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IONOSPHERIC DATA IN JAPAN

FOR JULY 1989

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CONTENTS

COMMUNICATIONS RESEARCH LABORATORY
MINISTRY OF POSTS AND TELECOMMUNICATIONS
TOKYO, JAPAN

Correction

There was a mistake in the monthly plot of FOF2 (page 62). So we would like to ask that the error be corrected as follows;

1. Period

From JUNE 1988(Vol.40 No.6) to JUNE 1989(Vol.41 No.6)

2. Error correction

To correct an error caused by a plotting program bug, the frequency value of the vertical axis should be changed from 5, 10, 15, 20 MHz to read 4, 9, 14, 19 MHz. But the hourly values of FOF2 by automatic scaling have no mistakes.

JULY, 1989
Communications Research Laboratory
Ministry of Posts and Telecommunications
Tokyo, Japan

訂正

MONTHLY MEDIANS PLOT OF FOF2(６２ページ)に一部誤りがありましたので、以下のように訂正をお願い致します。

１．期間

ＪＵＮＥ　１９８８（Ｖｏｌ．４０　Ｎｏ．６）から
ＪＵＮＥ　１９８９（Ｖｏｌ．４１　Ｎｏ．６）まで

２．訂正

プロットプログラムのバグのため、縦軸の周波数表示を５，１０，１５，２０ＭＨｚから４，９，１４，１９　ＭＨｚに読み変える。なお、AUTOMATIC SCALING によるHOURLY VALUES OF FOF2 は誤りがありません。

１９８９年７月
郵政省　通信総合研究所

INTRODUCTION

This Series contains data on ionosphere (I), solar radio emission (S) and radio propagation (P) obtained at the following stations under the Communications Research Laboratory, Ministry of Posts and Telecommunications of Japan.

Station	Geographic		Geomagnetic		Technical Method
	Latitude	Longitude	Latitude	Longitude	
Wakkanai	45°23.5′N	141°41.2′E	35.3°N	206.5°	Vertical Sounding (I)
Akita	39°43.5′N	140°08.0′E	29.5°N	205.9°	" (I)
Kokubunji	35°42.4′N	139°29.3′E	25.5°N	205.8°	" (I)
Yamagawa	31°12.1′N	130°37.1′E	20.4°N	198.3°	" (I)
Okinawa	26°16.9′N	127°48.4′E	15.3°N	196.0°	" (I)
Hiraiso	36°22.0′N	140°37.5′E	26.3°N	206.8°	Radio Receiving (S, P)
Inubo	35°42.2′N	140°51.5′E	25.6°N	207.0°	" (P)

A. IONOSPHERE

Ionospheric observations are carried out at the above five stations in Japan by means of vertical sounding using ionosondes. The ionosonde produces ionograms, which are recorded digitally on computer storage medium as well as graphically on 35 mm photographic film. The digitally-recorded ionograms are collected from each station by the central computer and reduced to numerical values and Summary Plots by the automatic processing system. The ionograms obtained at Kokubunji are manually scaled as well by experienced specialists to supplement automatically-scaled parameters.

A1. Automatic Scaling

Digital ionograms are automatically scaled by the pattern recognition method. The following five factors of ionospheric characteristics are published for the present. The reliability of these factors has been ascertained by comparison of the automatically-scaled parameters with the manually-scaled values of large amounts of test ionograms.

The published data consist of tabulations of hourly values of three factors (*foF2, fEs, fmin*) and monthly medians of two factors (*h′Es, h′F*), daily Summary Plots and monthly medians plot of *foF2*.

a. Characteristics of Ionosphere

foF2	Ordinary wave critical frequency for the *F2* layer
fEs	Highest frequency of the *Es* layer whether it may be ordinary or extraordinary
fmin	Lowest frequency which shows vertical ionospheric reflections
h′Es *h′F*	Minimum virtual height on the ordinary wave for the *Es* and *F* layers, respectively

b. Descriptive Letters

The following descriptive letters are used in the tables.

- A Impossible measurement because of the presence of a lower thin layer, for example *Es* (for *foF2*).
- B Impossible measurement because of absorption in the vicinity of *fmin*.
- C Impossible measurement because of any failure in observation.
- G Impossible automatic scaling because of too small ionization density of the layer (for *fEs*).
- N Impossible automatic scaling because of complex echoes.
- Blank No digital record because of trouble in the automatic data processing system, but existence of film record.

c. Definitions of the CNT, MED, UQ and LQ

Median count (CNT) is the number of numerical values from which the median has been computed. In addition to numerical values, the count may include a descriptive letter G.

Median (MED) is defined as the middle value when the numerical values are arranged in order of magnitude, or the average of the two middle values if there is an even number of values.

Upper quartile (UQ) is the median value of the upper half of the values when they are ranked according to magnitude; the *lower quartile* (LQ) is the median value of the lower half.

If CNT is less than 10, there are blank spaces left.

d. Reliability of Automatic Scaling

The results of the comparison between automatically-scaled values and manually-scaled ones showed that hourly values of *foF2*, *fEs* and *fmin* were scaled within a difference of 1 MHz from about 90, 90 and 99 %, respectively of the test ionograms.

e. Summary Plot

Daily Summary Plots which are made from quarter-hourly digital ionograms are published to present general ionosphere conditions. The upper and middle parts of a Summary Plot show the diurnal variation of the frequency range of the echoes reflected from the *F* and *E* regions, respectively. The two solid arcing lines indicate the predicted values of *fxE* and *foE* calculated by the method described in the CCIR report 340. The lower part shows the diurnal variation of the virtual height where the echo traces become horizontal.

A2. Manual Scaling

The published data consist of tabulations of hourly values of the ionospheric characteristics and figures of daily *f*-plot.

All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction (Second Edition) 1972" and its revision of chapters 1-4, published in July 1978.

a. Characteristics of Ionosphere

fxI	Top frequency of spread *F* trace
foF2 *foF1* *foE* *foEs*	Ordinary wave critical frequency for the *F2*, *F1*, *E* and *Es* including particle *E* layers, respectively.
fbEs	Blanketing frequency of the *Es* layer, e.g. the lowest ordinary wave frequency visible through *Es*
fmin	Lowest frequency which shows vertical ionospheric reflections
M(3000)F2 *M(3000)F1*	Maximum usable frequency factor for a path of 3000 km for transmission by *F2* and *F1* layers, respectively
h′F2 *h′F* *h′E* *h′Es*	Minimum virtual height on the ordinary wave for the *F2*, whole *F*, *E* and *Es* layers, respectively
Types of *Es*	See below b. (iii)

b. Symbols

(i) Descriptive Letters

The following letters are entered after, or used to replaced a numerical value on the monthly tabulation sheets, if necessary.

A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example *Es*.

B Measurement influenced by, or impossible because of, absorption in the vicinity of *fmin*.

C Measurement influenced by, or impossible because of, any non-ionospheric reason.

D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range in use.

E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.

F Measurement influenced by, or impossible because of, the presence of spread echoes.

G Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately.

H Measurement influenced by, or impossible because of, the presence of a stratification.

K Presence of particle *E* layer.

L Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.

M Interpretation of measurement questionable because the ordinary and extraordinary components are not distinguishable.

N Conditions are such that the measurement cannot be interpreted.

O Measurement refers to the ordinary component.

P Man-made perturbations of the observed parameter; or spur type spread *F* present.

Q Range spread present.

R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.

S Measurement influenced by, or impossible because of, interference or atmospherics.

T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.

V Forked trace which may influence the measurement.

W Measurement influenced or impossible because the echo lies outside the height range recorded.

X Measurement refers to the extraordinary component.

Y Lacuna phenomena, severe layer tilt.

Z Third magneto-electronic component present.

(ii) Qualifying Letters

The following letters are entered in the first column before a numerical value on the monthly tabulation sheets, if necessary.

A Less than. Used only when *fbEs* is deduced from *foEs* because total blanketing of higher layer is present.

D Greater than.

E Less than.

I Missing value has been replaced by an interpolated value.

J Ordinary component characteristic deduced from the extraordinary component.

M Mode interpretation uncertain.

O Extraordinary component characteristic deduced from the ordinary component. (Used for x-characteristics only.)

T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.

U Uncertain or doubtful numerical value.

Z Measurement deduced from the third magneto-electronic component.

(iii) Description of Types of *Es*

When more than one type of *Es* trace are present on the ionogram, the type for the trace used to determine *foEs* must be written first. The number of multiple trace is indicated after the type letter.

The types are:

f An *Es* trace which shows no appreciable increase of height with frequency.

l A flat *Es* trace at or below the normal *E* layer minimum virtual height or below the particle *E* layer minimum virtual height.

c An *Es* trace showing a relatively symmetrical cusp at or below *foE*. (Usually a daytime type.)

h An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above *foE*. The cusp is not symmetrical, the low frequency end of the *Es* trace lying clearly above the high frequency end of the normal *E* trace. (Usually a daytime type.)

q An *Es* trace which is diffuse and non-blanketing over a wide frequency range.

r An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation.

a An *Es* trace having a well-defined flat or gradually rising lower edge with stratified and diffuse traces present above it.

s A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace.

d A weak diffuse trace at heights below 95 km associated with high absorption and large *fmin*.

n The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.

k The designation 'k' is used to show the presence of particle *E*. When *foEs* > *foE* (particle *E*) the *Es* type precedes k.

c. Definitions of the CNT, MED, UQ and LQ

Median count (CND) is the number of values from which the median has been computed. In addition to numerical values, the count may include certain descriptive letters.

Median (MED) is the middle value when the numerical values are arranged in order of magnitude, or the average of the two middle values if there is an even number of values.

Upper quartile (UQ) is the median value of the upper half of the values when they are ranked according to magnitude; the *lower quartile* (LQ) is the median value of the lower half.

B. SOLAR RADIO EMISSION

Solar radio observations at 100, 200 and 500 MHz are carried out at Hiraiso. The observation equipment consists of two parabolic antennas, one with 10-meter diameter for 100 and 200 MHz measurements and one with 6-meter diameter for 500 MHz measurements, each being equipped with a pair of crossed doublet antennas as a primary radiator, and three appropriate receivers. Each pair of the crossed doublet antennas is used as a polarimeter. Observations are continuously carried out almost from sunrise to sunset.

B1. Daily Data at Hiraiso

The three-hourly mean and daily mean values of the solar radio emission intensities at the base-level are tabulated separately for 200 and 500 MHz measurements. Here, the base-level intensity is defined as the intensity recorded during the time when no radio emission burst is taking place. The intensities are expressed by the flux density in 10^{-22} Wm^{-2} Hz^{-1} unit.

The table for 200 MHz measurements also presents the variability indices defined by the number of impulsive radio bursts within the three-hour intervals as follows:

0 quiet or no burst,

1 a few bursts,

2 many bursts,

3 very many bursts.

The daily variability index is defined as the daily mean of three-hourly indices.

The following symbols are used in the tables, when interference or radio bursts prevented measuring the base-level flux densities or determining the variability indices:

*	Measurement impossible because of interference.
B	Measurement impossible because of bursts.

Daily data within parentheses mean that the observation time does not exceed one third of the period.

B2. Outstanding Occurrences at Hiraiso

The table is a list of outstanding occurrences of solar radio emission bursts observed at Hiraiso during a month. Listed in the table are the date, frequencies, the type of event, the start time and the time of maximum, both in U.T. expressed in hours, minutes and tenths of a minute, the duration in minutes, the peak and mean flux densities in 10^{-22} Wm^{-2} Hz^{-1} unit, and the polarization.

The type of event is expressed by a combination of a numerical code and a letter symbol in accordance with the "Descriptive Text of Solar Geophysical Data, NOAA" as defined by H. Tanaka in the "Instruction Manual for Monthly Report of Solar Radio Emission, WDC-C2" in January 1975:

SGD Code	Letter Symbol	Morphological Classification
1	S	Simple 1
2	S/F	Simple 1F
3	S	Simple 2
4	S/F	Simple 2F
5	S	Simple
6	S	Minor
7	C	Minor+
8	S	Spike
20	GRF	Simple 3
21	GRF	Simple 3A
22	GRF	Simple 3F
23	GRF	Simple 3AF
24	R	Rise
25	R	Rise A
26	FAL	Fall
27	RF	Rise and Fall
28	PRE	Precursor
29	PBI	Post Burst Increase
30	PBI	Post Burst Increase A
31	ABS	Post Burst Decrease
32	ABS	Absorption
40	F	Fluctuations
41	F	Group of Bursts
42	SER	Series of Bursts
43	NS	Onset of Noise Storm
44	NS	Noise Storm in progress
45	C	Complex
46	C	Complex F
47	GB	Great Burst
48	C	Major
49	GB	Major+

The polarization is expressed by the polarization degree and sense as follows:

R or L	right- or left-handed polarization,
W, M or S	weak, moderate or strong polarization,
0	almost zero or unable to detect polarization due to small increase of flux,
00	polarization degree of less than 1 percent.

One of the following symbols may be attached after numerical values, if necessary.

D	greater than, or later than,
E	less than or earlier than,
U	approximate, or uncertain.

C. RADIO PROPAGATION

C1. H.F. Field Strength at Hiraiso

Field strength observation of 15 MHz standard waves transmitted from WWV and WWVH stations which are located respectively at Fort Collins, Colorado and Kauai, Hawaii, is carried out at Hiraiso. In order to avoid interference among the same frequency waves, the upper sideband of WWV or WWVH with the audio tone 660 Hz is picked up by the use of a narrow band-pass filter with 80 Hz bandwidth. Particulars of the transmitters and the receiver are summarized in the following table.

The tabulated *field strength* expressed in dB above one microvolt per meter is the average of quasi-peak values of the incident upper sideband field intensity in 45 seconds after the universal time indicated on the table. Abbreviated symbols are as follows:

CNT	number of observed values,
MED	median,
UD	value of the uppermost decile when they are ranked according to magnitude,
LD	value of the lowest decile when they are ranked according to magnitude,
U	uncertain,
E	less than,
C	influenced by, or impossible because of, any artificial accident,
S	influenced by, or impossible because of, interferences or atmospherics.

C2. Radio Propagation Quality Figures at Hiraiso

The tabulated six-hourly quality figures are calculated for standard waves WWV transmitted from Fort Collins and WWVH transmitted from Kauai.

Quality figures expressing radio propagation conditions range over five grades as follows:

1	very poor (very disturbed),
2	poor (disturbed),
3	rather poor (unstable),
4	normal,
5	good.

Whole day quality figure ranged in grades of 1o, 1+, 2–, 2o, 2+, 3–, 3o, 3+, 4–, 4o, 4+, 5–, 5o stands for an average of six-hourly quality figures of the two circuits. Abbreviated symbols are as follows:

C	artificial accident,
S	propagational accident,
U	inaccurate.

The column of conditions presents a record of the forecast of *radio propagation conditions* which is applicable to forthcoming 12 hours and broadcast six times per hour from JJY (Japan Standard Wave) station. The conditions are denoted as follows:

N	normal,
U	unstable,
W	disturbed.

Characteristics	Transmitter		Receiver
Station Call	WWV	WWVH	
Location	Fort Collins, Colorado	Kauai, Hawaii	Hiraiso, Ibaraki
latitude	40°41′N	22°00′N	36°22′N
longitude	105°02′W	159°46′W	140°38′E
Distance	9150 km	5910 km	—
Carrier Power	10 kW	10 kW	—
Power in each sideband	625 W	625 W	—
Modulation	50 %	50 %	—
Antenna	λ/2 vertical	λ/2 vertical	4.5 m vertical rod
Bandwidth	—	—	80 Hz for upper sideband
Calibration	—	—	Every hour

Data on *geomagnetic storms* which are often correlated with radio propagation disturbances are tabulated based on reports from observation at Kakioka Magnetic Observatory, Japan Meteorological Agency. *Time* (U.T.) is expressed in hours and minutes (or tenths of an hour), and *range* in nanotesla. When they are uncertain quantitatively, /'s are used to replace the numerical values. Continuation of a geomagnetic storm is denoted by ---.

C3. Phase Variation in OMEGA Radio Waves at Inubo

The phase values of eight OMEGA radio signals as received at Inubo are depicted for an interval of one month, along with the phase deviation defined as a deviation from a value averaged over the six quietest day within the month. Particulars of the received signals are given in the table below.

In each of the four panels of the figure, the phase (ϕ) is shown in the lower part and the phase deviation ($\triangle\phi$) is shown in the upper part. The phase data are sampled every 30 min, so the curves of the phase and phase deviation are composed of 48 data points per day. The phase delay is measured as a positive value.

The polar cap phase anomaly (PCPA) caused by the solar protons are well detected on the Norway signal. The start, end and maximum times of the PCPA are listed in the table next to the figure, where the times are expressed as day/hour & minute in U.T.. The maximum phase deviation in the list is defined as a phase advance (negative values in the figure) in degrees.

C4. Sudden Ionospheric Disturbances

a. Short Wave Fade-out (SWF) at Hiraiso

The table of short wave fade-out (SWF) is prepared from the record of field intensities measured at Hiraiso.

Drop-out intensities of the 10 MHz, the 20 MHz, and the 25 MHz waves are respectively distinguished by marks ', '', and ''' from those of the 15 MHz wave for WWV and WWVH. Values of *start, duration, type,* and *importance* are obtained from data of the circuit whose drop-out intensity in dB is underlined as xx. When these quantities could not be determined accurately, they are accompanied by one of the following symbols.

D greater than,
E less than,
U uncertain or doubtful.

Types of fade-out are as follows:

S sudden drop-out and gradual recovery,
SL slow drop-out taking 5 to 15 minutes and gradual recovery,
G gradual and irregular in both drop-out and recovery.

Importance of fade-out is scaled according to its amplitude into nine ascending grades as 1–, 1, 1+, 2–, 2, 2+, 3–, 3, 3+.

Correspondence of solar optical flare, solar radio burst, and geomagnetic crochet to SWF is marked by X, being determined with data from interchange messages of IUWDS and observations at Hiraiso.

In table (a) SWF, *date* indicates the day to which the *start-time* of the event belongs.

b. Sudden Phase Anomaly (SPA) at Inubo

Data of sudden phase anomaly (SPA) are prepared from the records of phase measurement of VLF radio waves received at Inubo. The transmitting stations are listed in the following table.

Phase advance is shown in unit of degree at its maximum stage. No transmission or no reception during the period is indicated by —, an indistinguishable record is spaced out, and a multi-peak event is marked by *. The most remarkable or distinct phase advance is underlined and listed in the column of *Time*.

In table (b) SPA, *date* indicates the day to which the *start-time* of the event belongs.

The following letters may be attached to the value, if necessary.

D greater than,
E less than,
U uncertain or doubtful.

Transmitting Stations						
Name	Location (Geographic Coordinates)		Call Sign	Frequency (kHz)	Radiation Power (kW)	Arc Distance from Inubo (km)
Norway	66°25′N	013°08′E	Ω/N	13.6	10	7820
Liberia	06°18′N	010°40′W	Ω/L	13.6	10	14480
Hawaii	21°24′N	157°50′W	Ω/H	13.6	10	6100
North Dakota	46°22′N	098°20′W	Ω/ND	13.6	10	9140
La Reunion	20°58′S	055°17′E	Ω/LR	13.6	10	10970
Argentina	43°03′S	065°11′W	Ω/AR	13.6	10	17640
Australia	38°29′S	146°56′E	Ω/AU	13.6	10	8270
Japan	34°37′N	129°27′E	Ω/J	13.6	10	1040
North West Cape	21°49′S	114°10′E	NWC	22.3	1000	6990

HOURLY VALUES OF FOF2 AT WAKKANAI

JUL.1989

LAT. 45.4N LON. 141.7E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	82	75	75	68	74	74	74	84	N	83	80	71		71	74	73	71	77	81	83	83	80	87	84
2	80	67	76	62		69	65	73	A	A	76	63		66	65	A	A		76	72	66	N	76	85
3	85	82	83	74	74	81	82	83	85	74	87	A	A	82	86	79	82	80	81	75	87	84	84	79
4	85	85	80	78	80	87	A	107	101	95	A	86		80		70		88	65	85		77	86	
5	88									85	89	90	87	90	80	79	73	74	75	84	83	88	83	85
6	86	77	73	72	77	80	78	96	88		83	84	86	81	79	78	82	90	82	86	77	78	80	81
7	66	76	71	74	73	80	100	90	91	66					56	57	67	66	68	66	66	66	72	66
8	70	N	66	74	75	76	80	75	74	66	56					54	64	58	52	66	72	65		
9	79	76	70	71	76	86		90	97	97	88	92	93	76	86	85	80	82	80	81	88	92	90	84
10	78	71	78	74	76	87	87	94	91	90		85	92	81	80	81	81	78	76	80		82	66	85
11	86	72	78	61	67	80	88	98	95	90	90	89	89	87	A	76	74	76	72	79	78	A	90	85
12	84	85	80	84	84	84	88	88		89	91	87	80		80	74	76	79	80	66	88	87	65	88
13	88	82	88	89	88	97	101	107	98	86	90	88	89	90	84	81	76	78	87	82		84		86
14	80	74	74	77	78	91	78	107	114	98	90	88	99	109		90	A	82	80	84	87	89	90	90
15	85	85	86	78	82	99	98	96	87	84			84	84	84	82	78	81		86	89	86	84	88
16	84	83	80	71	64	73	88	59	81	A	72	A	84	68	72	74	71	A			75	78	84	82
17		68	67	71	69	85	88	105	100	84	84			84	82	76	75	75	86	89	83	82	66	63
18	82	86	77	68	62	61	84	67	72				73	68	73	61		73	64	73	74	83	77	74
19	64	65	64	59	66	79	88	103	88									67		78	78	80	77	84
20	75	68		66	63	71	91	96	92	90			78	87	87	80	78	80	86	88	89	80	84	74
21	80	80	73	72	67	84	87	84	90	A	90	87	77	84	80	76	77	74	78	84	89	66	78	76
22	77	76	66	69	79	87	90	105	94	89	89	85	77	68	78		A	72	78	84	85	88	A	80
23	81	77	74	80	76	79	A	A		A						66	A	65	67	71	71	A	75	64
24		67	66	64	66	67	72	84	86	79	76	75	64		74	64	70	73	76	83	68	84	85	86
25	87	85	79	70	74	72	76	87	90	86	76	80	81	80	77	73	81	81	78	77	80	82	83	82
26	74	80	77	72	79	79	83	94	91	90	A	91	92	84	81	80	80	84	84	66	88	73	82	73
27	68	N	78	66	64	72	68	79	87	A	71	67	67	72	64	73	67	62	70	66	68	79	86	84
28	66	74	64	62	69	75	82	83	75	78	81	60	73		77	75	81	80	74	77	84	84	85	83
29	74	73	75	74	77	81	72	84	80	74	A	A	68	77	73	76	78	78	79		C	89	85	68
30	76	74	72	64	63	62	A	85	A	A	A	81	81	80	74	73	78		78	85	89	88	83	80
31	77	71	74	69	70	82	90	111	107	94	91	101	91	88	83	78	84	80	82	90	88	92	77	66
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	29	30	29	30	26	29	25	22	20	20	22	24	25	28	24	28	28	29	27	28	28	29
MED	80	76	75	71	74	80	86	90	90	86	86	86	82	81	79	76	78	78	78	81	83	82	83	82
U Q	85	82	78	74	77	85	88	100	96	90	90	88	89	85	82	79	80	80	81	84	88	87	85	85
L Q	74	71	70	66	66	73	78	83	85	79	76	77	77	74	73	73	72	73	73	72	74	78	77	74

HOURLY VALUES OF FES AT WAKKANAI

JUL.1989

LAT. 45.4N LON. 141.7E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	71	58	35	28	G	38	58	62	66	59	64	70	96	74	62		98	55	94	45	72	G	44	57
2	35	28	25	G	42	32	47	66	70	87	90	57	60	G	62	165	96	107	55	53	40	29	G	31
3	59	58	40	G	G	38	51	G	53	48	62	72	106	55	G	G	G	59	58	41	38	37	56	30
4	40	36	39	34	32	44	100	86	84	96	122	58	78	60	G	G	81	129	78	94	92	85	115	161
5	134									103	64	71	57	G	G	G	G	86	48	58	54	38	37	G
6	G	G	34	29	G	37	56	59	78	69	G	G	G	G	G	G	G	55	47	42	30	32	33	28
7	26	G	28	G	G	37	47	56	90	58	G	G		G	G	G	G	57	86	58	31	30	28	G
8	28	G	G	G	G	G	46	57	64	60	58	54	62	G	G	G	58	59	72	55	44	G	G	29
9	28	G	G	29	G	G	44	G	G	57	G	G	G	G	60	68	53	59	56	50	45	35	28	G
10	G	G	G	G	G	G	52	55	G	55	48	G	G	G	G	57	57	64	57	53	73	28	33	28
11	G	30	58	36	G	G	47	60	69	63	78	57	56	94	136	92	62	46	G	38	96	94	68	59
12	G	G	28	27	33	G	56	55	69	82	96	84	G	56	G	G	G	G	44	G	33	32	G	28
13	33	59	106	58	40	36	55	71	70	64	70	70	65	74	68	44	G	46	65	89	161	59	84	36
14	69	58	43	28	33	42	65	95	73	62	60	86	84	129	97	102	141	44	55	58	65	96	70	145
15	96	G	G	G	27	38	57	74	67	60	60	G	G	G	G	57	60	60		55	135	34	49	28
16	31	36	29	G	G	G	G	G	G	80	70	90	65	67	71	G	54	89	160	129	95	93	65	72
17	55	59	31	37	29	G	G	G	G	G	65	89	58	G	G	G	53	47	46	52	62	59	60	65
18	67	48	40	26	32	45	54	54	60	65	G	G	G	G	G	G	G	47	40	44	34	G	39	G
19	G	G	G	G	28	35	39	G	G	56	G		G		G	G	60	92	76	53	91	29	45	37
20	G	27	57	39	G	G	G	60	62	56	64	59	G	54	G	G	G	43	38	32	40	G	32	31
21	33	G	G	G	G	31	45	64	74	95	64	59	77	73	G	G	42	46	G	65	44	59	70	31
22	37	25	30	G	G	39	48	51	67	57	62	G	G	G	G	128	150	78	35	73	126	143	90	73
23	72	46	27	G	G	57	70	90	78	96	58	66		G	G	G	72	57	48	42	57	26	26	27
24		G	G	G	G	G	G	G	62	47	G	G	G	G	G	56	53	72	70	50	85	45	32	37
25	G	G	43	G	G	32	G	56	60	61	61	G	G	G	G	G	G	G	38	40	36	28	36	28
26	G	26	33	28	25	G	G	G	44	57	147	G	G	G	55	72	G	57	64	65	59	41	36	27
27	35	39	32	42	28	G	49	40	60	79	60	G	59	74	63	63	51	48	40	50	58	69	90	59
28	80	31	58	29	39		G	65	72	60	96	58	48	75	96	62	45	56	37	32	60	60	41	45
29	38	33	58	33	G	36	41	54	58	60	64	91	60	G	54	58	59	106	57	146	67	68	60	29
30	33	31	40	45	G	39	70	60	91	96	94	G	G	68	76	G	G	66	92	65	92	91	40	57
31	31	24	G	35	27	52	58	54	77	76	80	60	57	G	G	G	G	52	44	38	G	28	25	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	29	30	30	30	31	31	30	29	30	31	30	31	31	30	31	31	31	31	31
MED	33	28	32	28	G	35	48	56	66	61	64	58	56	G	G	G	53	57	55	53	59	37	40	31
U Q	59	39	40	34	29	38	56	64	73	80	78	70	63	68	62	62	60	72	70	65	91	68	65	57
L Q	G	G	G	G	G	G	39	40	58	57	58	G	G	G	G	G	G	47	40	42	40	28	32	28

HOURLY VALUES OF FMIN AT WAKKANAI

JUL.1989

LAT. 45.4N LON. 141.7E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D\H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	17	16	18	18	22	22	35	36	39	38	42	39	39	40	43	34	28	20	17	18	17	16	18
2	17	18	16	16	16	23	26	26	38	38	43	43	45		40	44	35	21	20	18	17	17	16	16
3	17	15	15	15	16	18	23	32	38	42	40	43	42	52	54	43	47	23	20	18	14	16	18	18
4	15	16	16	16	17	18	29	33	38	39	39	40	40	43	42	52	36	28	20	20	14	18	17	17
5	17									39	40	42	43	42	62	42	27	33	20	18	17	17	17	15
6	15	16	16	15	18	17	26	21	36	38	49		60	46	48	40	23	21	22	17	17	17	15	17
7	17	15	17	14	20	20	23	33	39	38	43			80	90	70	N	27	18	18	15	16	17	16
8	16	16	15	16	18	22	30	32	38	39	40	39	42		80	38	28	20	18	18	18	14	16	18
9	16	15	16	17	20	23	26	27	40	39	60	49	65	46	41	36	42	21	18	18	17	17	18	16
10	18	15	15	15	17	21	28	26	41	38	51	50	70	52	43	36	34	24	20	16	17	17	16	17
11	16	16	15	15	17	20	28	33	36	38	40	44	42	46	38	35	29	23	18	16	17	16	16	16
12	16	17	15	15	17	18	20	27	34	28	42	39		39	42	49	28	21	24	18	16	16	16	18
13	16	15	16	16	17	20	23	28	39	39	39	40	40	42	45	24	44	24	18	17	16	16	14	16
14	18	18	17	16	17	21	23	36	38	39	43	43	42	39	43	35	38	35	17	16	18	16	18	17
15	17	15	15	15	17	18	21	26	36	40	39		62		57	41	28	23	18	16	17	16	17	16
16	14	15	17	17	23	16	21	42	29	36	40	43	46	45	35	37	35	24	20	22	17	17	16	18
17	16	17	14	14	16	18	23	48	48	47	40	56	44	48	52		28	23	18	17	14	18	15	16
18	17	15	16	17	15	20	24	32	34	39	28		70		42	41	37	32	23	16	15	16	16	16
19	16	15	15	16	18	17	22	30	54	38						48	35	23	20	16	14	18	17	17
20	17	17	15	17	16	18	32	34	36	40	39	39	53	39	44	54	24	29	18	17	17	16	17	18
21	16	14	15	15	16	17	21	26	35	37	39	45	39	45	53	34	33	22	20	18	16	17	17	16
22	18	17	16	16	17	18	20	29	34	38	39		64	50	53	36	26	22	21	17	21	16	18	18
23	18	20	17	17	17	17	20	24	26	40	39	39		42		41	36	23	18	16	16	17	16	16
24		15	15	15	17	26	21	32	28	39	39		51			35	27	21	20	17	14	16	18	16
25	15	15	16	15	17	17	22	30	27	38	39	49	40	52	54	50	38	32	30	18	17	15	16	18
26	17	15	16	17	20	47	24	23	27	41	40	56	55	48	39	43	26	24	17	17	15	17	17	17
27	16	15	17	20	18	17	20	23	36	36	38	53	38	35	42	35	23	29	18	17	16	16	15	15
28	17	14	16	16	18	17	24	21	33	43	39	36	43	41	38	30	22	21	17	17	17	17	16	18
29	15	15	17	16	17	17	20	23	35	39	40	40	39	58	38	33	34	21	18	16	18	16	15	17
30	15	15	16	16	17	18	23	27	36	36	39	59	55	38	42	40	34	20	18	21	16	17	16	17
31	17	15	17	17	17	17	20	27	34	38	38	39	40	52	52	48	35	22	20	18	17	17	15	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	31	30	24	27	25	28	30	30	31	31	31	31	31	31	31
MED	16	15	16	16	17	18	23	28	36	39	40	43	43	45	43	40	34	23	20	17	17	17	16	17
U Q	17	17	16	17	18	21	26	33	38	39	40	49	55	51	53	44	36	28	20	18	17	17	17	18
L Q	16	15	15	15	17	17	21	26	34	38	39	39	40	40	40	35	27	21	18	16	15	16	16	16

HOURLY VALUES OF FOF2 AT AKITA

JUL.1989

LAT. 39.7N LON. 140.1E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	84	84	82	78	77	82	95		91	91	A	86	86	87	82	A		87	88	A	84	89	87
2	87	84	82	74	62	67	77		A		A	A	A	85	81	78	78	83	90	81	71	A	80	82
3	82	84	86	76		75	85	88	84	86	82	84	85	88	91	90	90	85	86	84	82	84	83	82
4	80	83	82		76	79	98	104	107	A	88	A	90	89	84	A	88	86	84	87	86	87	90	86
5	84	A	82	82	88	85	86	88	N	A	91	A	86	92	90	90	88	83	87	A	78	80	84	86
6	90	86	82		80	80	76	83	90	A	82	87	91	94	90	88	87	A		A		78	80	84
7	78	79	71	74	77	85	88	96			A		A	A	A				A	71	A	70	75	66
8	77	71	71	66		81	78	78	72	A	A	A		A	A	58	A	A	A	66	A	82	84	84
9	82	84	84	82	82	91	97	95	94	92	91	93		A	98	94	93	94	89	89	88	88		84
10	83	83	86	80	83	88	88	94	93	91	90	91	90	A	90	88		96	87	86	A		A	85
11	87	A	81	71	77	84	90	103	101	95	103	A		A	A	86	82	N	A	77	80	85	83	85
12	91	88	A	85	84	87	85	88	86	A	A	N	A	A	88	85	84	84	86	86	86	85	86	89
13	92	85	85	85	86	88	102	116	99	A	A	A	117	A	A	99	A	82	A	87	A	86	87	88
14	88	80	90	85	81	87	109	108	108	98	A	99	101	102	98	91	86	88	84	84	87	91	84	92
15	86	92		85	86		90	89	94	A	A	88	A	88	90	91	90	88	87	89	86	86	N	100
16	96	84	82	78	67	77	90	90	88	82	83	90	94	A	A	79	74	A	A	A	78	72	85	85
17	81	76	75	71	73	77	85		97	78	80	83	A	88	A	88	A	A	A	85	84	77	80	82
18	82	83	84	73		A	78		A	73	A	90	91	86	84	81	77	79	76	A	A	A	80	81
19	77	N	78	73	75	78	87	111	88	A	A	68	A	62	67	66		A	83	82		83	66	86
20	66	79	66	66	68	79	88	104	88	86		C		C	C				92	90	86	A	86	80
21	85	86	81	84	86	83	85	90	100	84	88	84	A	87	A	90	82	78	82	91	85	81	78	80
22	76	76	79		74	82	91	102	103	100	88	88	91	A		86	80	80	81	86	88	84		76
23	84	N	86	83	74	80	86	90	80	77	77	78	77	69		66	71	A	A	74	71	79	78	78
24	76	66	70	70	68	77	84	90	87	A	86	80	77	76	83	84	77	82	84	83	A	80	90	84
25	83	87	89	76	72	73	81	A	98	A	80	84	84	86	84	84	88	87	82	80	84		83	84
26	86	80	76	73	71	82	84	90	100	90	91	91	93	88	89	N	89	91	88	84	86	85	89	88
27	85	85	88	79	77	68	80	92	84	96	78	A	80	A	79	78	76	72	72	66	67	82	A	80
28	80	67	64	66	76	77	85	91	84	86	77	78	85	87	85	A	83	86	84	A	82	80	82	83
29	86	77	84	79	78	84	83	90	86	A	A	80	A	86	80	A	84	81	A	88	85	A	84	85
30	84	82	90	54	63	63	74	88	90	83	84	A	A	85	84	82	83	84	84	A	A	80	86	83
31	83		79	78	93	74	85	112	90	A	92	110	108	100	88	90	90	91	93	80	90	85	84	83
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	26	29	28	28	29	31	27	26	17	20	19	18	20	21	25	23	21	22	25	21	25	26	31
MED	84	83	82	77	77	80	85	91	90	86	87	87	90	87	87	86	84	84	85	84	85	83	84	84
U Q	86	85	85	82	82	84	90	103	99	93	91	91	93	88	90	90	88	88	87	87	86	85	86	86
L Q	80	79	77	72	72	77	82	89	86	82	81	80	85	85	83	80	78	81	83	80	79	80	80	82

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT AKITA

JUL.1989

LAT. 39.7N LON. 140.1E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	91	81	43	42	31	G	53	69	55	80	81	109	92	G	58	74	128	179	70	62	142	99	68	48
2	38	37	69	48	G	44	72	78	138	84	100	116	151	54	69	55	57	55	57	44	48	68	79	59
3	114	128	49	44		G	44	62	61	49	G	55	86	62	58	52	51	58	39	40	58	32	39	34
4	40	50	66		G	37	50	57	73	103	75	115	55	91	88	115	69	48	54	73	70	92	71	82
5	35	92	58	49	31	43	62	84	134	142	89	136	83	54	60	50	47	83	51	115	58	58	33	38
6	28	31	32		G	34	49	82	100	100	74	72	57	69	69	84	81	178	134	129	60	49	28	30
7	29	37	37	30	38	49	58	95	179	110	115	137	85	56	54	G	48	61	82	49	106	58	G	30
8	33	29	26	40	32	G	57	72	67	92	85	52	67	92	115	68	89	106	96	48	94	58	90	30
9	37	33	29	28	40	38	51	70	83	78	92	82	100	178	127	54	G	44	84	85	128	125	36	30
10	G	23	G	G	G	36	36	50	56	93	62	86	119	184	G	85	180	105	73	73	67	91	127	124
11	86	92	58	82	48	38	54	55	63	74	84	124	134	180	158	66	62	108	88	61	60	83	60	108
12	97	91	115	70	59	37	37	57	130	179	178	108	116	112	62	58	62	69	60	50	41	33	32	39
13	45	49	92	66	58	34	72	56	85	127	180	179	166	174	116	88	92	84	93	50	137	84	132	136
14	112	68	52	37	28	35	71	84	146	68	90	84	68	68	50	103	84	G	55	72	58	116	91	85
15	48	91	96	59	54		55	90	74	91	132	112	76	86	77	63	58	81	61	62	92	94	58	58
16	38	47	40	35	24	29	39	68	55	69	53	59	72	86	124	55	46	73	82	132	68	81	91	59
17	54	36	40	34	38	35	40		46	58	55	53	100	65	103	86	99	102	125	36	59	59	110	66
18	41	58	80	48	G	29	60	74	84	79	116	G	G	50	49	51	62	70	71	113	94	134	28	24
19	23	G	G	G	24	30	36	49	58	127	140	66	53	G	G	104	179	159	145	57		58	40	40
20	40	34		36	37	G	G	90	71	53		C		C	C				70	57	49	89	58	60
21	58	G	G	38	43	41	59	80	73	70	74	54	109	90	90	88	94	73	48	43	79	91	43	34
22	70	32	G	G	G	32	G	51	57	83	62	49	69	90	G	52	60	92	49	61	34	31	G	G
23	G	33	G	31	G	32	35	54	61	68	61	78	61	56	G	G	G	84	104	36	57	84	54	G
24	G	G	34	29	G	G	42	63	54	91	58	59	G	G	G	71	49	44	50	32	43	69	58	90
25	55	48	49	33	28	33	G	93	91	73	59	56	54	G	G	G	G	G	34	31	67	40	30	24
26	37	36	32	32	36	G	37	G	48	52	63	90	56	57	95	106	66	42	G	44	38	89	90	72
27	39	66	43	50	37	36	36	40	60	94	95	124	80	116	G	53	58	G	46	42	58	71	92	92
28	51	32	41	57	38	G	41	46	57	74	G	54	G	69	64	84	59	54	60	84	57	72	44	31
29		49	32	28	60	30	42		59	104	77	85	96	80	54	90	G	72	130	94	81	114	94	32
30	92	58	58	58	G	35	40	80	52	53	55	115	146	75	G	G	G	85	90	109	117	135	134	91
31	72		54	48	36	33	59	80	84	92	54	69	82	68	74	G	61	84	56	82	127	32	25	34
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	29	30	30	31	29	31	31	30	30	30	30	30	30	30	30	31	31	30	31	31	31
MED	40	42	42	38	32	34	44	69	67	83	76	83	81	69	61	64	60	73	70	61	64	81	58	40
U Q	70	66	58	49	38	37	58	81	85	100	95	115	100	91	90	86	84	92	90	84	94	92	91	82
L Q	35	32	32	30	G	29	37	54	57	69	59	56	57	56	G	52	48	54	51	44	57	58	33	30

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT AKITA

JUL.1989

LAT. 39.7N LON. 140.1E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D\H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	15	15	15	15	24	18	17	23	24	23	26	35		44	22	21	23	18	16	16	15	16	16
2	16	15	15	15	16	17	20	23	26	39	23	29	26	36	41	27	21	17	17	16	15	17	16	16
3	16	15	15	15		18	18	21	26	23	26	24	44	24	20	27	21	20	20	16	16	16	16	16
4	16	15	15		16	16	16	18	20	23	29	34	40	42	35	39	21	21	17	17	17	16	16	16
5	15	15	15	15	16	17	16	21	21	24	27	32	38	28	34	27	22	24	16	16	16	16	16	16
6	17	15	15	15	15	16	21	20	22	23	23	23	33	33	34	24	20	21	18	16	16	16	16	20
7	17	14	15	15	15	17	18	17	21	22	39	39	38	35	35		21	18	15	16	16	15	16	15
8	16	15	15	15	15	18	18	20	23	22	40	38	38	34	32	32	18	20	17	15	16	16	15	16
9	16	14	15	15	15	15	17	20	20	22	36	36	33	26	26	30	20	21	17	16	16	16	16	18
10	16	15	16	15	15	16	18	20	23	24	34	35	35	34	33	24	21	17	16	17	18	15	16	15
11	16	15	15	15	15	16	20	20	22	22	28	34	35	24	28	23	20	17	20	21	17	16	15	15
12	16	15	15	15	15	15	20	18	21	22	24	35	38	32	27	26	23	18	17	15	15	16	17	15
13	15	15	15	15	15	16	20	21	26	22	28	27	38	29	24	24	23	18	16	16	15	15	16	15
14	16	16	16	15	17	18	17	18	21	21	33	33	30	38	42	22	20	20	20	18	15	16	15	16
15	16	14	15	15	15		16	17	20	22	35	36	28	36	33	23	22	17	16	16	15	16	15	16
16	16	16	17	15	15	17	17	18	22	26	23	27	26	34	26	30	21	20	17	15	15	16	16	16
17	15	15	15	14	15	16	18		21	23	26	33	26	32	30	28	21	17	17	17	16	16	16	15
18	16	15	15	15	16	16	20	20	22	28	36		37	23	24	21	21	18	16	15	16	15	16	15
19	16	15	15	15	15	16	20	22	21	23	26	14	18	36	34	22	26	20	18	17		16	16	16
20	15	16	16	15	15	18	17	21	21	36		C		C	C				16	15	16	15	16	17
21	16	15	16	15	15	16	18	20	22	26	28	38	34	33	34	28	22	18	15	16	16	16	16	17
22	15	15	16	16	16	17	18	17	24	24	35	34	30	38	N	23	21	18	17	16	15	17	16	16
23	16	16	17	15	15	16	16	18	21	22	23	38	28	26		23	22	20	16	15	16	16	16	16
24	21	16	15	16	16	17	18	20	24	23	26	36		36		34	23	22	16	15	18	16	15	16
25	15	15	15	15	15	18	18	21	18	24	27	42	30	28	26	26	22	18	26	16	16	16	16	16
26	16	15	15	14	15	24	17	20	21	27	26	40	39	34	32	26	22	18	15	16	16	16	16	16
27	16	15	15	15	15	15	16	18	22	26	27	38	38	34	34	22	23	18	16	16	17	16	16	15
28	16	15	15	15	15	16	17	20	22	27	34	33		38	23	27	21	18	14	16	17	15	16	18
29	16	15	15	15	15	16	16	17	21	24	26	36	34	38	30	24	21	16	16	16	17	16	16	16
30	16	15	15	15	15	17	16	18	21	24	38	38	28	32		26	20	18	16	16	17	16	16	16
31	16	15	15	15	15	16	17	16	22	38	26	38	39	26	23	22	23	20	17	16	15	15	15	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	30	30	31	30	31	31	30	29	28	29	26	29	30	30	31	31	30	31	31	31
MED	16	15	15	15	15	16	18	20	22	24	27	35	34	34	32	26	21	18	17	16	16	16	16	16
U Q	16	15	15	15	15	17	18	20	23	26	34	38	38	36	34	27	22	20	17	16	17	16	16	16
L Q	16	15	15	15	15	16	17	18	21	22	26	30	29	28	26	23	21	18	16	16	15	15	16	15

HOURLY VALUES OF FOF2 AT KOKUBUNJI

JUL.1989

LAT. 35.7N LON. 139.5E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	81	88	91	92	79	80	86	86		94	102	89	97	96	N	88	A		A	A		92	91	90
2	98	92	93	72	64	67	78		A		A		80	86	94	89	88	92	92	80			81	
3	93	A	91	83	72	81			78	87		86	92	100	102	102	94	92	94	91	91	88		88
4	86	90	87	96	78	86	105	106	104		95	94	100	101	91	88	91	92	96	92	85	90	94	91
5	90	88	87	92	90	100	94	92	109	95	A		100	101	101	96	96	97	90	88	89	87	88	91
6	97	94	88	86		A		89	85		N	C	A	103		106	A	A				88	79	84
7	92	76	71	74	76	84	119	112			A		A			70	82	80		71		75		
8	76	77	71	68	70	92	77	86			A	A	A	A	A			A	A	72	79	84	86	80
9	88	93	83	91	92	90	92	90	88	87		94	83	96	101	100	100	102	101	101	86	88	88	86
10	88	87	85	84	84	94	100	96	94	95		97	94	100	98	A	88		94			81		88
11	87	92	86	90	78	81	93	100	96		101			A	A		85			85	84	88	86	93
12	84	98	90	84	91	93			A	104	105	106	98	102	A		92	94	94	92	87	91	94	
13	99		90		89	91	104	107	98	91	A	101	97	98	97	91	92	89	87	89	89	92	88	A
14	90	91	89	84	76	85	100	104	113			98		104	92	102	N	98	93	97	A	84	86	86
15	91	98	98	94	87	93	99	84	100	91	90	90			97	A	95				80		91	90
16	102	98	85	92	81	N	104	91	91	N	96	102	105	98		86	80	84	88	74	77	81		86
17	84	86	81	74	66	86	100	111	86	84	87	90		97		97	90		88	89	81	N	85	90
18	98	92			63	72	85		82	A	81	87	91	N	96	91	85	90	86	86	80	A		82
19	80	87	75	78	73	78	94		92	93		80	79	77	72	73	65	75		81	78	87	92	90
20	82	79	76	71	75	79	100	100	89			87	92	96	N	103	92	94	A	89	84	85		
21			85	92	91	89	97	92	95		87	97	101	118		98		A	90	103	94	80	83	80
22			75	72	77	C	92		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	96	76	82	87	84						74	A		79	79	74
24	71	72		75	C	C	C	C	C	91	90		A	90		88	90	92	88	84	78	78	81	99
25	A	97	89	86	74	70	82	108			86	90	89	91										
26											95		90	98	99	101		95	100	86	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		78	85	85	84
28	81		66	67	75	82	91	88	94	86	78				94			93	91	84	72	78	76	87
29		84	91	80	80	84	96	105	96	86	81		90	96	91	91	88			99	86	82	88	92
30	88	94	95	72	60		79	94	98	91	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	112	102	C	C	104	109	108			106	90	85
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	22	25	25	25	22	23	20	20	15	15	17	19	21	14	19	19	17	18	21	19	23	21	22
MED	88	90	87	84	77	84	94	95	94	91	90	90	92	98	96	91	90	92	92	88	84	85	86	88
U Q	93	94	90	91	85	91	100	105	98	94	96	97	100	101	99	101	94	96	94	92	87	88	90	90
L Q	82	86	78	73	72	80	86	89	88	86	82	87	89	96	92	88	85	89	88	82	78	81	82	84

