VIIRS SDR Release, Beta Data Quality
June 2012
Recommended Cautions for Data Users

The JPSS Algorithm Engineering Review Board has released the VIIRS Sensor Data Record product to the public with a Beta Quality data quality attribute. Beta quality is defined as:

- Early release product
- Initial calibration applied
- Minimally validated and may still contain significant errors (rapid changes can be 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 aware of certain specific data product characteristics. We call these characteristics product caveats, and the product caveats for VIIRS at this time are:

1. VisNIR band degradation: larger than expected time-dependent instrument responsivity degradation centered near the 0.86 um band (primarily in bands 865 nm-M7, 742 nm-M6, 672 nm-M5, 1240 nm-M8, 1378 nm-M9, 1610 nm-M10, 865 nm-I2, and 640 nm-I1). Gain LUT values are being updated weekly in the operational SDR product and the weekly gain degradation at M7 is approximately 0.5%/week. Data for dates earlier than the initial data release date have gain steps in excess of 0.5% between successive product gain updates. Best calibrations occur on the date of first use of the tables in each week, typically for data corresponding to a Friday.
2. M6 high radiance fold-over: sensor specified maximum measured radiance on the 742 nm band (M6) is set at 41 watt m^{-2} sr^{-1} μm^{-1}. Certain cloudy scenes have a radiance in excess of the maximum radiance and the sensor response in digital numbers for these scenes "folds-over." A high radiance values in M7 is one indicator that the M6 value may be the result of fold-over.
3. Striping in some VIIRS bands: striping occurs in several VIIRS bands especially over uniform scenes.
4. Instrument and spacecraft maneuvers and tests: maneuvers and special tests are still being performed to VIIRS to better characterize instrument performance. These include but are not limited to the monthly lunar maneuver, quarterly blackbody WarmUp CoolDown (WUCD) tests. During such events, the data may not be optimal. Data users are encouraged to contact the VIIRS SDR team if any related issues arise.
5. Spectral effects of response degradation: response degradation is a loss of spectral reflectance in the VIIRS fore optics due to UV exposure damage to mirror surfaces. This effect is seen as a gain degradation from solar diffuser observations and also may be

characterized as a reduction in system spectral throughput rather than a (spectrally flat) gain reduction. The team is developing revised spectral response functions, and Environmental Data Record developers are encouraged to assess whether they may need to revise the sensor spectral characteristics in developing their EDRs.

6. The on-board calibration sector sequence for gain states displays an anomalous pattern about once every 24 hours. There exists a potential for an error offset correction value for all dual gain bands (M1 – M5, M7 and M13) in the localize time frame about the time of the presence of the anomalous calibration sector pattern. The linear gain of the M13 band also may be in error for some observations in the localized time frame about this same time. The offset error small, usually below a few DN values for these bands, and the M13 radiance error is uncertain.

More information about VIIRS can be found at the following VIIRS websites: http://www.star.nesdis.noaa.gov/jpss/VIIRS.php, and https://cs.star.nesdis.noaa.gov/NCC/VIIRS, where users can find the user's guide, algorithm theoretical basis documents (ATBD), on-orbit instrument performance data, sample codes to read the VIIRS SDR data, conference presentations, and image gallery, etc.

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