NOAA Western Region Computer Programs and
Problems NWS WRCP - No. 1

STANDARDIZED FORMAT FOR COMPUTER SERIES

Salt Lake City, Utah
January 1984
(Revised)

U.S. DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration / National Weather Service

PREFACE

This Western Region publication series is considered as a subset of our Technical Memorandum series. This series will be devoted exclusively to the exchange of information on and documentation of computer programs and related subjects. This series was initiated because it did not seem appropriate to publish computer program papers as Technical Memoranda; yet, we wanted to share this type of information with all Western Region forecasters in a systematic way. Another reason was our concern that in the developing AFOS-era there will be unnecessary and wasteful duplication of effort in writing computer programs in National Weather Service (NWS). Documentation and exchange of ideas and programs envisioned in this series hopefully will reduce such duplication. We also believe that by publishing the programming work of our forecasters, we will stimulate others to use these programs or develop their own programs to take advantage of the computing capabilities AFOS makes available.

We solicit computer-oriented papers and computer programs from forecasters for us to publish in this series. Simple and short programs should not be prejudged as unsuitable.

The great potential of the AFOS-era is strongly related to local computer facilities permitting meteorologists to practice in a more scientific environment. It is our hope that this new series will help in developing this potential into reality.

NOAA WESTERN REGION COMPUTER PROGRAMS AND PROBLEMS NWS WRCP

1 Standardized Format for Computer Series. REVISED January 1984.
2 AFOS Crop and Soil Information Report Programs. Ken Mielke, July 1979.
3 Decoder for Significant Level Transmissions of Raobs. John A. Jannuzzi, August 1979.
4 Precipitable Water Estimate. Elizabeth Morse, October 1979.
5 Utah Recreational Temperature Program. Kenneth M. Labas, November 1979.
6 Normal Maximum/Minimum Temperature Program for Montana, Kenneth Mielke, December 1979.
7 Plotting of Ocean Wave Energy Spectral Data. John R. Zimmerman, December 1979.
8 Raob Plot and Analysis Routines. John A. Jannuzzi, January 1980.
9 The SWAB Program. Morris S. Webb, Jr., April 1980. (PB80-196041)
10 Flash-Flood Procedure. Donald P. Laurine and Ralph C. Hatch, April 1980. (PB80-298658)
11 Program to Forecast Probability of Summer Stratus in Seattle Using the Durst Objective Method. John R. Zimmerman, May 1980.
12 Probability of Sequences of Wet and Dry Days. Hazen H. Bedke, June 1980. (PB80-223340)
13 Automated Montana Hourly Weather Roundup. Joe L. Johnston, July 1980. (PB81-102576)
14 Lightning Activity Levels. Mark A. Mollner, July 1980. (PB81-108300)
15 Two Fortran Applications of Wind-Driven Ekman Water Transport Theory: Upwelling Index and Storm Tide. Kent S. Short, July 1980. (PB81-102568)
16 AFOS System Local Data Base Save and Rebuild Procedures or A Master Doomsday Program. Brian W. Finke, July 1980. (PB81-108342)
17 AFOS/RDOS Translator Subroutine. Morris S. Webb, Jr., August 1980. (PB81-108334)
18 AFOS Graphics Creation from Fortran. Alexander E. MacDonald, August 1980. (PB81-205304)
19 DATAKEYØ Repair Program. Paul D. Tolleson, August 1980. (PB81-102543)
20 Contiguous File Transfer from the DPCM to the DCM. Paul D. Tolleson, September 1980. (PB81-128035)
21 Freezing Level Program. Kenneth B. Mielke, September 1980. (PB81-128043)
22 Radar Boresighting Verification Program. Thomas E. Adler, November 1980.
23 Accessing the AFOS Data Base. Matthew Peroutka, January 1981.
24 AFOS Work Processor. Morris S. Webb, Jr., February 1981. (PB81-210007)
25 Automated Weather Log for Terminal Forecasting. John A. Jannuzzi, February 1981. (PB81-210999)
26 Program to Computer Downwind Concentrations from a Toxic Spill. John R. Zimmerman, February 1981. (PB81-205296)
27 Animation of AFOS Graphics. Joe Wakefield and Jim Fors, April 1981.
28 AFOS Interactive Graphics. Jim Fors, Don Laurine, and Sandy MacDonald, April 1981.
29 Computer Programs for Aviation Forecast Transmission. Kenneth B. Mielke and Matthew R. Peroutka, May 1981.
30 AFOS Product Collective Program. Morris S. Webb, Jr., September 1981.
31 Graphic Display of FOUS Output. Stephen D. Steenrod, September 1981.
32 Automation of Hourly Aviation Observation Calculations. W. Paul Duval, October 1981.
33 Mesoscale Objective Analysis. Andrew J. Spry and Jeffrey L. Anderson, December 1981.
34 Orographic Snowfall Rate Model for Alta, Utah. Steven K. Todd and Glenn E. Rasch, December 1981.
35 F-6 Monthly Climatic Summary Program for AFOS. Peter G. Mueller, May 1982.

