EmisView: New Software for Visualizing and Quality Assuring Emission Modeling Data

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ABSTRACT

EmisView is a new, open-source visualization tool that will improve the quality assurance of emissions data for use in air quality modeling efforts of states, Regional Planning Organizations (RPOs), and the U.S. Environmental Protection Agency (EPA). It works closely with emission models, including the Sparse Matrix Operator Kernel Emissions (SMOKE) modeling system, and the CONsolidated Community Emissions Processing Tool (CONCEPT), which has been developed by the Midwest RPO. The analyses and graphics created by EmisView can be configured and repeated in an automated fashion. The first beta version of EmisView will be released in May 2005, an additional release will follow in September 2005. It will be released under a GNU Public License, which will enable modelers to examine its source code and enhance it as needed. EmisView is being developed to perform analyses that the states, RPOs, and EPA have identified as priorities. By September 2005, the software will be able to plot emissions at various temporal and spatial resolutions with many types of plots (e.g., bar, line); display spatial plots of gridded, county, and source-level emissions; track a single source through all the stages of the emissions modeling process; and compare at least two emissions modeling runs (e.g., versions 1 and 2, or controlled versus uncontrolled). More information on the EmisView project is available at http://emisview.sourceforge.net.

INTRODUCTION

EmisView is an open-source emissions data quality assurance (QA) tool that is being developed by the EPA's Emissions Inventory Improvement Program (EIIP). EmisView supports emissions modeling activities of states, Regional Planning Organizations (RPOs), and EPA. EmisView reads data used and created by the Sparse Matrix Operator Kernel Emissions (SMOKE) modeling system[1] and the CONsolidated Community Emissions Processing Tool (CONCEPT)[2]. EmisView can read the emission inventory data formats that are used by SMOKE and CONCEPT, which include the National emission inventory Input Format (NIF3) and Output Format (NOF), Inventory Data Analyzer (IDA), and One Record per Line (ORL) formats. EmisView will also be able to read SMOKE and CONCEPT intermediate data at specified stages of processing and to access model-ready output files. For more information on SMOKE, see http://www.cep.unc.edu/empd/products/smoke/version2.1/. For more information on CONCEPT, see http://www.conceptmodel.org.

EmisView is being designed and developed to perform analyses that were identified as priorities according to EPA and community specifications. Some of the capabilities that EmisView will include when it is fully developed are the following:

- Plot the hourly, daily, and monthly distribution of emissions with line and bar charts. These plots could be for specific emissions sources, or could be aggregated by country, state, county, source category code (SCC), coordinates (in latitude-longitude), facility, or any combination of these.

- Compare at least two emissions modeling runs (e.g., versions 1 and 2, or controlled and uncontrolled) using as many of the tool's functions as is practicable. The comparison feature will enable the flagging of differences between two runs using a user-defined tolerance.

- Display spatial plots of gridded, state, or county emissions, with background maps of countries, states, and counties. Spatial plots will be able to iterate through multiple hours, days, or months, depending on data availability.

- Track a single source through the entire emissions modeling process, including spatial allocation, speciation, temporal allocation, layer assignments, growth, and control assignments made using cross-references by the emissions models.

The exact features included in EmisView will vary according to the version. New functionality will be added between the release of the initial version in May 2005 and Version 1.0 in September 2005 as discussed in the Release Schedule section of this paper. EmisView runs on PCs running Linux or Windows, and includes an easy-to-use installation package. The user documentation will include example cases of emissions modeling, examples of QA checks that the software can perform, and explanations of how to use all of its features.

BACKGROUND

In fall of 2004, the EIIP-funded emissions quality assurance tool project was announced to the emissions modeling community. The new tool was named EmisView, and a mechanism was made available via the SourceForge web site to allow users to submit suggestions for types of analyses to include in the software. Major contributions were received from the Lake Michigan Air Directors Consortium, Alpine Geophysics LLC, and the University of North Carolina's Carolina Environmental Program (CEP). Additional contributions were received from other interested parties, such as states and private firms. CEP compiled the recommendations from the community into a document titled "Recommendations for Quality Assurance Approaches."[3] This report also included many of the requirements for EmisView as well as a preliminary discussion of the system design. The design for the EmisView software evolved over the course of several months from the information in the recommendations document and from several discussions with EPA regarding emissions modeling QA needs. The design was documented in draft and final[4] design documents.

The EmisView project has been registered with SourceForge.net, the world's largest open-source software development web site; its project page is available at http://sourceforge.net/projects/emisview. From this page, users can access the various features provided by SourceForge, such as bug tracking, requests for enhancement, user support requests, software distributions, and the Concurrent Versions System (CVS) repository that contains the source code. The project web pages, including the "Recommendations for Quality Assurance Approaches" document and the EmisView final design document are available from http://emisview.sourceforge.net. EmisView will be released under a GNU Public License, thereby enabling members of the emissions modeling community to access the source code, enhance the software as needed, and provide the revised software back to the community.

APPROACH

Analysis Goals

EmisView will support advanced QA of emission inventories and emissions modeling data within a single software package. It will provide emissions modelers with a powerful tool for performing beginning-to-end QA of emissions data. EmisView will support interactive analyses via a graphical user interface (GUI). Once analyses are defined, users will be able to save the configuration of the analyses and apply them using a command-line interface on the same or new datasets. EmisView will be an integral quality assurance component of EPA's new Emission Modeling Framework,[5] which will serve as a data management tool for emissions modeling data, a quality assurance system, and a GUI for running SMOKE.

The analysis products that EmisView will create include the following:

- **Tables** (also known as reports) – row- and column-based tabular data, such as what you would load into a spreadsheet.

