ATSUKO COMPUTING
INTERNATIONAL

November 14, 1983 ACI-111483-FR

National Aeronautics and Space Administration
George C. Marshall Space Flight Center
Marshall Space Flight Center, AL 35812

Attention: AP29-F/Edward M. Harper

Subject: Final Report -- "Analysis of Severe Storm Data"

Dear Sir:

Atsuko Computing International (ACI) is pleased to submit the Final Report for Contract NAS8-34744, "Analysis of Severe Storm Data", as an Enclosure to this letter.

If you have any questions concerning this report, please contact me at (205) 533-7590.

Sincerely,

ATSUKO COMPUTING INTERNATIONAL

John S. Hickey
Principal Investigator

jsh/jh

Enclosure: Final Report

Copies of Enclosure to:

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ACI-111483-FR

ANALYSIS OF SEVERE STORM DATA

FINAL REPORT

Prepared for:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GEORGE C. MARSHALL SPACE FLIGHT CENTER
MARSHALL SPACE FLIGHT CENTER, ALABAMA 35812

Attention:

AP29-F/Edward M. Harper

Under Contract:

NAS8-34744

Prepared by:

John S. Hickey
Shogo Karitani

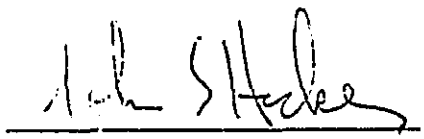
November 14, 1983

ATSUKO COMPUTING INTERNATIONAL
HUNTSVILLE, ALABAMA • USA

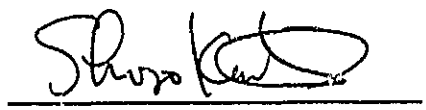
PREFACE

This is the Final Report prepared by Atsuko Computing International (ACI), under Contract NAS8-34744, entitled "Analysis of Severe Storm Data", for the System Dynamics Laboratory of the Marshall Space Flight Center. The NASA technical monitor for this contract is Dr. Greg Wilson/ED44.

Prepared by:



John S. Hickey



Shogo Karitani

ABSTRACT

This report describes the Mesoscale Analysis and Space Sensor (MASS) Data Management and Analysis System developed by Atsuko Computing International (ACI) on the MASS HP-1000 Computer System within the Systems Dynamics Laboratory of the Marshall Space Flight Center.

The MASS Data Management and Analysis System has been successfully implemented and utilized daily by atmospheric scientists to graphically display and analyze large volumes of conventional and satellite derived meteorological data.

The scientist can process interactively various atmospheric data (Sounding, Single Level, Gird, and Image) by utilizing the MASS (AVE80) Task Scheduler which links numerous software programs, allowing each to share common data and user inputs, thereby reducing overhead, optimizing execution time, and thus enhancing user flexibility, useability, and understandability of the total system/software capabilities.

In addition ACI has installed eight APPLE III graphics/imaging computer terminals in individual scientist offices and integrated them into the MASS HP-1000 Computer System thus providing significant enhancement to the overall research environment.

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1.0 INTRODUCTION

Atsuko Computing International (ACI) is pleased to submit this Final Report under Contract NAS8-34744 to the Marshall Space Flight Center for a research study entitled "Analysis of Severe Storms Data".

The primary objectives of this effort were to initially develop a Mesoscale Analysis and Space Sensor (MASS) Data Management and Analysis System on the HP-1000 Computer System and then to extend the MASS data-base management system by the integration of the MASS system disc, plotting, and video hardware via ultilization of new imaging/graphics color display capabilities.

ACI's initial approach was to develop various software packages on the MASS HP-1000 Computer System to process several Atmospheric Variability Experiment (AVE) data types from IBM formatted data tapes and to generate several graphical outputs utilizing the existing hardware/software configuration.

ACI then developed a MASS data-base-management package to convert various experiment data types (Soundings, Single Level, Grid, Image) into a standard format for storing in "random access" disc files, thus making the data readily accessible to the general purpose plotting and analysis software packages.

Next, ACI developed an interactive task scheduler (AVE80) which linked the programs together, thus allowing each program to share data and user inputs, thereby reducing overhead, optimizing execution, and enhancing the user's flexibility, useability, and understandability of the total software capabilities.

In summary the following events were performed by ACI to accomplish the initial activities discussed above:

- o -- Designed, tested and implemented a "random access" disc file system for the AVE data.
- o -- Developed the data-base-management capabilites for MASS data on the MASS HP-1000 computer system.
- o -- Modified existing AVE software to interface with the MASS System graphics hardware/software.
- o -- Developed new software to display graphically the AVE data in a convention normally used by severe storms researchers.
- o -- Modified existing AVE programs on the MASS System to better optimize the processing of the "random access" data sets.

- o -- Provided HP-1000 System level software development, System generations, and installation of new operating system and hardware equipment.

- o -- Developed data-base-management on the MASS HP-1000 compute to process ancillary AVE data.

- o -- Generated a User's Manual Notebook of general-purpose management and plotting software ava.; ble for the MASS System User's.

Once the above effort was completed, ACI extended it's activities to enhance the MASS Data Management and Analysis System by upgrading the existing MASS HP-1000 computer system software/hardware capabilities.

ACI performed extensive modifications to the data-base management software on the MASS HP-1000 to process the four major types of data generated by the AVE/VAS field programs and other related data.

In addition, ACI performed the integration of new MASS system disc, plotting, and video hardware, thus providing for the utilization of new imaging/graphics color display capabilities.

ACI also developed a remote terminal display capability to communicate with the MASS HP-1000 System and provide for interactive video, graphics/imaging, and editing capabilities from individual user offices.

These tasks performed by ACI conclude all work to be performed by ACI under this contract and are listed below:

- o -- Integrated the computer management system for MASS data with disc, plotting, and video hardware capabilites on the MASS computer system utilizing the new imaging/graphics color display capabilities.

- o -- Extended the data-base-management development on the MASS computer to process severe storm sounding, single level, grid, and image data from NASA's AVE/VAS field program.

- o -- Developed the capability to provide video, graphics, and character display of the four severe storm data types using local and remote smart-terminals that communicate with the MASS computer hardware.

- o -- Provided updates and user guidance as to the operation and capabilities developed for the atmospheric scientists participating in the Mesoscale Analysis & Space Sensor Program.

- o -- Demonstrated on a regular weekly basis with the Systems Dynamics Laboratory Scientists the development and evolution of the MASS software/system design.

The remainder of this report details the four major areas of activity in ACI's development of the MASS Data Management & Analysis System. The following provides a brief overview of what is contain-in each of the following sections:

Section 2.0 -- MASS COMPUTER SYSTEM

- o -- System Specifications
- o -- Hardware Configuration
- o -- Terminal LU Assignments
- o -- Disc LU Assignments

Section 3.0 -- DATA BASE AND FILE MANAGEMENT

- o -- Data Types and File Naming
- o -- Data Structure and Formats
- o -- Directory Files
- o -- Documentation Files
- o -- Lat/Lon Files
- o -- Utility Software

Section 4.0 -- ANALYSIS & DISPLAY SOFTWARE

- o -- AVE80 Interactive Software
- o -- Operational Procedures
- o -- Graphical Outputs
- o -- Sounding Data Software (SND80)
- o -- Single Level Data Software (SGL80)
- o -- Grid Data Software (GRD80)
- o -- Image Data Software (IMG80)

Section 5.0 -- MASS APPLE III USER TERMINALS

- o -- APPLE III Hardware Configuration
- o -- APPLE III Terminal Softkey Definitions
- o -- APPLE III Emulation Software
- o -- APPLE III Graphics Interface Software

Section 6.0 -- CONCLUSIONS AND RECOMMENDATIONS

- o -- MASS System/Software Capabilities Summary
- o -- MASS System/Software Recommendations

2.0 MASS COMPUTER SYSTEM

The MASS HP-1000 Computer System is located in the Atmospheric Sciences Division of the Systems Dynamics Laboratory of the Marshall Space Flight Center. The technical specifications are as follows:

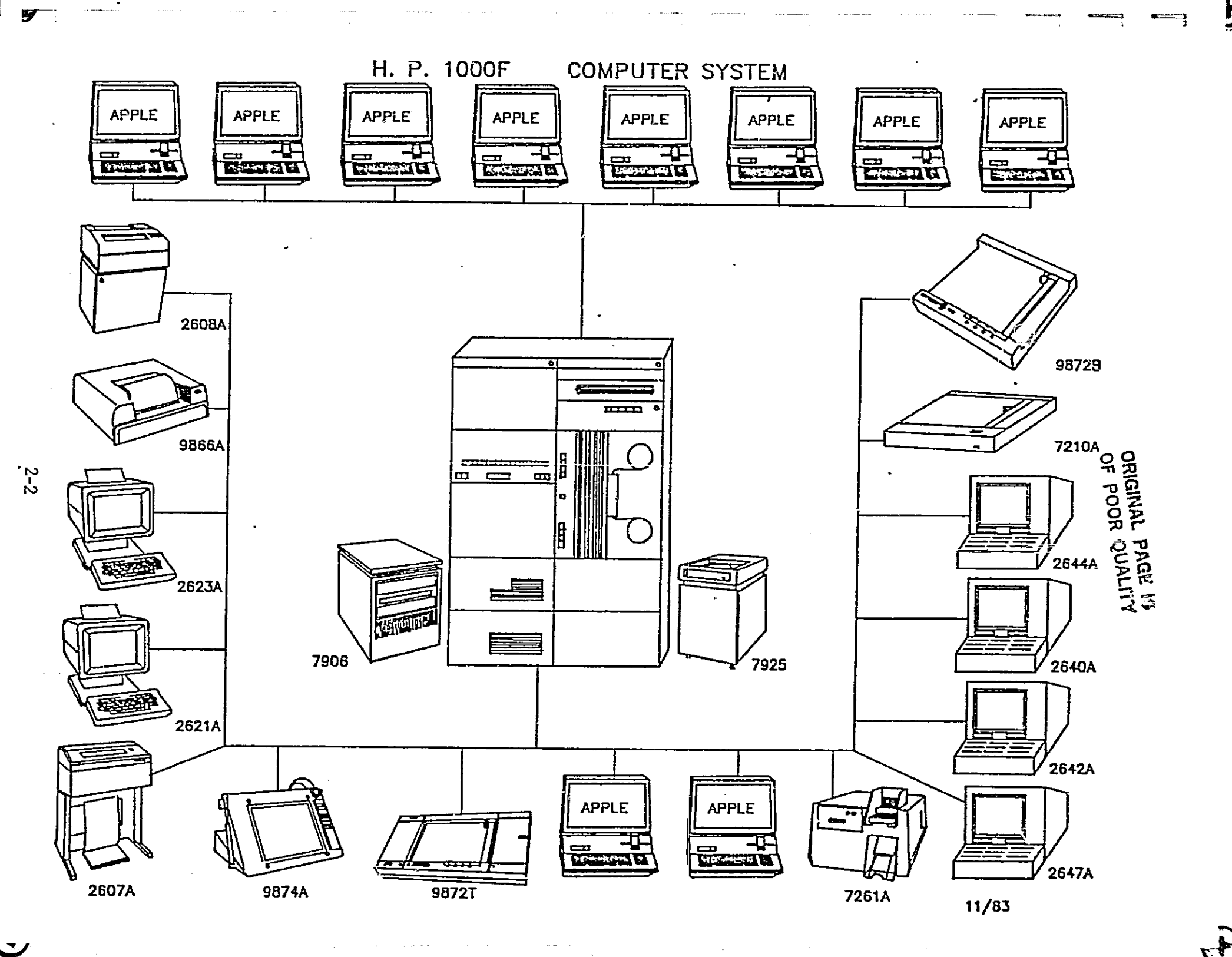
1. HP-1000 F-series CPU
   a) Memory Size: 576 pages (megabytes)
   b) Word Size: 16 bits

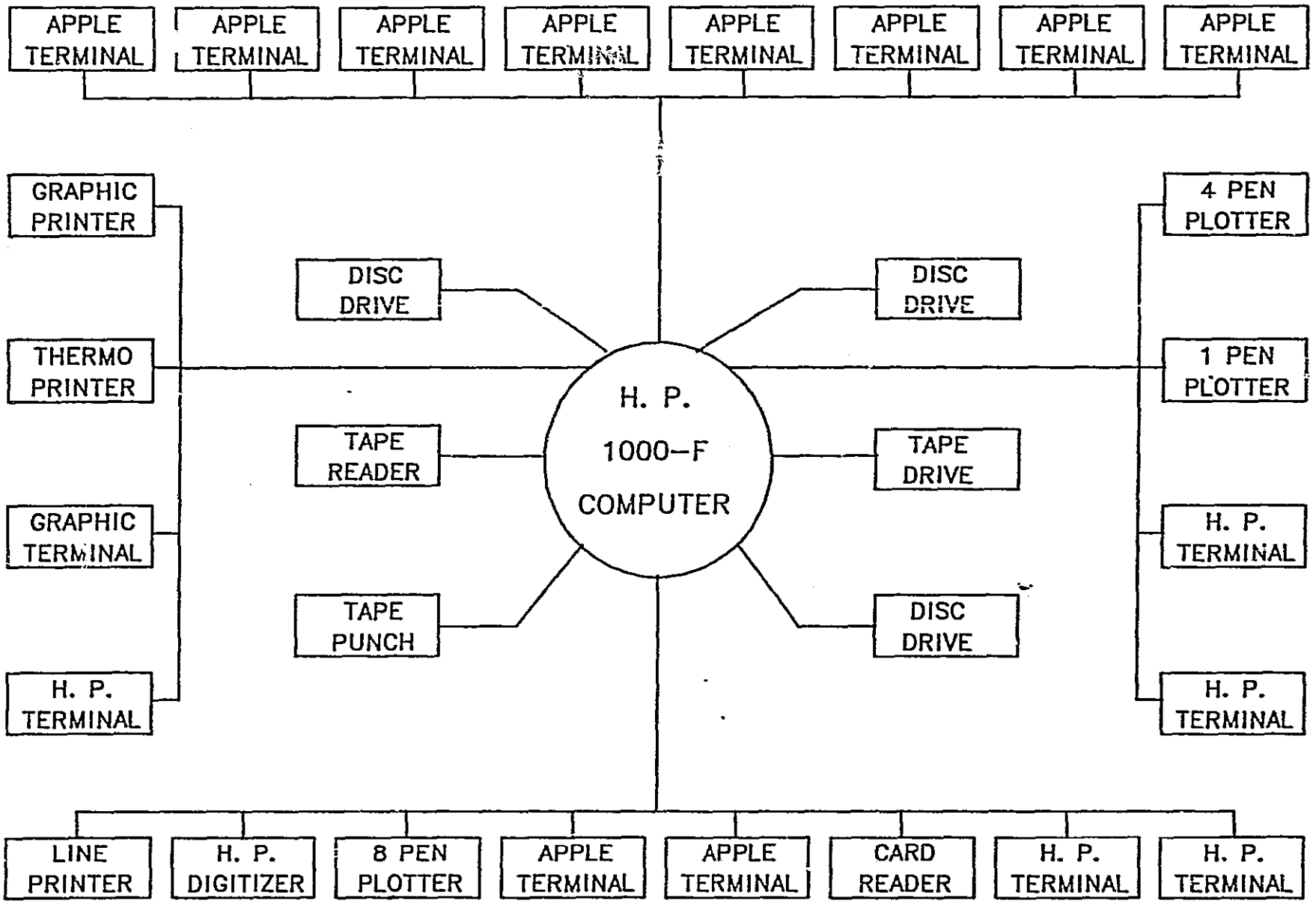
2. INPUT-OUTPUT DEVICES
   a) HP-2640 Alpha-Numeric Terminal
   b) HP-2642 Alpha-Numeric Terminal
   c) HP-2644 Alpha-Numeric Terminal
   d) HP-2647 Graphics Terminal
   e) HP-7970B Digital Magnetic Tape (800bpi)
   f) HP-7900A 5 Megabyte Disc Drive
   g) HP-7925M 120 Megabyte Disc Drive
   h) HP-7906 20 megabyte Disc Drive
   i) DIGITAL DECWRITER II Terminal
   j) HP-2623 Graphics Terminal
   k) APPLE III Color Graphics Terminal
   l) BELL 103 Datagnone Modem
   m) BELL 212 Dataphone Modem

3. INPUT DEVICES
   a) HP-7261A Optical Mark Card Reader
   b) HP-9874A Digitizer
   c) HP-2748B Tape Reader

4. OUTPUT DEVICES
   a) HP-2608A Graphic/Line Printer
   b) HP-9872T 8-Pen Color Graphics Plotter
   c) HP-2895B Paper Tape Punch
   d) HP-9872B 4-Pen Plotter
   e) HP-2607A Line Printer
   f) HP-7210A Single Pen Plotter
   g) HP-9866A Thermal Printer

The MASS Computer System configuration and detailed block diagram are shown in pages 2-2 and 2-3 respectively.





H. P. 1000 F COMPUTER BLOCK DIAGRAM

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ACI has assigned the MASS System terminal LU's to that shown in the table below:

MASS SYSTEM -- TERMINAL LU ASSIGNMENT
(SEPTEMBER 23, 1983)

LU#	MODEL DESCRIPTION	BAUD	DESCRIPTION
01	DECWRITER II TERM	300	SYSTEM CONSOLE
04	HP-2640A CRT TERM	2400	USER TERMINAL
05	HP-2644A CRT TERM	2400	USER TERMINAL
07	HP-2647A GRP TERM	9600	GRPH TERMINAL
09	HP-2621A CRT TERM	9600	USER TERMINAL
13	DATA PHONE 300	300	REMOTE TERMINAL
16	DATA PHONE 1200	1200	REMOTE TERMINAL
39 MUX	APPLE III CRT TERM	9600	USER TERMINAL
40 MUX	APPLE III CRT TERM	9600	USER TERMINAL
41 MUX	APPLE III CRT TERM	9600	USER TERMINAL
42 MUX	APPLE III CRT TERM	9600	USER TERMINAL
43 MUX	APPLE III CRT TERM	9600	USER TERMINAL
60	HP-2623A GRP TERM	9600	GRP/PRT TERMINAL
61 MUX	APPLE III CRT TERM	9600	USER TERMINAL
62 MUX	APPLE III CRT TERM	9600	USER TERMINAL
63 MUX	HP-2642A CRT TERM	9600	USER TERMINAL

ACI has performed all the necessary system generations required to incorporate all software updates received from Hewlett-Packard under the "software update" agreement and to install all incoming hardware equipment.

The MASS HP-1000 Computer System currently operates under the RTE-IV Operating System (Revision 2301). Both the FTN4 and FTN4X compilers are supported, in addition to EDITR and EDIT, and Graphics 1000 and Graphics II software packages.

ACI has also provided system backups of all the MASS software/ data file residing on the dedicated MASS HP-7925 120mb disc drive. ACI has structured the HP-7925 disc LU's to maximize data storage and to minimize program storeage. A detailed MASS disc LU assigment is shown below:

HP 7906 DISC LU ASSIGNMENT
(SEPTEMBER 23, 1983)

LU#	LABLE	#TRKS	TYPE	DESCRIPTION
02	SYSTEM	203	FIXED	RESERVED SYS
03	AUXSYS	144	FIXED	RESERVED SYS
31	NORM	203	FIXED	RESERVED NORM
32	ES84	203	FIXED	ED44 USERS
33	ES82	203	REMOV	ED42 USERS
34	BIGGIE	398	REMOV	GENERAL USERS
35	HPSOFT	203	REMOV	HP-SYS SOFTWARE
36	CSC	203	FIXED	RESERVED CSC
37	CRN#37	203	REMOV	USER'S PACK
38	SPOOL	048	FIXED	SPOOLING

HP 7925 DISC LU ASSIGNMENT
(SEPTEMBER 23, 1983)

LU#	LABLE	#TRKS	DESCRIPTION/USERS
44	IMGDTA	1200	IMAGE DATA
45	SNDDTA	1600	25-MB SOUNDING DATA
46	SGLDTA	1200	SINGLE LEVEL DATA
47	GRDDTA	1200	GRID DATA
48	TMPDTA	400	TEMPORARY DATA STORAGE
49	UTILLB	400	UTIL LIB & GP-1000 LIB
50	TY6PRG	300	OPERATIONAL TYPE 6 PROGS
51	USER01	100	HICKEY, KARITANI
52	USER02	100	ROTHERMEL, FITZGERALD
53	USER03	100	JEDLOVEC,KELLER,MEYER
54	USER04	100	ARNOLD
55	USER05	100	WILSON, ATKINSON
56	USER06	100	ROBERTSON
57	USER07	100	DICKERSON
58	USER08	100	GARST,GOOD,GILL,CHRIST
59	USER09	100	KALB, McNIDER
TOTAL:		7200	

3.0 DATA BASE & FILE MANAGEMENT

ACI has developed a Data Base Management package to convert various experiment data into a standard format for storing in "random access" disc files, thus making the data readily accessible to the Analysis and Display Software (AVE80 Series) and other general purpose plotting and analysis software.

The four specific data types currently processed utilizing the MASS data base management software are:

1) -- Sounding Data
2) -- Single Level Data
3) -- Grid Data
4) -- Image Data

All data sets are initially converted into a standard format and a "random access" disc file created and named accordingly to a defined MASS Data File naming convention as shown on Page 3-2.

All data sets can be accessed by the Analysis and Display (AVE80 Series) programs via retrieving information from a data base Directory File.

The data base Directory File contains the "random access" data file name, Lat@Lon File names, Documentation File name, along with the associated parameter indexes.

ACI has structured the MASS HP-7925 120mb disc to store the four data types and provide for simple file management. Each data set type is assigned to a specific LU as follows:

LU#44 -- Assigned only for Image Data
LU#45 -- Assigned only for Sounding Data
LU#46 -- Assigned only for Single Level Data
LU#47 -- Assigned only for Grid Data
LU#48 - Assigned only for Temporary Data

The AVE80 Series code expects the specific data type to be already existing on the appropriate LU, thus allows for faster accessing and minimizes the data housekeeping/archieving functions.

ACI has developed numerous utility programs which are included in the Data Base Management package to provide functions such as:

- o -- Create Random Access Data Base
- o -- Create Documentation File
- o -- Create Latitude/Longitude File
- o -- Archive/Restore Data Base

3.1 DATA TYPES & FILE NAMING CONVENTION

ACI has developed the MASS Analysis and Display Software to process four types of experiment data:

1) -- Sounding Data
2) -- Single Level Data
3) -- Grid Data
4) -- Image Data

A standard file naming convention has been adopted for these data types as shown below:

MASS Data File Naming Convention

(Six character format)

File Name:	X1	X2	X3	XX4	X5

Where:

X1 = 'R' for Random Access Data Set
= 'S' for Sequential Access Data Set

X2 = 'I' for Image Data
= 'G' for Grid Data
= 'M' for 25-mb Data
= 'S' for Single Level Data

X3 = 'R' for Rawinsonde Data
= 'T' for TIROS OS Sounding Data
= 'A' for TIROS AVHRR Image Data
= 'V' for GOES VAS Sounding Data
= 'G' for GOES VISSR Image Data
= 'S' for Surface-ground Data
= 'C' for Cloud Motion Data
= 'P' for Precipitation Data
= 'M' for MDR Data
= 'N' for NOAA Satellite Data
= 'X' for Digitized Radar Data
= 'D' for Documentation Data (Raw)
= 'L' for Latitude/Long Data (Raw)
= 'Q' for Documentation Data (Sat)
= 'Z' for Latitude/Long Data (Sat)
= ' ' others determined as needed

XX4 = 'An' for AVE/AVESS Group
= 'Sn' for AVE/SESAME Group
= 'Vn' for AVE/VAS Group
= 'On' for Other Group (undefined)
Note: n = 1-9 for Numbering Data Types

X5 = 'n' for Data File Version
Note: n = 1-9,A-Z Data Version Numbers

Example: File Name = RMRS11

Implies: R - Random Data Set
M - 25-mb Sounding Data
R - Rawinsonde Data
S1 - AVE/SESAME I Data Group
1 - Version 1

3.2 DATA STRUCTURE & FORMAT

The four data types each have a dedicated Directory File that contains the file names and parameter information for indexing into the "random access" data base. The number of stations, time periods, and data parameters are all provided in the Directory File.

A description of the Directory File structure and format is given below:

#n	R-Data	R-L/L	PR	STA	TM	S-Docu	S-L/L	Group	(Typ)	Time Per.	YR
01	RMRA41	RMLA41	16	042	09	SMDA41	SMLA41	AVE IV	Raw	APR 24-25	75

Where:
- #n -- Indicates entry number from 1 to 30 entries
- R-Data -- Random Access Data File Name
- R-L/L -- Random Access Lat/Lon File Name
- PR -- Indicates Number of Data Parameters
- STA -- Indicates number of Stations
- TM -- Indicates NUmber of Time Periods
- S-Docu -- Sequential Documentation File Name
- S-L/L -- Sequential Lat/Lon File Name
- Group -- Indicates 1 of 4 Data Groups (AVE,SESAME,VAS,OTH)
- (Typ) -- Indicates Data Type (Raw,Sat,Radr,Cld,Bas,Derv,Etc.)
- Time P -- Indicates Time & Date of Data Base

The Directory File parameters (time periods, stations) are used to compute the indexing scheme used to access various data records in the "random access" data base. An example Directory File for each of the four data types is shown in Section 3.3.

3.3 DIRECTORY FILES

Associated with the MASS Analysis and Display Software, four Directory Files exist, one for each data type:

1) *IMGDR -- Directory File for Image Data on LU#44
2) *SNNDR -- Directory File for Sounding Data on LU#45
3) *SGLDR -- Directory File for Single Level Data on LU#46
4) *GRDDR -- Directory File for Grid Data on LU#47

The Directory Files are each in a fixed format and entries are indexed according to four defined data cases:

1) -- AVE/AVESS
2) -- AVE/SESAME
3) -- AVE/VAS
4) -- Other

Each entry contains the "random access" data file and Lat/Lon File names, the Documentation File name, along with the number of data parameters, time periods, and number of stations. An actual example of each of the four Directory Files is shown on the following pages.

EXAMPLE of Sounding Directory File: *SNDDR

```
0001  #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/AVESS  (Raw) Time Per.  YR .
0002  -- ------  ------  -- --- -- ------  ------  ---------------- ---------  -- .
0003  01 RMRA41  RMLA41  16 042 09 SMDA41  SMLA41  AVE IV           APR 24-25  79 .
0004  02 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0005  30 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0006  #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/SESAME (Raw) Time Per.  YR .
0007  -- ------  ------  -- --- -- ------  ------  ---------------- ---------  -- .
0008  01 RMRS11  RMLS11  16 039 09 SMDS11  SMLS11  AVE-SESAME I     APR 10-11  79 .
0009  02*RMRS21  RMLS21  16 040 09 SMDS21  SMLS21  AVE-SESAME II    APR 19-20  79 .
0010  30 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0011  #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/VAS    (Raw) Time Per.  YR .
0012  -- ------  ------  -- --- -- ------  ------  ---------------- ---------  -- .
0013  01*RMRV11  RMLV11  16 012 03 SMDV11  SMLV11  AVE-VAS I        FEB 06-07  82 .
0014  02 RMRV21  RMLV21  16 037 08 SMDV21  SMLV21  AVE-VAS II       MAR 06-07  82 .
0015  30 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0016  #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   OTHER      (Raw) Time Per.  YR .
0017  -- ------  ------  -- --- -- ------  ------  ---------------- ---------  -- .
0018  01 RGRV22  RDATA1  16 526 01 SMQS11  SDATA1  BOB'S LITEN1     DATE       YR .
0019  02 RGRV22  RDATA2  16 494 01 SMQS11  SDATA2  BOB'S LITEN2     DATE       YR .
0020  30 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0021  #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/AVESS  (Sat) Time Per.  YR .
0022  -- ------  ------  -- --- -- ------  ------  ---------------- ---------  -- .
0023  01 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0024  02 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0025  30 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0026  #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/SESAME (Sat) Time Per.  YR .
0027  -- ------  ------  -- --- -- ------  ------  ---------------- ---------  -- .
0028  01*RMTS11  RMZS11  16 113 01 SMQS11  SMZS11  TIROS-N OS UWRES APR 10     79 .
0029  02 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0030  30 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0031  #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/VAS    (Sat) Time Per.  YR .
0032  -- ------  ------  -- --- -- ------  ------  ---------------- ---------  -- .
0033  01*RMVV21  RMZV21  16 168 05 SMQV21  SMZV21  GOES-E VAS BAD R MAR 06-07  82 .
0034  02 RMVV22  RMZV22  16 207 08 SMQV22  SMZV22  GOES-E VAS OPER  MAR 06-07  82 .
0035  30 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0036  #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   OTHER      (Sat) Time Per.  YR .
0037  -- ------  ------  -- --- -- ------  ------  ---------------- ---------  -- .
0038  01 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0039  02 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0040  30 ______  ______  __ ___ __ ______  ______  ________________ _________  __ .
0041  99 End of  Directory File
```

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OF POOR QUALITY

EXAMPLE of Single Level Directory File: *SGLDR

```
0001  #n R-Data  R-L/L   PR  STA  TM S-Docu  S-L/L   AVE/AVESS  (SFC) Time Per.  YR
0002  --
0003  01
0004  02
0005  30
0006  #n R-Data  R-L/L   PR  STA  TM S-Docu  S-L/L   AVE/SESAME (SFC) Time Per.  YR
0007  --
0008  01 RSSS11  RSLS11  16  784  49 SSDS11  SSLS11  AVE-SESAME I     APR 10-11 79
0009  02*RSSS21  RSLS21  16  770  49 SSDS21  SSLS21  AVE-SESAME II    APR 19-20 79
0010  30
0011  #n R-Data  R-L/L   PR  STA  TM S-Docu  S-L/L   AVE/VAS    (SFC) Time Per.  YR
0012  --
0013  01
0014  02
0015  30
0016  #n R-Data  R-L/L   PR  STA  TM S-Docu  S-L/L   OTHER      (SFC) Time Per.  YR
0017  --
0018  01
0019  02
0020  30
0021  #n R-Data  R-L/L   PR  STA  TM S-Docu  S-L/L   AVE/AVESS  (CLD) Time Per.  YR
0022  --
0023  01 RSCA41  RSLA41  163138 06 SSDA41  SSLA41  SOBEL 25-49 RATO APR 24-25 75
0024  02 RSCA42  RSLA42  164887 02 SSDA42  SSLA42  SOBEL+DATA 25-49 APR 24-25 75
0025  30 RSCA4U  RSLA4U  161586 06 SSDA4U  SSLA4U  AVE IV  5N 35TMP APR 24-25 75
0026  #n R-Data  R-L/L   PR  STA  TM S-Docu  S-L/L   AVE/SESAME (CLD) Time Per.  YR
0027  --
0028  01
0029  02
0030  30
0031  #n R-Data  R-L/L   PR  STA  TM S-Docu  S-L/L   AVE/VAS    (CLD) Time Per.  YR
0032  --
0033  01
0034  02
0035  30
0036  #n R-Data  R-L/L   PR  STA  TM S-Docu  S-L/L   OTHER      (CLD) Time Per.  YR
0037  --
0038  01
0039  02
0040  30
0041  #n R-Data  R-L/L   PR  STA  TM S-Docu  S-L/L   AVE/AVESS  (PCP) Time Per.  YR
0042  --
0043  01
0044  02
0045  30
0046  #n R-Data  R-L/L   PR  STA  TM S-Docu  S-L/L   AVE/SESAME (PCP) Time Per.  YR
0047  --
0048  01
0049  02
0050  30
```

```
0051   #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/VAS     (PLP) Time Per.  YR
0052   -- ------  ------  -- --- -- ------  ------  ----------------- ---------  --
0053   01 RPD001  RPL001  16 531 96 SPD001  SPL001  AVE-VAS III       MAR 26-29  82
0054   02
0055   30
0056   #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   OTHER       (PLP) Time Per.  YR
0057   -- ------  ------  -- --- -- ------  ------  ----------------- ---------  --
0058   01
0059   02
0060   30
0061   #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/AVESS   (LTG) Time Per.  YR
0062   -- ------  ------  -- --- -- ------  ------  ----------------- ---------  --
0063   01
0064   02
0065   30
0066   #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/SESAME  (LTG) Time Per.  YR
0067   -- ------  ------  -- --- -- ------  ------  ----------------- ---------  --
0068   01 RGRV22  RDATA1  16 526 01 SMQS11 SDATA1  BOB'S LITEN1      DATE       YR
0069   02 RGRV22  RDATA2  16 494 01 SMQS11 SDATA2  BOB'S LITEN2      DATE       YR
0070   30
0071   #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/VAS     (LTG) Time Per.  YR
0072   -- ------  ------  -- --- -- ------  ------  ----------------- ---------  --
0073   01
0074   02
0075   30
0076   #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   OTHER       (LTG) Time Per.  YR
0077   -- ------  ------  -- --- -- ------  ------  ----------------- ---------  --
0078   01
0079   02
0080   30
0081   #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/AVESS   (TBD) Time Per.  YR
0082   -- ------  ------  -- --- -- ------  ------  ----------------- ---------  --
0083   01
0084   02
0085   30
0086   #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/SESAME  (TBD) Time Per.  YR
0087   -- ------  ------  -- --- -- ------  ------  ----------------- ---------  --
0088   01
0089   02
0090   30
0091   #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   AVE/VAS     (TBD) Time Per.  YR
0092   -- ------  ------  -- --- -- ------  ------  ----------------- ---------  --
0093   01
0094   02
0095   30
0096   #n R-Data  R-L/L   PR STA TM S-Docu  S-L/L   OTHER       (TBD) Time Per.  YR
0097   -- ------  ------  -- --- -- ------  ------  ----------------- ---------  --
0098   01
0099   02
0100   30
0101   99 End of Directory File
```

