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JPSS Common Data Format Control Book – External Volume IV Part 2 - Imagery, Atmospheric, and Cloud EDRs

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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.

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Change History Log

Revision	Effective Date	Description of Changes (Reference the CCR & CCB/ERB Approve Date)
Original	March 31, 2011	This version incorporates the following CCRs**: CCR-474-10-0004** (ECR-CGS-0006: CDFCB-X Volume IV Part 2: 1. Corrected typo in the Overall Quality format definition included in the various Cloud product Quality Flags – the upper range is listed as strictly less than 100%, whereas it should have been listed as greater than or equal to. 2. Added XML Product Profiles to coincide with CDFCB-X Volume IV Parts 2 updates. 3. Corrected DCO number on CDFCBX Volume IV Part 2.); **CCR-474-11-0015** (ECR-CGS- 0025: CDFCB-X Vol. IV Part 2 Change Pages G2: 1. ECR A-317 – Update to OMPS TC EDR to correct a QF Description, SO2 Index; 2. PCR025649 – Update of Cloud QF descriptions for convergent pixels to match the EDR PR and Operational Algorithm); **CCR-474-11-0028** (ECR-CGS-0033: CDFCB-X Vol. IV P2 Change Page 1) Updates to Table 5.1.3.2 1, NCC Imagery Product Profile); **474-CCR-11-0038 (**ECR-CGS-0043: This ECR provides updates to the CDFCB-X volumes III & IV XMLs to match the documentation. This is in support of the NPP pre-launch baseline documentation (IDPS Mx5). Please look in the ECR Drivers folder to find the change pages for these driving ECRs to compare to the new XML change pages. Drivers: ECR-CGS-0006, Updates to CDFCB-X-Vol-IVPart-2; ECR-CGS-0025, Updates to CDFCB-X-Vol-IVPart-2; ECR-CGS-0033, Updates to CDFCB-X-Vol-IVPart-2; V1 files include changes in quality flags 2 & 4. “% valid retrievals <” is added between values to match the CDFCB. An additional “=” is added before the value 100. Also, versions G1 and G2 to part 2 were combined to reduce number of documents. V2 adds back in the notes lost from the CCL G1_G2 file when it became V1. It also, at NASA’s request, combines the OMPS_NP_IP G1 and G2 files into a G1_G2 file. The following lists the affected documents for the changes listed above. All are xml updates to match the documentation. D34862-04-02_NPOESS-CDFCB-X-Vol-IV-Part-2_G2_OMPS-TC-EDR-PP_Ch_Pg; D34862-04-02_NPOESS-CDFCB-X-Vol-IV-Part-2_G1_G2_VIIRSCBH-EDR-PP_Ch_Pg_v1; D34862-04-02_NPOESSCDFCB-X-Vol-IV-Part-2_G1_G2_VIIRS-CCL-EDRPP_Ch_Pg_v2; D34862-04-02_NPOESS-

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		CDFCB-X-Vol IV-Part-2_G2_VIIRS-CEP-EDR-PP_Ch_Pg_v1; D34862-04-02_NPOESS-CDFCB-X-Vol-IV-Part-2_G2_VIIRSCOT-EDR-PP_Ch_Pg_v1; D34862-04-02_NPOESSCDFCB-X-Vol-IV-Part-2_G2_VIIRS-CTH-EDRPP_Ch_Pg_v1; D34862-04-02_NPOESS-CDFCB-X-Vol-IV-Part-2_G2_VIIRS-CTP-EDR-PP_Ch_Pg_v1; D34862-04-02_NPOESS-CDFCB-X-Vol-IV-Part-2_G2_VIIRSCTT-EDR-PP_Ch_Pg_v1; D34862-04-02_NPOESSCDFCB-X-Vol-IV-Part-2_G3_VIIRS-NCC-EDRPP_Ch_Pg) .) to create JPSS CDFCB, External, Volume 4, Part 2,(Imagery, Atmospheric, and Cloud EDRs) Rev -. Thiswas approved at the JPSS Ground ERB March 31, 2011.

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Revision/Change Record

For Document No. D34862-04-02

Revision	Document Date	Revision/Change Description	Pages Affected
---	10/21/2005	Incorporation of the following ECRs: ECR 446C provides the Revision --- (initial submission) of this document. The following ECRs are included in this revision: • D34659 CIS ICD ECR 216C – Initial "Draft" Release • D31400-10 SARSAT System OPSCON SYS-020-060 ECR 229B – Rev A • SY15-0007 System Specification ECR 274A - Active Fires classification to an ARP • D34659 CIS ICD ECR 290C – Rev A • D37005 NPP EDR-PR v1.8 ECR 431B – Requirements Updates • D34862-01 CDFCB-X Vol. I ECR 445B – Rev A • D34862-04-02 CDFCB-X Vol. IV Part 2 ECR 446C – Initial Release	All
A	09/10/2007	Incorporation of the following DCOs and ECRs: ECR 617A provides the Revision A of this document. The following ECRs/DCOs are included in this revision: • ECR 480A, DNB/NCC on GTM projection and HRI exclusion for NPP • ECR 515B, NPOESS Restructure Baseline – Demanifest and GFE Sensor Performance • DCO A1 D34862-04-02 CDFCB-X Vol.IV Part 2 ECR 525E – Aerosol EDR • ECR 528A – Day/Night Quality Flag Updates • ECR 530C, Two Sensor EDRs • ECR 531D, NPOESS Restructure – App D Updates, Part 1 • ECR 534D, NPOESS Data Products • DCO A2 D34862-04-02 CDFCB-X Valid Part 2 ECR 547C – VIIRS Imagery EDR • DCO A3 D34862-04-02 CDFCB-X Vol. IV Part 2 ECR 576C – Cloud Data Products • DCO A4 D34862-04-02 CDFCB-X Vol. IV Part 2 ECR 603A – CrIMSS EDR • ECR 617A CIDP CDFCB-X Vol. III and Vol. IV This revision also incorporates updates to the following: • Product Profile consistency updates	All

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B	07/07/2008	Incorporation of the following DCOs and ECRs: ECR 779A provides the Revision B of this document. The following ECRs/DCOs are included in this revision: ECR 779A Rev B Updates to D34862-04 CDFCB-X Vol IV, Parts 1-4 • ECR 469C, Rev A Release of D34651 NPOESS to FT ICD and Requirements Updates • ECR 546E, NPOESS Restructure – App. D and G Column 3 Updates, Part 2 • DCO B1 D34862-04-02 CDFCB-X Vol.IV Part 2 ECR 648A – OMPS Ozone EDR Updates • DCO B2 D34862-04-02 CDFCB-X Vol.IV Part 2 ECR 665A – CrIMSS EDR Updates • DCO B3 D34862-04-02 CDFCB-X Vol.IV Part 2 ECR 668 – Padbyte Representation in the VIIRS GTM Imagery GEO • DCO B4 D34862-04-02 CDFCB-X Vol IV. Part 2 ECR 675A – VIIRS Aerosol Updates • DCO B5 D34862-04-02 CDFCB-X Vol. IV Part 2 ECR 708B – Update of the VIIRS & CrIMSS EDR Geo Prod. Profile XML for the CDFCB-X Vol. IV • DCO B6 D34862-04-02 CDFCB-X Vol. IV Part 2 ECR 725A – Update of the VIIRS & CrIMSS EDR Prod. Profile XML for the CDFCB-X Vol. IV • DCO B7 D34862-04-02 CDFCB-X Vol. IV Part 2 ECR 765A - QST Gridded IP & CrIMSS NPOESS EDR Format Updates	All
C	01/23/2009	ECR 898B is the NPOESS CDR version of this document. No DCOs have been submitted for this rev and therefore none need to be incorporated.	All
D	06/04/2009	ECR 959A updates this document to Revision D. No DCOs have been submitted for this revision.	All
E	12/09/2009	ECR 1014A incorporates the following Updates: • VIIRS Aerosol Data Format – changed QF6 to SmallModeFraction, a percentage applicable to ocean pixels. Also added NA bit values for QF4 and QF5. Changes as per implementation of ARB ECR A-184A • Added consistency to Cloud Product Quality Flags based on user, IDPS, and A&DP request – vetted at the DFWG (no	7, 9, 11, 36, 46, 53, 63, 70, 81-83, 87, 98, 99, 102, 110, 127, 128, 139, 140, 144,

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Revision	Document Date	Revision/Change Description	Pages Affected
		sizing changes – used spares) • Incorporated ECR A-251B, VIIRS SDR Cal & Geolocation Updates • Added (N=Number of Granules) to Aggregate Dimension column in the Product Data Content Summary tables throughout the document based on user request for clarity as to what 'N' is • Update Section 5.2.1.1 CrIMSS EDR to specify NPOESS era dynamic product FOR/FOV static layout also updated quality flag description (added Day/Night Flag, using spare) o Incorporated ECR A-190A, CrIMSS EDR Quality Flags o Incorporated ECR A-237, CrIMSS Quality Flags • Update VIIRS Aerosol EDR QF1 (Land/Ocean QF) "Excluded Not Produced" legend entry, updated legend value of 3 instead of 2 • Updated XML Product Profiles based on redlines to accompany document o CrIMSS-EDR-PP.xml o VIIRS-Aeros-EDR-PP.xml o VIIRS-Aeros-EDR-GEO-PP.xml o VIIRS-SusMat-EDR-PP.xml o VIIRS-CBH-EDR-PP.xml o E_VIIRS-CCL-EDR-PP.xml o VIIRS-CEP-EDR-PP.xml o VIIRS-COT-EDR-PP.xml o VIIRS-CTH-EDR-PP.xml o VIIRS-CTP-EDR-PP.xml o VIIRS-CTT-EDR-PP.xml	152, 153, 155, 158, 161-163, 170, 206, 208, 211, 212, 214, 221, 227, 230, 237, 243, 246, 255, 260, 263, 270, 276, 278, 285, 291, 293, 300, 306, 308
F	04/16/2010	ECR 1061D incorporates the following updates: • Removal of Availability Conditions throughout • Updated valid RangeMin/Max values for scaled products to align with CDFCB-X Volume I o VIIRS I-Band EDRs o NCC EDR o CrIMSS EDR - removed since not scaled o VIIRS Aerosol EDR o Suspended Matter EDR	pp. 5, 77, 120, 154, 165, 202, 218, 235, 253, 268, 283, 298 pp. 10, 14, 18, 22, 26, 46, 61, 85, 126-133, 156, 206,

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Revision/Change Record

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Revision	Document Date	Revision/Change Description	Pages Affected
		o VIIRS Cloud Base Height EDR o VIIRS Cloud Cover/Layers EDR o VIIRS Cloud Effective Particle Size EDR o VIIRS Cloud Optical Thickness EDR o VIIRS Cloud Top Height EDR o VIIRS Cloud Top Pressure EDR o VIIRS Cloud Top Temperature EDR	221, 238, 256, 271, 286, 301
		• Added ELINT as possible fill value type to: CrIMSS EDR	p. 86
		• Corrected fill values typo for Iterations parameter in CrIMSS EDR	p.89
		• Updates to various quality flag descriptions, values and Quality Summary metadata based on IPAC/Bubble testing results o VIIRS Aerosol EDR o VIIRS Suspended Matter EDR o VIIRS Cloud Base Height EDR o VIIRS Cloud Cover/Layers EDR o VIIRS Cloud Effective Particle Size EDR o VIIRS Cloud Optical Thickness EDR o VIIRS Cloud Top Height EDR o VIIRS Cloud Top Pressure EDR o VIIRS Cloud Top Temperature EDR	pp. 140, 163, 209-210, 212-213, 217, 225, 229-230, 234, 242, 245-246, 250, 259, 262-263, 267, 278, 282, 293, 297, 308, 312
		• Updated XML Product Profiles to match the redlines. • Incorporation of ECR 1054B, OMPS Updates	pp. 165-196
		• Corrected OMPS TC EDR file size – from 125.8 to 123.3 KiB	p. 166
		• Made Granule Size nomenclature consistent – 'Estimated Granule Size' throughout	pp. 6, 43, 51, 59, 66, 80, 105, 123, 141, 154, 166
		• Updated VIIRS NCC Quality Flags, Table 5.1.3.2-2 based on input from IDPS - removed Dead Pixel Replacement mask	p. 62

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5.0 ENVIRONMENTAL DATA RECORDS

For an overview of the CDFCB-X and the list of reference documents, see the CDFCB-X Volume I - Overview, D34862-01. For an introduction to this volume, see the CDFCB-X, Volume IV, Part 1 - IPs, ARPs, and Geolocation Data, D34862-04-01.

Environmental Data Records (EDRs) are data records that contain the environmental parameters or imagery generated by the NPOESS system as products deliverable to the user. The NPOESS and NPP required set of EDRs are defined in the NPOESS System Specification.

An EDR is either an official EDR, which means that it is part of the set of official NPOESS Data Products (as defined by the NPOESS Glossary and the NPOESS System Specification), or it is a substitute EDR. A substitute EDR is produced by substitute ancillary data, data defined by a central in order to create a data product using different input (specifically, different ancillary data) than that which is prescribed by NPOESS.

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 NPP EDRs are also delivered during NPOESS, thus only those EDRs which are NPOESS-only are annotated as such within their respective Description/Purpose section of their interface definition.

The NPP satellite will satisfy the EDRs listed in Table 5.0-1, NPP Environmental Data Records.

Table 5.0-1, NPP Environmental Data Records

NPP EDR Name	CrIMSS	OMPS	VIIRS
CrIMSS Profile (AVMP, AVTP, AVPP)	X		
Imagery			X
Sea Surface Temperature			X
Aerosol Optical Thickness			X
Aerosol Particle Size Parameter			X
Suspended Matter			X
Ozone Total Column		X	
Cloud Base Height			X
Cloud Cover/Layers			X
Cloud Effective Particle Size			X
Cloud Optical Thickness			X
Cloud Top Height			X
Cloud Top Pressure			X
Cloud Top Temperature			X
Albedo (Surface)			X
Land Surface Temperature			X
Vegetation Index			X
Snow Cover and Depth			X
Surface Type			X
Ice Surface Temperature			X
Net Heat Flux			X
Ocean Color/Chlorophyll			X
Sea Ice Characterization			X

The NPOESS satellite will satisfy the EDRs listed in Table 5.0-2, NPOESS Environmental Data Records.

Table 5.0-2, NPOESS Environmental Data Records

NPOESS EDR Name	CrIMSS	OMPS	VIIRS
CrIMSS Profile (AVMP, AVTP, AVPP)	X		
Imagery			X
Sea Surface Temperature			X
Aerosol Optical Thickness			X
Aerosol Particle Size Parameter			X
Suspended Matter			X
Ozone Total Column		X	
Cloud Base Height			X
Cloud Cover/Layers			X
Cloud Effective Particle Size			X
Cloud Optical Thickness			X
Cloud Top Height			X
Cloud Top Pressure			X
Cloud Top Temperature			X
Albedo (Surface)			X
Land Surface Temperature			X
Vegetation Index			X
Snow Cover/Depth			X
Surface Type			X
Active Fires			X
Ice Surface Temperature			X
Net Heat Flux			X
Ocean Color/Chlorophyll			X
Sea Ice Characterization			X

5.1 Imagery

Imagery products contain two primary data fields:

- A two-dimensional array of locally averaged absolute in-band radiances at the Top of the Atmosphere (TOA) measured in the direction of the viewing sensor
- The corresponding array of Brightness Temperatures (also referred to as Equivalent Black Body Temperatures – EBBTs) if the band is primarily emissive or the corresponding array TOA reflectance if the band is primarily reflective during the daytime

Notes:

All Imagery EDRs are produced in a Ground Track Mercator (GTM) projection.

There are multiple EDRs produced for Imagery products, depending on sensor data availability:

- VIIRS Imagery EDRs
  - I-Band Imagery EDRs
    - I1-Band Imagery EDR
    - I2-Band Imagery EDR
    - I3-Band Imagery EDR
    - I4-Band Imagery EDR
    - I5-Band Imagery EDR
  - M-Band Imagery EDRs
    - First M-Band Imagery EDR (Default: M1-Band)
    - Second M-Band Imagery EDR (Default: M4-Band)
    - Third M-Band Imagery EDR (Default: M9-Band)
    - Fourth M-Band Imagery EDR (Default: M14-Band)
    - Fifth M-Band Imagery EDR (Default: M15-Band)
    - Sixth M-Band Imagery EDR (Default: M16-Band)
  - Near Constant Contrast Imagery EDR

Note: Only six M-Band Imagery EDRs are produced by NPOESS. The EDRs produced by a given Interface Data Processor (IDP) is determined by that IDP's configuration.

Sensors	VIIRS

Effectivity	NPP and NPOESS
EDR Contents	For each pixel, the I-Band Imagery EDRs (I1 – I5) contain: • Calibrated TOA radiances and reflectances (Reflective Bands: I1-I3) • Calibrated TOA radiances and EBBTs (Emissive Bands: I4-I5) • Quality flags For each pixel, the M-Band Imagery EDRs (M1 – M16) contain: • Calibrated TOA radiances and reflectances (Reflective Bands: M1-M11) • Calibrated TOA radiances and EBBTs (Emissive Bands: M12-M16) For each pixel, the NCC Imagery EDR contains: • NCC Imagery Data – Albedo (Normalized TOA Reflectance ... no atmospheric correction applied) • Quality flags

This document has been identified per the NPOESS Common Data Format Control Book – External Volume 5 Metadata, D34862-05, Appendix B as a document to be provided to the NOAA Comprehensive Large Array-data Stewardship System (CLASS) via the delivery of NPOESS Document Release Packages to CLASS.

5.1.1 I-Band Imagery

Data Mnemonic	EDRE-IMAG-C0030 (Official)
Description/ Purpose	The VIIRS I-Band Imagery radiances, reflectances, and brightness temperatures are characterized by a 375m Horizontal Reporting Interval (HRI). These products are mapped from the 375m VIIRS SDR Imagery Resolution Geolocation to a GTM projection. The spatial resolution of the I-Band Imagery on GTM is 375 meters ± 1%. The “PixelRowSDR” and “PixelColSDR” geolocation fields provide the SDR row and column coordinate for each GTM pixel mapping. The scan level geolocation quality flag “QF1_VIIRSGTMGEO” provides a flag that indicates whether a pixel has crossed a granule boundary during the SDR to GTM mapping process. If a granule boundary was crossed, the original SDR pixel may be located using effectivity time or the N_Input_Prod standard metadata item may be used to obtain the N_Reference_ID for each SDR granule The calibrated radiances at TOA for bands I1 – I3 are under daytime conditions. The calibrated radiances at TOA for bands I4 – I5 are under daytime and nighttime conditions. This data is reported in W/(m2 ·μm·sr) The calibrated reflectances at TOA for bands I1 – I3 are under daytime conditions and are unitless. The calibrated EBBT for bands I4 – I5 are under daytime and nighttime conditions. This data is reported in Kelvins.
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 60.6 MiB This granule size includes I-Band related fields only and is based on a VIIRS granule duration of approximately 86 seconds. Geolocation and metadata attributes are not included. Additional size added by HDF5 packaging is also not included. Geolocation Estimated Granule Size: 423.9 MiB
File Format Type	HDF5

Data Content and Data Format	See Section 5.1.1.1, VIIRS I-Band Imagery Data Content Summary See Section 5.1.1.2, VIIRS I-Band Imagery Product Profile See Section 5.1.1.3, VIIRS I-Band Imagery HDF5 Details See Section 5.1.1.4, VIIRS I-Band HDF5 Metadata Details See Section 5.1.1.5, VIIRS I-Band Imagery GTM Geolocation Details See Section 5.1.1.6, VIIRS I-Band Imagery GTM Geolocation Product Profile See Section 5.1.1.7, VIIRS I-Band Imagery GTM Geolocation HDF5 Details See Section 5.1.1.8, VIIRS I-Band GTM Imagery Geolocation HDF5 Metadata Details

5.1.1.1 VIIRS I-Band Imagery Data Content Summary

VIIRS I1 – I3 Bands (daytime only) are reflective bands and contain calibrated TOA radiances and reflectances. Bands I4 and I5 (daytime and nighttime) are emissive bands and contain calibrated TOA radiances and EBBTs. See each band's product profile (Section 5.1.1.2) for full product details. Table 5.1.1.1-1, VIIRS I-Band Data Content Summary – Bands I1 – I3, and Table 5.1.1.1-2, VIIRS I-Band Data Content Summary – Bands I4 – I5, list the content of the I-Band granule. Note that only one of the five bands will appear in any single data product's granule.

Table 5.1.1.1-1, VIIRS I-Band Data Content Summary – Bands I1-I3

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
Radiance	TOA radiances for the I1-Band / I2-Band / or I3-Band	unsigned 16-bit integer (scaled from 32-bit floating point)	[N*1541, 8241]	[1541,8241]	W/(m2 sr um)

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
Reflectance	TOA reflectances (daytime only) for the I1 – I3	unsigned 16-bit integer (scaled from 32-bit floating point)	[N*1541, 8241]	[1541,8241]	unitless
QF1_VIIRSIMGEDR	Pixel Level Quality Flags for the I1, I2, or I3 Band	unsigned 8-bit char	[N*1541, 8241]	[1541,8241]	unitless
PadByte1	Pad byte	unsigned 8-bit char	[N*3]	[3]	unitless
RadianceFactors	Scale = 1st array element; Offset = 2nd array element for the I1 – I3 Band radiances	32-bit floating point	[N*2]	[2]	scale (1st array element) = unitless offset (2nd array element) = W/(m2 sr um)
ReflectanceFactors	Scale = 1st array element; Offset = 2nd array element for the I1 – I3 Band reflectances	32-bit floating point	[N*2]	[2]	scale (1st array element) = unitless offset (2nd array element) = unitless

Table 5.1.1.1-2, VIIRS I-Band Data Content Summary, Bands I4-I5

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
Radiance	TOA radiances for the I4 or I5 Bands	unsigned 16-bit integer (scaled from 32-bit floating point)	[N*1541, 8241]	[1541,8241]	W/(m2 sr um)
BrightnessTemperature	Top of Atmosphere Equivalent Blackbody Brightness Temperatures (daytime and nighttime) for the I4 or I5 Bands	unsigned 16-bit integer (scaled from 32-bit floating point)	[N*1541, 8241]	[1541,8241]	kelvin
QF1_VIIRSIMGEDR	Pixel Level Quality Flags for the I4 or I5 Bands	unsigned 8-bit char	[N*1541, 8241]	[1541,8241]	unitless
PadByte1	Pad byte	unsigned 8-bit char	[N*3]	[3]	unitless
RadianceFactors	Scale = 1st array element; Offset = 2nd array element for the I4 – I5 Band radiances	32-bit floating point	[N*2]	[2]	scale (1st array element) = unitless offset (2nd array element) = W/(m2 sr um)
BrightnessFactors	Scale = 1st array element; Offset = 2nd array element for the I4 – I5 Band brightness temperatures	32-bit floating point	[N*2]	[2]	scale (1st array element) = unitless offset (2nd array element) = kelvin

5.1.1.2 VIIRS I-Band Imagery Product Profile

Table 5.1.1.2-1, VIIRS I1-Band Imagery Product Profile – Radiance and Reflectance

Fields

Name	Data Size	Dimensions
Radiance	2byte(s)	
Reflectance	2byte(s)	

Radiance – Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Radiance – 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
Top of Atmosphere radiances for the I1-Band	0	-0.41	861.60	W/(m2 sr um)	Yes	RadianceFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Reflectance – Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Reflectance – 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
Top of Atmosphere Reflectances (Daytime only) for the I1-Band	0	0.00	1.60	unitless	Yes	ReflectanceFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Table 5.1.1.2-2, VIIRS I1-Band Imagery Product Profile – Quality Flags

Fields

Name	Data Size	Dimensions
QF1_VIIRSIMGEDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Imagery Quality (Pixel Quality as determined by the SDR Calibration Quality. Dead Pixel Replacement: Individual bad pixels caused by a bad detector are filled as an average of the two adjacent detector pixels. Bad edge-of-scan pixels use the adjacent pixel value. If two adjacent pixels are dead, a fill value is used for each pixel.)	0			unitless	No		2 bit(s)		
Pixel is Saturated	2			unitless	No		1 bit(s)		
Missing Data (Data required for calibration processing is not available for processing)	3			unitless	No		2 bit(s)		
Out of Range	5			unitless	No		2 bit(s)		

Imagery Quality – Fill Values:

Name	Value

Imagery Quality – Legend Entries:

Name	Value
Good	0
Poor	1
No Calibration	2
Dead Pixel Replacement	3

Pixel is Saturated – Fill Values:

Name	Value

Pixel is Saturated – Legend Entries:

Name	Value
False	0
True	1

Missing Data – Fill Values:

Name	Value

Missing Data – Legend Entries:

Name	Value
All data present	0
Earth View RDR data missing	1
Cal data (Space View, Earth View, Cal View, Solar Diffuser) missing	2
Thermistor Data Missing	3

Out of Range – Fill Values:

Name	Value

Out of Range – Legend Entries:

Name	Value
All data within range	0
Radiance out of range	1
Reflectance out of range	2
Both Radiance and Reflectance out of range	3

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		Spare				7			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value**

PadByte1 — 1byte(s)

Name	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**
Granule	Yes	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**
Pad byte				unitless	No		unsigned 8-bit char	**Name** **Value**	**Name** **Value**

Table 5.1.1.2-3, VIIRS I1-Band Imagery Product Profile – Scale Factors

Fields

Name	Data Size	Dimensions
RadianceFactors	4byte(s)	
ReflectanceFactors	4byte(s)	

RadianceFactors – Dimensions

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

RadianceFactors – 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
Scale = first array element; Offset = second array element	0			Scale = unitless; Offset = W/(m2 sr um)	No		32-bit floating point				

ReflectanceFactors – Dimensions

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

ReflectanceFactors – 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
Scale = first array element; Offset = second array element	0			unitless	No		32-bit floating point				

Table 5.1.1.2-4, VIIRS I2-Band Imagery Product Profile – Radiance and Reflectance

Name	Data Size	Dimensions
Radiance	2byte(s)	
Reflectance	2byte(s)	

Radiance – Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Radiance – 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
Top of Atmosphere radiances for the I2-Band	0	-0.24	418.80	W/(m2 sr um)	Yes	RadianceFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Reflectance – Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Reflectance – 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
Top of Atmosphere Reflectances (Daytime only) for the I2-Band	0	0.00	1.60	unitless	Yes	ReflectanceFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Table 5.1.1.2-5, VIIRS I2-Band Imagery Product Profile – Quality Flags

Name	Data Size	Dimensions
QF1_VIIRSIMGEDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Imagery Quality (Pixel Quality as determined by the SDR Calibration Quality. Dead Pixel Replacement: Individual bad pixels caused by a bad detector are filled as an average of the two adjacent detector pixels. Bad edge-of-scan pixels use the adjacent pixel value. If two adjacent pixels are dead, a fill value is used for each pixel.)	0			unitless	No		2 bit(s)	Name Value	Name: Good, Value: 0; Name: Poor, Value: 1; Name: No Calibration, Value: 2; Name: Dead Pixel Replacement, Value: 3
Pixel is Saturated	2			unitless	No		1bit(s)	Name Value	Name: False, Value: 0; Name: True, Value: 1
Missing Data (Data required for calibration processing is not available for processing)	3			unitless	No		2 bit(s)	Name Value	Name: All data present, Value: 0; Name: Earth View RDR data missing, Value: 1; Name: Cal data (Space View, Earth View, Cal View, Solar Diffuser) missing, Value: 2; Name: Thermistor Data Missing, Value: 3
Out of Range	5			unitless	No		2 bit(s)	Name Value	Name: All data within range, Value: 0; Name: Radiance out of range, Value: 1; Name: Reflectance out of range, Value: 2; Name: Both Radiance and Reflectance out of range, Value: 3

