U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
Silver Spring, Md. 20910

December 20, 1974

Reply to Attn of: W42x1

Subject: 360/195 Version of the MOS Development System

To: Members of TDL

Our 360/195 version of the MOS Development System is ready for use. In order for you to use it effectively you will need the attached Office Note 74-14. This Note, which has dated pages, will be modified as necessary and kept current with changes in the system; the altered pages will be furnished to you for substitution in your copy of the Note. Please tell me of anything you think needs changing, and especially of any errors you find.

We are working on the computer program writeups. In a month or so I hope to distribute a set of these. In the meantime, if you want to use the system, get what is available in the way of writeups from George Hollenbaugh, the person who wrote the program, or me.

The MOS programs are on the load module DSN=NWS.SDO.TDL.LOAD. Additional details are in Office Note 74-14. I have asked George Hollenbaugh to be the MOSLIB librarian. Those of you writing programs for inclusion in MOSLIB, please carefully follow the instructions on page II-1 of Office Note 74-14. This is very important if we are going to have a well-oiled system.

Many of you have contributed to the MOS system and to O.N. 74-14. Only by such a joint effort could this system be put together. For your cooperation, I thank you very much.

Bob

Harry R. Glahn
Deputy Director, TDL

DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE
TDL DEVELOPMENT OFFICE
TDL DEVELOPMENT LABORATORY

TDL Office Note 74-14

THMOS DEVELOPMENT SYSTEM
IBM 360/195 VERSION

Harry R. Glahn

December 1974

REVISION OF TDL OFFICE NOTE 74-14

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THE TDL MOS DEVELOPMENT SYSTEM
IBM 360/195 VERSION

by

Harry R. Glahn

I. INTRODUCTION

Model Output Statistics (MOS) is a technique in which a predictand is related statistically to predictors which are themselves forecasts (or output) from numerical models. This technique was conceived and planning began for its use in connection with the development of the Subsynoptic Advection Model (SAM) (Glahn and Lowry, 1972) in 1965. Since that time, and up until 1972, two sets of MOS processing programs have been used, one in connection with SAM and PE (the NMC 6-level Primitive Equation Model, Shuman and Hovermale, 1968) data and the other with PE and Trajectory (Reap's(1972) Trajectory model) data--the so-called PEATMOS system.

As other models were developed, it became clear that we needed a more general system which would accept data, and allow the merging of data, from several models. It would have to be flexible enough so that output from new models, as they are developed, could be accommodated. Planning for this new system started in March 1972. It went into use in 1973 and was described by Glahn (1973). The so-called PEATMOS data collection ended September 30, 1972 and the new MOS collection started on October 1, 1972. All MOS-related programs up to that time were for the CDC 6600.

In late 1973 NOAA began phasing out its CDC 6600 computers and installing its dual IBM 360/195 system. This made necessary the conversion of all programs and data tapes. These converted programs and tapes are now ready for use and are described in this Note. Conversion was a joint effort of many people in TDL and several have actively contributed to the programming. In this latter group I want especially to mention Frank Globokar, George Hollenbaugh, Al Forst, Don Foster, and Fred Marshall.

II MOS Computer Program Library

A library (source and load) of the IBM 360/195 computer programs associated with the MOS System are located on partitioned data sets

DSN=NWS.SDO.TDL.W4LIB.SOURCE

and

DSN=NWS.SDO.TDL.W4LIB.LOAD

maintained on the NOAA Computers at Suitland, Md., with member names starting with the characters "OP" and aliased (alternate name for the member) the member names without the prefix "OP". George Hollenbaugh is the MOS librarian. The rules concerning additions and use of the MOS programs are:

1. A program is made part of the MOS library only when it is checked-out and ready for use by others.

2. Before a member is placed in the MOS library, a program writeup, a compilation listing, and a duplicate source deck will be provided to the librarian. (The source deck actually provided should have been checked-out.) The format of the source deck and program writeup should follow TDL Office Note 79-13, Techniques Development Laboratory Software Standards.

3. Once on the library, a program may not be modified without the consent of the librarian and the person who wrote it.

4. The librarian is the only person permitted to add or replace programs on the MOS library.

Adding a member to the MOS library can be accomplished with the following deck setup:

```
//S1 EXEC PGM=IEBUPDTE
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSN=NWS.SDO.TDL.W4LIB.SOURCE,DISP=SHR
//SYSUT2 DD DSN=NWS.SDO.TDL.W4LIB.SOURCE,DISP=SHR
//SYSIN DD *
./ ADD NAME=OPM999
./ NUMBER NEW1=1,INCR=1
    (FORTRAN SOURCE DECK)
./ ENDUP
//S2 EXEC NFORXCL,FXPMAP=MAP,FXPL=XL,FXPXREF=XREF,FXPOPT=2,COND=(8,LT)
//FORT.SYSIN DD DSN=NWS.SDO.TDL.W4LIB.SOURCE(OPM600),DISP=SHR
//LKED.SYSLMOD DD DSN=NWS.SDO.TDL.W4LIB.LOAD,DISP=SHR
//LKED.SYSIN DD *
 ALIAS M999
 NAME OPM999(R)
/*
//
```

To replace a member on the MOS library simply change the sixth card in the setup above to:

```
./ REPL NAME=OPM999
```

To use members OPXXXXXX and OPYYYYYY from the MOS library, the JCL should include:

```
//LKED.W4LIB DD DSN=NWS.SDO.TDL.W4LIB.LOAD.DISP=SHR
//LKED.SYSIN DD *
 INCLUDE W4LIB(OPXXXXXX,OPYYYYYY)
```

To use a member or members from the MOS library without having to specifically name them, the JCL should be:

```
//LKED.SYSLIB DD
//            DD
//            DD DSN=NWS.SDO.TDL.W4LIB.LOAD,DISP=SHR
```

III. [redacted] OF THE DEVELOPMENT SYSTEM

The basic programs [redacted] within the system are depicted in Fig. III-1. Each box rep[redacted]in program or a subroutine for which there is a main program dr[redacted] program operates on input data and usually supplies data for an[redacted]am; this data flow is represented by arrows. Each box also shows [redacted] or persons primarily responsible for that program; in most ins[redacted] first person listed wrote the program. The name of the program [redacted], if it conforms to the MOS system naming convention. The [redacted] the MOSLIB unless the name appears in parenthesis. The [redacted] MOS programs start with the letter M and the following numbers [redacted]anges indicated in Fig. III-2. The number in the lower left co[redacted]box in Fig. III-1 is for reference in the following section.

A MOS Tapes Notel[redacted]ned by George Hollenbaugh which contains tape formats and [redacted]tion of tapes and data for MOS system users. Tape formats are [redacted] in this note. All tapes used in the MOS system are 9-trac[redacted]

[redacted]orecasts (Boxes 1-4)

Basic forecast fi[redacted]ious numerical models are saved in grid-point form on special TDL g[redacted]d in Section IV. Each model run produces a disk file of data. [redacted] program extracts the data to be saved and stores it on another [redacted]. Then, periodically, another archiving program transfers th[redacted] tape; this is usually done once a week. This procedure has been i[redacted] on the IBM 360/195 since the fall of 1974.

Refor[redacted]-Point Tapes (Boxes 11, 13-16)

MOS CDC-6600 grid-[redacted] (described by Glahn, 1973) have been converted to the IBM 360/19[redacted] in Section IV. The tape numbers can be found in the MOS Ta[redacted]. Data on these tapes were collected between October 1, 1972 a[redacted]he IBM collection started.

R[redacted]S Grid-Point Tapes (Box 12)

PEATMOS CDC-6600 [redacted]es (described by Glahn, 1973) have been converted to the IBM 360/19[redacted] in Section IV. The tape numbers can be found in the MOS Tapes [redacted]ta on these tapes were collected between July 3, 1969 and September [redacted] Although the PEATMOS tapes contained both PE and Trajectory mod[redacted] reformatted tapes have the PE and Trajectory data on separate t[redacted]

[redacted]polate (Boxes 21-25)

A separate version [redacted]routine M200XX exists for each model data collection. A driv[redacted] is available in source language. Interpolation into the grid-point [redacted] made for specific points, usually, but not limited to, station [redacted] designated by the National Climatic Center (NCC).

