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**Joint Polar Satellite System (JPSS)  
Common Data Format Control Book –  
External  
Volume IV Part 4  
- Earth Radiation Budget and Space EDRs  
For Public Release**

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National Aeronautics and  
Space Administration

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# **JPSS Common Data Format Control Book – External Volume IV Part 4 - Earth Radiation Budget and Space EDRs**

## **JPSS Electronic Signature Page**

### **Prepared By:**

Thomas Jennings  
JPSS Ground Project System Engineer  
(Electronic Approvals available online at [https://jpssmis.gsfc.nasa.gov/mainmenu\\_dsp.cfm](https://jpssmis.gsfc.nasa.gov/mainmenu_dsp.cfm) )

### **Approved By:**

#### **JPSS Ground System**

Nicholas Speciale  
JPSS Ground Project Systems Manager  
(Electronic Approvals available online at [https://jpssmis.gsfc.nasa.gov/mainmenu\\_dsp.cfm](https://jpssmis.gsfc.nasa.gov/mainmenu_dsp.cfm) )

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## Preface

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Any questions should be addressed to:

JPSS Ground Project Configuration Management Office  
NASA/GSFC  
Code 474  
Greenbelt, MD 20771

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Northrop Grumman Space & Mission Systems Corp.  
**Space Technology**  
One Space Park  
Redondo Beach, CA 90278



**Engineering & Manufacturing Development (EMD) Phase  
Acquisition & Operations Contract**

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Volume IV – Part IV – Earth Radiation Budget and Space EDRs**

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**Point of Contact:** \_\_\_\_\_  
Ron Andrews, SE&I IPT

**ELECTRONIC APPROVAL SIGNATURES:**

\_\_\_\_\_  
Clark Snodgrass, SEITO Lead

\_\_\_\_\_  
Fabrizio Pela, SE&I IPT Lead

\_\_\_\_\_  
Bill Sullivan, Ground Segments IPT Lead

\_\_\_\_\_  
Mary Ann Chory, Space Segment IPT Lead

\_\_\_\_\_  
Ben James, Operations and Support IPT Lead

\_\_\_\_\_  
David Vandervoet, NPOESS Program Manager

Prepared by  
**Northrop Grumman Space Technology**  
One Space Park  
Redondo Beach, CA 90278

Prepared for  
**Department of the Air Force**  
NPOESS Integrated Program Office  
C/O SMC/CIK  
2420 Vela Way, Suite 1467-A8  
Los Angeles AFB, CA 90245-4659

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<b>Revision/Change Record</b>	<b>For Document No. D34862-04-04</b>
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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: <ul style="list-style-type: none"> <li>• D34659 CIS ICD ECR 216C – Initial “Draft” Release</li> <li>• D31400-10 SARSAT System OPSCON SYS-020-060 ECR 229B – Rev A</li> <li>• SY15-0007 System Specification ECR 274A - Active Fires classification to an ARP</li> <li>• D34659 CIS ICD ECR 290C – Rev A</li> <li>• D37005 NPP EDR-PR v1.8 ECR 431B – Requirements Updates</li> <li>• D34862-01 CDFCB-X Vol. I ECR 445B – Rev A</li> <li>• D34862-04-04 CDFCB-X Vol. IV Part 4 ECR 446C – Initial Release</li> </ul>	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: <ul style="list-style-type: none"> <li>• ECR 515B, NPOESS Restructure Baseline</li> <li>• ECR 530C, Two Sensor EDRs</li> <li>• D34862-04-04 CDFCB-X Vol. IV Part 4 ECR 612A – VIIRS Land Surface Albedo EDR Update</li> <li>• ECR 617A CIDP CDFCB-X Vol. III and Vol. IV</li> </ul> This revision also incorporates updates to the following: <ul style="list-style-type: none"> <li>• Product Profile consistency updates</li> </ul>	All
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: <ul style="list-style-type: none"> <li>• DCO B1 D34862-04-04 CDFCB-X Vol. IV Part 4 ECR 751A, Update of the VIIRS EDR PP XML</li> </ul>	All
C	01/23/2009	ECR 898B provides the Revision C of this document. No other ECRs/DCOs were incorporated into this Revision.	All
D	06/04/2009	ECR 959A provides Revision D of this document. No other ECRs/DCOs were incorporated into this Revision.  Revision D for this document (CDFCB-X, Vol IV, Part 4) only, does not contain any content changes to the formats. This part is being updates to keep revision numbers in synch with the other 3 parts of the volume.	All

