Suggested changes to 474-00001-04-03 JPSS CDFCB External Volume IV – Part III Land and Ocean/Water EDRs Revision A Block 1.2.3 dated November 30, 2012

5.4.2 Land Surface Temperature

|  |  |
| --- | --- |
| Data Mnemonic | EDRE-VLST-C0030 (Official)  EDRE-VLST-C0031 (Substitute) |
| Description/ Purpose | The VIIRS LST algorithms are based on physical regression methods to retrieve skin LST. They use brightness temperature , which is derived from radiances, sensed by VIIRS Infrared (IR) channels. Land Surface Temperature (LST) is defined as the skin temperature of the uppermost layer of the land surface.  The LST EDR is required only for horizontal cells that are categorized as “confidently clear by the cloud mask. ”. In the production, LST EDR is also available for ”probably clear” and “probably cloudy” pixels.  Sensors:  VIIRS  Effectivity: NPP and NPOESS |
| File-Naming Construct | See the JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4 for details. |
| File Size | Estimated Granule Size: 11.72 MiB  This granule size includes VIIRS Land Surface Temperature 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 | See Section 5.4.2.1, VIIRS Land Surface Temperature EDR Data Content Summary  See Section 5.4.2.2, VIIRS Land Surface Temperature EDR Product Profile  See Section 5.4.2.3, VIIRS Land Surface Temperature EDR HDF5 Details  See Section 5.4.2.4, VIIRS Land Surface Temperature EDR HDF5 Metadata Details  See Section 5.4.2.5, VIIRS Land Surface Temperature EDR Geolocation Details |

VIIRS Land Surface Temperature EDR Data Content Summary

Table 5.4.2.1-1, VIIRS Land Surface Temperature EDR Data Content Summary

| Name | Description | Data Type | Aggregate Dimension (N = Number of Granules) | Granule Dimension | Units |
| --- | --- | --- | --- | --- | --- |
| LandSurfaceTemperature | Land Surface Temperature | unsigned 16-bit integer | [N\*768, 3200] | [768, 3200] | kelvin |
| QF1\_VIIRSLSTEDR | Pixel level Quality Flags | unsigned 8-bit char | [N\*768, 3200] | [768, 3200] | unitless |
| QF2\_VIIRSLSTEDR | unsigned 8-bit char | [N\*768, 3200] | [768, 3200] | unitless |
| QF3\_VIIRSLSTEDR | unsigned 8-bit char | [N\*768, 3200] | [768, 3200] | unitless |
| LSTFactors | Scale = First Array Element; Offset = 2nd Array Element | 32-bit floating point | [N\*2] | [2] | scale = unitless; offset = kelvin |

#### 5.4.2.2 VIIRS Land Surface Temperature EDR Product Profile…………….

Table 5.4.2.2-2, VIIRS Land Surface Temperature EDR Product Profile - Quality Flags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fields** | | | | |
| **Name** | **Data Size** | **Dimensions** |  |  |
| QF1\_VIIRSLSTEDR | 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** | | LST Quality (Indicates the quality of the pixel level retrieval) | 0 |  |  | unitless | No |  | 2 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | High | 0 | | Medium | 1 | | Low | 2 | | No Retrieval | 3 | | | Algorithm (Indicates which algorithm branch was implemented) | 2 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | 4-Band Dual Split Window | 0 | | 2-Band Split Window | 1 | | | Day/Night | 3 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | Night (Solar Zenith Angle > 85 Degrees) | 0 | | Day (Solar Zenith Angle <= 85 degrees) | 1 | | | Bad SWIR Pixel (M12 and M13 band data not available) | 4 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | Both Available | 0 | | At least one not available | 1 | | | Bad LWIR Pixel (M15 and M16 band data not available) | 5 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | Both Available | 0 | | At least one not available | 1 | | | Exclusion - Fire detected in pixel (from the VIIRS Cloud Mask) | 6 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | False | 0 | | True | 1 | | | Exclusion - Thin Cirrus (Retrieval performance exclusion due to thin cirrus detection by VIIRS Cloud Mask) | 7 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | False | 0 | | True | 1 | | |  |  |
| QF2\_VIIRSLSTEDR | 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** | | Degradation - Sensor Zenith Angle > 40 degrees | 0 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | False | 0 | | True | 1 | | | Out of Expected Range - The LST derived from the algorithm is outside of the NPOESS System Specification Validated Range defined by 213K <= LST <= 343K | 1 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | False | 0 | | True | 1 | | | Cloud Confidence Indicator | 2 |  |  | unitless | No |  | 2 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | Confidently Clear | 0 | | Probably Clear | 1 | | Probably Cloudy | 2 | | Confidently Cloudy | 3 | | | Exclusion: AOT > 1.0 (AOT in horizontal cell > 1.0 on the slant path (AOT @550nm)) | 4 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | False | 0 | | True | 1 | | | Exclusion - Horizontal Cell Size > 1.3km (HCS > 1.3 km, swath width > 1700 km, Sensor Zenith Angle > 53.0 degrees) | 5 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | False | 0 | | True | 1 | | | Sun Glint in pixel (as indicated in the VIIRS Cloud Mask) | 6 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | False | 0 | | True | 1 | | | Inside Terminator (85 deg < Solar Zenith Angle <= 100 deg) | 7 |  |  | unitless | No |  | 1 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | False | 0 | | True | 1 | | |  |  |
| QF3\_VIIRSLSTEDR | 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** | | Land/Water Background | 0 |  |  | unitless | No |  | 3 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | Land and Desert | 0 | | Land/No Desert | 1 | | Inland Water | 2 | | Sea Water | 3 | | Coastal | 5 | | | Surface Type (of the LST Retrieval) | 3 |  |  | unitless | No |  | 5 bit(s) | |  |  | | --- | --- | | **Name** | **Value** | | |  |  | | --- | --- | | **Name** | **Value** | | Evergreen Needleleaf Forests | 1 | | Evergreen Broadleaf Forests | 2 | | Deciduous Needleleaf Forests | 3 | | Deciduous Broadleaf Forests | 4 | | Mixed Forests | 5 | | Closed Shrublands | 6 | | Open Shrublands | 7 | | Woody Savannahs | 8 | | Savannahs | 9 | | Grasslands | 10 | | Permanent Wetlands | 11 | | Croplands | 12 | | Urban and Build-up | 13 | | Cropland/Natural Vegetation Mosaics | 14 | | Snow and Ice | 15 | | Barren | 16 | | Water | 17 | | Fill | 31 | | |  |  |