EXAMPLE of Grid Data Directory File: *GRDDR

```
0001  #n R-Data  R-L/L   PR LVL TM S-Docu  S-L/L   #C #R GDS  AVE/SESAME  BNRaw  Time Per.  YR
0002  -- ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0003  01 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0004  02 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0005  30
0006  #n R-Data  R-L/L   PR LVL TM S-Docu  S-L/L   #C #R GDS  AVE/SESAME  BNRaw  Time Per.  YR
0007  -- ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0008  01*RGRS11  RGLS11  06 018 09 SGDS11  SGLS11  20 15 972  GJJ MS THESIS     APR 10-11  79
0009  02 RGRS12  RGLS12  05 020 09 SGDS12  SGLS12  18 12 900  AVE-SESAME I  V2  APR 10-11  79
0010  30
0011  #n R-Data  R-L/L   PR LVL TM S-Docu  S-L/L   #C #R GDS  AVE/VAS     BNRaw  Time Per.  YR
0012  -- ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0013  01*RGRV21  RGLV21  06 018 07 SGDV21  SGLV21  16 16 756  NESO 45 SMO       MAR 06-07  82
0014  02*RGRV24  RGLV21  06 018 07 SGDV24  SGLV21  16 16 756  NESO 00           MAR 06-07  82
0015  30
0016  #n R-Data  R-L/L   PR LVL TM S-Docu  S-L/L   #C #R GDS  OTHER       BNRaw  Time Per.  YR
0017  -- ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0018  01 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0019  02 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0020  30
0021  #n R-Data  R-L/L   PR LVL TM S-Docu  S-L/L   #C #R GDS  AVE/AVESS   BNSat  Time Per.  YR
0022  -- ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0023  01 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0024  02 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0025  30
0026  #n R-Data  R-L/L   PR LVL TM S-Docu  S-L/L   #C #R GDS  AVE/SESAME  BNSat  Time Per.  YR
0027  -- ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0028  01*RGTS11  RGZS11  06 010 01 SGQS11  SGZS11  17 13 060  U OF W TIROS RES  APR 10     79
0029  02
0030  30
0031  #n R-Data  R-L/L   PR LVL TM S-Docu  S-L/L   #C #R GDS  AVE/VAS     BNSat  Time Per.  YR
0032  -- ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0033  01*RGVV21  RGZV21  06 018 08 SGQV21  SGZV21  16 16 864  UofWop basic 2    MAR 06-07  82
0034  02 RGVV24  RGZV21  06 018 08 SGQV24  SGZV21  16 16 864  UofWop basic 4    MAR 06-07  82
0035  30
0036  #n R-Data  R-L/L   PR LVL TM S-Docu  S-L/L   #C #R GDS  OTHER       BNSat  Time Per.  YR
0037  -- ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0038  01 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0039  02 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0040  30
0041  #n R-Data  R-L/L   PR LVL TM S-Docu  S-L/L   #C #R GDS  AVE/AVESS   BSSfc  Time Per.  YR
0042  -- ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0043  01 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0044  02 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0045  30
0046  #n R-Data  R-L/L   PR LVL TM S-Docu  S-L/L   #C #R GDS  AVE/SESAME  BSSfc  Time Per.  YR
0047  -- ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0048  01 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0049  02 ------  ------  -- --- -- ------  ------  -- -- ---  ----------------  ---------  --
0050  30
```

ORIGINAL PAGE IS
OF POOR QUALITY

```
0051  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/VAS     BSSfc Time Per. YR
0052  --
0053  01
0054  02
0055  30
0056  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS OTHER       BSSfc Time Per. YR
0057  --
0058  01
0059  02
0060  30
0061  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/AVESS   BSCld Time Per. YR
0062  --
0063  01
0064  02
0065  30
0066  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/SESAME BSCld Time Per. YR
0067  --
0068  01
0069  02
0070  30
0071  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/VAS     BSCld Time Per. YR
0072  --
0073  01
0074  02
0075  30
0076  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS OTHER       BSCld Time Per. YR
0077  --
0078  01
0079  02
0080  30
0081  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/AVESS   BSPcp Time Per. YR
0082  --
0083  01
0084  02
0085  30
0086  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/SESAME BSPcp Time Per. YR
0087  --
0088  01
0089  02
0090  30
0091  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/VAS     BSPcp Time Per. YR
0092  --
0093  01
0094  02
0095  30
0096  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS OTHER       BSPcp Time Per. YR
0097  --
0098  01
0099  02
0100  30
```

0101	#n	R-Data	R-L7L	PR	LVL	TM	S-Docu	S-L7L	#C	#R	GDS	AVE/AVESS	BSLTG	Time Per.	YR
0102	--	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0103	01	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0104	02	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0105	30														
0106	#n	R-Data	R-L7L	PR	LVL	TM	S-Docu	S-L7L	#C	#R	GDS	AVE/SESAME	BSLTG	Time Per.	YR
0107	--	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0108	01	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0109	02	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0110	30														
0111	#n	R-Data	R-L7L	PR	LVL	TM	S-Docu	S-L7L	#C	#R	GDS	AVE/VAS	BSLTG	Time Per.	YR
0112	--	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0113	01	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0114	02	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0115	30														
0116	#n	R-Data	R-L7L	PR	LVL	TM	S-Docu	S-L7L	#C	#R	GDS	OTHER	BSLTG	Time Per.	YR
0117	--	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0118	01	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0119	02	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0120	30														
0121	#n	R-Data	R-L7L	PR	LVL	TM	S-Docu	S-L7L	#C	#R	GDS	AVE/AVESS	BSnnT	Time Per.	YR
0122	--	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0123	01	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0124	02	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0125	30														
0126	#n	R-Data	R-L7L	PR	LVL	TM	S-Docu	S-L7L	#C	#R	GDS	AVE/SESAME	BSnnT	Time Per.	YR
0127	--	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0128	01	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0129	02	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0130	30														
0131	#n	R-Data	R-L7L	PR	LVL	TM	S-Docu	S-L7L	#C	#R	GDS	AVE/VAS	BSnnT	Time Per.	YR
0132	--	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0133	01	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0134	02	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0135	30														
0136	#n	R-Data	R-L7L	PR	LVL	TM	S-Docu	S-L7L	#C	#R	GDS	OTHER	BSnnT	Time Per.	YR
0137	--	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0138	01	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0139	02	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0140	30														
0141	#n	R-Data	R-L7L	PR	LVL	TM	S-Docu	S-L7L	#C	#R	GDS	AVE/AVESS	BSnn2	Time Per.	YR
0142	--	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0143	01	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0144	02	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0145	30														
0146	#n	R-Data	R-L7L	PR	LVL	TM	S-Docu	S-L7L	#C	#R	GDS	AVE/SESAME	BSnn2	Time Per.	YR
0147	--	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0148	01	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0149	02	------	------	--	---	--	------	------	--	--	---	----------	-----	---------	--
0150	30														

```
0151   #n R-Data  R-L/L   PR  LVL  TM  S-Docu  S-L/L   #C  #R  GDS  AVE/VAS      BSnn2  Time Per.  YR
0152   --
0153   01
0154   02
0155   30
0156   #n R-Data  R-L/L   PR  LVL  TM  S-Docu  S-L/L   #C  #R  GDS  OTHER        BSnn2  Time Per.  YR
0157   --
0158   01
0159   02
0160   30
0161   #n R-Data  R-L/L   PR  LVL  TM  S-Docu  S-L/L   #C  #R  GDS  AVE/AVESS    DMRaw  Time Per.  YR
0162   --
0163   01
0164   02
0165   30
0166   #n R-Data  R-L/L   PR  LVL  TM  S-Docu  S-L/L   #C  #R  GDS  AVE/SESAME   DMRaw  Time Per.  YR
0167   --
0168   01
0169   02
0170   30
0171   #n R-Data  R-L/L   PR  LVL  TM  S-Docu  S-L/L   #C  #R  GDS  AVE/VAS      DMRaw  Time Per.  YR
0172   --
0173   01 RGRV22  RGLV21  01  001  07  SGDV22  SGLV21  16  16  007  PRE. H20                MAR 06-07  82
0174   02*RGRV23  RGLV21  01  018  07  SGDV23  SGLV21  16  16  126  REL. HUM (SMO)          MAR 06-07  82
0175   30
0176   #n R-Data  R-L/L   PR  LVL  TM  S-Docu  S-L/L   #C  #R  GDS  OTHER        DMRaw  Time Per.  YR
0177   --
0178   01
0179   02
0180   30
0181   #n R-Data  R-L/L   PR  LVL  TM  S-Docu  S-L/L   #C  #R  GDS  AVE/AVESS    DMSat  Time Per.  YR
0182   --
0183   01
0184   02
0185   30
0186   #n R-Data  R-L/L   PR  LVL  TM  S-Docu  S-L/L   #C  #R  GDS  AVE/SESAME   DMSat  Time Per.  YR
0187   --
0188   01
0189   02
0190   30
0191   #n R-Data  R-L/L   PR  LVL  TM  S-Docu  S-L/L   #C  #R  GDS  AVE/VAS      DMSat  Time Per.  YR
0192   --
0193   01 RGVV22  RGZV21  01  001  08  SGQV22  SGZV21  16  16  008  PRECIP H20 UofWm        MAR 06-07  82
0194   02*RGVV23  RGZV21  01  018  08  SGQV23  SGZV21  16  16  144  REL. HUM. UofWm         MAR 06-07  82
0195   30
0196   #n R-Data  R-L/L   PR  LVL  TM  S-Docu  S-L/L   #C  #R  GDS  OTHER        DMSat  Time Per.  YR
0197   --
0198   01
0199   02
0200   30
```

```
0201  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/AVESS  DSSfc Time Per. YR
0202  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0203  01 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0204  02 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0205  30
0206  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/SESAME DSSfc Time Per. YR
0207  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0208  01 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0209  02 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0210  30
0211  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/VAS    DSSfc Time Per. YR
0212  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0213  01 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0214  02 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0215  30
0216  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS OTHER      DSSfc Time Per. YR
0217  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0218  01 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0219  02 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0220  30
0221  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/AVESS  DSCId Time Per. YR
0222  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0223  01 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0224  02 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0225  30
0226  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/SESAME DSCId Time Per. YR
0227  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0228  01 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0229  02 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0230  30
0231  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/VAS    DSCId Time Per. YR
0232  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0233  01 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0234  02 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0235  30
0236  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS OTHER      DSCId Time Per. YR
0237  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0238  01 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0239  02 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0240  30
0241  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/AVESS  DSPcp Time Per. YR
0242  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0243  01 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0244  02 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0245  30
0246  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/SESAME DSPcp Time Per. YR
0247  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0248  01 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0249  02 ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- --------- --
0250  30
```

```
0251  #n  R-Data  R-L/L  PR  LVL  TM  S-Docu  S-L/L  #C  #R  GDS  AVE/VAS     DSFcp  Time Per.  YR
0252  --  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0253  01  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0254  02  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0255  30  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0256  #n  R-Data  R-L/L  PR  LVL  TM  S-Docu  S-L/L  #C  #R  GDS  OTHER       DSFcp  Time Per.  YR
0257  --  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0258  01  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0259  02  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0260  30  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0261  #n  R-Data  R-L/L  PR  LVL  TM  S-Docu  S-L/L  #C  #R  GDS  AVE/AVESS   DSLTG  Time Per.  YR
0262  --  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0263  01  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0264  02  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0265  30  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0266  #n  R-Data  R-L/L  PR  LVL  TM  S-Docu  S-L/L  #C  #R  GDS  AVE/SESAME  DSLTG  Time Per.  YR
0267  --  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0268  01  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0269  02  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0270  30  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0271  #n  R-Data  R-L/L  PR  LVL  TM  S-Docu  S-L/L  #C  #R  GDS  AVE/VAS     DSLTG  Time Per.  YR
0272  --  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0273  01  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0274  02  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0275  30  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0276  #n  R-Data  R-L/L  PR  LVL  TM  S-Docu  S-L/L  #C  #R  GDS  OTHER       DSLTG  Time Per.  YR
0277  --  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0278  01  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0279  02  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0280  30  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0281  #n  R-Data  R-L/L  PR  LVL  TM  S-Docu  S-L/L  #C  #R  GDS  AVE/AVESS   DSnnT  Time Per.  YR
0282  --  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0283  01  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0284  02  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0285  30  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0286  #n  R-Data  R-L/L  PR  LVL  TM  S-Docu  S-L/L  #C  #R  GDS  AVE/SESAME  DSnnT  Time Per.  YR
0287  --  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0288  01  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0289  02  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0290  30  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0291  #n  R-Data  R-L/L  PR  LVL  TM  S-Docu  S-L/L  #C  #R  GDS  AVE/VAS     DSnnT  Time Per.  YR
0292  --  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0293  01  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0294  02  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0295  30  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0296  #n  R-Data  R-L/L  PR  LVL  TM  S-Docu  S-L/L  #C  #R  GDS  OTHER       DSnnT  Time Per.  YR
0297  --  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0298  01  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0299  02  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
0300  30  ------  -----  --  ---  --  ------  -----  --  --  ---  ----------  -----  ---------  --
```

```
0301  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/AVESS  DSnn2 Time Per. YR
0302  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- ---------- --
0303  01
0304  02
0305  30
0306  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/SESAME DSnn2 Time Per. YR
0307  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- ---------- --
0308  01
0309  02
0310  30
0311  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS AVE/VAS   DSnn2 Time Per. YR
0312  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- ---------- --
0313  01
0314  02
0315  30
0316  #n R-Data R-L/L  PR LVL TM S-Docu S-L/L  #C #R GDS OTHER     DSnn2 Time Per. YR
0317  -- ------ ------ -- --- -- ------ ------ -- -- --- ---------- ----- ---------- --
0318  01
0319  02
0320  30
0321  99 End of Directory File
```


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EXAMPLE of Image Data Directory File: *IMGDR

```
0001  #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE NG AVE/AVESS  (SAT) Time Per. YR .
0002  -- ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0003  01 RIGA41 01 002 07 00000 00000 SIQA41 1024 1024 01 SMS-2 VISSR AVE4 APR 24     75 .
0004  01 RIGA42 01 001 01 00000 00000 SIQA41 1024 1024 01 SMS-2 VISSR AVE4 APR 24     75 .
0005  30                                                                               .
0006  #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE NG AVE/SESAME (SAT) Time Per. YR .
0007  -- ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0008  01 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0009  02 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0010  30                                                                               .
0011  #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE NG AVE/VAS    (SAT) Time Per. YR .
0012  -- ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0013  01 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0014  02 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0015  30                                                                               .
0016  #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE NG OTHER       (SAT) Time Per. YR .
0017  -- ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0018  01 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0019  02 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0020  30                                                                               .
0021  #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE NG AVE/AVESS  (RAD) Time Per. YR .
0022  -- ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0023  01 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0024  02 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0025  30                                                                               .
0026  #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE NG AVE/SESAME (RAD) Time Per. YR .
0027  -- ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0028  01 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0029  02 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0030  30                                                                               .
0031  #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE NG AVE/VAS    (RAD) Time Per. YR .
0032  -- ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0033  01 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0034  02 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0035  30                                                                               .
0036  #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE NG OTHER       (RAD) Time Per. YR .
0037  -- ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0038  01 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0039  02 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0040  30                                                                               .
0041  #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE NG AVE/AVESS  (TBD) Time Per. YR .
0042  -- ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0043  01 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0044  02 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0045  30                                                                               .
0046  #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE NG AVE/SESAME (TBD) Time Per. YR .
0047  -- ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0048  01 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0049  02 ------ -- --- -- ----- ----- ------ ---- ---- -- ---------------- --------- -- .
0050  30                                                                               .
```

ORIGINAL PAGE IS
OF POOR QUALITY

```
0051   #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE MG AVE/VAS      (TBD) Time Per. YR .
0052   --
0053   01
0054   02
0055   30
0056   #n R-Data PR CHN TM ULLIN ULELE S-Docu #LIN #ELE MG OTHER        (TBD) Time Per. YR .
0057   --
0058   01
0059   02
0060   30
0061   99 End of Directory File
```

3.4 DOCUMENTATION FILES

Another file is the Documentation File which details the contents of each "random access" data base, thus for each "data base" there exists an associated "Documentation File". The Documentation File contains the following information:

- o -- Detailed Station Names
- o -- Specific Time/Date Information
- o -- All available Pressure Levels
- o -- All defined Data Parameters and Data Units
- o -- Comment Information

An example of a Documentation File for each of the four types of data is given in the following pages.

Note that the formats are fixed and must adhere to that shown in the examples and defined below:

LINE#	FORMAT	DESCRIPTION
1-23	Free	Displayed to Terminal Only
24	Fixed	Starting Index for Time Periods
25-35	Fixed	Labels for Plotting and Questions
36	Fixed	Starting Index for Pressure Levels
37-47	Fixed	Labels for Plotting and Questions
48	Fixed	Starting Index for Parameter VAlues
49-59	Fixed	Labels for Plotting and Questions
60	Fixed	Starting Index for Documenation Page
61-83	Free	Displayed to Terminal Only

```
SMDV31 T=00004 IS ON CR00045 USING 00034 BLKS R=0000

0001   The Rawinsonde Stations participating in the (AVE-VAS III) Experiment are:
0002   01- Crowell          ,TX     15+ Boothville      ,LA     29+ Albequerque    ,NM
0003   02- Henrietta        ,TX     16+ Jackson         ,LA     30+ Winslow        ,AZ
0004   03- Durant           ,OK     17+ Lake Charles    ,LA     31+ Salem          ,IL
0005   04- Throckmorton     ,TX     18+ Longview        ,TX     32+ Dodge City     ,KS
0006   05- Denton           ,TX     19+ Victoria        ,TX     33+ Topeka         ,KS
0007   06- Abilene          ,TX     20+ Stephenville    ,TX     34+ Denver         ,CO
0008   07- Ennis            ,TX     21+ Del Rio         ,TX     35+ Grand Junction ,CO
0009   08- Brownwood        ,TX     22+ Midland         ,TX     36+ Peoria         ,IL
0010   09- Hewitt           ,TX     23+ El Paso         ,TX     37+ Omaha          ,NE
0011   10- Menard           ,TX     24+ Tucson          ,AZ     38+ North Platte   ,NE
0012   11- Burnet           ,TX     25+ Little Rock     ,AR     39  xxxxxxxxxxxxxxx,xx
0013   12- College Station, TX     26+ Monett          ,MO     40  xxxxxxxxxxxxxxx,xx
0014   13- Fort Sill        ,OK     27+ Oklahoma City   ,OK     41  xxxxxxxxxxxxxxx,xx
0015   14- Post             ,TX     28+ Amarillo        ,TX     42  xxxxxxxxxxxxxxx,xx
0016   Note:  (-) Special Network (SN), (+) National Weather Service (NWS)
0017
0018   Eight Soundings were taken at each of the above Stations:
0019    1--1200GMT 3/27/82      2--1500GMT 3/27/82      3--1800GMT 3/27/82
0020    4--2100GMT 3/27/82      5--0000GMT 3/28/82      6--0300GMT 3/28/82
0021    7--0600GMT 3/28/82      8--1200GMT 3/28/82
0022
0023
0024   TIMES: nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ
0025          01-27/1200002 02-27/1500002 03-27/1800002 04-27/2100002 05-28/0000002
0026          06-28/0300002 07-28/0600002 08-28/1200002 09-99/9999992 10-99/9999992
0027          11-99/9999992 12-99/9999992 13-99/9999992 14-99/9999992 15-99/9999992
0028          16-99/9999992 17-99/9999992 18-99/9999992 19-99/9999992 20-99/9999992
0029          21-99/9999992 22-99/9999992 23-99/9999992 24-99/9999992 25-99/9999992
0030          26-99/9999992 27-99/9999992 28-99/9999992 29-99/9999992 30-99/9999992
0031          31-99/9999992 32-99/9999992 33-99/9999992 34-99/9999992 35-99/9999992
0032          36-99/9999992 37-99/9999992 38-99/9999992 39-99/9999992 40-99/9999992
0033          41-99/9999992 42-99/9999992 43-99/9999992 44-99/9999992 45-99/9999992
0034          46-99/9999992 47-99/9999992 48-99/9999992 49-99/9999992 50-99/9999992
0035
0036   LEVEL:  nn-aaaaaaaaa:  nn-aaaaaaaaa:  nn-aaaaaaaaa:  nn-aaaaaaaaa:  nn-aaaaaaaaa:
0037           01-SURFACE  :  02-1000 MB  :  03- 975 MB  :  04- 950 MB  :  05- 925 MB  :
0038           06- 900 MB  :  07- 875 MB  :  08- 850 MB  :  09- 825 MB  :  10- 800 MB  :
0039           11- 775 MB  :  12- 750 MB  :  13- 725 MB  :  14- 700 MB  :  15- 675 MB  :
0040           16- 650 MB  :  17- 625 MB  :  18- 600 MB  :  19- 575 MB  :  20- 550 MB  :
0041           21- 525 MB  :  22- 500 MB  :  23- 475 MB  :  24- 450 MB  :  25- 425 MB  :
0042           26- 400 MB  :  27- 375 MB  :  28- 350 MB  :  29- 325 MB  :  30- 300 MB  :
0043           31- 275 MB  :  32- 250 MB  :  33- 225 MB  :  34- 200 MB  :  35- 175 MB  :
0044           36- 150 MB  :  37- 125 MB  :  38- 100 MB  :  39- 075 MB  :  40- 050 MB  :
0045           41- 025 MB  :  42-9999 MB  :  43-9999 MB  :  44-9999 MB  :  45-9999 MB  :
0046           46-9999 MB  :  47-9999 MB  :  48-9999 MB  :  49-9999 MB  :  50-9999 MB  :
0047
```

```
0048  PARAM:  nn=aaaaaaaa:aaaaaaaa:n.nE+nn :        nn=aaaaaaaa:aaaaaaaa:n.nE+nn :
0049          01=TIME     :Min.  +00:1.0E+00 :        02=CONTACT  :      +00:1.0E+00 :
0050          03=HEIGHT   :GPM   +00:1.0E+00 :        04=PRESSURE :MB    +00:1.0E+00 :
0051          05=TEMP     :Deg C+00:1.0E+00 :        06=DEW PT   :Deg C+00:1.0E+00 :
0052          07=WIND DIR :Deg   +00:1.0E+00 :        08=WIND SPD :M/S   +00:1.0E+00 :
0053          09=U-COMP   :M/S   +00:1.0E+00 :        10=V-COMP   :M/S   +00:1.0E+00 :
0054          11=POT TEMP :Deg K+00:1.0E+00 :        12=E POT T  :Deg K+00:1.0E+00 :
0055          13=MX RATIO :GM/Kg+00:1.0E+00 :        14=REL HUM  :%     +00:1.0E+00 :
0056          15=BAL RNGE :KM    +00:1.0E+00 :        16=BAL AZ   :Deg   +00:1.0E+00 :
0057          17=         :          :          :        18=         :          :          :
0058          19=         :          :          :        20=         :          :          :
0059
0060  USER:   *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES) ***
0061     01:  Raw 25-mb Data From Tape
0062     02:
0063     03:
0064     04:
0065     05:
0066     06:
0067     07:
0068     08:
0069     09:
0070     10:
0071     11:
0072     12:
0073     13:
0074     14:
0075     15:
0076     16:
0077     17:
0078     18:
0079     19:
0080     20:
0081     21:
0082     22:
0083     23:
0084  ** END-OF-DATA
```

```
SMQV22 T=00004 IS ON CR00045 USING 00282 BLKS R=0000

0001   The VAS Satellite Sounding available for the (AVE-VAS II) Experiment are:
0002    SEE DETAILED LISTING:   TIME 1100GMT -- 128 SOUNDINGS.
0003                            TIME 1435GMT -- 140 SOUNDINGS.
0004                            TIME 1735GMT -- 144 SOUNDINGS.
0005                            TIME 2035GMT -- 175 SOUNDINGS.
0006                            TIME 2335GMT -- 184 SOUNDINGS.
0007                            TIME 0235GMT -- 168 SOUNDINGS.
0008                            TIME 0835GMT -- 187 SOUNDINGS.
0009                            TIME 1100GMT -- 207 SOUNDINGS.
0010
0011
0012
0013
0014
0015
0016
0017   Soundings were produced at eight times:
0018    1--1100GMT 3/06/82      2--1435GMT 3/06/82      3--1735GMT 3/06/82
0019    4--2035GMT 3/06/82      5--2335GMT 3/06/82      6--0235GMT 3/07/82
0020    7--0835GMT 3/07/82      8--1100GMT 3/07/82
0021
0022    Note: (Select Lat/Long print option for detailed information)
0023
0024   TIMES: nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ
0025          01-06/1100002 02-06/1435002 03-06/1735002 04-06/2035002 05-06/2335002
0026          06-07/0235002 07-07/0835002 08-07/1100002 09-99/9999999Z 10-99/9999999Z
0027          11-99/9999999Z 12-99/9999999Z 13-99/9999999Z 14-99/9999999Z 15-99/9999999Z
0028          16-99/9999999Z 17-99/9999999Z 18-99/9999999Z 19-99/9999999Z 20-99/9999999Z
0029          21-99/9999999Z 22-99/9999999Z 23-99/9999999Z 24-99/9999999Z 25-99/9999999Z
0030          26-99/9999999Z 27-99/9999999Z 28-99/9999999Z 29-99/9999999Z 30-99/9999999Z
0031          31-99/9999999Z 32-99/9999999Z 33-99/9999999Z 34-99/9999999Z 35-99/9999999Z
0032          36-99/9999999Z 37-99/9999999Z 38-99/9999999Z 39-99/9999999Z 40-99/9999999Z
0033          41-99/9999999Z 42-99/9999999Z 43-99/9999999Z 44-99/9999999Z 45-99/9999999Z
0034          46-99/9999999Z 47-99/9999999Z 48-99/9999999Z 49-99/9999999Z 50-99/9999999Z
0035
0036   LEVEL:   nn-aaaaaaaaa:   nn-aaaaaaaaa:   nn-aaaaaaaaa:   nn-aaaaaaaaa:   nn-aaaaaaaaa:
0037            01-SURFACE  :   02-1000 MB  :   03- 975 MB  :   04- 950 MB  :   05- 925 MB  :
0038            06- 900 MB  :   07- 875 MB  :   08- 850 MB  :   09- 825 MB  :   10- 800 MB  :
0039            11- 775 MB  :   12- 750 MB  :   13- 725 MB  :   14- 700 MB  :   15- 675 MB  :
0040            16- 650 MB  :   17- 625 MB  :   18- 600 MB  :   19- 575 MB  :   20- 550 MB  :
0041            21- 525 MB  :   22- 500 MB  :   23- 475 MB  :   24- 450 MB  :   25- 425 MB  :
0042            26- 400 MB  :   27- 375 MB  :   28- 350 MB  :   29- 325 MB  :   30- 300 MB  :
0043            31- 275 MB  :   32- 250 MB  :   33- 225 MB  :   34- 200 MB  :   35- 175 MB  :
0044            36- 150 MB  :   37- 125 MB  :   38- 100 MB  :   39- 075 MB  :   40- 050 MB  :
0045            41- 025 MB  :   42-9999 MB  :   43-9999 MB  :   44-9999 MB  :   45-9999 MB  :
0046            46-9999 MB  :   47-9999 MB  :   48-9999 MB  :   49-9999 MB  :   50-9999 MB  :
0047
```

```
0048  PARAM:  nn=aaaaaaaa:aaaaaaaa:n.nE+nn :        nn=aaaaaaaa:aaaaaaaa:n.nE+nn :
0049          01=         :     +00:1.0E+00 :        02=         :     +00:1.0E+00 :
0050          03=HEIGHT   :GPM  +00:1.0E+00 :        04=PRESSURE:MB    +00:1.0E+00 :
0051          05=TEMP     :Deg C+00:1.0E+00 :        06=DEW PT   :Deg C+00:1.0E+00 :
0052          07=WIND DIR:Deg   +00:1.0E+00 :        08=WIND SPD:M/S   +00:1.0E+00 :
0053          09=U-COMP   :M/S  +00:1.0E+00 :        10=V-COMP   :M/S  +00:1.0E+00 :
0054          11=POT TEMP:Deg K+00:1.0E+00 :         12=E POT T  :Deg K+00:1.0E+00 :
0055          13=MX RATIO:GM/Kg+00:1.0E+00 :         14=REL HUM  :%    +00:1.0E+00 :
0056          15=         :     +00:1.0E+00 :        16=         :     +00:1.0E+00 :
0057          17=         :         :       :        18=         :         :       :
0058          19=         :         :       :        20=         :         :       :
0059
0060  USER;   *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES) ***
0061     01:        This is a VAS satellite sounding data set for the 6-7 March 82:
0062     02:  (AVE VAS II) experiment period.  It was produced by the NESS group :
0063     03:  at the University of Wisconsin using the 'VSOUND' program on McIDAS:
0064     04:  (DEC 1982) and is the official VAS Demonstration data set.  The    :
0065     05:  data provided by U of Wisc was interpolated from standard data     :
0066     06:  levels to 25mb levels at MSFC and put into the 'AVE' data format.  :
0067     07:  The VSOUND program uses an iterative method to improve on a first  :
0068     08:  guess temperature and moisture profile based on the observed rad-   :
0069     09:  iance pattern averaged over about 75km in N-S, W-E direction.  A    :
0070     10:  direct solution of the R.T. equation is utilized in a least squares:
0071     11:  fashion to improve on the iterative solution.
0072     12:
0073     13:
0074     14:
0075     15:
0076     16:
0077     17:
0078     18:
0079     19:
0080     20:
0081     21:
0082     22:
0083     23:
0084  ** END-OF-DATA
```

```
SSDS11 T=00004 IS ON CR00046 USING 00026 BLKS R=0000

0001   The Surface Stations participating in the (AVE-SESAME I) Experiment are:
0002     784 STATIONS (SEE DETAILED LIST)
0003
0004
0005   The time periods available are:
0006    49 Times from 0600GMT  4/10/79 to 4/12/79 every hour
0007
0008   1-0624/10 08-1324/10 15-2024/10 22-0324/11 29-1024/11 36-1724/11 43-0024/12
0009   2-0724/10 09-1424/10 16-2124/10 23-0424/11 30-1124/11 37-1824/11 44-0124/12
0010   3-0824/10 10-1524/10 17-2224/10 24-0524/11 31-1224/11 38-1924/11 45-0224/12
0011   4-0924/10 11-1624/10 18-2324/10 25-0624/11 32-1324/11 39-2024/11 46-0324/12
0012   5-1024/10 12-1724/10 19-0024/11 26-0724/11 33-1424/11 40-2124/11 47-0424/12
0013   6-1124/10 13-1824/10 20-0124/11 27-0824/11 34-1524/11 41-2224/11 48-0524/12
0014   7-1224/10 14-1924/10 21-0224/11 28-0924/11 35-1624/11 42-2324/11 49-0624/12
0015
0016
0017
0018
0019
0020
0021
0022    Note: (Select Lat/Long print option for detailed information)
0023
0024   TIMES: nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ
0025          01-10/0600002 02-10/0700002 03-10/0800002 04-10/0900002 05-10/1000002
0026          06-10/1100002 07-10/1200002 08-10/1300002 09-10/1400002 10-10/1500002
0027          11-10/1600002 12-10/1700002 13-10/1800002 14-10/1900002 15-10/2000002
0028          16-10/2100002 17-10/2200002 18-10/2300002 19-11/0000002 20-11/0100002
0029          21-11/0200002 22-11/0300002 23-11/0400002 24-11/0500002 25-11/0600002
0030          26-11/0700002 27-11/0800002 28-11/0900002 29-11/1000002 30-11/1100002
0031          31-11/1200002 32-11/1300002 33-11/1400002 34-11/1500002 35-11/1600002
0032          36-11/1700002 37-11/1800002 38-11/1900002 39-11/2000002 40-11/2100002
0033          41-11/2200002 42-11/2300002 43-12/0000002 44-12/0100002 45-12/0200002
0034          46-12/0300002 47-12/0400002 48-12/0500002 49-12/0600002 50-99/9999992
0035
0036   LEVEL:   nn-aaaaaaaa:   nn-aaaaaaaa:   nn-aaaaaaaa:   nn-aaaaaaaa:   nn-aaaaaaaa:
0037            01-SURFACE  :   02-9999 MB  :   03-9999 MB  :   04-9999 MB  :   05-9999 MB  :
0038            06-9999 MB  :   07-9999 MB  :   08-9999 MB  :   09-9999 MB  :   10-9999 MB  :
0039            11-9999 MB  :   12-9999 MB  :   13-9999 MB  :   14-9999 MB  :   15-9999 MB  :
0040            16-9999 MB  :   17-9999 MB  :   18-9999 MB  :   19-9999 MB  :   20-9999 MB  :
0041            21-9999 MB  :   22-9999 MB  :   23-9999 MB  :   24-9999 MB  :   25-9999 MB  :
0042            26-9999 MB  :   27-9999 MB  :   28-9999 MB  :   29-9999 MB  :   30-9999 MB  :
0043            31-9999 MB  :   32-9999 MB  :   33-9999 MB  :   34-9999 MB  :   35-9999 MB  :
0044            36-9999 MB  :   37-9999 MB  :   38-9999 MB  :   39-9999 MB  :   40-9999 MB  :
0045            41-9999 MB  :   42-9999 MB  :   43-9999 MB  :   44-9999 MB  :   45-9999 MB  :
0046            46-9999 MB  :   47-9999 MB  :   48-9999 MB  :   49-9999 MB  :   50-9999 MB  :
0047
```

```
0048  PARAM:   nn=aaaaaaaa:aaaaaaaa:n.nE+nn :          nn=aaaaaaaa:aaaaaaaa:n.nE+nn :
0049           01=STAT #  :      +00:1.0E+00 :          02=ELEV    :M     +00:1.0E+00 :
0050           03=LO CLD  :      +00:1.0E+00 :          04=MI CLD  :      +00:1.0E+00 :
0051           05=HI CLD  :      +00:1.0E+00 :          06=SPARE   :      +00:1.0E+00 :
0052           07=SPARE   :      +00:1.0E+00 :          08=ALT     :In.   +02:1.0E-01 :
0053           09=TEMP    :Deg C+00:1.0E+00 :          10=DEW PT  :Deg C+00:1.0E+00 :
0054           11=DIR     :Deg  +00:1.0E+00 :          12=SPEED   :M/S   +00:1.0E+00 :
0055           13=VISIBL  :KM   +01:1.0E-01 :          14=W GUST  :M/S   +00:1.0E+00 :
0056           15=PRECIP  :In.  +02:1.0E-02 :          16=SPARE   :      +00:1.0E+00 :
0057           17=STN#    : CHAR*4 :        :          18=TIME    : CHAR*4 :          :
0058           19=WX1     : CHAR*4 :        :          20=WX2     : CHAR*4 :          :
0059
0060  USER:   *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES) ***
0061     01:  Raw surface data from tape provided by G. Darkow of the Univ. of___:
0062     02:  Missouri._____________________________________________________________:
0063     03:  _____________________________________________________________________:
0064     04:  _____________________________________________________________________:
0065     05:  _____________________________________________________________________:
0066     06:  _____________________________________________________________________:
0067     07:  _____________________________________________________________________:
0068     08:  _____________________________________________________________________:
0069     09:  _____________________________________________________________________:
0070     10:  _____________________________________________________________________:
0071     11:  _____________________________________________________________________:
0072     12:  _____________________________________________________________________:
0073     13:  _____________________________________________________________________:
0074     14:  _____________________________________________________________________:
0075     15:  _____________________________________________________________________:
0076     16:  _____________________________________________________________________:
0077     17:  _____________________________________________________________________:
0078     18:  _____________________________________________________________________:
0079     19:  _____________________________________________________________________:
0080     20:  _____________________________________________________________________:
0081     21:  _____________________________________________________________________:
0082     22:  _____________________________________________________________________:
0083     23:  _____________________________________________________________________:
0084  ** END-OF-DATA
```

```
SSDA41 T=00004 IS ON CR00046 USING 00026 BLKS R=0000

0001  The cloud motion information for the AVE IV experiment is as follows:
0002
0003  Groups of cloud motion vectors were calculated as follows:
0004
0005                  TRACKING INTERVAL OF 5 MINUTES
0006                  COMPOSITE FILE:  MAX.   RATIO ---TEMPLATE SIZE 25 TO 49
0007
0008      1 --210258 2      4/24/75
0009      2 --210756 2      4/24/75
0010      3 --211253 2      4/24/75
0011      4 --211750 2      4/24/75
0012      5 --212247 2      4/24/75
0013      6 --212744 2      4/24/75
0014
0015
0016
0017
0018
0019
0020
0021
0022  3138 vectors  (Note: Select Lat/Long print option for detailed information)
0023
0024  TIMES: nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ
0025         01-24/2102582 02-24/2107562 03-24/2112532 04-24/2117502 05-24/2122472
0026         06-24/2127442
0027
0028
0029
0030
0031
0032
0033
0034
0035
0036  LEVEL:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:
0037         01-SAT WIND
0038
0039
0040
0041
0042
0043
0044
0045
0046
0047
```

```
0048  PARAM:   nn=aaaaaaaa:aaaaaaaa:n.nE+nn :        nn=aaaaaaaa:aaaaaaaa:n.nE+nn :
0049           01=OBS NO.  :      +00:1.0E+00 :      02=LOOP     :      +00:1.0E+00 :
0050           03=ECOS     :      +00:1.0E+00 :      04=WIND SPD :M/S   +01:1.0E-01 :
0051           05=WIND DIR :DEG   +01:1.0E-01 :      06=D LINE   :      +00:1.0E+00 :
0052           07=D ELE    :      +00:1.0E+00 :      08=SIZE     :      +00:1.0E+00 :
0053           09=RATIO    :      +01:1.0E-01 :      10=VIS LEV  :      +00:1.0E+00 :
0054           11=IR LEV   :      +00:1.0E+00 :      12=TEMP 1   :DEG C+01:1.0E-01 :
0055           13=TEMP 2   :DEG C+01:1.0E-01 :       14=DELTA T  :DEG C+01:1.0E-01 :
0056           15=VIS VAR  :      +01:1.0E-01 :      16=IR VAR   :      +01:1.0E-01 :
0057           17=BLANK    : CHAR*4 :                18=BLANK    : CHAR*4 :          :
0058           19=BLANK    : CHAR*4 :                20=BLANK    : CHAR*4 :          :
0059
0060  USER:    *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES) ***
0061    01:          4 SCENES       1024 X 1024    SOBEL FILTERED
0062    02:       SEPARATED BY  5 MINUTES
0063    03:   TEMPLATE SIZE      25 TO 49
0064    04:   SKIP 10 PIXELS
0065    05:   COMPOSITE FILE    MAXIMUM RATIO AMONG TEMPLATE SIZES
0066    06:        INCLUDES ALL          TEMPERATURE DIFFERENCES
0067    07:    TEMPERATURE RANGE OF    ALL    DEGREES C
0068    08:   MAXIMUM SEARCH DISTANCE 15PIXELS
0069    09:        NUMBER OF VECTORS PER TIME PERIOD:
0070    10:   TIME 1          3046
0071    11:        2          3023
0072    12:        3          2966
0073    13:        4          2887
0074    14:        5          2954
0075    15:        6          3138
0076    16:
0077    17:
0078    18:
0079    19:
0080    20:
0081    21:
0082    22:
0083    23:
0084  ** END-OF-DATA
```

```
SGDV29 T=00004 IS ON CR00047 USING 00026 BLKS R=0000

0001  The GRID data for the AVE-VAS II experiment is as follows:
0002
0003   ( 6)-PARAMS:    1- Height    2- Temperature  3- U Wind
0004                   4- V Wind    5- Mix Ratio    6- Dew Pt
0005
0006   (18)-LEVELS:    1- Sfc      2- 900mb  3- 850mb  4- 800mb  5- 750mb  6- 700mb
0007                   7- 650mb    8- 600mb  9- 550mb 10- 500mb 11- 450mb 12- 400mb
0008                  13- 350mb   14- 300mb 15- 250mb 16- 200mb 17- 150mb 18- 100mb
0009
0010   ( 7)-TIMES:     1-06/1100Z   2-06/1445Z  3-06/1745Z  4-06/2045Z  5-06/2345Z
0011                   6-07/0245Z   7-07/0545Z
0012
0013
0014
0015
0016
0017
0018
0019
0020
0021
0022  Grid (16x16) (Note: Select Lat/Long print option for detailed information)
0023
0024  TIMES: nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ
0025         01-06/1100000Z 02-06/1445000Z 03-06/1745000Z 04-06/2045000Z 05-06/2345000Z
0026         06-07/0245000Z 07-07/0545000Z
0027
0028
0029
0030
0031
0032
0033
0034
0035
0036  LEVEL:  nn-aaaaaaaaa:  nn-aaaaaaaaa:  nn-aaaaaaaaa:  nn-aaaaaaaaa:  nn-aaaaaaaaa:
0037          01-SURFACE  :  02-  900MB  :  03-  850MB  :  04-  800MB  :  05-  750MB  :
0038          06-  700MB  :  07-  650MB  :  08-  600MB  :  09-  550MB  :  10-  500MB  :
0039          11-  450MB  :  12-  400MB  :  13-  350MB  :  14-  300MB  :  15-  250MB  :
0040          16-  200MB  :  17-  150MB  :  18-  100MB  :
0041
0042
0043
0044
0045
0046
0047
```

```
0048  PARAM:   nn=aaaaaaaa:aaaaaaaa:n.nE+nn :          nn=aaaaaaaa:aaaaaaaa:n.nE+nn :
0049           01=HEIGHT   :GPM   +00:1.0E+00 :          02=TEMP     :Deg C+00:1.0E+01 :
0050           03=U WIND   :M/S   +00:1.0E+00 :          04=V WIND   :M/S   +00:1.0E+00 :
0051           05=MIX RAT  :GMGKg+00:1.0E+01 :          06=DEW PT   :Deg C+00:1.0E+01 :
0052           07=SPARE    :      +00:1.0E+00 :          08=SPARE    :      +00:1.0E+00 :
0053           09=SPARE    :      +00:1.0E+00 :          10=SPARE    :      +00:1.0E+00 :
0054           11=SPARE    :      +00:1.0E+00 :          12=SPARE    :      +00:1.0E+00 :
0055           13=SPARE    :      +00:1.0E+00 :          14=SPARE    :      +00:1.0E+00 :
0056           15=SPARE    :      +00:1.0E+00 :          16=SPARE    :      +00:1.0E+00 :
0057           17=BLANK    : CHAR*4 :          :          18=BLANK    : CHAR*4 :          :
0058           19=BLANK    : CHAR*4 :          :          20=BLANK    : CHAR*4 :          :
0059
0060  USER:    *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES) ***
0061     01:         THIS IS BASIC GRID FILE FROM THE AVE-VAS II EXPERIMENT.  THE
0062     02:   ANALYSIS REGION IS OVER CENTRAL TEXAS AND OKLAHOMA. THE INPUT DATA
0063     03:   IS ADJUSTED RAWINSONDE SOUNDINGS CORRESPONDING TO THE TIME OF THE
0064     04:   VAS SOUNDING DATA.  THE GRIDDED DATA WAS PRODUCED BY THE
0065     05:   PROGRAM WHICH IS THE BARNES 1964 ANALYSIS SCHEME.  INPUT OPTIONS
0066     06:   CAME FROM A FILE SIMILAR TO              THESE OPTIONS INCLUDE
0067     07:   A SCAN RADIUS OF 228.6 KM FOR ALL PARAMETERS AND 4 ITERATIONS.  THE
0068     08:   WINDS ARE NOT SMOOTHED IN THE VERTICAL.  THE Z GRID AT THE SFC IS
0069     09:   ACTUALLY STATION PRESSURE.  SEE THE FILE '              ' FOR MORE INFO
0070     10:   OR CONTACT GARY JEDLOVEC.  FEB 24 1983.
0071     11:
0072     12:         THIS GRIDDED DATA SET DIFFERS FROM 'RNRV21' ONLY IN
0073     13:         THE MOISTURE PARAMETERS
0074     14:
0075     15:   ____________________________________________________________________
0076     16:   ____________________________________________________________________
0077     17:   ____________________________________________________________________
0078     18:   ____________________________________________________________________
0079     19:   ____________________________________________________________________
0080     20:   ____________________________________________________________________
0081     21:   ____________________________________________________________________
0082     22:   ____________________________________________________________________
0083     23:   ____________________________________________________________________
0084  ** END-OF-DATA
```

```
SGQV21 T=00004 IS ON CR00047 USING 00027 BLKS R=0000

0001  The GRID data for the AVE-VAS II experiment from VAS is as follows:
0002
0003   ( 6)-PARAMS:    1- Height    2- Temperature  3- U Wind
0004                   4- V Wind    5- Mix Ratio    6- Dew Pt
0005
0006   (18)-LEVELS:    1- Sfc      2- 900mb  3- 850mb  4- 800mb  5- 750mb  6- 700mb
0007                   7- 650mb    8- 600mb  9- 550mb 10- 500mb 11- 450mb 12- 400mb
0008                  13- 350mb   14- 300mb 15- 250mb 16- 200mb 17- 150mb 18- 100mb
0009
0010   ( 8)-TIMES:     1-06/1100Z   2-06/1435Z  3-06/1735Z  4-06/2035Z  5-06/2335Z
0011                   6-07/0235Z   7-07/0835Z  8-07/1100Z
0012
0013
0014
0015
0016
0017
0018
0019
0020
0021
0022  Grid (16x16) (Note: Select Lat/Long print option for detailed information)
0023
0024  TIMES: nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ
0025         01-06/110000Z 02-06/143500Z 03-06/173500Z 04-06/203500Z 05-06/233500Z
0026         06-07/023500Z 07-07/083500Z 08-07/110000Z
0027
0028
0029
0030
0031
0032
0033
0034
0035
0036  LEVEL:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:
0037          01-SURFACE :  02-  900MB :  03-  850MB :  04-  800MB :  05-  750MB :
0038          06-  700MB :  07-  650MB :  08-  600MB :  09-  550MB :  10-  500MB :
0039          11-  450MB :  12-  400MB :  13-  350MB :  14-  300MB :  15-  250MB :
0040          16-  200MB :  17-  150MB :  18-  100MB
0041
0042
0043
0044
0045
0046
0047
```

```
0048  PARAM:   nn=aaaaaaaa:aaaaaaaa:n.nE+nn :          nn=aaaaaaaa:aaaaaaaa:n.nE+nn :
0049           01=HEIGHT   :GPM   +00:1.0E+00 :          02=TEMP     :Deg C+00:1.0E+00 :
0050           03=U WIND   :M/S   +00:1.0E+00 :          04=V WIND   :M/S   +00:1.0E+00 :
0051           05=MIX RAT  :GM/Kg+00:1.0E+01 :          06=DEW PT   :Deg C+00:1.0E+00 :
0052           07=SPARE    :      +00:1.0E+00 :          08=SPARE    :      +00:1.0E+00 :
0053           09=SPARE    :      +00:1.0E+00 :          10=SPARE    :      +00:1.0E+00 :
0054           11=SPARE    :      +00:1.0E+00 :          12=SPARE    :      +00:1.0E+00 :
0055           13=SPARE    :      +00:1.0E+00 :          14=SPARE    :      +00:1.0E+00 :
0056           15=SPARE    :      +00:1.0E+00 :          16=SPARE    :      +00:1.0E+00 :
0057           17=BLANK    : CHAR*4 :          :          18=BLANK    : CHAR*4 :          :
0058           19=BLANK    : CHAR*4 :          :          20=BLANK    : CHAR*4 :          :
0059
0060  USER;   *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES) ***
0061    01:         THIS IS A BASIC GRID FILE FROM THE AVE-VAS II EXPERIMENT.  THE
0062    02:   ANALYSIS REGION IS OVER CENTRAL TEXAS AND OKLAHOMA (IDENTICAL TO
0063    03:   THE MESOSCALE RAWINSONDE AREA).  THE INPUT DATA IS THE VAS DEMO
0064    04:   SOUNDING DATA SET PRODUCED BY THE U OF W USING BILL SMITH'S OPER-
0065    05:   ATIONAL RETRIEVAL ALGORITHM AND IS THE OFFICIAL EVALUATION DATA SET.
0066    06:   THE GRIDS WERE PRODUCED WITH A BARNES (1964) ANALYSIS SCHEME WITH A
0067    07:   SCAN RADIUS OF 228.6 KM FOR ALL PARAMETERS AND 3 ITERATIONS WERE
0068    08:   PERFORMED.  THE SFC Z GRID IS ACTUALLY THE REPORTED STATION PRESS-
0069    09:   URE.  SEE THE FILE 'BVV8N1::53' FOR THESE OPTIONS OR CONSULT WITH
0070    10:   GARY JEDLOVEC ABOUT THE FILE.    GARY JEDLOVEC, FEB 1983.
0071    11:
0072    12:     PLEASE NOTE:  THE OBSEVATION TIMES ARE ACTUALLY BEGINNING
0073    13:                   SCAN TIME OF THE DWELL SOUNDING SCANS
0074    14:
0075    15:   _____________________________________________________________________
0076    16:   _____________________________________________________________________
0077    17:   _____________________________________________________________________
0078    18:   _____________________________________________________________________
0079    19:   _____________________________________________________________________
0080    20:   _____________________________________________________________________
0081    21:   _____________________________________________________________________
0082    22:   _____________________________________________________________________
0083    23:   _____________________________________________________________________
0084  ** END-OF-DATA
```

```
SGDV22 T=00004 IS ON CR00047 USING 00024 BLKS R=0000

0001  The GRID data for the AVE-VAS II experiment from VAS is as follows:
0002
0003   ( 1)-PARAMS:    1- PRECIPITABLE WATER IN COLUMN
0004
0005
0006   (01)-LEVELS:    1- Column
0007
0008
0009
0010   ( 7)-TIMES:      1-06/1100Z   2-06/1445Z  3-06/1745Z  4-06/2045Z  5-06/2345Z
0011                    6-07/0245Z   7-07/0545Z
0012
0013
0014
0015
0016
0017
0018
0019
0020
0021
0022  Grid (16x16) (Note: Select Lat/Long print option for detailed information)
0023
0024  TIMES: nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ
0025         01-06/1100002 02-06/1445002 03-06/1745002 04-06/2045002 05-06/2345002
0026         06-07/0245002 07-07/0545002
0027
0028
0029
0030
0031
0032
0033
0034
0035
0036  LEVEL:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:
0037         01-Column
0038
0039
0040
0041
0042
0043
0044
0045
0046
0047
```

```
0048  PARAM:  nn=aaaaaaaaa:aaaaaaaa:n.nE+nn :          nn=aaaaaaaaa:aaaaaaaaa:n.nE+nn :
0049           01=PRE H2O  :mm      +00:1.0E+01 :          02=SPARE    :       +00:1.0E+00 :
0050           03=SPARE    :        +00:1.0E+00 :          04=SPARE    :       +00:1.0E+00 :
0051           05=SPARE    :        +00:1.0E+00 :          06=SPARE    :       +00:1.0E+00 :
0052           07=SPARE    :        +00:1.0E+00 :          08=SPARE    :       +00:1.0E+00 :
0053           09=SPARE    :        +00:1.0E+00 :          10=SPARE    :       +00:1.0E+00 :
0054           11=SPARE    :        +00:1.0E+00 :          12=SPARE    :       +00:1.0E+00 :
0055           13=SPARE    :        +00:1.0E+00 :          14=SPARE    :       +00:1.0E+00 :
0056           15=SPARE    :        +00:1.0E+00 :          16=SPARE    :       +00:1.0E+00 :
0057           17=BLANK    : CHAR*4 :           :          18=BLANK    : CHAR*4 :          :
0058           19=BLANK    : CHAR*4 :           :          20=BLANK    : CHAR*4 :          :
0059
0060  USER:   *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES) ***
0061    01:         THIS IS A DERIVED GRID FILE FOR THE AVE-VAS II EXPERIMENT. THE
0062    02:   ANALYSIS REGION IS OVER CENTRAL TEXAS AND OKLAHOMA (IDENTICAL TO
0063    03:   THE BASIC GRID FILE 'RGRV21' ).  THE INPUT DATA ARE THE MIXING
0064    04:   RATIO GRIDS FROM THE FILE 'RGRV21'.  THE OUTPUT IS THE TOTAL PRE-
0065    05:   CIPITABLE WATER IN THE VERTICAL COLUMN AT EACH GRID POINT CAL-
0066    06:   CULATED FROM 18 LEVEL (50mb) GRIDDED DATA.  THE GRIDS ARE IN MM OF
0067    07:   WATER (MM/CM2).     GARY JEDLOVEC, FEB 1983.
0068    08:
0069    09:
0070    10:
0071    11:
0072    12:
0073    13:
0074    14:
0075    15:
0076    16:
0077    17:
0078    18:
0079    19:
0080    20:
0081    21:
0082    22:
0083    23:
0084  ** END-OF-DATA
```

EXAMPLE of Documentation File for Image Satellite Data

```
SGQV22 T=00004 IS ON CR00047 USING 00026 BLKS K=0000
0001  The GRID data for the AVE-VAS II experiment from VAS is as follows:
0002
0003   ( 1)-PARAMS:    1- PRECIPITABLE WATER IN COLUMN
0004
0005
0006   (01)-LEVELS:    1- Column
0007
0008
0009
0010   ( 8)-TIMES:     1-06/1100Z   2-06/1435Z  3-06/1735Z  4-06/2035Z  5-06/2335Z
0011                   6-07/0235Z   7-07/0835Z  8-07/1100Z
0012
0013
0014
0015
0016
0017
0018
0019
0020
0021
0022  Grid (16x16) (Note: Select Lat/Long print option for detailed information)
0023
0024  TIMES: nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ nn-dd/hhmmssZ
0025         01-06/110000Z 02-06/143500Z 03-06/173500Z 04-06/203500Z 05-06/233500Z
0026         06-07/023500Z 07-07/083500Z 08-07/110000Z
0027
0028
0029
0030
0031
0032
0033
0034
0035
0036  LEVEL:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:  nn-aaaaaaaa:
0037         01-Column
0038
0039
0040
0041
0042
0043
0044
0045
0046
0047
```

```
0048  PARAM:  nn=aaaaaaaa:aaaaaaaa:n.nE+nn :          nn=aaaaaaaa:aaaaaaaa:n.nE+nn :
0049           01=PRE H2O :mm    +00:1.0E+01 :          02=SPARE   :      +00:1.0E+00 :
0050           03=SPARE   :      +00:1.0E+00 :          04=SPARE   :      +00:1.0E+00 :
0051           05=SPARE   :      +00:1.0E+00 :          06=SPARE   :      +00:1.0E+00 :
0052           07=SPARE   :      +00:1.0E+00 :          08=SPARE   :      +00:1.0E+00 :
0053           09=SPARE   :      +00:1.0E+00 :          10=SPARE   :      +00:1.0E+00 :
0054           11=SPARE   :      +00:1.0E+00 :          12=SPARE   :      +00:1.0E+00 :
0055           13=SPARE   :      +00:1.0E+00 :          14=SPARE   :      +00:1.0E+00 :
0056           15=SPARE   :      +00:1.0E+00 :          16=SPARE   :      +00:1.0E+00 :
0057           17=BLANK   : CHAR*4 :         :          18=BLANK   : CHAR*4 :
0058           19=BLANK   : CHAR*4 :         :          20=BLANK   : CHAR*4 :
0059
0060  USER:   *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES) ***
0061    01:         THIS IS A DERIVED GRID FILE FOR THE AVE-VAS II EXPERIMENT. THE
0062    02:   ANALYSIS REGION IS OVER CENTRAL TEXAS AND OKLAHOMA (IDENTICAL TO
0063    03:   THE BASIC GRID FILE 'RGVV21' ).  THE INPUT DATA ARE THE MIXING
0064    04:   RATIO GRIDS FROM THE FILE 'RGVV21'.  THE OUTPUT IS THE TOTAL PRE-
0065    05:   CIPITABLE WATER IN THE VERTICAL COLUMN AT EACH GRID POINT CAL-
0066    06:   CULATED FROM 18 LEVEL (50mb) GRIDDED DATA.  THE GRIDS ARE IN MM OF
0067    07:   WATER (MM/CM2).    GARY JEDLOVEC, FEB 1983.
0068    08:
0069    09:
0070    10:
0071    11:
0072    12:   ____________________________________________________________________
0073    13:   ____________________________________________________________________
0074    14:   ____________________________________________________________________
0075    15:   ____________________________________________________________________
0076    16:   ____________________________________________________________________
0077    17:   ____________________________________________________________________
0078    18:   ____________________________________________________________________
0079    19:   ____________________________________________________________________
0080    20:   ____________________________________________________________________
0081    21:   ____________________________________________________________________
0082    22:   ____________________________________________________________________
0083    23:   ____________________________________________________________________
0084  ** END-OF-DATA
```

ORIGINAL PAGE IS
OF POOR QUALITY

```
SIQA41 T=00004 IS ON CR00044 USING 00024 BLKS R=0000

0001  The Parameter and Channel definitions for this (AVE IV) VISSR data are:
0002   PARAMETERS
0003   1-COUNT VALUES
0004
0005
0006   CHANNELS
0007   1-VISIBLE
0008   2-IR
0009
0010
0011
0012
0013
0014
0015
0016  VISSR Image Data is available for the following Times:
0017   1--210258 GMT 4/24/75        2--210756 GMT 4/24/75
0018   3--211253 GMT 4/24/75        4--211750 GMT 4/24/75
0019   5--212247 GMT 4/24/75        6--212744 GMT 4/24/75
0020   7--213241 GMT 4/24/75
0021
0022   Note: (Select Lat/Long print option for detailed information)
0023
0024  TIMES:  nn-dd/hhmmssZ  nn-dd/hhmmssZ  nn-dd/hhmmssZ  nn-dd/hhmmssZ  nn-dd/hhmmssZ
0025           01-24/210258Z  02-24/210756Z  03-24/211253Z  04-24/211750Z  05-24/212247Z
0026           06-24/212744Z  07-24/213241Z  08-99/99999999Z  09-99/99999999Z  10-99/99999999Z
0027           11-99/99999999Z  12-99/99999999Z  13-99/99999999Z  14-99/99999999Z  15-99/99999999Z
0028           16-99/99999999Z  17-99/99999999Z  18-99/99999999Z  19-99/99999999Z  20-99/99999999Z
0029           21-99/99999999Z  22-99/99999999Z  23-99/99999999Z  24-99/99999999Z  25-99/99999999Z
0030           26-99/99999999Z  27-99/99999999Z  28-99/99999999Z  29-99/99999999Z  30-99/99999999Z
0031           31-99/99999999Z  32-99/99999999Z  33-99/99999999Z  34-99/99999999Z  35-99/99999999Z
0032           36-99/99999999Z  37-99/99999999Z  38-99/99999999Z  39-99/99999999Z  40-99/99999999Z
0033           41-99/99999999Z  42-99/99999999Z  43-99/99999999Z  44-99/99999999Z  45-99/99999999Z
0034           46-99/99999999Z  47-99/99999999Z  48-99/99999999Z  49-99/99999999Z  50-99/99999999Z
0035
0036  CHNLS:   nn-aaaaaaaa:   nn-aaaaaaaa:   nn-aaaaaaaa:   nn-aaaaaaaa:   nn-aaaaaaaa:
0037           01-VISIBLE :   02-IR      :   03-         :   04-         :   05-         :
0038           06-        :   07-        :   08-         :   09-         :   10-         :
0039           11-        :   12-        :   13-         :   14-         :   15-         :
0040           16-        :   17-        :   18-         :   19-         :   20-         :
0041           21-        :   22-        :   23-         :   24-         :   25-         :
0042           26-        :   27-        :   28-         :   29-         :   30-         :
0043           31-        :   32-        :   33-         :   34-         :   35-         :
0044           36-        :   37-        :   38-         :   39-         :   40-         :
0045           41-        :   42-        :   43-         :   44-         :   45-         :
0046           46-        :   47-        :   48-         :   49-         :   50-         :
0047
```

```
0048  PARAM:   nn=aaaaaaaa:aaaaaaaa:n.nE+nn :          nn=aaaaaaaa:aaaaaaaa:n.nE+nn :
0049           01=CNT VAL :          :1.0E+00 :          02=          :          :1.0E+00 :
0050           03=        :          :1.0E+00 :          04=          :          :1.0E+00 :
0051           05=        :          :1.0E+00 :          06=          :          :1.0E+00 :
0052           07=        :          :1.0E+00 :          08=          :          :1.0E+00 :
0053           09=        :          :1.0E+00 :          10=          :          :1.0E+00 :
0054           11=        :          :1.0E+00 :          12=          :          :1.0E+00 :
0055           13=        :          :1.0E+00 :          14=          :          :1.0E+00 :
0056           15=        :          :1.0E+00 :          16=          :          :1.0E+00 :
0057           17=        :          :        :          18=          :          :        :
0058           19=        :          :        :          20=          :          :        :
0059
0060  USER:   *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES) ***
0061     01:                          IMAGE DATE 4 24 75
0062     02:              IMAGES ARE SEPARATED BY FIVE MINUTES
0063     03:              TIME PERIOD COVERED IS 210258 TO 213241
0064     04:              EACH IMAGE IS 1024 X 1024 PIXELS
0065     05:
0066     06:
0067     07:
0068     08:
0069     09:                          SCENE PARAMETERS
0070  DATE   42475  42475  42475  42475  42475  42475  42475
0071  TIME 210258 210756 211253 211750 212247 212744 213241
0072  ULLN   2503   2505   2506   2508   2510   2511   2513
0073  ULEL   9054   9052   9050   9048   9046   9045   9043
0074                       NAVIGATION PARAMETERS FOR 4/24/75
0075        ETIMY     ETIMH    SEMIMA     ECCEN    ORBINC     MEANA  PERIGEE   ASNODE
0076      1975114         0   4218826       778       928     26211   153405   276578
0077       DECLIN    RASCEN    PICLIN    NAVDAY     SPINR
0078       883748   1931435      7300   1975114    600000
0079       DEGLIN    LINTOT    DEGELE    ELETOT     PITCH       YAW      ROLL
0080       200000    801821    182230     15288     -1930         0         0
0081  TIME 192801 202734 205800 210258 211750 212247 212744 213241 215800 222752
0082  BETA  13416  12311  12462  11672  12841  14232  13031  11114  12306  13148
0083  BETD   -281   -225   -231   -193   -249   -313   -257   -168   -223   -261
0084  ** END-OF-DATA
```

3.5 LAT/LON FILES

Also associated with the Directory File and Documentation File is the Lat/Lon File. This file contains for each station in the data base a specific latitude and longitude. The Analysis and Display Software uses the Lat/Lon File to plot data on a Base Map at the actual station or recording location.

A standard format has been defined for all Lat/Lon files and is shown below:

```
**********************************************************************
**                                                                  **
** Subject:      Standard Format for Lat/Lon Files                  **
**                                                                  **
** Remarks:      The following format should be used                **
**               in creating all AVE-type lat/lon files             **
**               to be used by the MASS Analysis and                **
**               Display Software.                                  **
**                                                                  **
** Format:       WRITE(n,n) STAT#,LAT,LON,TPER,STID                 **
**               FORMAT(I4,2X,F5.2,2X,F6.2,2X,I2,2X,A4)             **
**                                                                  **
**               Where:  STAT# -- I4   Station Number               **
**                       LAT   -- F5.2 Latitude                     **
**                       LON   -- F6.2 Longitude                    **
**                       TPER  -- I2   Time Period                  **
**                       STID  -- A4   Station Id                   **
**********************************************************************
C
C
L
1
nnnnbbxx.xxbbxxx.xxbbnnbbaaaa
0001   32.50  101.82   01   CKL
0002   33.50  100.85   01   BVE
0003   32.45   99.75   01   JAN
0004   25.60   89.50   01   LCH
0005   27.80   90.35   01   GGG
```

Although the format is fixed and the Lat/Lon values are required the User may choose other parameters in place of the STAT#, TPER, or STID. In addition, it should be notes the Image Data does not require Lat/Lon Files.

EXAMPLE of LAT/LON File Formats

SMLV31 T=00004 IS ON CR00045 USING 00006 BLKS

0001	0001	33.98	99.71	01	CRO
0002	0002	33.93	98.22	01	HEN
0003	0003	33.94	96.40	01	DUA
0004	0004	33.19	99.18	01	TRK
0005	0005	33.20	97.19	01	DTN
0006	0006	32.43	99.69	01	ABI
0007	0007	32.33	96.66	01	ENN
0008	0008	31.71	99.10	01	BWD
0009	0009	31.48	97.20	01	HEW
0010	0010	30.94	99.81	01	MEN
0011	0011	30.74	98.23	01	BUR
0012	0012	30.64	96.47	01	CLL
0013	0013	34.67	98.41	01	FSI
0014	0014	33.15	101.39	01	POS
0015	0015	29.33	89.41	01	BVE
0016	0016	32.33	90.08	01	JAN
0017	0017	30.08	93.18	01	LCH
0018	0018	32.40	94.80	01	GGG
0019	0019	28.83	96.92	01	VCT
0020	0020	30.33	98.25	01	SEP
0021	0021	29.33	100.92	01	DRT
0022	0022	31.93	102.19	01	MAF
0023	0023	31.90	106.40	01	ELP
0024	0024	32.13	110.96	01	TUS
0025	0025	34.78	92.24	01	LIT
0026	0026	36.90	93.91	01	UMN
0027	0027	35.30	97.70	01	OKC
0028	0028	35.24	101.69	01	AMA
0029	0029	35.00	106.70	01	ABQ
0030	0030	35.05	110.76	01	INW
0031	0031	38.66	88.98	01	SLO
0032	0032	37.76	99.98	01	DDC
0033	0033	39.07	95.62	01	TOP
0034	0034	39.80	104.90	01	DEN
0035	0035	39.10	108.53	01	GJT
0036	0036	40.67	89.68	01	PIA
0037	0037	41.36	96.01	01	OMA
0038	0038	41.14	100.68	01	LBF

SMZV22 T=00004 IS ON CR00045 USING 00221 BLKS

0001	0001	43.06	102.60	01	1100
0002	0002	42.95	100.73	01	1100
0003	0003	42.84	98.91	01	1100
0004	0004	42.74	97.13	01	1100
0005	0005	42.66	95.40	01	1100
0006	0006	42.58	93.70	01	1100
0007	0007	42.16	103.92	01	1100
0008	0008	42.04	102.04	01	1100
0009	0009	41.93	100.22	01	1100
0010	0010	41.83	98.44	01	1100
0011	0011	41.74	96.71	01	1100
0012	0012	41.27	105.24	01	1100
0013	0013	41.15	103.35	01	1100
0014	0014	41.04	101.52	01	1100
0015	0015	40.94	99.75	01	1100
0016	0016	40.84	98.01	01	1100
0017	0017	40.76	96.32	01	1100
0018	0018	40.68	94.66	01	1100
0019	0019	40.62	109.56	01	1100
0020	0020	40.28	104.67	01	1100
0021	0021	40.17	102.83	01	1100
0022	0022	40.06	101.05	01	1100
0023	0023	39.88	97.62	01	1100
0024	0024	39.80	95.96	01	1100
0025	0025	39.70	109.91	01	1100
0026	0026	39.32	104.14	01	1100
0027	0027	39.21	102.35	01	1100
0028	0028	39.11	100.61	01	1100
0029	0029	39.02	98.91	01	1100
0030	0030	38.94	97.25	01	1100
0031	0031	38.86	95.62	01	1100
0032	0032	38.80	110.27	01	1100
0033	0033	38.43	104.55	01	1100
0034	0034	38.32	102.77	01	1100
0035	0035	38.22	101.04	01	1100
0036	0036	38.13	99.36	01	1100
0037	0037	38.05	97.71	01	1100
0038	0038	37.85	109.65	01	1100

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ATSUKO COMPUTING INTERNATIONAL
HUNTSVILLE, ALABAMA • USA

3.6 UTILITY SOFTWARE

ACI has developed various utility software to create and maintain data files on the MASS Computer System. The following three programs provide for the capability of creating, archieving, and restoring the data files:

- -- Program AVE09: creates "random access" data base
- -- Program LATLN: creates "random access" Lat/Lon file
- -- Program TSVRS: Archieves/restores data files

The AVE09 program process various IBM formatted data tapes and data types, and generates "random access" standard formatted data sets accessible by the AVE80 Series programs and other general purpose programs.

