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NRL Report 7929

12

A Program to Plot a Track and Bathymetry or Magnetic Profile on a Polar Stereographic Projection

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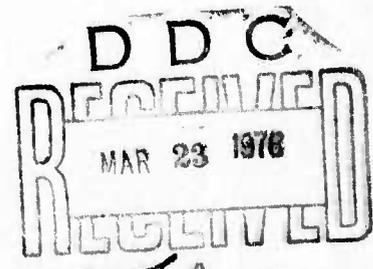
and

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February 27, 1976

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NAVAL RESEARCH LABORATORY
Washington, D.C.

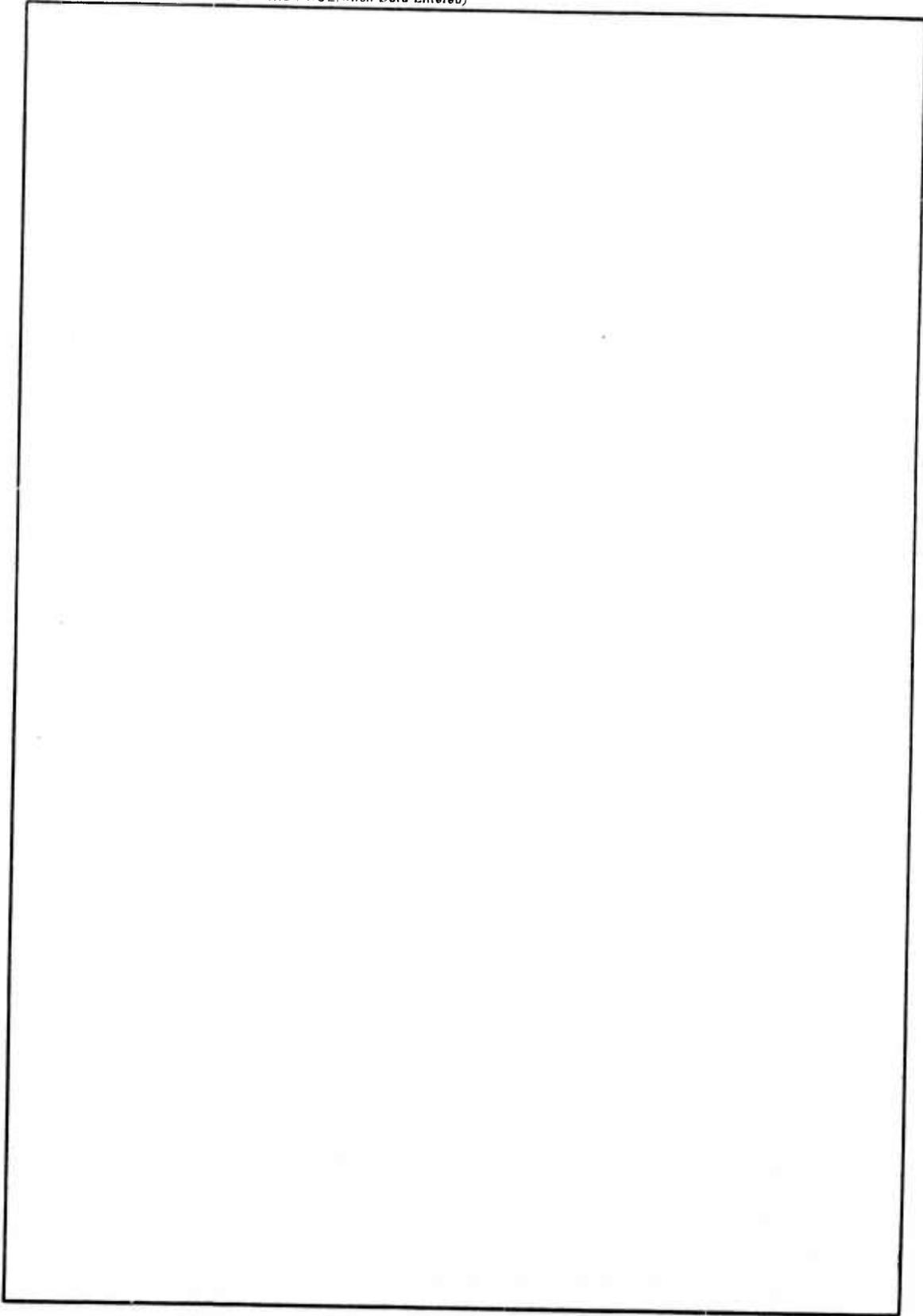
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) A program has been written for plotting a track and the superimposed bathymetry or magnetic profile on a polar stereographic projection. This profile series is plotted perpendicular to the track, using uncorrected fathoms or meters for bathymetry and residual magnetic intensity for magnetics. The program was written in Fortran IV for use on a CDC 3800 Computer; however, the program can be converted to run on other systems with little difficulty.		

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A PROGRAM TO PLOT A TRACK AND BATHYMETRY OR MAGNETIC
PROFILE ON A POLAR STEREOGRAPHIC PROJECTION

1.0 IDENTIFICATION

- 1.1 Title
Program to Plot a Track and Bathymetry or Magnetic Profile on a Polar Stereographic Projection.
- 1.2 Identification Name
Track.
- 1.3 Classification Code
None.
- 1.4 RCC Identification Number
None.
- 1.5 Entry Points
TRACK.
- 1.6 Programming Language
Language: CDC 3600/3800 Fortran.
Routine Type: Program.
Operating System: Drum Scope 2.1.
- 1.7 Computer and Configuration
CDC 3800.
- 1.8 Contributor or Programmer
Marilyn L. Blodgett, Code 8176MB, Long Range Propagation Section,
written for the Environmental Sciences Section, Acoustics Division.
- 1.9 Contributing Organization
NRL - Naval Research Laboratory, Washington, D.C. 20375.
- 1.10 Program Availability
If supplied with a magnetic tape, the Environmental Sciences Section,
Acoustics Division, will make a copy of this program.
- 1.11 Verification
This program has been used and tested by the Environmental Sciences
Section, Acoustics Division, for several months.
- 1.12 Date
April 1976

Manuscript submitted September 3, 1975.

2.0 PURPOSE

2.1 Description of the Routine

This program reads the data collected by an oceanographic or geophysical experiment from a magnetic tape and plots the track and bathymetric or magnetic value perpendicular to the track as a profile. We use the format recommended by the National Research Council of the National Academy of Sciences with one slight modification for the input data tape. There is one logical record (of 80 characters) for each data point. The different types of data (bathymetry and magnetics) are separated by an end-of-file mark with a double end-of-file mark at the end of all the data.

Before the program reads this input tape, it reads two cards. The first card defines the actual data format on the input tape (the format varies for the two types of data). The second card specifies the number of files to be skipped over on the first input tape, the physical height of the map to be drawn, the actual latitude and longitude values to be included on the grid, the dates of the data on the first input tape to be considered for plotting, the actual values to be plotted, and the units per inch for plotting the bathymetric or magnetic profiles along the track.

With all the required parameters defined, the program starts to read the input tape one record at a time. Each record is checked to see that the fix falls on the defined grid and that it was taken on or between the two specified dates. Only those points which meet both requirements are stored in core. The program continues reading the first input tape until it reads an end-of-file mark or a fix taken after the last specified date. If there are additional input tapes, the program reads them in a similar manner. The beginning and end dates for each new input tape are contained on an Extra card. A maximum of four input tapes can be used. When all the input tapes have been read, the program prepares to plot the track and the specified values, either bathymetry or magnetics.

The track is plotted on a polar stereographic projection which is drawn exactly to scale. The grid may be blown up to any reasonable size. The largest grid we have defined is 1 degree of latitude equals 20 inches. The number of degrees of longitude included in the grid will depend on the scale of the entire grid and the specific area of interest. In the case of 1 degree of latitude equals 20 inches, no more than 10 degrees of longitude can be included in the grid. Since the projection is drawn exactly to scale, a mosaic can later be built of the entire area. Depending on the type of data read, the profiling values will be either uncorrected fathoms, uncorrected meters, or residual magnetic intensity.

2.1.1 Bathymetry Data

The program reads the year, date (month and day), hour, minute, latitude, longitude, and uncorrected fathoms from the input tape according to the specified format. The southern latitudes and the western longitudes are

preceded by a negative sign. The program can convert uncorrected fathoms to uncorrected meters. The track is plotted in a continuous straight line, and the profiling series is either uncorrected fathoms or meters multiplied by -1 to drop it below the track.

2.1.2 Magnetic Data

The program reads the year, date (month and day), hour, minute, latitude, longitude, and residual magnetic intensity from the input tape according to the specified format. The southern latitudes and the western longitudes are preceded by a negative sign. The track is plotted in a continuous straight line, and the profiling series is residual magnetic intensity.

2.2 Problem Background

Program Track was written so that the researcher can build a profile, either magnetic or bathymetric, along the track from which the data were taken. Presenting data in this manner will show bathymetric or magnetic trends in relation to the geographic area.

3.0 USAGE

3.1 Calling Sequence or Operation Procedure

Not applicable.

