



# Using VOCDat to Validate and Process Air Toxics Data

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# Outline of Presentation

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- Overview
- After obtaining data from laboratories
  - Using VOCDat for processing and validating data
  - Importing and exporting data
  - Validating examples and ideas
- Recent additions to VOCDat
- Hands-on training
- What other features would be helpful?



# VOCDat: How Did We Get Here?

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- Originally developed for Photochemical Assessment Monitoring Stations (PAMS) VOC data to facilitate
  - Importing data from AQS/AIRS format
  - Exporting data into AQS/AIRS format
  - Viewing and validating data before submitting to AQS!
- Applicable to other data sets, including air toxics, PM<sub>2.5</sub>, and continuous data



# Importance of Data Validation

“The purpose of data validation is to detect and then verify any data values that may not represent actual air quality conditions at the sampling station.”\*

**Without proper validation  
before analysis, erroneous  
conclusions may be drawn!**

\* U.S. Environmental Protection Agency (1984) Quality assurance handbook for air pollution measurement systems: Volume II. Ambient air specific methods. Sections 2.1, 2.2, 2.6, and 2.9. Report prepared by the Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC, EPA-600/4-77-027a, July.



# Example Approach Using VOCDat

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- Obtain air toxics data from laboratory
- Import into VOCDat
- Review data quality and apply screening criteria
- Flag invalid data
- Export into AQS-ready format
- Prepare and report precision information



# What is VOCDat?

- VOCDat is a Windows-based, menu-driven program used to
  - Import various data formats
  - Display VOC, toxics, and PM data
  - Validate the data
  - Begin data analyses
  - Export the data into EPA AQS format



VOCDat

Version 2.43

Volatile Organic Compound Data  
Display, Quality Control, and Analysis

Developed as part of:  
NARSTO-Northeast  
Modifications funded by:  
US EPA OAQPS

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# VOCDat Features (1 of 2)

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- Imports and exports AQS AMP370 (old AIRS) format
- Imports and exports AQS R2 format
- Imports flexible format ASCII files
- Imports Turbochrome and TotalChrome (auto-GC) formats
- Exports formats suitable for other software (such as spreadsheets or databases)
- Edits data quality control (QC) codes on screen (keeps a log of changes)
- Prepares graphical displays of time series, scatter, and fingerprint plots



## VOCDat Features (2 of 2)

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- Provides summary statistics
- Allows species list (selectable) customization
- Allows screening criteria customization
- Creates “weighted” data (using reactivity or risk)
- Calculates species group sums including paraffins, olefins, aromatics, unidentified, and carbonyls
- Facilitates AQS precision report preparation and formatting





# How VOCDat Works

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- VOCDat needs to know what species to expect in the data file
  - Species.txt defines abbreviations, method codes, and units
  - Several species lists are available
  - Only species in the list will be exported
- Once VOCDat knows what species to expect, you can input your data from AQS, text, etc.
- VOCDat also allows supplemental data handling
  - Species2.txt allows use of meteorological and criteria pollutant data in validation
  - These are not exported into AQS format



# VOCDat Terminology

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- Species list: list of species you tell VOCDat to expect; includes units and method code
- Import: bring data from various formats into VOCDat
- Open: open data in \*.VOC file; these data have already been imported into VOCDat and saved
- Save: save current data as \*.VOC file, including any validation flags
- Export: export current data into AQS or txt format, including any validation flags

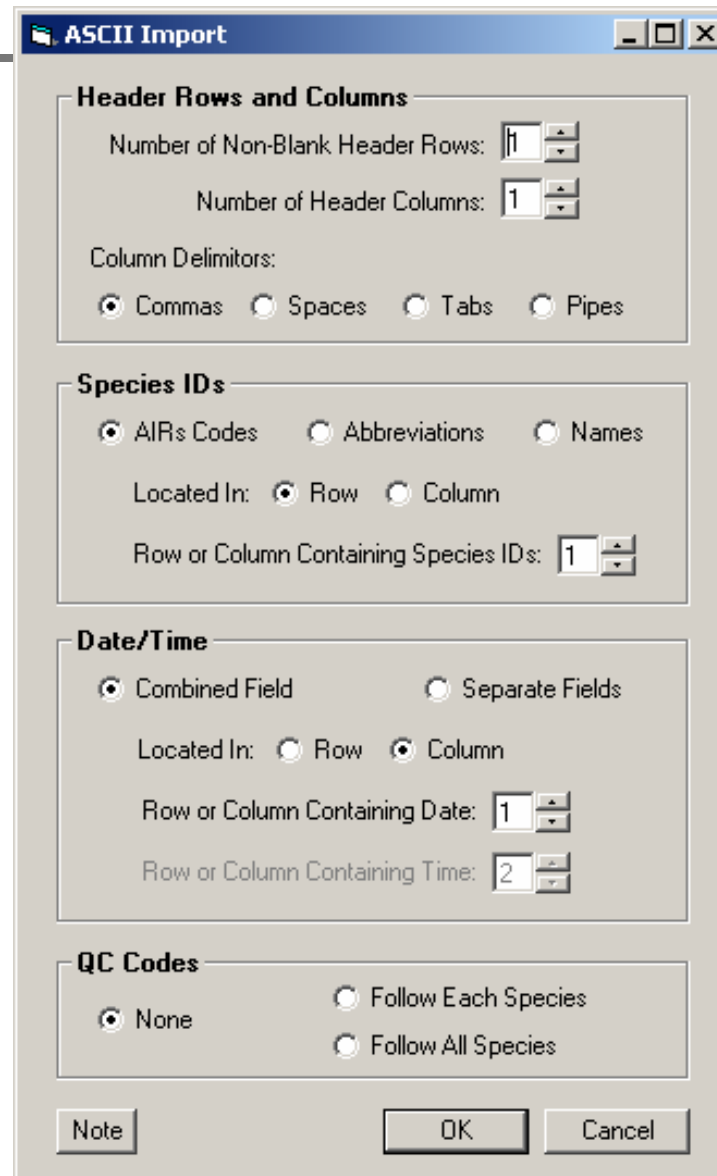


# From the Beginning

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- Once you acquire air toxics data from the laboratory, then what?
- Select TO-15 method species list
  - List may be modified to accommodate other species
- Check format of data received
  - Are data in one of a number of specific formats?
  - If not, work with laboratories to get data in a more useful format — or, know anyone who likes Access? Use their knowledge for laboratory data!
  - Can now import database-style data (in ASCII format)
- Import into VOCDat

# Importing ASCII Files



The image shows a screenshot of a software dialog box titled "ASCII Import". The dialog is organized into several sections with various input fields and radio buttons.

**Header Rows and Columns**

- Number of Non-Blank Header Rows: 1
- Number of Header Columns: 1
- Column Delimiters:  Commas,  Spaces,  Tabs,  Pipes

**Species IDs**

- AIRs Codes,  Abbreviations,  Names
- Located In:  Row,  Column
- Row or Column Containing Species IDs: 1

**Date/Time**

- Combined Field,  Separate Fields
- Located In:  Row,  Column
- Row or Column Containing Date: 1
- Row or Column Containing Time: 2

**QC Codes**

- None,  Follow Each Species,  Follow All Species

At the bottom of the dialog, there are three buttons: "Note", "OK", and "Cancel".



# Validation Approach (1 of 2)

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- Understand the pollutant sources, lifetimes, temporal behavior, etc. (use tools such as “cheat sheets”)
- Understand site location, sampling, and analysis techniques
- Inspect summary statistics and apply screening criteria



# Validation Approach (2 of 2)

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- Inspect all species
  - Time series plots
  - Scatter plots (internal consistency)
- Inspect every sample
  - Fingerprint plots (in elution order)
- Flag data and document modifications
- Prepare data for AQS



# Making Validation Easier

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- Once data are VOCDat-ready, validation is easy!
- With the EPA, STI has developed “cheat sheets” for 18 HAPs
  - Available at [www.ladco.org/toxics.html](http://www.ladco.org/toxics.html)
  - Useful in analysis!
- Easily generated simple graphs allow quick validation
- VOCDat user’s guide not as useful for examples and ideas

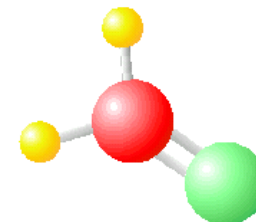
# Sample HAPs Validation Sheet (1 of 2)

## Formaldehyde

**Synonyms:** BFV; formalin; formalith; formic aldehyde; Formol; FYDE; HCHO; HOCH; karsan; lysoform; Methanal; methyl aldehyde; methylene glycol; methylene oxide; oxomethylene

**Molecular formula:** CH<sub>2</sub>O  
**AIRS parameter code:** 43502  
**Chemical group:** Carbonyl

**CAS Registry #:** 50-00-0



**Summary:** Formaldehyde is created by the oxidation of gas-phase hydrocarbons. Formaldehyde concentrations exhibit diurnal and seasonal variability because Formaldehyde photochemical production is a function of sunlight. Although it is also rapidly removed from the atmosphere via photochemical reaction, continuous production from the oxidation of methane and nonmethane hydrocarbons keep formaldehyde at concentrations above detection.