		Spare	7			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**

PadByte1	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**
		Granule	Yes	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**	
Pad byte				unitless	No		unsigned 8-bit char	**Name**	**Value**	**Name**	**Value**

Table 5.1.1.2-6, VIIRS I2-Band Imagery Product Profile – Scale Factors

Name	Data Size	Dimensions
RadianceFactors	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 = second array element				Scale = unitless; Offset = W/(m2 sr um)	No		32-bit floating point	**Name** **Value**	**Name** **Value**

Name	Attribute 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 = second array element				unitless	No		32-bit floating point	**Name** **Value**	**Name** **Value**

Table 5.1.1.2-7, VIIRS I3-Band Imagery Product Profile – Radiance and Reflectance

Name	Data Size	Dimensions
Radiance	2byte(s)	
Reflectance	2byte(s)	

Radiance – Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Radiance – 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
Top of Atmosphere radiances for the I3-Band	0	-0.21	87.00	W/(m2·sr·μm)	Yes	RadianceFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Reflectance – Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Reflectance – 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
Top of Atmosphere Reflectances (Daytime only) for the I3-Band	0	0.00	1.60	unitless	Yes	ReflectanceFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Table 5.1.1.2-8, VIIRS I3-Band Imagery Product Profile – Quality Flags

Name	Data Size	Dimensions
QF1_VIIRSIMGEDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Imagery Quality (Pixel Quality as determined by the SDR Calibration Quality. Dead Pixel Replacement: Individual bad pixels caused by a bad detector are filled as an average of the two adjacent detector pixels. Bad edge-of-scan pixels use the adjacent pixel value. If two adjacent pixels are dead, a fill value is used for each pixel.	0			unitless	No		2 bit(s)	Name / Value	Name / Value: Good 0; Poor 1; No Calibration 2; Dead Pixel Replacement 3
Pixel is Saturated	2			unitless	No		1 bit(s)	Name / Value	Name / Value: False 0; True 1
Missing Data (Data required for calibration processing is not available for processing)	3			unitless	No		2 bit(s)	Name / Value	Name / Value: All data present 0; Earth View RDR data missing 1; Cal data (Space View, Earth View, Cal View, Solar Diffuser) missing 2; Thermistor Data Missing 3
Out of Range	5			unitless	No		2 bit(s)	Name / Value	Name / Value: All data within range 0; Radiance out of range 1; Reflectance or EBBT 2

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											out of range	
											Both Radiance and Reflectance/EBBT out of range	3
		Spare	7			unitless	No		1 bit	**Name** **Value**	**Name** **Value**	
PadByte1	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**						
		Granule	Yes	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**
Pad byte				unitless	No		unsigned 8-bit char	**Name** **Value**	**Name** **Value**

Table 5.1.1.2-9, VIIRS I3-Band Imagery Product Profile – Scale Factors

Name	Data Size	Dimensions
RadianceFactors	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 = second array element				Scale = unitless; Offset = W/(m2 sr um)	No		32-bit floating point	Name Value	Name Value

Name	Data Size	Dimensions
ReflectanceFactors	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 = second array element				unitless	No		32-bit floating point	Name Value	Name Value

Table 5.1.1.2-10, VIIRS I4-Band Imagery Product Profile – Radiance and Brightness Temperature

Name	Data Size	Dimensions
Radiance	2byte(s)	
BrightnessTemperature	2byte(s)	

Radiance — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Radiance — 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
Top of Atmosphere radiances for the I4-Band	0	-0.01	3.61	W/(m2 sr μm)	Yes	RadianceFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

BrightnessTemperature — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

BrightnessTemperature — 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
Top of Atmosphere Equivalent Blackbody Brightness Temperatures for the I4-Band	0	208.00	367.00	kelvin	Yes	BrightnessFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

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Table 5.1.1.2-11, VIIRS I4-Band Imagery Product Profile – Quality Flags

Name	Data Size	Dimensions
QF1_VIIRSIMGEDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Imagery Quality (Pixel Quality as determined by the SDR Calibration Quality. Dead Pixel Replacement: Individual bad pixels caused by a bad detector are filled as an average of the two adjacent detector pixels. Bad edge-of-scan pixels use the adjacent pixel value. If two adjacent pixels are dead, a fill value is used for each pixel.)	0			unitless	No		2 bit(s)	Name	Value	Name	Value
										Good	0
										Poor	1
										No Calibration	2
										Dead Pixel Replacement	3
Pixel is Saturated	2			unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Missing Data (Data required for calibration processing is not available for processing)	3			unitless	No		2 bit(s)	Name	Value	Name	Value
										All data present	0
										Earth View RDR data missing	1
										Cal data (Space View, Earth View, Cal View, Solar Diffuser) missing	2
										Thermistor Data Missing	3
Out of Range	5			unitless	No		2 bit(s)	Name	Value	Name	Value
										All data within range	0
										Radiance out of range	1
										EBBT out of range	2
										Both Radiance and EBBT out of range	3
Spare	7			unitless	No		1	Name	Value	Name	Value

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										bit(s)		
PadByte1	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**						
		Granule	Yes	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**	
		Pad byte				unitless	No		unsigned 8-bit char	**Name** **Value**	**Name** **Value**	

Table 5.1.1.2-12, VIIRS I4-Band Imagery Product Profile – Scale Factors

Name	Data Size	Dimensions
RadianceFactors	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 = second array element				Scale = unitless; Offset = W/(m2 sr um)	No		32-bit floating point	Name / Value	Name / Value

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 = second array element				Scale = unitless; Offset = kelvin	No		32-bit floating point	Name / Value	Name / Value

Table 5.1.1.2-13, VIIRS I5-Band Imagery Product Profile – Radiance and Brightness Temperature

Name	Data Size	Dimensions
Radiance	2byte(s)	
BrightnessTemperature	2byte(s)	

Radiance – Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Radiance – 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
Top of Atmosphere radiances for the I5-Band	0	-0.08	18.49	W/(m2 sr um)	Yes	RadianceFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

BrightnessTemperature – Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

BrightnessTemperature – 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
Top of Atmosphere Equivalent Blackbody Brightness Temperatures for the I5-Band	0	150.00	380.00	kelvin	Yes	BrightnessFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Table 5.1.1.2-14, VIIRS I5-Band Imagery Product Profile – Quality Flags

Name	Data Size	Dimensions
QF1_VIIRSIMGEDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Imagery Quality (Pixel Quality as determined by the SDR Calibration Quality. Dead Pixel Replacement: Individual bad pixels caused by a bad detector are filled as an average of the two adjacent detector pixels. Bad edge-of-scan pixels use the adjacent pixel value. If two adjacent pixels are dead, a fill value is used for each pixel.)	0			unitless	No		2 bit(s)	Name Value	Name: Good, Poor, No Calibration, Dead Pixel Replacement Value: 0, 1, 2, 3
Pixel is Saturated	2			unitless	No		1 bit(s)	Name Value	Name: False, True Value: 0, 1
Missing Data (Data required for calibration processing is not available for processing)	3			unitless	No		2 bit(s)	Name Value	Name: All data present, Earth View RDR data missing, Cal data (Space View, Earth View, Cal View, Solar Diffuser) missing, Thermistor Data Missing Value: 0, 1, 2, 3
Out of Range	5			unitless	No		2 bit(s)	Name Value	Name: All data within range, Radiance out of range, EBBT out of range, Both Radiance and EBBT out of range Value: 0, 1, 2, 3
Spare	7			unitless	No		1 bit(s)	Name Value	Name Value

Name	Data Size	Dimensions
PadByte1	1byte(s	

Name	Granule	Dynamic	Min Array Size	Max Array Size

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)

	Boundary			
Granule	Yes	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
Pad byte				unitless	No		unsigned 8-bit char				

Table 5.1.1.2-14, VIIRS I5-Band Imagery Product Profile – Factors

Name	Data Size	Dimensions
RadianceFactors	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 = second array element				Scale = unitless; Offset = W/(m2 sr um)	No		32-bit floating point	Name / Value	Name / Value

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 = second array element				Scale = unitless; Offset = kelvin	No		32-bit floating point	Name / Value	Name / Value

5.1.1.3 VIIRS I-Band Imagery HDF5 Details

Figures 5.1.1.3-1 through 5.1.1.3-5 provide the details on the content and datatypes of the I-Band Imagery products. These UML diagrams provide details at the product level only. In addition to these UML diagrams, refer to the CDFCB-X, Volume IV, Part 1, D34862-04-01 Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

The I-Band Imagery products within the HDF5 files can be found within the Data_Products group with the group names of VIIRS-I1-EDR, VIIRS-I2-EDR, VIIRS-I3-EDR, VIIRS-I4-EDR, and VIIRS-I5-EDR, depending on the specific data product contained in the file. The aggregation and granule(s) contain the data fields listed in the UML diagrams. The corresponding HDF5 data type for each field is also provided.

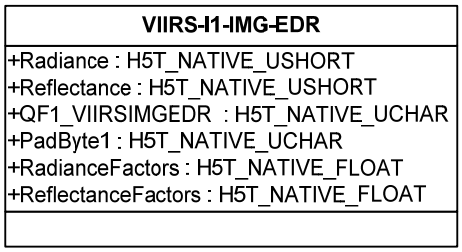

Figure 5.1.1.3-1, VIIRS I1-Band Imagery UML Diagram

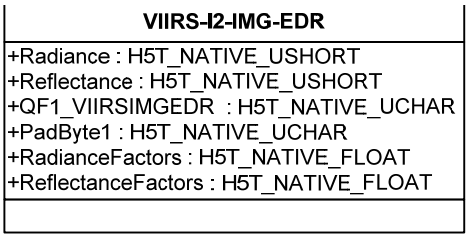

Figure 5.1.1.3-2, VIIRS I2-Band Imagery UML Diagram

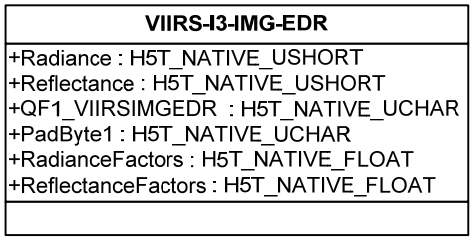

Figure 5.1.1.3-3, VIIRS I3-Band Imagery UML Diagram

VIIRS-I4-IMG-EDR
+Radiance : H5T_NATIVE_USHORT +BrightnessTemperature : H5T_NATIVE_USHORT +QF1_VIIRSIMGEDR : H5T_NATIVE_UCHAR +PadByte1 : H5T_NATIVE_UCHAR +RadianceFactors : H5T_NATIVE_FLOAT +BrightnessFactors : H5T_NATIVE_FLOAT

Figure 5.1.1.3-4, VIIRS I4-Band Imagery UML Diagram

VIIRS-I5-IMG-EDR
+Radiance : H5T_NATIVE_USHORT +BrightnessTemperature : H5T_NATIVE_USHORT +QF1_VIIRSIMGEDR : H5T_NATIVE_UCHAR +PadByte1 : H5T_NATIVE_UCHAR +RadianceFactors : H5T_NATIVE_FLOAT +BrightnessFactors : H5T_NATIVE_FLOAT

Figure 5.1.1.3-5, VIIRS I5-Band Imagery UML Diagram

5.1.1.4 VIIRS I-Band Imagery HDF5 Metadata Details

The HDF5 metadata elements associated with the I-Band Imagery EDR are listed in the CDFCB-X Volume V - Metadata, D34862-05, Section 4.3, HDF5 (Metadata) Hierarchy. The I-Band Imagery metadata includes all common metadata at the root, product, aggregation, and granule level.

In addition to the common metadata items for this product, Table 5.1.1.4-1, VIIRS I-Band Imagery N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values, provide 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 I-Band Imagery EDRs.

Note that there is a standard granule level metadata item that identifies the Imagery Band. This metadata item is the “Band_ID” and is set to “I1”, “I2”, “I3”, “I4” or “I5”.

Table 5.1.1.4-1, VIIRS I-Band Imagery N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Comments**
Summary – Imagery Quality	0 – 100	Percent of good quality pixels in granule	
Summary – Range Check	0 – 100	Percent of measured radiances in granule outside of required range	
Summary – Saturated Pixel	0 – 100	Percent of saturated pixels in granule	

5.1.1.5 VIIRS I-Band Imagery GTM Geolocation Details

Data Mnemonic	None
Description/ Purpose	The VIIRS I-Band Imagery GTM Geolocation is mapped to a GTM grid from the Imagery Resolution SDR Geolocation. The original SDR pixel row and column (i,j)th value is provided in the fields “PixelRowSDR” and “PixelColSDR”. Details for each field of the geolocation are provided in Table 5.1.1.5-1, VIIRS I-Band Imagery GTM Geolocation Data Content Summary.
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 423.9 MiB not including metadata or HDF5 overhead.
File Format Type	HDF5
Data Content and Data Format	The VIIRS I-Band Imagery GTM Geolocation contains: Time Field Geolocation Angular Fields Height and Satellite Range Geolocation Quality Flags SDR pixel mapping field (for SDR row and column) Pad bytes See Section 5.1.1.5, VIIRS I-Band Imagery GTM Geolocation Details See Section 5.1.1.6, VIIRS I-Band Imagery GTM Geolocation Product Profiles See Section 5.1.1.7, VIIRS I-Band Imagery GTM Geolocation HDF5 Details See Section 5.1.1.8, VIIRS I-Band Imagery GTM Geolocation HDF5 Metadata Details

Table 5.1.1.5-1, VIIRS I-Band Imagery GTM Geolocation Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
Time	Time of the nadir point of the GTM row in IET (1/1/1958). Represents the time of the nadir point of the GTM row	64-bit integer	[N*1541]	[1541]	microsecond
Latitude	Latitude of each pixel (positive North)	32-bit floating point	[N*1541, 8241]	[1541, 8241]	degree
Longitude	Longitude of each pixel (positive East)	32-bit floating point	[N*1541, 8241]	[1541, 8241]	degree
SolarZenithAngle	Zenith angle of sun at each pixel position	32-bit floating point	[N*1541, 8241]	[1541, 8241]	degree
SolarAzimuthAngle	Azimuth angle of sun (measured clockwise positive from North) at each pixel position	32-bit floating point	[N*1541, 8241]	[1541, 8241]	degree
SatelliteZenithAngle	Zenith angle to Satellite at each pixel position	32-bit floating point	[N*1541, 8241]	[1541, 8241]	degree
SatelliteAzimuthAngle	Azimuth angle (measured clockwise positive from North) to Satellite at each pixel position	32-bit floating point	[N*1541, 8241]	[1541, 8241]	degree
Height	Ellipsoid-Geoid separation	16-bit integer	[N*1541, 8241]	[1541, 8241]	meter
PadByte1	Pad byte	8-bit unsigned char	[N*2]	[2]	unitless
SatelliteRange	Line of sight distance from the ellipsoid intersection to the satellite	32-bit floating point	[N*1541, 8241]	[1541, 8241]	meter

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
QF1_VIIRSGTMGEO	Pixel Level Geolocation Quality Flags	unsigned 8-bit char	[N*1541, 8241]	[1541, 8241]	unitless
QF2_VIIRSGTMGEO	Scan Level Geolocation Quality Flags	unsigned 8-bit char	[N]	[48]	unitless
PadByte2	Pad byte	8-bit unsigned char	[N*1]	[1]	unitless
PixelRowSDR	Imagery SDR pixel row index number that was remapped to this GTM pixel (row numbering begins with zero)	unsigned 16-bit integer	[N*1541, 8241]	[1541, 8241]	unitless
PixelColSDR	Imagery SDR pixel column index number that was remapped to this GTM pixel (column numbering begins with zero)	unsigned 16-bit integer	[N*1541, 8241]	[1541, 8241]	unitless
PadByte3	Pad byte	8-bit unsigned char	[N*6]	[6]	unitless

5.1.1.6 VIIRS I-Band Imagery GTM Geolocation Product Profile

Table 5.1.1.6-1, VIIRS I-Band Imagery GTM Geolocation Product Profile

Fields																
Name	**Data Size**	**Dimensions**														
Time	8byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		AlongTrack	Yes	No	1541	1541										
		Datum														
		Description		**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Time of the nadir point of the GTM row in IET (1/1/1958). Represents the time of the nadir point of the GTM row		0			microsecond	No		64-bit integer	**Name**	**Value**	**Name**	**Value**		
											NA_INT64_FILL	-999				
											MISS_INT64_FILL	-998				
											ERR_INT64_FILL	-995				
											ELINT_INT64_FILL	-994				
											VDNE_INT64_FILL	-993				
Latitude	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		AlongTrack	Yes	No	1541	1541										
		CrossTrack	No	No	8241	8241										
		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 pixel (positive North)		0			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				
											ELINT_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	1541	1541										
		CrossTrack	No	No	8241	8241										
		Datum														
		Description		**Datum**	**Unscaled**	**Unscaled**	**Measurement**	**Scaled**	**Scale**	**Data**	**Fill Values**		**Legend**			

			Offset	Valid Range Min	Valid Range Max	Units		Factor Name	Type			Entries	
		Longitude of each pixel (positive East)	0			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		
										ELINT_FLOAT32_FILL	-999.4		
										VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
SolarZenithAngle	4byte(s)	AlongTrack	Yes	No	1541	1541
		CrossTrack	No	No	8241	8241

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 pixel position	0			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
SolarAzimuthAngle	4byte(s)	AlongTrack	Yes	No	1541	1541
		CrossTrack	No	No	8241	8241

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 pixel position	0			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	
										ELINT_FLOAT32_FILL	-999.4	
										VDNE_FLOAT32_FILL	-999.3	

SatelliteZenithAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

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 pixel position	0			degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SatelliteAzimuthAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

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 pixel position	0			degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

Height — 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541

		CrossTrack	No	No	8241	8241

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
Ellipsoid-Geoid separation	0			meter	No		16-bit integer	NA_INT16_FILL	-999		
								MISS_INT16_FILL	-998		
								ERR_INT16_FILL	-995		
								ELINT_INT16_FILL	-994		
								VDNE_INT16_FILL	-993		

PadByte1 — 1byte(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	
								Name	Value	Name	Value
Pad byte	0			unitless	No		unsigned 8-bit char				

SatelliteRange — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

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
Line of sight distance from the ellipsoid intersection to the satellite	0			meter	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

QF1_VIIRSGTMGEO — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

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
SDR Pixel Mapping Coordinate (GTM to SDR). Indicates whether this pixel originated from the previous, current, or next granule in the SDR Imagery Resolution Geolocation.	0			unitless	No		2 bit(s)			Error	0
										Previous Granule	1

											Current Granule	2
											Next Granule	3
		Spare	2			unitless	No		6 bit(s)	Name Value	Name Value	

QF2_VIIRSGTMGEO — 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
Solar Eclipse	0			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Spare	1			unitless	No		7 bit(s)	Name Value	Name Value

PadByte2 — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Granule	Yes	No	1	1

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Pad byte	0			unitless	No		unsigned 8-bit char	Name Value	Name Value

PixelRowSDR — 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Imagery SDR pixel row index number that was remapped to this GTM pixel (row numbering begins with zero)	0			unitless	No		unsigned 16-bit integer	Name Value NA_UINT16_FILL 65535 MISS_UINT16_FILL 65534 ERR_UINT16_FILL 65531 ELINT_UINT16_FILL 65530 VDNE_UINT16_FILL 65529	Name Value

PixelColSDR — 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1541	1541
CrossTrack	No	No	8241	8241

Datum

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

				Range Min	Range Max			Name			
		Imagery SDR pixel column index number that was remapped to this GTM pixel (column numbering begins with zero)	0			unitless	No		unsigned 16-bit integer	**Name** / **Value**: NA_UINT16_FILL 65535; MISS_UINT16_FILL 65534; ERR_UINT16_FILL 65531; ELINT_UINT16_FILL 65530; VDNE_UINT16_FILL 65529	**Name** / **Value**

PadByte3	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**					
		Granule	Yes	No	6	6					
		Datum									
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**	**Legend Entries**
		Pad byte	0			unitless	No		unsigned 8-bit char	**Name** / **Value**	**Name** / **Value**

5.1.1.7 VIIRS I-Band Imagery GTM Geolocation HDF5 Details

The VIIRS I-Band Imagery GTM Geolocation is mapped to a GTM grid from the Imagery Resolution SDR Geolocation. The original SDR pixel row and column (i,j) value is provided in the fields “PixelRowSDR” and “PixelColSDR”. Figure 5.1.1.7-1, VIIRS I-Band Imagery GTM Geolocation UML Diagram, provides details on the contents and datatypes of the I-Band Imagery geolocation.

VIIRS-IMG-GTM-EDR-GEO
+Time : 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 +Height : H5T_NATIVE_SHORT +PadByte1 : H5T_NATIVE_UCHAR +SatelliteRange : H5T_NATIVE_FLOAT +QF1_VIIRSGTMGEO : H5T_NATIVE_UCHAR +QF2_VIIRSGTMGEO : H5T_NATIVE_UCHAR +PadByte2 : H5T_NATIVE_UCHAR +PixelRowSDR : H5T_NATIVE_USHORT +PixelColSDR : H5T_NATIVE_USHORT +PadByte3 : H5T_NATIVE_UCHAR

Figure 5.1.1.7-1, VIIRS I-Band Imagery GTM Geolocation UML Diagram

5.1.1.8 VIIRS I-Band Imagery GTM Geolocation HDF5 Metadata Details

The HDF5 metadata elements associated with the I-Band Imagery GTM Geolocation are listed in the CDFCB-X Volume V, Section 4.3, HDF5 (Metadata) Hierarchy. The I-Band Imagery GTM Geolocation metadata includes all common metadata at the root, product, aggregation, and granule level.

There are no additional metadata elements or granule level quality flags for this geolocation.

5.1.2 M-Band Imagery

Data Mnemonic	EDRE-VMOD-C0030 (Official)
Description/ Purpose	The VIIRS Moderate Band Imagery EDRs are characterized by a 750m Horizontal Reporting Interval (HRI). All M-Band imagery products are re-sampled from the VIIRS moderate resolution SDR geolocation to a GTM projection. The “PixelRowSDR” and “PixelColSDR” geolocation fields provide the SDR row and column coordinate for each GTM pixel mapping. The scan level geolocation quality flag “QF1_VIIRSGTMGEO” provides a flag that indicates whether a pixel has crossed a granule boundary during the SDR to GTM mapping process. If a granule boundary was crossed, the original SDR pixel may be located using effectivity time or the N_Input_Prod standard metadata item may be used to obtain the N_Reference_ID for each SDR granule. Unlike the VIIRS I-Band products, not all VIIRS M-Band EDRs are created and made available for delivery. Instead, only a subset (six) of the 16 M-Bands may be configured at the IDP for output at any one time. The default bands are M1, M4, M9, M14, M15, and M16.
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 12.1 MiB This granule size includes M-Band related fields only and is based on a VIIRS granule duration of approximately 28.5 seconds. Geolocation and metadata attributes are not included. Additional size added by HDF5 packaging is also not included. Geolocation Granule Size: 106.1 MiB
File Format Type	HDF5
Data Content and Data Format	See Section 5.1.2.1, M-Band Imagery Data Content Summary See Section 5.1.2.2, M-Band Imagery Product Profile See Section 5.1.2.3, M-Band Imagery HDF5 Details See Section 5.1.2.4, M-Band Imagery HDF5 Metadata Details See Section 5.1.2.5, M-Band Imagery GTM Geolocation Details See Section 5.1.2.6, M-Band Imagery GTM Geolocation Product Profile See Section 5.1.2.7, M-Band Imagery GTM Geolocation HDF5 Details See Section 5.1.2.8, M-Band Imagery GTM Geolocation HDF5 Metadata Details

5.1.2.1 M-Band Imagery Data Content Summary

Table 5.1.2.1-1, M-Band Imagery Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
Radiance	TOA radiances for the M-Band selected	unsigned 16-bit integer (scaled from 32-bit floating point)	[N*771, 4121]	[771,4121]	W/(m^2 sr um)
BrightnessTemperatureOrReflectance	EBBT (for an emissive M-Band) or TOA Reflectances (for a reflective M-Band)	unsigned 16-bit integer (scaled from 32-bit floating point)	[N*771, 4121]	[771,4121]	unitless
RadianceFactors	Scale = 1st array element; Offset = 2nd array element for the selected M-Band radiance	32-bit floating point	[N*2]	[2]	scale (1st array element) = unitless offset (2nd array element) = W/(m^2 sr um)
BrightnessTemperatureOrReflectanceFactors	Scale = 1st array element; Offset = 2nd array element for the selected M-Band Reflectance or Brightness Temperature	32-bit floating point	[NX2]	[2]	scale (1st array element) = unitless offset (2nd array element) = kelvin for brightness temperature , unitless for reflectance

5.1.2.2 M-Band Imagery Product Profile

The following tables represent the Product Profiles representative of any one of the available M-Band EDRs. Note that the default bands may be reflective (M1, M4, M9) or emissive (M14, M15 and M16). Therefore the “BrightnessTemperatureReflectance” field may apply to either reflectance or brightness temperature as appropriate. The products are named with the generic names “VIIRS-M1ST-IMG-EDR”, “VIIRS-M2ND-IMG-EDR”, “VIIRS-3RD-IMG-EDR”, “VIIRS-4TH-IMG-EDR”, “VIIRS-5TH-IMG-EDR”, and “VIIRS-6TH-IMG-EDR” since any of the 16 M-bands may be requested. The metadata item “Band_ID” must be inspected in order to determine which M-Band was selected for each product.

Table 5.1.2.2-1, M-Band Imagery Product Profile

(VIIRS-M1ST-IMG-EDR, VIIRS-M2ND-IMG-EDR, VIIRS-M3RD-IMG-EDR, VIIRS-M4TH-IMG-EDR, VIIRS-M5TH-IMG-EDR, VIIRS-M6TH-IMG-EDR)

Name	Data Size	Dimensions
Radiance	2byte(s)	
BrightnessTemperatureOrReflectance	2byte(s)	

Radiance — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

Radiance — Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Top of Atmosphere radiances for the M-Band selected	0	Varies[1]	Varies	W/(m2 sr um)	Yes	RadianceFactors	unsigned 16-bit integer		

Radiance — Fill Values

Name	Value
NA_UINT16_FILL	65535
MISS_UINT16_FILL	65534
ONBOARD_PT_UINT16_FILL	65533
ONGROUND_PT_UINT16_FILL	65532
ERR_UINT16_FILL	65531
ELINT_UINT16_FILL	65530
VDNE_UINT16_FILL	65529
SOUB_UINT16_FILL	65528

Radiance — Legend Entries

Name	Value

BrightnessTemperatureOrReflectance — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

BrightnessTemperatureOrReflectance — Datum

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

[1] See the CDFCB-X Volume I, Table H-2, EDR/IP/ARP Scaling

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		Brightness Temperatures (for an emissive M-Band) or Top of Atmosphere Reflectances (for a reflective M-Band) for the selected M-Band	0	Varies[2] (for BrightnessTemp) or 0.00 (for Reflectance)	Varies (for BrightnessTemp) or 1.60 (for Reflectance)	kelvin (for BrightnessTemp) or unitless (for Reflectance)	Yes	BrightnessTemperatureReflectance Factors	unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**
										NA_UINT16_FILL	65535		
										MISS_UINT16_FILL	65534		
										ONBOARD_PT_UINT16_FILL	65533		
										ONGROUND_PT_UINT16_FILL	65532		
										ERR_UINT16_FILL	65531		
										ELINT_UINT16_FILL	65530		
										VDNE_UINT16_FILL	65529		
										SOUB_UINT16_FILL	65528		

[2] See the CDFCB-X Volume I, Table H-2, EDR/IP/ARP Scaling

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Table 5.1.2.2-1, M-Band Imagery Product Profile - Factors

Fields												
RadianceFactors	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**	**Name**	**Value**
		Scale = first array element; Offset = second array element	0			Scale = unitless; Offset = W/(m2 sr um)	No		32-bit floating point			
		Legend Entries										
		Name	**Value**									
BrightnessTemperatureOrReflectance Factors	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**	**Name**	**Value**
		Scale = first array element; Offset = second array element	0			Scale = unitless; Offset = kelvin (for BrightnessTemp) or unitless (for Reflectance)	No		32-bit floating point			
		Legend Entries										
		Name	**Value**									

5.1.2.3 M-Band Imagery HDF5 Details

Figure 5.1.2.3-1, M-Band Imagery UML Diagram, provides details on the content and datatypes of the M-Band Imagery product. This UML provides details at the product level only. In addition to this UML, refer to the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

The M-Band Imagery product within the HDF5 file can be found within the Data_Products group with the group name of VIIRS-M1ST-IMG-EDR, VIIRS-M2ND-IMG-EDR, VIIRS-M3RD-IMG-EDR, VIIRS-M4TH-IMG-EDR, VIIRS-M5TH-IMG-EDR, or VIIRS-M6TH-IMG-EDR. The name of VIIRS-M<1st..6th>-EDR is used in Figure 5.1.2.3-1, M-Band Imagery UML Diagram, in order to represent the six possibilities with the single model – all six products produced at a given IDP will be represented in the same manner. The aggregation and granule(s) contain the data fields listed in the UML .The corresponding HDF5 data type for each field is also provided.

