



MEMORANDUM FOR: The JPSS Program Record
SUBMITTED BY: JPSS **Vegetation Health Product** Team Lead, **Xiwu Zhan**
CONCURRED BY: JPSS Algorithm Management Project Lead Lihang Zhou
JPSS STAR Program Manager Ingrid Guch
APPROVED BY: JPSS Program Scientist Satya Kalluri

SUBJECT: NOAA-21 VHP **Provisional** maturity status and public release
DATE: 09/29/2023

Provisional maturity status declaration for Vegetation Health Product

Maturity Review Date: 9/28/2023
Effective Date: 03/31/2023
Operational System: VHsuite v2r1

The JPSS Algorithm Maturity Readiness Review Board approved the release of the JPSS **Vegetation Health Product** to the public with a Provisional maturity level quality as of **03/31/2023** (effective date), based on [JPSS Validation Maturity Review held on 9/28/2023](#).

1. Maturity stage definition (reference to the AMM webpage for maturity definition:
<http://www.star.nesdis.noaa.gov/jpss/AlgorithmMaturity.php>)
2. Algorithm Description:
Vegetation Health Indices product (VHP) includes Vegetation Condition index (VCI), Temperature Condition index (TCI) and Vegetation Health index (VHI) derived from JPSS VIIRS data for latitude zone from -55S to 75N with resolution of 1km, in geographic grid (equal latitude and longitude) saved in NETCDF format,
List of Products (Collection Short Name (CSN)) **includes**
Vegetation Condition index (VCI),
Temperature Condition index (TCI) and
Vegetation Health index (VHI).
Product requirements/Exclusions (DPS)
VHP Product is daytime product using VIIRS visible, NIR and IR bands, with low confidence over snow and desert areas.
Quality flags (Table): Remark = From the least significant bit (LSB):
bit1: 0-valid, 1-invalid
bit2: 0-non-desert, 1-desert
bit3: 0-nonland, 1-land
bit4: 0-noncoastal, 1-coastal
bit5: 0-valid, 1-too cold condition
Product evaluation/validation
NOAA-21 VIIRS VHP product was validated by comparing to similar products from other satellites /research team, such as VHPs from S-NPP and NOAA-20, MODIS NDVI, LTDR, GIMMS, et al.



Read-me for Data Users

Product availability/reliability

NOAA-21 VIIRS VHP data were produced since 02/13/2023, but data before 03/31/2023 (Provisional maturity effective date) were not reliable because of NOAA-21 VIIRS SDR reached Validated maturity after 03/30/2023. SDR data are input to VHP algorithms.

VHP from S-NPP VIIRS was available since 2012 week 12

VHP from NOAA-20 VIIRS was available since 2018 week 1 to current

VHP from NOAA-21 VIIRS was available since 2023 week 7 to current

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&NOAA-20/VIIRS to NOAA-21/VIIRS
- (5) Noise removal from NDVI and BT to produce no noise SMN from NDVI and SMT from BT
- (6) Climatology ancillary data updates

Known errors/issues/limitations

VHP data are not good over snow, desert area

VHP data may have slightly lower quality at the beginning 7 weeks and the ending 7 weeks of the available time series.

3. Changes since last maturity stage

Added capability to process NOAA-21 data into software version of DAP 2021.

4. Review board recommendations

5. Path Forward/Future Plan

Will develop and update the climatology using all available data from AVHRR and VIIRS of S-NPP, NOAA-20 and NOAA-21;

Will improve the algorithm, for example: using percentiles to evaluate the climatic max and min NDVI;

Will validate VHP by crop yield data, drought data, wild fire data et al.

6. Additional Items to note

Additional information is available in the VHP 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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