

Using EmisView to Quality Assure and Visualize Emission Modeling Data

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Outline

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- Subsets
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- Future Plans

Introduction to EmisView

- Open source tool for quality assurance and visualization of emissions data
- Goal: Create plots and tables of emission summaries at various spatial and temporal resolutions
- Supports emissions inventory and modeling staff at states, RPOs, EPA, and industry
- Supports SMOKE and CONCEPT
- Funded by the Emission Inventory Improvement Program (EIIP) and EPA's Emission Inventory Group (EIG)

EmisView Setup

- Prerequisites:
 - **Java 1.4** (to run the software)
 - **R** (for plots)
 - **MySQL** or **PostgreSQL** (to store data)
- Download and run EmisView Installer
 - Downloads software and documentation
 - Configures for user's system
 - Sets up to use MySQL or PostgreSQL
 - Can be run again to download updates

Performing an Analysis in EmisView

1. Load an Inventory to create a **Dataset**
2. Create a **Subset** to specify how the data should be subselected and aggregated
3. Select a **Product** that specifies how to present the data (e.g., in particular tables and / or plots)
4. Run the **Analysis** to view the results

EmisView Main GUI

The screenshot displays the EmisView application window. The title bar reads "EmisView" and includes standard window control buttons. The menu bar contains "File", "Options", "Tools", and "Help". Below the menu bar are four tabs: "Datasets", "Subsets", "Products", and "Analyses". A toolbar contains icons for a bar chart, a funnel, an eye, a dollar sign with "00", a double left arrow, a refresh icon, and a split icon. The main area features a table with the following data:

#	Select	Name	Type	Region	Start Date Time
1	<input type="checkbox"/>	NC IDA Area 1996	IDA Nonpoint/Nonroad Inventory	NC	01/01/96 00:00
2	<input type="checkbox"/>	KY nonpoint 2002	NIF3 Nonpoint Inventory	KY	01/01/02 00:00

Below the table is a horizontal scrollbar. At the bottom of the window, a status bar indicates "2 rows : 6 columns". A row of buttons includes "New", "Copy", "Rename", "Delete", "Configure", and "Help".

Importing Data

- Click New on Datasets tab to show Importer
- Choose Dataset Type (e.g. NIF3 Nonpoint Inventory)
- Select file(s)
- Modify table names if desired

The screenshot shows the 'Dataset Importer' dialog box. At the top, 'Dataset Type' is set to 'NIF3 Nonpoint Inventory'. Under 'Import Data', 'From:' is set to 'File'. The 'File Names:' field contains 'sview4\data\nif3\area_nonpointky_np_pe.bd' and has a 'Browse' button. 'Country:' is set to 'United States'. The 'Tables to Create' section contains a table with the following data:

Type	Name
Nonpoint Control Equipment	ky_np_ce
Nonpoint Emission	ky_np_em
Nonpoint Emission Processes	ky_np_ep
Nonpoint Emission Periods	ky_np_pe
Nonpoint Emission Summary	ky_np_summary

Below the table, there is an 'Add Prefix to Table Names' text box and an 'Update' button. At the bottom, there is a checkbox for 'Overwrite the tables if they exist?' which is currently unchecked. The 'Import' and 'Cancel' buttons are at the very bottom.

Supported Data Types

Data Type	Formats
Point inventory	NIF3, IDA, ORL
Nonroad mobile inv.	NIF3, IDA, ORL
Nonpoint (area) inv.	NIF3, IDA, ORL
Onroad mobile inv.	NIF3, IDA, ORL

- **NIF3** is used by **CONCEPT** for most source types
- **NIF3** support is currently for **ASCII** fixed format files and can be read directly from **CONCEPT** database
- **IDA** and **ORL** formats are used as inputs to **SMOKE**

Specify Dataset Properties

- Give a **Name** and **Description**
- Confirm **start date**, **end date**, **resolution**
- Specify **Region** and **Sector**
- Note **Pollutants**
- Confirm **Units**
- **Other Metadata** tab shows database tables and metadata

