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IONOSPHERIC DATA IN JAPAN

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CONTENTS

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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)
Kokubunji	35°42.4′N	139°29.3′E	25.5°N	205.8°	Vertical Sounding (I)
Yamagawa	31°12.1′N	130°37.1′E	20.4°N	198.3°	Vertical Sounding (I)
Okinawa	26°16.9′N	127°48.4′E	15.3°N	196.0°	Vertical Sounding (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°	Radio Receiving (P)

A. IONOSPHERE

Ionospheic observations are carried out at the above four 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 descriptivel etter 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 I-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 transmisson 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 l etters 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 normnal *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 200, 500 and 2800 MHz are carried out at Hiraiso. The observation equipment consists of two parabolic antennas, one with 10-meter diameter for 200 MHz measurements and one with 2-meter diameter for 500 and 2800 MHz measurements, 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 are tabulated separately for 200 and 500 MHz measurements. 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 200, 500 and 2800 MHz 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.

B3. Summary Plots of $F_{10.7}$ at Hiraiso

The 10.7 cm solar radio flux at Hiraiso is plotted over a one month period. The 10.7 cm flux ($F_{10.7}$) is determined by adjusting the 10.7 cm radio flux measured at Hiraiso to the Pentincton 10.7 cm radio flux. The figure on the right-hand side shows the $F_{10.7}$ index estimated at Hiraiso.

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 600 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 for 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	innuenced 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.

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

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 par hour from JJY (Japan Standard Wave) staion. The conditions are denoted as follows:

N normal,
U unstable,
W disturbed.

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 ($\Delta\ \phi$) 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 and X-ray flares, and solar radio burst 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. 1994

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	A	35	A	38	40	A	A	A	A	A	A	A	A	A	A	61	60	A	58	57		39	57	57
2	57	28	35		A	A	A	A	A	A	A	A	A	A	A	A	A	49	60	62	57	57	57	
3	57	40	29	35	A	A	A	A	A	A	A	A	A	A	A	A	A	A	57	53	66	57	57	56
4	28	36	36	34	40	31	A	A	A	A	A	A	A	A	A	A	A	A	A	A	61	58	30	A
5	38	35	35	31	30	A	A	A	A	A	A	A	A	A	A	A	A	A	60	68	57	68	57	58
6	57	38	49	37	38	A	A	A	68	A	A	A	A	A	A	A	58	55	58	63	68	67	57	56
7	A	A	A	46	37	40	A	A	A	52	A	A	A	A	A	A	57	57	A	A	57	32	A	A
8		23	51	50	A	A	A	A	A	A	A	A	A	A	A	A	A	A	62	A	A	58	A	68
9	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	56	66	A	A	57
10	36	42	35	40	A	34	58	62	A	A	A	A	A	A	A	A	49	58	A	A	62	A	49	57
11	57	52	57	A	35	A	56	67	54	A	A	A	A	A	A	61	A	A	58	56	58	60	61	55
12	57	57	44	46	40	32	60	A	60	A	A	A	A	A	A	A	A	A	56	56	67	A	57	55
13	56	57	57	32	40	57	A	A	A	A	A	A	A	A	A	A	56	A	A	61	57	57	55	57
14	57	50	37	A	A	A	59	66	A	A	A	A	A	A	A	A	A	A	A	A	61	71	68	68
15	69	56	57	55	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	58		56	59	56
16	58	55	56	52	24	24	A	A	A	A	A	A	A	A	A	A	A	A	A	58	58	68	68	67
17	57	40	48	42	A	37	A	A	A	A	A	A	A	A	A	A	A	A	A	A		49	56	57
18	29	A	41	35	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	57	35	69	23
19	38	47	35		38	31	A	A	A	A	A	A	A	A	A	A	A	A	27	61	57	28	57	40
20	A	35	35	32	A	29	A	A	A	A	A	A	A	A	A	A	A	A	A	A	56	57	36	A
21	A	40	35	28		A	A	A	A	A	A	A	A	A	A	A	A	A	53	56	57	69	58	28
22	38	59	35	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	57	57	57	57	35	57
23	44	35	30	31	32	32	A	A	A	A	A	A	A	A	A	A	A	A	A	59	56	71	68	40
24	40	35	40	37	32	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	61	57	49	57
25	29	23	40	A	41	36	A	60	59	A	A	A	A	A	A	A	67	68	58	53		A	A	A
26	A	A	A	44	A	A	A	A	A	A	A	A	A	A	A	A	A	57	56	A	A	60	57	58
27	57	35	38		36	40	A	A	A	A	A	A	A	A	A	57	56	63	60	62	57	57	56	29
28	35	39	34	A	40	A	A	A	A	A	A	A	A	A	A	57	A	A	53	55	56	57	38	57
29	57	A	A	A	A	28	A	A	57	A	C	C	C	C	C	C	C	A	58	A	67	59	58	57
30	57	57	35	36	46	A	A	A	A	60	C	C	A	A	A	A	56	A	61	A	A	A	A	A
31	28	35	38	32	30	32	A	A	60	57	A	A	A	A	60	A	A	A	A	A	A	A	A	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	24	26	26	21	17	14													17	18	23	25	25	24
MED	56	40	38	37	38	32													58	58	57	57	57	57
U Q	57	52	48	45	40	37													60	61	62	63	58	57
L Q	37	35	35	32	32	31													56	56	57	56	52	55

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT WAKKANAI

JUL. 1994

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	40	33	34	26	29	38	35	32	33	62	37	36	36	63	75	30	28	92	41	61		39	38	38
2	33	33	G		31	57	72	58	56	63	41	44	31	32	32	71	35	28	29	G	G	G	G	
3	38	60	33	36	40	41	24	29	37	53	55	76	36	36	35	46	39	45	34	G	G	39	62	48
4	24	28	23	36	G	25	38	59	38	40	65	66	92	39	54	61	82	77	60	54	36	36	30	39
5	32	G	28	29	G	36	53	65	46	31	93	37	70	41	37	87	136	88	39	35	54	29	26	32
6	33	26	G	G	G	24	35	35	65	38	51	39	36	34	45	59	41	36	33	38	34	28	38	38
7	59	60	60	40	38	28	36	36	57	54	92	60	95	79	96	86	51	64	94	72	68	40	94	94
8		60	36	56	39	54	92	75	130	118	60	66	39	58	72	84	52	66	62	74	72	62	61	35
9	62	56	47	39	39	44	65	55	66	59	74	126	56	88	78	61	56	50	63	63	42	60	64	G
10	26	30	29	28	31	30	42	66	85	79	138	77	76	37	82	31	37	46	69	64	47	39	33	33
11	28	36	36	39	29	34	38	60	72	78	142	82	76	46	38	42	55	57	48	49	49	40	37	G
12	25	28	G	28	27	29	31	60	76	56	70	58	75	71	77	96	65	54	56	34	65	70	50	64
13	34	38	31	30	26	34	66	65	61	96	92	95	60	38	60	63	65	116	54	49	63	64	75	64
14	46	42	33	37	51	39	30	56	70	95	93	89	121	85	37	63	72	96	95	94	86	60	60	28
15	33	30	G	G	40	36	38	60	64	40	54	35	36	31	114	60	36	36	44	34	27	34	37	40
16	30	34	26	23	G	31	34	65	118	90	70	58	72	82	157	30	46	42	59	86	G	G	32	G
17	28	33	36	26	27	35	28	54	64	58	45	61	60	72	31	40	62	46	46	46	34	G	G	32
18	36	38	G	31	25	34	60	61	40	78	62	32	36	33	32	42	54	45	76	74	45	28	G	28
19	28	33	29	G	G	24	33	38	32	42	39	36	42	32	35	36	63	38	38	40	28	40	38	63
20	39	33	30	G	11	32	36	53	35	58	63	39	36	66	76	52	75	72	96	97	76	40	38	40
21	38	30	27	38		38	28	50	76	77	87	66	56	40	36	58	70	55	38	28	64	54	58	35
22	29	34	27	56	38	36	34	70	41	42	70	63	38	37	35	30	30	46	34	30	37	34	38	24
23	G	28	23	24	26	G	55	51	62	64	39	36	34	38	37	44	53	58	87	40	49	56	33	39
24	32	28	29	33	29	60	56	36	65	53	79	60	43	33	29	29	28	46	61	50	44	38	24	34
25	30	26	28	29	26	24	27	30	44	49	42	52	37	34	34	56	46	36	52	33	32	62	63	65
26	65	59	35	28	36	40	36	38	44	77	74	74	86	96	88	88	54	36	36	76	78	58	40	42
27	46	24	29		G	26	28	34	58	40	60	74	35	37	32	30	28	44	40	35	29	36	45	30
28	35	33	28	28	24	30	36	63	93	97	43	38	92	62	72	39	57	43	40	35	40	41	41	45
29	38	59	58	39	79	38	59	54	51	41	C	C	C	C	C	C	C	70	43	61	33	34	34	28
30	29	G	G	26	G	39	57	37	53	32	C	C	40	78	167	88	40	72	50	74	69	65	58	40
31	36	28	25	25	38	32	38	61	28	36	44	44	42	41	56	29	36	66	134	84	72	85	71	56
	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	31	29	30	31	31	31	31	31	29	29	30	30	30	30	30	31	31	31	30	31	31	30
MED	33	33	29	29	28	34	36	55	58	58	63	60	42	40	50	54	52	50	50	49	44	40	38	38
U Q	38	38	34	37	38	39	56	61	70	78	83	74	75	71	77	63	63	70	63	74	65	60	60	45
L Q	29	28	23	25	11	29	33	37	41	41	44	38	36	36	35	36	37	43	39	35	33	34	33	30

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT WAKKANAI

JUL. 1994

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	15	15	15	15	16	16	16	17	16	17	17	20	17	17	17	17	17	15	15	15		14	15	15
2	15	15	15		15	15	20	16	16	16	20	18	17	20	18	16	16	16	14	17	15	15	15	
3	15	15	15	15	15	16	16	16	16	17	30	16	18	18	16	17	16	16	14	17	15	15	15	14
4	16	16	16	15	23	15	20	18	17	16	18	17	18	16	15	15	16	15	15	16	15	15	15	15
5	15	17	15	15	16	17	16	17	16	16	20	16	17	16	17	16	15	15	15	15	16	15	15	15
6	15	15	15	15	15	16	16	16	16	17	16	18	17	16	16	16	16	15	14	15	15	15	15	15
7	15	15	15	15	15	15	15	17	16	16	17	21	21	17	16	16	15	15	15	15	15	15	15	15
8		14	15	14	15	16	15	17	15	16	20	17	17	17	16	17	15	15	15	16	15	15	15	15
9	15	16	15	15	15	16	15	17	16	16	16	16	21	20	17	17	16	15	16	15	15	15	15	15
10	15	15	15	15	15	15	16	16	16	17	22	17	17	18	20	16	16	15	15	16	15	15	15	15
11	16	15	15	15	16	15	15	16	16	18	20	17	23	21	16	17	16	15	14	15	15	15	15	15
12	15	15	15	15	15	15	16	16	16	17	17	18	17	18	20	16	16	15	15	14	15	16	15	15
13	15	15	15	15	16	15	16	16	16	16	17	20	26	20	17	17	16	16	14	15	15	15	15	15
14	14	15	14	15	15	15	16	16	16	16		18	18	17	16	16	17	15	16	15	15	15	16	15
15	15	15	15	15	15	16	16	16	16	17	16	21	20	17	16	16	16	15	15	15	15	15	15	15
16	15	15	15	16	17	17	16	20	15	18	21	17	20		17	17	16	16	14	15	15	15	15	15
17	14	15	15	15	17	15	16	16	15	17	17	18	16	17	16	17	15	16	15	15	15	16	15	15
18	15	14	15	15	15	16	17	17	16	16	20	16	16	17	16	20	16	16	15	15	16	15	15	15
19	15	15	15	16	17	17	16	17	16	16	17	17	18	18	16	17	16	15	14	15	15	15	15	15
20	15	15	15	15	18	15	17	16	16	16	17	18	18	18	16	18	16	16	15	15	15	15	15	15
21	15	15	15	15		17	16	17	16	17	21	22	20	24	16	16	16	15	15	16	15	15	15	14
22	15	14	15	14	15	15	16	16	16	16	20	17	18	18	17	16	15	15	15	15	15	15	15	16
23	15	16	15	16	16	21	16	15	15	18	17	16	17	20	18	16	16	15	15	15	14	15	15	15
24	15	15	15	15	15	15	15	16	16	16	17	17	17	17	16	16	15	16	15	15	14	15	16	15
25	15	15	15	15	16	16	16	16	15	16	16	16	18	18	17	17	15	15	14	15	15	15	15	15
26	15	15	15	15	15	15	16	16	16	16	17	17	18	16	17	16	14	15	15	15	15	15	14	15
27	15	15	15		16	20	15	16	15	16	16	17	17	17	17	15	15	15	15	15	15	16	15	16
28	15	15	15	16	15	15	16	16	16	16	18	16	18	17	16	16	16	14	15	15	15	14	15	15
29	15	14	15	15	15	15	15	15	16	16	C	C	C	C	C	C	C	16	15	15	15	15	15	16
30	15	15	16	15	16	15	15	17	16	16	C	C	17	17	16	16	15	15	15	15	15	15	15	15
31	15	15	15	15	15	15	16	15	15	17	18	16	18	20	15	17	16	14	16	15	16	15	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	30	31	31	29	30	31	31	31	31	31	28	29	30	29	30	30	30	31	31	31	30	31	31	30
MED	15	15	15	15	15	15	16	16	16	16	17	17	18	17	16	16	16	15	15	15	15	15	15	15
U Q	15	15	15	15	16	16	16	17	16	17	20	18	18	19	17	17	16	16	15	15	15	15	15	15
L Q	15	15	15	15	15	15	15	16	16	16	17	16	17	17	16	16	15	15	14	15	15	15	15	15

HOURLY VALUES OF foF2 AT KOKUBUNJI

JUL. 1994

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	A	46	34	40		50	A	A	A	A	A	A		A	74	63	63	52	A	95	60	68	51	68
2	57	A	44		44	A	53	A	A	A	A	A		49	A	A	55	60	68	70	57	60	48	57
3	54	48	37	40	37	46	A	51	51	A	A	A	A	A	A	A		66	68	A	54	57	59	57
4	57	48	46	32	59	46	A	57	49	A	A	A	A	A	A	A	A	59	68	93	68	A	A	46
5	43	39	40	36	34	37	48	57	A		A	A	A		A	A	56	A	70	90	94	57	A	A
6	39	A	46	46	41	44	69	67	A	A	A	A	A	A	A	A	A	71	C		A	60	57	47
7	A	28	46	44	39	44	57	A	A	A	A	59	A	A	65	70	80	92	67		68	56	A	57
8	69	47	46	45	40	A	A		A	A	A	A	A	49	A	77	49	61	61	68	63	59	57	A
9	47	43	41	42	44	A	69	65	A	36	A	A	A	A	A	72	76	71		A	A	A	58	58
10	50	49	47	45	40	A	59	69	46	A	A	A	A	A	87	A	77	69	68	60	68	57	70	56
11	56	52	48	46		65	60	70	85	76	A	A	A	A	71	66	71	76	82	95	56	A	51	57
12	57	48	46	40	44	46		66	A	A	A	A	71	73	74	87	87	83	70	67	70	57	47	54
13	48	47	43	41	40	44	A	66	A	A	A	A	A	A	61	70	66	66	82		A	68	58	54
14	48	56	50	48		48	A	67		A	A	A	A	A	A	66	A	A	80				71	
15	69	57	60	56	55	48	71	A	A	A	A	A	A	A	A	A	A	54	56	69	54	57	A	48
16	A	47	44	40			A	A	A	A		A		A	A	A	A	A	A	A	60	70	64	57
17	52	56	57	57	56	44	48	48	A	A	A	A	A	A	57	A	54	58	A	57	57	49	57	A
18	48	46	41	A	38	40	A	A	A	A	A	A	A		A	A	A	A	A	68		54	57	A
19	47	47	46	35	38	46	57	60	A	62	A	A	A	A	58	A		58	61	60	56	48	44	A
20	29	43	37	A	A	35	65	A	A		A	A		A	A	A	A	56	67	70	59	A	57	57
21	A	A	A	43	43	45	48	53	A	N	A	A	A	A	A	A	A	52		69	81		56	57
22	46	42	48	41		A	A	72	54	A	A	A	A	A	A	A	56	61	A	A	57	48	47	A
23	47	40	42	32	35	38	48	58	66	A	A	A	63	A	68	51	A	61	60	69	68	54	A	A
24	A	A	46	39	44	69	50	A	A	66	A	A	A	A	68	A	57	A	A	69	70	70	68	49
25	A	42	41	36	44	A	48	57	50	A	A	A	A	A	70	A	A	61	A	A	58	57	56	49
26	A	48	A	A	48	43	A	A	50	A	A	A	58	62	A	A	A	92	92	95	69	70	58	56
27	57	57	56	37	59	A	57	56	A	A	A	A	A	A	A	81	A	93		58	29	47	A	38
28	A	A	35	A	A	89	A	69	64	A	A	A	A	A	A	A	70	71	34	A	A		57	50
29	47	43		35	59	89	A	62	A		A	A	A	A	A	A	A	A	119	94	A	66	70	57
30	58	45	42	40	40	24	46	A	73	65	61	A	60	A	A	70	77	92	57	68	62	57	57	50
31	48	57	37	A	A	A	71	58	67	A	A	A	58	66	66	65	67	68	66	72	57	50	A	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	23	26	28	25	23	22	18	20	11						12	12	16	25	20	21	24	24	24	22
MED	48	47	45	40	43	46	57	61	54						68	70	66	66	68	69	60	57	57	56
U Q	57	49	46	45	48	48	65	67	67						72	74	76	73	75	91	68	63	58	57
L Q	47	43	41	36	39	43	48	57	50						63	65	56	58	61	67	57	54	53	49

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT KOKUBUNJI

JUL. 1994

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	66	60	77	46		40	88	41	77	58	55	34		48	65	59	46	69	117	132	84	31	27	34
2	34	35	34		G	61	58	95	70	108	90	51		33	37	33	30	37	38	36	35	25	G	G
3	29	G	G	G	26	28	36	43	57	31	71	68	131	54	74	90	127	56	35	64	32	26	41	35
4	24	29	34	32	32	28	36	28	30	84	52	70	110	94	70	55	50	35	33	G	34	58	44	29
5	44	34	31	30	33	30	31	51	56		114	65	58	60	78	90	71	65	96	71	171	70	79	81
6	58	56	38	33	31	28	38	55	70	87	49	51	61	59	75	85	74	48	C		62	41	38	44
7	83	70	38	39	35	32	53	70	59	59	96	40	88	84	40	44	34	37	35		29	48	41	34
8	50	50	33	26	41	48	68	95	131	110	85	75	73	55	73	38	46	46	49	40	35	116	35	73
9	32	34	G	28	38	30	41	40	60	59	64	94	60	43	34	28	36	60	40	92	78	70	58	67
10	51	37	38	24	31	35	52	78	49	54	62	78	54	59	84	80	61	59	68	38	G	35	36	G
11	27	28	30	31	30	30	33	44	55	68	62	61	122	89	55	54	53	58	47	33	27	99	55	47
12	40	28	26	28	G	30		50	58	114	71	35	G	57	62	60	47	61	73	59	52	58	G	32
13	23	50	26	31	36	33	76	58	69	98	57	111	56	57	40	50	59	41	32		121	84	40	52
14	51	34	42	37		30	48	68		56	79	87	81	57	61	70	60	58	57		117		48	34
15	60	35	56	30	G	28	34	44	38	47	57	57	51	48	50	74	51	28	43	25	38	39	33	31
16	30	24	G	G	G	29	40	45	48	54		67		56	86	32	30	62	57	76	G	30	G	58
17	28	25	32	53	38	34	34	41	34	51	44	40	40	54	31	56	54	58	90	38	32	28	30	55
18	55	34	48	37	26	G	44	59	62	108	71	60	53		58	74	90	128	58	60		34	32	29
19	25	G	30	G	G	29	34	40	59	48	112	86	75	61	52	56		37	34	28	29	28	G	48
20	73	30	56	47	33	33	51	89	86	72	40	40		52	55	59	59	44	81	36	36	60	52	49
21	50	43	34	26	G	G	29	36	69	92	133	71	52	64	60	62	59	54		69	58	59	38	31
22	30	30	30	30	50	30	84	49	68	91	60	52	57	53	53	58	29	62	89	76	67	52	42	68
23	56	43	30	G	32	G	40	40	53	57	128	59	41	68	69	46	69	51	32	62	52	74	59	59
24	66	58	41	32	31	29	50	48	96	48	41	58	48	68	82	43	82	91	174	86	37	38	59	32
25	44	31	34	34	40	40	33	36	40	41	33	48	81	74	53	61	67	50	108	64	34	56	48	53
26	60	60	57	72	54	50	80	93	34	37	35	44	33	40	63	88	62	128	42	54	49	40	54	52
27	57	41	30	40	32	30	34	44	78	55	57	86	101	85	124	50	84	81		43	28	98	71	102
28	53	48	63	51	34	48	74	41	39	72	99	94	42	61	80	60	47	41	34	36	54		33	34
29	43	25	G	G	G	40	49	41	127	98	49	70	51	47	74	92	94	135	108	71	109	76	67	71
30	41	34	25	28	38	29	45	88	58	54	54	66	43	55	83	47	53	43	56	54	44	38	34	26
31	28	G	G	58	53	45	40	48	53	87	60	68	52	46	50	52	55	37	32	G	G	G	72	50
	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	29	31	30	31	30	30	30	31	27	30	31	31	30	31	28	27	30	29	31	31
MED	44	34	33	31	32	30	42	48	58	59	61	65	56	57	62	58	57	56	52	54	38	48	41	47
U Q	57	48	41	39	38	40	53	68	70	91	85	75	81	64	75	74	69	62	85	71	62	70	55	58
L Q	30	28	26	26	13	29	34	41	49	54	52	51	48	52	52	47	47	41	35	36	32	32	33	32

HOURLY VALUES OF fmin AT KOKUBUNJI

JUL. 1994

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	14	15		14	14	16	16	14	18	26		35	20	18	17	15	15	15	15	14	14	15
2	15	14	14		15	16	15	15	16	30	30	30		24	18	16	15	14	15	15	15	15	18	15
3	15	15	17	15	15	14	14	16	17	16	26	18	24	40	36	21	16	15	15	15	15	15	14	14
4	15	15	15	15	14	14	15	14	16	20	35	36	34	23	21	22	15	15	15	15	15	14	15	15
5	15	14	14	15	17	14	14	15	15		30	26	34	22	24	17	15	14	15	16	14	15	15	15
6	15	15	15	14	14	15	15	14	15	20	17	30	32	27	20	17	16	15	C		14	15	14	15
7	14	14	14	14	15	14	15	15	16	22	17		35	20		17	15	15	16		15	15	15	14
8	14	14	14	14	15	15	15	14	16	17	23	28	32	40	22	18	14	15	15	15	14	15	15	14
9	15	14	14	15	14	15	15	15	16	18	24	35	34	21	17	18	15	16	14	15	14	14	15	15
10	15	14	14	15	15	14	15	15	18	21	33	42	34	34	32	26	20	16	14	15	15	14	15	14
11	15	14	15	14	14	14	15	16	15	20	22	22	30	23	18	22	16	14	15	15	15	14	15	14
12	15	14	14	14	15	14		16	17	18	22	24		24	22	24	15	15	15	15	14	14	15	14
13	15	14	14	14	14	14	15	14	15	24	28	28	28	26	20	34	16	14	15		15	14	15	15
14	14	14	15	14		15	14	15		18	22	30	32	38	27	22	14	14	14		15		15	14
15	14	14	14	15	15	18	15	14	15	18	18	38	14		35	18	16	15	15	14	14	15	15	15
16	15	15	15	14	15	15	15	15	32	34		34		18	22	17	16	15	14	15	15	14	14	14
17	15	15	14	14	15	15	14	15	22	21	18			35		33	17	15	14	15	14	14	15	14
18	14	15	14	14	15	16	16	15	16	16	20	23	26		38	14	15	15	15	15		14	14	14
19	14	14	14	14	15	15	15	14	16	21	20	22	34	33	26	20		15	14	15	15	15	14	14
20	14	14	15	14	15	15	15	14	16	16	17			36	18	16	15	17	15	15	14	15	15	14
21	15	15	14	14	15	18	14	14	17	17	24	22	33	29	20	16	16	15		14	15	14	15	14
22	15	14	14	14	15	15	15	16	15	17	24	23	27	26	20	17	16	15	15	14	15	15	14	15
23	14	14	14	15	15	16	14	14	15	15	16	23	32	21	20	20	15	15	14	15	14	14	15	14
24	14	14	14	14	16	15	15	15	17	23	22	16	20	26	20	20	16	15	14	14	15	14	14	15
25	14	14	14	14	14	15	14	14	15	17	23	23	23	20	21	22	15	15	14	15	15	14	14	15
26	14	14	15	14	14	15	15	15	16	17	18	18	22	48	21	15	18	15	14	14	14	15	14	14
27	15	14	14	14	14	15	15	15	14	16	22	16	18	24	17	16	15	15		14	15	15	15	14
28	14	15	15	14	14	15	15	15	14	17	32	32	33	32	21	17	15	15	15	14	14		14	15
29	14	15	15	16	15	15	15	15	15	16	17	18	22	20	21	20	14	15	14	20	15	14	15	14
30	15	14	14	14	14	15	15	15	14	18	23	33	35	33	23	18	15	15	16	14	15	14	14	14
31	16	14	15	14	14	14	14	15	15	17	16	18	21	21	17	16	15	15	15	15	18	14	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	31	31	31	30	29	31	30	31	30	30	30	28	25	29	29	31	30	31	28	27	30	29	31	31
MED	15	14	14	14	15	15	15	15	16	18	22	25	32	26	21	18	15	15	15	15	15	14	15	14
U Q	15	15	15	15	15	15	15	15	16	21	24	31	34	34	23	22	16	15	15	15	15	15	15	15
L Q	14	14	14	14	14	14	14	14	15	17	18	22	22	21	20	17	15	15	14	14	14	14	14	14

HOURLY VALUES OF foF2 AT YAMAGAWA

JUL. 1994

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	44	47	A	A	A		38	A	59	A	A	A	A		71	67	A	A	A	A	A	A	A	
2	35	A	A	A	49	43	57	58	50	A	A	A	A			A	67	82	85	77	49	A		59
3	56	49	44	69	A	48	46	57	68	A					73	73	68	78	83	A	A		A	A
4	56	49	52	48	42	44	56	57	A	A	A	A	A	A	A	53	64	70	82	82	A	32		49
5	A	A	A	36	44	37	48	58	66	A	A	56		73		A	A	72	86	93		69	A	A
6	A	43	25	A	A	A	A	68		A	A	A	A	N	A	A	A	A		A	A	A	A	
7	57	54		48	49	37	46	69	A	A	A		70	82	80	83	96	94	78	70		49	44	A
8	39	A	89	24	43	58	A	A	62	A	A		A	66	A	93	A	67	66	69	61	59	A	49
9	50	37	A	31	38	37	A	A	A	A		63	A			83	101	92	80	A	A	A	A	49
10	A	A	A	49	43	47	56	48	A	A			66	75	77	A	86	81	72	69	A	A	A	
11		55	48	48	43	35	A	69	72	80	A	A	71	82	A	80	86	97	87	69	69	A	46	A
12	A	A	44	36	44		49	57	A	A	66	66	A	A	A	71	95	93	86	95	37	41	34	A
13	A	43	36	A	35		A	61	70	64	A	A	A		A	71	76	74	74	76	69	55	A	A
14		A	A	48	43	40	A	56	79	A	A			A	A	78	71	68	78	84	82	A	A	A
15		A	53	57	57		47	A	A	A	A		A		A		56	A	A	68	A		46	
16	67	38	47	26	46	A	36	56	A	A	A			66	68		A	54	A	68	C	C	89	58
17	28	A	52	A	26	59	48	A	A	A	A		A	58	A	A	A	73	70	68	A	A	A	A
18	58	59	37	44		N		60	A	A	A			A		A	A	60	68	68	A		N	A
19		59	69	35		28		A	A	61		A	A	75	84	72	68	66	A	68	69		59	36
20	26	A	A	A	28	N	A	68	A	A	A	A		68	69		A	A	80	74	49	A	36	
21	35	37	34	69	37	31		A	56	A	A					67	A	A		A	79	A		A
22	A	29	34	24	26	29	30	A	A	A	A	A		A	A	A	70	67	69	A	A	A	A	A
23	A	A	A	A	25	26	34	A	61	A	A			71	A	76	68	64	72	70	54	59	A	A
24	36	A	26	59	30	26	28	A	A	A	A		A	66	A	A	A	A	A	A	71	89	49	28
25	32	49	A	23	A	A		A	A	A	A				71	72	A	78	71	A	A	A	A	A
26	28	69	A	A	35		A	A	A	A	62	A	A		73	77	80	85	80	68	70	28	59	35
27	A	38	28	28	28	28	59	A	59	A	A		A	A	A	A	98	85	73	70	A		59	
28	A	A				25	A	A	A	A	A	A	A	A	A		72	78	A	59	A	49		89
29	A	A	A	28	69	N	29	A	75	A			62		68	70	67	73	34	A	A	A	A	A
30	39		30	A	26	59	A	62	71	A	A	A			A	78	92	78	74		66	59		35
31	28			35	59	26	69	A	62	59	A	A	A	A	A	A	A	78	76	72	A	A	A	69
	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	17	16	17	21	24	20	17	15	14					11	10	17	19	25	23	21	13	12	10	11
MED	39	48	44	36	42	37	47	58	64					71	72	73	72	78	76	70	69	56	48	49
U Q	56	54	52	48	45	45	56	68	71					75	77	79	92	83	82	76	70	59	59	59
L Q	30	38	32	28	29	28	35	57	59					66	69	70	68	67	71	68	51	45	44	35

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT YAMAGAWA

JUL. 1994

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	G	31	38	49	58	59	32	40	52	39	59	79	93	G	G	64	95	107	95	48	84	67	70	33
2	28	40	40	34	32	27	40	44	38	79	58	60	116		G	38	31	46	32	36	32	41	28	25
3	G	26	G	33	29	32	33	39	60	28					50	40	51	27	37	80	87	59	53	33
4	G	G	32	31	31	32	26	32	34	84	73	52	62	55	30	40	42	59	46	33	32	24		83
5	33	44	50	29	G	G	33	45	50	71	50	G		G		65	84	70	34	32	G	G	38	39
6	42	33	30	40	40	41	52	36		61	97	136	160	81	170	178	137	92	149	104	92	84	40	32
7	33	28	28	G	G	G	28	32	29	58	61	G	G	G	G	58	G	56	40	G	24	G	28	40
8	32	30	29	41	32	25	32	32	31	40	40		63	G	31	G	66	28	28	82	38	32	33	33
9	33	32	40	24	59	34	32	31	34	51		G	55			G	40	61	61	83	57	41	70	51
10	49	58	44	32	G	G	25	29	35	58	G		G	30	58	54	74	52	52	91	70	41	34	28
11	G	G	30	G	24	G	33	32	50	80	64	64	44	66	86	89	78	61	54	80	38	36	31	41
12	40	58	32	G	G	G	29	32	34	39	54	56	56	58	56	G	34	40	34	32	30	G	40	33
13	38	33	26	32	34	34	56	39	46	51	61	142	53	G	48	43	31	29	50	58	G	32	92	78
14	31	39	40	32	G	33	55	44	136	94	76	G		59	83	61	61	54	41	38	72	82	86	56
15	50	34	69	33	G	27	29	38	59	72	42	G	78		56		60	96	83	57	72	33	25	32
16	40	33	32	34	43	29	31	33	36	60	51	G		G	30		30	38	41	28	C	C	G	G
17	34	45	29	49	27	G	31	32	44	40	31		30	29	113	64	67	101	31	41	40	40	32	28
18	G	28	G	G	G	G	26	30	29	83	65			90		31	30	30	36	38	55	33	32	30
19	G	G	G	24	G	G	G	32	36	36	G	71	56	74	88	G	G	54	56	G	G	G	G	30
20	28	33	38	34	30	24	34	39	103	30	78	30		G	30		71	70	37	31	26	39	G	24
21	G	G	30	33	G	G	31	28	31	30	30					30	30	29		35	30	34	32	35
22	33	29	30	30	26	28	24	33	77	62	84	70		71	145	77	31	61	70	87	88	80	70	79
23	59	72	40	77	78	34	31	40	57	78	64			G	90	85	58	26	28	G	G	27	32	36
24	G	32	32	38	G	G	28	33	80	81	88	G	87	55	30	30	92	67	56	81	39	56	39	32
25	30	29	38	32	36	32	27	33	32	32	30			G	52	36	59	59	41	70	41	54	33	35
26	38	33	33	37	24	32	34	31	52	40	G	31	30		G	G	31	53	40	58	34	36	32	32
27	40	34	32	26	33	32	29	28	61	80	79		68	80	136	150	85	40	39	27	40	28	G	26
28	36	38	30	G		32	32	92	85	141	159	116	104	91	84	G	28	34	26	G	34	33	28	G
29	37	41	59	33	33	30	32	31	26	31			30		G	G	38	26	35	32	93	56	37	43
30	86	32	32	40	30	32	33	40	39	35	34	31	G		29	29	28	72	32	68	32	G	25	G
31	G	G	G	G	G	G	30	68	44	56	32	31	55	78	137	91	82	70	65	49	58	34	32	33
	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	31	30	31	31	31	30	31	28	21	21	23	27	28	31	31	30	31	30	30	30	31
MED	33	33	32	32	28	28	31	33	44	58	58	31	56	55	52	40	51	54	40	41	38	35	32	33
U Q	40	39	40	37	33	32	33	40	59	79	74	70	82	74	88	64	74	70	56	80	70	54	40	40
L Q	G	28	29	24	G	G	28	32	34	39	33	G	30	G	30	15	31	34	34	32	30	28	28	28

HOURLY VALUES OF fmin AT YAMAGAWA

JUL. 1994

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	14	15	15	15	15	14	14	15	16	16	24		38			21	18	14	14	14	15	15	15	15
2	15	15	15	15	15	15	14	14	15	16	23	26	36				17	14	14	14	15	14	15	14
3	14	14	15	14	15	15	14	14	15	16					50	18	17	15	14	15	14	15	15	15
4	15	16	15	14	14	15	15	14	15	21	23	36	45	33		21	20	15	15	14	14	16		15
5	15	14	14	15	14	15	14	15	15	15	21			50		22	16	15	15	14	15	14	15	15
6	15	15	15	15	14	15	14	14		15	18	22	39	48	43	22	16	15	15	14	14	14	14	15
7	15	14	15	14	15	15	15	15	16		23		54	52	52	23		15	14	17	14	15	14	15
8	15	15	15	15	14	14	14	15	15	18			45	50		49	17	14	15	15	15	14	15	15
9	15	15	14	14	14	14	14	14	18	18		51	38			49	24	15	14	15	14	15	14	14
10	14	14	14	15	14	14	16	18	20	21	46		53	48	45	34	18	15	15	15	14	15	14	14
11	15	14	15	14	14	14	14	14	15		36	38	36	42	45	24	18	15	14	15	15	14	15	14
12	14	14	15	15	15	15	14	15	17	23	38	36	42	35	36		20	16	14	14	15	14	15	14
13	14	15	14	14	14	14	14	15	15	17	36	46		49	34	22	17	15	14	15	15	14	14	14
14	14	14	14	14	14	14	14	16	16	17	35			40	43	41	17	15	15	15	15	14	15	15
15	16	14	14	14	14	14	14	14	15	23	23		44		45		21	15	15	14	14	14	15	14
16	14	15	15	15	14	16	15	14	17	17	23	48		49	48		20	15	15	14	C	C	15	14
17	15	14	15	14	14	14	15	14	16	15	21		66	48	46	21	20	16	15	15	15	15	15	15
18	14	14	14	14	14	14	20	15	16	21	18			52		22	17	16	15	14	15	14	15	14
19	14	14	15	14	14	15	14	15	16	20		48		48	48	52		16		16	15	15	14	15
20	14	14	14	14	15	15	15	15	15	18	23			55	23		16	15	16	14	15	14	15	14
21	14	14	14	14	14	14	15	18	15	18	23					54	18	15		15	14	14	14	14
22	15	14	14	14	14	15	15	14	16	17	22	49		47	50	48	23	16	16	14	15	14	14	14
23	14	14	15	15	14	14	14	15	15	18	22			50	45	22	16	15	15	15	14	14	14	15
24	14	14	14	14	14	14	14	14	15	17	21		47	47	54	20	20	16	15	14	14	14	14	14
25	14	14	15	14	14	14	14	14	15	16	20				50	18	22	14	15	15	14	14	14	14
26	14	14	14	15	14	15	15	15	15	17		21			55	53	23	16	16	15	14	14	15	14
27	14	14	14	15	14	14	14	15	15	18	21		49	48	46	49	16	15	15	15	15	15	15	15
28	15	15	15	15		14	14	15		18	50	48	48	50	47			16	16	15	16	14	14	14
29	15	15	15	14	15	14	14	15	18	20			52		53	50	18		17	15	14	15	15	14
30	15	14	14	15	14	15	14	15	15	18	24		51			20	16	15	14	15	14	14	14	15
31	16	15	15	15	15	15	15	15	16	22	22			23	28	18	16	15	14	14	15	15	14	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	31	31	31	31	30	31	31	31	29	29	25	12	17	21	22	25	28	30	29	31	30	30	30	31
MED	14	14	15	14	14	14	14	15	15	18	23	42	45	48	46	22	18	15	15	15	15	14	15	14
U Q	15	15	15	15	15	15	15	15	16	20	29	48	51	50	50	49	20	16	15	15	15	15	15	15
L Q	14	14	14	14	14	14	14	14	15	16	21	31	38	44	43	21	16	15	14	14	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT OKINAWA