MOS DEVELOPMENT SYSTEM

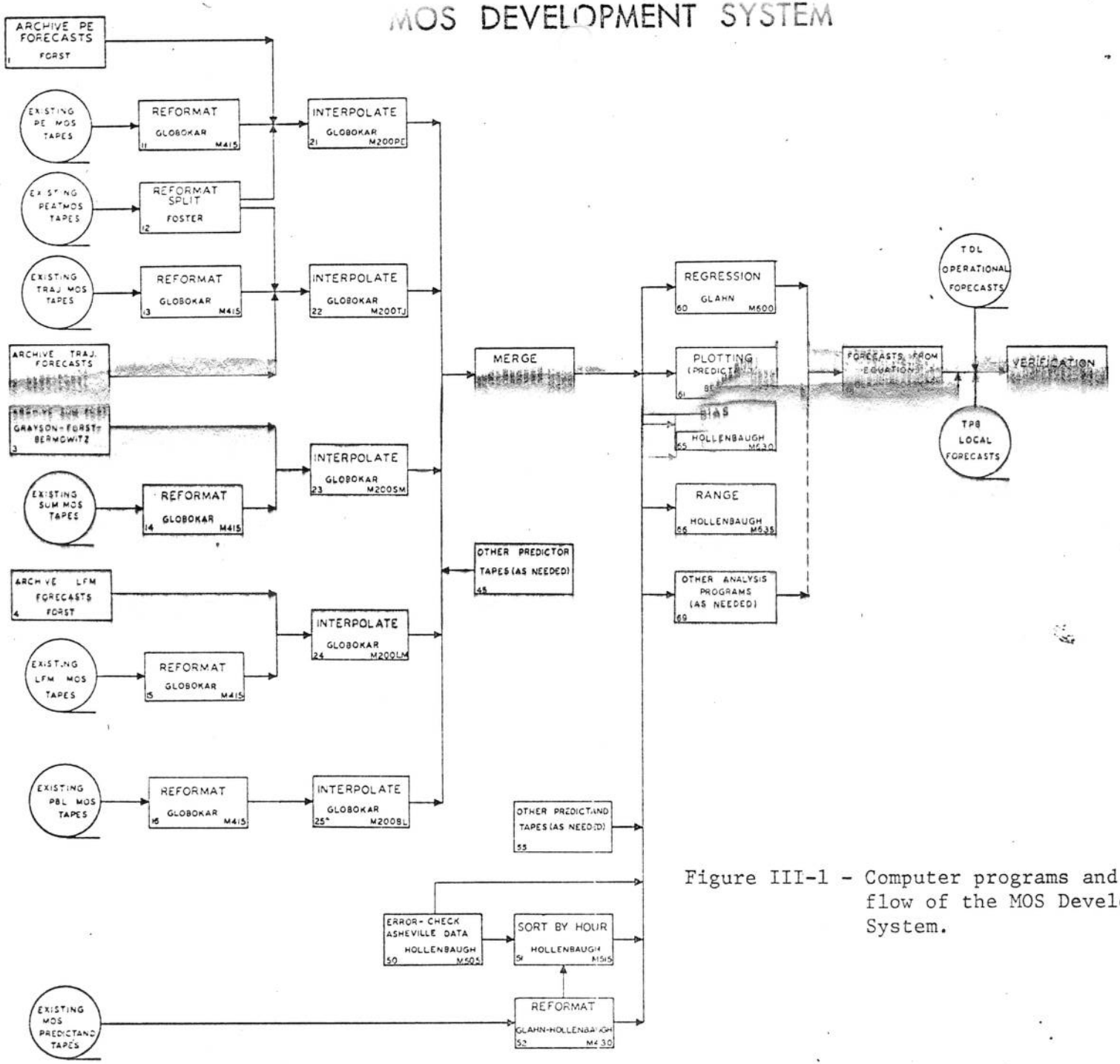


Figure III-1 - Computer programs and data flow of the MOS Development System.

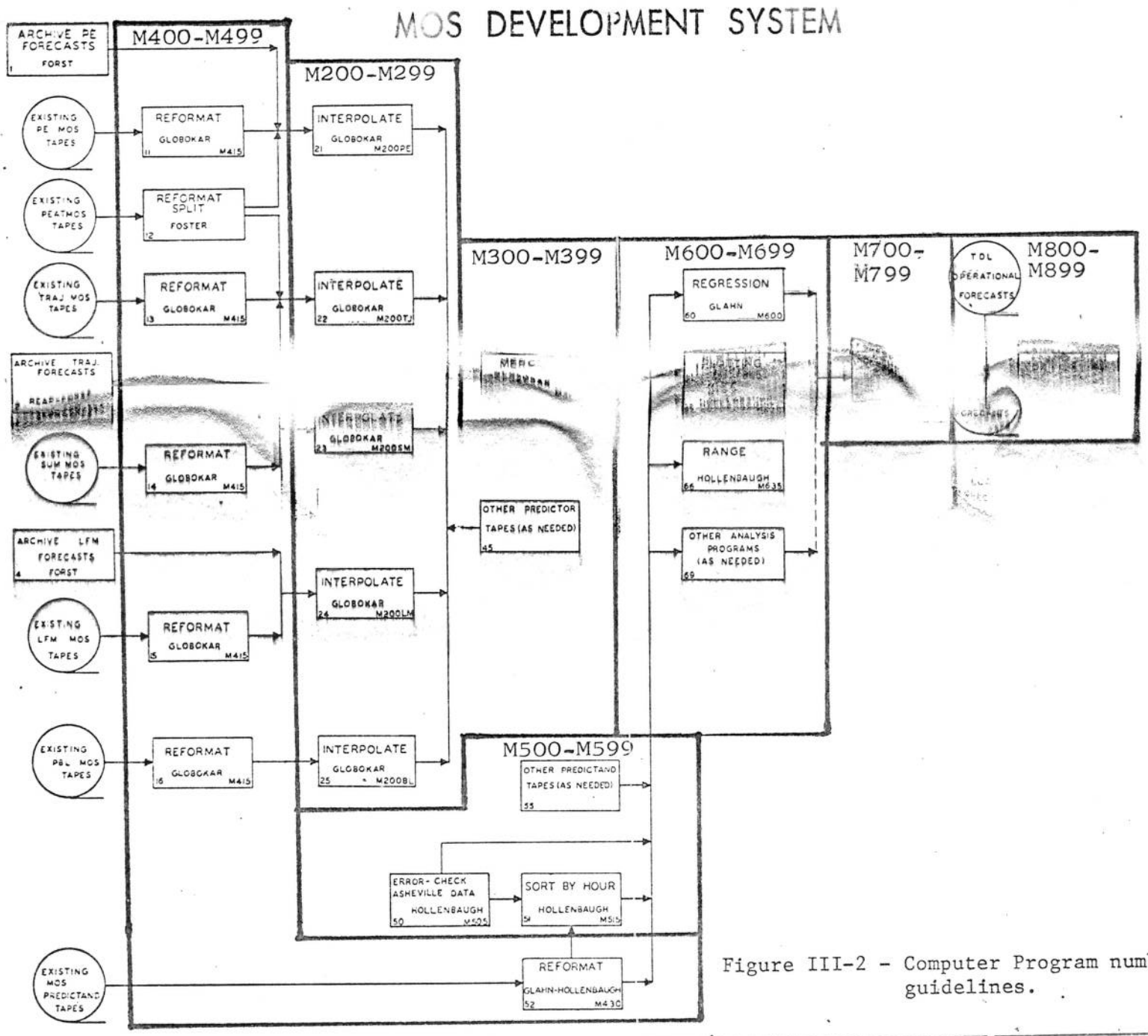


Figure III-2 - Computer Program numbering guidelines.

WBAN numbers. The tape [illegible] given in Section V. All MOS grid-point data are in a format that can [illegible]led by M200XX.

M[illegible]olated Tapes (Box 30)

If it is desired to m[illegible]rom more than one model, M300 should be used. It will properly inte[illegible] from two input tapes and produce a merged interpolated tape in the [illegible]rmat as the input tapes. If data from more than two models are to [illegible] more than one run of M300 will be necessary. The points for which [illegible] data are provided should be the same on the two tapes to be me[illegible] a particular date will not be transferred to the output tape [illegible] that date exist on both input tapes. The dates printed out by [illegible] dates for which data for all models merged are available for [illegible].

[illegible]ictor Tapes (Box 45)

It may be that a user [illegible] to provide predictors other than those contained on, or those that can [illegible] from, the MOS tapes. If so, he need only prepare these predict[illegible]same format as that produced by M200XX. M300 will then merge them [illegible]tors from the numerical models for input to analysis programs.

Er[illegible]sheville Data (Box 50)

Three-hourly observ[illegible] U.S. stations are received monthly from the National Climatic C[illegible]ville. The format is explained in Section VI of this note. T[illegible]undergo a careful automatic-manual check for correctness. T[illegible] to flag errors, etc., and to put the data into the format [illegible] in Section VII) needed by the MOS analysis programs is M505.

[illegible] Hour (Box 51)

Output of M505 cont[illegible]ations/day. For most purposes, only one hour, say 0600 GMT, will[illegible] a program for a particular run; occasionally, two hours might be[illegible] will prepare a tape consisting of data from either one or two [illegible] hours. Error-free tapes from M505 and M515 are maintained by [illegible]ugh and the tape numbers are kept in the MOS Tapes Notebook. [illegible] users should not need to use M505 or M515.

[illegible]redictands (Box 52)

Existing CDC-6600 M[illegible] tapes are reformatted for the IBM 360/195 MOS system by M430. [illegible]tting has already been done and error-free tapes are maintained b[illegible]ollenbaugh. Individual users should not need to use M430. Eight obs[illegible]/day are available starting with October 1, 1972; prior to that ti[illegible] four observations/day are available.

Predictand Tapes (Box 55)

It may be that a user wants to provide predictands other than those contained on, or that are computed from, the archived tapes. If so, he need only prepare the predictands in the same format as that produced by M505, M515, and M430 as specified in Section VII, the dimensions of the predictand data matrix are adjustable. However, there are restrictions concerning the range of dates and also restrictions in analysis programs such as M600 as to the maximum matrix size allowed. Users should check with Bob Glahn before using this option.

Regression (Box 60)

M600 is our major analysis program and produces regression equations on paper and, if desired, on card/or magnetic tape. Predictors are screened and can be continuous, binary or computed by subroutine; they can be from the predictand tape as well as from the predictor tape. Predictands can be continuous, binary, or computed by subroutine. Equations can be single station or generalized operator.

Predictand Plotting (Box 61)

M640 will take a specified predictand for specified dates from a predictand tape and plot its value at specified stations (locations) on a U.S. map.

Bias (Box 65)

M630 stratifies a sample on a predictor value and computes the relative frequency of a binary predictand on that stratified sample. It is used primarily in selecting predictors over which to develop regionalized (generalized operator) equations.

Range (Box 66)

M635 computes the maximum and minimum values which a regression equation with only binary predictors can produce.

Other Analysis Programs (Box 69)

A user may want to write another analysis program. If so, the routines provided for reading predictor and predictand tapes should be used: RDX, RDY1, RDY2, RDY3, and YUNPKR.

Forecasts From Equations (Box 70)

M700 accepts equations on cards or tape in the format prepared by M600 and produces forecasts on MOS predictor tapes. If desired, verifying observational data can be added with the forecasts in preparation for verification. (This program is not yet available on the IBM 360/195.

Verification (Box 80)

M800 accepts input [redacted] tapes containing MOS guidance forecasts available from the Technical [redacted] Branch OM&O; these forecasts are collated with observations from a [redacted] tape and output for future analysis. One type of forecast, su[redacted] speed or cloud amount, is handled on a specific run and the output [redacted] for comparatively verifying that variable. Typically, each us[redacted] provide his own verification program, which would use M800 output. ([redacted] is not yet operational on the IBM 360/195; however, a CDC-660[redacted] available.)

IV. GRID-POINT PREDICTOR TAPES

The grids on which the basic forecast and analysis fields are saved, the lists of fields saved for each model, and the format of the grid-point tapes are given in this section. The specific dates for which data from a particular model are available are given in the MOS Tapes Notebook.

Format of MOS Grid-Point Predictor Tapes

A - Multiple records consisting of:

Words 1-12: Standard NMC 12-word identifier (see NMC Office Note 84).

Words 13-NPKWDS: Packed grid-point data, 16 bits per word.

Grid-point data are packed by the NMC routine W3AI00. The first packed datum is in the leftmost 16 bits of the 32-bit word, the second packed datum is in the remaining 16 bits. The first datum is the lower left grid-point value. Scanning of the grid is then by column (upward) from left to right.

