File Revision Date:
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Data set description:

PI: F. Minvielle
Instrument: UV SPECTRORADIOMETER (BENTHAM DTMc300)
Site: Saint-Denis, La Reunion, France (-20.90S, 55.50E, 85 m), January 2009
Local horizon: mountain southward
Local environment: coastal
Measurement Quantity :

Global spectral irradiance on a horizontal surface (cosine weighted) in the 280-450 nm range (or 280-400 nm) , wavelength step = 0.5 nm. Scans taken every 15 min from sunrise to sunset.

The data summaries on the NDACC database include the following :

1. 290-450 nm integral
2. UVA, 315-400 nm
3. UVB, 290-315 nm
4. Erythemal UV
5. Derived total Ozone column
6. Relative uncertainty of retrieved Ozone

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Few reference articles:

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Instrument description:
Double monochromator Bentham DTMc300 - 2400 gr/mm
Cosine response error: < 5% for angles < 80¡
Wavelength range:
Before 15 December 2011: Wavelength range : 280-400 nm
After 15 December 2011: Wavelength range : 280-450 nm
Resolution : 0.5nm
Wavelength alignment: After correction the shift is generally less than 0.02 nm, and up to 0.03 nm towards 300 nm (according to QASUME 2013)
Slit function: 1.1 10-3 at 1.25 nm from line center and 5. 10-5 at 3 nm
Sampling step: 0.5 nm
Saturation threshold: 2. W/m2/nm
Detection threshold: 1. 10-6 W/m2/nm
Scan duration: 5-6 min
Overall calibration accuracy: Expanded relative uncertainty for 1000W lamp:
For two solar zenith angles and for a coverage factor k=2:
SZA = 30¡: 4.5% at 310 nm and 4.1% at 400 nm
SZA = 60¡: 5.7% at 310 nm and 4.5% at 400 nm
Stray light: 10-6 W/m2/nm
Stabilized temperature: 23¡C before 19 April 2011, after 25¡C. (Sometimes problems with regulation, Flag #2 = 2)
Scan date and time: time is recorded at each wavelength
Global irradiance scan frequency: 15 min

Weekly cleaning of the diffuser.

Algorithm description:
Calibration: every three months with a 1000 W standard lamp traceable to NIST and a calibrated 150 W lamp (only 150 W before December 2010). Each time scans of a mercury lamp.
The 1000 W lamp has been re-calibrated with QASUME, in April 2013. The data after December 2010 have then been reprocessed.
Wavelength calibration: alignment against Fraunhofer lines performed with an algorithm developed at LOA (Houet, 2003) and improved

during a QASUME campaign held at OHP in September 2010.
Spectra are corrected for the instrument's cosine error.
In 2017 a new 1000 W has been purchased. Calibrations carried out with the 2 lamps agree to within 4% in the UV-B, 2-3% in the UV-A.
In 2019 a new 1000 W has been purchased. Calibrations carried out with the 2 newest lamps agree to within 2% in the whole wavelength range.

Ozone retrieval:
Mean of total ozone values from various irradiance ratios of two wavelengths (Houet, M. and C. Brogniez, 2004, Stamnes et al., 1991).
The dispersion around the mean gives an estimate of the uncertainty.
Only ozone values with a relative dispersion lower than 3% are reported since a larger relative dispersion indicates a variable cloudiness during the scan and thus, possibly, a less reliable ozone value (Brogniez et al. 2005).

Instrument history:
The Bentham spectroradiometer working at SDR began routine measurements in 2009.
April - November 2012 repair (replacement of the turrets)
Slit function (laser diode) and angular response of the entrance were measured during QASUME 2013.
May 2016- June 2017 repair (replacement of the turrets)
Due to the covid-19 epidemic and containment, cleaning of the entrance optics may not have been done as frequently as usual in March, April and May 2020, see quality data flags.