MEMORANDUM FOR: The Record
FROM: Marco Vargas, JPSS Green Vegetation Fraction (GVF) Team Lead
SUBJECT: SNPP VIIRS GVF Validated maturity status and public release
DATE: 10/18/2016

Validated maturity status declaration for SNPP VIIRS GVF product
Maturity Review Date: **10/18/2016**
Effective Date: **mm/dd/2016**
Operational System: **NDE, Version 1.0**

The JPSS Algorithm Maturity Readiness Review Board approved the release of the SNPP VIIRS GVF Product to the public with a validated maturity level quality as of mm/dd/2016, based on JPSS Validation Maturity Review held on 10/18/2016 (http://www.star.nesdis.noaa.gov/jpss/Docs.php).

1. **Validated maturity Definition**
   The Definition of validated maturity stage is available at the JPSS Algorithm Maturity Matrix webpage: http://www.star.nesdis.noaa.gov/jpss/AlgorithmMaturity.php

2. **GVF Product Description**
   As part of the NOAA JPSS NDE program, NOAA/NESDIS/STAR has developed a new near real time GVF product. The VIIRS GVF is calculated using data from the VIIRS sensor onboard the SNPP satellite. The GVF product was transitioned from research to operations in February 2015. The new GVF product has two components; the first GVF product has global coverage at 0.036° spatial resolution (4-km at the equator) in Lat/Lon projection, and the second GVF product is regional (Lat 90°N - 7.5°S, Lon 130°E - 30°E) at 0.009° spatial resolution (1-km at the equator) in Lat/Lon projection. Both GVF products are weekly composites, updated daily based on the past week's data. The GVF retrieval algorithm is based on the AVHRR heritage GVF algorithm. The VIIRS GVF is derived from EVI unlike the AVHRR GVF which is derived from NDVI. The VIIRS GVF retrieval algorithm uses VIIRS red (I1), near-infrared (I2) and blue (M3) surface reflectance bands centered at 0.640 μm, 0.865 μm and 0.490 μm, respectively, to calculate the Enhanced Vegetation Index (EVI) and derive GVF from EVI. The GVF products output file format is NetCDF4.

   Product requirements/Exclusions (L1RDS)
   VIIRS GVF product requirements are documented in the Joint Polar Satellite System (JPSS) Level 1 Requirements Supplement (L1RDS). Appendix D of the L1RDS describes performance exclusions for the Suomi NPP products.
   VIIRS GVF product requirements are also documented in the JPSS ESPC Requirements Document (JERD) Volume 2: Science Requirements Version 2.0.

Quality flags

Not applicable (see section 3.2.2 Quality Flags from the ESPC JERD Volume 2: Science Requirements – Version: 2.0 Mar 31, 2016,).

Product evaluation/validation

Quantitative evaluation to date is predominantly based on correlative analysis with Landsat derived GVF data at global scale, Google Earth satellite imagery derived GVF, AVHRR GVF, and tower-based radiation flux measurement data at selected sites over the conterminous US. The analyses performed showed VIIRS GVF meeting the APU performance thresholds in the JPSS Level 1 Requirements Supplement.

Product availability/reliability

VIIRS GVF data has been produced operationally at NDE since 02/12/2015.
The GVF global product is available at NOAA CLASS.
http://www.nsof.class.noaa.gov/saa/products/search?sub_id=0&datatype_family=NDE_DAILY&submit.x=25&submit.y=4

Algorithm performance dependence

The quality of the VIIRS GVF product is critically dependent on the quality of the Surface Reflectance input bands, cloud mask and geolocation information.

Known errors/issues/limitations

An error was discovered in the Land Water Mask (LWM) used by the GVF production system, which introduced artificial dashed lines in a few lakes in North America. It has been noted that the smoothing algorithm used by the GVF production system introduced a time shift (~ 2 weeks) in the seasonal cycle (when compared to the AVHRR GVF seasonal cycle). The recommended remediation strategies for the two issues described above have been presented.

3. **Changes since last maturity stage**
   None

4. **Review board recommendations**
   TBD

5. **Path Forward/Future Plan**
   A CCR will be submitted to the SPSRB to update the GVF product Land Water Mask, and update the smoothing algorithm. The next step in the life cycle of the VIIRS GVF product is to begin the Long Term Monitoring (LTM) phase.

6. **Additional Items to note**

Additional information is available in the SNPP VIIRS GVF algorithm theoretical basis document (ATBD) and validation maturity review briefing, which can be accessed at:
http://www.star.nesdis.noaa.gov/jpss/Docs.php

Points of Contact:

Name: Marco Vargas
Email: marco.vargas@noaa.gov
Phone: 301-386-3590

Name: Hanjun Ding
Email: hanjun.ding @noaa.gov
Phone: 301-386-3243