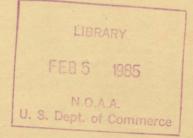NOAA Western Region Computer Programs and
Problems NWS WRCP - No. 35

F-6 MONTHLY CLIMATIC SUMMARY PROGRAM FOR AFOS

Salt Lake City, Utah
May 1982

**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 Memo-
randum series. This series will be devoted exclusively to the exchange of information
on and documentation of computer programs and related subjects. This series was initi-
ated 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.
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.

F-6 MONTHLY CLIMATIC SUMMARY PROGRAM FOR AFOS

Peter G. Mueller
Weather Service Forecast Office
Boise, Idaho

May 1982

This publication has been reviewed

and is approved for publication by

Scientific Services Division,

Western Region.

L. W. Snellman

L. W. Snellman, Chief
Scientific Services Division
Western Region Headquarters
Salt Lake City, Utah

CONTENTS

FIGURES

F-6 MONTHLY CLIMATIC SUMMARY PROGRAM FOR AFOS

Peter G. Mueller
WSFO Boise, Idaho

I.   General Information

   A.   Summary:

   If computers do anything well, it's accounting. To that end,
   summarizing an entire month's observational data is made easier and
   error-free if computerized. The F-6 Program described here will
   perform most of the accounting necessary to compute a station's
   monthly WS Form F-6.

   In addition, the F-6 Program creates another file which is stored
   directly into the AFOS data base. This allows the file, or key, to be
   addressable for future retrieval or transmission on NOAA Weather
   Wire. The information in the second file is essentially the same as the
   first, but in a somewhat different form.

   F6.SV will normally be run on the first day of each month and is
   designed as a monthly climatic summary suitable for NOAA Weather
   Wire dissemination.

   B.   Environment:

   All data is entered via an AFOS ADM. The program runs in background
   and uses approximately 11K of memory. The language is FORTRAN.

   C.   References:

   In order to store a file directly into the AFOS data base, the following
   routines are used during compilation: BG.LB, UTIL.LB, and AFOSE.LB.

II.   Applications

   A.   Program Description:

   The program is designed to compute the Weather Service Form F-6. It
   is intended to eliminate simple mathematical and bookkeeping errors
   inherently associated with F-6 computations.

   Input for the program requires less effort than the old technique of
   adding an entire month's data two or more times on a calculator. Data
   is entered on AFOS once each day into an AFOS preformat (Figures 1a
   and 1b).

   On the first day of the new month, data previously entered is checked
   for entry errors.

1

B. Input Required:

Each day, for the day, enter:

    1.   Maximum Temperature
    2.   Minimum Temperature
    3.   Precipitation*
    4.   Wind Speed
    5.   Sunshine
    6.   Sky Cover

    OPTIONAL

    7.   Specials
    8.   Record Specials

*For trace amounts of precipitation, enter a negative number, such as -99.

From the input the following output is produced (see Figure 2):

a)   Totals of all inputs (including "Trace" for Precip.).

b)   Calculation and totals for heating and cooling degree days.

c)   Averages of maximum, minimum, monthly temperatures, wind speed, and sky cover.

d)   Highest and lowest temperature and the date(s) they occurred.

e)   Number of days with:
    1) Max 32° or below
    2) Max 90° or above
    3) Min 32° or below
    4) Min 0° or below
    5) Clear Days (0/10 - 3/10)
    6) Partly Cloudy Days (4/10 - 7/10)
    7) Cloudy Days (8/10 - 10/10)
    8) Precip over .01 inch
    9) Precip over .10 inch
   10) Precip over .50 inch
   11) Precip over 1 inch

f)   Monthly departure from normal for:
    1) Temperature
    2) Precipitation
    3) Heating Degree Days
    4) Cooling Degree Days
    5) Percent of Sunshine
    6) Seasonal Heating Degree Days
    7) Seasonal Cooling Degree Days

g)   Accumulative totals for seasonal heating and cooling degree days.
h)   Actual percent of sunshine.

2

The computations for accumulations and the departure from normals are accomplished by the use of a normals file. The file contains a complete set of normals of temperature, precipitation, heating, and cooling degrees days as well as minutes and normal percent of sunshine. It is necessary to produce the normals file at each station that uses the program.

The normals file can be typed on an AFOS ADM. Once completed (see Figures 4a and 4b), the AFOS header must be stripped off the normals file once it is placed on the disk. (SAVE:CCCNNNXXX DP0:MONTHNORM). This requires the use of the Data General Text Editor, which is located on DP0. This file is finished and need not be touched again unless monthly normals are updated.

The program accounts for leap years. It automatically adds the minutes of sunshine, heating, and if any, cooling degree day normals for the 29th of February.

In addition to producing most of the F-6 summary (Figure 2), F6.SV Program also creates a monthly climatic summary (Figure 3) which is stored directly into the AFOS data base. As a result, it will always be there for future retrieval, reference, or as a product for transmission on NOAA Weather Wire.

However, two changes must be made to the newly created data base file before transmission on the NWW. These changes should be made using the edit mode in AFOS. First, the 24-hour maximum precipitation must be manually entered. This could not be computed because the precipitation may encompass a portion of two consecutive days. Second, all minus signs must be converted to teletype equivalents (e.g., > @ <). However, it is safer to simply replace the minus sign with the word "minus" as some NWW subscriber teletypes (TV, radio stations, and newspapers) are not equipped with a minus sign or dash key.

