U.S. DEPARTMENT OF INTERIOR

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DIMCALC: A BASIC Program for computing Absolutes and Baselines from DIM - Magnetometer Observations.

by

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ABSTRACT

Program DIMCALC (Appendix A) calculates the absolute and baseline values of the Earth's magnetic field from observations taken with a Declination-Inclination Magnetometer (DIM) and variation data from any recording variometers. DIMCALC reduces the repetitious keystrokes and the input errors. In addition, the output can be tailored to include statistical analysis and an abstract of baseline information. It is capable of running on any IBM compatible computer running Dos 3.3 or greater, 640kb of memory and a single floppy drive.

INTRODUCTION

This program was first conceived in 1988 as a tool for field work which attempted to eliminate the repetitious errors which were inherent in the input while using a calculator. The first program was written in BASIC on a Tandy Model 100 laptop computer. Initial attempts were hampered by the limited memory size of the computer, thus the first program was rather limited in scope and occupied approximately 11,000 bytes of memory. Gradually as experience was gained additional checks on the input data were included, output was expanded to more closely image the standard baseline output. This generation of the program is written in pseudo BASICA modified for use with TurboBasic. Essentially all of the line numbers are retained, however, some TurboBasic specific calls are incorporated. Minor changes are required to return the program to BASICA format.

The DIM instrument consists of a single axis fluxgate magnetometer mounted on one side of the telescope of a non-magnetic theodolite. The fluxgate output is observed in a null mode and the horizontal and verticle circles are read and recorded. It is the angular relationship and Total Field observations which allows us to calculate the magnetic field elements. UP and DOWN refer to the position of the fluxgate mounted on the telescope. NORTH and SOUTH refer to the theodolite verticle circle position.

OPERATION

Upon execution of DIMCALC displays a menu screen as illustrated below which gives the user a number of options.

MAIN MENU

NORMAL RUN OF PROGRAM
MONTHLY BASELINES"
MODIFY OBSY4.DAT
WINDOW TO DOS - TYPE EXIT TO RETURN TO MENU
END OF DIM PROGRAM - EXIT TO DOS

By moving the highlighted bar with the arrow keys and hitting Enter, you can choose the option you want.

In all cases the default response is indicated in brackets, such as [Y], however there are a few questions for which a specific answer is required.

If you choose the Normal Run of Program then the next question asked is:

Do you have a printer attached to your PC Y(es) or N(o) ?[Y]:
If you respond with NO then the output will go to the screen which is necessary when no printer is available.

You will next get the following list:

DIM COMPUTATIONS
OF MAGNETIC DECLINATION,
HORZ AND VERT INTENSITY

BA = BARROW BD = BOULDER BS = BAY STLOUIS CO = COLLEGE
DR = DELRIO FN = FRESNO FR = FREDERICKSBURG GU = GUAM
HO = HONOLULU NT = NEWPORT SI = SITKA SJ = SAN JUAN
TU = TUCSON KG = KING GEORGE

INPUT STATION ID :

A listing of the present USGS stations is shown above and is contained in a constants file named OBSY4.DAT. If a station ID were entered which was not included in this list then the program would prompt the user for the necessary information. This information then can be appended to this file for future use.

Next it is necessary to input the date :

FORMAT FOR THE DATE AND YEAR DAY(3 DIGITS)"
03/11/90,061

INPUT DATE OF OBSERVATIONS (MM/DD/YY) & YEAR DAY:

The program calculates the Year Day from the date and responds if there is a discrepancy.

INPUT OBSERVER INITIALS(xxx) :

ENTER THE VARIATIONS INSTRUMENT USED:

[1] Normal
[2] Omis
[3] DCP
[4] Repeat

Input the Number:

Normal refers to the normal analog standard photo recording magnetograph. The OMIS is the present generation standard digital recording magnetograph. The DCP is the latest generation digital recording magnetograph which transmits the data in near real time via GOES satellites. The fourth option is Repeat which is considered a generic type of variation instrument which has been used on Repeat Surveys.

The F pier correction presently in OBSY4.DAT is ___

Do you wish to use this value? [Y]:

This F pier correction is presently used to correct the proton magnetometer observations to the standard DIM pier. It is necessary during Absolute Calibration Observations to observe the Total Field element either simultaneously or sequentially. This is only possible if the Total Field sensor is placed some distance from the DIM pier, therefore a Total Field pier difference must be established. If this value is not correct the program will prompt for a different value as listed next.

Enter the new Pier correction:

Do you wish to make this Pier Correction permanent in OBSY4.DAT:

Since it is possible to run this program on any IBM PC compatible machine the next question asks where the OBSY4.DAT file resides.

PLEASE SPECIFY THE DRIVE (A,B,C,D,OR E) WHERE THE OBSY4.DAT FILE RESIDES [A]:

You next need to know whether to use the DIM presently assigned to the station or some other unit.

DIM _____. presently in use at station _____.
Is this correct : [Y]?

If not correct, then input the one to be used.

ENTER DIM INSTRUMENT USED :

The variation instrument at each station has some conversion factor for each element by which the sensor output can be changed to some convenient unit of measure. Normally the OMIS scale value for H, D or Z is assumed to be unity however for the high latitude stations of Barrow, College and Sitka the values are different and may need to be changed. The OBSY4.DAT file contains the most recent scale values for these stations.

THE SCALE VALUES PRESENTLY IN USE AT station _____ are

HSV = _.___ DSV = _.___ ZSV = _.___

DO YOU WISH TO USE THESE VALUES [Y]es or No ?
If No then Input the scale values for this station
H SV(NT/&) D SV(NT/&) Z SV(NT/&)

Do you wish to make these values permanent in OBSY4.DAT [Y]?

Next you need to indicate whether to input the data from either the keyboard or if the data was previously input into a file.

Do you wish to input data from the (K)eyboard or (F)ile? [K]?

Next decide whether the data is to be output in the normal total form mode or whether we want only the abstracted baseline values. The Total form (as listed on page 9) mode is a standard form which has been developed by the USGS for use with DIM observations. The output follows this form exactly. The Baseline output (Appendices B,C and D) is an abstracted output which complies with the standard observatory form used by the USGS.

DO YOU WISH THE OBSERVATION FORMS PRINTED OUT OR COMPUTE BASELINES ONLY ?"(T)otal form or (B)aselines : [T]?

You are now ready to input the actual observation data. The model DIM being used dictates whether the angle data will be entered as degrees and minutes or degrees, minutes and seconds. Generally for the USGS at present all instrument numbers less than 8000 have been assigned to the older EDA DIM's and greater than 8000 refer to the newer Bartington DIM's.

INPUT ALL ANGLES AS PAIRS SEPARATED BY COMMAS e.g. 163,35.2":
or
INPUT ALL ANGLES AS TRIPLES SEPARATED BY COMMAS, e.g. 163,35,12.2":

Working on set ____

The next question is repeated for each set of observations to cover the possibility of observing across a day boundary.

INPUT NEW DATE ?[N] ?"

INPUT " MARK UP ";M1,M2

INPUT " MARK DN ";M3,M4

The program checks that the difference of the inputs is approximately 180 degrees and will flag it with the statement

"ONE or ROTH MARK READINGS IN ERROR"

ALL TIMES ENTERED AS 4 DIGITS e.g., 2341 NO COLONS

DECLINATION ANGLES

INPUT START TIME:

INPUT NORTH DOWN

INPUT " SOUTH DOWN

INPUT " SOUTH UP

INPUT " NORTH UP

INPUT STOP TIME:

INCLINATION ANGLES

INPUT START TIME:

INPUT " EAST UP

INPUT " EAST DOWN

INPUT " WEST DOWN

INPUT " WEST UP

INPUT STOP TIME:

You have just input a set of four angles for both the Declination and Inclination observations. The program now checks these angles to verify whether or not they are approximately 180 degrees from each other since they represent the angles observed for null readings of the fluxgate sensor with the telescope placed in four orthogonal positions. This is indicated on the Total printout list on page 10 and is labeled S= and N= and E= and W=.

Please recheck: one of your Declination angles exceeds 3 degrees
or
Please recheck: one of your Inclination angles exceeds 3 degrees

then

INPUT SECTION COMPLETE. SATISFIED WITH THE VALUES? Y OR N : [Y]?

If the answer is NO then the user is allowed to replace any value as follows:

WHICH TIME OR ANGLE WAS ENTERED INCORRECTLY ?"

MARK ANGLES = MK , TIMES=T1,T2,T3,T4
HORZ ANGLES =ND,SD,SU,NU ; VERT ANGLES = EU,ED,WD,WU

You will next be asked to input the total field values.

Input Total Field ?

Also, the program checks the total field values by comparing them to a mean value derived from the obsy4.dat file for this particular station.

TOTAL FIELD POSSIBLY IN ERROR. INPUT VALUE = _____._ SHOULD BE APPROXIMATELY _____

***** IS THIS VALUE CORRECT ?[N]**

Next

INPUT THE D,H,Z ORDINATES SEPARATED BY COMMAS :

DID YOU INPUT THE ORDINATES CORRECTLY SEPARATED BY COMMAS ?

ARE YOU SATISFIED WITH THE PROTON AND ORDINATE VALUES ? [Y]/N

Then the data is printed out in the following format:

^^^^^^^^^^^^^^^^ DIM PRINTOUT OF COMPUTATIONS^^^^^^^^^^^^^^^^

```
       DIM COMPUTATIONS
     OF MAGNETIC DECLINATION,
     HORZ AND VERT INTENSITY
     STATION NAME : BOULDER
 OBSERVED DATE : 10/08/93  JD= 281
      OBSERVER  : LWP
         DIM   154162
  MAGNETOGRAPH  : OMIS
         SET #   1
MARK  UP     :  16   12.68
MARK  DOWN   : 196   12.74
TIME = 1617.0
NORTH DOWN   : 270   20.92
SOUTH DOWN   :  90   16.64
SOUTH UP     :  90   17.32  S =  0  0.7
NORTH UP     : 270   19.75  N =  0  1.2
TIME = 1619.0
TIME = 1623.0
EAST  UP     : 112   45.15
EAST  DOWN   : 292   44.99  E =179 59.8
WEST  DOWN   : 247   13.72
WEST  UP     :  67   13.95  W =179 59.8
TIME = 1626.0
DSV=0.1629  HSV=1.0000  ZSV=1.0000
++++++++++++++++++++++++++++++++++
+ MAG S. MER.       =     0 18 39.5
+ MEAN MARK         =   196 12 42.6
+ MAG AZ OF MARK    =   195 54  3.1
+ TRUE AZ OF MARK   =    27 15  0.0
+ MAG DECLINATION   = E  11 20 56.9
+ ORD IN nt         =      -89.57
+ D ORD IN MIN SEC  =      -14 35.5
+ D BASELINE        = E  11 35 32.4
++++++++++++++++++++
+ INCLINATION       =  67  14  22.9
++++++++++++++++++++
+ F MEAN            =     54566.50
+ F PIER CORR.      =       -18.10
+ CORR.TOTAL FIELD  =     54548.40
++++++++++++++++++++
+ HORIZONTAL FIELD  =     21103.51
+ H ORD IN nt       =       -56.65
+ H ORDINATE IN nt  =       -56.65
+ H BASELINE        =     21160.16
++++++++++++++++++++
+ VERTICAL FIELD    =     50300.79
+ Z ORD IN nt       =      -108.72
+ Z ORDINATE IN nt  =      -108.72
+ Z BASELINE        =     50409.51
$$$$$$$$$$$10-13-1993$$$$$$$$$$
```

^^^^^^^^^^^^^^^^^^ END OF DIM PRINTOUT FOR SET^^^^^^^^^^^^^^^

Input for SET _____.

The program loops back to the beginning step where the question regarding " NEW DATE " is asked. Next when it is time to input the Mark Up reading input if no more data is to be entered then the following is done.

Input 999,0 TO EXIT WHEN COMPLETE
Input 777,0 TO REDO ONE OF THE COMPUTATIONS

At this stage if you choose the 999,0 then the program loops to the abstract listing of the baselines.

^^^^^^^^^ PROCESSING BASELINE COMPUTATION SECTION ^^^^^^^^^^

WIDE OUTPUT BASELINE COMPUTATION BEGINS

This refers to the output printout which is effectively rotated 90 degrees so as to fit on an 8 1/2 in by 11 inch piece of paper.

THE PROCESSED BASELINE VALUES

SET	DECLINATION	HORIZONTAL	VERTICAL
1	11 35 29.3	21163.03	50398.40
2	11 35 38.1	21166.63	50397.26
3	11 35 53.0	21165.10	50397.89
4	11 35 45.7	21164.81	50398.53
5	11 35 12.9	21164.82	50397.83
6	11 35 11.2	21164.92	50398.81
7	11 35 51.1	21164.66	50398.80
MEAN	11 35 34.5	21164.85	50398.22
STD.DEV.	17.28	1.05	0.58

DO YOU WISH TO REJECT ANY OF THE SETS FROM THE MEAN (Y/[N])

You now may reject any of the data and to do selective means.

ENTER SET NUMBER TO BE REJECTED , [0] IF FINISHED

ENTER ELEMENT TO BE REJECTED, H, D, Z, or [N]one IF FINISHED

IF YOU ARE NOT SATISFIED WITH THE MEAN FOR THE _____ SETS

YOU CAN MEAN CONSECUTIVE SUBSETS OF THE ____ SETS.

DO YOU WISH TO MEAN A SUBSET OF VALUES? (Y/[N])

YOU HAVE __ TOTAL SETS TO BE MEANED

ENTER THE NUMBER OF SETS IN THE SUBMEAN (0 TO TERMINATE)

THERE ARE _____ CONSECUTIVE SETS NOT MEANED

Writing out file _____ to disk for use with SIDEWAYS

After you return to DOS type - - - SIDEWAYS filename

___ TOTAL NUMBER OF SETS PROCESSED

^^^^^^^^^^^^^^^ END OF PROGRAM - ADDITIONAL DATA ? ^^^^^^^^^^^^

DO YOU HAVE ANOTHER VARIATIONS INSTRUMENT TO CALCULATE BASELINES USING THESE ABSOLUTE VALUES ? : [N]?

If SO ENTER THE VARIATIONS INSTRUMENT USED?

Are the ordinate values in (g)ammas or some other (s)ystem:?

Input the scale values for this station ?

INPUT " D , H , AND Z ORDINATES :

INPUT SECTION COMPLETE

DO YOU HAVE MORE TO RUN ? [N]

****************** MONTHLY BASELINE SECTION ********************

Data that is recorded in a normal manner on the observation sheets is entered into the program in sequential order as a result of prompts and then you need to enter the month and year to process.

