

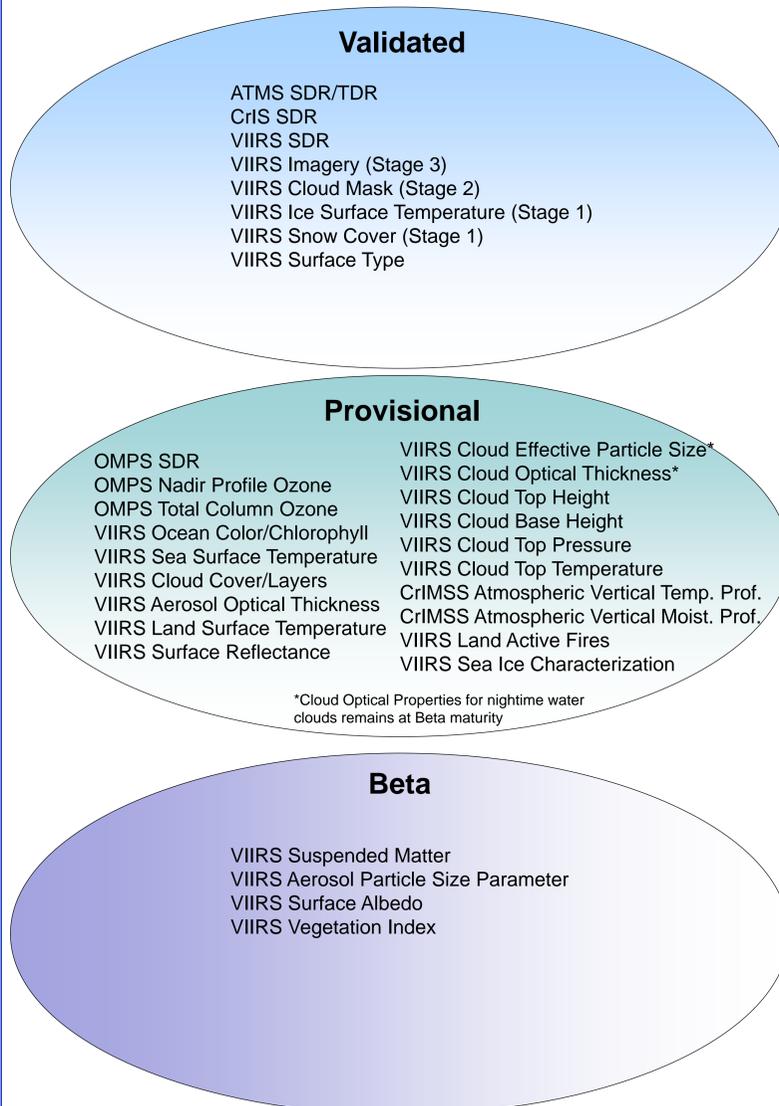
Introduction

Data from the JPSS satellite suite are processed into sensor and environmental data records (SDRs and EDRs) that are disseminated to the customer and user community for integration into a multitude of applications, including forecasting, military applications, and climate studies. To ensure quality of the JPSS data products, the JPSS Ground Project has established a Calibration/Validation Program consisting of multiple discipline teams led by community experts that have extensive knowledge of the sensors, extensive subject matter expertise, and heritage experience with space-based environmental measurements. Documented Suomi National Polar-orbiting Partnership (SNPP) Cal/Val Plans explain the detailed activities planned for the assessment, improvement, and validation of the Suomi NPP SDRs and EDRs.

The Suomi NPP Data Product Maturity definitions (Tables 1 and 2) are based on heritage NASA Earth Observing System (EOS) classifications, in order to support consistency and continuity with the EOS mission. Additionally, the JPSS definitions include conditions to meet product requirements. Each SDR (Level 1 equivalent), EDR (Level 2 equivalent), and intermediate product is individually assessed for maturity, as discipline team leads define the specific exit criteria and translate the general definitions to specific definitions for each product. The JPSS Program maintains an Algorithm Maturity Matrix (AMM) which defines the actual or projected dates that each of the data products has reached or will reach the various levels of maturity. Note that these dates reflect when the necessary algorithm modifications that will result in generation of the beta, provisional, or validated products have been identified; implementation of these changes into the operational system may be delayed anywhere from 1 week to several months depending on the complexity of the necessary changes. Inter-algorithm dependencies are also tracked with the AMM tool to ensure consistency between maturity advancement schedules and quick assessment of impacts of delays in validation efforts.