III. Procedures

A. Program Initiation:

Once the data has been entered and carefully checked, simply do an AFOS save to F6DATA in DP0, (Example: SAVE:CCCNNNXXX DP0:F6DATA). Initiation of the program can be accomplished from any AFOS ADM (RUN: F6).

Execution time is roughly 20 seconds or less. When the run is completed an alarm light will flash at the console where the program was initiated.

B. Files Produced:

Once the run is completed two separate files are available. The first is "F6OUTPUT". This file contains all the information needed for the F-6 Form. To display it there are two options:

1. <u>TYPE F6OUTPUT</u> - Type this command on the dasher and the file will be output to the dasher.

2. <u>PRINT F6OUTPUT</u> - Type this command on the dasher and the file will be output to the printer/plotter.

The second product will be stored in a predesignated file in the AFOS data base (currently BIOCLIB01). Retrieval of that product is similar to any other data base product.

C. Program Restrictions:

An abort message will appear on the initiating screen when sky cover is greater than 10.

D. Machine Requirements:

The program is designed with WSOs in mind, using approximately 11K of memory. In order to place files into the AFOS data base, F6.SV must reside or be linked from DP0. File "MONTHNORM" and "F6DATA" must also reside or be linked from DP0 when executing the program.

4

```
WOUS00 KBOI 160700

7=JULY     8=AUGUST    9=SEPEMBER 10=OCTOBER 11=NOVEMBER 12=DECEMBER

MONTH NUMBER[--],198[-]
                                                            # OF
                                        SUN    SKY   # OF  RECORD
DATE MAX   MIN   PCPN  WNDSPEED  SHINE  COVER  SPCLS SPECIALS
  1 [---] [ --] [ .00] [ --.-]   [---]  [--]   [--]  [--]
  2  --    --    .00    -.-       ---    --     --    --
  3  --    --    .00    -.-       ---    --     --    --
  4  ---   --    .00    -.-       ---    --     --    --
  5  --    --    .00    -.-       ---    --     --    --
  6  --    --    .00    -.-       ---    --     --    --
  7  --    --    .00    -.-       ---    --     --    --
  8  --    --    .00    -.-       ---    --     --    --
  9  --    --    .00    -.-       ---    --     --    --
 10  --    --    .00    -.-       ---    --     --    --
 11  --    --    .00    -.-       ---    --     --    --
 12  --    --    .00    -.-       ---    --     --    --
 13  --    --    .00    -.-       ---    --     --    --
 14  --    --    .00    -.-       ---    --     --    --
 15  --    --    .00    -.-       ---    --     --    --
 16  --    --    .00    -.-       ---    --     --    --
 17  --    --    .00    -.-       ---    --     --    --
 18  --    --    .00    -.-       ---    --     --    --
 19  --    --    .00    -.-       ---    --     --    --
 20  --    --    .00    -.-       ---    --     --    --
 21  --    --    .00    -.-       ---    --     --    --
 22  --    --    .00    -.-       ---    --     --    --
 23  --    --    .00    -.-       ---    --     --    --
 24  --    --    .00    -.-       ---    --     --    --
 25  --    --    .00    -.-       ---    --     --    --
 26  --    --    .00    -.-       ---    --     --    --
 27  --    --    .00    -.-       ---    --     --    --
 28  --    --    .00    -.-       ---    --     --    --
 29  --    --    .00    -.-       ---    --     --    --
 30  --    --    .00    -.-       ---    --     --    --
 31  --    --    .00    -.-       ---    --     --    --
```

Figure la. Preformat for Input of Daily Data

BOISADBOI   EWDUS00 KBOI 010800
01=JANUARY 02=FEBRUARY 03=MARCH   04=APRIL   05=MAY   06=JUNE
07=JULY   08=AUGUST   09=SEPTEMBER 10=OCTOBER 11=NOVEMBER 12=DECEMBER

MONTH NUMBER 09 ,198 1

DATE	MAX	MIN	PCPN	WNDSPEED	SUN SHINE	SKY COVER	# OF SPCLS	# OF RECORD SPECIALS
1	85	55		11.2	759	1		
2	75	45		8.8	687	6		
3	85	48		6.0	741			
4	82	50		8.2	622	7		
5	79	50		9.6	740	1		
6	81	46		5.5	777	1		
7	89	56		7.9	774			
8	90	57		6.9	772			
9	91	61		7.3	769			
10	82	52		7.5	767			
11	88	49		7.8	755			
12	90	52		6.6	761			
13	90	53		7.2	730	1		
14	87	51		7.9	754			
15	90	52		7.6	751			
16	92	54		7.9	749			
17	95	57		8.5	741			
18	96	64		9.7	631	2		
19	76	47	.01	10.1	616	3	3	1
20	72	41	.00	7.5	481	8		
21	67	39	.00	8.0	734	1		
22	67	39	.00	7.3	656	4		
23	64	36	.00	5.8	112	10		
24	61	40	.01	8.5	0	10		
25	56	40	.31	7.0	425	7	7	6
26	62	42	-99	13.5	4	10		
27	83	50	-99	13.7	547	8	3	
28	64	50	.03	6.1	43	10		1
29	66	40		6.0	503	6		
30	64	32		5.6	706	2		

*※※※

ON FIRST DAY OF NEW MONTH...WHEN LAST DAY OF THE MONTH DATA HAS BEEN ENTERED... TYPE THE FOl
1)SAVE:BOISADBOI DP0:F6DATA (YOU SHOULD GET "JOB COMPLETE")
3)RUN:F2.SV
4)YOU MAY NOW CALL UP ON ADM BOICLIBOI AND ON DASHER TYPE OR PRINT F6OUTPUT.