<b>Reactivity</b>	High	<b>Lifetime</b>	Hours
<b>Background<sup>1</sup> conc.</b>	0.2 ± 0.07 µg/m <sup>3</sup> (from 1980-2002)	<b>Spatial scale</b>	Local, subregional, regional
<b>Molecular Weight</b>	30.03	<b>Conversion factor<sup>2</sup></b>	1 ppb = 1.35 µg/m <sup>3</sup>
<b>Sources</b>	Key photochemical reaction product. Also produced by power plants, manufacturing facilities, incinerators, and automobile exhaust emissions. Used as a chemical intermediate, analytical reagent, concrete and plaster additive, used in cosmetics, disinfectants, fumigants, photography, and wood preservation and particle board products.		
<b>Sinks</b>	Photolysis; reaction with OH		
<b>1 in 10<sup>6</sup> cancer risk:</b>	0.08 µg/m <sup>3</sup> (IRIS, 2003); 0.17 µg/m <sup>3</sup> (CAL EPA, 2002)		
<b>Non-cancer RfC<sup>3</sup></b>	3.6 µg/m <sup>3</sup> tier 2 (Axelrad <i>et al.</i> , 1998); 3 µg/m <sup>3</sup> (CAL EPA, 2000)		
<b>Minimum Detection Limits (Pilot Cities)</b>	Average: 0.05 µg/m <sup>3</sup> Range: 0.001-0.1 µg/m <sup>3</sup>		

**Regulations since 1990:** Direct regulations include: wood furniture manufacturing in 1995 (33,000 tons/yr); off-site waste operations in 1996 (43,000 tons/yr); and pulp and paper production (155,000 tons/yr)<sup>4</sup>. Also, Maximum Achievable Control Technology (MACT) reductions on other VOCs will also indirectly reduce formaldehyde production (see Benzene, 1,3-butadiene).



# Sample HAPs Validation Sheet (2 of 2)

## Data Validation Guidelines for Formaldehyde

Table of expected temporal and spatial behavior

<i>Temporal or Spatial Scale</i>	<i>Expect Variability?</i>	<i>Behavior/explanation</i>	<i>Action</i>
<b>Diurnal (time of day)</b>	Urban-yes Rural-likely	Photochemical production from other VOCs is highest during the day	Check for midday-afternoon peak in concentrations
<b>Day of week</b>	Possible, but not likely	If VOC concentrations are significantly lower on weekends, production may be lowered	Check for lower concentrations of formaldehyde on weekends
<b>Seasonal</b>	Yes-highest during the summer	Increased production with increased sunlight	Check for differences in average concentrations as a function of season
<b>Annual</b>	Possible	May correlate with decreased concentrations of VOCs	Check for interannual differences, correlate with total non-methane organic carbon concentrations
<b>Urban/Rural</b>	Yes-likely higher urban	Urban has automobile emissions and industry; rural sites may be influenced by local forests	Check for urban/rural differences. Determine sources in each environment
<b>Regional</b>	Yes-highest in urban centers	Same as urban/rural	Same as urban/rural
<b>Global</b>	Yes	Same as urban/rural	Same as urban/rural

**Possible interspecies correlations:** Acetaldehyde should show the strongest correlation with formaldehyde. May also correlate reasonable well with benzene, 1,3-butadiene, and total nonmethane organic carbon.

**Typical Urban Concentrations:** 1999 from historical database: 2.0-5.1  $\mu\text{g}/\text{m}^3$   
2001-2002 from pilot city study: 1.8-3.8  $\mu\text{g}/\text{m}^3$

# VOCDat Screening Checks (1 of 3)

## Abundant Species Concentrations

**Abundant Species Concentrations**

Sample fails screening if:

<input checked="" type="checkbox"/>	1.	acety	concentration is less than	0.5	ppbC
<input checked="" type="checkbox"/>	2.	ebenz	concentration is less than	0.5	ppbC
<input checked="" type="checkbox"/>	3.	benz	concentration is less than	0.5	ppbC
<input checked="" type="checkbox"/>	4.	tol	concentration is less than	0.5	ppbC
<input checked="" type="checkbox"/>	5.	mpxyl	concentration is less than	0.5	ppbC
<input checked="" type="checkbox"/>	6.	oxyl	concentration is less than	0.5	ppbC
<input checked="" type="checkbox"/>	7.	124tmb	concentration is less than	0.5	ppbC
<input type="checkbox"/>	8.	benz	concentration is less than	0.5	ppbC
<input type="checkbox"/>	9.	benz	concentration is less than	0.5	ppbC
<input type="checkbox"/>	10.	benz	concentration is less than	0.5	ppbC

Concentration Comparisons

Concentration Variability

OK Cancel

# VOCDat Screening Checks (2 of 3)

## Abundant Species Comparisons

**Concentration Comparisons**

Sample fails screening if:

<input checked="" type="checkbox"/>	1.	acety	concentration is greater than	benz	concentration
<input checked="" type="checkbox"/>	2.	benz	concentration is greater than	tol	concentration
<input type="checkbox"/>	3.	oxyl	concentration is greater than		concentration
<input checked="" type="checkbox"/>	4.	oxyl	concentration is greater than	mpxyl	concentration
<input type="checkbox"/>	5.	benz	concentration is greater than		concentration
<input checked="" type="checkbox"/>	6.		concentration is greater than		concentration
<input type="checkbox"/>	7.		concentration is greater than		concentration
<input type="checkbox"/>	8.		concentration is less than	1000	ppbC and
		uidvoc	concentration is greater than	200	ppbC
<input type="checkbox"/>	9.		concentration is less than	2	ppbC and
		benz	concentration is greater than	2	ppbC
<input type="checkbox"/>	10.	uidvoc	fraction of		
			is greater than	50	percent

Abundant Species Concentrations

Concentration Variability

OK Cancel

# VOCDat Screening Checks (3 of 3)

Abundant  
Species  
Concentration  
Variability

**Concentration Variability**

Sample fails screening if:

