

# O3Brewer

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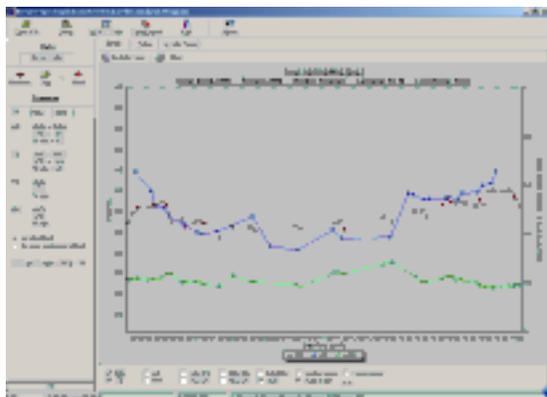
## 1. Introduction

O3Brewer is the Brewer B-files analysis program.

The program is used to process Brewer B-files . The output can be graph and file in ASCII code of O3, SO2, NO2 , AOD or HG, SL tests for one day, month, year or selected period of time.

Raw counts are used for calculations.

Version	4.0
Program Language:	Delphi
Operating System	W95/98...



## 2. Hardware requirements

- IBM PC compatible
- MS Windows 95/NT/98 ...

### note:

Before you start to work with the program, be sure that the declaration of the month in the "Short date style" format is M or MM and not MMM (for example in January it should be '1', '01' and not 'JAN'). Program encode and decode date based on system settings and it is not possible to accept MMM month style for all languages. Date setting you can find in "Control Panel" - "Regional Settings" - "Date" - "Short date style" in your Windows system.

### 3. O3Brewer directory and file structure

In the same directory must be these files:

O3Brewer.exe - main program

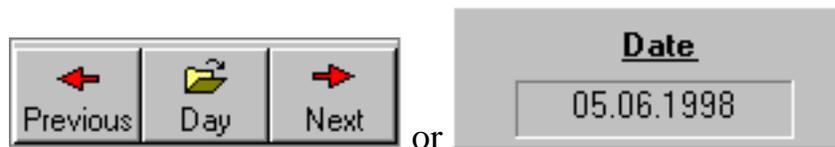
O3Brewer.i01,O3Brewer.i02,...O3Brewer.i99 - files of constant, each for a different time period

### 4. Description of menu system

- Open File

The command opens Brewer data file and processes it based on initialization file. The default directory is set in Setup menu - Path to data files (B-files).

If you want to change date to open another file, it is faster to click on some of these buttons:

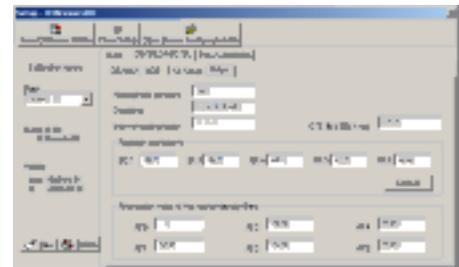
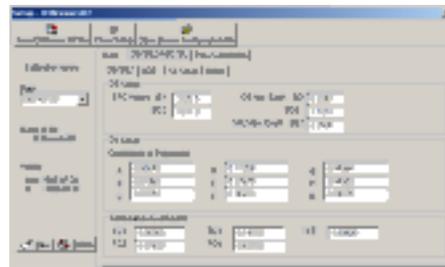
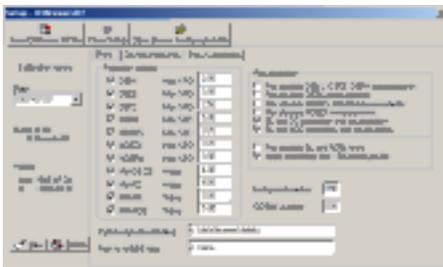


or press '+', '-!.

To see the data from one month or year press "Day" button and select Month or Year.

- Setup

The command involves to change all parameters for the calculation of O3,SO2 and NO2.



- **WODC Code**

Menu is used to code O3 data in both Independent Brewer Format (INB) and new extCSV data format.

- **Data Export**

Output of processed data in ASCII code with respect to initialization file setting. Created files can be easily imported into worksheets (Excel...).



## **5. Working with program**

### **Starting the program for the first time**

1. Press the "Setup" button, complete the form correctly - especially "Path to data files" and "Instrument number" and save it.
2. Press "Open file" button. If "Path to data files" and "Instrument number" are correct, you can choose any B-file in the "Open file" dialog.
3. If you can see your ozone data on the screen, you can have a look to another B-file using key "+" or "-", or press the button "Previous" or "Next". Use button "Day" and then "Month" or "Year" from the menu to see daily averages for one month or one year.
4. If the "Path to data files" comes to the Brewer controlling computer (for example in the network it could be - \Brewer\\c\bdata), then the O3Brewer reads actual B-file after its start. This is useful when the Brewer computer has the MS Windows operating system and O3Brewer can be installed there.
5. Exit program

## Recalculations

The program can work also with the old B-file format. All constants must be properly set in the O3Brewer.ini file using "Setup" form.

## O3Brewer initialization files

Program can work with data files which need to be recalculated for certain time period or which are placed in different directories of different network computers. For these cases it is necessary to create the set of initialization files (O3Brewer.i01 .. O3Brewer.i99).

To create a new initialization file open "Setup" "O3/SO2/NO2/SL" page and press "New" button in "Calibration history" section. Now you have opened new initialization file (the second should be O3Brewer.i02) and you can change the constants properly for this date period and finally save it.

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## Appendix A

### Working with charts

#### Chart zoom and scroll

Scrolling and zooming a chart is simply setting its axis scales to the desired values. After zooming or scrolling a chart, all series will repaint their points in their new positions. Charts can be zoomed by user interaction with mouse dragging. Users can zoom drawing a rectangle around the chart area they want to see in detail. You should press the left mouse button to draw the zoomed area. Dragging should be done from top/left to bottom down. Dragging in the opposite direction resets axis scales [no zoom]. It is strongly recommended to unzoom chart after zoom and before you try to plot another data set. As soon as users release the mouse button, chart repaints to show the zoomed area. Scrolling is very similar to zoom. Axis scales are incremented or decrement and the whole chart component is repainted to show series points at their new positions. You should press the right mouse button and drag.

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## Appendix B

### SL test O3 correction

## Method of calculation

SL corrections are applied on "Data export" and "WODC coding" also. Each B-file must have at least one SL measurement. The program starts to read the B-files 10 days before the selected date period to read SL test results first and to create "SLsmooth.prn" file, and stop 10 days after the selected date period. After the "SLsmooth.prn" file is created the program reads this file together with B-files again for export or data coding. It means that if you want to apply this corrections to data for WODC, you should do it after the tenth day in the next month.

## Example - Direct Sun ozone calculation

$$DS\_O3 = (R6 - XB1 + tempcorr + (XR6 - ra6)) / XA1 / Mu;$$

where

R6	double ratio
XB1	ETC on O3 ratio (from O3Brewer Setup)
tempcorr	temperature correction if necessary
XR6	Value of SL R6 from the last intercomparison (from O3Brewer setup)
ra6	Smoothing SL R6 ratio for the day (from SLsmooth.prn file)
XA1	O3 on O3 ratio ((from O3Brewer Setup)
Mu	airmass

## Smoothing filter

$$weights = Fx = 1 / (\sigma * \sqrt{2 * PI}) * \exp(-(\sqrt{DT}) / (2 * \sqrt{\sigma}))$$

$$\sigma = 5$$

$$DT = [10..0..10]$$