

NEUBrew Umkehr Ozone Vertical Profile Data

Server/URL

http://esrl.noaa.gov/gmd/grad/neubrewdata/products/ozone_profiles/

The directory hierarchy is .../ozone_profiles/QC_Level/Station/year/instrument_ID/productFile

Where:

QC_Level = 100-999

Station = bondville_il, fort_peck_mt, houston_tx,
mrs_nederland_co, raleigh_nc, tmtf_boulder_co

YYYY = Four Digit Year

Instrument_ID = BR134, BR140, BR141, BR146, BR147, BR154

Product File Naming Convention

yyyyJJJ_ssssss_BBBBB_o3p_AA.LLL
2012001_tmtfco_BR134_o3p_am.100

Where:

yyyy = 4 Digit Year

JJJ = Day of Year 001 thru 366

ssssss = 6 Character Station Name

tmtfco = Table Mountain Test Facility Boulder Colorado

dsrcco = David Skaggs Research Center Boulder Colorado

ftpkmt = Fort Peck Montana

hstntx = Houston Texas (University of)

rlghnc = Raleigh North Carolina

bndvil = Bondville Illinois

mtrsco = Mountain Research Station Nederland Colorado

BBBBB = 5 Character Brewer Serial Number

o3p = indicates an ozone vertical profile product file

AA = 'am' Indicates AM morning profile. 'pm' indicates PM or afternoon profile is contained in the file

LLL = QC Level, 3 digits 000 – 999, usually in groups of 100,200,300, ...

Ozone Vertical Profile Data File Format

The ozone profile data are ASCII text files, formatted the same as the original files produced by O3Bumkehr.exe. Product files will only contain only one AM or PM profile. An example AM profile product file is shown in Figure 1 below. Descriptions of the field values are defined in the table below.

```
09.01.2012 AM Boulder TMTF
OBS TOZ 328.5 SOL TOZ 328.0 ITER 3 RES 0.58 DF 0.003 DN 0.235 COL DENSITY 8.68226513645614E+0018
INITL NVAL 55.4 68.6 82.2 93.7 96.2 94.5 90.1 85.8 83.2
A PRIORI PROF (DU) 0.001 0.004 0.017 0.079 0.368 1.200 3.959 10.649 20.936 37.725 65.997 78.396 52.042 29.385 12.242 9.438
SOLUTION PROF (DU) 0.001 0.004 0.017 0.078 0.357 1.137 3.600 9.395 19.376 38.679 68.720 79.252 53.404 31.005 13.017 9.935
HEIGHT 51.00 49.00 47.00 45.00 43.00 41.00 39.00 37.00 35.00 33.00 31.00 29.00 27.00 25.00 23.00 ...
DENSITY 0.00 0.62 0.95 1.49 2.29 3.40 4.87 6.77 9.14 12.37 17.00 23.28 31.46 40.46 47.47 ...
```

