VIIRS-Surface Type-EDR Release, Validated Stage 2 Data Quality
Jan 2015
Read-me for Data Users

The JPSS Algorithm Engineering Review Board (AERB) released the Suomi NPP VIIRS-Surface Type-EDR to the public with a Stage 2 Validation level maturity with an effective date of 11/14/2014 corresponding to the operational implementation of the new surface type intermediate product (474-CCR-14-1700/DR7552) in IDPS build Mx8.5. Because Surface type is a granulated version of the QST IP updated with snow and fire data, declaration of validated stage 2 maturity of the VIIRS-Surface Type-EDR implies the same maturity of the QST-IP. This assessment is based on both qualitative and quantitative analysis of the VIIRS surface type intermediate product and environmental data record. Quantitative evaluation is predominantly based on visual interpretation against high spatial resolution remote sensing data.

Validated Stage 2 quality is defined as:

- Using a **limited** set of samples, the algorithm output is shown to meet the 70% classification accuracy performance attributes identified in the **JPSS Level 1 Requirements Supplement with the exception of the S-NPP Performance Exclusions**

The Board recommends that users be informed of the following product information and characteristics when evaluating the VIIRS-Surface Type-EDR:

1. **Product Requirements:** Product requirements are now documented in the Joint Polar Satellite System (JPSS) Level 1 Requirements Supplement (L1RDS) and apply only to future satellites, starting with JPSS 1. Appendix D of the L1RDS describes performance exclusions for the Suomi NPP products.

2. **Algorithm Description**. The Suomi NPP VIIRS-Surface Type-EDR is based on heritage code, adapted for use with the VIIRS data. More algorithm description can be found from the VIIRS Surface Type EDR Algorithm Theoretical Basis Document (ATBD).

3. **Product Evaluation.** Quantitative evaluation to date is predominantly based on visual interpretation against high spatial resolution remote sensing data. Validation results showed that the new VIIRS surface type intermediate product (QSTIP) achieved 73.92% overall classification accuracy, which exceeds the L1RD requirement for this product. Verification of ST-EDR data suggested the all quality flags embedded in the ST-EDR have been successfully implemented following the surface type operational algorithm description document.

4. **Quality Flags.** VIIRS Surface Type EDR quality flags are three 8-bits unsigned integers that provide information about fire, snow, vegetation, cloud cover, sun glint, input data quality, aerosol level, snow information source, and the confidence of surface type label imported from the gridded surface type map which is generated offline from IDPS. Bit 0 of the first 8-bit integer indicates whether the pixel has active fire (1-yes, 0-no fire). Bit 1 is to flag snow cover (1-yes, 0-no snow). If there is snow in the pixel, bit 4 of the second QF integer tells whether the snow information is from the multi-satellite snow cover data product IVSIC. Users are strongly recommended to refer to the JPSS Operational Algorithm Description (OAD) document for VIIRS Surface Type EDR when the above stated information is of concern.

5. **Known Errors**. None.

6. **Future Work**. The next steps in the VIIRS-Surface Type-EDR validation process, for Stage 2 validation maturity, is to implement better data compositing algorithm, use more training data with better representativeness, use SVM classification algorithm instead of C5.0 decision tree and perform a comprehensive post-classification improvements.

More information about VIIRS and the VIIRS-Surface Type-EDR product can be found at the following websites, where users can find the Algorithm Theoretical Basis Document (ATBD), Operational Algorithm Description (OAD) document, Common Data Format Control Book (CDFCB), and product examples:

http://www.star.nesdis.noaa.gov/jpss/ATBD.php

Additionally, the VIIRS Sensor Data Record (SDR) provisional quality Read-me document is available at: http://www.nsof.class.noaa.gov/saa/products/welcome

Point of Contact:

Ashley Griffin, Land JPSS Algorithm Manager (JAM)
JPSS Data Products, Engineering and Services
ashley.griffin@nasa.gov

Xiwu (Jerry) Zhan, STAR Surface Type Product Lead
NOAA/NESDIS/STAR/JPSS Land Discipline Team
xiwu.zhan@noaa.gov