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USER'S GUIDE FOR THE URBAN AIRSHED MODEL

Volume V: Description and Operation of the ROM - UAM Interface Program System

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16. ABSTRACT

This document serves as a manual for the ROM-UAM Interface System that enables the use of ROM model outputs to be used as input meteorological and Boundary/initial condition processors.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
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Volume V: Description and Operation of the ROM - UAM Interface Program System

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NOTICE

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PREFACE

This user's guide for the Urban Airshed Model (UAM) is divided into five 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 I provides historical background on the model and describes in general the scientific basis for the model. It describes the structure of the required unformatted (binary) files that are used directly as input to the UAM. This volume also presents the formats of the output files and information on how to run an actual UAM simulation. 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. The preprocessor input files are ASCII files that are generated from raw input data (meteorological, air quality, emissions). The preprocessor input files are then read by individual preprocessor programs to create the unformatted (binary) files that are read directly by the UAM. 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. The preprocessors available for generating wind fields and emissions inventories for the UAM are described separately in Volumes III and IV, respectively.

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 from countywide average total hydrocarbon, nitrogen oxide, and carbon monoxide emissions available from national emissions inventories, such as the National Emissions Data System or the National Acid Precipitation Assessment Program. 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).

ACKNOWLEDGEMENTS

Since its initial conception in the early 1970's, many individuals have contributed to the development of the Urban Airshed Model. This document reflects the latest methodology and software development and provides a guide for new users of the model. Based on the past efforts of the original developers of the UAM and the authors of the original 1978 user's manual, the first four volumes were written by the following individuals from Systems Applications, Inc.:

Volume I	Ralph E. Morris, Thomas C. Myers, and Jay L. Haney
Volume II	Ralph E. Morris, Thomas C. Myers, Edward L. Carr, Marianne C. Causley, Sharon G. Douglas, and Jay L. Haney
Volume III	Sharon G. Douglas, Robert C. Kessler, and Edward L. Carr
Volume IV	Marianne C. Causley, Julie L. Fieber, Michele Jimenez, and LuAnn Gardner

Volume V, containing the ROM-UAM Interface Program Guide, as well as Appendix D in Volume IV (Biogenics Emissions Inventory System) were written by the following individuals of Computer Sciences Corporation and EPA's Atmospheric Sciences Modeling Division:

Volume V	Ruen-Tai Tang, Susan C. Gerry, Joseph S. Newsom, Allan R. Van Meter, and Richard A. Wayland (CSC); James M. Godowitch and Kenneth L. Schere (EPA)

The U.S. Environmental Protection Agency and the South Coast Air Quality Management District provided support for the preparation of this document. Richard D. Scheffe, Ned Meyer, Dennis Doll, and Ellen Baldridge of the U.S. EPA's Office of Air Quality Planning and Standards contributed to this document with their insightful technical reviews. Henry Hogo and Tom Chico of the South Coast Air Quality Management District also reviewed the documents and provided their comments.

Others at Systems Applications, Inc. that have contributed to the continued development of the UAM in the last few years include Dr. Gary Whitten and Mr. Gary Moore.

ABSTRACT

A set of computer programs has been developed in order to provide a link between select outputs of the Regional Oxidant Model (ROM version 2.1) system and the Urban Airshed Model Carbon Bond IV [UAM (CB-IV)] system. Thirteen individual ROM model and processor output files containing concentrations, meteorological parameters, surface characteristic information, and biogenic emissions are needed to exercise the seven interface programs. Output files generated by the interface codes are in compatible formats for input to either UAM preprocessors or the model. With the exception of diffusion break heights and anthropogenic emissions, the interface system generates all UAM input data from the ROM database files. Currently, the ROM data are available over a domain covering the northeastern states in conjunction with the Regional Ozone Modeling for Northeast Transport (ROMNET) program. Applications of the ROM for other regions of the United States are anticipated.

The initial step in the interfacing process is to apply a menu-driven data retrieval program especially developed within the Gridded Model Information Support System (GMISS). User-specified information about the UAM domain and simulation period is employed by the retrieval program to automatically extract the specific ROM outputs needed by the interface codes. The retrieved input data files contain the appropriate spatial and temporal "windows" needed to execute the interface programs for a particular UAM modeling application. The ROM database and the data retrieval program reside on the EPA/NCC-IBM 3090 computer system.

The interface programs have been written in standard FORTRAN-77 code which allows the interface package to be readily adaptable for execution on most computer systems. Methodologies and procedures applied to the ROM system outputs by the interface codes in order to generate compatible data files for the UAM system are described. The interface system is also designed to allow the user to substitute or include alternate data sets than those from the ROM database. Instructions for the preparation and application of the individual interface programs are also given. Input control data files and example outputs for each interface program are also provided for a test case.

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SECTION 1

INTRODUCTION

A set of computer programs has been developed to enable the Urban Airshed Model (UAM) system to be driven by Regional Oxidant Model (ROM) system outputs. The computer program package has been designated the ROM-UAM interface system. Since both the ROM and UAM are independent models with their own separate processor systems, the interface programs serve as external links between particular ROM output files and components of the UAM system. The principal functions of the interfaces are to interpolate specific gridded parameters from the ROM outputs, and to generate data files in compatible formats for input to the UAM preprocessors or the UAM program. In particular, the interface programs have been designed for use with the ROM 2.1 system files and the UAM Carbon Bond IV [UAM (CB-IV)] system.

The impetus for the development of a ROM-UAM interface program was initiated under EPA's Regional Ozone Modeling for Northeast Transport (ROMNET) study. One of the major objectives of ROMNET was to apply the ROM to generate estimates of air quality concentrations for projection and post-control scenarios in order to specify initial conditions and boundary values in urban-scale modeling to be conducted by states in the development of State Implementation Plans. For this, the ROM 2.1 system was applied to simulate selected episodes with emission scenarios that include a base year, a future year, and control strategies. The procedures for the selection and number of high ozone episodes being modeled over the northeastern United States have been described by Doll et al. (1989).

The importance of regional and interurban transport of pollutant species in distinct urban plumes within the ROMNET study region has been recognized from both experimental (Wolf and Lioy, 1980; Clarke and Ching, 1983) and modeling studies (Rao, 1987). A major factor for such pollutant plumes is the existence of emissions-rich areas associated with the corridor of large metropolitan centers along the north-eastern coast of the United States and also the numerous large isolated urban areas within this region. However, the specification of spatially-detailed inflow boundary conditions for urban-scale modeling has been difficult to achieve due to a lack of spatial resolution in measurements both at the surface and aloft. Additionally, appropriate future-year boundary conditions, which may be even more critical to urban-scale modeling under certain emissions reduction strategies, would be difficult to quantify. Therefore, the results of the ROM simulations for the northeastern region (Figure 1) are to provide representative highly-resolved boundary conditions of ozone and precursor species for use in urban model applications within this area. In this regard, the ROM-UAM interface system is an integral component of ROMNET because it is the key element in the transfer of the regional model results to urban model applications. Although it is to be initially implemented in the UAM applications for urban domains within the ROMNET region, the interface programs are expected to be suitable for the UAM applications using the ROM results from other modeled regions.

The UAM has been identified as the preferred modeling approach for urban ozone modeling (EPA, 1986). Like the ROM, the UAM is a grid-based photochemical oxidant model that mathematically treats the relevant physical and chemical processes important to ozone production, destruction, and removal, albeit on a smaller spatial scale. Both models require extensive input data including concentrations for initial and boundary conditions, and meteorological and emissions data. Consequently, the wide variety of data types already assembled and available in the ROM system database should be exploited and the scope of the interface effort was expanded to include more than just the ROM predicted concentrations. In all, 13 different ROM data files are applied in the interface programs, which include gridded fields of various meteorological parameters (e.g., winds, temperature, water vapor, etc.), land use information, and biogenic emissions.

The ROM-UAM interface system actually consists of seven main programs. Each interface program provides a link between certain ROM data files and a particular UAM preprocessor or the model program. Specifically, an output file generated by an interface is in a compatible format for direct input to either a UAM preprocessor or the model. The ROM data files needed by the interface programs are created by the user when exercising a data retrieval program specifically designed for this interface package. The data retrieval program is part of the Gridded Model Information Support System (GMISS). The ROM database and the GMISS data retrieval program are maintained on the EPA National Computer Center (NCC) IBM 3090 system. The retrieved data files generated by the user on this computer can be transferred to another computer system if desired, where the interface programs and the UAM system will eventually be exercised. The interface codes also exist on the IBM 3090, however, they are readily adaptable to other computer systems since these algorithms have been written according to American National Standard Institute (ANSI) FORTRAN-77 language specifications.

Due to the extent of the coupling between these model systems through this interface package, the performance of the UAM will be strongly impacted by results of the ROM simulations. The development of the ROM system has progressed in parallel with a strong model evaluation program. The most recent revision of the ROM (ROM 2.1), as documented in Young et al. (1989), incorporates changes based on comparison of the ROM 2.0 results against observed databases (Schere and Wayland, 1989). The ROM 2.1

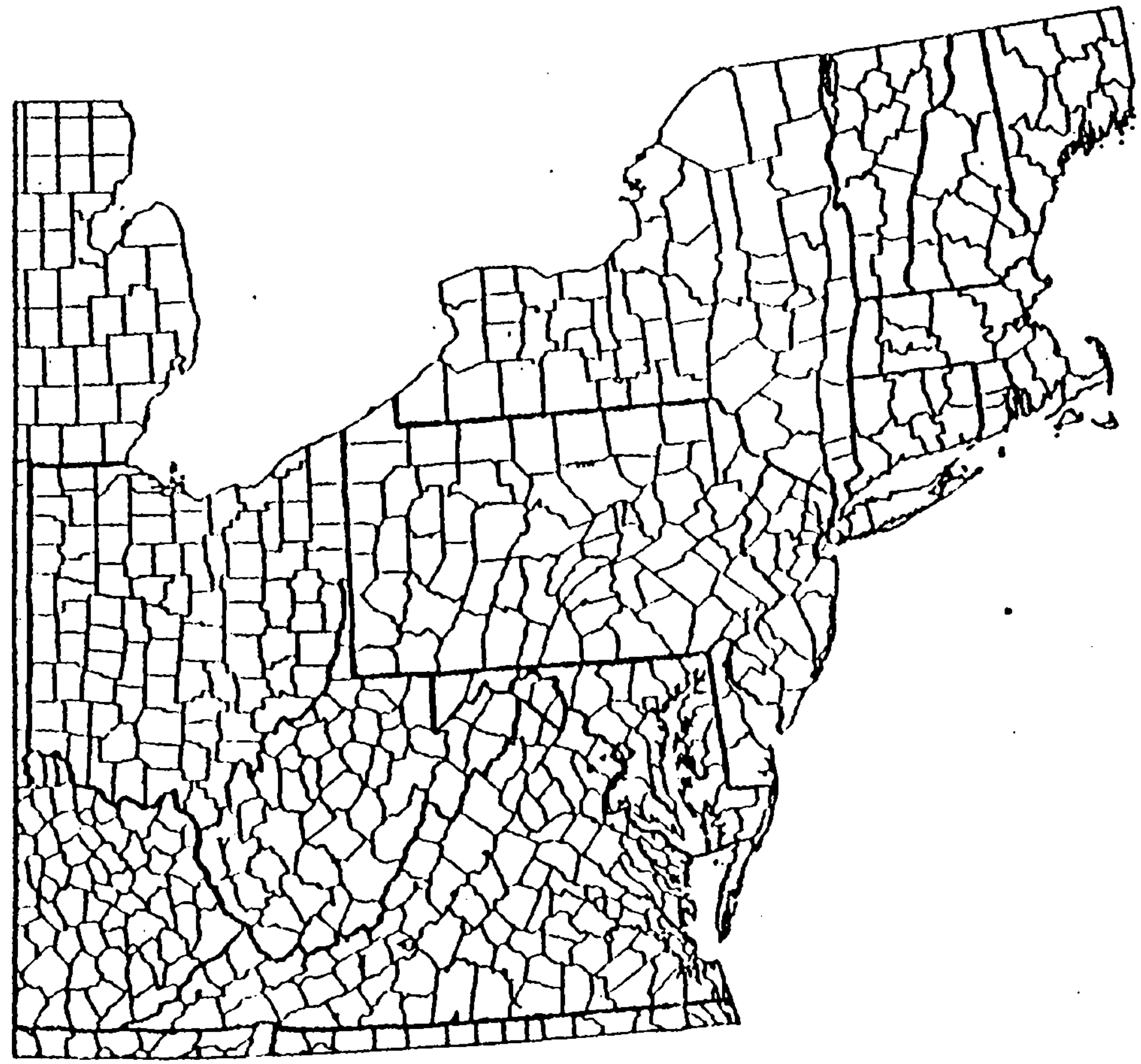


Figure 1. Northeast regional modeling domain.

model results have also been compared to ozone measurements in the ROMNET region by Pierce et al. (1990a). The ROM evaluations have revealed the capability of the model to simulate the spatial pattern of urban plumes and regional concentration levels. Changes in the UAM system have also occurred since the version documented by Ames et al. (1985). Of particular significance, the photochemical mechanisms imbedded in earlier versions of both models have been upgraded to the latest carbon bond (CB-IV) mechanism. The details about the development of the CB-IV mechanism for these models have been presented by Gery et al. (1988, 1989) and appear in Volume I of the UAM(CB-IV) User's Guide (Morris et al. 1990a). The interface programs have been specifically constructed for use with the current version of the Urban Airshed Model, designated as UAM (CB-IV). The methodologies and user instructions for the UAM (CB-IV) model are fully described in Volumes I and II of this User's Guide (Morris et al. 1990a,b). For the purpose of brevity in this report, the acronyms ROM and UAM are meant to refer to the most recent operational versions of these models.

This report is divided into sections devoted to various aspects of the interface package. Section 2 gives a summary of some of the salient features and important limitations when applying the interface programs. A broad overview of the interface package and its programs is provided in Section 3. A technical description of the methods and procedures employed to derive the time dependent and spatially-varying gridded data fields for the UAM system from the ROM outputs is given in Section 4. The detailed format specifications of the input/output files for each interface and instructions for their execution, of particularly relevance to computer specialists, are presented in Section 5. In addition, an example test case has also been assembled and should be exercised after implementation of the interface codes on a particular computer. Samples of the input/output files and run streams for an IBM system are also provided in Appendices to assist the user in properly exercising the interface programs.

SECTION 2

FEATURES AND LIMITATIONS OF THE INTERFACE

The ROM-UAM interface programs have been designed to utilize various ROM output files in generating input data files for the UAM preprocessor programs or the UAM model program. This coupling of the two model systems is performed by seven individual interface programs. Notable features of the interface package are enumerated below:

- Interfaces link only components of the UAM (CB-IV) model system and certain outputs of the ROM 2.1 system, and not earlier versions of these two models.
- Four interfaces provide formatted input files for the UAM preprocessors and three interfaces generate binary files directly for use in executing the UAM model.
- Thirteen different ROM output files are applied in executing the various interface programs. Users must create these specially "windowed" data files for their particular UAM domain and simulation period by accessing the ROM database through a data retrieval program developed for the Gridded Model Information Support System (GMISS) on the EPA NCC-IBM 3090 computer system.
- Interface programs have been generalized to allow the user to input specifications about the particular UAM domain and grid (i.e. origin, number of grid cells, and grid cell size) and the vertical configuration of the UAM (i.e. number of lower and upper levels).
- Interfacing for initial, lateral and top boundary conditions is performed for 17 of the 23 pollutant species which must be specified in the UAM (CB-IV) model. Default values are defined for the remaining six species.
- Lateral and top boundary concentrations are resolved hourly and spatially at each UAM grid cell.
- Options have been built into two interface programs to allow the user to apply non-ROM input data files (e.g. concentrations, winds).
- Quality-assured data may be incorporated into formatted packet files through an on-line editor at a terminal.

- A utility program included with the interface package converts any binary file into an equivalent ASCII formatted data file so that its contents may be examined prior to use in model execution.

- Horizontal wind fields generated by the wind interface are determined by matching the ROM gridded wind components from layers 1 and 2 into the vertical levels of the UAM. The methodologies employed in the wind interface are those applied in the UAM Diagnostic Wind Model system described in Volume III of this User's Guide (Douglas et al. 1990).

Certain limitations also exist with this version of the interface:

- No interfacing of the diffusion break height is performed. The user must apply a method recommended for deriving hourly values of this parameter as described in Volume II of this User's Guide (Morris et al. 1990b). As part of the interface package, a processor program (PDFSNBK) produces a formatted packet file for the UAM diffusion break preprocessor program (DFSNBK) using a user-supplied data file. A spatially-invariant diffusion break at each hour is assumed by the interface programs.

- No interfacing of anthropogenic area or point source emissions is performed. The UAM point source preprocessor (PTSRCE) and the Emissions Processor System (EPS) already exist for creating emissions for these source types (Volume IV, Causley et al. 1990). A biogenics interface is limited to combining an existing binary anthropogenic area emissions inventory file and the ROM gridded biogenic emissions of certain hydrocarbon and NO_x species.

- No interfacing is performed for the UAM preprocessors, CPREP or SPREP, the chemical parameters and the simulation control programs, respectively.

SECTION 3

OVERVIEW OF THE INTERFACE SYSTEM

A general framework showing how the interface program package fits into the overall UAM model system is depicted in Figure 2. The interface programs are executed before exercising any UAM preprocessor program. The important first step to be performed in the interfacing process is the creation of a set of formatted data files which are needed as inputs to the interface programs.

The user must execute a menu-driven data retrieval program that has been specifically developed when interfacing the UAM with the ROM system outputs. The ROM database is composed of large files of predicted concentrations (CONC), processor output files (PF), and other ROM model files (MF). The ROM database files and the interface data retrieval program exist exclusively on the EPA-NCC IBM 3090 computer system. In the retrieval step, the user supplies time and UAM domain-specific information to the retrieval program which will automatically extract all the ROM parameters over the desired time period and for the selected spatial "window". Since the retrieved data files will be formatted, the user may decide to transfer them to another computer system where the actual execution of the interface programs, and the UAM preprocessor and model simulations will be conducted. Detailed instructions and procedures for applying the retrieval program with the ROM database are described in CSC (1990).

The set of interface programs produce either formatted "packet" files which are in a compatible format for direct input to particular UAM preprocessors or binary files that are ready for direct input to the UAM model (Figure 2). For the latter, certain UAM preprocessors are bypassed with no execution required. The interface codes have been programmed according to ANSI FORTRAN-77 full language specifications. Therefore, although the interface programs reside on the IBM 3090 computer, these codes are easily adaptable to other computer systems after minor revisions. The user has the ability to examine the contents of "packet" files generated by most interface programs with an on-line editor. Furthermore, at this stage the user may wish to supplement these files with additional quality-assured observed data before proceeding with the execution of a UAM preprocessor. For the interface programs which generate binary files ready for the model, an optional feature has been built into the codes that allow the user the flexibility of supplying an alternate data set. The details in Section 5 should be consulted for the structure and format of non-ROM

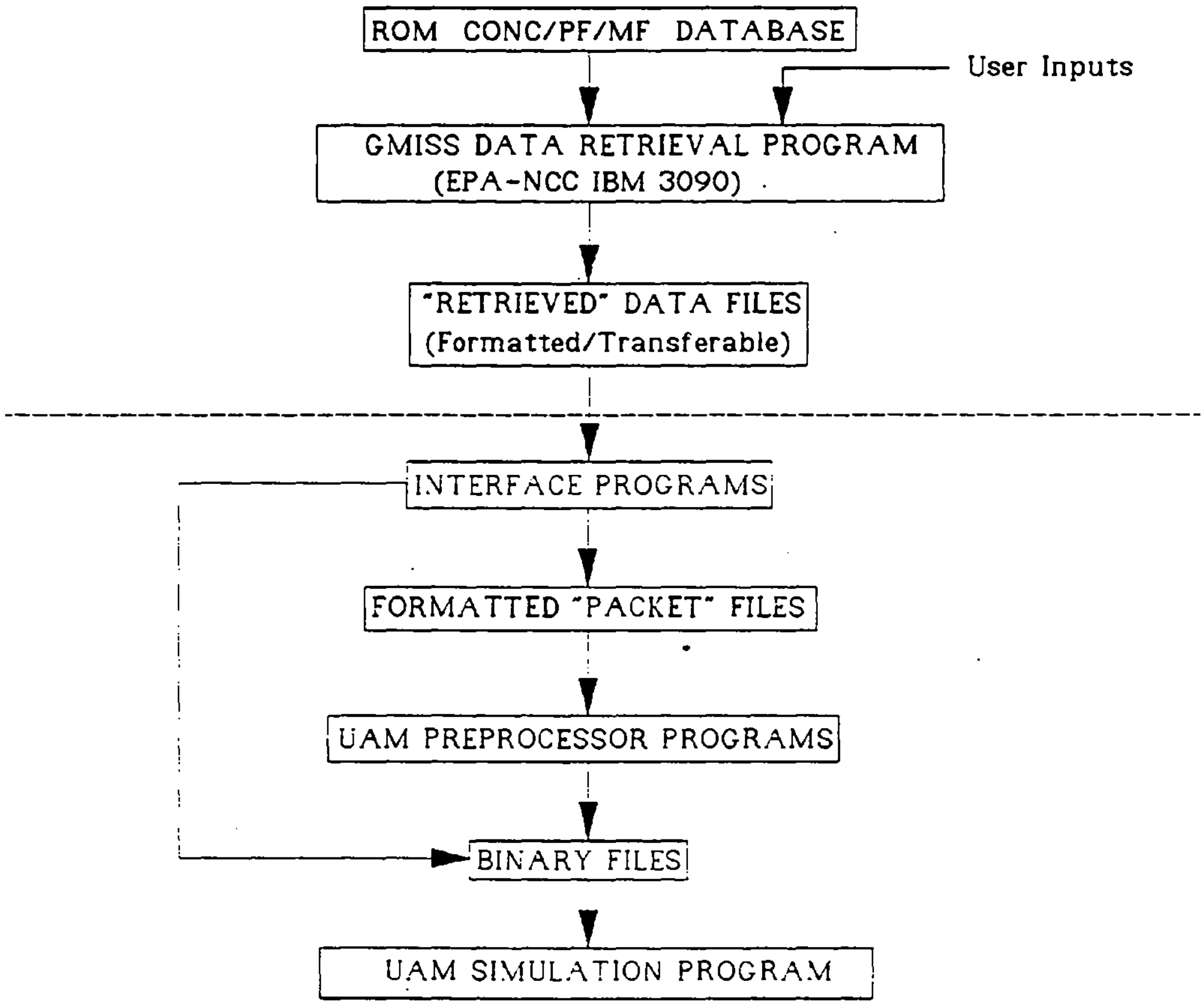


Figure 2. Flow diagram showing the data retrieval and interface processing steps performed to generate data files for the UAM preprocessors and model.

data files and the particular interface programs which have this capability. In this instance, it must be noted that the user would be undertaking an additional effort to generate an alternate data file for an interface program. A utility program is also part of the interface package for converting a binary file into a formatted ASCII file version so that it can be examined before model execution.

The UAM model code requires 13 binary input files in any modeling application. Table 1 gives a complete list of the UAM preprocessor names and the binary output file generated by each program. The UAM preprocessor programs have been grouped into categories in Table 1 to indicate binary data files are required for initial and boundary (lateral and top) concentrations, various meteorological parameters (e.g., winds, etc) and surface features, emissions, and finally, control information about the chemical species and reactions, and the model run parameters.

A comprehensive approach was taken in interfacing the two model systems in order to take advantage of the extensive variety of data sets available from the ROM model and processor network for use as inputs to as many UAM preprocessors as possible. A complete list of data files retrieved from the ROM database and their contents is provided in Table 2. The file names listed in Table 2 are those designated within the ROM system and these file names will be imbedded within the extended file name of the retrieved files generated by the user. One or more of these files are needed to exercise each interface program. With the exception of the temperature profile data file, all of the retrieved files contain gridded fields of the ROM processor or model results. The structure and format of these files are documented in Section 5.

An overview of the complete ROM-UAM interface program package is provided in Table 3. It shows the retrieved ROM files needed for each interface program. There are seven actual interface programs. The designated name for an interface program begins with the letter "I" and the remainder of its name is given by the UAM preprocessor program name. In addition, a processor program (PDFSNBK) that reformats hourly diffusion break data (DBDATA), supplied by the user, is part of the interface program package. The outputs from the other interface programs are formatted "packet" files (e.g, RTPACK, etc.) for use as inputs to the appropriate UAM preprocessor. Since these files are formatted, the user has the capability to examine their contents and also can insert additional data before exercising the UAM preprocessors. The interface programs for generating winds (IWIND) and for initial and boundary concentrations (ICONC) produce binary files for use in UAM execution. Consequently, the diagnostic wind model (DWM) system and the concentration preprocessors (i.e., AIRQUL, BNDARY, TPCONC) are not exercised when these interface programs are applied. A combined area emissions file is created by the IBIOG interface program from a user-supplied anthropogenic file and a ROM biogenic emissions file. The output emissions file of IBIOG is also binary and ready for input in UAM simulations. However, interfacing of anthropogenic point or area emissions is not performed.

TABLE 1. SUMMARY OF THE UAM PREPROCESSOR PROGRAMS		
Name	Internal name in binary file	Contents
	CONCENTRATIONS	
AIRQUL	AIRQUALITY	Initial concentration fields
BNDARY	BOUNDARY	Lateral boundary concentrations
TPCONC	TOPCONC	Top boundary concentrations
	METEOROLOGY AND SURFACE CHARACTERISTICS	
DFSNBK	DIFFBREAK	Diffusion break heights
REGNTP	REGIONTOP	Model region top heights
METSCL	METSCALARS	Five meteorological parameters and photolysis rate
TMPRTR	TEMPERATURE	Surface temperature field
DWM[1]	WIND	Horizontal wind component fields
CRETER	TERRAIN	Surface roughness and vegetation fraction factor
	EMISSIONS	
EPS[2]	EMISSIONS	Anthropogenic area emissions
PTSRCE	PTSOURCE	Major point source emissions
	CONTROL DATA	
CPREP	CHEMPARAM	Species reaction rate information
SPREP	SIMCONTROL	Model simulation input information

1. DWM = Diagnostic Wind Model
2. EPS = Emissions Preprocessor System

TABLE 2. RETRIEVED ROM FILES USED BY INTERFACE PROGRAMS	
ROM system file name	Description of file contents
ROM21	Hourly predicted concentrations of 17 species from layer 1, 2, and 3
MF165	Hourly gridded heights of layer 1
MF166	Hourly gridded heights of layer 2
MF174	Hourly gridded water vapor concentration in layer 1
PF102	Hourly vertical-interpolated temperature profiles
PF103	Hourly gridded surface air temperature
PF108	Gridded surface roughness length
PF114	Hourly gridded layer 2 horizontal wind components
PF115	Hourly gridded layer 1 horizontal wind components
PF117	Hourly gridded total sky cover fraction
PF118	Gridded fractions of eleven land use categories
PF119	Gridded terrain elevation
PF144	Hourly gridded biogenic emissions of six species

TABLE 3. OVERVIEW OF THE ROM-UAM INTERFACE PROGRAMS AND INPUT/OUTPUT FILES

ROM or other input files	Interface programs	'PACKET' file	UAM preprocessor	Binary file
User DBDATA	PDFSNBK →	DBPACK	DFSNBK	DBBIN
DBDATA MF166 PF119	IREGNTP → └→ RTDATA	RTPACK	REGNTP	RTBIN
MF174 PF102 PF117 PF119 RTDATA DBDATA	IMETSCL →	MSPACK User data (optional)	METSCL	MSBIN
PF103	ITMPRTR →	TPPACK User data (optional)	TMPRTR	TPBIN
MF165 PF114 PF115 PF119 DBDATA RTDATA	IWIND →			WDBIN
PF108 PF118	ICRETER →	CRPACK User data (optional)	CRETER	CRBIN
ROM21 MF165 PF119 DBDATA	ICONC →			AQBIN BCBIN TCBIN
PF144 User EMISSIONS*	IBIOG → └→ BIOASC (optional)			EMBIN

* Anthropogenic area emissions file

SECTION 4

TECHNICAL APPROACHES

4.1 ATTRIBUTES OF THE REGIONAL AND URBAN MODELS RELEVANT TO INTERFACING

Although both models are Eulerian grid models, differences in the framework of their 3-dimensional grids have to be addressed prior to the development of approaches for interfacing the ROM system data with the UAM components. Fortunately, interfacing in the time dimension was straightforward since both model systems have a 1-h time resolution in common. Output results from the ROM and processors contained in the retrieved data files are available at hourly intervals, which is the time interval required of input data for the UAM preprocessor and model programs. The time period of the ROM results in the retrieved data files will also span a full 24-h period beginning at midnight of the day being simulated by the UAM, or two consecutive 24-h periods if a 2-day UAM simulation is planned.

Notable differences in the horizontal and vertical grid dimensions exist between these models that had to be reconciled to properly interface the ROM results with the UAM system components. In the horizontal dimension, the UAM is applied with a finer-mesh grid spacing and over a substantially smaller domain than that of the ROM. The horizontal framework of the ROM grid is based on the latitude-longitude system. Columns are north-south along longitude lines and rows are oriented in an east-west direction along latitude lines with the horizontal resolution set at 1/4 degree of longitude by 1/6 degree of latitude. These specifications translate into a horizontal grid spacing of about 19 km in mid-latitudes. The ROM grid for the ROMNET region as depicted in Figure 3 consists of 64 columns by 52 rows. Each grid point shown in Figure 3 is situated at the lower left corner of a grid cell. In contrast, the horizontal grid framework of the UAM is based on the Cartesian coordinate system. Horizontal grid spacing is specified by the user, and has generally been defined to be from 2 km to 8 km. For a typical urban application, the spatial domain of the UAM is generally on the order of 200 km, whereas the much larger ROMNET domain spans about 1,000 km on each side. Clearly, a relatively small subregion of the ROM domain would provide sufficient overlap of a particular UAM domain.

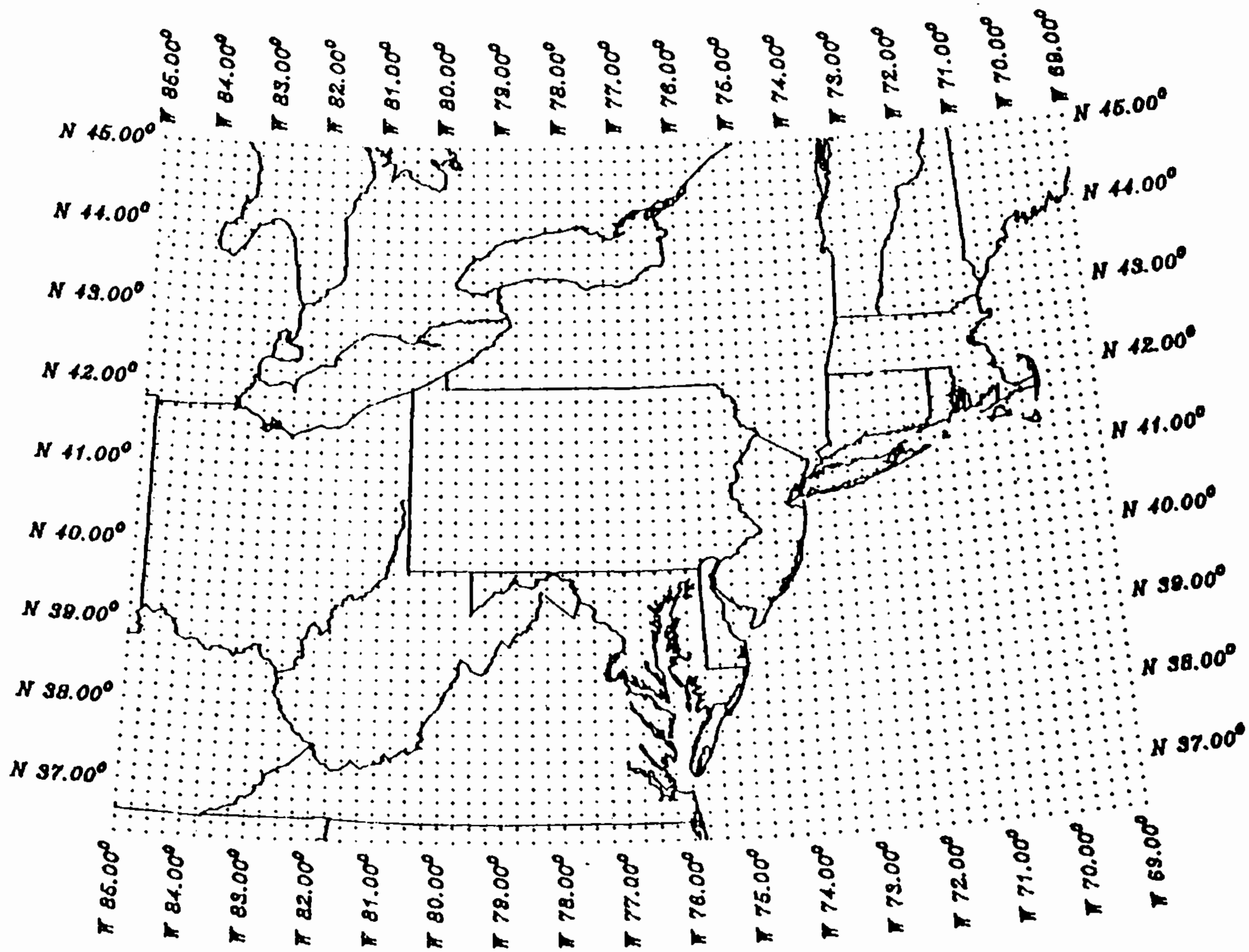


Figure 3. The gridded ROMNET region (64 columns by 52 rows); dots are situated at the ROM grid cell corners.

The appropriate spatial coverage of the ROM gridded parameters in a particular UAM application is provided from information supplied by the user during the data retrieval step. Figure 4 demonstrates how the ROM grid points overlap the UAM domain for applications with the interface programs. The data files generated for the interface programs by the GMISS retrieval system contain parameters from all ROM grid cells whose midpoints lie inside the UAM domain and in a surrounding buffer zone consisting of two grid points outside each UAM boundary. The various parameters and concentrations at the ROM grid points surrounding the UAM domain are particularly useful in the specification of boundary values for the urban model.

Differences in the vertical structure and number of vertical levels between the models also presented a challenge for interfacing several parameters. The height of the diffusion break, widely known as the mixing height, is the key reference height in the UAM system that separates the lower and upper level cells. The user specifies the number of prognostic UAM vertical levels below the diffusion break and the number of upper levels situated between the diffusion break and the model's region top height. Lower levels are of equal thickness, and each level expands or contracts according to the temporal behavior of the diffusion break. The thickness of the UAM upper level(s) is controlled by the difference between the region top and the diffusion break heights.

In contrast to the UAM vertical framework, the ROM exhibits three prognostic layers which vary spatially and temporally. Figure 5 illustrates the configuration and vertical extent of each ROM layer during the daytime. A shallow diagnostic surface layer (layer 0) is also depicted, however, it has not been implemented in the ROM version 2.1. Consequently, predicted values from layer 0 have not been considered in any interface approaches. Results from layer 1 have been applied as surrogates for surface values (Schere and Wayland, 1989). During most of the daytime period, layers 1 and 2 are imbedded in the well-mixed convective boundary layer. The height of layer 1 varies from 10 to 600 m above ground and layer 2 heights are generally from 1,000 to 1,500 m. The top model layer (layer 3) represents the synoptic scale inversion layer capping the boundary layer or the vertical extent of a cumulus cloud layer, if present (Figure 5). At night, the contents of layer 2 represent the remnants of the bulk of the previous day's mixed layer, while the vertical extent of the nocturnal radiative inversion is confined in layer 1. Finally, none of the ROM layers is meant to simulate the temporal variation of the diffusion break height over the diurnal cycle.

The technical aspects and procedures incorporated into individual interface programs are described in the remainder of this section.

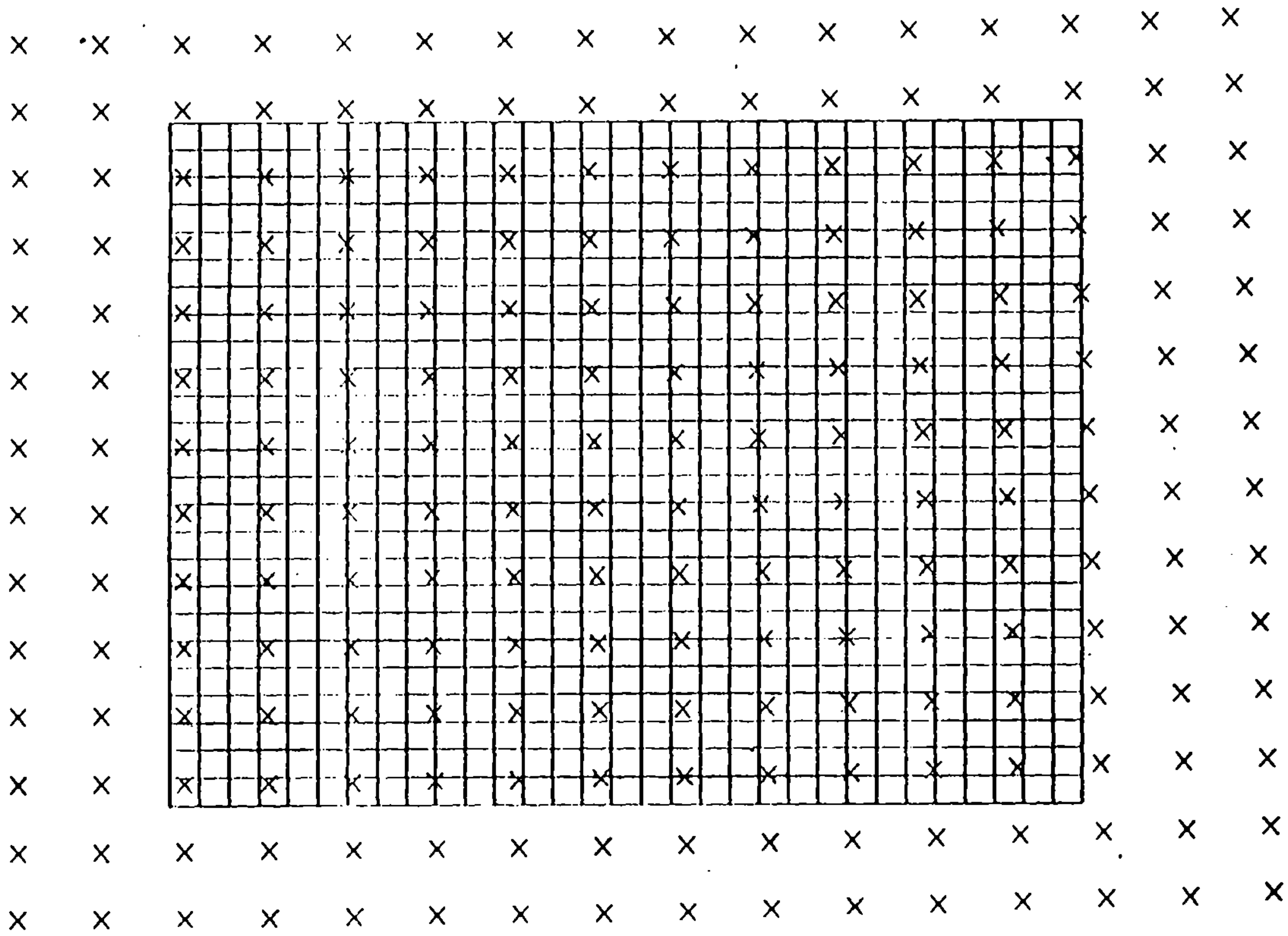


Figure 4. Example of grid points (mid-points) of ROM cells overlaying a UAM domain. Two ROM rows/columns extend beyond each UAM boundary.

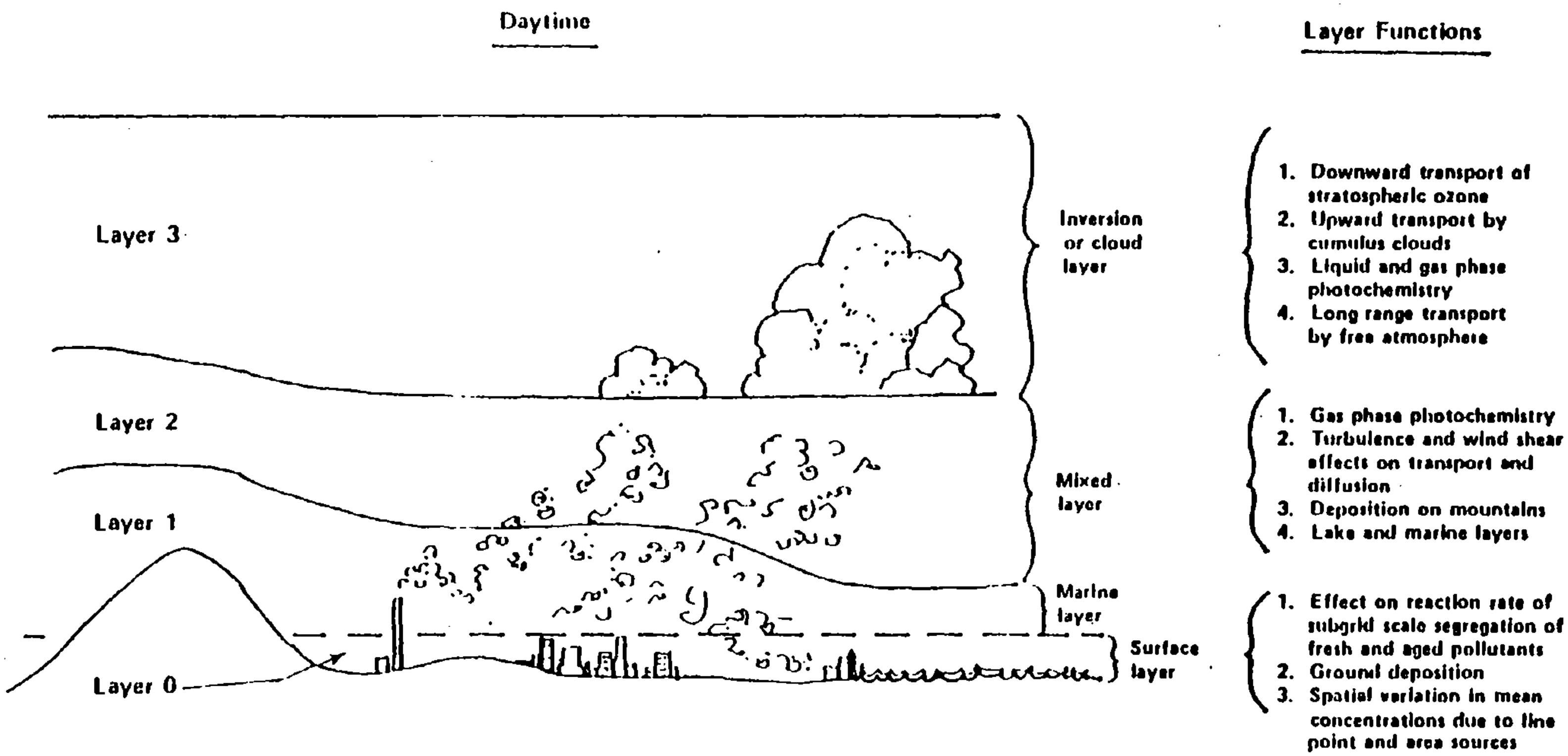


Figure 5. ROM vertical layer structure during daytime conditions.

4.2 TREATMENT OF METEOROLOGICAL AND SURFACE PARAMETERS

4.2.1 Diffusion Break and Region Top Heights

The variation of vertical levels in the UAM is dictated by the diffusion break and region top heights. In particular, the diffusion break (Z_{DB}) is the key reference height which separates the sets of lower and upper levels in the model and it serves as the boundary between the differing stability regimes that characterize these two vertical groups of levels. Hourly values of the diffusion break are needed by several interface programs as well as a UAM preprocessor. However, as noted earlier, none of the ROM layer heights emulates the diurnally-varying diffusion break height. Consequently, interfacing of Z_{DB} values was not feasible for this version of the interface programs. The user should refer to the description of DIFFBREAK in Volume II of the User's Guide (Morris et al. 1990b) for a methodology to derive hourly diffusion break values. Since other interface programs require a Z_{DB} file, the development of this data file must be one of the initial tasks to be performed.

A preprocessor program contained within the interface package has been developed to generate a formatted "packet" file compatible with the input format specifications of the DFSNBK preprocessor. The user should consult Section 5 for the format specifications of the input data file (DBDATA) for the interface diffusion break processor program (PDFSNBK). A set of 24 hourly diffusion break heights is needed by interface programs if the UAM will be simulating a single day. For a 2-day UAM application, hourly diffusion break values for two full days must be prepared.

The region top height (Z_T) defines the total extent of the UAM domain in the vertical dimension. The magnitude and time variation of Z_T is important in model applications since the thickness of upper level(s) is determined from the difference between Z_T and the diffusion break height for each hour. Additionally, Z_T should be sufficiently high that elevated point source plumes remain within one of the model's vertical levels. If a point source plume rises above Z_T, its emissions are above the model domain and are not considered in the model simulation.

The interface method to derive Z_T uses the height of ROM layer 2. During the nocturnal period, ROM layer 2 height was designed to represent the vertical extent of the previous day's mixed layer. In the region top interface, a UAM domain-wide average height of layer 2 is determined from the ROM gridded values for each hour of the simulation day. The lowest average layer 2 height value (Z_{R2min}) is chosen as the initial region top height at the beginning hour of the UAM simulation, which is expected be any hour prior to sunrise on the day being modeled. The region top height is allowed to vary temporally, however; like Z_{DB}, no spatial variation has been imposed on Z_T in this version of the interface. The hourly variation of Z_T in the interface is described in equation (1).

$$Z_T(t) = Z_{R2min} + (Z_{DBmax} - Z_{R2min} + \Delta Z) \cdot [(Z_{DB}(t) - Z_{DBmin}) / (Z_{DBmax} - Z_{DBmin})] \quad (1)$$

where:

	$Z_T(t)$	= region top height at hour t
	$Z_{DB}(t)$	= diffusion break height at hour t
	Z_{DBmin}	= morning minimum diffusion break height
	Z_{DBmax}	= afternoon maximum diffusion break height
	ΔZ	= minimum upper thickness interval = $DZ_u \cdot IZU$
	DZ_u	= upper level minimum thickness criterion
	IZU	= number of upper levels
	Z_{R2min}	≥ 1,000 m (minimum criterion)

An example of the variation of Z_T by applying equation (1) and the temporal variation of Z_{DB} are illustrated in Figure 6. The region top height increases gradually during the post-sunrise period and reaches its highest value in the afternoon when Z_{DB} reaches a maximum. The weighting function inside the brackets in equation (1) is based on the temporal variation of Z_{DB} and it controls the behavior of Z_T. The region top height descends gradually during the evening and nocturnal hours, while Z_{DB} generally decreases much more dramatically in Figure 6. During the time period after the maximum Z_{DB} has been reached, equation (1) continues to specify the behavior of Z_T. However, a new minimum ROM average layer 2 height, computed from values from the next day, is substituted for Z_{R2min}. Thus, in a single day simulation, the retrieved data file of layer 2 heights must contain the ROM results from two consecutive days. It is also evident from Figure 6 that Z_T remains above Z_{DB} with this formulation because a minimum thickness criterion (DZ_u) has also been implemented. At the time of Z_{DBmax}, Z_T is greater than Z_{DB} by at least the product of the upper level minimum thickness (DZ_u) and the number of upper levels (IZU). This requirement also ensures that the upper levels remain above Z_{DB} at all hours of the model simulation. In the test case, the value for DZ_u was set to 100 m.

The interface program for region top also requires a gridded terrain elevation file since ROM layer 2 height values have been written as altitudes above sea level. An additional input file for the region top interface includes the hourly values of Z_{DB} for a 24-h period for single day simulations. The output file created by the region top interface (IREGNTP) is in a compatible format for direct input to the REGNTP preprocessor program.