3.2 Arguments, Parameters, and/or Initial Conditions

Not applicable.

3.3 Space Required (Decimal and Octal)

3.3.1 Unique Storage

5127 octal (2647 decimal) locations exclusive of system library functions.

3.3.2 Common Blocks

Blank common
/1/, /3/, /5/, /7/, /8/, /9/, /10/.

3.3.3 Temporary Storage

None.

3.4 Messages and Instructions to the Operator

None.

3.5 Error Return, Messages, and Codes

None.

3.6 Informative Messages to the User

None.

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- 3.7 Input
The actual format of the data on the input tape, the map parameters, and the command words are read in via input cards. The track and the data to be profiled are read in via magnetic tape on logical units 15 through 18. Appendix A presents samples of our data formats on the input tape. Appendix B is a complete description of the input deck setup.
- 3.8 Output
The program prints on the standard printer (logical unit 61) the data format, chart parameters, number of data points read in, and the number of data points plotted on the map for both the track and the profiled data. Appendix C presents sample profiles, and Appendix D presents a sample output listing. The program writes the plotting instructions on a magnetic tape (logical unit 40).
- 3.9 Formats
Appendix B describes the program deck structure.
- 3.10 External Routines and Symbols
ATAN2, SQRTF, SIN, COS, ATANF, SPACE00, BACKFILE, SKIPFILE, PLOTS, NUMBER, STOPPLOT, PLOT, SYMBOL.
- 3.11 Timing
The time required depends on the size of the grid and the number of data read and plotted.
- 3.12 Accuracy
The grid is reproduced exactly to scale.
- 3.13 Cautions to Users
None.
- 3.14 Program Deck Structure
Appendix B describes the program deck structure.
- 3.15 References - Literature
R.L. Parker, "The UCSD Hypermap Programs," University of California, San Diego.

M.J. Kertyzak and J.D. Phillips, "GRENHY," Woods Hole Oceanographic Institute, Woods Hole, Massachusetts.

M.L. Blodgett and J.V. Massingill, "A Program for Storing Oceanographic Data on Magnetic Tape," NRL Report 7861, March 1975.

4.0 **METHOD OR ALGORITHM**

Not Applicable.

5.0 **FLOW CHART AND/OR SOURCE LANGUAGE LISTING**

The flow chart and listing are given in Appendixes E and F.

6.0 **COMPARISON**

No other known programs are available for comparison.

7.0 **TEST METHOD AND RESULTS**

The program has been used and tested successfully on a Calcomp plotter.

8.0 **REMARKS**

None.

**APPENDIX A
Sample Input Data Record**

NAVIGATION RECORD

Cruise Number	Time Zone	Year	Month	Day	Hour	Minute	Latitude	Longitude	Fix Description	Fix Number
731608		73	10	2	18	30	77.8333	10.225550		204
000000	000000	000000	000000	000000	000000	000000	0000000000	0000000000	0000000000	0000000000
111111	111111	111111	111111	111111	111111	111111	1111111111	1111111111	1111111111	1111111111
222222	222222	222222	222222	222222	222222	222222	2222222222	2222222222	2222222222	2222222222
333333	333333	333333	333333	333333	333333	333333	3333333333	3333333333	3333333333	3333333333
444444	444444	444444	444444	444444	444444	444444	4444444444	4444444444	4444444444	4444444444
555555	555555	555555	555555	555555	555555	555555	5555555555	5555555555	5555555555	5555555555
666666	666666	666666	666666	666666	666666	666666	6666666666	6666666666	6666666666	6666666666
777777	777777	777777	777777	777777	777777	777777	7777777777	7777777777	7777777777	7777777777
888888	888888	888888	888888	888888	888888	888888	8888888888	8888888888	8888888888	8888888888
999999	999999	999999	999999	999999	999999	999999	9999999999	9999999999	9999999999	9999999999

^aImplies a decimal point.

BATHYMETRY RECORD

Cruise Number	Time Zone	Year	Month	Day	Hour	Minute	Latitude	Longitude	Uncorrected Fathoms	Corrected Meters	Matthews Zone
231602		1973	8	23	11	50	25.4981	8.7553	20067	3704	
006000	00000	00000	00000	00000	00000	00000	00000000	0000000000	0000000000	006061	606
11111	11111	11111	11111	11111	11111	11111	11111111	1111111111	1111111111	11111	11111
222222	22222	22222	22222	22222	22222	22222	22222222	2222222222	2222222222	22222	22222
333333	33333	33333	33333	33333	33333	33333	33333333	3333333333	3333333333	33333	33333
444444	44444	44444	44444	44444	44444	44444	44444444	4444444444	4444444444	44444	44444
555555	55555	55555	55555	55555	55555	55555	55555555	5555555555	5555555555	55555	55555
666666	66666	66666	66666	66666	66666	66666	66666666	6666666666	6666666666	66666	66666
777777	77777	77777	77777	77777	77777	77777	77777777	7777777777	7777777777	77777	77777
888888	88888	88888	88888	88888	88888	88888	88888888	8888888888	8888888888	88888	88888
999999	99999	99999	99999	99999	99999	99999	99999999	9999999999	9999999999	99999	99999

^AImplies a decimal point.

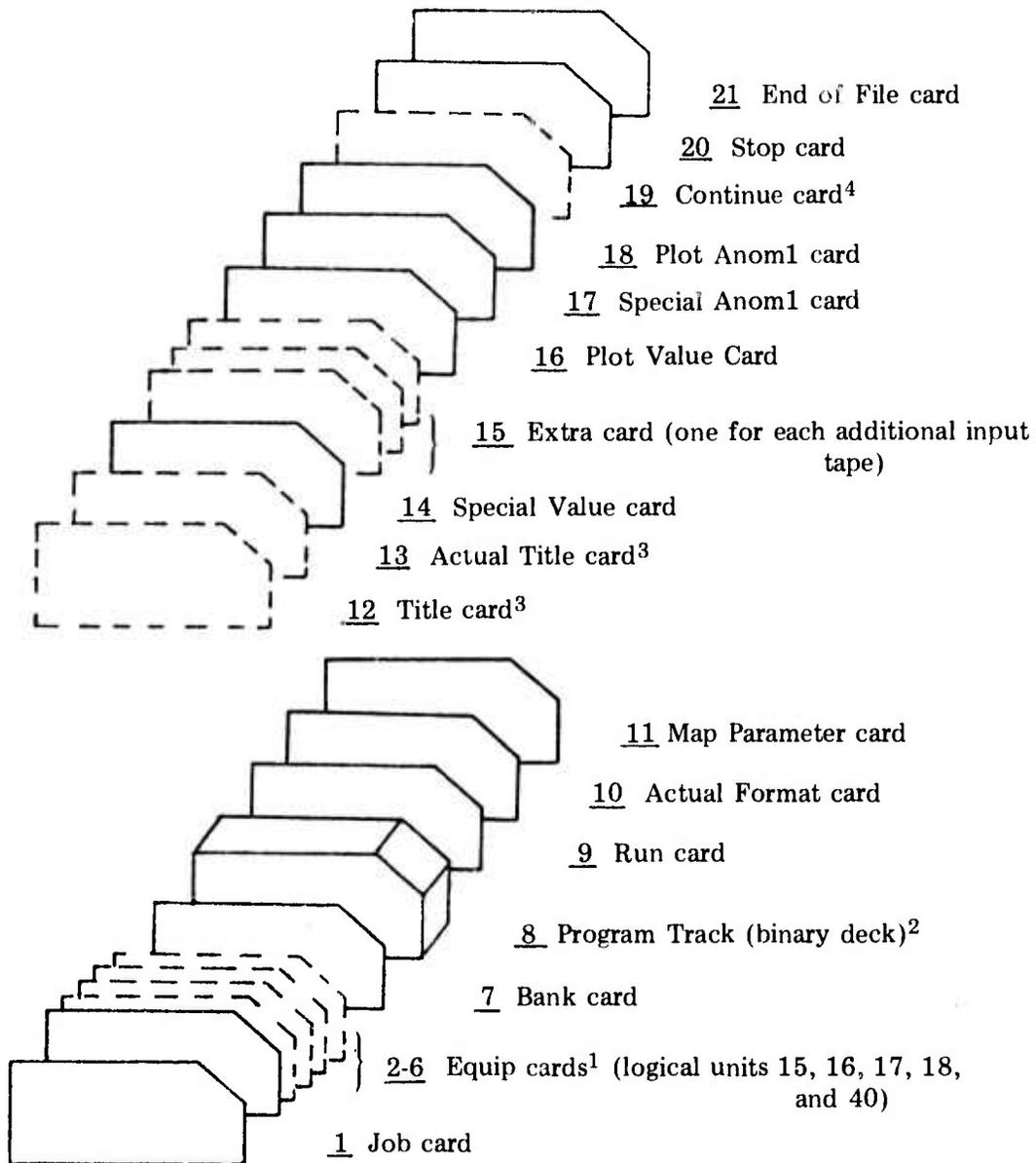
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MAGNETIC RECORD

Cruise Number	Time Zone	Year	Month	Day	Hour	Minute	Latitude	Longitude	Total Magnetic Field in Gammas	Residual Magnetic Intensity
221005		1952	02	02	18	00	22.5207	10.2467	5095	2
000000	000000	000000	000000	000000	000000	000000	000000	000000	000000	000000
1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111
2222	2222	2222	2222	2222	2222	2222	2222	2222	2222	2222
3333	3333	3333	3333	3333	3333	3333	3333	3333	3333	3333
4444	4444	4444	4444	4444	4444	4444	4444	4444	4444	4444
5555	5555	5555	5555	5555	5555	5555	5555	5555	5555	5555
6666	6666	6666	6666	6666	6666	6666	6666	6666	6666	6666
7777	7777	7777	7777	7777	7777	7777	7777	7777	7777	7777
8888	8888	8888	8888	8888	8888	8888	8888	8888	8888	8888
9999	9999	9999	9999	9999	9999	9999	9999	9999	9999	9999

^AImplies a decimal point.

