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Block 2.0.0

Goddard Space Flight Center
Greenbelt, Maryland

National Aeronautics and
Space Administration

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Joint Polar Satellite System (JPSS) Algorithm Specification Volume II: Data Dictionary for the Cloud Physical Properties
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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
NASA/GSFC
Code 474
Greenbelt, MD 20771

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-13-1194 which was approved by JPSS Ground ERB on the effective date shown.	All
0200A	Jan 30, 2014	This version incorporates 474-CCR-13-1450 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	Dec 05, 2014	This version incorporates 474-CCR-14-2133 which was approved by the JPSS Ground ERB on the effective date shown.	All
0200C	Jul 28, 2015	This version incorporates 474-CCR-15-2288 and 474-CCR-15-2506 which was approved by the JPSS Ground ERB on the effective date shown.	All

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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 Cloud Physical Properties – Volume II: Data Dictionary contains the specifications for the format of the Cloud Physical Properties Intermediate 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.

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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
474-00448-01-16	JPSS Algorithm Specification Volume I: Software Requirements Specification (SRS) for the Cloud Physical Properties

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
474-00041	Joint Polar Satellite System (JPSS) Cloud Top Algorithm Theoretical Basis Document (ATBD)
474-00042	Joint Polar Satellite System (JPSS) VIIRS Cloud Effective Particle Size and Cloud Optical Thickness Algorithm Theoretical Basis Document (ATBD)
474-00044	Joint Polar Satellite System (JPSS) VIIRS Cloud Cover/Layers Algorithm Theoretical Basis Document (ATBD)
474-00045	Joint Polar Satellite System (JPSS) VIIRS Cloud Base Height Algorithm Theoretical Basis Document (ATBD)

Document Number	Title
474-00448-03-16	Joint Polar Satellite System (JPSS) Algorithm Specification Volume III: Operational Algorithm Description (OAD) for the Cloud Physical Properties
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 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

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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 (1 .. n). 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. 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.

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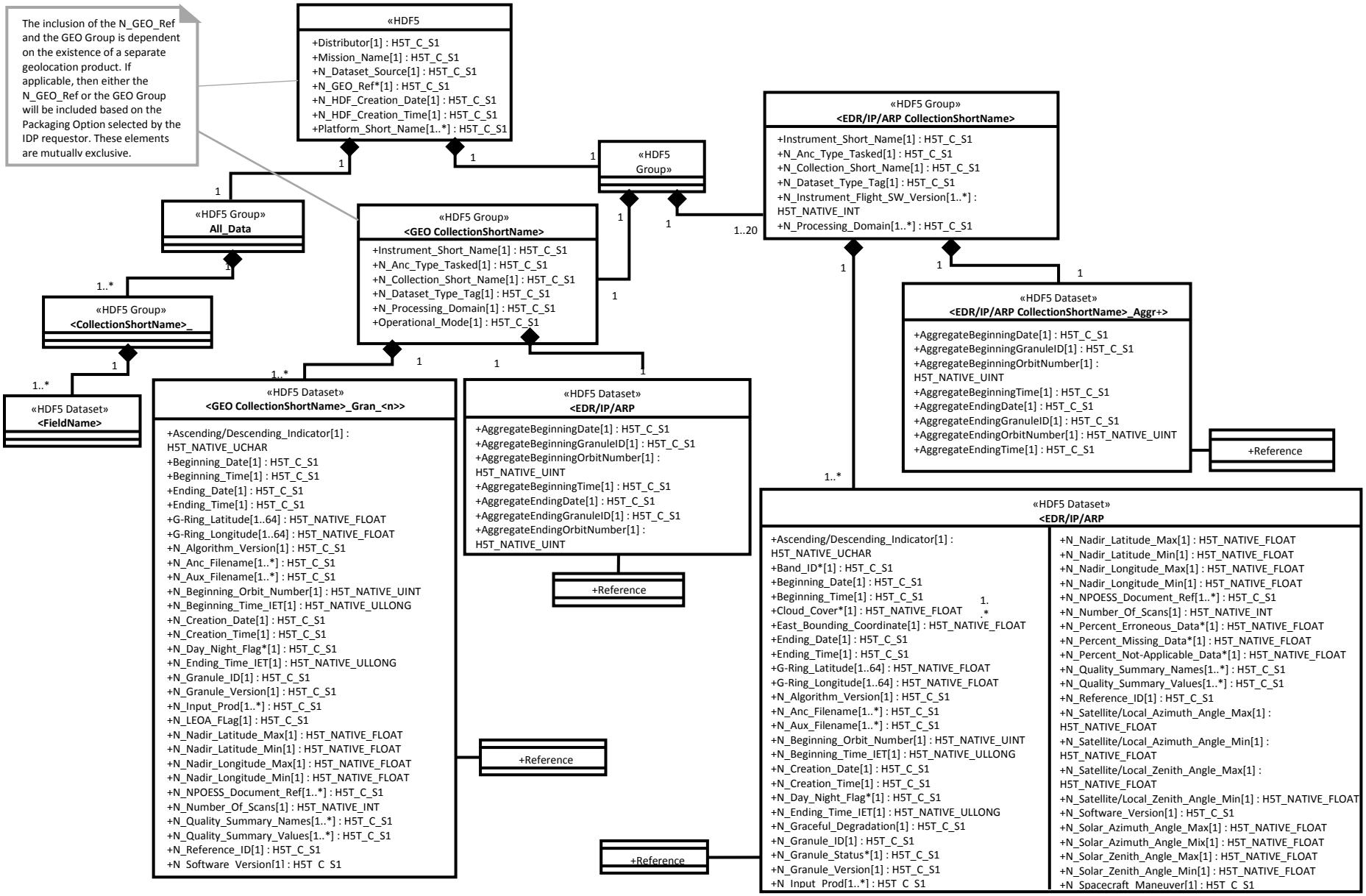

Figure: 3.1-1 Generalized UML Diagram for statically sized HDF5 IP/EDR Files

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".

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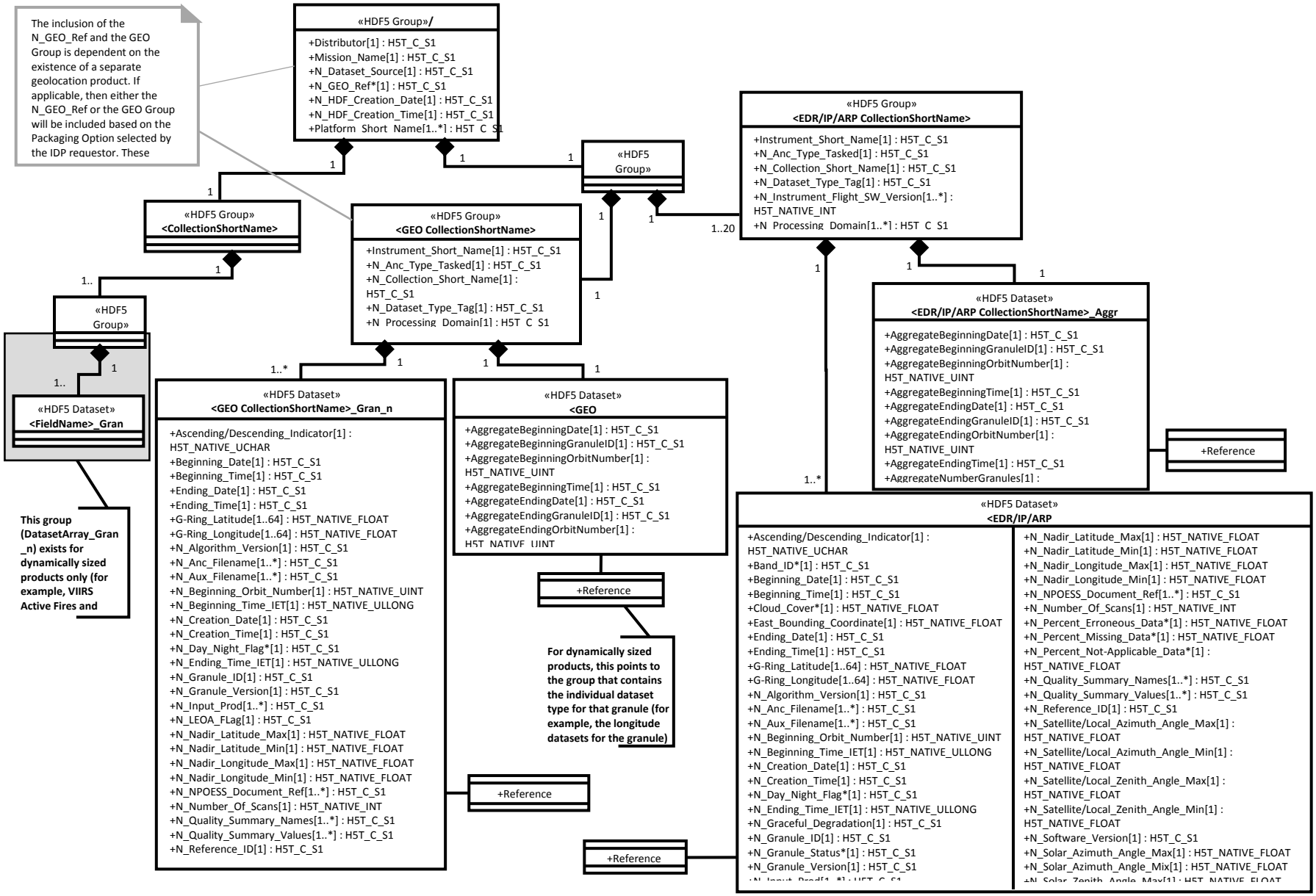

Figure: 3.2-1 Generalized UML Diagram for dynamically sized HDF5 IP/EDR Files

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4 Intermediate Products (IPs)

IPs are defined as a data subset or retrieval by-product that is required within another primary data product's generation sequence or is used as an input to secondary processing or analysis. The IPs defined here can be packaged and delivered to the end-user. Other IPs are generated during the creation of EDRs but are not deliverable and are thus not documented here.

4.1 VIIRS Cloud Base Height IP Format

Data Mnemonic	IMPI_VCBH_R0100 (Official) IMPI_VCBH_R0110 (Substitute)
Description/ Purpose	Moderate Resolution Pixel Level Cloud Base Height Information
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.0 for details.
File Size	See Table: 4.1.1-1 VIIRS Cloud Base Height Data Content Summary for size.
File Format Type	HDF5
Production Frequency	As requested
Data Content and Data Format	This IP contains the datasets with the described formatting as shown in the following product profile tables See Section 4.1.1 VIIRS Cloud Base Height IP Content Summary See Section 4.1.2 VIIRS Cloud Base Height IP Product Profile See Section 4.1.3 VIIRS Cloud Base Height IP HDF5 Details See Section 4.1.4 VIIRS Cloud Base Height IP Metadata Details See Section 4.1.5 VIIRS Cloud Base Height IP Geolocation Details

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4.1.1 VIIRS Cloud Base Height Data Content Summary

Table: 4.1.1-1 VIIRS Cloud Base Height Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
cbh	Cloud Base Height	32-bit floating point	[N*768, 3200]	[768, 3200]	kilometers
QF_VIIRSCBHIP	Quality Flags	unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
File Size	**12,288,000 Bytes**				

4.1.2 VIIRS Cloud Base Height IP Product Profile

Table: 4.1.2-1 VIIRS Cloud Base Height IP Product Profile

VIIRS-CBH-IP Product Profile

Fields

Name	Data Size	Dimensions
cbh	4byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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	
								Name	Value	Name	Value
Cloud Base Height	0	0	20	kilometers	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ONBOARD_PT_FLOAT32_FILL	-999.7		
								ONGROUND_PT_FLOAT32_FILL	-999.6		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		
								SOUB_FLOAT32_FILL	-999.2		

VIIRS-CBH-IP Product Profile - Quality Flags

Fields

Name	Data Size	Dimensions
QF_VIIRSCBHIP	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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	
								Name	Value	Name	Value
Check if cbh within 0 to 20km	0	0	1		No		1 bit(s)			out of range	1
										not	0
Check if confidently clear	1	0	1		No		1 bit(s)			confidently clear	1
										not	0
Check if in sunglint	2	0	1		No		1 bit(s)			in sunglint	1

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

											not	0
		Spare	3	MIN_VAL	MAX_VAL		No		5 bit(s)	**Name** **Value**	**Name** **Value**	

4.1.3 VIIRS Cloud Base Height IP HDF5 Details

Figure 4.1.3-1 provides the details on the content and data types of the VIIRS Cloud Base Height IP products. 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-CB-Ht-IP
+cbh : H5T_NATIVE_FLOAT +QF_VIIRSCBHIP : H5T_NATIVE_UCHAR

Figure: 4.1.3-1 VIIRS Cloud Base Height IP UML Diagram

4.1.4 VIIRS Cloud Base Height IP Metadata Details

The product metadata elements contained in the VIIRS Cloud Base Height IP are listed in 474-00448-02-01, JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms, Sections 4 and 5. These metadata elements include all common metadata at the root, product, aggregation, and granule level.

There are no granule level Quality Flags defined as metadata elements in the VIIRS Cloud Base Height IP. Therefore, there are no entries in the N_Quality_Summary_Name/Value metadata attributes for this product.

4.1.5 VIIRS Cloud Base Height IP Geolocation Details

See 474-00448-02-06 JPSS Algorithm Specification Vol II: Data Dictionary for VIIRS RDR/SDR, Section 6.2.65, VIIRS M-Band SDR Geolocation for VIIRS Cloud Base Height IP Geolocation details.

4.2 VIIRS Cloud Layer-Type IP Format

Data Mnemonic	IMPI_VICC_R0100 (Official) IMPI_VICC_R0110 (Substitute)
Description/ Purpose	Moderate Resolution Pixel Level Cloud Layer and Type information. The cloud layer numbers represent the layer number in which any cloud is present for each pixel in the granule. The cloud layer type values represent the type of cloud layer that is present for each pixel in the granule. Effectivity: S-NPP/JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.0 for details.
File Size	See Table: 4.2.1-1 VIIRS Cloud Layer-Type Data Content Summary for size. This granule size includes output related fields and quality flags only. Geolocation and metadata attributes are not included. Additional size added by HDF5 packaging is also not included.
File Format Type	HDF5
Production Frequency	As requested
Data Content and Data Format	This IP contains the datasets with the described formatting as shown in the following product profile tables See Section 4.2.1 VIIRS Cloud Layer-Type IP Content Summary

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

	See Section 4.2.2 VIIRS Cloud Layer-Type IP Product Profile See Section 4.2.3 VIIRS Cloud Layer-Type IP HDF5 Details See Section 4.2.4 VIIRS Cloud Layer-Type IP Metadata Details See Section 4.2.5 VIIRS Cloud Layer-Type IP Geolocation Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

4.2.1 VIIRS Cloud Layer-Type Data Content Summary

Table: 4.2.1-1 VIIRS Cloud Layer-Type Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
cloudLayer	Cloud Layer	unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
cloudType	Cloud Type Identification	unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF_VIIRSCDLAYERTYPEIP	Quality Flags	unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
File Size	**7,372,800 Bytes**				

4.2.2 VIIRS Cloud Layer-Type IP Product Profile

Table: 4.2.2-1 VIIRS Cloud Layer-Type IP Product Profile

VIIRS-CCL-PIX-IP Product Profile

Fields

Name	Data Size	Dimensions
cloudLayer	1byte(s)	
cloudType	1byte(s)	

cloudLayer Dimensions:

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	No	No	3200	3200

cloudLayer Datum:

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type
Cloud Layer	0	0	3	Unitless	No		unsigned 8-bit char

cloudLayer Fill Values:

Name	Value
NA_UINT8_FILL	255
MISS_UINT8_FILL	254
ONBOARD_PT_UINT8_FILL	253
ONGROUND_PT_UINT8_FILL	252
ERR_UINT8_FILL	251
ELLIPSOID_UINT8_FILL	250
VDNE_UINT8_FILL	249
SOUB_UINT8_FILL	248

cloudLayer Legend Entries:

Name	Value

cloudType Dimensions:

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	No	No	3200	3200

cloudType Datum:

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type
Cloud Type Identification	0	1	5	Unitless	No		unsigned 8-bit char

cloudType Fill Values:

Name	Value
NA_UINT8_FILL	255
MISS_UINT8_FILL	254
ONBOARD_PT_UINT8_FILL	253
ONGROUND_PT_UINT8_FILL	252
ERR_UINT8_FILL	251
ELLIPSOID_UINT8_FILL	250
VDNE_UINT8_FILL	249
SOUB_UINT8_FILL	248

cloudType Legend Entries:

Name	Value
Stratus	1
Alto Cumulus	2
Cumulus	3
Cirrus	4
Cirrus Cumulus	5

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

VIIRS-CCL-PIX-IP Product Profile - Quality Flags

Fields

Name	Data Size	Dimensions
QF_VIIRSCDLAYERTYPEIP	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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	
								Name	Value	Name	Value
Cloud confidence	0	0	3	Unitless	No		2 bit(s)			CONF_CLEAR	0
										PROB_CLOUDY	2
										CONF_CLOUDY	3
Surface type	2	0	5	Unitless	No		3 bit(s)			land desert	0
										land not desert	1
										inland water	2
										sea water	3
										coastal	5
Sunglint	5	0	1	Unitless	No		1 bit(s)			not	0
										in sunglint	1
Snow/ice surface	6	0	1	Unitless	No		1 bit(s)			not	0
										snow/ice	1
Spare	7	0	1	Unitless	No		1 bit(s)				

4.2.3 VIIRS Cloud Layer-Type IP HDF5 Details

Figure 4.2.3-1 provides the details on the content and data types of the VIIRS Cloud Layer-Type IP products. 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-Cd-Layer-Type-IP
+cloudLayer : H5T_NATIVE_UCHAR +cloudType : H5T_NATIVE_UCHAR +QF_VIIRSCDLAYERTYPEIP : H5T_NATIVE_UCHAR

Figure: 4.2.3-1 VIIRS Cloud Layer-Type IP UML Diagram

4.2.4 VIIRS Cloud Layer-Type IP Metadata Details

The product metadata elements contained in the VIIRS Cloud Layer-Type IP are listed in 474-00448-02-01, JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms, Sections 4 and 5. These metadata elements include all common metadata at the root, product, aggregation, and granule level in the HDF5 file.

There are no granule level Quality Flags defined as metadata elements in the VIIRS Cloud Layer-Type IP. Therefore, there are no entries in the N_Quality_Summary_Name/Value metadata attributes for this product.

4.2.5 VIIRS Cloud Layer-Type IP Geolocation Details

See 474-00448-02-06, JPSS Algorithm Specification Vol II: Data Dictionary for VIIRS RDR/SDR, Section 6.2.65, VIIRS M-Band SDR Geolocation for VIIRS Cloud Layer-Type IP Geolocation details.

4.3 VIIRS Cloud Cover-Type IP Format

Data Mnemonic	IMPI_VCLT_R0100 (Official) IMPI_VCLT_R0110 (Substitute)
Description/ Purpose	6km x 6km HC Level Fractional Cloud Cover Information for each Layer. Cloud cover values represent the cloud fractional coverage present for each layer in each horizontal cell (HC) in the granule and the total cloud coverage for each HC in the granule. Effectivity: S-NPP/JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.0 for details.
File Size	Data Granule Size: 1,170,432 bytes per granule This granule size includes output related fields and quality flags only. Geolocation and metadata attributes are not included. Additional size added by HDF5 packaging is also not included.
File Format Type	HDF5
Production Frequency	As requested
Data Content and Data Format	This IP contains the datasets with the described formatting as shown in the following product profile tables

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

	See Section 4.3.1 VIIRS Cloud Cover-Type IP Content Summary See Section 4.3.2 VIIRS Cloud Cover-Type IP Product Profile See Section 4.3.3 VIIRS Cloud Cover-Type IP HDF5 Details See Section 4.3.4 VIIRS Cloud Cover-Type IP Metadata Details See Section 4.3.5 VIIRS Cloud Cover-Type IP Geolocation Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

4.3.1 VIIRS Cloud Cover-Type Data Content Summary

Table: 4.3.1-1 VIIRS Cloud Cover-Type Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
layerCloudCover	Layer Cloud Cover Cell	32-bit floating point	[N*96, 508, 4]	[96, 508, 4]	Unitless
totalCloudCover	Total Cloud Cover Cell	32-bit floating point	[N*96, 508]	[96, 508]	Unitless
cloudType	Cloud Types	unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	Unitless
File Size	**1,170,432 Bytes**				

4.3.2 VIIRS Cloud Cover-Type IP Product Profile

Table: 4.3.2-1 VIIRS Cloud Cover-Type IP Product Profile

VIIRS-Cd-Cov-Type-IP Product Profile

Fields

Name	Data Size	Dimensions
layerCloudCover	4byte(s)	
totalCloudCover	4byte(s)	

layerCloudCover — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
VIIRS_CLD_HC_ROWS	Yes	No	96	96
VIIRS_CLD_HC_COLS	No	No	508	508
VIIRS_CLD_LYRS	No	No	4	4

layerCloudCover — Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Layer Cloud Cover Cell	0	0	1	Unitless	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ONBOARD_PT_FLOAT32_FILL	-999.7		
								ONGROUND_PT_FLOAT32_FILL	-999.6		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		
								SOUB_FLOAT32_FILL	-999.2		

totalCloudCover — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
VIIRS_CLD_HC_ROWS	Yes	No	96	96
VIIRS_CLD_HC_COLS	No	No	508	508

totalCloudCover — Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Total Cloud Cover Cell	0	0	1	Unitless	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ONBOARD_PT_FLOAT32_FILL	-999.7		
								ONGROUND_PT_FLOAT32_FILL	-999.6		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

										SOUB_FLOAT32_FILL	-999.2	

cloudType — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
VIIRS_CLD_HC_ROWS	Yes	No	96	96
VIIRS_CLD_HC_COLS	No	No	508	508
VIIRS_CLD_LYRS	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type
Cloud Types	0	1	5	Unitless	No		unsigned 8-bit char

Fill Values

Name	Value
NA_UINT8_FILL	255
MISS_UINT8_FILL	254
ONBOARD_PT_UINT8_FILL	253
ONGROUND_PT_UINT8_FILL	252
ERR_UINT8_FILL	251
ELLIPSOID_UINT8_FILL	250
VDNE_UINT8_FILL	249
SOUB_UINT8_FILL	248

Legend Entries

Name	Value
Stratus	1
Alto Cumulus	2
Cumulus	3
Cirrus	4
Cirrus Cumulus	5

4.3.3 VIIRS Cloud Cover-Type IP HDF5 Details

Figure 4.3.3-1 provides the details on the content and data types of the VIIRS Cloud Cover-Type IP products. 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-Cd-Cov-Type-IP
+layerCloudCover : H5T_NATIVE_FLOAT +totalCloudCover : H5T_NATIVE_FLOAT +cloudType : H5T_NATIVE_UCHAR

Figure: 4.3.3-1 VIIRS Cloud Cover-Type IP UML Diagram

4.3.4 VIIRS Cloud Cover-Type IP Metadata Details

The product metadata elements contained in the VIIRS Cloud Cover-Type IP are listed in 474-00448-02-01, JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms, Sections 4 and 5. These metadata elements include all common metadata at the root, product, aggregation, and granule level.

