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USER'S GUIDE FOR THE URBAN AIRSHED MODEL

Volume VI: User's Manual for the Postprocessing System

EPA-450/4-90-007F

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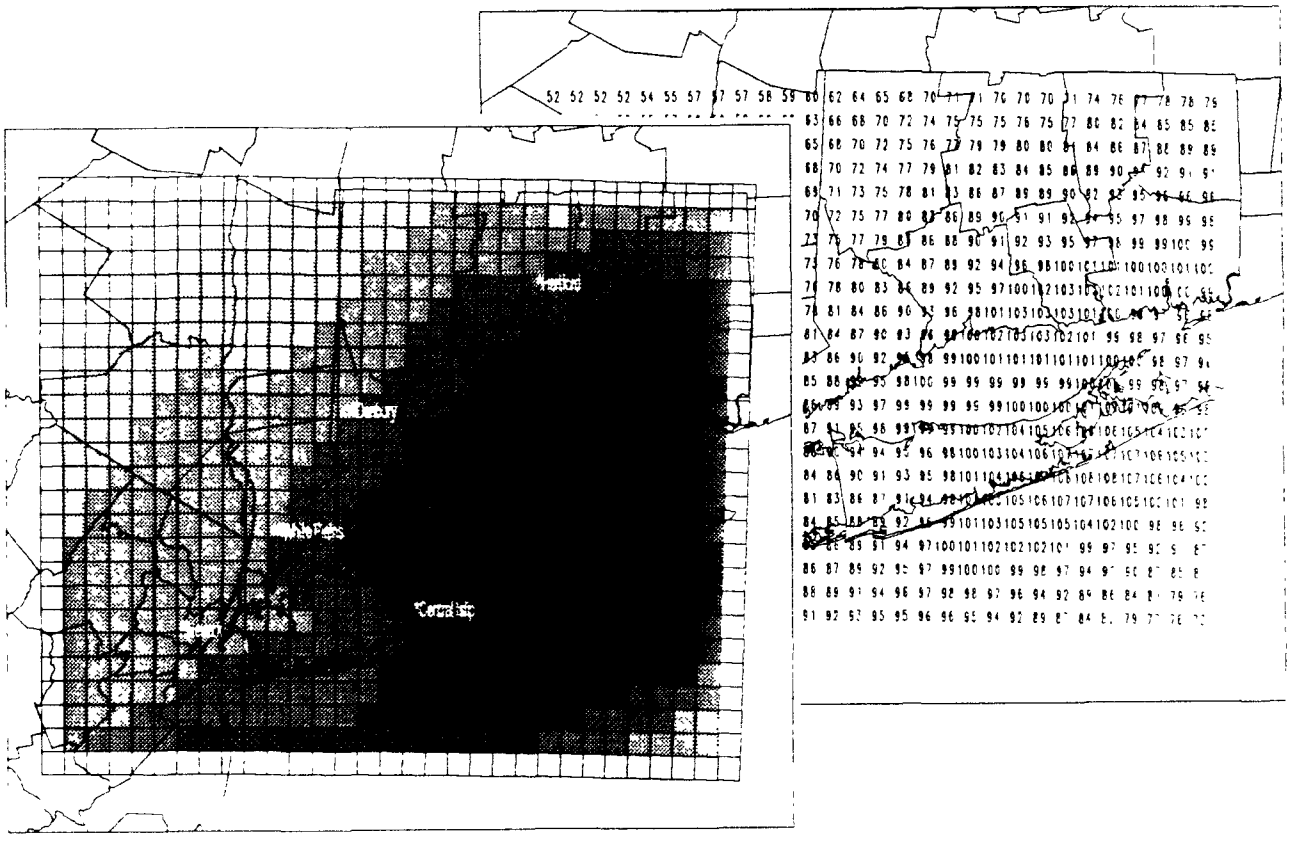

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NOTICE

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PREFACE

This user's guide for the Urban Airshed Model (UAM) is divided into six volumes as follows:

Volume I--User's Manual for UAM(CB-IV)
Volume II--User's Manual for the UAM(CB-IV) Modeling System (Preprocessors)
Volume III--User's Manual for the Diagnostic Wind Model
Volume IV--User's Manual for the Emissions Processor System
Volume V--Description and Operation of the ROM-UAM Interface Program System
Volume VI--User's Manual for the Postprocessing System

Volume I provides historical background on the model and describes in general the scientific basis for the model. For those users that already possess a UAM modeling database or have prepared inputs without the use of the standard UAM preprocessors, this volume should serve as a self-sufficient guide to running the model.

Volume II describes the file formats and software for each of the standard UAM preprocessors that are part of the UAM modeling system. Included in this volume is an example problem that illustrates how inputs were created from measurement data for an application of the UAM in Atlanta.

Volume III is the user's manual for the Diagnostic Wind Model (DWM). This model is a stand-alone interpolative wind model that uses surface- and upper-level wind observations at selected sites within the modeling domain of interest to provide hourly, gridded, three-dimensional estimates of winds using objective techniques. It provides one means of formulating wind fields to the UAM.

Volume IV describes in detail the Emissions Processor System (EPS). This software package is used to process anthropogenic area and point source emissions for the UAM. An appendix to this volume describes the Biogenic Emissions Inventory System (BEIS), which can be used to generate gridded, speciated biogenic emissions. Software for merging the anthropogenic area, mobile, and biogenic emissions files into UAM input format is also described in this volume.

Volume V describes the ROM-UAM interface program system, a software package that can be used to generate UAM input files from inputs and outputs provided by the EPA Regional Oxidant Model (ROM).

Volume VI is the user's manual for the Postprocessing System (PPS). The UAM Postprocessing System (UAMPPS) is a data display and analysis tool for evaluating emission control strategies. After executing the UAM system, the results from one or more model runs may be graphically compared. The UAMPPS creates time-series plots, tile maps, bar charts, box plots, scatter plots, and quantile plots. Through a series of menus, the user has a wide range of flexibility in scaling and labelling the graphs.

ACKNOWLEDGMENTS

This manual (Volume VI) and the software it describes were written and developed for the U.S. Environmental Protection Agency by the following individuals of Computer Sciences Corporation: Art Alexander, Vincent DelGobbo, Beverly Goodrich, and Christine Maxwell.

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SECTION 1

INTRODUCTION

The Urban Airshed Model Postprocessing System (UAMPPS) User's Guide is provided as an aid for those interested in using the system for policy analysis and model control strategy evaluation. This user's guide is designed to provide assistance on how to effectively navigate through the menu system and how to respond to the menus. Although some file-format information is provided for the more sophisticated user, there is no other programming or system-level information in this document.

The UAMPPS is an interactive screen-driven system that provides the user with a variety of visual tools for evaluation and analysis of Urban Airshed Model (UAM) predictions. Specific UAMPPS features are discussed in more detail in later sections of this user's guide. The UAM is a three-dimensional Eulerian model which simulates chemical and physical processes that take place in the atmosphere and provides information on concentrations of reactive and inert air pollutants. The model is intended for simulation of dynamics within relatively local urban environments, compared with other models that are intended for more regional or global extents. The model provides support for development of emission control strategies, estimation of air quality in areas for which data are unavailable, and planning for control of air pollution episodes.

The UAMPPS operates on the U.S. Environmental Protection Agency (EPA) National Computer Center (NCC) IBM mainframe under MVS/XA with Time Sharing Option (TSO). Limited CLISTs and TSO-specific commands are used, but should be of little concern to the user. The current version of the UAMPPS operates in a SAS Version 6.06 environment utilizing the SAS/AF software to drive base SAS and SAS/GRAPH software.

The user's guide is organized as follows: Section 2, Overview, provides a description of the organization and capabilities of the UAMPPS. Section 3, Navigating Through the UAMPPS, provides a guide to using the UAMPPS. Section 4, Screen Reference, provides a description of the user-interface, including a description of <u>each</u> screen. The screen descriptions are provided in the order that they are presented. In addition to the descriptions, example responses have been provided. By presenting the screen

descriptions in this fashion, Section 4 also serves as a tutorial for using the system. Section 5, System Input, provides an overview of the nature of the UAM output which serve as input to the system. Finally, Section 6, System Output, describes the various output products from the UAMPPS.

SECTION 2

OVERVIEW

The ability to utilize a model is only as effective as the techniques available for interpreting the model results. Model output is commonly analyzed from one of three perspectives; change over time, comparison between specific (or groups of) observations, or interpretation of the collective (entire domain) results. To aid in the interpretation of model output, graphics are frequently used to visualize relationships from each of these perspectives. In fact, it is often easier to express a relationship in terms of how it might appear on a chart or map than it is to determine exactly the right quantitative question to be asked. For this reason, the UAMPPS has been designed to assist the scientist or analyst in interpreting model results by providing an interactive application for building graphics. The graphic tools provided in the UAMPPS were selected based on the EPA Office of Air Quality Planning and Standards' (OAQPS) experience with the Regional Oxidant Model (ROM) and informal polls of the potential user community.

The UAMPPS consists of two modules, which provide capabilities for data extraction and graphics creation. The data extraction module provides the capability to organize UAM predicted data, based on species and level. The graphics module provides the user with tools to create a variety of graphics from the extracted data. Both of these modules are discussed in greater detail below.

2.1 DATA EXTRACTION

A large volume of information is generated from a single execution of the UAM. All 24 species, a variable number of levels, hourly concentrations, and descriptive information about the model run are contained in one file. Processing this file each time a graphic is created would result in lengthy work sessions with large amounts of idle time spent waiting for the entire model file to be scanned for the requested data for each graphic. Also, time-sharing and connect-time resource costs might be prohibitive to producing the number and types of analyses required.

2. OVERVIEW

The Extract module of the UAMPPS provides the capability for subsetting the model results based on species and level. In addition, the extraction process transforms the data from a gridded binary format to either a SAS-formatted data file used in the UAMPPS or a generic text file that can be imported into other graphics packages. The resulting files are named according to species, level, control strategy, and date, and thus provide a default method of organizing commonly used data.

2.2 GRAPHICS CREATION

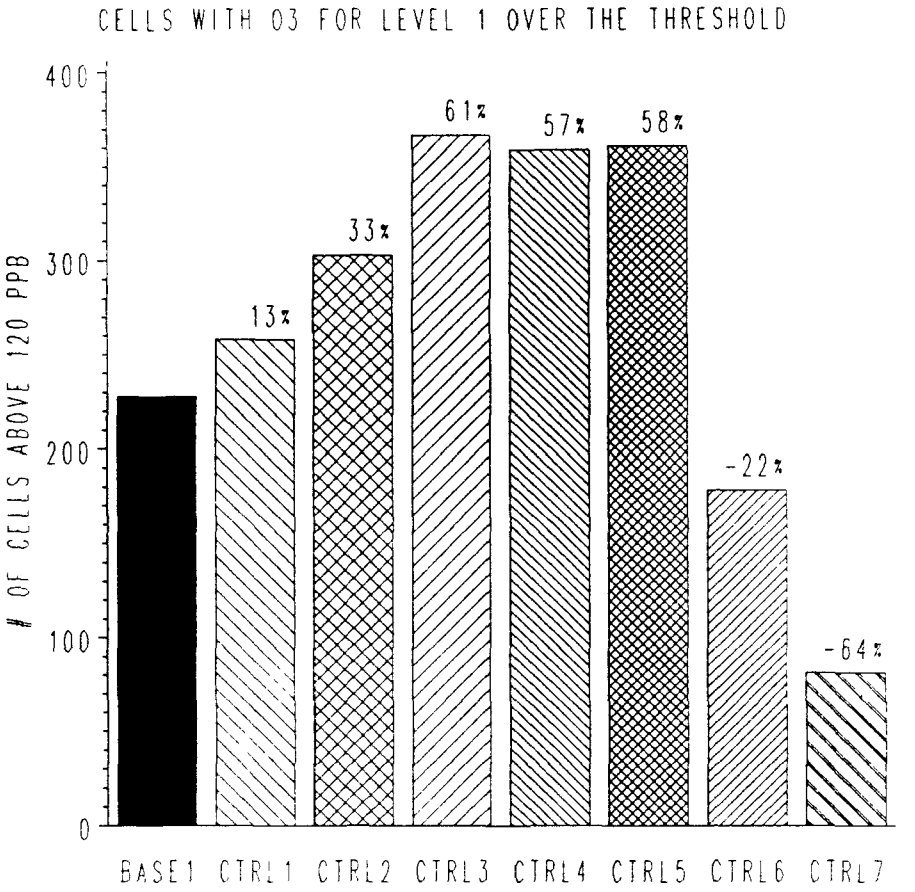
The main goal of the UAMPPS is to provide a tool for creating graphics to assist in model analysis and policy decision support. The Graphics module provides a variety of statistical, temporal, and spatial graphics to achieve this goal. Table 2-1 below includes a list of graphics supported by the UAMPPS.

TABLE 2-1. GRAPHICS SUPPORTED BY THE UAMPPS

Statistical	Bar charts Box plots Scatter plots Quantile plots
Temporal	Shaded temporal plots (two-line time series) Temporal line plots (multiline time-series)
Spatial	Shaded tile maps Gridded value maps

Statistical graphics, which usually portray information outside the context of time or location, are very useful for immediate quantitative comparisons of observations. Temporal graphics provide a technique for portraying change in model results over time. Spatial graphics ignore the temporal aspect of the data but provide information on locational relationships. The following pages illustrate examples of the supported graphics, along with the types of information that may be displayed with each type of graphic.

Graphics created by the UAMPPS may be viewed on a graphics terminal as they are created and optionally saved in a SAS graphics library. This feature is useful for creating hard-copy output and for composing graphics with multiple plots on a single page. Section 6.2 discusses graphics libraries in more detail.

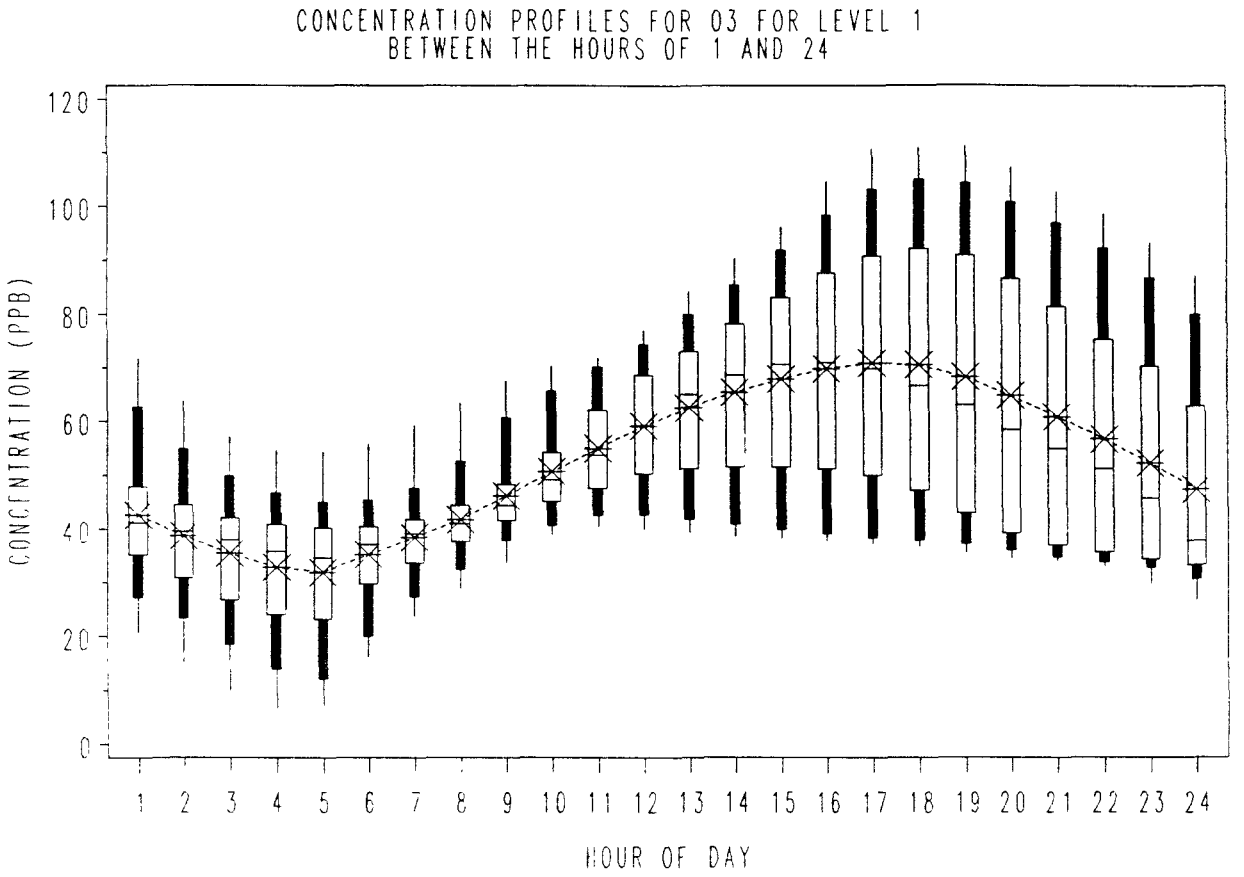


Example bar chart.

Bar charts provide a quick look at how several control strategies (up to 10) compare with each other. The height of the bars is proportional to the value of the theme.

Themes:

- Number of grid cells with concentrations above given threshold between given start and stop times
- Average concentration for a given hour for the domain
- Maximum concentration for a given hour for the domain

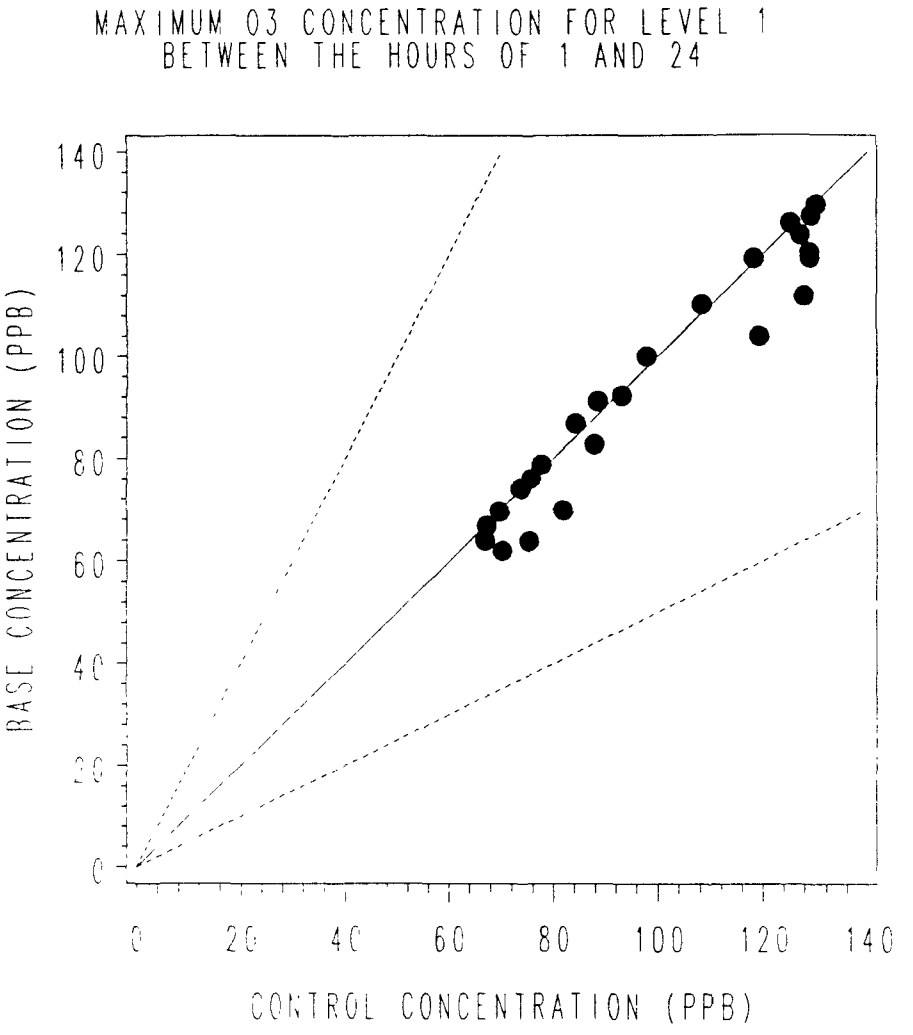


Example box plot.

The box plot provides information about the spread in the concentration values at each hour for a range of hours. The range, median, and average as well as percentile information is provided for each hour.