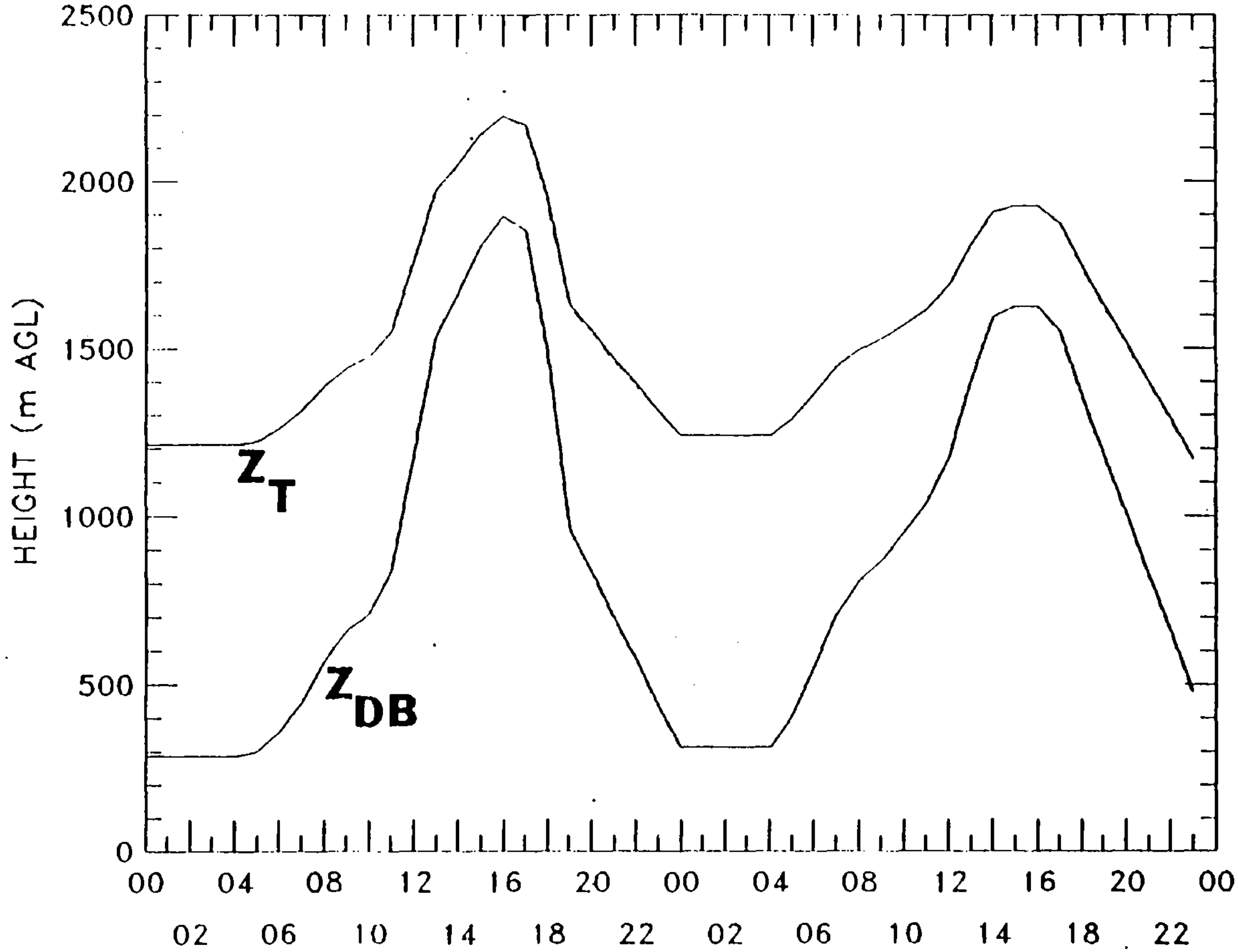


Figure 6. Time variation of the region top height (Z_T) and diffusion break height (Z_{DB}) over two diurnal periods.

4.2.2 Meteorological Scalars

There are six parameters that must be specified on an hourly basis in an input file for the METSCL preprocessor. Table 4 provides a list of the meteorological scalar parameters and a brief description of each variable. No spatial variation has been built into METSCL for these parameters. Five of the six parameters are specified or derived with retrieved data files from the ROM system. Atmospheric pressure (ATMOSPRESS) has not been interfaced. A default value of 1.0 atm (i.e. 1 atm = 1013.25 mb for a standard atmosphere) has been set for this parameter for each hour. However, a user may wish to substitute atmospheric pressure measurements, if available, in place of this default value in the formatted packet file (MSPACK) generated by the interface program.

The vertical temperature gradients represent layer-average values below and above the diffusion break height. Upper-air rawinsonde temperature profiles obtained twice-daily at National Weather Service sites have been interpolated at 50-m increments and to hourly intervals by a ROM processor (Young et al. 1989). During the data retrieval phase, the interpolated temperature profiles from upper-air site(s) located within the UAM domain are provided and the user has the ability to request one or more additional sites. However, before applying the retrieved temperature profiles in the interface, a user should examine the representativeness of the temperature profiles at a particular site for the meteorological conditions existing over the domain during the simulation period; particularly profiles from any selected site located outside the model domain.

TABLE 4. LIST OF METEOROLOGICAL SCALARS

Parameter name	Internal units	Definition
TGRADBELOW	K/m	Vertical temperature gradient (dT/dZ) from the surface to diffusion break height
TGRADABOVE	K/m	Vertical temperature gradient between diffusion break and region top heights
EXPCLASS	----	Exposure class - integer scale indicator of the near-surface atmospheric stability
RADFACTOR	min^{-1}	NO_2 photolysis rate constant, k_1
CONCWATER	ppm	average surface water vapor concentration
ATMOSPRESS	atm	surface atmospheric pressure

The individual temperature gradients at 50-m intervals from the upper-air site(s) are used to compute the hourly layer-average values below and above the diffusion break. During nocturnal hours when a surface-based inversion layer often exists, positive values for TGRADBELOW can be expected. Although notable spatial variations in the nocturnal low-level temperature structure have been found within large urban areas (Godowitch et al. 1987), values of these variables are assumed to be spatially invariant in the current version of the METSCL. During the daytime period, values of TGRADBELOW should be close to the adiabatic lapse rate (-0.010 K/m) or even slightly super-adiabatic, while daytime values of TGRADABOVE are expected to reflect a slightly stable ($dT/dZ > -0.01$ K/m) layer or an inversion lapse rate (positive dT/dZ).

The exposure class (EXPCLASS) is a unitless index with values ranging between -2 and 3. It is intended to be an indicator of the atmospheric stability near the surface due to either solar heating or radiational cooling. The methodology applied to derive hourly EXPCLASS values is presented in Table 5. EXPCLASS depends on the solar zenith angle and cloud cover. A retrieved ROM file of gridded fractional cloud cover values interpolated from observations (Young et al. 1989) is used to compute an hourly domain-wide average fractional cloud cover. The latitude-longitude of the middle of the UAM domain is adequate for the solar zenith angle calculations. Table 5 reveals that positive EXPCLASS values occur during daytime hours and negative values are restricted to the nocturnal period. The cloud cover criteria are applied to account for the attenuation of solar insolation or reduced radiational cooling due to the presence of clouds during the day and nocturnal hours, respectively. In the midday period when solar insolation is a maximum, the highest possible EXPCLASS value of +3 is achieved if the cloud cover fraction is under 50%. This methodology is identical to the scheme employed by Morris et al. (Volume II, 1990b).

The NO_2 photolysis rate constant (RADFACTOR) is an important parameter since it impacts the photochemical reactions built into the carbon-bond chemical mechanism. A matrix of NO_2 photolysis rate constants (Demerjian et al., 1980) dependent on zenith angle and altitude has been incorporated into the interface program (IMETSCL) to compute the RADFACTOR along with the date, time, diffusion break height and latitude-longitude position. In contrast to the other metscalar parameters, which are specified at the beginning of each hour, the model defines RADFACTOR values at the end of each hour and performs a linear interpolation from hourly values to individual time steps. Consequently, the RADFACTOR value is computed with the solar zenith angle at the end of each hour. In addition, a RADFACTOR value is also generated for the hour before the beginning hour of model simulation. During nocturnal hours, RADFACTOR is near zero and night-time chemistry takes place. When the RADFACTOR exceeds a threshold value of +0.011 min^{-1}, the model switches to the daytime photochemical mechanism. Clear-sky values for RADFACTOR are currently computed by this version of the interface for use in the UAM (CB-IV) model.

TABLE 5. METHODOLOGY FOR DERIVATION OF THE EXPOSURE INDEX

Solar zenith angle (degrees)	Domain average cloud cover (%)	EXPCLASS (unitless)
	[NOCTURNAL HOURS]	
>85	≤50	-2
>85	>50	-1
	[DAYLIGHT HOURS]	
≤30	≤50	3
≤30	>50	2
$30 < \theta \le 55$	≤50	2
$30 < \theta \le 55$	>50	1
$55 < \theta \le 85$	≤50	1
$55 < \theta \le 85$	>50	0

The concentration of water vapor (CONCWATER) in the lower atmosphere is also a metscalar parameter needed by the model. A domain-wide average value is computed for each hour with the ROM hourly gridded water vapor concentrations from layer 1.

4.2.3 Surface Air Temperature Field

Hourly surface temperatures are needed by the TMPRTR preprocessor program. A retrieved ROM file containing hourly gridded surface air temperatures interpolated from National Weather Service sites (Young et al. 1989) is utilized by the ITMPRTR program to generate a formatted file for input into the TMPRTR preprocessor program. No spatial interpolation is performed in the interface program. The function of the interface program is to reformat the gridded ROM values into a compatible format for TMPRTR, which spatially interpolates temperatures to the UAM grids. The user may examine the formatted packet file produced by the interface, and quality- assured hourly temperature data from non-gridded sites if available, may be inserted into this file before processing it in the TMPRTR preprocessor.

4.2.4 Wind Fields

An accurate representation of the 3-dimensional wind flow over the domain is crucial to the model's ability to simulate the magnitudes and spatial patterns of pollutant species. Wind fields from ROM layers 1 and 2 are used in the wind interface program (IWIND).

In the ROM 2.1, the wind field for layer 1 is generated from observed surface data. Layer-average wind components for layer 2 are derived from upper-air wind data, however, surface winds are also given some weight in the determination of the gridded winds in this layer (Young et al. 1989). The wind field from ROM layer 3 has been excluded from consideration in this interface since layer 3 generally represents the flow above the UAM domain.

A practical methodology was developed to interface the ROM gridded wind fields into the multiple levels of the urban model for any used-defined vertical configuration. In order to capture the important diurnal variations that often occur in the wind structure, the gridded winds from ROM layers 1 and 2 are applied in the wind interface. The approach designed to match the ROM layer winds into the UAM vertical cells is outlined in Table 6. The gridded heights of ROM layer 1 are compared to the heights of the bottom and top of each UAM level. If a UAM level is completely imbedded in ROM layer 1, then the gridded layer 1 wind components are specified for that level. For any UAM levels entirely above ROM layer 1, then ROM layer 2 winds are applied to define transport. For the condition where a UAM level overlaps both ROM layers, weighting factors based on the fractional amounts that the UAM level overlaps each layer are applied to the wind components of each ROM layer to determine the wind components (Table 6).

The wind interface also applies certain methods found in the Diagnostic Wind Model (DWM) system, one of the principal program components of the UAM system. After the wind components have been matched into each UAM vertical level, an inverse distance-squared weighting technique (equation 2) is applied to spatially interpolate the wind components, still at the resolution of the ROM grid points, to the fine-mesh UAM grid points. The spatial interpolation procedure is applied to each wind component field at each vertical level.

$$(u,v)_{ij} = \sum_{n=1}^{N} (u_n, v_n) \cdot r_n^{-2} \; / \; \sum r_n^{-2} \qquad (2)$$

where $(u,v)_{ij}$ = wind components at UAM grid point i,j

(u_n, v_n) = the ROM wind components at grid point n

N = maximum of five surrounding ROM grid point values

r = distance between UAM grid point and a ROM grid point

TABLE 6. ROM-UAM WIND INTERFACING METHODOLOGY

Criteria:

* If $Z_{Tk} \le Z_{R1}$; use ROM layer 1 winds
* If $Z_{Bk} > Z_{R1}$; use ROM layer 2 winds
* If a UAM level overlaps both ROM layers ($Z_{Bk} < Z_{R1} \le Z_{Tk}$); determine weighting terms (W1, W2) from:

$$W1 = (Z_{R1} - Z_{Bk}) / (Z_{Tk} - Z_{Bk})$$

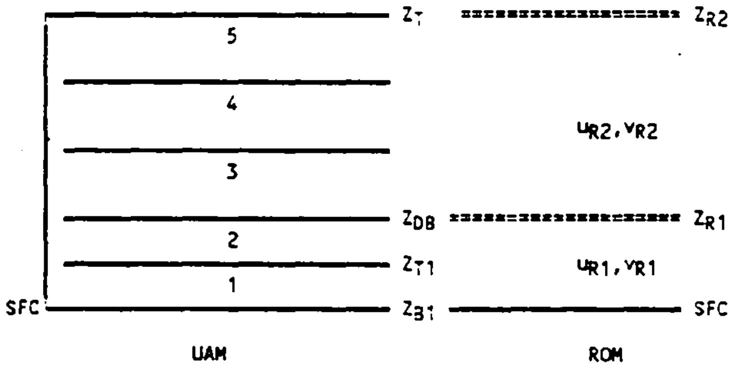
$$W2 = (Z_{Tk} - Z_{R1}) / (Z_{Tk} - Z_{Bk})$$

where Z_{R1} = ROM layer 1 height
Z_{Tk} = top (T) of a UAM vertical level k
Z_{Bk} = bottom (B) a a UAM vertical level k

$$u,v = u_{R1},v_{R1} * W1 + u_{R2},v_{R2} * W2$$

where $u_{R\#},v_{R\#}$ = ROM gridded wind components in layer 1,2

Example configuration of models around sunrise:



Using equation (2), the wind components at UAM grid point i, j are determined from values at the nearest surrounding ROM grid points. A default maximum radius of influence (RMAX) of 25 km has been imposed for this purpose so that only the nearby ROM grid points are included in the interpolation procedure. If RMAX was set too large, unwanted smoothing could occur in the interpolated field. Values from up to five ROM grid points may be used in the interpolation expression in equation (2). Another constraint required when applying an inverse-distance weighting method is to supply a minimum distance criterion since the distance between two grid points must always be nonzero (division by zero produces an error on many computer systems). Therefore, a minimum distance (RMIN) of 1 km is suggested between a pair of ROM and UAM grid points.

The next step is to subject the interpolated wind components to a five-point filter technique, which reduces any spatial discontinuities and dampens vertical velocities contained in the interpolated horizontal wind field. The purpose of applying the filter is also to reduce anomalous divergence as much as possible. The form of the five-point filter is given by:

$$X_{sm}(i,j) =$$

$$0.5 \cdot X(i,j) + 0.125 \cdot [X(i+1,j) + X(i-1,j) + X(i,j-1) + X(i,j+1)] \qquad (3)$$

where X is either the u or v wind component, and X_{sm} is the smoothed value.

Only values at the surrounding four UAM grid points are employed in this filter technique at a given grid point (i,j). The number of times that the wind component field is subjected to the filter method is specified by the value of NSMTH. In the test case, NSMTH was set equal to 2.

Next, an initial vertical velocity field is computed at each level from the divergence derived from the smoothed horizontal wind component fields. Unrealistically large vertical velocities may still remain. Consequently, a method applied in the DWM has also been implemented in the wind interface that progressively diminishes vertical velocities toward zero at the region top (Douglas et al. 1990). However, the horizontal wind component fields are not mass-consistent after vertical velocities have been revised in this manner. Therefore, a final procedure is to exercise an iterative technique in order to minimize divergence which involves slight adjustments of the horizontal wind components throughout the entire grid until a minimum divergence criterion is reached (default minimum divergence = 1×10^{-6} s^{-1}). The final products of the wind interface are gridded fields of u,v components at each UAM level. An example of the wind field at level 1 for a UAM domain obtained from the ROM gridded winds according to these procedures is displayed in Figure 7.

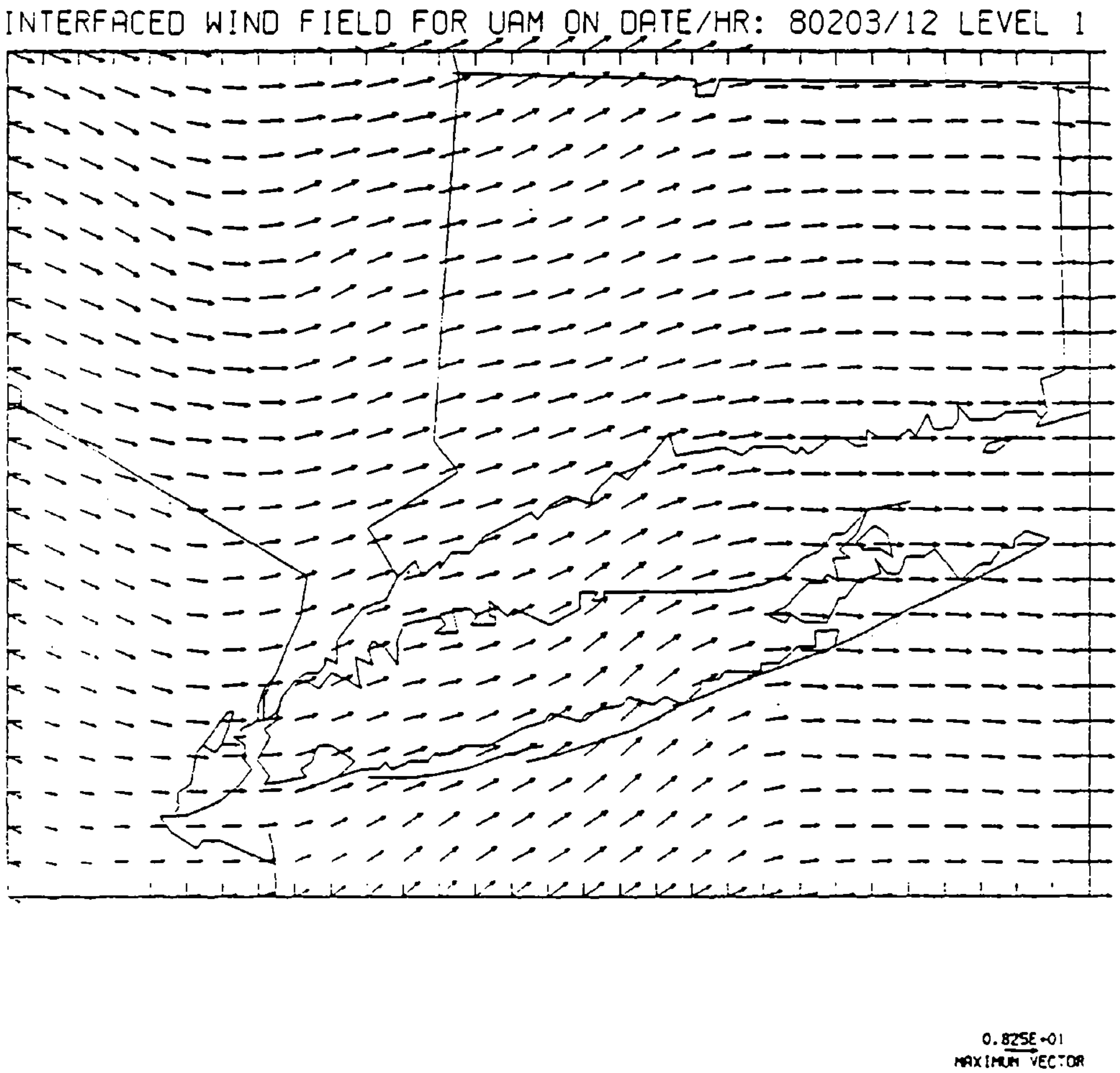


Figure 7. Wind field derived for an example UAM grid from ROM gridded wind components.

An optional feature also exists in the interface to allow the user to input a wind field file, already gridded for the UAM domain, which had been generated from another wind model. The interface can accept the wind file and create a binary wind file compatible with the UAM. The user is referred to Section 5 for the input format specifications of an alternate wind file for the interface program.

An alternative to wind interfacing is the DWM system, which is a stand-alone independent package available to the user with the UAM (CB-IV) system [Douglas et al. 1990]. If the user elects to apply the DWM, surface and upper-air wind data must be processed in order to exercise the computer programs associated with this wind model. The DWM system has a postprocessor program which generates a binary wind file for the UAM.

4.2.5 Surface Characteristics

The two surface characteristics required by the CRETER preprocessor are gridded fields of surface roughness length (ROUGHNESS) and the VEGFACTOR, a measure of the relative surface uptake capability of a particular land use type compared to that of an alfalfa crop.

An interface program has been developed to directly apply the gridded ROM fields of surface roughness length (Z_0) and a land use inventory available at the resolution of the ROM grid is employed to derive grid-average vegetation factor values. Both of these surface parameters are employed to treat dry deposition processes in the UAM and Z_0 values are also applied in the derivation of vertical diffusivity in the model.

An area-weighting scheme was selected as a more appropriate approach than the distance-weighting scheme for the determination of UAM gridded values for these surface parameters from gridded ROM values. With the area-weighting technique, the fractional amounts of each UAM cell covered by different ROM cells are determined. An algorithm based on slopes and intercepts between grid cell lines accurately computes the fractional area of a UAM grid cell covered by any ROM cell. An example of the area-weighting scheme is provided by a subset of the ROM and UAM grid cells in Figure 8. For UAM cell U1, contributions from all four ROM cells would be fractionally weighted to determine the grid-area average value. On the other hand, grid-area average value for U4 would be specified totally by R4 since U4 is completely inside ROM cell R4. The number of ROM grid cells impacting a particular UAM cell is certainly dependent on the horizontal grid cell size of the urban model. As grid cell size decreases, more UAM grid cells may be completely imbedded in a single ROM grid cell since the ROM grids remains fixed at about 19 km on a side.

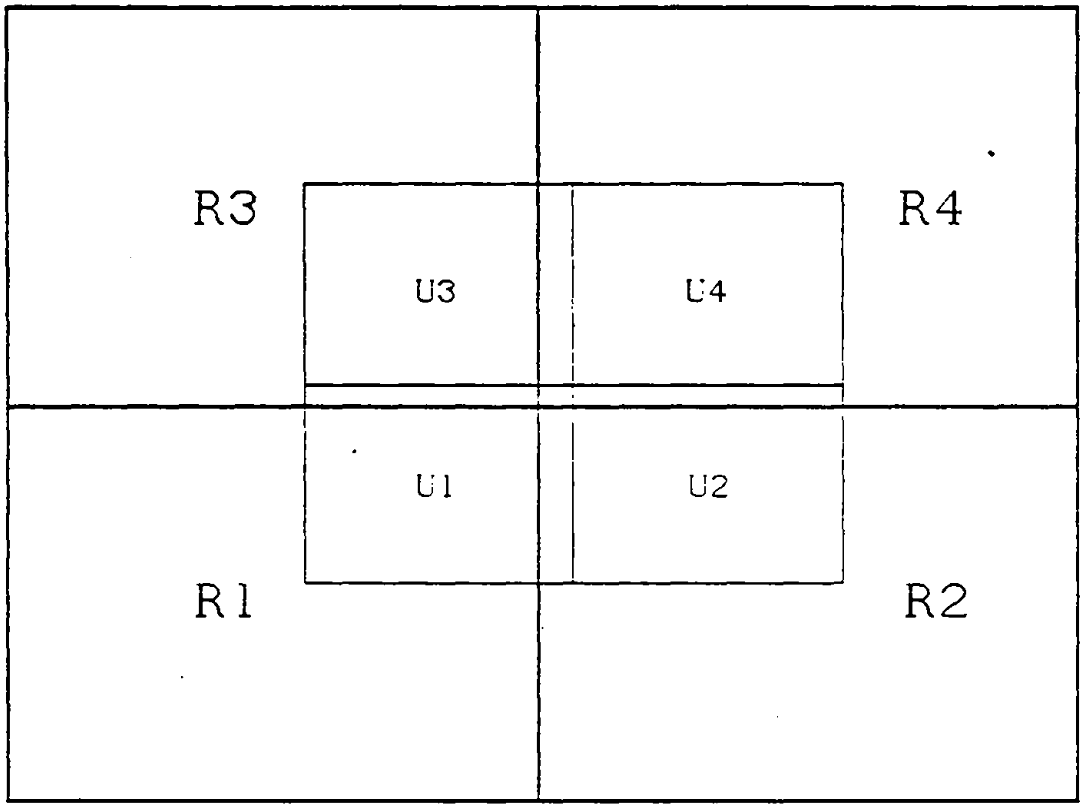


Figure 8. Example set of ROM and UAM grid cells for the fractional area weighting method. (The ROM cells are about a factor of 4 larger than a UAM grid cell in this case.)

The eleven land use categories contained in the ROM gridded inventory are presented in Table 7. The fractional coverage of each land use in each ROM cell comprises the land use inventory data. For dry deposition in the UAM, a deposition factor (β) represents the relative surface uptake rate of a particular land use category compared to an alfalfa crop. The following expression has been developed to derive an average vegetation factor for each UAM grid cell.

$$VEGFACTOR_{u} = \sum_{n=1}^{nn} (A_n / A_u) \cdot \alpha_n \qquad (4)$$

where: $\alpha_n = \sum L_m \cdot \beta_m$ is the overall vegetative factor for ROM cell n from the fractional amounts of each land use (L_m) times deposition factor β_m for the land use types in Table 7.

In equation (4), the areal contribution of each ROM cell to a UAM cell's area (A_n / A_u) is summed in order to obtain the UAM grid-area average VEGFACTOR value.

Values of ROUGHNESS are also derived for each UAM grid by applying the area-weighting technique to ROM gridded surface roughness values. The formatted output file of the terrain interface (ICRETER) is in a compatible format for direct input to the CRETER preprocessor.

TABLE 7. LAND USE CATEGORIES AND ASSOCIATED DEPOSITION FACTORS

	Designation	Description	Deposition factor (β)
1	URBAN	urban, little vegetation	0.2
2	AGRI	agricultural land; adequate water	0.5
3	RANGE	range land, usually low soil moisture	0.4
4	DF	deciduous forest	0.4
5	EV	evergreen (coniferous) forest	0.3
6	MF	mixed forest, including wetland	0.3
7	WATER	water bodies (fresh or salt water)	0.03
8	BARREN	barren land, mostly desert	0.2
9	NFW	non-forested wetland	0.3
10	MIXED	mixed agriculture and range land	0.5
11	ROCKY	rocky areas with low shrubs-lichens	0.3

4.3 TREATMENT OF CONCENTRATIONS

The concentrations of 23 chemical species must be specified for initial conditions, lateral boundary conditions, and top boundary conditions in model applications with the CB-IV version of the UAM. A complete list of the chemical species and their alphanumeric names designated internally in the UAM system are provided in Table 8. Complete details about the development of the carbon-bond chemical mechanism have been documented by Gery et al. (1988, 1989) and its adaptation into the UAM is fully described in Morris et al. (Volume I, 1990a).

TABLE 8. CHEMICAL SPECIES IN THE UAM (CB-IV) MODEL

	Model nomenclature	Chemical name	Interfaced (X)
1	NO	Nitric oxide	X
2	NO2	Nitrogen dioxide	X
3	O3	Ozone	X
4	OLE	Olefinic carbon bond species	X
5	PAR	Paraffinic carbon bond species	X
6	TOL	Toluene	X
7	XYL	Xylene	X
8	FORM	Formaldehyde	X
9	ALD2	Higher molecular weight aldehydes	X
10	ETH	Ethene	X
11	CRES	Cresol and higher molecular weight phenols	
12	MGLY	Methylglyoxal	
13	OPEN	Aromatic ring fragment acid	
14	PNA	Peroxynitric acid	
15	NXOY	Nitrogen species group	
16	PAN	Peroxyacetyl nitrate	X
17	CO	Carbon monoxide	X
18	HONO	Nitrous acid	X
19	H2O2	Hydrogen peroxide	X
20	HNO3	Nitric acid	X
21	MEOH	Methanol	X
22	ETOH	Etnanol	
23	ISOP	Isoprene	X

NOTE: X = concentrations of species interfaced from the ROM.
Default minimum value defined for six species not interfaced.

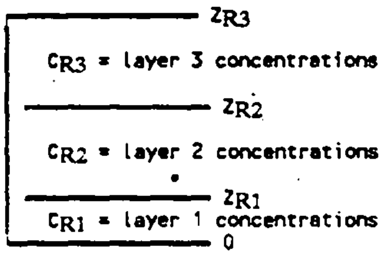
Since both the regional and urban model systems include the CB-IV chemical mechanism, it is possible to interface the ROM predicted concentrations for all species (except for ETOH, which is not available from the ROM simulations). However, sensitivity test simulations were undertaken to investigate whether it is necessary to interface all chemical species. A series of model test simulations involved different sets of species interfaced with ROM concentrations while the remaining species were prescribed by a minimum default value (10^{-6} ppm). The same results for ozone were achieved by interfacing 17 species from the ROM as with the full set, while results differed when interfacing fewer species from the ROM. Limiting the number of species to be interfaced also helped to reduce the size of the concentration file generated by the retrieval program. Table 8 also indicates the 17 species interfaced from the ROM predicted concentrations, which are employed in the derivation of initial, lateral boundary, and top boundary conditions for the UAM. Although values for the other six species are not derived by the concentration interface program, minimum default values are specified in the CHEMPARAM file which is created by the CPREP preprocessor program for the model.

The most challenging aspect of interfacing concentrations was to develop a method to match the concentrations from the three layers of the ROM into a user-specified number of UAM vertical cells and to design the scheme to be applicable over an entire diurnal period. The methodology outlined in Table 9 has been incorporated into the concentration interface (ICONC) program. The approach presented in Table 9 is versatile since it can accommodate any number of user-defined vertical levels and is applicable over the entire diurnal cycle. It is also a realistic approach for matching of ROM layer concentrations into multiple UAM vertical levels based on knowledge of the relationship between the diffusion break height and ROM layer heights with time. This method is applied to obtain concentrations at the various vertical UAM levels for initial and boundary conditions.

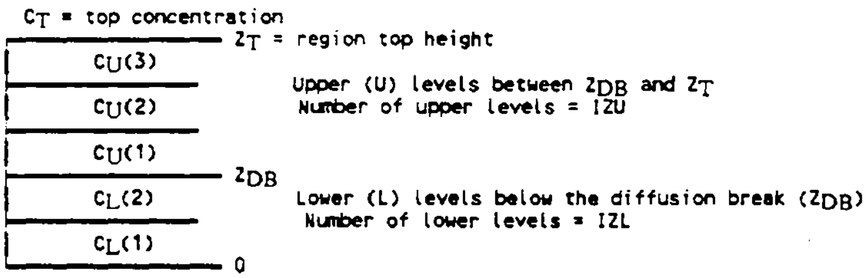
The key feature of the vertical interfacing methodology for lower levels is the weighting scheme which is dependent upon the time variation of Z_{DB}. Concentrations of species in lower levels are derived from equation (5) in Table 9. It shows that ROM layer 1 and 2 concentrations are applied to specify lower level values. There is a criterion that if ROM layer 1 height (Z_{R1}) is greater than Z_{DB}, ROM layer 1 concentrations are exclusively employed to define UAM lower level concentrations. This condition often exists during nocturnal or early morning hours. As the diffusion break approaches the maximum value (Z_{DBmax}), F1 approaches zero while F2 goes to unity in equation (8) and (9), respectively. Consequently, concentrations for lower UAM levels approach the average value of ROM layers 1 and 2. In addition, it is evident that the same concentrations are specified for all lower levels (i.e. no vertical concentration gradient). The rationale for the lack of a concentration gradient across the lower levels is that mixing is expected to be sufficiently vigorous below Z_{DB} at any hour that vertical gradients are quickly eliminated by the model.

TABLE 9. VERTICAL METHODOLOGY FOR INTERFACING CONCENTRATIONS[1]

ROM (R) Layers (layer thickness not to scale):



Example Configuration of UAM Vertical Levels (thicknesses not to scale):



Lower level concentrations (C_L):

$$C_L(k) = C_{R1} \cdot F1 + [(C_{R1} + C_{R2})/2] \cdot F2 \qquad \text{for} \quad k = 1, IZU \tag{5}$$

$$\text{If} \quad Z_{DB}(t) < Z_{R1}, \quad C_L(k) = C_{R1}$$

Upper level concentrations (C_U):

$$C_U(kk) = C_{R2} + [(kk - 0.5)/IZU \cdot (C_T - C_{R2})] \qquad \text{for} \quad kk = 1, IZL \tag{6}$$

$$C_T = C_{R2} \cdot F1 + C_{R3} \cdot F2 \tag{7}$$

Weighting factors (*F1* and *F2*):

$$F1 = 1 - (Z_{DB}(t) - Z_{R1})/(Z_{DBmax} - Z_{R1}) \tag{8}$$

$$F2 = (Z_{DB}(t) - Z_{R1})/(Z_{DBmax} - Z_{R1}) \tag{9}$$

1. This methodology is applied to each ROM grid point location.
The interpolation procedure to UAM grids is described in Section 4.3.1.

Vertical concentration differences have been included in the derivation of values for upper levels according to equation (6) in Table 9. Upper level concentrations are controlled by ROM layer 2 and layer 3 values since the top concentration (C_T) is dependent on ROM layer 3 values. At the beginning hour of simulation, C_T equals the ROM layer 2 concentration (C_{R2}) and no vertical concentration gradient exists across the upper levels. The rationale for this scheme follows from the specification of the height of ROM layer 2 as the initial value of Z_T. In addition, layer 2 represents a rather thick residual layer of pollutants which have been well-mixed during the previous daytime period. A strong vertical gradient may develop across the upper levels in the UAM during the day because C_T approaches ROM layer 3 concentrations. Layer 3 concentrations are generally near tropospheric background values which can be considerably lower than layer 2 concentrations in certain areas of the model domain.

The following sections describe the procedures in the concentration interface (ICONC) which derives initial, lateral boundary, and top boundary conditions of the pollutant species for the UAM.

4.3.1 Initial Conditions

The set of initial conditions represents the concentrations of all species in each cell of the model grid at the starting hour of simulation. Model predicted concentrations are certainly impacted by initial conditions for some time. However, the influence of initial conditions diminishes as a simulation progresses.

The procedure applied in the concentration interface (ICONC) for deriving initial concentrations at each UAM grid cell begins with the use of the vertical method already described in Table 9. Once concentrations have been derived at each UAM vertical level, values must be spatially resolved to each UAM grid cell by applying the inverse distance-squared interpolation technique described earlier.

$$C_m(i,j) = \sum C_{mn} \cdot r_n^{-2} / \sum r_n^{-2} \qquad (10)$$

where $C_m(i,j)$ = concentration of species m at UAM grid i,j

C_{mn} = concentration of species m at ROM grid cell n

r_n = distance between midpoints of a UAM and a ROM grid cell

In applying the spatial interpolation step prescribed by equation (10), concentrations in ROM grid cells immediately surrounding each UAM grid cell are included in the interpolation procedure to preserve horizontal gradients that may exist in the ROM gridded concentration field.

Initial concentration fields are determined with the above procedure for the 17 species identified in Table 8. The gridded arrays of initial concentrations of these pollutant species are written to a binary file for direct use in the UAM. Thus, the UAM preprocessor for initial conditions (AIRQUL) will not be exercised when applying the interface for concentrations. If a user wishes to examine the initial concentration file, a binary to ASCII conversion program has been included in the interface package (Appendix E). This conversion program generates a formatted ASCII data file from a binary data file so that the initial conditions may be examined via any on-line editor or the ASCII formatted file can be listed on a line printer.

4.3.2 Lateral Boundary Conditions

One of the primary purposes for interfacing the ROM and UAM systems is to specify boundary concentrations for the urban model from regional model simulation results, which provides for considerably greater spatial density of concentrations than is available from existing ambient monitoring sites. The inflow of pollutants along the upwind model boundary is of particular importance in UAM simulations since pollutant boundary concentrations are advected into the heart of the domain where they become involved in the variety of photochemical reactions with the urban emissions.

A methodology has been designed to provide for temporally-varying concentrations of each interfaced species at each boundary cell. In the UAM, the grid cells around the outer edge of the domain at each level constitute the group of lateral boundary cells (Figure 9). The first step is to apply the vertical method described earlier to obtain concentrations at each vertical UAM level for each ROM grid point location. The next procedure consists of spatially averaging the values from three ROM grid points: the two ROM grid points in each row (or column) exterior to the UAM domain and the ROM grid point in each row (or column) just inside the boundary. This averaging step is illustrated with the set of ROM points shown in Figure 9. The averaging procedure is performed with each set of these ROM grid points for each ROM row and column around the entire perimeter of the UAM domain. These averaged values represent the boundary values along each side at the resolution of the ROM grid. The averaging of values over the outermost ROM grid points provides some spatial smoothing for boundary conditions. The last step is to derive boundary concentrations at each UAM grid point. Linear interpolation is employed using the averaged ROM values along each side of the UAM domain to derive boundary concentrations at each UAM grid cell. This step is repeated to determine boundary concentrations at each vertical level and the entire procedure is also performed each hour. The lateral boundary concentrations are written to a binary file (BCBIN) for use in UAM simulations.

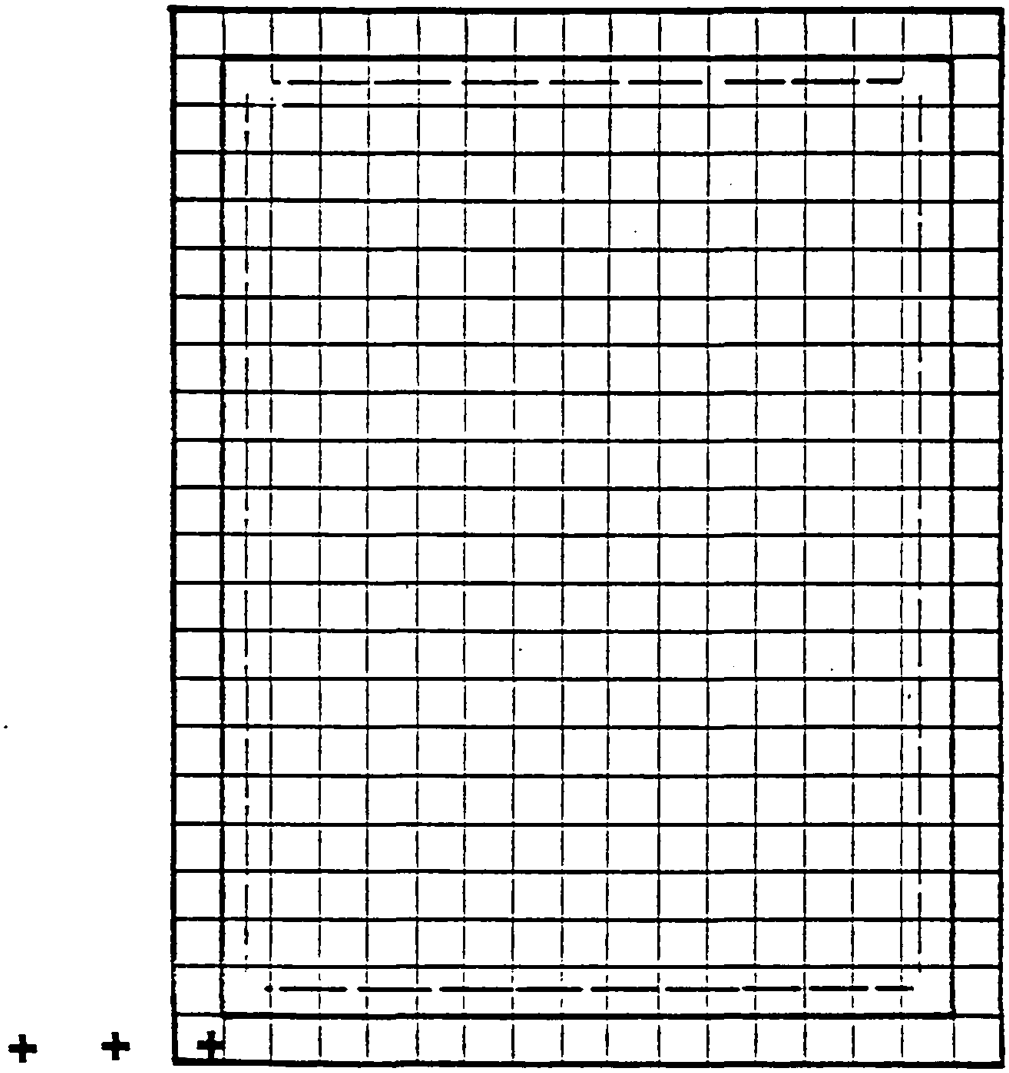


Figure 9. Boundary grid cells in the UAM model are the outer cells enclosed by bold lines. ROM grid points are shown in the lower left.

4.3.3 Top Boundary Conditions

Boundary concentrations must also be defined at the top of the model domain. The procedures installed in the ICONC interface allow top boundary values to vary both in time and space in order to take full advantage of the ROM predicted concentration fields. Top concentrations can have a greater impact on surface concentrations in a UAM configuration where the diffusion break height and region top height become identical. However, this feature has been eliminated when interfacing is applied as noted in Section 4.2.1. Nevertheless, top concentrations can still be gradually mixed into the lower levels even across the rather shallow upper levels. Therefore, top concentrations must be properly specified.

The derivation of the top concentration (C_T) begins with equation (7) in Table 9. It provides for the hourly evolution of C_T values at each ROM grid point overlapping the UAM domain. As noted earlier, C_T has been designed to evolve from ROM layer 2 to layer 3 concentrations during the course of the daytime period. Then the same inverse distance-squared weighting technique described earlier is employed on C_T values at the ROM grid points to resolve concentrations at each UAM grid cell at the top of the UAM. These steps are repeated hourly to provide for temporally-varying top concentrations for the UAM. A separate binary output file is generated that contains the top boundary concentrations (TCBIN).

4.3.4 Summary of Concentration Interfacing

The specification of initial, and lateral and top boundary conditions is a primary objective of the ROM-UAM interface effort. The methodologies described in the previous sections have been designed to provide the fullest possible temporal and spatial resolution of concentrations for these key conditions in the UAM from ROM gridded concentrations. An overview of the steps undertaken to resolve initial, boundary, and top conditions in the concentration interface is given in Table 10.

TABLE 10. CONCENTRATION INTERFACING PROCEDURES

INITIAL CONDITIONS:

Perform vertical method described in Table 9 with ROM gridded concentrations at the starting hour to derive values at each UAM level.

Perform horizontal interpolation to obtain values at each UAM grid point using the inverse distance-squared method.

LATERAL BOUNDARY CONDITIONS:

Perform vertical method with ROM gridded concentrations to derive concentrations at each UAM level.

Average the two exterior ROM grid points and the ROM grid point located immediately inside the UAM boundary in each ROM row/column.

Perform linear interpolation to resolve UAM boundary grid values.

Iterate the above steps for each hour.

TOP CONDITIONS:

Use vertical method to determine top concentrations at each ROM grid point.

Perform horizontal interpolation to spatially resolve concentrations to each UAM grid

Iterate to perform above steps for each hour.

4.4 TREATMENT OF AREA BIOGENIC EMISSIONS

Although an awareness of hydrocarbon emissions from naturally-occurring sources has existed for over two decades, it was not until recently that concerted efforts were undertaken to measure emissions of hydrocarbon species from various vegetation types (Lamb et al. 1985) and to attempt to compile a biogenic emissions inventory (Lamb et al. 1987). While uncertainties remain in the estimation of biogenic emissions, it is also necessary to consider the best available biogenic emission rates in combination with anthropogenic area sources of hydrocarbons and nitrogen oxides in UAM applications.

During the development of the ROM 2.1 model, an effort was also underway to develop a new biogenic emissions processing system to be named BEIS--Biogenics Emissions Inventory System. Briefly, the methodology in BEIS applied broad vegetation classes and a canopy model used in estimating leaf temperature and solar intensity profiles within forest stands to derive emissions directly for isoprene, α-pinene, monoterpene, and unknown organic species. Emission rates of these species were converted into hourly biogenic emissions for CB-IV organic classes which include; isoprene (ISOP), paraffins (PAR), olefins (OLE), high molecular weight aldehydes (ALD2), and nonreactive hydrocarbons (NONR). BEIS also includes a procedure to determine NO and NO_2 emission rates from grassland and soil. The allocation scheme for these species, and the biomass and environmental factors employed in computing the biogenic emissions for BEIS are fully described by Pierce et al. (1990b) [See also Appendix D to Volume IV of the User's Guide].

The hourly biogenic area emissions of six species are contained in the retrieved ROM PF144 data file and include ISOP, PAR, OLE, ALD2, NO, NO_2. The tasks performed by the biogenic emissions interface (IBIOG) are to resolve the gridded biogenic emissions to the UAM grid cells and to combine these values with the area anthropogenic emissions file supplied by the user. The technique applied to derive UAM gridded biogenic emissions from the ROM gridded values is the fractional-area weighting method. This is a similar algorithm as described earlier to resolve the surface roughness and vegetative factor to the UAM grid, except with a variation needed for its application to emissions.

The ROM gridded biogenic emissions represent emission rates over the area of each ROM grid cell. When applying the area weighting technique, the ratio of the area of a ROM grid cell contained in a UAM cell to the total area of the ROM cell (A_{Ri}/A_R) is used to scale the ROM biogenic emission rate. This factor is needed to preserve the emission density (Q/A_R). For example, in the case of a UAM cell entirely inside a ROM grid cell, the UAM cell biogenic emissions would be computed with the ratio of the total area of the UAM grid cell to the ROM cell's area multiplied by the ROM cell's biogenic emissions. In the general application, the area of each ROM cell overlapping a given UAM grid cell is scaled by the total area of the ROM grid cell (A_R). Then the biogenic emission rate for each species for a particular UAM grid cell is determined by summing the scaled contributions from every ROM grid cell that overlaps a UAM cell.

The IBIOG interface combines the biogenic emissions for the six species with the corresponding area anthropogenic emissions of these same species and generates a single binary area emissions which contains the sum from both inventories.

SECTION 5

USER'S INSTRUCTIONS

The interface system is a set of eight batch-oriented computer processors requiring 16 data files listed in Table 11 and some card inputs described in the following subsections. The processor called PDFSNBK reads in user-supplied diffusion break data instead of ROM data. The processor IBIOG combines the ROM biogenic emissions data with user-supplied area-source emissions data. The remainder of the interface processors require retrieved ROM data files.

This system produces five formatted data files for UAM preprocessors and five unformatted data files directly used by UAM. 'IWIND' and 'ICONC' processors have a built-in option for user-supplied data.

Although these eight processors are independent in the interface system, the diffusion break and regiontop data are required by 'IMETSCL' and 'IWIND' processors. Therefore, the user should process diffusion break data first, followed by processing regiontop data. The remaining processors can be executed in any order. The user needs to supply hourly observed or derived diffusion break heights for the interface system. The user is referred to Volume II of the User's Guide (Morris et al. 1990b) for the recommended procedures to obtain a diffusion break data file.

TABLE 11. INPUT DATA FILES USED BY EACH INTERFACE PROCESSOR

Data file	Interface processor							
	PDFSNBK	IREGNTP	ITMPRTR	IMETSCL	IWIND	ICRETER	ICONC	IBIOG
DBDATA*	X	X		X	X		X	
EMISSIONS**								X
RTDATA***				X	X			
ROM21							X	
MF165					X		X	
MF166		X						
MF174				X				
PF102				X				
PF103			X					
PF108						X		
PF114					X			
PF115					X			
PF117				X				
PF118						X		
PF119		X		X	X		X	
PF144								X

* DBDATA: Diffusion break data (user-supplied).

** EMISSIONS: Area source emission data (user-supplied).

*** RTDATA: Regiontop data derived from 'IREGNTP' interface processor.

(A description of the remaining data files is presented in Table 2.)

5.1 DIFFUSION BREAK DATA PROCESSOR (PDFSNBK)

5.1.1 Processor Function

This processor prepares hourly diffusion break data for use in the preprocessor 'DFSNBK' of UAM. PDFSNBK reads in user-supplied diffusion break data and control data pack; then, it generates a formatted packet file that is in a compatible format for input to the UAM preprocessor 'DFSNBK'. Flow of information through the PDFSNBK interface processor is shown in Figure 10.

