Notes on DS274.0--Tropical Pacific Ocean Analyses

Subset C - Long-term Monthly and Composite (Multiple Months) Means

This set consists of one tape with 5 files. Each file contains all data for a given parameter. A file contains 12 monthly means and 36 composite means. A single grid is made up of 15 tape blocks and therefore there are 720 tape blocks in each file.

Each tape block contains data for two $2^9$ lines of each grid and the blocks are numbered 1-15 (sub-record number).

Tape blocks in files one and two have 8 extra bytes at the end. Block lengths in each file are as follows:

<table>
<thead>
<tr>
<th>File</th>
<th>Block Length (8-bit bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2942</td>
</tr>
<tr>
<td>2</td>
<td>2942</td>
</tr>
<tr>
<td>3</td>
<td>7684</td>
</tr>
<tr>
<td>4</td>
<td>5404</td>
</tr>
<tr>
<td>5</td>
<td>2934</td>
</tr>
</tbody>
</table>

The grid layout is as shown in figure one and differs from the layout of Subset B.

See documentation by Rasmussan and Carpenter for further information.
MONTHLY AND COMPOSITE MAPS FOR
THE TROPICAL PACIFIC OCEAN

INTRODUCTION

A special cooperative project was undertaken between CEAS and NCC to expand the HSST data set to include intake as well as bucket sea surface temperature observations for the total period 1860-1976.

DATA BASE

NCC merged all available observations, removed all duplicate observations, quality checked the data, and produced thirty-four 9-track Ebdic 1600 BPI tapes of about 16 million observations. Each observation contains Marsden square, latitude, longitude, year, month, day, hour, wind direction and speed, air temperature, sea-surface temperature, and data source indicator. CEAS extracted from the 34 tapes the data for the period 1946-1976, which were sorted by Marsden square, month, and year.

EDITING OF DATA

Each Marsden square was subdivided into 25 2°x2° squares with the boundaries as shown in figure 2. For each subsquare, a mean and standard deviation by month was computed for the following variables: sea surface temperature (SST), sea-air temperature difference (SMA), east-west component of the wind (u) and north-south component of the wind (v). The variables were subjected to four passes for each Marsden square; on each pass removing those values of SST, SMA which were outside the limits of 3.481σ where σ is the standard deviation of the observations with a new mean of σ recomputed after each pass. 3.481σ corresponds to the .005 percent level of discard.
for a normal distribution, but because of the presence of isolated outliers, the number of discarded observations was generally well above this level. The wind components were treated as a bivariate distribution. Again, four passes were made, with observations for which the Chi square number was greater than 15.202 eliminated in each pass, and a new distribution recomputed after each pass. The $\chi^2$ number of 15.202 corresponds to a discard level of .005 for a bivariate distribution, but as in the case of temperature, the number of discarded observations was, in general, considerably larger than this figure.

**OUTPUT DATA SET**

This data set consists of monthly mean, and 36 composite charts of CST, SMA, SMAF, (u, v), and (UXF, VXF) with the boundaries as shown in Figure 1.

The monthly mean charts based upon the period (1946-1976) were computed giving equal weight to each value and discarding those grid points with less than two observations. The fields were filled and smoothed using the NOAA subroutine as described by Rasmusson and Carpenter (1981).

The 36 composite charts were prepared for the period January (-1) through December (+1) of the warming events as described by Rasmusson and Carpenter (1981).
TAPE STRUCTURE AND FORMAT

This data set has one (9 track, 6250BPI) EBCDIC tape which has five files each containing monthly mean and composite maps with the format shown in Table 1, and whose contents follow:

FILE 1 - Sea Surface Temperatures

To decode this file refer to Table 1 and Appendix A for the Fortran read and decode subroutine.