B - End of data on tape signaled by an EOF.

COMMENTS: A "Collection" of tapes contains data (initial fields and/or forecasts) from one numerical model (for instance, the PE) for all of its run times (for instance, 0000Z and 1200Z for the PE) for any number of dates in sequence. An exception is the TDL BLM, whose run times are in separate collections. Each collection has its own number of words per record, NPKWDS; this will remain constant throughout the period of collection. The data are not (necessarily) separated by month or season; a tape contains as many cases as possible. The standard NMC units are used for the variables wherever possible. A missing value is indicated by all 16 bits set to 1. The order of the fields is immaterial except that the order must be constant on any one tape; if the order changes, or fields are added or dropped, a new tape is started.

I/O Mode: These are 9-track tapes written in 6250 bpi density with the FORTRAN WRITE statement and with the DD statement:

```
//GO.FT01F001 DD DSN=YYGRID,DCB=(RECFM=VBS,LRECL=Q,BLKSIZE=R,DEN=4),
            DISP=(NEW,KEEP,KEEP),LABEL=(,SL),
            UNIT=T6250,VOL=SER=EXXXXX
```

where EXXXXX is a NOAA Computer Division tape and YY, Q, and R take the values from the table below for the various models.

MODEL	YY	Q	R
NMC PE	PE	708*	14164
TDL Trajectory	TJ	496*	4964
NMC LFM	LM	1540*	15404
TDL SUM	SM	5092*	15280
NMC Boundary Layer	BL	1540*	15404
NMC LFM-II	LX	3168*	15844
TDL BLM 0000GMT	BØ	2152	10764
TDL BLM 1200GMT	B1	2152	10764

*Prior to June 1980, most (or all) tapes were written with Q=4 bytes less as a DCB parameter. The tapes were actually written correctly (with the Q as listed), but the label contains the incorrect value. With normal FORTRAN use, this creates no problem. However, using some utility routines without specifying the actual record length will cause problems.

Data Collection

Initial and forecast from the NMC hemispheric 6-layer Primitive Equation (are archived over the 4 grids shown in Figure IV-1. The ids, numbered 1 through 4, cover the "lower 48" states, Alaska, Hawaii, and Puerto Rico respectively. Data for a total of points are saved. The tape format is given in "Format of -Point Predictor Tapes." The packed data plus the 12 identifier require a record size of 176 32-bit words.

The PE fields being saved listed in the two tables below. The order of these fields not remain constant throughout the collection period except that all hour fields will preceed all t_0+12 hour fields, etc. The table below gives the fields saved for the period July 3, 1969 December 30, 1972 (the PEATMOS collection); the second table gives fields saved October 1, 1972 to the present.

VARIABLES FROM 6-LAYER FULL-MESH PE
PERIOD OF July 3, 1969 – SEPT. 30, 1972

Variable	Units	Forecast Interval to + 0	6	12	18	24	30	36	42	48
1000 MB HEIGHT	M		X	X	X	X		X		X
850 MB HEIGHT	M		X	X	X	X		X		X
500 MB HEIGHT	M		X	X	X	X		X		X
1000 MB TEMP.	DEG K	X		X		X		X		X
850 MB TEMP.	DEG K	X		X		X		X		X
700 MB TEMP.	DEG K	X				X				
500 MB TEMP.	DEG K					X				
B.L. POT. TEMP.	DEG K		X	X	X	X		X		X
SURFACE PRESS. (p*)	MB		X	X	X	X		X		X
B.L. U	M/SEC		X	X	X	X		X		X
B.L. V	M/SEC		X	X	X	X		X		X
*B.L. ω	MB/SEC		X	X	X	X	X	X	X	X
REL. HUM. (SFC-490)	PERCENT		X	X	X	X	X	X	X	X
*REL. HUM. (B.L.)	PERCENT		X	X	X	X	X	X	X	X
*(REL. HUM.) 1	PERCENT		X	X	X	X	X	X	X	X
*(REL. HUM.) 2	PERCENT		X	X	X	X	X	X	X	X
PRECIP. WATER	KG/M^2				X		X		X	
PRECIP. AMT.	M			X		X		X		X
850 MB U	M/SEC					X				
850 MB V.	M/SEC					X				
700 MB U	M/SEC					X				
700 MB V	M/SEC					X				
500 MB U	M/SEC					X				
500 MB V	M/SEC					X				
1000 MB ω	MB/SEC					X				
850 MB ω	MB/SEC					X				
650 MB ω	MB/SEC					X				

*These 4 variables, boundary layer vertical velocity and the relative humidity in 3 layers, are available only after August 8, 1970.

B.L. = lowest 50 mb;
Layer 1 = B.L. top to ~ 720 mb
Layer 2 = ~720 mb to ~ 490 mb

PE MODEL VARIABLES SAVED
6LPE PERIOD OF RECORD: OCT. 1, 1972 - JAN. 19, 1978
7LPE PERIOD OF RECORD: JAN. 27, 1978 - AUG. 12, 1980
SPECTRAL PERIOD OF RECORD: AUG. 13, 1980 - PRESENT
(0000 GMT CYCLE ONLY)

Variable	Units	Forecast Interval t_o +												
											96			204*
											108			216
										60	120			228
										72	132	156	180	240
		6	12	18	24	30	36	42	48	84	144	168	192	252
1000 MB HEIGHT	M	X	X	X	X		X		X	X	#@	#α	¢α	¢
850 MB HEIGHT	M	X	X	X	X		X		X	X	%	Γ	Γ	
700 MB HEIGHT	M										#@&	Γ	Γ	
500 MB HEIGHT	M	X	X	X	X		X		X	X	#@	#α	¢α	¢
1000 MB TEMP.	DEG K		X		X		X		X	X	%	Γ	Γ	
850 MB TEMP.	DEG K	X	X	X	X		X		X	X	%	Γ	Γ	
700 MB TEMP.	DEG K		X		X		X		X	X	%	Γ	Γ	
500 MB TEMP.	DEG K		X		X		X		X	X	%	Γ	Γ	
B.L. POT. TEMP.	DEG K	X	X	X	X		X		X	X				
1000 MB DEW PT	DEG K	+	+	+	+	+	+	+	+	+$	%$			
850 MB DEW PT	DEG K	+	+	+	+	+	+	+	+	+$	%$			
700 MB DEW PT	DEG K	+	+	+	+	+	+	+	+	+$	%$			
500 MB DEW PT	DEG K	+	+	+	+	+	+	+	+	+$	%$			
SURFACE PRESS. (p*)	MB		X		X		X		X	X				
B.L. U	M/SEC	X	X	X	X		X		X	X				
B.L. V	M/SEC	X	X	X	X		X		X	X				
B.L. ω	MB/SEC	X	X	X	X		X		X	X				
REL. HUM. (SFC-490)	PERCENT	X	X	X	X	X	X	X	X	X	%-	Γ	Γ	
(REL. HUM.) B.L.	PERCENT	X	X	X	X		X		X	X				
(REL. HUM.) Layer 1	PERCENT	X	X	X	X		X		X	X				
(REL. HUM.) Layer 2	PERCENT	X	X	X	X		X		X	X				
PRECIP. WATER	KG/M^2		X		X		X		X	X				
PRECIP. AMT.	M		X	X	X	X	X	X	X	X	%	Γ	Γ	
850 MB U	M/SEC		X		X		X		X	X				
850 MB V	M/SEC		X		X		X		X	X				
700 MB U	M/SEC				X									
700 MB V	M/SEC				X									
500 MB U	M/SEC				X									
500 MB V	M/SEC				X									
850 MB ω	MB/SEC		X		X		X		X	X				
650 MB ω	MB/SEC		X		X		X		X	X				
p** (TROP. PRESS.)	MB		X		X		X		X	X				
TOTAL FIELDS CURRENTLY AVAILABLE BY HOUR		16	27	17	31	6	27	6	27	23	10	10	10	2

\# These fields available starting October 1, 1975.
¢ These fields available starting November 2, 1978.
\+ These fields available starting June 27, 1979.
% These fields available starting November 28, 1979.
* These fields are generated by the barotropic extension model.
@ Prior to November 28, 1979, these fields were generated by the barotropic extension model. Since that date, they have been forecast by the extended 7LPE or the Spectral model (after August 12, 1980).
$ These fields were dropped as of August 13, 1980.
\- These fields were unavailable from August 13, 1980 through August 27, 1980.
α Prior to September 17, 1981, these fields were generated by the barotropic extension model. Since that time, they have been forecast by the Spectral model.
Γ These fields available starting September 17, 1981.
& 700-mb height fields from the barotropic extension was computed by NMC as follows:

$$Z_{700} = Z_{500} - 0.468981156\ (Z_{500} - Z_{1000})$$

where Z_{1000}, Z_{700}, Z_{500} are the 1000-, 700-, and 500-mb heights, respectively.

NOTE: If any field is missing from a projection, no fields are saved for that day.

B.L. = Lowest 50 mb;
Layer 1 = B.L. top to ~ 720 mb;
Layer 2 = ~ 720 to ~ 490 mb.