- **Nongeographic plots** – plots such as line and bar charts.

- **Geographic plots** – plots that show data in conjunction with maps, such as geopolitical boundaries.

Wherever possible, EmisView will facilitate the customization of predefined analyses, such as adjusting colors, labels, and axis ranges. It will also facilitate the addition of new analyses by Structured Query Language (SQL) programmers. EmisView will initially focus on criteria pollutants, but the design will not prohibit using the software for toxics compounds as well.

The "Recommendations for Quality Assurance Approaches" document provides many examples of analysis products similar to those that will be produced by EmisView. The Multimedia Integrated Modeling System (MIMS) Analysis Engine (discussed later in this document) will be used to produce the tables and nongeographic plots. The nongeographic plots available in the initial version will include bar, stacked and adjacent bar, box and whisker, cumulative density function (CDF), discrete category, histogram, rank order, XY, scatter, line, time series, regression, and tornado. Geographic plots will not be available in the initial version, but will be added in a later version.

EmisView allows users to define data "subsets", which facilitate taking a large dataset and making it a manageable size for analysis by selecting portions of the data (e.g., choosing certain states) and aggregating the data (e.g., summing over each SCC). This is similar to the creation of a "summary table" of data, discussed in the recommendations document. Summary tables provide a summary of emissions in a Dataset summed across specified spatial and temporal resolutions. Once EmisView creates a summary table, the following types of statistical tables can be created from the data in the summary table: basic statistics, histogram, percentile, regression analysis, and correlation analysis. The software will also support vertical emissions distribution reports, which show how emissions are distributed vertically by layer.

Some analyses can be considered to be "threshold reports" (e.g., Stack Quality Assurance Report, Major NO_x Report). A threshold report identifies entries in a table for which the value in a column exceeds a certain threshold (e.g. NOx emissions > 100 tons/yr). The initial version of EmisView will create threshold reports that show only the rows with values that exceed specified threshold values. "Top N" and "Top N%" reports will also be supported. A later version of EmisView will allow users to create these reports from scripts.

Data Goals

EmisView will be able to read in inventory, intermediate, and air quality model (AQM)-ready output data for SMOKE and CONCEPT. Table 1 shows most of the data types that will be read. An additional format that will be read by EmisView but is not shown in Table 1 (because it is not used as an input format to CONCEPT or SMOKE) is the NOF. EmisView will store information that describes the datasets that have been loaded into it. This information will include a name, description, data type (e.g., NIF3 Point Source Inventory), sector, region, time period, bounding box of the data's geographic extent, temporal resolution, pollutants, and units. It will also retain the emissions modeling stages that have been completed on the data (e.g., gridding, speciation), and other metadata that can be added for the dataset as the user chooses to do so. The type of data and as much other information as possible will be diagnosed automatically as the files are imported. When used with CONCEPT, EmisView will provide a mechanism for selecting data tables from the CONCEPT database, as opposed to requiring the data to be imported from individual data files.

Table 1. Emissions Data Types Read by EmisView.

Data Type	CONCEPT	SMOKE
Point-source inventory	NIF3	IDA, ORL
Nonroad mobile inventory	NIF3	IDA, ORL
Nonpoint (stationary area) inventory	NIF3	IDA, ORL
On-road mobile inventory	NIF3	IDA, IDA activity data, ORL
Intermediate data	Specific database tables	Smkreport outputs
Model-ready data	Database tables, UAM/CAMx low-level and elevated	CMAQ netCDF, UAM/CAMx low-level and elevated

The data fields stored by EmisView will be at an appropriate level of detail for the data type. For example, point-source inventory data will include stack parameters, whereas low-level model-ready data will be gridded and time-stepped (usually hourly). For NIF3 datasets, the actual NIF3 structure will be used. A goal for EmisView is to support analysis of data from computers running Windows, even if the emissions modeling was done on Linux or another UNIX system. The NIF3, IDA, ORL, and Smkreport outputs are ASCII and are therefore portable across Linux and Windows. NetCDF (network Common Data Form) is a portable binary format. Urban Airshed Model (UAM)/Comprehensive Air quality Model with eXtensions (CAMx) binary files are not portable, which is an issue that will be addressed during the remaining EmisView development.

The Main GUI

Figure 1 shows a picture of the EmisView Main GUI, which contains four tabs: Analyses, Datasets, Subsets, and Products. On each tab there is a table listing the items corresponding to that tab (e.g., the available analyses are listed on the Analyses tab). Each table has a toolbar with buttons to sort, filter, show and hide columns, format columns, reset, select all items, and unselect all items. The Copy, Rename, Delete, Edit, and Run buttons at the bottom of the GUI operate on the rows with checkmarks in the Select column. If the user selects Copy, a dialog box for copying the selected items is shown. This dialog box makes it easy to add a prefix and/or suffix to each name, and to edit each name independently. When the user selects New, EmisView shows a window appropriate for creating and editing an item on the selected tab. For example, an "Analysis Editor" appears when "New" is selected

from the Analysis tab. Examples of the Analysis Editor, Dataset Editor, Subset Editor, and Product Editor are shown in Figures 2, 3, 4, and 6, respectively.