JUL. 1994

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		A			A		A			A		A												A
			41			38		62	63		58		61	67	67	72	78	83	62	80	92	94	74	
2		A		A		A				A	A		A	A										A
	69		56		57		60	62	55			79				82	74	94	81	71	60		55	
3							A		A			A												A
	54	59	46	44	41	40		69		58	57		61	82	87	83	74	93	90	68	69	44	50	
4	A						A					A										A	A	
		74	44	42	44	47		57	52	59	58		71	76	73	59	65	93	92	70	61			43
5									A	A	A									A	A			
	52	44	45	50	48	44	52	70				65	76	93	92	87	80	93	94			52	58	43
6	A			A		A	A	A		A	A	A	A	A	A	A	A	A		A	A	A		
		43	53		31				71										83				61	52
7											A							A			A			
		55	55	44	43		46	54		60		69	74	78	91	90	110		93	81		63	69	
8									A	A		A												
	49	45	58	48	48	50		60			58		59	64	92	86	80		82	74	62	50	57	48
9						A	A	A	A		A		A										A	A
	45	43	48	48	40					61		62			65	88	95	95	85	94	68	48		
10																							A	
	44	53		37	37		46	49	58	62	57	61	69	77	82	88	92	92	93	91	69	54		48
11																			A				A	
	60	57	50	49	37	32	46	60	64	72	67	63	78	82	86	90	124	111		82	66	48		41
12	A							A							A									
		44	44	37	44	30	49		64	92	67	68	66	67		78	89	116	115	92	70		47	
13								A				A			A									
	46	61	56	46	49	44	47		62	75	59		58	64		81	81	82	81	84	70	50	40	50
14	A							A	A		A	A					A					A		A
		42	45	40	38	36	44			62			59	60	74	76		75	92	80	81		70	
15								A	A	A	A	A		A	A	A	A	A				A	A	A
	62	55	54		51	42	57												60	57				48
16											A	A					A					A		
	47	50	47	46	44		59		75	61			63	92	76	61		55	81	82	68		60	49
17	A	A	A		A					A	A	A		A	A	A								
				39			34	42	55				60				72		84	71	57	60		60
18	A									A			A	A			A				A	A		A
		57	57	48	59	38	43	54	57						58	56		75	92	59			51	
19	A					A	A			A	A	A												
		38	47	42	32			46	79				71	85	92	94	92	84	86	69	69	59	32	
20				A	A	A	A			A	A		A								A		A	A
	48	36	42					54	57					77	76	73	92	92	91	67		46		
21		A				A	A			A		A	A	A								A	A	A
	44		49	42	40			70	58						68	72	70	57	58	94	92			
22					N	N		A		A	A	A	A										A	A
	44	41		36			32		55					79	92	94	93	88	76	81	69	50		
23	A	A				A	A	A	A	A	A													
			36	38	35							57	78	92	104	92	102	103	92	93	55	42	48	
24	A						A			A	A	A							A			A	A	A
		43		42				56	46				67	75	68	60	57	72		94	89			
25	A						A			A	A	A										A	A	A
		32	36	32	37			57	75				58	70	76	80	82	90	82	81	70			
26		A				A						C	C	C	C								A	A
	32		48	41	35		44	44	58	67	56					92	94	92	94	94	82	51		
27						A	A		A	A	A	A	A	A										
		60	57		38			57							84		96	86	92	94	94	59	46	50
28				A	A	A	A				A		A	A	A					A				A
	46	47	45					39	63	55		62				67	81	98	68		61	61		
29					A		A			A													A	A
	53	60		41		69		53	64			61	70	83	75	76	91	93	80	81	92	58		
30	A						A			A	A													A
		70	59	47	48	41		68	68			49	64	68	78	92	81	86	80	62	68	82		
31																		A		N				
	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	24	25	23	23	13	14	21	21	12		11	19	20	22	26	25	25	28	27	24	19	15	11
MED	48	48	48	42	41	41	46	57	62	62		62	66	77	77	82	82	92	84	81	69	52	55	48
U Q	53	58	55	47	48	45	52	62	66	69		68	71	82	91	90	93	93	92	92	81	60	61	50
L Q	44	43	44	39	37	37	44	51	56	59		61	60	67	73	72	76	82	80	70	64	48	47	43

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

JUL. 1994

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	G	37	G		46	G	45	31	42	69	64	87	48	41	35	34	33	59	42	56	G	45	49	68
2	33	46	50	43	41	39	32	35	40	63	80	77	56	46		46	38	26	G	29	34	25	50	48
3	26	G	G	G	G	G	44	58	116	38	46	68	65	G	34	43	42	42	35	G	35	24	43	29
4	39	24	22	27	25	66	41	29	44	46	44	35	68	43	35	39	74	36	36	34	38	39	42	G
5	28	25	47	G	G	G	26	40	73	40	11	42	41	57	43	63	64	69	72	168	52	26	G	33
6	54	40	59	82	34	36	43	60	94	92	87	70	72	184	139	86	96	103	89	152	86	99	66	39
7		31	39	22	42	G	G	37		49	78	51	66	68	61	70	51	97	76	36	71	58	42	41
8	32	45	26	30	42	70		40	46	76	41	51	55	42	43	43	42	47	G	26	44	34	53	40
9	41	28	37	44	47	55	67	71	60	44	56	56	42		35	61	56	59	35	30	47	66	42	34
10	38	G		34	29		44	37	36	39	35	54	61	52	67	81	68	60	42	37	60	48	37	27
11	25	G	G	G	G	G	86	36	45	58	75	48	78	67	65	74	81	77	88	68	60	42	44	36
12	44	29	25	26	G	29	34	69	70	42	46	64	63	49	66	G	52	48	48	67	98		G	G
13	G	G	G	G	42	50	28	94	94	47	45	60	40	66	68	42	38	34	38	31	33	G	43	49
14	46	26	43	G	G	24	41	48	66	88	49	49	G	157	56	48	114	91	88	84	37	73	72	56
15	58	71	43		33	34	40	44	51	85	64	56		63	61	78	98	60	40	28	43	41	33	40
16	40	35	44	44	24		97	117	42	60	68	60	60	67	50	36	51	45	48	41	41	98	29	G
17	64	40	37	58	38	G	42	70	46	64	68	30	G	74	78	73	66		40	58	42	48	G	G
18	42	G	G	G	G	G	47	25	38	29	G		44	58	50	42	56	51	37	25	69	50	49	40
19	41	25	24	G	G	34	43	40	38	48	56	54	62	82	90	92	60	35	32	G	G	44	23	G
20	G	43	45	48	43	33	48	31	45	43	43		41	38	38	31	G	42	G	G	47	44	46	34
21	29	25	28	25	33	41	35	G	N	36	G	50	36	47	46	37	39	31	23	28	28	47	25	58
22	28	43		G	G	G	32	57	37	48	94	64	96	91	52	60	68	49	45	38	48	44	27	50
23	40	41	32	31	G	76	87	74	96	92	66	51	85	57	116	38	53	43	G	G	24	G	39	
24	34	G	G	26	29	G	48	34	46	52	95	48	76	44	51	44	58	46	60	56	56	73	42	49
25	62	34	G	27	G		38	46	40	43	44	41	35	50	53	64	68	47	58	46	40	36	49	59
26	43	34	44	27	G	42	G	32	47	47	46	C	C	C	C	38	36	42	40	25	43	37	49	48
27		41	70		G	41	78	40	72	74	85	113	86	85	85	66	51	40	68	58	66	30	G	G
28	G	G	42	55	40	75	62	43	48	98	69	69	128	78	96	43	54	50	47	46	28	87		66
29	51	44	152	60	151	28	45	50	50	36	G	47	46	50	58	39	31	42	34	28	46	50	40	66
30	59	58	43	42	26	43	60	40	50	73	150	34	32	48	56	58	36	41	38	29	29	36		
31																								
	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	30	28	27	30	27	29	30	28	30	30	27	28	28	28	30	30	29	30	30	30	29	28	28
MED	40	32	37	27	28	34	43	40	46	48	56	54	58	57	56	45	54	47	40	35	43	44	42	40
U Q	45	41	44	44	41	43	54	58	68	73	75	64	70	71	67	66	68	59	58	56	56	54	49	49
L Q	28	24	11	G	G	G	34	35	42	43	44	48	41	46	44	39	39	41	35	28	34	35	28	28

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT OKINAWA

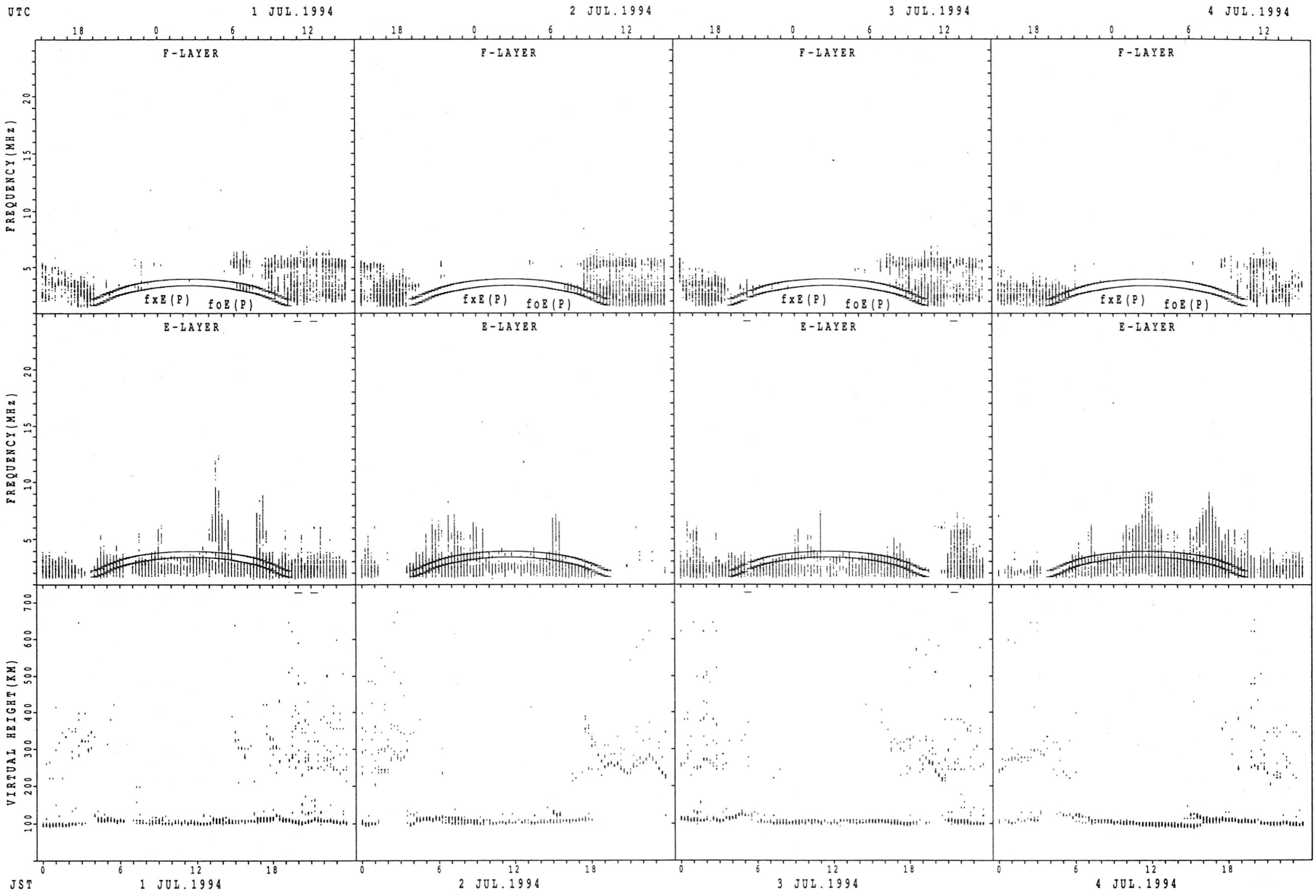
JUL. 1994

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

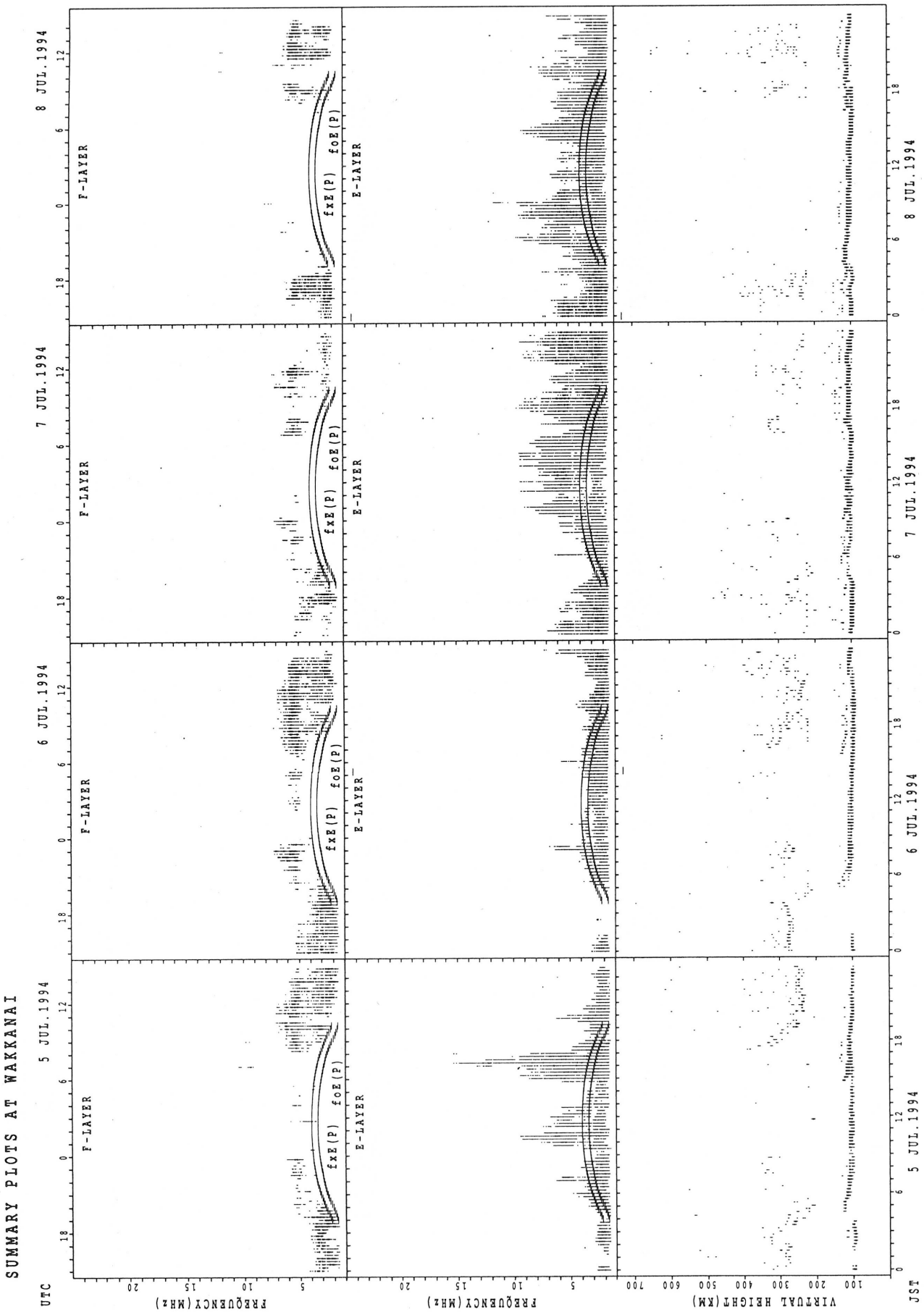
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	14		14	14	14	15	16	16	22	28	33	26	28	26	17	16	15	14	15	14	14	14
2	14	14	14	14	14	14	14	14	15	16	16	28	28	30		22	16	15	38	14	14	15	14	14
3	14	15	14	15	14	14	14	14	14	16	17	33	38			18	16	14	15	17	15	14	14	14
4	14	15	14	15	14	14	14	15	15	24	20		28	29	23	18	16	15	15	14	14	15	14	14
5	14	14	15	14	14	14	14	14	16	16	29	30	32	34	33	30	18	17	17	14	14	15	15	14
6	14	14	14	14	14	14	14	14	14	16	22	28	29	29	29	26	17	15	15	15	14	14	14	15
7		14	14	14	14	14	14	14		17	27	29	34	30	29	32	17	15	15	15	14	14	14	14
8	14	14	14	14	15	14		14	15	16	23	38	38	34	36	23	16	15	30	15	14	14	14	14
9	14	14	14	14	14	14	14	14	16	16	30	30	29		28	24	17	15	15	14	14	14	15	15
10	14	15		14	14		20	14	15	17	23	27	36	33	27	22	18	16	17	15	14	14	14	14
11	14	16	15	17	15	17	15	14	15	18	27	29	28	28	27	26	21	15	15	14	14	14	15	14
12	14	14	14	14	14	14	15	14	16	20	28	28	29	29	29		21	17	20	14	14		15	14
13	15	16	15	15	14	14	14	14	15	16	23	28	28	29	28	24	17	16	14	14	14	15	14	14
14	14	14	14	15	14	14	15	16	15	18	33	36		28	36	28	17	15	18	14	14	14	14	14
15	14	15	14		14	14	14	14	15	16	22	29		48	36	33	17	15	17	14	14	14	14	14
16	15	15	15	14	14		14	15	15	18	26	28	34	29	27		17	16	15	15	14	14	14	15
17	14	14	14	14	14	16	14	14	14	16	20			27	28	26	21		16	14	14	14	16	15
18	15	15	14	14	18	14	16	23	15	16			26	41	36	34	18	15	15	14	15	14	14	15
19	15	15	14	15	14	14	14	14	16	16	20	26	28	29	28	27	18	15	14	17	14	14	14	15
20	15	14	14	14	14	14	15	14	15	16	21		30	29	24	47	47	16	33	17	14	15	14	14
21	15	14	14	15	14	14	14	15	15	16		24	29	30	28	26	17	15	27	16	14	14	15	14
22	14	14		14	14	15	15	14	15	17	21	28	29	30	30	27	16	15	15	14	15	14	14	14
23	15	15	14	14	15	14	14	14	16	17	21	27	34	27	28	26	17	15	34	17	14	15	14	
24	14	14	14	14	14	14	18	14	14	16	18	24	27	36	39	20	16	15	16	14	15	14	14	14
25	14	14	14	14	14		14	14	14	15	18	23		36	24	21	17	15	14	15	14	14	14	14
26	14	14	14	14	15	14	15	14	14	16	24	C	C	C	C	22	17	16	17	17	15	14	14	14
27		14	14		14	14	14	14	15	16	18	26	27	27	22	20	16	15	15	14	14	15	15	17
28	15	14	14	14	14	14	14	14	15	17	18	27	27	30	32	27	18	15	16	14	14	14		15
29	14	15	14	14	15	14	14	14	15	17		23	27	29	35	20	17	15	14	14	14	14	15	14
30	14	14	14	14	14	14	14	14	14	15	20	20		28	21	18	17	14	15	14	14	14		14
31	14	16	14	16	14	14		14	15	27	35	20	24	28	26	22	28	14	16	14	14		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	29	31	29	28	31	28	29	31	30	31	28	26	25	28	28	29	31	30	31	31	31	29	29	30
MED	14	14	14	14	14	14	14	14	15	16	22	28	29	29	28	26	17	15	15	14	14	14	14	14
U Q	15	15	14	15	14	14	15	14	15	17	26	29	33	31	32	27	18	16	17	15	14	14	15	15
L Q	14	14	14	14	14	14	14	14	15	16	20	26	27	28	27	21	17	15	15	14	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

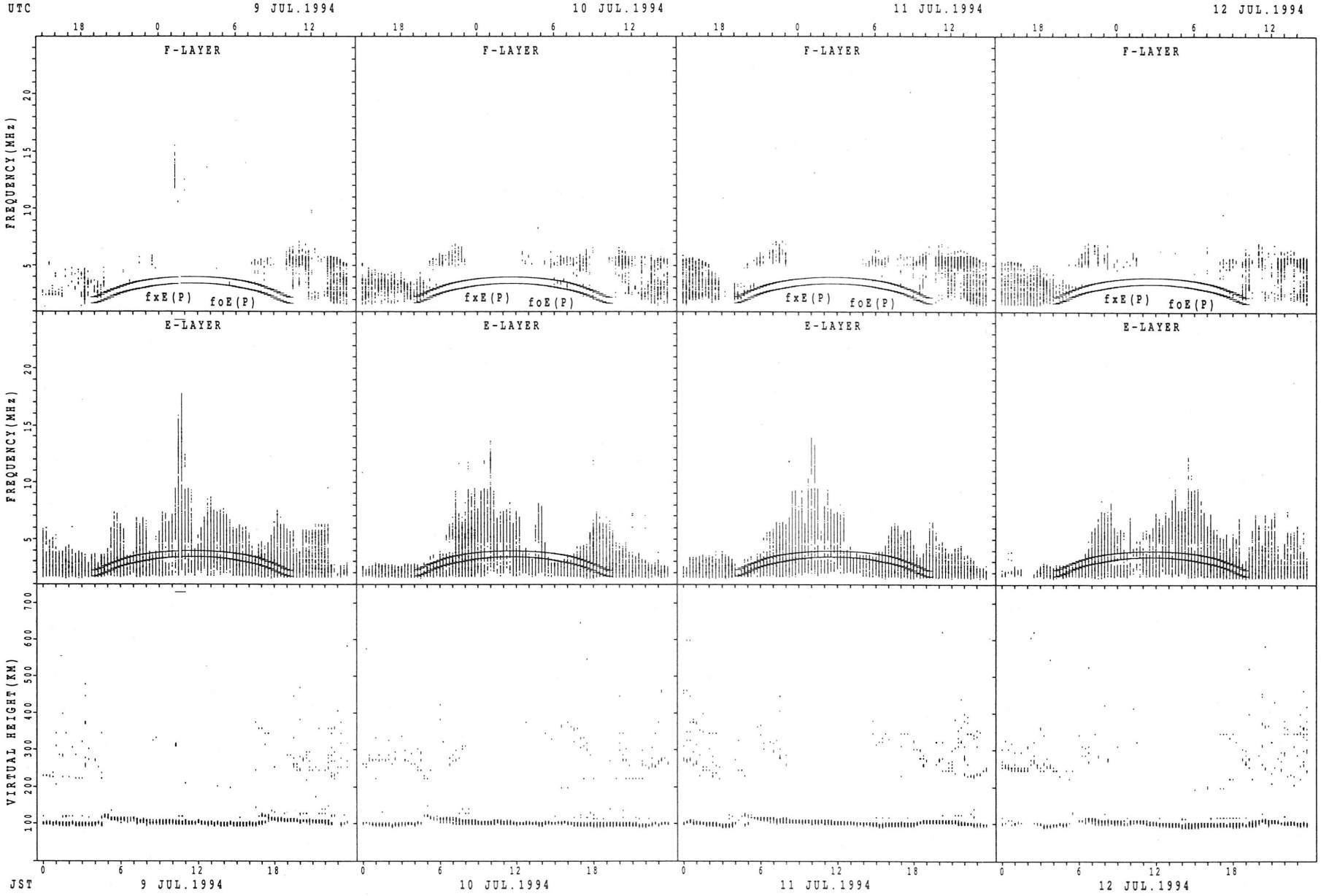
SUMMARY PLOTS AT WAKKANAI



fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

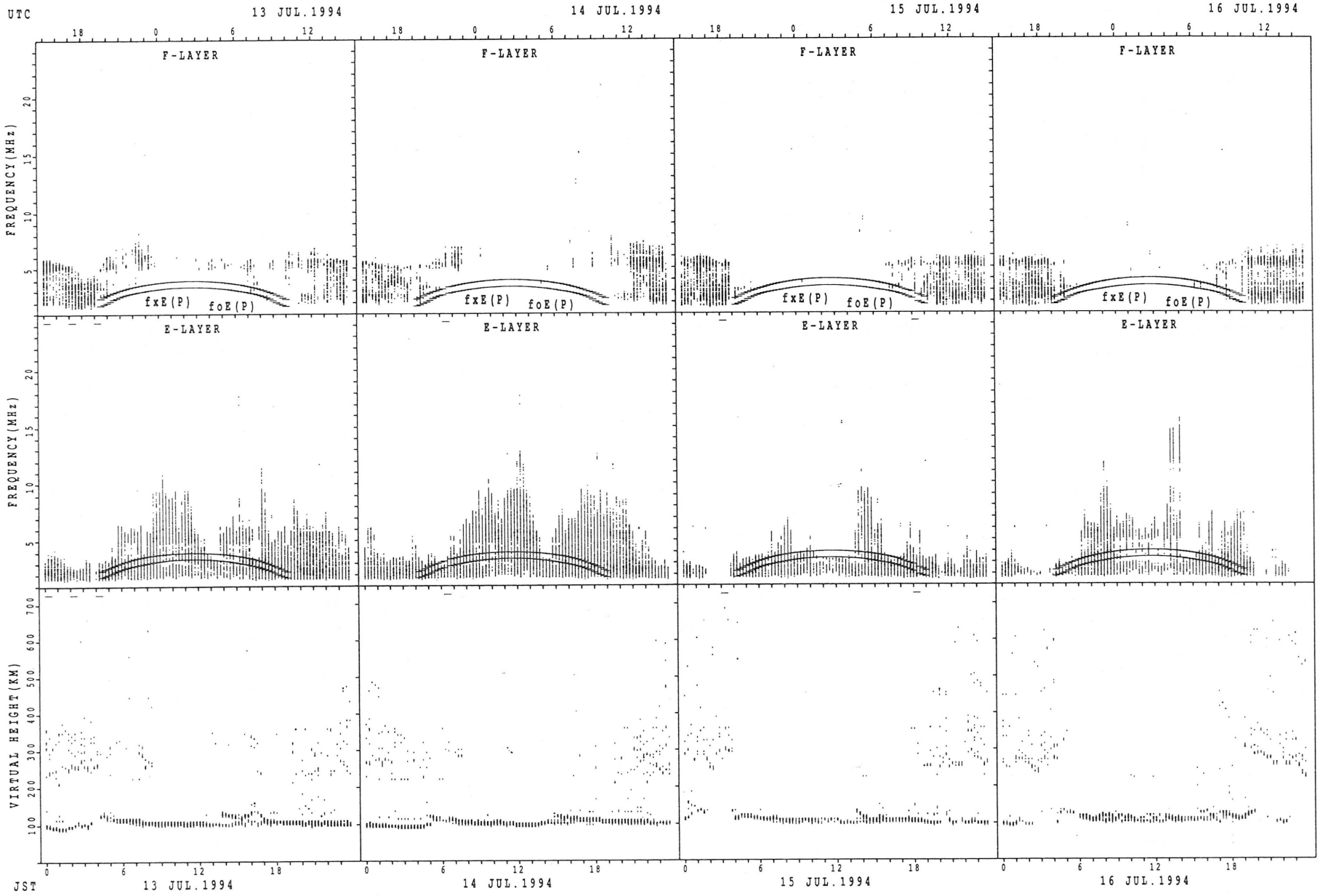

SUMMARY PLOTS AT WAKKANAI
UTC
JST
5 JUL.1994
6 JUL.1994
7 JUL.1994
8 JUL.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT WAKKANAI



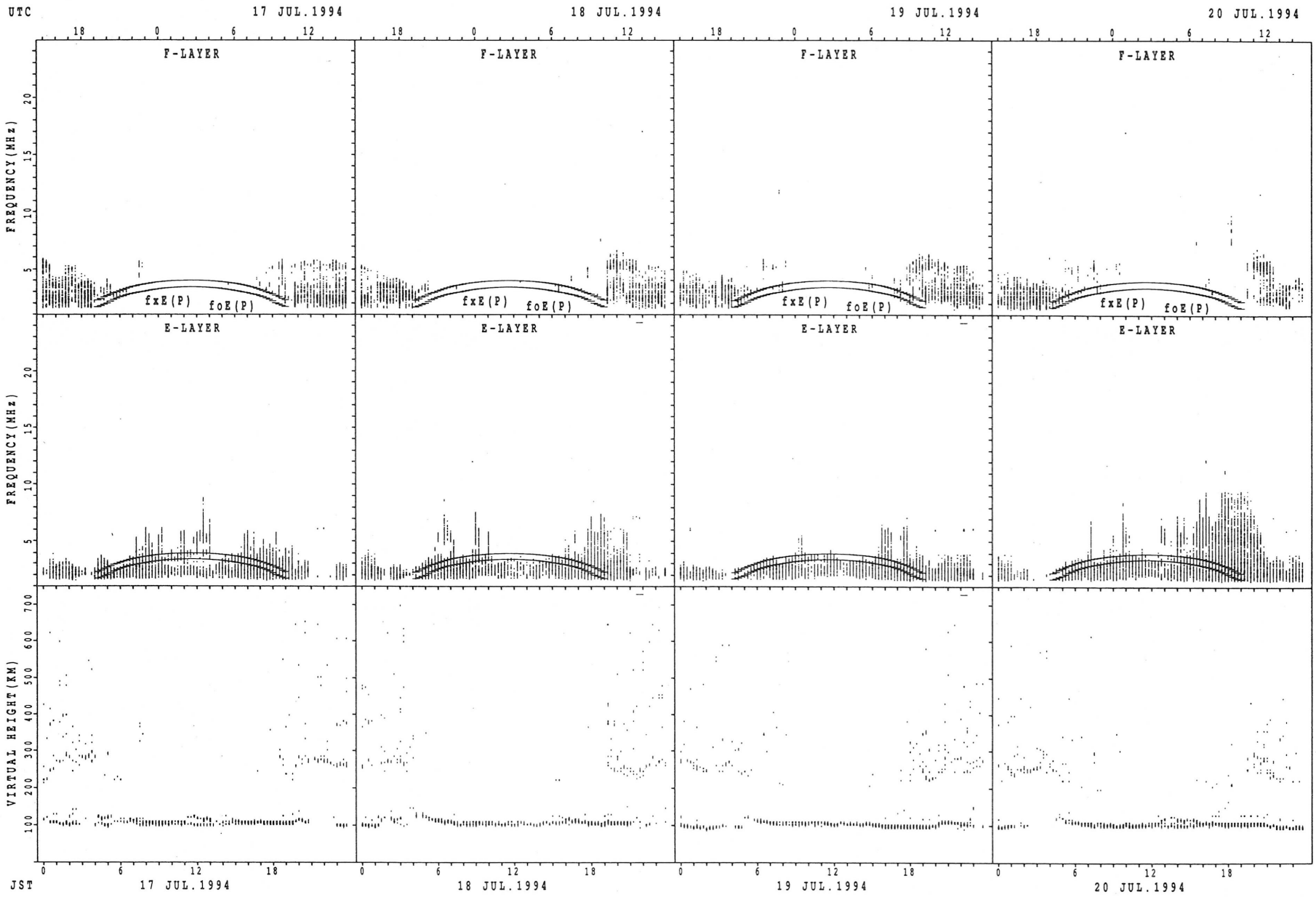
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT WAKKANAI

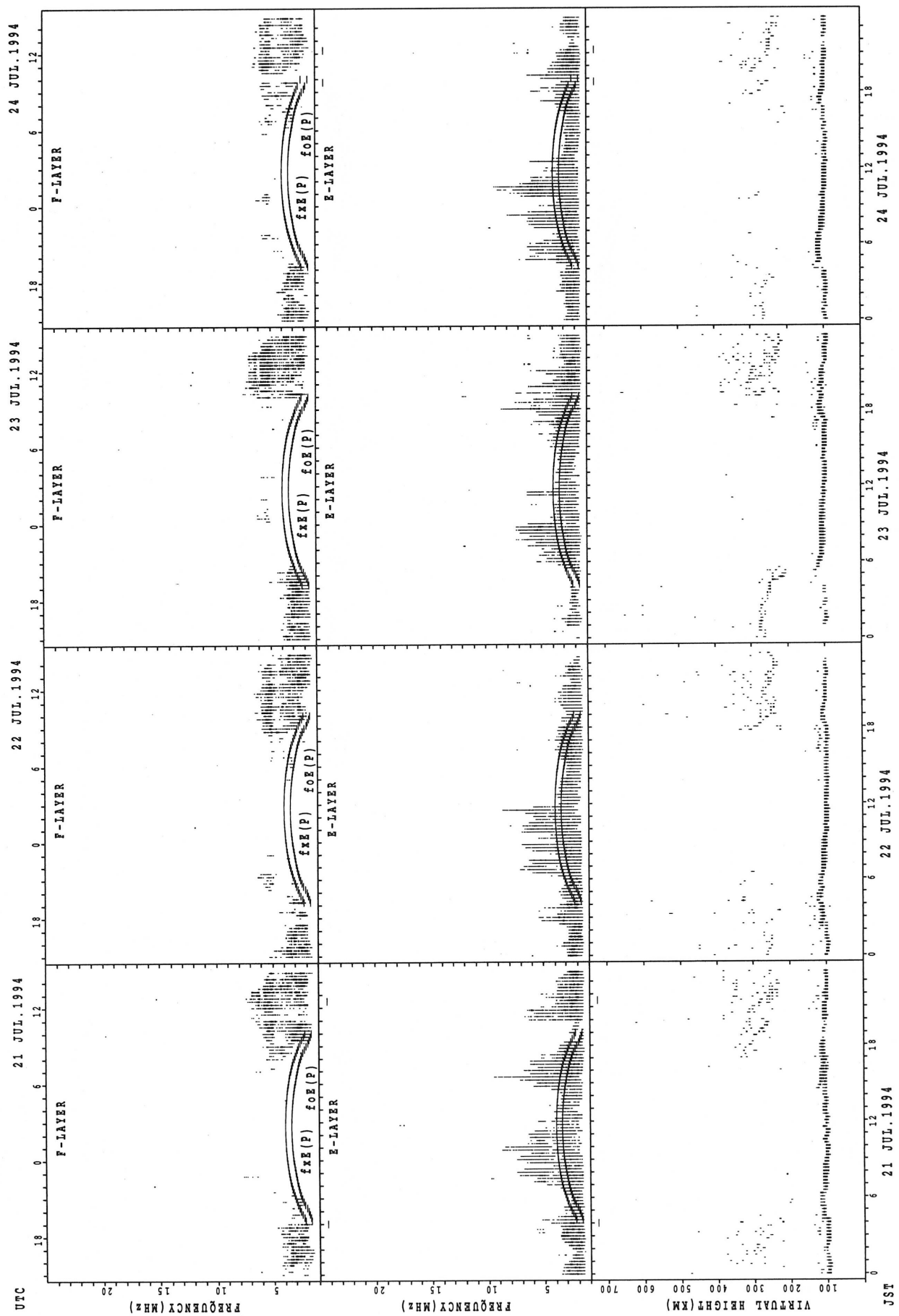


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

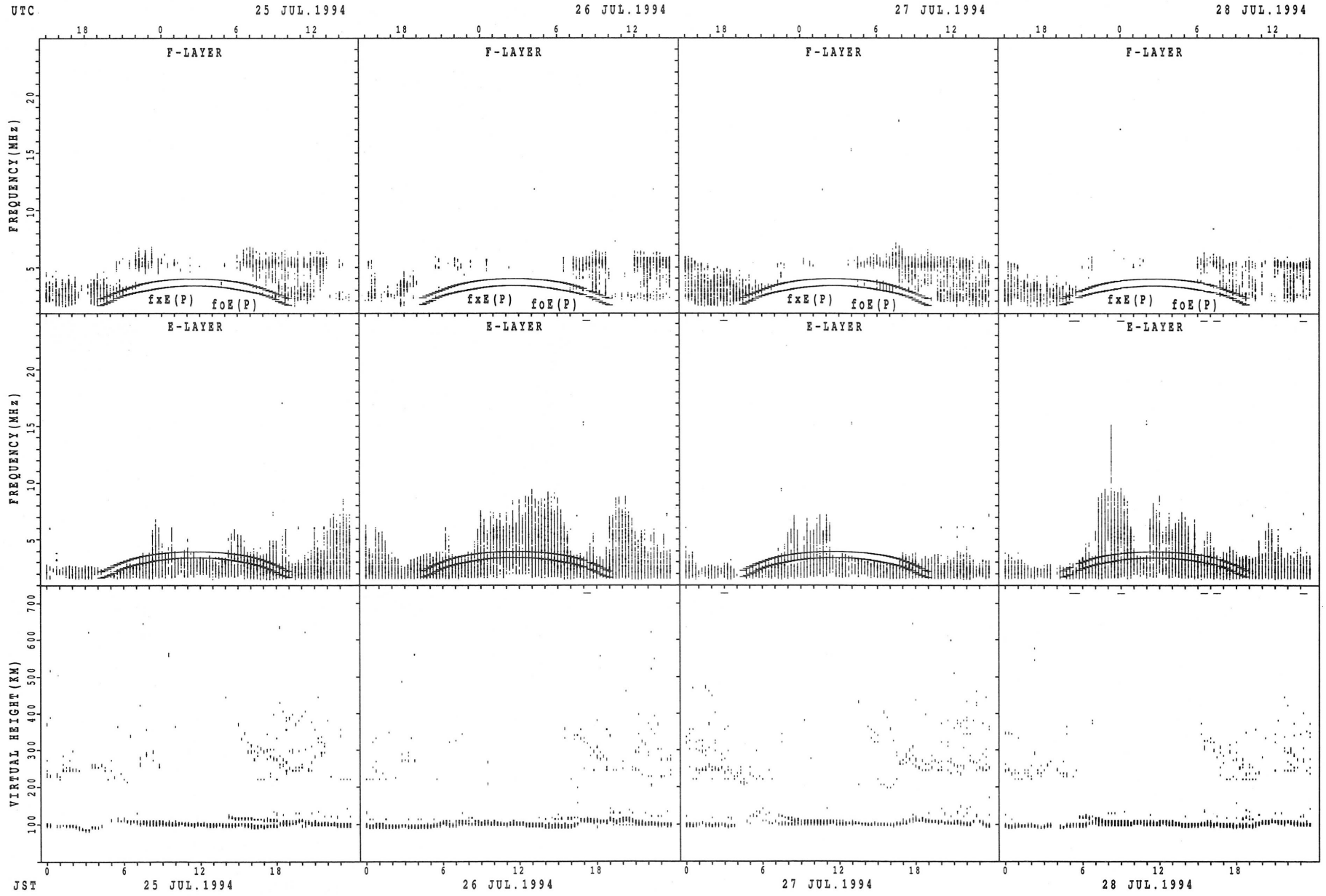
SUMMARY PLOTS AT WAKKANAI



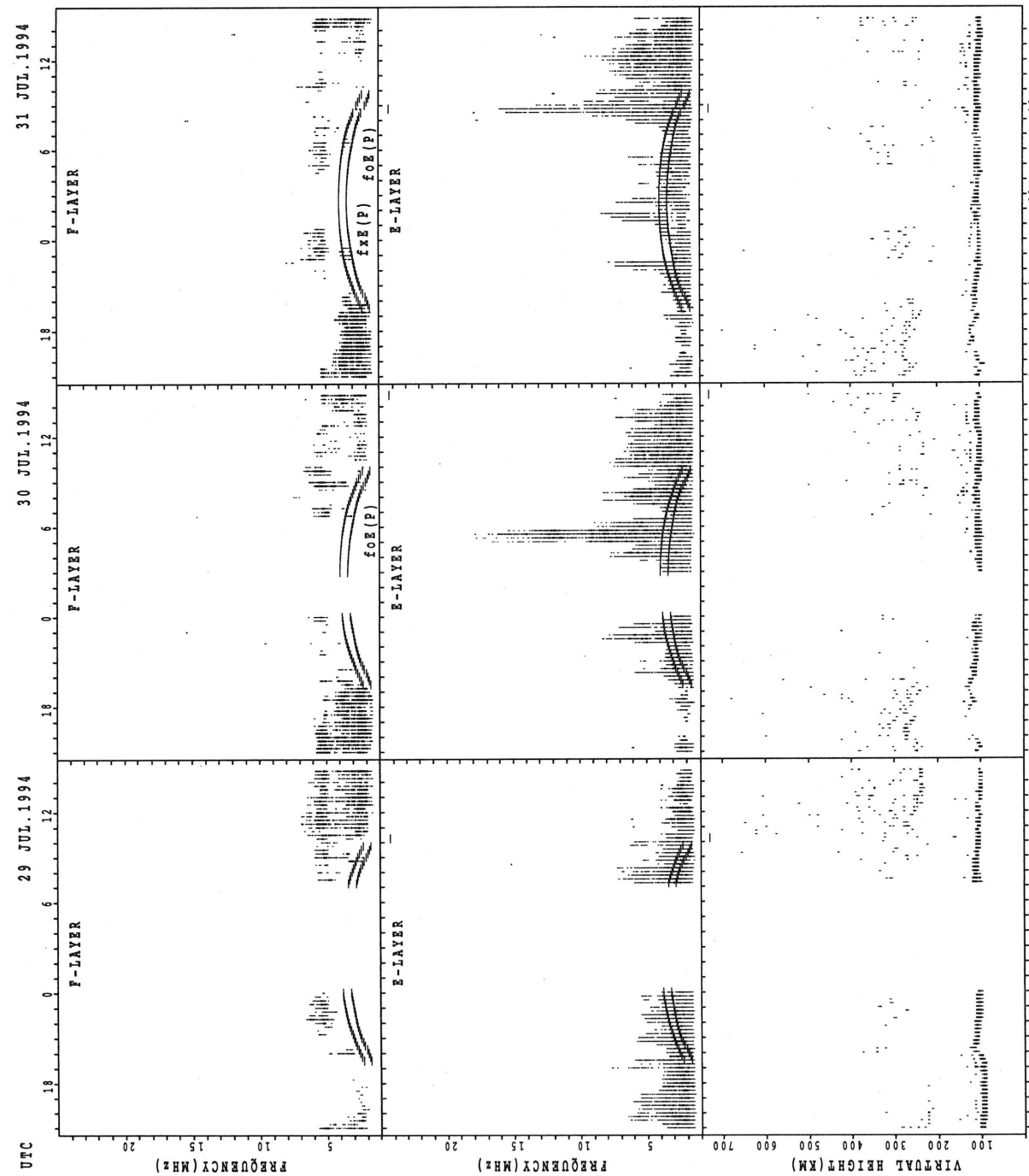
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
21 JUL.1994
22 JUL.1994
23 JUL.1994
24 JUL.1994
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