APPENDIX B
Deck Assembly for Program Track



¹The program uses scratch tapes on logical units 20 and 05, but no Equip cards are required, since the drum is used.

²If the Fortran source deck is used instead of the binary deck, a Fortran card is required after the Bank card. In addition, a Scope card and Load card must follow the source deck.

³These two cards are not required by the program; both cards may be present or both omitted.

⁴This card is used only if another plot is desired. It is to be followed by a second set of input cards (10-18).

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<u>Number</u>	<u>Card Title</u>	<u>Column Number</u>	<u>Description</u>
1	Job	1-21	7/9 JOB, Charge No., ID No., time. See page 2-2 of the 3600/3800 Computer System Drum Scope Manual.
2-6	Equip	1-18	7/9 EQUIP, 40=**, WO, LO 7/9 EQUIP, 15=**, RO, HI 7/9 EQUIP, 16=**, RO, HI 7/9 EQUIP, 17=**, RO, HI 7/9 EQUIP, 18=**, RO, HI 40, 15, 16, 17, 18 = logical unit numbers. RO = read only. WO = write only. LO = low density. HI = high density.
7	Bank		-/0/7/9 BANK, (0), /1/ See page 7-17 of the 3600/3800 Computer System Drum Scope Manual.
8	Program	Deck of Track	This is the main program with associated subroutines. If the Fortran source deck is used instead of the binary deck, a Fortran card is required after the Bank card. The Fortran card reads 7/9 FTN, L, R, X. In addition a Scope card with SCOPE starting in column 10 and a Load card must follow the source deck.
9	Run	1-13	7/9 RUN, T, P, R, M, D T = time limit in minutes. P = Maximum number of print or write operations. R, M, D may be left blank. See page 2-15 of the 3600/3800 Computer System Drum Scope Manual.
10	Actual Format	1-?	(13X, I2, I4, 1X I2, F3.1, F8.4, F9.4, 28XF5, 5X) This format should be replaced by the desired input format. The format must be enclosed in parentheses and left-justified. Via this format the program reads the year, date, hour, minute, latitude, longitude, and value for the profiling series (uncorrected fathoms for bathymetry and residual magnetic intensity for magnetics).

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<u>Number</u>	<u>Card Title</u>	<u>Column Number</u>	<u>Description</u>
			<p>The formats for reading the two data types on our input tapes are:</p> <ul style="list-style-type: none"> ● Bathymetry (13×I2, I4, 1×I2, F3.1, F8.4, F9.4, 10×F5.1) ● Magnetics (13×I2, I4, 1×I2, F3.1, F8.4, F9.4, 28×F5).
11	Map Parameter	2	<p>-1, 0, or 1 -1 = multiply uncorrected fathoms by -1 to drop the value series below the track. 0 = plot the anomaly value as read from the input tape. This parameter is used to plot the residual magnetic intensity. 1 = convert uncorrected fathoms to uncorrected meters and multiply by -1 to drop the profiling series below the track.</p>
		4	<p>0 or 1 0 = plot only the track. 1 = plot both the track and the profiling series.</p>
		6	<p>0 or 1 0 = plot all data which falls on the defined grid. 1 = plot all data which falls between the southern degree of latitude plus one degree and the northern degree of latitude.</p>
		9-10	<p>2 Number of degrees between latitude lines drawn on the grid.</p>
		11-12	<p>1 Number of degrees between the longitude lines drawn on the grid.</p>

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<u>Number</u>	<u>Card Title</u>	<u>Column Number</u>	<u>Description</u>
		13-14	0, 1, or 2 Number of files to be skipped over our input tape. There are a maximum of three files on our Geodata tapes.
		15-22	1000.00 Units per inch for plotting the anomaly along the track. The maximum is 2000 gammas per inch on the map surface. A value of 1000 means that a profiling value of 1000 gammas would be plotted 1 inch above the track. The remainder of the anomaly data would be scaled accordingly.
		23-30	20.0 Physical height of the chart to be drawn. To obtain this figure, you must measure the actual physical height from an existing map.
		31-38	82.5 The degree of latitude at the base of the chart (the southernmost latitude). This value may be either a whole or a half degree. (Southern latitudes are preceded by a minus sign.)
		39-46	84.5 The northernmost degree of latitude. The difference between the degrees of latitude should be an integer.
		47-54	-15.0 The westernmost degree of longitude. (Western longitudes are preceded by a minus sign.)
		55-62	05.0 The easternmost degree of longitude.
		64	1, 2, 3, or 4 Number of input tapes, with the maximum being four tapes.

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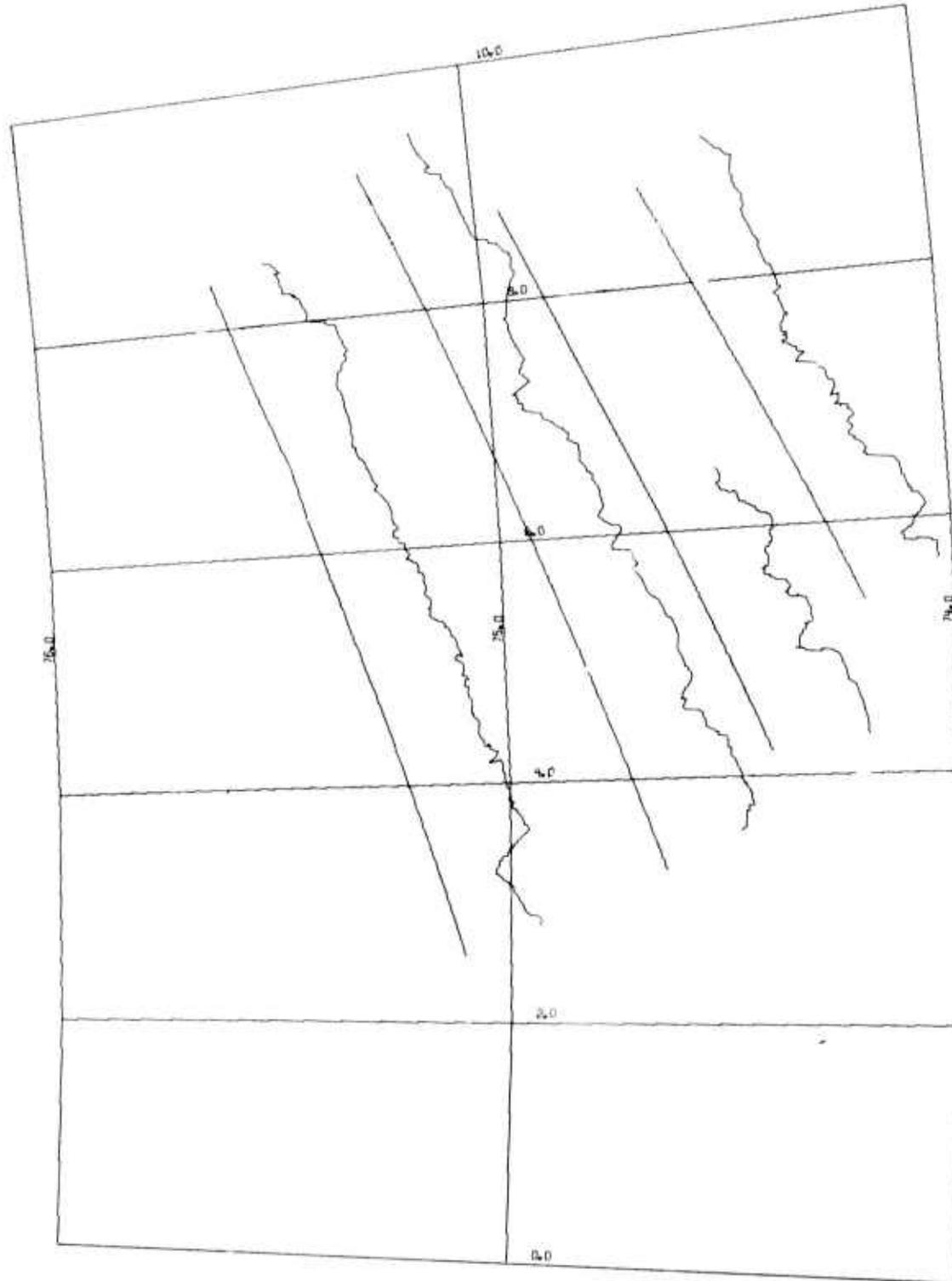
<u>Number</u>	<u>Card Title</u>	<u>Column Number</u>	<u>Description</u>
		65-72	02251600 The date and time of the first data point to be plotted from the first input tape. Columns 65-66 = month, 67-68 = day, 69-70 = hours, and 71-72 = minutes.
		73-80	02280830 The date and time of the last data point to be plotted from the first input tape. All data taken on and between the dates and times of the first and last data points will be plotted if they fall within the defined chart.
12	Title	1-5	TITLE This command allows the user to label the chart. This is a non-obligatory card.
13	Actual Title	1-80	ARCTIC BASIN The appropriate title may be punched anywhere in the 80 columns. This is a nonobligatory card.
14	Special Values	1-14	SPECIAL VALUES This command allows the user to associate the name. Values with the series of data points read from the input tape(s). The program will store only those data points which fall on the defined chart and which were taken on or between the two dates specified.
15	Extra	1-4	0, 1, or 2 Number of files to be skipped over on the second input tape. There must be an Extra card for each additional input tape. Since there is a maximum of four input tapes, the maximum number of Extra cards is three.