There are no granule level Quality Flags defined as metadata elements in the VIIRS Cloud Cover-Type IP. Therefore, there are no entries in the N_Quality_Summary_Name/Value metadata attributes for this product.

4.3.5 VIIRS Cloud Cover-Type IP Geolocation Details

VIIRS Cloud Cover-Type IP uses the VIIRS Cloud Aggregation Geolocation. See section 4.8 for geolocation details**.**

4.4 VIIRS Cloud Top Parameters IP Format

Data Mnemonic	IMPI_VCTP_R0100 (Official) IMPI_VCTP_R0110 (Substitute)
Description/ Purpose	Cloud Top Temperature, Pressure, and Height for each VIIRS Moderate Resolution Pixel. Effectivity: S-NPP/JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.0 for details.
File Size	See Table: 4.4.1-1 VIIRS Cloud Top Parameters Data Content Summary for size. This granule size includes output related fields and quality flags only. Geolocation and metadata attributes are not included. Additional size added by HDF5 packaging is also not included.
File Format Type	HDF5
Production Frequency	As requested
Data Content and Data Format	See Section 4.4.1 VIIRS Cloud Top Parameters IP Content Summary See Section 4.4.2 VIIRS Cloud Top Parameters IP Product Profile See Section 4.4.3 VIIRS Cloud Top Parameters IP HDF5 Details See Section 4.4.4 VIIRS Cloud Top Parameters IP Metadata Details See Section 4.4.5 VIIRS Cloud Top Parameters IP Geolocation Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

4.4.1 VIIRS Cloud Top Parameters Data Content Summary

Table: 4.4.1-1 VIIRS Cloud Top Parameters Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
ctt	Cloud top Temperature	32-bit floating point	[N*768, 3200]	[768, 3200]	Kelvin
cth	Cloud Top Height	32-bit floating point	[N*768, 3200]	[768, 3200]	km
ctp	Cloud Top Pressure	32-bit floating point	[N*768, 3200]	[768, 3200]	mbar
QF1_VIIRSCTPIP	Quality Flags	unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF2_VIIRSCTPIP		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF3_VIIRSCTPIP		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
File Size	**36,864,000 Bytes**				

4.4.2 VIIRS Cloud Top Parameters IP Product Profile

Table: 4.4.2-1 VIIRS Cloud Top Parameters IP Product Profile

VIIRS-CTP-IP Product Profile

Fields

Name	Data Size	Dimensions
ctt	4byte(s)	
cth	4byte(s)	

ctt — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	No	No	3200	3200

ctt — 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 top Temperature	0	180	310	Kelvin	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
								NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ONBOARD_PT_FLOAT32_FILL	-999.7		
								ONGROUND_PT_FLOAT32_FILL	-999.6		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		
								SOUB_FLOAT32_FILL	-999.2		

cth — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	No	No	3200	3200

cth — 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 Top Height	0	0	20	km	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
								NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ONBOARD_PT_FLOAT32_FILL	-999.7		
								ONGROUND_PT_FLOAT32_FILL	-999.6		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

										VDNE_FLOAT32_FILL	-999.3	
										SOUB_FLOAT32_FILL	-999.2	

ctp	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**
		M_VIIRS_SDR_ROWS	Yes	No	768	768
		M_VIIRS_SDR_COLS	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	
								Name	**Value**	**Name**	**Value**
Cloud Top Pressure	0	50	1050	mbar	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ONBOARD_PT_FLOAT32_FILL	-999.7		
								ONGROUND_PT_FLOAT32_FILL	-999.6		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		
								SOUB_FLOAT32_FILL	-999.2		

VIIRS-CTP-IP Product Profile - Quality Flags

Fields

Name	Data Size	Dimensions
QF1_VIIRSCTPIP	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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	
								Name	**Value**	**Name**	**Value**
Altitude range check	0	1	3	Unitless	No		2 bit(s)			<3 (km)	1
										>3 and <7 (km)	2
										>7 (km)	3
Surface type	2	0	5	Unitless	No		3 bit(s)			land desert	0
										land not desert	1
										inland water	2
										sea water	3
										coastal	5
Sunglint	5	0	1	Unitless	No		1 bit(s)			in sunglint	1
										not	0
Check if out of range (50-1050 mb)	6	0	1	Unitless	No		1 bit(s)			out of range	1
										not	0
Snow/ice surface	7	0	1	Unitless	No		1 bit(s)			snow/ice	1
										not	0

QF2_VIIRSCTPIP	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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	
								Name	**Value**	**Name**	**Value**
Cloud phase	0	0	3	Unitless	No		3 bit(s)			bad data	0
										water	1
										ice	2
										mixed	3

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		Check if out of range (0-20 km)	3	0	1	Unitless	No		1 bit(s)	Name Value	Name Value out of range 1 not 0
		Check if out of range (180-310 Kelvin)	4	0	1	Unitless	No		1 bit(s)	Name Value	Name Value out of range 1 not 0
		IR ice ctt convergence for residual night water	5	0	1	Unitless	No		1 bit(s)	Name Value	Name Value convergence 1 not 0
		IR ice ctt convergence for residual night ice	6	0	1	Unitless	No		1 bit(s)	Name Value	Name Value convergence 1 not 0
		IR ice ctt convergence for residual IR day ice	7	0	1	Unitless	No		1 bit(s)	Name Value	Name Value convergence 1 not 0
QF3_VIIRSCTPIP	1byte(s)										

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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**
A quality flag for using black cloud approach	0	0	7	Unitless	No		3 bit(s)	Name Value	Name Value clear 0 nondaywater convergence 1 daywater convergence 2 black cloud 1 convergence 3 black cloud 2 in bound 4 black cloud 3 (unused) 5 nonconvergence 7
WindowIR for daywater cloud converges	3	0	1	Unitless	No		1 bit(s)	Name Value	Name Value no convergence 1 yes convergence 0
Spare	4	MIN_VAL	MAX_VAL	Unitless	No		4 bit(s)	Name Value	Name Value

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

4.4.3 VIIRS Cloud Top Parameters IP HDF5 Details

Figure 4.4.3-1 provides the details on the content and data types of the VIIRS Cloud Top Parameters IP products. 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-Cd-Top-Parm-IP
+ctt : H5T_NATIVE_FLOAT +cth : H5T_NATIVE_FLOAT +ctp : H5T_NATIVE_FLOAT +QF1_VIIRSCTPIP : H5T_NATIVE_UCHAR +QF2_VIIRSCTPIP : H5T_NATIVE_UCHAR +QF3_VIIRSCTPIP : H5T_NATIVE_UCHAR

Figure: 4.4.3-1 VIIRS Cloud Top Parameters IP UML Diagram

4.4.4 VIIRS Cloud Top Parameters IP Metadata Details

The product metadata elements contained in the VIIRS Cloud Top Parameters IP are listed in 474-00448-02-01, JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms, Section 4 and 5. These metadata elements include all common metadata at the root, product, aggregation, and granule level.

There are no granule level Quality Flags defined as metadata elements in the VIIRS Cloud Top Parameters IP. Therefore, there are no entries in the N_Quality_Summary_Name/Value metadata attributes for this product.

4.4.5 VIIRS Cloud Top Parameters IP Geolocation Details

See 474-00448-02-06 Algorithm Specification Vol II: Data Dictionary for VIIRS RDR/SDR, Section 6.2.65, VIIRS M-Band SDR Geolocation for VIIRS Cloud Top Parameters IP Geolocation details.

4.5 VIIRS Parallax Corrected Cloud Mask IP Format

Data Mnemonic	IMPI_VPCM_R0100 (Official) IMPI_VPCM_R0110 (Substitute)
Description/ Purpose	Parallax Corrected Cloud Mask data This format for this IP is identical to the format of the delivered Cloud Mask IP. (Note that the content of the flags will be different, however, between the parallax corrected and non-parallax corrected Cloud Mask IPs). Format details are in the JPSS Algorithm Specification Vol II: Data Dictionary for Cloud Mask, 474-00448-02-11. Note: The Collection Shortname for the VIIRS Parallax Corrected Cloud Mask IP is: VIIRS-Parx-Corr-CM-IP All field names and HDF5 data types in the UML diagram in the JPSS Algorithm Specification Vol II: Data Dictionary for Cloud Mask, 474-00448-02-11, Figure 5.1.3.3-1, are applicable to the VIIRS Parallax Corrected Cloud Mask IP. Effectivity: S-NPP/JPSS
File-Naming	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.0 for details.

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Construct	
File Size	See the JPSS Algorithm Specification Vol II: Data Dictionary for Cloud Mask, 474-00448-02-11
File Format Type	HDF5
Production Frequency	As requested
Data Content and Data Format	See Section 4.5.1 VIIRS Parallax Corrected Cloud Mask Properties IP Content Summary See Section 4.5.2 VIIRS Parallax Corrected Cloud Mask Properties IP Product Profile See Section 4.5.3 VIIRS Parallax Corrected Cloud Mask Properties IP HDF5 Details See Section 4.5.4 VIIRS Parallax Corrected Cloud Mask Properties IP Metadata Details See Section 4.5.5 VIIRS Parallax Corrected Cloud Mask Properties IP Geolocation Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

4.5.1 VIIRS Parallax Corrected Cloud Mask Data Content Summary

Table: 4.5.1-1 VIIRS Parallax Corrected Cloud Mask Properties Data Content

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
QF1_VIIRSCMIP	Cloud Mask EDR Quality Flags	unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF2_VIIRSCMIP		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF3_VIIRSCMIP		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF4_VIIRSCMIP		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF5_VIIRSCMIP		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF6_VIIRSCMIP		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**				

4.5.2 VIIRS Parallax-corrected Cloud Mask Properties IP Product Profile

Table: 4.5.2-1 VIIRS Parallax-corrected Cloud Mask Properties IP Product Profile

CORR-CLOUDMASK-IP Product Profile

Fields

Name	Data Size	Dimensions
QF1_VIIRSCMIP	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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 (Name, Value)	Legend Entries (Name, Value)
Cloud Mask Quality Pixel	0	0	3		No		2 bit(s)		Poor 0 Low 1 Medium 2 High 3
Cloud Detection And Confidence Pixel	2	0	3		No		2 bit(s)		Confidently Clear 0

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

												Probably Clear 1 Probably Cloudy 2 Confidently Cloudy 3
		Day/Night Pixel	4	0	1		No		1 bit(s)	Name Value		Name Value Night 0 Day 1
		Snow/Ice Surface Pixel	5	0	1		No		1 bit(s)	Name Value		Name Value No Snow/Ice 0 Snow/Ice 1
		Sun Glint Pixel	6	0	3		No		2 bit(s)	Name Value		Name Value None 0 Geometry Based 1 Wind Speed Based 2 Geometry and Wind Based 3

QF2_VIIRSCMIP 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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	0	5		No		3 bit(s)	Name Value	Name Value Land and Desert 0 Land No Desert 1 Inland Water 2 Sea Water 3 Coastal 5
Shadow Detected Pixel	3	0	1		No		1 bit(s)	Name Value	Name Value No 0 Yes 1
Non Cloud Obstruction (Heavy Aerosol)	4	0	1		No		1 bit(s)	Name Value	Name Value No 0 Yes 1
Fire Detected (Cloud Mask)	5	0	1		No		1 bit(s)	Name Value	Name Value No 0 Yes 1
Cirrus (Solar RM9)	6	0	1		No		1 bit(s)	Name Value	Name Value No Cloud 0 Cloud 1
Cirrus IR	7	0	1		No		1 bit(s)	Name Value	Name Value No Cloud 0 Cloud 1

QF3_VIIRSCMIP 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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 Threshhold Cloud Test (BTM15) Pixel	0	0	1		No		1 bit(s)	Name Value	Name Value No Cloud 0 Cloud 1
High Cloud (BTM12-BTM16) Test Pixel	1	0	1		No		1 bit(s)	Name Value	Name Value No Cloud 0 Cloud 1
IR Temperature Difference Test (BTM14-BTM15 and BTM15-BTM16) Pixel	2	0	1		No		1 bit(s)	Name Value	Name Value No Cloud 0

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

												Cloud	1
		Temperature Difference Test(BTM15-BTM12) Pixel	3	0	1		No		1 bit(s)	Name Value		Name	Value
												No Cloud	0
												Cloud	1
		Temperature Difference Test (BTM12-BTM13) Pixel	4	0	1		No		1 bit(s)	Name Value		Name	Value
												No Cloud	0
												Cloud	1
		Visible Reflectance Test (RM5) Pixel	5	0	1		No		1 bit(s)	Name Value		Name	Value
												No Cloud	0
												Cloud	1
		Visible Reflectance Test (RM7) Pixel also Visible Reflectance Test (RM1)	6	0	1		No		1 bit(s)	Name Value		Name	Value
												No Cloud	0
												Cloud	1
		Visible Ratio Test (RM7/RM5) Pixel	7	0	1		No		1 bit(s)	Name Value		Name	Value
												No Cloud	0
												Cloud	1
QF4_VIIRSCMIP	1byte(s)												

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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	0	0	3		No		2 bit(s)	Name	Value	Name	Value
										Confidently Clear	0
										Probably Clear	1
										Probably Cloudy	2
										Confidently Cloudy	3
Conifer Boreal Forest	2	0	1		No		1 bit(s)	Name	Value	Name	Value
										No	0
										Yes	1
Spatial Uniformity Test	3	0	1		No		1 bit(s)	Name	Value	Name	Value
										No	0
										Yes	1
Dust Candidate	4	0	1		No		1 bit(s)	Name	Value	Name	Value
										No	0
										Yes	1
Smoke Candidate	5	0	1		No		1 bit(s)	Name	Value	Name	Value
										No	0
										Yes	1
Volcanic Ash Candidate	6	0	1		No		1 bit(s)	Name	Value	Name	Value
										No	0
										Yes	1
Spare	7	0	0		No		1 bit(s)	Name	Value	Name	Value

QF5_VIIRSCMIP 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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 Imagery Resolution RI1 Test	0	0	15		No		4 bit(s)	Name	Value	Name	Value
										Not Cloudy	0
										Partly Cloudy	1-14
										Cloudy	15
Cloud Imagery Resolution R12 Test	4	0	15		No		4 bit(s)	Name	Value	Name	Value

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

												Not Cloudy 0 Partly Cloudy 1-14 Cloudy 15

QF6_VIIRSCMIP 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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	0	7		No		3 bit(s)		Not Executed 0 Clear 1 Partly Cloudy 2 Water Cloud 3 Supercooled Water/Mixed Phase 4 Opaque Ice Cloud 5 Cirrus Cloud 6 Cloud Overlap 7
Thin Cirrus Flag	3	0	1		No		1 bit(s)		No 0 Yes 1
Ephemeral Water Flag	4	0	1		No		1 bit(s)		No 0 Yes 1
Degraded TOC NDVI Flag	5	0	1		No		1 bit(s)		No 0 Yes 1
Degraded Sunglint Flag	6	0	1		No		1 bit(s)		No 0 Yes 1
Degraded Polar Night Flag	7	0	1		No		1 bit(s)		No 0 Yes 1

ScanAllOcean 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	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
ScanAllOcean	0	0	1	Unitless	No		unsigned 8-bit char	NA_UINT8_FILL 255 MISS_UINT8_FILL 254 ONBOARD_PT_UINT8_FILL 253 ONGROUND_PT_UINT8_FILL 252 ERR_UINT8_FILL 251 ELLIPSOID_UINT8_FILL 250 VDNE_UINT8_FILL 249 SOUB_UINT8_FILL 248	

ScanNoOcean 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	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
ScanNoOcean	0	0	1	Unitless	No		unsigned 8-bit char	NA_UINT8_FILL 255 MISS_UINT8_FILL 254 ONBOARD_PT_UINT8_FILL 253 ONGROUND_PT_UINT8_FILL 252	

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

										ERR_UINT8_FILL	251
										ELLIPSOID_UINT8_FILL	250
										VDNE_UINT8_FILL	249
										SOUB_UINT8_FILL	248

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	
								Name	Value	Name	Value
GranuleAllOcean	0	0	1	Unitless	No		unsigned 8-bit char	NA_UINT8_FILL	255		
								MISS_UINT8_FILL	254		
								ONBOARD_PT_UINT8_FILL	253		
								ONGROUND_PT_UINT8_FILL	252		
								ERR_UINT8_FILL	251		
								ELLIPSOID_UINT8_FILL	250		
								VDNE_UINT8_FILL	249		
								SOUB_UINT8_FILL	248		

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	
								Name	Value	Name	Value
GranuleNoOcean	0	0	1	Unitless	No		unsigned 8-bit char	NA_UINT8_FILL	255		
								MISS_UINT8_FILL	254		
								ONBOARD_PT_UINT8_FILL	253		
								ONGROUND_PT_UINT8_FILL	252		
								ERR_UINT8_FILL	251		
								ELLIPSOID_UINT8_FILL	250		
								VDNE_UINT8_FILL	249		
								SOUB_UINT8_FILL	248		

4.5.3 VIIRS Parallax Corrected Cloud Mask Properties IP HDF5 Details

Figure 4.5.3-1 provides the details on the content and data types of the VIIRS Parallax Corrected Cloud Mask Properties products. 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-Parx-Corr-CM-IP
+QF1_VIIRSCMIP : H5T_NATIVE_UCHAR +QF2_VIIRSCMIP : H5T_NATIVE_UCHAR +QF3_VIIRSCMIP : H5T_NATIVE_UCHAR +QF4_VIIRSCMIP : H5T_NATIVE_UCHAR +QF5_VIIRSCMIP : H5T_NATIVE_UCHAR +QF6_VIIRSCMIP : H5T_NATIVE_UCHAR +ScanAllOcean : H5T_NATIVE_UCHAR +ScanNoOcean : H5T_NATIVE_UCHAR +GranuleAllOcean : H5T_NATIVE_UCHAR +GranuleNoOcean : H5T_NATIVE_UCHAR

Figure: 4.5.3-1 VIIRS Parallax Corrected Cloud Mask Properties IP UML Diagram

4.5.4 VIIRS Parallax Corrected Cloud Mask Properties IP Metadata Details

The product metadata elements contained in the VIIRS Parallax Corrected Cloud Mask Properties IP are listed in 474-00448-02-01, JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms, Sections 4 and 5. These metadata elements include all common metadata at the root, product, aggregation, and granule level.

There are no granule level Quality Flags defined as metadata elements in the VIIRS Parallax Corrected Cloud Optical Properties IP. Therefore, there are no entries in the N_Quality_Summary_Name/Value metadata attributes for this product.

4.5.5 VIIRS Parallax Corrected Cloud Mask Properties IP Geolocation Details

See 474-00448-02-06 Algorithm Specification Vol II: Data Dictionary for VIIRS RDR/SDR, Section 6.2.65, VIIRS M-Band SDR Geolocation for VIIRS Parallax Corrected Cloud Mask Properties IP Geolocation details.

4.6 VIIRS Parallax Corrected Cloud Optical Properties IP Format

Data Mnemonic	IMPI_VPCP_R0100 (Official) IMPI_VPCP_R0110 (Substitute)
Description/ Purpose	Parallax Corrected Cloud Optical Properties Data. Effectivity: S-NPP/JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.0 for details.
File Size	See Table: 4.6.1-1 VIIRS Parallax Corrected Cloud Optical Properties Data Content Summary for size. This granule size includes output related fields and quality flags only. Geolocation and metadata attributes are not included. Additional size added by HDF5 packaging is also not included.