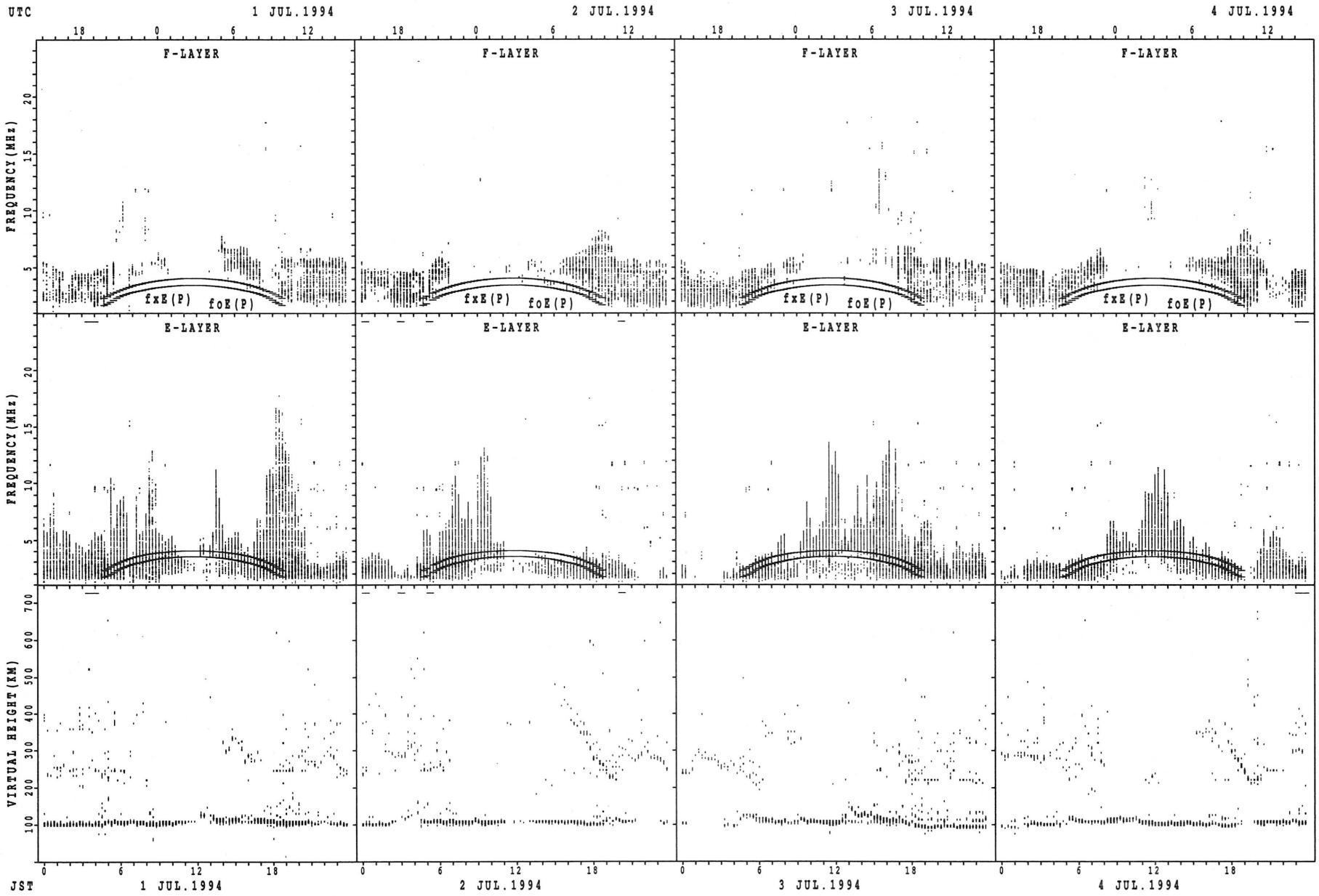
SUMMARY PLOTS AT WAKKANAI



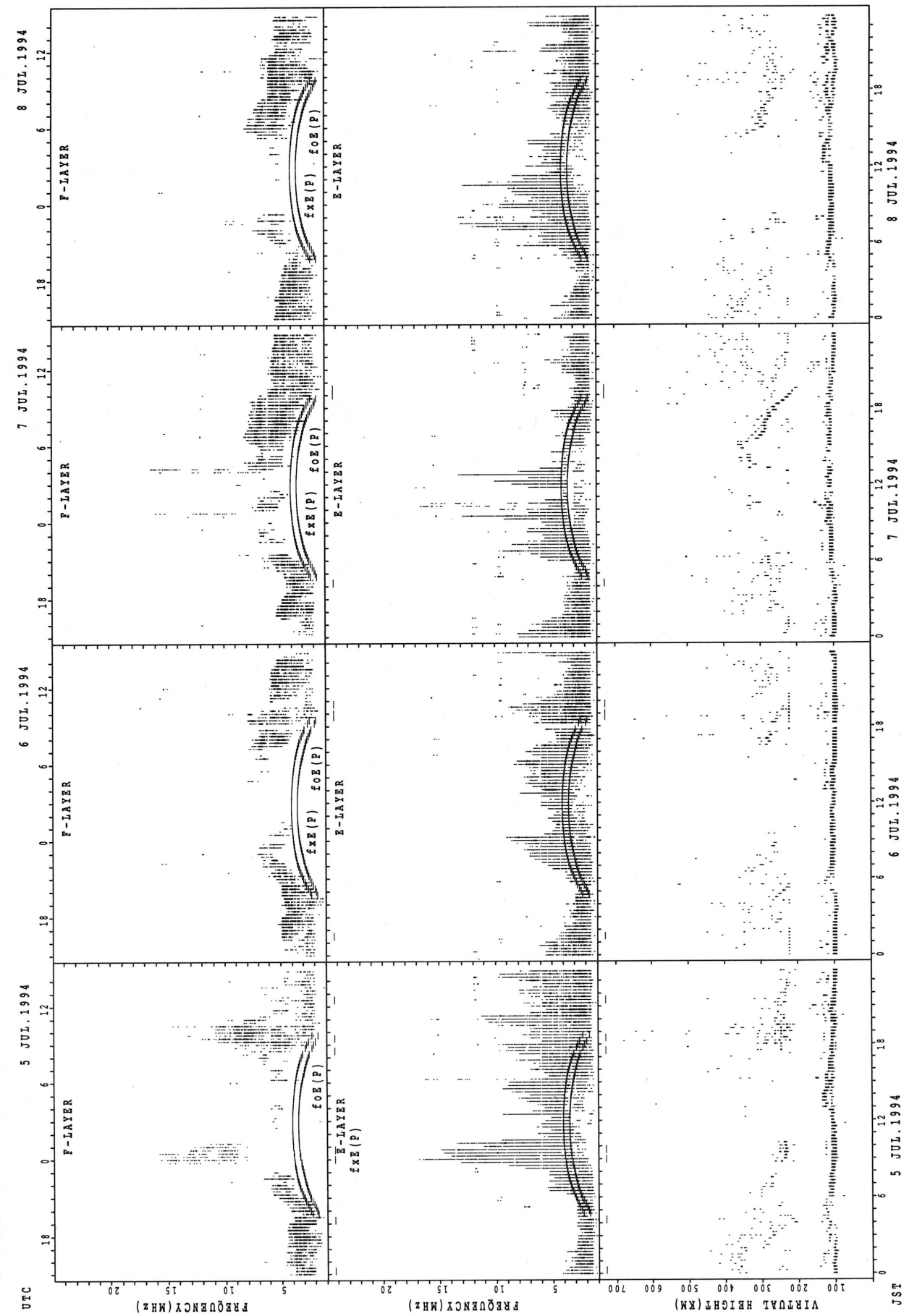
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

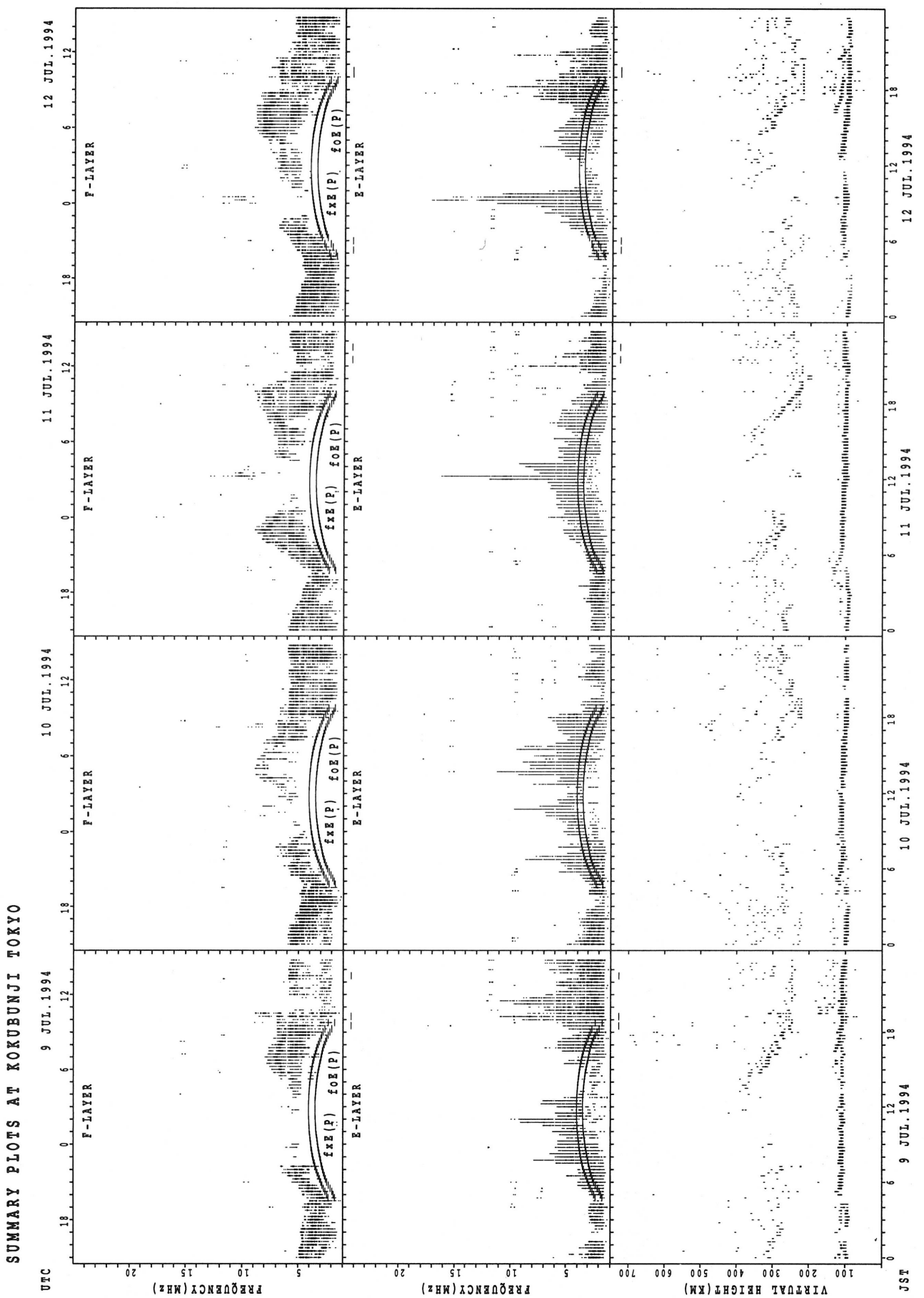

SUMMARY PLOTS AT WAKKANAI
UTC
JST
29 JUL.1994
30 JUL.1994
31 JUL.1994
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

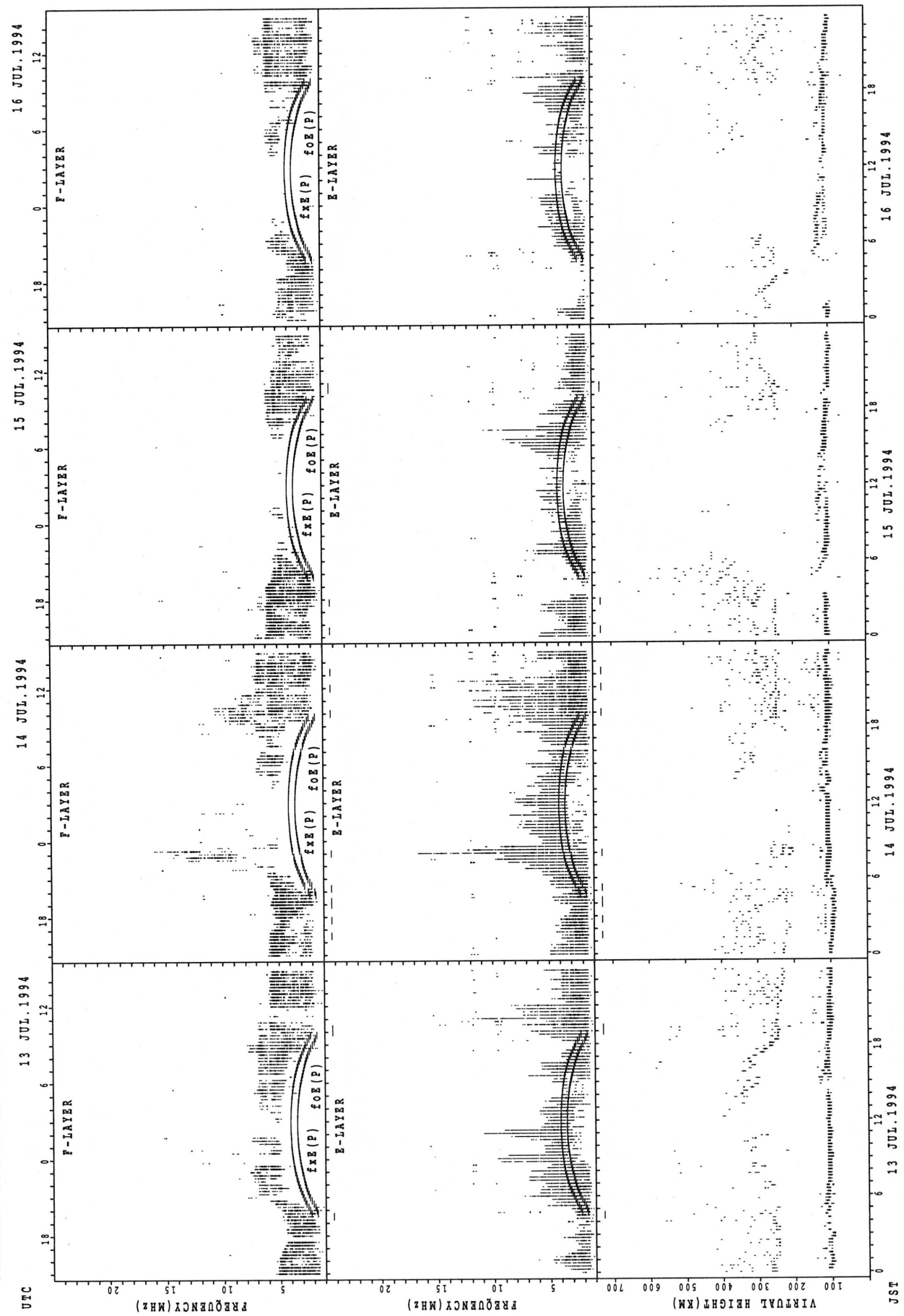
SUMMARY PLOTS AT KOKUBUNJI TOKYO



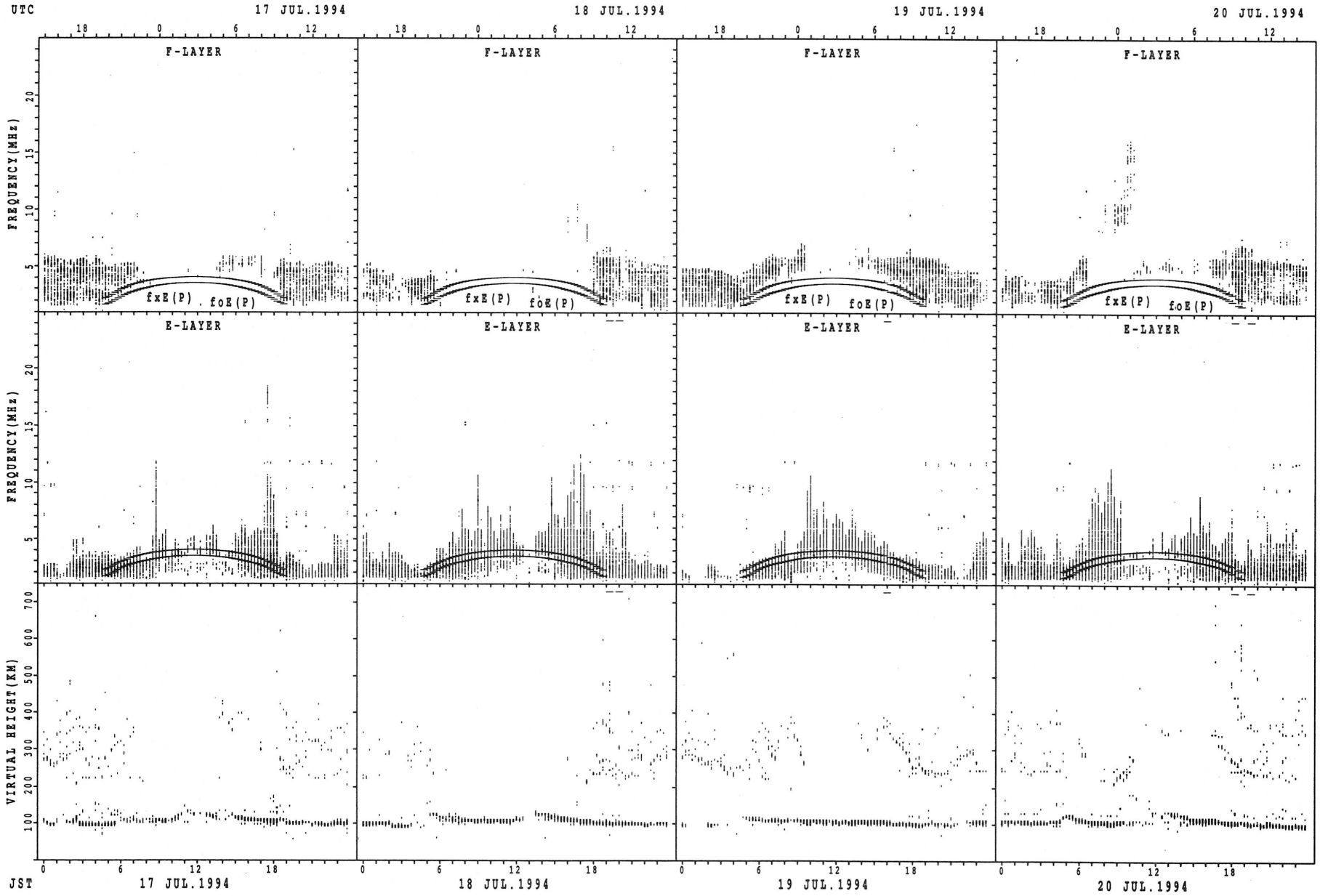
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
5 JUL.1994
6 JUL.1994
7 JUL.1994
8 JUL.1994
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

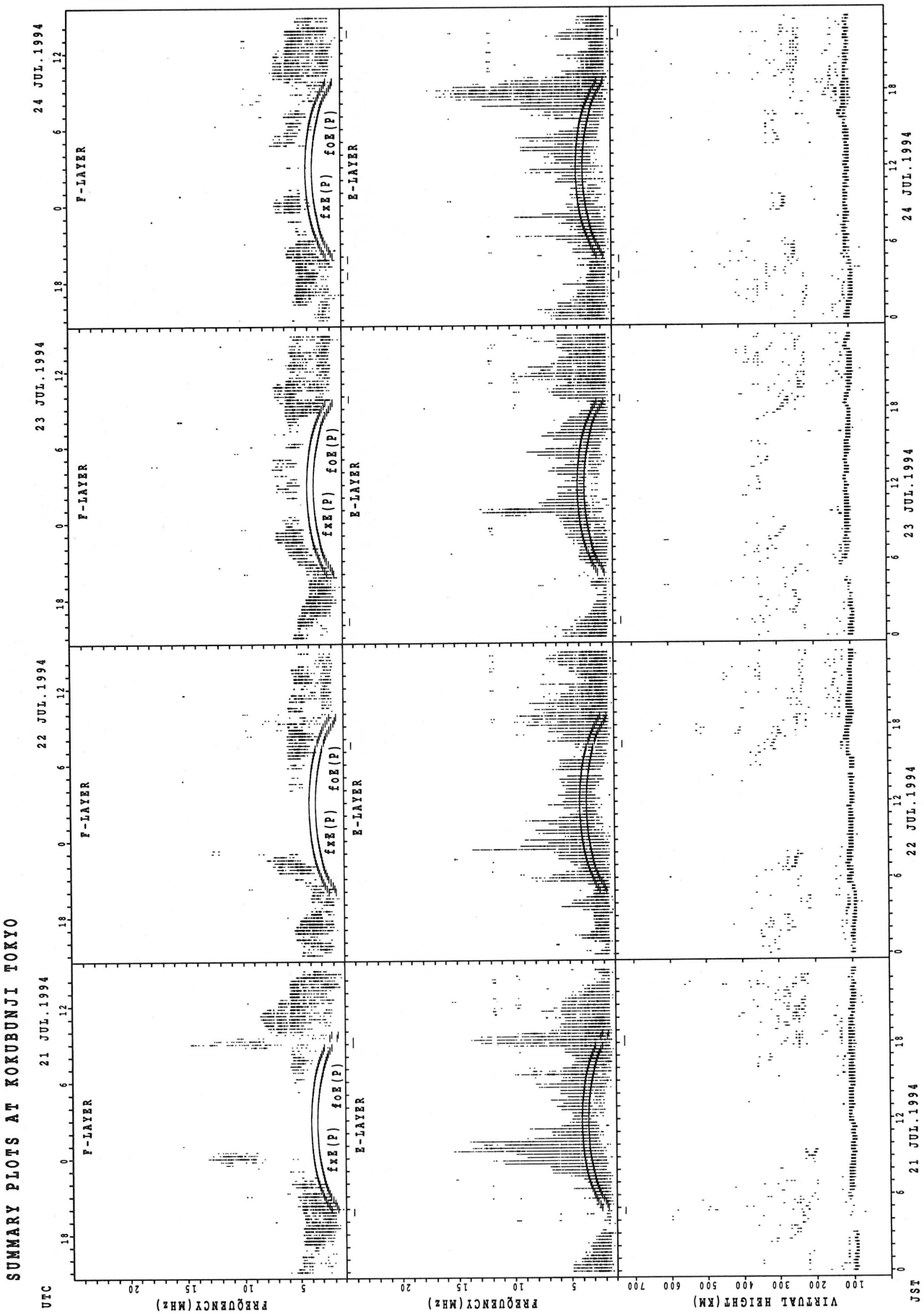

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
9 JUL.1994
10 JUL.1994
11 JUL.1994
12 JUL.1994
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
13 JUL.1994
14 JUL.1994
15 JUL.1994
16 JUL.1994
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

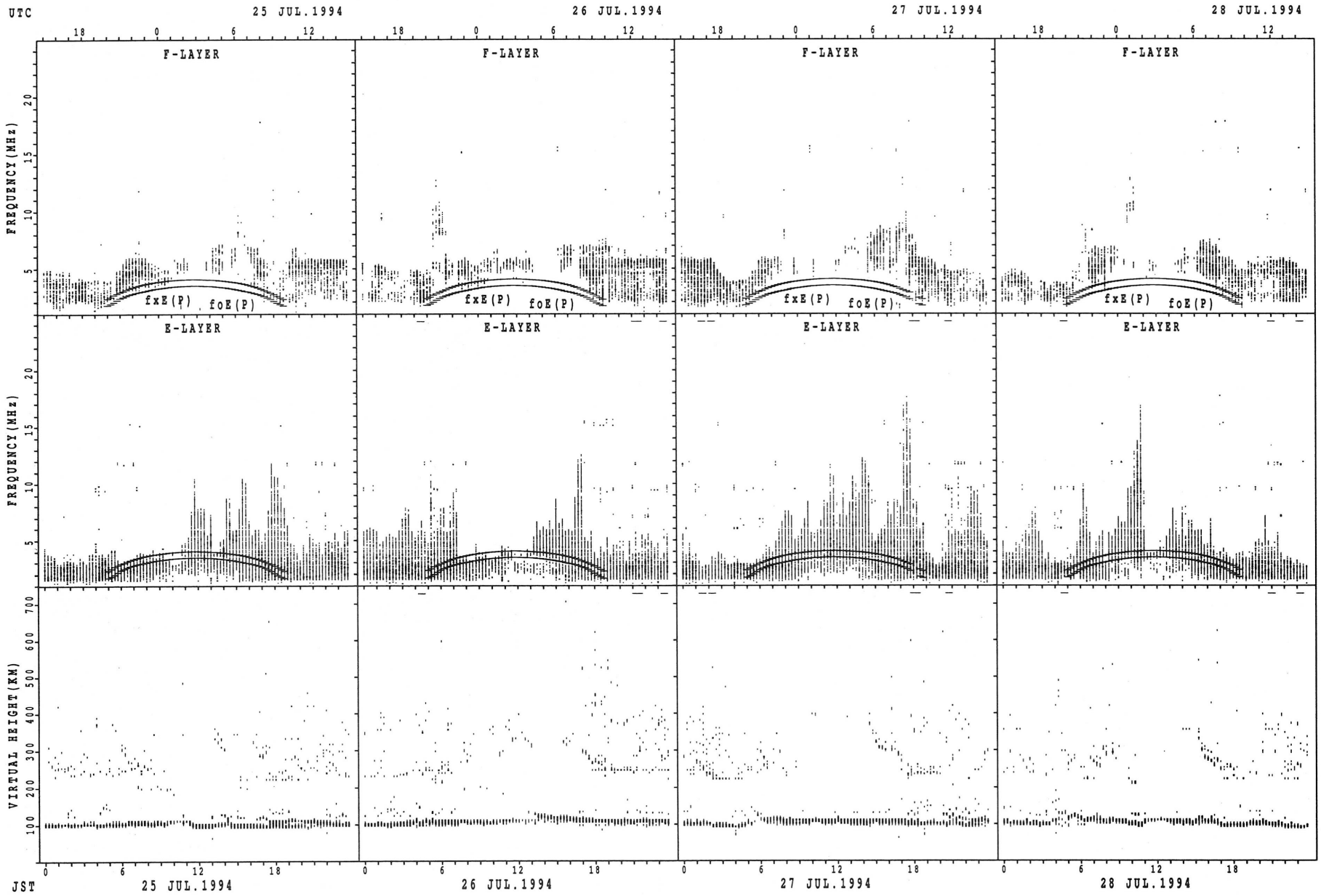
SUMMARY PLOTS AT KOKUBUNJI TOKYO



fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

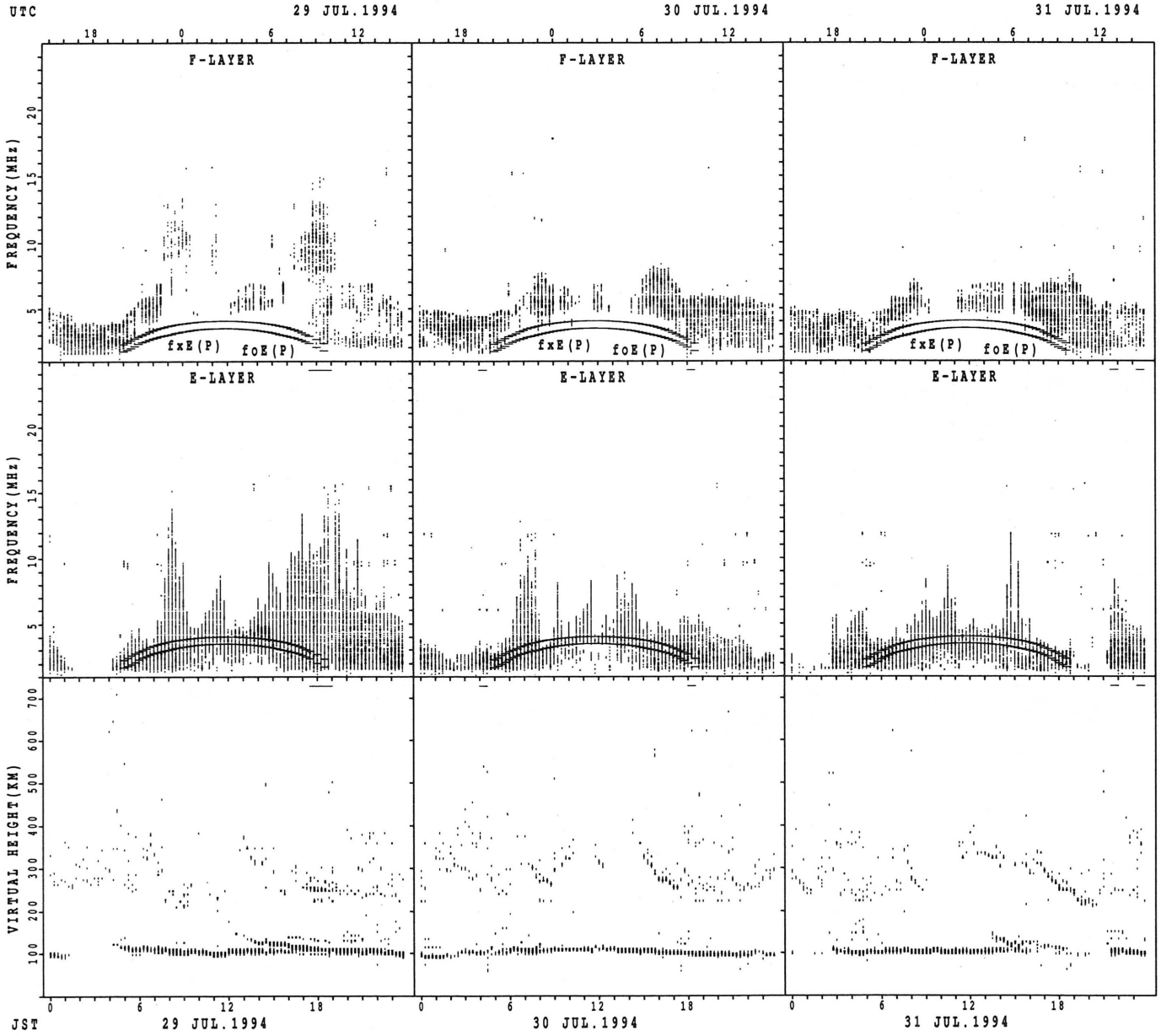

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
21 JUL.1994
22 JUL.1994
23 JUL.1994
24 JUL.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



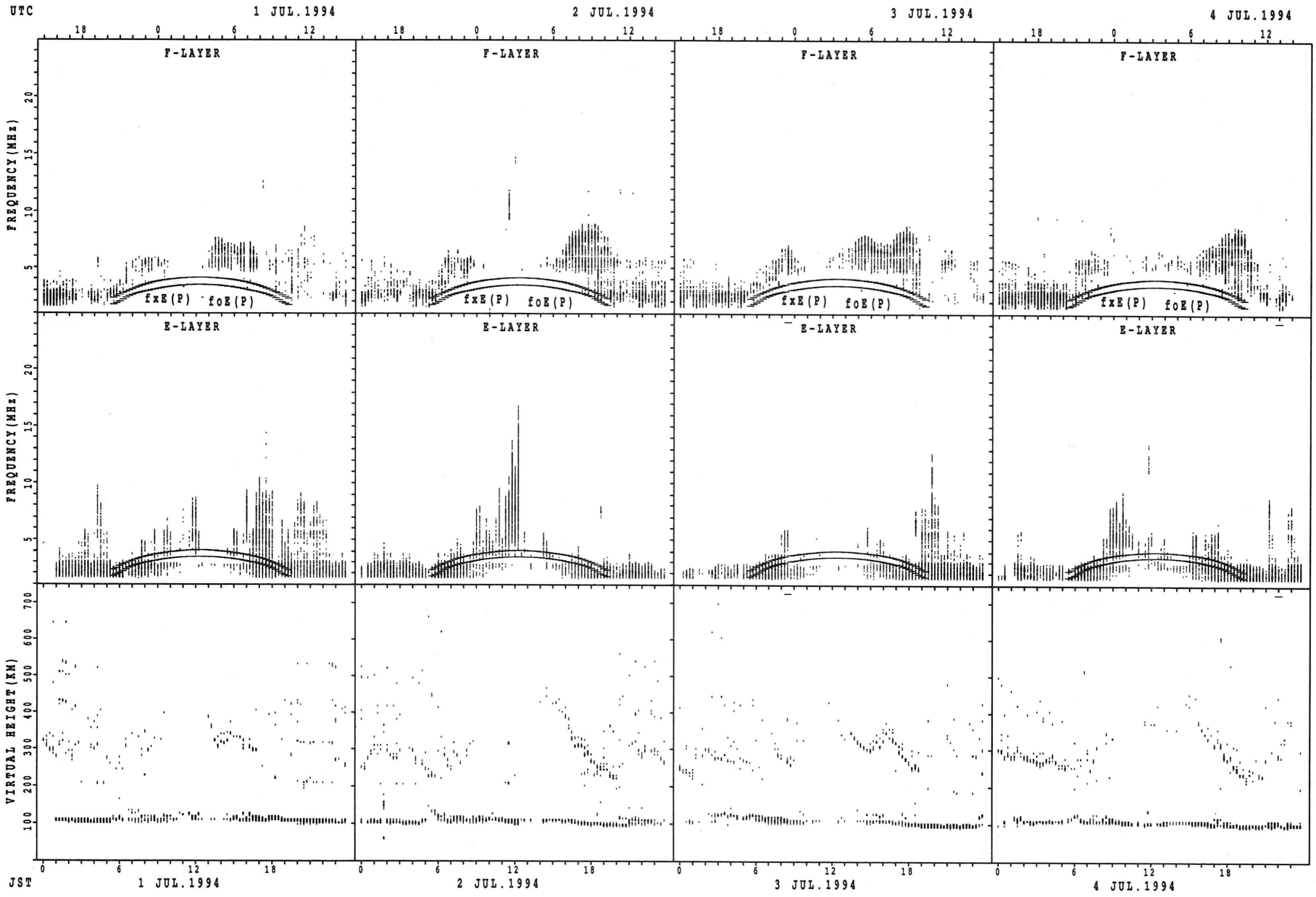
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

