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(NASA-CR-161579) SUN SERIES PROGRAM FOR THE
REEDA SYSTEM Final Report (Atsuko Computing
International) 80 p HC A05/MF A01 CSCL 03B

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SUN SERIES PROGRAM FOR THE REEDA SYSTEM

FINAL REPORT

Prepared for:

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Under Contract:

NAS8-33814

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INTRODUCTION

Currently various solar activity forecasting studies are being performed at NASA/MSFC by the Atmospheric Sciences Division. The objective is to automate a scheme that will predict an accurate solar sun spot value. The reliability of the sun spot value is important because it determines the effect which solar activity has on various layers of the earth's atmosphere. This effect is important in determining the drag on orbiting space vehicles.

Atsuko Computing International (ACI) personnel were initially responsible for developing a series of computer programs (Sun Series) which run on the REEDA HP Minicomputer system to aid NASA's solar activity predictions used in orbital life time predictions. These programs utilize various mathematical smoothing techniques and perform statistical and graphical analysis of various solar activity data bases residing on the REEDA System. An example of the capabilities that are provided by the Sun Series programs are listed below:

- o Statistical
 - Monthly Means
 - 3-month running mean
 - 5-month running mean
 - 6-month running mean
 - 9-month running mean
 - 12-month running mean
 - 13-month running mean
 - Mean, standard deviation, ± 2 sigma
- o Graphical
 - Solar cycles
 - 10.7 Cm Flux -vs- Sunspots
 - Geomagnetic Ap Index -vs- Sunspots
 - Scatter plots
 - Least squares fit
 - Minimal cycles
 - Up/down cycles.

The Sun Series programs perform both statistical and graphical processing of the following Sun Series disc resident data bases:

- o Sunspots (1749 - 1980)
- o 10.7 Cm Flux (1947 - 1980)
- o Geomagnetic Ap (1932 - 1980).

Under contract NAS8-33814, ACI has modified some of the Sun Series programs to use new data and to remain compatible with the new REEDA System RTE-IVB operating system and HP-7906 Disc drive. The major tasks performed were as follows:

TASK A) Modified the following Sun Series programs to enhance and improve the capability to generate various statistical and graphical outputs:

- SUN25 (SSP01 new name)
- SUN77 (SSP02 new name)
- SUN80 (SUN80 new program)
- SUN81 (SUN81 new program).

TASK B) Modified the following Sun Series data bases to provide a standard form and a common disc file media for utilization by the Sun Series programs so that new data can be easily added to the system, without having to make FORTRAN statement changes in the main programs:

- FLUX47 (1947 - 1982)
- SSPOTS (1749 - 1982)
- GEOMAG (1932 - 1982).

The remainder of this report describes the Sun Series programs that have been developed or modified as a result of this report. It is the intent of this report to be a working document which describes the new Sun Series programs. These programs along with the complete Sun Series programs and data bases reside on the REEDA System dedicated Solar Activity disc pack.

PROGRAM SSP01 DESCRIPTION

PROGRAM SSP01

```
C*****
C**
C** DESCRIPTION: THIS PROGRAM READS THE MONTHLY 10.7 FLUX **
C** VALUES (STARTING FEB 1947) FROM DISC FILE **
C** "FLUX47", READS THE MONTHLY SUNSPOT VALUES **
C** (STARTING JAN 1749) FROM DISC FILE "SSPOTS", **
C** AND READS THE MONTHLY GEOMAGNETIC AP INDEX **
C** VALUES FROM DISC FILE "GEOMAG". THE PROGRAM **
C** THEN COMPUTES A 3-MONTH AND 13-MONTH MOVING **
C** AVERAGES (ZURICH'S) AND GENERATES A PRINTED **
C** LISTING OF THE MONTHLY, 3-MONTH, AND 13-MONTH **
C** SMOOTHED DATA. **
C**
C** INPUTS: DISC FILE "FLUX47" -- MONTHLY 10.7 FLUX DATA. **
C** DISC FILE "SSPOTS" -- MONTHLY SUNSPOT DATA. **
C** DISC FILE "GEOMAG" -- MONTHLY GEOMAG AP INDEX. **
C**
C** OUTPUTS: PRINTED LISTING OF MONTHLY, 3-MONTH, AND THE **
C** 13-MONTH SMOOTHED DATA FOR THE 10.7 FLUX, **
C** SUNSPOTS, AND GEOMAGNETIC AP INDEX VALUES. **
C**
C** WRITTEN BY: JOHN S. HICKEY (ACI). **
C** REVISED: APRIL 12, 1980 **
C**
C*****
```

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0001 FTM4.L
0002 PROGRAM SSP01
0003 C*****
0004 C**
0005 C** DESCRIPTION: THIS PROGRAM READS THE MONTHLY 10.7 FLUX
0006 C** VALUES (STARTING FEB 1947) FROM DISC FILE
0007 C** "FLUX47", READS THE MONTHLY SUNSPOT VALUES
0008 C** (STARTING JAN 1749) FROM DISC FILE "SSPOTS",
0009 C** AND READS THE MONTHLY GEOMAGNETIC AP INDEX
0010 C** VALUES FROM DISC FILE "GEOMAG". THE PROGRAM
0011 C** THEN COMPUTES A 3-MONTH AND 13-MONTH MOVING
0012 C** AVERAGES (ZURICH'S) AND GENERATES A PRINTED
0013 C** LISTING OF THE MONTHLY, 3-MONTH, AND 13-MONTH
0014 C** SMOOTHED DATA.
0015 C**
0016 C** INPUTS: DISC FILE "FLUX47" -- MONTHLY 10.7 FLUX DATA.
0017 C** DISC FILE "SSPOTS" -- MONTHLY SUNSPOT DATA.
0018 C** DISC FILE "GEOMAG" -- MONTHLY GEOMAG AP INDEX.
0019 C**
0020 C** OUTPUTS: PRINTED LISTING OF MONTHLY, 3-MONTH, AND THE
0021 C** 13-MONTH SMOOTHED DATA FOR THE 10.7 FLUX,
0022 C** SUNSPOTS, AND GEOMAGNETIC AP INDEX VALUES.
0023 C**
0024 C** WRITTEN BY: JOHN S. WICKEY (AC1).
0025 C** REVISED: APRIL 12, 1960
0026 C**
0027 C*****
0028 C
0029 C** COMMON STATEMENTS
0030 C
0031 COMMON /SUNNY/SS(2800),
0032 IDCB(272),JDCB(272),KDCB(272),
0033 IBUF(46),JBUF(40),RBUF(40),
0034 ILOOP1(3),ILOOP2(3),ILOOP3(3)
0035 C
0036 C** DIMENSION STATEMENTS
0037 C
0038 DIMENSION IMON1(24)
0039 DIMENSION IFILE1(3),IFILE2(3),IFILE3(3)
0040 DIMENSION IPAR(5)
0041 C
0042 C** DATA STATEMENTS
0043 C
0044 DATA IMON1/2HJA,2HN ,2MFE,2HB ,2HNA,2HR ,2MAP,2HR ,2HMA,2HY ,
0045 2HJU,2HN ,2HJU,2HL ,2HAU,2HC ,2HSE,2HP ,2HOC,2HT ,
0046 2HMO,2HV ,2HDE,2HC /
0047 DATA IFILE1/2HFL,2HUX,2H47,IFILE2/2HSS,2HPO,2HTS/
0048 DATA IFILE3/2HGE,2HOM,2HAG/
0049 DATA IBLK/2H /
0050 C
0051 C** INITIALIZE LOGICAL UNIT FOR TERMINAL PROGRAM IS RUNNING ON.
0052 C
0053 CALL RPAR(IPAR)
0054 LU = IPAR(1)
0055 C

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0056 C** PRINT PROGRAM DESCRIPTION TO CRT
0057 C
0058 WRITE(LU,994)
0059 994 FORMAT('***** PROGRAM SSP01 IS NOW RUNNING. IT WILL TAKE ABOUT',/
0060 ' 15 SECS FOR THE PROGRAM TO READ ALL THE DATA FROM',/
0061 ' A DISC FILE. THEN IT WILL REPORT THE DATES OF THE',/
0062 ' DATA AND ASK HOW MANY COPIES YOU WANT PRINTED. ',//,
0063 ' * PROGRAM WRITTEN BY: JOHN S. HICKEY (ACI). ',//,
0064 ' * LATEST REVISION: APRIL 12, 1980. ',//)
0065 C
0066 C** CALL SUBROUTINE REPT TO READ DATA FILE AND DETERMINE THE
0067 C** LAST MONTH AND YEAR OF THE DATA OF THE FOLLOWING:
0068 C** IFLG1,IYR1 -- LAST MONTH/YEAR FOR 10.7 FLUX
0069 C** IFLG2,IYR2 -- LAST MONTH/YEAR FOR SUNSPOTS
0070 C** IFLG3,IYR3 -- LAST MONTH/YEAR FOR GEOMAGNET AP INDEX
0071 C
0072 CALL REPT(IFLG1,IFLG2,IFLG3,IYR1,IYR2,IYR3)
0073 J = (IFLG1-1)*2 + 1
0074 K = (IFLG2-1)*2 + 1
0075 L = (IFLG3-1)*2 + 1
0076 C
0077 C** WRITE STARTING AND END DATES OF DATA FILES TO CRT
0078 C
0079 WRITE(LU,501) IMON(J),IMON(J+1),IYR1,IMON(J),IMON(J+1),IYR1,
0080 IMON(J),IMON(J+1),IYR1,IMON(K),IMON(K+1),IYR2,
0081 IMON(K),IMON(K+1),IYR2,IMON(L),IMON(L+1),IYR3,
0082 IMON(L),IMON(L+1),IYR3,IMON(L),IMON(L+1),IYR3,
0083 IMON(L),IMON(L+1),IYR3
0084 501 FORMAT('/// THIS PROGRAM GENERATES THE FOLLOWING OUTPUTS: ///,
0085 ' 1. MONTHLY MEAN FOR 10.7 CM FLUX -- FEB 1947 -- ',2A2.14 /
0086 ' 2. 3-MONTH MEAN FOR 10.7 CM FLUX -- FEB 1947 -- ',2A2.14 /
0087 ' 3. 13-MONTH MEAN FOR 10.7 CM FLUX -- FEB 1947 -- ',2A2.14 /
0088 ' 4. MONTHLY MEAN FOR SUNSPOT VALUES -- JAN 1749 -- ',2A2.14 /
0089 ' 5. 3-MONTH MEAN FOR SUNSPOT VALUES -- JAN 1749 -- ',2A2.14 /
0090 ' 6. 13-MONTH MEAN FOR SUNSPOT VALUES -- JAN 1749 -- ',2A2.14 /
0091 ' 7. MONTHLY MEAN FOR GEOMAG AP INDEX -- JAN 1932 -- ',2A2.14 /
0092 ' 8. 3-MONTH MEAN FOR GEOMAG AP INDEX -- JAN 1932 -- ',2A2.14 /
0093 ' 9. 13-MONTH MEAN FOR GEOMAG AP INDEX -- JAN 1932 -- ',2A2.14 /
0094 ' //)
0095 C
0096 C** ASK FOR # OF COPIES OF OUTPUT TO PRINT?
0097 C
0098 WRITE(LU,1214)
0099 1214 FORMAT('ENTER NUMBER OF COPIES DESIRED: ')
0100 READ(LU,*) ICOPY
0101 IF(ICOPY.EQ.0) STOP
0102 C
0103 C** INITIALIZE ICOPY COUNTER TO 0
0104 ICOPY = 0
0105 C
0106 C** LOOP THRU 3 TIMES TO PRINT 10.7 FLUX, SUNSPOTS, AND GEOMAGNETIC AP
0107 C
0108 2222 CONTINUE
0109 DO 1111 INRUM=1,3
0110 IF(INRUM.EQ.1) IFLAG = IFLG1

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0111 IF(IHRUM.EQ.2) IFLAG = IFLG2
0112 IF(IHRUM.EQ.3) IFLAG = IFLG3
0113 IF(IHRUM.EQ.1) IYEARS = IYR1
0114 IF(IHRUM.EQ.2) IYEARS = IYR2
0115 IF(IHRUM.EQ.3) IYEARS = IYR3
0116 C
0117 C** READ IN 10.7 FLUX VALUES IF IHRUM = 1
0118 C
0119     00 40 I1=1,3
0120     IF(IHRUM.NE.1) GO TO 72
0121 C
0122 C** OPEN DISC FILE AND READ IN DATA
0123 C
0124     CALL OPEN(JDCB,IERR,IFILE1,0)
0125     DO 3 K=1,ILOOPI(1)
0126     J = (K-1)*12 + 1
0127     CALL READF(JDCB,IERR,IBUF)
0128     CALL CODE
0129     READ(IBUF,391) (SS(I),I=J,J+11)
0130     FORMAT(4X,12(F6.1))
0131     CONTINUE
0132     CALL CLOSE(JDCB)
0133 C
0134 C** READ IN SUNSPOT VALUES IF IHRUM = 2
0135 C
0136 72     IF(IHRUM.NE.2) GO TO 73
0137 C
0138 C** OPEN DISC FILE
0139 C
0140     CALL OPEN(JDCB,IERR,IFILE2,0)
0141     DO 4 K=1,ILOOPI(2)
0142     J = (K-1)*12 + 1
0143     CALL READF(JDCB,IERR,JBUF)
0144     CALL CODE
0145     READ(JBUF,391) (SS(I),I=J,J+11)
0146     CONTINUE
0147     CALL CLOSE(JDCB)
0148 C
0149 C** READ IN GEOMAGNETIC AP INDEX IF IHRUM = 3
0150 C
0151 73     IF(IHRUM.NE.3) GO TO 74
0152 C
0153 C** OPEN DISC FILE
0154 C
0155     CALL OPEN(KDCB,IERR,IFILE3,0)
0156     DO 5 K=1,ILOOPI(3)
0157     J = (K-1)*12 + 1
0158     CALL READF(KDCB,IERR,KBUF)
0159     CALL CODE
0160     READ(KBUF,391) (SS(I),I=J,J+11)
0161     CONTINUE
0162     CALL CLOSE(KDCB)
0163 C
0164 C** COMPUTE 3-MONTH MOVING AVERAGE USING END POINT
0165 C

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0166 74 IF(I1.EQ.1) GO TO 222
0167 IF(I1.EQ.3) GO TO 221
0168 IF(INRUM.EQ.1) IBEGIN = 2
0169 IF(INRUM.NE.1) IBEGIN = 1
0170 DO 6 I=IBEGIN, ILOOP2(INRUM)
0171 6 SS(I) = (SS(I) + SS(I+1) + SS(I+2))/3.
0172 DO 7 K=1, ILOOP2(INRUM)
0173 I = ILOOP2(INRUM)-K + 1
0174 J = I + 2
0175 SS(J) = SS(I)
0176 7 CONTINUE
0177 SS(1) = 0.
0178 SS(2) = 0.
0179 IF(INRUM.EQ.1) SS(3) = 0.
0180 GO TO 222
0181 C
0182 C== SMOOTH SUM SPOT DATA USING ZURICH'S METHOD
0183 C
0184 221 CONTINUE
0185 IF(INRUM.EQ.1) IBEGIN = 8
0186 IF(INRUM.NE.1) IBEGIN = 7
0187 DO 24 I=IBEGIN, ILOOP3(INRUM)
0188 J = I - 6
0189 SS(J) = (SS(I-6)+SS(I+6)+2.*(SS(I-5)+SS(I-4)+SS(I-3)
0190 +SS(I-2)+SS(I-1)+SS(I)+SS(I+1)+SS(I+2)+SS(I+3)
0191 +SS(I+4)+SS(I+5)))/24.
0192 24 CONTINUE
0193 ILOP = ILOOP3(INRUM)-6
0194 DO 8 K = 1, ILOP
0195 I = ILOP - K + 1
0196 J = I + 6
0197 SS(2) = SS(1)
0198 8 CONTINUE
0199 SS(1) = 0.
0200 SS(2) = 0.
0201 SS(3) = 0.
0202 SS(4) = 0.
0203 SS(5) = 0.
0204 SS(6) = 0.
0205 J=I(BEGIN.EQ.2) SS(7) = 0.
0206 SS(ILOOP3(INRUM)+1) = 0.
0207 SS(ILOOP3(INRUM)+2) = 0.
0208 SS(ILOOP3(INRUM)+3) = 0.
0209 SS(ILOOP3(INRUM)+4) = 0.
0210 SS(ILOOP3(INRUM)+5) = 0.
0211 SS(ILOOP3(INRUM)+6) = 0.
0212 C
0213 C== PRINT OUT HEADER FOR DATA TYPE AND DATES OF DATA
0214 C
0215 222 J= (IFLAG-1)*2 + I
0216 IF(I1.EQ.1.AND.INRUM.EQ.1) WRITE(6,101) IMONI(J), IMONI(J+1), IYEARS
0217 IF(I1.EQ.1.AND.INRUM.EQ.2) WRITE(6,201) IMONI(J), IMONI(J+1), IYEARS
0218 IF(I1.EQ.1.AND.INRUM.EQ.3) WRITE(6,301) IMONI(J), IMONI(J+1), IYEARS
0219 IF(I1.EQ.2.AND.INRUM.EQ.1) WRITE(6,102) IMONI(J), IMONI(J+1), IYEARS
0220 IF(I1.EQ.2.AND.INRUM.EQ.2) WRITE(6,202) IMONI(J), IMONI(J+1), IYEARS

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0221 IF(I1.E0.2.AND.IMRUN.E0.3) WRITE(6,302) IMON(J),IMON(J+1),IYEARS
0222 IF(I1.E0.3.AND.IMRUN.E0.1) WRITE(6,303) IMON(J),IMON(J+1),IYEARS
0223 IF(I1.E0.3.AND.IMRUN.E0.2) WRITE(6,203) IMON(J),IMON(J+1),IYEARS
0224 IF(I1.E0.3.AND.IMRUN.E0.3) WRITE(6,303) IMON(J),IMON(J+1),IYEARS
0225 C
0226 C** CALL DATE SUBROUTINE AND PRINT CURRENT DATE ON OUTPUT
0227 C
0228 CALL DATE
0229 101 FORMAT('1 ***** MONTHLY MEAN 10.7 CM FLUX FOR FEB 1947 THRU *2A2,
0230 14,* ****')
0231 102 FORMAT('1 *** 3-MONTH MOVING AVERAGE (COMPUTED WITH END MONTH) *
0232 10.7 CM FLUX FOR FEB 1947 THRU *2A2,14,* ****')
0233 103 FORMAT('1 *** 13-MONTH MOVING AVERAGE (COMPUTED WITH ZURICH'S *
0234 METHOD) 10.7 CM FLUX FOR FEB 1947 THRU *2A2,14,* ****')
0235 201 FORMAT('1 ***** MONTHLY MEAN SUM SPOT VALUES FOR JAN 1749*
0236 * THRU *2A2,14,* ****',/)
0237 202 FORMAT('1 *** 3-MONTH MOVING AVERAGE (COMPUTED WITH END MONTH)*
0238 * SUM SPOTS VALUES FOR JAN 1749 THRU *2A2,14,* ****',/)
0239 203 FORMAT('1 *** 13-MONTH MOVING AVERAGE (COMPUTED USING ZURICH'S*
0240 * METHOD) SUM SPOT VALUES FOR JAN 1749 THRU *2A2,14,* ****',/)
0241 301 FORMAT('1 ***** MONTHLY GEOMAGNETIC AP INDEX VALUES FOR JAN 1932*
0242 * THRU *2A2,14,* ****',/)
0243 302 FORMAT('1 *** 3-MONTH MOVING AVERAGE (COMPUTED WITH END MONTH)*
0244 * GEOMAGNETIC AP INDEX FOR JAN 1932 THRU *2A2,14,* ****',/)
0245 303 FORMAT('1 *** 13-MONTH MOVING AVERAGE (COMPUTED USING ZURICH'S *
0246 * METHOD) GEOMAGNETIC AP INDEX FOR JAN 1932 THRU *2A2,14,* ****',/)
0247 C
0248 C
0249 C** PRINT OUT MONTHLY, 3-MONTH, AND 13-MONTH DATA VALUES
0250 C
0251 WRITE(6,307)
0252 307 FORMAT('
0253 *
0254 *
0255 *
0256 *
0257 *
0258 *
0259 *
0260 *
0261 *
0262 *
0263 *
0264 *
0265 *
0266 *
0267 *
0268 *
0269 *
0270 *
0271 *
0272 *
0273 *
0274 *
0275 *
YEAR JAN AUG SEP OCT NOV DEC
JUN JUL
IYEAR = 1947
IYEAR = 1749
IYEAR = 1932
DO 30 I=1,12
J= (I-1)*12 + 1
IF(IYEAR.GT.IYEARS) GO TO 30
IF(I1.E0.1) WRITE(6,200) IYEAR, (SS(K),K=J,J+11)
IF(I1.E0.2) WRITE(6,200) IYEAR, (SS(K),K=J,J+11)
IF(I1.E0.3) WRITE(6,200) IYEAR, (SS(K),K=J,J+11)
FORMAT(5X,14,3X,12(F6.1,3X))
IYEAR = IYEAR + 1
CONTINUE
CONTINUE
CONTINUE
CONTINUE
C** CHECK FOR NUMBER OF COPIES
0270 C
0271 C
0272 C
0273 C
0274 C
0275 C
ICOPY = ICOPY + 1
IF(ICOPY.NE.ICOPY) GO TO 2222
C** PROGRAM TERMINATION

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PAGE 0006 SSPO1 1145 PM WED.. 18 JUNE, 1980

0276 C
0277 STOP
0278 END

FTN4 COMPILER: HP92060-16092 REV. 1926 (790430)

.. NO WARNINGS .. NO ERRORS .. PROGRAM = 02555 COMMON = 00000

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0279 SUBROUTINE DATE
0280 C.....
0281 C.. THIS SUBROUTINE CALLS A SYSTEM LIBRARY ROUTINE ..
0282 C.. AND CALCULATES THE CURRENT DATE TO BE PRINTED ..
0283 C.. ON THE OUTPUT LISTING. ..
0284 C.....
0285 C
0286 C.. DIMENSION STATEMENTS
0287 C
0288 DIMENSION ITIME(S),ICT(12)
0289 DIMENSION MON(24)
0290 DATA ICT/31,30,31,30,31,30,31,31,30,31,30,31/
0291 C
0292 C.. DATA STATEMENTS
0293 C
0294 DATA MON/28JAN,28FEB,28MAR,28APR,28MAY,28JUN,28JUL,28AUG,28SEP,28OCT,28NOV,28DEC/
0295 C
0296 C.. CALL EXEC ROUTINE TO RETRIEVE TIME PARAMETERS
0297 C
0298 CALL EXEC(II,ITIME,IYEAR)
0299 MDAY = ITIME(5)
0300 ITOT = 0
0301 DO 10 I=1,12
0302 ITOT = ITOT + ICT(I)
0303 IF(MDAY.LE.ITOT) GO TO 11
0304 CONTINUE
0305 10 CONTINUE
0306 11
0307 IDAY = ITOT - ICT(1)
0308 IDAY = MDAY - IDAY
0309 IMON = I
0310 J = (IMON-1)*2 + 1
0311 C
0312 C.. PRINT DATE TO OUTPUT LISTING
0313 C
0314 WRITE(6,900) MON(J),IDAY,IYEAR
0315 FORMAT(' ***** DATE OF THIS LISTING: ',202,12,'.',15,
0316 ' . -- ATMOSPHERIC SCIENCES DIVISION NASA/MSFC/ESR4 *****',/)
0317 C
0318 C.. RETURN TO CALLING PROGRAM
0319 C
0320 RETURN
0321 END

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FTM4 COMPILER: HP92060-16092 REV. 1926 (790430)

