



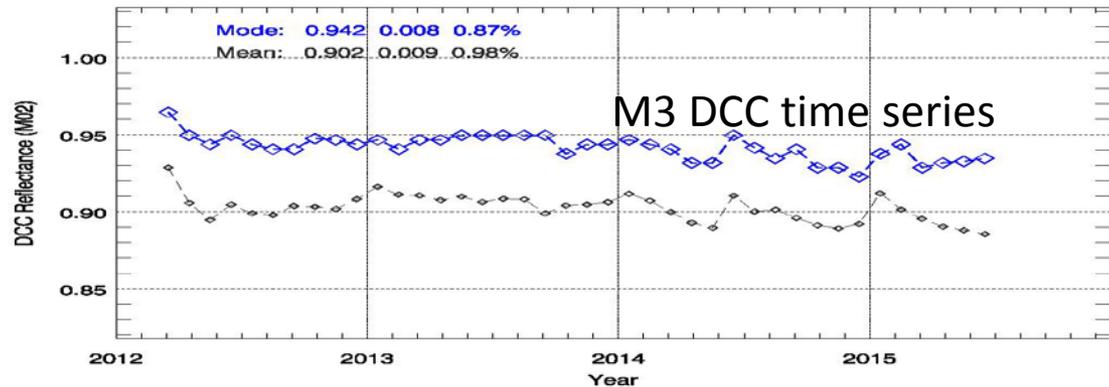
VIIRS SDR Breakout Session

Opening remarks: accomplishments and path forward

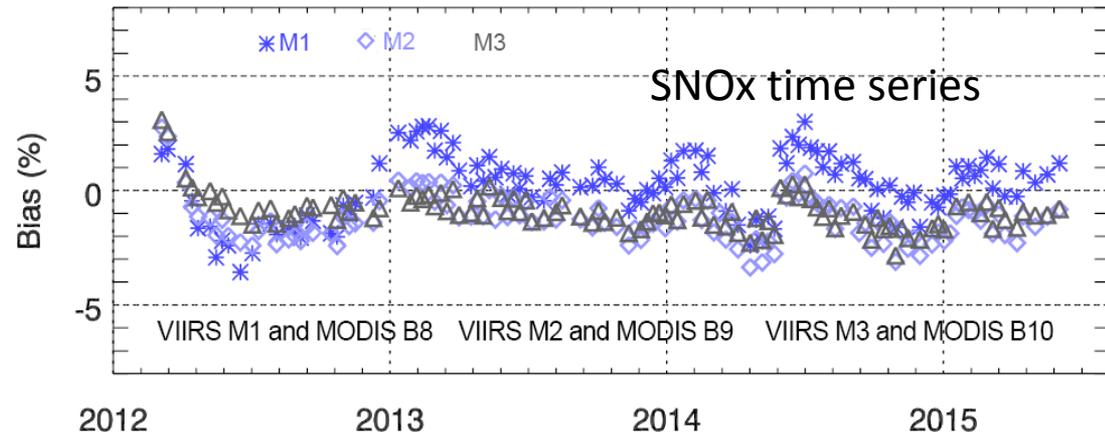
Changyong Cao
VIIRS SDR lead
NOAA/NESDIS/STAR

August 26, 2015

- VIIRS calibration is closely monitored at 30+ cal/val sites worldwide;
- Time series shows the calibration is very stable, and accurate (better than the +/-2% spec);
- Comprehensive calibration & monitoring include monthly maneuvers such as lunar cal, as well as DNB offset and gain transfer (VROP702)

