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Joint Polar Satellite System (JPSS) Algorithm Specification Volume II: Data Dictionary for the Cloud Mask

Block 2.0.0

Goddard Space Flight Center
Greenbelt, Maryland

National Aeronautics and
Space Administration

Joint Polar Satellite System (JPSS) Algorithm Specification Volume II: Data Dictionary for the Cloud Mask JPSS Review/Approval Page

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Preface

This document is under JPSS Ground ERB configuration control. Once this document is approved, JPSS approved changes are handled in accordance with Class I and Class II change control requirements as described in the JPSS Configuration Management Procedures, and changes to this document shall be made by complete revision.

Any questions should be addressed to:

JPSS Configuration Management Office
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Change History Log

Revision	Effective Date	Description of Changes (Reference the CCR & CCB/ERB Approve Date)	Sections Affected
0200-	Aug. 29, 2013	This version incorporates 474-CCR-13-1182 which was approved by JPSS Ground ERB on the effective date shown.	All
0200A	Jan 30, 2014	This version incorporates 474-CCR-13-1431 which was approved by JPSS Ground ERB on the effective date shown.	All
0200A1	Oct 23, 2014	This version incorporates 474-CCR-14-2091 which was approved by the JPSS Ground ERB for CO10 on the effective date shown.	All
0200B	Mar 02, 2015	This version incorporates 474-CCR-14-2087, 474-CCR-15-2284 and 474-CCR-15-2288 which was approved by the JPSS Ground ERB on the effective date shown.	All
0200C	Jul 28, 2015	This version incorporates 474-CCR-15-2506 which was approved by the JPSS Ground ERB on the effective date shown.	All
0200D	Feb 12, 2016	This version incorporates 474-CCR-15-2657, and 474-CCR-16-2784 which was approved by the JPSS Ground ERB on the effective date shown.	All

List of TBx Items

TBx	Type	ID	Text	Action
None				

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1 Introduction

1.1 Scope

The Joint Polar Satellite System (JPSS) Algorithm Specification for VIIRS Cloud Mask - Volume II: Data Dictionary contains the specifications for the format of the Cloud Mask Products (IPs) and Environmental Data Records (EDRs). This specification includes the format of the Hierarchical Data Format Release 5 (HDF5) files, as well as the product definitions. These formats are available to external users of the JPSS. For an overview of the data product formats, see 474-00001-01, JPSS CDFCB-X Vol I. For an overview of the metadata formats for data products, see 474-00448-02-01, JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms.

1.2 Organization

Section	Contents
Section 1	Provides information regarding the scope, and organization of this document, as reference material only.
Section 2	Lists parent documents and related documents that were used as sources of information for this document or that provide additional background information to aid understanding of the interface implementations.
Section 3	Provides an overview of the HDF5 UML for the data product types
Section 4	Provides a description of the contents of each JPSS Intermediate Product associated with this algorithm grouping.
Section 5	Provides a description of the contents of each JPSS EDR associated with this algorithm grouping.
Section 6	Provides a description of the Ancillary and Auxiliary Data Inputs if applicable.
Section 7	Provides a description of relevant Look-Up Tables (LUTs) and Processing Coefficient Tables (PCTs) associated with this algorithm grouping.
Appendix A	Provides the Data Mnemonic to Interface Mapping for the data products in this volume.
Appendix B	Provides a mapping of the quality flags by sensor and product that are reportable to the associated data product quality flag Test ID used in the processing environment.
Appendix C	Reference 470-00041, JPSS Program Lexicon
Attachment A	Provides the list of applicable xml files for this Data Dictionary.

2 Related Documentation

The latest JPSS documents can be obtained from URL: https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm. JPSS Project documents have a document number starting with 470, 472 or 474 indicating the governing Configuration Control Board (CCB) (Program, Flight, or Ground) that has the control authority of the document.

2.1 Parent Documents

The following reference document(s) is (are) the Parent Document(s) from which this document has been derived. Any modification to a Parent Document will be reviewed to identify the impact upon this document. In the event of a conflict between a Parent Document and the content of this document, the JPSS Program Configuration Change Board has the final authority for conflict resolution.

Document Number	Title
474-00448-01-11	JPSS Algorithm Specification Volume I: Software Requirements Specification (SRS)

2.2 Applicable Documents

The following document(s) is (are) the Applicable Document(s) from which this document has been derived. Any modification to an Applicable Document will be reviewed to identify the impact upon this document. In the event of conflict between an Applicable Document and the content of this document, the JPSS Program Configuration Change Board has the final authority for conflict resolution.

Document Number	Title
NPR 7150.2A	NASA Software Engineering Requirements
474-00167	Joint Polar Satellite System (JPSS) Common Ground System (CGS) Requirements Document
474-00005	Joint Polar Satellite System (JPSS) Government Resource for Algorithm Verification, Independent Testing, and Evaluation (GRAVITE) Requirements Document
N/A	Hierarchical Data Format, Version 5 (HDF5), http://www.hdfgroup.org/HDF5/

2.3 Information Documents

The following documents are referenced herein and amplify or clarify the information presented in this document. These documents are not binding on the content of this document.

Document Number	Title
D0001-M01-S01-011	Joint Polar Satellite System (JPSS) VIIRS Cloud Mask Algorithm Theoretical Basis Document (ATBD)
474-00448-03-11	Joint Polar Satellite System (JPSS) Algorithm Specification Volume III: Operational Algorithm Description (OAD) for the Cloud Mask
474-00333	Joint Polar Satellite System (JPSS) Ground System (GS) Architecture Description Document (ADD)
474-00054	Joint Polar Satellite System (JPSS) Ground System (GS) Concept of

Document Number	Title
	Operations (ConOps)
470-00041	Joint Polar Satellite System (JPSS) Program Lexicon
474-00001-01	Joint Polar Satellite System (JPSS) Common Data Format Control Book, Vol I - Overview
474-00448-02-01	Joint Polar Satellite System (JPSS) Algorithm Specification Volume II: Data Dictionary for the Common Algorithms

3 UML for HDF5 Products

The following paragraphs describe the structure and contents of the IP and EDR granules formed by the JPSS ground processing software.

3.1 Intermediate Products and Environmental Data Records HDF5 Details - Statically Sized

Figure 3.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, depicts the HDF5 IP/EDR organization as a Unified Modeling Language (UML) class diagram. Each HDF5 IP/EDR file contains an HDF5 Root Group, '/', a Data Products Group, Product Groups (Collection Short Name), an optional Geolocation Group (depending upon packaging option, see the JPSS CDFCB-X Vol. I, for a description of the geolocation packaging), and an All Data Group (dataset arrays). The Product Groups and Geolocation Group both contain datasets - an Aggregation Dataset (Collection Short Name_Agg) and Granule Datasets (Collection Short Name_Gran_n) - where n indicates the nth granule in a temporal aggregation of granules (0 .. n-1). A granule is a general term used to describe the minimum quanta of data collected per processing period, generally on the order of seconds. For the definition and organization of the metadata attributes contained in the HDF5 files, see the JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms - Metadata. Attributes that are specific to a particular IP/EDR are listed with the specific IP/EDR's data format definition. For the generalized formats and packaging options for the Geolocation data, see the JPSS CDFCB-X Vol. I - Overview.

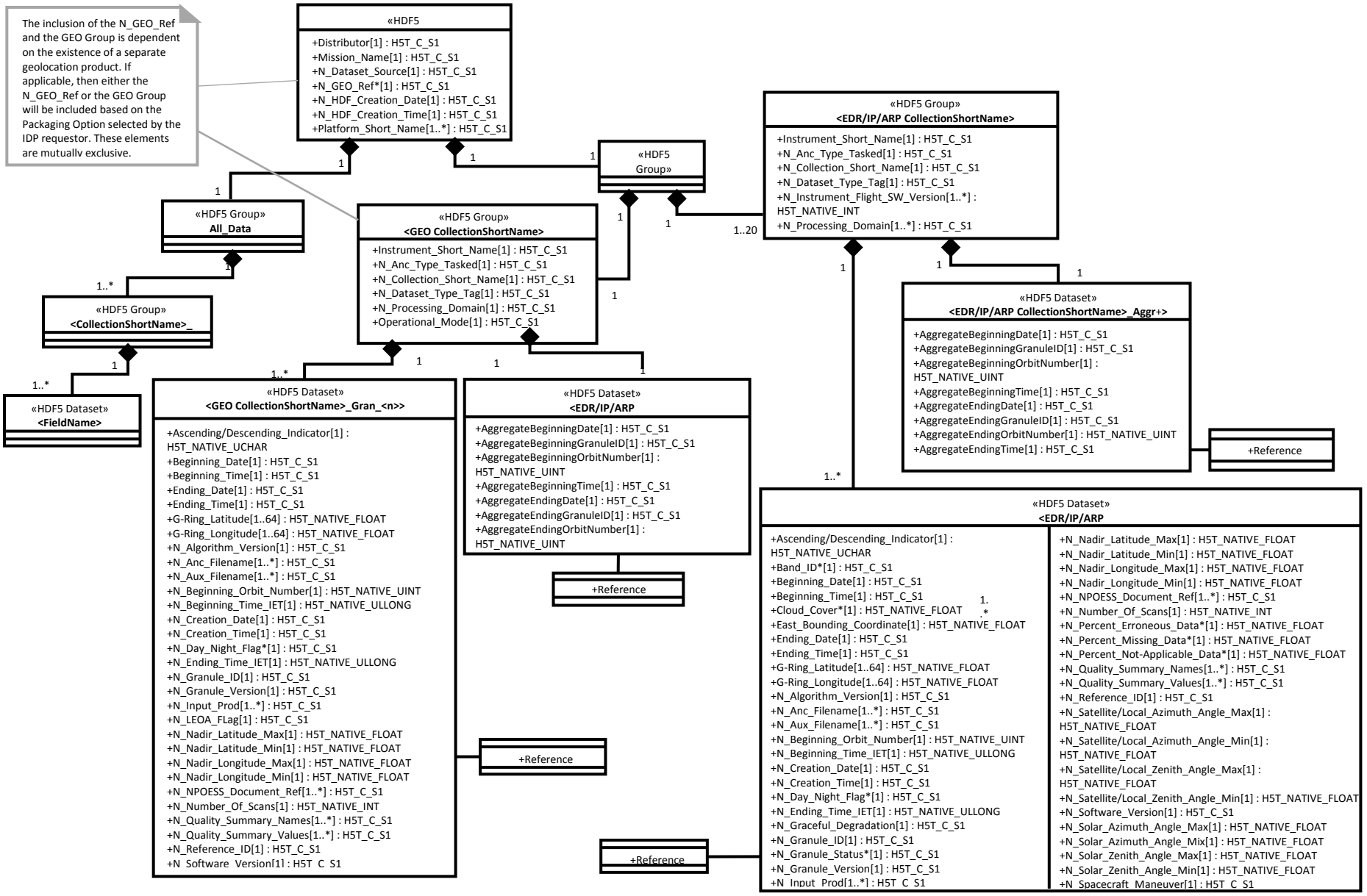

Figure: 3.1-1 Generalized UML Diagram for statically sized HDF5 IP/EDR Files

3.2 Intermediate Products, Application Related Products and Environmental Data Records HDF5 Details - Dynamically Sized

Figure 3.2-1, Generalized UML Diagram for dynamically sized HDF5 IP/EDR Files, depicts the HDF5 IP/EDR organization as a Unified Modeling Language (UML) class diagram for products that contain dynamically sized fields. Dynamically sized means that a field's length will vary from granule to granule. The organization of the HDF5 file is identical to the statically sized HDF5 file with the exception of the aggregation and corresponding All_Data group. For statically sized products, the object ID stored in the aggregation array points to a Dataset_Array under the All_Data group. This Dataset_Array is a single HDF5 dataset for each field. This single HDF5 dataset contains all the data for all granules in the file for a given field. However, for dynamically sized products, the object ID stored in the aggregation array points to an HDF5 group instead. This HDF5 group contains one or more datasets - a separate dataset for each granule for a given field. The dataset is named "Dataset_Array_Gran_n".

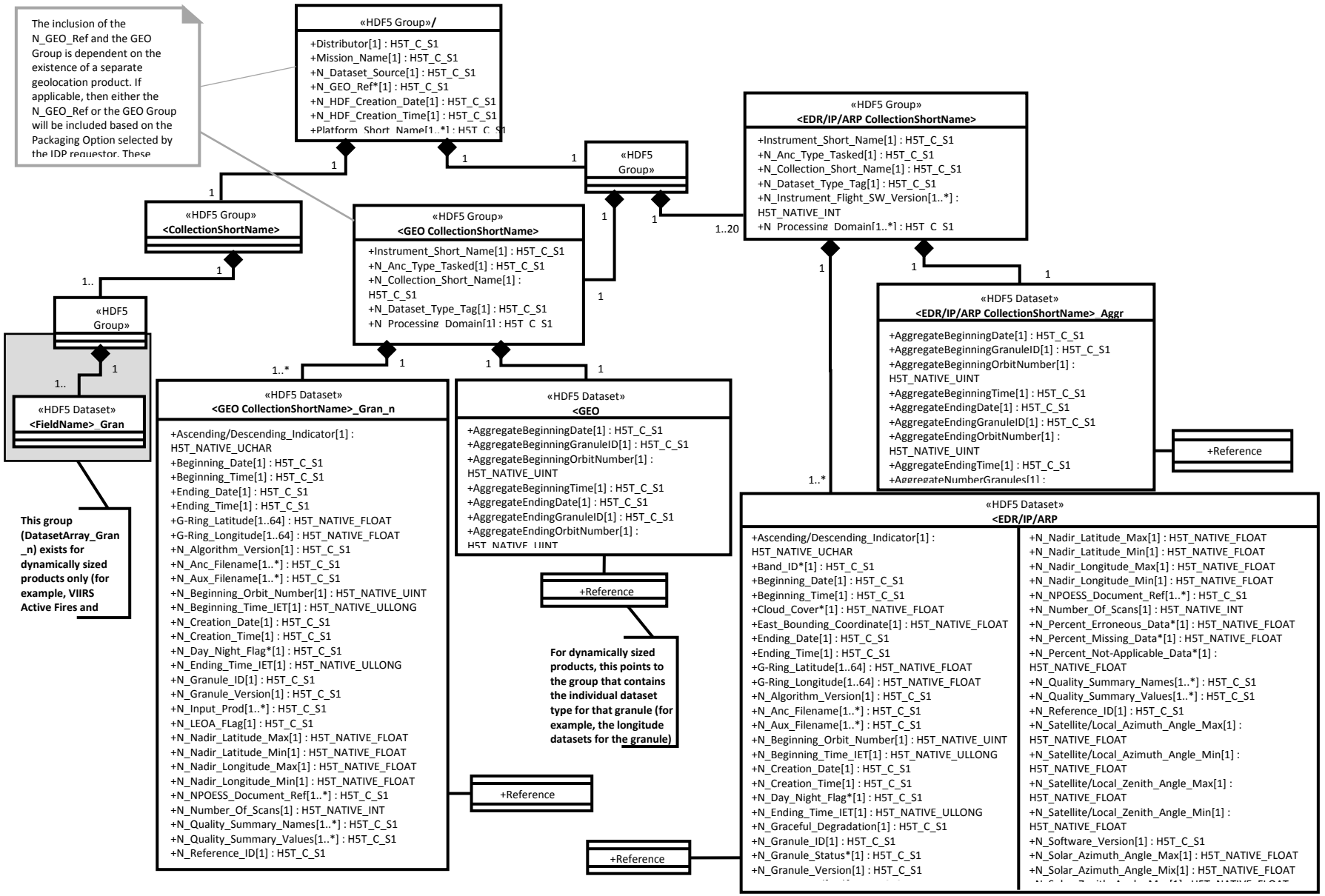

Figure: 3.2-1 Generalized UML Diagram for dynamically sized HDF5 IP/EDR Files

4 Intermediate Products (IPs)

Not applicable.