HOURLY VALUES OF FES AT KOKUBUNJI

JUL. 1989

LAT. 35.7N LON. 139.5E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		49	56	44	45		61	70	91	61	60	56	53	59	66	95	161	110	146	131	116	115	89	C
2	73	43	49	40		36	81	83	92		104			65	G	55	58	64	72	56	76	60	45	58
3	69	44	100	60	60	38	38	56		50		64	73	78	71	56	58	44	G	27		44	27	
4		31	33			29	39	52	53	60	75	93	81		G	58	107	92	84	61	30	31	69	59
5	73	50	44	37	33		60	62	92	90	182			65	96	108	104	58	60	72	55	59	59	42
6	59	64	60	66		81	94	92	79	126	168	C	108	100			137	176		179	102	83	98	47
7	31	33	40	46	34	36	57	83	180	91		143		124	80	102	67	69	94	49	45	60	58	
8	58	52	44	38	30			50	75	80	103	90	88	98	112	96	93	100	76	60	57	57	80	82
9	57	54	54	49	36	31	50	72	68	92			G	G		61			50	57	102		92	60
10	30		24				49	68	66	53	63	79	101	54	58	136	60	94	94	175	96	134	82	90
11	142	72	96	59	34	36	55	62	84	115	167	168	154	182	184	137	68		61	54	40	38	58	44
12	103	58	71	118	59	60			60	69	82	100	86	64	114	85	100		56	72	54	33	42	30
13							36	46	54	52	53	60	64	80	75	81	58	63	54	44	43	36	49	130
14	58	57	55	24		36	80	116	81	128	140	77	55	55	C	60	54	G	42	62	91	92	89	83
15	71	94	61	43	42	G	44	78	71	74	66		48	114	85	120	55	64	91	152	95	82	58	56
16	43	43	45	38	24	52	45	46	59	103	91	69	100	65	84	60	48	44	36	32	95	104		61
17	58	46	34	28		28	56	54	71	59	67	54	98	62	100	C	53	61	79		41	61	34	49
18		48	40		25	46	60	61		135		72	74	61	51		48	43	49	58	60	128	95	26
19				33	28	37	72	61	48	59		75	73	72	59	72	72	58	62	48	128	82	65	55
20	51	43	38	31	43		43	74	106	94		78	57	51	G	G	82	84	175	64		58	142	
21	58	83		62	55	50	62	92	93			55	54	51		59	96	95	82	62	40	60	84	50
22	89		56	38		C	48	60	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	54	60	58	54	72	88		54	106	92	64	169	67	59	51	48
24				36	C	C	C	C	C	86	69	90	90	49	43	48	46	60	58	45	34	30	60	70
25	119	81	52	45	35	26	41	87	102	92	96	53	61											
26											54	69	58	72	55	52	94	59	55	64	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		93	56	69	102
28	60	59	37	48	38		37		62	61	78	105	73	57	60	115	154	90	72	45	31	33	55	62
29		25	60	30	31	26	38	61	86		64		46	40	55	49	G	144	117		26	45	40	48
30	55		44	32	46		44	51	48	56	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	75	60	C	C		54	70		125	132	94	92
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	20	21	23	23	18	17	24	24	24	24	20	21	25	26	21	23	25	24	26	24	25	26	26	23
MED	58	50	49	40	36	36	50	62	73	77	76	75	73	64	66	61	68	64	67	60	60	60	62	58
U Q	73	61	60	49	45	48	60	80	91	93	103	91	89	80	90	102	102	93	84	72	95	83	89	82
L Q	56	43	40	33	31	28	42	55	59	59	63	58	56	55	53	55	54	58	55	48	40	44	51	48

HOURLY VALUES OF FMIN AT KOKUBUNJI

JUL.1989

LAT. 35.7N LON. 139.5E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	16	16	15	18	16	14	39	24	35	38	32	29	30	26	20	16	16	15	15	15	15	C
2	15	15	15	14	16	16	15	17	18	28	40	34	29	32	27	26	21	16	16	15	15	14	14	14
3	15	17	15	14	14	16	16	18	22	27		29		34	40	24	20	17	15	14	15	15	15	14
4	15	15	14	15	14	15	16	16	17	23	30					24	26	17	16	15	14	14	15	14
5	15	14	14	14	14	16	15	16	26	14	33	35	36	33	24	28	18	26	15	15	14	15	15	15
6	15	14	14	14	14	17	16	14	18			C	36	35	38	24	20	18	18	14	15	15	14	14
7	15	14	14	14	14	16	16	18	20	23	28	N	38	35	33	27	18	17	17	16	15	14	21	
8	15	14	14	15	15		17	20	23	27	29	30	36	32	34	27	22	17	21	15	14	15	15	15
9	15	14	14	14	14	16	16	18	18	26	30	39	34	32	29	27	24	17	15	15	14	14	15	15
10	15	15	14	14	14	17	16	17	18	27	38		33	35	34	27	20	21	17	15	14	15	17	15
11	14	14	14	14	14	16	16	18	21	26	32	33	34	32	35	22	22	17	16	15	15	15	14	14
12	15	14	14	15	15	15			42	27		35	35	38	35	27	23	18	16	15	15	15	15	15
13	17		15			16	16	20	22	24	40	30	36	33	30	23	21	17	16	14	14	15	15	15
14	15	14	15	15	14	15	16		18	24	27	35	42	34	C	26	18	16	17	15	16	14	15	14
15	15	14	14	14	15	18	17	20	21	22		40	33	38	32	30	21	21	16	17	14	15	15	15
16	15	14	15	14	14	15	16	15	22	23	32		34	35	33	26	20	18	16	14	14	15	15	15
17	15	15	14	15	15	16	16	18	22	21	33	38	30	35	34	C	14	15	14	14	14	15	15	15
18	15	15	15	14	16	15	16	20	23	24	35		42	26	33	24	21	16	18	15	15	14	15	15
19	15	14	18	14	15	15	15	16	14			29	33	33	33	24	20	17	21	15	15	14	15	14
20	15	14	14	14	14	15	16	20	17	23		29	35	34	35	32	18	16	15	14	15	14	15	
21	N	17	14	14	15	14	18	18	22		33	34	35	26	33	23	21	17	16	15	15	15	15	15
22	14	14	15	14	16	C	17	16	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	18	21	29	30		32		27	23	16	16	15	18	14	15	14
24	14	17		15	C	C	C	C	C	28	34	35		35	33	30	23	20	17	16	15	14	15	15
25	14	14	14	14	14	16		18	24	26	35	34	30	30										
26											34	40	38	35	34	29	20	18	18	16	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		15	15	15	15
28	14	17	14	14	14	15	15	17	24	29	33	34	33	30	29	21	18	17	15	14	17	15	15	15
29	17	14	14	15	14	18	15	15	20	21			32		28	26		17	16	14	15	15	14	14
30	14	14	15	15	15		14	18	21		C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	34	29	C	C	23	16	15	15	14	14	15	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	26	26	26	25	23	24	24	26	23	20	20	24	26	23	25	26	27	27	27	27	27	27	24
MED	15	14	14	14	14	16	16	18	21	24	33	34	34	33	33	26	20	17	16	15	15	15	15	15
U Q	15	15	15	15	15	16	16	18	23	27	35	36	36	35	34	27	22	18	17	15	15	15	15	15
L Q	15	14	14	14	14	15	15	16	18	23	30	30	33	32	30	24	20	16	15	14	14	14	15	14

HOURLY VALUES of FOF2 AT YAMAGAWA

JUL.1989

LAT. 31.2N LON. 130.6E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	98	96	90	88	84	83	86	88	86	94	102	101	104	100	97	100	N	105	101	85	77	78	83	86
2	90	91	83	82	76	74	90	67	78	A	A	86	90	105	106	112	111	105	102	88	71	80	84	86
3	88	87	89	85	71	76	86	89	90	85	82	88	92	98	105	102	104	102	98	93	88		86	A
4	86	88	86	85	81	81	86	107	99	88	A	98	104	101	97	88	95	102	99	100	88	91	88	88
5	84	106	102	86	88	86	84		A			A	A	A		A	N	106	104	102	88	84	86	90
6	85	99	100	86	71	76	77	78	80		A	A	96	102	110	113	113	108	101	98		A	86	84
7	84	84	83	77	69	74	85	110	106	96	74	A	96	103	104	108	86	101	87	A	A	66	76	78
8	75	76	79	80	77	79	76	91	88	A	85	A	A		90	92	87	85	86	84	82	78	84	87
9	87	90	83	85	80	82	80	86	85				95	97	92	92	90	96	99	101	85		85	90
10	87	86	94	84	86	88	87	87	88	96	90	92	A	A	A	100	100	101	100	91	82		85	84
11	86	88	83	85	80	78	83	88	A	105	107	106	107	106	105	100	99	101	86	89	85	88	88	86
12	86	90	85	86	84	86	86	88	90	101		91	105	107	107	108	113	112	108	101	90	85	87	86
13	82	90	86	86	81	83	90	88	94	91	96	92	95	102	105	103	107	105	91	92	89	89	87	86
14	84	90	84	77	76	78	86	102	86	A	A	101	104	104	102	106	108	104	107	105	86	86	90	88
15	107	110	110	85	77	78	86	97	90	90	85		91	A	97	102	107	96	A	A	A	88	86	86
16	100	108	86	86	85	81	80		94		89	104	A	106	99	102	105	100	A	80			81	84
17	83	87	85	85	78	80	86	86	84	80	A	88	91	96	103	103	97	85	87	84	86	80	85	87
18	86	87	81	76	67	59	67	86	78	82	90	98	96	A	107	110	103	101	102	90	78	N	78	78
19	A	87	78	82	82	71	78	76	80	91		93	100	103	105	102	71	102	99	99	90	83	88	87
20	86	A	86	84	83	81	88	88	80	74	A	80	87	100	108	A	102	112	106	96	86	87	87	83
21	82	103	100	102	86	85	86	87	84	85	88		104	111		106	100	104	108	111	104	80	86	88
22	88	87	82	79	80	78	86	95	100	88	91	95	103	106	104	105	100	91	95	102	95	78	78	86
23	84	88	82	83	82	75	86	108	108	84	A	A	93	86	88	88	86	85	81	75	76	74	A	76
24	80	79	79	76	67	74	84	88	90	90	81	A	88	96	103	104	98	95	88	100	88	79	80	83
25	85	86	89	A	68	74	83	104	84	81	A	A	94	100	100	105	107	107	96	91	90	A		86
26	84	82	83	80	79	80	80	85	86	91	94	98	97	105	112	108	106	111	110	101	88	88	103	108
27	100	88	88	84	76	69	86	88	97	97	88	101						99	91	86	87	84	82	86
28					66					82	C	C	C	98	93	94	100	96	107	86	87	87	83	86
29	86	88	85	86	84	83	85	88	96	83	85		88	103										
30																								
31				80			83			79	83	A	95	102	106	111	116	115	91	86	88	88	86	87
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	28	28	29	28	29	26	26	23	17	17	24	24	25	26	26	29	27	27	25	22	27	28
MED	86	88	85	84	80	78	86	88	88	88	88	95	96	102	104	103	101	102	99	92	87	84	86	86
U Q	88	91	89	86	83	82	86	95	94	94	92	101	103	105	106	108	107	105	104	101	88	88	87	87
L Q	84	87	83	80	73	74	81	86	84	82	84	89	91	99	97	100	97	96	91	86	83	79	83	84

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

JUL.1989

LAT. 31.2N LON. 130.6E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	33	35	26	G	G	G	G	41	54	59	49	G	G	G	G	52	G	G	43	33	32	37	32	32
2	24	41	29	24	G	G	33	43	86	110	94	97	57	G	G	61	54	60	61	51	131	166	86	41
3	71	57	51	51	61	40	G	43	58	61	56	49	G	63	75	79	74	69	69	46	68	45	39	45
4	45	29	33	27	28	G	35	48	70	79	83	64	87	67	80	G	G	54	86	51	33	34	25	41
5	57	91	58	46	38	G	31	38	110	113	103	131	136	123	136	167	91	58	68	59	58	68	104	90
6	41	38	50	38	28	G	G	46	70	111	95	165	86	85	66	64	87	57	53	78	166	151	113	91
7	85	35	G	43	31	G	G	45	175	77	95	119	79	58	63	56	92	95	101	115	109	58	69	65
8	46	44	36	30	G	G	35	57	68	114	75	100	176	126	63	50	68	G	38	34	44	33	G	65
9	91	37	40	46	59	59	48	49	56			110	54	68	55	52	51	44	46	77	95	41	79	84
10	92	49	30	33	32	30	41	68	138	G	69	85	124	118	106	63	59	54	72	160	41	43	38	82
11	71	69		91	30	29	43	44	128	93	87	116	68	84	89	100	44	44	38	29	33	25	29	32
12	24	24	G	G	70	34	39	44	50	52		54	62	80	86	92	76	45	40	32	31	40	32	32
13	G	24	G	G	G	G	G	38	48	45	84	G	G	58	55	56	45	48	51	41	60	43	G	37
14	38	33	24	G	G	G	35	45	68	114	100	91	57	G	G	61	G	68	75	83	32	58	44	92
15	59	46	43	36	29	G	32	38	43	G	66	58	90	114	115	78	69	106	167	150	92	91	59	46
16	40	46	28	26	G	G	38		57	77	68	78	112	86	G	47	74	64	72	58	55	48	40	28
17	33	25	32	G	G	32	57	82	59	69	78	67	73	80	58	80	84	89	86	72	72	60	69	32
18	28	44	26	G	G	G	36	58	62	74	76	60	59	111	86	63	53	53	73	90	50	27	33	30
19	91	70	92	70	40	30	46	40	57	71	84	93	57	56	74	76	G	46	91	46	66	24	32	43
20	71	54	42	38	28	30	46	59	71	92	92	66	82	65	83	110	112	107	63	57	36	45	45	38
21	70	37	30	29	26	G	32	48	47	45	80	124	114	140	85	79	72	66	71	103	112	92	92	84
22	66	86	54	43	G	G	55	51	62	78	74	67	62	G	58	54	44	80	110	151	38	30	69	38
23	31	38	57	66	50	38	45	45	69	84	98	138	69	G	G	G	G	44	55	36	29	90	58	30
24	54	58	40	30	G	G	31	68	74	81	99	85	69	83	G	94	59	64	55	48	69	28	39	37
25	38	30	116	91	58	28	49	72	79	78	179	151	147	G	55	G	54	82	70	42	43	82	38	28
26	45	38	33	30	26	25	G	G	54	49	57	58	62	G	56	53	54	44	G	G	26	G	G	G
27	32	29	38	58	69	28	57	49	51	54	54	54						G	38	45	26	41	70	70
28					57					66	C	C	C	G	79	G	91	G	41	G	G	68	38	28
29	24	58	91	45	50	33	G	37	G	G	67		G	G										
30																								
31				G			33			64	74	118	101	62	G	G	G	G	G	49	40	41	33	40
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	27	29	29	28	29	27	28	29	27	28	28	29	28	28	28	29	29	29	29	29	29	29
MED	45	40	36	33	28	G	35	45	62	74	80	85	69	65	63	61	56	54	63	51	44	43	39	40
U Q	70	55	51	46	50	30	45	57	72	88	95	117	95	85	84	79	75	68	74	80	70	68	69	67
L Q	32	34	28	12	G	G	16	41	54	53	68	59	57	G	28	51	44	44	42	38	32	33	32	32

HOURLY VALUES OF FMIN AT YAMAGAWA

JUL.1989

LAT. 31.2N LON. 130.6E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	16	16	17	21	29	35	34	36		34	27	21	20	16	15	15	15	15	15
2	16	15	15	16	15	15	15	16	21	23	33	36	39			29	22	21	15	15	15	15	15	15
3	15	15	15	15	15	15	16	16	21	24	36	33	46	35	42	34	23	33	16	15	16	15	15	15
4	15	15	15	15	15	15	15	17	22	23	24	38	36	42	42	44	44	22	17	16	15	15	15	15
5	15	15	15	15	15	15	16	18	21	22	36	38	35	36	34	32	33	29	16	15	15	15	16	15
6	15	15	15	15	15	15	16	17	17	22	34	36	38	42	39	38	24	21	17	15	16	15	15	15
7	15	15	15	15	15	16	15	16	18	22	32	34	33	35	32	23	30	17	15	15	15	15	15	15
8	15	15	15	16	15	15	15	16	18	21	30	33	32	40	36	35	23	23	18	15	15	15	15	15
9	15	15	15	15	15	15	15	16	20			43	38	36	35	26	22	20	17	15	15	15	15	15
10	15	15	15	15	15	15	15	16	18	21	35	34	36	38	33	30	23	21	16	16	15	15	15	15
11	15	15	15	15	15	15	15	16	20	24	32	37	36	34	30	24	22	23	17	15	15	15	16	15
12	15	16	15	15	15	15	15	16	17	23	30	39	36	34	33	30	22	21	16	16	15	16	15	15
13	15	16	16	15	15	16	15	16	23	22	32	33	34	43	34	24	21	23	17	15	15	15	15	15
14	15	15	15	15	15	15	15	16	17	22	26	34	34	49		30	22	20	20	16	15	15	15	15
15	15	15	15	15	15	15	15	16	18	24	23	35	34	34	34	27	21	20	18	15	15	15	15	15
16	15	15	15	15	15	15	15		21	21	33	36	38	35	34	27	21	20	16	16	16	15	15	15
17	15	16	15	15	15	15	16	15	20	21	34	34	36	34	39	35	24	21	16	16	15	15	15	15
18	15	15	15	15	15	15	16	16	20	22	33	36	34	36	32	30	23	22	15	16	15	15	15	15
19	15	15	15	15	15	15	15	16	18	24	29	34	44	44	45	30	28	21	16	15	15	16	15	15
20	15	15	15	15	18	15	15	17	20	21	38	39	36	36	35	33	27	23	17	15	15	15	15	15
21	15	15	15	16	15	15	15	16	17	22	33	36	36	35	35	32	21	18	15	15	15	15	15	15
22	15	15	15	16	20	16	16	16	22	22	34	34	38	36	45	33	26	20	17	15	15	15	15	15
23	15	15	15	15	15	15	15	15	16	17	29	36	35	45	42	29	23	18	16	16	16	15	15	15
24	15	15	15	15	15	15	15	16	18	29	35	39	39	39	35	27	23	21	16	15	15	15	15	15
25	15	15	15	15	15	15	15	15	18	20	28	30	36	34	32	32	23	20	30	15	15	15	15	15
26	15	15	15	15	15	14	18	17	20	21	33	35	43	35	42	39	22	22	17	16	16	15	15	15
27	15	15	15	15	15	15	15	16	18	23	30	34						20	16	15	16	15	15	15
28					15					21	C	C	C	58	41	29	26	20	17	18	16	15	16	15
29	16	15	15	16	16	17	16	17	17	28	27		54	60										
30																								
31				15			16			28	30	42	36	30	32	24	27	22	18	16	15	16	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	29	29	28	29	27	28	29	28	28	28	27	26	28	28	29	29	29	29	29	29	29
MED	15	15	15	15	15	15	15	16	19	22	32	36	36	36	35	30	23	21	16	15	15	15	15	15
U Q	15	15	15	15	15	15	16	17	21	24	34	37	38	42	41	33	26	22	17	16	15	15	15	15
L Q	15	15	15	15	15	15	15	16	18	21	29	34	35	35	33	27	22	20	16	15	15	15	15	15

HOURLY VALUES OF FOF2 AT OKINAWA

JUL. 1989

LAT. 26.3N LON. 127.8E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	104	86	93	86	87	88	86	83	85	82	96	106	94	98	104	102	123	122	97	87	81	80	80	77
2	84	85	88	80	62	61	80	64	76	A	96	A	106	107	121	133	A	120	119	103	88	90	83	87
3	A	97	88	82	81	75	85	90	88	87	90	90	67	96	100	94	103	104	106	105	103	88	86	86
4	66	84	144	104	87	78	87	88	88	84	84	95	98	94	90	98	97	103	100	97	90	88	79	86
5	89	99	109	92	90	84	85	95	89	85	A	99	107	A	A	122	121		120		88	90	88	86
6	A	104	86	84	78	67	68	80	84	64	A	87	104	107	121	122	118	105	104	89	90	81	79	84
7	79	A	81	72	76	78	77	88	96	84		85	112	94	90	116	128	118	105	91	88	83	82	86
8	84	78	86	77	78	75	80	88	80	80	81		91	95	109	92	98	95	89	91	84	85	78	80
9	81	85	88	85	76	64	76	84	83	82	82	92	100	100	87	87	98	106	112	102	85	A	A	83
10	83	86	86	87	88	76	84	81	87	90	98	A	A	N	97	100	105	101	105	97	85	76		
11	81	85	76	77	65	58	67	107	93	96	96	92	102	112	100	101	105	101	94	88	90	88	87	87
12	86	97	88	87	85	71	77	86	93	95	90	100	106	105	118	121	122	138	133	105	88	88	87	88
13		90	86	80	78	78	84	85	88	94	94		100	105	117	121	120	120	103	103	103	103	84	88
14	72	109	88	79	75	67	83	87	91	88	97	94	101	104	116	122		130	106	104	91	90		94
15	87	86	99	86	78	76	85	87	96	85	72	89	96	98	98	105	99	105	A		85	88	86	85
16	120	142	85	88	86	76	76	86	94	92	90	89	101	113	82	122	118	104	95	86	87	A	82	86
17	86	82	97	86	78	67	74	87	85	82	76	88	98	104	103	105	100	98	95	86	90	84	80	A
18	85	87	83	77		58	52	82	77	84	87	75	104	119	118	121	128	122	119	104	87	73		72
19		74		65	65	61	59	64	77	88	90	96	105	110	105	119	127	121	105	110	103	97	89	88
20	84	87	84	86	84	78	78	79	86	75	75	82	96	111	112	120	135	137	122	103	110	83		110
21	87	N	109	103	84	84	87	80	85	78	82	86	101	121	122	135	140	141	137	130	105	88	86	109
22		90	84	80	83	80	81	A	90	A	91	96	103	106	108	110	95	97	92	104	88	85	82	86
23	86	85	84	84	85	80	77	90	91	88	A	80	97	112	105	106	97	90	96	86	87	79		74
24	A	76	78	64	66	64	78	97	92	83	A	84	97	A	122	107	113	109	103	102	103	85	84	109
25	87	92	92	66	60	63	66	88	82	86	95	94	91	97	A	122	125	108		103	109	89	85	86
26	86	87	85	80	81	78	54	75	83	96	95	88	100	104	111	116	119	121	130	107	108	90	88	102
27	144	131	103	88	87	79	76	84	104	96	90	101	103	120	118	121	123	121	102	91	88	66	77	77
28	86	86	76	67	64	71	65	80	88	78	80	89	96	101	97	110	105	129	130	107	91	88	86	88
29	87	86	94	86	60	66	78	90	86	77	80	80	96	104	106	105	110	128	136	104	131	142	175	170
30	151	175	86	84	62	63	56	90	87	90	A	92	96	103	100	103	105	105	100	97	88		86	84
31	85	90	86	84	80	80	85	91	84	A	82	88	90	104	110	121	120	106	102	105	97	84	83	85
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	29	30	31	30	31	31	30	31	28	25	27	30	28	29	31	29	30	29	29	31	28	25	29
MED	86	87	86	84	78	75	78	86	87	85	90	89	100	104	106	116	118	108	105	103	90	88	84	86
U Q	87	97	93	86	85	78	84	90	91	90	95	95	103	110	117	121	123	122	119	104	103	89	86	88
L Q	83	85	84	77	66	64	68	81	84	82	81	86	96	99	99	103	101	104	98	91	87	83	81	84

HOURLY VALUES OF FES AT OKINAWA

JUL.1989

LAT. 26.3N LON. 127.8E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	30	23	G	G	G	G	G	38	44	G	49	G	G	G	G	G	G	49	65	38	32	43	39	41
2	32	28	G	G	G	30	G	42	67	84	90	94	69	66	G	58	100	G	44	68	28	G	G	92
3		41	44	28	68	88	39	47	46	46	49	81	G	G	51	60	55	58	51	33	30	40	G	
4	G	31	G	27	G	G	31	42	48	G	67	128	G	G	G	G	50	58	72	46	32	58	40	31
5	38	81	G	G	G	22	33	43	61	66	100	146	80	103	162	113	83	73	92	86	32	46	31	
6	59	39	32	28	G	G	35	46	90	145	114	G	G	61	63	57	55	75	60	36	57	31	33	84
7	89	94	84	59	36	28	40	40	49	G	G	G	51	G	G	53	59	83	56	59		25	34	26
8	30	40	29		G	G	30	41	57	58	51	G	102	59	G	51	53	51	65	91	84	44	33	
9	G	G	41	26	110	33	49	58	67	63	64	66	66	72	58	66	58	50	42	41	34	72	92	76
10	91	86	36	69	30	G	G	42	59	79	57	146	102	G	G	G	G	G	G	29	G	24	26	31
11	24	26	32	G	G	43	G	71	46	47	64	62	52	G	G	G	83	64	47	G	26	32	23	24
12	24		G	G	G	G	G	60	42	G	55	82	70	77	84	66	68	64	51	41	36	30	31	27
13	28	G	G	G	G	G	33	67	42	50	49	G	G	G	58	67	G	G	61	65	59	34	38	26
14	G	G	G	G	G	24	32	42	45	54	58	52	G	G	G	52	62	71	82	61	126	60	33	41
15	36	G	G	G	G	G	G	40	53	61	96	88	63	68	G	51	47	60	180	95	86	48	40	38
16	32	G	28	G	G	G	G	40	47	52	G	59	G	63	53	68	64	47	50	37	55	88	60	28
17	33	33	G	41	38	40	33	44	66	93	71	53	52	59	G	77	60	55	50	47	28	22	25	41
18	37	28	G	32	29	24	46	49	65	72	87	127	73	58	82	99	65	66	84	43	38	28	25	32
19	G	34		48	G	G	28	49	110	89	G	G	63	G	64	76	63	42	40	57	40	46	40	41
20	39	60	G	G	G	G	28	40	60	70	83	78	78	58	77	57	51	60	G	33	G	28	38	G
21	24	36	G	G	G	G	G	36	42	G	51	G	54	G	51	G	G	55	85	66	58	40		92
22	32	39	32	30	G	G	33	108	81		90	63	109	66	54	G	52	51	46	39	40	36	31	
23	23	G	34	G	G	49	28	66	52	53	124	G	G	G	G	G	G	G	G	44	58	31	40	81
24	83	36	32	23	G	G	40	43	62	85	82	66	68	102	77	68	66	79	62	66	61	39	30	33
25	24	G	G	23	G	G	32	60	68	G	G	G	G	59	170	G	51	51	55	59	43	36	69	69
26	82	36	39	39	37	50	61	58	45	G	52	G	G	56	G	G	51	G	40	G	G	27	24	G
27	G	G	G	G	G	G	28	42	42	56	61	56	50	49	69	68	53	53	92	48	25	28	38	34
28	80	65	90	84	61	38	G	42	68	75	96	G	66	66	G	G	64	52	42	34	31	40	31	34
29	28	G	G	G	G	G	44	49	50	46	G	G	G	53	G	56	60	63	57	59	48	37	41	33
30	26	40	38	67	48	39	43	40	46	68	90	72	G	G	G	61	54	65	39	G	25	33	33	G
31	G	G	G	G	24	G	G	39	66	93	51	67	G	G	G	67	G	G	G	40	29	25	30	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	30	31	30	27
MED	30	32	G	12	G	G	31	43	53	57	61	59	52	56	G	57	55	55	51	44	35	36	33	33
U Q	38	40	34	32	30	33	39	58	66	75	90	81	69	66	64	67	64	64	65	61	57	44	40	41
L Q	24	G	G	G	G	G	G	40	46	46	49	G	G	G	G	G	50	47	42	36	28	28	30	26

HOURLY VALUES OF FMIN AT OKINAWA

JUL.1989

LAT. 26.3N LON. 127.8E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
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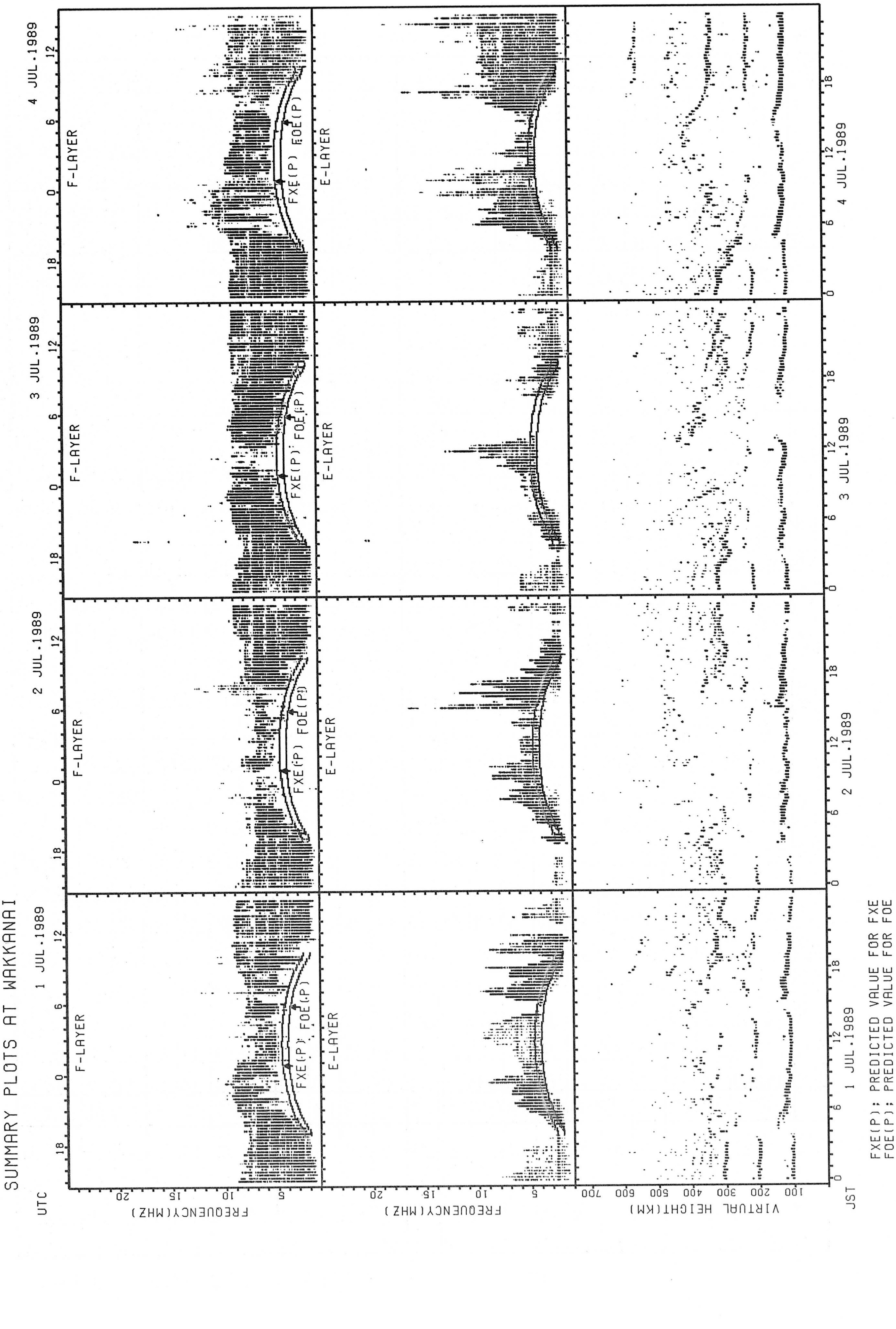
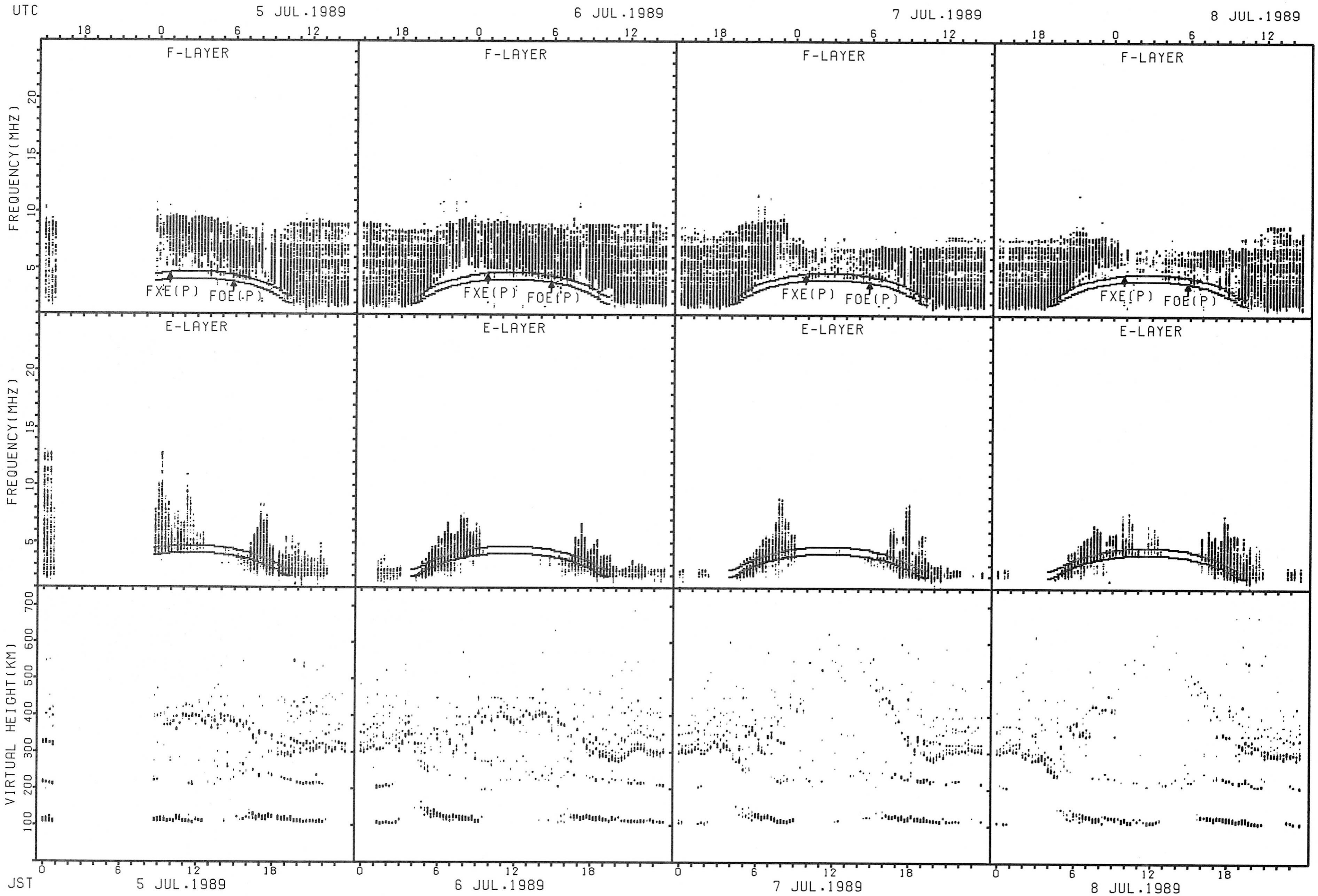
MED	15	15	15	15	15	15	15	16	23	27	29	32	33	33	32	30	27	23	16	15	15	15	15	15
U Q	15	15	15	15	15	15	16	18	24	28	29	33	35	34	34	32	28	24	18	16	15	15	15	15
L Q	15	15	15	15	15	15	15	15	22	26	28	29	30	32	30	29	27	21	15	15	14	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN


SUMMARY PLOTS AT WAKKANAI
1 JUL.1989
2 JUL.1989
3 JUL.1989
4 JUL.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
UTC
JST
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



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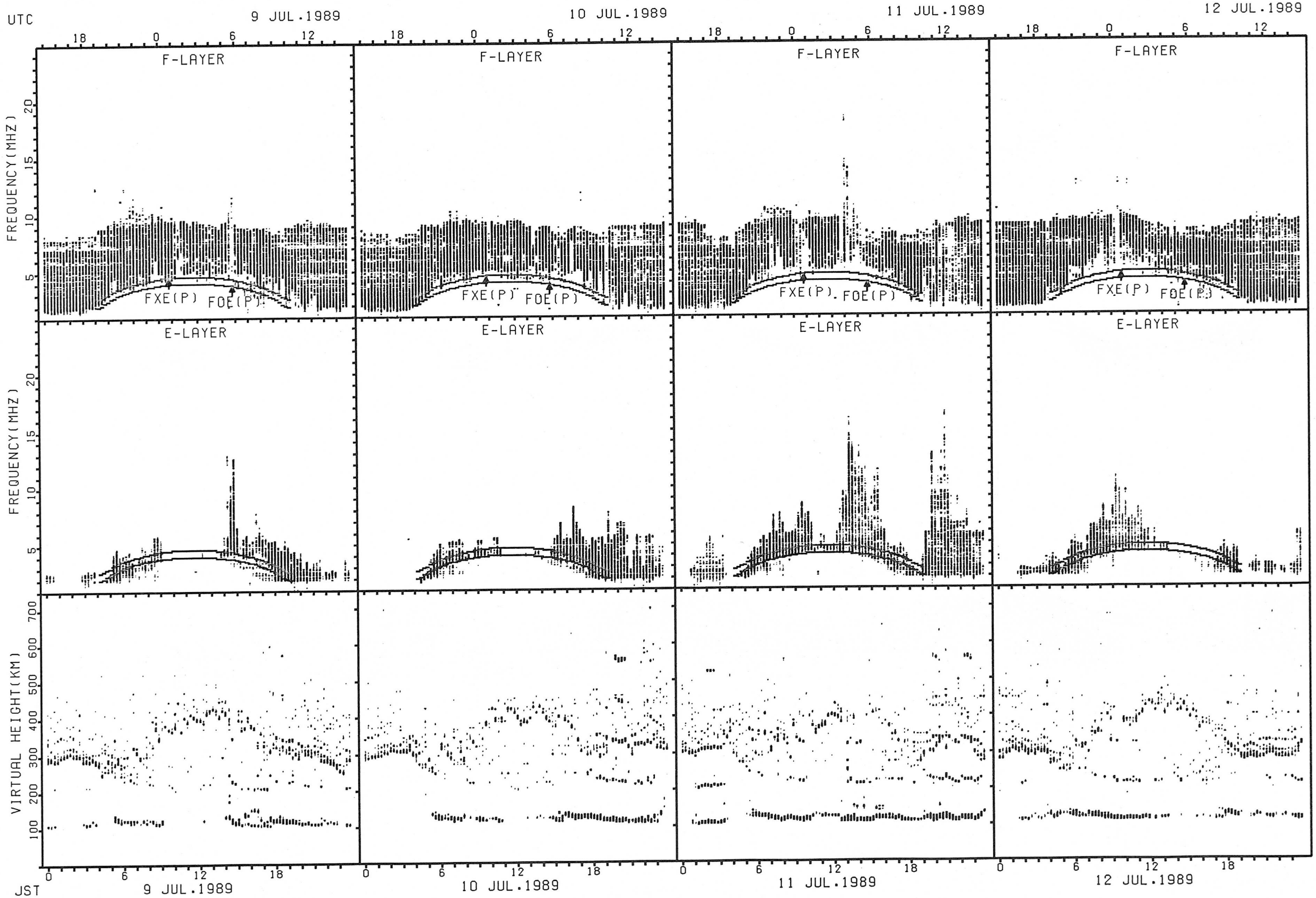
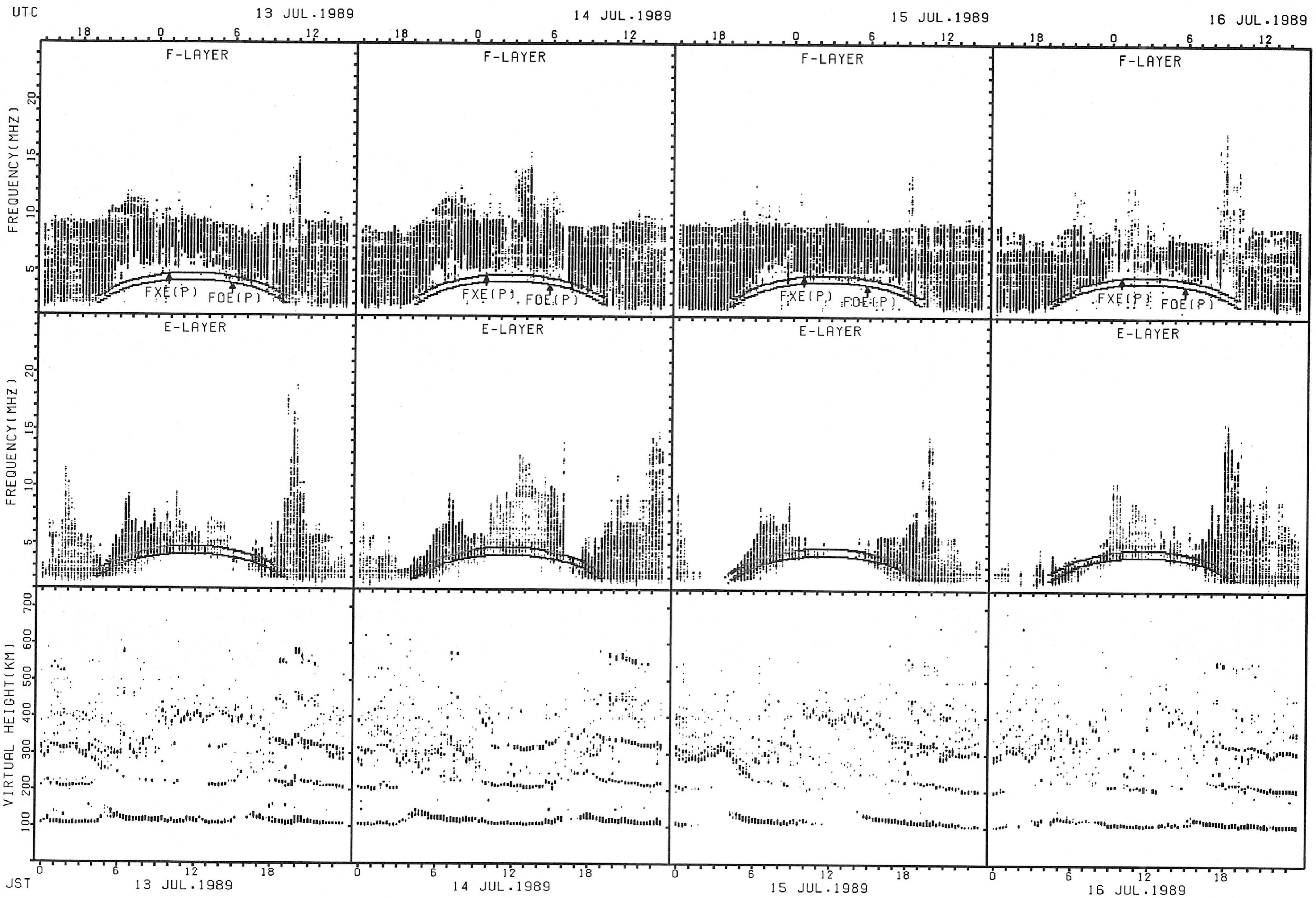
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



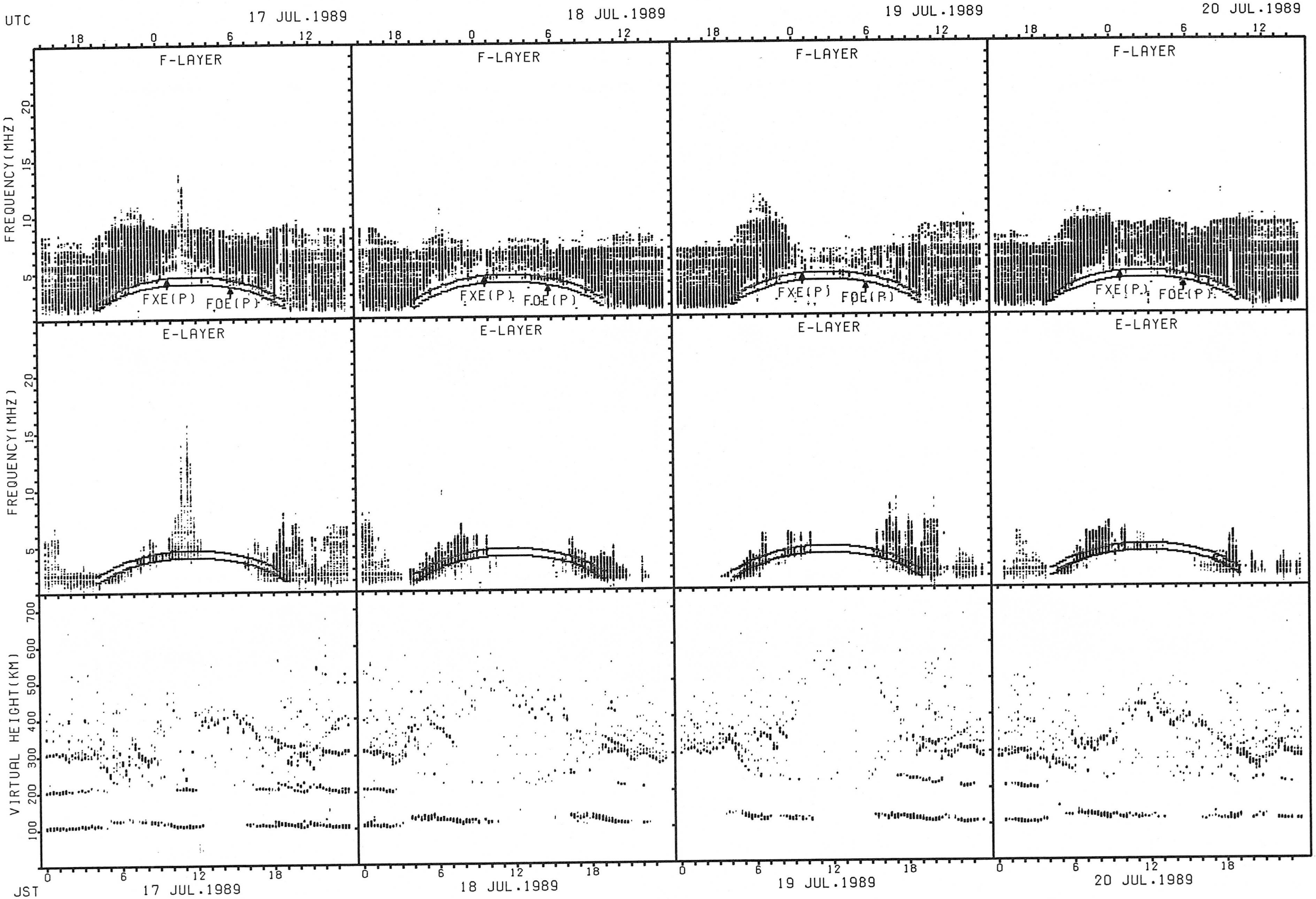
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