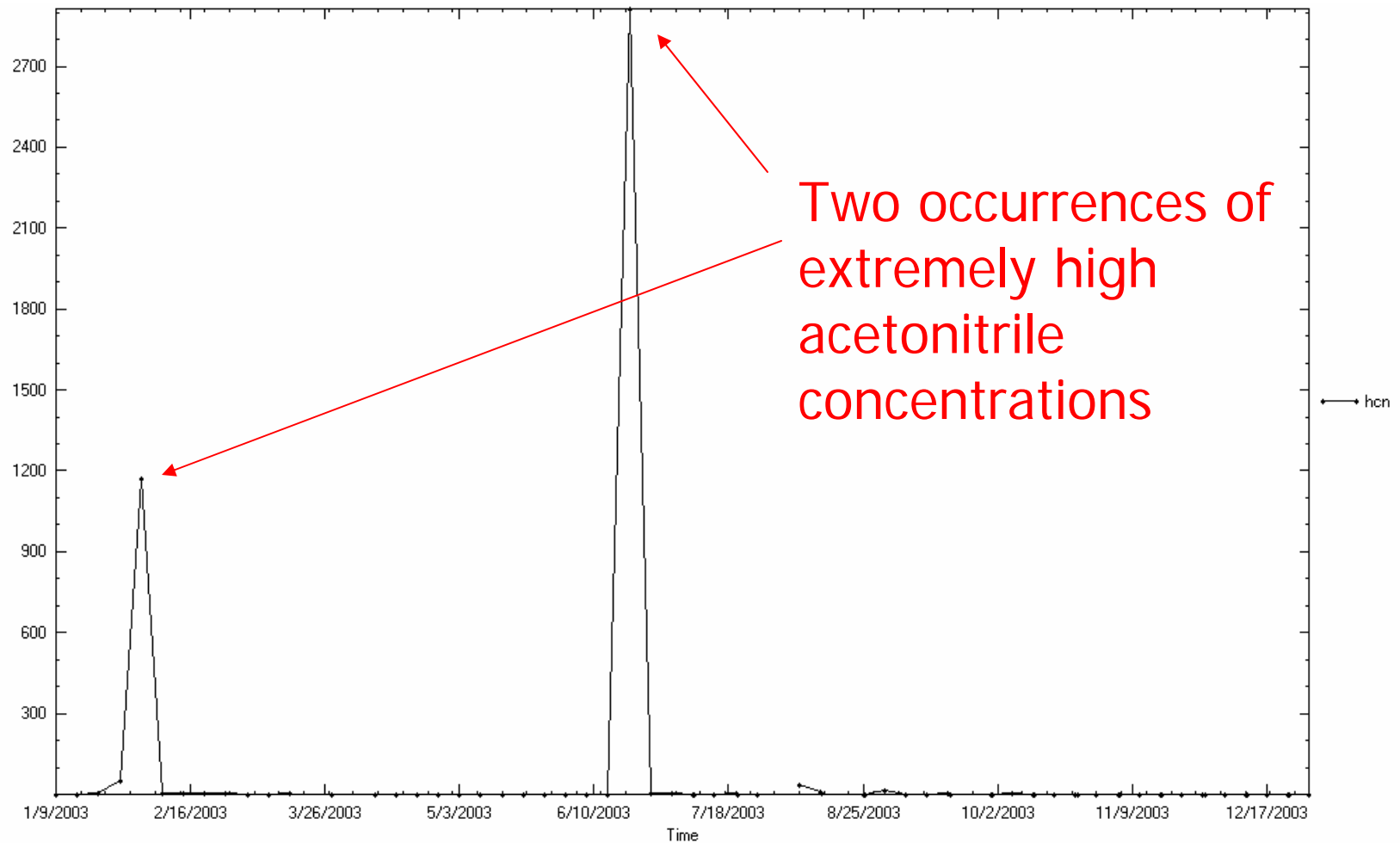
	The concentration of	is more than	times the standard deviation of the mean
<input checked="" type="checkbox"/> 1.	acety	3	
<input checked="" type="checkbox"/> 2.	13but	3	
<input checked="" type="checkbox"/> 3.	mtbe	3	
<input checked="" type="checkbox"/> 4.	benz	3	
<input checked="" type="checkbox"/> 5.	tol	3	
<input checked="" type="checkbox"/> 6.	mpxyl	3	
<input checked="" type="checkbox"/> 7.	styr	3	
<input checked="" type="checkbox"/> 8.	124tmb	3	
<input type="checkbox"/> 9.	benz	3	
<input type="checkbox"/> 10.	benz	3	

Abundant Species Concentrations

Concentration Comparisons

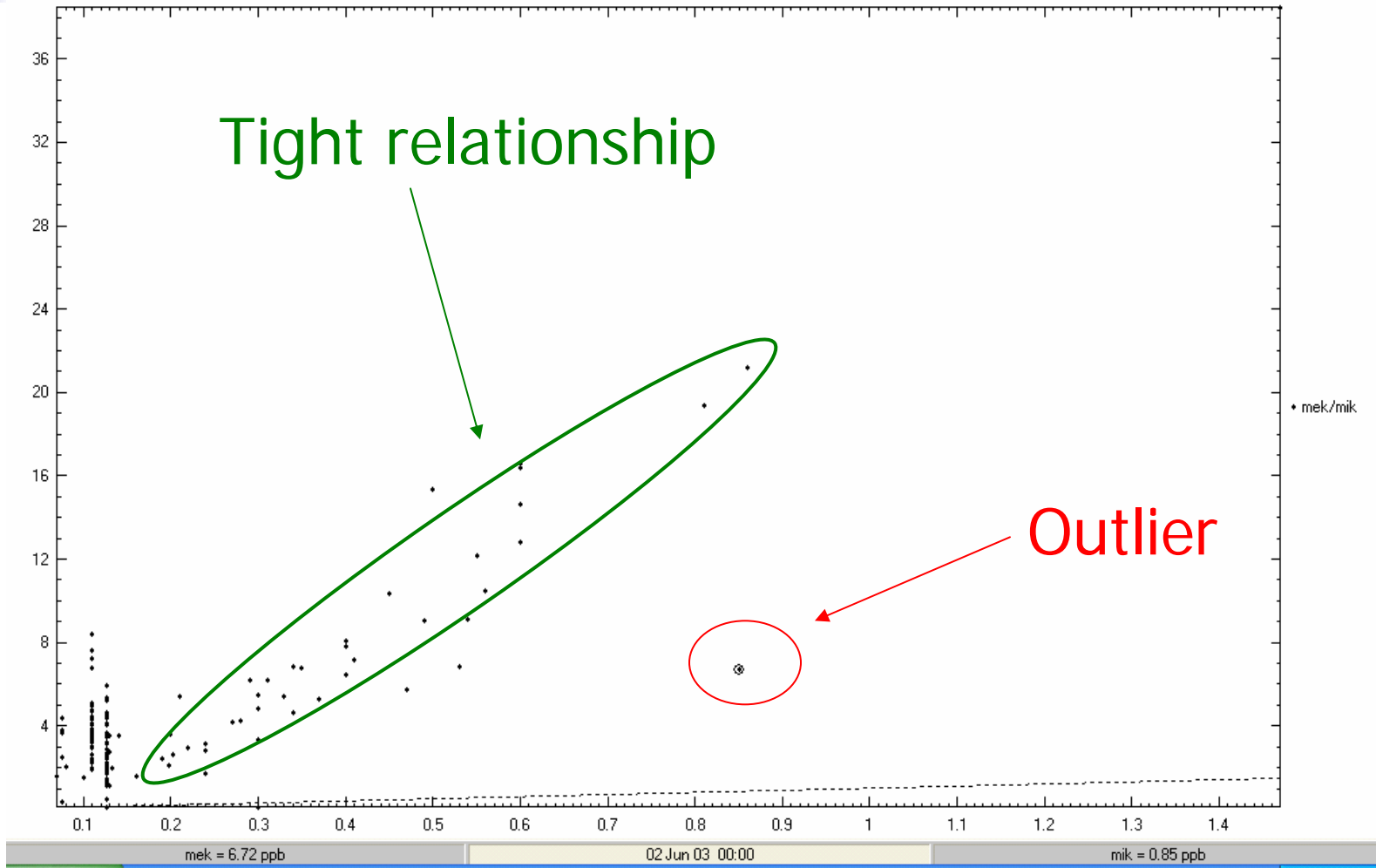
OK Cancel

# Example – Extreme Events



# Example –Species Relationships

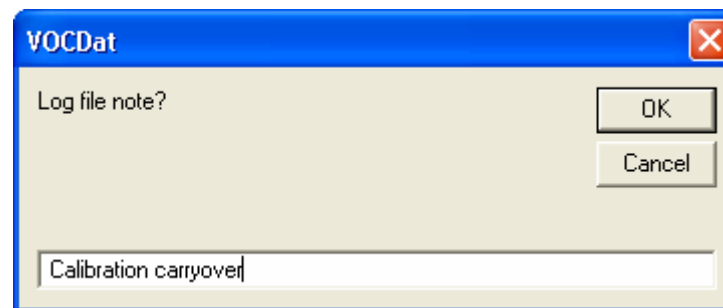
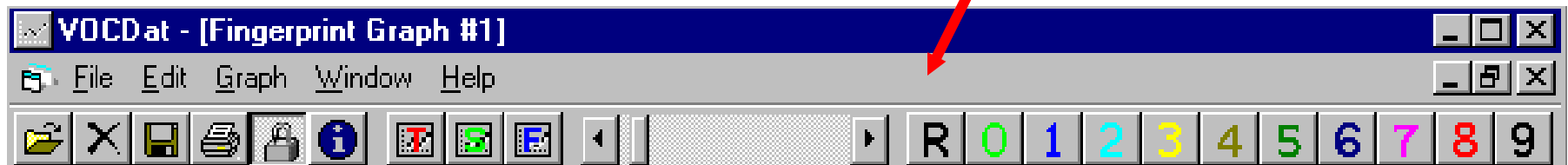
Methyl Ethyl Ketone