Figure 1. Analyses Tab of the EmisView Main GUI.
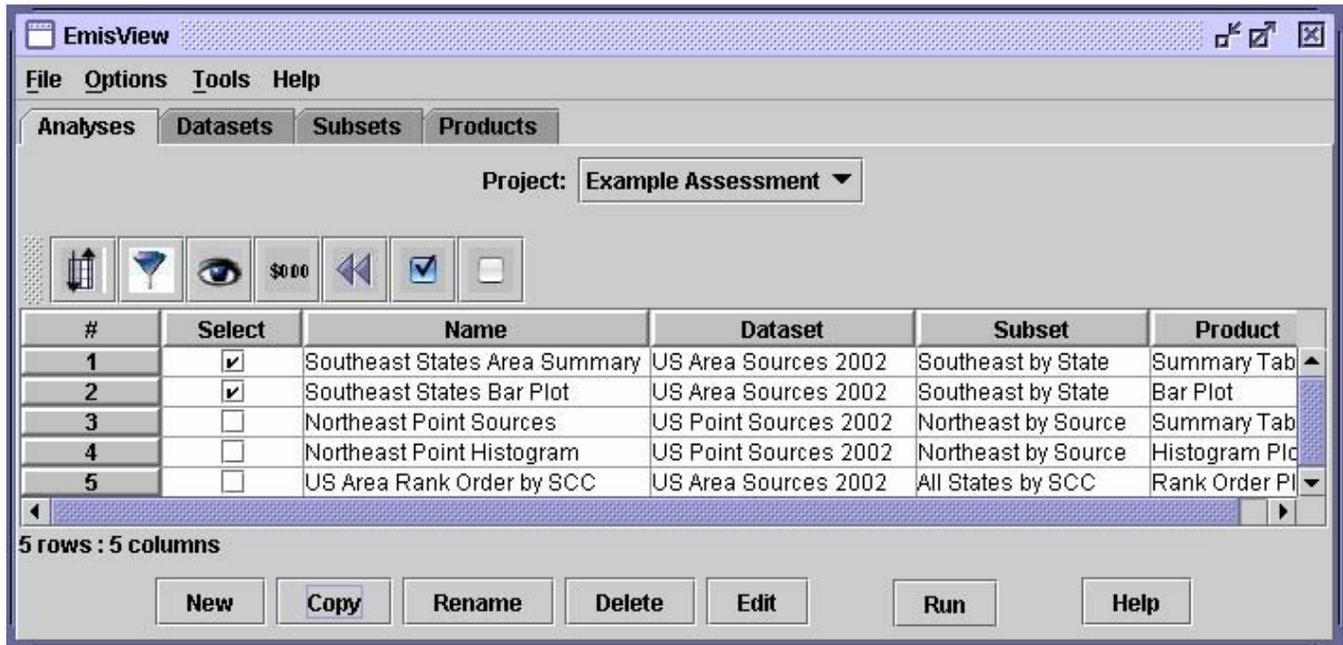
Analyses (the first tab) are a key concept in EmisView. Analyses have four main parts: basic information, a Dataset, a Subset, and an analysis Product.

- The basic information includes the name and description of the Analysis and the Project to which it belongs. The Project is an attribute of an Analysis that specifies a name for a set of related Analyses.

- The Dataset is the actual dataset on which to run the analysis.

- The Subset is a description of how the data should be subselected and grouped (e.g., give data as state totals by SCC).

- The Product is the types of tables and/or plots that will be produced. The simplest Product will extract the specified Subset of the Dataset from the database and load it as a table into the Analysis Engine without any additional processing.

Once all the parts of the Analysis object are defined, the user can run the analysis to produce the products (i.e., plots and tables). The **Analysis Editor** is the GUI window that is used to view and edit the contents of an Analysis. An example is shown in Figure 2.

EmisView will collect information from the Dataset , Subset, and Product specified by the user for an Analysis and use that information to construct a string that represents an SQL query that can extract the desired level of information from the dataset (e.g., sum over all SCCs for each state). When an Analysis is run, the query will be constructed, executed, and the resulting data will be provided directly to the Analysis Engine. As an alternative to a Subset, the user may specify a custom query to execute. This gives maximum flexibility for extracting information from the datasets, especially for those familiar with SQL.

