MODIS/Terra Snow Cover Daily L3 Global 0.05Deg CMG, Version 7

USER GUIDE

How to Cite These Data

As a condition of using these data, you must include a citation:

Hall, D. K. and G. A. Riggs. 2026. *MODIS/Terra Snow Cover Daily L3 Global 0.05Deg CMG, Version6*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/VWL799JNRZ2N. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT NSIDC@NSIDC.ORG

FOR CURRENT INFORMATION, VISIT https://doi.org/10.5067/VWL799JNRZ2N

National Snow and Ice Data Center

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1 DATA DESCRIPTION

This global data set is produced by mapping daily MOD10A1 tiles to the MODIS Climate Modeling Grid (CMG). MOD10A1 observations at 500 m are mapped into 0.05° CMG (~ 5 km) grid cells, binned by observation type (e.g. snow, cloud, ocean), and counted to identify the most frequently occurring feature type. Snow cover is detected using the Normalized Difference Snow Index (NDSI) in a preceding product (MOD10_L2), which is ultimately carried forward to this product. Snow-covered land typically has a very high reflectance in visible bands and very low reflectance in the shortwave infrared; the NDSI reveals the magnitude of this difference. The Scientific Data Sets (SDSs) included in this product are described in Table 1 and a sample image of the data is shown in Figure 1.

1.1 Parameters

Table 1. SDS Details

Parameter	Description	Values
Day_CMG_Snow_Cover	The percentage of snow-covered land mapped in the CMG cell.	0-100: percent of snow in cell 107: lake ice 111: night 237: inland water 239: ocean 250: cloud obscured water 253: data not mapped 255: fill
Day_CMG_Cloud_Obscured	The percentage of cloud-covered land mapped in the CMG cell.	0-100: percent of cloud in cell 107: lake ice 111: night 237: inland water 239: ocean 250: cloud obscured water 252: Antarctica mask 253: data not mapped 255: fill

Parameter	Description	Values
Day_CMG_Clear_Index	Percentage of clear-sky land observations mapped in the CMG cell.	0-100: clear index value 107: lake ice 111: night 237: inland water 239: ocean 250: cloud obscured water 253: data not mapped 255: fill
Snow_Spatial_QA	Basic quality assurance indicator.	0: best 1: good 2: ok 3: poor 4: other 237: inland water 239: ocean 250: cloud obscured water 252: Antarctica mask 253: not mapped 254: no retrieval 255: fill
Lat	Upper left X coordinate for each grid cell in degrees north.	Coordinate value range: 90.0º to - 90.0º
Lon	Upper left Y coordinate for each grid cell in degrees east.	Coordinate value range: -180.0º to 180.0º

1.2 Sample Data Image

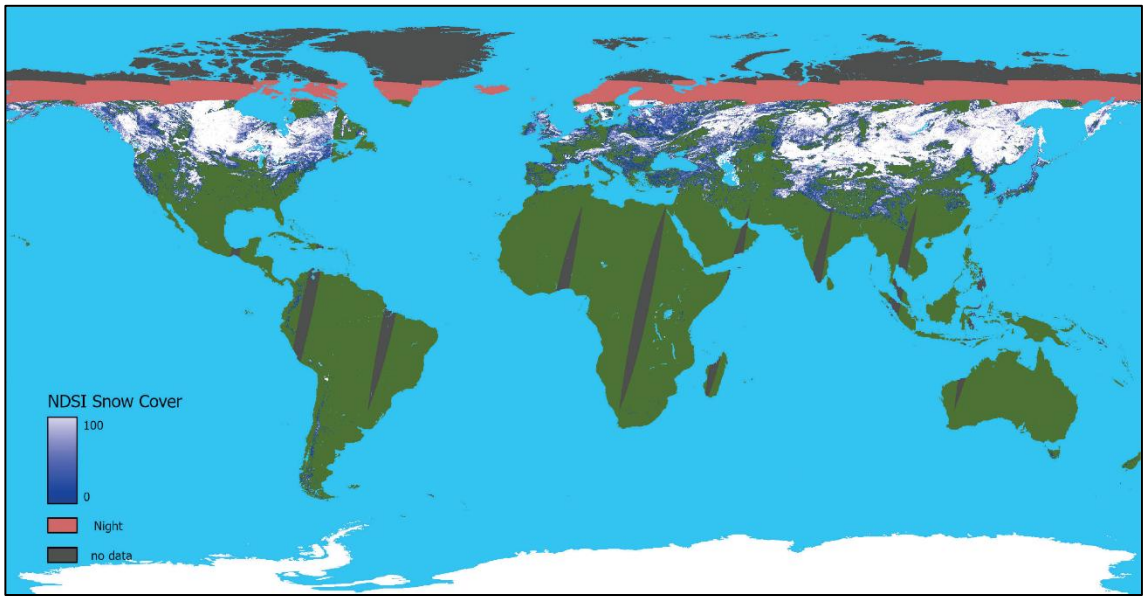


Figure 1. This MOD10C1 snow map shows the percent of snow cover mapped to a 0.05° CMG (approx. 5 km).