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

File Format Type	HDF5
Production Frequency	As requested
Data Content and Data Format	See Section 4.6.1 VIIRS Parallax Corrected Cloud Optical Properties IP Content Summary See Section 4.6.2 VIIRS Parallax Corrected Cloud Optical Properties IP Product Profile See Section 4.6.3 VIIRS Parallax Corrected Cloud Optical Properties IP HDF5 Details See Section 4.6.4 VIIRS Parallax Corrected Cloud Optical Properties IP Metadata Details See Section 4.6.5 VIIRS Parallax Corrected Cloud Optical Properties IP Geolocation Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

4.6.1 VIIRS Parallax Corrected Cloud Optical Properties Data Content Summary

Table: 4.6.1-1 VIIRS Parallax Corrected Cloud Optical Properties Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
cot	Cloud Optical Thickness	32-bit floating point	[N*768, 3200]	[768, 3200]	micrometers
eps	Effective Particle Size	32-bit floating point	[N*768, 3200]	[768, 3200]	micrometers
QF1_VIIRSCOPIP	Quality Flags	unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF2_VIIRSCOPIP		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF3_VIIRSCOPIP		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
File Size	**27,033,600 Bytes**				

4.6.2 VIIRS Parallax-corrected Cloud Optical Properties IP Product Profile

Table: 4.6.2-1 VIIRS Parallax-corrected Cloud Optical Properties IP Product Profile

VIIRS-CORR-COP-IP Product Profile

Fields

Name	Data Size	Dimensions
cot	4byte(s)	
eps	4byte(s)	

cot — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	No	No	3200	3200

cot — Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Cloud Optical Thickness	0	0.0	30	micrometers	N0o		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ONBOARD_PT_FLOAT32_FILL	-999.7		
								ONGROUND_PT_FLOAT32_FILL	-999.6		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		
								SOUB_FLOAT32_FILL	-999.2		

eps — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	No	No	3200	3200

eps — Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Effective Particle Size	0	0	50	micrometers	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ONBOARD_PT_FLOAT32_FILL	-999.7		
								ONGROUND_PT_FLOAT32_FILL	-999.6		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

										VDNE_FLOAT32_FILL	-999.3
										SOUB_FLOAT32_FILL	-999.2

VIIRS-CORR-COP-IP Product Profile - Quality Flags

Fields

Name	Data Size	Dimensions
QF1_VIIRSCOPIP	1byte(s)	
QF2_VIIRSCOPIP	1byte(s)	

QF1_VIIRSCOPIP — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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 (Name / Value)	Legend Entries (Name / Value)
Overall Pixel level flag	0	0	1	Unitless	No		1 bit(s)		cop quality flag is set / 1 not / 0
Ice COT out of bounds	1	0	1	Unitless	No		1 bit(s)		out of bounds / 1 not / 0
Water COT out of bounds	2	0	1	Unitless	No		1 bit(s)		out of bounds / 1 not / 0
Ice EPS out of bounds	3	0	1	Unitless	No		1 bit(s)		out of bounds / 1 not / 0
Water EPS out of bounds	4	0	1	Unitless	No		1 bit(s)		out of bounds / 1 not / 0
Cloud phase	5	0	5	Unitless	No		3 bit(s)		Not exe / 0 Cirrus / 1 Opaque ice / 2 water / 3 mixed / 4 multiple layer / 5

QF2_VIIRSCOPIP — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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 (Name / Value)	Legend Entries (Name / Value)
Day water iteration convergence	0	0	1	Unitless	No		1 bit(s)		convergence / 1 not / 0
Day ice iteration convergence	1	0	1	Unitless	No		1 bit(s)		convergence / 1 not / 0
Water COT < 1 at daytime	2	0	1	Unitless	No		1 bit(s)		yes / 1 not / 0
Ice COT < 1 at daytime	3	0	1	Unitless	No		1 bit(s)		yes / 1 not / 0
Water COT < 1 at nightime	4	0	1	Unitless	No		1 bit(s)		yes / 1 not / 0

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		Ice COT < 1 at nighttime	5	0	1	Unitless	No		1 bit(s)	Name Value	Name Value yes 1 not 0					
		Exclude sun glint	6	0	1	Unitless	No		1 bit(s)	Name Value	Name Value in sunglint 1 not 0					
		Probably/Confidently cloudy	7	0	1	Unitless	No		1 bit(s)	Name Value	Name Value yes 1 not 0					
QF3_VIIRSCOPIP	1byte(s)	Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size										
		M_VIIRS_SDR_ROWS	Yes	No	768	768										
		M_VIIRS_SDR_COLS	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					
		Degraded condition for ice cloud cot>10	0	0	1	Unitless	No		1 bit(s)	Name Value	Name Value yes 1 not 0					
		qf_bad_sdr_data	1	0	2	Unitless	No		2 bit(s)	Name Value	Name Value Good 0 Poor 1 No Calibration 2					
		Spare	3	0	0	Unitless	No		5 bit(s)	Name Value	Name Value					

4.6.3 VIIRS Parallax Corrected Cloud Optical Properties IP HDF5 Details

Figure 4.6.3-1 provides the details on the content and data types of the VIIRS Parallax Corrected Cloud Optical Properties products. 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-Parx-Corr-Cd-Opt-Prop-IP
+cot : H5T_NATIVE_FLOAT +eps : H5T_NATIVE_FLOAT +QF1_VIIRSCOPIP : H5T_NATIVE_UCHAR +QF2_VIIRSCOPIP : H5T_NATIVE_UCHAR +QF3_VIIRSCOPIP : H5T_NATIVE_UCHAR

Figure: 4.6.3-1 VIIRS Parallax Corrected Cloud Optical Properties IP UML Diagram

4.6.4 VIIRS Parallax Corrected Cloud Optical Properties IP Metadata Details

The product metadata elements contained in the VIIRS Parallax Corrected Cloud Optical Properties IP are listed in 474-00448-02-01, JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms, Sections 4 and 5. These metadata elements include all common metadata at the root, product, aggregation, and granule level.

There are no granule level Quality Flags defined as metadata elements in the VIIRS Parallax Corrected Cloud Optical Properties IP. Therefore, there are no entries in the N_Quality_Summary_Name/Value metadata attributes for this product.

4.6.5 VIIRS Parallax Corrected Cloud Optical Properties IP Geolocation Details

See 474-00448-02-06 Algorithm Specification Vol II: Data Dictionary for VIIRS RDR/SDR, Section 6.2.65, VIIRS M-Band SDR Geolocation for VIIRS Parallax Corrected Cloud Optical Properties IP Geolocation details.

4.7 VIIRS Parallax Corrected Cloud Top Parameters IP Format

Data Mnemonic	IMPI_VPTP_R0100 (Official) IMPI_VPTP_R0110 (Substitute)
Description/ Purpose	Parallax Corrected Cloud Top Parameters Data Effectivity: S-NPP/JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.0 for details.
File Size	See Table: 4.7.1-1 VIIRS Parallax Corrected Cloud Top Parameters Data Content Summary for size. This is based on a 48 scan VIIRS granule. This granule size includes output related fields and quality flags only. Geolocation and metadata attributes are not included. Additional size added by HDF5 packaging is also not included.
File Format Type	HDF5
Production Frequency	As required
Data Content and Data Format	See Section 4.7.1 VIIRS Parallax Corrected Cloud Top Parameters IP Content Summary

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

	See Section 4.7.2 VIIRS Parallax Corrected Cloud Top Parameters IP Product Profile See Section 4.7.3 VIIRS Parallax Corrected Cloud Top Parameters IP HDF5 Details See Section 4.7.4 VIIRS Parallax Corrected Cloud Top Parameters IP Metadata Details See Section 4.7.5 VIIRS Parallax Corrected Cloud Top Parameters IP Geolocation Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

4.7.1 VIIRS Parallax Corrected Cloud Top Parameters Data Content Summary

Table: 4.7.1-1 VIIRS Parallax Corrected Cloud Top Parameters Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
ctt	Cloud top Temperature	32-bit floating point	[N*768, 3200]	[768, 3200]	Kelvin
cth	Cloud Top Height	32-bit floating point	[N*768, 3200]	[768, 3200]	km
ctp	Cloud Top Pressure	32-bit floating point	[N*768, 3200]	[768, 3200]	mbar
QF1_VIIRSCTPIP	Quality Flags	unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF2_VIIRSCTPIP		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
QF3_VIIRSCTPIP		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	Unitless
File Size	**36,864,000 Bytes**				

4.7.2 VIIRS Parallax Corrected Cloud Top Parameters IP Product Profile

Table: 4.7.2-1 VIIRS Parallax Corrected Cloud Top Parameters IP Product Profile

VIIRS-CORR-CTP-IP Product Profile

Fields

Name	Data Size	Dimensions
ctt	4byte(s)	
cth	4byte(s)	

ctt — Dimensions:

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	No	No	3200	3200

ctt — Datum:

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
ctt Pixel	0	180	310	Kelvin	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ONBOARD_PT_FLOAT32_FILL	-999.7		
								ONGROUND_PT_FLOAT32_FILL	-999.6		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		
								SOUB_FLOAT32_FILL	-999.2		

cth — Dimensions:

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	No	No	3200	3200

cth — Datum:

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
cth Pixel	0	0	20	km	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ONBOARD_PT_FLOAT32_FILL	-999.7		
								ONGROUND_PT_FLOAT32_FILL	-999.6		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

										VDNE_FLOAT32_FILL	-999.3	
										SOUL_FLOAT32_FILL	-999.2	

ctp	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**							
		M_VIIRS_SDR_ROWS	Yes	No	768	768							
		M_VIIRS_SDR_COLS	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**	
		ctp Pixel	0	50	1050	mbar	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
										NA_FLOAT32_FILL	-999.9		
										MISS_FLOAT32_FILL	-999.8		
										ONBOARD_PT_FLOAT32_FILL	-999.7		
										ONGROUND_PT_FLOAT32_FILL	-999.6		
										ERR_FLOAT32_FILL	-999.5		
										ELLIPSOID_FLOAT32_FILL	-999.4		
										VDNE_FLOAT32_FILL	-999.3		
										SOUB_FLOAT32_FILL	-999.2		

VIIRS-CORR-CTP-IP Product Profile - Quality Flags

Fields

Name	**Data Size**	**Dimensions**														
QF1_VIIRSCTPIP	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		M_VIIRS_SDR_ROWS	Yes	No	768	768										
		M_VIIRS_SDR_COLS	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**	
		Altitude range check	0	1	3	Unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**
												<3 (km)	1
												>3 and <7 (km)	2
												>7 (km)	3
		Surface type	2	0	5	Unitless	No		3 bit(s)	**Name**	**Value**	**Name**	**Value**
												land desert	0
												land not desert	1
												inland water	2
												sea water	3
												coastal	5
		Sunglint	5	0	1	Unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
												in sunglint	1
												not	0
		Check if out of range (50-1050 mb)	6	0	1	Unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
												out of range	1
												not	0
		Snow/ice surface	7	0	1	Unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
												snow/ice	1
												not	0
QF2_VIIRSCTPIP	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		M_VIIRS_SDR_ROWS	Yes	No	768	768										
		M_VIIRS_SDR_COLS	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	0	3	Unitless	No		3 bit(s)	**Name**	**Value**	**Name**	**Value**
												bad data	0
												water	1
												ice	2
												mixed	3

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		Check if out of range (0-20 km)	3	0	1	Unitless	No		1 bit(s)	Name Value	Name Value out of range 1 not 0
		Check if out of range (180-310 Kelvin)	4	0	1	Unitless	No		1 bit(s)	Name Value	Name Value out of range 1 not 0
		IR ice ctt convergence for residual night water	5	0	1	Unitless	No		1 bit(s)	Name Value	Name Value convergence 1 not 0
		IR ice ctt convergence for residual night ice	6	0	1	Unitless	No		1 bit(s)	Name Value	Name Value convergence 1 not 0
		IR ice ctt convergence for residual IR day ice	7	0	1	Unitless	No		1 bit(s)	Name Value	Name Value convergence 1 not 0
QF3_VIIRSCTPIP	1byte(s)										

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
M_VIIRS_SDR_ROWS	Yes	No	768	768
M_VIIRS_SDR_COLS	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**
A quality flag for using black cloud approach	0	0	7	Unitless	No		3 bit(s)	Name Value	Name Value clear 0 nondaywater convergence 1 daywater convergence 2 black cloud 1 convergence 3 black cloud 2 in bound 4 black cloud 3 (unused) 5 nonconvergence 7
WindowIR for daywater cloud converges	3	0	1	Unitless	No		1 bit(s)	Name Value	Name Value no convergence 1 yes convergence 0
Spare	4	MIN_VAL	MAX_VAL	Unitless	No		4 bit(s)	Name Value	Name Value

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

4.7.3 VIIRS Parallax Corrected Cloud Top Properties IP HDF5 Details

Figure 4.7.3-1 provides the details on the content and data types of the VIIRS Parallax Corrected Cloud Top Properties products. 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-Parx-Corr-Cd-Top-Parm-IP
+ctt : H5T_NATIVE_FLOAT +cth : H5T_NATIVE_FLOAT +ctp : H5T_NATIVE_FLOAT +QF1_VIIRSCTPIP : H5T_NATIVE_UCHAR +QF2_VIIRSCTPIP : H5T_NATIVE_UCHAR +QF3_VIIRSCTPIP : H5T_NATIVE_UCHAR

Figure: 4.7.3-1 VIIRS Parallax Corrected Cloud Top Properties IP UML Diagram

4.7.4 VIIRS Parallax Corrected Cloud Top Parameters IP Metadata Details

The product metadata elements contained in the VIIRS Parallax Corrected Cloud Top Parameters IP are listed in 474-00448-02-01, JPSS Algorithm Specification Vol. II: Data Dictionary for the Common Algorithms, Sections 4 and 5. These metadata elements include all common metadata at the root, product, aggregation, and granule level.

There are no granule level Quality Flags defined as metadata elements in the VIIRS Parallax Corrected Cloud Top Parameters IP. Therefore, there are no entries in the N_Quality_Summary_Name/Value metadata attributes for this product.

4.7.5 VIIRS Parallax Corrected Cloud Top Parameters IP Geolocation Details

See 474-00448-02-06 Algorithm Specification Vol II: Data Dictionary for VIIRS RDR/SDR, Section 6.2.65, VIIRS M-Band SDR Geolocation for VIIRS Parallax Corrected Cloud Top Parameters IP Geolocation details.

4.8 VIIRS Cloud Aggregated Geolocation

Description/ Purpose	The VIIRS Moderate Resolution SDR geolocation (non terrain corrected) pixel positions are aggregated to produce the Cloud Aggregated (6 km x 6 km) geolocation. The geolocation indicates the location of a cell where the cloud resides, not the average cloud position.
File-Naming Construct	See the JPSS CDFCB-X Vol. I, Section 3.4 for details.
File Size	See Table: 4.8.1-1 VIIRS Cloud Aggregated Geolocation Data Content Summary for size.
File Format Type	HDF5
Data Content and Data Format	For each aggregated cell, the VIIRS Cloud Aggregated Geolocation contains: Time Fields Geolocation Angular Fields Spacecraft Position, Velocity, and Attitude Spacecraft Solar Zenith and Azimuth Angles Geolocation Quality Flags

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

	See Section 4.8.1 VIIRS Cloud Aggregated Geolocation Data Content Summary See Section 4.8.2 VIIRS Cloud Aggregated Geolocation Product Profiles See Section 4.8.3 VIIRS Cloud Aggregated Geolocation HDF5 Details See Section 4.8.4 VIIRS Cloud Aggregated Geolocation HDF5 Metadata Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

4.8.1 VIIRS Cloud Aggregated Geolocation Data Content Summary

Table: 4.8.1-1 VIIRS Cloud Aggregated Geolocation Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
StartTime	Starting Time of each scan in IET (1/1/1958)	64-bit integer	[N*48]	[48]	microsecond
MidTime	Mid-Time of each scan in IET (1/1/1958)	64-bit integer	[N*48]	[48]	microsecond
Latitude	Latitude of each cell (positive North)	32-bit floating point	[N*96, 508]	[96, 508]	degree
Longitude	Longitude of each cell (positive East)	32-bit floating point	[N*96, 508]	[96, 508]	degree
SolarZenithAngle	Zenith angle of sun at each cell position	32-bit floating point	[N*96, 508]	[96, 508]	degree
SolarAzimuthAngle	Azimuth angle of sun (measured clockwise positive from North) at each cell position	32-bit floating point	[N*96, 508]	[96, 508]	degree
SatelliteZenithAngle	Zenith angle to Satellite at each cell position	32-bit floating point	[N*96, 508]	[96, 508]	degree
SatelliteAzimuthAngle	Azimuth angle (measured clockwise positive from North) to Satellite at each cell position	32-bit floating point	[N*96, 508]	[96, 508]	degree
SCPosition	Spacecraft position in ECR Coordinates (X, Y, Z) at the mid-time of scan	32-bit floating point	[N*48, 3]	[48, 3]	meter
SCVelocity	Spacecraft velocity in ECR Coordinates (dx/dt, dy/dt, dz/dt) at the mid-time of scan	32-bit floating point	[N*48, 3]	[48, 3]	m/s
SCAttitude	Spacecraft attitude with	32-bit	[N*48, 3]	[48, 3]	arcsecond

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
	respect to Geodetic Reference Frame Coordinates (roll, pitch, yaw) at the midtime of scan	floating point			
SCSolarZenithAngle	The angle in the spacecraft reference frame from zenith vector (negative z-axis) to the solar vector	32-bit floating point	[N*48]	[48]	degree
SCSolarAzimuthAngle	The angle in the spacecraft reference frame from x-axis to the solar vector projected onto the spacecraft x-y plane, measured counterclockwise (observer looking toward zenith (negative z-axis))	32-bit floating point	[N*48]	[48]	degree
QF1_SCAN_VIIRSCLDAGGGEO	Scan Level Geolocation Quality Flags	unsigned 8-bit char	[N*48]	[48]	unitless
QF2_VIIRSCLDAGGGEO	Cell Level Geolocation Quality Flags	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
File Size	**1,222,128 Bytes**				

4.8.2 VIIRS Cloud Aggregated Geolocation Product Profile

Table: 4.8.2-1 VIIRS Cloud Aggregated Geolocation Product Profile

VIIRS Cloud Aggregated Geolocation Product Profile

Fields

Name	Data Size	Dimensions
StartTime	8byte(s)	
MidTime	8byte(s)	

StartTime — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Scan	Yes	No	48	48

StartTime — Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Starting Time of each scan in IET (1/1/1958)	0	MIN_VAL	MAX_VAL	microsecond	No		64-bit integer	NA_INT64_FILL	-999		
								MISS_INT64_FILL	-998		
								ERR_INT64_FILL	-995		
								VDNE_INT64_FILL	-993		

MidTime — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Scan	Yes	No	48	48

MidTime — Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		Mid-Time of each scan in IET (1/1/1958)	0	MIN_VAL	MAX_VAL	microsecond	No		64-bit integer	**Name**	**Value**	**Name**	**Value**
										NA_INT64_FILL	-999		
										MISS_INT64_FILL	-998		
										ERR_INT64_FILL	-995		
										VDNE_INT64_FILL	-993		

Latitude — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Latitude of each cell (positive North)	0	MIN_VAL	MAX_VAL	degree	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
								NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

Longitude — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Longitude of each cell (positive East)	0	MIN_VAL	MAX_VAL	degree	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
								NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SolarZenithAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Zenith angle of sun at each cell position	0	MIN_VAL	MAX_VAL	degree	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
								NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SolarAzimuthAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Azimuth angle of sun (measured clockwise positive from North) at each cell position	0	MIN_VAL	MAX_VAL	degree	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
								NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SatelliteZenithAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		AlongTrack	Yes	No	96	96
		CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Zenith angle to Satellite at each cell position	0	MIN_VAL	MAX_VAL	degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
SatelliteAzimuthAngle	4byte(s)	AlongTrack	Yes	No	96	96
		CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Azimuth angle (measured clockwise positive from North) to Satellite at each cell position	0	MIN_VAL	MAX_VAL	degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELLIPSOID_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
SCPosition	4byte(s)	Scan	Yes	No	48	48
		ECRCoordinate	No	No	3	3

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Spacecraft position in ECR Coordinates (X, Y, Z) at the mid-time of scan	0	MIN_VAL	MAX_VAL	meter	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
SCVelocity	4byte(s)	Scan	Yes	No	48	48
		ECRCoordinate	No	No	3	3

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Spacecraft velocity in ECR Coordinates (dx/dt, dy/dt, dz/dt) at the mid-time of scan	0	MIN_VAL	MAX_VAL	m/s	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
SCAttitude	4byte(s)					

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Scan	Yes	No	48	48
GRFCoordinate	No	No	3	3

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Spacecraft attitude with respect to Geodetic Reference Frame Coordinates (roll, pitch, yaw) at the mid-time of scan	0	MIN_VAL	MAX_VAL	arcsecond	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								VDNE_FLOAT32_FILL	-999.3		

SCSolarZenithAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Scan	Yes	No	48	48

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
The angle in the spacecraft reference frame from zenith vector (negative z-axis) to the solar vector	0	MIN_VAL	MAX_VAL	degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								VDNE_FLOAT32_FILL	-999.3		

SCSolarAzimuthAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Scan	Yes	No	48	48

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
The angle in the spacecraft reference frame from x-axis to the solar vector projected onto the spacecraft x-y plane, measured counterclockwise (observer looking toward zenith (negative z-axis)	0	MIN_VAL	MAX_VAL	degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								VDNE_FLOAT32_FILL	-999.3		

VIIRS Cloud Aggregated Geolocation Product Profile - Quality Flags

Fields

Name	Data Size	Dimensions
QF1_SCAN_VIIRSCLDAGGGEO	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Scan	Yes	No	48	48

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Attitude and Ephemeris Availability Status	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			Nominal - E&A data available	0
										Missing Data <= Small Gap	1
										Small Gap < Missing Data < Granule Boundary	2
										Missing Data >= Granule Boundary	3
HAM/RTA Encoder Flag - Indicates the quality of the HAM	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		and RTA encoder timestamps										Good Data	0
												Bad Data - either HAM, RTA, or both are bad for the entire scan	1
												Degraded Data - either HAM, RTA, or both are corrupted within the scan.	2
												Missing Data - Missing encoder data for the scan	3
		Within South Atlantic Anomaly	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1		
		Solar Eclipse during Earth view scan	5	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1		
		Spare	6	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value		
		Half Angle Mirror side	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value Mirror Side A 0 Mirror Side B 1		

QF2_VIIRSCLDAGGGEO — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Invalid Input Data (Indicates that any of the Spacecraft Ephemeris or Attitude Data is Invalid or the encoder data is invalid)	0	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Bad Pointing (Indicates that the sensor LOS does not intersect the geoid or is near the limb based upon sensor zenith angle.)	1	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Bad Terrain (Indicates that the algorithm could not obtain a valid terrain value.)	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Invalid Solar Angles	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Spare	4	MIN_VAL	MAX_VAL	unitless	No		4 bit(s)	Name Value	Name Value

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

4.8.3 VIIRS Cloud Aggregated Geolocation HDF5 Details

Figure 4.8.3-1, VIIRS Cloud Aggregated Geolocation UML Diagram, provides details on the content and data types of the Cloud Aggregated Geolocation. This UML diagram provides details at the product level only. In addition to this UML diagram, 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-CLD-AGG-GEO
+StartTime : H5T_NATIVE_LLONG +MidTime : H5T_NATIVE_LLONG +Latitude : H5T_NATIVE_FLOAT +Longitude : H5T_NATIVE_FLOAT +SolarZenithAngle : H5T_NATIVE_FLOAT +SolarAzimuthAngle : H5T_NATIVE_FLOAT +SatelliteZenithAngle : H5T_NATIVE_FLOAT +SatelliteAzimuthAngle : H5T_NATIVE_FLOAT +SCPosition : H5T_NATIVE_FLOAT +SCVelocity : H5T_NATIVE_FLOAT +SCAttitude : H5T_NATIVE_FLOAT +SCSolarZenithAngle : H5T_NATIVE_FLOAT +SCSolarAzimuthAngle : H5T_NATIVE_FLOAT +QF1_SCAN_VIIRSCLDAGGGEO : H5T_NATIVE_UCHAR +QF2_VIIRSCLDAGGGEO : H5T_NATIVE_UCHAR

Figure: 4.8.3-1 VIIRS Cloud Aggregated Geolocation UML Diagram

4.8.4 VIIRS Cloud Aggregated Geolocation HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Cloud Aggregated Geolocation are listed in the JPSS Algorithm Specification Vol. II: Data Dictionary for the Common Algorithms, Section 5.3, HDF5 (Metadata) Hierarchy. The Cloud Aggregated Geolocation metadata includes all common metadata at the root, product, aggregation, and granule level.