PE MODEL VARIABLES SAVED
6LPE PERIOD OF RECORD: OCT. 1, 1972 - JAN. 19, 1978
7LPE PERIOD OF RECORD: JAN. 26, 1978 - AUG. 11, 1980
SPECTRAL PERIOD OF RECORD: AUG. 12, 1980 - PRESENT
(1200 GMT CYCLE ONLY)

Variable	Units	Forecast Interval t_o +									72# 84 96
		6	12	18	24	30	36	42	48	60$	
1000 MB HEIGHT	M	X	X	X	X		X		X	X	
850 MB HEIGHT	M	X	X	X	X		X		X	X	
500 MB HEIGHT	M	X	X	X	X		X		X	X	X
1000 MB TEMP.	DEG K		X		X		X		X	X	
850 MB TEMP.	DEG K	X	X	X	X		X		X	X	
700 MB TEMP.	DEG K		X		X		X		X	X	
500 MB TEMP.	DEG K		X		X		X		X	X	
B.L. POT. TEMP.	DEG K	X	X	X	X		X		X	X	
1000 MB DEW PT	DEG K	+	+	+	+	+	+	+	+	+%	
850 MB DEW PT	DEG K	+	+	+	+	+	+	+	+	+%	
700 MB DEW PT	DEG K	+	+	+	+	+	+	+	+	+%	
500 MB DEW PT	DEG K	+	+	+	+	+	+	+	+	+%	
SURFACE PRESS. (p*)	MB		X		X		X		X	X	
B.L. U	M/SEC	X	X	X	X		X		X	X	
B.L. V	M/SEC	X	X	X	X		X		X	X	
B.L. ω	MB/SEC	X	X	X	X		X		X	X	
REL. HUM. (SFC-490)	PERCENT	X	X	X	X	X	X	X	X	X	
(REL. HUM.) B.L.	PERCENT	X	X	X	X		X		X	X	
(REL. HUM.) Layer 1	PERCENT	X	X	X	X		X		X	X	
(REL. HUM.) Layer 2	PERCENT	X	X	X	X		X		X	X	
PRECIP. WATER	KG/M^2		X		X		X		X	X	
PRECIP. AMT.	M		X	X	X	X	X	X	X	X	
850 MB U	M/SEC		X		X		X		X	X	
850 MB V	M/SEC		X		X		X		X	X	
700 MB U	M/SEC				X						
700 MB V	M/SEC				X						
500 MB U	M/SEC				X						
500 MB V	M/SEC				X						
850 MB ω	MB/SEC		X		X		X		X	X	
650 MB ω	MB/SEC		X		X		X		X	X	
p**(TROP. PRESS.)	MB		X		X		X		X	X	
TOTAL FIELDS CURRENTLY AVAILABLE BY HOUR		16	27	17	31	6	27	6	27	23	1

$ Fields at 60 hours are available beginning March 23, 1977.
# These fields for projections > 60 hours are available starting August 9, 1978.
+ These fields available starting June 29, 1979.
% These fields were dropped as of August 12, 1980.

NOTE: If any field is missing from a projection, no fields are saved for that day.

B.L. = Lowest 50 mb;
Layer 1 = B.L. top to ~ 720 mb;
Layer 2 = ~ 720 to 490 mb.

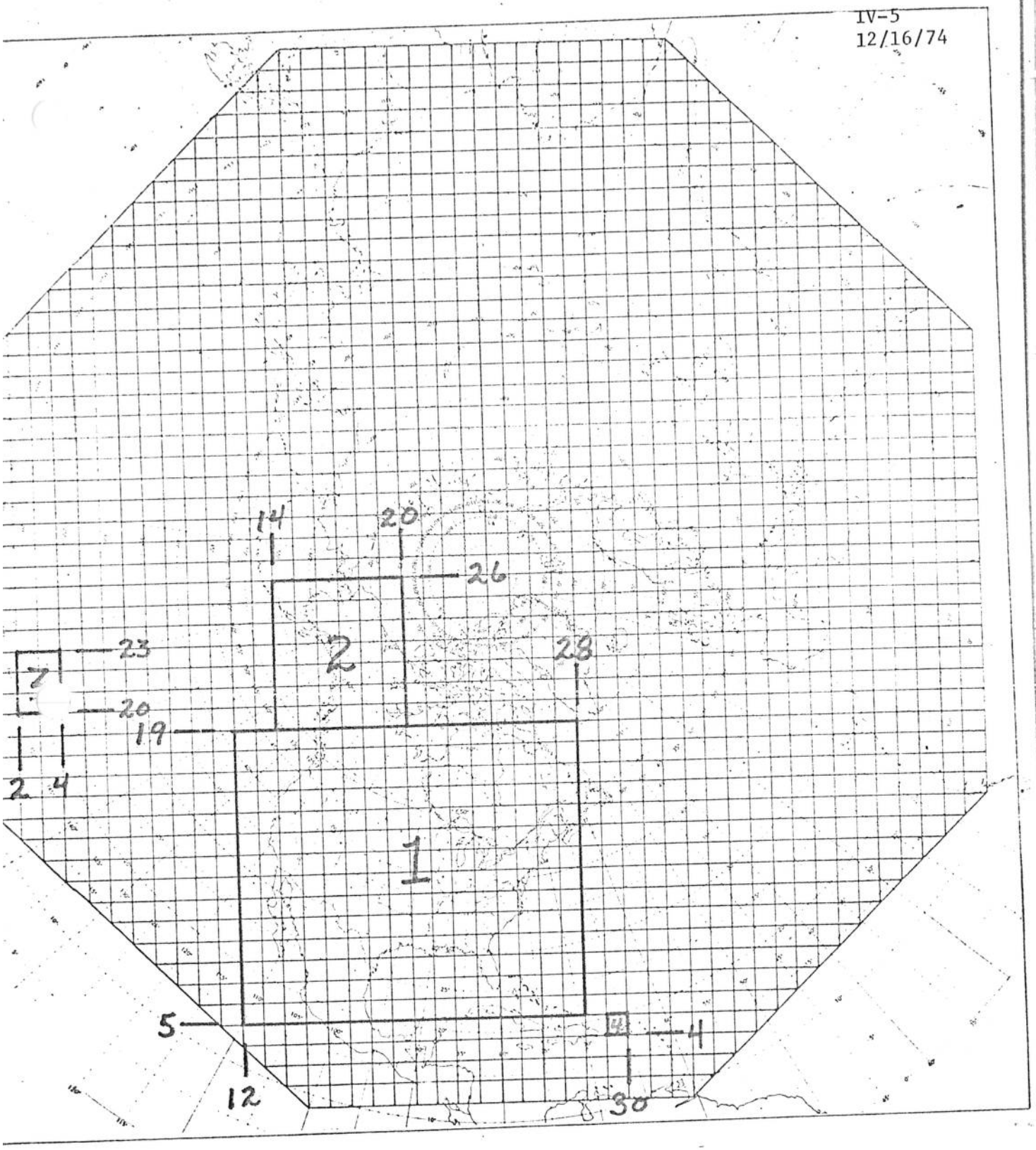


Figure IV-1.--Grids on which PE data are collected for the MOS System.

TRAJ Data Collection

Forecast fields from the TDL Trajectory (TRAJ) model are archived over the grid shown in Figure IV-2. Data for 221 grid points are saved. The tape format is given in "Format of MOS Grid-Point Predictor Tapes." The packed data plus the 12 identifiers require a record size of 123 32-bit words.

Currently, 22 TRAJ fields are being saved at t_o+24 (only). In addition, nine fields from NMC numerical prediction models are saved on the TRAJ grid at t_o+24. The names of the fields are shown in the table below.

The fields are produced from both the PE and LFM forecast models. The period of record for the PE-generated TRAJ fields is July 3, 1969, to the present. Prior to November 1, 1972, the fields underwent two bi-quadratic space interpolations, whereas after that date they did not. The period of record for the LFM generated TRAJ fields is March 1, 1976, to the present.

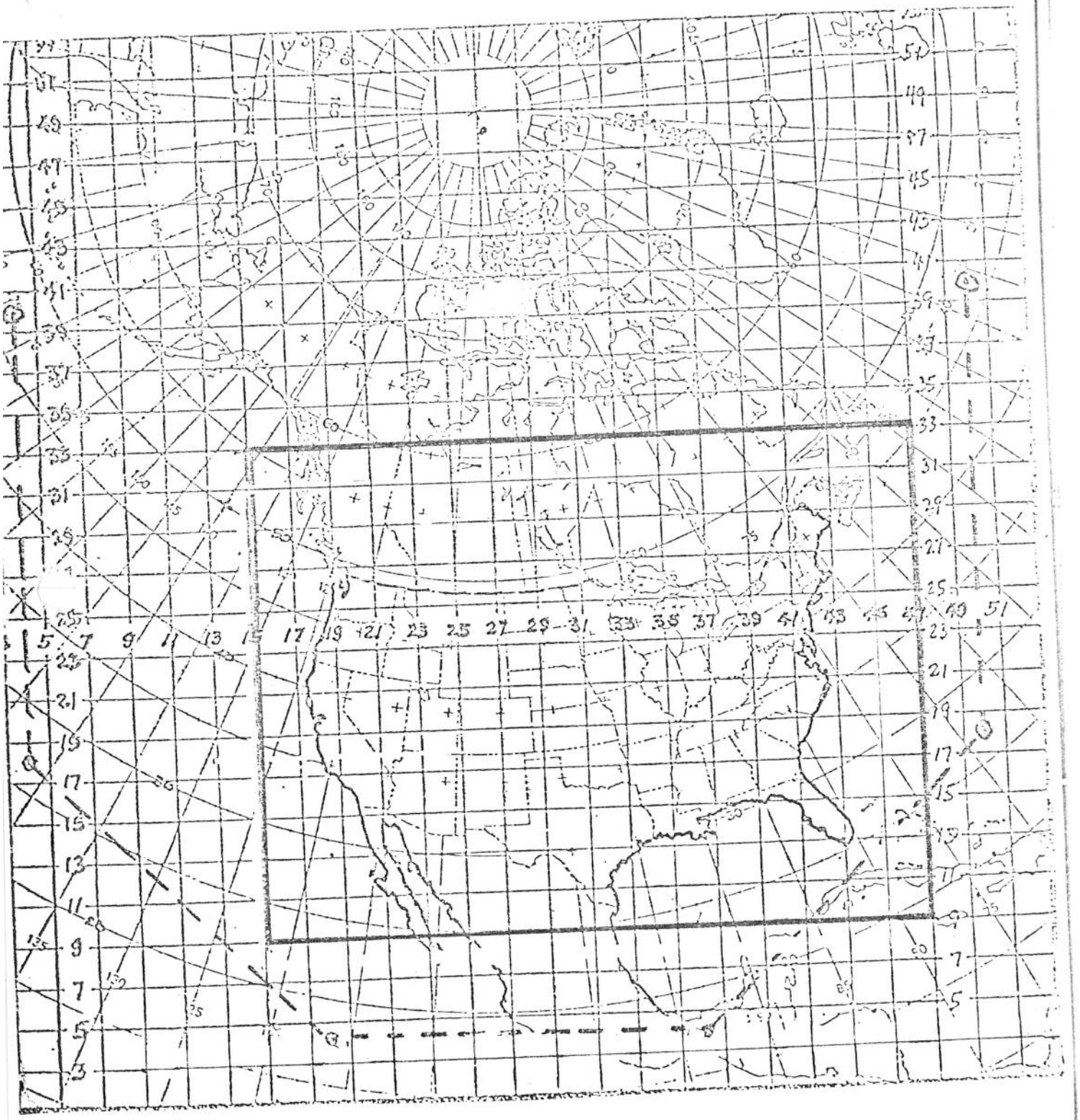
VARIABLES SAVED FROM TRAJECTORY MODEL

Variable	Units
SURFACE TEMPERATURE	DEG K
SURFACE DEW POINT	DEG K
850 MB TEMPERATURE	DEG K
850 MB DEW POINT	DEG K
700 MB TEMPERATURE	DEG K
700 MB DEW-POINT	DEG K
SFC REL. HUMID.	PERCENT
850 MB REL. HUMID.	PERCENT
700 MB REL. HUMID.	PERCENT
700-SFC MEAN REL. HUMID.	PERCENT
SFC 12-HR NET VERT. DISPL.	MB
850 MB 12-HR NET VERT. DISPL.	MB
700 MB 12-HR NET VERT. DISPL.	MB
SFC 24-HR NET VERT. DISPL.	MB
850 MB 24-HR NET VERT. DISPL.	MB
700 MB 24-HR NET VERT. DISPL.	MB
700-SFC CNVCTV. INSTAB.	DEG K
SFC 12-HR PRECIP. AMT. (12-24 HR)	M
SFC 12-HR HORIZ. CVGNC.	SEC^{-1}
850 MB 12-HR HORIZ. CVGNC.	SEC^{-1}
K INDEX	DEG C
TOTAL TOTALS INDEX	DEC C

