

# MOD10\_L2 and MYD10\_L2 Snow Cover Attributes, Version 5

## MOD10\_L2 AND MYD10\_L2 GLOBAL SNOW COVER ATTRIBUTES

The MOD10\_L2 and MYD10\_L2 snow cover product data files include three Earth Observing System Data and Information System (EOSDIS) Core System (ECS) global attributes. These global attributes are stored as character strings in Parameter Value Language (PVL) format. Also, these global attributes as well as other attributes can be found in the associated metadata file, and are formatted as Extensible Markup Language (XML). The metadata file should be examined to determine if post-production changes were made to the metadata. Post-production metadata changes are not updated in the data file. Changes such as Quality Assessment (QA) updates are only reflected in the metadata file.

### CoreMetadata.0

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Also known as inventory metadata, core metadata are used to populate the EOSDIS Core System (ECS) inventory, which allows users to locate granules of interest.

Object Name	Comments	Sample Value
ShortName	Earth Science Data Type (ESDT), name of product.	MOD10_L2
VersionID	ECS Version.	5
ReprocessingActual	Number of times processed.	Reprocessed
ReprocessingPlanned	Expect that products will be reprocessed at least once.	Further update is anticipated
LocalGranuleID		MOD10_L2.A2003018.0850.005.2006114140551.hdf
DayNightFlag	Snow will have either day or both.	Day
ProductionDateTime	Time granule was produced.	2006-04-24T14:07:21.000Z
LocalVersionID	Version of algorithm delivered from the Science Computing Facility (SCF).	SCF V5.0.4



Object Name	Comments	Sample Value
PGEVersion	Version of product generation executable.	5.0.7
InputPointer	Input data files used to create this product.	MOD02HKM.A2003018.0850.005.2006101121411.hdf, MOD021KM.A2003018.0850.005.2006101121411.hdf, MOD35_L2.A2003018.0850.005.2006101163640.hdf, MOD03.A2003018.0850.005.2006096190808.hdf
RangeBeginningDate	Beginning date of the first scan line in the swath.	2003-01-18
RangeBeginningTime	Beginning time of the first scan line in the swath.	08:50:00.000000
RangeEndingDate	Ending date of the last scan line in the swath.	2003-01-18
RangeEndingTime	Ending time of the last scan line in the swath.	08:55:00.000000
ExclusionGringFlag		N
GringPointLatitude	Geographic latitude bounds of swath coverage.	48.3023932188235 43.9668888867059 26.6986732791391 29.9350067242648
GringPointLongitude	Geographic longitude bounds of swath coverage.	18.1975758658798 48.3580849897086 40.397145450837 16.5230375402673
GringPointSequenceNo		1,2,3,4
OrbitNumber		16412
EquatorCrossingLongitude		21.953256171555
EquatorCrossingDate		2003-01-18
EquatorCrossingTime		09:03:02.194649
ParameterName	Parameter for which QA statistics are given in this metadata object.	Snow Cover
AutomaticQualityFlag	Result of automated checks during the run of the algorithm that screens for significant amounts of anomalous data.	Passed

Object Name	Comments	Sample Value
AutomaticQualityFlagExplanation	Explanation of result of automated QA checks made during execution.	No automatic quality assessment done in the PGE
ScienceQualityFlag	Set by snow investigator after post-production investigation.	Not investigated
ScienceQualityFlagExplanation	Explanation of Science Flag.	Visit <a href="#">Product Quality Documentation for MOD10_L2</a> for the product Science Quality status.
QAPercentMissingData		0
QAPercentCloudCover		34
AncillaryInputPointer	Location of geolocation input product in production system.	MOD03.A2003018.0850.005.2006096190808.hdf
AncillaryInputType	Type of ancillary data referenced by pointer.	Geolocation
AssociatedPlatformShortName		Terra
AssociatedInstrumentShortName		MODIS
AssociatedSensorShortName		MODIS

## CoreMetadata.0 Product Specific Attributes (PSAs)

The CoreMetadata.0 product specific metadata attributes can be found by using most search tools.

Object Name	Comments	Sample Value
QAPercentGoodQuality	Summary quality assurance statistics for data product.	90
QAPercentOtherQuality		3
GranuleNumber	Unique granule identifier.	254
SnowCoverPercent	Summary percentage of snow-covered land.	07

## ArchiveMetadata.0

These attributes contain information relevant to production of the data product. They also contain an alternate bounding of geographic coverage of the swath. These data are useful in determining what version of the algorithm was used to generate the product.