In addition to the common metadata items for the VIIRS Cloud Aggregated Geolocation, the following items are included as name/value pairs under the granule level metadata attribute "N_Quality_Summary":

Table: 4.8.4-1 VIIRS Cloud Aggregated Geolocation Quality Summary Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Comments**
Automatic Quality Flag	0 - 1	0 = Retrieval Successful; 1 = Retrieval not Successful (one or more geolocation subroutines failed)	
Percent Missing Data	0 - 100%	Percent of missing pixels in granule	
Percent Out-of-bounds	0 - 100%	Percent of pixels identified as out-of-bounds in granule	

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

5 Cloud 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 Cloud Base Height

The cloud base height is defined as the height above sea level where cloud bases occur. More precisely, for a cloud covered earth location; the cloud base height is the set of altitudes of the bases of the clouds that intersect the local vertical at that particular location.

The reported heights are horizontal spatial averages over a cell, i.e., a square region of the earth's surface. If a cloud layer does not extend over an entire cell, the spatial average is limited to the portion of the cell that is covered by the layer.

This EDR will be produced from all nominal JPSS orbits, but the measurement accuracy for a terminator orbit might be degraded due to VIIRS calibration limitations for a terminator orbit. The terminator orbit is not included in computing the maximum local average revisit time.

5.1.1 VIIRS Cloud Base Height

Data Mnemonic	EDRE-CLBH-C1030 (Official) EDRE-CLBH-C1031 (Substitute)
Description/ Purpose	The Cloud Base Height EDR using VIIRS data. The Cloud Base Height EDR is derived by subtracting cloud thickness from cloud top height. Cloud thickness is estimated from input values of Cloud Optical Thickness, Effective Particle Size, and cloud phase. This thickness is subtracted from Cloud Top Height to yield Cloud Base Height. Note that although standard meteorological convention is to provide cloud heights Above Ground Level (AGL), the VIIRS Cloud Base Height is provided as the height above Mean Sea Level (MSL).

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4 for details.
File Size	See Table: 5.1.1.1-1 VIIRS Cloud Base Height Data Content Summary for size. This granule size includes Cloud Base Height 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	Each EDR contains two types of data (layered and averaged) and three types of quality flags (layered, averaged, and non-cloud related). Therefore, each granule will contain: Layer cloud base height Average cloud base height (of all layers)* Quality Flags: Scale/Offset Factors *Note: The Average Cloud Base Height Field is a simple average of the Cloud Base Heights identified for each cell at each layer. The layers are vertically averaged to provide this field. Be aware that a cell in the Average Cloud Base Height field may contain data averaged from multiple layers widely separated in altitude and therefore very different in cloud base heights. See Section 5.1.1.1 VIIRS Cloud Base Height Data Content Summary See Section 5.1.1.2 VIIRS Cloud Base Height Product Profile See Section 5.1.1.3, VIIRS Cloud Base Height HDF5 Details See Section 5.1.1.4 VIIRS Cloud Base Height HDF5 Metadata Details See Section 5.1.1.5 VIIRS Cloud Base Height Geolocation Details

5.1.1.1 VIIRS Cloud Base Height Data Content Summary

Table: 5.1.1.1-1 VIIRS Cloud Base Height Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
LayerCloudBaseHeight	Cloud Base Height - layered product (ordered from top of atmosphere to surface)	unsigned 16-bit integer	[N*96, 508, 4]	[96, 508, 4]	km
AverageCloudBaseHeight	Cloud Base Height - Average Cloud Base Height of all Layers	unsigned 16-bit integer	[N*96, 508]	[96, 508]	km
QF1_VIIRSCBHLAYEREDR	Layer CBH Quality Flags	unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCBHLAYEREDR		unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCBHAVGEDR	Quality Flags for AverageCloudBaseHeight Fields	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCBHAVGEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCBHEDR	Non-Cloud Quality Flags	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCBHEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
CBHFactors	Scale = first array element; Offset = 2nd array element	32-bit floating point	[N*2]	[2]	Scale = unitless; Offset = km
File Size	**1,072,904 Bytes**				

5.1.1.2 VIIRS Cloud Base Height Product Profile

Table: 5.1.1.2-1 VIIRS Cloud Base Height Product Profile

VIIRS Cloud Base Height Product Profile

Fields

Name	Data Size	Dimensions
LayerCloudBaseHeight	2byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Cloud Base Height - layered product (ordered from top of atmosphere to surface)	0	-1.00	20.00	km	Yes	CBHFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

										MISS_UINT16_FILL	65534
										ERR_UINT16_FILL	65531
										ELLIPSOID_UINT16_FILL	65530
										VDNE_UINT16_FILL	65529
										SOUB_UINT16_FILL	65528

AverageCloudBaseHeight 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

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 Base Height - Average Cloud Base Height of all Layers	0	-1.00	20.00	km	Yes	CBHFactors	unsigned 16-bit integer	Name	Value	Name	Value
								NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		
								ELLIPSOID_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

VIIRS Cloud Base Height Product Profile - Quality Flags

Fields

Name	Data Size	Dimensions

QF1_VIIRSCBHLAYEREDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

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 Confidence (Indicates cloudiness - percent cloudiness for this layer)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= cloudiness < 25%	0
										25% <= cloudiness < 50%	1
										50% <= cloudiness < 75%	2
										75% <= cloudiness < =100%	3
Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Water Cloud Fraction < 25%	0
										25% <= Water Cloud Fraction < 50%	1
										50% <= Water Cloud Fraction < 75%	2
										75% <= Water Cloud Fraction <=100%	3
Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Multi-layer Cloud Fraction < 25%	0
										25% <= Multi-layer Cloud Fraction < 50%	1
										50% <= Multi-layer Cloud Fraction < 75%	2
										75% <= Multi-layer Cloud Fraction <= 100%	3
Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Mixed Phase Cloud Fraction < 25%	0
										25% <= Mixed Phase Cloud Fraction < 50%	1
										50% <= Mixed Phase Cloud Fraction < 75%	2

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

													75% <= Mixed Phase Cloud Fraction <= 100%	3

QF2_VIIRSCBHLAYEREDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0 <= % valid retrievals < 25%	0
										25 <= % valid retrievals < 50%	1
										50 <= % valid retrievals < 75%	2
										75 <= % valid retrievals <= 100%	3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Spare	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1

QF3_VIIRSCBHAVGEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

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 Confidence (Indicates cloudiness - percent cloudiness)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= cloudiness < 25%	0
										25% <= cloudiness < 50%	1
										50% <= cloudiness < 75%	2
										75% <= cloudiness <= 100%	3
Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Water Cloud Fraction < 25%	0
										25% <= Water Cloud Fraction < 50%	1
										50% <= Water Cloud Fraction < 75%	2
										75% <= Water Cloud Fraction <= 100%	3
Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Multi-layer Cloud Fraction < 25%	0
										25% <= Multi-layer Cloud Fraction < 50%	1
										50% <= Multi-layer Cloud Fraction < 75%	2

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

												75% <= Multi-layer Cloud Fraction <= 100%	3
		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value		Name	Value
												0% <= Mixed Phase Cloud Fraction < 25%	0
												25% <= Mixed Phase Cloud Fraction < 50%	1
												50% <= Mixed Phase Cloud Fraction < 75%	2
												75% <= Mixed Phase Cloud Fraction <= 100%	3

QF4_VIIRSCBHAVGEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values (Name / Value)	Legend Entries (Name / Value)
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0 <= % valid retrievals < 25% : 0 25 <= % valid retrievals < 50% : 1 50 <= % valid retrievals < 75% : 2 75 <= % valid retrievals <= 100% : 3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)		False : 0 True : 1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)		False : 0 True : 1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)		False : 0 True : 1
Spare	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)		False : 0 True : 1

QF5_VIIRSCBHEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values (Name / Value)	Legend Entries (Name / Value)
Snow/Ice Fraction	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Snow/Ice Fraction < 25% : 0 25% <= Snow/Ice Fraction < 50% : 1 50% <= Snow/Ice Fraction < 75% : 2 75% <= Snow/Ice Fraction <= 100% : 3
Exclusion - Sunglint (Percent of pixels in sunglint in Horizontal Cell)	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Sunglint Fraction < 25% : 0

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

												25% <= Sunglint Fraction < 50%	1
												50% <= Sunglint Fraction < 75%	2
												75% <= Sunglint Fraction <= 100%	3
		Day/Night Degradation Flag	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value		Name	Value
												Day (Solar Zenith Angle < 75 degrees)	1
												Night (Solar Zenith Angle >= 75 degrees)	2
												Transition (Terminator)	3
		Bad SDR Data (Quality of CBH degraded or CBH not obtained due to any bad SDR data in Horizontal cell)	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value		Name	Value
												Good	0
												Poor	1
												No Calibration	2
QF6_VIIRSCBHEDR	1byte(s)												

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Surface Type - Sea Water (Ocean) Fractional Coverage within Horizontal Cell	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Sea Water Fraction < 25%	0
										25% <= Sea Water Fraction < 50%	1
										50% <= Sea Water Fraction < 75%	2
										75% <= Sea Water Fraction <= 100%	3
Surface Type - Coastal Fractional Coverage within Horizontal Cell	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Coastal Fraction < 25%	0
										25% <= Coastal Fraction < 50%	1
										50% <= Coastal Fraction < 75%	2
										75% <= Coastal Fraction <= 100%	3
spare	4	MIN_VAL	MAX_VAL	unitless	No		4 bit(s)	Name	Value	Name	Value

VIIRS Cloud Base Height Product Profile - Scale Factors

Fields

Name	Data Size	Dimensions
CBHFactors	4byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Granule	Yes	No	2	2

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Scale = first array element; Offset = 2nd array element	0	MIN_VAL	MAX_VAL	Scale = unitless; Offset = km	No		32-bit floating point	Name	Value	Name	Value

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

5.1.1.3 VIIRS Cloud Base Height HDF5 Details

Figure 5.1.1.3-1, VIIRS Cloud Base Height UML Diagram, provides the details on the content and datatypes of the Cloud Base Height. 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-CBH-EDR
+LayerCloudBaseHeight : H5T_NATIVE_USHORT +AverageCloudBaseHeight : H5T_NATIVE_USHORT +QF1_VIIRSCBHLAYEREDR : H5T_NATIVE_UCHAR +QF2_VIIRSCBHLAYEREDR : H5T_NATIVE_UCHAR +QF3_VIIRSCBHAVGEDR : H5T_NATIVE_UCHAR +QF4_VIIRSCBHAVGEDR : H5T_NATIVE_UCHAR +QF5_VIIRSCBHEDR : H5T_NATIVE_UCHAR +QF6_VIIRSCBHEDR : H5T_NATIVE_UCHAR +CBHFactors : H5T_NATIVE_FLOAT

Figure: 5.1.1.3-1 VIIRS Cloud Base Height UML Diagram

5.1.1.4 VIIRS Cloud Base Height HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Cloud Base Height EDR are listed in the JPSS Algorithm Specification Vol. II: Data Dictionary for the Common Algorithms, Section 4 and 5. The VIIRS EDR metadata includes all of the common metadata at the root, product, aggregation, and granule levels.

In addition to the common metadata items for this product, Table 5.1.1.4-1, VIIRS Cloud Base Height Quality Summary Metadata Values, provides the following items as name/value pairs. The listed name/value pair items in the table are the granule level quality flags for the VIIRS Cloud Base Height EDR.

Table: 5.1.1.4-1 VIIRS Cloud Base Height Quality Summary Metadata Values

N_Quality_Summary			
Name	Value	Description	Comments
Exclusion/Degradation Summary	0 - 100	Percent of cloudy pixels with one or more exclusion or degradation criteria flags	
Percent Converged Pixels	0 - 100	A ratio (expressed as a percent) of the number of converged vs. that of cloudy pixels for the entire granule.	

5.1.1.5 VIIRS Cloud Base Height Geolocation Details

See Section 4.8, VIIRS Cloud Aggregated Geolocation.

5.1.2 Cloud Cover/Layers

Data Mnemonic	EDRE-VCCL-C0030 (Official) EDRE-VCCL-C0031 (Substitute)

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Description/ Purpose	The cloud cover is defined as the fraction of a given area on the earth's surface for which a locally normal line segment, extending between two given altitudes, intersects a cloud. This EDR will be produced from all nominal JPSS orbits, but the measurement accuracy for a terminator orbit will be degraded due to VIIRS calibration limitations for a terminator orbit. Sensors: VIIRS Effectivity: S-NPP/JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4 for details.
File Size	See Table: 5.1.2.1-1 VIIRS Cloud Cover/Layers Height Data Content Summary for size. This granule size includes Cloud Cover/Layers 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	For each cell, the Cloud Cover/Layers EDR contains: Layer cloud cover Summed cloud cover (of all layers) Cloud type Quality Flags Scale/Offset Factors See Section 5.1.2.1, Cloud Cover/Layers Data Content Summary See Section 5.1.2.2 Cloud Cover/Layers Product Profile See Section 5.1.2.3, Cloud Cover/Layers HDF5 Details See Section 5.1.2.4, Cloud Cover/Layers HDF5 Metadata Details See Section 5.1.2.5, Cloud Cover/Layers Geolocation Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

5.1.2.1 VIIRS Cloud Cover/Layers Data Content Summary

Table: 5.1.2.1-1 VIIRS Cloud Cover/Layers Height Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
LayerCloudCover	Cloud Cover Fraction - layered product (ordered from top of atmosphere to surface)	unsigned 16-bit integer	[N*96, 508, 4]	[96, 508, 4]	unitless
SummedCloudCover	Cloud Cover Fraction - Vertical Sum of all layers	unsigned 16-bit integer	[N*96, 508]	[96, 508]	unitless
LayerCloudType	Cloud Type - layered product (ordered from top of atmosphere to surface)	unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF1_VIIRSCCLLAYERED R	Layer CCL Quality Flags	unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCCLLAYERED R		unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCCLSUMEDR	Quality Flags for SummedCloudCover Field	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCCLSUMEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCCLEDR	Non-Cloud Quality Flags	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCCLEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
CCLFactors	Scale = first array element; Offset = 2nd array element	32-bit floating point	[N*2]	[2]	unitless
File Size	**1,267,976 Bytes**				

5.1.2.2 VIIRS Cloud Cover/Layers Height Product Profile

Table: 5.1.2.2-1 VIIRS Cloud Cover/Layers Height Product Profile

VIIRS Cloud Cover Layers Height Product Profile

Fields		
Name	**Data Size**	**Dimensions**
LayerCloudCover	2byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
		Cloud Cover Fraction - layered product (ordered from top of atmosphere to surface)	0	0.00	1.00	unitless	Yes	CCLFactors	unsigned 16-bit integer	Name	Value	Name	Value
										NA_UINT16_FILL	65535		
										MISS_UINT16_FILL	65534		
										ERR_UINT16_FILL	65531		
										ELLIPSOID_UINT16_FILL	65530		
										VDNE_UINT16_FILL	65529		
										SOUB_UINT16_FILL	65528		
SummedCloudCover	2byte(s)												

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

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 Cover Fraction - Vertical Sum of all layers	0	0.00	1.00	unitless	Yes	CCLFactors	unsigned 16-bit integer	Name	Value	Name	Value
								NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		
								ELLIPSOID_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

LayerCloudType 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

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 Type - layered product (ordered from top of atmosphere to surface)	0	MIN_VAL	MAX_VAL	unitless	No		unsigned 8-bit char	Name	Value	Name	Value
								NA_UINT8_FILL	255	Stratus	1
								MISS_UINT8_FILL	254	Altocumulus	2
								ERR_UINT8_FILL	251	Cumulus	3
								ELLIPSOID_UINT8_FILL	250	Cirrus	4
								VDNE_UINT8_FILL	249	Cirrocumulus	5
								SOUB_UINT8_FILL	248		

VIIRS Cloud Cover Layers Height Product Profile - Quality Flags

Fields

Name	Data Size	Dimensions
QF1_VIIRSCCLLAYEREDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

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 Confidence (Indicates cloudiness - percent cloudiness for this layer)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= cloudiness < 25%	0
										25% <= cloudiness < 50%	1
										50% <= cloudiness < 75%	2
										75% <= cloudiness <= 100%	3
Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Water Cloud Fraction < 25%	0
										25% <= Water Cloud Fraction < 50%	1
										50% <= Water Cloud Fraction < 75%	2

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

												75% <= Water Cloud Fraction <= 100% | 3
		Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value		Name | Value 0% <= Multi-layer Cloud Fraction < 25% | 0 25% <= Multi-layer Cloud Fraction < 50% | 1 50% <= Multi-layer Cloud Fraction < 75% | 2 75% <= Multi-layer Cloud Fraction <= 100% | 3
		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value		Name | Value 0% <= Mixed Phase Cloud Fraction < 25% | 0 25% <= Mixed Phase Cloud Fraction < 50% | 1 50% <= Mixed Phase Cloud Fraction < 75% | 2 75% <= Mixed Phase Cloud Fraction <= 100% | 3

QF2_VIIRSCCLLAYEREDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value	Name | Value 0 <= % valid retrievals < 25% | 0 25 <= % valid retrievals < 50% | 1 50 <= % valid retrievals < 75% | 2 75 <= % valid retrievals <= 100% | 3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name | Value	Name | Value False | 0 True | 1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name | Value	Name | Value False | 0 True | 1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name | Value	Name | Value False | 0 True | 1
Spare	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value	Name | Value
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name | Value	Name | Value False | 0 True | 1

QF3_VIIRSCCLSUMEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

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 Confidence (Indicates cloudiness - percent cloudiness)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value	Name | Value

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

												0% <= cloudiness < 25% 0 25% <= cloudiness < 50% 1 50% <= cloudiness < 75% 2 75% <= cloudiness <= 100% 3
		Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value		Name Value 0% <= Water Cloud Fraction < 25% 0 25% <= Water Cloud Fraction < 50% 1 50% <= Water Cloud Fraction < 75% 2 75% <= Water Cloud Fraction <= 100% 3
		Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value		Name Value 0% <= Multi-layer Cloud Fraction < 25% 0 25% <= Multi-layer Cloud Fraction < 50% 1 50% <= Multi-layer Cloud Fraction < 75% 2 75% <= Multi-layer Cloud Fraction <= 100% 3
		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value		Name Value 0% <= Mixed Phase Cloud Fraction < 25% 0 25% <= Mixed Phase Cloud Fraction < 50% 1 50% <= Mixed Phase Cloud Fraction < 75% 2 75% <= Mixed Phase Cloud Fraction <= 100% 3

QF4_VIIRSCCLSUMEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name Value 0 <= % valid retrievals < 25% 0 25 <= % valid retrievals < 50% 1 50 <= % valid retrievals < 75% 2 75 <= % valid retrievals <= 100% 3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Spare	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name Value
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

QF5_VIIRSCCLEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Snow/Ice Fraction	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0% <= Snow/Ice Fraction < 25%	0
										25% <= Snow/Ice Fraction < 50%	1
										50% <= Snow/Ice Fraction < 75%	2
										75% <= Snow/Ice Fraction <= 100%	3
Exclusion - Sunglint (Percent of pixels in sunglint in Horizontal Cell)	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0% <= Sunglint Fraction < 25%	0
										25% <= Sunglint Fraction < 50%	1
										50% <= Sunglint Fraction < 75%	2
										75% <= Sunglint Fraction <= 100%	3
Day/Night Degradation Flag	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			Day (Solar Zenith Angle < 75 degrees)	1
										Night (Solar Zenith Angle >= 75 degrees)	2
										Transition (Terminator)	3
Bad SDR Data (Quality of CCL degraded or CCL not obtained due to any bad SDR data in Horizontal cell)	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			Good	0
										Poor	1
										No Calibration	2

QF6_VIIRSCCLEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Surface Type - Sea Water (Ocean) Fractional Coverage within Horizontal Cell	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0% <= Sea Water Fraction < 25%	0
										25% <= Sea Water Fraction < 50%	1
										50% <= Sea Water Fraction < 75%	2
										75% <= Sea Water Fraction <= 100%	3
Surface Type - Coastal Fractional Coverage within Horizontal Cell	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0% <= Coastal Fraction < 25%	0
										25% <= Coastal Fraction < 50%	1
										50% <= Coastal Fraction < 75%	2
										75% <= Coastal Fraction <= 100%	3
spare	4	MIN_VAL	MAX_VAL	unitless	No		4 bit(s)				

VIIRS Cloud Cover Layers Height Product Profile - Scale Factors

Fields		
Name	Data Size	Dimensions

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

CCLFactors	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Granule	Yes	No	2	2									
		Datum													
		Description		**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**		
		Scale = first array element; Offset = 2nd array element		0	MIN_VAL	MAX_VAL	unitless	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**	

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

5.1.2.3 VIIRS Cloud Cover/Layers HDF5 Details

Figures 5.1.2.3-1, VIIRS Cloud Cover/Layers UML Diagram, provides the details on the content and datatypes of the Cloud Cover/Layers 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-CCL-EDR
+LayerCloudCover : H5T_NATIVE_USHORT +SummedCloudCover : H5T_NATIVE_USHORT +LayerCloudType : H5T_NATIVE_UCHAR +QF1_VIIRSCCLLAYEREDR : H5T_NATIVE_UCHAR +QF2_VIIRSCCLLAYEREDR : H5T_NATIVE_UCHAR +QF3_VIIRSCCLSUMEDR : H5T_NATIVE_UCHAR +QF4_VIIRSCCLSUMEDR : H5T_NATIVE_UCHAR +QF5_VIIRSCCLEDR : H5T_NATIVE_UCHAR +QF6_VIIRSCCLEDR : H5T_NATIVE_UCHAR +CCLFactors : H5T_NATIVE_FLOAT

Figure: 5.1.2.3-1 VIIRS Cloud Cover/Layers UML Diagram

5.1.2.4 VIIRS Cloud Cover/Layers HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Cloud Cover/Layers EDR are listed in the JPSS Algorithm Specification Vol. II: Data Dictionary for the Common Algorithms. The VIIRS EDR metadata includes all of the common metadata at the root, product, aggregation, and granule levels.