Dataset: KY nonpoint 2002

About this Dataset Other Metadata

Basic Information

Dataset Name KY nonpoint 2002

Description Imported from C:\Program Files\emisview4\data\nif3\area_nonpoint

Temporal Information

Start Date 01/01/2002 00:00 End Date 12/31/2002 23:59 MM/dd/yyyy HH:mm

Resolution Annual

Geographic Information

Region KY

Sectors

#	Sectors
1	Non_Point

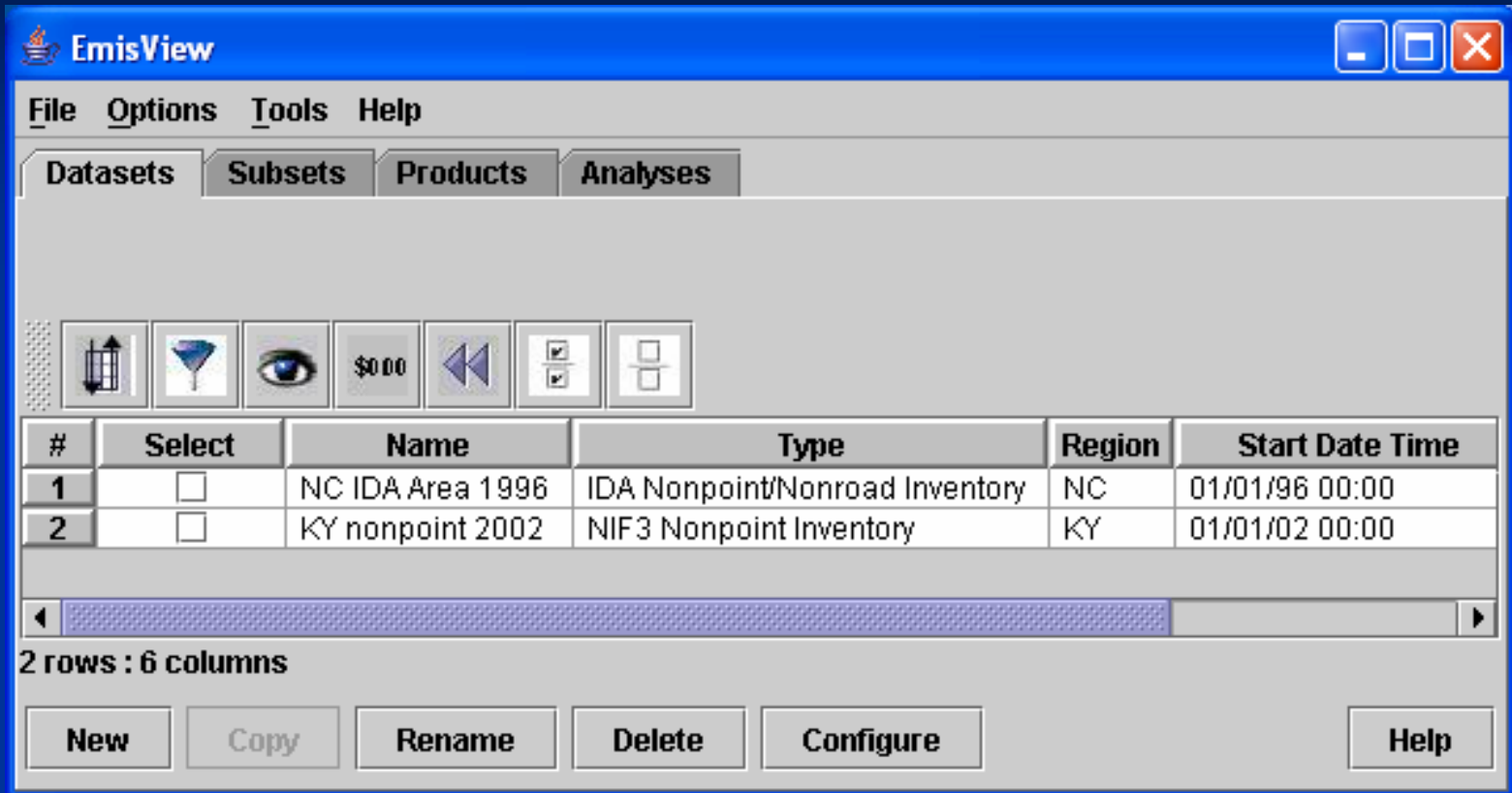
Pollutants

CO
NH3
NOX
SO2

Units LB

Save Copy Save & Close Close Help

Imported Dataset Now in Table



The screenshot shows the EmisView software window. The title bar reads "EmisView" and includes standard window controls. The menu bar contains "File", "Options", "Tools", and "Help". Below the menu bar are four tabs: "Datasets", "Subsets", "Products", and "Analyses". A toolbar contains several icons: a column