VIIRS-M<1st..6th>-EDR
+Radiance : H5T_NATIVE_USHORT +BrightnessTemperatureOrReflectance : H5T_NATIVE_USHORT +RadianceFactors : H5T_NATIVE_FLOAT +BrightnessTemperatureOrReflectanceFactors : H5T_NATIVE_FLOAT

Figure 5.1.2.3-1, M-Band Imagery UML Diagram

5.1.2.4 M-Band Imagery HDF5 Metadata Details

The HDF5 metadata elements associated with the M-Band Imagery EDR are listed in the CDFCB-X Volume V - Metadata, D34862-05, Section 4.3, HDF5 (Metadata) Hierarchy. The M-Band Imagery metadata includes all common metadata at the root, product, aggregation, and granule level.

Note that one standard Imagery Metadata item at the granule level, Band_ID, is used to indicate the M-Band name (M1, M2, etc.) for the M-Band EDR.

There are no additional granule level metadata elements for the M-Band Imagery.

5.1.2.5 M-Band Imagery GTM Geolocation Details

Data Mnemonic	None
Description/ Purpose	The M-Band GTM Geolocation is mapped to a GTM grid from the M-Band Resolution SDR Geolocation. Table 5.1.2.5-1, M-Band Imagery GTM Geolocation Data Content Summary provides geolocation details.
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 106.06 MiB not including metadata or HDF5 overhead.
File Format Type	HDF5
Data Content and Data Format	The VIIRS M-Band Imagery GTM Geolocation contains: Time Field Geolocation Angular Fields Height and Satellite Range Geolocation Quality Flags SDR pixel mapping field (for SDR row and column) Pad bytes See Section 5.1.2.5, M-Band Imagery GTM Geolocation Content Summary See Section 5.1.2.6, M-Band Imagery GTM Geolocation Product Profiles See Section 5.1.2.7, M-Band Imagery GTM Geolocation HDF5 Details See Section 5.1.2.8, M-Band Imagery GTM Geolocation HDF5 Metadata Details

Table 5.1.2.5-1, M-Band Imagery GTM Geolocation Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
Time	Time of the nadir point of the GTM row in IET (1/1/1958). Represents the time of the nadir point of the GTM row	64-bit integer	[N*771]	[771]	microsecond

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
Latitude	Latitude of each pixel (positive North)	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
Longitude	Longitude of each pixel (positive East)	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
SolarZenithAngle	Zenith angle of sun at each pixel position	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
SolarAzimuthAngle	Azimuth angle of sun (measured clockwise positive from North) at each pixel position	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
SatelliteZenithAngle	Zenith angle to Satellite at each pixel position	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
SatelliteAzimuthAngle	Azimuth angle (measured clockwise positive from North) to Satellite at each pixel position	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
Height	Ellipsoid-Geoid separation	16-bit integer	[N*771, 4121]	[771, 4121]	meter
PadByte1	Pad byte	unsigned 8-bit char	[N*2]	[2]	unitless
SatelliteRange	Line of sight distance from the ellipsoid intersection to the satellite	32-bit floating point	[N*771, 4121]	[771, 4121]	meter
QF1_VIIRSGTMGEO	Pixel Level Geolocation Quality Flags	unsigned 8-bit char	[N*771, 4121]	[771, 4121]	unitless
QF2_VIIRSGTMGEO	Granule Level Geolocation Quality Flags	unsigned 8-bit char	[N]	[1]	unitless
PixelRowSDR	Moderate SDR pixel row index number that was remapped to this GTM pixel (row numbering begins with zero)	unsigned 16-bit integer	[N*771, 4121]	[771, 4121]	unitless

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
PixelColSDR	Moderate SDR pixel column index number that was remapped to this GTM pixel (column numbering begins with zero)	unsigned 16-bit integer	[N*771, 4121]	[771, 4121]	unitless
PadByte2	Pad byte	unsigned 8-bit char	[N*4]	[4]	unitless

5.1.2.6 M-Band Imagery GTM Geolocation Product Profile

Table 5.1.2.6-1, M-Band Imagery GTM Geolocation Product Profile

Fields

Name	Data Size	Dimensions
Time	8byte(s)	
Latitude	4byte(s)	
Longitude	4byte(s)	

Time — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771

Time — 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
Time of the nadir point of the GTM row in IET (1/1/1958). Represents the time of the nadir point of the GTM row	0			microsecond	No		64-bit integer	NA_INT64_FILL	-999		
								MISS_INT64_FILL	-998		
								ERR_INT64_FILL	-995		
								VDNE_INT64_FILL	-993		

Latitude — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

Latitude — 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
Latitude of each pixel (positive North)	0			degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

Longitude — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

Longitude — 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
Longitude of each pixel (positive East)	0			degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		

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											ELINT_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	771	771
CrossTrack	No	No	4121	4121

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 pixel position	0			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		
								ELINT_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	771	771
CrossTrack	No	No	4121	4121

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 pixel position	0			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SatelliteZenithAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

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 to Satellite at each pixel position	0			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SatelliteAzimuthAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

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 (measured clockwise positive from North) to Satellite at each pixel position	0			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

Height — 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Ellipsoid-Geoid separation	0			meter	No		16-bit integer	Name	Value	Name	Value
								NA_INT16_FILL	-999		
								MISS_INT16_FILL	-998		
								ERR_INT16_FILL	-995		
								ELINT_INT16_FILL	-994		
								VDNE_INT16_FILL	-993		

PadByte1 — 1byte(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	
Pad byte	0			unitless	No		unsigned 8-bit char	Name	Value	Name	Value

SatelliteRange — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Line of sight distance from the ellipsoid	0			meter	No		32-bit floating	Name	Value	Name	Value
								NA_FLOAT32_FILL	-999.9		

		intersection to the satellite							point	MISS_FLOAT32_FILL	-999.8
										ERR_FLOAT32_FILL	-999.5
										ELINT_FLOAT32_FILL	-999.4
										VDNE_FLOAT32_FILL	-999.3

QF1_VIIRSGTMGEO — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
SDR Pixel Mapping Coordinate (GTM to SDR). Indicates whether this pixel originated from the previous, current, or next granule in the SDR Moderate Resolution Geolocation.	0			unitless	No		2 bit(s)	Name / Value	Name / Value: Error 0; Previous Granule 1; Current Granule 2; Next Granule 3
Spare	2			unitless	No		6 bit(s)	Name / Value	Name / Value

QF2_VIIRSGTMGEO — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Granule	Yes	No	1	1

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Solar Eclipse	0			unitless	No		1 bit(s)	Name / Value	Name / Value: False 0; True 1
Spare	1			unitless	No		7 bit(s)	Name / Value	Name / Value

PixelRowSDR — 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Moderate SDR pixel row index number that was remapped to this GTM pixel (row numbering begins with zero)	0			unitless	No		unsigned 16-bit integer	Name / Value: MISS_UINT16_FILL 65534; ERR_UINT16_FILL 65531; VDNE_UINT16_FILL 65529	Name / Value

PixelColSDR	2byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		AlongTrack	Yes	No	771	771									
		CrossTrack	No	No	4121	4121									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Moderate SDR pixel column index number that was remapped to this GTM pixel (column numbering begins with zero)	0			unitless	No		unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**		
										MISS_UINT16_FILL	65534				
										ERR_UINT16_FILL	65531				
										VDNE_UINT16_FILL	65529				
PadByte2	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Granule	Yes	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**			
		Pad byte	0			unitless	No		unsigned 8-bit char	**Name**	**Value**	**Name**	**Value**		

5.1.2.7 M-Band Imagery GTM Geolocation HDF5 Details

The M-Band Imagery GTM Geolocation is mapped to a GTM grid from the VIIRS M-Band Resolution SDR Geolocation. Figure 5.1.2.7-1, M-Band Imagery GTM Geolocation UML Diagram, provides details on the contents and datatypes of the M-Band Imagery geolocation.

VIIRS-MOD-GTM-EDR-GEO
+Time : 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 +Height : H5T_NATIVE_SHORT +PadByte1 : H5T_NATIVE_UCHAR +SatelliteRange : H5T_NATIVE_FLOAT +QF1_VIIRSGTMGEO : H5T_NATIVE_UCHAR +QF2_VIIRSGTMGEO : H5T_NATIVE_UCHAR +PixelRowSDR : H5T_NATIVE_USHORT +PixelColSDR : H5T_NATIVE_USHORT +PadByte2 : H5T_NATIVE_UCHAR

Figure 5.1.2.7-1, M-Band Imagery GTM Geolocation UML Diagram

5.1.2.8 M-Band Imagery GTM Geolocation HDF5 Metadata Details

The HDF5 metadata elements associated with the M-Band Imagery GTM Geolocation EDR are listed in the CDFCB-X Volume V – Metadata, D34862-05, Section 4.3, HDF5 (Metadata) Hierarchy. The M-Band Imagery GTM Geolocation metadata includes all common metadata at the root, product, aggregation, and granule level.

Note that M-Band Imagery is delivered with no quality flags. Therefore, there are no granule level summary quality flags in the M-Band's N_Quality_Summary_Name/Value metadata attributes.

5.1.3 Near Constant Contrast Imagery

Data Mnemonic	EDRE-IMAG-C1030 (Official)
Description/ Purpose	The VIIRS Near Constant Contrast (NCC) imagery EDR includes a daytime/nighttime visible imagery product that maintains apparent contrast under daytime, nighttime, and terminator region illumination conditions. This product is derived from the daytime/nighttime visible band (DNB) and mapped onto the same GTM Grid as the VIIRS M-Band Resolution Imagery. The “PixelRowSDR” and “PixelColSDR” geolocation fields provide the SDR row and column coordinate for each GTM pixel mapping. The scan level geolocation quality flag “QF1_VIIRSGTMGEO” provides a flag that indicates whether a pixel has crossed a granule boundary during the SDR to GTM mapping process. If a granule boundary was crossed, the original SDR pixel may be located using effectivity time or the N_Input_Prod standard metadata item may be used to obtain the N_Reference_ID for each SDR granule. The NCC visible imagery minimizes the apparent transition across the terminator when it is viewed on a graphical display system so that apparent image contrast is maintained across the imagery. NCC Visible Imagery is derived from the broad DNB measured in regions with solar illumination in daytime, with lunar illumination at night, and near the terminator (twilight) region.
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 9.1 MiB This granule size includes NCC related fields only and is based on a VIIRS granule duration of approximately 28.5 seconds. Geolocation and metadata attributes are not included. Additional size added by HDF5 packaging is also not included.
File Format Type	HDF5

Data Content and Data Format	See Section 5.1.3.1, NCC Imagery Data Content Summary See Section 5.1.3.2, NCC Imagery Product Profile See Section 5.1.3.3, NCC Imagery HDF5 Details See Section 5.1.3.4, NCC Imagery HDF5 Metadata Details See Section 5.1.3.5, NCC Imagery GTM Geolocation Details See Section 5.1.3.6, NCC Imagery GTM Geolocation Product Profile See Section 5.1.3.7, NCC Imagery GTM Geolocation HDF5 Details See Section 5.1.3.8, NCC Imagery GTM Geolocation HDF5 Metadata Details

5.1.3.1 NCC Imagery Data Content Summary

Table 5.1.3.1-1, NCC Imagery Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
Albedo	Normalized Top of Atmosphere Reflectance (no atmospheric correction applied)	unsigned 16-bit integer (scaled from 32-bit floating point)	[N*771, 4121]	[771, 4121]	unitless
QF1_VIIRSNCCEDR	Pixel Level Quality Flags	8-bit unsigned char	[N*771, 4121]	[771, 4121]	unitless
PadByte1	Pad byte	Unsigned 8-bit char	[N*3]	[3]	unitless
AlbedoFactors	Scale = 1st array element; Offset = 2nd array element for the NCC Albedo	32-bit floating point	[N*2]	[2]	scale (1st array element) = unitless offset (2nd array element) = unitless

5.1.3.2 NCC Imagery Product Profile

Table 5.1.3.2-1, NCC Imagery Product Profile

Name	Data Size	Dimensions
Albedo	2byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

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
Normalized Top of Atmosphere Reflectance (no atmospheric correction applied)	0	0	5	unitless	Yes	AlbedoFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Table 5.1.3.2-2, VIIRS NCC Imagery Product Profile – Quality Flags

Name	Data Size	Dimensions
QF1_VIIRSNCCEDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Imagery Quality (Pixel Quality as determined by the SDR Calibration Quality.)	0			unitless	No		2 bit(s)	Name / Value	Name: Good, Value: 0 Name: Poor, Value: 1 Name: No Calibration, Value: 2
Pixel is Saturated	2			unitless	No		1 bit(s)	Name / Value	Name: False, Value: 0 Name: True, Value: 1
Missing Data (Data required for calibration processing is not available for processing)	3			unitless	No		2 bit(s)	Name / Value	Name: All data present, Value: 0 Name: Earth View RDR data missing, Value: 1 Name: Cal data (Space View, Earth View, Cal View, Solar Diffuser), Value: 2

											missing	
											Thermistor Data Missing	3
		Out of Range - Calibrated pixel value outside of LUT threshold limits	5			unitless	No		1 bit(s)	**Name** **Value**	**Name**	**Value**
											All Data Within Range	0
											DNB Radiance Out of Range	1
		Spare	6			unitless	No		1 bit(s)	**Name** **Value**	**Name**	**Value**
		NCC Error (Processing error occurred while trying to produce NCC pixel)	7			unitless	No		1 bit(s)	**Name** **Value**	**Name**	**Value**
											False	0
											True	1

PadByte1	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**						
		Granule	Yes	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**	
		Pad byte	0			unitless	No		Unsigned 8-bit char	**Name** **Value**	**Name**	**Value**

Table 5.1.3.2-3, VIIRS NCC Imagery Product Profile – Scale Factors

Name	Data Size	Dimensions
AlbedoFactors	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	
								Name	Value	Name	Value
Scale = first array element; Offset = second array element				unitless	No		32-bit floating point				

5.1.3.3 NCC Imagery HDF5 Details

Figure 5.1.3.3-1, NCC Imagery UML Diagram, provides details on the content and datatypes of the NCC Imagery product. This UML provides details at the product level only. In addition to this UML, refer to the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

The NCC Imagery product within the HDF5 file can be found within the Data_Products group with the group name of VIIRS-NCC-EDR. The aggregation and granule(s) contain the data fields listed in the UML .The corresponding HDF5 data type for each field is also provided.

VIIRS-NCC-EDR
+Albedo : H5T_NATIVE_USHORT +QF1_VIIRSNCCEDR : H5T_NATIVE_UCHAR +PadByte1 : H5T_NATIVE_UCHAR +AlbedoFactors : H5T_NATIVE_FLOAT

Figure 5.1.3.3-1, NCC Imagery UML Diagram

5.1.1.4 VIIRS NCC Imagery HDF5 Metadata

The HDF5 metadata elements associated with the NCC Imagery EDR are listed in the CDFCB-X Volume V – Metadata, D34862-05, Section 4.3, HDF5 (Metadata) Hierarchy. The NCC Imagery metadata includes all common metadata at the root, product, aggregation, and granule level.

In addition, NCC Imagery HDF5 Metadata includes granule level Quality Flags stored as metadata in the N_Quality_Summary_Name and N_Quality_Summary Value metadata attributes. The NCC content and format is identical to the I-Band. See Section 5.1.1.4, I-Band Imagery HDF5 Metadata Details for content and format.

Also note that there is a standard granule level metadata item that identifies the NCC Band. This metadata item is the “Band_ID” and is set to “DNB” since the NCC Imagery is created from the Day-Night Band SDR product.

5.1.3.5 NCC Imagery GTM Geolocation Details

Data Mnemonic	None
Description/ Purpose	The NCC Geolocation is mapped to a GTM grid from the Day-Night Band (DNB) SDR Geolocation. Table 5.1.3.5-1, NCC Imagery GTM Geolocation Data Content Summary provides geolocation details.
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 136.4 MiB not including metadata or HDF5 overhead.
File Format Type	HDF5
Data Content and Data Format	The VIIRS NCC Imagery GTM Geolocation contains: Time Field Geolocation Angular Fields Height and Satellite Range Geolocation Quality Flags SDR pixel mapping field (for SDR row and column) Pad bytes See Section 5.1.3.5, NCC Imagery GTM Geolocation Content Summary See Section 5.1.3.6, NCC Imagery GTM Geolocation Product Profiles See Section 5.1.3.7, NCC Imagery GTM Geolocation HDF5 Details See Section 5.1.3.8, NCC Imagery GTM Geolocation HDF5 Metadata Details

Table 5.1.3.5-1, NCC Imagery GTM Geolocation Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
Time	Time of the nadir point of the GTM row in IET (1/1/1958). Represents the time of the nadir point of the GTM row	64-bit integer	[N*771]	[771]	microsecond
Latitude	Latitude of each pixel (positive North)	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
Longitude	Longitude of each pixel (positive East)	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
SolarZenithAngle	Zenith angle of sun at each pixel position	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
SolarAzimuthAngle	Azimuth angle of sun (measured clockwise positive from North) at each pixel position	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
SatelliteZenithAngle	Zenith angle to Satellite at each pixel position	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
SatelliteAzimuthAngle	Azimuth angle (measured clockwise positive from North) to Satellite at each pixel position	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
Height	Ellipsoid-Geoid separation	32-bit floating point	[N*771, 4121]	[771, 4121]	meter
SatelliteRange	Line of sight distance from the ellipsoid intersection to the satellite	32-bit floating point	[N*771, 4121]	[771, 4121]	meter
QF1_VIIRSGTMGEO	Pixel Level Geolocation Quality Flags	unsigned 8-bit char	[N*771, 4121]	[771, 4121]	unitless

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
QF2_VIIRSGTMGEO	Granule Level Quality Flag	unsigned 8-bit char	[N]	[1]	unitless
PixelRowSDR	Day-Night Band SDR pixel row index number that was remapped to this GTM pixel (row numbering begins with zero)	unsigned 16-bit integer	[N*771, 4121]	[771, 4121]	unitless
PixelColSDR	Day-Night Band SDR pixel column index number that was remapped to this GTM pixel (column numbering begins with zero)	unsigned 16-bit integer	[N*771, 4121]	[771, 4121]	unitless
MoonIllumFraction	Fraction of the moon illuminated	32-bit floating point	[N]	[1]	unitless
LunarZenithAngle	Zenith angle of moon at each pixel position	32-bit floating point	[N*771, 4121]	[771, 4121]	degree
LunarAzimuthAngle	Azimuth angle of moon (measured clockwise positive from North) at each pixel position	32-bit floating point	[N*771, 4121]	[771, 4121]	unitless
PadByte1	Pad byte	unsigned 8-bit char	[N*4]	[4]	unitless

5.1.3.6 NCC Imagery GTM Geolocation Product Profile

Table 5.1.3.6-1, NCC Imagery GTM Geolocation Product Profile

Fields

Name	Data Size	Dimensions
Time	8byte(s)	
Latitude	4byte(s)	
Longitude	4byte(s)	

Time — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771

Time — 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
Time of the nadir point of the GTM row in IET (1/1/1958). Represents the time of the nadir point of the GTM row	0			microsecond	No		64-bit integer	NA_INT64_FILL	-999		
								MISS_INT64_FILL	-998		
								ERR_INT64_FILL	-995		
								VDNE_INT64_FILL	-993		

Latitude — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

Latitude — 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
Latitude of each pixel (positive North)	0			degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

Longitude — Dimensions

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

Longitude — 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
Longitude of each pixel (positive East)	0			degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		

This document has been identified per the NPOESS Common Data Format Control Book – External Volume 5 Metadata, D34862-05, Appendix B as a document to be provided to the NOAA Comprehensive Large Array-data Stewardship System (CLASS) via the delivery of NPOESS Document Release Packages to CLASS.

										ELINT_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	771	771
CrossTrack	No	No	4121	4121

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 of sun at each pixel position	0			degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_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	771	771
CrossTrack	No	No	4121	4121

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 of sun (measured clockwise positive from North) at each pixel position	0			degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SatelliteZenithAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

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 pixel position	0			degree	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SatelliteAzimuthAngle	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**								
		AlongTrack	Yes	No	771	771								
		CrossTrack	No	No	4121	4121								
		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 (measured clockwise positive from North) to Satellite at each pixel position	0			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			
										ELINT_FLOAT32_FILL	-999.4			
										VDNE_FLOAT32_FILL	-999.3			
Height	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**								
		AlongTrack	Yes	No	771	771								
		CrossTrack	No	No	4121	4121								
		Datum												
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**		
		Ellipsoid-Geoid separation	0			meter	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**	
										NA_INT16_FILL	-999.9			
										MISS_INT16_FILL	-999.8			
										ERR_INT16_FILL	-999.5			
										ELINT_INT16_FILL	-999.4			
										VDNE_INT16_FILL	-999.3			
SatelliteRange	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**								
		AlongTrack	Yes	No	771	771								
		CrossTrack	No	No	4121	4121								
		Datum												
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**		
		Line of sight distance from the ellipsoid intersection to the satellite	0			meter	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**	
										NA_FLOAT32_FILL	-999.9			
										MISS_FLOAT32_FILL	-999.8			
										ERR_FLOAT32_FILL	-999.5			
										ELINT_FLOAT32_FILL	-999.4			
										VDNE_FLOAT32_FILL	-999.3			
QF1_VIIRSGTMGEO	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**								
		AlongTrack	Yes	No	771	771								
		CrossTrack	No	No	4121	4121								

		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**
		DNB Pixel Mapping (GTM to SDR DNB). Indicates whether this pixel originated from the previous, current, or next granule in the SDR DNB geolocation.	0			unitless	No		2 bit(s)			Error	0
												Previous Granule	1
												Current Granule	2
												Next Granule	3
		Spare	2			unitless	No		6 bit(s)	**Name**	**Value**	**Name**	**Value**

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
QF2_VIIRSGTMGEO	1byte(s)	Granule	Yes	No	1	1

		Datum												
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Solar Eclipse	0			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
												False	0
												True	1
		Lunar Eclipse	1			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
												False	0
												True	1
		Spare	2			unitless	No		6 bit(s)	**Name**	**Value**	**Name**	**Value**

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
PixelRowSDR	2byte(s)	AlongTrack	Yes	No	771	771
		CrossTrack	No	No	4121	4121

		Datum											
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Day-Night Band SDR pixel row index number that was remapped to this GTM pixel (row numbering begins with zero)	0			unitless	No		unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**
										NA_UINT16_FILL	65535		
										MISS_UINT16_FILL	65534		
										ONBOARD_PT_UINT16_FILL	65533		
										ONGROUND_PT_UINT16_FILL	65532		
										ERR_UINT16_FILL	65531		
										ELINT_UINT16_FILL	65530		
										VDNE_UINT16_FILL	65529		

PixelColSDR — 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Day-Night Band SDR pixel column index number that was remapped to this GTM pixel (column numbering begins with zero)	0			unitless	No		unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**
								NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

MoonIllumFraction — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	1	1

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Fraction of the moon illuminated (expressed as percent)	0			percent	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
								NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								VDNE_FLOAT32_FILL	-999.3		

LunarZenithAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	771	771
CrossTrack	No	No	4121	4121

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 moon at each pixel position	0			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

LunarAzimuthAngle	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**						
		AlongTrack	Yes	No	771	771						
		CrossTrack	No	No	4121	4121						
		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 moon (measured clockwise positive from North) at each pixel position	0			unitless	No		32-bit floating point	**Name**	**Value**	**Name** **Value**
										NA_FLOAT32_FILL	-999.9	
										MISS_FLOAT32_FILL	-999.8	
										ERR_FLOAT32_FILL	-999.5	
										ELINT_FLOAT32_FILL	-999.4	
										VDNE_FLOAT32_FILL	-999.3	
PadByte1	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**						
		Granule	Yes	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**
		Pad byte	0			unitless	No		unsigned 8-bit integer	**Name**	**Value**	**Name** **Value**

5.1.3.7 NCC Imagery GTM Geolocation HDF5 Details

The NCC Imagery Geolocation is mapped to a GTM grid from the Day-Night Band SDR Geolocation. Figure 5.1.3.7-1, NCC Imagery GTM Geolocation UML Diagram, provides details on the contents and datatypes of the NCC Imagery geolocation.

VIIRS-NCC-GTM-GEO
+Time : 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 +Height : H5T_NATIVE_FLOAT +SatelliteRange : H5T_NATIVE_FLOAT +QF1_VIIRSGTMGEO : H5T_NATIVE_UCHAR +QF2_VIIRSGTMGEO : H5T_NATIVE_UCHAR +PixelRowSDR : H5T_NATIVE_USHORT +PixelColSDR : H5T_NATIVE_USHORT +MoonIllumFraction : H5T_NATIVE_FLOAT +LunarZenithAngle : H5T_NATIVE_FLOAT +LunarAzimuthAngle : H5T_NATIVE_FLOAT +PadByte1 : H5T_NATIVE_UCHAR

Figure 5.1.3.7-1, NCC Imagery GTM Geolocation UML Diagram

5.1.3.8 NCC Imagery GTM Geolocation HDF5 Metadata Details

The HDF5 metadata elements associated with the NCC Imagery GTM Geolocation EDR are listed in the CDFCB-X Volume V – Metadata, D34862-05, Section 4.3, HDF5 (Metadata) Hierarchy. The NCC Imagery GTM Geolocation metadata includes all common metadata at the root, product, aggregation, and granule level.

There are no additional metadata elements or granule level quality flags for this geolocation.

5.1.4 DELETED

5.2 Atmospheric Environmental Data Records

5.2.1 Atmospheric Vertical Moisture, Temperature, and Pressure Profile

An Atmospheric Vertical Moisture Profile (AVMP) is a set of estimates of average mixing ratio in three-dimensional cells centered on specified points along a local vertical. The mixing ratio of a sample of air is the ratio of the mass of water vapor in the sample to the mass of dry air in the sample. The AVMP EDR is reported on the slant path.

An Atmospheric Vertical Temperature Profile (AVTP) is a set of estimates of the average atmospheric temperature in three-dimensional cells centered on specified points along a local vertical.