Figure 2. Analysis Editor
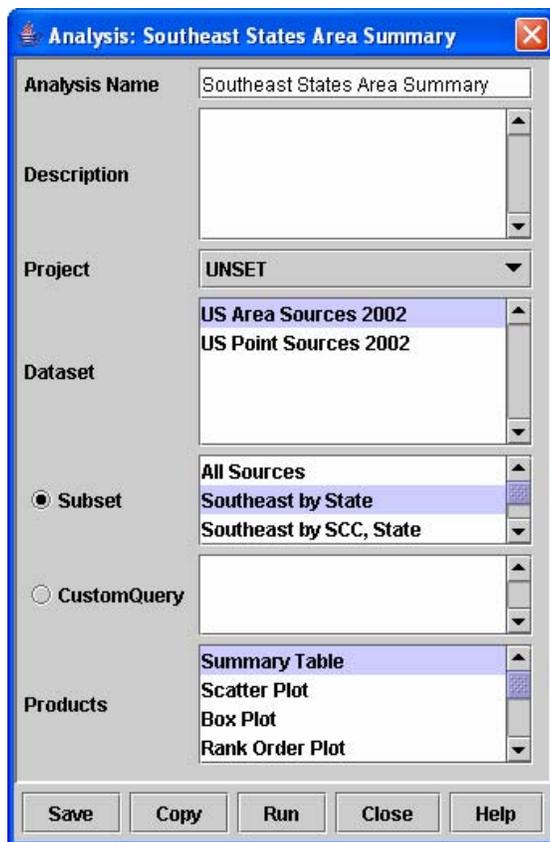
Figure 3. Dataset Editor
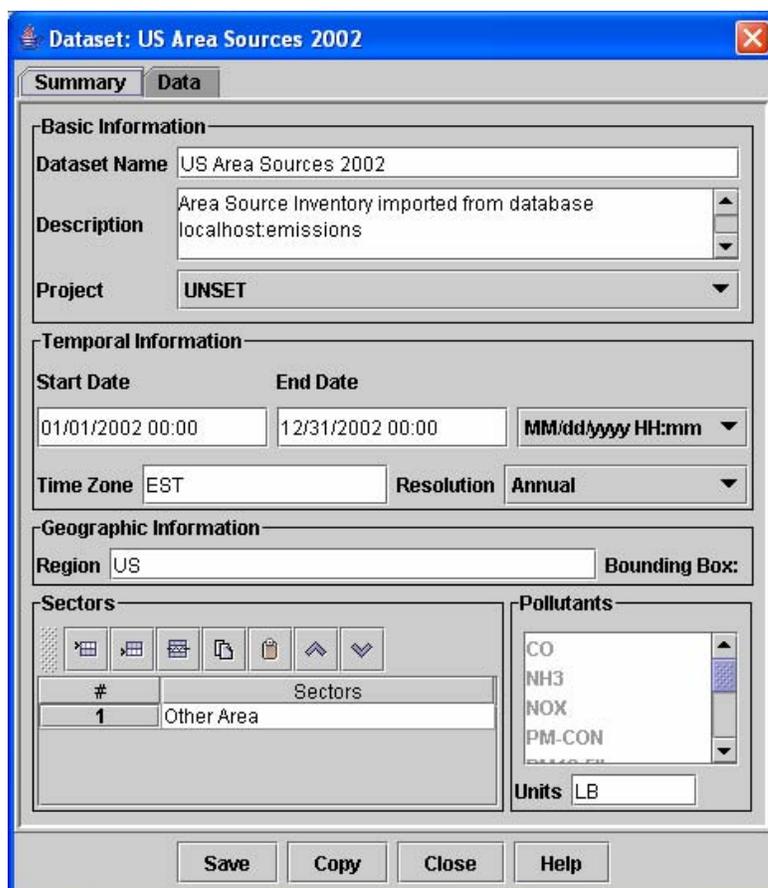
Figure 3 shows an example of the Summary tab of the **Dataset Editor**. This editor is used to show and specify information about **Datasets** (the second tab). Basic information (e.g., name, description) is shown at the top, followed by temporal information, geographic information, sectors, and pollutants. The start date, end date, pollutants, units, and a basic description are filled in automatically when the Dataset is created. The time zone, region, and sectors need to be specified by the user. The Data tab of the Dataset Editor contains information about the type of dataset (e.g., NIF3 Area Inventory), the database it resides in, and the data tables the emissions data reside in. It also contains a list of metadata as keyword-value pairs that can be specified by the user as needed.

Subsets (the third tab) contain information about how to select and subtotal data from the source Dataset. Thus, the **Subset Editor** (Figure 4) will allow the user to specify how data should be subselected and subtotaled. For example, the Subset Editor would be used to specify that the user wants to see subtotals by SCC for a specific set of states. The Subset Editor has the following tabs: **Summary, Region, Codes, Pollutants, Times,** and **Layers**. The Summary tab will specify the level of aggregation for the data and other general information. The Region tab will allow the user to specify states, counties, and other geographic regions of interest. The codes tab will allow the user to specify SCC, SIC, NAICS, and other codes of interest. Pollutants of interest will be selected from the Pollutants tab. In Figure 4, the Subset Editor is being used to select the data for PM-related pollutants. Layers of interest will be selected from the Layers tab, but this tab is available only for elevated model-ready data.

Figure 4. Subset Editor
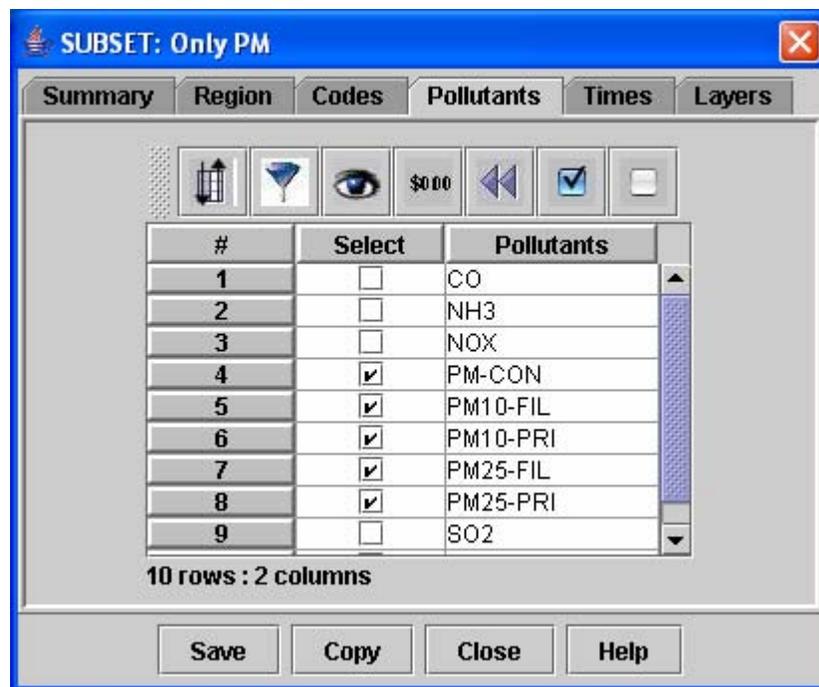
The **Products** tab (fourth tab) of the Main GUI lists the analysis products that are available in EmisView. The example shown in Figure 5 lists the plots and tables that are currently available. Some of the products are system defined and cannot be changed by the user. However, if the user makes a copy of the system defined product, then a custom configuration file can be specified to control the exact look of the product. An example of specifying a custom product with the Product Editor is shown in Figure 6. The '*' following the title of the product means that the user has changed the specification of the product but has not yet saved the changes. This feature is also implemented on the other types of editors. Note that it is likely that some reorganization or redefinition of these products will occur prior to the initial release.