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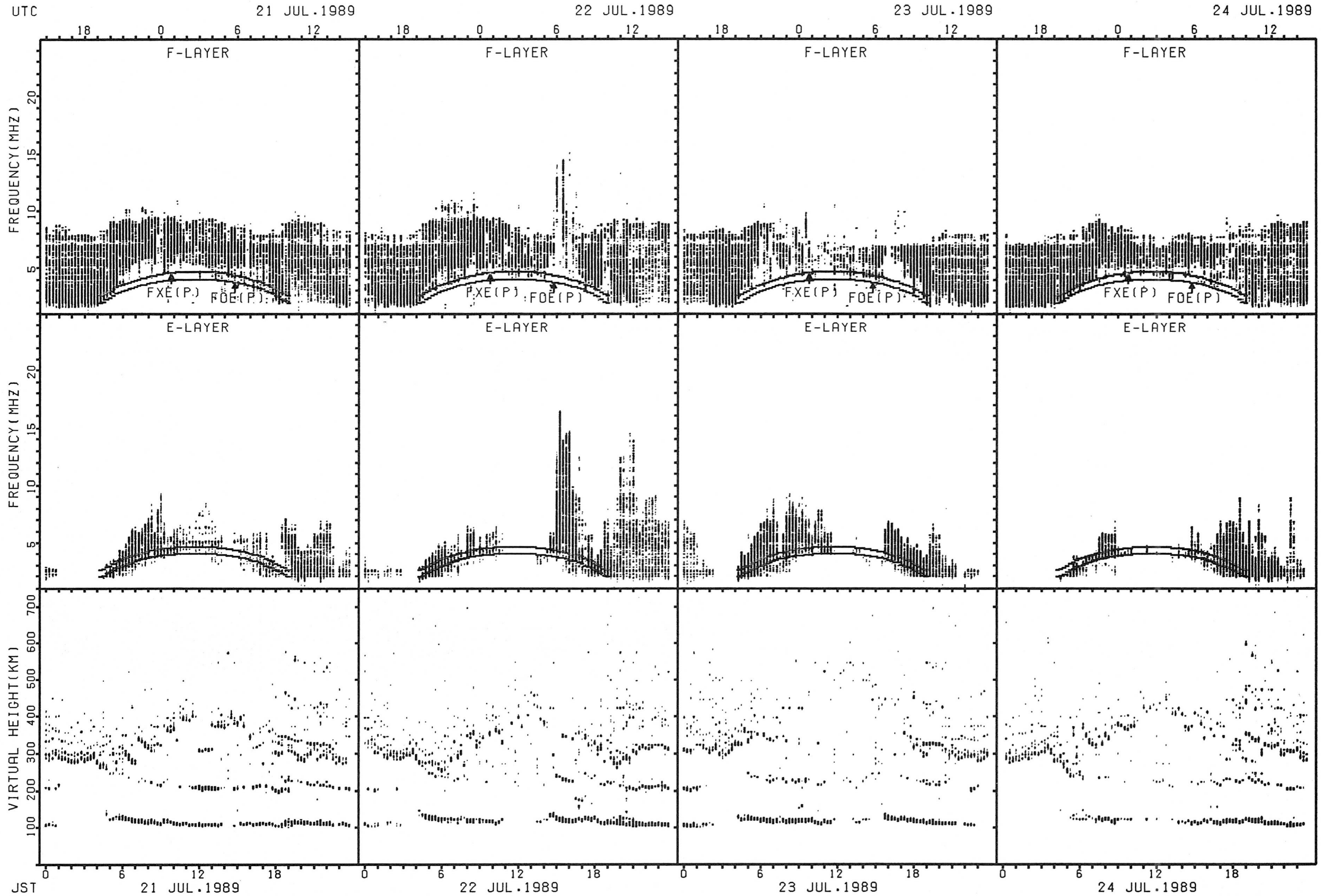
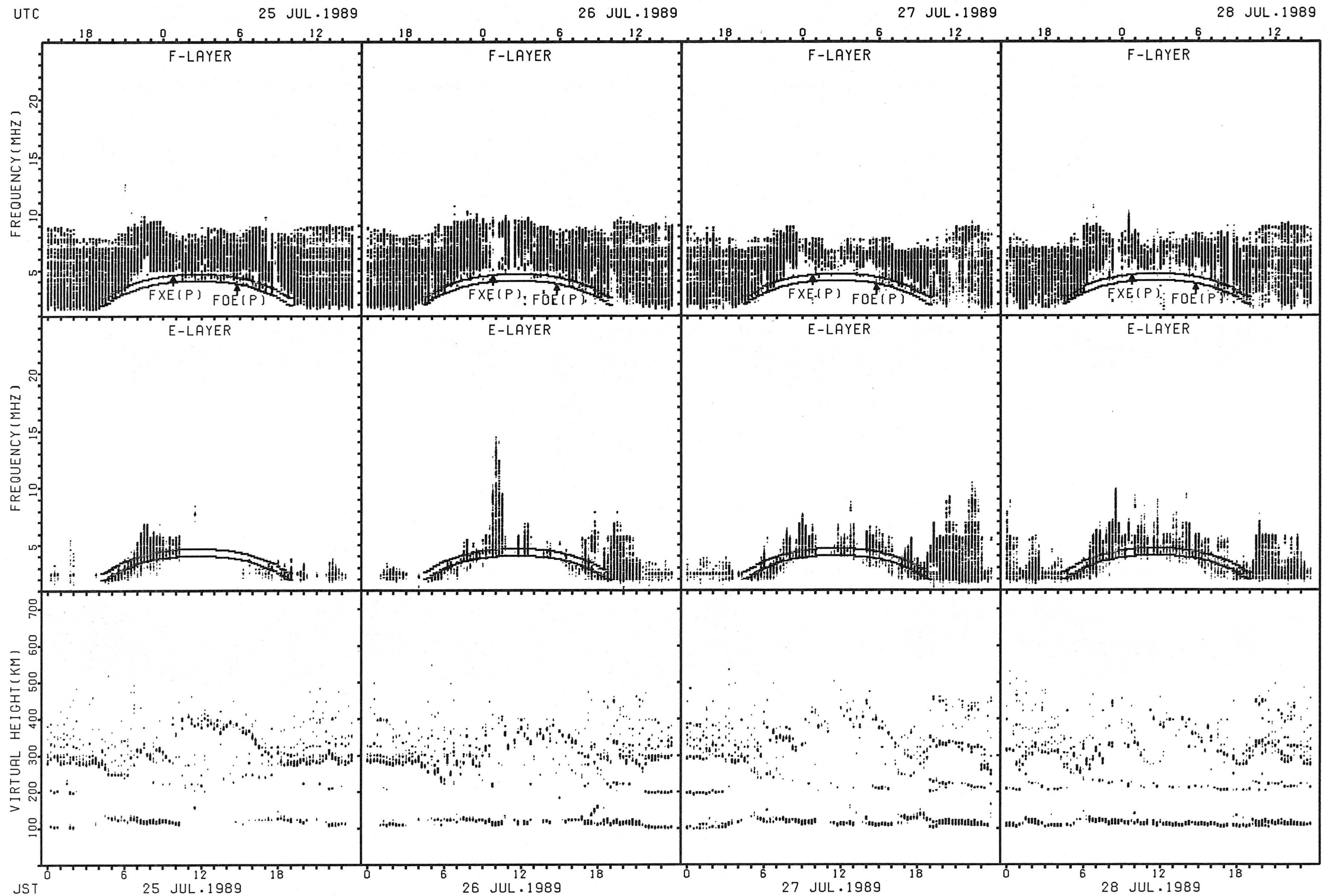
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



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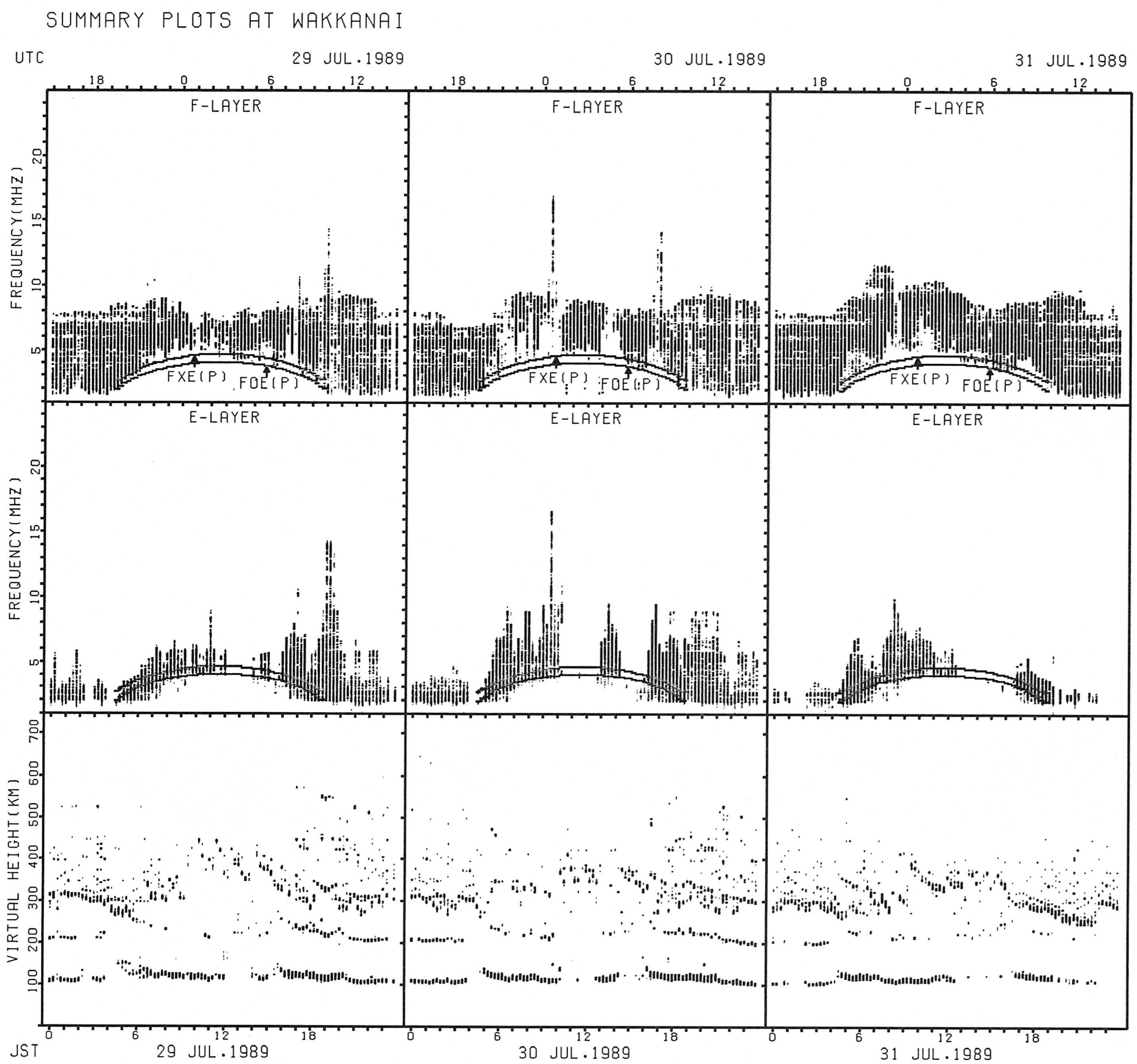
FOE(P); PREDICTED VALUE FOR FOE



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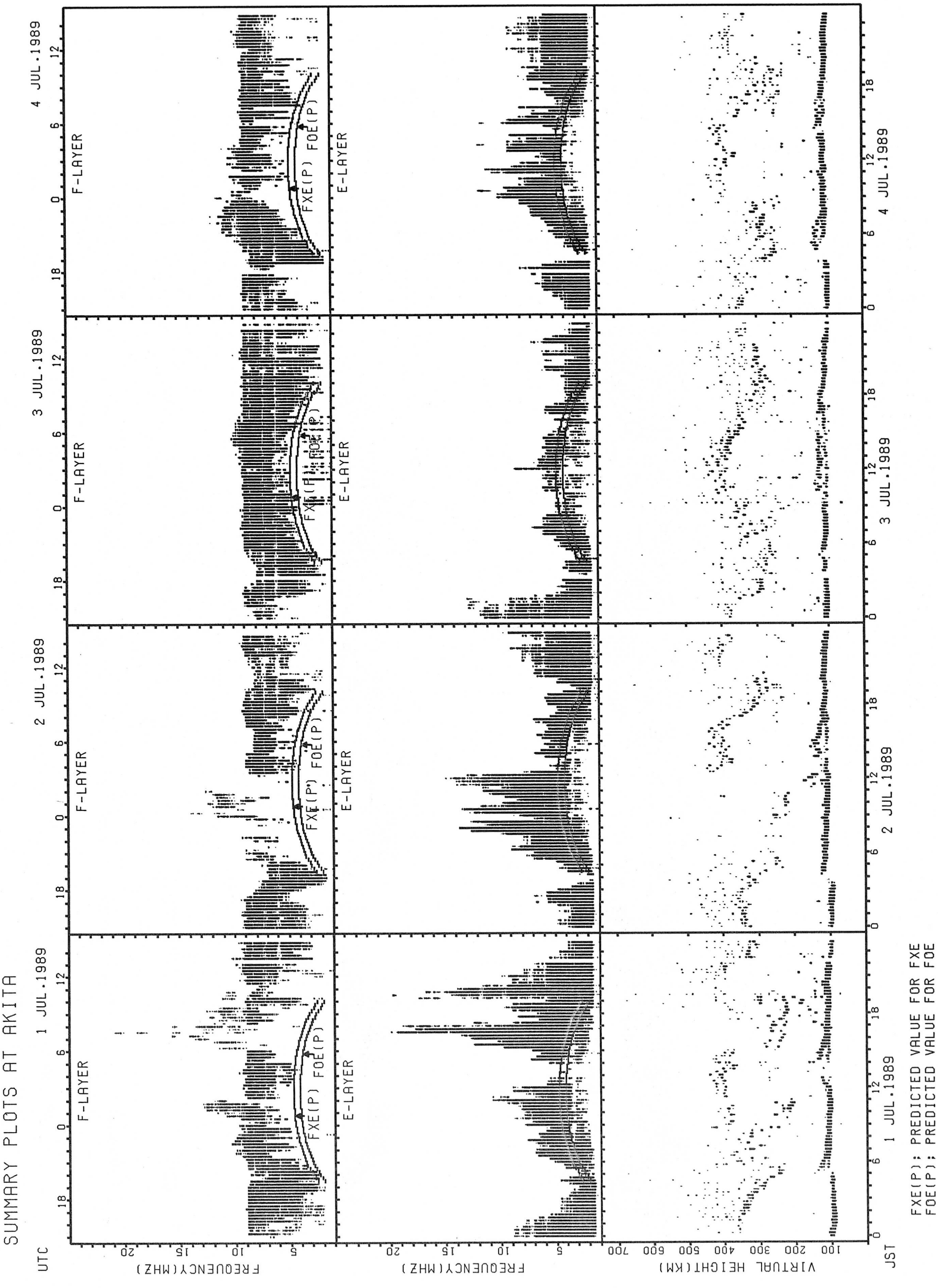
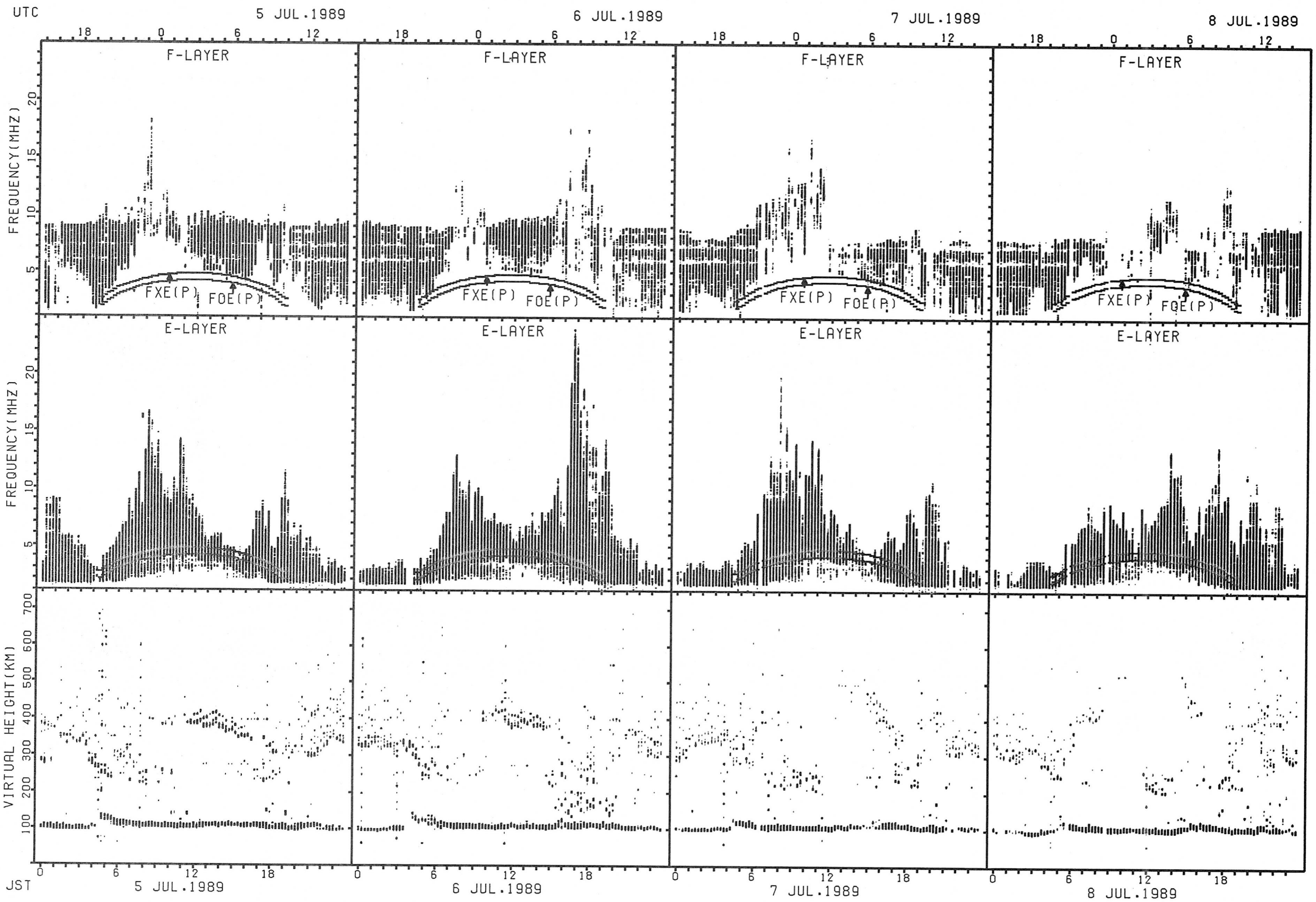
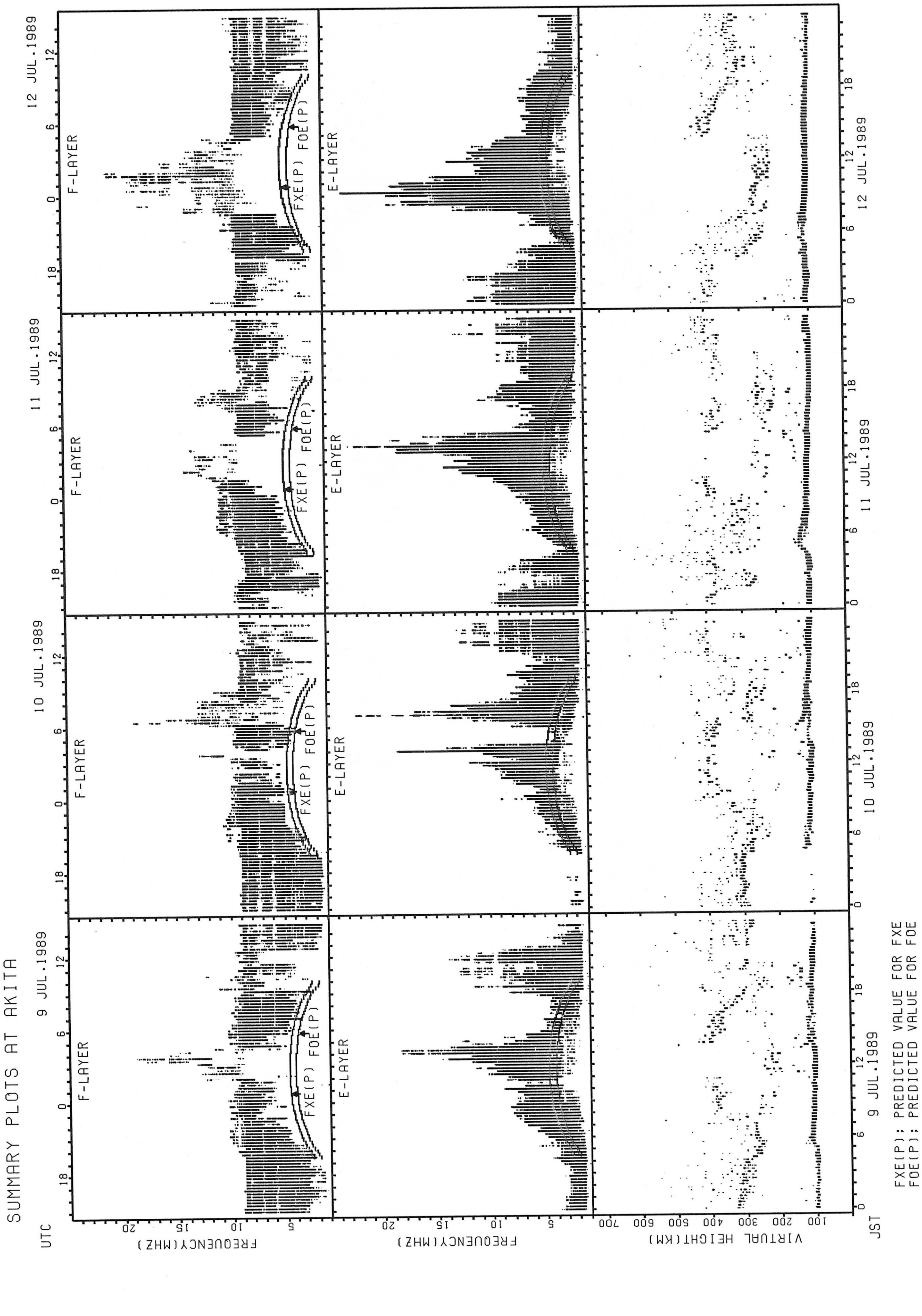


SUMMARY PLOTS AT AKITA
UTC
JST
1 JUL.1989
2 JUL.1989
3 JUL.1989
4 JUL.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

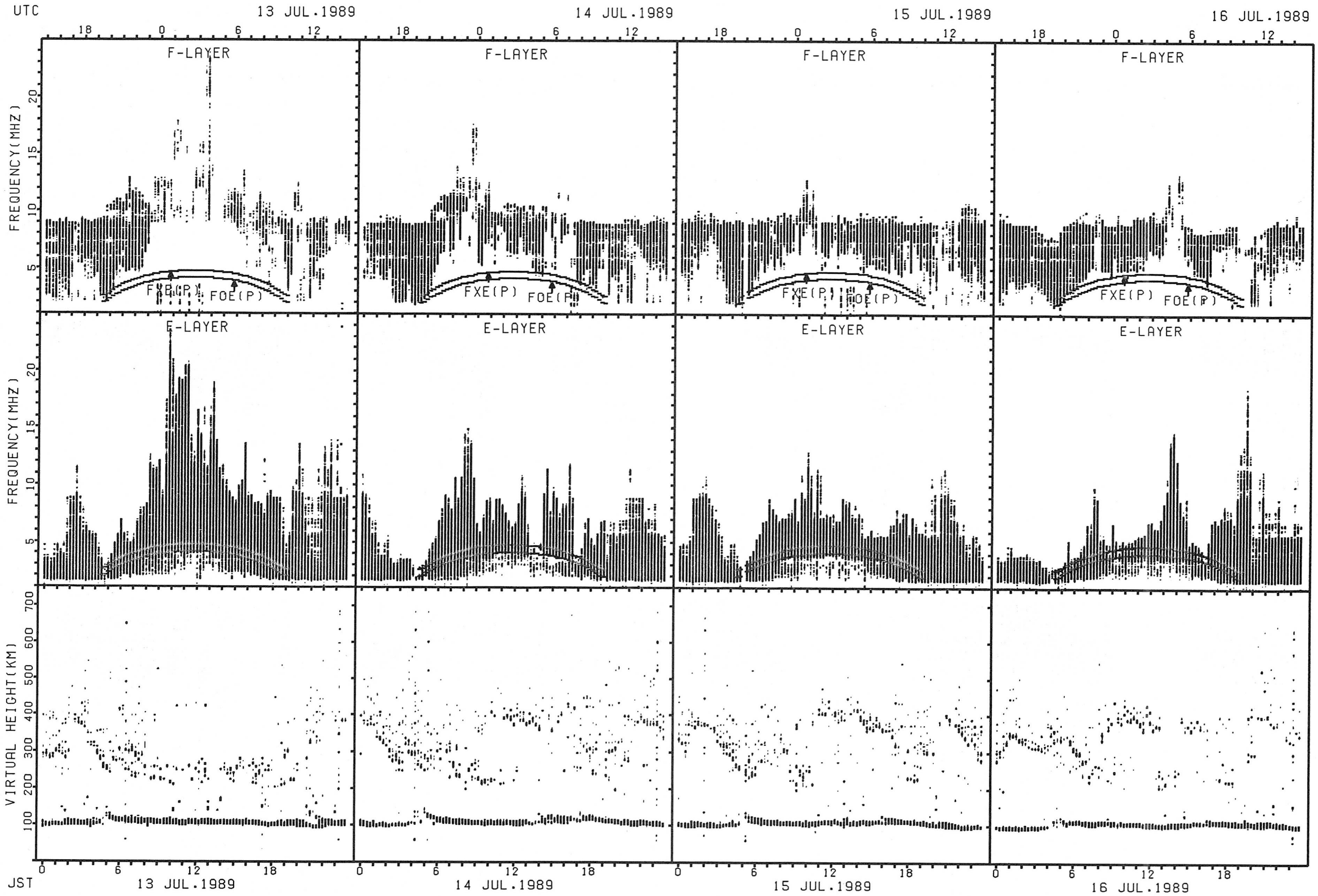
SUMMARY PLOTS AT AKITA



FXE(P): PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

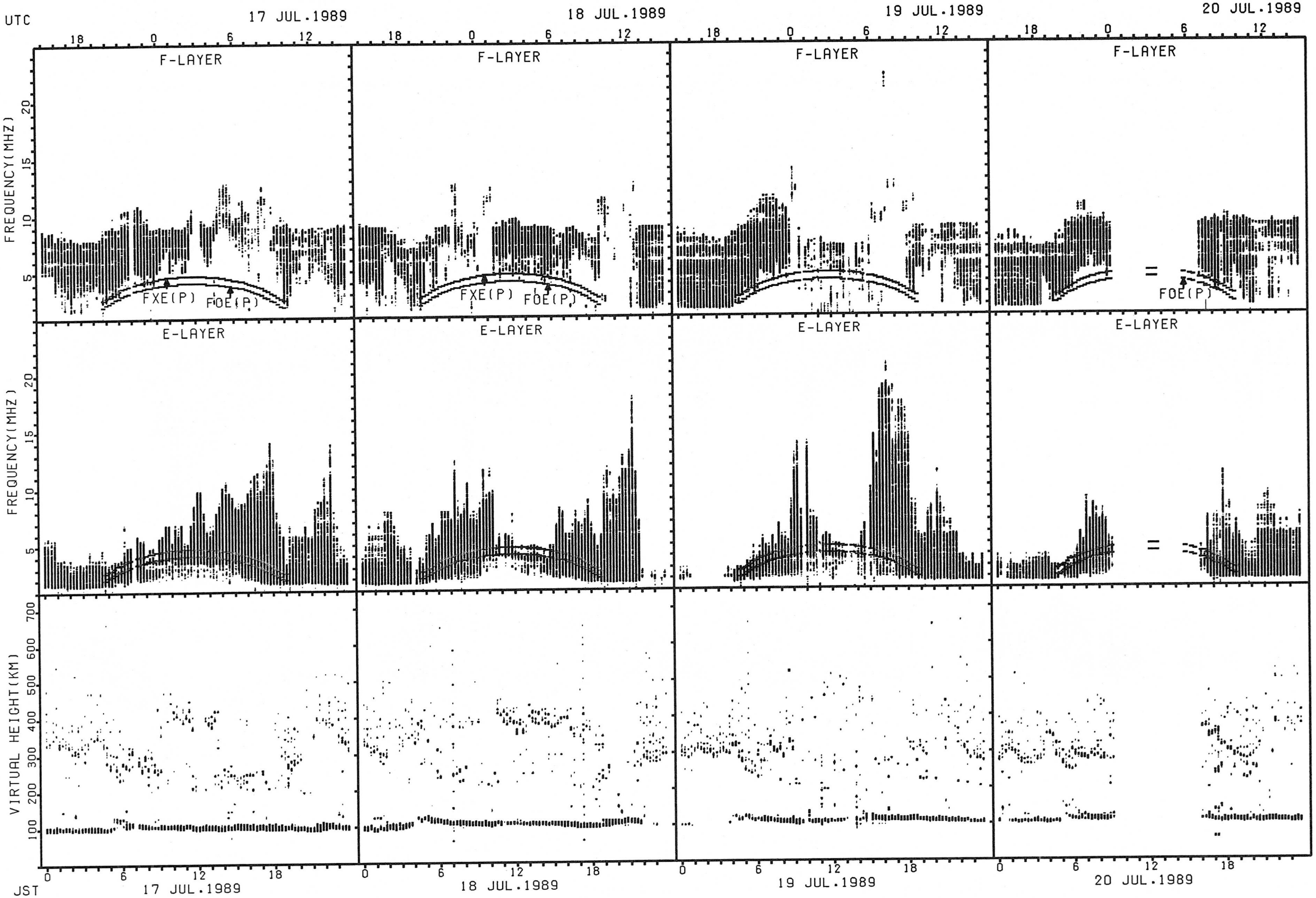

SUMMARY PLOTS AT AKITA
9 JUL.1989
10 JUL.1989
11 JUL.1989
12 JUL.1989
UTC
JST
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA



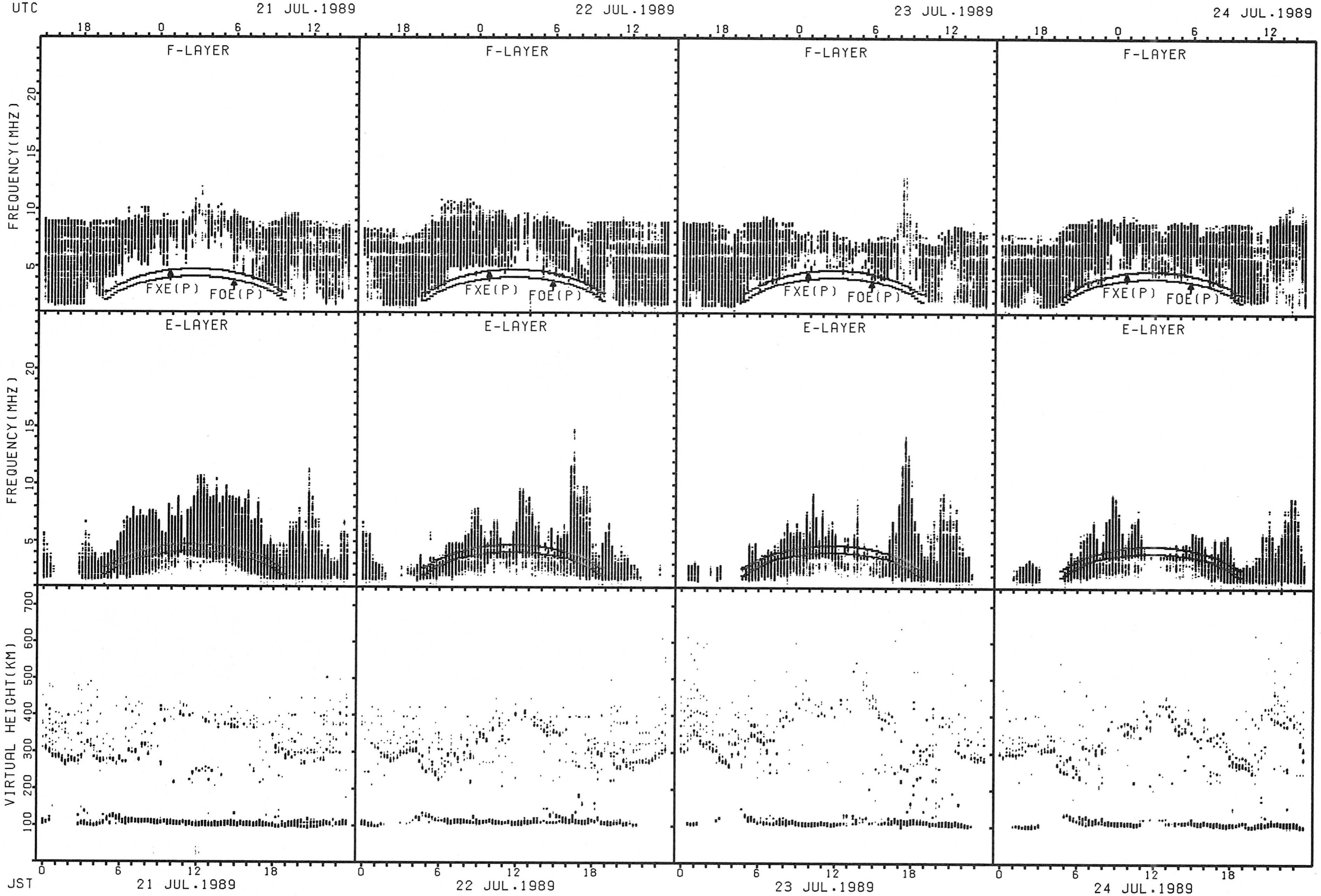
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA



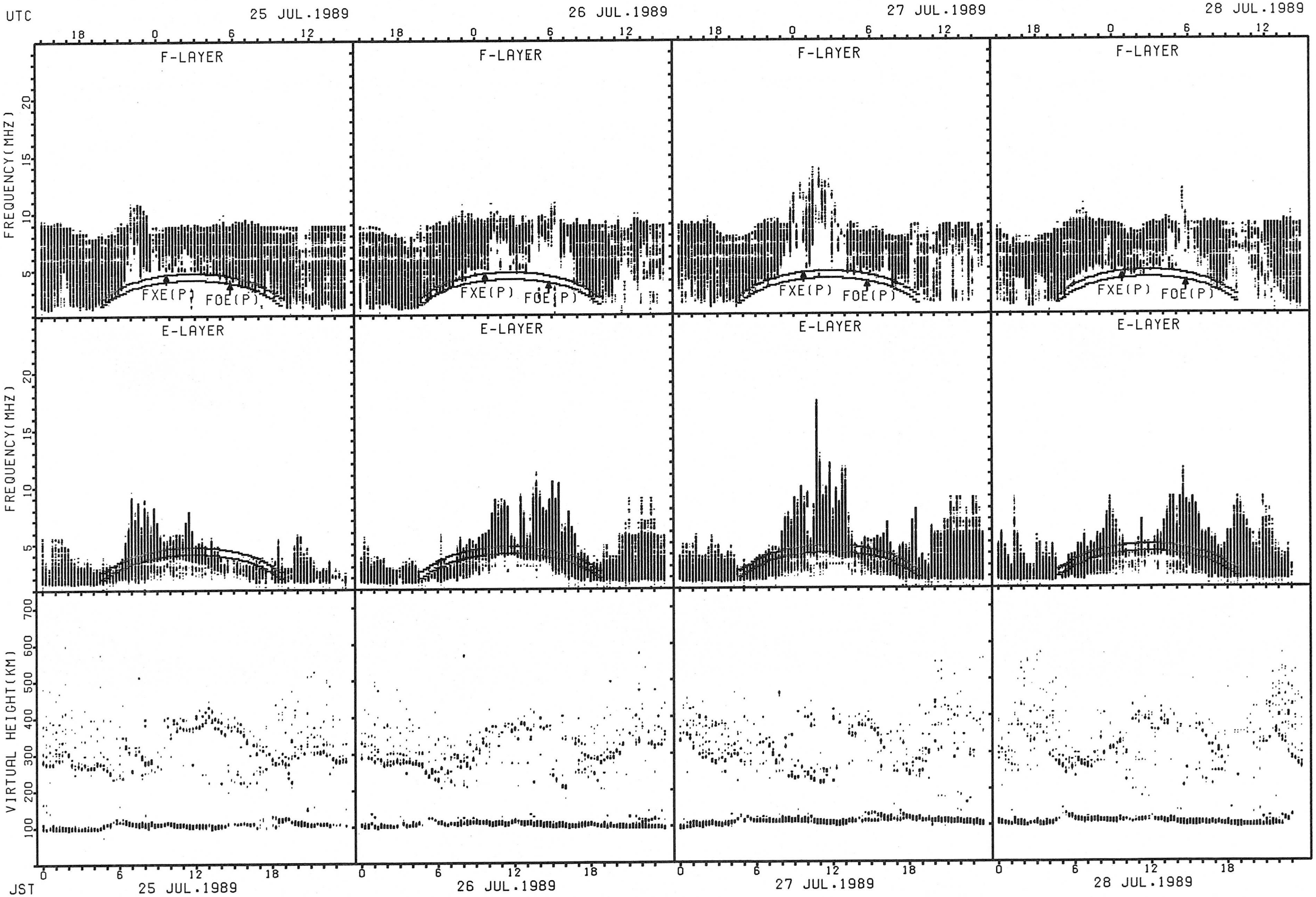
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA



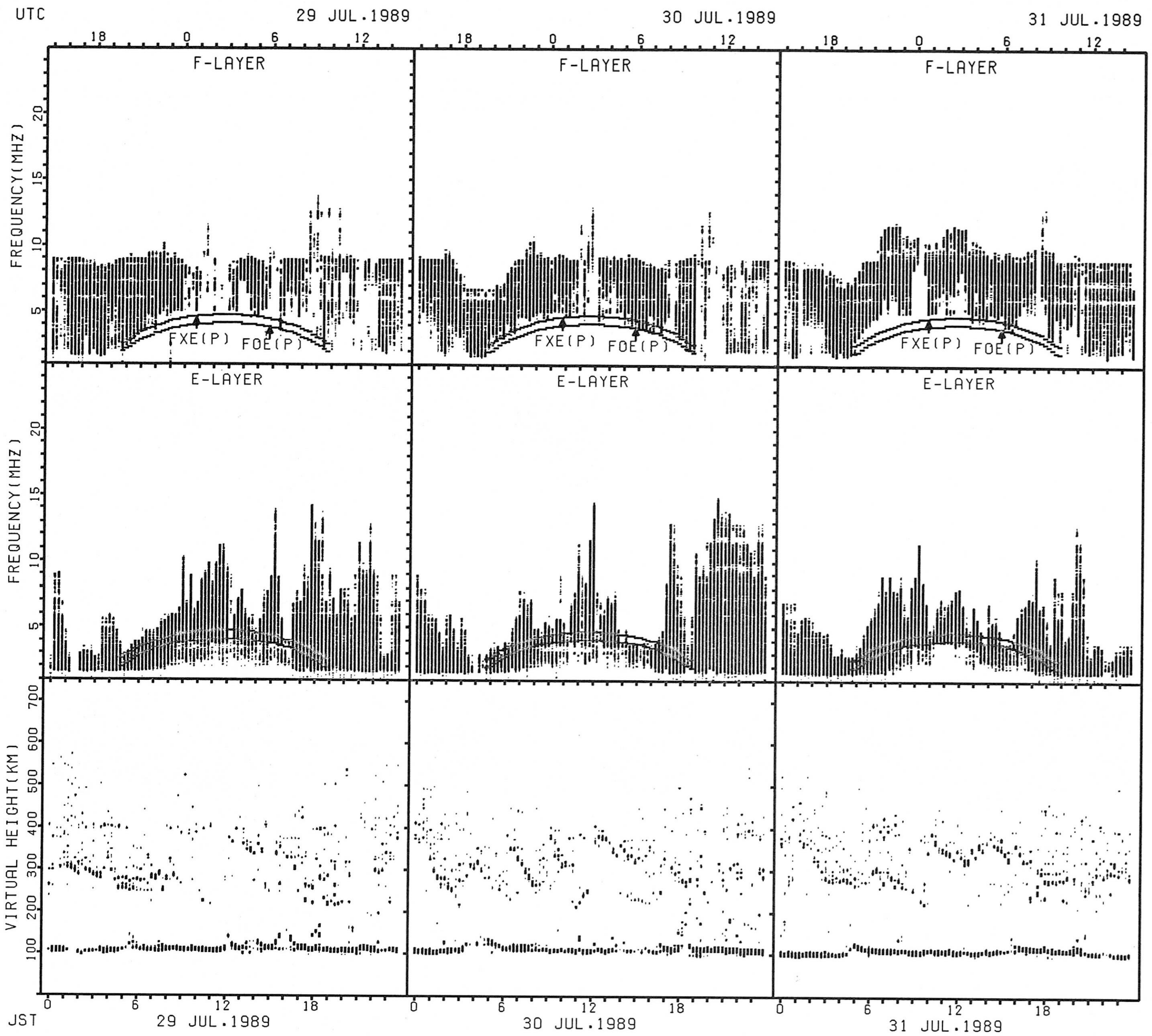
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA



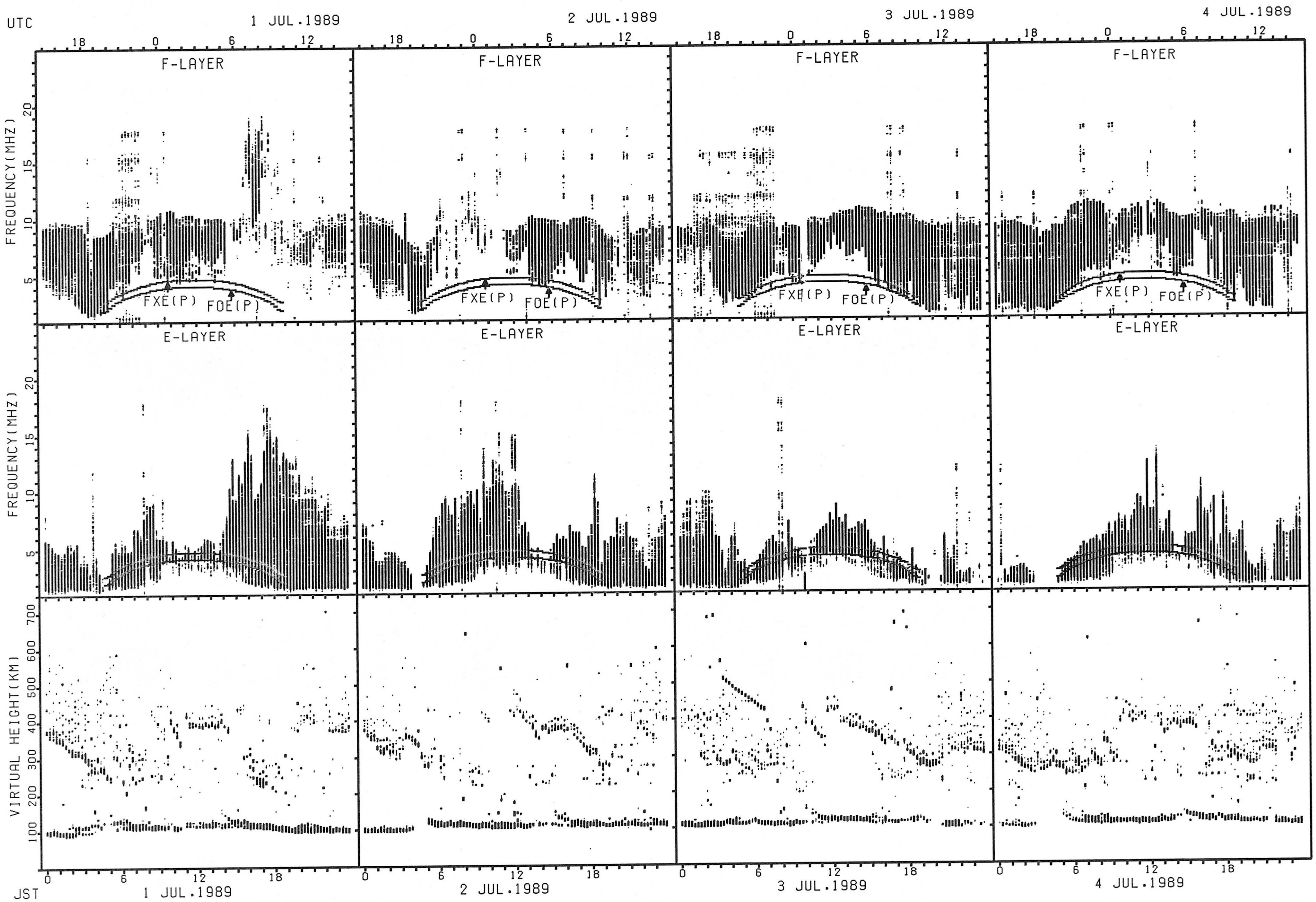
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