Themes:

- Concentration percentiles for each hour between a given start and stop time across all grid cells

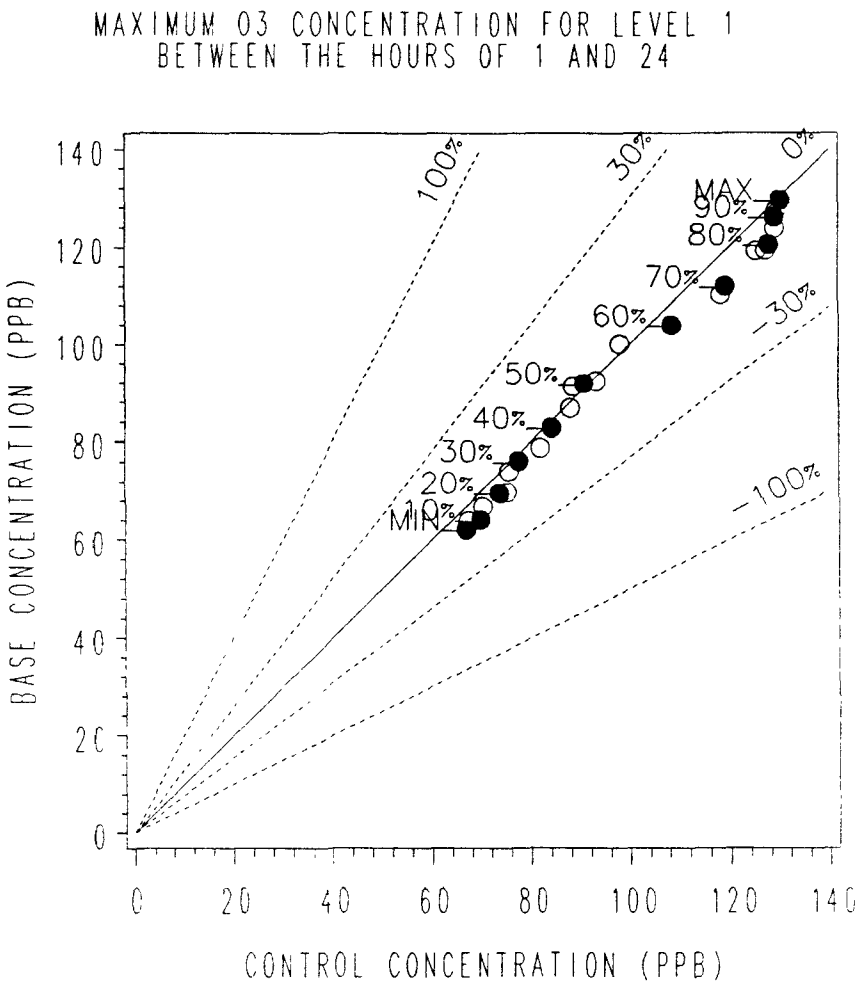


Example scatter plot.

The scatter plot provides a comparison of two control strategies with paired data. A single point references a given hour or grid cell for both strategies. The position of the point in relation to the two axes compares the concentration values of each strategy at a given hour or grid cell.

Themes:

- Maximum concentrations over all grid cells at each hour
- Maximum concentrations over all hours at each grid cell

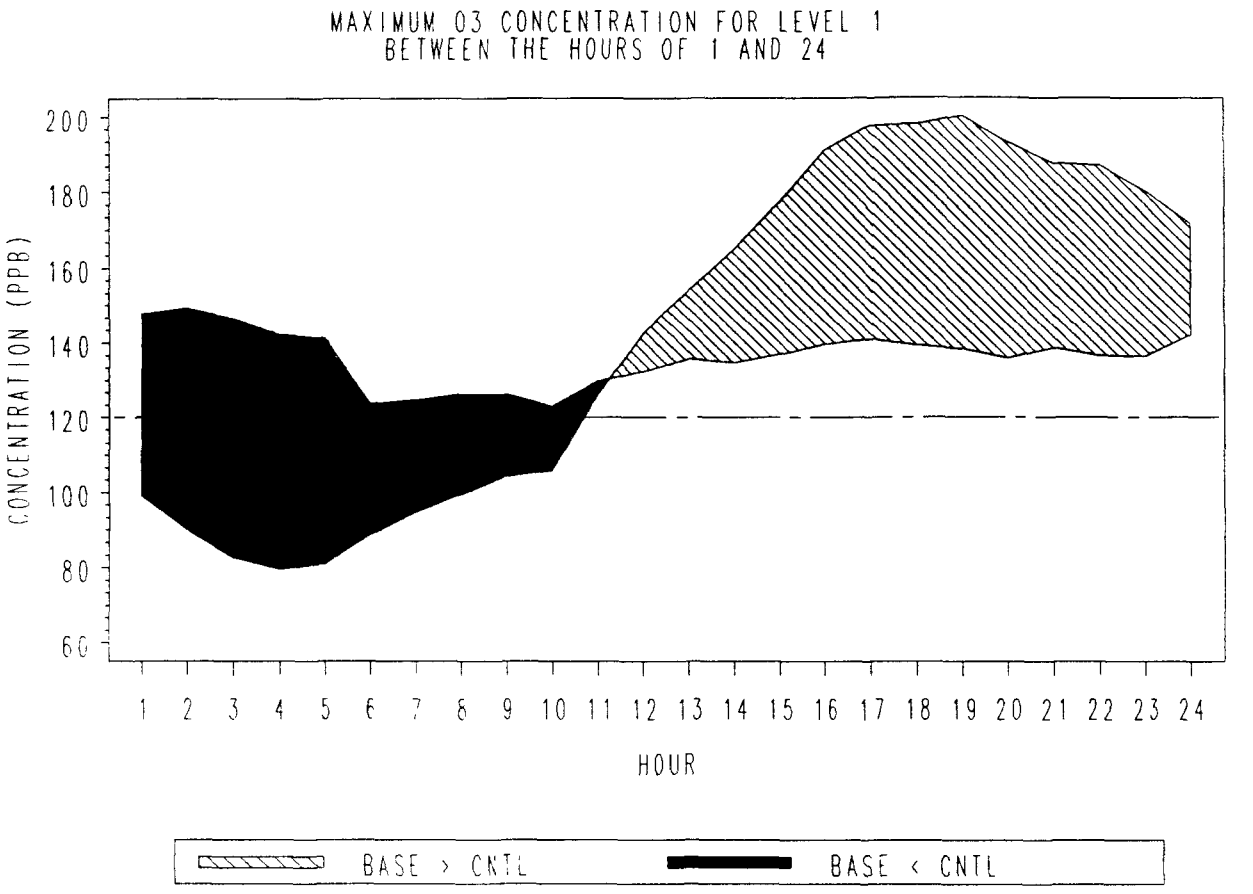


Example quantile plot.

The quantile plot, which also provides a comparison of two control strategies, is a scatter plot with deciles annotated. The data for each control strategy are independently rank ordered--from highest to lowest values. Minimum, maximum, and decile values are annotated as filled circles; intermediate values are plotted as empty circles.

Themes:

- Maximum concentrations over all grid cells at each hour
- Maximum concentrations over all hours at each grid cell

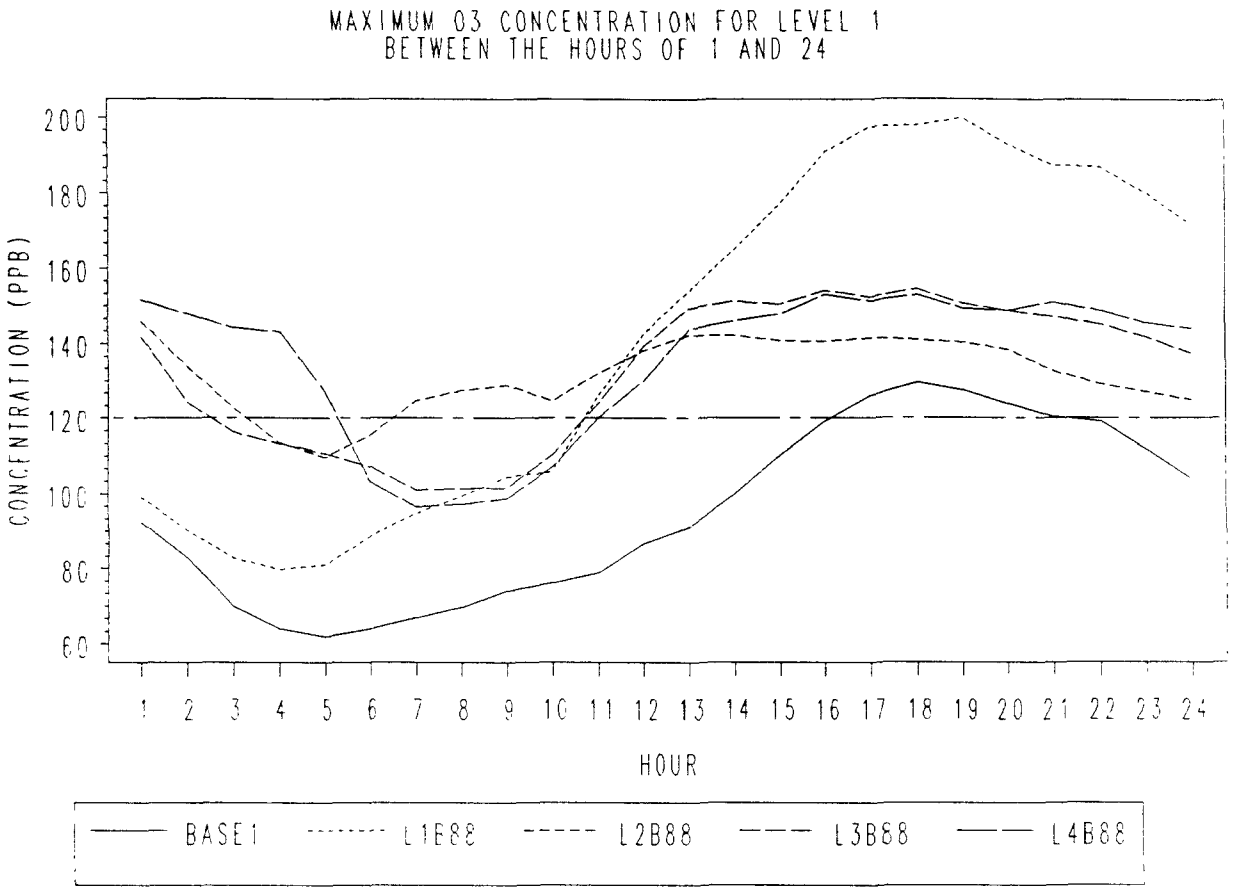


Example shaded temporal plot.

The shaded temporal plot is used to accentuate the difference between two time-series plots--highlighting with color or pattern, the areas where the plots are different. Usually, these plots consist of one dominant line and one subordinate line; highlighting is then used to indicated where the subordinate line is greater or less than the dominant line.

Themes:

- Domain maximum or average concentration for each hour of a given range of hours

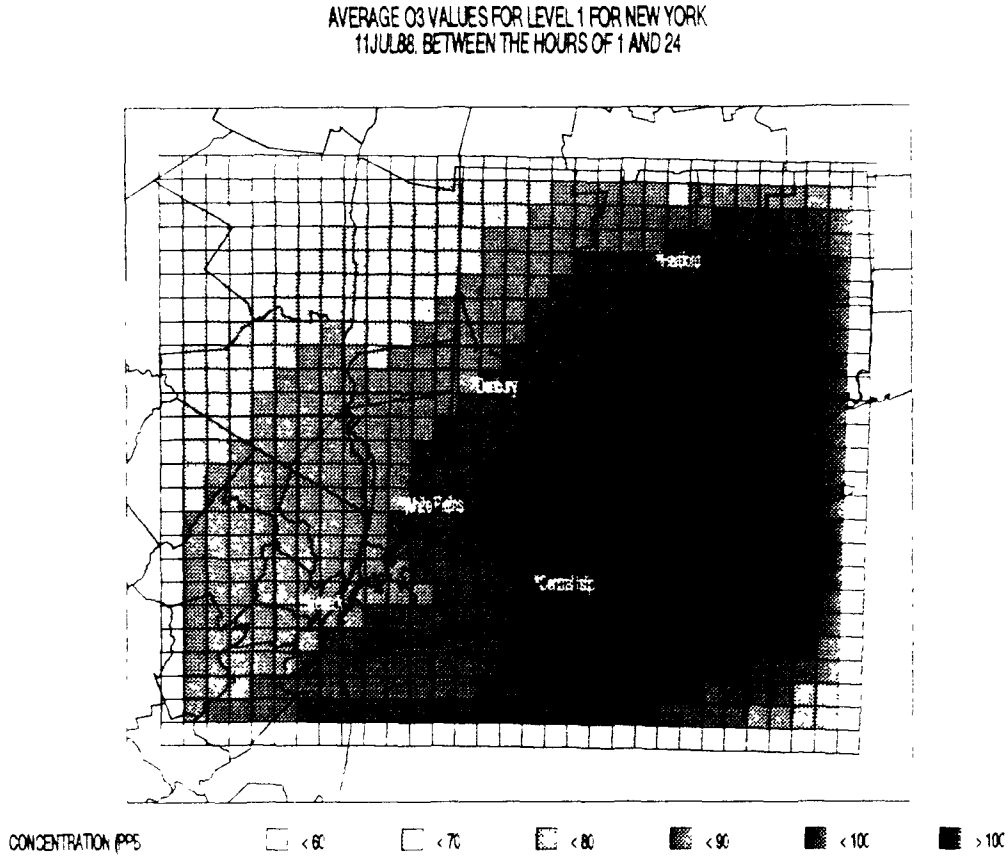


Example temporal line plot.

The temporal line plot is used to accentuate the differences between time-series plots (for up to 10 time-series plots). The temporal line plot allows comparisons of a variety of control strategies simultaneously. Lines may be displayed in different colors or in different line patterns.

Themes:

- Domain maximum or average concentration for each hour of a given range of hours

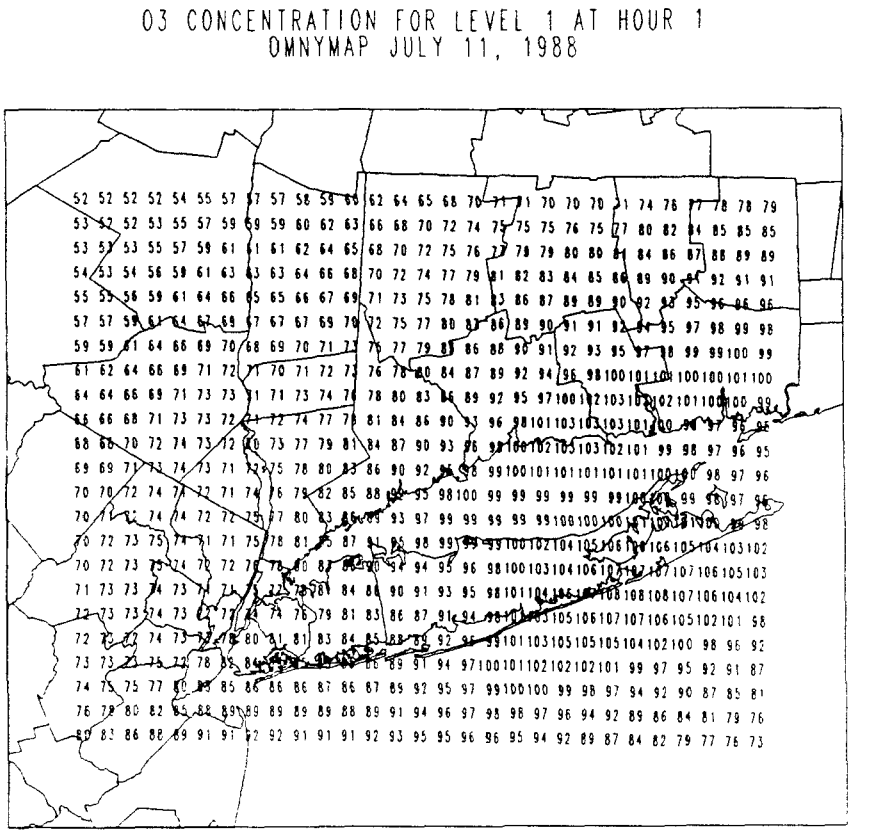


Example shaded tile map.

Shaded tile maps are choropleth maps; the grid cells of the model are the symbolized areas. Colors or patterns are assigned to ranges of values (class breaks), usually corresponding to an ascending or descending continuous scale. With the appropriate choice of color or pattern, spatial relationships in the data are readily apparent. Actual cell values are not shown, however this type of graphic is more useful for a qualitative interpretation of the data. Note that because the choice of class breaks is made by the author of the graphic, subjectivity can be introduced.

Themes:

- Concentrations for all grid cells for a given hour
- Concentrations for all grid cells averaged over a range of hours
- Maximum hourly concentration for a given range of hours for each grid cell
- Hour of occurrence of maximum concentration for a given range of hours for each grid cell
- Concentration differences for all grid cells for a given hour for two extracted files
- Concentration percent differences for all grid cells for a given hour for two extracted files
- Maximum concentration differences for all grid cells for a given hour for two extracted files



Example gridded value map.

Gridded value maps place the actual grid cell value at the appropriate geographic location on the graphic. This allows actual model output to be quickly referenced against a background of political or enumeration boundaries. Because the value is shown in each grid cell, the interpretation of the model output is left to the viewer, rather than the author.

A variation of the gridded value map is the color gridded tile map in which the values are actually plotted in color as they are displayed on the screen or plotted to a hard-copy device. In addition to retaining the information of the value, class breaks and colors may be chosen to help illustrate general trends. This type of graphic might be especially appropriate for audiences of mixed technical expertise.

Themes:

- Concentrations for all grid cells for a given hour
- Concentrations for all grid cells averaged over a range of hours
- Maximum hourly concentration for a given range of hours for each grid cell
- Hour of occurrence of maximum concentration for a given range of hours for each grid cell
- Concentration differences for all grid cells for a given hour for two extracted files
- Concentration percent differences for all grid cells for a given hour for two extracted files
- Maximum concentration differences for all grid cells for a given hour for two extracted files

SECTION 3

NAVIGATING THROUGH THE UAMPPS

This section provides an overview of how to use the UAMPPS. Basic information on starting the system and on the menu sequence is covered. In addition, a discussion of common screen features is presented.

3.1 STARTING THE SYSTEM

The system is started by executing the UAMPPS CLIST from the TSO prompt. Type "UAMPPS" at the TSO prompt and press [Enter]. There will be a short pause while the UAMPPS main menu is loaded. From the main menu, you can enter the Extract module, enter the Graphics module, go directly to the graphics catalog, access on-line help, or exit to TSO. Simply tab the cursor to the desired position option and press [Enter].

3.2 EXTRACT MODULE

Figure 3-1 illustrates the order in which the screens of the Extract module will be presented to you. These screens are always presented in the same order and are accessed sequentially. At any time within the Extract module, you may press [PF3/PF15] to move to the previous screen or press [PF4/PF16] to jump to the main menu.

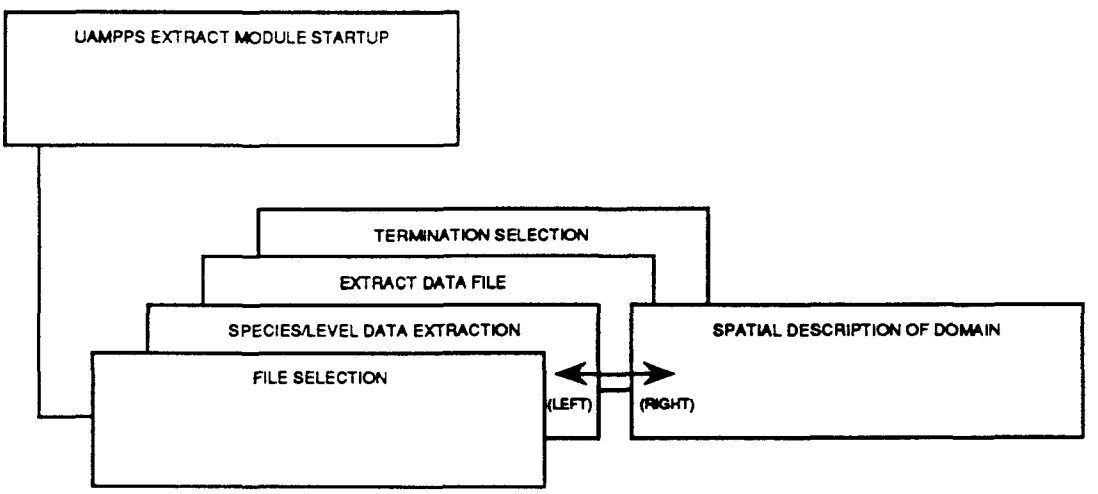


Figure 3-1. Extract module menu sequence.

3. NAVIGATING

After an extraction has been completed, you will be presented with the Termination Selection Screen, where you can choose to exit the Extract module or perform another extraction. Exiting the Extract module will return you to the UAMPPS main menu.