Enter the MONTH , full YEAR to process ie: 8,1989:

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```
100 CLS
110 '****************************************'
120 '
130 '   DIMCALC.BAS - COMPUTATION OF ABSOLUTES
140 '         VERSION OF 1-27-94
150 '
160 '****************************************'
170 '
180 PRINT:PRINT:PRINT:MAXFILES=20:ON ERROR GOTO 9080
190 JYR$=RIGHT$(DATE$,1):  ' jyr$ = last digit of julian year
200 DIM AB$(100),ACCD(100),ACCH(100),ACCZ(100),ADM$(100),AFIELD(120)
210 DIM BA(100),BB(100),BC(100),BD(100),BE(100),BH(100),BZ(100)
215 DIM BCALD$(100),BCALH$(100),BCALZ$(100)
220 DIM DECANG(100),DM$(25),EDORG(100),EHORG(100),EZORG(100)
225 DIM EDRED(100),EHRED(100),EZRED(100),F1(100),FJD$(100)
230 DIM GA(100),GB(100),GH(100),GZ(100),INCANG(100),JD(120),JD$(120)
235 DIM MDD(100),MDS(100),MDM(100),MHS(100),MZS(100)
240 DIM MO$(12),M$(9),MSET%(100),MD(100),MH(100),MZ(100),MEAND(100)
245 DIM MEANH(100),MEANZ(100)
250 DIM OB$(100),OD$(100),OZ$(100),RJSET%(100),SDEVD(100),SDEVH(100)
255 DIM SDEVZ(100),TSTART(120),TSTOP(120),U(100)
260 CA$=",":FLGFORM$="T":NS%=1:ORDSGN=1:FLGCNVRT = 0:FLGMOBAS=0
270 OBSYFN$ = "OBSY4.DAT" : OBSYTMP$ = "TMP.DAT"
280 AFORM$="& ! & ! ### ! ##.# ! ## ! ###.# ! ##### ! & ! #.### ! #.### ! #.###"
290 PAA$=  " ###  ###" : PAB$="  ######.##! ######.##!"
300 PA$ = PAA$ +"  ##.##!  " + PAB$ : PB$=  PAA$ + " ## ##.#!  " + PAB$
310 PXA$=  " ###  ###  ##.##  ######.##  "
320 PX$ = PXA$ + "######.##" :PY$=  PXA$ + "######.##!"
330 PWA$=  "MEAN  ###  ": PWB$ = "      ######.##  ######.##"
340 PW$ = PWA$ + "##.##" + PWB$ :PC$= PWA$ + "## ##.#" + PWB$
350 XXA$="\ \  \      \####   #### ####.## #.#### ###"
:XXB$="!           \ \    ###.##     \    \"
360 XXC$ = " ##.## ####.## ### ##.##" : XXD$ = " ## ##.# ### ##.# ### ## ##.#"
370 XX$= XXA$ + XXC$  + XXB$ : XXS$=XXA$ + XXD$  + XXB$: XYA$ = " \ \"
380 XYB$ = CHR$(229)+CHR$(61) + "  ##.##    ###.## "
390 XY$=XXA$ + " ##.## ####.## ### ##.##! ## ##.## " + XYA$ + XYB$
400 XYS$=XXA$ +" ## ##.# ### ##.# ### ## ##.#! ## ## ##.#"  + XYA$ + XYB$
410 YXA$="\ \  \      \####   ####  #####.## #.####  #####.## #####.## #####.##!"
420 YX$ = YXA$ + "           \ \  ###.##     \   \" : WY$ = YXA$ + "######.## " + XYB$
430 NOOBSY%=12:FC$="N":FLGBASLN=0:FLGBAS1=0:FLG2=0:FLGSTRTS=0
:INSTTYPE=2:OBSFLAG=0:FLGRW=1
440 EL$(1)="DECLINATION":EL$(2)="HORIZONTAL":EL$(3)="VERTICAL"
450 MG$(1)="NORMAL":MG$(2)="OMIS":MG$(3)="DCP":MG$(4)="REPEAT"
460 ORDV$(1) = "mm":ORDV$(2) = "nt":ORDV$(3) = "nt":ORDV$(4) = "dv"
470 DATA JANUARY,FEBRUARY,MARCH,APRIL,MAY,JUNE,JULY,AUGUST,SEPTEMBER
,OCTOBER,NOVEMBER,DECEMBER
480 FOR I= 1 TO 12 : READ MO$(I):NEXT
490  ' IA= obsy number
500  ' PC= f pier correction
510  ' FC= approximate f field
520  ' NA$= raw dim data file
```

```
530  ' FLGAGON$= flag for obsy east or west of agonic line
540  ' NOOBSY%= number of observatories
550  ' FLGMARK = 1 if mark input error has occurred and second time through
560  ' FLGIN1ST = 1 if through input section more than first time
570  ' FLGINANG = 1 if one of the input angles are wrong
580  ' FLGDATE= 1 if more than first time through and checking for observer
to ask for new date
590  ' FLGFORM$= B for baselines only else T for TOTAL FORM
600  ' FLGINST = 1 FOR ANOTHER VARIATIONS INSTRUMENT
610  ' FLGBASLN = 1 FOR BASELINES
620  ' FLGMOBAS = 1 FOR FIRST TIME THRU MONTHLY BASELINES
630 GOSUB 650:GOTO 660
640 ' open the constants file "OBSY4.DAT" and read in the DIM data
650 CLOSE 2 : FLGRW = 0 : GOSUB 960 : FLGRW = 1 : RETURN
660 B=0:F=7:MX=9:MY=3:N=5
670 SCREEN 0
680 MN$="MAIN MENU":M$(1)="NORMAL RUN OF PROGRAM":M$(2)="MONTHLY BASELINES"
690 M$(3)="MODIFY OBSY4.DAT":M$(4)="WINDOW TO DOS - EXIT TO RETURN TO MENU "
700 M$(5)="END OF DIM PROGRAM - EXIT TO DOS"
710 GOSUB 9150
720 ON S GOSUB 830,740,780,810,820
730 GOTO 710
740 GOSUB 7570:CLS:RETURN :  ' MONTHLY BASELINE SECTION
750 PRINT "BA = BARROW","BD = BOULDER","BS = BAY STLOUIS","CO = COLLEGE"
760 PRINT "DR = DELRIO","FN = FRESNO","FR = FREDERICKSBURG","GU = GUAM"
770 PRINT "HO = HONOLULU","NT = NEWPORT","SI = SITKA    ","SJ = SAN JUAN"
775 PRINT "TU = TUCSON":PRINT "KG = KING GEORGE":RETURN
780 CLS:GOSUB 750:PRINT " ":PRINT " ":INPUT " STATION ID";BB$
:BB$=UCASE$(BB$):PRINT " ":PRINT " "
790 AA$=BB$ : OLDBB$ = BB$ : BBB$ = BB$
800 CLOSE 2 : FLGRW = 0 : GOSUB 960 : GOSUB 1380:CLOSE 2 : FLGRW = 1 : RETURN
810 SHELL:CLS:RETURN
820 SYSTEM
830 CLOSE 2 : GOSUB 650:GOSUB 840:GOSUB 1180:GOSUB 2260:GOSUB 2200:GOTO 2300
840 CLS:LOCATE 3,3:PRINT " ":PRINT " ":PRINT " Turn your
PRINTER ON and set ONLINE":PRINT " "
850 INPUT " Do you have a printer attached to your PC  Y(es) or N(o) ? [Y]";PTR$
855 PTR$=UCASE$(PTR$)
860 IF PTR$= "" THEN PTR$="Y"
870 IF PTR$="Y" THEN 900
880 IF PTR$="F" THEN 930
890 IF PTR$="N" THEN 940 ELSE 850
900 SCREEN 1
910 LOCATE 12,10:PRINT " PRINTER IS OFFLINE" : LPRINT CHR$(30):PRINT " "
:SCREEN 2:SCREEN 0
920 OPEN "LPT1:" FOR OUTPUT AS #1:RETURN
930 OPEN "OPENFILE.OUT" FOR OUTPUT AS #1:RETURN
940 OPEN "SCRN:" FOR OUTPUT AS #1:RETURN
950 ' open "OBSY4.DAT" and write out new pier correction
960 CLOSE 2 : OPEN OBSYFN$ FOR INPUT AS #2
970 IF FLGRW = 1 THEN OPEN OBSYTMP$ FOR OUTPUT AS #3
```

```
980 INPUT #2, DIMHD$
990 IF EOF(2) THEN PRINT " END-OF-FILE REACHED AT BEGINNING OF OBSY4.DAT FILE"
:RETURN
1000 IF FLGRW = 1 THEN WRITE #3, DIMHD$
1010 INPUT #2,DIMNUM
1020 IF FLGRW = 1 THEN WRITE #3,DIMNUM
1030 FOR I=1 TO DIMNUM
1040 INPUT #2,DM$(I),DUM$
1050 IF FLGRW = 1 THEN WRITE #3,DM$(I),DUM$
1060 NEXT I
1070 IF FLGRW = 0 THEN FLGRW = 1 : RETURN
1080 IF EOF(2) GOTO 1170
1090 INPUT #2,AB$,BB$,TA,TB,IA,PC,FC,FLGAGON$,HSV,DSV,ZSV
:IF VAL(DM$(IA)) > 8000 THEN FLGINSTS = 1
1100 ALEN = LEN(BB$) : FOR I = 1 TO ALEN : AVAL = ASC(MID$(BB$,I,1))
1110 IF AVAL < 65 OR AVAL > 90 THEN 1120 ELSE 1130
1120 NEXT I
1130 BB$ = MID$(BB$,I,2)
1140 IF BB$ <> AA$ THEN 1150 ELSE PC=PCNEW:HSV=HSVNEW:DSV=DSVNEW:ZSV=ZSVNEW
1150 PRINT #3, USING AFORM$;AB$;CA$;BB$;CA$;TA;CA$;TB;CA$;IA;CA$;PC;CA$;FC;CA$
;FLGAGON$;CA$;HSV;CA$;DSV;CA$;ZSV
1160 GOTO 1080
1170 CLOSE 2,3 :KILL OBSYFN$:NAME OBSYTMP$ AS OBSYFN$:RETURN
1180 CLS:LOCATE 3,3:PRINT "       DIM COMPUTATIONS":PRINT "   OF
MAGNETIC DECLINATION,"
1190 PRINT "   HORZ AND VERT INTENSITY":PRINT " ":PRINT " ":GOSUB 750
:PRINT " ":PRINT " "
1200 INPUT " STATION ID ";AA$:AA$=UCASE$(AA$):BB$ = AA$ : OLDBB$=BB$:BBB$ = BB$
1210 IF FLGBASLN=1 GOTO 1340 :  ' BASELINES
1220 PRINT " ":PRINT " ":PRINT " Format for the DATE and JULIAN DAY(3 digits)"
1230 PRINT "03/11/90,061":PRINT " ":INPUT "OBSERVED DATE(MM/DD/YY) & JULIAN DAY";OD$(1),JD$(1)
1240 OZ$(1)=OD$(1):GOSUB 8010:JMO=MONTH:ALEN = LEN(OD$(1))
: IF ALEN = 8 THEN 1250 ELSE 1320
1250 AMONTH = VAL(LEFT$(OD$(1),2)):ADAY = VAL(MID$(OD$(1),4,2))
1260 IF AMONTH <> MONTH OR ADAY <> DAY THEN 1270 ELSE 1320
1270 BEEP 3 : BMONTH$ = STR$(MONTH) : ALEN = LEN(BMONTH$)
:IF ALEN = 2 THEN BMONTH$ = "0" + RIGHT$(BMONTH$,1)
ELSE IF ALEN = 3 THEN BMONTH$ = RIGHT$(BMONTH$,2)
1280 BDAY$ = STR$(DAY) : ALEN = LEN(BDAY$) : IF ALEN = 2 THEN BDAY$ = "0"
+ RIGHT$(BDAY$,1) ELSE IF ALEN = 3 THEN BDAY$ = RIGHT$(BDAY$,2)
1290 AJDATE$ = BMONTH$ + "/" + BDAY$ + "/" + RIGHT$(STR$(YEAR),2)
: PRINT " ":PRINT " "
1300 PRINT " INPUT DATE                              ";OD$(1);
:PRINT " possibly in error compared to COMPUTED DATE  ";AJDATE$
1310 PRINT " Derived from JULIAN DAY                 ";JD$(1)
:PRINT " " : PRINT " ":GOTO 1220
1320 SET%=1:FJD$(SET%)=JD$(1):JYR$=RIGHT$(OD$(1),1)
1330 PRINT " ":INPUT " Input Observer INITIALS ";OB$(1):OB$(1)=UCASE$(OB$(1))
1340 PRINT " ":PRINT " Enter the variations INSTRUMENT used "
1350 PRINT USING " [1] &   [2] &   [3] &  [4] &";MG$(1);MG$(2);MG$(3);MG$(4)
1360 PRINT " ":INPUT "NUMBER ? [2]";INSTTYPE:PRINT " "
```

```
:IF INSTTYPE<1 OR INSTTYPE > 4 THEN INSTTYPE=2
1370 ORDVAL = INSTTYPE
1380 'Search thru the Station constants for the correct station
1390 IF EOF(2) THEN GOTO 1640
1400 INPUT #2,AB$,BB$,TA,TB,IA,PC,FC,FLGAGON$,HSV,DSV,ZSV
1410 IF VAL(DM$(IA)) > 8000 THEN FLGINSTS = 1
1420 ALEN = LEN(BB$) : FOR I = 1 TO ALEN : AVAL = ASC(MID$(BB$,I,1))
1430 IF AVAL < 65 OR AVAL > 90 THEN 1440 ELSE 1450
1440 NEXT I
1450 BB$ = MID$(BB$,I,2):IF BB$ = AA$ THEN 1470
1460 GOTO 1390
1470 IF INSTTYPE = 1 AND FLGINST = 1 THEN RETURN
: ' NORMAL MAG AND ADDITIONAL CALCULATION
1480 PRINT " ":PRINT " The F pier correction presently in
OBSY4.DAT is ";USING " ###.#";PC
1490 PRINT " ":INPUT " Do you wish to use this value? [Y]";ANS$
1500 IF ANS$ = "" THEN ANS$ = "Y":GOTO 1550
1510 ANS$=UCASE$(ANS$):IF ANS$ = "Y"  THEN 1550
1520 INPUT " Enter the new Pier correction ";PCNEW:PC=PCNEW
1530 INPUT " Do you wish to make this Pier Correction permanent
in OBSY4.DAT ";ANS$
1540 ANS$=UCASE$(ANS$):IF ANS$ = "" OR ANS$ = "Y" THEN PC=PCNEW:GOSUB 950
1550 IF S <> 3 THEN 1580
1560 GOSUB 1950 :  ' SCALE VALUES SECTION
1570 IF S = 3 THEN RETURN :  ' MODIFY OBSY4.DAT
1580 IF FLGFORM$="B" THEN GOTO 1630 :  ' BASELINES
1590 PRINT " ":INPUT " Please specify the DRIVE (A,B,C,D,OR E)
where the DAT FILE will reside [B]";DRIVE$
1600 DRIVE$ = LEFT$(DRIVE$,1)
1610 IF DRIVE$ = "" THEN DRIVE$ = "B"
1620 DRIVE$=UCASE$(DRIVE$)+":"
1630 NA$=DRIVE$+BB$+JYR$+JD$(SET%)+".DAT":GOSUB 10290:NA$ = LEFT$(NA$,8)
+ SUFFIXI$ : GOSUB 1890:RETURN:  ' CHECK AND APPEND CORRECT SUFFIX
1640 CLOSE #2 : OPEN "OBSY4.DAT" FOR APPEND AS #2
1650 PRINT " ":PRINT " OK. Since ";:PRINT USING "&";AA$;:PRINT " is not a
NORMAL OBSERVATORY input your own constants "
1660 BB$=AA$:INPUT " Please input the STATION LOCATION( ie FREDERICKSBURG)";AB$
1670 PRINT " ":INPUT "True AZ of Mark(D,M)=";TA,TB:TC=(TA+TB/60):PRINT " "
1680 INPUT "F Pier Corr   (nt)  =";PC:PRINT " ":INPUT "Average TOTAL
FIELD =";FC:PRINT " "
1690 INPUT "Enter DIM INSTRUMENT used :";IB$:PRINT " "
1700 FOR I = 1 TO DIMNUM:IF IB$ = DM$(I) THEN 1710 ELSE 1730
1710 IA=I:IF VAL(DM$(IA)) > 8000 THEN FLGINSTS = 1
1720 GOTO 1740
1730 NEXT I
1740 PRINT " "
1750 INPUT "Are you EAST or WEST of the AGONIC LINE :";AL$:AL$=UCASE$(AL$)
1760 INPUT "Are you NORTH or SOUTH of the MAGNETIC EQUATOR :";AM$
:AM$=UCASE$(AM$)
1770 OBSFLAG=1:WRITE #2,AB$,BB$,TA,TB,IA,PC,FC,AL$,1,1,1:CLOSE #2
1780 PRINT " ":INPUT " Please specify the DRIVE (A,B,C,D,E,F,G,H AND I)
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```
where the DAT FILE will reside [B]";DRIVE$
1790 DRIVE$ = LEFT$(DRIVE$,1)
1800 IF DRIVE$ = "" THEN DRIVE$ = "B"
1810 DRIVE$=UCASE$(DRIVE$)+":"
1820 NA$=DRIVE$+BB$+JYR$+JD$(SET%)+".DAT":GOSUB 10290: NA$ = LEFT$(NA$,8)
+ SUFFIXI$ :  ' CHECK AND APPEND CORRECT SUFFIX
1830 IF OBSFLAG=1 THEN GOSUB 1900: RETURN
1840 PRINT " ":PRINT USING " DIM & presently in use at & .";DM$(IA);AB$
1850 INPUT " is this correct : [Y]";CR$:CR$=UCASE$(CR$)
1860 IF CR$="" THEN CR$="Y"
1870 IF CR$="N" THEN GOSUB 2120
1880 RETURN
1890 TC=TA+TB/60:TBS = (TB - FIX(TB))*60!:GOSUB 1830
1900 FACTOR=1:NZ$=MID$(NA$,3,2) :  ' HSV=1:ZSV=1:DSV=1
1910 IF NZ$="CO" OR NZ$="SI" OR NZ$="BA" THEN FACTOR=4:GOTO 1950:' SCALE VALUES
1920 IF INSTTYPE = 1 THEN GOTO 1950
1930 IF INSTTYPE = 4 THEN GOTO 2080
1940 IF OBSFLAG=1 THEN 1950 ELSE 2110
1950 PRINT USING " The SCALE VALUES presently in use at \  \ are ";BB$
1960 PRINT USING " HSV = #.###   DSV = #.###  ZSV = #.### ";HSV
;DSV;ZSV:PRINT " "
1970 INPUT " Do you wish to use these values [Y]es or No ";ANS$
1980 ANS$=UCASE$(ANS$):IF ANS$ = "" OR ANS$ = "Y" THEN 2060
1990 PRINT " ":PRINT  " Input the ";USING "&";MG$(INSTTYPE);
 scale values for this station
2000 PRINT  USING "    H SV(NT/&)   D SV(NT/&)  Z SV(NT/&)"
;ORDV$(ORDVAL);ORDV$(ORDVAL);ORDV$(ORDVAL)
2010 INPUT  "    ";HSVNEW,DSVNEW,ZSVNEW:HSV=HSVNEW:DSV=DSVNEW:ZSV=ZSVNEW
2020 IF INSTTYPE = 2 THEN INPUT " Do you wish to make these values
permanent in OBSY4.DAT  [Y]";ANS$ ELSE 2050
2030 ANS$=UCASE$(ANS$)
2040 IF ANS$ = "" OR ANS$ = "Y" THEN PCNEW=PC:GOSUB 950:GOSUB 640:GOSUB 1380
2050 IF S = 3 THEN RETURN
2060 IF INSTTYPE = 1 THEN FACTOR = 1
2070 GOTO 2110
2080 PRINT " Input the scale value units used on the repeat variation
instrument "
2090 INPUT " MM = [1]  MV = [2]  NT = [3]  DIV = [4] ";ORDVAL
2100 FACTOR=1:GOTO 1950
2110 IF IA => 0 THEN RETURN
2120 PRINT USING " Input the DIM being used at & : ";AA$:INPUT ":";IB$
2130 FOR I = 1 TO DIMNUM:IF IB$ = DM$(I) THEN 2140 ELSE 2160
2140 IA=I:ORGDIM$ = DM$(IA) : IF VAL(DM$(IA)) > 8000 THEN FLGINSTS = 1
2150 RETURN
2160 NEXT I
2170 PRINT " ":PRINT USING " no INST CONSTANTS for inst #### : ";IB$:PRINT " "
2180 INPUT "Input your own CONSTANTS for this inst?:";AD$:AD$=UCASE$(AD$)
2190 DM$(IA)=IB$:GOTO 1860
2200 PRINT " ":INPUT "Do you wish to input data from the (K)eyboard
or (F)ile? [K]";FK$
2210 IF FK$ = "" THEN FK$ = "K":GOTO 2240
```