The LATLN program processes the "random access" data files and generates sequential and random access latitude/longitude files. Also program LATLN can generate the Lat/Lon files given only initial latitude and longitude starting inputs along with a step size increment.

Program TSVRS has been developed to provide archieving/restoring capabilities of the four "random access" data types. This program is an interactive tool which utilizes four directories (one for each data type) to keep time/dated information of each file that has been saved or restored. The directory indicates where the data is to be restored and flags the Data Base Directory entry with an "*" if the data set is archieved from the system and no longer active.

4.0 ANALYSIS & DISPLAY SOFTWARE

The MASS Analysis and Display Software developed by ACI has been incorporated in to a series of programs called the "AVE80 Series". The AVE80 Series consists of four major divisions of programs which process the four various types of atmospheric data (Sounding, Single Level, Gird, and Image). A functional flow chart is given on page 4-2.

The user operates the AVE80 Series programs interactively by using a "Transfer File" (\AVE80) which links the necessary programs for processing a user selected data type.

Various graphical outputs are then generated based upon the user's selectivity. Several output options and devices provide for a broad range for displaying the data in both a single case or multiple batch mode of operation.

4.1 AVE80 SERIES INTERACTIVE SOFTWARE

The AVE80 Series interactive software is comprised of four main programs and a subset of over 13 other programs linked together by a task scheduler to provide the User with a sophisticated means for processing the four data types and generating the various outputs.

The detailed flow diagram on page 4-2, shows the relationship of the different programs with respect to the data and output types.

As shown, there are four destinct main programs which make up the AVE80 Series:

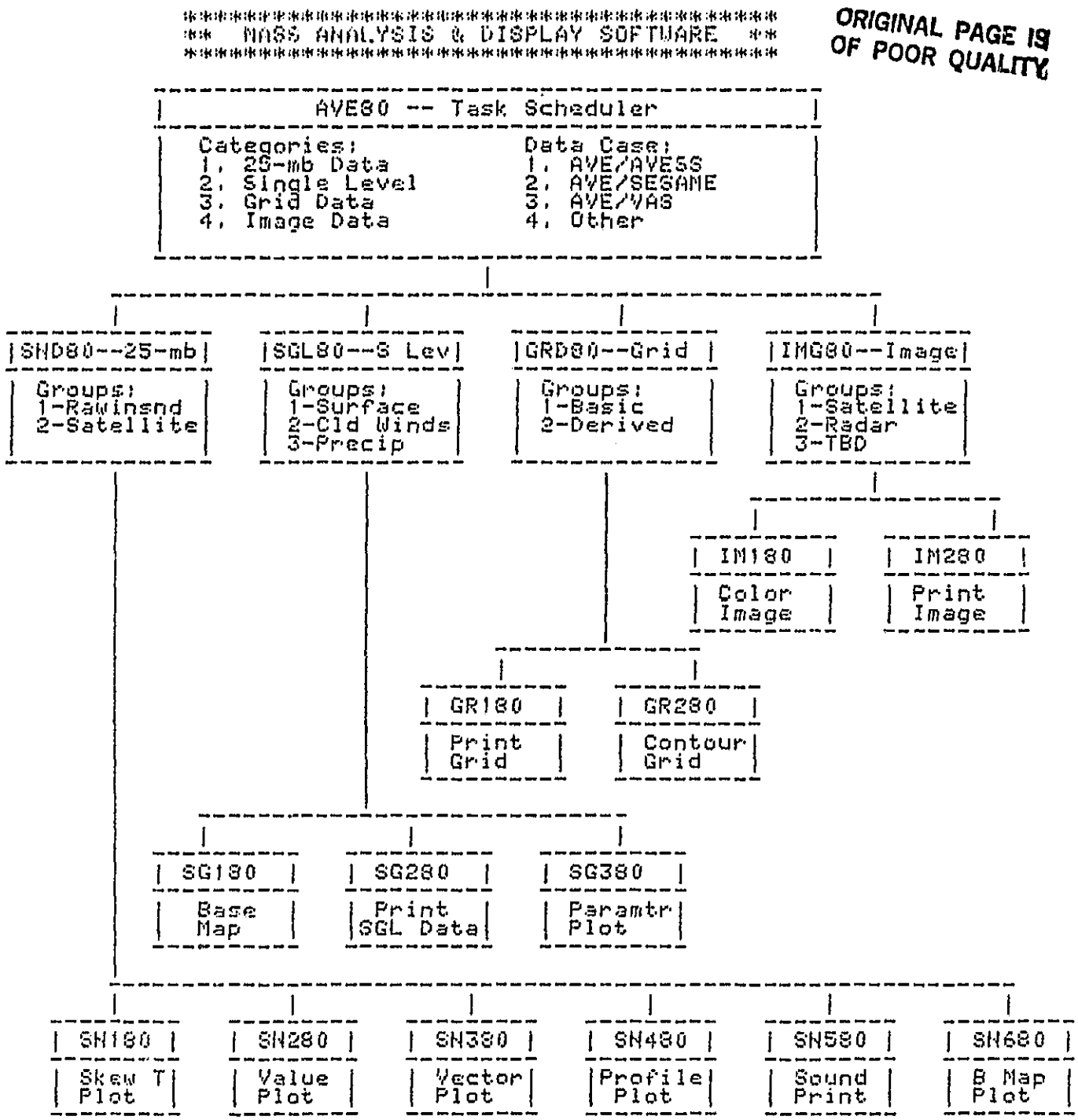
1) Program SND80 -- Process Rawinsonde/Satellite Sounding Data

2) Program SGL80 -- Process Rawinsonde/Satellite Single Level Data

3) Program GRD80 -- Process Surface/Cloud Wind/Precipitation Data

4) Program IMG80 -- Process Satellite/Radar Image Data

The User's interactive inputs are passed from one program to another via a common data file. The four data types may be accessed randomly by multiple users at the same time. Outputs are then generated based upon user inputs and device/output selection parameters. A detailed description of the AVE80 Series programs along with sample outputs are given in the remainder of this section.



Detailed Flowchart of MASS AVE80 Software

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Below is a logical flow diagram of the "AVE80" Interactive Task Scheduler along with the associated input/outputs:

```
      FTN4X,L
      PROGRAM AVE80(3,90),ACI-091382 AVE80--AVE TASK SCHEDULER
C*******************************************************************
C**                                                               **
C** DESCRIPTION:  Program 'AVE80' schedules the following AVE     **
C**               programs according to the "user selected"       **
C**               "data type" to be processed:                    **
C**                                                               **
C** LOGICAL FLOW:                 -------------                   **
C**                               |   AVE80   |                   **
C**                               -------------                   **
C**                                     |                         **
C**                  ----------------------------------           **
C**                  |          |          |          |           **
C**                SND80      SGL80      GRD80      IMG80         **
C**               (25-mb)    (S Lev)    (Grid )    (Image)        **
C**                                                               **
C** DATA Type: Description                                        **
C**                ------------------------                       **
C**                1.     25-mb Data                              **
C**                2.     Single Level Data                       **
C**                3.     Grid Data                               **
C**                4.     Image Data                              **
C**                                                               **
C** DATA SETS:    Description                                     **
C**                ------------------------                       **
C**                1. AVE/AVESS                                   **
C**                2. AVE/SESAME                                  **
C**                3. AVE/VAS                                     **
C**                4. OTHER                                       **
C**                                                               **
C** INPUTS:       Data Type (1-4)                                 **
C**               Data Set  (1-4)                                 **
C**                                                               **
C** OUTPUTS:      Generated from the Scheduled Programs:          **
C**                  o -- Skew T Profile Plot                     **
C**                  o -- Parameter Value Plot                    **
C**                  o -- Parameter Profile Plot                  **
C**                  o -- Wind Vector Plot                        **
C**                  o -- Wind Profile Plot                       **
C**                  o -- Wind Barb Plot                          **
C**                  o -- Printed Contour Profile                 **
C**                  o -- Contour Plot                            **
C**                  o -- Printed Grid Profile                    **
C**                  o -- Color Image Display                     **
C**                  o -- Shaded Printed Image                    **
C**                                                               **
C*******************************************************************
```

4.2 OPERATIONAL PROCEDURES

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To operate the AVE80 Series programs the user simply runs the AVE80 task scheduler "transfer file" program "\AVE80". The AVE80 task scheduler will initially ask the user to select one of four data types to process:

```
-------------------------------
|     Basic Data Types:       |
-------------------------------
|   1. Sounding Data          |
|   2. Single Level Data      |
|   3. Grid Data              |
|   4. Image Data             |
-------------------------------
.TE:  To select Data Type, User must enter  :.n

NTER Desired Data Type? (:,1 or:,2 or:,3 or:,4)
USE,60
.,4

*** PLEASE WAIT -- AVE80 SERIES PROGRAMS ARE BEING LOADED ***
```

Once the user selects the desired data type, the task scheduler will load the appropriate programs needed to process the selected data type, (loading all AVE80 Series programs requires to much space in the loader area).

The AVE80 Series programs will then prompt the user for various interactive inputs for qualifying the desired data options. The user may choose to process data on an individual single case basis or select a batch mode where he can set up start/stop boundaries to process multiple data cases (production mode of operation).

Finally the user must select the graphical output type and the output device to display the data. Upon completion, the user can at that time modify his inputs and continue processing or simply terminate, at which time the task scheduler removes all programs from the loader area and releases all devices and data sets.

:**TURN OF SOFT KEY DISPLAY

Mesoscale Analysis & Space Sensor (MASS)
Analysis & Display Software

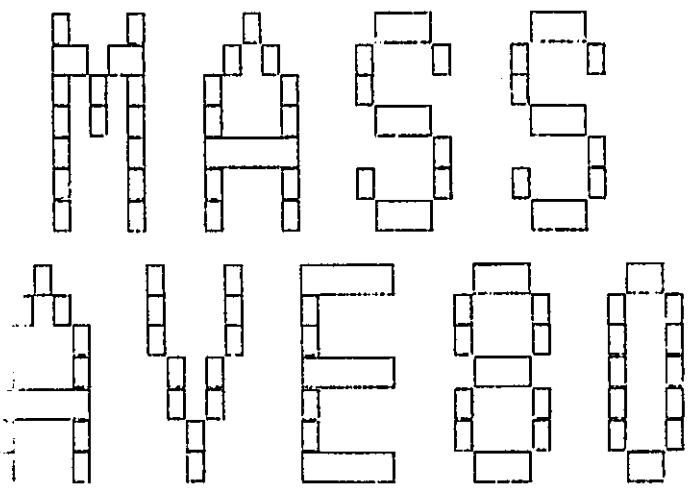
By
ATSUKO COMPUTING INTERNATIONAL
(Revision: 11/18/83)

AVE80 -- ID Segment Loader

Basic Data Types:
1. Sounding Data
2. Single Level Data
3. Grid Data
4. Image Data

E: To select Data Type, User must enter :,n

TTER Desired Data Type? (:,1 or:,2 or:,3 or:,4)
JSE,60
,1



PLEASE WAIT -- AVE80 SERIES PROGRAMS ARE BEING LOADED

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```
 --------------------------
 | PROJECT DATA SETS |
 --------------------------
 |    1. AVE/AVESS        |
 |    2. AVE/SESAME       |
 |    3. AVE/VAS          |
 |    4. Other            |
 --------------------------

ENTER Desired Data Set? (1 to 4): 2

 ------------------
 |SOUNDING DATA |
 ------------------
 | Categories:     |
 | 1-Rawinsonde    |
 | 2-Satellite     |
 |                 |
 ------------------

ENTER Desired Data Category? : 1

   Data  R-L/L  PR STA TM S-Docu S-L/L  AVE/SESAME (Raw) Time Per.  YR
   ----- ------ -- --- -- ------ ------ ---------------- ---------  --
01 RMRS11 RMLS11 16 039 09 SMDS11 SMLS11 AVE-SESAME I     APR 10-11 79 .
02*RMRS21 RMLS21 16 040 09 SMDS21 SMLS21 AVE-SESAME II    APR 19-20 79 .
03*RMRS31 RMLS31 16 041 09 SMDS31 SMLS31 AVE-SESAME III   APR 25-26 79 .
04*RMRS41 RMLS41 16 042 09 SMDS41 SMLS41 AVE-SESAME IV    MAY 09-10 79 .
05 RMRS51 RMLS51 16 042 09 SMDS51 SMLS51 AVE-SESAME V     MAY 20-21 79 .
06*RMRS61 RMLS61 16 038 09 SMDS61 SMLS61 AVE-SESAME VI    JUN 07-08 79 .
07 RMRS12 RMLS11 16 039 09 SMDS12 SMLS11 ADJ SESAME I GJ  APR 10-11 79 .
08 RMRS52 RMLS51 16 042 10 SMDS52 SMLS51 ADJ SES V (SLU) MAY 20-21 79 .

ENTER Desired Experiment Data Base? (1 to 30): 1

ENTER Display Data Documentation Page? (Y/N): N


 *****************************************************************
 *****     SND80 SERIES  --   SOUNDING GRAPHICS  PACKAGE      *****
 *****************************************************************


Available Output Types:
 1.  Print  -- Sounding Data
 2.  Plot   -- Skew T Profiles --(Under Construction)
 3.  Plot   -- Values Time/Space Cross-section
 4.  Plot   -- Profiles Time/Space Cross-section
 5.  Plot   -- Wind Vectors Time/Space Cross-section
 6.  Plot   -- Base Map Sounding Data
 7.  *TBD*  -- For Future Development

ENTER Desired Output Type? (1 - 7): 6
```

```
Available Output Devices:
 1.  Graphics Terminal (LU#60)
 .   Graphics Terminal (LU#07)
 .   4-Pen Plotter     (LU#20)
 .   8-Pen Plotter     (LU#18)
 .   Graphics Printer  (LU#28)

ER Desired Device Type? (1 - 4): 1
ER Western Longitude? (Deg): 107
ER Northern Latitude? (Deg): 43
ER Map Scale? (1) -- 1/12.5m  (7) -- 1/ 3.0m
              (2) -- 1/10.0m  (8) -- 1/ 2.5m
              (3) -- 1/ 7.5m  (9) -- 1/ 2.0m
              (4) -- 1/ 5.0m  (10)-- 1/ 1.5m
              (5) -- 1/ 4.0m  (11)-- 1/ 1.0m
              (6) -- 1/ 3.5m  (12)-- 1/ 0.5m: 2

The Rawinsonde Stations participating in the (AVE-SESAME I) Experiment are:
01+ Centerville    ,AL    15+ Amarillo       ,TX    29- Concordia      ,KS
    Boothville     ,LA    16+ Albuquerque    ,NM    30- Durant         ,OK
    Jackson        ,MS    17+ Salem          ,IL    31- Fort Smith     ,AR
 +  Lake Charles   ,LA    18+ Dodge City     ,KS    32- Gage           ,OK
 +  Longview       ,TX    19+ Topeka         ,KS    33- Goodland       ,KS
    Victoria       ,TX    20+ Denver         ,CO    34- Junction       ,TX
    Stephenville  ,TX    21+ Peoria         ,IL    35- Monroe         ,LA
 +  Del Rio        ,TX    22+ Omaha          ,NE    36- Marfa          ,TX
 +  Midland        ,TX    23+ North Platte   ,NE    37- Morton         ,TX
 +  El Paso        ,TX    24- Abilene        ,TX    38- Raton          ,NM
11+ Nashville     ,TN    25- Bartlesville   ,OK    39- Oxford         ,KS
12+ Little Rock   ,AR    26- Columbia       ,MO    40  xxxxxxxxxxxxxxx,xx
13+ Monett        ,MO    27- Childress      ,TX    41  xxxxxxxxxxxxxxx,xx
14+ Oklahoma City ,OK    28- College Station,TX    42  xxxxxxxxxxxxxxx,xx
Note:  (-) Special Network (SN), (+) National Weather Service (NWS)

Nine Soundings were taken at each of the above Stations:
 1--1200GMT 4/10/79     4--2100GMT 4/10/79     7--0600GMT 4/11/79
 2--1500GMT 4/10/79     5--0000GMT 4/11/79     8--0900GMT 4/11/79
 3--1800GMT 4/10/79     6--0300GMT 4/11/79     9--1200GMT 4/11/79


ER Print Detailed Station List? (Y/N): N
 R Station Mode? (1-All, 2-SN, 3-NWS, 4-Enter): 1
 R Multiple Plots-Batch Mode? (Y/N): N
ER Desired Time #? (1- 9): 1
```

```
                    ---------- Pressure Level Index Menu ----------
01=SURFACE :  02=1000 MB :  03= 975 MB :  04= 950 MB :  05= 925 MB :
06= 900 MB :  07= 875 MB :  08= 850 MB :  09= 825 MB :  10= 800 MB :
11= 775 MB :  12= 750 MB :  13= 725 MB :  14= 700 MB :  15= 675 MB :
16= 650 MB :  17= 625 MB :  18= 600 MB :  19= 575 MB :  20= 550 MB :
21= 525 MB :  22= 500 MB :  23= 475 MB :  24= 450 MB :  25= 425 MB :
26= 400 MB :  27= 375 MB :  28= 350 MB :  29= 325 MB :  30= 300 MB :
31= 275 MB :  32= 250 MB :  33= 225 MB :  34= 200 MB :  35= 175 MB :
36= 150 MB :  37= 125 MB :  38= 100 MB :  39= 075 MB :  40= 050 MB :
41= 025 MB :  42=9999 MB :  43=9999 MB :  44=9999 MB :  45=9999 MB :
46=9999 MB :  47=9999 MB :  48=9999 MB :  49=9999 MB :  50=9999 MB :
```

ENTER Pressure Level Index# ? (01 to 41): 22

ENTER Plot Station Locator '+' ? (Y/N): N

ENTER Plot Station Label ? (Y/N): Y

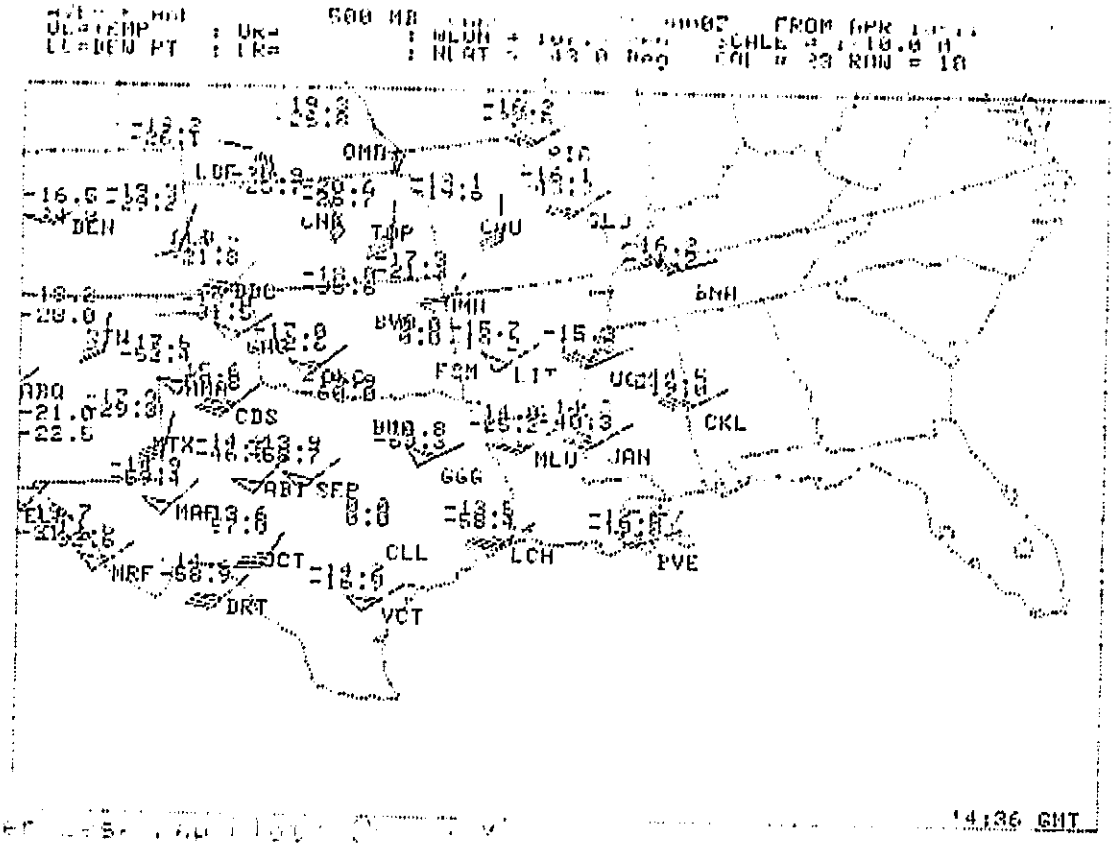
ENTER Label Type? (1)'0001' or (2)'ABI ': ?

```
                    ---------- Parameter Index Menu ----------
01=TIME     :Min. +00:1.0E+00 :  02=CONTACT :     +00:1.0E+00 :
03=HEIGHT   :GPM  +00:1.0E+00 :  04=PRESSURE:MB   +00:1.0E+00 :
05=TEMP     :Deg C+00:1.0E+00 :  06=DEW PT  :Deg C+00:1.0E+00 :
07=WIND DIR:Deg  +00:1.0E+00 :  08=WIND SPD:M/S  +00:1.0E+00 :
09=U-COMP   :M/S  +00:1.0E+00 :  10=V-COMP  :M/S  +00:1.0E+00 :
11=POT TEMP:Deg K+00:1.0E+00 :  12=E POT T :Deg K+00:1.0E+00 :
13=MX RATIO:GM/Kg+00:1.0E+00 :  14=REL HUM :%    +00:1.0E+00 :
15=BAL RNGE:KM   +00:1.0E+00 :  16=BAL AZ  :Deg  +00:1.0E+00 :
17=         :        :       :  18=         :        :       :
19=         :        :       :  20=         :        :       :
```

ENTER Parameter Processing Desired? (Y/N): Y

ENTER Parameter Range Check Desired? (Y/N): N

ENTER Parameters from Menu? (Up to 4): 5,6
ENTER Default Grid Size (23,18)? (Y/N): Y
ENTER Wind Vectors Desired? (Y/N): Y
ENTER Plot: (A) Arrows or (B) Wind Barbs (A or B): B
ENTER Base Map Desired? (Y/N): Y
ENTER Default Color/Linestyle? (Y/N): Y



Another ... desired? (Y or ...)

,60

URN ON SOFT KEY DISPLAY

.0

VE80 SER ...

4.3 GRAPHICAL OUTPUTS

In this section examples of various outputs generated by the AVE80 Series programs are presented. The following graphical outputs are included:

- o -- Skew T Profile Plot
- o -- Parameter Value Plot
- o -- Wind Vector Plot
- o -- Wind Profile Plot
- o -- Parameter Profile Plot
- o -- Wind Barb Plot
- o -- Base Map Plot
- o -- Contour Plot
- o -- Grided Data Plot
- o -- Shaded Image Display

4.4 SOUNDING DATA SOFTWARE -- SND80

ORIGINAL PAGE IS OF POOR QUALITY

This section details the "SND80" Sounding Software. Below a logical flow of the "SND80" program and the associated input files required and graphical outputs available are given.

```
      FTN4X,L
      PROGRAM SND80(3),ACI-010783 SND80--AVE-25MB MAIN PROGRAM
C*********************************************************************
C**                                                                 **
C** DESCRIPTION:  Program 'SND80' processes a user selected         **
C**               25-mb Rawinsonde or Satellite data group          **
C**               and generates various printed and plotted         **
C**               outputs:                                          **
C**                                                                 **
C** LOGICAL FLOW:                     -------------                 **
C**                                   |   SND80   |                 **
C**                                   -------------                 **
C**                                         |                       **
C**                  ------------------------------------------     **
C**                  |       |        |       |       |       |     **
C**               SN180   SN280   SN380   SN480   SN580   SN680     **
C**              (SkewT) (Value) (Vectr) (Profl) (Sound) (B Map)    **
C**                                                                 **
C** DATA GROUPS:  1. Rawinsonde                                     **
C**               2. Satellite                                      **
C**                                                                 **
C** INPUTS:       Array   Filenn  Description                       **
C**               ------  ------  --------------------------        **
C**               IQFIL   ?SND80  SND80 Question File               **
C**               IDFIL   *SNNDR  Directory File                    **
C**               IRFIL   RMRS11  Random Access Data File           **
C**               IBFIL   RMLS11  Random Lat/Lon Data File          **
C**               ISFIL   RMDS11  Documentation File                **
C**               IMFIL   SMLS11  Sequential Lat/Lon File           **
C**                                                                 **
C** OUTPUTS:      1.  Print   --  Sounding                 (SN580)  **
C**               2.  Plot    --  Skew T                   (SN180)  **
C**               3.  Plot    --  Parameter Values         (SN280)  **
C**               4.  Plot    --  Parameter Vectors        (SN380)  **
C**               5.  Plot    --  Parameter Profiles       (SN480)  **
C**               6.  Plot    --  25-mb Station/Base Map   (SN680)  **
C**                                                                 **
C*********************************************************************
```

In the remainder of this section detailed examples generated by the "SND80" Software along with complete "Operational Procedures" are given.

Mesoscale Analysis & Space Sensor (MASS)
Analysis & Display Software

by
ATSUKO COMPUTING INTERNATIONAL
(Revision: 11/18/83)

AVE80 -- ID Segment Loader

Basic Data Types:
1. Sounding Data
2. Single Level Data
3. Grid Data
4. Image Data

E: To select Data Type, User must enter :,n

TEN Desired Data Type? (:,1 or:.2 or:,3 or:,4)
.SE,60
1

[illegible]

[illegible]

PROJECT DATA SETS
1. AVE/AVESS
2. AVE/SESAME
3. AVE/VAS
4. Other

EN Desired Data Set? (1 to 4): 3

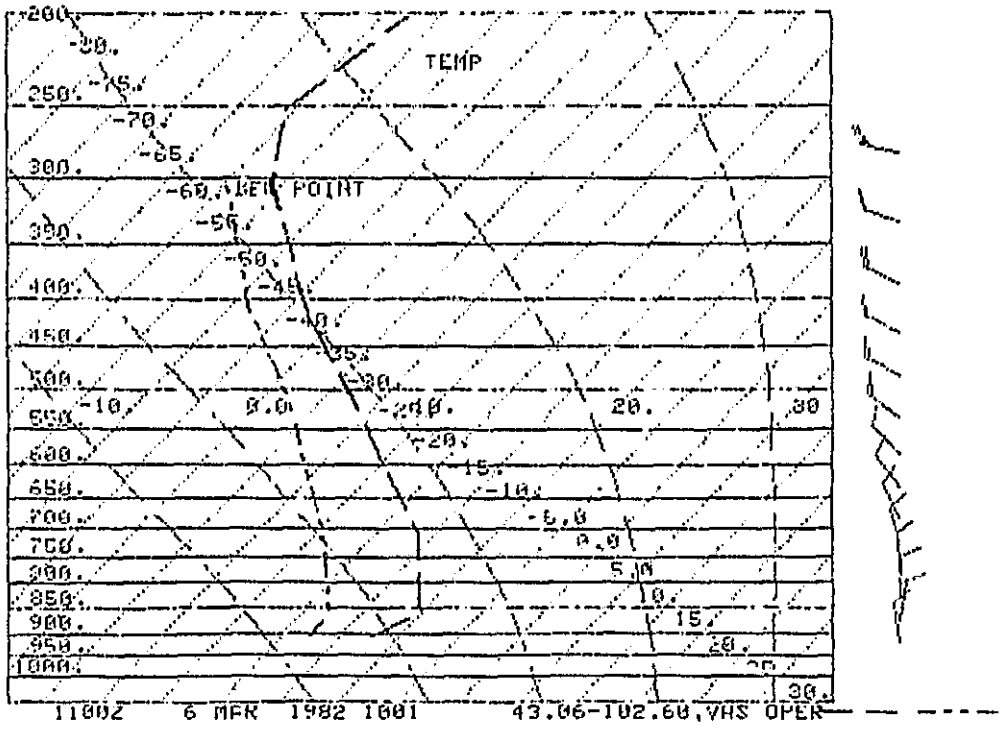
SOUNDING DATA
Categories:
1-Rawinsonde
2-Satellite

[illegible]

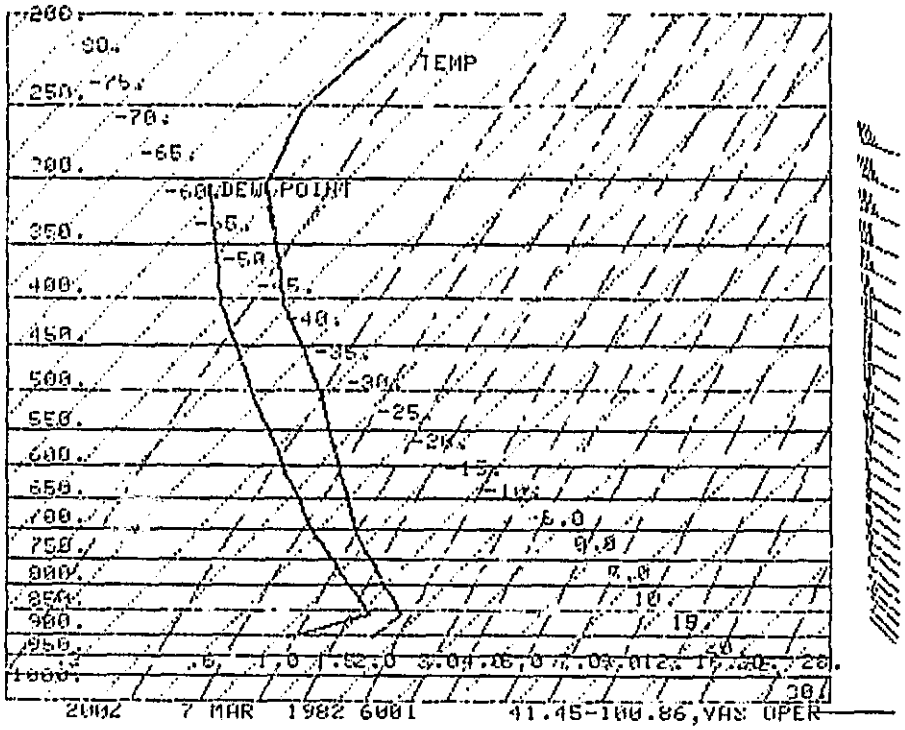
```
 RMVV21 RMZV21 10 168 05 SMQV21 SMZV21 GOES-F VAS EAD R MAR 06-07 8
 RMVV22 RMZV22 16 207 08 SMQV22 SM7V22 GOES-F VAS OPER  MAR 06-07 8
 RMVV23 RMZV23 16 018 03 SMQV23 SM7V23 GSFC TRAINING    MAR 06-07 8
*RMVV24 RMZV24 16 153 05 SMQV24 SMZV24 GOES-F VAS GSFC  MAR 06-07 8
 RMVV25 RMZV24 16 153 05 SMQV25 SMZV24 VAS GSFC COMPLET MAR 06-07 8
 RMVV26 RMZV26 16 223 08 SMQV26 SMZV26 GOES-F VAS FES   MAR 06-07 8

ER Desired Experiment Data Base? (1 to 30): ?

