BTS2048-UV-S-WP measurement results - a quick overview

Ralf Zuber, Peter Sperfeld, Stefan Riechelmann

El Arenosillo (Huelva), Spain
BTS2048-UV-S setup

- cooled backthinned CCD based array spectroradiometer
- ZEMAX optimized crossed Czerny-Turner optical bench in a very compact design
  → no optical fiber is needed
  → robust device and simplified transport

- internal filter wheel with 6 different filter (edge filter and bandpass filter) in front of the spectrometer unit for improved straylight suppression
  → different measurement modes are possible (different use of filter)

1) optical radiation 2) cosine diffuser 3) filter wheel 4) BiTec sensor 5) electrical connectors 6) Microprocessor for data processing and communication.
BTS2048-UV-S-WP

- Weather-proof and temperature controlled unit can be mounted on a sun tracker
- Stray light tube (developed by PTB), FOV 2.8°
- Optical bandwidth 0.6 nm
- Typical measurement time:
  - 4 s (solar bandpass filter mode)
  - 0.2 s (out of range correction mode)
- Only Ethernet (or USB) and power is needed
MatShic wavelength correction

Matshic wavelength corrections

- DOY: 258, 259, 260, 261, 262, 264, 265
- Correction / nm
- Wavelength / nm

Tunable laser

280 300 320 340 360 380 400 420 440
Comparison BTS2048-UV-S-WP to QASUME

Remark: Spectral data convolved with 1 nm slit and wavelength corrected (BTS)
Comparison of time synchronized data (wavelength by wavelength)
Comparison BTS2048-UV-S-WP to QASUME

Remark: Spectral data convolved with 1 nm slit and wavelength corrected (BTS) Comparison of time synchronized data (wavelength by wavelength)
libRadtran algorithm for determining TOC values

Remark: Algorithm details will be published soon.
TOC (20.09.-25.09.) show a good agreement
Discussion

• The BTS2048-UV-S-WP is able to perform precise measurements of direct solar spectral irradiance comparable to DM systems like QASUME

• Using libRadtran algorithms precise TOC evaluations could be applied comparable to established ozone measurement systems like Dobson and Brewer.

• The measurement campaign at Izaña showed that at higher air mass the S/N is decreasing in the short wavelength region, hence the uncertainty of the TOC determination is rising

→ Gigahertz-Optik improved the design of the entrance optic to increase the sensitivity by a factor of 4 by same FOV: $2.8^\circ$ ($\pm 1.4^\circ$) to solve this issue
For further Information, feel free to contact:

Gigahertz-Optik GmbH
E-Mail: r.zuber@gigahertz-optik.de
Web: www.gigahertz-optik.com

PTB
E-Mail: Peter.Sperfeld@ptb.de
Web: www.ptb.de

Thank you for your attention !!!