr <sup>-1</sup> μm <sup>-1</sup>	TBD

MODIS CID-3



Table 3. MODIS Level-1B Science Data Sets

SDS Name	Description	Rank	Dimensions	Data Type	Units	Range
EV_1KM_RefSB_Uncert_Indexes	Band 17, 18, 19, 26 uncertainty indexes at 1 km resolution	3	{4, 2000, 1354} band x scan x pixel	8-bit integer	N/A	TBD
EV_1KM_Emissive	Band 20, 23, 24, 25, 27, 29, 31, 32, 33, 34, 35, 36 radiances at 1 km resolution	3	{12, 2000, 1354} band x scan x pixel	16-bit integer	W m <sup>-2</sup> sr <sup>-1</sup> μm <sup>-1</sup>	TBD
EV_1KM_Emissive_Uncert_Indexes	Band 20, 23, 24, 25, 27, 29, 31, 32, 33, 34, 35, 36 uncertainty indexes at 1 km resolution	3	{12, 2000, 1354} band x scan x pixel	8-bit integer	N/A	TBD

Table 4. MODIS Geolocation HDF Structure Summary

HDF Name	HDF Structure Type	Num Records	Table Number	Size (bytes)
MODIS Geolocation Core Metadata	HDF Annotations	1	<a href="#">Reference 6</a>	10 000
MODIS Geolocation Archive Metadata	HDF Annotations	1	<a href="#">Reference 6</a>	10 000
MODIS Geolocation Product Specific Metadata	HDF Annotations	1	<a href="#">Reference 6</a>	10 000
MODIS Geolocation Swath Structural Metadata	HDF Annotations	1	<a href="#">Reference 6</a>	10 000
MODIS Geolocation Data	SDS	39	<a href="#">Table 5</a>	59 678 050
Total MODIS Geolocation Bytes/File:				59 718 050

Table 5. MODIS Geolocation Science Data Sets

SDS Name	Description	Rank	Dimensions	Data Type	Units	Range
Focal_length	Focal length for detectors	1	{37} band	64-bit float	μm	TBD
band_position	Scan IFOV Offsets of band trailing edges with respect to the Optical Center	1	{37} band	64-bit float	TBD	TBD
detector_space	Nominal detector spacing in the cross-scan direction	1	{37} band	64-bit float	μm	TBD
detector_offsets	Offsets of detector positions from nominal locations on the focal plane	2	{37, 2} band x {scan, track}	64-bit float	μm	TBD
T_offset	Offsets of the first sample for a band to time of 1km frame	1	{37} band	64-bit float	TBD	TBD
num_samples	Number of samples per frame for each band.	1	{37} band	16-bit integer	N/A	N/A
Scan number	Scan number in granule	1	{200} scan	16-bit integer	N/A	N/A

MODIS CID-4



Table 5. MODIS Geolocation Science Data Sets

SDS Name	Description	Rank	Dimensions	Data Type	Units	Range
EV frames	Number of Earth view frames in scan	1	{200} scan	16-bit integer	N/A	N/A
SD frames	Number of solar diffuser frames in scan	1	{200} scan	16-bit integer	N/A	N/A
SV frames	Number of space view frames in scan	1	{200} scan	16-bit integer	N/A	N/A
EV start time	Earth view start time (TAI)	1	{200} scan	64-bit float	sec	TBD
SD start time	Solar diffuser view start time (TAI)	1	{200} scan	64-bit float	sec	TBD
SV start time	Space view start time (TAI)	1	{200} scan	64-bit float	sec	TBD
SD Sun zenith	Sun vector zenith angle in SD frame	1	{200} scan	32-bit float	deg	TBD
SD Sun azimuth	Sun vector azimuth angle in SD frame (clockwise rotation about SD Z axis with respect to SD Y axis)	1	{200} scan	32-bit float	deg	TBD
Moon Vector	Moon unit vector in instrument frame	2	{200, 3} scan x vector dimension	32-bit float	TBD	TBD
sun_ref	Unit Sun vector in ECR frame at scan center time	2	{200, 3} scan x vector dimension	32-bit float	TBD	TBD
Mirror side	Mirror side	1	{200} scan	16-bit integer	TBD	TBD
num_impulse	Number of mirror encoder samples for this scan	1	{200} scan	8-bit integer	TBD	TBD
impulse_enc	Mirror angles from encoder data.	2	{200, 25} scan x encoder values	64-bit float	N/A	N/A
impulse_time	Mirror encoder sample times from start of scan	2	{200, 25} scan x encoder values	64-bit float	sec	TBD
L1 scan quality	L1A scan quality flags	2	{200, 4} scan x flag	32-bit integer	N/A	N/A
Geo scan quality	Geolocation scan quality flags	2	{200, 4} scan x flag	8-bit integer	N/A	N/A
EV center time	Earth view center frame time (TAI)	1	{200} scan	64-bit float	sec	TBD
orb_pos	ECR orbit position at scan center time	2	{200, 3} scan x vector dimension	64-bit float	m	TBD
orb_vel	ECR orbit velocity at scan center time	2	{200, 3} scan x vector dimension	64-bit float	m sec <sup>-1</sup>	TBD
T_inst2ECR	instrument-to-ECR frame transformation matrix at scan center time	3	{200, 3, 3} scan x vector x vector dimension	64-bit float	TBD	TBD