5 Environmental Data Records (EDRs)

Environmental Data Records (EDRs) are data records that contain the environmental parameters or imagery generated by the JPSS system as products deliverable to the user. The JPSS and S-NPP required set of EDRs are defined in 470-00067-02, the JPSS Ground System Requirements Document, Vol II. An EDR is either an official EDR, which means that it is part of the set of official JPSS Data Products, or it is a substitute EDR. A substitute EDR is produced by substitute ancillary data, data defined by the IDP operator in order to create a data product using different input (specifically, different ancillary data) than that which is prescribed by JPSS. EDRs provide stable measurements useful for long-term trends. An EDR contains the following:

- EDR specific data (as described in each section)
- Appropriate geolocation values
- Quality Flags
- Metadata represented as Attributes in the HDF5 file that are provided at the granule and aggregation level
- The EDRs are separated by category and are presented alphabetically within each category. All S-NPP EDRs are also delivered during JPSS, thus only those EDRs which are JPSS-only are annotated as such within their respective Description/Purpose section of their interface definition.

5.1 VIIRS Cloud Mask EDR

Data Mnemonic	EDRE-CMIP-C0030 (Official) EDRE-CMIP-C0031 (Substitute)
Description/ Purpose	The VIIRS Cloud Mask (VCM) technique incorporates a number of cloud detection tests that determine whether a cloud obstructs a cell. If a cloud is detected, the VCM indicates whether its phase is water, ice, or mixed. Additionally, the VCM specifies whether aerosols, fire, or shadows are detected within the cell field of view (FOV). A spatial uniformity test is also performed on the scene. Sensors: VIIRS Effectivity: S-NPP and JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, Section 3.0 for details.
File Size	Estimated Granule Size: See Table 5.1.1-1 VIIRS Cloud Mask EDR Data Content Summary for size This granule size includes Cloud Mask EDR related fields only and is based on a VIIRS granule size consisting of 48 scans. Metadata attributes are not included. Additional size added by HDF5 packaging is also not included.
File Format Type	HDF5
Data Content and Data Format	The Cloud Mask EDR contains cloud mask data for each pixel, scan, and granule regardless if the scan and/or granule is composed of all ocean or no ocean data. For each pixel, scan, and/or granule, the Cloud Mask EDR contains: • Cloud mask flags for all pixels

	• Scan All Ocean data for each scan • Scan No Ocean data for each scan • Granule All Ocean data for the entire granule • Granule No Ocean data for the entire granule Since this is a global data mask, there are no fill values necessary. All of the cloud mask data defaults to zero until assigned by the algorithm. See Section 5.1.1, VIIRS Cloud Mask EDR Data Content Summary See Section 5.1.2, VIIRS Cloud Mask EDR Product Profile See Section 5.1.3, VIIRS Cloud Mask EDR Details See Section 5.1.4, VIIRS Cloud Mask EDR Metadata Details See Section 5.1.5, VIIRS Cloud Mask EDR Geolocation Details

5.1.1 VIIRS Cloud Mask EDR Data Content Summary

Table: 5.1.1-1 VIIRS Cloud Mask EDR Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
QF1_VIIRSCMEDR	Cloud Mask EDR Quality Flags	unsigned 8-bit char	[N*768, 3200]	[768, 3200]	unitless
QF2_VIIRSCMEDR		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	unitless
QF3_VIIRSCMEDR		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	unitless
QF4_VIIRSCMEDR		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	unitless
QF5_VIIRSCMEDR		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	unitless
QF6_VIIRSCMEDR		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	unitless
ScanAllOcean	Scan All Ocean Flag - one value per scan per M-Band detector	unsigned 8-bit char	[N*768]	[768]	unitless
ScanNoOcean	Scan No Ocean Flag - one value per scan per M-Band detector	unsigned 8-bit char	[N*768]	[768]	unitless
GranuleAllOcean	Granule All Ocean Flag	unsigned 8-bit char	[N*1]	[1]	unitless
GranuleNoOcean	Granule No Ocean Flag	unsigned 8-bit char	[N*1]	[1]	unitless
File Size	**14,747,138 Bytes**				

5.1.2 VIIRS Cloud Mask EDR Product Profile

Table: 5.1.2-1 VIIRS Cloud Mask EDR Product Profile

Cloud Mask EDR Product Profile

Fields

Name	Data Size	Dimensions

QF1_VIIRSCMEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	768	768
CrossTrack	No	No	3200	3200

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Cloud Mask Quality Pixel (# cloud test performed)/(# possible cloud tests)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Poor (No cloud tests performed) = 0 Low (0 < cloud tests performed < 50%) = 1 Medium (50% <= cloud tests performed < 100%) = 2 High (100% = cloud tests performed) = 3
Cloud Detection and Confidence Pixel	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Confidently Clear = 0 Probably Clear = 1 Probably Cloudy = 2 Confidently Cloudy = 3
Day/Night Pixel (Day = Solar Zen Angle <= 85 deg)	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Night = 0 Day = 1
Snow/Ice Surface Pixel	5	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	No Snow/Ice = 0 Snow/Ice = 1
Sun Glint Pixel	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	None = 0 Geometry Based = 1 Wind Speed Based = 2 Geometry and Wind Based = 3

QF2_VIIRSCMEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	768	768
CrossTrack	No	No	3200	3200

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Land/Water Background Pixel	0	MIN_VAL	MAX_VAL	unitless	No		3 bit(s)	Name / Value	Land and Desert = 0 Land No Desert = 1 Inland Water = 2 Sea Water = 3 Coastal = 5
Shadow Detected Pixel	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	No = 0 Yes = 1
Non Cloud Obstruction (Heavy Aerosol)	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	No = 0 Yes = 1

		Fire Detected (Cloud Mask)	5	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: No 0; Yes 1
		Cirrus (Solar RM9)	6	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: No Cloud 0; Cloud 1
		Cirrus IR (BTM15-BTM16)	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: No Cloud 0; Cloud 1

QF3_VIIRSCMEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	768	768
CrossTrack	No	No	3200	3200

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
IR Threshold Cloud Test (BTM15) Pixel	0	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: No Cloud 0; Cloud 1
High Cloud (BTM12-BTM16) Test Pixel	1	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: No Cloud 0; Cloud 1
IR Temperature Difference Test (BTM14-BTM15 and BTM15-BTM16 Pixel)	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: No Cloud 0; Cloud 1
Temperature Difference Test (BTM15-BTM12) Pixel	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: No Cloud 0; Cloud 1
Temperature Difference Test (BTM12-BTM13) Pixel	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: No Cloud 0; Cloud 1
Visible Reflectance Test (RM5) Pixel	5	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: No Cloud 0; Cloud 1
Visible Reflectance Test (RM7) Pixel; Also Visible Reflectance Test (RM1)	6	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: No Cloud 0; Cloud 1
Visible Ratio Test (RM7/RM5) Pixel	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: No Cloud 0; Cloud 1

QF4_VIIRSCMEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	768	768
CrossTrack	No	No	3200	3200

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Adjacent Pixel Cloud Confidence Pixel (Most extreme value is provided here of any of the 8 adjacent pixels. Confidently Cloudy is most extreme, followed by Probably Cloudy, Probably Clear, and Confidently Clear.)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value: Confidently Clear 0; Probably Clear 1; Probably Cloudy 2; Confidently Cloudy 3
Conifer Boreal Forest (Pixel is identified as Conifer Boreal Forest)	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value: False 0

											True 1
		Spatial Uniformity Test (Pixel passed the Spatial Uniformity Test)	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		Dust Candidate (Indicates potential dust contaminated pixel)	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		Smoke Candidate (Indicates potential smoke contaminated pixel)	5	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		Dust or Volcanic Ash is present	6	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		Spare	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value

QF5_VIIRSCMEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	768	768
CrossTrack	No	No	3200	3200

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Spare	0	MIN_VAL	MAX_VAL	unitless	No		8 bit(s)	Name Value	Name Value

QF6_VIIRSCMEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	768	768
CrossTrack	No	No	3200	3200

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Cloud Phase	0	MIN_VAL	MAX_VAL	unitless	No		3 bit(s)	Name Value	Name Value Not Executed 0 Clear 1 Partly Cloudy (Probably Clear OR Probably Cloudy) 2 Water Cloud 3 Supercooled Water/Mixed Phase 4 Opaque Ice Cloud 5 Cirrus Cloud 6 Cloud Overlap 7
Thin Cirrus Present	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Ephemeral Water Detected	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Degraded: TOC NDVI (0.2 < TOC NDVI < 0.4)	5	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Degraded: Sun Glint in Pixel	6	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Degraded: Polar Night (pixel is in region poleward of 60 degrees N/S and nighttime condition)	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1

ScanAllOcean 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	768	768

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Scan All Ocean Flag - one value per scan per M-Band detector	0	MIN_VAL	MAX_VAL	unitless	No		unsigned 8-bit char	Name	Value	Name	Value
								NA_UINT8_FILL	255	Scan for this M-Band detector does not contain all ocean pixels (some land pixels in scan)	0
								MISS_UINT8_FILL	254	Scan for this M-Band detector contains all ocean pixels	1
								ONBOARD_PT_UINT8_FILL	253		
								ONGROUND_PT_UINT8_FILL	252		
								ERR_UINT8_FILL	251		

ScanNoOcean — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	768	768

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Scan No Ocean Flag - one value per scan per M-Band detector	0	MIN_VAL	MAX_VAL	unitless	No		unsigned 8-bit char	Name	Value	Name	Value
								NA_UINT8_FILL	255	Scan for this M-Band detector contains at least one ocean pixel	0
								MISS_UINT8_FILL	254	Scan for this M-Band detector contains no ocean pixels	1
								ONBOARD_PT_UINT8_FILL	253		
								ONGROUND_PT_UINT8_FILL	252		
								ERR_UINT8_FILL	251		

GranuleAllOcean — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Granule All Ocean Flag	0	MIN_VAL	MAX_VAL	unitless	No		unsigned 8-bit char	Name	Value	Name	Value
								NA_UINT8_FILL	255	Granule does not contain all ocean pixels (some land pixels in granule)	0
								MISS_UINT8_FILL	254	Granule contains all ocean pixels	1
								ONBOARD_PT_UINT8_FILL	253		
								ONGROUND_PT_UINT8_FILL	252		
								ERR_UINT8_FILL	251		

GranuleNoOcean — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Granule No Ocean Flag	0	MIN_VAL	MAX_VAL	unitless	No		unsigned 8-bit char	Name	Value	Name	Value
								NA_UINT8_FILL	255	Granule contains at least one ocean pixel	0
								MISS_UINT8_FILL	254	Granule contains no ocean pixels	1
								ONBOARD_PT_UINT8_FILL	253		
								ONGROUND_PT_UINT8_FILL	252		
								ERR_UINT8_FILL	251		

5.1.3 VIIRS Cloud Mask EDR HDF5 Details

Figure 5.1.3-1, Cloud Mask EDR UML Diagram, provides the details on the content and data types of the Cloud Mask EDR. These UML diagrams provide details at the product level only. In addition to these UML diagrams, refer to Figure 3.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

VIIRS-CM-EDR
+GranuleAllOcean : H5T_NATIVE_UCHAR
+GranuleNoOcean : H5T_NATIVE_UCHAR
+QF1_VIIRSCMEDR : H5T_NATIVE_UCHAR
+QF2_VIIRSCMEDR : H5T_NATIVE_UCHAR
+QF3_VIIRSCMEDR : H5T_NATIVE_UCHAR
+QF4_VIIRSCMEDR : H5T_NATIVE_UCHAR
+QF5_VIIRSCMEDR : H5T_NATIVE_UCHAR
+QF6_VIIRSCMEDR : H5T_NATIVE_UCHAR
+ScanAllOcean : H5T_NATIVE_UCHAR
+ScanNoOcean : H5T_NATIVE_UCHAR

Figure: 5.1.3-1 VIIRS Cloud Mask EDR UML Diagram

5.1.4 VIIRS Cloud Mask EDR HDF5 Metadata Details

The HDF5 metadata elements associated with the Cloud Mask EDR are listed in 474-00448-02-01-B0200, JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms, Sections 4 and 5. The Cloud Mask EDR metadata includes all common metadata at the root, product, aggregation, and granule level. There are no granule level Quality Flags defined as metadata elements in the Cloud Mask EDR. (The two granule level flags, GranuleAllOcean and GranuleNoOcean are written as HDF5 datasets for this product). Therefore, there are no entries in the N_Quality_Summary_Name/Value metadata attributes for this product.

5.1.5 VIIRS Cloud Mask EDR Geolocation Details

Cloud Mask EDR is produced on the VIIRS Moderate Resolution Geolocation (non-Terrain Corrected). See the JPSS Algorithm Specification Volume II: Data Dictionary for VIIRS RDR/SDR, (474-00448-02-06), Section 6.2, VIIRS SDR Moderate Resolution SDR for details.

6 Ancillary and Auxiliary Data Inputs

Not applicable

7 Look-up Tables and Processing Coefficient Tables

The template used for these formats in this document is described below.

Data Mnemonic: This is a unique identifier. JPSS CDFCB-X Vol. I, 474-00001-01 describes the data mnemonic definition methodology.

Description/Purpose: A brief description of the data format and its purpose.

Instrument: Identification of the Instrument associated with the table.

File-Naming Construct: A description of the file-naming constructs for those data units that apply. JPSS CDFCB-X Vol. I, 474-00001-01 defines file-naming conventions.

File Size: The size of the data file.

File Format Type: The format type of the data file.

Production Frequency: Production frequency is the interval of time for data generation. A production frequency equal to dynamic implies that it is only as requested or as needed.

Data Format/Structure: This defines the actual data format. The definitions provide information for every data element in the data unit.

The following rules apply to all tables:

1. All field names mandatory, unless specified otherwise.
2. Fill data is specified, where applicable.
3. Strings are left-aligned and integers are right-aligned, unless specified otherwise.
4. For information regarding Coordinated Universal Time (UTC) and IDPS Epoch Time (IET) conventions, see the JPSS CDFCB-X Vol. I, 474-00001-01.
5. For all references of the ASCII Standard, the corresponding International Standards Organization (ISO) standard is ISO/IEC 10646. The specific Unicode is UTF8, unless stated otherwise.
6. The fields are presented in order (either top - down or most significant first), unless stated otherwise.

7.1 Look-up Tables

Algorithm Look-up Table (LUT) files contain tables of pre-computed values used in lieu of real-time algorithm computations to reduce processing resource demands. Table values are typically the result of RTM executions and other environmental model simulations. These data generally cover broad, multi-dimensional parameter spaces which are unique to each algorithm.

7.1.1 VIIRS Cloud Mask EDR LUTs

VIIRS Cloud Mask EDR currently uses no LUTs.

7.2 Processing Coefficient Tables

The S-NPP/JPSS-1 ground system data product generation subsystem uses Processing Coefficient Table (PCT) file parameters. PCT files can be either Automated or Manual coefficient tables. Within the Manual table type are two coefficient classes: Initial and Ephemeral. Sections below describe all three and any tables of that type for the product.

7.2.1 Automated Processing Coefficients

Automated Processing Coefficient (PC) files contain parameters updated and/or created during the processing of the S-NPP/JPSS Data Products by the processing algorithms. The processing environment subsequently uses these files without human review of their contents. Files can be used immediately after creation or in future processing such as the next granule in the production data stream processing.

7.2.1.1 VIIRS Cloud Mask Automated PCs

VIIRS Cloud Mask EDR currently uses no Automated PCs.

7.2.2 Manual Processing Coefficients

Manual Processing Coefficient (PC) files contain parameters used for S-NPP/JPSS Data Product generation which require human review prior to operational processing environment insertion. Manual Processing Coefficients have two classes:

- Initialization PCTs contain infrequently updated initial parameters sets S-NPP/JPSS uses for data product generation.
- Ephemeral PCTs contain frequently updated parameters sets S-NPP/JPSS uses for data product generation.

7.2.2.1 VIIRS Cloud Mask EDR Initialization PCs

VIIRS Cloud Mask EDR currently uses no Initialization PCs.