.. NO WARNINGS .. NO ERRORS .. PROGRAM = 00191 COMMON = 00500

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0322      SUSO TIME REPRC(IFLC1,IFLC2,IFLC3,IYR1,IYR2,IYR3)
0323      C
0324      C THIS SUBROUTINE READS THE DATA FILES 'FLUX42', 'SSPOTS',
0325      C AND 'CEORAC' AND DETERMINES THE ENDING MONTH AND YEAR
0326      C FOR EACH DATA SET.
0327      C
0328      C
0329      C ** COMMON STATEMENTS
0330      C
0331      COMMON /SUMNY/SS(2000),
0332      IDCB(272),JDCB(272),KOCB(272),
0333      IBUF(40),JBUF(40),KBUF(40),
0334      ILOOP1(3),ILOOP2(3),ILOOP3(3)
0335      C
0336      C ** DIMENSION STATEMENTS
0337      C
0338      DIMENSION IFILE1(3),IFILE2(3),IFILE3(3)
0339      C
0340      C ** DATA STATEMENTS
0341      C
0342      DATA IFILE1/2MFL,2MUK,2M47/
0343      DATA IFILE2/2MSS,2MPO,2M7S/
0344      DATA IFILE3/2MGE,2MOR,2MAC/
0345      C
0346      C ** READ THE FILE 'FLUX42' TO DETERMINE LAST DATA POINT
0347      C
0348      C ** OPEN DISC FILE FOR 10.7 FLUX
0349      C
0350      CALL OPEN(IDCB,IERR,IFILE1,0)
0351      DO 3 K=1,ILOOP1(1)
0352      J = (K-1)*12 + J
0353      CALL READF(IDCB,IERR,IBUF)
0354      CALL CODE
0355      READ(IBUF,391) (SS(I),I=J,J+11)
0356      391  FORMAT(4X,12(F6.1))
0357      J
0358      C
0359      C ** CHECK FOR LAST DATA POINT
0360      C
0361      ILPI = 12*ILOOP1(1)
0362      90 161 J=304,ILPI
0363      IF(SS(J).EQ.0) GO TO 162
0364      161  CONTINUE
0365      162  ILOOP2(1) = J - 3
0366      C
0367      C ** COMPUTE LAST MONTH 'IFLC1' AND LAST YEAR 'IYR1'
0368      C
0369      JPTS = J-1
0370      IYR = (JPTS/12)
0371      NYR = FLOAT(JPTS)/12.
0372      DIFF = NYR - FLOAT(IYR)
0373      IF(DIFF.EQ.0.) IYR = IYR - 1
0374      IYR1 = IYR + 1947
0375      JY = (JPTS/12)
0376      JY = JY + 12

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0377 IF(LC1 = JPTS - JY
0378 IF(IFLC1.EQ.0) IFLC1 = 12
0379 ILOOPJ(1) = J - 7
0380 CALL CLOSE(IGCB)
0381 C
0382 C** READ SUNSPOT VALUES FROM DISC FILE *SSPOTS*
0383 C
0384 CALL OPEN(KDCB, IERR, IFILE2, 0)
0385 DO 4 K=1, ILOOP1(2)
0386 J = (K-1)*12 + 1
0387 CALL READ(KDCB, IERR, JBUF)
0388 CALL CODE
0389 READ(JBUF, J91) (SS(1), I=J, J+11)
0390 4 CONTINUE
0391 C
0392 C** CHECK FOR LAST DATA POINT
0393 C
0394 ILP2 = 12*ILOOP1(2)
0395 DO 163 J=2760, ILP2
0396 IF(SS(J).EQ.0) GO TO 164
0397 163 CONTINUE
0398 164 ILOOP2(2) = J - 3
0399 C
0400 C** COMPUTE LAST MONTH *IFLC2* AND LAST YEAR *IYR2*
0401 C
0402 JPTS = J - 1
0403 IYR = (JPTS/12)
0404 XVR = FLOAT(JPTS)/12.
0405 DIFF = XVR - FLOAT(IYR)
0406 IF(DIFF.EQ.0) IYR = IYR - 1
0407 IYR2 = IYR + 1749
0408 JY = (JPTS/12)
0409 JY = JY + 12
0410 IFLC2 = JPTS - JY
0411 IF(IFLC2.EQ.0) IFLC2 = 12
0412 ILOOPJ(2) = J - 7
0413 CALL CLOSE(JDCB)
0414 C
0415 C** READ DISC FILE *GEORAC*
0416 C
0417 CALL OPEN(KDCB, IERR, IFILE3, 0)
0418 DO 5 K=1, ILOOP1(3)
0419 J = (K-1)*12 + 1
0420 CALL READ(KDCB, IERR, KBUF)
0421 CALL CODE
0422 READ(KBUF, J91) (SS(1), I=J, J+11)
0423 5 CONTINUE
0424 C
0425 C** CHECK FOR LAST DATA POINT
0426 C
0427 ILP3 = 12*ILOOP1(3)
0428 DO 165 J=564, ILP3
0429 IF(SS(J).EQ.0) GO TO 166
0430 165 CONTINUE
0431 166 ILOOP3(3) = J - 3

```

```
0432 C
0433 C** COMPUTE LAST MONTH "IFLG3" AND LAST YEAR "IYR3"
0434 C
0435 JPTS = J - 1
0436 IYR = (JPTS/12)
0437 XYR = FLOAT(JPTS)/12.
0438 DIFF = XYR - FLOAT(IYR)
0439 IF(DIFF.EQ.0.) IYR = IYR - 1
0440 IYR3 = IYR + 1932
0441 JY = (JPTS/12)
0442 JY = JY + 12
0443 IFLG3 = JPTS - JY
0444 IF(IFLG3.EQ.0) IFLG3 = 12
0445 LLOOP3(3) = J - 7
0446 CALL CLOSE(KDCB)
0447 C
0448 C** RETURN TO CALLING PROGRAM
0449 C
0450 RETURN
0451 END
```

FTM4 COMPILER: HP92060-16092 REV. 1926 (790430)

** NO WARNINGS ** NO ERRORS ** PROGRAM = 00373 COMMON = 00000