The Atmospheric Vertical Pressure Profile (AVPP) is a set of estimates of atmospheric pressure at specified altitudes above the Earth's surface. Pressure is a derived quantity. Its profile is derived from the retrieved temperature and moisture profiles and an external estimate of pressure at some level in the atmosphere.

Whether a cell is clear or cloudy is determined by comparing the radiance from the CrIS spectral bands.

Sensors	CrIMSS
Effectivity	NPP/NPOESS
EDR Contents	For each pixel, the AVMP, AVTP, and VPP CrIMSS EDR contains: Moisture profile data Temperature profile data Pressure profile data Latitude Longitude Quality flags

5.2.1.1 CrIMSS EDR

Data Mnemonic	EDRE-AVMP-C1030 (Official) EDRE-AVMP-C1031 (Substitute)
Description/ Purpose	For this format, the CrIMSS algorithm retrieves 1, 4, or 9 times per field of regard (FOR) to yield a minimum of 120 retrievals and a maximum of 1080 retrievals per granule (4 scans x 30 retrievals per scan up to 4 scans x 270 retrievals per scan).

	For State 1 (NPP only). CrIMSS retrieves once per field of regard (FOR) to yield a total of 120 retrievals per granule (4 scans x 30 retrievals per scan). This EDR combines the CrIMSS AVMP, AVTP and Pressure Profile Fields. It uses a combination of CrIS and ATMS retrieval data, the best combined retrieval for each Field of Regard. The CrIMSS AVMP EDR is reported in the range of 970 mb to 100 mb, where 970 mb is the reference surface. The product is reported on 22 layers as an average moisture (g/kg) within a given vertical cell. The CrIMSS AVTP EDR is reported in the range of 1020 mb to 0.5 mb, where 1020 mb is the reference surface. This product is reported on 42 layers as an average temperature (Kelvin) within a given vertical cell. The pressure profile is reported at 31 geopotential heights. For the NPOESS era (States 2 and 3), the FOV layout is a static output and corresponds to each retrieval. For the 4 FOVs in an FOR, there will always be 4 separate retrievals per FOR and the order of the retrievals will be: (For the FOV layout represented as: 1 2 3 4 5 6 7 8 9 FOV # • 1, 2, 4, 5 = 1st Retrieval • 2, 3, 5, 6 = 2nd Retrieval • 4, 5, 7, 8 = 3rd Retrieval • 5, 6, 8, 9 = 4th Retrieval Note 1: States 2 and 3 contain dynamically sized granules that are dependent on the number of retrievals. For this dynamically sized product, the aggregation is a set of object IDs that dereference to the corresponding group of the same name (rather than the corresponding dataset) under All_Data in the HDF5 file. The aggregation for a particular field is the set of all datasets under All_Data for that field (rather than a single dataset array as is the case for statically sized products).The Aggregation dimension is dependent on how users assemble the granules for each field into a data structure when reading from the HDF5 file. See CDFCB-X, Vol IV, Part 1, Section 1.2.2, Intermediate Products, Application Related Products and Environmental Records HDF5 Details – Dynamically Sized, for details regarding the HDF5 structure of

	dynamically sized products.
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Sizes: Granule size is variable, dependent on the number of retrievals in the granule: Min: 51.01 KiB Max: 456.01 KiB This granule size includes CrIMSS EDR 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 per request
Data Content and Data Format	See Section 5.2.1.1.1, CrIMSS EDR Data Content Summary See Section 5.2.1.1.2, CrIMSS EDR Product Profile See Section 5.2.1.1.3, CrIMSS EDR HDF5 Details See Section 5.2.1.1.4, CrIMSS EDR Metadata Details See Section 5.2.1.1.5, CrIMSS EDR Geolocation Data Content Summary See Section 5.2.1.1.6, CrIMSS EDR Geolocation Product Profile See Section 5.2.1.1.7, CrIMSS EDR Geolocation HDF5 Details See Section 5.2.1.1.8, CrIMSS EDR Geolocation HDF5 Metadata Details

5.2.1.1.1 CrIMSS EDR Data Content Summary

Table 5.2.1.1.1-1, CrIMSS EDR Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
NumRetrievals	Number of retrievals for this granule	32-bit integer	Statically Sized Granule: [N] Dynamically Sized Granule: See Note 1	[1]	unitless

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
FORnum	Field of Regard Number (1-120)	32-bit integer	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
H2O	Retrieved Water Vapor Mass Mixing Ratio Profile (Moisture Profile)	32-bit floating point	Statically Sized Granule: [N* NumRetrievals, 22] Dynamically Sized Granule: See Note 1	[NumRetrievals, 22]	g/kg
Temperature	Retrieved Temperature Profile	32-bit floating point	Statically Sized Granule: [N* NumRetrievals, 42] Dynamically Sized Granule: See Note 1	[NumRetrievals, 42]	kelvin
Pressure	Retrieved Pressure Profile	32-bit floating point	Statically Sized Granule: [N* NumRetrievals, 31] Dynamically Sized Granule: See Note 1	[NumRetrievals, 31]	hPa
PressureLevels_H2O	Pressure levels for H2O retrieval	32-bit floating point	Statically Sized Granule: [N*22] Dynamically Sized Granule: See Note 1	[22]	hPa
PressureLevels_Temperature	Pressure levels for Temperature retrieval	32-bit floating point	Statically Sized Granule: [N*42] Dynamically Sized Granule: See Note 1	[42]	hPa

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
AltitudeLevels_Pressure	Altitudes corresponding to Pressure Retrieval (0km - 30km)	32-bit floating point	Statically Sized Granule: [N*31] Dynamically Sized Granule: See Note 1	[31]	km
SurfacePressure	Surface Pressure (Secondary Output)	32-bit floating point	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	hPa
SkinTemperature	Temperature at the terrain surface	32-bit floating point	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	kelvin
LandFraction	Land Fraction	32-bit floating point	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
Iterations	Number of iterations before convergence	32-bit integer	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	iteration
ChiSquareIR+MW	Chi Square value from joint IR-microwave radiance matching retrieval	32-bit floating point	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
ChiSquareMW1	Chi Square value from microwave radiance matching retrieval - stage1	32-bit floating point	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
ChiSquareMW2	Chi Square value from microwave radiance matching retrieval - stage2	32-bit floating point	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
IR_NoiseAmplification	IR Noise Amplification Factors	32-bit floating point	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
ProfileDiff	The RMS difference between the seven lowest levels of the first (MW) and second (IR) stage retrievals.	32-bit floating point	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
QF1_CrIMSSEDR	Granule Level Quality Flag	unsigned 8-bit char	Statically Sized Granule: [N] Dynamically Sized Granule: See Note 1	[1]	unitless
QF2_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N] Dynamically Sized Granule: See Note 1	[1]	unitless
QF3_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N] Dynamically Sized Granule: See Note 1	[1]	unitless
QF4_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N] Dynamically Sized Granule: See Note 1	[1]	unitless

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
QF5_CrIMSSEDR	Retrieval Level Quality Flags	unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
QF6_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
QF7_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
QF8_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
QF9_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
QF10_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
QF11_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
QF12_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
QF13_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
QF14_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
QF15_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless
QF16_CrIMSSEDR		unsigned 8-bit char	Statically Sized Granule: [N* NumRetrievals] Dynamically Sized Granule: See Note 1	[NumRetrievals]	unitless

5.2.1.1.2 CrIMSS EDR Product Profile

Table 5.2.1.1.2-1, CrIMSS EDR Product Profile

Name	Data Size	Dimensions
NumRetrievals	4byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Granule	Yes	No	1	1

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
Number of retrievals for this granule	0			unitless	No		32-bit integer	NA_INT32_FILL	-999		
								MISS_INT 32_FILL	-998		
								ERR_INT 32_FILL	-995		
								VDNE_INT32_FILL	-993		

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080

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
Field of Regard Number (1-120) Note that FOR 1-30 = scan 1, FOR 31-60 = scan 2, FOR 61-90 = scan 3, FOR 91-120 = scan 4	0			unitless	No		32-bit integer	NA_INT32_FILL	-999		
								MISS_INT 32_FILL	-998		
								ERR_INT 32_FILL	-995		
								VDNE_INT32_FILL	-993		

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080
Level	No	No	22	22

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
Retrieved Water Vapor	0			g/kg	No		32-bit floating				

		Mass Mixing Ratio Profile (Moisture Profile)							point	NA_FLOAT32_FILL	-999.9	
										MISS_FLOAT32_FILL	-999.8	
										ERR_FLOAT32_FILL	-999.5	
										ELINT_FLOAT32_FILL	-999.4	
										VDNE_FLOAT32_FILL	-999.3	

Temperature — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080
Level	No	No	42	42

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
Retrieved Temperature Profile	0			kelvin	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

Pressure — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080
Level	No	No	31	31

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
Retrieved Pressure Profile	0			hPa	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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

PressureLevels_H2O — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Level	Yes	No	22	22

Datum

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

		Pressure levels for H2O retrieval	0			hPa	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		
										ELINT_FLOAT32_FILL	-999.4		
										VDNE_FLOAT32_FILL	-999.3		

PressureLevels_Temperature	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**							
		Level	Yes	No	42	42							
		Datum											
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Pressure levels for Temperature retrieval	0			hPa	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		
										ELINT_FLOAT32_FILL	-999.4		
										VDNE_FLOAT32_FILL	-999.3		

AltitudeLevels_Pressure	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**							
		Level	Yes	No	31	31							
		Datum											
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Altitudes corresponding to Pressure Retrieval (0km - 30km)	0			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		
										ELINT_FLOAT32_FILL	-999.4		
										VDNE_FLOAT32_FILL	-999.3		

SurfacePressure	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**							
		Retrieval	Yes	Yes	120	1080							
		Datum											
		Description	**Datum**	**Unscaled**	**Unscaled**	**Measurement**	**Scaled**	**Scale**	**Data**	**Fill Values**		**Legend**	

			Offset	Valid Range Min	Valid Range Max	Units		Factor Name	Type			Entries	
		Surface Pressure (Secondary Output)	0			hPa	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		
										ELINT_FLOAT32_FILL	-999.4		
										VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
SkinTemperature	4byte(s)	Retrieval	Yes	Yes	120	1080

Datum											
Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Temperature at the terrain surface	0			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
LandFraction	4byte(s)	Retrieval	Yes	Yes	120	1080

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 Fraction	0			unitless	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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Iterations	4byte(s)	Retrieval	Yes	Yes	120	1080

		Datum										
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Number of iterations before convergence	0			iteration	No		32-bit integer	**Name**	**Value**	**Name**	**Value**
										NA_INT32_FILL	-999		
										MISS_INT32_FILL	-998		
										ONBOARD_PT_INT32_FILL	-997		
										ONGROUND_PT_INT32_FILL	-996		
										ERR_INT32_FILL	-995		
										ELINT_INT32_FILL	-994		
										VDNE_INT32_FILL	-993		
ChiSquareIR+MW	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**							
		Retrieval	Yes	Yes	120	1080							
		Datum											
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Chi Square value from joint IR-microwave radiance matching retrieval	0			unitless	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		
										ELINT_FLOAT32_FILL	-999.4		
										VDNE_FLOAT32_FILL	-999.3		
ChiSquareMW1	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**							
		Retrieval	Yes	Yes	120	1080							
		Datum											
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Chi Square value from microwave radiance matching retrieval - stage1	0			unitless	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		
										ELINT_FLOAT32_FILL	-999.4		

										VDNE_FLOAT32_FILL	-999.3	

ChiSquareMW2 — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080

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
Chi Square value from microwave radiance matching retrieval - stage2	0			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

IR_NoiseAmplification — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080

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
IR Noise Amplification Factors	0			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

ProfileDiff — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080

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
Profile differences between MW & IR	0			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	
										ELINT_FLOAT32_FILL	-999.4	
										VDNE_FLOAT32_FILL	-999.3	

Table 5.2.1.1.2-2, CrIMSS EDR Product Profile – Quality Flags

Fields																
Name	**Data Size**	**Dimensions**														
QF1_CrIMSSEDR	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		Granule	Yes	No	1	1										
		Datum														
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**				
		CrIS Detector 1 Failed - LWIR	0			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
												False	0			
												True	1			
		CrIS Detector 2 Failed - LWIR	1			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
												False	0			
												True	1			
		CrIS Detector 3 Failed - LWIR	2			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
												False	0			
												True	1			
		CrIS Detector 4 Failed - LWIR	3			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
												False	0			
												True	1			
		CrIS Detector 5 Failed - LWIR	4			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
												False	0			
												True	1			
		CrIS Detector 6 Failed - LWIR	5			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
												False	0			
												True	1			
		CrIS Detector 7 Failed - LWIR	6			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
												False	0			
												True	1			
		CrIS Detector 8 Failed - LWIR	7			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
												False	0			
												True	1			
QF2_CrIMSSEDR	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		Granule	Yes	No	1	1										
		Datum														

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		Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
		CrIS Detector 9 Failed - LWIR	0			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		CrIS Detector 1 Failed - MWIR	1			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		CrIS Detector 2 Failed - MWIR	2			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		CrIS Detector 3 Failed - MWIR	3			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		CrIS Detector 4 Failed - MWIR	4			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		CrIS Detector 5 Failed - MWIR	5			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		CrIS Detector 6 Failed - MWIR	6			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		CrIS Detector 7 Failed - MWIR	7			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
QF3_CrIMSSEDR	1byte(s)										

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Granule	Yes	No	1	1

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
CrIS Detector 8 Failed - MWIR	0			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
CrIS Detector 9 Failed - MWIR	1			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
CrIS Detector 1 Failed - SWIR	2			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1

		CrIS Detector 2 Failed - SWIR	3			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		CrIS Detector 3 Failed - SWIR	4			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		CrIS Detector 4 Failed - SWIR	5			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		CrIS Detector 5 Failed - SWIR	6			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		CrIS Detector 6 Failed - SWIR	7			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
QF4_CrIMSSEDR	1byte(s)										

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Granule	Yes	No	1	1

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
CrIS Detector 7 Failed - SWIR	0			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
CrIS Detector 8 Failed - SWIR	1			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
CrIS Detector 9 Failed - SWIR	2			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
Apodization Flag	3			unitless	No		2 bit(s)	Name Value	Name Value No Apodization Applied 0 Hamming 1 Blackmann 2
Day/Night Flag	5			unitless	No		2 bit(s)	Name Value	Name Value Day 0 Night 1 Terminator 2
Spare	7			unitless	No		1 bit(s)	Name Value	Name Value

QF5_CrIMSSEDR	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**											
		Retrieval	Yes	Yes	120	1080											
		Datum															
		Description		**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**				
		Combined IR+MW retrieval did not converge		0			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
													False	0			
													True	1			
		Microwave only retrieval did not converge		1			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
													False	0			
													True	1			
		Overall Retrieval Quality		2			unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**			
													High (IR + MW)	0			
													Low (IR only)	1			
													Low (MW only)	2			
													Poor (non-converged)	3			
		Difference between MW+IR temperature profile minus MW only temperature profile exceeds threshold		4			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
													False	0			
													True	1			
		Cloudiness		5			unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**			
													Clear	0			
													Partly Cloudy	1			
													Cloudy	2			
		Ice Mask		7			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
													No Ice	0			
													Ice on water	1			
QF6_CrIMSSEDR	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**											
		Retrieval	Yes	Yes	120	1080											
		Datum															
		Description		**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**				
		Non-LTE Flag		0			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
													LTE	0			
													Non-LTE	1			
		Rain Flag: Precipitation detected within the FOR exceeding 2 mm/hr		1			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**			
													False	0			

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											True	1
		Retrieval Cell Size (Number of FOVs used for this retrieval)	2			unitless	No		2 bit(s)	**Name** **Value**	**Name**	**Value**
											9 FOVs used	0
											4 FOVs used	1
											1 FOV used	2
											No Retrieval	3
		Temperature out of range: Atmospheric temperature at one or more of the pressure levels, or the surface skin temperature, is out of the expected range.	4			unitless	No		1 bit(s)	**Name** **Value**	**Name**	**Value**
											False	0
											True	1
		Spare	5			unitless	No		3 bit(s)	**Name** **Value**	**Name**	**Value**

QF7_CrIMSSEDR — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Sun Glint present in retrieval	0			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value**
									False 0
									True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 1	1			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value**
									False 0
									True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 2	2			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value**
									False 0
									True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 3	3			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value**
									False 0
									True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 4	4			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value**
									False 0
									True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 5	5			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value**
									False 0
									True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel	6			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value**

		- 6										False 0 True 1
		ATMS SDR Quality – Channel not used due to poor quality - Channel - 7	7			unitless	No		1 bit(s)	**Name Value**	**Name Value**	False 0 True 1

QF8_CrIMSSEDR	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**
		Retrieval	Yes	Yes	120	1080

Datum

Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**	**Legend Entries**
ATMS SDR Quality – Channel not used due to poor quality - Channel - 8	0			unitless	No		1 bit(s)	**Name Value**	**Name Value** False 0 True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 9	1			unitless	No		1 bit(s)	**Name Value**	**Name Value** False 0 True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 10	2			unitless	No		1 bit(s)	**Name Value**	**Name Value** False 0 True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 11	3			unitless	No		1 bit(s)	**Name Value**	**Name Value** False 0 True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 12	4			unitless	No		1 bit(s)	**Name Value**	**Name Value** False 0 True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 13	5			unitless	No		1 bit(s)	**Name Value**	**Name Value** False 0 True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 14	6			unitless	No		1 bit(s)	**Name Value**	**Name Value** False 0 True 1
ATMS SDR Quality – Channel not used due to poor quality - Channel - 15	7			unitless	No		1 bit(s)	**Name Value**	**Name Value** False 0 True 1

QF9_CrIMSSEDR	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**
		Retrieval	Yes	Yes	120	1080

Datum

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

								Name			
		ATMS SDR Quality – Channel not used due to poor quality - Channel - 16	0			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		ATMS SDR Quality – Channel not used due to poor quality - Channel - 17	1			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		ATMS SDR Quality – Channel not used due to poor quality - Channel - 18	2			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		ATMS SDR Quality – Channel not used due to poor quality - Channel - 19	3			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		ATMS SDR Quality – Channel not used due to poor quality - Channel - 20	4			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		ATMS SDR Quality – Channel not used due to poor quality - Channel - 21	5			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		ATMS SDR Quality – Channel not used due to poor quality - Channel - 22	6			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1
		ATMS data is not available	7			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1

QF10_CrIMSSEDR 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Day/Night Flag	0			unitless	No		1 bit(s)	Name Value	Name Value Day 0 Night 1
Spare	1			unitless	No		1 bit(s)	Name Value	Name Value
CrIS SDR Quality (FOV #1 SWIR Quality)	2			unitless	No		2 bit(s)	Name Value	Name Value Good 0 Degraded 1 Invalid 2

		CrIS SDR Quality (FOV #1 MWIR Quality)	4			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
		CrIS SDR Quality (FOV #1 LWIR Quality)	6			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
QF11_CrIMSSEDR	1byte(s)	**Name** **Granule Boundary** **Dynamic** **Min Array Size** **Max Array Size** Retrieval Yes Yes 120 1080									
		Datum									
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**	**Legend Entries**
		CrIS SDR Quality (FOV #2 SWIR Quality)	0			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
		CrIS SDR Quality (FOV #2 MWIR Quality)	2			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
		CrIS SDR Quality (FOV #2 LWIR Quality)	4			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
		CrIS SDR Quality (FOV #3 SWIR Quality)	6			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
QF12_CrIMSSEDR	1byte(s)	**Name** **Granule Boundary** **Dynamic** **Min Array Size** **Max Array Size** Retrieval Yes Yes 120 1080									
		Datum									
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**	**Legend Entries**
		CrIS SDR Quality (FOV #3 MWIR Quality)	0			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2

		CrIS SDR Quality (FOV #3 LWIR Quality)	2			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
		CrIS SDR Quality (FOV #4 SWIR Quality)	4			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
		CrIS SDR Quality (FOV #4 MWIR Quality)	6			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
QF13_CrIMSSEDR	1byte(s)	**Name** **Granule Boundary** **Dynamic** **Min Array Size** **Max Array Size** Retrieval Yes Yes 120 1080									
		Datum									
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**	**Legend Entries**
		CrIS SDR Quality (FOV #4 LWIR Quality)	0			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
		CrIS SDR Quality (FOV #5 SWIR Quality)	2			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
		CrIS SDR Quality (FOV #5 MWIR Quality)	4			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
		CrIS SDR Quality (FOV #5 LWIR Quality)	6			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** Good 0 Degraded 1 Invalid 2
QF14_CrIMSSEDR	1byte(s)	**Name** **Granule Boundary** **Dynamic** **Min Array Size** **Max Array Size** Retrieval Yes Yes 120 1080									
		Datum									
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**	**Legend Entries**

		CrIS SDR Quality (FOV #6 SWIR Quality)	0			unitless	No		2 bit(s)	Name Value		Name	Value
												Good	0
												Degraded	1
												Invalid	2
		CrIS SDR Quality (FOV #6 MWIR Quality)	2			unitless	No		2 bit(s)	Name Value		Name	Value
												Good	0
												Degraded	1
												Invalid	2
		CrIS SDR Quality (FOV #6 LWIR Quality)	4			unitless	No		2 bit(s)	Name Value		Name	Value
												Good	0
												Degraded	1
												Invalid	2
		CrIS SDR Quality (FOV #7 SWIR Quality)	6			unitless	No		2 bit(s)	Name Value		Name	Value
												Good	0
												Degraded	1
												Invalid	2
QF15_CrIMSSEDR	1byte(s)	Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size							
		Retrieval	Yes	Yes	120	1080							
		Datum											
		Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
		CrIS SDR Quality (FOV #7 MWIR Quality)	0			unitless	No		2 bit(s)	Name Value		Name	Value
												Good	0
												Degraded	1
												Invalid	2
		CrIS SDR Quality (FOV #7 LWIR Quality)	2			unitless	No		2 bit(s)	Name Value		Name	Value
												Good	0
												Degraded	1
												Invalid	2
		CrIS SDR Quality (FOV #8 SWIR Quality)	4			unitless	No		2 bit(s)	Name Value		Name	Value
												Good	0
												Degraded	1
												Invalid	2
		CrIS SDR Quality (FOV #8 MWIR Quality)	6			unitless	No		2 bit(s)	Name Value		Name	Value
												Good	0
												Degraded	1
												Invalid	2
QF16_CrIMSSEDR	1byte(s)	Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size							
		Retrieval	Yes	Yes	120	1080							

		Datum											
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		CrIS SDR Quality (FOV #8 LWIR Quality)	0			unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**
												Good	0
												Degraded	1
												Invalid	2
		CrIS SDR Quality (FOV #9 SWIR Quality)	2			unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**
												Good	0
												Degraded	1
												Invalid	2
		CrIS SDR Quality (FOV #9 MWIR Quality)	4			unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**
												Good	0
												Degraded	1
												Invalid	2
		CrIS SDR Quality (FOV #9 LWIR Quality)	6			unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**
												Good	0
												Degraded	1
												Invalid	2

5.2.1.1.3 CrIMSS EDR HDF5 Details

Figure 5.2.1.1.3-1, CrIMSS EDR UML Diagram, provides details on the contents and data types of the CrIMSS EDR product. This UML provides details at the product level detail only. In addition to this UML, refer to the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

CrIMSS-EDR
+NumRetrievals : H5T_NATIVE_INT +FORnum : H5T_NATIVE_FLOAT +H2O : H5T_NATIVE_FLOAT +Temperature : H5T_NATIVE_FLOAT +Pressure : H5T_NATIVE_FLOAT +PressureLevels_H2O : H5T_NATIVE_FLOAT +PressureLevels_Temperature : H5T_NATIVE_FLOAT +AltitudeLevels_Pressure : H5T_NATIVE_FLOAT +SurfacePressure : H5T_NATIVE_FLOAT +SkinTemperature : H5T_NATIVE_FLOAT +LandFraction : H5T_NATIVE_FLOAT +Iterations : H5T_NATIVE_INT +ChiSquareIR+MW : H5T_NATIVE_FLOAT +ChiSquareMW1 : H5T_NATIVE_FLOAT +ChiSquareMW2 : H5T_NATIVE_FLOAT +IR_NoiseAmplification : H5T_NATIVE_FLOAT +ProfileDiff : H5T_NATIVE_FLOAT +QF1_CrIMSSEDR : H5T_NATIVE_UCHAR +QF2_CrIMSSEDR : H5T_NATIVE_UCHAR +QF3_CrIMSSEDR : H5T_NATIVE_UCHAR +QF4_CrIMSSEDR : H5T_NATIVE_UCHAR +QF5_CrIMSSEDR : H5T_NATIVE_UCHAR +QF6_CrIMSSEDR : H5T_NATIVE_UCHAR +QF7_CrIMSSEDR : H5T_NATIVE_UCHAR +QF8_CrIMSSEDR : H5T_NATIVE_UCHAR +QF9_CrIMSSEDR : H5T_NATIVE_UCHAR +QF10_CrIMSSEDR : H5T_NATIVE_UCHAR +QF11_CrIMSSEDR : H5T_NATIVE_UCHAR +QF12_CrIMSSEDR : H5T_NATIVE_UCHAR +QF13_CrIMSSEDR : H5T_NATIVE_UCHAR +QF14_CrIMSSEDR : H5T_NATIVE_UCHAR +QF15_CrIMSSEDR : H5T_NATIVE_UCHAR +QF16_CrIMSSEDR : H5T_NATIVE_UCHAR

Figure 5.2.1.1.3-1, CrIMSS EDR HDF5 UML Diagram

5.2.1.1.4 CrIMSS EDR HDF5 Metadata Details

The HDF5 metadata elements associated with the CrIMSS EDR are listed in the CDFCB-X Volume V. The CrIMSS 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 5.2.1.1.4-1, CrIMSS EDR N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level 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 CrIMSS EDR.