ER Display Data Documentation Page? (Y/N): Y
R:  *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES
1:        This is a VAS satellite sounding data set for the 6-7 Marc
2:  (AVE VAS II) experiment period.  It was produced by the NESS gr
3:  at the University of Wisconsin using the 'VSOUND' program on Mc
4:  (DEC 1982) and is the official VAS Demonstration data set.  The
5:  data provided by U of Wisc was interpolated from standard data
6:  levels to 25mb levels at MSFC and put into the 'AVE' data forma
7:  The VSOUND program uses an iterative method to improve on a fir
8:  guess temperature and moisture profile based on the observed ra
9:  iance pattern averaged over about 75km in N-S, W-E direction.
0:  direct solution of the R.T. equation is utilized in a least squ
1:  fashion to improve on the iterative solution.
2:
3:
4:
5:
6:
7:
8:
9:
0:
1:
2:
ER Restart Documentation Page or Proceed? (R/P): P

      **********************************************************
      *****                                                *****
      *****     SND80 SERIES  --  SOUNDING GRAPHICS PACKAGE    ***
      *****                                                *****
      **********************************************************

ilable Output Types:
.  Print -- Sounding Data
.  Plot  -- Skew T Profiles --(Under Construction)
.  Plot  -- Values Time/Space Cross-section
.  Plot  -- Profiles Time/Space Cross-section
.  Plot  -- Wind Vectors Time/Space Cross-section
.  Plot  -- Base Map Sounding Data
.  *TED* -- For Future Development
```

```
. Graphics Terminal (LU#07)
. 4-Pen Plotter     (LU#20)
. 8-Pen Plotter     (LU#18)
. Graphics Printer  (LU#28)

ER Desired Device Type? (1 - 4): 1

ER Multiple Plots --(Batch Mode)? (Y/N): N
 VAS Satellite Sounding available for the (AVE-VAS II) Experiment a
E DETAILED LISTING:  TIME 1100GMT -- 128 SOUNDINGS.
                     TIME 1435GMT -- 140 SOUNDINGS.
                     TIME 1735GMT -- 144 SOUNDINGS.
                     TIME 2035GMT -- 175 SOUNDINGS.
                     TIME 2335GMT -- 184 SOUNDINGS.
                     TIME 0235GMT -- 168 SOUNDINGS.
                     TIME 0835GMT -- 187 SOUNDINGS.
                     TIME 1100GMT -- 207 SOUNDINGS.

ndings were produced at eight times:
-1100GMT 3/06/82     2--1435GMT 3/06/82     3--1735GMT 3/06/82
-2035GMT 3/06/82     5--2335GMT 3/06/82     6--0235GMT 3/07/82
-0835GMT 3/07/82     8--1100GMT 3/07/82

te: (Select Lat/Long print option for detailed information)

ER Print Detailed Station List? (Y/N): N

ER Stat,Time ? (n,n): 1,1

ER Default Data Color/Linestyle? (Y/N): N

n Color        Linestyle
-----------------------------------------------
. Brown        0 ________ Solid
               1 ........ Light Solid
. Red          2 _ _ _ _  Short Dashes
               3 __ __ __ Long Dashes
. Green        4 __.__.__ Centerline
               5 .      . Dots as Endpoints
. Blue         6 __..__.. 2 Dashed Centerline
-----------------------------------------------

ER Color & Linestyle for Temperature? (n,n): 1,0
ER Color & Linestyle for Dew Point Temp.? (n,n): 1,0
```

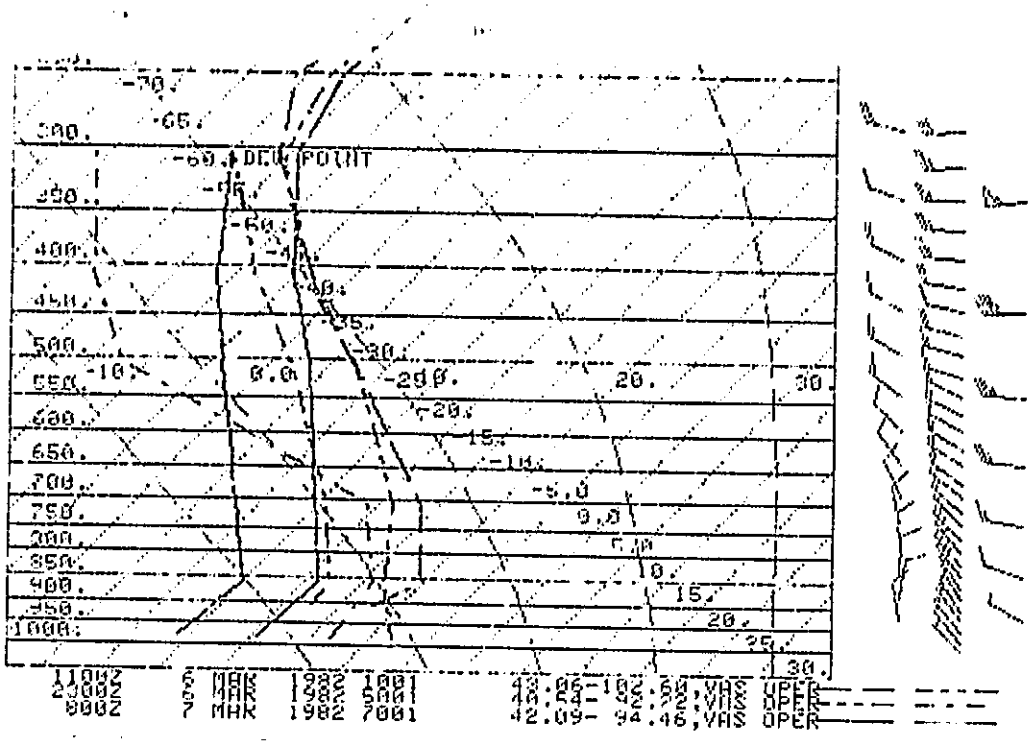
```
ENTER Time/Date Label Position? (1-Top, 2-Mid, 3-Bot): 1
ENTER Wind Barbs Desired? (Y/N): Y
ENTER Wind Barb Interval? (1-25mb, 2-50mb, 3-100mb): 2
ENTER Draw SKEW T Chart? (Y/N): Y

ENTER TEMPERATURE Lines? (Y/N): Y
      ENTER Color & Linestyle? (2,0): 1,1
ENTER DRY ADIABATIC Lines? (Y/N): N
ENTER MIX RATIO Lines? (Y/N): N
ENTER SATURATED ADIABATIC Lines? (Y/N): Y
      ENTER Color & Linestyle? (2,0): 1,3
ENTER STANDARD ATMOSPHERE Line? (Y/N): N
```



[ENTER] TEMPERATURE Lines? (Y/N): Y
[ENTER] Color & Linestyle? (2,0): 1,1
[ENTER] DRY ADIABATIC Lines? (Y/N): N
[ENTER] MIX RATIO Lines? (Y/N): Y
[ENTER] Color & Linestyle? (2,0): 1,3
[ENTER] SATURATED ADIABATIC Lines? (Y/N): N
[ENTER] STANDARD ATMOSPHERE Line? (Y/N): N



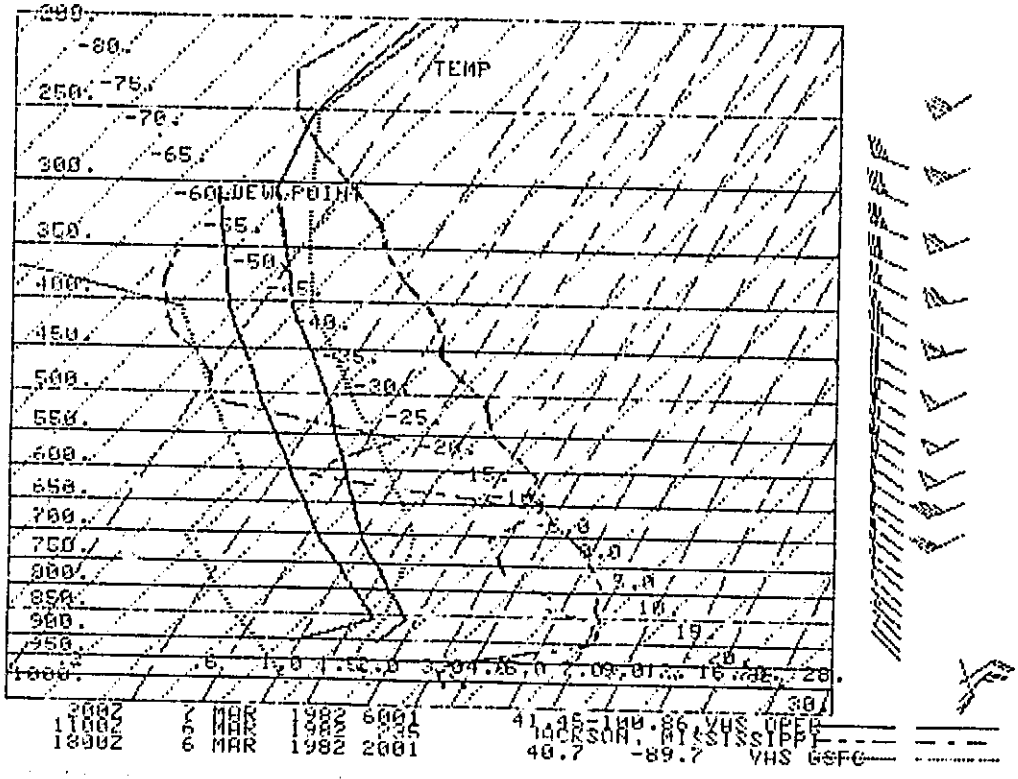
[ENTER] [illegible]
[ENTER] [illegible]
[ENTER] Default Time/Date Label Position? (Y/N): N
[ENTER] Time/Date Label Position? (1-Top, 2-Mid, 3-Bot): 3
[ENTER] Wind Barbs Desired? (Y/N): Y
[ENTER] Wind Barb Interval? (1-25mb, 2-50mb, 3-100mb): 3



[illegible]

[illegible]: Y

[illegible] Wind barb interval? (1-25mb, 2-50mb, 3-100mb): 3



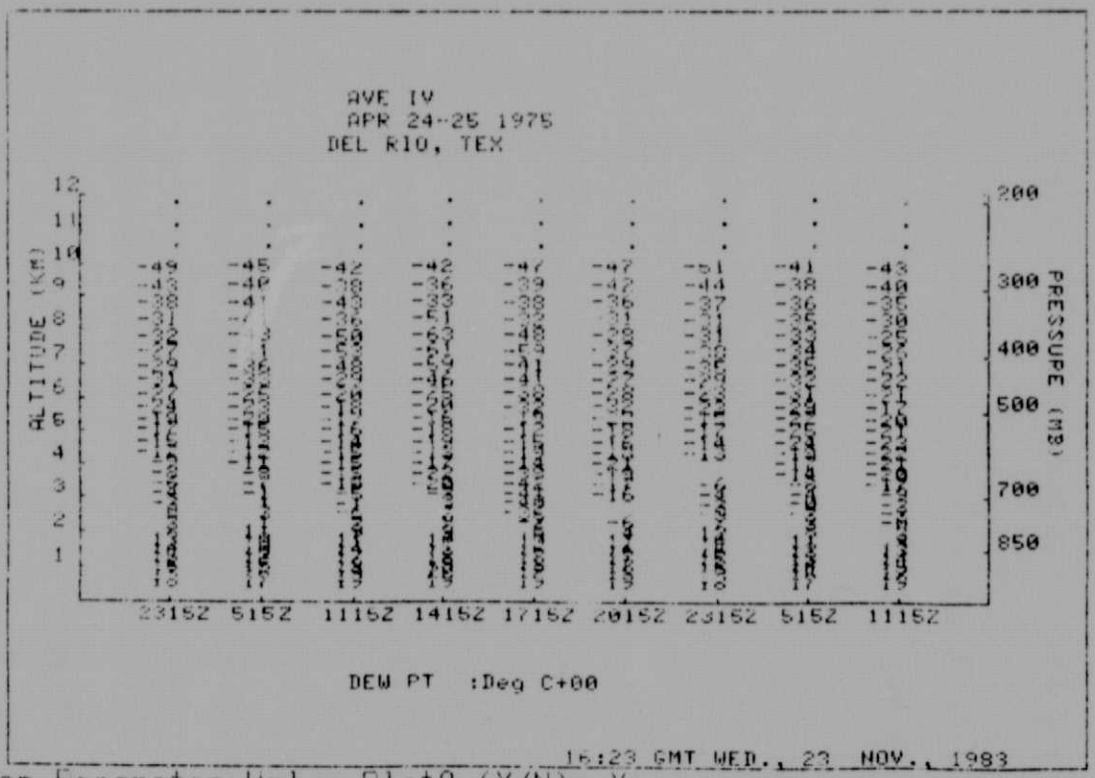
[illegible]:

```
   Plot  -- Skew T Profiles --(Under Construction)
   Plot  -- Values Time/Space Cross-section
   Plot  -- Profiles Time/Space Cross-section
   Plot  -- Wind Vectors Time/Space Cross-section
   Plot  -- Base Map Sounding Data
   *TBD* -- For Future Development

 Desired Output Type? (1 - 7): 3

Table Output Devices:
   Graphics Terminal (LU#60)
   Graphics Terminal (LU#07)
   4-Pen Plotter     (LU#20)
   8-Pen Plotter     (LU#18)

 Desired Device Type? (1 - 4): 1

Table Plotting Modes:
Plot - All Times for Station
Plot - User Selected Station/Times

 Plotting Option:  1

Rawinsonde Stations participating in the (AVE-IV) Experiment are:
Charleston      ,SC    15+ Athens           ,GA    29+ Albany
Tampa           ,FL    16+ Greensboro       ,NC    30+ Pittsburg
Waycross        ,GA    17+ Nashville        ,TN    31+ Buffalo
Apalachicola    ,FL    18+ Little Rock      ,AR    32+ Peoria
Centerville     ,AL    19+ Monette          ,MO    33+ Omaha
Boothville      ,LA    20+ Amarillo         ,TX    34+ North Platte
Jackson         ,MS    21+ Wallops Island   ,VA    35+ Portland
Lake Charles    ,LA    22+ Sterling         ,VA    36+ Flint
Shreveport      ,LA    23+ Huntington       ,WV    37+ Green Bay
Victoria        ,TX    24+ Dayton           ,OH    38+ Huron
Stephenville    ,TX    25+ Salem            ,IL    39+ St. Cloud
Del Rio         ,TX    26+ Dodge City       ,KS    40+ Rapid City
Midland         ,TX    27+ Topeka           ,KS    41- MSFC
Hatteras        ,NC    28+ Fort Totten      ,NY    42- Fort Sill
:  (-) Special Network (SN), (+) National Weather Service (NWS)

Soundings were taken at each of the above Stations:
0000GMT 4/24/75     4--1500GMT 4/24/75     7--0000GMT 4/25/75
0600GMT 4/24/75     5--1800GMT 4/24/75     8--0600GMT 4/25/75
1200GMT 4/24/75     6--2100GMT 4/24/75     9--1200GMT 4/25/75

 Print Detailed Station List? (Y/N): N
```

```
03=HEIGHT   :GPM   +00:1.0E+00 :        04=PRESSURE:MB    +00:1.0E
05=TEMP     :Deg C+00:1.0E+00 :        06=DEW PT   :Deg C+00:1.0E
07=WIND DIR:Deg   +00:1.0E+00 :        08=WIND SPD:M/S   +00:1.0E
09=U-COMP   :M/S   +00:1.0E+00 :       10=V-COMP   :M/S   +00:1.0
11=POT TEMP:Deg K+00:1.0E+00 :         12=E POT T  :Deg K+00:1.0
13=MX RATIO:GM/Kg+00:1.0E+00 :         14=REL HUM  :%     +00:1.0
15=BAL RNGE:KM    +00:1.0E+00 :        16=BAL AZ   :Deg   +00:1.0
17=         :          :       :      18=         :          :
19=         :          :       :      20=         :          :
```

ER Select Parameter: 6

ER Select Altitude (Y-Axis) Scale (3, 6, 12, or 20 km): 12
ER Select Plotting Interval (1=25mb 2=50mb 3=100mb): 1



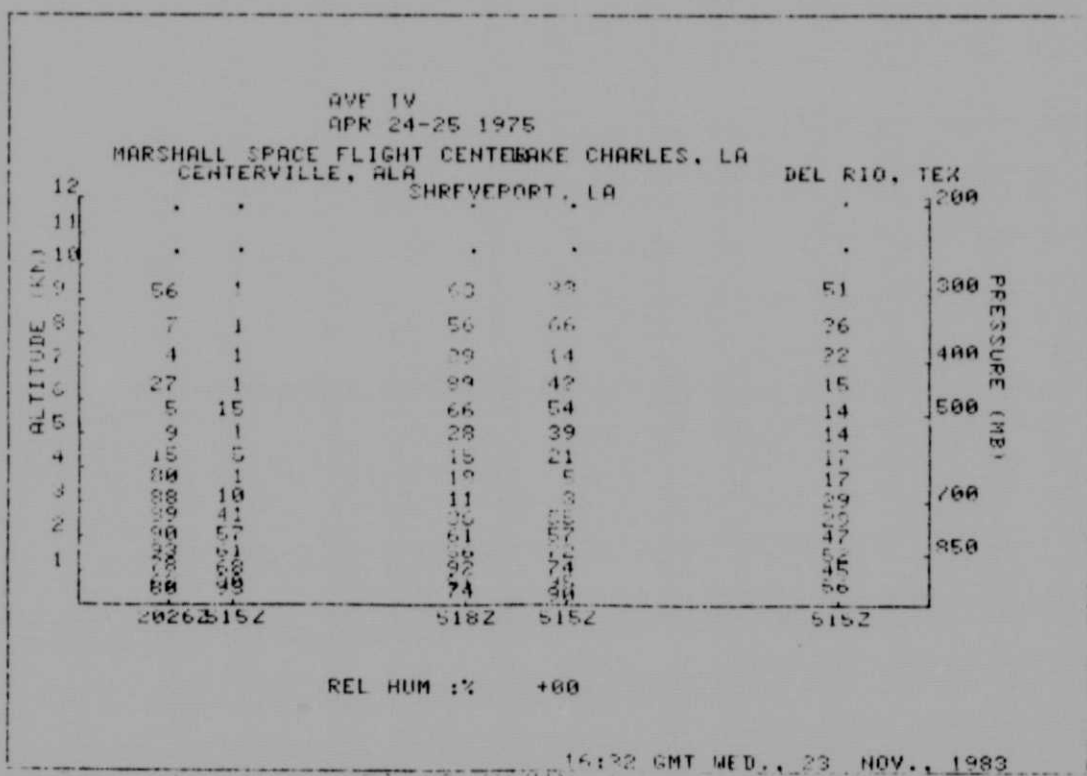
ER Another Parameter Value Plot? (Y/N): Y

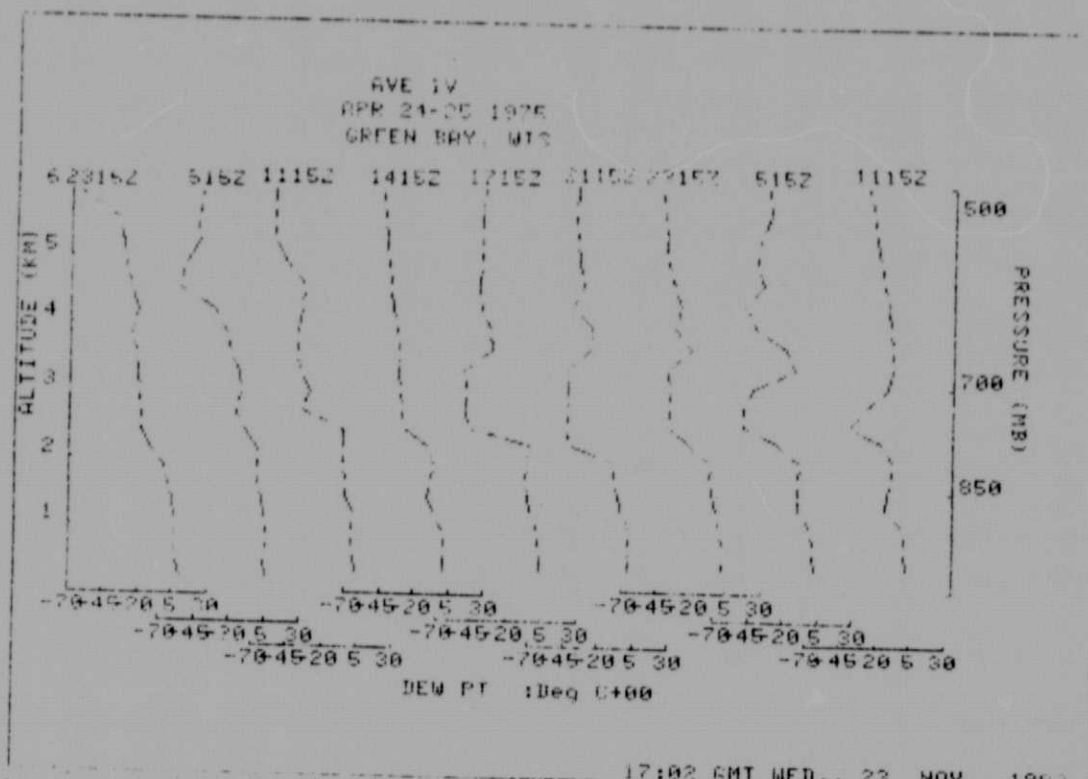
ilable Plotting Modes:
. Plot - All Times for Station
. Plot - User Selected Station/Times

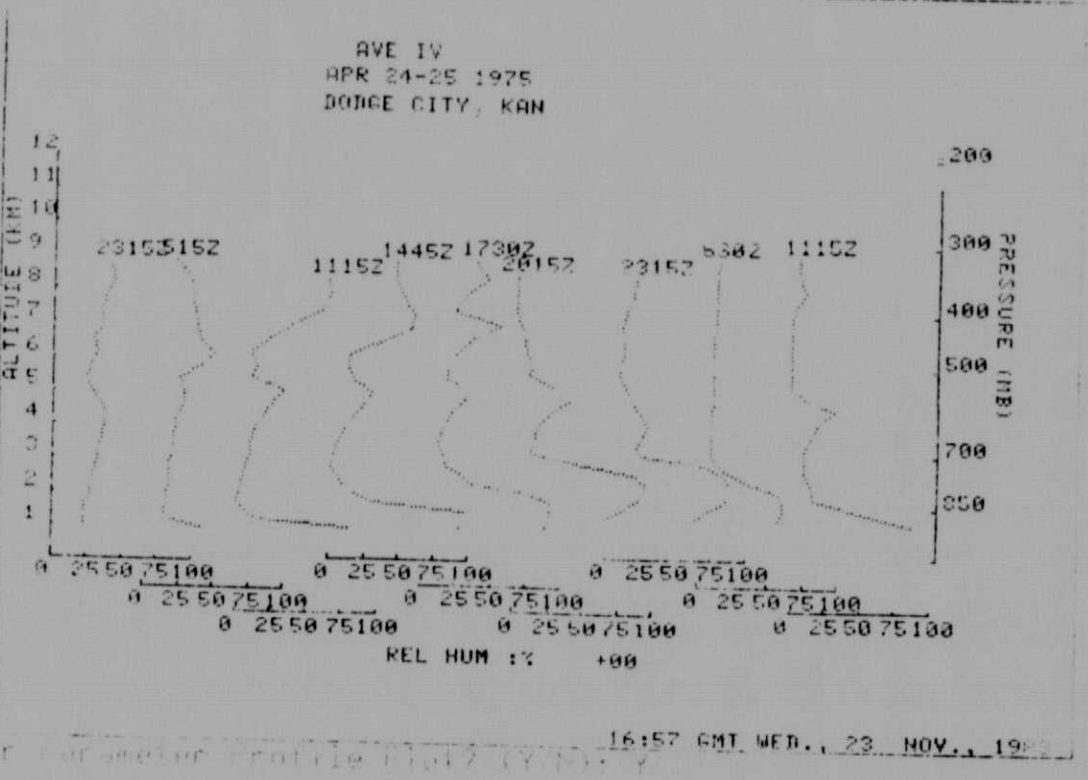
ER Plotting Option:

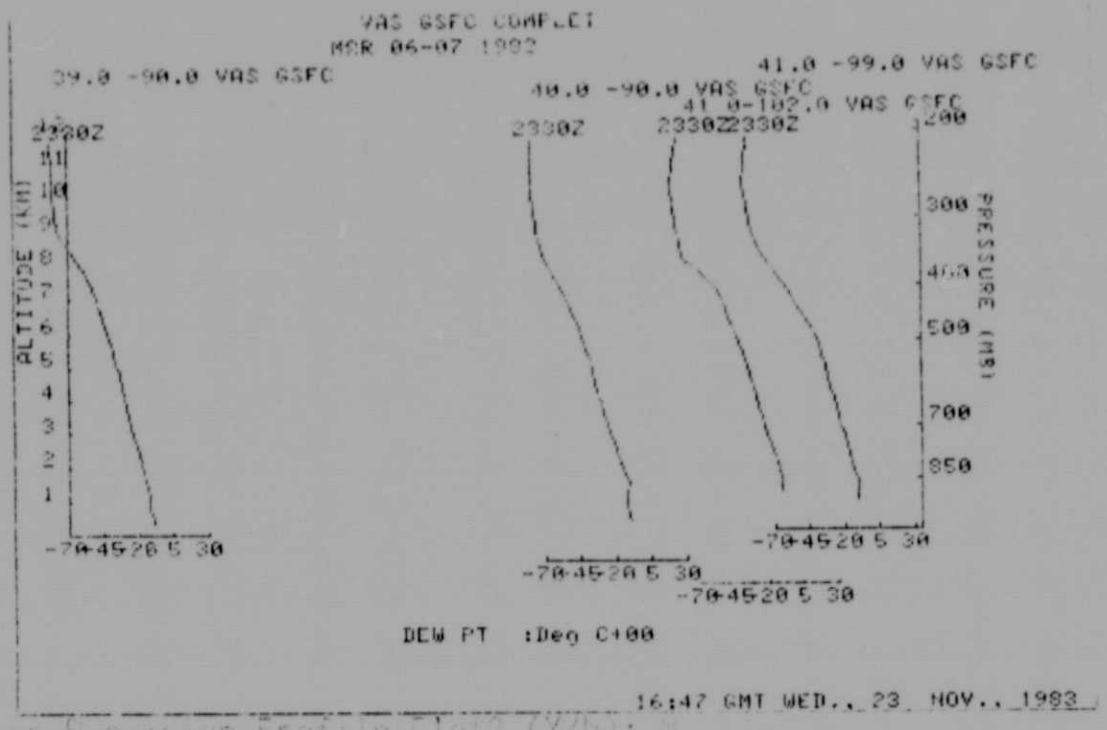
= 500km
= 250km
= 100km
= 50km
= 25km
= 10km

Stat,Time ? (n,n): 6.8
Stat,Time ? (n,n): 9.8
Stat,Time ? (n,n): 12.8
Stat,Time ? (n,n): 9999

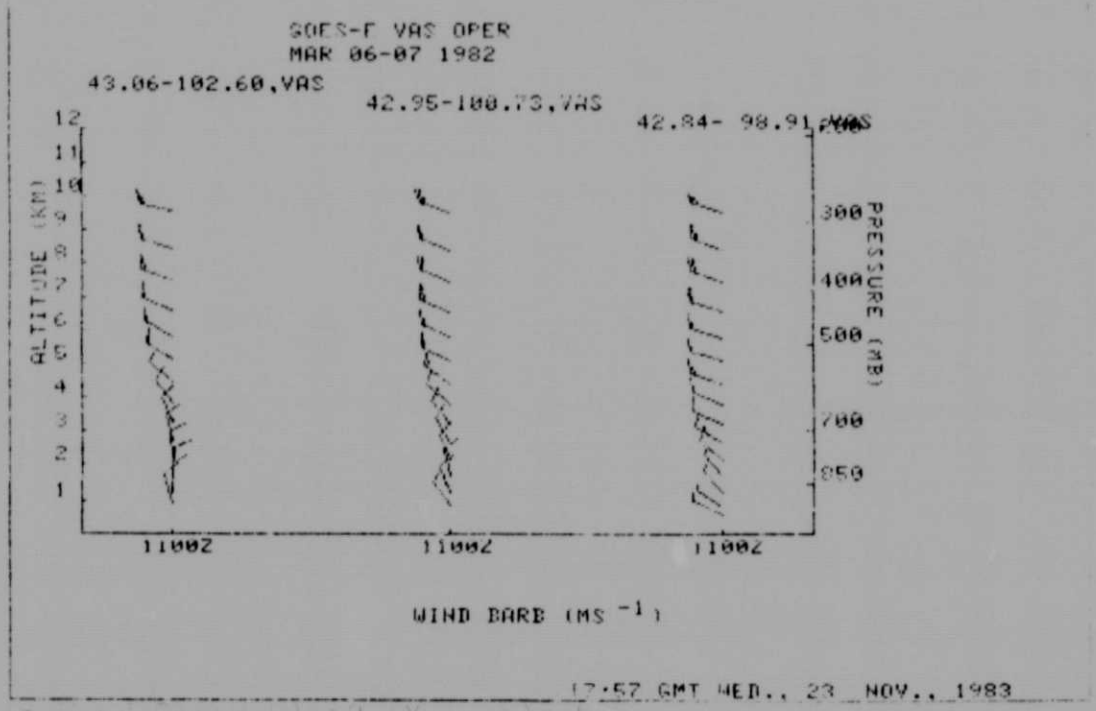




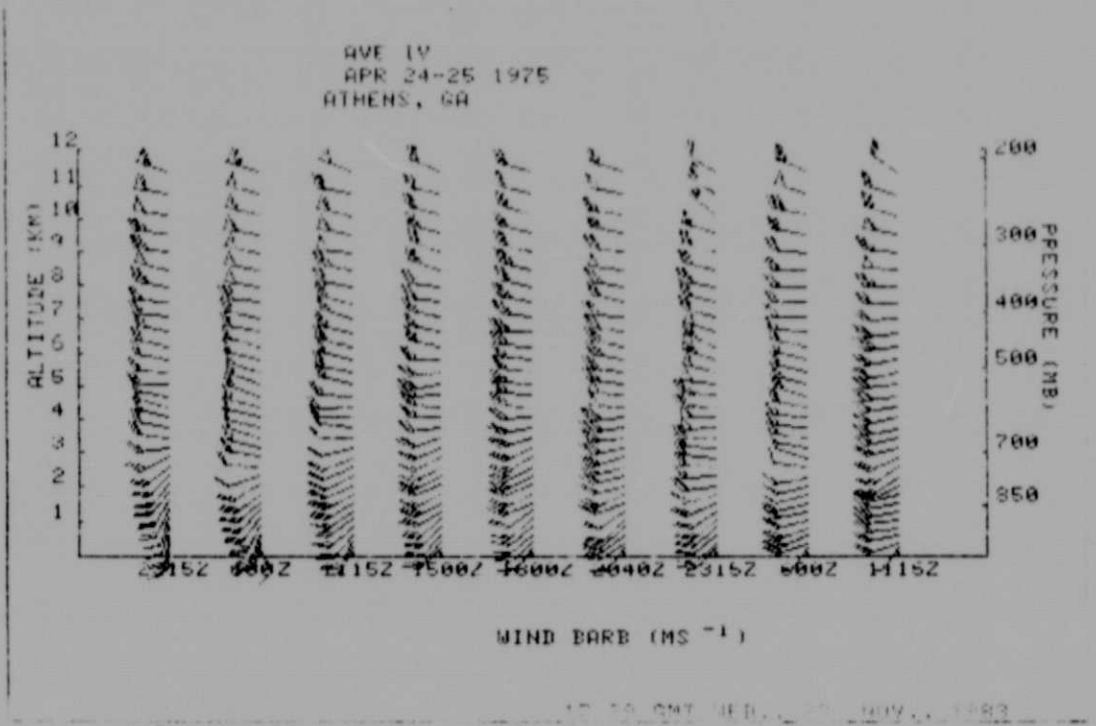




Another Parameter Profile Plot? (Y/N): N

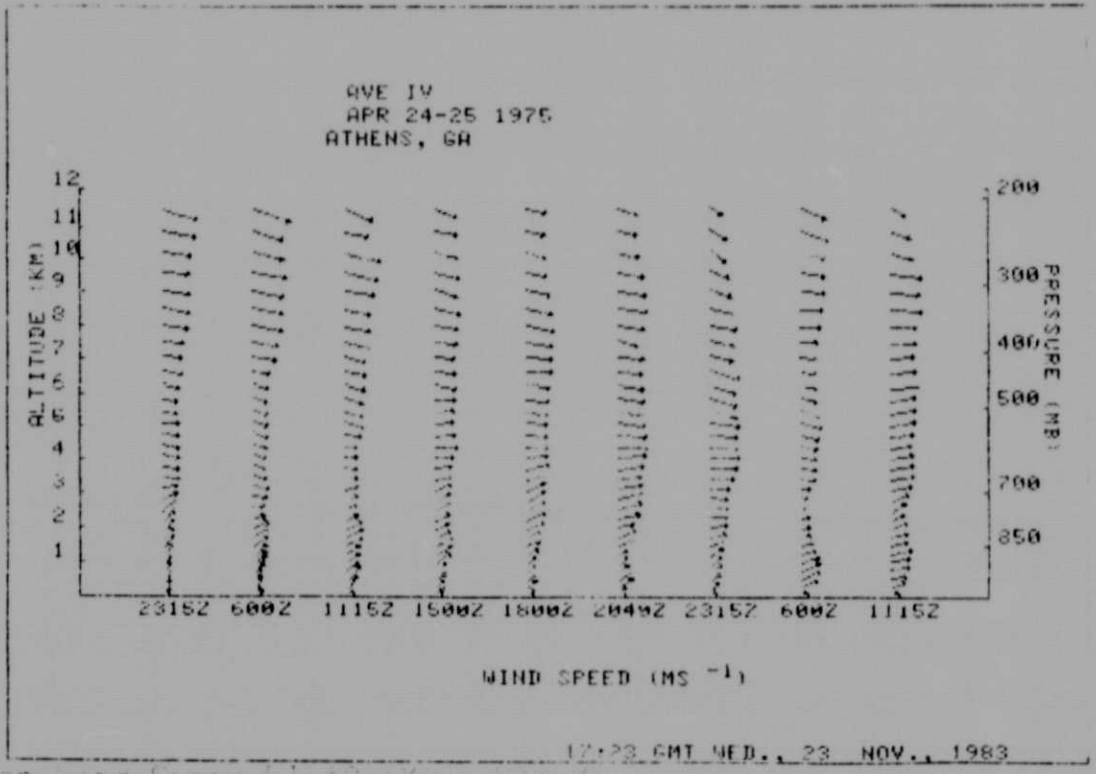


Another wind speed plot? (Y or N): N



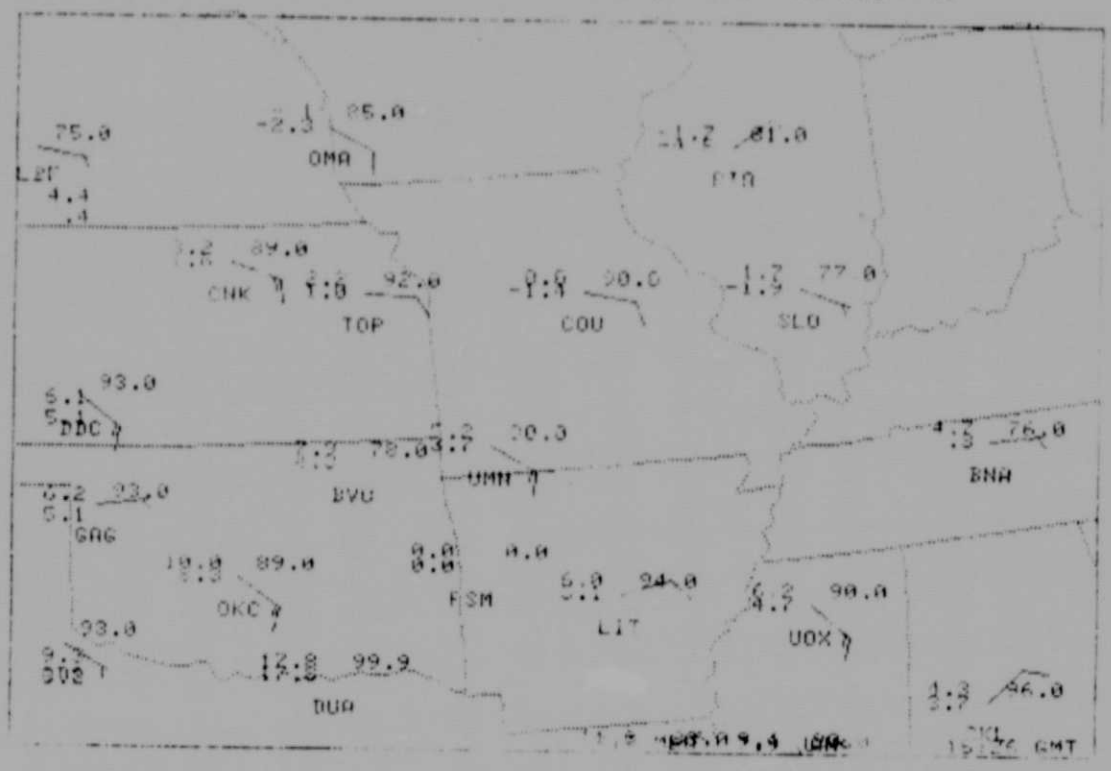
12:23 GMT WED., 23 NOV., 1983

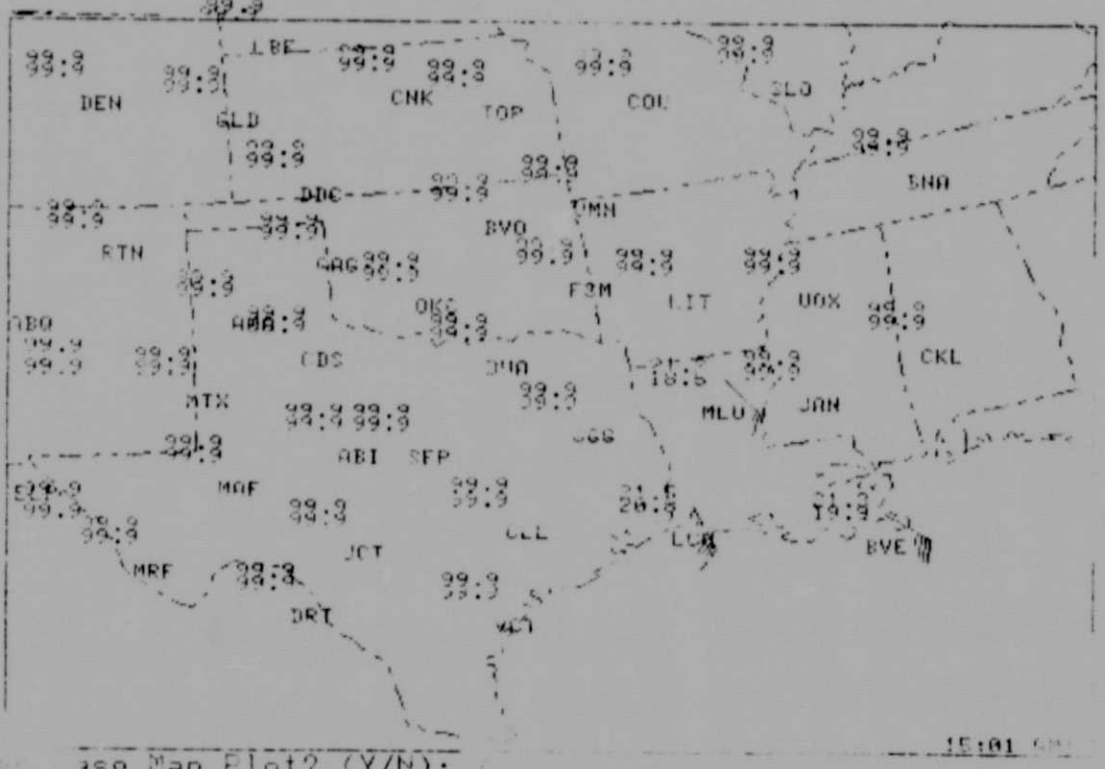
Another Wind Speed Plot? (Y or N): Y



12:23 GMT WED., 23 NOV., 1983

Another Wind Speed Plot? (Y or N): Y





Another Base Map Plot? (Y/N):

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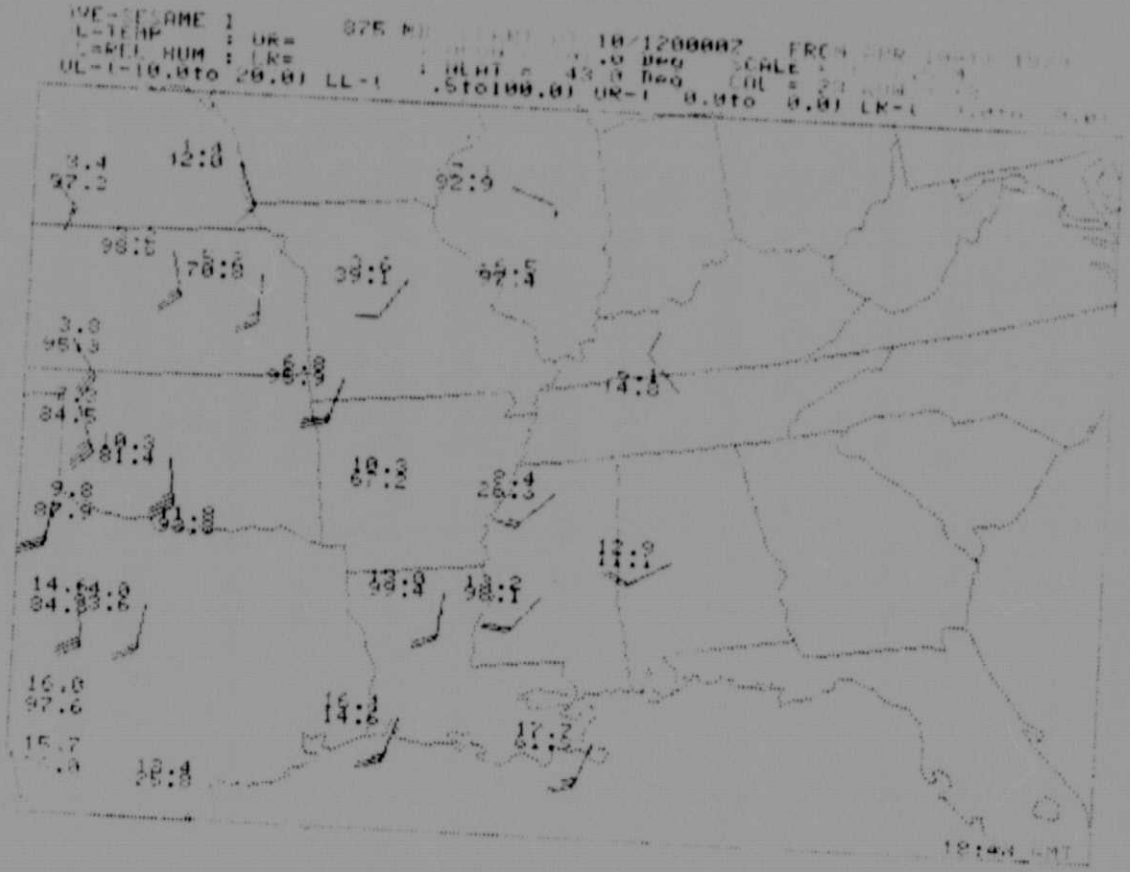
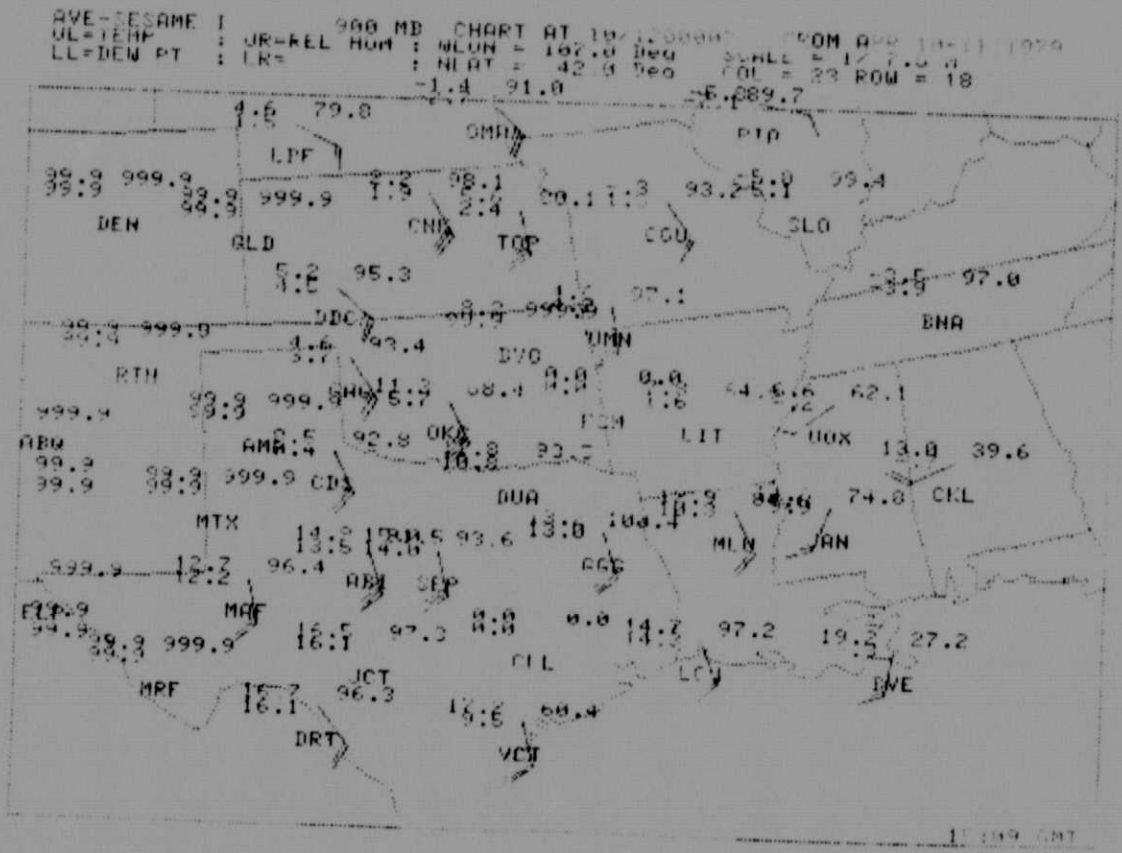
OF POOR QUALITY





4.5 SINGLE LEVEL DATA SOFTWARE -- SGL80

This section details the "SGL80" Single Level Software. Below a logical flow of the "SGL80" program and the associated input files required and graphical outputs available are given.

