



MEMORANDUM FOR: The Record
FROM: Felix Kogan JPSS VIIRS-VH Team Lead
SUBJECT: SNPP/JPSS1 (J1) VIIRS-VH Product validated maturity status and public release
DATE: 10/18/2016

Beat maturity status declaration for VIIRS-VH

Maturity Review Date: 10/18/2016
Effective Date: 10/18/2016
Operational System: VIIRS-VH, Version 1.1

The JPSS Algorithm Maturity Readiness Review Board approved the release of the **VIIRS-VH** to the public with a Validated maturity level quality as of **10/18/2016** (effective date), based on JPSS Validation Maturity Review held on **10/18/2016** (link to review artifacts).

1. Maturity stage definition (reference to the AMM webpage for maturity definition: <http://www.star.nesdis.noaa.gov/jpss/AlgorithmMaturity.php>)

2. Algorithm Description:

List of Products (Collection Short Name (CSN))

Vegetation Health (VH) Indices of the EDR are weekly composite products. It consists of three indices, Vegetation Condition Index (VCI), Thermal Condition Index (TCI) and Vegetation Health Index (VHI).

Product requirements/Exclusions (L1RDS)

| EDR Attributes | JPSS L1RD | Veg. Health Product System |
|-------------------------------------|--|--|
| Horizontal Cell Size | Threshold – 0.036° (4 km) Objective – 0.018°, 0.009° (2 and 1 km) | Threshold – 0.036° (4 km) Objective – 0.018°, 0.009° (2 and 1 km) |
| Vertical Reporting Interval | NS | NS |
| Mapping Uncertainty, 3 sigma | Threshold – <0.036° (4 km) Objective – <0.018°, <0.009°, <0.0045° | Threshold – <0.036° (4 km) Objective – <0.018°, <0.009°, <0.0045° |
| Measurement Precision | Threshold – 4.0% (For the range 0-100%) Objective – NS | Threshold – 4.0% (For the range 0-100%) Objective – NS |
| Measurement Accuracy | Threshold – 1.0% Objective – NS | Threshold – 1.0% Objective – NS |
| Refresh | Threshold – Every 7 day period Objective – Every 5 day period | Threshold – Every 7 day period Objective – Every 5 day period |

Quality flags (Table)

The validation was done by event cases, not by pixels. No new quality flag was added to product file.

Product evaluation/validation

Validation of VH-EDR is conducted via cross-comparison of VH-EDR and inter-comparisons of VH-EDR's images, digital data and their spatial and temporal trends. The validation data includes: (1) The official USA and NOAA/NESDIS VH products (2) Data and products from other sensors (VIIRS, MODIS, AVHRR, SPOT etc) and (3) In situ data (a- Drought indicators (USDM, Palmer, SPI, Precipitation anomaly, temperature anomaly etc), b - crop yield, c- crop conditions, d - economic indicators, E - users' response and others). VH-EDR requires weekly and time-series based validation, primarily related to its ability to capture spatial and temporal vegetation variations.

Product availability/reliability

VIIRS-VH EDR data were produced since 7/31/2015, but data before/**10/18/2016** (Validated maturity effective date) were not reliable because of they were not fully validated.

Algorithm performance dependence

- (1) Calibration of VIIRS reflectivity bands I1, I2
- (2) I5 measurements
- (3) Conversion of reflective and emissive channels to NDVI and BT, respectively
- (4) Changes from SNPP/VIIRS to J1/VIIRS
- (5) Noise removal from NDVI and BT and producing no noise SMN from NDVI and SMT from BT
- (6) Relationship between VIIRS SMN and SMT with AVHRR SMN and SMT, respectively
- (7) Climatology changes

Known errors/issues/limitations

We will continue monitor the performance/quality of VIIRS VH products

3. Changes since last maturity stage

This is the first maturity stage.

4. Review board recommendations

Path

5. Path Forward/Future Plan

Planned further improvements

- a. Update Regression Coefficients between VIIRS SMN & SMT with AVHRR SMN & SMT
- b. Update algorithm for SMN & SMT climatology due to climate warming
- c. Start developing VIIRS SMN & SMT climatology
- d. Update changes from SNPP/VIIRS to J1/VIIRS

Planned Cal/Val activities/milestones

- (1) Validate by standard Vegetation Health and drought products
- (2) Validate by similar products from other satellites (AVHRR, MODIS, SPOT etc)
- (3) Validate by crop and pasture production data for countries and admin. regions



Read-me for Data Users

- (4) Validate by comparing with other events
- (5) Validate by agricultural assessments
- (6) Validate by economic indicators
- (7) Validate by users response

6. Additional Items to note

Additional information is available in the VIIRS-VH algorithm theoretical basis document (ATBD) and validation maturity review briefing, which can be accessed at:

<http://www.star.nesdis.noaa.gov/jpss/Docs.php>

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