REDUNDANT FIELDS FROM THE FULL-MESH PE OR FINER-MESH LFM*

Variable	Units
500 MB TEMPERATURE	DEG K
B.L. U	M/SEC
B.L. V	M/SEC
850 MB U	M/SEC
850 MB V	M/SEC
700 MB U	M/SEC
700 MB V	M/SEC
500 MB U	M/SEC
500 MB V	M/SEC

*The winds are still oriented with the PE or LFM (not TRAJ) models.



Fi IV-2. Grid on which TRAJ data are collected for the MOS System is shown with the LFM grid as a background.

LFM DATA COLLECTION

Initial and forecast fields from NMC's Limited Area Fine Mesh (LFM) model and its successor LFM-II are archived over the small grid shown in Figure IV-3. Data for a total of 744 grid points are saved. The tape format is given in "Format of MOS Grid Point Predictor Tapes." The packed data plus the 12 identifiers require a record size of 384 32-bit words. The first operational run of the LFM-II was at 1200 GMT August 31, 1977. The DSN is LMGRID.

In addition, the same fields saved on the small grid have been saved for the LFM-II on the large grid shown in Figure IV-3 starting with 0000 GMT September 1, 1977. Data for a total of 1558 grid points are saved. The packed data plus the 12 identifiers require a record size of 791 32-bit words. The DSN is LXGRID.

The LFM fields being saved are listed in the tables below. The order of these fields may not remain constant throughout the collection period except that all t_o+0 hour fields will preceed all t_o+6 hour fields, etc. The first table (p IV-9) is a composite showing the present collection and when each variable was added. The next several tables show what variables are available starting at times when the collection was changed.

VARIABLES SAVED FROM LFM AND LFM-II
LFM I Period of Record: 0000 GMT Oct. 31, 1971 - 0000 GMT Aug. 31, 1977
LFM-II Period of Record: 1200 GMT Aug 31, 1977 - Present

Variable	Units	Forecast Interval t_0+ 0	6	12	18	24	30	36	42	48
REL. HUM. (SFC-490)	PERCENT		X	X	X	X	&	&	$	$
PRECIP. WATER	KG/M^2		X	X	X	X	&	&	$	$
B.L. POT. TEMP.	DEG K		X	X	X	X	&	&	$	$
B.L. U	M/SEC		X	X	X	X	&	&	$	$
B.L. V	M/SEC		X	X	X	X	&	&	$	$
1000 MB HEIGHT	M	X	X	X	X	X	&	&	$	$
850 MB HEIGHT	M	X	X	X	X	X	&	&	$	$
700 MB HEIGHT	M	X	%	X	%	X	&	&	$	$
500 MB HEIGHT	M	X	%	X	%	X	&	&	$	$
1000 MB TEMP.	DEG K	X(SFC)		X		X		&		$
850 MB TEMP.	DEG K	X	X	X	X	X	&	&	$	$
700 MB TEMP.	DEG K	X	*	X	#	X	&	&	$	$
500 MB TEMP.	DEG K	X	*	X	#	X	&	&	$	$
400 MB TEMP.	DEG K		@	@	@	@	@	@	@	@
300 MB TEMP.	DEG K		@	@	@	@	@	@	@	@
200 MB TEMP.	DEG K		@	@	@	@	@	@	@	@
850 MB U	M/SEC		X	X	X	X	&	&	$	$
700 MB U	M/SEC			X		X		&		$
500 MB U	M/SEC		*	X	#	X	&	&	$	$
400 MB U	M/SEC		@	@	@	@	@	@	@	@
300 MB U	M/SEC		@	@	@	@	@	@	@	@
200 MB U	M/SEC			X		X		&		$
850 MB V	M/SEC		X	X	X	X	&	&	$	$
700 MB V	M/SEC			X		X		&		$
500 MB V	M/SEC		*	X	#	X	&	&	$	$
400 MB V	M/SEC		@	@	@	@	@	@	@	@
300 MB V	M/SEC		@	@	@	@	@	@	@	@
200 MB V	M/SEC			X		X		&		$
850 MB ω	MB/SEC			X		X		&		$
700 MB ω	MB/SEC		%	X	%	X	&	&	$	$
500 MB ω	MB/SEC		*	X	#	X	&	&	$	$
PRECIP. AMT.	M		+	+	%	%	&	&	$	$
SURFACE PRESS. (p*)	MB			X		X		&		$
(REL. HUM.) B.L.	PERCENT	X	X	X	X	X	&	&	$	$
(REL. HUM.) 1	PERCENT	X	X	X	X	X	&	&	$	$
(REL. HUM.) 2	PERCENT	X	X	X	X	X	&	&	$	$
1000 MB DEW POINT	DEG K		X	X	X	X	&	&	$	$
850 MB DEW POINT	DEG K		*	X	#	X	&	&	$	$
700 MB DEW POINT	DEG K		*	X	#	X	&	&	$	$
500 MB DEW POINT	DEG K		*	X	#	X	&	&	$	$
400 MB DEW POINT	DEG K		@	@	@	@	@	@	@	@
300 MB DEW POINT	DEG K		@	@	@	@	@	@	@	@
SEA LEVEL PRESS.	MB	X		X		X		&		$
B.L. ω	MB/SEC		X	X	X	X	&	&	$	$
Total fields by hour		12	36	44	36	44	36	44	36	44

\+ These 2 variables are available starting 1200 GMT Dec. 7, 1971.
% These 8 variables are available starting 0000 GMT Oct. 1, 1972.
* These 8 variables are available starting 0000 GMT March 6, 1974.
\# These 8 variables are available starting 0000 GMT March 16, 1974.
& These 62 variables are available starting 1200 GMT April 2, 1975.
$ These 62 variables are available starting 0000 GMT February 1, 1976.
@ These 72 variables are available starting 0000 GMT November 29, 1978.

B.L. = lowest 50 mb;
Layer 1 = B.L. top to approximately 720 mb
Layer 2 = approximately 720 mb to approximately 490 mb

VARIABLES SAVED FROM LFM AND LFM-II
LFM Period of Record: 0000 GMT Oct. 31, 1971 - 0000 GMT Aug. 31, 1977
LFM-II Period of Record: 1200 GMT Aug. 31, 1977 - Present

Variable	Units	Forecast Interval t_0+ 0	6	12	18	24	30	36	42	48
REL. HUM. (SFC-490)	PERCENT		X	X	X	X				
PRECIP. WATER	KG/M^2		X	X	X	X				
B.L. POT. TEMP.	DEG K		X	X	X	X				
B.L. U	M/SEC		X	X	X	X				
B.L. V	M/SEC		X	X	X	X				
1000 MB HEIGHT	M	X	X	X	X	X				
850 MB HEIGHT	M	X	X	X	X	X				
700 MB HEIGHT	M	X		X		X				
500 MB HEIGHT	M	X		X		X				
1000 MB TEMP.	DEG K	X(SFC)		X		X				
850 MB TEMP.	DEG K	X	X	X	X	X				
700 MB TEMP.	DEG K	X		X		X				
500 MB TEMP.	DEG K	X		X		X				
400 MB TEMP.	DEG K									
300 MB TEMP.	DEG K									
200 MB TEMP.	DEG K									
850 MB U	M/SEC		X	X	X	X				
700 MB U	M/SEC			X		X				
500 MB U	M/SEC			X		X				
400 MB U	M/SEC									
300 MB U	M/SEC									
200 MB U	M/SEC			X		X				
850 MB V	M/SEC		X	X	X	X				
700 MB V	M/SEC			X		X				
500 MB V	M/SEC			X		X				
400 MB V	M/SEC									
300 MB V	M/SEC									
200 MB V	M/SEC			X		X				
850 MB ω	MB/SEC			X		X				
700 MB ω	MB/SEC			X		X				
500 MB ω	MB/SEC			X		X				
PRECIP. AMT.	M		*	*						
SURFACE PRESS. (p*)	MB			X		X				
(REL. HUM.) B.L.	PERCENT	X	X	X	X	X				
(REL. HUM.) 1	PERCENT	X	X	X	X	X				
(REL. HUM.) 2	PERCENT	X	X	X	X	X				
1000 MB DEW POINT	DEG K		X	X	X	X				
850 MB DEW POINT	DEG K			X		X				
700 MB DEW POINT	DEG K			X		X				
500 MB DEW POINT	DEG K			X		X				
400 MB DEW POINT	DEG K									
300 MB DEW POINT	DEG K									
SEA LEVEL PRESS.	MB	X		X		X				
B.L. ω	MB/SEC		X	X	X	X				
Total fields by hour		12	16	35	15	34				

*These two variables are available starting 1200 GMT Dec. 7, 1971.