7.2.2.2 VIIRS Cloud Mask EDR Ephemeral PCT

Data Mnemonic	DP_NU-LM2020-014
Description/ Purpose	The VIIRS Cloud Mask EDR Ephemeral PC provides tunable processing coefficients for use by the algorithm during execution. The coefficients can be modified (tuned) through a configuration control process in response to algorithm, performance, inputs, sensitivity, etc. changes.
File-Naming Construct	See the File-Naming Convention for Auxiliary Data Formats, JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4. The Collection Short Name used in the filename is based on the table - see the JPSS CDFCB-X Vol. I, 474-00001-01, Table B-1 for the applicable Collection Short Names.
File Size	See Table 7.2.2.2-1 VIIRS Cloud Mask EDR Ephemeral PC Data Format for size
File Format Type	Little Endian Binary
Production Frequency	As needed

Data Content and Data Format	For details see Table 7.2.2.2-1, VIIRS Cloud Mask EDR Ephemeral PC Data Format

Table: 7.2.2.2-1 VIIRS Cloud Mask EDR Ephemeral PC Data Format

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
snow_thresh_BTM15	4	32-bit floating point	273.0 - 285.0	Kelvin	Maximum M15 brightness temperature at which snow/ice may exist
snow_thresh_RM7	4	32-bit floating point	0.05 - 0.20	unitless	Minimum M7 reflectance for which snow/ice can be present
ndsi_snow	4	32-bit floating point	0.30 - 0.50	unitless	Minimum normalized difference snow index for snow/ice to be present
snow_thinCiM9	4	32-bit floating point	0.0 - 0.1	unitless	Minimum M9 reflectance for snow/ice to be present rather than thin cirrus
VCM_SNOWICE_M12M13BTD_CLDFREE_THRESH_FOR_M9THINCI	4	32-bit floating point	-100.0 -100.0	Kelvin	Total Precipitable water path correction factor for global atmospheric moisture variations evidence by the M15-M16 BTD used in the surface temperature-M15 difference test to detect non-overlap thin cirrus identified by the M9 test
VCM_SNOWICE_SFCM15DIFF_CLDTHRESH_FOR_M9THINCI	4	32-bit floating point	0.0 -30.0	Kelvin	Surface temperature -M15BT difference threshold used to identify non-overlapping thin cirrus detected by the M9 thin cirrus test that fail the M12M13BTD test
VCM_SNOWICE_SFCM15DIFF_TPW_CORR_FACTOR_FOR_M9THINCI	4	32-bit floating point	0.0 -20.0	1/Kelvin	Total Precipitable water path correction factor for global atmospheric moisture variations evidence by the M15-M16 BTD used in the surface temperature-M15 difference test to detect non-overlap thin cirrus identified by the M9 test
VCM_SNOWICE_SFCM15DIFF_CLDTHRESH_FOR_M9OVERLAP	4	32-bit floating point	0.0-30.0	Kelvin	Surface temperature -M15BT difference threshold used to identify existence of overlap clouds when the M9 band fails to detect any clouds present.
VCM_SNOWICE_SFCM15DIFF_TPW_CORR_FACTOR_FOR_M9OVERLAP	4	32-bit floating point	0.0 -20.0	1/Kelvin	Total Precipitable water path correction factor for global atmospheric moisture variations evidence by the M15-M16 BTD used in the surface temperature-M15 difference test to detect overlap thin cirrus not identified by the M9 test

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
VCM_SNOWICE_POLAR_LAT	4	32-bit floating point	0.0 - 90.0	Degrees	Minimum latitude at which the VCM snow/ice routine is used over open ocean; for lower latitudes, the snow/ice ancillary product is used
snow_thresh_BTM14_M15	4	32-bit floating point	0.30 - 0.70	Kelvin	Maximum M14 - M15 BTD for snow/ice to be present rather than thin cirrus
snow_thresh_BTM12_M15_LoElev	4	32-bit floating point	5.0 - 15.0	Kelvin	Minimum M12 - M15 BTD for snow/ice to exist rather than thin cirrus; threshold used for elevations less than or equal to HiElevThresh (See Cloud Confidence Parameters)
snow_thresh_BTM12_M15_HiElev	4	32-bit floating point	7.5 - 20.0	Kelvin	Minimum M12 - M15 BTD for snow/ice to exist rather than thin cirrus; threshold used for elevations greater than HiElevThresh
maxSolarZenith	4	32-bit floating point	75.0 - 90.0	degree	Maximum solar zenith angle for daytime classification
VCM_DAYNIGHT_TOL	4	32-bit floating point	0.0 - 1.0e-04	degree	Tolerance on maxSolarZenith
VCM_SUNGLINT_MAX_SOLZEN	4	32-bit floating point	87.0 - 91.0	degree	Maximum solar zenith angle for determining sun glint
VCM_SUNGLINT_MAX_REFANG_FOR_GEO	4	32-bit floating point	33.0 - 39.0	degree	Maximum reflection angle for sun glint to be geometry based
PROB_THRESH	4	32-bit floating point	0.0 - 3.0	unitless	Probability threshold for sun glint
LAMBDA_M12	4	32-bit floating point	3.75e-06 - 3.82e-06 m (3.78 m +/- 32 nm)	meters	Response-weighted M12 band center
M12_MEAN_TOA_SOL_IRRAD	4	32-bit floating point	10.5 - 10.9 W/m2	W/m^2 (mu)m	Average extra-terrestrial solar irradiance in M12 band corrected for sensor responsivity
VCM_AERO_NUM_MOD_WIN_CANDS_THRESH	4	32-bit integer	0 - 4	unitless	Minimum number of moderate resolution pixels containing heavy aerosol candidates for heavy aerosol spatial test to be performed. Defined as 0 to

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					VCM_AERO_MOD_WINSIZE^2.
VCM_AERO_NUM_IMG_SAMPS_STDDEV_THRESH	4	32-bit integer	0 - 16	unitless	Minimum number of imagery resolution pixels required to compute standard deviation for heavy aerosol spatial test. Defined as 0 to 4*(VCM_AERO_MOD_WINSIZE^2
VCM_AERO_ASH_POLAR_LAT	4	32-bit floating point	50.0 - 70.0	degree	Lower bound latitude for using volcanic ash detection in polar regions
VCM_AERO_ASH_TROPIC_LAT	4	32-bit floating point	20.0 - 40.0	degree	Lower bound latitude for using volcanic ash detection in tropic regions
VCM_AERO_DUST_SOLZEN	4	32-bit floating point	70.0 - 80.0	degree	Maximum solar zenith angle allowed for dust detection
VCM_AERO_SMOKE_SOLZEN	4	32-bit floating point	70.0 - 80.0	degree	Maximum solar zenith angle allowed for smoke detection
VCM_AERO_ASH_SOLZEN	4	32-bit floating point	60.0 - 80.0	degree	Maximum solar zenith angle allowed for volcanic ash detection
VCM_AERO_SMOKE_CONF_M11M1_REFLRATIO_THRESH	4	32-bit floating point	0.0 - 0.2	unitless	Maximum M11/M1 reflectance ratio at nadir for confident heavy aerosol detection; smoke candidate flag also set; value corrected for sensor zenith angle
VCM_AERO_SMOKE_CAND_M11M1_REFLRATIO_THRESH	4	32-bit floating point	0.1 - 0.4	unitless	Maximum M11/M1 reflectance ratio at nadir for possible presence of smoke; value corrected for sensor zenith angle
VCM_RAYLEIGH_M1_MOLTAU	4	32-bit floating point	0.0 - 1.0	unitless	M1 molecular optical thickness for Rayleigh reflectance calculation
VCM_RAYLEIGH_M5_MOLTAU	4	32-bit floating point	0.0 - 1.0	unitless	M5 molecular optical thickness for Rayleigh reflectance calculation
VCM_AERO_DUST_CAND_M1_REFL_THRESH	4	32-bit floating point	0.0 - 1.0	unitless	Maximum M1 reflectance for possible presence of dust
VCM_AERO_DUST_CAND_M1M5_REFLRATIO_THRESH	4	32-bit floating point	0.0 - 1.0	unitless	Maximum M1/M5 reflectance ratio at nadir for possible presence of dust; value corrected for sensor zenith angle
VCM_AERO_COMP_OCEAN_M15M16BTD_MAX_THRESH	4	32-bit floating point	-0.5 - -0.1	Kelvin	Maximum M15 - M16 BTD threshold for volcanic ash detection
VCM_AERO_ASH_OCEAN_MAX_LAT	4	32-bit floating point	50.0 - 70.0	degree	Maximum latitude for applying volcanic ash detection over water

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
VCM_AERO_ASH_OCEAN_MIN_LAT	4	32-bit floating point	-60.0 - -40.0	degree	Minimum latitude for applying volcanic ash detection over water
VCM_AERO_ASH_MIN_TOC_NDVI	4	32-bit floating point	0.5 - 0.8	unitless	Minimum TOC NDVI for which volcanic ash detection over land should be performed
VCM_AERO_ASH_EXCLREG1_LAT_UP	4	32-bit floating point	-10.0 - 0.0	degree	Boundaries of 1st exclusion region where volcanic ash detection over water is not performed in order to eliminate regions of high false alarms
VCM_AERO_ASH_EXCLREG1_LAT_LO	4	32-bit floating point	-40.0 - -20.0	degree	Boundaries of 1st exclusion region where volcanic ash detection over water is not performed in order to eliminate regions of high false alarms
VCM_AERO_ASH_EXCLREG1_LON_LF	4	32-bit floating point	-120.0 - -100.0	degree	Boundaries of 1st exclusion region where volcanic ash detection over water is not performed in order to eliminate regions of high false alarms
VCM_AERO_ASH_EXCLREG1_LON_RT	4	32-bit floating point	-80.0 - -60.0	degree	Boundaries of 1st exclusion region where volcanic ash detection over water is not performed in order to eliminate regions of high false alarms
VCM_AERO_ASH_EXCLREG2_LAT_UP	4	32-bit floating point	-30.0 - 0.0	degree	Boundaries of 2nd exclusion region where volcanic ash detection over water is not performed in order to eliminate regions of high false alarms
VCM_AERO_ASH_EXCLREG2_LAT_LO	4	32-bit floating point	-50.0 - -10.0	degree	Boundaries of 2nd exclusion region where volcanic ash detection over water is not performed in order to eliminate regions of high false alarms
VCM_AERO_ASH_EXCLREG2_LON_LF	4	32-bit floating point	-15.0 - 15.0	degree	Boundaries of 2nd exclusion region where volcanic ash detection over water is not performed in order to eliminate regions of high false alarms
VCM_AERO_ASH_EXCLREG2_LON_RT	4	32-bit floating point	0.0 - 30.0	degree	Boundaries of 2nd exclusion region where volcanic ash detection over water is not performed in order to eliminate

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					regions of high false alarms
VCM_AERO_ASH_EXCLREG3_LAT_UP	4	32-bit floating point	10.0 - 50.0	degree	Boundaries of 3rd exclusion region where volcanic ash detection over water is not performed in order to eliminate regions of high false alarms
VCM_AERO_ASH_EXCLREG3_LAT_LO	4	32-bit floating point	0.0 - 30.0	degree	Boundaries of 3rd exclusion region where volcanic ash detection over water is not performed in order to eliminate regions of high false alarms
VCM_AERO_ASH_EXCLREG3_LON_LF	4	32-bit floating point	-175.0 - -125.0	degree	Boundaries of 3rd exclusion region where volcanic ash detection over water is not performed in order to eliminate regions of high false alarms
VCM_AERO_ASH_EXCLREG3_LON_RT	4	32-bit floating point	-150.0 - -90.0	degree	Boundaries of 3rd exclusion region where volcanic ash detection over water is not performed in order to eliminate regions of high false alarms
VCM_AERO_ASH_REFM12_MIN_THRESH_1	4	32-bit floating point	0 - 0.2	unitless	First minimum M12 reflectance for volcanic ash detection over land
VCM_AERO_ASH_BTM15_MAX_THRESH_1	4	32-bit floating point	190.0 - 240.0	Kelvin	First maximum M15 BT threshold for detection of volcanic ash over land
VCM_AERO_ASH_REFM5_MAX_THRESH_1	4	32-bit floating point	0.25 - 0.60	unitless	First maximum M5 reflectance threshold for detection of volcanic ash over land
VCM_AERO_ASH_BTM15_TROPIC_MAX_THRESH_1	4	32-bit floating point	270.0 - 290.0	Kelvin	1st set of spectral discriminators for volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_M12M5REFRAT_TROPIC_MIN_THRESH_1	4	32-bit floating point	0.0 - 1.0	unitless	1st set of spectral discriminators for volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD,

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					respectively
VCM_AERO_ASH_M15M16BTDIFF_TROPIC_MAX_THRESH_1	4	32-bit floating point	0.0 - 0.5	Kelvin	1st set of spectral discriminators for volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_BTM15_TROPIC_MAX_THRESH_2	4	32-bit floating point	275.0 - 295.0	Kelvin	2nd set of spectral discriminators for volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_M12M5REFRAT_TROPIC_MIN_THRESH_2	4	32-bit floating point	0.0 - 1.0	unitless	2nd set of spectral discriminators for volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_M15M16BTDIFF_TROPIC_MAX_THRESH_2	4	32-bit floating point	-1.5 - 0.0	Kelvin	2nd set of spectral discriminators for volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_BTM15_TROPIC_MAX_THRESH_3	4	32-bit floating point	267.0 - 287.0	Kelvin	3rd set of spectral discriminators for volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, Respectively
VCM_AERO_ASH_M12M5REFRAT_TROPI	4	32-bit floating	0.0 - 1.0	unitless	3rd set of spectral discriminators for

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
C_MIN_THRESH_3		point			volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, Respectively
VCM_AERO_ASH_M15M16BTDIFF_TROPIC_MAX_THRESH_3	4	32-bit floating point	-3 - -1	Kelvin	3rd set of spectral discriminators for volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, Respectively
VCM_AERO_ASH_BTM15_TROPIC_MAX_THRESH_4	4	32-bit floating point	223.0 - 243.0	Kelvin	4th set of spectral discriminators for volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - maximum M5 reflectance, - minimum M12 reflectance, respectively
VCM_AERO_ASH_REFM5_TROPIC_MAX_THRESH_4	4	32-bit floating point	0.0 - 1.0	unitless	4th set of spectral discriminators for volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - maximum M5 reflectance, - minimum M12 reflectance, respectively
VCM_AERO_ASH_REFM12_TROPIC_MIN_THRESH_4	4	32-bit floating point	0.0 - 0.5	unitless	4th set of spectral discriminators for volcanic ash detection over land at tropical latitudes: - maximum M15 BT, - maximum M5 reflectance, - minimum M12 reflectance, respectively
VCM_AERO_ASH_BTM15_MIDLAT_MAX_THRESH_1	4	32-bit floating point	260.0 - 280.0	Kelvin	1st set of spectral discriminators for volcanic ash detection over land at mid latitudes:

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					- maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_M12M5REFRAT_MIDLAT_MIN_THRESH_1	4	32-bit floating point	0.0 - 1.0	unitless	1st set of spectral discriminators for volcanic ash detection over land at mid latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_M15M16BTDIFF_MIDLAT_MAX_THRESH_1	4	32-bit floating point	-1.0 - 0.0	Kelvin	1st set of spectral discriminators for volcanic ash detection over land at mid latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_BTM15_MIDLAT_MAX_THRESH_2	4	32-bit floating point	260.0 - 280.0	Kelvin	2nd set of spectral discriminators for volcanic ash detection over land at mid latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_M12M5REFRAT_MIDLAT_MIN_THRESH_2	4	32-bit floating point	0.0 - 1.0	unitless	2nd set of spectral discriminators for volcanic ash detection over land at mid latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_M15M16BTDIFF_MIDLAT_MAX_THRESH_2	4	32-bit floating point	-2.0 - 0.0	Kelvin	2nd set of spectral discriminators for volcanic ash detection over land at mid latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio,