5.1.2 Input/Output Components

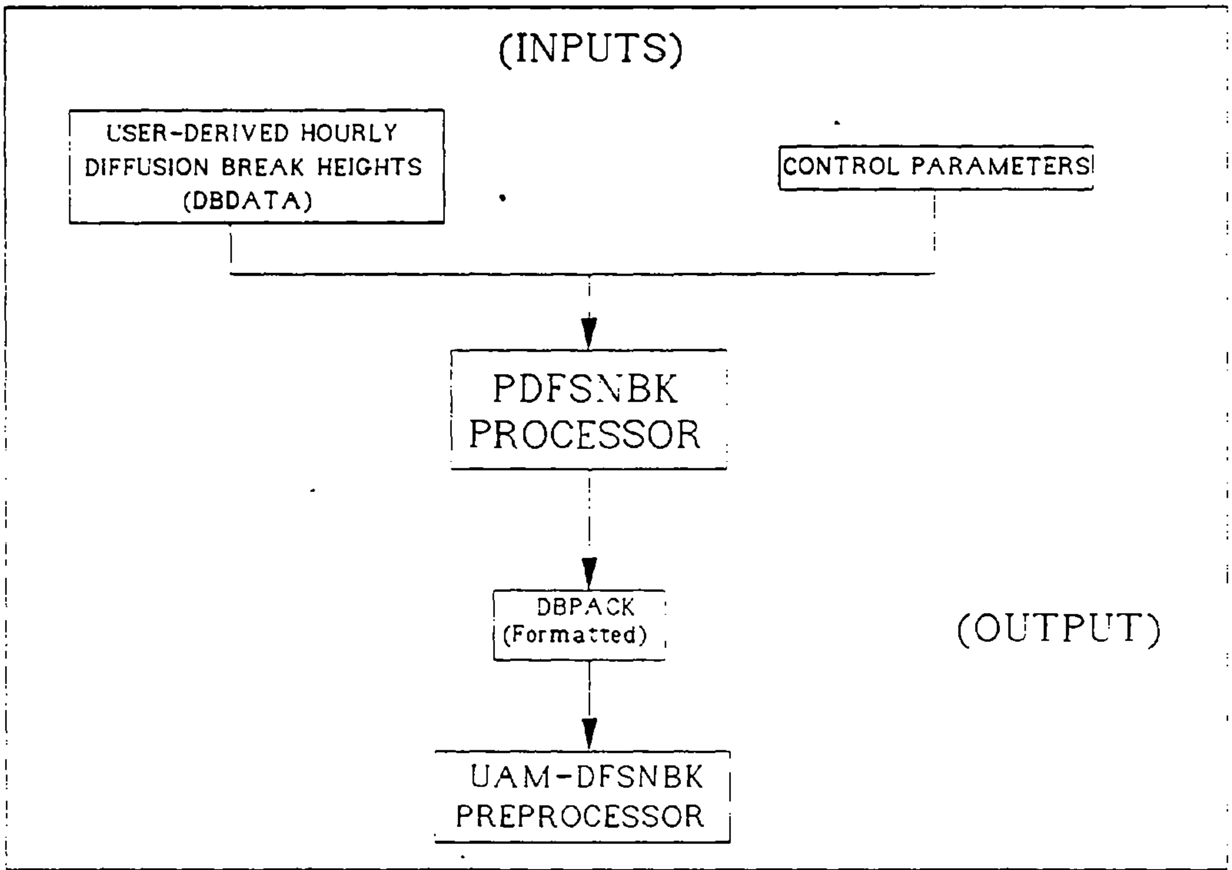
5.1.2.1 Input Files--

The data contained in input data file (DBDATA) are user-supplied diffusion break data associated with date and time. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 12.

```
    READ(3,17,END=998) LDAY,LTIM,VMH
        .....
17  FORMAT(I7,I3,F10.0)
```

TABLE 12. DBDATA INPUT FILE PARAMETERS

Card number	Parameter number	Parameter name	Units	Data type	Description
1+	1	LDAY		Integer*4	Year/Julian date (e.g., 80203)
	2	LTIM	h	Integer*4	Time, LST (e.g., 20)
	3	VMH	m	Real*4	Diffusion break height AGL



Note: The hourly diffusion break height file (DBDATA), derived by the user is the primary input file. The DBPACK output file is formatted for use in the DFSNBK preprocessor.

Figure 10. Flow diagram of the diffusion break data processor, PDFSNBK.

5.1.2.2 Control Cards--

The control cards define the general information of the UAM model application. Thirty-five variables included on control cards are used, in the format shown below. Dots indicate additional program statements. Table 13 defines the control card variables. Additional information about these parameters can be found in Volume II of the User's Guide (Morris et al. 1990b).

```
          READ(5,23) TP
          READ(5,20) FID
          READ(5,21) (IOP(I),I=1,23)
          READ(5,22) ISYD,ISHM,IEYD,IEHM
              .....
          READ(5,24) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ
          READ(5,25) IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
              .....
          READ(5,33) ISUB
              .....
          READ(5,34)  SUBID,IROW,ICOL,ICONT
              .....
          READ(5,35)  SUBID,VAR,MHD,VMIN,VMAX,NOP
              .....
 (If NOP = 0, skip the following READ statements.)

          READ(5,39)  PNAME,IPVAL
              .....
          READ(5,36)  PNAME,PVAL
              .....
       20 FORMAT(A60)
       21 FORMAT(5I10,/,3I10,/,5I10,/,4I10,/,6I10)
       22 FORMAT(4I10)
       23 FORMAT(A10)
       24 FORMAT(2F10.0,I10,/,2F10.0,/,2F10.0)
       25 FORMAT(3I10,/,2I10,F10.1,2F10.0)
       33 FORMAT(I10)
       34 FORMAT(A10,3I10)
       35 FORMAT(3A10,2F10.1,I10)
       36 FORMAT(A10,F10.2)
       39 FORMAT(A10,I10)
```

TABLE 13. CONTROL CARD VARIABLES FOR PDFSNBK

Card number	Variable name	Units	Data type	Description
1	TP		Character*10	File name (i.e., DIFFBREAK)
2	FID		Character*60	File identifier
3	IOP(I)		Integer*4	Control options
	I=1			Number of species (set to 0)
	I=2			Number of user-defined variables
	I=3			Number of stations (i.e., ROM grid cells)
	I=4			Number of subregions
	I=5			Number of parameters
4	I=6			Output file number
	I=7			Input print option-- 0: don't print; 1: print
	I=8			Output print option-- (0 or 1, as above)
5	I=9			Print unit table (0 or 1)
	I=10			Print station locations (0 or 1)
	I=11			Print region (0 or 1)
	I=12			Print methods table (0 or 1)
	I=13			Print station values (0 or 1)
6	I=14			Number of vertical parameters
	I=15			Number of profile heights
	I=16			Print vertical methods table (0 or 1)
	I=17			Print vertical profiles table (0 or 1)
7	I=18			DIFFBREAK unit number
	I=19			REGIONTOP unit number
	I=20			TOPCONC unit number
	I=21			TEMPERATUR unit number
	I=22			METSCALARS unit number
	I=23			WIND unit number

(continued)

TABLE 13. CONTROL CARD VARIABLES FOR PDFSNBK (CONCLUDED)

Card number	Variable name	Units	Data type	Description
8	ISYD		Integer*4	Beginning year/Julian date (*yyddd*--e.g. 80203)
	ISHM		Integer*4	Beginning time (*hhmm*--e.g. 0100, military time)
	IEYD		Integer*4	Ending year/Julian date
	IEHM		Integer*4	Ending time (military time)
9	XLOCR	m	Real*4	Reference origin (*x*-coordinate)
	YLOCR	m	Real*4	Reference origin (*y*-coordinate)
	IZONE1		Integer*4	UTM zone
10	XLOC	m	Real*4	Origin of grid in *x*-direction
	YLOC	m	Real*4	Origin of grid in *y*-direction
11	XSZ	m	Real*4	Cell size in *x*-direction
	YSZ	m	Real*4	Cell size in *y*-direction
12	IX		Integer*4	Number of cells in *x*-direction
	IY		Integer*4	Number of cells in *y*-direction
	IZ		Integer*4	Number of cells in *z*-direction
13	IZL		Integer*4	Number of cells in lower layer
	IZU		Integer*4	Number of cells in upper layer
	SFCH	m	Real*4	Height of surface layer (set to zero)
	ALH	m	Real*4	Minimum height of cell in lower layers
	AUH	m	Real*4	Minimum height of cell in upper layers
14	ISUB		Integer*4	Number of subregions (set equal to 1)
15	SUBID		Character*10	Subregion name
	IROW		Integer*4	Beginning row number
	ICOL		Integer*4	Beginning column number
	ICONT		Integer*4	Cell count; if negative, equal to rest of model region
16	SUBID		Character*10	Subregion name
	VAR		Character*10	Variable name
	MHD		Character*10	Method name
	VMIN	m	Real*4	Minimum value
	VMAX	m	Real*4	Maximum value
	NOP		Integer*4	Number of parameter cards that follow
17+	PNAME		Character*10	Parameter name
	IPVAL		Integer*4	Parameter value
18+	PNAME		Character*10	Parameter name
	PVAL		Real*4	Parameter value

Example:

```
DIFFBREAK
HEIGHT OF THE MIXED LAYER
         0         0       224         1        10
        23         1         1
         0         0         0         0         0
         0         0         0         0
         0         0         0         0         0         0
     80203         0     80205      0100
        0.        0.        18
   520000.  4460000.
     8000.     8000.
        31        25         5
         2         3       0.0      50.0     100.0
         1
A                  1         1        -1
A         DIFFBREAK CONSTANT          0.     3000.         0
```

5.1.2.3 Output File

The output file (DBPACK) contains not only the diffusion break data but also general information of UAM model application. Dots indicate additional program statements. The output parameters are listed in Table 14.

```
          WRITE(8,20) CNTL
          WRITE(8,23) TP
          WRITE(8,20) FID
          WRITE(8,21) (IOP(I),I=1,23)
          WRITE(8,22) ISYD,ISHM,IEYD,IEHM
          WRITE(8,23) END
              .....
          WRITE(8,20) REGN
          WRITE(8,24) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ
          WRITE(8,25) IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
          WRITE(8,23) END
              .....
          WRITE(8,20) TINTVL
              .....
          WRITE(8,22) IYD1,IHM1,IYD2,IHM2
              .....
          WRITE(8,20) SUBR
              .....
          WRITE(8,34) SUBID,IROW,ICOL,ICONT
          WRITE(8,23) END
              .....
          WRITE(8,20) METH
              .....
          WRITE(8,35) SUBID,VAR,MHD,VMIN,VMAX,NOP
              .....
                .
  (If NOP = 0, skip the next two WRITE statements.)

          WRITE(8,39) PNAME,IPVAL
              .....
          WRITE(8,36) PNAME,PVAL
          WRITE(8,23) END
              .....
          WRITE(8,23) CONST
          WRITE(8,37) SUBID,VAR,VMH
          WRITE(8,23) END
          WRITE(8,23) ENDT
              .....
       20 FORMAT(A60)
       21 FORMAT(5I10,/,3I10,/,5I10,/,4I10,/,6I10)
       22 FORMAT(4I10)
       23 FORMAT(A10)
       24 FORMAT(2F10.0,I10,/,2F10.0,/,2F10.0)
       25 FORMAT(3I10,/,2I10,F10.1,2F10.0)
       34 FORMAT(A10,3I10)
       35 FORMAT(3A10,2F10.1,I10)
       36 FORMAT(A10,F10.2)
       37 FORMAT(A10,A10,F10.1)
       39 FORMAT(A10,I10)
```

5.2.2.3 Output Files--

'IREGNTP' generates two output files.

RTPACK--This file contains the region top data and general information of the UAM model application. The formats are listed below; dots indicate additional program statements. Table 5-20 defines the parameters of RTPACK.

```
        WRITE(25,20) CNTL
        WRITE(25,23) TP
        WRITE(25,20) FID
        WRITE(25,21) (IOP(I),I=1,23)
        WRITE(25,22) ISYD,ISHM,IEYD,IEHM
        WRITE(25,23) END
             .....
        WRITE(25,20) REGN
        WRITE(25,24) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ
        WRITE(25,25) IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
        WRITE(25,23) END
             .....
        WRITE(25,20) TINTVL
             .....
        WRITE(25,22) IYD1,IHM1,IYD2,IHM2
             .....
        WRITE(25,20) SUBR
             .....
        WRITE(25,34) SUBID,IROW,ICOL,ICONT
        WRITE(25,23) END
             .....
        WRITE(25,20) METH
             .....
        WRITE(25,35) SUBID,VAR,MHD,VMIN,VMAX,NOP
             .....
(If NOP = 0, skip the next two WRITE statements)
        WRITE(25,39) PNAME,IPVAL
             .....
        WRITE(25,36) PNAME,PVAL
        WRITE(25,23) END
             .....
        WRITE(25,23) CONST
        WRITE(25,37) SUBID,VAR,ZTOP
        WRITE(25,23) END
        WRITE(25,23) ENDT
             .....
     20 FORMAT(A60)
     21 FORMAT(5I10,/,3I10,/,5I10,/,4I10,/,6I10)
     22 FORMAT(4I10)
     23 FORMAT(A10)
     24 FORMAT(2F10.0,I10,/,2F10.0,/,2F10.0)
     25 FORMAT(3I10,/,2I10,F10.1,2F10.0)
     34 FORMAT(A10,3I10)
     35 FORMAT(3A10,2F10.1,I10)
     36 FORMAT(A10,F10.2)
     37 FORMAT(A10,A10,F10.1)
     39 FORMAT(A10,I10)
```

TABLE 20. RTPACK PARAMETERS

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	CNTL		Character*60	Control pack header
2	2	TP		Character*10	File name
3	3	FID		Character*60	File identifier
4-8	4	IOP(I)		Integer*4	Control options
9	5	ISYD		Integer*4	Beginning year/Julian date
	6	ISHM		Integer*4	Beginning time
	7	IEYD		Integer*4	Ending year/Julian date
	8	IEHM		Integer*4	Ending time
10	9	END		Character*10	Control pack terminator
11	10	REGN		Character*60	Region pack header
12	11	XLOCR	m	Real*4	Reference origin (x-coordinate)
	12	YLOCR	m	Real*4	Reference origin (y-coordinate)
	13	IZONE1		Integer*4	UTM zone
13	14	XLOC	m	Real*4	Origin of grid in x-direction
	15	YLOC	m	Real*4	Origin of grid in y-direction
14	16	XSZ	m	Real*4	Cell size in x-direction
	17	YSZ	m	Real*4	Cell size in y-direction
15	18	IX		Integer*4	Number of cells in x-direction
	19	IY		Integer*4	Number of cells in y-direction
	20	IZ		Integer*4	Number of cells in z-direction
16	21	IZL		Integer*4	Number of cells in lower layer
	22	IZU		Integer*4	Number of cells in upper layer
	23	SFCH	m	Real*4	Height of surface layer
	24	ALH	m	Real*4	Minimum height of cell in lower layer
	25	AUH	m	Real*4	Minimum height of cell in upper layer
17	26	END		Character*10	Control pack terminator
18+	27	TINTVL		Character*60	Hourly data header
19+	28	IYD1		Integer*4	Beginning year/Julian date for hourly data
	29	IHM1		Integer*4	Beginning time
	30	IYD2		Integer*4	Ending year/Julian date

(continued)

TABLE 20. RTPACK PARAMETERS (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	31	IHM2		Integer*4	Ending time
20	32	SUBR		Character*60	Subregion pack header
21	33	SUBID		Character*10	Subregion name
	34	IROW		Integer*4	Beginning row number
	35	ICOL		Integer*4	Beginning column number
	36	ICONT		Integer*4	Cell count
22	37	END		Character*10	Control pack terminator
23	38	METH		Character*60	Method pack header
24	39	SUBID		Character*10	Subregion name
	40	VAR		Character*10	Variable name
	41	MHD		Character*10	Method name
	42	VMIN	m	Real*4	Minimum region top value
	43	VMAX	m	Real*4	Maximum region top value
	44	NOP		Integer*4	Number of parameter cards that followed
25+	45	PNAME		Character*10	Parameter name
	46	IPVAL		Integer*4	Parameter value
26+	47	PNAME		Character*10	Parameter name
	48	PVAL		Real*4	Parameter value
27	49	END		Character*10	Control pack terminator
28+	50	CONST		Character*10	Constant pack header
29+	51	SUBID		Character*10	Variable name
	52	VAR		Character*10	Subregion name
	53	ZTOP	m	Real*4	Region top value
30+	54	END		Character*10	Control pack terminator
31+	55	ENDT		Character*10	Time interval pack terminator

RTDATA--This file contains simple format of region top data associated with date/time. Table 21 shows the parameters of RTDATA. The formats are listed below.

```
   WRITE(9,17) IYD1,ISH,ZTOP
17 FORMAT(I7,I3,F10.1)
```

TABLE 21. RTDATA PARAMETERS

Card number	Parameter number	Parameter name	Units	Data type	Description
1+	1	IYD1		Integer*4	Year/Julian date
	2	ISH		Integer*4	Time
	3	ZTOP	m	Real*4	Region top value

5.2.3 Resource Summary for an IREGNTP Application

5.2.3.1 Memory Requirements--

FORTRAN source file:	1	file	13,312	bytes
Object file:	1	file	12,288	bytes
Executable file:	1	file	10,240	bytes
	3	files	35,840	bytes

5.2.3.2 Execution Time Requirements (Representative Values for a 48-h Scenario)--

	IBM 3090
Charged CPU time (hh:mm:ss):	00:00:01
Virtual address space:	3371 K

5.2.3.3 Space Requirements: Log and Print Files--

IREGNTP	3,584 bytes
Print Files:	None

5.2.3.4 Space Requirements: Input and Output Files--

Table 22 shows the input file and output file space requirements.

TABLE 22. IREGNTP I/O FILE SPACE REQUIREMENTS

File group	File name	File type	Storage (in bytes)	Scenario data span
Input	DBDATA	Formatted	2,048	72 hours
	MF166	Formatted	198,144	72 hours
	PF119	Formatted	3,584	48 hours
			203,776	
Output	RTPACK	Formatted	9,728	48 hours
	RTDATA	Formatted	1,536	48 hours
			11,264	

5.2.3.5 Space Requirements: Tape Files--

None

5.2.4 Run Stream Command File for an Interface Application

```
//* JOB CARD
//*
//*
/*ROUTE PRINT HOLD
//*
//STEP1  EXEC  PGM=IREGNTP
//STEPLIB  DD  DSN=MMAS.UAM.INTRFACE.LOAD
//* THESE ARE THE INPUT FILES
//FT03F001  DD  DSN=MMAS.UAM.INTRFACE.INPUT.DBDATA,DISP=SHR
//FT01F001  DD  DSN=MMAS.UAM.INTRFACE.INPUT.PF119,DISP=SHR
//FT13F001  DD  DSN=MMAS.UAM.INTRFACE.INPUT.MF166,DISP=SHR
//* THESE ARE THE OUTPUT FILES
//FT25F001  DD DSN=<UIDACCT>.UAM.INTRFACE.OUTPUT.RTPACK,
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(5,5)),UNIT=SYSDA,
//             DCB=(RECFM=FB,LRECL=80,BLKSIZE=1600)
//FT09F001  DD DSN=<UIDACCT>.UAM.INTRFACE.OUTPUT.RTDATA,
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(5,5)),UNIT=SYSDA,
//             DCB=(RECFM=FB,LRECL=132,BLKSIZE=2640)
//*
//*  THIS IS THE CONTROL CARD
//FT05F001  DD *
REGIONTOP
REGIONTOP FILE CREATED AT 01/05/90
         0         0       224         1        10
        28         1         1
         0         0         0         0         0
         0         0         0         0
         0         0         0         0         0         0
     80203         0     80204      2400
        0.        0.        18
   520000.  4460000.
     8000.     8000.
        31        25         5
         2         3       0.0      50.0     100.0
       4.0        16        14
         1
A                  1         1        -1
A         REGIONTOP CONSTANT          200.     3000.         0
/*
//* THIS IS END OF DATA
//
```

5.2.5 Main Program, Subroutines, Functions, and Block Data Required

5.2.5.1 Main Program--

IREGNTP

5.2.5.2 Subroutines--

None.

5.2.5.3 Functions--

None.

5.2.5.4 Block Data Files--

None.

5.2.6 I/O and Utility Library Subroutines and Functions Required

None.

5.2.7 INCLUDE Files

None.

5.3 TEMPERATURE INTERFACE (ITMPRTR)

5.3.1 Processor Function

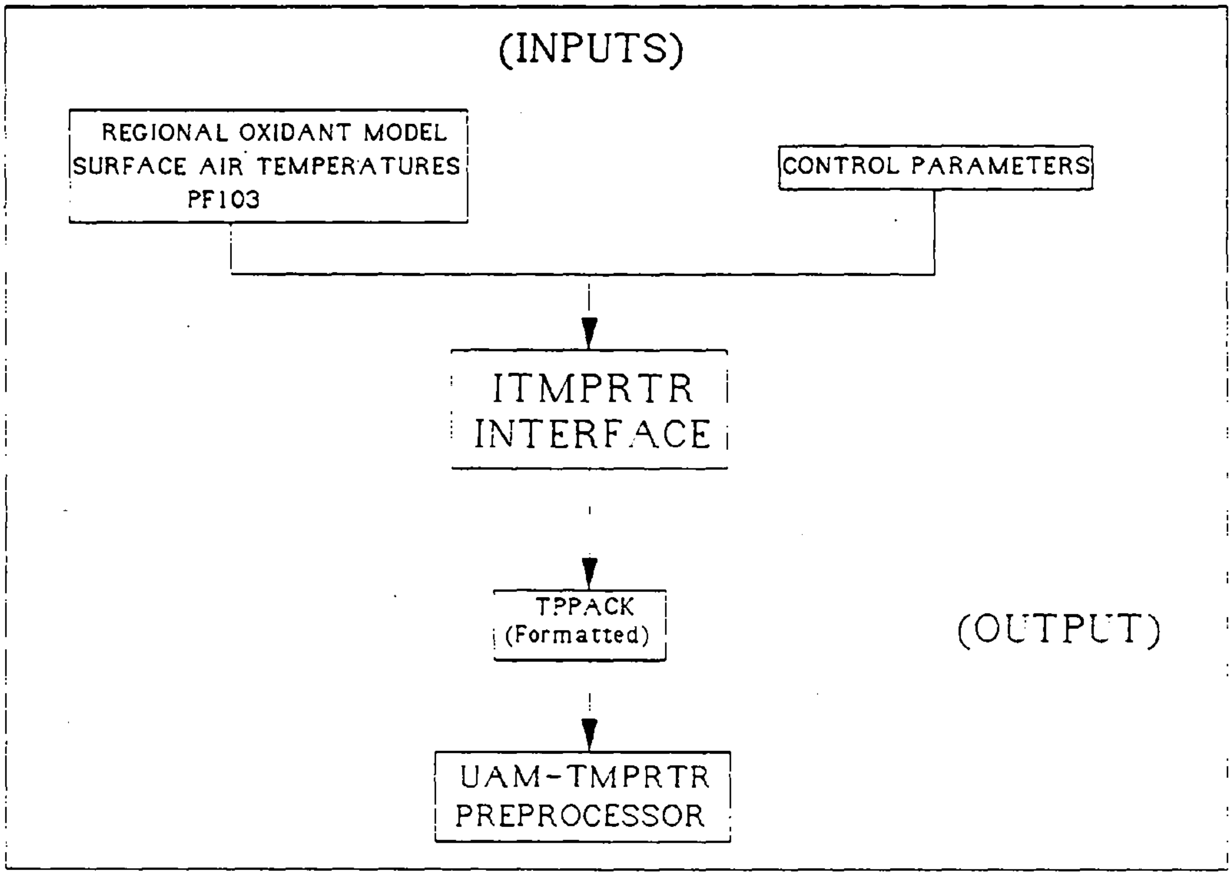
This processor prepares surface air temperature data for use in the UAM preprocessor 'TMPRTR'. ITMPRTR reads in ROM hourly gridded surface air temperature data from PF103 and then calculates UTM (Universal Transverse Mercator) coordinates corresponding to the midpoint of each ROM grid cell. It also reads in control data that contain the general information on the UAM model application. This processor then generates a formatted packet file that is in a compatible format for input to UAM preprocessor 'TMPRTR'. Flow of information through the ITMPRTR interface processor is shown in Figure 12.

5.3.2 Input/Output Components

5.3.2.1 Input Files--

'ITMPRTR' requires a retrieved ROM MF/PF file, PF103. This data file contains hourly gridded surface air temperature values. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 23.

```
    READ(7,12)  T1A,IMX1,T1B,IMY1,T1C,ISPC
    READ(7,13)  T2,IDLAT1,IMLAT1,SLAT1
    READ(7,13)  T2,IDLON1,IMLON1,SLON1
    READ(7,15)  T3
      .....
    READ(7,300,END=999) LDATE,LTIME
      .....
    READ(7,30,END=999) (VAL(I,J),I=1,INX)
      .....
 12 FORMAT(A52,I2,A8,I2,A14,I2)
 13 FORMAT(A27,I4,1X,I2,1X,F5.2)
 15 FORMAT(A80)
300 FORMAT(I5,1X,I2)
 30 FORMAT(30E12.6)
```



Note: The TPPACK output file is formatted for use in the TMPRTR preprocessor program.

Figure 12. Flow diagram of the ITMPRTR interface program with input and output files.

TABLE 23. PF103 PARAMETER LIST FOR ITMPRTR

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	T1A		Character*52	Subtitle name
	2	IMX1		Integer*4	Number of columns
	3	T1B		Character*8	Subtitle name
	4	IMY1		Integer*4	Number of rows
	5	T1C		Character*14	Subtitle name
	6	ISPC		Integer*4	Number of parameters
2	7	T2		Character*27	Subtitle name
	8	IDLAT1		Integer*4	Degrees of latitude for southwest corner of ROM retrieved subregion
	9	IMLAT1		Integer*4	Minutes of latitude
	10	SLAT1		Real*4	Seconds of latitude
3	11	T2		Character*27	Subtitle name
	12	IDLON1		Integer*4	Degrees of longitude
	13	IMLON1		Integer*4	Minutes of longitude
	14	SLON1		Real*4	Seconds of longitude
4+	15	T3		Character*80	Header information
5+	16	LDATE		Integer*4	Year/Julian date
	17	LTIME	h	Integer*4	Time
6+	18	VAL(I,J)	K	Real*4	Temperature values *I* : Index of columns *J* : Index of rows

5.3.2.2 Control Cards--

The control cards define the general information of UAM model application. Forty-two variables included in twenty-three control cards are used, in the format shown below. Dots indicate additional program statements. Table 24 defines the control card variables.

```
      READ(5,23) TP
      READ(5,20) FID
      READ(5,21) (IOP(I),I=1,23)
      READ(5,22) ISYD,ISHM,IEYD,IEHM
      .....
      READ(5,24) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ
      READ(5,25) IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
      .....
      READ(5,23) UNITCD
      READ(5,26) FACTM,FACTA,WTMOL
      .....
      READ(5,28) HTZ,INX,INY
      .....
      READ(5,33) ISUB
      .....
      READ(5,34)  SUBID,IROW,ICOL,ICONT
      .....
      READ(5,35)  SUBID,VAR,MHD,VMIN,VMAX,NOP
      .....
      READ(5,39)  PNAME,IPVAL
      .....
      READ(5,36)  PNAME,PVAL
      .....
   20 FORMAT(A60)
   21 FORMAT(5I10,/,3I10,/,5I10,/,4I10,/,6I10)
   22 FORMAT(4I10)
   23 FORMAT(A10)
   24 FORMAT(2F10.0,I10,/,2F10.0,/,2F10.0)
   25 FORMAT(3I10,/,2I10,F10.1,2F10.0)
   26 FORMAT(3F10.1)
   28 FORMAT(3X,F7.1,3I10)
   33 FORMAT(I10)
   34 FORMAT(A10,3I10)
   35 FORMAT(3A10,2F10.1,I10)
   36 FORMAT(A10,F10.2)
   39 FORMAT(A10,I10)
```

TABLE 24. CONTROL CARD VARIABLES FOR ITMPRTR

Card number	Variable name	Units	Data type	Description
1	TP		Character*10	File name (i.e., TEMPERATURE)
2	FID		Character*60	File identifier
3	IOP(I)		Integer*4	Control options
	I=1			Number of species
	I=2			Number of user-defined variables
	I=3			Number of stations (ROM grid points)
	I=4			Number of subregions
	I=5			Number of parameters
4	I=6			Output file number
	I=7			Input print option 0: don't print; 1: print
	I=8			Output print option (0 or 1, as above)
5	I=9			Print unit table (0 or 1)
	I=10			Print station locations (0 or 1)
	I=11			Print region (0 or 1)
	I=12			Print methods table (0 or 1)
	I=13			Print station values (0 or 1)
6	I=14			Number of vertical parameters
	I=15			Number of profile heights
	I=16			Print vertical methods table (0 or 1)
	I=17			Print vertical profiles table (0 or 1)
7	I=18			DIFFBREAK unit number
	I=19			REGIONTOP unit number
	I=20			TOPCONC unit number
	I=21			TEMPERATUR unit number
	I=22			METSCALARS unit number
	I=23			WIND unit number
8	ISYD		Integer*4	Beginning year/Julian date (*yyddd*--e.g. 80203)
	ISHM		Integer*4	Beginning time (*hhmm*--e.g. 0100, military time)
	IEYD		Integer*4	Ending year/Julian date
	IEHM		Integer*4	Ending time
9	XLOCR	m	Real*4	Reference origin (*x*-coordinate)

(continued)

TABLE 24. CONTROL CARD VARIABLES FOR ITMPRTR (CONCLUDED)

Card number	Variable name	Units	Data type	Description
	YLOCR	m	Real*4	Reference origin (*y*-coordinate)
	IZONE1		Integer*4	UTM zone
10	XLOC	m	Real*4	Origin of grid in *x*-direction
	YLOC	m	Real*4	Origin of grid in *y*-direction
11	XSZ	m	Real*4	Cell size in *x*-direction
	YSZ	m	Real*4	Cell size in *y*-direction
12	IX		Integer*4	Number of cells in *x*-direction
	IY		Integer*4	Number of cells in *y*-direction
	IZ		Integer*4	Number of cells in *z*-direction
13	IZL		Integer*4	Number of cells in lower layer
	IZU		Integer*4	Number of cells in upper layer
	SFCH	m	Real*4	Height of surface layer
	ALH	m	Real*4	Minimum height of cells in lower layer
	AUH	m	Real*4	Minimum height of cells in upper layer
14	UNITCD		Character*10	Unit name
15	FACTM		Real*4	Multiplicative factor
	FACTA		Real*4	Additive factor
	WTMOL		Real*4	Molecular weight
16	HTZ	m	Real*4	Height of station
	INX		Integer*4	Number of cells in *x*-direction (ROM)
	INY		Integer*4	Number of cells in *y*-direction (ROM)
17	ISUB		Integer*4	Number of subregions
18	SUBID		Character*10	Subregion name
	IROW		Integer*4	Beginning row number
	ICOL		Integer*4	Beginning column number
	ICONT		Integer*4	Cell count; if negative, equal to rest of model region
19	SUBID		Character*10	Subregion name
	VAR		Character*10	Variable name
	MHD		Character*10	Method name
	VMIN	m	Real*4	Minimum value
	VMAX	m	Real*4	Maximum value
	NOP		Integer*4	Number of parameter cards that follow
20+	PNAME		Character*10	Parameter name
	IPVAL		Integer*4	Parameter value
21+	PNAME		Character*10	Parameter name
	PVAL		Real*4	Parameter value

Example:

```
TEMPERATUR
TEMPERATURE FILE CREATED AT 02/07/90
          0          0        224          1         10
         28          0          0
          0          0          0          0          0
          0          0          0          0
          0          0          0          0          0          0
      80203         00      80204       2400
         0.         0.         18
   520000.  4460000.
      8000.      8000.
         31         25          5
          2          3        0.0       50.0      100.0
DEGK
         1.         0.         0.
        4.0         16         14
          1
A                    1          1         -1
A          TEMPERATURSTATINTERP       270.0      330.0          4
EXTENT          10.0
INITRADIUS       2.0
RADIUSINCR       1.0
MAXRADIUS        5.0
```

5.3.2.3 Output Files--

'ITMPRTR' generates one output file, TPPACK. This file contains ROM gridded surface air temperature associated with UTM coordinates and general information of UAM model application. Dots indicate additional program statements. Table 25 shows the parameters of TPPACK.

```
      WRITE(23,20) CNTL
      WRITE(23,23) TP
      WRITE(23,20) FID
      WRITE(23,21) (IOP(I),I=1,23)
      WRITE(23,22) ISYD,ISHM,IEYD,IEHM
      WRITE(23,23) END
      .....
      WRITE(23,20) REGN
      WRITE(23,24) XLOCR,YLOCR,IZONE,XLOC,YLOC,XSZ,YSZ
      WRITE(23,25) IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
      WRITE(23,23) END
      .....
      WRITE(23,20) UNIT
      WRITE(23,27) TP,UNITCD,FACTM,FACTA,WTMOL
      WRITE(23,23) END
      .....
      WRITE(23,20) STAN
      .....
      WRITE(23,29) I,XX(I),YY(I),HTZ
      WRITE(23,23) END
      .....
      WRITE(23,20) TINTVL
      .....
      WRITE(23,22) IYD1,IHM1,IYD2,IHM2
      .....
      WRITE(23,20) SUBR
      .....
      WRITE(23,34) SUBID,IROW,ICOL,ICONT
      WRITE(23,23) END
      .....
      WRITE(23,20) METH
      .....
      WRITE(23,35) SUBID,VAR,MHD,VMIN,VMAX,NOP
      .....
      WRITE(23,39) PNAME,IPVAL
      .....
      WRITE(23,36) PNAME,PVAL
      WRITE(23,23) END
      WRITE(23,20) STRD
      WRITE(23,37) K,VAR,VAL1(K)
      WRITE(23,23) END
      WRITE(23,23) ENDT
      .....
   20 FORMAT(A60)
   21 FORMAT(5I10,/,3I10,/,5I10,/,4I10,/,6I10)
   22 FORMAT(4I10)
   23 FORMAT(A10)
   24 FORMAT(2F10.0,I10,/,2F10.0,/,2F10.0)
   25 FORMAT(3I10,/,2I10,F10.1,2F10.0)
   27 FORMAT(2A10,3F10.1)
   29 FORMAT(I4.3,6X,2F10.0,F10.1)
   34 FORMAT(A10,3I10)
   35 FORMAT(3A10,2F10.1,I10)
   36 FORMAT(A10,F10.2)
   37 FORMAT(I4.3,6X,A10,F10.2)
   39 FORMAT(A10,I10)
```

TABLE 25. TPPACK PARAMETERS

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	CNTL		Character*60	Control pack header
2	2	TP		Character*10	File name
3	3	FID		Character*60	File identifier
4-8	4	IOP(I)		Integer*4	Control options
9	5	ISYD		Integer*4	Beginning year/Julian date
	6	ISHM		Integer*4	Beginning time
	7	IEYD		Integer*4	Ending year/Julian date
	8	IEHM		Integer*4	Ending time
10	9	END		Character*10	Control pack terminator
11	10	REGN		Character*60	Region pack header
12	11	XLOCR	m	Real*4	Reference origin (*x*-coordinate)
	12	YLOCR	m	Real*4	Reference origin (*y*-coordinate)
	13	IZONE		Integer*4	UTM zone
13	14	XLOC	m	Real*4	Origin of grid in *x*-direction
	15	YLOC	m	Real*4	Origin of grid in *y*-direction
14	16	XSZ	m	Real*4	Cell size in *x*-direction
	17	YSZ	m	Real*4	Cell size in *y*-direction
15	18	IX		Integer*4	Number of cells in *x*-direction
	19	IY		Integer*4	Number of cells in *y*-direction
	20	IZ		Integer*4	Number of cells in *z*-direction
16	21	IZL		Integer*4	Number of cells in lower layer
	22	IZU		Integer*4	Number of cells in upper layer
	23	SFCH	m	Real*4	Height of surface layer
	24	ALH	m	Real*4	Minimum height of cells in lower layer
	25	AUH	m	Real*4	Minimum height of cells in upper layer
17	26	END		Character*10	Control pack terminator
18	27	UNIT		Character*60	Unit pack header
19	28	TP		Character*10	File name
	29	UNITCD		Character*10	Unit name
	30	FACTM		Real*4	Multiplicative factor
	31	FACTA		Real*4	Additive factor
	32	WTMOL		Real*4	Molecular weight
20	33	END		Character*10	Control pack terminator
21	34	STAN		Character*60	Station pack header
22	35	I		Integer*4	Index of stations

(continued)

TABLE 25. TPPACK PARAMETERS (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	36	XX(I)	m	Real*4	*x*-location in UTM
	37	YY(I)	m	Real*4	*y*-location in UTM
	38	HTZ	m	Real*4	Height of station
23	39	END		Character*10	Control pack terminator
24+	40	TINTVL		Character*60	Hourly data header
25+	41	IYD1		Integer*4	Beginning year/Julian date for hourly
	42	IHM1		Integer*4	data
	43	IYD2		Integer*4	Beginning time
	44	IHM2		Integer*4	Ending year/Julian date
26	45	SUBR		Character*60	Ending time
					Subregion pack header
27	46	SUBID		Character*10	Subregion name
	47	IROW		Integer*4	Beginning row number
	48	ICOL		Integer*4	Beginning column number
	49	ICONT		Integer*4	Cell count
28	50	END		Character*10	Control pack terminator
29	51	METH		Character*60	Method pack header
30	52	SUBID		Character*10	Subregion name
	53	VAR		Character*10	Variable name
	54	MHD		Character*10	Method name
	55	VMIN	K	Real*4	Minimum temperature value
	56	VMAX	K	Real*4	Maximum temperature value
	57	NOP		Integer*4	Number of parameter cards that follow
31+	58	PNAME		Character*10	Parameter name
	59	IPVAL		integer*4	Parameter value
32+	60	PNAME		Character*10	Parameter name
	61	PVAL		Real*4	Parameter value
33	62	END		Character*10	Control pack terminator
34+	63	STRD		Character*60	Station reading header
35+	64	K		Integer*4	Index of station
	65	VAR		Character*10	Variable name
	66	VAL1(K)	K	Real*4	Temperature values
36+	67	END		Character*10	Control pack terminator
37+	68	ENDT		Character*10	Time interval pack terminator

5.3.3 Resource Summary for an ITMPRTR Application

5.3.3.1 Memory Requirements--

FORTRAN source file:	1	file	38,912	bytes
Object file:	1	file	14,848	bytes
Executable file:	1	file	12,288	bytes
	3	files	66,048	bytes

5.3.3.2 Execution Time Requirements (Representative Values for a 48-h Scenario)--

	IBM 3090
Charged CPU time (hh:mm:ss):	00:00:01
Virtual address space:	9468 K

5.3.3.3 Space Requirements: Log and Print Files--

ITMPRTR	11,264 bytes
Print Files:	None

5.3.3.4 Space Requirements: Input and Output Files--

Table 26 shows the input file and output file space requirements.

TABLE 26: ITMPRTR I/O FILE SPACE REQUIREMENTS

File group	File name	File type	Storage (in bytes)	Scenario data span
Input	PF103	Formatted	132,096	48 hours
Output	TPPACK	Formatted	364,032	48 hours

5.3.3.5 Space Requirements: Tape Files--

None

5.3.4 Run Stream Command File for an Interface Application

```
//* JOB CARD
//*
//*
/*ROUTE PRINT HOLD
//STEP1 EXEC PGM=ITMPRTR
//STEPLIB  DD DSN=MMAS.UAM.INTRFACE.LOAD
//* THIS IS THE INPUT FILE
//FT07F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.PF103,DISP=SHR
//* THIS IS THE OUTPUT FILE
//FT23F001 DD DSN=<UIDACCT>.UAM.INTRFACE.OUTPUT.TPPACK,
//            DISP=(NEW,CATLG,DELETE),
//            SPACE=(TRK,(100,10)),UNIT=SYSDA,
//            DCB=(RECFM=FB,LRECL=132,BLKSIZE=2640)
//*
//*  THIS IS THE CONTROL PACKET
//FT05F001 DD *
TEMPERATUR
TEMPERATURE FILE CREATED AT 02/07/90
         0         0       224         1        10
        28         0         0
         0         0         0         0         0
         0         0         0         0
         0         0         0         0         0         0
     80203        00     80204      2400
        0.        0.        18
  520000.  4460000.
     8000.     8000.
        31        25         5
         2         3       0.0      50.0     100.0
DEGK
        1.        0.        0.
       4.0        16        14
         1
A                  1         1        -1
A         TEMPERATURSTATINTERP     270.0     330.0         4
EXTENT        10.0
INITRADIUS     2.0
RADIUSINCR     1.0
MAXRADIUS      5.0
/*
//* THIS IS END OF DATA
//
```

5.3.5 Main Program, Subroutines, Functions, and Block Data Required

5.3.5.1 Main Program--

ITMPRTR

5.3.5.2 Subroutines--

UTM2

5.3.5.3 Functions--

None.

5.3.5.4 Block Data Files--

None.

5.3.6 I/O and Utility Library Subroutines and Functions Required

None.

5.3.7 INCLUDE Files

None.

5.4 METSCALARS INTERFACE (IMETSCL)

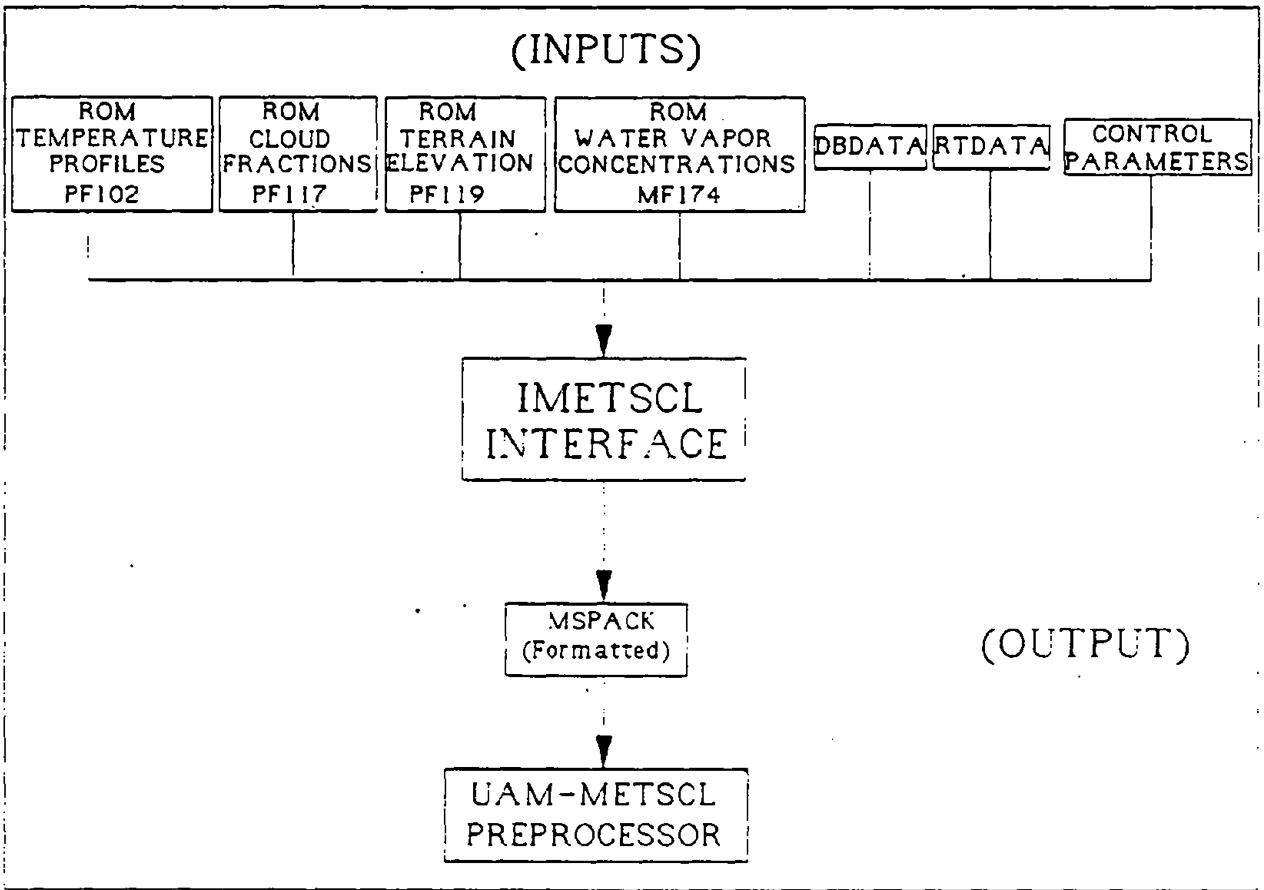
5.4.1 Processor Function

This processor prepares meteorological scalar data for use in the UAM preprocessor 'METSCL'. IMETSCL reads in ROM gridded terrain elevations, hourly gridded fractional sky coverages, hourly interpolated vertical temperature profiles from upper air site(s), hourly gridded water vapor concentrations, hourly domain-average region top heights from IREGNTP processor, and user-supplied diffusion break data. Atmospheric pressure has been set to 1.0 atm for all hours. The hourly vertical temperature gradients for below and above the diffusion break are calculated by averaging the individual temperature gradients at 50-m intervals from the ROM upper air data file. Water vapor concentration is calculated by averaging ROM hourly gridded water vapor concentrations over the entire UAM domain. The exposure class is determined by the solar zenith angle and cloud cover. The location of the middle of the UAM domain is used for solar zenith angle calculation and domain-wide average cloud cover is also applied in this scheme. The values used for NO_2 photolysis rate constants are based on Demerjian et al. (1980) and use the date, time, diffusion break, and location. This processor then generates a formatted packet file that is in a compatible format for input to the UAM preprocessor 'METSCL'. Flow of information through the IMETSCL interface processor is shown in Figure 13.

5.4.2 Input/Output Components

5.4.2.1 Input Files--

'IMETSCL' requires four retrieved ROM MF/PF files, one derived file from IREGNTP, and one user-supplied file.



Note: The MSPACK output file is formatted for use in the METSCL preprocessor program.

Figure 13. Flow diagram for the IMETSCL interface program with input and output files.