selection icon, a funnel icon, an eye icon, a "\$000" icon, a double arrow icon, a checkmark icon, and a square icon. The main area displays a table with the following data:

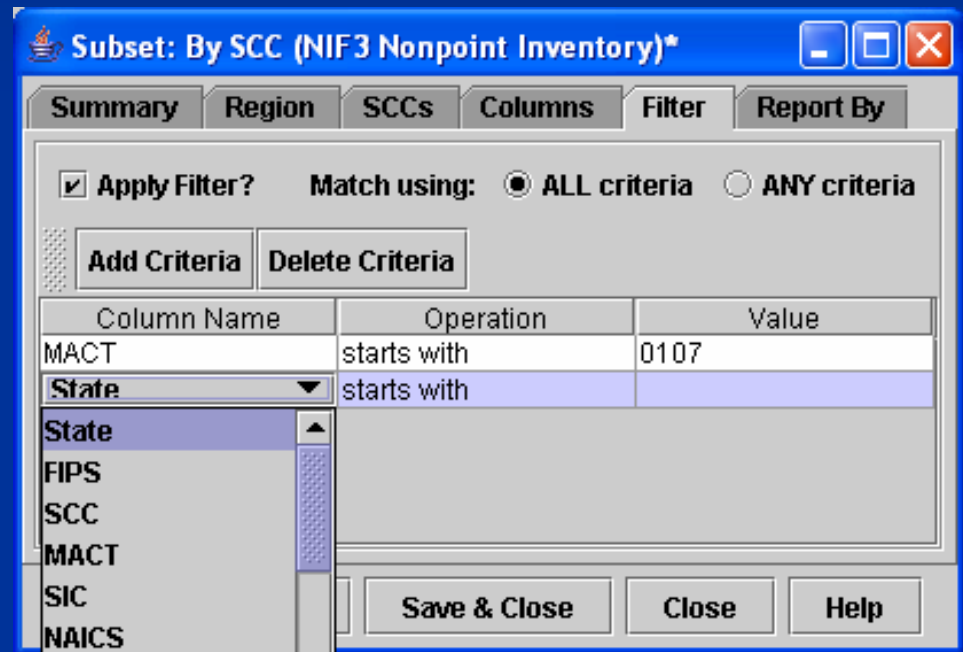
#	Select	Name	Type	Region	Start Date Time
1	<input type="checkbox"/>	NC IDA Area 1996	IDA Nonpoint/Nonroad Inventory	NC	01/01/96 00:00
2	<input type="checkbox"/>	KY nonpoint 2002	NIF3 Nonpoint Inventory	KY	01/01/02 00:00

Below the table is a horizontal scrollbar. At the bottom of the window, there are several buttons: "New", "Copy", "Rename", "Delete", "Configure", and "Help". The status bar at the bottom left indicates "2 rows : 6 columns".

- Buttons on toolbar control view of table and selection (**Sort, filter, show/hide columns, format, select all, clear all**)
- Buttons at bottom operate on selected items