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STANDARDIZED FORMAT FOR COMPUTER SERIES

Scientific Services Division
Western Region Headquarters
Salt Lake City, Utah

January 1984

UNITED STATES
DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary

National Oceanic and
Atmospheric Administration
John V. Byrne, Administrator

National Weather
Service
Richard E. Hallgren, Director

EDITOR'S NOTE

This revised CP reflects new guidelines for application programming given in AFOS Handbook 5, Volume 6. This handbook should be consulted for detailed information not covered in this document.

The papers in this series will be suitable for storage in a 3-ring binder. In this way, changes or updates to a program can easily be entered in the proper place in the binder.

Programs selected for publication will be those that have value to others in the Western Region. That is, programs that would have a general usage by other forecasters or that produce a result not performed by a previously published program. A short program does not imply one of little value, nor does a large program guarantee its value. While most papers published will probably be computer programs, we also solicit papers involving computer problems, computer management, etc.

This technical publication has been reviewed and is approved for publication by Scientific Services Division, Western Region.

Glenn E. Rasch

Glenn E. Rasch, Chief
Scientific Services Division
Western Region Headquarters
Salt Lake City, Utah

CONTENTS

STANDARDIZED FORMAT FOR COMPUTER SERIES

Scientific Services Division, WRH

I. Introduction

A. State the Purpose of the Program

B. Motivation for Development

C. Benefits to the User

II. Methodology and Software Structure

A. Using clear, concise statements, give a broad description of how the program works and how data flows through the program.

B. Equations and algorithms, if applicable, should be developed to demonstrate the scientific foundation of the program.

C. Describe the relationship among disk files, program files and input/output data. An illustration is preferred, as shown in Figure 1. Use standard symbols such as the Federal Information Processing Standard (FIPS), Figure 2, and AFOS related symbols, Figure 3.

D. For large programs, clearly show the flow of logic, from the main program to the subroutines, indicating the function of each subroutine.

III. Cautions and Restrictions

Describe program limitations which may affect computer stability, resource contention, and use or interpretation of the output.

IV. References

A formal list of published material referred to in the text should be presented. The AMS journal reference system is the accepted standard.

V. Program Information and Procedures for Installation and Execution

This information is presented in two parts.

A. PART A - Program Information and Installation Procedure

This is to be used primarily by the computer system manager. It lists characteristics, requirements and instructions for setting up the program and data files at the site. (See Appendix A).

B. PART B - Execution Procedures and Error Conditions

This is written primarily for the user. It contains running instructions and error conditions. (See Appendix A).

As shown in Appendix A, Parts A and B are self-explanatory. Comments should be clear and brief.

VI. Figures

Unless figures can be better intermixed with the test, they are added as a group. Captions should be clear and complete. A figure depicting the program structure, main program, subprograms and load line is mandatory. An example is shown in Figure 4.

VII. Appendices

Information not suitable for the main body of the text may be put in the appendices.

VIII. Program Listings

A documentation header block must be placed at the beginning of each source code (main and subprograms). Structure of the header block is given in Appendix B.