Figure Ib. Sample Input

6

CLIMAT SUMMARY FOR THE MONTH OF SEPTEMBER

MAXIMUM	MINIMUM	TOTALS OF		PRECIP-ITATION	WIND SPEED	SUNSHINE	SKY COVER
		HEATING DEGREE DAYS	COOLING DEGREE DAYS				
2369	1448	137	101	0.36	241.2	18107	98

AVERAGES OF

MAXIMUM	MINIMUM	WIND SPEED	SKY COVER
79.0	49.3	8.0	3.3

TEMPERATURE DATA

AVERAGE MONTHLY......... 63.6
DEPARTURE FROM NORMAL... 0.5

HIGHEST   96   ON   18
LOWEST   32   ON   30

NUMBER OF DAYS WITH—
MAX 32 OR BELOW.......... 0
MAX 90 OR ABOVE.......... 8
MIN 32 OR BELOW.......... 1
MIN 0 OR BELOW.......... 0

HEATING DEGREE DAYS
TOTAL THIS MONTH........ 137
DEPARTURE FROM NORMAL... 10
SEASONAL TOTAL.......... 157
DEPARTURE FROM NORMAL... 18

COOLING DEGREE DAYS
TOTAL THIS MONTH........ 101
DEPARTURE FROM NORMAL... 31
SEASONAL TOTAL.......... 659
DEPARTURE FROM NORMAL... -50

PERCENTAGE OF SUNSHINE.... 80.%
NUMBER OF SPECIALS.........13
NUMBER OF RECORD SPECIALS.. 8

PRECIPITATION DATA

TOTAL FOR MONTH........ 0.36 INCHES
DEPARTURE FROM NORMAL.. -0.05

WEATHER DATA

NUMBER OF DAYS—

CLEAR.............19
PARTLY CLOUDY.... 5
CLOUDY........... 6

WITH 0.01 INCH OR MORE PRECIP 4
WITH 0.10 INCH OR MORE PRECIP 1
WITH 0.50 INCH OR MORE PRECIP 0
WITH 1 INCH OR MORE OF PRECIP 0

Figure 2. Sample Output of F6OUTPUT

7

```
BOICLIBOI
WOUS00 KBOI 012200

WEATHER SUMMARY FOR BOISE IDAHO FOR THE MONTH OF SEPTEMBER

AVERAGE MONTHLY TEMPERATURE..................... 63.6
DEPARTURE FROM NORMAL........................... 0.5
HIGHEST TEMPERATURE............................. 96 ON  18
LOWEST TEMPERATURE.............................. 32  ON  30
AVERAGE DAILY MAXIMUM TEMPERATURE............... 79.0
AVERAGE DAILY MINIMUM TEMPERATURE............... 48.3

TOTAL PRECIPITATION FOR MONTH................... 0.36
DEPARTURE FROM NORMAL........................... -0.05
GREATEST IN 24 HOURS............................ 0.32 ON 24 AND 25
NUMBER OF DAYS WITH 0.01 OR MORE OF PRECIP..... 4

HEATING DEGREE DAYS...BASE 65 DEGREES
TOTAL FOR MONTH................................. 137
DEPARTURE FROM NORMAL........................... 10
SEASON TOTAL...FROM JULY 1 TO JULY 1........... 157
DEPARTURE FROM NORMAL........................... 18
COOLING DEGREE DAYS...BASE 65 DEGREES
TOTAL FOR MONTH................................. 101
DEPARTURE FROM NORMAL........................... 31
SEASON TOTAL...FROM JANUARY 1 TO JANUARY 1:.... 658
DEPARTURE FROM NORMAL........................... -50


SUNSHINE
TOTAL MINUTES OF SUNSHINE......................18107 MINUTES
PERCENT OF POSSIBLE FOR THE MONTH.............. 80. PERCENT
DEPARTURE FROM NORMAL.......................... -2. PERCENT

NUMBER OF DAYS   CLEAR...19   PARTLY CLOUDY... 5  CLOUDY... 6

ADD ANY ADDITIONAL COMMENTS IN THE SPACE PROVIDED BELOW....SUCH AS
NEW RECORDS OR UNUSUAL WEATHER EVENTS

96 DEGREES ON THE 18TH WAS A NEW HIGH TEMPERATURE FOR THAT DATE.

END<(( )))))))NNNN<<<<<<<<<<<<<<<<<
```
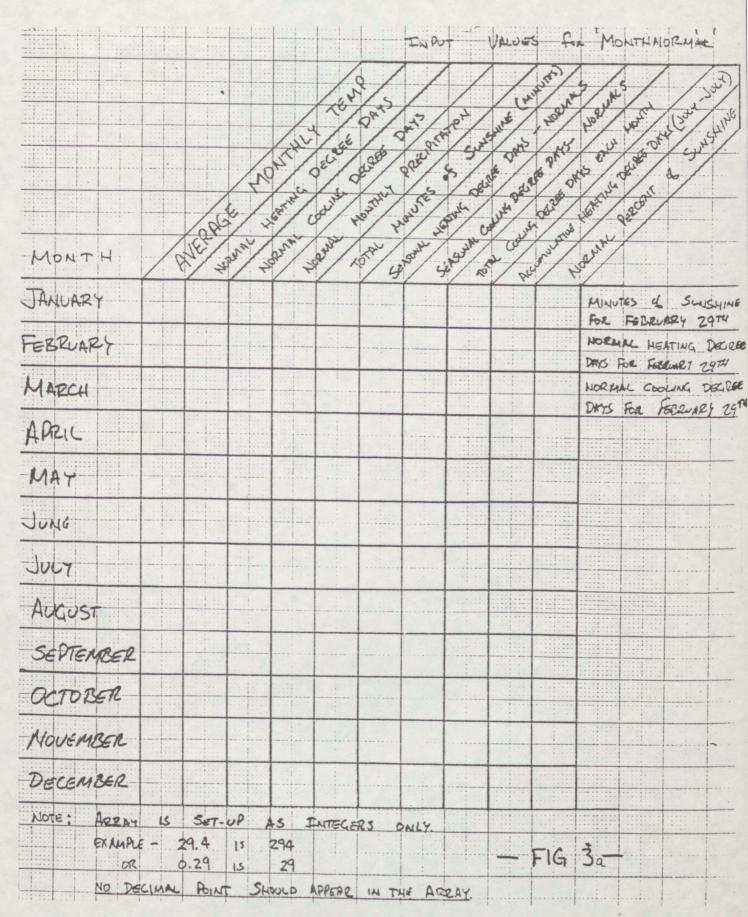
Figure 3. Sample Output of AFOS Product BOICLIBOI