Table 5.2.1.1.4-1, CrIMSS EDR N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Notes**
CrIMSS Retrieval Quality	0 – 100	Percent of retrievals within granule with high quality of retrieval	
CrIS Input Data Quality	0 – 100	Percent of CrIS SDR input retrievals with high quality	
ATMS Input Data Quality	0 – 100	Percent of ATMS SDR input retrievals with high quality	

5.2.1.1.5 CrIMSS EDR Geolocation Data Content Summary

Data Mnemonic	None
Description/ Purpose	For this format, the CrIMSS algorithm retrieves 1, 4, or 9 times per field of regard (FOR) to yield a minimum of 120 retrievals and a maximum of 1080 retrievals per granule (4 scans x 30 retrievals per scan up to 4 scans x 270 retrievals per scan). This EDR Format is for State 1 (NPP only). For this format, CrIMSS retrieves once per field of regard (FOR) to yield a total of 120 retrievals per granule (4 scans x 30 retrievals per scan).
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Sizes: Granule size is variable, dependent on the number of retrievals in the granule: Min: 3.96 KiB Max: 33.96 KiB This granule size includes CrIMSS EDR 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
Data Content and Data Format	The CrIMSS EDR Geolocation contains: Time Fields Geolocation Angular Fields Spacecraft Position, Velocity, and Attitude Geolocation Quality Flags See Section 5.2.1.1.5, CrIMSS EDR Geolocation Content Summary See Section 5.2.1.1.6, CrIMSS EDR Geolocation Product Profiles See Section 5.2.1.1.7, CrIMSS EDR Geolocation Data Content Summary See Section 5.2.1.1.8, CrIMSS EDR Geolocation HDF5 Details See Section 5.2.1.1.9, CrIMSS EDR Geolocation HDF5 Metadata Details

Table 5.2.1.1.5-1, CrIMSS EDR Geolocation Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
StartTime	Starting Time of each scan in IET (1/1/1958)	64-bit integer	[N*4]	[4]	microsecond
MidTime	Starting Time of each scan in IET (1/1/1958)	64-bit integer	[N*4]	[4]	microsecond
Latitude	Latitude of each retrieval (positive North)	32-bit floating point	[N* NumRetrievals]	[NumRetrievals]	degree
Longitude	Longitude of each retrieval (positive East)	32-bit floating point	[N* NumRetrievals]	[NumRetrievals]	degree
SolarZenithAngle	Zenith angle of sun at each retrieval position	32-bit floating point	[N* NumRetrievals]	[NumRetrievals]	degree
SolarAzimuthAngle	Azimuth angle of sun (measured clockwise positive from North) at each retrieval position	32-bit floating point	[N* NumRetrievals]	[NumRetrievals]	degree
SatelliteZenithAngle	Zenith angle to Satellite at each retrieval position	32-bit floating point	[N* NumRetrievals]	[NumRetrievals]	degree
SatelliteAzimuthAngle	Azimuth angle (measured clockwise positive from North) to Satellite at each retrieval position	32-bit floating point	[N* NumRetrievals]	[NumRetrievals]	degree
Height	Height above Mean Sea Level	32-bit floating point	[N* NumRetrievals]	[NumRetrievals]	meter

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
SatelliteRange	Line of sight distance from the ellipsoid intersection to the satellite	32-bit floating point	[N* NumRetrievals]	[NumRetrievals]	meter
SCPosition	Spacecraft position in ECR Coordinates (X, Y, Z) at the mid-time of scan	32-bit floating point	[N*4, 3]	[4, 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*4, 3]	[4, 3]	m/s
SCAttitude	Spacecraft attitude with respect to Geodetic Reference Frame Coordinates (roll, pitch, yaw) at the midtime of scan	32-bit floating point	[N*4, 3]	[4, 3]	arcsecond
QF1_CrIMSSGEO	Scan Level Geolocation Quality Flags	unsigned 8-bit char	[N*4]	[4]	unitless

5.2.1.1.6 CrIMSS EDR Geolocation Product Profile

Table 5.2.1.1.6-1, CrIMSS EDR Geolocation Product Profile

Fields																		
Name	**Data Size**	**Dimensions**																
StartTime	8byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**												
		Scan	Yes	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**						
		Starting Time of each scan in IET (1/1/1958)	0			microsecond	No		64-bit integer	**Name**	**Value**	**Name**	**Value**					
										NA_INT64_FILL	-999							
										MISS_INT64_FILL	-998							
										ERR_INT64_FILL	-995							
										ELINT_INT64_FILL	-994							
										VDNE_INT64_FILL	-993							
MidTime	8byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**												
		Scan	Yes	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**						
		Starting Time of each scan in IET (1/1/1958)	0			microsecond	No		64-bit integer	**Name**	**Value**	**Name**	**Value**					
										NA_INT64_FILL	-999							
										MISS_INT64_FILL	-998							
										ERR_INT64_FILL	-995							
										ELINT_INT64_FILL	-994							
										VDNE_INT64_FILL	-993							
Latitude	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**												
		Retrieval	Yes	Yes	120	1080												
		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 retrieval (positive North)	0			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							

This document has been identified per the NPOESS Common Data Format Control Book – External Volume 5 Metadata, D34862-05, Appendix B as a document to be provided to the NOAA Comprehensive Large Array-data Stewardship System (CLASS) via the delivery of NPOESS Document Release Packages to CLASS.

										ELINT_INT32_FILL	-999.4	
										VDNE_FLOAT32_FILL	-999.3	

Longitude — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080

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 retrieval (positive East)	0			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		
								ELINT_INT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SolarZenithAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080

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 retrieval position	0			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		
								ELINT_INT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SolarAzimuthAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080

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 retrieval position	0			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		
								ELINT_INT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SatelliteZenithAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Retrieval	Yes	Yes	120	1080

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 to Satellite at each retrieval position	0			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		
										ELINT_FLOAT32_FILL	-999.4		
										VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
SatelliteAzimuthAngle	4byte(s)	Retrieval	Yes	Yes	120	1080

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 (measured clockwise positive from North) to Satellite at each retrieval position	0			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Height	4byte(s)	Retrieval	Yes	Yes	120	1080

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Height above Mean Sea Level	0			meter	No		32-bit floating point	Name	Value	Name	Value
								NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

		Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
SatelliteRange	4byte(s)	Retrieval	Yes	Yes	120	1080

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Line of sight distance from the ellipsoid intersection to the	0			meter	No		32-bit floating point	Name	Value	Name	Value
								NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		

		satellite								ERR_FLOAT32_FILL	-999.5	
										ELINT_FLOAT32_FILL	-999.4	
										VDNE_FLOAT32_FILL	-999.3	

SCPosition — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Scan	Yes	No	4	4
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			meter	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SCVelocity — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Scan	Yes	No	4	4
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			m/s	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SCAttitude — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Scan	Yes	No	4	4
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 attitude with respect to Geodetic Reference Frame Coordinates (roll, pitch, yaw) at the midtime of scan	0			arcsecond	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ELINT_FLOAT32_FILL	-999.4		
								ERR_FLOAT32_FILL	-999.5		

										VDNE_FLOAT32_FILL	-999.3

Table 5.2.1.1.6-2, CrIMSS EDR Geolocation Product Profile – Quality Flags

Fields															
Name	**Data Size**	**Dimensions**													
QF1_CrIMSSGEO	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Scan	Yes	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**			
		Missing Ephemeris or Attitude Data	0			unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**		
												Nominal - E&A data available	0		
												Missing Data <= Small Gap	1		
												Small Gap < Missing Data < Granule Boundary	2		
												Missing Data >= Granule Boundary	3		
		Spare	2			unitless	No		6 bit(s)	**Name**	**Value**	**Name**	**Value**		

5.2.1.1.7 CrIMSS EDR Geolocation HDF5 Details

Figure 5.2.1.1.7-1, CrIMSS EDR Geolocation UML Diagram, provides details on the contents and data types of the CrIMSS EDR Geolocation product. This UML provides details at the product level detail only. In addition to this UML, refer to the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

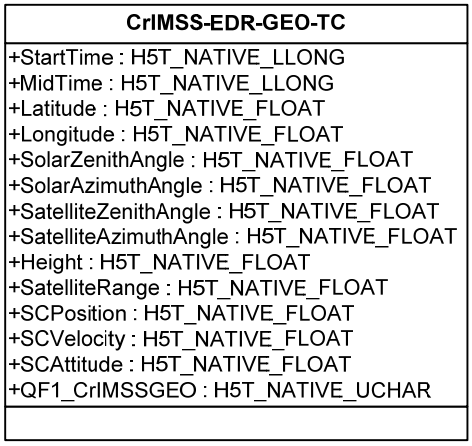

Figure 5.2.1.1.7-1, CrIMSS EDR Geolocation HDF5 UML Diagram

5.2.1.1.8 CrIMSS EDR Geolocation HDF5 Metadata Details

The HDF5 metadata elements associated with the CrIMSS EDR Geolocation are listed in the CDFCB-X Volume V. The CrIMSS EDR Geolocation metadata includes all of the common metadata at the root, product, aggregation, and granule levels. No other granule level metadata (N_Quality_Summary_Name/Value metadata) is defined for this product

5.2.1.2 DELETED

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5.2.1.3 DELETED

5.2.1.4 DELETED

5.2.1.5 DELETED

5.2.1.6 DELETED

5.2.2 Aerosol Optical Thickness and Aerosol Particle Size Parameter

Aerosol Optical Thickness (AOT) for this particular data product is defined as the extinction (scattering + absorption) vertical optical thickness of aerosols at multiple wavelengths within the 0.4 – 2.4 μm spectral range based on narrow band (bandwidth < 0.05 μm) measurements. Optical thickness, τ, is related to transmission, t, by t = exp(-τ).The AOT EDR is reported as the unitless quantity, τ.

Aerosol particle size may be characterized by two different parameters, the Ångström wavelength exponent and the effective radius. The Ångström wavelength exponent α is defined by:

$$\alpha = -\frac{\Delta \ln \tau}{\Delta \ln \lambda}$$

where: τ is the extinction (scattering + absorption) vertical optical thickness of the aerosols within specified layers of the atmosphere, λ is the wavelength, and Δ refers to the difference between measurements in two narrow bands. The units for the Ångström wavelength exponent are dimensionless.

Sensors	VIIRS
Effectivity	NPP
EDR Contents	For each horizontal cell, the Aerosol product contains: AOT at 11 wavelengths Ångström exponent Quality Flags Scale/Offset Values

5.2.2.1 DELETED

5.2.2.2 VIIRS AEROSOL

Data Mnemonic	EDRE-AOTH-C1030 (Official) EDRE-AOTH-C1031 (Substitute)
Description/ Purpose	The VIIRS Aerosol product consists of the VIIRS Aerosol Optical Thickness (AOT) EDR and the VIIRS Aerosol Particle Size Parameter (APSP) EDR. These two EDRs have been combined into a single product. The VIIRS AOT EDR provides aerosol optical thicknesses for a vertical column over both land and ocean globally on a daily basis. AOT is retrieved only during the daytime under clear conditions when the cell is not in cloud shadow. The AOT retrievals over ocean are executed on a VIIRS pixel-by-pixel basis. The AOT is produced globally at 12.8 km or less resolution (8 x 8 moderate resolution pixel aggregation at nadir) This product is produced from all nominal NPOESS orbits, but the measurement accuracy for a terminator orbit will be degraded due to a high incidence of challenging forward scattering geometries. For both ocean and land, the Aerosol Optical Depths values are obtained based on a chosen aerosol model at the 550nm wavelength. A Look-up table correlates AOTs at 550nm to AOTs at other wavelengths. With the exception of the 550nm output, linear interpolation is performed on the LUT values to obtain AOTs for the output wavelengths: • 0.412 microns • 0.445 microns • 0.488 microns • 0.555 microns • 0.672 microns • 0.746 microns • 0.865 microns • 1.240 microns • 1.610 microns • 2.250 microns • 0.550 microns Note that although the first ten wavelengths listed above correspond to center wavelengths for bands M1 – M8 and M10 – M11, these AOTs are not retrieved directly from the radiances of those bands.

	The AOT EDR is generated where the local Solar Zenith Angle <= 80°. Note: The term 'water' is for the most part synonymous with 'ocean water'. The description will be specific in quality flag descriptions when referring to inland water or lakes where aerosols are not retrieved by VIIRS. The VIIRS Aerosol Particle Size Parameter (APSP) EDR is produced at the same resolution (8 x 8 moderate resolution pixel aggregation at nadir) as the AOT EDR. The APSP reports the angstrom wavelength exponent over both land and ocean. The angstrom exponent is calculated using two different narrow band wavelengths and is an indicator of aerosol particle size. Larger values indicate small particles and smaller values indicate large particles such as sea salt and dust.
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: Aerosol Product: 1.10 MiB This granule size includes VIIRS Aerosol Product 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
Data Content and Data Format	See Section 5.2.2.2.1, VIIRS Aerosol Data Content Summary See Section 5.2.2.2.2, VIIRS Aerosol Product Profile See Section 5.2.2.2.3, VIIRS Aerosol HDF5 Details See Section 5.2.2.2.4, VIIRS Aerosol Metadata Details See Section 5.2.2.2.5, VIIRS Aerosol Geolocation Details See Section 5.2.2.2.6, VIIRS Aerosol Geolocation Product Profile See Section 5.2.2.2.7, VIIRS Aerosol Geolocation HDF5 Details See Section 5.2.2.2.8, VIIRS Aerosol Geolocation HDF5 Metadata Details

5.2.2.2.1 VIIRS Aerosol Data Content Summary

Table 5.2.2.2.1-1, VIIRS Aerosol Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
AerosolOpticalDepth_at_412nm	Aerosol Optical Depth at 412nm	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
AerosolOpticalDepth_at_445nm	Aerosol Optical Depth at 445nm	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
AerosolOpticalDepth_at_488nm	Aerosol Optical Depth at 488nm	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
AerosolOpticalDepth_at_555nm	Aerosol Optical Depth at 555nm	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
AerosolOpticalDepth_at_672nm	Aerosol Optical Depth at 672nm	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
AerosolOpticalDepth_at_746nm	Aerosol Optical Depth at 746nm	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
AerosolOpticalDepth_at_865nm	Aerosol Optical Depth at 865nm	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
AerosolOpticalDepth_at_1240nm	Aerosol Optical Depth at 1240nm	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
AerosolOpticalDepth_at_1610nm	Aerosol Optical Depth at 1610nm	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
AerosolOpticalDepth_at_2250nm	Aerosol Optical Depth at 2250nm	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
AerosolOpticalDepth_at_550nm	Aerosol Optical Depth Interpolated to 550nm	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
AngstromExponent	Aerosol Angstrom Wavelength Exponent	unsigned 16-bit integer	[N*96, 400]	[96, 400]	unitless
QF1_VIIRSAEROEDR	Aerosol Quality Flags	8-bit unsigned char	[N*96, 400]	[96, 400]	unitless
QF2_VIIRSAEROEDR		8-bit unsigned char	[N*96, 400]	[96, 400]	unitless
QF3_VIIRSAEROEDR		8-bit unsigned char	[N*96, 400]	[96, 400]	unitless

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
QF4_VIIRSAEROEDR		8-bit unsigned char	[N*96, 400]	[96, 400]	unitless
QF5_VIIRSAEROEDR		8-bit unsigned char	[N*96, 400]	[96, 400]	unitless
SmallModeFraction	Applies to ocean pixels	8-bit unsigned char	[N*96, 400]	[96, 400]	percent
AerosolOpticalDepthFactors	A 32-bit floating point array consisting of two elements: the first is the scale value, the second is the offset value	32-bit floating point	[N*2]	[2]	unitless
AngstromExponentFactors		32-bit floating point	[N*2]	[2]	unitless

5.2.2.2.2 VIIRS Aerosol Product Profile

Table 5.2.2.2.2-1, VIIRS Aerosol Product Profile – Optical Depths

Name	Data Size	Dimensions
AerosolOpticalDepth_at_412nm	2byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

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
Aerosol Optical Depth Interpolated to 412nm	0	-1.00	10.00	unitless	Yes	AerosolOpticalDepthFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Name	Data Size	Dimensions
AerosolOpticalDepth_at_445nm	2byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

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	Valu	Nam	Valu
Aerosol	0	-1.00	10.00	unitless	Yes	AerosolOpticalDepthFact	unsigne				

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		Optical Depth Interpolated to 445nm						ors	d 16-bit integer		e	e	e
										NA_UINT16_FILL	65535		
										MISS_UINT16_FILL	65534		
										ONBOARD_PT_UINT16_FILL	65533		
										ONGROUND_PT_UINT16_FILL	65532		
										ERR_UINT16_FILL	65531		
										ELINT_UINT16_FILL	65530		
										VDNE_UINT16_FILL	65529		
										SOUB_UINT16_FILL	65528		
AerosolOpticalDepth_at_488nm	2byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**							
		AlongTrack	Yes	No	96	96							
		CrossTrack	No	No	400	400							
		Datum											
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Aerosol Optical Depth Interpolated to 488nm	0	-1.00	10.00	unitless	Yes	AerosolOpticalDepthFactors	unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**
										NA_UINT16_FILL	65535		
										MISS_UINT16_FILL	65534		
										ONBOARD_PT_UINT16_FILL	65533		
										ONGROUND_PT_UINT16_FILL	65532		
										ERR_UINT16_FILL	65531		
										ELINT_UINT16_FILL	65530		
										VDNE_UINT16_FILL	65529		
										SOUB_UINT16_FILL	65528		
AerosolOpticalDepth_at_555n	2byte(s	**Name**	**Granule**	**Dynamic**	**Min Array Size**	**Max Array Size**							

m)

	Boundary			
AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

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
Aerosol Optical Depth Interpolated to 555nm	0	-1.00	10.00	unitless	Yes	AerosolOpticalDepthFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

AerosolOpticalDepth_at_672nm 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

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
Aerosol Optical Depth Interpolated to 672nm	0	-1.00	10.00	unitless	Yes	AerosolOpticalDepthFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		

										ERR_UINT16_FILL	65531		
										ELINT_UINT16_FILL	65530		
										VDNE_UINT16_FILL	65529		
										SOUB_UINT16_FILL	65528		

AerosolOpticalDepth_at_746nm	2byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**							
		AlongTrack	Yes	No	96	96							
		CrossTrack	No	No	400	400							
		Datum											
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Aerosol Optical Depth Interpolated to 746nm	0	-1.00	10.00	unitless	Yes	AerosolOpticalDepthFactors	unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**
										NA_UINT16_FILL	65535		
										MISS_UINT16_FILL	65534		
										ONBOARD_PT_UINT16_FILL	65533		
										ONGROUND_PT_UINT16_FILL	65532		
										ERR_UINT16_FILL	65531		
										ELINT_UINT16_FILL	65530		
										VDNE_UINT16_FILL	65529		
										SOUB_UINT16_FILL	65528		

AerosolOpticalDepth_at_865nm	2byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**							
		AlongTrack	Yes	No	96	96							
		CrossTrack	No	No	400	400							
		Datum											
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	

		Aerosol Optical Depth Interpolated to 865nm	0	-1.00	10.00	unitless	Yes	AerosolOpticalDepthFactors	unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**
										NA_UINT16_FILL	65535		
										MISS_UINT16_FILL	65534		
										ONBOARD_PT_UINT16_FILL	65533		
										ONGROUND_PT_UINT16_FILL	65532		
										ERR_UINT16_FILL	65531		
										ELINT_UINT16_FILL	65530		
										VDNE_UINT16_FILL	65529		
										SOUB_UINT16_FILL	65528		
AerosolOpticalDepth_at_1240nm	2byte(s)												

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

Datum										
Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
Aerosol Optical Depth Interpolated to 1240nm	0	-1.00	10.00	unitless	Yes	AerosolOpticalDepthFactors	unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**
								NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

AerosolOpticalDepth_at_1610nm	2byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		AlongTrack	Yes	No	96	96										
		CrossTrack	No	No	400	400										
		Datum														
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**				
		Aerosol Optical Depth Interpolated to 1610nm	0	-1.00	10.00	unitless	Yes	AerosolOpticalDepthFactors	unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**			
										NA_UINT16_FILL	65535					
										MISS_UINT16_FILL	65534					
										ONBOARD_PT_UINT16_FILL	65533					
										ONGROUND_PT_UINT16_FILL	65532					
										ERR_UINT16_FILL	65531					
										ELINT_UINT16_FILL	65530					
										VDNE_UINT16_FILL	65529					
										SOUB_UINT16_FILL	65528					
AerosolOpticalDepth_at_2250nm	2byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		AlongTrack	Yes	No	96	96										
		CrossTrack	No	No	400	400										
		Datum														
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**				
		Aerosol Optical Depth Interpolated to 2250nm	0	-1.00	10.00	unitless	Yes	AerosolOpticalDepthFactors	unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**			
										NA_UINT16_FILL	65535					
										MISS_UINT16_FILL	65534					
										ONBOARD_PT_UINT16_FILL	65533					
										ONGROUND_PT_UINT16_F	6553					

										ILL	2	
										ERR_UINT16_FILL	65531	
										ELINT_UINT16_FILL	65530	
										VDNE_UINT16_FILL	65529	
										SOUB_UINT16_FILL	65528	

AerosolOpticalDepth_at_550nm — 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Aerosol Optical Depth at 550nm	0	-1.00	10.00	unitless	Yes	AerosolOpticalDepthFactors	unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**
								NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

AngstromExponent — 2byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

Datum

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

		Aerosol Angstrom Wavelength Exponent	0	-2.00	10.00	unitless	Yes	AngstromExponentFactors	unsigned 16-bit integer	**Name**	**Value**	**Name**	**Value**
										NA_UINT16_FILL	65535		
										MISS_UINT16_FILL	65534		
										ONBOARD_PT_UINT16_FILL	65533		
										ONGROUND_PT_UINT16_FILL	65532		
										ERR_UINT16_FILL	65531		
										ELINT_UINT16_FILL	65530		
										VDNE_UINT16_FILL	65529		
										SOUB_UINT16_FILL	65528		

Table 5.2.2.2.2-2, VIIRS Aerosol Product Profile – Quality Flags

Name	Data Size	Dimensions
QF1_VIIRSAEROEDR	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
AOT Product Quality - Valid over land and ocean	0			unitless	No		2 bit(s)	Name: Value	Name: Value Not Retrieved: 0 Low: 1 Medium: 2 High: 3
APSP Quality (Anstrom Exponent Quality) - Valid over land and ocean	2			unitless	No		2 bit(s)	Name: Value	Name: Value Not Retrieved: 0 Low: 1 Medium: 2 High: 3
Land / Ocean / Not Produced	4			unitless	No		2 bit(s)	Name: Value	Name: Value Land: 0 Ocean: 1 Excluded Not Produced: 3
AOT is outside of the System Specification Range - Valid over land and ocean	6			unitless	No		1 bit(s)	Name: Value	Name: Value False: 0 True: 1
APSP is outside of the System Specification Range - Valid over land and ocean	7			unitless	No		1 bit(s)	Name: Value	Name: Value False: 0 True: 1

QF2_VIIRSAEROEDR	1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

Datum

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

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		Cloud Contamination in Cell – Valid over land and ocean	0			unitless	No		1 bit(s)	Name Value		Name	Value		
												False	0		
												True	1		
		Cloud Adjacent to Cell – Valid over land and ocean	1			unitless	No		1 bit(s)	Name Value		Name	Value		
												False	0		
												True	1		
		Cirrus Contamination in Cell – Valid over land and ocean	2			unitless	No		1 bit(s)	Name Value		Name	Value		
												False	0		
												True	1		
		Bad SDR Data Present in Horizontal Cell (Quality of AOT/APSP degraded or AOT/APSP not retrieved due to bad SDR data in horizontal cell) – Valid over land and ocean	3			unitless	No		1 bit(s)	Name Value		Name	Value		
												False	0		
												True	1		
		Sun Glint in Cell – Valid over land and ocean	4			unitless	No		1 bit(s)	Name Value		Name	Value		
												False	0		
												True	1		
		Cloud Shadow in Cell – Valid over land and ocean	5			unitless	No		1 bit(s)	Name Value		Name	Value		
												False	0		
												True	1		
		Snow / Ice in Cell – Valid over land and ocean	6			unitless	No		1 bit(s)	Name Value		Name	Value		
												False	0		
												True	1		
		Fire Detected in Cell – Valid over land and ocean	7			unitless	No		1 bit(s)	Name Value		Name	Value		
												False	0		
												True	1		
QF3_VIIRSAEROEDR	1byte(s)														

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Low Sun, Degraded, 65 degrees < Solar Zenith Angle <= 80 degrees	0			unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Low Sun, Excluded, Solar Zenith Angle > 80 degrees	1			unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1

		Bright Surface in Cell (Land) / Shallow or Turbid Water in Cell (Ocean)	2			unitless	No		1 bit(s)	Name Value	Name	Value
											False	0
											True	1
		Excluded, Angstrom Exponent for AOT at 550 nm < 0.15	3			unitless	No		1 bit(s)	Name Value	Name	Value
											False	0
											True	1
		Spare	4			unitless	No		4 bit(s)	Name Value	Name	Value

QF4_VIIRSAEROEDR	1byte(s)	Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size							
		AlongTrack	Yes	No	96	96							
		CrossTrack	No	No	400	400							
		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 Model Aerosol Index (Land only) – Valid over land only	0			unitless	No		3 bit(s)	Name Value	Name	Value	
											Dust	0	
											Smoke – High Absorption	1	
											Smoke – Low Absorption	2	
											Urban - Clean	3	
											Urban - Polluted	4	
											NA – Not Land	7	
		spare	3			unitless	No		5 bit(s)	Name Value	Name	Value	

QF5_VIIRSAEROEDR	1byte(s)	Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size							
		AlongTrack	Yes	No	96	96							
		CrossTrack	No	No	400	400							
		Datum											
		Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries		
		Small Mode Aerosol Model (Ocean only)	0			unitless	No		3 bit(s)	Name Value	Name	Value	
											Fine Mode 1	0	
											Fine Mode 2	1	
											Fine Mode	2	

											3	
											Fine Mode 4	3
											NA – No Ocean	7
		Large Mode Aerosol Model (Ocean only)	3			unitless	No		3 bit(s)	**Name** **Value**	**Name**	**Value**
											Course Mode 1	0
											Course Mode 2	1
											Course Mode 3	2
											Course Mode 4	3
											Course Mode 5	4
											NA – No Ocean	7
		spare	6			unitless	No		2bit(s)	**Name** **Value**	**Name**	**Value**

SmallModeFraction — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Small Mode Fraction (Ocean only)	0	0	100	percent	No		unsigned 8-bit char	**Name**	**Value**	**Name**	**Value**
								NA_UINT8_FILL	255		
								MISS_UINT8_FILL	254		
								ONBOARD_PT_UINT8_FILL	253		
								ONGROUND_PT_UINT8_FILL	252		
								ERR_UINT8_FILL	251		
								ELINT_UINT8_FILL	250		
								VDNE_UINT8_FILL	249		

Table 5.2.2.2.2-3, VIIRS Aerosol Product Profile – Factors

Name	Data Size	Dimensions
AerosolOpticalDepthFactors	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				unitless	No		32-bit floating point	Name Value	Name Value

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 = second array element				unitless	No		32-bit floating point	Name Value	Name Value

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5.2.2.2.3 VIIRS Aerosol HDF5 Details

Figure 5.2.2.2.3-1, VIIRS Aerosol UML Diagram, provides details on the contents and data types of the Aerosol product. This UML provides details at the product level detail only. In addition to this UML, refer to the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

VIIRS-Aeros-EDR
+AerosolOpticalDepth_at_412nm : H5T_NATIVE_UINT +AerosolOpticalDepth_at_445nm : H5T_NATIVE_UINT +AerosolOpticalDepth_at_488nm : H5T_NATIVE_UINT +AerosolOpticalDepth_at_555nm : H5T_NATIVE_UINT +AerosolOpticalDepth_at_672nm : H5T_NATIVE_UINT +AerosolOpticalDepth_at_746nm : H5T_NATIVE_UINT +AerosolOpticalDepth_at_865nm : H5T_NATIVE_UINT +AerosolOpticalDepth_at_1240nm : H5T_NATIVE_UINT +AerosolOpticalDepth_at_1610nm : H5T_NATIVE_UINT +AerosolOpticalDepth_at_2250nm : H5T_NATIVE_UINT +AerosolOpticalDepth_at_550nm : H5T_NATIVE_UINT +AngstromExponent : H5T_NATIVE_USHORT +QF1_VIIRSAEROEDR : H5T_NATIVE_UCHAR +QF2_VIIRSAEROEDR : H5T_NATIVE_UCHAR +QF3_VIIRSAEROEDR : H5T_NATIVE_UCHAR +QF4_VIIRSAEROEDR : H5T_NATIVE_UCHAR +QF5_VIIRSAEROEDR : H5T_NATIVE_UCHAR +QF6_VIIRSAEROEDR : H5T_NATIVE_UCHAR +AerosolOpticalDepthFactors : H5T_NATIVE_FLOAT +AngstromExponentFactors : H5T_NATIVE_FLOAT

Figure 5.2.2.2.3-1, VIIRS Aerosol UML Diagram

5.2.2.2.4 VIIRS Aerosol HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS AOT EDR are listed in the CDFCB-X Volume V. 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 5.2.2.2.4-1, VIIRS Aerosol N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level 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 Aerosol.

