

GRWG VIS/NIR sub-group briefing report

GSICS VIS/NIR Sub-Group Report, presented by David Doelling

GSICS annual meeting, Frascati, Italy, March 4-8, 2019

Wish to thank ESA-ESRIN for hosting GSICS meeting

- Good to see many European agency based calibration presentations
 - Hope to gain new calibration insights

GSICS and CEOS IVOS recommended solar spectra

- Short term approach to construct a solar spectra based on the best solar spectra datasets, which have been scaled to a common TSI reference in the more temporal stable part of the spectra.
 - Based on web meetings during late 2017 and early 2018
- Kurt Thome suggested that we should be consistent with CEOS and use the Thuillier solar spectra until a new is decided upon
- Odele Coddington is presenting the TSIS-1 total and spectral (200-2400 nm) solar irradiance observations (4h)
- Tom Stone leading a discussion on solar spectra for VIS/NIR calibration (4i)

NPP-VIIRS NOAA V2 product as the GSICS official VIS/NIR Reference

- NOAA is the official source of NPP-VIIRS data
- At the NOAA VIIRS science team meeting (Aug 2018), we heard that the NOAA team has a version 2 NPP-VIIRS calibration,
 - However, due to reprocessing and archive limitations it is uncertain when the dataset will become available.
- NOAA suggested that it could process locally NPP-VIIRS V2 granules over the GSICS calibration domains.
- We have Sirish Uprety representing NOAA to present the availability of the NPP-VIIRS NOAA V2 calibrated dataset. (4k)
- We will discuss this in the VIS/NIR session on Wednesday afternoon, the best way to proceed on making this data available (4m)

Rethinking L1B calibrated radiance datasets

- Currently, every time the L1B imager data is reprocessed, which can be yearly, you have to download the whole dataset (TB's) all over again, which also may take years and resources
- If the user could only download the dataset once and apply calibration modules, could save reprocessing and storage requirements
 - Must ensure accurate calibrated radiances when applying calibration module
- The remote sensing instrument community would release a level 1b dataset that contains all of the required on orbit instrument measurements.
 - The calibration module can then be downloaded and applied to update calibration, for example the Terra-MODIS WV detector striping anomaly
 - The instrument providers would then provide a calibration module and test dataset to ensure proper implementation, similar to GOME-2 and SCIAMACHY
- Two reservations from processing agencies
 - the users do not want to apply the calibration module, for small number of granules the calibration could be processed as ordered
 - The onboard calibration parameters (detectors, RVS, mirror degradation) are too extensive and perhaps the instrument calibration team loss of control of the dataset
- When reviewing papers that use dataset, make sure the authors attribute the project name, product name, version number and doi.

Spectral Band Adjustment Factor Status

- There are 3 VIS/NIR hyperspectral datasets that can be used for SBAF
 - SCIAMACHY 30x240 km FOV, mostly complete visible spectra (except $> 1.6\mu\text{m}$), high resolution spectra
 - GOME-2 40x80 km FOV, limited visible spectra, high resolution spectra
 - Hyperion 30m FOV, complete spectral range, low spectral resolution, limited sampling
- NASA-Langley SBAF tool ([web site here](#))
 - You can now plot scene specific spectra, as well as the band specific scatter plots to obtain the SBAF factor
 - You can now use other spectral bands to specify a specific scene type. For example use the $1.6\mu\text{m}$ channel to differentiate between ice and water clouds to compute the SBAF factor for the $0.65\mu\text{m}$ channel if your sensor has a $1.6\mu\text{m}$ channel
- Rajendra Bhatt will present the updates to the NASA SBAF tool (4q)

Lunar Calibration Status

Sebastien and Tom

- Planning another Lunar Calibration Workshop
- Development of the GIRO benchmark for validating lunar models
- Using the Moon to character the sensor MTF effort is being lead by NOAA
- GIRO/GLOD license agreement have been recently signed by JMA, USGS, KMA, JAXA, CNES, ESA
 - The distribution of the GIRO code has started for those agencies. But the GLOD will be provided at a later stage once it is consolidated

GIRO benchmark status

- Primary purpose is to validate the GIRO model against ROLOR reference
- Complete benchmark dataset created by EUMETSAT (Seb Wagner)
 - Designed to work with GIRO

DCC Calibration Status

- Write a GSICS DCC calibration methodology/implementation paper that combines the efforts of all GPRCs
 - First on the agenda for the VIS/NIR discussion (4v)
 - High priority
- Obtain demonstration product status this year
- Begin to implement DCC methodology for GEO SWIR bands
- DCC product file convention is nearly finalized
- Bias plotting package is being developed

Combining VIS/NIR method calibration gains

- Combine the multiple calibration approaches to provide users calibration coefficients with the least uncertainty for their application
- GSICS to provide to both lunar and DCC calibration coefficients, as well as an optimized blend
- Some methods are suited for stability or calibration transfer, the uncertainties will vary by wavelength
- Some methods are best suited for certain retrievals,
 - ocean color/aerosols would rely more on Rayleigh scattering

New VIS/NIR approaches

- Advance the Rayleigh scattering approach
 - Kazuki Koderu to present the JMA Rayleigh scattering approach during VIS/NIR section (4p)
 - Bertrand Fournie to present and begin formulating Rayleigh scattering approach during VIS/NIR section, should be performed with the UV group
- GPRC VIS/NIR priorities
 - During the VIS/NIR section we hope to obtain the GPRC priorities in order to prioritize and combine VIS/NIR efforts
- The VIS/NIR group has calibration approach leads
 - Dave Doelling for DCC, Tom Stone for lunar
 - If you would like to lead VIS/NIR GSICS calibration approach we would like to discuss this at the VIS/NIR discussion at the end of Wednesday (4v)

VIS/NIR discussion topics

- Working with NOAA to obtain NPP-VIIRS V2 calibrated data
- GSICS multi-GPRC DCC calibration paper
- Rayleigh scattering calibration approach next steps
- Web meeting agenda
- GPRC VIS/NIR upcoming priorities