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					- maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_BTM15_MIDLAT_MAX_THRESH_3	4	32-bit floating point	267.0 - 287.0	Kelvin	3rd set of spectral discriminators for volcanic ash detection over land at mid latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_M12M5REFRAT_MIDLAT_MIN_THRESH_3	4	32-bit floating point	0.0 - 1.0	unitless	3rd set of spectral discriminators for volcanic ash detection over land at mid latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_M15M16BTDIFF_MIDLAT_MAX_THRESH_3	4	32-bit floating point	-3 - -1	Kelvin	3rd set of spectral discriminators for volcanic ash detection over land at mid latitudes: - maximum M15 BT, - minimum M12/M5 reflectance ratio, - maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_BTM15_MIDLAT_MAX_THRESH_4	4	32-bit floating point	-220.0 - 250.0	Kelvin	4th set of spectral discriminators for volcanic ash detection over land at mid latitudes: - maximum M15 BT, - maximum M5 reflectance, - minimum M12 reflectance, respectively
VCM_AERO_ASH_REFM5_MIDLAT_MAX_THRESH_4	4	32-bit floating point	0.0 - 1.0	unitless	4th set of spectral discriminators for volcanic ash detection over land at mid latitudes: - maximum M15 BT, - maximum M5 reflectance, - minimum M12 reflectance, respectively

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
VCM_AERO_ASH_REFM12_MIDLAT_MIN_THRESH_4	4	32-bit floating point	0.0 - 1.0	unitless	4th set of spectral discriminators for volcanic ash detection over land at mid latitudes: - maximum M15 BT, - maximum M5 reflectance, - minimum M12 reflectance, respectively
VCM_AERO_ASH_BTM15_POLAR_MAX_THRESH_1	4	32-bit floating point	267.0 - 287.0	Kelvin	1st set of spectral discriminators for volcanic ash detection over land at polar latitudes: -maximum M15 BT, -maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_M15M16BTDIFF_POLAR_MAX_THRESH_1	4	32-bit floating point	-5.0 - 0.0	Kelvin	1st set of spectral discriminators for volcanic ash detection over land at polar latitudes: -maximum M15 BT, -maximum M15 - M16 BTD, respectively
VCM_AERO_ASH_BTM15_POLAR_MAX_THRESH_2	4	32-bit floating point	260.0 - 280.0	Kelvin	2nd set of spectral discriminators for volcanic ash detection over land at polar latitudes: -maximum M15 BT, -maximum M15 - M16 BTD, -minimum M12/M5 reflectance ratio, respectively
VCM_AERO_ASH_M15M16BTDIFF_POLAR_MAX_THRESH_2	4	32-bit floating point	-1.0 - 0.0	Kelvin	2nd set of spectral discriminators for volcanic ash detection over land at polar latitudes: -maximum M15 BT, -maximum M15 - M16 BTD, -minimum M12/M5 reflectance ratio, respectively
VCM_AERO_ASH_M12M5REFRAT_POLAR_MIN_THRESH_2	4	32-bit floating point	0.0 - 2.0	unitless	2nd set of spectral discriminators for volcanic ash detection over land at polar latitudes: -maximum M15 BT,

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					-maximum M15 - M16 BTD, -minimum M12/M5 reflectance ratio, respectively
VCM_AERO_ASH_BTM15_POLAR_MAX_THRESH_3	4	32-bit floating point	230.0 - 260.0	Kelvin	3rd set of spectral discriminators for volcanic ash detection over land at polar latitudes: -maximum M15 BT, -maximum M15 - M16 BTD, -minimum M12 reflectance, respectively
VCM_AERO_ASH_M15M16BTDIFF_POLAR_MAX_THRESH_3	4	32-bit floating point	-1.0 - 0.0	Kelvin	3rd set of spectral discriminators for volcanic ash detection over land at polar latitudes: -maximum M15 BT, -maximum M15 - M16 BTD, -minimum M12 reflectance, respectively
VCM_AERO_ASH_REFM12_POLAR_MIN_THRESH_3	4	32-bit floating point	0.0 - 1.0	unitless	3rd set of spectral discriminators for volcanic ash detection over land at polar latitudes: -maximum M15 BT, -maximum M15 - M16 BTD, -minimum M12 reflectance, respectively
VCM_AERO_ASH_BTM15_POLAR_MAX_THRESH_4	4	32-bit floating point	220.0 - 260.0	Kelvin	4th set of spectral discriminators for volcanic ash detection over land at polar latitudes: -maximum M15 BT, -minimum M12 reflectance, -maximum M5 reflectance, respectively
VCM_AERO_ASH_REFM12_POLAR_MIN_THRESH_4	4	32-bit floating point	0.0 - 1.0	unitless	4th set of spectral discriminators for volcanic ash detection over land at polar latitudes: -maximum M15 BT, -minimum M12 reflectance, -maximum M5 reflectance,

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					respectively
VCM_AERO_ASH_REFM5_POLAR_MAX_THRESH_4	4	32-bit floating point	0.0 - 1.0	unitless	4th set of spectral discriminators for volcanic ash detection over land at polar latitudes: -maximum M15 BT, -minimum M12 reflectance, -maximum M5 reflectance, respectively
VCM_AERO_WATER_STDDEV_THRESH	4	32-bit floating point	0.0 - 1.0	unitless	Maximum standard deviation for heavy aerosol detection over ocean and inland water without glint
VCM_AERO_WATER_GLINT_STDDEV_THRESH	4	32-bit floating point	0.0 - 1.0	unitless	Maximum spatial standard deviation for heavy aerosol detection over ocean and inland water with glint
VCM_AERO_WATER_GLINT_STDDEV_THRESH	4	32-bit floating point	0.0 - 0.05	unitless	Maximum spatial standard deviation for heavy aerosol detection over land, desert, and coast without glint
VCM_AERO_LAND_STDDEV_THRESH	4	32-bit floating point	0.0 - 1.0	unitless	Maximum spatial standard deviation for heavy aerosol detection over land, desert, and coast with glint
VCM_AERO_LAND_GLINT_STDDEV_THRESH	4	32-bit floating point	0.0 - 1.0	unitless	Maximum spatial standard deviation for heavy aerosol detection over land, desert, and coast with glint
VCM_AERO_COMP_TOCNDVI_THRESH	4	32-bit floating point	0.0 - 1.0	unitless	Minimum TOC_NDVI for heavy aerosol detection over desert, land, and coast using spatial test
BTI4_limit	4	32-bit floating point	240.0 - 280.0	Kelvin	Minimum TOC_NDVI for heavy aerosol detection over desert, land, and coast using spatial test
VCM_I2_MAX_VAR_THRESH	4	32-bit floating point	0.001 - 0.5	unitless	Maximum I2 reflectance variation in imagery pixels for a given viewing geometry to detect clouds with the spatial uniformity test for daytime confidently and probably clear mod res pixels over water
VCM_I2_MIN_VAR_THRESH	4	32-bit floating	0.001 - 0.2	unitless	minimum I2 reflectance variation in

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
		point			imagery pixels for a given viewing geometry to detect clouds with the spatial uniformity test for daytime confidently and probably clear mod res pixels over water
I4varthres	4	32-bit floating point	0.0-1.0	Kelvin	Minimum I4 BT variation threshold to detect water clouds with the spatial uniformity test for nighttime confidently- and probably-clear mod res pixels over water
I5varthres	4	32-bit floating point	0.0-1.0	Kelvin	minimum I5 BT variation threshold to detect ice clouds with the spatial uniformity test for nighttime confidently- and probably-clear mod res pixels over water
vis2_ref_arr	6156	32-bit floating point	0.0-100.0	Kelvin	Theoretical calculation of expected I2 reflectance variations, expressed as percentages, for cloud-free atmosphere as a function of scattering geometry 3 Dimensional Array: NSZ x NVZ x NRAZ Size of Dimension(s): 9 x 9 x 19
VCM_CONFIDENCE_HIGH	4	32-bit floating point	0.85 - 1.0	unitless	maximum composite cloud confidence threshold for classifying a daytime pixel as ’Confidently Clear’
VCM_CONFIDENCE_MED	4	32-bit floating point	0.4 - 0.6	unitless	maximum composite cloud confidence threshold for classifying a daytime pixel as ’Probably Clear’
VCM_CONFIDENCE_LOW	4	32-bit floating point	0.0 - 0.2	unitless	maximum composite cloud confidence threshold for classifying a pixel as ’Probably Cloudy‘; a daytime pixel is classified as ’Confidently Cloudy‘ when the composite cloud confidence value is less than or equal to the value of this parameter
VCM_CONFIDENCE_HIGH_NIGHT	4	32-bit floating	0.85 - 1.0	unitless	maximum composite cloud confidence

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
		point			threshold for classifying a pixel as 'Confidently Clear' at night
VCM_CONFIDENCE_MED_NIGHT	4	32-bit floating point	0.4 - 0.6	unitless	maximum composite cloud confidence threshold for classifying a pixel as 'Probably Clear' at night
VCM_CONFIDENCE_LOW_NIGHT	4	32-bit floating point	0.0 - 0.2	unitless	maximum composite cloud confidence threshold for classifying a pixel as 'Probably Cloudy'; a pixel is classified as 'Confidently Cloudy' when the composite cloud confidence value is less than or equal to this value
VCM_MIN_COS_SENZEN_TOL	4	32-bit floating point	1.0e-5 - 1.0e-3	unitless	minimum allowable value for the cosine of the moderate band sensor zenith angle in order to avoid a singularity (1/0) result when the secant of the angle is determined
VCM_MIN_PTPW	4	32-bit floating point	0.0 - 0.10	cm	minimum path total Precipitable water limit used in the execution of the M15-M12 BTD test for nighttime pixels
VCM_M9_HIGH_PTPW_LIMIT	4	32-bit floating point	0.0 - 20.0	cm	Maximum path total Precipitable water limit used in the execution of the daytime M9 cloud conf and thin cirrus tests
VCM_M15_M16_MIN_DIFTEMP	4	32-bit floating point	0.00 - 0.20	Kelvin	minimum M15 - M16 BTD allowed before the default M15 - M16 BTD is used
VCM_M15M16_WATER_TO_SNOW_EMISS_CORR	4	32-bit floating point	0.0 - 1.0	Unitless	Water to snow emissivity correction factor for the M15M16 BTD used over snow or ice in both day and night
CD_M15_M12_Hi	4	32-bit floating point	-15.0 - -5.0	Kelvin	Confident clear threshold used in the coast/day M15 - M12 emission difference test
CD_M15_M12_Mid	4	32-bit floating point	-20.0 - -10.0	Kelvin	Clear/cloudy threshold used in the coast/day M15 - M12 emission difference test
CD_M15_M12_Lo	4	32-bit floating point	-20.0 - -10.0	Kelvin	Confident cloudy threshold used in the coast/day M15 - M12 emission

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					difference test
CD_M15_M16_Mid	4	32-bit floating point	0.0 - 5.0	Kelvin	Clear/cloudy default threshold used in the coast/day M15 - M16 emission thin cirrus test
CD_M15_M16_LO_CORR	4	32-bit floating point	0.0 - 5.0	Kelvin	Correction added to the coast/day M15-M16 clear/cloudy threshold (derived or default CD_M15_M16_Mid) to define the confident cloudy threshold for the M15 - M16 emission thin cirrus test
CD_M15_M16_HI_CORR	4	32-bit floating point	-2.0 - 0.0	Kelvin	Correction applied to the coast/day M15-M16 clear/cloudy threshold (derived or default CD_M15_M16_Mid) to define the confident clear threshold for the M15 - M16 emission thin cirrus test
CD_M9_PTPW_INFLECTION	4	32-bit floating point	0.0 - 0.50	cm	total path integrated water vapor value at coast/day M9 vs path TPW inflection pt
CD_M9_HI_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000.0	unitless	0th-1st order polynomial coeffs on path tpw used in the ConfClr threshold calc for the coast/day M9 cloud conf reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
CD_M9_MID_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000.0	unitless	0th-1st order polynomial coeffs on path tpw used in the Clr/Cldy calc for the coast/day M9 cloud conf reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
CD_M9_LO_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000.0	unitless	0th-1st order polynomial coeffs on path tpw used in the ConfCldy threshold calc for the coast/day M9 cloud conf reflectance and thin cirrus tests; calc

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
DD_MIN_POLAR_LAT	4	32-bit floating point	50.0 - 70.0	degree	Absolute value of the minimum latitude defining the boundary of the polar latitude region for desert/day tests
DD_MAX_POLAR_LAT	4	32-bit floating point	MAX_LAT	degree	Absolute value of the maximum latitude defining the boundary of the polar latitude region for desert/day tests
DD_M15_M12_A1	4	32-bit floating point	0.0 - 10.0	Kelvin/cm	1st degree coefficient used in desert/day M15 - M12 threshold determination under low total path integrated water vapor (tpiwv) conditions according to equation threshold = A*tpiwv + B
DD_M15_M12_B1	4	32-bit floating point	-100.0 - 100.0	Kelvin	0th degree coefficient used in desert/day M15 - M12 threshold determination under low total path integrated water vapor (tpiwv) conditions according to equation threshold = A*tpiwv + B
DD_M15_M12_A2	4	32-bit floating point	0.0 - 10.0	Kelvin/cm	1st degree coefficient used in desert/day M15 - M12 threshold determination under high total path integrated water vapor (tpiwv) conditions according to equation threshold = A*tpiwv + B
DD_M15_M12_B2	4	32-bit floating point	-100.0 - 100.0	Kelvin	0th degree coefficient used in desert/day M15 - M12 threshold determination under high total path integrated water vapor (tpiwv) conditions according to equation threshold = A*tpiwv + B
DD_M15_M12_TPIWV_switch	4	32-bit floating point	0.1 - 5.0	cm	Total path integrated water vapor (tpiwv) switch value used for classifying low

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					versus high tpiwv conditions in the desert/day M15 - M12 emission difference test
DD_M15_M12_LO_CORR	4	32-bit floating point	-10.0 - 10.0	Kelvin	Correction added to the derived desert/day M15-M12 clear/cloudy threshold to define the confident cloudy threshold for the M15 - M12 emission thin cirrus test
DD_M15_M12_HI_CORR	4	32-bit floating point	-10.0 - 10.0	Kelvin	Correction added to the derived desert/day M15-M12 clear/cloudy threshold to define the confident clear threshold for the M15 - M12 emission thin cirrus test
DD_M15_M16_Mid	4	32-bit floating point	0.1 - 10.0	Kelvin	Clear/cloudy default threshold used in the desert/day M15 - M16 emission thin cirrus test
DD_M15_M16_LO_CORR	4	32-bit floating point	-10.0 - 10.0	Kelvin	Correction added to the desert/day M15-M16 clear/cloudy threshold (derived or default DD_M15_M16_Mid) to define the confident cloudy threshold for the M15 - M16 emission thin cirrus test
DD_M15_M16_HI_CORR	4	32-bit floating point	-10.0 - 10.0	Kelvin	Correction added to the desert/day M15-M16 clear/cloudy threshold (derived or default DD_M15_M16_Mid) to define the confident clear threshold for the M15 - M16 emission thin cirrus test
implicit_pad0	4	unsigned 8-bit char	0	Unitless	Padding 1 Dimensional Array: PAD_BYTES_4 Size of Dimension(s): 4
DD_M1_PRESS_SCALEHT_CORR	4	32-bit floating point	5000.0 - 10000.0	meters	scale height used in desert/day M1 to correct molecular tau for altitudes above sea-level
DD_M1_HI_POLY_COEFS	32	64-bit floating point	-1000.0 - 1000.0	unitless	0th-3rd order polynomial coefficients on scattering angle when used in the Confident Clear threshold calculation for

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					the desert/day M1 reflectance test. 1 Dimensional Array: NUM_DD_M1_POLY_COEFS Size of Dimension(s): 4
DD_M1_MID_POLY_COEFS	32	64-bit floating point	-1000.0 - 1000.0	unitless	0th-3rd order polynomial coefficients on scattering angle when used in the Clear/Cloudy threshold calculation for the desert/day M1 reflectance test. 1 Dimensional Array: NUM_DD_M1_POLY_COEFS Size of Dimension(s): 4
DD_M1_LO_POLY_COEFS	32	64-bit floating point	-1000.0 - 1000.0	unitless	0th-3rd order polynomial coefficients on scattering angle when used in the Confident Cloudy threshold calculation for the desert/day M1 reflectance test. 1 Dimensional Array: NUM_DD_M1_POLY_COEFS Size of Dimension(s): 4
DD_M1_HI_CORR	4	32-bit floating point	-1.0 - 1.0	unitless	Confident Clear threshold correction for the desert/day M1 reflectance test
DD_M1_MID_CORR	4	32-bit floating point	-1.0 - 1.0	unitless	Confident Clear threshold correction for the desert/day M1 reflectance test
DD_M1_LO_CORR	4	32-bit floating point	-1.0 - 1.0	unitless	Confident Clear threshold correction for the desert/day M1 reflectance test
DD_M9_PTPW_INFLECTION	4	32-bit floating point	0.0 - 0.50	cm	Total path integrated water vapor value at desert/day M9 vs path TPW inflection pt
DD_M9_HI_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000.0	unitless	0th-1st order polynomial coeffs on path tpw used in the ConfClr threshold calc for the desert/day M9 cloud conf reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
DD_M9_MID_POLY_COEFS	16	64-bit floating	-1000.0 - 1000.0	unitless	0th-1st order polynomial coeffs on path