Table 5.2.2.2.4-1, VIIRS Aerosol N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Notes**
Aerosol AOT Summary Quality	0 – 100	Percent of cells with high quality AOT retrieval	This is a granule level quality flag.
Aerosol APSP Summary Quality	0 – 100	Percent of cells with high quality APSP retrieval	This is a granule level quality flag.
AOT Exclusion Summary	0 – 100	Percent of cells with AOT retrieval quality “LOW” or “NO RETREIVAL”	This is a granule level quality flag.
APSP Exclusion Summary	0 – 100	Percent of cells with APSP retrieval quality “LOW” or “NO RETREIVAL”	This is a granule level quality flag.
No Land in Granule	0	Land Present in Granule	Indicates whether the product granule contains any land coverage or not. This is a granule level quality flag.
	1	No Land Present in Granule	
No Ocean in Granule	0	Ocean Present in Granule	Indicates whether the product granule contains any ocean coverage or not. This is a granule level quality flag.
	1	No Ocean Present in Granule	

5.2.2.2.5 VIIRS Aerosol Geolocation Details

Data Mnemonic	None
Description/ Purpose	The VIIRS Aerosol Geolocation is produced at the same resolution (8 x 8 moderate resolution pixel aggregation at nadir) as the VIIRS Aerosol Product and is based on the VIIRS moderate resolution geolocation with terrain correction applied.
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 1.21 MiB not including metadata or HDF5 overhead.
File Format Type	HDF5
Data Content and Data Format	The VIIRS Aerosol Geolocation contains: Time Fields Geolocation Angular Fields Height and Satellite Range Spacecraft Position, Velocity, and Attitude Spacecraft Solar Zenith and Azimuth Angles Geolocation Quality Flags See Section 5.2.2.2.5, VIIRS Aerosol Geolocation Details See Section 5.2.2.2.6, VIIRS Aerosol Geolocation Product Profiles See Section 5.2.2.2.7, VIIRS Aerosol Geolocation HDF5 Details See Section 5.2.2.2.8, VIIRS Aerosol Geolocation HDF5 Metadata Details

Table 5.2.2.2.5-1, VIIRS Aerosol Geolocation Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	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

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
Latitude	Latitude of each cell (positive North)	32-bit floating point	[N*96, 400]	[96, 400]	degree
Longitude	Longitude of each cell (positive East)	32-bit floating point	[N*96, 400]	[96, 400]	degree
SolarZenithAngle	Zenith angle of sun at each cell position	32-bit floating point	[N*96, 400]	[96, 400]	degree
SolarAzimuthAngle	Azimuth angle of sun (measured clockwise positive from North) at each cell position	32-bit floating point	[N*96, 400]	[96, 400]	degree
SatelliteZenithAngle	Zenith angle to Satellite at each cell position	32-bit floating point	[N*96, 400]	[96, 400]	degree
SatelliteAzimuthAngle	Azimuth angle (measured clockwise positive from North) to Satellite at each cell position	32-bit floating point	[N*96, 400]	[96, 400]	degree
Height	Height above Mean Sea Level	32-bit floating point	[N*96, 400]	[96, 400]	meter
SatelliteRange	Line of sight distance from the ellipsoid intersection to the satellite	32-bit floating point	[N*96, 400]	[96, 400]	meter
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

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
SCAttitude	Spacecraft attitude with respect to Geodetic Reference Frame Coordinates (roll, pitch, yaw) at the midtime of scan	32-bit floating point	[N*48, 3]	[48, 3]	arcsecond
QF1_SCAN_VIIRSAEROGEO	Scan Level Geolocation Quality Flags	unsigned 8-bit char	[N*48]	[48]	unitless
QF2_VIIRSAEROGEO	Cell Level Geolocation Quality Flags	unsigned 8-bit char	[N*96, 400]	[96, 400]	unitless

5.2.2.2.6 VIIRS Aerosol Geolocation Product Profile

Table 5.2.2.2.6-1, VIIRS Aerosol Geolocation Product Profile

Fields																
Name	**Data Size**	**Dimensions**														
StartTime	8byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		AlongTrack	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**				
		Starting Time of each scan in IET (1/1/1958)	0			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					
MidTime	8byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		AlongTrack	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**				
		Mid-Time of each scan in IET (1/1/1958)	0			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	400	400										
		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			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					
										ELINT_FLOAT32_FILL	-999.4					

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										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	400	400

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			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		
								ELINT_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	400	400

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			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		
								ELINT_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	400	400

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			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SatelliteZenithAngle — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size

		AlongTrack	Yes	No	96	96
		CrossTrack	No	No	400	400

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 to Satellite at each cell position	0			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SatelliteAzimuthAngle	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**
		AlongTrack	Yes	No	96	96
		CrossTrack	No	No	400	400

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 (measured clockwise positive from North) to Satellite at each cell position	0			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		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

Height	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**
		AlongTrack	Yes	No	96	96
		CrossTrack	No	No	400	400

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Height above Mean Sea Level	0			meter	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
								NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

SatelliteRange	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**
		AlongTrack	Yes	No	96	96
		CrossTrack	No	No	400	400

		Datum										
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**	
		Line of sight distance from the ellipsoid intersection to the satellite	0			meter	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
										NA_FLOAT32_FILL	-999.9		
										MISS_FLOAT32_FILL	-999.8		
										ERR_FLOAT32_FILL	-999.5		
										ELINT_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**	
		Spacecraft position in ECR Coordinates (X, Y, Z) at the mid-time of scan	0			meter	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
										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**	
		Spacecraft velocity in ECR Coordinates (dx/dt, dy/dt, dz/dt) at the mid-time of scan	0			m/s	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**
										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)	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**	
		Spacecraft attitude with	0			arcsecond	No		32-bit	**Name**	**Value**	**Name**	**Value**

		respect to Geodetic Reference Frame Coordinates (roll, pitch, yaw) at the midtime of scan							floating point	NA_FLOAT32_FILL MISS_FLOAT32_FILL ERR_FLOAT32_FILL VDNE_FLOAT32_FILL	-999.9 -999.8 -999.5 -999.3

Table 5.2.2.2.6-2, VIIRS Aerosol Geolocation Product Profile – Quality Flags

Fields												
Name	**Data Size**	**Dimensions**										
QF1_SCAN_VIIRSAEROGEO	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**	
		Attitude and Ephemeris Availability Status	0			unitless	No		2 bit(s)	**Name** **Value**	**Name**	**Value**
											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 and RTA encoder timestamps	2			unitless	No		2 bit(s)	**Name** **Value**	**Name**	**Value**
											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			unitless	No		1 bit(s)	**Name** **Value**	**Name**	**Value**
											False	0
											True	1
		Solar Eclipse during Earth view scan	5			unitless	No		1 bit(s)	**Name** **Value**	**Name**	**Value**
											False	0
											True	1
		Spare	6			unitless	No		2 bit(s)	**Name** **Value**	**Name**	**Value**
QF2_VIIRSAEROGEO	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**						

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AlongTrack	Yes	No	96	96
CrossTrack	No	No	400	400

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			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, is near the limb, has invalid sensor angles or other similar condition.)	1			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			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
										False	0
										True	1
Invalid Solar Angles	3			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
										False	0
										True	1
Spare	4			unitless	No		4 bit(s)	**Name**	**Value**	**Name**	**Value**

5.2.2.2.7 VIIRS Aerosol Geolocation HDF5 Details

Figure 5.2.2.2.7-1, VIIRS Aerosol Geolocation UML Diagram, provides details on the contents and data types for this geolocation product.

VIIRS-Aeros-EDR-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 +Height : H5T_NATIVE_FLOAT +SatelliteRange : H5T_NATIVE_FLOAT +SCPosition : H5T_NATIVE_FLOAT +SCVelocity : H5T_NATIVE_FLOAT +SCAttitude : H5T_NATIVE_FLOAT +QF1_SCAN_VIIRSAEROGEO : H5T_NATIVE_UCHAR +QF2_VIIRSAEROGEO : H5T_NATIVE_UCHAR

Figure 5.2.2.2.7-1, VIIRS Aerosol Geolocation UML Diagram

5.2.2.2.8 VIIRS Aerosol Geolocation HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Aerosol Geolocation product are listed in the CDFCB-X Volume V – Metadata, D34862-05, Section 4.3, HDF5 (Metadata) Hierarchy. The VIIRS Aerosol Geolocation metadata includes all of the common metadata attributes located at the root, product, aggregation, and granule levels.

In addition to the common metadata items for this product, Table 5.2.2.2.8-1, VIIRS Aerosol Geolocation N_Quality_Summary Granule_Name/N_Quality_Summary_Value Level Metadata Values, provides the following items as name/value pairs under the granule level metadata attribute “N_Quality_Summary.”

Table 5.2.2.2.8-1, VIIRS Aerosol Geolocation N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Notes**
Percent Missing Data	0 – 100	Contains the percentage of missing data equal to the quotient of the number of cells with no Aerosol Value set due to missing data over the total number of cells in the granule.	This is a granule level quality flag.
Percent Out of Bounds Data	0 – 100	Contains the percentage of out of bounds data equal to the quotient of the number of cells with out of bounds data over the total number of cells in the granule.	This is a granule level quality flag.
Automatic Quality Flag	0	Retrieval Successful	String containing “Retrieval Successful” or “Retrieval not Successful” depending on granule level quality assurance metadata retrieval success. This is a granule level quality flag.
	1	Retrieval not Successful (one or more geolocation subroutines failed)	

5.2.3 DELETED

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5.2.4 Suspended Matter

Data Mnemonic	EDRE-VRSM-C0030 (Official) EDRE-VRSM-C0031 (Substitute)
Description/ Purpose	Suspended matter is defined as dust, sand, volcanic ash, sea salt, smoke, and radioactive smoke in the atmosphere. The retrieval algorithm combines the unique spectral properties of each type of suspended matter with aerosol optical thickness, particle size parameter, and geolocation to classify the suspended matter globally. This EDR will be produced from all nominal NPOESS orbits, but the measurement accuracy for a terminator orbit will be degraded due to VIIRS calibration limitations The Suspended Matter EDR is produced at a 1.6 km resolution. Sensors: VIIRS Effectivity: NPP and NPOESS
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 14.06 MiB This granule size includes VIIRS Suspended Matter 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
Data Content and Data Format	See Section 5.2.4.1, Suspended Matter Data Content Summary See Section 5.2.4.2, Suspended Matter Product Profile See Section 5.2.4.3, Suspended Matter HDF5 Details See Section 5.2.4.4, Suspended Matter HDF5 Metadata Details See Section 5.2.4.5, Suspended Matter Geolocation Details

5.2.4.1 Suspended Matter Data Content Summary

Table 5.2.4.1-1, Suspended Matter Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
SuspendedMatterType	Suspended Matter Type Index	8-bit unsigned char	[N*768, 3200]	[768, 3200]	unitless
SmokeConcentration	SmokeConcentration	unsigned 16-bit integer	[N*768, 3200]	[768, 3200]	micrograms / m3
QF1_VIIRSSusMatEDR	Suspended Matter Quality Flags	8-bit unsigned char	[N*768, 3200]	[768, 3200]	unitless
QF2_VIIRSSusMatEDR		8-bit unsigned char	[N*768, 3200]	[768, 3200]	unitless
QF3_VIIRSSusMatEDR		8-bit unsigned char	[N*768, 3200]	[768, 3200]	unitless
SmokeConcentrationFactors	A 32-bit floating point array consisting of two elements: the first is the scale value, the second is the offset value	32-bit floating point	[N*2]	[2]	Scale = unitless; Offset = micrograms / m3

5.2.4.2 Suspended Matter Product Profile

Table 5.2.4.2-1, Suspended Matter Product Profile

Name	Data Size	Dimensions
SuspendedMatterType	1byte(s)	
SmokeConcentration	2byte(s)	

SuspendedMatterType — Dimensions

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

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Suspended Matter Type Index	0			unitless	No		unsigned 8-bit char	NA_UINT8_FILL	255	Ash	0
								MISS_UINT8_FILL	254	Dust	1
								ONBOARD_PT_UINT8_FILL	253	Smoke	2
								ONGROUND_PT_UINT8_FILL	252	Sea Salt	3
								ERR_UINT8_FILL	251	Unknown	4
								ELINT_UINT8_FILL	250	None	5
								VDNE_UINT8_FILL	249		

SmokeConcentration — Dimensions

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

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
SmokeConcentration	0	-1.00	2000.00	micrograms / m3	Yes	SmokeConcentrationFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ONBOARD_PT_UINT16_FILL	65533		
								ONGROUND_PT_UINT16_FILL	65532		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	6553		

											0	
										VDNE_UINT16_FILL	65529	
										SOUB_UINT16_FILL	65528	

Table 5.2.4.2-2, VIIRS Suspended Matter Product Profile – Quality Flags

Name	Data Size	Dimensions
QF1_VIIRSSusMatEDR	1byte(s)	

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

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values (Name / Value)	Legend Entries (Name / Value)
Suspended Matter Detection Product Quality	0			unitless	No		2 bit(s)		Not Retrieved: 0 Low Quality: 1 Medium Quality: 2 High Quality: 3
Suspended Matter Type Product Quality	2			unitless	No		2 bit(s)		No Quality: 0 Low Quality: 1 Medium Quality: 2 High Quality: 3
Smoke Concentration Product Quality	4			unitless	No		2 bit(s)		No Quality: 0 Low Quality: 1 Medium Quality: 2 High Quality: 3
Land/Ocean/Not Produced	6			unitless	No		2 bit(s)		Land Present: 0 Ocean Present: 1 Not Produced: 3

QF2_VIIRSSusMatEDR	1byte(s)

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

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CrossTrack	No	No	3200	3200		

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
								Name	Value	Name	Value
Cloud Contamination in Cell	0			unitless	No		1 bit(s)			Quality Not Degraded (Confidently Clear)	0
										Quality Degraded	1
Cloud Adjacent to Cell	1			unitless	No		1 bit(s)			Quality Not Degraded (Confidently Clear)	0
										Quality Degraded	1
Cirrus Contamination in Cell	2			unitless	No		1 bit(s)			No Thin Cirrus	0
										Thin Cirrus	1
Bad SDR	3			unitless	No		1 bit(s)			False	0
										True	1
Sun Glint in Cell	4			unitless	No		1 bit(s)			False	0
										True	1
Cloud Shadow in Cell	5			unitless	No		1 bit(s)			No Cloud Shadow	0
										Cloud Shadow	1
Snow/Ice in Cell	6			unitless	No		1 bit(s)			No Snow/Ice	0
										Snow/Ice	1
Fire Detected in Cell	7			unitless	No		1 bit(s)			False	0
										True	1

QF3_VIIRSSusMatEDR	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**
		AlongTrack	Yes	No	768	768
		CrossTrack	No	No	3200	3200

Datum

		Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
		Smoke Concentration Out of Expected Range	0			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
												False	0
												True	1
		Excluded Typing for AOT at 550nm < 1.0	1			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
												False	0
												True	1
		Excluded Detection for AOT at 550nm < 0.5	2			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
												False	0
												True	1
		Low Sun Exclusion – SZA > 65 degrees	3			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
												False	0
												True	1
		Bright Surface in horizontal cell (Over Land only); Shallow or Turbid Water in horizontal cell (Over Ocean only)	4			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**
												False	0
												True	1
		spare	5			unitless	No		2 bits	**Name**	**Value**	**Name**	**Value**

Table 5.2.4.2-3, VIIRS Suspended Matter Product Profile – Factors

Name	Data Size	Dimensions
SmokeConcentrationFactors	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	
								Name	Value	Name	Value
Scale = first array element; Offset = 2nd array element				Scale = unitless; Offset = micrograms / m3	No		32-bit floating point				

5.2.4.3 VIIRS Suspended Matter HDF5 Details

Figure 5.2.4.3-1, VIIRS Suspended Matter UML Diagram, provides details on the contents and data types for the VIIRS Suspended Matter EDR product. This UML provides details at the product level detail only. In addition to this UML, refer to the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

The VIIRS Suspended Matter product within the HDF5 file can be found within the Data_Product group with the group name of VIIRS-SusMat-EDR. The aggregation and granule(s) contain the data fields listed in the UML .The corresponding HDF5 data type for each field is also provided.

VIIRS-SusMat-EDR
+SuspendedMatterType : H5T_NATIVE_UCHAR +SmokeConcentration : H5T_NATIVE_USHORT +QF1_VIIRSSusMatEDR : H5T_NATIVE_UCHAR +QF2_VIIRSSusMatEDR : H5T_NATIVE_UCHAR +QF3_VIIRSSusMatEDR : H5T_NATIVE_UCHAR +SmokeConcentrationFactors : H5T_NATIVE_FLOAT

Figure 5.2.4.3-1, VIIRS Suspended Matter HDF5 Diagram

5.2.4.4 VIIRS Suspended Matter HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Suspended Matter EDR are listed in the CDFCB-X Volume V – Metadata, D34862-05, Section 4.3, HDF5 (Metadata) Hierarchy. The VIIRS Suspended Matter EDR metadata includes all common metadata at the root, product, aggregation, and granule levels.

In addition to the common metadata items for this product, Table 5.2.4.4-1, VIIRS Suspended Matter N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values, provides the following items as name/value pairs.

Table 5.2.4.4-1, VIIRS Suspended Matter N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Notes**
Summary Suspended Matter Product Quality	0 – 100	Percent of Pixels with high quality Suspended Matter Detection Retrieval	This is a granule level quality flag.
Typing Product Quality	0 – 100	Percent of Pixels with high quality Suspended Matter Typing Retrieval	This is a granule level quality flag.
Typing Exclusion Summary	0 – 100	Percent of pixels with “LOW QUALITY” or “NO QUALITY” Suspended Matter Typing Product Quality	This is a granule level quality flag.
Detection Exclusion Summary	0 – 100	Percent of pixels with “LOW QUALITY” or “NO QUALITY” Suspended Matter Detection Product Quality	This is a granule level quality flag.

5.2.4.5 VIIRS Suspended Matter Geolocation Details

VIIRS Suspended Matter is produced on the VIIRS Moderate Resolution Geolocation – Terrain Corrected. See the CDFCB-X, Volume IV, Part 1, D34862-04-01, Section 4.9.5, VIIRS Moderate Resolution Geolocation – Terrain Corrected, for details.

5.2.5 DELETED

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5.2.6 Ozone Total Column

Sensors	OMPS
Effectivity	NPP/NPOESS
EDR Contents	The primary output of the OMPS Total Column (TC) Ozone is the ColumnAmountO3 field. This is the best estimate of total ozone produced by the algorithm. In addition to this field, other fields are: - Total Ozone values after corrections (Aerosol correction, Profile Shape and Temperature Profile corrections) - First Guess IP fields (Total Ozone and residuals output from the First Guess IP.) - Flags and fields with retrieval information (Algorithm flag, error flag, scene condition, external data used) - Normalized Radiance input from the OMPS TC SDR - External data needed for the Total Ozone calculation (Temperature profile, cloud top pressure, terrain pressure, cloud fraction, ground reflectivity, tropopause pressure, snow/ice fraction, ozone profile used to perform shape correction) - Other values calculated within the retrieval that are either required to obtain the Total Ozone best estimate (reflectivity, total ozone below cloud, profile mixing fraction, tropospheric ozone, ozone values calculated for each triplet pair) or produced as a secondary product (SO2 index, aerosol index) - Total Ozone Mapping Spectrometer (TOMS) v7 fields: Total ozone amounts, residuals, and sensitivities calculated with the TOMS version 7 method. - Quality Flags - South Atlantic Anomaly field

5.2.6.1 Ozone Total Column

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

Description/ Purpose	The Ozone total column is defined as the amount of Ozone in a vertical column of the atmosphere measured in Dobson Units (1 DU = 1 milli-atm-cm). The grating spectrometer and focal plane for total column measurements provide 0.45 nm spectral sampling across the wavelength range of 300 to 380 nm for a total of 22 wavelengths. The 22 wavelengths are those closest to: 1. 308.5 nm 2. 310.5 nm 3. 312.0 nm 4. 312.5 nm 5. 314.0 nm 6. 315.0 nm 7. 316.0 nm 8. 317.0 nm 9. 318.0 nm 10. 320.0 nm 11. 321.0 nm 12. 322.5 nm 13. 325.0 nm 14. 328.0 nm 15. 329.0 nm 16. 331.0 nm 17. 332.0 nm 18. 336.0 nm 19. 364.0 nm * 20. 367.0 nm * 21. 372.0 nm * 22. 377.0 nm * * Reflectivity Wavelength Pressure units are provided in atmospheres (1 atm = 1013.25 hPa)
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 123.3 KiB This granule size includes OMPS Total Column Ozone 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
Data Content and Data Format	See Section 5.2.6.1.1, Ozone Total Column Data Content Summary See Section 5.2.6.1.2, Ozone Total Column Product Profile See Section 5.2.6.1.3, Ozone Total Column HDF5 Details See Section 5.2.6.1.4, Ozone Total Column Metadata See Section 5.2.6.1.5, Ozone Total Column Geolocation Details

5.2.6.1.1 Ozone Total Column Data Content Summary

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Table 5.2.6.1.1-1, Ozone Total Column Data Content Summary

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
ColumnAmountO3	Total Ozone best estimate	32-bit floating point	[N*5, 35]	[5, 35]	DU
Reflectivity	Average Reflectivity from retrieval	32-bit floating point	[N*5, 35]	[5, 35]	unitless
Wavelengths	22 Wavelengths of Observation	32-bit floating point	[N*5, 35, 22]	[5, 35, 22]	nm
NValueMeasured	Measured normalized radiances for 22 wavelengths	32-bit floating point	[N*5, 35, 22]	[5, 35, 22]	unitless
OzoneBelowCloud	Total Ozone below cloud	32-bit floating point	[N*5, 35]	[5, 35]	DU
TerrainPressure	Pressure at Terrain Surface	32-bit floating point	[N*5, 35]	[5, 35]	atm
CloudTopPressure	Cloud Top Pressure (from VIIRS)	32-bit floating point	[N*5, 35]	[5, 35]	atm
CloudFraction	Cloud Fraction calculated within code from either VIIRS Cloud Top Pressure (when snow/ice present) or from measured N-Value (when no snow/ice present)	32-bit floating point	[N*5, 35]	[5, 35]	unitless

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
MixingFraction	Profile Mixing Fraction	32-bit floating point	[N*5, 35]	[5, 35]	unitless
Aerosolindex	Best Aerosol Index from retrieval = weighted average of all triplet aerosol indices	32-bit floating point	[N*5, 35]	[5, 35]	unitless
TropophericO3Below13km	Best Tropospheric Ozone (below 13km). Calculated from a weighted average of all Tropospheric Ozone values from triplets	32-bit floating point	[N*5, 35]	[5, 35]	DU

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
ColumnAmountO3_fromFirstGuessIP	First Guess Total Column Ozone from the OMPS TC IP. This is equivalent to the "Best Ozone" from retrieval field for the OMPS TC. The First Guess IP calculates an initial Ozone value before all VIIRS processes are available for processing.	32-bit floating point	[N*5, 35]	[5, 35]	DU
ColumnAmountO3Residuals_fromFirstGuessIP	Residuals from First Guess Total Column IP	32-bit floating point	[N*5, 35, 22]	[5, 35, 22]	unitless
TropophericO3Below13km_perTripletPair	Tropospheric Ozone below 13km determined from enhanced residual correction for all 12 triplets	32-bit floating point	[N*5, 35, 12]	[5, 35, 12]	DU
TemperatureProfile	Temperature Profile used in retrieval (from CrIS)	32-bit floating point	[N*5, 35, 11]	[5, 35, 11]	K
TropopausePressure	Pressure at tropopause	32-bit floating point	[N*5, 35]	[5, 35]	atm

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
SnowIceFraction	Snow/Ice Fraction (from VIIRS)	32-bit floating point	[N*5, 35]	[5, 35]	unitless
OzoneProfileUsedforCorrection	Ozone Profile used in retrieval for Profile Correction routine	32-bit floating point	[N*5, 35, 11]	[5, 35, 11]	DU
SO2index	Sulfur Dioxide Index	32-bit floating point	[N*5, 35]	[5, 35]	unitless
SurfaceReflectivity	Minimum UV surface reflectivity	32-bit floating point	[N*5, 35]	[5, 35]	unitless
ColumnAmountO3v7	Total Column Ozone retrieved as calculated using the TOMS heritage v7 method (uses those wavelengths close to those used in the TOMS v7 algorithm)	32-bit floating point	[N*5, 35]	[5, 35]	DU
Residualsv7	Residuals from retrieval as calculated using the TOMS v7 method	32-bit floating point	[N*5, 35, 22]	[5, 35, 22]	unitless
Sensitivitiesv7	Sensitivities from retrieval as calculated using the TOMS v7 method	32-bit floating point	[N*5, 35, 22]	[5, 35, 22]	unitless

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
FirstOzoneFromTripletPairs	Initial estimate of total column ozone within the retrieval. This represents the Total Column amount before residual, temperature and profile corrections are applied.	32-bit floating point	[N*5, 35, 12]	[5, 35, 12]	DU
AerosolCorrectedOzone	Total Column Ozone after Aerosol Correction	32-bit floating point	[N*5, 35, 4]	[5, 35, 4]	DU
ProfileAndTemperatureCorrectedOzone	Total Column Ozone after Temperature and Profile Shape corrections	32-bit floating point	[N*5, 35, 4]	[5, 35, 4]	DU
AlgorithmFlag	Flag indicates which triplet pairs were used in the retrieval	unsigned 8-bit char	[N*5, 35]	[5, 35]	unitless
ErrorFlag	Error flag - bit mask indicating various errors in retrieval	unsigned 8-bit char	[N*5, 35]	[5, 35]	unitless

Name	Description	Data Type	Aggregate Dimensions (N = Number of Granules)	Granule Dimensions	Units
SceneCondition	Scene Condition - bit mask indicating various scene conditions	unsigned 8-bit char	[N*5, 35]	[5, 35]	unitless
ExternalDataUsed	Bit mask indicating what external data was used in retrieval	unsigned 8-bit char	[N*5, 35]	[5, 35]	unitless
QF1_OMPSTC	IFOV level Quality Flag	unsigned 8-bit char	[N*5, 35]	[5, 35]	unitless
QF2_OMPSTC	IFOV level Quality Flag	unsigned 8-bit char	[N*5, 35]	[5, 35]	unitless
SAA	Spacecraft within the South Atlantic Anomaly (extent in percent based on Climatological data)	unsigned 8-bit char	[N*5]	[5]	unitless
PadByte1	Pad byte	Unsigned 8-bit char	[N*1]	[1]	unitless

5.2.6.1.2 Ozone Total Column Product Profile

Table 5.2.6.1.2-1, Ozone Total Column Product Profile

Name	Data Size	Dimensions
ColumnAmountO3	4byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35

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 Ozone best estimate	0	50	650	DU	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

Reflectivity	4byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35

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
Average Reflectivity from retrieval	0			unitless	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

Wavelengths	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Wavelength	No	No	22	22									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		22 Wavelengths of Observation	0			nm	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				
NValueMeasured	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Wavelength	No	No	22	22									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Measured normalized radiances for 22 wavelengths	0			unitless	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				

OzoneBelowCloud — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35

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 Ozone below cloud	0			DU	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

TerrainPressure — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35

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
Pressure at Terrain Surface	0			atm	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

CloudTopPressure — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35

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 (from VIIRS)	0			atm	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

This document has been identified per the NPOESS Common Data Format Control Book – External Volume 5 Metadata, D34862-05, Appendix B as a document to be provided to the NOAA Comprehensive Large Array-data Stewardship System (CLASS) via the delivery of NPOESS Document Release Packages to CLASS.