MONTH	AVERAGE MONTHLY TEMP	NORMAL HEATING DEGREE DAYS	NORMAL COOLING DEGREE DAYS	NORMAL MONTHLY PRECIPITATION	TOTAL MINUTES OF SUNSHINE (MINUTES)	SEASONAL HEATING DEGREE DAYS - NORMALS	SEASONAL COOLING DEGREE DAYS - NORMALS	TOTAL COOLING DEGREE DAYS EACH MONTH	ACCUMULATIVE HEATING DEGREE DAYS (JULY-JULY)	NORMAL PERCENT OF SUNSHINE	
JANUARY											MINUTES OF SUNSHINE FOR FEBRUARY 29TH
FEBRUARY											NORMAL HEATING DEGREE DAYS FOR FEBRUARY 29TH
MARCH											NORMAL COOLING DEGREE DAYS FOR FEBRUARY 29TH
APRIL											
MAY											
JUNE											
JULY											
AUGUST											
SEPTEMBER											
OCTOBER											
NOVEMBER											
DECEMBER											

NOTE: ARRAY IS SET-UP AS INTEGERS ONLY.

EXAMPLE - 29.4 IS 294
OR 0.29 IS 29

NO DECIMAL POINT SHOULD APPEAR IN THE ARRAY.

— FIG 3a —

Figure 4a. "MONTHNORM" File Worksheet

TYPE _MONTHNORM_   (EXAMPLE of INPUT DATA)

```
290 1116    0 147 17436 3437    0     0     0  41  670
355  826    0 116 17653 4263    0     0     0  51   27
411  741    0 101 22207 5004    0     0  4658  63    0
490  480    0 114 24184 5484    0     1  5090  67    0
574  252   17 132 27374 5736   17     3  5405  71    0
648   97   91 106 27673 5833  108    52  5502  75    0
745    0  295  15 27997     0  403   205    15  88    0
722   12  235  30 25919    12  638   296    20  85    0
631  127   70  41 22504   139  708     0     0  82    0
521  406    6  80 20486   545  714    68     0  68    0
398  756    0 132 17457  1301    0     0     0  45    0
321 1020    0 136 16751  2321    0     0     0  40    0
R
```

CONFIGURATION of ARRAY IS:

I3, 1X, I4, 1X, I3, 1X, I3, 1X, I5, 1X, I4, 1X, I3, 1X, I4, 1X, I4, 1X, I4, 1X, I4

NOTE: ALL COLUMNS SHOULD LINE UP.
(1X = 1 SPACE)