```
0432      BLOCK DATA
0433      C*****
0434      C** THIS BLOCK DATA CONTAINS THE DATA ***
0435      C** VALUES FOR VARIABLE THAT ARE IN ***
0436      C** COMMON AND THE INITIAL VALUES NEED ***
0437      C** TO BE DECLARED IN DATA STATEMENTS. ***
0438      C*****
0439      C
0440      C** COMMON STATEMENTS
0441      C
0442      COMMON /SUNNY/SS(2008),
0443      .   IDC8(272),JDC8(272),KDC8(272),
0444      .   IBUF(40),JBUF(40),KBUF(40),
0445      .   ILOOP1(3),ILOOP2(3),ILOOP3(3)
0446      C
0447      C** DATA STATEMENTS
0448      C
0449      DATA ILOOP1/36,234,51/
0450      END
0470
```

FTN4 COMPILER: HP92060-16092 REV. 1926 (790430)

* NO WARNINGS ** NO ERRORS **

BLOCK COMMON SUNNY SIZE = 06561

PAGE 0012 FTH. 1145 PM WED., 18 JUNE, 1980

0471 ENDS

PROGRAM SSP01 INPUTS:

Disc File: "FLUX47" -- Monthly 10.7 Flux Data (1947-1980).

Disc File: "SSPOTS" -- Monthly Sunspot Data (1749-1980).

Disc File: "GEOMAG" -- Monthly Geomagnetic AP Index (1932-1980).

SPOTS T-00003 IS ON CR00034 USING 00074 BLKS R-0000

0001	1749	58.0	62.6	70.0	55.7	85.0	83.5	94.8	66.3	75.9	75.5	158.6	85.2
0002	1750	73.3	75.9	89.2	88.3	50.0	100.0	85.4	103.0	91.2	65.7	63.3	75.4
0003	1751	70.0	43.5	45.3	56.4	60.7	50.7	66.3	59.8	23.5	23.2	28.5	44.0
0004	1752	35.0	50.0	71.0	59.3	39.6	78.4	29.3	27.1	46.6	37.6	40.0	6.7
0005	1753	44.0	32.0	45.7	38.0	36.0	31.7	22.0	39.0	28.0	25.0	20.0	6.7
0006	1754	0	3.0	1.7	13.7	20.7	28.7	18.8	12.3	8.2	24.1	13.2	4.2
0007	1755	10.2	11.2	6.8	6.5	0	0	8.6	3.2	17.8	23.7	6.8	20.0
0008	1756	12.5	7.1	5.4	9.4	12.5	12.9	3.6	6.4	11.8	14.3	17.0	9.4
0009	1757	14.1	21.2	26.2	30.0	38.1	12.8	25.0	51.3	39.7	32.5	64.7	33.5
0010	1758	37.6	52.0	49.0	72.3	46.4	45.0	44.0	38.7	62.5	37.7	43.0	43.0
0011	1759	48.3	44.0	46.8	47.0	49.0	50.0	51.0	71.3	77.2	59.7	46.3	57.0
0012	1760	67.3	59.5	74.7	58.3	72.0	48.3	66.0	75.6	61.3	50.6	59.7	61.0
0013	1761	70.0	91.0	80.7	71.7	107.2	99.3	94.1	91.1	100.7	88.7	89.7	46.0
0014	1762	43.8	72.8	45.7	60.2	39.9	77.1	33.8	67.7	68.5	69.3	77.8	77.2
0015	1763	56.5	31.9	34.2	32.9	32.7	35.8	54.2	26.5	68.1	46.3	60.9	61.4
0016	1764	59.7	59.7	40.2	34.4	44.3	30.0	30.0	30.0	28.0	28.0	26.0	25.7
0017	1765	24.0	26.0	25.0	22.0	20.2	29.0	27.0	29.7	16.0	14.0	14.0	13.0
0018	1766	12.0	11.0	36.6	6.0	26.8	3.0	3.3	4.0	4.3	5.0	5.7	19.2
0019	1767	27.4	30.0	43.0	32.9	29.8	33.3	21.9	40.8	42.7	44.1	54.7	53.3
0020	1768	53.5	66.1	46.3	42.7	72.7	77.4	52.6	66.8	74.8	77.8	90.6	111.8
0021	1769	73.9	64.2	64.3	96.7	73.6	94.4	119.6	120.3	148.8	158.2	148.1	112.0
0022	1770	104.0	142.5	80.1	51.0	70.1	83.3	109.8	126.3	104.4	103.5	132.2	102.3
0023	1771	36.0	46.2	46.7	64.9	152.7	119.5	67.7	58.5	101.4	90.9	99.7	95.7
0024	1772	100.9	90.8	31.1	52.2	38.0	57.0	77.3	56.2	50.5	78.6	61.3	64.0
0025	1773	54.6	29.0	51.2	32.9	41.1	28.4	27.7	12.7	29.3	26.3	40.9	43.2
0026	1774	46.8	65.4	55.7	43.8	51.3	28.5	17.5	6.6	7.9	14.0	17.7	12.2
0027	1775	4.4	11.6	6.3	3.9	12.3	1.0	7.9	3.2	5.6	15.1	7.9	
0028	1776	21.7	11.6	6.3	21.8	11.2	19.0	1.0	24.2	16.0	30.0	35.0	40.0
0029	1777	45.0	36.5	39.0	95.5	80.3	80.7	95.0	112.0	116.2	106.5	146.0	157.3
0030	1778	177.3	109.3	134.0	145.0	238.9	171.6	153.0	140.0	171.7	156.3	150.3	105.0
0031	1779	114.7	165.7	118.0	145.0	140.0	113.7	143.0	112.0	111.0	124.0	114.0	110.0
0032	1780	70.0	98.0	98.0	95.0	107.2	88.0	86.0	96.0	93.7	77.0	60.0	58.7
0033	1781	98.7	74.7	53.0	68.3	104.7	97.7	73.5	66.0	51.0	27.3	67.0	35.2
0034	1782	54.0	37.5	37.0	41.0	54.3	38.0	37.0	44.0	34.0	23.2	31.5	30.0
0035	1783	28.0	39.7	26.7	28.3	23.0	25.2	32.2	20.0	18.0	8.0	15.0	10.5
0036	1784	13.0	8.0	11.0	10.0	6.0	9.0	6.0	10.0	10.0	8.0	17.0	14.0
0037	1785	6.5	8.0	9.0	15.7	20.7	26.3	36.3	20.0	32.0	47.2	40.2	27.3
0038	1786	37.2	47.6	47.7	85.4	92.3	59.0	83.0	89.7	111.5	112.3	116.0	112.7
0039	1787	134.7	106.0	87.4	127.2	134.8	99.2	128.0	137.2	157.3	157.0	141.5	174.0
0040	1788	138.0	129.2	143.3	108.5	113.0	154.2	141.5	136.0	141.0	142.0	94.7	129.5
0041	1789	114.0	125.3	120.0	123.3	123.5	120.0	117.0	103.0	112.0	89.7	134.0	135.5
0042	1790	103.0	127.5	96.3	94.0	93.0	91.0	69.3	87.0	77.3	84.3	82.0	74.0
0043	1791	72.7	62.0	74.0	77.2	73.7	64.2	71.0	43.0	66.5	61.7	67.0	66.0
0044	1792	58.0	64.0	63.0	75.7	62.0	61.0	45.8	60.0	59.0	59.0	57.0	55.0
0045	1793	56.0	55.0	55.5	53.0	52.3	51.0	50.0	29.3	24.0	47.0	44.0	45.7
0046	1794	45.0	44.0	38.0	28.4	55.7	41.5	41.0	40.0	11.1	28.5	67.4	51.4
0047	1795	21.4	33.9	12.6	18.6	31.0	17.1	12.9	25.7	13.5	19.5	25.0	18.0
0048	1796	22.0	23.8	15.7	31.7	21.0	6.7	26.9	1.5	18.4	11.0	8.4	5.1
0049	1797	14.4	4.2	4.0	4.0	7.3	1.1	4.3	6.0	5.7	6.9	5.8	3.0
0050	1798	2.0	4.0	12.4	1.1	8.2	0	0	3.0	2.4	1.5	12.5	9.9
0051	1799	1.6	12.6	21.7	8.4	8.2	10.6	2.1	0	0	4.6	2.7	8.6
0052	1800	6.9	9.3	13.9	0	5.0	23.7	21.0	19.5	11.5	12.3	10.5	40.1
0053	1801	27.0	29.0	30.0	31.0	42.0	31.2	35.0	38.7	33.5	32.6	39.8	48.2
0054	1802	47.8	47.0	40.8	42.0	44.0	46.0	48.0	50.0	51.8	38.5	34.5	50.0
0055	1803	50.0	50.8	29.5	25.0	44.3	36.0	48.3	34.1	45.3	54.3	51.0	49.0
0056	1804	45.3	48.3	48.0	50.6	33.0	34.8	29.8	43.1	53.0	62.3	61.0	50.0
0057	1805	61.0	44.1	51.4	37.5	39.0	40.5	37.6	42.7	44.4	29.4	41.0	39.7
0058	1806	39.0	29.4	32.7	27.7	26.4	25.6	30.0	28.3	24.0	27.3	25.0	24.0

0059	1807	12.0	12.2	9.6	23.8	10.0	12.0	12.7	12.0	5.7	8.0	2.6	0.0
0060	1808	0.0	4.5	0.0	12.3	13.5	6.7	8.0	11.7	4.7	10.5	12.3	0.0
0061	1809	7.2	9.2	0.9	2.5	2.0	7.7	0.3	0.2	0.0	0.0	0.0	0.0
0062	1810	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0063	1811	0.0	0.0	0.0	0.0	0.0	6.6	0.0	0.0	2.4	6.1	8.1	1.1
0064	1812	11.3	1.9	0.7	0.0	1.0	1.3	0.5	15.6	5.2	3.9	7.9	10.1
0065	1813	0.0	10.3	1.9	16.6	5.5	11.2	18.3	8.4	15.3	27.8	16.7	14.3
0066	1814	22.2	0.0	5.7	23.8	5.8	14.9	18.5	2.3	8.1	19.3	14.5	20.1
0067	1815	19.2	32.2	26.2	31.6	9.8	55.9	35.5	47.2	31.5	33.5	37.2	65.0
0068	1816	26.3	69.8	73.7	58.8	44.3	43.6	38.8	23.2	47.8	56.4	38.1	29.9
0069	1817	36.4	37.9	96.2	26.4	21.2	40.0	50.0	45.0	36.7	25.6	28.9	28.4
0070	1818	34.9	22.4	29.7	34.5	53.1	36.4	28.0	31.5	26.1	31.7	10.9	25.8
0071	1819	32.5	20.7	3.7	20.2	19.6	35.0	31.4	26.1	14.9	27.5	25.1	30.6
0072	1820	19.2	26.6	4.5	15.4	29.3	10.8	20.6	25.9	5.2	9.0	7.9	9.7
0073	1821	21.5	4.3	5.7	9.2	1.7	1.8	2.5	4.8	4.4	18.8	4.4	0.0
0074	1822	0.0	0.0	16.1	13.5	1.5	5.6	7.9	2.1	0.0	0.0	0.0	0.0
0075	1823	0.0	0.0	0.6	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	20.4
0076	1824	21.6	10.8	0.0	19.4	2.8	0.0	1.4	20.5	25.2	25.2	0.0	8.8
0077	1825	5.0	15.5	22.4	3.8	15.4	15.4	30.9	25.4	15.7	15.6	11.7	22.0
0078	1826	17.7	18.2	36.7	24.0	32.4	37.1	52.5	39.6	18.9	50.6	39.5	68.1
0079	1827	34.6	47.4	57.8	46.0	56.3	56.7	42.9	53.7	49.6	57.2	48.2	46.1
0080	1828	52.8	64.4	65.0	61.1	89.1	98.0	59.3	76.4	50.4	34.7	57.0	46.9
0081	1829	43.0	49.4	72.3	95.0	67.5	73.9	90.8	78.3	52.8	57.2	67.6	55.5
0082	1830	52.2	72.1	84.6	107.1	66.3	65.1	43.9	50.7	62.1	84.4	81.2	82.1
0083	1831	47.5	50.1	93.4	54.6	38.1	33.4	45.2	54.9	37.9	46.2	43.5	28.9
0084	1832	30.9	55.5	55.1	26.9	41.3	26.7	13.9	8.9	8.2	21.1	14.3	27.5
0085	1833	11.3	14.9	11.8	2.8	12.9	7.0	7.0	5.7	11.6	7.5	5.9	9.9
0086	1834	4.9	18.1	3.9	1.4	8.8	7.8	8.7	4.0	11.5	24.8	30.5	34.5
0087	1835	7.5	24.5	19.7	61.5	43.6	33.2	59.8	59.0	100.8	95.2	100.0	77.5
0088	1836	88.6	107.6	98.1	142.9	111.4	121.7	116.7	107.8	95.1	137.4	120.9	206.2
0089	1837	188.0	175.6	134.6	138.2	111.3	158.0	162.8	134.0	96.3	123.7	107.0	129.8
0090	1838	144.9	84.8	140.8	126.6	137.6	94.5	108.2	78.8	73.6	90.8	77.4	79.8
0091	1839	107.6	102.5	77.7	61.8	53.8	54.6	84.7	131.2	132.7	90.8	68.8	63.6
0092	1840	81.2	87.7	67.8	65.9	69.2	48.5	60.7	57.8	74.0	55.0	54.3	53.7
0093	1841	24.0	29.9	29.7	42.6	67.4	55.7	30.8	39.3	35.1	28.5	19.8	38.8
0094	1842	20.4	22.1	21.7	26.9	24.9	20.5	12.6	26.5	18.5	38.1	40.5	17.6
0095	1843	13.3	3.5	8.3	8.8	21.1	10.5	9.5	11.8	4.2	5.3	19.1	12.7
0096	1844	9.4	14.7	13.6	20.8	12.0	3.7	21.2	23.9	6.9	21.5	10.7	21.6
0097	1845	25.7	43.6	43.3	56.9	47.8	31.1	30.6	32.3	29.6	40.7	39.4	59.7
0098	1846	38.7	51.0	63.9	69.2	59.9	65.1	46.5	54.8	107.1	55.9	60.4	65.5
0099	1847	62.6	44.9	85.7	44.7	75.4	85.3	52.2	140.6	161.2	180.4	138.9	109.6
0100	1848	159.1	111.8	108.9	107.1	102.2	129.0	139.2	132.5	100.3	132.4	114.6	159.9
0101	1849	156.7	131.7	96.5	102.5	80.6	81.2	78.0	67.7	93.7	71.5	99.7	97.0
0102	1850	78.0	89.4	82.6	44.1	61.6	70.0	39.1	61.6	86.2	71.0	54.8	61.0
0103	1851	75.5	105.4	64.6	56.5	62.6	63.2	36.1	57.4	67.9	62.5	50.9	71.4
0104	1852	68.4	66.4	61.2	65.4	54.9	46.9	42.0	39.7	37.5	67.3	54.3	45.4
0105	1853	41.1	42.9	37.7	47.6	34.7	40.0	45.9	50.4	33.5	42.3	28.8	23.4
0106	1854	15.4	20.0	20.7	26.4	24.0	21.1	18.7	15.8	22.4	12.7	28.2	21.4
0107	1855	12.3	11.4	17.4	4.4	9.1	5.3	3.1	4.4	0.0	9.7	4.2	3.1
0108	1856	5.5	4.9	4.4	6.5	0.0	5.2	4.6	5.9	4.4	4.5	7.7	7.2
0109	1857	13.7	7.4	5.2	11.1	28.6	16.0	22.2	16.9	42.4	40.6	31.4	37.2
0110	1858	39.0	34.9	57.5	38.3	41.4	44.5	56.7	55.3	80.1	91.2	51.9	66.9
0111	1859	82.7	87.6	90.3	85.7	91.0	87.1	95.2	106.8	105.8	114.6	97.2	81.0
0112	1860	82.4	89.0	98.9	71.4	107.1	108.6	116.7	100.3	92.2	90.1	97.9	95.6
0113	1861	62.3	77.8	101.0	98.5	56.8	87.8	78.0	82.5	79.9	67.2	53.7	80.5
0114	1862	63.1	64.5	43.6	53.7	64.4	84.0	73.4	62.5	66.6	42.0	50.6	40.9
0115	1863	48.3	56.7	66.4	40.6	53.8	40.8	32.7	48.1	22.0	39.9	37.7	41.2
0116	1864	57.7	47.1	66.3	35.8	40.6	57.8	54.7	54.8	28.9	33.9	57.6	28.6
0117	1865	48.7	39.3	39.5	29.4	34.5	26.6	26.0	37.8	17.1	24.6	12.0	11.5
0118	1866	31.6	38.4	24.6	17.6	12.9	9.3	9.3	12.7	0.0	14.1	9.0	0.0

PROGRAM SSP01 OUTPUTS: (Processing "FLUX47" Data)

- Monthly 10.7 Flux Data.
- 3-Month 10.7 Flux Smoothed Data.
- 13-Month 10.7 Flux Smoothed Data.

***** MONTHLY MEAN 10.7 CM FLUX FOR FEB 1947 THRU MAY 1980 *****

***** DATE OF THIS LISTING: JUN 17, 1980 --- ATMOSPHERIC SCIENCES DIVISION NASA/MSFC/ES04 *****

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1947	0.0	202.7	235.7	264.1	261.2	226.6	215.2	231.2	199.7	209.0	179.8	176.4
1948	155.7	134.3	135.5	204.1	226.9	195.5	182.8	172.8	163.7	159.1	165.4	193.3
1949	183.5	220.2	203.9	182.5	154.9	157.5	159.9	175.2	172.5	176.2	180.4	165.2
1950	150.7	143.3	137.8	164.3	137.1	128.7	134.1	120.9	98.6	99.9	101.9	101.1
1951	107.9	101.9	102.5	127.1	108.6	161.7	116.3	109.8	117.8	106.0	104.4	102.4
1952	95.4	86.2	78.5	94.0	60.9	84.8	89.8	95.3	81.9	92.8	93.4	85.7
1953	83.2	72.8	70.4	81.0	72.5	73.0	69.8	75.5	74.3	71.9	71.4	70.8
1954	68.7	69.2	71.9	68.7	68.0	67.3	67.7	69.9	74.3	73.2	72.6	75.5
1955	84.3	82.0	74.0	77.3	82.0	88.0	87.3	90.7	95.1	111.0	130.0	134.6
1956	141.2	167.2	160.6	165.9	183.4	154.0	162.8	193.8	200.9	201.6	250.4	233.7
1957	231.2	196.7	197.8	200.0	208.5	252.1	218.0	202.3	267.1	282.1	259.2	286.5
1958	251.5	212.2	251.5	245.9	218.6	220.5	234.1	237.0	243.5	228.0	209.2	238.2
1959	274.5	207.9	229.2	210.6	212.7	217.5	203.0	234.2	194.3	165.1	184.8	182.2
1960	202.6	170.9	146.8	167.6	182.7	161.9	163.9	174.4	144.3	142.3	148.9	138.1
1961	122.0	106.4	104.8	105.0	99.3	109.9	116.5	106.2	112.7	96.7	90.3	94.8
1962	94.9	102.2	100.3	96.2	97.9	91.0	80.7	77.3	89.5	87.0	84.9	82.0
1963	79.5	79.7	77.8	79.5	87.8	83.5	75.9	80.9	85.1	85.1	81.7	78.4
1964	73.4	76.8	75.9	72.6	69.3	69.0	67.0	69.3	70.2	73.4	73.7	78.1
1965	78.6	75.2	74.1	72.0	78.2	77.0	74.3	74.8	76.6	80.2	77.7	77.8
1966	87.9	84.2	90.3	97.2	98.5	96.3	106.7	106.6	110.9	108.6	113.3	124.6
1967	147.7	147.0	160.6	129.9	143.0	120.2	140.3	153.7	132.1	136.1	145.3	163.0
1968	189.1	173.2	142.6	129.5	134.9	142.3	137.2	142.2	141.0	142.5	138.5	148.4
1969	152.7	155.2	172.3	155.5	145.4	162.2	136.6	143.0	137.3	154.0	156.7	143.6
1970	158.3	175.4	158.4	162.0	188.4	154.9	152.0	138.2	143.2	147.0	162.0	152.0
1971	162.6	137.8	111.9	116.7	109.9	101.7	117.4	114.1	104.0	107.2	114.0	124.5
1972	114.8	141.8	128.5	112.9	129.6	135.4	122.0	123.7	113.6	121.6	101.6	102.9
1973	102.2	98.7	100.4	105.0	97.0	91.2	84.5	82.9	105.6	87.7	81.5	84.2
1974	83.1	79.0	78.0	87.0	93.0	89.0	92.5	83.0	89.0	97.0	88.0	81.1
1975	77.5	74.2	72.4	70.7	70.1	69.7	79.7	90.4	79.6	75.4	80.8	74.6
1976	74.7	70.5	76.6	76.2	70.6	70.6	67.5	74.8	73.1	75.9	72.9	76.7
1977	77.4	82.3	76.6	77.6	79.6	91.5	81.1	84.3	99.9	96.9	93.7	102.1
1978	109.6	145.4	141.8	149.4	146.3	142.2	131.1	114.0	157.9	158.2	151.5	175.5
1979	203.0	204.1	183.8	173.8	165.2	180.3	165.9	172.7	200.2	217.9	231.7	203.5
1980	206.2	200.0	168.1	207.9	224.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

0000 3-MONTH MOVING AVERAGE (COMPUTED WITH END MONTH, 10.7 CM FLUX FOR FEB 1947 THRU MAY 1980 0000

0000 DATE OF THIS LISTING: JUN 19, 1980 -- ATMOSPHERIC SCIENCES DIVISION WASA/MSFC/ES04 0000

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1947	0.0	0.0	0.0	234.2	233.7	250.6	234.3	224.3	215.4	213.3	156.2	188.4
1948	170.6	155.5	141.0	159.3	190.0	210.0	201.6	190.7	173.1	165.2	162.7	172.6
1949	180.7	199.0	202.5	202.2	180.4	165.0	157.4	164.2	169.2	175.3	177.0	174.6
1950	169.4	153.0	143.9	148.5	153.1	150.0	140.0	127.9	117.9	106.5	100.1	101.0
1951	103.6	102.6	104.1	110.5	132.7	152.5	148.9	129.3	114.6	111.2	109.4	104.3
1952	100.7	94.7	86.7	82.9	81.1	83.2	84.9	85.0	87.9	85.9	82.6	84.0
1953	84.1	80.6	75.5	74.1	74.6	75.5	71.8	73.0	73.2	73.9	72.5	71.4
1954	70.3	69.6	69.9	69.9	69.5	68.0	67.7	68.3	69.2	71.1	72.0	73.8
1955	77.5	80.6	80.4	78.0	78.3	83.0	86.3	88.9	91.0	99.2	112.3	125.5
1956	135.3	147.7	155.3	164.6	163.3	161.1	160.1	170.2	185.0	190.8	217.6	235.2
1957	245.1	223.9	205.2	194.8	202.1	220.2	226.2	224.1	229.1	250.8	269.0	276.3
1958	265.7	250.1	238.4	236.5	238.7	228.3	221.1	227.2	224.9	236.2	226.9	225.1
1959	240.6	240.2	237.2	215.9	217.5	213.6	211.1	210.2	210.5	197.5	181.4	177.4
1960	189.9	185.2	173.4	161.8	159.0	164.1	162.8	166.7	167.6	160.4	151.9	143.1
1961	136.3	122.2	111.1	105.4	103.0	104.7	108.6	110.9	111.8	105.2	99.9	93.9
1962	93.3	97.3	99.1	99.6	98.1	95.0	89.9	83.0	82.5	84.9	87.4	84.9
1963	82.1	80.4	79.0	79.0	81.7	83.6	82.4	80.1	80.6	83.7	84.0	81.7
1964	78.5	76.9	76.0	75.1	72.7	70.4	68.5	68.4	68.0	71.0	72.4	75.3
1965	77.0	77.5	76.0	73.8	74.8	79.7	76.5	75.4	75.2	77.2	78.2	78.6
1966	81.1	83.3	87.5	90.6	95.3	97.3	100.5	103.2	108.1	108.7	110.9	115.5
1967	128.5	139.8	151.8	145.0	148.5	131.0	134.5	138.1	142.0	140.6	137.8	148.1
1968	165.8	175.1	168.3	148.4	142.3	142.2	144.8	140.6	140.1	145.2	144.0	146.5
1969	146.5	152.1	160.1	161.0	157.7	154.4	148.1	147.3	139.0	144.8	149.3	151.4
1970	152.9	159.1	164.0	165.3	162.9	161.0	158.4	148.4	144.5	142.8	150.7	153.9
1971	159.1	151.1	137.4	122.1	112.8	109.4	109.7	111.1	111.8	108.4	100.4	115.2
1972	117.8	127.0	128.4	127.7	123.7	126.0	129.0	127.7	120.4	120.3	112.3	108.7
1973	102.2	101.3	100.4	101.4	100.0	97.7	90.9	86.2	91.0	92.1	91.6	84.5
1974	82.9	82.1	80.0	81.3	86.0	89.7	91.5	88.2	88.2	89.7	91.3	88.7
1975	82.2	77.6	74.7	72.4	71.1	70.2	73.2	79.9	83.2	81.8	78.6	76.9
1976	76.7	73.3	73.9	74.4	74.5	72.5	69.6	71.0	71.0	74.6	74.0	75.2
1977	75.7	78.0	78.0	78.0	77.9	82.9	84.1	85.6	88.4	93.7	96.8	97.6
1978	101.8	119.0	132.3	143.5	145.9	146.0	139.9	129.1	134.3	143.4	153.9	161.7
1979	176.7	194.2	197.6	187.9	174.9	173.1	170.5	173.0	179.6	196.9	216.6	217.7
1980	213.8	203.2	191.4	192.0	200.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PROGRAM SSP01 OUTPUTS: (Processing "SSPOTS" Data)

- Monthly Sunspot Data.
- 3-Month Smoothed Sunspot Data.
- 13-Month Smoothed Sunspot Data.

***** MONTHLY MEAN SUN SPOT VALUES FOR JAN 1749 THRU MAY 1980 *****
 ***** DATE OF THIS LISTING: JUN 19, 1980 --- ATMOSPHERIC SCIENCES DIVISION NASA/MSFC/ES04 *****

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1749	58.0	62.6	70.0	55.7	85.0	83.5	94.8	66.3	75.9	75.5	158.6	85.2
1750	73.3	75.9	89.2	88.3	90.0	100.0	85.4	103.0	91.2	65.7	63.3	75.4
1751	70.0	43.5	45.3	60.7	60.7	50.7	56.3	50.7	23.2	23.2	28.5	44.0
1752	35.0	50.0	71.0	59.3	59.7	39.6	78.4	29.3	27.1	46.6	37.6	40.0
1753	44.0	32.0	45.7	38.0	36.0	31.7	22.0	39.0	28.0	25.0	20.0	6.7
1754	0.0	3.0	1.7	13.7	20.7	26.7	18.8	12.3	8.2	24.1	13.2	4.2
1755	10.2	11.2	5.8	6.5	0.0	0.0	8.6	3.2	17.8	23.7	6.8	20.0
1756	12.5	7.1	5.4	9.4	12.5	12.9	3.6	6.4	11.9	14.3	17.0	9.4
1757	14.1	21.2	26.2	30.0	38.1	12.8	25.0	51.3	39.7	32.5	64.7	33.5
1758	37.6	52.0	49.0	72.3	46.4	45.0	44.0	38.7	62.5	37.5	43.0	43.0
1759	48.3	44.0	46.8	48.3	49.0	50.0	51.0	71.3	77.2	59.7	46.3	57.0
1760	67.3	59.5	74.7	58.3	72.0	48.3	66.0	75.6	61.3	50.6	59.7	61.0
1761	70.0	91.0	80.7	71.7	107.2	99.3	94.1	91.1	100.7	88.7	89.7	46.0
1762	43.8	72.8	45.7	60.2	39.9	77.1	33.8	67.7	68.5	69.3	77.8	77.2
1763	56.5	31.9	34.2	32.9	32.7	35.8	54.2	26.5	68.1	46.3	60.9	61.4
1764	59.7	59.7	40.2	34.4	44.3	30.0	30.0	30.0	28.2	28.0	26.0	25.7
1765	24.0	26.0	25.0	22.0	20.2	20.0	27.0	29.7	16.0	14.0	14.0	13.0
1766	12.0	11.0	36.6	6.0	26.8	3.0	3.3	4.0	4.3	5.0	5.7	19.2
1767	27.4	30.0	43.0	32.9	29.8	33.3	21.9	40.8	42.7	44.1	54.7	53.3
1768	53.5	66.1	46.3	42.7	77.7	77.4	52.6	66.8	74.8	77.8	90.6	111.8
1769	73.9	64.2	64.3	96.7	73.6	94.4	118.6	120.3	148.8	158.2	148.1	112.0
1770	104.0	142.5	80.1	51.0	70.1	83.3	109.8	126.3	104.4	103.6	132.2	102.3
1771	36.0	46.2	46.7	64.9	152.7	119.5	67.7	58.5	101.4	90.0	99.7	95.7
1772	100.9	90.8	31.1	92.2	38.0	57.0	77.3	56.2	50.5	78.6	61.3	64.0
1773	94.6	29.0	51.2	32.9	41.1	28.4	27.7	12.7	29.3	26.3	40.9	43.2
1774	46.8	65.4	55.7	43.8	51.3	28.5	17.5	6.6	7.9	14.0	17.7	12.2
1775	4.4	0.0	11.6	11.2	3.9	12.3	1.0	7.9	3.2	5.6	15.1	7.9
1776	21.7	11.6	6.3	21.8	11.2	19.0	1.0	24.2	16.0	30.0	35.0	40.0
1777	45.0	36.5	39.0	95.5	80.3	80.7	95.0	112.0	116.2	106.5	146.0	157.3
1778	177.3	109.3	134.0	145.0	238.9	171.6	153.0	140.0	171.7	156.3	150.3	195.0
1779	114.7	165.7	118.0	145.0	140.0	113.7	143.0	112.0	111.0	124.0	114.0	110.0
1780	70.0	98.0	98.0	95.0	107.2	88.0	86.0	86.0	93.7	77.0	60.0	58.7
1781	98.7	74.7	53.0	68.3	104.7	97.7	73.5	66.0	51.0	27.3	67.0	35.2
1782	54.0	37.5	37.0	41.0	54.3	38.0	37.0	44.0	34.0	23.2	31.5	30.0
1783	28.0	38.7	26.7	28.3	23.0	25.2	32.2	20.0	18.0	8.0	15.0	10.5
1784	13.0	8.0	11.0	10.0	6.0	9.0	6.0	10.0	10.0	8.0	17.0	14.0
1785	6.5	8.0	9.0	15.7	20.7	26.3	35.3	20.0	32.0	47.2	40.2	27.3
1786	37.2	47.6	47.7	85.4	92.3	59.0	83.0	89.7	111.5	112.3	116.0	112.7
1787	134.7	106.0	87.4	127.2	134.8	99.2	128.0	137.2	157.3	157.0	141.5	174.0
1788	138.0	129.2	143.3	108.5	113.0	154.2	141.5	136.0	141.0	142.0	94.7	129.5
1789	114.0	125.3	120.0	123.3	123.5	120.0	117.0	103.0	112.0	89.7	134.0	135.5
1790	103.0	127.5	96.3	94.0	93.0	91.0	69.3	87.0	77.3	84.3	82.0	74.0
1791	72.7	62.0	74.0	77.2	73.7	64.2	71.0	43.0	66.5	61.7	67.0	66.0
1792	58.0	64.0	58.0	75.7	62.0	61.0	45.8	60.0	59.0	59.0	57.0	56.0
1793	56.0	55.0	55.5	53.0	52.3	51.0	50.0	29.3	24.0	47.0	44.0	45.7
1794	45.0	44.0	38.0	28.4	55.7	41.5	41.0	40.0	11.1	28.5	67.4	51.4
1795	21.4	39.9	12.6	18.6	31.0	17.1	12.9	25.7	13.5	19.5	25.0	18.0
1796	22.0	23.8	15.7	31.7	21.0	6.7	26.9	1.5	18.4	11.0	8.4	5.1
1797	14.4	4.2	4.0	4.0	7.3	11.1	4.3	6.0	5.7	6.9	5.8	3.0
1798	2.0	4.0	12.4	1.1	0.0	0.0	0.0	3.0	2.4	1.5	12.5	9.9
1799	1.6	12.6	21.7	0.0	9.2	10.6	2.1	0.0	0.0	4.6	2.7	8.6
1800	6.9	9.3	13.9	0.0	5.0	23.7	31.0	19.5	11.5	12.3	10.5	40.1
1801	27.0	29.0	30.0	31.0	32.0	31.2	35.0	34.7	33.5	32.6	34.0	44.7
1802	47.0	47.0	40.8	42.0	44.0	46.0	48.0	50.0	51.8	50.5	34.5	50.0

1803	50.0	30.8	29.5	25.0	44.3	36.0	48.3	34.1	45.3	54.3	51.0	48.0
1804	45.3	48.3	48.0	50.6	33.4	36.8	29.8	43.1	52.3	62.3	61.0	60.0
1805	61.0	44.1	51.4	37.5	39.0	40.5	37.6	42.7	44.4	29.4	41.0	34.3
1806	38.0	29.6	32.7	27.7	26.4	25.6	30.0	26.3	24.0	8.0	25.0	24.0
1807	12.0	12.2	9.6	23.8	10.0	12.0	12.7	12.0	5.7	4.7	10.5	12.3
1808	0.0	4.5	0.0	12.3	13.5	13.5	6.7	8.0	11.7	0.0	0.0	0.0
1809	7.2	9.2	9.9	2.5	2.0	7.7	3.3	2.2	4.4	0.0	0.0	0.0
1810	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1811	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0	2.4	6.1	0.0	0.0
1812	11.3	1.9	1.7	11.3	1.0	1.3	5.5	15.6	5.2	3.9	7.9	10.1
1813	0.0	10.3	1.9	16.6	5.5	11.2	18.3	8.4	15.3	27.8	16.7	14.3
1814	22.2	12.0	5.7	23.8	5.8	14.9	18.5	2.3	8.1	19.3	14.5	20.1
1815	19.2	32.2	19.2	31.6	9.8	55.9	35.5	47.2	31.5	33.5	37.2	65.0
1816	26.3	68.8	73.7	58.8	44.3	43.6	38.8	23.2	47.8	56.4	38.9	29.9
1817	36.4	57.9	96.2	26.4	21.2	40.0	50.0	31.5	36.7	25.6	28.9	28.4
1818	34.9	22.4	29.7	34.5	53.1	36.4	38.0	31.5	26.1	31.7	10.9	25.8
1819	32.5	20.7	3.7	20.2	19.6	35.0	31.4	26.1	14.9	27.5	25.1	30.6
1820	19.2	26.6	4.5	19.4	29.3	10.8	20.6	25.9	5.2	9.0	7.9	9.7
1821	21.5	4.3	5.7	19.2	1.7	1.8	2.5	4.8	4.4	18.8	4.4	0.0
1822	0.0	9.9	16.1	13.5	1.5	5.6	7.9	2.1	0.0	0.0	0.0	0.0
1823	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1824	21.6	10.9	0.0	19.4	2.8	0.0	0.0	0.0	20.5	0.0	0.0	20.4
1825	5.0	15.5	22.4	3.8	15.4	15.4	30.9	25.4	15.7	25.2	11.7	22.0
1826	17.7	18.2	36.7	24.0	32.4	37.1	52.5	39.6	18.9	50.6	39.5	68.1
1827	34.6	47.4	57.8	46.0	56.3	56.7	42.9	53.7	49.6	57.2	48.2	46.1
1828	52.8	64.4	65.0	61.1	89.1	98.0	54.3	76.4	50.4	34.7	57.0	46.9
1829	43.0	49.4	72.3	95.0	67.5	73.9	90.8	78.3	52.8	57.2	67.6	56.5
1830	32.2	72.1	84.6	107.1	66.3	65.1	43.9	50.7	62.1	84.4	81.2	82.1
1831	47.5	50.1	93.4	54.6	38.1	33.4	45.2	54.9	37.9	46.2	43.5	28.9
1832	30.9	55.5	55.1	26.9	41.3	26.7	13.9	8.9	9.2	21.1	14.3	27.5
1833	11.3	14.9	11.8	2.8	12.9	1.0	7.0	5.7	11.6	7.5	5.9	9.9
1834	4.9	18.1	3.9	1.4	8.8	7.8	8.7	4.0	11.5	24.8	30.5	34.5
1835	7.5	24.5	19.7	61.5	43.6	33.2	59.8	59.0	100.8	95.2	100.0	77.5
1836	88.6	107.6	98.1	142.9	111.4	124.7	116.7	107.8	95.1	137.4	120.9	206.2
1837	188.0	175.6	134.6	138.2	111.3	158.0	162.8	134.0	96.3	123.7	107.0	129.8
1838	144.9	140.8	140.8	126.6	137.6	94.5	108.2	78.8	73.6	90.8	77.4	79.8
1839	107.6	102.5	77.7	61.8	53.8	54.6	84.7	131.2	132.7	90.8	68.8	63.6
1840	81.2	87.7	67.8	65.9	69.2	48.5	60.7	57.8	74.0	55.0	54.3	53.7
1841	24.0	29.9	29.7	42.6	67.4	55.7	30.8	39.3	35.1	28.5	19.8	38.8
1842	20.4	22.1	21.7	26.9	24.9	20.5	17.6	26.5	18.5	38.1	40.5	17.6
1843	13.3	3.5	8.3	8.8	21.1	10.5	9.5	11.8	4.2	5.3	19.1	12.7
1844	9.4	14.7	13.6	20.8	12.0	3.7	21.2	23.9	6.9	21.5	10.7	21.6
1845	25.7	43.6	43.3	56.9	47.8	31.1	30.6	32.3	29.6	39.4	39.4	59.7
1846	38.7	51.0	63.9	69.2	59.9	65.1	46.5	54.8	107.1	55.9	60.4	65.5
1847	62.6	44.9	85.7	44.7	75.4	85.3	52.2	140.6	161.2	180.4	138.9	109.6
1848	159.1	111.8	108.9	107.1	102.2	129.0	139.2	132.5	100.3	132.4	114.6	159.9
1849	156.7	131.7	96.5	102.5	80.6	81.2	78.0	67.7	93.7	71.5	99.7	97.0
1850	78.0	89.4	82.6	44.1	61.6	70.0	39.1	61.6	86.2	71.0	54.8	61.0
1851	75.5	105.4	64.6	56.5	62.6	63.2	36.1	57.4	67.9	62.5	50.9	71.4
1852	68.4	66.4	61.2	65.4	54.9	46.9	42.0	39.7	37.5	67.3	54.3	45.4
1853	41.1	42.9	37.7	47.6	34.7	40.0	45.9	50.4	33.5	42.3	28.8	23.4
1854	15.4	20.0	20.7	26.4	24.0	21.1	18.7	15.8	22.4	12.7	28.2	21.4
1855	12.3	11.4	17.4	4.4	9.1	5.3	0.0	3.1	9.7	4.2	9.7	3.1
1856	5.5	4.9	17.4	6.5	0.0	5.2	4.6	5.9	4.4	4.5	7.7	7.2
1857	13.7	7.4	5.2	11.1	28.6	16.0	22.2	16.9	42.4	40.6	31.4	37.2
1858	39.0	34.9	57.5	38.3	41.4	44.5	56.7	51.2	80.1	51.9	51.9	66.9
1859	83.7	87.6	90.3	87.1	91.0	87.1	95.2	106.8	105.8	114.6	97.2	81.0
1860	82.4	88.0	98.9	71.4	107.1	108.6	116.7	100.3	92.2	90.1	97.9	95.6
1861	63.3	77.8	101.0	98.5	108.6	87.8	79.0	82.5	79.9	67.2	53.7	60.7
1862	63.1	64.5	43.6	53.7	64.4	84.0	73.4	62.5	68.6	42.0	50.6	40.9

1863	48.3	56.7	66.4	40.6	53.8	40.8	32.7	48.1	22.0	39.9	37.7	41.2
1864	57.7	47.1	66.3	35.8	40.6	57.8	54.7	54.0	28.5	33.9	37.7	28.6
1865	48.7	39.3	66.3	29.4	34.5	33.6	26.8	37.8	21.6	17.1	24.6	12.8
1866	31.6	38.4	24.6	17.6	12.9	16.5	9.3	12.7	7.3	14.1	9.0	1.5
1867	9.0	7.7	9.2	9.1	2.9	1.9	9.0	4.8	9.8	13.5	9.6	25.2
1868	15.8	15.8	26.5	36.6	26.7	31.1	39.0	34.4	47.2	61.7	59.1	67.6
1869	60.9	59.3	52.7	41.0	104.0	108.4	59.2	79.6	80.6	59.4	77.4	104.3
1870	77.3	114.9	160.0	175.0	176.0	135.6	132.4	153.8	136.0	146.4	147.5	130.0
1871	88.3	125.3	143.2	162.4	145.5	191.7	103.0	110.0	80.3	89.0	105.4	90.3
1872	79.5	120.1	88.4	102.1	107.6	109.9	103.5	92.9	114.6	103.5	112.0	83.9
1873	86.7	107.0	98.3	76.2	47.9	44.8	66.9	68.2	47.5	47.4	55.4	49.2
1874	60.8	64.2	46.4	32.0	44.6	38.2	67.8	61.3	28.0	34.3	28.9	29.3
1875	14.6	21.5	33.8	29.1	11.5	23.9	12.5	14.6	2.4	12.7	17.7	9.9
1876	14.3	15.0	31.2	2.3	5.1	1.6	15.2	8.8	9.9	14.3	9.9	8.2
1877	24.4	8.7	11.9	15.8	21.6	14.2	6.0	6.3	16.9	6.7	14.2	2.2
1878	3.3	6.6	7.8	1.1	5.9	6.4	1.1	0.0	5.3	1.1	4.1	5.5
1879	1.0	6.2	0.0	6.2	2.4	4.8	7.5	10.7	6.1	12.3	13.1	7.3
1880	24.0	27.2	19.3	19.5	23.5	34.1	21.9	48.1	66.0	43.0	30.7	29.6
1881	36.4	53.2	51.5	51.7	43.5	60.5	76.9	58.0	53.2	64.0	54.8	47.3
1882	45.0	69.3	67.5	95.8	64.1	45.2	45.4	40.4	57.7	59.2	84.4	41.8
1883	60.6	46.9	42.8	82.1	31.5	76.3	80.6	46.0	52.6	83.8	84.5	75.9
1884	91.5	86.9	86.8	76.1	66.5	51.2	53.1	55.8	61.9	47.8	36.6	47.2
1885	42.8	71.8	49.8	95.0	73.0	83.7	66.5	50.0	39.6	38.7	30.9	21.7
1886	29.9	25.9	57.3	43.7	30.7	27.1	30.3	16.9	21.4	8.6	6.6	13.0
1887	10.3	13.2	4.2	6.9	20.0	15.7	23.3	21.4	7.4	6.9	10.7	20.7
1888	12.7	7.1	7.8	5.1	7.1	7.1	3.1	2.8	8.8	2.1	10.7	6.7
1889	8	8.5	6.7	4.3	2.4	6.4	9.4	20.6	6.5	2.1	6.7	6.7
1890	5.3	6	5.1	1.6	4.8	1.3	11.6	8.5	17.2	11.2	9.6	7.8
1891	13.5	22.2	10.4	20.5	41.1	48.3	58.8	33.2	53.8	51.5	41.9	32.2
1892	69.1	75.6	49.9	69.6	79.6	76.3	76.8	101.4	62.8	70.5	63.4	78.6
1893	75.0	73.0	65.7	88.1	84.7	89.9	88.6	129.2	77.9	80.0	75.1	93.8
1894	83.2	84.6	52.3	81.6	101.2	98.9	106.0	70.3	65.9	75.5	56.6	60.0
1895	63.3	67.2	61.0	76.9	67.5	71.5	47.8	68.9	57.7	67.9	47.2	70.7
1896	22.0	57.4	52.0	43.8	27.7	49.0	45.0	27.2	61.3	28.7	38.0	42.6
1897	40.6	29.4	29.1	31.0	20.0	11.3	27.6	21.8	48.1	14.3	8.4	33.3
1898	30.2	36.4	38.3	14.5	25.8	22.3	9.0	31.4	34.8	34.4	30.9	12.6
1899	19.5	19.2	18.1	14.2	7.7	20.5	13.5	2.9	8.4	13.0	7.8	10.5
1900	9.4	13.6	8.6	16.0	15.2	12.1	8.3	4.3	8.3	12.9	4.5	3.3
1901	2	2.4	4.5	0.0	10.2	5.8	7	1.0	6.6	3.7	3.8	0.0
1902	5.5	0.0	12.4	0.0	2.8	1.4	9	2.3	7.6	16.3	10.3	1.1
1903	8.3	17.0	13.5	26.1	14.6	16.3	27.9	28.8	11.1	38.9	44.5	45.6
1904	31.6	24.5	37.2	43.0	39.5	41.9	50.6	58.2	30.1	54.2	38.0	54.6
1905	54.8	85.8	56.5	39.3	48.0	49.0	73.0	58.8	55.0	78.7	107.2	55.5
1906	45.5	31.2	64.5	55.2	57.7	63.2	103.3	47.7	56.1	17.8	38.9	64.7
1907	76.4	108.2	60.7	52.6	43.0	40.4	49.7	54.3	85.0	65.4	47.3	47.3
1908	39.2	33.9	28.7	57.6	40.8	48.1	39.5	30.5	86.9	32.3	45.5	39.5
1909	56.7	46.6	66.3	32.3	35.0	22.6	35.8	23.1	38.8	58.4	55.8	54.2
1910	26.4	31.5	21.4	8.4	22.2	12.3	14.1	11.5	26.2	38.3	4.9	5.8
1911	3.4	9.0	7.8	16.5	9.0	2.2	3.5	4.0	4.0	2.6	4.2	2.2
1912	3	0.0	4.9	4.5	4.4	4.1	3.0	3.5	9.5	4.6	1.1	6.4
1913	2.3	2.9	5	9	0.0	0.0	1.7	2	1.2	3.1	1.7	3.8
1914	2.8	2.6	3.1	17.3	5.2	11.4	5.4	7.7	12.7	8.2	16.4	22.3
1915	23.0	42.3	38.8	41.3	33.0	68.8	71.6	69.6	49.5	53.5	42.5	34.5
1916	45.3	55.4	67.0	71.8	74.5	67.7	53.5	35.2	45.1	50.7	65.6	53.0
1917	74.7	71.9	94.8	74.7	114.1	114.9	119.8	154.5	129.4	72.2	96.4	129.3
1918	96.0	65.3	72.2	80.5	76.7	59.4	107.6	101.7	79.9	85.0	83.4	159.2
1919	48.1	79.5	66.5	51.8	88.1	111.2	64.7	69.0	54.7	52.8	42.0	34.9
1920	51.1	53.9	70.2	14.8	33.3	38.7	27.5	19.2	36.3	49.6	27.2	29.9
1921	31.5	28.5	26.7	37.4	22.2	37.7	41.9	32.8	17.8	17.8	17.8	17.8
1922	11.8	26.4	84.7	11.0	8.0	5.8	10.9	6.5	4.7	16.2	17.4	17.4

*** 3-MONTH MOVING AVERAGE (COMPUTED WITH END MONTH) SUN SPOTS VALUES FOR JAN 1749 THRU MAY 1980 ***

*** DATE OF THIS LISTING: JUN 19, 1980 -- ATMOSPHERIC SCIENCES DIVISION NASA/MSFC/ES04 ***

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	'EP	OCT	NOV	DEC
1749	0.0	0.0	63.5	62.8	70.2	74.7	87.8	81.5	79.0	72.6	103.3	106.4
1750	105.7	78.1	79.5	84.5	89.2	92.8	91.8	96.1	93.2	85.6	73.4	68.1
1751	69.6	63.0	52.9	48.4	54.1	55.9	59.2	58.9	49.9	35.5	25.1	31.9
1752	35.8	43.0	52.0	60.1	63.9	52.9	59.2	49.1	44.9	34.3	37.1	41.4
1753	40.5	38.7	40.6	38.6	39.9	35.2	29.9	30.9	29.7	30.7	24.3	17.2
1754	8.9	3.2	1.6	6.1	12.0	20.4	22.1	19.3	13.1	14.9	15.2	13.8
1755	9.2	8.5	9.4	8.2	4.4	2.2	2.9	3.9	9.9	14.9	16.1	16.8
1756	13.1	13.2	8.3	7.3	9.1	11.6	9.7	7.6	7.3	10.8	14.4	13.6
1757	13.5	14.9	20.5	25.8	31.4	27.0	25.3	29.7	38.7	41.2	45.6	43.6
1758	45.3	41.0	46.2	57.8	55.9	54.6	45.1	42.6	48.4	46.3	47.7	41.2
1759	44.8	45.1	46.4	45.9	47.6	48.7	50.0	57.4	66.5	69.4	61.1	54.3
1760	56.9	61.3	67.2	64.2	68.3	59.5	62.1	63.3	67.6	62.5	57.2	57.1
1761	63.6	74.0	80.6	81.1	86.5	92.7	100.2	94.8	95.3	93.5	93.0	74.8
1762	59.8	54.2	54.1	59.6	48.6	59.1	50.3	59.5	56.7	68.5	71.9	74.8
1763	70.5	55.2	40.9	33.0	33.3	33.8	40.9	38.8	49.6	47.0	58.4	56.2
1764	60.7	60.3	53.2	44.8	39.6	36.2	34.8	30.9	49.6	28.7	27.4	26.6
1765	25.2	25.2	23.0	24.3	22.4	20.7	22.4	25.6	24.2	19.9	14.7	13.7
1766	13.0	12.0	19.9	17.9	23.1	11.9	11.0	3.4	3.9	4.4	5.0	10.0
1767	17.4	25.5	33.5	35.3	35.2	32.0	28.3	32.0	35.1	42.5	47.2	50.7
1768	53.8	57.6	55.3	51.7	55.6	65.9	69.2	65.6	64.7	73.1	81.1	93.4
1769	92.1	83.3	67.5	75.1	78.2	88.2	95.5	111.1	129.2	142.4	151.7	139.4
1770	121.4	119.5	108.9	91.2	67.1	68.1	87.7	106.5	113.5	111.4	113.4	112.7
1771	90.2	61.5	43.0	52.6	88.1	112.4	113.3	81.9	75.9	83.3	97.0	95.1
1772	98.8	95.8	74.3	71.4	53.8	62.4	57.4	63.5	61.3	61.8	63.5	68.0
1773	60.0	49.2	44.9	37.7	41.7	34.1	32.4	22.9	23.2	22.8	32.2	36.8
1774	43.6	51.8	56.0	55.0	50.3	41.2	32.4	17.5	10.7	9.5	13.2	14.6
1775	11.4	5.5	5.3	7.6	8.9	9.1	5.7	7.1	4.0	5.6	8.0	9.5
1776	14.9	13.7	13.2	13.2	13.1	17.3	10.4	14.7	13.7	23.4	27.0	35.0
1777	40.0	40.5	40.2	57.0	71.6	85.5	85.3	95.9	107.7	111.6	122.9	136.6
1778	160.2	148.0	140.2	129.4	122.6	185.2	187.8	154.9	154.9	156.0	159.4	137.2
1779	123.3	128.5	132.8	142.9	134.3	132.9	132.2	122.9	122.0	115.7	116.3	116.0
1780	98.0	92.7	88.7	97.0	100.1	96.7	93.7	86.7	88.6	85.6	76.9	65.2
1781	72.5	77.4	75.5	65.3	75.3	90.2	92.0	79.1	63.5	49.1	48.4	43.2
1782	52.1	42.2	42.8	38.5	44.1	44.4	43.1	39.7	38.3	33.7	29.6	28.2
1783	29.8	32.2	31.1	31.2	26.0	25.5	26.8	25.8	23.4	15.3	13.7	11.2
1784	12.8	10.5	10.7	9.7	9.0	8.3	7.0	8.3	8.7	9.3	11.7	13.0
1785	12.5	9.5	7.8	10.9	15.1	20.9	27.8	27.5	29.4	33.1	39.8	38.2
1786	34.9	37.4	44.2	60.2	75.1	78.9	78.1	77.2	94.7	104.5	113.3	113.7
1787	121.1	117.8	109.4	106.9	116.5	120.4	120.7	121.5	140.8	150.5	151.9	157.5
1788	151.2	147.1	136.8	127.0	121.6	125.2	136.2	143.9	139.5	139.7	125.9	122.1
1789	112.7	122.9	119.8	122.9	122.3	122.3	120.2	113.3	110.7	101.6	111.9	119.7
1790	124.2	122.0	108.9	105.9	94.4	92.7	84.4	82.4	77.9	82.9	81.2	80.1
1791	76.2	69.6	69.6	71.1	75.0	71.7	69.6	59.4	60.2	57.1	64.9	64.9
1792	63.7	62.7	61.7	67.6	66.9	66.2	56.3	55.6	54.9	59.3	58.3	57.3
1793	56.3	55.7	55.5	54.5	53.6	52.1	51.1	43.4	34.4	33.4	38.3	45.6
1794	44.9	44.9	42.3	36.8	40.7	41.9	46.1	40.8	30.7	26.5	35.7	49.1
1795	46.7	37.6	24.6	23.7	20.7	22.2	20.3	18.6	17.4	19.6	19.3	20.8
1796	21.7	21.3	20.5	23.7	22.8	19.8	18.2	11.7	15.6	10.3	12.6	8.2
1797	5.3	7.9	7.5	4.1	5.1	7.5	7.6	7.1	5.3	6.2	6.1	5.2
1798	3.6	3.0	6.1	5.8	4.5	4.4	0.0	1.0	1.8	2.3	5.5	8.0
1799	8.0	8.0	12.0	14.2	12.8	9.1	7.0	4.2	7.7	1.5	2.4	5.3
1800	6.1	8.3	10.0	7.7	6.3	9.6	16.6	21.4	17.3	14.4	11.4	21.0
1801	25.9	32.0	28.7	30.0	31.0	31.4	32.7	31.0	35.7	34.9	37.7	40.5
1802	45.3	47.7	45.2	43.3	42.3	44.0	46.0	48.0	49.9	46.8	41.6	41.0

1803	44.8	50.3	43.4	35.1	42.9	39.5	42.6	44.6	50.2	51.1
1804	48.1	47.2	47.2	49.0	32.7	32.7	42.0	52.8	58.8	61.1
1805	60.7	35.0	32.8	44.3	42.6	39.0	41.6	38.8	38.3	35.2
1806	39.4	35.6	33.8	30.0	28.9	27.3	26.8	25.8	25.3	25.3
1807	20.3	16.1	11.3	15.2	14.5	11.6	10.1	8.6	9.0	3.5
1808	9	15.8	1.5	5.6	11.2	9.4	8.9	8.1	9.0	9.2
1809	10.0	9.6	5.8	4.2	3.3	2.7	3.3	2.2	1.1	0.0
1810	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1811	0.0	0.0	0.0	0.0	2.2	2.2	3.0	2.8	3.1	2.7
1812	4.4	4.8	4.6	9	8.6	5.8	7.1	8.2	5.7	7.3
1813	6.0	6.8	4.1	9.6	8.0	11.7	14.0	17.2	19.9	19.6
1814	17.9	16.2	13.3	13.8	11.9	11.9	9.6	9.9	14.0	18.0
1815	17.9	23.8	25.9	30.0	33.7	33.7	38.1	37.4	14.0	45.2
1816	42.0	53.4	56.3	67.1	42.2	35.2	36.6	42.5	47.4	41.5
1817	34.8	41.4	63.5	60.2	37.1	45.0	43.9	35.8	30.4	27.6
1818	30.7	28.6	29.0	28.9	39.2	32.0	28.5	29.8	22.9	22.8
1819	23.1	26.3	19.9	14.9	24.9	30.8	24.1	22.8	22.5	27.7
1820	25.0	25.5	16.8	16.8	28.7	19.1	17.2	13.4	7.4	8.9
1821	13.0	11.8	10.5	6.4	2.0	3.0	3.9	9.3	9.2	7.7
1822	1.5	3.3	5.7	10.2	5.0	5.2	3.9	8	1	7.7
1823	0.0	0.0	2	2	2	2	2	0	0	1
1824	14.0	17.6	10.8	10.1	7.4	7.4	7.3	15.7	15.2	8.7
1825	1.9	7.1	14.3	13.9	13.9	23.9	24.0	15.7	15.2	8.7
1826	17.1	19.3	24.2	26.3	31.2	43.1	37.0	36.4	14.3	16.4
1827	47.4	50.4	46.6	50.4	53.4	51.1	48.7	53.5	36.3	52.7
1828	49.0	54.4	60.7	63.5	71.7	76.2	60.4	53.8	51.7	59.5
1829	49.0	46.4	54.9	72.2	78.3	81.0	74.0	62.8	47.4	46.2
1830	58.8	60.3	69.6	87.9	86.0	91.0	82.6	59.2	59.2	60.4
1831	70.3	59.9	63.7	66.0	38.9	52.2	52.2	46.3	79.9	82.6
1832	34.4	38.4	47.2	45.8	27.3	44.5	46.0	46.3	42.5	39.5
1833	17.7	17.9	12.7	9.8	27.3	16.5	10.3	12.7	14.5	21.0
1834	6.9	11.0	9.0	7.8	7.0	4.6	8.1	8.3	8.3	7.8
1835	24.2	22.2	17.2	35.2	41.6	6.8	8.1	13.4	22.3	29.9
1836	86.7	91.2	98.1	116.2	45.5	59.7	73.2	85.0	98.7	90.9
1837	171.7	189.9	166.1	149.5	117.6	116.4	106.5	113.4	117.8	154.8
1838	127.2	139.8	123.5	117.4	144.0	151.6	131.0	118.0	109.0	120.2
1839	88.3	95.6	107.7	117.4	113.4	93.8	86.9	81.1	80.6	82.7
1840	71.2	77.5	78.9	73.8	64.4	90.2	116.2	118.2	97.4	74.4
1841	44.0	35.9	27.9	34.1	59.5	55.7	64.2	62.3	61.1	54.3
1842	26.3	27.1	21.4	23.6	51.3	41.9	35.1	34.3	32.8	29.0
1843	23.8	11.5	8.4	6.9	19.3	19.9	19.2	27.7	32.4	32.1
1844	13.7	12.3	12.6	16.4	12.3	10.6	8.5	17.4	9.5	12.4
1845	19.3	30.3	37.5	47.9	36.5	16.3	17.3	17.4	13.0	17.9
1846	45.9	49.8	51.2	61.4	64.3	31.3	30.8	34.2	36.6	46.6
1847	62.8	57.7	64.4	58.4	57.2	55.5	69.5	72.6	74.5	60.6
1848	135.9	126.8	126.6	109.3	71.0	93.7	118.0	160.7	160.2	143.0
1849	143.7	149.4	128.3	110.2	123.5	133.6	124.0	121.7	115.8	135.6
1850	91.6	88.1	83.3	72.0	56.9	75.6	79.8	77.6	88.3	89.4
1851	63.8	80.6	81.8	75.5	62.8	56.9	62.3	72.9	70.7	62.3
1852	62.6	68.7	65.3	64.3	54.0	52.2	53.8	62.6	60.4	61.6
1853	46.9	43.1	40.6	42.7	47.9	42.9	39.7	48.2	53.0	55.7
1854	22.5	19.6	18.7	22.4	40.2	43.4	43.3	42.1	34.9	31.5
1855	20.6	15.0	13.7	11.1	23.8	18.5	19.0	17.0	21.1	20.8
1856	2.6	2.8	1.9	3.9	6.3	2.9	1.2	4.3	4.6	5.7
1857	3.5	9.4	8.8	7.9	3.3	5.2	5.0	4.9	5.5	6.5
1858	35.9	37.0	43.8	43.6	22.3	18.4	27.2	33.3	38.1	36.4