Methyl Isobutyl Ketone

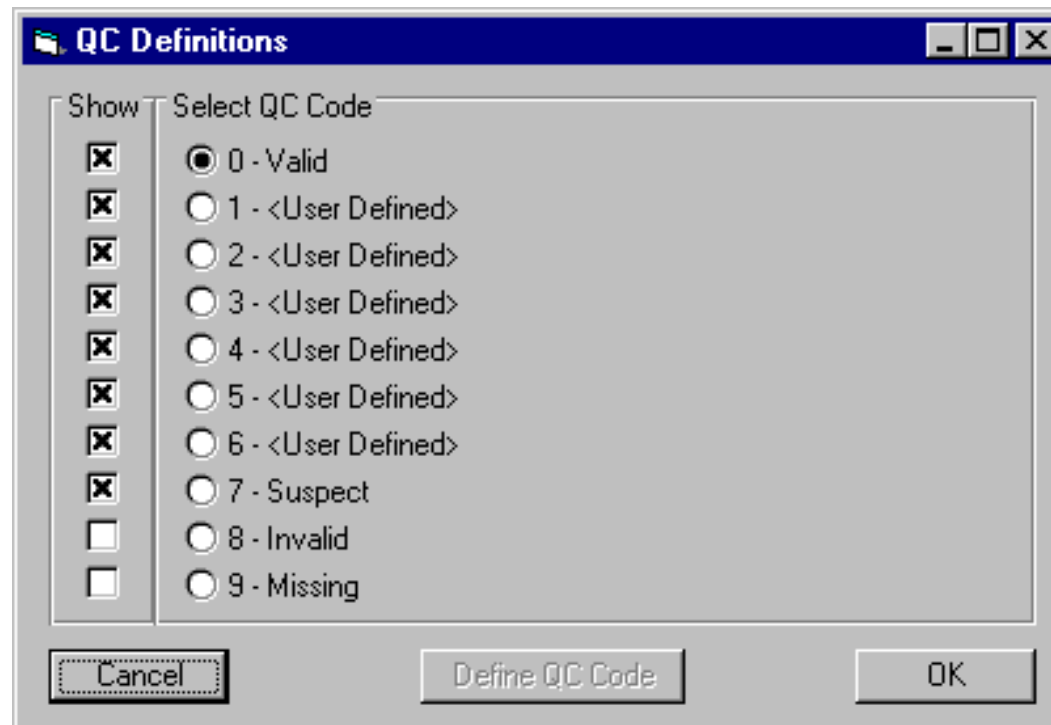
# Flagging Suspect/Invalid Data (1 of 2)

Once erroneous data are identified, the VOCDat toolbar can be used to flag either the entire sample record or a single parameter



# Flagging Suspect/Invalid Data (2 of 2)

Assign user-defined codes to indicate the problem





# Exporting Into AQS Format I

Species Selected

The screenshot shows the VOCDat software interface. The 'Export Data' menu is open, and the 'AIRS Information' dialog box is displayed. The 'Species to Output' list is circled in blue, and the 'Sample Duration' and 'Sampling Frequency' dropdowns are also circled in blue. A green arrow points from the 'Export Data' menu to the dialog box.

**AIRS Information**

AIRS Codes

AIRS Code:  State:  County:  Site:

POC Code:

Method Code:  (default)

Action Code:

Time Gaps

Fill Time Gaps

Fill Time Gaps With:

Null Value Reason Code:

Null Data Code (New AIRS):

Duration and Frequency (for export only - not saved)

Sample Duration:

Sampling Frequency:

Species to Output

PAMS In Use All Clear

Name	Minimum	Maximum
<input checked="" type="checkbox"/> DCM	00.04	01.01
<input checked="" type="checkbox"/> CHC13	00.03	00.16
<input checked="" type="checkbox"/> CC14	00.04	00.23
<input type="checkbox"/> DCE		
<input checked="" type="checkbox"/> TCE	00.02	00.40
<input type="checkbox"/> TCEA		
<input checked="" type="checkbox"/> TCE3	00.02	00.14
<input type="checkbox"/> 12DCP		
<input type="checkbox"/> t13DCP		
<input checked="" type="checkbox"/> c13DCP	00.18	00.18

OK Cancel





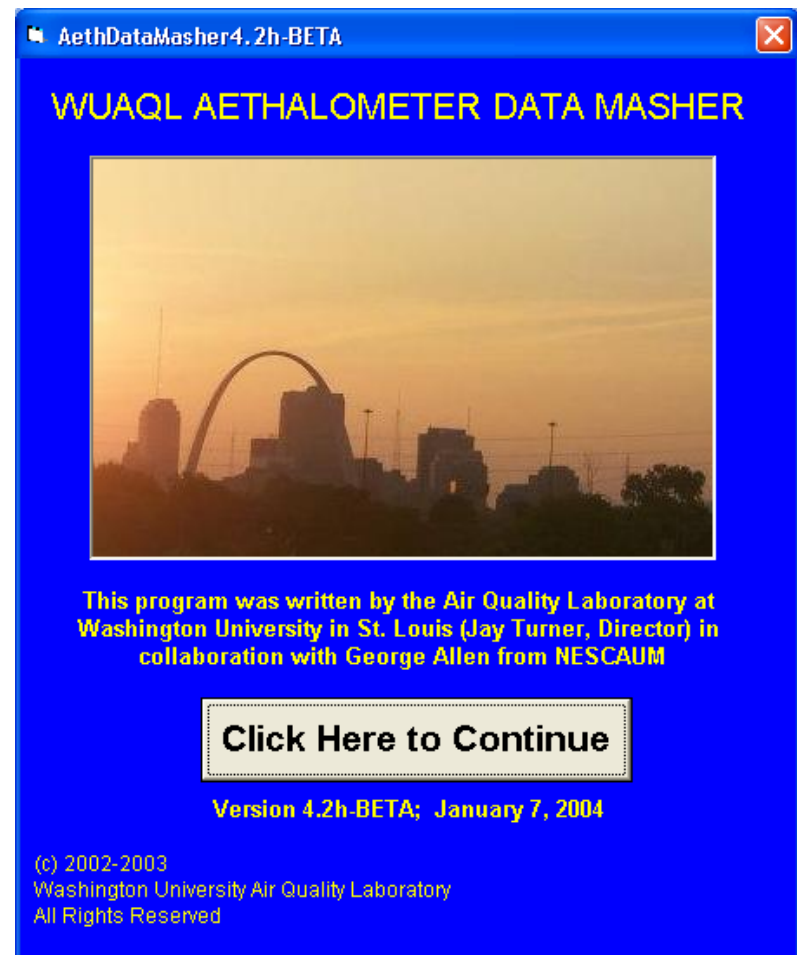
# Aethalometer (Black Carbon)

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- NATTS sites have Aethalometers™ to monitor black carbon (BC), a marker (thought not unique) for diesel particulate matter (DPM).
- What to do with the data?
  - Use “Data Masher” developed by Dr. Jay Turner (Washington University, St. Louis)
  - Bring the exported data from the Aethalometer™ directly into the Data Masher
  - Then into VOCDat – ready for validation and export into AQS format

# Data Masher

- Five-minute or 1-hr averaged data can be input into the Data Masher
- Can be calculated by hourly averages
- Can be voided by hours with <75% completeness
- Available from Jay Turner: [JRTurner@seas.wustl.edu](mailto:JRTurner@seas.wustl.edu) (link also available from [vocdat.sonomatech.com](http://vocdat.sonomatech.com))