Figure 5. Products Tab
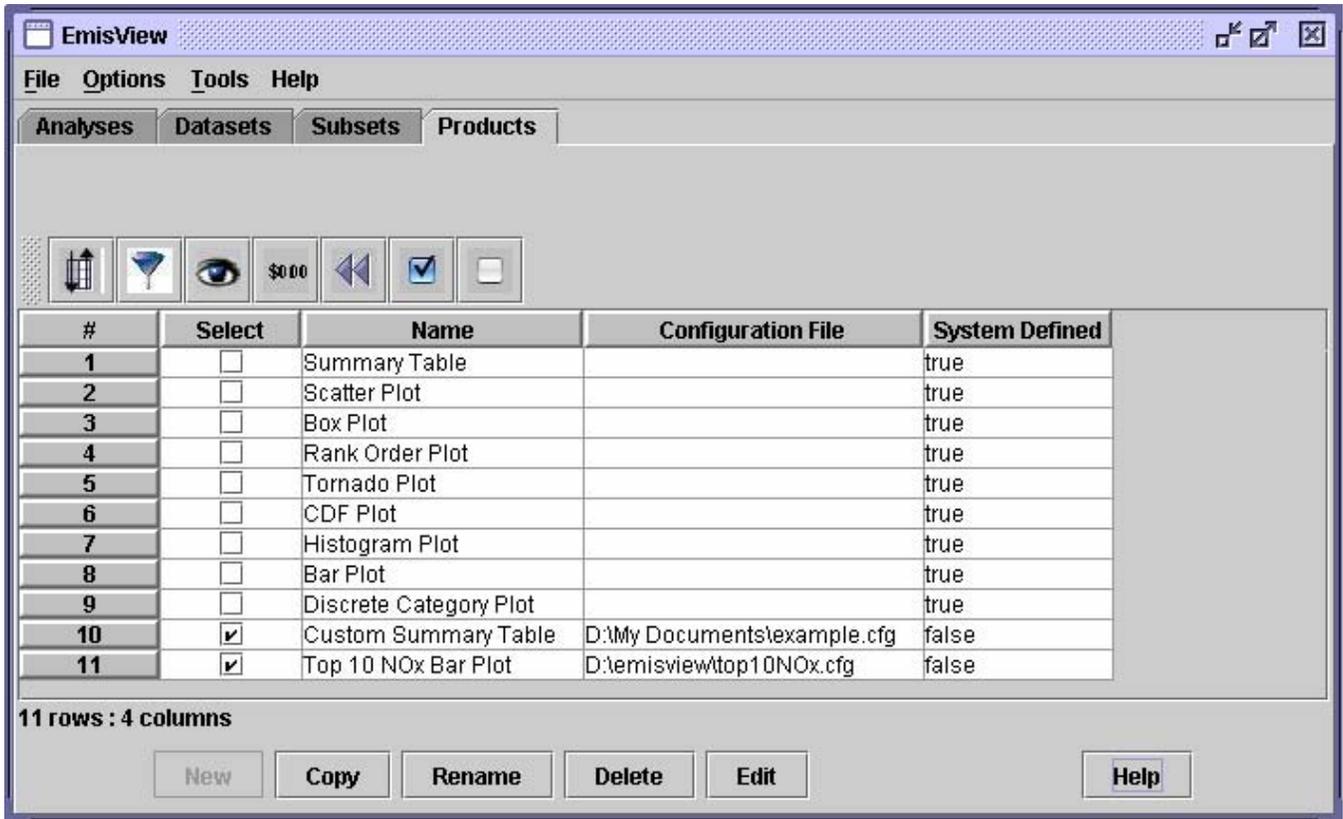
Figure 6. Product Editor

System Architecture

A system architecture provides information on the various components of the system and how they interact with one another. The major system components of EmisView are the Importers, Graphical User Interface, Query Subsystem, Analysis Engine, and the Reference, Analysis, and Emissions Data databases. Figure 7 shows a data flow diagram. Solid arrows indicate that data are flowing in the direction of the arrow from one component to another. Dashed arrows indicate that an action is triggered by the GUI, but only a small amount of data indicating user requests are flowing as part of that communication.