Figure 4b. Sample "MONTHNORM" File

10

IV. Sample Listing

```
C  RLDR/P/M F6.RB MONTH.RB BG.LB UTIL.LB FORT.LB AFOSE.LB
   CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
   C                                                                C
   C  PROGRAM NAME IS F6. PROGRAM COMPUTES THE F5 CLIMAT OUTPUT.    C
   C  PROGRAM WRITTEN BY PETER MUELLER...MET INTERN...JUNE 1991.    C
   C                                                                C
   CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
   C
         COMPILER NOSTACK
         DIMENSION ID(31,6), A(31,2), NORM(12,11), NDAY(10),MDAY(10)
         COMMON K,LEAP
         CALL OPEN(1,"F6DATA",2,IER)
         CALL OPEN(2,"MONTHNORM",2,IER)
         CALL OPEN(3,"F6OUTPUT",2,IER)
         READ(1,1)MO,IYR
       1 FORMAT(4(/),13X,I2,6X,I1,//)
         ICNTRL=3
         CALL MONTH(MO,ICNTRL,IYR)
         IHI=-99
         ILO=99
   C
   C
      10 N=N+1
         IF(N.GT.K)GO TO 99
         READ(1,2)(ID(N,1),ID(N,2),A(N,1),A(N,2),(ID(N,L),L=3,6))
       2 FORMAT(5X,2(I3,3X),F4.2,4X,F5.1,5X,I3,4X,I2,5X,I2,4X,I2)
         IF(ID(N,4).GT.10)CALL FORKE("F2","SKY COVER",IER)
         IF(ID(N,4).GT.10)GO TO 500
         IAVG=(((ID(N,1)+ID(N,2))+1)/2)-65
         IF(IAVG.EQ.0)GO TO 3
   C
   C   FIND AVERAGE TEMPERATURE AND COMPUTE HEATING AND COOLING DEGREE DAYS
   C
         IF(IAVG.GT.0)ICDD=IAVG+ICDD;  SUM UP THE COOLING DEGREE DAYS
         IF(IAVG.LT.0)IHDD=IAVG+IHDD;  SUM UP THE HEATING DEGREE DAYS
       3 IMAX=ID(N,1)+IMAX;          SUM UP ALL THE MAX TEMPS
         IMIN=ID(N,2)+IMIN;          SUM UP ALL THE MIN TEMPS
         IF(PCP.EQ.0.AND.A(N,1).LT.0)GO TO 40
         IF(PCP.LT.0.AND.A(N,1).LE.0)GO TO 41
         IF(PCP.LT.0.AND.A(N,1).GT.0)PCP=0
         IF(PCP.GT.0.AND.A(N,1).LT.0)GO TO 41
         PCP=A(N,1)+PCP;             SUM UP ALL THE PRECIP
         GO TO 41
      40 PCP=-99
      41 WND=A(N,2)+WND;             SUM UP ALL THE WIND SPEEDS
         ISS=ID(N,3)+ISS;            SUM UP THE SUNSHINE
         ISK=ID(N,4)+ISK;            SUM UP THE SKY COVER
         ISP=ID(N,5)+ISP;            SUM UP THE SPECIALS TAKEN
         IRS=ID(N,6)+IRS;            SUM UP THE RECORD SPECIALS
   C
   C  FIND THE HIGHEST AND LOWEST TEMPERATURE OF THE MONTH AND THE DAY IT OCCURRED
   C
         IF(IHI.GT.ID(N,1))GO TO 9
         IF(IHI.EQ.ID(N,1))GO TO 20
         NDAY(1)=N
         IA=1
         DO 30 I=2,10
      30 NDAY(I)=0
```

```
          IHI=ID(N,1)
     8 IF(ILO.LT.ID(N,2))GO TO 9
          IF(ILO.EQ.ID(N,2))GO TO 21
          MDAY(1)=N
          IE=1
          DO 31 I=2,10
    31 MDAY(I)=0
          ILO=ID(N,2)
          GO TO 9
    20 IA=IA+1
          NDAY(IA)=N
          GO TO 8
    21 IE=IE+1
          MDAY(IE)=N
     9 IF(ID(N,1).GE.90)IT90=IT90+1;MAX TEMP EQUAL TO OR GREATER THAN 90
          IF(ID(N,1).LE.32)ITX32=ITX32+1;MAX TEMP EQUAL OR LESS THAN 32
          IF(ID(N,2).LE.32)ITN32=ITN32+1; MIN TEMP EQUAL TO OR LESS THAN 32
          IF(ID(N,2).LE.0)IT0=IT0+1: MIN TEMP EQUAL TO OR LESS THAN ZERO
          IF(ID(N,4).LE.3)ICLR=ICLR+1; NUMBER OF CLEAR DAYS
          IF(ID(N,4).GE.8)ICLDY=ICLDY+1; NUMBER OF CLOUDY DAYS
          IF(A(N,1).GE..01)I01=I01+1; NUMBER OF DAYS PRECIP OVER .01
          IF(A(N,1).GE..10)I10=I10+1; NUMBER OF DAYS PRECIP OVER .10
          IF(A(N,1).GE..50)I50=I50+1; NUMBER OF DAYS PRECIP OVER .50
          IF(A(N,1).GE.1)INCH=INCH+1; NUMBER OF DAYS PRECIP OVER 1 INCH
          GO TO 10
    99 AVGMX=(FLOAT(IMAX)/K)+.001
          AVGMN=(FLOAT(IMIN)/K)+.001
          AVGWND=(WND/K)+.001
          IHDD=-1*IHDD
          ASK=(FLOAT(ISK)/K)+.001
          ISHDD=IHDD
          ISCDD=ICDD
          NO=MO-1
C
C     READ IN THE NORMALS AND SEASONAL TOTALS
C
          DO 11 M=1,12
          READ(2,4)(NORM(M,MN),MN=1,11)
     4 FORMAT(I3,1X,3(I4),1X,2(I5),I4,4(1X,I4))
          IF(M.GT.NO)GO TO 6
          ISCDD=ISCDD+NORM(M,8)
     6 IF(M.NE.NO)GO TO 11
          ISHDD=ISHDD+NORM(NO,9)
    11 CONTINUE
          IF(LEAP.EQ.1.AND.MO.EQ.2)GO TO 200
          GO TO 201
   200 NORM(2,5)=NORM(2,5)+NORM(1,11)
          NORM(2,6)=NORM(2,6)+NORM(2,11)
          NORM(2,7)=NORM(2,7)+NORM(3,11)
          NORM(2,2)=NORM(2,2)+NORM(2,11)
          NORM(2,3)=NORM(2,3)+NORM(3,11)
   201 IF(MO.EQ.7)ISHDD=IHDD
          IF(MO.EQ.1)ISCDD=ICDD
          IHDFN=ISHDD-NORM(MO,6)
          ICDFN=ISCDD-NORM(MO,7)
          IMX=AVGMX*10
          AVGMX=(AVGMX*10)+.001
          IF((AVGMX-IMX).GE..5)IMX=IMX+1
          AVGMX=FLOAT(IMX)/10
          IMN=AVGMN*10
```

