

GRWG UV Sub-Group Briefing Report & Introducing Special Session on Strategy for Inter-calibration of SWIR Spectrometers

Rose Munro



Selected GRWG-UV Subgroup Baseline Projects

Reference Solar Spectrum

Aim: to evaluate the available reference solar spectra and make a recommendation for a reference solar spectrum for community use. Lead – Larry Flynn (NOAA)

White Paper on Ground-based Characterisation of UV/Vis/NIR/SWIR spectrometers

Aim: to prepare a white paper documenting best-practise for the on-ground calibration of UV/Vis/NIR/SWIR spectrometers based on in-orbit experience from relevant missions. Lead – Rosemary Munro (EUMETSAT) (*transferred from R. Lang*)

Match-ups and Target Sites

Aim: to produce over-pass comparisons of UV sensors for specific target sites in use by the community. As a first step summaries of methods and results for target sites currently in use will be collected. Lead – TBC.

Cross-calibration below 300nm

Aim: To devise new methods for comparison of wavelength pairs for different viewing geometries taking into account contribution function equivalence to allow radiometric performance comparisons for ozone profile wavelengths from 240 – 200 nm. Lead Larry Flynn (NOAA).

White Paper on Ground-based Characterisation

White Paper still in drafting stage – contributions and/or offers to author sub-sections welcome!

Proposed table of contents

- Accuracy, sensitivity and repeatability
 - I. Sources / commissioning
 - II. Thermal and pressure environment / stability and characterization

- Instrument components
 - I. Detector level
 - a) Noise
 - b) PRNU/PPG
 - c) SMEAR
 - d) Etaloning
 - II. Stray-light
 - III. Grating and alignment (ISRF)
 - a) Spectral assignment
 - b) Spectral stability
 - IV. Pointing and Spatial stability (ISRF/PSF)
 - a) Spatial and spectral aliasing
 - b) Radiometric and spectral scene in-homogeneity errors.
 - c) Detector co-registration (overlap)
 - V. Polarisation sensitivity
 - VI. Radiometric response
 - a) Sources
 - b) Geometry
 - VII. Diffuser characterisation
 - VIII. Degradation and contamination
 - IX.?

White Paper on Ground-based Characterisation

Linked to planned:

“CEOS WGCV Workshop on On-Ground Calibration and Characterisation”

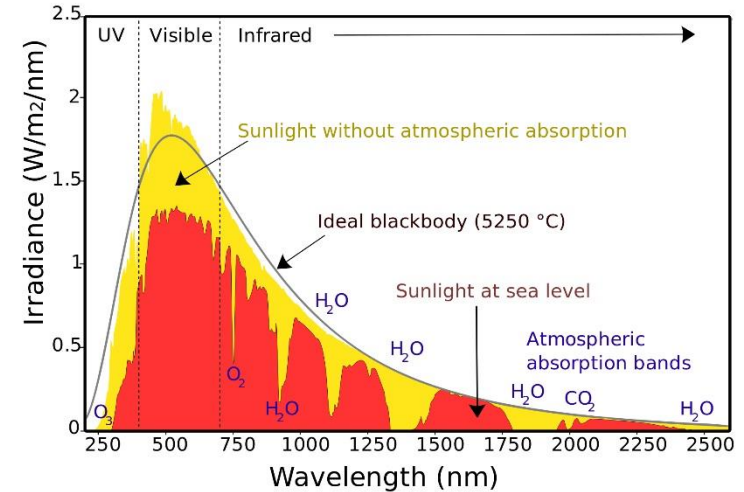
currently anticipated for February 2020.

See also Agenda item 10b.

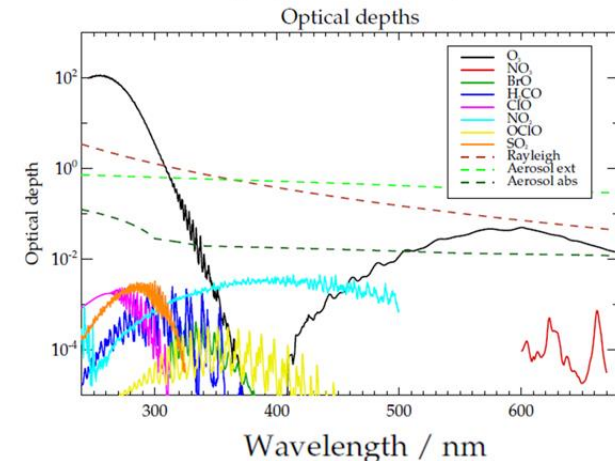
De Facto Scope of the UV Sub-Group

- Class of instruments addressed *reflective solar spectrometers*
- Main focus on atmospheric trace gases
- Moderate to high spectral resolution to *resolve trace gas absorption features*
- Polarization important
- Long list of relevant instruments (not exhaustive) TOMS, SBUV, OMPS, GOME, SCIAMACHY, GOME-2, OMI, Sentinel-5 Precursor, Sentinel-5, Sentinel-4, GEMS, TEMPO, EMI, GOSAT, OCO-2 & -3, Tansat, Copernicus CO₂

Spectrum of Solar Radiation (Earth)



Trace gas signatures in UV/visible region



Courtesy of Brian Kerridge, STFC/RAL, UK / NCU

Outlook for UV Sub-Group (I)

Propose renaming to **Reflective Solar Spectrometer Sub-Group** (or similar)

Addressing the following aspects for UV – SWIR spectrometers

- On-ground characterisation
- Solar calibration
- Lunar calibration
- Inter-calibration
- Polarization
- Development of common methods for use of invariant targets & vicarious calibration sites with homogeneous surface over sufficiently large area.

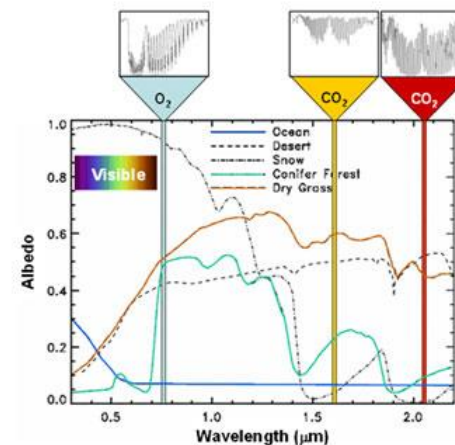


Image courtesy of JPL

Outlook for UV Sub-Group (II)

Consistent with CEOS WGCV strategy discussed in WGCV meeting #44 (http://ceos.org/wp-content/uploads/2018/06/WGCV44_Minutes_v1.01.pdf)

- GHG instrument L1 activities in cooperation with GSICS/UVSG
- GHG L2 addressed under CEOS WGCV/ACSG

Special Session on Strategy for Inter-calibration of SWIR Spectrometers – Thursday 15:00

Thank you for your Attention
Questions?