Object Name	Comment	Sample Value
EastBoundingCoordinate	Extent of swath coverage in latitude and longitude.	48.3549361672515
WestBoundingCoordinate		16.5452762107832
NorthBoundingCoordinate		48.2836681567257
SouthBoundingCoordinate		26.7862337500816
AlgorithmPackageAcceptanceDate	Algorithm descriptors.	05-2005
AlgorithmPackageMaturityCode		Normal
AlgorithmPackageName		MOD_PR10
AlgorithmPackageVersion		5
InstrumentName		Moderate-Resolution Imaging SpectroRadiometer
ProcessingDateTime		2006-04-24T14:07:21.000Z
LongName		MODIS/Terra Snow Cover 5-Min L2 Swath 500m
ProcessingCenter		MODAPS
SPSOParameters		None
LocalInputGranuleID	Names of input files.	MOD02HKM.A2003018.0850.005.2006101121411.hdf, MOD021KM.A2003018.0850.005.2006101121411.hdf, MOD35_L2.A2003018.0850.005.2006101163640.hdf, MOD03.A2003018.0850.005.2006096190808.hdf
DescrRevision		5.0
ProcessingEnvironment		Linux minion5035 2.6.8.1-26mdksmp #1 SMP Mon Nov 28 12:40:04 MST 2005 i686 Intel(R) Xeon(TM) CPU 2.80GHz unknown GNU/Linux

## StructMetadata.0

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These attributes specify the content and structure of an HDF-EOS file and are not discussed further here. For more information, please see the 2001 white paper titled [An HDF-EOS and Data Formatting Primer for the ECS Project](#).

## Product Specific Global Attributes

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These attributes are specific to the MOD10L2 and MYD10L2 snow cover product.

Attribute Name	Comment	Sample Value
HDFEOSVersion	Version of HDF-EOS Toolkit.	HDFEOS_V2.a
L1BCalibrationQuality	MODIS data general quality indicator.	marginal
L1BMissionPhase		Execution
L1BNadirPointing		Yes
L1BVersionID	Version of L1B processing algorithm.	2000-02-24
SCFAlgorithmVersion		<p>\$Id: MOD_PR10_AAmain.c,v 1.2 2006/01/19 23:19:52 powell Exp \$</p> <p>\$Id: MOD_PR10_ActionMessages.h,v 1.1 2005/05/19 16:15:52 powell Exp \$</p> <p>\$Id: MOD_PR10.h,v 1.4 2006/01/20 15:52:02 powell Exp \$</p> <p>\$Id: MOD_PR10_Process_L1B.c,v 1.2 2005/05/19 18:18:15 powell Exp \$</p> <p>\$Id: MOD_PR10_Compute_SfcTemp.c,v 1.2 2005/05/19 18:15:12 powell Exp \$</p> <p>\$Id: MOD_PR10_Process_SnowFile.c,v 1.2 2005/05/19 18:18:59 powell Exp \$</p> <p>\$Id: MOD_PR10_CopyL1BmetaToSnow.c,v 1.2 2005/05/19 18:15:48 powell Exp \$</p> <p>\$Id: MOD_PR10_CopyGEOmetaToSnow.c,v 1.2 2005/05/19 18:14:18 powell Exp \$</p> <p>\$Id: MOD_PR10_Process_GEO.c,v 1.1 2005/05/19 17:30:23 powell Exp \$</p> <p>\$Id: MOD_PR10_Process_Cloud.c,v 1.1 2005/05/19 17:30:23 powell Exp \$</p> <p>\$Id:</p>

Attribute Name	Comment	Sample Value
		MOD_PR10_Process_5kmS nowFile.c,v 1.2 2005/05/19 18:17:29 powell Exp \$ \$Id: MOD_PR10_Compute_Snow .c,v 1.3 2006/01/20 15:53:49 powell Exp \$ \$Id: MOD_PR10_Compute_Fracti onalSnow.c,v 1.4 2006/01/20 15:53:02 powell Exp \$ \$Id: MOD_PR10_UpdateCounts. c,v 1.1 2005/05/19 17:30:23 powell Exp \$ \$Id: MOD_PR10_MakeMeta.c,v 1.2 2005/05/19 18:16:34 powell Exp
Surface_Temperature_Scre en_Threshold	Temperature above which a pixel can not be classified as snow.	283.0
Shaded_Land_Screen_T hreshold	The difference in reflectance of MODIS Band 4 - Band 5 must be greater than this for a pixel to be mapped as snow.	0.20
HDFEOS_FractionalOffset_ Along_swath_lines_500m_ MOD_Swath_Snow	Fractional offset add to the along swath direction offset found in the HDFEOS structural metadata in order to correctly geolocate the data.	0.5
HDFEOS_FractionalOffset_ Cross_swath_pixels_500m_ _MOD_Swath_Snow	Fractional offset add to the cross swath direction offset found in the HDFEOS structural metadata in order to correctly geolocate the data.	0.0

# MOD10\_L2 AND MYD10\_L2 LOCAL SNOW COVER ATTRIBUTES

Local attributes describe the data and provide summary information about the results of the snow cover algorithm. Two types of local attributes are reported: Hierarchical Data Format (HDF) predefined and custom local attributes.

