

VIIRS NCC Imagery EDR Release, Beta Data Quality
February 2013
Read-me for Data Users

The JPSS Algorithm Engineering Review Board released the VIIRS Near Constant Contrast (NCC) Imagery Environmental Data Records to the public with a Beta level Maturity as of 18 July, 2012. Beta quality is defined as:

- Early release product
- Initial calibration applied
- Minimally validated and may still contain significant errors (additional changes are expected)
- Available to allow users to gain familiarity with data formats and parameters
- Product is not appropriate as the basis for quantitative scientific publications, studies and applications

The Board recommends that users be informed of the following product information and characteristics when evaluating the VIIRS NCC Imagery EDR.

1. The VIIRS Imagery EDR comprises all 5 I-bands, 6 of the 16 M-bands, and the Day Night Band (DNB). The DNB is a special case, where the Imagery produced is referred to as Near Constant Contrast (NCC). NCC Imagery contains additional processing and therefore is considered independent of the other Imagery products. This memorandum applies only to the NCC, Imagery EDRs.
2. Imagery is heavily dependent on the upstream SDRs, in this case the DNB SDR. As calibration of the DNB SDRs improves, so does the quality of the Imagery. Radiometric accuracy and sufficient geolocation, covered by the VIIRS SDR team, are prerequisites for any Imagery to attain the next stage. The VIIRS SDRs, including the DNB, formally achieved beta status in mid-May 2012. Please see the VIIRS SDR Read-me for additional information on these products.
3. The NCC Imagery EDR takes the VIIRS DNB SDR and transfers the appropriate values on as Ground Track Mercator (GTM) projection. GTM uses the nearest pixel; it does not use an average unless an isolated pixel has a bad value. Creating NCC Imagery includes two additional steps not taken for any other imagery product: (1) It computes an albedo for each pixel and (2) it mitigates solar/lunar variations across scan lines through the use of Look-Up Tables (LUTs), hence making it easier for a human viewer to discriminate actual atmospheric or ground features. This is especially important in the vicinity of the terminator.
4. Users should note the following issues. Each of these issues has a documented Discrepancy Report that will be resolved prior to provisional declaration of the VIIRS NCC Imagery EDR.
 - Areas of fill in the shape of triangles are noted in approximately 8% of the NCC products.
 - Although it was expected that NCC Imagery would be useful down to half moon illumination, it is currently useful only with 2-3 days either side of the full moon phase.
 - Stray light is noted on the dark side of the terminator, when the sun is just below the horizon.

- Excessive fill was also noted in very dark pixels and in granules where the solar angle crossed the 105 solar angle, the point where the algorithm assumes no solar illumination exists.

Two of the items above are not related to the NCC algorithm. The cause of the triangles was missing adjacent granules, and has been significantly mitigated by improvements in the ground system. As of October 2012 the percentage of cases is below 0.5%. Stray light has been tied to the instrument; however a software correction is in development for a potential 2013 implementation. The other issues above are being addressed via changes in the LUTs, through the stray light correction, or modifications to the NCC algorithm itself.

Additional Items to note:

1. Instrument and spacecraft maneuvers and tests: maneuvers and special tests are still being performed on-orbit to better characterize the VIIRS instrument performance. These include but are not limited to the monthly lunar maneuver, quarterly blackbody WarmUp CoolDown (WUCD) tests. During such events, the VIIRS Imagery EDRs will not be optimal, and may not be useable. Data users are encouraged to contact the VIIRS SDR team if any related issues arise. See VIIRS SDR Read-me for Beta Data Quality for POC.

2. The VIIRS VisNIR band degradation has had no negative impact on the NCC Imagery EDRs. See VIIRS SDR readme for details on this anomaly.

Additional information on VIIRS, algorithm theoretical basis documents (ATBDs), and examples of VIIRS Imagery are available at

<http://rammb.cira.colostate.edu/projects/npp/>

The VIIRS SDR Read-me for Beta Data Quality is available at

http://www.class.ngdc.noaa.gov/notification/pdfs/120615_VIIRS_SDR_Release_v2.pdf

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