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IONOSPHERIC DATA IN JAPAN

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CONTENTS

COMMUNICATIONS RESEARCH LABORATORY
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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°	Solar Radio Emission (S)
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 descriptive letter G.

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction (Second Edition) 1972 " and its revision of chapters 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 letters are entered after, or used to replaced a numerical value on the monthly tabulation sheets, if necessary.

A Measurement influenced by, or impossible because of, the presence of a lower thin layer,for example *Es*.
B Measurement influenced by, or impossible because of, absorption in the vicinity of *fmin*.
C Measurement influenced by, or impossible because of, any non-ionospheric reason.
D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range in use.
E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.
F Measurement influenced by, or impossible because of, the presence of spread echoes.
G Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately.
H Measurement influenced by, or impossible because of, the presence of a stratification.
K Presence of particle *E* layer.
L Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.
M Interpretation of measurement questionable because the ordinary and extraordinary components are not distinguishable.
N Conditions are such that the measurement cannot be interpreted.
O Measurement refers to the ordinary component.
P Man-made perturbations of the observed parameter; or spur type spread *F* present.
Q Range spread present.
R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
S Measurement influenced by, or impossible because of, interference or atmospherics.
T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
V Forked trace which may influence the measurement.
W Measurement influenced or impossible because the echo lies outside the height range recorded.
X Measurement refers to the extraordinary component.
Y Lacuna phenomena, severe layer tilt.
Z Third magneto-electronic component present.

(ii) Qualifying Letters

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

A Less than. Used only when *fbEs* is deduced from *foEs* because total blanketing of higher layer is present.
D Greater than.
E Less than.
I Missing value has been replaced by an interpolated value.
J Ordinary component characteristic deduced from the extraordinary component.
M Mode interpretation uncertain.
O Extraordinary component characteristic deduced from the ordinary component. (Used for x-characteristics only.)
T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
U Uncertain or doubtful numerical value.
Z Measurement deduced from the third magneto-electronic component.

(iii) Description of Types of *Es*

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

The types are:

f An *Es* trace which shows no appreciable increase of height with frequency.
l A flat *Es* trace at or below the normal *E* layer minimum virtual height or below the particle *E* layer minimum virtual height.
c An *Es* trace showing a relatively symmetrical cusp at or below *foE*. (Usually a daytime type.)
h An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above *foE*. The cusp is not symmetrical, the low frequency end of the *Es* trace lying clearly above the high frequency end of the 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 three parabolic antennas, one with 10-meter diameter for 200 MHz measurements, one with 6-meter diameter for 500 MHz measurements and one with 2-meter diameter for 2800 MHz measurements, each being equipped with a pair of crossed doublet antennas as a primary radiator, and three appropriate receivers. Each pair of the crossed doublet antennas is used as a polarimeter. Observations are continuously carried out almost from sunrise to sunset.

B1. Daily Data at Hiraiso

The three-hourly mean and daily mean values of the solar radio emission intensities are tabulated for 500 MHz measurements. The intensities are expressed by the flux density in 10^{-22} Wm^{-2} Hz^{-1} unit.

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.

The following symbols are used in the $F_{10.7}$ index:

*	Measurement made not at 3h U.T..
B	Measurement affected by bursts.

C. RADIO PROPAGATION

C1. 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.

C2. 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	/N	13.6	10	7820
Liberia	06°18′N	010°40′W	/L	13.6	10	14480
Hawaii	21°24′N	157°50′W	/H	13.6	10	6100
North Dakota	46°22′N	098°20′W	/ND	13.6	10	9140
La Reunion	20°58′S	055°17′E	/LR	13.6	10	10970
Argentina	43°03′S	065°11′W	/AR	13.6	10	17640
Australia	38°29′S	146°56′E	/AU	13.6	10	8270
Japan	34°37′N	129°27′E	/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. 1997