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
		point			tpw used in the Clr/Cldy threshold calc for the desert/day M9 cloud conf reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
DD_M9_LO_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000.0	unitless	0th-1st order polynomial coeffs on path tpw used in the ConfCldy threshold calc for the desert/day M9 cloud conf reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
LD_M12_M13_Hi	4	32-bit floating point	5.0 - 14.0	Kelvin	Confident clear threshold used in the land/day M12 - M13 emission difference test
LD_M12_M13_Mid	4	32-bit floating point	6.0 - 17.0	Kelvin	Clear/cloudy threshold used in the land/day M12 - M13 emission difference test
LD_M12_M13_Lo	4	32-bit floating point	07.0 - 20.0	Kelvin	Confident cloudy threshold used in the land/day M12 - M13 emission difference test
LD_M15_M12_Hi	4	32-bit floating point	-20.0 - -12.0	Kelvin	Confident clear threshold used in the land/day M15 - M12 emission difference test
LD_M15_M12_Mid	4	32-bit floating point	-25.0 - -14.0	Kelvin	Clear/cloudy threshold used in the land/day M15 - M12 emission difference test
LD_M15_M12_Lo	4	32-bit floating point	-30.0 - -16.0	Kelvin	Confident cloudy threshold used in the land/day M15 - M12 emission difference test
LD_M15_M16_Mid	4	32-bit floating point	1.0 - 4.0	Kelvin	Clear/cloudy default threshold used in the land/day M15 - M16 emission thin cirrus test

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
LD_M15_M16_LO_CORR	4	32-bit floating point	0.10 - 1.0	Kelvin	Correction added to the land/day M15-M16 clear/cloudy threshold (derived or default LD_M15_M16_Mid) to define the confident cloudy threshold for the M15 - M16 emission thin cirrus test
LD_M15_M16_HI_CORR	4	32-bit floating point	-1.0 - 1.0	Kelvin	Correction added to the land/day M15-M16 clear/cloudy threshold (derived or default LD_M15_M16_Mid) to define the confident clear threshold for the M15 - M16 emission thin cirrus test
LD_M5_M7_Hi	4	32-bit floating point	1.5 - 2.5	unitless	Confident clear threshold used in the land/day M7/M5 reflectance threshold test
LD_M5_M7_Mid	4	32-bit floating point	1.25 - 2.25	unitless	Clear/cloudy threshold used in the land/day M7/M5 reflectance threshold test
LD_M5_M7_Lo	4	32-bit floating point	0.99 - 2.0	unitless	Confident cloudy threshold used in the land/day M7/M5 reflectance threshold test
LD_M5_GEMI_THRESH	4	32-bit floating point	0.001 - 0.20	unitless	Minimum M5 reflectance required to perform the land/day M7/M5 reflectance threshold test
LD_M9_PTPW_INFLECTION	4	32-bit floating point	0.0 - 0.50	cm	Total path integrated water vapor value at land/day M9 vs. path TPW inflection pt
LD_M9_HI_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000.0	unitless	0th-1st order polynomial coeffs on path tpw used in the ConfClr threshold calc for the land/day M9 cloud conf reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
LD_M9_MID_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000	unitless	0th-1st order polynomial coeffs on path tpw used in the Clr/Cldy threshold calc for the land/day M9 cloud conf

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
LD_M9_LO_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000	unitless	0th-1st order polynomial coeffs on path tpw used in the ConfCldy threshold calc for the land and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
LN_M12_M16_MAX_PTPW	4	32-bit floating point	0.0 - 30.0	cm	Maximum path total precipitable water limit under which the land/night M12M16 BTD test is executed
LN_M12_M16_Hi	4	32-bit floating point	1.0 - 5.0	Kelvin	Confident clear threshold used in the land/night M12 - M16 emission difference test
LN_M12_M16_Mid	4	32-bit floating point	1.5 - 5.5	Kelvin	Clear/cloudy threshold used in the land/night M12 - M16 emission difference test
LN_M12_M16_Lo	4	32-bit floating point	2.0 - 6.0	Kelvin	Confident cloudy threshold used in the land/night M12 - M16 emission difference test
LN_M15_M12_Hi	4	32-bit floating point	1.0 - 5.0	Kelvin	Confident clear threshold used in the land/night M15 - M12 emission difference test
LN_M15_M12_Mid	4	32-bit floating point	1.25 - 5.5	Kelvin	Clear/cloudy threshold used in the land/night M15 - M12 emission difference test
LN_M15_M12_Lo	4	32-bit floating point	1.5 - 6.0	Kelvin	Confident cloudy threshold used in the land/night M15 - M12 emission difference test
LN_M15_M12_MAX_PTPW	4	32-bit floating point	1.0 - 8.0	cm	Maximum slant-path-corrected total Precipitable water limit for the land/night M15 - M12 BTD emission test

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
LN_HI_PTPW_FACTOR	4	32-bit floating point	0.1 - 1.0	Kelvin/cm	Slant path total Precipitable water factor used for adjusting the M15 - M12 confident clear sky threshold LN_M15_M12_Hi, see above
LN_MID_PTPW_FACTOR	4	32-bit floating point	0.1 - 1.0	Kelvin/cm	Slant path total Precipitable water factor used for adjusting the M15 - M12 clear/cloudy threshold LN_M15_M12_Mid, see above
LN_LO_PTPW_FACTOR	4	32-bit floating point	0.1 - 1.0	Kelvin/cm	Slant path total Precipitable water factor used for adjusting the M15 - M12 confident cloudy threshold LN_M15_M12_Lo, see above
LN_M15_M16_Mid	4	32-bit floating point	1.0 - 8.0	Kelvin	Clear/cloudy default threshold used in the land/night M15 - M16 emission thin cirrus test
LN_M15_M16_LO_CORR	4	32-bit floating point	0.1 - 1.0	Kelvin	Correction added to the land/night M15-M16 clear/cloudy threshold (derived or default LN_M15_M16_Mid) to define the confident cloudy threshold for the M15 - M16 emission thin cirrus test
LN_M15_M16_HI_CORR	4	32-bit floating point	-1.0 - +1.0	Kelvin	Correction added to the land/night M15-M16 clear/cloudy threshold (derived or default LN_M15_M16_Mid) to define the confident clear threshold for the M15 - M16 emission thin cirrus test
LN_M15_LO_CORR	4	32-bit floating point	0.1 - 5.0	Kelvin	Correction added to the derived M15 clear/cloudy threshold used in the land/night M15 emission test to produce the confident cloudy threshold
LN_M15_HI_CORR	4	32-bit floating point	-10.0 - 10.0	Kelvin	Correction added to the derived M15 clear/cloudy threshold used in the land/night M15 emission test to produce the confident clear threshold
SD_M15_M16_Mid	4	32-bit floating point	0.0 - 5.0	Kelvin	Clear/cloudy default threshold used in the snow/day M15 - M16 emission thin cirrus test

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
SD_M15_M16_LO_CORR	4	32-bit floating point	-0.50 - -0.15	Kelvin	Correction added to the snow/day M15-M16 clear/cloudy threshold (derived or default LN_M15_M16_Mid) to define confidently cloudy threshold for the M15 - M16 emission thin cirrus test
SD_M15_M16_HI_CORR	4	32-bit floating point	-0.50 - -0.15	Kelvin	Correction added to the snow/day M15-M16 clear/cloudy threshold (derived or default LN_M15_M16_Mid) to define the confidently clear threshold for the M15 - M16 emission thin cirrus test
SD_M12_M13_Hi	4	32-bit floating point	0.1 - 12.0	Kelvin	Confident clear threshold used in the snow/day M12 - M13 emission difference test
SD_M12_M13_Mid	4	32-bit floating point	0.5 - 15.0	Kelvin	Clear/cloudy threshold used in the snow/day M12 - M13 emission difference test
SD_M12_M13_Lo	4	32-bit floating point	1.0 - 30.0	Kelvin	Confident cloudy threshold used in the snow/day M12 - M13 emission difference test
SD_M12_M15_Hi	4	32-bit floating point	0.1 - 30.0	Kelvin	Confident clear threshold used in the snow/day M15 - M12 emission difference test when terrain height is less or equal to high elevation threshold, HiElevThresh
SD_M12_M15_Mid	4	32-bit floating point	3.0 - 35.0	Kelvin	Clear/cloudy threshold used in the snow/day M15 - M12 emission difference test when terrain height is less or equal to high elevation threshold, HiElevThresh
SD_M12_M15_Lo	4	32-bit floating point	5.0 - 40.0	Kelvin	Confident cloudy threshold used in the snow/day M15 - M12 emission difference test when terrain height is less or equal to high elevation threshold
SD_M12_M15_HiHiElev	4	32-bit floating point	0.1 - 30.0	Kelvin	Confident clear threshold used in the snow/day M15 - M12 emission difference test when terrain height is

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					greater than high elevation threshold
SD_M12_M15_MidHiElev	4	32-bit floating point	6.0 - 35.0	Kelvin	Clear/cloudy threshold used in the snow/day M15 - M12 emission difference test when terrain height is greater than high elevation threshold
SD_M12_M15_LoHiElev	4	32-bit floating point	7.0 - 40.0	Kelvin	Confident cloudy threshold used in the snow/day M15 - M12 emission difference test when terrain height is greater than high elevation threshold
SD_M9_PTPW_INFLECTION	4	32-bit floating point	0.0 - 0.50	cm	Total path integrated water vapor value at desert/day M9 vs. path TPW inflection pt
implicit_pad1	4	unsigned 8-bit char	0	unitless	1 Dimensional Array: PAD_BYTES_4 Size of Dimension(s): 4
SD_M9_HI_ZERO_TPW_REFLECTANCE	8	64-bit floating point	0.0 - 100.0	unitless	M9 high clear-sky confidence reflectance at 0 cm total Precipitable water for the snow/day M9 cloud conf reflectance test; value percent reflectance
SD_M9_MID_ZERO_TPW_REFLECTANCE	8	64-bit floating point	0.0 - 100.0	unitless	M9 cloud/no cloud reflectance at 0 cm total Precipitable water for the snow/day M9 cloud conf reflectance test; value percent reflectance
SD_M9_LO_ZERO_TPW_REFLECTANCE	8	64-bit floating point	0.0 - 100.0	unitless	M9 low clear-sky confidence reflectance at 0 cm total Precipitable water for the snow/day M9 cloud conf reflectance test; value percent reflectance
SD_M9_HI_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000.0	unitless	0th-1st order polynomial coeffs on path tpw used in the ConfClr threshold calc for the snow/day M9 cloud conf reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
SD_M9_MID_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000.0	unitless	0th-1st order polynomial coeffs on path tpw used in the Clr/Cldy threshold calc for the snow/day M9 cloud conf reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
SD_M9_LO_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000	unitless	0th-1st order polynomial coeffs on path tpw used in the ConfCldy threshold calc for the snow/day M9 cloud conf reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
SN_M15_M16_Mid	4	32-bit floating point	0.0 - 5.0	Kelvin	Clear/cloudy default threshold used in the snow/night M15-M16 emission thin cirrus test
SN_M15_M16_LO_CORR	4	32-bit floating point	-0.50 - -0.15	Kelvin	Correction added to the snow/night M15-M16 clear/cloudy threshold (derived or default LN_M15_M16_Mid) to define confidently cloudy threshold for the M15 - M16 emission thin cirrus test
SN_M15_M16_HI_CORR	4	32-bit floating point	-0.50 - -0.15	Kelvin	Correction add to the snow/night M15-M16 clear/cloudy threshold (derived or default LN_M15_M16_Mid) to define confidently clear threshold for the M15 - M16 emission thin cirrus test
SN_M12_M16_Hi	4	32-bit floating point	1.0 - 5.0	Kelvin	Confident clear threshold used in the snow/night M12 - M16 emission difference test
SN_M12_M16_Mid	4	32-bit floating point	1.5 - 5.5	Kelvin	Clear/cloudy threshold used in the snow/night M12 - M16 emission

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					difference test
SN_M12_M16_Lo	4	32-bit floating point	2.0 - 6.0	Kelvin	Confident cloudy threshold used in the snow/night M12 - M16 emission difference test
SN_M15_M12_Hi	4	32-bit floating point	-10.0 - 0.0	Kelvin	Confident clear threshold used in the snow/night M15 - M12 emission difference test
SN_M15_M12_Mid	4	32-bit floating point	-12.5 - -2.5	Kelvin	Clear/cloudy threshold used in the snow/night M15 - M12 emission difference test
SN_M15_M12_Lo	4	32-bit floating point	-15.0 - -5.0	Kelvin	Confident cloudy threshold used in the snow/night M15 - M12 emission difference test
SN_M15_LO_CORR	4	32-bit floating point	0.1 - 5.0	Kelvin	Correction added to the derived M15 clear/cloudy threshold used in the snow/night M15 emission test to produce the confident cloudy threshold
SN_M15_HI_CORR	4	32-bit floating point	-10.0 - 10.0	Kelvin	Correction added to the derived M15 clear/cloudy threshold used in the snow/night M15 emission test to produce the confident clear threshold
WD_M12_M13_Hi	4	32-bit floating point	0.1 - 12.0	Kelvin	Confident clear threshold used in the water/day M12 - M13 emission difference test
WD_M12_M13_Mid	4	32-bit floating point	1.0 - 13.0	Kelvin	Clear/cloudy threshold used in the water/day M12 - M13 emission difference test
WD_M12_M13_Lo	4	32-bit floating point	2.0 - 14.0	Kelvin	Confident cloudy threshold used in the water/day M12 - M13 emission difference test
WD_M15_M12_Hi	4	32-bit floating point	-10.0 - 5.0	Kelvin	Confident clear threshold used in the water/day M15 - M12 emission difference test
WD_M15_M12_Mid	4	32-bit floating point	-15.0 - -7.5	Kelvin	Clear/cloudy threshold used in the water/day M15 - M12 emission difference test

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
WD_M15_M12_Lo	4	32-bit floating point	-20.0 - -10.0	Kelvin	Confident cloudy threshold used in the water/day M15 - M12 emission difference test
WD_M15_M16_Mid	4	32-bit floating point	1.0 - 8.0	Kelvin	Clear/cloudy default threshold used in the water/day M15 - M16 emission thin cirrus test
WD_M15_M16_LO_CORR	4	32-bit floating point	0.1 - 1.0	Kelvin	Correction added to the water/day M15 - M16 clear/cloudy threshold (derived or default WD_M15_M16_Mid) to define the confident cloudy threshold for the M15 - M16 emission thin cirrus test
WD_M15_M16_HI_CORR	4	32-bit floating point	-1.0 - 1.0	Kelvin	Correction added to the water/day M15-M16 clear/cloudy threshold (derived or default WD_M15_M16_Mid) to define the confident clear threshold for the M15 - M16 emission thin cirrus test
WD_M14_M15_M16_LO_CORR	4	32-bit floating point	0.1 - 1.0	Kelvin	Correction added to a derived clear/cloudy threshold to define the confident cloudy threshold for the trispectral emission test
WD_M14_M15_M16_HI_CORR	4	32-bit floating point	-1.0 - 1.0	Kelvin	Correction added to a derived clear/cloudy threshold to define the confident clear threshold for the trispectral emission test
WD_M5_M7_Hi1	4	32-bit floating point	0.70 - 0.98	unitless	Confident clear threshold used in the water/day M7/M5 reflectance threshold test when no land (e.g., island) and no sun glint is present
WD_M5_M7_Mid1	4	32-bit floating point	0.8 - 1.05	unitless	Clear/cloudy threshold used in the water/day M7/M5 reflectance threshold test when no land (e.g., island) and no sun glint is present
WD_M5_M7_Lo1	4	32-bit floating point	0.9 - 1.5	unitless	Confident cloudy threshold used in the water/day M7/M5 reflectance threshold test when no land (e.g., island) and no sun glint is present