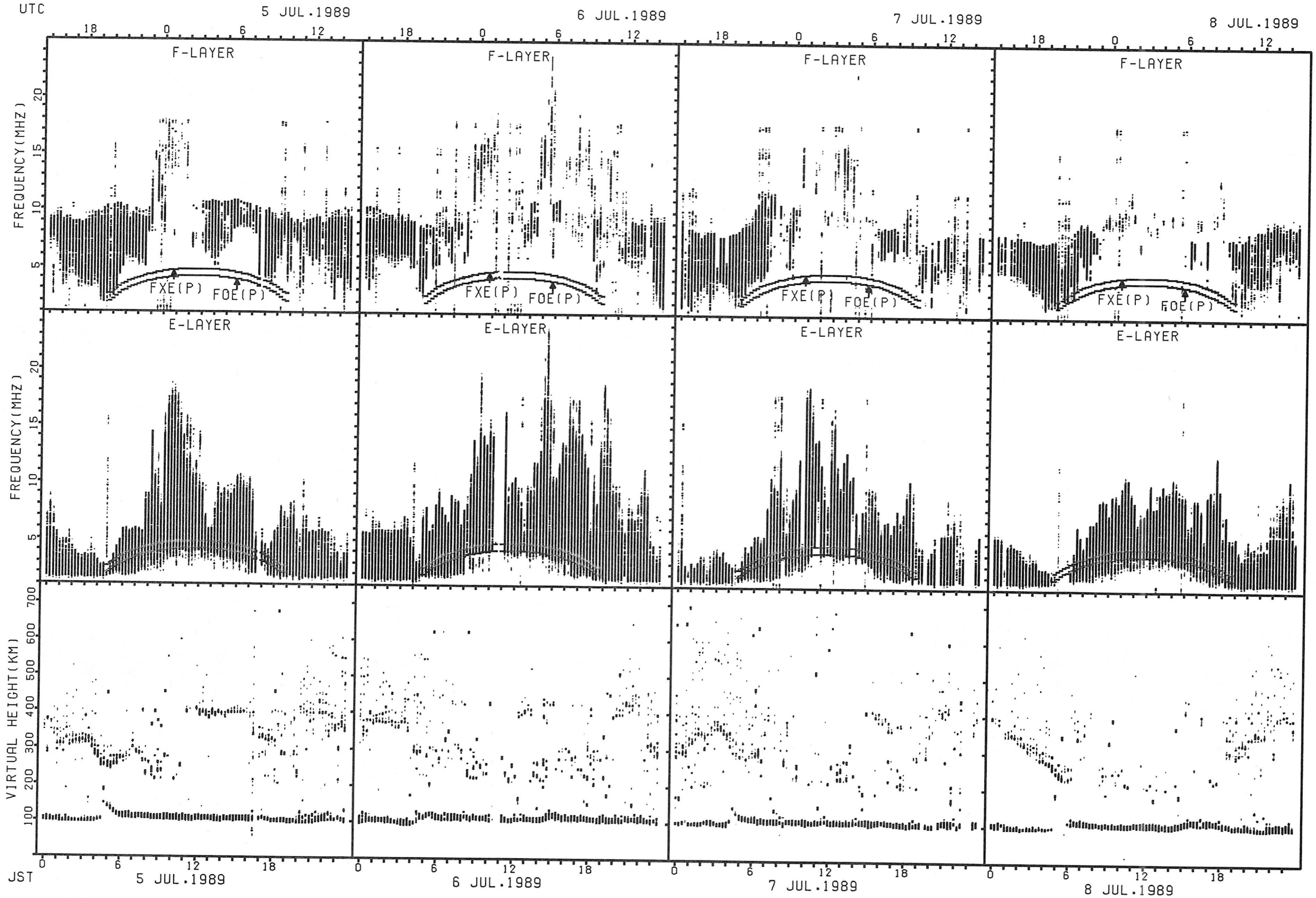
SUMMARY PLOTS AT KOKUBUNJI TOKYO



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

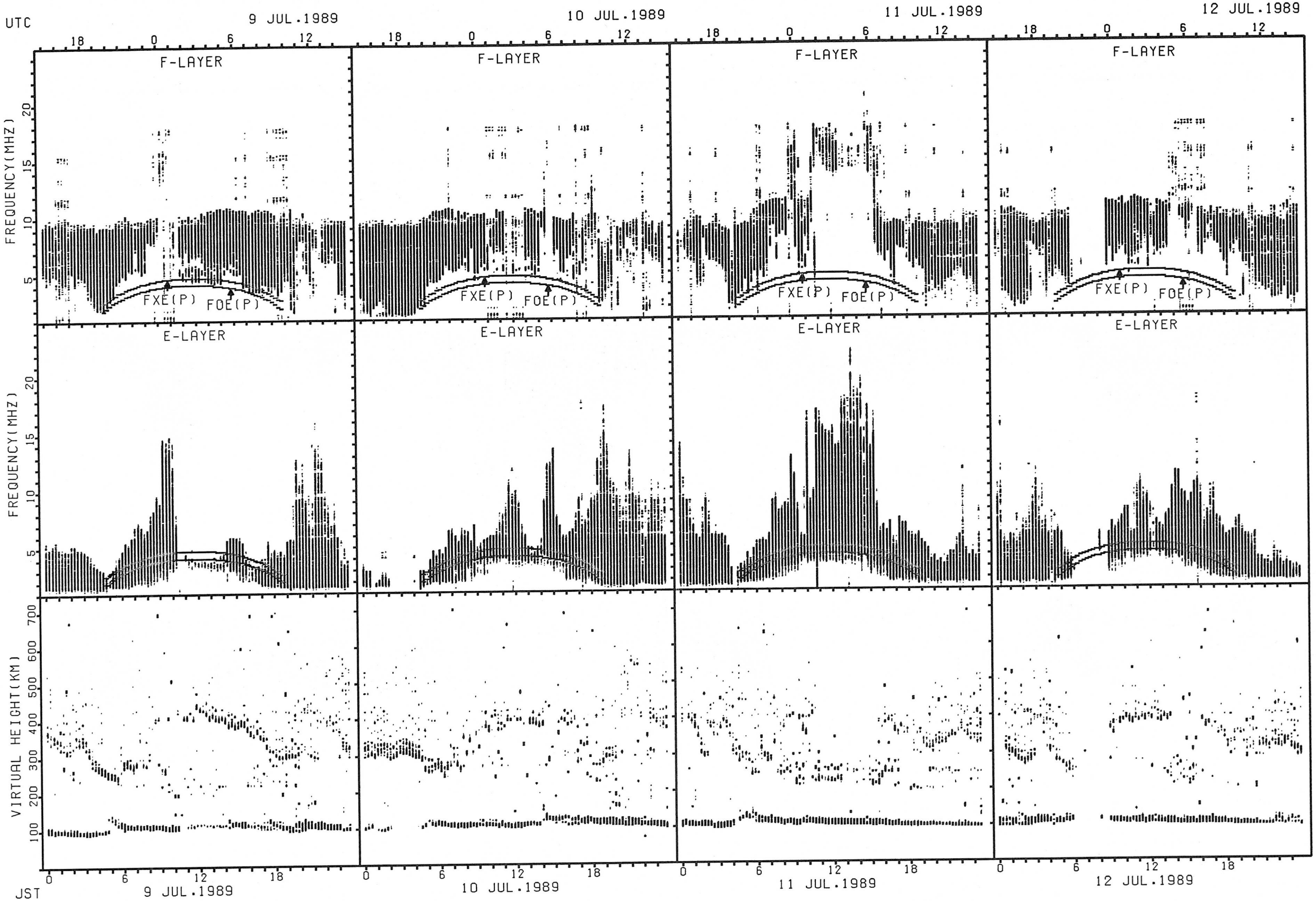
SUMMARY PLOTS AT KOKUBUNJI TOKYO



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

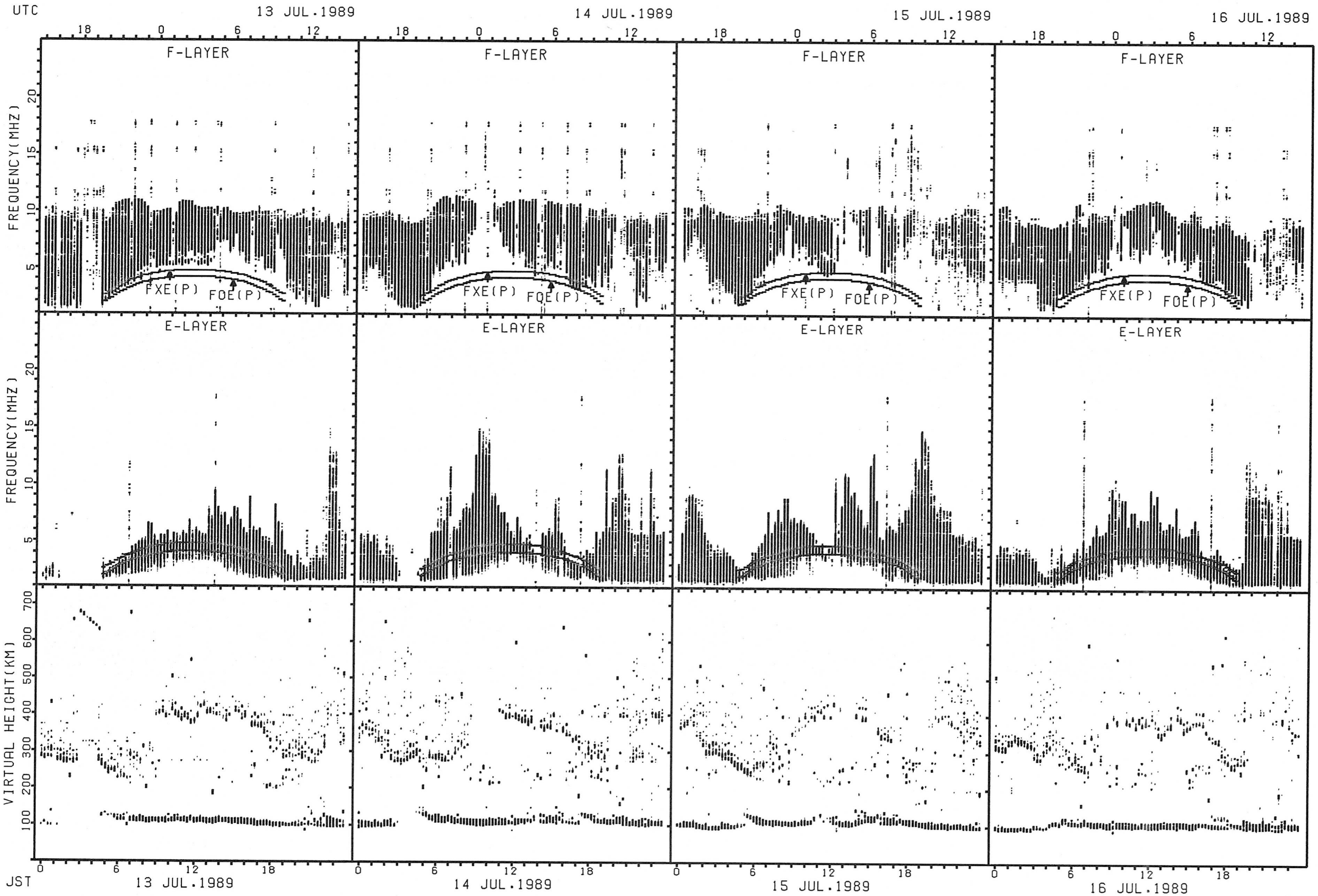
SUMMARY PLOTS AT KOKUBUNJI TOKYO



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

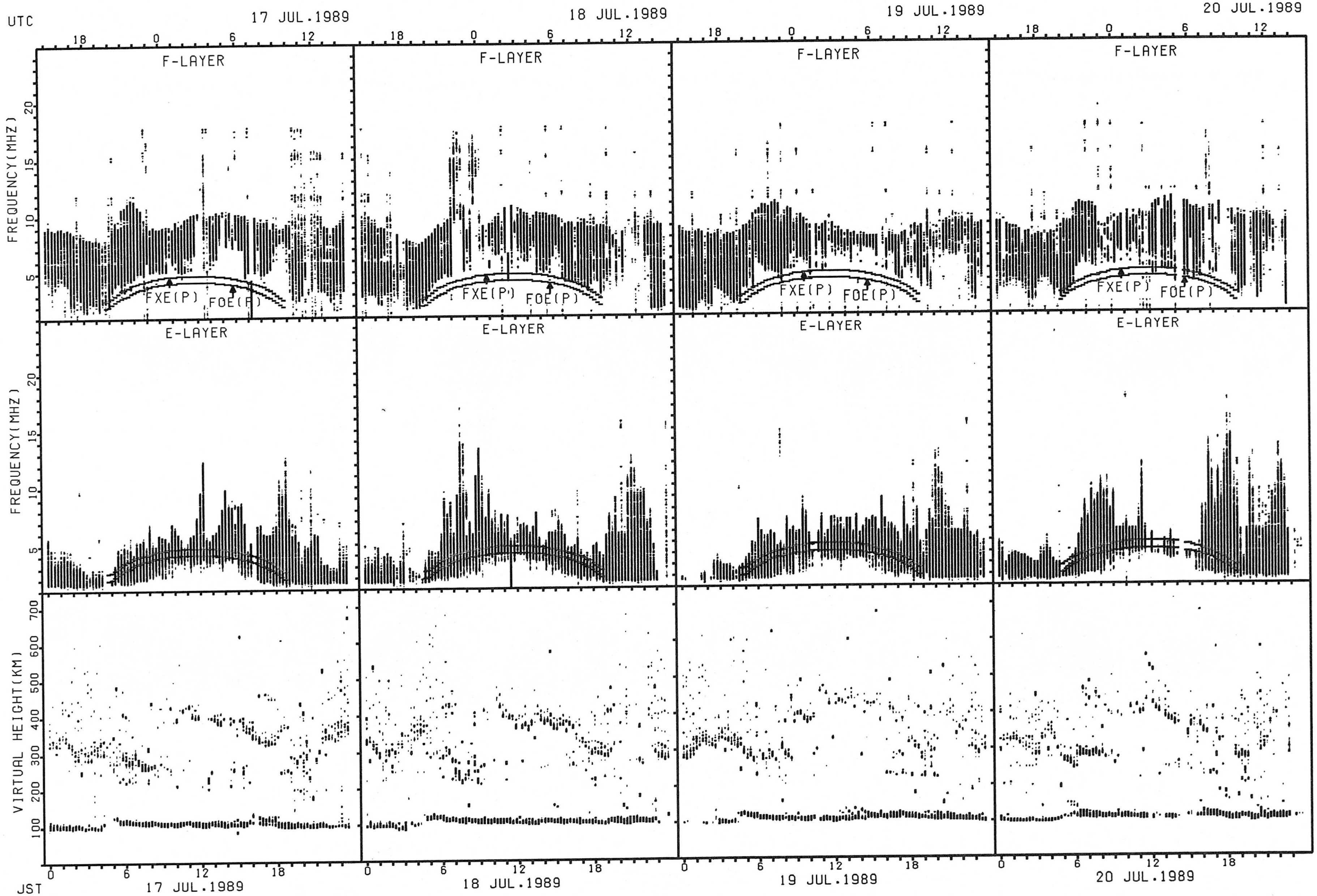
SUMMARY PLOTS AT KOKUBUNJI TOKYO



FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

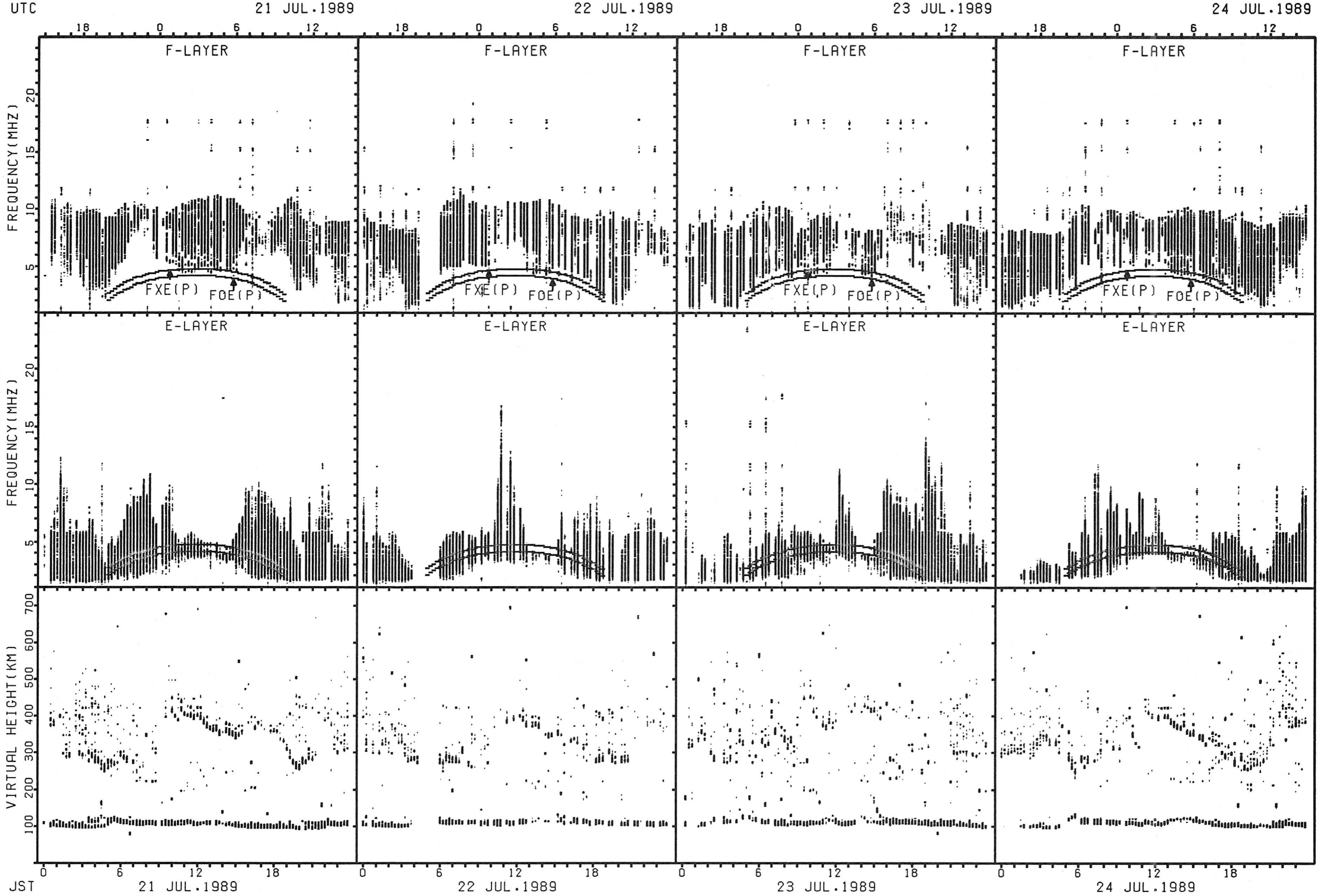
SUMMARY PLOTS AT KOKUBUNJI TOKYO



FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

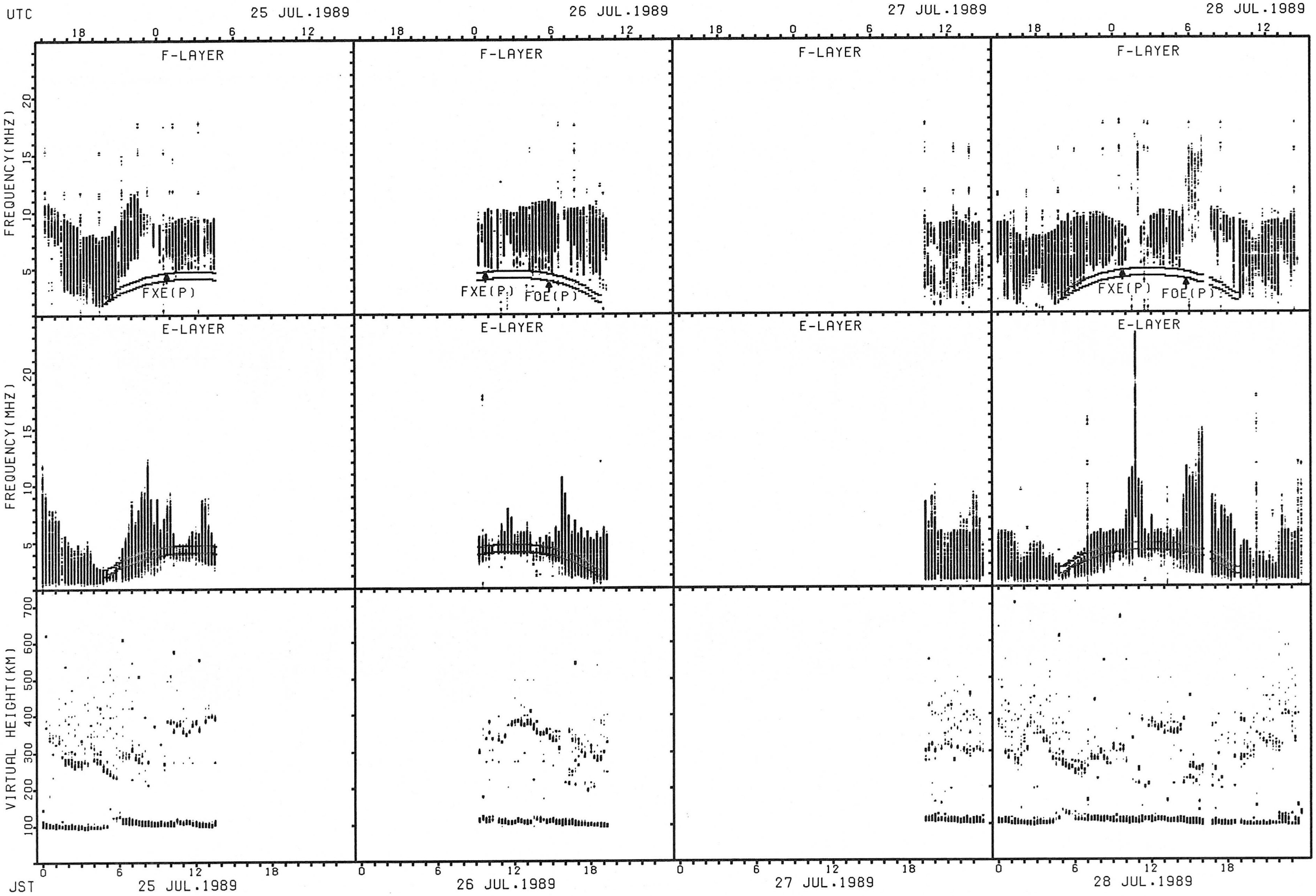
SUMMARY PLOTS AT KOKUBUNJI TOKYO



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

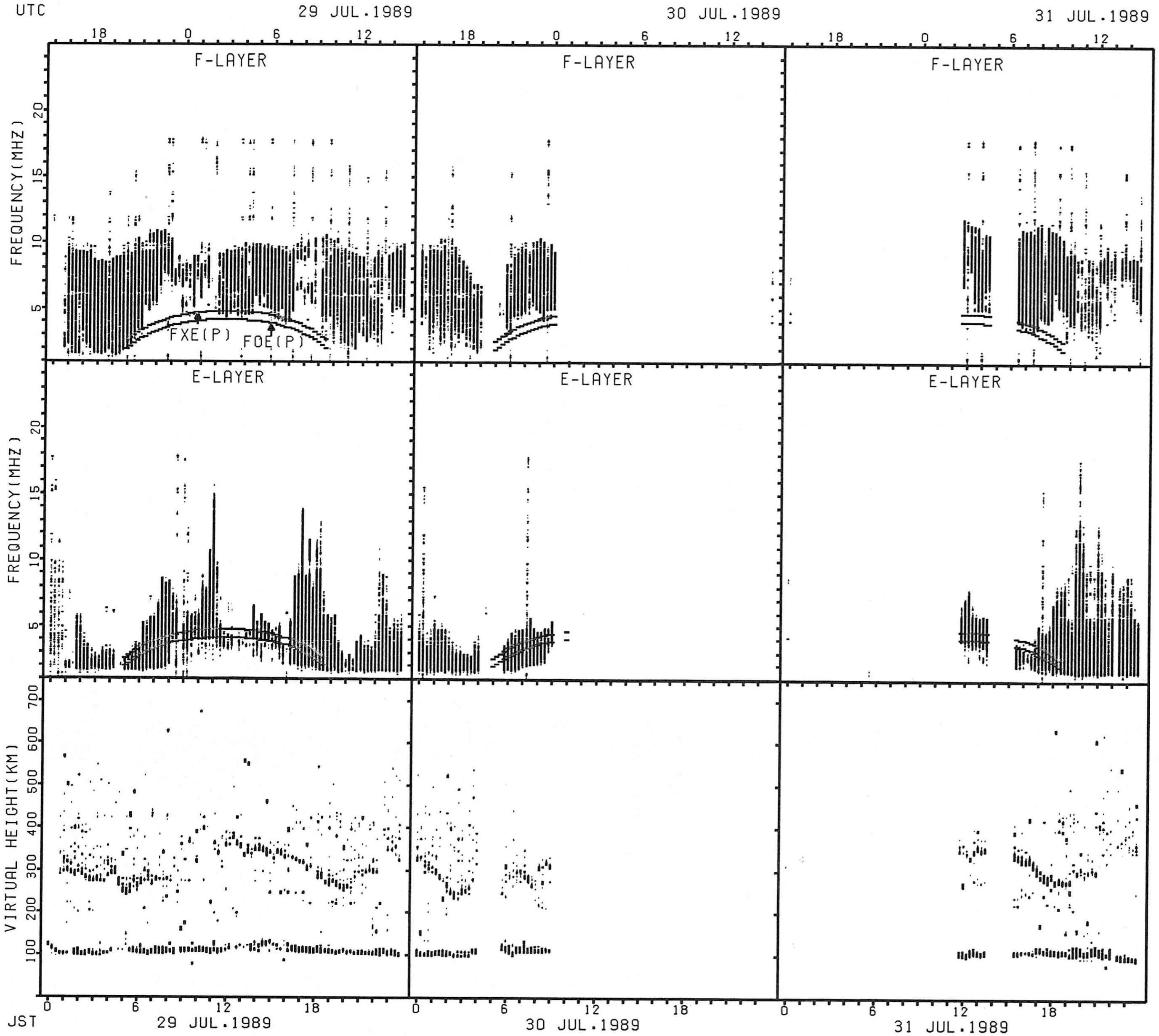
SUMMARY PLOTS AT KOKUBUNJI TOKYO



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

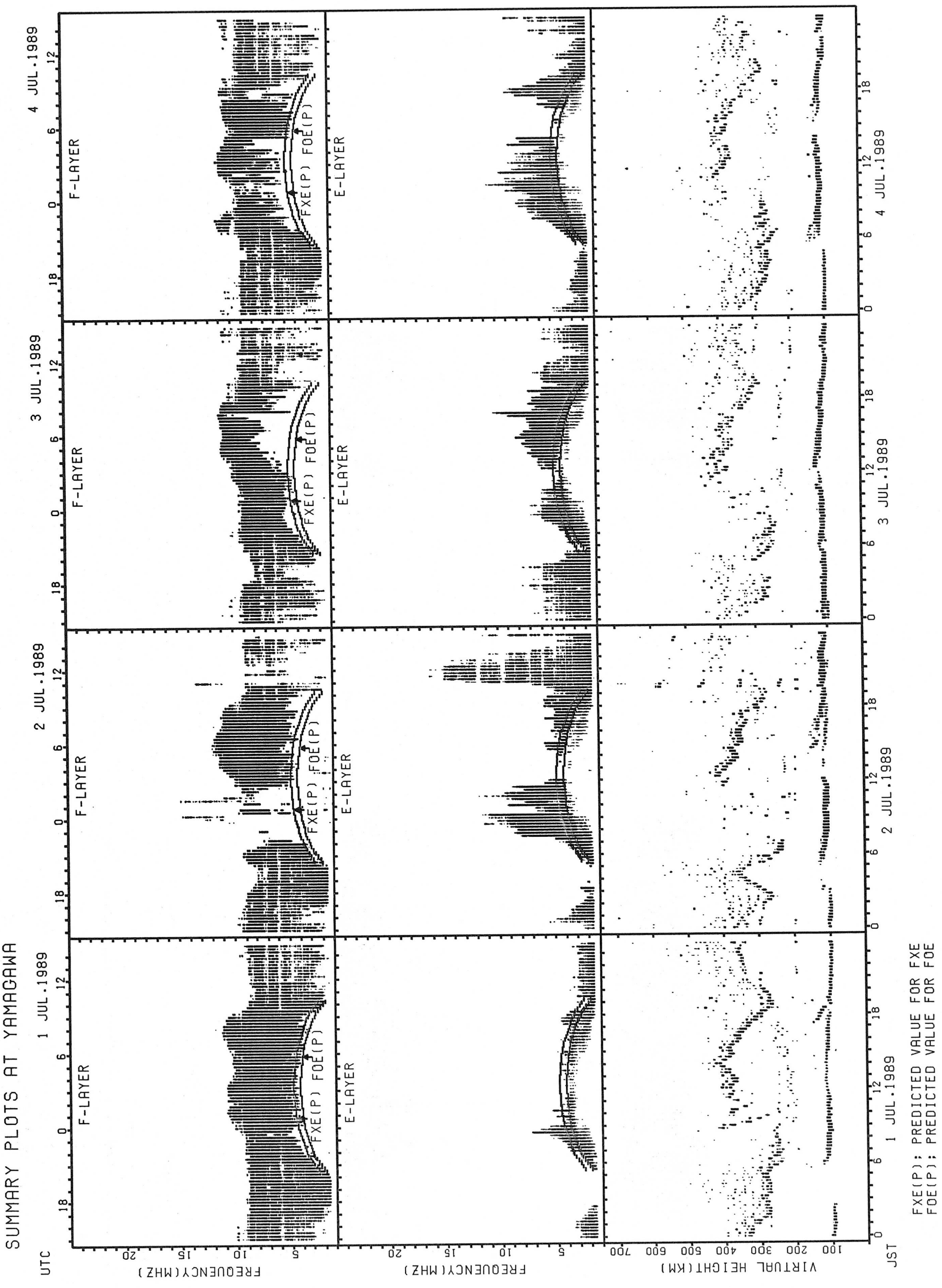
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

SUMMARY PLOTS AT KOKUBUNJI TOKYO

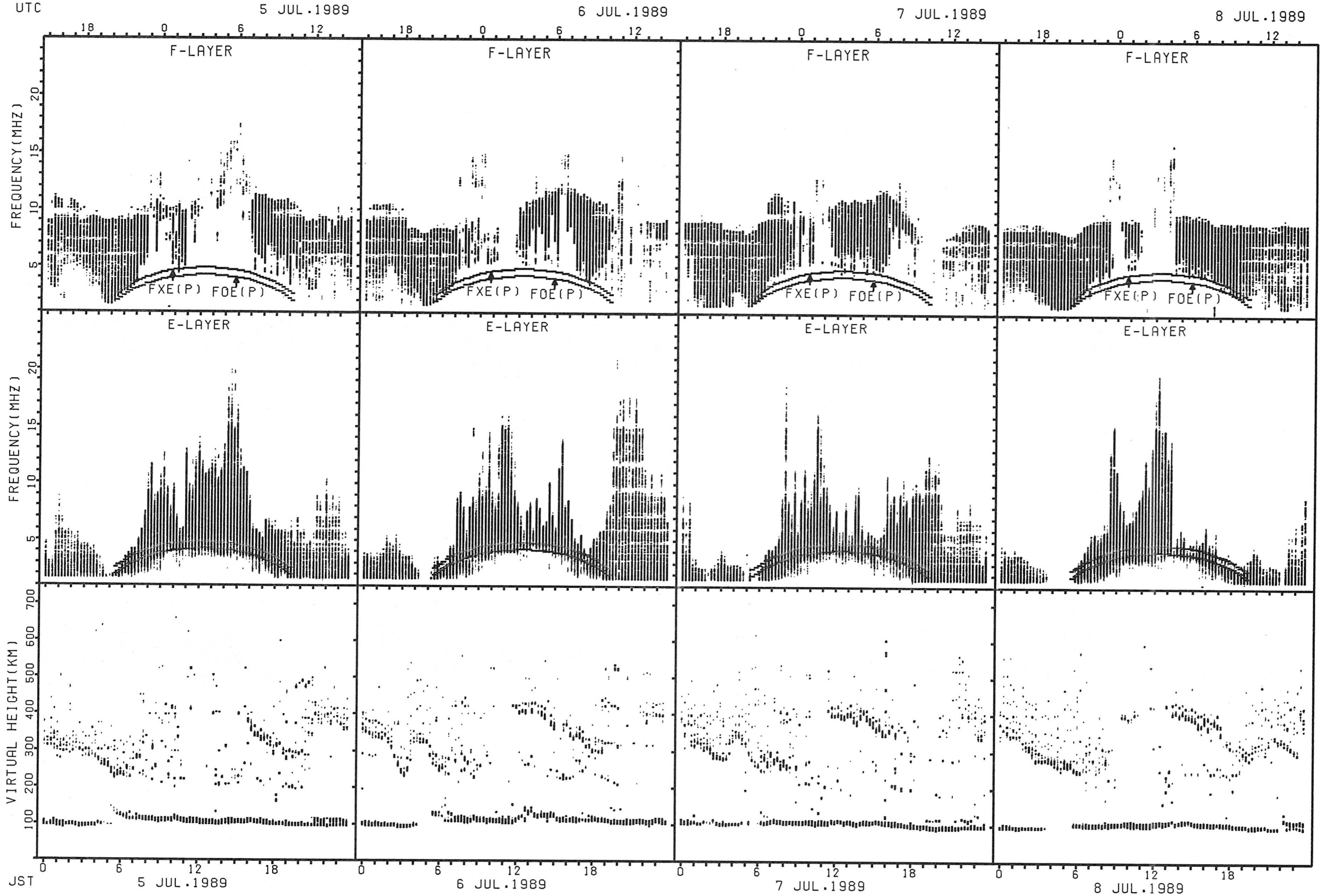


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

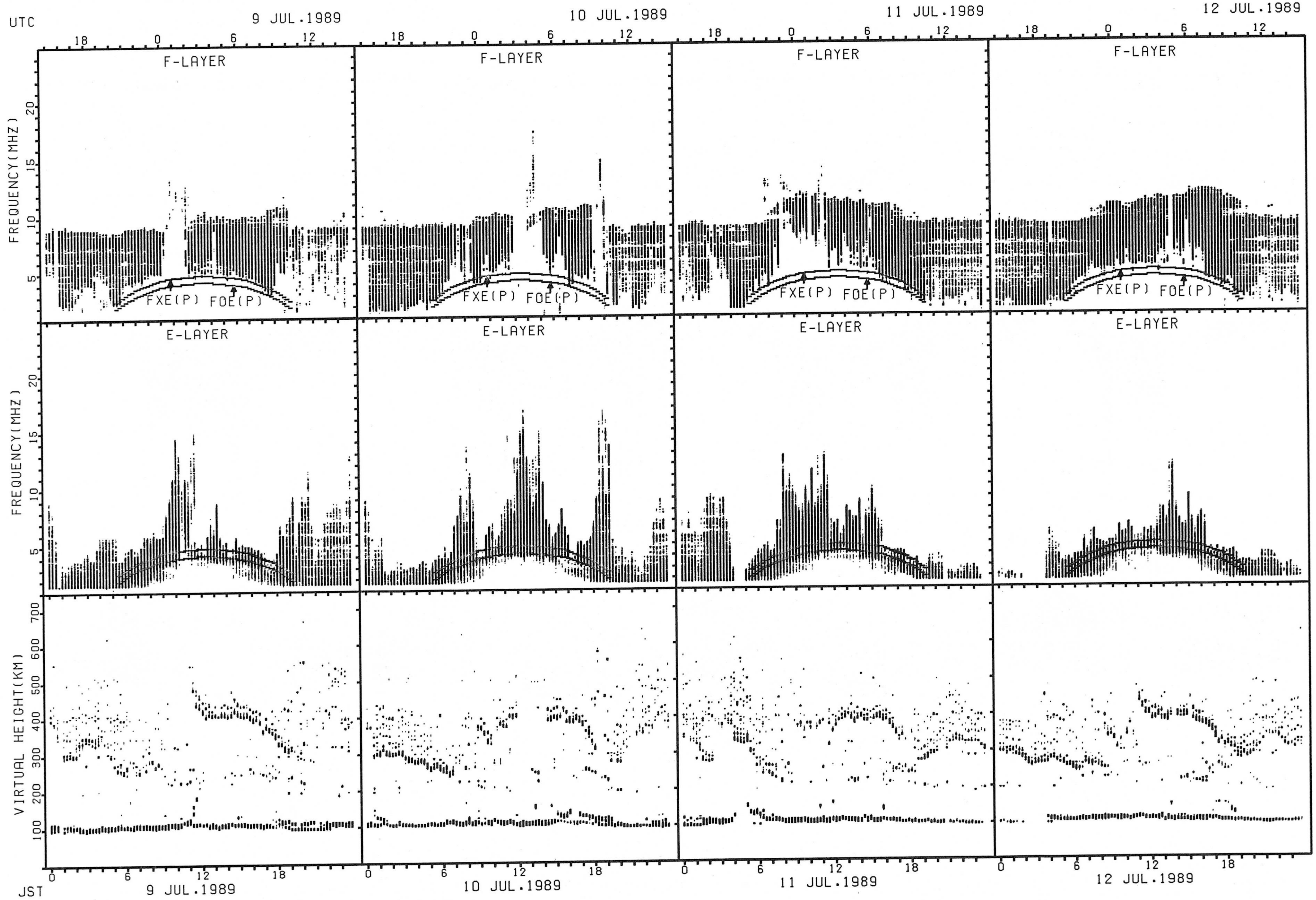

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
1 JUL.1989
2 JUL.1989
3 JUL.1989
4 JUL.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
100 200 300 400 500 600 700
5 10 15 20
18 0 6 12
0 6 12 18
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



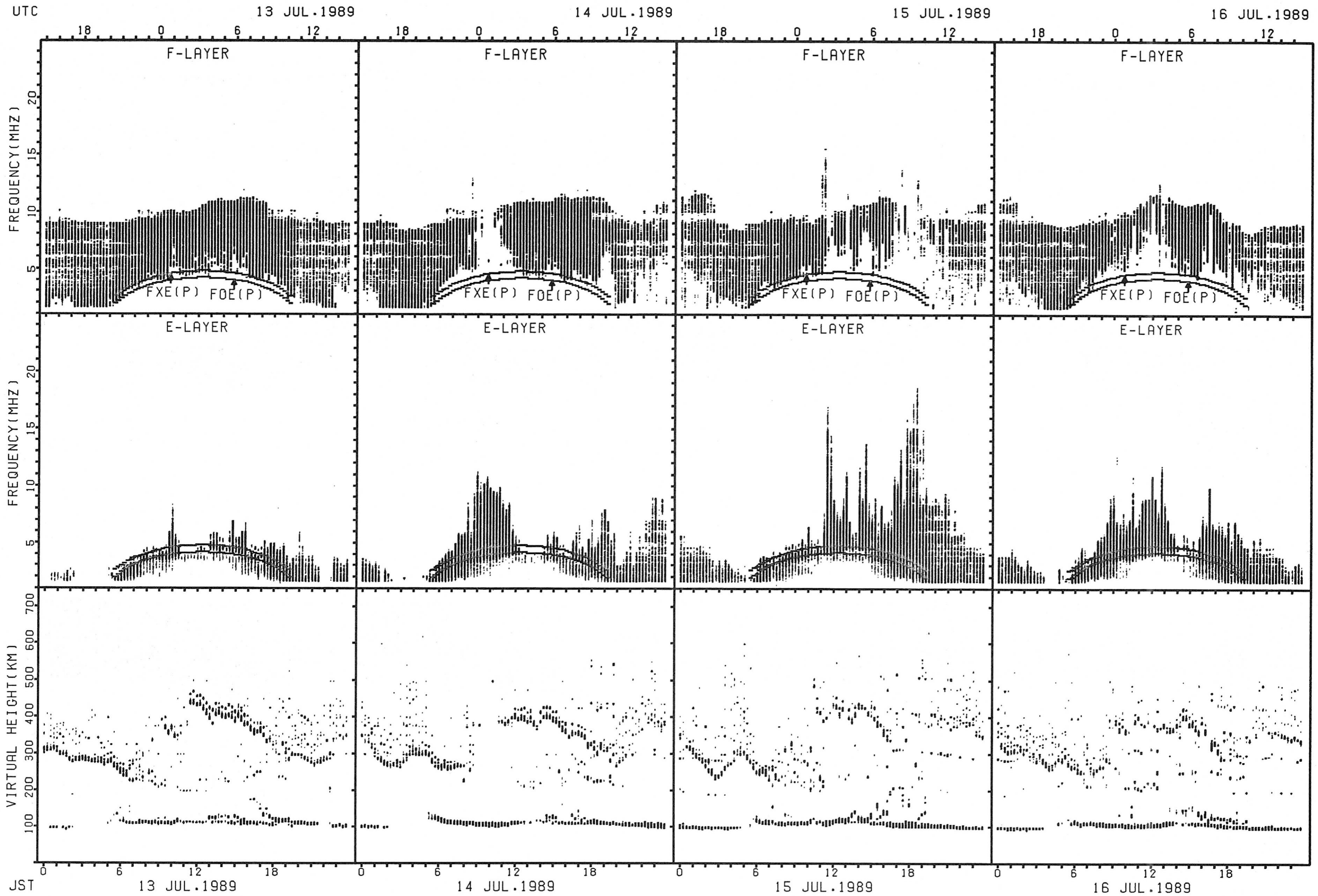
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



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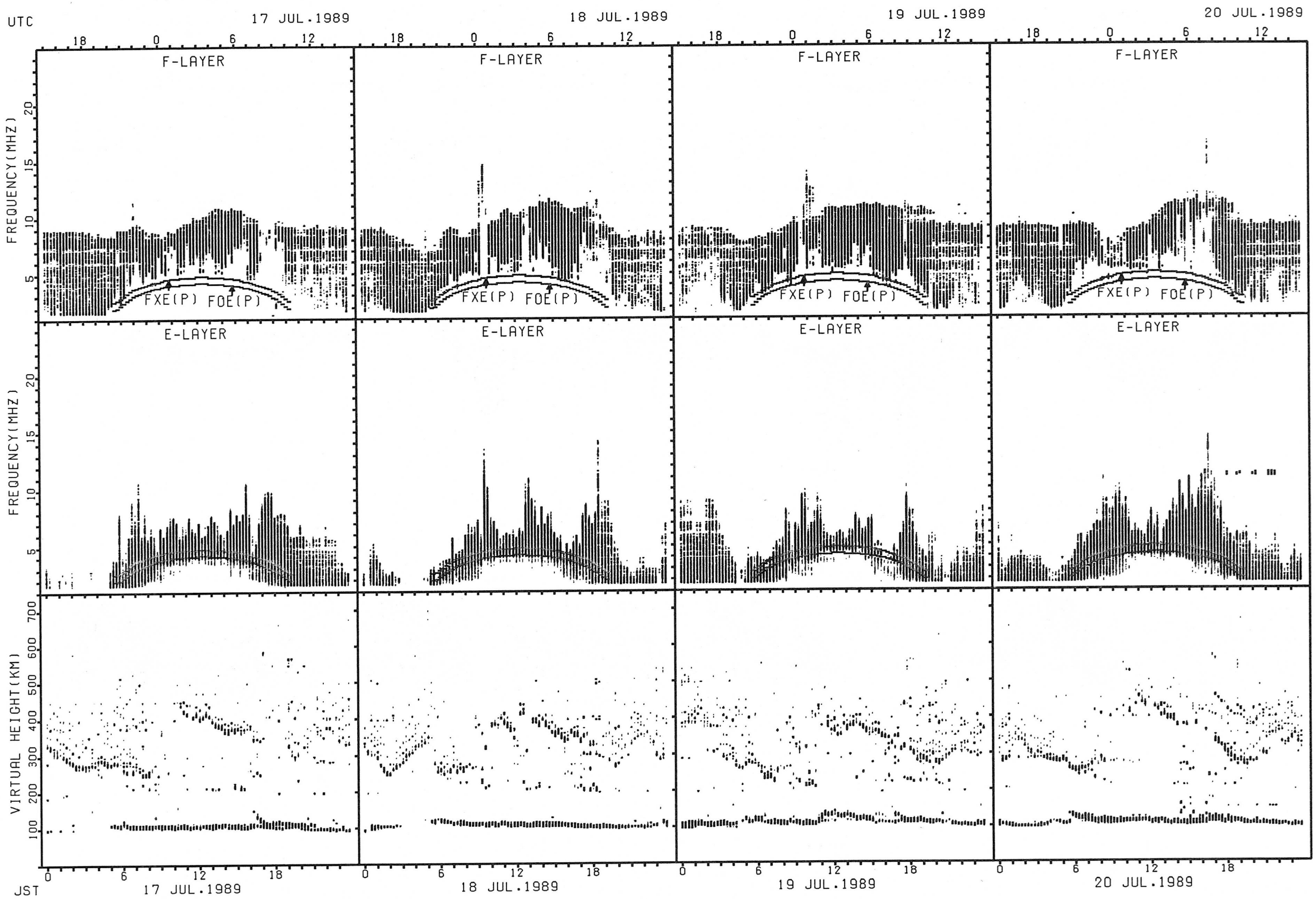
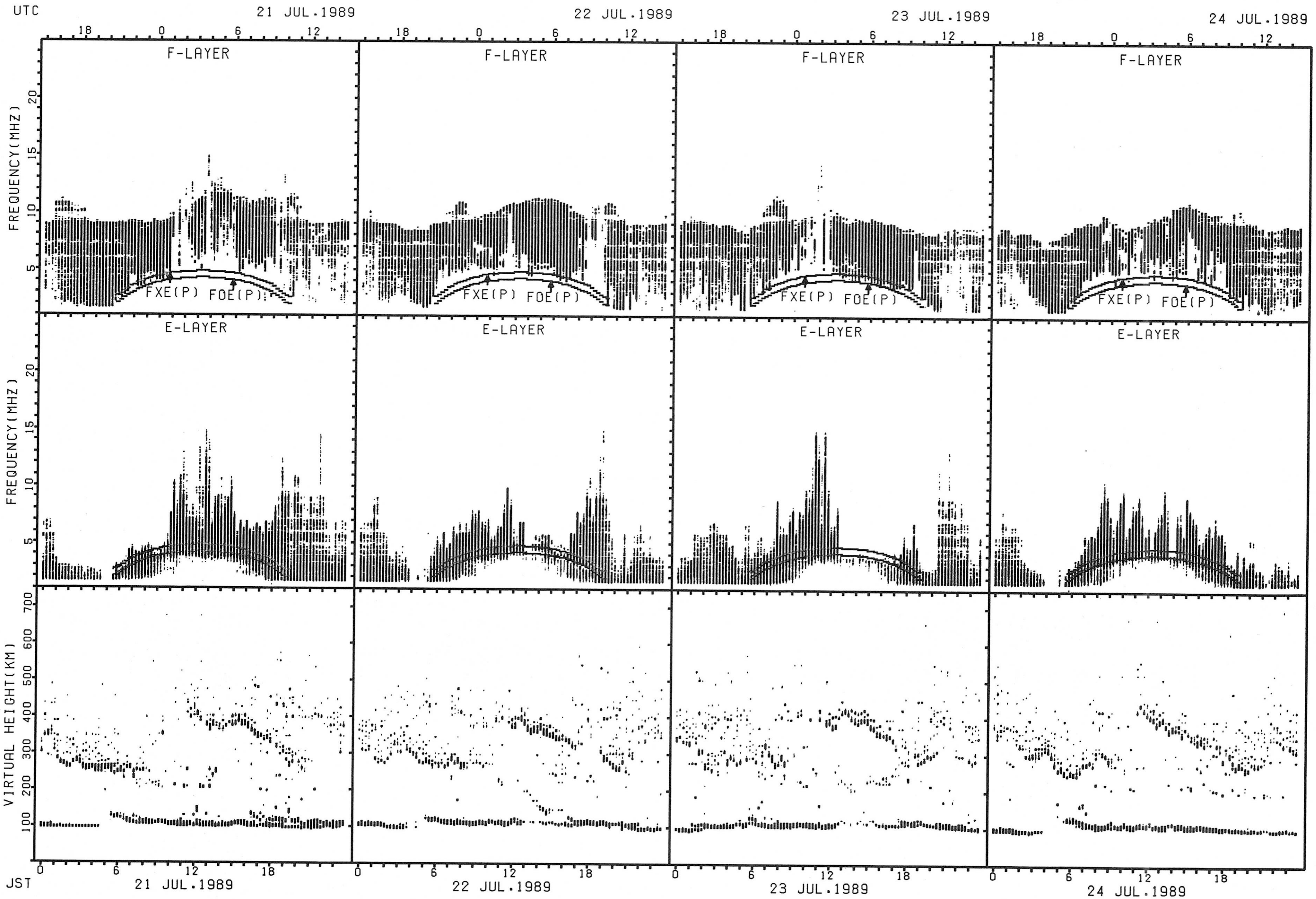
SUMMARY PLOTS AT YAMAGAWA



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



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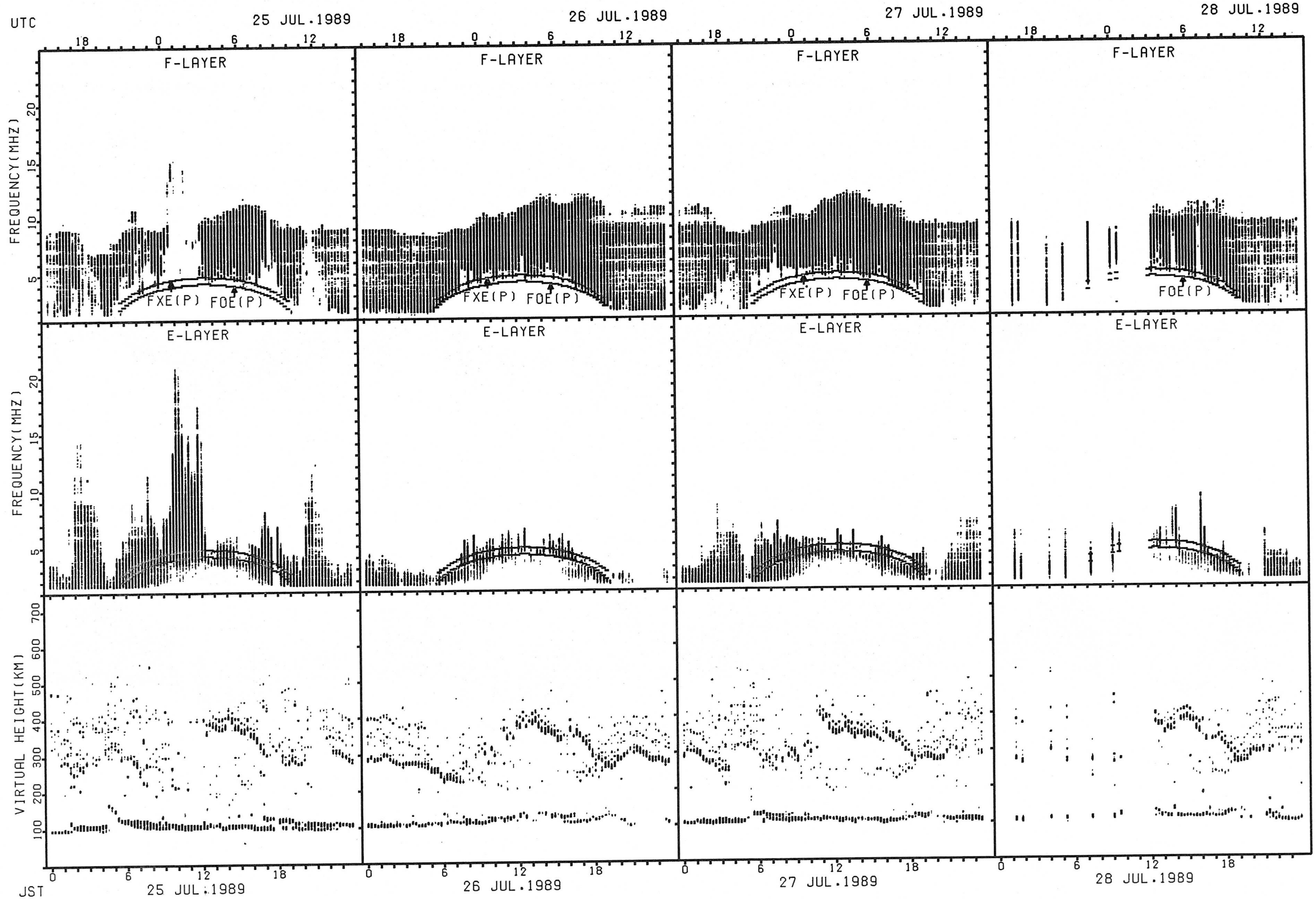
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