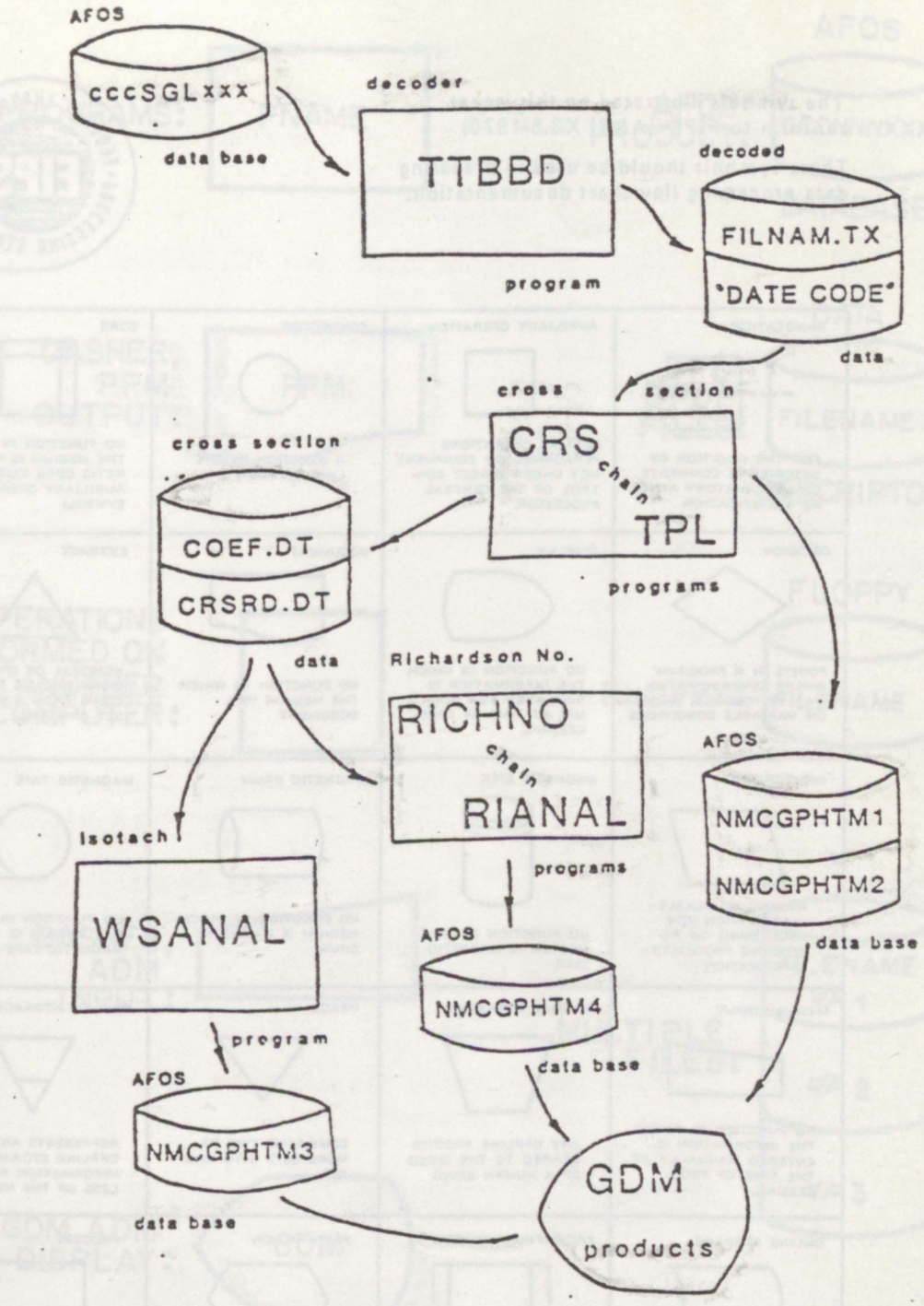
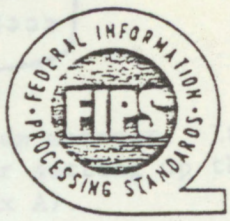


FIGURE 1. Data and Program Flow Illustration.

The symbols illustrated on this jacket conform to FIPS--(ANSI X3.5-1970)

These symbols should be used in preparing data processing flowchart documentation.