FILE 2 - (Sea-Air) Temperatures

Format - Table 1
Read and Decode - Appendix B

FILE 3 - Winds

Format - Table 1
Read and Decode - Appendix C

FILE 4 - (UXF, VXF)

Format - Table 1
Read and Decode - Appendix D

FILE 5 - (Sea-Air) Temperature x Wind Speed

Format - Table 1
Read and Decode - Appendix E
### TABLE 1

**FILE 1 - Sea Surface Temperature**

<table>
<thead>
<tr>
<th>Field</th>
<th>Position</th>
<th>Format</th>
<th>Units</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-80</td>
<td>80A1</td>
<td>Bytes</td>
<td>Title</td>
</tr>
<tr>
<td>2</td>
<td>81-82</td>
<td>I2</td>
<td>Number</td>
<td>Map Number</td>
</tr>
<tr>
<td>3</td>
<td>83-84</td>
<td>I2</td>
<td>Number</td>
<td>Sub Record</td>
</tr>
<tr>
<td>4</td>
<td>85-89</td>
<td>F5.2</td>
<td>Degs/C</td>
<td>Δ SST</td>
</tr>
<tr>
<td>5</td>
<td>90-94</td>
<td>F5.2</td>
<td>Degs/C</td>
<td>SST</td>
</tr>
<tr>
<td>6</td>
<td>95-99</td>
<td>I5</td>
<td>Number</td>
<td>Land/Sea Indicator</td>
</tr>
</tbody>
</table>

- Fields 4 through 6 occur 190 times/record

**FILE 2 - (Sea-Air) Temperature**

<table>
<thead>
<tr>
<th>Field</th>
<th>Position</th>
<th>Format</th>
<th>Units</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-80</td>
<td>80A1</td>
<td>Bytes</td>
<td>Title</td>
</tr>
<tr>
<td>2</td>
<td>81-82</td>
<td>I2</td>
<td>Number</td>
<td>Map number</td>
</tr>
<tr>
<td>3</td>
<td>83-84</td>
<td>I2</td>
<td>Number</td>
<td>Sub Record</td>
</tr>
<tr>
<td>4</td>
<td>85-89</td>
<td>F5.2</td>
<td>DEGS/C</td>
<td>Δ S A</td>
</tr>
<tr>
<td>5</td>
<td>90-94</td>
<td>F5.2</td>
<td>DEGS/C</td>
<td>S A</td>
</tr>
<tr>
<td>6</td>
<td>95-99</td>
<td>I5</td>
<td>Number</td>
<td>Land/Sea Indicator</td>
</tr>
</tbody>
</table>

- Fields 4-6 occur 190 times/record

**FILE 3 - Winds**

<table>
<thead>
<tr>
<th>Field</th>
<th>Position</th>
<th>Format</th>
<th>Units</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-80</td>
<td>80A1</td>
<td>Bytes</td>
<td>Title</td>
</tr>
<tr>
<td>2</td>
<td>81-82</td>
<td>I2</td>
<td>Number</td>
<td>Map Number</td>
</tr>
<tr>
<td>3</td>
<td>83-84</td>
<td>I2</td>
<td>Number</td>
<td>Sub Record</td>
</tr>
<tr>
<td>4</td>
<td>85-90</td>
<td>F6.2</td>
<td>M/S</td>
<td>Δ u</td>
</tr>
<tr>
<td>5</td>
<td>91-96</td>
<td>F6.2</td>
<td>M/S</td>
<td>u</td>
</tr>
<tr>
<td>6</td>
<td>97-102</td>
<td>F6.2</td>
<td>M/S</td>
<td>Δ v</td>
</tr>
<tr>
<td>7</td>
<td>103-108</td>
<td>F6.2</td>
<td>M/S</td>
<td>v</td>
</tr>
<tr>
<td>8</td>
<td>109-114</td>
<td>F6.2</td>
<td>M/S</td>
<td>Δ F</td>
</tr>
<tr>
<td>9</td>
<td>115-120</td>
<td>F6.2</td>
<td>M/S</td>
<td>F</td>
</tr>
<tr>
<td>10</td>
<td>121-124</td>
<td>I4</td>
<td>Number</td>
<td>Land/Sea Indicator</td>
</tr>
</tbody>
</table>