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

HD	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	38	35	A	38	44		60	57	53	A	A	A	A	A	A	54	A	A	A	57	57	68		70
2	A	43	A	45	36	40	A	A	A	A	A	A	A	A	A	59	A	43	52	53	57			
3												A	A	A	A	A	A	A	A	A	56	C	C	C
4		A	38	32	37	38	A	A	A	A	A	A	A	A	A	A	A	38	A	57	55	70	57	
5	35	35	30	31		A	A	A	A	A	A	A	A	A	A	A	A	A	A	56	55	56		
6	A	40	35	A	35	39	A	A	A	A	A	A	A	A	A	A	A	A	A	30	35		57	
7	23	31	A	37	41	A	58		80	A	A	A	A	A	A	A	A	A	A	A	57	59	57	
8		A	A	38	38	A	50	A	A	A	A	A	A	A	A	A	A	A	A	59	A	28	28	25
9		32	35	32		35	A	A	A	A	A	A	A	A	A	A	A	A	A	58	57	56	56	56
10		A	A	34	28	A	59	A	A	A	A	A	A	A	A	A	A	A	56	58	A	68		
11			A	38	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	57		57
12	38	28	A	35	41	38	A	A	A	A	A	A	A	A	A	A	A	A	A	56	54	56	59	57
13	A	A	A	A	35	31	A	A	A	51	A	A	A	A	A	A	A	A	69	79	57	58	A	59
14		A	A	38	A	23	A	A	A	A	A	A	A	A	A	A	A	A	57	58	57	56	57	
15		A	A	59		26	A	A	A	A	A	A	A	A	A	A	49	A	A	52	A	58	57	56
16	57	A	32	36		39	A	A	A	A	A	A	A	A	A	A	A	51	55	60	57	57	56	
17	29	38	38	32		37	A	58	A	A	A	A	A	A	A	A	A	28	36	A	57	60	56	56
18		36	35	30	31	38	A	A	A	A	A	A	A	A	A	A	A	A	52	A	A	68	68	57
19	57	A	31	A	26	A	A	A	A	A	A	A	A	A	A	A	A	A	A	57	57	58	57	
20		38	32	31	38	A	A	A	A	A	A	A	A	A	A	A	A	A	A	47	55	56		46
21		38	35	31	A		A	A	A	A	A	A	A	A	A	A	A	A	40		57	49		35
22	A	A	35	29			A	54	A	A	A	A	A	A	A	A	A	A	38	47	57	58	57	57
23		35	38	38	A	36		57	48	A	54	A	A	A	A	A	49	A	37		57	57	57	57
24	58	A	35	29	A	40	A	A	A	66	A	A	A	A	A	A	A	51	A	54	60	56		39
25	38	A	38	32		A	A	56		A	A	A	A	A	A	A	A	A	A	56	57	67		56
26	A	41	32	40		36	A	A	34		A	B	A	A	A	A	49	A	33	32		57	A	57
27		A	A	A	24			55	A	A	A	59	A	A	A	A	A	A	59	70	69			58
28	57		36			A	A	A	A	A	A	57	A	57	A	A	A	A	A	A	A	57	57	
29	A	A	A	A		36	A	A	A	A	A	A	A	A	A	A	A	A	A	67	68	67		A
30	42	40	49		32	28	A	53	49	55	A	A	A	A	A	A	A	59	54	56	57	57	57	52
31	52		29	33	38	A	29	A	A	A	A	A	A	A	A	51	A	A	A	68	60	A	57	52
	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	14	18	23	15	16													13	23	24	26	17	19
MED	40	37	35	34	36	36													52	57	57	57	57	56
U Q	57	40	38	38	38	38													56	59	57	60	57	57
L Q	36	35	32	31	31	33													37	53	56	56	56	52