3.3 GRAPHICS MODULE

The sequence in which the screens of the Graphics module are presented is shown in Figure 3-2. The screens that you will see are based on your selection of graphic type on the Graphic Selection Screen.

Choosing "1" will display the screens associated with the generation of statistical graphics; selecting "2" or "3" causes the temporal and spatial graphics generation screens to be presented, respectively. At any time within the Graphics module, you may press [PF3/PF15] to move to the previous screen or press [PF4/PF16] to jump to the main menu.

After a graphic has been generated, you will be presented with the Termination Selection Screen, where you can choose to return to the main menu, save the graphic, or generate another graphic. From the main menu, you may exit the system and return to the TSO prompt by placing the cursor on the exit block and pressing [Enter]. If at any time you wish to exit the Graphics module, press [PF4/PF16] to return to the main menu.

If you choose to save the graphic that you generated, the Graphics Catalog Generation Screen will be displayed. The only time this screen will be displayed is when you select the option on the Termination Selection Screen to save the graphic. After filling out the requested information, the graphic is saved and the Termination Selection Screen is redisplayed.

3.4 INTERACTING WITH SCREENS

The information presented in this subsection is generic across all or most screens. There may be some departures from this description depending on the type of terminal available.

3.4.1 Using Menus

Each menu that appears on your terminal screen prompts you for certain information. Press [Tab] to move the cursor to the data entry fields. After you have supplied the requested information, press [Enter] to process the panel. If a screen consists of more than one page, you can use [PF20] and [PF19] to move forward and backward between the screens. The menu program checks the information that you have entered for errors and inconsistencies and reports any problems it finds. Correct any problems and again press [Enter] and the next menu will appear.

To override any defaults, type over the field and eliminate any extraneous characters by using either the [Space bar] or the [Erase EOF] or [DEL] keys.

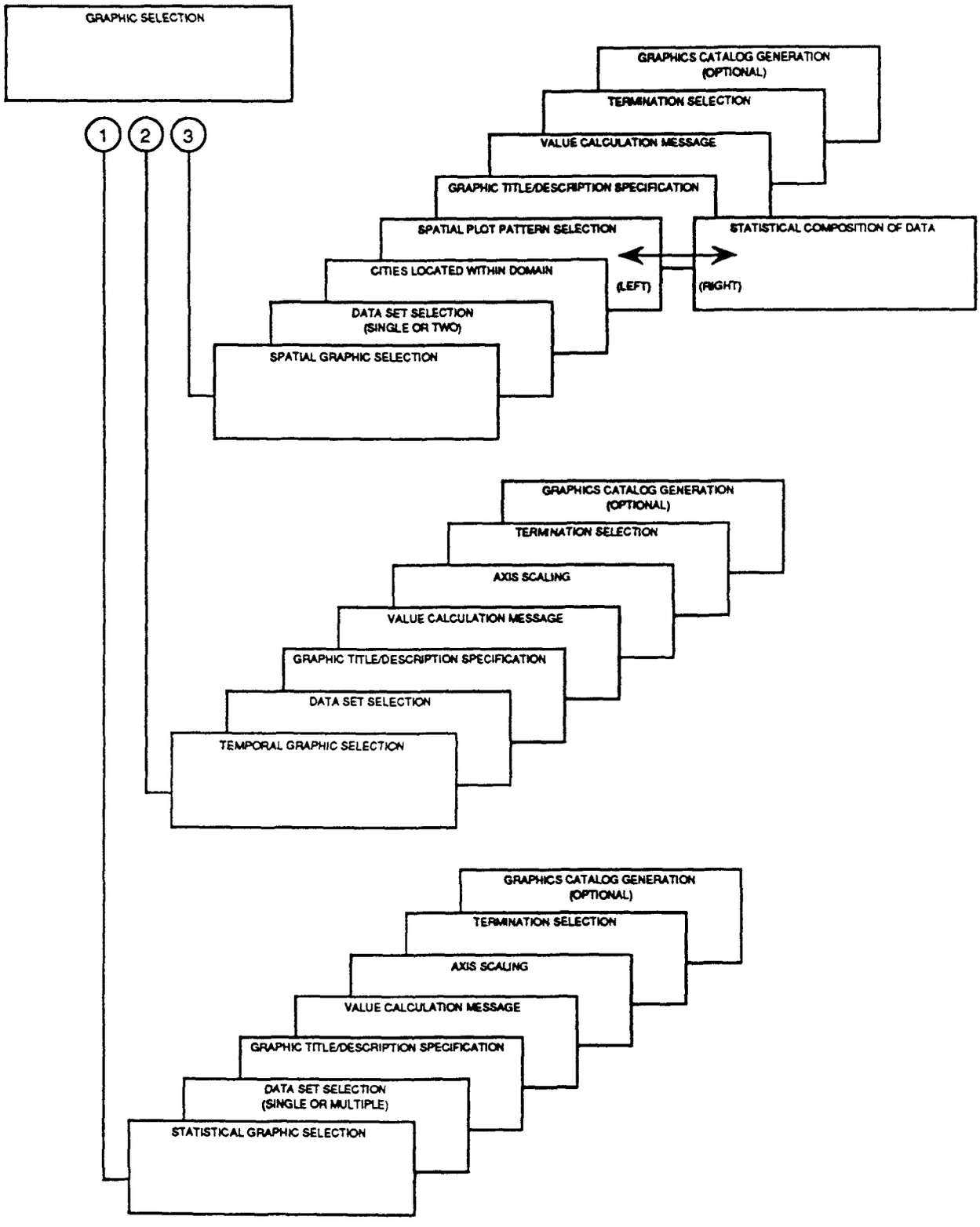


Figure 3-2. Graphics module menu sequence.

3.4.2 Colors on Input Screens

If you are using a terminal that supports IBM color graphics, you may notice that different types of information are displayed on the screens in different colors.

- The text describing a given field is displayed in cyan.
- If the field is protected (i.e., it is not intended to be updated but is merely designed to supply information to you), the color of the field will be pink.
- Fields that require a response from you are displayed in green.
- System error or informational messages are displayed in red.
- If invalid data is input to a field and the program detects the error, the field will be displayed in red and reverse video.

If a monochrome terminal is used, no colors will be observed. However, if an error is detected, the terminal will most likely display the field in reverse video.

3.4.3 PF Keys

Table 3-1 lists the standard PF-key functions. The CANCEL function--[PF3] or [PF15], denoted herein as [PF3/PF15]--is available on every menu. It lets you return to a previous menu or exit from the UAMPPS without producing a graph. The ABORT function--[PF4] or [PF16], denoted as [PF4/PF16]--is available on every menu except the main menu. It is a quick way to abandon a graphics request and return to the UAMPPS main menu. The scroll functions (BACKWARD, FORWARD) are meaningful only on menus displaying an item list that does not completely fit on one screen.

TABLE 3-1. PF-KEY FUNCTIONS FOR UAMPPS MENUS

PF Key	Command	Assigned Function
PF1 or PF13[a]	HELP	Provides context-sensitive information on how to proceed or indicates what information is required.
PF3 or PF15[a]	CANCEL	Terminates the current menu without taking any action and return to the previous menu.
PF4 or PF16[a]	ABORT	Terminates the current menu without taking any action and returns to the UAMPPS main menu.
PF7 or PF19[b]	BACKWARD	Scrolls toward the beginning of a list of items.
PF8 or PF20[b]	FORWARD	Scrolls toward the end of a list of items.

a These PF Keys are available on all menus except the main menu.
b These PF Keys are available on menus that contain a list that is too long to fit on one screen.

3.4.4 Error Messages

All UAMPPS menus have error windows that will notify you if something is wrong. After a menu program detects a field error, a window will open with a message after you press [Enter]. In addition to the error message relating to a particular screen field, the message window will instruct you to press [PF15] to continue. After you have read the message and have pressed [PF15], the window will close and the field that is in error will be highlighted (red on color terminals) to make it stand out. The cursor will be placed on the appropriate field for easy data correction.

3.4.5 Error Correction

Fill-in-the-blank fields associated with an error are highlighted (red on color terminals). If there are multiple errors, the error message describes only the first one and the cursor is positioned on that field. You should change that field to eliminate the error. If you determine that there are other fields in error, it is most efficient to change them also, before you press [Enter]. If you are not sure whether or not more fields are in error, correct the field for which the error message applies and press [Enter]. If there is an additional error, an error message applicable to the next highlighted field will then appear, and you can correct it. In some instances, an error condition involves two or more fields and you may need to decide which of them is the "culprit" (i.e., the one causing the error).

3.4.6 Selection Fields and Selection Lists

Some menus display a table of values for you to choose from. Press [Tab] to move the cursor from one selection field to the next. Enter an "S" in any field that you want to select. The list of values may be more than one screen long. If so, scroll down the list by pressing [PF20] or up the list by pressing [PF19]. If you wish to change a selection, simply press [Space bar] or [Del] to remove the "S" from a field. After you are finished selecting items from the list, press [PF3/PF15] to move to the next menu.

Some menus contain fields that are linked to a list of valid values from which one value may be chosen for that field. Whenever these "Selection Lists" are available for a field, the menu will inform you of the list's existence and instruct you to enter a "?" in the field and press [Enter] to display the list. A list window will open on top of the current menu and the cursor will be placed on the first item in the list. Press [Tab] to move down the visible list; press [PF19] or [PF20] to scroll up or down a list that is longer than one window. Press [Enter] to close the list window and transfer the list value that is under the cursor to the related screen field. Once the list value is transferred to the related screen field, it may be necessary to press [Enter] once more to process the menu selections and move on to the next menu in the sequence.

3.4.7 Protected Fields

Sections of the screen (skipped over when you press [Tab]) are protected; you cannot alter them. If you move the cursor with cursor-movement keys to a protected area on the screen and attempt to enter data, the terminal keyboard locks and you must press [Reset] to regain use of it. Menu titles, instructions, and "white space" are examples of protected areas. Sometimes an area of a menu that looks like a fill-in-the-blank field with an initial value is instead a protected field. If the menu program determines that only one value is valid for the field, the computer "fills in" that value for you and makes the field protected. If you can tab the cursor to a field, it has an initial value that can be changed. If you cannot tab to it, the field is protected.

3.4.8 Scrolling

Some menus have a list of items to choose from. If the entire list does not fit on the screen, you can scroll to see more items. Imagine that part of the menu is a window through which you see the list of items. Scrolling forward is like sliding the window down, toward the end of the list. Scrolling backward is like sliding the window up, toward the beginning of the list. The window scrolls by the number of lines visible, until it reaches the end or beginning of the list. If the beginning of a list is displayed, scrolling backward has no effect; if the end of the list is displayed, scrolling forward has no effect. The message "end of file" or "at bottom" or "at top" may appear in the message area, however.

3.4.9 Field Values Saved and Recalled

The first time you use a menu, the fields in which you can enter values are blank or they have default values chosen by the menu program. Underlines indicate the locations and sizes of blank fields. When you leave a particular menu, the UAMPPS saves the values of all fill-in-the-blank fields, but not the selections you make from a scrollable list. The next time you use the same menu, the values you entered (or the defaults you accepted) are displayed as the initial values. If you want to use the same values again, you do not have to reenter them. To override any defaults, type over the field and eliminate any extraneous characters by using either the [Space bar] or the [Erase EOF] or [DEL] keys.

3.4.10 On-line Help

On-line help is available from most screen fields. To access on-line help, simply place the cursor on the field for which help is desired and press [PF1/PF13]. A window with an explanation and additional information on the field will open on top of the menu. The help window may be one screen or multiple screens, depending on the field and the complexity of the related information. From the help window, press [PF3/PF15] to return to the application screen and continue your data entry.

SECTION 4

SCREEN REFERENCE

This section provides an in depth explanation of all fields displayed on each screen of the UAMPPS. Presented below is the main menu screen:

```
URBAN AIRSHED MODEL

                    MAIN MENU

        EXTRACT        GRAPHICS        GRAPHICS CATLG

                HELP            EXIT

        Place cursor on your selection and press the enter key.
```

From the main menu screen, you can enter the Extract module, enter the Graphics module, go directly to a previously defined graphics catalog, access on-line help, or exit the UAMPPS system to TSO. Simply tab the cursor to the desired position and press [Enter].

You can return to this menu from any other UAMPPS menu by pressing [PF4] or [PF16].

4. SCREEN

Table 4-1 provides an overview of the sequence in which the screens are displayed for the Extract and Graphics modules. To preserve continuity, all screens pertaining to an extraction or a given type of graphic are presented consecutively, just as you would view them if you were running the actual system.

For example, if you are creating a temporal line plot, you would see the following screens:

- Temporal Graphic Selection,
- Temporal Line Chart Data Selection,
- Graphic Title/Description Specification,
- Value Calculation Message,
- Axis Scaling, and
- Termination Selection.

Because the Graphic Title/Description Specification, the Value Calculation Message, and the Termination Selection screens appear in the Statistical, Temporal, and Spatial graphics subprograms, they have been included in each subsection. Although this may appear to be redundant, it serves the purpose of preserving continuity.

In addition, responses are provided on the sample screens to step you through a session using the Extract and Graphics modules to create statistical, temporal, and spatial graphics. Thus, you can use this section as a brief tutorial as you execute the UAMPPS Extract and Graphics modules.

Each individual screen description has four components: a screen image, purpose, instructions, and error messages. At the top of the page, a sample screen image is presented which resembles what you would see if you were actually running the UAMPPS modules. Below the screen image is a brief summary of the purpose of the screen, followed by a detailed set of instructions designed to assist you in properly filling in all fields on the screen. Following the instructions is a list of error messages that you may encounter, along with instructions on how to fix each error.

TABLE 4-1. SEQUENCING OF SCREENS

Section	Module	Screen
4.1	Extract	Extract Module Startup Screen UAM File Selection Screen Species/Level Data Extraction Screen Extraction Process Message Screen Termination Selection Screen
4.2	Graphics	Graphic Selection Screen
4.2.1	Statistical Graphics	Statistical Graphic Selection Screen Single and Multiple Observation Data Set Selection Screens Graphic Title/Description Specification Screen Value Calculation Message Screen Axis Scaling Screen Termination Selection Screen Graphics Catalog Generation Screen
4.2.2	Temporal Graphics	Temporal Graphic Selection Screen Shaded Temporal Chart Data Set Selection Screen Temporal Line Chart Data Set Selection Screen Graphic Title/Description Specification Screen Value Calculation Message Screen Axis Scaling Screen Termination Selection Screen Graphics Catalog Generation Screen
4.2.3	Spatial Graphics	Spatial Graphic Selection Screen Single Observation Data Set Selection Screen and Spatial Differences Data Set Selection Screen Cities Subset Screen Spatial Plot Pattern Selection Screen and Statistical Composition of Data Screen Graphic Title/Description Specification Screen Value Calculation Message Screen Termination Selection Screen Graphics Catalog Generation Screen
4.3	Graphics Catalog	Graphics Catalog Management Menu Screen

4. SCREEN

4.1 DATA EXTRACTION

The results of a UAM execution contain a large volume of information. All 24 species (see Table 4-2), a variable number of levels, hourly concentration, and descriptive information about the model run are contained in one file. The Extract module of the UAMPPS provides the data extraction capability for subsetting the model results based on species and level. In addition, the extraction process transforms the data from a gridded binary format to either a SAS-formatted data file used in the UAMPPS or a generic text file that can be imported into other graphics packages. The resulting files are named according to species, level, control strategy, and date, and thus provide a default method of organizing commonly used data.

TABLE 4-2. DEFINITION OF THE UAM (CB-IV) STATE SPECIES

UAM species	Species name
NO	Nitric oxide
NO2	Nitrogen dioxide
O3	Ozone
OLE	Olefinic carbon bond (C=C)
PAR	Paraffinic carbon bond (C-C)
TOL	Toluene (C_6H_5-CH_3)
XYL	Xylene (C_6H_6-$(CH_3)_2$)
FORM	Formaldehyde (CH_2=O)
ALD2	High molecular weight aldehydes (RCHO, R > H)
ETH	Ethane (CH_2=CH_2)
CRES	Cresol and higher molecular weight phenols
MGLY	Methyl glyoxal ($CH_3C(O)C(O)H$)
OPEN	Aromatic ring fragment acid
PNA	Peroxynitric acid (HO_2NO_2)
NXOY	Total of nitrogen compounds ($NO + NO_2 + N_2O_5 + NO_3$)
PAN	Peroxyacyl nitrate ($CH_3C(O)O_2NO_2$)
CO	Carbon monoxide
HONO	Nitrous acid
H2O2	Hydrogen peroxide
HNO3	Nitric acid
MEOH	Methanol (optional)
ETOH	Ethanol (optional)
ISOP	Isoprene (optional)
CLBR	Calibration

```
1.0

                URBAN AIRSHED MODEL POSTPROCESSING SYSTEM (UAMPPS)
                                Extract Module

NOTE:

 THE EXTRACT MODULE IS CAPABLE OF OUTPUTTING EITHER A SAS FORMAT DATA
 FILE FOR PROCESSING BY THE UAMPPS/UAMPES GRAPHICS SYSTEMS OR A GENERIC
 TEXT FILE FOR USE WITH OTHER SOFTWARE PROGRAMS.

 IF YOU WANT TO PRODUCE THE GENERIC TEXT FILE, YOU MUST ENTER A 'Y'
 IN THE FIELD BELOW.  NOTE THAT SUCH A FILE MAY BE DOWNLOADED AND
 MANIPULATED AS WOULD ANY TEXT FILE FOR INPUT INTO OTHER SYSTEMS.
 IT MAY NOT, HOWEVER, BE USED AS INPUT FOR UAMPPS OR UAMPES GRAPHICS.

 IF YOU DO NOT ENTER A 'Y' THE SYSTEM WILL DEFAULT TO THE SAS FORMAT.

 DO YOU WANT TO OUTPUT A GENERIC TEXT FILE (Y/N)? N

   PF1/PF13=HELP        PF3/PF15=PREV MENU        PF4/PF16=MAIN MENU
```

The Extract Module Startup Screen gives you an opportunity to specify what type of output file will be produced by the extract. The default output file is an extracted SAS-formatted data set, which is used as input for the UAMPPS and UAMPES graphics modules. You may choose to output a generic text file by entering a Ⓨ at the prompt. If you enter anything other than the Ⓨ or nothing at all, the SAS-formatted data set will be produced.

The naming convention for the extracted output file is as follows:

uidacct.UAM.ftyp.EXT.spec.Xddmmmyy.Lnss

where:	uid	=	your User ID supplied by the NCC
	acct	=	your account number supplied by the NCC
	ftyp	=	SASD for SAS-formatted data sets; or TEXT for generic text files
	spec	=	the species you are extracting in this run
	dd	=	the starting day of the UAM run
	mmm	=	the starting month of the UAM run (JAN, FEB, MAR, etc.)
	yy	=	the starting year of the UAM run
	n	=	the number of the level you are extracting in this run

Extract: Extract Module Startup Screen (concluded)

Note that, if you are attempting to perform an extraction for a given species, level, start date combination, and base/control strategy that has previously been performed, the existing file will be deleted and the results of the present run will be contained in a data set with the same name.

Instructions:

Press [Enter] to continue. Press [PF4] or [PF16] to abort the extract and return to the main menu.

Error Messages:

None.

```
1.1
                    UAMPPS:  Extract File Selection

    Please enter the Fully Qualified Data Set Name for the UAM file from
    which you wish to extract a Species and Level subset of information.
    Also, supply the name of the Boundary File.

    Do not enclose the Data Set Name in quotes.

       UAM Output Data Set:  uidacct.UAM.MODEL.GR8X8.BS88.JUL1188.AVGCNC

    Boundary File Data Set:  uidacct.AIRSHED.GR8X8.BS88.JUL1188.BCBIN

    Please supply Study Description and Scenario Information

    Study: New York   Base or Control (B or C): B  Year or Control #: 88

    Please enter the User Id and the Account that will be used to create
    the data set name containing the extracted UAM data.

            User Id:  uid        Account Number:  acct

      PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

The information requested on this panel is used to determine the name of the extracted data set and to provide some information on its name and location.

Instructions:

You must supply fully qualified names of both the UAM output file from which you wish to extract data and the UAM boundary file. Do NOT enclose the data set name in quotes. Please note that the input file should be binary and not ASCII or EBCDIC and must be a cataloged disk file residing on the NCC IBM mainframe.

Generally, the name of the domain is placed in the "Study" field, although you may choose any type of identifier. You must also indicate the Base/Control and the Year/Control indicators in the appropriate fields.

For example, if the file you are performing the extraction on is a base file for the year 1988, then enter "B" in the "Base or Control" field and "88" in the "Year or Control" field. Otherwise, enter "C" and the control strategy number in the corresponding fields. Both fields are required. The information you supply is stored as descriptive information and is used to generate the name of the output data set.

Extract: File Selection Screen (concluded)

Finally, you must supply User ID and account information in order to determine the prefix of the output data set being created. These two pieces of information were supplied to you by the NCC when you received your IBM account authorization.

When you are finished specifying all of the necessary information, press [Enter] to process your selections.

Error Messages:

Entering an invalid file name on either the "UAM Input Data Set" field or the "Boundary File Data Set" field will result in the following message displayed in the center of the screen:

```
Press PF15 to continue
   DATA SET DOES NOT EXIST.  PLEASE REENTER DATA SET NAME.
```

If the geographical boundaries in the boundary file do not fall within the geographical domain of the data file, the following message will appear:

```
Press PF15 to continue
    FILE DOMAINS ARE INCOMPATIBLE... REENTER ONE OR BOTH.
```

Press [PF15] to continue and reenter file names.

All other fields are required. If you leave any of the these fields blank, the following message will result:

```
Press PF15 to continue
              VALUE REQUIRED AT CURSOR LOCATION.
```

For the "Base or Control" field, any value other than B or C will result in:

```
Press PF15 to continue
               PLEASE ENTER B OR C TO CONTINUE.
```

For the "Year or Control" field, the response must be a numeric value between 0 and 99. Any other response will result in:

```
Press PF15 to continue
              VALID RANGE 0-99...PLEASE REENTER.
```

When you press [PF15] to continue, the cursor will be placed on the appropriate field for data entry.