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<b>Revision/Change Record</b>	<b>For Document No. D34862-04-04</b>
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Revision	Document Date	Revision/Change Description	Pages Affected
E	12/09/2009	ECR 1014A incorporates the following changes: <ul style="list-style-type: none"> <li>• 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</li> <li>• Updated Surface Albedo QFs               <ul style="list-style-type: none"> <li>○ Corrected legend for Aerosol Bounce</li> <li>○ Added Input Data Quality Flag (used spare)</li> <li>○ Reference MIS in lieu of CMIS</li> </ul> </li> <li>• Updated XML Product Profile based on redlines to accompany document               <ul style="list-style-type: none"> <li>○ D34862-04-04_NPOESS-CDFCB-X-Vol-IV-Part-4_E_VIIRS-SA-EDR-PP.xml</li> </ul> </li> </ul>	6, 8-10
F	04/16/2010	ECR 1061D incorporates the following updates: <ul style="list-style-type: none"> <li>• Removal of Availability Conditions throughout</li> <li>• Updated valid RangeMin/Max values for scaled products to align with CDFCB-X Volume I               <ul style="list-style-type: none"> <li>○ VIIRS Surface Albedo EDR</li> </ul> </li> <li>• Updates to various quality flag descriptions, values, and Quality Summary metadata based on IPAC/Bubble testing results               <ul style="list-style-type: none"> <li>○ VIIRS Surface Albedo EDR</li> </ul> </li> <li>• Updated XML Product Profiles to match the redlines.</li> <li>• Made Granule Size nomenclature consistent – 'Estimated Granule Size' throughout</li> <li>• Updated Surface Albedo QF ordering – reflects that of NHF with verbiage specific to SA</li> </ul>	p. 5  p. 7  pp, 10, 13  p. 6  p. 8

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## **5.6 Earth Radiation Budget 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.

## 5.6.1 DELETED

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#### 5.6.4 VIIRS Surface Albedo

<b>Data Mnemonic</b>	EDRE-VRSA-C0030 (Official) EDRE-VRSA-C0031 (Substitute)
<b>Description/ Purpose</b>	<p>Surface Albedo is defined as the total amount of solar radiation in the 0.4 to 4.0 micron band that is reflected by the Earth's surface into an upward hemisphere (sky dome). This includes both diffuse and direct components, divided by the total amount incident from this hemisphere, again including both diffuse and direct components.</p> <p>The Surface Albedo EDR is required only during the daytime and under clear conditions. This is an instantaneous, not a time-averaged, measurement.</p> <p>The VIIRS Surface Albedo EDR consists of a single albedo field (with associated Quality Flags and scale/offset factors). The albedo is a combination of Land Surface Albedo (from the Land Surface Albedo IP), the Ocean Albedo (from the Net Heat Flux algorithm's Ocean Albedo IP), and the Ice Albedo (from the Snow Cover algorithm's Ice Albedo IP).</p> <p>Quality flags are passed through from the IP where they originated. Since the Surface Albedo product is a combination of Land, Ocean, and Ice Albedo IPs, the quality flags may apply to some or all of these. See the flag's product profile description for details.</p> <p>Sensors: VIIRS</p> <p>Effectivity: NPP and NPOESS</p>
<b>File-Naming Construct</b>	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.0 for details.
<b>File Size</b>	<p>Estimated Granule Size: 11.72 MiB</p> <p>This granule size includes VIIRS Surface Albedo EDR related fields and quality flags only. Geolocation and metadata attributes are not included. Additional size added by HDF5 packaging is also not included.</p>
<b>File Format Type</b>	HDF5
<b>Production Frequency</b>	As per request

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<b>Data Content and Data Format</b>	<p>See Section 5.6.4.1, VIIRS Surface Albedo EDR Data Content Summary</p> <p>See Section 5.6.4.2, VIIRS Surface Albedo EDR Product Profile</p> <p>See Section 5.6.4.3, VIIRS Surface Albedo EDR HDF5 Details</p> <p>See Section 5.6.4.4, VIIRS Surface Albedo EDR Metadata Details</p> <p>See Section 5.6.4.5, VIIRS Surface Albedo EDR Geolocation Details</p>
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### 5.6.4.1 VIIRS Surface Albedo EDR Data Content Summary