```
2220 FK$=UCASE$(FK$)
2230 IF FK$ = "K" OR FK$ = "F" THEN 2240 ELSE 2200
2240 IF FK$ = "K" THEN FLGFORM$="T" :  ' KEYBOARD INPUT AND TOTAL FORM OUTPUT
2250 RETURN
2260 PRINT " ":PRINT " Do you wish the OBSERVATION FORMS":PRINT "
printed out or compute BASELINES only ?"
2270 INPUT " (T)otal form or (B)aselines : [T] ";FLGFORM$
:IF FLGFORM$ = "" THEN FLGFORM$="T" :RETURN
2280 FLGFORM$=UCASE$(FLGFORM$):IF FLGFORM$="B" THEN FK$="F"
:  ' BASELINES ONLY AND FILE INPUT
2290 IF FLGFORM$="T" OR FLGFORM$="B" THEN RETURN ELSE GOTO 2260
2300 SET%=1:FLGIN1ST=0:FLGDATE=0:SSET%=SET%:ND$=MID$(NA$,3,6)+".abs"
2310 OPEN ND$ FOR OUTPUT AS #6:IF FLGBASLN=1 THEN RETURN
2320 IF FK$="F" THEN 2350 :  ' FILE INPUT
2330 NC$=NA$:OPEN NA$ FOR APPEND AS #5 :IF FLGBASLN=1 THEN RETURN
2340 IF FK$<>"F" THEN 2390 :  ' KEYBOARD INPUT
2350 OPEN NA$ FOR INPUT AS #3: FLG2=0:INPUT #3,AVAR1$,AVAR2$,AVAR3$,SET%
2360 NS% = SET% : GOSUB 10150
2370 OZ$(SET%)=AVAR1$:JD$(SET%)=AVAR2$:SSET%=SET%:FJD$(SET%)=JD$(SET%)
:OD$(SET%)=OZ$(SET%)
2380 GOTO 2470
2390 INPUT " STARTING SET # :";SSET%:SET%=SSET%:FJD$(SET%)=JD$(SET%)
2400 IF SET% <> 1 THEN FLGSTRTS=1:FLGIN1ST=1:GOSUB 4670
2410 FLG2=1
2420 FC$="N"
2430 IF VAL(DM$(IA)) > 8000 THEN FLGINSTS = 1 : GOTO 2450
2440 PRINT " ":PRINT "Input all angles as PAIRS separated by COMMAS
ie 163,35.2":PRINT " ":GOTO 2470
2450 DM$(IA)=IB$
2460 PRINT " ":PRINT "Input all angles as TRIPLES separated by COMMAS
ie 163,35,12.2":PRINT " "
2470 NS%=SET%
2480 '
2490 '^^^^^^^^^^^^^^^^^^^^^ DIM DATA INPUT SECTION ^^^^^^^^^^^^^^^^^^^^^^^^^^^^
2500 FLGINANG=0:FLGMARK=0
2510 IF FK$ = "K" THEN 2570 ELSE 2520
2520 IF FLG2 = 1 THEN 2550
2530 PRINT " ":PRINT "Working on set ";USING " ### ";SET%;
2540 GOTO 2560
2550 PRINT USING "  ### ";SET%;
2560 IF FK$="F" THEN INPUT #3,M1,M2,M3,M4:GOTO 2680
2570  OB$(SET%) = OB$(1) : ADM$(SET%) = ORGDIM$
2580 IF FLGDATE=1 AND OB$(SET%) <> "AB" THEN PRINT " "
:INPUT " New Date ?[N] ?";AD$ ELSE 2630
2590 IF AD$ = "" THEN AD$ = "N":GOTO 2630
2600 AD$=UCASE$(AD$)
2610 IF AD$="Y" OR AD$="N" THEN 2620 ELSE 2570
2620 PRINT " ":IF AD$="Y" THEN INPUT "DATE & J.D.";OD$(NS%),FJD$(NS%):PRINT " "
2630 IF FLGINSTS = 0 THEN INPUT " MARK UP ";M1,M2 ELSE
INPUT " MARK UP DEG,MIN,SEC  ";M1,M2,M2S
2640 IF FLGMARK = 1 GOTO 2670
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```
2650 IF M1 = 999 GOTO 5580 : ' goto baseline processing section
2660 IF M1 = 777 GOTO 4470
2670 IF FLGINSTS = 0 THEN INPUT " MARK DN ";M3,M4 ELSE
INPUT " MARK DN DEG,MIN,SEC  ";M3,M4,M4S
2680 MU=180-ABS((M1+M2/60)-(M3+M4/60)):IF FLGINST = 1
THEN 3130 ELSE IF FLGFORM$ = "B" THEN 2760 :  ' ADDITIONAL BASELINE CALC
2690 IF ABS(MU) > .833333 THEN 2700 ELSE 2720
2700 IF FLG2 = 1  AND FK$="F" THEN PRINT " Your file is
messed up check it ":SYSTEM
2710 PRINT " ":BEEP 2:PRINT "ONE or BOTH MARK readings
in error":FLGMARK=1:GOTO 2630
2720 IF FLGINANG=1 GOTO 3560
2730 NT%=NS%:FLGINANG=0:IF(FLGIN1ST=0) THEN ML=MU
2740 IF(ABS(ML-MU)>.0167) THEN FLGIN1ST=0
2750 IF FK$<>"F" THEN 2780
2760 INPUT #3,BA(NS%),C1,C2,C3,C4,C5,C6,C7,C8,BB(NS%)
:INPUT #3,BC(NS%),V1,V2,V3,V4,V5,V6,V7,V8,BE(NS%)
2770 GOTO 3130
2780 PRINT " ":PRINT "   DECLINATION ANGLES":PRINT " "
2790 PRINT TAB(10)"All times entered as 4 DIGITS ie 2341  no colons":PRINT " "
2800 INPUT " INPUT START TIME: ";BA(NS%)
2810 IF FLGINANG=1 GOTO 3560
2820 IF FLGINSTS = 0 THEN INPUT " NORTH DOWN ";C1,C2 ELSE
INPUT " NORTH DOWN DEG,MIN,SEC  ";C1,C2,C2S
2830 IF C1 > 360 AND C2 = 0 THEN BEEP:GOTO 2820
2840 IF FLGINANG=1 GOTO 3560
2850 IF FLGINSTS = 0 THEN INPUT " SOUTH DOWN ";C3,C4 ELSE
INPUT " SOUTH DOWN DEG,MIN,SEC  ";C3,C4,C4S
2860 IF C3 > 360 AND C3 = 0 THEN BEEP:GOTO 2850
2870 IF FLGINANG=1 GOTO 3560
2880 IF FLGINSTS = 0 THEN INPUT " SOUTH UP   ";C5,C6 ELSE
INPUT " SOUTH UP   DEG,MIN,SEC  ";C5,C6,C6S
2890 IF C5 > 360 AND C6 = 0 THEN BEEP:GOTO 2880
2900 IF FLGINANG=1 GOTO 3560
2910 IF FLGINSTS = 0 THEN INPUT " NORTH UP   ";C7,C8 ELSE
INPUT " NORTH UP   DEG,MIN,SEC  ";C7,C8,C8S
2920 IF C7 > 360 AND C8 = 0 THEN BEEP:GOTO 2910
2930 IF FLGINANG=1 GOTO 3560
2940 INPUT " INPUT STOP TIME: ";BB(NS%)
2950 IF FLGINANG=1 GOTO 3560
2960 PRINT " ":PRINT " INCLINATION ANGLES":PRINT " "
2970 INPUT " INPUT START TIME: ";BC(NS%)
2980 IF FLGINANG=1 GOTO 3560
2990 IF FLGINSTS = 0 THEN INPUT " EAST  UP   ";V1,V2 ELSE
INPUT " EAST  UP   DEG,MIN,SEC  ";V1,V2,V2S
3000 IF V1 > 360 AND V2 = 0 THEN BEEP:GOTO 2990
3010 IF FLGINANG=1 GOTO 3560
3020 IF FLGINSTS = 0 THEN INPUT " EAST DOWN  ";V3,V4 ELSE
INPUT " EAST DOWN  DEG,MIN,SEC  ";V3,V4,V4S
3030 IF V3 > 360 AND V4 = 0 THEN BEEP:GOTO 3020
3040 IF FLGINANG=1 GOTO 3560
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3050 IF FLGINSTS = 0 THEN INPUT " WEST DOWN  ";V5,V6 ELSE
INPUT " WEST DOWN  DEG,MIN,SEC  ";V5,V6,V6S
3060 IF V5 > 360 AND V6 = 0 THEN BEEP:GOTO 3050
3070 IF FLGINANG=1 GOTO 3560
3080 IF FLGINSTS = 0 THEN INPUT " WEST UP    ";V7,V8 ELSE
INPUT " WEST UP    DEG,MIN,SEC  ";V7,V8,V8S
3090 IF V7 > 360 AND V8 = 0 THEN BEEP:GOTO 3080
3100 IF FLGINANG=1 GOTO 3560
3110 INPUT " INPUT STOP TIME: ";BE(NS%):PRINT " "
3120 IF FLGINANG=1 GOTO 3560
3130 IF ABS(ABS(C1-C3) - 180) > 3 OR ABS(ABS(C7-C5) - 180) > 3 THEN FLGDANG = 1
3140 IF ABS(ABS(V1-V3) - 180) > 3 OR ABS(ABS(V7-V5) - 180) > 3 THEN FLGIANG = 1
3150 IF FLGDANG = 1 OR FLGIANG = 1 THEN 3260
3160 IF FLGINSTS = 1 THEN GOSUB 10340
3170 GOSUB 5190
3180 IF C1>=360 THEN C1=C1-360
3190 IF C3>=360 THEN C3=C3-360
3200 IF C5>=360 THEN C5=C5-360
3210 IF C7>=360 THEN C7=C7-360
3220 IF(FLGIN1ST=0) THEN CM=CL:VM=VL
3230 IF FLGINST = 1 OR FLGFORM$="B" THEN GOTO 3610:' ADDITIONAL BASELINE CALC
3240 '^^^^^^^^^^^^^^^^^^^^^^^^ DIM PRINTOUT SECTION^^^^^^^^^^^^^^^^^^^^^^^^^^^^
3250 IF FK$="F" THEN GOTO 3610 :  ' FILE INPUT
3260 CC=ABS((C1+C2/60)-(C7+C8/60)):CD=FIX(CC):CE=(CC-CD)*60
:CZ=ABS((C3+C4/60)-(C5+C6/60))
3270 CX=FIX(CZ):CY=(CZ-CX)*60:CL=ABS(CC-CZ):VC=ABS((V1+V2/60)-(V3+V4/60))
:VD=FIX(VC)
:VE=(VC-VD)*60
3280 VZ=ABS((V5+V6/60)-(V7+V8/60)):VX=FIX(VZ):VY=(VZ-VX)*60:VL=ABS(VC-VZ)
3290 IF FLGINSTS = 1 THEN GOSUB 9510 ELSE GOSUB 9370
3300 IF FLGDANG = 1 THEN BEEP 2 :PRINT " ":PRINT " Please
recheck: one of your Declination angles exceeds 3 degrees":PRINT " "
3310 IF FLGIANG = 1 THEN BEEP 2 :PRINT " ":PRINT " Please
recheck: one of your Inclination angles exceeds 3 degrees":PRINT " "
3320 FLGIANG = 0 : FLGDANG = 0
3330 INPUT "Input section complete.Satisfied with the values? Y OR N : [Y] ";GO$
3340 IF GO$ = "" THEN GO$ = "Y":GOTO 3610
3350 GO$=UCASE$(GO$):IF GO$ = "Y" GOTO 3610
3360 BEEP 4 : PRINT " ":PRINT " Which TIME or ANGLE was input wrong?"
3365 PRINT " MARK ANGLES = MK, TIMES=T1,T2,T3,T4"
3367 PRINT " HORZ ANGLES = ND,SD,SU,NU,VERT ANGLES = EU,ED,WD,WU : "
3370 INPUT AC$
3380 IF LEFT$(AC$,1)="t" THEN AC$ = "T" + RIGHT$(AC$,1):GOTO 3410
3390 IF LEFT$(AC$,1)="T" THEN 3410
3400 AC$=UCASE$(AC$)
3410 FLGINANG=1
3420 IF AC$ = "MK" GOTO 2630
3430 IF AC$ = "T1" GOTO 2800
3440 IF AC$ = "ND" GOTO 2820
3450 IF AC$ = "SD" GOTO 2850
3460 IF AC$ = "SU" GOTO 2880
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3470 IF AC$ = "NU" GOTO 2910
3480 IF AC$ = "T2" GOTO 2940
3490 IF AC$ = "T3" GOTO 2970
3500 IF AC$ = "EU" GOTO 2990
3510 IF AC$ = "ED" GOTO 3020
3520 IF AC$ = "WD" GOTO 3050
3530 IF AC$ = "WU" GOTO 3080
3540 IF AC$ = "T4" GOTO 3110
3550 PRINT "????":BEEP 4  :PRINT " Answer ";AC$;"was not correct.
 It must be one of the two letter combinations."
3560 PRINT "Do you still want to change one of the ANGLES"
:INPUT " Y or N or E to EXIT : ";AC$:AC$=UCASE$(AC$) : IF AC$ = "Y" GOTO 3360
3570 IF AC$="E" THEN STOP
3580 GOSUB 5190
3590 IF FLGINSTS = 0 THEN GOSUB 9370 ELSE GOSUB 9510
3600 IF FK$ = "K" THEN 3130
3610 DECANG(SET%)=((CX+CY/60)-(CD+CE/60))*60
:INCANG(SET%)=((VD+VE/60)-(VX+VY/60))*60
3620 IF FLGINST=1  THEN GOTO 3830 :  ' ADDITIONAL BASELINE CALC
3630 IF FK$<>"F" THEN 3650
3640 INPUT #3,TF,EDORG(NS%),EHORG(NS%),EZORG(NS%):GOTO 3830
3650 IF AA$ = "GU" THEN 3660 ELSE 3680
3660 PRINT " ":INPUT " Original listed TOTAL FIELD
before -4096 will be added     ";TF
3670 TF = TF - 4096: GOTO 3690
3680 PRINT " ":INPUT " TOTAL FIELD     ";TF
3690 IF(ABS(TF-FC) < 1000) THEN 3760
3700 BEEP 2:PRINT USING " TOTAL FIELD possibly in error.
Input value was  ######.# which should be approximately ######";TF;FC
3710 PRINT " ":INPUT " ***  is this value correct ? [N] ";OK$
3720 IF OK$ = "" THEN OK$ = "N"
3730 OK$=UCASE$(OK$)
3740 IF OK$ = "Y" THEN GOTO 3760 ELSE GOTO 3750
3750 IF AA$ = "GU" THEN GOTO 3660 ELSE GOTO 3680
3760 PRINT " ":INPUT " Input the D,H,Z ordinates separated
by commas : ";EDORG(NS%),EHORG(NS%),EZORG(NS%)
3770 IF EDORG(NS%) <> 0 AND EHORG(NS%) = 0 AND EZORG(NS%) = 0
THEN BEEP 3 :GOTO 3780 ELSE 3790
3780 PRINT " ":INPUT " Did you input the ORDINATES correctly
separated by commas ";DUM1$:IF DUM1$ <> "y" OR DUM1$ <> "Y" THEN 3760
3790 PRINT " ":INPUT " Are you satisfied with the PROTON and
ORDINATE values ? ( [Y] / N )";OK$
3800 IF OK$ = "" THEN 3830
3810 OK$=UCASE$(OK$)
3820 IF OK$ = "N" THEN 3680
3830 IF FLGAGON$ = "E" AND INSTTYPE = 1 THEN ORDSGN = -1
3840 GOSUB 5310:  ' CALCULATE D ANGLE INFO
3850 IF FLGAGON$="E" OR MW > 0 THEN SG$=" W" ELSE SG$=" E"
3860 IF FLGINST = 1 THEN 3880 :  ' ADDITIONAL BASELINE CALC
3870 IF FLGFORM$="B" THEN GOTO 4160
3880 PRINT #1," ":GOSUB 7540
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3890 PRINT #1, USING "DSV=#.####  HSV=#.####  ZSV=#.####";DSV;HSV;ZSV
3900 '^^^^^^^^^^^^^^^^^ DIM PRINTOUT OF COMPUTATIONS^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
3910 PRINT #1, STRING$(33,43):PRINT #1, "+"
3920 IF FLGINSTS = 0 THEN GOSUB 9930 ELSE GOSUB 10040
3930 PRINT #1, "+":PRINT #1, STRING$(20,43)