```
1.2
                    UAMPPS:  Extract Species/Level Data

    Model Run
      Start Day: 11JUL88    Hour:  1        End Day: 11JUL88    Hour: 24
      Number of Species: 24                 Number of Segments: _1

    Domain
      Columns(x):  31            Rows(y):  25
      Vertical Levels(z):  5     ( Upper  3 , Lower  2 )

    Enter a ? and Press Enter to Select from a List of Available Species

    Select Species:  03                     Select Level:  1

           Press PF20 for a Spatial Description of the Domain.

      PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

```
1.2
            UAMPPS:  Extract Spatial Description of the Domain

      UTM Zone:  18
      Reference Origin(x):       0       Reference Origin(y):        0
      Origin of Grid(x):    520000       Origin of Grid(y):    4460000

      Columns(x):  31                    Rows(y):  25
      Grid Interval(x):  8000            Grid Interval(y):  8000

      Vertical Levels(z):   5            ( Upper  3 , Lower  2 )
      Height to Base of Surface Level:    0
      Minimum Height to Lower Level:     50
      Minimum Height to Upper Level:    150

      Press PF19 to return to the Species/Level Data Extraction Menu.

      PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

Extract: Species/Level Data Screen
(concluded)

This screen is a 2-page screen. Page 1 of this screen lists the starting and ending periods of the UAM run and the species present, along with some spatial information. Page 2 is purely informational, showing the spatial description of the domain. The number of columns, rows, and vertical levels are repeated from page 1 so that you will not have to page back and forth to see a complete spatial description of the domain.

Instructions:

On Page 1 of this screen, you are asked to supply the name of the species and the number of the level from which you would like data extracted. The name of the species must match one of the names supplied in the list of available species. If you enter a "?" in the "Select Species" field and press [Enter], a list of available species will be displayed. You may select a species by placing the cursor on a member of the list and pressing [Enter]. The level you select must be less than or equal to the total number of vertical levels.

When you are finished specifying all the necessary information, press [Enter] to process your selections.

Error Messages:

If the "Select Species" field is left blank or the species entered is not a valid species, the following message is displayed:

```
Press PF15 to continue

              INVALID SPECIES...PLEASE REENTER.
```

The "Select Level" field must be less than or equal to the number of vertical levels in the domain. If this is not the case, the following message will be displayed:

```
Press PF15 to continue

        SELECT LEVEL FIELD OUTSIDE VALID RANGE...REENTER.
```

When you press [PF15] to continue, the cursor will be placed on the appropriate field for data entry.

```
1.3
                    UAMPPS:  EXTRACT DATA FILE


      PRESS ENTER TO BEGIN EXTRACTION OF DATA FROM THE UAM FILE

                    FOR SPECIES  03  AND LEVEL 1

             THIS PROCESS MAY TAKE FOUR MINUTES OR LONGER.

                 THE OUTPUT DATA SET WILL BE CALLED:

             'uidacct.UAM.SASD.EXT.03.X11JUL88.L1B88'

      THE PREVIOUS COPY OF THIS DATA SET WILL BE DELETED IF IT EXISTS.

    ***  BE SURE TO MAKE NOTE OF THIS DATA SET NAME FOR LATER USE  ***

     PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

After the Species/Level Data Selection Screen is completed, the extraction process begins. The message screen is displayed indicating the species and level being extracted along with the name of the extracted data set. At this time, you should make note of the name of the data set that is being created. When you enter the Graphics module, you will need to supply this or another extracted data set name. Therefore, it is recommended that you keep a list containing the names of all data sets you extract along with a brief description of their contents. After the extraction is complete, you are, of course, free to rename any or all files, if you so desire.

Instructions:

Make note of the name of the extracted data set and be sure to write it down for later use. This data set name is required by the UAMPPS Graphics module.

Because large data files are involved, the extraction process may take 4 minutes or longer.

Error Messages:

None.

```
1.4
                    Termination Selection


          Select the action you would like to take.

               1)  Extract Another File

               2)  Exit the Extraction Module

          Selection: 2
```

The Termination Selection Screen allows you to perform another extraction or to exit the Extract module. If another extraction is chosen, control is returned to the Extract Module Startup Screen described earlier.

Instructions:

To perform another extraction, enter "1" in the "Selection" field, otherwise, enter "2" to exit the Extract module. If you choose to exit the Extract module, you will be returned to the UAMPPS main menu.

Error Messages:

The values "1" or "2" are the only valid values for the "Selection" field. Any other entry will result in the following error message:

```
Press PF15 to continue
                    YOU MUST ENTER 1 OR 2 TO CONTINUE.
```

Press [PF15] to remove the message from the screen. Then, enter a "1" or "2" and press [Enter].

4.2 GRAPHICS CREATION

The Graphics module provides a variety of statistical, temporal, and spatial graphics to assist in model analysis and policy decision support.

4.2.1 Statistical Graphics

Statistical graphics, which usually portray information outside the context of time or location, are very useful for immediate quantitative comparisons of observations. The UAMPPS provides four types of statistical graphics: the bar chart, the box plot, the scatter plot, and the quantile plot.

- For a quick comparison of multiple control strategies, use a bar chart. A bar chart compares up to 10 data sets, with a dominant data set used as the basis for comparison. Percentage differences between each control strategy and the base are annotated on each bar.
- If you want detailed information on specific concentrations contained in a data set, use the box plot. The box plot provides the range, median, and average, as well as percentile information for each hour for a single data set.
- For a comparison of concentration information of two control strategies over a time or grid cells, use the scatter and quantile plots.

4.2.2 Temporal Graphics

Temporal graphics provide a technique for portraying change in model results over time. The UAMPPS provides two types of temporal graphics: the shaded temporal plot and the temporal line plot.

- For a comparison of two control strategies over a specified time span, use the shaded temporal plot. The shaded temporal plot highlights areas of difference between the two strategies occurring within the time span.
- For a comparison of multiple control strategies over time, use the temporal line plot. Like its statistical counterpart, the bar chart, the temporal line plot compares up to 10 data sets, but the comparison here is more specific for a given range of hours.

4.2.3 Spatial Graphics

Spatial graphics ignore the temporal aspect of the data but provide information on locational relationships. The UAMPPS provides two types of spatial graphics: the shaded tile map and the gridded value map. Either map can provide an overview of the concentrations of a single control strategy over a geographical region or of the differences between two strategies for the region.

- For a general overview of the concentration pattern over the area, select the shaded tile map.
- For more specific concentration values of the area, select the gridded value map.

```
2.0
            URBAN AIRSHED MODEL POSTPROCESSING SYSTEM (UAMPPS)
                          Graphic Selection

                   1)  STATISTICAL GRAPHICS
                         Bar Charts
                         Box Plots
                         Scatter Plots
                         Quantile Plots

                   2)  TEMPORAL GRAPHICS
                         Time Series Line Graph

                   3)  SPATIAL GRAPHICS
                         Shaded Tile Maps
                         Gridded Value Maps

                Selection: 1          Device: IBM3179

Type ? on the device field and press ENTER for a list of supported devices

     PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

The Graphic Selection Screen is the first panel you will see upon invoking the Graphics module. From this screen, you can select the type of graphic to display and the type of terminal on which you would like to display it. The hard-copy devices are not supported directly. After displaying the graphic on your terminal, you may save it to a SAS graphics library and then plot it at a later date on the desired hard-copy device. SAS Graphics Catalogs are discussed separately in this document.

Instructions:

In the "Device" field, enter the name of the terminal that you are using/emulating, or you may enter a "?" on the device field and press [Enter] for a list of supported devices. Be sure to consult the user's manual supplied by the terminal manufacturer if you are not certain what type of graphics device you are using or emulating. Failure to enter the proper device name on this screen may result in unrecoverable errors when you attempt to display a plot.

If you are using a Tektronix 4207, 4211, or 4224 connected via a coaxial adapter, use the device "TCX4207". If you are using one of the above named devices but NOT with a coaxial connection, use the device "TEK4207". The devices "IBM3179" and "GDDMPCG" can be entered if you are using or emulating an IBM 3179G terminal; the device "IBM3279" should be selected if you are using or emulating an IBM 3279G terminal.

Anytime you select a device from the list, you will also be asked to choose "display" or "no display" mode. If you are generating graphics to view during the current session, choose "display". If you are generating graphics to store in the catalog for later viewing or you are using a device that does not display graphics, choose "no display". The display mode that you select will remain in effect until you re-enter the list and change devices and display modes.

A value of "1", "2" or "3" should be entered in the "Selection" field in order to display a specific type of graphic. Samples of the types of graphics available can be found in Section 2 of this document.

When you are done specifying all the necessary information, press [Enter] to process your selections.

Error Messages:

If any value other than "1", "2" or "3" is entered in the "Selection" field, the following message will be displayed in the center of the screen:

```
┌──Press PF15 to continue──────────────────────────────────────────┐
│                                                                   │
│      ENTER EITHER 1, 2, OR 3  -OR-  PRESS PF13 FOR HELP.          │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘
```

When you press [PF15], the message will be removed from the screen and the cursor will be placed on the "Selection" field to allow you to enter either "1", "2" or "3", or press [PF13] for related help.

Finally, if you specify a value in the "Device" field that is not in the list of supported terminal devices, the system will display a list of supported devices from which you may choose one.

```
2.1
                    UAMPPS:  Statistical Graphic Selection

Plot Type: 1  1) Bar Chart  2) Box Plot  3) Scatter Plot  4) Quantile Plot

           Period of Interest:  Start Day 11JUL88  Hour 1
                                End Day   11JUL88  Hour 24

 Analysis: 1  BAR CHARTS      1) Number of Cells above Threshold
                              2) Average Concentration
                              3) Maximum Concentration

              BOX PLOTS       4) Hourly Concentration Percentiles

              SCATTER PLOTS   5) Hourly Concentration Maximum
                              6) Grid Cell Concentration Maximum

              QUANTILE PLOTS  7) Hourly Concentration Maximum
                              8) Grid Cell Concentration Maximum

 Threshold Value (ppb): 120  (Used for Analysis 1 or 4)

      PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

This screen allows you to select the type of statistical graphic you would like to create. You can choose to display a bar chart, a box plot, a scatter plot, or a quantile plot, with various statistics applied to create each of them.

Instructions:

Choose either a bar chart or box plot by specifying either "1" or "2" in the "Plot Type" field, respectively.

You must then determine the period of interest for the particular type of graphic that you selected. This consists of starting and ending dates and times; the values you specify must correspond to the extracted data you are going to use as input.

For example, if you have an extracted data set containing data for hours 1 to 24 on July 11, 1988, then you must enter "11JUL88" in the "Start Day" and "End Day" fields and may choose any range of hours between 1 and 24 for the "Start Hour" and "End Hour" fields. The only restriction is that the starting hour is less than the ending hour. Because there is limited input validation applied to these fields, you must be careful to supply accurate values. Failure to do so can result in unpredictable errors.

By filling out the "Analysis" field, you determine the type of statistic that is displayed in the graphic. As indicated, types "1", "2" and "3" correspond to bar charts, type "4" to box plots, types "5" and "6" to scatter plots, and types "7" and "8" to quantile plots.

If you are creating a bar chart, you can determine the number of cells over a given concentration threshold for the period of interest by selecting "1" for "Analysis". Note that the "Threshold Value" field at the bottom of the screen must be filled in. By selecting "2" or "3" for "Analysis", you will create a bar chart showing the average or maximum concentration over the period of interest, respectively.

When a plot type "2" (box plot) is selected, analysis type "4" is the only acceptable choice. You must also supply a value for the concentration threshold for box plots. If you do not want a reference line drawn at the value of the concentration threshold, simply enter a value of zero for threshold and no reference line will be drawn.

Two "Analysis" types are available for both scatter plots and quantile plots. They are: maximum concentrations over all grid cells at each hour and maximum concentrations over all hours at each grid cell. These selections are "5" and "6", respectively, for scatter plots and "7" and "8", respectively, for quantile plots.

When you are done specifying all the necessary information, press [Enter] to process your selections.

Error Messages:

If the "Plot Type" field is left blank or if it contains a value outside the valid range, the following message will be displayed in the center of the screen:

```
┌──Press PF15 to continue──────────────────────────────────────────┐
│                                                                   │
│     ENTER EITHER 1, 2, 3, OR 4  -OR-  PRESS PF13 FOR HELP.        │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘
```

Press [PF15] to continue and the cursor will be placed on the appropriate field to allow you to enter a valid value.

Blank or improper "Date" fields can result in the following error:

```
┌──Press PF15 to continue──────────────────────────────────────────┐
│                                                                   │
│        START DAY MUST PRECEDE END DAY.  PLEASE REENTER.           │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘
```

Statistical Graphics: Graphic Selection Screen (concluded)

If a "Start Hour" or "End Hour" field is blank, <1, or >24, then the following message will appear:

```
Press PF15 to continue

TIME VALUE RANGE IS 1-24 INCLUSIVE.  PLEASE REENTER.
```

If the "Start Hour" field is greater than the "End Hour" field, the following message will appear:

```
Press PF15 to continue

START TIME MUST PRECEDE END TIME.  PLEASE REENTER.
```

Values of the "Analysis" field are valid only in certain combinations with the "Plot Type" field. An improper combination will result in an error message similar to the following:

```
Press PF15 to continue

VALID ANALYSIS VALUES ARE 5 AND 6.  PLEASE REENTER.
```

A blank "Threshold Value" field, if one is required, will result in the following message:

```
Press PF15 to continue

PLEASE ENTER A THRESHOLD VALUE OR A ZERO FOR NO THRESHOLD.
```

```
2.1.1
                UAMPPS:  Single Observation Data Set Selection


          Please enter the Fully Qualified Data Set Name for the
          extracted (Species and Level) UAM data set to be used
          in this graphic.

          Do not enclose the Data Set Name in quotes.


     Extracted Data Set: uidacct.UAM.SASD.EXT.O3.X11JUL88.L1B88


     PF1/PF13=Help          PF3/PF15=Prev Menu          PF4/PF16=Main Menu
```

```
2.1.1
                UAMPPS:  Multiple Observation Data Set Selection

     Enter up to ten Fully Qualified Data Set Names for the extracted
     (Species and Level) UAM data sets to be used in this graphic.

     Order is important;  the dominant data set should be entered first.
     Do not enclose the Data Set Names in quotes.  Do not skip lines.

                 Extracted Data Sets                      Bar Labels
       uidacct.UAM.SASD.EXT.O3.X05JUL88.L1B88              BASE1
       uidacct.UAM.SASD.EXT.O3.X05JUL88.L1C01              CNTL1
       uidacct.UAM.SASD.EXT.O3.X05JUL88.L1C02              CNTL2
       uidacct.UAM.SASD.EXT.O3.X05JUL88.L1C03              CNTL3
       uidacct.UAM.SASD.EXT.O3.X05JUL88.L1C04              CNTL4
       ____________________________________________        ____
       ____________________________________________        ____
       ____________________________________________        ____
       ____________________________________________        ____
       ____________________________________________        ____

     PF1/PF13=Help          PF3/PF15=Prev Menu          PF4/PF16=Main Menu
```

Statistical Graphics: Data Set Selection Screens (continued)

```
2.1.1
        UAMPPS:  Statistical Two Observation Data Set Selection


        Please enter the Fully Qualified Data Set Name for the
        extracted (Species and Level) UAM data sets to be used
        in this graphic.

        Order is important;  the data set to be plotted on the
        vertical axis should be entered first.

        Do not enclose the Data Set Name in quotes.

    Vertical Axis Data Set:  ____________________________________
  Horizontal Axis Data Set:  ____________________________________

        Please enter the color and the size of the symbols
        that will be used on the plot.

                    Color: ________      Size: _____


   PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

The Single Observation Data Set Selection Screen is displayed for box plots; the Multiple Observation Data Set Selection Screen is displayed for bar charts; and the Statistical Two Observation Data Set Selection Screen is displayed for scatter plots and quantile plots. All screens are similar in appearance and have the same function: to determine the name(s) of the data set(s) to be used to generate the graphic.

Regardless of the type of graphic generated, the input data sets must be extracted SAS-formatted data sets created by the Extract module. They must be currently cataloged disk files on the NCC IBM mainframe containing data corresponding to the period of interest specified on the previous screen.

Instructions:

Enter the fully qualified name of the data set(s) you wish to process in the space(s) provided. Be sure NOT to enclose the data set name(s) in quotes. If you are creating a bar chart, the order in which you enter the files is important; the dominant data set should be entered first. If you are creating scatter plots or quantile plots, the first data set will be plotted on the vertical axis and the second data set will be plotted on the horizontal axis.

On the Multiple Observation Data Set Selection Screen, be sure to enter data set names on consecutive lines. When the system encounters a blank data set name (after the first and second data set names, which are required), it assumes that data set entry is complete. Any data after the blank data set name is ignored.

When you are done specifying all the necessary information, press [Enter] to process your selections.

Error Messages:

The "Extracted Data Set" field is required for the Single Observation Data Set Selection Screen. Leaving this field blank, entering an invalid file, or using quotes in the file name will result in the following message:

```
Press PF15 to continue
DATA SET DOES NOT EXIST.  PLEASE REENTER DATA SET NAME.
```

When you press [PF15], the cursor will be placed on the field to allow you to enter a valid data set name.

The first and second "Extracted Data Sets" fields are required for the Multiple Observation Data Set Selection Screen and leaving either field blank will result in the message:

```
Press PF15 to continue
THIS DATA SET FIELD MAY NOT BE LEFT BLANK.
```

As before, entering an invalid data set name will result in the following:

```
Press PF15 to continue
THIS DATA SET DOES NOT EXIST.  PLEASE REENTER DATA SET NAME.
```

Statistical Graphics: Data Set Selection Screens (concluded)

All data sets must have a data set label and each label must be unique. If a label is left blank or the label duplicates another, the following message is displayed:

```
Press PF15 to continue
                PLEASE ENTER A UNIQUE DATA SET LABEL.
```

For scatter plots and quantile plots, you need to specify a color and a size for the plot symbol. If either is left blank, the following message will appear:

```
Press PF15 to continue
                VALUE REQUIRED AT CURSOR LOCATION.
```

Press [PF15] to continue and the cursor will be placed on the appropriate field for data entry.

If the time period entered as "Start Day"/"End Day" and "Hour" fields on the previous screen (i.e., the Statistical Graphic Selection Screen) do not fall within the time period of data contained in the selected file, the following message will appear:

```
Press PF15 to continue

DATE/TIME RANGE ENTERED:
Start Day: 11JUL88    Hour:  1    End Day: 11JUL88    Hour: 24
OUTSIDE RANGE OF FILE DATE/TIME:
Start Day: 11JUL88    Hour: 13    End Day: 11JUL88    Hour: 24
 PLEASE ENTER A NEW FILE NAME -OR- RETURN TO PREVIOUS SCREEN
    BY PRESSING PF3/PF15 AND ENTER A NEW DATE/TIME RANGE.
```

When you press [PF15], the cursor will be placed on the "Extracted Data Set" field. At this point you must choose between entering another file name or returning to the Statistical Graphic Selection Screen (by pressing [PF3/PF15]) to change the period of interest.

```
                UAMPPS:  Graphic Title/Description Specification

Enter requested information. Skip any fields not desired. Do not use quote

                TEXT                                  COLOR     FONT     SIZE
Title #1
CELLS WITH O3 FOR LEVEL 1 OVER THE THRESHOLD          WHITE     NONE     1.0
Title #2
                                                      WHITE     NONE     1.0
Footnote #1
                                                      WHITE     NONE     1.0
Footnote #2
                                                      WHITE     NONE     1.0
Vertical Axis
# OF CELLS ABOVE 120 PPB                              WHITE     NONE     1.0
Horizontal Axis
                                                      WHITE     NONE     1.0

      PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

In this screen, you specify titles, footnotes, and axes labels along with their respective color, font, or text size.