- Figures 4 - 10 occur 190 times/record
- Fields occur 190 times
### FILE 4 - (UXF-VXF)

<table>
<thead>
<tr>
<th>Field</th>
<th>Position</th>
<th>Format</th>
<th>Units</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-80</td>
<td>80A$^l$</td>
<td>Bytes</td>
<td>Title</td>
</tr>
<tr>
<td>2</td>
<td>81-82</td>
<td>I2</td>
<td>Number</td>
<td>Map Number</td>
</tr>
<tr>
<td>3</td>
<td>83-84</td>
<td>I2</td>
<td>Number</td>
<td>Sub Record</td>
</tr>
<tr>
<td>4</td>
<td>85-90</td>
<td>F6.2</td>
<td>(M/S)$^2$</td>
<td>$\Delta$ (UXF)</td>
</tr>
<tr>
<td>5</td>
<td>91-96</td>
<td>F6.2</td>
<td>(M/S)$^2$</td>
<td>(UXF)</td>
</tr>
<tr>
<td>6</td>
<td>97-102</td>
<td>F6.2</td>
<td>(M/S)$^2$</td>
<td>$\Delta$ (VXF)</td>
</tr>
<tr>
<td>7</td>
<td>103-108</td>
<td>F6.2</td>
<td>(M/S)$^2$</td>
<td>(VXF)</td>
</tr>
<tr>
<td>8</td>
<td>109-112</td>
<td>I4</td>
<td>Number</td>
<td>Land/Sea Indicator</td>
</tr>
</tbody>
</table>

Fields 4 - 8 repeat 190 times/record

### FILE 5 - (Sea-Air) Temperature x Wind Speed

<table>
<thead>
<tr>
<th>Field</th>
<th>Position</th>
<th>Format</th>
<th>Units</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-80</td>
<td>80A$^l$</td>
<td>Bytes</td>
<td>Title</td>
</tr>
<tr>
<td>2</td>
<td>81-82</td>
<td>I2</td>
<td>Number</td>
<td>Map Number</td>
</tr>
<tr>
<td>3</td>
<td>83-84</td>
<td>I2</td>
<td>Number</td>
<td>Sub Record</td>
</tr>
<tr>
<td>4</td>
<td>85-89</td>
<td>F5.2</td>
<td>DEG(M/S)</td>
<td>$\Delta$ SMAF</td>
</tr>
<tr>
<td>5</td>
<td>90-94</td>
<td>F5.2</td>
<td>DEG(M/S)</td>
<td>SMAF</td>
</tr>
<tr>
<td>6</td>
<td>95-98</td>
<td>I5</td>
<td>Number</td>
<td>Land/Sea</td>
</tr>
</tbody>
</table>

Fields 4-6 repeat 189 times/record
Squares are always oriented so that the lowest number is nearest the intersection of the Greenwich Meridian and the Equator.
SUBROUTINE GETSMA (SMA, DMA, DSN, T)

DIMENSION SMA(95,30), DMA(95,30), DSN(95,30), T(20), SBU(733)

LOGICAL*1 A1, I, J, K
DATA MAPS/000/
DATA EQUIVALENCE(SBU, DMA, DSN, T)

DC 76, DC 1, 30, DC 2

CALL FFGET(DBU, 8, 1240)

IF(I+1) LT 01, GOTO 66

MPS = MPS + 1

FCTRAT(1, 10, 1, X20A4/)

DC 56, K = 1, 20

F(I) = SBU

PRINT 16, MAP, I

LAT = LL

LATS = LL + 1

MPS = MPS + 1

DC 66, LAT = LATN, LATS

DC 66, LON = 1, 95

W = MM + 1

CALL FFA2F(ABJF, 1, MM, 1, 5, 1, SMA, LON, LAT, IDMA)