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<u>Number</u>	<u>Card Title</u>	<u>Column Number</u>	<u>Description</u>
		5-12	02251600 The date and time of the first data point to be plotted from the second input tape. The dates for the first input tape are on the Map Parameter card.
		13-20	02280830 Date and time of the last data point to be read and plotted from the second input tape.
16	Plot Values	1-11	PLOT VALUES This command causes the named series to be plotted.
17	Special Anom1	1-13	SPECIAL ANOM1 This command allows the user to plot the profiling series. Use only if there is a 1 in Column 4 of Card No. 11.
18	Plot Anom1	1-10	PLOT ANOM1 This command causes the profiling series to be plotted. Use only if there is a 1 in Column 4 of Card No. 11.
19	Continue		This card is used only if another plot is desired. It should be followed by a set of control cards (cards 10 through 18). The program will not rewind the input tapes. It will continue reading where it left off unless told to skip to another file by the Map Parameter card.
20	Stop		STOP This command terminates the program.
21	End of File		Terminates the run.

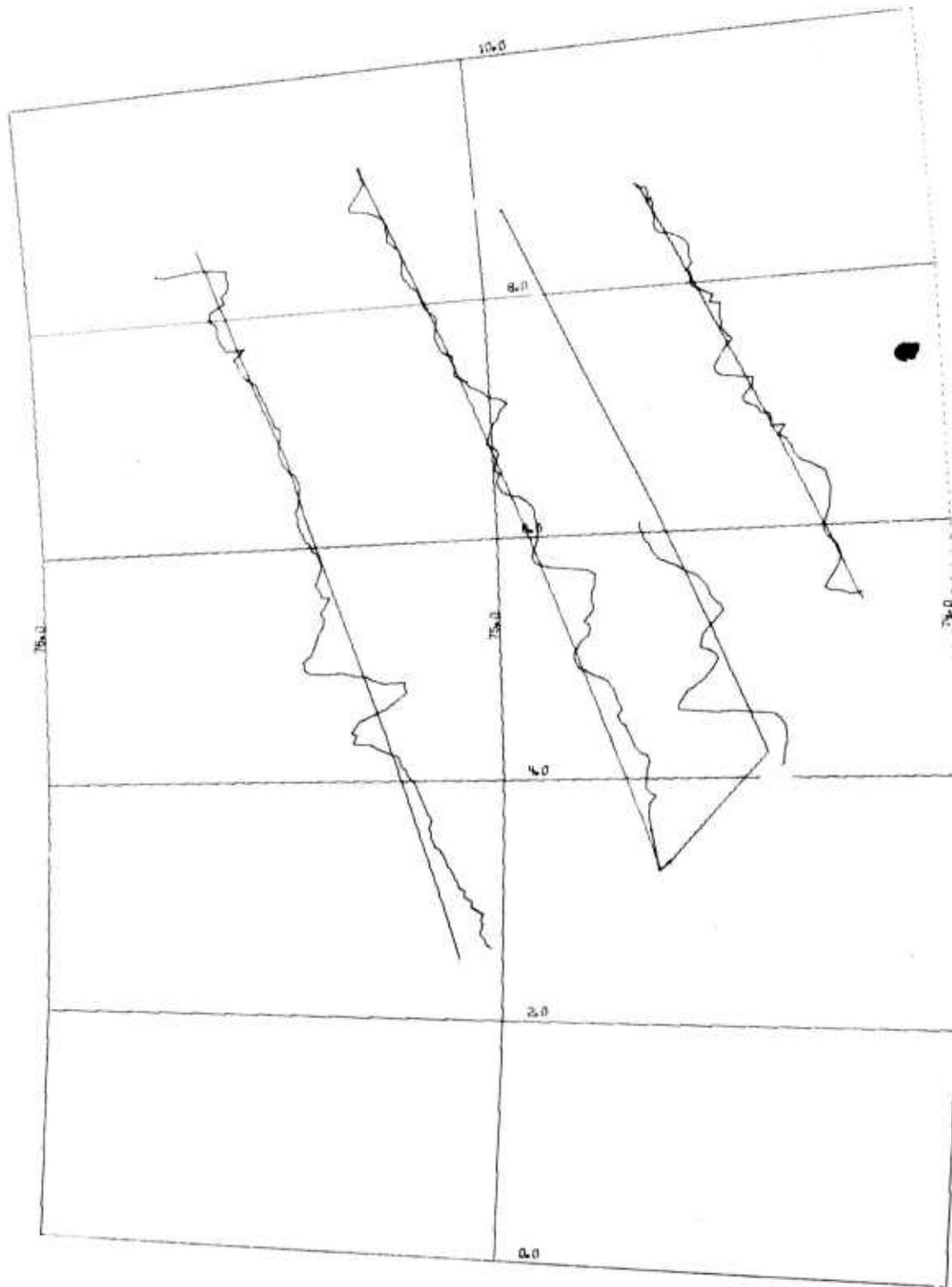
APPENDIX C
Sample Profiles

BATHYMETRY PROFILE



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MAGNETIC PROFILE



APPENDIX D
Sample Output Listing

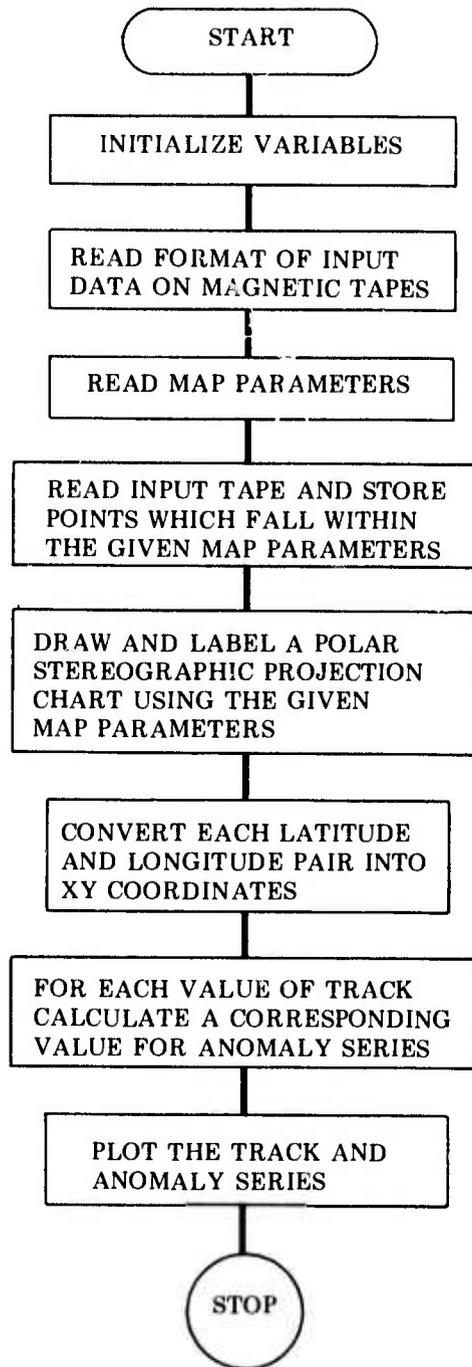
DATA FORMAT ... (13X,12,14,1X12,F3.1,F8.4,F9.4,10XF5.1,23X)

CHART PARAMETERS

SOUTHMOST LATITUDE	74.0	NORTHMOST LATITUDE	76.0
WESTMOST LONGITUDE	0.0	EASTMOST LONGITUDE	10.0

PROGRAM READ IN	1279	POINTS	
PROGRAM PLOTTED	1278	POINTS ON THE MAP	
PROGRAM READ IN	1279	POINTS	
PROGRAM PLOTTED	975	POINTS ON THE MAP	