# Example Import – Aethalometer Data (1 of 3)

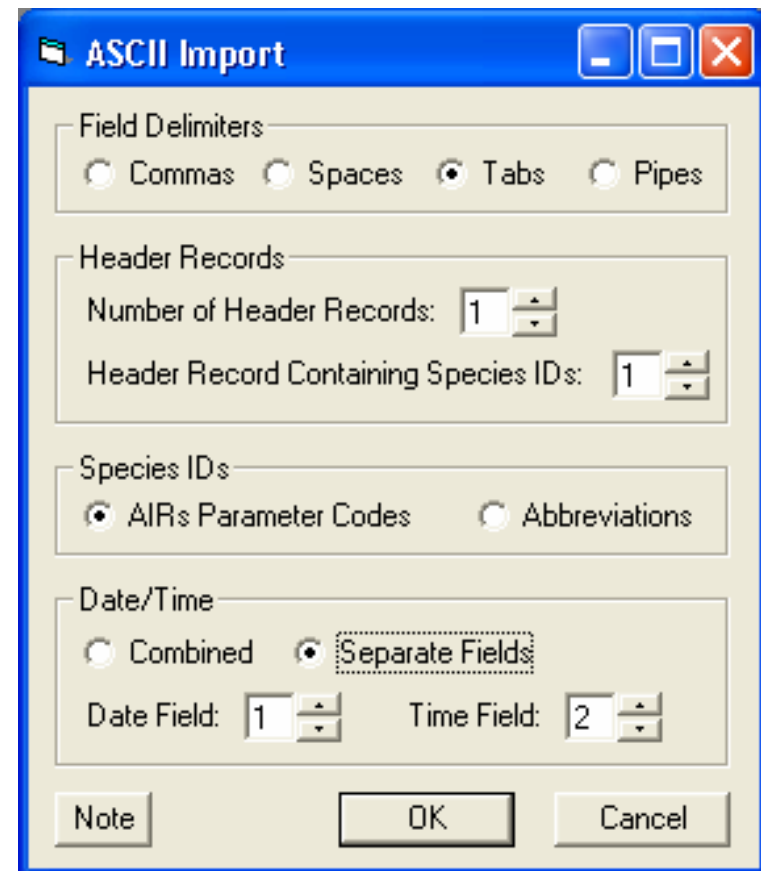
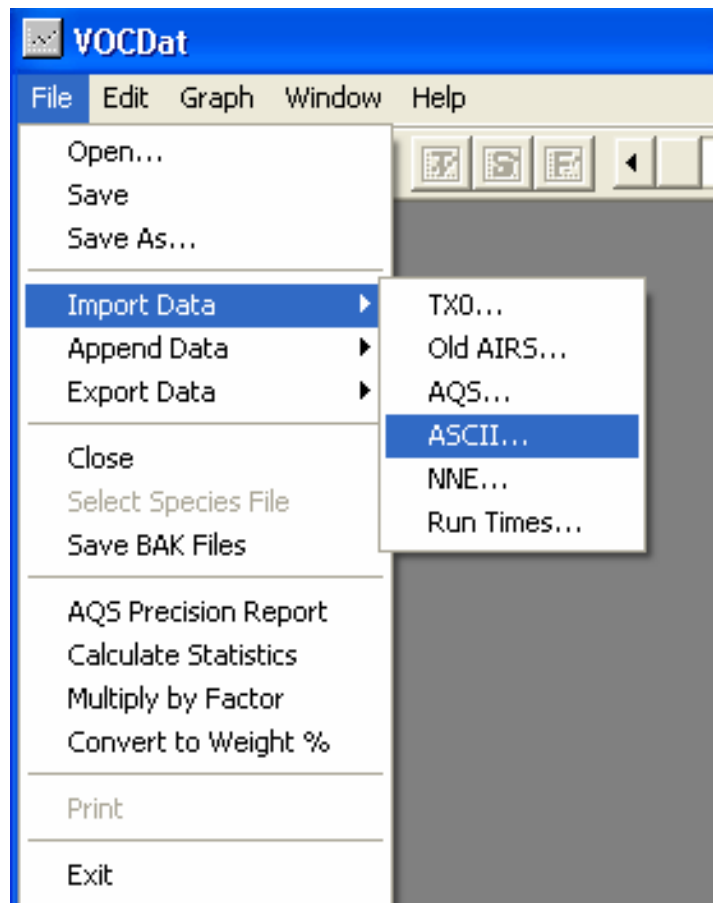
- Data are provided in a comma-separated text file with no header records.
- Save the file as tab-delimited \*.txt (or \*.CSV).

Date	time	84313
8/5/2003	21:00:00	0.251
8/5/2003	22:00:00	0.322
8/5/2003	23:00:00	0.19
8/6/2003	0:00:00	0.149
8/6/2003	1:00:00	0.289
8/6/2003	2:00:00	0.519
8/6/2003	3:00:00	0.316
8/6/2003	4:00:00	0.338
8/6/2003	5:00:00	0.511

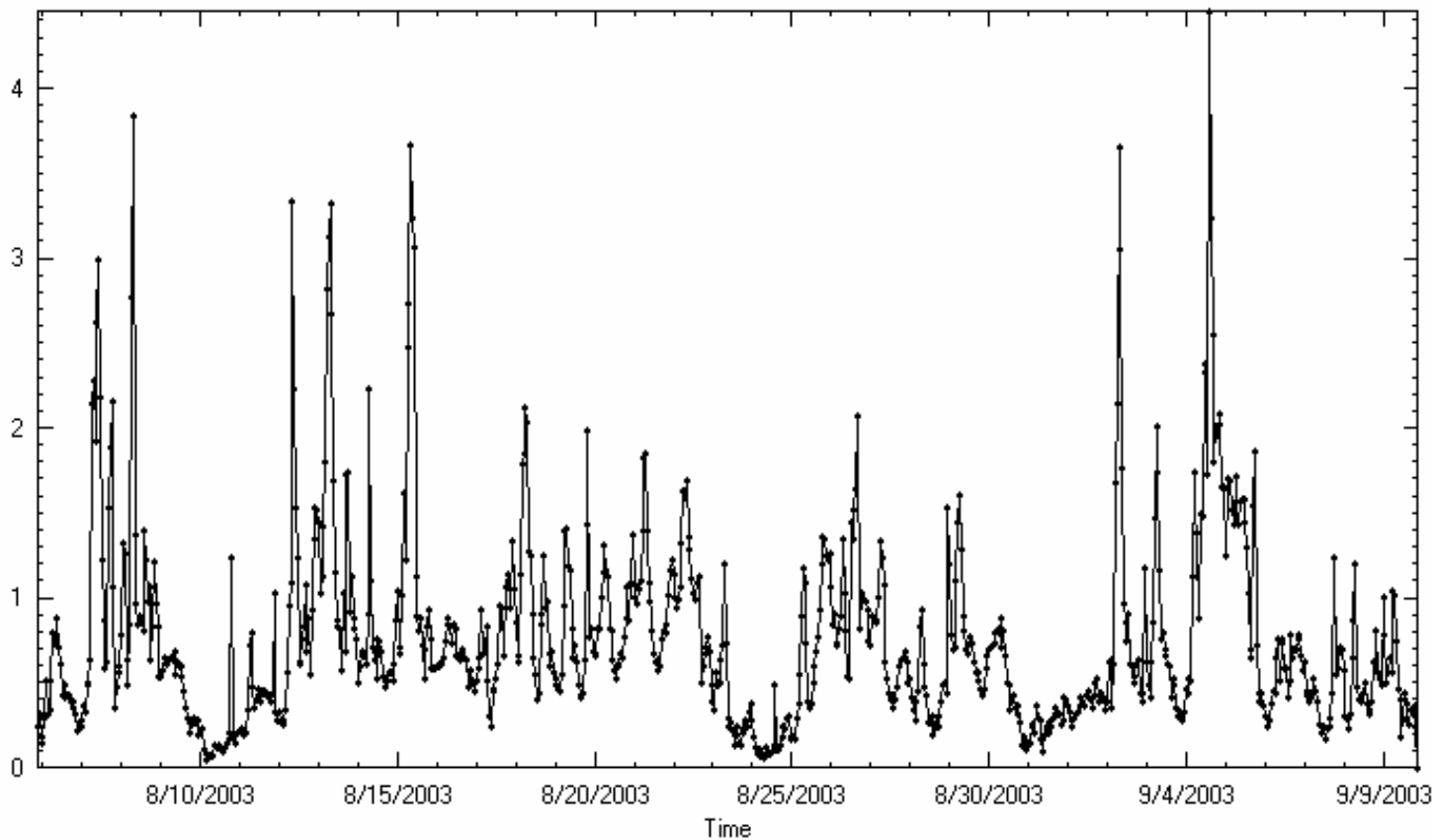
## In VOCDat Species file:

84313      Black carbon PM2.5 STP  
 88313      Black Carbon PM2.5 LC  
 84313      Black carbon PM2.5 STP  
 88313      Black Carbon PM2.5 LC

# Example Import – Aethalometer Data (2 of 3)



# Example Import – Aethalometer Data (3 of 3)



Ready for validation and export into AQS format!