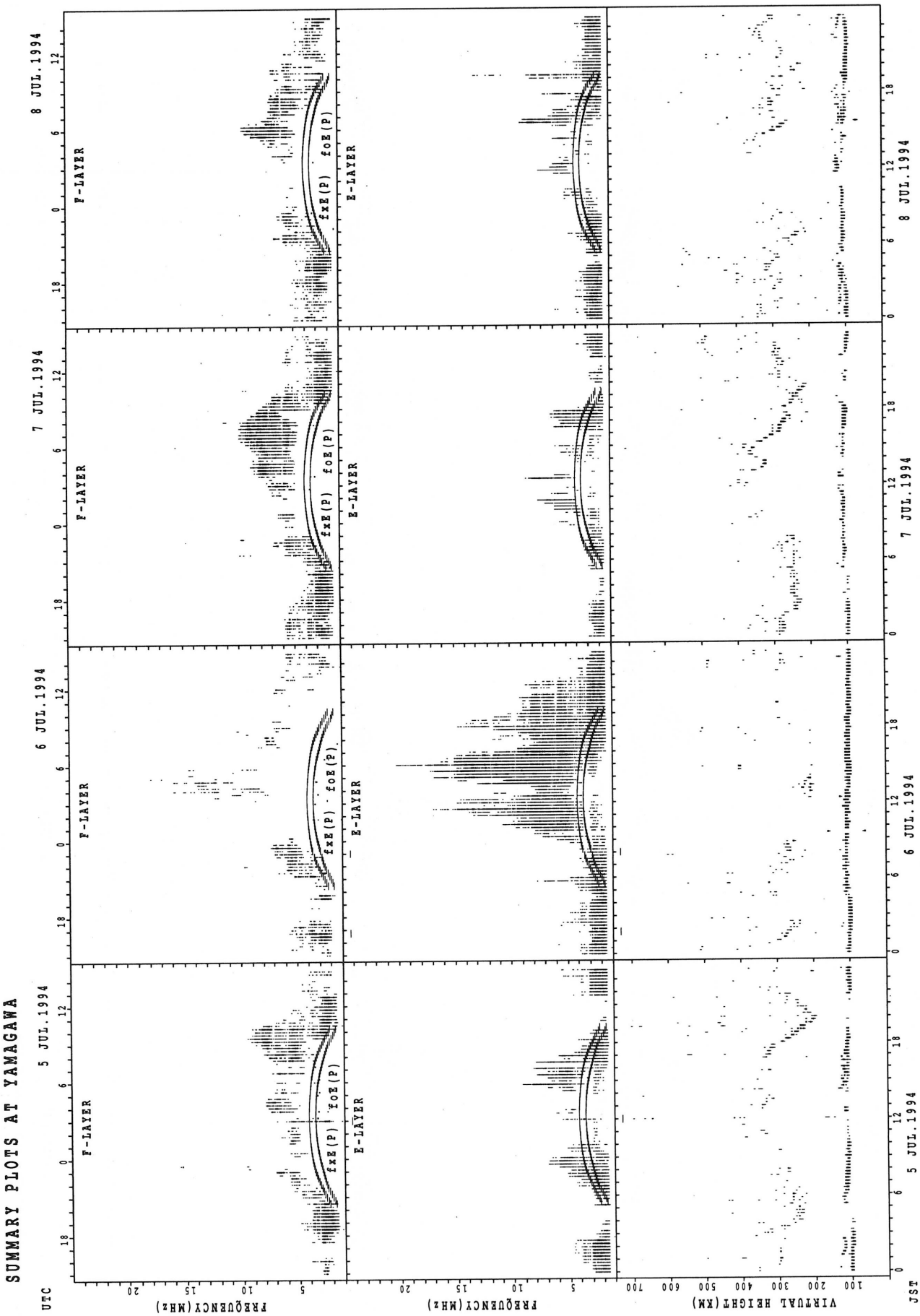


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

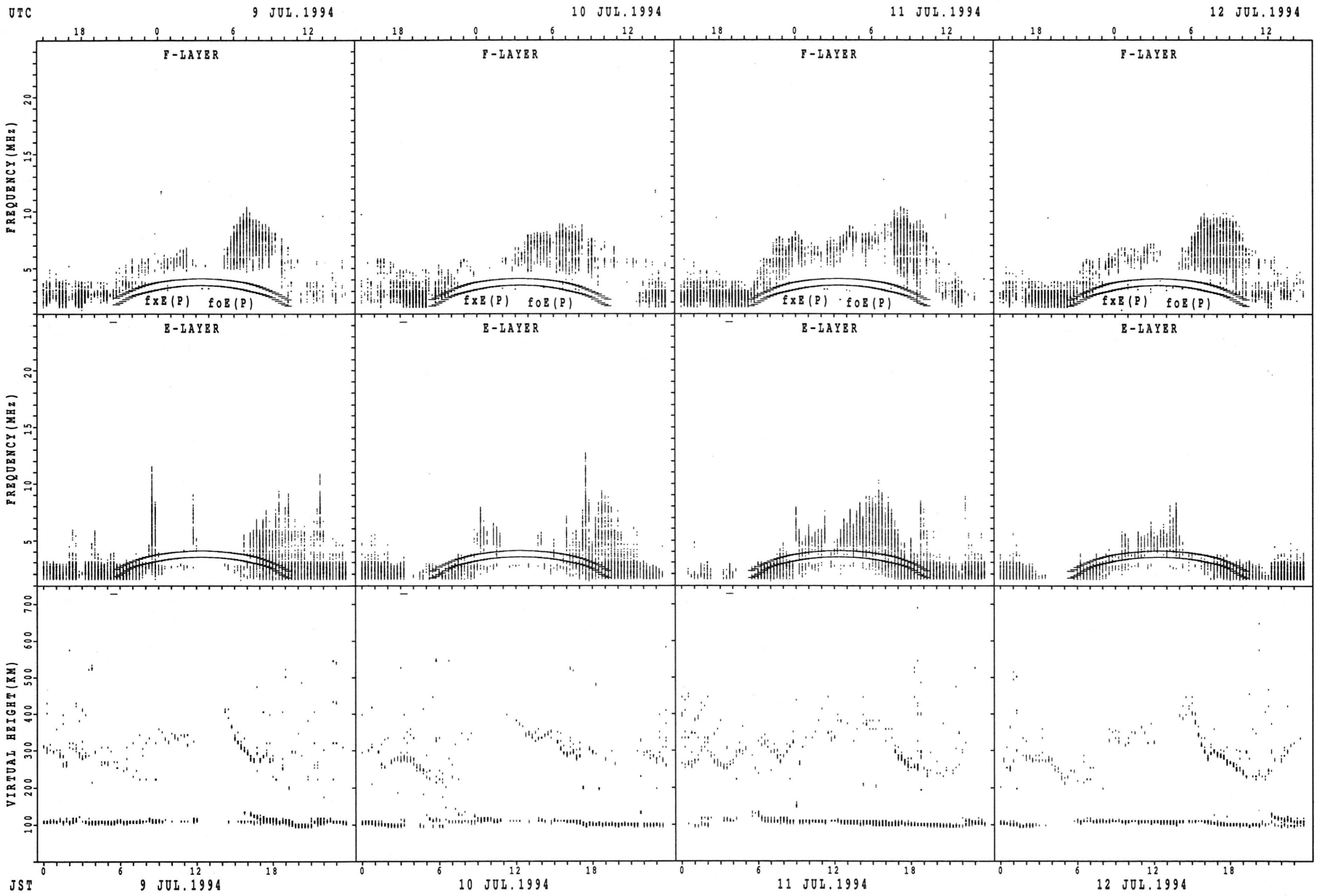
SUMMARY PLOTS AT YAMAGAWA



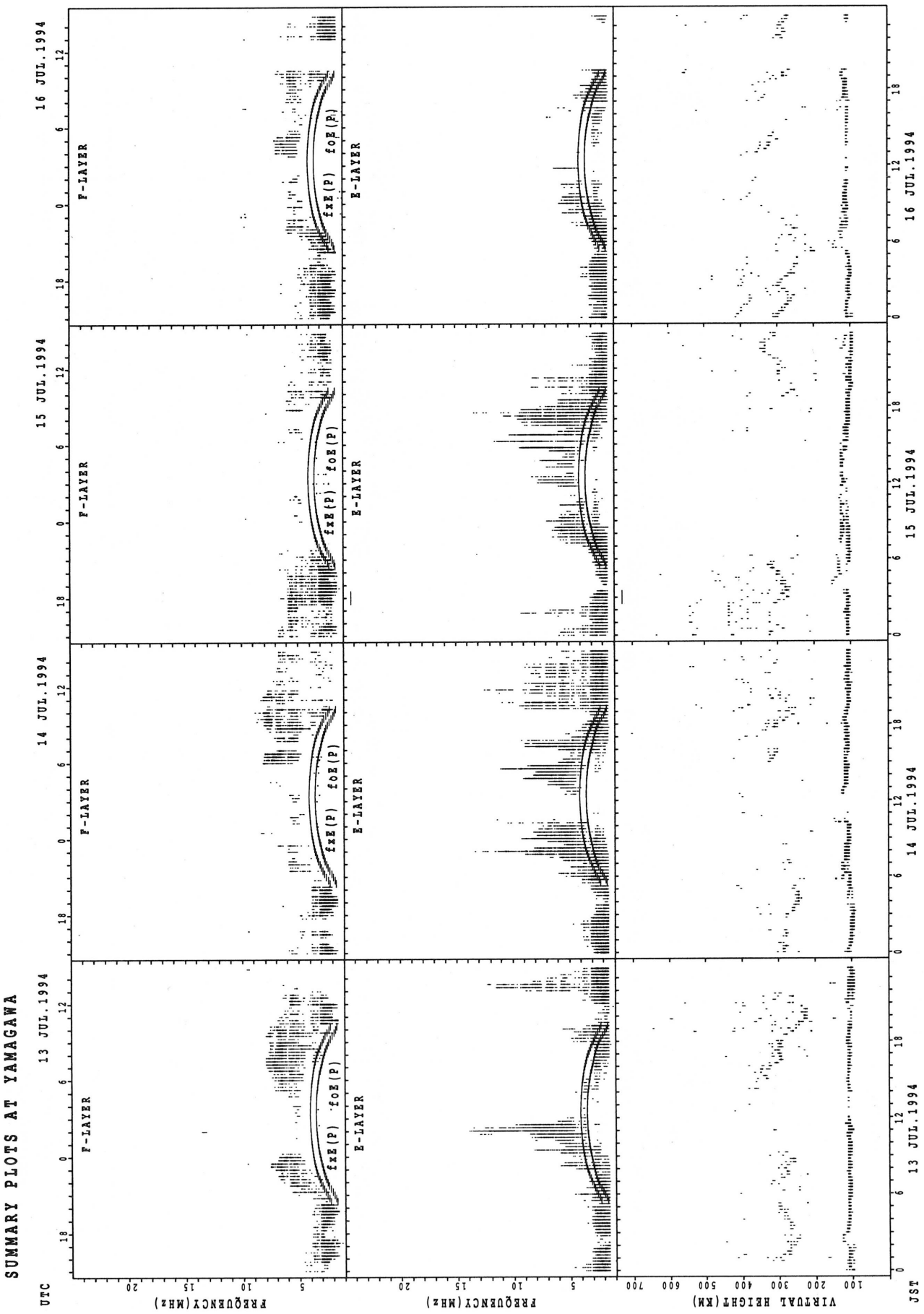
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
5 JUL.1994
6 JUL.1994
7 JUL.1994
8 JUL.1994
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

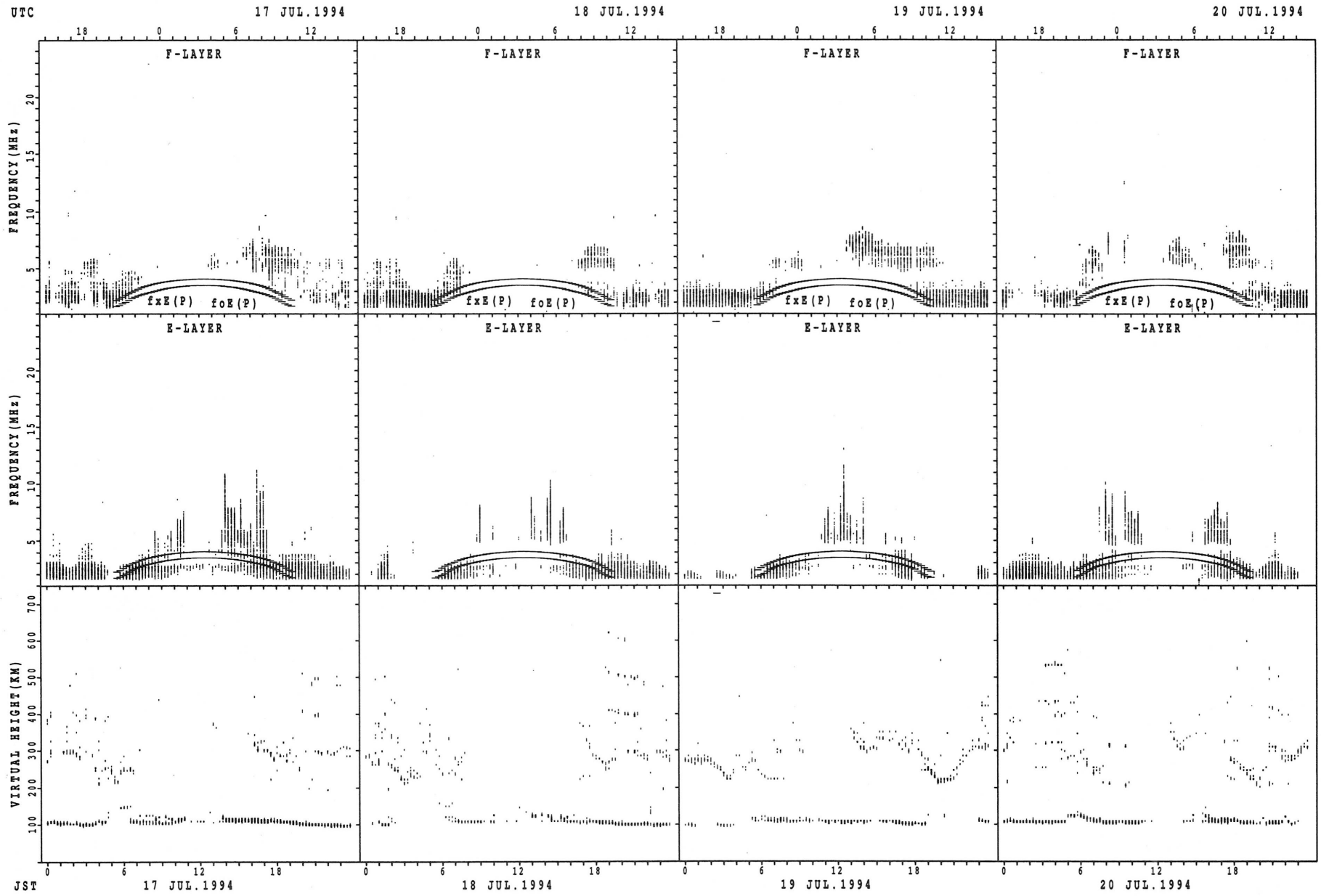
SUMMARY PLOTS AT YAMAGAWA



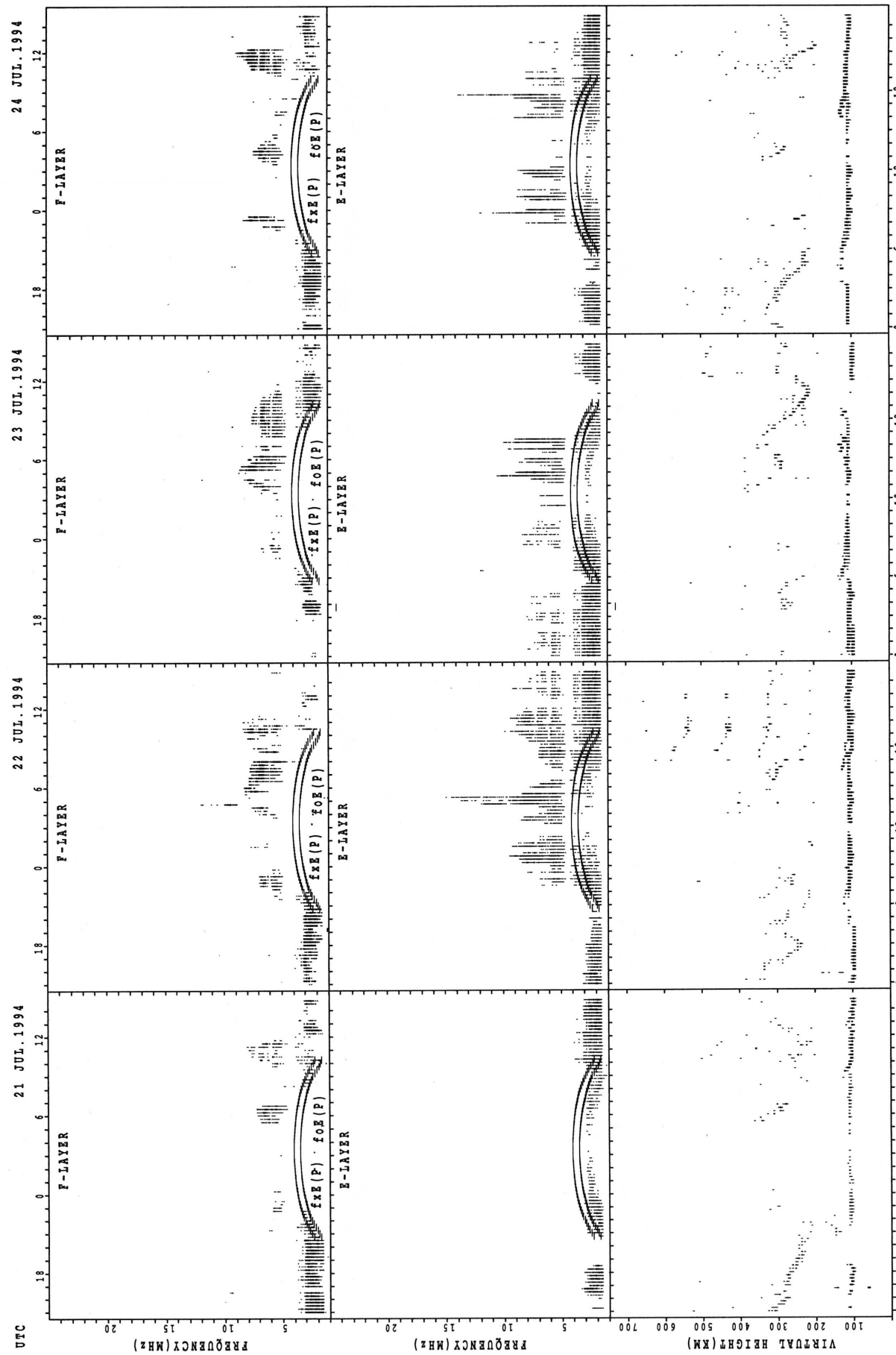
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
13 JUL.1994
14 JUL.1994
15 JUL.1994
16 JUL.1994
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

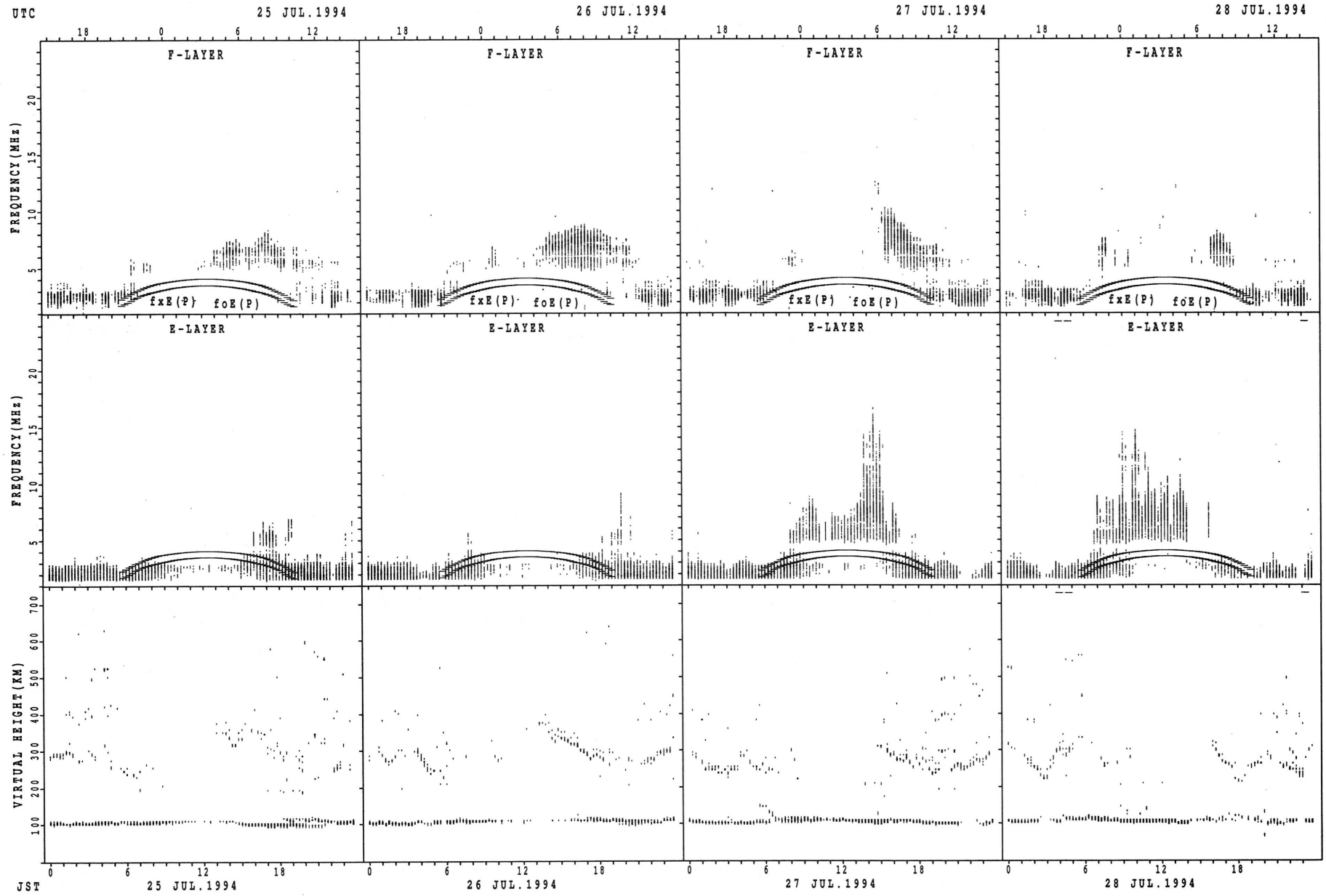
SUMMARY PLOTS AT YAMAGAWA



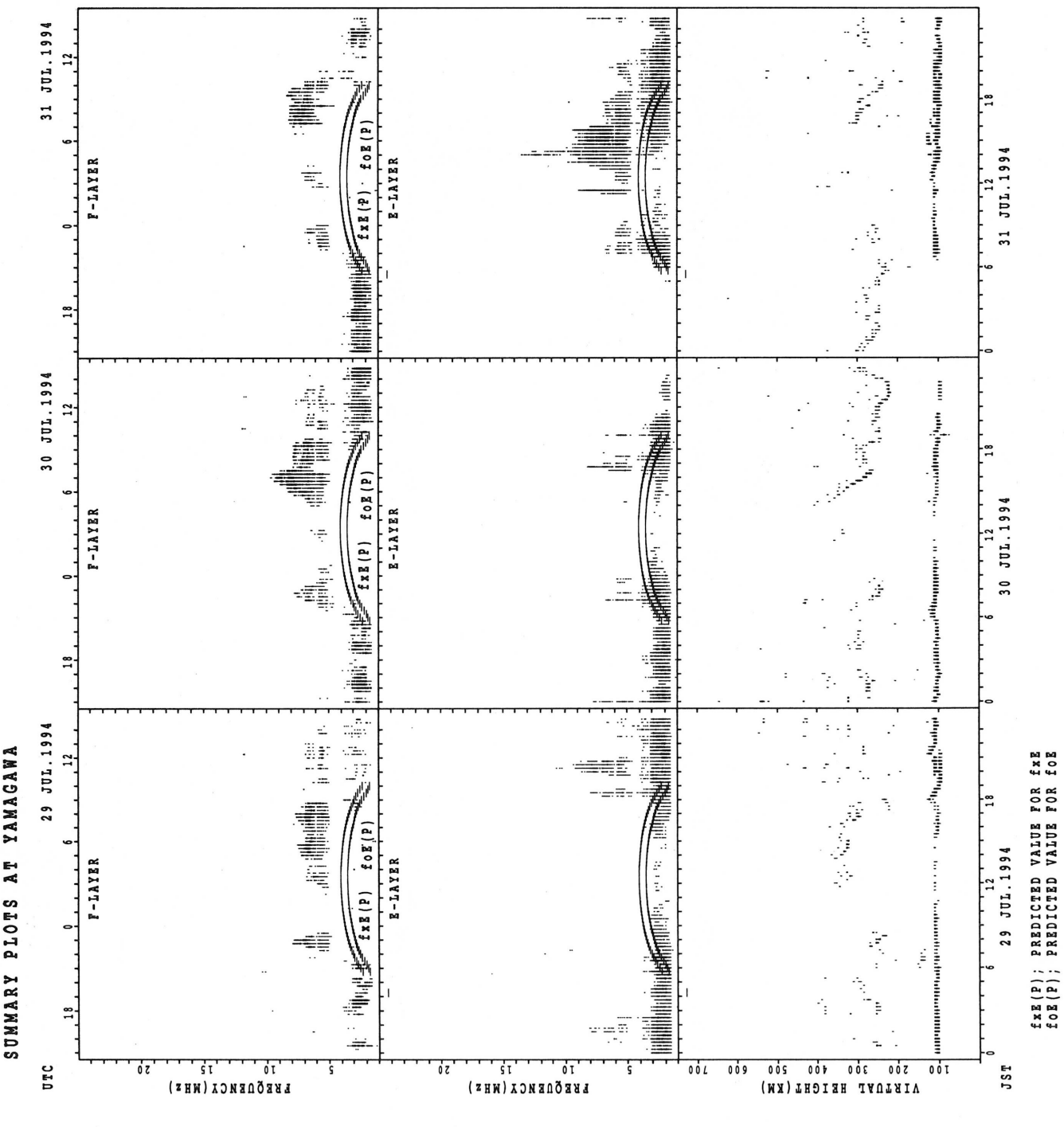
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
21 JUL.1994
22 JUL.1994
23 JUL.1994
24 JUL.1994
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) · foE(P)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

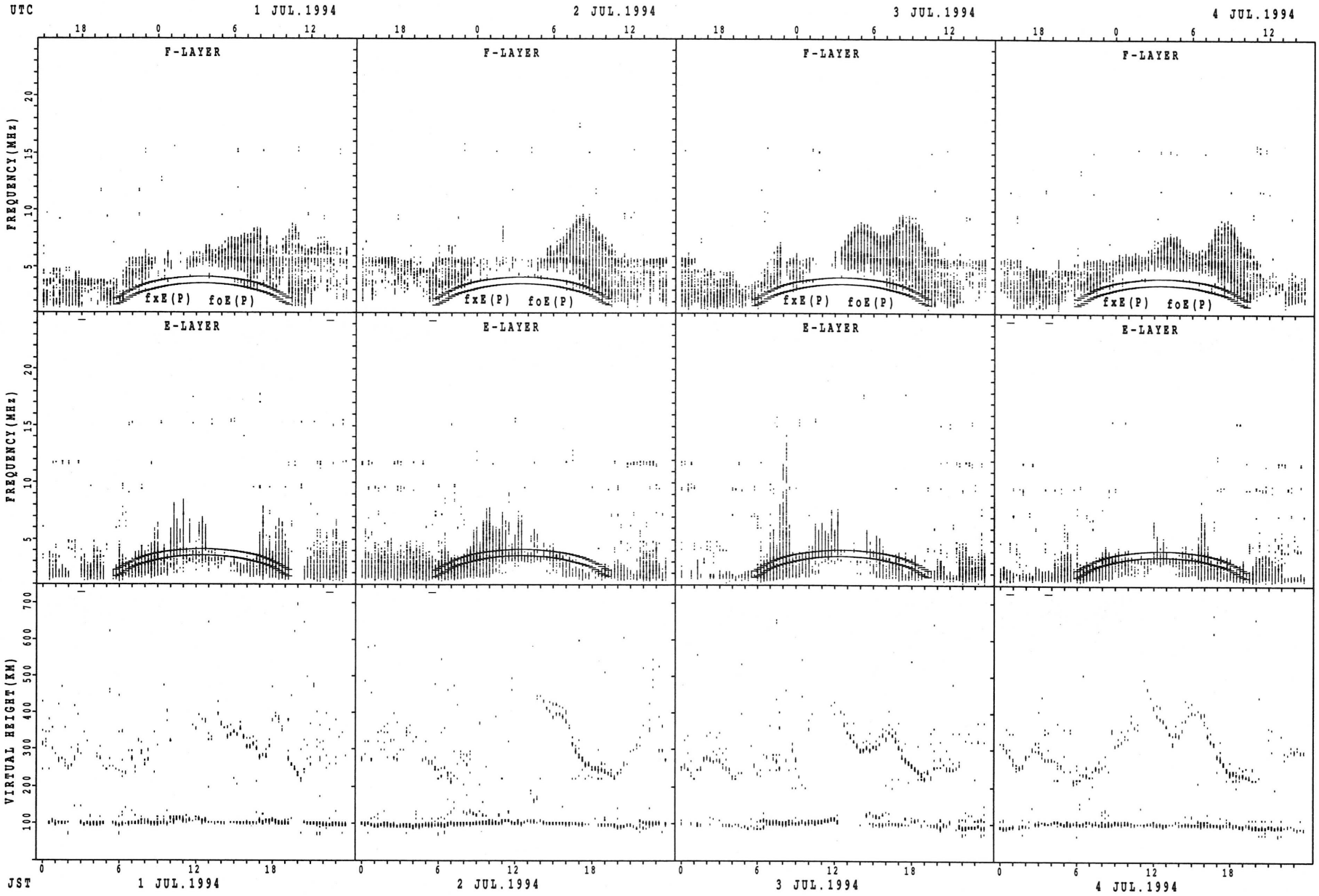
SUMMARY PLOTS AT YAMAGAWA



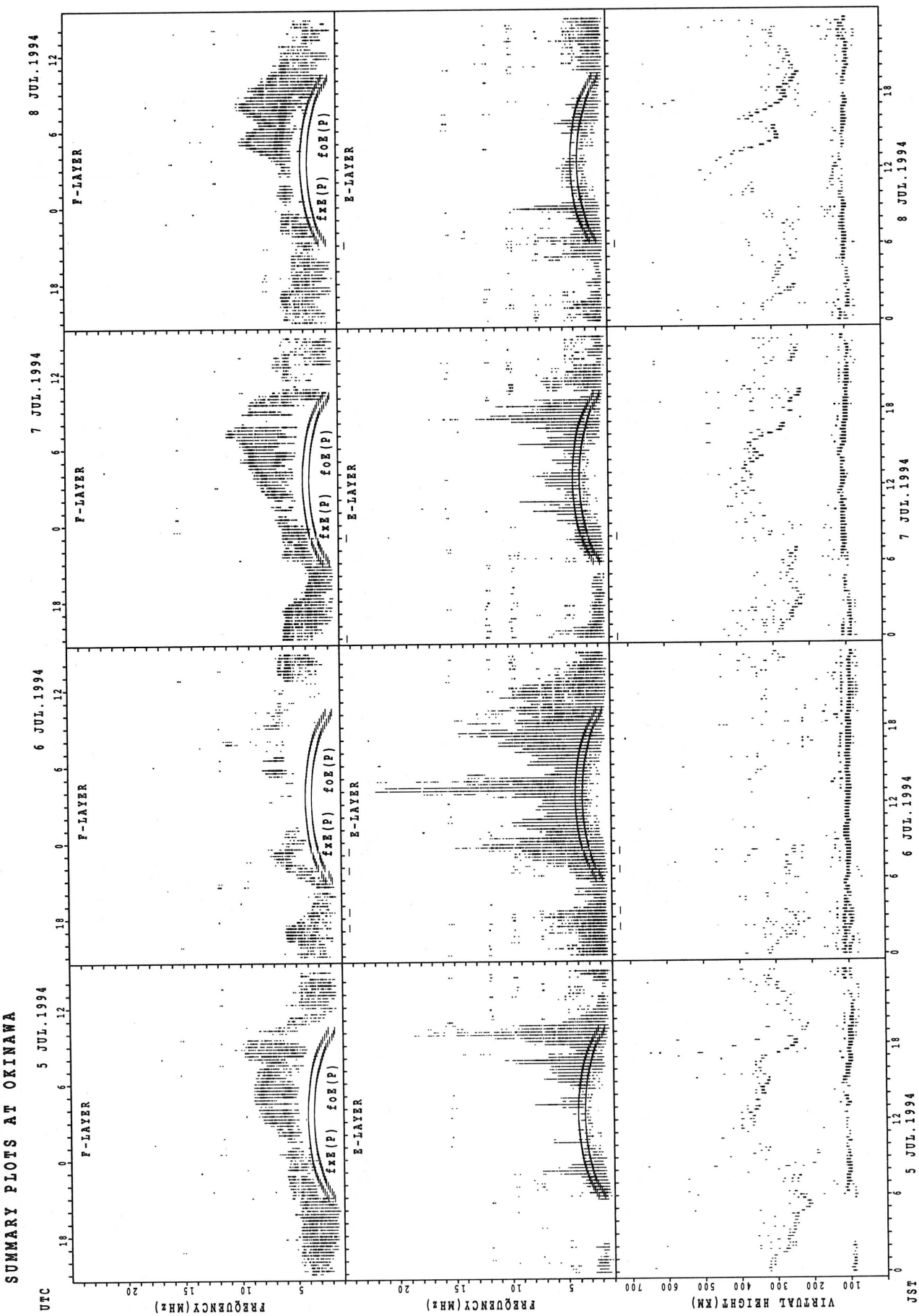
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
29 JUL.1994
30 JUL.1994
31 JUL.1994
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

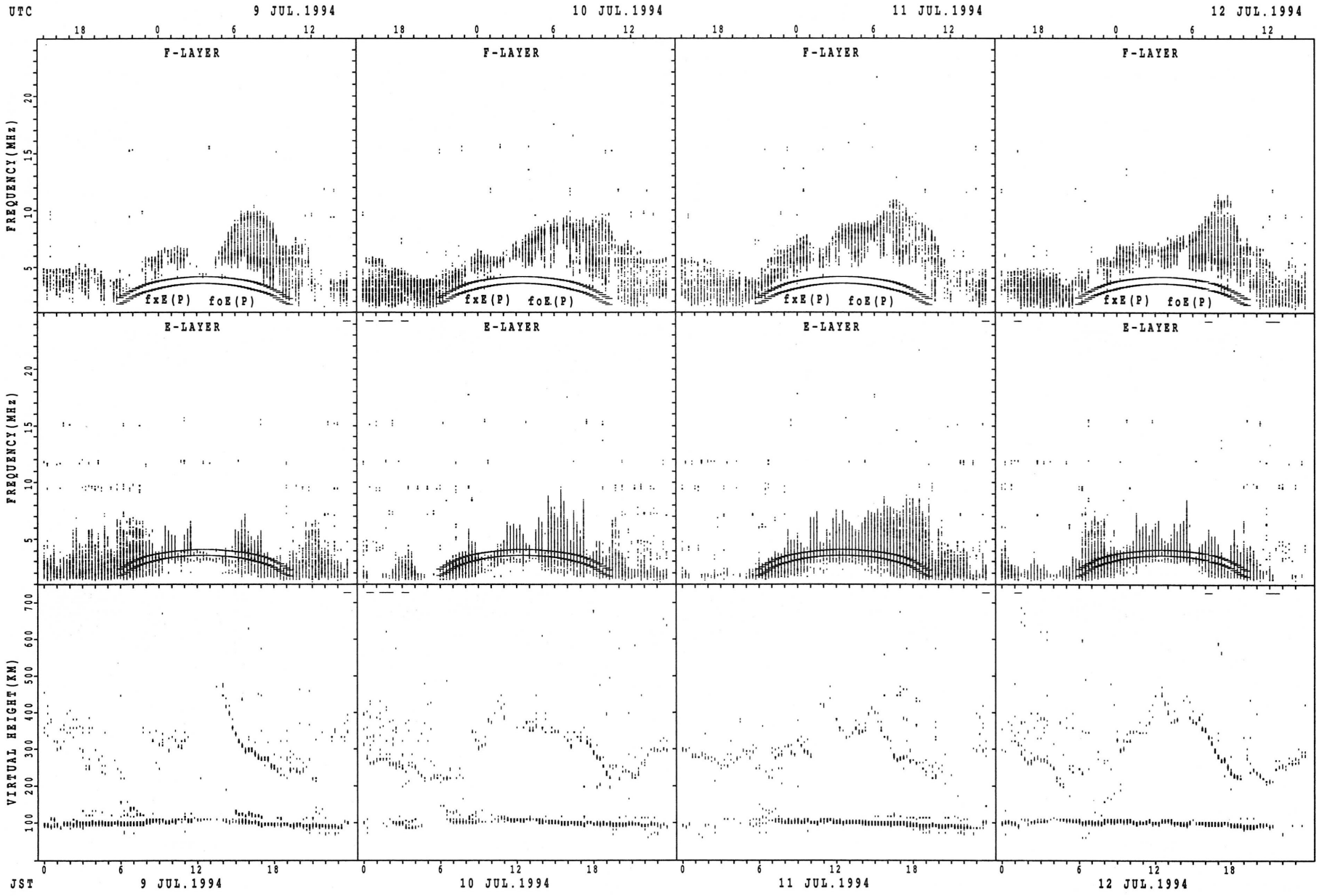
SUMMARY PLOTS AT OKINAWA



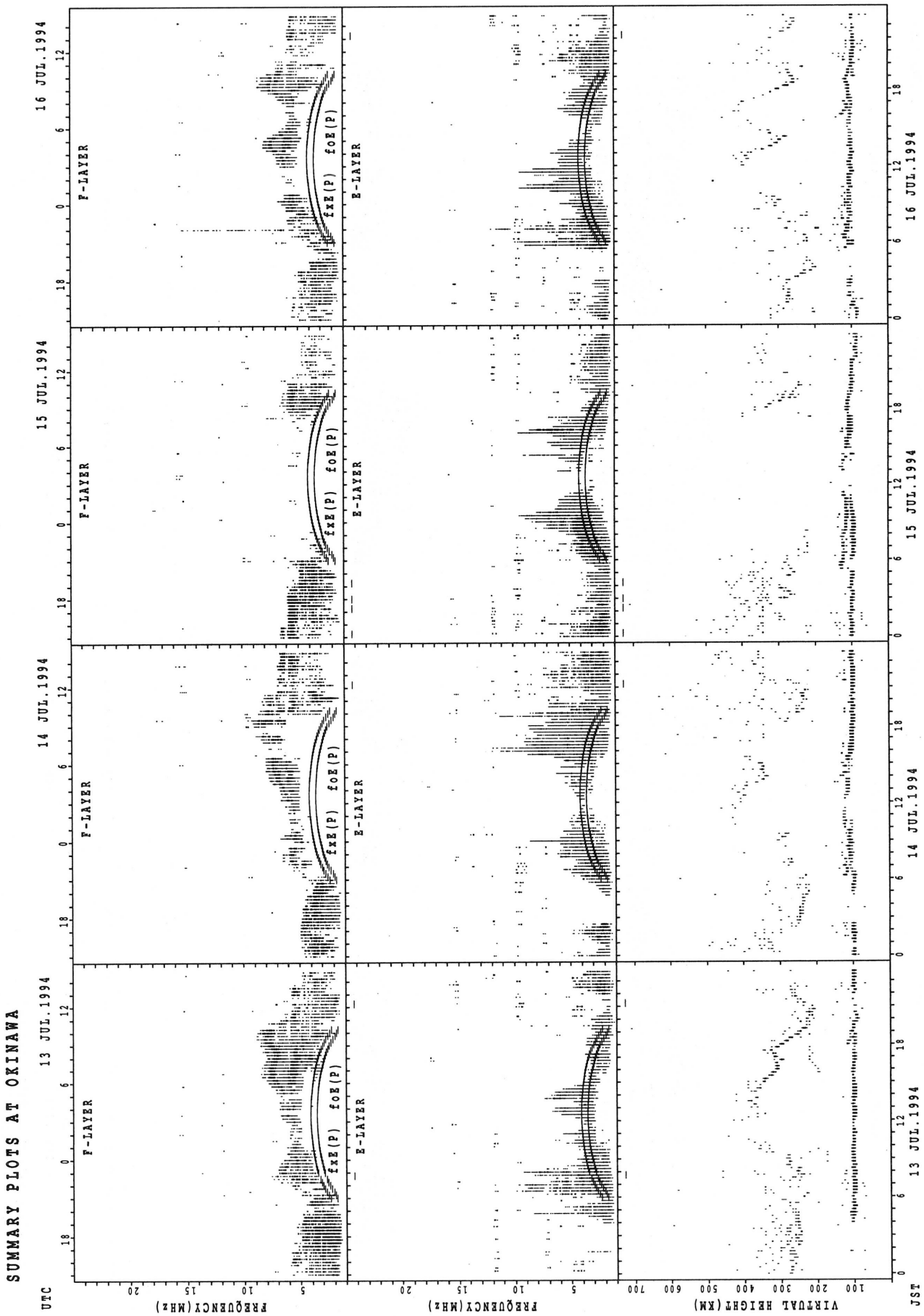
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
5 JUL.1994
6 JUL.1994
7 JUL.1994
8 JUL.1994
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