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT WAKKANAI

JUL. 1997

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	43	45	53	29	29	32	40	42	46	79	36	39	41		44		58		55	32	62	39		64
2	56		45	35	32	27	38	45	63	84	81	56		58	74		42	37	42	42	34			
3													67	38	62	46	58	59	44	61	56	60	62	32
4		38	32	24	27	30	45	52	66	54	41	38	40	40	42	35	46	36	40	29	34	39	37	39
5	30	34	29	30		60	47	46	42		35	45	31	38	32	38	45	37	36	29	32	38		34
6		30	34	40	33	27	34	35	36	40	74	40	43	39	31	31	54	30	37	34	34	54	40	60
7		35	38	39	44	46	40		34			39	38	58		57	57		77	68	61	40	37	33
8		43	45	29	31	34	38	46	97	70	95	65	62	40			82	78	38	71	44	30	37	34
9	43		60	61	29	59	47	58	55	67	58	53	53	52		32	34	60	42		33	46	53	43
10	60	58	62	63	37	44	51	63	63	32	45	38	43		35	35	29	44		59	56	57	55	34
11		37	39	38	42	39	47	43	39	85		61	81	65	55	53	46	39	43	61	46	43	38	32
12		41	43	33	28	32	46	46	82	41		59	44	41	70	58	85	76	58	46	73		65	52
13	62	54	45	40	42	36	54	63	70	45		86	44	65	63			151	68	148	75	61	96	
14	56	52	57	28	46	60	70			53	61	80	45			60	37	57	45	62				62
15	65		58	78	31	32	40	43	42	70	73	61	131		78	85	37	61	48		60	37	34	35
16	40	29	45	36	34	58	36	42	56	54	54	34	43	32	62	85	64		36	28	36	42	39	46
17	40	34	34	34	28	32	41	46	85		94	75	36	58	61	64	38	37	43		28	29	40	
18	32		28	32	32	34	56		74	76	64	79	98	94	31	32	57	61	53		92	65	46	38
19	32	33	30	32	46	40	44	55	56		72	60	42	34	36	32	65	46	47	45	32	37	45	G
20	G	G	G	G	27	32	39	44	53	42	39	38	36	35	40	42	77	94	56	31	39	36		29
21	24	G	25	26	28		46	60	35	37	32	35	34	36	34	32	31	30	36		44	27	28	27
22		35	G	32	G	29	54	63	78	54	35	33	33	33	37	30	32	38	39	30	37	38	30	27
23	28	G	30	29	32	31	41	42	43	64	37	36	36	40	33	60			74	74	41	30	28	34
24	33	39	29	30	30	30	37	43	75	72	42		61	57	72		41	39	69	70	60	44	44	37
25	38	38	32	27	33	29	30	38	39	57	38	37	31	39	37	36	56	51	36	34	36	38		41
26	60		29	31	24	29	32	62	41	38	32	B	32	33	43	40	46	60	47	37	31	36	62	36
27	33	34	41	43	26	33		53	46	43	66	54	39	58	38	45	61	64		71	44	38	28	34
28	28	43	28	37	36	62	56	80	63	60	63	44	38	39	85	73	129	80	85	61	79	57	55	34
29	62		56	43		37	57	62	76	96	77	83	97	84	60	46	45	62	60	62	38	36	32	38
30	29	39	65	33	38	41	36	31	36	38	60	60	58	56	94	58	36	42	30	26	29	29	32	38
31	36	40	33	34	33	39	32	58	75	57	30	38	34	36	31	31	56	61	80	36	29	28	29	29
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	24	30	30	28	29	29	27	29	26	26	28	30	27	27	26	29	27	29	26	30	28	25	28
MED	38	38	36	33	32	34	41	46	56	56	56	49	42	40	43	44	46	57	45	46	40	38	39	34
U Q	56	42	45	39	36	42	49	60	74	70	72	61	58	58	63	58	59	62	59	62	60	45	54	40
L Q	30	33	29	29	28	30	37	43	41	42	37	38	36	36	35	32	37	38	38	32	34	36	32	32