**Table 5.6.4.1-1, VIIRS Surface Albedo EDR Data Content Summary**

Name	Description	Data Type	Aggregate Dimension (N = Number of Granules)	Granule Dimension	Units
Albedo	VIIRS Surface Albedo - Combined Albedo derived from the Land, Ocean and Ice Albedo IPs	unsigned 16-bit integer	[N*768, 3200]	[768, 3200]	unitless
QF1_VIIRSSAEDR	Pixel level Quality flags	unsigned 8-bit char	[N*768, 3200]	[768, 3200]	unitless
QF2_VIIRSSAEDR		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	unitless
QF3_VIIRSSAEDR		unsigned 8-bit char	[N*768, 3200]	[768, 3200]	unitless
AlbedoFactors	Scale = First Array Element; Offset = 2nd Array Element	32-bit floating point	[N*2]	[2]	unitless

5.6.4.2 VIIRS Surface Albedo EDR Product Profile

Table 5.6.4.2-1, VIIRS Surface Albedo EDR Product Profile

Fields													
Name	Data Size	Dimensions											
Albedo	2bytes	<b>Name</b>	<b>Granule Boundary</b>	<b>Dynamic</b>	<b>Min Array Size</b>	<b>Max Array Size</b>							
		AlongTrack	Yes	No	768	768							
		CrossTrack	No	No	3200	3200							
		<b>Datum</b>											
		<b>Description</b>	<b>Datum Offset</b>	<b>Unscaled Valid Range Min</b>	<b>Unscaled Valid Range Max</b>	<b>Measurement Units</b>	<b>Scaled</b>	<b>Scale Factor Name</b>	<b>Data Type</b>	<b>Fill Values</b>		<b>Legend Entries</b>	
		VIIRS Surface Albedo - Combined Albedo derived from the Land, Ocean and Ice Albedo IPs	0	-1.00	2.00	unitless	Yes	AlbedoFactors	unsigned 16-bit integer	<b>Name</b>	<b>Value</b>	<b>Name</b>	<b>Value</b>
										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 5.6.4.2-2, VIIRS Surface Albedo EDR Product Profile – Quality Flags**

Fields																				
Name	Data Size	Dimensions																		
QF1_VIIRSSAEDR	1byte	<b>Name</b>	<b>Granule Boundary</b>	<b>Dynamic</b>	<b>Min Array Size</b>	<b>Max Array Size</b>														
		AlongTrack	Yes	No	768	768														
		CrossTrack	No	No	3200	3200														
		<b>Datum</b>																		
		<b>Description</b>	<b>Datum Offset</b>	<b>Unscaled Valid Range Min</b>	<b>Unscaled Valid Range Max</b>	<b>Measurement Units</b>	<b>Scaled</b>	<b>Scale Factor Name</b>	<b>Data Type</b>	<b>Fill Values</b>	<b>Legend Entries</b>									
		Albedo Retrieval Quality (Indicates the quality of the pixel level retrieval) – Applies to Ice, Ocean, and Land Albedos	0			unitless	No		2 bit(s)	<b>Name</b>   <b>Value</b>	<table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Good</td> <td>0</td> </tr> <tr> <td>Poor (Exclusion)</td> <td>1</td> </tr> <tr> <td>No Retrieval</td> <td>2</td> </tr> </tbody> </table>		Name	Value	Good	0	Poor (Exclusion)	1	No Retrieval	2
		Name	Value																	
		Good	0																	
		Poor (Exclusion)	1																	
		No Retrieval	2																	
Out of Range – Retrieved albedo is out of expected reporting range of 0 <= Albedo <= 1. Applies to Ice, Ocean, and Land Albedos	2			unitless	No		1 bit(s)	<b>Name</b>   <b>Value</b>	<table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>False</td> <td>0</td> </tr> <tr> <td>True</td> <td>1</td> </tr> </tbody> </table>		Name	Value	False	0	True	1				
Name	Value																			
False	0																			
True	1																			
Stray light maximum radiance exclusion – Applies to Ice, Ocean, and Land Albedos	3			unitless	No		1 bit(s)	<b>Name</b>   <b>Value</b>	<table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>False</td> <td>0</td> </tr> <tr> <td>True</td> <td>1</td> </tr> </tbody> </table>		Name	Value	False	0	True	1				
Name	Value																			
False	0																			
True	1																			
Input Chlorophyll Concentration	4			unitless	No		1 bit(s)	<b>Name</b>   <b>Value</b>	<table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Available</td> <td>0</td> </tr> <tr> <td>Not Available (Climatology Used)</td> <td>1</td> </tr> </tbody> </table>		Name	Value	Available	0	Not Available (Climatology Used)	1				
Name	Value																			
Available	0																			
Not Available (Climatology Used)	1																			
Input Wind Speed – Applies to Ocean Albedo	5			unitless	No		2 bit(s)	<b>Name</b>   <b>Value</b>	<table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Not available (ocean)/Not used (land/ice)</td> <td>0</td> </tr> <tr> <td>NWP</td> <td>1</td> </tr> <tr> <td>MIS</td> <td>3</td> </tr> </tbody> </table>		Name	Value	Not available (ocean)/Not used (land/ice)	0	NWP	1	MIS	3		
Name	Value																			
Not available (ocean)/Not used (land/ice)	0																			
NWP	1																			
MIS	3																			
Spare	7			unitless	No		1 bit(s)	<b>Name</b>   <b>Value</b>	<b>Name</b>   <b>Value</b>											
QF2_VIIRSSAEDR	1byte	<b>Name</b>	<b>Granule Boundary</b>	<b>Dynamic</b>	<b>Min Array Size</b>	<b>Max Array Size</b>														
		AlongTrack	Yes	No	768	768														
		CrossTrack	No	No	3200	3200														
		<b>Datum</b>																		
		<b>Description</b>	<b>Datum Offset</b>	<b>Unscaled Valid</b>	<b>Unscaled Valid</b>	<b>Measurement Units</b>	<b>Scaled</b>	<b>Scale Factor</b>	<b>Data Type</b>	<b>Fill Values</b>	<b>Legend Entries</b>									