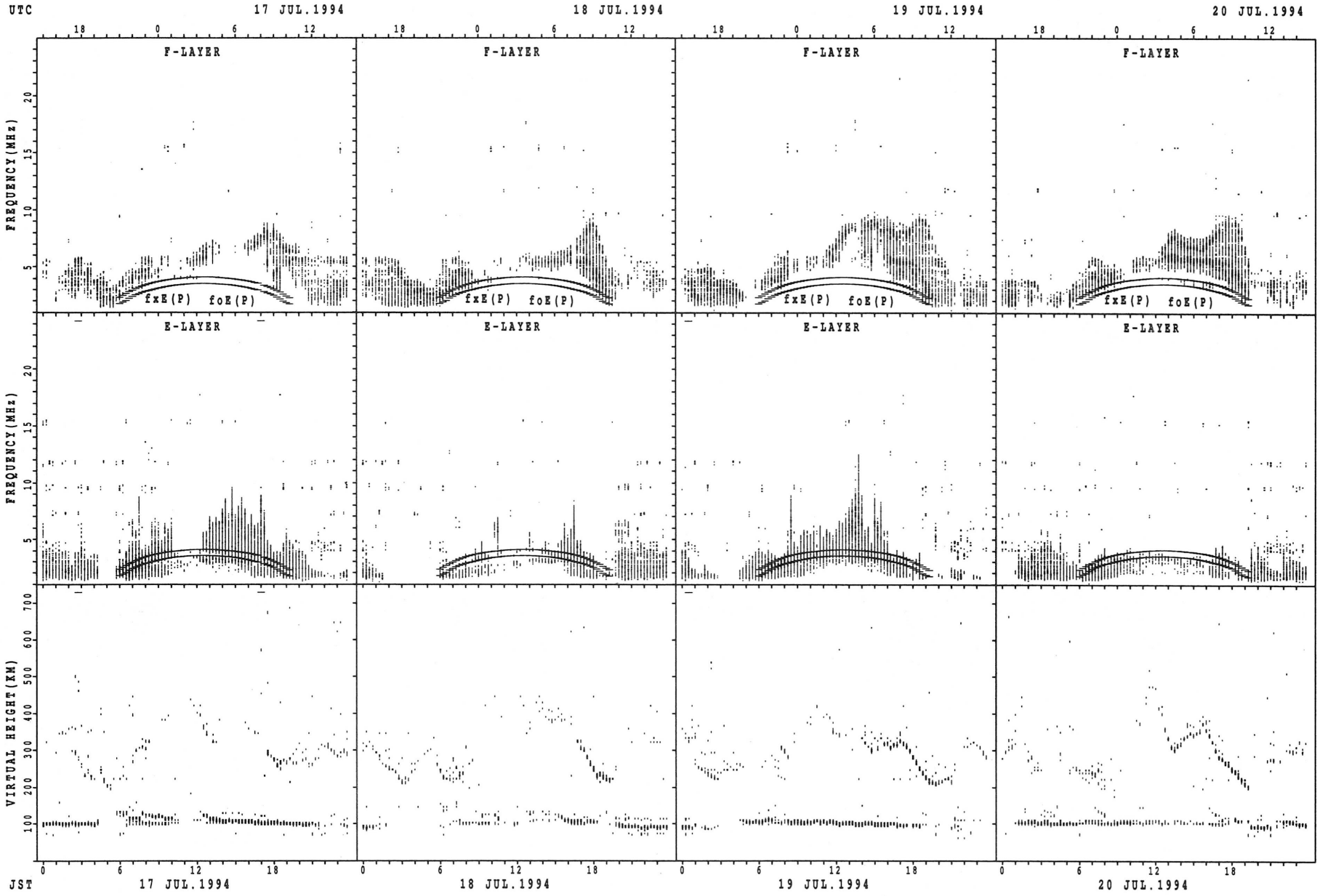
SUMMARY PLOTS AT OKINAWA



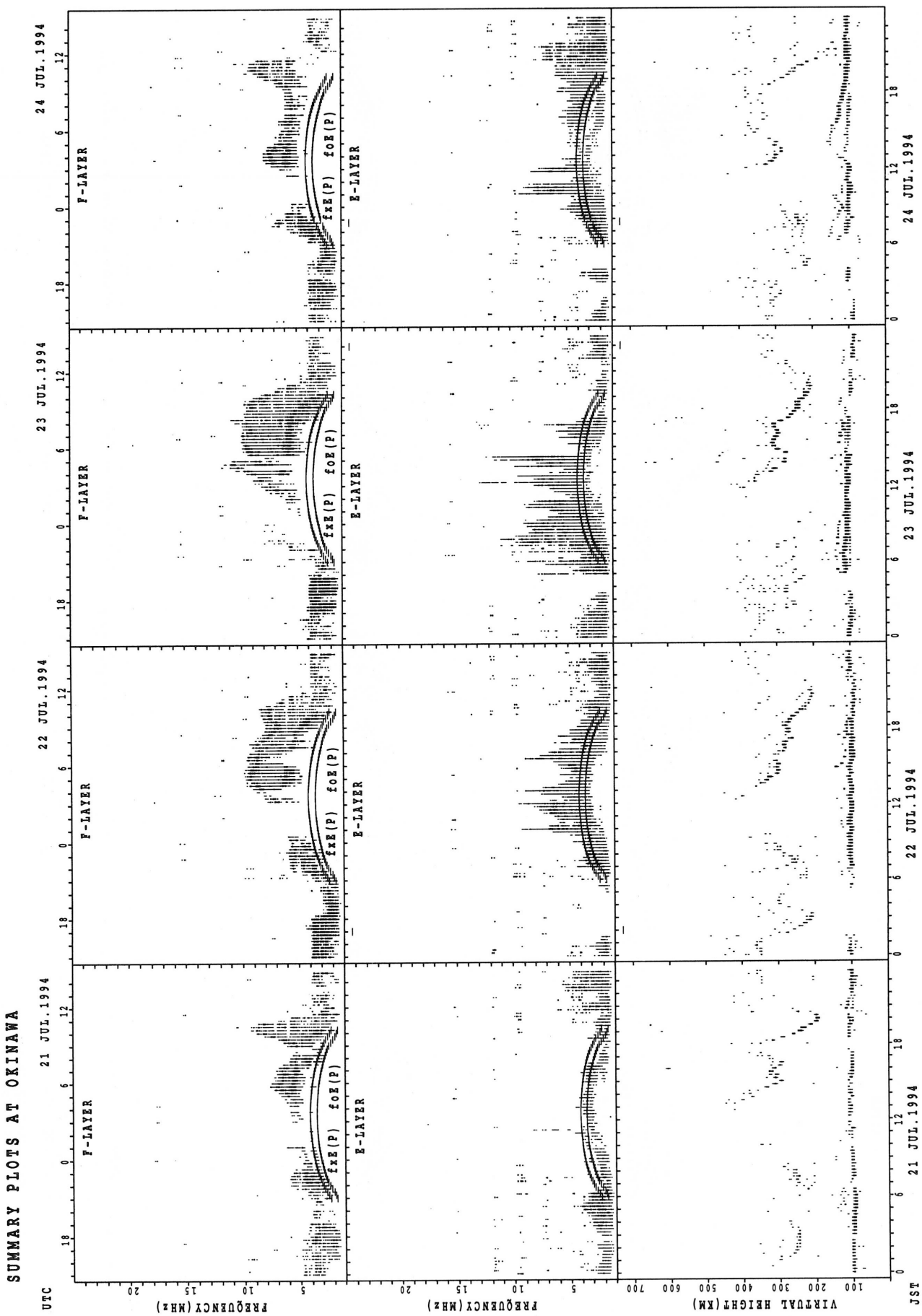
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
JST
13 JUL.1994
14 JUL.1994
15 JUL.1994
16 JUL.1994
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

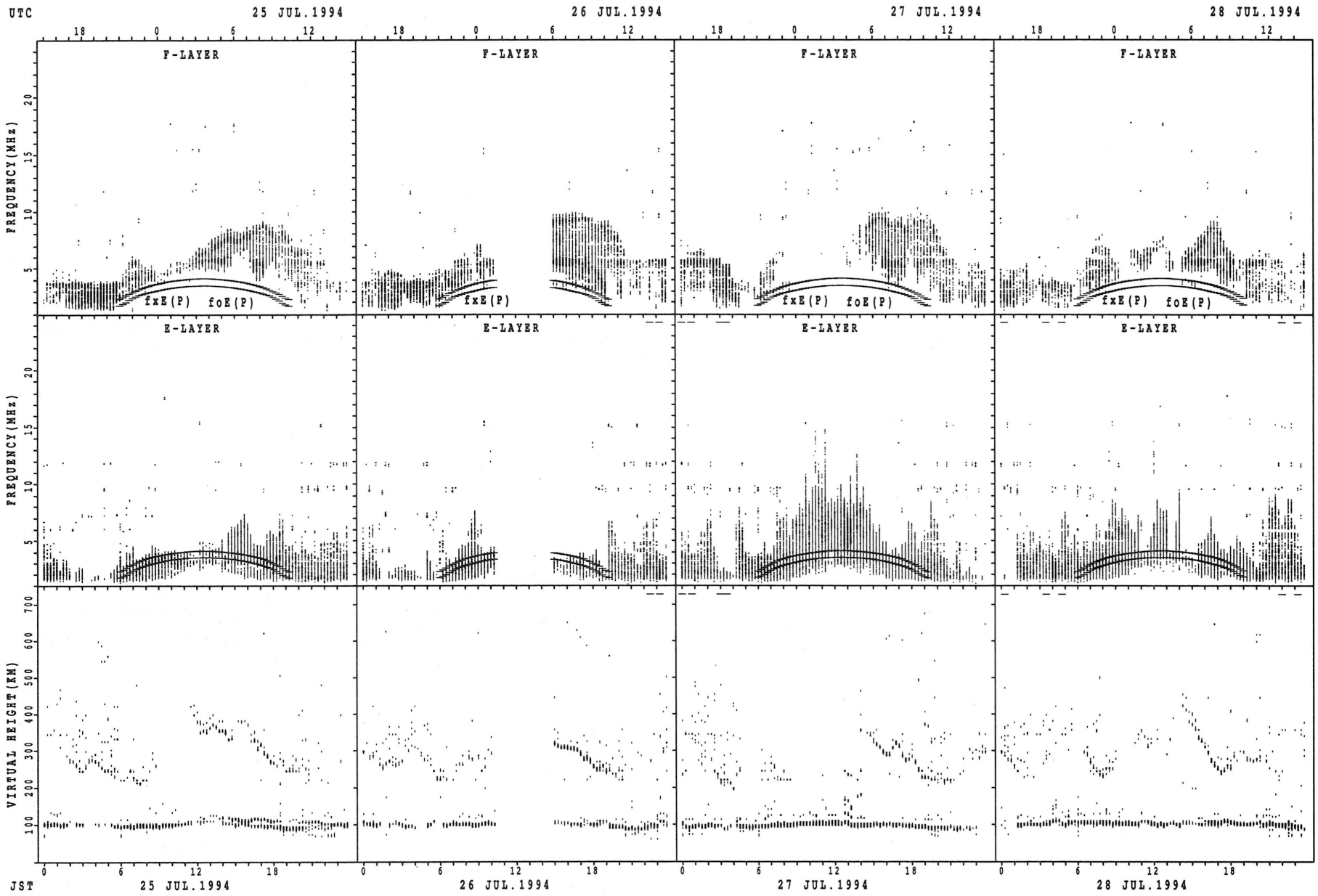
SUMMARY PLOTS AT OKINAWA



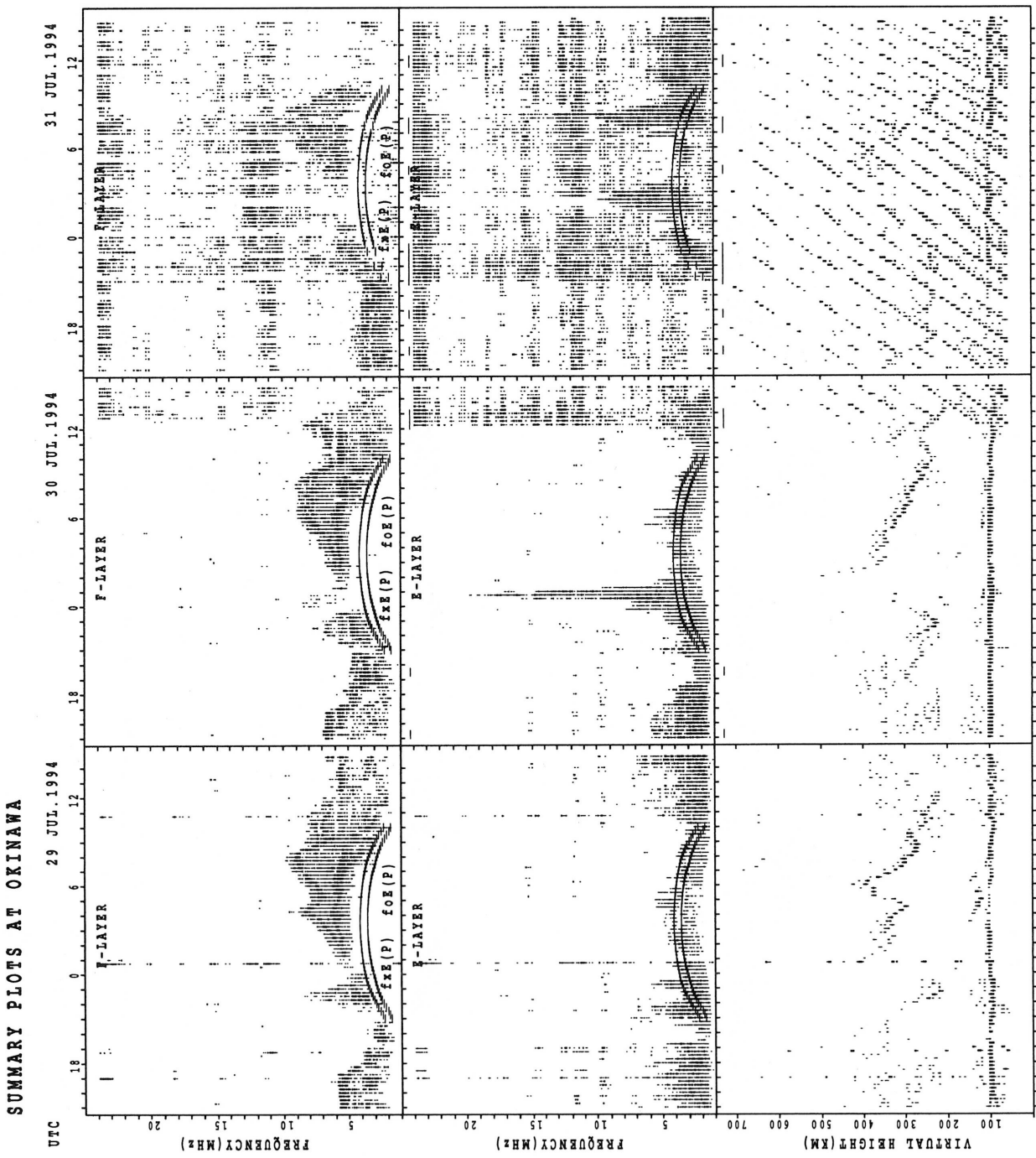
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
JST
21 JUL.1994
22 JUL.1994
23 JUL.1994
24 JUL.1994
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



fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
JST
29 JUL.1994
30 JUL.1994
31 JUL.1994
F-LAYER
E-LAYER
Es-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

MONTHLY MEDIANS OF h'F AND h'Es

JUL. 1994 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

h'F STATION WAKKANAI LAT. 45.4N LON. 141.7E

	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																								
U Q																								
L Q																								

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	29	29	25	25	22	30	31	31	31	31	29	29	30	30	30	30	30	31	31	29	27	28	28	27
MED	103	101	99	99	106	118	113	111	109	107	107	105	105	105	105	107	107	111	111	109	107	107	105	103
U Q	105	105	104	110	115	125	115	115	113	109	111	108	107	107	113	113	113	115	113	112	109	111	109	107
L Q	99	97	97	97	99	111	113	109	107	105	103	103	103	101	101	101	103	107	101	104	103	104	102	101

h'F STATION KOKUBUNJI LAT. 35.7N LON. 139.5E

	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																	12	10		10				
MED																	306	295		262				
U Q																	320	308		290				
L Q																	281	274		242				

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	31	28	26	25	22	28	30	31	30	30	30	31	26	30	31	31	30	31	28	25	27	28	27	29
MED	103	103	100	99	101	112	113	113	111	111	109	109	110	111	113	113	113	113	111	107	105	107	107	105
U Q	105	105	105	105	107	121	119	113	115	113	111	113	113	121	121	121	117	115	113	113	111	113	111	109
L Q	101	98	95	95	95	104	111	109	107	105	107	107	103	105	107	105	105	105	105	102	103	103	99	102

h'F STATION YAMAGAWA LAT. 31.2N LON. 130.6E

	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																12	13	16	22	12				
MED																330	308	289	294	271				
U Q																336	339	317	304	284				
L Q																309	288	279	272	252				

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	26	27	25	19	20	30	31	30	31	25	14	18	14	22	21	29	31	29	26	26	25	26	28
MED	107	106	105	105	111	109	116	111	113	113	109	111	115	110	113	113	113	113	111	108	105	103	105	105
U Q	111	111	109	111	113	114	129	115	117	115	115	113	117	113	113	115	116	119	115	111	111	109	111	110
L Q	103	103	101	102	105	106	111	111	111	111	107	107	111	107	111	109	109	107	106	105	101	101	101	101

MONTHLY MEDIANS OF h'F AND h'Es

JUL.1994 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

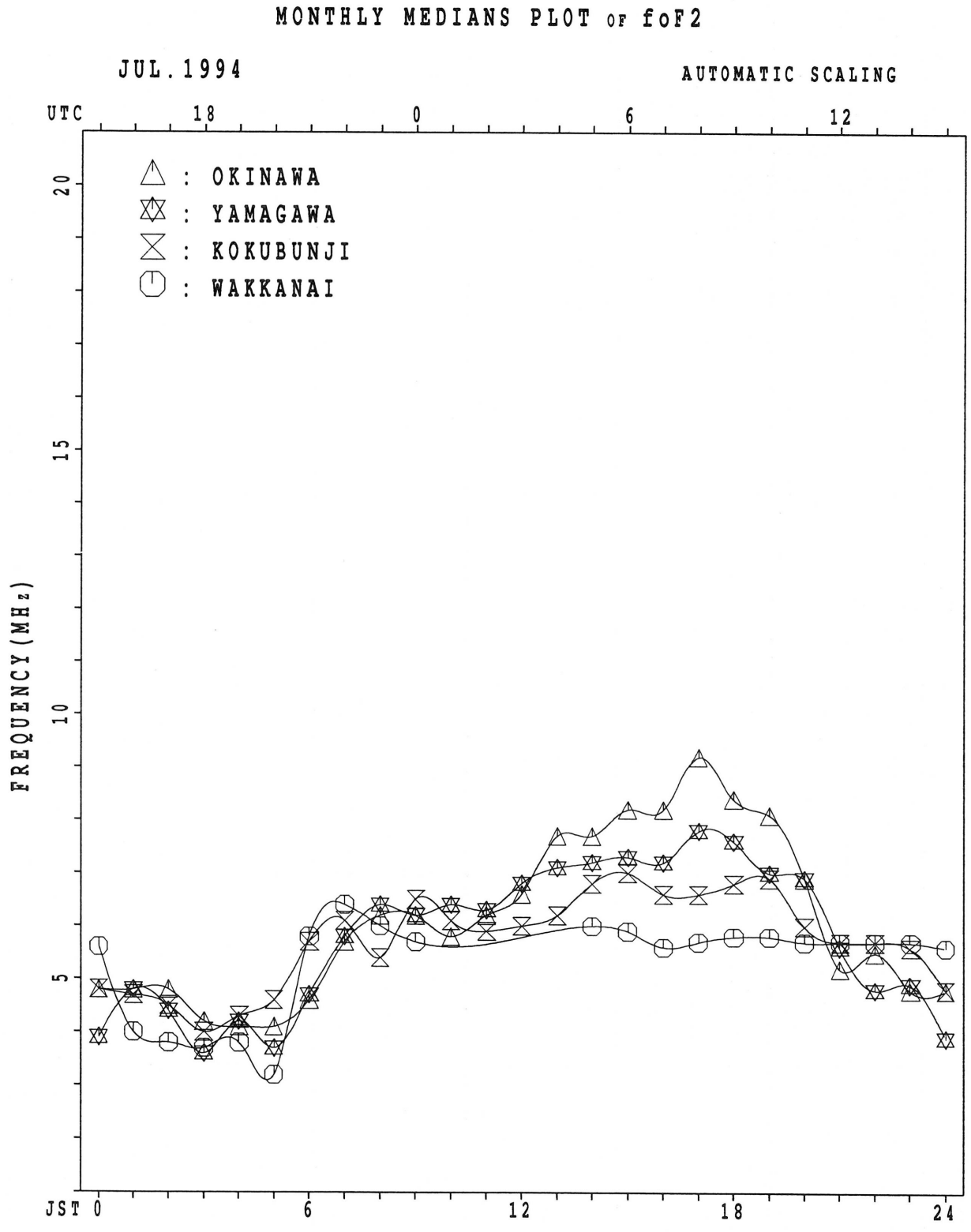
STATION OKINAWA LAT. 26.3N LON. 127.8E

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														11	17	19	21	23	23	22	15			
MED														330	318	324	312	286	268	258	282			
U Q														352	340	346	337	316	290	278	314			
L Q														314	295	304	300	280	246	240	234			

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	23	21	19	18	18	27	29	28	30	26	27	26	27	27	29	29	29	26	26	28	27	24	22
MED	99	97	101	103	103	103	105	105	106	107	107	109	109	109	107	111	103	103	102	103	95	95	94	98
U Q	104	101	104	105	105	105	125	118	117	113	113	115	115	115	117	114	113	111	111	109	101	103	101	107
L Q	93	95	95	97	97	99	95	99	103	105	103	105	103	103	101	102	100	99	97	97	95	93	89	91


MONTHLY MEDIANS PLOT OF foF2
JUL.1994
AUTOMATIC SCALING
UTC
18
0
6
12
△ : OKINAWA
✡ : YAMAGAWA
⧖ : KOKUBUNJI
○ : WAKKANAI
FREQUENCY(MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 FXI (0.1MHZ) 135° E MEAN TIME (G.M.T. + 9H)

LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

H / D	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	56	51	46	47	48					66											X 67	X 65	65	X 62
2	X 56	49	X 48	48	51																X 58	X 62	X 58	X 58
3	X 60	49	X 48	X 44	X 44																X 62	X 62	X 56	X 54
4	X 55	X 53	X 50	X 48	X 44																0 X 73	A	46	53
5	51	51	47	47	48	43														100	X 80	A	A	A
6	A	X 50	53	X 48	X 48	51															X 67	X 64	X 61	56
7	A	A	53	51	46																X 55	61	60	56
8	56	54	54	X 49	46																X 69	X 61	56	55
9	53	50	48	X 46	48																X 63	X 65	64	65
10	63	64	55	50	49	49															X 65	X 60	X 60	61
11	61	57	X 51	X 48	45																X 68	A	56	64
12	61	54	51	47	50																X 75	X 60	X 55	56
13	55	54	51	47	47	49															A	70	65	65
14	62	63	58	56	58	56														89	X 84	79	79	75
15	74	64	66	64	X 60	54					60										X 56	X 54	X 52	X 52
16	X 51	X 51	X 48	X 49	45																X 68	X 69	X 71	65
17	X 62	X 56	X 56	60	X 55	49															X 55	X 54	X 55	54
18	X 54	X 49	X 46	X 43	X 43																X 62	X 58	X 55	X 55
19	52	X 49	X 50	X 48	X 41																X 61	X 49	X 48	49
20	A	47	45	40	X 41																X 67	59	62	55
21	X 54	X 52	X 48	49	X 47															X 78	X 87	76	X 68	X 59
22	X 50	53	55	48	42															X 80	X 62	54	56	A
23	55	54	47	43	39															X 71	66	X 57	56	60
24	56	52	52	50	49															X 72	X 74	X 70	62	X 53
25	X 50	X 46	X 47	44	A															X 67	X 66	X 63	X 61	66
26	58	54	51	A	X 51	46														X 77	X 71	X 62	64	64
27	73	62	62	46	42															X 62	X 54	54	56	A
28	46	51	49	X 40	X 43															X 52	X 56	57	63	55
29	53	51	X 41	X 40	51	43														X 68	A	75	76	62
30	X 49	50	50	47	49															X 71	X 65	X 64	X 62	X 55
31	X 53	X 51	X 47	50	X 49	46														X 77	X 63	X 53	53	53
	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	30	31	30	30	10				1	1									13	29	28	30	28
MED	55	52	50	48	48	49				66	60									X 72	X 66	X 62	60	56
U Q	60	54	53	49	49	51														79	X 70	65	64	63
L Q	52	50	47	46	X 44	46														X 68	X 62	X 57	X 56	54

JUL. 1994 FXI (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 FOF2 (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	J F 50	F 43	F 38	F 39	F 37	J R 55	53	49	I A 54	F 58	I A 52	Y	Y	54	74	63	64	52	A	56	61	S 59	F 56	56
2	50	F 40	42	F 41	F 39	I A 43	60	A	A	50	50	50	52	57	52	49	55	60	71	80	52	56	52	52
3	J S 54	F 40	42	38	38	42	41	50	51	R 50	A	A	A	57	62	66	68	65	68	J S 59	56	56	50	48
4	49	47	44	42	S 38	44	J R 46	58	57	E G 42	52	A	A	A	A	56	U A 55	58	66	80	67	A	F 35	J F 44
5	F 42	F 40	F 37	F 37	J S 40	32	49	55	J R 56	A	A	I A 52	60	59	U A 61	63	58	68	70	F 88	J S 74	A	A	A
6	A	J S 44	J F 45	42	J S 42	F 43	J R 51	63	66	I A 60	51	R 45	I A 52	56	I A 62	A	U A 70	71	70	S 70	61	58	55	F 49
7	A	A	F 43	F 42	F 38	42	54	A	61	59	70	64	I A 62	75	71	71	77	73	71	63	49	F 52	F 50	F 48
8	F 48	F 42	F 45	43	F 37	I A 39	50	72	63	A	A	J R 55	I A 56	59	J R 64	76	73	66	60	59	63	55	F 46	F 45
9	F 45	F 40	F 38	40	F 38	39	53	62	58	58	57	I A 56	60	58	59	70	74	71	64	I S 67	57	S 60	F 54	F 55
10	F 55	F 54	F 46	F 41	F 38	F 40	55	65	J R 64	50	Y	I A 64	64	77	R 86	J R 79	75	64	66	59	59	54	54	F 54
11	F 54	51	45	42	38	41	58	73	84	75	59	62	I A 69	A	69	65	69	75	79	85	62	A	F 46	F 52
12	F 53	F 47	F 42	F 38	F 39	S 43	55	64	J R 62	I A 62	59	64	71	73	R 76	87	88	82	70	77	69	54	49	F 48
13	F 48	F 44	F 41	F 38	F 36	F 42	57	65	72	I A 66	62	A	55	64	67	69	64	66	73	J S 72	A	F 62	F 55	F 55
14	F 54	F 53	F 52	F 50	F 47	F 46	54	65	A	J R 53	A	I A 48	I A 51	55	R 62	67	60	60	69	S 78	78	F 66	F 69	F 65
15	F 66	F 54	F 58	F 56	S 55	J S 49	48	46	44	47	F 54	R 46	A	45	R 52	I A 48	50	52	53	56	50	48	46	46
16	45	45	42	43	F 32	S 38	51	46	46	A	E G 43	I A 51	R 44	55	56	54	49	U A 51	52	56	62	63	65	F 58
17	56	51	50	F 52	49	F 42	46	J R 48	47	A	E G 44	I Y 47	U R 51	I A 50	55	55	54	58	S 52	51	49	48	J S 49	F 47
18	S 48	43	40	37	37	38	45	A	A	A	I A 46	A	49	49	A	A	A	A	55	64	56	52	49	49
19	F 44	43	44	42	35	42	47	60	55	62	A	I A 52	A	R 60	60	58	55	57	58	57	55	43	42	F 41
20	A	F 37	F 35	F 31	J S 35	37	52	A	A	A	49	J R 53	54	58	53	55	J R 52	57	64	70	61	F 51	52	F 48
21	48	46	42	F 42	J S 41	S 44	48	53	58	A	A	A	R 51	A	51	57	53	53	A	72	81	F 67	S 62	53
22	44	41	J F 49	F 40	F 36	41	J R 52	J R 70	56	A	A	50	52	J R 53	51	57	58	59	60	J R 74	56	46	F 46	A
23	F 46	F 44	40	F 35	F 32	36	46	56	65	60	58	R 61	64	I A 66	68	56	I A 53	J R 52	56	65	F 61	S 51	F 45	F 50
24	F 46	44	F 42	F 41	F 41	49	46	42	I A 54	67	J R 52	U R 51	51	I A 58	67	57	56	I A 50	47	66	68	64	F 50	47
25	44	40	41	F 35	A	A	R 46	59	56	47	R 51	56	A	A	71	65	65	61	A	61	61	57	54	F 54
26	F 46	F 46	F 45	A	S 46	F 35	J R 55	58	55	E G 44	56	54	58	61	A	A	65	R 66	65	71	65	56	F 51	J F 55
27	F 60	F 52	F 52	F 39	J S 37	J R 36	50	55	I A 55	50	50	I A 52	58	I A 70	I A 72	79	79	87	75	55	48	F 45	F 43	A
28	F 37	F 42	F 41	32	F 33	A	A	63	65	66	A	A	54	54	59	64	70	64	51	46	V 50	F 49	F 50	F 46
29	F 44	F 41	35	34	S 41	F 36	50	58	A	A	R 49	A	51	59	A	62	A	A	A	62	A	F 65	F 66	F 53
30	43	F 42	F 40	F 36	F 41	S 42	46	56	72	66	64	R 63	65	J R 59	J R 59	69	78	71	59	65	59	58	56	50
31	47	45	41	F 38	J S 43	F 38	43	59	66	56	I A 51	55	58	J R 68	65	64	64	65	68	71	57	47	F 47	F 42
	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	30	31	30	30	29	30	27	26	22	22	23	25	27	27	28	29	29	27	31	29	28	30	28
MED	F 48	F 44	F 42	F 40	38	42	50	58	58	58	52	53	55	58	62	64	64	64	65	65	61	56	F 50	F 50
U Q	F 54	F 47	F 45	F 42	S 41	43	54	64	65	62	58	61	61	64	69	69	72	70	70	72	64	60	55	F 54
L Q	44	F 41	F 40	F 37	F 37	38	46	53	55	50	50	50	51	55	56	56	55	57	56	59	56	50	F 46	F 47

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 FOF1 (0.01MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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						L		405		430				440		445	405	L 365						
2							370			430		430	420	445	440	420	U R 395	390	330					
3								395		430				R 455				390	U L 340					
4							U L 420	390	420	420						430	U A 420	390	320					
5							365	L					460											
6							L				445							395						
7							L					440			440	440	420	380	L					
8							U A 350							445		440	420	380	L					
9						L	L 420	395						435	445	435	430		L					
10								405	L 425		450													
11							L 385	415	420						U A 465	440	U A 415	420	330					
12						L	L	U A 415			445	460	455	455			410							
13											U A 455			U A 480	R 445	445	U A 415	385	L					
14														U A 455		430								
15						L	340		405	405								370	L					
16							L		405		U R 430		U R 395		430	445	390		340					
17							330	405	430		440		440		420			U A 345						
18							390						430											
19							L 355	370		420				U R 460	430	U A 430	U A 420	370	L 330					
20							355				420	430	440	465				U A 350						
21							U L 380	380					420		430	U A 430								
22						U L 275		380				440	R 440			430	415	370						
23							365	390	U A 405	440		R 445	460						340					
24						L	L	395		420		U A 440				420	390							
25							L 350	405	405	430	430	455			U A 440			365						
26								405	405	440	445	440	R 440	440					U L 355					
27							L	L					460			U A 415								
28								380	415				445		U A 445		430	380	L					
29								395					430	R 455										
30								U A 395	420	420			445			U A 440	420	380	L					
31								390	U A 415				440		U A 440	440	U A 405	380	U L 315					
	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						1	14	19	12	11	9	9	16	12	12	17	16	18	9					
MED						U L 275	365	395	415	430	445	440	440	455	440	435	415	380	330					
U Q							L 385	405	420	430	448	450	450	U 458	445	440	420	390	U L 340					
L Q							350	390	405	420	430	435	430	442	430	430	405	370	325					

JUL. 1994 FOF1 (0.01MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 FOE (0.01MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	A	A	A	A	A	R 355	R	355	340	320	290	A 250	A	B				
2						A	A 275		A	A	A	A	R	330	A	330	A	A	190	A				
3						A	A	A	290	330	A 340	A	A	340	350	315	290	A	A	B				
4						A	A	A	325	330	355	A	A	A	A	A	A	A	A	B				
5						A	240	A 275	A 315	A	A	A	A	355	345	330	A 290	250	A	B				
6						A	A	A	A	A 305	A	A	A	A	A	A	A	A	A	B				
7						A	A	A	A	A 340	355	A	355	350	340	330	A	280	180	B				
8						A	A	A	A	A	A	A	A	355	340	A	295	A	A	B				
9						A	A	295	U A 315	A 340	A	U A 365	355	A	330	I R 320	295	255	190	B				
10						A	U A 230	A 290	A	330	A 345	A	A	A	A	330	A	A	A	B				
11						A	255	290	320	A	345	A	A	A	A	A	A	A	A	B				
12						A	A	280	295	A 330	355	345	355	350	A 340	A	A	A	A	B				
13						A	A	290	A 315	A	A	A	A	A	A	320	290	A	A	B				
14						A	215	A	A	A	A	A	A	A	A	330	295	A	A	B				
15						A	A	A	A	340	A	355	345	355	340	315	A 290	A	A	B				
16						A	225	265	315	340	345	A	R	340	A	345	305	A	A	B				
17						A	A	265	295	A	A	345	355	355	R 320	315	290	A	A	B				
18						B	A	A 265	305	A 320	A	A	A	355	340	315	290	A	A	B				
19						A	225	A 265	U A 290	U A 320	A	A	A	A	A	A	A	A	A	A				
20						B	A 215	A	A	A 295	340	350	A	350	340	315	290	A	A	B				
21						B	A	A	A	A	A	A	A	A	A	A	A	A	A					
22						A	A 215	A	A	A	A	A	A	A	A	A	295	A	A					
23						B	215	A	295	A 320	A	A	A	A	A	A	A	A	A					
24						A	A	A	A	A	A	A	A	A	A	A	265	A	A					
25						A	A	275	A	A	340	A 355	A	A	A	A	A	A	A					
26						A	A	A	A	A	A	A	340	345	330	330	280	A	A					
27						B	A	A	290	315	A 330	A	A	A	A	A	A	A	A					
28						A	205	275	305	A 320	A	A	A	A	A	A	A	A	A					
29						A	A	280	A 305	A	A	A	A	A	A	305	280	A	A					
30						S	A	A	A	A	A	A	A	A	A	A	A	A	A					
31						A	A	A	A	A	A	A	A	A	A	305	280	240	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							10	14	15	15	10	7	6	13	12	17	17	5	3					
MED							220	275	305	A 330	345	355	355	350	340	320	290	250	190					
U O							230	290	315	340	355	355	355	355	340	330	295	268	190					
L O							215	265	295	A 320	340	345	345	342	335	315	285	245	180					

JUL. 1994 FOE (0.01MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 FOES (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	J A 64	J A 57	J A 50	J A 44	J A 56	46	89	43	83	J A 59	56	G	G	47	65	J A 54	40	J A 62	J A 118	J A 129	J A 80	34	J A 23	J A 36
2	J A 31	J A 36	33	J A 24	J A 36	61	J A 51	J A 96	70	J A 106	J A 86	43	G	G	37	G 32	34	J A 33	J A 36	36	32	24	E B 12	E B 12
3	27	19	E B 11	18	30	J A 22	J A 29	J A 41	J A 51	38	71	J A 61	131	51	71	J A 95	129	56	J A 41	J A 56	J A 31	24	39	43
4	23	27	33	J A 38	J A 38	28	J A 31	33	38	J A 81	47	70	92	J A 92	75	57	46	36	31	E B 12	J A 22	J A 55	J A 36	37
5	J A 45	J A 36	37	29	J A 36	28	30	J A 45	60	168	112	65	57	J A 52	J A 77	J A 87	J A 78	65	100	70	J A 111	70	70	J A 66
6	54	51	39	34	J A 33	32	J A 32	55	J A 66	J A 83	J A 45	J A 48	62	62	75	J A 80	75	J A 43	J A 69	J A 84	62	45	37	44
7	J A 82	J A 59	J A 36	J A 37	J A 37	32	52	J A 69	61	60	88	41	92	85	G	39	J A 36	J A 39	28	J A 23	J A 23	J A 41	J A 40	33
8	J A 42	J A 44	35	28	26	J A 56	63	93	J A 144	J A 124	86	J A 69	J A 77	J A 50	J A 69	37	J A 43	J A 47	J A 44	J A 46	J A 41	J A 110	37	J A 78
9	J A 40	J A 29	J A 26	J A 22	31	30	J A 35	32	61	62	64	94	J A 54	44	39	G	39	J A 54	J A 32	J A 107	J A 73	J A 64	J A 58	65
10	J A 53	33	J A 35	32	J A 31	J A 32	J A 47	J A 73	J A 47	46	J A 56	77	52	60	J A 80	J A 72	59	57	66	37	18	32	J A 43	J A 26
11	J A 25	26	29	30	J A 23	30	G	38	J A 50	J A 61	J A 57	61	122	89	53	J A 48	J A 46	J A 53	J A 44	33	J A 23	93	J A 57	J A 39
12	42	28	25	28	28	22	31	J A 45	58	117	J A 63	40	41	J A 51	J A 57	J A 52	J A 43	J A 57	J A 72	59	J A 47	J A 50	J A 24	J A 29
13	24	50	25	32	S 23	31	74	J A 50	68	99	J A 52	J A 108	J A 51	J A 54	41	44	J A 52	33	37	67	J A 125	J A 85	40	J A 49
14	J A 45	34	J A 44	37	J A 36	28	J A 49	74	167	54	J A 78	86	78	J A 49	59	J A 65	J A 53	56	J A 53	J A 100	J A 115	J A 109	J A 41	J A 46
15	J A 55	J A 43	J A 51	29	E B 12	J A 26	35	J A 42	39	41	56	50	45	46	46	J A 67	51	32	J A 40	28	J A 44	J A 44	33	J A 28
16	28	J A 29	19	E B 11	J A 25	23	33	40	42	47	38	66	G	J A 50	37	44	36	J A 64	J A 52	J A 78	23	29	22	J A 51
17	J A 22	28	J A 26	J A 48	J A 34	37	35	J A 40	36	54	49	41	43	49	G	55	J A 48	60	J A 84	J A 50	36	28	29	J A 44
18	J A 50	33	J A 43	37	28	J A 22	J A 42	57	61	108	70	58	J A 50	42	56	J A 69	90	J A 125	58	J A 69	J A 49	35	32	28
19	25	19	J A 26	24	E B 13	23	29	34	J A 52	42	J A 111	J A 80	75	60	51	J A 51	49	37	32	27	27	J A 24	20	J A 48
20	53	J A 29	J A 50	47	37	J A 31	49	87	85	72	G	40	44	47	J A 48	59	58	J A 40	J A 83	35	J A 33	J A 55	J A 47	J A 44
21	J A 44	J A 40	J A 31	27	28	35	29	J A 32	J A 65	95	J A 140	71	51	62	J A 56	60	J A 91	J A 47	J A 132	J A 63	J A 60	J A 59	42	J A 30
22	28	J A 27	31	31	J A 44	31	J A 84	J A 45	J A 63	91	61	J A 48	55	54	53	J A 53	37	J A 59	J A 85	J A 73	64	J A 48	J A 42	J A 65
23	J A 50	J A 44	28	22	J A 25	28	34	J A 36	J A 46	J A 54	123	J A 60	42	68	J A 64	46	70	51	32	J A 59	J A 46	75	J A 55	J A 50
24	J A 63	J A 59	J A 38	46	42	J A 26	J A 45	J A 44	98	J A 44	44	58	56	70	J A 79	45	J A 80	J A 92	J A 174	J A 83	38	J A 36	69	J A 33
25	J A 39	J A 27	J A 31	33	J A 43	47	J A 32	J A 30	38	J A 41	G	J A 49	J A 80	J A 69	46	61	67	J A 45	110	J A 61	33	J A 53	J A 43	J A 55
26	61	J A 56	J A 50	J A 76	J A 50	50	79	J A 84	J A 34	39	37	43	37	43	J A 58	J A 87	J A 56	J A 127	42	54	50	J A 39	J A 49	J A 47
27	J A 55	J A 38	J A 27	J A 39	28	J A 30	J A 26	J A 36	J A 73	J A 48	55	J A 83	J A 112	88	125	76	J A 80	81	89	43	29	J A 96	J A 63	J A 103
28	J A 46	J A 45	J A 69	J A 46	J A 29	51	J A 72	J A 36	44	J A 68	101	J A 102	J A 43	61	J A 74	67	J A 42	J A 37	J A 31	J A 30	55	44	J A 38	J A 35
29	J A 37	27	22	E B 11	J A 34	J A 35	J A 45	42	J A 125	99	49	68	J A 46	46	74	92	J A 87	135	108	82	J A 103	J A 78	64	J A 58
30	J A 48	34	23	J A 28	J A 43	S 32	J A 39	87	J A 52	J A 50	52	J A 63	43	48	84	48	52	42	J A 53	J A 47	42	J A 36	39	24
31	28	E B 11	18	J A 58	J A 46	J A 43	42	J A 45	J A 48	J A 85	60	J A 65	J A 46	47	47	46	J A 49	31	33	18	23	E B 10	J A 68	J A 49
	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	J A 44	J A 34	J A 31	32	J A 33	31	39	J A 44	60	61	57	61	51	51	57	55	52	J A 53	J A 53	J A 56	J A 42	J A 45	J A 40	J A 44
U Q	J A 53	J A 44	J A 39	J A 39	J A 38	37	51	69	70	95	86	71	77	62	74	J A 69	J A 75	J A 62	85	J A 73	J A 62	J A 70	J A 55	J A 51
L Q	28	27	26	27	28	28	31	J A 36	46	47	49	48	43	47	46	46	43	39	36	35	29	34	33	33