ANNOTATION FOR THE ADDITION OF DESCRIPTIVE COMMENTS OR EXPLANATORY NOTES AS CLARIFICATION	**AUXILIARY OPERATION** OFFLINE OPERATIONS PERFORMED ON EQUIPMENT NOT UNDER DIRECT CONTROL OF THE CENTRAL PROCESSOR.	**CONNECTOR** A JUNCTION IN THE LINE OF FLOW	**CORE** I/O FUNCTION IN WHICH THE MEDIUM IS MAGNETIC CORE (USE AUXILIARY OPERATION SYMBOL)
DECISION POINTS IN A PROGRAM WHERE SEVERAL PATHS MAY BE POSSIBLE, BASED ON VARIABLE CONDITIONS	**DISPLAY** I/O FUNCTION IN WHICH THE INFORMATION IS DISPLAYED FOR HUMAN USE AT TIME OF PROCESSING.	**DOCUMENT** I/O FUNCTION IN WHICH THE MEDIUM IS A DOCUMENT	**EXTRACT** REMOVAL OF ONE OR MORE SPECIFIC SETS OF ITEMS FROM A SINGLE SET OF ITEMS.
INPUT/OUTPUT MAKING AVAILABLE INFORMATION FOR PROCESSING OR RECORDING PROCESSED INFORMATION	**MAGNETIC DISK** I/O FUNCTION IN WHICH MEDIUM IS MAGNETIC DISK	**MAGNETIC DRUM** I/O FUNCTION IN WHICH MEDIUM IS MAGNETIC DRUM	**MAGNETIC TAPE** I/O FUNCTION IN WHICH THE MEDIUM IS MAGNETIC TAPE
MANUAL INPUT I/O FUNCTION IN WHICH THE INFORMATION IS ENTERED MANUALLY AT THE TIME OF PROCESSING.	**MANUAL OPERATION** ANY OFFLINE PROCESS GEARED TO THE SPEED OF A HUMAN BEING	**MERGE** COMBINING TWO OR MORE SETS INTO ONE SET	**OFFLINE STORAGE** REPRESENTS ANY OFFLINE STORAGE OF INFORMATION REGARDLESS OF THE MEDIUM
ONLINE STORAGE REPRESENTS AN I/O FUNCTION UTILIZING MASS STORAGE THAT CAN BE ACCESSED ON LINE	**PRE-DEFINED PROCESS** A NAMED PROCESS CONSISTING OF ONE OR MORE OPERATIONS OR PROGRAM STEPS, SPECIFIED ELSEWHERE. (SUBROUTINE)	**PREPARATION** A GROUP OF INSTRUCTIONS WHICH MODIFY, UPDATE, CORRECT OR OTHERWISE CHANGE THE PROGRAM	**PROCESS** REPRESENTS THE PROCESS OF EXECUTING A DEFINED OPERATION OR GROUP OF OPERATIONS
PUNCHED CARD I/O FUNCTION IN WHICH THE MEDIUM IS PUNCHED CARDS INCLUDING MARK SENSE CARDS, STUB CARDS	**PUNCHED TAPE** I/O FUNCTION IN WHICH THE MEDIUM IS PUNCHED TAPE	**SORT** ARRANGING A SET INTO A PARTICULAR SEQUENCE (USE EXTRACT AND MERGE)	**TERMINAL** A POINT AT WHICH INFORMATION CAN ENTER OR LEAVE