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT WAKKANAI

JUL. 1997

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	15	15	15	15	16	16	16	17	17	16	15	15	15	16	15	15	15		15
2	15	16	15	15	15	15	15	15	16	16	16	18	17	18	17	17	15	16	15	14	15			
3												16	20	17	16	16	15	15	15	15	15	15	15	15
4		15	15	15	16	15	14	14	15	16	16	17	17	16	16	16	16	15	15	15	15	15	15	15
5	15	15	15	16		16	15	15	16	16	17	18	17	17	16	16	15	15	15	15	15	16	15	16
6	15	15	15	15	14	15	15	15	15	18	17	16	18	17	16	16	15	15	15	15	15	15	15	16
7	15	15	15	15	15	15	15		15	16	17	16		16	17	16	15	14	15	15	15	15	15	15
8		15	15	15	15	15	15	16	15	16	17	17	20	17	16	16	16	15	15	14	16	15	15	15
9	15	15	15	15	15	15	15	16	16	16	16	16	17	16	16	16	15	15	15	15	15	15	15	15
10	15	15	15	15	15	16	15	15	16	15	16	17	17	16	16	17	15	16	15	14	15	15	15	15
11		15	15	15	15	14	15	16	16	17	17	18	17	16	17	17	15	14	15	15	16	15	15	15
12	15	14	15	15	15	15	15	15	17	18	18	17	18	17	16	16	17	15	15	14	15	15	15	15
13	15	15	15	15	15	15	15	15	16	17	18	17	17	17	16	15	15	15	15	14	15	15	15	15
14	15	14	14	15	15	14	15	15	16	17	16	20	17	18	16	15	16	15	17	14	15	15	15	15
15	16	15	15	15	15	15	15	15	16	16	17	16	18	17	16	16	16	16	16	15	15	15	15	15
16	15	16	15	15	15	15	15	16	15	16	17	17	17	17	17	16	15	15	15	14	15	15	15	15
17	15	15	15	15	15	16	15	15	16	17	18	17	18	18	18	16	16	16	15	15	15	16	15	15
18	15	15	15	15	15	15	15	15	16	16	16	17	18	17	18	16	16	15	15	15	15	15	15	15
19	15	15	15	15	15	15	15	15	16	16	18	17	20	17	16	16	15	16	14	16	15	15	15	15
20	15	15	15	15	16	15	16	16	16	17	16	17	17	16	16	17	16	15	16	14	15	15		15
21	15	15	15	15	16		15	16	15	16	17	16	18	18	17	16	16	16	15		15	16	15	16
22	15	15	15	15	15	16	16	15	16	16	17	18	17	17	16	16	15	15	16	15	15	15	15	15
23	15	15	15	15	15	15	15	16	16	16	16	18	17	17	15	16	16	15	15	15	15	15	15	15
24	15	16	15	15	16	15	15	15	16	16	17	16	18	16	17	16	15	16	16	15	15	14	15	15
25	15	15	15	15	15	15	15	16	15	15	16	16	17	18	16	17	16	14	15	15	15	15	15	15
26	15	15	15	15	15	16	16	15	16	16	17	B	21	17	20	16	16	15	15	15	15	15	14	15
27	15	15	15	15	15	15	15	15	16	15	16	17	16	17	16	16	16	15	16	15	15	15	15	15
28	15	15	15	15	15	15	16	16	16	16	16	17	18	16	16	16	16	15	15	16	15	15	15	15
29	15	15	15	15		15	16	16	15	16	16	16	17	17	17	16	16	15	14	14	15	15	15	16
30	15	15	15	15	15	15	15	15	16	16	16	17	18	18	17	16	16	15	15	16	16	15	15	15
31	15	15	15	15	15	14	15	16	17	16	17	17	21	20	17	15	15	16	15	15	15	17	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	27	30	30	30	28	29	30	29	30	30	30	30	30	31	31	31	31	31	31	30	31	30	28	30
MED	15	15	15	15	15	15	15	15	16	16	17	17	17	17	16	16	16	15	15	15	15	15	15	15
U Q	15	15	15	15	15	15	15	16	16	16	17	17	18	17	17	16	16	16	15	15	15	15	15	15
L Q	15	15	15	15	15	15	15	15	15	16	16	16	17	16	16	16	15	15	15	14	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT KOKUBUNJI