JUL. 1994 FOES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 FBES (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	23	32	23	23	18	18	50	36	A A 83	38	A A 56	G	G	41	56	42	35	28	A A 118	25	17	16	E B 11	15
2	15	22	22	14	E B 12	A A 61	26	A A 96	A A 70	39	45	40	G	G	37	G 30	28	24	G 17	15	19	14	E B 12	E B 12
3	E B 10	E B 11	E B 11	E B 11	E B 11	17	23	28	41	35	A A 71	A A 61	A A 131	39	50	52	51	31	22	18	18	E B 10	24	23
4	14	E B 11	E B 11	14	14	17	26	29	37	36	46	A A 70	A A 92	A A 92	A A 75	39	U A 40	28	23	E B 12	15	A A 55	23	13
5	15	18	13	13	16	18	28	35	54	A A 168	A A 112	A A 65	42	48	U A 53	51	47	54	38	57	61	A A 70	A A 70	A A 66
6	A A 54	S 33	24	14	17	18	29	44	55	A A 83	38	40	A A 62	51	A A 75	A A 80	U A 61	32	40	40	37	28	20	18
7	A A 82	A A 59	18	17	18	20	31	A A 69	52	50	49	38	A A 92	62	G	37	34	G	27	15	13	17	19	17
8	14	14	18	13	14	A A 56	35	42	57	A A 124	A A 86	48	A A 77	38	52	36	37	29	25	19	22	24	21	19
9	13	E B 10	E B 11	13	15	18	31	G 23	51	47	54	A A 94	48	37	35	G	32	42	24	37	46	24	31	30
10	18	18	17	E B 13	E B 12	23	32	34	36	40	38	A A 77	50	50	63	G 28	55	41	37	18	13	E B 10	19	14
11	14	13	16	21	E B 11	18	G	32	38	53	54	50	A A 122	A A 89	47	39	42	34	22	18	13	A A 93	20	18
12	15	13	13	13	E B 11	16	27	42	56	A A 117	G 31	37	40	41	53	49	33	47	21	31	14	14	14	18
13	14	14	14	20	E B 11	18	42	47	59	A A 99	46	A A 108	50	48	37	41	42	30	20	49	A A 125	13	13	19
14	31	23	23	23	15	17	36	51	A A 167	48	A A 78	A A 86	A A 78	46	52	41	50	49	41	41	21	22	19	18
15	20	19	24	13	E B 12	17	26	40	34	37	50	39	A A 45	39	40	A A 67	42	30	18	E B 13	13	14	18	18
16	17	14	16	E B 11	E B 11	18	28	40	39	A A 47	38	A A 66	G	46	35	43	33	U A 41	28	41	13	20	14	13
17	E B 11	E B 12	13	17	15	20	26	32	34	A A 54	40	U Y 41	40	A A 49	G	49	43	35	28	16	16	13	18	29
18	32	17	17	26	13	E B 12	30	A A 57	A A 61	A A 108	A A 70	A A 58	39	42	A A 56	A A 69	A A 90	A A 125	37	16	29	E B 11	17	14
19	E B 11	E B 11	13	13	E B 13	18	24	30	46	40	A A 111	A A 80	A A 75	38	37	43	42	30	20	15	13	15	13	27
20	A A 53	18	21	18	15	16	32	A A 87	A A 85	A A 72	G	38	42	42	42	50	52	35	32	23	15	30	18	20
21	18	21	20	17	E B 10	20	23	30	47	A A 95	A A 140	A A 71	38	A A 62	39	43	42	38	A A 132	20	22	19	20	E B 11
22	14	15	14	14	13	16	43	33	47	A A 91	A A 61	42	41	52	45	39	34	32	50	31	23	18	18	A A 65
23	32	22	17	E B 10	13	17	28	32	41	40	51	39	U Y 42	A A 68	50	45	A A 70	42	22	50	19	23	17	20
24	23	19	19	15	15	16	21	34	A A 98	34	39	44	46	A A 70	47	34	32	A A 92	42	21	14	18	13	14
25	22	14	16	17	A A 43	A A 47	21	G 18	33	35	G	40	A A 80	A A 69	44	50	55	27	A A 110	51	21	21	25	29
26	20	21	21	A A 76	23	17	43	32	31	35	34	37	37	38	A A 58	A A 87	51	41	23	53	17	16	27	22
27	22	13	13	16	16	16	23	31	A A 73	40	46	A A 83	41	A A 88	A A 125	42	49	37	23	24	14	E B 11	15	A A 103
28	17	23	15	18	15	A A 51	A A 72	G 22	33	56	A A 101	A A 102	40	51	45	50	37	32	14	21	15	16	17	15
29	19	16	E B 11	E B 11	13	22	24	30	A A 125	A A 99	42	A A 68	39	38	A A 74	52	A A 87	A A 135	A A 108	44	A A 103	39	33	22
30	15	20	14	14	16	18	28	40	34	38	46	47	41	47	55	44	34	33	17	21	29	21	19	E B 10
31	E B 10	E B 11	E B 13	14	21	21	23	32	42	47	A A 60	47	40	47	44	41	41	29	18	E B 11	16	E B 10	20	18
	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	17	17	16	14	14	18	28	34	47	47	49	48	42	47	47	43	42	34	25	21	17	18	19	18
U Q	23	21	20	18	16	20	32	42	A A 61	A A 91	A A 70	A A 71	A A 75	A A 62	A A 56	50	51	42	40	41	23	24	21	23
L Q	14	E B 13	E B 13	E B 13	E B 12	17	24	30	37	38	39	40	40	39	39	39	34	30	21	16	14	E B 14	15	14

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IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 FMIN (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

H / D	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	11	12	11	12	10	12	12	E S 18	13	13	15	22	23	19	14	14	14	13	12	13	11	12	11	13
2	11	12	11	13	12	13	12	12	13	17	12	20	19	19	16	13	12	13	13	10	13	11	12	12
3	10	11	11	11	11	13	12	13	12	14	13	16	14	15	15	14	E S 17	13	12	11	13	10	12	11
4	13	11	11	12	12	13	13	14	12	16	16	21	16	21	14	13	13	13	E S 15	12	13	12	11	12
5	12	11	12	11	12	13	13	13	12	14	22	15	20	18	18	13	12	13	12	13	12	13	E S 13	E S 14
6	E S 14	12	13	11	E S 14	12	12	12	13	16	12	13	18	16	13	13	14	13	13	13	11	13	11	11
7	13	13	11	11	11	11	13	13	13	16	13	18	16	13	19	14	14	14	13	12	12	14	12	11
8	11	10	11	10	11	12	12	12	12	12	15	16	22	18	14	13	13	13	12	13	10	11	13	13
9	10	10	11	12	13	12	11	13	13	13	18	18	18	17	16	15	13	14	12	11	12	11	10	11
10	12	12	13	13	12	13	13	13	13	17	14	25	19	17	17	13	13	12	10	13	11	10	12	11
11	12	12	12	13	11	13	11	13	13	17	17	16	23	18	14	14	13	13	13	12	11	13	E S 14	12
12	11	10	10	11	11	11	12	12	13	18	15	14	23	17	15	16	12	12	12	12	10	13	11	10
13	12	12	10	12	11	11	12	14	13	15	14	21	19	21	13	20	11	13	13	13	12	12	11	11
14	12	13	11	12	10	10	13	12	12	13	15	17	15	22	17	18	17	13	12	15	11	13	13	10
15	11	11	13	10	12	12	14	13	14	14	13	17	18	18	14	14	15	13	12	13	12	12	13	13
16	12	11	14	11	11	13	12	13	12	13	16	32	24	18	E S 14	13	13	12	13	10	11	E S 13	10	10
17	11	12	12	11	12	10	13	12	14	17	15	15	13	17	17	E S 14	13	13	12	11	12	12	12	12
18	12	12	10	12	10	12	E S 18	12	15	13	19	17	17	19	18	14	13	13	13	13	11	11	11	10
19	11	11	11	11	13	12	12	12	17	19	16	13	22	20	19	20	13	13	11	11	13	12	10	12
20	11	13	11	13	11	12	12	13	11	13	15	18	29	20	14	11	14	E S 15	11	13	11	13	12	12
21	13	12	12	12	10	13	12	13	12	16	20	14	13	20	14	14	14	13	12	13	12	13	11	11
22	13	11	11	12	10	13	13	13	13	12	16	16	24	24	18	14	14	14	13	14	11	12	13	11
23	12	13	11	10	10	13	12	11	13	13	13	13	20	17	16	14	13	13	13	13	13	11	12	11
24	11	10	12	11	13	11	11	13	13	13	17	13	13	19	15	16	12	14	12	12	12	11	11	11
25	11	11	11	10	11	11	12	13	11	13	19	19	17	21	17	E S 20	13	12	13	13	13	12	13	12
26	11	11	11	10	11	12	12	12	13	13	13	13	20	16	14	13	13	12	12	11	10	13	10	10
27	13	12	10	12	E S 13	13	12	12	13	13	13	13	17	13	13	15	13	12	13	12	13	11	11	12
28	12	11	12	11	12	12	12	12	13	15	18	23	17	15	14	14	14	13	11	13	11	11	12	10
29	13	12	11	11	11	12	12	13	12	12	12	14	18	16	18	18	12	12	11	14	12	11	11	10
30	10	10	11	11	11	E S 16	12	12	12	16	13	22	14	16	18	14	12	13	13	12	11	13	11	10
31	10	11	13	11	10	12	12	12	13	13	13	18	15	14	14	14	12	14	10	11	11	10	11	13
	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	12	11	11	11	11	12	12	13	13	14	15	17	18	18	15	14	13	13	12	13	12	12	11	11
U Q	12	12	12	12	12	13	13	13	13	16	17	20	22	20	17	15	14	13	13	13	12	13	12	12
L Q	11	11	11	11	11	12	12	12	12	13	13	14	16	16	14	13	12	13	12	11	11	11	11	10

JUL. 1994 FMIN (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

H / D	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	J F 300	F 320	F 290	F 285	F 300	J R 310	A	290	A	F 315	A	Y	Y	275	315	300	335	335	A	305	285	S 315	F 290	315
2	355	F 285	305	F 300	F 325	A	345	A	A	325	295	280	320	300	280	265	290	290	320	340	315	290	280	295
3	J S 315	F 280	300	315	350	350	365	315	300	R 290	A	A	A	285	295	315	325	310	325	J S 325	300	305	290	300
4	305	300	290	325	S 310	330	J R 290	340	380	G	270	A	A	A	A	305	A	300	320	340	375	A	F 310	J F 285
5	F 270	F 305	F 285	F 295	J S 355	350	315	330	J R 315	A	A	A	310	305	A	300	275	285	315	F 350	J S 365	A	A	A
6	A	J S 315	J F 325	340	J S 300	F 335	J R 310	325	375	A	275	R 305	A	300	A	A	A	325	315	S 350	310	300	320	F 290
7	A	A	F 305	F 305	F 305	325	330	A	315	290	300	320	A	295	305	280	315	320	335	360	320	F 290	F 295	F 290
8	F 275	F 280	F 315	290	F 320	A	295	340	A 360	A	A	J R 280	A	305	J R 285	330	340	330	325	315	315	295	F 315	F 295
9	F 290	F 295	F 290	295	F 310	300	325	340	325	340	A 300	A	305	300	305	295	310	320	330	I S 325	320	S 285	F 305	F 300
10	F 300	F 290	F 285	F 305	F 310	F 310	335	325	J R 355	320	Y	A	285	280	R 300	J R 310	300	330	325	345	310	305	300	F 300
11	F 300	295	320	310	315	305	300	310	330	325	290	305	A	A	305	285	305	320	330	345	340	A	F 315	F 300
12	F 310	F 325	F 325	F 290	F 310	S 330	335	350	J R 255	A	330	290	305	300	R 270	300	300	310	345	330	335	305	320	F 310
13	F 295	F 295	F 320	F 305	F 320	F 305	325	330	320	A	315	A	295	295	295	300	300	315	340	J S 310	A	F 320	F 295	F 295
14	F 290	F 330	F 305	F 310	F 330	F 330	270	330	A	J R 335	A	A	A	315	R 300	295	310	300	305	S 305	310	F 300	F 295	F 295
15	F 310	F 285	F 290	F 285	S 275	J S 250	280	270	210	245	F 280	R 250	A	250	R 285	A	295	290	305	320	305	285	295	300
16	305	315	310	335	F 320	S 315	350	315	295	A	G	A	R 280	295	315	310	290	A	300	325	295	290	290	F 290
17	305	290	295	F 295	325	F 320	315	J R 315	305	A	G	Y	U R 280	A	290	310	305	320	S 330	340	315	290	J S 305	F 305
18	S 300	310	310	295	310	325	225	A	A	A	A	A	275	290	A	A	A	A	315	325	320	305	315	305
19	F 285	305	305	315	335	305	310	335	320	315	A	A	A	R 300	320	335	305	320	355	330	345	315	305	F 300
20	A	F 315	F 325	F 340	J S 290	325	315	A	A	A	245	J R 275	270	310	310	310	J R 290	300	325	320	315	F 300	300	F 295
21	305	310	295	F 345	J S 340	S 330	330	345	335	A	A	A	R 320	A	300	315	305	325	A	300	315	F 345	S 300	335
22	300	300	J F 315	F 305	F 285	285	J R 305	J R 350	360	A	A	270	285	R 285	315	325	340	280	J R 330	340	300	F 300	A
23	F 315	F 305	330	F 320	F 290	320	325	315	325	325	305	R 295	310	A 310	315	A	J R 320	325	330	F 345	S 290	F 320	F 315
24	F 315	280	F 295	F 310	F 320	355	350	250	A	340	J R 330	U R 310	295	A	335	325	330	A	295	305	330	310	F 350	340
25	310	325	320	F 300	A	A	R 335	355	385	300	R 305	325	A	A	305	305	320	315	A	330	320	320	330	F 310
26	F 305	F 305	F 300	A	S 340	F 330	J R 325	320	355	G	320	315	295	330	A	A	R 320	300	325	315	340	330	F 320	J F 295
27	F 315	F 305	F 340	F 320	J S 275	J R 305	340	315	A	345	290	A	305	A	A	300	305	340	345	340	310	F 295	F 295	A
28	F 310	F 300	F 345	330	F 330	A	A	340	335	340	A	A	320	A	305	300	335	345	355	315	V 295	F 300	F 310	F 310
29	F 310	F 315	300	315	S 265	F 300	310	300	A	A	R 295	A	290	295	A 305		A	A	A	320	A	F 305	F 295	F 320
30	325	F 295	F 290	F 310	F 305	S 315	325	305	335	315	315	R 305	325	J R 280	J R 260	315	325	345	330	325	320	300	330	290
31	295	345	300	F 290	J S 315	F 295	325	350	350	365	A	285	305	J R 305	325	330	330	325	350	345	320	300	F 290	F 290
	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	30	31	30	30	27	29	27	23	19	19	15	20	21	24	27	26	27	27	31	29	28	30	28
MED	F 305	F 305	F 305	F 308	312	320	325	325	330	320	295	295	300	300	302	305	308	320	325	325	320	300	F 302	F 300
U Q	F 310	F 315	F 320	320	325	330	335	340	355	340	315	310	310	305	310	315	325	330	335	340	338	308	315	F 310
L Q	F 298	F 295	F 295	F 295	S 300	305	308	315	315	290	275	280	285	288	R 288	300	300	300	315	315	310	292	295	F 295

JUL. 1994 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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						L	A 340		A	420	A	Y	Y	A	A	A 355	370	L 365	A					
2						A	380	A	A	A	A	A 310	375	385	390	385	U R 385	335	340					
3								380	A	400	A	A	A	R 355	A	A	A	365	U L 390					
4							U L 325	415	385	400	A	A	A	A	A	A	A	355	335					
5							390	L	A	A	A	A	360	A	A	A	A	A	A					
6							L	A	A	A	435	A	A	A	A	A	A	380	A					
7							L	A	A	A	A	470	A	A	360	390	365	360	L					
8						A	A	A	A	A	A	A	A	A	A	380	A 350	370	L					
9						L	L 350	390	A	A	A	A	A	A	385	370	365	A	L					
10								385	A	A	A	A	A	A	A	A	A	A						
11							L 325	380	400	A	A	A	A	A	A	415	A	390	365					
12						L	L	A	A	A	355	395	415	375	A	A	365	A						
13							A	A	A	A	A	A	A	A	R 390	365	A	360	L					
14							A	A	A	A	A	A	A	A	A	A 355	A	A	A					
15						L	340	A	365	395	A	R	A	A	A	A	A	360	L					
16							L	A	385	A	U R 395	A	U R 400	A	A 325	A	385	A	350	A				
17							395	360	385	A	380	Y	390	A	395	A	A	A						
18							345	A	A	A	A	A	395	A	A	A	A	A	A					
19							L 365	430	A	A	A	A	A	U R 360	A 325	A	A	355	L 360					
20							A	A	A	A	455	415	A	365	A	A	A	A	A					
21							U L 360	395	A	A	A	A	A	A	A	A	A	A	A					
22						U L 390	A	395	A	A	A	A	R 350	A	A	395	350	350	A					
23							375	405	A	A	A	R 385	Y	A	A	A	A	A	350					
24						L	L	380	A	415	A	A	A	A	A	385	385	A	A					
25						A	L 365	380	410	405	460	395	A	A	A	A	A	375	A					
26							A	360	400	395	430	415	R 395	380	A	A	A	A	U L 365					
27							L	L	A	A	A	A	A 325	A	A	A	A							
28						A	A	395	370	A	A	A	A	A	A	A	365	A 375	L					
29							A	385	A	A	A	A	A	A	A	A	A	A	A					
30							A	A	385	440	A	A	A	A	A	A	385	A	L					
31								355	A	A	A	A	395	A	A	A 370	A	350	U L 365					
	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						1	12	17	9	8	7	7	10	6	7	11	11	15	9					
MED						U L 390	362	385	385	402	430	395	392	370	385	380	365	360	360					
U Q							378	395	400	418	455	415	R 395	380	390	390	385	375	U L 365					
L Q							342	370	378	398	380	385	360	R 360	A 325	A 365	365	355	345					

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IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 H'F2 (KM) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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						280	A	375	A	335	A	Y	Y	440	310	335	280	270	A					
2						A	260	A	A	350	A	455	365	380	440	475	390	350	275					
3								330	365	415	A	A	A	410	370	325	A 300	295	270					
4							415	290	265	G	A 445	A	A	A	A	365	A	310	285					
5							325	280	A 335	A	A	A	355	345	A	A 345	E A 380	A 345	295					
6							340	295	255	A	465	E A 380	A	E A 385	A	A	A	280	275					
7							285	A	A 330	E A 345	330	330	A	355	325	355	290	280	260					
8						A	370	275	A 285	A	A	E A 385	A	380	370	290	285	270	250					
9						L 285	310	270	A 325	305	A	A	355	370	365	330	310	285	265					
10								285	255	310	R	A	390	340	315	310	A 310	285						
11							325	315	270	295	A	345	A	A	325	360	325	290	260					
12						285	280	260	A	A	320	375	305	315	365	305	295	A 270						
13							A 310	265	A 310	A	320	A	405	345	345	325	325	310	265					
14							A 330	E A 295	A	305	A	A	A	370	370	310	A 345	E A 355	300					
15						385	405	440	655	565	E A 400	505	A	A 490	500	A	390	370	320					
16							285	A 345	395	A	G	A	440	390	360	360	420	A	340	A				
17							315	340	390	A	G	Y	460	A	395	A	365	300						
18							655	A	A	A	A	A	Y 480	410	A	A	A	A	A 295					
19							330	285	A 340	330	A	A	A	360	330	315	360	315	245					
20							320	A	A	A	Y	425	420	350	365	A 375	A	320	275					
21							L 275	275	285	A	A	A	360	A	425	335	A 360	305	A					
22						375	E A 335	255	A 255	A	A	485	410	A	430	340	310	275	A					
23							320	310	290	320	E A 355	380	340	A	320	325	A	325	280					
24						245	250	560	A	275	290	370	E A 420	A	290	320	295	A	A					
25						A	310	280	255	370	405	340	A	A	305	330	A 320	290	A					
26							A 290	285	270	G	350	365	385	310	A	A	A 310	300	270					
27							295	L 270	A	A 285	435	A	370	A	A	320	310							
28						A	A	270	285	A 285	A	A	365	A	365	340	275	255	230					
29							330	370	A	A	380	A	410	370	A	A 335	A	A	A					
30							255	340	270	295	320	340	315	A 390	A 440	325	270	255	260					
31								270	270	270	A	425	365	335	305	310	285	295	255					
	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						6	26	27	22	19	15	15	20	21	24	26	25	26	21					
MED						285	315	285	285	315	U 368	378	373	370	365	330	310	294	270					
U Q						375	330	340	335	370	445	425	415	390	382	345	360	315	290					
L Q						280	285	270	270	295	320	345	358	345	322	320	292	280	260					

JUL. 1994 H'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 H'F (KM) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	295	A 320	335	A 325	310	240	A	A	A	215	A	Y	Y	A	A	A	235	210	A	280	280	255	260	265
2	230	325	305	280	285	A	255	A	A	A	A	A	265	220	215	200	215	235	230	225	250	285	295	275
3	230	275	275	250	255	230	205	200	A	230	A	A	A	260	A	A	A	250	S 225	240	280	225	315	305
4	280	280	280	265	265	265	225	195	255	225	A	A	A	A	A	A	A	225	235	240	210	A	A 340	300
5	330	A 330	295	255	215	250	230	245	A	A	A	A	A	A	A	A	A	A	A	A 255	A 245	A	A	A
6	A	A	265	235	260	230	250	A	A	A	210	A	A	A	A	A	A	230	A	A 240	270	285	255	310
7	A	A	265	270	255	240	A 250	A	A	A	A	185	A	A	240	225	230	220	A 250	215	250	310	320	315
8	315	325	280	280	245	A	A	A	A	A	A	A	A	A	A	205	A	205	A	255	265	265	280	340
9	295	300	275	280	275	240	A 260	225	A	A	A	A	A	A	210	200	215	A	245	240	A	320	315	A 325
10	A 325	280	295	260	265	260	250	245	A	A	A	A	A	A	A	A	A	A	A 240	220	250	225	285	265
11	255	270	250	275	250	245	H 230	230	220	A	A	A	A	A	A	215	A	230	235	220	200	A	A 320	295
12	235	230	250	280	250	220	215	A	A	A	230	205	205	A 245	A	A	240	A	220	250	220	240	240	270
13	265	265	240	255	245	250	A	A	A	A	A	A	A	A	215	245	A	230	260	A	A	240	270	270
14	305	270	280	285	255	235	A	A	A	A	A	A	A	A	A	A	A	A	A	A 270	255	260	285	280
15	280	295	315	280	280	270	250	A	235	230	A	A	A	A	A	A	A	230	215	240	240	275	300	305
16	295	255	285	240	250	240	270	A	250	A	230	A	230	A	A	A	245	A	A 250	A	270	310	275	255
17	265	250	275	285	250	265	235	235	205	A	A 255	Y	250	A	200	A	A	A	A 270	250	265	295	295	A 325
18	A 325	295	290	A 315	255	250	270	A	A	A	A	A	235	A	A	A	A	A	A	250	250	255	285	280
19	280	275	260	265	225	240	240	210	A	A	A	A	A	E A 265	A	A	A	250	230	235	225	245	285	E A 345
20	A	285	285	285	275	260	A	A	A	A	185	200	A	250	A	A	A	A	A	230	225	A 315	285	310
21	295	290	275	245	220	230	205	195	A	A	A	A	A	A	A	A	A	A	A	260	245	225	275	220
22	295	285	260	265	280	255	A	A 230	A	A	A	A	A	A	A	220	250	A 245	A	245	235	270	305	A
23	E A 300	280	245	240	250	245	250	205	A	A	A	255	Y	A	A	A	A	A	210	A 280	235	250	320	280
24	300	340	305	285	260	230	235	230	A	H 195	A	A	A	A	A	200	210	A	A	265	225	260	235	210
25	285	255	245	255	A	A	225	200	205	195	185	210	A	A	A	A	A	225	A	A	250	245	280	280
26	310	280	300	A	225	245	A	240	195	200	185	185	220	A 260	A	A	A	A	240	E A 295	230	245	300	300
27	280	275	230	230	290	250	265	240	A	A	A	A	A	A	A	A	A	240	230	230	230	265	295	A
28	330	300	240	280	285	A	A	235	205	A	A	A	A	A	A	A	245	E A 250	210	265	270	310	255	265
29	280	255	255	255	315	295	A	235	A	A	A	A	A	A	A	A	A	A	A	E A 285	A	A 295	A 295	260
30	240	A 300	280	290	260	270	A	A	220	205	A	A	A	A	A	A	220	A	235	250	260	270	250	260
31	270	230	255	315	280	255	230	230	A	A	A	A	200	A	A	A	A	210	230	240	215	250	295	315
	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	29	31	30	30	27	21	18	9	8	7	6	7	6	5	8	10	16	19	28	28	28	30	28
MED	286	280	275	272	258	245	240	230	220	210	210	202	230	252	215	210	232	230	235	244	248	262	285	280
U Q	302	300	290	285	280	260	252	235	242	228	230	210	250	A 260	228	222	245	242	A 245	262	262	290	300	310
L Q	268	268	255	255	250	240	228	205	205	198	185	185	205	245	205	200	215	222	225	238	228	245	275	265

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 H'E (KM) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	A	A	A	A	A	105	115	110	105	105	105	A 135	A	B				
2						A	A 100		A	A	100	A	110	110	A	A 135	A	A	115	A				
3						A	A	A	100	100	100	100	A	110	105	105	105	A	A	B				
4						A	A	A	105	105	110	A	A	A	A	A	A	A	A	B				
5						A	110	110	110	A	A	A	A	100	110	110	105	105	A	B				
6						A	A	A	A	100	A	A	A	A	A	A	A	A	A	B				
7						A	A	A	A	100	100	A	110	110	110	110	A	110	110	B				
8						A	A	A	A	A	A	A	A	120	105	A	110	A	A	B				
9						A	A	A 135	100	100	105	110	110	A	110	110	110	110	115	B				
10						A	110	105	A	105	105	110	A	105	105	A 130	A	A	A	B				
11						A	115	110	105	105	105	105	A	A	A	A	A	A	A	B				
12						A	A	110	110	110	E A 140	A	110	105	105	A	A	A	A	B				
13						A	A	110	105	105	A	A	A	A	105	110	105	A	A	B				
14						A	105	A	A	A	A	A	A	A	A	110	110	110	A	B				
15						A	A	A	A	A	A	115	110	110	110	110	110	A	A	B				
16						A	115	125	115	110	110	A	110	105	A	105	105	105	A	B				
17						A	115	110	110	A	110	110	110	110	110	110	105	A	A	B				
18						B	A	105	105	105	105	A	A	115	110	110	110	A	A	B				
19						A	110	110	110	110	A	A	A	A	A	A	A	A	A	B				
20						B	110	A	100	100	100	115	A	120	105	105	105	A	A	B				
21						B	A	A	A	A	A	A	A	A	A	A	A	A	A					
22						A	105	A	A	A	A	A	A	A	A	A	105	105	A					
23						B	110	A	110	A	A	A	A	A	105	A	A	A	A					
24						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
25						A	A	A 125	A	A	110	A	A	A	A	A	A	A	A					
26						A	A	A	A	100	A	A	105	105	110	110	110	A	A					
27						B	A	100	110	100	100	A	A	A	A	A	A	A	A					
28						A	110	A 120	105	105	A	A	A	105	A	A	105	A	A					
29						A	105	105	105	A	A	A	A	A	A	A 125	125	A	A					
30						S	A	100	A	A	A	105	105	A	A	A	A	A	A					
31						A	A	A	A	A	A	A	A	A	A	A	105	110	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							12	16	16	16	14	9	10	15	15	16	17	8	3					
MED							110	110	105	105	105	110	110	110	105	110	105	110	115					
U Q							112	A 115	110	105	110	112	110	110	110	A 110	110	110	115					
L Q							108	105	105	100	100	105	110	105	105	108	105	105	110					

JUL. 1994 H'E (KM)

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1994 H'ES (KM) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

H / D	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	105	105	100	115	105	110	100	100	100	G	G	125	110	115	120	110	105	105	105	105	110	115
2	100	100	105	115	115	105	110	110	105	110	110	110	G	G	110	110	110	105	100	115	115	110	B	B
3	105	130	B	100	95	125	110	110	110	125	105	100	100	155	125	150	110	115	100	95	95	95	95	110
4	90	110	95	100	95	100	115	110	135	110	115	105	100	100	100	100	95	100	120	B	105	110	110	100
5	100	100	120	120	115	130	125	120	110	100	100	100	105	125	125	115	110	110	110	100	105	100	105	100
6	100	95	100	90	120	100	110	110	105	100	105	100	100	125	100	120	100	95	95	125	95	95	95	100
7	100	100	95	95	105	95	105	105	105	120	110	115	110	110	G	115	115	120	115	115	110	110	100	100
8	110	95	125	95	100	115	110	110	125	115	100	100	100	120	115	115	115	125	115	115	125	115	100	110
9	135	110	115	115	105	115	115	110	110	110	110	105	110	115	120	G	125	125	115	105	110	105	105	105
10	100	95	95	115	125	115	110	110	115	115	110	110	110	110	110	100	100	95	95	95	125	100	100	100
11	95	95	90	90	95	155	G	115	115	105	110	110	100	100	100	105	100	100	100	100	105	105	105	100
12	100	90	95	95	95	105	105	115	110	100	100	150	130	120	110	110	100	110	115	115	120	110	120	125
13	95	95	105	95	115	110	110	110	105	105	105	105	105	105	110	125	115	115	110	110	110	105	105	105
14	100	100	90	90	90	90	110	105	95	105	105	105	100	120	120	115	115	110	110	100	100	110	110	120
15	105	105	105	110	B	135	125	110	110	130	125	125	125	125	120	110	110	110	105	110	100	105	100	95
16	100	130	95	B	125	135	125	125	125	120	130	110	G	115	110	135	150	115	110	110	120	110	105	100
17	105	105	100	95	95	95	135	120	120	105	115	145	130	120	G	115	110	105	100	125	100	95	95	100
18	95	95	95	95	115	135	120	110	110	105	105	110	110	125	120	120	115	110	105	115	100	95	95	100
19	95	110	95	105	B	110	110	115	110	110	100	105	100	105	105	100	100	100	95	100	100	125	100	105
20	105	105	105	100	100	125	110	105	100	100	G	165	130	135	120	115	110	110	105	105	105	100	100	100
21	100	95	90	95	110	100	115	105	100	100	110	100	105	100	105	100	125	115	105	105	100	100	100	105
22	100	115	95	90	100	100	105	105	100	100	100	100	100	100	100	100	130	115	105	110	100	100	100	100
23	100	100	95	95	100	110	115	115	110	110	100	105	110	110	120	105	100	100	125	105	95	100	100	105
24	100	100	95	115	105	110	105	110	105	100	110	105	105	95	105	105	120	110	130	110	100	105	105	100
25	100	100	100	100	100	100	105	100	105	100	G	125	95	115	120	100	95	115	105	110	105	110	105	110
26	100	100	100	100	105	105	100	105	105	110	105	110	155	135	115	115	115	110	110	105	105	105	110	100
27	100	100	100	95	95	100	115	115	110	110	105	105	110	100	100	130	100	100	125	100	100	115	110	105
28	105	105	110	100	105	110	115	110	120	105	105	120	110	105	100	100	115	115	95	95	105	100	115	100
29	95	95	105	B	105	115	110	110	110	100	100	100	100	100	120	120	115	110	110	110	105	110	100	100
30	130	90	90	100	100	110	105	105	120	110	110	110	115	110	115	105	100	100	100	100	100	95	95	100
31	95	B	95	105	100	100	100	100	100	110	100	100	100	100	135	120	120	115	115	105	100	B	100	100
	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	30	30	29	29	31	30	31	31	31	29	30	28	30	29	30	31	31	31	30	31	30	30	30
MED	100	100	98	100	100	110	110	110	110	105	105	105	105	112	110	115	110	110	105	105	105	105	100	100
U Q	105	105	105	105	112	115	115	115	115	110	110	110	110	125	120	120	115	115	115	110	110	110	105	105
L Q	100	95	95	95	98	100	105	105	105	100	100	100	100	100	105	105	100	100	100	100	100	100	100	100

JUL. 1994 H'ES (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

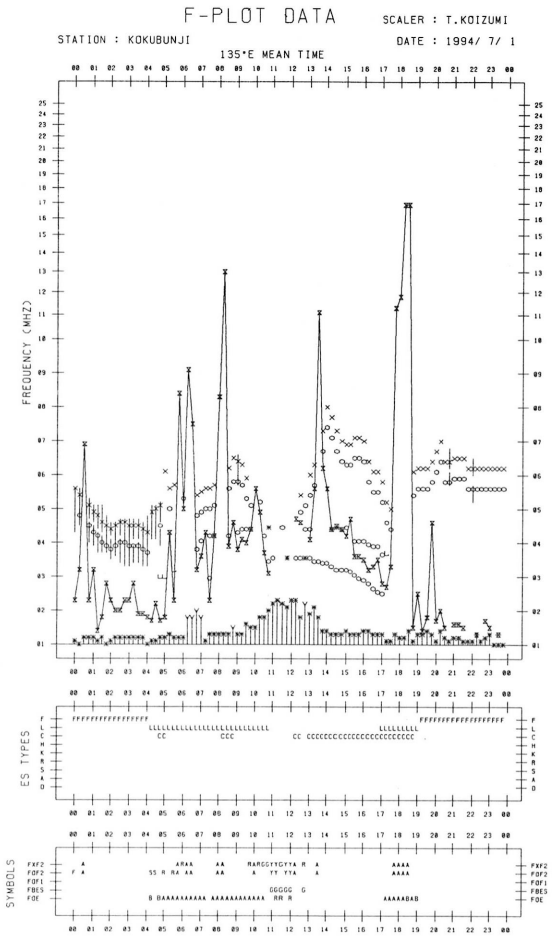
JUL. 1994 TYPES OF ES 135°E MEAN TIME (G.M.T. + 9H)

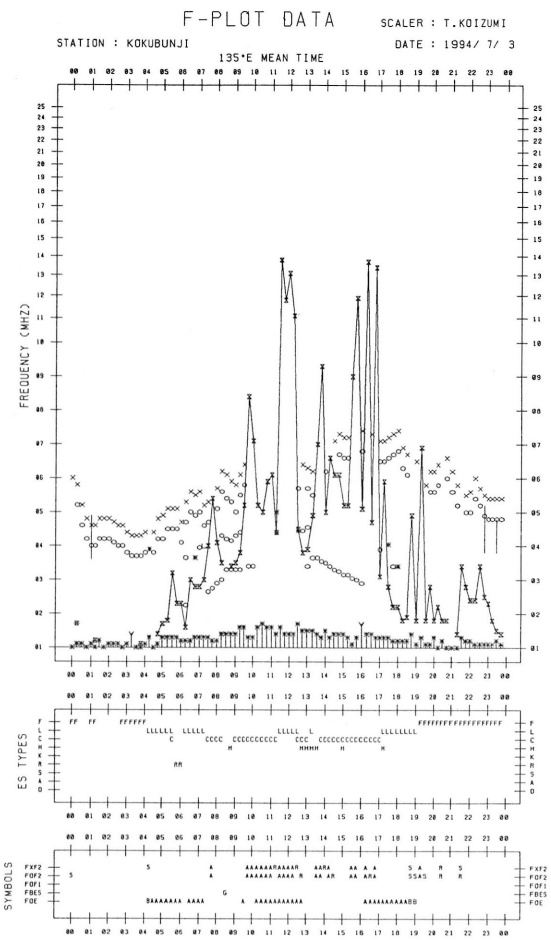
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