3940 PRINT #1, "+ INCLINATION     = ";USING "###  ##  ##.#";W3;W5;W6
3950 PRINT #1, STRING$(19,43)
3960 PRINT #1, "+ F MEAN          =  ";USING " ######.##";TF
3970 PRINT #1, "+ F PIER CORR.    =  ";USING " ######.##";PC
3980 PRINT #1, "+ CORR.TOTAL FIELD =  ";USING " ######.##";FM
3990 PRINT #1, STRING$(19,43):PRINT #1, "+"
4000 PRINT #1, "+ HORIZONTAL FIELD =  ";USING " ######.##";H1
4010 IF NZ$="CO" OR NZ$="SI" OR NZ$="BA" THEN 4020 ELSE 4040
4020 IF ORDVAL = 2 THEN 4030 ELSE 4040
4030 PRINT #1, "+ H ORD IN ";USING "\ V4   =     ";ORDV$(ORDVAL)
;USING "#####.##";EHORG(NS%):GOTO 4050
4040 PRINT #1, "+ H ORD IN ";USING "\ \    =     ";ORDV$(ORDVAL)
;USING "#####.##";EHORG(NS%)
4050 PRINT #1, "+ H ORDINATE IN nt =     ";USING "#####.##";EHRED(NS%)
4060 PRINT #1, "+ H BASELINE      =    ";USING "######.##";EQ
4070 PRINT #1, STRING$(20,43):PRINT #1, "+"
4080 PRINT #1, "+ VERTICAL FIELD   =  ";USING " ######.##";Z1
4090 IF NZ$="CO" OR NZ$="SI" OR NZ$="BA" THEN 4100 ELSE 4120
4100 IF ORDVAL = 2 THEN 4110 ELSE 4120
4110 PRINT #1, "+ Z ORD IN ";USING "\ V4   =     ";ORDV$(ORDVAL)
;USING "#####.##";EZORG(NS%):GOTO 4130
4120 PRINT #1, "+ Z ORD IN ";USING "\ \    =     #####.##"
;ORDV$(ORDVAL);EZORG(NS%)
4130 PRINT #1, "+ Z ORDINATE IN nt =     ";USING "#####.##";EZRED(NS%)
4140 PRINT #1, "+ Z BASELINE      =    ";USING "######.##";ER
4150 PRINT #1,STRING$(12,36);DATE$;STRING$(11,36):PRINT #1,CHR$(12)
4160 GA(NS%)=MD:GH(NS%)=H1:GZ(NS%)=Z1:RR%=MD*600:RQ=H1*10:RP=Z1*10
4170 PRINT #6, USING "\ \ #### #### # ###### ######";FJD$(NS%)
;BA(NS%);BB(NS%);2;RR%;EP*600
4180 PRINT #6, USING "\ \ #### #### # ###### ######";FJD$(NS%)
;BC(NS%);BE(NS%);1;RQ;EQ*10
4190 PRINT #6, USING "\ \ #### #### # ###### ######";FJD$(NS%)
;BC(NS%);BE(NS%);3;RP;ER*10
4200 IF FLGINST = 1 THEN 5080 :  ' ADDITIONAL BASELINE CALC
4210 IF FK$="K" AND FC$="R" THEN 4630 ELSE 4220 :  ' KEYBOARD
INPUT AND A RECALCULATION
4220 IF FK$="K" AND FC$<>"R" THEN 4230 ELSE 4240
4230 PRINT " ":PRINT " Writing out data to ";NA$;" file for
set number ";SET%: PRINT " ":GOSUB 10440: GOTO 4250
4240 IF FK$="F" AND FC$="R" THEN 4630 :  ' FILE INPUT AND RECALCULATION
4250 SET%=SET%+1:NT%=NS%:FLGIN1ST=1:FLGDATE=1:ML=MU:NS%=NS%+1
:FJD$(NS%)=FJD$(NS%-1):OD$(NS%)=OD$(NS%-1)
4260 IF FK$<>"F" THEN GOTO 4380
4270 IF EOF(3) AND FLGBAS1=1 THEN CLOSE 3 : GOTO 7780
:' INPUT DATA FROM ANOTHER FILE
4280 IF EOF(3) AND FLGFORM$="T" THEN SET%=SET%-1:GOTO 4470
```

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: ' RECALCUATION SECTION
4290 IF EOF(3) THEN SET%=SET%-1:GOTO 4470 :  ' RECALCULATION SECTION
4300 INPUT #3,AVAR1$,AVAR2$,AVAR3$,SET%
4310 OD$(NS%)=AVAR1$:FJD$(NS%)=AVAR2$
4320 GOSUB 10150
4330 IF FLGBAS1=1 THEN SET%=NS%
4340 IF FLGFORM$="B" THEN 4360
4350 DELAY 6
4360 FLG2=1:FLGCNVRT = 0 : GOTO 2500
4370 '^^^^^^^^^^^^^^^^^^^^ END OF DIM PRINTOUT FOR SET^^^^^^^^^^^^^^^^^^^^^^^^
4380 IF FLGINSTS = 1 THEN 4390 ELSE 4400
4390 PRINT " ":PRINT " 999,0,0  when complete to exit "
:PRINT " 777,0,0  to redo one of the computations": GOTO 4410
4400 PRINT " ":PRINT " 999,0 when complete to exit "
:PRINT " 777,0 to redo one of the computations"
4410 PRINT " ":PRINT " Input for set # ";SET%:PRINT " ":GOTO 2500
4420 PRINT #1,TAB(8);"DIM COMPUTATIONS":PRINT #1, "
OF MAGNETIC DECLINATION,"
4430 PRINT #1, "     HORZ AND VERT INTENSITY":PRINT #1, "
STATION NAME : ";AB$
4440 PRINT #1, USING " OBSERVED DATE : \      \";OD$(NS%);
:PRINT #1, USING "  JD= \ \";FJD$(NS%)
4450 PRINT #1,       "      OBSERVER  : ";LEFT$(OB$(NS%),3)
:PRINT #1, USING "         DIM   \      \ ";ADM$(NS%)
4460 PRINT #1, USING "  MAGNETOGRAPH  : \      \ ";MG$(INSTTYPE):RETURN
4470 '^^^^^^^^^^^^^^^^^^^^ RECALCULATION SECTION ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
4480 CSET%=SET%:PRINT " ":PRINT " ":INPUT "Enter the set
number to recalculate (0 if none):";SET%
4490 NS%=1:IF SET%=0 THEN 4500 ELSE 4510: '   GOTO BASELINE COMPUTING SECTION
4500 SET%=CSET%+1:NS%=SET%:GOTO 5580
4510 FK$="K":FC$="R":FLGMARK=1:CSET%=SET%:GOTO 4540: ' GOTO THE
READ AND WRITE SECTION
4520 FLGDATE=1:GOTO 2500
4530 '^^^^^^^^^^^^^^^^^^^^ READ AND WRITE DATA TO DISK^^^^^^^^^^^^^^^^^^^^^^^^^^
4540 CLOSE #3,#4 : NB$=DRIVE$+"test.tmp":OPEN NA$ FOR INPUT AS #4
: OPEN NB$ FOR OUTPUT AS #5
4550 PRINT " ":PRINT " READING AND WRITING DISC FILES":PRINT " "
4560 IF EOF(4) THEN GOTO 4650
4570 INPUT #4,OD$(NS%),FJD$(NS%),AVAR3$,SET%:INPUT #4,M1,M2,M3,M4
4580 GOSUB 10150
4590 INPUT #4,BA(NS%),C1,C2,C3,C4,C5,C6,C7,C8,BB(NS%)
:INPUT #4,BC(NS%),V1,V2,V3,V4,V5,V6,V7,V8,BE(NS%)
4600 INPUT #4,TF,DUM1,DUM2,DUM3:IF AD$ = "Y" THEN 4630
4610 EDORG(SET%)=DUM1:EHORG(SET%)=DUM2:EZORG(SET%)=DUM3
4620 IF SET%=CSET% THEN GOTO 3250
4630 GOSUB 10440
4640 NS% = SET% + 1:GOTO 4560
4650 CLOSE #2,#3,#4 :IF AD$ = "Y" THEN SET% = SET% + 1 : RETURN
4660 KILL NA$:NAME NB$ AS NA$: GOTO 4470
4670 PRINT " ":PRINT " READING DISC FILES":PRINT " "
4680 CLOSE #4 : OPEN NA$ FOR INPUT AS #4 : FLGIN1ST=0:NS%=SET%
```

```
4690 IF EOF(4) THEN 4770
4700 INPUT #4,OD$(NS%),FJD$(NS%),AVAR3$,SET%:INPUT #4,M1,M2,M3,M4
4710 OD$(NS%+1)=OD$(NS%):FJD$(NS%+1)=FJD$(NS%)
4720 PRINT " ":PRINT " Working . . on set ";USING "### ";SET%
:NS%=SET%:IF FLGSTRTS=1 THEN 4740
4730 IF FLGIN1ST=0 THEN SSET%=SET%
4740 FLGIN1ST=1:INPUT #4,BA(NS%),C1,C2,C3,C4,C5,C6,C7,C8,BB(NS%)
4750 INPUT #4,BC(NS%),V1,V2,V3,V4,V5,V6,V7,V8,BE(NS%)
:INPUT #4,TF,EDORG(SET%),EHORG(SET%),EZORG(SET%)
4760 GOSUB 5190:GOSUB 5310:GA(NS%)=MD:GH(NS%)=H1:GZ(NS%)=Z1
4770 IF FLGSTRTS<>1 THEN 4810
4780 IF FLGSTRTS = 1 AND SET% = SSET% -1 THEN NS%=NS%+1:GOTO 4800
4790 GOTO 4690
4800 CLOSE #4 : OPEN NA$ FOR APPEND AS #4 : SET%=SET%+1:RETURN
4810 GOSUB 5570
4820 '
4830 '^^^^^^^^^^^^^^^ END OF PROGRAM - ADDITIONAL DATA ? ^^^^^^^^^^^^^^^^^^^^^^^^^^^^
4840 BEEP 3 :PRINT " Do you have another variations"
:PRINT " instrument to calculate baselines for "
4850 INPUT " using these Absolute Values ? : [N] ";AD$
:IF AD$ = "Y" OR AD$ = "y" THEN 4860 ELSE 5120
4860 FLGINST=1 :PRINT " Enter the VARIATIONS INSTRUMENT used "
4870 PRINT USING " [1] \   \  [2] \   \  [3] \   \  [4] \    \"
;MG$(1);MG$(2);MG$(3);MG$(4)
4880 INPUT "NUMBER ";INSTTYPE:ORDVAL=INSTTYPE:IF INSTTYPE > 0 AND
INSTTYPE < 5 THEN 4890 ELSE 4860
4890 GOSUB 10290: NA$ = LEFT$(NA$,8) + SUFFIXI$ : PRINT " "
:CLOSE #4 : OPEN NA$ FOR APPEND AS #4
4900 IF INSTTYPE = 2 OR INSTTYPE = 3 THEN 4970 ELSE 4940
4910 PRINT " ":INPUT " Are the ordinate values in (g)ammas
or some other (s)ystem:";AD$
4920 SD=1!:SH=1!:SZ=1!
4930 IF AD$="G" OR AD$="g" THEN 4970 ELSE 4940
4940 PRINT " ":PRINT  " Input the ";USING "&";MG$(INSTTYPE)
;" scale values for this station"
4950 PRINT  USING "    H SV(NT\ \)   D SV(NT\ \)  Z SV(NT\ \)"
;ORDV$(ORDVAL);ORDV$(ORDVAL);ORDV$(ORDVAL)
4960 INPUT  "    ";SH,SD,SZ:DSV=SD:HSV=SH:ZSV=SZ
4970 SET%=SSET%:NS%=NT%: IF INSTTYPE = 1 THEN FACTOR = 1
4980 CLOSE #3,#4 : NB$ = LEFT$(NA$,8)+ ".DAT":OPEN NB$ FOR INPUT
AS #4 : OPEN NA$ FOR OUTPUT AS #3
4990 FOR I= 1 TO NT%:PRINT " FOR SET # ";SET%:NS% = I
5000 INPUT " D , H , AND Z ORDINATES :";EDORG(I),EHORG(I),EZORG(I)
5010 INPUT #4,OD$(NS%),FJD$(NS%),AVAR3$,SET%:INPUT #4,M1,M2,M3,M4
5020 GOSUB 10150
5030 INPUT #4,BA(NS%),C1,C2,C3,C4,C5,C6,C7,C8,BB(NS%)
:INPUT #4,BC(NS%),V1,V2,V3,V4,V5,V6,V7,V8,BE(NS%)
5040 INPUT #4,TF,DUM1,DUM2,DUM3
5050 GOSUB 10440
5060 GOTO 2680
5070 DELAY 3
```

```
5080 SET%=SET%+1:NEXT I
5090 NT% = NS%:NS% = 1:GOSUB 5580
5100  ' reinitializing the mean variables
5110 MD(1)=0:MH(1)=0:MZ(1)=0:PRINT " ":PRINT " Input section complete "
:PRINT " ":GOTO 5580
5120 CLOSE
5130 FLGINST=0:GOSUB 8450:PRINT " ":INPUT " Do you have more to run ? [N] ";AC$
5140 IF AC$ = "" THEN AC$ = "N":GOTO 5180
5150 AC$=UCASE$(AC$):IF AC$="Y" THEN CLOSE #1,#2,#3,#6 : FLGBAS1=0:GOTO 5170
5160 GOTO 5180
5170 CLEAR:SET%=1:STSTART1=0:STSTART2=0:STSTOP1=0:STSTOP2=0
:SFIELD1=0:SFIELD2=0:SFIELD3=0:GOTO 180
5180 SYSTEM
5190 CC=ABS((C1+C2/60)-(C7+C8/60)):IF CC>3! THEN 5200 ELSE GOTO 5220
5200 IF C1 < C7 THEN C1=C1+360 ELSE C7=C7+360
5210 GOTO 5190
5220 IF CC >= 360 THEN CC=CC-360
5230 CD=FIX(CC):CE=(CC-CD)*60
5240 CZ=ABS((C3+C4/60)-(C5+C6/60))
5250 IF CZ>3!  THEN 5260 ELSE GOTO 5280
5260 IF C3 < C5 THEN C3=C3+360 ELSE C5=C5+360
5270 GOTO 5240
5280 IF CZ >= 360 THEN CZ=CZ-360
5290 CX=FIX(CZ):CY=(CZ-CX)*60:CL=ABS(CC-CZ):VC=ABS((V1+V2/60)-(V3+V4/60))
:VD=FIX(VC):VE=(VC-VD)*60
5300 VZ=ABS((V5+V6/60)-(V7+V8/60)):VX=FIX(VZ):VY=(VZ-VX)*60:VL=ABS(VC-VZ)
: RETURN
5310 MS=(((M1+M2/60)+(M3+M4/60))/2):MS=MS+90
5320 D1=C1+C2/60:D2=C3+C4/60:D3=C5+C6/60:D4=C7+C8/60:D5=(D1+D2+D3+D4)/4
5330 IF C1 = 0 OR C7 = 0 AND C1 <> C7 THEN D5 = D5 + 90: GOTO 5350
5340 IF C3 = 0 OR C5 = 0 AND C3 <> C5 THEN D5 = D5 + 90
5350 IF D5>180 THEN D5=D5-180
5360 M5=(MS-FIX(MS))*60:M6=FIX(MS):D6=FIX(D5):D7=(D5-D6)*60
5370 D7S = (D7 - FIX(D7))*60!:M5S = (M5 - FIX(M5))*60!
5380 E1=MS-D5:E2=FIX(E1):E3=ABS((E1-E2)*60):E3S = (E3 - FIX(E3))*60!
5390 MD=E1-TC
5400 IF MD > 90 THEN 5410 ELSE 5420
5410 MD=MD-180:GOTO 5400
5420 IF MD < -90 THEN 5430 ELSE 5440
5430 MD=MD+180:GOTO 5420
5440 MW=MD:MD= ABS(MD):N1=FIX(MD):N2=(MD-N1)*60
:W1=(V5+V6/60)+(V7+V8/60)-(V1+V2/60)-(V3+V4/60)
5450 N2S = (N2 - FIX(N2))*60!:W2=(W1+360)/4:W3=FIX(W2)
:W4=(W2-W3)*60:W5=FIX(W4):W6=(W4-W5)*60
5460 FM=TF+PC:H1=FM*COS(W2*1.745329E-02):Z1=FM*SIN(W2*1.745329E-02)
5470 IF NZ$="CO" OR NZ$="SI" OR NZ$="BA" THEN 5490 ELSE 5480
5480 IF INSTTYPE = 2 OR INSTTYPE = 3 THEN DSV=3438/H1
5490 EO= (EDORG(NS%)*FACTOR*DSV)/60
5500 EDRED(NS%)=ORDSGN*EDORG(NS%)*FACTOR*DSV:EHRED(NS%)=EHORG(NS%)*FACTOR*HSV
:EZRED(NS%)=EZORG(NS%)*FACTOR*ZSV
5510 EDREDS = (EDRED(NS%) - FIX(EDRED(NS%)))*60!
```

```
5520 EP=MD-EO: IF FLGAGON$="E" AND INSTTYPE = 2 THEN EO=-EO:EP=MD-EO