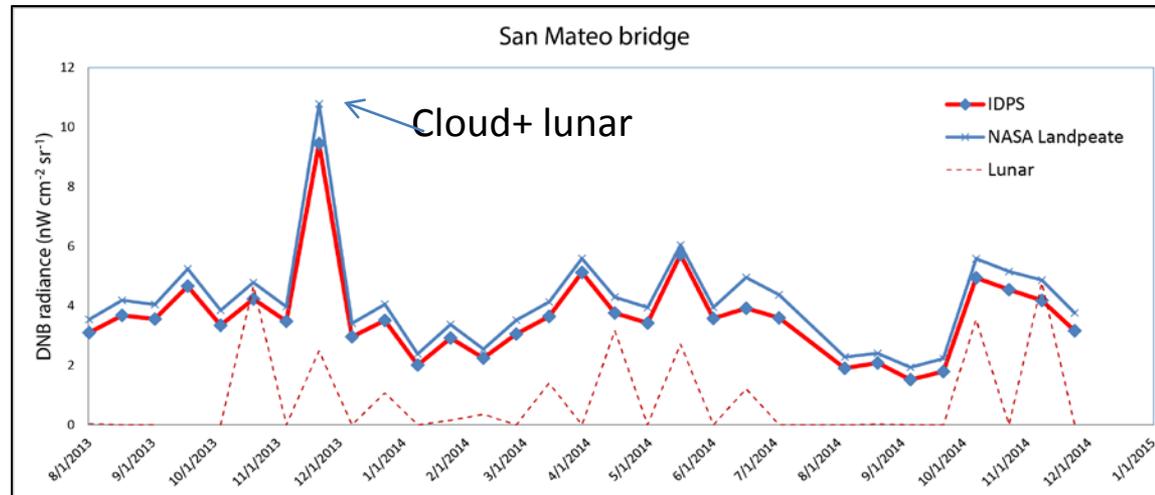
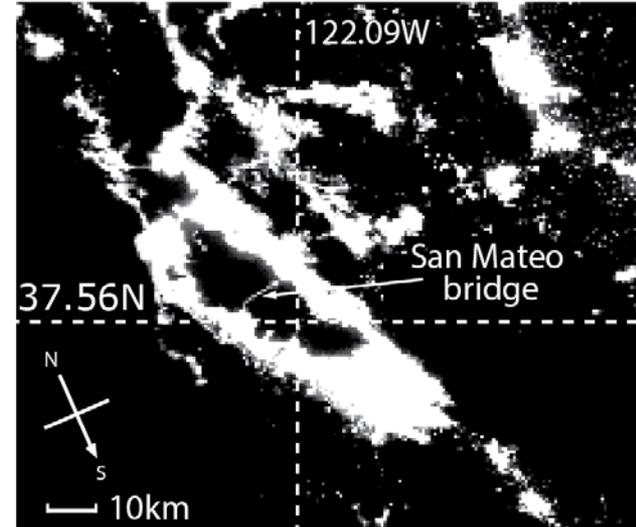


VIIRS very stable according to DCC trending

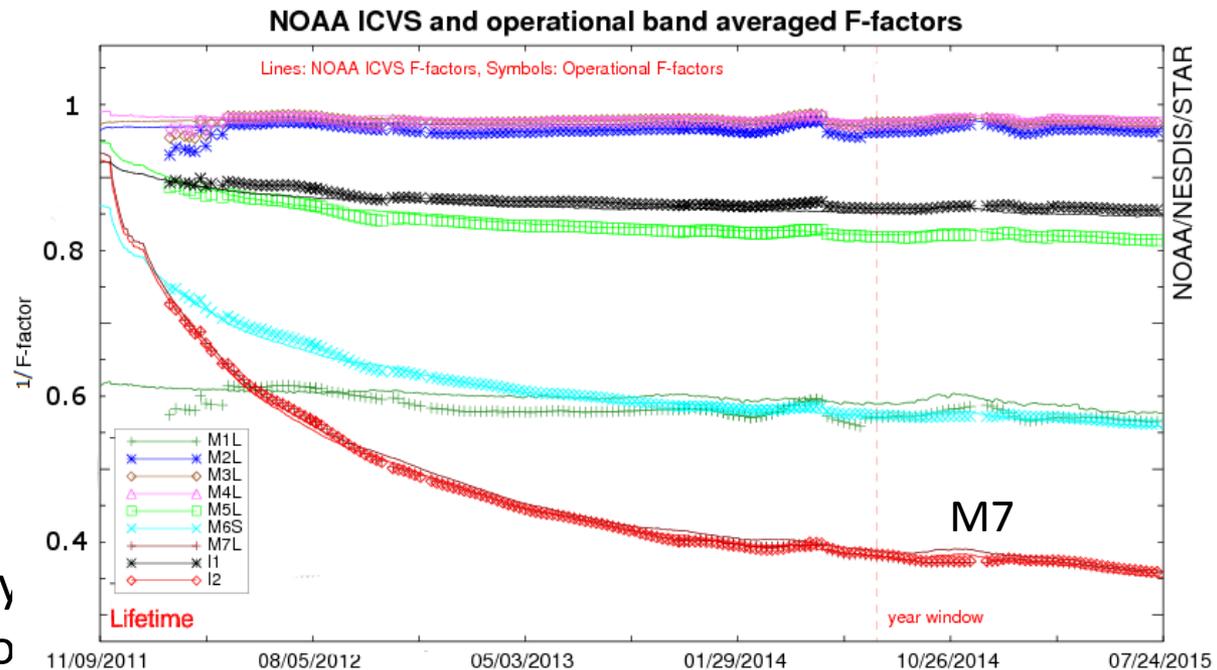


VIIRS very accurate when compared to MODIS

- Validation using San Mateo bridge lights (faint light near Lmin)
- Time series shows NASA LandPeate is consistent with IDPS radiances
- Lunar has minimal impact in clear sky due to narrow bridge width, except in cloudy cases
- Further work expanded to oil platforms



- Rotating Telescope Assembly (RTA) mirror degradation was a major anomaly, due to prelaunch contamination;
- Band M7 has the largest degradation (~70%) since launch;
- The degradation rate has become negligible since a year ago;
- The VIIRS SDR team actively maintains the calibration to compensate for the degradation;
- Impact on users are only limited to early orbits during beta maturity.