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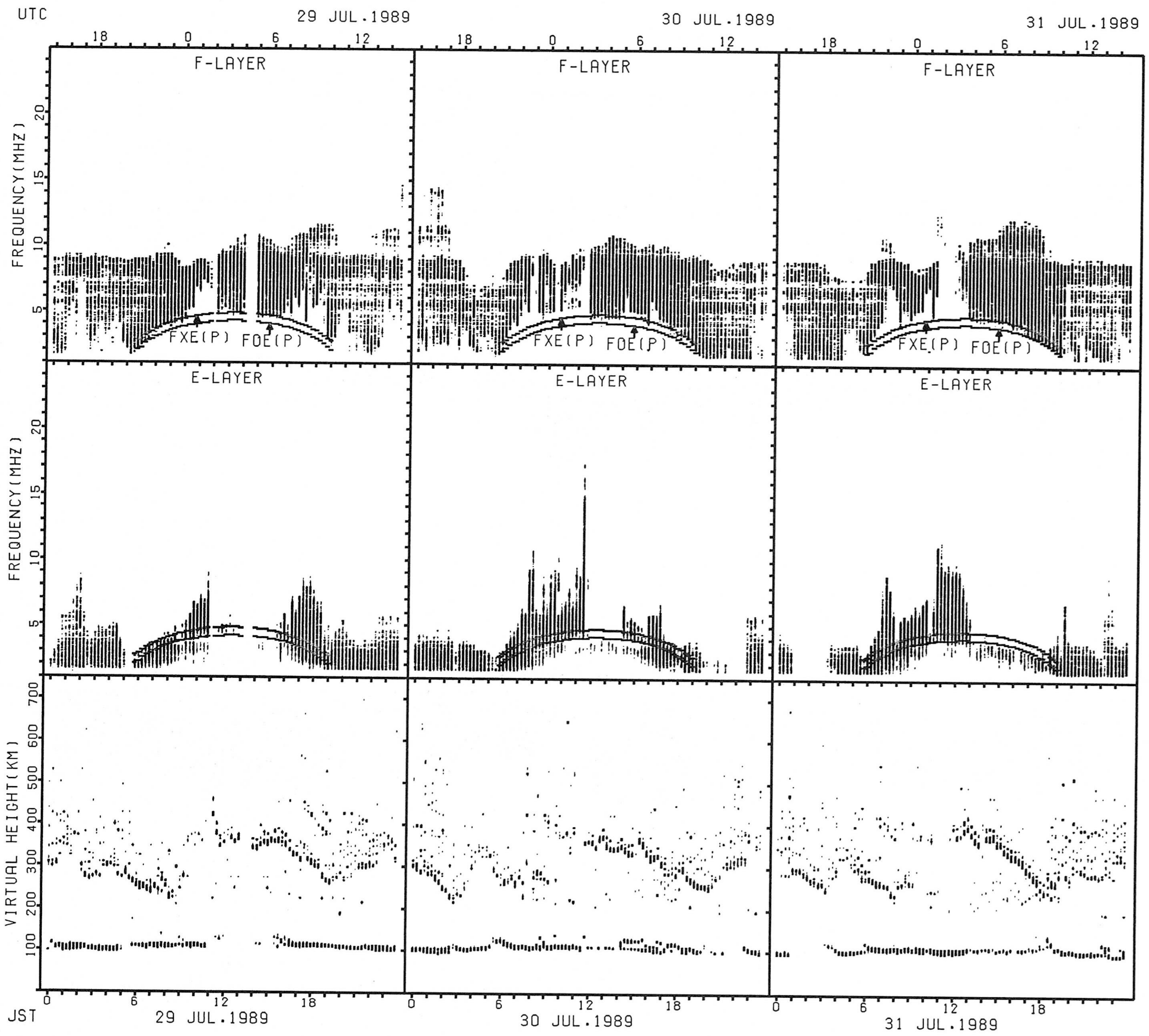
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



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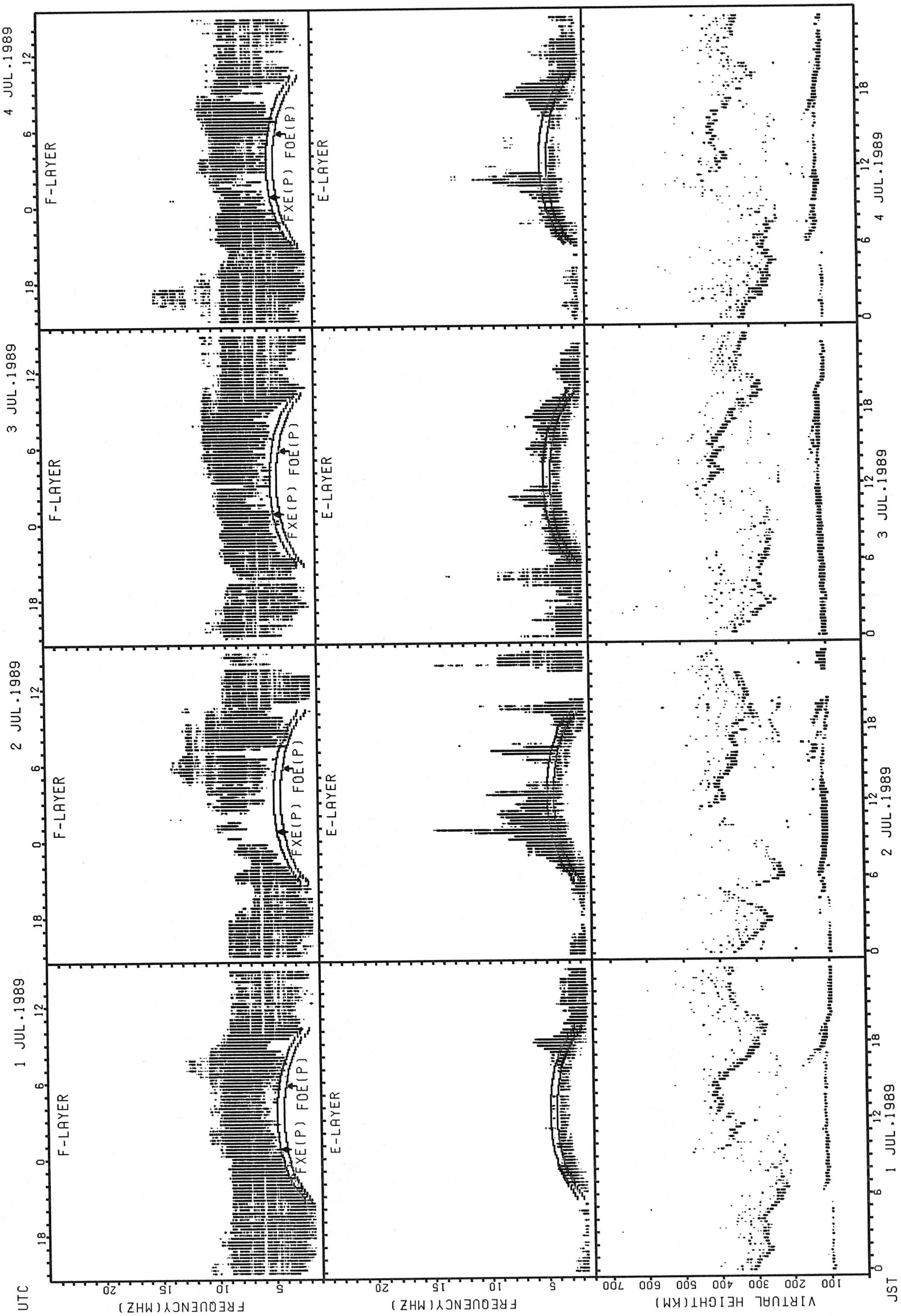
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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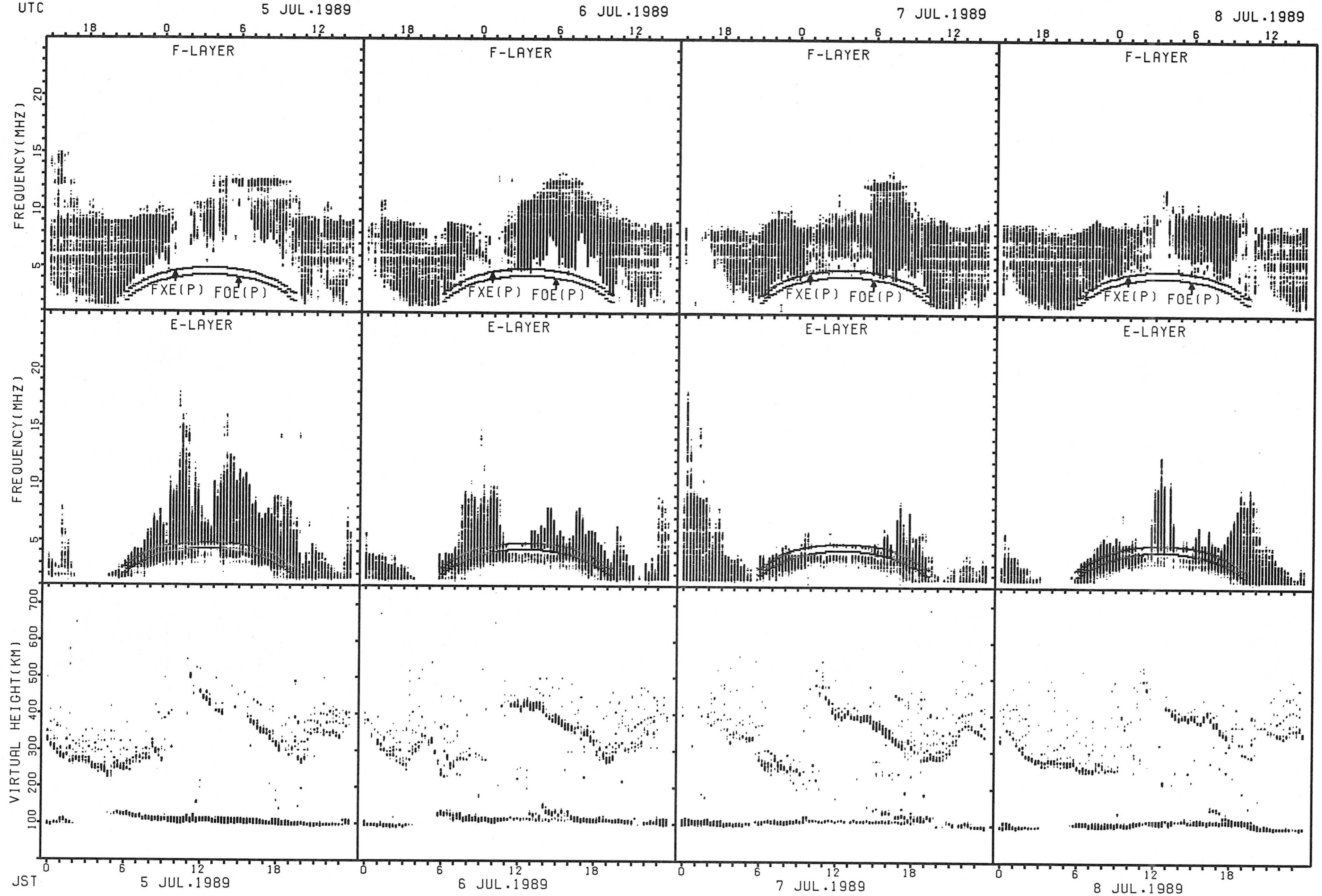
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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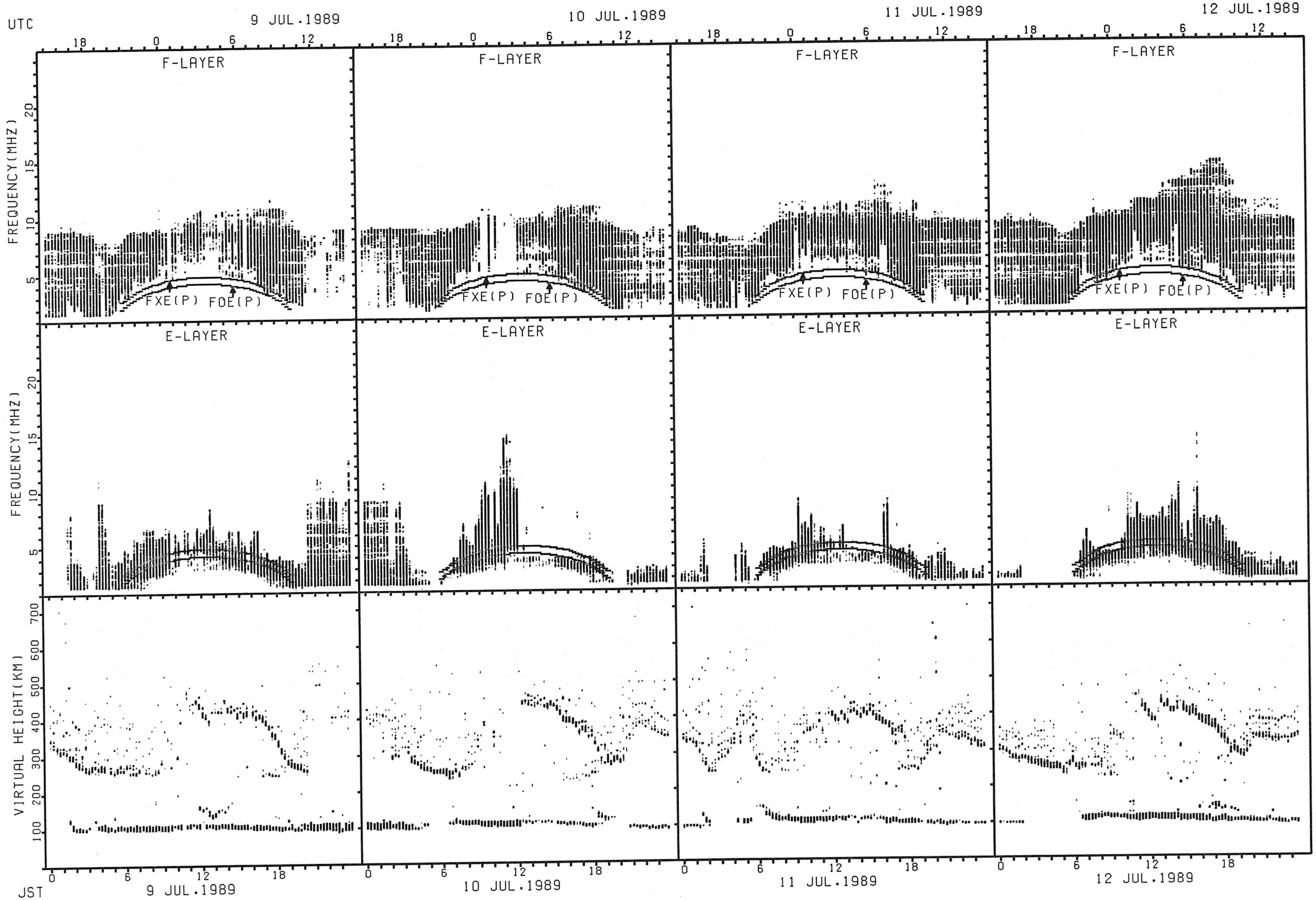
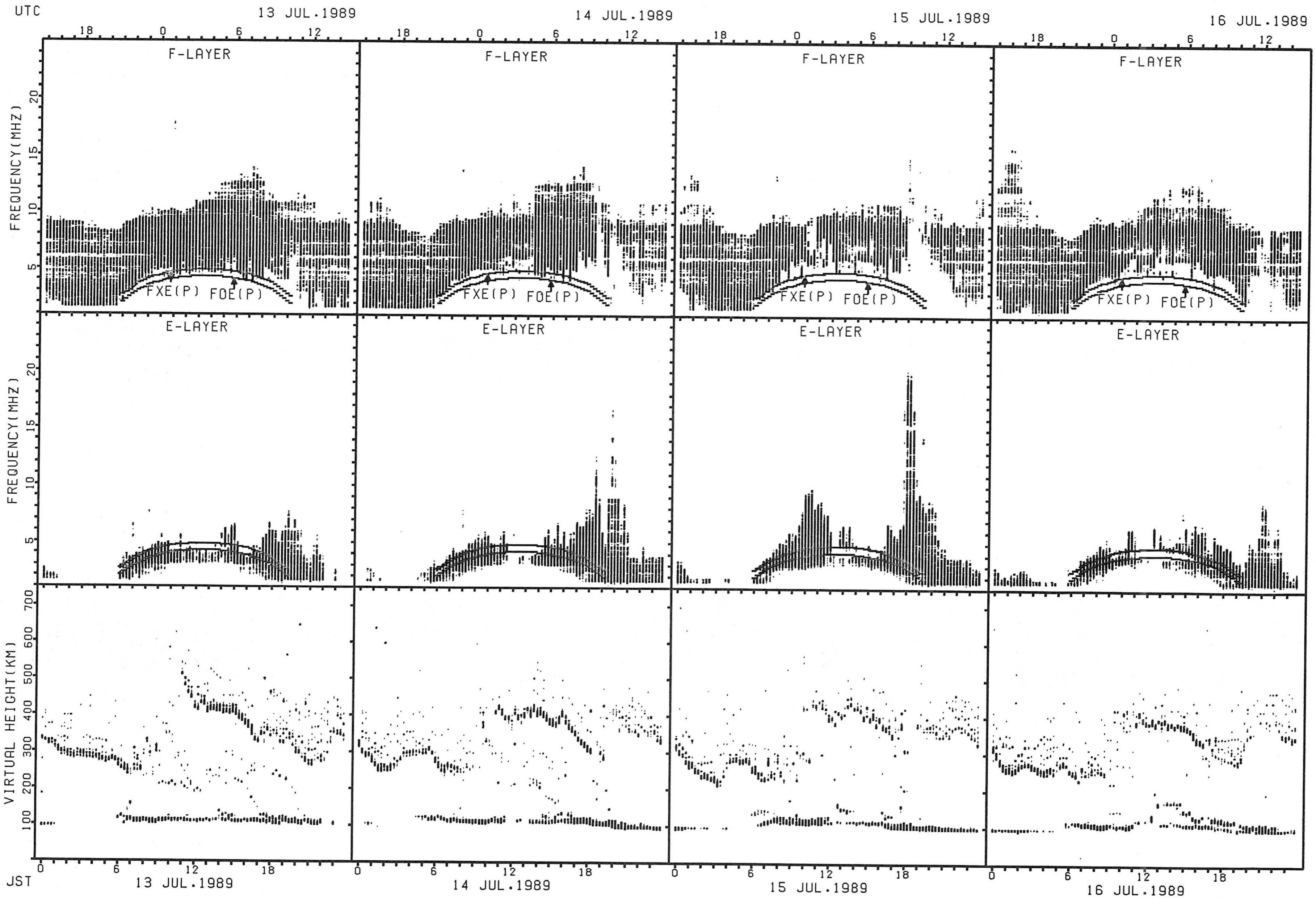
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



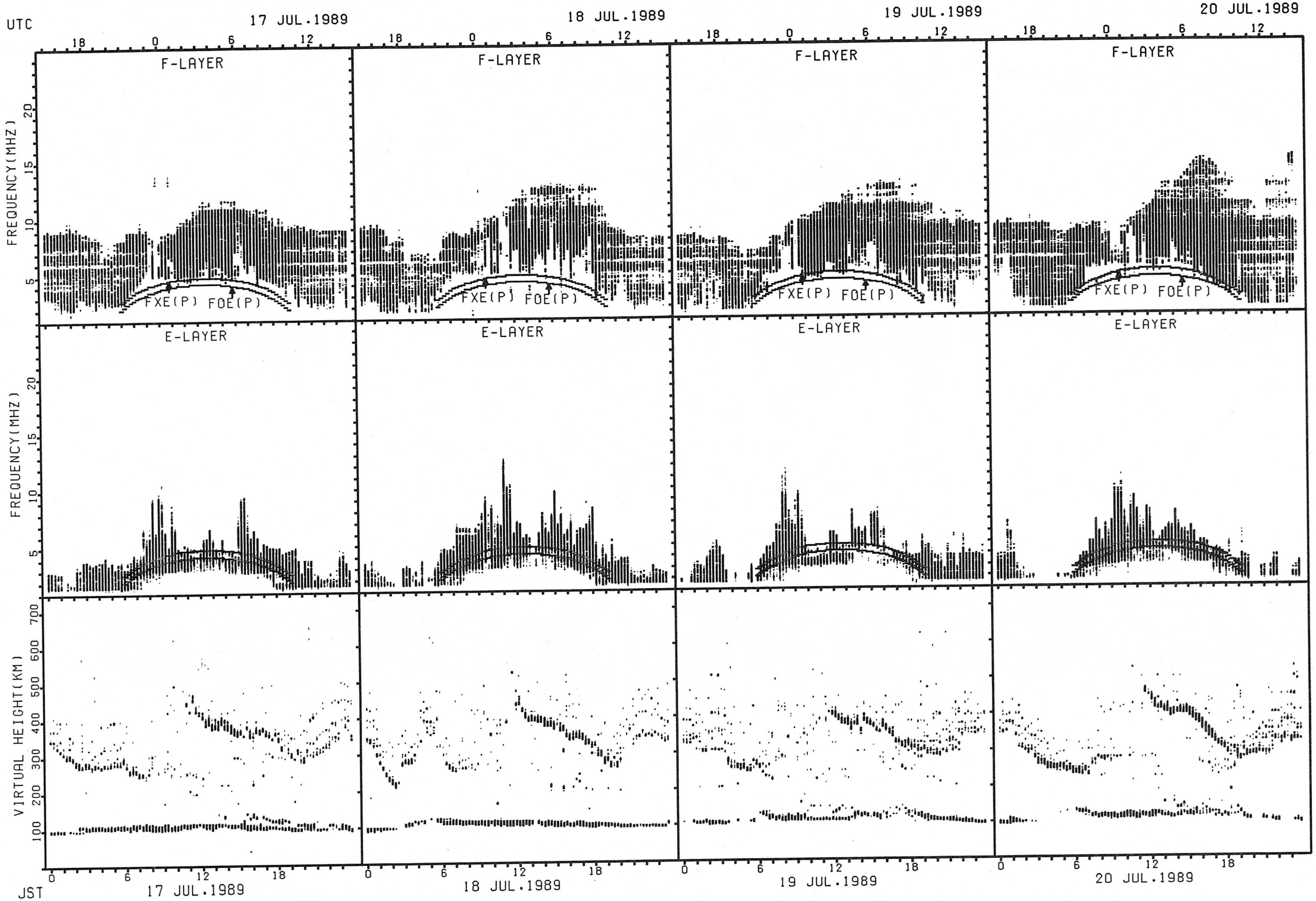
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



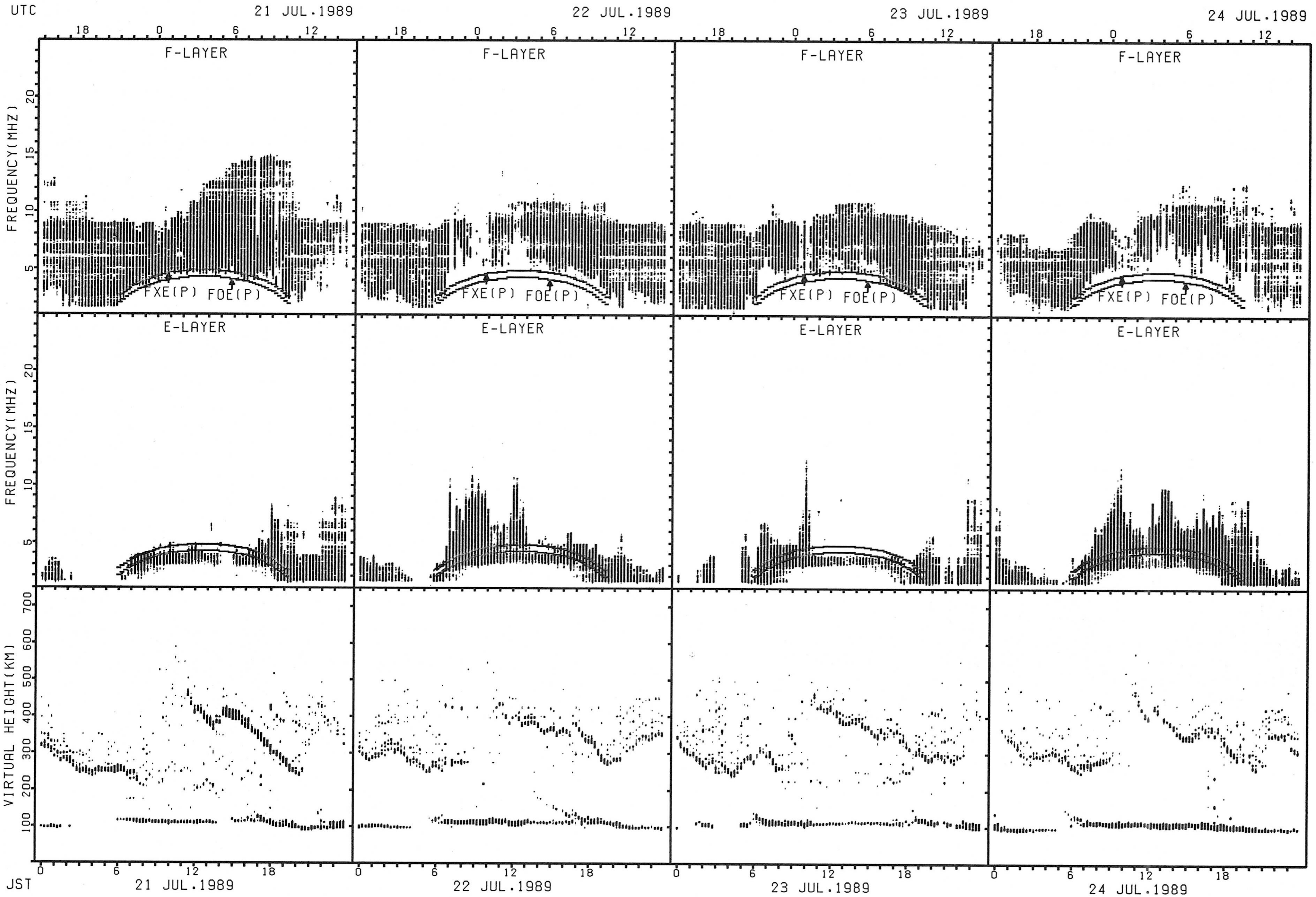
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA

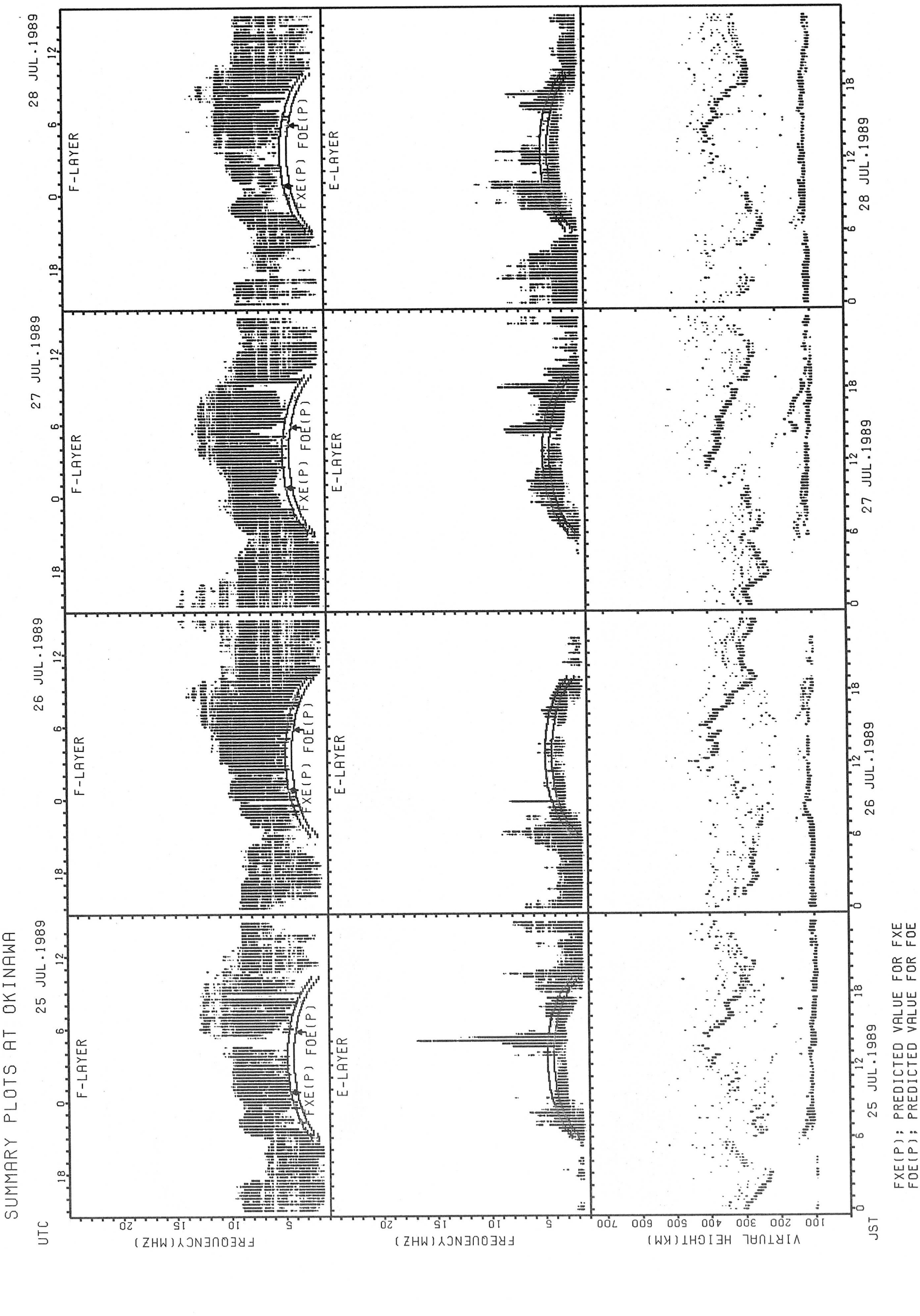


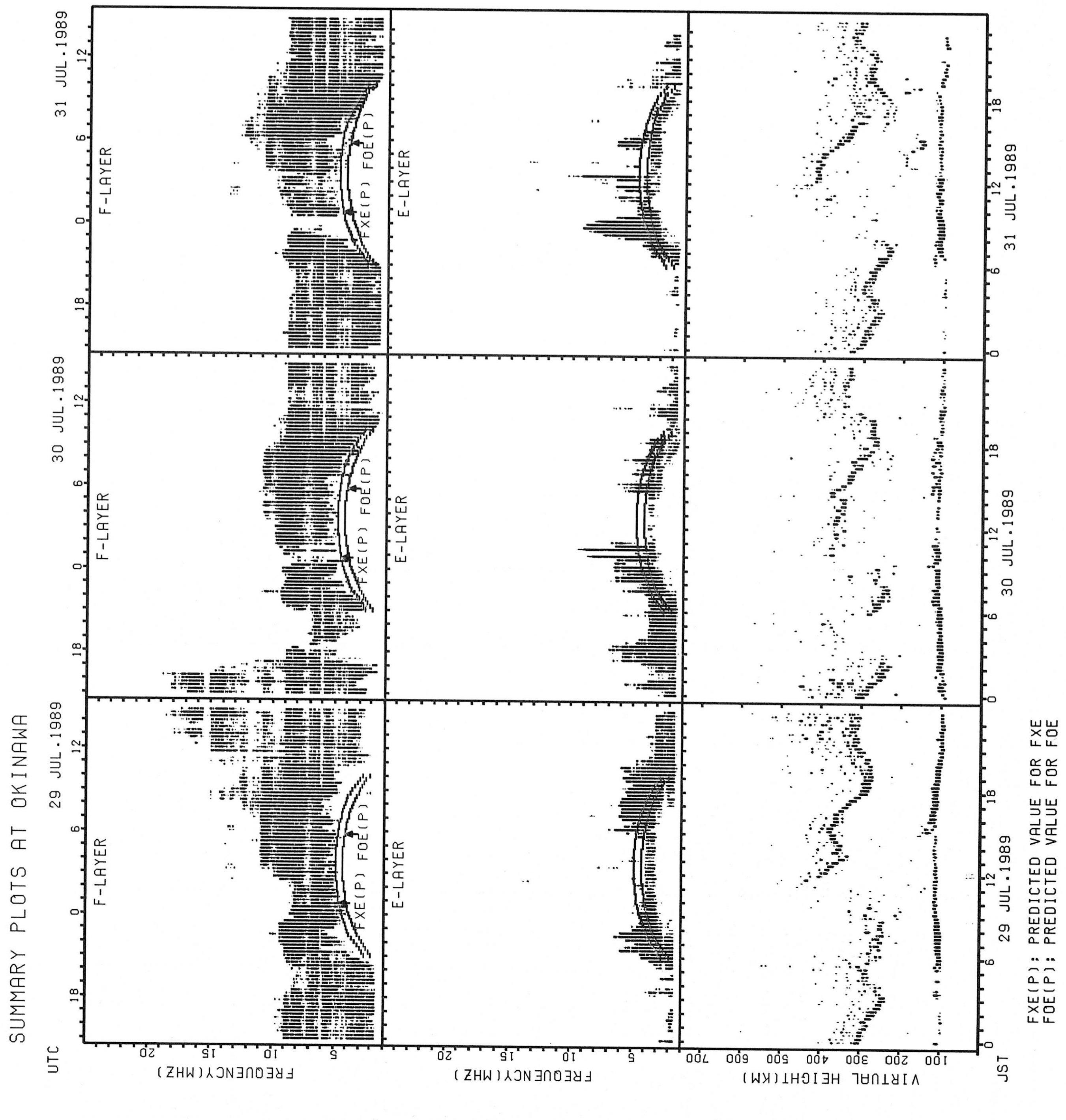
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
JST
25 JUL.1989
26 JUL.1989
27 JUL.1989
28 JUL.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
29 JUL.1989
30 JUL.1989
31 JUL.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

MONTHLY MEDIANS OF H'F AND H'ES

JUL.1989 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

STATION WAKKANAI LAT. 45.4N LON. 141.7E

H'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		13	10			16	21	28									11	13	14	22	20	13	13	14
MED		362	361			337	322	325									342	314	315	329	330	360	362	353
U Q		374	384			362	344	342									354	349	338	342	357	418	377	368
L Q		351	356			305	310	308									328	258	252	302	270	329	341	336

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	22	19	22	17	13	18	23	24	25	30	25	18	16	13	12	13	19	29	28	30	30	27	28	26
MED	111	111	112	111	125	131	125	122	117	117	117	115	117	115	119	121	125	125	123	119	119	117	113	113
U Q	115	113	115	117	130	135	131	125	121	121	120	117	117	117	123	140	129	129	126	119	123	119	115	115
L Q	109	109	109	108	114	125	123	121	116	115	114	113	113	112	116	117	119	120	121	115	117	113	113	111

STATION AKITA LAT. 39.7N LON. 140.1E

H'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	16	22	15	11	11	26	29	25								19	21	22	20				14
MED	368	366	357	352	346	308	301	292	282								342	332	314	292				353
U Q	376	379	374	368	376	342	328	320	303								358	346	328	325				372
L Q	340	356	340	332	336	284	290	266	254								250	241	246	247				336

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	25	26	21	23	28	29	31	31	28	29	27	26	22	25	26	28	30	31	30	31	29	29
MED	107	103	103	105	105	121	119	115	113	109	109	109	109	111	113	119	116	116	113	111	113	115	111	109
U Q	111	111	107	107	108	129	124	119	117	113	113	112	113	113	127	126	121	121	119	115	119	119	119	113
L Q	101	103	100	101	101	113	115	113	111	109	107	107	107	107	107	106	107	108	109	109	109	111	106	103

STATION KOKUBUNJI LAT. 35.7N LON. 139.5E

H'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	18	21	22	19	16	22	26	27	22								18	23	24	24	17	15	12	18
MED	352	348	335	350	338	297	286	280	281								327	322	303	302	348	360	360	376
U Q	358	366	350	378	377	360	310	300	316								344	336	317	329	377	382	376	400
L Q	336	331	270	338	298	268	270	256	240								242	250	221	275	229	282	245	340

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	24	26	26	21	19	27	28	27	24	23	24	25	26	21	25	27	26	28	26	28	29	29	26
MED	111	105	107	102	107	121	119	115	113	110	111	110	109	109	113	119	117	117	111	109	111	115	111	110
U Q	113	107	113	111	117	133	125	120	117	112	113	114	113	113	126	128	127	121	116	113	118	128	119	117
L Q	107	101	99	101	101	113	115	113	111	107	109	108	105	107	107	110	109	109	103	103	101	107	107	105

MONTHLY MEDIANS OF H'F AND H'ES

JUL.1989 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

STATION YAMAGAWA LAT. 31.2N LON. 130.6E

H'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	25	26	25	16	19	27	28	22	17	10						25	24	26	26	23			11
MED	353	348	329	328	333	336	288	272	263	286	275						346	334	301	308	342			372
U Q	366	361	358	347	351	354	304	295	290	328	298						358	340	330	328	364			388
L Q	345	332	314	316	327	304	260	264	252	263	212						337	314	258	296	302			360

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	27	24	21	16	24	29	30	27	29	29	25	21	23	25	25	26	29	29	30	30	28	30
MED	106	101	105	104	109	113	121	119	113	111	111	113	111	111	113	123	113	121	119	113	109	107	107	105
U Q	113	113	111	110	112	150	125	128	117	115	115	121	119	123	125	131	131	127	122	121	115	113	113	115
L Q	101	99	99	99	102	108	115	112	111	109	107	109	107	107	107	107	110	109	112	107	103	101	101	101

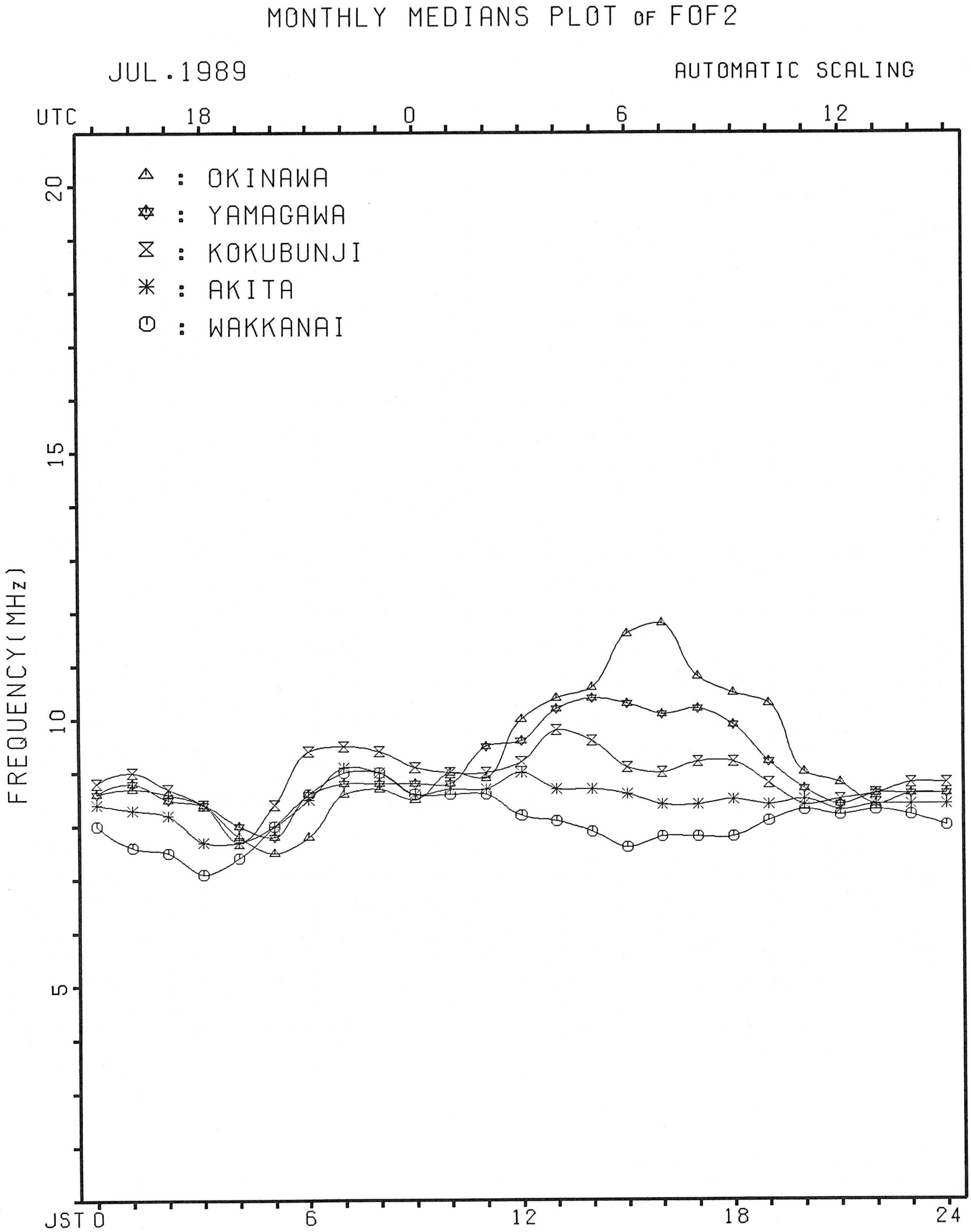
STATION OKINAWA LAT. 26.3N LON. 127.8E

H'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	25	28	18	15	10	21	25	30	17							17	25	29	28	26	17		
MED	350	324	312	302	298	323	290	274	282	292							346	342	318	306	330	354		
U Q	366	345	326	318	324	348	302	291	306	326							360	352	331	325	338	371		
L Q	328	304	296	294	286	296	266	257	270	266							332	320	307	295	308	330		

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	20	14	15	10	13	21	31	31	23	26	19	18	18	15	21	25	25	27	28	27	30	28	23
MED	99	99	103	105	106	109	119	115	113	113	111	113	112	116	123	125	125	119	113	112	105	101	101	101
U Q	109	106	107	109	109	123	131	123	119	119	115	115	123	141	173	145	133	129	119	119	111	109	107	113
L Q	97	97	97	97	101	107	107	111	111	109	109	109	109	111	109	112	111	112	111	107	101	99	99	99


MONTHLY MEDIANS PLOT OF FOF2
JUL.1989
AUTOMATIC SCALING
UTC
18
0
6
12
△ : OKINAWA
✡ : YAMAGAWA
⧖ : KOKUBUNJI
✳ : AKITA
⦶ : WAKKANAI
20
15
10
5
FREQUENCY(MHz)
JST 0
6
12
18
24

IONOSPHERIC DATA

JUL. 1989 | FXI (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42'.4 N , Long. 139° 29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	98	103	100	98	88	91															X 95	X 97	105	C
2	111	108	103	X 84	X 77																X 83	X 80	X 90	X 92
3	X 92	X 95	98	95	X 80																X 96	X 99	X 95	X 99
4	X 99	X 99	X 94	X 89	X 86																X 97	X 101	X 107	X 107
5	X 101	X 97	X 92	X 94	103																0 X 93	101	99	X 103
6	105	X 102	X 97	X 96	S																X 87	99	97	101
7	95	X 87	X 87	X 82	X 84		112														X 78	X 84	S	S
8	X 84	X 84	X 80	X 77	X 78																X 89	95	X 99	97
9	101	97	X 96	99	X 96																102	103	X 97	99
10	X 99	X 97	X 97	X 97	94																X 92	99	S	X 99
11	96	X 97	X 95	X 93	89																X 95	X 96	X 99	X 99
12	106	X 105	101	X 91	99																X 98	X 103	X 106	X 110
13	X 106	S	X 98	S	S																X 101	X 101	X 101	X 98
14	103	X 103	X 96	X 93	X 89																A	X 101	X 97	X 97
15	108	107	110	105	X 98																X 95	X 99	X 107	106
16	X 108	X 103	X 93	X 94	X 87																X 85	X 90	X 85	97
17	X 94	X 91	X 88	85	X 80																X 88	S	X 93	X 92
18	X 90	X 95	0 X 85	S	X 77	80															X 85	A	99	X 95
19	92	S	X 86	X 86	X 86	91															X 90	X 97	X 99	X 98
20	X 93	X 90	X 84	X 80	X 81															104	X 99	X 96	X 96	S
21	S	S	104	100	102	98														X 113	X 105	X 90	X 91	X 91
22	X 90	X 88	X 85	X 84	X 84	C			C	C	C	C	C	C	C	C	C	C	C		C	C	C	C
23	C	C	C	C	C															A	S	X 90	X 89	X 88
24	X 83	X 84	S	X 81	C															X 93	X 87	X 89	96	107
25	A	X 103	98	X 82	X 82															X 92	X 91	X 96	X 95	X 95
26	X 94	X 90	X 86	X 82	X 80															X 99	C	C	C	C
27	C	C	C	C	C															X 89	X 89	X 91	X 93	X 93
28	92	X 88	X 76	X 78	83															X 95	0 X 88	X 91	X 92	99
29	S	X 95	X 96	X 88	X 89															X 107	X 96	X 93	X 97	X 96
30	102	X 99	0 X 104	X 82	X 71															C	C	C	C	C
31	C	C	C	C	C															X 100	S	X 97	X 98	96
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	25	27	26	25	4	1													9	25	26	26	25
MED	X 98	X 97	X 96	X 88	X 86	91	112													X 99	X 92	X 96	X 97	X 98
UQ	103	X 103	98	X 95	X 89	94														X 104	X 96	X 99	X 99	X 99
LQ	X 92	X 90	X 86	X 82	X 80	86														X 93	X 88	X 91	X 93	X 95