1859	67.5	79.4	87.2	87.9	47.5	52.2	64.0	75.5	70.0	70.0
1860	86.9	83.9	89.8	86.1	91.1	96.4	102.6	109.1	105.9	97.6
1861	85.3	74.6	80.4	82.4	110.9	108.5	103.1	94.2	93.4	94.5
1862	85.8	69.4	57.1	93.9	73.9	73.3	67.3	64.0	64.0	64.0
1863	85.8	69.4	57.1	93.9	73.9	73.3	67.3	64.0	64.0	64.0

1863	46.6	48.6	57.1	56.6	53.6	45.1	42.4	40.5	34.3	36.7	33.2	39.6
1864	45.5	48.7	57.0	49.7	47.6	44.7	51.0	55.8	46.0	39.1	40.0	40.0
1865	45.0	39.9	42.5	36.9	34.5	32.5	31.6	32.7	28.7	25.5	21.1	18.2
1866	23.0	27.6	31.5	26.9	19.4	15.7	12.9	12.8	9.8	11.4	10.1	8.2
1867	3.5	7.7	3.3	5.0	5.7	3.2	3.1	3.8	6.5	9.4	11.0	16.1
1868	16.8	18.9	19.3	26.3	29.9	31.5	28.9	31.5	36.9	47.8	56.0	62.8
1869	62.5	62.6	57.6	51.0	65.9	84.5	90.5	82.4	73.1	73.2	72.5	80.4
1870	86.3	98.8	117.4	145.0	165.3	157.2	148.0	140.6	140.7	145.4	143.3	141.3
1871	121.9	114.5	118.9	143.6	150.4	133.2	113.4	101.6	97.8	93.1	91.6	94.9
1872	91.7	96.6	96.0	103.5	99.4	100.5	107.7	102.8	104.3	103.7	110.0	99.8
1873	94.2	92.5	97.3	93.8	74.1	56.3	53.2	60.0	60.9	54.4	50.1	50.7
1874	55.1	58.1	57.1	47.5	41.0	38.3	50.2	55.8	52.4	41.2	30.4	30.8
1875	24.3	21.8	23.3	28.1	24.8	21.5	16.0	17.0	9.8	9.9	10.9	13.4
1876	14.0	13.1	18.7	16.2	12.9	3.0	7.3	8.5	11.3	11.0	11.4	10.8
1877	14.2	13.8	15.0	12.1	16.4	17.2	13.9	8.8	9.7	10.0	12.6	7.7
1878	6.6	4.0	5.9	4.8	4.6	4.1	4.1	2.2	1.8	2.1	3.5	1.9
1879	1.9	7.7	1.9	2.3	2.9	4.5	4.9	7.7	8.1	9.7	10.5	10.9
1880	14.8	19.5	23.5	22.0	20.8	25.7	26.5	34.7	45.3	52.4	46.6	34.4
1881	32.2	39.7	47.0	52.1	48.9	51.9	60.3	65.1	62.7	58.4	57.3	55.4
1882	49.0	53.9	60.6	77.5	75.8	68.4	51.6	43.7	47.8	52.4	67.1	61.8
1883	62.3	49.8	50.1	57.3	52.1	63.3	67.6	67.6	59.7	60.8	73.6	81.4
1884	84.0	84.8	88.4	83.3	76.5	64.6	56.9	53.4	56.9	55.2	48.8	43.9
1885	42.2	53.9	54.8	58.9	59.3	70.6	74.4	66.7	52.0	42.8	36.4	30.4
1886	27.5	25.9	37.7	42.3	43.9	33.8	29.4	24.8	22.9	15.6	10.1	7.3
1887	7.9	12.2	9.2	8.1	10.4	14.2	19.7	20.1	17.4	11.8	7.0	11.4
1888	13.4	13.5	9.2	6.7	6.6	6.4	5.7	4.3	4.9	4.6	7.2	6.5
1889	6.1	5.3	5.3	6.5	4.5	4.4	5.1	12.1	12.2	9.7	2.9	3.0
1890	4.1	4.2	3.7	2.4	3.8	2.6	5.9	7.1	12.4	12.3	12.7	9.5
1891	10.3	14.5	15.4	17.7	24.0	36.6	49.4	46.8	48.6	46.2	49.1	41.9
1892	47.7	59.0	64.9	65.0	66.4	75.2	77.6	84.8	80.3	78.2	66.2	71.5
1893	73.0	75.5	71.2	75.6	79.5	87.6	87.7	102.6	93.6	95.7	77.7	83.0
1894	84.0	87.2	73.4	72.8	78.4	93.9	102.0	91.7	80.7	70.6	66.0	64.0
1895	60.0	63.5	63.8	68.4	68.5	72.0	62.3	62.7	58.1	64.8	57.6	61.9
1896	49.0	52.4	46.1	51.1	41.2	40.2	40.6	40.4	44.5	39.1	42.7	36.4
1897	40.4	37.5	33.0	29.8	26.7	20.8	19.0	20.9	32.5	28.1	23.6	18.7
1898	21.0	33.3	35.0	29.7	25.2	20.9	19.0	20.9	25.1	33.5	33.4	26.0
1899	21.0	13.8	15.6	13.8	13.3	14.1	13.9	12.3	8.3	8.1	9.7	10.4
1900	9.2	11.2	10.5	12.7	11.4	14.4	11.9	8.2	7.0	8.5	8.6	5.9
1901	1.7	1.0	2.4	2.3	4.9	5.3	5.6	2.5	8	1.8	2.7	2.5
1902	3.1	1.8	6.0	4.1	5.1	1.4	1.7	1.5	3.6	8.7	11.4	9.2
1903	6.6	8.9	12.9	18.9	18.1	19.0	19.6	24.3	22.6	26.3	31.5	43.0
1904	40.6	33.9	31.1	34.9	39.9	41.5	44.0	50.2	46.3	47.5	40.8	48.9
1905	65.7	65.1	65.7	60.5	47.9	45.4	56.7	60.3	62.3	64.2	80.3	80.5
1906	69.4	44.1	47.1	50.4	59.2	58.7	74.7	71.4	69.0	40.5	37.6	40.5
1907	60.0	83.1	81.8	73.8	52.1	45.3	44.4	48.1	63.0	68.2	70.6	58.1
1908	49.3	40.1	33.9	40.1	42.4	48.8	42.8	59.4	72.3	69.9	54.9	39.1
1909	47.2	47.6	56.5	48.4	44.9	30.3	31.5	27.2	32.6	40.1	51.0	56.1
1910	45.5	37.4	26.4	20.4	17.3	14.3	16.2	12.6	17.3	25.3	23.1	16.3
1911	4.7	6.1	6.7	11.1	11.1	9.2	4.9	3.2	3.8	3.5	3.6	3.0
1912	2.2	8	1.7	3.1	4.6	4.3	3.8	2.5	4.3	4.8	5.1	4.0
1913	3.3	3.9	1.9	1.4	4.5	3.3	6.6	6.6	1.0	1.5	1.7	2.5
1914	2.4	3.1	2.8	7.7	8.5	11.3	7.3	8.2	8.6	9.5	12.4	15.6
1915	20.6	29.2	34.7	40.8	37.7	47.7	57.9	70.0	63.6	57.5	48.5	43.5
1916	40.8	45.1	55.9	64.7	71.1	71.3	65.2	52.1	44.6	43.7	53.8	56.4
1917	64.4	66.5	80.5	80.5	94.5	101.2	116.3	129.7	134.6	118.7	99.3	99.3
1918	107.2	96.9	77.8	73.7	76.5	72.2	81.2	89.6	96.4	88.9	82.8	75.9
1919	63.6	62.3	64.7	65.9	68.8	93.7	88.0	81.6	62.8	58.8	43.2	43.2
1920	42.7	46.6	46.3	39.4	39.4	28.9	33.2	28.5	27.7	35.0	37.7	35.6
1921	29.5	29.9	28.0	27.1	27.1	28.4	32.6	32.8	27.7	19.4	17.7	10.8
1924	14.8	19.0	30.1	30.1	24.0	8.1	8.2	7.7	7.4	5.0	6.1	10.4

1923	9.8	7.8	3.1	3.6	4.2	6.1	5.3	4.4	5.7	8.4	11.6	8.1
1924	4.4	2.8	2.5	6.1	11.3	18.7	24.3	23.8	24.2	23.3	24.4	21.5
1925	14.8	15.1	15.6	24.3	30.8	49.7	42.9	41.3	45.5	55.8	62.7	75.5
1926	76.3	80.1	68.1	57.0	55.1	58.8	63.4	62.5	58.2	64.6	64.3	70.5
1927	73.8	84.7	81.4	85.4	80.7	77.2	64.4	55.9	59.0	61.8	66.2	58.5
1928	65.3	67.4	69.8	79.8	81.0	83.0	88.8	91.1	90.5	78.3	67.1	56.9
1929	59.4	63.6	60.6	55.3	53.7	61.0	66.8	69.3	56.8	51.4	56.5	81.0
1930	84.8	74.4	50.1	41.0	36.7	34.6	29.2	25.2	26.3	30.5	34.0	31.9
1931	25.2	27.8	29.2	34.8	28.6	23.7	19.1	15.2	16.5	14.0	15.9	15.5
1932	16.2	13.5	11.3	11.0	13.4	17.1	16.6	12.5	6.8	7.0	9.4	9.4
1933	16.5	15.2	14.9	11.7	5.4	3.8	3.7	2.7	2.7	2.8	2.9	1.3
1934	1.4	3.8	5.2	17.8	11.8	12.6	11.9	8.1	7.2	6.0	6.1	9.9
1935	14.2	18.2	20.7	18.6	20.9	28.4	35.6	36.6	35.4	41.8	53.2	59.6
1936	62.8	66.2	71.4	75.4	68.9	66.5	59.0	69.8	71.8	84.0	93.5	109.3
1937	123.8	128.1	115.0	107.2	103.3	118.8	130.7	137.7	127.8	121.1	100.0	96.0
1938	98.2	102.1	101.4	102.2	105.0	108.6	130.1	126.2	123.5	101.5	103.6	104.7
1939	88.4	83.5	74.1	83.7	97.3	109.5	105.6	101.5	105.3	102.2	89.6	66.1
1940	53.6	50.7	64.4	67.8	66.1	66.3	68.6	85.6	79.8	75.7	60.0	60.6
1941	57.4	52.8	43.5	41.2	36.2	40.7	52.1	62.2	64.3	57.4	50.2	39.4
1942	35.9	40.7	47.5	55.9	46.6	32.4	18.0	16.4	18.4	18.9	22.4	24.1
1943	21.9	21.3	22.9	27.5	22.5	15.9	11.6	13.4	14.2	12.4	9.3	12.3
1944	10.9	7.7	5.1	3.9	4.6	2.6	4.2	8.9	12.0	16.0	14.0	18.7
1945	19.2	19.9	17.6	22.1	28.0	32.9	36.5	34.9	34.5	43.2	49.9	47.4
1946	40.3	53.7	70.1	79.5	79.1	78.0	91.5	99.0	105.9	101.3	106.8	115.9
1947	120.4	123.6	126.3	137.7	160.3	171.7	174.4	170.2	172.0	173.9	153.7	136.0
1948	117.7	103.7	96.5	123.5	152.8	177.2	161.3	156.0	147.8	145.8	125.1	123.4
1949	117.6	146.5	153.0	162.3	136.9	125.0	117.9	123.8	131.6	133.6	140.1	130.9
1950	120.9	104.7	102.0	106.0	109.8	101.1	93.6	86.6	75.8	66.0	55.8	36.8
1951	56.3	58.0	58.6	69.6	85.8	100.7	90.2	74.4	68.5	65.2	62.4	49.9
1952	46.3	36.4	28.5	24.6	24.8	29.6	33.0	43.5	40.8	35.6	24.7	26.7
1953	27.6	21.6	13.5	13.9	16.8	20.7	14.3	18.0	17.1	17.0	9.7	4.1
1954	1.4	1.1	3.3	4.4	4.5	9.9	1.9	4.5	4.9	5.6	5.9	7.9
1955	13.3	17.2	16.3	12.7	15.0	24.0	29.1	33.0	36.7	47.3	63.5	74.9
1956	78.9	91.5	105.3	117.3	121.9	121.3	127.4	138.4	137.3	166.0	176.6	182.9
1957	186.1	162.4	197.7	154.3	165.7	180.2	184.2	182.0	193.7	215.9	233.5	234.7
1958	217.6	202.3	186.0	183.9	187.3	180.9	179.4	187.7	197.6	194.3	178.3	173.8
1959	185.8	182.7	182.1	164.0	173.7	168.0	163.4	172.6	164.8	152.1	126.9	120.1
1960	131.8	125.8	118.2	110.1	114.6	117.3	117.2	122.0	127.7	114.7	99.9	86.0
1961	77.7	63.2	52.3	53.5	55.1	63.3	66.2	67.8	63.2	52.4	44.6	36.7
1962	37.1	43.0	44.9	47.4	45.2	44.0	35.8	28.5	31.6	37.5	39.2	29.9
1963	23.3	22.5	20.4	23.6	29.8	36.1	32.8	29.6	30.5	35.8	32.5	24.5
1964	17.9	16.0	16.5	14.3	11.5	9.1	7.2	7.2	5.7	6.7	6.1	9.5
1965	13.7	15.6	17.5	10.9	14.2	15.6	17.3	12.2	12.5	15.3	17.6	17.6
1966	20.3	23.2	26.0	32.8	39.8	47.2	49.9	51.9	52.7	52.9	54.9	61.6
1967	79.5	91.6	105.4	91.6	89.3	74.4	81.8	88.7	91.8	90.7	86.4	103.0
1968	114.2	120.0	108.6	95.1	100.2	106.2	111.2	105.2	107.5	111.4	103.6	101.2
1969	101.0	111.6	120.2	121.0	120.9	110.9	107.6	100.3	95.4	95.0	93.5	95.7
1970	101.0	112.4	114.1	113.4	113.3	114.6	115.6	104.1	101.7	93.0	93.8	88.4
1971	90.0	84.6	77.0	70.5	63.3	59.7	62.8	64.1	64.2	54.4	55.0	65.7
1972	69.0	77.4	76.7	77.2	74.6	77.2	81.7	80.4	72.4	67.4	55.6	49.4
1973	43.4	43.9	44.1	48.9	49.7	46.5	35.0	29.4	36.0	38.5	38.0	26.0
1974	24.9	25.6	25.0	29.2	33.7	38.6	43.8	41.8	43.2	40.3	37.4	30.9
1975	21.5	17.0	14.0	9.4	8.5	8.5	16.2	26.4	27.3	20.9	14.1	12.1
1976	11.8	6.7	11.4	13.0	17.7	14.5	8.9	10.2	10.6	16.8	13.1	13.7
1977	12.3	18.3	16.1	14.9	13.6	23.3	26.2	30.0	31.8	39.3	39.0	38.7
1978	41.4	62.9	74.0	89.9	86.3	92.5	82.7	74.5	88.9	107.1	120.4	115.2
1979	129.1	142.3	147.4	125.7	124.6	128.5	147.8	150.4	163.3	172.3	186.0	181.9
1980	173.9	165.9	149.3	150.8	157.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0

***** 13-MONTH MOVING AVERAGE (COMPUTED USING ZURICH'S METHOD) SUN SPOT VALUES FOR JAN 1749 THRU MAY 1980 *****
 ***** DATE OF THIS LISTING: JUN 19, 1980 -- ATMOSPHERIC SCIENCES DIVISION HASA/MSFC/ES84 *****

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1749	0.0	0.0	0.0	0.0	0.0	0.0	81.6	82.8	84.1	86.3	87.8	88.7
1750	89.6	90.2	92.3	92.6	89.2	93.8	83.3	81.0	79.6	75.4	72.9	69.6
1751	66.8	64.2	59.5	54.9	51.7	49.0	46.2	45.0	46.4	47.5	47.6	47.1
1752	47.2	46.4	45.3	46.4	47.8	48.0	48.2	47.8	46.0	44.1	42.2	40.9
1753	38.2	36.2	35.7	35.8	34.2	32.1	28.8	25.8	22.8	19.9	18.3	17.4
1754	17.1	15.8	13.9	13.0	12.7	12.3	12.6	13.4	14.0	13.9	10.7	10.7
1755	9.2	8.4	8.4	8.8	8.5	8.9	9.7	9.6	9.4	9.4	10.1	11.1
1756	11.5	11.4	11.3	10.6	10.6	10.6	10.3	10.9	12.4	14.1	16.0	17.1
1757	18.0	20.7	23.8	25.7	29.4	31.4	33.4	35.7	37.9	40.6	42.7	44.4
1758	46.5	46.8	47.2	48.4	47.7	47.2	48.0	48.2	47.7	46.6	45.6	46.0
1759	46.5	48.1	50.1	51.6	52.7	53.4	54.8	56.2	58.0	59.6	61.1	62.0
1760	62.5	63.3	62.8	61.8	62.0	62.7	63.0	64.4	66.0	66.8	68.0	72.4
1761	75.7	77.5	79.8	83.0	85.8	86.5	84.8	82.9	80.7	78.8	75.5	71.7
1762	68.3	64.8	62.5	60.4	59.0	59.9	61.7	60.5	58.3	56.7	55.3	53.2
1763	52.4	51.5	49.8	48.8	47.1	45.8	45.3	46.5	48.0	48.3	48.8	49.1
1764	47.8	46.9	45.4	43.0	40.8	37.8	34.9	32.0	29.9	28.8	27.3	25.8
1765	25.2	25.2	24.6	23.6	22.5	21.4	20.4	19.3	19.1	19.0	18.6	18.1
1766	16.4	14.4	12.8	12.0	11.2	11.2	12.1	13.5	14.5	15.9	17.2	18.6
1767	20.6	22.9	26.0	29.3	32.9	36.4	38.9	41.5	43.1	43.7	46.1	49.9
1768	53.0	55.4	57.8	60.6	63.5	67.4	70.7	71.5	72.1	75.1	77.8	77.8
1769	51.2	86.2	91.5	97.9	103.7	106.1	107.3	111.9	115.8	114.5	112.5	111.9
1770	111.1	110.9	109.3	105.2	102.3	101.2	98.0	91.1	85.7	84.9	88.9	93.9
1771	93.6	89.0	86.1	85.4	83.5	81.9	84.3	88.8	90.1	90.5	86.9	79.5
1772	77.3	77.6	75.4	72.8	70.7	67.8	64.6	60.1	58.3	56.7	54.3	53.3
1773	50.0	46.1	43.5	40.4	37.4	35.6	34.5	35.6	37.3	38.0	39.3	39.3
1774	38.9	38.2	37.0	35.6	34.2	31.9	28.9	24.4	19.8	16.6	13.3	10.6
1775	9.3	8.6	8.5	7.9	7.5	7.2	7.7	8.9	9.2	9.2	10.7	10.7
1776	11.0	11.7	12.9	14.5	16.3	18.5	20.8	22.8	25.2	29.6	35.6	41.0
1777	47.5	55.1	62.9	70.3	78.1	87.6	98.0	106.6	113.6	119.6	128.2	138.6
1778	144.8	148.4	151.9	156.3	158.5	156.5	151.8	151.5	153.2	152.5	148.4	141.9
1779	139.0	137.5	133.8	129.9	127.0	125.7	124.1	119.4	115.7	112.8	109.4	106.9
1780	103.5	100.0	98.2	95.5	91.3	86.9	86.0	86.2	83.4	80.4	79.2	79.5
1781	79.4	78.0	75.4	71.5	69.8	69.1	66.2	62.8	60.6	58.8	55.6	51.0
1782	47.0	44.5	42.9	42.0	40.4	38.7	37.4	36.3	36.0	35.0	33.2	31.3
1783	30.6	29.4	27.7	26.4	25.1	23.6	22.2	20.3	18.3	16.9	15.5	14.1
1784	12.3	10.8	10.0	9.7	9.8	10.0	9.9	9.6	9.5	9.7	10.5	11.9
1785	13.9	15.5	16.9	19.4	22.0	23.5	25.4	28.3	31.6	36.1	42.0	46.3
1786	49.6	54.5	60.7	66.7	72.6	79.3	86.9	93.4	97.5	100.9	104.4	107.9
1787	111.4	115.3	119.2	122.9	125.9	123.5	132.2	133.3	136.6	139.1	136.4	137.8
1788	140.7	141.2	140.4	139.1	136.6	132.8	129.9	128.7	127.6	127.3	128.3	127.3
1789	124.9	122.5	119.9	116.5	116.0	117.9	117.7	117.3	116.4	114.2	111.7	109.2
1790	106.0	103.4	101.2	99.6	97.2	92.5	88.6	84.6	81.0	79.3	77.8	75.9
1791	74.9	73.1	70.8	69.4	67.9	66.9	66.0	65.4	65.1	64.5	64.0	63.4
1792	62.2	61.9	62.2	61.8	61.3	60.5	60.0	59.5	58.8	57.6	56.2	55.4
1793	55.1	54.0	51.3	49.3	47.3	46.7	46.7	45.5	44.3	42.6	41.7	41.4
1794	40.7	40.7	40.7	39.3	39.5	40.8	40.0	38.9	37.6	36.2	34.7	32.7
1795	30.5	28.7	28.2	28.0	25.8	22.7	21.3	20.6	20.1	20.8	20.9	20.1
1796	20.2	19.8	19.0	18.8	17.8	16.6	15.7	14.6	13.3	11.6	9.9	9.5
1797	8.8	8.0	7.7	7.0	6.7	6.5	5.9	5.4	5.7	5.9	5.5	4.7
1798	4.1	3.8	3.5	3.2	3.2	3.8	4.1	4.4	5.1	5.8	6.5	7.3
1799	7.8	7.8	7.5	7.6	7.3	6.8	7.0	7.1	6.6	5.9	5.4	5.9
1800	7.2	8.8	10.1	10.9	11.5	13.2	15.3	17.0	18.5	20.4	22.0	24.3
1801	29.7	26.6	28.3	30.0	32.1	33.7	34.9	34.7	33.7	30.8	25.8	20.7
1802	41.8	44.8	44.1	45.1	45.1	45.0	45.1	45.4	45.1	43.9	43.2	42.8

1807	42.4	41.7	40.8	41.2	42.5	43.1	42.9	42.6	43.2	45.1	45.7	45.2
1808	44.3	44.0	44.6	45.3	46.0	47.0	48.1	48.6	48.6	48.2	47.9	48.3
1809	48.9	49.2	48.8	47.1	44.9	41.3	41.3	38.8	38.4	37.2	36.3	35.2
1810	34.2	33.2	31.7	30.7	30.0	27.0	27.0	25.1	23.4	22.3	21.5	20.2
1811	18.9	17.6	16.3	14.7	13.0	11.1	9.6	8.7	8.0	7.1	6.8	7.0
1812	6.7	6.4	6.5	6.6	6.8	7.6	8.4	8.9	9.2	8.8	7.9	7.2
1813	1.1	0.0	0.0	0.0	4.0	3.0	2.2	1.6	1.1	1.0	0.8	0.4
1814	3.3	2.9	3.7	3.7	3.9	4.6	4.5	4.4	4.8	5.5	6.4	7.0
1815	8.1	8.6	8.7	10.1	11.5	12.0	13.1	14.1	14.8	15.3	15.4	15.3
1816	15.4	15.2	14.6	14.0	13.5	13.7	13.8	14.5	16.2	17.4	17.9	19.8
1817	22.2	24.8	27.6	29.2	30.7	33.5	35.7	37.5	41.0	44.1	46.7	47.6
1818	47.3	46.4	46.1	47.7	49.7	47.3	46.2	46.2	46.3	44.0	44.0	42.6
1819	43.2	44.5	45.0	43.2	41.6	41.1	41.0	39.5	35.2	32.8	34.0	35.6
1820	34.6	33.1	32.1	31.9	31.4	30.5	30.3	30.1	29.0	27.3	25.3	23.9
1821	24.0	23.9	23.2	22.5	23.4	23.7	23.4	23.1	23.4	23.4	23.7	23.1
1822	21.7	21.2	20.8	19.6	18.1	16.5	15.8	14.9	14.1	13.7	12.1	10.6
1823	9.5	7.8	6.9	7.3	7.5	7.0	5.7	4.7	5.0	5.6	5.7	5.9
1824	6.3	6.4	6.1	5.1	4.2	4.0	4.0	4.0	3.3	2.1	1.4	1.2
1825	1.1	1.1	1.1	1.1	1.1	1.1	2.7	4.0	4.5	5.3	6.2	6.3
1826	6.3	6.3	7.2	9.1	10.2	9.4	7.9	7.4	8.5	8.8	8.6	9.8
1827	11.7	14.0	14.8	14.2	14.3	15.7	17.1	17.7	18.4	19.9	21.4	23.0
1828	24.9	28.3	27.1	28.7	31.3	34.4	37.0	38.9	41.0	42.8	44.7	46.5
1829	46.9	47.1	49.0	50.5	50.5	50.6	50.5	51.9	52.9	53.9	55.9	59.0
1830	61.2	62.6	63.6	62.6	62.1	62.5	62.1	61.1	60.7	62.5	63.0	61.1
1831	61.6	63.2	63.4	64.4	65.8	66.6	67.4	68.7	70.2	71.2	71.7	71.3
1832	68.9	65.8	65.1	66.6	68.3	69.9	70.8	69.7	69.1	67.3	63.9	61.4
1833	60.2	60.4	59.6	57.0	58.8	50.0	47.1	46.7	45.3	42.5	41.5	41.4
1834	39.8	36.6	33.4	31.1	36.28	27.6	26.7	24.2	20.7	17.9	15.7	13.5
1835	12.1	11.7	11.7	11.3	10.3	9.3	8.3	8.1	7.9	7.5	7.3	7.4
1836	7.8	7.8	7.7	8.4	10.2	12.2	13.4	13.7	14.6	17.8	21.8	24.3
1837	27.5	31.9	37.9	44.6	50.4	55.1	60.2	67.1	73.8	80.5	86.7	93.3
1838	95.5	103.9	105.7	107.2	109.9	116.1	125.6	132.6	136.9	138.2	138.0	139.4
1839	142.7	145.8	146.9	145.4	145.2	141.5	136.5	130.9	127.4	127.2	127.8	126.2
1840	121.3	116.7	113.5	111.2	109.6	105.2	101.6	100.8	98.9	87.4	82.2	82.2
1841	79.6	80.8	85.4	87.9	87.5	86.5	84.7	83.0	82.0	81.7	82.5	82.9
1842	81.7	72.6	72.1	68.2	66.1	65.1	62.3	57.5	53.5	50.9	49.9	50.1
1843	49.2	47.1	44.7	42.0	39.5	37.4	36.7	36.2	35.5	34.5	32.1	28.9
1844	26.6	25.4	24.1	23.8	23.1	25.1	23.9	22.8	21.5	20.2	19.3	18.7
1845	18.1	17.4	16.2	14.2	12.0	10.9	10.5	10.8	11.5	12.3	12.3	11.7
1846	11.9	12.9	13.5	14.3	14.6	14.6	15.7	17.6	20.0	22.7	25.7	28.4
1847	29.9	30.6	31.9	33.7	35.7	38.5	40.6	41.5	42.6	44.0	45.0	46.9
1848	49.0	50.6	54.8	58.6	60.1	61.3	62.5	63.2	63.9	63.8	64.9	64.9
1849	66.0	69.9	75.6	81.1	91.5	96.6	102.5	109.3	113.0	116.6	120.3	123.3
1850	128.7	132.0	129.1	124.6	121.6	122.7	124.7	125.4	125.7	125.0	123.9	121.0
1851	116.5	111.2	108.2	105.4	102.3	95.4	93.1	88.1	85.7	82.7	79.5	78.2
1852	76.2	74.3	73.7	73.4	71.5	68.1	66.5	67.1	67.0	66.8	67.3	67.1
1853	66.7	66.4	65.4	64.3	63.8	64.1	64.2	62.3	60.7	60.8	60.8	59.8
1854	58.9	58.9	56.9	55.8	56.1	55.2	53.0	48.9	48.9	47.2	45.6	44.5
1855	44.3	45.0	45.2	44.0	41.9	39.9	38.0	35.9	34.3	32.7	31.3	30.1
1856	28.2	25.6	23.7	22.0	20.8	20.7	20.4	20.0	19.5	19.4	16.9	15.6
1857	14.2	12.9	11.4	10.4	9.2	7.5	6.2	5.4	4.5	3.8	3.6	3.2
1858	3.3	3.6	3.9	3.9	3.8	4.1	4.9	5.5	5.8	6.2	7.6	9.2
1859	10.4	11.6	13.7	16.7	19.2	21.5	23.8	26.0	29.3	32.6	34.3	36.0
1860	38.6	41.7	44.8	48.5	51.5	53.6	56.7	60.7	64.5	67.6	71.7	75.5
1861	78.9	82.6	85.9	87.9	90.8	93.2	93.8	93.7	94.1	93.9	94.0	95.5
1862	97.3	97.9	97.1	95.5	94.3	92.8	94.9	93.7	93.7	94.5	93.6	90.6
1863	80.1	85.8	84.5	83.1	80.3	77.8	77.2	76.7	73.7	70.5	67.8	64.1
1864	67.1	66.7	69.1	66.6	62.5	60.8	58.5	57.4	58.2	58.2	57.4	55.4

PROGRAM SSPO1 OUTPUTS: (Processing "GEOMAG" Data)

- Monthly Geomagnetic Ap Index Data.
- 3-Month Smoothed Geomagnetic Ap Index Data.
- 13-Month Smoothed Geomagnetic Ap Index Data.

***** MONTHLY GEOMAGNETIC AP INDEX VALUES FOR JAN 1932 THRU MAY 1980 *****

***** DATE OF THIS LISTING: JUN 19, 1980 -- ATMOSPHERIC SCIENCES DIVISION NASA/MSFC/ES84 *****

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1932	11.0	12.0	18.0	17.0	14.0	7.0	7.0	12.0	12.0	10.0	3.0	9.0
1933	10.0	11.0	12.0	13.0	12.0	8.0	7.0	9.0	12.0	10.0	9.0	7.0
1934	6.0	8.0	11.0	6.0	7.0	5.0	6.0	9.0	10.0	6.0	5.0	8.0
1935	9.0	10.0	10.0	8.0	6.0	10.0	7.0	5.0	13.0	12.0	8.0	10.0
1936	9.0	11.0	9.0	15.0	10.0	12.0	11.0	5.0	9.0	9.0	8.0	5.0
1937	7.0	13.0	12.0	20.0	13.0	12.0	12.0	10.0	9.0	29.0	12.0	10.0
1938	28.0	16.0	13.0	19.0	18.0	9.0	13.0	12.0	17.0	16.0	10.0	11.0
1939	7.0	16.0	37.0	28.0	21.0	15.0	19.0	15.0	13.0	22.0	9.0	11.0
1940	15.0	12.0	37.0	18.0	13.0	16.0	12.0	11.0	14.0	14.0	16.0	15.0
1941	14.0	18.0	33.0	15.0	11.0	11.0	12.0	16.0	27.0	11.0	16.0	11.0
1942	9.0	12.0	22.0	17.0	8.0	8.0	13.0	13.0	17.0	22.0	15.0	11.0
1943	11.0	9.0	13.0	14.0	14.0	12.0	15.0	31.0	26.0	24.0	20.0	14.0
1944	13.0	12.0	18.0	15.0	9.0	8.0	6.0	9.0	10.0	11.0	6.0	14.0
1945	10.0	10.0	17.0	13.0	9.0	7.0	9.0	7.0	10.0	11.0	8.0	13.0
1946	13.0	22.0	33.0	20.0	17.0	16.0	22.0	11.0	34.0	13.0	13.0	9.0
1947	12.0	12.0	31.0	18.0	14.0	16.0	16.0	26.0	32.0	23.0	14.0	11.0
1948	12.0	13.0	17.0	13.0	19.0	10.0	10.0	20.0	15.0	27.0	16.0	13.0
1949	20.0	15.0	19.0	14.0	18.0	14.0	8.0	13.0	13.0	25.0	15.0	9.0
1950	12.0	18.0	14.0	18.0	16.0	14.0	14.0	23.0	22.0	28.0	20.0	16.0
1951	16.0	22.0	21.0	27.0	20.0	17.0	20.0	22.0	40.0	24.0	18.0	20.0
1952	19.0	26.0	33.0	34.0	27.0	18.0	15.0	13.0	23.0	20.0	12.0	15.0
1953	15.0	15.0	22.0	16.0	16.0	13.0	16.0	19.0	21.0	16.0	13.0	7.0
1954	9.0	16.0	16.0	14.0	7.0	6.0	8.0	10.0	17.0	15.0	9.0	6.0
1955	12.0	12.0	15.0	14.0	11.0	9.0	8.0	9.0	13.0	11.0	13.0	8.0
1956	18.0	15.0	20.0	27.0	26.0	17.0	13.0	16.0	17.0	13.0	24.0	10.0
1957	17.0	17.0	26.0	21.0	11.0	22.0	16.0	14.0	49.0	14.0	18.0	18.0
1958	15.0	27.0	26.0	20.0	17.0	24.0	25.0	18.0	20.0	16.0	18.0	15.0
1959	14.0	24.0	24.0	17.0	19.0	15.0	32.0	23.0	28.0	19.0	22.0	19.0
1960	15.0	18.0	18.0	42.0	24.0	20.0	20.0	20.0	20.0	36.0	32.0	21.0
1961	12.0	16.0	14.0	14.0	13.0	14.0	28.0	11.0	13.0	16.0	10.0	12.0
1962	7.0	10.0	8.0	14.0	7.0	9.0	12.0	15.0	19.0	10.0	13.0	13.0
1963	11.0	9.0	8.0	10.0	11.0	11.0	12.0	13.0	28.0	15.0	12.0	11.0
1964	12.0	12.0	13.0	13.0	10.0	9.0	9.0	8.0	11.0	10.0	7.0	5.0
1965	6.0	9.0	8.0	8.0	6.0	10.0	8.0	9.0	10.0	7.0	6.0	7.0
1966	7.0	8.0	13.0	7.0	9.0	6.0	12.0	9.0	10.0	10.0	10.0	12.0
1967	11.0	11.0	7.0	9.0	25.0	12.0	8.0	12.0	16.0	10.0	10.0	14.0
1968	11.0	16.0	13.0	13.0	13.0	17.0	10.0	12.0	14.0	16.0	17.0	9.0
1969	8.0	15.0	17.0	14.0	17.0	9.0	8.0	8.0	15.0	9.0	10.0	7.0
1970	7.0	7.0	17.0	16.0	9.0	10.0	19.0	13.0	11.0	12.0	12.0	9.0
1971	12.0	12.0	11.0	15.0	13.0	9.0	8.0	9.0	13.0	12.0	11.0	10.0
1972	13.0	10.0	12.0	11.0	10.0	14.0	8.0	24.0	13.0	12.0	14.0	10.0
1973	16.0	20.0	25.0	30.0	17.0	17.0	12.0	12.0	14.0	18.0	12.0	11.0
1974	15.0	16.0	23.0	21.0	18.0	17.0	24.0	19.0	23.0	26.0	18.0	15.0
1975	16.0	18.0	20.0	16.0	13.0	11.0	12.0	10.0	10.0	12.0	18.0	12.0
1976	13.0	16.0	22.0	17.0	14.0	10.0	9.0	9.0	12.0	12.0	10.0	10.0
1977	10.0	11.0	11.0	16.0	11.0	8.0	14.0	5.0	16.0	13.0	10.0	10.0
1978	15.0	16.0	15.0	23.0	25.0	20.0	13.0	17.0	18.0	12.0	15.0	13.0
1979	16.0	15.0	19.0	25.0	14.0	12.0	12.0	18.0	14.0	14.0	10.0	9.0
1980	10.0	12.0	8.0	11.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*** 3-MONTH MOVING AVERAGE (COMPUTED WITH END MONTH) GEOMAGNETIC AP INDEX FOR JAN 1932 THRU MAY 1980 ***

***** DATE OF THIS LISTING: JUN 19, 1980 -- ATMOSPHERIC SCIENCES DIVISION NASA/MSFC/ES84 *****

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1932	0.0	0.0	13.7	15.7	16.3	12.7	9.3	8.7	10.3	11.3	10.0	9.0
1933	9.0	10.0	11.0	12.0	12.3	11.0	9.0	8.0	9.3	10.3	10.3	8.7
1934	7.3	7.0	8.3	8.3	8.0	6.0	6.0	6.7	8.3	8.3	7.0	6.3
1935	7.3	9.0	9.7	9.3	8.0	8.0	7.7	7.3	8.3	10.0	11.0	10.0
1936	9.0	10.0	9.7	11.7	11.3	12.3	11.0	9.3	7.0	6.3	7.3	7.3
1937	6.7	8.3	10.7	15.0	15.0	15.0	12.3	11.3	10.3	13.0	13.0	14.0
1938	16.7	18.0	19.0	15.7	16.3	16.3	13.3	11.3	14.0	15.0	14.3	12.3
1939	9.3	11.3	14.0	21.0	22.7	21.3	18.3	17.7	17.0	18.0	14.7	14.0
1940	11.7	12.7	21.3	22.3	22.7	15.7	13.7	15.3	13.0	13.0	14.7	15.0
1941	15.0	15.7	21.7	22.0	19.7	12.3	13.7	15.3	20.7	18.0	18.0	12.7
1942	12.0	10.7	14.3	17.0	15.7	11.0	9.7	11.3	14.3	17.3	18.0	16.0
1943	12.3	10.3	11.0	12.0	13.7	13.3	13.7	19.3	24.0	27.0	23.3	19.3
1944	15.7	13.0	14.3	15.0	14.0	10.7	7.7	7.7	8.3	10.0	9.0	10.3
1945	10.0	11.3	12.3	13.3	13.0	9.7	8.3	7.7	8.7	9.3	9.7	10.7
1946	11.3	16.0	22.7	25.0	23.3	17.7	18.3	16.3	22.3	19.3	20.0	11.7
1947	11.3	11.0	18.3	20.3	21.0	16.0	15.3	19.3	24.7	27.0	23.0	16.0
1948	12.3	12.0	14.0	14.3	16.3	14.0	13.0	13.3	15.0	20.7	19.3	18.7
1949	16.3	16.0	18.0	16.0	17.0	15.3	13.3	11.7	11.3	17.0	17.7	16.3
1950	12.0	13.0	14.7	16.7	16.0	16.0	14.7	17.7	20.3	25.0	23.3	21.3
1951	17.3	18.0	19.7	23.3	22.7	21.3	19.0	19.7	27.3	28.7	27.3	20.7
1952	19.0	21.7	26.0	31.0	31.3	26.3	20.0	15.3	17.0	18.7	18.3	15.7
1953	14.0	15.0	17.3	17.7	18.0	15.0	15.0	16.0	18.7	18.7	16.7	12.0
1954	9.7	10.7	13.7	15.3	12.3	9.0	7.0	8.0	11.7	14.0	13.7	10.0
1955	9.0	10.0	13.0	13.7	13.3	11.3	9.3	8.7	10.0	11.0	12.3	10.7
1956	13.0	13.7	17.7	20.7	24.3	23.3	18.7	15.3	15.7	15.7	18.3	15.7
1957	17.0	14.7	20.0	21.3	19.3	18.0	16.3	17.3	26.3	25.7	27.0	16.7
1958	17.0	20.0	22.7	24.3	21.0	20.3	22.0	22.3	20.0	18.0	14.7	13.0
1959	12.3	17.7	20.7	21.7	20.0	17.0	22.0	23.3	27.7	23.3	23.0	20.0
1960	18.7	16.0	15.7	24.7	28.0	28.7	21.3	20.0	20.0	25.3	29.3	29.7
1961	21.7	16.3	14.0	14.7	13.7	13.7	18.3	17.7	17.3	13.3	13.0	12.7
1962	9.7	9.7	8.3	10.7	9.7	10.0	9.3	12.0	15.3	14.7	14.0	12.0
1963	12.3	11.0	9.3	9.0	9.7	10.7	11.3	12.0	17.7	18.7	18.3	12.7
1964	11.7	11.7	12.3	12.7	12.0	10.7	9.3	8.7	9.3	9.7	9.3	7.3
1965	6.0	6.7	7.7	8.3	7.3	8.0	8.0	9.0	9.0	8.7	7.7	6.7
1966	6.7	7.3	9.7	9.3	9.7	7.3	9.0	10.0	14.7	14.0	13.3	10.7
1967	11.0	11.3	9.7	9.0	13.7	15.3	15.0	9.7	11.0	11.7	13.3	11.3
1968	11.7	13.7	13.3	14.0	13.0	14.3	13.3	13.0	12.0	14.0	15.7	14.0
1969	11.3	10.7	13.3	15.3	16.0	13.3	11.3	8.3	10.3	10.7	11.3	8.7
1970	8.0	7.0	10.3	13.3	14.0	11.7	12.7	14.0	14.3	12.0	11.7	11.0
1971	11.0	11.0	11.7	12.7	13.0	12.3	10.0	8.7	10.0	11.3	12.0	11.0
1972	11.3	11.0	11.7	11.0	11.0	11.7	10.7	15.3	15.0	16.3	13.0	12.0
1973	13.3	15.3	20.3	25.0	24.0	21.3	15.3	13.7	12.7	14.7	14.7	13.7
1974	12.7	14.0	18.0	20.0	20.7	18.7	19.7	20.0	22.0	22.7	22.3	19.7
1975	16.3	16.3	18.0	18.0	16.3	13.3	12.0	11.0	10.7	10.7	13.3	14.0
1976	14.3	13.7	17.0	18.3	17.7	13.7	11.0	9.3	10.0	11.0	11.0	10.3
1977	9.7	10.3	10.7	12.7	12.7	11.7	11.0	11.7	14.3	14.0	13.0	11.0
1978	11.7	13.7	15.7	18.3	17.7	22.7	19.3	16.7	16.0	15.7	15.0	13.3
1979	14.7	14.7	16.7	19.7	19.3	17.0	12.7	14.0	14.7	14.7	12.0	10.3
1980	9.7	10.3	10.0	10.3	10.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0

PROGRAM SSP02 DESCRIPTION

PROGRAM SSP02

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C*****
C**
C** DESCRIPTION: THIS PROGRAM READS THE MONTHLY 10.7 FLUX **
C** VALUES (STARTING FROM FEB 1947) FROM DISC **
C** FILE "FLUX47" AND MONTHLY SUNSPOT VALUES **
C** (STARTING FROM JAN 1947) FROM DISC FILE **
C** "SSPP47" AND COMPUTES A 5-MONTH AND 13-MONTH **
C** MEAN. IT THEN PLOTS BOTH THE 10.7 FLUX AND **
C** SUNSPOT VALUES VERSUS TIME ON THE SAME USER **
C** SPECIFIED PLOT FOR MONTHLY, 5-MONTH, OR 13- **
C** MONTH VALUES. **
C**
C** INPUTS: DISC FILE "FLUX47" -- 10.7 FLUX VALUES. **
C** DISC FILE "SSPP47" -- SUNSPOT VALUES. **
C**
C** OUTPUTS: PRINTED LISTING OF MONTHLY, 5-MONTH, AND **
C** 13-MONTH SMOOTHED 10.7 FLUX AND SUNSPOT **
C** VALUES. A USER SPECIFIED PLOT PAIRING THE 10.7**
C** FLUX AND SUNSPOT VALUES VS. TIME. **
C**
C** WRITTEN BY: JOHN S. HICKEY (ACI). **
C** REVISED: APRIL 12, 1980 **
C**
C*****
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0001 FTH4.L
0002 PROGRAM SSP02
0003 C*****
0004 C**
0005 C** DESCRIPTION: THIS PROGRAM READS THE MONTHLY 10.7 FLUX
0006 C** VALUES (STARTING FROM FEB 1947) FROM DISC
0007 C** FILE "FLUX47" AND MONTHLY SUNSPOT VALUES
0008 C** (STARTING FROM JAN 1947) FROM DISC FILE
0009 C** "SSPP47" AND COMPUTES A 5-MONTH AND 13-MONTH
0010 C** MEAN. IT THEN PLOTS BOTH THE 10.7 FLUX AND
0011 C** SUNSPOT VALUES VERSUS TIME ON THE SAME USER
0012 C** SPECIFIED PLOT FOR MONTHLY, 5-MONTH, OR 13-
0013 C** MONTH VALUES.
0014 C**
0015 C** INPUTS: DISC FILE "FLUX47" -- 10.7 FLUX VALUES.
0016 C** DISC FILE "SSPP47" -- SUNSPOT VALUES.
0017 C**
0018 C** OUTPUTS: PRINTED LISTING OF MONTHLY, 5-MONTH, AND
0019 C** 13-MONTH SMOOTHED 10.7 FLUX AND SUNSPOT
0020 C** VALUES. A USER SPECIFIED PLOT PAIRING THE 10.7
0021 C** FLUX AND SUNSPOT VALUES VS. TIME.
0022 C**
0023 C** WRITTEN BY: JOHN S. HICKEY (ACI).
0024 C** REVISED: APRIL 12, 1980
0025 C**
0026 C*****
0027 C
0028 C** DIMENSION STATEMENTS
0029 C
0030 DIMENSION KF(420),XF5M(420),XF13M(420)
0031 DIMENSION ILAB1(7),ILAB2(9)
0032 DIMENSION IZLAB(6)
0033 DIMENSION SS(420),SS5M(420),SS13M(420)
0034 DIMENSION IPAR(5),IPLAB(11),IYLAB(11),ITITLE(26),IDLAB(11)
0035 DIMENSION IBUF(40),JBUF(40),IDCB(256),JDCB(256)
0036 DIMENSION NAME1(3),NAME2(3)
0037 C
0038 C** DATA STATEMENTS
0039 C
0040 DATA NAME1/2HFL,2HUX,2H47/
0041 DATA ILAB1/12,2H10,2H 7,2H C,2HM ,2HFL,2HUX/
0042 DATA ILAB2/16,2H5U,2HM ,2HSP,2H0T,2H V,2HAL,2HUE,2HS /
0043 DATA NAME2/2HSS,2HPP,2H47/
0044 DATA IZLAB/9,2HNS,2HFC,2H/E,2H50,2HI /
0045 DATA IPLAB/20,2H ,2H ,2H ,2H ,2H ,2H ,2H ,2H ,2H ,2H ,2H ,2H ,2H /
0046 DATA IYLAB/20,2H10,2H 7,2H C,2HM ,2HFL,2HUX,2H V,2HAL,2HUE,2HS /
0047 DATA IDLAB/20,2H5U,2HM ,2HSP,2H0T,2H V,2HAL,2HUE,2HS ,2H ,2H /
0048 DATA IBLK/2H /
0049 DATA ITITLE/50/
0050 C** INITIALIZE LOGICAL UNIT
0051 C
0052 CALL RMPAR(IPAR)
0053 LU = IPAR(1)
0054 C
0055 C** READ IN FLUX VALUES FROM DISC FLUX47

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0056 C
0057 CALL OPEN(1DCB,IERR,NAME1,0)
0058 DO 444 K=1,35
0059 J = (K-1)*12 + 1
0060 CALL READF(1DCB,IERR,IBUF)
0061 CALL CODE
0062 READ(1BUF,391) (XF(I),I=J,J+11)
0063 FORMAT(4X,12(F6.1))
0064 CONTINUE
0065 CALL CLOSE(1DCB)
0066 C
0067 C** READ IN SUN SPOT VALUES
0068 C
0069 CALL OPEN(JDCB,IERR,NAME2,0)
0070 DO 445 K=1,35
0071 J = (K-1)*12 + 1
0072 CALL READF(JDCB,IERR,JBUFF)
0073 CALL CODE
0074 READ(JBUFF,391) (SS(I),I=J,J+11)
0075 CONTINUE
0076 CALL CLOSE(JDCB)
0077 C
0078 C** ZERO OUT ARRAYS
0079 C
0080 DO 2 I=1,420
0081 XFSM(I) = 0.
0082 XF13M(I) = 0.
0083 SSM(I) = 0.
0084 SS13M(I) = 0.
0085 CONTINUE
0086 SS(I) = 0.0
0087 C
0088 C** COMPUTE THE LAST VALID DATE OF SUNSPOT/FLUX DATA
0089 C
0090 DO 3 I1=2,420
0091 IF(SS(I1).EQ.0.0.OR.XF(I1).EQ.0.0) GO TO 4
0092 CONTINUE
0093 3 ILAST = I1-1
0094 C
0095 C** COMPUTE 5-MONTH MOVING AVERAGE USING MID POINT
0096 C
0097 DO 6 I=4,ILAST-2
0098 J = I - 2
0099 XFSM(I) = (XF(I-2) + XF(I-1) + XF(I) + XF(I+1) + XF(I+2))/5.
0100 6 SSM(I) = (SS(I-2) + SS(I-1) + SS(I) + SS(I+1) + SS(I+2))/5.
0101 CC SSM(I) = (SS(I) + SS(I+1) + SS(I+2))/3.
0102 C
0103 C** SMOOTH SUN SPOT DATA USING ZURICH'S METHOD
0104 C
0105 DO 24 I=9,ILAST-6
0106 XF13M(I) = (XF(I-6)+XF(I+6)+2.*(XF(I-5)+XF(I-4)+XF(I-3)
0107 .+XF(I-2)+XF(I-1)+XF(I)+XF(I+1)+XF(I+2)+XF(I+3)
0108 .+XF(I+4)+XF(I+5)))/24.
0109 SS13M(I) = (SS(I-6)+SS(I+6)+2.*(SS(I-5)+SS(I-4)+SS(I-3)
0110 .+SS(I-2)+SS(I-1)+SS(I)+SS(I+1)+SS(I+2)+SS(I+3)

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0111      +SS(I+4)+SS(I+5))/24.
0112      24 CONTINUE
0113      C
0114      C** PRINT OUT DATA ARRAYS
0115      C
0116      DD 40 I1=1,6
0117      IF(I1.EQ.1) WRITE(6,301)
0118      IF(I1.EQ.2) WRITE(6,302)
0119      IF(I1.EQ.3) WRITE(6,303)
0120      IF(I1.EQ.4) WRITE(6,304)
0121      IF(I1.EQ.5) WRITE(6,305)
0122      IF(I1.EQ.6) WRITE(6,306)
0123      FORMAT('1 **** MONTHLY MEAN 10.7 CM FLUX FOR FEB 1947 TO DATE
0124      * *****//)
0125      FORMAT('1 **** 5-MONTH MOVING AVERAGE (COMPUTED WITH MID POINT)*
0126      * 10.7 CM FLUX FOR FEB 1947 TO DATE *****//)
0127      FORMAT('1 **** 13-MONTH MOVING AVERAGE (COMPUTED WITH MID-POINT)*
0128      * 10.7 CM FLUX FOR FEB 1947 TO DATE **//)
0129      FORMAT('1 **** MONTHLY MEAN SUN SPOT VALUES FOR FEB 1947*
0130      * TO DATE *****//)
0131      FORMAT('1 **** 5-MONTH MOVING AVERAGE (COMPUTED WITH MID POINT)*
0132      * SUN SPOT VALUES FOR FEB 1947 TO DATE *****//)
0133      FORMAT('1 **** 13-MONTH MOVING AVERAGE (COMPUTED WITH MID-POINT)*
0134      * SUN SPOT VALUES FOR FEB 1947 TO DATE *****//)
0135      WRITE(6,307)
0136      FORMAT(' YEAR      JAN      FEB      MAR      APR      MAY      DEC
0137      *      JUN      JUL      AUG      SEP      OCT      NOV
0138      //)
0139      IYEAR = 1947
0140      DO 30 I=1,35
0141      J = (I-1)*12 + 1
0142      IF(I1.EQ.1) WRITE(6,200) IYEAR, (XF(K),K=J,J+11)
0143      IF(I1.EQ.2) WRITE(6,200) IYEAR, (XFSM(K),K=J,J+11)
0144      IF(I1.EQ.3) WRITE(6,200) IYEAR, (XFJM(K),K=J,J+11)
0145      IF(I1.EQ.4) WRITE(6,200) IYEAR, (SS(K),K=J,J+11)
0146      IF(I1.EQ.5) WRITE(6,200) IYEAR, (SSSM(K),K=J,J+11)
0147      IF(I1.EQ.6) WRITE(6,200) IYEAR, (SSJM(K),K=J,J+11)
0148      FORMAT('X,14,3X,12(F6.1,3X)')
0149      IYEAR = IYEAR + 1
0150      CONTINUE
0151      40 CONTINUE
0152      C
0153      C** ASK FOR PLOTS
0154      C
0155      WRITE(LU,1048)
0156      FORMAT('PLOTS DESIRED: 0=NO 1=YES -')
0157      READ(LU,*) IPLOTS
0158      IF(IPLOTS.EQ.0) GO TO 999
0159      C
0160      C** GENERATE PLOTS
0161      C
0162      CALL PLTLU(12)
0163      CALL SFAC(15.,10.)
0164      CALL LLEFT
0165      PAUSE 2

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0166 CALL PLOT(0.,0.,-3)
0167 CALL PLOT(2.,1.,-3)
0168 C
0169 C** DRAW X-AXIS
0170 C
0171 CALL PLOT(0.,0.,3)
0172 CALL PLOT(10.9676,0.,2)
0173 C
0174 C** DRAW Y-AXIS
0175 C
0176 CALL PLOT(0.,0.,3)
0177 CALL PLOT(0.,7.,2)
0178 C** TIC AND NUM Y AXIS
0179 YINC = 0.
0180 DO 445 JK=1,16
0181 XNUM = (JK-1)*20
0182 IF(XNUM.EQ.0) XINC = -.2
0183 IF(YNUM.GT.0.AND.JK.LT.100) XINC = -.3
0184 IF(XNUM.GE.100) XINC = -.4
0185 CALL NUMB(XINC,YINC,1,XNUM,0.,-1)
0186 CALL PLOT(-.05,YINC,3)
0187 CALL PLOT(.05,YINC,2)
0188 YINC = YINC + .4667
0189 445 CONTINUE
0190 CALL SYMB(-.7,2.3,.12,IYLAB,90.,1)
0191 CALL SYMB(-1.,2.54,.12,IDLAB,90.,1)
0192 C** TIC AND NUM X AXIS
0193 XINC = 0.
0194 DO 446 JK=1,35
0195 XNUM = (JK-1)*3
0196 XNUM = (JK-1) + 47
0197 IF(XNUM.EQ.0) CALL NUMB(XINC-.05,-.2,-1,XNUM,0.,-1)
0198 IF(XNUM.GT.0.AND.XNUM.LT.100) CALL NUMB(XINC-1.,-2.,1,XNUM,0.,-1)
0199 IF(XNUM.GE.100) CALL NUMB(XINC-.15,-.2,-1,XNUM,0.,-1)
0200 CALL PLOT(XINC,-.05,3)
0201 CALL PLOT(XINC,.05,2)
0202 XINC = XINC + .3226
0203 446 CONTINUE
0204 CALL SYMB(3.86,-.5,.12,IXLAB,0.,1)
0205 CALL SYMB(7.5,-.5,.1,IZLAB,0.,1)
0206 CALL PLOT(0.,0.,3)
0207 C
0208 C** BLANK OUT TITLE ARRAY
0209 C
0210 DO 43 I=2,26
0211 ITITLE(I) = IBLK
0212 C
0213 C** ASK FOR TITLE FOR PLOT
0214 C
0215 WRITE(LU,400)
0216 FORMAT(' ENTER PLOT TITLE: ')
0217 READ(LU,401) (ITITLE(K),K=2,26)
0218 401 FORMAT(25A2)
0219 C
0220 C** ASK FOR PLOT TYPE??

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0221 C
0222 WRITE(LU,402)
0223 FORMAT(' ENTER PLOT TYPE: 1-(MONTH) 2-(5MONTH) 3-(13MONTH) ')
0224 READ(LU,*) ITYPE
0225 CALL SYMB(.5,7.2,.12,ITITLE,0.,1)
0226 IPLT = 0
0227 IF(ITYPE.NE.1) GO TO 45
0228 IPLT = IPLT + 1
0229 DO 44 I=2,ILAST
0230 X = FLOAT(I)*.0269
0231 IF(IPLT.EQ.1) Y = XF(I)* .02333
0232 IF(IPLT.EQ.2) Y = SS(I)* .02333
0233 IF(I.EQ.2) CALL PLOT(X,Y,3)
0234 IF(I.NE.2) CALL PLOT(X,Y,2)
0235 CONTINUE
0236 IF(IPLT.EQ.1) CALL SYMB(X+.1,Y.,1.,ILAB1,0.,1)
0237 PAUSE 1
0238 IF(IPLT.EQ.1) GO TO 6666
0239 IF(IPLT.EQ.2) CALL SYMB(X+.1,Y.,1.,ILAB2,0.,1)
0240 GO TO 39
0241 IF(ITYPE.NE.2) GO TO 47
0242 IPLT = IPLT + 1
0243 DO 46 I=4,ILAST-2
0244 X = FLOAT(I)*.0269
0245 IF(IPLT.EQ.1) Y = XFSH(I) * .02333
0246 IF(IPLT.EQ.2) Y = SSSM(I) * .02333
0247 IF(I.EQ.4) CALL PLOT(X,Y,3)
0248 IF(I.NE.4) CALL PLOT(X,Y,2)
0249 CONTINUE
0250 IF(IPLT.EQ.1) CALL SYMB(X+.1,Y.,1.,ILAB1,0.,1)
0251 PAUSE 2
0252 IF(IPLT.EQ.1) GO TO 6667
0253 IF(IPLT.EQ.2) CALL SYMB(X+.1,Y.,1.,ILAB2,0.,1)
0254 GO TO 39
0255 IPLT = IPLT + 1
0256 DO 48 I=8,ILAST-6
0257 X = FLOAT(I)*.0269
0258 IF(IPLT.EQ.1) Y = XF13M(I)* .02333
0259 IF(IPLT.EQ.2) Y = SS13M(I)* .02333
0260 IF(I.EQ.8) CALL PLOT(X,Y,3)
0261 IF(I.NE.8) CALL PLOT(X,Y,2)
0262 CONTINUE
0263 IF(IPLT.EQ.1) CALL SYMB(X+.1,Y.,1.,ILAB1,0.,1)
0264 PAUSE 3
0265 IF(IPLT.EQ.1) GO TO 47
0266 IF(IPLT.EQ.2) CALL SYMB(X+.1,Y.,1.,ILAB2,0.,1)
0267 C
0268 C** END PLOTTING
0269 C
0270 CALL URITE
0271 STOP
0272 END

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FIN4 COMPILER: MP92060-16092 REV. 1926 (790430)

.. NO WARNINGS .. NO ERRORS .. PROGRAM = 07936 COMMON = 00000

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0273 ENDS

PROGRAM SSPO2 INPUTS:

Disc File: "FLUX47" -- Monthly 10.7 Flux Data (1947-1980).

Disc File: "SSPP47" -- Monthly Sunspot Data (1947-1980).

PROGRAM SSP02 OUTPUTS: (Processing "FLUX47" Data)

- Monthly 10.7 Flux Data.
- 5-Month 10.7 Flux Smoothed Data.
- 13-Month 10.7 Flux Smoothed Data.

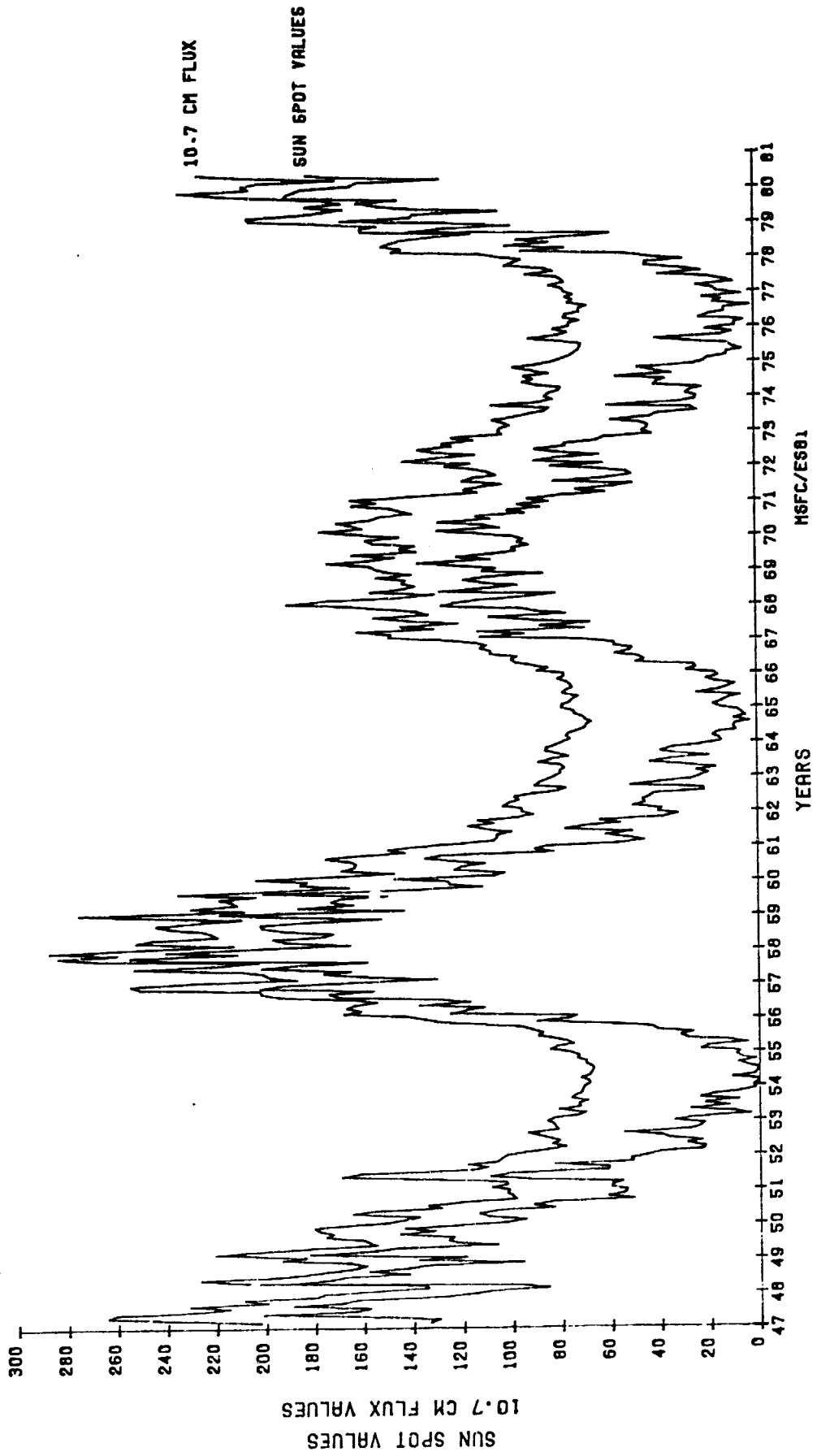
PROGRAM SSP02 OUTPUTS: (Processing "SSPP47" Data)

- Monthly Sunspot Data.
- 5-Month Smoothed Sunspot Data.
- 13-Month Smoothed Sunspot Data.

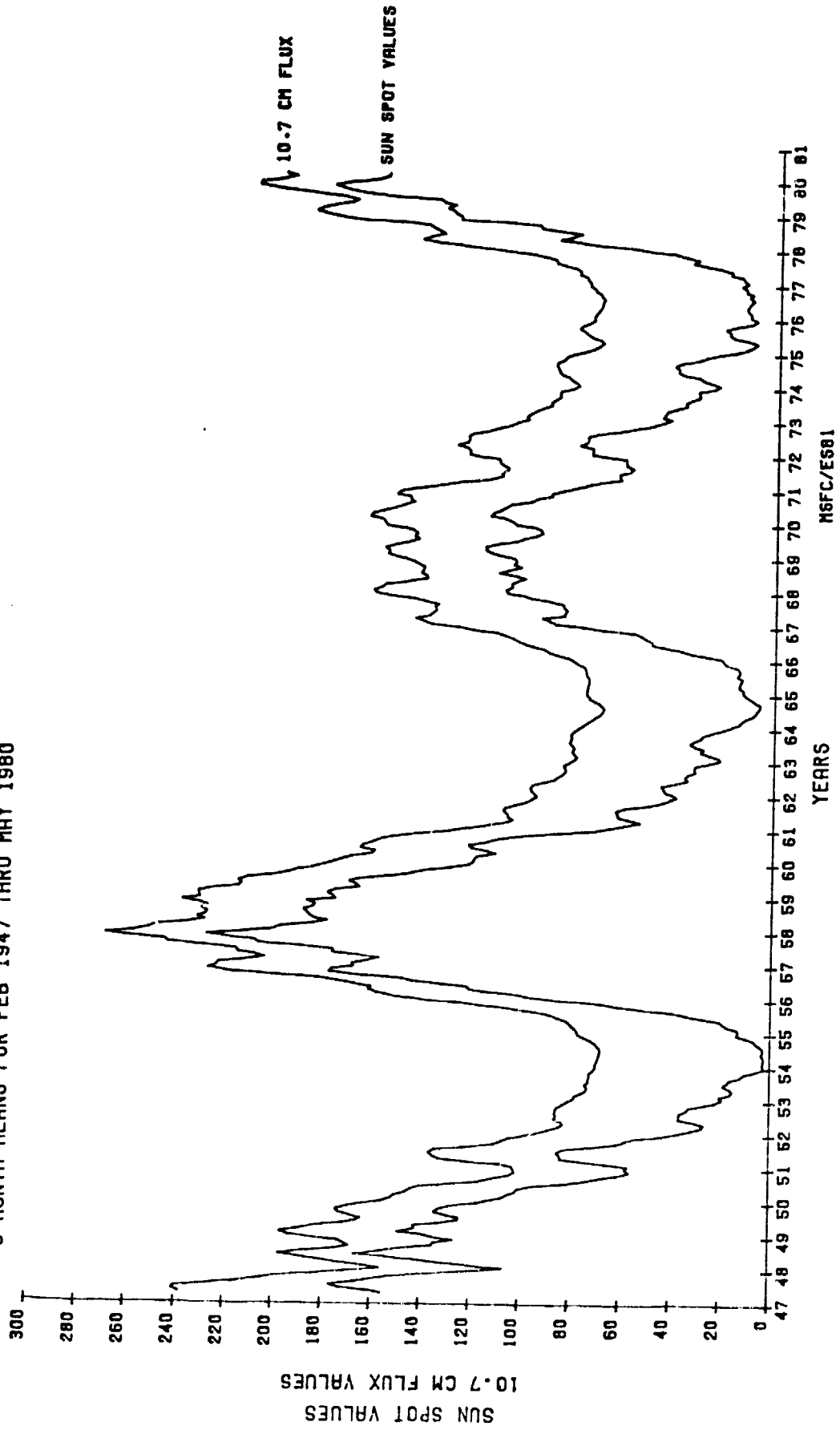
PROGRAM SSPO2 OUTPUTS: (Processing "FLUX47" and "SSPP47" Data)

- Monthly Mean Plot of 10.7 Flux -vs- Sunspot Data.
- 5-Month Mean Plot of 10.7 Flux -vs- Sunspot Data.
- 13-Month Mean Plot of 10.7 Flux -vs- Sunspot Data.

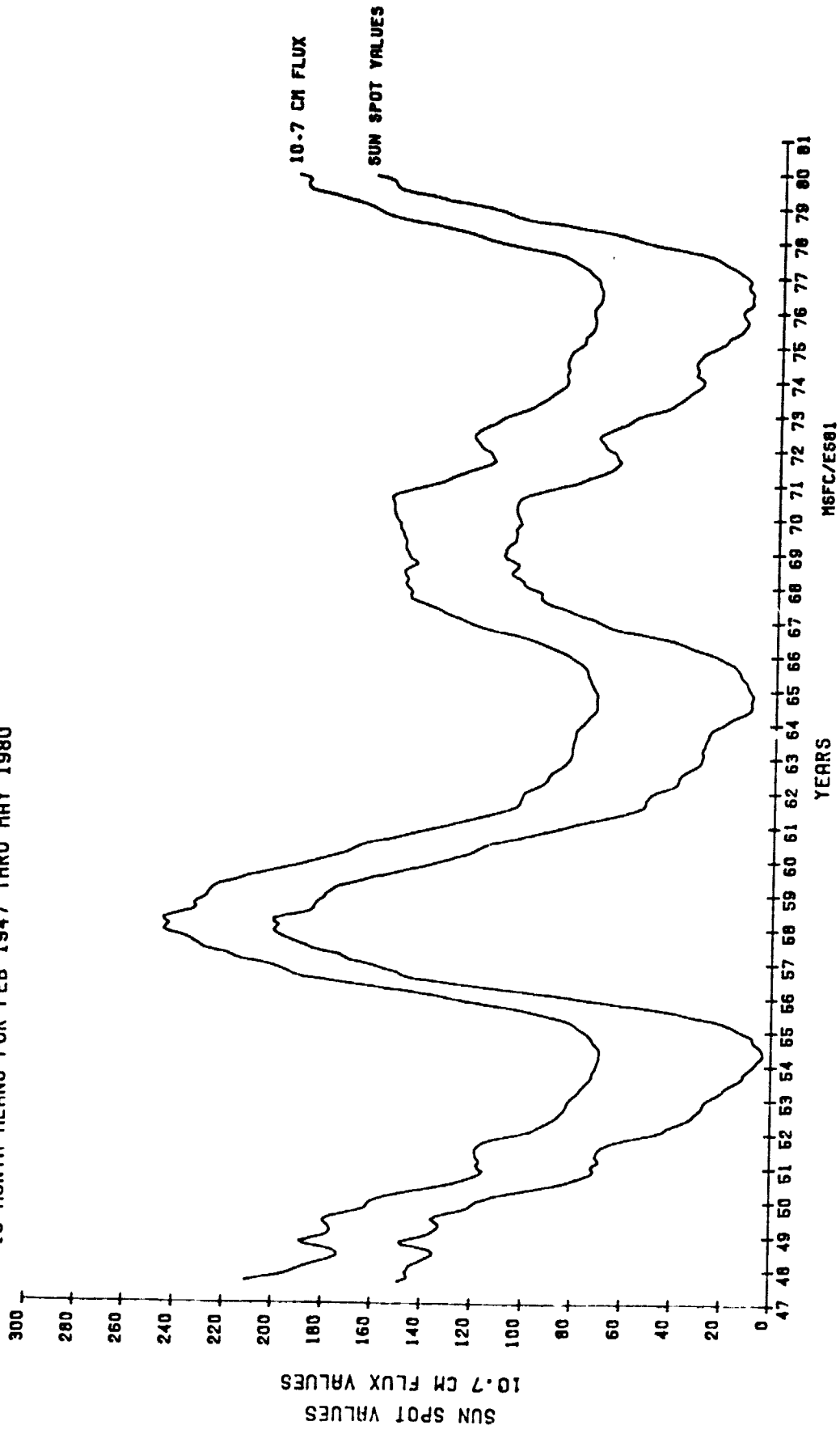
MONTHLY MEANS FOR FEB 1947 THRU MAY 1980



5-MONTH MEANS FOR FEB 1947 THRU MAY 1980



13-MONTH MEANS FOR FEB 1947 THRU MAY 1980



PROGRAM SUN80 DESCRIPTION

PROGRAM SUN80

