VIIRS Imagery EDR Release, Validation Stage 3 Data Quality
Jan 10 2014
Read-me for Data Users

The JPSS Algorithm Engineering Review Board released all VIIRS Imagery Environmental Data Records (EDRs) to the public with a Validation stage 3 level of maturity as of 20 August 2013. Validation stage 3 data quality is defined such that an algorithm output has been shown to meet threshold performance attributes, using a **large** set of samples, as identified in the JPSS Level 1 Requirements Supplement with the exception of S-NPP Performance Exclusions. The Imagery has no performance exclusions tied solely to S-NPP. With the accomplishment of Validation Level 3, the Imagery product is now an operational product for any and all users.

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

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 to produce pseudo-albedos, otherwise it is treated similar to M-band Imagery EDRs.

2. CLASS archives only the I-band and NCC Imagery EDRs. It does not archive any Imagery created from the M-bands. The Imagery derived from the M-bands was agreed to after requirements had been established for what the program was expected to produce and deliver to CLASS. Although this additional Imagery is quite useful for identifying atmospheric and surface features, no need was foreseen to have it archived, and that remains the case today.

3. The Imagery EDR algorithm processes VIIRS SDRs and transfers radiance/reflectance/brightness temperature values on as Ground Track Mercator (GTM) projection. GTM uses the nearest pixel rather than an average of the surrounding pixels, unless an isolated pixel has a bad value. In that case it will use the average of the adjacent pixels. In any other case where bad or fill values exist in the upstream Sensor Data Records (SDRs), the Imagery will also provide a fill value.

4. Radiometric accuracy and sufficient geolocation, covered by the VIIRS SDR Team, are prerequisites for Imagery to attain Validation stage 3 data quality. Both are acceptable as of January 2014. There are no known issues for either radiometric accuracy or geolocation that negatively impact any of the Imagery products to the extent a typical user would observe them.

5. The current capability of the Imagery EDR is qualitatively well characterized. There are currently no open issues with any of the Imagery product, but certain features may be present that require some explanation. These areas are as follows:

    a. For non-NCC Imagery, minor striping has been reported either under extreme enhancement or in some cases where channel differences are produced. The overall impact is minor at most, and under typical use, striping is not noticeable in non-NCC Imagery.

b. NCC Imagery is able to provide a useful image even under minimal illumination conditions, such as that associated with the new moon. However in such cases the signal-to-noise ratio can become quite small; and artifacts from the sensor may appear. The image itself may look quite noisy, and it may appear striped. However this is a natural effect tied to the small signal when little (lunar) illumination is available. It is not an error from the sensor or the NCC Image itself. This will not occur in daylight when the scene is well lit by the sun.

6. Additional Items to note:

a. 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.

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

c. When displaying adjacent Imagery EDR granules, lines of fill will be noted between the granules. This is expected and not an error, these lines of fill exist to ensure the file size of the Imagery EDR product remains constant, even though the number of Ground Track Mercator rows varies from granule to granule. It is up to the user to remove these lines if desired.   More detail on why these lines of fill are necessary may be found in the Imagery User's Guide.

7. The Imagery EDR validation process is now completed. However there is always the possibility of an unexpected anomaly. If this occurs, users are encouraged to contact the Imagery Product Lead (Dr. Don Hillger via Don.Hillger@colostate.edu) or the point-of-contact below.

Additional information on VIIRS, algorithm theoretical basis documents (ATBDs), and examples of VIIRS Imagery are available at
http://www.star.nesdis.noaa.gov/jpss/ or
http://rammb.cira.colostate.edu/projects/npp/

Point of Contact
Janna Feeley
JPSS DPA Cal/Val Lead
Janna.h.Feeley@nasa.gov
240 684-0974