SBUV Overpass Information

Each file is labeled by name of station and overpass number in the format:

Satellite label (e.g. noaa17_SBUV2)
Data label (e.g. l2ovp_o3du_v8.6)
Station Name (e.g. boulder)
Station number (usually the assigned WMO station number)
Extension (.txt for text format)

Example: noaa09_sbuv2_l2ovp_o3ppmv_v8.6_boulder.co_067.txt

The header information contains the name, number, location and altitude of the station with -999 being a fill value if any of the fields are unknown. Then a short description of the data is provided indicating the date, time and other information concerning each individual overpass retrieval.

Overpass Algorithm

Because the SBUV instruments view only in the nadir with a small (~180km square) FOV, it takes about two weeks to provide full global coverage unlike the TOMS-like instruments which provides daily global coverage. The overpass algorithm for the SBUV data has been created to return daily overpass values, even if the SBUV measurements are not directly overhead of the ground station. The SBUV ozone measurements made every 1.85 degrees in latitude (approximately 100 points per orbit) are interpolated along the orbital track to 0.5 degrees yielding approximately 320 interpolated points per orbit. Because successive orbits are spaced 26 degrees apart, a box +/- 2 degrees in latitude and +/- 20 degrees in longitude (large enough to encompass 2 orbits) is chosen around the ground station's location. A weighted 1/distance average is then used to calculate the interpolated ozone amount at that location. The weighted ozone values are reported for the total column ozone as well as for 21 SBUV layers . The column ozone value and the values for each layer are reported in Dobson Units. There is also a separate overpass product that produces ozone volume mixing ratio in parts per million (PPMV) at 15 pressure levels from 50.0 to 0.5 hPa, as well as total column ozone. The weighted distance (in km) from the ground station is reported with every overpass value and can be used to filter the data. For long-term comparisons to ground station data, it has been found that filtering on the distance parameter is not required as the noise term stays essentially the same as the number of data points gets reduced.

Data Availability

The satellite data currently are all Solar Backscatter UltraViolet (SBUV) type instruments with the following data availability:

Nimbus-4 BUV
April 1970 – April 1977
(Significantly less data after mid 1973)

Nimbus-7 SBUV
October 1978 – June 1990

NOAA-9 SBUV/2
February 1985 - February 1998

NOAA-11 SBUV/2
December 1988 - March 2001

NOAA-14 SBUV/2
February 1995 – April 2006

NOAA-16 SBUV/2
October 2000 – December 2011 (more recent data will be updated in April of every year)

NOAA-17 SBUV/2
July 2002 - December 2011 (more recent data will be updated in April of every year)

NOAA-18 SBUV/2
June 2005 - December 2011 (more recent data will be updated in April of every year)

Suggestions for Data Usage:
21 Layer Product (in Dobson Units per Layer)

TROPICS (20 North to 20 South)

'It is suggested that the individual SBUV layers in the lower stratosphere and troposphere be summed up and used as one value due to the fact that the SBUV information content of the troposphere and lower stratosphere is low and cannot be used to resolve small scale vertical features in the ozone profile. In the tropics we recommend the following layer combinations: from the surface up to 16 hPa or from 250 to 16 hPa. The next 6 SBUV layers between 16 and 1 hPa can be then used separately. All layers above 1 hPa should also be summed together for the similar reasons

Mid and High Latitudes (greater than 20 degrees)

'It is suggested that the individual SBUV layers in the lower stratosphere and troposphere be summed up and used as one value due to the fact that the SBUV information content of the troposphere and lower stratosphere is low and cannot be used to resolve small scale vertical features in the ozone profile. In the tropics we recommend the following layer combinations: from the surface up to 25 hPa or from 250 to 25 hPa. The next 7 SBUV layers between 25 and 1 hPa can be then used separately. All layers above 1 hPa should also be summed together for the similar reasons

Suggestions for Data Usage:
PPMV Product at 15 Levels

It is suggested that the three lowest SBUV levels (30, 40 & 50 hPa) in the tropics should be used with caution since SBUV information content of the troposphere and lower stratosphere is low and cannot resolve small scale vertical features in the profile. All SBUV retrieved layers outside the tropics (20 South to 20 North) can be used individually, bearing in mind the low vertical resolution of SBUV.

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