PF102--This data file contains hourly vertical temperature profile data. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 27.

```
      READ(12,12) T1A,IMX4,T1B,IMY4,T1C,ISPC
      READ(12,13) T2,IDLAT4,IMLAT4,SLAT4
      READ(12,13) T2,IDLON4,IMLON4,SLON4
      READ(12,15) T3
         .....
      READ(12,111) IST
         .....
      READ(12,300,END=996) LDAT5,LTIM5
      READ(12,301,END=996) LEV(IP)
         .....
      READ(12,302,END=996) HT(KB,IP)
         .....
      READ(12,111) IST
         .....
      READ(12,300,END=996) LDAT5,LTIM5
      READ(12,301,END=996) LEV(IP)
         .....
      READ(12,302,END=996) TEMP(KB,IP)
         .....
      READ(12,111) IST
         .....
      READ(12,300,END=996) LDAT5,LTIM5
      READ(12,301,END=996) LEV(IP)
         .....
      READ(12,302,END=996) RM(KB,IP)
         .....
   12 FORMAT(A52,I2,A8,I2,A14,I2)
   13 FORMAT(A27,I4,1X,I2,1X,F5.2)
   15 FORMAT(A80)
  111 FORMAT(I3)
  300 FORMAT(I5,1X,I2)
  301 FORMAT(17X,I5)
  302 FORMAT(1X,E12.6)
```

TABLE 27. PF102 PARAMETERS FOR IMETSCL

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	T1A		Character*52	Subtitle name
	2	IMX4		Integer*4	Number of columns
	3	T1B		Character*8	Subtitle name
	4	IMY4		Integer*4	Number of rows
	5	T1C		Character*14	Subtitle name
	6	ISPC		Integer*4	Number of parameters
2	7	T2		Character*27	Subtitle name
	8	IDLAT		Integer*4	Degrees of latitude for southwest corner of ROM domain
	9	IMLAT4		Integer*4	Minutes of latitude
	10	SLAT4		Real*4	Seconds of latitude
3	11	T2		Character*27	Subtitle name
	12	IDLON4		Integer*4	Degrees of longitude
	13	IMLON4		Integer*4	Minutes of longitude
	14	SLON4		Real*4	Seconds of longitude
4+	15	T3		Character*80	Header information
5+	16	IST		Integer*4	Number of stations
6+	17	LDAT5		Integer*4	Year/Julian date
	18	LTIM5	h	Integer*4	Time
7+	19	LEV(IP)		Integer*4	Number of levels-- IP : Index of stations
8+	20	HT(M,N)	m	Real*4	Height (MSL)-- *M* : Index of levels *N* : Index of stations
9+	21	IST		Integer*4	Number of stations
10+	22	LDAT5		Integer*4	Year/Julian date
	23	LTIM5	h	Integer*4	Time
11+	24	LEV(IP)		Integer*4	Number of levels-- IP : Index of stations
12+	25	TEMP(M,N)	K	Real*4	Virtual temperature-- *M* & *N* are same as above
13+	26	IST		Integer*4	Number of stations
14+	27	LDAT5		Integer*4	Year/Julian date
	28	LTIM5	h	Integer*4	Time
15+	29	LEV(IP)		Integer*4	Number of levels-- IP : Index of stations
16+	30	RM(M,N)		Real*4	Mixing ratio fraction-- *M* & *N* are same as above

PF117--This data file contains hourly gridded fractional cloud cover data. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 28.

```
      READ(10,12) T1A,IMX3,T1B,IMY3,T1C,ISPC
      READ(10,13) T2,IDLAT3,IMLAT3,SLAT3
      READ(10,13) T2,IDLON3,IMLON3,SLON3
      READ(10,15) T3
      .....
      READ(10,300,END=997) LDAT3,LTIM3
      .....
      READ(10,30,END=997) (VAX(I,J),I=1,INX)
      .....
   12 FORMAT(A52,I2,A8,I2,A14,I2)
   13 FORMAT(A27,I4,1X,I2,1X,F5.2)
   15 FORMAT(A80)
  300 FORMAT(I5,1X,I2)
   30 FORMAT(30E12.6)
```

TABLE 28. PF117 PARAMETERS FOR IMETSCL

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	T1A		Character*52	Subtitle name
	2	IMX3		Integer*4	Number of columns
	3	T1B		Character*8	Subtitle name
	4	IMY3		Integer*4	Number of rows
	5	T1C		Character*14	Subtitle name
	6	ISPC		Integer*4	Number of parameters
2	7	T2		Character*27	Subtitle name
	8	IDLAT3		Integer*4	Degrees of latitude for southwest corner of ROM domain
	9	IMLAT3		Integer*4	Minutes of latitude
	10	SLAT3		Real*4	Seconds of latitude
3	11	T2		Character*27	Subtitle name
	12	IDLON3		Integer*4	Degrees of longitude
	13	IMLON3		Integer*4	Minutes of longitude
	14	SLON3		Real*4	Seconds of longitude
4+	15	T3		Character*80	Header information
5+	16	LDAT3		Integer*4	Year/Julian date
	17	LTIM3	h	Integer*4	Time
6+	18	VAX(I,J)		Real*4	Fractional cloud cover-- *I* : Index of columns *J* : Index of rows

PF119--This data file contains gridded terrain elevation data. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 29.

```
      READ(1,12)  T1A,IMX1,T1B,IMY1,T1C,ISPC
      READ(1,13)  T2,IDLAT1,IMLAT1,SLAT1
      READ(1,13)  T2,IDLON1,IMLON1,SLON1
      READ(1,15)  T3
         .....
      READ(1,300,END=999) LDAY1,LTIM1
         .....
      READ(1,30,END=999) (VA1(I,J),I=1,INX)
         .....
   12 FORMAT(A52,I2,A8,I2,A14,I2)
   13 FORMAT(A27,I4,1X,I2,1X,F5.2)
   15 FORMAT(A80)
  300 FORMAT(I5,1X,I2)
   30 FORMAT(30E12.6)
```

TABLE 29. PF119 PARAMETERS FOR IMETSCL

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	T1A		Character*52	Subtitle name
	2	IMX1		Integer*4	Number of columns
	3	T1B		Character*8	Subtitle name
	4	IMY1		Integer*4	Number. of rows
	5	T1C		Character*14	Subtitle name
	6	ISPC		Integer*4	Number of parameters
2	7	T2		Character*27	Subtitle name
	8	IDLAT1		Integer*4	Degrees of latitude for southwest corner of ROM domain
	9	IMLAT1		Integer*4	Minutes of latitude
	10	SLAT1		Real*4	Seconds of latitude
3	11	T2		Character*27	Subtitle name
	12	IDLON1		Integer*4	Degrees of longitude for southwest corner of ROM domain
	13	IMLON1		Integer*4	Minutes of longitude
	14	SLON1		Real*4	Seconds of longitude
4+	15	T3		Character*80	Header information
5	16	LDAY1		Integer*4	Year/Julian date
	17	LTIM1	h	Integer*4	Time
6+	18	VA1(I,J)	m	Real*4	Terrain elevation-- *I* : Index of columns *J* : Index of rows

MF174--This data file contains hourly gridded water vapor concentration of layer 1. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 30.

```
      READ(4,12)  T1A,IMX2,T1B,IMY2,T1C,ISPC
      READ(4,13)  T2,IDLAT2,IMLAT2,SLAT2
      READ(4,13)  T2,IDLON2,IMLON2,SLON2
      READ(4,15) T3
          .....
      READ(4,300,END=996) LDAT2,LTIM2
          .....
      READ(4,30,END=996) (VAL(I,J),I=1,INX)
          .....
  12  FORMAT(A52,I2,A8,I2,A14,I2)
  13  FORMAT(A27,I4,1X,I2,1X,F5.2)
  15  FORMAT(A80)
 300  FORMAT(I5,1X,I2)
  30  FORMAT(30E12.6)
```

TABLE 30. MF174 PARAMETERS FOR IMETSCL

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	T1A		Character*52	Subtitle name
	2	IMX2		Integer*4	Number of columns
	3	T1B		Character*8	Subtitle name
	4	IMY2		Integer*4	Number of rows
	5	T1C		Character*14	Subtitle name
	6	ISPC		Integer*4	Number of parameters
2	7	T2		Character*27	Subtitle name
	8	IDLAT2		Integer*4	Degrees of latitude for southwest corner of ROM domain
	9	IMLAT2		Integer*4	Minutes of latitude
	10	SLAT2		Real*4	Seconds of latitude
3	11	T2		Character*27	Subtitle name
	12	IDLON2		Integer*4	Degrees of longitude for southwest corner of ROM domain
	13	IMLON2		Integer*4	Minutes of longitude
	14	SLON2		Real*4	Seconds of longitude
4+	15	T3		Character*80	Header information
5+	16	LDAT2		Integer*4	Year/Julian date
	17	LTIM2	h	Integer*4	Time
6+	18	VAL(I,J)	ppm	Real*4	Water vapor concentration-- *I* : Index of columns *J* : Index of rows

DBDATA--The data contained in this file are user-supplied diffusion break data associated with date and time. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 31.

```
READ(3,17,END=998) LDAY,LTIM,VMH
     .....
17 FORMAT(I7,I3,F10.0)
```

TABLE 31. DBDATA PARAMETERS FOR IMETSCL

Card number	Parameter number	Parameter name	Units	Data type	Description
1+	1	LDAY		Integer*4	Year/Julian date
	2	LTIM	h	Integer*4	Time
	3	VMH	m	Real*4	Diffusion break value

RTDATA--This file contains simple format of region top data associated with date/time. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 32.

```
READ(9,17,END=998) LDAT6,LTIM6,RTOP
     .....
17 FORMAT(I7,I3,F10.0)
```

TABLE 32. RTDATA PARAMETERS FOR IMETSCL

Card number	Parameter number	Parameter name	Units	Data type	Description
1+	1	LDAT6		Integer*4	Year/Julian date
	2	LTIM6	h	Integer*4	Time
	3	RTOP	m	Real*4	Region top value

5.4.2.2 Control Cards--

Twenty-nine variables included in fifteen control cards are used, in the formats shown below. It defines the general information of UAM model application. Dots indicate additional program statements. The control card variables are listed in Table 33.

```
       READ(5,63) ALA,ALO,TZ
       .....
       READ(5,23) TP
       READ(5,20) FID
       READ(5,21) (IOP(I),I=1,23)
       READ(5,22) ISYD,ISHM,IEYD,IEHM
       .....
       READ(5,24) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ
       READ(5,25) IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
       .....
       READ(5,28) HTZ,INX,INY,ATMOV
       .....
    20 FORMAT(A60)
    21 FORMAT(5I10,/,3I10,/,5I10,/,4I10,/,6I10)
    22 FORMAT(4I10)
    23 FORMAT(A10)
    24 FORMAT(2F10.0,I10,/,2F10.0,/,2F10.0)
    25 FORMAT(3I10,/,2I10,F10.1,2F10.0)
    28 FORMAT(F10.1,2I10,F10.4)
    63 FORMAT(3F10.0)
```

TABLE 33. CONTROL CARD VARIABLES FOR IMETSCL

Card number	Variable name	Units	Data type	Description
1	ALA	° N	Real*4	Latitude of middle of UAM domain
	ALO	° W	Real*4	Longitude of middle of UAM domain
	TZ		Real*4	Time zone for computation of solar zenith angle (relative to Greenwich Mean Time); Example: 5 = EST
2	TP		Character*10	File name (i.e. METSCALARS)
3	FID		Character*60	File identifier
4	IOP(I)		Integer*4	Control options
	I=1			Number of species
	I=2			Number of user-defined variables
	I=3			Number of stations (ROM grid points)
	I=4			Number of subregions
	I=5			Number of parameters
5	I=6			Output file number
	I=7			Input print option-- 0: don't print; 1: print
	I=8			Output print option-- (0 or 1, as above)
6	I=9			Print unit table (0 or 1)
	I=10			Print station locations (0 or 1)
	I=11			Print region (0 or 1)
	I=12			Print methods table (0 or 1)
	I=13			Print station values (0 or 1)
7	I=14			Number of vertical parameters
	I=15			Number of profile heights
	I=16			Print vertical methods table (0 or 1)
	I=17			Print vertical profiles table (0 or 1)
8	I=18			DIFFBREAK unit number
	I=19			REGIONTOP unit number
	I=20			TOPCONC unit number
	I=21			TEMPERATUR unit number
	I=22			METSCALARS unit number
	I=23			WIND unit number
9	ISYD		Integer*4	Beginning year/Julian date (*yyddd*--e.g. 80203)
	ISHM		Integer*4	Beginning time (*hhmm*--e.g. 0100, military time)

(continued)

TABLE 33. CONTROL CARD VARIABLES FOR IMETSCL (CONCLUDED)

Card number	Variable name	Units	Data type	Description
	IEYD		Integer*4	Ending year/Julian date
	IEHM		Integer*4	Ending time
10	XLOCR	m	Real*4	Reference origin (x-coordinate)
	YLOCR	m	Real*4	Reference origin (y-coordinate)
	IZONE1		Integer*4	UTM zone
11	XLOC	m	Real*4	Origin of grid in x-direction
	YLOC	m	Real*4	Origin of grid in y-direction
12	XSZ	m	Real*4	Cell size in x-direction
	YSZ	m	Real*4	Cell size in y-direction
13	IX		Integer*4	Number of cells in x-direction
	IY		Integer*4	Number of cells in y-direction
	IZ		Integer*4	Number of cells in z-direction
14	IZL		Integer*4	Number of cells in lower layer
	IZU		Integer*4	Number of cells in upper layer
	SFCH	m	Real*4	Height of surface layer
	ALH	m	Real*4	Minimum height of cell in lower layer
	AUH	m	Real*4	Minimum height of cell in upper layer
15	HTZ	m	Real*4	Height of station
	INX		Integer*4	Number of ROM cells in x-direction
	INY		Integer*4	Number of ROM cells in y-direction
	ATMOV	atm	Real*4	Atmospheric pressure

Example:

```
      41.       73.        5.
METSCALARS
METSCALARS FILE CREATED AT 02/07/90
        0         0       224         1        10
       28         1         1
        0         0         0         0         0
        0         0         0         0
        0         0         0         0         0         0
    80203         0     80204      2400
       0.        0.        18
  520000.  4460000.
    8000.     8000.
       31        25         5
        2         3       0.0      50.0     100.0
      4.0        16        14    1.0000
```

5.4.2.3 Output Files--

'IMETSCL' generates one output file.

MSPACK--This file contains six meteorological scalars and general information on the UAM model application. The formats are shown below; dots indicate additional program statements. The output parameters in MSPACK are listed in Table 34.

```
      WRITE(24,20) CNTL
      WRITE(24,23) TP
      WRITE(24,20) FID
      WRITE(24,21) (IOP(I),I=1,23)
      WRITE(24,22) IYD8,IHM8,IEYD,IEHM
      WRITE(24,23) END
          .....
      WRITE(24,20) REGN
      WRITE(24,24) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ
      WRITE(24,25) IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
      WRITE(24,23) END
          .....
      WRITE(24,20) TINTVL
          .....
      WRITE(24,22) IYD8,IHM8,IYD9,IHM9
          .....
      WRITE(24,23) TITLE
      WRITE(24,37) TBEL,RTDN1
      WRITE(24,37) TABV,RTUP1
      WRITE(24,47) EXPC,EXP
      WRITE(24,37) RADF,RK1
      WRITE(24,37) CONC,H2O
      WRITE(24,37) ATMO,ATMOV
      WRITE(24,23) END
      WRITE(24,23) ENDT
          .....
      WRITE(24,20) TINTVL
          .....
      WRITE(24,22) IYD1,IHM1,IYD2,IHM2
          .....
      WRITE(24,23) TITLE
      WRITE(24,37) TBEL,RTDN1
      WRITE(24,37) TABV,RTUP1
      WRITE(24,47) EXPC,EXP
      WRITE(24,37) RADF,RK1
      WRITE(24,37) CONC,H2O
      WRITE(24,37) ATMO,ATMOV
      WRITE(24,23) END
      WRITE(24,23) ENDT
          .....
   20 FORMAT(A60)
   21 FORMAT(5I10,/,3I10,/,5I10,/,4I10,/,6I10)
   22 FORMAT(4I10)
   23 FORMAT(A10)
   24 FORMAT(2F10.0,I10,/,2F10.0,/,2F10.0)
   25 FORMAT(3I10,/,2I10,F10.1,2F10.0)
   37 FORMAT(A10,F10.4)
   47 FORMAT(A10,F10.1)
```

TABLE 34. MSPACK PARAMETERS

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	CNTL		Character*60	Control pack header
2	2	TP		Character*10	File name
3	3	FID		Character*60	File identifier
4-8	4	IOP(I)		Integer*4	Control options
9	5	IYD8		Integer*4	Beginning year/Julian date
	6	IHM8		Integer*4	Beginning time
	7	IEYD		Integer*4	Ending year/Julian date
	8	IEHM		Integer*4	Ending time
10	9	END		Character*10	Control pack terminator
11	10	REGN		Character*60	Region pack header
12	11	XLOCR	m	Real*4	Reference origin (x-coordinate)
	12	YLOCR	m	Real*4	Reference origin (y-coordinate)
	13	IZONE1		Integer*4	UTM zone
13	14	XLOC	m	Real*4	Origin of grid in x-direction
	15	YLOC	m	Real*4	Origin of grid in y-direction
14	16	XSZ	m	Real*4	Cell size in x-direction
	17	YSZ	m	Real*4	Cell size in y-direction
15	18	IX		Integer*4	Number of cells in x-direction
	19	IY		Integer*4	Number of cells in y-direction
	20	IZ		Integer*4	Number of cells in z-direction
16	21	IZL		Integer*4	Number of cells in lower layer
	22	IZU		Integer*4	Number of cells in upper layer
	23	SFCH	m	Real*4	Height of surface layer
	24	ALH	m	Real*4	Minimum height of cell in lower layer
	25	AUH	m	Real*4	Minimum height of cell in upper layer
17	26	END		Character*10	Control pack terminator
18	27	TINTVL		Character*60	Hourly data header
19	28	IYD8		Integer*4	Beginning year/Julian date
	29	IHM8		Integer*4	Beginning time (1 h before real data recording hour)
	30	IYD9		Integer*4	Ending year/Julian date
	31	IHM9		Integer*4	Ending time
20	32	TITLE		Character*10	Title name
21	33	TBEL		Character*10	Parameter name
	34	RTDN1	K/m	Real*4	Temperature gradient for below diffusion break height
22	35	TABV		Character*10	Parameter name

(continued)

TABLE 34. MSPACK PARAMETERS (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	36	RTUP1	K/m	Real*4	Temperature gradient for above diffusion break height
23	37	EXPC		Character*10	Parameter name
	38	EXP		Real*4	Exposure class
24	39	RADF		Character*10	Parameter name
	40	RK1	min^{-1}	Real*4	NO_2 photolysis rate constant
25	41	CONC		Character*10	Parameter name
	42	H2O	ppm	Real*4	Water vapor concentration
26	43	ATMO		Character*10	Parameter name
	44	ATMOV	atm	Real*4	Atmospheric pressure
27	45	END		Character*10	Control pack terminator
28	46	ENDT		Character*10	Time interval pack terminator
29+	47	TINTVL		Character*60	Hourly data header
30+	48	IYD1		Integer*4	Beginning year/Julian date for hourly data
	49	IHM1		Integer*4	Beginning time
	50	IYD2		Integer*4	Ending year/Julian date
	51	IHM2		Integer*4	Ending time
31+	52	TITLE		Character*10	Title name
32+	53	TBEL		Character*10	Parameter name
	54	RTDN1	K/m	Real*4	Temperature gradient for below diffusion break height
33+	55	TABV		Character*10	Parameter name
	56	RTUP1	K/m	Real*4	Temperature gradient for above diffusion break height
34+	57	EXPC		Character*10	Parameter name
	58	EXP		Real*4	Exposure class
35+	59	RADF		Character*10	Parameter name
	60	RK1	min^{-1}	Real*4	NO_2 photolysis rate constant
36+	61	CONC		Character*10	Parameter name
	62	H2O	ppm	Real*4	Water vapor concentration
37+	63	ATMO		Character*10	Parameter name
	64	ATMOV	atm	Real*4	Atmospheric pressure
38+	65	END		Character*10	Control pack terminator
39+	66	ENDT		Character*10	Time interval pack terminator

5.4.3 Resource Summary for an IMETSCL Application

5.4.3.1 Memory Requirements--

FORTRAN source file:	1	file	41,472	bytes
Object file:	1	file	25,600	bytes
Executable file:	1	file	19,456	bytes
	3	files	86,528	bytes

5.4.3.2 Execution Time Requirements (Representative Values for a 48-h Scenario)--

	IBM 3090
Charged CPU time (hh:mm:ss):	00:00:02
Virtual address space:	9512 K

5.4.3.3 Space Requirements: Log and Print Files--

IMETSCL	9,216 bytes
Print Files:	None

5.4.3.4 Space Requirements: Input and Output Files--

Table 35 shows the input file and output file space requirements.

TABLE 35. IMETSCL I/O FILE SPACE REQUIREMENTS

File group	File name	File type	Storage (in bytes)	Scenario data span
Input	PF102	Formatted	474,112	48 hours
	PF117	Formatted	132,096	48 hours
	PF119	Formatted	3,584	48 hours
	MF174	Formatted	132,096	48 hours
	DBDATA	Formatted	2,048	72 hours
	RTDATA	Formatted	1,536	48 hours
			745,472	
Output	MSPACK	Formatted	1899	48 hours

5.4.3.5 Space Requirements: Tape Files--

None

5.4.4 Run Stream Command File for an Interface Application

```
//* JOB CARD
//*
//*
/*ROUTE PRINT HOLD
//*
//STEP1   EXEC  PGM=IMETSCL
//STEPLIB  DD  DSN=MMAS.UAM.INTRFACE.LOAD
//* THESE ARE THE INPUT FILES
//FT03F001  DD  DSN=MMAS.UAM.INTRFACE.INPUT.DBDATA,DISP=SHR
//FT04F001  DD  DSN=MMAS.UAM.INTRFACE.INPUT.MF174,DISP=SHR
//FT09F001  DD  DSN=MMAS.UAM.INTRFACE.INPUT.RTDATA,DISP=SHR
//FT12F001  DD  DSN=MMAS.UAM.INTRFACE.INPUT.PF102,DISP=SHR
//FT01F001  DD  DSN=MMAS.UAM.INTRFACE.INPUT.PF119,DISP=SHR
//FT10F001  DD  DSN=MMAS.UAM.INTRFACE.INPUT.PF117,DISP=SHR
//* THIS IS THE OUTPUT FILE
//FT24F001  DD DSN=<UIDACCT>.UAM.INTRFACE.OUTPUT.MSPACK,
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(5,5)),UNIT=SYSDA,
//             DCB=(RECFM=FB,LRECL=132,BLKSIZE=2640)
//*
//* THIS IS THE CONTROL CARD
//FT05F001  DD *
      41.        73.        5.
METSCALARS
METSCALARS FILE CREATED AT 02/07/90
         0          0        224          1         10
        28          1          1
         0          0          0          0          0
         0          0          0          0
         0          0          0          0          0          0
     80203          0      80204       2400
        0.         0.         18
   520000.   4460000.
     8000.      8000.
        31         25          5
         2          3        0.0       50.0      100.0
       4.0         16         14     1.0000
/*
//* THIS IS END OF DATA
//
```

5.4.5 Main Program, Subroutines, Functions, and Block Data Required

5.4.5.1 Main Program--

IMETSCL

5.4.5.2 Subroutines--

SOLAR

RTPHO

5.4.5.3 Functions--

None.

5.4.5.4 Block Data Files--

None.

5.4.6 I/O and Utility Library Subroutines and Functions Required

None.

5.4.7 INCLUDE Files

None.

5.5 WIND FIELD INTERFACE (IWIND)

5.5.1 Processor Function

This processor prepares *u*-component and *v*-component wind data for the UAM model application. IWIND reads in ROM gridded terrain elevation, ROM hourly gridded heights of layer 1, user-supplied diffusion break data, region top data derived from IREGNTP, and ROM hourly gridded *u* and *v* wind components of layer 1 and 2. The methodology described in Section 4.2.4 has been applied to match the wind data from two ROM layers into user-defined number of UAM vertical cells. An option is built in this processor for the user to provide his own wind data for UAM model application. The format of an alternate gridded wind file is described in this section. IWIND generates an unformatted file that is in a compatible format for input to the UAM. Flow of information through IWIND interface processor is shown in Figure 14.

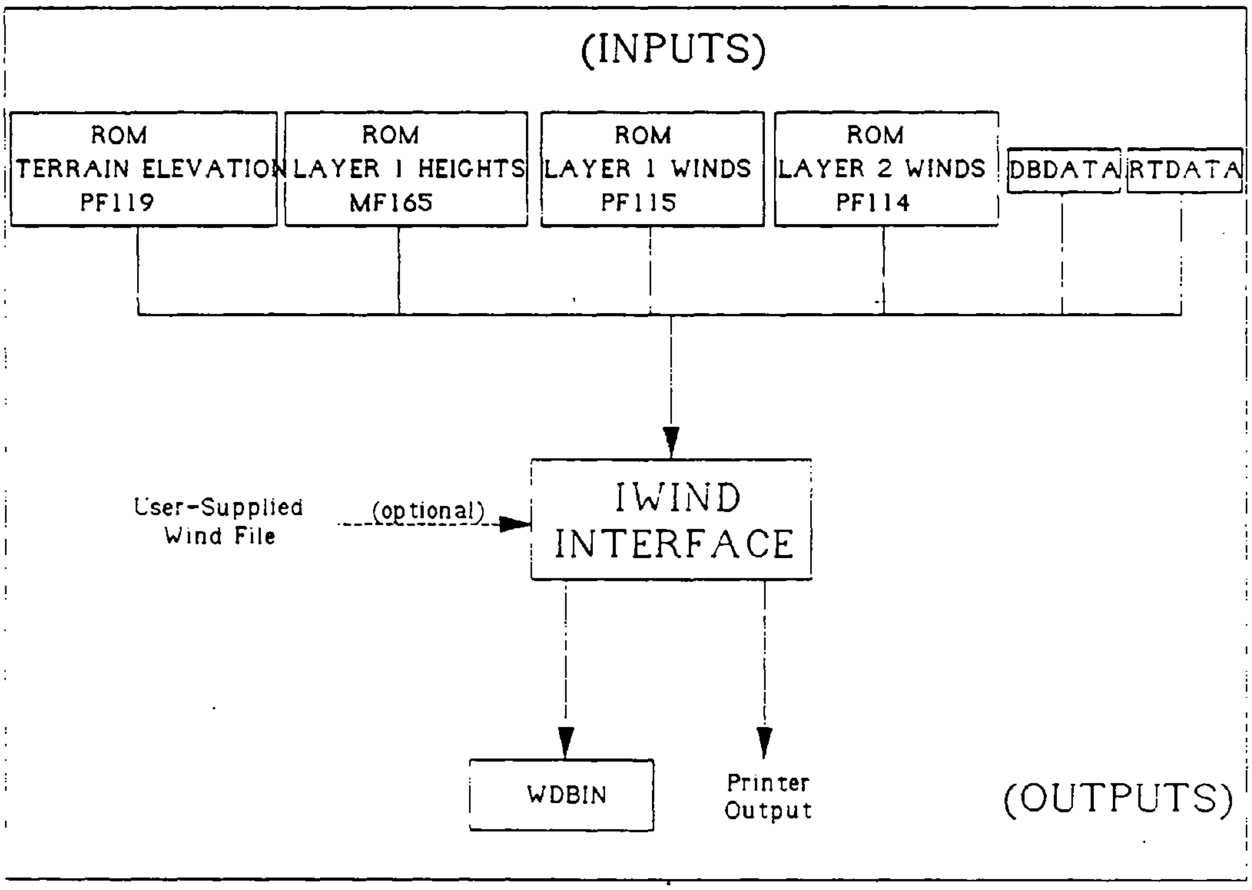
5.5.2 Input/Output Components

5.5.2.1 Input Files--

'IWIND' requires four retrieved ROM MF/PF files, one user-supplied diffusion break data file, and one derived region top data file. If the user provides his own data, the format of file should be consistent with the format of input file WDDATA listed in this section.

MF165--This data file contains hourly gridded heights of layer 1. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 36.

```
      READ(IRD2,3) IRX,IRY,NPARC
       .....
      READ(IRD2,2)
       .....
      READ(IRD2,222) NAME(I),IUNIT(I),IDESC(I)
       .....
      READ(IRD2,49) IDATE,ITIM,PNAME2
       .....
      READ(IRD2,51,END=999) (ZR1(I,J),I=1,IRX)
       .....
    3 FORMAT(52X,I2,8X,I2,14X,I2)
    2 FORMAT(1X)
  222 FORMAT(1X,A12,7X,A12,6X,A40)
   49 FORMAT(I5,1X,I2,1X,2A10)
   51 FORMAT(30E12.6)
```



Note: The WDBIN binary file is for use in the UAM model program.

Figure 14. Flow diagram of the IWIND interface program with input and output files.

TABLE 36. MF165 PARAMETERS FOR IWIND

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	IRX		Integer*4	Number of columns (ROM)
	2	IRY		Integer*4	Number of rows (ROM)
	3	NPARC		Integer*4	Number of parameters
3+	4	NAME(I)		Character*12	Parameter names-- *I* : Index of parameter
	5	IUNIT(I)		Character*12	Unit names
	6	IDESC(I)		Character*40	Parameter description
4+	7	IDATE		Integer*4	Year/Julian date
	8	ITIM	h	Integer*4	Time
	9	PNAME2		Character*10	Parameter name
5+	10	ZR1(I,J)	m	Real*4	Hourly gridded height of layer 1-- *I* : Index of columns *J* : Index of rows

PF119--This data file contains gridded terrain elevation data. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 37.

```
      READ(IRD1,3) IRX,IRY,NPARB
      READ(IRD1,13) T2,IDLAT1,IMLAT1,SLAT1
      READ(IRD1,13) T2,IDLON1,IMLON1,SLON1
        .....
      READ(IRD1,2)
        .....
      READ(IRD1,222) NAME(I),IUNIT(I),IDESC(I)
        .....
      READ(IRD1,49) IDATE,ITIM,PNAME1
        .....
      READ(IRD1,51) (ELE(I,J),I=1,IRX)
        .....
    3 FORMAT(52X,I2,8X,I2,14X,I2)
   13 FORMAT(A27,I4,1X,I2,1X,F5.2)
    2 FORMAT(1X)
  222 FORMAT(1X,A12,7X,A12,6X,A40)
   49 FORMAT(I5,1X,I2,1X,2A10)
   51 FORMAT(30E12.6)
```

TABLE 37. PF119 PARAMETERS FOR IWIND

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	IRX		Integer*4	Number of columns (ROM)
	2	IRY		Integer*4	Number of rows (ROM)
	3	NPARB		Integer*4	Number of parameters
2	4	T2		Character*27	Subtitle name
	5	IDLAT1		Integer*4	Degrees of latitude for the southwest corner of the ROM domain
	6	IMLAT1		Integer*4	Minutes of latitude
	7	SLAT1		Real*4	Seconds of latitude
3	8	T2		Character*27	Subtitle name
	9	IDLON1		Integer*4	Degrees of longitude
	10	IMLON1		Integer*4	Minutes of longitude
	11	SLON1		Real*4	Seconds of longitude
5	12	NAME(I)		Character*12	Parameter names-- *I* : Index of parameter
	13	IUNIT(I)		Character*12	Unit names
	14	IDESC(I)		Character*40	Parameter description
6	15	IDATE		Integer*4	Year/Julian date
	16	ITIM	h	Integer*4	Time
	17	PNAME1		Character*10	Parameter name
7+	18	ELE(I,J)	m	Real*4	Terrain elevation-- *I* : Index of columns *J* : Index of rows

DBDATA--The data contained in this file are user-supplied hourly diffusion break data associated with date and time. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 38.

```
 READ(3,17,END=45) LDAY(I),LTIM(I),ZDB(I)
  .....
17 FORMAT(I7,I3,F10.0)
```

TABLE 38. DBDATA PARAMETERS FOR IWIND

Card number	Parameter number	Parameter name	Units	Data type	Description
1+	1	LDAY(I)		Integer*4	Year/Julian date
	2	LTIM(I)	h	Integer*4	Time
	3	ZDB(I)	m	Real*4	Diffusion break value-- *I* : Index of hours

RTDATA--This file contains a simplified format of region top data derived from the IREGNTP processor. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 39.

```
 READ(9,17,END=46) LLDAY(I),LLTIM(I),ZTOP(I)
  .....
17 FORMAT(I7,I3,F10.0)
```

TABLE 39. RTDATA PARAMETERS FOR IWIND

Card number	Parameter number	Parameter name	Units	Data type	Description
1+	1	LLDAY(I)		Integer*4	Year/Julian date
	2	LLTIM(I)	h	Integer*4	Time
	3	ZTOP(I)	m	Real*4	Region top value-- *I* : Index of hours

PF115--This data file contains gridded wind components for layer 1. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 40.

```
        READ(IRD17,3) IRX,IRY,NPARD
         .....
        READ(IRD17,2)
         .....
        READ(IRD17,222) NAME(I),IUNIT(I),IDESC(I)
         .....
        READ(IRD17,49,END=999) ID1,IT1,PNAMEA,PNAMEB
         .....
        READ(IRD17,51,END=999) (UR(I,J,1),I=1,IRX)
         .....
        READ(IRD17,51,END=999) (VR(I,J,1),I=1,IRX)
         .....
      3 FORMAT(52X,I2,8X,I2,14X,I2)
      2 FORMAT(1X)
    222 FORMAT(1X,A12,7X,A12,6X,A40)
     49 FORMAT(I5,1X,I2,1X,2A10)
     51 FORMAT(30E12.6)
```

TABLE 40. PF115 PARAMETERS FOR IWIND

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	IRX		Integer*4	Number of ROM columns
	2	IRY		Integer*4	Number of ROM rows
	3	NPARD		Integer*4	Number of parameters
3+	4	NAME(I)		Character*12	Parameter names-- *I* : Index of parameter
	5	IUNIT(I)		Character*12	Unit names
	6	IDESC(I)		Character*40	Parameter description
4+	7	ID1		Integer*4	Year/Julian date
	8	IT1	h	Integer*4	Time
	9	PNAMEA		Character*10	Parameter name
	10	PNAMEB		Character*10	Parameter name
5+	11	UR(I,J,1)	ms^{-1}	Real*4	Hourly gridded *u*-component of layer 1-- *I* : Index of columns *J* : Index of rows
6+	12	VR(I,J,1)	ms^{-1}	Real*4	Hourly gridded *v*-component of layer 1

PF114--This data file contains gridded wind components for layer 2. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 41.

```
      READ(IRD16,3) IRX,IRY,NPARD
      .....
      READ(IRD16,2)
      .....
      READ(IRD16,222) NAME(I),IUNIT(I),IDESC(I)
      .....
      READ(IRD16,49,END=999) ID2,IT2,PNAMEC,PNAMED
      .....
      READ(IRD16,51,END=999) (UR(I,J,2),I=1,IRX)
      .....
      READ(IRD16,51,END=999) (VR(I,J,2),I=1,IRX)
      .....
    3 FORMAT(52X,I2,8X,I2,14X,I2)
    2 FORMAT(1X)
  222 FORMAT(1X,A12,7X,A12,6X,A40)
   49 FORMAT(I5,1X,I2,1X,2A10)
   51 FORMAT(30E12.6)
```

TABLE 41. PF114 PARAMETERS FOR IWIND

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	IRX		Integer*4	Number of ROM columns
	2	IRY		Integer*4	Number of ROM rows
	3	NPARD		Integer*4	Number of parameters
3+	4	NAME(I)		Character*12	Parameter names-- *I* : Index of parameter
	5	IUNIT(I)		Character*12	Unit names
	6	IDESC(I)		Character*40	Parameter description
4+	7	ID2		Integer*4	Year/Julian date
	8	IT2		Integer*4	Time
	9	PNAMEC		Character*10	Parameter name
	10	PNAMED		Character*10	Parameter name
5+	11	UR(I,J,2)	ms^{-1}	Real*4	Hourly gridded *u*-component of layer 2-- *I* : Index of columns *J* : Index of rows
6+	12	VR(I,J,2)	ms^{-1}	Real*4	Hourly gridded *v*-component of layer 2

WDDATA--This data file contains user-supplied gridded wind data. The user should set up his own data to follow this data structure. IWIND generates a compatible file for input to the UAM application. The formats for the user-supplied wind file are shown below; dots indicate additional program statements. The input parameters are listed in Table 42. The formats of the output parameters are identical to the formats of WDDATA input.

```
      READ(33,1000) IFILE, NOTE, NSEG, NSPECS, JDATE, BEGTIM, IDATE,
     &              ENDTIM
      .....
      READ(33,1001) ORGX, ORGY, IZONE, UTMX, UTMY, DELTAX, DELTAY,
     &             NX, NY, NZ, NZLOWR, NZUPPR, HTSUR, HTLOW, HTUPP
      .....
      READ(33,1002) IX, IY, NXCLL, NYCLL
      .....
      READ(33,1003,END=999) IDATE, TDATA, JDATE, TNEXT
      .....
      READ(33,1004) ISEG, REF, XMX, YMX, WEST, EAST, SOUTH, ORTH
      .....
      READ(33,1005) ISEG, WINDX
      READ(33,1006) ((WWX(I,J,K),I=1,NX),J=1,NY)
      READ(33,1005) JSEG, WINDY
      READ(33,1006) ((WWY(I,J,K),I=1,NX),J=1,NY)
      .....
 1000 FORMAT(10A1,2X,60A1,/,I2,1X,I2,1X,I6,1X,F6.2,1X,I6,1X,F6.2)
 1001 FORMAT(F10.2,F10.2,I3,F10.2,F10.2,2F6.0,5I4,3F7.0)
 1002 FORMAT(4I5)
 1003 FORMAT(I6,F7.0,I6,F7.0)
 1004 FORMAT(I4,7F8.1)
 1005 FORMAT(I4,10A1)
 1006 FORMAT(7D16.9)
```

TABLE 42. WDDATA PARAMETERS (OPTIONAL FILE)

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	IFILE		Integer*4	File name
	2	NOTE		Integer*4	File identifier
2	3	NSEG		Integer*4	Number of segments
	4	NSPECS		Integer*4	Number of species
	5	JDATE		Integer*4	Beginning year/Julian date (*yyddd*--e.g. 80203)
	6	BEGTIM		Real*4	Beginning time (*hhmm*--e.g. 0100, military time)
	7	IDATE		Integer*4	Ending year/Julian date
	8	ENDTIM		Real*4	Ending time
3	9	ORGX	m	Real*4	*x*-coordinate (UTM units)
	10	ORGY	m	Real*4	*y*-coordinate (UTM units)
	11	IZONE		Integer*4	UTM zone
	12	UTMX	m	Real*4	*x*-location
	13	UTMY	m	Real*4	*y*-location
	14	DELTAX	m	Real*4	Cell size in *x*-direction
	15	DELTAY	m	Real*4	Cell size in *y*-direction
	16	NX		Integer*4	Number of cells in *x*-direction (UAM)
	17	NY		Integer*4	Number of cells in *y*-direction (UAM)
	18	NZ		Integer*4	Number of cells in *z*-direction (UAM)
	19	NZLOWR		Integer*4	Number of cells between surface layer and diffusion break
	20	NZUPPR		Integer*4	Number of cells between diffusion break and top of region
	21	HTSUR	m	Real*4	Height of surface layer
	22	HTLOW	m	Real*4	Minimum height of cell between surface layer and diffusion break
	23	HTUPP	m	Real*4	Minimum height of cell between diffusion break and top of region
4	24	IX		Integer*4	*x*-location of segment origin with respect to origin of modeling region
	25	IY		Integer*4	*y*-location of segment origin with respect to origin of modeling region
	26	NXCLL		Integer*4	Number of cells in *x*-direction
	27	NYCLL		Integer*4	Number of cells in *y*-direction
5+	28	IDATE		Integer*4	Beginning year/Julian date
	29	TDATA		Real*4	Beginning time
	30	JDATE		Integer*4	Ending year/Julian date

(continued)

TABLE 42. WDDATA PARAMETERS (OPTIONAL FILE CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	31	TNEXT		Real*4	Ending time
6+	32	ISEG		Integer*4	Segment number
	33	REF	m	Real*4	Anemometer height
	34	XMX	m/h	Real*4	Maximum absolute value of *u*-component data
	35	YMX	m/h	Real*4	Maximum absolute value of *v*-component data
	36	WEST	m/h	Real*4	Average wind speed at W-boundary
	37	EAST	m/h	Real*4	Average wind speed at E-boundary
	38	SOUTH	m/h	Real*4	Average wind speed at S-boundary
	39	ORTH	m/h	Real*4	Average wind speed at N-boundary
7+	40	ISEG		Integer*4	Segment number
	41	WINDX		Real*4	Name of *u*-component wind
8+	42	WWX(I,J,K)	m/h	Real*4	*u*-component wind speed-- *I* : Index of columns *J* : Index of rows *K* : Index of levels
9+	43	JSEG		Integer*4	Segment number
	44	WINDY		Real*4	Name of *v*-component wind
10+	45	WWY(I,J,K)	m/h	Real*4	*v*-component wind speed

5.5.2.2 Control Cards--

The control cards define general information of the UAM model application. Twenty-five variables included in nine control cards are used, in the format shown below. Dots indicate additional program statements. The control card variables are listed in Table 43.

```
      READ(5,27) IUSER
        .....
      READ(5,101) (AOTEW(I),I=1,60)
      READ(5,23) IBDY,TBEG,IEDY,TEND
        .....
      READ(5,24) ORGX,ORGY,IZONE1,UTMXOR,UTMYOR,DELTAX,DELTAY
      READ(5,25) NX,NY,NZUAM,NZLOWR,NZUPPR,HTSUR,HTLOW,HTUPP
        .....
      READ(5,26) IPR1,IPR2,IOBR,NSMTH
        .....
  101 FORMAT(60A1)
   23 FORMAT(2(I10,F10.0))
   24 FORMAT(2F10.0,I10,/,2F10.0,/,2F10.0)
   25 FORMAT(3I10,/,2I10,F10.1,2F10.0)
   26 FORMAT(4I10)
   27 FORMAT(I10)
```

TABLE 43. CONTROL CARD VARIABLES FOR IWIND

Card number	Parameter number	Variable name	Units	Data type	Description
1	1	IUSER		Integer*4	Index of user-suppplied data-- 0 : ROM data > 0 : user-supplied data
2	2	AOTEW		Character*60	File name of initial conditions
3	3	IBDY		Integer*4	Beginning year/Julian date
	4	TBEG		Real*4	Beginning time
	5	IEDY		Integer*4	Ending year/Julian date
	6	TEND		Real*4	Ending time
4	7	ORGX	m	Real*4	Reference origin (x-coordinate)
	8	ORGY	m	Real*4	Reference origin (y-coordinate)
	9	IZONE1		Integer*4	UTM zone
5	10	UTMXOR	m	Real*4	Origin of grid in x-direction
	11	UTMYOR	m	Real*4	Origin of grid in y-direction
6	12	DELTAX	m	Real*4	Cell size in x-direction
	13	DELTAY	m	Real*4	Cell size in y-direction
7	14	NX		Integer*4	Number of cells in x-direction (UAM)
	15	NY		Integer*4	Number of cells in y-direction (UAM)
	16	NZUAM		Integer*4	Number of cells in z-direction (UAM)
8	17	NZLOWR		Integer*4	Number of cells in lower layer
	18	NZUPPR		Integer*4	Number of cells in upper layer
	19	HTSUR	m	Real*4	Height of surface layer
	20	HTLOW	m	Real*4	Minimum height of cell in lower layer
	21	HTUPP	m	Real*4	Minimum height of cell in upper layer
9	22	IPR1		Integer*4	Print option for ROM parameters-- 0 : Don't print; 1 : Print
	23	IPR2		Integer*4	Print option for UAM level winds-- 0 : Don't print; 1 : Print
	24	IOBR		Integer*4	O'Brien procedure option-- 0 : Don't apply this option 1 : Apply this option
	25	NSMTH		Integer*4	Smoothing scheme option-- 0 : Don't apply this option > 0 : Apply option NSMTH times

Example:

```
          0
INTERFACE ROM WINDS TEST RUN FOR 21-22 JULY 1980(3/07/90)
    80203         0.     80204       24.
       0.         0.        18
  520000.   4460000.
    8000.      8000.
       31        25         5
        2         3       0.0       50.0       100.0
        1         0         1          2
```

5.5.2.3 **Output Files--**

'IWIND' generates one output file.

WDBIN--This file contains the *u*-component and *v*-component wind data and general information for the UAM model application. The formats are shown below; dots indicate additional program statements. The output parameters are listed in Table 44.

```
 WRITE(IWR28) AWFHDR,AOTEW,NSEG,NSPECS,IBDY,TBEG,IEDY,TEND
     .....
 WRITE(IWR28) ORGX,ORGY,IZONE1,UTMXOR,UTMYOR,DELTAX,DELTAY,
&             NX,NY,NZUAM,NZLOWR,NZUPPR,HTSUR,HTLOW,HTUPP
     .....
 WRITE(IWR28) IX,IY,NX,NY
     .....
 WRITE(IWR28) IYJD1,RTIM1,IYJD2,RTIM2
     .....
 WRITE(IWR28) ISEG,REF,XMX,YMX,WBND,EBND,SBND,RNBND
     .....
 WRITE(IWR28) ISEG,AWINDX, ((UM(I,J,K), I=1,NX), J=1,NY)
 WRITE(IWR28) JSEG,AWINDY, ((VM(I,J,K), I=1,NX), J=1,NY)
```

TABLE 44. WDBIN PARAMETERS

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	AWFHDR		Character*10	File name
	2	AOTEW		Character*60	File identifier
	3	NSEG		Integer*4	Number of segments
	4	NSPECS		Integer*4	Number of species
	5	IBDY		Integer*4	Beginning year/Julian date
	6	TBEG		Real*4	Beginning time
	7	IEDY		Integer*4	Ending year/Julian date
	8	TEND		Real*4	Ending time
2	9	ORGX	m	Real*4	*x*-coordinate
	10	ORGY	m	Real*4	*y*-coordinate
	11	IZONE1		Integer*4	UTM zone
	12	UTMXOR	m	Real*4	*x*-location
	13	UTMYOR	m	Real*4	*y*-location
	14	DELTAX	m	Real*4	Cell size in *x*-direction
	15	DELTAY	m	Real*4	Cell size in *y*-direction
	16	NX		Integer*4	Number of cells in *x*-direction
	17	NY		Integer*4	Number of cells in *y*-direction
	18	NZUAM		Integer*4	Number of cells in *z*-direction
	19	NZLOWR		Integer*4	Number of cells between surface layer and diffusion break
	20	NZUPPR		Integer*4	Number of cells between diffusion break and top of region
	21	HTSUR	m	Real*4	Height of surface layer
	22	HTLOW	m	Real*4	Minimum height of cell between surface layer and diffusion break
	23	HTUPP	m	Real*4	Minimum height of cell between diffusion break and top of region
3	24	IX		Integer*4	*x*-location of segment origin with respect to origin of modeling region
	25	IY		Integer*4	*y*-location of segment origin with respect to origin of modeling region
	26	NX		Integer*4	Number of cells in *x*-direction
	27	NY		Integer*4	Number of cells in *y*-direction
4+	28	IYJD1		Integer*4	Beginning year/Julian date for hourly data
	29	RTIM1		Real*4	Beginning time
	30	IYJD2		Integer*4	Ending year/Julian date

(continued)

TABLE 44. WDBIN PARAMETERS (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	31	RTIM2		Real*4	Ending time
5+	32	ISEG		Integer*4	Segment number
	33	REF	m	Real*4	Anemometer height
	34	XMX	m/h	Real*4	Maximum absolute value of *u*-component data
	35	YMX	m/h	Real*4	Maximum absolute value of *v*-component data
	36	WBND	m/h	Real*4	Average wind at W-boundary
	37	EBND	m/h	Real*4	Average wind at E-boundary
	38	SBND	m/h	Real*4	Average wind at S-boundary
	39	RNBND	m/h	Real*4	Average wind at N-boundary
6+	40	ISEG		Integer*4	Segment number
	41	AWINDX		Character*10	Name of *u*-component wind
	42	UM(I,J,K)	m/h	Real*4	*u*-component wind speed-- *I* : Index of columns *J* : Index of rows *K* : Index of levels
7+	43	JSEG		Integer*4	Segment number
	44	AWINDY		Character*10	Name of *v*-component wind
	45	VM(I,J,K)	m/h	Real*4	*v*-component wind speed

5.5.3 Resource Summary for an IWIND Application

5.5.3.1 Memory Requirements--

FORTRAN source file:	1	file	74,240	bytes
Object file:	1	file	41,472	bytes
Executable file:	1	file	30,208	bytes
	3	files	145,920	bytes

5.5.3.2 Execution Time Requirements (Representative Values for a 48-h Scenario)--

	IBM 3090
Charged CPU time (hh:mm:ss):	00:10:21
Virtual address space:	10136 K

5.5.3.3 Space Requirements: Log and Print Files--

IWIND	296,448 bytes
Print Files:	None

5.5.3.4 Space Requirements: Input and Output Files--

Table 45 shows the input file and output file space requirements.

TABLE 45. IWIND I/O FILE SPACE REQUIREMENTS

File group	File name	File type	Storage (in bytes)	Scenario data span
Input	DBDATA	Formatted	2,048	72 hours
	RTDATA	Formatted	1,536	48 hours
	MF165	Formatted	197,632	72 hours
	PF119	Formatted	3,584	48 hours
	PF114	Formatted	263,168	48 hours
	PF115	Formatted	263,168	48 hours
			731,136	
	WDDATA (optional)	Formatted		
Output	WDBIN	Unformatted	269,132	48 hours

5.5.3.5 Space Requirements: Tape Files--

None.

5.5.4 Run Stream Command File for an IWIND Application

```
//* JOB CARD
//*
//*
/*ROUTE PRINT HOLD
//STEP1 EXEC PGM=IWIND
//STEPLIB  DD DSN=MMAS.UAM.INTRFACE.LOAD.
//* THESE ARE THE INPUT FILE
//FT16F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.PF114,DISP=SHR
//FT17F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.PF115,DISP=SHR
//FT02F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.MF165,DISP=SHR
//FT01F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.PF119,DISP=SHR
//FT03F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.DBDATA,DISP=SHR
//FT09F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.RTDATA,DISP=SHR
//* THIS IS THE OUTPUT FILE
//FT28F001 DD DSN=<UIDACCT>.UAM.INTRFACE.OUTPUT.WDIN,
//            DISP=(NEW,CATLG,CATLG),
//            SPACE=(TRK,(100,10)),UNIT=SYSDA,
//            DCB=(RECFM=VB,LRECL=5000,BLKSIZE=5004)
//*
//* THIS IS THE CONTROL CARD
//FT05F001 DD *
         0
INTERFACE ROM WINDS TEST RUN FOR 21-22 JULY 1980(2/12/90)
     80203        0.     80204       24.
        0.        0.        18
   520000.  4460000.
     8000.     8000.
        31        25         5
         2         3       0.0      50.0      100.0
         1         0         1         2
/*
//* THIS IS END OF DATA
//
```

5.5.5 Main Program, Subroutines, Functions, and Block Data Required

5.5.5.1 Main Program--

IWIND

5.5.5.2 Subroutines--

UTM2
GRIDROM
GRIDPRT
XMIT
SMTH
CELLHT
HORINTERP
DIVCEL
SPD
RTHETA
FMINF
MINIM
USERWD

5.5.5.3 Functions--

None.