Instructions:

You can specify up to two titles and two footnotes for any given graphic. Simply type the text of the title or footnote in the fields called "TEXT" and then choose the corresponding color, font and size. You should be sure that the color you specify is supported by the device you are using. Generally, it is a good idea to use "WHITE" for display on a terminal and "BLACK" for printing on a hard-copy device. You may select a color from the basic color list by typing a "?" in the color field and then pressing [Enter]. Otherwise, you may enter any valid color supported by your graphics device. A complete discussion of SAS/Graph colors may be found in SAS/Graph Software Reference, Volume 1, Chapter 7.

Next, you will want to choose a font to print the text of your title or footnote. A font value of "NONE" tells the system to use the hardware characters of the device to compose the text. This is a very simple font, but suitable for most applications. The "NONE" font is also drawn faster than any other font, so it should be used if saving time is important or for previewing graphics.

Finally, you will need to specify the size of the characters printed in the title or footnote. We recommend that you try using the value "1.0" in the "Size" field first, and then change it if you find that the result is not acceptable. Using a large value of "SIZE" can cause awkward looking titles.

Statistical Graphics: Graphic Title/Description Specification Screen (concluded)

Keep in mind that titles and footnotes take up space which can be used for the displaying of the graphic. Thus, if you specify two titles and two footnotes, the actual graphic will be smaller than if you specified one title and one footnote. Similarly, the size (specified in the "SIZE" field) of the title or the footnote affects the size of the display area for the graphic. For this reason, you should judiciously choose the number and size of the titles and footnotes.

Axes labels are specified in the same way as titles and footnotes. Generally it is a good idea to use the same color and font for the labels as you used for the titles, but this is completely up to you.

When you are done specifying all the necessary information, press [Enter] to process your selections.

Error Messages:

The "Title #1" field is required for all graphics. If the title line is left blank or if its "Color", "Font", or "Size" fields are left blank, the following message is displayed:

```
Press PF15 to continue
------------------------------------------------------------------------

                A VALUE IS REQUIRED AT THE CURSOR LOCATION.
```

The "Vertical Axis" and "Horizontal Axis" fields are required for certain graph types. If these fields are required and are left blank, the following message is displayed:

```
Press PF15 to continue
------------------------------------------------------------------------

          A VALUE IS REQUIRED IN THIS FIELD FOR THIS GRAPH TYPE.
```

When the "Vertical Axis" and "Horizontal Axis" fields are required, the corresponding "Color", "Font", and "Size" fields are also required. Leaving any of these blank at these times will result in the following message:

```
Press PF15 to continue
------------------------------------------------------------------------

                A VALUE IS REQUIRED AT THE CURSOR LOCATION.
```

If any of the above error messages is encountered, press [PF15] and enter the required data at the cursor location.

```
                    UAMPPS:  Value Calculation Message

            Press ENTER to Calculate Values and DISPLAY Graph

                    Process could take several minutes


      PF1/PF13=Help          PF3/PF15=Prev Menu          PF4/PF16=Main Menu
```

```
                    CALCULATING VALUES AND PLOTTING GRAPH
AFTER SCREEN GRAPHIC HAS BEEN CREATED, PRESS ENTER FOR DISPOSITION OPTIONS
```

The Value Calculation Message Screen provides status information.

Instructions:

The upper screen frame will appear after you have entered the necessary title and label information in the Graphic Title/Description Specification Screen. The screen informs you that there will be a perceptible delay, while the intensive calculations required to construct the graph are performed. Press [Enter] to continue.

After you press [Enter], the lower screen frame will appear and remain on until the next screen in the sequence is displayed. On some devices, the "Calculating Values and Plotting Graph" message will blink.

Error Messages:

None.

```
                    UAMPPS:  Box Plot Axis Scaling

          Default Axis Values     Data Values     Selected Axis Values

Maximum          120              111.2              115
Minimum          0                6.483              5
Step             24                                  5

          Do you want box plot legend displayed (Y/N)?  N

    PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

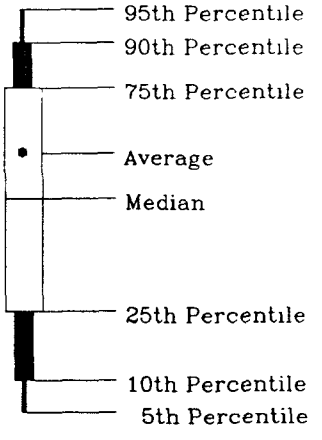
The Axis Scaling Screen allows you the option of altering the scale on the vertical chart axis.

Instructions:

The "Default Axis Values" column and the "Data Values" column are informational. The "Default Axis Values" column gives you suggested values for the vertical axis based on the actual maximum and minimum data values displayed the "Data Values" column. The actual values used in drawing the chart will be the values you enter in the "Selected Axis Values" column.

For box plots, you may choose to display the "box plot legend" (see example below) before the chart is displayed. Here, the default is always "N". Type a "Y" if you want the "box plot legend" displayed.

BOX PLOT LEGEND



Keep in mind that the "Selected Axis Values" column defaults to your previously entered values. If you change data sets, the "Selected Axis Values" column may need to be changed.

Error Messages:

Three errors are possible from the Axis Scaling Screen.

(1) If the maximum "Selected Axis Value" is less than the maximum "Data Value", the following error message is displayed:

```
Press PF15 to continue

DATA VALUES GREATER THAN MAXIMUM AXIS VALUE...REENTER.
```

(2) If the minimum "Selected Axis Value" is greater than the minimum "Data Value", the following error message is displayed:

```
Press PF15 to continue

DATA VALUES LESS THAN MINIMUM AXIS VALUE...REENTER.
```

(3) If the difference between the maximum and minimum "Selected Axis Value" is not equally divisible by the selected axis step value, then the following message is displayed:

```
Press PF15 to continue

RANGE NOT EQUALLY DIVISIBLE BY STEP VALUE...REENTER.
```

In each case, press [PF15] and the cursor will be placed on the appropriate field. Refer to the "Data Values" column, reenter valid values, and press [Enter] when done.

At this point, your graphic will be displayed on the screen and, when you are through viewing it, press [Enter] to continue.

```
2.2
                    UAMPPS:  Termination Selection



                         Choose the Action you would like to take.


        1)  Change Device, Plot Type, or Starting/Ending Conditions
        2)  Change Input Data Sets
        3)  Change Cutoff Ranges or Titles

        4)  Redisplay the Graphic
        5)  Save the Graphic

        6)  Exit UAMPPS Graphic Module (Without Saving Graphic)


Selection:  5
```

The Termination Selection Screen provides a number of options for saving, redisplaying, modifying, or recreating graphics as well as exiting the UAMPPS Graphics module. Depending on your response, you will be transferred to the appropriate screen, where you can make any changes. The screens always execute in the same order as previously specified.

Instructions:

A value between "1" and "6" must be entered in the "Selection" field at the bottom of this screen. A description of the six possible options follows. If you would like more information regarding any screen discussed below, please refer to the detailed screen descriptions presented earlier in this section.

Option 1 -- Change Device, Plot Type or Starting/Ending Conditions

Selecting this option returns you to the Graphic Selection Screen, where you can change the device type or the type of graphic being generated. After making any changes and processing the selections, the Statistical Graphic Selection Screen will be displayed, allowing you to change the starting and/or ending conditions.

Option 2 -- Change Input Data Sets

When this option is selected, either the Single or Multiple Observation Data Set Selection Screen is displayed, depending on the type of graphic that you originally chose. It is assumed that you would like to generate the same type of graphic with the same starting and ending conditions, but with different data displayed. Simply supply the new name(s) of the data set(s) on this screen.

Option 3 -- Change Cutoff Ranges or Titles

The Graphic Title/Description Specification Screen is displayed when this option is chosen, and you can change the titles, footnotes, and/or axis labels along with their respective colors, fonts, and sizes.

Option 4 -- Redisplay the Graphic

Selecting this option will cause the graphic that was just viewed to be redisplayed on your terminal screen. This option is mostly for your convenience, to allow you a quick method of reviewing the last graphic without going through all the steps to recreate it.

Option 5 -- Save the Graphic

The Graphics Catalog Generation Screen (discussed later in this section) is displayed when you choose this option. This screen allows you to specify the name of the data set that will contain the SAS Graphics Catalog as well as descriptive fields that will later aid in the identifying the graphic.

Option 6 -- Exit UAMPPS Graphic Module (Without Saving Graphic)

As the title indicates, selecting this option will cause you to leave the UAMPPS Graphics module without saving the graphic that was just created. All open files will be closed and you will be returned to the main menu.

When you are done specifying the value for "Selection", press [Enter] to process your selection.

Error Messages:

If any value other than "1" through "6" is entered in the "Selection" field, the following message will be displayed in the center of the screen:

```
┌──Press PF15 to continue──────────────────────────────────────────┐
│                                                                   │
│     YOU MUST ENTER A VALUE FROM 1-6 INCLUSIVE TO CONTINUE.        │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘
```

After you press [PF15], the cursor will be placed on the "Selection" field to allow you to enter a value between "1" and "6".

```
                UAMPPS:  Graphics Catalog Generation

        Please enter below the Fully Qualified Data Set Name
        of the Graphics Catalog to be created or modified.

        Do not enclose the Data Set Name in Quotes


    Graphics Catalog DSN:  uidacct.UAM.SAMPLE.GCATLG

        Enter the NAME and Description of this graphic.  This
        information will be stored in the Graphics Catalog and
        will aid in identifying the plot.

                  Name: BAR

           Description: NEW YORK 11JUL88 03 L1 B88 GT THRESH

     PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

This screen provides you a way to permanently save any or all graphics you generate in a device independent SAS Graphics Catalog. Because this is a device independent file, you can replay these graphics later on any graphics device and change as many colors you desire.

You will be asked for the name of the data set that will contain the graphics catalog as well as some descriptive information that will aid in later identification of the plot. If the data set name you supply already exists, the file will be kept and the current graphic will be added to any existing graphics. No default data set name is supplied, but suggested descriptive information is furnished.

Instructions:

Enter the fully qualified name of the data set you wish use for the SAS Graphics Catalog in the space provided. Be sure not to enclose the data set name in quotes.

The "Name" and "Description" fields are required and are used to aid in identifying the type of graphic in the catalog without displaying it on the terminal screen.

If meaningful values of "Name" and "Description" were supplied when the graphic was generated, you should be able to easily identify the graphic. For this reason, we recommend that you use the default values supplied.

Default values for the "Name" field are either "BAR", "BOX", "SCAT", or "QUANT" depending on whether a bar chart, box plot, scatter plot, or quantile plot was generated, respectively. The default value of the "Description" field is always of the form:

study start-day species *L*n scenario stat

where:

study	=	the "STUDY" variable supplied in the Extract module
start-day	=	the Start date for this graphic
species	=	the species for which the graphic is being generated
n	=	the number of the level for which the graphic is being generated
scenario	=	the "SCENARIO" variable supplied in the Extract module
stat	=	the statistic chosen for this graphic, which will be "GT THRESH", "AVG CONC" or "MAX CONC" for bar charts and "HRLY CONC" for box plots.

Thus the default description for a bar chart showing the number of cells in the New York domain with base year 1988 ozone concentration for level 1 over a given threshold on July 11, 1988 would be:

NEW YORK 11JUL88 O3 L1 B88 GT THRESH

and the default name would be "BAR".

When you are done specifying all the necessary information, press [Enter] to process your selections.

If the data set you specified already exists, it will be kept and the current graphic will be added to it. If the data set does not exist, you will be asked if you want to create it. If you do not wish to create the data set, enter a "N" and press [Enter]. If you enter a "Y", you will be asked if you want to catalog or delete the data set upon deallocation. If you want the catalog and its contents to be saved for use in future SAS sessions, enter a "C" and press [Enter].

The screen will clear and the next screen displayed will be the PROC GREPLAY screen. For complete information on using PROC GREPLAY, see Chapter 36 of the Version 6 edition of the SAS/GRAPH User's Guide. When you are finished using the Graphics Catalog, press [PF15] to return to UAMPPS.

Error Messages:

None.

```
2.2
                    UAMPPS:  Temporal Graphic Selection


            Plot Type: 1      1)  Shaded      2)  Line


            Period of Interest:  Start Day 11JUL88  Hour  1
                                 End Day   11JUL88  Hour  24


            Analysis: 1       1)  Hourly Maximum Concentration
                              2)  Hourly Average Concentration



 Threshold Value (ppb): 120

      PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

This screen allows you to select the type of temporal graphic that you would like to create. You can choose to display either a shaded or multiple line plot, with various statistics applied to create each of them.

Instructions:

Choose a shaded or multiple line plot by specifying either "1" or "2" in the "Plot Type" field.

You must then determine the period of interest for the particular type of graphic that you selected. This consists of starting and ending dates and times, corresponding to the extracted data you are going to use as input.

For example, if you have an extracted data set containing data for hours 1 to 24 on July 11, 1988, then you must enter "11JUL88" in the "Start Day" and "End Day" fields and may choose any range of hours between 1 and 24 for the "Start Hour" and "End Hour" fields. The only restriction is that the starting hour needs to be less than the ending hour. Because there is no input validation applied to these fields, you must be careful to supply accurate values. Failure to do so can result in unpredictable fatal errors.

By filling in the "Analysis" field, you determine the type of statistic that is displayed in the graphic. You can choose to either display the hourly maximum or hourly average concentration over the period of interest by selecting "1" or "2" for "Analysis", respectively.

Note that the "Threshold Value" field at the bottom of the screen must be filled in. You must specify the concentration at which you would like a reference line drawn the graphic. If you do not want a reference line drawn, enter a value of "0".

When you are done specifying all the necessary information, press [Enter] to process your selections.

Error Messages:

Leaving the "Plot Type" field blank or entering a value other than "1" or "2" will result in the following message being displayed in the center of the screen:

```
Press PF15 to continue
------------------------------------------------------------------------

            ENTER 1 OR 2  -OR-  PRESS PF13 FOR HELP.
```

Press [PF15] to continue and the cursor will be placed on the "Plot Type" field to allow you to enter a valid value.

Blank or improper "Date" fields can result in the following error:

```
Press PF15 to continue
------------------------------------------------------------------------

        START DAY MUST PRECEDE END DAY.  PLEASE REENTER.
```

If a "Start Hour" of "End Hour" field is blank, <1 or >24, then the following message will appear:

```
Press PF15 to continue
------------------------------------------------------------------------

     TIME VALUES MUST BE BETWEEN 1 AND 24.  PLEASE REENTER.
```

If the "Start Hour" field is greater than the "End Hour" field, then the following message will appear:

```
Press PF15 to continue
------------------------------------------------------------------------

       START TIME MUST PRECEDE END TIME.  PLEASE REENTER.
```

Temporal Graphics: Graphic Selection Screen (concluded)

The "Analysis" field has only two valid values. A blank or values other than "1" or "2" will result in an error identical to that of the "Plot Type" field above.

A blank "Threshold Value" field will result in the following message:

```
Press PF15 to continue

PLEASE ENTER A THRESHOLD VALUE OR A ZERO FOR NO THRESHOLD.
```

```
2.2.1
            UAMPPS:  Shaded Temporal Plot Data Set Selection


        Please enter the Fully Qualified Data Set Names for the
        extracted (Species and Level) UAM data sets to be used
        for this graphic.

        Order is important;  the dominant data set should be
        entered first.

        Do not enclose the Data Set Name in quotes.


            Extracted Data Sets:                Graphic Legend Labels

   uidacct.UAM.SASD.EXT.03.X11JUL88.L1B88            BASE

   uidacct.UAM.SASD.EXT.03.X11JUL88.L1C01            CNTL

  PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

This screen allows you to enter the names of the data sets to be used to generate the shaded line plot. Two data sets are required because the graphic illustrates the difference between two values of concentration at a given point in time.

The input data sets must be extracted SAS format data sets created by the Extraction module. The data sets must be currently cataloged disk files on the NCC IBM mainframe containing data corresponding to the period of interest specified on the Temporal Graphic Selection Screen.

Instructions:

Enter the fully qualified name of the data sets that you wish to process in the spaces provided. Be sure NOT to enclose the data set names in quotes. Note that the order in which you enter the files is important; the dominant data set should be entered first.

When you are done specifying all the necessary information, press [Enter] to process your selections.

Temporal Graphics: Shaded Temporal Plot Data Set Selection Screen (concluded)

Error Messages:

Both "Data Set" fields are required. Leaving either field blank, entering invalid data set names, or using quotes in the file name will result in the following message:

```
Press PF15 to continue

   DATA SET DOES NOT EXIST.  PLEASE REENTER DATA SET NAME.
```

Both data sets must be designated with unique labels. If a label is left blank or the labels are the same, the following error message will result:

```
Press PF15 to continue

   DUPLICATE LABELS ARE NOT ALLOWED.  REENTER ONE OR BOTH.
```

If the time period entered as "Start Day"/"End Day" and "Hour" fields on the previous screen (i.e., the Statistical Graphic Selection Screen) do not fall within the time period of data contained in the selected file, the following message will appear:

```
Press PF15 to continue

DATE/TIME RANGE ENTERED:
Start Day: 11JUL88    Hour:  1    End Day: 11JUL88   Hour: 24
OUTSIDE RANGE OF FILE DATE/TIME:
Start Day: 11JUL88    Hour: 13    End Day: 11JUL88   Hour: 24
 PLEASE ENTER A NEW FILE NAME -OR- RETURN TO PREVIOUS SCREEN
    BY PRESSING PF3/PF15 AND ENTER A NEW DATE/TIME RANGE
```

When you press [PF15], the cursor will be placed on the "Extracted Data Set" field. At this point you must choose between entering another file name or returning to the Statistical Graphic Selection Screen (by pressing [PF3/PF15]) to change the period of interest.

```
2.2.1
                UAMPPS:  Temporal Line Plot Data Set Selection

   Enter up to ten Fully Qualified Data Set Names for the extracted
   (Species and Level) UAM data sets to be used in this graphic.

   Do not enclose the Data Set Name in quotes.  Do not skip lines.

                                                Line     Line     Line
          Extracted Data Set Name               Legend   Type     Color
uidacct.UAM.SASD.EXT.03.X05JUL88.L1B88          BASE1    1        RED
uidacct.UAM.SASD.EXT.03.X05JUL88.L1C01          CNTL1    1        YELLOW
uidacct.UAM.SASD.EXT.03.X05JUL88.L1C02          CNTL2    1        BLUE
uidacct.UAM.SASD.EXT.03.X05JUL88.L1C03          CNTL3    1        GREEN
uidacct.UAM.SASD.EXT.03.X05JUL88.L1C04          CNTL4    1        CYAN
                                                         -
                                                         -
                                                         -
                                                         -
                                                         -

    PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

This screen allows you to enter the names of the data sets to be used to generate the multiple line plot as well as the type of line to be drawn and the color of the line. A minimum of two data sets are required and up to ten can be specified.

The input data sets must be extracted SAS format data sets created by the Extraction module. They must be currently cataloged disk files on the NCC IBM mainframe containing data corresponding to the period of interest specified on the Temporal Graphic Selection Screen.

Instructions:

Enter the fully qualified name of the data sets you wish to process in the spaces provided. Be sure not to enclose the data set names in quotes. Because no concentration differences are being displayed, the order in which you specify the data sets is not important. Be sure to enter data set names on consecutive lines. When the system encounters a blank data set name (after the first and second data set names, which are required), it assumes that data set entry is complete. Any data after the blank data set name is ignored.

Next to each data set name, you must enter the line legend label, the type of line, and the corresponding color that you would like to be used in plotting the data. Valid line types can be found in the Version 6 edition of the SAS/GRAPH User's Guide. As on previous screens, colors may be selected by typing a "?" in the "Line Color" field and pressing [Enter], or by typing in a color.

When you are done specifying all the necessary information, press [Enter] to process your selections.

Temporal Graphics: Temporal Line Plot Data Set Selection Screen (concluded)

Error Messages:

"Extracted Data Set" fields 1 and 2 are required and leaving either field blank will result in a message similar to the following:

```
Press PF15 to continue

                DATA SET CANNOT BE LEFT BLANK.
```

Entering an invalid data set name in any of the 10 fields will result in the following:

```
Press PF15 to continue

   DATA SET DOES NOT EXIST.  PLEASE REENTER DATA SET NAME.
```

All data sets must have a "Line Legend" label and each label must be unique. If a label is left blank or the label duplicates another, then the following message is displayed:

```
Press PF15 to continue

             PLEASE ENTER A UNIQUE DATA SET LABEL.
```

All nonblank data sets must have a "Line Type" and a "Line Color". Leaving any of these fields blank will result in the following error message:

```
Press PF15 to continue

              VALUE REQUIRED AT CURSOR POSITION.
```

If the time period entered as "Start Day"/"End Day" and "Hour" fields on the previous screen (i.e., the Statistical Graphic Selection Screen) do not fall within the time period of data contained in the selected file, the following message will appear:

```
Press PF15 to continue

DATE/TIME RANGE ENTERED
Start Day: 11JUL88    Hour:  1    End Day: 11JUL88   Hour: 24
OUTSIDE RANGE OF FILE DATE/TIME:
Start Day: 11JUL88    Hour: 13    End Day: 11JUL88   Hour: 24
 PLEASE ENTER A NEW FILE NAME -OR- RETURN TO PREVIOUS SCREEN
    BY PRESSING PF3/PF15 AND ENTER A NEW DATE/TIME RANGE
```

When you press [PF15], the cursor will be placed on the "Extracted Data Set" field. At this point you must choose between entering another file name or returning to the Statistical Graphic Selection Screen (by pressing [PF3/PF15]) to change the period of interest.