12

```
          AVGMN=(AVGMN*10)+.001
          IF((AVGMN-IMN).GE..5)IMN=IMN+1
          AVGMN=FLOAT(IMN)/10
          AVGT=AVGMX+AVGMN
          AVGT=(AVGT/2)+.001
  X       TYPE AVGMX
  X       TYPE AVGMN
  X       TYPE AVGT -
          TDFN=AVGT-FLOAT(NORM(MO,1))/10
          IH=IHDD-NORM(MO,2)
          IC=ICDD-NORM(MO,3)
          P=PCP-(FLOAT(NORM(MO,4))/100)
          IF(PCP.LT.0)P=-1*(FLOAT(NORM(MO,4))/100)
          PSS=(FLOAT(ISS)/(FLOAT(NORM(MO,5))))*100
          SDFN=PSS-NORM(MO,10)
          IPC=K-(ICLR+ICLDY)
          NORM(MO,8)=ICDD
          NORM(MO,9)=ISHDD
          IF(LEAP.EQ.1.AND.MO.EQ.2)GO TO 205
          GO TO 206
  205     NORM(2,2)=NORM(2,2)-NORM(2,11)
          NORM(2,3)=NORM(2,3)-NORM(3,11)
          NORM(2,5)=NORM(2,5)-NORM(1,11)
          NORM(2,6)=NORM(2,6)-NORM(2,11)
          NORM(2,7)=NORM(2,7)-NORM(3,11)
  206     REWIND 2
          DO 12 I=1,12
  12      WRITE(2,5)(NORM(I,J),J=1,11)
  5       FORMAT(1X,I3,1X,3(I4),1X,2(I5),I4,4(1X,I4))
          IF(PCP.LT.0)GO TO 60
          WRITE(3,50) IMAX,IMIN,IHDD,ICDD,PCP,WND,ISS,ISK
  50      FORMAT(//25X,"TOTALS   OF",/4X,"MAXIMUM   MINIMUM   HEATING   COOLING
         1   PRECIP-   WIND  SUNSHINE   SKY",/24X,"DEGREE    DEGREE     ITA
         1TION    SPEED",13X,"COVER",/24X,"DAYS       DAYS"//4(5X,I5),4X,F6.2
         1,3X,F6.1,4X,I5,6X,I3)
          GO TO 59
  60      WRITE(3,61) IMAX,IMIN,IHDD,ICDD,WND,ISS,ISK
  61      FORMAT(//25X,"TOTALS   OF",/4X,"MAXIMUM   MINIMUM   HEATING   COOLING
         1   PRECIP-   WIND  SUNSHINE   SKY",/24X,"DEGREE    DEGREE     ITA
         1TION    SPEED",13X,"COVER",/24X,"DAYS       DAYS",//4(5X,I5),3X,"
         1TRACE",3X,F6.1,4X,I5,6X,I3)
  59      WRITE(3,51)AVGMX,AVGMN,AVGWND,ASK
  51      FORMAT(//19X,"AVERAGES  OF",/4X,"MAXIMUM   MINIMUM   WIND SPEED
         1   SKY COVER",/6X,F4.1,5X,F4.1,8X,F5.1,7X,F4.1)
          IF(PCP.LT.0)GO TO 62
          WRITE(3,52)AVGT,PCP,TDFN,P
  52      FORMAT(//6X,"TEMPERATURE DATA",20X,"PRECIPITATION DATA",/1X,
         1"AVERAGE MONTHLY",9(".."),F5.1,5X,"TOTAL FOR MONTH........",F6.2,
         1" INCHES",/1X,"DEPARTURE FROM NORMAL...",F5.1,6X,"DEPARTURE FROM
         1 NORMAL..",F6.2)
  C
  C TEST TO SEE IF A MAX OR MIN TEMP OCCUR MORE THAN ONCE IN A MONTH.
  C
          GO TO 69
  62      WRITE(3,63)AVGT,TDFN,P
  63      FORMAT(//5X,"TEMPERATURE DATA",20X,"PRECIPITATION DATA",/1X,
         1"AVERAGE MONTHLY",9(".."),F5.1,6X,"TOTAL FOR MONTH........TRACE",
         1/1X,"DEPARTURE FROM NORMAL...",F5.1,6X,"DEPARTURE FROM NORMAL..",F6.2)
  69      WRITE(3,74)IHI
  74      FORMAT(/1X,"HIGHEST   ",I3,"   ON ",Z)
```