Figure 7. Data Flow Diagram for EmisView
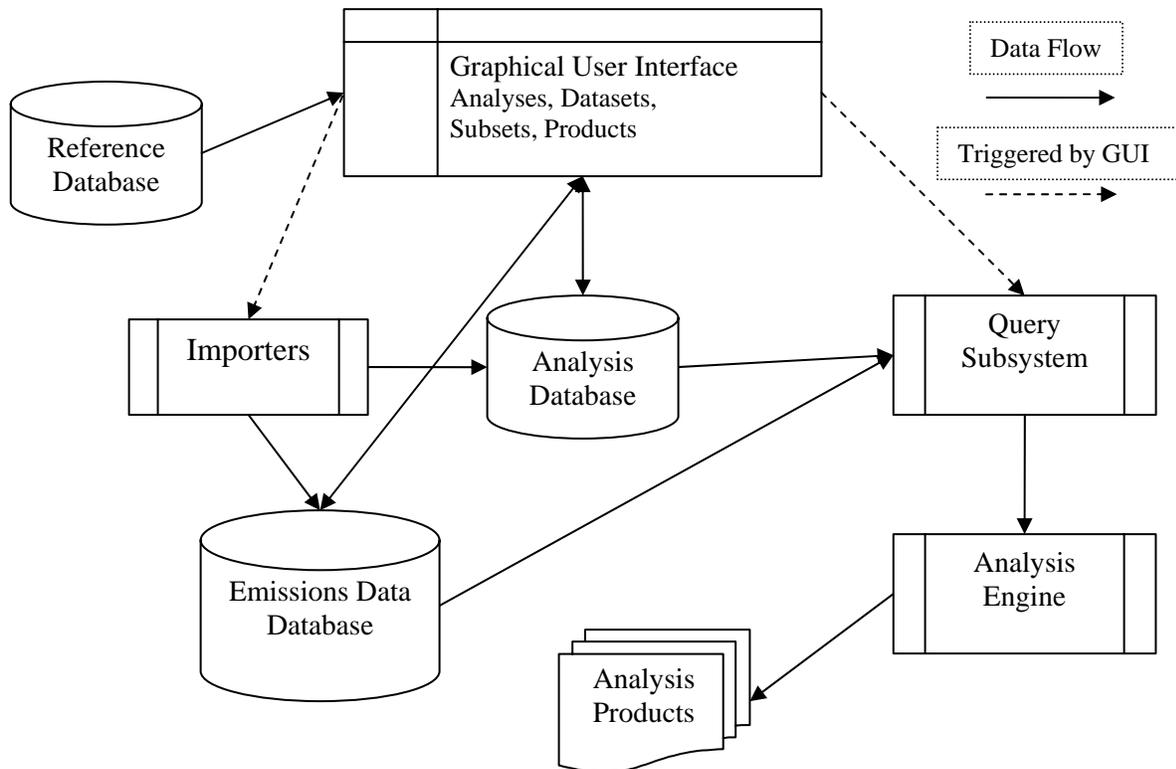
The following bullets provide an overview of the items shown in Figure 7.

- The user interacts with the system through the **Graphical User Interface**. The **GUI** is used to create analyses that specify the datasets to be analyzed, how to subset the data, and the products to create. User preferences and current settings of individual components (e.g., directory/file navigation history) will be preserved (stored and retrieved) between sessions so a user can resume working where she/he left off.

- The **Reference Database** contains lookup tables for codes used by EmisView and their descriptions (e.g., state and county FIPS codes, SCCs), along with a set of predefined analysis templates that will be provided with EmisView as a starting point for users. The Reference Database will be a static read-only database for most users. However, advanced users will be able to modify its contents by issuing SQL commands, and the updated databases might be distributed to less advanced users.

- Data are entered into the system using **Importers**. Importers will be available for NIF3 data in various formats (e.g., ASCII, XML), IDA, ORL, a set of standard tabular ASCII outputs from Smkreport, and for Input/Output Application Programming Interface (I/O API) netCDF files that contain AQM-ready emissions data. Note that Smkreport is a program provided with SMOKE that can output SMOKE intermediate and output data at various levels of aggregation. Importers store emissions data in the **Emissions Data Database,** and also update informational data in the **Analysis Database.**

- The **Emissions Data Database** stores the emissions data that are read in by the **Importers.** This includes emission inventories, intermediate emissions modeling data from CONCEPT or SMOKE, and AQM-ready emissions outputs that are stored within the CONCEPT database. Note that binary AQM-ready emissions files will not be stored in this database.

- Information needed by EmisView is stored in the **Analysis Database**. This includes a list of the available analyses and datasets for a user, along with other bookkeeping information that needs to be stored by EmisView between sessions. Therefore, in contrast to the primarily static **Reference Database**, the **Analysis Database** is quite dynamic – its contents are frequently accessed and modified by the user via the GUI.

- The **Query Subsystem** dynamically builds queries that extract the data of interest from the **Emissions Data Database** and some additional information from the **Analysis Database**. Once the queries have been constructed, they are executed and the resulting tables of data are provided to the **Analysis Engine.** The intermediate results of all queries will be saved and maintained between sessions. Users will be able to delete these results on demand.

- The **Analysis Engine** is an open-source analysis tool that was developed as part of MIMS. The Analysis Engine allows for more refined analysis (e.g., sorting, filtering, plotting) of the data that were extracted from the **Emissions Data Database.**

- **Analysis Products,** such as finished plots and tables, are output from the **Analysis Engine**.

Note that the databases to be used by EmisView at any given time can be specified by choosing the **Set Databases** menu item from the Options menu of the EmisView Main GUI. This will cause a dialog box to appear from which each of the three databases can be specified. Note that the Reference Database should already be available on the user's computer as a result of the EmisView installation, whereas the Analysis and Emissions Data Databases could be existing databases or new ones.

Creating Tables and Plots with the Analysis Engine

The Analysis Engine is an open-source software package for generating tables and plots that was developed, in part, at CEP. It has three main components: the table application, the plotting engine, and the statistics package. The table application displays data as rows and columns. Multiple datasets can be loaded, each onto a separate tab. The table application can sort, filter, and format the data. It accesses the statistics package to compute statistics on the data, and it passes subsets of the data to the plotting engine, which creates many types of plots. The Analysis Engine is provided as part of EPA's MIMS, but does not require any other parts of MIMS (e.g., the Framework) to run and can be used as a stand-alone system. MIMS is distributed via SourceForge from http://mimsfw.sourceforge.net. The MIMS SourceForge web site points to a tutorial for the Analysis Engine. For more information on MIMS, see http://www.epa.gov/asmdnerl/Multimedia/MIMS/.