FIGURE 2

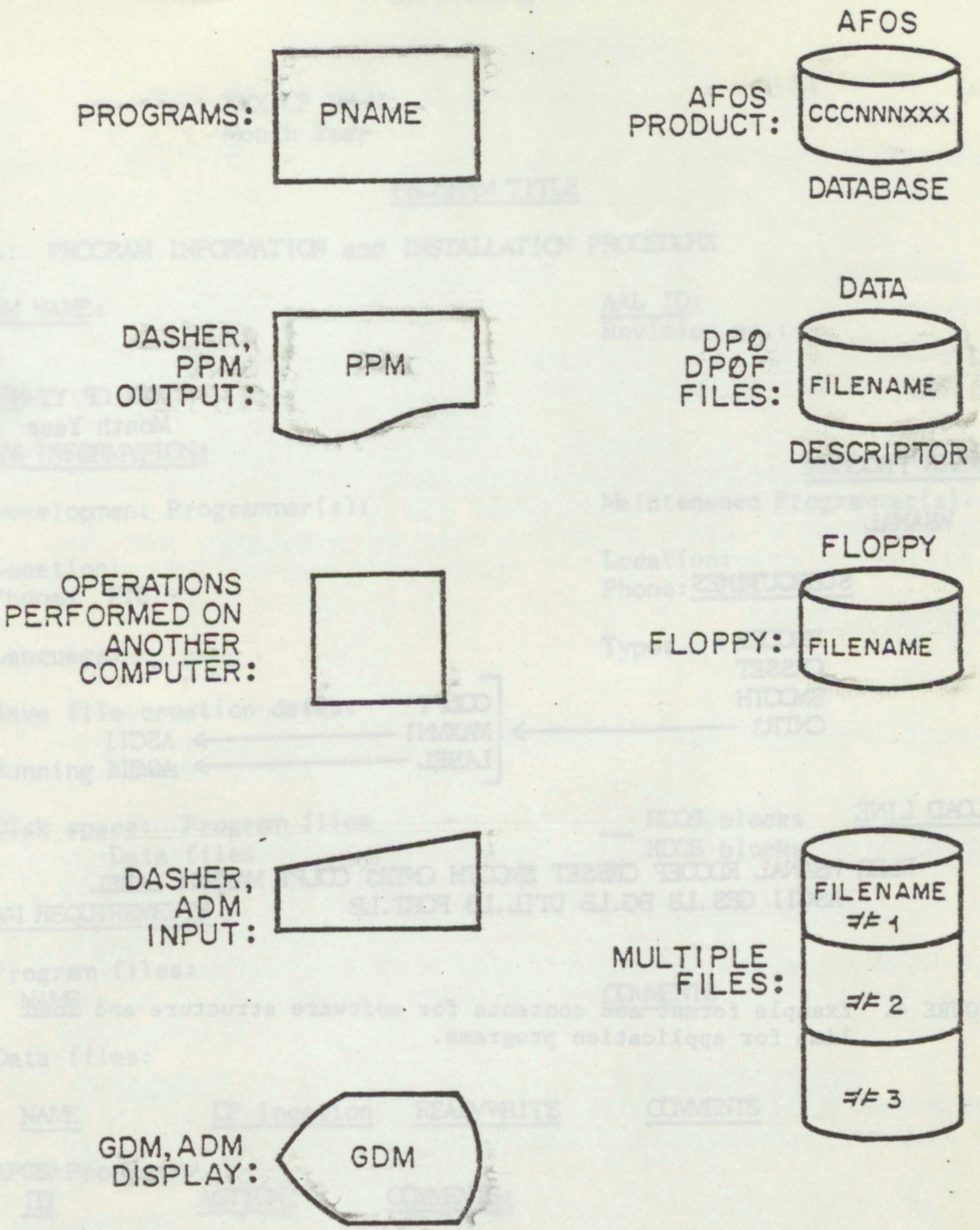

PROGRAMS:
PNAME
AFOS
AFOS PRODUCT:
CCCNNNXXX
DATABASE
DASHER, PPM OUTPUT:
PPM
DATA
DPØ DPØF FILES:
FILENAME
DESCRIPTOR
OPERATIONS PERFORMED ON ANOTHER COMPUTER:
FLOPPY
FLOPPY:
FILENAME
DASHER, ADM INPUT:
MULTIPLE FILES:
FILENAME #1
#2
#3
GDM, ADM DISPLAY:
GDM

FIGURE 3

XXX CP YY-N
Month Year

MAIN PROGRAM

WSANAL

SUBROUTINES

RDCOEF
CRSSET
SMOOTH
CNTR3 ⟶ COLPT
MAXMN1 ⟶ ASCII
LABEL ⟶ ASCII

LOAD LINE

RLDR WSANAL RDCOEF CRSSET SMOOTH CNTR3 COLPT MAXMN1 LABEL
ASCII GRS.LB BG.LB UTIL.LB FORT.LB

FIGURE 4. Example format and contents for software structure and load line for application programs.