16-layer averaging kernel															
-0.000	0.061	0.014	0.003	-0.001	0.000	0.000	-0.000	0.000	0.000	-0.000	-0.000	0.000	0.000	0.000	-0.000
-0.000	0.271	0.061	0.015	-0.003	0.000	0.000	-0.000	0.000	0.000	-0.000	-0.000	0.000	0.000	0.000	-0.000
0.000	1.137	0.273	0.072	-0.012	0.002	0.001	-0.000	0.000	0.000	-0.000	0.000	0.000	0.000	-0.000	0.000
0.000	3.324	0.856	0.242	0.009	0.017	0.005	-0.001	0.000	0.000	-0.000	0.000	0.000	-0.000	-0.000	0.000
-0.000	0.479	-0.230	-0.184	0.738	0.098	-0.002	-0.000	0.001	0.000	-0.001	-0.000	0.000	0.000	-0.000	-0.000
0.000	1.977	1.969	1.057	1.249	0.357	0.075	-0.002	-0.011	0.002	0.002	-0.000	-0.000	-0.000	-0.000	-0.000
0.000	53.186	20.552	6.982	0.076	0.569	0.360	0.120	-0.047	-0.007	0.021	-0.002	-0.007	0.000	0.003	-0.002
-0.004	209.738	39.418	-1.155	4.785	-1.557	-0.070	0.842	0.070	-0.077	0.057	-0.006	-0.017	0.005	0.005	-0.006
0.030	716.871	80.532	-11.544	10.852	-3.010	-1.311	0.649	0.538	0.121	0.023	0.006	-0.004	-0.010	-0.037	-0.002
0.035	761.427	18.322	-24.766	4.295	0.670	-0.258	-0.564	0.388	0.713	0.166	-0.042	-0.028	0.037	0.029	-0.070
0.119	-860.199	-159.026	-16.695	-12.271	1.896	2.067	0.339	-0.325	0.509	0.547	0.165	0.043	-0.012	-0.191	-0.034
0.373	-1250.708	-27.081	60.626	-14.661	2.288	0.575	-0.190	0.265	-0.194	0.228	0.631	0.445	-0.070	-0.562	0.274
-0.326	-32.507	12.752	7.640	1.856	0.350	-0.376	-0.210	0.178	-0.113	-0.010	0.238	0.422	0.493	0.308	-0.336
-0.174	310.722	0.854	-17.913	3.667	-0.471	-0.091	0.027	-0.038	0.024	-0.014	-0.017	0.177	0.492	0.716	-0.068
0.153	129.456	0.443	-8.171	1.379	-0.230	0.007	0.028	-0.034	0.022	-0.007	-0.020	0.027	0.163	0.402	0.256
0.276	49.355	2.410	-3.048	0.583	-0.124	0.002	0.013	-0.014	0.008	-0.007	0.001	-0.003	0.055	0.284	0.377

Figure 1 Umkehr File Format for a Morning (AM) Profile

Line	Descriptions
1	Date in the format dd.MM.yyyy AM/PM Profile Designation, AM for Sunrise, PM for Sunset. Station Name Description
2	OBS TOZ - Observed Total Column Ozone Derived from Brewer B-File Data. SOL TOZ - Solution Total Ozone Derived from O3BUmkehr.exe ITER - The number of algorithm iterations required to resolve the solution. Good profiles should have ITER < 4 RES - Residual in derived profile from the last iteration. A good profile residual should be less than or equal to 1.0 DF - Delta in forcing factor from last iteration. Should be less than one DN - Difference between observed and retrieved zenith sky radiances (Umkehr). Should be less than one COL DENSITY - Total Column Density of the profile in units [10^{11} Molecules / cm^3]
3	INITL NVAL - Observed Umkehrs
4	A PRIORI PROF (DU) - 16 level a priori profile, top-down
5	SOLUTION PROF (DU) - 16 level solution profile, top-down
6	HEIGHT - in kilometers, top-down, 26 levels. Lines 6-7, these are the lines of interest for plotting O3 profiles.
7	DENSITY - in units [10^{11} Molecules / cm^3], top-down, 26 values
9	Blank line
10 - 26	16-layer averaging Kernel - Table of smoothing curves available for comparisons with other ozone profiles that have higher vertical resolution than Umkehr ozone profile. This information is included in the file, but is currently not used for any purpose. It may be more useful as diagnostic indicators for the developers.

Ozone Vertical Profile Product Level 100 Files

At this time (2011-JAN-10), only one QC'ed level of data is being distributed, Level 100. The quality control algorithm only distributes files that pass the following criteria:

1. The Iterations field value (*ITER* in line 2) is less than 4
2. The Residuals field value (*RES* in line 2) is less than or equal to 1.0

If product data files are missing, then either the processing didn't produce a profile due to interference from clouds, or the data file was filtered-out by the level 100 QC rules shown above.

Version 2.5 of O3BUmk3hr.exe is used to generate the raw input profile files the comprise Level 100 data.

The ozone vertical profile product files should have a latency of one day. Data collection for the previous day starts at 7 UTC . Product files for yesterday should be available on the FTP/HTTP server by ~11:30 UTC today.