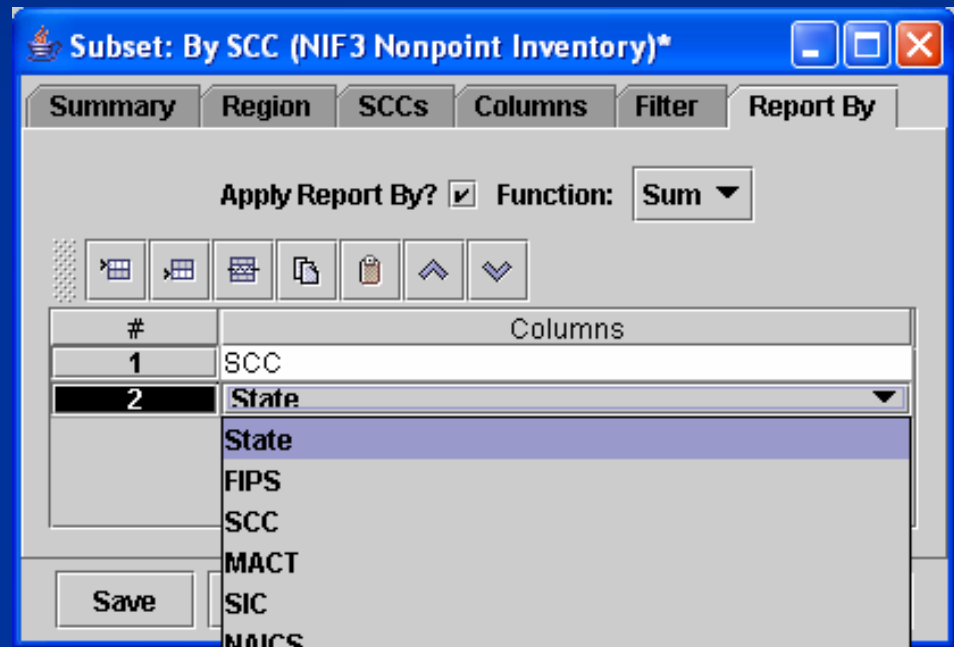
Subset Editor Overview

- Specifies how to subset and aggregate data
- Subsets can be defined by **region** (i.e., country, state, county characteristics), **SCC**, **Columns**, **Filter**



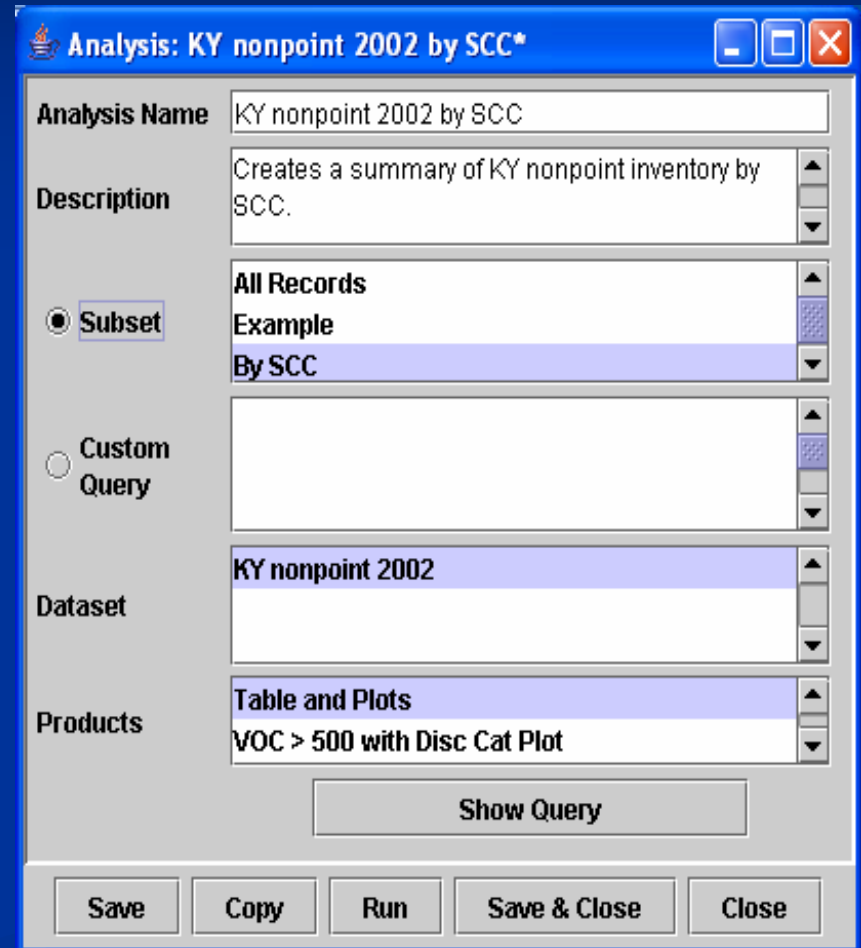
Subset Editor – Report By

- You may **aggregate** by state, FIPS, SCC, MACT, SIC, NAICS, ...
- Function applied can be **Sum**, **Mean**, **Min**, or **Max**
- Subsets can be reused on different datasets