# Precision Report

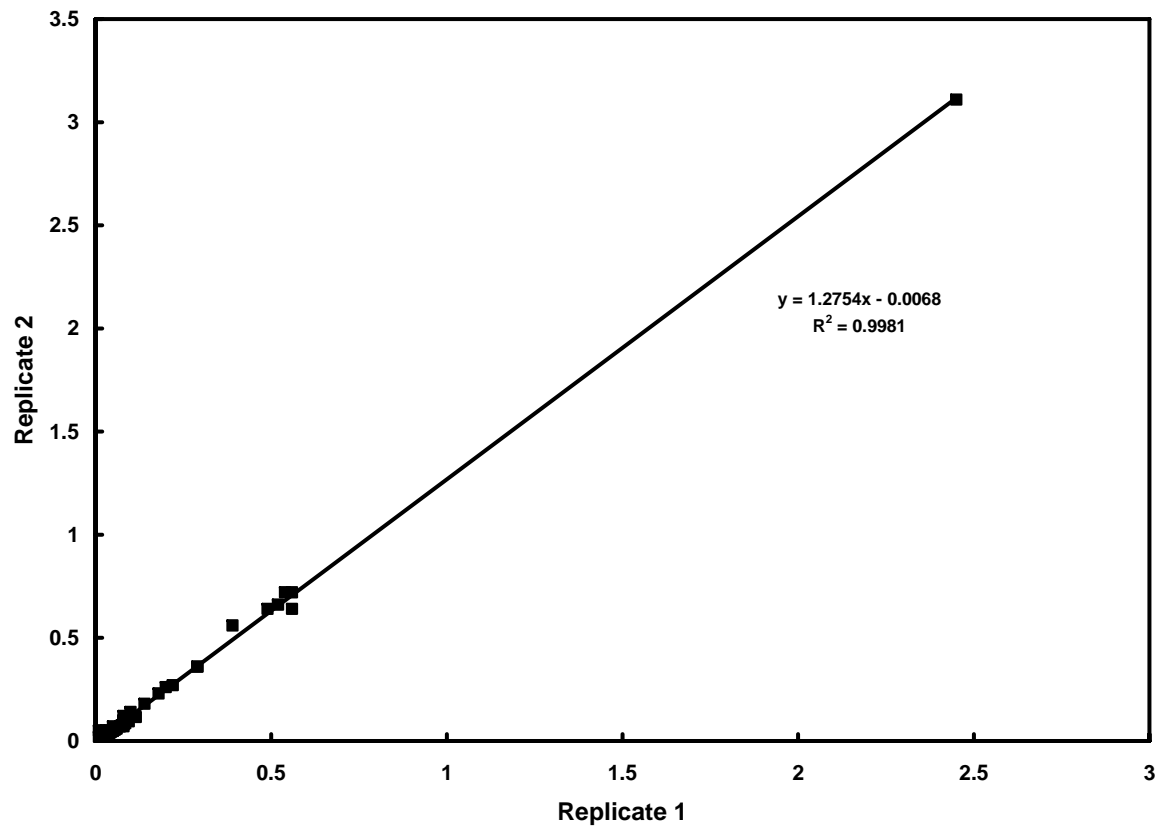
---

- Allows reporting of duplicate (collocated) and replicate (second chemical analysis) samples into AQS
- Used to determine
  - Precision
  - Reproducibility of results
  - Confidence in measurements and sampling



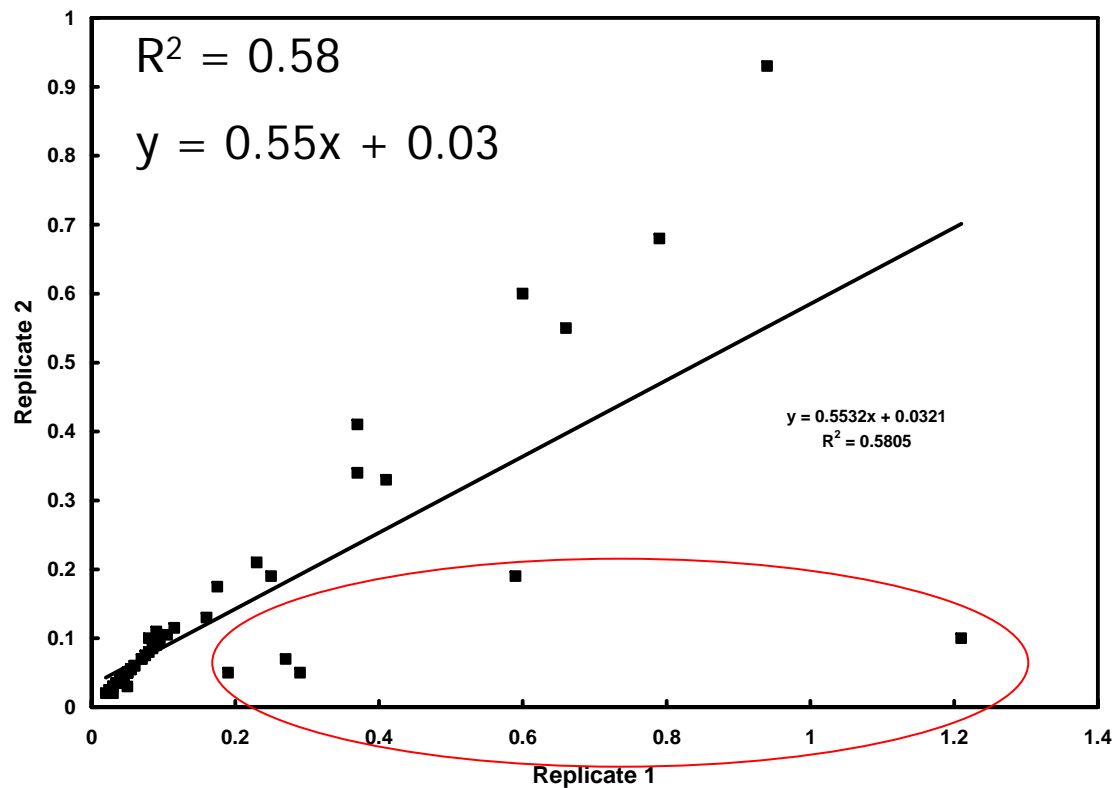
# Usefulness of Precision Report

Compare replicate measurements (good example)



# Usefulness of Precision Report

Compare replicate measurements (bad example)



Outliers flagged  
as suspect (poor  
reproducibility)

# Precision Report Format

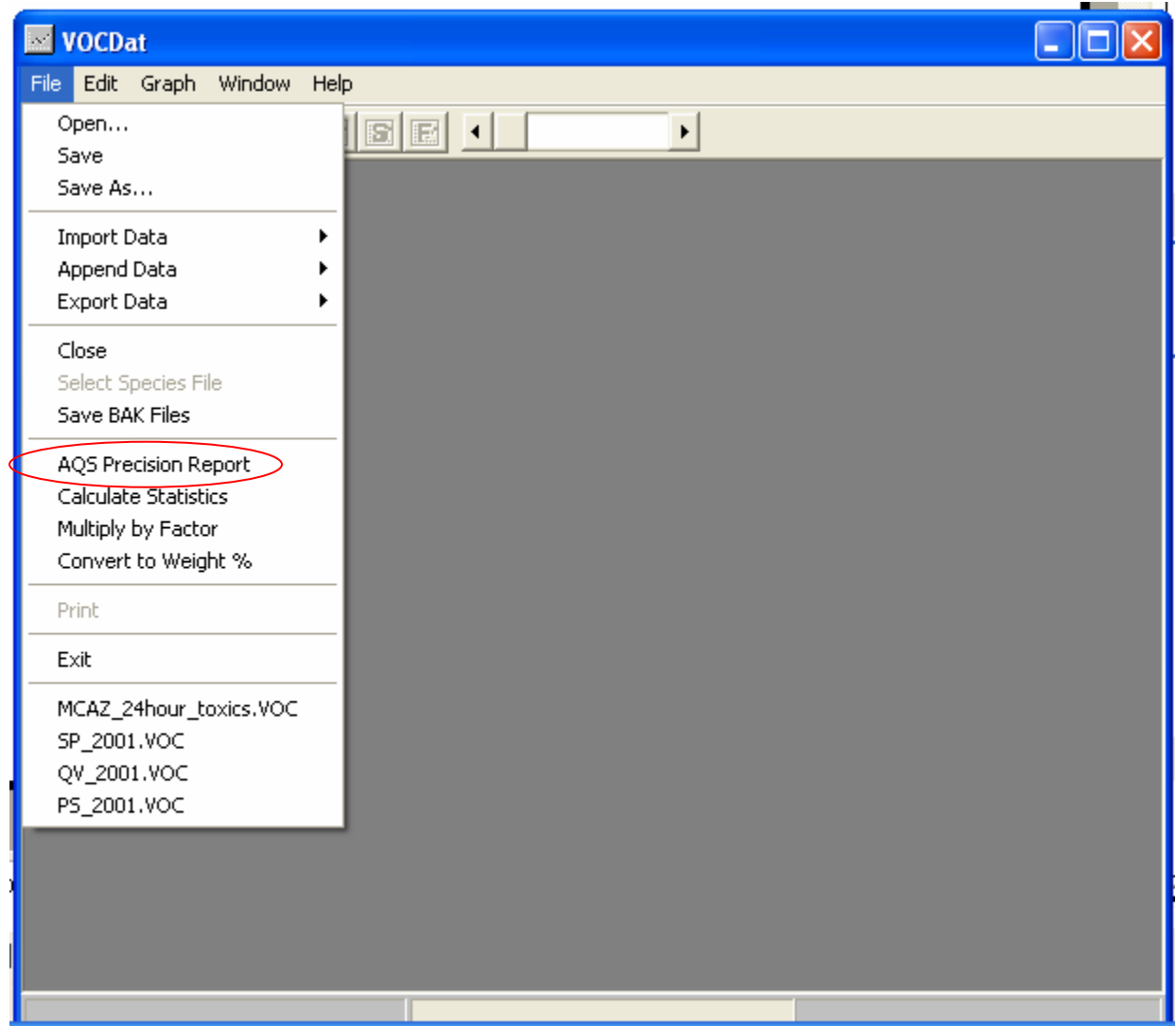
- Template is provided for data input
- Text-formatted cells were required to keep zeroes in front of AIRS Site Codes
- POC IDs indicate, from left to right, primary sample, duplicate, replicate, and duplicate-replicate samples

