Description of Version 2 Data Format NSF UV Monitoring Network: Cloud Optical Depth

Filename: SITE_vX.2_COD.csv

      where SITE   is MCM for McMurdo Station, Antarctica
                        PAL for Palmer Station, Antarctica
                        SPO for South Pole, Antarctica
                        USH for Ushuaia, Argentina
                        SAN for San Diego, California
                        BAR for Barrow, Alaska
                        SUM for Summit, Greenland
             X   is volume identifier (1, 2, 3, …)
             .2   is identifier for Version 2
             COD   is identifier of data type (COD=Cloud optical depth)

Cloud optical depth is estimated by comparing measured spectral irradiance at 450 nm with the associated model values calculated for different cloud optical depths. The algorithm assumes a homogenous cloud. Cloud type, vertical extent, and effective droplet radius for each site are provided below.

Site	Cloud type	Cloud extent (km above sea level)	Effective droplet radius (µm)
McMurdo	Water	2 - 3	10
Palmer	Water	1 - 2	8
South Pole	Ice	5 - 6	20
Ushuaia	Water	3 - 4	7
San Diego	Water	1 - 3	10
Barrow	Water	1 - 2	7
Summit	Ice	5 - 6	20

Column Assignment

Label	Description	Unit	Remark
Filename	Filename of spectral scan		1
Time	Time in UT at start of scan	mm/dd/yy hh:mm:ss	
SZA	Solar zenith angle at start of scan	degree	2
Sky condition	"CS", if spectrum was measured during clear skies		
Measured cloud transmittance (unbiased)	Ratio of measured and modeled spectral irradiance at 450 nm		
Measured cloud transmittance (biased)	Ratio of measured and modeled spectral irradiance at 450 nm, scaled with a solar zenith angle dependent factor to take deviations of measurement and model during clear sky conditions into account. This ratio is then used for estimating cloud optical depth.		3
Cloud optical depth	Cloud optical depth		
TSI coefficient of variation	Standard deviation of all measurements of the TSI sensor performed during the period of a spectral scan, divided by the average of those measurements.		4

See next page for remarks**.**

Remarks

1 - Filename convention of spectral scans:
sCyyhhmm.jjj

where
s   = Site identifier (A=McMurdo; B=Palmer; C=South Pole; D=Ushuaia; E=San Diego;
            F=Barrow; J=Summit)
C   = Always C
yy   = Year
hh   = Hour (UT)
mm   = Minute
jjj   = Day of Year

2 - Solar zenith is the true solar zenith angle, i.e. the angle between the zenith and the Sun if
the Earth had no atmosphere. Due to refraction of the Earth's atmosphere, the Sun
appears to an observer, who is standing at the surface of the Earth, at a smaller angle.

3 - Under clear skies, measured and modeled spectral irradiance values should ideally agree.
In practice, the agreement is not perfect and a solar zenith angle dependent correction
factor is applied to avoid that a cloud optical depth larger than zero is returned by the
algorithm. These correction factors typically range between 0.95 and 1.05.

4 - TSI stands for "Total scene irradiance" and refers to a filtered photodiode that is integral to
the SUV-100 spectroradiometer. The sensor is sensitive between 330 and 380 nm.
Measurements of the sensor can be used to estimate the variation of radiation levels (for
example due to changing cloud cover) during the period of a spectral scan.