B.L. = lowest 50 mb;
Layer 1 = B.L. top to approximately 720 mb
Layer 2 = approximately 720 mb to approximately 490 mb

VARIABLES SAVED FROM LFM AND LFM-II
LFM Period of Record: 0000 GMT Oct. 1, 1972 - 0000 GMT Aug. 31, 1977
LFM-II Period of Record: 1200 GMT Aug. 31, 1977 - Present

Variable	Units	Forecast Interval t_0+ 0	6	12	18	24	30	36	42	48
REL. HUM. (SFC-490)	PERCENT		X	X	X	X				
PRECIP. WATER	KG/M^2		X	X	X	X				
B.L. POT. TEMP.	DEG K		X	X	X	X				
B.L. U	M/SEC		X	X	X	X				
B.L. V	M/SEC		X	X	X	X				
1000 MB HEIGHT	M	X	X	X	X	X				
850 MB HEIGHT	M	X	X	X	X	X				
700 MB HEIGHT	M	X	X	X	X	X				
500 MB HEIGHT	M	X	X	X	X	X				
1000 MB TEMP.	DEG K	X(SFC)		X		X				
850 MB TEMP.	DEG K	X	X	X	X	X				
700 MB TEMP.	DEG K	X		X		X				
500 MB TEMP.	DEG K	X		X		X				
400 MB TEMP.	DEG K									
300 MB TEMP.	DEG K									
200 MB TEMP.	DEG K									
850 MB U	M/SEC		X	X	X	X				
700 MB U	M/SEC			X		X				
500 MB U	M/SEC			X		X				
400 MB U	M/SEC									
300 MB U	M/SEC									
200 MB U	M/SEC			X		X				
850 MB V	M/SEC		X	X	X	X				
700 MB V	M/SEC			X		X				
500 MB V	M/SEC			X		X				
400 MB V	M/SEC									
300 MB V	M/SEC									
200 MB V	M/SEC			X		X				
850 MB ω	MB/SEC			X		X				
700 MB ω	MB/SEC		X	X	X	X				
500 MB ω	MB/SEC			X		X				
PRECIP. AMT.	M		X	X	X	X				
SURFACE PRESS. (p*)	MB			X		X				
(REL. HUM.) B.L.	PERCENT	X	X	X	X	X				
(REL. HUM.) 1	PERCENT	X	X	X	X	X				
(REL. HUM.) 2	PERCENT	X	X	X	X	X				
1000 MB DEW POINT	DEG K		X	X	X	X				
850 MB DEW POINT	DEG K			X		X				
700 MB DEW POINT	DEG K			X		X				
500 MB DEW POINT	DEG K			X		X				
400 MB DEW POINT	DEG K									
300 MB DEW POINT	DEG K									
SEA LEVEL PRESS.	MB	X		X		X				
B.L. ω	MB/SEC		X	X	X	X				
Total fields by hour		12	19	35	19	35				

B.L. = lowest 50 mb;
Layer 1 = B.L. top to approximately 720 mb
Layer 2 = approximately 720 mb to approximately 490 mb

VARIABLES SAVED FROM LFM AND LFM-II
LFM Period of Record: 0000 GMT Mar. 6, 1974 - 0000 GMT Aug. 31, 1977
LFM-II Period of Record: 1200 GMT Aug. 31, 1977 - Present

Variable	Units	Forecast Interval t_0+ 0	6	12	18	24	30	36	42	48
REL. HUM. (SFC-490)	PERCENT		X	X	X	X				
PRECIP. WATER	KG/M^2		X	X	X	X				
B.L. POT. TEMP.	DEG K		X	X	X	X				
B.L. U	M/SEC		X	X	X	X				
B.L. V	M/SEC		X	X	X	X				
1000 MB HEIGHT	M	X	X	X	X	X				
850 MB HEIGHT	M	X	X	X	X	X				
700 MB HEIGHT	M	X	X	X	X	X				
500 MB HEIGHT	M	X	X	X	X	X				
1000 MB TEMP.	DEG K	X(SFC)		X		X				
850 MB TEMP.	DEG K	X	X	X	X	X				
700 MB TEMP.	DEG K	X	X	X	*	X				
500 MB TEMP.	DEG K	X	X	X	*	X				
400 MB TEMP.	DEG K									
300 MB TEMP.	DEG K									
200 MB TEMP.	DEG K									
850 MB U	M/SEC		X	X	X	X				
700 MB U	M/SEC			X		X				
500 MB U	M/SEC		X	X	*	X				
400 MB U	M/SEC									
300 MB U	M/SEC									
200 MB U	M/SEC			X		X				
850 MB V	M/SEC		X	X	X	X				
700 MB V	M/SEC			X		X				
500 MB V	M/SEC		X	X	*	X				
400 MB V	M/SEC									
300 MB V	M/SEC									
200 MB V	M/SEC			X		X				
850 MB ω	MB/SEC			X		X				
700 MB ω	MB/SEC		X	X	X	X				
500 MB ω	MB/SEC		X	X	*	X				
PRECIP. AMT.	M		X	X	X	X				
SURFACE PRESS. (p*)	MB			X		X				
(REL. HUM.) B.L.	PERCENT	X	X	X	X	X				
(REL. HUM.) 1	PERCENT	X	X	X	X	X				
(REL. HUM.) 2	PERCENT	X	X	X	X	X				
1000 MB DEW POINT	DEG K		X	X	X	X				
850 MB DEW POINT	DEG K		X	X	*	X				
700 MB DEW POINT	DEG K		X	X	*	X				
500 MB DEW POINT	DEG K		X	X	*	X				
400 MB DEW POINT	DEG K									
300 MB DEW POINT	DEG K									
SEA LEVEL PRESS.	MB	X		X		X				
B.L. ω	MB/SEC		X	X	X	X				
Total fields by hour		12	27	35	27	35				

*These eight variables are available starting 0000 GMT Mar 16, 1974

B.L. = lowest 50 mb;
Layer 1 = B.L. top to approximately 720 mb
Layer 2 = approximately 720 mb to approximately 490 mb

VARIABLES SAVED FROM LFM AND LFM-II
LFM Period of Record: 1200 GMT Apr. 2, 1975 - 0000 GMT Aug. 31, 1977
LFM-II Period of Record: 1200 GMT Aug. 31, 1977 - Present

Variable	Units	Forecast Interval t_0+ 0	6	12	18	24	30	36	42	48
REL. HUM. (SFC-490)	PERCENT		X	X	X	X	X	X		
PRECIP. WATER	KG/M^2		X	X	X	X	X	X		
B.L. POT. TEMP.	DEG K		X	X	X	X	X	X		
B.L. U	M/SEC		X	X	X	X	X	X		
B.L. V	M/SEC		X	X	X	X	X	X		
1000 MB HEIGHT	M	X	X	X	X	X	X	X		
850 MB HEIGHT	M	X	X	X	X	X	X	X		
700 MB HEIGHT	M	X	X	X	X	X	X	X		
500 MB HEIGHT	M	X	X	X	X	X	X	X		
1000 MB TEMP.	DEG K	X(SFC)		X		X		X		
850 MB TEMP.	DEG K	X	X	X	X	X	X	X		
700 MB TEMP.	DEG K	X	X	X	X	X	X	X		
500 MB TEMP.	DEG K	X	X	X	X	X	X	X		
400 MB TEMP.	DEG K									
300 MB TEMP.	DEG K									
200 MB TEMP.	DEG K									
850 MB U	M/SEC		X	X	X	X	X	X		
700 MB U	M/SEC			X		X		X		
500 MB U	M/SEC		X	X	X	X	X	X		
400 MB U	M/SEC									
300 MB U	M/SEC									
200 MB U	M/SEC			X		X		X		
850 MB V	M/SEC		X	X	X	X	X	X		
700 MB V	M/SEC			X		X		X		
500 MB V	M/SEC		X	X	X	X	X	X		
400 MB V	M/SEC									
300 MB V	M/SEC									
200 MB V	M/SEC			X		X		X		
850 MB ω	MB/SEC			X		X		X		
700 MB ω	MB/SEC		X	X	X	X	X	X		
500 MB ω	MB/SEC		X	X	X	X	X	X		
PRECIP. AMT.	M		X	X	X	X	X	X		
SURFACE PRESS. (p*)	MB			X		X		X		
(REL. HUM.) B.L.	PERCENT	X	X	X	X	X	X	X		
(REL. HUM.) 1	PERCENT	X	X	X	X	X	X	X		
(REL. HUM.) 2	PERCENT	X	X	X	X	X	X	X		
1000 MB DEW POINT	DEG K		X	X	X	X	X	X		
850 MB DEW POINT	DEG K		X	X	X	X	X	X		
700 MB DEW POINT	DEG K		X	X	X	X	X	X		
500 MB DEW POINT	DEG K		X	X	X	X	X	X		
400 MB DEW POINT	DEG K									
300 MB DEW POINT	DEG K									
SEA LEVEL PRESS.	MB	X		X		X		X		
B.L. ω	MB/SEC		X	X	X	X	X	X		
Total fields by hour		12	27	35	27	35	27	35		

B.L. - lowest 50 mb;
Layer 1 = B.L. top to approximately 720 mb
Layer 2 = approximately 720 mb to approximately 490 mb

VARIABLES SAVED FROM LFM AND LFM-II
LFM Period of Record: 0000 GMT Feb. 1, 1976 - 0000 GMT Aug. 31, 1977
LFM-II Period of Record: 1200 GMT Aug. 31, 1977 - Present