```
    FTN4X,L
    PROGRAM SGL80(3,90),ACI-020383 SGL80--AVE-SINGLE LEVEL PROGRAM
C*****************************************************************
C**                                                             **
C** DESCRIPTION:  Program 'SGL80' processes a user selected     **
C**               Surface, Cloud Wind, or Precipitation data    **
C**               group and generates a Single Level Station    **
C**               and Base Map plot.                            **
C**                                                             **
C** LOGICAL FLOW:                 -------------                 **
C**                               |   SGL80   |                 **
C**                               -------------                 **
C**                                     |                       **
C**               -----------------------------------------     **
C**               |       |       |       |       |       |     **
C**             SG180   SG280   SG380   SG480   SG580   SG680   **
C**           (B Map) (Print) (Plot)   (TBD)   (TBD)   (TBD)    **
C**                                                             **
C** DATA GROUPS:  1. Surface                                    **
C**               2. Cloud Winds                                **
C**               3. Precipitation                              **
C**                                                             **
C** INPUTS:       Array   Filenn  Description                   **
C**               ------  ------  -------------------------     **
C**               IQFIL   ?SGL80  SGL80 Question File           **
C**               IDFIL   *SGLDR  Directory File                **
C**               IRFIL   RMRS11  Random Access Data File       **
C**               IBFIL   RMLS11  Random Lat/Lon Data File      **
C**               ISFIL   SMDS11  Documentation File            **
C**               IMFIL   SMLS11  Sequential Lat/Lon File       **
C**                                                             **
C** OUTPUTS:      1.  Plot   --  Station & Base Map     (SG180) **
C**               2.  Print  --  Station Parameters     (SG280) **
C**               3.  Plot   --  Station Parameters     (SG380) **
C**                                                             **
C*****************************************************************
```

In the remainder of this section detailed examples generated by the "SGL80" Software along with complete "Operational Procedures" are given.

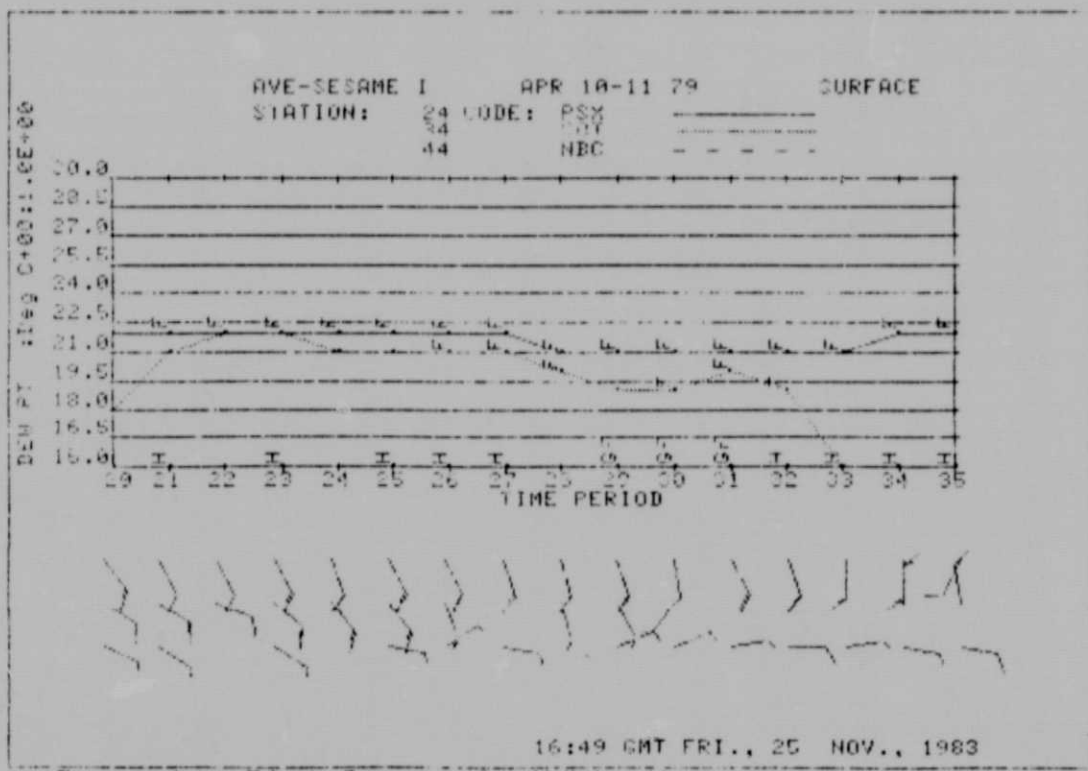
```
Mesoscale Analysis & Space Sensor (MASS)
       Analysis & Display Software
                    By
      ATSUKO COMPUTING INTERNATIONAL
          (Revision:  11/18/83)

         AVE80 -- ID Segment Loader
                    |
        -----------------------------
        |    Basic Data Types:       |
        -----------------------------
        |  1. Sounding Data          |
        |  2. Single Level Data      |
        |  3. Grid Data              |
        |  4. Image Data             |
        -----------------------------
TE:  To select Data Type, User must enter  :.n

TER Desired Data Type? (:.1 or:.2 or:.3 or:.4)
JSE,60
,2

*** PLEASE WAIT -- AVE80 SERIES PROGRAMS ARE BEING LOADED ***

                    |
          ---------------------
          | PROJECT DATA SETS |
          ---------------------
          |   1. AVE/AVESS    |
          |   2. AVE/SESAME   |
          |   3. AVE/VAS      |
          |   4. Other        |
          ---------------------

ER Desired Data Set? (1 to 4): ?
                    |
            ----------------
            |SINGLE LEVEL |
            ----------------
            | Categories: |
            | 1-Surface   |
            | 2-Cld Winds |
            | 3-Precip    |
            ----------------

   Desired Data Category? (1 to 3):
```

```
RSSS11 RSLS11 16 764 49 SSDS11 SSLS11 AVE-SESAME I     APR 10-11 79
RSSS21 RSLS21 16 770 49 SSDS21 SSLS21 AVE-SESAME II    APR 19-20 79
RSSS31 RSLS31 16 773 49 SSDS31 SSLS31 AVE-SESAME III   APR 25-26 79

ER Desired Experiment Data Base? (1 to 30): 1

ER Print Lat/Lon File?(Y/N): N

ER Print Documentation Page? (Y/N): N

ER Display Data Documentation Page? (Y/N): Y
R:  *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES) ***
 1:  Raw surface data from tape provided by G. Darkow of the Univ. o
 2:  Missouri.
 3:
 4:
 5:
 6:
 7:
 8:
 9:
 0:
 1:
 2:
 3:
 4:
 5:
 6:
 7:
 8:
 9:
 0:
 1:
 2:
ER Restart Documentation Page or Proceed? (R/P): P

**********************************************************
**                                                      **
**    SG180 SERIES -- INTERACTIVE SINGLE LEVEL PACKAGE  **
**                                                      **
**********************************************************

Available Output Types:
.  Plot  -- Single Level Station & Base Map (SG180)
.  Print -- Single Level Parameters         (SG280)
.  Plot  -- Single Level Parameter          (SG380)

ER Desired Output Type? (1 - 3):
```

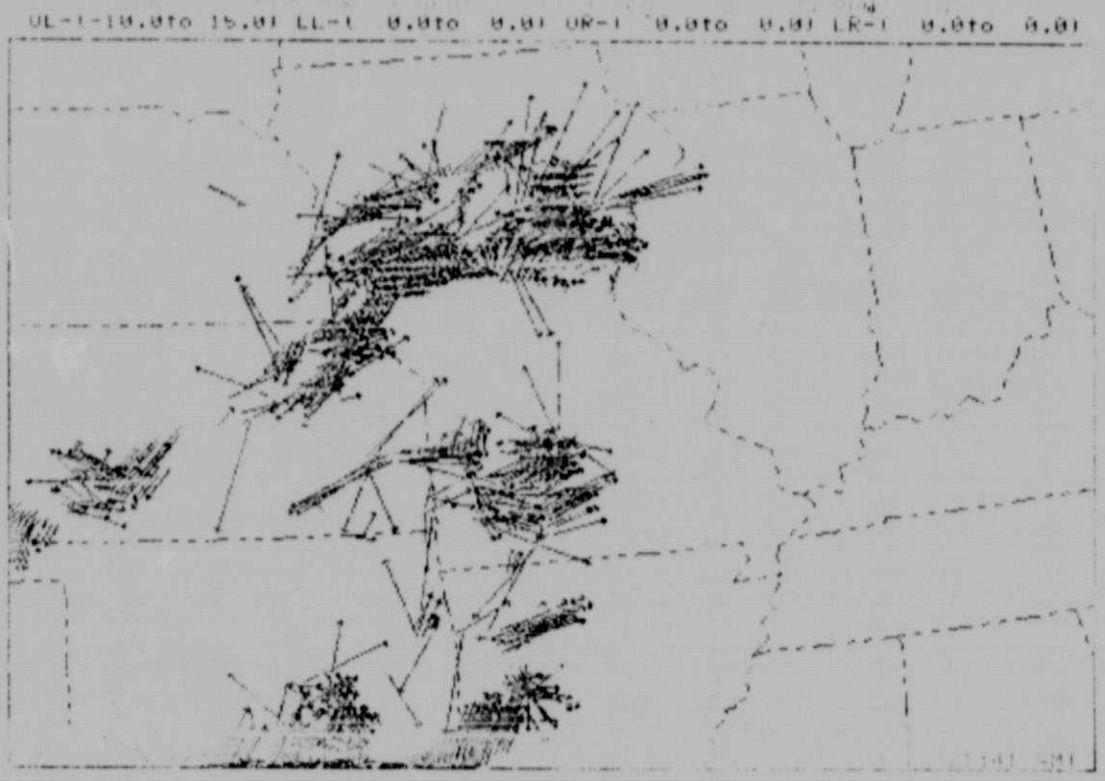
ORIGINAL PAGE IS OF POOR QUALITY

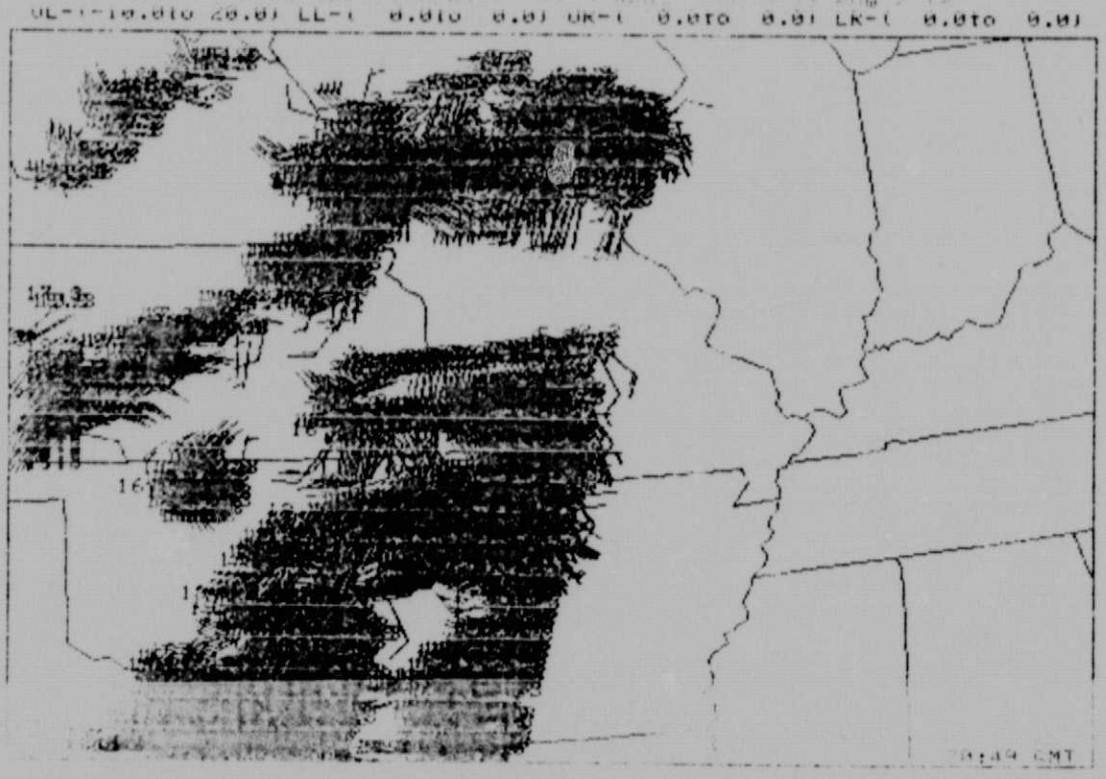
```
 Graphics Terminal     (LU#07)
 4-Pen Plotter         (LU#20)
 8-Pen Plotter         (LU#18)
 Line Printer/Plotter  (LU#28)

 Desired Device Type? (1 - 5): 1

 Multiple Plots--(Batch Mode)? (Y/N): N
 Surface Stations participating in the (AVE-SESAME I) Experiment are
 54 STATIONS (SEE DETAILED LIST)

 time periods available are:
 Times from 0600GMT  4/10/79 to 4/12/79 every hour

 Z4/10 08-13Z4/10 15-20Z4/10 22-03Z4/11 29-10Z4/11 36-17Z4/11 43-00Z
 Z4/10 09-14Z4/10 16-21Z4/10 23-04Z4/11 30-11Z4/11 37-18Z4/11 44-01Z
 Z4/10 10-15Z4/10 17-22Z4/10 24-05Z4/11 31-12Z4/11 38-19Z4/11 45-02Z
 Z4/10 11-16Z4/10 18-23Z4/10 25-06Z4/11 32-13Z4/11 39-20Z4/11 46-03Z
 Z4/10 12-17Z4/10 19-00Z4/11 26-07Z4/11 33-14Z4/11 40-21Z4/11 47-04Z
 Z4/10 13-18Z4/10 20-01Z4/11 27-08Z4/11 34-15Z4/11 41-22Z4/11 48-05Z
 Z4/10 14-19Z4/10 21-02Z4/11 28-09Z4/11 35-16Z4/11 42-23Z4/11 49-06Z

 e: (Select Lat/Long print option for detailed information)

 Number of Stations (max= 3): 3

 Station Numbers ? (n,n,n): 24,34,44

 Desired Time Range: (Range: 1,49): 20,35

                     ---------- Parameter Index Menu ----------
  01=STAT #  :       +00:1.0E+00 :        02=ELEV    :M      +00:1.0E
  03=LO CLD  :       +00:1.0E+00 :        04=MI CLD  :       +00:1.0E
  05=HI CLD  :       +00:1.0E+00 :        06=SPARE   :       +00:1.0E
  07=SPARE   :       +00:1.0E+00 :        08=ALT     :In.    +02:1.0E
  09=TEMP    :Deg C+00:1.0E+00   :        10=DEW PT  :Deg C+00:1.0E
  11=DIR     :Deg    +00:1.0E+00 :        12=SPEED   :M/S    +00:1.0E
  13=VISIBL  :KM     +01:1.0E-01 :        14=W GUST  :M/S    +00:1.0E
  15=PRECIP  :In.    +02:1.0E-02 :        16=SPARE   :       +00:1.0E
  17=STN#    : CHAR*4 :          :        18=TIME    : CHAR*4 :
  19=WX1     : CHAR*4 :          :        20=WX2     : CHAR*4 :

 Select Parameter: 10
```

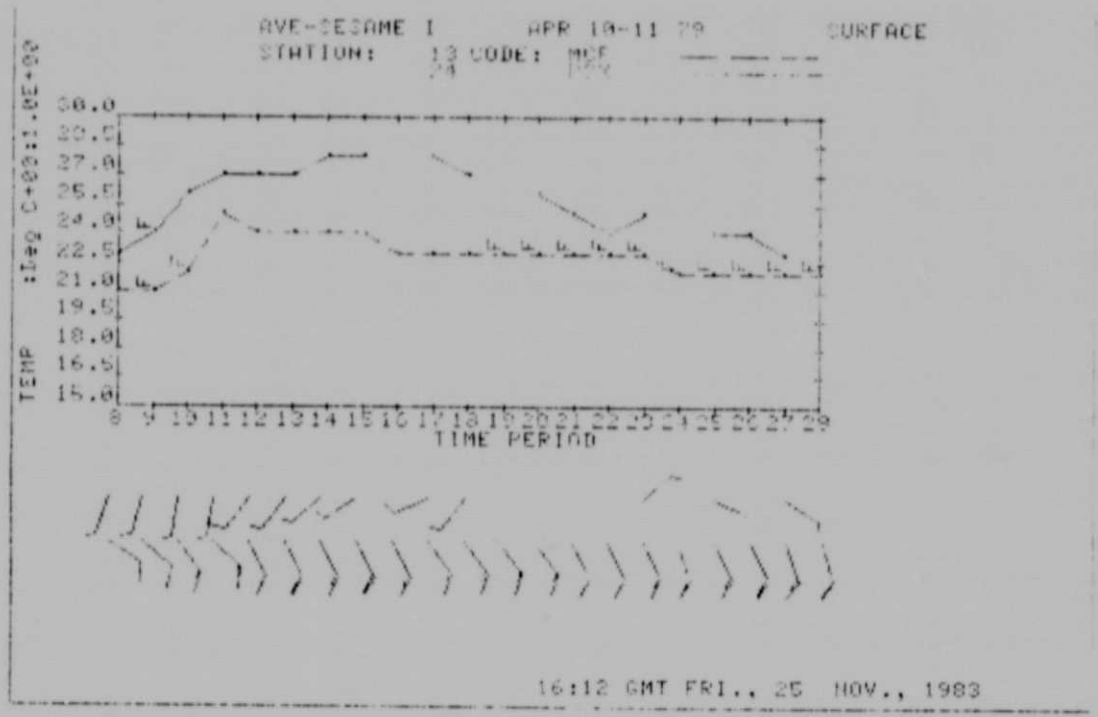
```
TER] Char*4 Parameter Desired for Plotting? (Y/N): Y
TER] Char*4 # (17,18,19, or 20): 19
TER] Select Color/Linestyle for Data Plot? (Y/N): N

TER] Grid pattern desired on plot ? (Y/N):  Y

orizontal Lines Only      = 1
ertical  Lines  Only      = 2
oth Horiz. & Vert. Lines  = 3
                    ENTER] 1

TER] Number of Y-Axis tick marks:  11

TER] Length of X-Axis (Time-Axis) in Inches (min=2.,max=13.):  12

EASE WAIT] while plot data is being computed.
RAY( 1, 1) =    22.00
RAY( 1, 2) =    22.00
RAY( 1, 3) =    22.00
TER] '0' TO PROCEED: 00
```

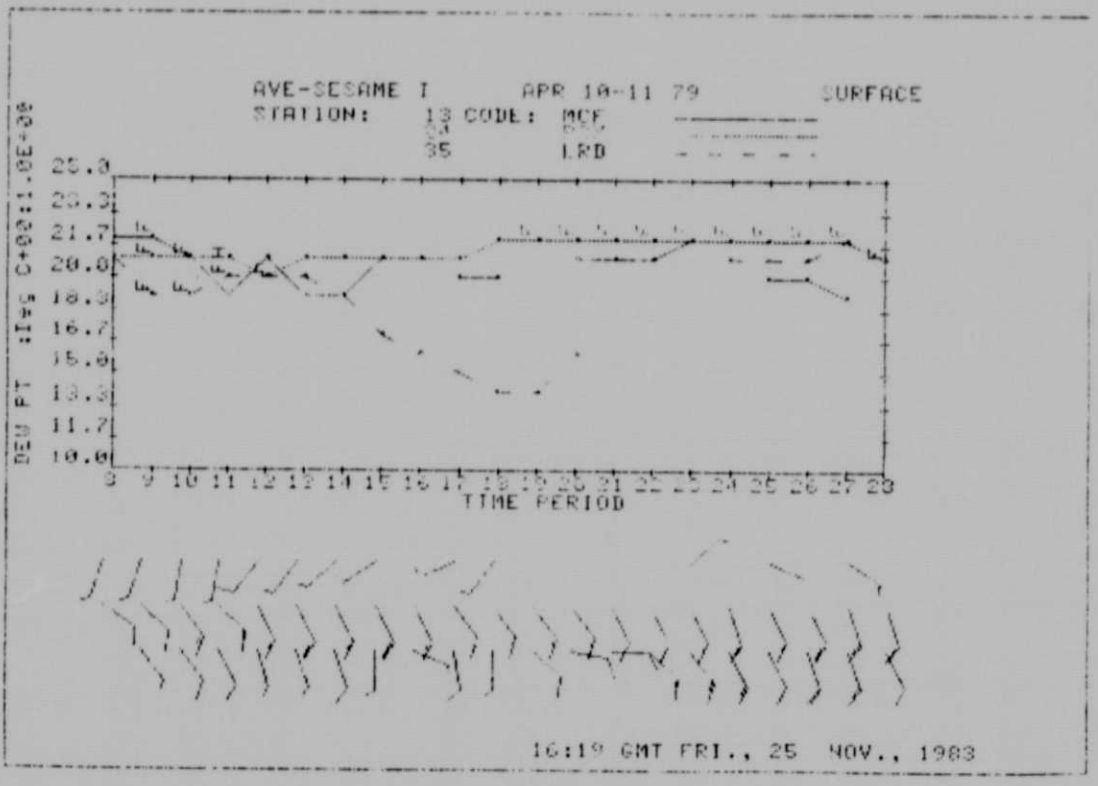


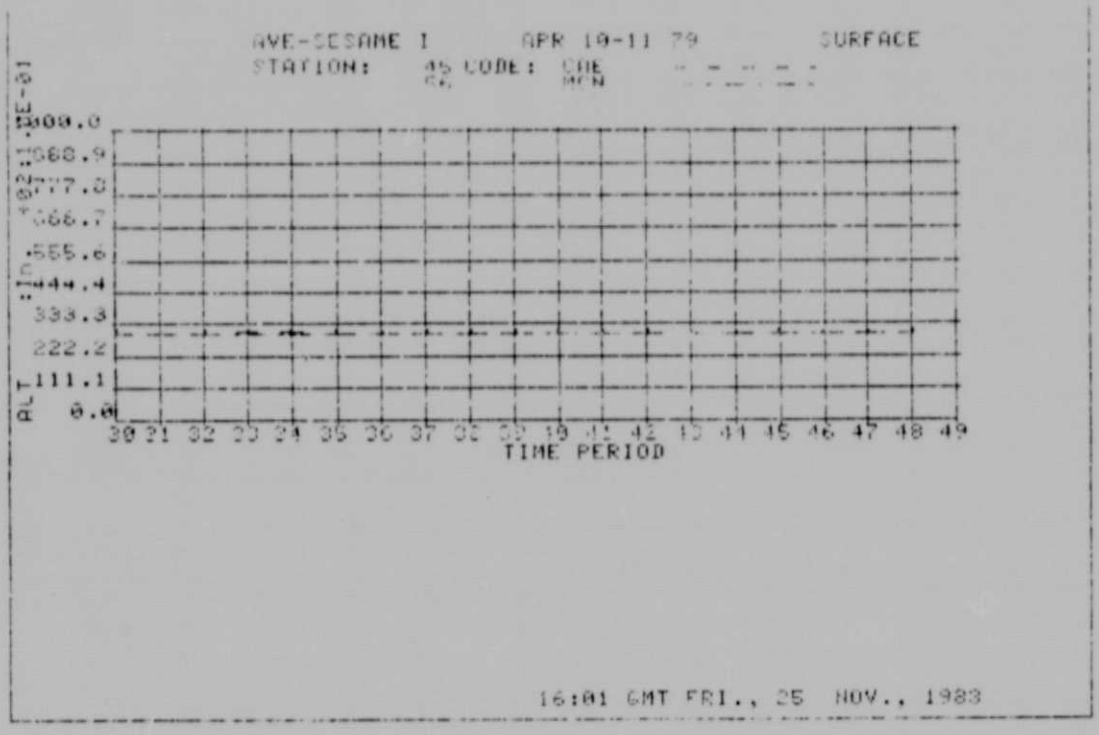