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
WD_M5_M7_Hi2	4	32-bit floating point	1.0 - 1.4	unitless	Confident clear threshold used in the water/day M7/M5 reflectance threshold test when no sun glint is present but some land (e.g., land) is present
WD_M5_M7_Mid2	4	32-bit floating point	1.0 - 1.3	unitless	Clear/cloudy threshold used in the water/day M7/M5 reflectance threshold test when no sun glint is present but some land (e.g., land) is present
WD_M5_M7_Lo2	4	32-bit floating point	0.9 - 1.5	unitless	Confident cloudy threshold used in the water/day M7/M5 reflectance threshold test when no sun glint is present but some land (e.g., land) is present
VCM_M7_TOA_NDVI_THRESH	4	32-bit floating point	0.001 - 0.2	unitless	maximum TOA NDVI allowable for execution of the water/day M7 reflectance
implicit_pad2	4	unsigned 8-bit char	0	unitless	1 Dimensional Array: PAD_BYTES_4 Size of Dimension(s): 4
WD_M7_HI_POLY_COEFS	32	64-bit floating point	-1000.0 - 1000.0	unitless	0th-3rd order polynomial coefficients on scattering angle when used in the Confident Clear threshold calculation for the water/day /noGlint M7 reflectance test; calc yields percent reflectance. 1 Dimensional Array: NUM_WD_M7_POLY_COEFS Size of Dimension(s): 4
WD_M7_MID_POLY_COEFS	32	64-bit floating point	-1000.0 - 1000.0	unitless	0th-3rd order polynomial coefficients on scattering angle when used in the Clear/Cloudy threshold calculation for the water/day /noGlint M7 reflectance test; calc yields percent reflectance. 1 Dimensional Array: NUM_WD_M7_POLY_COEFS Size of Dimension(s): 4

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
WD_M7_LO_POLY_COEFS	32	64-bit floating point	-1000.0 - 1000.0	unitless	0th-3rd order polynomial coefficients on scattering angle when used in the Confident Cloudy threshold calculation for the water/day /noGlint M7 reflectance test; calc yields percent reflectance. 1 Dimensional Array: NUM_WD_M7_POLY_COEFS Size of Dimension(s): 4
WD_M7_HI_CORR	4	32-bit floating point	-1.0 - 1.0	unitless	Confident Clear threshold correction for the water/day /noGlint M7 reflectance test, expressed as fraction, not percent.
WD_M7_MID_CORR	4	32-bit floating point	-1.0 - 1.0	unitless	Clear/Cloudy threshold correction for the water/day /noGlint M7 reflectance test, expressed as fraction, not percent.
WD_M7_LO_CORR	4	32-bit floating point	-1.0 - 1.0	unitless	Confident Cloudy threshold correction for the water/day /noGlint M7 reflectance test, expressed as fraction, not percent.
implicit_pad3	4	unsigned 8-bit char	0	unitless	1 Dimensional Array: PAD_BYTES_4 Size of Dimension(s): 4
WD_M7_SNGLNT_HI_POLY_COEFS	32	64-bit floating point	-1000.0 - 1000.0	unitless	0th-3rd order polynomial coefficients on scattering angle when used in the Confident Clear threshold calculation for the M7 reflectance test over inland water or in glint; calc yields percent reflectance. 1 Dimensional Array: NUM_WD_M7_POLY_COEFS Size of Dimension(s): 4
WD_M7_SNGLNT_MID_POLY_COEFS	32	64-bit floating point	-1000.0 - 1000.0	unitless	0th-3rd order polynomial coefficients on scattering angle when used in the Clear/Cloudy threshold calculation for the M7 reflectance test over inland water or in glint; calc yields percent

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					reflectance. 1 Dimensional Array: NUM_WD_M7_POLY_COEFS Size of Dimension(s): 4
WD_M7_SNGLNT_LO_POLY_COEFS	32	64-bit floating point	-1000.0 - 1000.0	unitless	0th-3rd order polynomial coefficients on scattering angle when used in the Confident Cloudy threshold calculation for the M7 reflectance test over inland water or in glint; calc yields percent reflectance. 1 Dimensional Array: NUM_WD_M7_POLY_COEFS Size of Dimension(s): 4
WD_M7_SNGLNT_HI_CORR	4	32-bit floating point	-1.0 - 1.0	unitless	
WD_M7_SNGLNT_MID_CORR	4	32-bit floating point	-1.0 - 1.0	unitless	
WD_M7_SNGLNT_LO_CORR	4	32-bit floating point	-1.0 - 1.0	unitless	
WD_M9_PTPW_INFLECTION	4	32-bit floating point	0.0 - 0.50	cm	total path integrated water vapor value at water/day M9 vs path TPW inflection pt
WD_M9_HI_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000.0	unitless	0th-1st order polynomial coeffs on path tpw used in the ConfClr threshold calc for the water/day M9 cloud conf reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
WD_M9_MID_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000	unitless	0th-1st order polynomial coeffs on path tpw used in the Clr/Cldy threshold calc for the water/day M9 cloud conf reflectance and thin cirrus tests; calc

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
WD_M9_LO_POLY_COEFS	16	64-bit floating point	-1000.0 - 1000	unitless	0th-1st order polynomial coeffs on path tpw used in the ConfCldy threshold calc for the water/day M9 cloud conf reflectance and thin cirrus tests; calc yields percent reflectance 1 Dimensional Array: NUM_xD_M9_POLY_COEFS Size of Dimension(s): 2
WN_M15_M12_Hi	4	32-bit floating point	1.0 - 5.0	Kelvin	Confident clear base threshold used in the water/night M15 - M12 emission difference test; threshold adjusted for Precipitable water
WN_M15_M12_Mid	4	32-bit floating point	1.25 - 5.5	Kelvin	Clear/cloudy base threshold used in the water/night M15 - M12 emission difference test; threshold adjusted for Precipitable water
WN_M15_M12_Lo	4	32-bit floating point	1.5 - 6.0	Kelvin	Confident cloudy base threshold used in the water/night M15 - M12 emission difference test; threshold adjusted for Precipitable water
WN_M15_M12_MAX_PTPW	4	32-bit floating point	1.0 - 8.0	cm	Maximum slant-path-corrected total Precipitable water limit for the water/night M15 - M12 BTD emission test
WN_HI_PTPW_FACTOR	4	32-bit floating point	0.1 - 1.0	Kelvin/cm	Slant path total Precipitable water factor used for adjusting the M15 - M12 confident clear sky threshold WN_M15_M12_Hi, see above
WN_MID_PTPW_FACTOR	4	32-bit floating point	0.1 - 1.0	Kelvin/cm	Slant path total Precipitable water factor used for adjusting the M15 - M12

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					clear/cloudy threshold WN_M15_M12_Mid, see above
WN_LO_PTPW_FACTOR	4	32-bit floating point	0.1 - 1.0	Kelvin/cm	Slant path total Precipitable water factor used for adjusting the M15 - M12 confident cloudy threshold WN_M15_M12_Lo, see above
WN_M15_M16_Mid	4	32-bit floating point	01.0 - 8.0	Kelvin	Clear/cloudy default threshold used in the water/night M15 - M16 emission thin cirrus test
WN_M15_M16_LO_CORR	4	32-bit floating point	0.1 - 1.0	Kelvin	Correction added to the water/night M15-M16 clear/cloudy threshold (derived or default WN_M15_M16_Mid) to define the confident cloudy threshold for the M15 - M16 emission thin cirrus test
WN_M15_M16_HI_CORR	4	32-bit floating point	-1.0 - 1.0	Kelvin	Correction added to the water/night M15-M16 clear/cloudy threshold (derived or default WN_M15_M16_Mid) to define the confident clear threshold for the M15 - M16 emission thin cirrus test
WN_M15_LO_CORR	4	32-bit floating point	0.1 - 5.0	Kelvin	Correction added to the derived M15 clear/cloudy threshold used in the water/night M15 emission test to produce the confident cloudy threshold
WN_M15_HI_CORR	4	32-bit floating point	-10.0 - 10.0	Kelvin	Correction added to the derived M15 clear/cloudy threshold used in the water/night M15 emission test to produce the confident clear threshold
WN_M14_M15_M16_LO_CORR	4	32-bit floating point	0.1 - 1.0	Kelvin	Correction added to a derived clear/cloudy threshold to define the confident cloudy threshold for the trispectral emission test
WN_M14_M15_M16_HI_CORR	4	32-bit floating point	-1.0 - 1.0	Kelvin	Correction added to a derived clear/cloudy threshold to define the confident clear threshold for the trispectral emission test
HiElevThresh	4	32-bit integer	1000 - 5000	meters	Minimum high terrain value required for

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					performing snow/day and snow/night M12 - M15 emission difference test
sst_thres	4	32-bit floating point	2.0 - 7.0	Kelvin	Clear/cloudy base threshold used for ocean pixels in the water/night M15 - M16 emission threshold test; value adjusted with brightness temperature difference and corrected for sensor zenith angle
sst_in_water_thres	4	32-bit floating point	3.0 - 11.0	Kelvin	Clear/cloudy base threshold used for inland water pixels in the water/night M15 - M16 emission threshold test; value adjusted with brightness temperature difference and corrected for sensor zenith angle
lst_thres	4	32-bit floating point	6.0 - 14.0	Kelvin	Clear/cloudy base threshold used for non-desert pixels in the land/night M15 - M16 BTD emission threshold test; value adjusted with brightness temperature difference and corrected for sensor zenith angle
lst_desert_thres	4	32-bit floating point	15.0 - 25.0	Kelvin	Clear/cloudy base threshold used for desert pixels in the land/night M15 - M16 emission threshold test; value adjusted with brightness temperature difference and corrected for sensor zenith angle
lst_snow_thres	4	32-bit floating point	2.0 - 14.0	Kelvin	Clear/cloudy base threshold used in the snow/night M15 - M16 emission threshold test; value adjusted with brightness temperature difference and corrected for sensor zenith angle
VCM_MIN_SFC_TEMP	4	32-bit floating point	160.0 - 180.0	Kelvin	Minimum surface temperature required to perform the nighttime M15 - M16 emission threshold test
VCM_MAX_SFC_TEMP	4	32-bit floating point	340.0 - 360.0	Kelvin	Maximum surface temperature required to perform the nighttime M15 - M16

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					emission threshold test
snglntRatio_Hi1	4	32-bit floating point	0.8 - 1.05	unitless	Confident clear threshold used in the water/day M7/M5 reflectance threshold test when sun glint is present but no land (e.g., island) is present
snglntRatio_Mid1	4	32-bit floating point	0.9 - 1.15	unitless	Clear/cloudy threshold used in the water/day M7/M5 reflectance threshold test when sun glint is present but no land (e.g., island) is present
snglntRatio_Lo1	4	32-bit floating point	1.0 - 1.6	unitless	Confident cloudy threshold used in the water/day M7/M5 reflectance threshold test when sun glint is present but no land (e.g., island) is present
snglntRatio_Hi2	4	32-bit floating point	1.05 - 1.45	unitless	Confident clear threshold used in the water/day M7/M5 reflectance threshold test when sun glint and some land (e.g., island) is present
snglntRatio_Mid2	4	32-bit floating point	1.0 - 1.3	unitless	Clear/cloudy threshold used in the water/day M7/M5 reflectance threshold test when sun glint and some land (e.g., island) is present
snglntRatio_Lo2	4	32-bit floating point	1.05 - 1.6	unitless	Confident cloudy thresholds used in the water/day M7/M5 reflectance threshold test when sun glint and some land (e.g., island) is present
BTM12_limit	4	32-bit floating point	230.0 - 250.0	Kelvin	Minimum brightness temperature M12 required for performing M15 - M12 emission difference test under nighttime conditions
highLat	4	32-bit floating point	50.0 - 70.0	degree	Maximum northern latitude in which M12-M13 BT Difference Test is used
lowLat	4	32-bit floating point	-70.0 - -50.0	degree	Maximum southern latitude in which M12-M13 BT Difference Test is used
VCM_M15M12DIFF_MIN_TOCNDVI	4	32-bit floating point	0.1 - 0.4	unitless	Minimum TOC NDVI required to perform the land/day and coast/day M15 - M12 emission difference test.

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
VCM_M12M13DIFF_MIN_TOCNDVI	4	32-bit floating point	0.1 - 0.4	unitless	Minimum TOC NDVI required to perform the land/day M12 - M13 emission difference test
VCM_NIGHT_MIN_TOCNDVI	4	32-bit floating point	0.1 - 0.4	unitless	Minimum TOC NDVI required to perform the land/night M15 - M12 emission difference test
VCM_TRISPEC_C0	4	32-bit floating point	2.0 - 3.0	Kelvin	Coefficients for the tri-spectral clear/cloudy threshold calculation, where midpt = VCM_TRISPEC_C0 + VCM_TRISPEC_C1 * T + VCM_TRISPEC_C2 * T2 + VCM_TRISPEC_C3 * T3
VCM_TRISPEC_C1	4	32-bit floating point	-4.0 - -3.0	unitless	Coefficients for the tri-spectral clear/cloudy threshold calculation, where midpt = VCM_TRISPEC_C0 + VCM_TRISPEC_C1 * T + VCM_TRISPEC_C2 * T2 + VCM_TRISPEC_C3 * T3
VCM_TRISPEC_C2	4	32-bit floating point	0.0 - 2.0	1/Kelvin	Coefficients for the tri-spectral clear/cloudy threshold calculation, where midpt = VCM_TRISPEC_C0 + VCM_TRISPEC_C1 * T + VCM_TRISPEC_C2 * T2 + VCM_TRISPEC_C3 * T3
VCM_TRISPEC_C3	4	32-bit floating point	-2.0 - 0.0	1/Kelvin^2	Coefficients for the tri-spectral clear/cloudy threshold calculation, where midpt = VCM_TRISPEC_C0 + VCM_TRISPEC_C1 * T + VCM_TRISPEC_C2 * T2 + VCM_TRISPEC_C3 * T3
M15_M16_WV_CORR_THRESH	4	32-bit floating point	0.1 - 3.0	Kelvin	Minimum threshold at which the M15 - M16 BTD clear/cloudy threshold is corrected for water vapor effects; used for nighttime tests for land, water and snow
M15_MIDPT_WV_CORR_FACTOR	4	32-bit floating	1.0 - 3.0	unitless	Water vapor correction factor applied to

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
		point			the M15 - M16 brightness temperature difference; the resulting product is used to adjust the nighttime M15 clear/cloudy threshold for land, water and snow
M15_ATM_SLANT_WV_CORR_FACTOR	4	32-bit floating point	1.0 - 6.0	Kelvin	Slant path water vapor correction factor used in the M15 emission nighttime tests for land, water and snow
GEMI_RATIO1_CONST_1	4	32-bit floating point	1.0 - 3.0	unitless	Coefficients used in the M7/M5 GEMI ratio equation for land/day, where
GEMI_RATIO1_CONST_2	4	32-bit floating point	0.0 - 3.0	unitless	m5/m7)GEMI =
GEMI_RATIO1_CONST_3	4	32-bit floating point	0.0 - 2.0	unitless	(GEMI_EQU_CONST_1 - GEMI_EQU_CONST_2 * ratio_c3) -
GEMI_RATIO2_CONST_1	4	32-bit floating point	0.0 - 1.0	unitless	((RefM5 - GEMI_EQU_CONST_3)/(GEMI_EQU_ CONST_4 - RefM5))
GEMI_EQU_CONST_1	4	32-bit floating point	0.0 - 2.0	unitless	and
GEMI_EQU_CONST_2	4	32-bit floating point	0.0 - 0.2	unitless	ratio_c3 =
GEMI_EQU_CONST_3	4	32-bit floating point	0.0 - 1.0	unitless	(GEMI_RATIO1_CONST1(RefM7 - RefM5) + GEMI_RATIO1_CONST_2(RefM7) + GEMI_RATIO1_CONST_3(RefM5)) / (RefM7 + RefM5 + GEMI_RATIO_CONST2_1)
GEMI_EQU_CONST_4	4	32-bit floating point	0.0 - 1.0	unitless	
LD_M9_THIN_CIRRUS_WEIGHT_CORR	4	32-bit floating point	0.0 - 1.0	unitless	weighting factor for M9 mid - M9 conf clr threshold diff used in adjusting M9 thin cirrus threshold test for land/day
CD_M9_THIN_CIRRUS_WEIGHT_CORR	4	32-bit floating point	0.0 - 1.0	unitless	weighting factor for M9 mid - M9 conf clr threshold diff used in adjusting M9 thin cirrus threshold test for coast/day
DD_M9_THIN_CIRRUS_WEIGHT_CORR	4	32-bit floating point	0.0 - 1.0	unitless	weighting factor for M9 mid - M9 conf clr threshold diff used in adjusting M9