1.3 File Information

1.3.1 Format

Data are provided in HDF-EOS5 (.h5) format and are stored as 8-bit unsigned integers. For software and more information, visit the HDF-EOS website.

1.3.2 Data File

As shown in Figure 2, each data file includes three data fields (`Day_CMG_Clear_Index`, `Day_CMG_Cloud_Obscured`, and `Day_CMG_Snow_Cover`), one data quality field (`Snow_Spatial_QA`), and two geolocation fields (`Lat` and `Lon`).

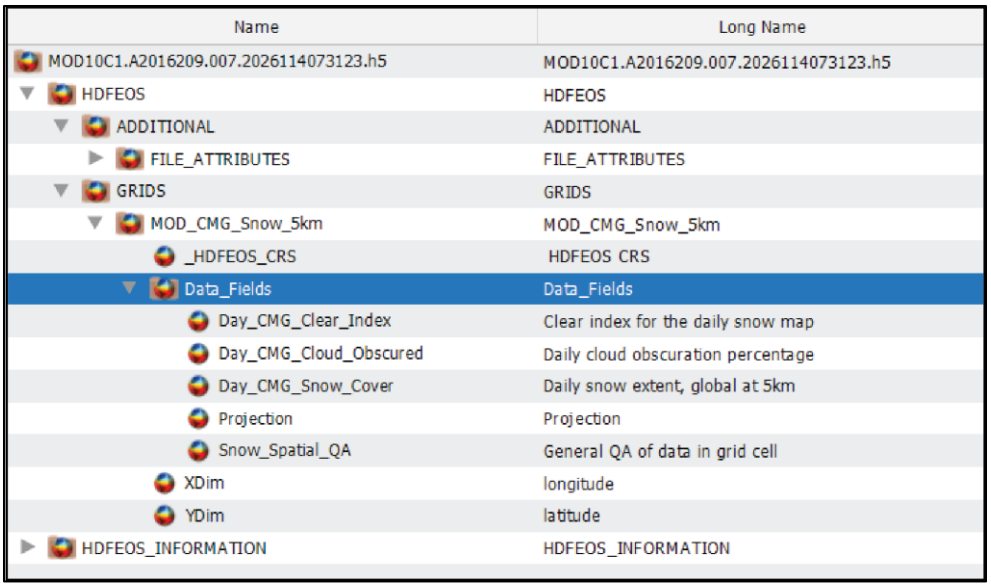


Figure 2. This figure shows the fields included in each data file as displayed with Panoply software.

1.3.3 Ancillary Files

A browse image file (`.jpg`) and metadata file (`.xml`) are provided with each data file.

1.3.4 Naming Convention

Files are named according to the following convention and as described in Table 2.

File naming convention:

`MOD[PID].A[YYYY][DDD][VVV].[yyyy][ddd][hhmmss].hdf`

Table 2. File Name Variables

`MOD`	MODIS/Terra
`PID`	Product ID
`A`	Acquisition date follows
`YYYY`	Acquisition year
`DDD`	Acquisition day of year
`VVV`	Version (Collection) number
`yyyy`	Production year
`ddd`	Production day of year
`hhmmss`	Production hour/minute/second in GMT
`.h5`	HDF-EOS5 formatted data file

File name example

`MOD10C1.A2024347.007.2026167200400.h5`

Note: Data files contain important metadata including global attributes that are assigned to the file and local attributes like coded integer keys that provide details about the data fields. In addition, each HDF-EOS5 data file has a corresponding XML metadata file (`.xml`) which contains some of the same internal metadata as the HDF-EOS5 file plus additional information regarding user support, archiving, and granule-specific post-production.

1.4 Spatial Information

1.4.1 Coverage

Coverage is global. Terra's sun-synchronous, near-polar circular orbit is timed to cross the equator from north to south (descending node) at approximately 10:30 A.M. local time. See Section 2.2 for additional information about Terra's ongoing orbital drift. Complete global coverage occurs every one to two days (more frequently near the poles). The following sites offer tools that track and predict Terra's orbital path:

- Daily Terra Orbit Tracks, Space Science and Engineering Center, University of Wisconsin-Madison
- NASA LaRC Satellite Overpass Predictor (includes viewing zenith, solar zenith, and ground track distance to specified lat/lon)

1.4.2 Projection

MODIS CMG data sets are provided in geographic latitude/longitude coordinates. For additional details about the MODIS CMG see the NASA MODIS Lands | MODIS Grids web page.

1.4.3 Resolution

0.05°

1.4.4 Geolocation

The following tables provide information for geolocating this data set.