5530 B1=FIX(EP):B2=(EP-B1)*60:EQ=H1-EHRED(NS%):ER=Z1-EZRED(NS%)
5540 B2S = (B2 - FIX(B2))*60!
5550 GA(NS%)=MD:GH(NS%)=H1:GZ(NS%)=Z1:RETURN
5560 '
5570 '^^^^^^^^^^^^ PROCESSING BASELINE COMPUTATION SECTION ^^^^^^^^^^^^^^^^^^
5580 CLOSE #2
5590 ERASE MD,MH,MZ,MDD,MDS,MDM,MHS,MZS
5600 ERASE MEAND,MEANH,MEANZ,SDEVD,SDEVH,SDEVZ
5610 SUMD=0:SUMH=0:SUMZ=0:SUMBD=0:SUMBH=0:SUMBZ=0:INDEX=0:INDEXD=0:INDEXH=0
:INDEXZ=0
5620 GOSUB 10290 : NE$=MID$(NA$,3,6)+SUFFIXO$
5630 OPEN NE$ FOR OUTPUT AS #2:BR$="R": BQ$=" "
5640 PRINT " ":PRINT " WIDE OUTPUT BASELINE COMPUTATION BEGINS ":PRINT " "
5650 CLS:ISTRT = 1 : IEND = SET% - 1:SET1% = 1:SET2% = SET% - 1:JJ = 1
:GOSUB 5660:GOTO 6110
5660 LOCATE 1,10:PRINT "    THE PROCESSED BASELINE VALUES ":PRINT " "
5670 PRINT TAB(10)" SET DECLINATION  HORIZONTAL   VERTICAL":PRINT " "
5680 ISTRT = SET1%:IEND = SET2%:SUMD=0:SUMH=0:SUMZ=0:SUMBD=0:SUMBH=0:SUMBZ=0
5690 INDEXA=0:INDEXD = 0:INDEXH = 0:INDEXZ = 0
5700 IF IEND < 2 THEN PRINT " Only one set processed - terminating baselines "
:GOTO 4840
5710 FOR LJ = ISTRT TO IEND:INDEXA=INDEXA+1
5720 EO=EDRED(LJ): IF FLGAGON$="E" AND INSTTYPE = 2 THEN EO=-EO
5730 BD(LJ)=GA(LJ)-(EO/60):B1=FIX(GA(LJ)):B2=(GA(LJ)-B1)*60:B3=FIX(BD(LJ))
:B4=(BD(LJ)-B3)*60
5740 BH(LJ)=GH(LJ)-EHRED(LJ):BZ(LJ)=GZ(LJ)-EZRED(LJ)
5750 IF ACCD(LJ) = 1 THEN BBD$ = BR$ ELSE INDEXD = INDEXD + 1
: SUMD = SUMD + BD(LJ) : BBD$ = BQ$
5760 IF ACCH(LJ) = 1 THEN BBH$ = BR$ ELSE INDEXH = INDEXH + 1
: SUMH = SUMH + BH(LJ) : BBH$ = BQ$
5770 IF ACCZ(LJ) = 1 THEN BBZ$ = BR$ ELSE INDEXZ = INDEXZ + 1
: SUMZ = SUMZ + BZ(LJ) : BBZ$ = BQ$
5780 IF FLGINSTS = 0 THEN 5790 ELSE 5800
5790 PRINT TAB(10)USING PA$;LJ;B3;B4;BBD$;BH(LJ);BBH$;BZ(LJ);BBZ$:GOTO 5810
5800 B4S = (B4 - FIX(B4))*60! : PRINT TAB(10)USING PB$;LJ;B3;FIX(B4);B4S
;BBD$;BH(LJ);BBH$;BZ(LJ);BBZ$
5810 NEXT LJ
5820 IF INDEXD <> 0 THEN MEAND(JJ)=SUMD/(INDEXD)
5830 IF INDEXH <> 0 THEN MEANH(JJ)=SUMH/(INDEXH)
5840 IF INDEXZ <> 0 THEN MEANZ(JJ)=SUMZ/(INDEXZ)
5850 B3=FIX(MEAND(JJ)):B4=(MEAND(JJ)-B3)*60
5860 IF FLGINSTS = 0 THEN 5870 ELSE 5880
5870 PRINT " ":PRINT TAB(10)USING PW$;B3;B4;MEANH(JJ);MEANZ(JJ)
:INDEX=0:GOTO 5890
5880 B4S = (B4 - FIX(B4))*60! : PRINT " ":PRINT TAB(10)USING
PC$;B3;FIX(B4);B4S;MEANH(JJ);MEANZ(JJ):INDEX=0
5890 INDEXD = 0:INDEXH = 0:INDEXZ = 0
5900 FOR LJ = ISTRT TO IEND
5910 IF RJSET%(LJ) = 1 THEN 5920 ELSE 5960
5920 IF ACCD(LJ) = 0 THEN SUMBD=SUMBD + (MEAND(JJ)-BD(LJ))^2
```

```
:INDEXD = INDEXD + 1
5930 IF ACCH(LJ) = 0 THEN SUMBH=SUMBH + (MEANH(JJ)-BH(LJ))^2
:INDEXH = INDEXH + 1
5940 IF ACCZ(LJ) = 0 THEN SUMBZ=SUMBZ + (MEANZ(JJ)-BZ(LJ))^2
:INDEXZ = INDEXZ + 1
5950 GOTO 5980
5960 SUMBD=SUMBD + (MEAND(JJ)-BD(LJ))^2:SUMBH=SUMBH + (MEANH(JJ)-BH(LJ))^2
:SUMBZ=SUMBZ + (MEANZ(JJ)-BZ(LJ))^2
5970 INDEXD = INDEXD + 1:INDEXH = INDEXH + 1: INDEXZ = INDEXZ + 1
5980 INDEX = INDEX + 1
5990 NEXT LJ
6000 IF (INDEXD-2) < 1 THEN SDEVD(JJ) = 0 : GOTO 6020
6010 SDEVD(JJ)=60*SQR(ABS(SUMBD/(INDEXD-1)))
6020 IF (INDEXH-2) < 1 THEN SDEVH(JJ) = 0 : GOTO 6040
6030 SDEVH(JJ)=SQR(ABS(SUMBH/(INDEXH-1)))
6040 IF (INDEXZ-2) < 1 THEN SDEVZ(JJ) = 0 : GOTO 6060
6050 SDEVZ(JJ)=SQR(ABS(SUMBZ/(INDEXZ-1)))
6060 IF FLGINSTS = 1 THEN 6070 ELSE 6080
6070 SDEVD(JJ) = SDEVD(JJ)*60!:PRINT TAB(10);:PRINT "STD.DEV.    ";
:PRINT USING " ##.##     ###.##     ###.##";SDEVD(JJ);SDEVH(JJ);SDEVZ(JJ)
: GOTO 6090
6080 PRINT TAB(10);:PRINT "STD.DEV.   ";
:PRINT USING "##.##     ###.##     ###.##";SDEVD(JJ);SDEVH(JJ);SDEVZ(JJ)
6090 PRINT " ":IF INDEX > 13 THEN INPUT " hit 'ENTER' to continue' ";DUM$
6100 RETURN
6110 JL=1: LST% = SET% - 1:PRINT " ":PRINT " "
6120 INPUT "Do you wish to REJECT any of the sets from the mean ( Y/[N] ) ";ANS$
6130 ANS$=UCASE$(ANS$):ANS1$=ANS$:IF ANS$ <> "Y" THEN 6300
6140 I=1
6150 PRINT SPACE$(74):INPUT " Enter SET NUMBER to be rejected
, [0] if finished ";I
6160 RJSET%(I) = 1
6170 IF I = 0 THEN 6270
6180 LEL = 1
6190 PRINT SPACE$(72):INPUT " Enter ELEMENT to be rejected, H, D, Z,
or [N]one IF FINISHED ";ELMT$
6200 ELMT$=UCASE$(ELMT$)
6210 IF ELMT$ = "N" THEN 6150
6220 IF ELMT$ = "H" THEN ACCH(I) = 1:GOTO 6250
6230 IF ELMT$ = "D" THEN ACCD(I) = 1:GOTO 6250
6240 IF ELMT$ = "Z" THEN ACCZ(I) = 1
6250 IF LEL < 3 THEN LEL = LEL + 1:GOTO 6190
6260 I = I + 1 : GOTO 6150
6270 CLS:INDEX = 0:GOSUB 5660:PRINT " "
6280 PRINT " If you are not satisfied with the MEAN for the ";INDEX;" sets"
6290 PRINT " you can MEAN consecutive subsets of the ";INDEX;" sets."
6300 INPUT " Do you wish to MEAN A SUBSET of values? ( Y/[N] ) ";ANS$
6310 ANS$=UCASE$(ANS$):ANS2$=ANS$
6320 IF ANS$ <> "Y" THEN MSET%(1) = INDEX:GOTO 6420
6330 I=1:LST%=INDEX:SLFT%=INDEX
6340 PRINT " ":PRINT USING " You have ## Total Sets to be meaned";INDEX
```

```
:PRINT " "
6350 PRINT SPACE$(79):INPUT " Enter the number of SETS in the
SUBMEAN (0 to terminate)";MSET%(I)
6360 IF MSET%(I) < 2 THEN 6380
6370 ICOUNT = ICOUNT + 1
6380 IF MSET%(I) = 0 THEN 6420
6390 SLFT%=SLFT%-MSET%(I):PRINT " ":PRINT " There are ";SLFT%
;" consecutive sets not meaned"
6400 IF SLFT% = 0 THEN  6420
6410 I=I+1:GOTO 6350
6420 LST%= SET%-1:NS%=LST%
6430 IF ANS1$ <> "Y" AND ANS2$ <> "Y" THEN GOTO 6470
6440 JJ=1:SET1%=1:SET2%=MSET%(1):GOSUB 5680:SUMSET% = SET1% + SET2%
6450 FOR JJ = 2 TO ICOUNT:SET1% = SUMSET% : SET2% = SET1% + MSET%(JJ) -1
6460 SUMSET% = SET2% + 1:GOSUB 5680:NEXT JJ
6470 CLS:LOCATE 3,10:PRINT "Writing out file ";NE$;" to disk for
use with sideways":PRINT " "
6480 LOCATE 5,10:PRINT "  After you return to DOS type - - -  SIDEWAYS ";
:PRINT USING "&";NE$;:PRINT "  - - -"
6490 DUM$=RIGHT$(OD$(NS%),1):ALEN= LEN(OD$(NS%))
6500 IF ASC(DUM$) = 32 OR ASC(DUM$) = 0 THEN OD$(NS%)=LEFT$(OD$(NS%),ALEN-1)
:GOTO 6490
6510 JYR$="19"+RIGHT$(OD$(NS%),2):FOR I=1 TO 3:AZ$=MID$(OD$(NS%),I,1)
6520 IF AZ$ > CHR$(47) AND AZ$ < CHR$(58) THEN 6550
6530 IF I=2 THEN BZ$=MID$(OD$(NS%),1,1) ELSE IF I=3 THEN BZ$=MID$(OD$(NS%),1,2)
6540 IZ = VAL(BZ$):GOTO 6560
6550 NEXT
6560 I=0:IP=1:IQ=NS%:MDS(1)=0:MHS(1)=0:MZS(1)=0:HM=0
6570 FOR II=IP TO IQ:HM=HM + GH(II):NEXT II
6580 IF NZ$="CO" OR NZ$="SI" OR NZ$="BA" THEN 6590
ELSE IF INSTTYPE = 2 THEN DSV=3438/(HM/NS%)
6590 GOSUB 6600:GOTO 6720
6600 IF FLGINSTS = 1 THEN 6610 ELSE 6620
6610 Y$=STRING$(105,"_"):W$=STRING$(105,"-")
:YA$=SPACE$(90)+"         DELTA    INSTR.": GOTO 6630
6620 Y$=STRING$(100,"_"):W$=STRING$(100,"-")
:YA$=SPACE$(93)+"DELTA    INSTR."
6630 WW$=STRING$(11,"-")+SPACE$(7)+STRING$(5,"-")+SPACE$(6)
+STRING$(4,"-")+SPACE$(5)+STRING$(5,"-")+SPACE$(5)+STRING$(12,"-")
+SPACE$(4)+STRING$(7,"-")
6640 PRINT #2," ":PRINT #2,STRING$(83,36);DATE$;STRING$(12,36):PRINT #2," "
6650 PRINT #2,SPACE$(20) "COMPUTATION OF BASE LINE VALUES"
:PRINT #2,Y$:PRINT #2," "
6660 YY$="\       \"+SPACE$(6)+"\       \"+SPACE$(2)+"\  \"
+SPACE$(5)+"\     \"+SPACE$(4)+"\     \"+SPACE$(4)+"\       \"
6670 PRINT #2, "OBSERVATORY ";SPACE$(6);"MONTH  ";SPACE$(4);"YEAR "
;SPACE$(4);"INSTR ";SPACE$(4);"MAGNETOGRAPH";SPACE$(4);"ELEMENT"
6680 PRINT #2,WW$:RETURN
6690 '
6700 'DECLINATION BASELINE OUTPUT
6710 '
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```
6720 PRINT #2,USING YY$;AB$;MO$(IZ);JYR$;DM$(IA);MG$(INSTTYPE);EL$(1)
:PRINT #2,Y$:PRINT #2,YA$
6730 IF FLGINSTS = 1 THEN 6740 ELSE 6750
6740 PRINT #2,"JD   DATE    START STOP  ORD.  SCALE
OBSRVD.  COMP   BASELINE   MEAN    OBSVR.    DECL":GOTO 6760
6750 PRINT #2,"JD   DATE    START STOP  ORD.  SCALE
OBSRVD.  COMP   BASELINE   MEAN    OBSVR.    DECL"
6760 IF NZ$="CO" OR NZ$="SI" OR NZ$="BA" THEN 6770 ELSE 6780
6770 IF ORDVAL = 2 THEN INSRT$ = ORDV$(ORDVAL)+"/4":GOTO 6790
6780 INSRT$ = " " + ORDV$(ORDVAL)+" "
6790 PRINT #2,SPACE$(29);USING "\ \  ";INSRT$;
6800 IF FLGINSTS = 1 THEN 6810 ELSE 6820
6810 PRINT #2,"VALUE   ABSOL.   ORD.    VALUES ";SPACE$(27);"ANGLE"
: GOTO 6830
6820 PRINT #2,"VALUE   ABSOL.  ORD.  VALUES ";SPACE$(25);"ANGLE"
6830 PRINT #2,W$:JL = 1:INCRE%=MSET%(1):INDEXD=0
6840 FOR J=IP TO IQ
6850 B1=FIX(GA(J)):B2=(GA(J)-B1)*60:B3=FIX(BD(J)):B4=(BD(J)-B3)*60
:T5=BB(J)-BA(J)
6860 B2S = (B2 - FIX(B2))*60! : EDREDS = ABS((EDRED(J) - FIX(EDRED(J)))*60!)
6870 B4S = (B4 - FIX(B4))*60!
6880 IF ACCD(J) = 1 THEN ACC$ = BR$:GOTO 6900 ELSE ACC$ = BQ$
6890 MD(JL)=MD(JL)+BD(J):INDEXD = INDEXD + 1
6900 IF J = INCRE% THEN 6910 ELSE 7000
6910 IF INDEXD <> 0 THEN 6920 ELSE 6950
6920 MDS(JL)=MD(JL)/INDEXD
6930 MDD(JL)=FIX(MDS(JL)):MDM(JL)=(MDS(JL)-MDD(JL))*60
6940 MDMS(JL) = (MDM(JL) - FIX(MDM(JL)))*60!
6950 IF FLGINSTS = 1 THEN 6960 ELSE 6970
6960 PRINT #2,USING XYS$;FJD$(J);OD$(J);BA(J);BB(J);EDORG(J);DSV;B1;FIX(B2)
;B2S;FIX(EDRED(J));EDREDS;B3;FIX(B4);B4S;ACC$;MDD(JL);FIX(MDM(JL));MDMS(JL)
;SG$;SDEVD(JL);DECANG(J):GOTO 6980
6970 PRINT #2,USING XY$;FJD$(J);OD$(J);BA(J);BB(J);EDORG(J);DSV;B1;B2;EDRED(J)
;B3;B4;ACC$;MDD(JL);MDM(JL);SG$;SDEVD(JL);DECANG(J): GOTO 6980
6980 IF J = IQ THEN 7040
6990 JL = JL + 1 : INCRE% = INCRE% + MSET%(JL):INDEXD = 0:GOTO 7030
7000 IF FLGINSTS = 1 THEN 7010 ELSE 7020
7010 PRINT #2,USING XXS$;FJD$(J);OD$(J);BA(J);BB(J);EDORG(J);DSV;B1;FIX(B2)
;B2S;FIX(EDRED(J));EDREDS;B3;FIX(B4);B4S;ACC$;OB$(J);DECANG(J);ADM$(J)
: GOTO 7030
7020 PRINT #2,USING XX$;FJD$(J);OD$(J);BA(J);BB(J);EDORG(J);DSV;B1;B2
;EDRED(J);B3;B4;ACC$;OB$(J);DECANG(J);ADM$(J): GOTO 7030
7030 NEXT J
7040 PRINT #2,CHR$(12)
7050 '
7060 'HORIZONTAL BASELINE OUTPUT
7070 '
7080 GOSUB 6600
7090 PRINT #2,USING YY$;AB$;MO$(IZ);JYR$;DM$(IA);MG$(INSTTYPE);EL$(2)
:PRINT #2," "
7100 Y$=STRING$(100,"_"):W$=STRING$(100,"-"):YA$=SPACE$(93)+"DELTA   INSTR."
```

```
7110 PRINT #2,Y$:PRINT #2,YA$
7120 PRINT #2,"JD  DATE  START  STOP  ORD.  SCALE  OBSRVD.  COMP
BASELINE  MEAN  OBSVR.  INCL"
7130 IF NZ$="CO" OR NZ$="SI" OR NZ$="BA" THEN 7140 ELSE 7150