APPENDIX E
Flow Chart



APPENDIX F
Source Language Listing

```

PROGRAM TRACK
DIMENSION IBLF(254)
DIMENSION NAME(6) , IFM(20)
REAL LATMIN,LATMAX,LONGMIN,LENGMAX ,LAT
COMMON DELAT,DELON,XPOLAT,XPELON
COMMON LX
COMMON W,DIST,ANOMCK,CHANGE,AP,LKK,KNUM,INUM,GINCH
COMMON ANOM( 2),III,JJJ,KKK,XLAST
COMMON LAT(2)
COMMON INP,IG,U,V,XLAT,XLON
COMMON POLAT,PCLONG,RET,LMIN,LMAX,VMIN,VMAX,HEIGHT,NLAT,NLON,
*IFROJ,IBOX,SCALE,ISYMB,ILINE
COMMON NALL,ISTART(1),NAMES(10,6),LENG,LAST
COMMON YES,TITLE(10),ICOL,IA(76)
COMMON/1/IDATE(2) ,HEDN(2)
COMMON/3/LATMIN,LATMAX
COMMON/5/JUDY1,JUDY2,ITM1,ITM2
COMMON/7/LONGMIN,LENGMAX
COMMON/8/IFM
COMMON/10/IEXTRA,ISKIP
DATA(KEY1=4HCNT),(KEY2=4HREAD),(KEY3=4HCMP),(KEY4=4HSPEC),(KEY5=
13HMAP),(KEY6=4HTITL),(KEY7=4HFLND),(KEY8=4HPLBT),(KEY9=4HPRIN),(KE
2Y10=4HSTOP),(KEY11=4HERAS),(KEY12=4HSTOR),(KEY13=4HRECA),(KEY14=4H
30THE),(KEY15=4HPBLE),(KEY16=4HTURN),(KEY17=4HFPLB)
REWIND 15
6601 REWIND 20
KNUM=0
INUM=0
JJJ=0
NALL=0
LAST=0
REWIND 05
REWIND 06
INP=60
IG=61
ISTART(1)=1
YES=-100.0
ICOL=100
C KKK IS A INDICATOR IF=0 WILL ONLY READ TRACK SERIES FROM CALCM
C IF=1 WILL CALCULATE ANOMALY SERIES AS WELL
KKK=1
DIST=10,
ANOMCK=1500,
CHANGE=20,
CALL PLOTS(IBLF,254,40,29)
READ (INP,1000) IFM
WRITE(IG,1001) IFM
1000 FORMAT(20A4)
1001 FORMAT(///= DATA FORMAT .:.,20A4)
SCALE=0,
WIDTH=HEIGHT
C ISYMB FOR NAVIGATION DATA / LINE AND NOT ANNOT 1 SYMBOL AND ANNOT
READ(60,900)IBOX,KKK,ISYMB,ILINE,NLAT,NLON,ISKIP,GINCH,HEIGHT,
1LATMIN,LATMAX,LONGMIN,LENGMAX,IEXTRA,JUDY1,ITM1,JUDY2,ITM2
900 FORMAT(7I2,6F8,2. 12,4I4)
DE 701 IX=1,ISKIP

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```

701 CALL SKIPFILE(15)
    DIST=10,0
    CHANGE=20,0
    ANOMCK=1500,0
    ILINE=1
700 IPRQJ=7
    PELONG=0.0
    PELAT=90.0
    F=.0174533
    SCALE=COS(LATMIN*F)
    DELON=LONGMAX-LONGMIN
    DELAT=LATMAX-LATMIN
    XLON=0
    XLAT=LATMAX
    CALL CONV(XLAT)
    VMAX=V
    XLAT=LATMIN
    CALL CONV(XLAT)
    VMIN=V
    UMAX=(3,1415926536/360.)*DELON*SCALE
    UMIN=-UMAX
910 WRITE(10,1003)
1003 FERMAT(1H0,16)CHART PARAMETERS)
    WRITE(10,1004)LATMIN,LATMAX
1004 FERMAT(1H ,20)SOUTHMOST LATITUDE ,F10.1,10X,20)NORTHMOST LATITUDE
    1 ,F10.1)
    WRITE(10,1005) LONGMIN,LANGMAX
1005 FERMAT(1H ,20)WESTMOST LONGITUDE ,F10.1,10X,20)EASTMOST LONGITUDE
    1 ,F10.1)
10 CALL NEXT(KEY,NAME)
    IF(KEY.EQ,KEY1) GO TO 6600
    IF(KEY.EQ,KEY4) GO TO 1055
    IF(KEY.EQ,KEY6) GO TO 600
    IF(KEY.EQ,KEY8) CALL @LTPUT(NAME,1)
    IF (KEY .EQ, KEY10) GO TO 100
    GO TO 10
1055 CALL @THER(LAT(1),LAT(LAST+1))
    LAST=LAST + NP
    IF(LKK.EQ,2) GO TO 10
    WRITE(10,1050) NP
1050 FERMAT(16)OPREGRAM READ IN,19,2X6)POINTS)
    GO TO 10
600 READ(INP,8000) TITLE
8000 FERMAT(10A8)
    WRITE(10,6000) TITLE
6000 FERMAT(1H0,12)MAP TITLE ;10A8)
    YES=100,0
    GO TO 10
6600 CALL PLOT(WIDTH +10,0,0,0,83)
    GO TO 6601
100 CALL PLOTS(0,0)
    CALL STOPPLOT
    END

```

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PROGRAM LENGTH	IDENT	TRACK
ENTRY POINTS	01166	
BLOCK NAMES	00541	
	00315	
1	00004	
3	00002	
5	00004	
7	00002	
8	00024	
10	00002	

EXTERNAL SYMBOLS

QOENTRY
 THEND,
 QOCCICT,
 PLOTS
 SKIFFILE
 CONY
 NEXT
 OUTPUT
 OTHER
 PLOT
 STOPLOT
 COSF
 REW,
 TSH,
 STH,
 SL0,
 SLI,
 QNSINGL.

00233 SYMBOLS

C SUBROUTINE CONV(LAT,IPEN,IFRCJ)
 CCC BASIC SUBROUTINE CONTAINING 12 STANDARD PROJECTIONS.
 C

```

REAL LAT
DIMENSION HEAD(2)
DIMENSION S(2),P(2)
DIMENSION LAT(2)
DIMENSION A(4)
COMMON DELAT,DELON,XPCLAT,XPCLON
COMMON LX
COMMON W,DIST,ANOMCK,CHANGE,AP,LKK,KNUM,INUM,GINCH
COMMON ANOM( 2),IIII,OUU,KKK,XLAST
COMMON X(2)
COMMON INP,IO,U(2),XLAT,XLON
COMMON POLAT,PHIO,PGT,LV(4),HEIGHT,NLAT,NLON,III(2),SCALE,ISYMB
1,ILINE
COMMON NALL,ISTART(11),NAMES(10,6),LENG,LAST
COMMON YES,TITLE(10),ICOL,IA(76)
COMMON/1/IDATE(2),HEDN(2)
COMMON/9/UDIFF,DIFF,LUIN,VVIN
DATA(RATIO=1.00092),(ECCSO=0.0067227)
DATA(F=,U174533),(LLAST=9999,)
DATA((A(I),I=1,4)=1.37027,4.28771,.080412,=.14842)
DATA(EE=1.7182818)
  
```

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```

RCF=97.2957795
IDAY=0.0
IPKN=0
ZERO=0.0
ZNINE=99.0
PI=3.14159
C   UV(4)=VMAX(UV(3)=VFIN
    SCAL=HEIGHT/(LV(4)-UV(3))
C
C   GENERAL ENTRY POINT FOR ALL AZIMUTHAL PROJECTIONS.
C
1   SINPH=SIN(F*(LAT(2)-PHI0))
    COSPH=COS(F*(LAT(2)-PHI0))
    SINRT=-COS(F*RCF)
    COSRT= SIN(F*RCF)
    SINL0= SIN(F*PGLAT)
    COSL0 =COS(F*PGLAT)
    SINLA=SIN(F*LAT(1))
    COSLA=SQRT(1,-SINLA*SINLA)
    CESA=SINLA*SINL0-COSLA*COSL0*COSPH
    SINA=SQRT(1,00001-CESA*CESA)
    SINB=COSLA*SINPH/SINA
    COSB=(SINLA*COSL0-COSLA*SINL0*COSPH)/SINA
C
C   STEREOGRAPHIC WITH ORIGIN AT PGLAT,PGLONG
C
70  R=2.0*SINA/(1,000001+CESA)
101 U(1)= R*(COSB*COSRT-SINB*SINRT)
    U(2)=R*(SINB*COSRT+COSB*SINRT)
C   THIS SECTION CALCULATES SERIES ANOM
C   I COULD HAVE BEEN REPLACED WITH III BUT IT WAS NOT WORTH THE EFFORT
C   JJJ IS A COUNTER. IT IS IN COMMON BECAUSE IT NEEDS TO BE INCREMENTED
C   EACH TIME IT SWITCHES FROM *ELTPUT* TO *CONV*
C   THE VALUE OF III IS SET IN *ETHER* IT IS THE NEXT UNUSED POSITION
C   IN ARRAY X(12000) WHICH WILL START SERIES ANOM.
    IF(LKK,NE,1)GO TO 18
    P(1)=U(1)
    P(2)=U(2)
    JJJ=JJJ + 1