CloudFraction	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		Swath	Yes	No	5	5										
		IFOV	No	No	35	35										
		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 Fraction calculated within code from either VIIRS Cloud Top Pressure (when snow/ice present) or from measured N-Value (when no snow/ice present)	0			unitless	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**			
										NA_FLOAT32_FILL	-999.9					
										MISS_FLOAT32_FILL	-999.8					
										ERR_FLOAT32_FILL	-999.5					
										ELINT_FLOAT32_FILL	-999.4					
										VDNE_FLOAT32_FILL	-999.3					
MixingFraction	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		Swath	Yes	No	5	5										
		IFOV	No	No	35	35										
		Datum														
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**				
		Profile Mixing Fraction	0			unitless	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**			
										NA_FLOAT32_FILL	-999.9					
										MISS_FLOAT32_FILL	-999.8					
										ERR_FLOAT32_FILL	-999.5					
										ELINT_FLOAT32_FILL	-999.4					
										VDNE_FLOAT32_FILL	-999.3					

Aerosolindex	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Best Aerosol Index from retrieval = weighted average of all triplet aerosol indices	0			unitless	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				
Tropospheric O3Below13km	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Best Tropospheric Ozone (below 13km). Calculated from a weighted average of all tropospheric Ozone values from triplets	0			DU	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				

ColumnAmountO3_fromFirstGuessIP	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		First Guess Total Column Ozone from the OMPS TC IP. This is equivalent to the "Best Ozone" from retrieval field for the OMPS TC. The First Guess IP calculates an initial Ozone value before all VIIRS processes are available for processing.	0	50	650	DU	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				
ColumnAmountO3Residuals_fromFirstGuessIP	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Wavelength	Yes	No	22	22									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Residuals from First Guess Total Column IP	0			unitless	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				

TroposphericO3Below13km_perTripletPair	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**								
		Swath	Yes	No	5	5								
		IFOV	No	No	35	35								
		Triplet	No	No	12	12								
		Datum												
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**		
		Tropospheric Ozone below 13km determined from enhanced residual correction for all 12 triplets	0			DU	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**	
										NA_FLOAT32_FILL	-999.9			
										MISS_FLOAT32_FILL	-999.8			
										ERR_FLOAT32_FILL	-999.5			
										ELINT_FLOAT32_FILL	-999.4			
										VDNE_FLOAT32_FILL	-999.3			
TemperatureProfile	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**								
		Swath	Yes	No	5	5								
		IFOV	No	No	35	35								
		Level	No	No	11	11								
		Datum												
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**		
		Temperature Profile used in retrieval (from CrIS)	0			kelvin	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**	
										NA_FLOAT32_FILL	-999.9			
										MISS_FLOAT32_FILL	-999.8			
										ERR_FLOAT32_FILL	-999.5			
										ELINT_FLOAT32_FILL	-999.4			
										VDNE_FLOAT32_FILL	-999.3			

TropopausePressure	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Pressure at tropopause	0			atm	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				
SnowIceFraction	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		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 (from VIIRS)	0			unitless	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				

OzoneProfileUsedforCorrection	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Level	No	No	11	11									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Ozone Profile used in retrieval for Profile Correction routine	0			DU	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				
SO2index	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Sulfur Dioxide Index	0			unitless	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				

SurfaceReflectivity	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		Swath	Yes	No	5	5										
		IFOV	No	No	35	35										
		Datum														
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**				
		Minimum UV surface reflectivity	0			unitless	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**			
										NA_FLOAT32_FILL	-999.9					
										MISS_FLOAT32_FILL	-999.8					
										ERR_FLOAT32_FILL	-999.5					
										ELINT_FLOAT32_FILL	-999.4					
										VDNE_FLOAT32_FILL	-999.3					
ColumnAmountO3v7	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**										
		Swath	Yes	No	5	5										
		IFOV	No	No	35	35										
		Datum														
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**				
		Total Column Ozone retrieved as calculated using the TOMS heritage v7 method (uses those wavelengths close to those used in the TOMS v7 algorithm)	0	50	650	DU	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**			
										NA_FLOAT32_FILL	-999.9					
										MISS_FLOAT32_FILL	-999.8					
										ERR_FLOAT32_FILL	-999.5					
										ELINT_FLOAT32_FILL	-999.4					
										VDNE_FLOAT32_FILL	-999.3					

Residualsv7	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Wavelength	No	No	22	22									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Residuals from retrieval as calculated using the TOMS v7 method	0			unitless	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				
Sensitivitiesv7	4byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Wavelength	No	No	22	22									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Sensitivities from retrieval as calculated using the TOMS v7 method	0			unitless	No		32-bit floating point	**Name**	**Value**	**Name**	**Value**		
										NA_FLOAT32_FILL	-999.9				
										MISS_FLOAT32_FILL	-999.8				
										ERR_FLOAT32_FILL	-999.5				
										ELINT_FLOAT32_FILL	-999.4				
										VDNE_FLOAT32_FILL	-999.3				

FirstOzoneFromTripletPairs — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35
Triplet	No	No	12	12

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
Initial estimate of total column ozone within the retrieval. This represents the Total Column amount before residual, temperature and profile corrections are applied.	0	50	650	DU	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

AerosolCorrectedOzone — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35
Reflectivity Wavelength	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
Total Column Ozone after Aerosol Correction	0	50	650	DU	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

ProfileAndTemperatureCorrectedOzone — 4byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35
Reflectivity Wavelength	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
Total Column Ozone after Temperature and Profile Shape corrections	0	50	650	DU	No		32-bit floating point	NA_FLOAT32_FILL	-999.9		
								MISS_FLOAT32_FILL	-999.8		
								ERR_FLOAT32_FILL	-999.5		
								ELINT_FLOAT32_FILL	-999.4		
								VDNE_FLOAT32_FILL	-999.3		

AlgorithmFlag — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35

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
Flag indicates which triplet pairs were used in the retrieval	0			unitless	No		unsigned 8-bit char			No Snow/Ice present, Wavelength Pairs = Perturbation Pairs = 308.5 - 321.0, 310.5 - 321.0, 312.0 - 321.0	1
										No Snow/Ice present, Wavelength Pairs = Perturbation Pairs = 310.5 - 321.0, 312.0 - 321.0, 312.5 - 321.0	2
										No Snow/Ice present, Wavelength Pairs = Perturbation Pairs = 312.0 - 321.0, 312.5 - 321.0, 314.0 - 321.0	3
										No Snow/Ice present, Wavelength Pairs 312.5 - 321.0, 314.0 - 321.0, 318.0 - 336.0; Perturbation Pairs = 308.5 – 321.0, 308.5 – 321.0, 308.5 –336.0	4

											No Snow/Ice present, Wavelength Pairs 314.0 - 321.0, 318.0 - 336.0, 315.0 - 321.0; Perturbation Pairs = 310.5 – 321.0, 310.5 – 336.0, 310.5 – 321.0	5
											No Snow/Ice present, Wavelength Pairs 318.0 - 336.0, 315.0 - 321.0, 320.0 - 329.0; Perturbation Pairs = 310.5 – 336.0, 310.5 – 321.0, 310.5 – 329.0	6
											No Snow/Ice present, Wavelength Pairs 318.0 - 336.0, 315.0 - 321.0, 320.0 - 329.0; Perturbation Pairs = 312.5 – 336.0, 312.5 – 321.0, 312.5 – 329.0	7
											No Snow/Ice present, Wavelength Pairs 320.0 - 329.0, 322.5 - 332.0, 325.0 - 336.0; Perturbation Pairs = 314.0 – 336.0, 314.0 – 321.0, 314.0 – 329.0	8
											No Snow/Ice present, Wavelength Pairs 320.0 - 329.0, 322.5 - 332.0, 325.0 - 336.0; Perturbation Pairs = 315.0 – 329.0, 315.0 – 332.0, 315.0 – 336.0	9
											No Snow/Ice present, Wavelength Pairs 322.5 - 332.0, 325.0 - 336.0, 328.0 - 336.0; Perturbation Pairs = 315.0 – 332.0, 315.0 – 336.0, 315.0 – 336.0	10
											No Snow/Ice present, Wavelength Pairs 325.0 - 336.0, 328.0 - 336.0, 331.0 - 336.0; Perturbation Pairs = 320.0 – 336.0, 320.0 – 336.0, 320.0 – 336.0	11
											Snow/Ice present, Wavelength Pairs = Perturbation Pairs = 308.5 - 321.0, 310.5 - 321.0, 312.0 - 321.0	21
											Snow/Ice present,	22

											Wavelength Pairs = Perturbation Pairs = 310.5 - 321.0, 312.0 - 321.0, 312.5 - 321.0	
											Snow/Ice present, Wavelength Pairs = Perturbation Pairs = 312.0 - 321.0, 312.5 - 321.0, 314.0 - 321.0	23
											Snow/Ice present, Wavelength Pairs 312.5 - 321.0, 314.0 - 321.0, 318.0 - 336.0; Perturbation Pairs = 308.5 – 321.0, 308.5 – 321.0, 308.5 –336.0	24
											Snow/Ice present, Wavelength Pairs 314.0 - 321.0, 318.0 - 336.0, 315.0 - 321.0; Perturbation Pairs = 310.5 – 321.0, 310.5 – 336.0, 310.5 – 321.0	25
											Snow/Ice present, Wavelength Pairs 318.0 - 336.0, 315.0 - 321.0, 320.0 - 329.0; Perturbation Pairs = 310.5 – 336.0, 310.5 – 321.0, 310.5 – 329.0	26
											Snow/Ice present, Wavelength Pairs 318.0 - 336.0, 315.0 - 321.0, 320.0 - 329.0; Perturbation Pairs = 312.5 – 336.0, 312.5 – 321.0, 312.5 – 329.0	27
											Snow/Ice present, Wavelength Pairs 320.0 - 329.0, 322.5 - 332.0, 325.0 - 336.0; Perturbation Pairs = 314.0 – 336.0, 314.0 – 321.0, 314.0 – 329.0	28
											Snow/Ice present, Wavelength Pairs 320.0 - 329.0, 322.5 - 332.0, 325.0 - 336.0; Perturbation Pairs = 315.0 – 329.0, 315.0 – 332.0, 315.0 – 336.0	29
											Snow/Ice present, Wavelength Pairs 322.5 - 332.0, 325.0 - 336.0, 328.0	30

											- 336.0; Perturbation Pairs = 315.0 – 332.0, 315.0 – 336.0, 315.0 – 336.0	
											Snow/Ice present, Wavelength Pairs 325.0 - 336.0, 328.0 - 336.0, 331.0 - 336.0; Perturbation Pairs = 320.0 – 336.0, 320.0 – 336.0, 320.0 – 336.0	31

ErrorFlag — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
Residual too large	0			Unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**
										False	0
										True	1
SO2 index too large	1			Unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**
										False	0
										True	1
Triplet inconsistency	2			Unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**
										False	0
										True	1
Ozone value out of range	3			Unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**
										False	0
										True	1
Surface Reflectivity out of range	4			Unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**
										False	0
										True	1
Spare	5			unitless	No		3 bits	**Name**	**Value**	**Name**	**Value**

SceneCondition	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		Descending/Ascending Retrieval	0			unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**		
												Descending retrieval	0		
												Ascending retrieval	1		
		Snow/Ice Present	1			unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		Tropospheric Aerosols Present	2			unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		Snow/Ice (fraction of area covered) > 0.0	3			unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		Solar Zenith Angle > 80 degrees	4			unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		Surface Reflectivity is > 1.20 or < -0.05	5			unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		Spare	6			unitless	No		2 bit	**Name**	**Value**	**Name**	**Value**		

ExternalDataUsed	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**									
		Swath	Yes	No	5	5									
		IFOV	No	No	35	35									
		Datum													
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**			
		CrIMSS Temperature Profile used	0			unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		VIIRS Snow/Ice available	1			unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		VIIRS Cloud Top Pressure Used	2			unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		Spare	3			unitless	No		5 bits	**Name**	**Value**	**Name**	**Value**		

Table 5.2.6.1.2-2, Ozone Total Column Product Profile – Quality Flags

Name	Data Size	Dimensions
QF1_OMPSTC	1byte(s)	

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35

Datum

Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries
Total Column Quality (Overall quality of the TC retrieval)	0			unitless	No		2 bits	Name / Value	Name / Value: No Retrieval 0; Low 1; Medium 2; High 3
Input Data Quality is not good	2			unitless	No		1 bit	Name / Value	Name / Value: False 0; True 1
O3 triplet selection is not Consistent within retrieval(Ozone Triplet consistency)	3			unitless	No		1 bit	Name / Value	Name / Value: False 0; True 1
Residues are not Consistent (Indicates whether the residues from the 22 wavelengths are consistent)	4			unitless	No		1 bit	Name / Value	Name / Value: False 0; True 1
SO2 Index > 6DU (Degraded Condition)	5			unitless	No		1 bit	Name / Value	Name / Value: False 0; True 1
Solar Zenith Angle Exclusion (SZA in normal, degraded, or excluded (night) condition)	6			unitless	No		2 bits	Name / Value	Name / Value: Solar Zenith Angle < 80 degrees (no exclusion) 0; 80 degrees <= Solar Zenith 1

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											Angle < 88 degrees (degraded)	
											Solar Zenith Angle >= 88 degrees (Exclusion)	2

QF2_OMPSTC — 1byte(s)

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size
Swath	Yes	No	5	5
IFOV	No	No	35	35

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 or Ice Surface is within the IFOV	0			unitless	No		1 bit		False 0 True 1
Sun Glint present within IFOV	1			unitless	No		1 bit		False 0 True 1
Solar Eclipse present (All or part of the IFOV is affected by a solar eclipse, umbra or penumbra viewing)	2			unitless	No		1 bit		False 0 True 1
Best Total Column Ozone retrieved is outside of system spec range of 50-650 DU	3			unitless	No		1 bit		False 0 True 1
Performance Range (Performance requirements as a function of ozone concentration in DU)	4			unitless	No		2 bits		TC > 450 0 250 < TC <= 450 1 TC <= 250 2
Aerosol Index limit exceeded	6			unitless	No		1 bit		False 0 True 1
spare	7			unitless	No		1 bit		

SAA	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**								
		Swath	Yes	No	5	5								
		Datum												
		Description	**Datum Offset**	**Unscaled Valid Range Min**	**Unscaled Valid Range Max**	**Measurement Units**	**Scaled**	**Scale Factor Name**	**Data Type**	**Fill Values**		**Legend Entries**		
		Spacecraft within the South Atlantic Anomaly (extent in percent based on Climatological data)	0			unitless	No		unsigned 8-bit char	**Name**	**Value**	**Name**	**Value**	
												0% <= SAA <= 10%	0	
												10% < SAA <= 20%	1	
												20% < SAA <= 30%	2	
												30% < SAA <= 40%	3	
												40% < SAA <= 50%	4	
												50% < SAA <= 60%	5	
												60% < SAA <= 70%	6	
												70% < SAA <= 80%	7	
												SAA > 80%	8	
PadByte1	1byte(s)	**Name**	**Granule Boundary**	**Dynamic**	**Min Array Size**	**Max Array Size**								
		Granule	Yes	No	1	1								
		Datum												

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		Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values		Legend Entries	
		Pad byte				unitless	No		unsigned 8-bit char	Name	Value	Name	Value

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5.2.6.1.3 Ozone Total Column HDF5 Details

Figure 5.2.6.1.3-1, Ozone Total Column UML Diagram, provides details on the contents and data types of the Ozone Total Column product. This UML provides details at the product level detail only. In addition to this UML, refer to the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

OMPS-TC-EDR
+ColumnAmountO3 : H5T_NATIVE_FLOAT +Reflectivity : H5T_NATIVE_FLOAT +NValueMeasured : H5T_NATIVE_FLOAT +OzoneBelowCloud : H5T_NATIVE_FLOAT +TerrainPressure : H5T_NATIVE_FLOAT +CloudTopPressure : H5T_NATIVE_FLOAT +CloudFraction : H5T_NATIVE_FLOAT +MixingFraction : H5T_NATIVE_FLOAT +Aerosolindex : H5T_NATIVE_FLOAT +TropospherioO3Below13km : H5T_NATIVE_FLOAT +ColumnAmountO3_fromFirstGuessIP : H5T_NATIVE_FLOAT +ColumnAmountO3Residuals_fromFirstGuessIP : H5T_NATIVE_FLOAT +TropospherioO3Below13km_perTripletPair : H5T_NATIVE_FLOAT +TemperatureProfile : H5T_NATIVE_FLOAT +TropopausePressure : H5T_NATIVE_FLOAT +SnowIceFraction : H5T_NATIVE_FLOAT +OzoneProfileUsedforCorrection : H5T_NATIVE_FLOAT +SO2index : H5T_NATIVE_FLOAT +SurfaceReflectivity : H5T_NATIVE_FLOAT +ColumnAmountO3v7 : H5T_NATIVE_FLOAT +Residualsv7 : H5T_NATIVE_FLOAT +Sensitivitiesv7 : H5T_NATIVE_FLOAT +FirstOzoneFromTripletPairs : H5T_NATIVE_FLOAT +AerosolCorrectedOzone : H5T_NATIVE_FLOAT +ProfileAndTemperatureCorrectedOzone : H5T_NATIVE_FLOAT +AlgorithmFlag : H5T_NATIVE_UCHAR +ErrorFlag : H5T_NATIVE_UCHAR +SceneCondition : H5T_NATIVE_UCHAR +ExternalDataUsed : H5T_NATIVE_UCHAR +QF1_OMPSTC : H5T_NATIVE_UCHAR +QF2_OMPSTC : H5T_NATIVE_UCHAR +SouthAtlanticAnomaly : H5T_NATIVE_UCHAR

Figure 5.2.6.1.3-1, OMPS Total Column UML Diagram

5.2.6.1.4 Ozone Total Column HDF5 Metadata

The HDF5 metadata elements associated with the OMPS Total Column Ozone are listed in the CDFCB-X Volume V – Metadata, D34862-05, Section 4.3, HDF5

(Metadata) Hierarchy. The OMPS Total Column Ozone metadata includes all common metadata at the root, product, aggregation, and granule levels.

In addition to the common metadata items for this product, Table 5.2.6.1.4-1, Ozone Total Column Ozone N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values, provides the following items as name/value pairs.

Table 5.2.6.1.4-1, Ozone Total Column Ozone N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Notes**
Summary Quality	0 – 100	Percent of retrievals with high quality	
Exclusion Summary	0 – 100	Percent of retrievals within granule with one or more exclusion criteria flags	
Input Data Summary	0 – 100	Percent of retrievals affected by poor input data	

5.2.6.1.5 Ozone Total Column Geolocation Details

OMPS Total Column Ozone Geolocation is the same as the OMPS Science SDR Geolocation. See the CDFCB-X, Volume III – Science Data Records, D34862-03, Sections 2.10.1.5 – 2.10.1.8 for details.

5.2.7 DELETED

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5.2.8 DELETED

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5.2.9 DELETED

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5.2.10 DELETED

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5.2.11 DELETED

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5.3 Cloud Environmental Data Records

5.3.1 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 NPOESS 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.

The Cloud Base Height EDR is reported in km above the Mean Sea Level.

Sensors	VIIRS
Effectivity	NPP/NPOESS
EDR Contents	Each EDR will contain: Layer cloud base height Total cloud base height Quality Flags

5.3.1.1 DELETED

5.3.1.2 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).
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 1.03 MiB 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 5.3.1.2.1, VIIRS Cloud Base Height Data Content Summary See Section 5.3.1.2.2, VIIRS Cloud Base Height Product Profile See Section 5.3.1.2.3, VIIRS Cloud Base Height HDF5 Details See Section 5.3.1.2.4, VIIRS Cloud Base Height HDF5 Metadata Details See Section 5.3.1.2.5, VIIRS Cloud Base Height Geolocation Details

5.3.1.2.1 VIIRS Cloud Base Height Data Content Summary

Table 5.3.1.2.1-1, VIIRS Cloud Base Height Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
LayerCloudBaseHeight	Cloud Base Height - layered product (ordered from top of atmosphere to surface)	16-bit unsigned integer	[N*96, 508, 4]	[96, 508, 4]	km
AverageCloudBaseHeight	Cloud Base Height – Average Cloud Base Height of all Layers	16-bit unsigned integer	[N*96, 508]	[96, 508]	km

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
QF1_VIIRSCBHLAYEREDR	Layer CBH Quality Flags	8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCBHLAYEREDR		8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCBHAVGEDR	Quality Flags for AverageCloudBaseHeight Fields	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCBHAVGEDR		8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCBHEDR	Non-Cloud Quality Flags	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCBHEDR		8-bit unsigned 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

5.3.1.2.2 VIIRS Cloud Base Height Product Profile

Table 5.3.1.2.2-1, VIIRS Cloud Base Height Product Profile

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**	
		Cloud Base Height - layered product (ordered from top of atmosphere to surface)	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		
										ELINT_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		
										ELINT_UINT16_FILL	65530		
										VDNE_UINT16_FILL	65529		
										SOUB_UINT16_FILL	65528		

Table 5.3.1.2.2-2, VIIRS Cloud Base Height Product Profile – Quality Flags

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	
								Name	Value	Name	Value
Cloud Confidence (Indicates cloudiness - percent cloudiness for this layer)	0			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			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			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			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_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			unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**
										0 <= % valid retrievals < 25%	0
										25 <= % valid retrievals <	1

											50%	
											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			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			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1	
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit(s)	Name Value	Name Value False 0 True 1	
		Spare	5			unitless	No		2 bit(s)	Name Value	Name Value	
		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7			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			unitless	No		2 bit(s)	Name Value	Name Value 0% <= cloudiness < 25% 0 25% <= cloudiness < 50% 1	

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												50% <= cloudiness < 75%	2
												75% <= cloudiness <= 100%	3
		Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2			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			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			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

														100%	
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**		**Legend Entries**			
		Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0			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			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			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		Spare	5			unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**		

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		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7			unitless	No		1 bit(s)	Name / Value	Name	Value
											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		Legend Entries	
Snow/Ice Fraction	0			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			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			unitless	No		2 bit(s)	Name	Value	Name	Value
										Day (Solar Zenith Angle < 75 degrees)	1
										Night (Solar Zenith Angle >= 75 degrees)	2
										Transition	3

												(Terminator)	
		Bad SDR Data (Quality of CBH degraded or CBH not obtained due to any bad SDR data in Horizontal cell)	6			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			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			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	3

												Fraction <= 100%	
		spare	4			unitless	No		4 bit(s)	Name Value		Name Value	

Table 5.3.1.2.2-3, VIIRS Cloud Base Height Product Profile – Factors

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				Scale = unitless; Offset = km	No		32-bit floating point	Name Value		Name Value	

5.3.1.2.3 VIIRS Cloud Base Height HDF5 Details

Figure 5.3.1.2.3-1, 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 the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

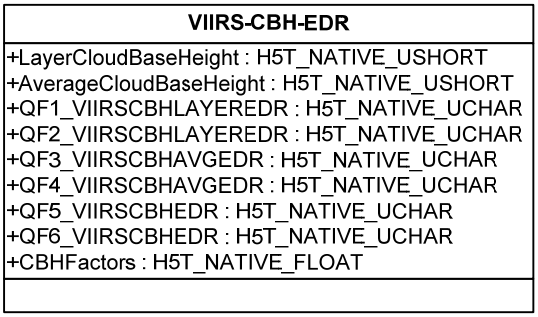

Figure 5.3.1.2.3-1, VIIRS Cloud Base Height UML Diagram

5.3.1.2.4 VIIRS Cloud Base Height HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Cloud Base Height EDR are listed in the CDFCB-X Volume V. 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 5.3.1.2.4-1, VIIRS Cloud Base Height N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level 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 5.3.1.2.4-1, VIIRS Cloud Base Height N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary

Name	Value	Description	Notes
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.	

5.3.1.2.5 VIIRS Cloud Base Height Geolocation Details

See CDFCB-X, Vol. IV, Part I, D34862-04-01, Section 4.9.7, VIIRS Cloud Aggregated Geolocation.

5.3.2 Cloud Cover/Layers

Data Mnemonic	EDRE-VCCL-C0030 (Official) EDRE-VCCL-C0031 (Substitute)
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 NPOESS orbits, but the measurement accuracy for a terminator orbit will be degraded due to VIIRS calibration limitations for a terminator orbit. Sensors: VIIRS Effectivity: NPP and NPOESS
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 1.21 MiB 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 5.3.2.1, Cloud Cover/Layers Data Content Summary See Section 5.3.2.2 Cloud Cover/Layers Product Profile See Section 5.3.2.3, Cloud Cover/Layers HDF5 Details See Section 5.3.2.4, Cloud Cover/Layers HDF5 Metadata Details See Section 5.3.2.5, Cloud Cover/Layers Geolocation Details

5.3.2.1 VIIRS Cloud Cover/Layers Data Content Summary

Table 5.3.2.1-1, VIIRS Cloud Cover/Layers Height Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
LayerCloudCover	Cloud Cover Fraction - layered product (ordered from top of atmosphere to surface)	16-bit unsigned integer	[N*96, 508, 4]	[96, 508, 4]	unitless
SummedCloudCover	Cloud Cover Fraction – Vertical Sum of all layers	16-bit unsigned integer	[N*96, 508]	[96, 508]	unitless
LayerCloudType	Cloud Type - layered product (ordered from top of atmosphere to surface)	8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF1_VIIRSCCLLAYEREDR	Layer CCL Quality Flags	8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCCLLAYEREDR		8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCCLSUMEDR	Quality Flags for SummedCloudCover Field	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCCLSUMEDR		8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCCLEDR	Non-Cloud Quality Flags	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCCLEDR		8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
CCLFactors	Scale = first array element; Offset = 2nd array element	32-bit floating point	[N*2]	[2]	unitless

5.3.2.2 VIIRS Cloud Cover/Layers Height Product Profile

Table 5.3.2.2-1, VIIRS Cloud Cover/Layers Height Product Profile

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

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 Cover Fraction - layered product (ordered from top of atmosphere to surface)	0	0.00	1.00	unitless	Yes	CCLFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		
								ELINT_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	
								Name	Value	Name	Value
Cloud Cover Fraction – Vertical Sum of all layers	0	0.00	1.00	unitless	Yes	CCLFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		
								ELINT_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

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		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			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
										ELINT_UINT8_FILL	250	Cirrus	4
										VDNE_UINT8_FILL	249	Cirrocumulus	5
										SOUB_UINT8_FILL	248		

Table 5.3.2.2-2, VIIRS Cloud Cover/Layers Product Profile – Quality Flags

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	
								Name	Value	Name	Value
Cloud Confidence (Indicates cloudiness - percent cloudiness for this layer)	0			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			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			unitless	No		2 bit(s)			0% <= Multi-layer Cloud Fraction < 25%	0
										25% <= Multi-layer Cloud Fraction < 50%	1

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												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			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			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	3

											retrievals < =100%
		Out of bounds - More than 50% of pixels in Horizontal Cell are outside of the system spec valid range.	2			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			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value** False 0 True 1
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value** False 0 True 1
		Spare	5			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value**
		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7			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	
								Name	Value	Name	Value
Cloud Confidence (Indicates cloudiness - percent cloudiness)	0			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			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			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	3

												Fraction <= 100%	
		Cloud Fractional Coverage within Horizontal Cell - Mixed Phase (Water and Ice) Cloud	6			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			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			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			unitless	No		1 bit(s)	Name Value		Name Value		
												False 0		
												True 1		
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit(s)	Name Value		Name Value		
												False 0		
												True 1		
		Spare	5			unitless	No		2 bit(s)	Name Value		Name Value		
		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7			unitless	No		1 bit(s)	Name Value		Name Value		
												False 0		
												True 1		
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	
Snow/Ice Fraction	0			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			unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Sunglint Fraction < 25%	0
										25% <= Sunglint Fraction < 50%	1
										50% <=	2

												Sunglint Fraction < 75%	
												75% <= Sunglint Fraction <= 100%	3
		Day/Night Degradation Flag	4			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 CCL degraded or CCL not obtained due to any bad SDR data in Horizontal cell)	6			unitless	No		2 bit(s)	**Name** **Value**		**Name**	**Value**
												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**	
		Surface Type - Sea Water (Ocean) Fractional Coverage within Horizontal Cell	0			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 -	2			unitless	No		2	**Name** **Value**		**Name**	**Value**

		Coastal Fractional Coverage within Horizontal Cell							bit(s)			0% <= Coastal Fraction < 25%	0
												25% <= Coastal Fraction < 50%	1
												50% <= Coastal Fraction < 75%	2
												75% <= Coastal Fraction <= 100%	3
		spare	4			unitless	No		4 bit(s)	**Name** **Value**		**Name** **Value**	

Table 5.3.2.2-3, VIIRS Cloud Cover/Layers Product Profile – Factors

Name	Data Size	Dimensions
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	
								Name	Value	Name	Value
Scale = first array element; Offset = 2nd array element				unitless	No		32-bit floating point				

5.3.2.3 VIIRS Cloud Cover/Layers HDF5 Details

Figures 5.3.2.3-1, 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 the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

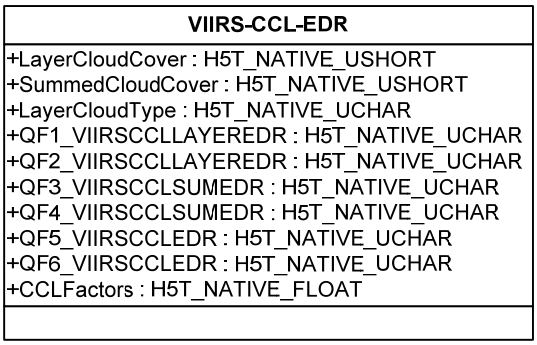

Figure 5.3.2.3-1, VIIRS Cloud Cover/Layers UML Diagram

5.3.2.4 VIIRS Cloud Cover/Layers HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Cloud Cover/Layers EDR are listed in the CDFCB-X Volume V. 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 5.3.2.4-1, VIIRS Cloud Cover/Layers N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level 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 5.3.2.4-1, VIIRS Cloud Cover/Layers N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Notes**
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.	