5.5.5.4 Block Data Files--

None.

5.5.6 I/O and Utility Library Subroutines and Functions Required

None.

5.5.7 INCLUDE Files

None.

5.6 SURFACE CHARACTERISTICS INTERFACE (ICRETER)

5.6.1 Processor Function

This processor prepares surface characteristic parameters for use in the UAM preprocessor 'TERAIN'. ICRETER reads in ROM gridded effective surface roughness and gridded land use fractions for each land use category. The surface roughness length (ROUGHNESS) and the vegetation factor (VEG-FACTOR) are the two surface characteristics interpolated to the UAM grid cells using an area-weighting method described earlier. This processor also reads in control data that define the general information of the UAM model application and then generates a formatted packet file that is in a compatible format for input to the UAM preprocessor 'CRETER'. Flow of information through the ICRETER interface processor is shown in Figure 15.

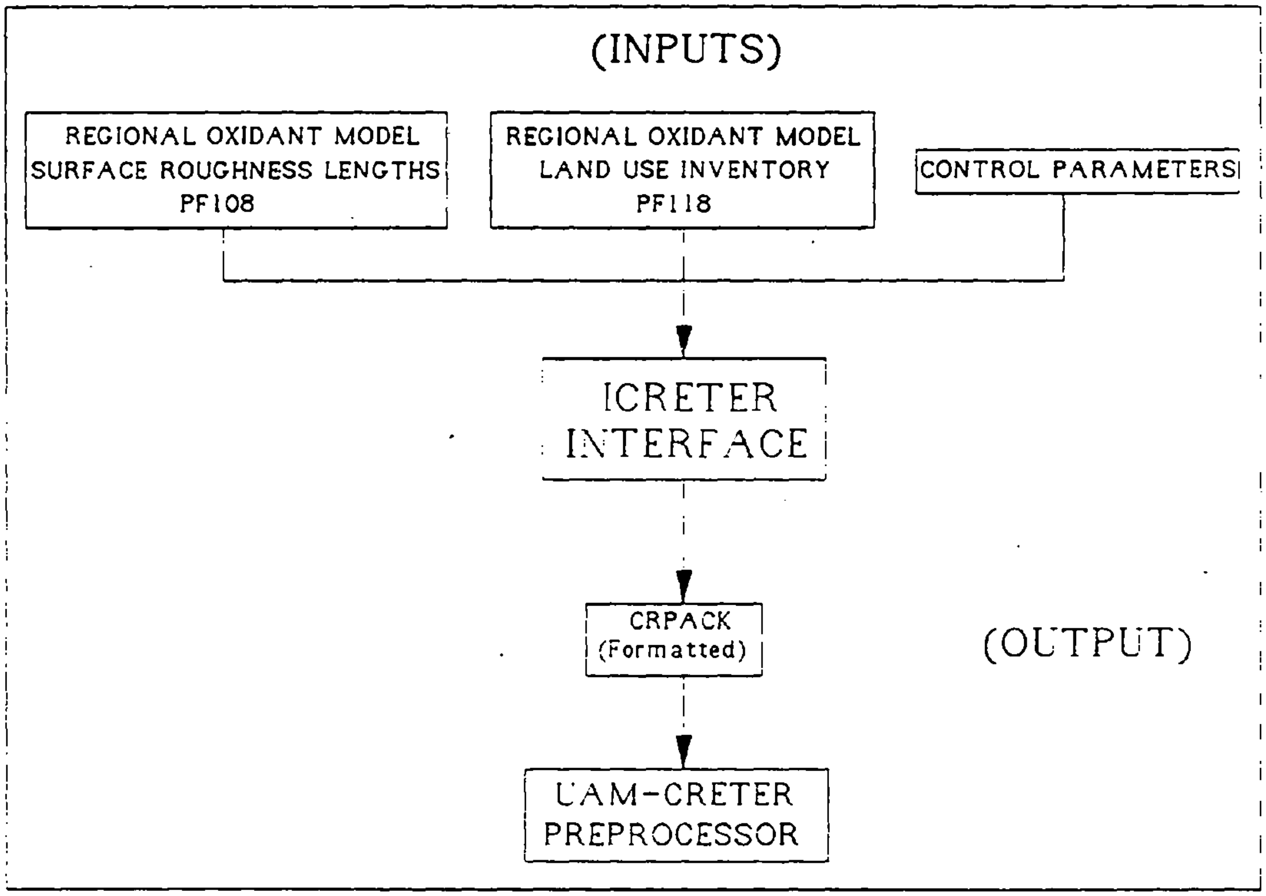
5.6.2 Input/Output Components

5.6.2.1 Input Files--

'ICRETER' requires two retrieved ROM MF/PF files.

PF108--This data file contains the ROM gridded effective surface roughness length values. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 46.

```
      READ(15,12) T1A,IMX2,T1B,IMY2,T1C,ISPC
      READ(15,13) T2,IDLAT2,IMLAT2,SLAT2
      READ(15,13) T2,IDLON2,IMLON2,SLON2
      READ(15,15) T3
        .....
      READ(15,300,END=999) LDAT2,LTIM2
        .....
      READ(15,39,END=999) (A(I,J),I=1,INX)
        .....
   12 FORMAT(A52,I2,A8,I2,A14,I2)
   13 FORMAT(A27,I4,1X,I2,1X,F5.2)
   15 FORMAT(A80)
  300 FORMAT(I5,1X,I2)
   39 FORMAT(30E12.6)
```



Note: The output file (CRPACK) is in a compatible format for use in the CRETER preprocessor program.

Figure 15. Flow diagram of the ICRETER interface program with input and output files.

TABLE 46. PF108 PARAMETERS FOR ICRETER

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	T1A		Character*52	Subtitle name
	2	IMX2		Integer*4	Number of columns
	3	T1B		Character*8	Subtitle name
	4	IMY1		Integer*4	Number of rows
	5	T1C		Character*14	Subtitle name
	6	ISPC		Integer*4	Number of parameters
2	7	T2		Character*27	Subtitle name
	8	IDLAT2		Integer*4	Degrees of latitude for the southwest corner of the ROM domain
	9	IMLAT2		Integer*4	Minutes of latitude
	10	SLAT2		Real*4	Seconds of latitude
3	11	T2		Character*27	Subtitle name
	12	IDLON2		Integer*4	Degrees of longitude for the southwest corner of the ROM domain
	13	IMLON2		Integer*4	Minutes of longitude
	14	SLON2		Real*4	Seconds of longitude
4+	15	T3		Character*80	Header information
5	16	LDAT2		Integer*4	Year/Julian date
	17	LTIM2	h	Integer*4	Time
6+	18	A(I,J)	m	Real*4	Surface roughness length-- *I* : Index of columns *J* : Index of rows

PF118--This data file contains the ROM gridded land use fractions for each land use category. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 47.

```
    READ(14,12) T1A,IMX1,T1B,IMY1,T1C,ISPC
    READ(14,13) T2,IDLAT1,IMLAT1,SLAT1
    READ(14,13) T2,IDLON1,IMLON1,SLON1
    READ(14,15) T3
     .....
    READ(14,300,END=999) LDAT2,LTIM2
     .....
    READ(14,39,END=999) (VEG(I,J,K),I=1,INX)
     .....
 12 FORMAT(A52,I2,A8,I2,A14,I2)
 13 FORMAT(A27,I4,1X,I2,1X,F5.2)
 15 FORMAT(A80)
300 FORMAT(I5,1X,I2)
 39 FORMAT(30E12.6)
```

TABLE 47. PF118 PARAMETERS FOR ICRETER

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	T1A		Character*52	Subtitle name
	2	IMX1		Integer*4	Number of columns
	3	T1B		Character*8	Subtitle name
	4	IMY1		Integer*4	Number of rows
	5	T1C		Character*14	Subtitle name
	6	ISPC		Integer*4	Number of parameters
2	7	T2		Character*27	Subtitle name
	8	IDLAT1		Integer*4	Degrees of latitude for the southwest corner of the ROM domain
	9	IMLAT1		Integer*4	Minutes of latitude
	10	SLAT1		Real*4	Seconds of latitude
3	11	T2		Character*27	Subtitle name
	12	IDLON1		Integer*4	Degrees of longitude for the southwest corner of the ROM domain
	13	IMLON1		Integer*4	Minutes of longitude
	14	SLON1		Real*4	Seconds of longitude
4+	15	T3		Character*80	Header information
5	16	LDAT2		Integer*4	Year/Julian date
	17	LTIM2	h	Integer*4	Time
6+	18	VEG(I,J,K)		Real*4	Land use fractional amounts-- *I* : Index of columns *J* : Index of rows *K* : Index of land use category

5.6.2.2 Control Cards--

Fifty-two variables included on control cards are used in the format shown below. Dots indicate additional program statements. The control card variables are listed in Table 48.

```
          READ(5,10) NX,NY,X1,Y1,MX,MY,DX,DY
          READ(5,1000) IDDLAT,IMMLAT,SECLAT,IDDLON,IMMLON,SECLON
              .....
          READ(5,23) TP
          READ(5,20) FID
          READ(5,21) (IOP(I),I=1,23)
          READ(5,22) ISYD,ISHM,IEYD,IEHM
              .....
          READ(5,24) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ
          READ(5,25) IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
              .....
          READ(5,28) HTZ,INX,INY
          READ(5,33) ISUB
              .....
          READ(5,34) SUBID,IROW,ICOL,ICONT
          READ(5,35) SUBID,VAR1,MHD,VMIN,VMAX,NOP
              .....

(If NOP = 0, skip the next two READ statements.)

          READ(5,49) PNAME,IPVAL
              .....
          READ(5,36) PNAME,PVAL
              .....
          READ(5,35) SUBID,VAR2,MHD,VMIN,VMAX,NOP
              .....

(If NOP = 0, skip the next two READ statements.)

          READ(5,49) PNAME,IPVAL
              .....
          READ(5,36) PNAME,PVAL
              .....
       20 FORMAT(A60)
       21 FORMAT(5I10,/,3I10,/,5I10,/,4I10,/,6I10)
       22 FORMAT(4I10)
       23 FORMAT(A10)
       24 FORMAT(2F10.0,I10,/,2F10.0,/,2F10.0)
       25 FORMAT(3I10,/,2I10,F10.1,2F10.0)
       28 FORMAT(3X,F7.1,2I10)
       33 FORMAT(I10)
       34 FORMAT(A10,3I10)
       35 FORMAT(3A10,2F10.1,I10)
       36 FORMAT(A10,F10.2)
       49 FORMAT(A10,I10)
       10 FORMAT(2I5,2F10.0,2I7,2F10.0)
     1000 FORMAT(1X,I2,1X,I2,1X,F6.3,1X,I3,1X,I2,1X,F6.3)
```

TABLE 48. CONTROL CARD VARIABLES FOR ICRETER

Card number	Card number	Variable name	Units	Data type	Description
1	1	NX		Integer*4	Number of cells in x-direction (ROM)
	2	NY		Integer*4	Number of cells in y-direction (ROM)
	3	X1	m	Real*4	x-location of origin
	4	Y1	m	Real*4	y-location of origin
	5	MX		Integer*4	Number of cells in x-direction (UAM)
	6	MY		Integer*4	Number of cells in y-direction (UAM)
	7	DX	m	Real*4	UAM cell size in x-direction
	8	DY	m	Real*4	UAM cell size in y-direction
2	9	IDDLAT		Integer*4	Degrees of latitude for origin of windowed ROM domain
	10	IMMLAT		Integer*4	Minutes of latitude
	11	SECLAT		Real*8	Seconds of latitude
	12	IDDLON		Integer*4	Degrees of longitude for origin of windowed ROM domain
	13	IMMLON		Integer*4	Minutes of longitude
	14	SECLON		Real*8	Seconds of longitude
3	15	TP		Character*10	File name
4	16	FID		Character*60	File identifier
5	17	IOP(I)		Integer*4	Control options
		I=1			Number of species
		I=2			Number of user-defined variables
		I=3			Number of stations (ROM grid points)
		I=4			Number of subregions
		I=5			Number of parameters
6		I=6			Output file number
		I=7			Input print option-- 0: don't print; 1: print
		I=8			Output print option-- (0 or 1, as above)
7		I=9			Print unit table (0 or 1)
		I=10			Print station locations (0 or 1)
		I=11			Print region (0 or 1)
		I=12			Print methods table (0 or 1)
		I=13			Print station values (0 or 1)
8		I=14			Number of vertical parameters
		I=15			Number of profile heights
		I=16			Print vertical methods table (0 or 1)
		I=17			Print vertical profiles table (0 or 1)
9		I=18			DIFFBREAK unit number
		I=19			REGIONTOP unit number
		I=20			TOPCONC unit number

(continued)

TABLE 48. CONTROL CARD VARIABLES FOR ICRETER (CONTINUED)

Card number	Card number	Variable name	Units	Data type	Description
		I=21			TEMPERATUR unit number
		I=22			METSCALARS unit number
		I=23			WIND unit number
10	18	ISYD		Integer*4	Beginning year/Julian date (*yyddd*--e.g. 80203)
	19	ISHM		Integer*4	Beginning time (hhmm--e.g. 0100, military time)
	20	IEYD		Integer*4	Ending year/Julian date
	21	IEHM		Integer*4	Ending time
11	22	XLOCR	m	Real*4	Reference origin (*x*-coordinate)
	23	YLOCR	m	Real*4	Reference origin (*y*-coordinate)
	24	IZONE1		Integer*4	UTM zone
12	25	XLOC	m	Real*4	Origin of grid in *x*-direction
	26	YLOC	m	Real*4	Origin of grid in *y*-direction
13	27	XSZ	m	Real*4	Cell size in *x*-direction
	28	YSZ	m	Real*4	Cell size in *y*-direction
14	29	IX		Integer*4	Number of cells in *x*-direction
	30	IY		Integer*4	Number of cells in *y*-direction
	31	IZ		Integer*4	Number of cells in *z*-direction
	32	IZL		Integer*4	Number of cells in lower layer
	33	IZU		Integer*4	Number of cells in upper layer
	34	SFCH	m	Real*4	Height of surface layer
15	35	ALH	m	Real*4	Minimum height of cell in lower layer
	36	AUH	m	Real*4	Minimum height of cell in upper layer
16	37	HTZ	m	Real*4	Height of station
	38	INX		Integer*4	Number of cells in *x*-direction (ROM)
	39	INY		Integer*4	Number of cells in *y*-direction (ROM)
17	40	ISUB		Integer*4	Number of subregions
18	41	SUBID		Character*10	Subregion name
	42	IROW		Integer*4	Beginning row number
	43	ICOL		Integer*4	Beginning column number
	44	ICONT		Integer*4	Cell count; if negative, equal to rest of model region
19	45	SUBID		Character*10	Subregion name
	46	VAR1		Character*10	Roughness name
	47	MHD		Character*10	Method name
	48	VMIN		Real*4	Minimum value
	49	VMAX		Real*4	Maximum value
	50	NOP		Integer*4	Number of parameter. cards that followed
20+	51	PNAME		Character*10	Parameter name
	52	IPVAL		Integer*4	Parameter value

(continued)

TABLE 48. CONTROL CARD VARIABLES FOR ICRETER (CONCLUDED)

Card number	Card number	Variable name	Units	Data type	Description
21+	53	PNAME		Character*10	Parameter name
	54	PVAL		Real*4	Parameter value
22	55	SUBID		Character*10	Subregion name
	56	VAR2		Character*10	Vegetative factor name
	57	MHD		Character*10	Method name
	58	VMIN		Real*4	Minimum value
	59	VMAX		Real*4	Maximum value
	60	NOP		Integer*4	Number of parameter cards that follow
23+	61	PNAME		Character*10	Parameter name
	62	IPVAL		Integer*4	Parameter value
24+	63	PNAME		Character*10	Parameter name
	64	PVAL		Real*4	Parameter value

Example:

```
  16   14   520000.  4460000.     31     25     8000.     8000.
 40 00 00.000 075 15 00.000
TERRAIN
   SURFACE ROUGHNESS AND VEGETATIVE FACTORS
          0         0       224         1        20
         11         1         1
          0         0         0         1         0
          0         0         0         0
          0         0         0         0         0         0
      80001         0     80366      2400
         0.        0.        18
    520000.  4460000.
      8000.     8000.
         31        25         5
          2         3       0.0      50.0     100.0
        4.0        16        14
          1
A                   1         1        -1
A         ROUGHNESS GRID VALUE     0.0000       20.         0
A         VEGFACTOR GRID VALUE     0.0000        2.         0
```

5.6.2.3 Output Files--

'ICRETER' generates one output file, CRPACK. This file contains a gridded surface roughness and vegetative factor for each UAM cell. The formats are shown below; dots indicate additional program statements. The output parameters are listed in Table 49.

```
      WRITE(26,20) CNTL
      WRITE(26,23) TP
      WRITE(26,20) FID
      WRITE(26,21) (IOP(I),I=1,23)
      WRITE(26,22) ISYD,ISHM,IEYD,IEHM
      WRITE(26,23) END
        .....
      WRITE(26,20) REGN
      WRITE(26,24) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ
      WRITE(26,25) IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
      WRITE(26,23) END
        .....
      WRITE(26,20) SUBR
        .....
      WRITE(26,34) SUBID,IROW,ICOL,ICONT
      WRITE(26,23) END
        .....
      WRITE(26,20) METH
        .....
      WRITE(26,35) SUBID,VAR1,MHD,VMIN,VMAX,NOP
        .....
      WRITE(26,49) PNAME,IPVAL
        .....
      WRITE(26,36) PNAME,PVAL
        .....
      WRITE(26,35) SUBID,VAR2,MHD,VMIN,VMAX,NOP
        .....
      WRITE(26,49) PNAME,IPVAL
        .....
      WRITE(26,36) PNAME,PVAL
      WRITE(26,23) END
        .....
      WRITE(26,23) GRIDV
        .....
      WRITE(26,37) SUBID,VAR1,I,J,VAL(I,J)
        .....
      WRITE(26,37) SUBID,VAR2,I,J,VAV(I,J)
        .....
      WRITE(26,23) END
      WRITE(26,23) ENDT
        .....
   20 FORMAT(A60)
   21 FORMAT(5I10,/,3I10,/,5I10,/,4I10,/,6I10)
   22 FORMAT(4I10)
   23 FORMAT(A10)
   24 FORMAT(2F10.0,I10,/,2F10.0,/,2F10.0)
   25 FORMAT(3I10,/,2I10,F10.1,2F10.0)
   34 FORMAT(A10,3I10)
   35 FORMAT(3A10,2F10.1,I10)
   36 FORMAT(A10,F10.2)
   37 FORMAT(A10,A10,2I10,F10.4)
   49 FORMAT(A10,I10)
```

TABLE 49. CRPACK PARAMETERS

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	CNTL		Character*60	Control pack header
2	2	TP		Character*10	File name
3	3	FID		Character*60	File identifier
4-8	4	IOP(I)		Integer*4	Control options
9	5	ISYD		Integer*4	Beginning year/Julian date
	6	ISHM		Integer*4	Beginning time
	7	IEYD		Integer*4	Ending year/Julian date
	8	IEHM		Integer*4	Ending time
10	9	END		Character*10	Control pack terminator
11	10	REGN		Character*60	Region pack header
12	11	XLOCR	m	Real*4	Reference origin (x-coordinate)
	12	YLOCR	m	Real*4	Reference origin (y-coordinate)
	13	IZONE1		Integer*4	UTM zone
13	14	XLOC	m	Real*4	Origin of grid in x-direction
	15	YLOC	m	Real*4	Origin of grid in y-direction
14	16	XSZ	m	Real*4	Cell size in x-direction
	17	YSZ	m	Real*4	Cell size in y-direction
15	18	IX		Integer*4	Number of cells in x-direction
	19	IY		Integer*4	Number of cells in y-direction
	20	IZ		Integer*4	Number of cells in z-direction
16	21	IZL		Integer*4	Number of cells in lower layer
	22	IZU		Integer*4	Number of cells in upper layer
	23	SFCH	m	Real*4	Height of surface layer
	24	ALH	m	Real*4	Minimum height of cell in lower layer
	25	AUH	m	Real*4	Minimum height of cell in upper layer
17	26	END		Character*10	Control pack terminator
18	27	SUBR		Character*60	Subregion pack header
19	28	SUBID		Character*10	Subregion name
	29	IROW		Integer*4	Beginning row number
	30	ICOL		Integer*4	Beginning column number
	31	ICONT		Integer*4	Cell count
20	32	END		Character*10	Control pack terminator
21	33	METH		Character*60	Method pack header
22	34	SUBID		Character*10	Subregion name
	35	VAR1		Character*10	Roughness name

(continued)

TABLE 49. CRPACK PARAMETERS (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	36	MHD		Character*10	Method name
	37	VMIN		Real*4	Minimum value
	38	VMAX		Real*4	Maximum value
	39	NOP		Integer*4	Number of parameter cards that follow
23+	40	PNAME		Character*10	Parameter name
	41	IPVAL		Integer*4	Parameter value
24+	42	PNAME		Character*10	Parameter name
	43	PVAL		Real*4	Parameter name
25	44	SUBID		Character*10	Subregion name
	45	VAR2		Character*10	Vegetative factor name
	46	MHD		Character*10	Method name
	47	VMIN		Real*4	Minimum value
	48	VMAX		Real*4	Maximum value
	49	NOP		Integer*4	Number of parameter cards that follow
26+	50	PNAME		Character*10	Parameter name
	51	IPVAL		Integer*4	Parameter value
27+	52	PNAME		Character*10	Parameter name
	53	PVAL		Real*4	Parameter value
28	54	END		Character*10	Control pack terminator
29	55	GRIDV		Character*10	Station reading header
30+	56	SUBID		Character*10	Subregion name
	57	VAR1		Character*10	Roughness name
	58	I		Integer*4	Index of x-coordinate
	59	J		Integer*4	Index of y-coordinate
	60	VAL(I,J)	m	Real*4	Roughness value-- I : Index of columns J : Index of rows
31+	61	SUBID		Character*10	Subregion name
	62	VAR2		Character*10	Vegetative factor name
	63	I		Integer*4	Index of x-coordinate
	64	J		Integer*4	Index of y-coordinate
	65	VAV(I,J)		Real*4	Vegetative factor value I & J are same as above
32	66	END		Character*10	Control pack terminator
33	67	ENDT		Character*10	Time interval pack terminator

5.6.3 Resource Summary for an ICRETER Application

5.6.3.1 Memory Requirements--

FORTRAN source file:	1	file	52,736	bytes
Object file:	1	file	23,552	bytes
Executable file:	1	file	18,944	bytes
	3	files	95,232	bytes

5.6.3.2 Execution Time Requirements (Representative Values for a 48-h Scenario)--

	IBM 3090
Charged CPU time (hh:mm:ss):	00:00:01
Virtual address space:	9620 K

5.6.3.3 Space Requirements: Log and Print Files--

ICRETER	4,096 bytes
Print Files:	None

5.6.3.4 Space Requirements: Input and Output Files--

Table 50 shows the input file and output file space requirements.

TABLE 50. ICRETER I/O FILE SPACE REQUIREMENTS

File group	File name	File type	Storage (in bytes)	Scenario data span
Input	PF108	Formatted	3,584	48 hours
	PF118	Formatted	31,232	48 hours
			34,816	
Output	CRPACK	Formatted	81,920	48 hours

5.6.3.5 Space Requirements: Tape Files--

None

5.6.4 Run Stream Command File for an Interface Application

```
//* JOB CARD
//*
//*
/*ROUTE PRINT HOLD
//STEP1 EXEC PGM=ICRETER
//STEPLIB  DD DSN=MMAS.UAM.INTRFACE.LOAD
//* THESE ARE THE INPUT FILES
//FT14F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.PF118,DISP=SHR
//FT15F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.PF108,DISP=SHR
//* THIS IS THE OUTPUT FILE
//FT26F001 DD DSN=<UIDACCT>.UAM.INTRFACE.OUTPUT.CRPACK,
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(5,5)),UNIT=SYSDA,
//             DCB=(RECFM=FB,LRECL=132,BLKSIZE=2640)
//*
//* THIS IS THE CONTROL CARD
//FT05F001 DD *
   16   14   520000.  4460000.     31      25      8000.      8000.
 40 00 00.000 075 15 00.000
TERRAIN
   SURFACE ROUGHNESS AND VEGETATIVE FACTORS
         0          0        224          1        20
        11          1          1
         0          0          0          1         0
         0          0          0          0
         0          0          0          0         0         0
     80203          0      80204       2400
        0:         0.         18
   520000.   4460000.
     8000.      8000.
        31         25          5
         2          3        0.0       50.0     100.0
       4.0         16         14
         1
A                   1          1         -1
A         ROUGHNESS GRID VALUE     0.0000       20.         0
A         VEGFACTOR GRID VALUE     0.0000        2.         0
/*
//* THIS IS END OF DATA
//
```

5.6.5 Main Program, Subroutines, Functions, and Block Data Required

5.6.5.1 Main Program--

ICRETER

5.6.5.2 Subroutines--

UTM2

QUAD

5.6.5.3 Functions--

None.

5.6.5.4 Block Data Files--

None.

5.6.6 I/O and Utility Library Subroutines and Functions Required

None.

5.6.7 INCLUDE Files

None

5.7 CONCENTRATION INTERFACE (ICONC)

5.7.1 Processor Function

This processor prepares initial conditions, lateral boundary conditions, and top boundary conditions of 17 species for the UAM model application. ICONC reads in ROM gridded terrain elevation, ROM hourly gridded heights of layer 1, user-supplied diffusion break data, and ROM 3-h running average predicted concentrations. The methodology described in Section 4.3 has been applied to match the concentrations from the three layers of ROM into a user-defined number of UAM vertical cells.

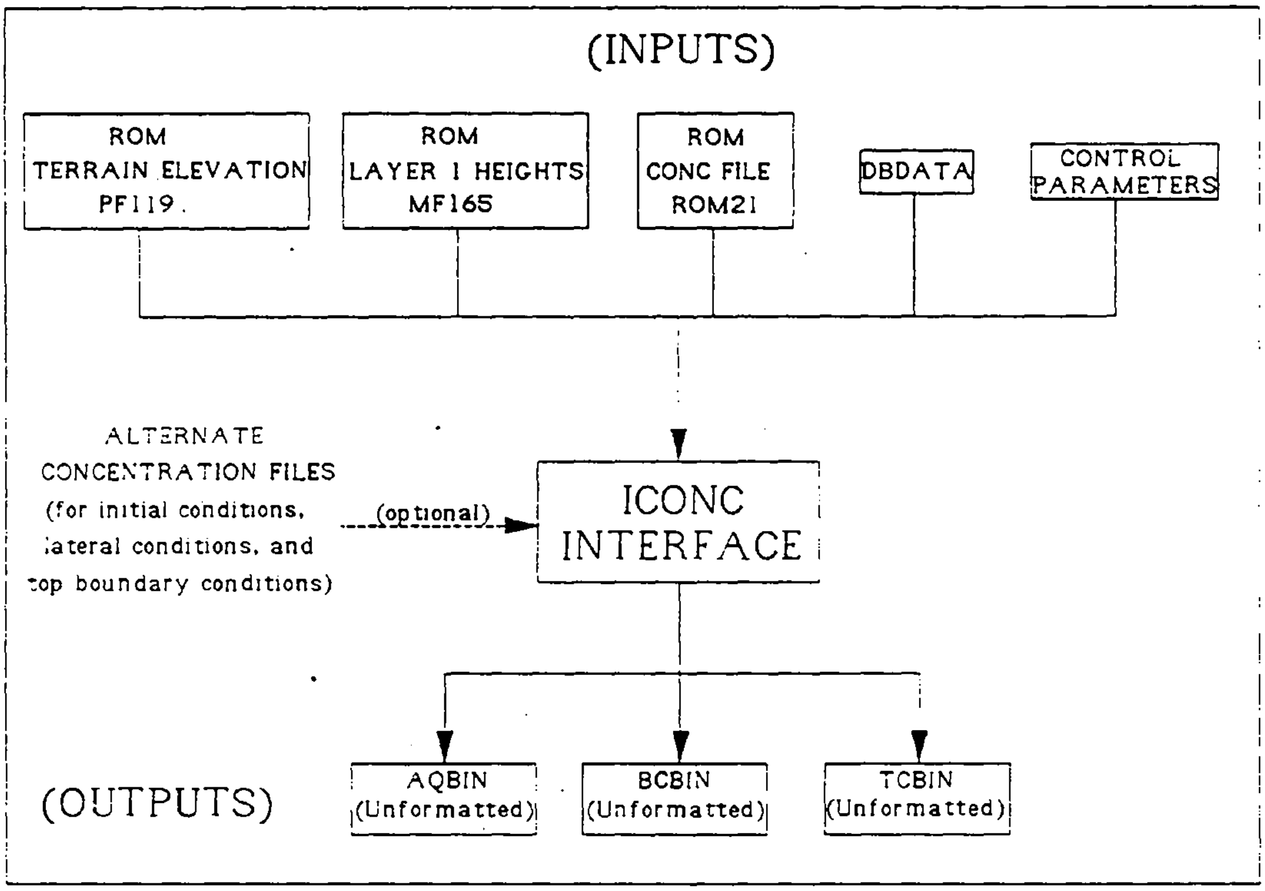
The user should be aware that: (1) this vertical interfacing methodology does not specify vertical gradients below the diffusion break height, (2) concentrations among the lower layers are determined by ROM layer 1 and 2 concentrations, and (3) concentrations above the diffusion break height are specified by ROM layer 2 and layer 3 concentrations. After applying the vertical interfacing methodology, a horizontal interpolation scheme (inverse distance-squared weighting) is incorporated into this processor for initial conditions and top boundary conditions. For lateral boundary conditions, two extra ROM columns/rows of data and one interior ROM data point are averaged. The same vertical method applied for initial conditions is used for each UAM level and then a linear interpolation method is performed to derive UAM boundary values at each grid cell. An option is built in this processor for the user to provide concentration files for initial conditions, lateral conditions, and top boundary conditions. This processor then generates an unformatted file that is in a format compatible for input to the UAM model application. Flow of information through the ICONC interface processor is shown in Figure 16.

5.7.2 Input/Output Components

5.7.2.1 Input Files--

'ICONC' requires two retrieved ROM MF/PF files (MF165 and PF119), one user-supplied data file (DBDATA), and a ROM concentration data file (ROM21). If the user provides data files, the format of the file should be consistent with the formats of input file AQDATA, TCDATA, and BCDATA listed below.

MF165--This data file contains hourly gridded heights of layer 1. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 51.



Note: The output files are unformatted for direct use in the UAM program.

Figure 16. Flow diagram of the ICONC interface program with input and output files.

```
      READ(2,12)  T1A,IMX2,T1B,IMY2,T1C,ISPC
      READ(2,13)  T2,IDLAT2,IMLAT2,SLAT2
      READ(2,13)  T2,IDLON2,IMLON2,SLON2
      READ(2,15)  T3
        .....
      READ(2,300,END=996) LDATE,LTIME
        .....
      READ(2,30,END=996) (Z1(I,J),I=1,INX)
        .....
   12 FORMAT(A52,I2,A8,I2,A14,I2)
   13 FORMAT(A27,I4,1X,I2,1X,F5.2)
   15 FORMAT(A80)
  300 FORMAT(I5,1X,I2)
   30 FORMAT(30E12.6)
```

TABLE 51. MF165 PARAMETERS FOR ICONC

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	T1A		Character*52	Subtitle name
	2	IMX2		Integer*4	Number of columns
	3	T1B		Character*8	Subtitle name
	4	IMY2		Integer*4	Number of rows
	5	T1C		Character*14	Subtitle name
	6	ISPC		Integer*4	Number of parameters
2	7	T2		Character*27	Subtitle name
	8	IDLAT2		Integer*4	Degrees of latitude for the southwest corner of the ROM domain
	9	IMLAT2		Integer*4	Minutes of latitude
	10	SLAT2		Real*4	Seconds of latitude
3	11	T2		Character*27	Subtitle name
	12	IDLON2		Integer*4	Degrees of longitude for the southwest corner of the ROM domain
	13	IMLON2		Integer*4	Minutes of longitude
	14	SLON2		Real*4	Seconds of longitude
4+	15	T3		Character*80	Header information
5+	16	LDATE		Integer*4	Year/Julian date
	17	LTIME	h	Integer*4	Time
6+	18	Z1(I,J)	m	Real*4	Hourly gridded height of layer 1-- *I* : Index of columns *J* : Index of rows

PF119--This data file contains gridded terrain elevations. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 52.

```
      READ(1,12)  T1A,IMX1,T1B,IMY1,T1C,ISPC
      READ(1,13)  T2,IDLAT1,IMLAT1,SLAT1
      READ(1,13)  T2,IDLON1,IMLON1,SLON1
      READ(1,15)  T3
         .....
      READ(1,300,END=999) LDAT2,LTIM2
         .....
      READ(1,30,END=999) (SFC(I,J),I=1,IMX)
         .....
   12 FORMAT(A52,I2,A8,I2,A14,I2)
   13 FORMAT(A27,I4,1X,I2,1X,F5.2)
   15 FORMAT(A80)
  300 FORMAT(I5,1X,I2)
   30 FORMAT(30E12.6)
```

TABLE 52. PF119 PARAMETERS FOR ICONC

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	T1A		Character*52	Subtitle name
	2	IMX1		Integer*4	Number of columns
	3	T1B		Character*8	Subtitle name
	4	IMY1		Integer*4	Number of rows
	5	T1C		Character*14	Subtitle name
	6	ISPC		Integer*4	Number of parameters
2	7	T2		Character*27	Subtitle name
	8	IDLAT1		Integer*4	Degrees of latitude for the southwest corner of the ROM domain
	9	IMLAT1		Integer*4	Minutes of latitude
	10	SLAT1		Real*4	Seconds of latitude
3	11	T2		Character*27	Subtitle name
	12	IDLON1		Integer*4	Degrees of longitude for the southwest corner of the ROM domain
	13	IMLON1		Integer*4	Minutes of longitude
	14	SLON1		Real*4	Seconds of longitude
4+	15	T3		Character*80	Header information
5+	16	LDAT2		Integer*4	Year/Julian date
	17	LTIM2	h	Integer*4	Time
6+	18	SFC(I,J)	m	Real*4	Hourly gridded terrain elevation-- *I*: Index of columns *J*: Index of rows

DBDATA--The data contained in this file are user-supplied diffusion break data associated with date and time. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 53.

```
    READ(3,17,END=998) LDAY(I),LTIM(I),VMH(I)
    .....
17  FORMAT(I7,I3,F10.1)
```

TABLE 53. DBDATA PARAMETERS FOR ICONC

Card number	Parameter number	Parameter name	Units	Data type	Description
1+	1	LDAY(I)		Integer*4	Year/Julian date
	2	LTIM(I)	h	Integer*4	Time
	3	VMH(I)	m	Real*4	Diffusion break value-- *I* : Index of hours

ROM21--This data file contains modified ROM gridded 3-h running average concentration data. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 54.

```
      READ(8,400) NCOL, NROW, NLEV, NSPC
      .....
      READ(8,500) ((SPC(J,I),J=1,4), I=1,NSPC)
      .....
      READ(8,339) ((LVNAME(J,I),J=1,4), I=1,NLEV)
      .....
      READ(8,441) TEXT1, TEXT2
      .....
      READ(8,1000) LDATE, LTIME
      .....
      READ(8,900) (C1(J,I,1,K),J=1,NCOL)
      READ(8,900) (C1(J,I,2,K),J=1,NCOL)
      READ(8,900) (C1(J,I,3,K),J=1,NCOL)
      .....
  400 FORMAT(104X,4I4)
  500 FORMAT(17(4A1))
  339 FORMAT(3(4A1))
  441 FORMAT(2A80)
 1000 FORMAT(I5,I4)
  900 FORMAT(30E12.6)
```

TABLE 54. ROM21 PARAMETERS FOR ICONC

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	NCOL		Integer*4	Number of columns
	2	NROW		Integer*4	Number of rows
	3	NLEV		Integer*4	Number of levels
	4	NSPC		Integer*4	Number of species
2	5	SPC(I,J)		Character*10	Species name-- *I* : Index of name *J* : Index of species
3	6	LVNAME(I,J)		Character*10	Level name-- *I* & *J* are same as above
4+	7	TEXT1			Dummy text
	8	TEXT2			Dummy text
5+	9	LDATE			Year/Julian date
	10	LTIME	h		Time
6+	11	C1(I,J,1,K)	ppm	Real*4	Concentration for layer 1 *I* : Index of columns *J* : Index of rows *K* : Index of species
7+	12	C1(I,J,2,K)	ppm	Real*4	Concentration for layer 2
8+	13	C1(I,J,3,K)	ppm	Real*4	Concentration for layer 3

AQDATA--This data file contains user-supplied gridded concentration data for initial conditions. The user should set up his own data to follow this data structure. ICONC generates a compatible file for input to the UAM application. The formats for the user-supplied data file are shown below, dots Indicate additional program statements. The input parameters are listed in Table 55. The formats of output parameters are identical with formats of input, but it is a binary unformatted file.

```
      READ (17,2100) IFILE,NOTE,NSEG,NSPECS,IDATE,BEGTIM,JDATE,ENDTIM
      ...
      READ (17,2001) ORGX, ORGY, IZONE, UTMX, UTMY, DELTAX, DELTAY,
     &   NX, NY, NZ, NZLOWR, NZUPPR, HTSUR, HTLOW, HTUPP
      ...
      READ (17,1002) IX, IY, NXCLL, NYCLL
      ...
      READ (17,1003) ((MSPEC(M,L),M=1,10),L=1,NSPECS)
      ...
      READ (17,1005,END=999) IBGDAT,BEGTIM,IENDAT,ENDTIM
      ...
      READ (17,1006) ISEG, (MSPEC(M,L),M = 1,10)
      ...
      READ (17,1007) ((EMOB(I,J,L),I=1,NX),J=1,NY)
      ...
 1002 FORMAT(4I5)
 1003 FORMAT(10A1)
 1005 FORMAT(5X,2(I10,F10.2))
 1006 FORMAT(I4,10A1)
 1007 FORMAT(9E14.7)
 2001 FORMAT(F10.1,1X,F10.1,1X,I3,F10.1,1X,F10.1,1X,2F6.0,5I4,3F7.0)
 2100 FORMAT(10A1,60A1,/,I2,1X,I2,1X,I6,F6.0,I6,F6.0)
```

TABLE 55. AQDATA PARAMETERS FOR ICONC

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	IFILE		Character*10	File name
	2	NOTE		Character*60	File identifier
2	3	NSEG		Integer*4	Number of segments
	4	NSPECS		Integer*4	Number of species
	5	IDATE		Integer*4	Beginning year/Julian date (*yyddd*--e.g. 80203)
	6	BEGTIM		Real*4	Beginning time (*hhmm*--e.g. 0100, military time)
	7	JDATE		Integer*4	Ending year/Julian date
	8	ENDTIM		Real*4	Ending time
3	9	ORGX	m	Real*4	*x*-coordinate (UTM units)
	10	ORGY	m	Real*4	*y*-coordinate (UTM units)
	11	IZONE		Integer*4	UTM zone
	12	UTMX	m	Real*4	*x*-location
	13	UTMY	m	Real*4	*y*-location
	14	DELTAX	m	Real*4	Cell size in *x*-direction
	15	DELTAY	m	Real*4	Cell size in *y*-direction
	16	NX		Integer*4	Number of cells in *x*-direction
	17	NY		Integer*4	Number of cells in *y*-direction
	18	NZ		Integer*4	Number of cells in *z*-direction
	19	NZLOWR		Integer*4	Number of cells between surface layer and diffusion break
	20	NZUPPER		Integer*4	Number of cells between diffusion break and top of region
	21	HTSUR	m	Real*4	Height of surface layer
	22	HTLOW	m	Real*4	Minimum height of cell between surface layer and diffusion break
	23	HTUPP	m	Real*4	Minimum height of cell between diffusion break and top of region
4	24	IX		Integer*4	*x*-location of segment origin with respect to origin of modeling region
	25	IY		Integer*4	*y*-location of segment origin with respect to origin of modeling region

(continued)

TABLE 55. AQDATA PARAMETERS FOR ICONC (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	26	NXCLL		Integer*4	Number of cells in x-direction
	27	NYCLL		Integer*4	Number of cells in y-direction
5	28	MSPEC(I,J)		Character*10	Species names I : Index of name J : Index of species
6+	29	IBGDAT		Integer*4	Beginning year/Julian date for hourly data
	30	BEGTIM		Real*4	Beginning time
	31	IENDAT		Integer*4	Ending year/Julian date
	32	ENDTIM		Real*4	Ending time
7+	33	ISEG		Integer*4	Segment number
	34	MSPEC(I,J)		Character*10	Species names
8+	35	EMOB(I,J,L)	ppm	Real*4	Concentrations for initial condition I : Index of columns J : Index of rows L : Index of species

TCDATA--This data file contains user-supplied gridded concentration data for top boundary condition. The user should set up his own data to follow this data structure. ICONC generates a compatible file for input to the UAM application. The formats for the user-supplied data file are shown below, dots indicate additional program statements. The input parameters are listed in Table 56. The formats of output parameters are identical with formats of input, but it is a binary unformatted file.

```
      READ (18,2100) IFILE,NOTE,NSEG,NSPECS,IDATE,BEGTIM,JDATE,ENDTIM
       ...
      READ (18,2001) ORGX, ORGY, IZONE, UTMX, UTMY, DELTAX, DELTAY,
     $  NX, NY, NZ, NZLOWR, NZUPPR, HTSUR, HTLOW, HTUPP
       ...
      READ (18,1002) IX, IY, NXCLL, NYCLL
       ...
      READ (18,1003) ((MSPEC(M,L),M=1,10),L=1,NSPECS)
       ...
      READ (18,1005,END=999) IBGDAT,BEGTIM,IENDAT,ENDTIM
       ...
      READ (18,1006) ISEG, (MSPEC(M,L),M=1,10)
       ...
      READ (18,1007) ((EMOB(I,J),I=1,NX),J=1,NY)
       ...
 2100 FORMAT(10A1,60A1,/,I2,1X,I2,1X,I6,F6.0,I6,F6.0)
 2001 FORMAT(F10.1,1X,F10.1,1X,I3,F10.1,1X,F10.1,1X,2F6.0,5I4,3F7.0)
 1002 FORMAT(4I5)
 1003 FORMAT(10A1)
 1005 FORMAT(5X,2(I10,F10.2))
 1006 FORMAT(I4,10A1)
 1007 FORMAT(9E14.7)
```

TABLE 56. TCDATA PARAMETERS FOR ICONC

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	IFILE		Character*10	File name
	2	NOTE		Character*60	File identifier
2	3	NSEG		Integer*4	Number of segments
	4	NSPECS		Integer*4	Number of species
	5	IDATE		Integer*4	Beginning year/Julian date
	6	BEGTIM		Real*4	Beginning time
	7	JDATE		Integer*4	Ending year/Julian date
	8	ENDTIM		Real*4	Ending time
3	9	ORGX	m	Real*4	*x*-coordinate (UTM units)
	10	ORGY	m	Real*4	*y*-coordinate (UTM units)
	11	IZONE		Integer*4	UTM zone
	12	UTMX	m	Real*4	*x*-location
	13	UTMY	m	Real*4	*y*-location
	14	DELTAX	m	Real*4	Cell size in *x*-direction
	15	DELTAY	m	Real*4	Cell size in *y*-direction
	16	NX		Integer*4	Number of cells in *x*-direction
	17	NY		Integer*4	Number of cells in *y*-direction
	18	NZ		Integer*4	Number of cells in *z*-direction
	19	NZLOWR		Integer*4	Number of cells between surface layer and diffusion break
	20	NZUPPR		Integer*4	Number of cells between diffusion break and top of region
	21	HTSUR	m	Real*4	Height of surface layer
	22	HTLOW	m	Real*4	Minimum height of cell between surface layer and diffusion break
	23	HTUPP	m	Real*4	Minimum height of cell between diffusion break and top of region
4	24	IX		Integer*4	*x*-location of segment origin with respect to origin of modeling region
	25	IY		Integer*4	*y*-location of segment origin with respect to origin of modeling region

(continued)

TABLE 56. TCDATA PARAMETERS FOR ICONC (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	26	NXCLL		Integer*4	Number of cells in x-direction
	27	NYCLL		Integer*4	Number of cells in y-direction
5	28	MSPEC(I,J)		Character*10	Species names I: Index of name J: Index of species
6+	29	IBGDAT		Integer*4	Beginning year/Julian date for hourly data
	30	BEGTIM		Real*4	Beginning time
	31	IENDAT		Integer*4	Ending year/Julian date
	32	ENDTIM		Real*4	Ending time
7+	33	ISEG		Integer*4	Segment number
	34	MSPEC		Integer*4	Species names
8+	35	EMOB(I,J)	ppm	Real*4	Concentrations at top of region I: Index of columns J: Index of rows

BCDATA--This data file contains user-supplied gridded concentration data for lateral boundary condition. The user should set up his own data to follow this data structure. ICONC generates a compatible file for input to the UAM application. The formats for the user-supplied data file are shown below, dots indicate additional program statements. The input parameters are listed in Table 57. The formats of output parameters are identical with formats of input, but it is a binary unformatted file.

```
      READ(19,2100)IFILE,NOTE,NSEG,NSPECS,IDATE,BEGTIM,JDATE,ENDTIM
      ...
      READ(19,2001) ORGX, ORGY, IZONE, UTMX, UTMY, DELTAX, DELTAY,
     &     NX, NY, NZ, NZLOWR, NZUPPR, HTSUR, HTLOW, HTUPP
      ...
      READ(19,1002) (IX(I),IY(I), NXCLL(I), NYCLL(I),I=1,NSEG)
      ...
      READ(19,1003) ((MSPEC(I,J),I=1,10),J=1,NSPECS)
      ...
      READ(19,1021) ISEGM,IEDGE,NCELLS,((ILOC(II,J),II=1,4),J=1,NCELLS)
      ...
      READ(19,1007,END=999) IBGDAT,BEGTIM,IENDAT,ENDTIM
      ...
      READ(19,1009,iostat=iostat)ISEGNM,(SPNAME(II,K),II=1,10),NEDGNO,
     &          ((BCONC(II,JJ),II=1,NZ),JJ=1,NCEL)
      ...
 1002 FORMAT(4I5)
 1003 FORMAT(10A1)
 1007 FORMAT(5X,2(I10,F10.2))
 1009 FORMAT(I10,10A1,I10/(9E14.7))
 1021 FORMAT(3I10/(9I14))
 2001 FORMAT(F10.1,1X,F10.1,1X,I3,F10.1,1X,F10.1,1X,2F6.0,5I4,3F7.0)
 2100 FORMAT(10A1,60A1,/,I2,1X,I2,1X,I6,F6.0,I6,F6.0)
```

TABLE 57. BCDATA PARAMETERS FOR ICONC

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	IFILE		Character*10	File name
	2	NOTE		Character*60	File identifier
2	3	NSEG		Integer*4	Number of segments
	4	NSPECS		Integer*4	Number of species
	5	IDATE		Integer*4	Beginning year/Julian date
	6	BEGTIM		Real*4	Beginning time
	7	JDATE		Integer*4	Ending year/Julian date
	8	ENDTIM		Real*4	Ending time
3	9	ORGX	m	Real*4	*x*-coordinate (UTM units)
	10	ORGY	m	Real*4	*y*-coordinate (UTM units)
	11	IZONE		Integer*4	UTM zone
	12	UTMX	m	Real*4	*x*-location
	13	UTMY	m	Real*4	*y*-location
	14	DELTAX	m	Real*4	Cell size in *x*-direction
	15	DELTAY	m	Real*4	Cell size in *y*-direction
	16	NX		Integer*4	Number of cells in *x*-direction
	17	NY		Integer*4	Number of cells in *y*-direction
	18	NZ		Integer*4	Number of cells in *z*-direction
	19	NZLOWR		Integer*4	Number of cells between surface layer and diffusion break
	20	NZUPPR		Integer*4	Number of cells between diffusion break and top of region
	21	HTSUR	m	Real*4	Height of surface layer
	22	HTLOW	m	Real*4	Minimum height of cell between surface layer and diffusion break
	23	HTUPP	m	Real*4	Minimum height of cell between diffusion break and top of region
4	24	IX		Integer*4	*x*-location of segment origin with respect to origin of modeling region
	25	IY		Integer*4	*y*-location of segment origin with respect to origin of modeling region

(continued)

TABLE 57. BCDATA PARAMETERS FOR ICONC (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	26	NXCLL		Integer*4	Number of cells in *x*-direction
	27	NYCLL		Integer*4	Number of cells in *y*-direction
5	28	MSPEC(I,J)		Character*10	Species names *I* : Index of name *J* : Index of species
6+	29	ISEGM		Integer*4	Segment number
	30	IEDGE		Integer*4	Edge number
	31	NCELLS		Integer*4	Number of cells on edge
	32	ILOC(I,J)		Integer*4	Index of each grid *I* : Index indicator *J* : Grid indicator
7+	33	IBGDAT		Integer*4	Beginning year/Julian date for hourly data
	34	BEGTIM		Real*4	Beginning time
	35	IENDAT		Integer*4	Ending year/Julian date
	36	ENDTIM		Real*4	Ending time
8+	37	ISEGNM		Integer*4	Segment number
	38	SPNAME(I,J)		Character*10	Species names
	39	NEDGNO		Integer*4	Edge number
	40	BCONC(I,J)	ppm	Real*4	Concentrations for lateral boundary *I* : Index of columns *J* : Index of rows

5.7.2.2 **Control Cards--**

Thirty-six variables included in sixteen control cards are used, in the format shown below. Dots indicate additional program statements. The control card variables are listed in Table 58.

```
      READ(5,29) IUSER
      .....
      READ(5,23) TP
      READ(5,23) TP2
      READ(5,23) TP3
      READ(5,20) FID
      READ(5,20) FID2
      READ(5,20) FID3
      READ(5,22) ISYD,ISHM,IEYD,IEHM
      .....
      READ(5,24) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ
      READ(5,25) IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
      .....
      READ(5,28) INX,INY
      .....
      READ(5,26) RDUS,RDINC,RDMAX
      .....
      READ(5,33) ISUB
      .....
   20 FORMAT(A60)
   22 FORMAT(4I10)
   23 FORMAT(A10)
   24 FORMAT(2F10.0,I10,/,2F10.0,/,2F10.0)
   25 FORMAT(3I10,/,2I10,F10.1,2F10.0)
   26 FORMAT(3F10.1)
   28 FORMAT(2I10)
   29 FORMAT(I10)
   33 FORMAT(I10)
```

TABLE 58. CONTROL CARD VARIABLES FOR ICONC

Card number	Variable name	Units	Data type	Description
1	IUSER		Integer*4	Index of user-suppplied data-- 0 : ROM data >0 : user-supplied data
2	TP		Character*10	File name of initial conditions (i.e., AIRQUALITY)
3	TP2		Character*10	File name of top boundary conditions (i.e., TOPCONC)
4	TP3		Character*10	File name of lateral boundary conditions (i.e., BOUNDARY)
5	FID		Character*60	File identifier of initial conditions

(continued)

TABLE 58. CONTROL CARD VARIABLES FOR ICONC (CONCLUDED)

Card number	Variable name	Units	Data type	Description
6	FID2		Character*60	File identifier of top boundary conditions
7	FID3		Character*60	File identifier of lateral boundary conditions
8	ISYD		Integer*4	Beginning year/Julian date
	ISHM		Integer*4	Beginning time
	IEYD		Integer*4	Ending year/Julian date
	IEHM		Integer*4	Ending time
9	XLOCR	m	Real*4	Reference origin (x-coordinate)
	YLOCR	m	Real*4	Reference origin (y-coordinate)
	IZONE1		Integer*4	UTM zone
10	XLOC	m	Real*4	Origin of grid in x-direction
	YLOC	m	Real*4	Origin of grid in y-direction
11	XSZ	m	Real*4	Cell size in x-direction
	YSZ	m	Real*4	Cell size in y-direction
12	IX		Integer*4	Number of cells in x-direction (UAM)
	IY		Integer*4	Number of cells in y-direction (UAM)
	IZ		Integer*4	Number of cells in z-direction (UAM)
13	IZL		Integer*4	Number of cells in lower layer
	IZU		Integer*4	Number of cells in upper layer
	SFCH	m	Real*4	Height of surface layer
	ALH	m	Real*4	Minimum height of cell in lower layer
	AUH	m	Real*4	Minimum height of cell in upper layer
14	INX		Integer*4	Number of cells in x-direction (ROM)
	INY		Integer*4	Number of cells in y-direction (ROM)
15	RDUS	km	Real*4	Initial radius for influence of spatial interpolation
	RDINC	km	Real*4	Radius increment for influence of spatial interpolation
	RDMAX	km	Real*4	Maximum radius for influence of spatial interpolation
16	ISUB		Integer*4	Number of subregions

Example:

```
          0
AIRQUALITY
TOPCONC
BOUNDARY
AIRQUALITY FILE CREATED AT 03/08/90 (UPPER VERTICAL VARIATION)
TOP CONCENTRATION FILE CREATED AT 03/08/90 (UPPER VERTICAL VARIATION)
BOUNDARY FILE CREATED AT 03/08/90 (UPPER VERTICVAL VARIATION)
     80203          0      80204      2400
        0.         0.         18
   520000.   4460000.
     8000.      8000.
        31         25          5
         2          3        0.0      50.0      100.0
        16         14
      20.0       10.0       50.0
         1
```

5.7.2.3 Output Files--

'ICONC' generates three output files.