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					thin cirrus threshold test for desert/day
SD_M9_THIN_CIRRUS_WEIGHT_CORR	4	32-bit floating point	0.0 - 1.0	unitless	weighting factor for M9 mid - M9 conf clr threshold diff used in adjusting M9 thin cirrus threshold test for snow/day
WD_M9_THIN_CIRRUS_WEIGHT_CORR	4	32-bit floating point	0.0 - 1.0	unitless	weighting factor for M9 mid - M9 conf clr threshold diff used in adjusting M9 thin cirrus threshold test for water/day
M15_M16_THIN_CIRRUS_MID_CORR	4	32-bit floating point	-2.0 - -0.1	Kelvin	Correction added to the M15 - M16 clear/cloudy thin cirrus threshold
VCM_TOA_NDVI_THRESH	4	32-bit floating point	0.001 - 0.1	unitless	Maximum TOA NDVI for detection of ephemeral water
CP_LAMBDA_M12	4	32-bit floating point	3.6e-06 - 3.8e-06	meters	M12 band center used in Cloud_Phase()
CP_M12_MEAN_TOA_SOL_IRRAD	4	32-bit floating point	8.0 - 12.0	W/m^2	Mean M12 top of atmosphere solar irradiance
CP_M12_BW_MICRONS	4	32-bit floating point	0.01 - 0.03	microns	M12 bandwith
CP_M12_BW_METERS	4	32-bit floating point	0.01e-06 - 0.03e-06	meters	M12 bandwith
CP_EARTHSUNRATIO	4	32-bit floating point	0.5 - 1.5	unitless	Ratio of the earth to sun distance/sun diameter
CP_M14M15_BTM15_LIMIT	4	32-bit floating point	310.0 - 350.0	Kelvin	Maximum valid BTM15 used in the M14M15 BTD test
CP_WIN_OVER_CORRECTION	4	32-bit floating point	0.01 - 0.20	Kelvin	SWBTD correction to vary MIN_win_over threshold table
CP_NIR_OVERLAP_WATER_CORRECTION	4	32-bit floating point	0.01 - 0.1	unitless	NIR correction to M9 over water which alters the M10 threshold
CP_NIR_OVERLAP_LAND_CORRECTION	4	32-bit floating point	0.01 - 0.1	unitless	NIR correction to M9 over land which alters the M10 threshold
CP_NIR_OVERLAP_LAND_MAX_POLY	4	32-bit floating point	0.1 - 0.5	unitless	Lower limit on M10 reflection used with NIR test over land
CP_M9_WATER_HI_LAT_N	4	32-bit floating point	40.0 - 70.0	degree	Latitude for NIR cloud overlap test
CP_M9_WATER_HI_LAT_S	4	32-bit floating point	-70.0 - -40.0	degree	Latitude for NIR cloud overlap test
CP_IR_WATER_TROPIC_LAT_N	4	32-bit floating	20.0 - 40.0	degree	North latitude defining humid tropics for

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
		point			nighttime overlap test
CP_IR_WATER_TROPIC_LAT_S	4	32-bit floating point	-40.0 - 20.0	degree	South latitude defining humid tropics for nighttime overlap test
CP_M9_DESERT_HI_LAT_N	4	32-bit floating point	40.0 - 70.0	degree	Latitude for NIR cloud overlap test
CP_M9_DESERT_HI_LAT_S	4	32-bit floating point	-70.0 - -40.0	degree	Latitude for NIR cloud overlap test
CP_M12_WATER_HI_LAT_N	4	32-bit floating point	50.0 - 70.0	degree	Hi polar latitude for NIR M12 test; assumes surf type is water
CP_M12_WATER_HI_LAT_S	4	32-bit floating point	-70.0 - -60.0	degree	Lo polar latitude for NIR M12 test; assumes surf type is water
CP_M12_DESERT_EXCLREG1_LAT_HI	4	32-bit floating point	30.0 - 40.0	degree	Hi latitude desert exclusion for NIR daytime cirrus M12 test
CP_M12_DESERT_EXCLREG1_LAT_LO	4	32-bit floating point	5.0 - 15.0	degree	Lo latitude desert exclusion for NIR daytime cirrus M12 test
CP_M12_DESERT_EXCLREG1_LON_LF	4	32-bit floating point	-40.0 - 0.5	degree	Left longitude desert exclusion for NIR daytime cirrus M12 test
CP_M12_DESERT_EXCLREG1_LON_RT	4	32-bit floating point	25.0 - 60.0	degree	Right longitude desert exclusion for NIR daytime cirrus M12 test
CP_M9_LAND_HI_LAT_N	4	32-bit floating point	30.0 - 50.0	degree	North latitude for NIR cloud overlap test
CP_M9_LAND_HI_LAT_S	4	32-bit floating point	-50.0 - -30.0	degree	South latitude for NIR cloud overlap test
CP_M10_SNOW_HI_LAT_N	4	32-bit floating point	40.0 - 60.0	degree	North latitude for SWBTD cloud overlap test
CP_M10_SNOW_HI_LAT_S	4	32-bit floating point	-60.0 - 40.0	degree	South latitude for SWBTD cloud overlap test
CP_MAX_BTM15_CERTAIN_ICE	4	32-bit floating point	230.0 - 240.0	Kelvin	Maximum BTM15 for certain ice; all water is frozen at -40C
CP_MIN_BTM15_MIXED	4	32-bit floating point	240.0 - 260.0	Kelvin	Minimum BTM15 where water/ice coexist
CP_MAX_BTM15_MIXED	4	32-bit floating point	270.0 - 275.0	Kelvin	Maximum BTM15 where water/ice coexist
CP_MAX_M10M5_RATIO_OVER_LAND	4	32-bit floating point	0.8 - 1.0	unitless	Maximum M10/M5 ratio for M10 refl over land
CP_OP_ICE_MAX_M10M5_RATIO	4	32-bit floating	0.8 - 1.0	unitless	Maximum M10/M5 ratio for opaque

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
		point			cirrus
CP_CIRRUS_MIN_M9_THRESH	4	32-bit floating point	0.001 - 0.04	unitless	Minimum M9 reflectance to detect presence of cirrus cloud; also used to reclassify mixed phase to cirrus. Note intentional double use.
CP_CIRRUS_MAX_M5_THRESH	4	32-bit floating point	0.3 - 0.5	unitless	Maximum M5 reflectance to detect presence of cirrus cloud
CP_CIRRUS_MIN_M9M5_RATIO_THRESH	4	32-bit floating point	0.1 - 0.2	unitless	Minimum M9/M5 ratio to detect presence of cirrus cloud
CP_OP_ICE_MAX_BTM15_THRESH	4	32-bit floating point	260.0 - 266.0	Kelvin	Maximum BTM15 allowed to reclassify mixed phase to opaque ice
CP_M14_M15_THRESH_CORR	4	32-bit floating point	0.1 - 0.3	unitless	M14M15 BTD threshold correction to reclassify opaque ice to mixed phase
CP_THIN_CIRRUS_MIN_M9_THRESH	4	32-bit floating point	0.001 - 0.04	unitless	Minimum M9 reflectance threshold to reclassify water phase to cirrus
CP_MIN_M14M15BTD_THRESH	4	32-bit floating point	0.4 - 0.6	Kelvin	Minimum M14M15 BTD to reclassify water phase to cirrus
CP_M12_MIN_EMIS_THRESH_NIGHT	4	32-bit floating point	0.9 - 1.5	unitless	Minimum EMSM12 to identify cirrus clouds at night using M15M16BTD test
CP_M12_MAX_EMIS_THRESH_NIGHT	4	32-bit floating point	12 - 16	unitless	Maximum EMSM12 to identify cirrus clouds at night using M12 emission test
CP_MAX_BTM15_WIN_OVER	4	32-bit floating point	265.0 - 275.0	Kelvin	Maximum BTM15 for SWBTD test to detect cloud overlap
CP_MAX_BTM15_NIR_OVER	4	32-bit floating point	275.0 - 285.0	Kelvin	Maximum BTM15 for NIR test to detect cloud overlap
CP_MAX_BTM15_NIGHT_OVER	4	32-bit floating point	280.0 - 300.0	Kelvin	Maximum BTM15 for nighttime detection of cloud overlap
CP_NIR_CIRRUS_THRES_WATER_M12	4	32-bit floating point	0.1 - 0.3	Kelvin	Maximum NIR M12 threshold for detection of cirrus over water
CP_NIR_CIRRUS_THRES_LAND_M12	4	32-bit floating point	0.1 - 0.3	Kelvin	Maximum NIR M12 threshold for detection of cirrus over land
CP_NIR_CIRRUS_THRES_DESERT_M12	4	32-bit floating point	0.25 - 0.5	Kelvin	Maximum NIR M12 threshold for detection of cirrus over desert
CP_MIN_CIRRUS	4	32-bit floating point	0.4 - 0.8	Kelvin	Minimum allowable cirrus threshold for M15-M16 BTD cirrus test
CP_MAX_CIRRUS	4	32-bit floating	3.5 - 7.0	Kelvin	Maximum allowable cirrus threshold for

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
		point			M15-M16 BTD cirrus test
CP_MIN_M5_OVER	4	32-bit floating point	0.25 - 0.5	unitless	SWBTD cloud overlap test param; minimum M5 reflectance to ensure presence of lower level water cloud
CP_MID_M5_OVER	4	32-bit floating point	0.4 - 0.8	unitless	SWBTD cloud overlap test param; M5 breakpoint. 4th degree polynomial applied min to mid region; linear mid to max
CP_MAX_M5_OVER	4	32-bit floating point	0.4 - 0.8	unitless	SWBTD cloud overlap test param; M5 breakpoint. 4th degree polynomial applied min to mid region; linear mid to max
CP_MIN_M1_OVER	4	32-bit floating point	0.9 - 1.0	unitless	SWBTD cloud overlap test param; max M5 where curve fit is linear
CP_MIN_M9_OVER_WATER_LOW	4	32-bit floating point	0.3 - 0.6	unitless	Min M1 refl over desert for valid SWBTD threshold
CP_MIN_M9_OVER_LAND_LOW	4	32-bit floating point	0.001 - 0.04	unitless	Lower M9 limits of the NIR detection window for daytime overlap for land, tropic/mid latitudes
CP_MIN_M9_OVER_WATER_HIGH	4	32-bit floating point	0.04 - 0.15	unitless	Lower M9 limits of the NIR detection window for daytime overlap for land, tropic/mid latitudes
CP_MIN_M9_OVER_LAND_HIGH	4	32-bit floating point	0.04 - 0.15	unitless	Lower M9 limits of the NIR detection window for daytime overlap for water, high latitudes
CP_M9_WIN_CHECK_THRES_LAND	4	32-bit floating point	0.05 - 0.2	unitless	Upper M9 limits of the NIR window for daytime overlap for land
CP_M9_WIN_CHECK_THRES_WATER	4	32-bit floating point	0.04 - 0.15	unitless	Upper M9 limits of the NIR window for daytime overlap for water
CP_MAX_M9_OVER	4	32-bit floating point	0.25 - 0.5	unitless	Maximum M9 reflectance for valid NIR overlap threshold
CP_SNOW_M10_THRES_LOW	4	32-bit floating point	0.05 - 0.20	unitless	Minimum M10 threshold in for detection of cloud overlap in non-polar latitudes with SWBTD test
CP_SNOW_M10_THRES_HIGH	4	32-bit floating point	0.20 - 0.40	unitless	Minimum M10 threshold in for detection of cloud overlap in polar latitudes with

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					SWBTD test
CP_M15_M16_N_OVER_L_TROPWATER	4	32-bit floating point	0.5 - 1.0	Kelvin	M15-M16 BTD low threshold for overlap over tropic oceans at night
CP_M15_M16_N_OVER_H_TROPWATER	4	32-bit floating point	1.0 - 3.0	Kelvin	M15-M16 BTD hi threshold for overlap over tropic oceans at night
CP_M12_N_OVER_L_TROPWATER	4	32-bit floating point	0.5 - 2.0	Kelvin	BTM12 low threshold for overlap over tropic oceans at night
CP_M12_N_OVER_H_TROPWATER	4	32-bit floating point	1.5 - 3.0	Kelvin	BTM12 hi threshold for overlap over tropic oceans at night
CP_M15_M16_N_OVER_L_MIDWATER	4	32-bit floating point	0.5 - 1.0	Kelvin	M15-M16 BTD low threshold for overlap over mid latitude oceans at night
CP_M15_M16_N_OVER_H_MIDWATER	4	32-bit floating point	1.0 - 3.0	Kelvin	M15-M16 BTD hi threshold for overlap over mid latitude oceans at night
CP_M12_N_OVER_L_MIDWATER	4	32-bit floating point	0.5 - 2.0	Kelvin	BTM12 low threshold for overlap over mid latitude oceans at night
CP_M12_N_OVER_H_MIDWATER	4	32-bit floating point	1.0 - 3.0	Kelvin	BTM12 hi threshold for overlap over mid latitude oceans at night
CP_M15_M16_N_OVER_L_LAND	4	32-bit floating point	0.5 - 1.0	Kelvin	M15-M16 BTD low threshold for overlap over land at night
CP_M15_M16_N_OVER_H_LAND	4	32-bit floating point	1.0 - 3.0	Kelvin	M15-M16 BTD hi threshold for overlap over land at night
CP_M12_N_OVER_L_LAND	4	32-bit floating point	0.5 - 2.0	Kelvin	BTM12 low threshold for overlap over land at night
CP_M12_N_OVER_H_LAND	4	32-bit floating point	1.0 - 3.0	Kelvin	BTM12 hi threshold for overlap over land at night
CP_M12_M15_N_OVER_L	4	32-bit floating point	2.0 - 5.0	Kelvin	M12-M15 BTD low threshold at night
CP_M12_M15_N_OVER_H	4	32-bit floating point	10.0 - 20.0	Kelvin	M12-M15 BTD hi threshold at night
implicit_pad4	4	unsigned 8-bit char	0	unitless	1 Dimensional Array: PAD_BYTES_4 Size of Dimension(s): 4
A_nir_over_water	144	64-bit floating point	-100.0 - 100.0	unitless	NIR cloud overlap test coefficients used to define the M10 threshold over a water surface. Thresholds are a function of scattering angle (i.e., 18 bins used at 10

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					deg intervals represent 0 to 180 degrees scattering geometry). Coefficients are for a 4-degree polynomial in M9 reflectance, x: $Ax^4 + Bx^3 + Cx^2 + Dx + E$ 1 Dimensional Array: NSCT Size of Dimension(s): 18
B_nir_over_water	144	64-bit floating point	-100.0 - 100.0	unitless	NIR cloud overlap test coefficients used to define the M10 threshold over a water surface. Thresholds are a function of scattering angle (i.e., 18 bins used at 10 deg intervals represent 0 to 180 degrees scattering geometry). Coefficients are for a 4-degree polynomial in M9 reflectance, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NSCT Size of Dimension(s): 18
C_nir_over_water	144	64-bit floating point	-100.0 - 100.0	unitless	NIR cloud overlap test coefficients used to define the M10 threshold over a water surface. Thresholds are a function of scattering angle (i.e., 18 bins used at 10 deg intervals represent 0 to 180 degrees scattering geometry). Coefficients are for a 4-degree polynomial in M9 reflectance, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NSCT Size of Dimension(s): 18
D_nir_over_water	144	64-bit floating point	-100.0 - 100.0	unitless	NIR cloud overlap test coefficients used to define the M10 threshold over a water surface. Thresholds are a function of scattering angle (i.e., 18 bins used at 10 deg intervals represent 0 to 180 degrees