In addition to the common metadata items for this product, Table 5.1.2.4-1, VIIRS Cloud Cover/Layers Quality Summary Metadata Values, provides the following items as name/value pairs. The listed name/value pair items in the table are the granule level quality flags for the VIIRS Cloud Cover/Layers EDR.

Table: 5.1.2.4-1 VIIRS Cloud Cover/Layers Quality Summary Metadata Values

N_Quality_Summary			
Name	Value	Description	Comments
Exclusion/Degradation Summary	0 - 100	Percent of cloudy pixels with one or more exclusion or degradation criteria flags	
Percent Converged Pixels	0 - 100	A ratio (expressed as a percent) of the number of converged vs. that of cloudy pixels for the entire granule.	

5.1.2.5 VIIRS Cloud Cover/Layers Geolocation Details

See Section 4.8, VIIRS Cloud Aggregated Geolocation.

5.1.3 Cloud Effective Particle Size

Data Mnemonic	EDRE-VCEP-C0030 (Official)

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

	EDRE-VCEP-C0031 (Substitute)
Description/ Purpose	Effective cloud particle size is defined as the ratio of the third moment of the drop size distribution to the second moment, averaged over a layer of air within a cloud. The Cloud Effective Particle Size EDR is reported in units of micrometers. Sensors: VIIRS Effectivity: S-NPP/JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4 for details.
File Size	See Table: 5.1.3.1-1 Cloud Effective Particle Size Data Content Summary for size. This granule size includes Cloud Effective Particle Size 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	For each cell, the Cloud Effective Particle Size EDR contains: Layer effective particle size Average effective particle size (of all layers) * Scale/Offset Factors *Note: The Average Cloud Effective Particle Size Field is a simple average of the Cloud Effective Particle Sizes identified for each cell at each layer. The layers are vertically averaged to provide this field. Be aware that a cell in the Average Cloud Effective Particle Size field may contain data averaged from multiple layers widely separated in altitude and therefore very different in cloud type and effective particle size. See Section 5.1.3.1, Cloud Effective Particle Size Data Content Summary See Section 5.1.3.2, Cloud Effective Particle Size Product Profile See Section 5.1.3.3, Cloud Effective Particle Size HDF5 Details See Section 5.1.3.4, Cloud Effective Particle Size HDF5 Metadata Details See Section 5.1.3.5, Cloud Effective Particle Size Geolocation Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

5.1.3.1 Cloud Effective Particle Size Data Content Summary

Table: 5.1.3.1-1 Cloud Effective Particle Size Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
LayerCloudEffectiveParticleSize	Cloud Effective Particle Size - layered product (ordered from top of atmosphere to surface)	unsigned 16-bit integer	[N*96, 508, 4]	[96, 508, 4]	micrometers
AverageCloudEffectiveParticleSize	Cloud Effective Particle Size - Average of all layers	unsigned 16-bit integer	[N*96, 508]	[96, 508]	micrometers
QF1_VIIRSCEPSLAYEREDR	Layer CEPS Quality Flags	unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCEPSLAYEREDR		unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCEPSAVGEDR	Quality Flags for Averaged CEPS Fields	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCEPSAVGEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCEPSEDR	Non-Cloud Quality Flags	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCEPSEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
CEPSFactors	Scale = first array element; Offset = 2nd array element	32-bit floating point	[N*2]	[2]	Scale = unitless; Offset = micrometers
File Size	**1,072,904 Bytes**				

5.1.3.2 Cloud Effective Particle Size Product Profile

Table: 5.1.3.2-1 Cloud Effective Particle Size Product Profile

Cloud Effective Particle Size Product Profile

Fields						
Name	**Data Size**	**Dimensions**				
LayerCloudEffectiveParticleSize	2byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**
		AlongTrack	Yes	No	96	96

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

CrossTrack	No	No	508	508	
Layer	No	No	4	4	

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 Effective Particle Size - layered product (ordered from top of atmosphere to surface)	0	0.00	124.00	micrometers	Yes	CEPSFactors	unsigned 16-bit integer	Name / Value NA_UINT16_FILL 65535 MISS_UINT16_FILL 65534 ERR_UINT16_FILL 65531 ELLIPSOID_UINT16_FILL 65530 VDNE_UINT16_FILL 65529 SOUB_UINT16_FILL 65528	Name / Value

AverageCloudEffectiveParticleSize 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

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 Effective Particle Size - Average of all layers	0	0.00	124.00	micrometers	Yes	CEPSFactors	unsigned 16-bit integer	Name / Value NA_UINT16_FILL 65535 MISS_UINT16_FILL 65534 ERR_UINT16_FILL 65531 ELLIPSOID_UINT16_FILL 65530 VDNE_UINT16_FILL 65529 SOUB_UINT16_FILL 65528	Name / Value

Cloud Effective Particle Size Product Profile - Quality Flags

Fields

Name	Data Size	Dimensions
QF1_VIIRSCEPSLAYEREDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

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 Confidence (Indicates cloudiness - percent cloudiness for this layer)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value 0% <= cloudiness < 25% 0 25% <= cloudiness < 50% 1 50% <= cloudiness < 75% 2 75% <= cloudiness <= 100% 3
Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value 0% <= Water Cloud Fraction < 25% 0 25% <= Water Cloud Fraction < 50% 1 50% <= Water Cloud Fraction < 75% 2 75% <= Water Cloud Fraction <= 100% 3
Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value 0% <= Multi-layer Cloud Fraction < 25% 0 25% <= Multi-layer Cloud Fraction < 50% 1 50% <= Multi-layer Cloud Fraction < 75% 2 75% <= Multi-layer Cloud Fraction <= 100% 3

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
											0% <= Mixed Phase Cloud Fraction < 25%	0
											25% <= Mixed Phase Cloud Fraction < 50%	1
											50% <= Mixed Phase Cloud Fraction < 75%	2
											75% <= Mixed Phase Cloud Fraction <= 100%	3

QF2_VIIRSCEPSLAYEREDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0 <= % valid retrievals < 25%	0
										25 <= % valid retrievals < 50%	1
										50 <= % valid retrievals < 75%	2
										75 <= % valid retrievals <= 100%	3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Spare	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1

QF3_VIIRSCEPSAVGEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

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 Confidence (Indicates cloudiness - percent cloudiness)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= cloudiness < 25%	0
										25% <= cloudiness < 50%	1
										50% <= cloudiness < 75%	2
										75% <= cloudiness <= 100%	3
Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Water Cloud Fraction < 25%	0
										25% <= Water Cloud Fraction < 50%	1
										50% <= Water Cloud Fraction < 75%	2
										75% <= Water Cloud Fraction <= 100%	3

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		Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value 0% <= Multi-layer Cloud Fraction < 25% / 0 25% <= Multi-layer Cloud Fraction < 50% / 1 50% <= Multi-layer Cloud Fraction < 75% / 2 75% <= Multi-layer Cloud Fraction <= 100% / 3
		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value 0% <= Mixed Phase Cloud Fraction < 25% / 0 25% <= Mixed Phase Cloud Fraction < 50% / 1 50% <= Mixed Phase Cloud Fraction < 75% / 2 75% <= Mixed Phase Cloud Fraction <= 100% / 3

QF4_VIIRSCEPSAVGEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value 0 <= % valid retrievals < 25% / 0 25 <= % valid retrievals < 50% / 1 50 <= % valid retrievals < 75% / 2 75 <= % valid retrievals <= 100% / 3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value False / 0 True / 1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value False / 0 True / 1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value False / 0 True / 1
Spare	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name / Value	Name / Value False / 0 True / 1

QF5_VIIRSCEPSEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Snow/Ice Fraction	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value 0% <= Snow/Ice Fraction < 25% / 0 25% <= Snow/Ice Fraction < 50% / 1

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												50% <= Snow/Ice Fraction < 75%	2
												75% <= Snow/Ice Fraction <= 100%	3
		Exclusion - Sunglint (Percent of pixels in sunglint in Horizontal Cell)	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value		Name	Value
												0% <= Sunglint Fraction < 25%	0
												25% <= Sunglint Fraction < 50%	1
												50% <= Sunglint Fraction < 75%	2
												75% <= Sunglint Fraction <= 100%	3
		Day/Night Degradation Flag	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value		Name	Value
												Day (Solar Zenith Angle < 75 degrees)	1
												Night (Solar Zenith Angle >= 75 degrees)	2
												Transition (Terminator)	3
		Bad SDR Data (Quality of CEPS degraded or CEPS not obtained due to any bad SDR data in Horizontal cell)	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value		Name	Value
												Good	0
												Poor	1
												No Calibration	2
QF6_VIIRSCEPSEDR	1byte(s)												

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Surface Type - Sea Water (Ocean) Fractional Coverage within Horizontal Cell	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Sea Water Fraction < 25%	0
										25% <= Sea Water Fraction < 50%	1
										50% <= Sea Water Fraction < 75%	2
										75% <= Sea Water Fraction <= 100%	3
Surface Type - Coastal Fractional Coverage within Horizontal Cell	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Coastal Fraction < 25%	0
										25% <= Coastal Fraction < 50%	1
										50% <= Coastal Fraction < 75%	2
										75% <= Coastal Fraction <= 100%	3
spare	4	MIN_VAL	MAX_VAL	unitless	No		4 bit(s)	Name	Value	Name	Value

Cloud Effective Particle Size Product Profile - Scale Factors

Fields

Name	Data Size	Dimensions
CEPSFactors	4byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Granule	Yes	No	2	2

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Scale = first array element; Offset = 2nd array element	0	MIN_VAL	MAX_VAL	Scale = unitless; Offset = micrometers	No		32-bit floating point	Name	Value	Name	Value

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5.1.3.3 Cloud Effective Particle Size HDF5 Details

Figures 5.1.3.3-1, Cloud Effective Particle Size UML Diagram, provides the details on the content and datatypes of the VIIRS Cloud Effective Particle Size 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-CEPS-EDR
+LayerCloudEffectiveParticleSize : H5T_NATIVE_USHORT +AverageCloudEffectiveParticleSize : H5T_NATIVE_USHORT +QF1_VIIRSCEPSLAYEREDR : H5T_NATIVE_UCHAR +QF2_VIIRSCEPSLAYEREDR : H5T_NATIVE_UCHAR +QF3_VIIRSCEPSAVGEDR : H5T_NATIVE_UCHAR +QF4_VIIRSCEPSAVGEDR : H5T_NATIVE_UCHAR +QF5_VIIRSCEPSEDR : H5T_NATIVE_UCHAR +QF6_VIIRSCEPSEDR : H5T_NATIVE_UCHAR +CEPSFactors : H5T_NATIVE_FLOAT

Figure: 5.1.3.3-1 Cloud Effective Particle Size UML Diagram

5.1.3.4 Cloud Effective Particle Size HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Cloud Effective Particle Size EDR are listed in the JPSS Algorithm Specification Vol. II: Data Dictionary for the Common Algorithms. The VIIRS EDR metadata includes all of the common metadata at the root, product, aggregation, and granule levels.

In addition to the common metadata items for this product, Table 5.1.3.4-1, Cloud Effective Particle Size Quality Summary Metadata Values, provides the following items as name/value pairs. The listed name/value pair items in the table are the granule level quality flags for the Cloud Effective Particle Size EDR.

Table: 5.1.3.4-1 Cloud Effective Particle Size Quality Summary Metadata Values

N_Quality_Summary			
Name	Value	Description	Comments
Exclusion/Degradation Summary	0 - 100	Percent of cloudy pixels with one or more exclusion or degradation criteria flags	
Percent Converged Pixels	0 - 100	A ratio (expressed as a percent) of the number of converged vs. that of cloudy pixels for the entire granule.	

5.1.3.5 Cloud Effective Particle Size Geolocation Details

See Section 4.8, VIIRS Cloud Aggregated Geolocation.

5.1.4 Cloud Optical Thickness

Data Mnemonic	EDRE-VCOT-C0030 (Official)

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

	EDRE-VCOT-C0031 (Substitute)
Description/ Purpose	Cloud optical thickness is defined as the extinction (scattering and absorption) vertical optical thickness of each distinguishable cloud layer in a vertical column of the atmosphere as well as the average optical thickness of all layers. Optical thickness,τ, is related to transmittance, t, by $t = \exp(-\tau)$. This EDR will be produced from all nominal JPSS orbits, but the measurement accuracy for a terminator orbit will be degraded due to VIIRS calibration limitations for a terminator orbit. The Cloud Optical Thickness EDR is reported for up to four cloud layers (ordered from the Top of Atmosphere to Surface) and will include the averaged cloud optical thickness, integrated vertically per cell. This EDR is reported as the unitless quantity Tau (τ). Sensors: VIIRS Effectivity: S-NPP/JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4 for details.
File Size	See Table: 5.1.4.1-1 Cloud Optical Thickness Data Content Summary for size. This granule size includes Cloud Optical Thickness 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	For each cell, the Cloud Optical Thickness EDR contains: Layer cloud optical thickness Average cloud optical thickness (of all layers)* Quality Flags Scale/Offset Factors *Note: The Average Cloud Optical Thickness Field is a simple average of the Cloud Optical Thickness identified for each cell at each layer. The layers are vertically averaged to provide this field. Be aware that a cell in the Average Cloud Optical Thickness field may contain data averaged from multiple layers widely separated in altitude and therefore very different in cloud type and optical thickness. See Section 5.1.4.1 Cloud Optical Thickness Data Content Summary See Section 5.1.4.2 Cloud Optical Thickness Product Profile See Section 5.1.4.3 Cloud Optical Thickness HDF5 Details See Section 5.1.4.4 Cloud Optical Thickness HDF5 Metadata Details See Section 5.1.4.5 Cloud Optical Thickness Geolocation Details

5.1.4.1 Cloud Optical Thickness Data Content Summary

Table: 5.1.4.1-1 Cloud Optical Thickness Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
LayerCloudOpticalThickness	Cloud Optical Thickness - layered product (ordered from top of atmosphere to surface)	unsigned 16-bit integer	[N*96, 508, 4]	[96, 508, 4]	unitless
AverageCloudOpticalThickness	Cloud Optical Thickness - Average of all layers	unsigned 16-bit integer	[N*96, 508]	[96, 508]	unitless
QF1_VIIRSCOTLAYEREDR	Layer COT Quality Flags	unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCOTLAYEREDR		unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCOTAVGEDR	Quality Flags for AverageCloudOpticalThickness Field	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCOTAVGEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCOTEDR	Non-Cloud Quality Flags	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCOTEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
COTFactors	Scale = first array element; Offset = 2nd array element	32-bit floating point	[N*2]	[2]	unitless
File Size	**1,072,904 Bytes**				

5.1.4.2 Cloud Optical Thickness Product Profile

Table: 5.1.4.2-1 Cloud Optical Thickness Product Profile

Cloud Optical Thickness Product Profile

Fields

Name	Data Size	Dimensions
LayerCloudOpticalThickness	2byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
		Cloud Optical Thickness - layered product (ordered from top of atmosphere to surface)	0	0.10	128.00	unitless	Yes	COTFactors	unsigned 16-bit integer	Name / Value: NA_UINT16_FILL 65535; MISS_UINT16_FILL 65534; ERR_UINT16_FILL 65531; ELLIPSOID_UINT16_FILL 65530; VDNE_UINT16_FILL 65529; SOUB_UINT16_FILL 65528	Name / Value
AverageCloudOpticalThickness	2byte(s)										

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

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 Optical Thickness - Average of all layers	0	0.10	128.00	unitless	Yes	COTFactors	unsigned 16-bit integer	Name / Value: NA_UINT16_FILL 65535; MISS_UINT16_FILL 65534; ERR_UINT16_FILL 65531; ELLIPSOID_UINT16_FILL 65530; VDNE_UINT16_FILL 65529; SOUB_UINT16_FILL 65528	Name / Value

Cloud Optical Thickness Product Profile - Quality Flags

Fields

Name	Data Size	Dimensions
QF1_VIIRSCOTLAYEREDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

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 Confidence (Indicates cloudiness - percent cloudiness for this layer)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value: 0% <= cloudiness < 25% 0; 25% <= cloudiness < 50% 1; 50% <= cloudiness < 75% 2; 75% <= cloudiness <= 100% 3
Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value: 0% <= Water Cloud Fraction < 25% 0; 25% <= Water Cloud Fraction < 50% 1; 50% <= Water Cloud Fraction < 75% 2; 75% <= Water Cloud Fraction <= 100% 3
Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value: 0% <= Multi-layer Cloud Fraction < 25% 0; 25% <= Multi-layer Cloud Fraction < 50% 1; 50% <= Multi-layer Cloud Fraction < 75% 2; 75% <= Multi-layer Cloud Fraction <= 100% 3
Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value	Name / Value: 0% <= Mixed Phase Cloud Fraction < 25% 0

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

											25% <= Mixed Phase Cloud Fraction < 50%	1
											50% <= Mixed Phase Cloud Fraction < 75%	2
											75% <= Mixed Phase Cloud Fraction <= 100%	3

QF2_VIIRSCOTLAYEREDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values (Name / Value)	Legend Entries (Name / Value)
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0 <= % valid retrievals < 25% : 0 25 <= % valid retrievals < 50% : 1 50 <= % valid retrievals < 75% : 2 75 <= % valid retrievals <= 100% : 3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)		False : 0 True : 1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)		False : 0 True : 1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)		False : 0 True : 1
Spare	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)		False : 0 True : 1

QF3_VIIRSCOTAVGEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values (Name / Value)	Legend Entries (Name / Value)
Cloud Confidence (Indicates cloudiness - percent cloudiness)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= cloudiness < 25% : 0 25% <= cloudiness < 50% : 1 50% <= cloudiness < 75% : 2 75% <= cloudiness <= 100% : 3
Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Water Cloud Fraction < 25% : 0 25% <= Water Cloud Fraction < 50% : 1 50% <= Water Cloud Fraction < 75% : 2 75% <= Water Cloud Fraction <= 100% : 3
Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Multi-layer Cloud Fraction < 25% : 0

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

												25% <= Multi-layer Cloud Fraction < 50% | 1 50% <= Multi-layer Cloud Fraction < 75% | 2 75% <= Multi-layer Cloud Fraction <= 100% | 3
		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value		Name | Value 0% <= Mixed Phase Cloud Fraction < 25% | 0 25% <= Mixed Phase Cloud Fraction < 50% | 1 50% <= Mixed Phase Cloud Fraction < 75% | 2 75% <= Mixed Phase Cloud Fraction <= 100% | 3

QF4_VIIRSCOTAVGEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value	Name | Value 0 <= % valid retrievals < 25% | 0 25 <= % valid retrievals < 50% | 1 50 <= % valid retrievals < 75% | 2 75 <= % valid retrievals <= 100% | 3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name | Value	Name | Value False | 0 True | 1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name | Value	Name | Value False | 0 True | 1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name | Value	Name | Value False | 0 True | 1
Spare	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value	Name | Value
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name | Value	Name | Value False | 0 True | 1

QF5_VIIRSCOTEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Snow/Ice Fraction	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value	Name | Value 0% <= Snow/Ice Fraction < 25% | 0 25% <= Snow/Ice Fraction < 50% | 1 50% <= Snow/Ice Fraction < 75% | 2 75% <= Snow/Ice Fraction <= | 3

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

												100%	
		Exclusion - Sunglint (Percent of pixels in sunglint in Horizontal Cell)	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
											0% <= Sunglint Fraction < 25%	0
											25% <= Sunglint Fraction < 50%	1
											50% <= Sunglint Fraction < 75%	2
											75% <= Sunglint Fraction <= 100%	3
		Day/Night Degradation Flag	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
											Day (Solar Zenith Angle < 75 degrees)	1
											Night (Solar Zenith Angle >= 75 degrees)	2
											Transition (Terminator)	3
		Bad SDR Data (Quality of COT degraded or COT not obtained due to any bad SDR data in Horizontal cell)	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
											Good	0
											Poor	1
											No Calibration	2
QF6_VIIRSCOTEDR	1byte(s)												

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries	
Surface Type - Sea Water (Ocean) Fractional Coverage within Horizontal Cell	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
									0% <= Sea Water Fraction < 25%	0
									25% <= Sea Water Fraction < 50%	1
									50% <= Sea Water Fraction < 75%	2
									75% <= Sea Water Fraction <= 100%	3
Surface Type - Coastal Fractional Coverage within Horizontal Cell	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
									0% <= Coastal Fraction < 25%	0
									25% <= Coastal Fraction < 50%	1
									50% <= Coastal Fraction < 75%	2
									75% <= Coastal Fraction <= 100%	3
spare	4	MIN_VAL	MAX_VAL	unitless	No		4 bit(s)	Name Value	Name Value	

Cloud Optical Thickness Product Profile - Scale Factors

Fields

Name	Data Size	Dimensions
COTFactors	4byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Granule	Yes	No	2	2

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries	
Scale = first array element; Offset = 2nd array element	0	MIN_VAL	MAX_VAL	unitless	No		32-bit floating point	Name Value	Name	Value

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

5.1.4.3 Cloud Optical Thickness HDF5 Details

Figures 5.1.4.3-1, Cloud Optical Thickness UML Diagram, provides the details on the content and datatypes of the VIIRS Cloud Optical Thickness 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-COT-EDR
+LayerCloudOpticalThickness : H5T_NATIVE_USHORT +AverageCloudOpticalThickness : H5T_NATIVE_USHORT +QF1_VIIRSCOTLAYEREDR : H5T_NATIVE_UCHAR +QF2_VIIRSCOTLAYEREDR : H5T_NATIVE_UCHAR +QF3_VIIRSCOTAVGEDR : H5T_NATIVE_UCHAR +QF4_VIIRSCOTAVGEDR : H5T_NATIVE_UCHAR +QF5_VIIRSCOTEDR : H5T_NATIVE_UCHAR +QF6_VIIRSCOTEDR : H5T_NATIVE_UCHAR +COTFactors : H5T_NATIVE_FLOAT

Figure: 5.1.4.3-1 Cloud Optical Thickness UML Diagram

5.1.4.4 Cloud Optical Thickness HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Cloud Optical Thickness EDR are listed in the JPSS Algorithm Specification Vol. II: Data Dictionary for the Common Algorithms. The VIIRS EDR metadata includes all of the common metadata at the root, product, aggregation, and granule levels.