5.3.2.5 VIIRS Cloud Cover/Layers Geolocation Details

See CDFCB-X, Vol. IV, Part I, D34862-04-01, Section 4.9.7, VIIRS Cloud Aggregated Geolocation.

5.3.3 Cloud Effective Particle Size

Data Mnemonic	EDRE-VCEP-C0030 (Official) 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: NPP and NPOESS
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 1.03 MiB 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) * Quality Flags 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 5.3.3.1, Cloud Effective Particle Size Data Content Summary See Section 5.3.3.2, Cloud Effective Particle Size Product Profile See Section 5.3.3.3, Cloud Effective Particle Size HDF5 Details See Section 5.3.3.4, Cloud Effective Particle Size HDF5 Metadata Details See Section 5.3.3.5, Cloud Effective Particle Size Geolocation Details

5.3.3.1 Cloud Effective Particle Size Data Content Summary

Table 5.3.3.1-1, Cloud Effective Particle Size Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
LayerCloudEffectiveParticleSize	Cloud Effective Particle Size - layered product (ordered from top of atmosphere to surface)	16-bit unsigned integer	[N*96, 508, 4]	[96, 508, 4]	micrometer

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
AverageCloudEffectiveParticleSize	Cloud Effective Particle Size - Average of all layers	16-bit unsigned integer	[N*96, 508]	[96, 508]	micrometers
QF1_VIIRSCEPSLAYEREDR	Layer CEPS Quality Flags	8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCEPSLAYEREDR		8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCEPSAVGEDR	Quality Flags for Averaged CEPS Fields	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCEPSAVGEDR		8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCEPSEDR	Non-Cloud Quality Flags	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCEPSEDR		8-bit unsigned 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 = micrometer

5.3.3.2 Cloud Effective Particle Size Product Profile

Table 5.3.3.2-1, Cloud Effective Particle Size Product Profile

Name	Data Size	Dimensions
LayerCloudEffectiveParticleSize	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 Effective Particle Size - layered product (ordered from top of atmosphere to surface)	0	0.00	124.00	micrometer	Yes	CEPSFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Name	Data Size	Dimensions
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	
								Name	Value	Name	Value
Cloud Effective Particle Size - Average of all layers	0	0.00	124.00	micrometers	Yes	CEPSFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		

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										ELINT_UINT16_FILL	65530	
										VDNE_UINT16_FILL	65529	
										SOUB_UINT16_FILL	65528	

Table 5.3.3.2-2, Cloud Effective Particle Size Product Profile – Quality Flags

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	
								Name	Value	Name	Value
Cloud Confidence (Indicates cloudiness - percent cloudiness for this layer)	0			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			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			unitless	No		2 bit(s)			0% <= Multi-layer Cloud Fraction < 25%	0
										25% <= Multi-layer Cloud	1

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											Fraction < 50%	
											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			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			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			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			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value** False 0 True 1	
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value** False 0 True 1	
		Spare	5			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value**	
		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7			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			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value** 0% <= cloudiness < 25% 0 25% <= cloudiness < 50% 1 50% <= 2

												cloudiness < 75%	
												75% <= cloudiness <= 100%	3
		Cloud Fractional Coverage within Horizontal Cell - Water Cloud	2			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			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			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 (Name / Value)	Legend Entries (Name / Value)
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0			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			unitless	No		1 bit(s)		False : 0 True : 1

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		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			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value** False 0 True 1
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value** False 0 True 1
		Spare	5			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value**
		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7			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			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			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			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			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			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			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			unitless	No		4 bits	**Name**	**Value**	**Name**	**Value**	

Table 5.3.3.2-3, Cloud Effective Particle Size Product Profile – Factors

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	
								Name	Value	Name	Value
Scale = first array element; Offset = 2nd array element				Scale = unitless; Offset = micrometers	No		32-bit floating point				

5.3.3.3 Cloud Effective Particle Size HDF5 Details

Figures 5.3.3.3-1, 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 the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

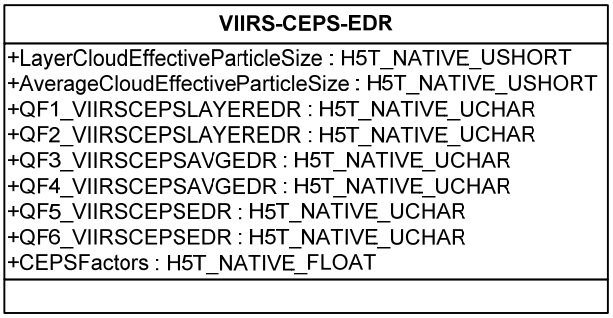

Figure 5.3.3.3-1, Cloud Effective Particle Size UML Diagram

5.3.3.4 Cloud Effective Particle Size HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Cloud Effective Particle Size EDR are listed in the CDFCB-X Volume V. 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 5.3.3.4-1, Cloud Effective Particle Size N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level 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 5.3.3.4-1, Cloud Effective Particle Size N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Notes**
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.	

5.3.3.5 Cloud Effective Particle Size Geolocation Details

See CDFCB-X, Vol. IV, Part I, D34862-04-01, Section 4.9.7, VIIRS Cloud Aggregated Geolocation.

5.3.4 DELETED

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5.3.6 Cloud Optical Thickness

Data Mnemonic	EDRE-VCOT-C0030 (Official) 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(- τ). This EDR will be produced from all nominal NPOESS 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: NPP and NPOESS
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 1.03 MiB 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 5.3.6.1, Cloud Optical Thickness Data Content Summary See Section 5.3.6.2, Cloud Optical Thickness Product Profile See Section 5.3.6.3, Cloud Optical Thickness HDF5 Details See Section 5.3.6.4, Cloud Optical Thickness HDF5 Metadata Details See Section 5.3.6.5, Cloud Optical Thickness Geolocation Details

5.3.6.1 Cloud Optical Thickness Data Content Summary

Table 5.3.6.1-1, Cloud Optical Thickness Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
LayerCloudOpticalThickness	Cloud Optical Thickness - layered product (ordered from top of atmosphere to surface)	16-bit unsigned integer	[N*96, 508, 4]	[96, 508, 4]	unitless
AverageCloudOpticalThickness	Cloud Optical Thickness - Average of all layers	16-bit unsigned integer	[N*96, 508]	[96, 508]	unitless

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
QF1_VIIRSCOTLAYEREDR	Layer COT Quality Flags	8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCOTLAYEREDR		8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCOTAVGEDR	Quality Flags for AverageCloudOpticalThickness Field	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCOTAVGEDR		8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCOTEDR	Non-Cloud Quality Flags	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCOTEDR		8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
COTFactors	Scale = first array element; Offset = 2nd array element	32-bit floating point	[N*2]	[2]	unitless

5.3.6.2 Cloud Optical Thickness Product Profile

Table 5.3.6.2-1, Cloud Optical Thickness Product Profile

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									
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
ELINT_UINT16_FILL	65530
VDNE_UINT16_FILL	65529
SOUB_UINT16_FILL	65528

Name	Value

Name	Data Size	Dimensions
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
ELINT_UINT16_FILL	65530
VDNE_UINT16_FILL	65529
SOUB_UINT16_FILL	65528

Name	Value

Table 5.3.6.2-2, Cloud Optical Thickness Product Profile – Quality Flags

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	
								Name	Value	Name	Value
Cloud Confidence (Indicates cloudiness - percent cloudiness for this layer)	0			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			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			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			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_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**	
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0			unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**
										0 <= % valid retrievals < 25%	0
										25 <= % valid retrievals <	1

											50%	
											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			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			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value**	
											False	0
											True	1
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value**	
											False	0
											True	1
		Spare	5			unitless	No		2 bit(s)	**Name** **Value**	**Name** **Value**	
		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7			unitless	No		1 bit(s)	**Name** **Value**	**Name** **Value**	
											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		Legend Entries	
Cloud Confidence (Indicates cloudiness - percent cloudiness)	0			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			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			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			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

												100%	

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	
								Name	Value	Name	Value
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0			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			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			unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit(s)	Name	Value	Name	Value
										False	0
										True	1
Spare	5			unitless	No		2 bit(s)	Name	Value	Name	Value
Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7			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	
								Name	Value	Name	Value
Snow/Ice Fraction	0			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			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			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 COT	6			unitless	No		2 bit(s)			Good	0

		degraded or COT not obtained due to any bad SDR data in Horizontal cell)									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	
								Name	Value	Name	Value
Surface Type - Sea Water (Ocean) Fractional Coverage within Horizontal Cell	0			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			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			unitless	No		4	Name	Value	Name	Value

									bit(s)		

Table 5.3.6.2-3, Cloud Optical Thickness Product Profile – Factors

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	
								Name	Value	Name	Value
Scale = first array element; Offset = 2nd array element				unitless	No		32-bit floating point				

5.3.6.3 Cloud Optical Thickness HDF5 Details

Figures 5.3.6.3-1, 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 the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

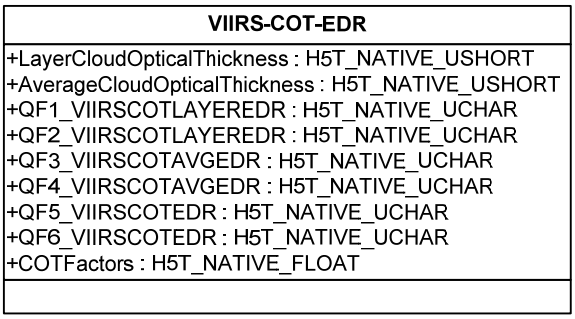

Figure 5.3.6.3-1, Cloud Optical Thickness UML Diagram

5.3.6.4 Cloud Optical Thickness HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Cloud Optical Thickness EDR are listed in the CDFCB-X Volume V. 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 5.3.6.4-1, Cloud Optical Thickness N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level 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 5.3.6.4-1, Cloud Optical Thickness N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Notes**
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.	

5.3.6.5 Cloud Optical Thickness Geolocation Details

See CDFCB-X, Vol. IV, Part I, D34862-04-01, Section 4.9.7, VIIRS Cloud Aggregated Geolocation.

5.3.7 Cloud Top Height

Data Mnemonic	EDRE-VCTH-C0030 (Official) 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: NPP and NPOESS
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 1.03 MiB 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
Data Content and Data Format	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 5.3.7.1, Cloud Top Height Data Content Summary See Section 5.3.7.2, Cloud Top Height Product Profile See Section 5.3.7.3, Cloud Top Height HDF5 Details See Section 5.3.7.4, Cloud Top Height HDF5 Metadata Details See Section 5.3.7.5, Cloud Top Height Geolocation Details

5.3.7.1 Cloud Top Height Data Content Summary

Table 5.3.7.1-1, Cloud Top Height Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
LayerCloudTopHeight	Cloud Top Height - layered product (ordered from top of atmosphere to surface)	16-bit unsigned integer	[N*96, 508, 4]	[96, 508, 4]	km
AverageCloudTopHeight	Cloud Top Height - Average of all layers	16-bit unsigned integer	[N*96, 508]	[96, 508]	km
QF1_VIIRSCTHLAYEREDR	Layer CTH Quality Flags	8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCTHLAYEREDR		8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCTHAVGEDR	Quality Flags for AverageCloudTopHeight Field	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCTHAVGEDR		8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCTHEDR	Non-Cloud Quality Flags	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCTHEDR		8-bit unsigned char	[N*96, 508]	[96, 508]	unitless

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
CTHFactors	Scale = first array element; Offset = 2nd array element	32-bit floating point	[N*2]	[2]	Scale = unitless ; Offset = km

5.3.7.2 Cloud Top Height Product Profile

Table 5.3.7.2-1, Cloud Top Height Product Profile

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		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Name	Data Size	Dimensions
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		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Table 5.3.7.2-2, Cloud Top Height Product Profile – Quality Flags

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			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			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			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			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_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	
Overall Quality (Percent of valid retrievals = valid Retrievals / total number of cloudy pixels)	0			unitless	No		2 bit(s)	Name	Value	Name	Value
										0 <= % valid retrievals < 25%	0
										25 <= % valid retrievals <	1

											50%	
											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			unitless	No		1 bit	**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			unitless	No		1 bit	**Name** **Value**	**Name** **Value** False 0 True 1	
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit	**Name** **Value**	**Name** **Value** False 0 True 1	
		Opaque (black) cloud branching	5			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 <=	3

												100%	
		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7			unitless	No		1 bit(s)	Name Value		Name Value 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	
Cloud Confidence (Indicates cloudiness - percent cloudiness)	0			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			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			unitless	No		2 bit(s)	Name	Value	Name	Value
										0% <= Multi-layer Cloud Fraction < 25%	0
										25% <= Multi-layer Cloud Fraction < 50%	1

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											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			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			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			unitless	No		1 bit	**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			unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	1		
		Opaque (black) cloud branching	5			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			unitless	No		1 bit(s)	**Name**	**Value**	**Name**	**Value**		
												False	0		
												True	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									
		Datum													

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		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			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			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			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 CTH degraded or CTH not obtained due to any bad SDR data in Horizontal cell)	6			unitless	No		2 bit(s)	Name	Value	Name	Value
												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							

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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			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			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			unitless	No		4 bit(s)	**Name**	**Value**	**Name**	**Value**

Table 5.3.7.2-3, Cloud Top Height Product Profile – Factors

Name	Data Size	Dimensions
CTHFactors	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	
								Name	Value	Name	Value
Scale = first array element; Offset = 2nd array element				Scale = unitless; Offset = km	No		32-bit floating point				

5.3.7.3 Cloud Top Height HDF5 Details

Figures 5.3.7.3-1, 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 the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

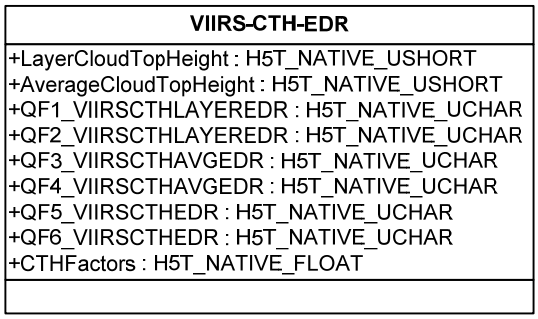

Figure 5.3.7.3-1, Cloud Top Height UML Diagram

5.3.7.4 Cloud Top Height HDF5 Metadata Details

The HDF5 metadata elements associated with the Cloud Top Height EDR are listed in the CDFCB-X Volume V. 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 5.3.7.4-1, Cloud Top Height N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level 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 5.3.7.4-1, Cloud Top Height N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary

Name	Value	Description	Notes
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.	

5.3.7.5 Cloud Top Height Geolocation Details

See CDFCB-X, Vol. IV, Part I, D34862-04-01, Section 4.9.7, VIIRS Cloud Aggregated Geolocation

5.3.8 Cloud Top Pressure

Data Mnemonic	EDRE-VCTP-C0030 (Official) EDRE-VCTP-C0031 (Substitute)
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, 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: NPP and NPOESS
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 1.03 MiB 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 5.3.8.1, Cloud Top Pressure Data Content Summary See Section 5.3.8.2, Cloud Top Pressure Product Profile See Section 5.3.8.3, Cloud Top Pressure HDF5 Details See Section 5.3.8.4, Cloud Top Pressure HDF5 Metadata Details See Section 5.3.8.5, Cloud Top Pressure Geolocation Details

5.3.8.1 Cloud Top Pressure Data Content Summary

Table 5.3.8.1-1, Cloud Top Pressure Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
LayerCloudTopPressure	Cloud Top Pressure - layered product (ordered from top of atmosphere to surface)	16-bit unsigned integer	[N*96, 508, 4]	[96, 508, 4]	hPa
AverageCloudTopPressure	Cloud Top Pressure - Average of all layers	16-bit unsigned integer	[N*96, 508]	[96, 508]	hPa
QF1_VIIRSCTPLAYERED R	Layer CTP Quality Flags	8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF2_VIIRSCTPLAYERED R		8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
QF3_VIIRSCTPAVGEDR	Quality Flags for AverageCloudTopPressure Field	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCTPAVGEDR		8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCTPEDR	Non-Cloud Quality Flags	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCTPEDR		8-bit unsigned 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

5.3.8.2 Cloud Top Pressure Product Profile

Table 5.3.8.2-1, Cloud Top Pressure Product Profile

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		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		
								ELINT_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	
								Name	Value	Name	Value
Cloud Top Pressure - Average of all layers	0	50.00	1050.00	hPa	Yes	CTPFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Table 5.3.8.2-2, Cloud Top Pressure Product Profile – Quality Flags

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	
								Name	Value	Name	Value
Cloud Confidence (Indicates cloudiness - percent cloudiness for this layer)	0			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			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			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			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_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			unitless	No		2 bit(s)	Name	Value	Name	Value
										0 <= % valid retrievals < 25%	0
										25 <= % valid retrievals <	1

											50%	
											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			unitless	No		1 bit	**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			unitless	No		1 bit	**Name** **Value**	**Name**	**Value**
											False	0
											True	1
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit	**Name** **Value**	**Name**	**Value**
											False	0
											True	1
		Opaque (black) cloud branching.	5			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 <=	3

												100%	
		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7			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			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			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			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			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			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			unitless	No		1 bit	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			unitless	No		1 bit	Name	Value	Name	Value		
												False	0		
												True	1		
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit	Name	Value	Name	Value		
												False	0		
												True	1		
		Opaque (black) cloud branching.	5			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			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									
		Datum													

This document has been identified per the NPOESS Common Data Format Control Book – External Volume 5 Metadata, D34862-05, Appendix B as a document to be provided to the NOAA Comprehensive Large Array-data Stewardship System (CLASS) via the delivery of NPOESS Document Release Packages to CLASS.

		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			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			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			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 CTP degraded or CTP not obtained due to any bad SDR data in Horizontal cell)	6			unitless	No		2 bit(s)	Name	Value	Name	Value
												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							

This document has been identified per the NPOESS Common Data Format Control Book – External Volume 5 Metadata, D34862-05, Appendix B as a document to be provided to the NOAA Comprehensive Large Array-data Stewardship System (CLASS) via the delivery of NPOESS Document Release Packages to CLASS.

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			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			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			unitless	No		4 bit(s)	**Name**	**Value**	**Name**	**Value**

Table 5.3.8.2-3, Cloud Top Pressure Product Profile – Factors

Name	Data Size	Dimensions
CTPFactors	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	
								Name	Value	Name	Value
Scale = first array element; Offset = 2nd array element				Scale = unitless; Offset = hPa	No		32-bit floating point				

5.3.8.3 Cloud Top Pressure HDF5 Details

Figures 5.3.8.3-1, 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 the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

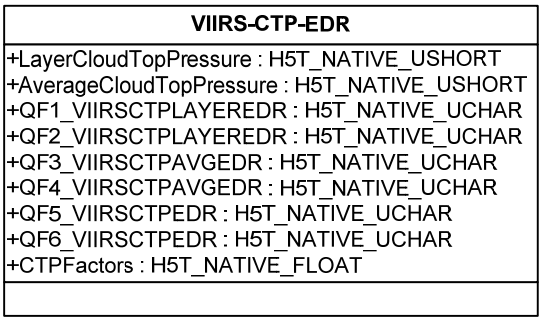

Figure 5.3.8.3-1, Cloud Top Pressure UML Diagram

5.3.8.4 Cloud Top Pressure HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Cloud Top Pressure EDR are listed in the CDFCB-X Volume V. 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 5.3.8.4-1, Cloud Top Pressure N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level 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 5.3.8.4-1, Cloud Top Pressure N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Notes**
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.	

5.3.8.5 Cloud Top Pressure Geolocation Details

See CDFCB-X, Vol. IV, Part I, D34862-04-01, Section 4.9.7, VIIRS Cloud Aggregated Geolocation.

5.3.9 Cloud Top Temperature

Data Mnemonic	EDRE-VCTT-C0030 (Official) EDRE-VCTT-C0031 (Substitute)
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: NPP and NPOESS
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.4 for details.
File Size	Estimated Granule Size: 1.03 MiB 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 5.3.9.1, Cloud Top Temperature Data Content Summary See Section 5.3.9.2, Cloud Top Temperature Product Profile See Section 5.3.9.3, Cloud Top Temperature HDF5 Details See Section 5.3.9.4, Cloud Top Temperature HDF5 Metadata Details See Section 5.3.9.5, Cloud Top Temperature Geolocation Details

5.3.9.1 Cloud Top Temperature Data Content Summary

Table 5.3.9.1-1, Cloud Top Temperature Data Content Summary

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
LayerCloudTopTemperature	Cloud Top Temperature - layered product (ordered from top of atmosphere to surface)	16-bit unsigned integer	[N*96, 508, 4]	[96, 508, 4]	K
AverageCloudTopTemperature	Cloud Top Temperature - Average of all layers	16-bit unsigned integer	[N*96, 508]	[96, 508]	K
QF1_VIIRSCTTLAYEREDR	Layer CTT Quality Flags	8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
QF2_VIIRSCTTLAYEREDR		8-bit unsigned char	[N*96, 508, 4]	[96, 508, 4]	unitless
QF3_VIIRSCTTAVGEDR	Quality Flags for AverageCloudTopTemperature Field	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF4_VIIRSCTTAVGEDR		8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF5_VIIRSCTTEDR	Non-Cloud Quality Flags	8-bit unsigned char	[N*96, 508]	[96, 508]	unitless
QF6_VIIRSCTTEDR		8-bit unsigned 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 = K

5.3.9.2 Cloud Top Temperature Product Profile

Table 5.3.9.2-1, Cloud Top Temperature Product Profile

Name	Data Size	Dimensions
LayerCloudTopTemperature	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 Temperature - layered product (ordered from top of atmosphere to surface)	0	180.00	343.00	K	Yes	CTTFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Name	Data Size	Dimensions
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	
								Name	Value	Name	Value
Cloud Top Temperature - Average of all layers	0	180.00	343.00	K	Yes	CTTFactors	unsigned 16-bit integer	NA_UINT16_FILL	65535		
								MISS_UINT16_FILL	65534		
								ERR_UINT16_FILL	65531		
								ELINT_UINT16_FILL	65530		
								VDNE_UINT16_FILL	65529		
								SOUB_UINT16_FILL	65528		

Table 5.3.9.2-2, Cloud Top Temperature Product Profile – Quality Flags

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	
								Name	Value	Name	Value
Cloud Confidence (Indicates cloudiness - percent cloudiness for this layer)	0			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			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			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			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			unitless	No		2 bit(s)	**Name**	**Value**	**Name**	**Value**
										0 <= % valid retrievals < 25%	0
										25 <= % valid retrievals <	1

											50%	
											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			unitless	No		1 bit	**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			unitless	No		1 bit	**Name** **Value**	**Name** **Value** False 0 True 1	
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit	**Name** **Value**	**Name** **Value** False 0 True 1	
		Opaque (black) cloud branching.	5			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 <= 3	

												100%	
		Ice Cloud Pixels with COT > 10.0 in Horizontal Cell > 50%	7			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			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			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			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			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			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			unitless	No		1 bit	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			unitless	No		1 bit	Name Value	Name Value False 0 True 1				
		Pixels with COT < 1.0 in Horizontal Cell > 50%	4			unitless	No		1 bit	Name Value	Name Value False 0 True 1				
		Opaque (black) cloud branching.	5			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			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													

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		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			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			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			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			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							

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		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			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			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			unitless	No		4 bit(s)	**Name**	**Value**	**Name**	**Value**	

Table 5.3.9.2-3, Cloud Top Temperature Product Profile – Factors

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	
								Name	Value	Name	Value
Scale = first array element; Offset = 2nd array element				Scale = unitless; Offset = K	No		32-bit floating point				

5.3.9.3 Cloud Top Temperature HDF5 Details

Figures 5.3.9.3-1, 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 the CDFCB-X, Volume IV, Part 1, D34862-04-01, Figure 1.2.1-1, Figure 1.2.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, for a complete UML rendering of this product.

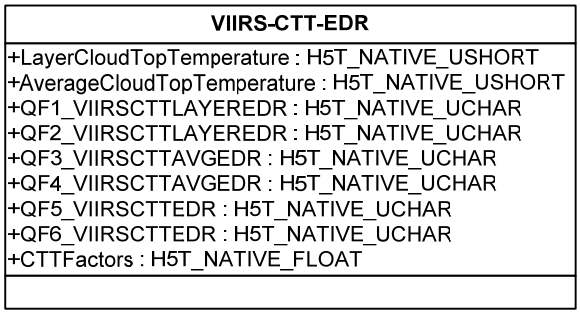

Figure 5.3.9.3-1, Cloud Top Temperature UML Diagram

5.3.9.4 Cloud Top Temperature HDF5 Metadata Details

The HDF5 metadata elements associated with the Cloud Top Temperature EDR are listed in the CDFCB-X Volume V. 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 5.3.9.4-1, Cloud Top Temperature N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level 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 5.3.9.4-1, Cloud Top Temperature N_Quality_Summary_Name/N_Quality_Summary_Value Granule Level Metadata Values

N_Quality_Summary			
Name	**Value**	**Description**	**Notes**
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.	

5.3.9.5 Cloud Top Temperature Geolocation Details

See CDFCB-X, Vol. IV, Part I, D34862-04-01, Section 4.9.7, VIIRS Cloud Aggregated Geolocation.