7140 IF ORDVAL = 2 THEN INSRT$ = ORDV$(ORDVAL)+"/4":GOTO 7160
7150 INSRT$ = " " + ORDV$(ORDVAL)+" "
7160 PRINT #2,SPACE$(30);USING "\  \  ";INSRT$;
:PRINT #2,"VALUE  ABSOL.  ORD.  VALUES ";SPACE$(22);"ANGLE"
7170 PRINT #2,W$:JL = 1:INCRE%=MSET%(1):INDEXH = 0:FOR K = IP TO IQ
7180 IF ACCH(K) = 1 THEN ACC$ = BR$:GOTO 7200 ELSE ACC$ = BQ$
7190 MH(JL)=MH(JL)+BH(K):INDEXH = INDEXH + 1
7200 IF K = INCRE% THEN 7210 ELSE 7250
7210 IF INDEXH <> 0 THEN MHS(JL)=MH(JL)/INDEXH
7220 PRINT #2,USING WY$;FJD$(K);OD$(K);BC(K);BE(K);EHORG(K);HSV;GH(K)
;EHRED(K);BH(K);ACC$;MHS(JL);SDEVH(JL);INCANG(K)
7230 IF K = IQ THEN GOTO 7270
7240 JL = JL + 1 : INCRE% = INCRE% + MSET%(JL):INDEXH = 0:GOTO 7260
7250 PRINT #2,USING YX$;FJD$(K);OD$(K);BC(K);BE(K);EHORG(K);HSV;GH(K)
;EHRED(K);BH(K);ACC$;OB$(K);INCANG(K);ADM$(K)
7260 NEXT K
7270 PRINT #2, " ":PRINT #2,CHR$(12)
7280 '
7290 'VERTICAL BASELINE OUTPUT
7300 '
7310 GOSUB 6600
7320 PRINT #2,USING YY$;AB$;MO$(IZ);JYR$;DM$(IA);MG$(INSTTYPE);EL$(3)
:PRINT #2," "
7330 Y$=STRING$(100,"_"):W$=STRING$(100,"-"):YA$=SPACE$(93)+"DELTA  INSTR."
7340 PRINT #2,Y$:PRINT #2,YA$
7350 PRINT #2,"JD  DATE  START  STOP  ORD.  SCALE
OBSRVD.  COMP  BASELINE  MEAN  OBSVR.  INCL"
7360 IF NZ$="CO" OR NZ$="SI" OR NZ$="BA" THEN 7370 ELSE 7380
7370 IF ORDVAL = 2 THEN INSRT$ = ORDV$(ORDVAL)+"/4" : GOTO 7390
7380 INSRT$ = " " + ORDV$(ORDVAL)+" "
7390 PRINT #2,SPACE$(30);USING "\  \  ";INSRT$;
:PRINT #2,"VALUE  ABSOL.  ORD.  VALUES ";SPACE$(22);"ANGLE"
7400 PRINT #2,W$:JL = 1 : INCRE% = MSET%(1):INDEXZ = 0:FOR L = IP TO IQ
7410 IF ACCZ(L) = 1 THEN ACC$ = BR$:GOTO 7430 ELSE ACC$ = BQ$
7420 MZ(JL)=MZ(JL)+BZ(L):INDEXZ = INDEXZ +1
7430 IF L = INCRE% THEN 7440 ELSE 7480
7440 IF INDEXZ <> 0 THEN MZS(JL)=MZ(JL)/INDEXZ
7450 PRINT #2,USING WY$;FJD$(L);OD$(L);BC(L);BE(L);EZORG(L);ZSV;GZ(L)
;EZRED(L);BZ(L);ACC$;MZS(JL);SDEVZ(JL);INCANG(L)
7460 IF L = IQ THEN GOTO 7500
7470 JL = JL + 1:INCRE% = INCRE% + MSET%(JL):INDEXZ = 0:GOTO 7490
7480 PRINT #2,USING YX$;FJD$(L);OD$(L);BC(L);BE(L);EZORG(L);ZSV;GZ(L)
;EZRED(L);BZ(L);ACC$;OB$(L);INCANG(L);ADM$(L)
7490 NEXT L
7500 FOR LLL = 1 TO 10: PRINT #2, " ":NEXT LLL
7510 PRINT #2,CHR$(12):CLOSE #4,#3 : BEEP:PRINT " "
7520 PRINT USING "  ###  TOTAL NUMBER OF SETS PROCESSED ";NS%
```

```
:PRINT " ":PRINT " "
7530 GOTO 4840
7540 GOSUB 4420
7550 IF FLGINSTS = 0 OR FK$="F" THEN GOSUB 9650 ELSE GOSUB 9790
7560 RETURN
7570 ' ***************  MONTHLY BASELINE SECTION  ****************
7580 CLS
7590 FLGMOBAS = 1
7600 INPUT "  PLEASE SPECIFY THE DRIVE (A,B,C,D,E,F,G,H OR I )
WHERE THE DAT FILE WILL RESIDE ";X$
7610 X$ = LEFT$(X$,1)
7620 X$=UCASE$(X$) : DRIVE$ = X$ + ":"
7630 IF X$="A" GOTO 7680
7640 IF X$="B" GOTO 7690
7650 IF X$="C" GOTO 7700
7660 IF X$="D" GOTO 7710
7670 IF X$="E" GOTO 7720
7673 IF X$="F" GOTO 7723
7675 IF X$="G" GOTO 7725
7677 IF X$="H" GOTO 7727
7679 IF X$="I" GOTO 7729 ELSE PRINT " incorrect DRIVE specified":GOTO 7600
7680 SHELL "DIRSRT A:":GOTO 7730
7690 SHELL "DIRSRT B:":GOTO 7730
7700 SHELL "DIRSRT C:":GOTO 7730
7710 SHELL "DIRSRT D:":GOTO 7730
7720 SHELL "DIRSRT E:":GOTO 7730
7723 SHELL "DIRSRT F:":GOTO 7730
7725 SHELL "DIRSRT G:":GOTO 7730
7727 SHELL "DIRSRT H:":GOTO 7730
7729 SHELL "DIRSRT I:"
7730 FLGBASLN=1:NS%=NT%+1: SET%=NS%:FLGFORM$="B" :  ' BASELINES
7740 GOSUB 840:GOSUB 1180:GOSUB 10290:NA$=DRIVE$+AA$+JYR$+JD$(NS%)
+SUFFIXI$:  ' CHECK AND APPEND CORRECT SUFFIX
7750 PRINT " ":INPUT " Enter the MONTH  ,  full
YEAR to process  ie: 8,1989  ";JMO,YRIN
7760 IF JMO = 0 THEN SYSTEM
7761 ERASE MD,MH,MZ,MDD,MDS,MDM,MHS,MZS
7762 ERASE MEAND,MEANH,MEANZ,SDEVD,SDEVH,SDEVZ
7763 SUMD=0:SUMH=0:SUMZ=0:SUMBD=0:SUMBH=0:SUMBZ=0
:INDEX=0:INDEXD=0:INDEXH=0:INDEXZ=0
7770 OPEN "DIR.LST" FOR INPUT AS #5
7780 INPUT #5,AI$
7790 IF EOF(5) THEN GOTO 7970
7800 IF LEFT$(AI$,2) <> BBB$ THEN 7780
7810 IF MID$(AI$,10,3) <> RIGHT$(SUFFIXI$,3) THEN 7780
7820 CI$=LEFT$(AI$,6):NA$= DRIVE$+BBB$ +LEFT$(MO$(JMO),3)
+RIGHT$(STR$(YRIN),2)
7830 ND$=MID$(NA$,3,7) + ".ABS"
7840 IF FLGBAS1=0 THEN GOSUB 2310:FLGBAS1=1 :  ' MONTHLY
BASELINES - OPEN .ABS FILE
7850 BI$=DRIVE$+CI$+SUFFIXI$:OPEN BI$ FOR INPUT AS #3
```

```
7860 IF EOF(3) THEN CLOSE 3 : GOTO 7780
7870 INPUT #3,OD$(NS%),FJD$(NS%),AVAR3$,DUM1$
7880 GOSUB 10150
7890 DUM1$=RIGHT$(OD$(NS%),1):ALEN= LEN(OD$(NS%))
7900 IF ASC(DUM1$) = 32 OR ASC(DUM1$) = 0 THEN OD$(NS%)=LEFT$(OD$(NS%),ALEN-1)
:GOTO 7890
7910 OZ$(NS%)=OD$(NS%):JD$(NS%)=FJD$(NS%)
7920 IF EOF(3) THEN CLOSE 3 : GOTO 7780
7930 DUM1$=RIGHT$(OD$(NS%),1):ALEN= LEN(OD$(NS%))
7940 GOSUB 8010
7950 IF YEAR =  YRIN AND MONTH = JMO THEN FLGBAS2= 1:FK$="F"
:FLGFORM$="B":PRINT " ":GOTO 2500
7960 CLOSE #3 : GOTO 7780
7970 IF FLGBAS2 = 0 THEN CLOSE #5 : GOTO 7980 ELSE 7990
7980 DELAY 5:PRINT " ":CLS:GOTO 7750
7990 CLOSE
8000 GOSUB 10290: NE$= RIGHT$(NA$,7)+SUFFIXO$:SSET%=1:GOTO 5630
8010 YR = VAL(RIGHT$(OZ$(NS%),2)):JL= VAL(JD$(NS%)):YR = YR + 1900
:YRS$ = MID$(STR$(YR),2,4)
8020 Q$="1-1-"+YRS$:GOSUB 8190:JULIAN = JULIAN +JL - 1:GOSUB 8090:RETURN
8030 ' SUBROUTINE  MONTH,DAY,YEAR to JULIAN DAY,WEEKDAY
8040 JULIAN = INT(365.2422# * YEAR + 30.44 * (MONTH-1) +DAY +1)
:T1 = MONTH -2 -12 * (MONTH < 3)
8050 T2 = YEAR + (MONTH < 3):T3 = INT (T2/100):T2 = T2 - 100* T3
8060 WEEKDAY = INT(2.61 * T1 -.2) + DAY + T2 + INT(T2/4)
:WEEKDAY = (WEEKDAY + INT(T3/4) - T3 - T3 + 77) MOD 7 +1
8070 T4 = JULIAN - 7 * INT(JULIAN /7):JULIAN = JULIAN - T4
+ WEEKDAY + 7*(T4 < WEEKDAY - 1) + 1721060#:RETURN
8080 ' SUBROUTINE JULIAN DAY TO MONTH,DAY,YEAR,WEEKDAY
8090 T5 = JULIAN:YEAR  = INT ((JULIAN - 1721061!) / 365.25 + 1)
:MONTH = 1:DAY = 1
8100 GOSUB 8040
8110 IF JULIAN <= T5 THEN 8130
8120 YEAR = YEAR -1:GOTO 8100
8130 MONTH = INT(( T5- JULIAN) / 29 +1)
8140 GOSUB 8040
8150 IF JULIAN <= T5 THEN 8170
8160 MONTH = MONTH -1:GOTO 8140
8170 DAY = T5 - JULIAN +1:GOSUB 8040: RETURN
8180 ' SUBROUTINE TO COME UP WITH ASTRONOMICAL JULIAN DAY NUMBER
8190 CAL$=Q$:MONTH=0:DAY=0:YEAR=0:FOR II= 1 TO LEN(CAL$):CHAR$=MID$(CAL$,II,1)
8200 IF CHAR$ < "0" OR CHAR$ > "9" THEN MID$(CAL$,II,1) = ":"
8210 NEXT II
8220 IF INSTR(CAL$,":") THEN 8260
8230 IF LEN(CAL$) <> 6 AND LEN(CAL$) <> 8 THEN 8430
8240 MONTH = VAL(LEFT$(CAL$,2)):DAY = VAL(MID$(CAL$,3,2))
:YEAR = VAL(MID$(CAL$,5))
8250 GOTO 8360
8260 VFLAG=0:FOR II = 1 TO LEN(CAL$):CALVAL=VAL(MID$(CAL$,II))
8270 IF CALVAL = 0 THEN VFLAG = 0
8280 IF CALVAL = 0 OR VFLAG = 1 THEN 8350
```

```
8290 IF MONTH THEN 8310
8300 MONTH = CALVAL:GOTO 8340
8310 IF DAY THEN 8330
8320 DAY = CALVAL:GOTO 8340
8330 YEAR = CALVAL
8340 VFLAG=1
8350 NEXT II
8360 IF YEAR < 100 AND YEAR > 0 THEN YEAR = YEAR + 1900
8370 IF YEAR < 1582 OR YEAR > 3999 THEN YEAR = 0
8380 IF YEAR = 0 THEN 8430
8390 MONTH2 = MONTH:DAY2 = DAY:YEAR2 = YEAR:GOSUB 8040:GOSUB 8090
8400 IF MONTH2 <> MONTH THEN YEAR = 0
8410 IF DAY2 <> DAY THEN YEAR = 0
8420 IF YEAR2 <> YEAR THEN YEAR = 0
8430 RETURN
8440 'SUBROUTINE TO OUTPUT DATA TO FILENAME.CAL FILE
8450 JOLD=1:I=1
8460 IF FLGBASLN = 0 THEN RETURN :  ' BASELINES
8470 CLOSE #6
8480 OPEN ND$ FOR INPUT AS #1 : NE$=LEFT$(ND$,7)+".CAL"
:OPEN NE$ FOR OUTPUT AS #2
8490 PRINT " ":PRINT " ":PRINT "Output of baseline data to ":PRINT " "
8500 PRINT USING  " & for processing ";NE$:PRINT " "
8510 IF EOF(1) GOTO 8570
8520  ' READ IN ALL OF THE .ABS DATA
8530 INPUT #1, JD(I),TSTART(I),TSTOP(I),ELEMENT(1),DUM1,AFIELD(I)
8540 INPUT #1, JD(I+1),TSTART(I+1),TSTOP(I+1),ELEMENT(2),DUM2,AFIELD(I+1)
8550 INPUT #1,JD(I+2),TSTART(I+2),TSTOP(I+2),ELEMENT(3),DUM3,AFIELD(I+2)
8560 JEND=I+2:I=I+3:GOTO 8510
8570 JNEW=JEND:DOLD=TSTART(1):INCRE2 = 1
8580 FOR J = JOLD TO JNEW-3
8590 IF J = JEND THEN J = J - 2 : GOTO 8650
8600 IF (JD(J+3) = JD(J)) AND ((TSTART(J+3)-DOLD) > 100) THEN 8610 ELSE 8620
8610 JNEW=J+3: GOTO 8650
8620 IF JD(J+3) > JD(J) THEN 8630 ELSE 8640
8630 JNEW=J+3:GOTO 8650
8640 NEXT J
8650  ' LOOP TO SUM THE DATA SETS IF TIME BETWEEN SETS < 3 HOURS
8660 IF JEND-JNEW < 3 THEN JNEW = JEND+3
8670 K=0:FOR I = JOLD TO JNEW-3  STEP 3
8680 C1=TSTART(I)-FIX(TSTART(I)/100)*100:C3=TSTOP(I)-FIX(TSTOP(I)/100)*100
8690 C5=TSTART(I+2)-FIX(TSTART(I+2)/100)*100
:C7=TSTOP(I+2)-FIX(TSTOP(I+2)/100)*100
8700 D1=FIX(TSTART(I)/100)+C1/60:D3=FIX(TSTOP(I)/100)+C3/60
8710 D5=FIX(TSTART(I+2)/100)+C5/60:D7=FIX(TSTOP(I+2)/100)+C7/60
8720 K=K+1:STSTART1 = STSTART1 +D1:STSTART2 = STSTART2 +D5
8730 STSTOP1=STSTOP1 + D3:STSTOP2=STSTOP2 + D7:SFIELD1 = SFIELD1 + AFIELD(I)
8740 SFIELD2 = SFIELD2 + AFIELD(I+1):SFIELD3 = SFIELD3 + AFIELD(I+2)
:NEXT I:GOSUB 9060
8750 MTIME1=(STSTART1+STSTOP1)/(2*K):MTIME2=(STSTART2+STSTOP2)/(2*K)
8760 A1=FIX(MTIME1):A2=INT((MTIME1-A1)*60):A3=FIX(MTIME2)
```

```
:A4=INT((MTIME2-A3)*60)
8770 IF A1 < 10 THEN A1$=STRING$(1,"0") +MID$(STR$(A1),2,1)
ELSE A1$ =MID$(STR$(A1),2,2)
8780 IF A2 < 10 THEN A2$=STRING$(1,"0") +MID$(STR$(A2),2,1)
ELSE A2$ =MID$(STR$(A2),2,2)
8790 IF A3 < 10 THEN A3$=STRING$(1,"0") +MID$(STR$(A3),2,1)
ELSE A3$ =MID$(STR$(A3),2,2)
8800 IF A4 < 10 THEN A4$=STRING$(1,"0") +MID$(STR$(A4),2,1)
ELSE A4$ =MID$(STR$(A4),2,2)
8810 MF1$=STR$(INT(SFIELD1/K)):MF2$=STR$(INT(SFIELD2/K))
:MF3$=STR$(INT(SFIELD3/K))
8820 KL=7-LEN(MF1$):KM=7-LEN(MF2$):KN=7-LEN(MF3$):A5=11:MF1$=SPACE$(KL)+MF1$
:MF2$=SPACE$(KM)+MF2$:MF3$=SPACE$(KN)+MF3$
8830 IF MONTH < 10 THEN GOTO 8840 ELSE 8850
8840 DCAL$(1)=STRING$(1,"0")+MID$(STR$(MONTH),2,1):GOTO 8860
8850 DCAL$(1)=MID$(STR$(MONTH),2,2)
8860 IF DAY < 10 THEN GOTO 8870 ELSE 8880
8870 DCAL$(2)=STRING$(1,"0")+MID$(STR$(DAY),2,1):GOTO 8890
8880 DCAL$(2)=MID$(STR$(DAY),2,2)
8890 DCAL$(3)=MID$(STR$(YEAR),4,2):DCAL$(4)=DCAL$(1)+DCAL$(2)+DCAL$(3)
8900 ACAL$(1)=DCAL$(4)+A1$+A2$+MID$(STR$(A5),2,2)+MID$(STR$(ELEMENT(1)),2,1)+MF1$
8910 ACAL$(2)=DCAL$(4)+A3$+A4$+MID$(STR$(A5),2,2)+MID$(STR$(ELEMENT(2)),2,1)+MF2$