Table 5. MODIS Geolocation Science Data Sets

SDS Name	Description	Rank	Dimensions	Data Type	Units	Range
attitude_angles	Spacecraft attitude at scan center time expressed in the Orbital Reference frame (roll, pitch, yaw)	2	{200, 3} scan x vector dimension	64-bit float	deg	TBD
ang_rates	Spacecraft attitude rates in spacecraft reference frame (roll, pitch, yaw)	2	{200, 3} scan x vector dimension	32-bit float	deg sec <sup>-1</sup>	TBD
Longitude	Geodetic longitude	2	{2000, 1354} scan x pixel	32-bit float	deg	-180 .. 180
Latitude	Geodetic latitude	2	{2000, 1354} scan x pixel	32-bit float	deg	-90 .. 90
Height	Height above ellipsoid	2	{2000, 1354} scan x pixel	16-bit integer	m	TBD
SensorZenith	Sensor (spacecraft) zenith angle	2	{2000, 1354} scan x pixel	16-bit integer	deg	0 .. 180
SensorAzimuth	Sensor (spacecraft) azimuth angle	2	{2000, 1354} scan x pixel	16-bit integer	deg	-180 .. 180
Range	Slant range (to spacecraft)	2	{2000, 1354} scan x pixel	16-bit integer	m	TBD
SolarZenith	Solar zenith angle	2	{2000, 1354} scan x pixel	16-bit integer	deg	0 .. 180
SolarAzimuth	Solar azimuth angle	2	{2000, 1354} scan x pixel	16-bit integer	deg	-180 .. 180
Land/SeaMask	EOS Land/Sea Mask	2	{2000, 1354} scan x pixel	8-bit integer	N/A	N/A
gflags	Geolocation flags	2	{2000, 1354} scan x pixel	8-bit integer	N/A	N/A

**CID\_MODIS Instrument Data  
 Volume**

**CID\_MODIS Geolocation Data**

**CID\_MODIS Total Data**

<b>Total Bytes/File:</b> 294,723,468	<b>Total Bytes/File:</b> 59,748,050	<b>TotalMbytes/Granule:</b> 338.1
<b>Total Mbytes/File:</b> 281.1	<b>Total Mbytes/File:</b> 56.98	<b>Total Mbytes/Hour:</b> 57.0
<b>Total Mbytes/Hour:</b> 3,372.2	<b>Total Mbytes/Hour:</b> 683.8	<b>Total Mbytes/Day:</b> 97,367
<b>Total Mbytes/Day:</b> 80,948	<b>Total Mbytes/Day:</b> 16,410	<b>Total Mbytes/Month:</b> 3,018,378



## MODIS CID Revision Record

The product Revision Record contains information pertaining to approved section changes. The table lists the date the Software Configuration Change Request (SCCR) was approved, the Release and Version Number, the SCCR number, a short description of the revision, and the revised sections. The authors are listed on the document cover.

MODIS CID Revision Record

SCCR Approval Date	Release/Version Number	SCCR Number	Description of Revision	Section(s) Affected
N/A	R3V1	N/A	<ul style="list-style-type: none"> <li>• Updated format to comply with standards.</li> <li>• The EOSDIS Product Code line was removed from the document. (6/17/2008)</li> <li>• Some links were not working. They have now been modified. (12/09/2010)</li> <li>• The ASDC footer was added to the bottom of the document. (06/07/2013)</li> <li>• Eliminated section numbers from the Data Products Catalog. Specifically, in this document, section number 4.2 was removed. (12/18/2013)</li> <li>• Updated some links to refer to the .pdf file instead of the .doc file. (06/20/2014)</li> <li>• Updated document to change “mm” to “μm.” (09/12/2019)</li> </ul>	<p>All            Sec. 4.2</p> <p>All</p> <p>All</p> <p>All</p> <p>All</p> <p>Tables 3 &amp; 5</p>