Table 3. Projection Details

Region	Global
Geographic coordinate system	WGS84
Projected coordinate system	Geographic Lat/Lon
Longitude of true origin	0°
Latitude of true origin	0°
Scale factor at longitude of true origin	1.0
Datum	WGS 84
Ellipsoid/spheroid	WGS 84
Units	degrees
False easting	0°
False northing	0°
EPSG code	4326
PROJ4 string	+proj=longlat +datum=WGS84 +no_defs
Reference	https://epsg.io/4326

Table 4. Grid Details

Region	Global
Grid cell size (x, y pixel dimensions)	0.05°
Number of rows	3600
Number of columns	7200
Nominal gridded resolution	0.05°
Grid rotation	N/A
Geolocated upper left point in grid	-180.0°(x), 90.0°(y)
Geolocated lower right point in grid	180.0°(x), -90.0°(y)

1.5 Temporal Information

1.5.1 Coverage

MODIS Terra data are available from 24 February 2000 to present. However, because the NDSI depends on visible light, data are not produced when viewing conditions are too dark. In addition, anomalies over the course of the Terra mission have resulted in minor data outages. If you cannot locate data for a particular date or time, check the MODIS/Terra Data Outages web page.

1.5.2 Resolution

Daily

2 DATA ACQUISITION AND PROCESSING

2.1 Background

The processing for MODIS Collection 7 (C7) applies required changes to the calibration algorithms to address known satellite issues resulting from the Terra constellation exit and the discontinuation of Terra/Aqua Inclination Adjustment Maneuvers (IAM) and Drag Make-Up (DMU) Maneuver. These issues include:

- Orbital drift
- Optical and electronic crosstalk across different bands and detectors
- Terra mirror side polarization effect

These changes primarily affect the L1 Geolocation and calibrated top of the atmosphere (TOA) land products, which include the L1B input products for MOD10_L2. These changes are described in greater detail in the MODIS Land C7 Changes documentation. No changes have been made to the MODIS snow cover algorithm as part of the C7 updates. These MODIS C7 snow and ice data projects have also been updated from HDF-EOS2 to HDF-EOS5 format.

This data set provides daily global maps of the snow cover extent, cloud cover extent, and clear index extent. Snow cover extent and cloud cover extent are provided as the percentage of snow-covered land or cloud-covered land mapped in the CMG cell. The clear index extent is provided as the percentage of all land observations in the cell that were clear, thus producing an estimate of the amount of land surface that was observable.

2.2 Acquisition

MODIS scans the entire globe every one to two days. As such, most locations on Earth are imaged at least once per day and more frequently where swaths overlap, such as near the poles. Terra's sun-synchronous, near-circular polar orbit is timed to cross the equator from north to south (descending node) at approximately 10:30 A.M. local time.

Ongoing changes in the Terra orbit
The Terra flight operations team conducted Terra's last inclination adjust maneuver to maintain Terra's orbit in February 2020. The inclination adjust maneuvers were used to control the platform's 10:30 AM mean local time (MLT) equator crossing. Terra continued to drift and reached a 10:15 AM MLT in October 2022. On 12 October and 19 October 2022, the flight operations team performed two retrograde maneuvers, which caused Terra to exit the Earth Sciences Constellation and lower to an altitude of 694 km by. MLT continued to drift after these maneuvers, reaching 9:06 AM as of December 2025. Estimated monthly changes in the MLT for Terra MODIS can be found here. Orbital drift has impacted MODIS data

products, but Terra MODIS is expected to remain operational until the end of the mission in February 2027.

Earlier crossing times for a morning platform like Terra mean lower solar elevations leading to more prevalent shadows. This decrease in orbit altitude alters the spatial coverage of the sensor including possible gaps in spatial sampling, decreased spatial coverage, and higher spatial resolution. Products are mostly expected to be science quality except for reduced grid size (from lower altitude) and without a strict 16-day repeat of observations (from drift and changing orbit).

2.3 Sources

Table 5 lists the data set and parameter inputs to the MODIS CMG binning algorithm.

Table 5. Inputs to the MOD10C1 CMG Binning Algorithm

Product ID	Long Name	Parameters
MOD10A1	MODIS/Terra Snow Cover Daily L3 Global 500m SIN Grid, Version 7	NDSI_Snow_Cover NDSI_Snow_Cover_Algorithm_Flags_QA NDSI_Snow_Cover_Basic_QA

2.4 Processing

The MOD10C1 CMG binning algorithm is used to calculate the snow cover extent, cloud cover extent, and associated quality values mapped to CMG grid cells. The algorithm maps 500 m MOD10A1 'NDSI_Snow_Cover' observations into 0.05° (approx. 5 km) CMG cells. Approximately, 100 MOD10A1 'NDSI_Snow_Cover' observations are mapped into each CMG cell. The mapped observations are binned by feature type (snow, cloud, night, ocean, etc.) and counted to identify the most frequently occurring feature type in the CMG cell. The observation counts are then used to determine the feature type assigned to the CMG cell. Specific details are provided below.

2.4.1 Snow Cover Extent

The percent of snow cover mapped to each CMG cell is calculated by computing the ratio of MOD10A1, 500 m snow cover observations to the total number of land observations that were mapped into the CMG cell. To assist with counting, the binning algorithm converts NDSI snow cover values to a binary snow/no snow flag, with NDSI > 0 indicating the presence of at least some snow. The result is expressed as the percentage of snow observations mapped in the CMG cell. The valid range of snow cover extent is 0-100%.