AQBIN--This file contains the initial conditions of chemical concentrations and general information for the UAM model application. The formats are shown below; dots indicate additional program statements. The output parameters are listed in Table 59.

```
 WRITE(20) TP,FID,ISUB,NSPC,ISYD,SHM,ISYD,SHM+1.
 WRITE(20) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ,
&          IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
 WRITE(20) IX1,IY1,IX,IY
 WRITE(20) ((SPC(J,I),J=1,10),I=1,NSPC)
     .....
 WRITE(20) IYD1,HM1,IYD1,HM2
     .....
 WRITE(20) ISUB,(SPC(J,K),J=1,10),((C3(I,J,M,K),I=1,IX),J=1,IY)
```

TABLE 59. AQBIN PARAMETERS

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	TP		Character*10	File name (i.e., AIRQUALITY)
	2	FID		Character*60	File identifier
	3	ISUB		Integer*4	Number of segments (i.e., 1)
	4	NSPC		Integer*4	Number of chemical species
	5	ISYD		Integer*4	Beginning year/Julian date
	6	SHM		Real*4	Beginning time
2	7	XLOCR	m	Real*4	*x*-coordinate (UTM units)
	8	YLOCR	m	Real*4	*y*-coordinate (UTM units)
	9	IZONE1		Integer*4	UTM zone
	10	XLOC	m	Real*4	*x*-location
	11	YLOC	m	Real*4	*y*-location
	12	XSZ	m	Real*4	Cell size in *x*-direction
	13	YSZ	m	Real*4	Cell size in *y*-direction
	14	IX		Integer*4	Number of cells in *x*-direction
	15	IY		Integer*4	Number of cells in *y*-direction
	16	IZ		Integer*4	Number of cells in *z*-direction
	17	IZL		Integer*4	Number of cells between surface layer and diffusion break
	18	IZU		Integer*4	Number of cells between diffusion break and top of region
	19	SFCH	m	Real*4	Height of surface layer
	20	ALH	m	Real*4	Minimum height of cell between surface layer and diffusion break
	21	AUH	m	Real*4	Minimum height of cell between diffusion break and top of region
3	22	IX1		Integer*4	*x*-location of segment origin with respect to origin of modeling region
	23	IY1		Integer*4	*y*-location of segment origin with respect to origin of modeling region
	24	IX		Integer*4	Number of cells in *x*-direction
	25	IY		Integer*4	Number of cells in *y*-direction

(continued)

TABLE 59. AQBIN PARAMETERS (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
4	26	SPC(J,I)		Character*10	Species names-- *I* : Index of name *J* : Index of species
5	27	IYD1		Integer*4	Beginning year/Julian date for hourly data
	28	HM1		Real*4	Beginning time
	29	HM2		Real*4	Ending time
6+	30	ISUB		Integer*4	Segment number
	31	SPC(J,K)		Character*10	Species names
	32	C3(I,J,M,K)	ppm	Real*4	Concentrations for initial conditions-- *I* : Index of columns *J* : Index of rows *M* : Index of levels *K* : Index of species

TCBIN--This file contains the top boundary conditions of concentrations and general information for the UAM model application. The formats are shown below; dots indicate additional program statements. The output parameters are listed in Table 60.

```
 WRITE(21) TP2,FID2,ISUB,NSPC,ISYD,SHM,IEYD,EHM
 WRITE(21) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ,
$          IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
 WRITE(21) IX1,IY1,IX,IY
 WRITE(21) ((SPC(J,I),J=1,10),I=1,NSPC)
     .....
 WRITE(21) IYD1,HM1,IYD2,HM2
     .....
 WRITE(21) ISUB,(SPC(J,K),J=1,10),((C3(I,J,IZ+1,K),I=1,IX),J=1,IY)
```

TABLE 60. TCBIN PARAMETERS

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	TP2		Character*10	File name
	2	FID2		Character*60	File identifier
	3	ISUB		Integer*4	Number of segments
	4	NSPC		Integer*4	Number of species
	5	ISYD		Integer*4	Beginning year/Julian date
	6	SHM		Real*4	Beginning time
	7	IEYD		Integer*4	Ending year/Julian date
	8	EHM		Real*4	Ending time
2	9	XLOCR	m	Real*4	*x*-coordinate (UTM units)
	10	YLOCR	m	Real*4	*y*-coordinate (UTM units)
	11	IZONE1		Integer*4	UTM zone
	12	XLOC	m	Real*4	*x*-location
	13	YLOC	m	Real*4	*y*-location
	14	XSZ	m	Real*4	Cell size in *x*-direction
	15	YSZ	m	Real*4	Cell size in *y*-direction
	16	IX		Integer*4	Number of cells in *x*-direction
	17	IY		Integer*4	Number of cells in *y*-direction
	18	IZ		Integer*4	Number of cells in *z*-direction
	19	IZL		Integer*4	Number of cells between surface layer and diffusion break
	20	IZU		Integer*4	Number of cells between diffusion break and top of region
	21	SFCH	m	Real*4	Height of surface layer
	22	ALH	m	Real*4	Minimum height of cell between surface layer and diffusion break
	23	AUH	m	Real*4	Minimum height of cell between diffusion break and top of region
3	24	IX1		Integer*4	*x*-location of segment origin with respect to origin of modeling region
	25	IY1		Integer*4	*y*-location of segment origin with respect to origin of modeling region
	26	IX		Integer*4	Number of cells in *x*-direction
	27	IY		Integer*4	Number of cells in *y*-direction
4	28	SPC(J,I)		Character*10	Species names-- *I* : Index of name *J* : Index of species
5+	29	IYD1		Integer*4	Beginning year/Julian date for hourly data
	30	HM1		Real*4	Beginning time

(continued)

TABLE 60. TCBIN PARAMETERS (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	31	IYD2		Integer*4	Ending year/Julian date
	32	HM2		Real*4	Ending time
6+	33	ISUB	ppm	Real*4	Concentrations for initial conditions--
	34	SPC(J,K)			*I* : Index of columns
	35	C3(I,J,M,K)			*J* : Index of rows
					M : Index of levels
					K : Index of species

BCBIN--This file contains the lateral boundary conditions of concentrations and general information for the UAM model application. The formats are shown below; dots indicate additional program statements. The output parameters are listed in Table 61.

```
WRITE(22) TP3,FID3,ISUB,NSPC,ISYD,SHM,IEYD,EHM
WRITE(22) XLOCR,YLOCR,IZONE1,XLOC,YLOC,XSZ,YSZ,
&         IX,IY,IZ,IZL,IZU,SFCH,ALH,AUH
WRITE(22) IX1,IY1,IX,IY
WRITE(22) ((SPC(J,I),J=1,10),I=1,NSPC)
   .....
WRITE(22) ISUB,M,ICELL(M),((ILOC(I,J),I=1,4),J=1,ICELL(M))
   .....
WRITE(22) IYD1,HM1,IYD1,HM2
   .....
WRITE(22) ISUB,(SPC(J,K),J=1,10),M1,((BDC(I,J),I=1,IZ),J=1,IY)
   .....
WRITE(22) ISUB,(SPC(J,K),J=1,10),M2,((BDC(I,J),I=1,IZ),J=1,IY)
   .....
WRITE(22) ISUB,(SPC(J,K),J=1,10),M3,((BDC(I,J),I=1,IZ),J=1,IY)
   .....
WRITE(22) ISUB,(SPC(J,K),J=1,10),M4,((BDC(I,J),I=1,IZ),J=1,IY)
```

TABLE 61. BCBIN PARAMETERS

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	TP3		Character*10	File name
	2	FID3		Character*60	File identifier
	3	ISUB		Integer*4	Number of segments
	4	NSPC		Integer*4	Number of species
	5	ISYD		Integer*4	Beginning year/Julian date
	6	SHM		Real*4	Beginning time
	7	IEYD		Integer*4	Ending year/Julian date
	8	EHM		Real*4	Ending time
2	9	XLOCR	m	Real*4	*x*-coordinate (UTM units)
	10	YLOCR	m	Real*4	*y*-coordinate (UTM units)
	11	IZONE1		Integer*4	UTM zone
	12	XLOC	m	Real*4	*x*-location
	13	YLOC	m	Real*4	*y*-location
	14	XSZ	m	Real*4	Cell size in *x*-direction
	15	YSZ	m	Real*4	Cell size in *y*-direction
	16	IX		Integer*4	Number of cells in *x*-direction
	17	IY		Integer*4	Number of cells in *y*-direction
	18	IZ		Integer*4	Number of cells in *z*-direction
	19	IZL		Integer*4	Number of cells between diffusion break and surface layer
	20	IZU		Integer*4	Number of cells between diffusion break and top of region
	21	SFCH	m	Real*4	Height of surface layer
	22	ALH	m	Real*4	Minimum height of cell between surface layer and diffusion break
	23	AUH	m	Real*4	Minimum height of cell between diffusion break and top of region
3	24	IX1		Integer*4	*x*-location of segment origin with respect to origin of modeling region
	25	IY1		Integer*4	*y*-location of segment origin with respect to origin of modeling region
	26	IX		Integer*4	Number of cells in *x*-direction
	27	IY		Integer*4	Number of cells in *y*-direction
4	28	SPC(J,K)		Character*10	Species names-- *J* : Index of name *K* : Index of species
5+	29	ISUB		Integer*4	Segment number
	30	M		Integer*4	Edge number

(continued)

TABLE 61. BCBIN PARAMETERS (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	31	ICELL(M)		Integer*4	Number of cells on edge
	32	ILOC(I,J)		Integer*4	Index of location-- I : Index of indicator J : Index of grids
6+	33	IYD1		Integer*4	Beginning year/Julian date for hourly data
	34	HM1		Real*4	Beginning time
	35	IYD2		Integer*4	Ending year/Julian date
	36	HM2		Real*4	Ending time
7+	37	ISUB		Integer*4	Segment number
	38	SPC(J,K)		Character*10	Species name
	39	M1		Integer*4	Index of boundary-- 1 : West 2 : East 3 : South 4 : North
	40	BDC(I,J)		Real*4	Concentrations for lateral boundary condition-- *I* : Index of columns *J* : Index of rows
8+	41	ISUB		Integer*4	Segment number
	42	SPC(J,K)		Character*10	Species name
	43	M2		Integer*4	Edge number
	44	BDC(I,J)		Real*4	Concentration for lateral boundary
9+	45	ISUB		Integer*4	Segment number
	46	SPC(J,K)		Character*10	Species name
	47	M3		Integer*4	Edge number
	48	BDC(I,J)		Real*4	Concentration for lateral boundary
10+	49	ISUB		Integer*4	Segment number
	50	SPC(J,K)		Character*10	Species name
	51	M4		Integer*4	Edge number
	52	BDC(I,J)		Real*4	Concentration for lateral boundary

5.7.3 Resource Summary for a UAM Application

5.7.3.1 Memory Requirements--

FORTRAN source file:	1	file	61,440	bytes
Object file:	1	file	37,888	bytes
Executable file:	1	file	31,232	bytes
	3	files	130,560	bytes

5.7.3.2 Execution Time Requirements (Representative Values for a 48-h Scenario)--

	IBM 3090
Charged CPU time (hh:mm:ss):	00:01:31
Virtual address space:	10136 K

5.7.3.3 Space Requirements: Log and Print Files--

ICONC	19,456 bytes
Print Files:	None

5.7.3.4 Space Requirements: Input and Output Files--

Table 62 shows the input file and output file space requirements.

TABLE 62. ICONC I/O FILE SPACE REQUIREMENTS

File group	File name	File type	Storage (in bytes)	Scenario data span
Input	DBDATA	Formatted	2,048	72 hours
	MF165	Formatted	197,632	72 hours
	PF119	Formatted	3,584	48 hours
	ROM21	Formatted	7,067,648	48 hours
			7,270,912	
Output	AQBIN	Unformatted	269,312	48 hours
	BCBIN	Unformatted	2,001,920	48 hours
	TCBIN	Unformatted	2,574,336	48 hours
			4,845,568	

5.7.3.5 Space Requirements: Tape Files--

None

5.7.4 Run Stream Command File for an Interface Application

```
//* JOB CARD
//*
//*
/*ROUTE PRINT HOLD
//STEP1 EXEC PGM=ICONC
//STEPLIB  DD DSN=MMAS.UAM.INTRFACE.LOAD
//* THESE ARE THE INPUT FILES
//FT01F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.PF119,DISP=SHR
//FT02F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.MF165,DISP=SHR
//FT03F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.DBDATA,DISP=SHR
//FT08F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.ROM21,DISP=SHR
//* THESE ARE THE OUTPUT FILES
//FT20F001 DD DSN=<UIDACCT>.UAM.INTRFACE.OUTPUT.AQBIN,
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(5,5)),UNIT=SYSDA,
//             DCB=(RECFM=VB,LRECL=5000,BLKSIZE=5004)
//FT21F001 DD DSN=<UIDACCT>.UAM.INTRFACE.OUTPUT.TCBIN,
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(5,5)),UNIT=SYSDA,
//             DCB=(RECFM=VB,LRECL=5000,BLKSIZE=5004)
//FT22F001 DD DSN=<UIDACCT>.UAM.INTRFACE.OUTPUT.BCBIN,
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(5,5)),UNIT=SYSDA,
//             DCB=(RECFM=VB,LRECL=5000,BLKSIZE=5004)
*
//*  THIS IS THE CONTROL CARD
//FT05F001 DD *
       0
AIRQUALITY
TOPCONC
BOUNDARY
AIRQUALITY FILE CREATED AT 02/07/90 (UPPER VERTICAL VARIATION)
TOP CONCENTRATION FILE CREATED AT 02/07/90 (UPPER VERTICAL VARIATION)
BOUNDARY FILE CREATED AT 02/07/90 (UPPER VERTICVAL VARIATION)
     80203         0     80204       2400
        0.        0.        18
   520000.  4460000.
     8000.     8000.
        31        25         5
         2         3       0.0       50.0      100.0
        16        14
      20.0      10.0      50.0
         1
/*
//* THIS IS END OF DATA
//
```

5.7.5 Main Program, Subroutines, Functions, and Block Data Required

5.7.5.1 Main Program--

ICONC

5.7.5.2 Subroutines--

USERAQ

USERBC

USERTC

TSFM

STGNV

UTM2

5.7.5.3 Functions--

None.

5.7.5.4 Block Data Files--

None.

5.7.6 I/O and Utility Library Subroutines and Functions Required

None.

5.7.7 INCLUDE Files

None.

5.8 BIOGENIC EMISSIONS INTERFACE (IBIOG)

5.8.1 Processor Function

This preprocessor prepares a combined biogenic-anthropogenic emissions data file for use in the UAM. IBIOG reads in ROM biogenics emissions from PF144 for six species: olefin, paraffin, isoprene, aldyhyde, NO, and NO_2. IBIOG computes UTM coordinates for ROM grid points, applies an area-weighting method to derive biogenic emissions values for the UAM grid cells, and merges the UAM gridded biogenics with the area source emissions file. The combined file is an unformatted output file for use in the model. An optional ASCII version of just the biogenic emissions data can also be written. Flow of information through the IBIOG interface processor is shown in Figure 17.

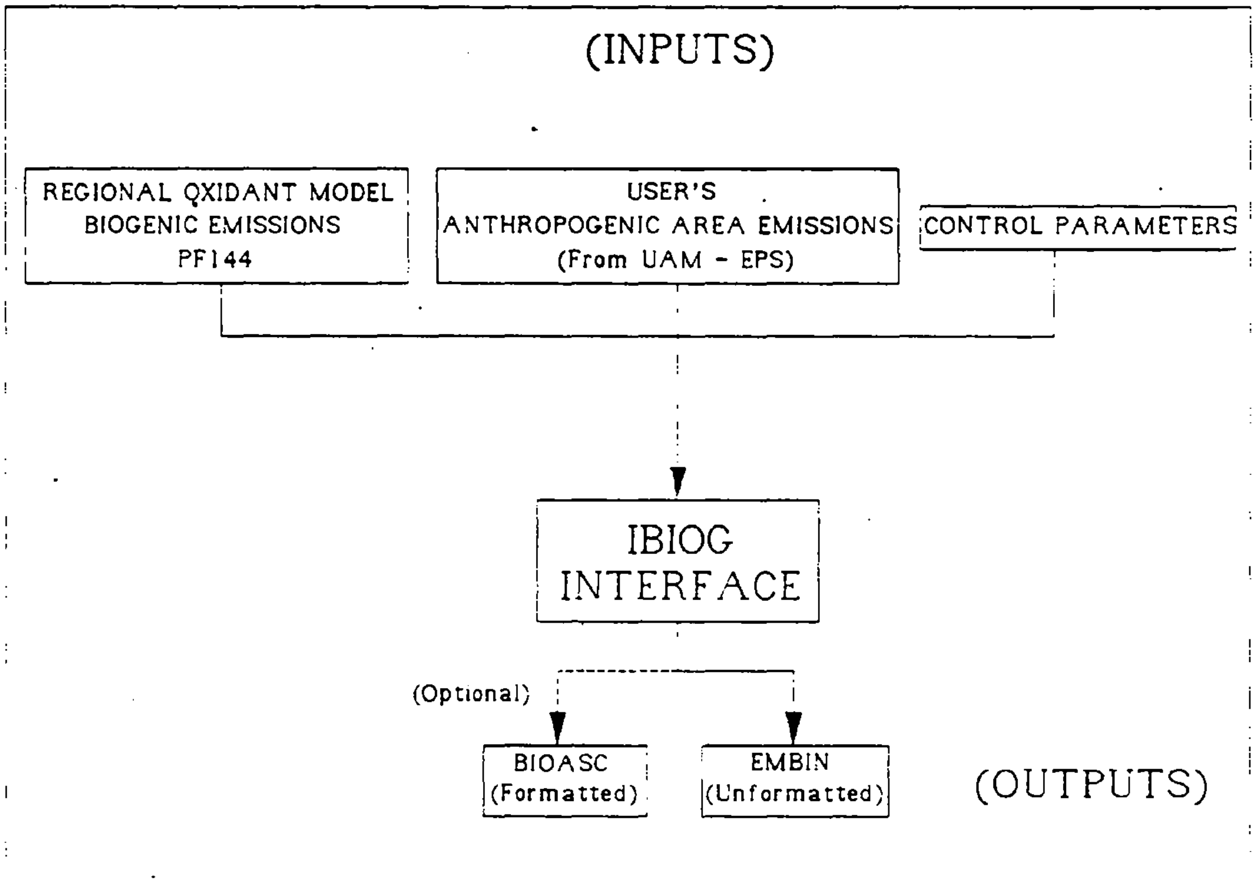
5.8.2 Input/Output Components

5.8.2.1 Input Files--

'IBIOG' requires one retrieved ROM MF/PF file and one user-supplied data file.

PF144--PF144 is the windowed ROM biogenics file. The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 63.

```
      READ(19,1103, IOSTAT = IOST) PFCOL,PFROW,NPARM
1103  FORMAT(52X,I2,8X,I2,14X,I2)
      ....
      READ(19,1104, IOSTAT = IOST) DUMMY
1104  FORMAT(A4)
      ....
      READ(19,1101,IOSTAT=IOST)LDATE, LTIME, (PNAME(I),I=1,NPARM)
1101  FORMAT(I5,1X,I2,1X,7(1X,A10))
      ....
      READ(19,1102,IOSTAT=IOST)
     &      (A(I,H,L),I=1,PFCOL)
1102  FORMAT(30(E12.6))
```



Note: The area anthropogenic emissions (unformatted) file is generated by the user from the UAM Emissions Processor System (EPS). The EMBIN (unformatted) file contains both biogenic and anthropogenic area emissions for use in the UAM. An optional formatted biogenics file (BIOASC) may also be generated if desired.

Figure 17. Flow diagram of the IBIOG interface program with input and output files.

TABLE 63. PF144 PARAMETERS FOR IBIOG

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	PFCOL		Integer*2	Number of columns
	2	PFROW		Integer*2	Number of rows
	3	NPARM		Integer*2	Number of parameters
2	4	DUMMY		Character*4	Dummy variable
3	5	LDATE		Integer*5	Date
	6	LTIME	h	Integer*2	Time
	7	PNAME(I)		Character*10	Parameter name-- I : Index of parameters
4+	8	A(I,J,1)	moles/h	Real*4	Olefin biogenic emission rates-- I : Index of columns J : Index of rows
	9	A(I,J,2)	moles/h	Real*4	Paraffin biogenic emission rates
	10	A(I,J,3)	moles/h	Real*4	Isoprene biogenic emission rates
	11	A(I,J,4)	moles/h	Real*4	Aldehydes biogenic emission rates
	12	A(I,J,5)	moles/h	Real*4	Nitric oxide biogenic emission rates
	13	A(I,J,6)	moles/h	Real*4	Nitrogen dioxide biogenic emission rates

EMISSION--EMISSION is the binary area source emissions file generated by exercising the UAM Emissions Processor System (Causley et al. 1990). The formats are shown below; dots indicate additional program statements. The input parameters are listed in Table 64.

```
 READ (18,IOSTAT = IOST) INFILE,NOTE,NSEG,NSPECS,IDATE,
&                        BEGTIM,JDATE,ENDTIM
       ....
 READ  (18) ORGX,ORGY,IZONE,UTMX,UTMY,DELTAX,DELTAY,NXA,NYA,
&           NZ,NZLOWR,NZUPPR,HTSUR,HTLOW,HTUPP
 READ  (18) IX,IY,NXCLL,NYCLL
 READ  (18) ((MSPEC(I,J),I=1,10),J=1,NSPECS)
       ....
 READ  (18) IBGDAT, BEGTIM, IENDAT, ENDTIM
       ....
 READ (18) ISEG, (MSPEC(M,L),M = 1,10), ((EMOB(I,J,L),
&            I = 1, MX),J = 1, MY)
```

TABLE 64. ANTHROPOGENIC EMISSION PARAMETERS FOR IBIOG

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	INFILE		Integer*4	File name
	2	NOTE		Integer*4	File identifier
	3	NSEG		Integer*4	Number of segments
	4	NSPECS		Integer*4	Number of species
	5	IDATE		Integer*4	Beginning date (*yyddd*--e.g. 80203)
	6	BEGTIM		Real*4	Beginning time (*hhmm*--e.g. 0100, military time)
	7	JDATE		Integer*4	Ending date
	8	ENDTIM		Real*4	Ending time
2	9	ORGX	m	Real*4	Reference origin (*x*-coordinate)
	10	ORGY	m	Real*4	Reference origin (*y*-coordinate)
	11	IZONE		Integer*4	UTM zone
	12	UTMX		Real*4	Origin of grid in *x*-direction
	13	UTMY		Real*4	Origin of grid in *y*-direction
	14	DELTAX	m	Real*4	Cell size in *x*-direction
	15	DELTAY	m	Real*4	Cell size in *y*-direction
	16	NXA		Integer*4	Number of cells in *x*-direction
	17	NYA		Integer*4	Number of cells in *y*-direction
	18	NZ		Integer*4	Number of cells in *z*-direction
	19	NZLOWR		Integer*4	Number of cells in lower layer
	20	NZUPPR		Integer*4	Number of cells in upper layer
	21	HTSUR	m	Real*4	Height of surface layer
	22	HTLOW	m	Real*4	Minimum height of cell in lower layer
	23	HTUPP	m	Real*4	Minimum height of cell in upper layer
3	24	IX		Integer*4	Dummy variable
	25	IY		Integer*4	Dummy variable
	26	NXCLL		Integer*4	Number of cells in *x*-direction
	27	NYCLL		Integer*4	Number of cells in *y*-direction
4	28	MSPEC(I,J)		Integer*4	Species in the header-- I : Index of species name J : Index of species
5	29	IBGDAT		Integer*4	Beginning date
	30	BEGTIM		Real*4	Beginning hour

(continued)

TABLE 64. ANTHROPOGENIC EMISSION PARAMETERS FOR IBIOG (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	31	IENDAT		Integer*4	Ending date
	32	ENDTIM		Real*4	Ending hour
6	33	ISEG		Integer*4	Segment number
	34	MSPEC(M,L)		Integer*4	Species in hour-- M = 1,10 L = 1,NSPECS
	35	EMOB(I,J,L)	moles/h	Real*4	Emission rate-- I : Index of columns J : Index of rows L : Index of species

5.8.2.2 Control Cards--

Control card information is changed each time in the command file. The formats are shown below; dots indicate additional program statements. The control card variables are listed in Table 65.

```
      READ(5,10) BDATE,BHOUR,EDATE,EHOUR
10    FORMAT(1X,I5,1X,I3,1X,I5,1X,I3)
      READ(5,15) NX,NY,X1,Y1,MX,MY,DX,DY
15    FORMAT(1X,2I5,2F10.0,2I7,2F10.0)
      READ(5,20)IPT,IDDLAT,IMMLAT,SECLAT,IDDLON,
     &          XIMMLON,SECLON
20    FORMAT(A4,1X,I2,1X,I2,1X,F6.3,1X,I3,1X,I2,1X,F6.3)
      READ(5,25)ASCWRITE
25    FORMAT(1X,I2)
```

TABLE 65. CONTROL CARD VARIABLES FOR IBIOG

Card number	Variable name	Units	Data type	Description
1	BDATE		Integer*5	Beginning date
	BHOUR		Integer*3	Beginning hour
	EDATE		Integer*5	Ending date
	EHOUR		Integer*3	Ending hour
2	NX		Integer*4	Number of cells in x-direction (ROM)
	NY		Integer*4	Number of cells in y-direction (ROM)
	X1	m	Real*4	Origin of grid in x-direction
	Y1	m	Real*4	Origin of grid in y-direction
	MX		Integer*4	Number of cells in x-direction (UAM)
	MY		Integer*4	Number of cells in y-direction (UAM)
	DX	m	Real*4	UAM cell size in x-direction
	DY	m	Real*4	UAM cell size in y-direction
3	IPT		Character*4	Station ID
	IDDLAT		Integer*4	Degrees of latitude
	IMMLAT		Integer*4	Minutes of latitude
	SECLAT		Real*4	Seconds of latitude
	IDDLON		Integer*4	Degrees of longitude
	XIMMLON		Integer*4	Minutes of longitude
	SECLON		Real*4	Seconds of longitude
4	ASCWRITE		Integer*2	Index of output

Example:

```
 80203    0 80204  24
    16   14  520000.  4460000.     31     25     8000.     8000.
PLL1 40 00 00.000 075 15 00.00
  1
```

5.8.2.3 Output Files--

'IBIOG' generates two output files--one binary file and one optional ASCII file.

EMBIN--EMBIN contains the merged biogenic and area hourly gridded emissions, including: olefin, paraffin, isoprene, aldehydes, NO, and NO_2. The formats are shown below; dots indicate additional program statements. The output parameters are listed in Table 66.

```
 WRITE (29) INFILE, NOTE, NSEG, NSPECS+1, BDATE, RBHOUR, EDATE,
&          REHOUR
 WRITE (29) ORGX, ORGY, IZONE, UTMX, UTMY, DELTAX, DELTAY,
&          NXA, NYA, NZ, NZLOWR, NZUPPR, HTSUR, HTLOW, HTUPP
 WRITE (29) IX, IY, NXCLL, NYCLL
 WRITE (29) ((MSPEC(M,L),M=1,10),L=1,NSPECS+1)
       ....
 WRITE (29) IBGDAT,BEGTIM,IENDAT,ENDTIM
       ....
 WRITE (29) ISEG,(MSPEC(M,K),M=1,10),((AREABIO(I,J,K),
&                  I = 1, MX),J = 1, MY)
```

TABLE 66. EMBIN PARAMETERS

Card number	Parameter number	Parameter name	Units	Data type	Description
1	1	INFILE		Integer*4	File name (i.e., EMISSIONS)
	2	NOTE		Integer*4	File identifier
	3	NSEG		Integer*4	Number of segments
	4	NSPECS+1		Integer*4	Number of species
	5	BDATE		Integer*4	Beginning date (*yyddd*--e.g. 80203)
	6	RBHOUR		Real*4	Beginning time (*hhmm*--e.g. 0100, military time)
	7	EDATE		Integer*4	Ending date
	8	REHOUR		Real*4	Ending time
2	9	ORGX	m	Real*4	Reference origin (*x*-coordinate)
	10	ORGY	m	Real*4	Reference origin (*y*-coordinate)

(continued)

TABLE 66. EMBIN PARAMETERS (CONCLUDED)

Card number	Parameter number	Parameter name	Units	Data type	Description
	11	IZONE		Integer*4	UTM zone
	12	UTMX	m	Real*4	Origin of grid in *x*-direction
	13	UTMY	m	Real*4	Origin of grid in *y*-direction
	14	DELTAX	m	Real*4	Cell size in *x*-direction
	15	DELTAY	m	Real*4	Cell size in *y*-direction
	16	NXA		Integer*4	Number of cells in *x*-direction
	17	NYA		Integer*4	Number of cells in *y*-direction
	18	NZ		Integer*4	Number of cells in *z*-direction
	19	NZLOWR		Integer*4	Number of cells in lower layer
	20	NZUPPR		Integer*4	Number of cells in upper layer
	21	HTSUR	m	Real*4	Height of surface layer
	22	HTLOW	m	Real*4	Minimum height of cell in lower layer
	23	HTUPP	m	Real*4	Minimum height of cell in upper layer
3	24	IX		Integer*4	Dummy variable
	25	IY		Integer*4	Dummy variable
	26	NXCLL		Integer*4	Number of cells in *x*-direction
	27	NYCLL		Integer*4	Number of cells in *y*-direction
4	28	MSPECS(I,J)		Integer*4	Species in header
5	29	IBGDAT		Integer*4	Beginning date
	30	BEGTIM		Real*4	Beginning time
	31	IENDAT		Integer*4	Ending date
	32	ENDTIM		Real*4	Ending time
6	33	ISEG		Integer*4	Segment number
	34	MSPECS(I,J)		Integer*4	Species each hour
	35	AREABIO(I,J,K)	moles/h	Real*4	Emission rate-- I : Index of columns J : Index of rows K : Index of species

BIOASC--BIOASC contains only the biogenic emissions data. This file is optional. The formats are shown below; dots indicate additional program statements. The output parameters are listed in Table 67.

```
      WRITE (9,60) INFILE,NOTE,NSEG,BIOSPECS2,BDATE,RBHOUR,EDATE,
     &             REHOUR
      WRITE (9,70) ORGX, ORGY, IZONE, UTMX, UTMY, DELTAX, DELTAY,
     $       NXA, NYA, NZ, NZLOWR, NZUPPR, HTSUR, HTLOW, HTUPP
      WRITE (9,80) IX, IY, NXCLL, NYCLL
      WRITE (9,90) ((BIONAME2(M,L),M=1,10),L=1,BIOSPECS2)
60    FORMAT(10A1,60A1,/,I2,1X,I2,1X,I6,F6.0,I6,F6.0)
70    FORMAT(F10.1,1X,F10.1,1X,I3,F10.1,1X,F10.1,1X,2F6.0,5I4,3F7.0)
80    FORMAT(4I5)
90    FORMAT(10A1)
      ....
      WRITE (9,140) IBGDAT,BEGTIM,IENDAT,ENDTIM
140   FORMAT(5X,2(I10,F10.2))
      ....
      WRITE (9,380) ISEG, (BIONAME2(M,K),M=1,10)
380   FORMAT(I4,10A1)
      WRITE (9,390) ((BIOGEN(I,J,K),I=1,MX),J=1,MY)
390   FORMAT(9E14.7)
```

TABLE 67. BIOASC PARAMETERS

Card number	Parameter number	Parameter name[1]	Units	Data type	Description
1	1	INFILE		Integer*4	File name
	2	NOTE		Integer*4	File identifier
	3	NSEG		Integer*4	Number of segments
	4	BIOSPECS2		Integer*4	Number of species
	5	BDATE		Integer*4	Beginning date (*yyddd*-e.g. 80203)
	6	RBHOUR		Real*4	Beginning time (*hhmm*--e.g. 0100, military time)
	7	EDATE		Integer*4	Ending date
	8	REHOUR		Real*4	Ending time
2	9	ORGX	m	Real*4	Reference origin (*x*-coordinate)
	10	ORGY	m	Real*4	Reference origin (*y*-coordinate)

(continued)

TABLE 67. BIOASC PARAMETERS (CONCLUDED)

Card number	Parameter number	Parameter name[1]	Units	Data type	Description
	11	IZONE		Integer*4	UTM zone
	12	UTMX	m	Real*4	Origin of grid in *x*-direction
	13	UTMY	m	Real*4	Origin of grid in *y*-direction
	14	DELTAX	m	Real*4	Cell size in *x*-direction
	15	DELTAY	m	Real*4	Cell size in *y*-direction
	16	NXA		Integer*4	Number of cells in *x*-direction
	17	NYA		Integer*4	Number of cells in *y*-direction
	18	NZ		Integer*4	Number of cells in *z*-direction
	19	NZLOWR		Integer*4	Number of cells in lower layer
	20	NZUPPR		Integer*4	Number of cells in upper layer
	21	HTSUR	m	Real*4	Height of surface layer
	22	HTLOW	m	Real*4	Minimum height of cell in lower layer
	23	HTUPP	m	Real*4	Minimum height of cell in upper layer
3	24	IX		Integer*4	Dummy variable
	25	IY		Integer*4	Dummy variable
	26	NXCLL		Integer*4	Number of cells in *x*-direction
	27	NYCLL		Integer*4	Number of cells in *y*-direction
4	28	BIONAME2(I,J)		Integer*4	Species in header
5	29	IBGDAT		Integer*4	Beginning date
	30	BEGTIM		Real*4	Beginning time
	31	IENDAT		Integer*4	Ending date
	32	ENDTIM		Real*4	Ending time
6	33	ISEG		Integer*4	Segment number
	34	BIONAME2(I,J)		Integer*4	Species in each hour
7	35	BIOGEN(I,J)	moles/h	Real*4	Olefin emission rate
	36	BIOGEN(I,J)	moles/h	Real*4	Paraffin emission rate
	37	BIOGEN(I,J)	moles/h	Real*4	Isoprene emission rate
	38	BIOGEN(I,J)	moles/h	Real*4	Aldehyde emission rate
	39	BIOGEN(I,J)	moles/h	Real*4	Nitric oxide emission rate
	40	BIOGEN(I,J)	moles/h	Real*4	Nitrogen dioxide emission rate

1. I is the index of columns; J is the index of rows.

5.8.3 Resource Summary for a UAM Application

5.8.3.1 Memory Requirements--

FORTRAN source file:	1	file	59,392	bytes
Object file:	1	file	33,280	bytes
Executable file:	1	file	27,136	bytes
	3	files	119,808	bytes

5.8.3.2 Execution Time Requirements (Representative Values for a 48-h Scenario)--

	IBM 3090
Charged CPU time (hh:mm:ss):	00:00:33
Virtual address space:	3371 K

5.8.3.3 Space Requirements: Log and Print Files--

IBIOG	43,008 bytes
Print Files:	None

5.8.3.4 Space Requirements: Input and Output Files--

Table 68 shows the input file and output file space requirements

TABLE 68. IBIOG I/O FILE SPACE REQUIREMENTS

File name	File type	Storage (in bytes)	Scenario data span
INPUT:			
PF144	Formatted	918,016	48 hours
EMISSION	Unformatted	1,515,008	48 hours
		2,433,024	
BINARY OUTPUT:			
EMBIN	Unformatted	1,666,560	48 hours
ASCII OUTPUT:			
BIOASC	Formatted	5,832,192	48 hours

5.8.3.5 Space Requirements: Tape Files--

None

5.8.4 Run Stream Command File for an IBIOG Application

```
//*JOB CARD
//*
//*
/*ROUTE PRINT HOLD
//STEP1 EXEC PGM=IBIOG
//STEPLIB  DD DSN=MMAS.UAM.INTRFACE.LOAD
//* THESE ARE THE INPUT FILE
//FT18F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.EMISSION,DISP=SHR
//FT19F001 DD DSN=MMAS.UAM.INTRFACE.INPUT.PF144,DISP=SHR
//* THESE ARE THE OUTPUT FILES
//FT09F001 DD DSN=<UIDACCT>.UAM.INTRFACE.OUTPUT.BIOASC,
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(100,10)),UNIT=SYSDA,
//             DCB=(RECFM=FB,LRECL=132,BLKSIZE=7920)
//FT29F001 DD DSN=<UIDACCT>.UAM.INTRFACE.OUTPUT.EMBIN,
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(100,10)),UNIT=SYSDA,
//             DCB=(RECFM=VB,LRECL=5000,BLKSIZE=5004)
*
//* THIS IS THE CONTROL CARD
//FT05F001 DD *
 80203    0 80204   24
     16    14    520000.  4460000.      31      25      8000.      8000.
PLL1 40 00 00.000 075 15 00.000
   1
/*
//* THIS IS END OF DATA
//

NOTE:  <UIDACCT>=USERID AND ACCOUNT
```

5.8.5 Main Program, Subroutines, Functions, and Block Data Required

5.8.5.1 Main Program--

IBIOG

5.8.5.2 Subroutines--

BIOUTM6

QUAD

UTMCON

5.8.5.3 Functions--

None.

5.8.5.4 Block Data Files--

None.

5.8.6 I/O and Utility Library Subroutines and Functions Required

None.

5.8.7 INCLUDE Files

None.

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APPENDIX A

DESCRIPTION OF THE EXAMPLE TEST CASE

A test case of input/output files has been assembled for a user to exercise when initially implementing the interface program package with the UAM system. The test case is the two-day of July 21-22, 1980. The example UAM domain is the New York metropolitan area. A set of 13 ROM retrieved data files contains all parameters needed for exercising the interfaces for the 48-h period.

Appendix B presents the contents of the control data files input to the interface programs and Appendix C contains a partial listing of each ROM data file used in this test case. In addition, Appendix D presents the printer output produced by each interface and the initial contents of each output data file generated by the interface programs for comparison with the results obtained by the user.

Appendix E describes the utility programs to convert a binary data file to ASCII formatted file (BINASC) or convert a formatted file into a binary file (ASCBIN). The BINASC program can be applied to convert the binary files generated by the concentration, wind, and biogenic emissions interface programs to compare user results with those provided in Appendix D for these particular files. Finally, Appendix F gives a complete listing of the contents of a magnetic tape that contains the input/output files for this test case along with the interface program source codes.