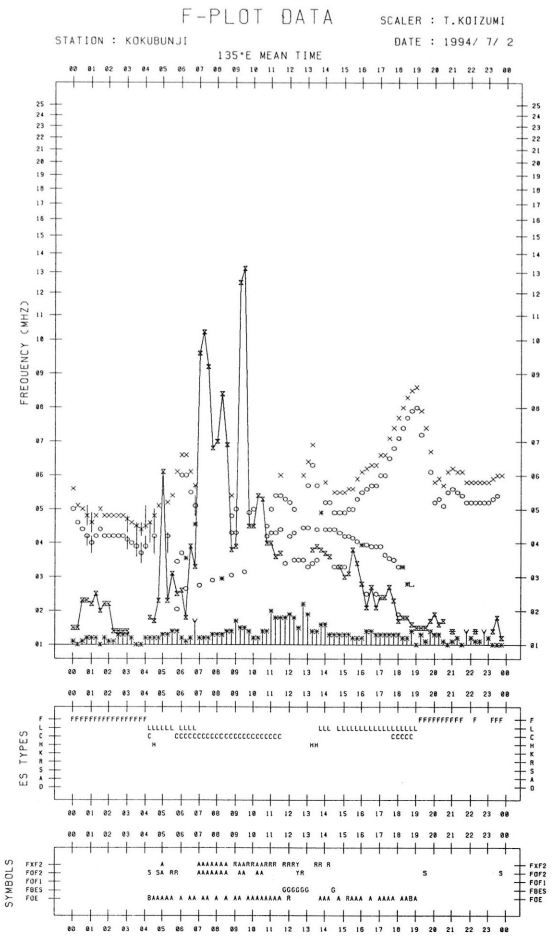
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 3	F 5	F 4	F 5	F 2	CL 22	L 3	L 2	L 3	L 2	L 1			C 1	C 2	C 2	C 2	LC 21	LC 42	L 4	F 4	F 3	F 2	FFF 22
2	FF 21	FF 52	FF 42	F 2	FF 21	L 4	LC 31	C 3	C 2	C 2	C 2	C 1			L 1	L 1	L 2	L 2	LC 32	L 2	F 3	F 2		
3	F 2	F 1		F 1	FF 11	L 2	R 1	L 3	C 2	C 2	C 2	C 2	L 2	HC 11	C 2	HC 12	C 3	C 2	L 3	L 4	FFF 52	F 2	F 5	FFF 33
4	F 2	FF 12	FF 22	FF 21	F 2	LC 11	C 2	C 2	H 1	C 1	C 1	L 2	L 2	L 2	L 2	L 2	L 2	L 2	CL 12		F 1	F 4	F 4	FF 21
5	F 4	FF 42	FF 32	FF 22	F 1	C 2	C 1	C 2	C 2	C 3	L 3	L 2	L 1	C 2	C 2	C 2	C 2	C 4	L 2	L 4	F 4	F 2	F 5	F 4
6	F 3	FF 31	F 4	F 2	F 2	L 1	C 2	C 3	L 3	C 3	L 1	L 1	L 2	CL 12	LC 21	CL 13	L 3	LC 21	LL 22	CL 24	F 3	FF 31	F 2	FF 22
7	F 4	FF 42	FF 32	FF 22	FF 12	L 3	L 3	L 3	L 3	C 1	C 2	C 1	C 2	C 2		C 1	C 2	C 1	C 2	LC 21	F 2	FFF 21	F 3	F 4
8	FF 22	F 3	FF 22	F 2	F 1	L 2	L 3	L 2	HL 12	CL 12	L 2	LC 21	L 2	C 1	C 2	C 1	C 1	CL 12	CL 21	CL 12	FF 22	FF 21	F 2	FF 22
9	FFF 22	FF 21	FF 11	FF 12	F 2	L 2	C 2	L 2	C 2	C 2	C 2	C 2	C 1	CL 11	C 1		C 2	C 2	C 2	C 5	F 5	F 3	F 4	F 5
10	FF 32	F 3	FF 22	FF 22	FF 11	CL 31	C 4	C 2	C 1	C 1	C 2	C 2	C 2	L 3	L 2	L 2	L 3	L 3	L 4	L 4	FF 11	F 2	F 2	F 1
11	F 2	F 2	F 3	F 2	FF 11	HCL 11		C 1	C 1	C 2	C 2	C 2	L 3	L 2	L 3	L 3	L 2	L 3	L 4	L 5	F 3	FF 35	FF 24	FF 42
12	F 3	FF 31	FF 21	F 2	FF 11	L 2	C 2	C 2	C 2	C 3	L 2	HL 11	C 1	C 1	C 2	CL 21	LC 21	CL 23	CLH 23	CLH 23	FFF 13	FF 43	F 1	FF 12
13	F 2	FF 21	FF 11	F 2	F 1	C 2	C 3	C 2	C 3	C 3	L 2	L 2	L 2	L 2	L 1	C 1	C 2	C 2	C 3	L 5	F 4	F 5	F 5	F 5
14	F 6	F 4	FF 42	FF 42	FF 41	LC 31	CL 31	C 3	L 4	L 2	L 2	L 2	L 3	C 2	CL 21	C 2	C 3	C 4	C 3	C 5	F 4	F 3	F 4	FF 24
15	F 5	F 5	F 4	F 2		L 1	C 1	LC 21	L 2	CL 11	CL 11	CL 11	C 1	C 1	C 1	C 2	C 2	L 2	L 3	L 2	F 3	FF 23	F 2	F 2
16	F 3	FF 22	F 1		F 1	C 1	C 2	CL 21	CL 21	CL 11	C 1	C 2		C 1	C 2	C 2	H 1	C 2	C 3	C 3	F 1	F 5	F 2	F 3
17	F 2	FF 11	F 4	FFF 32	FF 32	LC 32	CL 11	C 1	C 1	C 1	L 1	H 1	C 1	C 1		C 2	C 2	C 2	L 2	CL 22	F 2	F 2	F 3	F 4
18	FR 31	FF 42	FF 42	F 3	FF 21	C 1	C 2	C 2	C 2	C 2	C 2	C 1	L 1	C 1	C 1	C 2	C 3	C 3	L 4	CL 23	F 7	F 4	F 4	FF 22
19	F 2	F 1	F 2	F 1		C 1	C 2	C 2	C 3	C 1	L 3	L 2	L 2	L 2	L 1	L 2	L 2	L 2	L 3	L 2	F 1	FF 22	F 1	F 6
20	F 5	FF 42	F 6	F 4	F 3	C 2	C 4	C 3	L 3	C 3		H 1	C 1	HL 11	C 1	C 3	C 2	C 2	L 3	LC 31	F 5	F 5	F 4	FF 32
21	FF 32	FF 32	FF 21	F 1	FF 11	L 1	CL 21	L 1	L 3	L 3	CL 12	L 2	L 2	L 2	L 2	L 2	CL 12	CL 32	C 5	F 4	F 4	F 3	F 4	F 2
22	F 2	FF 12	FF 31	FF 22	FF 22	LC 21	C 4	L 3	L 3	L 3	L 2	L 2	L 2	L 2	L 2	L 2	C 1	C 2	C 4	FF 33	F 4	F 4	FF 32	FF 42
23	F 2	FF 22	F 1	F 2	F 2	L 1	C 2	CL 21	C 2	CL 21	L 3	L 1	L 1	L 2	CL 12	L 1	L 3	L 3	CL 12	F 5	FF 31	FF 24	FF 42	FF 62
24	F 4	F 3	F 5	FF 24	FF 22	C 1	C 4	L 2	C 3	L 1	L 1	L 2	L 1	L 2	L 2	LC 11	CL 21	C 3	CL 24	FF 32	F 2	F 2	F 2	F 2
25	F 3	FF 21	FF 42	FF 42	F 5	L 5	L 3	L 2	C 2	L 1		CL 11	L 2	CL 22	CL 21	L 3	L 3	CL 24	CL 34	FF 42	FF 52	FF 52	F 4	FF 42
26	FF 42	F 4	F 3	F 3	F 2	L 3	L 3	L 2	L 2	C 2	L 1	L 1	H 1	C 1	C 2	C 2	C 3	C 3	C 3	F 3	F 3	F 3	F 5	F 6
27	F 3	F 2	F 2	F 3	F 2	L 2	L 2	C 2	CL 32	C 2	C 1	C 2	C 1	C 2	L 2	CL 12	LC 21	L 3	CL 14	L 4	F 1	FF 12	FF 22	F 4
28	FF 41	F 4	FF 13	F 3	F 2	C 1	CH 52	L 1	C 1	C 3	L 2	CL 22	L 1	L 2	L 2	L 2	C 2	CL 22	L 2	F 2	FF 23	F 2	FF 23	FF 23
29	F 2	FF 22	F 1		F 1	C 4	C 4	CL 21	C 4	L 3	L 2	L 2	L 2	L 1	CL 12	CL 22	CL 32	C 3	C 5	F 4	F 4	FFF 24	F 4	FF 42
30	FF 22	FF 32	F 2	F 2	F 3	L 1	L 3	C 2	CL 11	C 1	L 1	L 1	C 1	C 1	CL 12	L 2	L 3	L 3	L 3	FF 32	F 3	F 3	FF 31	F 1
31	F 2		F 1	FF 21	FF 41	LC 31	LC 21	LC 21	L 2	LL 22	L 2	L 2	L 1	L 1	CL 12	CL 21	C 2	C 1	C 2	F 1	F 1		F 3	F 4
	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																								
U Q																								
L Q																								

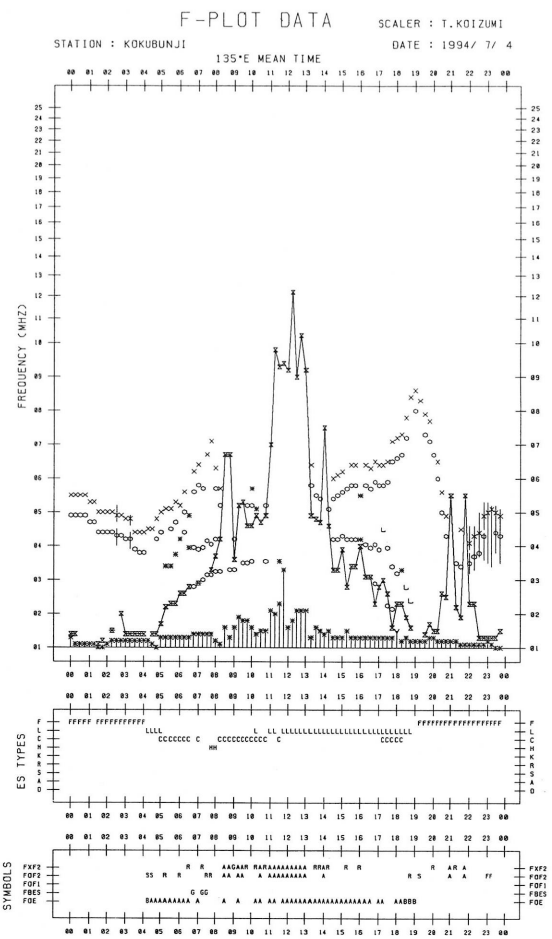
f-PLOTS OF IONOSPHERIC DATA

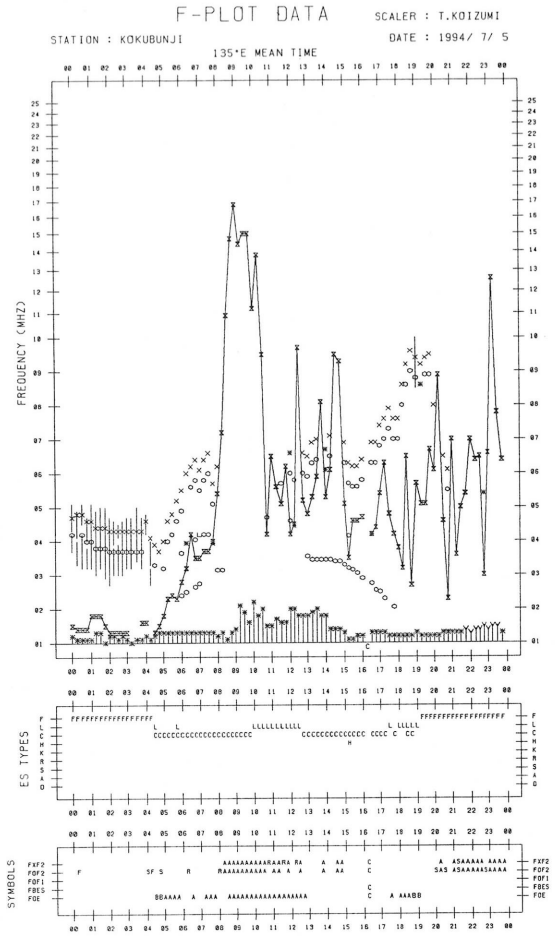
KEY OF F-PLOT	
I	SPREAD
○	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑, Y	FMIN
∧	GREATER THAN
∨	LESS THAN

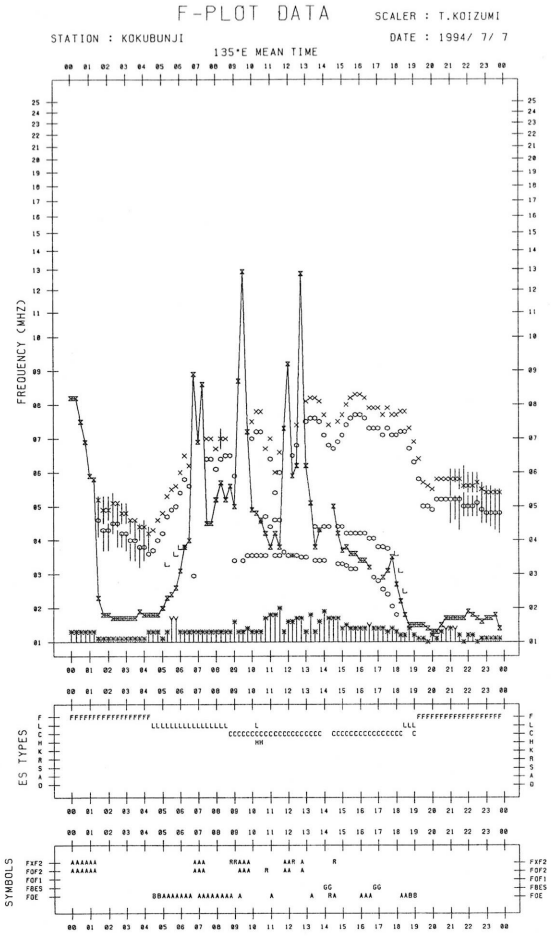

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/ 1
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/ 3
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/ 2
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/ 4
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/ 5
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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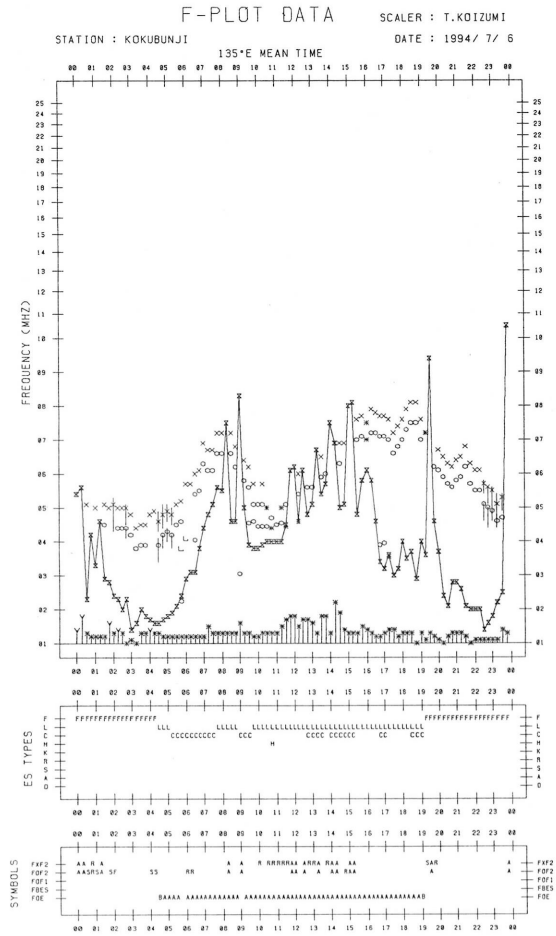
STATION : KOKUBUNJI
DATE : 1994/ 7/ 7
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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STATION : KOKUBUNJI
DATE : 1994/ 7/ 6
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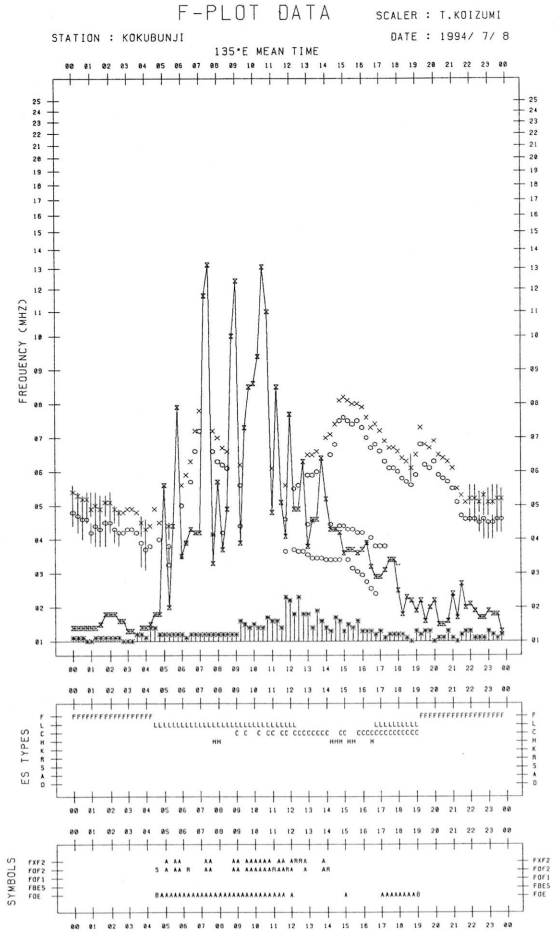
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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DATE : 1994/ 7/ 8
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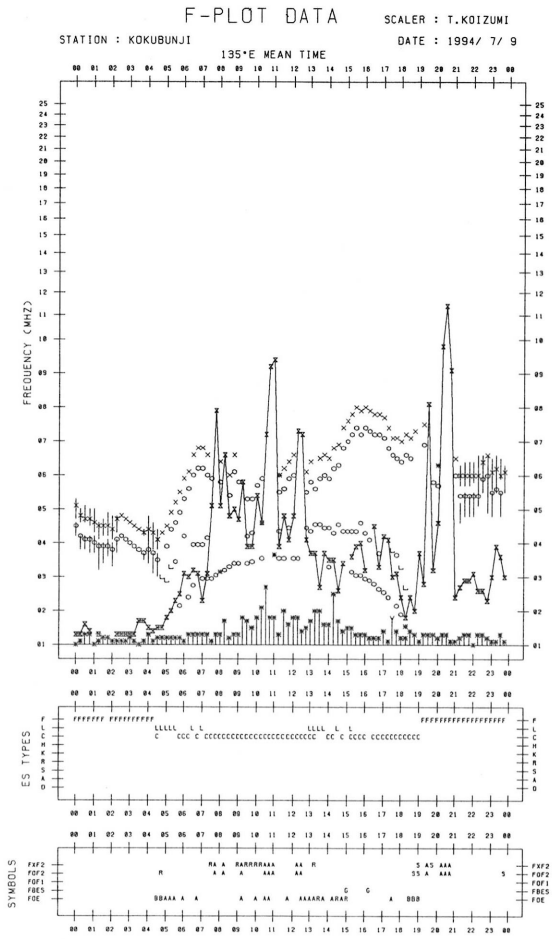
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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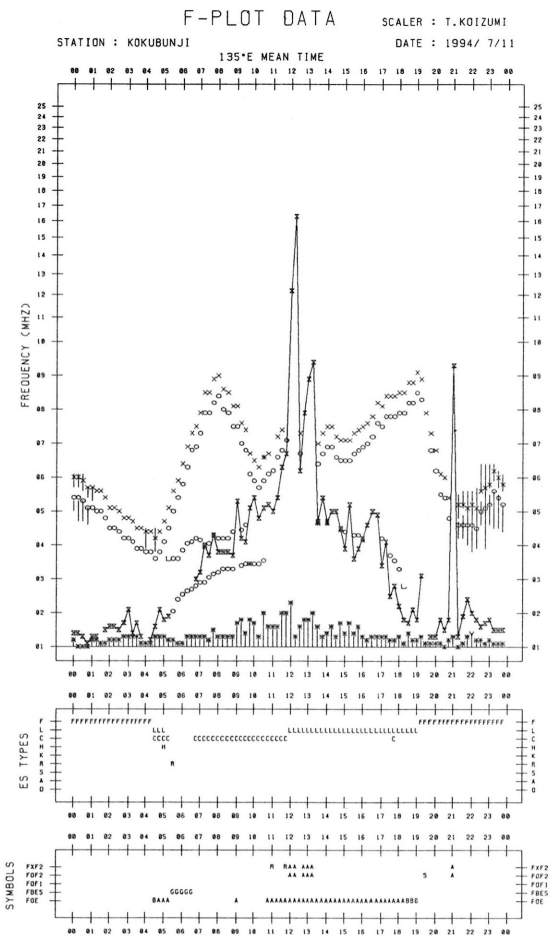
DATE : 1994/ 7/ 9
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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STATION : KOKUBUNJI
DATE : 1994/ 7/11
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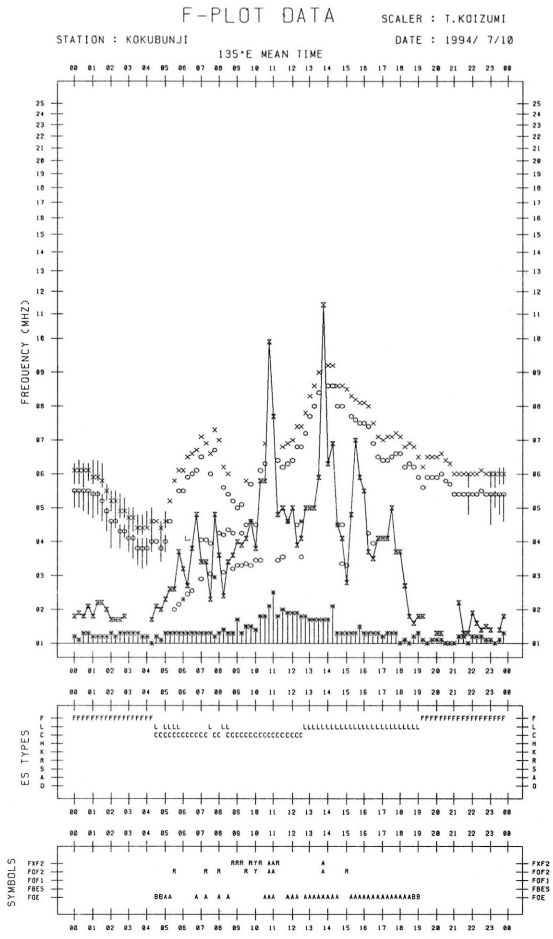
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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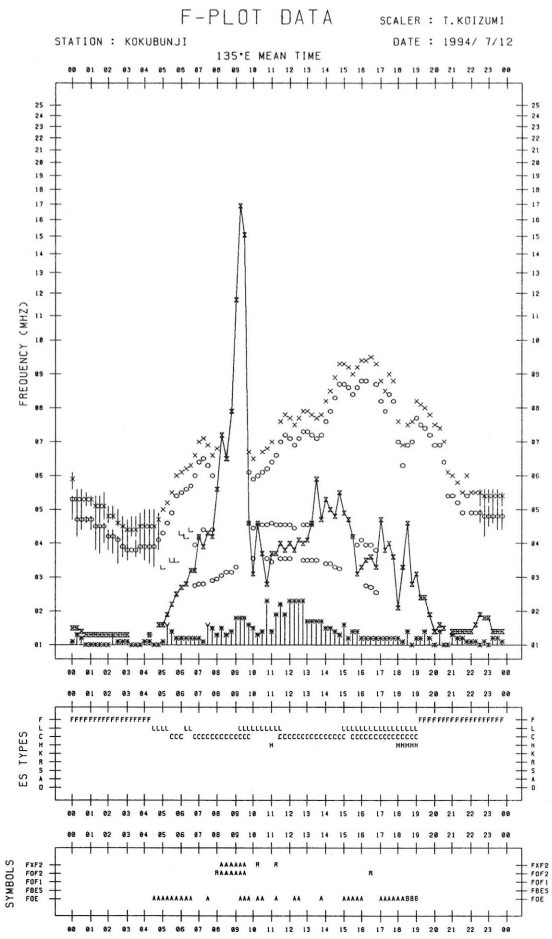
STATION : KOKUBUNJI
DATE : 1994/ 7/10
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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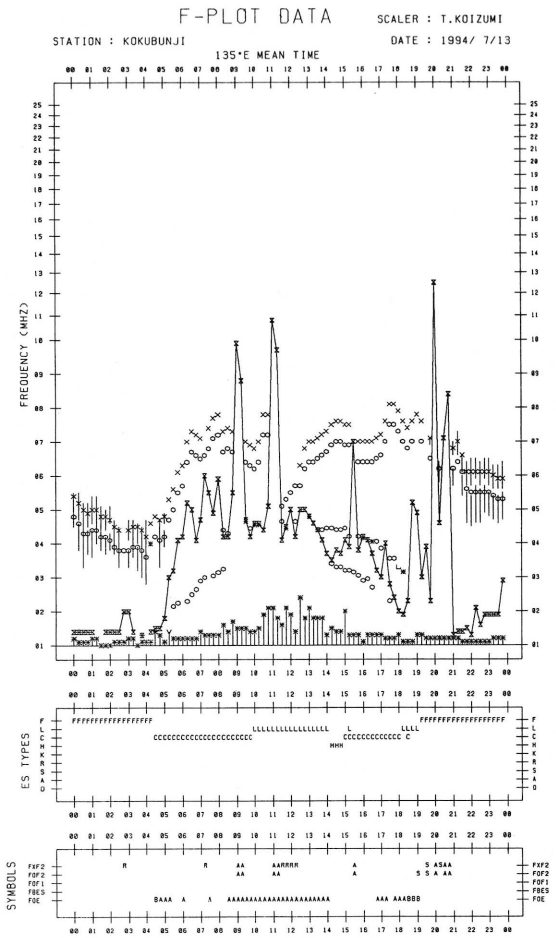
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/12
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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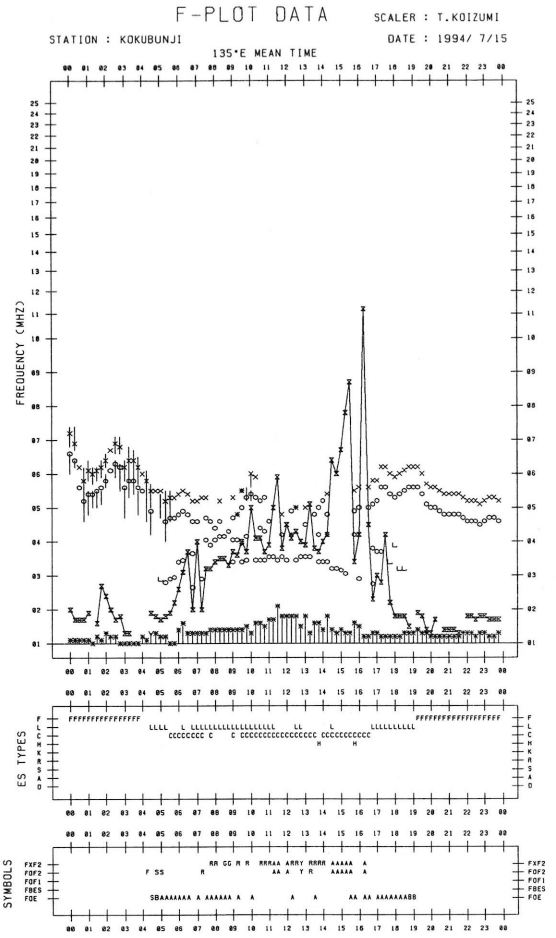
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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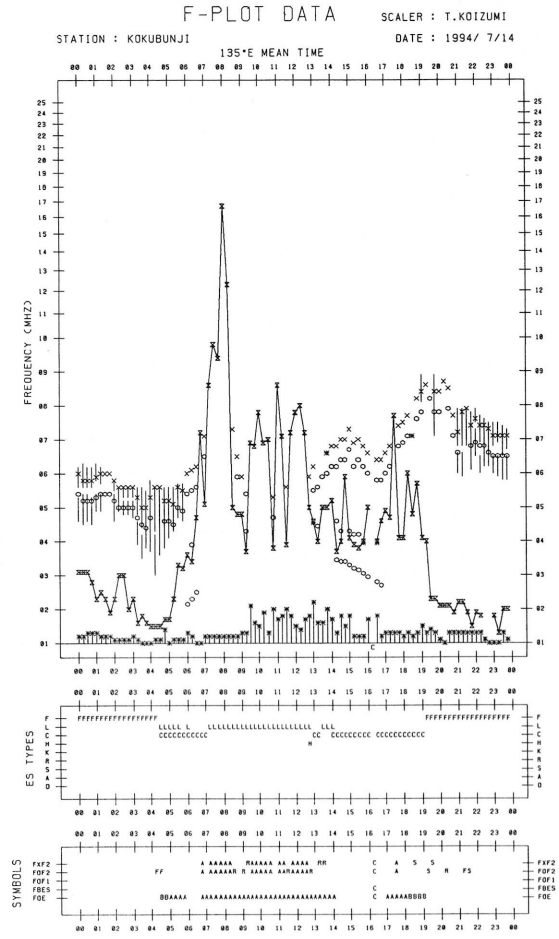
STATION : KOKUBUNJI
DATE : 1994/ 7/15
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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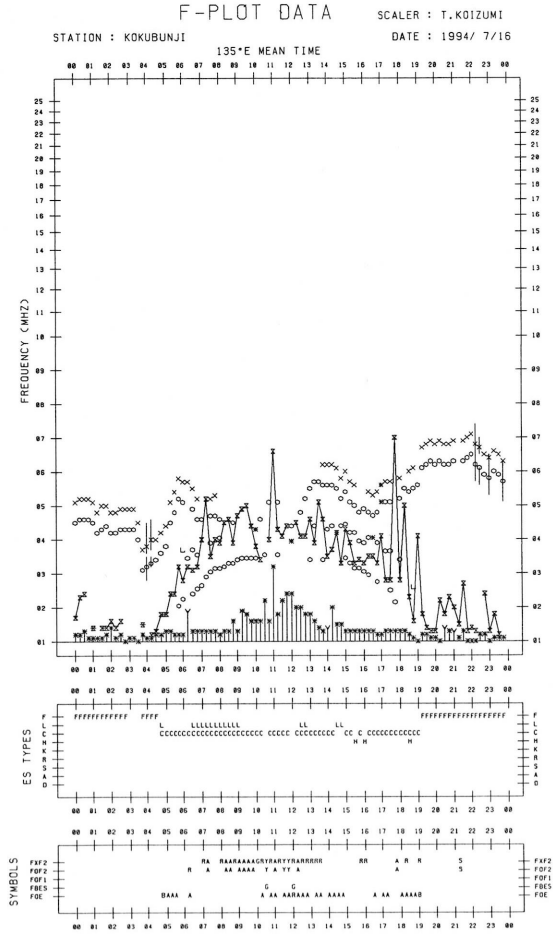
STATION : KOKUBUNJI
DATE : 1994/ 7/14
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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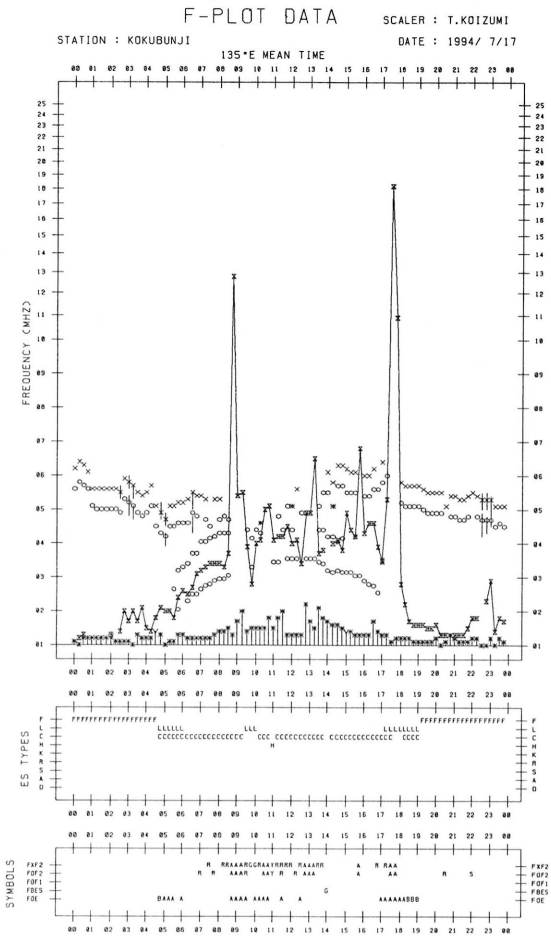
STATION : KOKUBUNJI
DATE : 1994/ 7/16
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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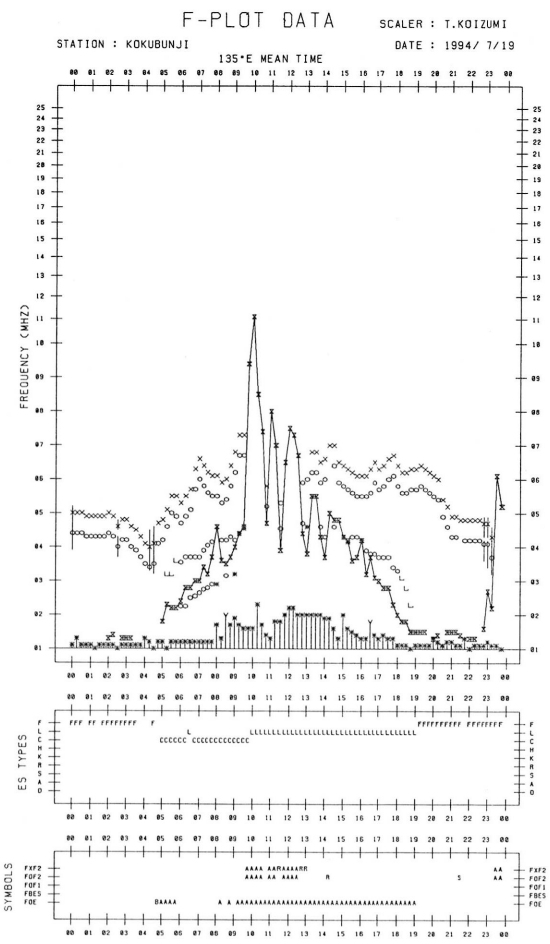
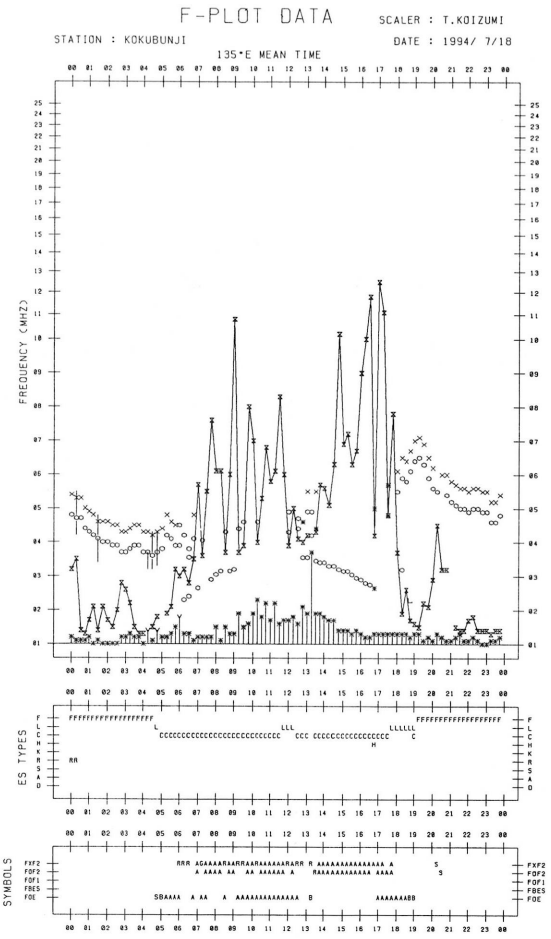
STATION : KOKUBUNJI
DATE : 1994/ 7/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
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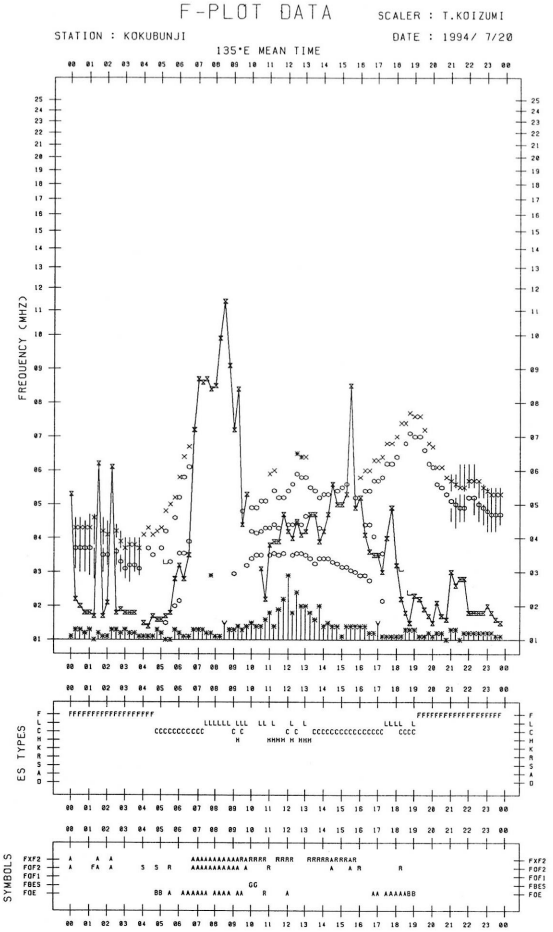
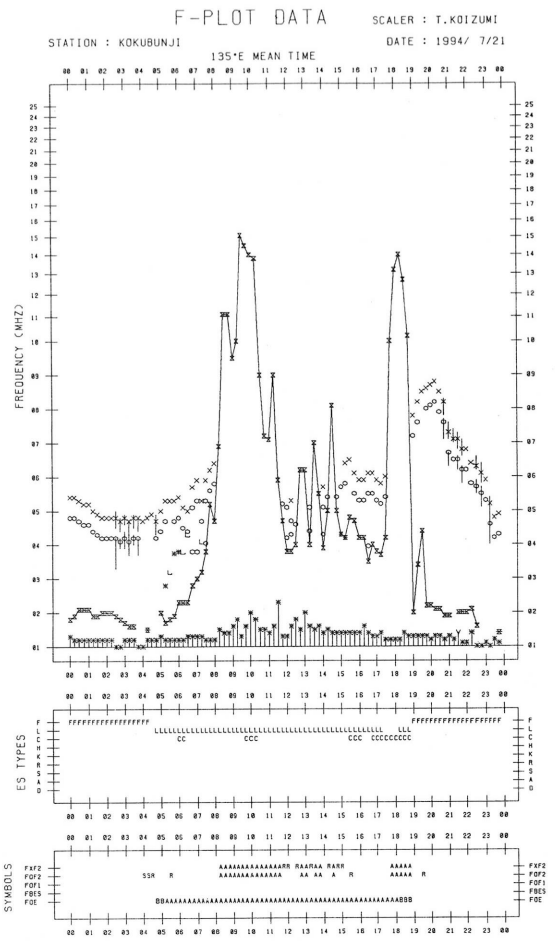
STATION : KOKUBUNJI
DATE : 1994/ 7/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/20
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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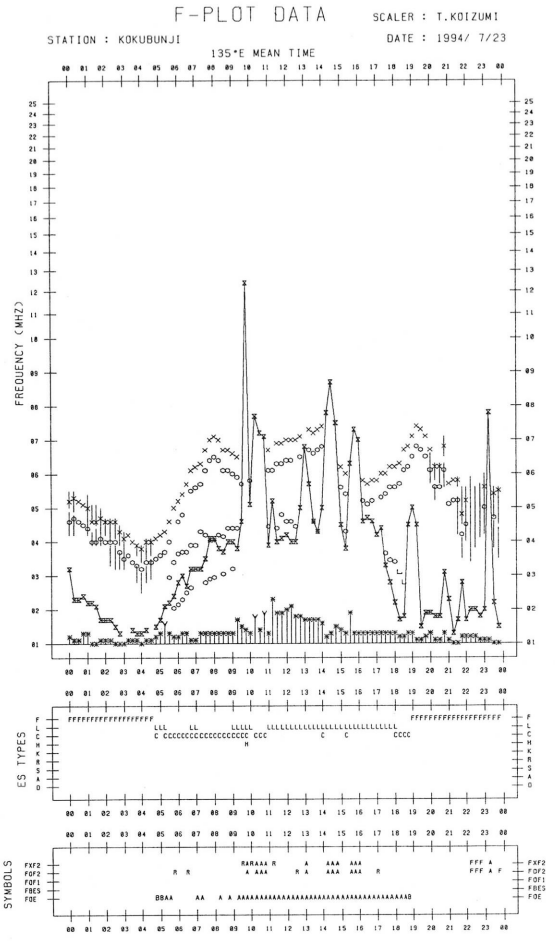
STATION : KOKUBUNJI
DATE : 1994/ 7/21
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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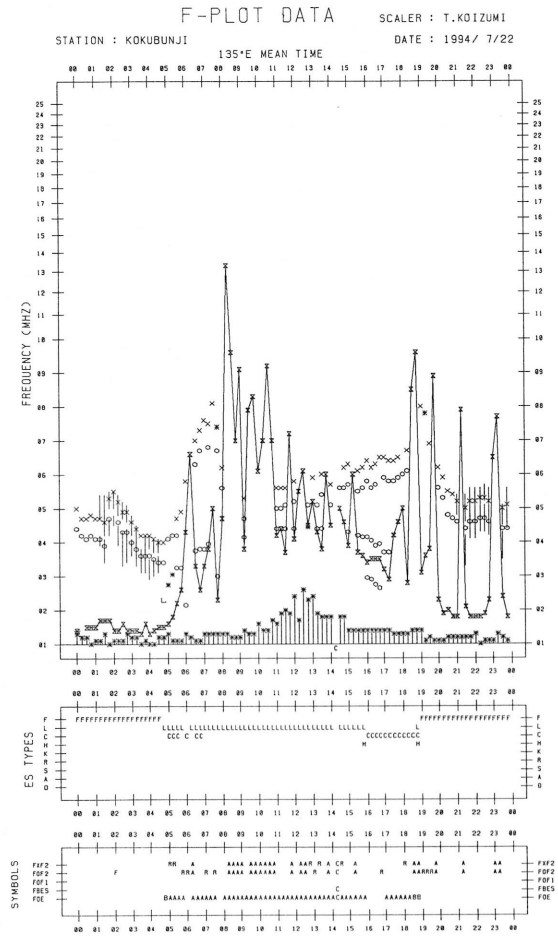
STATION : KOKUBUNJI
DATE : 1994/ 7/23
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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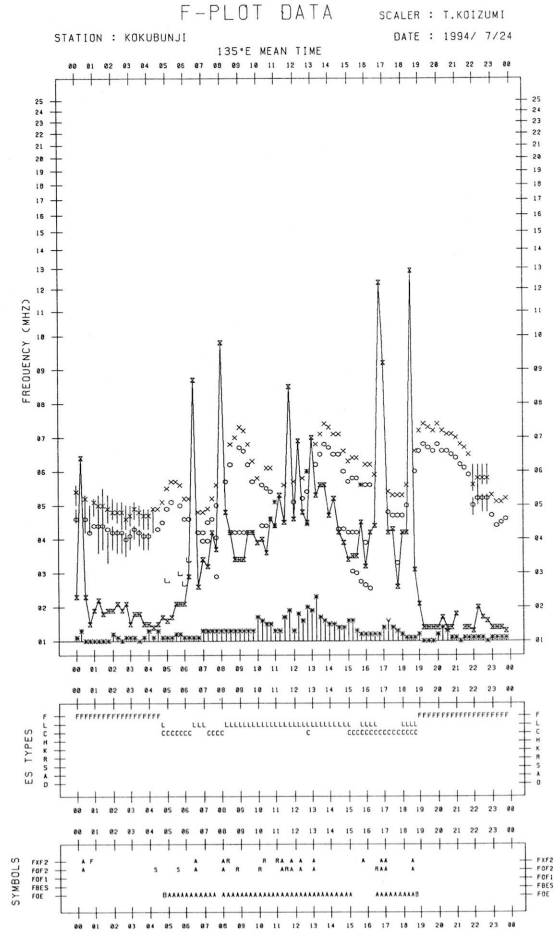
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/22
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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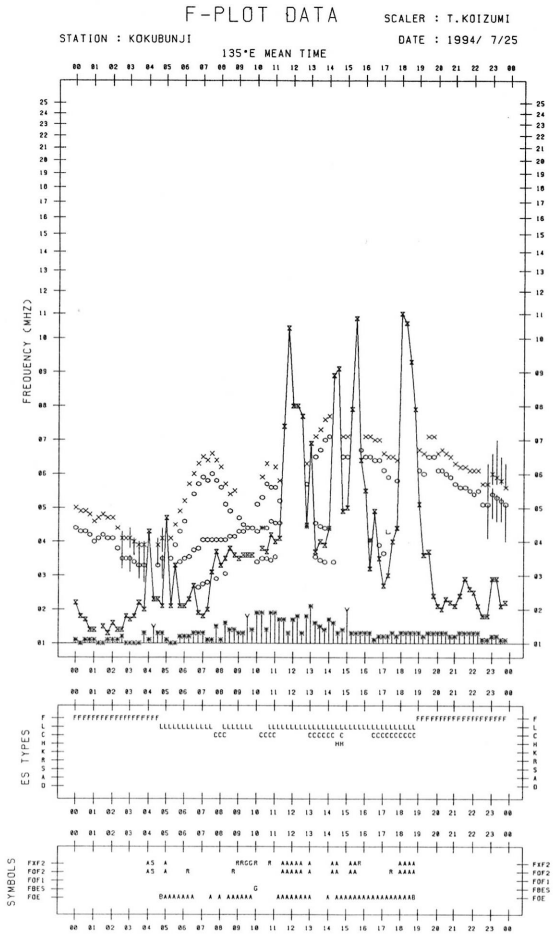
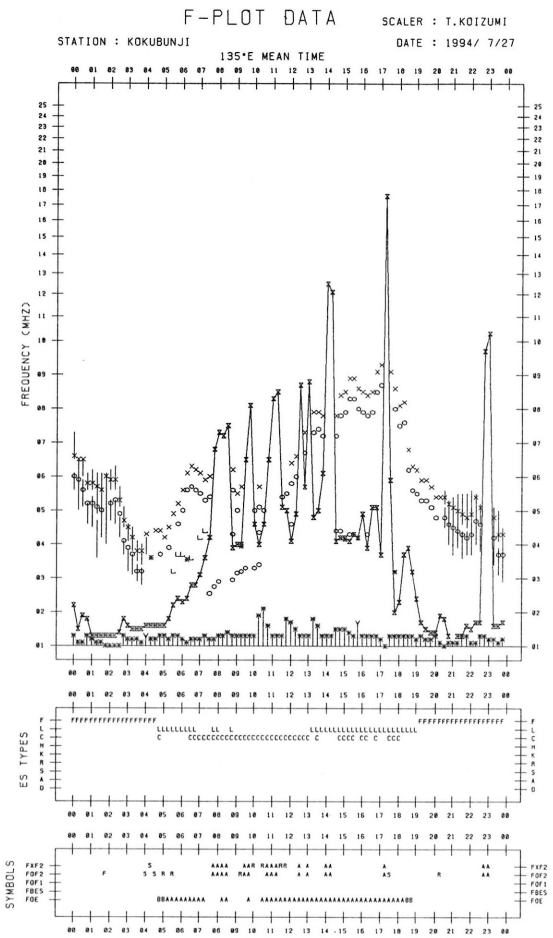
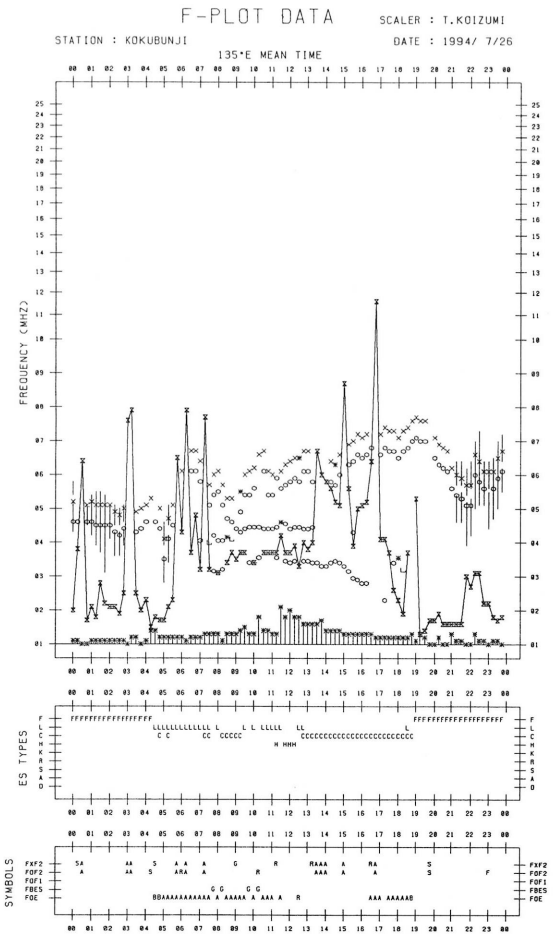
STATION : KOKUBUNJI
DATE : 1994/ 7/24
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/25
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/27
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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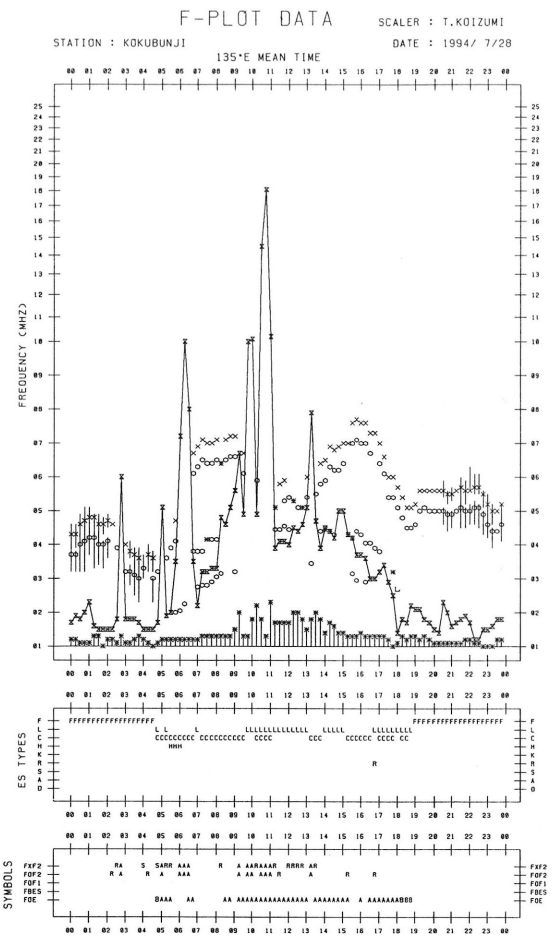
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/26
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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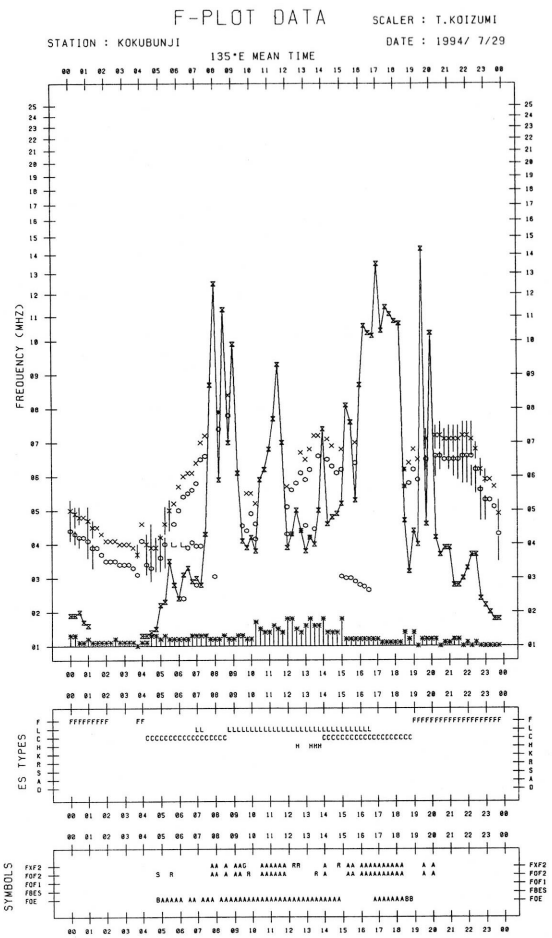
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/28
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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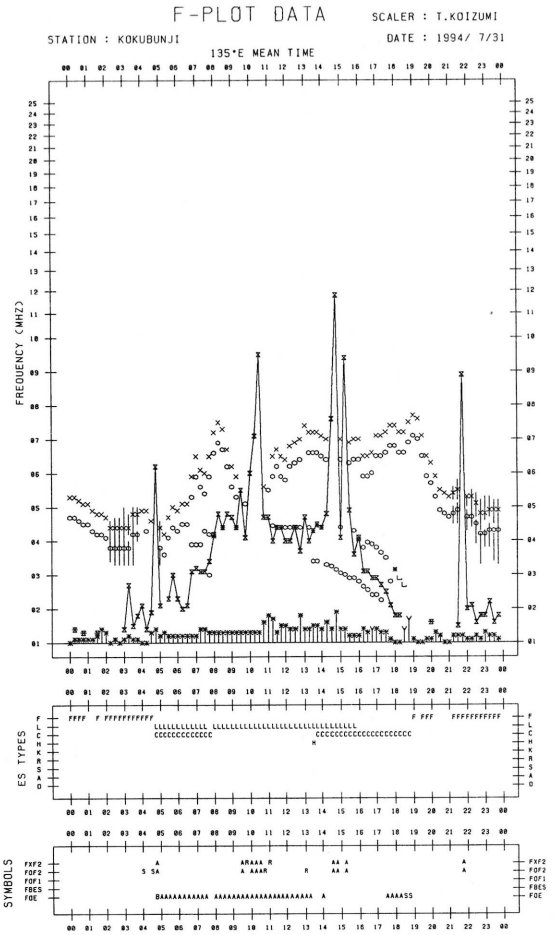
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 7/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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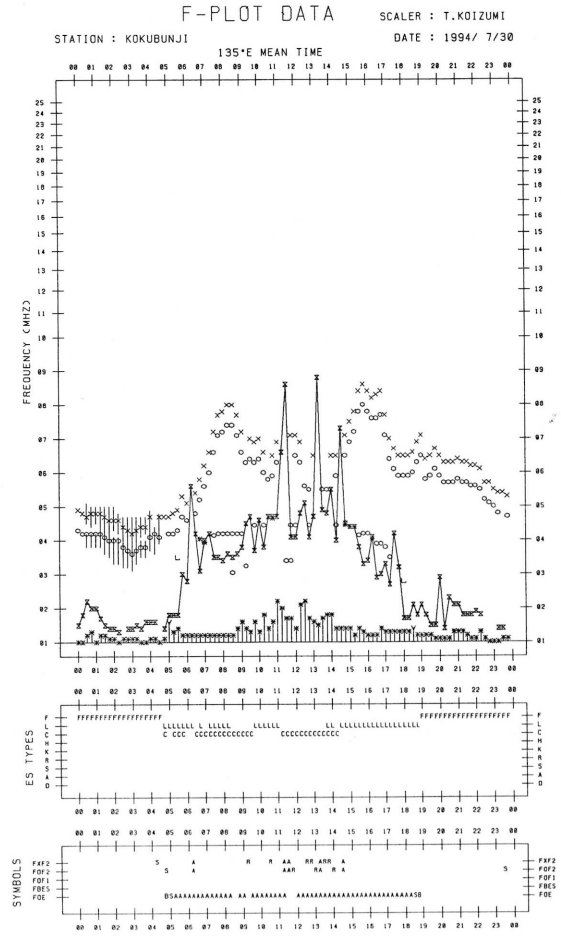
STATION : KOKUBUNJI
DATE : 1994/ 7/31
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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DATE : 1994/ 7/30
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