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		Range Min	Range Max		Name													
Cloud Confidence – Applies to Ice, Ocean and Land Albedos	0			unitless	No		2 bit(s)	<table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Confidently Clear</td> <td>0</td> </tr> <tr> <td>Probably Clear</td> <td>1</td> </tr> <tr> <td>Probably Cloudy</td> <td>2</td> </tr> <tr> <td>Confidently Cloudy</td> <td>3</td> </tr> </tbody> </table>	Name	Value	Confidently Clear	0	Probably Clear	1	Probably Cloudy	2	Confidently Cloudy	3
Name	Value																	
Confidently Clear	0																	
Probably Clear	1																	
Probably Cloudy	2																	
Confidently Cloudy	3																	
Cloud Shadow Detected	2			unitless	No		1 bit(s)	<table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>False</td> <td>0</td> </tr> <tr> <td>True</td> <td>1</td> </tr> </tbody> </table>	Name	Value	False	0	True	1				
Name	Value																	
False	0																	
True	1																	
Algorithm Branch – Applies to Ice, Ocean and Land Albedos	3			unitless	No		2 bit(s)	<table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Land</td> <td>0</td> </tr> <tr> <td>Sea Ice</td> <td>1</td> </tr> <tr> <td>Ocean</td> <td>2</td> </tr> <tr> <td>Not Produced</td> <td>3</td> </tr> </tbody> </table>	Name	Value	Land	0	Sea Ice	1	Ocean	2	Not Produced	3
Name	Value																	
Land	0																	
Sea Ice	1																	
Ocean	2																	
Not Produced	3																	
Solar Zenith Angle Degradation/Exclusion – Applies to Ice, Ocean and Land Albedos	5			unitless	No		2 bit(s)	<table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>None (Solar Zenith &lt; 65 degrees)</td> <td>0</td> </tr> <tr> <td>Degraded (65 degrees &lt;= Solar Zenith &lt;= 85 degrees)</td> <td>1</td> </tr> <tr> <td>Exclusion (Solar Zenith &gt; 85 degrees)</td> <td>2</td> </tr> </tbody> </table>	Name	Value	None (Solar Zenith < 65 degrees)	0	Degraded (65 degrees <= Solar Zenith <= 85 degrees)	1	Exclusion (Solar Zenith > 85 degrees)	2		
Name	Value																	
None (Solar Zenith < 65 degrees)	0																	
Degraded (65 degrees <= Solar Zenith <= 85 degrees)	1																	
Exclusion (Solar Zenith > 85 degrees)	2																	
Spare	7			unitless	No		1 bit(s)	<table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Name	Value								
Name	Value																	