2.4.2 Cloud Cover Extent

The percent of cloud cover mapped to each CMG cell is calculated by computing the ratio of MOD10A1, 500 m cloud cover observations to the total number of land observations that were mapped into the CMG cell. The result is expressed as the percentage of cloud observations mapped in the CMG cell. The valid range of cloud cover extent is 0-100%.

2.4.3 Clear Index Extent

The clear index reports the fraction of all land observations in the cell that were observed under clear sky conditions. Though calculated independently from observation counts, the clear index is essentially 100 minus the percentage of cloud cover and can be used to assess the quality of the cell's snow cover value. A high clear index indicates predominantly clear-sky conditions; low values correspond to cells with extensive cloud cover and indicate that the snow cover estimate was derived from a partial view of the land surface.

2.4.4 Inland Water

Inland water bodies are identified using the inland water bit flag in the MOD10A1 'NDSI_Snow_Cover_Algorithm_Flags_QA' array. The number of water body observations in a CMG grid cell are counted and tallied. If the water body has more lake ice observations than open water observations it is interpreted as lake ice. In the output data arrays, pixels with inland water are assigned a value '237', pixels with lake ice are assigned a value '107', and cloud obscured lakes are assigned a value of '250'.

2.4.5 Ocean

A CMG-specific land mask was made for use with the binning algorithm. The 0.05° land mask was derived from the University of Maryland 1km global land cover data set. If a CMG cell contains 12% or greater land then it is considered land and analyzed; if less than 12% it is considered ocean. This threshold was selected as a balance that minimized snow errors along coasts yet was sensitive to mapping snow along coasts.

2.4.6 Night

The polar darkness extent is based on the latitude of the CMG cell nearest the equator that is full of night observations. All CMG cells poleward of that latitude are filled as night. This approach was adopted so that a neat demarcation of night and day is visible in the CMG.

2.4.7 Antarctica

To improve the visual quality of data, Antarctica has been masked as 100% snow covered using the MODIS land/water mask. As such, this data set cannot be used to map snow in Antarctica. For users who wish to evaluate Antarctica, the MOD10_L2 data set offers a higher resolution and contains more data and information about accuracy and error.

2.4.8 Global Mask

A global mask is applied at the end of the algorithm to eliminate erroneous snow cover detections in regions where snow is extremely unlikely, such as the Amazon, the Sahara, and the Great Sandy Desert. The presence of snow cover in these regions stems from erroneous snow detections in the MOD10_L2 data set which are carried forward through the processing chain to the CMG. The mask is specifically designed to eliminate extremely unlikely snow cover in the CMG while allowing it in regions where snow may be a rare event.

2.5 Quality Information

The 'Snow_Spatial_QA' parameter contains quality assurance (QA) values mapped from the MOD10A1 'NDSI_Snow_Cover_Basic_QA' field. These values provide a qualitative estimate of the algorithm result, for each pixel, based on the input data and solar zenith data. The QA value applied to a CMG cell is the most frequently occurring MOD10A1 'NDSI_Snow_Cover_Basic_QA' value mapped into the cell. The binning algorithm returns the most frequent QA value for each CMG cell, and if there is a QA value tie, the highest QA value of the tied values is reported in the 'Snow_Spatial_QA' SDS. For a detailed description of the QA values, see the MOD10A1 user guide.

2.6 Errors

NDSI has proven to be a robust indicator of snow cover. Numerous investigators have utilized MODIS snow cover data sets and reported accuracy in the range of 88% to 93%. Snow commission errors (detecting snow where there is no snow) are typically associated with cloud cover and thus snow errors may appear on any day in conjunction with cloud cover. Users should consider how best to interpret and use the snow cover data, or whether to combine it with the cloud cover data.

To reduce erroneous snow cover detections in regions of the world that climatologically should never have snow, a global 'snow impossible' mask is applied in the algorithm. This mask improves the synoptic quality of the data set, but at the expense of not detecting highly unusual snowfall. If a

highly unusual snowfall event occurs, the MOD10_L2 and MOD10A1 products should be used to investigate the event.

Snow errors are ultimately propagated from MOD10_L2 to MOD10A1 and then into this data set. For additional details, regarding potential error sources in the input data, see the MODIS Snow Products Collection 7 User Guide (Riggs et al., 2025).

2.7 Instrumentation

2.7.1 Description

The MODIS instrument provides 12-bit radiometric sensitivity in 36 spectral bands ranging in wavelength from 0.4 µm to 14.4 µm. Two bands are imaged at a nominal resolution of 250 m at nadir, five bands at 500 m, and the remaining bands at 1000 m. A ±55 degree scanning pattern at an altitude of 705 km achieves a 2330 km swath with global coverage every one to two days.