```
                UAMPPS:  Graphic Title/Description Specification


Enter requested information. Skip any fields not desired. Do not use quote

                TEXT                                  COLOR     FONT     SIZE
Title #1
MAXIMUM O3 CONCENTRATION FOR LEVEL 1                  WHITE     NONE     1.0
Title #2
BETWEEN THE HOURS OF 1 AND 24                         WHITE     NONE     1.0
Footnote #1
                                                      WHITE     NONE     1.0
Footnote #2
                                                      WHITE     NONE     1.0
Vertical Axis
CONCENTRATION  (PPB)                                  WHITE     NONE     1.0
Horizontal Axis
HOUR                                                  WHITE     NONE     1.0

      PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

In this screen you specify titles, footnotes, and axes labels along with their respective color, font, and text size.

Instructions:

You can specify up to two titles and two footnotes for any given graphic. Simply type the text of the title or footnote in the fields called "TEXT" and then choose the corresponding color, font and size. You should be sure that the color you specify is supported by the device you are using. Generally, it is a good idea to use "WHITE" for display on a terminal and "BLACK" for printing on a hard-copy device. As before, limited color selection is available by typing a "?" on the color field and pressing [Enter].

Next, you will want to choose a font to print the text of your title or footnote. A value of "NONE" tells the system to use the hardware characters of the device to compose the text. This is usually a very simple font, but suitable for most applications. The "NONE" font is also drawn faster than any other font, so it should be used if saving time is important or for previewing graphics.

Finally, you will need to specify the size of the characters printed in the title or footnote. We recommend that you use a "1.0" in the size field, and then change it if you find that the result is not acceptable. Using a large value of "SIZE" can cause awkward looking titles.

Temporal Graphics: Graphic Title/Description Specification Screen (concluded)

Keep in mind that titles and footnotes take up space which can be used for the displaying of the graphic. Thus, if you specify two titles and two footnotes, the actual graphic will be smaller than if you specified one title and one footnote. Similarly, the size (specified in the "SIZE" field) of the title or the footnote affects the size of the display area for the graphic. For this reason, you should judiciously choose the number and size of the titles and footnotes that you use.

Axes labels are specified in the same way as titles and footnotes. Generally it is a good idea to use the same color and font for the labels as you used for the titles, but this is completely up to you.

When you are done specifying all the necessary information, press [Enter] to process your selections.

Error Messages:

The "Title #1" field is required for all graphics. If the title line is left blank or if its "Color", "Font", or "Size" fields are left blank, the following message is displayed:

```
Press PF15 to continue

        A VALUE IS REQUIRED AT THE CURSOR LOCATION.
```

The "Vertical Axis" and "Horizontal Axis" fields are required for certain graph types. If these fields are required and are left blank, the following message is displayed:

```
Press PF15 to continue

    A VALUE IS REQUIRED IN THIS FIELD FOR THIS GRAPH TYPE.
```

If the "Vertical Axis" and "Horizontal Axis" fields are required, the corresponding "Color", "Font", and "Size" fields are also required. Leaving any of these fields blank at these times will result in the following message:

```
Press PF15 to continue

        A VALUE IS REQUIRED AT THE CURSOR LOCATION.
```

If any of the above error messages is encountered, press [PF15] and enter the required data at the cursor location.

```
UAMPPS:  Value Calculation Message

Press ENTER to Calculate Values and DISPLAY Graph

Process could several minutes


PF1/PF13-Help        PF3/PF15-Prev Menu        PF4/PF16-Main Menu
```

```
CALCULATING VALUES AND PLOTTING GRAPH
AFTER SCREEN GRAPHIC HAS BEEN CREATED, PRESS ENTER FOR DISPOSITION OPTIONS
```

The Value Calculation Message Screen provides status information.

Instructions:

The upper screen frame will appear after you have entered the necessary title and label information in the Graphic Title/Description Specification Screen. The screen informs you that there will be a perceptible delay, while the intensive calculations required to construct the graph are performed. Press [Enter] to continue.

After you press [Enter], the lower screen frame will appear and remain on until the next screen in the sequence is displayed. On some devices, the "Calculating Values and Plotting Graph" message will blink.

Error Messages:

None.

```
                UAMPPS:  Temporal Shaded Chart Axis Scaling

          Default Axis Values    Data Values    Selected Axis Values

Maximum          120              111.2              115
Minimum          0                6.483              5
Step             24                                  5


    PF1/PF13-Help        PF3/PF15-Prev Menu        PF4/PF16-Main Menu
```

The Axis Scaling Screen allows you the option of altering the scale on the vertical chart axis.

Instructions:

The "Default Axis Values" column and the "Data Values" column are informational. The "Default Axis Values" column gives you suggested values for the vertical axis based on the actual maximum and minimum data values displayed in the "Data Values" column. The actual values used in drawing the chart will be the values you enter in the "Selected Axis Values" column.

Keep in mind here that the "Selected Axis Values" column defaults to your previously entered values. If you change data sets, the "Selected Axis Values" column may need to be changed.

Error Messages:

Three errors are possible from the Axis Scaling Screen.

(1) If the maximum "Selected Axis Value" is less than the maximum "Data Value", the following error message is displayed:

```
Press PF15 to continue

    DATA VALUES GREATER THAN MAXIMUM AXIS VALUE...REENTER.
```

(2) If the minimum "Selected Axis Value" is greater than the minimum "Data Value", the following error message is displayed:

```
Press PF15 to continue

DATA VALUES LESS THAN MINIMUM AXIS VALUE...REENTER.
```

(3) If the difference between the maximum and minimum "Selected Axis Value" is not equally divisible by the selected axis step value, then the following message is displayed:

```
Press PF15 to continue

RANGE NOT EQUALLY DIVISIBLE BY STEP VALUE...REENTER.
```

In each case, press [PF15] and the cursor will be placed on the appropriate field. Refer to the "Data Values" column, reenter valid values, and press [Enter] when done.

At this point, your graphic will be displayed on the screen and, when you are through viewing it, press [Enter] to continue.

```
                    UAMPPS:  Termination Selection


                 Choose the Action you would like to take.

        1)  Change Device, Plot Type, or Starting/Ending Conditions
        2)  Change Input Data Sets
        3)  Change Cutoff Ranges or Titles

        4)  Redisplay the Graphic
        5)  Save the Graphic

        6)  Exit UAMPPS Graphic Module (Without Saving Graphic)


 Selection:  5
```

The Termination Selection Screen provides you with a number of options for saving, redisplaying, modifying, or recreating graphics as well as exiting the UAMPPS Graphics module. Depending on your response, you will be transferred to the appropriate screen, where you can make any changes. The screens always execute in the same order as previously specified.

Instructions:

A value between "1" and "6" must be entered in the "Selection" field at the bottom of this screen. A description of the six possible options follows. If you would like more information regarding any screen discussed below, please refer to the detailed screen descriptions presented earlier in this section.

Option 1 -- Change Device, Plot Type or Starting/Ending Conditions

Selecting this option returns you to the Graphic Selection Screen, where you can change the device type or the type of graphic being generated. After making any changes and processing the selections, the Temporal Graphic Selection Screen will be displayed, allowing you to change the starting and/or ending conditions.

Option 2 -- Change Input Data Sets

When this option is selected, either the Shaded Temporal Chart Data Set Selection Screen or the Temporal Line Chart Data Set Selection Screen is displayed, depending on the type of plot that you originally chose. It is assumed that you would like to generate the same type of graphic with the same starting and ending conditions, but with different data displayed. Simply supply the new name(s) of the data set(s) on this screen.

Option 3 -- Change Cutoff Ranges or Titles

The Graphic Title /Description Specification Screen is displayed when this option is chosen, and you can change the titles, footnotes, and/or axis labels along with their respective colors, fonts, and sizes.

Option 4 -- Redisplay the Graphic

Selecting this option will cause the graphic that was just viewed to be redisplayed on your terminal screen. This option is mostly for your convenience, to allow you a quick method of reviewing the last graphic without going through all the steps to recreate it.

Option 5 -- Save the Graphic

The Graphics Catalog Generation Screen (discussed later in this section) is displayed when you choose this option. This screen allows you to specify the name of the data set that will contain the SAS Graphics Catalog as well as descriptive fields that will later aid in the identification of the graphic.

Option 6 -- Exit UAMPPS Graphic Module (Without Saving Graphic)

As the title indicates, selecting this option will cause you to leave the UAMPPS graphics module without saving the graphic that was just created. All open files will be closed and you will be returned to the main menu.

When you are done specifying the value for "Selection", press [Enter] to process your selection.

Error Messages:

If any value other than "1" through "6" is entered in the "Selection" field, the following message will be displayed in the center of the screen:

```
Press PF15 to continue
------------------------------------------------------------------------

     YOU MUST ENTER A VALUE FROM 1-6 INCLUSIVE TO CONTINUE.

------------------------------------------------------------------------
```

After you press [PF15], the cursor will be placed on the "Selection" field to allow you to enter a value between "1" and "6".

```
                UAMPPS:  Graphics Catalog Generation Menu


        Please enter below the Fully Qualified Data Set Name
        of the Graphics Catalog to be created or modified.

        Do not enclose the Data Set Name in Quotes


    Graphics Catalog DSN:  uidacct.UAM.SAMPLE.GCATLG


        Enter the NAME and Description of this graphic.  This
        information will be stored in the Graphics Catalog and
        will aid in identifying the plot.


                  Name: SLINE


             Description: NEW YORK 11JUL88 03 L1 B88 HRLY MAXC

     PF1/PF13=Help          PF3/PF15=Prev Menu          PF4/PF16=Main Menu
```

This screen provides you a way to permanently save any or all graphics you generate in a device independent SAS Graphics Catalog. Because this is a device independent file, you can replay these graphics later on any graphics device and change as many colors you desire.

You will be asked for the name of the data set that will contain the graphics catalog as well as some descriptive information that will aid in later identification of the plot. If the data set name you supply already exists, the file will be kept and the current graphic will be added to any existing graphics. No default data set name is supplied, but suggested descriptive information is furnished.

Instructions:

Enter the fully qualified name of the data set you wish use for the SAS Graphics Catalog in the space provided. Be sure NOT to enclose the data set name in quotes. If the data set already exists, it will be kept and the current graphic will be added to it. No default is supplied for this field.

The "Name" and "Description" fields are required and are used to aid in identifying the type of graphic in the catalog without displaying it on the terminal screen.

If meaningful values of "Name" and "Description" were supplied when the graphic was generated, you should be able to easily identify the graphic. For this reason, we recommend that you use the default values that are supplied, which are explained below.

Default values for the "Name" field are either "SLINE" or "MLINE", depending on whether a shaded or multiple line plot was generated, respectively. The default value of the "Description" field is always of the form:

study start-day species *L*n scenario stat

where:

study	=	the "STUDY" variable supplied in the Extract module
start-day	=	the Start date for this graphic
species	=	the species for which the graphic is being generated
n	=	the number of the level for which the graphic is being generated
scenario	=	the "SCENARIO" variable supplied in the Extract module
stat	=	the statistic chosen for this graphic, which will be "HRLY MAXC" or "HRLY AVGC" to indicate hourly maximum or average concentrations, respectively.

Thus, the default description for a shaded line plot showing the 1988 base year hourly maximum ozone concentration in the New York domain for level 1 on July 11, 1988 would be:

NEW YORK 11JUL88 O3 L1 B88 HRLY MAXC

and the default name would be "SLINE".

When you are done specifying all the necessary information, press [Enter] to process your selections.

If the data set you specified already exists, it will be kept and the current graphic will be added to it. If the data set does not exist, you will be asked if you want to create it. If you do not wish to create the data set, enter a "N" and press [Enter]. If you enter a "Y", you will be asked if you want to catalog or delete the data set upon deallocation. If you want the catalog and its contents to be saved for use in future SAS sessions, enter a "C" and press [Enter].

The screen will clear and the next screen displayed will be the PROC GREPLAY screen. For complete information on using PROC GREPLAY, see Chapter 36 of the Version 6 edition of the SAS/GRAPH User's Guide. When you are finished using the Graphics Catalog, press [PF15] to return to UAMPPS.

Error Messages:

None.

```
2.3
                    UAMPPS:  Spatial Graphic Selection


          Map Type: 1  1) Shaded Tile    2) Gridded Value

      Pattern Type: 1  1) Color          2) Monochrome

   Grid Annotation: 1  1) None           2) Col/Row        4) Lat/Lon

   City Annotation: 3  1) None  2) All   3) Subset Cities  4) Prev Subset

  Period of Interest:  Start Day 11JUL88  Hour  1
                       End Day   11JUL88  Hour 24

        Analysis: 1    1)  Average Concentration
                       2)  Maximum Concentration
                       3)  Hour of Maximum Concentration
                       4)  Concentration at a Given Hour
                       5)  Percent Difference
                       6)  Difference
                       7)  Maximum Concentration Difference

    PF1/PF13-Help        PF3/PF15-Prev Menu        PF4/PF16-Main Menu
```

This screen allows you to select the type of spatial graphic that you would like to create. You can choose to display either color or monochrome versions of a shaded tile or gridded value map, with various statistics being applied to create each of them.

Instructions:

Choose either a shaded tile or gridded value map by specifying either "1" or "2" in the "Map Type" field, respectively.

After selecting the type of graphic that you would like to display, you may then choose to display either a color or monochrome plot. Inserting a "1" in the "Pattern Type" field will yield a color plot; a value of "2" will generate a monochrome plot.

Next, you must decide the type of grid annotation that you want displayed on the chart. A "1" in the "Grid Annotation" field will display no annotation, a "2" will annotate rows and columns, and a "3" will display latitude/longitude annotation.

The "City Annotation" field allows you to determine what cities, if any, will be displayed on the map. Selection "1" displays no cities. Selection "2" displays all major cities within the domain; you may find that displaying all cities within the domain produces cluttered output. Selection "3" allows you to select the cities that you would like to display from the complete list. After you have decided on a subset of cities to display, you may repeat that subset on subsequent runs by selecting "4".

It is important to note here that the "City Annotation" selection "3" must be run before selection "4" can be used. The subset is not retained at the end of a session.

Also, if you choose to change domains within a session, you must run selection "3" to produce a valid subset for the new domain. For example, a previous subset (selection "4") for New York would not overlay on a domain for Atlanta.

You must then determine the "Period of Interest" for the particular type of graphic that you selected. This consists of starting and ending dates and times, with the values you specify corresponding to the extracted data you are going to use as input.

For example, if you have an extracted data set containing data for hours 1 to 24 on July 11, 1988, then you must enter "11JUL88" in the "Start Day" and "End Day" fields and may choose any range of hours between 1 and 24 for the "Start Hour" and "End Hour" fields. The only restriction is that the starting hour is less than the ending hour.

By filling out the "Analysis" field, you determine the type of statistic that is displayed in the graphic. The types of statistics corresponding to the various options are explained below.

Option 1 -- Average Concentration

Computes the average concentration for each cell in the domain over the period of interest and displays the result in the graphic.

Option 2 -- Maximum Concentration

Computes the maximum concentration for each cell in the domain over the period of interest and displays the result in the graphic.

Option 3 -- Hour of Maximum Concentration

Determines the hour at which the maximum concentration for each grid cell in the domain occurs over the period of interest, and displays the result in the graphic.

Option 4 -- Concentration at a Given Hour

Determines the concentration at the hour specified in the "Start Hour" field of this screen and displays the result on the graphic.

Option 5 -- Percent Difference

Computes the percent difference in concentration for two different input files for each cell in the domain over the period of interest, and displays the result in the graphic. Note that two Extract SAS-format data sets are needed to produce this graphic.

Option 6 -- Difference

Computes the straight difference in concentration for two different files for each cell in the domain over the period of interest, and displays the result in the graphic. Note that two Extract SAS-format data sets are needed to produce this graphic.

Option 7 -- Maximum Difference

Calculates the maximum concentration for each cell for each of the two input files; then displays the difference of the grid cell maximums. Note that two Extract SAS-format data sets are needed to produce this graphic.

When you are done specifying all the necessary information, press [Enter] to process your selections.

Error Messages:

All fields on this screen are required. Leaving the "Map Type" field blank or entering a value other than "1" or "2" will result in the following message:

```
Press PF15 to continue
------------------------------------------------------------------------

            ENTER 1 OR 2  -OR-  PRESS PF13 FOR HELP.
```

Also, the "Pattern Type", "Grid Annotation" and "City Annotation" fields must also contain values within their respective allowable ranges or a similar error will be displayed.

For the "City Annotation" field, selection "4" is only valid after the subset of cities has been created. Thus, choosing selection "4" before selection "3" will result in the following message:

```
Press PF15 to continue
------------------------------------------------------------------------

     SELECTION 4 ONLY VALID AFTER SELECTION 3 HAS BEEN RUN.
```

As with statistical graphics and temporal graphics (Sections 4.2.1 and 4.2.2), the spatial graphics "Date" fields require that the start date and hour precede the end date and hour. The "Date" fields must be valid SAS dates and the "Hour" fields must be between 1 and 24. Failure to follow these rules will result in the same error messages detailed in previous graphics selections.

For the "Analysis" field, any value other than "1" through "7" will result in the following message:

```
Press PF15 to continue

ANALYSIS VALUES MUST BE FROM 1-7 INCLUSIVE.  PLEASE REENTER.
```

For all of the above error messages, press PF15 to continue and the cursor will be positioned for data entry.

Spatial Graphics: Single Observation Data Set Selection Screen and Spatial Differences Data Set Selection Screen

```
                UAMPPS:  Data Set Selection

        Please enter the Fully Qualified Data Set Name for the
        extracted (species and level) UAM data set to be used
        for this graphic.

        Do not enclose the Data Set Name in quotes.

    Extracted Data Set:  uidacct.UAM.SASD.EXT.O3.X11JUL88.L1B88

     PF1/PF13=Help          PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

```
2.3.1
                UAMPPS:  Spatial Differences Data Set Selection

        Please enter the Fully Qualified Data Set Names for the
        extracted (Species and Level) UAM data sets to be used
        for this graphic.

        Order is important;  the dominant data set should be
        entered first.

        Do not enclose the Data Set Names in quotes.

    Extracted Data Set:  uidacct.UAM.SASD.EXT.O3.X11JUL88.L1B88

    Extracted Data Set:  uidacct.UAM.SASD.EXT.O3.X11JUL88.L2C01

     PF1/PF13=Help          PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

When difference or percent difference plots are created, the Spatial Differences Data Set Selection Screen is displayed; the Single Observation Data Set Selection Screen is displayed for all other statistic types. Both screens are similar in appearance and have the same function: to determine the name(s) of the data set(s) to be used to generate the graphic.

Regardless of the type of graphic generated, the input data sets must be Extract SAS-format data sets created by the Extraction module. They must be currently cataloged disk files on the NCC IBM mainframe containing data corresponding to the period of interest specified on the previous screen.

Instructions:

Enter the fully qualified name of the data set(s) you wish to process in the space(s) provided. Be sure not to enclose the data set name(s) in quotes. If you are creating a difference or percent difference plot, the order in which you enter the file names is important; the dominant data set should be entered first.

When you are done specifying all the necessary information, press [Enter] to process your selections.

Error Messages:

Because the "Extracted Data Set" field in all cases, leaving one (or both) data set names blank or entering data set names that do not exist will result in the following message:

```
Press PF15 to continue
   DATA SET DOES NOT EXIST.  PLEASE REENTER DATA SET NAME.
```

When you press [PF15], the message will disappear and the cursor will be placed at the appropriate field for data entry.