In addition to the common metadata items for this product, Table 5.1.4.4-1, Cloud Optical Thickness Quality Summary Metadata Values, provides the following items as name/value pairs. The listed name/value pair items in the table are the granule level quality flags for the Cloud Optical Thickness EDR.

Table: 5.1.4.4-1 Cloud Optical Thickness Quality Summary Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Comments**
Exclusion/Degradation Summary	0 - 100	Percent of cloudy pixels with one or more exclusion or degradation criteria flags	
Percent Converged Pixels	0 - 100	A ratio (expressed as a percent) of the number of converged vs. that of cloudy pixels for the entire granule.	

5.1.4.5 Cloud Optical Thickness Geolocation Details

See Section 4.8, VIIRS Cloud Aggregated Geolocation.

5.1.5 Cloud Top Height

Data Mnemonic	EDRE-VCTH-C0030 (Official)

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

	EDRE-VCTH-C0031 (Substitute)
Description/ Purpose	The cloud top height is defined for each cloud-covered earth location as the set of heights of the tops of the cloud layers overlying the location. The reported heights are horizontal spatial averages over a cell (i.e., a square region of the earth's surface). If a cloud layer does not extend over an entire cell, the spatial average is limited to the portion of the cell that is covered by the layer. The cloud top height is not defined or reported for cells that are categorized as "probably clear" or "confidently clear" by more than half of the cloud mask elements that cover the cloud top height horizontal cell. Note that although standard meteorological convention is to provide cloud heights Above Ground Level (AGL), the Cloud Top Height is provided as the height above Mean Sea Level (MSL). Sensors: VIIRS Effectivity: S-NPP/JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4 for details.
File Size	See Table: 5.1.5.1-1 Cloud Top Height Data Content Summary for size. This granule size includes Cloud Top Height 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
	For each cell, the Cloud Top Height EDR contains: Layer cloud top height Average cloud top height (of all layers)* Quality Flags Scale/Offset Factors *Note: The Average Cloud Top Height Field is a simple average of the Cloud Top Heights identified for each cell at each layer. The layers are vertically averaged to provide this field. Be aware that a cell in the Average Cloud Top Height field may contain data averaged from multiple layers widely separated in altitude and therefore very different in cloud top heights. See Section 5.1.5.1 Cloud Top Height Data Content Summary See Section 5.1.5.2 Cloud Top Height Product Profile See Section 5.1.5.3 Cloud Top Height HDF5 Details See Section 5.1.5.4 Cloud Top Height HDF5 Metadata Details See Section 5.1.5.5 Cloud Top Height Geolocation Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

5.1.5.1 Cloud Top Height Data Content Summary

Table: 5.1.5.1-1 Cloud Top Height Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
LayerCloudTopHeight	Cloud Top Height - layered product (ordered from top of atmosphere to surface)	unsigned 16-bit integer	[N*96, 508, 4]	[96, 508, 4]	km
AverageCloudTopHeight	Cloud Top Height - Average of all layers	unsigned 16-bit integer	[N*96, 508]	[96, 508]	km
QF1_VIIRSCTHLAYEREDR	Layer CTH Quality Flags	unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCTHLAYEREDR		unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCTHAVGEDR	Quality Flags for AverageCloudTopHeight Field	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCTHAVGEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCTHEDR	Non-Cloud Quality Flags	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCTHEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
CTHFactors	Scale = first array element; Offset = 2nd array element	32-bit floating point	[N*2]	[2]	Scale = unitless; Offset = km
File Size	**1,072,904 Bytes**				

5.1.5.2 Cloud Top Height Product Profile

Table: 5.1.5.2-1 Cloud Top Height Product Profile

Cloud Top Height Product Profile

Fields

Name	Data Size	Dimensions
LayerCloudTopHeight	2byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Cloud Top Height - layered product (ordered from top of atmosphere to surface)	0	-1.00	20.00	km	Yes	CTHFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

											MISS_UINT16_FILL 65534 ERR_UINT16_FILL 65531 ELLIPSOID_UINT16_FILL 65530 VDNE_UINT16_FILL 65529 SOUB_UINT16_FILL 65528
AverageCloudTopHeight	2byte(s)										

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Cloud Top Height - Average of all layers	0	-1.00	20.00	km	Yes	CTHFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		
								ELLIPSOID_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Cloud Top Height Product Profile - Quality Flags

Fields

Name	Data Size	Dimensions
QF1_VIIRSCTHLAYEREDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Cloud Confidence (Indicates cloudiness - percent cloudiness for this layer)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0% <= cloudiness < 25%	0
										25% <= cloudiness < 50%	1
										50% <= cloudiness < 75%	2
										75% <= cloudiness <= 100%	3
Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0% <= Water Cloud Fraction < 25%	0
										25% <= Water Cloud Fraction < 50%	1
										50% <= Water Cloud Fraction < 75%	2
										75% <= Water Cloud Fraction <= 100%	3
Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0% <= Multi-layer Cloud Fraction < 25%	0
										25% <= Multi-layer Cloud Fraction < 50%	1
										50% <= Multi-layer Cloud Fraction < 75%	2
										75% <= Multi-layer Cloud Fraction <= 100%	3
Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0% <= Mixed Phase Cloud Fraction < 25%	0
										25% <= Mixed Phase Cloud Fraction < 50%	1
										50% <= Mixed Phase Cloud Fraction < 75%	2
										75% <= Mixed Phase Cloud Fraction	3

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

													<= 100%	

QF2_VIIRSCTHLAYEREDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0 <= % valid retrievals < 25%	0
										25 <= % valid retrievals < 50%	1
										50 <= % valid retrievals < 75%	2
										75 <= % valid retrievals <= 100%	3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)			False	0
										True	1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)			False	0
										True	1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)			False	0
										True	1
Opaque (black) cloud branching	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0% <= Opaque Cloud branch in HCS < 25%	0
										25% <= Opaque Cloud branch in HCS < 50%	1
										50% <= Opaque Cloud branch in HCS < 75%	2
										75% <= Opaque Cloud branch in HCS <= 100%	3
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)			False	0
										True	1

QF3_VIIRSCTHAVGEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Cloud Confidence (Indicates cloudiness - percent cloudiness)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0% <= cloudiness < 25%	0
										25% <= cloudiness < 50%	1
										50% <= cloudiness < 75%	2
										75% <= cloudiness <= 100%	3
Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)			0% <= Water Cloud Fraction < 25%	0
										25% <= Water Cloud Fraction < 50%	1
										50% <= Water Cloud Fraction < 75%	2
										75% <= Water Cloud Fraction <= 100%	3

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
											0% <= Multi-layer Cloud Fraction < 25%	0
											25% <= Multi-layer Cloud Fraction < 50%	1
											50% <= Multi-layer Cloud Fraction < 75%	2
											75% <= Multi-layer Cloud Fraction <= 100%	3
		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
											0% <= Mixed Phase Cloud Fraction < 25%	0
											25% <= Mixed Phase Cloud Fraction < 50%	1
											50% <= Mixed Phase Cloud Fraction < 75%	2
											75% <= Mixed Phase Cloud Fraction <= 100%	3

QF4_VIIRSCTHAVGEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name: 0 <= % valid retrievals < 25% — Value: 0 Name: 25 <= % valid retrievals < 50% — Value: 1 Name: 50 <= % valid retrievals < 75% — Value: 2 Name: 75 <= % valid retrievals <= 100% — Value: 3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name: False — Value: 0 Name: True — Value: 1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name: False — Value: 0 Name: True — Value: 1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name: False — Value: 0 Name: True — Value: 1
Opaque (black) cloud branching	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name: 0% <= Opaque Cloud branch in HCS < 25% — Value: 0 Name: 25% <= Opaque Cloud branch in HCS < 50% — Value: 1 Name: 50% <= Opaque Cloud branch in HCS < 75% — Value: 2 Name: 75% <= Opaque Cloud branch in HCS <= 100% — Value: 3
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name: False — Value: 0 Name: True — Value: 1

QF5_VIIRSCTHEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values (Name / Value)	Legend Entries (Name / Value)
Snow/Ice Fraction	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Snow/Ice Fraction < 25% : 0 25% <= Snow/Ice Fraction < 50% : 1 50% <= Snow/Ice Fraction < 75% : 2 75% <= Snow/Ice Fraction <= 100% : 3
Exclusion - Sunglint (Percent of pixels in sunglint in Horizontal Cell)	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Sunglint Fraction < 25% : 0 25% <= Sunglint Fraction < 50% : 1 50% <= Sunglint Fraction < 75% : 2 75% <= Sunglint Fraction <= 100% : 3
Day/Night Degradation Flag	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		Day (Solar Zenith Angle < 75 degrees) : 1 Night (Solar Zenith Angle >= 75 degrees) : 2 Transition (Terminator) : 3
Bad SDR Data (Quality of CTH degraded or CTH not obtained due to any bad SDR data in Horizontal cell)	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		Good : 0 Poor : 1 No Calibration : 2

QF6_VIIRSCTHEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values (Name / Value)	Legend Entries (Name / Value)
Surface Type - Sea Water (Ocean) Fractional Coverage within Horizontal Cell	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Sea Water Fraction < 25% : 0 25% <= Sea Water Fraction < 50% : 1 50% <= Sea Water Fraction < 75% : 2 75% <= Sea Water Fraction <= 100% : 3
Surface Type - Coastal Fractional Coverage within Horizontal Cell	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Coastal Fraction < 25% : 0 25% <= Coastal Fraction < 50% : 1 50% <= Coastal Fraction < 75% : 2 75% <= Coastal Fraction <= 100% : 3
spare	4	MIN_VAL	MAX_VAL	unitless	No		4 bit(s)		

Cloud Top Height Product Profile - Scale Factors

Fields

Name	Data Size	Dimensions
CTHFactors	4byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Granule	Yes	No	2	2

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		Datum											
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Scale = first array element; Offset = 2nd array element	0	MIN_VAL	MAX_VAL	Scale = unitless; Offset = km	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**

5.1.5.3 Cloud Top Height HDF5 Details

Figures 5.1.5.3-1, Cloud Top Height UML Diagram, provides the details on the content and datatypes of the Cloud Top Height EDR. These UML diagrams provide details at the product level only. In addition to these UML diagrams, refer to Figure 3.2-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

VIIRS-CTH-EDR
+LayerCloudTopHeight : H5T_NATIVE_USHORT +AverageCloudTopHeight : H5T_NATIVE_USHORT +QF1_VIIRSCTHLAYEREDR : H5T_NATIVE_UCHAR +QF2_VIIRSCTHLAYEREDR : H5T_NATIVE_UCHAR +QF3_VIIRSCTHAVGEDR : H5T_NATIVE_UCHAR +QF4_VIIRSCTHAVGEDR : H5T_NATIVE_UCHAR +QF5_VIIRSCTHEDR : H5T_NATIVE_UCHAR +QF6_VIIRSCTHEDR : H5T_NATIVE_UCHAR +CTHFactors : H5T_NATIVE_FLOAT

Figure: 5.1.5.3-1 Cloud Top Height UML Diagram

5.1.5.4 Cloud Top Height HDF5 Metadata Details

The HDF5 metadata elements associated with the Cloud Top Height EDR are listed in the JPSS Algorithm Specification Vol. II: Data Dictionary for the Common Algorithms. The Cloud Top Height EDR metadata includes all of the common metadata at the root, product, aggregation, and granule levels.

In addition to the common metadata items for this product, Table 5.1.5.4-1, Cloud Top Height Quality Summary Metadata Values, provides the following items as name/value pairs. The listed name/value pair items in the table are the granule level quality flags for the VIIRS Cloud Top Height EDR.

Table: 5.1.5.4-1 Cloud Top Height Quality Summary Metadata Values

N_Quality_Summary			
Name	Value	Description	Comments
Exclusion/Degradation Summary	0 - 100	Percent of cloudy pixels with one or more exclusion or degradation criteria flags	
Percent Converged Pixels	0 - 100	A ratio (expressed as a percent) of the number of converged vs. that of cloudy pixels for the entire granule.	

5.1.5.5 Cloud Top Height Geolocation Details

See Section 4.8, VIIRS Cloud Aggregated Geolocation

5.1.6 Cloud Top Pressure

Data Mnemonic	EDRE-VCTP-C0030 (Official) EDRE-VCTP-C0031 (Substitute)

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Description/ Purpose	The cloud top pressure is defined for each cloud-covered earth location as the set of atmospheric pressures at the tops of the cloud layers overlying the location. The reported pressures are horizontal spatial averages over a cell (i.e., a square region of the earth's surface). If a cloud layer does not extend over an entire cell, then that spatial average is limited to the portion of the cell that is covered by the layer. Cloud top pressure is not defined or reported for clear cells. The Cloud Top Pressure EDR is reported for up to four layers. The data is reported in units of mb. Sensors: VIIRS Effectivity: S-NPP/JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4 for details.
File Size	See Table: 5.1.6-1 Cloud Top Pressure Data Content Summary for size. This granule size includes Cloud Top Pressure 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	For each cell, the Cloud Top Pressure EDR contains: Layer cloud top pressure Average cloud top pressure* Quality Flags Scale/Offset Factors *Note: The Average Cloud Top Pressure Field is a simple average of the Cloud Top Pressures identified for each cell at each layer. The layers are vertically averaged to provide this field. Be aware that a cell in the Average Cloud Top Pressure field may contain data averaged from multiple layers widely separated in altitude and therefore very different in cloud top pressures. See Section 5.1.6.1 Cloud Top Pressure Data Content Summary See Section 5.1.6.2 Cloud Top Pressure Product Profile See Section 5.1.6.3 Cloud Top Pressure HDF5 Details See Section 5.1.6.4 Cloud Top Pressure HDF5 Metadata Details See Section 5.1.6.5 Cloud Top Pressure Geolocation Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

5.1.6.1 Cloud Top Pressure Data Content Summary

Table: 5.1.6-1 Cloud Top Pressure Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
LayerCloudTopPressure	Cloud Top Pressure - layered product (ordered from top of atmosphere to surface)	unsigned 16-bit integer	[N*96, 508, 4]	[96, 508, 4]	hPa
AverageCloudTopPressure	Cloud Top Pressure - Average of all layers	unsigned 16-bit integer	[N*96, 508]	[96, 508]	hPa
QF1_VIIRSCTPLAYEREDR	Layer CTP Quality Flags	unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCTPLAYEREDR		unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCTPAVGEDR	Quality Flags for AverageCloudTopPressure Field	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCTPAVGEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCTPEDR	Non-Cloud Quality Flags	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCTPEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
CTPFactors	Scale = first array element; Offset = 2nd array element	32-bit floating point	[N*2]	[2]	Scale = unitless; Offset = hPa
File Size	**1,072,904 Bytes**				

5.1.6.2 Cloud Top Pressure Product Profile

Table: 5.1.6.2-1 Cloud Top Pressure Product Profile

Cloud Top Pressure Product Profile

Fields

Name	Data Size	Dimensions
LayerCloudTopPressure	2byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Cloud Top Pressure - layered product (ordered from top of atmosphere to surface)	0	50.00	1050.00	hPa	Yes	CTPFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

										MISS_UINT16_FILL	65534
										ERR_UINT16_FILL	65531
										ELLIPSOID_UINT16_FILL	65530
										VDNE_UINT16_FILL	65529
										SOUB_UINT16_FILL	65528

AverageCloudTopPressure	2byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**								
		AlongTrack	Yes	No	96	96								
		CrossTrack	No	No	508	508								
		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 Top Pressure - Average of all layers	0	50.00	1050.00	hPa	Yes	CTPFactors	unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**
										NA_UINT16_FILL	65535		
										MISS_UINT16_FILL	65534		
										ERR_UINT16_FILL	65531		
										ELLIPSOID_UINT16_FILL	65530		
										VDNE_UINT16_FILL	65529		
										SOUB_UINT16_FILL	65528		

Cloud Top Pressure Product Profile - Quality Flags

Fields

Name	**Data Size**	**Dimensions**														
QF1_VIIRSCTPLAYEREDR	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		AlongTrack	Yes	No	96	96										
		CrossTrack	No	No	508	508										
		Layer	No	No	4	4										
		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 Confidence (Indicates cloudiness - percent cloudiness for this layer)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**		
												0% <= cloudiness < 25%	0		
												25% <= cloudiness < 50%	1		
												50% <= cloudiness < 75%	2		
												75% <= cloudiness <= 100%	3		
		Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**		
												0% <= Water Cloud Fraction < 25%	0		
												25% <= Water Cloud Fraction < 50%	1		
												50% <= Water Cloud Fraction < 75%	2		
												75% <= Water Cloud Fraction <= 100%	3		
		Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**		
												0% <= Multi-layer Cloud Fraction < 25%	0		
												25% <= Multi-layer Cloud Fraction < 50%	1		
												50% <= Multi-layer Cloud Fraction < 75%	2		
												75% <= Multi-layer Cloud Fraction <= 100%	3		
		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**		
												0% <= Mixed Phase Cloud Fraction < 25%	0		
												25% <= Mixed Phase Cloud Fraction < 50%	1		
												50% <= Mixed Phase Cloud Fraction < 75%	2		
												75% <= Mixed Phase Cloud Fraction	3		

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													<= 100%	

QF2_VIIRSCTPLAYEREDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0 <= % valid retrievals < 25%	0
										25 <= % valid retrievals < 50%	1
										50 <= % valid retrievals < 75%	2
										75 <= % valid retrievals <= 100%	3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Opaque (black) cloud branching	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Opaque Cloud branch in HCS < 25%	0
										25% <= Opaque Cloud branch in HCS < 50%	1
										50% <= Opaque Cloud branch in HCS < 75%	2
										75% <= Opaque Cloud branch in HCS <= 100%	3
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1

QF3_VIIRSCTPAVGEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

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 Confidence (Indicates cloudiness - percent cloudiness)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= cloudiness < 25%	0
										25% <= cloudiness < 50%	1
										50% <= cloudiness < 75%	2
										75% <= cloudiness <= 100%	3
Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Water Cloud Fraction < 25%	0
										25% <= Water Cloud Fraction < 50%	1
										50% <= Water Cloud Fraction < 75%	2
										75% <= Water Cloud Fraction <= 100%	3

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		Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value		
											0% <= Multi-layer Cloud Fraction < 25%	0		
											25% <= Multi-layer Cloud Fraction < 50%	1		
											50% <= Multi-layer Cloud Fraction < 75%	2		
											75% <= Multi-layer Cloud Fraction <= 100%	3		
		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value		
											0% <= Mixed Phase Cloud Fraction < 25%	0		
											25% <= Mixed Phase Cloud Fraction < 50%	1		
											50% <= Mixed Phase Cloud Fraction < 75%	2		
											75% <= Mixed Phase Cloud Fraction <= 100%	3		
QF4_VIIRSCTPAVGEDR	1byte(s)	Name / Granule Boundary / Dynamic / Min Array Size / Max Array Size												
		AlongTrack / Yes / No / 96 / 96												
		CrossTrack / No / No / 508 / 508												
		Datum												
		Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries			
		Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value		
											0 <= % valid retrievals < 25%	0		
											25 <= % valid retrievals < 50%	1		
											50 <= % valid retrievals < 75%	2		
											75 <= % valid retrievals <= 100%	3		
		Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name	Value		
											False	0		
											True	1		
		Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name	Value		
											False	0		
											True	1		
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name	Value		
											False	0		
											True	1		
		Opaque (black) cloud branching	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value		
											0% <= Opaque Cloud branch in HCS < 25%	0		
											25% <= Opaque Cloud branch in HCS < 50%	1		
											50% <= Opaque Cloud branch in HCS < 75%	2		
											75% <= Opaque Cloud branch in HCS <= 100%	3		
		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value	Name	Value		
											False	0		
											True	1		
QF5_VIIRSCTPEDR	1byte(s)	Name / Granule Boundary / Dynamic / Min Array Size / Max Array Size												
		AlongTrack / Yes / No / 96 / 96												
		CrossTrack / No / No / 508 / 508												