JUL. 1989 | FXI (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1989 | FOF2 (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42'.4 N , Long. 139° 29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 87	F 89	F	F 85	F 80	F 82	91	98	93	102	105	99	99	97	97	93	A	A	A	A	89	91	F 94	I C 96
2	F 101	F 99	F 95	78	71	68	80	71	A	A	A	87	85	94	94	92	91	94	95	85	77	J R 74	84	V 86
3	86	89	F 38	F 82	74	80	39	95	88	83	92	92	94	100	102	102	98	96	97	93	90	93	89	93
4	93	93	88	83	80	86	103	108	106	96	98	102	105	103	95	92	94	95	95	94	91	95	101	S 101
5	95	91	86	88	F 92	99	97	94	94	98	A	101	102	102	102	103	99	97	95	92	87	F 93	F 90	97
6	F 98	96	91	90	I S 82	82	A	81	87	A	A	C	A	106	A	107	A	A	97	92	J S 81	F 87	F 87	F 89
7	F 86	81	81	76	78	88	F 103	114	111	V 98	A	A	A	A	77	80	84	82	79	71	72	78	I S 82	I S 79
8	78	78	74	71	72	I S 78	83	89	79	75	A	A	A	A	A	75	74	A	A	78	83	F 86	Z 93	F 87
9	F 88	F 90	90	F 88	V 90	90	94	V 94	97	98	U S 96	98	99	103	105	104	102	103	100	100	F 92	F 95	91	F 91
10	93	91	91	91	F 86	95	99	103	99	98	99	100	R 102	103	101	A	93	A	99	95	86	F 87	I S 96	93
11	F 84	S 91	89	87	F 79	88	100	107	109	110	111	A	A	A	A	A	88	91	89	90	89	90	93	93
12	F 99	99	F 91	85	F 88	95	S	R	R	106	109	109	106	104	A	96	97	99	97	98	92	97	100	104
13	100	I S 98	92	I S 88	I S 90	95	105	110	101	95	98	106	102	101	100	94	96	96	97	94	95	95	95	92
14	F 91	97	90	87	83	92	107	110	109	102	97	104	106	107	I C 107	104	103	103	99	101	A	95	91	91
15	F 98	F 101	F 101	F 98	92	93	98	94	101	94	91	92	I S 94	A	99	A	101	93	93	92	89	93	101	F 97
16	102	97	92	88	81	88	105	95	95	94	99	105	107	102	90	88	83	86	88	78	79	84	S 79	F 89
17	88	85	82	F 77	74	80	103	109	91	87	90	96	98	99	101	I C 99	96	94	92	93	82	I S 86	87	86
18	84	89	S 79	I S 78	71	F 74	86	94	88	A	89	99	R 103	97	97	96	90	94	90	88	79	A	F 85	89
19	F 82	I S 80	S 80	80	80	F 80	98	103	101	97	90	85	86	80	80	77	74	76	83	85	84	91	93	92
20	87	84	78	74	75	82	99	104	91	90	94	97	98	107	109	105	97	100	A	F 95	93	S 90	90	S
21	S	S	F 93	F 93	F 90	F 88	98	99	93	I S 94	98	101	106	110	R 107	102	92	92	94	107	99	84	85	85
22	S 84	S 79	S 78	78	78	I C 86	96	105	I C 106	I C 101	I C 96	I C 102	I C 102	I C 102	I C 102	I C 100	I C 93	I C 90	I C 89	I C 92	I C 91	I C 88	I C 84	I C 82
23	I C 82	I C 82	I C 86	I C 81	I C 81	I C 88	I C 100	I C 99	99	Z 84	86	91	87	81	78	80	A	79	77	A	I S 79	84	83	82
24	77	78	I S 76	75	I C 74	I C 86	I C 98	I C 95	I C 94	94	95	89	A	93	96	96	93	95	90	87	81	83	F 87	F 97
25	A	97	F 83	76	76	74	83	111	93	88	89	93	93	92	96	97	97	101	93	86	85	90	89	89
26	88	84	80	76	74	79	87	92	99	R 93	99	R 100	97	100	104	105	97	99	101	93	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	83	83	85	87	87
28	F 85	S 82	70	72	F 72	86	93	94	94	91	V 83	A	92	95	94	R 92	92	97	92	89	S 82	85	V 86	F 89
29	I S 88	89	90	82	83	90	100	106	99	86	86	I R 89	93	94	95	92	92	96	R 101	101	90	87	91	90
30	F 92	93	S 98	V 76	65	S	84	96	99	93	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	116	108	I C 105	I C 106	107	111	107	94	I S 91	91	92	F 89
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	28	28	29	29	28	27	28	27	26	23	23	24	25	25	26	26	25	26	28	28	28	29	28
MED	88	90	88	82	80	86	98	98	97	94	96	99	99	101	99	96	94	95	94	92	86	89	90	90
UQ	94	96	91	88	83	90	100	106	101	93	98	102	104	103	102	103	97	99	97	94	91	93	93	93
LQ	84	83	80	76	74	80	90	94	93	90	90	92	94	95	95	92	91	92	90	86	82	85	86	87

JUL. 1989 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1989 | FOF1 (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42'.4 N , Long. 139°29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								A	A	L	620	620	600	590	A	A	A	A	A	A				
2							A	A	A	A	A	590	600	600	610	560	550	A	A	A				
3							L	L	510	L 610	590	A	A	A	A	570	L 530	L 560	L					
4							L	L	L	L	L 690	A	A	570	580	L 580	A	A	L					
5								L	A	A	A	A	A	580	A	A	A	L	A					
6						A	A	A	A	A	A	C	A	A	A	A	A	A	A	A				
7							L	A	A	A	A	B	A	A	A	550	510	A	A					
8							L	L	A	A	A	A	A	A	A	U A 560	A	A	A	A				
9							L	L	L	A	A	L 610	620	H 570	570	580	L 540	L 520	L	A				
10						L		L	A	L 570	L	580	610	610	580	A	L 550	A	A					
11							L		A	A	L	A	A	A	A	A	A	L	A	A				
12								L	R	L 590	A	U L 630	L 630	630	A	A	L	A	A					
13								L	U L 580	650	L 630	620	U L 620	610	A	A	530	L 530	L					
14							L	A	L	A	A	A	S	H 590	I C 620	L 600	570	H 550	L	A				
15							L	A	A	A	630	L 630	H 610	A	A	A	520	A	A	A				
16						L	L	L	L	A	A	590	A	A	A	L	L 590	U L 500	L					
17							L	L	A	L 630	L 580	610	A	600	A	C	530	L	A					
18						L		L	L	A	650	A	A	L	580	L 570	L 560	U L 510	L					
19							A	A	L	580	L 560	580	570	A	R 560	A	L	L	A					
20							L	A	A	630	A	620	600	570	580	L 600	L 530	L	A					
21							A	A	A	S	480	580	630	L 590	R 570	L 550	L 540	A	A					
22							L		C	I C 620	I C 620	I C 620	I C 660	I C 610	I C 580	I C 560	I C 550	C	C	C				
23						C	C	C	530	U L 610	580	560	A	580	560	580	A	A	A					
24						C	C	C	C	A	L 620	A	A	580	580	L 560	490	L 470	L					
25							L	A	A	A	A	560	590	L 570	570	L	U L 560	U L 500						
26								L	L	L	L	L	L	A	L	U L 570	A	L	A					
27						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
28							L	L	L	540		A	A	570	540	A	A	A	A					
29							L	A	A	L 590	U A 540	A	L	H 590	580	U L 580	L 540	A	A					
30						S	L	L	L	L 560	C	C	C	C	C	C	C	C	C					
31						C	C	C	C	C	C	C	A	U L 630	C	C	530	L	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									3	12	13	15	12	19	15	15	18	8						
MED									530	L 600	620	610	610	590	580	L 570	540	L 515						
UQ									555	625	630	620	625	605	580	L 580	L 560	L 540						
LQ									520	L 575	580	580	600	575	570	560	530	U L 500						

JUL. 1989 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

JUL. 1989 | FOE (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42'.4 N , Long. 139° 29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						215	290	335	A	375	A	410	405	A	A	400	360	300	A	B				
2						A	275	A	375	390	A	A	A	A	395	385	355	310	230	B				
3						A	A	A	350	A	405	425	415	415	405	380	360	310	250	B				
4						210	285	335	360	380	390	395	405	400	400	395	370	320	A	B				
5						225	290	330	370	390	A	A	A	A	A	A	A	A	A	B				
6						B	290	330	380	390	400	C	A	A	A	395	375	315	A	B				
7						A	A	A	A	A	A	B	A	A	A	A	A	A	A	B				
8						A	285	330	A	A	390	A	A	A	A	A	370	315	A	B				
9						A	280	A	A	A	A	A	R 415	405	405	385	360	310	230	B				
10						A	265	320	A	385	395	A	A	A	420	390	360	320	245	B				
11						A	280	340	A	A	400	420	A	A	A	A	A	A	A	B				
12						A	A	R	B	A	A	A	A	A	A	A	A	A	A	B				
13						200	275	350	A	390	A	415	415	A	A	375	A	A	A	B				
14						A	A	A	370	A	A	405	A	A	I C 410	380	355	315	245	B				
15						195	265	330	350	385	395	R 420	420	A	A	U A 390	370	A	230	B				
16						A	A	A	A	A	A	A	A	A	A	A	A	U A 315	240	B				
17						205	A	A	350	A	A	A	A	A	A	C	365	315	A	B				
18						A	285	335	375	A	395	410	A	A	A	A	A	A	A	B				
19						A	270	320	345	A	A	A	A	A	A	385	355	315	U A 235	B				
20						210	275	340	365	385	A	A	A	A	405	400	355	310	A	B				
21						A	A	A	A	S	A	A	A	A	R	A	A	A	A					
22							A	U A 340	I C 350	I C 375	I C 390	I C 405	I C 410	I C 415	I C 415	I C 395	I C 360	I C 300	I C 200	C				
23						C	I C 265	C	345	360	A	405	U A 405	A	400	390	355	305	225					
24						C	I C 270	I C 320	I C 350	370	390	335	B	A	A	A	A	A	A					
25						A	265	335	A	365	A	A	A	A	A	385	355	A	A					
26						B	265	A	365	A	390	A	A	A	A	A	A	A	A					
27						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
28						180	265	320	355	A	A	A	A	A	A	A	A	A	A					
29						160	265	A	355	370	390	A	A	410	400	380	355	295	A					
30						S	270	315	360	365	C	C	C	C	C	C	C	C	C					
31						C	C	C	C	C	C	C	A	A	C	C	R 345	310	215					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						9	21	17	18	15	12	11	8	5	10	16	18	17	11					
MED						205	275	330	358	380	392	410	412	410	405	388	360	310	230					
UQ						210	285	335	370	388	398	418	415	415	410	395	365	315	242					
LQ						195	265	320	350	370	390	405	405	405	400	382	355	310	228					

JUL. 1989 | FOE (0.01 MHZ)

IONOSPHERIC DATA

JUL. 1989 | FOES (0.1 MHZ)

135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42'.4 N , Long. 139° 29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	56JA	43JA	49JA	40JA	39JA	27	48JA	64JA	84JA	54JA	53JA	48	46	52JA	61JA	88JA	159JA	109JA	139JA	130	110JA	107JA	32JA	C
2	66JA	41JA	41JA	33JA	21	28	73JA	79JA	90	96JA	105	108JA	93JA	63	G	47	52	57JA	64JA	49JA	74	53JA	34	50JA
3	57	59	95JA	52JA	51JA	31JA	32	48JA	46JA	44	44	58	65JA	69JA	63JA	48	50	35	G	19	19	45JA	25	21JA
4	16JA	25JA	25JA	19	12EB	24	31	43	45	53JA	67JA	87JA	74JA	53JA	G	51	101JA	85JA	77JA	55JA	29	21JA	57JA	51JA
5	65JA	42JA	43JA	29JA	26JA	G	52JA	55JA	91	84JA	180JA	122	108	61	90JA	100JA	95JA	47	51JA	71JA	37	52JA	50JA	35JA
6	51JA	61JA	54JA	60	47	74JA	91	90	71JA	125	152	C	104JA	92	132	102JA	131JA	173JA	68JA	192JA	97JA	79JA	84JA	45JA
7	30	26JA	32JA	40JA	27JA	29	51JA	77JA	176JA	87JA	215JA	137JA	131JA	122	72JA	95JA	60JA	61JA	90JA	47	38JA	53JA	51JA	32
8	50JA	45JA	42JA	41JA	24JA	24	31	42	68JA	78	96JA	89	86JA	98	107JA	99JA	87JA	94JA	79	52JA	50JA	43JA	72JA	75JA
9	50JA	47JA	48JA	43JA	30JA	25	43JA	65JA	62JA	89	123	46	G	G	46	53	38	33	43JA	50JA	88JA	62JA	85JA	56JA
10	29	20	19JA	12EB	21	22	42JA	60JA	61JA	46	56JA	73JA	97JA	49JA	50	129JA	54JA	94	90JA	171JA	98JA	140JA	97JA	87JA
11	141JA	65JA	95JA	53JA	28JA	31JA	48JA	57JA	77JA	111JA	162JA	161JA	150JA	182JA	183JA	137	66	50JA	62	53	38	31JA	51JA	38JA
12	90	51JA	65JA	121JA	52JA	52JA	29	G	59	62JA	76JA	97JA	85JA	57JA	113	34	85JA	77JA	55	65JA	47JA	32	40JA	25JA
13	21	21ES	13EB	22ES	21ES	21	30	40JA	49JA	46	49JA	57JA	58JA	78JA	71JA	75JA	53JA	57JA	48	42	38JA	21JA	41JA	137JA
14	51JA	58JA	50JA	21JA	12EB	29JA	76JA	113JA	77JA	128	141JA	77	57	49	C	55JA	48	G	36	63	99	88JA	88JA	76JA
15	70JA	89JA	53JA	38JA	36JA	18G	36	72JA	67JA	73	59JA	47	47	113	83	115JA	48	67	94JA	151	88JA	75JA	52JA	50JA
16	40JA	37JA	40JA	29JA	19JA	50JA	38JA	42JA	52JA	103	84JA	66JA	98	58JA	76JA	52JA	41JA	38	29	25JA	109JA	96JA	43JA	59
17	53JA	41JA	28JA	20JA	22JA	24	49JA	47JA	66JA	51JA	65	47	96	60	98	C	45	55JA	72JA	66JA	33	63	32	42JA
18	25JA	41JA	32JA	35	20JA	40JA	54JA	54JA	52JA	133JA	70JA	70JA	74	54JA	46	59JA	44JA	38JA	42JA	51JA	53JA	123JA	100JA	24
19	20	18	17ES	28JA	24JA	30JA	65JA	53JA	42	54JA	54JA	67JA	65JA	65JA	52	65JA	65JA	52JA	57	43JA	144JA	81JA	51JA	48JA
20	45JA	36JA	35	29	39JA	22	37	69JA	99JA	90JA	67	74JA	50JA	49	37G	G	77JA	84	169JA	59JA	95	56JA	134JA	25ES
21	57	90	66JA	56JA	48JA	45JA	56JA	85JA	91	57	59	48JA	55	44	39G	52JA	92JA	83JA	75JA	56JA	34JA	53JA	80JA	46JA
22	87JA	54JA	44JA	31JA	15EB	C	42JA	56JA	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	48JA	53JA	58	48	66JA	83JA	G	48	106	92	58JA	170JA	68	52JA	49JA	43JA
24	24JA	15EB	29ES	36JA	C	C	C	C	C	78JA	69JA	82JA	90	46JA	42	42	38	53JA	52JA	38JA	26JA	27	52JA	61JA
25	121JA	76JA	45JA	39JA	27JA	26	36	81JA	97JA	91	89JA	47JA	56JA	63JA	46JA	43	38	36JA	44JA	52JA	54JA	22JA	47JA	52JA
26	50JA	31JA	44JA	28JA	31JA	31JA	G	34	G	57JA	48	62JA	53JA	68JA	48	44	92	58	53	58JA	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	79	93JA	48	62JA	115JA
28	52JA	53JA	29JA	42JA	33JA	21	31	47JA	56JA	53	70JA	104	66JA	50	55JA	107	148JA	83JA	68JA	40JA	27JA	25JA	41JA	48JA
29	48DS	23	53JA	24JA	25	20JA	30	54JA	84	45	57JA	170JA	43	43	49	43	G	138JA	114JA	37JA	21JA	40JA	39	41JA
30	52JA	50JA	36JA	25	39JA	34DS	37JA	46JA	42	43JA	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	68JA	53JA	C	C	G	46JA	70	57JA	118JA	122JA	98JA	85JA
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	27	26	27	27	27	28	27	26	28	28	26	26	28	28	28	29	28	28	28	27
MED	52JA	42JA	42JA	34JA	27JA	28	42JA	55JA	66JA	68JA	69JA	72JA	67JA	59JA	54	57	57JA	58JA	63JA	55JA	54JA	53JA	52JA	48JA
UQ	61JA	56JA	52JA	42JA	38JA	31JA	52JA	70JA	84JA	90	100JA	97JA	94JA	74	83JA	99JA	92JA	86JA	78JA	66JA	96JA	80JA	83JA	60JA
LQ	35JA	28JA	30JA	26JA	21	22	32	46JA	50JA	53JA	58JA	48JA	56JA	50JA	46	48	44	46JA	50	47JA	36JA	36JA	42JA	40JA

JUL. 1989 | FOES (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1989 | FBES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42'.4 N, Long. 139°29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	29	31	29	26	14 EB	23	38	55	70	46	51	46	45	49	61	70	159 AA	109 AA	139 AA	130 AA	51	47	25	C
2	40	21	26	24	16 EB	27	44	60	90 AA	96 AA	105 AA	50	45	56	G	45	50	52	61	49	71	43	27	31
3	42	41	37	32	31	27	29	38	42	43	43	57	65	67	63	45	47	35	G	18	13 EB	25	14 EB	14 EB
4	14 EB	14 EB	17	14 EB	12 EB	23	31	38	42	47	50	76	69	43	G	47	74	57	29	44	16	16	54	44
5	48	21	32	23	23	G	39	49	76	69	180 AA	70	69	48	65	69	75	38	43	42	25	28	31	18
6	20	47	20	47	32 US	72	91 AA	79	61	125 AA	152 AA	C	104 AA	69	132 AA	65	131 AA	173 AA	57	74	51	49	41	23
7	14 EB	22	18	18	18	27	36	55	56	79	215 AA	137 AA	131 AA	122 AA	65	46	48	55	67	31	27	17	21	27
8	19	28	23	24	18	24	G	39	64	71	96 AA	89 AA	86 AA	98 AA	107 AA	56	57	94 AA	79 AA	34	22	29	48	53
9	18	24	26	30	20	22	37	51	49	78	87	45	G	G	41	48	38	33	31	43	39	40	30	18
10	18	14 EB	12 EB	12 EB	13 EB	22	34	52	56	43	49	53	44	44	50	129 AA	45	94 AA	83	23	41	30	46	38
11	29	41	38	23	13 EB	24	37	42	67	91	50	161 AA	150 AA	182 AA	183 AA	137 AA	61	35	57	38	24	29	43	30
12	62	26	16	45	24	34	29	G	59 UR	54	68	48	48	57	113 AA	75	49	55	48	43	32	21	15 EB	14 EB
13	16 EB	21 ES	13 EB	22 ES	21 ES	17	29	G	42	42	47	49	47	46	67	75	51	46	38	29	21	18	18	68
14	18	25	21	14	12 EB	23	32	72	50	85	85	69	57 US	47	C	48	38	G	33	45	99 AA	40	22	44
15	43	73	36	28	26	16 G	35	60	61	70	52	46	44	113 AA	64	115 AA	40	63	63	80	41	44	24	36
16	24	28	31	13 EB	14 EB	21	38 L	36	46	75	79	53	71	56	76	50	38	36	27	21	23	17	24	30
17	27	19	19	16	18	21	32	36	56	49	53	44	88	51	91	C	42	45	60	48	23	60 US	24	15 EB
18	18	27	23	23	17	24	33	41	40	133 AA	46	70	73	52	44	49	39	32	34	29	44	123 AA	67	15 EB
19	13 EB	13 EB	17 ES	20	17	24	52	45	37	48	45	48	50	63	47	61	48	32	50	31	50	38	39	21
20	24	29	30	22	24	18 G	33	58	64	49	66 UR	59	45	43	37 G	G	38	40	169 AA	23	62	35	76	25 ES
21	57 US	90 US	39	31	24	25	53	76	71	56 US	59	44	46	42	39 UG	41	50	58	51	40	28	29	39	20
22	39	21	23	22	15 EB	C	30	41	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	40	42	41	45	62	47	G	45	106 AA	69	47	170 AA	68 US	25	21	20
24	14 EB	15 EB	29 ES	17	C	C	C	C	C	71	49	80	90 AA	43	41	40	36	32	34	25	23	18	39	41
25	121 AA	53	32	26	19	21	33	58	76	82	59	43	47	46	41	40	G	33	35	20	29	19	31	34
26	44	24	32	19	19	22	G	33	G	44	45	53	50	60	47	42	37	42	43	55	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	75	15 EB	23	26	23
28	25	40	16	29	23	21	29	40	51	49	53	104 AA	59	45	44	76	74	51	58	20	19	19	17	22
29	S	15	22	16	13 EB	14 G	29	47	71	42	54	55	43	43	47	41	G	52	70	19	17	28	25	24
30	31	30	19	18	20	S	30	40	42	45	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	62	49	C	C	G	41	63	36	35	16	43	51
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	28	28	28	27	25	27	27	27	28	27	26	28	28	26	26	28	28	28	29	28	28	28	27
MED	25	26	24	22	18	23	33	45	56	55	53	53	58	49	48	48	48	46	50	38	28	28	28	25
UQ	41	36	32	27	23	24	38	56	66	78	82	70	72	62	67	70	68	58	63	48	47	40	42	37
LQ	18	21	18	17	14 EB	21	30	38	42	46	49	46	46	46	41	45	38	35	34	25	22	19	23	20

JUL. 1989 | FBES (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1989 | FMIN (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42'.4 N, Long. 139° 29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	15	15	14	16	15	17	33	20	26	29	27	26	26	23	18	16	14	13	14	13	15	C
2	14	14	15	13	16	15	14	17	17	24	39	27	22	31	25	23	20	16	13	14	14	14	15	13
3	14	17	13	12	12	14	15	18	20	22	26	26	28	32	27	21	18	15	15	13	13	13	14	14
4	14	14	12	14	12	15	15	16	16	22	26	25	25	26	23	24	25	16	14	14	13	12	14	15
5	15	12	13	14	13	15	16	16	18	20	30	28	30	26	21	29	19	23	13	13	13	13	15	15
6	14	14	14	14	14	18	19	18	18	19	22	C	32	35	33	23	20	17	17	14	15	15	14	13
7	14	14	14	13	14	16	15	16	18	21	25	65	31	25	32	21	16	15	16	15	12	13	ES 17	ES 23
8	14	13	12	14	13	16	17	18	17	26	24	26	28	29	33	24	19	14	18	13	13	14	15	13
9	13	13	13	13	13	13	16	17	17	22	23	35	27	23	24	24	19	16	14	15	13	14	14	14
10	15	14	12	12	13	16	15	17	17	18	31	26	30	31	31	22	18	19	14	13	13	13	ES 18	13
11	12	13	13	14	13	14	14	16	18	22	27	25	30	24	31	18	18	16	14	15	14	14	13	14
12	13	13	13	14	13	13	ES 23	29	38	19	21	31	33	33	30	25	20	17	16	15	15	13	15	14
13	16	ES 21	13	ES 22	ES 21	14	16	17	20	20	35	24	28	28	26	21	18	15	12	13	12	13	14	14
14	13	13	13	12	12	14	15	27	16	17	21	27	35	30	C	21	18	15	16	13	15	13	15	13
15	14	12	13	12	14	13	16	17	19	19	23	32	26	32	27	26	21	19	15	15	12	14	14	15
16	14	15	14	13	14	13	14	18	17	19	30	20	26	33	25	21	18	17	14	14	12	15	15	13
17	14	14	13	13	14	16	16	17	20	20	25	29	24	31	29	C	19	16	13	13	12	14	13	15
18	15	14	14	15	14	15	17	18	19	22	27	25	38	25	28	24	19	17	17	14	15	14	15	15
19	13	13	ES 17	14	14	14	15	15	18	23	21	24	30	29	26	24	18	16	17	15	15	14	13	13
20	14	12	12	13	13	15	14	18	16	20	27	28	33	32	32	26	16	16	14	13	14	13	14	ES 25
21	ES 23	ES 17	14	14	14	13	17	16	17	ES 41	24	31	29	23	33	20	20	16	14	13	14	15	15	15
22	13	14	14	14	15	C	17	16	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	16	19	26	25	26	24	23	19	20	16	15	14	ES 18	13	14	13
24	14	15	ES 29	14	C	C	C	C	C	23	30	32	39	32	30	25	18	18	14	15	14	13	14	16
25	13	13	12	13	14	14	18	17	19	23	29	29	26	29	27	22	20	16	17	13	15	14	14	18
26	ES 20	13	13	13	14	14	17	17	21	23	26	35	33	33	32	25	19	17	17	16	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	12	15	15	15	14
28	14	17	12	13	14	14	15	17	20	26	28	32	28	25	22	18	16	17	13	13	15	13	13	14
29	ES 20	12	13	13	13	12	13	14	15	17	27	20	26	28	23	21	21	14	15	13	14	14	13	14
30	13	13	14	13	13	ES 20	16	16	19	21	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	25	24	C	C	20	16	14	16	13	13	14	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	27	26	27	27	27	28	27	26	28	28	26	26	28	28	28	29	28	28	28	27
MED	14	14	13	13	14	14	16	17	18	20	26	28	28	29	28	23	19	16	14	14	14	14	14	14
UQ	14	14	14	14	14	16	16	18	20	22	28	31	32	32	31	24	20	17	16	15	15	14	15	15
LQ	13	13	13	13	13	14	15	16	17	19	24	25	26	25	25	21	18	16	14	13	13	13	14	13

JUL. 1989 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1989 | M(3000)F2 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42'.4 N, Long. 139° 29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	270F	270F	F	280F	285F	275F	280	300	290	255	260	250	265	260	265	260	A	A	A	A	265	265	265F	265IC
2	265F	275F	280F	265	265	305	305	A	A	A	A	255	255	270	265	260	265	275	290	300	A	280JR	255	260V
3	265	280	280F	300F	285	290	295	290	295	265	260	275	260	270	265	270	280	285	290	290	280	270	270	275
4	270	280	300	290	290	305	300	300	285	270	245	270	260	270	265	265	270	285	280	290	275	265	265	270S
5	280	275	280	270	285F	305	300	280	285	280	A	260	C	270	265	270	275	270	285	285	285	265F	260F	260
6	255F	265	270	265	265IS	265	C	A	270	A	A	C	A	255	A	265	A	A	285	275	270JS	255F	265F	275F
7	285F	270	265	265	265	265	265F	270	285	270V	A	A	A	A	250	260	260	275	A	290	275	250	S	S
8	255	265	270	275	285	290IS	295	260	260	A	A	A	A	A	A	255	260	A	A	285	270	270F	270	255F
9	270F	275F	275	280F	295V	300	290	280V	255	250	A	255	245	245	255	255	260	265	275	285	275F	280F	255	265F
10	265	265	265	265	275F	290	300	285	280	270	245	265	255R	250	260	A	255	A	A	280	275	255F	260IS	260
11	270F	270S	285	265	270F	275	275	285	270	255	250	A	A	A	A	A	260	265	285	275	270	260	260	265
12	265F	285	285F	270	285F	300	S	R	R	270	255	255	255	255	A	255	265	265	285	285	275	265	265	270
13	280	280IS	285	S	S	295	285	285	290	250	255	255	250	250	255	255	250	255	275	280	270	275	265	A
14	265F	265	265	280	270	285	280	285	275	270	A	245	260	255	260IC	260	265	270	275	285	A	265	265	250
15	265F	270F	290F	285F	280	295	295	300	295	285	270	250	S	A	255	A	275	280	275	A	255	260	265	275F
16	275	270	275	275	270	270	280	310	275	265	260	260	260	275	265	270	265	275	290	290	265	255	255S	270F
17	270	265	275	280F	270	285	285	305	315	260	255	245	255	260	A	C	275	280	280	290	290	270IS	255	255
18	270	285	285S	270IS	265	270F	285	280	235	A	235	265	270R	260	270	265	265	275	285	290	285	A	A	270
19	280F	275IS	270S	265	270	285F	285	290	295	260	260	250	250	255	265	270	275	275	280	285	275	255	270	270
20	275	275	280	275	270	285	295	300	300	255	250	255	250	260	265	265	270	275	A	300F	280	275S	A	S
21	S	S	305F	300F	305F	310F	290	280	290	260IS	245	250	250	265	280R	275	260	270	270	285	305	285	260	275
22	265S	280S	270S	265	280	290IC	300	275	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	280	275Z	245	265	275	255	260	255	A	A	295	A	S	270	270	270
24	275	270	S	270	C	C	C	C	C	285	255	A	A	260	270	275	285	290	295	300	280	265	250F	270F
25	A	285	305F	305	285	305	290	285	320	A	265	270	265	265	265	270	280	280	300	285	270	270	270	280
26	280	285	285	290	285	305	315	300	290	285R	270	285R	260	260	270	275	A	280	290	290	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	275	270	280	280
28	270F	285S	275	280	295F	290	315	310	300	300	325V	A	275	280	275	275R	275	290	295	285	290S	270	270V	265F
29	265IS	265	285	285	275	295	300	300	325	280	285	275IR	265	270	275	280	285	280	290R	295	295	275	275	265
30	270F	280	310S	295V	270	S	285	285	285	290	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	270	275	275IC	280IC	280	290	300	295	285IS	275	275	280F
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	26	27	26	26	25	24	25	23	20	21	21	24	23	24	24	23	23	25	25	27	25	25
MED	270	275	280	275	278	290	290	285	285	270	255	255	260	260	265	265	268	275	285	285	275	270	265	270
UQ	275	280	285	285	285	300	300	300	295	280	262	265	265	270	270	272	275	280	290	290	285	272	270	275
LQ	265F	270	270	268	270	285	285	280	275	260	248	250	255	255	260	260	260	270	280	285	270	262	260	265

JUL. 1989 | M(3000)F2 (0.01)

IONOSPHERIC DATA

JUL. 1989 | M(3000)F1 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42'.4 N, Long. 139° 29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								A	A	L	355	370	390	365	A	A	A	A	A	A				
2							A	A	A	A	A	360	370	A	375	355	A	A	A	A				
3							L	L	395	L 395	395	A	A	A	A	350	A	L 370	L					
4							L	L	L	L	L 345	A	A	A	360	L 335	A	A	L					
5								L	A	A	A	A	A	370	A	A	A	L	A					
6						A	A	A	A	A	A	C	A	A	A	A	A	A	A	A				
7							L	A	A	A	A	B	A	A	A	A	A	A	A					
8							L	L	A	A	A	A	A	A	A	A	A	A	A	A				
9							L	L	L	A	A	L 380	380	H 395	385	A	L 375	L 365	L	A				
10						L		L	A	L 390	L	A	385	405	A	A	L 340	A	A					
11							L		A	A	L	A	A	A	A	A	A	L	A	A				
12								L	R	A	A	U L 360	L 370	A	A	A	L	A	A					
13								L	U L 375	370	L 365	360	U L 365	365	A	A	A	A	L					
14							L	A	L	A	A	A	S	H 375	C	L 335	355	H 370	L	A				
15							L	A	A	A	A	L 365	H 380	A	A	A	360	A	A	A				
16						L	L	L	L	A	A	A	A	A	A	L	L 350	U L 355	L					
17							L	L	A	L 350	A	375	A	A	A	C	A	L	A					
18						L		L	L	A	365	A	A	L	375	A	L 350	U L 375	L					
19							A	A	L	350	L 390	350	A	A	R 350	A	L	L	A					
20							L	A	A	355	A	A	365	375	380	L 365	L 370	L	A					
21							A	A	A	S	395	395	345	L 395	R 355	L 385	A	A	A					
22							L		C	C	C	C	C	C	C	C	C	C	C	C				
23						C	C	C	375	U L 380	395	395	A	380	375	330	A	A	A					
24						C	C	C	C	A	L 335	A	A	380	385	L 390	395	L 365	L					
25							L	A	A	A	A	390	355	L 360	385	L	U L 370	U L 365						
26								L	L	L	L	L	L	A	L	U L 355	A	L	A					
27						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
28							L	L	L	A		A	A	355	380	A	A	A	A					
29							L	A	A	L 390	A	A	L	H 395	360	U L 365	L 365	A	A					
30						S	L	L	L	L 365	C	C	C	C	C	C	C	C	C					
31						C	C	C	C	C	C	C	A	U L 345	C	C	365	L	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									3	9	9	11	10	14	12	10	11	7						
MED									375	L 370	365	370	370	375	375	L 355	L 365	L 365						
UQ									385	L 390	395	385	380	395	382	L 365	L 370	L 370						
LQ									375	355	L 355	360	365	365	360	L 335	352	L 365						

JUL. 1989 | M(3000)F1 (0.01)

IONOSPHERIC DATA

JUL. 1989 | H'F2 (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42'.4 N, Long. 139° 29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								290	335EA	375L	375	415	390	400	390	400A	A	A	A	A				
2							270	A	A	A	A	415	430	390	380	380	375	355	315	285EA				
3							290	300	285	370	395	355	415	380	375	360	330	330	310					
4							280	280	270	L	445	390	380	365	385	390	380EA	315	315					
5								325	375EA	350	A	400EA	410A	385	400	370	370A	335	320					
6						A	A	A	300A	A	A	C	A	395	A	360	A	A	310A	A				
7							310L	295A	310	390EA	A	A	A	A	450EA	430	385	340	A					
8							265	350L	A	A	A	A	A	A	A	430	430	A	A	310A				
9							280	295	360L	445EA	A	415	435	425	405	385	365	355	315	305A				
10						285		310	310	330	385L	370	400	390	385	A	385	A	A					
11							340L		345EA	450EA	380L	A	A	A	A	A	390	360	325A	320				
12								295	R	355	395	385	400	400	A	410EA	380	340	310					
13								290	315	405	405	390	375	420	400	A	395	375	350					
14							275	300A	325	400EA	A	420	400	385	370IC	375	370	340	310	305A				
15							265	280A	285	335EA	375	415	415	A	400	A	345	350	340A	A				
16						300L	300L	255	330	410EA	A	375	375	350	420EA	375	390	335	290					
17							290	280	265	385	390	430	A	400	A	C	345	330	340EA					
18						325L		320L	290L	A	480	400	370	385	380	360	370	325	310					
19							270	280	290	395	385	445	425	440	420	410	L	345L	330					
20							290	285	290A	400	425	395	420	395	370	360	345	335	A					
21							290A	A	335EA	S	415	410	410	375	360	350	380	360	350					
22							275		290IC	335IC	C	C	395IC	375IC	365IC	350IC	330IC	325IC	C					
23						C	330IC	350IC	345	385	455	375	385	435	435	420	A	A	305A					
24						C	C	270IC	340IC	340	405	A	A	400	370	355	325	320	305					
25							280	315	300A	A	385	365	385	395	385	350	360	330						
26								275	290	L	360	335	390	380	355	335	A	315	305					
27						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
28							250	265	300A	305		A	360	350	340H	395EA	375EA	300A	305EA					
29							265	275	280	330	330	275	385	365	350	345	335	325	325EA					
30						S	315L	310	300L	310	C	C	C	C	C	C	C	C	C					
31						C	C	C	C	C	C	C	350	355	C	C	325	305	290EA					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						3	20	24	26	21	18	21	23	25	23	23	24	24	22	5				
MED						300L	280	292	295	355U	392	392	395	390	382	368	369	335	311	305A				
UQ						312L	295	310	322	383	415	415	412	400	398	393	382	348	322	310A				
LQ						292	270	280	290	335	380	375	382	375	370	358	345	325	305	305A				

JUL. 1989 | H'F2 (KM)

IONOSPHERIC DATA

JUL. 1989 | H'F (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42'.4 N , Long. 139° 29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	325	335	300	300	265	245	A 250	A	A	E A 250	E A 260	230	210	E A 255	A	A	A	A	A	A	E A 360	A	335	C
2	A 360	305	310	305	340	275	A	A	A	A	A	E A 245	230	A	230	E A 255	A	A	A	A	A	A	A 360	E A 365
3	A 360	E A 335	A 315	285	E A 305	260	250	235	210	205	220	A	A	A	A	275	A	235	250	280	275	320	300	310
4	310	290	260	270	265	260	245	245	235	A 270	265	A	A	A	245	A	A	A	A 255	E A 280	270	310	E A 360	E A 325
5	E A 330	300	A 310	305	280	255	255	A	A	A	A	A	A	235	A	A	A	E A 270	A	A 280	285	E A 335	A 355	340
6	340	E A 360	320	A	S 330	A	A	A	A	A	A	C	A	A	A	A	A	A	A	A	A	A	A 370	305
7	285	305	325	330	320	270	A 255	A	A	A	A	B	A	A	A	A	A	A	A	275	315	330	315	A 335
8	335	320	305	285	280	255	230	235	A	A	A	A	A	A	A	A	A	A	A	A	305	E A 330	E A 360	A
9	315	305	300	305	265	250	A 260	A	E A 265	A	A	225	230	H 200	225	A	225	235	280	A	335	A 300	A 360	310
10	310	305	300	315	300	255	265	A	A	210	E A 265	A	230	195	E A 280	A	E A 280	A	A	295	E A 335	A 365	E A 345	E A 345
11	E A 340	E A 345	280	315	310	260	A 260	265	A	A	A	A	A	A	A	A	A	E A 260	A	A	315	330	E A 360	320
12	A	295	260	E A 340	A 300	245	235	255	R	A	A	E A 240	A 235	A	A	A	A	A	A	A	A 290	300	300	300
13	285	E S 290	265	290	305	255	225	210	230	220	225	240	H 250	240	A	A	A	A	A	E A 280	285	270	280	A
14	315	330	300	265	280	250	250	A	E A 275	A	A	A	S	225	C	E A 260	250	H 230	E A 270	A	A	E A 350	A 285	E A 385
15	E A 370	A	A 305	295	280	250	240	A	A	A	E A 270	235	H 220	A	A	A	E A 260	A	A	A	E A 350	E A 375	325	335
16	300	310	315	285	295	260	250	235	E A 260	A	A	A	B	A	A	A	255	250	255	275	310	335	360	E A 335
17	315	310	285	275	295	255	260	235	A	A 255	A	225	A	A	A	C	A	A	A	E A 290	A 270	A	330	350
18	315	285	280	A 300	325	285	A 255	E A 260	A 240	A	250	A	A	E A 290	225	A	250	240	A 275	285	A	A	A	285
19	280	310	305	320	300	265	A	A	205	E A 260	220	E A 265	A	A	E A 260	A	A	250	A	E A 275	A	E A 355	E A 325	285
20	285	A 310	295	280	A 320	270	245	A	A	245	A	A	240	225	230	235	220	A	A	260	A	320	A	S
21	S	A	A 290	285	255	260	A	A	A	S	210	205	A	205	E R 255	225	A	A	A	E A 295	260	280	A 355	305
22	A 350	310	305	310	285	I C 265	255	260	I C 240	I C 230	C	C	C	I C 220	I C 215	C	I C 230	C	I C 260	I C 290	I C 270	I C 295	C	C
23	I C 335	I C 330	I C 310	I C 280	I C 295	I C 310	C	C	235	220	H 205	210	A	H 235	235	A	A	A	A	A	A	325	310	290
24	295	305	E S 315	310	I C 310	C	C	C	C	A	E A 285	A	A	220	H 225	H 215	210	245	A	260	A 270	310	E A 395	E A 370
25	A	320	275	265	285	245	245	A	A	A	A	215	255	245	225	225	230	235	270	270	310	310	A 325	A 305
26	A 325	285	A 305	275	285	265	245	230	210	250	H 225	A	E A 275	A	E A 290	E A 250	A	A	A	A	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	280	320	310	305
28	A 330	A 295	305	A 335	300	270	240	245	A	A	E A 265	A	A	E A 250	230	A	A	A	A	270	275	290	300	335
29	S	295	290	270	285	255	240	A	A	205	A	A	H 215	H 200	A 250	245	235	A	A	270	245	A 300	295	A 325
30	A 320	E A 305	255	240	320	S	250	A 255	250	E A 245	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	A	E A 270	C	C	235	A	A	E A 270	E A 300	265	A 320	E A 335
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	27	29	28	29	26	23	13	12	13	13	11	11	16	15	9	12	10	8	18	22	24	26	24
MED	318	305	300	290	295	260	250	240	229	U 232	U 230	222	230	221	228	235	232	238	262	274	282	310	A 319	315
UQ	A 332	315	308	309	310	265	255	255	A 248	A 248	E A 265	235	242	242	241	E A 255	247	248	272	A 282	310	326	A 348	A 332
LQ	310	296	285	278	280	255	242	235	220	215	220	220	225	212	225	225	228	235	255	270	270	300	305	305

JUL. 1989 | H'F (KM)

IONOSPHERIC DATA

JUL. 1989 | H'E (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42'.4 N, Long. 139° 29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						125	115	115	130	110	110	115	115	115	115	115	115	110	115	B				
2						135	115	110	115	115	A	115	115	110	115	115	115	115	A 120	B				
3						A	115	110	115	110	115	115	115	110	120	115	110	115	120	B				
4						130	115	115	110	105	115	115	120	120	120	115	120	120	A	B				
5						140	115	115	110	110	A	A	A	A	A	A	A	A	A	B				
6						B	120	120	115	115	110	C	120	A	A	120	115	115	120	B				
7						130	115	110	110	110	110	B	120	115	A	A	A	A	A	B				
8						A	130	115	A	115	110	A	120	115	A	115	120	120	125	B				
9						A	115	115	110	115	115	125	115	115	115	115	115	120	A 120	B				
10						A	120	115	115	115	125	115	120	A	125	120	110	115	125	B				
11						130	120	115	110	110	115	120	115	115	120	A	A	A	A	B				
12						A	A	120	B	105	105	110	A	A	A	A	A	A	A	B				
13						E A 145	A 120	110	110	105	A	105	110	115	110	110	105	A	A	B				
14						125	115	A	110	105	110	110		115	I C 115	105	115	110	115	B				
15						E A 135	115	110	105	110	110	120	115	120	A	A	110	115	115	B				
16						A	255	120	110	A	A	A	A	A	A	A	A	A	E A 130	B				
17						130	115	110	105	105	A	A	A	A	A	C	115	110	A	B				
18						130	120	115	115	115	120	115	A	A	A	A	A	A	A	B				
19						130	115	110	115	115	A	A	A	A	A	115	110	120	125	B				
20						E A 150	E A 145	115	110	110	120	110	A	A	E A 140	120	115	115	A	B				
21						A	120	115	115	S	220	A	A	A	A	A	A	A	A					
22							110	110	I C 110	I C 115	I C 115	I C 110	I C 115	I C 110	I C 120	I C 115	I C 110	I C 110	C	C				
23						C	I C 120	C	110	110	A	120	115	115	120	115	120	115	125					
24						C	C	C	C	120	125	E B 125	A	A	120	120	115	A	A					
25						A	120	115	115	115	A	A	A	A	A	E A 130	E A 130	A	A					
26						B	120	A	120	115	120	120	120	A	120	120	115	A	A					
27						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
28						E B 140	120	115	120	110	A	A	115	110	110	A	A	A	A					
29						E A 140	A	A	110	110	115	110	A	115	115	115	115	115	120					
30						S	120	A 130	120	115	C	C	C	C	C	C	C	C	C					
31						C	C	C	C	C	C	C	110	115	C	C	115	120	120					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						15	26	24	26	27	19	18	17	16	16	18	21	17	14					
MED						130	119	115	110	110	115	115	115	115	119	115	115	115	120					
UQ						E E 140	120	115	115	115	120	120	120	115	120	120	115	120	125					
LQ						130	115	110	110	110	110	110	115	112	115	115	110	115	120					

JUL. 1989 | H'E (KM)

IONOSPHERIC DATA

JUL. 1989 | H'ES (KM) | 135°E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42'.4 N Long. 139°29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	100	115	115	135	140	125	125	115	115	110	120	120	125	115	130	125	120	105	105	115	115	105	C
2	100	100	105	105	110	120	115	115	110	110	110	110	115	110	G	145	125	120	115	110	115	110	110	115
3	115	105	110	110	110	110	115	110	110	110	EG 150	130	120	115	125	130	135	135	G	115	115	115	100	110
4	115	120	100	110	B	160	145	125	125	115	115	115	115	120	G	135	120	120	115	110	120	110	110	105
5	105	110	100	100	105	G	125	120	115	105	110	110	110	115	110	110	110	115	105	105	110	125	120	110
6	125	110	110	105	100	120	125	125	120	120	115	C	110	115	115	120	125	115	115	110	110	120	120	120
7	110	110	105	110	105	120	115	115	110	115	115	120	115	110	115	120	115	110	110	110	100	110	115	115
8	105	105	100	100	100	105	155	120	120	120	115	110	110	110	110	115	125	125	120	110	125	105	120	110
9	105	105	100	95	100	140	125	115	120	125	115	120	G	G	135	125	EG 165	EG 155	120	115	120	120	115	110
10	105	100	110	B	110	125	120	110	110	120	115	110	115	115	155	135	135	130	125	120	110	125	120	115
11	110	105	105	110	115	130	130	135	110	110	115	115	110	110	115	110	110	110	110	105	105	105	100	100
12	120	110	115	125	110	110	115	G	115	105	105	110	110	110	105	105	105	105	105	100	100	95	115	110
13	100	S	B	S	S	130	140	115	115	110	110	115	110	115	115	110	110	105	105	100	100	100	105	115
14	115	110	110	105	B	130	115	125	115	105	115	115	110	110	C	125	135	G	120	115	120	115	110	115
15	105	105	95	95	115	95	115	115	110	110	110	150	130	115	115	130	135	125	120	115	110	110	105	105
16	100	100	95	100	105	110	110	120	105	105	110	105	105	105	110	105	110	140	115	110	110	120	115	110
17	110	105	110	115	105	130	115	115	110	110	110	110	105	110	105	C	130	125	115	100	100	105	105	120
18	100	105	105	95	105	120	120	115	115	110	115	115	110	110	105	110	110	105	120	115	110	105	110	100
19	100	110	S	110	105	120	115	110	115	110	110	105	105	135	130	130	120	125	120	115	130	120	110	115
20	105	105	100	100	100	120	135	120	115	115	115	110	110	110	115	G	130	120	110	115	100	105	110	S
21	115	105	110	115	115	115	115	115	115	120	110	115	115	115	115	110	105	105	100	105	100	115	115	110
22	110	105	105	105	B	C	115	115	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	120	115	115	125	115	115	G	EG 170	120	115	115	115	115	110	105	105
24	120	B	S	110	C	C	C	C	C	115	115	110	115	115	125	115	115	110	110	105	105	105	120	115
25	110	105	105	105	105	105	125	115	110	115	110	115	110	110	110	145	EG 175	105	125	120	115	110	110	105
26	110	105	110	105	110	110	G	120	G	115	120	110	115	115	120	115	115	110	105	105	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	115	120	115	110	120
28	110	110	105	110	105	145	130	125	115	100	105	100	105	105	105	100	95	100	100	100	95	95	110	120
29	110	95	100	100	100	115	140	130	110	115	115	110	110	EG 150	130	135	G	115	115	110	110	110	105	105
30	105	105	105	100	110	135	135	125	125	115	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	110	110	C	C	G	125	115	115	120	125	120	120
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	26	25	26	23	25	26	26	26	28	27	26	27	27	23	25	26	27	27	29	28	28	28	26
MED	110	105	105	105	105	120	122	118	115	115	115	112	110	112	115	120	119	115	115	110	110	110	110	110
UQ	112	110	110	110	110	130	130	125	115	115	115	115	115	115	122	130	128	125	120	115	118	118	115	115
LQ	105	105	100	100	105	110	115	115	110	110	110	110	110	110	110	110	110	110	108	105	102	105	105	105

JUL. 1989 | H'ES (KM)

IONOSPHERIC DATA

JUL. 1989 | TYPES OF ES | 135° E Mean Time (G.M.T. + 9 h)