13

```
         DO 15 I=1,IA
   15 WRITE(3,75)NDAY(I)
   75 FORMAT(I4,Z)
         WRITE(3,76)ILO
   76 FORMAT(/1X,"LOWEST    ",I3,"   ON  ",Z)
         DO 16 I=1,IE
   16 WRITE(3,75)MDAY(I)
         WRITE(3,53)ITX32,IT90,ITN32,IT0,IHDD
   53 FORMAT(//1X,"NUMBER OF DAYS WITH-",/1X,"MAX 32 OR BELOW",9("."),I2,
      1/1X,"MAX 90 OR ABOVE",9("."),I2,/1X,"MIN 32 OR BELOW",9("."),I2,
      1/1X,"MIN 0 OR BELOW",10("."),I2,9X,"WEATHER DATA",//1X,"HEATING
      1 DEGREE DAYS",16X,"NUMBER OF DAYS-",/1X,"TOTAL THIS MONTH",8("."),
      1I4)
         WRITE(3,54)IH,ICLR,ISHDD,IPC,IHDFN,ICLDY,I01,ICDD,I10,IC,I50,ISCDD,
      1INCH,ICDFN
   54 FORMAT(1X,"DEPARTURE FROM NORMAL...",I4,7X,"CLEAR",12("."),
      1I2,/1X,"SEASONAL TOTAL",10("."),I4,7X,"PARTLY CLOUDY....",I2,
      1/1X,"DEPARTURE FROM NORMAL...",I4,7X,"CLOUDY",11("."),I2,//1X
      1,"COOLING DEGREE DAYS",16X,"WITH 0.01 INCH OR MORE PRECIP ",
      1I2,/1X,"TOTAL THIS MONTH........",I4,7X,"WITH 0.10 INCH OR MORE
      1 PRECIP ",I2,/1X,"DEPARTURE FROM NORMAL...",I4,7X,"WITH 0.50
      1 INCH OR MORE PRECIP ",I2,/1X,"SEASONAL TOTAL",10("."),I4,7X,
      1"WITH 1 INCH OR MORE OF PRECIP ",I2,/1X,"DEPARTURE FROM NORMAL...",I4)
         WRITE(3,55)PSS,ISP,IRS
   55 FORMAT(//1X,"PERCENTAGE OF SUNSHINE....",F4.0,"%",
      1/1X,"NUMBER OF SPECIALS.........",I2,
      1/1X,"NUMBER OF RECORD SPECIALS..",I2)
         CALL CLOSE (3,IER)
C
C    THE FOLLOWING FORMAT STATEMENTS GO DIRECTLY INTO THE AFOS DATABASE
C
         ICNTRL=4
         CALL OPEN(4,"BOICLIBOI",2,IER)
         WRITE(4,100)
  100 FORMAT(1X,"BOICLI60I000",4("<377>"),"50","<305>","<200>",/1X,
      1"                    ",/1X,"<12>","  ",/1X,"<12>","WEATHER SUMMARY
      1 FOR BOISE IDAHO FOR THE MONTH OF ",Z)
         CALL MONTH(MO,ICNTRL)
         WRITE(4,101)AVGT,TDFN,IHI
  101 FORMAT(/1X,"<12>","  ",/1X,"<12>","AVERAGE MONTHLY TEMPERATURE",20("."),
      1F5.1,/1X,"<12>","DEPARTURE FROM NORMAL",26("."),F5.1,/1X,"<12>","HIGHEST
      1 TEMPERATURE",29("."),I3,"   ON  ",Z)
         DO 89 I=1,IA
   89 WRITE(4,75)NDAY(I)
         WRITE(4,107)ILO
  107 FORMAT(/1X,"<12>","LOWEST TEMPERATURE",29("."),I3,"   ON  ",Z)
         DO 98 I=1,IE
   98 WRITE(4,75)MDAY(I)
         IF(PCP.LT.0)GO TO 110
         WRITE(4,102)AVGMX,AVGMN,PCP,P,I01
  102 FORMAT(/1X,"<12>","AVERAGE DAILY MAXIMUM TEMPERATURE",14("."),F5.1
      1,/1X,"<12>","AVERAGE DAILY MINIMUM TEMPERATURE",14("."),F5.1,/1X,
      1"<12>","  ",/1X,"<12>","TOTAL PRECIPITATION FOR MONTH",18("."),F6.2,/1X,
      1"<12>","DEPARTURE FROM NORMAL",26("."),F6.2,/1X,"<12>","GREATEST IN 24
      1 HOURS",27("."),"  X.XX ON XX        ",/1X,"<12>","NUMBER OF
      1 DAYS WITH 0.01 OR MORE OF PRECIP.....",I3)
         GO TO 120
  110 WRITE(4,111)AVGMX,AVGMN,P,I01
```