```
C*****
C**
C** DESCRIPTION: THIS PROGRAM READS THE MONTHLY 10.7 FLUX **
C** VALUES (STARTING FEB 1947) FROM DISC FILE **
C** "FLUX47", READS THE MONTHLY SUN SPOT VALUES **
C** (STARTING JAN 1749) FROM DISC FILE "SS4947" **
C** AND THEN COMPUTES A 13-MONTH MOVING AVERAGE **
C** (ZURICH SMOOTHING) FOR BOTH THE SUN SPOT AND **
C** 10.7 CM FLUX VALUES. IN ADDITION, A REGRES- **
C** SION ANALYSIS OF THE SUN SPOT DATA IS PERFORM- **
C** ED TO PRODUCE A PREDICTED VALUE FOR THE 10.7 **
C** CM FLUX FROM 1749 TO 1947. **
C** **
C** INPUTS: DISC FILE "FLUX47" -- MONTHLY 10.7 FLUX DATA **
C** DISC FILE "SS4947" -- MONTHLY SUN SPOT DATA **
C** **
C** OUTPUTS: PRINTED LISTING OF 13-MONTH (ZURICH) SMOOTHED **
C** VALUES FOR 10.7 CM FLUX AND THE PREDICTED **
C** VALUES FOR 10.7 CM FLUX. TWO DISC FILE **
C** "FLUX80" FOR 13-MONTH (ZURICH) SMOOTHED 10.7 **
C** CM FLUX VALUES AND "SSPT80" FOR PREDICTED 10.7 **
C** CM FLUX VALUES ARE CREATED ON THE REMOVABLE **
C** DISC (LU11). **
C** **
C** WRITTEN BY: JOHN S. HICKEY (ACI) **
C** **
C** LAST UPDATE: MARCH 25, 1980 -- JESSE S. HIPPS (ACI) **
C** **
C*****
```

LSUN80 T=00004 IS ON CR00032 USING 30027 BLKS R=0000