JUL. 1997

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	36	36	44		38	45	A	74	52	A	A	A	A	A	A	45	A	A	68		56		A
2	43	42	38	37	A	47	50	A	A	A	A	A	A	A	A	55	70	68	A	48	57		57	
3	47	38	36	36		A	51	57	A	A	A	A	A	A	A	52	A	59	58	49	A	A	A	28
4	A	A	59			41	A	A	A	49	A	A	A	A	A	A	A	A	A	69	76	47		
5	36		A	34	34	40	47	A	109		A	A	A	A	A	A	A	A	47	55	57	47	A	A
6	35	35	38	34	32			47	58	A	A	A	A	A	A	55	A	48	A	A		44	44	A
7	36	A	A	29		A	A	57	60	A	A	A	A	56				54	61	76	69		A	42
8	43	38	40	35	A	46	46	48	A	A	A	A	A	A	A	A	A	56	80	A	A	A	32	44
9	40	38	35	34		A	A	A	A	A	A	A	A	A	A	A	47	56	51	54	57	58		48
10	44	A	A	36		56	A	A	62	A	A	A		A	A	A	A	A	50	A	57		A	A
11	A	A	A	22		35	48	A	A	A	A	A	A	A	62	A	52		A	57	58	52	43	44
12	43	40	36	35		A	50	A	A	A	A	A	A	A	A	A	A	64		44	A	A	A	56
13	A	A	41	39	A	36	A	A	71	58	A	A		A	A	51	A	A	51	A		50	A	
14	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	55	72	64	57	57	48
15		44	36	38	37		A	56	A	A	A	A	A	A	A	62		A	46	56			57	50
16	56	48	46	42	47	40	A	A	A	A	A	A	A	A	49	A	A	A	63	63	58	56	56	51
17	50	46	42	44	38	A	56		A	A	A	A	B	A	A	A		50	A	A	70	57	56	47
18	46	42	44	38		42	44	56	56		A	A	A	A	56	54	A	A	59	A	A	A	56	51
19	56	46	38	40	34	A	A	A	A	A	A	A	A	A	A	A	A	A	A	68		57	48	45
20	45	A	A	A	41		A	A	52		A	A	A	A		A	A	A	55	60	56	56	57	44
21	45	A	A	36		A	A	A	A	68	A	A	A		A	A	50	A	38	58	67			37
22	A	37	A	35	A	A	51	56	49	A		A	A		A	A	52	47	46	47	A	57	57	
23	42	42	37	38		A	57	51	53	54	A	A	A	A	A	55	59	60		50	57	57		44
24	48	42	36	34		37	A	58	61	68	68	73	A	55	A	A	A	48	53	60	70	57	56	
25	A	40	A	38		36	A		56	49	A	A	A	67		54	49	A	56	61	67	56		43
26	45	45	42	43	A	44	46	56	A	A	A	A	A	A	A	48	51	A	57	60			58	
27	42	48	43	37		38	A	56	A	A	A	64		A	A	A	A	56	64	A	A	56	46	
28		40	40	35	36	A	A	A	52	A	A	A	A	A	62	54	A	55	A	67	59	A	A	
29	43	44	A	36	36	A	A	A	66	60	A	A	A	A	A	62	A	A	58	57	A	46	A	A
30	48	46	46	A	36		A	A	A	A	A	A	A	A	A	A	56	57	57	60	58	51	57	
31	45	45			38	A	50	56	51	A	A	A	A	A	A	64	65	63	70	64	68	57	57	58
	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	22	20	26	11	14	13	12	15							12	11	15	21	24	18	20	17	17
MED	44	42	39	36	36	40	50	56	58							54	52	56	56	60	58	56	56	45
U Q	47	45	42	38	38	44	51	56	66							58	59	60	60	65	68	57	57	50
L Q	42	38	36	35	34	37	46	53	52							53	49	50	50	54	57	50	47	43