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					scattering geometry). Coefficients are for a 4-degree polynomial in M9 reflectance, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NSCT Size of Dimension(s): 18
E_nir_over_water	144	64-bit floating point	-100.0 - 100.0	unitless	NIR cloud overlap test coefficients used to define the M10 threshold over a water surface. Thresholds are a function of scattering angle (i.e., 18 bins used at 10 deg intervals represent 0 to 180 degrees scattering geometry). Coefficients are for a 4-degree polynomial in M9 reflectance, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NSCT Size of Dimension(s): 18
A_nir_over_land	144	64-bit floating point	-100.0 - 100.0	unitless	NIR cloud overlap test coefficients used to define the M10 threshold over a grass surface. Thresholds are a function of scattering angle (i.e., 18 bins used at 10 deg intervals represent 0 to 180 degrees scattering geometry). Coefficients are for a 4-degree polynomial in M9 reflectance, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NSCT Size of Dimension(s): 18
B_nir_over_land	144	64-bit floating point	-100.0 - 100.0	unitless	NIR cloud overlap test coefficients used to define the M10 threshold over a grass surface. Thresholds are a function of scattering angle (i.e., 18 bins used at 10 deg intervals represent 0 to 180 degrees scattering geometry). Coefficients are for a 4-degree polynomial in M9

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					reflectance, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NSCT Size of Dimension(s): 18
C_nir_over_land	144	64-bit floating point	-100.0 - 100.0	unitless	NIR cloud overlap test coefficients used to define the M10 threshold over a grass surface. Thresholds are a function of scattering angle (i.e., 18 bins used at 10 deg intervals represent 0 to 180 degrees scattering geometry). Coefficients are for a 4-degree polynomial in M9 Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NSCT Size of Dimension(s): 18
D_nir_over_land	144	64-bit floating point	-100.0 - 100.0	unitless	NIR cloud overlap test coefficients used to define the M10 threshold over a grass surface. Thresholds are a function of scattering angle (i.e., 18 bins used at 10 deg intervals represent 0 to 180 degrees scattering geometry). Coefficients are for a 4-degree polynomial in M9 reflectance, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NSCT Size of Dimension(s): 18
E_nir_over_land	144	64-bit floating point	-100.0 - 100.0	unitless	NIR cloud overlap test coefficients used to define the M10 threshold over a grass surface. Thresholds are a function of scattering angle (i.e., 18 bins used at 10 deg intervals represent 0 to 180 degrees scattering geometry). Coefficients are for a 4-degree polynomial in M9 reflectance, x: Ax4 + Bx3 + Cx2 + Dx + E

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					1 Dimensional Array: NSCT Size of Dimension(s): 18
A_cirrus	56	64-bit floating point	-1.0e04 - 1.0e04	unitless	M15-M16 BTD (10.7(mu)m-12(mu)m) as a function of M15 BT coefficients for cirrus detection. Coefficients are for a 4-degree polynomial in M15 BT, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NVZA Size of Dimension(s): 7
B_cirrus	56	64-bit floating point	-1.0e04 - 1.0e04	unitless	M15-M16 BTD (10.7(mu)m-12(mu)m) as a function of M15 BT coefficients for cirrus detection. Coefficients are for a 4-degree polynomial in M15 BT, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NVZA Size of Dimension(s): 7
C_cirrus	56	64-bit floating point	-1.0e04 - 1.0e04	unitless	M15-M16 BTD (10.7(mu)m-12(mu)m) as a function of M15 BT coefficients for cirrus detection. Coefficients are for a 4-degree polynomial in M15 BT, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NVZA Size of Dimension(s): 7
D_cirrus	56	64-bit floating point	-1.0e04 - 1.0e04	unitless	M15-M16 BTD (10.7(mu)m-12(mu)m) as a function of M15 BT coefficients for cirrus detection. Coefficients are for a 4-degree polynomial in M15 BT, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NVZA Size of Dimension(s): 7
E_cirrus	56	64-bit floating point	-1.0e04 - 1.0e04	unitless	M15-M16 BTD (10.7(mu)m-12(mu)m) as a function of M15 BT coefficients for

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					cirrus detection. Coefficients are for a 4-degree polynomial in M15 BT, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NVZA Size of Dimension(s): 7
A_M14_M15	56	64-bit floating point	-1.0e03 - 1.0e03	Kelvin	M14-M15 BTD (8.6(mu)m-10.7(mu)m) coefficients as a function of M15 BT for cloud typing. Coefficients are for a 4-degree polynomial in M15 BT, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NVZA Size of Dimension(s): 7
B_M14_M15	56	64-bit floating point	-1.0e03 - 1.0e03	Kelvin	M14-M15 BTD (8.6(mu)m-10.7(mu)m) coefficients as a function of M15 BT for cloud typing. Coefficients are for a 4-degree polynomial in M15 BT, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NVZA Size of Dimension(s): 7
C_M14_M15	56	64-bit floating point	-1.0e03 - 1.0e03	Kelvin	M14-M15 BTD (8.6(mu)m-10.7(mu)m) coefficients as a function of M15 BT for cloud typing. Coefficients are for a 4-degree polynomial in M15 BT, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NVZA Size of Dimension(s): 7
D_M14_M15	56	64-bit floating point	-1.0e03 - 1.0e03	Kelvin	M14-M15 BTD (8.6(mu)m-10.7(mu)m) coefficients as a function of M15 BT for cloud typing. Coefficients are for a 4-degree polynomial in M15 BT, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NVZA

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					Size of Dimension(s): 7
E_M14_M15	56	64-bit floating point	-1.0e03 - 1.0e03	Kelvin	M14-M15 BTD (8.6(mu)m-10.7(mu)m) coefficients as a function of M15 BT for cloud typing. Coefficients are for a 4-degree polynomial in M15 BT, x: Ax4 + Bx3 + Cx2 + Dx + E 1 Dimensional Array: NVZA Size of Dimension(s): 7
A_win_over	448	64-bit floating point	-1.0e03 - 1.0e03	Kelvin	4-degree polynomial in M5 reflectance, x, as a function of scattering geometry used to calculate M5 reflectance threshold applied in the SWBTD (split-window BTD) test: Ax4 + Bx3 + Cx2 + Dx + E See MIN_win_over description below. 2 Dimensional Array: NSZA x NVZA Size of Dimension(s): 8 x 7
B_win_over	448	64-bit floating point	-1.0e03 - 1.0e03	Kelvin	4-degree polynomial in M5 reflectance, x, as a function of scattering geometry used to calculate M5 reflectance threshold applied in the SWBTD (split-window BTD) test: Ax4 + Bx3 + Cx2 + Dx + E See MIN_win_over description below. 2 Dimensional Array: NSZA x NVZA Size of Dimension(s): 8 x 7
C_win_over	448	64-bit floating point	-1.0e03 - 1.0e03	Kelvin	4-degree polynomial in M5 reflectance, x, as a function of scattering geometry used to calculate M5 reflectance threshold applied in the SWBTD (split-window BTD) test: Ax4 + Bx3 + Cx2 + Dx + E See MIN_win_over description below. 2 Dimensional Array:

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					NSZA x NVZA Size of Dimension(s): 8 x 7
D_win_over	448	64-bit floating point	-1.0e03 - 1.0e03	Kelvin	4-degree polynomial in M5 reflectance, x, as a function of scattering geometry used to calculate M5 reflectance threshold applied in the SWBTD (split-window BTD) test: Ax4 + Bx3 + Cx2 + Dx + E See MIN_win_over description below. 2 Dimensional Array: NSZA x NVZA Size of Dimension(s): 8 x 7
E_win_over	448	64-bit floating point	-1.0e03 - 1.0e03	Kelvin	4-degree polynomial in M5 reflectance, x, as a function of scattering geometry used to calculate M5 reflectance threshold applied in the SWBTD (split-window BTD) test: Ax4 + Bx3 + Cx2 + Dx + E See MIN_win_over description below. 2 Dimensional Array: NSZA x NVZA Size of Dimension(s): 8 x 7
MIN_win_over	448	64-bit floating point	0.0 - 10.0	Kelvin	Minimum M15-M16 BTD (10.7um - 12um), aka (SWBTD, split-window BTD) required for cloud overlap as a function of M5 reflectance for a single-layered water cloud; the M5 reflectance is a function of sol zen (1st dim) and sat zen (2nd dimension); applied when M5 values are between CP_MID_M5_OVER and CP_MAX_M5_OVER, but may be applied at lower M5. 2 Dimensional Array: NSZA x NVZA Size of Dimension(s): 8 x 7
M5_ndvi_coef	480	32-bit floating point	0.0 - 1.0	unitless	M5 coefficient table as a function of scattering angle and TOC NDVI bins

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					used in land/day and coast/day M5(M1) reflectance test for determining confident clear, clear/cloudy and confident cloudy thresholds; TOC NDVI bins consist of 10 bins from 0 to 1. Note that final thresholds are scaled by a factor of 0.01 and adjusted by a threshold adjustment, M5_*_THRES_ADJUST, in the software. 3 Dimensional Array: NTHRESH x NUM_NDVI_BINS x NCOEFS Size of Dimension(s): 3 x 10 x 4
M1_ndvi_coef	144	32-bit floating point	0.0 - 1.0	unitless	M1 coefficient table as a function of scattering angle and TOC NDVI bins used in land/day and coast/day M5(M1) reflectance test for determining confident clear, clear/cloudy and confident cloudy thresholds; TOC NDVI bins consist of MAX_NUM_M1_NDVI_BINS bins from 0 to MAX_NUM_M1_NDVI_BINS * 0.1. Note that final thresholds are scaled by a factor of 0.01 and adjusted by a threshold adjustment, M5_*_THRES_ADJUST, in the software. 3 Dimensional Array: NTHRESH x MAX_NUM_M1_NDVI_BINS x NCOEFS Size of Dimension(s): 3 x 3 x 4
M5_LO_THRES_ADJUST	4	32-bit floating point	0.01 - 0.05	unitless	Low clear-sky confidence threshold correction value for the M5 reflectance band used in the M5 reflectance test
M5_MID_THRES_ADJUST	4	32-bit floating point	0.01 - 0.04	unitless	Mid clear-sky confidence threshold correction value for the M5 reflectance band used in the M5 reflectance test

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
M5_HI_THRES_ADJUST	4	32-bit floating point	0.0 - 0.015	unitless	High clear-sky confidence threshold correction value for the M5 reflectance band used in the M5 reflectance test
M1_LO_THRES_ADJUST	4	32-bit floating point	0.01 - 0.05	unitless	Low clear-sky confidence threshold correction value for the M1 reflectance band used in the M5 reflectance test
M1_MID_THRES_ADJUST	4	32-bit floating point	0.01 - 0.04	unitless	Mid clear-sky confidence threshold correction value for the M5 reflectance band used in the M5 reflectance test
M1_HI_THRES_ADJUST	4	32-bit floating point	0.0 - 0.015	unitless	High clear-sky confidence threshold correction value for the M5 reflectance band used in the M5 reflectance test
M5_TEST_HI_NDVI_THRESH	4	32-bit floating point	0.5 - 0.8	unitless	High TOC NDVI threshold used in land/day and coast/day M5 tests to limit the minimum scattering angle used in calculating the TOA NDVI-based thresholds.
M5_TEST_HI_NDVI_MIN_SCAT_ANGLE	4	32-bit floating point	80.0 - 100.0	degree	Minimum scattering angle for high NDVI
VCM_SHADOW_MIN_NUM_DAY_PIXS	4	32-bit integer	2-8	unitless	The minimum number of moderate resolution ’day‘ pixels in a granule required to cast a shadow, where ’day‘ for the shadow algorithm is defined as pixels having a solar zenith angle < VCM_SHADOW_MAX_SZA
VCM_SHADOW_GRIDCELL_SIZE	4	32-bit integer	15 - 30	pixel	Hopping window size
VCM_SHADOW_LAPSE_RATE	4	32-bit floating point	5.0 - 10.0	degree K/km	Atmospheric lapse rate
VCM_SHADOW_MAX_SZA	4	32-bit floating point	70.0 - 80.0	degree	Maximum allowed solar zenith angle
VCM_SHADOW_DEFAULT_NCEP_2M_T	4	32-bit floating point	290.0 - 310.0	Kelvin	Default NCEP 2-meter surface air temperature
VCM_SHADOW_CLOUDHEIGHT_OFFSET	4	32-bit floating point	1.0 - 2.0	km	Cloud base and top offsets heights
VCM_SHADOW_CLOUDTHICKNESS_FACTOR	4	32-bit floating point	0.1 - 0.5	unitless	Cloud thickness adjustment factor

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
VCM_SHADOW_MIN_CLOUDBASE	4	32-bit floating point	0.25 - 1.25	km	Minimum cloud base height
VCM_SHADOW_MAX_CLOUDHEIGHT	4	32-bit floating point	14.0 - 18.0	km	Maximum cloud top height
VCM_SHADOW_CLOUDHEIGHT_STEPSIZE	4	32-bit floating point	0.5 - 1.5	km	Default cloud height step size
VCM_SHADOW_CLOUDHEIGHT_MAX_NSTEPS	4	32-bit integer	2 - 6	unitless	Maximum number of cloud height iteration steps (used to compute height step size)
VCM_SHADOW_POLAR_TROPO_HEIGHT	4	32-bit floating point	6.0 - 12.0	km	Polar Tropopause height
VCM_SHADOW_EQUATORIAL_TROPO_HEIGHT	4	32-bit floating point	15.0 - 18.0	km	Equatorial Tropopause height
VCM_SHADOW_ICECLOUD_BOT	4	32-bit floating point	0.05 - 3.0	km	Ice cloud minimum cloud base height
VCM_SHADOW_ICECLOUD_TOP	4	32-bit floating point	9.0 - 15.0	km	Ice cloud maximum cloud top height
VCM_SHADOW_THINCIRRUS_BOT	4	32-bit floating point	6.0 - 9.0	km	Thin cirrus cloud base height
VCM_SHADOW_THINCIRRUS_TOP	4	32-bit floating point	9.0 - 12.0	km	Thin cirrus cloud top height
VCM_SHADOW_CLDCONF_CHECK_WINDOW	4	32-bit integer	1 - 5	unitless	number of pixels to define the window half width for shadow application
VCM_POLAR_LAT	4	32-bit floating point	50.0 - 70.0	degree	Latitude demarking the beginning of the polar region
VCM_MIN_DEGRAD_TOC_NDVI	4	32-bit floating point	0.15 - 0.25	unitless	Minimum TOC NDVI of the defined degradation/exclusion range
VCM_MAX_DEGRAD_TOC_NDVI	4	32-bit floating point	0.35 - 0.45	unitless	Maximum TOC NDVI of the defined degradation/exclusion range
ShadowCastSwitch	4	32-bit integer	0-1	unitless	ShadowCastSwitch = 0 ;Shadow Cast Switch for casting shadow from confidently cloudy pixel only ShadowCastSwitch = 1 Shadow Cast Switch for casting shadows from confidently cloudy and probably cloudy pixels

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
File Size	**13,528 Bytes**				

Appendix A. Data Mnemonic to Interface Mapping

For a complete list of Data Mnemonic to Interface Mapping, see 474-00001-01, JPSS CDFCB-X Vol I. The CDFCB contains Data Mnemonics, Identifiers, Collection Short Names, Interface Documents, and Collection Long Names for each JPSS Data Product and for Geolocation data.

Appendix B. DQTT Quality Flag Mapping

Not Applicable

Appendix C. Abbreviations and Acronyms

See 470-00041, JPSS Program Lexicon for abbreviations and acronyms.

Attachment A. XML Formats for Related Data Products

Table: ATT-1 XML Formats for Related Products

File Number	File Name
1	474-00448-02-11_JPSS-CM-DD-Part-11_0200D_VIIRS-CM-EDR-PP.xml