The scan mirror assembly uses a continuously rotating, double-sided scan mirror to scan ±55 degrees and is driven by a motor encoder built to operate 100 percent of the time throughout the six-year instrument design life. The optical system consists of a two-mirror, off-axis afocal telescope which directs energy to five refractive objective assemblies, one each for the visible, near-infrared, shortwave infrared, middle-wavelength infrared, and long-wavelength infrared spectral regions. The MODIS instruments on the Terra and Aqua space vehicles were built to NASA specifications by Santa Barbara Remote Sensing, a division of Raytheon Electronics Systems. **Error! Reference source not found.** contains the instruments' technical specifications.

Table 6. MODIS Technical Specifications

Variable	Description
Orbit	~693 km altitude, ~9:30 A.M. descending node (Terra), sun-synchronous, near-polar, circular as of April 2026 (affected by ongoing orbital drift)
Scan Rate	20.3 rpm, cross track
Swath Dimensions	2330 km (cross track) by 10 km (along track at nadir)
Telescope	17.78 cm diameter off-axis, afocal (collimated) with intermediate field stop
Size	1.0 m x 1.6 m x 1.0 m
Weight	228.7 kg
Power	162.5 W (single orbit average)
Data Rate	10.6 Mbps (peak daytime); 6.1 Mbps (orbital average)
Quantization	12 bits

Variable	Description
Spatial Resolution	250 m (bands 1-2) / 500 m (bands 3-7) / 1000 m (bands (8-36)
Design Life	6 years

2.7.2 Calibration

MODIS has a series of on-board calibrators that provide radiometric, spectral, and spatial calibration of the MODIS instrument. The blackbody calibrator is the primary calibration source for thermal bands between 3.5 µm and 14.4 µm, while the Solar Diffuser (SD) provides a diffuse, solar-illuminated calibration source for visible, near-infrared, and short-wave infrared bands. The Solar Diffuser Stability Monitor tracks changes in the reflectance of the SD with reference to the sun so that potential instrument changes are not incorrectly attributed to changes in this calibration source. The Spectroradiometric Calibration Assembly provides additional spectral, radiometric, and spatial calibration.

MODIS uses the moon as an additional calibration technique and for tracking degradation of the SD by referencing the illumination of the moon since the moon's brightness is approximately the same as that of the Earth. Finally, MODIS deep space views provide a photon input signal of zero, which is used as a point of reference for calibration.

3 VERSION HISTORY

MODIS C7 snow products are derived using the same science algorithm used in MODIS C6.1 reprocessing. Differences between the C7 and C6.1 snow products are a result of changes in the calibration of the input products (MODIS L1B), including a new land/water mask and updated geolocation LUTs. Data product file format was also updated to HDF5. Details of these changes can be found in the MODIS Land C7 Changes documentation.

4 SOFTWARE AND TOOLS

The following sites can help you identify the right MODIS data for your study:

- NASA's Earth Observing System Data and Information System | Near Real-Time Data
- NASA Goddard Space Flight Center | MODIS Land Global Browse Images
- MODIS Land Discipline Group (MODLAND) Tile Calculator
- Tile Bounding Coordinates for the MODIS Sinusoidal Grid

The following resources are available to help users work with MODIS data:

- The HDF-EOS to GeoTIFF Conversion Tool (HEG) can reformat, re-project, and perform stitching/mosaicing and subsetting operations on HDF-EOS objects.
- HDFView is a simple, visual interface for opening, inspecting, and editing HDF files. Users can view file hierarchy in a tree structure, modify the contents of a data set, add, delete and modify attributes, and create new files.
- The MODIS Conversion Toolkit (MCTK) plug-in for ENVI can ingest, process, and georeference MODIS data sets, including products distributed with EASE-Grid projections. The toolkit includes support for swath projection and grid reprojection and comes with an API for large batch processing jobs.

5 RELATED WEBSITES

The following resources provide additional information about MODIS Version 6.1 data, including known problems, production schedules, and future plans:

- The MODIS Snow and Sea Ice Global Mapping Project
- NASA LDOPE | MODIS/VIIRS Land Product Quality Assessment

6 REFERENCES

Hall, D.K., Riggs, G.A. and Salomonson, V.V. 2001. Algorithm Theoretical Basis Document (ATBD) for MODIS Snow and Sea Ice-Mapping Algorithms. Guide. NASA Goddard Space Flight Center, Greenbelt, MD.

Riggs, G.A., Hall, D.K. and Roman, M.O. 2015. VIIRS Snow Cover Algorithm Theoretical Basis Document (ATBD). NASA Goddard Space Flight Center, Greenbelt, MD. (See PDF)

Riggs, G.A. and Hall, D.K. 2025. MODIS Snow Products Collection 7 User Guide. NASA Goddard Space Flight Center, Greenbelt, MD. (See PDF)