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT KOKUBUNJI

JUL. 1997

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	29	G	G	30	28		41	62	45	48	52		51	34	53	72	75	60	61	57	60	62	28	58
2	42	36	28	27	27	25	31	33	70	108	97	79	107	136	70	54	61	62	88	33	51	41	32	35
3		28	23	G	G		44	50	61	59	94		75	53	72		76		34	48		69	77	74
4	49	37		26		29	32	60	69	72	70	68	62	53	47	56	67	73	51		29	G	G	G
5	G	G	30	27	G	28	40	70	83	137	59	68	77	61	61	47	41	51	50	41	40	28	60	36
6		28	32	G	26	G		40	49	56	43	61	57	54	40	40	49	42	50	61		32		51
7	51	60	57		G	32	54	44	52	61	55	63	76	28	31	48	30	53	27	30		G	34	32
8	41	28	29	26	34	28	30	34	46	91			74	58	56	42	49	50	47	49	50		29	48
9	38	44		39		28	35	43	66	93	62	54	58	48	41	33	27	39	72		43	34		26
10		56	53	46		30	28	48	59	150	81	54	74		90	54	33	92	86	51		56		67
11	70	60	50	28	G	28	42		90	106	66	51	58	58	46	45	44		45	48	54	37	40	33
12	46		32	32	59	52	42	59	61	61	62	59	60	68	89		83	54	124	60	82			
13	70		52	43	50	50	50	45	54	30	76	58		56	108	51	58	86	71	72			78	
14		86	54	36	53	50	67	103	92		55		134	144	50	85	39	49	35		58	42	32	25
15		45	29	29	24		37	34	72	83	86		41	42	31	37	52	110	36	51			30	
16	48	43	32	37	G	G	39	48	48	46	38	50	50	54	51	52	88		79	42		58	56	45
17	41	59	28	33	44	29	41		112	75	91	49	B	48		85	60	44	47	54	24	30	29	
18	38	33	30	G		28	28	34	43		59	89	54	51	53	47	58	71	84	60	57	70		41
19	43	30	32	33	28	32	40	45	108	71		70	115	61	60	40	43	69	107	81	37	33	41	35
20		58	81	59	40	29	56		51	60		83	100	45			50	52	48	29	60		48	59
21	50	41	46	24	G	36	37	105		82	58	53		G	40	52	43	51	52	72	36	29	25	30
22	40	49	60	50	42	35	43	30	53	50		89	74			54	28	26	34	31	33	28	32	54
23			G	G	G	26		50	58	42	46	52	51	52	50	52	56	104		49	27	28	30	
24	32	33	53	32	G	28	57	92	60	68	42	52	57	58	71	51	49	30	32	G	G	G	G	53
25	60	42	35	G	34	40	39	43	57		50	32	41	40			28		36			50	49	40
26	G	36		44	48		33	48	62	60	45	40	51	53	59	61	61	52	43	43	28		41	50
27	39	34	28	51		43	106	58	50	57	49	58	32	76	66	134	51	32	29	71	81	41	50	
28	50	33	40	37		50		68	54	59	68	70	58	58	48	50	87	32	69	57	84	70	70	
29	39	40	40	31		54	64	59	60	50	46	50	76	81	69	61	70	69	32	35		62	50	60
30	51	50	60		54	54	32	49	60	87	84		136		87	91	48	36	28	34	34	27	29	G
31	28	30	30	36	28	30	36	35	42	71	50	49	61	32	29	30	43	40	59		28	30	34	28
	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	28	28	29	24	27	28	28	30	28	27	25	27	28	27	27	31	27	30	26	22	25	26	24
MED	42	38	32	32	28	30	40	48	60	64	59	58	60	54	53	52	50	52	49	49	42	34	34	40
U Q	50	49	52	38	43	43	47	59	69	85	76	69	76	59	70	61	61	69	71	60	58	57	50	53
L Q	38	31	29	26	G	28	34	41	51	56	49	50	51	46	46	45	43	40	35	35	29	28	29	31