8920 ACAL$(3)=DCAL$(4)+A3$+A4$+MID$(STR$(A5),2,2)+MID$(STR$(ELEMENT(3)),2,1)+MF3$
8930 BCALD$(INCRE2) = ACAL$(1):BCALH$(INCRE2) = ACAL$(2):BCALZ$(INCRE2) = ACAL$(3)
8940 STSTART1=0:STSTART2=0:STSTOP1=0:STSTOP2=0:SFIELD1=0:SFIELD2=0:SFIELD3=0
8950 DOLD=TSTART(I+4):JOLD=JNEW:JNEW=JEND
8960 IF I+3  => JEND GOTO 8980
8970 INCRE2 = INCRE2 + 1:GOTO 8580
8980  ' WRITE LOOP TO OUTPUT " FILENAME.CAL"
8990 PRINT " ":PRINT USING " WRITING OUT DATA TO & FILE ";NE$:PRINT " "
9000 FOR I = 1 TO INCRE2:PRINT #2,USING "\              \";BCALD$(I):NEXT I
9010 FOR I = 1 TO INCRE2:PRINT #2,USING "\              \";BCALH$(I):NEXT I
9020 FOR I = 1 TO INCRE2:PRINT #2,USING "\              \";BCALZ$(I):NEXT I
9030 FLGBAS2=0 : BB$ = OLDBB$
9040 IF FLGMOBAS = 1 THEN SET% = 1 : NS% = 1 : GOSUB 2300 : GOTO 7750
9050 RETURN
9060 YR= VAL(MID$(ND$,6,2)):JL=JD(J):YR = YR +1900:YRS$ = MID$(STR$(YR),2,4)
:Q$="1-1-"+YRS$
9070 GOSUB 8190:JULIAN = JULIAN +JL -1:GOSUB 8090:RETURN
9080 BEEP:PRINT " ": '  *     Error Trapper     *
9090 IF ERR = 25 THEN 9100 ELSE 9120
9100 PRINT " * * * *  PRINTER OFF LINE  * * * * ":PRINT " "
:PRINT "         PUT ON LINE":PRINT " ":PRINT " HIT ENTER TO CONTINUE":PRINT " "
9110 IF INKEY$ =CHR$(13) THEN RESUME ELSE 9110
9120 PRINT "Error ";ERR;" occurred in line ";ERL:PRINT " "
9130 DELAY 5:STOP
9140 '- - - - - CURSOR CONTROLLED MENU ROUTINE - - - - -
9150 COLOR F,B:CLS:W=0:IF MY<3 OR MY+N-1>24 THEN MY=3:IF MX<2 THEN MX=2
9160 ' - - - - PRINT MENU ITEMS - - - -
9170 LOCATE MY-2,MX:PRINT MN$:FOR S=1 TO N:LOCATE S+MY-1,MX,0:PRINT M$(S);
9180  IF LEN(M$(S))>W THEN W=LEN(M$(S))
```

```
9190 NEXT S:BEEP:W=W+1:S=0:GOSUB 9280
9200 ' - - - - MENU ITEM SELECTION LOOP - - - -
9210 A$=INKEY$:IF A$=CHR$(13) THEN RETURN
9220  IF A$="" OR LEN(A$)=1 THEN 9210
9230  A=ASC(RIGHT$(A$,1)):IF A=80 THEN GOSUB 9270
9240  IF A=72 THEN GOSUB 9310
9250 GOTO 9210
9260 ' - - - - MOVE CURSOR BAR DOWN - - - -
9270 GOSUB 9340
9280 S=S+1:IF S>N THEN S=1
9290 GOSUB 9360:RETURN
9300 ' - - - - MOVE CURSOR BAR UP - - - -
9310 GOSUB 9340:S=S-1:IF S<1 THEN S=N
9320 GOSUB 9360:RETURN
9330 ' - - - - NORMAL COLOR BAR - - - -
9340 LOCATE S+MY-1,MX-1:PRINT " ";M$(S);TAB(MX+W);:RETURN
9350 ' - - - - REVERSE COLOR BAR - - - -
9360 COLOR B,F:LOCATE S+MY-1,MX-1:PRINT " ";M$(S);TAB(MX+W);:COLOR F,B:RETURN
9370 PRINT " ":PRINT TAB(10):PRINT "SET #  ";SET%:PRINT " "
9380 PRINT USING "MARK  UP    : ###  ##.##";M1;M2
9390 PRINT USING "MARK  DOWN  : ###  ##.##";M3;M4:PRINT " "
9400 PRINT USING "TIME = ####.#";BA(NS%)
9410 PRINT USING "NORTH DOWN  : ###  ##.##";C1;C2
9420 PRINT USING "SOUTH DOWN  : ###  ##.##";C3;C4
9430 PRINT USING "SOUTH UP    : ###  ##.##  S =### ##.#";C5,C6,CX,CY
9440 PRINT USING "NORTH UP    : ###  ##.##  N =### ##.#";C7,C8,CD,CE
9450 PRINT USING "TIME = ####.#";BB(NS%):PRINT USING "TIME = ####.#";BC(NS%)
9460 PRINT USING "EAST  UP    : ###  ##.##";V1;V2
9470 PRINT USING "EAST  DOWN  : ###  ##.##  E =### ##.#";V3,V4,VD,VE
9480 PRINT USING "WEST  DOWN  : ###  ##.##";V5;V6
9490 PRINT USING "WEST  UP    : ###  ##.##  W =### ##.#";V7,V8,VX,VY
9500 PRINT USING "TIME = ####.#";BE(NS%):RETURN
9510 PRINT " ":PRINT TAB(10):PRINT "SET #  ";SET%:PRINT " "
9520 PRINT USING "MARK  UP    : ###  ##  ##.##";M1;FIX(M2);M2S
9530 PRINT USING "MARK  DOWN  : ###  ##  ##.##";M3;FIX(M4);M4S:PRINT " "
9540 PRINT USING "TIME = ####.#";BA(NS%)
9550 PRINT USING "NORTH DOWN  : ###  ##  ##.##";C1;FIX(C2);C2S
9560 PRINT USING "SOUTH DOWN  : ###  ##  ##.##";C3;FIX(C4);C4S
9570 PRINT USING "SOUTH UP    : ###  ##  ##.##  S =### ##.#";C5,FIX(C6),C6S,CX,CY
9580 PRINT USING "NORTH UP    : ###  ##  ##.##  N =### ##.#";C7,FIX(C8),C8S,CD,CE
9590 PRINT USING "TIME = ####.#";BB(NS%):PRINT USING "TIME = ####.#";BC(NS%)
9600 PRINT USING "EAST  UP    : ###  ##  ##.##";V1;FIX(V2);V2S
9610 PRINT USING "EAST  DOWN  : ###  ##  ##.##  E =### ##.#";V3,FIX(V4),V4S,VD,VE
9620 PRINT USING "WEST  DOWN  : ###  ##  ##.##";V5;FIX(V6),V6S
9630 PRINT USING "WEST  UP    : ###  ##  ##.##  W =### ##.#";V7,FIX(V8),V8S,VX,VY
9640 PRINT USING "TIME = ####.#";BE(NS%):RETURN
9650 PRINT " ":PRINT #1,TAB(10):PRINT #1,"SET #  ";SET%:PRINT #1," "
9660 PRINT  #1,USING "MARK  UP    : ###  ##.##";M1;M2
9670 PRINT  #1,USING "MARK  DOWN  : ###  ##.##";M3;M4:PRINT #1," "
9680 PRINT  #1,USING "TIME = ####.#";BA(NS%)
9690 PRINT  #1,USING "NORTH DOWN  : ###  ##.##";C1;C2
```

```
9700 PRINT  #1,USING "SOUTH DOWN  : ###   ##.##";C3;C4
9710 PRINT  #1,USING "SOUTH UP    : ###   ##.##  S =### ##.#";C5,C6,CX,CY
9720 PRINT  #1,USING "NORTH UP    : ###   ##.##  N =### ##.#";C7,C8,CD,CE
9730 PRINT  #1,USING "TIME = ####.#";BB(NS%)
:PRINT #1, USING "TIME = ####.#";BC(NS%)
9740 PRINT  #1,USING "EAST  UP    : ###   ##.##";V1;V2
9750 PRINT  #1,USING "EAST  DOWN  : ###   ##.##  E =### ##.#";V3,V4,VD,VE
9760 PRINT  #1,USING "WEST  DOWN  : ###   ##.##";V5;V6
9770 PRINT  #1,USING "WEST  UP    : ###   ##.##  W =### ##.#";V7,V8,VX,VY
9780 PRINT  #1,USING "TIME = ####.#";BE(NS%):RETURN
9790 PRINT " ":PRINT #1,TAB(10):PRINT #1,"SET #  ";SET%:PRINT #1," "
9800 PRINT  #1,USING "MARK  UP    : ###  ##  ##.##";M1;FIX(M2);M2S
9810 PRINT  #1,USING "MARK  DOWN  : ###  ##  ##.##";M3;FIX(M4);M4S
:PRINT #1," "
9820 PRINT  #1,USING "TIME = ####.#";BA(NS%)
9830 PRINT  #1,USING "NORTH DOWN  : ###  ##  ##.##";C1;FIX(C2);C2S
9840 PRINT  #1,USING "SOUTH DOWN  : ###  ##  ##.##";C3;FIX(C4);C4S
9850 PRINT  #1,USING "SOUTH UP    : ###  ##  ##.##  S =### ##.#"
;C5,FIX(C6),C6S,CX,CY
9860 PRINT  #1,USING "NORTH UP    : ###  ##  ##.##  N =### ##.#"
;C7,FIX(C8),C8S,CD,CE
9870 PRINT  #1,USING "TIME = ####.#";BB(NS%)
:PRINT #1, USING "TIME = ####.#";BC(NS%)
9880 PRINT  #1,USING "EAST  UP    : ###  ##  ##.##";V1;FIX(V2);V2S
9890 PRINT  #1,USING "EAST  DOWN  : ###  ##  ##.##  E =### ##.#"
;V3,FIX(V4),V4S,VD,VE
9900 PRINT  #1,USING "WEST  DOWN  : ###  ##  ##.##";V5;FIX(V6);V6S
9910 PRINT  #1,USING "WEST  UP    : ###  ##  ##.##  W =### ##.#"
;V7,FIX(V8),V8S,VX,VY
9920 PRINT  #1,USING "TIME = ####.#";BE(NS%):RETURN
9930 PRINT #1, "+ MAG S. MER.     =  ";USING "### ###.##";D6;D7
9940 PRINT #1, "+ MEAN MARK       =  ";USING "### ###.##";M6;M5
9950 PRINT #1, "+ MAG AZ OF MARK  =  ";USING "#### ###.##";E2;E3
9960 PRINT #1, "+ TRUE AZ OF MARK =  ";USING "### ###.##";TA;TB
9970 PRINT #1, "+ MAG DECLINATION =";USING "\ \### ###.##";SG$;N1;N2
9980 IF NZ$="CO" OR NZ$="SI" OR NZ$="BA" THEN 9990 ELSE 10010
9990 IF ORDVAL = 2 THEN 10000 ELSE 10010
10000 PRINT #1, "+ ORD IN ";USING "\ \ /4   =     ";ORDV$(ORDVAL)
;USING "####.##";ORDSGN*EDORG(NS%):GOTO 10020
10010 PRINT #1, "+ ORD IN ";USING "\ \     =     ";ORDV$(ORDVAL)
;USING "####.##";ORDSGN*EDORG(NS%)
10020 PRINT #1, "+ D ORD IN MIN.  =     ";USING "####.##";EDRED(NS%)
10030 PRINT #1, "+ D BASELINE     =";USING "\ \### ###.##";SG$;B1;B2:RETURN
10040 PRINT #1, "+ MAG S. MER.    =  ";USING "### ## ##.#";D6;FIX(D7);D7S
10050 PRINT #1, "+ MEAN MARK      =  ";USING "### ## ##.#";M6;FIX(M5);M5S
10060 PRINT #1, "+ MAG AZ OF MARK =  ";USING "#### ## ##.#";E2;FIX(E3);E3S
10070 PRINT #1, "+ TRUE AZ OF MARK =  ";USING "### ## ##.#";TA;FIX(TB);TBS
10080 PRINT #1, "+ MAG DECLINATION =";USING "\ \### ## ##.#";SG$;N1;FIX(N2);N2S
10090 IF NZ$="CO" OR NZ$="SI" OR NZ$="BA" THEN 10100 ELSE 10120
10100 IF ORDVAL = 2 THEN 10110 ELSE 10120
10110 PRINT #1, "+ ORD IN ";USING "\ \ /4   =     ";ORDV$(ORDVAL)
```

```
;USING "####.##";ORDSGN*EDORG(NS%):GOTO 10120
10120 PRINT #1, "+ ORD IN ";USING "\ \      =     ";ORDV$(ORDVAL)
;USING "####.##";ORDSGN*EDORG(NS%)
10130 PRINT #1, "+ D ORD IN MIN SEC =     ";USING "#### ##.#"
;FIX(EDRED(NS%));ABS(EDREDS)
10140 PRINT #1, "+ D BASELINE      =";USING "\ \### ## ##.#"
;SG$;B1;FIX(B2);B2S:RETURN
10150 GOSUB 650
10160 ALEN = LEN(AVAR3$)
10170 IF ALEN > 3 THEN 10200
10180 ADM$(NS%) = DM$(IA)
10190 GOTO 10270
10200 IF ASC(MID$(AVAR3$,3,1)) < 65 THEN 10210 ELSE 10250
10210 ADM$(NS%) = MID$(AVAR3$,3,ALEN-4)
10220 OB$(NS%)  = MID$(AVAR3$,1,2)
10230 IF NS% = 1 THEN OB$(IA) = OB$(1)
10240 GOTO 10280
10250 ADM$(NS%) = MID$(AVAR3$,4,ALEN-4)
10260 OB$(NS%)  = MID$(AVAR3$,1,3)
10270 IF NS% = 1 THEN OB$(IA) = OB$(1)
10280 CLOSE 2 : RETURN
10290 ON INSTTYPE GOTO 10300,10310,10320,10330
10300 SUFFIXI$= ".DT1" : SUFFIXO$ = ".WD1" :RETURN
10310 SUFFIXI$= ".DAT" : SUFFIXO$ = ".WID" : RETURN
10320 SUFFIXI$= ".DT3" : SUFFIXO$ = ".WD3" : RETURN
10330 SUFFIXI$= ".DT4" : SUFFIXO$ = ".WD4" : RETURN
10340 IF FK$ = "F" THEN 10390 ELSE IF FK$ = "K" THEN 10350
10350 M2 = M2 + M2S/60:M4 = M4 + M4S/60:C2 = C2 + C2S/60:C4 = C4
+ C4S/60:C6 = C6 + C6S/60:C8 = C8 + C8S/60
10360 V2 = V2 + V2S/60:V4 = V4 + V4S/60:V6 = V6 + V6S/60:V8 = V8 + V8S/60
10370 FLGCNVRT = 1
10380 RETURN
10390 M2S= (M2 -FIX(M2))*60:M4S= (M4 -FIX(M4))*60
:C2S= (C2 -FIX(C2))*60:C4S= (C4 -FIX(C4))*60
10400 C6S= (C6 -FIX(C6))*60:C8S= (C8 -FIX(C8))*60
:V2S= (V2 -FIX(V2))*60:V4S= (V4 -FIX(V4))*60
10410 V6S= (V6 -FIX(V6))*60:V8S= (V8 -FIX(V8))*60
10420 FLGCNVRT = 1
10430 RETURN
10440 PRINT #5,USING "\     \!\ \!\ \      \!##"
;OD$(NS%),CA$,FJD$(NS%),CA$,OB$(NS%)+ADM$(NS%),CA$,SET%
10450 PRINT #5,USING "### ! ##.## ! ### ! ##.## ";M1,CA$,M2,CA$,M3,CA$,M4
10460 PRINT #5,USING "#### ! ### ! ##.## ! ### ! ##.## ! ### ! ##.##
! ### ! ##.## ! ####";BA(NS%),CA$,C1,CA$,C2,CA$,C3,CA$,C4,CA$,C5,CA$
,C6,CA$,C7,CA$,C8,CA$,BB(NS%)
10470 PRINT #5,USING "#### ! ### ! ##.## ! ### ! ##.## ! ### ! ##.##
! ### ! ##.## ! ####";BC(NS%),CA$,V1,CA$,V2,CA$,V3,CA$,V4,CA$,V5,CA$
,V6,CA$,V7,CA$,V8,CA$,BE(NS%)
10480 PRINT #5,USING "######.## ! ####.## ! ####.## ! ####.##";TF,CA$
,EDORG(SET%),CA$,EHORG(SET%),CA$,EZORG(SET%)
10490 CLOSE #5 : OPEN NA$ FOR APPEND AS #5
```

```
10500 FLGCNVRT = 0
10510 RETURN
□
```