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values (Name / Value)	Legend Entries (Name / Value)
Snow/Ice Fraction	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Snow/Ice Fraction < 25% : 0 25% <= Snow/Ice Fraction < 50% : 1 50% <= Snow/Ice Fraction < 75% : 2 75% <= Snow/Ice Fraction <= 100% : 3
Exclusion - Sunglint (Percent of pixels in sunglint in Horizontal Cell)	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Sunglint Fraction < 25% : 0 25% <= Sunglint Fraction < 50% : 1 50% <= Sunglint Fraction < 75% : 2 75% <= Sunglint Fraction <= 100% : 3
Day/Night Degradation Flag	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		Day (Solar Zenith Angle < 75 degrees) : 1 Night (Solar Zenith Angle >= 75 degrees) : 2 Transition (Terminator) : 3
Bad SDR Data (Quality of CTP degraded or CTP not obtained due to any bad SDR data in Horizontal cell)	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		Good : 0 Poor : 1 No Calibration : 2

QF6_VIIRSCTPEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values (Name / Value)	Legend Entries (Name / Value)
Surface Type - Sea Water (Ocean) Fractional Coverage within Horizontal Cell	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Sea Water Fraction < 25% : 0 25% <= Sea Water Fraction < 50% : 1 50% <= Sea Water Fraction < 75% : 2 75% <= Sea Water Fraction <= 100% : 3
Surface Type - Coastal Fractional Coverage within Horizontal Cell	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)		0% <= Coastal Fraction < 25% : 0 25% <= Coastal Fraction < 50% : 1 50% <= Coastal Fraction < 75% : 2 75% <= Coastal Fraction <= 100% : 3
spare	4	MIN_VAL	MAX_VAL	unitless	No		4 bit(s)		

Cloud Top Pressure Product Profile - Scale Factors

Fields

Name	Data Size	Dimensions
CTPFactors	4byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Granule	Yes	No	2	2

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

		Datum										
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Scale = first array element; Offset = 2nd array element	0	MIN_VAL	MAX_VAL	Scale = unitless; Offset = hPa	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**

5.1.6.3 Cloud Top Pressure HDF5 Details

Figures 5.1.6.3-1, Cloud Top Pressure UML Diagram, provides the details on the content and datatypes of the Cloud Top Pressure EDR. These UML diagrams provide details at the product level only. In addition to these UML diagrams, refer to Figure 3.2-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

VIIRS-CTP-EDR
+LayerCloudTopPressure : H5T_NATIVE_USHORT +AverageCloudTopPressure : H5T_NATIVE_USHORT +QF1_VIIRSCTPLAYEREDR : H5T_NATIVE_UCHAR +QF2_VIIRSCTPLAYEREDR : H5T_NATIVE_UCHAR +QF3_VIIRSCTPAVGEDR : H5T_NATIVE_UCHAR +QF4_VIIRSCTPAVGEDR : H5T_NATIVE_UCHAR +QF5_VIIRSCTPEDR : H5T_NATIVE_UCHAR +QF6_VIIRSCTPEDR : H5T_NATIVE_UCHAR +CTPFactors : H5T_NATIVE_FLOAT

Figure: 5.1.6.3-1 Cloud Top Pressure UML Diagram

5.1.6.4 Cloud Top Pressure HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Cloud Top Pressure EDR are listed in the JPSS Algorithm Specification Vol. II: Data Dictionary for the Common Algorithms. The VIIRS Cloud Top Pressure EDR metadata includes all of the common metadata at the root, product, aggregation, and granule levels.

In addition to the common metadata items for this product, Table 5.1.6.4-1, Cloud Top Pressure Quality Summary Metadata Values, provides the following items as name/value pairs. The listed name/value pair items in the table are the granule level quality flags for the Cloud Top Pressure EDR.

Table: 5.1.6.4-1 Cloud Top Pressure Quality Summary Metadata Values

N_Quality_Summary			
Name	Value	Description	Comments
Exclusion/Degradation Summary	0 - 100	Percent of cloudy pixels with one or more exclusion or degradation criteria flags	
Percent Converged Pixels	0 - 100	A ratio (expressed as a percent) of the number of converged vs. that of cloudy pixels for the entire granule.	

5.1.6.5 Cloud Top Pressure Geolocation Details

See Section 4.8, VIIRS Cloud Aggregated Geolocation.

5.1.7 Cloud Top Temperature

Data Mnemonic	EDRE-VCTT-C0030 (Official) EDRE-VCTT-C0031 (Substitute)

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Description/ Purpose	The cloud top temperature is defined for each cloud-covered earth location as the set of atmospheric temperatures at the tops of the cloud layers overlying the location. The reported temperatures are horizontal spatial averages over a cell (i.e., a square region of the earth's surface). If a cloud layer does not extend over an entire cell, the spatial average is limited to the portion of the cell that is covered by the layer. Cloud top temperature is not defined or reported for clear cells. The Cloud Top Temperature EDR is reported for up to four layers. The reporting range is 180 to 310 Kelvin. This product is reported in Kelvin. Sensors: VIIRS Effectivity: S-NPP/JPSS
File-Naming Construct	See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4 for details.
File Size	See Table: 5.1.7.1-1 Cloud Top Temperature Data Content Summary for size. This granule size includes Cloud Top Temperature 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	For each cell, the Cloud Top Temperature EDR contains: Layer cloud top temperature Average cloud top temperature* Quality Flags Scale/Offset *Note: The Average Cloud Top Height Field is a simple average of the Cloud Top Temperatures identified for each cell at each layer. The layers are vertically averaged to provide this field. Be aware that a cell in the Average Cloud Top Temperature field may contain data averaged from multiple layers widely separated in altitude and therefore very different in cloud top temperatures. See Section 5.1.7.1 Cloud Top Temperature Data Content Summary See Section 5.1.7.2 Cloud Top Temperature Product Profile See Section 5.1.7.3 Cloud Top Temperature HDF5 Details See Section 5.1.7.4 Cloud Top Temperature HDF5 Metadata Details See Section 5.1.7.5 Cloud Top Temperature Geolocation Details

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

5.1.7.1 Cloud Top Temperature Data Content Summary

Table: 5.1.7.1-1 Cloud Top Temperature Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
LayerCloudTopTemperature	Cloud Top Temperature - layered product (ordered from top of atmosphere to surface)	unsigned 16-bit integer	[N*96, 508, 4]	[96, 508, 4]	Kelvin
AverageCloudTopTemperature	Cloud Top Temperature - Average of all layers	unsigned 16-bit integer	[N*96, 508]	[96, 508]	Kelvin
QF1_VIIRSCTTLAYEREDR	Layer CTT Quality Flags	unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCTTLAYEREDR		unsigned 8-bit char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCTTAVGEDR	Quality Flags for AverageCloudTopTemperature Field	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCTTAVGEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCTTEDR	Non-Cloud Quality Flags	unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCTTEDR		unsigned 8-bit char	[N*96, 508]	[96, 508]	unitless
CTTFactors	Scale = first array element; Offset = 2nd array element	32-bit floating point	[N*2]	[2]	Scale = unitless ; Offset = Kelvin
File Size	**1,072,904 Bytes**				

5.1.7.2 Cloud Top Temperature Product Profile

Table: 5.1.7.2-1 Cloud Top Temperature Product Profile

Cloud Top Temperature Product Profile

Fields						
Name	**Data Size**	**Dimensions**				
LayerCloudTopTemperature	2byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

AlongTrack	Yes	No	96	96	
CrossTrack	No	No	508	508	
Layer	No	No	4	4	

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 Top Temperature - layered product (ordered from top of atmosphere to surface)	0	180.00	343.00	Kelvin	Yes	CTTFactors	unsigned 16-bit integer	Name / Value: NA_UINT16_FILL 65535; MISS_UINT16_FILL 65534; ERR_UINT16_FILL 65531; ELLIPSOID_UINT16_FILL 65530; VDNE_UINT16_FILL 65529; SOUB_UINT16_FILL 65528	Name / Value:

AverageCloudTopTemperature 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

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 Top Temperature - Average of all layers	0	180.00	343.00	Kelvin	Yes	CTTFactors	unsigned 16-bit integer	Name / Value: NA_UINT16_FILL 65535; MISS_UINT16_FILL 65534; ERR_UINT16_FILL 65531; ELLIPSOID_UINT16_FILL 65530; VDNE_UINT16_FILL 65529; SOUB_UINT16_FILL 65528	Name / Value:

Cloud Top Temperature Product Profile - Quality Flags

Fields

Name	Data Size	Dimensions
QF1_VIIRSCTTLAYEREDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

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 Confidence (Indicates cloudiness - percent cloudiness for this layer)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value:	Name / Value: 0% <= cloudiness < 25% 0; 25% <= cloudiness < 50% 1; 50% <= cloudiness < 75% 2; 75% <= cloudiness <= 100% 3
Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value:	Name / Value: 0% <= Water Cloud Fraction < 25% 0; 25% <= Water Cloud Fraction < 50% 1; 50% <= Water Cloud Fraction < 75% 2; 75% <= Water Cloud Fraction <= 100% 3
Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name / Value:	Name / Value: 0% <= Multi-layer Cloud Fraction < 25% 0; 25% <= Multi-layer Cloud Fraction < 50% 1; 50% <= Multi-layer Cloud Fraction < 75% 2; 75% <= Multi-layer Cloud Fraction 3

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

												<= 100%
		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
											0% <= Mixed Phase Cloud Fraction < 25%	0
											25% <= Mixed Phase Cloud Fraction < 50%	1
											50% <= Mixed Phase Cloud Fraction < 75%	2
											75% <= Mixed Phase Cloud Fraction <= 100%	3

QF2_VIIRSCTTLAYEREDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508
Layer	No	No	4	4

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0 <= % valid retrievals < 25%	0
										25 <= % valid retrievals < 50%	1
										50 <= % valid retrievals < 75%	2
										75 <= % valid retrievals <= 100%	3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Opaque (black) cloud branching	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Opaque Cloud branch in HCS < 25%	0
										25% <= Opaque Cloud branch in HCS < 50%	1
										50% <= Opaque Cloud branch in HCS < 75%	2
										75% <= Opaque Cloud branch in HCS <= 100%	3
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1

QF3_VIIRSCTTAVGEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

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 Confidence (Indicates cloudiness - percent cloudiness)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= cloudiness < 25%	0
										25% <= cloudiness < 50%	1

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

												50% <= cloudiness < 75% | 2 75% <= cloudiness <= 100% | 3
		Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value		Name | Value 0% <= Water Cloud Fraction < 25% | 0 25% <= Water Cloud Fraction < 50% | 1 50% <= Water Cloud Fraction < 75% | 2 75% <= Water Cloud Fraction <= 100% | 3
		Cloud Fractional Coverage within Horizontal Cell - Multi-Layer Cloud	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value		Name | Value 0% <= Multi-layer Cloud Fraction < 25% | 0 25% <= Multi-layer Cloud Fraction < 50% | 1 50% <= Multi-layer Cloud Fraction < 75% | 2 75% <= Multi-layer Cloud Fraction <= 100% | 3
		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value		Name | Value 0% <= Mixed Phase Cloud Fraction < 25% | 0 25% <= Mixed Phase Cloud Fraction < 50% | 1 50% <= Mixed Phase Cloud Fraction < 75% | 2 75% <= Mixed Phase Cloud Fraction <= 100% | 3

QF4_VIIRSCTTAVGEDR | 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value	Name | Value 0 <= % valid retrievals < 25% | 0 25 <= % valid retrievals < 50% | 1 50 <= % valid retrievals < 75% | 2 75 <= % valid retrievals <= 100% | 3
Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name | Value	Name | Value False | 0 True | 1
Convergent Pixels - More than 50% of pixels in Horizontal Cell are convergent (This flag indicates that one of the upstream algorithms did converge (COP or CTP) for those cloud EDRs whose algorithms do converge).	3	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name | Value	Name | Value False | 0 True | 1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name | Value	Name | Value False | 0 True | 1
Opaque (black) cloud branching	5	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name | Value	Name | Value 0% <= Opaque Cloud branch in HCS < 25% | 0 25% <= Opaque Cloud branch in HCS < 50% | 1 50% <= Opaque Cloud branch in HCS < 75% | 2

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

													75% <= Opaque Cloud branch in HCS <= 100%	3
		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7	MIN_VAL	MAX_VAL	unitless	No		1 bit(s)	Name Value		Name	Value	
												False	0	
												True	1	

QF5_VIIRSCTTEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries	
Snow/Ice Fraction	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
									0% <= Snow/Ice Fraction < 25%	0
									25% <= Snow/Ice Fraction < 50%	1
									50% <= Snow/Ice Fraction < 75%	2
									75% <= Snow/Ice Fraction <= 100%	3
Exclusion - Sunglint (Percent of pixels in sunglint in Horizontal Cell)	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
									0% <= Sunglint Fraction < 25%	0
									25% <= Sunglint Fraction < 50%	1
									50% <= Sunglint Fraction < 75%	2
									75% <= Sunglint Fraction <= 100%	3
Day/Night Degradation Flag	4	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
									Day (Solar Zenith Angle < 75 degrees)	1
									Night (Solar Zenith Angle >= 75 degrees)	2
									Transition (Terminator)	3
Bad SDR Data (Quality of CTT degraded or CTT not obtained due to any bad SDR data in Horizontal cell)	6	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
									Good	0
									Poor	1
									No Calibration	2

QF6_VIIRSCTTEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	508	508

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries	
Surface Type - Sea Water (Ocean) Fractional Coverage within Horizontal Cell	0	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
									0% <= Sea Water Fraction < 25%	0
									25% <= Sea Water Fraction < 50%	1
									50% <= Sea Water Fraction < 75%	2
									75% <= Sea Water Fraction <= 100%	3
Surface Type - Coastal Fractional Coverage within Horizontal Cell	2	MIN_VAL	MAX_VAL	unitless	No		2 bit(s)	Name Value	Name	Value
									0% <= Coastal Fraction < 25%	0
									25% <= Coastal Fraction < 50%	1
									50% <= Coastal Fraction < 75%	2
									75% <= Coastal Fraction <= 100%	3

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		spare	4	MIN_VAL	MAX_VAL	unitless	No		4 bit(s)	Name Value	Name Value		

Cloud Top Temperature Product Profile - Scale Factors

Fields

Name	Data Size	Dimensions
CTTFactors	4byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Granule	Yes	No	2	2

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Scale = first array element; Offset = 2nd array element	0	MIN_VAL	MAX_VAL	Scale = unitless; Offset = Kelvin	No		32-bit floating point	Name Value	Name Value

5.1.7.3 Cloud Top Temperature HDF5 Details

Figures 5.1.7.3-1, Cloud Top Temperature UML Diagram, provides the details on the content and datatypes of the Cloud Top Temperature 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-CTT-EDR
+LayerCloudTopTemperature : H5T_NATIVE_USHORT +AverageCloudTopTemperature : H5T_NATIVE_USHORT +QF1_VIIRSCTTLAYEREDR : H5T_NATIVE_UCHAR +QF2_VIIRSCTTLAYEREDR : H5T_NATIVE_UCHAR +QF3_VIIRSCTTAVGEDR : H5T_NATIVE_UCHAR +QF4_VIIRSCTTAVGEDR : H5T_NATIVE_UCHAR +QF5_VIIRSCTTEDR : H5T_NATIVE_UCHAR +QF6_VIIRSCTTEDR : H5T_NATIVE_UCHAR +CTTFactors : H5T_NATIVE_FLOAT

Figure: 5.1.7.3-1 Cloud Top Temperature UML Diagram

5.1.7.4 Cloud Top Temperature HDF5 Metadata Details

The HDF5 metadata elements associated with the Cloud Top Temperature EDR are listed in the JPSS Algorithm Specification Vol. II: Data Dictionary for the Common Algorithms. The Cloud Top Temperature EDR metadata includes all of the common metadata at the root, product, aggregation, and granule levels.

In addition to the common metadata items for this product, Table 5.1.7.4-1, Cloud Top Temperature Quality Summary Metadata Values, provides the following items as name/value pairs. The listed name/value pair items in the table are the granule level quality flags for the Cloud Top Temperature EDR.

Table: 5.1.7.4-1 Cloud Top Temperature Quality Summary Metadata Values

N_Quality_Summary			
Name	Value	Description	Comments
Exclusion/Degradation Summary	0 - 100	Percent of cloudy pixels with one or more exclusion or degradation criteria flags	
Percent Converged Pixels	0 - 100	A ratio (expressed as a percent) of the number of converged vs. that of cloudy pixels for the entire granule.	

5.1.7.5 Cloud Top Temperature Geolocation Details

See Section 4.8, VIIRS Cloud Aggregated Geolocation.

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

6 Cloud Physical Properties 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 CTP COT LUT

Data Mnemonic	NP_NU-LM0040-004
Description/ Purpose	The VIIRS Cloud Top Parameters (CTP) COT LUT file contains factors for the conversion of COT at 0.55 microns to 10.763 microns. This file is used in the VIIRS CTP algorithm.
File-Naming	See the File-Naming Convention for Auxiliary Data Formats, JPSS CDFCB-X Vol.

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Construct	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, for the applicable Collection Short Names. Version Number Field provides Provenance Version Identifier.
File Size	See Table: 7.1.1-1 VIIRS CTP COT LUT Data Format for size.
File Format Type	Little Endian Binary
Production Frequency	As needed
Data Content and Data Format	For details see Table 7.1.1-1, VIIRS CTP COT LUT Data Format.

Table: 7.1.1-1 VIIRS CTP COT LUT Data Format

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
data	31208	32-bit floating point	MIN_VAL – MAX_VAL	unitless	2 Dimensional Array: COT_ROWS x COT_COLS Size of Dimension(s): 3901 x 2
File Size	**31,208 Bytes**				

7.1.2 VIIRS CTP MSC LUT

Data Mnemonic	NP_NU-LM0040-005
Description/ Purpose	The VIIRS CTP Multiple Scattering Correction (MSC) file contains regression coefficients for multiple scattering corrections. This file is used by the VIIRS CTP algorithm.
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, for the applicable Collection Short Names. Version Number Field provides Provenance Version Identifier.
File Size	See Table: 7.1.2-1 VIIRS CTP MSC LUT Data Format for size.
File Format Type	Little Endian Binary
Production Frequency	As needed
Data Content and Data Format	For details see Table 7.1.2-1, VIIRS CTP MSC LUT Data Format.

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Table: 7.1.2-1 VIIRS CTP MSC LUT Data Format

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
grid_ndims	4	32-bit integer	3	unitless	Number of input dimensions. That is, the data vectors are specified on a grid in 'grid_ndims'-dimensional space
data_ndims	4	32-bit integer	4	unitless	Dimension of data values. Data variables are vectors with 'data_ndims' elements
ntics	12	32-bit integer	MIN_VAL – MAX_VAL	unitless	Number of 'tic marks' for each dimension. 'tic marks' are essentially the grid coordinates. The value in ntics[i] is the number of grid coordinates for dimension number 'i' 1 Dimensional Array: GRID_NDIMS Size of Dimension(s): 3
factor	12	32-bit integer	MIN_VAL – MAX_VAL	unitless	Factors for indexing values 1 Dimensional Array: GRID_NDIMS Size of Dimension(s): 3
tic_min	12	32-bit floating point	MIN_VAL – MAX_VAL	unitless	Min tic value used for interpolation 1 Dimensional Array: GRID_NDIMS Size of Dimension(s): 3
tic_max	12	32-bit floating point	MIN_VAL – MAX_VAL	unitless	Max tic value used for interpolation 1 Dimensional Array: GRID_NDIMS Size of Dimension(s): 3
tic	132	32-bit floating point	MIN_VAL – MAX_VAL	unitless	Tic mark (grid coordinate) table. The value in tic[i][j] is the 'j'th grid coordinate for dimension 'i' 2 Dimensional Array: GRID_NDIMS x NUM_TIC Size of Dimension(s): 3 x 11
data	4224	32-bit floating point	MIN_VAL – MAX_VAL	unitless	Regression coefficients for multiple scattering correction 2 Dimensional Array: DATA_NDIMS x NUM_DATA Size of Dimension(s): 4 x 264
File Size	**4,412 Bytes**				

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

7.1.3 VIIRS CTP OSS OD LUT

Data Mnemonic	NP_NU-LM0040-006
Description/ Purpose	The VIIRS CTP OSS OD LUT file contains the OSS forward model input parameters. This file is used in the VIIRS Cloud Top Pressure (CTP) algorithm.
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, for the applicable Collection Short Names. Version Number Field provides Provenance Version Identifier.
File Size	See Table: 7.1.3-1 VIIRS CTP OSS OD LUT Data Format for size.
File Format Type	Little Endian Binary
Production Frequency	As needed
Data Content and Data Format	For details see Table 7.1.3-1, VIIRS CTP OSS OD LUT Data Format.