    K=JJJ
    J=K-1
    IF(J)800,800,31
31  ANOM(1)=ANOM(2)
    HEDN(1)=HEDN(2)
    READ(06,33)ANOM(2),HEDN(2),IPPN
33  FORMAT(2F10,4,12)
800  I=1111
    IF(K,EQ,1) 501,602
901  S(1)=P(1)
    S(2)=P(2)
    GO TO 20
602  IF(IPEN,EQ,3) 603,502
603  IPPN=5
    GO TO 205
502  IF(K,EQ,2) 503,604
503  XDIFF=P(1)-S(1)
    YDIFF=P(2)-S(2)
    GO TO 17
604  IF(IPPN,EQ,3) 503,504

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904 XDIFF=(XDIFF*1*(P(1)-S(1)))/(1+1)
    YDIFF=(YDIFF*1*(P(2)-S(2)))/(1+1)
17  GO TO 15
    15 HEAD(2)=ATAN2(YDIFF,XDIFF)
      IF(HEAD(2),LT,0,)HEAD(2)=2*PI+HEAD(2)
C HEAD(2) IS AN ANGLE BETWEEN 0 AND 2*PI
19  IF(0.,LE,HEAD(2))411,408
411 IF(HEAD(2),LE,PI/2)407,408
407 ISIGN=1
    GO TO 23
408 IF(3.*PI/2.,LT,HEAD(2))412,410
412 IF(HEAD(2),LT,2.*PI)409,410
409 ISIGN=1
    GO TO 23
410 ISIGN=-1
    23 XONE=S(1)-ISIGN*ANEM(2)*SIN(HEAD(2))/(QINCH*SCAL)
      XTWO =S(2)+ISIGN*ANEM(2)*COS(HEAD(2))/(QINCH*SCAL)
205 WRITE(05,700) XONE,XTWO,IPPR,IDAY
700 FORMAT(2F10,4,2I10)
      XLAST=XONE
      IWRIT=I+1
      S(1)=P(1)
      S(2)=P(2)
      HEAD(1)=HEAD(2)
16  I=I+2
20  III=I
18  RETURN

      BND

```

CONV

		ICENT	CONV
PROGRAM LENGTH		00515	
ENTRY POINTS	CONV	00032	
BLOCK NAMES		00315	
	1	00004	
	9	00004	
EXTERNAL SYMBOLS			
	Q1C10100		
	THEAD,		
	Q1C04100		
	QBCCICT,		
	ATAN2		
	SQRTF		
	SINF		
	COSF		
	TSH,		
	STH,		
	QNSINGL,		
00234 SYMBOLS			

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```

SUBROUTINE OUTPUT (NAME,IG0)
C
REAL LAT
INTEGER TITLE
DIMENSION RADIUS(2)
REAL LATMIN,LATMAX,LENGMIN,LENGMAX
REAL LATN0T(90),LENNET(180)
COMMON DELAT,DELON,XFOLAT,XPELEN
COMMON LX
COMMON W,DIST,ANOMCK,CHANGE,AP,LKK,KNUM,INUM,GINCH
COMMON ANOM( 2),III,JJJ,KKK,XLAST
COMMON LAT(2)
COMMON INP,IG,U,V,XLAT,XLON
COMMON P0LAT,P0LONG,P0T,LMIN,LMAX,VMIN,VMAX,HEIGHT,NLAT,NLON,
•IFR0J,IB0X,SCALE,ISYMB,ILINE
COMMON NALL,ISTART(11),NAMES(10,6),LENG,LAST
COMMON YES,TITLE(10),ICOL,IA(76)
COMMON/1/IDATE(2),MEDN(2)
COMMON/3/LATMIN,LATMAX
COMMON/7/LENGMIN,LENGMAX
COMMON/9/UDIFF,DIFF,LUIN,VVIN
DATA(F=,0174533)
DATA(SINI=,0174524),(CES1=;999848)
DATA(ENDLAT=99,0),(IFEN=0)
C
IF(LKK.EQ,2) GO TO 582
LTEMP=LKK
LKK=0
ENGMIN=LENGMIN
ENGMAX=LENGMAX
IF(LENGMIN,LT,0) ENGMIN=LENGMIN * 360
IF(LENGMAX,LT,0) ENGMAX=LENGMAX * 360
IFEN=3
TESTMIN=LENGMIN
TESTMAX=LENGMAX
ITMIN=ABS(TESTMIN)
ITMAX=ABS(TESTMAX)
C TEST IF COMPLETE CIRCLE
IF(ITMIN.EQ,0,AND,ITMAX.EQ;360) GO TO 3000
C TEST IF HOVERS AROUND 0 OR 180
IF(TESTMIN,GT,0,AND,TESTMAX,LT,0)GO TO 2001
IF(TESTMIN,LT,0,AND,TESTMAX,GT,0) GO TO 2000
IF(ABS(LENGMAX),GT,ABS(LENGMIN))GO TO 8500
C LEFT HALF OF SPHERE
IF(ABS(LENGMIN),LE,90,OR,ABS(LENGMIN),GT,90,AND,ABS(LENGMAX),LT,
190)GO TO 2005
XLAT=LATMAX
XLON= ENGMAX
CALL CONV(XLAT)
DIFF=V-VMIN
XLAT=LATMIN
XLON=ENGMAX
CALL CONV(XLAT)
UCIFF=U-UMIN
GO TO 8501
2005 XLAT=LATMIN
XLON= ENGMAX
CALL CONV(XLAT)
DIFF=V-VMIN
XLAT=LATMIN
XLON=ENGMIN
CALL CONV(XLAT)
UCIFF=U-UMIN
GO TO 8501

