



NATIONAL POLAR-ORBITING OPERATIONAL ENVIRONMENTAL SATELLITE SYSTEM (NPOESS)

**Common Data Format Control Book – External
Volume IV – Part IV – Earth Radiation Budget and Space EDRs
D34862-04-04 Rev C
CDRL No. A014**

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Revision/Change Record		For Document No. D34862-04-04	
Revision	Document Date	Revision/Change Description	Pages Affected
---	10/21/2005	<p>Incorporation of the following ECRs:</p> <p>ECR 446C provides the Revision --- (initial submission) of this document. The following ECRs are included in this revision:</p> <ul style="list-style-type: none"> • 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 • D34862-04-04 CDFCB-X Vol. IV Part 4 ECR 446C – Initial Release 	All
A	09/10/2007	<p>Incorporation of the following DCOs and ECRs:</p> <p>ECR 617A provides the Revision A of this document. The following ECRs/DCOs are included in this revision:</p> <ul style="list-style-type: none"> • ECR 530C, Two Sensor EDRs • D34862-04-04 CDFCB-X Vol. IV Part 4 ECR 612A – VIIRS Land Surface Albedo EDR Update • ECR 617A CIDP CDFCB-X Vol. III and Vol. IV <p>This revision also incorporates updates to the following:</p> <ul style="list-style-type: none"> • Product Profile consistency updates 	
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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

5.6.2 DELETED

5.6.3 DELETED

5.6.4 VIIRS Surface Albedo

Data Mnemonic	EDRE-VRSA-C0030 (Official) EDRE-VRSA-C0031 (Substitute)
Description/ Purpose	<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>Availability Conditions:</p> <ul style="list-style-type: none"> Day Clear Cloudy Land Ocean Ice <p>Sensors:</p> <ul style="list-style-type: none"> VIIRS <p>Effectivity: NPP and NPOESS</p>
File-Naming Construct	See the CDFCB-X Volume I - Overview, D34862-01, Section 3.0 for details.

File Size	Estimated Data Granule Sizes: 11.72 MiB 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.
File Format Type	HDF5
Production Frequency	As per request
Data Content and Data Format	See Section 5.6.4.1, VIIRS Surface Albedo EDR Data Content Summary See Section 5.6.4.2, VIIRS Surface Albedo EDR Product Profile See Section 5.6.4.3, VIIRS Surface Albedo EDR HDF5 Details See Section 5.6.4.4, VIIRS Surface Albedo EDR Metadata Details See Section 5.6.4.5, VIIRS Surface Albedo EDR Geolocation Details

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	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	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	
		VIIRS Surface Albedo - Combined Albedo derived from the Land, Ocean and Ice Albedo IPs	0	0.0	1.0	unitless	Yes	AlbedoFactors	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 5.6.4.2-2, VIIRS Surface Albedo EDR Product Profile – Quality Flags

Fields													
Name	Data Size	Dimensions											
QF1_VIIRSSAEDR	1byte	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	
		Albedo Retrieval Quality (Indicates the quality of the pixel level retrieval) – Applies to Ice, Ocean, and Land Albedos	0			unitless	No		2 bit(s)	Name Value	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)	Name Value	Name	Value	
								False	0				
								True	1				
Stray light maximum radiance exclusion – Applies to Ice, Ocean, and Land Albedos	3			unitless	No		1 bit(s)	Name Value	Name	Value			
								False	0				
								True	1				
Input Chlorophyll Concentration	4			unitless	No		1 bit(s)	Name Value	Name	Value			
								Available	0				
								Not Available (Climatology Used)	1				
Input Wind Speed – Applies to Ocean Albedo	5			unitless	No		2 bit(s)	Name Value	Name	Value			
								CMIS	0				
								NWP	1				
								Not available	3				
Spare	7			unitless	No		1 bit(s)	Name Value	Name Value				

Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size									
					AlongTrack	Yes	No	768	768				
					CrossTrack	No	No	3200	3200				
Datum													
Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries				
Cloud Confidence – Applies to Ice, Ocean and Land Albedos	0			unitless	No		2 bit(s)	Name Value	Name	Value			
									Confidently Clear	0			
									Probably Clear	1			
									Probably Cloudy	2			
Cloud Shadow Detected – Ocean Albedo	2			unitless	No		1 bit(s)	Name Value	Name	Value			
									False	0			
Algorithm Branch – Applies to Ice, Ocean and Land Albedos	3			unitless	No		2 bit(s)	Name Value	Name	Value			
									Land	0			
									Sea Ice	1			
									Ocean	2			
Solar Zenith Angle Degradation/Exclusion – Applies to Ice, Ocean and Land Albedos	5			unitless	No		2 bit(s)	Name Value	Name	Value			
									None (Solar Zenith < 70 degrees)	0			
									Degraded (70 degrees <= Solar Zenith <= 85 degrees)	1			
Exclusion (Solar Zenith > 85 degrees)									Name	Value			
										2			
Spare	7			unitless	No		1 bit(s)	Name Value	Name Value				

QF3_VIIRSSAEDR	1byte	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	
		Aerosol Source (Indicates source of the 550nm aerosol information used in the retrieval) - Applies to Ice and Ocean Albedos	0			unitless	No		2 bit(s)	Name Value	Name	Value
											VIIRS	0
											NAAPS	1
											Climatology	2
											Not available	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		
Spare	4			unitless	No		4 bit(s)	Name Value	Name Value			

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

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

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, Generalized UML Diagram for HDF5 IP/ARP/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**

N_Quality_Summary			
Name	Value	Description	Notes
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 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

5.6.5 DELETED

5.7 Space Environmental Data Records

5.7.1 DELETED

5.7.2 DELETED

5.7.3 DELETED

5.7.4 DELETED

5.7.5 DELETED

5.7.6 DELETED

5.7.7 DELETED

5.7.8 DELETED

5.7.9 DELETED

5.7.10 DELETED

5.7.11 DELETED

5.7.12 DELETED

5.7.13 DELETED