Variable	Units	Forecast Interval t_0+ 0	6	12	18	24	30	36	42	48
REL. HUM. (SFC-490)	PERCENT		X	X	X	X	X	X	X	X
PRECIP. WATER	KG/M^2		X	X	X	X	X	X	X	X
B.L. POT. TEMP.	DEG K		X	X	X	X	X	X	X	X
B.L. U	M/SEC		X	X	X	X	X	X	X	X
B.L. V	M/SEC		X	X	X	X	X	X	X	X
1000 MB HEIGHT	M	X	X	X	X	X	X	X	X	X
850 MB HEIGHT	M	X	X	X	X	X	X	X	X	X
700 MB HEIGHT	M	X	X	X	X	X	X	X	X	X
500 MB HEIGHT	M	X	X	X	X	X	X	X	X	X
1000 MB TEMP.	DEG K	X(SFC)		X		X		X		X
850 MB TEMP.	DEG K	X	X	X	X	X	X	X	X	X
700 MB TEMP.	DEG K	X	X	X	X	X	X	X	X	X
500 MB TEMP.	DEG K	X	X	X	X	X	X	X	X	X
400 MB TEMP.	DEG K									
300 MB TEMP.	DEG K									
200 MB TEMP.	DEG K									
850 MB U	M/SEC		X	X	X	X	X	X	X	X
700 MB U	M/SEC			X		X		X		X
500 MB U	M/SEC		X	X	X	X	X	X	X	X
400 MB U	M/SEC									
300 MB U	M/SEC									
200 MB U	M/SEC			X		X		X		X
850 MB V	M/SEC		X	X	X	X	X	X	X	X
700 MB V	M/SEC			X		X		X		X
500 MB V	M/SEC		X	X	X	X	X	X	X	X
400 MB V	M/SEC									
300 MB V	M/SEC									
200 MB V	M/SEC			X		X		X		X
850 MB ω	MB/SEC			X		X		X		X
700 MB ω	MB/SEC		X	X	X	X	X	X	X	X
500 MB ω	MB/SEC		X	X	X	X	X	X	X	X
PRECIP. AMT.	M		X	X	X	X	X	X	X	X
SURFACE PRESS. (p*)	MB			X		X		X		X
(REL. HUM.) B.L.	PERCENT	X	X	X	X	X	X	X	X	X
(REL. HUM.) 1	PERCENT	X	X	X	X	X	X	X	X	X
(REL. HUM.) 2	PERCENT	X	X	X	X	X	X	X	X	X
1000 MB DEW POINT	DEG K		X	X	X	X	X	X	X	X
850 MB DEW POINT	DEG K		X	X	X	X	X	X	X	X
700 MB DEW POINT	DEG K		X	X	X	X	X	X	X	X
500 MB DEW POINT	DEG K		X	X	X	X	X	X	X	X
400 MB DEW POINT	DEG K									
300 MB DEW POINT	DEG K									
SEA LEVEL PRESS.	MB	X		X		X		X		X
B.L. ω	MB/SEC		X	X	X	X	X	X	X	X
Total fields by hour		12	27	35	27	35	27	35	27	35

B.L. = lowest 50 mb;
Layer 1 = B.L. top to approximately 720 mb
Layer 2 = approximately 720 mb to approximately 490 mb

VARIABLES SAVED FROM LFM AND LFM-II
LFM-II Period of Record: 0000 GMT Nov. 29, 1978 - Present

Variable	Units	Forecast Interval t_o+ 0	6	12	18	24	30	36	42	48
REL. HUM. (SFC-490)	PERCENT		X	X	X	X	X	X	X	X
PRECIP. WATER	KG/M^2		X	X	X	X	X	X	X	X
B.L. POT. TEMP.	DEG K		X	X	X	X	X	X	X	X
B.L. U	M/SEC		X	X	X	X	X	X	X	X
B.L. V	M/SEC		X	X	X	X	X	X	X	X
1000 MB HEIGHT	M	X	X	X	X	X	X	X	X	X
850 MB HEIGHT	M	X	X	X	X	X	X	X	X	X
700 MB HEIGHT	M	X	X	X	X	X	X	X	X	X
500 MB HEIGHT	M	X	X	X	X	X	X	X	X	X
1000 MB TEMP.	DEG K	X(SFC)		X		X		X		X
850 MB TEMP.	DEG K	X	X	X	X	X	X	X	X	X
700 MB TEMP.	DEG K	X	X	X	X	X	X	X	X	X
500 MB TEMP.	DEG K	X	X	X	X	X	X	X	X	X
400 MB TEMP.	DEG K		X	X	X	X	X	X	X	X
300 MB TEMP.	DEG K		X	X	X	X	X	X	X	X
200 MB TEMP.	DEG K		X	X	X	X	X	X	X	X
850 MB U	M/SEC		X	X	X	X	X	X	X	X
700 MB U	M/SEC			X		X		X		X
500 MB U	M/SEC		X	X	X	X	X	X	X	X
400 MB U	M/SEC		X	X	X	X	X	X	X	X
300 MB U	M/SEC		X	X	X	X	X	X	X	X
200 MB U	M/SEC			X		X		X		X
850 MB V	M/SEC		X	X	X	X	X	X	X	X
700 MB V	M/SEC			X		X		X		X
500 MB V	M/SEC		X	X	X	X	X	X	X	X
400 MB V	M/SEC		X	X	X	X	X	X	X	X
300 MB V	M/SEC		X	X	X	X	X	X	X	X
200 MB V	M/SEC			X		X		X		X
850 MB ω	MB/SEC			X		X		X		X
700 MB ω	MB/SEC		X	X	X	X	X	X	X	X
500 MB ω	MB/SEC		X	X	X	X	X	X	X	X
PRECIP. AMT.	M		X	X	X	X	X	X	X	X
SURFACE PRESS. (p*)	MB			X		X		X		X
(REL. HUM.) B.L.	PERCENT	X	X	X	X	X	X	X	X	X
(REL. HUM.) 1	PERCENT	X	X	X	X	X	X	X	X	X
(REL. HUM.) 2	PERCENT	X	X	X	X	X	X	X	X	X
1000 MB DEW POINT	DEG K		X	X	X	X	X	X	X	X
850 MB DEW POINT	DEG K		X	X	X	X	X	X	X	X
700 MB DEW POINT	DEG K		X	X	X	X	X	X	X	X
500 MB DEW POINT	DEG K		X	X	X	X	X	X	X	X
400 MB DEW POINT	DEG K		X	X	X	X	X	X	X	X
300 MB DEW POINT	DEG K		X	X	X	X	X	X	X	X
SEA LEVEL PRESS.	MB	X		X		X		X		X
B.L. ω	MB/SEC		X	X	X	X	X	X	X	X
Total fields by hour		12	36	44	36	44	36	44	36	44

B.L. = lowest 50 mb;
Layer 1 = B.L. top to approximately 720 mb
Layer 2 = approximately 720 mb to approximately 490 mb

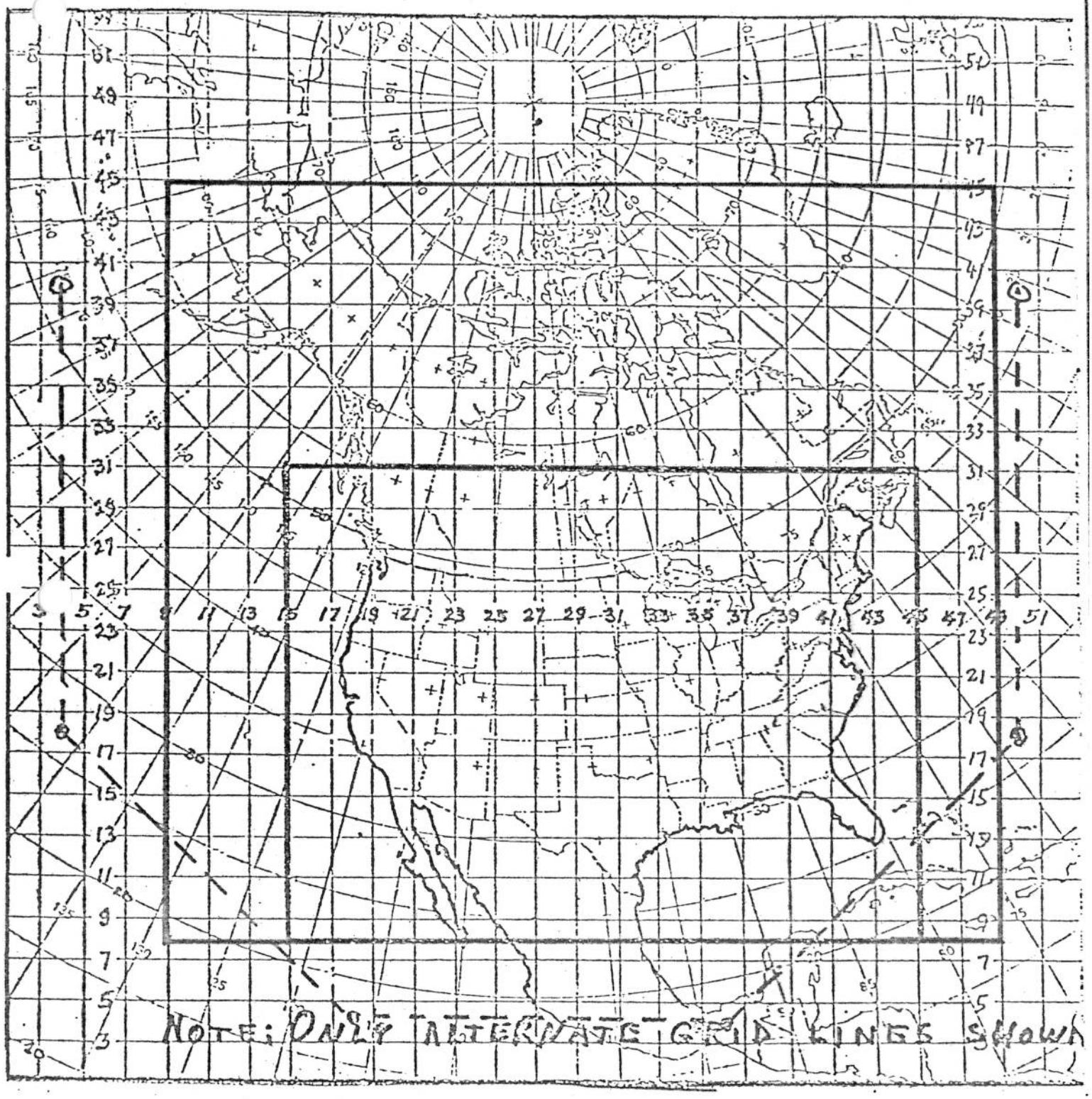


Figure IV-3--Grids on which LFM data are collected for the MOS system.