	A	B	C	D	E	F	G	H	I
1			<b>Sample</b>			<b>Precision Sample ID:</b>	<b>1</b>	<b>2</b>	<b>3</b>
2	<b>AIRS</b>	<b>Parameter</b>	<b>Duration</b>	<b>Unit</b>	<b>POC ID:</b>	5	1	2	3
3	<b>Code</b>	<b>Code</b>	<b>Code</b>	<b>Code</b>	<b>Method Code:</b>	110	110	110	110
4	040134009	43813	7	8	7/26/03 0:00	0.030	0.030	0.030	0.030
5	040134009	43814	7	8	7/26/03 0:00	0.020	0.020	0.030	0.030
6	040134009	43820	7	8	7/26/03 0:00	0.046	0.046	0.046	0.046
7	040134009	43818	7	8	7/26/03 0:00	0.046	0.046	0.046	0.046
8	040134009	43826	7	8	7/26/03 0:00	0.055	0.055	0.055	0.055
9	040134009	43815	7	8	7/26/03 0:00	0.054	0.054	0.054	0.054
10	040134009	43829	7	8	7/26/03 0:00	0.036	0.036	0.036	0.036
11	040134009	45810	7	8	7/26/03 0:00	0.081	0.081	0.081	0.081
12	040134009	45208	7	8	7/26/03 0:00	0.040	0.040	0.110	0.110
13	040134009	43843	7	8	7/26/03 0:00	0.036	0.036	0.036	0.036
14	040134009	45207	7	8	7/26/03 0:00	0.010	0.010	0.050	0.040
15	040134009	43218	7	8	7/26/03 0:00	0.062	0.062	0.062	0.062
16	040134009	43702	7	8	7/26/03 0:00	0.310	0.320	0.200	0.213
17	040134009	43206	7	8	7/26/03 0:00	0.260	0.280	0.220	0.230
18	040134009	43704	7	8	7/26/03 0:00	0.185	0.185	0.190	0.200

Save file as \*.txt

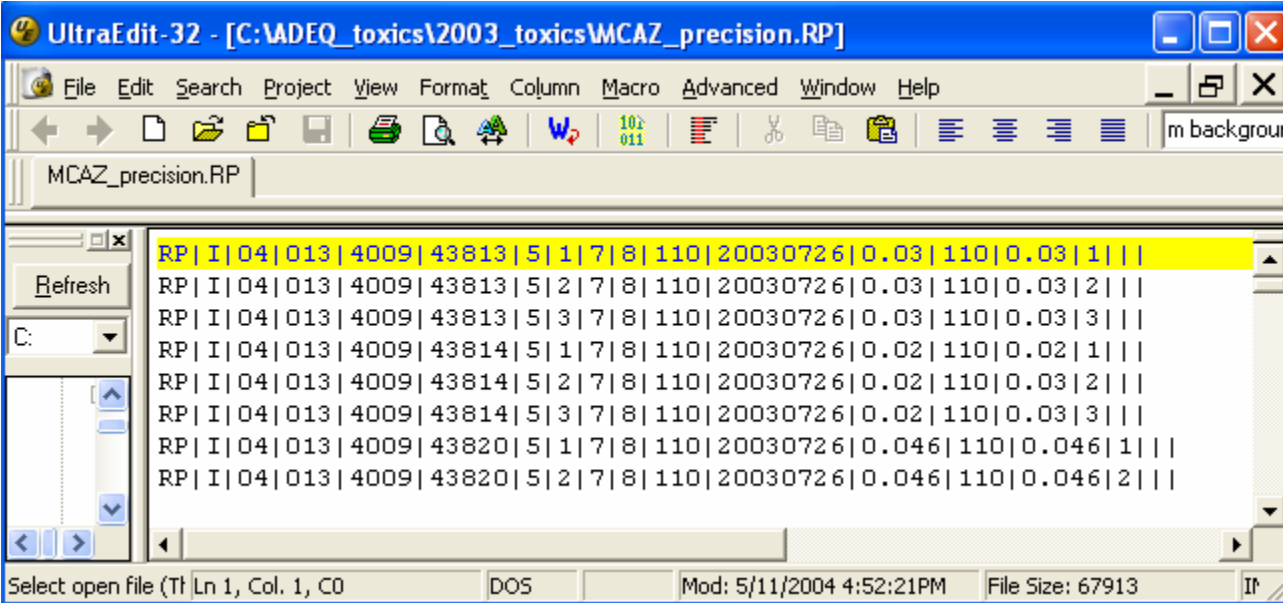
# Creating Precision Report

Import the text file (\*.txt) into VOCDat by opening AQS Precision Report in the file menu



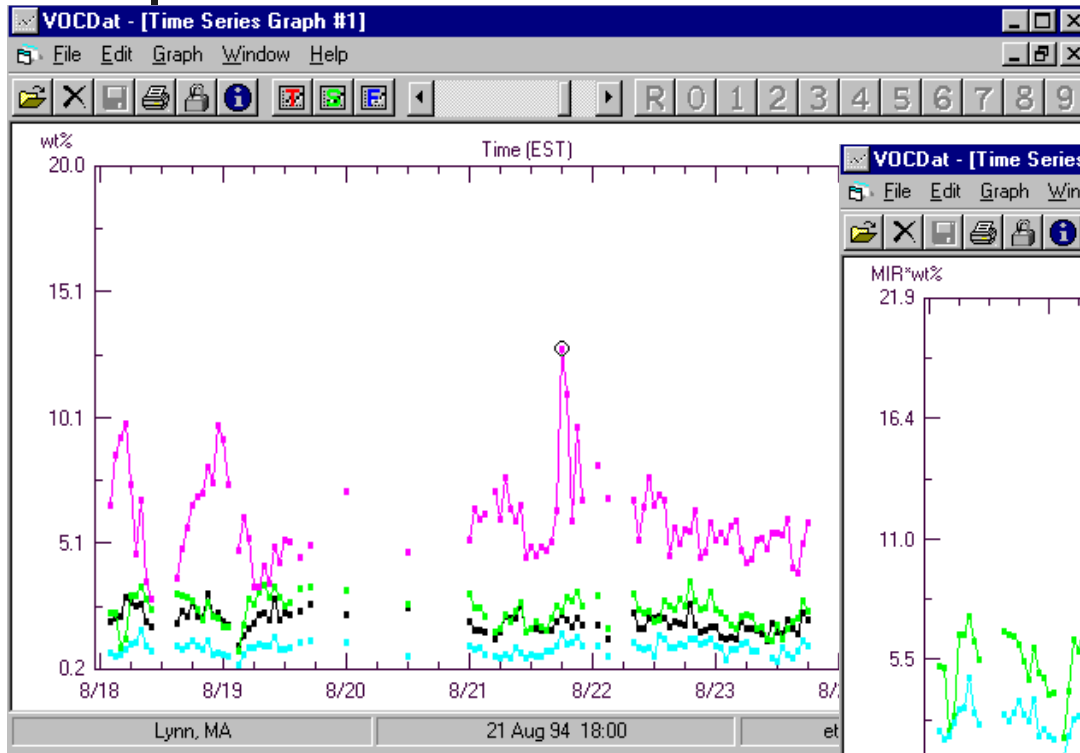
# Resultant Precision Report

After the file is imported into VOCDat, the data are automatically exported as an \*.RP file which is saved in the same folder as the imported text file