```
TER] Another Parameter Plot Desired? (Y/N): N
```

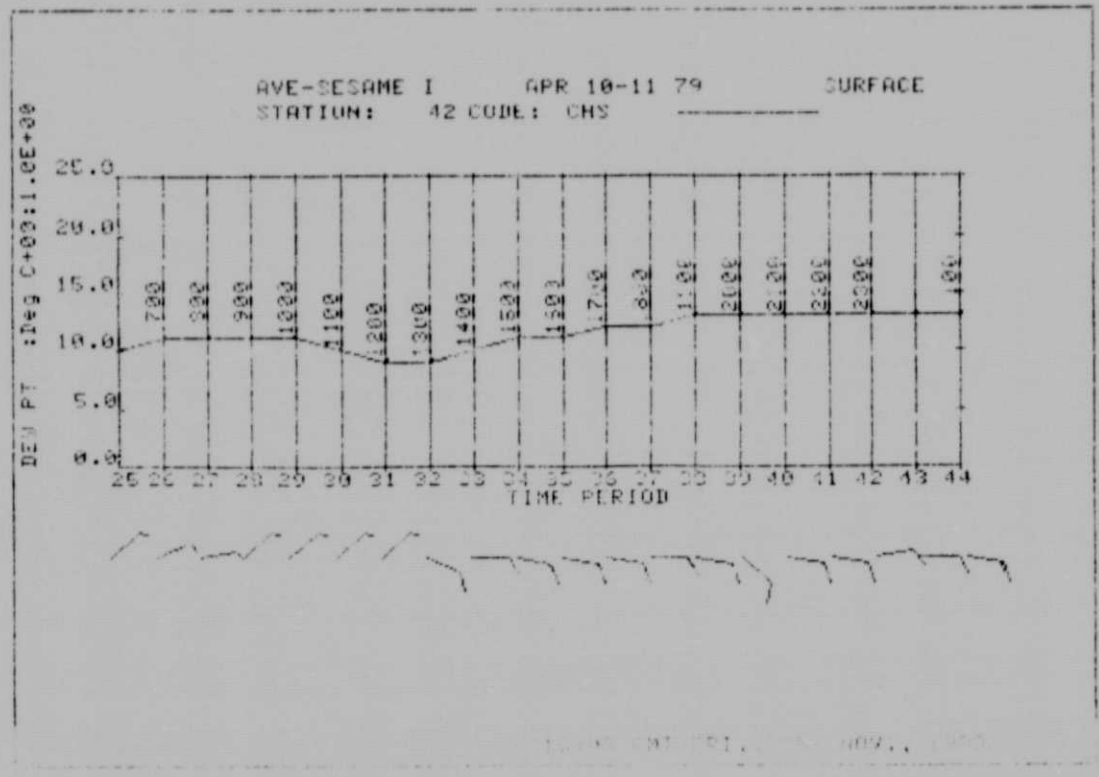


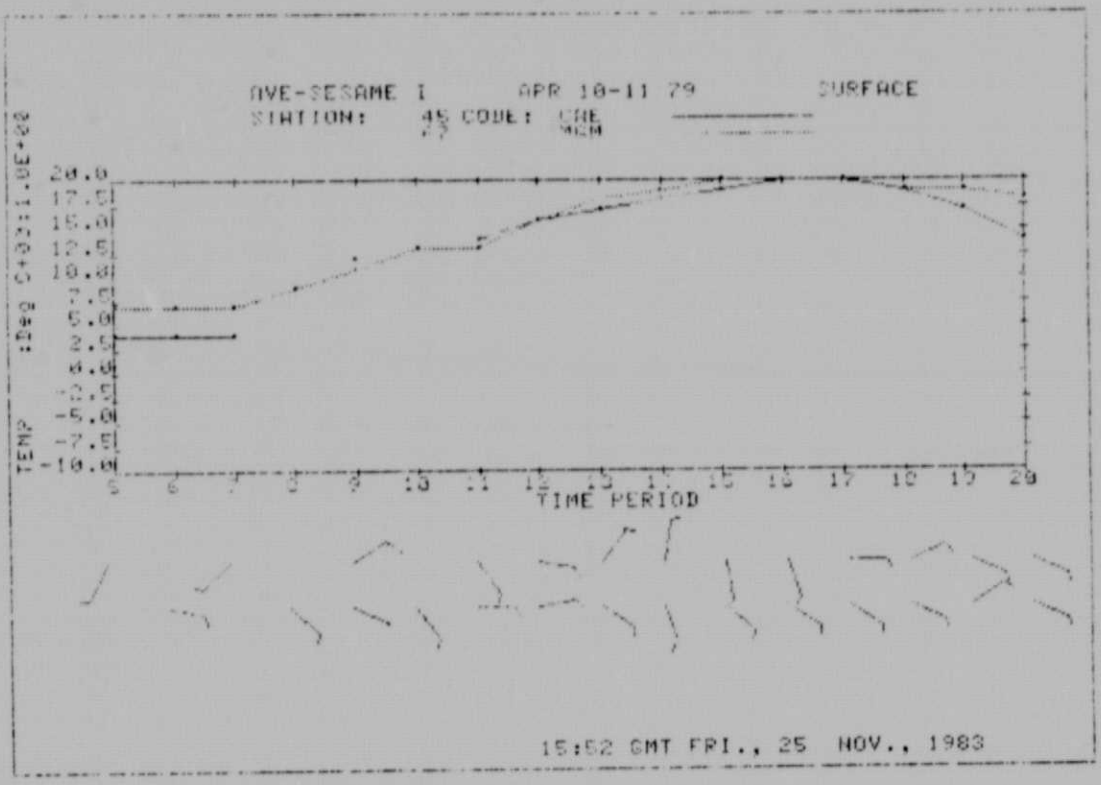


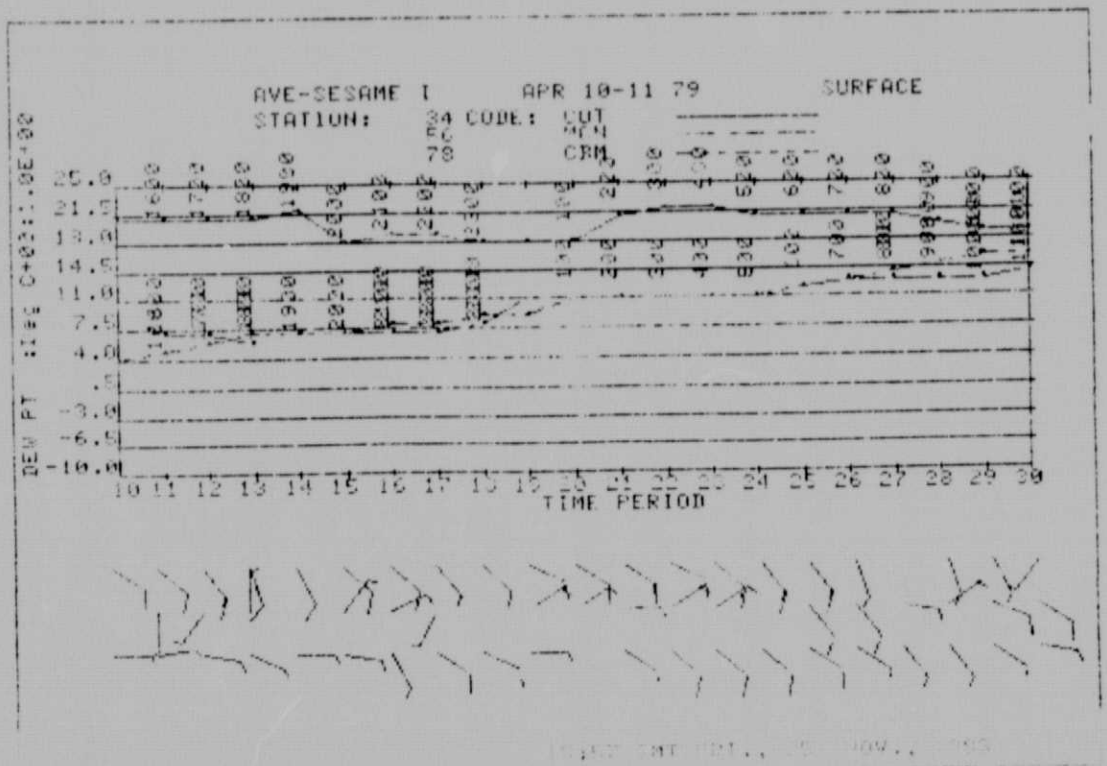












4.6 GRID DATA SOFTWARE -- GRD80

This section details the "GRD80" Grid Data Software. Below a logical flow of the "GRD80" program and the associated input files required and graphical outputs available are given.

```
      FTN4X,L
      PROGRAM GRD80(3,90),ACI-020483 GRD80--AVE-GRID DISPLAY PROGRAM
C*************************************************************
C**                                                         **
C** DESCRIPTION:  Program 'GRD80' processes a user selected  **
C**               Basic or Derived data group and generates a **
C**               printed output or contoured plot.         **
C**                                                         **
C**                                                         **
C** LOGICAL FLOW:                 -------------             **
C**                               |   GRD80   |             **
C**                               -------------             **
C**                                     |                   **
C**                  ---------------------------------      **
C**                  |      |      |      |      |      |    **
C**               GR180  GR280  GR380  GR480  GR580  GR680  **
C**              (Print) (Plot) (TBD)  (TBD)  (TBD)  (TBD)  **
C**                                                         **
C** DATA GROUPS:  1. Basic                                  **
C**               2. Derived                                **
C**                                                         **
C** INPUTS:       Array   Filenn  Description               **
C**               ------  ------  ------------------------  **
C**               IQFIL   ?GRD80  GRD80 Question File       **
C**               IDFIL   *GRDDR  Directory File            **
C**               IRFIL   RGBS11  Random Access Data File   **
C**               IBFIL   RGLS11  Random Lat/Lon Data File  **
C**               ISFIL   SGDS11  Seq. Documentation File  **
C**               IMFIL   SGLS11  Sequential Lat/Lon File   **
C**                                                         **
C** OUTPUTS:      1.  Print   -- GRID Data          (GR180) **
C**               2.  Plot    -- Contour GRID Data  (GR280) **
C**                                                         **
C*************************************************************
```

In the remainder of this section detailed examples generated by the "GRD80" Software along with complete "Operational Procedures" are given.

```
Analysis & Display Software
                By
ATSUKO COMPUTING INTERNATIONAL
(Revision:  11/12/85)

AVE80 -- ID Segment Loader

  Basic Data Types:
  1. Sounding Data
  2. Single Level Data
  3. Grid Data
  4. Image Data

E:  To select Data Type, User must enter :.n

TEN Desired Data Type? (:.1 or:,2 or:,3 or:,4)
SE,60
3

** PLEASE WAIT -- AVE80 SERIES PROGRAMS ARE BEING LOADED ***

AVE80 -- Task Scheduler

  PROJECT DATA SETS
  1. AVE/AVESS
  2. AVE/SESAME
  3. AVE/VAS
  4. Other

EN Desired Data Set? (1 to 4): 2

    GRID
  Categories:
  1-Basic
  2-Derived
```

ER] Desired Data Group? (1 to 2): 1

lable Raw Data Categories:
Rawinsonde
Satellite

ER] Desired Basic Data Group? (1 to 2): 1

S-Data R-L/L FR LVL TM S-Doc S-I/L #C #R GDS AVE/SESAME BMRaw Tim

RGRS11 RGLS11 06 018 09 SGDS11 SGLS11 20 15 972 GJJ MS THESIS AFR

RGRS12 RGLS12 05 020 09 SGDS12 SGLS12 18 12 900 AVE-SESAME I V2 AFR

FRQNCY RFILE1 01 001 01 SGDS12 FRQLOC 20 20 001 BOB'S GRID DATA MAY

ER] Desired Experiment Data Base? (1 to 30): 2

ER] Display Data Documentation Page? (Y/N): Y

R: *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES) ***

01:
02:
03:
04:
05:
06:
07:
08:
09:
10:
11:
12:
13:
14:
15:
16:
17:
18:
19:
20:
21:
22:

ER] Restart Documentation Page or Proceed? (R/P): P

ORIGINAL PAGE IS
OF POOR QUALITY

```
**************************************************************
**                                                       *****
**   GR180 SERIES -- INTERACTIVE  GRID DISPLAY PACKAGE   *****
**                                                       *****
**************************************************************
Available Output Types:
  Print/Contour -- GRID Data                 (GR180)
. Plot/Contour  -- GRID Data                 (GR280)


ENTER Desired Output Type? (1 - 6): 2
Available Output Devices:
.   HP-2608 Line Printer
.   HP-2623 Graphics Terminal (LU#60)
.   HP-2647 Graphics Terminal (LU#07)
.   HP-9872 4-Pen Plotter     (LU#20)
.   HP-9872 8-Pen Plotter     (LU#18)

ENTER Desired Device Type? (1 - 5): 2

ENTER Multiple Plots--(Batch Mode)? (Y/N): Y
  GRID data for the AVE-SESAME I experiment is as follows:

5)-PARAMS:   1- U Wind    2- V Wind        3- Temperature
             4- Rel Hum   5- Height

20)-LEVELS:  1- SFC      2-1000mb  3- 950mb  4- 900mb  5- 850mb  6- 800mb
             7- 750mb    8- 700mb  9- 650mb 10- 600mb 11- 550mb 12- 500mb
            13- 450mb   14- 400mb 15- 350mb 16- 300mb 17- 250mb 18- 200mb
            19- 150mb   20- 100mb

9)-TIMES:    1-10/1100Z   2-10/1400Z   3-10/1700Z   4-10/2000Z   5-10/2300Z
             6-11/0200Z   7-11/0500Z   8-11/0800Z   9-11/1100Z




Grid (18x12) (Note: Select Lat/Long print option for detailed information)


ENTER Desired Times(1- 9)? (First,Last,Increment): 1,9,2
```

```
06-  600MB :  07-  750MB :  08-  700MB :  09-  650MB :  10-  6[illegible]
11-  550MB :  12-  500MB :  13-  450MB :  14-  400MB :  15-  3[illegible]
16-  300MB :  17-  250MB :  18-  200MB :  19-  150MB :  20-  1[illegible]
```

ER Desired Level #'s (1 to 20)? (First,Last,Increment): 1,20,2
ER Do You Want Plotted Vectors? (Y/N): Y

Parameter Index Menu

01=U WIND	:M/S	+00:1.0E+00	02=V WIND	:M/S	+00:1.0E
03=TEMP	:Deg C	+00:1.0E+01	04=REL HUM	:%	+00:1.0E
05=HEIGHT	:GPM	+00:1.0E+00	06=SPARE	:	+00:1.0E
07=SPARE	:	+00:1.0E+00	08=SPARE	:	+00:1.0E
09=SPARE	:	+00:1.0E+00	10=SPARE	:	+00:1.0E
11=SPARE	:	+00:1.0E+00	12=SPARE	:	+00:1.0E
13=SPARE	:	+00:1.0E+00	14=SPARE	:	+00:1.0E
15=SPARE	:	+00:1.0E+00	16=SPARE	:	+00:1.0E
17=BLANK	: CHAR*4	:	18=BLANK	: CHAR*4	:
19=BLANK	: CHAR*4	:	20=BLANK	: CHAR*4	:

ER U & V Components (n,n): 1,2

ER Do You Want Plotted or Contoured Scalar Parameter? (Y/N): Y
ER Desired Parameters? (1st,2nd,3rd.. 6th): 4
ER Plot or Contour Entire Grid (18,12)? (Y/N): Y
ER Geographically Plotted GRIDS Desired? (Y/N): N

ER Plot GRID-POINT Locators '+' ? (Y/N): Y
ER Is GRID Point (1,1) in the Upper-Left (Y/N): Y

[illegible]ASE WAIT while data is being processed.
ER Plot Parameter Values? (Y/N): Y
ER Parameter Contouring Desired? (Y/N): N
ER Program Generated Contours Desired? (Y/N): Y

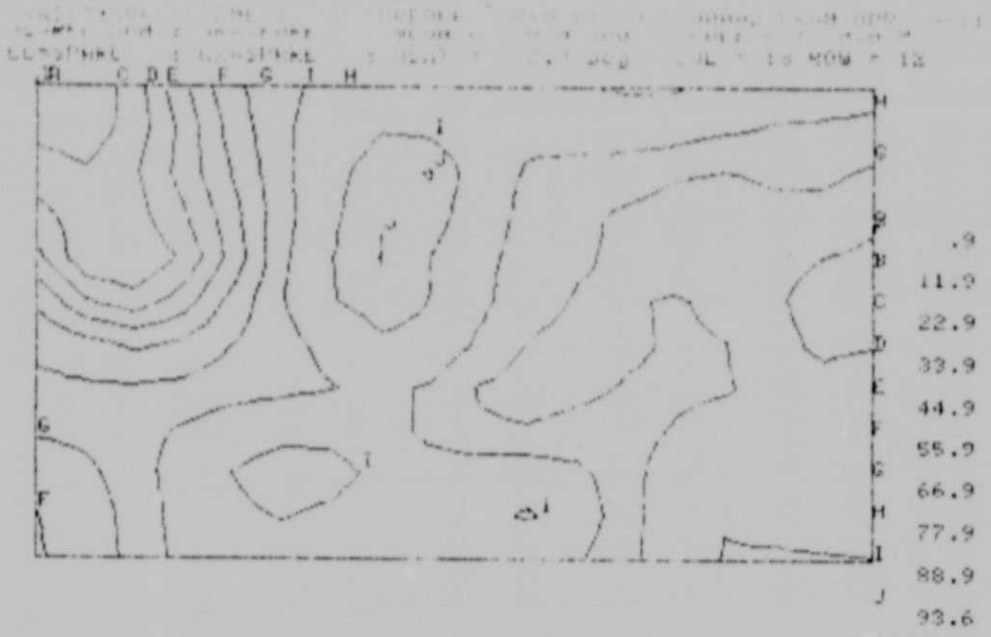
Color Codes

(1) BLACK (2) RED (3) GREEN (4) BLUE

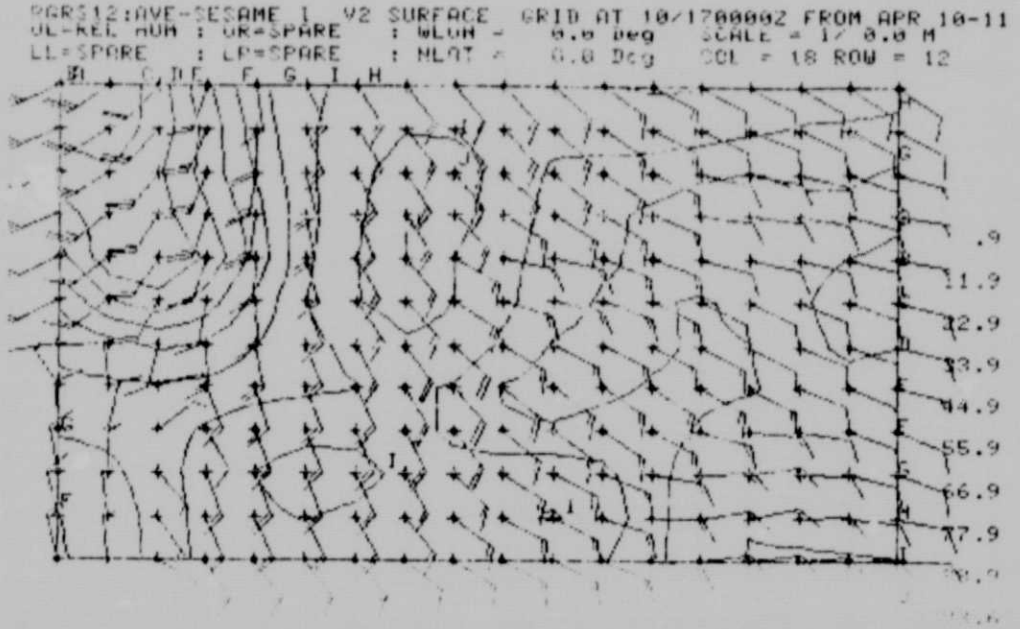
Line Styles

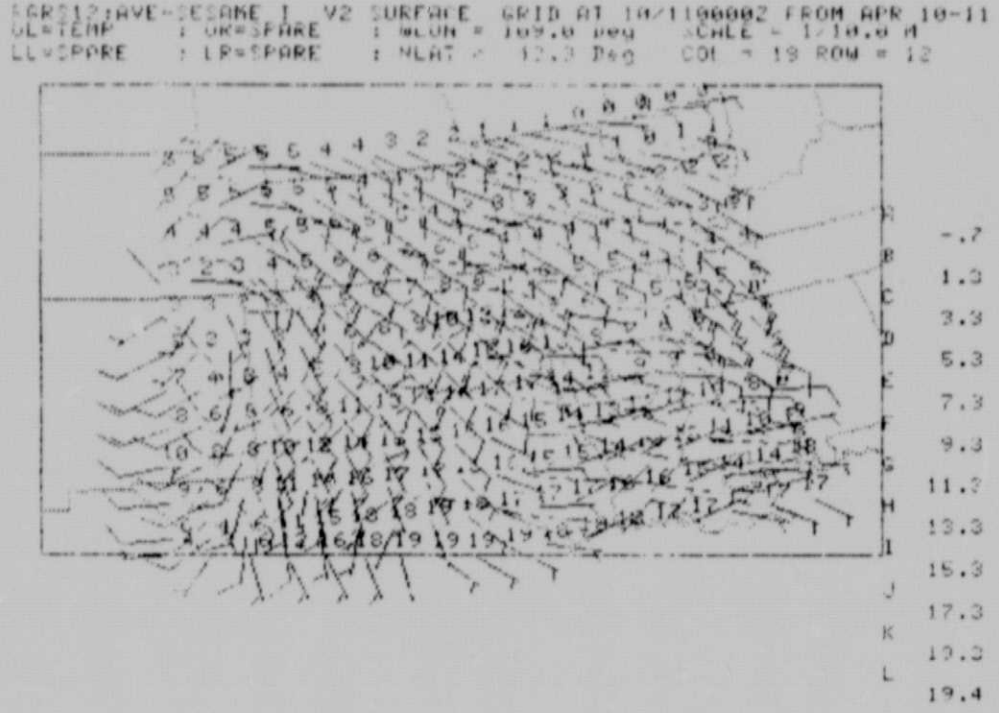
(0) SOLID (1) DOTTED (2) SHORT DASH
(3) LONG DASH (4) DASH-DOT (6) DASH-DOT-DOT

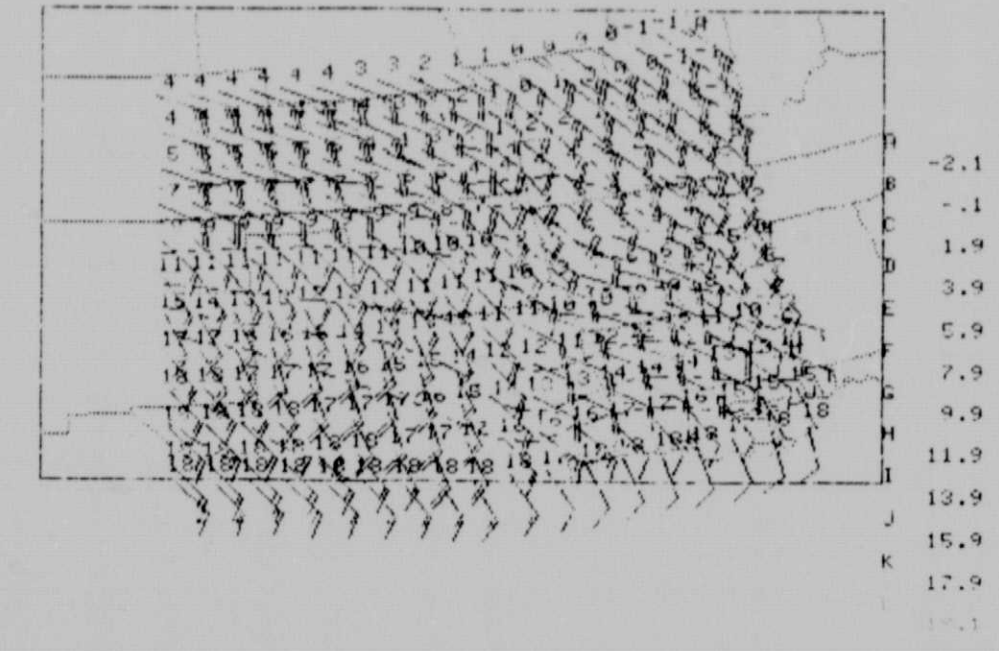
[illegible] Default Color/Parameter? (Y/N): Y

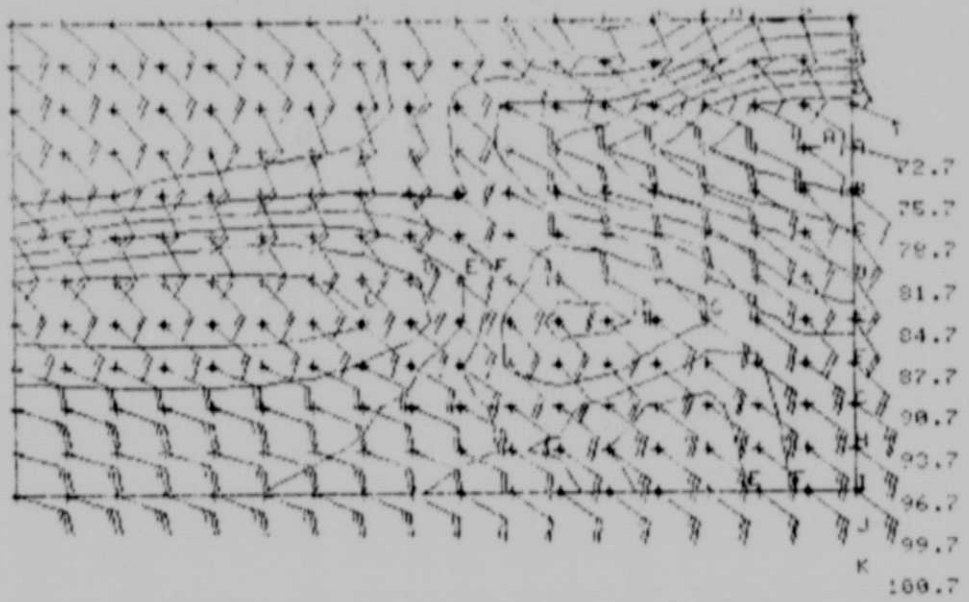


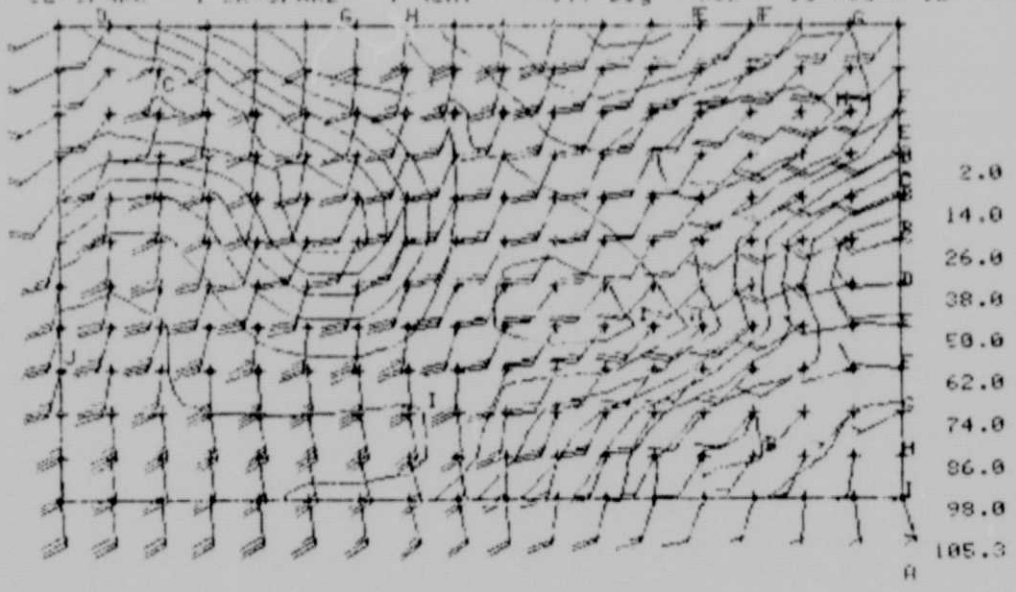
GRID(C,R), Act(18,12) Plotted(18,12) Strt(1, 1) End(18,12) C Int=11.

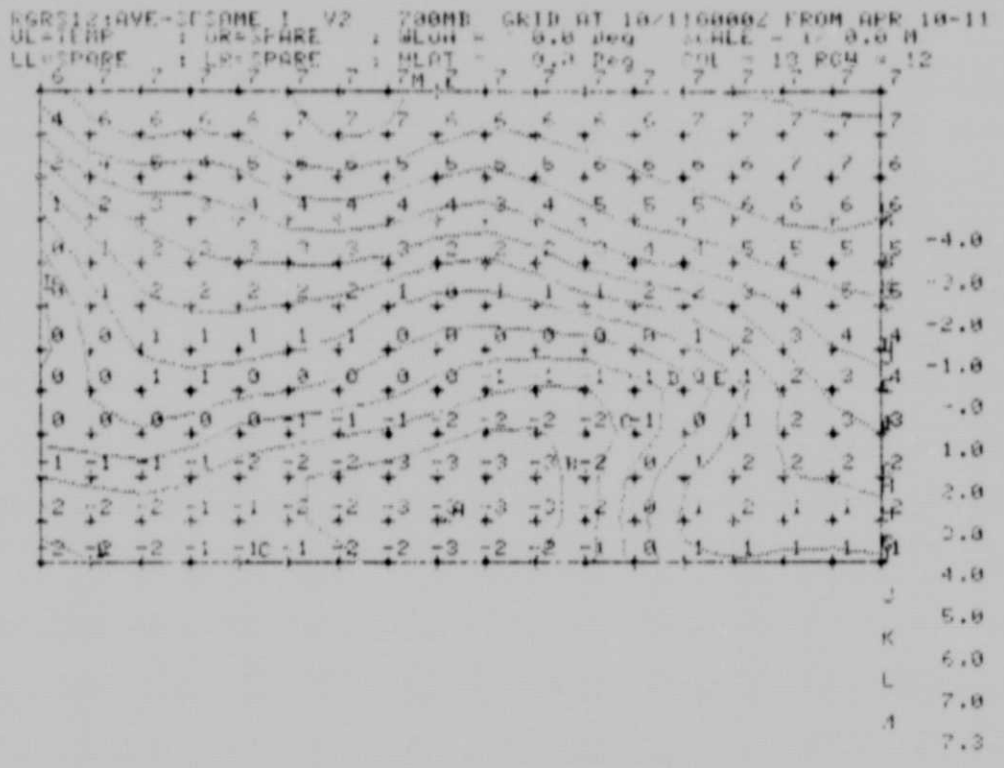


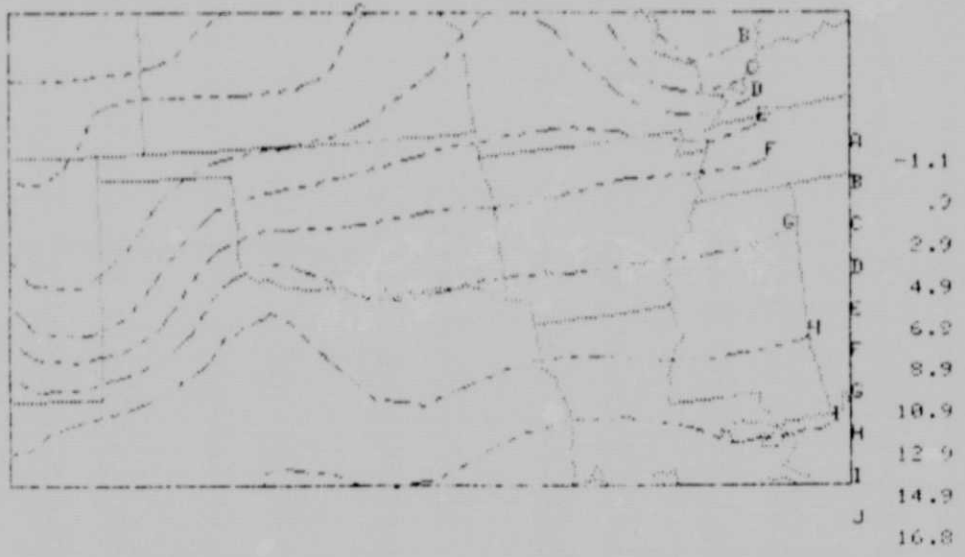


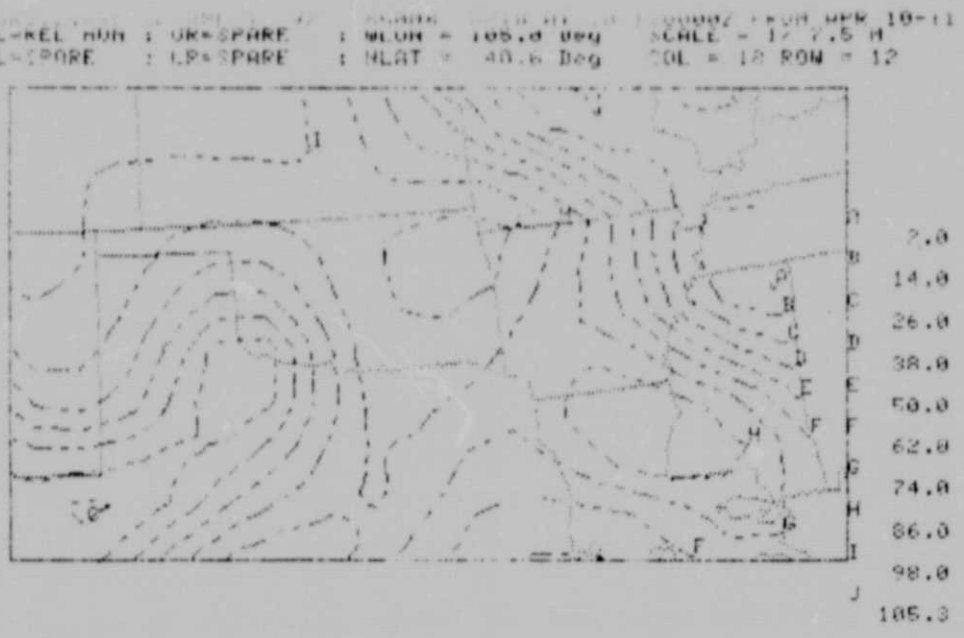




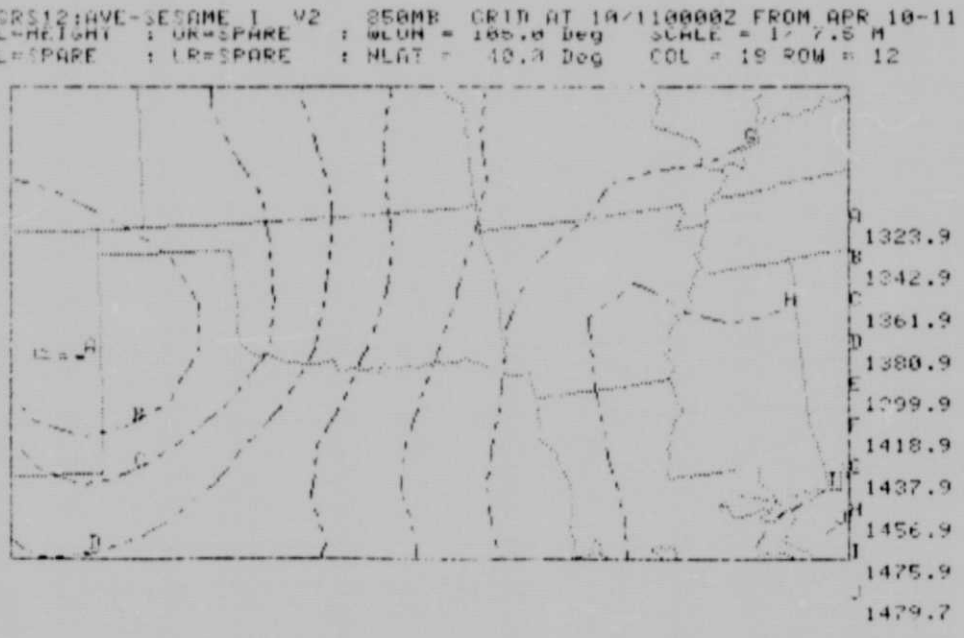




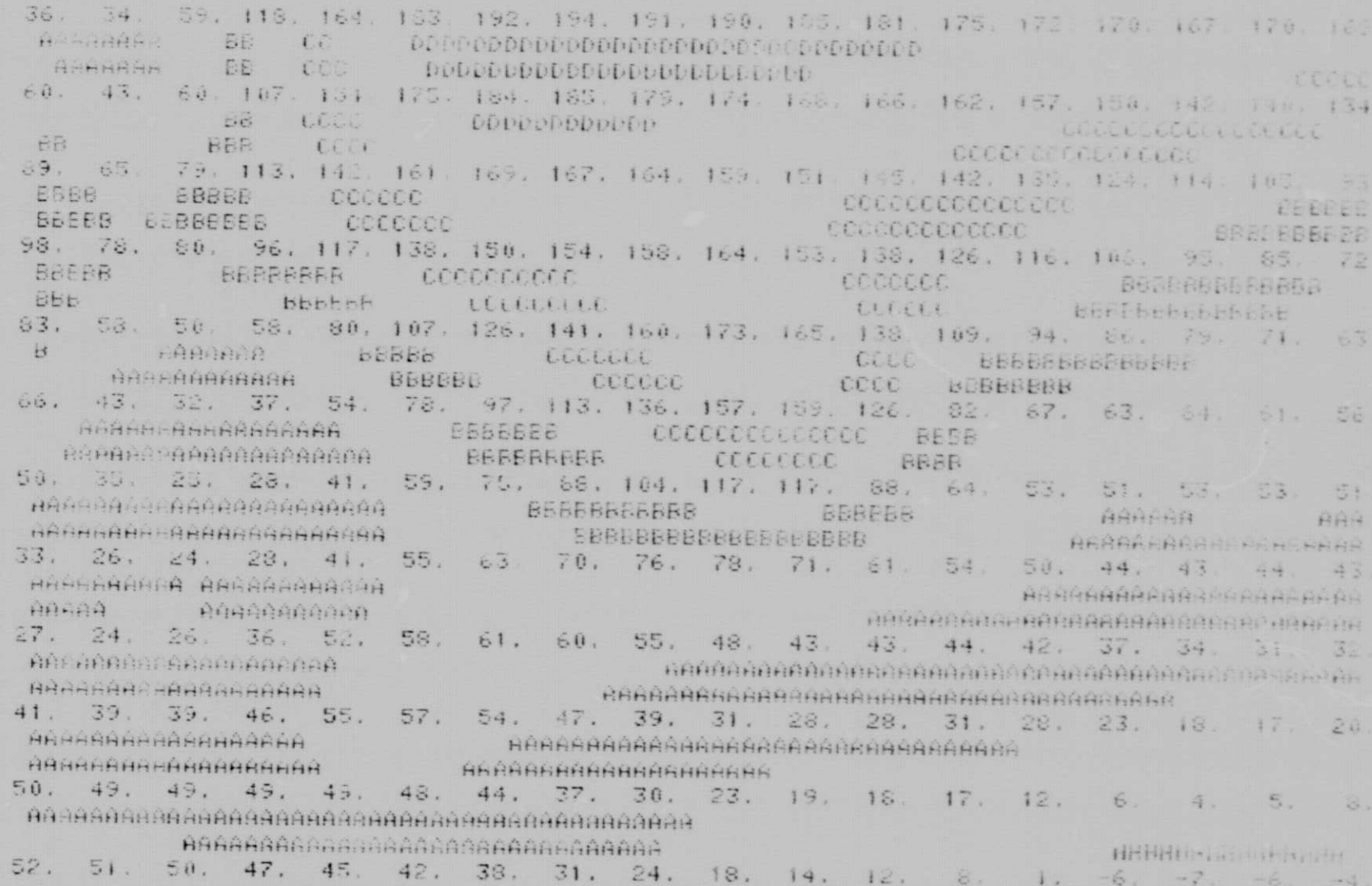


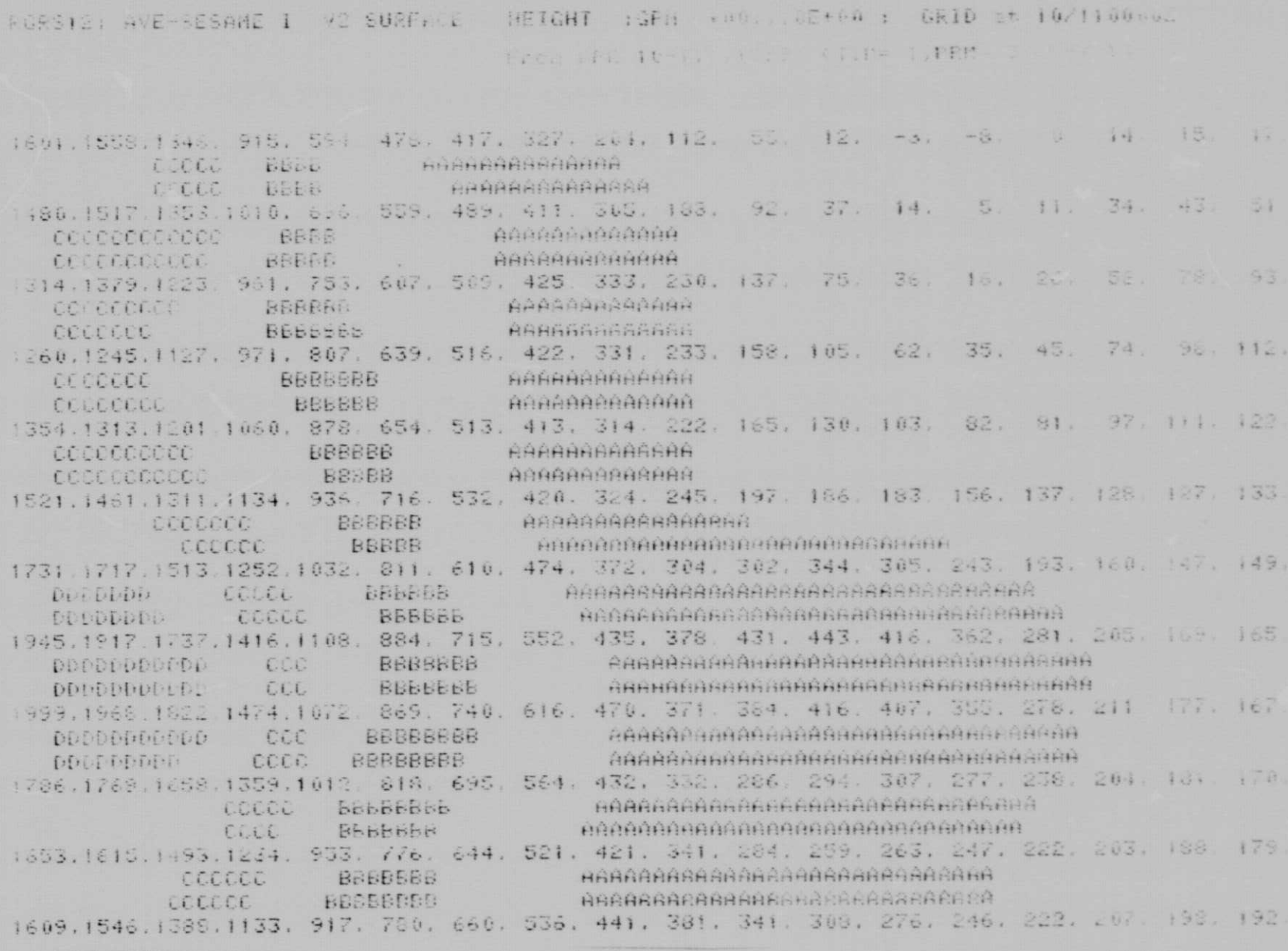


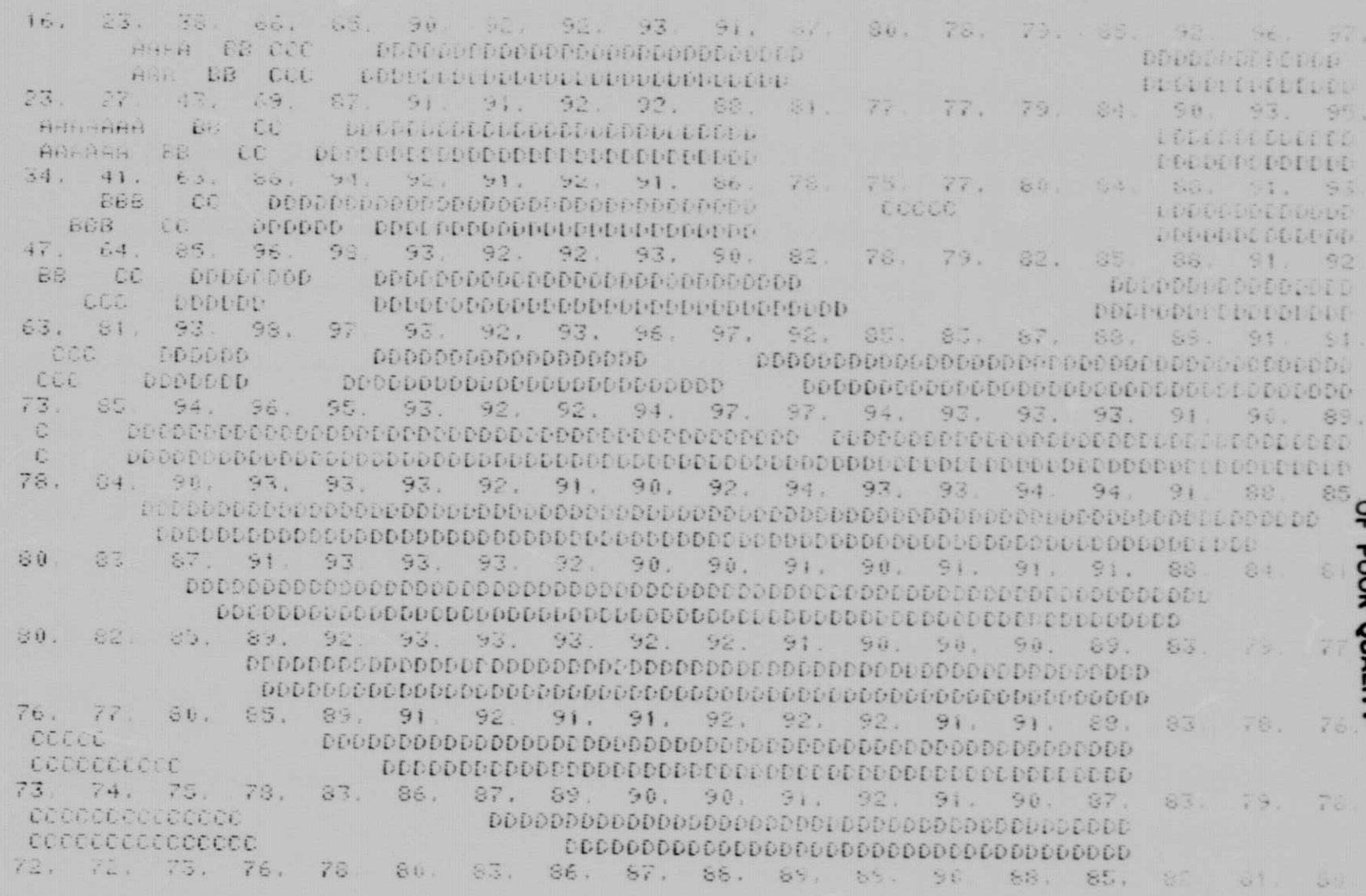
GRID(C,R): Act(18,12) Plotted(18,12) Strt(1, 1) End(18,12) C Int=12.0



C-2







4.7 IMAGE DATA SOFTWARE -- IMG80

This section details the "IMG80" Image Data Software. Below a logical flow of the "IMG80" program and the associated input files required and graphical outputs available are given.

