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

For Public Release

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Block 1.2.3



**Goddard Space Flight Center
Greenbelt, Maryland**

National Aeronautics and
Space Administration

JPSS Common Data Format Control Book - External Volume IV Part 4 - Earth Radiation Budget and Space 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.

Any questions should be addressed to:

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---	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"> • 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	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"> • ECR 515B, NPOESS Restructure Baseline • 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 This revision also incorporates updates to the following: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • DCO B1 D34862-04-04 CDFCB-X Vol. IV Part 4 ECR 751A, Update of the VIIRS EDR PP XML 	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
E	12/09/2009	ECR 1014A incorporates the following changes: <ul style="list-style-type: none"> • 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 • Updated Surface Albedo QFs <ul style="list-style-type: none"> ○ Corrected legend for Aerosol Bounce ○ Added Input Data Quality Flag (used spare) ○ Reference MIS in lieu of CMIS • Updated XML Product Profile based on redlines to accompany document <ul style="list-style-type: none"> ○ D34862-04-04_NPOESS-CDFCB-X-Vol-IV-Part-4_E_VIIRS-SA-EDR-PP.xml 	6, 8-10

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F	04/16/2010	ECR 1061D incorporates the following updates: <ul style="list-style-type: none"> • Removal of Availability Conditions throughout • Updated valid RangeMin/Max values for scaled products to align with CDFCB-X Volume I <ul style="list-style-type: none"> ○ VIIRS Surface Albedo EDR • Updates to various quality flag descriptions, values, and Quality Summary metadata based on IPAC/Bubble testing results <ul style="list-style-type: none"> ○ VIIRS Surface Albedo EDR • Updated XML Product Profiles to match the redlines. • Made Granule Size nomenclature consistent - 'Estimated Granule Size' throughout • Updated Surface Albedo QF ordering - reflects that of NHF with verbiage specific to SA 	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 JPSS CDFCB-X Vol. I. For an introduction to this volume, see the JPSS CDFCB-X Vol. IV Pt. 1.

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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>Sensors: VIIRS</p> <p>Effectivity: NPP and NPOESS</p>
File-Naming Construct	See the JPSS CDFCB-X Vol. I, Section 3.0 for details.
File Size	<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>

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 (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	2byte(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	
		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	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(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		
		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 Source - Applies to Ocean Albedo	5			unitless	No		2 bit(s)	Name Value	Name	Value			
									Not available (ocean)/Not used (land/ice)	0			
									NWP	1			
									MIS	3			
Spare	7			unitless	No		1 bit(s)	Name Value	Name	Value			
QF2_VIIRSSAEDR	1byte(s)	Name	Granule Boundary	Dynamic	Min Array Size	Max Array Size							
		AlongTrack	Yes	No	768	768							
		CrossTrack	No	No	3200	3200							
		Datum											
		Description	Datum Offset	Unscaled Valid Range Min	Unscaled Valid Range Max	Measurement Units	Scaled	Scale Factor Name	Data Type	Fill Values	Legend Entries		

	Cloud 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
								Confidently Cloudy	3
	Cloud Shadow Detected	2			unitless	No	1 bit(s)	Name Value	Name Value
								False	0
								True	1
	Background Type - Applies to Ice, Ocean, and Land Albedos	3			unitless	No	2 bit(s)	Name Value	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)	Name Value	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)	Name Value	Name Value

QF3_VIIRSSAEDR	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
		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 >=0.3 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		

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

Fields											
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
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 JPSS CDFCB-X Vol. IV Pt. 1, 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
+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 JPSS CDFCB-X Vol. V. 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	

N_Quality_Summary			
Name	Value	Description	Notes
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 JPSS CDFCB-X Vol. IV Pt. 1, Section 4.9.5, VIIRS Moderate Resolution - Terrain Corrected, for details.

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5.7 Space Environmental Data Records

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