VARIABLES SAVED FROM LFM AND LFM-II
LFM Period of Record: Oct. 1, 1972-Present
LFM-II Period of Record: Sept. 1, 1977-Present

Variable	Units	Forecast Interval t_o+ 0	6	12	18	24	30	36	42	48
REL. HUM. (SFC-490)	PERCENT		X	X	X	X	&	&	$	$
PRECIP. WATER	KG/M^2		X	X	X	X	&	&	$	$
B.L. POT. TEMP.	DEG K		X	X	X	X	&	&	$	$
B.L. U	M/SEC		X	X	X	X	&	&	$	$
B.L. V	M/SEC		X	X	X	X	&	&	$	$
1000 MB HEIGHT	M	X	X	X	X	X	&	&	$	$
850 MB HEIGHT	M	X	X	X	X	X	&	&	$	$
700 MB HEIGHT	M	X	X	X	X	X	&	&	$	$
500 MB HEIGHT	M	X	X	X	X	X	&	&	$	$
1000 MB TEMP.	DEG K	X(SFC)		X		X		&		$
850 MB TEMP.	DEG K	X	X	X	X	X	&	&	$	$
700 MB TEMP.	DEG K	X	*	X	#	X	&	&	$	$
500 MB TEMP.	DEG K	X	*	X	#	X	&	&	$	$
850 MB U	M/SEC		X	X	X	X	&	&	$	$
700 MB U	M/SEC			X		X		&		$
500 MB U	M/SEC		*	X	#	X	&	&	$	$
200 MB U	M/SEC			X		X		&		$
850 MB V	M/SEC		X	X	X	X	&	&	$	$
700 MB V	M/SEC			X		X		&		$
500 MB V	M/SEC		*	X	#	X	&	&	$	$
200 MB V	M/SEC			X		X		&		$
850 MB ω	MB/SEC			X		X		&		$
700 MB ω	MB/SEC		X	X	X	X	&	&	$	$
500 MB ω	MB/SEC		*	X	#	X	&	&	$	$
PRECIP. AMT.	M		X	X	X	X	&	&	$	$
SURFACE PRESS. (p*)	MB			X		X		&		$
(REL. HUM.) B.L.	PERCENT	X	X	X	X	X	&	&	$	$
(REL. HUM) 1	PERCENT	X	X	X	X	X	&	&	$	$
(REL. HUM) 2	PERCENT	X	X	X	X	X	&	&	$	$
1000 MB DEW POINT	DEG K		X	X	X	X	&	&	$	$
850 MB DEW POINT	DEG K		*	X	#	X	&	&	$	$
700 MB DEW POINT	DEG K		*	X	#	X	&	&	$	$
500 MB DEW POINT	DEG K		*	X	#	X	&	&	$	$
SEA LEVEL PRESS.	MB	X		X		X		&		$
B.L. ω	MB/SEC		X	X	X	X	&	&	$	$
Total fields by hour		12	27	35	27	35	27	35	27	35

* These 8 variables are available starting 0000 GMT March 6, 1974.
\# These 8 variables are available starting 0000 GMT March 16, 1974.
& These 62 variables are available starting 1200 GMT April 2, 1975.
$ These 62 variables are available starting 0000 GMT February 1, 1976.

B.L. = lowest 50 mb;
Layer 1 = B.L. top to approximately 720 mb
Layer 2 = approximately 720 mb to approximately 490

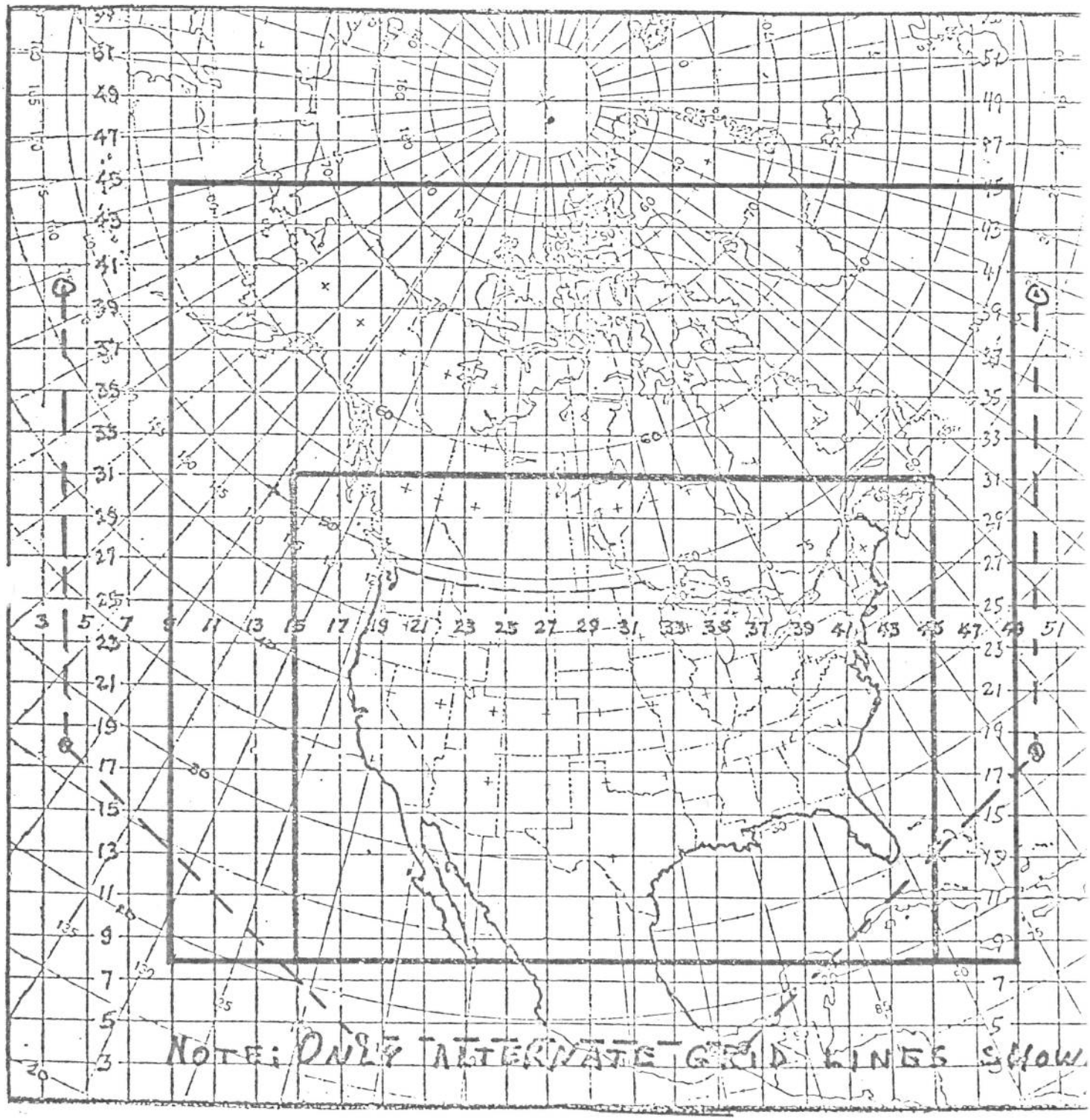


Figure IV-3--Grids on which LFM data are collected for the MOS system.

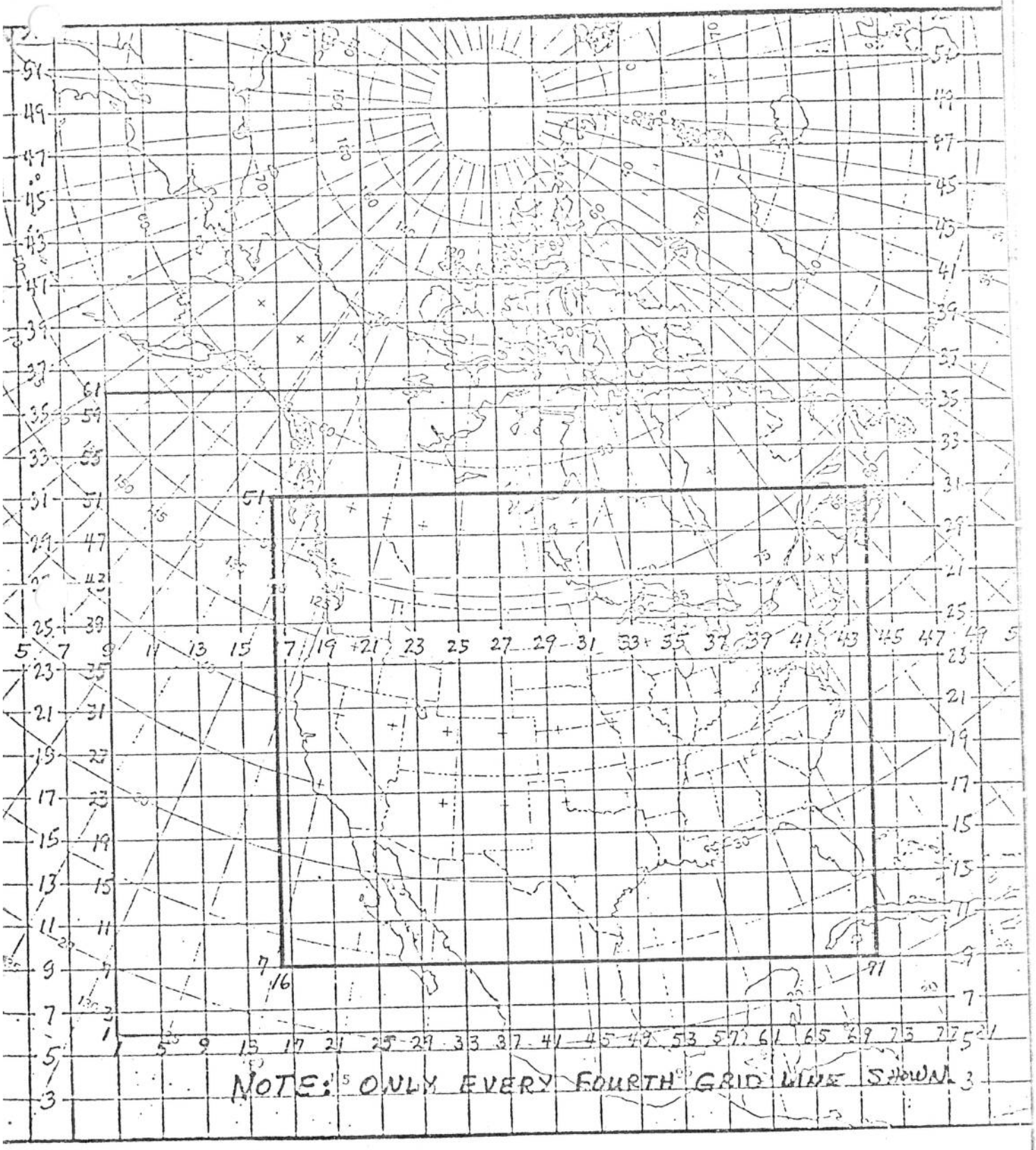


Figure IV-4 --Grid on which SUM data are collected for the MOS System. The 61x81 SUM grid is shown with the LFM grid as a background.

V. MOS INTERPOLATED PREDICTOR TAPES

The format of the MOS interpolated predictor tapes is indicated in this section. The NMC 2 to 1 packer (W3AI00) and unpacker (W3AI01) are used for the data records. These tapes are usually prepared by M200 or M300.