```

```

C COMPLETE CIRCLE
3000 DIFF=0
    XLAT=LATMIN
    XLON=270.0
    CALL CONV(XLAT)
    UDIFF=U-UMIN
    GO TO 8501
C HOVERS AROUND 180
2001 IF (ITMIN.GT.ITMAX) GO TO 2002
    XLAT=LATMAX
    XLON=ONGMIN
    CALL CONV(XLAT)
    DIFF=V-VMIN
    XLAT=LATMIN
    XLON=ONGMAX
    CALL CONV(XLAT)
    UDIFF=U-UMIN
    NLTEST=2
    GO TO 8501
C HOVERS AROUND 0
2000 DIFF=0
    XLAT=LATMIN
    XLON=LONGMIN
    CALL CONV(XLAT)
    UDIFF=U-UMIN
    NLTEST=1
    GO TO 8501
2002 XLAT=LATMAX
    XLON=ONGMAX
    CALL CONV(XLAT)
    DIFF=V-VMIN
    XLAT=LATMIN
    XLON=ONGMAX
    CALL CONV(XLAT)
    UDIFF=U-UMIN
    NLTEST=2
    GO TO 8501
C RIGHT HALF OF SPHERE
8500 IF (ABS(LONGMIN),LE.90,OR.ABS(LONGMIN),LT.90,AND,ABS(LONGMAX).GT.90) GO TO
1)GO TO 2004
    XLAT=LATMAX
    XLON=ONGMIN
    CALL CONV(XLAT)
    DIFF=V-VMIN
    XLAT=LATMAX
    XLON=ONGMAX
    CALL CONV(XLAT)
    UDIFF=U-UMIN
    GO TO 8501
2004 XLAT=LATMIN
    XLON=ONGMIN
    CALL CONV(XLAT)
    DIFF=V-VMIN
    XLAT=LATMAX
    XLON=ONGMIN
    CALL CONV(XLAT)
    UDIFF=U-UMIN
    GO TO 8501
8501 VVIN=VMIN
    VVAX=VMAX
    ULIN=UMIN
    ULAX=UMAX
    ICOUNT=0
    LKK=LTEMP

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ICHECK=0
KEUNT=0
LPL=1
FIRST=0
100 CONTINUE
C
C IF *IPEN* IS 0 THIS IS THE FIRST MAP AND THE ORIGIN IS NOT SHIFTED.
101 IF (IPEN) 102,103,102
102 CALL PLOT(WIDTH*1.0,0,0,-3)
C
103 WIDTH=HEIGHT*(UMAX-UMIN)/(VMAX-VMIN)
CALL PLOT(0,0,-3)
IF (YES.EQ,100,0)CALL SYMBOL( *1.0,,2,.21,TITLE,90,0,80)
YES=-1.0
C CERTAIN TRIG FUNCTION THAT ARE CONSTANT FOR A GIVEN MAP ARE CALCULATED AND
C STORED IN *CONV* - *NEWMAP* IS AN ENTRY TO THAT ROUTINE
C
SCALE=HEIGHT/(VMAX-VMIN)
DIFF=DIFF*SCALE
UCIFF=UCIFF*SCALE
LTEMP=LKK
LKK=0
C DRAW LONGITUDE LINES
DEG=FLOAT(NLON)
IPEN=3
XLAT=-90.0
PLONG=ONGMIN
IF (POLONG,LT,0,)PLENG=POLONG*360,
XLON=PLONG-DEG
DLAT=-.5
ZZMAX=DELAT/2,0
ZTOP=POLAT + ZZMAX
DO 110 I=1,360,NLEN
XLON=XLON+DEG
IF (XLON,GT,360,)XLEN=XLON-360,
DLAT=-DLAT
DO 110 J=1,361
XLAT=XLAT+DLAT
CALL CONV(XLAT)
Y=((U-UMIN)*SCALE)-UCIFF
W=((V-VMIN)*SCALE)-DIFF
555 FORMAT(1H0,8F10,5)
IF (NUTEST,EQ,1) GO TO 767
IF (XLON,LT,ONGMIN,OR,XLEN,GT,ONGMAX,OR,XLAT,LT,LATMIN,OR,XLAT,
1GT,LATMAX) GO TO 120
GO TO 778
767 IF (XLON,GT,ONGMAX,AND,XLEN,LT,ONGMIN,OR,XLAT,LT,LATMIN,OR,XLAT,GT,
1LATMAX) GO TO 120
778 IF (XLAT-ZTOP,4)7000,120,7000
7000 CALL PLOT (Y,W,IPEN)
IPEN=2
GO TO 110
120 IPEN=3
110 CONTINUE
DEG=FLOAT(NLAT)
150 XLAT=LATMIN-DEG
IG2=2*NLAT
C
DO 159 I=IG2,361,NLAT
XLAT=XLAT+DEG
IF (XLAT,GT,LATMAX + 1) GO TO 888
IF (XLAT,GE,90,)900,901

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900 XLAT=LATMIN-DEG
    DEG=-DEG
901 DLON=1.0
    IFEN=3
    XLON=-DLON
155 XLON=XLON+DLON
    CALL CONV(XLAT)
    W=((V-VMIN)*SCALE)-DIFF
    Y=((U-UMIN)*SCALE)-UDIFF
    IF(NUTEST,EQ,1) GO TO 779
556 IF(XLON,LT,ENGMIN,OR,XLENIGT,ENGMAX,OR,XLAT,LT,LATMIN,OR,XLAT,
    1GT,LATMAX) GO TO 158
    GO TO 780
779 IF(XLON,GT,ENGMAX,AND,XLENIGT,ENGMIN,OR,XLAT,LT,LATMIN,OR,XLAT,GT,
    1LATMAX) GO TO 158
780 CALL PLOT(Y,W,IFEN)
    IPEN = 2
156 IF(XLON-360,0)155,159,159
158 IPEN=3
    GO TO 156
159 CONTINUE
C
C LABEL LATITUDE LINES
888 ISTOP=LONGMAX - LENGMIN + 1
    ITOP = DELAT * 2 + 1
    IFEN = 3
    DEG=FLOAT(NLAT)
    IF(NUTEST,EQ,1) GO TO 775
    XPOLON= ENGMAX-(ENGMAX-ENGMIN)/2
    GO TO 774
775 XPOLON=LONGMAX-(LENGMAX-LENGMIN)/2
774 XPOLAT=LATMIN - DEG
    DO 171 I=1,ITOP
    XPOLAT=XPOLAT + DEG
    IF(XPOLAT,GT,LATMAX) GO TO 999
    CALL CONV(XPOLAT)
    Y=((U-UMIN)*SCALE)-UDIFF
    W=((V-VMIN)*SCALE)-DIFF
    CALL PLOT(Y*.05,W*.05,3)
    CALL NUMBER(Y*.05,W*.05,.07,XPOLAT,0.0,4HF6,1)
171 CONTINUE
C LABEL LONGITUDE LINES
999 DEG=FLOAT(NLON)
    XPOLAT=LATMIN + DELAT/2
    XPOLON=LONGMIN - DEG
803 XPOLON=XPOLON + DEG
    A=270. + XPOLON
    IF(A,GT,360) A=A-360
    IF(NUTEST,EQ,2) GO TO 8503
    IF(XPOLON,GT,LENGMAX) GO TO 998
    GO TO 8504
8503 IF(XPOLON,GT,ENGMAX) GO TO 998
8504 CALL CONV(XPOLAT)
    W=((V-VMIN)*SCALE)-DIFF
    Y=((U-UMIN)*SCALE)-UDIFF
    CALL PLOT(Y*.05,W*.05,3)
    CALL NUMBER(Y*.05,W*.05,.07,XPOLON,A,4HF6,1)
    GO TO 805
998 LKK=LTEMP
C
C PLOTTED OUTPUT SECTION.

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C
  REWIND 20
902  II=1
      IEND=LAST *2
      IFIN=IEND - 4
      JJJ=0
      IFEN=3
      INMAP=0
C   THE VALUE OF LKK IS SET IN SUB OTHER DEPENDING ON THE VALUE OF KKK
      IF(LKK.EQ,2)GO TO 303
      GO TO 301
309  W=((LAT(2)-VMIN)*SCALE)-DIFF
      Y=((LAT(1)-UMIN)*SCALE)-LDIFF
      GO TO 310
C
C   CHECK FOR BEGINNING OF NEW SERIES OR CHANGE TO POINT MODE
301  READ(20,6000)LAT(1),LAT(2),IPEN      ,IDATE(2)
      6000  FORMAT(2F10,4,2I10)
      IF(LAT(1)-ENCLAT)302,328,328
C
C   CONTINUOUS MODE DATA DRAWN
302  CALL CONV(LAT( 1),IPEN,IPROJ)
      GO TO 304
303  READ(05,6000) LAT(1),LAT(2),IPEN      ,IDATE(2)
      IF(EOF,05)390,777
777  IF(LAT(1)-ENCLAT)309,329,309
329  INMAP=INMAP+1
      IPEN=3
      II=II+2
331  IF(II-IFIN)303,390,390
304  CONTINUE
      W=((V-VMIN)*SCALE)-DIFF
      Y=((U-UMIN)*SCALE)-LDIFF
C
C   CHECKS IF POINT LIES INSIDE MAP RECTANGLE, IF NOT SKIPS PLOT ROUTINE AND
C   COUNTING STATEMENT
310  IF(IPEN,EQ,5) GO TO 210
9067 CALL PLOT(Y,W,IPEN)
210  CONTINUE
      INMAP=INMAP+1
      IPEN=2
320  II=II+2
      IF(LKK.EQ,2)GO TO 331
      IF (II-IEND) 301,390,390
328  INMAP=INMAP+1
330  IFEN=3
      GO TO 320
390  IMAP=INMAP - 1
      IF(LKK.EQ,2) GO TO 604
      WRITE(10,3000) IMAP
3000  FORMAT(16HPREGRAM PLOTTED,19,2X17HP0INTS ON THE MAP)
C   IF LKK=0 SUB OTHER WILL NOT CALCULATE ANOMALY SERIES ( IF=2 ANOMALY SERIES
C   HAS JUST BEEN PLOTTED THEREFOR REINITIALIZE EVERYTHING
      IF(LKK.EQ,0,OR,LKK.EC,2)604,399
604  KNUM=0
      INUM=0
      JJJ=0
      NALL=0
      LAST=0
399  CONTINUE

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C PROGRAM PLOTTED TRACK READY TO PLOT ANOMALY
REWIND 05
500 RETURN
C
C PRINTED OUTPUT SECTION
C
END

	IDENT	OUTPUT
PROGRAM LENGTH	02161	
ENTRY POINTS	00456	
BLOCK NAMES		
	00315	
1	00004	
3	00002	
7	00002	
9	00004	
EXTERNAL SYMBOLS		
Q1G10100		
THEAD,		
QBGCICT.		
CONV		
PLOT		
SYMBOL		
NUMBER		
QBGFEOF		
REW,		
TSH,		
STH,		
ONSINGL.		
00425 SYMBOLS		

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```

SUBROUTINE NEXT(INSTR,NAME)
C
C THIS PROGRAM ATTEMPTS TO PROVIDE A MACHINE-INDEPENDENT ROUTINE FOR READING
C CONTROL CARDS IN SUPERMAP. THE WORD LENGTH OF THE MACHINE IS REQUIRED TO BE
C AT LEAST FOUR BCD CHARACTERS LONG. THIS IS MET BY ALL MACHINES LIKELY TO BE
C ENCOUNTERED.
C
      DIMENSION NAME(6)
      COMMON DELAT,DELON,XPOLAT,XPOLON
      COMMON LX
      COMMON W,DIST,ANOMCK,CHANGE,AP,LKK,KNUM,INUM,GINCH
      COMMON ANOM( 2),III,JJJ,KKK,XLAST
      COMMON X(2)
      COMMON INP,IO,U,V,XLAT,XLON
      COMMON POLAT,POLONG,ROT,LMIN,LMAX,VMIN,VMAX,HEIGHT,NLAT,NLON,
      *IFROJ,IBOX,SCALE,ISYB,ILINE
      COMMON NALL,ISTART(11),NAMES(10,6),LENG,LAST
      COMMON YES,TITLE(10),ICOL,IA(76)
      COMMON/1/IDATE(2),HEDN(2)
      DATA( IBLANK=1H ),(ICEMMA=1H),(NULL=1)
10    DO 11 IWORD=1,6
11    NAME(IWORD)=IBLANK
      IWORD=1
15    IF (IWORD,GT,1) RETURN
20    ICOL=ICOL+1
      IF (ICOL,GT,76) GO TO 30
25    IAC=IA(ICOL)
      IF (IAC,EQ,IBLANK,OR, IAC,EG,ICEMMA) GO TO 15
      IF (IWORD,LE,6) NAME(IWORD)=IAC(ICOL)
      IWORD=IWORD+1
      NULL=1
      GO TO 20
30    IF (NULL,EQ,0) GO TO 35
      IF (IWORD,GT,1) RETURN
      READ (INP,1000) INSTR,IA
1000  FORMAT(A4,76A1)
      NULL=0
      NAME(1)=IBLANK
      DO 33 KCOL=1,76
C    KCOL IS USED BECAUSE THE COMPILER SEEMS UNABLE TO ACCEPT THE DO LOOP BELOW IF
C    ICOL IS USED THROUGHOUT.
      ICOL=KCOL
      IF (IA(KCOL),EQ,IBLANK,OR, IA(KCOL),EQ,ICEMMA) GO TO 10
33    CONTINUE
35    NULL=1
      RETURN
      END