```
0001 FIN4.L
0002 PROGRAM SUN80
0003 C
0004 C
0005 C DESCRIPTION: THIS PROGRAM READS THE MONTHLY 10.7 FLUX
0006 C VALUES (STARTING FEB 1947) FROM DISC FILE
0007 C "FLUX47". READS THE MONTHLY SUN SPOT VALUES
0008 C (STARTING JAN 1749) FROM DISC FILE "SS4947".
0009 C AND THEN COMPUTES A 13-MONTH MOVING AVERAGE
0010 C (ZURICH SMOOTHING) FOR BOTH THE SUN SPOT AND
0011 C 10.7 CM FLUX VALUES. IN ADDITION, A REGRES-
0012 C SION ANALYSIS OF THE SUN SPOT DATA IS PERFORM-
0013 C ED TO PRODUCE A PREDICTED VALUE FOR THE 10.7
0014 C CM FLUX FROM 1749 TO 1947.
0015 C
0016 C INPUTS: DISC FILE "FLUX47" -- MONTHLY 10.7 FLUX DATA
0017 C DISC FILE "SS4947" -- MONTHLY SUN SPOT DATA
0018 C
0019 C OUTPUTS: PRINTED LISTING OF 13-MONTH (ZURICH) SMOOTHED
0020 C VALUES FOR 10.7 CM FLUX AND THE PREDICTED
0021 C VALUES FOR 10.7 CM FLUX. TWO DISC FILE
0022 C "FLUX80" FOR 13-MONTH (ZURICH) SMOOTHED 10.7
0023 C CM FLUX VALUES AND "SP100" FOR PREDICTED 10.7
0024 C CM FLUX VALUES ARE CREATED ON THE REMOVABLE
0025 C DISC (LU11).
0026 C
0027 C WRITTEN BY: JOHN S. NICKEY (ACI)
0028 C
0029 C LAST UPDATE: MARCH 25, 1980 -- JESSE S. HIPPS (ACI)
0030 C
0031 C
0032 C
0033 C COMMON STATEMENT
0034 C
0035 C COMMON /SUN/SS(2000),
0036 C IDCB(256),JDCB(256),
0037 C IBUF(40),JBUF(40),
0038 C ILOOP1(3),ILOOP2(3),ILOOP3(3)
0039 C
0040 C DIMENSION STATEMENTS
0041 C
0042 C DIMENSION IROMI(24)
0043 C DIMENSION NAME1(3),NAME2(3)
0044 C DIMENSION IPAR(5)
0045 C
0046 C DATA STATEMENTS
0047 C
0048 C DATA IROMI/24JA,2MM ,2MFE,2MB ,2MRA,2MR ,2MAP,2HR ,2MRA,2MY ,
0049 C 2MJU,2M ,2MJU,2ML ,2MAU,2MC ,2MSE,2HP ,2MOC,2MT ,
0050 C 2MB,2MV ,2MDE,2MC /
0051 C DATA NAME1/2M L,2MUX,2M477,NAME2/2MSS,2M49,2M477
0052 C DATA IBLK/2M /
0053 C
0054 C INITIALIZE LOGICAL UNIT FOR TERMINAL PROGRAM IN RUNNING ON
0055 C
0056 C CALL RPARC(IPAR)
0057 C LU = IPAR(1)
0058 C
```