If the time period entered as "Start Day"/"End Day" and "Hour" fields on the previous screen (i.e., the Statistical Graphic Selection Screen) do not fall within the time period of data contained in the selected file, the following message will appear:

```
Press PF15 to continue
DATE/TIME RANGE ENTERED:
Start Day: 11JUL88    Hour:  1    End Day: 11JUL88    Hour: 24
OUTSIDE RANGE OF FILE DATE/TIME:
Start Day: 11JUL88    Hour: 13    End Day: 11JUL88    Hour: 24
 PLEASE ENTER A NEW FILE NAME -OR- RETURN TO PREVIOUS SCREEN
    BY PRESSING PF3/PF15 AND ENTER A NEW DATE/TIME RANGE.
```

When you press [PF15], the cursor will be placed on the "Extracted Data Set" field. At this point you must choose between entering another file name or returning to the Statistical Graphic Selection Screen (by pressing [PF3/PF15]) to change the period of interest.

```
2.3.1.1
                    UAMPPS:  Cities Located Within Domain

Place an S in the selection column for all cities to be displayed on map.

          Press PF20 to scroll down the list, PF19 to scroll up.

   After all selections have been made, press PF15 to save selections.

                    Selection        City

                        S        *BRIDGEPORT
                        -        *BRISTOL
                        -        *DANBURY
                        -        *FAIRFIELD
                        -        *GREENWICH
                        -        *HAMDEN
                        S        *HARTFORD
                        S        *MANCHESTER
                        -        *MERIDEN
                        -        *MILFORD

   PF1/PF13=Help          PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

If "City Annotation" field selection "3" was chosen on the Spatial Graphics Selection Screen, this screen will be displayed. It allows you to subset the cities within the domain covered by the Extract SAS-format data set.

Instructions:

All cities included in the SAS "Cities" data set that fall within the current domain will be present in the list of cities. The list may be several screens long. Scroll down the list by pressing (PF20); scroll up by pressing (PF19).

Place an "S" in the "Selection" column next to each city that you want in the cities subset. When you have completed the selection process, press (PF15) to save the subset. The screen will close and the next screen will be displayed.

Error Messages:

None.

2.3.2

UAMPPS: Spatial Plot Pattern Selection

Press PF20 to see the Statistical Composition of the Data.

Select the appropriate class breaks and corresponding colors or patterns
The available colors and patterns for your device are specified below.

Class	Default Cutoff Value	Assigned Cutoff Value	Assigned Color/Pattern
1	< 82	< 80	BLUE
2	< 96	< 95	CYAN
3	< 110	< 110	GREEN
4	< 124	< 125	YELLOW
5	< 138	< 140	PINK
6	>,= 138	>,= 140	RED

Available Colors (for Color plots)

BLUE CYAN GREEN YELLOW PINK RED WHITE

Available Patterns (for Monochrome Tile plots)

E M1N45 M3N45 M4N45 M5N45 S

PF1/PF13=Help PF3/PF15=Prev Menu PF4/PF16=Main Menu

2.3.2

UAMPPS: Statistical Composition of Data

Press PF19 to return to the Pattern Selection Menu.

Percentile	Value	Percentile	Value
5	81.4	55	126.3
10	89.9	60	129.6
15	94.1	65	132.3
20	97.1	70	134.8
25	99.1	75	138.4
30	105.1	80	140.7
35	110.6	85	143.5
40	115.5	90	145.5
45	119.4	95	148.8
50	122.2		

Minimum Value: 68.4 Maximum Value: 154.5

Number of Records: 667

PF1/PF13=Help PF3/PF15=Prev Menu PF4/PF16=Main Menu

4. SCREEN

Spatial Graphics: Spatial Plot Pattern Selection Screen and Statistical Composition of Data Screen (continued)

The Statistical Composition of Data Screen is really the second page of the Spatial Plot Pattern Selection Screen, and is accessed by pressing [PF20] when the Spatial Plot Pattern Selection Screen is displayed.

The purpose of the Statistical Composition of Data Screen is to provide you the information necessary to enter the cutoff values on the Spatial Plot Pattern Selection Screen. Based on the statistic chosen on the Spatial Graphic Selection Screen, you will be presented with the values of the data to be plotted broken down into several percentiles. Thus, you can determine the approximate percent of the data that will be contained in the cutoff ranges you select.

The Spatial Plot Pattern Selection Screen allows you to select cutoff values for the class breaks and a corresponding color or monochrome fill pattern to be displayed on the graphic.

NOTE: Neither of these screens will be displayed if you are generating a monochrome gridded value map.

Instructions:

The column labeled "Default Cutoff Value" offers a suggestion of six cutoff values derived from the data range detailed on the Statistical Composition of Data Screen. You may enter these values in the "Assigned Cutoff Value" fields or select your own values. The only restriction is that all six fields must have a value, and the values must be in ascending magnitude from top to bottom. Note that the logical operator preceding the "Assigned Cutoff Value" field will be used to subset the data for this class.

For example, in the sample screen listed above, the following class breaks are defined.

Class 1-- All data values less than 80 will be colored blue.

Class 2-- All data values greater than or equal to 80 but less than 95 will be colored cyan.

Class 3-- All data values greater than or equal to 95 but less than 110 will be colored green.

Class 4-- All data values greater than or equal to 110 but less than 125 will be colored yellow.

Class 5-- All data values greater than or equal to 125 but less than 140 will be colored pink.

Class 6-- All data values greater than or equal to 140 will be colored red.

You must also enter a color or monochrome fill pattern in the corresponding "Assigned Color/Pattern" field. We recommend that you choose from the colors listed at the bottom of this screen, because these colors are supported by the device you specified on the Graphic Selection Screen. Also, the available monochrome patterns that are listed have proved to yield good results, so they should be used when pattern fills are needed.

Note that values for "Assigned Cutoff Value" and "Assigned Color/Pattern" fields are retained from the previous run. If you change species, levels, or analysis types, the cutoff values may not adequately represent the range of values present. Always refer to the "Default Cutoff Value" column or the Spatial Composition of Data Screen before selecting cutoff values.

Error Messages:

If the Class 1 "Cutoff Value" field is left blank or if any "Color/Pattern" field is left blank, then the following message is displayed:

```
Press PF15 to continue

              VALUE REQUIRED AT CURSOR LOCATION.
```

Each succeeding "Cutoff Value" field must be greater than the preceding one. If this is not true or if one of the value fields is left blank, then a message similar to the following is displayed:

```
Press PF15 to continue

      CUTOFF VALUE 3 MUST BE GREATER THAN CUTOFF VALUE 2.
```

Press [PF15] and enter a corrected value at the cursor location.

```
                UAMPPS:  Graphic Title/Description Specification

 Enter requested information. Skip fields not desired. Do not use quotes.

                TEXT                                  COLOR     FONT     SIZE
Title #1
AVERAGE O3 CONCENTRATION FOR LEVEL 1                  WHITE     NONE     1.0
Title #2
BETWEEN THE HOURS OF 1 AND 24                         WHITE     NONE     1.0
Footnote #1
                                                      WHITE     NONE     1.0
Footnote #2
                                                      WHITE     NONE     1.0
Vertical Axis
                                                      WHITE     NONE     1.0
Horizontal Axis
CONCENTRATION (PPB)                                   WHITE     NONE     1.0

      PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

In this screen, you specify default titles, footnotes, and axes labels along with their respective color, font, or text size.

Instructions:

You can specify up to two titles and two footnotes for any given graphic. Simply type the text of the title or footnote in the fields called "TEXT" and then choose the corresponding color, font, and size. You should be sure that the color you specify is supported by the device you are using. Generally, it is a good idea to use "WHITE" for display on a terminal and "BLACK" for printing on a hard-copy device.

Next you will want to choose a font to print the text of your title or footnote. A value of "NONE" tells the system to use the hardware characters of the device to compose the text. This is usually a very simple font, but suitable for most applications. The "NONE" font is also drawn faster than any other font, so it should be used if saving time is important and also for previewing graphics.

Finally, you will need to specify the size of the characters printed in the title or footnote. We recommend that you use "1.0" in the "SIZE" field first, and then change it if you find that the result is not acceptable. Using a large value of "SIZE" can cause awkward looking titles.

Keep in mind that titles and footnotes take up space which can be used for the displaying of the graphic. Thus, if you specify two titles and two footnotes, the actual graphic will be smaller than if you specified one title and one footnote. Similarly, the size (specified in the "SIZE" field) of the title or the footnote affects the size of the display area for the graphic. For this reason, you should judiciously choose the number and size of the titles and footnotes that you use.

The "Vertical Axis" label is not used in spatial plots. The "Horizontal Axis" label field is used as the "Legend" label and its "COLOR", "FONT", and "SIZE" fields determine the color, font, and size of the text used in the legend.

When you are done specifying all the necessary information, press [Enter] to process your selections.

Error Messages:

The "Title #1" field is required for all graphics. If the title line is left blank or if its "COLOR", "FONT", or "SIZE" fields are left blank, the following message is displayed:

```
Press PF15 to continue

        A VALUE IS REQUIRED AT THE CURSOR LOCATION.
```

The "Horizontal Axis" field is required for this graph type. If it is left blank, the following message is displayed:

```
Press PF15 to continue

    A VALUE IS REQUIRED IN THIS FIELD FOR THIS GRAPH TYPE.
```

If the corresponding "COLOR", "FONT", and "SIZE" fields are left blank, the following message will occur:

```
Press PF15 to continue

        A VALUE IS REQUIRED AT THE CURSOR LOCATION.
```

If any of the above error messages is encountered, press [PF15] and enter the required data at the cursor location.

Spatial Graphics: Value Calculation Message Screen

```
                    UAMPPS:  Value Calculation Message

            Press ENTER to Calculate Values and DISPLAY Graph

                    Process could take several minutes.


      PF1/PF13=Help          PF3/PF15=Prev Menu          PF4/PF16=Main Menu
```

```
                    CALCULATING VALUES AND PLOTTING GRAPH
AFTER SCREEN GRAPHIC HAS BEEN CREATED, PRESS ENTER FOR DISPOSITION OPTIONS
```

The Value Calculation Message Screen provides status information.

Instructions:

The upper screen frame will appear after you have entered the necessary title and label information in the Graphic Title/Description Specification Screen. The screen informs you that there will be a perceptible delay, while the intensive calculations required to construct the graph are performed. Press [Enter] to continue.

After you press [Enter], the lower screen frame will appear and remain on until the next screen in the sequence is displayed. On some devices, the "Calculating Values and Plotting Graph" message will blink.

Error Messages:

None.

```
                    UAMPPS:  Termination Selection


                 Choose the Action you would like to take.


        1)  Change Device, Plot Type, or Starting/Ending Conditions
        2)  Change Input Data Sets
        3)  Change Cutoff Ranges or Titles

        4)  Redisplay the Graphic
        5)  Save the Graphic

        6)  Exit UAMPPS Graphic Module (Without Saving Graphic)


 Selection:  5
```

The Termination Selection Screen provides you with a number of options for saving, redisplaying, modifying, or recreating graphics as well as exiting the UAMPPS Graphics module.. Depending on your response, you will be transferred to the appropriate screen, where you can make any changes. The screens always execute in the same order as previously specified.

Instructions:

A value between "1" and "6" must be entered in the "Selection" field at the bottom of this screen. A description of the six possible options follows. If you would like more information regarding any screen discussed below, please refer to the detailed screen descriptions presented earlier in this section.

Option 1 -- Change Device, Plot Type or Starting/Ending Conditions

Selecting this option returns you to the Graphic Selection Screen, where you can change the device type or the type of graphic being generated. After making any changes and processing the selections, the Spatial Graphic Selection Screen will be displayed, allowing you to change the starting and/or ending conditions.

Option 2 -- Change Input Data Sets

When this option is selected, either the Single Observation Data Set Selection Screen or the Spatial Differences Data Set Selection Screen is displayed, depending on the type of plot that you originally chose. It is assumed that you would like to generate the same type of graphic with the same starting and ending conditions, but with different data displayed. Simply supply the new name(s) of the data set(s) on this screen.

Spatial Graphics: Termination Selection Screen (concluded)

Option 3 -- Change Cutoff Ranges or Titles

The Spatial Plot Pattern Selection Screen is displayed when this option is chosen, which allows you to change the class breaks and colors or patterns. Recall that the Statistical Composition of the Data Screen, which gives a statistical breakdown of the data by percentile, can be accessed by pressing [PF20].

Option 4 -- Redisplay the Graphic

Selecting this option will cause the graphic that was just viewed to be redisplayed on your terminal screen. This option is mostly for your convenience, to allow you a quick method of reviewing the last graphic without going through all the steps to recreate it.

Option 5 -- Save the Graphic

The Graphics Catalog Generation Screen (discussed later in this section) is displayed when you choose this option. This screen allows you to specify the name of the data set that will contain the SAS Graphics Catalog as well as descriptive fields that will later aid in the identification of the graphic.

Option 6 -- Exit UAMPPS Graphic Module (Without Saving Graphic)

As the title indicates, selecting this option will cause you to leave the UAMPPS graphics module without saving the graphic that was just created. All open files will be closed and you will be returned to the main menu.

When you are done specifying the value for "Selection", press [Enter] to process your selection.

Error Messages:

If any value other than "1" through "6" is entered in the "Selection" field, the following message will be displayed in the center of the screen:

```
Press PF15 to continue

    YOU MUST ENTER A VALUE FROM 1-6 INCLUSIVE TO CONTINUE.
```

After you press [PF15], the cursor will be placed on the "Selection" field to allow you to enter a value between "1" and "6".

```
UAMPPS                    Graphics Catalog Generation

        Please enter below the Fully Qualified Data Set Name
        of the Graphics Catalog to be created or modified.

        Do not enclose the Data Set Name in Quotes

    Graphics Catalog DSN:  uidacct.UAM.SAMPLE.GCATLG

        Enter the NAME and Description of this graphic.  This
        information will be stored in the Graphics Catalog and
        will aid in identifying the plot.

                  Name: CTILE

           Description: NEW YORK 11JUL88 03 L1 B88 AVG CONC

     PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

This screen allows you to permanently save any or all graphics that you generate in a device independent SAS Graphics Catalog. Because this is a device independent file, you can replay these graphics later on any graphics device and change as many colors you desire.

You will be asked for the name of the data set that will contain the graphics catalog as well as some descriptive information that will aid in later identification of the plot. If the data set name you supply already exists, the file will be kept and the current graphic will be added to any existing graphics. No default data set name is supplied, but suggested descriptive information is furnished.

Instructions:

Enter the fully qualified name of the data set you wish use for the SAS Graphics Catalog in the space provided. Be sure not to enclose the data set name in quotes. If the data set already exists, it will be kept and the current graphic will be added to it.

The "Name" and "Description" fields are required and are used to aid in identifying the type of graphic in the catalog without displaying it on the terminal screen.

Spatial Graphics: Graphics Catalog Generation Screen (concluded)

If meaningful values of "Name" and "Description" were supplied when the graphic was generated, you should be able to easily identify the graphic. For this reason, we recommend that you use the default values that are supplied, which are explained below.

Default values for the "Name" field are either "CTILE" or "CVALUE" for color tile and gridded value maps, respectively and "MTILE" or MVALUE" for monochrome tile and gridded value maps, respectively. The default value of the "Description" field is always of the form:

study start-day species *L*n scenario stat

where:

study	=	the "STUDY" variable supplied in the Extract module
start-day	=	the Start date for this graphic
species	=	the species for which the graphic is being generated
n	=	the number of the level for which the graphic is being generated
scenario	=	the "SCENARIO" variable supplied in the Extract module
stat	=	the statistic chosen for this graphic, which will be one of the following: "AVG CONC" or "MAX CONC" for average and maximum concentrations, respectively, "HR OF MAX" for hour of maximum concentration, "CONC AT HR start-time" for concentration at a given hour, where start-time is the value of the starting hour specified on the Spatial Graphic Selection Screen, "PCT DIFF" or "DIFF" for percent difference and difference, respectively.

Thus, the default description for a color shaded tile map for the New York domain showing the average base year 1988 ozone concentration for level 1 on July 11, 1988 would be:

NEW YORK 11JUL88 O3 L1 B88 AVG CONC

and the default name would be "CTILE".

When you are done specifying all the necessary information, press [Enter] to process your selections.

If the data set you specified already exists, it will be kept and the current graphic will be added to it. If the data set does not exist, you will be asked if you want to create it. If you do not wish to create the data set, enter a "N" and press [Enter]. If you enter a "Y", you will be asked if you want to catalog or delete the data set upon deallocation. If you want the catalog and its contents to be saved for use in future SAS sessions, enter a "C" and press [Enter].

The screen will clear and the next screen displayed will be the PROC GREPLAY screen. For complete information on using PROC GREPLAY, see Chapter 36 of the Version 6 edition of the SAS/GRAPH User's Guide. When you are finished using the Graphics Catalog, press [PF15] to return to UAMPPS.

Error Messages:

None.

4.3 GRAPHICS CATALOG

Within the SAS data management system, the Graphics Catalog is the storage area for the graphics command string that produces graphic output from the processed data. The resulting graphic data can be "replayed" to redisplay the graphic much more rapidly than repeating the graphic generation process. A temporary graphics catalog is always produced when SAS graphics procedures are run, but this temporary catalog and its contents are lost when the SAS session is concluded.

To save graphics output between SAS sessions, you must specify a permanent graphics catalog. The "Save the Graphic" option on the Termination Selection Screen of the graphics creation module allows you to create a permanent SAS graphics catalog and to store graphics output in it. To redisplay, merge graphics, remap colors, or otherwise manipulate the stored graphics, you must run the SAS GREPLAY procedure. GREPLAY may be run from the TSO Ready prompt by executing the SAS CLIST and subsequently submitting PROC GREPLAY to the system with the proper parameters. The Graphics Catalog management section of the UAMPPS allows you a "shortcut" to access PROC GREPLAY from the UAMPPS menu system.

Graphics Catalog: Catalog Management Menu Screen

```
UAMPPS 3.0
                    Graphic Catalog Management Menu


        Please enter below the Fully Qualified Data Set Name
        of the Graphics Catalog to be created or modified.

        Do not enclose the Data Set Name in Quotes.

    Graphics Catalog DSN:  uidacct.UAM.OAOPS.GCATLG

    Graphics Device      :  IBM3179


      PF1/PF13=Help        PF3/PF15=Prev Menu        PF4/PF16=Main Menu
```

If you choose the "Graphics Catalog" block on the main menu, you will find yourself in the above screen. This screen is intended to be a quick way for you to access PROC GREPLAY from within the UAMPPS. You may create a graphics catalog from this screen or access any existing one.

Instructions:

Enter the fully qualified data set name for the Graphics Catalog. (Do not confuse this data set name with the extracted UAM data sets.)

Also, enter your graphics device.

When you press [Enter], the screen will clear and the next screen displayed will be the PROC GREPLAY screen.

When you have finished using PROC GREPLAY, press [PF15] to return to the main menu.

Error Messages:

None.