APPENDIX B

INPUT CONTROL FILES FOR THE TEST CASE

1. PDFSNBK

```
DIFFBREAK
HEIGHT OF THE MIXED LAYER
         0         0       224         1        10
        23         1         1
         0         0         0         0         0
         0         0         0         0
         0         0         0         0         0         0
     80203         0     80205      0100
        0.        0.        18
  520000.  4460000.
     8000.     8000.
        31        25         5
         2         3       0.0      50.0     100.0
         1
A                  1         1        -1
A         DIFFBREAK CONSTANT          0.     3000.         0
```

2. IREGNTP

```
REGIONTOP
REGIONTOP FILE CREATED AT 02/07/90
         0         0       224         1        10
        28         1         1
         0         0         0         0         0
         0         0         0         0
         0         0         0         0         0         0
     80203         0     80204      2400
        0.        0.        18
  520000.  4460000.
     8000.     8000.
        31        25         5
         2         3       0.0      50.0     100.0
       4.0        16        14
         1
A                  1         1        -1
A         REGIONTOP CONSTANT        200.     3000.         0
```

3. ITMPRTR

```
TEMPERATUR
TEMPERATURE FILE CREATED AT 02/07/90
       0         0        224          1         10
      28         0          0
       0         0          0          0          0
       0         0          0          0
       0         0          0          0          0          0
   80203        00      80204       2400
      0.        0.         18
 520000.  4460000.
   8000.     8000.
      31        25          5
       2         3        0.0       50.0      100.0
DEGK
      1.        0.         0.
     4.0        16         14
       1
A                1          1         -1
A          TEMPERATURSTATINTERP      270.0      330.0          4
EXTENT        10.0
INITRADIUS     2.0
RADIUSINCR     1.0
MAXRADIUS      5.0
```

4. IMETSCL

```
     41.       73.         5.
METSCALARS
METSCALARS FILE CREATED AT 02/07/90
       0         0        224          1         10
      28         1          1
       0         0          0          0          0
       0         0          0          0
       0         0          0          0          0          0
   80203         0      80204       2400
      0.        0.         18
 520000.  4460000.
   8000.     8000.
      31        25          5
       2         3        0.0       50.0      100.0
     4.0        16         14     1.0000
```

5. IWIND

```
       0
INTERFACE ROM WINDS TEST RUN FOR 21-22 JULY 1980(3/07/90)
   80203        0.      80204        24.
      0.        0.         18
 520000.  4460000.
   8000.     8000.
      31        25          5
       2         3        0.0       50.0      100.0
       1         0          1          2
```

6. ICRETER

```
  16   14   520000.  4460000.      31      25      8000.      8000.
 40 00 00.000 075 15 00.000
TERRAIN
   SURFACE ROUGHNESS AND VEGETATIVE FACTORS
         0          0        224          1         20
        11          1          1
         0          0          0          1          0
         0          0          0          0
         0          0          0          0          0          0
     80001          0      80366       2400
        0.         0.         18
   520000.   4460000.
     8000.      8000.
        31         25          5
         2          3        0.0       50.0      100.0
       4.0         16         14
         1
A                   1          1         -1
A         ROUGHNESS GRID VALUE    0.0000        20.         0
A         VEGFACTOR GRID VALUE    0.0000         2.         0
```

7. ICONC

```
         0
AIRQUALITY
TOPCONC
BOUNDARY
AIRQUALITY FILE CREATED AT 03/08/90 (UPPER VERTICAL VARIATION)
TOP CONCENTRATION FILE CREATED AT 03/08/90 (UPPER VERTICAL VARIATION)
BOUNDARY FILE CREATED AT 03/08/90 (UPPER VERTICAL VARIATION)
     80203          0      80204       2400
        0.         0.         18
   520000.   4460000.
     8000.      8000.
        31         25          5
         2          3        0.0       50.0      100.0
        16         14
      20.0       10.0       50.0
         1
```

8. IBIOG

```
 80203    0 80204   24
   16   14   520000.  4460000.      31      25      8000.      8000.
PLL1 40 00 00.000 075 15 00.000
  1
```

APPENDIX C

SAMPLE OF THE ROM INPUT DATA FILES FOR THE TEST CASE

1. ROM21

```
000207900014441800080202000000230000360000000000NEROSXXX  75.125  40.083  71.375  42.250-0.25000 0.16667  16  14   3  17
ALD2CO  MTHLETH FORMH2O2HNO2HNO3ISOPNO  NO2 O3  OLE PAN PAR TOL XYL
1   2   3
ROM2.1                                                             ** GRIMES  06-06-89 *****************************************************
* N*E* *****   ROM 2_1 RUN ON IBM 3090                             * BENCHMARK   TEST OF ROM2_1 CODE WITH BLIM = 10

* BC FROM FORMULATION FV1072A, NEWIC IS FV1073A                    * BMATRIX FROM FORMULATION FV1073A

*               ROM/CONC FILE FV1073A PRODUCED                     ***********************************************************************

AVERAGED EXTRACTIONS.  NUMBER OF TIMESTEPS AVERAGED:    2          THIS IS AN EXTRACTION

   OUTPUTS DERIVED FROM ADDING OTHER SPECIES OR LEVELS                TIME SHIFTED TO BEGIN TIME

   THIS CONCENTRATION FILE HAS BEEN CONVERTED TO ASCII FORMAT


 80203000000     3600      1
 0.222582E-020.494094E-020.360278E-020.307475E-020.261280E-020.157029E-020.993246E-030.750864E-030.646239E-030.485347E-030.310672E-030.183181E-03
0.154606E-030.161886E-030.141871E-030.119871E-03
 0.184407E-020.184552E-020.135342E-020.895498E-030.750777E-030.732653E-030.676470E-030.577225E-030.463712E-030.377411E-030.316755E-030.266311E-03
0.210183E-030.153349E-030.116531E-030.936444E-04
 0.282339E-030.846461E-030.698181E-030.463226E-030.408597E-030.415189E-030.450417E-030.435745E-030.404934E-030.382721E-030.347220E-030.311779E-03
0.281868E-030.244681E-030.186057E-030.140866E-03
 0.265462E+000.438459E+000.402545E+000.237942E+000.200638E+000.159441E+000.142070E+000.133234E+000.135417E+000.145185E+000.146108E+000.136010E+00
0.124436E+000.120610E+000.117051E+000.112343E+00
 0.233856E+000.254743E+000.209077E+000.151890E+000.131045E+000.134032E+000.135595E+000.133282E+000.130210E+000.128313E+000.130020E+000.128562E+00
0.122178E+000.116109E+000.114374E+000.112938E+00
 0.103085E+000.160922E+000.145131E+000.123292E+000.117559E+000.118001E+000.121020E+000.120844E+000.120389E+000.122380E+000.123676E+000.126417E+00
0.127160E+000.123475E+000.118569E+000.115093E+00
 0.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.999999E-160.999999E-160.999999E-160.999999E-160.999999E-160.999999E-160.999999E-16
0.999999E-160.999999E-160.999999E-160.999999E-16
 0.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-15
0.100000E-150.100000E-150.100000E-150.100000E-15
 0.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-150.100000E-15
0.100000E-150.100000E-150.100000E-150.100000E-15
 0.164683E-020.297121E-020.434847E-020.192989E-020.162764E-020.132350E-020.111082E-020.898335E-030.604610E-030.231768E-030.436297E-040.954372E-06
0.866671E-050.980672E-050.475024E-050.337862E-05
 0.134486E-020.128179E-020.935693E-030.721845E-030.723215E-030.726564E-030.638008E-030.497715E-030.326373E-030.202839E-030.105446E-030.522091E-04
0.347477E-040.251123E-040.150660E-040.737244E-05
 0.127527E-030.541849E-030.432296E-030.238266E-030.223944E-030.254471E-030.317876E-030.308613E-030.270448E-030.234669E-030.178940E-030.121139E-03
0.896614E-040.850496E-040.655945E-040.443403E-04
 0.487639E-020.708015E-020.557449E-020.495460E-020.457216E-020.302830E-020.228110E-020.182747E-020.123982E-020.653594E-030.355242E-030.213585E-03
0.186196E-030.166796E-030.163260E-030.163888E-03
 0.466940E-020.471600E-020.402145E-020.325404E-020.303542E-020.302365E-020.278461E-020.238644E-020.199114E-020.171712E-020.150387E-020.134288E-02
0.120861E-020.108191E-020.100116E-020.973808E-03
 0.195197E-020.293822E-020.269000E-020.226939E-020.218320E-020.219986E-020.226320E-020.218668E-020.205805E-020.191383E-020.177215E-020.159917E-02
0.145747E-020.134452E-020.119222E-020.109265E-02
 0.532679E-020.573450E-020.605791E-020.553445E-020.504274E-020.399067E-020.321740E-020.266374E-020.188575E-020.117928E-020.817017E-030.488234E-03
```

```
0.408700E-030.312777E-030.296065E-030.304941E-03
 0.536149E-020.582059E-020.632565E-020.626611E-020.621530E-020.626987E-020.628328E-020.624987E-020.625242E-020.627455E-020.638459E-020.639184E-02
0.616626E-020.577739E-020.541347E-020.515432E-02
```

2. MF165

```
 FILE: MF165A      REGION: ROMNE11   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  1
 SOUTHWEST ROM CELL (LAT):    40  0  0.00
 SOUTHWEST ROM CELL (LON):    75 15  0.00
 CREATE DATE: 50689  CREATE TIME: 155355
 WRITE DATE:  50889   WRITE TIME:   73332
 PARAMETER NAME:    UNITS:             DESCRIPTION:
 Z1                 m above msl        interface surface elevation
 80203  0 Z1
 0.254019E+030.337519E+030.331630E+030.326815E+030.317370E+030.304907E+030.300000E+030.300000E+030.300000E+030.300000E+030.300000E+030.300000E+03
0.300000E+030.300000E+030.300000E+030.300000E+03
 0.383870E+030.358315E+030.338833E+030.328815E+030.317315E+030.306130E+030.300000E+030.300000E+030.300000E+030.300000E+030.300000E+030.300000E+03
0.300000E+030.300000E+030.300000E+030.300000E+03
 0.409037E+030.378981E+030.350870E+030.330667E+030.316963E+030.306111E+030.300407E+030.300130E+030.300000E+030.300000E+030.300000E+030.300000E+03
0.300000E+030.300000E+030.300000E+030.300000E+03
 0.443111E+030.417185E+030.387111E+030.249148E+030.223111E+030.311352E+030.309074E+030.308444E+030.305111E+030.301685E+030.300500E+030.300000E+03
0.300000E+030.300000E+030.300000E+030.300000E+03
 0.477519E+030.463741E+030.437778E+030.290241E+030.246056E+030.223167E+030.218593E+030.213870E+030.311685E+030.307611E+030.304963E+030.302426E+03
0.300944E+030.300148E+030.300000E+030.300000E+03
 0.540111E+030.513333E+030.498111E+030.450685E+030.292315E+030.254278E+030.337389E+030.324667E+030.313796E+030.307611E+030.305037E+030.302519E+03
0.301296E+030.300426E+030.300259E+030.300000E+03
 0.623037E+030.562870E+030.531426E+030.502148E+030.444741E+030.403333E+030.369130E+030.352833E+030.330889E+030.315981E+030.308093E+030.304556E+03
0.302037E+030.300426E+030.300259E+030.300000E+03
 0.680648E+030.600778E+030.549389E+030.517759E+030.475444E+030.451259E+030.419185E+030.399944E+030.364778E+030.345352E+030.331426E+030.327426E+03
0.320019E+030.314778E+030.308870E+030.303296E+03
 0.706593E+030.644944E+030.575982E+030.529019E+030.471444E+030.469444E+030.456148E+030.455148E+030.415963E+030.387370E+030.366889E+030.359500E+03
0.353278E+030.344537E+030.330981E+030.317796E+03
 0.709463E+030.674370E+030.620056E+030.544111E+030.465741E+030.464352E+030.485537E+030.508870E+030.472204E+030.427648E+030.400630E+030.395444E+03
0.398833E+030.385667E+030.359111E+030.336185E+03
 0.744315E+030.746574E+030.727278E+030.624185E+030.495741E+030.456167E+030.497574E+030.554111E+030.523167E+030.454574E+030.416963E+030.419074E+03
0.440111E+030.426130E+030.387204E+030.356296E+03
 0.789741E+030.827204E+030.832296E+030.738315E+030.570778E+030.484204E+030.508426E+030.593185E+030.578593E+030.492296E+030.434204E+030.440648E+03
0.472593E+030.456352E+030.405556E+030.369481E+03
 0.823074E+030.890018E+030.914518E+030.848537E+030.652407E+030.524296E+030.506000E+030.612944E+030.621796E+030.535889E+030.456407E+030.454611E+03
0.492537E+030.479019E+030.422093E+030.376074E+03
 0.817963E+030.884926E+030.909630E+030.866630E+030.677741E+030.540259E+030.505333E+030.623630E+030.666759E+030.585482E+030.496556E+030.475222E+03
0.514778E+030.493444E+030.431907E+030.375130E+03
```

3. MF166

```
FILE: MF166A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50889  WRITE TIME:   73332
PARAMETER NAME:    UNITS:             DESCRIPTION:
Z2                 m above msl        interface surface elevation
80203  0 Z2
 0.199422E+040.199631E+040.200560E+040.201169E+040.200797E+040.199312E+040.198121E+040.196634E+040.194285E+040.191010E+040.187678E+040.182489E+04
0.176368E+040.169392E+040.161689E+040.153510E+04
 0.204053E+040.203194E+040.202534E+040.202335E+040.201424E+040.199703E+040.197996E+040.196107E+040.193364E+040.189470E+040.185187E+040.179790E+04
0.174458E+040.167366E+040.159641E+040.151532E+04
 0.207379E+040.205867E+040.204089E+040.202573E+040.201110E+040.199081E+040.197059E+040.194795E+040.191463E+040.187782E+040.183056E+040.177489E+04
0.171141E+040.164110E+040.157434E+040.149403E+04
 0.210739E+040.209412E+040.207172E+040.203586E+040.200366E+040.198153E+040.196168E+040.193583E+040.189705E+040.185495E+040.180506E+040.174814E+04
0.168469E+040.161522E+040.154110E+040.147334E+04
 0.213287E+040.212935E+040.210843E+040.206024E+040.200720E+040.197126E+040.194664E+040.191230E+040.187759E+040.183167E+040.177975E+040.172094E+04
0.165690E+040.158830E+040.151508E+040.144100E+04
 0.217843E+040.215952E+040.214687E+040.209634E+040.202684E+040.197361E+040.193259E+040.189321E+040.184712E+040.179872E+040.174715E+040.168933E+04
0.162580E+040.155949E+040.149065E+040.141995E+04
 0.223454E+040.218223E+040.215113E+040.211667E+040.204634E+040.198592E+040.192887E+040.188536E+040.182801E+040.177128E+040.171400E+040.165680E+04
0.159575E+040.153175E+040.146655E+040.139999E+04
 0.226077E+040.218675E+040.213381E+040.209313E+040.203654E+040.199484E+040.193934E+040.189304E+040.182297E+040.176134E+040.170111E+040.164583E+04
0.158292E+040.151891E+040.145209E+040.139001E+04
 0.224949E+040.219193E+040.211985E+040.206042E+040.199020E+040.197023E+040.193567E+040.190629E+040.183182E+040.176416E+040.169974E+040.164405E+04
0.158588E+040.152245E+040.145733E+040.138680E+04
 0.221029E+040.217776E+040.211689E+040.203020E+040.193879E+040.191952E+040.191884E+040.191483E+040.184602E+040.176472E+040.169667E+040.165176E+04
0.160684E+040.154310E+040.146465E+040.138954E+04
 0.219919E+040.219846E+040.217389E+040.206209E+040.192067E+040.186451E+040.188455E+040.191542E+040.185458E+040.175689E+040.168131E+040.164219E+04
0.161936E+040.155965E+040.147398E+040.139623E+04
 0.219351E+040.222942E+040.222879E+040.212606E+040.194466E+040.184896E+040.185318E+040.191416E+040.187210E+040.175484E+040.166259E+040.163210E+04
0.162491E+040.156800E+040.147577E+040.139830E+04
 0.218089E+040.224288E+040.226401E+040.218809E+040.198001E+040.183927E+040.180298E+040.188870E+040.187318E+040.175993E+040.165040E+040.161623E+04
0.161995E+040.157099E+040.147805E+040.139612E+04
 0.212298E+040.218456E+040.220466E+040.215356E+040.195629E+040.180584E+040.175526E+040.185522E+040.187738E+040.177265E+040.165803E+040.160907E+04
0.161951E+040.156805E+040.147594E+040.138889E+04
```

4. MF174

```
FILE: MF174A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50889   WRITE TIME:   73302
PARAMETER NAME:    UNITS:            DESCRIPTION:
<wvc>1             ppm               layer 1 water vapor concentration
80203  0 <wvc>1
 0.237848E+050.232902E+050.230951E+050.229195E+050.228215E+050.227965E+050.227390E+050.226738E+050.226562E+050.226897E+050.227772E+050.229195E+05
0.231152E+050.233599E+050.236457E+050.239615E+05
 0.230116E+050.229318E+050.228578E+050.227472E+050.226931E+050.226816E+050.226615E+050.226188E+050.226231E+050.226773E+050.227833E+050.229412E+05
0.231487E+050.234004E+050.236881E+050.240005E+05
 0.226904E+050.226331E+050.226284E+050.226266E+050.226182E+050.226277E+050.226251E+050.226052E+050.226293E+050.226999E+050.228196E+050.229878E+05
0.232015E+050.234547E+050.237389E+050.240430E+05
 0.223870E+050.222938E+050.222782E+050.228168E+050.230161E+050.225612E+050.225384E+050.225398E+050.226146E+050.227348E+050.228760E+050.230543E+05
0.232688E+050.235184E+050.237943E+050.240857E+05
 0.221312E+050.219887E+050.219434E+050.224225E+050.227498E+050.229683E+050.229961E+050.230635E+050.226158E+050.227514E+050.229134E+050.231132E+05
0.233381E+050.235862E+050.238505E+050.241254E+05
 0.217803E+050.217170E+050.216298E+050.217457E+050.223600E+050.226659E+050.223761E+050.225213E+050.226903E+050.228500E+050.230103E+050.232049E+05
0.234185E+050.236544E+050.239023E+050.241590E+05
 0.213906E+050.214843E+050.214906E+050.215238E+050.217550E+050.219667E+050.222102E+050.223751E+050.226401E+050.228823E+050.230897E+050.232853E+05
0.234977E+050.237226E+050.239502E+050.241839E+05
 0.211763E+050.213405E+050.214539E+050.215149E+050.216755E+050.217787E+050.219783E+050.221441E+050.224796E+050.227444E+050.229981E+050.231941E+05
0.234398E+050.236820E+050.239339E+050.241790E+05
 0.211122E+050.212037E+050.213956E+050.215479E+050.218146E+050.217938E+050.218741E+050.219105E+050.222384E+050.225462E+050.228315E+050.230443E+05
0.232700E+050.235284E+050.238218E+050.240983E+05
 0.211454E+050.211542E+050.212733E+050.215730E+050.219836E+050.219627E+050.218262E+050.217080E+050.219904E+050.223806E+050.226951E+050.228730E+05
0.230069E+050.232792E+050.236514E+050.239782E+05
 0.210837E+050.209820E+050.209600E+050.212754E+050.219320E+050.221646E+050.218855E+050.215610E+050.217868E+050.223084E+050.226818E+050.227825E+05
0.227564E+050.230076E+050.234559E+050.238231E+05
 0.210036E+050.208419E+050.207774E+050.209513E+050.216078E+050.221189E+050.219475E+050.214521E+050.215608E+050.221524E+050.226468E+050.226904E+05
0.225595E+050.227938E+050.233068E+050.236901E+05
 0.209691E+050.207816E+050.207122E+050.207845E+050.213101E+050.219834E+050.220903E+050.214443E+050.214149E+050.219483E+050.225585E+050.226399E+05
0.224388E+050.226215E+050.231473E+050.235823E+05
 0.210378E+050.208518E+050.207875E+050.208317E+050.213005E+050.219972E+050.222136E+050.214749E+050.212737E+050.217043E+050.223224E+050.225213E+05
0.222847E+050.224928E+050.230203E+050.235087E+05
```

5. PF102

```
FILE: PF102A      REGION: N/A       TYPE: 1  COLS:  0  ROWS:  0  PARAMETERS:  3
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50689   WRITE TIME:  163633
PARAMETER NAME:    UNITS:            DESCRIPTION:
  Zm                 msl               height where param. were interpolated
  Tvm(z)             deg K             virtual temperature
  qm(z)              none              mixing ratio fraction
 2
80203  0  Zm
72518 42.75 73.80   99   86.00
 0.860000E+02
 0.136000E+03
 0.186000E+03
 0.236000E+03
 0.286000E+03
 0.336000E+03
 0.386000E+03
 0.436000E+03
 0.486000E+03
 0.536000E+03
   .....
   .....
80203  0  Zm
74486 40.78 73.77   99    8.00
 0.800000E+01
 0.580000E+02
 0.108000E+03
 0.158000E+03
 0.208000E+03
 0.258000E+03
 0.308000E+03
 0.358000E+03
 0.408000E+03
 0.458000E+03
 0.508000E+03
     .....
     .....
 2
80203  0  Tvm(z)
72518 42.75 73.80   99   86.00
 0.299673E+03
 0.300884E+03
 0.300925E+03
 0.300965E+03
 0.301005E+03
 0.301045E+03
 0.300960E+03
 0.300815E+03
 0.300671E+03
 0.300527E+03
```

```
    .....
    .....
80203  0  Tvm(z)
74486 40.78 73.77   99    8.00
 0.306043E+03
 0.306710E+03
 0.307377E+03
 0.307703E+03
 0.307355E+03
 0.307006E+03
 0.306658E+03
 0.306309E+03
 0.305963E+03
 0.305616E+03
    .....
    .....
  2
80203  0  qm(z)
72518 42.75 73.80   99   86.00
 0.166095E-01
 0.172370E-01
 0.167928E-01
 0.163486E-01
 0.159052E-01
 0.154620E-01
 0.151558E-01
 0.149125E-01
 0.146690E-01
 0.144253E-01
    .....
    .....
80203  0  qm(z)
74486 40.78 73.77   99    8.00
 0.150836E-01
 0.137985E-01
 0.125210E-01
 0.116594E-01
 0.116082E-01
 0.115566E-01
 0.115050E-01
 0.114534E-01
 0.114017E-01
 0.113497E-01
    .....
    .....
```

6. PF103

```
FILE: PF103A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):    40  0  0.00
SOUTHWEST ROM CELL (LON):    75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50689   WRITE TIME:  163526
PARAMETER NAME:    UNITS:            DESCRIPTION:
SURTMP             deg. K            Absolute surface temperature
80203  0 SURTMP
 0.303546E+030.303593E+030.303639E+030.303677E+030.303693E+030.303670E+030.303590E+030.303447E+030.303241E+030.302982E+030.302687E+030.302375E+03
0.302067E+030.301788E+030.301567E+030.301435E+03
 0.303703E+030.303793E+030.303869E+030.303918E+030.303923E+030.303866E+030.303741E+030.303547E+030.303294E+030.302998E+030.302676E+030.302347E+03
0.302034E+030.301762E+030.301564E+030.301466E+03
 0.303833E+030.303959E+030.304053E+030.304098E+030.304078E+030.303982E+030.303812E+030.303576E+030.303288E+030.302966E+030.302626E+030.302288E+03
0.301976E+030.301720E+030.301552E+030.301490E+03
 0.303913E+030.304069E+030.304172E+030.304204E+030.304153E+030.304020E+030.303813E+030.303545E+030.303232E+030.302891E+030.302540E+030.302199E+03
0.301896E+030.301663E+030.301531E+030.301502E+03
 0.303923E+030.304105E+030.304213E+030.304230E+030.304152E+030.303989E+030.303753E+030.303462E+030.303131E+030.302778E+030.302419E+030.302080E+03
0.301792E+030.301590E+030.301498E+030.301498E+03
 0.303854E+030.304060E+030.304173E+030.304178E+030.304080E+030.303894E+030.303638E+030.303330E+030.302986E+030.302623E+030.302262E+030.301931E+03
0.301666E+030.301503E+030.301452E+030.301479E+03
 0.303701E+030.303932E+030.304052E+030.304052E+030.303941E+030.303740E+030.303470E+030.303150E+030.302796E+030.302427E+030.302066E+030.301750E+03
0.301518E+030.301403E+030.301397E+030.301449E+03
 0.303471E+030.303722E+030.303853E+030.303853E+030.303736E+030.303527E+030.303248E+030.302919E+030.302557E+030.302185E+030.301832E+030.301540E+03
0.301355E+030.301296E+030.301336E+030.301414E+03
 0.303173E+030.303437E+030.303578E+030.303582E+030.303465E+030.303253E+030.302969E+030.302634E+030.302269E+030.301899E+030.301563E+030.301312E+03
0.301186E+030.301191E+030.301277E+030.301380E+03
 0.302819E+030.303081E+030.303229E+030.303239E+030.303125E+030.302914E+030.302631E+030.302295E+030.301933E+030.301576E+030.301273E+030.301078E+03
0.301025E+030.301098E+030.301229E+030.301356E+03
 0.302420E+030.302662E+030.302805E+030.302819E+030.302713E+030.302510E+030.302234E+030.301907E+030.301560E+030.301232E+030.300980E+030.300859E+03
0.300888E+030.301027E+030.301198E+030.301346E+03
 0.301987E+030.302185E+030.302309E+030.302325E+030.302231E+030.302045E+030.301789E+030.301488E+030.301173E+030.300895E+030.300713E+030.300679E+03
0.300792E+030.300989E+030.301193E+030.301357E+03
 0.301527E+030.301665E+030.301758E+030.301771E+030.301696E+030.301540E+030.301323E+030.301067E+030.300809E+030.300601E+030.300507E+030.300564E+03
0.300753E+030.300996E+030.301220E+030.301392E+03
 0.301056E+030.301127E+030.301182E+030.301194E+030.301145E+030.301035E+030.300876E+030.300689E+030.300511E+030.300395E+030.300396E+030.300540E+03
0.300785E+030.301053E+030.301282E+030.301451E+03
```

7. PF108

```
FILE: PF108A      REGION: ROMNET1   TYPE: 4  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):    40  0  0.00
SOUTHWEST ROM CELL (LON):    75 15  0.00
CREATE DATE: 50489  CREATE TIME: 105017
WRITE DATE:  50489   WRITE TIME:  121739
PARAMETER NAME:    UNITS:            DESCRIPTION:
Z0                 meters            effective surface roughness
80203  0 Z0
 0.665362E+000.457647E+000.291348E+000.825214E+000.725803E+000.500000E-010.500000E-010.500000E-010.500000E-010.500000E-010.500000E-010.500000E-01
0.500000E-010.500000E-010.500000E-010.500000E-01
 0.310299E+000.325405E+000.442385E+000.588497E+000.664180E+000.953904E-010.500000E-010.500000E-010.500000E-010.500000E-010.500000E-010.500000E-01
0.500000E-010.500000E-010.500000E-010.500000E-01
 0.228432E+000.331407E+000.489933E+000.760602E+000.500532E+000.953904E-010.500000E-010.500000E-010.500000E-010.500000E-010.500000E-010.500000E-01
0.500000E-010.500000E-010.500000E-010.500000E-01
 0.511670E+000.291348E+000.397352E+000.686739E+000.433034E+000.244745E+000.278196E+000.953904E-010.712627E-010.500000E-010.500000E-010.500000E-01
0.500000E-010.500000E-010.500000E-010.500000E-01
 0.356434E+000.751486E+000.736085E+000.702570E+000.594677E+000.559261E+000.696253E+000.686739E+000.700550E+000.147304E+000.147304E+000.500000E-01
0.500000E-010.500000E-010.500000E-010.500000E-01
 0.495808E+000.629627E+000.781584E+000.785266E+000.636062E+000.571265E+000.323994E+000.308618E+000.573595E+000.706863E+000.579735E+000.339742E+00
0.191171E+000.500000E-010.500000E-010.500000E-01
 0.676312E+000.726363E+000.796833E+000.752916E+000.815684E+000.653764E+000.720074E+000.299267E+000.712627E-010.500000E-010.556561E-010.154112E+00
0.205270E+000.106958E+000.817028E-010.500000E-01
 0.952979E+000.756899E+000.563027E+000.619729E+000.851446E+000.762306E+000.796833E+000.766282E+000.716060E+000.259847E+000.200021E+000.200021E+00
0.163984E+000.106958E+000.885499E-010.500000E-01
 0.914619E+000.914619E+000.726363E+000.366264E+000.552774E+000.812028E+000.666200E+000.691326E+000.766282E+000.745230E+000.772233E+000.697367E+00
0.706863E+000.806406E+000.564211E+000.172257E+00
 0.660693E+000.914619E+000.884961E+000.645320E+000.578552E+000.568599E+000.716902E+000.756900E+000.726083E+000.669966E+000.790915E+000.697367E+00
0.706863E+000.870043E+000.870043E+000.908877E+00
 0.660693E+000.686126E+000.821567E+000.821567E+000.736085E+000.552774E+000.553061E+000.908877E+000.685561E+000.704576E+000.591444E+000.697367E+00
0.706863E+000.845879E+000.836398E+000.561593E+00
 0.836671E+000.836671E+000.864232E+000.821567E+000.766282E+000.568312E+000.568599E+000.855339E+000.851446E+000.716622E+000.597573E+000.700832E+00
0.830810E+000.769977E+000.903395E+000.804168E+00
 0.806682E+000.806682E+000.952979E+000.952979E+000.952979E+000.465852E+000.660693E+000.841978E+000.841978E+000.952979E+000.794589E+000.938339E+00
0.890472E+000.675747E+000.791192E+000.860892E+00
 0.635444E+000.635444E+000.635444E+000.757178E+000.757178E+000.465852E+000.660693E+000.841978E+000.841978E+000.952979E+000.794589E+000.890472E+00
0.890472E+000.760324E+000.851446E+000.845879E+00
```

8. PF114

```
FILE: PF114A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  2
SOUTHWEST ROM CELL (LAT):    40  0  0.00
SOUTHWEST ROM CELL (LON):    75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50889   WRITE TIME:   73314
PARAMETER NAME:     UNITS:              DESCRIPTION:
<u>2                m/sec               west to east wind component in layer 2
<v>2                m/sec               south to north wind component in layer 2
80203  0  <u>2       <v>2
 0.811332E+010.847075E+010.840169E+010.775116E+010.787644E+010.843862E+010.839350E+010.865958E+010.878358E+010.769542E+010.646886E+010.580654E+01
0.504758E+010.458799E+010.452671E+010.427452E+01
 -.120538E+00-.546943E+000.359560E+010.470546E+010.600680E+010.691250E+010.391630E+010.280839E+010.178799E+01-.282761E+00-.727083E+00-.141855E+01
-.157417E+01-.141241E+01-.588149E+000.944562E+00
 0.946969E+010.859133E+010.824721E+010.815994E+010.827936E+010.109364E+020.121710E+020.121295E+020.126163E+020.101527E+020.790258E+010.757253E+01
0.635378E+010.559568E+010.503047E+010.445883E+01
 -.288151E+00-.624299E-010.370109E+010.515932E+010.496818E+010.557611E+010.413776E+010.229854E+010.230649E+010.193874E+010.623310E-01-.810838E+00
-.626338E+00-.114283E+01-.960462E-010.103193E+01
 0.810353E+010.781532E+010.803977E+010.861614E+010.856355E+010.109650E+020.132639E+020.137649E+020.134470E+020.108966E+020.920182E+010.862316E+01
0.702696E+010.616543E+010.548096E+010.489135E+01
 -.478612E+000.774335E+000.315891E+010.551124E+010.380210E+010.271657E+010.386104E+010.186091E+010.329983E+010.498175E+010.675933E+000.471973E-02
0.690653E+00-.737051E+000.703950E+000.119052E+01
 0.539648E+010.618572E+010.720794E+010.849052E+010.875175E+010.859708E+010.104136E+020.118175E+020.103506E+020.993573E+010.104050E+020.875892E+01
0.729357E+010.649159E+010.557479E+010.523684E+01
 -.109251E+010.628599E+000.214670E+010.517888E+010.356883E+010.883896E+000.226100E+010.188918E+010.482149E+010.606866E+010.119695E+010.150276E+01
0.179482E+01-.776207E-010.135766E+010.150425E+01
 0.361765E+010.442546E+010.548006E+010.732521E+010.817839E+010.615296E+010.663167E+010.808985E+010.689010E+010.904954E+010.109624E+020.867042E+01
0.769828E+010.680917E+010.534875E+010.504218E+01
 -.163663E+01-.279280E+000.971933E+000.377595E+010.425483E+010.151717E+010.449164E-010.228929E+010.584796E+010.393454E+010.187444E+010.355739E+01
0.225382E+010.114721E+010.194578E+010.183337E+01
 0.318248E+010.324063E+010.372928E+010.565023E+010.668093E+010.546892E+010.552541E+010.625781E+010.695627E+010.963986E+010.105714E+020.899337E+01
0.819098E+010.689033E+010.521376E+010.435835E+01
 -.172517E+01-.779726E+00-.144451E+000.181232E+010.496316E+010.297768E+01-.139296E+010.244353E+010.522457E+010.870455E+000.274188E+010.527385E+01
0.260489E+010.280705E+010.285398E+010.226456E+01
 0.279924E+010.253117E+010.295377E+010.447220E+010.547057E+010.625718E+010.688423E+010.742405E+010.982566E+010.109444E+020.974418E+010.928545E+01
0.811147E+010.641159E+010.527510E+010.374051E+01
 -.154196E+01-.663793E+00-.117347E+010.185881E+000.489932E+010.300557E+01-.180261E+010.171392E+010.318871E+01-.697184E-020.366289E+010.605841E+01
0.378212E+010.426236E+010.405867E+010.321382E+01
 0.185702E+010.183495E+010.292614E+010.405156E+010.571627E+010.727459E+010.776360E+010.894751E+010.113387E+020.110059E+020.900889E+010.854198E+01
0.712406E+010.559496E+010.507457E+010.359012E+01
 -.122470E+01-.890542E+00-.218395E+01-.988819E+000.377899E+010.195236E+01-.202037E+010.455835E-010.125911E+010.144425E+010.466103E+010.642295E+01
0.569117E+010.513617E+010.510699E+010.464181E+01
 0.127856E+010.126046E+010.261767E+010.364985E+010.653933E+010.780546E+010.690765E+010.808499E+010.930451E+010.896687E+010.792248E+010.662031E+01
0.572489E+010.497858E+010.433822E+010.370274E+01
 -.575775E+00-.185910E+01-.312511E+01-.239024E+010.158239E+010.178943E+01-.221023E+01-.184619E+010.484483E+000.284366E+010.582857E+010.721062E+01
0.707219E+010.575831E+010.579324E+010.568141E+01
 0.186982E+010.134866E+010.174265E+010.257245E+010.566712E+010.730091E+010.564360E+010.523752E+010.554549E+010.572883E+010.563609E+010.450667E+01
0.461511E+010.460146E+010.356315E+010.357674E+01
 0.386744E+00-.257940E+01-.372549E+01-.417657E+01-.138136E+010.257279E+01-.147621E+01-.290289E+010.438319E+000.293780E+010.688041E+010.822722E+01
0.709714E+010.653744E+010.636273E+010.575398E+01
 0.306631E+010.213258E+010.108750E+010.106797E+010.234998E+010.480644E+010.460954E+010.262494E+010.259409E+010.263893E+010.243292E+010.308814E+01
0.391578E+010.398731E+010.338522E+010.306421E+01
 0.123704E+01-.205824E+01-.364656E+01-.534011E+01-.405281E+010.215623E+010.275850E+00-.253773E+010.220796E+000.288115E+010.720994E+010.828046E+01
```

```
0.647373E+010.723490E+010.692514E+010.568054E+01
 0.390680E+010.298854E+010.126435E+01-.137522E-01-.139006E+010.270896E+000.242973E+010.107545E+010.686198E+000.351290E+00-.584068E-010.229705E+01
0.331361E+010.309757E+010.369143E+010.262947E+01
 0.179946E+01-.671300E+00-.274780E+01-.484649E+01-.493602E+01-.276361E+000.128944E+01-.121464E+01-.197634E+000.369638E+010.657864E+010.672091E+01
0.639445E+010.729389E+010.716786E+010.669846E+01
 0.437785E+010.350104E+010.191358E+01-.156700E+00-.295568E+01-.397572E+01-.124829E+01-.234727E+00-.100695E+01-.985694E+00-.549809E+000.173657E+01
0.275417E+010.272718E+010.397694E+010.300374E+01
 0.245850E+010.563387E+00-.121310E+01-.298234E+01-.340789E+01-.252077E+01-.812457E-01-.132840E+00-.213439E+000.435569E+010.542905E+010.442375E+01
0.683031E+010.666435E+010.692283E+010.843388E+01
 0.503199E+010.390662E+010.246790E+010.512095E+00-.184720E+01-.469911E+01-.371391E+01-.147632E+01-.205636E+01-.124569E+010.499678E+000.153322E+01
0.259297E+010.351691E+010.436509E+010.454954E+01
 0.349146E+010.147315E+010.542288E+00-.989689E+00-.589745E+00-.233178E+01-.290833E+01-.109346E+000.254375E+000.344963E+010.428644E+010.285655E+01
0.664351E+010.579065E+010.653791E+010.902730E+01
```

9. PF115

```
FILE: PF115A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  2
SOUTHWEST ROM CELL (LAT):    40  0  0.00
SOUTHWEST ROM CELL (LON):    75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50889   WRITE TIME:    73314
PARAMETER NAME:     UNITS:             DESCRIPTION:
<u>1                m/sec              west to east wind component in layer 1
<v>1                m/sec              south to north wind component in layer 1
80203  0  <u>1        <v>1
 0.670097E+000.129346E+010.645928E+000.347359E+000.152060E+010.253685E+010.356054E+010.434687E+010.426488E+010.423752E+010.377257E+010.244481E+01
0.124718E+010.711742E+000.769903E+000.898602E+00
 0.157498E+010.249493E+010.678859E+000.197825E+010.343960E+010.170235E+010.229577E+010.231592E+010.153904E+010.273093E+010.239504E+010.143289E+01
0.243594E+00-.817091E+00-.133859E+00-.454125E+00
 0.122915E+010.155913E+010.173284E+010.124891E+010.192651E+010.349774E+010.459420E+010.552716E+010.561785E+010.507821E+010.448882E+010.341409E+01
0.225363E+010.127750E+010.914290E+000.939445E+00
 0.110942E+010.230849E+010.143860E+010.187743E+010.218074E+010.778495E+000.140456E+010.195619E+010.184781E+010.297144E+010.323228E+010.263421E+01
0.112433E+01-.395929E+00-.265604E+00-.375130E+00
 0.198479E+010.141649E+010.248238E+010.288111E+010.268612E+010.350375E+010.440364E+010.533050E+010.551100E+010.489444E+010.452135E+010.398400E+01
0.313225E+010.202705E+010.125066E+010.954525E+00
 0.142678E+010.201512E+010.111099E+010.229866E+010.141573E+01-.255423E+000.650069E+000.133097E+010.227022E+010.351688E+010.374595E+010.348099E+01
0.205189E+010.450840E+00-.958214E-01-.137163E+00
 0.212752E+010.123688E+010.227552E+010.359600E+010.358494E+010.305667E+010.345695E+010.426839E+010.421656E+010.430114E+010.446418E+010.410722E+01
0.355238E+010.258138E+010.181682E+010.131416E+01
 0.242653E+010.198739E+01-.200915E+000.230219E+010.165145E+01-.544405E+00-.915976E-010.842704E+000.259936E+010.366355E+010.393707E+010.396900E+01
0.281871E+010.139372E+010.343926E+000.263924E+00
 0.138267E+010.141002E+010.170418E+010.299416E+010.405189E+010.306639E+010.289346E+010.332682E+010.326783E+010.413612E+010.451592E+010.410123E+01
0.367887E+010.279907E+010.222408E+010.180110E+01
 0.329577E+010.199921E+01-.118172E+010.125955E+010.212381E+010.180250E+00-.752876E+000.754775E+000.258194E+010.302500E+010.410774E+010.431750E+01
0.342513E+010.220388E+010.711845E+000.771643E+00
 0.496141E+000.178601E+010.164980E+010.223531E+010.396288E+010.385085E+010.331986E+010.314160E+010.365866E+010.454442E+010.451280E+010.426163E+01
0.386350E+010.294078E+010.209406E+010.167757E+01
 0.336600E+010.154436E+01-.104975E+01-.319435E+000.187870E+010.111606E+01-.851076E+000.834281E+000.200865E+010.230309E+010.438061E+010.455585E+01
0.401541E+010.299796E+010.107151E+010.114484E+01
 0.404373E+000.194113E+010.214953E+010.235239E+010.386319E+010.482427E+010.423517E+010.370310E+010.474539E+010.503607E+010.456186E+010.452562E+01
0.409228E+010.324114E+010.172005E+010.921038E+00
 0.281561E+010.589158E+00-.445359E+00-.151378E+010.816278E+000.139502E+01-.132532E+000.689087E+000.105606E+010.233865E+010.460774E+010.466370E+01
0.460842E+010.396347E+010.199955E+010.119630E+01
 0.113960E+010.178696E+010.251604E+010.299680E+010.408325E+010.514635E+010.472449E+010.450752E+010.520178E+010.512662E+010.492675E+010.465494E+01
0.407329E+010.356181E+010.192676E+010.784465E+00
 0.233172E+01-.315651E+00-.404337E+00-.213681E+01-.460076E+000.116466E+010.826855E+000.295635E+000.343913E+000.281466E+010.469849E+010.492868E+01
0.506087E+010.493527E+010.362114E+010.109559E+01
 0.191499E+010.162328E+010.231866E+010.311856E+010.403594E+010.449939E+010.445026E+010.486948E+010.457967E+010.460921E+010.521097E+010.453073E+01
0.375926E+010.361718E+010.305603E+010.234707E+01
 0.226680E+01-.654607E+00-.104339E+01-.265843E+01-.142983E+010.111532E+010.112968E+01-.913727E-020.405584E+000.269645E+010.469125E+010.567437E+01
0.533930E+010.545676E+010.494665E+010.120658E+01
 0.215789E+010.165329E+010.180129E+010.233121E+010.293251E+010.319346E+010.372078E+010.433863E+010.347785E+010.347222E+010.442211E+010.407405E+01
0.339880E+010.336830E+010.434937E+010.474340E+01
 0.242673E+01-.426344E+00-.164931E+01-.320687E+01-.198606E+010.122328E+010.589425E+000.161462E-010.113904E+010.186096E+010.449305E+010.657497E+01
0.563016E+010.527923E+010.477328E+010.160336E+01
 0.201583E+010.172001E+010.135375E+010.114633E+010.101766E+010.170899E+010.277758E+010.300969E+010.247681E+010.198579E+010.232310E+010.313519E+01
0.308496E+010.303022E+010.469691E+010.578427E+01
 0.259406E+010.326794E-01-.166929E+01-.329175E+01-.220602E+010.746058E+00-.165221E+000.265016E+000.192782E+010.142460E+010.393185E+010.670990E+01
```

```
0.602654E+010.462628E+010.318404E+010.196245E+01
 0.182170E+010.157736E+010.997598E+000.188010E+00-.518835E+000.341313E+000.147720E+010.138105E+010.152118E+010.754592E+000.190948E+000.181649E+01
0.265808E+010.281516E+010.393869E+010.458838E+01
 0.284531E+010.480027E+00-.113603E+01-.262820E+01-.215062E+01-.469453E+00-.598998E+000.468196E+000.224499E+010.215732E+010.318274E+010.559225E+01
0.623320E+010.390271E+010.159551E+010.200487E+01
 0.154332E+010.122996E+010.597600E+00-.296159E+00-.909263E+00-.719824E+00-.153910E+00-.781515E-010.409531E+000.242954E+00-.451389E+000.748980E+00
0.214948E+010.282308E+010.306350E+010.278619E+01
 0.320625E+010.902992E+00-.324770E+00-.168628E+01-.188272E+01-.145593E+01-.804828E+000.460366E+000.200032E+010.327785E+010.275481E+010.385907E+01
0.579982E+010.328885E+010.116575E+010.183263E+01
 0.102931E+010.893972E+000.301273E+00-.257846E+00-.523009E+00-.117802E+01-.140187E+01-.107888E+01-.603338E+000.234185E+000.361429E+000.588206E+00
0.192249E+010.306765E+010.303424E+010.252447E+01
 0.333689E+010.134675E+010.503587E+00-.108920E+01-.146855E+01-.132937E+01-.995008E+000.255733E+000.140526E+010.341236E+010.279987E+010.259698E+01
0.464531E+010.270785E+010.160068E+010.169470E+01
```

10. PF117

```
FILE: PF117A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):    40  0  0.00
SOUTHWEST ROM CELL (LON):    75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50689   WRITE TIME:  155907
PARAMETER NAME:    UNITS:             DESCRIPTION:
SIGMAct            none               fractional coverage of all cloud types
80203  0 SIGMAct
 0.237848E-020.486282E-020.752097E-020.102990E-010.136832E-010.189072E-010.274814E-010.402745E-010.571770E-010.777723E-010.102376E+000.132797E+00
0.172843E+000.228905E+000.311024E+000.433507E+00
 0.556311E-020.914643E-020.131181E-010.181415E-010.258323E-010.381439E-010.561355E-010.794062E-010.106679E+000.136919E+000.170366E+000.209208E+00
0.257898E+000.323290E+000.414709E+000.540008E+00
 0.105711E-010.161194E-010.229317E-010.327355E-010.478409E-010.697200E-010.982209E-010.131981E+000.169285E+000.208968E+000.251330E+000.298795E+00
0.355916E+000.428588E+000.522245E+000.635794E+00
 0.184875E-010.276976E-010.398971E-010.575550E-010.825474E-010.115100E+000.154157E+000.198099E+000.245209E+000.294296E+000.345623E+000.401449E+00
0.465277E+000.539458E+000.623186E+000.714007E+00
 0.311376E-010.468913E-010.679339E-010.963380E-010.132581E+000.175857E+000.224969E+000.278544E+000.335002E+000.393080E+000.452755E+000.515306E+00
0.581092E+000.646180E+000.707958E+000.774901E+00
 0.512684E-010.778719E-010.111827E+000.153209E+000.200984E+000.254218E+000.312282E+000.374298E+000.438848E+000.504479E+000.570398E+000.635462E+00
0.694260E+000.737776E+000.773827E+000.822501E+00
 0.823654E-010.125638E+000.177004E+000.232805E+000.291350E+000.352806E+000.417667E+000.485697E+000.555622E+000.625568E+000.693161E+000.753039E+00
0.793340E+000.808603E+000.824511E+000.860778E+00
 0.127968E+000.195032E+000.268627E+000.339387E+000.406685E+000.473260E+000.541229E+000.611080E+000.681594E+000.750118E+000.811866E+000.856668E+00
0.870542E+000.861323E+000.865217E+000.892430E+00
 0.190851E+000.288952E+000.389061E+000.473928E+000.546457E+000.613565E+000.679357E+000.744985E+000.809133E+000.868236E+000.915356E+000.937972E+00
0.926755E+000.902485E+000.899504E+000.919108E+00
 0.272495E+000.406089E+000.533808E+000.629566E+000.702511E+000.764788E+000.822389E+000.876869E+000.926929E+000.968987E+000.996058E+000.997011E+00
0.968905E+000.937101E+000.929065E+000.941805E+00
 0.371757E+000.538066E+000.687534E+000.787990E+000.856316E+000.909277E+000.953989E+000.992216E+000.100000E+010.100000E+010.100000E+010.100000E+01
0.100000E+010.967184E+000.954463E+000.961065E+00
 0.479083E+000.662961E+000.820637E+000.918739E+000.979461E+000.100000E+010.100000E+010.100000E+010.100000E+010.100000E+010.100000E+010.100000E+01
0.100000E+010.992737E+000.975696E+000.977041E+00
 0.567455E+000.740031E+000.891985E+000.986160E+000.100000E+010.100000E+010.100000E+010.100000E+010.100000E+010.100000E+010.100000E+010.100000E+01
0.100000E+010.100000E+010.992463E+000.989526E+00
 0.614977E+000.749132E+000.886267E+000.980684E+000.100000E+010.100000E+010.100000E+010.100000E+010.100000E+010.100000E+010.100000E+010.100000E+01
0.100000E+010.100000E+010.100000E+010.997968E+00
```

11. PF118

```
FILE: PF118A      REGION: ROMNET1   TYPE: 4  COLS: 16  ROWS: 14  PARAMETERS: 11
SOUTHWEST ROM CELL (LAT):    40  0  0.00
SOUTHWEST ROM CELL (LON):    75 15  0.00
CREATE DATE: 70688  CREATE TIME: 163944
WRITE DATE:  70688   WRITE TIME:  170420
PARAMETER NAME:    UNITS:          DESCRIPTION:
urban              none            urban
agri               none            agriculture
range              none            rangeland
df                 none            deciduous forest
ev                 none            evergreen
mf                 none            mixed forest including wetlands
water              none            water
barren             none            barren
nfw                none            non forested wetland
mar                none            mixed agricultural and rangeland
rocky              none            rocky open with shrubs and lichens
 80203  0  urban     agri      range     df        ev        mf        water     barren    nfw       mar       rocky
 0.850000E+000.400000E+000.500000E-010.500000E-010.300000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.100000E+000.400000E+000.800000E+000.150000E+000.500000E-010.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.500000E-010.100000E+000.100000E+000.650000E+000.500000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.000000E+000.000000E+000.000000E+000.150000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.000000E+000.100000E+000.500000E-010.000000E+000.150000E+000.100000E+010.100000E+010.100000E+010.100000E+010.100000E+010.100000E+010.100000E+01
0.100000E+010.100000E+010.100000E+010.100000E+01
 0.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
```

12. PF119

```
FILE: PF119A      REGION:.ROMNET1   TYPE: 4  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 70688  CREATE TIME: 135959
WRITE DATE:  70688   WRITE TIME:  140854
PARAMETER NAME:    UNITS:             DESCRIPTION:
Zt                 m above msl        terrain elevation
80203  0 Zt
 0.540185E+020.375185E+020.316296E+020.268148E+020.173704E+020.490741E+010.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.838704E+020.583148E+020.388333E+020.288148E+020.173148E+020.612963E+010.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.109037E+030.789815E+020.508704E+020.306667E+020.169630E+020.611111E+010.407407E+000.129630E+000.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.143111E+030.117185E+030.871111E+020.491481E+020.231111E+020.113519E+020.907407E+010.844444E+010.511111E+010.168519E+010.500000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+00
 0.177519E+030.163741E+030.137778E+030.902407E+020.460556E+020.231667E+020.185926E+020.138704E+020.116852E+020.761111E+010.496296E+010.242593E+01
0.944444E+000.148148E+000.000000E+000.000000E+00
 0.240111E+030.213333E+030.198111E+030.150685E+030.923148E+020.542778E+020.373889E+020.246667E+020.137963E+020.761111E+010.503704E+010.251852E+01
0.129630E+010.425926E+000.259259E+000.000000E+00
 0.323037E+030.262870E+030.231426E+030.202148E+030.144741E+030.103333E+030.691296E+020.528333E+020.308889E+020.159815E+020.809259E+010.455556E+01
0.203704E+010.425926E+000.259259E+000.000000E+00
 0.380648E+030.300778E+030.249389E+030.217759E+030.175444E+030.151259E+030.119185E+030.999444E+020.647778E+020.453519E+020.314259E+020.274259E+02
0.200185E+020.147778E+020.887037E+010.329630E+01
 0.406593E+030.344944E+030.275981E+030.229019E+030.171444E+030.169444E+030.156148E+030.155148E+030.115963E+030.873704E+020.668889E+020.595000E+02
0.532778E+020.445370E+020.309815E+020.177963E+02
 0.409463E+030.374370E+030.320056E+030.244111E+030.165741E+030.164352E+030.185537E+030.208870E+030.172204E+030.127648E+030.100630E+030.954444E+02
0.988333E+020.856667E+020.591111E+020.361852E+02
 0.444315E+030.446574E+030.427278E+030.324185E+030.195741E+030.156167E+030.197574E+030.254111E+030.223167E+030.154574E+030.116963E+030.119074E+03
0.140111E+030.126130E+030.872037E+020.562963E+02
 0.489741E+030.527204E+030.532296E+030.438315E+030.270778E+030.184204E+030.208426E+030.293185E+030.278593E+030.192296E+030.134204E+030.140648E+03
0.172593E+030.156352E+030.105556E+030.694815E+02
 0.523074E+030.590018E+030.614518E+030.548537E+030.352407E+030.224296E+030.206000E+030.312944E+030.321796E+030.235889E+030.156407E+030.154611E+03
0.192537E+030.179019E+030.122093E+030.760741E+02
 0.517963E+030.584926E+030.609630E+030.566630E+030.377741E+030.240259E+030.205333E+030.323630E+030.366759E+030.285481E+030.196556E+030.175222E+03
0.214778E+030.193444E+030.131907E+030.751296E+02
```