```
      FTN4X,L
      PROGRAM IMG80(3,90),ACI-011183 IMG80--AVE-IMAGE DISPLAY PROGRAM
C*****************************************************************
C**                                                             **
C** DESCRIPTION:  Program 'IMG80' processes a user selected     **
C**               Satellite or Radar data group and generates   **
C**               a Color Image Display.                        **
C**                                                             **
C**                                                             **
C** LOGICAL FLOW:                 -------------                 **
C**                              |   IMG80   |                  **
C**                               -------------                 **
C**                                     |                       **
C**              ----------------------------------------       **
C**                |       |        |        |       |       |  **
C**               IM180   IM280   IM380   IM480   IM580   IM680 **
C**              (Image) (Print)  (TBD)   (TBD)   (TBD)   (TBD) **
C**                                                             **
C** DATA GROUPS:  1. Satellite                                  **
C**               2. Radar                                      **
C**               3. TBD                                        **
C**                                                             **
C** INPUTS:       Array   Filenn  Description                   **
C**               ------  ------  ------------------------      **
C**               IQFIL   ?IMG80  IMG80 Question File           **
C**               IDFIL   *IMGDR  Directory File                **
C**               IRFIL   RIGA41  Random Access Data File       **
C**               ISFIL   SIQA41  Documentation File            **
C**                                                             **
C** OUTPUTS:      1.  Display -- Color Image            (IM180) **
C**               2.  Print   -- Shaded or Value Image  (IM280) **
C**                                                             **
C*****************************************************************
```

In the remainder of this section detailed ex-mples generated by the "IMG80" Software along with complete "Operational Procedures" are given.

```
Mesoscale Analysis & Space Sensor (MASS)
Analysis & Display Software

BY
ATSUKO COMPUTING INTERNATIONAL
(Revision:  11/18/83)
```

AVE80 -- ID Segment Loaded

```
Basic Data Types:
1. Sounding Data
2. Single Level Data
3. Grid Data
4. Image Data
```

NOTE: To select Data Type, User must enter :,n

ENTER Desired Data Type? (:,1 or:,2 or:,3 or:,4)
AUSE,60
:,4

```
*** PLEASE WAIT -- AVE80 SERIES PROGRAMS ARE BEING LOADED ***
```

AVE80 -- Task Scheduler

```
PROJECT DATA SETS
1. AVE/AVESS
2. AVE/SESAME
3. AVE/VAS
4. Other
```

ENTER Desired Data Set? (1 to 4): 1

```
IMAGE
Categories:
1-Satellite
2-Radar
3-TED
```

ENTER Desired Data Group? (1 to 3): 1

```
RIGA41 01 002 07 00000 00000 SIGA41 1024 1024 01 SMS-2 VISSR AVE4 AF
RIGA42 01 001 01 00000 00000 SIGA41 1024 1024 01 SMS-2 VISSR AVE4 AF

ER Desired Data Base? (1 to 30): 1

ER Display User Documentation Page? (Y/N): Y
S:  *** USER DATA-SET DOCUMENTATION PAGE FOR CRT DISPLAY (23 LINES)
1:                    IMAGE DATE 4 24 75
2:          IMAGES ARE SEPARATED BY FIVE MINUTES
3:          TIME PERIOD COVERED IS 210258 TO 213241
4:          EACH IMAGE IS 1024 X 1024 PIXELS
5:
6:
7:
8:
9:                    SCENE PARAMETERS
  42475  42475  42475  42475  42475  42475  42475
E 210258 210756 211253 211750 212247 212744 213241
A   2503   2505   2506   2508   2510   2511   2513
L   9054   9052   9050   9048   9046   9045   9043
                NAVIGATION PARAMETERS FOR 4/24/75
   ETIMY    ETIMH    SEMIMA    ECCEN    ORBINC    MEANA  PERIGEE   ASN
 1975114        0   4218826      778       928    26211   153405   276
  DECLIN   RASCEN   PICLIN   NAVDAY    SPINR
  883748  1931435     7300  1975114   600000
  DECLIN   LINTOT   DEGELE   ELETOT    PITCH      YAW      ROLL
  200000   801821   182230    15288    -1930        0         0
E 192801 202734 205800 210258 211750 212247 212744 213241 215800 222
A  13416  12311  12462  11672  12841  14232  13031  11114  12306  13
ER Proceed or Restart? (P/R): F
**********************************************************
**                                                      *****
**    IMG80 SERIES -- INTERACTIVE IMAGE DISPLAY PACKAGE *****
**                                                      *****
**********************************************************
ilable Output Types:
  Image -- Color Image Displays          (IM180)
  Print -- Image (Shaded or Value)       (IM280)

ER Desired Output Type? (1 - 6): 1

ER Examine Image Frames? (Y/N): Y

ER Select Image Frame? (1 or 2): 1
```

[illegible]

[illegible] Select Image Frame? (1 or 2): 2

ME #2 DISPLAYED

[illegible] Examine Image Frames? (Y/N): Y

[illegible] Select Image Frame? (1 or 2): 1

ME #1 DISPLAYED

[illegible] Examine Image Frames? (Y/N): N

[illegible] Load Image Frames? (Y/N): Y

[illegible] Select Image Frame? (1 or 2): 2

[illegible] Default Frame Size (lin=192,ele=140)? (Y/N): Y
Parameter and Channel definitions for this (AVE IV) VISSR data are
RAMETERS
COUNT VALUES

ANNELS
VISIBLE
IR

SR Image Data is available for the following Times:
-210258 GMT 4/24/75 2--210756 GMT 4/24/75
-211253 GMT 4/24/75 4--211750 GMT 4/24/75
-212247 GMT 4/24/75 6--212744 GMT 4/24/75
-213241 GMT 4/24/75

te: (Select Lat/Long print option for detailed information)

[illegible] Desired Channel Number? (1- 2): 1

[illegible] Desired Time Period? (1- 7): 1

```
[illegible]

ENTER Desired Time Period? (1- 7): 1

ENTER Desired Magnitude? (-n to +n): -1

ENTER Print Option? (1-HEX,2-SHAD,3-VALU): 2

ENTER Select Another Image? (Y/N): N

ENTER Continue with Case: AVE/AVESS ? (Y/N): N


ENTER Another Data Type Desired? (:,Y or:,N)
AUSE,60
 ,N
 **TURN ON SOFT KEY DISPLAY
 :
 SV,0
 * AVECO SERIES COMPLETED
 :
```

Print Option: 2 File Name: RIGA41 Time Period: 1 Channel: 1

Print Option: 3   File Name: RIGA41   Time Period: 1   Channel: 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
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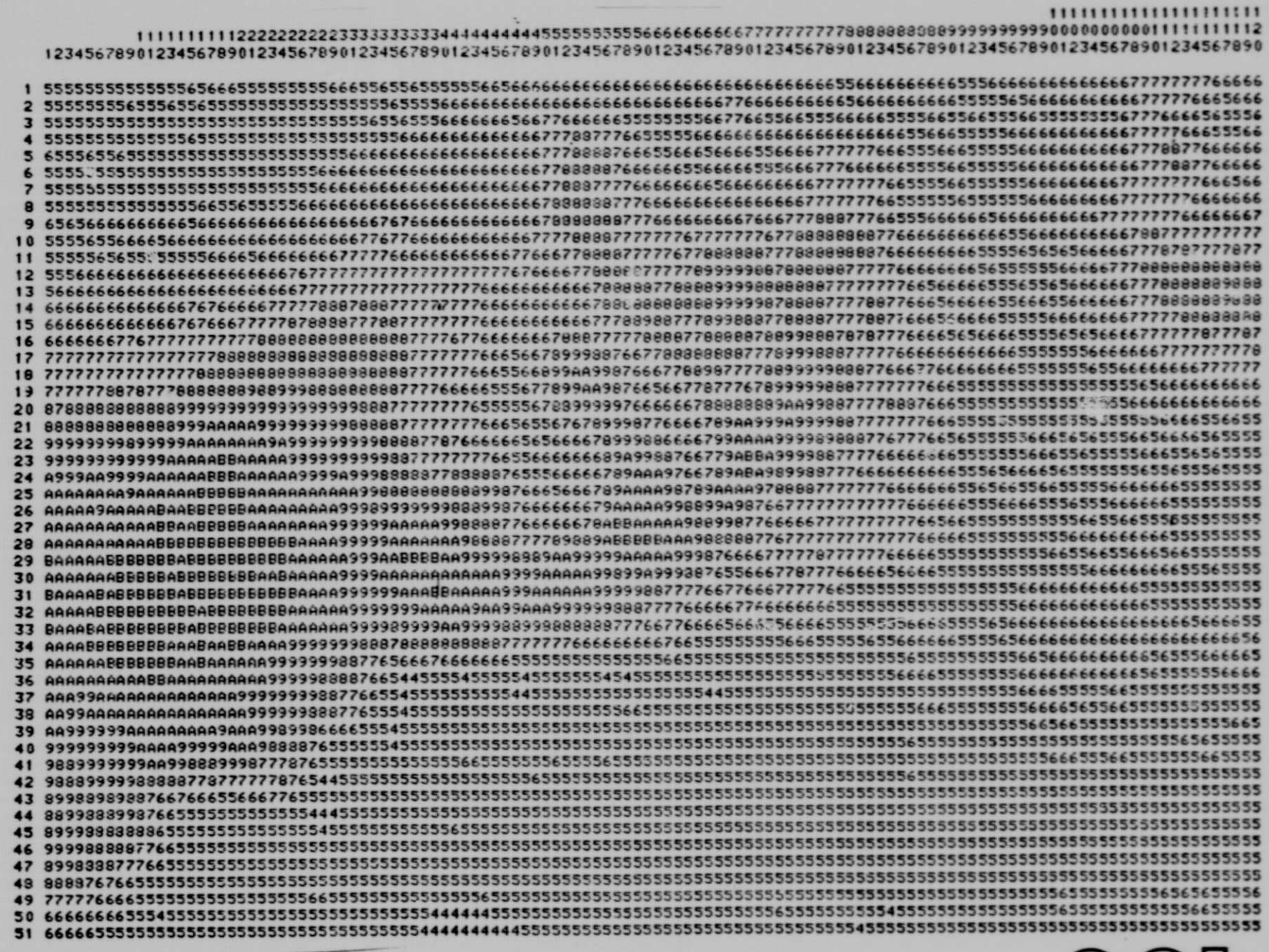
Print Option: 1 File Name: RIGA41 Time Period: 1 Channel: 1



5.0 MASS APPLE III USER TERMINALS

ACI has installed eight APPLE III Terminals and integrated them into the MASS HP-1000 Computer System as shown on Page 2-2. The following details the hardware configuration of each terminal:

- o -- APPLE III with 256K bytes memory
- o -- APPLE III Silentype Printer
- o -- One of the following Monitors:
  - -- OMNI Panasonic Monitor TV (40 column display)
  - -- JVC Color Monitor (40 column display)
  - -- BARCO Color Monitor (80 column display)
  - -- High Resolution B&W Monitor (80 column display)
  - -- Novation 212A modem or equivalent.

ACI has developed the following necessary software to allow the APPLE III terminals to utilize the MASS Analysis and Display Software interactively to generate both color image displays and graphic outputs:

- o -- APPLE III Terminal Emulation Software
- o -- MASS HP-1000/APPLE III Graphics Interface Software.

5.1 APPLE III TERMINAL EMULATION SOFTWARE

The APPLE III Emulation Software developed by ACI has three major functions:

1) -- Character Display Functions
2) -- Graphics/Image Display Functions
3) -- Communication Function.

The software was written using APPLE III Pascal and supports the hardware configurations described above. In addition, maintaining or updating this software requires at least one external APPLE III Disk.

The APPLE III terminal emulation software processes the incoming messages (character data) through APPLE III's built in asynchronous port using the RS232 driver (.RS232), performs the handshaking with HP-1000 asynchronous communication driver (DVA05) which utilizes ENQ/ACK protocol, and routes the messages to the console driver (.CONSOLE) or the graphics driver (.GRAF) depending on the incoming messages.

5.2 APPLE III TERMINAL SOFTKEY DEFINITION

To control the APPLE III Emulation Software, ACI has implemented the use of "SOFTKEYS" which provides the user a means for selecting various modes of operation:

- o -- Communication Speed Select
- o -- Display Mode Select
- o -- Graphics/Image Data Save/Load
- o -- Printer On/Off.

These SOFTKEY functions are performed when a user depresses first the APPLE III's special function key "OPEN APPLE" and then depresses one of ACI's definied "SOFTKEYS". This softkey is not sent to the HP-1000, thus it does not affect the communication.

The APPLE III Emulation Software treats all incoming messages as Character Display Data unless it starts with an "ESC". All the characters are sent to the console driver (.CONSOLE), and displayed on one of the monitors attached. The characters which have a value less than 32 except 13(CR), 10(LF), and 08(BS) are ignored and are not displayed.

In order to support various types of display monitors, the following "SOFTKEYS" have been implemented in the Emulation Software (Version 1.2):

SOFTKEY	DESCRIPTION
4	40 column display mode select for OMNI,Panasonic, and JVC monitors.
8	80 column display mode select for BARCO monitor and high resolution monitors.
C	Character display mode select.
E	Erase graphics/character display pages.
P	Toggle Silentype printer ON/OFF.

When the incoming messages start with the "ESC" code, these messages are treated as the Graphics/Image Data, and sent to the graphics driver (.GRAF). The following functions are included in the Emulation Software (Version 1.2):

- o -- Line imaging function using 140x192 full color mode
- o -- Reset viewport
- o -- Set viewport
- o -- Turn screen off
- o -- Turn screen on (enable graphics mode)
- o -- Set graphics mode
- o -- Set pen color
- o -- Set fill color
- o -- Draw line to X,Y
- o -- Plot point at X,Y
- o -- Move pen to X,Y
- o -- Clear viewport.

To support the above functions, ACI has implemented the following "SOFTKEYS":

SOFTKEY	DESCRIPTION
G	Graphics display mode
A	Advance graphics display to next page
E	Erase graphics/character display pages
F	Change graphics pages automatically (Animate)
S	Save current graphics page to internal disk drive
L	Load current graphics page from internal disk drive.

The APPLE III Terminal Emulation Software processes the incoming messages (character data) through APPLE III's built in asynchronous port using the RS232 driver (.RS232), performs the handshaking with HP-1000 asynchronous communication driver (DVA05) which utilizes ENQ/ACK protocol, and routes the messages to the console driver (.CONSOLE) or the the graphics driver (.GRAF) depending on the incoming messages. Since APPLE III's RS232 driver only supports ENQ/ACK protocol for output only, it is therefore necessary to implement this protocol at the application software level.

In order to support the various communication speeds, the following "SOFTKEY" functions are provided:

SOFTKEY	DESCRIPTION
1	9600 BPS Asynchronous Communication
2	1200 BPS Asynchronous Communication
3	300 BPS Asynchronous Communication.

It is advantageous to use the highest possible communication speed since no data will be lost with ENQ/ACK protocol. When communicating locally through an HP-12797A 8-channel MUX interface, 9600 BPS is thus recommended. When communicating through a modem such as the Novation 212A modems, 1200 BPS is the first choice. If the data seems dropped or garbled, then 300 BPS should be selected. Currently NASA/MSFC's MASS HP-1000 Computer System employees one 300 BPS modem link and one 1200 BPS modem link which neither use a communication protocol.

5.3 HP-1000/APPLE III GRAPHICS INTERFACE SOFTWARE

ACI developed a library of HP-1000 assembly subroutines to interface with the APPLE III's primitive graphics functions. This library of subroutines is written so that the user can call each from FORTRAN-IV. The following details the interface library routines:

- o -- Character Display Subroutines

  AINT -- Initialize APPLE III display pages
  ACON -- On/Off APPLE III character display page
  ACRS -- Reset viewport
  ACMD -- Text mode select
  ACFG -- Foreground color select
  ACBG -- Background color select
  ACCV -- Clear viewport

- o -- Graphics Display Subroutines

  AGRV -- Reset viewport
  AGSV -- Set viewport
  AGON -- On/Off APPLE III graphics display page
  AGMD -- Graphics mode select
  AGPN -- Pen color select
  AGFL -- Fill color select
  AGLN -- Draw line
  AGPT -- Plot point
  AGMV -- Move pen
  AGCV -- Clear viewport.

- o -- Image Display Subroutines

  AGDT -- Draw image.

For the user's convenience, a loader command file (^APPLE) has been provided which relocates the HP-1000/APPLE III Graphics Interface software library with the User's FORTRAN program code.

6.0 CONCLUSIONS & RECOMMENDATIONS

In summary the MASS System/Software developed by ACI currently provides the research scientist with the following capabilities:

- o -- An extensive Data Base Management package to convert various experiment data into standard formats for random accessing by the AVE80 Series programs and general purpose plotting and analysis packages.
- o -- An Analysis and Display package (AVE80) to graphically display and analysis large volumes of conventional and satellite derived meteorological data.
- o -- An interactive imaging/color graphics display capability utilizing color video hardware integrated into the MASS Computer System.
- o -- Local and remote smart-terminal capability which provides color video, graphics, and character display of the four types of Severe Storm data.

As a result of completing this research study, ACI recommends the following items for new research:

- o -- To continue to modify the atmospheric software and data sets to provide for more capabilities via the integration of the MASS HP-1000, Perkin-Elmer 3252, and the McIDAS-HARRIS/6 computer systems.
- o -- To procure several APPLE III computer systems for integration with the MASS Computer System and install within the individual scientist offices, thus to enhance the overall research environment.
- o -- To study the feasibility and possibility of upgrading the MASS HP-1000 Operating System from the RTE-IV Version to the new RTE-VI Version.
- o -- To study the feasibility of converting the AVE80 Series code from Graphics 1000 to the Graphics II software package, which is now the only Graphics package supported by HP.