Analysis Editor

- **Name:** KY nonpoint 2002 by SCC
- **Subset:** By SCC
- **Dataset:** KY nonpoint 2002
- **Product:** Table and Plots
- **Run** to see results
- **Alternative:** enter own custom query



Analysis Results

Analysis Results: KY nonpoint 2022 by SCC

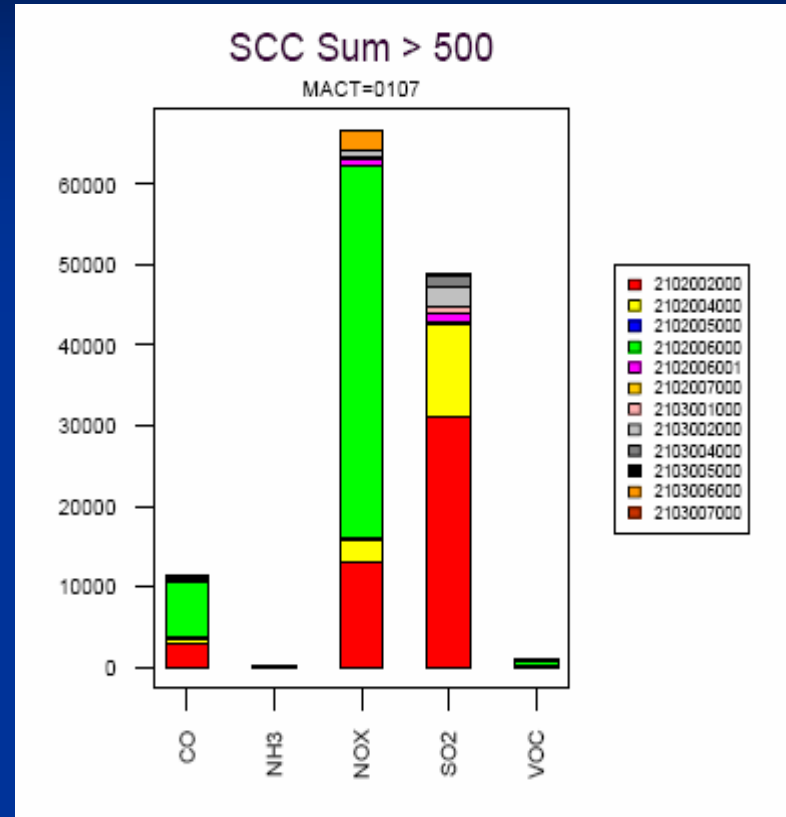
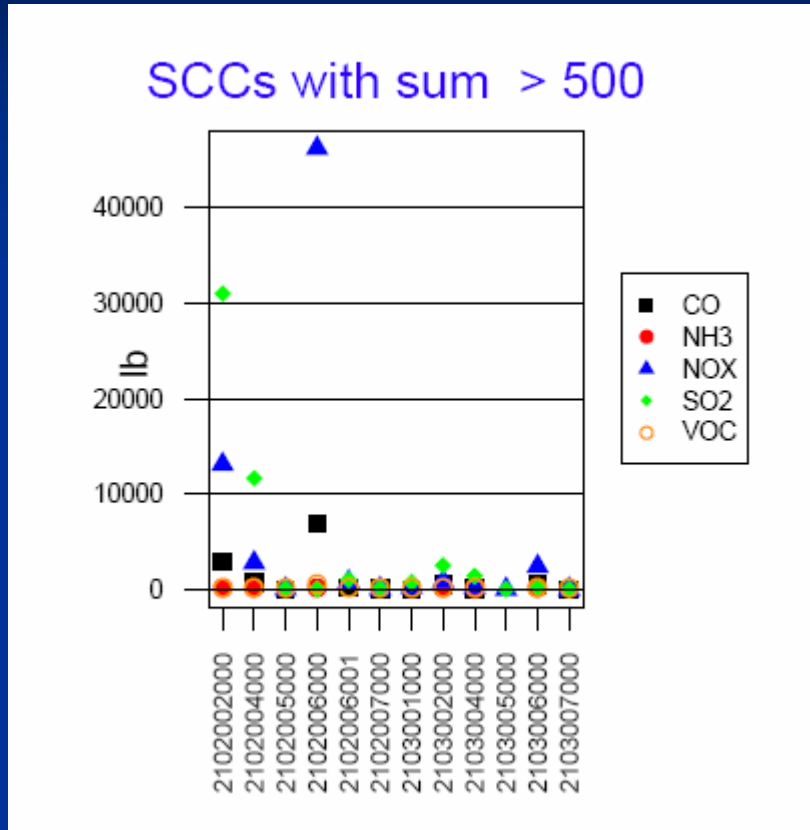
	SCC	VOC	NOX	CO	SO2	NH3
1	2102006000	5.548E02	4.63E04	6.89E03	3.59E01	1.41E02
2	2102004000	1.747E02	2.79E03	6.79E02	1.16E04	7.18E01
3	2102002000	1.363E02	1.31E04	2.93E03	3.10E04	2.90E-01
4	2103006000	6.450E01	2.39E03	4.78E02	1.88E02	1.18E01
5	2103002000	3.603E01	8.20E02	4.95E02	2.51E03	1.00E-02
6	2102006001	1.582E01	7.94E02	1.90E02	1.02E03	
7	2103004000	5.000E00	2.06E02	5.10E01	1.42E03	8.34E00
8	2102007000	1.620E00	8.05E01	2.01E01	1.03E02	
9	2103001000	6.400E-01	1.88E02	1.00E01	7.50E02	
10	2103007000	2.700E-01	5.67E00	1.14E00	7.28E00	
11	2102005000	1.600E-01	2.90E01	2.64E00	8.38E01	
12	2103005000		1.90E-01		5.50E-01	