VIIRS SDR Team 2015 Top Ten Accomplishments



- Developed J1 VIIRS DNB waiver mitigation and delivered pre-operational software to the program on-time, which greatly reduced program schedule and cost risks (Wang & Lee), in addition to operational straylight correction.
- Prepared all 47 J1 VIIRS LUTs (ver1.0) based on analysis of prelaunch test data, tested using ADL and simulated J1 data, and delivered to the program(Aerospace/VCST/STAR);
- Developed and demonstrated VIIRS DNB radiometric and geolocation monitoring/characterization capabilities using nightlight point sources (Cao & Bai, 2014,RS.), which is critically needed for J1 postlaunch validation of the waivers;
- Expanded validation time series with the 30+ validation sites worldwide, with added capabilities in the SWIR bands, as well as comparing with GOSAT FTS hyperspectral observations (Uprety & Cao, 2015, RSE);
- Generated recalibration coefficients since launch with the latest corrections and RSB Autocal (Blonski)



VIIRS SDR Team 2015 Top Ten Accomplishments



- Completed J1 VIIRS prelaunch test data analysis (VCST/Aerospace/STAR)
- Improved RSB autocal maturity;
- Geolocation thermal chip development for the infrared bands;
- Modeled VIIRS solar diffuser degradation using surface roughness and metrology;
- Active nightlight SBIR project feasibility study in support of VIIRS DNB cal/val.



Active Light Sources for DNB



Enables active remote sensing using passive instrument with well known ground truth

- Reference for existing point sources
- Study night atmosphere (aerosol, cloud, etc)
- Validate radiative transfer for point sources
- Perform spectral studies using different lights (make your own band).

VIIRS/DNB Cal/Val Benefits

- Reduce absolute uncertainties
- Improve stability over time
- Validate the scan vs. radiance bias across aggregation zones (J1)

Site requirements

- Clear sky
- Low aerosol loading
- Dry and thin atmosphere
- No lights nearby
- Large water body (such as lakes)

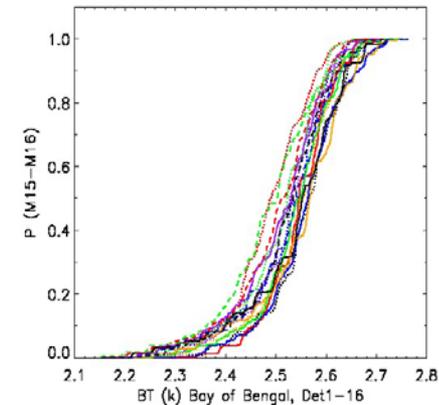
- VIIRS Cal/Val Special Issue (due Oct 30, 2015)
- Additional waiver mitigation
 - SWIR nonlinearity
 - Saturation
 - Bad detector
 - Improve LUTs



The screenshot shows the journal's homepage with a search bar at the top right. The main content area features a special issue announcement for "Calibration/Validation of Visible Infrared Imaging Radiometers and Applications". It includes a "Quicklinks" section with links to "Special Issue Editors", "Special Issue Information", "Keywords", and "Published Papers". Below this, it states "A special issue of Remote Sensing (ISSN 2072-4292)" and "Deadline for manuscript submissions: 30 October 2015". The "Special Issue Editor" section identifies the guest editor as Dr. Changyong Cao, NOAA/STAR, College Park, MD 20740 USA, with a website link and interests in calibration/validation of satellite radiometers, climate change detection, and ground-based instrumentation.

http://www.mdpi.com/journal/remotesensing/special_issues/VIIRS

- VIIRS SDR L1.5 product development (in collaboration with CST team)
 - Bow-tie refill
 - Feature contiguity in bow-tie deletion zone
 - Striping reduction
- VIIRS SDR reprocessing
- RSB autocal operational



- Field campaign preparation augmenting J1 cal/val in conjunction with GOES-R ABI, including near surface measurements with polarimeter, goniometer, and UAS based systems;
- Finalize Cal/val plan and ATBD