Upon implementation of the necessary algorithm modifications for 'beta' level maturity, each of the Suomi NPP data products, are made available to the community from the NOAA Comprehensive Large Array-data Stewardship System (CLASS). Members of the scientific community are encouraged to obtain these data from the archive and participate in the JPSS validation efforts as they progress to the provisional and validated maturity levels.

Data Product Maturity Status



A summary of the SNPP data product maturity status is illustrated above. In addition, detailed maturity status, as well as schedule for future milestones, is available from the NOAA STAR website:

<http://www.star.nesdis.noaa.gov/jpss/Data.php>

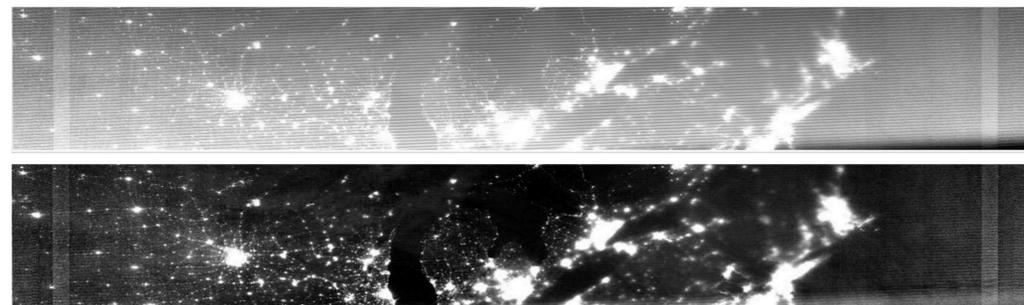
All SNPP data products are available for download from CLASS:

<http://www.class.ncdc.noaa.gov/saa/products/welcome>

Users can also find an individual 'read me' file for each SNPP data product at this website, detailing the analysis completed to date and performance attributes.

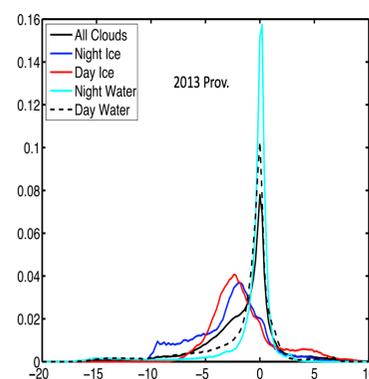
EDR Performance Examples

VIIRS Day-Night Band Imagery



Artifacts in the DNB SDR are inherited by the NCC Imagery EDR. Before August 2013 the most significant of these was a stray light issue with the DNB on the dark side of the terminator. The DNB SDR algorithm was adjusted to correct for this error in August 2013. The impact on the NCC Imagery EDR was profound. The removal of the stray light is evident in the bottom image, taken from the granule over the upper Midwest of the United States on 9 August 2013. As a reference, Lake Michigan may be seen in the middle of the granule

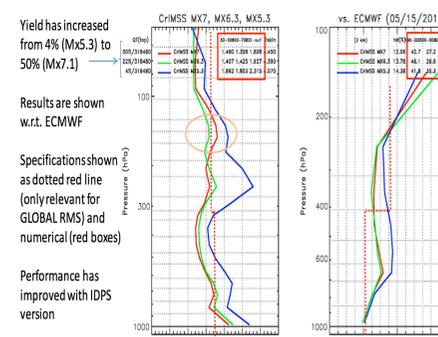
VIIRS Cloud Products



- 4 months of collocated CALIOP (lidar) comparisons with the VIIRS IP CTH product
- 20 minute maximum time separation
- Poles (>60deg lat) excluded.
- Results show positive bias for water clouds has been largely removed.
- High cloud bias remains.

CrIMSS AVMP/AVTP

Provisional Maturity Evaluation (Focus Day) for May 15, 2012



Yield has increased from 4% (Mx5.3) to 50% (Mx7.1)

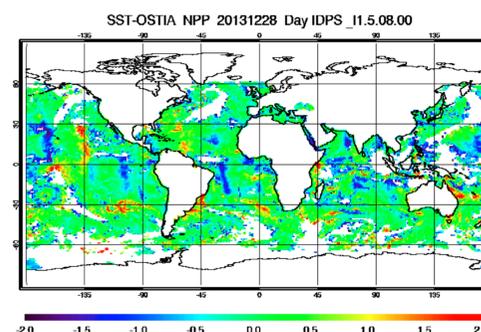
Results are shown w.r.t. ECMWF

Specifications shown as dotted red line (only relevant for GLOBAL RMS) and numerical (red boxes)