XXX CP YY-N
Month Year

PROGRAM TITLE

PART A: PROGRAM INFORMATION and INSTALLATION PROCEDURE

PROGRAM NAME: AAL ID:
Revision no.:

PURPOSE:

PROGRAM INFORMATION:

Development Programmer(s): Maintenance Programmer(s):

Location: Location:
Phone: FTS - Phone: FTS -

Language: Type:

Save file creation dates:

Running time:

Disk space: Program files - __ RDOS blocks
Data files - __ RDOS blocks

PROGRAM REQUIREMENTS

Program files:

NAME	COMMENTS

Data files:

NAME	DP location	READ/WRITE	COMMENTS

AFOS Products:

ID	ACTION	COMMENTS

LOAD LINE

RLDR _____

PROGRAM INSTALLATION

1.

2.

3.

Information and format for PART A, PROGRAM INFORMATION and INSTALLATION PROCEDURE.

XXX CP YY-N
Month Year

PROGRAM TITLE

PART B: PROGRAM EXECUTION and ERROR CONDITIONS

PROGRAM NAME: AAL ID:

Revision no.:

PROGRAM EXECUTION

1.

2.

3.

ERROR CONDITIONS

ADM MESSAGES	MEANING
1-	
2-	

DASHER MESSAGES	MEANING
1-	
2-	

Example contents and format for PART B, EXECUTION PROCEDURES and ERROR CONDITIONS.

FORTRAN - MAIN PROGRAM

R: PROGRAM NAME REVISION NO.

NOTE: The first issue or release of a program is revision number 01.00.

R: DATE PROGRAMMER NAME SITE LOCATION/PHONE
(Month,Year of compilation)

R: LANGUAGE, COMPILER REV COMPUTER OPERATING SYS/REV
(FORTRAN IV, Rev, etc.) (DG ECLIPSE S230) (RDOS/6.17)

NOTE: The compiler revision is obtained with the RDOS CLI command REV FORT. The response will list out the revision number for the compiler. There are two known FORTRAN compilers in use, revision numbers 5.20 and 5.57, with differences that alter the operational use of the program.

R: LOAD LINE

R: PURPOSE
(Tells what the program does, striving for brevity and descriptiveness.)

P: EXTERNALS
(List all referenced externals [subroutines] including utility library routines.)

P: CHANNELS/FILES
(List FORTRAN and RDOS channels [references to GCHN from the UTIL.LB specify RDOS channels] and associated filenames.)

P: VARIABLES
(List all important [use discretion] variable names used in the main program and a brief definition. Include the COMMON block assignment.)

R: EXITS
(List programmed halts and the reason for the halt. For example, STOP MESSAGE occurrences for programmed terminations. References to ERROR [UTIL.LB] are indicated under externals. Cite subroutine halts also in the MAIN program.)

R = REQUIRED P = PREFERRED

MAIN PROGRAM HEADER

FORTRAN - SUBROUTINE

Same format as for a MAIN program except:

1. A LOAD LINE is not included,
2. R: First line is the SUBROUTINE NAME $(A_1,A_2,A_3,A_4,\ldots,A_N)$.
3. R: PROGRAM NAME is left off, but the revision number remains. The revision number for a subroutine should represent revisions to the subroutine, and may differ from the main program.
4. R: Insert the ARGUMENT LIST after PURPOSE:
   ARGUMENT LIST
   (Define each A_n, n=1,N, in the subroutine calling argument list).

SUBROUTINE HEADER FORMAT

Soaring Forecast Program. David S. Toronto, July 1982.
Program to Work Up Climatic Summary Weather Service Forms (F-6, F-52). Peter G. Mueller, August 1982.
The Hovmöller Diagram. Pamela A. Hudadoff, September 1982.
850-Millibar Charts Derived from Surface Data. Jeffrey L. Anderson, December 1982.
AFOS Vector Graphic to Grid Point Program. James R. Fors, December 1982.
A Pilot Briefing Program for the Background Partition. Kenneth B. Mielke and Joe L. Johnston, March 1983
VERDAT and Four Local Verification Routines: TEM, BRI, REL, AV. Lawrence B. Dunn, September 1983.

NOAA SCIENTIFIC AND TECHNICAL PUBLICATIONS

The National Oceanic and Atmospheric Administration was established as part of the Department of Commerce on October 3, 1970. The mission responsibilities of NOAA are to assess the socioeconomic impact of natural and technological changes in the environment and to monitor and predict the state of the solid Earth, the oceans and their living resources, the atmosphere, and the space environment of the Earth.

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Information on availability of NOAA publications can be obtained from:

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