## HDF Predefined Local Attributes

Attribute Name	Reserved Label(s)	Definition	Sample Value
Label	long_name	Long name of the Scientific Data Set (SDS).	snow covered land
Unit	units	International System of Units (SI) of the data. This attribute may or may not be used.	none
Format	format	How the data should be viewed in Fortran format notation. Not used in the geolocation fields.	I3
Coordinate system	coordsys	Coordinate system to use for the data. Not used in the geolocation fields.	cartesian
Range	valid_range	Maximum and minimum values within a selected data range.	0-254
Fill value	fill_value	Data used to fill gaps in the swath.	255
Calibration	scale_factor scale_factor_err add_offset add_offset_err calibrated_nt	Not used.	not used

## Custom Local Attributes for the Snow\_Cover Field

Attribute Name	Definition	Sample Value	
Key	Key to the meaning of the coded integers within the SDS.	<b>Value</b>	<b>Description</b>
		0 = missing data	L1B data missing
		1 = no decision	no decision
		11 = night	darkness, terminator, or polar
		25 = no snow	snow-free land
		37 = lake	lake or inland water
		39 = ocean	open water
		50 = cloud	cloud obscured
		100 = lake ice	snow-covered lake ice
		200 = snow	snow-covered land
		254 = detector saturated	detector saturated
255 = fill	fill		
Nadir_data_resolution	Nominal spatial resolution of the pixels at nadir.	500 m	
Valid EV Obs Band 1	Percentage <sup>1</sup> of valid observations from Level 1B in Band 1 of the swath.	100.0	
Valid EV Obs Band 2	Percentage <sup>1</sup> of valid observations from Level 1B in Band 2 of the swath.	100.0	
Valid EV Obs Band 4	Percentage <sup>1</sup> of valid observations from Level 1B in Band 4 of the swath.	100.0	
Valid EV Obs Band 6	Percentage <sup>1</sup> of valid observations from Level 1B in Band 6 of the swath.	100.0	



Attribute Name	Definition	Sample Value
Saturated EV Obs Band 1	Percentage <sup>1</sup> of saturated observations from Level 1B in Band 1 of the swath.	0.342
Saturated EV Obs Band 2	Percentage <sup>1</sup> of saturated observations from Level 1B in Band 2 of the swath.	0.287
Saturated EV Obs Band 4	Percentage <sup>1</sup> of saturated observations from Level 1B in Band 4 of the swath.	0.779
Saturated EV Obs Band 6	Percentage <sup>1</sup> of saturated observations from Level 1B in Band 6 of the swath.	0.698

<sup>1</sup>These percentages are based on the total number of pixels in the swath (x dimensions \* y dimensions).

## Custom Local Attributes for the Snow\_Cover\_Pixel\_QA Field

Attribute Name	Definition	Value
Key	Explanation of the Quality Assessment (QA) Flag.	0 = good quality 1 = other quality 252 = Antarctica mask <sup>1</sup> 253 = land mask 254 = ocean mask 255 = fill

<sup>1</sup> Antarctica is not masked in the MOD10\_L2 product; however, it is masked in the Climate Modeling Grid (CMG) products such as MOD10C1. This is the standard QA key used for all the snow products.

## Custom Local Attributes for the Fractional\_Snow\_Cover Field

Attribute Name	Definition	Sample Value	
		Value	Description
Key	Key to the meaning of the coded integers within the SDS.	0 - 100 = fractional snow	in percent
		200 = missing data	L1B data missing
		201 = no decision	no decision
		211 = night	darkness, terminator, or polar
		225 = land	snow-free land
		237 = inland water	lake or inland water
		239 = ocean	open water
		250 = cloud	cloud obscured
		254 = detector saturated	detector saturated
		255 = fill	fill
Nadir_data_resolution	Data resolution at center of scan (space craft nadir direction).	500 m	

## Custom Local Attributes for the Latitude Field

Attribute Name	Definition	Sample Value
Source	Where the geolocation information came from.	MOD03 geolocation product; data read from center pixel in a 5 km box.

## Custom Local Attributes for the Longitude Field

Attribute Name	Definition	Sample Value
Source	Where the geolocation information came from.	MOD03 geolocation product; data read from center pixel in a 5 km box.