```

0059 C** PRINT PROGRAM DESCRIPTION TO THE CRT.
0060 C
0061 WRITE(LU,774)
0062 774 FORMAT('***** PROGRAM SUN80 IS NOW RUNNING. IT WILL TAKE ABOUT',//
0063 'TWELVE SECONDS FOR THE PROGRAM TO READ ALL THE',//
0064 'DATA FROM DISC FILES. THEN IT WILL REPORT THE',//
0065 'DATA AND ASK HOW MANY COPIES YOU WANT TO PRINT',//,
0066 'PROGRAM WRITTEN BY JOHN S. HICKEY (ACI).',//,
0067 'DATE COMPLETED: MARCH 25, 1980',//,
0068 'LATEST REVISION: MARCH 25, 1980',//)
0069 C
0070 C** CALL SUBROUTINE REPT TO READ DATA FILE AND DETERMINE THE
0071 C** LAST MONTH AND YEAR OF THE DATA OF THE FOLLOWING:
0072 C** IFLG1,IYR1 -- LAST MONTH/YEAR FOR 10.7 FLUX
0073 C** IFLG2,IYR2 -- LAST MONTH/YEAR FOR SUNSPOTS
0074 C
0075 CALL REPT(IFLG1,IFLG2,IYR1,IYR2)
0076 J = (IFLG1-1)*2 + 1
0077 K = (IFLG2-1)*2 + 1
0078 C
0079 C** WRITE STARTING AND END DATES OF DATA FILES TO CRT
0080 C
0081 WRITE (LU,501) IMON1(J),IMON1(J+1),IYR1,IMON1(K),IMON1(K+1),IYR2
0082 501 FORMAT('//','THIS PROGRAM GENERATES THE FOLLOWING OUTPUTS:',//,
0083 '1. 13-MONTH MEAN FOR 10.7 FLUX -- FEB 1947 --',2A2,14 /
0084 '2. PREDICTED 10.7 CM FLUX VALUES - JAN 1745 --',2A2,14 /
0085 '//')
0086 C
0087 C** ASK FOR # OF COPIES OF OUTPUT TO PRINT.
0088 C
0089 WRITE (LU,1214)
0090 1214 FORMAT(' ENTER NUMBER OF COPIES DESIRED: ')
0091 READ (LU,*) ICOPY
0092 IF(ICOPY.EQ.0) STOP
0093 C
0094 C** INITIALIZE ICOPY COUNTER TO 0
0095 C
0096 ICOPY = 0
0097 C
0098 C** LOOP THROUGH TWICE TO PRINT 10.7 FLUX AND SUN SPOTS
0099 C
0100 2222 CONTINUE
0101 DO 1111 IHRUN = 1,2
0102 IF(IHRUN.EQ.1) IFLAG = IFLG1
0103 IF(IHRUN.EQ.2) IFLAG = IFLG2
0104 IF(IHRUN.EQ.1) IYEARS = IYR1
0105 IF(IHRUN.EQ.2) IYEARS = IYR2
0106 C
0107 C** READ IN 10.7 FLUX VALUES IF IRUN = 1
0108 C
0109 IF(IHRUN.NE.1) GO TO 72
0110 C
0111 C** OPEN DISC FILE AND READ IN SUN SPOT DATA
0112 C
0113 CALL OPEN(IDC8,IERR,NAME1,0)
0114 IF(IERR.LT.0) WRITE (LU,101) IERR
0115 101 FORMAT(' IERR = ',16)
0116 DO 3 K=1,ICOOPI(1)
0117 J = (K-1)*12 + 1
0118 CALL READP(IDC8,IERR,ISUF)

```