When an Analysis is executed in EmisView, the query will be executed and the Analysis Engine will be loaded in a preconfigured state as specified by the configuration file selected for the chosen analysis Product. If no configuration file is specified, the table that appears will show the data with no adjustments, directly as they come from the database. After the Analysis Engine is loaded, the user can continue to analyze the data interactively. The Analysis Engine can also be used on its own or from the EmisView Tools menu. It can read many types of ASCII files. For the initial version of EmisView, we expect that each analysis Product will be able to create a single table and multiple associated plots. The Analysis Engine is a Java application that can run on Windows, Macintosh OSX, and Linux and other versions of UNIX. An example of the Analysis Engine table application is shown in Figure 6. Data in a column can be sorted up or down by clicking on the column header.

Figure 6. Analysis Engine Table Application
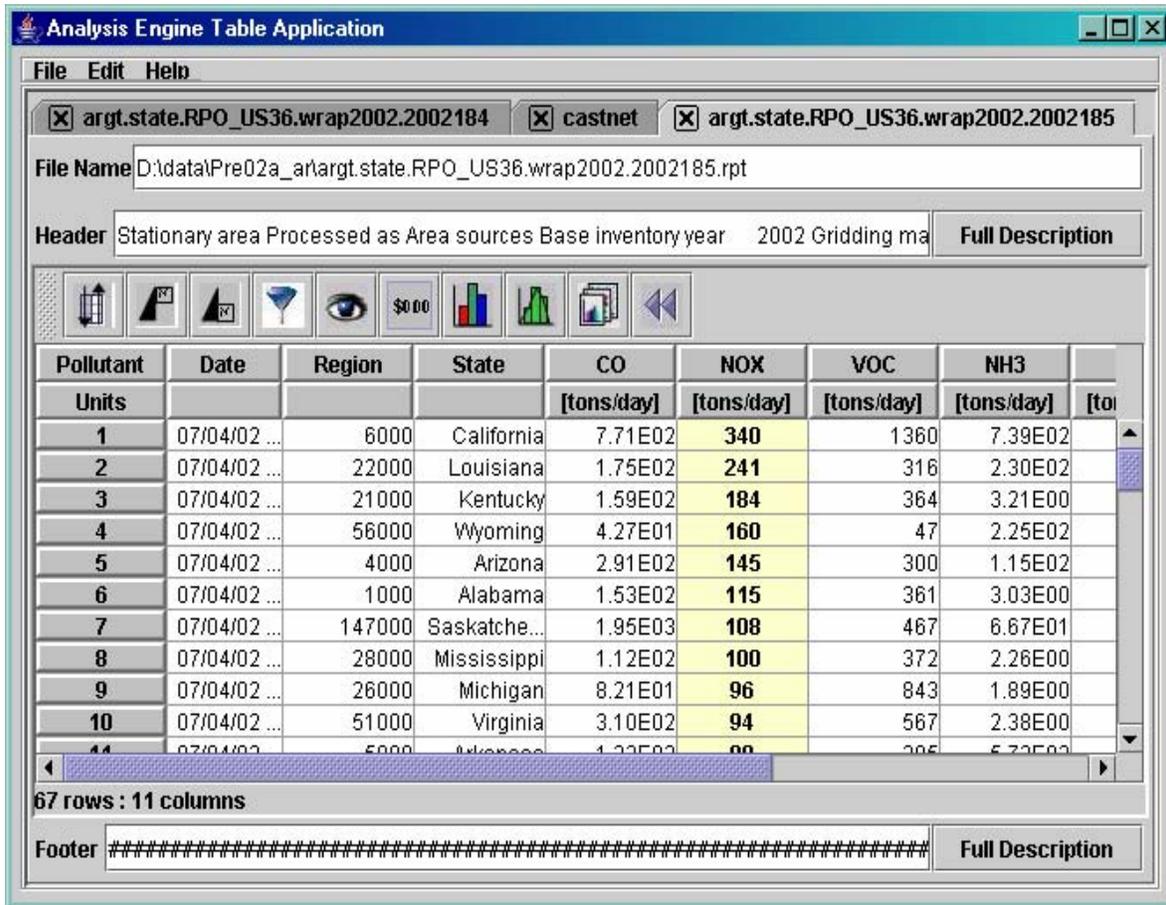
Operations available from the toolbar of the table application include sorting using multiple data columns, showing the top or bottom *N* rows (based on data from a specific column), filtering out rows (based on the data attributes of multiple columns), hiding columns, formatting columns, creating plots, computing statistics (e.g., mean, sum, histogram, percentiles), and viewing the "analysis configuration." The analysis configuration consists of the table configuration and the plots you have created during your session. Configurations can be saved and applied in future sessions, thereby allowing an analysis to be quickly repeated on a new dataset. After the table is made to appear as the user wants it, the contents of the table can be exported to .csv, .arff, and other delimited file formats. Eventually, other formats such as RTF, HTML, and XML may be supported.

The plotting engine consists of a Java interface to the statistical package R (see http://www.r-project.org/). The plot icon on the Analysis Engine toolbar provides users with access to the plotting engine. The following types of plots can be created by the Analysis Engine: bar, box and whisker, cumulative density function (CDF), discrete category, histogram, rank order, XY, scatter, line, time series, regression, and tornado. The plots can be shown on the screen and saved to a variety of formats, including PDF, Postscript, JPEG, PNG, and LaTeX.

Currently, the statistics package computes basic statistics, histograms, and percentiles and it performs correlation and regression analysis. The available basic statistics are minimum, maximum, sum, mean, median, standard deviation, skew, and kurtosis. Note that the Analysis Engine does not currently support the adding of rows or columns using "formulas," and there are some limitations to the plotting engine. The GUI for the plotting engine does not entirely shield the user from some of the obscure terminology used by the R package. Also, the plots that are generated are static images that cannot be interacted with — unlike in some software in which you can click on portions of the plot and

interact directly with them to resize them, type in labels, etc. However, the plot images are of good quality and very customizable.