7 DOCUMENT INFORMATION

7.1 Publication Date

November 2026

7.2 Date Last Updated

November 2026

APPENDIX A - FILE SPECIFICATIONS

```
+=====================================================================+
MODIS/Terra Snow Cover Daily L3 Global 0.05Deg CMG
MOD10C1
File Spec Generated: 2026-07-17
PGE Version: 7.0.0

Product ID:  MOD10
Process:     MOD_PR10C1
ESDT:        MOD10C1
Product name:MODIS/Terra Snow Cover Daily L3 Global 0.05Deg CMG
Product Level:     3


Point of Contact:       George Riggs
                    SSAI
                    NASA, GSFC, Code 971
                    Greenbelt, MD 20771
                    301-614-5650
                    George.A.Riggs.1@gsfc.nasa.gov

                    Sudipta Sarkar
                    SSAI
                    NASA, GSFC, Code 619
                    Greenbelt, MD 20771
                    301-614-6912
                    Sudipta.Sarkar@nasa.gov

Principal Investigator: Vincent V. Salomonson
                    NASA, GSFC, Code 900
                    Greenbelt, MD 20771
                    301-614-5631
                    Vincent.V.Salomonson@nasa.gov

Associate Investigator: Dorothy K. Hall
                        NASA, GSFC, Code 971
                        Greenbelt, MD 20771
                        301-614-5771
                        Dorothy.K.Hall@nasa.gov
Description:

Specification description of the MOD10C1 Climate Modeling
Grid (CMG) daily snow product at 0.05Deg resolution.

Descriptions of the SDSs are given along with a listing of the global
attributes,
local attributes, dimensions, and content of the SDSs.

The level 3 CMG snow cover product is archived in HDF-EOS
format and consists of 4 global attributes and 4 SDSs
with local attributes.  The CMG is in the HDF-EOS geographic projection
with a cell resolution of 0.05 degrees (approximately 5.55 km).
+=====================================================================+

GLOBAL ATTRIBUTES
```

Attribute Name	Data Type	Value
AlgorithmPackageAcceptanceDate	STRING	09-2013
AlgorithmPackageMaturityCode	STRING	Normal
AlgorithmPackageName	STRING	MOD_PR10C1
AlgorithmPackageVersion	STRING	7
AssociatedSensorShortName	STRING	MODIS
AutomaticQualityFlag	STRING	Passed
AutomaticQualityFlagExplanation	STRING	No automatic quality assessment done in the PGE
Conventions	STRING	CF-1.6, ACDD-1.3
DESCRrevision	STRING	7

DayNightFlag	STRING	Both
GlobalGridColumns	int32	[7200]
GlobalGridRows	int32	[3600]
GranuleID	STRING	MOD10C1.A2000105.007.2026024064812.h5
InputDataProducts	STRING	cmgTL5km_global_anc.hdf, MOD10A1.A2000105.h14v00.007.2026024054806.h5, MOD10A1.A2000105.h15v00.007.2026024060011.h5, MOD10A1.A2000105.h16v00.007.2026024062122.h5, ... MOD10A1.A2000105.h21v16.007.2026024061012.h5, MOD10A1.A2000105.h22v16.007.2026024061214.h5, MOD10A1.A2000105.h23v16.007.2026024060835.h5
InstrumentName	STRING	Moderate Resolution Imaging Spectroradiometer
LocalVersionID	STRING	SCF V6.0.0

LocalityValue	STRING	Global
LongName	STRING	MODIS/Terra Snow Cover Daily L3 Global 0.05Deg CMG
PGEVersion	STRING	7.0.0
ParameterName	STRING	Global Snow Cover
PlatformShortName	STRING	Terra
ProcessingCenter	STRING	MODAPS
ProcessingDateTime	STRING	2026-01-24T01:47:36.000000Z
ProcessingEnvironment	STRING	Linux minion20091 5.4.0-1123-fips #133-Ubuntu SMP Tue Jul 15 03:23:09 UTC 2025 x86_64 x86_64 x86_64 GNU/Linux
ProductionDateTime	STRING	2026-01-24T06:48:12.000Z
QAPERCENTGOODQUALITY	STRING	64

QAPERCENTOTHERQUALITY	STRING	36
QAPercentCloudCover	int32	[22]
QAPercentMissingData	int32	[0]
RangeBeginningDate	STRING	2000-04-14
RangeBeginningTime	STRING	00:00:00
RangeEndingDate	STRING	2000-04-14
RangeEndingTime	STRING	23:59:59
ReprocessingActual	STRING	reprocessed
ReprocessingPlanned	STRING	further update is anticipated
SNOWCOVERPERCENT	STRING	44
SPSOParameters	STRING	none

ScienceQualityFlag	STRING	Not Investigated
ScienceQualityFlagExplanation	STRING	See https://landweb.modaps.eosdis.nasa.gov/prodqa?sat=Terra for the product Science Quality status.
ShortName	STRING	MOD10C1
VersionID	int32	[7]
ZoneIdentifier	STRING	Other Grid System
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creator_email	STRING	modis-ops@lists.nasa.gov
creator_name	STRING	MODAPS
creator_url	STRING	https://ladsweb.modaps.eosdis.nasa.gov