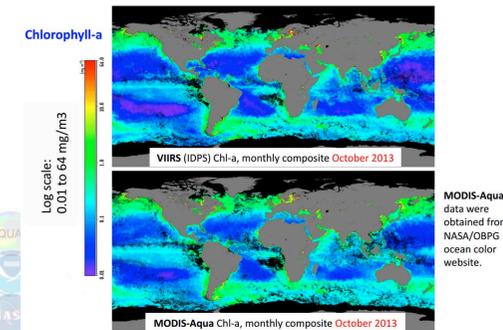
Performance has improved with IDPS version

VIIRS Sea Surface Temperature

28 December 2013

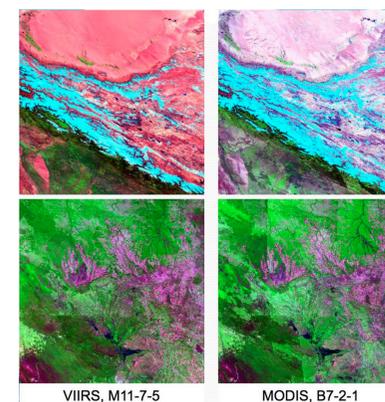


VIIRS Ocean Color



MODIS-Aqua data were obtained from NASA/OBPG ocean color website.

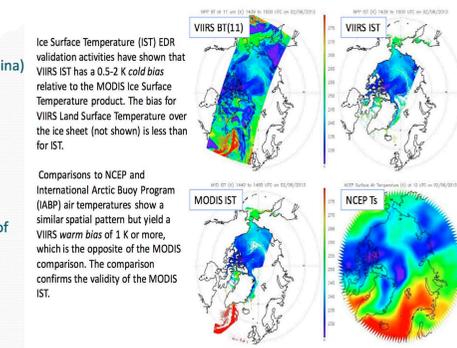
VIIRS Land Surface Type



Less snow pixels selected

Less artifacts (swath boundary)

VIIRS Ice Surface Temperature



Ice Surface Temperature (IST) EDR validation activities have shown that VIIRS IST has a 0.5-2 K cold bias relative to the MODIS Ice Surface Temperature product. The bias for VIIRS Land Surface Temperature over the ice sheet (not shown) is less than for IST.

Comparisons to NCEP and International Arctic Buoy Program (IABP) air temperatures show a similar spatial pattern but yield a VIIRS warm bias of 1 K or more, which is the opposite of the MODIS comparison. The comparison confirms the validity of the MODIS IST.

AMS 2014

Acronyms

CrIS – Cross-track Infrared Sounder

ATMS – Advanced Technology Microwave Sounder

VIIRS – Visible Infrared Imaging Radiometer Suite

OMPS – Ozone Mapping and Profiler Suite

Table 1

SNPP EDR Algorithm Maturity Definitions	
Beta	<ul style="list-style-type: none"> •Early release product •Minimally validated •May still contain significant errors •Available from CLASS 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
Provisional	<ul style="list-style-type: none"> •Product quality may not be optimal •Incremental product improvements are still occurring •General research community is encouraged to participate in the QA and validation of the product, but need to be aware that product validation and QA are ongoing •Users are urged to consult the EDR product status document prior to use of the data in publications •May be replaced in the archive when the validated product becomes available
Validated	<ul style="list-style-type: none"> •Product performance is well defined over a range of representative conditions •Further improvements to the product may be made •Product is specified as Stage 1, Stage 2, or Stage 3 Validated
Stage 1:	Product performance has been demonstrated to comply with the specifications using a small number of independent measurements obtained from selected locations and periods
Stage 2:	Product performance has been demonstrated to comply with the specifications over a widely distributed set of locations and periods
Stage 3:	Product performance has been demonstrated to comply with the specifications and product uncertainties are established via independent measurements in a systematic and statistically robust way representing global conditions

Table 2

SNPP SDR Algorithm Maturity Definitions	
Beta	<ul style="list-style-type: none"> •Early release product •Initial calibration applied •Minimally validated and may still contain significant errors •Frequent changes to the product can be expected •Available from CLASS 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
Provisional	<ul style="list-style-type: none"> •Product quality may not be optimal •Incremental product improvements are still occurring as calibration parameters are adjusted with sensor on-orbit characterization •General research community is encouraged to participate in the QA and validation of the product, but need to be aware that product validation and QA are ongoing •Users are urged to consult the SDR product status document prior to use of the data in publications
Validated/Calibrated	<ul style="list-style-type: none"> •On-orbit sensor performance is well-characterized and calibration parameters are adjusted accordingly •Ready for use in applications and scientific publications •Further improvements to the product may be made