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Table: 7.1.3-1 VIIRS CTP OSS OD LUT Data Format

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
NmolFix	2	16-bit integer	MIN_VAL – MAX_VAL	unitless	
Nmol	2	16-bit integer	MIN_VAL – MAX_VAL	unitless	
MolIDFix	24	16-bit integer	MIN_VAL – MAX_VAL	unitless	1 Dimensional Array: NUM_MOLIDFIX Size of Dimension(s): 12
MolID	2	16-bit integer	MIN_VAL – MAX_VAL	unitless	1 Dimensional Array: NUM_MOLID Size of Dimension(s): 1
Spare	2	16-bit integer	MIN_VAL – MAX_VAL	unitless	
NLayOD	4	32-bit integer	MIN_VAL – MAX_VAL	unitless	
NTmpOD	4	32-bit integer	MIN_VAL – MAX_VAL	unitless	
pref	96	32-bit floating point	MIN_VAL – MAX_VAL	unitless	1 Dimensional Array: NUM_PREF Size of Dimension(s): 24
tmptab	920	32-bit floating point	MIN_VAL – MAX_VAL	unitless	2 Dimensional Array: TMPTAB_ROWS x TMPTAB_COLS Size of Dimension(s): 23 x 10
wvptab	276	32-bit floating point	MIN_VAL – MAX_VAL	unitless	2 Dimensional Array: WVPTAB_ROWS x WVPTAB_COLS Size of Dimension(s): 23 x 3
padFloat	4	32-bit floating point	MIN_VAL – MAX_VAL	unitless	Pad
vFreq	48	64-bit floating point	MIN_VAL – MAX_VAL	unitless	1 Dimensional Array: NUM_VFREQ Size of Dimension(s): 6
NmolS_tmp	2	16-bit integer	MIN_VAL – MAX_VAL	unitless	

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
ImolS_tmp	2	16-bit integer	MIN_VAL – MAX_VAL	unitless	1 Dimensional Array: NUM_IMOLS Size of Dimension(s): 1
Padshort	4	16-bit integer	MIN_VAL – MAX_VAL	unitless	Spare 1 Dimensional Array: Size of Dimension(s): 2
kfix	5520	32-bit floating point	MIN_VAL – MAX_VAL	unitless	2 Dimensional Array: KFIX_ROWS x KFIX_COLS Size of Dimension(s): 6 x 230
dkh2o	5520	32-bit floating point	MIN_VAL – MAX_VAL	unitless	2 Dimensional Array: DKH2O_ROWS x DKH2O_COLS
kh2o	5520	32-bit floating point	MIN_VAL – MAX_VAL	unitless	2 Dimensional Array: KH2O_ROWS x KH2O COLS Size of Dimension(s): 6 x 230
File Size	**17,952 Bytes**				

7.1.4 VIIRS CTP OSS SEL LUT

Data Mnemonic	NP_NU-LM0040-007
	The VIIRS OSS SEL LUT file contains the OSS SEL regression coefficients. This file is used in the VIIRS CTP algorithm.
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, for the applicable Collection Short Names. Version Number Field provides Provenance Version Identifier.
File Size	See Table: 7.1.4-1 VIIRS CTP OSS SEL LUT Data Format for size.
File Format Type	Little Endian Binary
Production Frequency	As needed
Data Content and Data Format	For details see Table 7.1.4-1, VIIRS CTP OSS SEL LUT Data Format.

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Table: 7.1.4-1 VIIRS CTP OSS SEL LUT Data Format

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
nchan	4	32-bit integer	MIN_VAL – MAX_VAL	unitless	
nf_sel	4	32-bit integer	MIN_VAL – MAX_VAL	unitless	
nchmax	4	32-bit integer	MIN_VAL – MAX_VAL	unitless	
cFreq	4	32-bit floating point	MIN_VAL – MAX_VAL	unitless	1 Dimensional Array: NUM_CFREQ Size of Dimension(s): 1
nch	12	16-bit integer	MIN_VAL – MAX_VAL	unitless	1 Dimensional Array: NUM_NCH Size of Dimension(s): 6
coef	24	32-bit floating point	MIN_VAL – MAX_VAL	unitless	1 Dimensional Array: COEF_ROWS x COEF_COLS Size of Dimension(s): 6 x 1
ichmap	24	32-bit integer	MIN_VAL – MAX_VAL	unitless	1 Dimensional Array: ICH_ROWS x ICH_COLS Size of Dimension(s): 6 x 1
File Size	**76 Bytes**				

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 Physical Property Automated PCs

VIIRS Cloud Physical Properties product generation 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 Physical Properties Initialization PCs

7.2.2.1.1 VIIRS CBH Liquid Water Content PC

Data Mnemonic	NP_NU-LM0233-001
Description/ Purpose	The VIIRS Cloud Base Height (CBH) Liquid Water Content (LWC) PCT file contains the cloud Liquid Water Content values. This file contains a single fixed LWC value for each cloud type (cirrus, stratus, etc.). This file is used in the VIIRS CBH algorithm.
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, for the applicable Collection Short Names.
File Size	See Table: 7.2.2.1.1-1 VIIRS CBH LWC PC Data Format for size.
File Format Type	Little Endian Binary
Production Frequency	As needed
Data Content and Data Format	For details see Table 7.2.2.1.1-1 VIIRS CBH LWC PC Data Format

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Table: 7.2.2.1.1-1 VIIRS CBH LWC PC Data Format

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
lwc	48	64-bit floating point	0.000: no cloud 0.293: stratus 0.455: altocumulus - altostratus 0.580: cumulus 0.010: cirrus 0.010: cirrocumulus	g/m3	1 Dimensional Array: cloudType Size of Dimension(s): 6
File Size	**48 Bytes**				

7.2.2.1.2 VIIRS CCL Cloud Type PC

Data Mnemonic	NP_NU-LM0233-002
Description/ Purpose	The VIIRS CCL Cloud Type PCT file contains the attribute values of cloud types. These values are derived from standard meteorological definitions. This file is used in the VIIRS Cloud Cover/Layers (CCL) algorithm.
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, for the applicable Collection Short Names.
File Size	See Table: 7.2.2.1.2-1 VIIRS CCL Cloud Type PC Data Format for size.
File Format Type	Little Endian Binary
Production Frequency	As needed
Data Content and Data Format	For details see Table 7.2.2.1.2-1, VIIRS CCL Cloud Type PC Data Format

Table: 7.2.2.1.2-1 VIIRS CCL Cloud Type PC Data Format

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
height	20	32-bit floating point	stratus = 1.3 altocumulus = 3.5 cumulus = 3.3 cirrus = 9.0 cirrocumulus = 10.5	Kilometers	Mean Cloud Top Height 1 Dimensional Array: height Size of Dimension(s): 5
size	20	32-bit floating point	stratus = 13.5 altocumulus = 17.0 cumulus = 27.5 cirrus = 55.0 cirrocumulus = 75.0	Micrometers	Mean Cloud Effective Particle Size 1 Dimensional Array: size Size of Dimension(s): 5

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
op_thick	20	32-bit floating point	stratus = 5.5 altocumulus = 17.0 cumulus = 26.5 cirrus = 2.5 cirrocumulus = 4.5	unitless	Mean Cloud Optical Thickness 1 Dimensional Array: op_thick Size of Dimension(s): 5
File Size	**60 Bytes**				

7.2.2.1.3 VIIRS CCL/GCE Cloud Aggregation PC

Data Mnemonic	NP_NU-LM0233-005
Description/ Purpose	The VIIRS CCL/GCE Cloud Aggregation PCT file contains the data that identifies the cell sizes appropriate for the CCL data products (both the clustering cells and the aggregation cells). This file is used in the VIIRS CCL and GCE algorithms
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, for the applicable Collection Short Names.
File Size	See Table: 7.2.2.1.3-1 VIIRS CCL/GCE Cloud Aggregation PC Data Format for size.
File Format Type	Little Endian Binary
Production Frequency	As needed
Data Content and Data Format	For details see Table 7.2.2.1.3-1, VIIRS CCL/GCE Cloud Aggregation PC Data Format

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Table: 7.2.2.1.3-1 VIIRS CCL/GCE Cloud Aggregation PC Data Format

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
numAtCellsPerScan	4	32-bit integer	0-MAX_VAL	unitless	Number of along-track (rows) horizontal cells per scan
numXtCellsPerScan	4	32-bit integer	0-MAX_VAL	unitless	Number of cross-track (columns) horizontal cells per
numAtPixPerScan	4	32-bit integer	0-MAX_VAL	unitless	Number of along-track (rows) pixels per scan
numXtPixPerScan	4	32-bit integer	0-MAX_VAL	unitless	Number of cross-track (columns) pixels per scan
crow	575520	32-bit integer	0-MAX_VAL	unitless	Cell row index 1 Dimensional Array: VIIRS_AGGTBL_ENTRIES Size of Dimension(s): 143,880
ccol	575520	32-bit integer	0-MAX_VAL	unitless	Cell column index 1 Dimensional Array: VIIRS_AGGTBL_ENTRIES Size of Dimension(s): 143,880
scan	575520	32-bit integer	0-MAX_VAL	unitless	Scan index 1 Dimensional Array: VIIRS_AGGTBL_ENTRIES Size of Dimension(s): 143,880
row	575520	32-bit integer	0-MAX_VAL	unitless	Pixel row index 1 Dimensional Array: VIIRS_AGGTBL_ENTRIES Size of Dimension(s): 143,880
col	155056	32-bit integer	0-MAX_VAL	unitless	Pixel column index

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
					1 Dimensional Array: VIIRS_AGGTBL_ENTRIES Size of Dimension(s): 38,764
type	575520	32-bit integer	1 = CLUSTER_CELL 2 = PRODUCT_CELL 3 = PRODUCT_AND_CLUSTER CELL	unitless	Cell type 1 Dimensional Array: VIIRS_AGGTBL_ENTRIES Size of Dimension(s): 143,880
File Size	**3,453,136 Bytes**				

7.2.2.2 VIIRS Cloud Physical Properties Ephemeral PCTs

7.2.2.2.1 VIIRS CBH Ephemeral PC

Data Mnemonic	DP_NU-LM2020-012
Description/ Purpose	The VIIRS Cloud Base Height (CBH) 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: 7.2.2.2.1-1 VIIRS CBH Ephemeral PC
File Format Type	Little Endian Binary
Production Frequency	As needed
Data Content and Data Format	For details see Table 7.2.2.2.1-1, VIIRS CBH Ephemeral PC Data Format

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Table: 7.2.2.2.1-1 VIIRS CBH Ephemeral PC

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
minCbh	4	32-bit floating point	Initially set to 0.0	km	Cloud base height min
maxCbh	4	32-bit floating point	Initially set to 20.0	km	Cloud base height max
c0	4	32-bit floating point	Initially set to -0.006656	m^2/g	Ice Water Path (IWP) contents in equation IWP = Cot/[c_0 + (c_1 /2reff)]
c1	4	32-bit floating point	Initially set to 3.686	m^2 Micrometers/g	Ice Water Path (IWP) contents in equation IWP = Cot/[c_0 + (c_1 /2reff)]
c2	4	32-bit floating point	Initially set to 20.0	Celsius	Ice Water Concentration Constant
c3	4	32-bit floating point	Initially set to 2.455	Unitless	Ice Water Concentration Constant
c4	4	32-bit floating point	Initially set to -0.2443	Unitless	Ice Water Concentration Constant
c5	4	32-bit floating point	Initially set to 0.001	Unitless	Ice Water Concentration Constant
c6	4	32-bit floating point	Initially set to -7.6	Unitless	Ice Water Concentration Constant
c7	4	32-bit floating point	Initially set to 4.0	Unitless	Ice Water Concentration Constant
d0	4	32-bit floating point	Initially set to 2.0	gm/m^2	Liquid Water Concentration Constant
d3	4	32-bit floating point	Initially set to 3.0	Micrometers	Liquid Water Concentration Constant
minCtt	4	32-bit floating point	Initially set to -60.0	Celcius	Cloud Top Temperature Minimum
maxCtt	4	32-bit floating point	Initially set to -20.0	Celcius	Cloud Top Temperature Maximum
File Size	**56 Bytes**				

7.2.2.2.2 VIIRS CCL Ephemeral PC

Data Mnemonic	DP_NU-LM2020-013
Description/ Purpose	The VIIRS Cloud Cover/Layer (CCL) 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: 7.2.2.2.2-1 VIIRS CCL Ephemeral PC for size
File Format Type	Little Endian Binary
Production Frequency	As needed
Data Content and Data Format	For details see Table 7.2.2.2.2-1, VIIRS CCL Ephemeral PC Data Format

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Table: 7.2.2.2.2-1 VIIRS CCL Ephemeral PC

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
wgtCth	4	32-bit floating point	Initially set to 0.5	km	K-Means algorithm cluster assignment weight for cloud top height
wgtCot	4	32-bit floating point	Initially set to 0.0	Unitless	K-Means algorithm cluster assignment weight for cloud optical thickness
wgtEps	4	32-bit floating point	Initially set to 0.2	Micrometers	K-Means algorithm cluster assignment weight for cloud top height
wgtPhase	4	32-bit floating point	Initially set to 2.0	Unitless	K-Means algorithm cluster assignment weight for cloud top height
EkmCthThresh1	4	32-bit floating point	Initially set to 0.75	Unitless	Ekm_first_guess() threshold on CTH for not splitting layers
EkmCthThresh2	4	32-bit floating point	Initially set to 1.6	Unitless	Ekm_first_guess() threshold on CTH for not splitting layers
EkmCthThresh3	4	32-bit floating point	Initially set to 1.6	Unitless	Ekm_first_guess() threshold on CTH for not splitting layers
Cluster_Flag_Threshold	4	32-bit floating point	Initially set to 0.75	percent	Percentage of cloudy product pixels
CTH_LOW_THRESH	4	32-bit floating point	Initially set to 2.5	Unitless	Mbkm_first_guess() lower CTH threshold
CTH_MID_THRESH	4	32-bit floating point	Initially set to 5.0	Unitless	Mbkm_first_guess() middle CTH threshold
CTH_HIGH_THRESH	4	32-bit floating point	Initially set to 7.5	Unitless	Mbkm_first_guess() high CTH threshold
PHASE_WATER	4	32-bit floating point	Initially set to 0.0	Unitless	Water cloud
PHASE_MIXED	4	32-bit floating point	Initially set to 0.5	Unitless	Water and ice cloud
PHASE_ICE	4	32-bit floating point	Initially set to 1.0	Unitless	Ice cloud
gracefulDegradationMode	1	unsigned 8-bit char	Initially set to 0	Unitless	Switch for handling missing pixel data
kmeansAlgorithm	1	unsigned 8-bit char	Initially set to 0	Unitless	Switch to select the first guess algorithm for layer analysis
kmeansMaxIter	1	unsigned 8-bit char	Initially set to 3	Unitless	Maximum number of iterations
clusterConvergCrit	1	unsigned 8-bit char	Initially set to 14	Unitless	Convergence criteria = number of pixel reassignments

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
File Size	**60 Bytes**				

7.2.2.2.3 VIIRS Cloud Top Parameters (CTP) Ephemeral PC

Data Mnemonic	DP_NU-LM2020-016
Description/ Purpose	The VIIRS Cloud Top Parameters (CTP) 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: 7.2.2.2.3-1 VIIRS CTP Ephemeral PC for size.
File Format Type	Little Endian Binary
Production Frequency	As needed
Data Content and Data Format	For details see Table 7.2.2.2.3-1, VIIRS CTP Ephemeral PC Data Format

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Table: 7.2.2.2.3-1 VIIRS CTP Ephemeral PC

Field Name	Length (Bytes)	Data Type	Values (Initial)	Units	Comments
dayThresh	4	32-bit floating point	Initially set to 1.39626	radians	Day/Night solar zenith angle threshold
pw0	4	32-bit floating point	Initially set to 0.067	unitless	Precipitable Water regression coefficient
pw1	4	32-bit floating point	Initially set to -0.002	unitless	Precipitable Water regression coefficient
pw2	4	32-bit floating point	Initially set to 0.22	unitless	Precipitable Water regression coefficient
pw3	4	32-bit floating point	Initially set to 0.105	unitless	Precipitable Water regression coefficient
maxCth	4	32-bit floating point	Initially set to 20	Kilometers	Maximum height for CTH
minCth	4	32-bit floating point	Initially set to 0	Kilometers	Minimum height for CTH
maxCtp	4	32-bit floating point	Initially set to 1050	hPa	Maximum pressure for CTP
minCtp	4	32-bit floating point	Initially set to 50	hPa	Minimum pressure for CTP
maxCtt	4	32-bit floating point	Initially set to 310	Kelvin	Maximum temperature for CTT
minCtt	4	32-bit floating point	Initially set to 180	Kelvin	Minimum temperature for CTT
padding	4	Unsigned 8-char	Set to 0	unitless	1 Dimensional Array: Size of Dimension(s): 4
numAggAt	8	64-bit integer	Initially set to 8	unitless	Number of pixels along track in analysis block
numAggXt	8	64-bit integer	Initially set to 8	unitless	Number of pixels along scan in analysis block
maxIterRt	8	64-bit integer	Initially set to 10	unitless	Maximum number of allowed iteration of daywater CTP retrieval
chiSqFit	4	32-bit floating point	Initially set to 1	unitless	Chi-square requirement for convergence
blkCloudCot	4	32-bit floating point	Initially set to 200	unitless	Default COT for black clouds in WindowIR retrieval

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Field Name	Length (Bytes)	Data Type	Values (Initial)	Units	Comments
blkCloudEps	4	32-bit floating point	Initially set to 10	unitless	Default EPS for black clouds in WindowIR retrieval
thkCot1	4	32-bit floating point	Initially set to 1	unitless	COT threshold for cloud thickness table
thkCot2	4	32-bit floating point	Initially set to 3	unitless	COT threshold for cloud thickness table
thkCtp1	4	32-bit floating point	Initially set to 600	hPa	CTP threshold for cloud thickness table
thkCtp2	4	32-bit floating point	Initially set to 800	hPa	CTP threshold for cloud thickness table
cldThick	36	32-bit floating point	Initially set to [0][0] = 200 [0][1] = 100 [0][2] = 50 [1][0] = 150 [1][1] = 75 [1][2] = 38 [2][0] = 100 [2][1] = 50 [2][2] = 25	unitless	Cloud thickness as a function of COT and CTP as specified by thkCot1, thkCot2, thkCtp1, and thkCtp2 2 Dimensional Array: Size of Dimension(s): 3 x 3
maxVertTemp	4	32-bit floating point	Initially set to 325	Kelvin	Maximum vertical temperature
minVertTemp	4	32-bit floating point	Initially set to 180	Kelvin	Minimum vertical temperature
maxVertWaterVap	4	32-bit floating point	Initially set to 10	g/kg	Maximum vertical water vapor
minVertWaterVap	4	32-bit floating point	Initially set to 9.9999997e-10	g/kg	Minimum vertical water vapor
minTempProf	4	32-bit floating point	Initially set to 100	Kelvin	Minimum valid temperature profile value
padding1	4	Unsigned 8-bit integer	Set to 0	unitless	Size of Dimension(s): 4
File Size	**160 Bytes**				

7.2.2.2.4 Generate Cloud EDR (GCE) Ephemeral PC

Data Mnemonic	DP_NU-LM2020-017
Description/ Purpose	The VIIRS Generate Cloud EDR (GCE) 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: 7.2.2.2.4-1 VIIRS GCE Ephemeral PC for size.
File Format Type	Little Endian Binary
Production Frequency	As needed
Data Content and Data Format	For details see Table 7.2.2.2.4-1, VIIRS GCE Ephemeral PC Data Format

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Table: 7.2.2.2.4-1 VIIRS GCE Ephemeral PC

Field Name	Length (Bytes)	Data Type	Range of Values	Units	Comments
qf_cot_sza_threshold	4	32-bit floating point	0 - 1	Unitless	Cloud Optical Thickness solar zenith angle
c1	4	32-bit floating point	0 - 1	Unitless	Height_conversion constant
c2	4	32-bit floating point	0 - 1	Unitless	Height_conversion constant
c3	4	32-bit floating point	0 - 1	Unitless	Height_conversion constant
File Size	**16 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.

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Appendix B. DQTT Quality Flag Mapping

The following table maps the quality flags by sensor and product that are reportable to the associated data product quality flag Test ID used in the processing environment.

Table: B-1 DQTT Quality Flag Mapping

Algorithm	Product	Test ID	Quality Flag
Cloud Products	VIIRS-CBH-EDR	4700	Granule level Quality Flag
Cloud Products	VIIRS-CBH-EDR	4701	Exclusion/Degradation Summary
Cloud Products	VIIRS-CCL-EDR	4800	Granule level Quality Flag
Cloud Products	VIIRS-CCL-EDR	4801	Exclusion/Degradation Summary
Cloud Products	VIIRS-CEPS-EDR	4900	Granule level Quality Flag
Cloud Products	VIIRS-CEPS-EDR	4901	Exclusion/Degradation Summary
Cloud Products	VIIRS-COT-EDR	5000	Granule level Quality Flag
Cloud Products	VIIRS-COT-EDR	5001	Exclusion/Degradation Summary
Cloud Products	VIIRS-CTH-EDR	5100	Granule level Quality Flag
Cloud Products	VIIRS-CTH-EDR	5101	Exclusion/Degradation Summary
Cloud Products	VIIRS-CTP-EDR	5200	Granule level Quality Flag
Cloud Products	VIIRS-CTP-EDR	5201	Exclusion/Degradation Summary
Cloud Products	VIIRS-CTT-EDR	5300	Granule level Quality Flag
Cloud Products	VIIRS-CTT-EDR	5301	Exclusion/Degradation Summary

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

Appendix C. Abbreviations and Acronyms

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

Attachment A. XML Formats for Related Products

Table: ATT-1 XML Formats for Related Products

File Number	XML Filename
1	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-CBH-EDR-PP.xml
2	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-CCL-EDR-PP.xml
3	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-CEPS-EDR-PP.xml
4	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-COT-EDR-PP.xml
5	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-CTH-EDR-PP.xml
6	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-CTP-IP-PP.xml
7	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-CTT-EDR-PP.xml
8	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-Cd-Cov-Type-IP-PP.xml
9	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-Cd-Layer-Type-IP-PP.xml
10	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-CB-Ht-IP-PP.xml
11	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-Cd-Top-Parm-IP-PP.xml
12	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-Parx-Corr-CM-IP-PP.xml
13	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-Parx-Corr-Cd-Opt-Prop-IP-PP.xml
14	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-Parx-Corr-Cd-Top-Parm-IP-PP.xml
15	474-00448-02-16_JPSS-CPP-DD-Part-16_0200C_VIIRS-CLD-AGG-GEO-PP.xml

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.