Initial Version of EmisView

The initial version of EmisView will include a subset of the features that will eventually be included in the software. The initial version focuses on QA of point-, area-, and mobile-source inventories in the NIF3 and IDA formats and will be made available to beta users in May via the project web site, http://sourceforge.net/projects/emisview. Comments on the beta version will be accepted via bug reports and requests for enhancement on the EmisView project page. The initial version will be able to create pollutant summary tables by source, and the following types of plots: bar (including stacked and adjacent), box, CDF, discrete category, histogram, rank order, scatter, time series, and tornado. In this version of EmisView, outputs from Smkreport cannot be treated as EmisView "Datasets," but they *can* be loaded directly into the Analysis Engine, from which sorting, filtering, formatting, plotting, and statistics can be applied.

EmisView will be released under a GNU Public License. The user documentation includes example cases of emissions modeling, a list of QA checks that the software can perform, and explanations of how to use the features of the software. An easy-to-use installation package includes the software, example cases, and documentation. EmisView runs on Windows and Linux and other Unix systems. It will require that Java, R, and a relational database server (e.g., MySQL or PostgreSQL) be available on the computer on which EmisView is installed. EmisView will be tested on Windows using MySQL (see http://www.mysql.com/) and on Linux using PostgreSQL (http://www.postgresql.org/). EmisView may function properly on other Unix platforms, but will not be tested on those platforms.

Addition of Geographic Plotting Capabilities

Basic geographic plotting capabilities will be added to EmisView during the summer of 2005. These will include:

- GIS-based inventory viewing
- Thematic mapping of emissions by county or state
- Emissions density plots
- Overlays of other GIS data along with emissions data
- Maps of spatial surrogates
- Tile plots of gridded data
- Exporting map images to standard image formats

A review of several freely available mapping and visualization tools was conducted. As a result of this review, the Java Unified Mapping Platform (JUMP) has been selected to become the underlying tool for performing mapping within EmisView. JUMP is open source and released under the terms of the GNU Public License, version 2 (see http://www.vividsolutions.com/jump/). The JUMP interactive Workbench already has many of the features we would expect in an emissions geographic data visualization tool. Some of the more relevant features of JUMP are:

- Data (i.e., points, lines, and polygons) from multiple datasets can be viewed as layers on a common map.

- Thematic maps of points, lines, and polygons can be created by placing the shapes into customizable bins based on the values of an attribute (e.g. counties can be colored according to the level of emissions for a particular pollutant) or by using unique colors for each value of an attribute (e.g. each county is plotted using a different color).

- Support for panning and zooming of the map display, probing to get information about the shapes underneath the mouse pointer, and labeling of shapes.

JUMP can also save a configuration of a map to a file, and export map images to PNG and JPEG formats. In addition, it has an Applications Programming Interface (API) that gives full programmatic access to all functions, including I/O, feature-based datasets, visualization, and all spatial operations, thereby making it customizable. It is important to consider performance when choosing a mapping tool. JUMP was tested with a dataset of all 3000+ U.S. counties loaded, along with a dataset containing 20,000 points, and another containing 30,000 line segments. Test results indicated good performance on a modern laptop computer.

Addition of Extended QC Tool Features

The features of the National Emissions Inventory (NEI) Extended QC Tool (see http://www.epa.gov/ttn/chief/nif/index.html) will be integrated into EmisView during the summer of 2005. In addition, these new extended QC tool features and other basic analyses will be made scriptable such that the resulting analysis products can be generated from a script without running the GUI. The following analyses will be made available from EmisView:

- Report on the top N emissions sources by pollutant in an automated fashion.

- Compare two inventories (e.g., from two different years or two versions of the same inventory).

- Report on the pollutants available in an inventory dataset for each SCC.

- Aggregate counties by user-defined Metropolitan Statistical Area (MSA).

- Report on the minimum, maximum, average, standard deviation, and user-specified percentile values of emissions for each pollutant (and optionally each SCC), at the county, state, and national levels. It should be possible to compare these statistics between national/state values or between state/county values.

- Calculate ratios between pollutants at any level of aggregation.

- Calculate per capita emissions by SCC, state/SCC, or county/SCC for non-point-source categories.

- Compare of a list of pollutants and relative emissions magnitudes to total emissions of those pollutants created by an SCC at the facility, county, state or national level.

Release schedule

Table 2 shows the timing of the planned releases and the features that will be included in each.

Table 2. Release Schedule for EmisView

Version 0.9 beta version: May 25, 2005
- NIF3 ASCII and CONCEPT inventory importers for point-, area-, and mobile-source data
- IDA inventory importers for SMOKE inventory data
- NOF importer (similar to NIF3 but with extra fields)
- Example cases for point, area, and mobile sources
- Subsets that support subselection and aggregation
- Projects for organizing Analyses and Datasets
- Products include summary table and nongeographic plots
Version 1.0: September 15, 2005
- ORL inventory importers
- Intermediate data importers for SMOKE and CONCEPT
- UAM/CAMx model-ready emissions data importers
- CMAQ netCDF model-ready emissions importer
- Some comments from initial beta testing period addressed
- Basic geographic analyses
- NEI Extended QC tool analyses
- Enhanced script interface
- Track a source through the entire modeling process

CONCLUSIONS

EmisView will provide a set of functions that have not previously been integrated into a single tool. EmisView will create plots and tables of emissions data in interactive and batch modes. The plots and tables are created from emissions data summed to a specified level of resolution. Users can run analyses after specifying the datasets and subsets to use and the analysis products to create. By September 2005, EmisView will create geographic plots and support the analyses that are currently available in the NEI Extended QC Tool. EmisView will prove to be a useful tool for the emissions modeling community.

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KEYWORDS

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