13. PF144

```
FILE: PF144A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  6
SOUTHWEST ROM CELL (LAT):    40  0  0.00
SOUTHWEST ROM CELL (LON):    75 15  0.00
CREATE DATE: 52989  CREATE TIME:  94624
WRITE DATE:  52989  WRITE TIME:   94624
PARAMETER NAME:    UNITS:            DESCRIPTION:
OLE                moles/hr          olefins only
PAR                moles/hr          paraffins only
ISOP               moles/hr          isoprenes only
ALD2               moles/hr          aldehydes only
NO                 moles/hr          nitrous oxide
NO2                moles/hr          nitrogen dioxide
80203  0  OLE         PAR         ISOP        ALD2        NO          NO2
0.380525E+030.807434E+030.831100E+030.587412E+030.494050E+030.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.580911E+040.126062E+050.130054E+050.920088E+040.769932E+040.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.395884E+030.672109E+030.673969E+030.471070E+030.419718E+030.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.220498E+020.145261E+020.137323E+020.197455E+020.159536E+020.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.132299E+010.871565E+000.823935E+000.118473E+010.957216E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.730066E+030.687862E+030.547062E+030.613819E+030.638347E+030.338675E+020.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.113233E+050.106329E+050.837354E+040.946389E+040.985461E+040.522830E+030.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.652723E+030.636443E+030.555914E+030.582621E+030.598375E+030.317507E+020.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.185140E+020.199409E+020.230579E+020.200452E+020.195547E+020.103639E+010.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.111084E+010.119646E+010.138347E+010.120271E+010.117328E+010.621836E-010.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.794236E+030.874372E+030.589195E+030.479878E+030.384242E+030.290685E+020.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.123255E+050.135309E+050.901882E+040.736313E+040.593139E+040.449014E+030.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.705899E+030.800071E+030.598496E+030.476881E+030.360435E+030.270899E+020.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.186084E+020.226576E+020.246595E+020.194651E+020.118718E+020.885089E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
0.111651E+010.135946E+010.147957E+010.116791E+010.712309E+000.531053E-010.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000
.000000E+000.000000E+000.000000E+000.000000E+00
```

APPENDIX D

SAMPLE OUTPUT OF THE INTERFACES

I. LOG FILES

1. PDFSNBK

```
DIFFBREAK
HEIGHT OF THE MIXED LAYER
       0          0        224          1         10
      23          1          1
       0          0          0          0          0
       0          0          0          0
       0          0          0          0          0          0
   80203          0      80205       0100
      0.         0.         18
 520000.   4460000.
   8000.      8000.
      31         25          5
       2          3        0.0       50.0      100.0
     4.0         16         14
       1
A                 1          1         -1
A         DIFFBREAK CONSTANT         0.0     3000.0          0
```

2. IREGNTP

```
FILE: MF166A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50889   WRITE TIME:   73332
PARAMETER NAME:    UNITS:            DESCRIPTION:
Z2                 m above msl       interface surface elevation

FILE: PF119A      REGION: ROMNET1   TYPE: 4  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 70688  CREATE TIME: 135959
WRITE DATE:  70688   WRITE TIME:  140854
PARAMETER NAME:    UNITS:            DESCRIPTION:
Zt                 m above msl       terrain elevation

REGIONTOP
REGIONTOP FILE CREATED AT 02/07/90
         0         0       224         1        10
        28         1         1
         0         0         0         0         0
         0         0         0         0
         0         0         0         0         0         0
     80203         0     80204      2400
        0.        0.        18
   520000.  4460000.
     8000.     8000.
        31        25         5
         2         3       0.0      50.0     100.0
       4.0        16        14
         1
A                  1         1        -1
A         REGIONTOP CONSTANT         200.0    3000.0         0
```

3. ITMPRTR

```
FILE: PF103A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50689   WRITE TIME:  163526
PARAMETER NAME:    UNITS:            DESCRIPTION:
SURTMP             deg. K            Absolute surface temperature

TEMPERATUR
TEMPERATURE FILE CREATED AT 02/07/90
         0          0        224          1         10
        28          0          0
         0          0          0          0          0
         0          0          0          0
         0          0          0          0          0          0
     80203         00      80204       2400
        0.         0.         18
   520000.   4460000.
     8000.      8000.
        31         25          5
         2          3        0.0        50.       100.
DEGK
        1.         0.         0.
       4.0         16         14
     4436803.754        489342.737
     4455302.343        489368.769
     4473801.472        489394.890
     4492301.142        489421.102
     4510801.353        489447.404
     4529302.106        489473.795
     4547803.401        489500.276
     4566305.238        489526.846
        ...
        ...
        ...
         1
A                   1          1         -1
A         TEMPERATURSTATINTERP        270.0      330.0          4
EXTENT          10.0
INITRADIUS       2.0
RADIUSINCR       1.0
MAXRADIUS        5.0
```

4. IMETSCL

```
FILE: PF119A      REGION: ROMNET1   TYPE: 4  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 70688  CREATE TIME: 135959
WRITE DATE:  70688  WRITE TIME:  140854
PARAMETER NAME:    UNITS:            DESCRIPTION:
Zt                 m above msl       terrain elevation

FILE: MF174A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50889  WRITE TIME:   73302
PARAMETER NAME:    UNITS:            DESCRIPTION:
<wvc>1             ppm               layer 1 water vapor concentration

FILE: PF117A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50689  WRITE TIME:  155907
PARAMETER NAME:    UNITS:            DESCRIPTION:
SIGMAct            none              fractional coverage of all cloud types

FILE: PF102A      REGION: N/A       TYPE: 1  COLS:  0  ROWS:  0  PARAMETERS:  3
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50689  WRITE TIME:  163633
PARAMETER NAME:    UNITS:            DESCRIPTION:
  Zm               msl               height where param. were interpolated
  Tvm(z)             deg K           virtual temperature
  qm(z)              none            mixing ratio fraction

       41.        73.        5.
METSCALARS
METSCALARS FILE CREATED AT 03/15/90
         0          0        224          1         10
        28          1          1
         0          0          0          0          0
         0          0          0          0
         0          0          0          0          0          0
     80203          0      80204       2400
        0.         0.         18
   520000.   4460000.
     8000.      8000.
        31         25          5
         2          3        0.0        50.       100.
       4.0         16         14     1.0000
AVERAGE SURFACE ELEVATION =      129.60
```

5. IWIND

```
       0
INTERFACE ROM WINDS TEST RUN FOR 21-22 JULY 1980(3/07/90)
     80203         0.      80204        24.
        0.         0.         18
   520000.  4460000.
     8000.     8000.
        31        25          5
         2         3        0.0        50.       100.
         1         0          1          2
NX= 31  NY= 25  NZUAM= 5  UTMXOR=   520000.  UTMYOR=  4460000.
DELTAX=8000.  DELTAY=8000.
IBDY= 80203 TBEG=   0. IEDY= 80204 TEND=  24. ISHRS=  0
NZLOWR= 2  NZUPPR= 3 HTSUR=  0. HTLOW= 50.  HTUPP=100.
RMIN=  1. RMAX= 25. NINTRP= 5
ROM GRID PTS; IRX= 16  IRY= 14  IIR= 224
     4436803.754       489342.737
     4455302.343       489368.769
     4473801.472       489394.890
     4492301.142       489421.102
     4510801.353       489447.404
         ...
         ...
    -31.        -23.
    -31.         -5.
    -31.         14.
    -31.         32.
    -31.         51.
    -31.         69.
    -30.         88.
    -30.        106.
    -30.        125.
    -30.        143.
    -30.        162.
    -30.        180.
    -30.        199.
    -30.        217.
     -9.        -23.
     -9.         -5.
     -9.         14.
     -9.         32.
     -9.         51.
     -9.         69.
    -10.         88.
    -10.        106.
    -10.        125.
    -10.        143.
    -10.        162.
    -10.        180.
    -10.        199.
    -10.        217.
     12.        -23.
     12.         -5.
     12.         14.
     12.         32.
     12.         51.
     12.         69.
     11.         88.
     11.        106.
     11.        125.
     11.        143.
     11.        162.
     11.        180.
     11.        199.
     11.        217.
     33.        -23.
     33.         -5.
     33.         14.
     33.         32.
```

33.	51.
33.	69.
32.	88.
32.	106.
32.	125.
32.	143.
32.	162.
32.	180.
32.	199.
32.	218.
55.	-23.
54.	-4.
54.	14.
54.	33.
54.	51.
54.	70.
53.	88.
53.	107.
53.	125.
53.	144.
53.	162.
53.	181.
52.	199.
52.	218.
76.	-23.
76.	-4.
75.	14.
75.	33.
75.	51.
75.	70.
74.	88.
74.	107.
74.	125.

...
...

80203	0	285.
80203	1	285.
80203	2	285.
80203	3	285.
80203	4	285.
80203	5	300.
80203	6	360.

...
...

ROM TERRAIN ELEVATION (m, MSL)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
14	52	58	61	57	38	24	21	32	37	29	20	18	21	19	13	8
13	52	59	61	55	35	22	21	31	32	24	16	15	19	18	12	8
12	49	53	53	44	27	18	21	29	28	19	13	14	17	16	11	7
11	44	45	43	32	20	16	20	25	22	15	12	12	14	13	9	6
10	41	37	32	24	17	16	19	21	17	13	10	10	10	9	6	4
9	41	34	28	23	17	17	16	16	12	9	7	6	5	4	3	2
8	38	30	25	22	18	15	12	10	6	5	3	3	2	1	1	0
7	32	26	23	20	14	10	7	5	3	2	1	0	0	0	0	0
6	24	21	20	15	9	5	4	2	1	1	1	0	0	0	0	0
5	18	16	14	9	5	2	2	1	1	1	0	0	0	0	0	0
4	14	12	9	5	2	1	1	1	1	0	0	0	0	0	0	0
3	11	8	5	3	2	1	0	0	0	0	0	0	0	0	0	0
2	8	6	4	3	2	1	0	0	0	0	0	0	0	0	0	0
1	5	4	3	3	2	0	0	0	0	0	0	0	0	0	0	0

ARRAY HAS BEEN SCALED BY 0.1E+00 FOR PRINTING

DATE = 80203 HOUR = 0 ROM PARAMETER =21

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
14	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
13	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
12	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
11	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
10	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
9	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
8	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
7	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
6	30	30	30	30	20	20	30	30	30	30	30	30	30	30	30	30
5	30	30	30	20	20	20	20	20	30	30	30	30	30	30	30	30
4	30	30	30	20	20	30	30	30	30	30	30	30	30	30	30	30
3	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
2	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
1	20	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

ARRAY HAS BEEN SCALED BY 0.1E+00 FOR PRINTING

DATE = 80203 HOUR = 0 ROM PARAMETER = <u>1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
14	10	9	3	-3	-5	-12	-14	-11	-6	2	4	6	19	31	30	25
13	15	12	6	-3	-9	-7	-2	-1	4	2	-5	7	21	28	31	28
12	18	16	10	2	-5	3	15	14	15	8	2	18	27	28	39	46
11	20	17	14	11	10	17	28	30	25	20	23	31	31	30	47	58
10	22	17	18	23	29	32	37	43	35	35	44	41	34	34	43	47
9	19	16	23	31	40	45	45	49	46	46	52	45	38	36	31	23
8	11	18	25	30	41	51	47	45	52	51	49	47	41	36	19	8
7	4	19	21	24	39	48	42	37	47	50	46	45	41	32	17	9
6	5	18	16	22	40	39	33	31	37	45	45	43	39	29	21	17
5	14	14	17	30	41	31	29	33	33	41	45	41	37	28	22	18
4	21	12	23	36	36	31	35	43	42	43	45	41	36	26	18	13
3	20	14	25	29	27	35	44	53	55	49	45	40	31	20	13	10
2	12	16	17	12	19	35	46	55	56	51	45	34	23	13	9	9
1	7	13	6	3	15	25	36	43	43	42	38	24	12	7	8	9

ARRAY HAS BEEN SCALED BY 0.1E+02 FOR PRINTING

DATE = 80203 HOUR = 0 ROM PARAMETER = <v>1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
14	33	13	5	-11	-15	-13	-10	3	14	34	28	26	46	27	16	17
13	32	9	-3	-17	-19	-15	-8	5	20	33	28	39	58	33	12	18
12	28	5	-11	-26	-22	-5	-6	5	22	22	32	56	62	39	16	20
11	26	0	-17	-33	-22	7	-2	3	19	14	39	67	60	46	32	20
10	24	-4	-16	-32	-20	12	6	0	11	19	45	66	56	53	48	16
9	23	-7	-10	-27	-14	11	11	0	4	27	47	57	53	55	49	12
8	23	-3	-4	-21	-5	12	8	3	3	28	47	49	51	49	36	11
7	28	6	-4	-15	8	14	-1	7	11	23	46	47	46	40	20	12
6	34	15	-10	-3	19	11	-9	8	20	23	44	46	40	30	11	11
5	33	20	-12	13	21	2	-8	8	26	30	41	43	34	22	7	8
4	24	20	-2	23	17	-5	-1	8	26	37	39	40	28	14	3	3
3	14	20	11	23	14	-3	7	13	23	35	37	35	21	5	-1	-1
2	11	23	14	19	22	8	14	20	18	30	32	26	11	-4	-3	-4
1	16	25	7	20	34	17	23	23	15	27	24	14	2	-8	-1	-5

ARRAY HAS BEEN SCALED BY 0.1E+02 FOR PRINTING

DATE = 80203 HOUR = 0 ROM PARAMETER = <u>2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
14	5	4	2	1	-2	-5	-4	-1	-2	-1	0	2	3	4	4	5
13	4	4	2	0	-3	-4	-1	0	-1	-1	-1	2	3	3	4	3
12	4	3	1	0	-1	0	2	1	1	0	0	2	3	3	4	3
11	3	2	1	1	2	5	5	3	3	3	2	3	4	4	3	3
10	2	1	2	3	6	7	6	5	6	6	6	5	5	5	4	4
9	1	1	3	4	7	8	7	8	9	9	8	7	6	5	4	4
8	2	2	3	4	6	7	8	9	11	11	9	9	7	6	5	4
7	3	3	3	4	5	6	7	7	10	11	10	9	8	6	5	4
6	3	3	4	6	7	5	6	6	7	10	11	9	8	7	5	4
5	4	4	5	7	8	6	7	8	7	9	11	9	8	7	5	5
4	5	6	7	8	9	9	10	12	10	10	10	9	7	6	6	5
3	8	8	8	9	9	11	13	14	13	11	9	9	7	6	5	5
2	9	9	8	8	8	11	12	12	13	10	8	8	6	6	5	4
1	8	8	8	8	8	8	8	9	9	8	6	6	5	5	5	4

ARRAY HAS BEEN SCALED BY 0.1E+01 FOR PRINTING

DATE = 80203 HOUR = 0 ROM PARAMETER = <v>2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
14	35	15	5	-10	-6	-23	-29	-1	3	34	43	29	66	58	65	90
13	25	6	-12	-30	-34	-25	-1	-1	-2	44	54	44	68	67	69	84
12	18	-7	-27	-48	-49	-3	13	-12	-2	37	66	67	64	73	72	67
11	12	-21	-36	-53	-41	22	3	-25	2	29	72	83	65	72	69	57
10	4	-26	-37	-42	-14	26	-15	-29	4	29	69	82	71	65	64	58
9	-6	-19	-31	-24	16	18	-22	-18	5	28	58	72	71	58	58	57
8	-12	-9	-22	-10	38	20	-20	0	13	14	47	64	57	51	51	46
7	-15	-7	-12	2	49	30	-18	17	32	0	37	61	38	43	41	32
6	-17	-8	-1	18	50	30	-14	24	52	9	27	53	26	28	29	23
5	-16	-3	10	38	43	15	0	23	58	39	19	36	23	11	19	18
4	-11	6	21	52	36	9	23	19	48	61	12	15	18	-1	14	15
3	-5	8	32	55	38	27	39	19	33	50	7	0	7	-7	7	12
2	-3	-1	37	52	50	56	41	23	23	19	1	-8	-6	-11	-1	10
1	-1	-5	36	47	60	69	39	28	18	-3	-7	-14	-16	-14	-6	9

ARRAY HAS BEEN SCALED BY 0.1E+02 FOR PRINTING

SUMMARY OF DIVERGENCE MINIMIZATION

LEVEL	ITERATIONS	MAXIMUM DIVERGENCE (/SEC)
1	23	0.943E-06
2	23	0.943E-06
3	23	0.943E-06
4	23	0.943E-06
5	23	0.943E-06

0.1278E+02 0.7170E+01 0.2774E+01 0.2808E+01 0.2242E+01 0.2618E+01

....

....

6. ICRETER

```
FILE: PF118A      REGION: ROMNET1   TYPE: 4  COLS: 16  ROWS: 14  PARAMETERS: 11
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 70688  CREATE TIME: 163944
WRITE DATE:  70688   WRITE TIME:  170420
PARAMETER NAME:    UNITS:            DESCRIPTION:
urban              none              urban
agri               none              agriculture
range              none              rangeland
df                 none              deciduous forest
ev                 none              evergreen
mf                 none              mixed forest including wetlands
water              none              water
barren             none              barren
nfw                none              non forested wetland
mar                none              mixed agricultural and rangeland
rocky              none              rocky open with shrubs and lichens

FILE: PF108A      REGION: ROMNET1   TYPE: 4  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 50489  CREATE TIME: 105017
WRITE DATE:  50489   WRITE TIME:  121739
PARAMETER NAME:    UNITS:            DESCRIPTION:
Z0                 meters            effective surface roughness

   16   14   520000.  4460000.    31      25      8000.      8000.
 40 00 00.000 075 15 00.000
TERRAIN
   SURFACE ROUGHNESS AND VEGETATIVE FACTORS
         0         0       224        1         20
        11         1         1
         0         0         0        1          0
         0         0         0        0
         0         0         0        0          0          0
     80001         0     80366     2400
        0.        0.        18
   520000.  4460000.
     8000.     8000.
        31        25         5
         2         3       0.0      50.       100.
       4.0        16        14
         1
A                  1         1       -1
A         ROUGHNESS GRID VALUE    0.0         20.0          0
A         VEGFACTOR GRID VALUE    0.0          2.0          0
```

7. ICONC

```
        0

FILE: PF119A      REGION: ROMNET1   TYPE: 4  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 70688  CREATE TIME: 135959
WRITE DATE:  70688   WRITE TIME:  140854
PARAMETER NAME:    UNITS:             DESCRIPTION:
Zt                 m above msl        terrain elevation

FILE: MF165A      REGION: ROMNET1   TYPE: 5  COLS: 16  ROWS: 14  PARAMETERS:  1
SOUTHWEST ROM CELL (LAT):   40  0  0.00
SOUTHWEST ROM CELL (LON):   75 15  0.00
CREATE DATE: 50689  CREATE TIME: 155355
WRITE DATE:  50889  WRITE TIME:   73332
PARAMETER NAME:    UNITS:             DESCRIPTION:
Z1                 m above msl        interface surface elevation

AIRQUALITY
TOPCONC
BOUNDARY
AIRQUALITY FILE CREATED AT 03/08/90 (UPPER VERTICAL VARIATION)
TOP CONCENTRATION FILE CREATED AT 03/08/90 (UPPER VERTICAL VARIATION)
BOUNDARY FILE CREATED AT 03/08/90 (UPPER VERTICVAL VARIATION)
     80203         0      80204      2400
        0.        0.         18
   520000.  4460000.
     8000.     8000.
        31        25          5
         2         3        0.0        50.        100.
        16        14
      20.0      10.0       50.0
     4436803.754        489342.737
     4455302.343        489368.769
     4473801.472        489394.890
     4492301.142        489421.102
     4510801.353        489447.404
     4529302.106        489473.795
     4547803.401        489500.276
        ...
        ...
         1
```

8. IBIOG

```
 80203    0 80203  24
    16   14   520000.  4460000.      31      25      8000.      8000.
PLL1 40 00 00.000 075 15 00.000
  1
BEGIN DATE= 80203 BEGIN TIME=   0.00 END DATE= 80203 END TIME=   1.00
BEGIN DATE= 80203 BEGIN TIME=   1.00 END DATE= 80203 END TIME=   2.00
BEGIN DATE= 80203 BEGIN TIME=   2.00 END DATE= 80203 END TIME=   3.00
BEGIN DATE= 80203 BEGIN TIME=   3.00 END DATE= 80203 END TIME=   4.00
BEGIN DATE= 80203 BEGIN TIME=   4.00 END DATE= 80203 END TIME=   5.00
BEGIN DATE= 80203 BEGIN TIME=   5.00 END DATE= 80203 END TIME=   6.00
BEGIN DATE= 80203 BEGIN TIME=   6.00 END DATE= 80203 END TIME=   7.00
BEGIN DATE= 80203 BEGIN TIME=   7.00 END DATE= 80203 END TIME=   8.00
BEGIN DATE= 80203 BEGIN TIME=   8.00 END DATE= 80203 END TIME=   9.00
BEGIN DATE= 80203 BEGIN TIME=   9.00 END DATE= 80203 END TIME=  10.00
BEGIN DATE= 80203 BEGIN TIME=  10.00 END DATE= 80203 END TIME=  11.00
BEGIN DATE= 80203 BEGIN TIME=  11.00 END DATE= 80203 END TIME=  12.00
BEGIN DATE= 80203 BEGIN TIME=  12.00 END DATE= 80203 END TIME=  13.00
BEGIN DATE= 80203 BEGIN TIME=  13.00 END DATE= 80203 END TIME=  14.00
BEGIN DATE= 80203 BEGIN TIME=  14.00 END DATE= 80203 END TIME=  15.00
BEGIN DATE= 80203 BEGIN TIME=  15.00 END DATE= 80203 END TIME=  16.00
BEGIN DATE= 80203 BEGIN TIME=  16.00 END DATE= 80203 END TIME=  17.00
BEGIN DATE= 80203 BEGIN TIME=  17.00 END DATE= 80203 END TIME=  18.00
BEGIN DATE= 80203 BEGIN TIME=  18.00 END DATE= 80203 END TIME=  19.00
BEGIN DATE= 80203 BEGIN TIME=  19.00 END DATE= 80203 END TIME=  20.00
BEGIN DATE= 80203 BEGIN TIME=  20.00 END DATE= 80203 END TIME=  21.00
BEGIN DATE= 80203 BEGIN TIME=  21.00 END DATE= 80203 END TIME=  22.00
BEGIN DATE= 80203 BEGIN TIME=  22.00 END DATE= 80203 END TIME=  23.00
BEGIN DATE= 80203 BEGIN TIME=  23.00 END DATE= 80203 END TIME=  24.00
   ...Normal Completion of UAMBIO
```

II. OUTPUT DATA FILES

1. DBPACK

```
CONTROL
DIFFBREAK
HEIGHT OF THE MIXED LAYER
         0          0        224          1         10
        23          1          1
         0          0          0          0          0
         0          0          0          0
         0          0          0          0          0          0
     80203          0      80205        100
END
REGION
        0.         0.         18
   520000.  4460000.
     8000.      8000.
        31         25          5
         2          3        0.0        50.       100.
END
TIME INTERVAL
     80203          0      80203        100
SUBREGION
A                   1          1         -1
END
METHOD
A         DIFFBREAK CONSTANT             0.0     3000.0          0
END
CONSTANTS
A         DIFFBREAK        285.0
END
ENDTIME
TIME INTERVAL
     80203        100      80203        200
CONSTANTS
A         DIFFBREAK        285.0
END
ENDTIME
TIME INTERVAL
     80203        200      80203        300
CONSTANTS
A         DIFFBREAK        285.0
END
ENDTIME
TIME INTERVAL
     80203        300      80203        400
CONSTANTS
A         DIFFBREAK        285.0
END
ENDTIME
TIME INTERVAL
     80203        400      80203        500
CONSTANTS
A         DIFFBREAK        285.0
END
ENDTIME
TIME INTERVAL
     80203        500      80203        600
CONSTANTS
A         DIFFBREAK        300.0
END
ENDTIME
TIME INTERVAL
     80203        600      80203        700
CONSTANTS
A         DIFFBREAK        360.0
END
ENDTIME
  .....
  .....
```

2. RTPACK

```
CONTROL
REGIONTOP
REGIONTOP FILE CREATED AT 01/05/90
        0         0       224         1        10
       28         1         1
        0         0         0         0         0
        0         0         0         0
        0         0         0         0         0         0
    80203         0     80204      2400
END
REGION
       0.        0.        18
  520000.  4460000.
    8000.     8000.
       31        25         5
        2         3       0.0       50.      100.
END
TIME INTERVAL
    80203         0     80203       100
SUBREGION
A                 1         1        -1
END
METHOD
A         REGIONTOP CONSTANT        200.0    3000.0         0
END
CONSTANTS
A         REGIONTOP      1213.6
END
ENDTIME
TIME INTERVAL
    80203       100     80203       200
CONSTANTS
A         REGIONTOP      1213.6
END
ENDTIME
TIME INTERVAL
    80203       200     80203       300
CONSTANTS
A         REGIONTOP      1213.6
END
ENDTIME
TIME INTERVAL
    80203       300     80203       400
CONSTANTS
A         REGIONTOP      1213.6
END
ENDTIME
   .....
   .....
```

3. TPPACK

```
CONTROL
TEMPERATUR
TEMPERATURE FILE CREATED AT 02/07/90
         0          0        224          1         10
        28          0          0
         0          0          0          0          0
         0          0          0          0
         0          0          0          0          0          0
     80203          0      80204       2400
END
REGION
        0.         0.         18
   520000.   4460000.
     8000.      8000.
        31         25          5
         2          3        0.0        50.       100.
END
UNITS
TEMPERATURDEGK               1.0        0.0        0.0
END
STATIONS
 001          489343.  4436804.         4.0
 002          489369.  4455302.         4.0
 003          489395.  4473801.         4.0
 004          489421.  4492301.         4.0
 005          489447.  4510801.         4.0
 006          489474.  4529302.         4.0
 007          489500.  4547803.         4.0
 008          489527.  4566305.         4.0
 009          489554.  4584808.         4.0
 010          489580.  4603311.         4.0
    .....
    .....
TIME INTERVAL
     80203          0      80203        100
SUBREGION
A                   1          1         -1
END
METHOD
A         TEMPERATURSTATINTERP      270.0      330.0          4
EXTENT         10.00
INITRADIUS      2.00
RADIUSINCR      1.00
MAXRADIUS       5.00
END
STATION READINGS
 001      TEMPERATUR      303.55
 002      TEMPERATUR      303.70
 003      TEMPERATUR      303.83
 004      TEMPERATUR      303.91
 005      TEMPERATUR      303.92
 006      TEMPERATUR      303.85
 007      TEMPERATUR      303.70
 008      TEMPERATUR      303.47
 009      TEMPERATUR      303.17
 010      TEMPERATUR      302.82
    .....
    .....
ENDTIME
TIME INTERVAL
     80203        100      80203        200
STATION READINGS
 001      TEMPERATUR      303.18
 002      TEMPERATUR      303.33
 003      TEMPERATUR      303.46
 004      TEMPERATUR      303.55
 005      TEMPERATUR      303.58
 006      TEMPERATUR      303.53
 007      TEMPERATUR      303.39
 008      TEMPERATUR      303.17
 009      TEMPERATUR      302.86
 010      TEMPERATUR      302.48
```

4. MSPACK

```
CONTROL
METSCALARS
METSCALARS FILE CREATED AT 02/07/90
         0         0       224         1        10
        28         1         1
         0         0         0         0         0
         0         0         0         0
         0         0         0         0         0         0
     80202      2300     80204      2400
END
REGION
        0.        0.        18
   520000.  4460000.
     8000.     8000.
        31        25         5
         2         3       0.0       50.      100.
END
TIME INTERVAL
     80202      2300     80202      2400
SCALARS
TGRADBELOW     0.0023
TGRADABOVE    -0.0062
EXPCLASS         -1.0
RADFACTOR      0.0005
CONCWATER  22509.6289
ATMOSPRESS     1.0000
END
ENDTIME
TIME INTERVAL
     80203         0     80203       100
SCALARS
TGRADBELOW     0.0023
TGRADABOVE    -0.0062
EXPCLASS         -1.0
RADFACTOR      0.0005
CONCWATER  22509.6289
ATMOSPRESS     1.0000
END
ENDTIME
TIME INTERVAL
     80203       100     80203       200
SCALARS
TGRADBELOW     0.0023
TGRADABOVE    -0.0060
EXPCLASS         -1.0
RADFACTOR      0.0005
CONCWATER  23095.6016
ATMOSPRESS     1.0000
END
ENDTIME
     .....
     .....
```

5. WDBIN (converted from binary to ASCII-formatted data)

```
WIND          INTERFACE ROM WINDS TEST RUN FOR 21-22 JULY 1980(2/12/90)
 1  0  80203    0.00  80204  24.00
      0.00       0.00 18 520000.004460000.00 8000. 8000.  31  25    5   2   3      0.     50.    100.
   0    0   31    25
 80203      0. 80203      1.
   1     10.0 45990.0 25811.9  9987.5 10107.6  8070.5  9425.9
   1WINDX
 0.7787484370+04 0.8553667970+04 0.8769593750+04 0.8903515620+04 0.8833160160+04 0.9348628910+04
0.9969937500+04
 0.1058827730+05 0.1104651560+05 0.1213996090+05 0.1317583590+05 0.1401665230+05 0.1490912890+05
0.1618527340+05
 0.1722034370+05 0.1776625390+05 0.1769629690+05 0.1755433590+05 0.1756968750+05 0.1764129300+05
0.1710651170+05
 0.1695852340+05 0.1673910550+05 0.1592133590+05 0.1449221870+05 0.1330837500+05 0.1205008980+05
0.1114662500+05
 0.9691855470+04 0.8829847660+04 0.7501625000+04 0.7736925780+04 0.9063539060+04 0.9278667970+04
0.9718523440+04
 0.9427785160+04 0.9722082030+04 0.9969488280+04 0.1058001170+05 0.1126771480+05 0.1275506250+05
0.1394946480+05
 0.1496052340+05 0.1598364450+05 0.1744722660+05 0.1836491800+05 0.1912735160+05 0.1920291020+05
0.1890619140+05
 0.1857954690+05 0.1821802340+05 0.1719108590+05 0.1680505470+05 0.1635080470+05 0.1586653910+05
0.1462529300+05
 0.1366877340+05 0.1226152340+05 0.1145693750+05 0.9599613280+04 0.8617167970+04 0.6907863280+04
0.8338304690+04
 0.1023094920+05 0.1068435550+05 0.1149688670+05 0.1130546090+05 0.1171345310+05 0.1137795700+05
0.1144637500+05
     .....
     .....
```

6. CRPACK

```
CONTROL
TERRAIN
   SURFACE ROUGHNESS AND VEGETATIVE FACTORS
         0         0       224         1        20
        11         1         1
         0         0         0         1         0
         0         0         0         0
         0         0         0         0         0         0
     80203         0     80204      2400
END
REGION
        0.        0.        18
   520000.  4460000.
     8000.     8000.
        31        25         5
         2         3       0.0       50.      100.
END
SUBREGION
A                  1         1        -1
END
METHOD
A         ROUGHNESS GRID VALUE       0.0      20.0         0
A         VEGFACTOR GRID VALUE       0.0       2.0         0
END
GRIDVALUES
A         ROUGHNESS          1         1    0.4418
A         ROUGHNESS          2         1    0.4625
A         ROUGHNESS          3         1    0.5002
A         ROUGHNESS          4         1    0.6595
A         ROUGHNESS          5         1    0.6582
A         ROUGHNESS          6         1    0.6260
A         ROUGHNESS          7         1    0.6006
A         ROUGHNESS          8         1    0.6023
A         ROUGHNESS          9         1    0.1564
A         ROUGHNESS         10         1    0.0954
   .....
   .....
A         VEGFACTOR          1         1    0.4234
A         VEGFACTOR          2         1    0.4227
A         VEGFACTOR          3         1    0.4185
A         VEGFACTOR          4         1    0.4014
A         VEGFACTOR          5         1    0.4021
A         VEGFACTOR          6         1    0.3455
A         VEGFACTOR          7         1    0.2970
A         VEGFACTOR          8         1    0.2983
A         VEGFACTOR          9         1    0.0773
A         VEGFACTOR         10         1    0.0470
  .....
```

7. Concentrations (converted from binary to ASCII-formatted data)

a. AQBIN

```
AIRQUALITYAIRQUALITY FILE CREATED AT 02/07/90
 1 17  80203     0. 80203     1.
       0.0          0.0  18  520000.0  4460000.0  8000. 8000.  31  25   5   2   3      0.
50.   100.
    0     0    31    25
ALD2
CO
MEOH
ETH
FORM
H2O2
HONO
HNO3
ISOP
NO
NO2
O3
OLE
PAN
PAR
TOL
XYL
          80203        0.00       80203        1.00
   1ALD2
 0.5390055E-02 0.5550455E-02 0.5058065E-02 0.4465759E-02 0.4071090E-02 0.4019521E-02
0.3772630E-02 0.3532808E-02 0.3133613E-02
 0.2706288E-02 0.2334491E-02 0.1935369E-02 0.1647927E-02 0.1342687E-02 0.1092274E-02
0.1004362E-02 0.8889469E-03 0.8328399E-03
 0.7433663E-03 0.6453546E-03 0.5876040E-03 0.5277474E-03 0.4281648E-03 0.3995183E-03
0.3289634E-03 0.2650477E-03 0.2404772E-03
 0.1841258E-03 0.1746988E-03 0.1713723E-03 0.1653302E-03 0.5378228E-02 0.5623013E-02
0.5631592E-02 0.5478267E-02 0.5570099E-02
 0.4736841E-02 0.4871331E-02 0.4511725E-02 0.3436231E-02 0.3146544E-02 0.2624529E-02
0.1731435E-02 0.1550211E-02 0.1210967E-02
 0.8003742E-03 0.8093521E-03 0.7475831E-03 0.7270717E-03 0.7192129E-03 0.6843165E-03
0.6713336E-03 0.5685880E-03 0.5221746E-03
 0.4797077E-03 0.3669327E-03 0.3315944E-03 0.2645031E-03 0.2100678E-03 0.1904640E-03
0.1739417E-03 0.1619196E-03 0.4838329E-02
 0.5325098E-02 0.4836645E-02 0.4903592E-02 0.4939042E-02 0.4175354E-02 0.4485190E-02
0.4005142E-02 0.3465866E-02 0.3235064E-02
 0.3145505E-02 0.2414930E-02 0.2078671E-02 0.2100749E-02 0.1085541E-02 0.1208491E-02
0.1056023E-02 0.7603115E-03 0.7753933E-03
 0.6958642E-03 0.6817719E-03 0.6215631E-03 0.5444873E-03 0.5234110E-03 0.3996936E-03
0.3507985E-03 0.3200313E-03 0.2157307E-03
    .....
    .....
```

b. TCBIN

```
TOPCONC   TOP CONCENTRATION FILE CREATED AT 02/07/90
 1 17  80203     0. 80204    24.
       0.0         0.0  18  520000.0  4460000.0  8000. 8000.  31  25   5   2   3     0.
50.   100.
    0    0   31   25
ALD2
CO
MEOH
ETH
FORM
H2O2
HONO
HNO3
ISOP
NO
NO2
O3
OLE
PAN
PAR
TOL
XYL
          80203        0.00      80203       1.00
   1ALD2
 0.1676959E-02 0.1806376E-02 0.1687865E-02 0.1555634E-02 0.1470636E-02 0.1227236E-02
0.9601510E-03 0.9423597E-03 0.9040162E-03
 0.8467683E-03 0.8566619E-03 0.8375766E-03 0.8009754E-03 0.7869960E-03 0.7187899E-03
0.7026675E-03 0.6594190E-03 0.5990707E-03
 0.5853628E-03 0.5127888E-03 0.4908738E-03 0.4664999E-03 0.4024126E-03 0.3952233E-03
0.3685411E-03 0.3383362E-03 0.3201370E-03
 0.2767025E-03 0.2629498E-03 0.2298642E-03 0.1900253E-03 0.1593563E-02 0.1678694E-02
0.1729173E-02 0.1719858E-02 0.1728543E-02
 0.1359247E-02 0.1193167E-02 0.1134378E-02 0.1031648E-02 0.1032077E-02 0.9896115E-03
0.9917228E-03 0.9896662E-03 0.8673551E-03
 0.8579844E-03 0.8217592E-03 0.7480124E-03 0.7478236E-03 0.6606516E-03 0.6291592E-03
0.6079325E-03 0.5099142E-03 0.4712353E-03
 0.4490800E-03 0.3965900E-03 0.3850961E-03 0.3389593E-03 0.3040442E-03 0.2845160E-03
0.2389497E-03 0.2057391E-03 0.1391634E-02
 0.1569148E-02 0.1607519E-02 0.1770669E-02 0.1730786E-02 0.1608028E-02 0.1363098E-02
0.1359144E-02 0.1301320E-02 0.1142975E-02
 0.1246702E-02 0.1143262E-02 0.1111748E-02 0.1115325E-02 0.9252687E-03 0.9317605E-03
0.8724555E-03 0.7814355E-03 0.7794050E-03
 0.6807395E-03 0.6543004E-03 0.6072829E-03 0.4930545E-03 0.4935747E-03 0.4272133E-03
0.3992491E-03 0.3823470E-03 0.3114087E-03
 0.3003103E-03 0.2429265E-03 0.2112471E-03 0.1228761E-02 0.1184106E-02 0.1457017E-02
0.1739897E-02 0.1826769E-02 0.1752808E-02
    .....
    .....
```

c. BCBIN

```
BOUNDARY  BOUNDARY FILE CREATED AT 02/07/90
 1 17  80203     0. 80204    24.
      0.0          0.0  18  520000.0  4460000.0  8000. 8000.  31  25   5   2   3     0.
50.   100.
    0    0   31    25
ALD2
CO
MEOH
ETH
FORM
H2O2
HONO
HNO3
ISOP
NO
NO2
O3
OLE
PAN
PAR
TOL
XYL
         1         1         25
            0          0         0         0         2         0
0            0          2
            0          0         0         2         0         0
0           2           0
            0          0         2         0         0         0
2            0          0
            0          2         0         0         0         2
0            0          0
            2          0         0         0         2         0
0            0          2
            0          0         0         2         0         0
0            2          0
            0          0         2         0         0         0
2            0          0
            0          2         0         0         0         2
0            0          0
            2          0         0         0         2         0
0            0          2
            0          0         0         2         0         0
0            2          0
            0          0         2         0         0         0
0            0          0
            0
         1         2         25
            0          0         0         0        30         0
0            0         30
            0          0         0        30         0         0
0           30          0
            0          0        30         0         0         0
30            0          0
            0         30         0         0         0        30
0            0          0
           30          0         0         0        30         0
0            0         30
            0          0         0        30         0         0
0           30          0
            0          0        30         0         0         0
30            0          0
            0         30         0         0         0        30
0            0          0
           30          0         0         0        30         0
0            0         30
            0          0         0        30         0         0
0           30          0
            0          0        30         0         0         0
0            0          0
            0
```

```
     .....
     .....
      80203      0.00      80203      1.00
      1ALD2                1
 0.4772995E-02 0.4772995E-02 0.1499274E-02 0.1499274E-02 0.1499274E-02 0.4657090E-02
0.4657090E-02 0.1367880E-02 0.1367880E-02
 0.1367880E-02 0.4398949E-02 0.4398949E-02 0.1277624E-02 0.1277624E-02 0.1277624E-02
0.4099492E-02 0.4099492E-02 0.1199320E-02
 0.1199320E-02 0.1199320E-02 0.4098292E-02 0.4098292E-02 0.1163073E-02 0.1163073E-02
0.1163073E-02 0.4443850E-02 0.4443850E-02
 0.1175725E-02 0.1175725E-02 0.1175725E-02 0.4757784E-02 0.4757784E-02 0.1194114E-02
0.1194114E-02 0.1194114E-02 0.4892405E-02
 0.4892405E-02 0.1245040E-02 0.1245040E-02 0.1245040E-02 0.5027022E-02 0.5027022E-02
0.1295966E-02 0.1295966E-02 0.1295966E-02
 0.4989132E-02 0.4989132E-02 0.1346782E-02 0.1346782E-02 0.1346782E-02 0.4917748E-02
0.4917748E-02 0.1397577E-02 0.1397577E-02
    .....
    .....
```

8. EMBIN

```
EMISSIONS EMISSIONS FOR JD80203 FOR 1980 JUL 21 (16AUG1989)
 1 11  80203     0. 80204    24.
        0.0          0.0  18  520000.0  4460000.0  8000. 8000.  31  25   5   2   3     0.     50.
100.
    0    0   31    25
CO
NO
NO2
PAR
TOL
XYL
OLE
FORM
ALD2
ETH
ISOP
          80203        0.00        80203        1.00
    1CO
 0.3430000E+04 0.2906000E+04 0.1406000E+04 0.3539000E+04 0.3743000E+04 0.1456000E+04 0.2255000E+04
0.6156000E+04 0.5292000E+04
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.1596000E+04 0.2602000E+04 0.4222000E+04
0.6395000E+04 0.6929000E+04
 0.6836000E+04 0.4750000E+04 0.6078000E+04 0.1402000E+04 0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.1290000E+04
 0.1947000E+04 0.3809000E+04 0.1694100E+05 0.8463000E+04 0.6418000E+04 0.3730000E+04 0.1770000E+03
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.1841000E+04 0.6398000E+04 0.9196000E+04 0.2137270E+06
0.1902300E+05 0.2093700E+05
 0.6119000E+04 0.1296000E+04 0.4569000E+04 0.2054000E+04 0.3420000E+03 0.6470000E+03 0.1289000E+04
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
0.1594000E+04 0.3390000E+04
 0.3761000E+04 0.1671200E+05 0.1454800E+05 0.2155700E+05 0.1381000E+05 0.1572300E+05 0.1677900E+05
0.1511600E+05 0.1428200E+05
 0.1613100E+05 0.1252500E+05 0.7115000E+04 0.1190000E+04 0.4350000E+03 0.3040000E+03 0.8700000E+02
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.6930000E+03 0.1704000E+04 0.2073000E+04 0.6257000E+04 0.1460600E+05
0.3587200E+05 0.2620200E+05
 0.1845200E+05 0.3336200E+05 0.3124300E+05 0.2659500E+05 0.1810400E+05 0.1532300E+05 0.1430100E+05
0.1096000E+05 0.7732000E+04
 0.3265000E+04 0.4604000E+04 0.2760000E+04 0.6050000E+03 0.0000000E+00 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00
 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.8370000E+03
0.1668000E+04 0.2080000E+04
    .....
    .....
```

APPENDIX E

CONVERSION OF OUTPUT FILES (BINASC AND ASCBIN)

1. BINASC (BINARY TO ASCII: UNFORMATTED DATA TO FORMATTED DATA)

I. PROCESSOR FUNCTION

This processor converts binary UAM model input and output data to ASCII formatted data for investigation of pre- and post-model application. BINASC reads in UAM preprocessors' or ROM-UAM interface processors' output data files and control cards. The average concentration output data file from UAM model can also be converted to ASCII formatted data.

II. I/O COMPONENTS

A. Input Files

The input files consist of any input data file for UAM model application and UAM average concentration output data file.

B. Control Cards

Two control cards are used in this processor. The control card variables are listed in Table E-1.

```
      READ (*,100) IFILE
            .....
      READ (*,100) IPATH3
            .....
  100 FORMAT (A)
```

TABLE E-1. BINASC CONTROL CARD VARIABLES

Variable name	Units	Data type	Description
IFILE		Character*10	File name
IPATH3		Character*80	Index of unit for log file

Example: The run stream is listed below.

```
//* JOB CARD
//*
//*
/*ROUTE PRINT HOLD
//STEP1 EXEC PGM=BINASC
//STEPLIB  DD DSN=<UIDACCT>.LOAD,DISP=SHR
//* THIS IS THE INPUT FILE
//FT07F001 DD DSN=<input file>,DISP=SHR
//* THIS IS THE OUTPUT FILES
//FT09F001 DD DSN=<output file>,
//            DISP=(NEW,CATLG,DELETE),
//            SPACE=(TRK,(200,10)),UNIT=SYSDA,
//            DCB=(RECFM=FB,LRECL=132,BLKSIZE=7920)
//*
//FT05F001 DD *
EMISSIONS
6
/*
//* THIS IS END OF DATA
//
```

Valid input file names for each parameter are listed below.

```
AIRQUALITY   :  Air quality
AVERAGE      :  Average concentrations (output)
BOUNDARY     :  Boundary concentrations
CHEMPARAM    :  Chemistry parameter
DIFFBREAK    :  Diffusion break
EMISSIONS    :  Area source emissions
METSCALARS   :  Meteorological scalars
PTSOURCE     :  Point source emissions
REGIONTOP    :  Regiontop
SIMCONTROL   :  Simulation control
TEMPERATUR   :  Temperature
TERRAIN      :  Terrain
TOPCONC      :  Top concentration
WIND         :  Wind field
```

C. Output Files

The ASCII formatted data file contains the same information as the input binary unformatted data file.

2. ASCBIN (ASCII TO BINARY: FORMATTED DATA TO UNFORMATTED DATA)

I. PROCESSOR FUNCTION

This processor converts ASCII formatted UAM model input and output data back to binary data for model application. ASCBIN reads in UAM preprocessors' or ROM-UAM interface processors' output data files (ASCII formatted) and control cards. The average concentration output data file from the UAM model can also be converted to binary unformatted data for postprocessor application.

II. I/O COMPONENTS

A. Input Files

The input files consist of any input data file for the UAM model application and the UAM average concentration output data file.

B. Control Cards

Two control cards are used in the processor. The control card variables are listed in Table E-2.

```
    READ (*,100) IFILE
    READ (*,100) IPATH3
    .....
100 FORMAT (A)
```

TABLE E-2. ASCBIN CONTROL CARD VARIABLES

Variable name	Units	Data type	Description
IFILE		Character*10	File name
IPATH3		Character*80	Index of unit for log file

Example: The run stream is listed below.

```
//* JOB CARD
//*
//*
/*ROUTE PRINT HOLD
//STEP1 EXEC PGM=ASCBIN
//STEPLIB  DD DSN=<UIDACCT>.LOAD,DISP=SHR
//* THIS IS THE INPUT FILE
//FT07F001 DD DSN=<input file>,DISP=SHR
//* THIS IS THE OUTPUT FILES
//FT09F001 DD DSN=<output file>,
//            DISP=(NEW,CATLG,DELETE),
//            SPACE=(TRK,(200,10)),UNIT=SYSDA,
//            DCB=(RECFM=VB,LRECL=5000,BLKSIZE=5004)
//*
//FT05F001 DD *
EMISSIONS
6
/*
//* THIS IS END OF DATA
//
```

Valid input file names for each parameter are the same as those listed previously for BINASC.

C. Output Files

The binary unformatted data file contains the same information as the input ASCII formatted data file.

APPENDIX F

MAGNETIC TAPE LISTING OF PROGRAMS AND DATA FILES FOR THE EXAMPLE TEST CASE

	File number		File name
1. IBIOG	1	INPUTS-	EMISSION
	2		PF144
	3	INTERFACE-	IBIOG
	4	RUNSTREAM-	RUNBG
	5	LOGFILE-	BIOLOG
	6	OUTPUT FILES-	BIOASC
	7		EMBIN (ASCII VERSION)
2. ICONC	8	INPUTS-	PF119
	9		MF165
	10		DBDATA
	11		ROM21
	12	INTERFACE-	ICONC
	13	RUNSTREAM-	RUNCC
	14	LOGFILE-	CONCLOG
	15	OUTPUT FILES-	AQBIN (ASCII VERSION)
	16		TCBIN (ASCII VERSION)
	17		BCBIN (ASCII VERSION)
3. ICRETER	18	INPUTS-	PF118
	19		PF108
	20	INTERFACE-	ICRETER
	21	RUNSTREAM-	RUNCR
	22	LOGFILE-	TERLOG
	23	OUTPUT FILES-	CRPACK
4. IMETSCL	24	INPUTS-	DBDATA
	25		MF174
	26		RTDATA
	27		PF102
	28		PF119
	29		PF117
	30	INTERFACE-	IMETSCL
	31	RUNSTREAM-	RUNMS
	32	LOGFILE-	METLOG
	33	OUTPUT FILES-	MSPACK

		File number		File name
5.	IREGNTP	34	INPUTS-	DBDATA
		35		PF119
		36		MF166
		37	INTERFACE-	IREGNTP
		38	RUNSTREAM-	RUNRT
		39	LOGFILE-	REGLOG
		40	OUTPUT FILES-	RTDATA
		41		RTPACK
6.	ITMPRTR	42	INPUTS-	PF103
		43	INTERFACE-	ITMPRTR
		44	RUNSTREAM-	RUNTP
		45	LOGFILE-	TEMPLOG
		46	OUTPUT FILES-	TPPACK
7.	IWIND	47	INPUTS-	PF114
		48		PF115
		49		MF165
		50		PF119
		51		DBDATA
		52		RTDATA
		53	INTERFACE-	IWIND
		54	RUNSTREAM-	RUNWD
		55	LOGFILE-	WINDLOG
		56	OUTPUT FILES-	WDBIN (ASCII VERSION)
8.	PDFSNBK	57	INPUTS-	DBDATA
		58	INTERFACE-	PDFSNBK
		59	RUNSTREAM-	RUNDB
		60	LOGFILE-	DBLOG
		61	OUTPUT FILES-	DBPACK
9.	BINARY TO ASCII	62	CODE-	BINASC
		63	RUNSTREAM-	RUNBA
10.	ASCII TO BINARY	64	CODE-	ASCBIN
		65	RUNSTREAM-	RUNAB