```
PROC GREPLAY
  Command ---->

  IGOUT:  GOUT.PLOTS          GOUT:                    Device:  IBM3179
  TC:                         Template:                Scroll:  PAGE
  CC:                         Cmap:

  Sel   Name        Type  Description                          Updated
  ___   BAR          I    NEW YORK 11JUL88 03 L1 B88 GT THRESH  09/30/91
  ___   BOX          I    NEW YORK 11JUL88 03 L1 B88 HRLY CONC  09/30/91
  ___   SLINE        I    NEW YORK 11JUL88 03 L1 B88 HRLY MAXG  09/30/91
  ___   CVALUE       I    NEW YORK 11JUL88 03 L1 B88 HR OF MAX  09/30/91
  ___   CTILE        I    NEW YORK 11JUL88 03 L1 B88 PCT DIFF   09/30/91
  ___   ___         _    ___________________________________   ________
  ___   ___         _    ___________________________________   ________
  ___   ___         _    ___________________________________   ________
  ___   ___         _    ___________________________________   ________
  ___   ___         _    ___________________________________   ________
  ___   ___         _    ___________________________________   ________
  ___   ___         _    ___________________________________   ________
  ___   ___         _    ___________________________________   ________
  ___   ___         _    ___________________________________   ________
  ___   ___         _    ___________________________________   ________
  ___   ___         _    ___________________________________   ________
```

Field:	*Description:*
"IGOUT"	The name of the input catalog (the catalog currently displayed).
"GOUT"	The name of the output catalog (the catalog to which the graphic will be replayed or copied).
"Device"	The graphics device on which the graphic will be displayed (generally the current graphics device).
"TC"	The template catalog containing the template to be used when displaying the graphic (leave blank if no template is used).
"Template"	The name of the template to be used to display the graphic (leave blank if no template is used).
"Scroll"	The current scroll value for an entry list greater than one screen in length.
"CC"	The color map catalog from which the color map is drawn.
"Cmap"	The name of the color map used to display the graphic (leave blank if no color map is used).
"Sel"	The selection field; used to enter commands that apply to the corresponding catalog entry.

Graphics Catalog: GREPLAY Screen (concluded)

Field:	*Description:*
"Name"	The name that was assigned to the graphic by the "Name" field on the Graphics Catalog Generation screen.
"Type"	The type of graphics output. See Chapter 3 of SAS/GRAPH Reference for more information.
"Description"	The description that was assigned to the graphic by the "Description" field on the Graphics Catalog Generation screen.
"Updated"	The date that the catalog entry was generated.

Instructions:

Display a graphic:
Place an **S** in the "Sel" field and press [Enter].

Delete a graphic:
Enter **DEL** in the "Sel" field and press [Enter].

Copy a graphic:
Place a **C** in the "Sel" field and press [Enter]. The graphic entry will be copied to the catalog specified in the "GOUT" field.

Display a graphic (or graphics) in a template:
Enter a template catalog name in the "TC" field and the name of the template in the "Template" field. Next select the graphic (or graphics) from the catalog list by placing an **S** and a number (or numbers, i.e. **S1**, **S2**, etc.) in the "Sel" field(s) indicating the order in which to display the graphics in the template. Press [Enter].

Change the colors in a graphic:
Enter a color map catalog name in the "CC" field and the name of the color map in the "Cmap" field. Next select the graphic from the catalog list by placing an **S** in the selection field. Press [Enter].

Create or edit a template:
Enter a template catalog name in the "TC" field.
On the command line type: **edit templatename.TEMPLATE**, then press [Enter]. The TEMPLATE DESIGN window will be displayed for editing of the template. See SAS/GRAPH Reference (pages 1241-1244) for additional information on the TEMPLATE DESIGN window.

Create or edit a color map:
Enter a color map catalog name in the "CC" field.
On the command line type: **edit colormapname.CMAP**, then press [Enter]. The COLOR MAPPING window will be displayed for editing of the color map. See SAS/GRAPH Reference (pages 1244-1245) for additional information on the COLOR MAPPING window.

Change the current catalog:
Enter the new catalog name in the "IGOUT" field and press [Enter]. The new catalog list will be displayed.

SECTION 5

SYSTEM INPUT

Input for the UAMPPS Extract module consists of two UAM files:

(1) the UAM "average" prediction file-- an output file from the UAM.

(2) the UAM "boundary" file--a UAM input file.

The boundary file is used in the UAMPPS to establish geographical limits for processing data contained in the prediction file. The prediction file contains concentration values (one value for each hour) based on an average of the values for the preceding hour. For example, the first concentration is the average of the values that were calculated between hour 0 and the end of the first hour. The UAM Average Prediction file contains data for 24 species and a variable number of vertical levels and hours.

The UAM average prediction file is divided into two types of records: header records and time varying records.

There are four header records. These records contain information on the domain, species, time frame, and control strategy for the data contained in the file. The first header record describes the chemical and temporal nature of the file. The second record describes the spatial characteristics of the domain. The third record describes the layout of the concentration data records in records that follow. The last header record contains the names of the species contained in the UAM file.

Following the header records, the prediction file contains time varying data consisting of three types of data records. The first record provides temporal information for the next two data record types. The segment record indicates which segment the following data represents. Current UAM implementations support only one segment. The basic data record contains a grid of concentration values for each species and vertical level.

The header record for the boundary file is identical to that of the prediction file. Following the header record, the boundary file contains both time invariant and time varying data. The time invariant data

defines the boundaries of the region, both the external boundaries defined in the data preparation and the internal segment interfaces created when the region is segmented. For each segment there are four Boundary Definition Records, one record for each edge (Left, Right, Bottom and Top). Each Boundary Definition Record defines the location of the boundary cells at an edge of a segment. The time varying data consists of two record types, one set for each time interval. The first record provides temporal information for the data records. The boundary concentration records are in groups of four records (one for each edge) for each species and contain boundary concentration information on the vertical plane along the edge.

Appendix A provides a detailed description of the UAM file formats.

SECTION 6

SYSTEM OUTPUT

6.1 FORMAT

Output from the UAMPPS Extract module may take one of two forms depending on the user's response on the Extract Module Startup Screen.

(1) A response of "N" produces a SAS-formatted data set, which can be used for input to the UAMPPS or UAMPES Graphics modules.

(2) A response of "Y" produces a generic text file for export to other systems.

The **SAS-formatted data set** consists of two members: a concentration file and a descriptive file.

The concentration file contains a record for each grid cell--i.e., 24 hourly concentration values along with the identifying information for the type of species, vertical level, scenario, data, and row and column location in the domain. Files containing more than 24 hours will have more than one record for each grid cell. This method of storing the data allows for variability in the domain size without the limitations on record length that might arise from a gridded format.

The descriptive file contains the information from the UAM output file header. This information is especially important for the graphics procedures that create spatial plots requiring geometric information about the domain. It is also very important for interfacing with Geographic Information System (GIS) applications and utilities.

If you are familiar with SAS system software, this SAS data set can be exported and used to generate other types of graphics, reports, or statistical analyses.

The **generic text file** format consists of straight EBCDIC (or ASCII) text fields separated by one blank space. The first four records contain the file descriptive information. The remaining records contain the file concentration data.

More detailed descriptions of the extracted file formats are presented in Appendix B and Appendix C.

6. SYSTEM OUTPUT

6.2 SAS GRAPHICS CATALOG

The graphics images that you generate with the UAMPPS can be saved to a SAS Graphics Catalog for later use. A discussion of generating and saving graphics is covered in Sections 4.2.1 (Statistical Graphics), 4.2.2 (Temporal Graphics), and 4.2.3 (Spatial Graphics).

Once a graphic is saved in the catalog, it can be replayed using PROC GREPLAY and the image can be displayed on any of the SAS-supported devices, regardless of the device on which it was generated. For example, if you created a graphic using an IBM 3179G terminal and saved it to a graphics catalog, you can use PROC GREPLAY to display this graphic on a Tektronix 4211 terminal or any other device supported by SAS. A discussion of hardware devices supported by SAS can be found in Chapter 4 of the Version 6 edition of the SAS/GRAPH User's Guide.

By using a color map, you can change any or all of the colors of a graphic when replaying it from a graphics catalog. For example, if all of the titles of a particular graphic were white when you saved the graphic, you may use a color map to change white to red. Note that, not only the titles, but anything that was printed in white will be printed in red. Explanations and examples of color mapping with PROC GREPLAY can be found in Chapter 36 of the Version 6 edition of the SAS/GRAPH User's Guide pp. 1198, 1224, 1244, 1254, 1255.

For further information about graphics catalogs and replaying the graphics, you should consult Chapters 3 and 36 of the SAS/GRAPH User's Guide.

APPENDIX A

UAM OUTPUT FILE FORMAT

The UAM files contain several types of logical records broadly defined in two categories: header records and data records. The header records serve to define the temporal and spatial characteristics of the model run (Tables A-1 and A-3). The data records contain the actual concentration data as well as indicators for species and hour (Tables A-2 and A-4).

TABLE A-1. AVERAGE CONCENTRATION FILE HEADER RECORD DEFINITIONS

Each UAM output file contains four header records containing information on the domain, species, time frame, and control strategy for the data contained in the file. The file produced by the UAM is a binary file.

Variable	Type	Length	Field length	Description
Header Record 1 (model description) describes the chemical and temporal nature of the data in the file.				
FILNAM	Character	10	10	Heading information
FILEID	Character	60	60	Heading information
NOSEG	Integer	4	2	Number of segments
NOSPEC	Integer	4	2	Number of species
IDATB	Integer	4	6	Starting date for model run
TIMBEG	Float	4	6	Starting time for model run
JDATET	Integer	4	6	Ending date for model run
TIMEND	Float	4	6	Ending time for model run
Header Record 2 (domain description) describes the geometry of the domain.				
XREF	Float	4	10	Reference origin (x-direction)
YREF	Float	4	10	Reference origin (y-direction)
IUTM	Integer	4	3	UTM zone
XORG	Float	4	10	Origin of grid (x-direction)
YORG	Float	4	10	Origin of grid (y-direction)
DELTAX	Float	4	6	Grid interval (x-direction)
DELTAY	Float	4	6	Grid interval (y-direction)
NOXG	Integer	4	4	Number of columns in grid (x)
NOYG	Integer	4	4	Number of rows in grid (y)
NOZG	Integer	4	4	Number of vertical levels in grid (z)
NCELL1	Integer	4	4	Number of vertical levels in lower layer
NCELL2	Integer	4	4	Number of vertical levels in upper layer
SURFHT	Float	4	7	Height to base of surface level, m
HTMIN1	Float	4	7	Minimum height of lower level, m
HTMIN2	Float	4	7	Minimum height of upper level, m
Header Record 3 (data description) describes the layout of the concentration data records.				
ILOCX	Integer	4	5	Dummy
ILOCY	Integer	4	5	Dummy
NOX	Integer	4	5	Number of data values in x-direction
NOY	Integer	4	5	Number of data values in y-direction
Header Record 4 (file contents) contains the names of the species contained in the file.				
MSPEC	Character	10	10	Species name

TABLE A-2. AVERAGE CONCENTRATION FILE DATA RECORD DEFINITIONS

Variable	Type	Length	Field length	Description
Data Record 1 (temporal information) provides the start and end time for the following data block.				
IBGDAT	Integer	4	10	Starting date for data block
GETTIM	Integer	4	10	Starting time for data block
IENDAT	Float	4	10	Ending date for data block
ENDTIM	Float	4	10	Ending time for data block
Data Record 2 (segment record) indicates the segment (always one segment) and the species name of the following data block.				
ISEG	Integer	4	4	Segment indicator
FILNAM	Character	10	10	Species name
Data Record 3 (concentration record) contains the actual data for the model run. (This record repeats with nine values per physical record until all data in all logical rows and columns are complete.)				
CONC	Float			Concentrations, in units of ppm

TABLE A-3. BOUNDARY FILE HEADER RECORD DEFINITIONS

All UAM input and output files have a similar overall file structure. The header record information for the UAM Boundary input file is identical to that of the Average concentration output file. Following the header records are two categories of data records: regional boundary data and time-interval concentration data.

Variable	Type	Length	Field length	Description
Header Record 1 (model description) describes the chemical and temporal nature of the data in the file.				
FILNAM	Character	10	10	Heading information
FILEID	Character	60	60	Heading information
NOSEG	Integer	4	2	Number of segments
NOSPEC	Integer	4	2	Number of species
IDATB	Integer	4	6	Starting date for model run
TIMBEG	Float	4	6	Starting time for model run
JDATET	Integer	4	6	Ending date for model run
TIMEND	Float	4	6	Ending time for model run
Header Record 2 (domain description) describes the geometry of the domain.				
XREF	Float	4	10	Reference origin (x-direction)
YREF	Float	4	10	Reference origin (y-direction)
IUTM	Integer	4	3	UTM zone
XORG	Float	4	10	Origin of grid (x-direction)
YORG	Float	4	10	Origin of grid (y-direction)
DELTAX	Float	4	6	Grid interval (x-direction)
DELTAY	Float	4	6	Grid interval (y-direction)
NOXG	Integer	4	4	Number of columns in grid (x)
NOYG	Integer	4	4	Number of rows in grid (y)
NOZG	Integer	4	4	Number of vertical levels in grid (z)
NCELL1	Integer	4	4	Number of vertical levels in lower layer
NCELL2	Integer	4	4	Number of vertical levels in upper layer
SURFHT	Float	4	7	Height to base of surface level, m
HTMIN1	Float	4	7	Minimum height of lower level, m
HTMIN2	Float	4	7	Minimum height of upper level, m
Header Record 3 (data description) describes the layout of the concentration data records.				
ILOCX	Integer	4	5	Dummy
ILOCY	Integer	4	5	Dummy
NOX	Integer	4	5	Number of data values in x-direction
NOY	Integer	4	5	Number of data values in y-direction
Header Record 4 (file contents) contains the names of the species contained in the file.				
MSPEC	Character	10	10	Species name

TABLE A-4. BOUNDARY FILE DATA RECORD DEFINITIONS

Variable	Type	Length	Field length	Description
Data Records 1-4 (regional boundary data) Four Boundary Definition Records, one record for each edge. The edges are defined as follows: 1 Left West Lower limit column index for each row 2 Right East Upper limit column index for each row 3 Bottom South Lower limit row index for each column 4 Top North Upper limit row index for each column				
Each Boundary Definition Record defines the location of the boundary cells at an edge of a segment. The first three fields identify the edge and its dimensions:				
SEGNUM	Integer	4	4	Segment number (must be 1).
EDGNUM	Integer	4	4	Edge number.
CELNUM	Float	4	4	Number of cells on edge (i.e., number of rows and columns).
The next four fields define the boundary location for the grid index (row or column) along each edge:				
INDEX	Integer	4	4	Index, within the segment, of the cell at the edge of the region modeled. If 0, row or column is omitted from the simulation and the next three numbers are ignored.
SEGADJ	Integer	4	4	Segment number in which adjacent cell is located. If 0, boundary is external and next two numbers are ignored.
XINDEX	Integer	4	4	*x*-index of adjacent cell within segment defined by SEGADJ.
YINDEX	Integer	4	4	*y*-index of adjacent cell within segment defined by SEGADJ.
Data Records 5+ (time-interval concentration data) contains one set of the following records for each time interval. Time Interval Record contains four fields:				
BEGDATE	Integer	4	4	Beginning date (Julian).
BEGTIME	Float	4	4	Beginning time (hours).
ENDDATE	Integer	4	4	Ending date (Julian).
ENDTIME	Float	4	4	Ending time (hours).
For each segment in the region, there is a set of Boundary Concentration Records, grouped by species, with four records (one for each edge) for each species.				
SEGNO	Integer	4	4	Segment number (must be 1).
SPECIES	Character	10	10	Species name.
EDGENO	Integer	4	4	Edge number.
BDRYCONC	Float			Boundary concentrations at each vertical level for each cell along the edge. For rows or columns that are not to be simulated and for edges that represent internal segment boundaries, these numbers must be present but will be ignored.

APPENDIX B

EXTRACTED SAS DATA SET FORMAT

TABLE B-1. FIELDS IN SAS-FORMAT SPECIES/VERTICAL LEVEL EXTRACTION FILES OF MODEL CONCENTRATION DATA

Variable	Type	Length	Description
DATATYPE	Character	8	Type of model concentration data
STUDY	Character	8	Name of study selected for retrieval
SCENARIO	Character	8	Name of modeling scenario selected
SPECIES	Character	8	Code for a species selected-- e.g., "O3" for ozone
LEVEL	Character	4	Code for a vertical level selected-- e.g., "1" for level 1
SP	Numeric	8	Ordinal number of SPECIES for the model-- e.g., "3" for ozone.
LV	Numeric	8	Ordinal number of LEVEL for the model-- e.g., "2" for level 2.
CONCDATE	Numeric	8	Date of the data in this record, in SAS date format
ROW	Numeric	8	Row number of the model grid cell to which data in this record pertain
COL	Numeric	8	Column number of the model grid cell to which data in this record pertain
CONC(24)	Numeric	8*24	Concentration of SPECIES at each hour of the day specified by CONCDATE. These values may be referenced as separate fields (CONC1, ..., CONC24) or as an array (CONC{1}, ..., CONC{24}).

TABLE B-2. FIELDS IN SAS-FORMAT HEADER EXTRACTION FILES OF MODEL CONCENTRATION DATA

Variable	Type	Length	Description
DELTA_X	Numeric	8	Grid interval in *x*-direction, meters
DELTA_Y	Numeric	8	Grid interval in *y*-direction, meters
E_DAY	Numeric	8	Ending day, Julian
E_TIME	Numeric	8	Ending time, hour
EN_DATE	Character	7	Ending date, DDMMMYY
FILEID	Character	60	File identifier comment
FILENAME	Character	10	File name, e.g. 'AVERAGE'
MINHT_L	Numeric	8	Minimum height to lower level, meters
MINHT_U	Numeric	8	Minimum height to upper level, meters
NUM_COL	Numeric	8	Number of columns
NUM_HRS	Numeric	8	Time interval covered by file, hours
NUM_LEV	Numeric	8	Number of vertical levels
NUM_ROW	Numeric	8	Number of rows
NUM_SEG	Numeric	8	Number of segments
NUM_SPEC	Numeric	8	Number of species
NUMLEV_L	Numeric	8	Number of levels in lower layer
NUMLEV_U	Numeric	8	Number of levels in upper layer
NUMVAL_X	Numeric	8	Number of values in *x*-direction
NUMVAL_Y	Numeric	8	Number of values in *y*-direction

(continued)

TABLE B-2 (concluded).

Variable	Type	Length	Description
S_DAY	Numeric	8	Starting day, Julian
S_TIME	Numeric	8	Starting time, hour
ST_DATE	Character	7	Starting date, DDMMMYY
SURF_HT	Numeric	8	Height to base of surface level, meters
UTM_ZONE	Numeric	8	UTM zone
X_ORG	Numeric	8	*x*-coordinate of grid origin (UTM Easting), meters
Y_ORG	Numeric	8	*y*-coordinate of grid origin (UTM Northing), meters
X_REF	Numeric	8	*x*-coordinate of reference origin, meters
Y_REF	Numeric	8	*y*-coordinate of reference origin, meters
SPEC(24)	Character	40	Available species in the base UAM file. These values may be referenced as separate fields (SPEC1, ..., SPEC24) or as an array (SPEC{1}, ..., SPEC{24}).

APPENDIX C

EXTRACTED TEXT FILE FORMAT

TABLE C-1. FIELDS IN EXTRACTED TEXT-FORMAT FILES

(A) The following fields occur in sequence (each separated by a single space), once at the beginning of the file.

Variable	Type	Description
FILENAME	Character	File name, e.g. 'AVERAGE'
FILEID	Character	File identifier comment
NUM_SEG	Character	Number of segments
NUM_SPEC	Character	Number of species
S_DAY	Character	Starting day, Julian
E_DAY	Character	Ending day, Julian
S_TIME	Character	Starting time, hour
E_TIME	Character	Ending time, hour
NOURS	Character	Number of hours
NUM_HOURS	Character	Total time span covered in data (in hours)
X_REF	Character	x-coordinate of reference origin, meters
Y_REF	Character	y-coordinate of reference origin, meters
UTM_ZONE	Character	UTM zone
X_ORG	Character	x-coordinate of grid origin (UTM Easting), meters
Y_ORG	Character	y-coordinate of grid origin (UTM Northing), meters
DELTA_X	Character	Grid interval in x-direction, meters
DELTA_Y	Character	Grid interval in y-direction, meters
NUM_COL	Character	Number of columns

(continued)

Variable	Type	Description
NUM_ROW	Character	Number of rows
NUM_LEV	Character	Number of vertical levels
NUMLEV_L	Character	Number of levels in lower layer
NUMLEV_U	Character	Number of levels in upper layer
SURF_HT	Character	Height to base of surface level, meters
MINHT_L	Character	Minimum height to lower level, meters
MINHT_U	Character	Minimum height to upper level, meters
NUMVAL_X	Character	Number of values in *x*-direction
NUMVAL_Y	Character	Number of values in *y*-direction
SPEC1-24	Character	Available species in the base UAM file. These values may be referenced as separate fields (SPEC1, ..., SPEC24) or as an array (SPEC{1}, ..., SPEC{24}).
ST_DATE	Character	Starting date, DDMMMYY
EN_DATE	Character	Ending date, DDMMMYY

(B) The following fields occur in sequence (each separated by a single space) and repeat for all remaining data in the file.		
CONCDATE	Character	Date of the data in this record, DDMMMYY
SP	Character	Ordinal number of SPECIES for the model-- e.g., "20" for ozone in ROM 2.1
LV	Character	Ordinal number of LEVEL for the model-- e.g., "2" for level 2 in ROM 2.1

(concluded)

Variable	Type	Description
COL	Character	Column number of the model grid cell to which data in this record pertain
ROW	Character	Row number of the model grid cell to which data in this record pertain
STUDY	Character	Name of study selected for retrieval
SCENARIO	Character	Name of modeling scenario selected
SPECIES	Character	Code for a species selected-- e.g., "O3" for ozone
LEVEL	Character	Code for a vertical level selected-- e.g., "1" for level 1
CONC1-24	Character	Concentration of SPECIES (in ppm) at each hour of the day specified by CONCDATE. These values may be referenced as separate fields (CONC1, ..., CONC24) or as an array (CONC{1}, ..., CONC{24}).

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

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4. TITLE AND SUBTITLE User's Guide for the Urban Airshed Model Volume VI: User's Manual for the Postprocessing System		5. REPORT DATE November 19, 1991
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15 SUPPLEMENTARY NOTES

16 ABSTRACT

The UAM Postprocessing System (UAMPPS) is a data display and analysis tool for evaluating emission control strategies. After executing the UAM system the results from one or more model runs may be graphically compared. The UAMPPS creates time series plots, tile maps, bar charts, boxplots, scatter plots and quantile plots. Through a series of menus the user has a wide range of flexibility in scaling and labeling the graphs.

17. KEY WORDS AND DOCUMENT ANALYSIS

a DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Urban Airshed Model (UAM) species, scenario, quantile, tiles, boxplots, SAS graphics catalog		

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