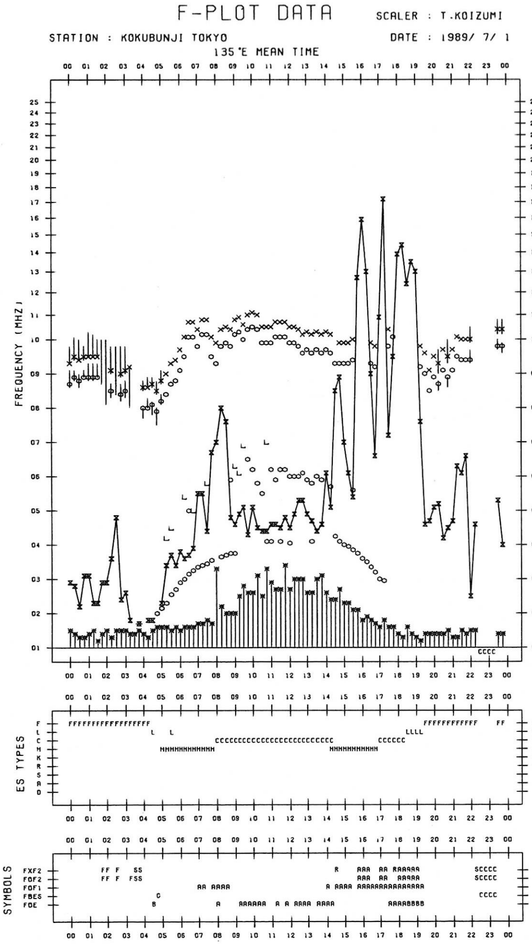
Station KOKUBUNJI TOKYO Lat. 35°42'.4 N , Long. 139°29'.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

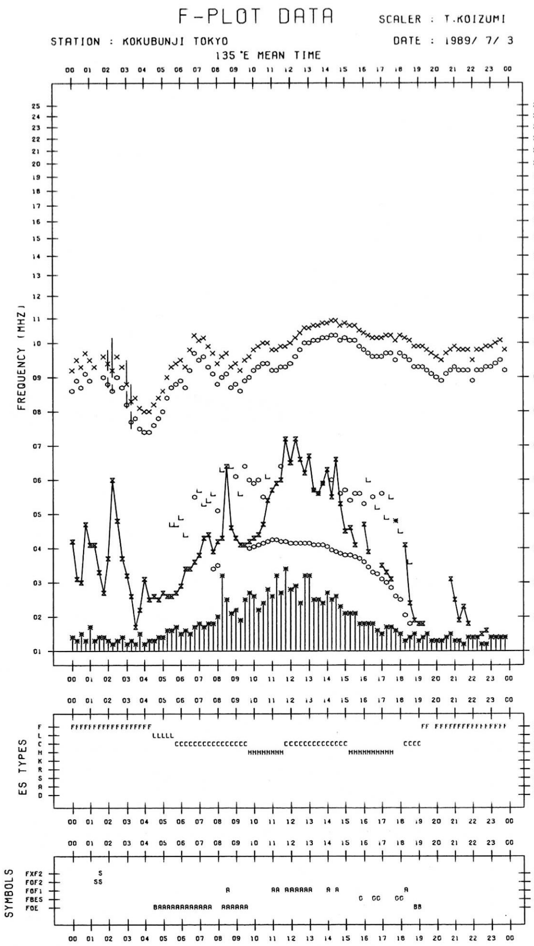
Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 3	F 5	FF 23	FF 22	FF 21	H 1	H 2	H 2	C 2	C 2	C 2	C 2	C 1	C 1	C 2	H 3	H 3	C 4	C 4	L 5	FF 24	FF 24	F 4	
2	F 4	F 3	F 2	F 3	F 1	C 2	C 5	C 4	C 3	C 3	C 2	C 2	C 2	C 2		H 2	H 3	H 3	CL 41	C 5	F 5	F 5	F 5	F 5
3	F 5	F 3	F 5	F 5	F 4	L 3	C 2	C 2	C 1	C 2	H 1	H 1	C 2	C 2	C 2	C 2	H 1	H 1		C 2	F 1	FF 24	F 2	F 2
4	F 1	FF 32	F 4	F 1		H 1	H 2	H 2	H 2	C 2	C 2	C 2	C 2	C 2		H 2	C 3	C 3	L 3	L 4	F 3	F 2	F 5	F 3
5	F 4	F 4	F 5	F 3	F 3		H 3	C 3	C 3	C 3	C 2	C 2	C 2	C 2	C 2	C 2	C 3	L 2	L 3	L 4	F 3	FF 34	FF 24	F 4
6	FF 32	F 4	F 2	F 4	F 1	C 3	C 2	C 3	C 2	C 3	C 2		C 2	C 2	C 4	C 2	C 3	C 4	C 4	L 5	F 3	F 5	FF 35	FF 25
7	F 2	F 4	F 5	F 4	FF 22	C 3	C 3	C 3	C 2	C 3	C 2	C 3	C 2	C 2	L 2	L 3	L 3	L 3	L 4	L 5	F 4	F 4	F 1	F 1
8	F 4	F 4	F 3	F 3	F 2	L 1	H 1	C 2	CL 31	C 2	C 3	L 2	C 3	C 3	L 3	C 2	C 3	C 3	C 2	L 3	FF 24	F 4	FF 45	FF 54
9	F 4	F 3	F 2	F 5	F 3	CL 21	CL 31	C 3	C 2	C 3	C 2	C 1			H 1	H 2	H 1	HL 11	CL 31	CL 52	FF 34	F 5	F 5	F 3
10	F 4	F 2	F 1		F 1	L 1	C 3	C 4	C 3	C 2	C 2	C 2	C 2	L 1	H 1	H 2	H 2	H 3	C 4	C 4	F 4	FF 24	F 3	F 4
11	F 4	F 4	F 3	FF 33	FF 21	C 2	H 3	H 3	CL 33	C 2	C 2	C 3	C 3	C 3	C 3	L 3	L 3	L 3	L 3	L 3	F 5	F 6	F 5	F 5
12	FF 34	FF 24	FF 24	FF 25	F 5	L 4	C 1		L 1	C 2	C 2	C 2	L 2	L 2	L 3	L 3	L 3	L 3	L 2	L 5	F 4	F 4	FF 21	FF 21
13	F 2					L 1	HL 11	C 1	C 2	C 1	C 1	C 2	C 2	C 2	C 2	C 3	C 3	L 3	L 3	L 4	F 4	F 2	FF 23	FF 32
14	FF 12	FF 32	FF 22	F 1		C 1	C 3	C 2	C 3	C 3	C 3	C 2	C 1	C 2		H 2	H 1		C 3	C 4	F 3	F 4	FF 24	F 5
15	F 5	F 6	F 5	F 5	FF 24	L 1	C 3	C 3	C 4	C 3	C 3	HC 11	H 1	C 3	CH 21	HL 31	H 2	C 2	C 3	C 5	F 5	F 5	F 5	F 5
16	F 5	F 5	F 4	F 2	F 2	C 3	C 3	C 3	C 3	L 3	L 3	L 2	L 3	L 2	L 3	L 3	L 2	HL 12	CL 22	C 3	F 5	FF 24	FF 12	FF 42
17	FF 23	F 3	FF 22	FF 21	FF 12	C 1	C 3	C 2	C 3	L 2	L 3	L 2	L 3	L 2	L 3		H 2	H 3	CL 42	L 4	F 4	F 2	F 3	FF 22
18	F 2	FF 22	FF 22	F 2	F 1	C 2	C 3	C 3	C 2	C 3	C 2	C 2	L 2	L 3	L 2	L 2	L 2	L 3	CL 22	CL 33	FF 44	F 5	F 5	F 2
19	F 1	F 1		FF 22	F 1	C 3	C 4	C 3	C 1	C 1	C 2	L 2	L 2	HL 22	HL 11	H 2	H 3	H 2	C 3	C 4	FF 25	FF 24	F 4	F 5
20	F 4	F 5	F 5	F 4	F 4	L 1	HL 22	C 3	C 3	C 2	C 2	C 2	L 2	L 2	L 1		H 1	C 3	L 3	L 3	F 5	FF 33	F 5	F 1
21	F 1	F 3	F 3	FF 23	FF 32	CL 31	C 3	C 3	C 3	C 1	C 2	L 1	L 2	L 2	L 1	L 2	L 3	L 3	L 3	F 4	F 4	FF 23	FF 32	F 3
22	F 3	F 2	F 4	F 2			C 1	C 1																
23									C 2	C 2	L 1	C 1	C 2	C 2		H 1	C 2	C 3	C 3	F 3	F 2	F 4	F 3	F 2
24	F 1			F 2						C 2	C 2	C 3	C 2	C 1	C 1	C 1	C 1	L 2	L 3	F 3	F 4	F 3	FF 34	F 6
25	F 3	F 4	F 4	F 3	F 3	L 1	C 1	C 4	C 3	C 3	L 2	L 1	L 2	L 2	L 1	HL 11	HL 11	L 2	HL 11	FF 12	F 3	F 2	F 4	F 2
26	F 3	F 5	F 5	F 3	F 2	L 2		L 2		C 2	C 2	C 2	C 2	L 2	C 2	C 2	C 3	L 4	L 3	F 3				
27																				F 5	F 2	F 3	F 3	FF 13
28	F 5	F 3	F 3	F 4	F 3	H 1	H 1	C 2	C 3	C 2	L 2	L 3	C 3	C 2	C 3	L 3	L 4	L 4	L 3	F 3	F 2	F 3	FF 22	FF 23
29	F 1	F 2	F 3	F 2	F 2	L 1	HL 22	HL 22	C 4	C 1	C 2	C 2	L 1	H 1	H 2	H 1		C 4	C 4	F 3	F 2	F 5	F 4	F 4
30	F 4	F 5	FF 23	FF 22	F 3	C 1	H 2	C 2	C 2	C 2														
31													C 2	C 2				H 2	C 4	F 4	F 3	FF 22	FF 14	FF 14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

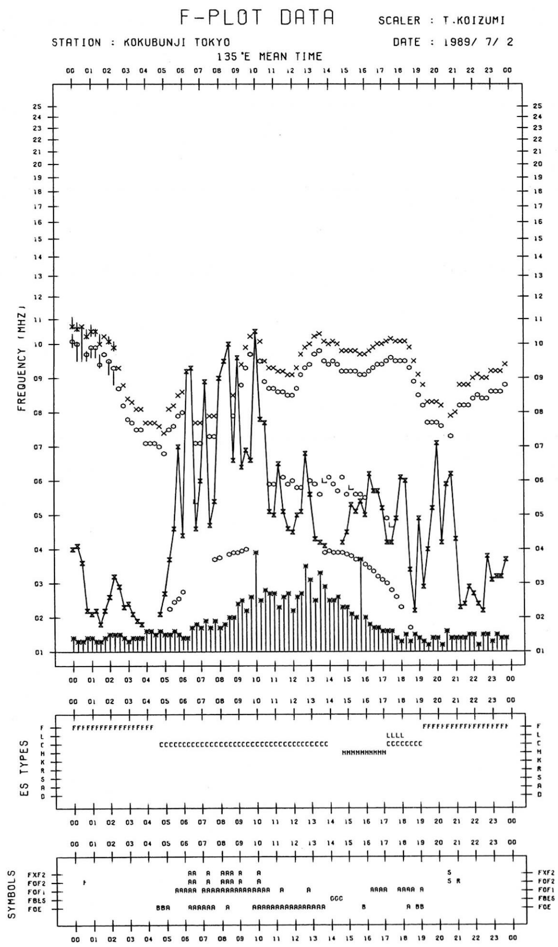
JUL. 1989 | TYPES OF ES

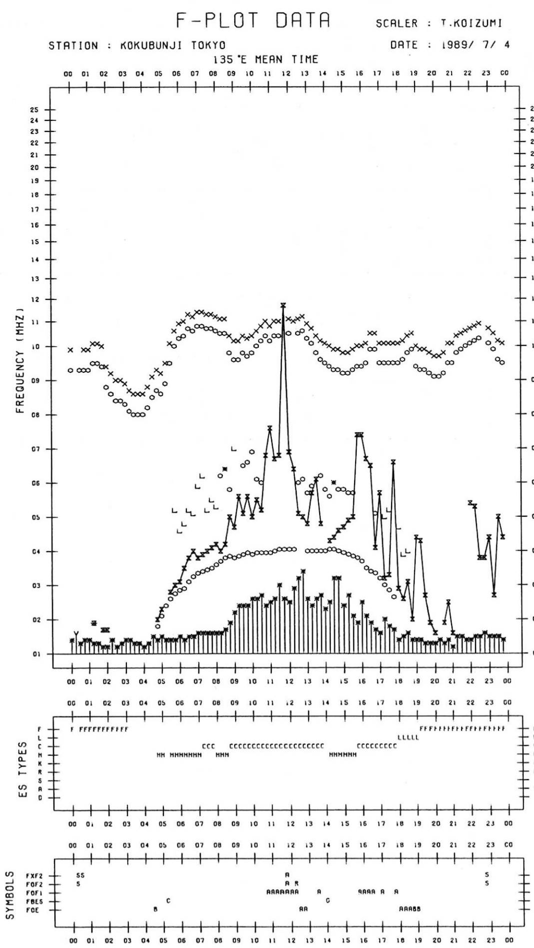
f-PLOTS OF IONOSPHERIC DATA

KEY OF F-PLOT	
!	SPREAD
⬡	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
∟	ESTIMATED FOF1
↑, Y	FMIN
∧	GREATER THAN
∨	LESS THAN


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/ 1
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/ 3
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/ 2
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

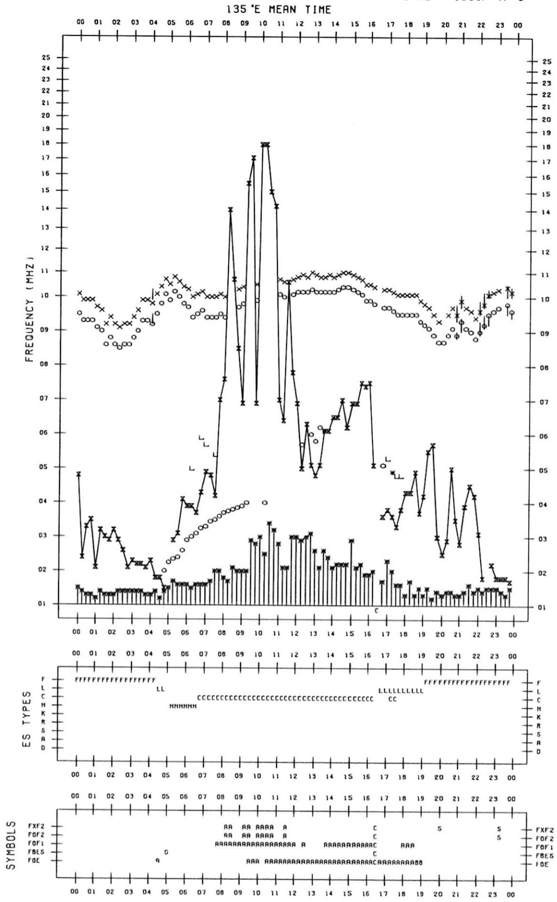

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/ 4
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO

DATE : 1989/ 7/ 5

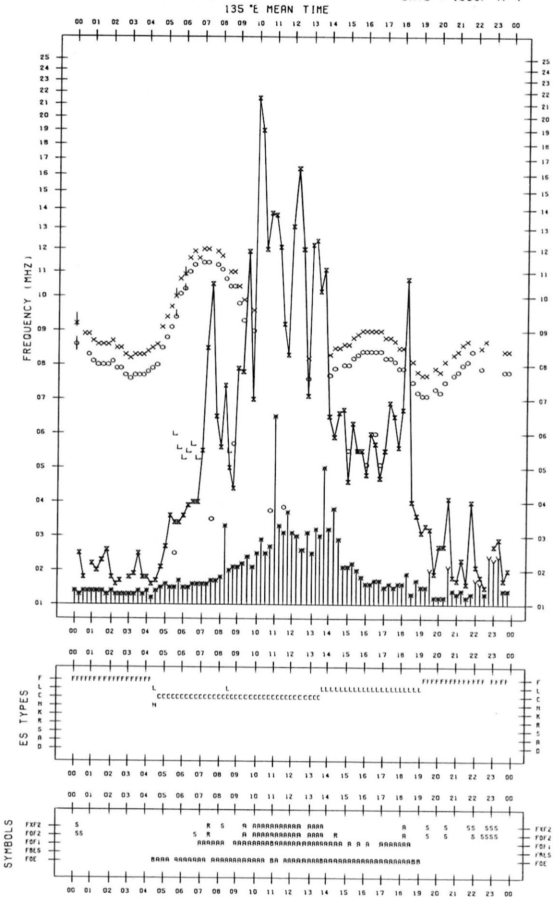


F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO

DATE : 1989/ 7/ 7

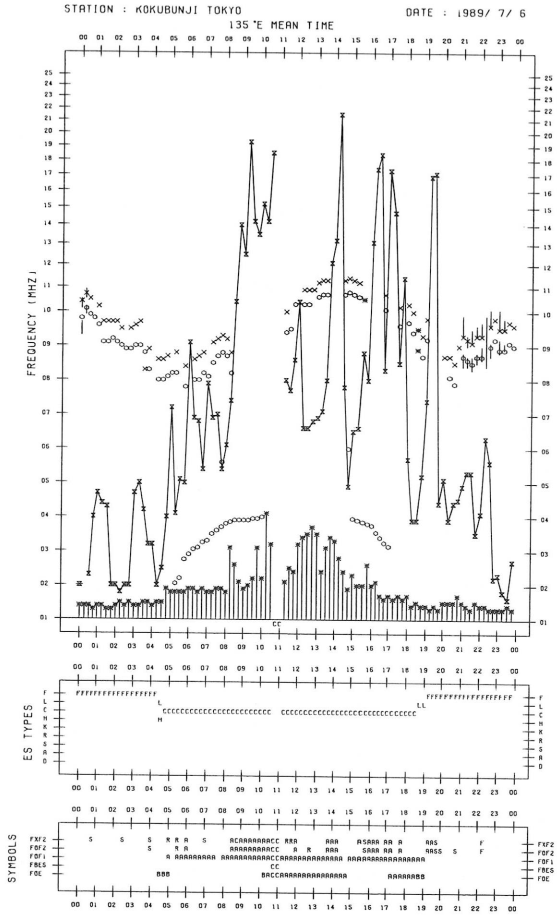


F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO

DATE : 1989/ 7/ 6

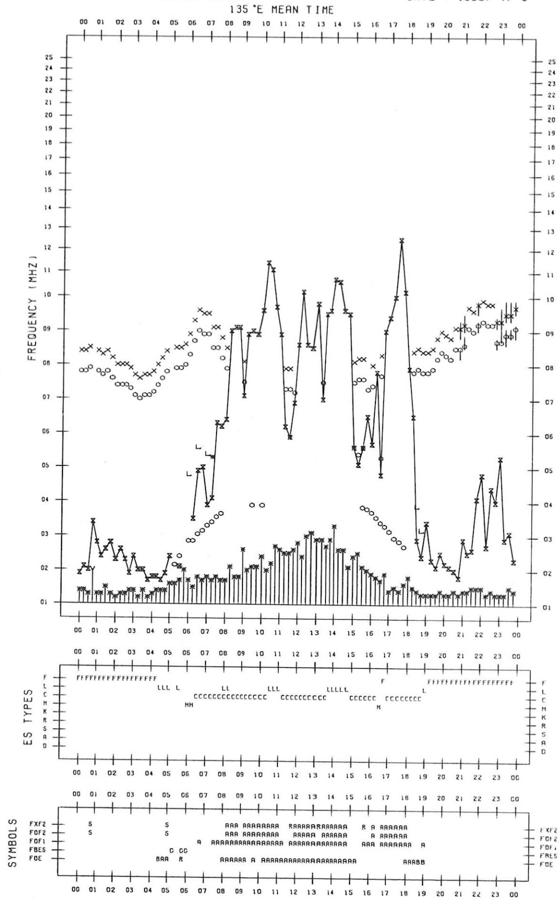


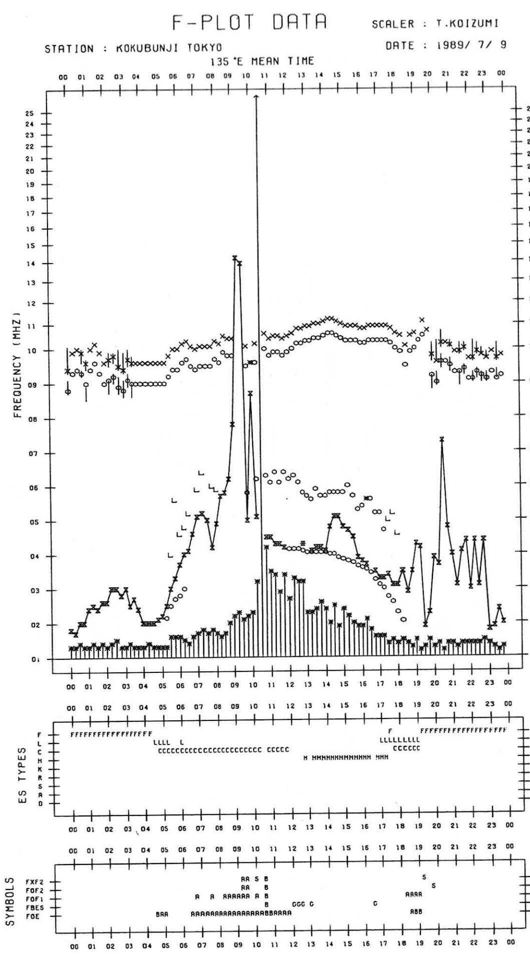
F-PLOT DATA

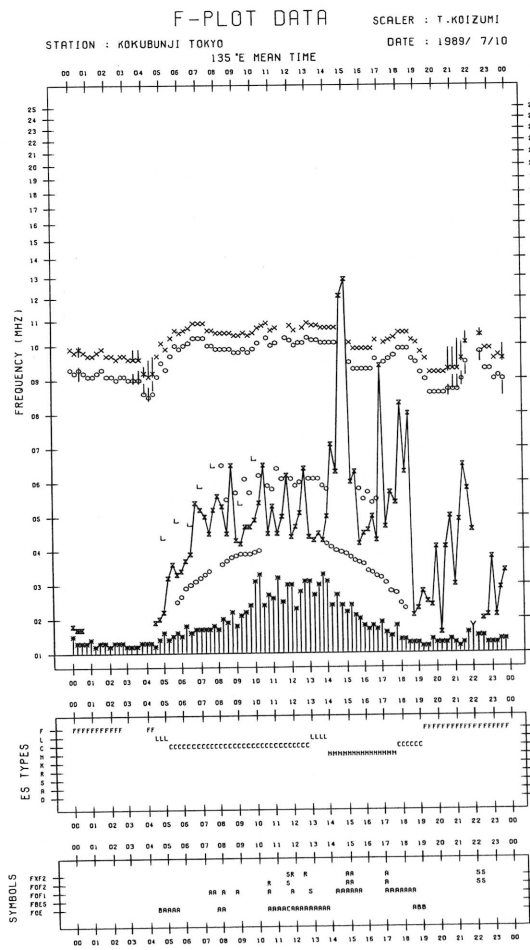
SCALER : T.KOIZUMI

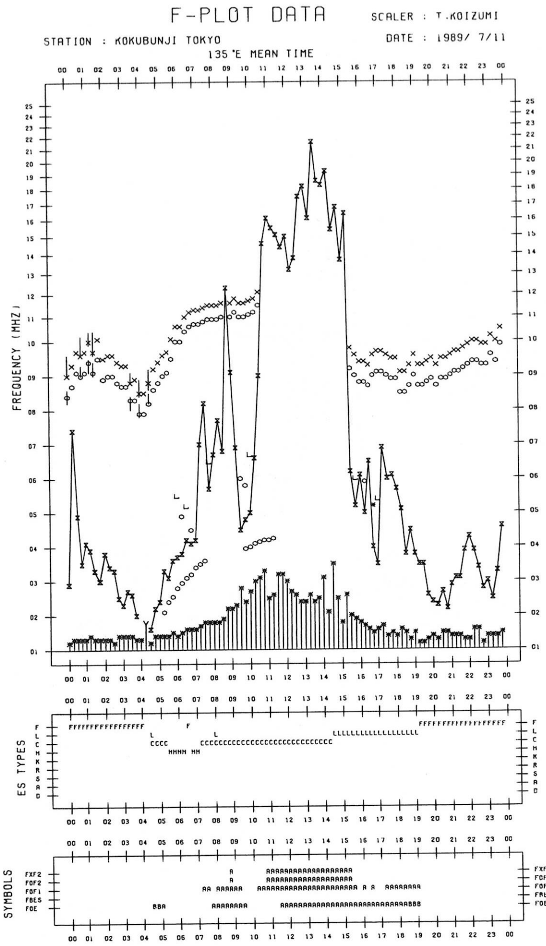
STATION : KOKUBUNJI TOKYO

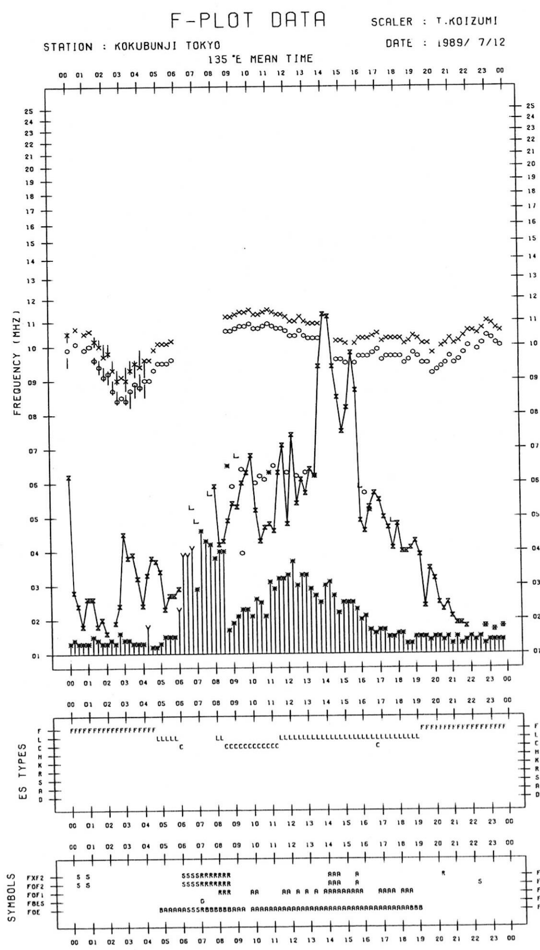
DATE : 1989/ 7/ 8




F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/ 9
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/10
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/11
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/12
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

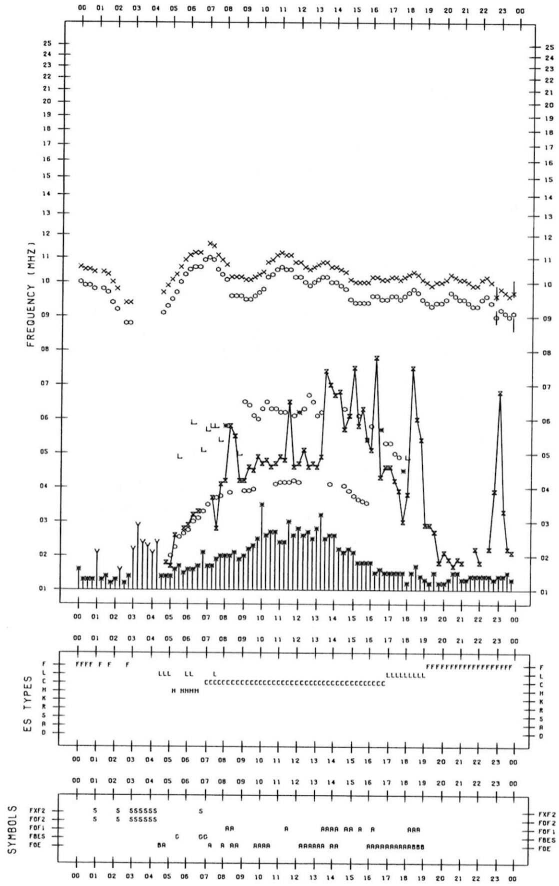
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO

DATE : 1989/ 7/13

135 °E MEAN TIME



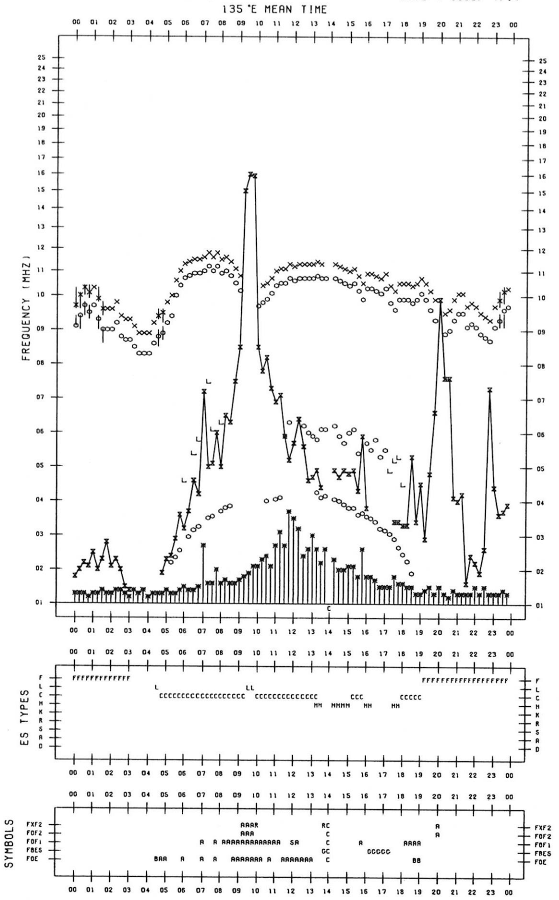
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO

DATE : 1989/ 7/14

135 °E MEAN TIME



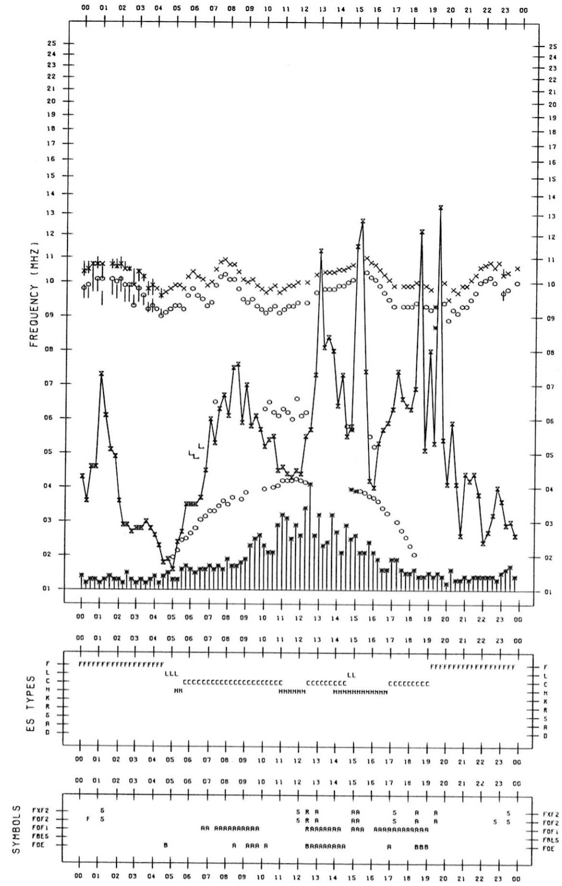
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO

DATE : 1989/ 7/15

135 °E MEAN TIME



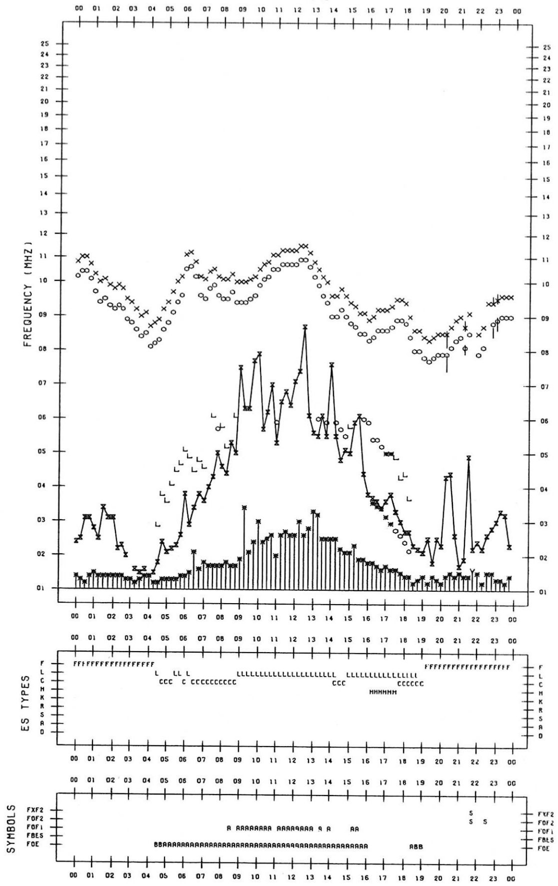
F-PLOT DATA

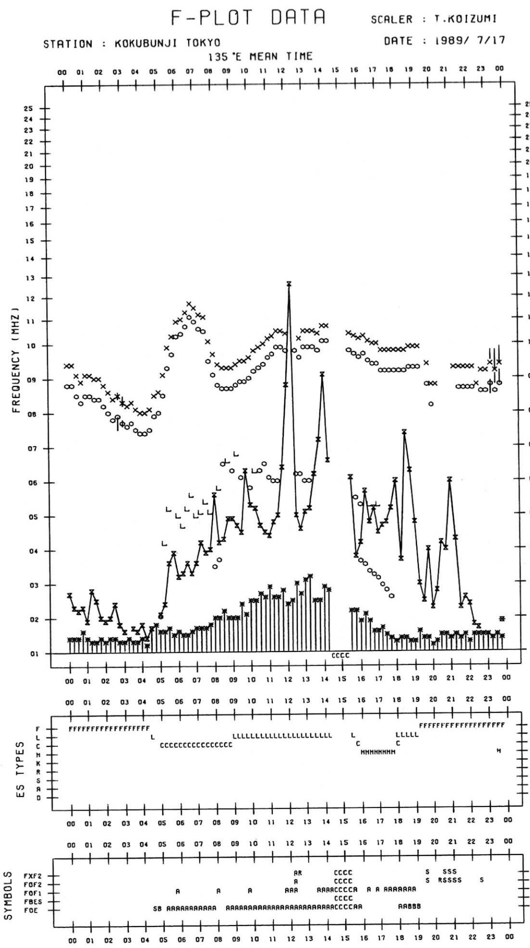
SCALER : T.KOIZUMI

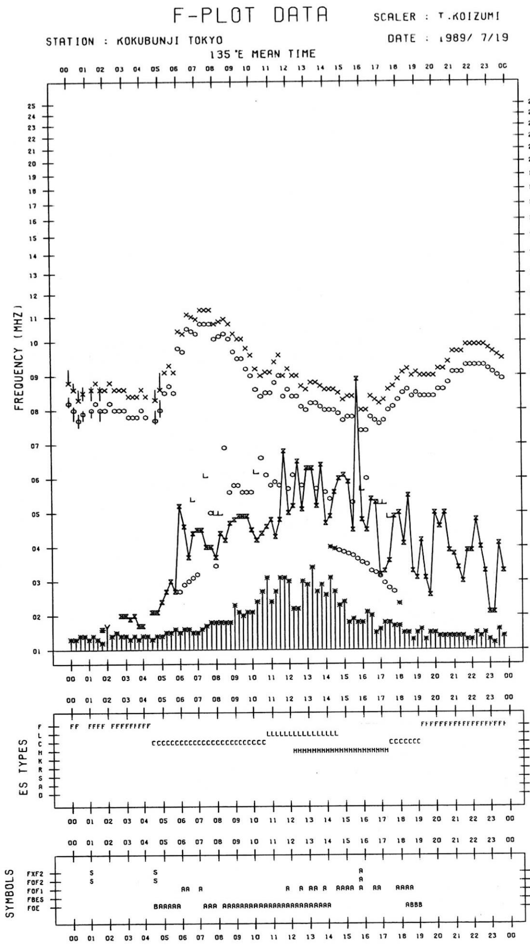
STATION : KOKUBUNJI TOKYO

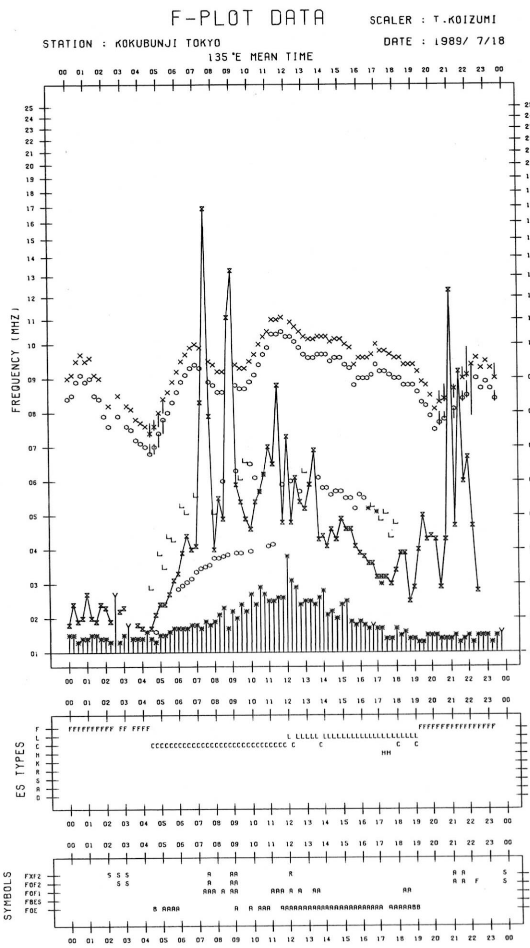
DATE : 1989/ 7/16

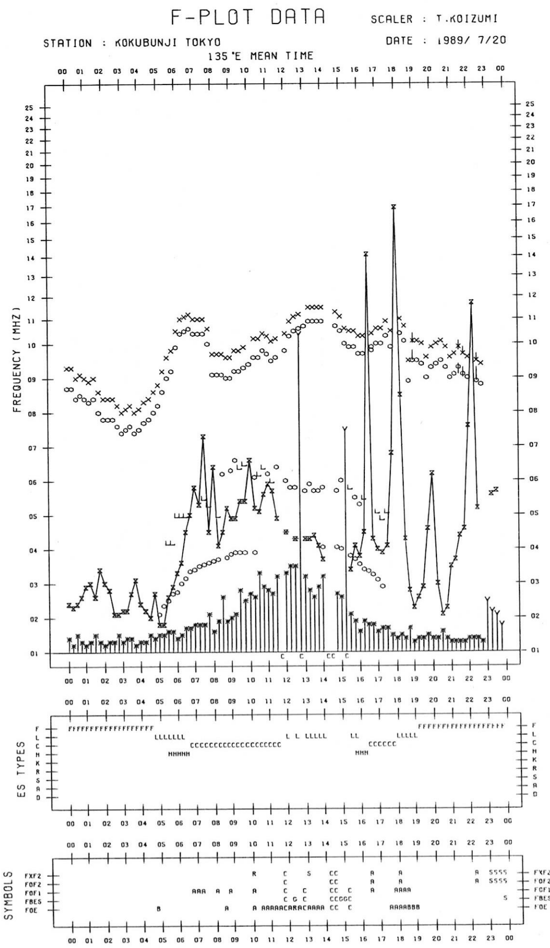
135 °E MEAN TIME




F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/20
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

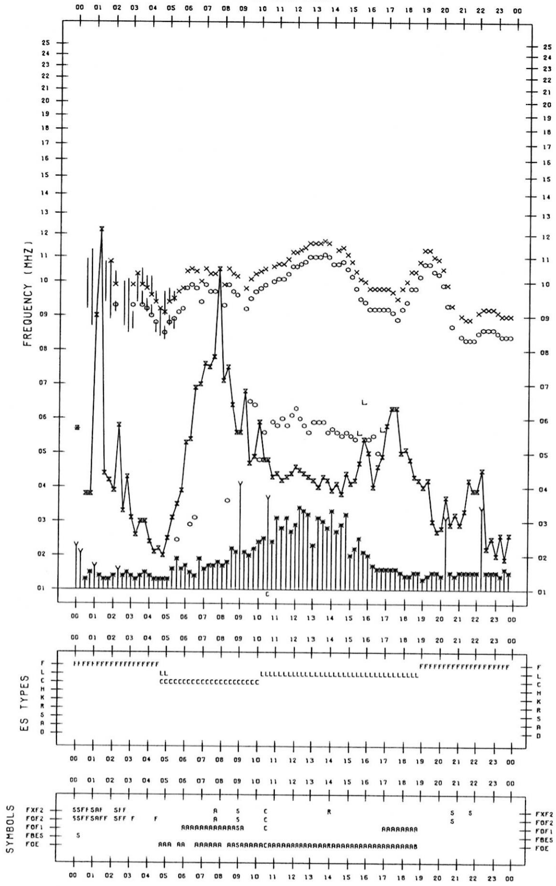
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO

DATE : 1989/ 7/21

135°E MEAN TIME



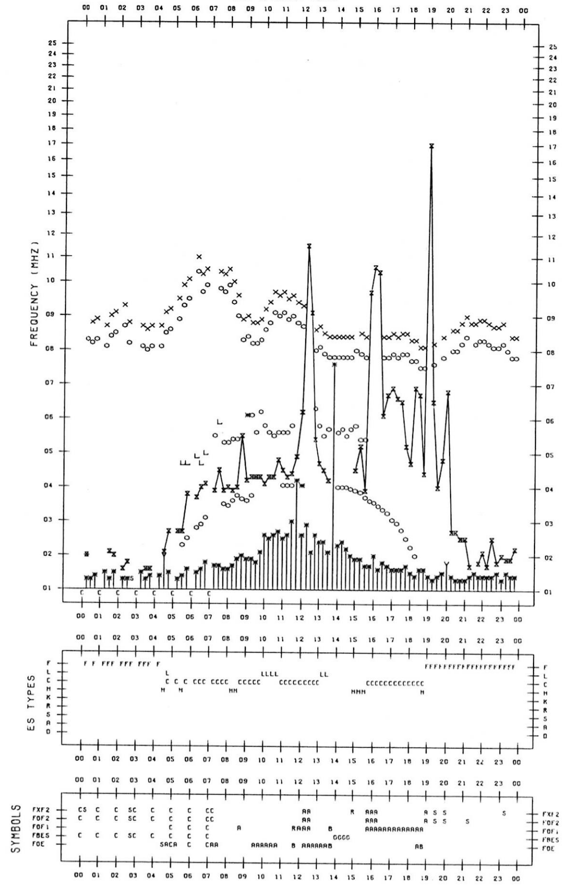
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO

DATE : 1989/ 7/23

135°E MEAN TIME



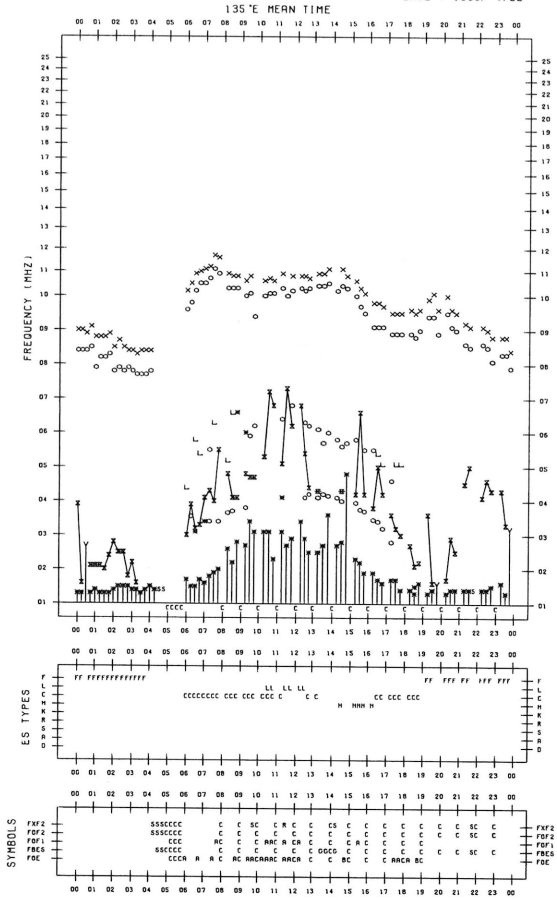
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO

DATE : 1989/ 7/22

135°E MEAN TIME



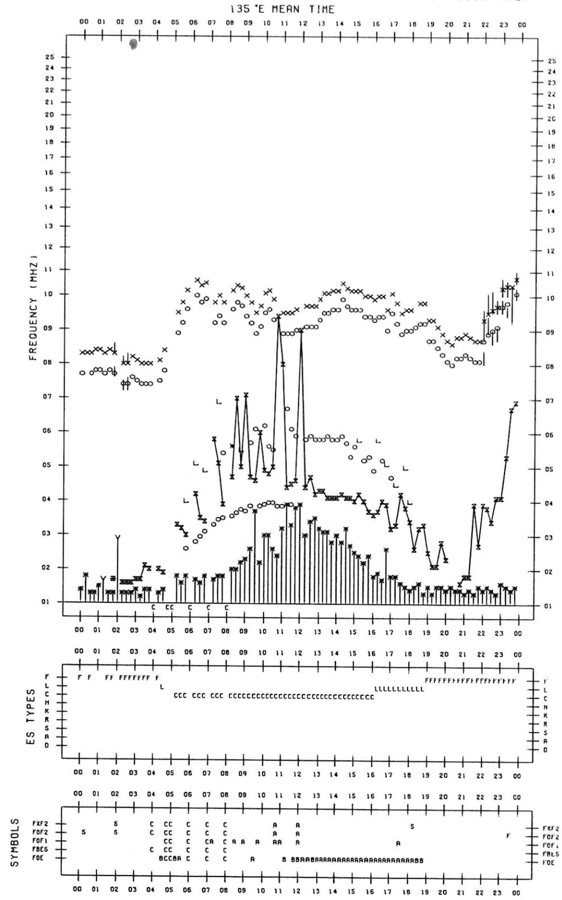
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO

DATE : 1989/ 7/24

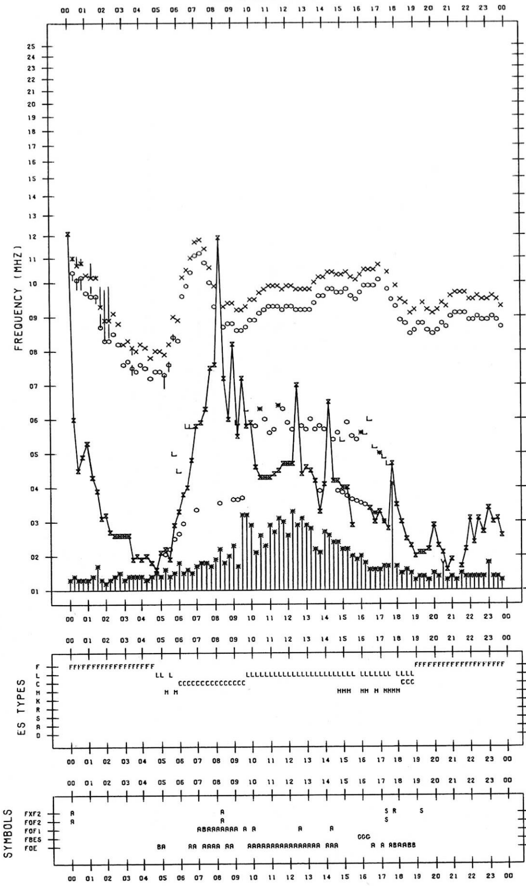
135°E MEAN TIME



F-PLOT DATA SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO DATE : 1989/ 7/25