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COMPUTATION OF BASE LINE VALUES

OBSERVATORY	MONTH	YEAR	INSTR	MAGNETOGRAPH	ELEMENT
BOULDER	JANUARY	1994	154162	OMIS	DECLINATION

ID	DATE	START	STOP	ORD. nt	SCALE VALUE	OBSRVD. ABSOL.	COMP ORD.	BASELINE VALUES	MEAN	OBSVR.	DELTA DECL ANGLE	INSTR.
005	01/05/94	1619	1621	-87.80	0.1628	11 21 12.0	-14 17.3	11 35 29.3		CWL	129.80	
005	01/05/94	1628	1630	-86.40	0.1628	11 21 34.5	-14 3.6	11 35 38.1		CWL	129.90	
005	01/05/94	1638	1640	-85.30	0.1628	11 22 0.0	-13 53.0	11 35 53.0		CWL	130.00	
005	01/05/94	1647	1649	-86.70	0.1628	11 21 39.0	-14 6.7	11 35 45.7		CWL	129.80	
020	01/20/94	2009	2012	-137.52	0.1628	11 12 48.2	-22 24.7	11 35 12.9		LWP	1.83	154162
020	01/20/94	2024	2026	-137.00	0.1628	11 12 51.6	-22 19.7	11 35 11.2		LWP	1.50	154162
020	01/20/94	2038	2040	-139.83	0.1628	11 13 3.8	-22 47.3	11 35 51.1	11 35 34.5	E σ=	17.28	-1.45

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COMPUTATION OF BASE LINE VALUES

OBSERVATORY	MONTH	YEAR	INSTR	MAGNETOGRAPH	ELEMENT
BOULDER	JANUARY	1994	154162	UMIS	HORIZONTAL

ID	DATE	START	STOP	ORD. nt	SCALE VALUE	OBSRVD. ABSOL.	COMP ORD.	BASELINE VALUES	MEAN	OBSVR.	DELTA INCI ANGLE	INSTR.
005	01/05/94	1623	1625	-38.00	1.0000	21125.03	-38.00	21163.03		CWL	-0.30	
005	01/05/94	1632	1634	-39.80	1.0000	21126.83	-39.80	21166.63		CWL	0.10	
005	01/05/94	1642	1644	-41.60	1.0000	21123.50	-41.60	21165.10		CWL	0.00	
005	01/05/94	1651	1653	-42.80	1.0000	21122.01	-42.80	21164.81		CWL	-0.10	
020	01/20/94	2015	2018	-69.60	1.0000	21095.22	-69.60	21164.82		LWP	0.22	154162
020	01/20/94	2030	2032	-69.93	1.0000	21094.99	-69.93	21164.92		LWP	0.01	154162
020	01/20/94	2044	2047	-69.53	1.0000	21095.13	-69.53	21164.66	21164.85 σ=	1.05	-0.07	

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COMPUTATION OF BASE LINE VALUES

OBSERVATORY	MONTH	YEAR	INSTR	MAGNETOGRAPH	ELEMENT
BOULDER	JANUARY	1994	154162	OMIS	VERTICAL

ID	DATE	START	STOP	ORD. nt	SCALE VALUE	OBSRVD. ABSOL.	COMP ORD.	BASELINE VALUES	MEAN	OBSVR.	DELTA INCl ANGLE	INSTR.
?05	01/05/94	1623	1625	-106.10	1.0000	50292.30	-106.10	50398.40		CWL	-0.30	
?05	01/05/94	1632	1634	-106.80	1.0000	50290.46	-106.80	50397.26		CWL	0.10	
?05	01/05/94	1642	1644	-108.20	1.0000	50289.69	-108.20	50397.89		CWL	0.00	
?05	01/05/94	1651	1653	-109.30	1.0000	50289.23	-109.30	50398.53		CWL	-0.10	
?20	01/20/94	2015	2018	-106.03	1.0000	50291.80	-106.03	50397.83		LWP	0.22	154162
?20	01/20/94	2030	2032	-105.83	1.0000	50292.98	-105.83	50398.81		LWP	-0.01	154162
?20	01/20/94	2044	2047	-105.88	1.0000	50292.92	-105.88	50398.80	50398.22	σ= 0.58	-0.07	