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geospatial_lon_max	float64	[180.]
geospatial_lon_min	float64	[-180.]
identifier_product_doi	STRING	10.5067/VWL799JNRZ2N
institution	STRING	NASA Goddard Space Flight Center, LAADS
instrument	STRING	MODIS
keywords_vocabulary	STRING	NASA Global Change Master Directory (GCMD) Science Keywords
license	STRING	https://www.earthdata.nasa.gov/engage/open-data-services-software-policies/data-use-guidance
naming_authority	STRING	https://doi.org
platform	STRING	Terra

```
+---------------------------------+-------------+-----------------------------
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|
+---------------------------------+-------------+-----------------------------
------------------------------------------------------------------------------
--+
| publisher_name                  | STRING      | LAADS
|
+---------------------------------+-------------+-----------------------------
------------------------------------------------------------------------------
--+
| publisher_url                   | STRING      |
https://ladsweb.modaps.eosdis.nasa.gov
|
+---------------------------------+-------------+-----------------------------
------------------------------------------------------------------------------
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+=============================================================================+

FILE STRUCTURE

├──── HDFEOS
│    ├──── ADDITIONAL
│    │    └──── FILE_ATTRIBUTES
│    └──── GRIDS
│         └──── MOD_CMG_Snow_5km
│              ├──── Data Fields
│              │    ├──── Day_CMG_Clear_Index
│              │    ├──── Day_CMG_Cloud_Obscured
│              │    ├──── Day_CMG_Snow_Cover
│              │    ├──── Projection
│              │    └──── Snow_Spatial_QA
│              ├──── XDim
│              └──── YDim
└──── HDFEOS INFORMATION
     └──── StructMetadata.0

+=============================================================================+

SDS Layers

SDS names:
       Day_CMG_Snow_Cover
       Day_CMG_Clear_Index
       Day_CMG_Cloud_Obscured
       Snow_Spatial_QA

+=============================================================================+

SDS Name: Day_CMG_Clear_Index
Data Type: uint8

Data is the percentage of land observed (clear sky view of the surface) in a
```

CMG cell based on the total amount of land that could be in the CMG cell. An ancillary data file of the amount of land in a CMG cell, as determined from the land/water mask, was created and used for the base of this percentage. If all the land area in a cell was observable the data value would be 100. The percentage
of snow in a cell is related to this value in that this value indicates how much
confidence may be associated with the amount of snow reported for the cell.

Attribute Name	Data Type	Value
Antarctica_clear_index_note	STRING	Antarctica deliberately mapped as snow. Clear index set to 100.
Cell_resolution	STRING	0.05 deg
DIMENSION_LIST	COMPOUND	
Key	STRING	0-100=clear index value, 107=lake ice, 111=night, 237=inland water, 239=ocean, 250=cloud obscured water, 253=data not mapped, 255=fill
Water_mask_land_threshold (%)	float32	[12.]
_FillValue	uint8	[255]
coordinates	STRING	/HDFEOS/GRIDS/MOD_CMG_Snow_5km/YDim /HDFEOS/GRIDS/MOD_CMG_Snow_5km/XDim
coordsys	STRING	latitude, longitude
grid_mapping	STRING	Projection
long_name	STRING	Clear index for the daily snow map
units	STRING	none
valid_range	uint8	[0 100]

SDS Name: Day_CMG_Cloud_Obscured
Data Type: uint8

This SDS provides a daily global view of the amount of cloud obscuration observed in a cell for the period.
Data given is the percentage of cloud-covered land based on the amount of land in the CMG cell.

Attribute Name	Data Type	Value
Antarctica_cloud_note	STRING	Antarctica deliberately mapped as snow. Cloud value set to 252
Cell_resolution	STRING	0.05 deg
DIMENSION_LIST	COMPOUND	
Key	STRING	0-100=percent of cloud in cell, 107=lake ice, 111=night, 237=inland water, 239=ocean, 250=cloud obscured water, 252=Antarctica mask, 253=data not mapped, 255=fill
Water_mask_land_threshold (%)	float32	[12.]
_FillValue	uint8	[255]
coordinates	STRING	/HDFEOS/GRIDS/MOD_CMG_Snow_5km/YDim /HDFEOS/GRIDS/MOD_CMG_Snow_5km/XDim
coordsys	STRING	latitude, longitude
grid_mapping	STRING	Projection
long_name	STRING	Daily cloud obscuration percentage
units	STRING	none
valid_range	uint8	[0 100]

SDS Name: Day_CMG_Snow_Cover

Data Type: uint8

This SDS provides a daily global view of snow cover extent at 0.05 x 0.05 degree resolution. Data given is the percentage of snow-covered land based on the total amount of land that could be in the CMG cell. This value is based on the counts of pixels binned into the CMG cell from the daily snow tiled product (MOD10A1).

Attribute Name	Data Type	Value
Antarctica_snow_note	STRING	Antarctica deliberately mapped as snow
Cell_resolution	STRING	0.05 deg
DIMENSION_LIST	COMPOUND	
Key	STRING	0-100=percent of snow in cell, 107=lake ice, 111=night, 237=inland water, 239=ocean, 250=cloud obscured water, 253=data not mapped, 255=fill
Water_mask_land_threshold (%)	float32	[12.]
_FillValue	uint8	[255]
coordinates	STRING	/HDFEOS/GRIDS/MOD_CMG_Snow_5km/YDim /HDFEOS/GRIDS/MOD_CMG_Snow_5km/XDim
coordsys	STRING	latitude, longitude
grid_mapping	STRING	Projection
long_name	STRING	Daily snow extent, global at 5km
units	STRING	none
valid_range	uint8	[0 100]

SDS Name: Projection
Data Type: int32

Attribute Name	Data Type	Value
grid_mapping_name	STRING	latitude_longitude

SDS Name: Snow_Spatial_QA
Data Type: uint8

Data given indicates the quality of the result in each cell of the CMG. QA values describe input data binned into each 0.05 degree cell.