```

0119 IF(IERR.LT.0) WRITE (LU,101) IERR
0120 CALL CODE
0121 READ (JBUF,391) (88(I),I=J,J+11)
0122 391 FORMAT(4X,12(F6.1))
0123 3 CONTINUE
0124 CALL CLOSE(IDC8)
0125 C
0126 C** READ IN SUN SPOT VALUES IF INRUN = 2
0127 C
0128 GO TO 221
0129 C
0130 C** OPEN DISC FILE
0131 C
0132 72 CALL OPEN(JDCB,IERR,NAME2,0)
0133 IF(IERR.LT.0) WRITE (LU,101) IERR
0134 DO 4 K=1,ILOOP1(2)
0135 J = (K-1)*12 + 1
0136 CALL READP(JDCB,IERR,JBUF)
0137 IF(IERR.LT.0) WRITE (LU,101) IERR
0138 CALL CODE
0139 READ (JBUF,391) (SS(I),I=J,J+11)
0140 4 CONTINUE
0141 CALL CLOSE(JDCB)
0142 GO TO 221
0143 C
0144 C** SMOOTH THE DATA USING ZURICH'S METHOD
0145 C
0146 221 CONTINUE
0147 IFCINRUN.EQ.1) IBEGIN = 8
0148 IFCINRUN.NE.1) IBEGIN = 7
0149 DO 24 I=IBEGIN,ILOOP3(INRUN)
0150 J=I-6
0151 SS(J) = (SS(I-6)+SS(I+6)+2.*(SS(I-5)+SS(I-4)+SS(I-3)
0152 +SS(I-2)+SS(I-1)+SS(I)+SS(I+1)+SS(I+2)+SS(I+3)
0153 +SS(I+4)+SS(I+5)))/24.
0154 24 CONTINUE
0155 ILOP = ILOOP3(INRUN)-6
0156 DO 8 K=1,ILOP
0157 I = ILOP - K + 1
0158 J = I + 6
0159 SS(J) = SS(I)
0160 8 CONTINUE
0161 SS(I) = 0.0
0162 SS(2) = 0.0
0163 SS(3) = 0.0
0164 SS(4) = 0.0
0165 SS(5) = 0.0
0166 SS(6) = 0.0
0167 IFCIBEGIN.EQ.2) SS(7) = 0.0
0168 SSCILOOP3(INRUN)+1) = 0
0169 SSCILOOP3(INRUN)+2) = 0
0170 SSCILOOP3(INRUN)+3) = 0
0171 SSCILOOP3(INRUN)+4) = 0
0172 SSCILOOP3(INRUN)+5) = 0
0173 SSCILOOP3(INRUN)+6) = 0
0174 C
0175 C** PRINT OUT HEADER FOR DATA TYPE AND DATES OF DATA
0176 C
0177 222 J = (IFLAG-1)*2 + 1
0178 IFCINRUN.EQ.1) WRITE (6,103) IMON(J),IMON(J+1),IYEARS

```



```

0179 C      IF<INRUN.EQ.2> WRITE (6,203) IMON(J),IMON(J+1),IYEARS
0180 C
0181 C** CALL DATE SUBROUTINE AND PRINT CURRENT DATE ON OUTPUT
0182 C
0183 C      CALL DATE
0184 C      103 FORMAT(*1 *** 13-MONTH MOVING AVERAGE (COMPUTED WITH ZURICH'S *
0185 C      "METHOD) 10.7 CM FLUX FOR FEB1947 THRU '2A2,14,' *****/)
0186 C      203 FORMAT(*1 *** REGRESSION EQUATION VALUE FOR 10.7 CM FLUX USING*
0187 C      " ZURICH SMOOTHED SUN SPOT VALUES FOR JAN 1749 THRU '2A2,14 ,/)
0188 C
0189 C** PRINT OUT 13-MONTH DATA VALUES
0190 C
0191 C      WRITE (6,307)
0192 C      307 FORMAT(
0193 C      .
0194 C      .)
0195 C      IF<INRUN.EQ.1> IYEAR = 1947
0196 C      IF<INRUN.EQ.2> IYEAR = 1749
0197 C      IF<INRUN.EQ.2> CALL CONV<SS>
0198 C      IF<ICOPT.EQ.0> CALL DISCF<LU,INRUN,IYEAR,IYEARS>
0199 C
0200 C** REINITIALIZE IYEAR AND WRITE TO THE LINE PRINTER
0201 C
0202 C      IF<INRUN.EQ.1> IYEAR = 1947
0203 C      IF<INRUN.EQ.2> IYEAR = 1749
0204 C      DO 30 I=1,10001<INRUN>
0205 C      J = (I-1)*12 + 1
0206 C      IF<IYEAR.GT.IYEARS> GO TO 30
0207 C      WRITE (6,200) IYEAR,<SS<K>,K=J,J+11>
0208 C      200 FORMAT(5X,14,3X,21<F6.1,3X>)
0209 C      IYEAR = IYEAR + 1
0210 C      30 CONTINUE
0211 C      1111 CONTINUE
0212 C
0213 C** CHECK FOR THE NUMBER OF COPIES
0214 C
0215 C      ICOPT = ICOPT + 1
0216 C      IF<ICOPT.NE.ICOPY> GO TO 2222
0217 C
0218 C** PROGRAM TERMINATION
0219 C
0220 C      STOP
0221 C      END
0222 C      SUBROUTINE DATE
0223 C      DIMENSION ITIME(5),ICT(12)
0224 C      DIMENSION MON(24)
0225 C      DATA ICT/31,28,31,30,31,30,31,31,30,31,30,31,30,31/
0226 C      DATA MON/2HJA,2HN ,2HFE,2HB ,2HMA,2HR ,2HAP,2HR ,2HQA,2HY ,
0227 C      2HJU,2HW ,2HJU,2HL ,2HAU,2HC ,2HSE,2HP ,2HNO,2HV ,2HDE,2HC /
0228 C      CALL EXEC<II,ITIME,IYEAR>
0229 C      MDAY = ITIME(5)
0230 C      ITOT = 0
0231 C      DO 10 I=1,12
0232 C      ITOT = ITOT + ICT(I)
0233 C      IF<MDAY.LE.ITOT> GO TO 11
0234 C      CONTINUE
0235 C      10 CONTINUE
0236 C      IDAY = ITOT - ICT(I)
0237 C      IDAY = MDAY - IDAY
0238 C      IMON = I

```

```

0239 J = (IMON-1)*2 + 1
0240 WRITE(6,888) MON(J),MON(J+1),IDAY,IYEAR
0241 FORMAT(' ***** DATE OF THIS LISTING: ',2A2.12,' ',15,
0242 ' -- ATMOSPHERIC SCIENCES DIVISION NASA/MSFC/ES84 *****',/)
0243 RETURN
0244 END
0245 SUBROUTINE REPR1(IFLGI,IFLG2,IYRI,IYR2)
0246 .....
0247 C** THIS SUBROUTINE READS THE DATA FILES "FLUX47" AND **
0248 C** "SS4947" AND DETERMINES THE ENDING MONTH AND YEAR **
0249 C** FOR EACH DATA SET.
0250 .....
0251 COMMON /SUN/SS(2008),
0252 IDCB(256),JDCB(256),
0253 IBUF(40),JBUF(40),
0254 ILOOP1(3),ILOOP2(3),ILOOP3(3)
0255 C
0256 C** DIMENSION STATEMENTS
0257 C
0258 C** DIMENSION NAME1(3),NAME2(3)
0259 C
0260 C** DATA STATEMENTS
0261 C
0262 DATA NAME1/2HFL,2HUX,2H47/
0263 DATA NAME2/2HSS,2H49,2H47/
0264 C
0265 C** READ THE FILE "FLUX47" TO DETERMINE THE LAST DATA POINT
0266 C
0267 CALL OPEN(IDCIB,IERR,NAME1,0)
0268 DO 3 K=1,ILOOP1(1)
0269 J = (K-1)*12 + 1
0270 CALL READF(IDCIB,IERR,IBUF)
0271 CALL CODE
0272 READ (IBUF,391) (SS(I),I=J,J+11)
0273 391 FORMAT(4X,12(F6.1))
0274 3 CONTINUE
0275 C
0276 C** CHECK FOR THE LAST DATA POINT
0277 C
0278 ILPI = 12*ILOOP1(1)
0279 DO 161 J=284,ILPI
0280 IF(SS(J).EQ.0) GO TO 162
0281 161 CONTINUE
0282 162 ILOOP2(1) = J - 3
0283 C
0284 C** COMPUTE THE LAST MONTH "IFLGI" AND THE LAST YEAR "IYRI"
0285 C
0286 JPTS = J - 1
0287 IYR = (JPTS/12)
0288 XYR = FLOAT(JPTS)/12.
0289 DIFF = XYR - FLOAT(IYR)
0290 IF(DIFF.EQ.0.) IYR = IYR - 1
0291 IYR1 = IYR + 1947
0292 JY = (JPTS/12)
0293 JY = JY*12
0294 IFLGI = JPTS - JY
0295 IF(IFLGI.EQ.0) IFLGI = 12
0296 ILOOP3(1) = J - 7
0297 CALL CLOSE(IDCIB)
0298 C

```

```

0299 C** READ SUN SPOT VALUES FROM DISC FILE 'SS4947'
0300 C
0301 CALL OPEN(JDCB, IERR, NAME2, 0)
0302 DO 4 K=1, ILOOP1(2)
0303 J = (K-1)*12 + 1
0304 CALL READF(JDCB, IERR, JBUF, 40, LEH)
0305 IF(LEN.EQ.-1) GO TO 6
0306 IF(IERR.LT.0) WRITE(1,104) IERR
0307 104 FORMAT(' IERR = ',I6)
0308 CALL CODE
0309 READ (JBUF,391) (SS(I),I=J,J+11)
0310 4 CONTINUE
0311 C
0312 C** CHECK FOR LAST DATA POINT
0313 C
0314 6 ILP2 = 12*ILOOP1(2)
0315 DO 163 J=2364, ILP2
0316 IF(SS(J).EQ.0) GO TO 164
0317 163 CONTINUE
0318 164 ILOOP2(2) = J - 3
0319 C
0320 C** COMPUTE LAST MONTH 'IFLC2' AND LAST YEAR 'IYR2'
0321 C
0322 JPTS = J - 1
0323 IYR = (JPTS/12)
0324 XYR = FLOAT(JPTS)/12.
0325 DIFF = XYR - FLOAT(IYR)
0326 IF(DIFF.EQ.0.) IYR = IYR - 1
0327 IYR2 = IYR + 1749
0328 JY = (JPTS/12)
0329 JY = JY*12
0330 IFLG2 = JPTS - JY
0331 IF(IFLG2.EQ.0) IFLG2 = 12
0332 ILOOP3(2) = J - 7
0333 CALL CLOSE(JDCB)
0334 C
0335 C** RETURN TO THRE CALLING PROGRAM
0336 C
0337 RETURN
0338 END
0339 BLOCK DATA
0340 C*****
0341 C** THIS BLOCK DATA CONTAINS THE DATA *****
0342 C** VALUES FOR VARIABLES THAT ARE IN ***
0343 C** COMMON AND THE INITIAL VALUES NEED ***
0344 C** TO BE DECLARED IN DATA STATEMENTS. ***
0345 C*****
0346 C
0347 C** COMMON STATEMENTS
0348 C
0349 COMMON /SUN/SS(2808),
0350 . IDC(256),JDCB(256),
0351 . IBUF(40),JBUF(40),
0352 . ILOOP1(3),ILOOP2(3),ILOOP3(3)
0353 C
0354 C** DATA STATEMENTS
0355 C
0356 DATA ILOOP1/36,200,51/
0357 END
0358 SUBROUTINE CONV(SS)

```

```

0359 C*****
0360 C** THIS SUBROUTINE CONVERTS THE SUN SPOT DATA TO PREDIC- **
0361 C** TED FLUX VALUES ACCORDING TO: **
0362 C**
0363 C** FLUX13 = 49.4 + 0.97*R(13) + 17.6 * EXP(-0.035*R(13))**
0364 C**
0365 C*****
0366 C
0367 C** DIMENSION AND DATA STATEMENTS
0368 C
0369 C
0370 C
0371 C** CONVERT THE DATA
0372 C
0373 C
0374 C
0375 C
0376 C
0377 C
0378 C
0379 C
0380 C** THIS SUBROUTINE WRITES THE 10.7 FLUX AND SUN SPOT **
0381 C** VALUES TO A DISC RESIDENT FILE. **
0382 C*****
0383 C
0384 C** DIMENSION AND DATA STATEMENTS
0385 C
0386 C
0387 C
0388 C
0389 C
0390 C
0391 C
0392 C
0393 C** SET THE NAME OF THE FILE TO FLUX (INRUN = 1) OR
0394 C** SSPT (INRUN = 2)
0395 C
0396 C
0397 C
0398 C
0399 C
0400 C
0401 C** CREATE THE FILE
0402 C
0403 C
0404 C
0405 C
0406 C
0407 C
0408 C** SET UP DO LOOP TO WRITE THE DATA
0409 C
0410 C
0411 C
0412 C
0413 C
0414 C
0415 C
0416 C
0417 C
0418 C

```

```

      DO 3 K=7,2430
      SS(K) = 49.4 + 0.97*SS(K) + 17.6 * EXP(-0.035*SS(K))
      3 CONTINUE
      RETURN
      END

```

```

      SUBROUTINE DISCF(LU,INRUN,IYEAR,IYEARS)

```

```

      COMMON /SUN/SS(2808),
      IDCB(256),JDCB(256),
      IBUF(40),JBUF(40),
      ILOOP1(3),ILOOP2(3),ILOOP3(3)
      DIMENSION IHAM(3),KDCB(144),KBUF(40)
      DATA IHAM/2H ,2H ,2H80/

```

```

      IHAM(1) = 2HFL
      IFC(INRUN.EQ.2) IHAM(1) = 2HSS
      IHAM(2) = 2HUX
      IFC(INRUN.EQ.2) IHAM(2) = 2HPT

```

```

      CALL CREAT(KDCB,IERR,IHAM,63,4,0,11)
      IFC(IERR.EQ.-2) CALL OPEN(KDCB,IERR,IHAM,0)
      IFC(IERR.LT.0) WRITE (LU,101) IERR
      101 FORMAT(' IERR = ',I6)

```

```

      DO 30 I=1,ILOOP1(INRUN)
      J = (I-1)*I2 + J
      IF(IYEAR.GT.IYEARS) GO TO 30
      CALL CODE
      WRITE (KBUF,200)IYEAR,(SS(K),K=J,J+11)
      CALL WRITE(KDCB,IERR,KBUF,40)
      200 FORMAT(14,I2(F6.1))
      IYEAR = IYEAR + 1
      30 CONTINUE

```

```
0419 C
0420 C** CLOSE THE FILE
0421 C
0422 CALL CLOSE(KOGB,IERR)
0423 IF(IERR.LT.0) WRITE(LU,101) IERR
0424 C
0425 C** TERMINATE
0426 C
0427 RETURN
0428 END
0429 ENDS
```

PROGRAM SUN81 DESCRIPTION

PROGRAM SUN81

```
C*****  
C**  
C** DESCRIPTION: THIS PROGRAM READS THE PREDICTED 10.7 CM FLUX **  
C** VALUES (JAN 1749 THRU FEB 1980) FROM DISC **  
C** "FLXALL". IT USES ZURICH'S METHOD TO SMOOTH **  
C** THE DATA AND THEN COMPUTES A MEAN,+2 SIGMA, **  
C** AND -2 SIGMA FOR ANY USER SPECIFIED CYCLE **  
C** OR CYCLES FOR 120 MONTHS AFTER THE BEGINNING **  
C** OF EACH CYCLE. IT ALSO RANKS THE VALUES IN **  
C** EACH INDIVIDUAL CYCLE IN INCREASING ORDER. **  
C**  
C** INPUTS: DISC FILE "FLXALL" -- PREDICTED 10.7 CM FLUX. **  
C**  
C** OUTPUTS: PRINTED LISTING OF MEAN,+2 SIGMA, AND -2 SIGMA **  
C** OF ZURICH'S SMOOTHED FLUX DATA FOR 120 MONTHS **  
C** AFTER THE BEGINNING OF EACH USER SPECIFIED **  
C** CYCLE. PRINTED LISTING OF RANKED VALUES. **  
C**  
C** WRITTEN BY: JOHN S. HICKEY (ACI). **  
C** MODIFIED BY: JESSE S. HIPPS (ACI) **  
C**  
C*****
```

3SUM81 T=0004 IS ON CR0032 USING 0027 BLKS R=000

```
0001 PIN4.L
0002 PROGRAM SUM81
0003 C
0004 C
0005 C** DESCRIPTION: THIS PROGRAM READS THE PREDICTED 10.7 CM FLUX **
0006 C** VALUES (JAN 1749 THRU FEB 1980) FROM DISC **
0007 C** "FLXALL". IT USES ZURICH'S METHOD TO SMOOTH **
0008 C** THE DATA AND THEN COMPUTES A MEAN,+2 SIGMA, **
0009 C** AND -2 SIGMA FOR ANY USER SPECIFIED CYCLE **
0010 C** OR CYCLES FOR 120 MONTHS AFTER THE BEGINNING **
0011 C** OF EACH CYCLE. IT ALSO RANKS THE VALUES IN **
0012 C** EACH INDIVIDUAL CYCLE IN INCREASING ORDER. **
0013 C**
0014 C** INPUTS: DISC FILE "FLXALL" -- PREDICTED 10.7 CM FLUX. **
0015 C**
0016 C** OUTPUTS: PRINTED LISTING OF MEAN,+2 SIGMA, AND -2 SIGMA **
0017 C** OF ZURICH'S SMOOTHED FLUX DATA FOR 120 MONTHS **
0018 C** AFTER THE BEGINNING OF EACH USER SPECIFIED **
0019 C** CYCLE. PRINTED LISTING OF RANKED VALUES. **
0020 C**
0021 C** WRITTEN BY: JOHN S. HICKEY (ACT). **
0022 C** MODIFIED BY: JESSE S. HIPPS (ACT) **
0023 C**
0024 C**
0025 C
0026 C** DIMENSION STATEMENTS
0027 C
0028 C DIMENSION X(22,122),SS(3000)
0029 C DIMENSION IDC8(144),IBUF(40),ICY(22),IA(22)
0030 C DIMENSION INDX(22)
0031 C DIMENSION IMON(22),IYR(22)
0032 C DIMENSION NAME(3)
0033 C DIMENSION IPAR(5)
0034 C DIMENSION DUM(22,122)
0035 C CALL RMPAR(IPAR)
0036 C LU=IPAR(1)
0037 C
0038 C** DATA STATEMENTS
0039 C
0040 C DATA NAME/2HFL,2HXA,2HLL/
0041 C DATA IBLK/2H /
0042 C DATA IMON/3,5,6,9,4,7,4,11,7,12,3,12,2,1,8,7,9,2,4,10,6/
0043 C DATA IYR/7,18,27,36,50,62,75,85,95,107,119,130,142,154,
0044 C 165,175,185,196,206,216,228/
0045 C
0046 C** BLANK OUT ARRAY
0047 C
0048 C DD 443 J=1,21
0049 443 IA(J) = IBLK
0050 C
0051 C** ASK FOR CYCLE TYPES?
0052 C
0053 C WRITE(LU,600)
0054 600 FORMAT('ENTER FIRST AND LAST CYCLES: -')
0055 READ(LU,*) ISTART,ISTOP
0056 ILAST = ISTOP + 1
0057 C
0058 C** OPEN AND READ DISC FILE "FLXALL"
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0059 C
0060 CALL OPEN(IOC8, IERR, NAME, 0)
0061 DO 4 K=1,231
0062 J = (K-1)*12 + 1
0063 CALL READF(IOC8, IERR, I8UF)
0064 CALL CODE
0065 READ(I8UF, 391) (SS(I), I=J, J+11)
0066 FORMAT(4X, 12(F6.1))
0067 391 CONTINUE
0068 4 CALL CLOSE(IOC8, IERR)
0069 DO 111 K=1,231
0070 I = (K-1)*12 + 1
0071 111 WRITE (6, 113) (SS(J), J=I, I+12)
0072 113 FORMAT(12F7.2)
0073 C
0074 C** COMPUTE THE 13 MONTH MOVING AVERAGE (ZURICH'S SMOOTHING)
0075 C
0076 DO 44 I=ISTART, ISTOP
0077 IYEAR = IYR(1) + 1748
0078 INDX(I) = (IYEAR - 1749)*12 + IMON(I)
0079 IF(I.EQ. ISTART) WRITE(6, 1554) ISTART, ISTOP
0080 WRITE(6, 1555) I, IMON(I), IYEAR
0081 1554 FORMAT(1H1, 5X, '***** STARTING DATES OF SMOOTHED (ZURICH'S) FLUX'
0082 ' * CYCLES *12* THRU *12* *****//')
0083 1555 FORMAT(5X, 'CYCLE D', 12, ' * BEGINS', 12, 2X, 14)
0084 44 CONTINUE
0085 STOT = ISTOP - ISTART + 1
0086 DO 20 K=1,121
0087 SUM = 0.
0088 DO 30 I=ISTART, ISTOP
0089 SUM = SS(INDX(I)+K-1) + SUM
0090 X(I, K) = SS(INDX(I)+K-1)
0091 30 CONTINUE
0092 SUPT = SUM/STOT
0093 X(LAST, K) = SUPT
0094 20 CONTINUE
0095 C
0096 C** WRITE TO PRINTER
0097 C
0098 WRITE(6, 201) ISTART, ISTOP
0099 201 FORMAT('1', /, ' SMOOTHED (ZURICH'S) FLUX CYCLES (*12* THRU *
0100 '12* INCLUDING 120-MONTHS AFTER CYCLE MINIMUM', //)
0101 DO 93 K=ISTART, ISTOP
0102 ICY(K) = K
0103 WRITE(6, 202) (ICY(K), K=ISTART, ISTOP)
0104 202 FORMAT(1X, 'CYCLE', 21('8', 12, 3X))
0105 WRITE(6, 204) (IA(K), K=ISTART, ISTOP)
0106 204 FORMAT(1X, '-----21(-----, A1)//)
0107 DO 55 I=1, 121
0108 J=I - 1
0109 WRITE(6, 200) J, (X(K, I), K=ISTART, ISTOP)
0110 200 FORMAT(21F6.2)
0111 200 FORMAT(1X, 13, 1X, 21(1X, F5.2))
0112 55 CONTINUE
0113 DO 29 I=1, 121
0114 DO 24 K=ISTART, ISTOP
0115 SUM(K, I)=X(K, I)
0116 CONTINUE
0117 24 DO 28 K=ISTART, ISTOP
0118 28 L=ISTART, ISTOP

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0119 XMIN=DUMCK,I)
0120 IF(XMIN.GT.DUMCL,I) DUMCK,I)=DUMCL,I)
0121 IF(XMIN.GT.DUMCL,I) DUMCL,I)=XMIN
0122 CONTINUE
0123 CONTINUE
0124 CONTINUE
0125 WRITE(6,400) ISTART,ISTOP
0126 FORMAT('1',/, ' SMOOTHED (RAKED) FLUX CYCLES ("12" THRU "
0127 12" INCLUDING 120-MONTHS AFTER THIS CYCLE MINIMUM ',//)
0128 WRITE(6,202) (ICY(K),K=ISTART,ISTOP)
0129 WRITE(6,204) (IAC(K),K=ISTART,ISTOP)
0130 DO 26 I=1,121
0131 J=I-1
0132 WRITE(6,200) J,(DUMCK(I),K=ISTOP,ISTART,-1)
0133 CONTINUE
0134 C
0135 C** WRITE MEAN AND PLUS AND MINUS 2 SIGMA
0136 C
0137 WRITE(6,332) ISTART,ISTOP
0138 FORMAT('11,10X,"SMOOTHED 10.7 FLUX CYCLES ("12" THRU "12") MEAN "
0139 " SIGMA, PLUS 2 SIGMA, AND MINUS 2 SIGMA",//)
0140 WRITE(6,331)
0141 FORMAT(5X,"MONTH MEAN SIGMA PLUS 2 SIGMA MINUS "
0142 " SIGMA")
0143 DO 333 K=1,121
0144 J = K - 1
0145 CALL SIGMA(X,K,SIG,ISTART,ISTOP,STOT,ILAST)
0146 SIGP = X(ILAST,K) + 2.*SIG
0147 SIGM = X(ILAST,K) - 2.*SIG
0148 WRITE(6,123) J,X(ILAST,K),SIG,SIGP,SIGM
0149 FORMAT(5X,13.5X,F7.2,5X,F7.2,5X,F7.2)
0150 CONTINUE
0151 STOP
0152 END
0153 SUBROUTINE SIGMA(X,N,SIG,ISTART,ISTOP,STOT,ILAST)
0154 C*****
0155 C** SUBROUTINE SIGMA COMPUTES A STANDARD DEVIATION **
0156 C** FROM A GIVEN ARRAY -X, A GIVEN MEAN - XMEAN, **
0157 C** AND A GIVEN SAMPLE SIZE - N. **
0158 C*****
0159 C
0160 C** DIMENSION STATEMENTS
0161 C
0162 DIMENSION X(21,121)
0163 XSUM1 = 0.
0164 XMEAN = X(ILAST,N)
0165 DO 1 I=ISTART,ISTOP
0166 1 XSUM1 = XSUM1 + X(I,N)**2
0167 XSUM2 = (XMEAN**2)*STOT
0168 XTOT = (XSUM1 - XSUM2)/STOT
0169 SIG = SORT(ABS(XTOT))
0170 RETURN
0171 END
0172 ENDS

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