CALL FFA2F(ABJF, 6, MM, 1, 5, 1, DMA, LON, LAT, IDMA)

CALL FFA2F(ABJF, 11, MM, 1, 5, 1, DSN, LON, LAT, IDDSN)

CONTINUE

RETURN

END

**** FORTRAN CROSS REFERENCE LISTING ****
SUBROUTINE GETWND (UB, DU, VB, DV, F, DF, FN, T)

DIMENSION UB(95,30), DU(95,30), VB(95,30), DV(95,30), FN(95,30),
1 F(95,30), DF(95,30), T(120), SBU(1921)

LOGICAL*1 BUF(7684), ABU (40,190)

DATA MAPS,000/
DATA EQUIVALENCE(SBU(1),BUF(1)),(BUF(85),ABU (1,1))

MAPS = MAPS + 1
DC 77 LL = 1, 30 , 2
CALL FFGET(3BU,8,7684)
IF(LLLGT(0)) 60 TO 56
DO 55 K = 1,20
DO 55 k = SBU(K)
55 CONTINUE
PRINT 16, MAPS, T
FORMAT(1IO,19,2X20A4)
CONTINUE

LATA = LL
LAT = LL + 1
MN = 0
DC 66 LAT = LAT*1,LATS
DO 66 LON = 1, 95
MN = MN + 1
66 CONTINUE
CALL FFAS2F(ASU(1,MM),1,6,2,1,UB(LON,LAT),1UB)
CALL FFAS2F(ASU(7,MM),1,6,2,1,DU(LON,LAT),1DU)
CALL FFAS2F(ASU(13,MM),1,6,2,1,UB(LON,LAT),IVB)
CALL FFAS2F(ASU(19,MM),1,6,2,1,DU(LON,LAT),IDV)
CALL FFAS2F(ASU(25,MM),1,6,2,1,UB(LON,LAT),IF9)
CALL FFAS2F(ASU(31,MM),1,6,2,1,DU(LON,LAT),IF9)
CALL FFAS2F(ASU(37,MM),1,4,0,1,FN(LON,LAT),IFN)
CONTINUE
RETURN
END

****FORTRAN CROSS REFERENCE LISTING****
SUBROUTINE GETSMF (SMF, DMF, DSN, T)

DIMENSION SMF(95,30), DMF(95,30), DSN(95,30), T(20), SBU(733)
LOGICAL I, BUF(2942), ABUF(15,190)

EQUIVALENCE (SMF(1), BUF(1))

CALL FFGET (BUF, 2942)

IFILLGT.001) 30 TO 56

DC 77 LL = 1, 30, 2

CALL FFGET (BUF, A, 2942)

IFILLGT.001) 30 TO 56

DC 77 LL = 1, 30, 2

PRINT 16, MAPS, T

LAT = LL + 1

LATS = LL + 1

MM = 00

DO 66 LAT = LATN, LATS

DC 66 LON = 1, 95

MM = MM + 1

CALL FFA2F (ABUF(I, MM), 1, 5, 2, 1, SMF (LON, LAT), ISMF)

CALL FFA2F (A3JF, 6, MM), 1, 5, 2, 1, DMF (LON, LAT), IDMF)

CALL FFA2F (A3JF, MM, 1, 5, 0, 1, DSN (LON, LAT), IDSN)

CONTINUE

RETURN

END
FAST FORTRAN I/O

A FAST FORTRAN I/O package using QSAM is now available to 360/195 users. The routines will automatically be loaded into programs executed under the NFOR procedures. The package may be used if the following conditions are satisfied:

1. Non-formatted I/O is wanted. (see note 7)
2. All data for a record is contiguous in core.
3. Backspacing is not required.