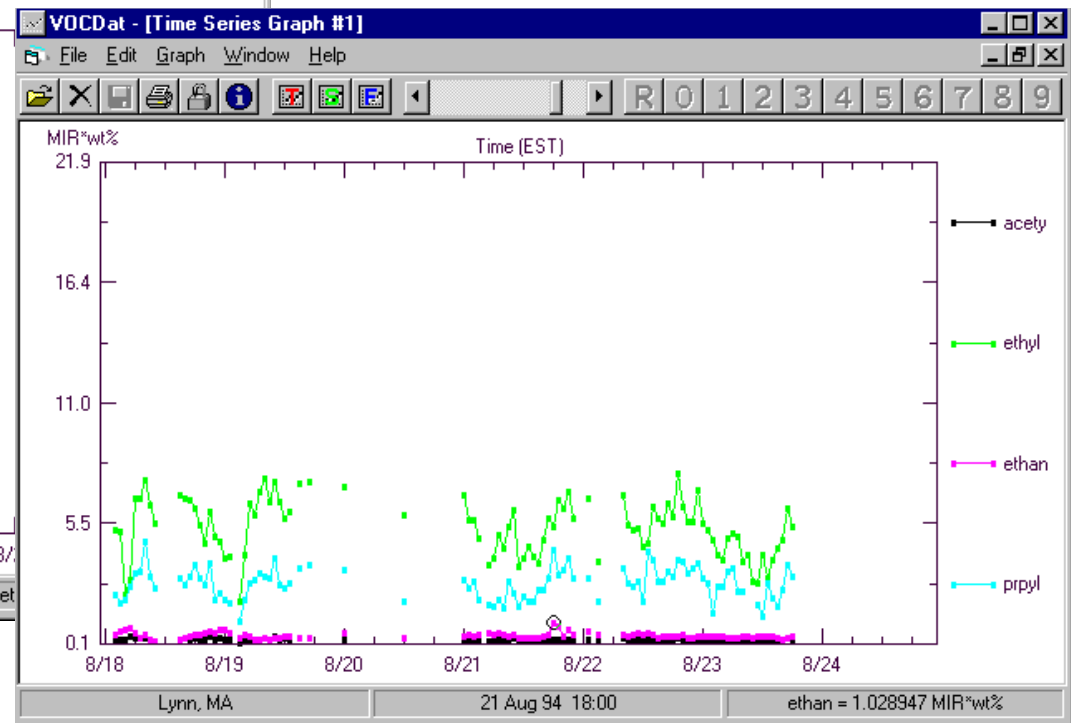


```
UltraEdit-32 - [C:\WDEQ_toxics\2003_toxics\MCAZ_precision.RP]
File Edit Search Project View Format Column Macro Advanced Window Help
MCAZ_precision.RP
RP|I|04|013|4009|43813|5|1|7|8|110|20030726|0.03|110|0.03|1|||
RP|I|04|013|4009|43813|5|2|7|8|110|20030726|0.03|110|0.03|2|||
RP|I|04|013|4009|43813|5|3|7|8|110|20030726|0.03|110|0.03|3|||
RP|I|04|013|4009|43814|5|1|7|8|110|20030726|0.02|110|0.02|1|||
RP|I|04|013|4009|43814|5|2|7|8|110|20030726|0.02|110|0.03|2|||
RP|I|04|013|4009|43814|5|3|7|8|110|20030726|0.02|110|0.03|3|||
RP|I|04|013|4009|43820|5|1|7|8|110|20030726|0.046|110|0.046|1|||
RP|I|04|013|4009|43820|5|2|7|8|110|20030726|0.046|110|0.046|2|||
Select open file (TF Ln 1, Col. 1, C0) DOS Mod: 5/11/2004 4:52:21PM File Size: 67913 IP
```

# Using Other Forms of the Data



Weight percent



Reactivity-weighted or  
risk-weighted



# Toxicity/Risk Factors

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- EPA's Integrated Risk Information System – IRIS (see <http://www.epa.gov/iris/index.html>).
- EPA Health Effects Notebook for Hazardous Air Pollutants (see <http://www.epa.gov/ttn/atw/hapindex.html>).
- EPA National Center for Environmental Assessment (NCEA) (see <http://cfpub.epa.gov/ncea/cfm/nceahome.cfm>).
- California EPA (see <http://www.oehha.ca.gov/>).
- Modeling Cumulative Outdoor Concentrations of Hazardous Air Pollutants by Systems Applications International, Inc. - Revised Final Report (see <http://www.epa.gov/cumulativeexposure/resource/report.htm>).
- California Air Resources Board Toxic Air Contaminant Identification List Summaries (see <http://www.arb.ca.gov/toxics/tac/tac.htm>).
- Application of Health Information to Hazardous Air Pollutants Modeled in EPA's Cumulative Exposure Project by Jane C. Caldwell, Tracey J. Woodruff, Rachel Morello-Frosch, and Daniel A. Axelrad (1998) (see <http://www.epa.gov/cumulativeexposure/CEPpapers/paperCWMA.pdf>).



# Unit Conversion

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- Select units when bringing data into VOCDat
- Convert among
  - ppbv (gaseous and semi-volatile HAPs)
  - ppbC (PAMS, auto-GC, VOC)
  - $\mu\text{g}/\text{m}^3$  (semi-volatile, particulate HAPs)
- Risk assessment focuses on  $\mu\text{g}/\text{m}^3$
- Must assume pressure, temperature when converting, which can cause up to 20% variability/uncertainty





# Obtaining VOCDat

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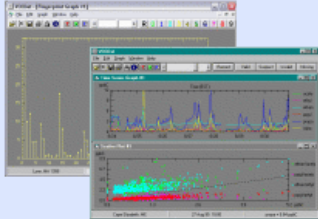
- Available free at  
<http://vocdat.sonomatech.com/>
- To register and get technical support,  
e-mail [vocdat@sonomatech.com](mailto:vocdat@sonomatech.com)

VOCDat - Netscape

File Edit View Go Bookmarks Tools Window Help

http://vocdat.sonomatech.com/ Search

Mail AIM Home Radio My Netscape Search Bookmarks



## VOCDat

VOCDat is a powerful tool for performing quality control tasks and exploratory data analysis on air pollutant data. It is designed to enable the states to rapidly validate and release their data.

**Download Now!**

- Download Latest Update
- User Registration

### VOCDat 2.53 Released

To coincide with the release of VOCDat 2.53, we have launched a new VOCDat website. This website contains links to download the latest version of VOCDat, as well as the updated users guide. The site features frequently asked questions, links to aethalometer resources, and an easy way in which to provide us with feedback.

Recent enhancements to VOCDat were funded by EPA and include: 1) the capability to convert data among  $\mu\text{g}/\text{m}^3$ , ppb, and ppbC units for gaseous pollutants; 2) expanded import capabilities to include data in vertical format (species concentrations in columns) rather than only horizontal format (species concentrations in rows) -- some states receive their data from national laboratories in vertical format, and 3) improved export to AQS features based on user interaction.

We look forward to your comments. If you have any questions, please use the "Questions/Comments?" link, or email us at the address below.

### How to get customer support

If you are having trouble, first read the [manual](#). Then, check the [FAQ](#) page. If you can still not solve your problem, please email [vocdat@sonomatech.com](mailto:vocdat@sonomatech.com). Include a description of your problem, an example data file, the species file you are using, and screenshots of the error (if possible).

### Related pages

Sonoma Technology, Inc. (STI) also provides the following related services:

### Users by Region

EPA Region 1:	13
EPA Region 2:	7
EPA Region 3:	10
EPA Region 4:	14
EPA Region 5:	20
EPA Region 6:	4
EPA Region 7:	2
EPA Region 8:	1
EPA Region 9:	38
EPA Region 10:	0
Other:	17

### Documentation

- About VOCDat
- VOCDat Manual (PDF)

### FAQ

- How is the sum of PAMS species computed? Why is VOCDat's sum different...
- I have samples that are invalid and by leaving the concentration blank...
- When I tried to export data into AQS format, I selected method code 128...
- More FAQ...

### Links

- Aethalometer resources
- Other resources

### Feedback

- Contact Us
- Questions/Comments?

### Registered User?

If you are a registered user, please log in by entering your email address below.

Log In

Download VOCDat and species files, etc.

Please register!

Manual and FAQ

Check if you have most current version



## Other Additions and Ideas?

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- Other import file formats?
- Additional QC checks? More refined screening criteria?
- Can we input comments into AQS?
- Improve precision information transfer?
- Improve MDL information transfer?
- Is there a standard QC code list for comments?



# Summary

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- Graphical techniques are useful to quickly and efficiently validate (and begin analysis of) aerometric data
- VOCDat is useful in processing and validating air toxics data



# Glossary

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AIRS – Aerometric Information Retrieval System  
AQS – Air Quality System  
auto-GC – automatic-Gas Chromatography  
BC – black carbon  
CFCs – chlorofluorocarbons  
CSV – comma separated values  
DPM – diesel particulate matter  
EPA – U.S. Environmental Protection Agency  
ERG – Eastern Research Group  
HAPs – Hazardous Air Pollutants  
NATTS – National Air Toxics Trends Sites  
PAMS – Photochemical Assessment Monitoring Stations  
PM – Particulate Matter  
POC – parameter occurrence code  
QC – Quality Control  
RTI – Research Triangle Institute  
VOC – Volatile Organic Compounds