12 rows : 6 columns

Description Load Configuration Export Close Help

- From the results table you can sort, filter, show/hide cols, format, create plots, show a description, load/save configuration, export

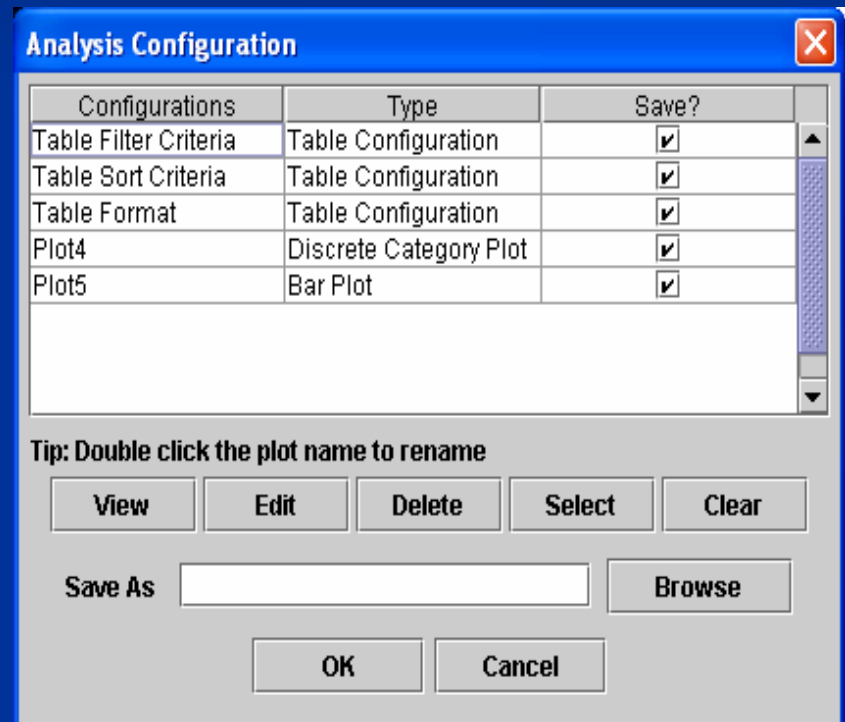
Examples of Plots



Available Plot types: Bar Plot, Box Plot, CDF Plot, Histogram, Discrete Category Plot, Rank Order Plot, Tornado Plot, XY