Attribute Name	Data Type	Value
Antarctica_QA_note	STRING	Antarctica deliberately mapped as snow. QA value set to 252.
Cell_resolution	STRING	0.05 deg
DIMENSION_LIST	COMPOUND	
Water_mask_land_threshold (%)	float32	[12.]
_FillValue	uint8	[255]
coordinates	STRING	/HDFEOS/GRIDS/MOD_CMG_Snow_5km/YDim /HDFEOS/GRIDS/MOD_CMG_Snow_5km/XDim
coordsys	STRING	latitude, longitude
grid_mapping	STRING	Projection
key	STRING	0=best, 1=good, 2=ok, 3=poor, 4=other, 237=inland water, 239=ocean, 250=cloud obscured water 252=Antarctica mask, 253=not mapped, 254=no retrieval 255=fill
long_name	STRING	General QA of data in grid cell
units	STRING	none

```
valid_range                     uint8        [0 4]
+=================================================================+

SDS Name: XDim
Data Type: float64

Attribute Name          Data Type    Value
CLASS                   STRING       DIMENSION_SCALE
NAME                    STRING       XDim
REFERENCE_LIST          COMPOUND
_FillValue              float64      [-999.]
coverage_content_type   STRING       coordinate
standard_name           STRING       longitude
units                   STRING       degrees_east
valid_range             float64      [-180.  180.]
+=================================================================+

SDS Name: YDim
Data Type: float64

Attribute Name          Data Type    Value
CLASS                   STRING       DIMENSION_SCALE
NAME                    STRING       YDim
REFERENCE_LIST          COMPOUND
_FillValue              float64      [-999.]
coverage_content_type   STRING       coordinate
standard_name           STRING       latitude
units                   STRING       degrees_north
valid_range             float64      [-90.  90.]

+=================================================================+

STRUCTURE METADATA

GROUP=SwathStructure
END_GROUP=SwathStructure
GROUP=GridStructure
      GROUP=GRID_1
            GridName="MOD_CMG_Snow_5km"
            XDim=7200
            YDim=3600
            UpperLeftPointMtrs=(-180000000.000000,90000000.000000)
            LowerRightMtrs=(180000000.000000,-90000000.000000)
            GridOrigin=HE5_HDFE_GD_UL
            Projection=HE5_GCTP_GEO
            SphereCode=12
            GROUP=Dimension
                  OBJECT=Dimension_1
                        DimensionName="XDim"
                        Size=7200
                  END_OBJECT=Dimension_1
                  OBJECT=Dimension_2
                        DimensionName="YDim"
                        Size=3600
                  END_OBJECT=Dimension_2
                  OBJECT=Dimension_3
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                        DimensionName="dimofone"
                        Size=1
                  END_OBJECT=Dimension_3
            END_GROUP=Dimension
            GROUP=DataField
                  OBJECT=DataField_1
                        DataFieldName="Day_CMG_Snow_Cover"
                        DataType=H5T_NATIVE_UCHAR
                        DimList=("YDim","XDim")
                        MaxdimList=("YDim","XDim")
                  END_OBJECT=DataField_1
                  OBJECT=DataField_2
                        DataFieldName="Day_CMG_Clear_Index"
                        DataType=H5T_NATIVE_UCHAR
                        DimList=("YDim","XDim")
                        MaxdimList=("YDim","XDim")
                  END_OBJECT=DataField_2
                  OBJECT=DataField_3
                        DataFieldName="Day_CMG_Cloud_Obscured"
                        DataType=H5T_NATIVE_UCHAR
                        DimList=("YDim","XDim")
                        MaxdimList=("YDim","XDim")
                  END_OBJECT=DataField_3
                  OBJECT=DataField_4
                        DataFieldName="Snow_Spatial_QA"
                        DataType=H5T_NATIVE_UCHAR
                        DimList=("YDim","XDim")
                        MaxdimList=("YDim","XDim")
                  END_OBJECT=DataField_4
                  OBJECT=DataField_5
                        DataFieldName="Projection"
                        DataType=H5T_NATIVE_INT
                        DimList=("dimofone")
                        MaxdimList=("dimofone")
                  END_OBJECT=DataField_5
            END_GROUP=DataField
            GROUP=MergedFields
            END_GROUP=MergedFields
      END_GROUP=GRID_1
END_GROUP=GridStructure
GROUP=PointStructure
END_GROUP=PointStructure
GROUP=ZaStructure
END_GROUP=ZaStructure
END
```