14

```
114 FORMAT(/1X,"<12>"."AVERAGE DAILY MAXIMUM TEMPERATURE",14("."),F5.1
   1,/1X,"<12>","AVERAGE DAILY MINIMUM TEMPERATURE",14("."),F5.1,/1X,
   1"<12>"," ",/1X,"<12>","TOTAL PRECIPITATION FOR MONTH",18("."),"TRACE",
   1/1X,"<12>","DEPARTURE FROM NORMAL",26("."),F6.2,/1X,"<12>","GREATEST
   1 IN 24 HOURS",27("."),"  X.XX ON XX ",/1X,"<12>","NUMBER OF DAYS WITH
   1 0.01 OR MORE OF PRECIP.....",I3)
120 WRITE(4,103)IHDD,IH,ISHDD,IHDFN
103 FORMAT(/1X,"<12>"," ",/1X,"<12>","HEATING DEGREE DAYS...BASE 65 DEGREES",
   1/1X,"<12>","TOTAL FOR MONTH",32("."),I4,/1X,"<12>","DEPARTURE FROM
   1 NORMAL",26("."),I4,/1X,"<12>","SEASON TOTAL...FROM JULY 1 TO JULY
   1 1",11("."),I4,/1X,"<12>","DEPARTURE FROM NORMAL".26("."),I4)
    WRITE(4,104)ICDD,IC,ISCDD,ICDFN
104 FORMAT(/1X,"<12>"," ",/1X,"<12>","COOLING DEGREE DAYS...BASE 65 DEGREES",/1X
   1,"<12>","TOTAL FOR MONTH",32("."),I4,/1X,"<12>","DEPARTURE FROM NORMAL",
   126("."),I4,/1X,"<12>","SEASON TOTAL...FROM JANUARY 1 TO JANUARY 1"
   1,5("."),I4,/1X,"<12>","DEPARTURE FROM NORMAL",26("."),I4)
    WRITE(4,105)ISS,PSS,SDFN,ICLR,IPC,ICLDY
105 FORMAT(/1X,"<12>"," ",/1X,"<12>","SUNSHINE",/1X,"<12>","TOTAL MINUTES OF
   1 SUNSHINE",22("."),I5," MINUTES",/1X,"<12>","PERCENT OF POSSIBLE FOR THE
   1 MONTH",14("."),F4.0," PERCENT",/1X,"<12>","DEPARTURE FROM NORMAL",
   126("."),F4.0," PERCENT",/1X,"<12>"," ",/1X,"<12>","NUMBER OF DAYS   CLEAR..."
   1,I2,"   PARTLY CLOUDY...",I2,"  CLOUDY...",I2,"<12>"," ")
    WRITE(4,106)
106 FORMAT(/1X,"<12>"," ",/1X,"<12>","ADD ANY ADDITIONAL COMMENTS IN THE SPACE
   1 PROVIDED BELOW.:...SUCH AS",/1X,"<12>","NEW RECORDS OR UNUSUAL
   1 WEATHER EVENTS",/1X,"<12>"," ",/1X,"<12>","END<((}}}}}}}NNNN<<<<<<
   1<<<<<<<<<",/1X,"<12><203>")
    CALL RESET
    CALL FSTORE("BOICLIBOI",0,IER)
    CALL FORKP("F6","CLIBOI",IER)
    CALL FORKO("F6","F6OUTPUT",IER)
    CALL DFILW("BOICLIBOI",IER)
500 STOP
    END
```

```
      SUBROUTINE MONTH(MO,ICNTRL,IYR)
      COMMON K,LEAP
      IF(ICNTRL.EQ.4)GO TO 26
      WRITE(3,25)
   25 FORMAT(4X,"CLIMAT SUMMARY FOR THE MONTH OF ",Z)
   26 GO TO(1,2,3,4,5,6,7,8,9,10,11,12),MO
    1 WRITE(ICNTRL,13)
   13 FORMAT(1X,"JANUARY")
      K=31
      RETURN
    2 WRITE(ICNTRL,14)
   14 FORMAT(1X,"FEBRUARY")
      K=28
C***** CHECK FOR LEAP YEAR
      LEAP=IYR/4-(IYR-1)/4
      IF(LEAP.EQ.1.AND.MO.EQ.2)K=29
      RETURN
    3 WRITE(ICNTRL,15)
   15 FORMAT(1X,"MARCH")
      K=31
      RETURN
    4 WRITE(ICNTRL,16)
   16 FORMAT(1X,"APRIL")
      K=30
      RETURN
    5 WRITE(ICNTRL,17)
   17 FORMAT(1X,"MAY")
      K=31
      RETURN
    6 WRITE(ICNTRL,18)
   18 FORMAT(1X,"JUNE")
      K=30
      RETURN
    7 WRITE(ICNTRL,19)
   19 FORMAT(1X,"JULY")
      K=31
      RETURN
    8 WRITE(ICNTRL,20)
   20 FORMAT(1X,"AUGUST")
      K=31
      RETURN
    9 WRITE(ICNTRL,21)
   21 FORMAT(1X,"SEPTEMBER")
      K=30
      RETURN
   10 WRITE(ICNTRL,22)
   22 FORMAT(1X,"OCTOBER")
      K=31
      RETURN
   11 WRITE(ICNTRL,23)
   23 FORMAT(1X,"NOVEMBER")
      K=30
      RETURN
   12 WRITE(ICNTRL,24)
   24 FORMAT(1X,"DECEMBER")
      K=31
      RETURN
      END
```

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.

The major components of NOAA regularly produce various types of scientific and technical information in the following kinds of publications:

PROFESSIONAL PAPERS — Important definitive research results, major techniques, and special investigations.

CONTRACT AND GRANT REPORTS — Reports prepared by contractors or grantees under NOAA sponsorship.

ATLAS — Presentation of analyzed data generally in the form of maps showing distribution of rainfall, chemical and physical conditions of oceans and atmosphere, distribution of fishes and marine mammals, ionospheric conditions, etc.

TECHNICAL SERVICE PUBLICATIONS — Reports containing data, observations, instructions, etc. A partial listing includes data serials; prediction and outlook periodicals; technical manuals, training papers, planning reports, and information serials; and miscellaneous technical publications.

TECHNICAL REPORTS — Journal quality with extensive details, mathematical developments, or data listings.

TECHNICAL MEMORANDUMS — Reports of preliminary, partial, or negative research or technology results, interim instructions, and the like.