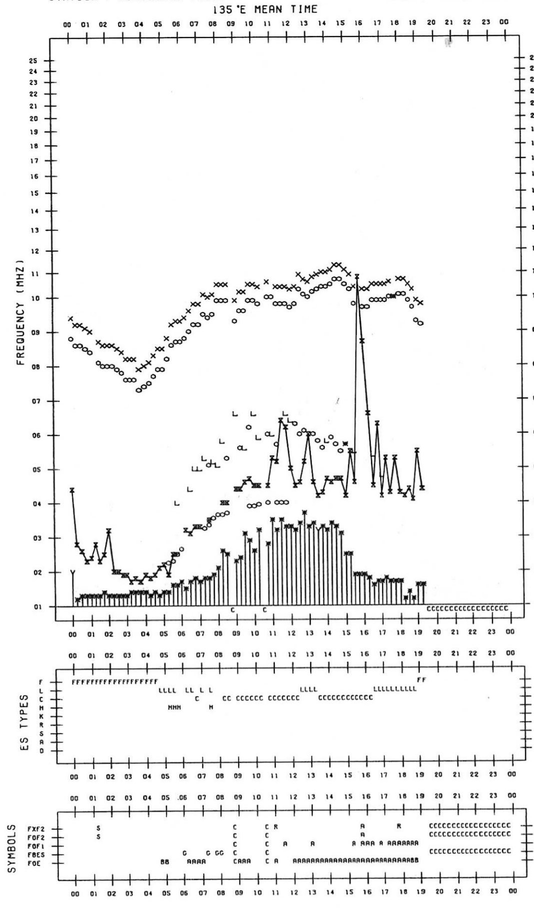
135°E MEAN TIME



F-PLOT DATA SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO DATE : 1989/ 7/26

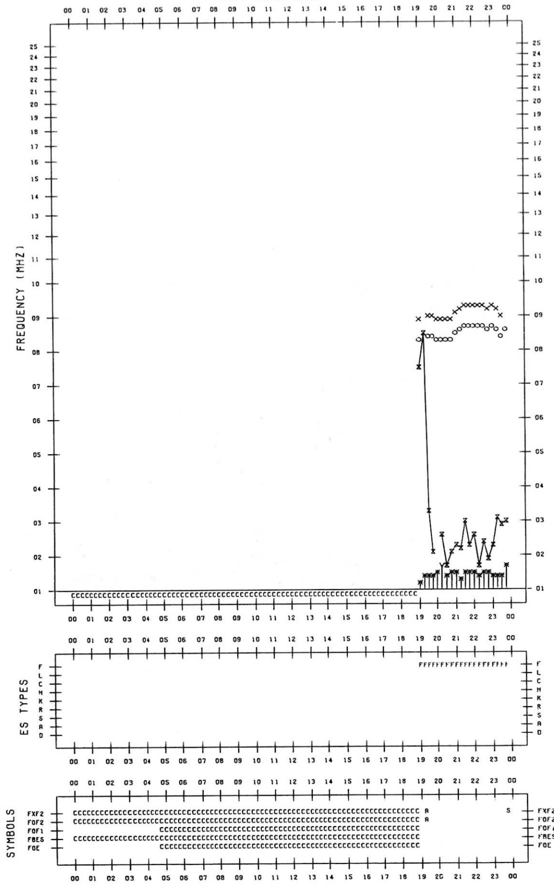
135°E MEAN TIME



F-PLOT DATA SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO DATE : 1989/ 7/27

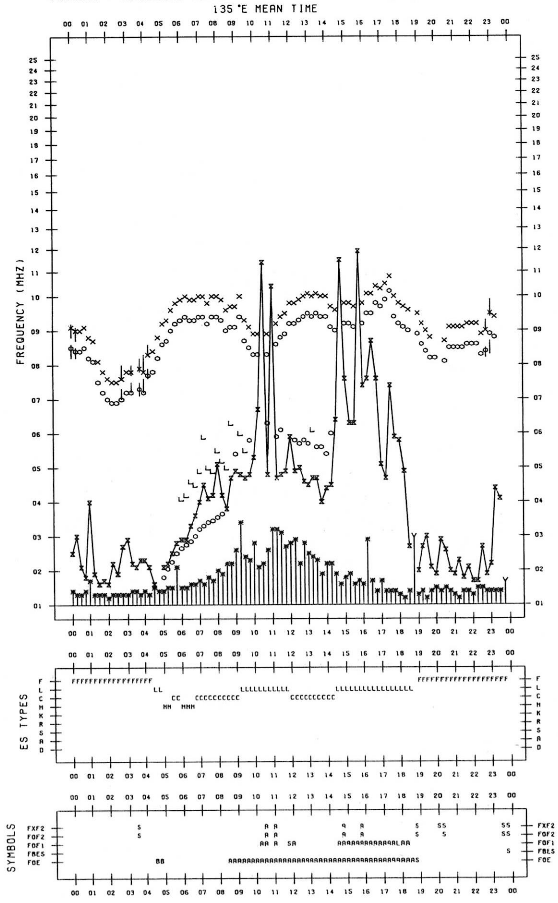
135°E MEAN TIME

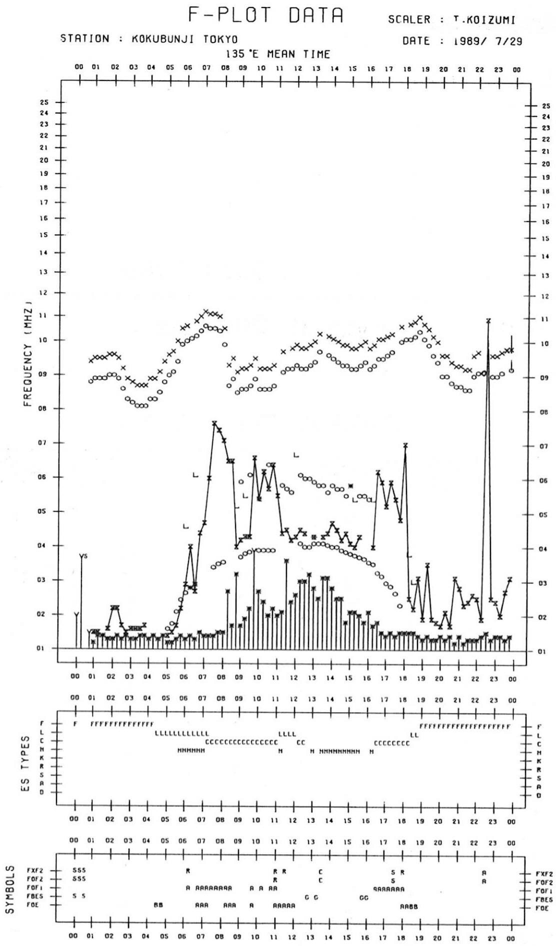


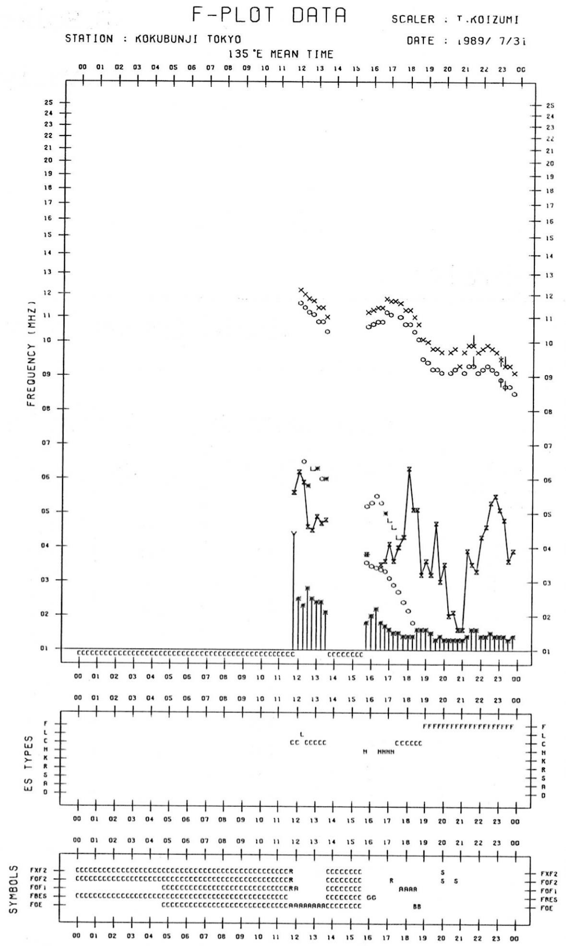
F-PLOT DATA SCALER : T.KOIZUMI

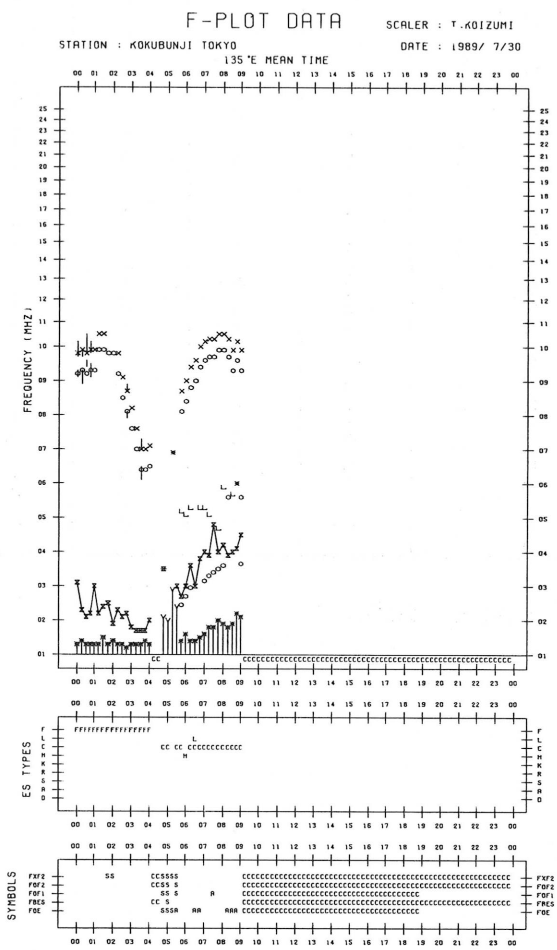
STATION : KOKUBUNJI TOKYO DATE : 1989/ 7/28

135°E MEAN TIME




F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/31
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 7/30
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

B. Solar Radio Emission

B1. Daily Data at Hiraiso

200 MHz

Hiraiso July 1989

Single-frequency total flux observations at 200 MHz

	FLUX DENSITY: $10^{-22}Wm^{-2}Hz^{-1}$					VARIABILITY: 0 TO 3				
UT / DATE	00-03	03-06	06-09	21-24	DAY	00-03	03-06	06-09	21-24	DAY
1	*	*	10	10	10	*	*	0	0	*
2	11	11	10	10	10	0	0	0	0	0
3	11	12	12	10	11	0	0	0	0	0
4	12	11	11	10	11	*	*	0	0	0
5	12	12	11	10	11	*	*	0	0	0
6	12	11	10	11	11	0	*	0	*	0
7	B	12	10	10	11	1	0	0	0	0
8	10	10	11	12	10	0	1	0	0	0
9	12	B	11	12	12	0	1	0	0	0
10	12	12	12	B	12	*	*	*	2	*
11	12	12	11	11	12	1	*	0	0	1
12	12	12	12	12	12	0	0	0	1	0
13	B	B	B	B	B	2	2	2	2	2
14	B	B	B	B	B	*	2	3	3	2
15	B	B	B	B	B	1	1	1	2	1
16	B	12	12	13	B	2	1	1	1	2
17	12	12	12	11	12	1	1	1	2	1
18	13	12	11	10	12	2	1	0	0	1
19	12	13	12	12	12	1	1	*	1	1
20	12	12	10	11	11	0	1	0	0	1
21	12	12	11	10	12	0	0	1	0	0
22	11	11	11	B	11	0	*	*	1	*
23	B	B	B	B	B	2	2	2	1	2
24	B	B	B	B	B	1	2	3	2	2
25	B	B	B	B	B	1	*	*	1	*
26	B	B	B	B	B	1	*	*	1	*
27	16	15	14	13	15	0	1	1	1	1
28	13	12	12	12	12	0	0	0	1	0
29	B	B	11	10	B	2	2	0	0	1
30	11	10	10	10	10	0	0	0	0	0
31	10	10	10	11	10	0	0	0	0	0

Note: No observations during the following periods.

none.

B.Solar Radio Emission

B1.Daily Data at Hiraiso

500 MHz

Hiraiso July 1989

Single-frequency total flux observations at 500 MHz

FLUX DENSITY: $10^{-22}Wm^{-2}Hz^{-1}$

UT / DATE	00-03	03-06	06-09	21-24	DAY
1	52	51	49	50	51
2	52	51	50	51	51
3	51	52	51	53	51
4	53	53	52	53	53
5	54	53	52	53	53
6	54	54	52	54	53
7	55	56	54	-	55
8	54	55	55	55	55
9	56	58	58	56	57
10	56	56	56	56	56
11	57	57	56	57	56
12	60	60	57	57	58
13	60	61	58	56	59
14	58	58	61	57	58
15	58	59	56	57	58
16	59	58	56	56	57
17	56	56	54	54	56
18	55	58	55	55	56
19	55	54	54	53	54
20	54	54	53	52	54
21	53	52	51	52	52
22	53	52	51	51	52
23	51	51	51	51	51
24	51	51	51	54	51
25	53	52	51	52	52
26	52	52	51	50	52
27	49	49	48	50	49
28	50	50	49	49	50
29	48	48	48	49	48
30	49	50	50	50	50
31	50	51	51	53	51

Note: No observations during the following periods:

7th 0600 - 0623
7th 1925 - 8th 0100

B. Solar Radio Emisssion

B2. Outstanding Occurrences at Hiraiso

Hiraiso July 1989

Single-frequncy observations

Normal observing period: 1950 - 0950 U.T. (sunrise to sunset)

JUL 1989	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY ($10^{-22}Wm^{-2}Hz^{-1}$) PEAK	MEAN	POLARIZATION REMARKS
3	500	42 SER	0135.2	0135.8	7.5	310	-	0
	100	46 C	0213.7	-	1.2	1000D	-	-
	200	42 SER	0213.9	0214.1	5.9	600	-	WR
	200	8 S	0516.5	0516.8	0.5	63	-	0
	200	42 SER	0549.5	0550.0	2.0	350	-	0
4	500	46 C	0000.5	0000.8	6.5	847	-	0
	200	46 C	0000.6	0000.7	1.3	360	-	0
6	100	46 C	2336.3	2337.4	2.0	425	-	-
	200	41 F	2338.3	2354.8	52.8	10	-	0
9	500	42 SER	0114.5	0117.5	38	34	-	0
	100	46 C	0128.2	-	4.6	1000D	-	-
	500	41 F	0229	0237	14	11	-	WL
	200	27 RF	0307.0	0408.0	104	5	1	WL
	500	24 R	0802	0918	105D	240	72	SL SUNSET
	100	42 SER	2051.3	2051.9	4.3	490	-	-
	200	42 SER	2051.5	2054.4	9.0	97	-	WR
	200	41 F	2253.5	2253.8	2.1	340	-	0
10	200	46 C	0007.9	0008.3	1.4	375	-	0
	200	44 NS	1930E	2200	300D	3	1	0
11	200	42 SER	2211.5	2211.6	4.0	170	-	0
	200	42 SER	2324.7	2324.7	3.3	110	-	0
13	200	42 SER	0110.4	0110.7	94	87	-	ML
	500	27 RF	0350	0417.5	57.5	12	4	WL
	200	27 RF	0406.2	0425.0	77.2	33	4	ML
	200	42 SER	0650.5	0700	10.6	295	-	WL
	200	27 RF	0703.0	0714.5	54	10	4	ML
	200	42 SER	2232.9	2334.0	80.5	260	-	0
14	200	43 NS	0500	0753	300D	42	8	ML
	500	20 GRF	0635	0728	85	8	3	WL
	200	44 NS	1930E	2227	860D	24	6	WL
	200	8 S	2156.8	2157.0	0.7	530	-	0
	100	8 S	2156.8	-	0.9	1000D	-	-
15	200	44 NS	1930E	2326	450D	11	7	WL
17	100	42 SER	0004.4	0005.1	6.6	285	-	-
	200	42 SER	0006.6	0006.9	4.3	440	-	0

JUL 1989	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY ($10^{-22}Wm^{-2}Hz^{-1}$) PEAK	MEAN	POLARIZATION REMARKS
18	500	46 C	0627.5	0628.2	5.0	8	-	0
	100	46 C	0734.3	-	1.3	1000D	-	-
19	200	41 F	0211	0225.4	75	118	-	0
	200	45 C	0349.0	0349.5	1.5	2600	-	WR
	200	46 C	2125.0	2129.7	10.6	15	-	0
	100	42 SER	2216.3	2230.1	32.3	630	-	-
	200	46 C	2224.8	-	6.7	110D	-	WR
	200	8 S	2355.6	2355.8	1.0	520	-	0
20	100	42 SER	0008.5	-	6.9	1000D	-	-
	200	42 SER	0008.6	0010.6	7.0	6800	-	WR
	100	42 SER	0303.1	0358.2U	104	1000D	-	-
	200	42 SER	0303.7	0358.3	100	230	-	WR
	500	42 SER	0304.5	0330.9	100	117	-	WR
	500	41 F	0700.0	0704.5	5.0	49	-	0
	200	46 C	0700.9	0704.3	4.8	240	-	WR
	100	46 C	0701.3	0704.6	6.6D	730	-	-
	200	46 C	0911.9	0912.2	2.1	180	-	MR
	200	46 C	2024.4	2025.5	25.7	460	21	0
				2034.6		30		0
	100	48 C	2024.9	2031.7	14.3	15000	1400	WL
	500	46 C	2025.0	2027.3	18.5	185	30	WLWR
	500	8 S	2330.0	2330.3	0.6	32	-	WL
21	200	42 SER	0041.2	0041.3	9.2	15	-	0
	500	42 SER	0041.2	0045.3	9.0	9	-	WL
	200	41 F	0244.4	0248.8	4.6	240	-	0
	100	41 F	0246.2	0246.7	3.0	185	-	-
	200	41 F	0348.2	0350.6	2.8	530	-	WR
	500	46 C	0349.3	0351.0	3.0	15	-	WR
	100	42 SER	0542.2	0553.7	13.9	1300	-	MR
	200	42 SER	0542.9	0545.5	14.5	440	-	SL
	500	46 C	0543.4	0545.8	8.0	153	34	MRWL
	500	46 C	0618.0	0619.3	3.0	17	-	0
	500	46 C	0645.5	0647.0	3.0	9	-	0
22	200	8 S	0007.9	0008.4	0.8	370	-	0
	200	46 C	0048.4	0048.8	4.6	220	-	0
	500	41 F	0327.5	0328.3	27.5	5	-	0
	200	44 NS	1940E	0413	840D	12	6	MR
	100	41 F	2042.2	2044.0	4.6	310	-	-
	200	46 C	2043.9	2045.0	2.0	550	-	WL
	500	46 C	2044.2	2045.0	3.2	24	-	WR
	200	41 F	2239.2	2240.3	33.7	136	-	SR
23	100	42 SER	0046.9	0053.2	6.6	1000	-	-
	200	41 F	0049.5	0052.8	37.0	540	-	0
	100	45 C	0656.8	0657.6	2.0	615	-	-
	200	44 NS	1940E	0322	840D	9	4	WR
24	200	42 SER	0202.3	0202.6	21.8	80	-	ML
	100	46 C	0727.1	0727.7	1.3	205	-	-
	200	46 C	0727.1	0728.0	1.3	107	-	0
	200	44 NS	1940E	0100	840D	10	5	WR
25	200	48 C	0840.3	0841.6	15.8	6100	290	0
	500	48 C	0840.7	0841.5	9.0D	6500	735	0 SUNSET
	100	48 C	0840.9	-	19.8	1000D	350D	-
	200	44 NS	1940E	0344	840D	11	5	0
27	200	46 C	0118.2	0118.5	2.3	65	-	0
	200	42 SER	2212.6	2212.9	5.9	1450	-	0
	100	8 S	2212.7	-	0.8	1000D	-	-
	500	46 C	2212.9	2213.1	6.5	81	-	0
28	200	43 NS	2300	0300	210	7	4	WL
29	100	46 C	0735.0	0735.6	1.3	680	-	-
	200	46 C	0735.2	0735.6	4.0	140	-	0
30	500	4 S/F	0037.5	0037.6	1.5	11	-	0
	500	46 C	0043.5	0046.7	7.0	24	-	0

C. RADIO PROPAGATION

C1. H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWV)

JUL 1989 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 15M	01H 15M	02H 15M	03H 15M	04H 15M	05H 15M	06H 15M	07H 15M	08H 15M	09H 15M	10H 15M	11H 15M	12H 15M	13H 15M	14H 15M	15H 15M	16H 15M	17H 15M	18H 15M	19H 15M	20H 15M	21H 15M	22H 15M	23H 15M
1	-7	-10	-7	0	4	3	6	6	4	8	-6	-8	ES -11	13	10	15	12	-3	-7	-2	ES -15	-1	-15	ES -24
2	ES -24	ES -24	ES -24	-10	1	-3	5	ES -16	1	-10	5	-1	-2	0	15	7	6	-3	ES -25	ES -25	ES -25	-16	ES -25	ES -25
3	-16	ES -25	ES -10	-10	-8	3	1	9	13	14	13	10	15	19	8	3	3	4	-4	-3	-7	-5	-16	ES -25
4	ES -24	-9	ES -24	ES -24	ES -9	2	5	10	15	24	22	19	19	19	19	-1	3	-2	-5	ES -9	ES -3	ES -24	ES -24	ES -24
5	ES -25	ES -25	-14	-7	-5	0	11	17	14	19	13	18	20	14	8	5	-6	-3	-6	-10	-11	ES -25	ES -25	ES -25
6	ES -24	ES -24	-7	-9	-1	-1	9	9	6	20	4	-6	-2	7	2	-2	13	9	-6	-3	-12	0	-6	-13
7	-10	ES -25	ES -25	ES -25	-11	-4	-7	0	4	9	15	-6	ES -16	-2	14	1	-2	-7	-9	-10	-12	ES -15	ES -15	ES -24
8	ES -25	ES -25	-16	ES -25	-11	1	1	10	13	14	14	13	13	15	0	2	-1	-9	-9	-5	-9	ES -24	ES -24	ES -24
9	-16	ES -25	ES -25	-10	-4	1	8	9	15	20	19	19	23	16	8	3	0	1	-5	-6	-2	-8	-11	ES -25
10	ES -25	ES -25	-16	-10	-6	1	12	6	14	17	17	14	19	17	11	13	13	0	-5	3	-8	-6	ES -25	ES -25
11	ES -25	ES -25	ES -25	ES -25	-16	-3	3	4	13	12	6	7	19	11	7	3	4	3	1	ES -4	-8	ES -24	-9	-15
12	-7	ES -25	-8	-3	-10	-2	3	6	14	13	8	10	15	13	7	11	3	1	-4	-10	-8	-16	-16	ES -25
13	ES -25	ES -16	-10	-8	-2	1	8	9	3	12	16	16	21	21	15	7	-5	-4	-10	-8	-11	-11	-10	-16
14	-8	-16	ES -16	-10	-2	0	6	11	12	19	16	7	19	19	12	6	11	2	-4	-5	-4	-8	-7	-11
15	-17	-17	-10	-10	-4	7	7	10	10	7	-7	1	8	14	8	11	12	2	-2	-12	-5	-14	-10	ES -25
16	-17	-17	-9	-1	0	0	8	12	16	13	11	4	18	17	14	1	0	-4	-10	-16	ES -25	ES -16	-16	ES -25
17	ES -26	-17	ES -26	-13	-9	-2	4	7	-17	10	22	16	19	21	1	9	1	1	-11	-3	3	-5	-5	ES -14
18	ES -14	-5	-4	-5	4	8	-5	9	6	-8	-14	ES -23	-5	0	5	2	ES -23	ES -23	ES -23	ES -23	-5	ES -23	0	-5
19	ES -23	ES -23	ES -23	ES -23	ES -23	-9	1	4	4	-10	ES -8	ES -23	-4	4	14	9	3	-1	ES -23	3	-11	ES -23	ES -23	ES -23
20	ES -23	ES -23	-3	ES -23	-4	5	13	9	17	15	15	5	15	13	7	3	-2	-4	-6	-5	-8	-10	ES -23	ES -23
21	ES -22	ES -22	ES -22	ES -22	-3	2	9	8	17	17	17	16	15	9	18	9	13	-1	1	-3	ES -22	-7	-2	ES -22
22	-10	-7	-9	ES -22	0	6	8	12	-13	0	-10	ES -22	-2	7	14	5	2	11	-1	1	2	0	7	23
23	-5	-11	-8	-1	-3	1	9	11	-3	-8	ES -23	ES -24	15	18	8	-6	3	3	-1	-1	-6	-14	-6	ES -14
24	ES -23	-1	-8	-5	-2	0	-8	ES -23	3	9	9	-1	1	22	7	2	5	4	-5	4	-14	ES -23	ES -23	ES -23
25	ES -24	ES -24	ES -24	-5	-4	2	7	9	7	10	12	2	4	3	3	2	7	8	-9	-11	ES -24	-15	-12	ES -24
26	ES -23	ES -23	ES -23	ES -23	-8	-4	2	11	13	13	9	3	17	17	15	0	4	-6	-6	-1	-5	ES -14	-14	-14
27	ES -23	ES -23	ES -23	-11	-4	4	5	7	-14	-8	ES -23	ES -23	3	19	12	20	7	0	-4	-14	-8	-5	ES -23	ES -23
28	-14	-12	ES -23	-10	-8	-1	2	18	12	13	13	12	13	10	13	14	4	0	3	-5	-4	-2	ES -23	-14
29	ES -23	ES -23	ES -23	-5	-5	4	4	5	10	14	9	4	3	14	12	0	-5	-1	-5	-14	-5	ES -23	ES -14	ES -14
30	ES -23	ES -23	-14	-14	-5	-4	4	9	7	5	4	-5	0	16	5	0	-2	-1	-5	ES -23	-14	ES -23	ES -23	ES -23
31	ES -23	ES -23	ES -23	-11	-11	-1	9	-1	1	-1	0	-14	-11	20	10	13	-1	-5	-1	-8	ES -23	ES -23	ES -23	ES -23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	ES -23	ES -23	US -16	-10	-4	1	5	9	10	12	9	4	13	14	10	3	3	-1	-5	US -5	US -8	US -14	US -15	ES -23
UD	-7	-7	-7	-1	1	6	11	12	16	20	19	18	20	21	15	14	13	8	1	3	-2	-1	-2	-11
LD	ES -25	ES -25	ES -25	ES -25	ES -11	-4	-5	-1	-13	-8	ES -14	ES -23	-11	0	2	-1	-5	-7	ES -23	ES -23	ES -24	ES -24	ES -25	ES -25

C. RADIO PROPAGATION

C1. H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWVH)

JUL 1989 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 45M	01H 45M	02H 45M	03H 45M	04H 45M	05H 45M	06H 45M	07H 45M	08H 45M	09H 45M	10H 45M	11H 45M	12H 45M	13H 45M	14H 45M	15H 45M	16H 45M	17H 45M	18H 45M	19H 45M	20H 45M	21H 45M	22H 45M	23H 45M
1	-10	-7	-2	3	14	9	15	21	27	24	21	19	22	23	22	18	18	11	2	7	9	0	-1	-9
2	-15	-9	6	5	11	18	16	19	24	23	21	17	18	18	21	22	23	9	11	14	7	0	-2	-6
3	-7	-7	-7	-4	8	16	19	22	25	24	21	23	19	20	21	25	15	19	17	13	1	-2	-1	-5
4	-2	2	-4	1	11	16	19	20	25	24	27	24	25	25	25	28	24	18	13	10	3	-3	-2	-6
5	-8	-5	-3	0	8	15	14	22	26	24	20	20	21	21	22	20	22	16	11	11	4	-6	-2	ES -25
6	-15	-11	1	0	14	15	16	23	23	24	18	22	22	15	27	18	23	17	16	-3	8	13	0	-16
7	-7	ES -25	-16	-12	1	6	17	23	17	21	26	23	22	17	18	18	19	17	5	14	11	5	-6	ES -24
8	ES -25	-5	-10	1	4	10	14	30	21	23	24	20	18	21	28	24	21	20	18	15	1	1	-3	-9
9	-4	ES -25	-3	4	7	13	19	24	26	25	25	23	22	22	22	23	25	17	9	11	2	-11	-10	2
10	-1	-3	0	7	10	16	16	22	24	23	22	22	24	16	19	22	22	13	8	7	0	0	0	-8
11	-13	-16	-12	-4	1	13	18	19	23	21	18	18	26	22	20	20	24	18	10	8	3	4	-2	-7
12	-1	-4	2	4	7	13	14	23	21	24	22	23	24	22	25	22	23	20	14	11	4	-2	-10	-2
13	-3	-5	1	4	5	13	15	25	23	25	24	22	21	19	21	17	22	9	16	6	-2	0	1	-7
14	-5	-8	-3	3	7	13	19	17	25	23	23	22	20	22	24	25	24	22	16	11	6	-5	-2	-7
15	-3	-4	-3	4	10	14	15	23	24	24	21	22	19	23	23	22	24	17	1	7	8	-2	-4	-5
16	-11	-11	-17	7	6	13	11	14	25	20	27	15	25	23	36	21	20	14	13	9	3	-1	-8	-3
17	-9	-17	-11	-4	1	9	13	20	15	24	21	24	24	21	19	15	24	19	9	8	2	-4	-5	-8
18	-2	-11	-5	0	7	10	14	21	29	28	26	22	24	25	30	23	8	27	14	15	11	5	7	5
19	-5	ES -23	ES -23	1	8	9	12	14	20	21	21	20	23	21	15	18	20	18	19	12	0	-5	-4	0
20	-2	0	4	6	13	18	19	22	22	25	22	22	24	19	23	24	23	19	13	14	4	2	-3	-14
21	-13	1	-1	6	7	11	20	21	27	24	27	27	24	25	29	29	13	18	20	4	8	7	-1	-7
22	ES -22	-7	-3	2	9	15	18	26	31	24	21	25	26	21	15	17	11	24	8	13	12	2	15	10
23	-2	-2	0	4	3	15	15	25	26	21	23	20	21	21	22	19	18	10	12	4	8	-1	-3	-5
24	-5	-5	-3	0	8	11	16	20	25	19	27	24	15	21	19	19	18	22	10	6	0	-8	-11	-4
25	-15	-15	-7	-1	9	16	16	17	16	21	16	24	22	24	18	17	16	15	10	7	3	-3	-1	-1
26	-8	-5	-4	3	4	8	18	22	22	15	15	23	23	23	23	10	19	18	6	6	5	3	-4	-5
27	-11	-9	-6	-6	7	11	17	22	22	29	30	23	27	19	20	23	20	17	7	10	3	2	-8	-6
28	-6	-6	-6	0	8	15	20	31	24	31	23	21	20	24	21	14	25	23	5	10	9	0	-3	-4
29	-11	-14	-5	-5	8	17	22	23	23	24	28	23	19	25	20	25	29	18	19	10	-1	-1	-2	-11
30	ES -14	-5	-1	2	11	13	20	22	19	25	25	22	16	17	20	28	22	20	1	10	4	3	-5	-11
31	-11	ES -23	-2	-3	3	11	17	21	24	25	26	22	20	25	21	21	23	17	11	7	5	-5	-5	-10
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	-8	-7	-3	1	8	13	16	22	24	24	23	22	22	21	21	21	22	18	11	10	4	0	-3	-6
UD	-2	0	2	6	13	17	20	26	27	28	27	24	26	25	29	28	25	23	19	14	11	5	1	2
LD	ES -15	ES -23	-16	-5	1	9	13	17	17	20	18	18	18	17	18	15	13	10	2	4	0	-6	-10	-16

C. Radio Propagation

c2. Radio Propagation Quality Figures at Hiraiso

Hiraiso

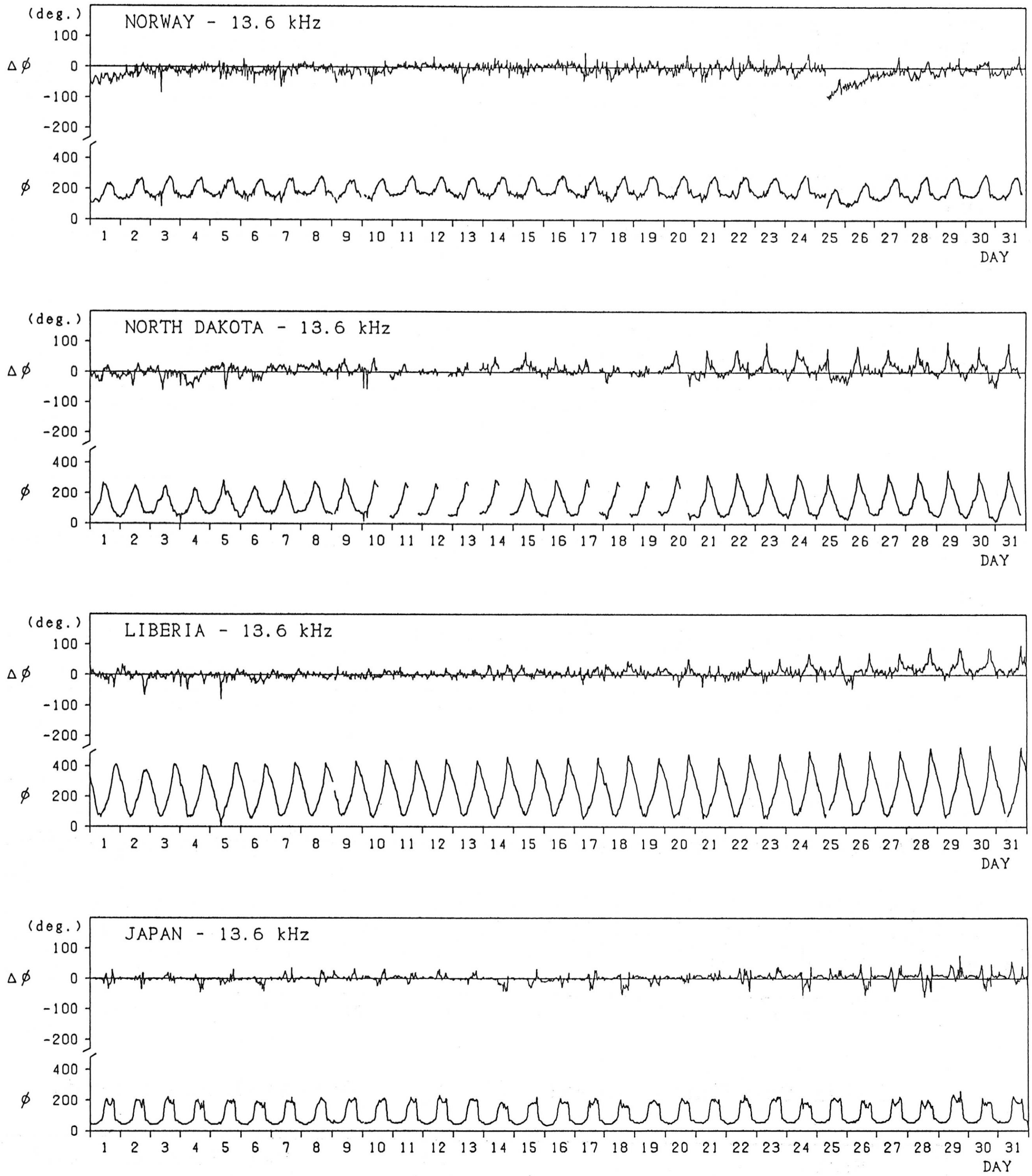
Time in U.T

Jul. 1989	Whole Day Figure	WWV 00-06	WWV 06-12	WWV 12-18	WWV 18-24	WWVH 00-06	WWVH 06-12	WWVH 12-18	WWVH 18-24	Conditions 00-06	Conditions 06-12	Conditions 12-18	Conditions 18-24	Principal Geomagnetic Storms Start	End	Range
1	4-	5	3	4	4	4	4	4	4	N	N	N	N			
2	4-	4	3	3	3U	4	4	4	4	U	U	U	U			
3	4o	4	4	4	4	4	4	4	4	N	N	N	N			
4	4o	4U	5	4	4U	4	4	4	4	N	N	N	N			
5	4o	4	5	4	3U	4	4	4	3	N	N	N	N			
6	4o	4	4	4	5	4	4	4	4	N	N	N	N			
7	3+	3U	3	3	4U	3	4	4	3	N	N	N	N			
8	4o	3	4	4	4U	4	4	4	4	N	N	N	N			
9	4o	4	5	4	4	4	4	4	4	N	N	N	N			
10	4o	4	5	4	4	4	4	4	4	N	N	N	N	NONE		
11	4-	3U	4	4	4U	3	4	4	4	N	N	N	N			
12	4o	4	4	4	4	4	4	4	4	N	N	N	N			
13	4o	3	4	4	4	4	4	4	4	N	N	N	N			
14	4o	4	4	4	5	4	4	4	4	N	N	N	N			
15	4o	5	3	4	4	4	4	4	4	N	N	N	N			
16	4o	5	4	4	3U	4	4	4	4	N	N	N	N			
17	4o	4	4	4	4	3	4	4	4	N	N	N	N			
18	3+	4	3	2	3U	4	4	4	4	N	N	N	N			
19	3+	3U	2	3	3U	3	4	4	4	N	N	N	N			
20	4o	4	4	4	4	4	4	4	4	N	N	N	N			
21	4o	4U	4	4	4	4	4	4	4	N	N	N	N			
22	4o	4	3	4	5	4	4	4	5	N	N	N	N			
23	4o	5	3	4	4	4	4	4	4	N	N	N	N			
24	4o	4	3	4	4U	4	4	4	4	N	N	N	N			
25	4o	4	4	4	3	4	4	4	4	N	N	N	N			
26	4o	3U	4	4	4	4	4	4	4	N	N	N	N			
27	4-	4	2	4	4	4	4	4	4	N	N	N	N			
28	4o	4	4	4	4	4	4	4	4	N	N	N	N			
29	4o	4	4	4	4U	4	4	4	4	N	N	N	N			
30	4-	4	3	4	3U	4	4	4	4	N	N	N	N			
31	4-	4	3	4	3U	4	4	4	4	N	N	N	N			

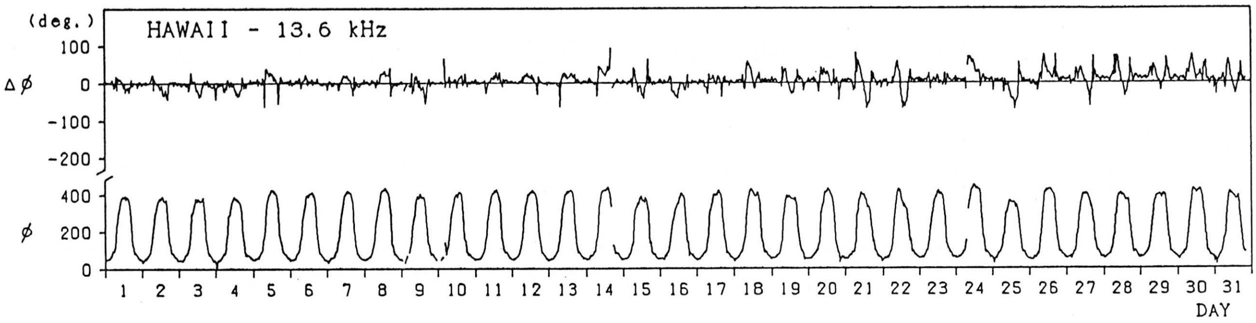
C. Radio Propagation

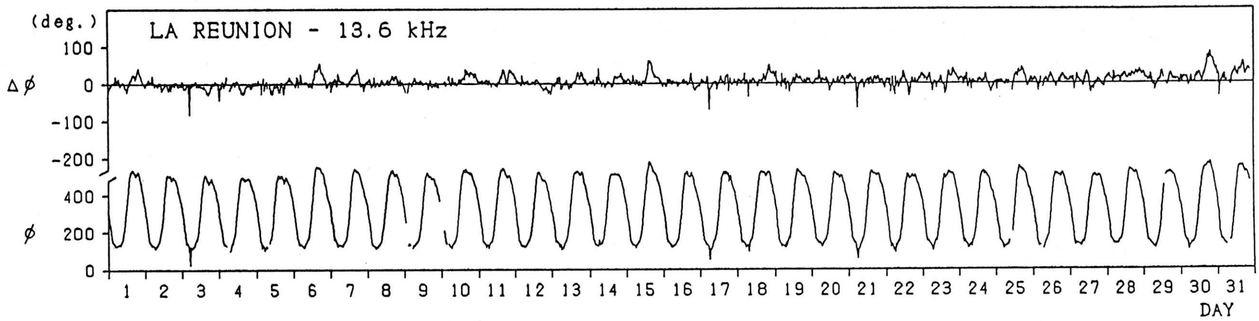
C3. Phase Variations in OMEGA Radio Waves at Inubo

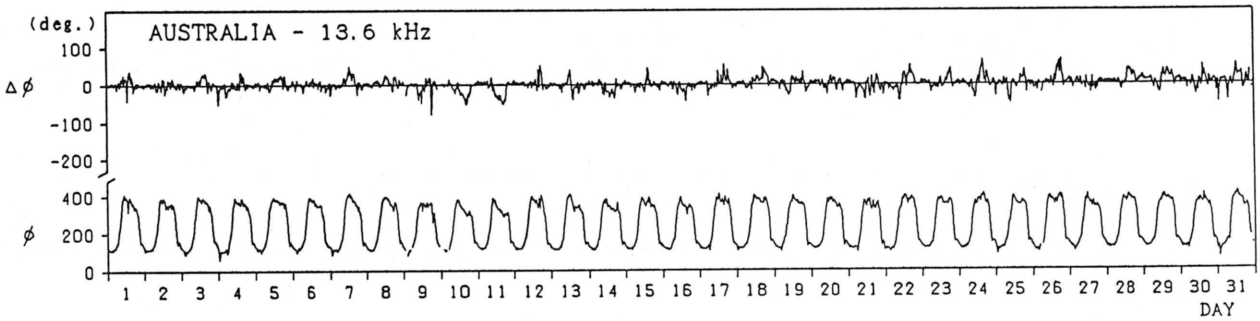
Inubo July 1989

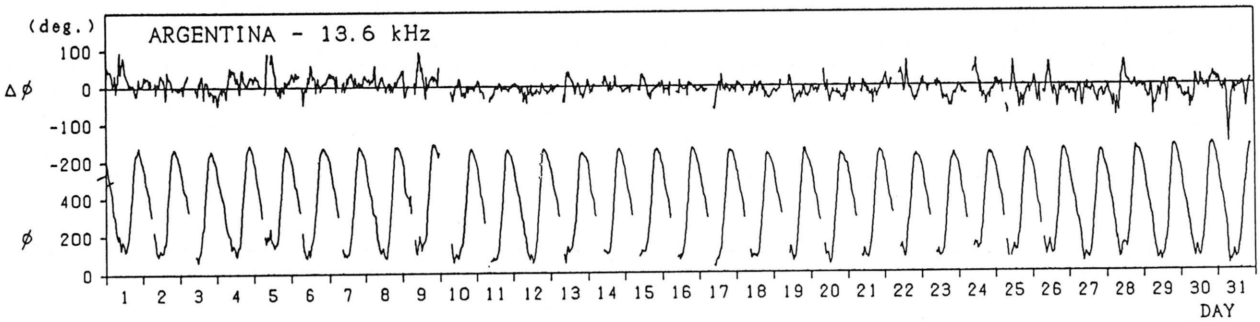


Inubo July 1989









Polar Cap Phase Anomaly (PCPA) on Norway-Inubo Circuit

Start (U.T.)	End (U.T.)	Max. (U.T.)	Max. Phase Deviation (negative value, deg.)
Jul.25/0837	Jul.27/1200	Jul.25/1258	124.2

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

(a) Short Wave Fade-out (SWF) at Hiraiso

Hiraiso

Time in U.T.

Jul. 1989	SWF: Drop-out Intensities(dB) CO	HA	1)	2)	3)	Start	Duration	Type	Imp.	Corresepondence: Solar Flare	Solar Noise
4		x	25	x		0000	15	S	2	x	x
4			8	x		0522	26	SL	1-		x
5			x	x	11	0752	26	SL	1-	x	x
9	x	x	16	x		0115	40	SL	1+	x	x
17			7		13	0548	27	SL	1		x
19			7	x		0401	21	S	1-		
21	32	x	12		13	0543	18	SL	3-		x
25		x	12			0031	20	SL	1		x
25			6			0159	12	SL	1-		
25	13		x	23	15	0838	34	S	1		x
26	x		8	.5	14	0459	53	G	1		
31	11		x	x	x	0703	22	SL	1		x

NOTES CO: Colorado(WWV) HA: Hawaii(WWVH) 1): Australia 2): Mosco 3): Londn

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Jul. 1989 Date	SPA: Phase Advance (degrees) Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Time (U.T.) Start	End	Maximum
2				22	18	18	0012	0058	0023
2				8	9		2324	2356	2330
3	23	24	32	—	27	27	0136	0253	0143
4	68	72	79	154*	112*	104	2348**	0145	0002
4	32	45	80	51	22	20	0515	0651D	0538
4			23	6			0651E	0738	0700
4					8		2251	2310	2255
5				8	8		0027	0115	0040
5	23	21	31	22	9	28	0316	0400	0324
5			11	—			0457	0517D	0504
5		31	23	—			0517E	0649	0530
5	41	87	82	38			0753	0907	0759
5			20				0937	1008	0940
5		36				28	1645	1714	1653
7	17		27	37	25	20	0048	0155	0053
7	18		28	30	12	14	0331	0404D	0337
7	17		26	22	10	13	0404E	0440	0409
7		16	13				1007	1035	1011
9	81	59	—	136	114	118	0114	0314	0130
12			24	24	8	13	0359	0452	0408
13			19				1050	1122	1102
16			15				0655	0751	0712
17		43	72	—	21		0550	0640D	0600
17			40	—			0640E	0808	0706
18				—	16		0018	0122	0029
18			13	13			0630	0713	0635
18			13				0919	0943	0924
19			49	43	19	15	0400	0451	0406
19			26				0941	1031	0952
19					30	38	2126	2243	2133
20		46					1118	1226	1137
20	36				102	72	2027	2145	2034
21					7		0045	0131	0052
21	32	17	31	28	8		0525	0543D	0531
21	37	55	92	72	19	20	0543E	0649	0551
21			13				0903	0917	0908
21					12	17	2007	2030	2015
21	23		15	22	28	25	2306	0038	2315
22	18			6	9		0140	0202	0144
22				9	5		0205	0230	0214
22	15	16	27	29	15	18	0317	0345	0321
22			39	—		24*	0511	0547D	0539
22			38	—			0547E	0735	0613
22	19				9		2050	2157	2102
23		24	9	8			0618	0644	0621

Inubo

Jul.	S		P			A			
1989	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
23			49	24			0647	0735	0653
23			13				0924	0952	0927
23					9		2132	2200	2135
24				—	7		0213	0235	0218
24			12	10			0349	0426	0357
24			37	20	16	17	0520	0630	0547
24		22	15				1149	1239	1155
24				—	7	19	2203	2244	2214
25	29	48	46	—	51	43	0028	0153	0042
25	20	17		—	15	13	0204	0251	0208
25		19	30	22	8		0453	0545	0501
25			22	23			0623	0718	0632
25		—	315	145		33	0838	1027	0845
25					10		2312	0012	2322
26				19	15	17	0039	0120	0044
26					10		0121	0148	0131
26					12		0150	0240	0206
26		22	37	26	14	23	0258	0403	0318
26	29	57	95	82	29	21	0457	0654	0523
27	19		24	27	17		0244	0340	0257
27			12	18	5		0351	0434	0403
27			10				0635	0709	0644
27			15	—			0716	0741	0720
27		39	22	8			0817	0919	0831
27					8	9	2215	2305	2234
28			8	9	6	16	0022	0122	0032
28			16	17	6		0355	0448	0408
29			21	8			0554	0611D	0604
29		34	39	34			0611E	0653D	0616
29	22	36	41	22			0653E	0813	0711
29			12				0838	0922	0842
29			9				0945	1006	0948
29		14	12				1017	1043	1024
29		29					1503	1553	1510
30				14	11	16	0036	0128	0055
30	17	28	46	51	17	15	0453	0605	0501
30					15		2042	2122	2051
30	15	18	13	—	26	25	2353	0054	0003
31	25	25	42	—	40	27	0113	0243	0133
31	37	113	95	—			0642	0828	0716
31	—	29		52*	—	—	2257	—	2324

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