200 MHz

Not available until system improvement is completed.

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso July 1994

Single-frequency total flux observations at 500 MHz					
Flux density: 10^{-22} Wm^{-2}Hz^{-1}					
UT	00-03	03-06	06-09	21-24	Day
Date					
1	27	27	27	28	27
2	28	28	28	27	28
3	28	28	29	28	28
4	28	28	28	29	28
5	27	27	28	28	28
6	28	28	28	28	28
7	29	29	29	31	29
8	31	31	31	29	31
9	29	29	29	29	29
10	29	29	28	29	29
11	28	28	28	28	28
12	28	28	28	28	28
13	27	26	26	27	27
14	27	26	26	28	27
15	27	27	27	27	27
16	26	26	26	27	26
17	27	(26)	-	26	27
18	25	(26)	-	26	26
19	26	(26)	-	26	26
20	26	-	-	26	26
21	25	-	-	27	26
22	26	-	-	26	26
23	26	26	26	26	26
24	25	25	25	25	25
25	25	25	25	25	25
26	25	25	25	25	25
27	25	25	25	26	25
28	26	26	26	26	26
29	25	27	27	27	26
30	27	27	27	26	27
31	26	26	26	26	26

Note: No observations during the following period.

17th 0336 - 0950 18th 0333 - 0950 19th 0330 - 0950
20th 0326 - 0950 21st 0322 - 0950 22nd 0318 - 0950

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso July 1994

Single-frequency observations

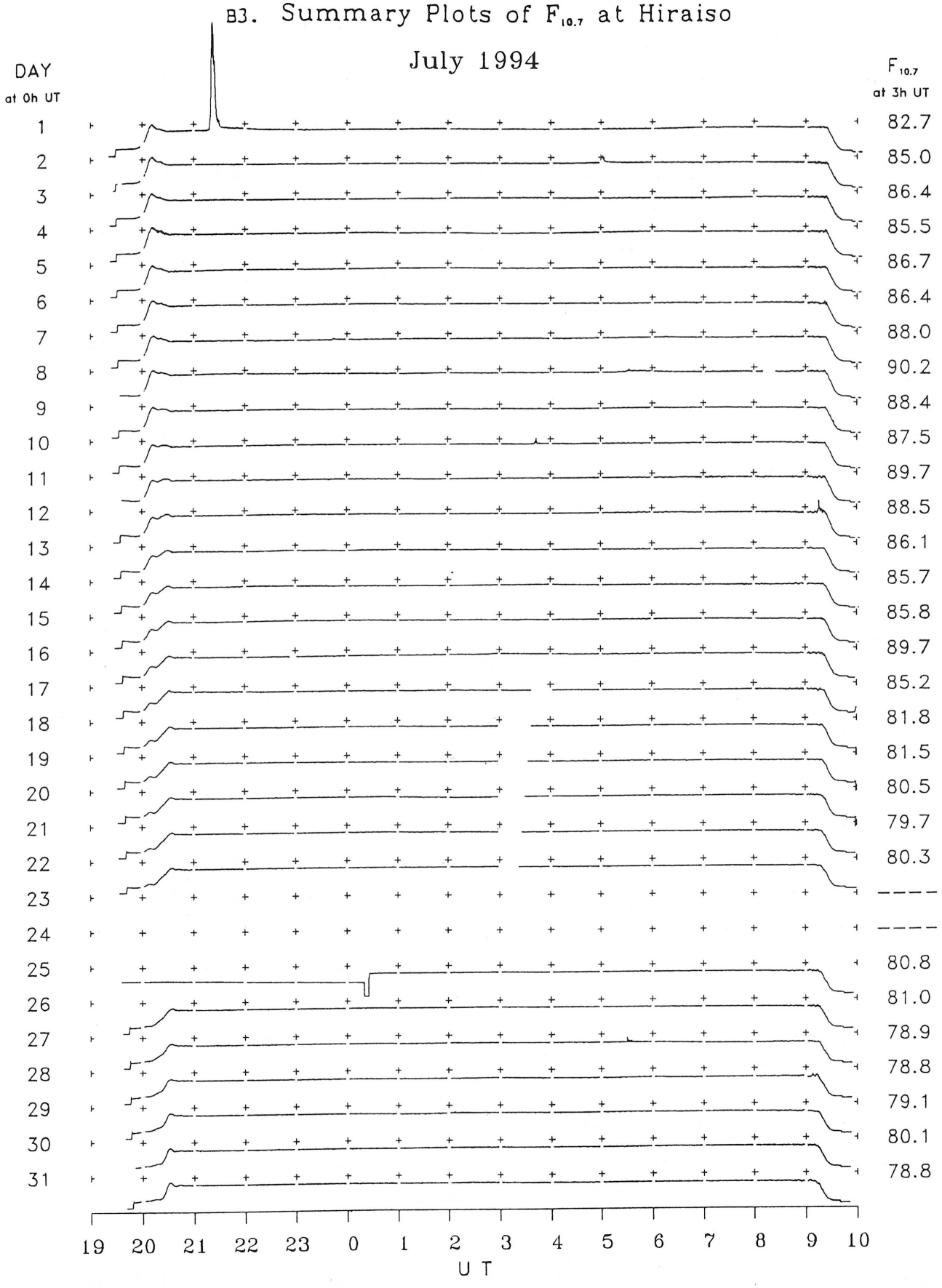
Normal observing period: 2020 - 0930 U.T. (sunrise to sunset)

JULY 1994	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
2	2800	45 C	0500.0	0502.2	6.5	27	7	0
5	500	42 SER	2102.2	2104.5	2.5	6	-	0
6	500	42 SER	0440.4	0443.8	4.0	7	-	0
	500	41 F	2341.7	2343.5	9.0	8	-	0
	2800	1 S	2342.2	2343.2	2.0	6	3	WL
7	500	8 S	0244.7	0245.0	0.4	9	-	WR
	500	42 SER	0820.3	0821.8	1.5	5	-	0
8	500	41 F	0149.2	0150.1	2.0	6	-	0
	2800	21 GRF	0517.6	0539.0	37	4	2	0
	2800	1 S	0532.5	0532.5	1.0	8	5	WR
9	500	42 SER	0028.4	0029.6	2.0	5	-	0
10	2800	45 C	0340.5	0342.8	3.0	18	8	0
12	2800	46 C	0915.5	0915.9	3.0	35	19	0
	500	8 S	2243.6	2243.6	0.4	4	-	0
13	500	1 S	0017.8	0018.4	1.5	5	3	WR
14	500	8 S	0042.9	0043.0	0.2	9	-	0
16	2800	1 S	0142.3	0143.4	1.0	5	3	0
19	500	8 S	0249.9	0250.7	0.5	1	-	0
23	500	42 SER	0114.0	0117.6	4.0	4	-	0

B. Solar Radio Emission

B3. Summary Plots of $F_{10.7}$ at Hiraiso

July 1994



Note: A vertical grid space corresponds to a 100 sfu.
Elevation angle range ≧ 6°.

C. RADIO PROPAGATION

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

JUL 1994 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

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

C. RADIO PROPAGATION

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

JUL 1994 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 46M	01H 46M	02H 46M	03H 46M	04H 46M	05H 46M	06H 46M	07H 46M	08H 46M	09H 46M	10H 46M	11H 46M	12H 46M	13H 46M	14H 46M	15H 46M	16H 46M	17H 46M	18H 46M	19H 46M	20H 46M	21H 46M	22H 46M	23H 46M
1	-12	-5	-6	-3	0	4	12	11	1	-18	9	11	10	ES -27	ES -27	ES -27	ES -27	-18	ES -27	-4	0	0	-5	-9
2	-9	-18	-2	-4	4	0	8	10	18	15	17	11	4	2	18	ES -27	ES -27	ES -27	ES -27	0	-5	-9	-12	-5
3	-5	3	-1	0	6	13	14	15	11	5	7	4	-1	7	ES -27	ES -27	ES -27	-1	-6	-3	-4	0	-3	-5
4	-9	-9	-1	4	9	9	17	10	15	9	16	9	-6	-8	ES -27	ES -27	ES -27	ES -27	-3	2	-12	-7	-12	-7
5	-6	-9	-4	16	16	9	10	16	19	17	9	14	5	-6	ES -27	ES -27	4	0	-6	-3	-5	-5	4	4
6	-3	-12	0	9	9	14	19	14	14	9	ES -27	4	0	-12	ES -27	4	-12	-5	7	11	-12	1	-1	4
7	-6	-10	-6	4	14	14	14	19	19	14	4	4	ES -27	ES -27	ES -27	ES -27	9	-5	-3	-3	-3	1	1	-3
8	-12	-6	-6	7	-1	10	12	10	17	9	2	ES -27	7	11	-9	ES -27	ES -27	ES -27	-6	-4	1	-1	4	-4
9	-4	-1	-5	-1	9	4	17	15	14	14	10	9	4	-4	-18	-6	ES -27	4	ES -27	1	0	-4	-6	-12
10	-12	-6	1	-1	4	11	14	14	19	6	6	7	7	10	ES -27	-9	-12	-6	ES -27	1	-3	1	4	4
11	-3	C	C	C	C	C	C	C	C	19	4	-18	-6	9	C	C	C	C	-3	-1	4	1	-1	-6
12	-9	-5	1	-1	4	9	9	11	11	14	14	9	-1	-9	-6	-12	4	4	4	4	1	-3	-1	-2
13	4	-1	-9	4	9	9	16	17	19	16	10	4	7	4	-12	-12	-1	-12	-6	9	6	4	-12	-1
14	-3	-12	-6	1	11	9	14	14	19	17	17	9	9	4	4	ES -27	ES -27	ES -27	ES -27	ES -27	-18	-12	ES -27	-12
15	-12	-12	-6	-3	-6	-6	-3	9	14	14	-1	1	5	-18	ES -27	ES -27	ES -27	ES -27	ES -27	4	-3	-12	ES -27	-6
16	-12	-12	-9	0	2	7	9	1	14	-18	-18	-1	-1	-2	-9	-12	ES -27	9	ES -27	-6	-1	-6	-3	ES -27
17	ES -27	-12	-5	2	1	4	9	15	ES -27	ES -27	ES -27	ES -27	ES -27	-12	-1	ES -27	ES -27	ES -27	ES -27	ES -27	-9	-1	-12	-9
18	ES -27	ES -27	-1	-4	2	8	11	7	18	11	11	-1	3	-5	ES -27	ES -27	ES -27	-3	ES -27	-4	-5	7	-6	2
19	-9	-8	-3	0	0	4	4	8	11	9	7	-7	ES -27	-18	-4	ES -27	1	-1	-12	4	1	4	-2	-1
20	-9	-18	1	3	C	C	C	C	C	C	C	4	-6	-1	ES -27	ES -27	ES -27	1	-6	1	-6	-4	-6	2
21	-12	-4	-5	-3	3	3	4	17	13	13	-3	ES -27	7	1	ES -27	ES -27	ES -27	ES -27	ES -27	-3	-12	4	3	-4
22	-6	-12	-9	1	4	-3	1	14	9	4	-1	-6	ES -27	ES -27	-18	ES -27	ES -27	-3	ES -27	-3	1	-1	-1	-3
23	1	-3	-3	7	2	7	13	14	14	11	13	1	ES -27	ES -27	ES -27	ES -27	ES -27	-1	-7	-4	-3	-6	-3	2
24	-2	-4	1	4	4	11	19	16	6	11	1	11	2	-12	-12	ES -27	ES -27	5	-9	ES -27	-1	4	4	-9
25	-6	-1	8	4	5	-6	9	9	5	9	9	11	12	4	ES -27	ES -27	ES -27	ES -27	-3	2	1	6	-3	-6
26	1	4	-1	5	-1	9	15	13	18	4	2	-6	-6	ES -27	ES -27	ES -27	-12	-18	-6	-8	-4	-9	-6	-9
27	-6	-12	-1	9	4	15	14	23	19	-12	-18	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-1	3	-1	0	-3	-6
28	1	-6	1	3	4	4	9	18	-4	ES -27	ES -27	ES -27	ES -27	ES -27	-18	ES -27	ES -27	ES -27	ES -27	-4	3	2	0	2
29	-6	-3	-1	2	9	9	12	13	1	3	-2	-3	-12	ES -27	ES -27	ES -27	ES -27	-2	ES -27	-2	-1	-6	-6	-4
30	-3	-1	2	2	7	13	18	16	16	10	8	9	-1	1	1	-8	-12	ES -27	0	-9	-3	-4	-1	-1
31	-1	-3	4	5	3	10	11	6	-4	-18	-12	-9	ES -27	-6	ES -27	ES -27	ES -27	ES -27	ES -27	-6	2	4	-12	-12
CNT	31	30	30	30	29	29	29	29	29	30	30	31	31	31	30	30	30	30	31	31	31	31	31	31
MED	-6	-6	-2	2	4	9	12	14	14	9	5	4	-1	-6	US -27	ES -27	ES -27	-9	-9	-3	-3	-1	-3	-4
UD	1	-1	2	9	11	14	18	18	19	17	16	11	9	9	1	-8	4	4	0	4	3	4	4	4
LD	-12	-18	-9	-3	-1	-3	4	7	-4	-18	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-12	-9	-12	-12

C. Radio Propagation

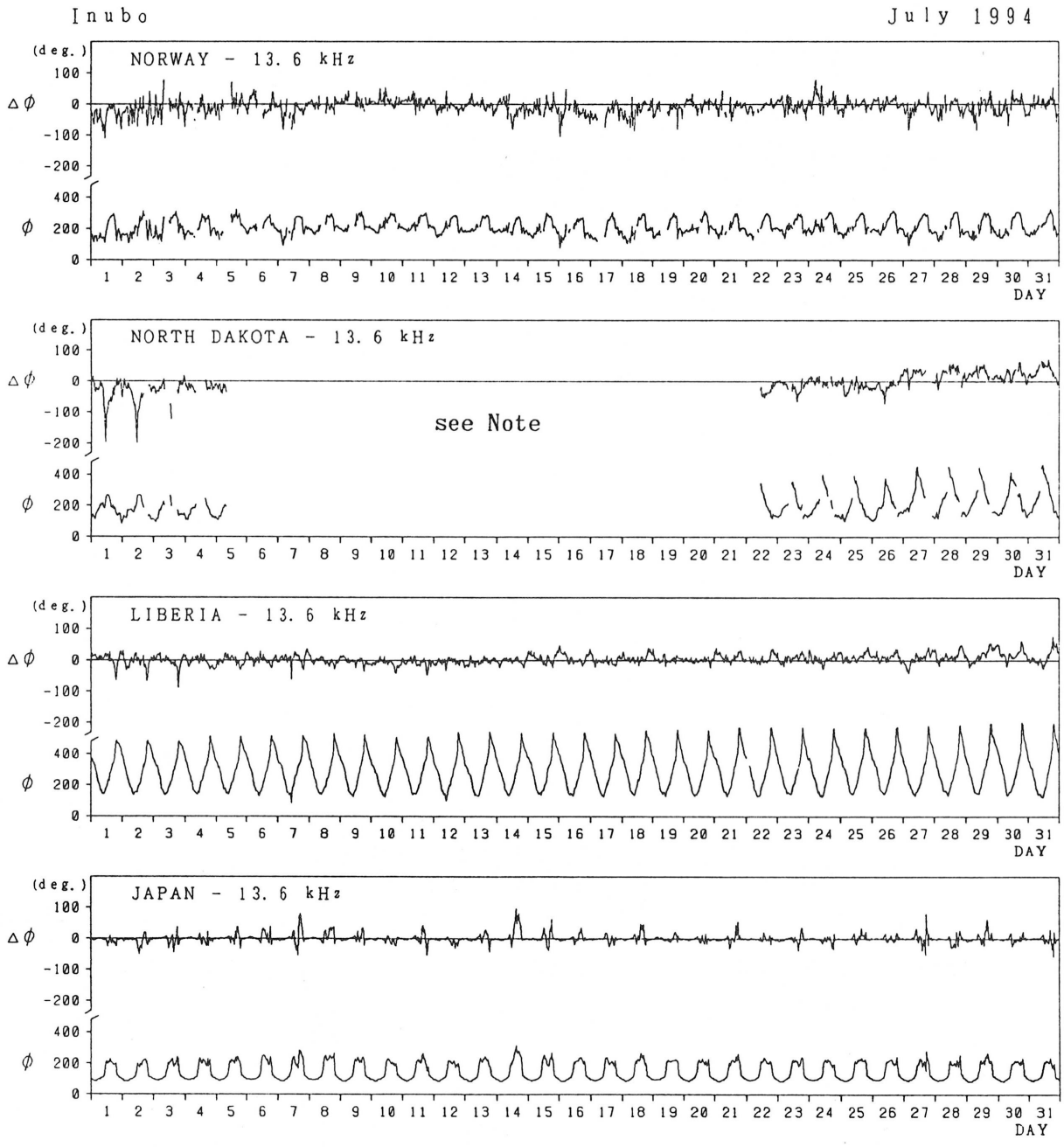
C2. Radio Propagation Quality Figures at Hiraiso

Hiraiso Time in U.T.

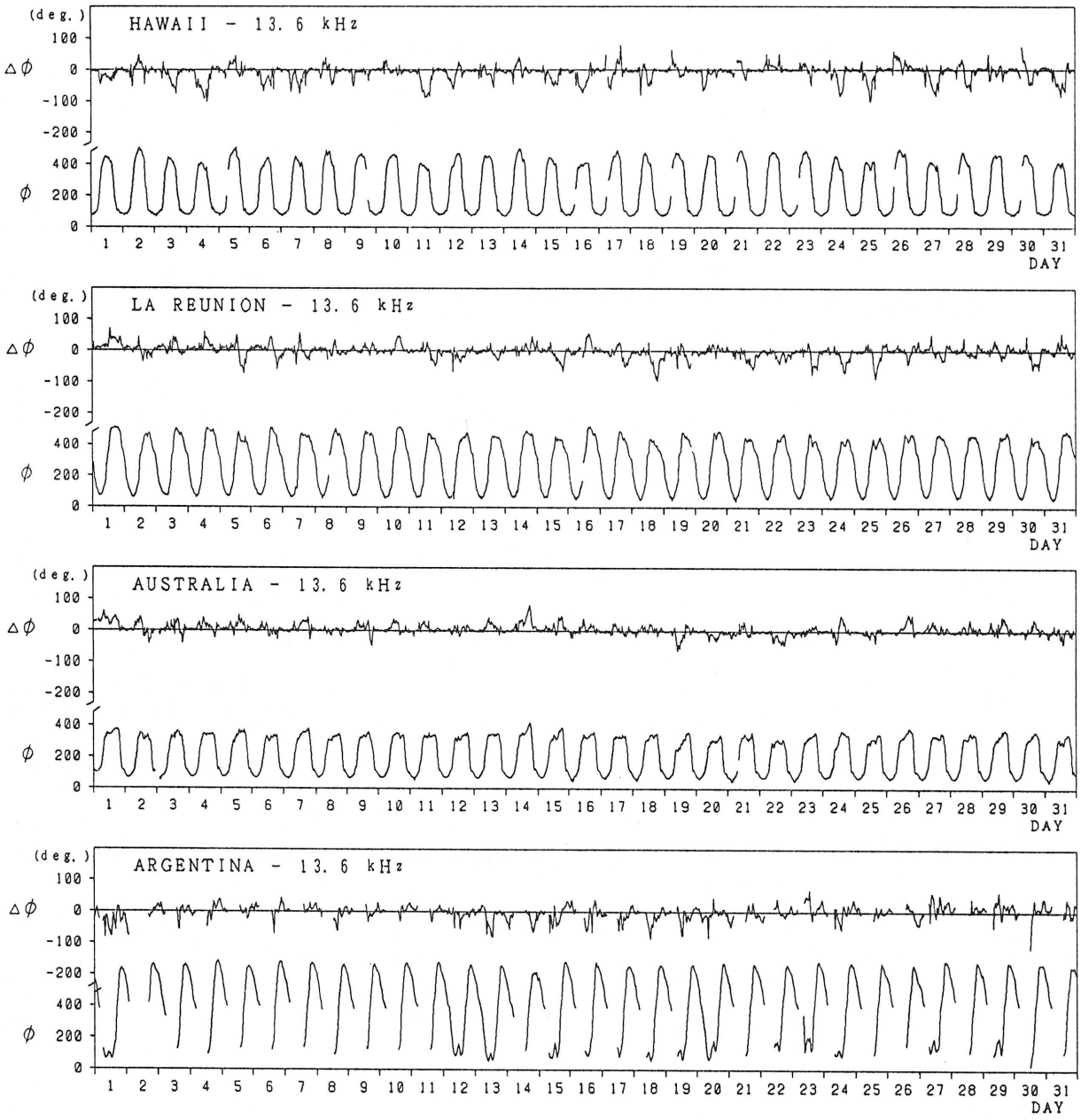
JULY 1994	Whole Day Figure	W W V 00 06	W W V 12 18	W W V 06 12	W W V 18 24	W W V H 00 06	W W V H 12 18	W W V H 06 12	W W V H 18 24	Condition 00 06	Condition 12 18	Condition 06 12	Condition 18 24	Principal Geomagnetic Storms Start h m	End h	RaPge nT
1	4- U	- -	- -	- -	- -	4 4	3U 4	4 4	3U 4	U U	U U	U U	U U	None		
2	4- U	- -	- -	- -	- -	4 4	4U 3	4 4	4U 3	U U	U U	U U	U U			
3	4+ U	5U -	- -	- -	- -	4 4	4U 4	4 4	4U 4	U U	U U	U U	U U			
4	4+ U	5U 5U	- 5U	- -	5U 5U	4 4	4U 4	4 4	4U 4	U U	U U	U U	U U			
5	4+	5U -	5U 5U	- -	- -	4 4	4 4	4 4	4 4	N N	N N	N N	N N			
6	4+	5U -	- -	- -	- -	4 4	4 4	4 4	4 4	N N	N N	N N	N N			
7	4+ U	5U -	5U -	- -	- -	4 4	4U 4	4 4	4U 4	N N	N N	N N	N N			
8	4+	5U 5U	- 5U	- -	- -	4 4	4 4	4 4	4 4	N N	N N	N N	N N			
9	4o	- -	5U -	- -	- -	4 4	4 3	4 4	4 3	N N	N N	N N	N N			
10	4+ U	5U -	5U 5U	- -	- -	4 4	4U 4	4 4	4U 4	N N	N N	N N	N N			
11	4+ U	C -	C 5U	- -	- -	C 4	C 4	4 4	4 4	N N	N N	N N	N N			
12	5-	5U 5U	5U 5U	- -	- -	4 4	5 4	4 4	5 4	N N	N N	N N	N N			
13	5-	5U 5U	5U 5U	- -	- -	4 4	5 4	4 4	5 4	N N	N N	N N	N N			
14	4o U	5U 5U	- -	- -	- -	4 4	4U 2	4 4	4U 2	N N	N N	N N	N N			
15	3+ U	- -	- -	- -	- -	3 4	3U 3	3 4	3U 3	N N	N N	N N	N N			
16	3+	- -	- -	- -	- -	4 3	4 3	4 3	4 3	N N	N N	N N	N N			
17	3+ U	- 5U	- -	- -	- -	3 2U	3U 3	3 2U	3U 3	N N	N N	N N	N N			
18	4o U	- -	- -	- -	- -	4 4	4U 4	4 4	4U 4	N N	N N	N N	N N			
19	4-	- -	- -	- -	- -	4 3	4 4	4 3	4 4	N N	N N	N N	N N			
20	4o U	- -	- -	- -	- -	4 C	4 4	4 C	4 4	N N	N N	N N	N N			
21	4- U	- -	- -	- -	4U	3 3	4U 4	3 3	4U 4	N N	N N	N N	N N			
22	4- U	5U -	- -	- -	- -	3 3	3U 4	3 3	3U 4	N N	N N	N N	N N			
23	4- U	- -	- -	- -	- -	4 4	3U 4	4 4	3U 4	N N	N N	N N	N N			
24	4+	5U 5U	- 5U	- -	- -	4 4	4 4	4 4	4 4	N N	N N	N N	N N			
25	4+	5U -	- -	- -	- -	4 4	4 4	4 4	4 4	N N	N N	N N	N N			
26	4+ U	- -	5U 5U	- -	- -	4 4	4U 4	4 4	4U 4	N N	N N	N N	N N			
27	4-	- -	- -	- 5U	- -	4 3	3 4	4 3	3 4	N N	N N	N N	N N			
28	3o U	- -	- -	- -	- -	4 2U	2 4	4 2U	2 4	N N	N N	N N	N N			
29	4- U	5U -	- -	- -	- -	4 3	3U 4	4 3	3U 4	N N	N N	N N	N N			
30	4+	5U -	- -	- -	- -	4 4	4 4	4 4	4 4	N N	N N	N N	N N			
31	3o U	- -	- -	- -	- -	4 2	3U 3	4 2	3U 3	N N	N N	N N	N N			

C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo



Inubo July 1994



Note : As for NORTH DAKOTA-13.6kHz, no record during 5 July 1230 UT - 21 July 2400 UT, due to the maintenance of transmitter.

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

NONE

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso Time in U.T.

JUL. 1994	S W F						Correspondence	
	Drop-out Intensities(dB)				Start	Dur.	Type	Imp.	Solar * Flare	Solar Burst
	CO	HA	AUS	MOS BBC						
12				8	0908	52	G	1-	0915	C

NOTE CO:Colorade(WWV) HA:Hawaii(WWVH) AUS:Australia MOS:Moscow BBC:London
* Optical and X-ray Flares

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Jul. 1994	S P A								
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	Ω/AU	Ω/H	Ω/ND	Start	End	Maximum
7		–	125			–	0955	1114	1007
8			23	10		–	0531	0620	0541
12		39	83			–	0914	1020	0924
14			32			–	0848	0918	0854
15			29			–	0718	0800	0734
16		20	14			–	0308	0406	0322
18		29				–	1331	1418	1347

IONOSPHERIC DATA IN JAPAN FOR JULY 1994
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