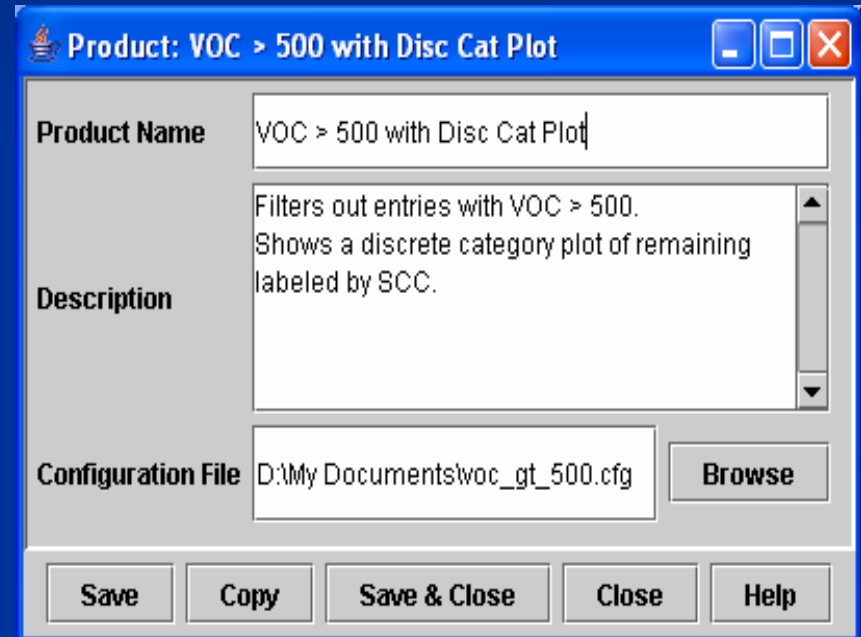
Analysis Configuration

- You can save the configuration of your table and the plots you created for later use. For example:
 - Sort by VOC
 - Format columns
 - Show VOC > 500
 - Create two plots



Products

- **Table and Plots** is the default product
- **Custom products** can be defined by specifying an analysis configuration



Flexible, Reusable Analyses

- Definition of the Analyses is saved in the database
- Components of analyses are reusable
 - The same subsets can be applied to different datasets
 - Applying different subsets to the same dataset produces different results
 - Results can be shown in different ways using custom products
 - Configuration of products can be saved

Availability

- Version 0.9 available now from <http://emisview.sourceforge.net>
- Bug reports and feature requests can be submitted to SourceForge
- Runs on Windows and Linux using MySQL or PostgreSQL
- Source code available under GNU Public License

Goals thru December 2005

- Support for Java 1.5
- Streamline process of creating plots
- Add statistics to Results window (e.g., min, max, sum, percentiles, histogram)
- Support "Show Top N" as Product
- Better support for mobile emissions and activity data
- Make analysis configurations more robust and flexible

Goals through September '06

- Export Shapefiles and create basic geographic plots (e.g. via JUMP)
- Enhanced batch interface
- Comparison of two Datasets (e.g., inventories)
- Importers for intermediate data (e.g. Smkreports), and air quality model-ready data
- Support grouping analyses into Projects
- Track a source through the modeling process

Links

- EmisView: emisview.sourceforge.net
- MIMS: mimsfw.sourceforge.net
- R: www.r-project.org
- MySQL: www.mysql.com
- PostgreSQL: www.postgresql.org
- JUMP: www.vividsolutions.com/jump
- NEI Extended QC Tool:
www.epa.gov/ttn/chief/nif