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Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size							
AlongTrack	Yes	No	768	768							
CrossTrack	No	No	3200	3200							
<b>Datum</b>											
Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries		
Aerosol Source (Indicates source of the 550nm aerosol information used in the retrieval) - Applies to land, Ice, and Ocean Albedos NAAPS or Climatology used in processing identified in EDR metadata	0			unitless	No		2 bit(s)	Name Value	Name	Value	
									Direct VIIRS retrieval	0	
									Interpolation Only	1	
									Interpolation & Climatology / NAAPS	2	
Climatology / NAAPS	3										
Exclusion – AOT (at 550nm) > 1.0	2			unitless	No		1 bit(s)	Name Value	Name	Value	
									False	0	
									True	1	
Coccolithophore degradation with calcite concentration due to coccolithophores $\geq 0.3 \text{ mg/m}^3$	3			unitless	No		1 bit(s)	Name Value	Name	Value	
									False	0	
									True	1	
Input Data Quality (Quality of Surface Albedo is degraded or not retrieved due to bad input data in horizontal cell) – Applies to Ice, Ocean and Land Albedos	4			unitless	No		2 bit(s)	Name Value	Name	Value	
									Good	0	
									Degraded	1	
									No Retrieval	2	
Spare	6			unitless	No		2 bit(s)	Name Value	Name	Value	

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**Table 5.6.4.2-3, VIIRS Surface Albedo EDR Product Profile – Factors**

Fields											
Name	Data Size	Dimensions									
AlbedoFactors	4bytes	<b>Name</b>	<b>Granule Boundary</b>	<b>Dynamic</b>	<b>Min Array Size</b>	<b>Max Array Size</b>					
		Granule	Yes	No	2	2					
		<b>Datum</b>									
		<b>Description</b>	<b>Datum Offset</b>	<b>Unscaled Valid Range Min</b>	<b>Unscaled Valid Range Max</b>	<b>Measurement Units</b>	<b>Scaled</b>	<b>Scale Factor Name</b>	<b>Data Type</b>	<b>Fill Values</b>	<b>Legend Entries</b>
Scale = First Array Element; Offset = 2nd Array Element	0			unitless	No		32-bit floating point	<b>Name</b>   <b>Value</b>	<b>Name</b>   <b>Value</b>		

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### 5.6.4.3 VIIRS Surface Albedo EDR HDF5 Details

Figure 5.6.4.3-1, VIIRS Surface Albedo EDR UML Diagram, provides details on the contents and data types of the VIIRS Surface Albedo 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.

VIIRS-SA-EDR
+Albedo : H5T_NATIVE_UINT
+QF1_VIIRSSAEDR : H5T_NATIVE_UCHAR
+QF2_VIIRSSAEDR : H5T_NATIVE_UCHAR
+QF3_VIIRSSAEDR : H5T_NATIVE_UCHAR
+QF4_VIIRSSAEDR : H5T_NATIVE_UCHAR
+AlbedoFactors : H5T_NATIVE_FLOAT

**Figure 5.6.4.3-1, VIIRS Surface Albedo EDR HDF5 UML Diagram**

### 5.6.4.4 VIIRS Surface Albedo EDR HDF5 Metadata Details

The HDF5 metadata elements associated with the VIIRS Surface Albedo EDR are listed in the CDFCB-X Volume V – Metadata, D34862-05. The VIIRS Surface Albedo 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 5.6.4.4-1, VIIRS Surface Albedo 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 VIIRS Surface Albedo EDR.

**Table 5.6.4.4-1, VIIRS Surface Albedo EDR  
N\_Quality\_Summary\_Name/N\_Quality\_Summary\_Value Granule Level Metadata  
Values**

<b>N_Quality_Summary</b>			
<b>Name</b>	<b>Value</b>	<b>Description</b>	<b>Notes</b>
Albedo Summary Quality	0 – 100	Percent of pixels within granule with high quality of retrieval	
Albedo Exclusion Summary	0 – 100	Percent of pixels within granule one or more exclusion criteria flags	
Summary Range Check	0 – 100	Percent of retrieved pixels outside of valid range	
No Ocean Coverage	0	At least one ocean pixel in granule	
	1	No ocean pixels in granule	
No Land Coverage	0	At least one land pixel in granule	
	1	No land pixels in granule	

#### **5.6.4.5 VIIRS Surface Albedo EDR Geolocation Data Content Summary**

VIIRS Surface Albedo EDR is produced on the VIIRS Moderate Resolution Geolocation with terrain correction applied. See the CDFCB-X, Volume IV, Part 1, D34862-04-01, Section 4.9.5, VIIRS Moderate Resolution – Terrain Corrected, for details.

#### **5.6.4 DELETED**

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## 5.6.5 DELETED

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## 5.7 Space Environmental Data Records

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## 5.7.1 DELETED

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## 5.7.2 DELETED

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#### **5.7.4 DELETED**

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## 5.7.10 DELETED

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## 5.7.11 DELETED

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## 5.7.12 DELETED

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### 5.7.13 DELETED

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