```

PROGRAM LENGTH		ICENT	NEXT
ENTRY POINTS	NEXT	00200	00012
BLOCK NAMES		00315	
EXTERNAL SYMBOLS	1	00004	
	THEAD,		
	QBCCICT,		
	TSM,		
	SLI,		
	QNSINGL.		
00156 SYMBOLS			

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SUBROUTINE OTHER(XOLD,XNEW)
REAL LATMIN,LATMAX,LENGMIN,LENGMAX
DIMENSION IYR(20),IDAY(20),IHR(20),DDMIN(20),RRLAT(20),RRLONG(
20),AANOMAL(20)
DIMENSION IFM(20),KPFEN(2)
COMMON DELAT,DELON,XFOLAT,XFOLON
COMMON LX
COMMON W,DIST,ANOPCK,CHANGE,N1,LKK,KNUM,INUM,GINCH
COMMON ANOM( 2),III,JJJ,KKK,XLAST
COMMON X(2)
COMMON INP,IC,U,V,XLAT,XLON
COMMON POLAT,POLONG,ROT,LMIN,LMAX,VMIN,VMAX,HEIGHT,NLAT,NLON,
*IFROJ,IBOX,SCALE,ISYB,ILINE
COMMON NALL,ISTART(11),NAMES(10,6),LENG,LAST
COMMON YES,TITLE(10),ICOL,IA(76)
COMMON/1/IDATE(2),MEDN(2)
COMMON/3/LATMIN,LATMAX
COMMON/5/JUDY1,JUDY2,ITM1,ITM2
COMMON/7/LENGMIN,LENGMAX
COMMON/8/IFM
COMMON/10/EXTRA,ISKIP
IT=15
IEX=0
ATMIN=LATMIN
ATMAX=LATMAX
IF(I SYMB.EQ,1) ATMIN=ATMIN + 1
DIST2=80.
MEDNL=279.
IFLIGHT=1
IMP=60
IAY1=3
ICAY=0
ZNINE=99.0
ZERO=0.0
DEGRA=1.745329E-2
CHANGE1=450.*(360.-CHANGE/2.)
CHANGE2=(450,0-CHANGE/2.)-360.
M=1
L=1
IF(LKK.EQ,1)GE TO 50
I=1
900 IF(I,EQ,1)200,201
200 WRITE(20,701)ZNINE,ZERO,IDAY,IDAY
808 FORMAT(1H0,110,2F10.4)
M=M+2
N=21
201 IF(N=20) 801,801,977
977 N=1
800 READ(IT,IFM)IYR(N),IDAY(N),IHR(N),DDMIN(N),RRLAT(N),RRLONG(N),
1AANOMAL(N)
IF(ICHECK,IT) 800,779
779 IF(EOF,IT) 777,778
777 IEND=IEND + 1
IF(IEND . GE. 1) GE TO 401
778 N=N + 1
IF(N,LT,21) 06 TO 800

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N=1
001 IYR=IYR(N)
    IJAY=IJAY(N)
    IHR=IHR(N)
    DMIN=UDMIN(N)
    JMIN=DMIN
    IJMIN=IHR*100 + JMIN
    RLAT=HRLAT(N)
    RLONG=HRLONG(N)
    ANOMAL=AAANOMAL(N)
    IF(IBOX)351,355,350
351 ANOMAL=-ANOMAL
    GE TO 355
350 ANOMAL=-ANOMAL*1.8288
355 N=N+1
    IF(IDAY,LT,JUDY1)GE TO 201
    IF(RLAT,GT,90,0)GE TO 202
    IF(IDAY,GT,JUDY2) GE TO 211
    IF(IYR.EQ.0) GO TO 811
    IF(RLAT,LT, ATMIN) GE TO 202
    IF(RLAT,GT,LATMAX) GE TO 202
    IF(RLONG,LT,LENGMIN) GE TO 202
    IF(RLONG,GT,LENGMAX) GE TO 202
    IF(IDAY,EQ,JUDY1.AND.IJMIN.LT,IJTM1) GO TO 201
    IF(IDAY,EQ,JUDY2.AND.IJMIN.GT,IJTM2) GO TO 811
    IF(IHR.EQ,KHR.AND.JMIN.LT,KMIN) GE TO 202
401 IF(L-3)70,72,72
202 IAY1=3
    GE TO 201
811 IF(L-3)97,810,810
810 WRITE(06,71)ANOM(1),HECN(1),KPPEN(1)
    GE TO 99
72 WRITE(06,71) ANOM(1),HEDN(1),KPPEN(1)
71 FORMAT(2F10,4,I2)
70 IF(IEND,EQ,1) GO TO 99
501 IF(L,EQ,1)GO TO 5
    HEDN( 1)=HECNL
5 CONTINUE
    ANOM(1)=ANOM(2)
    KPPEN(1)=KPPEN(2)
    KPPEN(2)=IAY1
    ANOM(2)=ANOMAL
    GE TO 19
19 CONTINUE
    WRITE(20,701)RLAT,RLONG,IAY1,IAY1
701 FORMAT(2F10,4,2I10)
    KHR=IHR
    KJMIN=JMIN
    IAY1=2
    IF(L,EQ,1)GO TO 60
    HEDN( 1)=450,-HECN( 1)
    IF(HEDN( 1),GT,360.00)HEDN( 1)=HEDN( 1)-360.0
910 HEDN( 1)=HEDN( 1)*DEGRA
60 CONTINUE
    L=L+1
    M=M+2

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12 IF(I,GT,10)GO TO 20
20 KK=I+1
   I=I+1
   GO TO 500
99 WRITE(06,71)ANOM(2),PEEN(1),KPPEN(2)
   IEX=IEX + 1
   IF(IEXTRA,EQ,IEX) GO TO 667
   L=1
   IT=IT + 1
665 READ(60,665)ISKIP,JUDY1,ITM1,JUDY2,ITM2
   FORMAT(5I4)
   DE 781 IX=1,ISKIP
781 CALL SKIPFILE(IT)
   IAY1=3
   IEND = 0
   GO TO 977
667 LENG=M-1
   REWIND 06
   III=M
   N1=I-1
   IF(KKK.EQ,0)206,207
206 LKK=0
   RETURN
207 LKK=1
   RETURN
C   THE VALUE OF III IS SET IN SUB CONV WHEN SERIES TRACK IS BEING PLOTTED
C   FOR EACH VALUE OF TRACK PLOTTED A CORRESPONDING VALUE OF SERIES ANOM
C   IS FOUND (THE SERIES WILL BE AN X,Y VALUE IN INCHES STORED IN COMMON X(1000)
C   WHEN SERIES ANOM IS PLOTTED SUBROUTINE CONVERT IS BYPASSED
C   SINCE THE SERIES ANOM IS ALREADY IN INCHES
C   III IS ONE MORE THAN THE TOTAL LENGTH OF ARRAYX(10000)
C   LENG IS THE LENGTH OF EACH SERIES CALCULATED IN *OTHER* WHICH IS STORED
C   IN X(10000) *NOT* THE LENGTH OF THE USED PORTION OF ARRAY X(10000)
90 LENG=(III-3)/2*INLP
   LKK=2
   RETURN
END

```

PROGRAM LENGTH	ICENT	OTHER
ENTRY POINTS	01045	
BLOCK NAMES	00242	
	00315	
1	00004	
3	00002	
5	00004	
7	00002	
8	00024	
10	00002	

EXTERNAL SYMBOLS
 THEAD,
 Q1C10100
 Q8C1CT,
 SKIFFILE
 Q8CIFE0F
 Q8CIFI0C
 REW,
 TSM,
 STH,
 QNSINGL.

00330 SYMBOLS

BINARY DECK
 BANK,(0),/1/
 LOAD
 RUN,90,10000