Calls can be made to the following subroutines:

FFGET(BUF,N,L,&END,&ERR)

FFGET reads a record of length L from FORTRAN unit N into contiguous locations starting at BUF. At EOF, transfer will be made to statement number 'END'. An I/O error causes transfer to be made to statement number 'ERR'. L is in bytes.

\[ 4 \text{ bytes} = 1 \text{ 32-bit} \]

FFGETB(BUF,N,L,&END,&ERR)

FFGETB is the same as FFGET except the records are read in reverse order. Only F and FB record formats may be read backwards.

FFPUT(BUF,N,L)

FFPUT writes a record of length L onto FORTRAN unit N from contiguous core locations starting at BUF.

FFRND(N)

FFRND rewinds FORTRAN unit N

FFUNLD(N)

FFUNLD dismounts FORTRAN unit N and frees core space occupied by buffers and the DCB.

FFPOSN(IO,N,NFILE)

FFPOSN positions FORTRAN unit N to file NFILE. IO should be set to 1 for input, 2 for output, and 3 for read backwards.

FFPOSN(IO,N,NFILE,NC,DSN)

If the 4th and 5th arguments are specified for FFPOSN the FORTRAN unit N is positioned to file NFILE of the data set
FAST FORTRAN DECODE AND ENCODE

A series of FAST FORTRAN decode and encode routines are now available to the 360/195 and 360/65 users. These routines may be used in conjunction with the FFIO routines or independent of them.

At present the following routines may be called:

FFA2I (IBUF, IPOS, IWIDTH, NUM, LOC, IERR)

FFA2I converts alphanumeric integer characters to binary integers. The characters are located in IBUF beginning at byte IPOS with width IWIDTH. The NUM consecutive integers will be placed in LOC(1) through LOC(NUM).

If there is a non-integer character in the field it will be treated as a zero and IERR will be set to one. IERR will normally be returned as zero.

FFA2F (IBUF, IPOS, IWIDTH, IDEC, NUM, XLOC, IERR)

FFA2F converts alphanumeric constants to REAL*4 floating points numbers placing them in XLOC(1) through XLOC(NUM).

The parameters are the same as in FFA2I except IDEC which indicates the decimal placement if no decimal occurs in the field.

FFI2A (IBUF, IPOS, IWIDTH, NUM, LOC)

FFI2A converts binary integers to alphanumeric characters. The values in LOC(1) through LOC(NUM) will be placed in IBUF beginning at byte IPOS with each integer filling IWIDTH characters. If the value of the integer is too large for the space provided, the area will be filled with asterisks.

FFF2A (IBUF, IPOS, IWIDTH, IDEC, NUM, XLOC)

FFF2A converts REAL*4 floating point numbers to characters as in FFI2A IDEC indicates the number of decimal places to be encoded.
1. SST  = Sea surface temperature
2. SST2  = (SST)^2
3. LATS  = Mean latitude of SST observations
4. LONS  = Mean longitude SST observations
5. DATES  = Mean day of month of SST observations
6. NS  = Number of SST observations
7. SMA  = (Sea-Air) temperature difference
8. SMA2  = (SMA)^2
9. LATM  = Mean latitude of SMA observations
10. LONM  = Mean longitude of SMA observations
11. DATEM  = Mean day of month of SMA observations
12. NM  = Number of SMA observations
13. SMAF  = SMA x wind speed
14. SMAF2  = (SMAF)^2
15. LATF  = Mean latitude of SMAF observations
16. LONF  = Mean longitude of SMAF observations
17. DATEF  = Mean day of month of SMAF observations
18. NF  = Number of SMAF observations
19. U  = U component of wind
20. U2  = (U)^2
21. V  = V component of wind
22. V2  = (V)^2
23. F  = Wind speed
24. F2  = (F)^2
25. UF  = (U component of wind) x (wind speed)
26. UF2  = (UF)^2
27. VF  = (V component of wind) x (wind speed)
28. VFL  = (VF)^2
29. LATW  = Mean latitude of wind observations
30. LONW  = Mean longitude of wind observations
31. DATEW  = Mean day of month of wind observations
32. NW  = Number of wind observations.