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT KOKUBUNJI

JUL. 1997

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	15	15	14	15	15	14	14	16	16	20	18	24	23	20	20	15	15	14	15	14	14	14	14
2	15	14	14	15	14	16	15	15	15	15	17	21	20	16	22	21	15	16	15	15	14	14	15	15
3	15	15	14	15	14	15	14	14	15	15		16	20		21	16	15	14	14	15	15	14	15	14
4	14	14	14	14		15	14	15	16	21	20	24	23	22	14	16	15	15	16	14	15	14	14	20
5	15	15	15	15	14	14	14	14	16	15	18	22	22	23	22	18	15	14	15	14	14	14	14	14
6	15	15	15	15	14	17		17	18	16	21	18	28	33		16	15	15	14	14		14	14	15
7	14	15	14	14	14	15	15	14	14	16	16	24	18	20	22	16	15	15	17	14	15	15	15	15
8	14	14	14	14	15	17	15	16	16	16	20	24	20	20	30		15	15	15	15	15	14	14	14
9	14	14	14	14		15	15	14	16	20	22		33	30	17	16	15	15	15	15	14	14		15
10	15	14	15	14		14	15	14	16	18	18	20	21	18	21	20	14	15	15	15	14	14	15	14
11	15	15	15	14	15	15	14	14	15	21	17	34		22	18	16	14		14	14	14	14	14	14
12	14	14	15	14	15	15	17	15	15	16		33		21	21	17	14	14	15	15	20	14	14	15
13	14	14	15	15	14	15	14	14	14	15	20			20		34	16	14	14	14		14	15	
14	15	15	15	14	15	15	15	15	15	21	20	22	32	32		14	14	15	15	15	14	14	15	15
15		14	14	15	14		14	16	16	16	20	24	22		22	16	15	14	15	17	14		14	14
16	14	14	15	14	14	17	14	14	15	15		23	21	35	33	15	15	14	15	15	14	15	15	15
17	14	14	14	15	15	15	14	15	15	17	20		B	24	22	17	15	15	15	14	16	14	14	15
18	14	14	14	15		16	15	15	16		23	21			34		15	16	15	15	14	14	14	15
19	14	15	15	15	14	14	16	15	17	15	24	28	21	21	24	16	16	15	15	15	15	14	15	15
20	14	15	15	15	15	14	15	14	16	16	23	23	33	23	17	16	15	15	15	15	15	14	14	14
21	15	14	14	15	15	15	15	15	16	15	23	26	16		16	17	15	14	15	15	14	15	14	15
22	15	15	14	15	14	14	14	15	15	16		20	28	27	18	14	15	16	14	14	14	14	14	15
23	15	15	15	14	15	16	15	15	16	18		27	21	21	18	15	17	15		14	15	14	15	15
24	14	14	14	14	15	14	15	14	15	15	16	18	24	20	18	16	17	15	15	15	14	14	15	15
25	14	15	14	15	14	16	15	15	15	15	22	22	26		20	18	17	15	15	14	14	14	14	14
26	14	14	15	14	15	15	14	16	20	17	17	22	39	20		20	14	15	15	15	15	15	14	14
27	14	14	14	14		16	14	15	16	23	16	16	18	35		16	15	14	14	15	14	14	14	15
28	15	14	14	15	14	15	14	14	15	21	22	23	20	24	18	17	15	16	14	20	15	15	15	
29	14	15	15	15	14	15	15	15	15	16	21	21		22	20	15	14	15	14	15	14	14	15	15
30	15	14	15	15	15	15	14	15	14	18	22	21	20	18	20	17	15	14	15	15	14	14	14	14
31	14	14	15	15	14	15	15	15	15	17	24	28	26	21	17	15	15	14	15	15	15	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	30	31	31	31	26	30	30	31	31	30	26	28	25	26	26	29	31	30	30	31	29	30	30	29
MED	14	14	15	15	14	15	15	15	15	16	20	22	22	22	20	16	15	15	15	15	14	14	14	15
U Q	15	15	15	15	15	16	15	15	16	18	22	24	27	24	22	17	15	15	15	15	15	14	15	15
L Q	14	14	14	14	14	15	14	14	15	15	18	20	20	20	18	16	15	14	14	14	14	14	14	14

HOURLY VALUES OF foF2 AT YAMAGAWA

JUL. 1997

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	55	59	61			28	43	60	54	60	A	A	B	57	A	69		61	66	73	80	59	39	
2		41		52	55	48	35	A	67	A	A		A	79	A	139		75	75	72	A	54	53	
3		69			36		31	A	53	A	A	67		66	68	72	66	A	84	74	39	39		
4	36	34					45	68	53	A	A	61	A	A	A	A	A	A	83	88	90	A	35	
5	60	61	59	59	32			65	55	A	A	57	B	A	A	54	A	A	A	54	60	A	39	
6			42		58	59	37	54	A	A	A	55	A	A	A	A	58	54	52	60				A
7	37	32	29			30	30	A	A	A	A	A	A	A	84	A	54	59	81		84	79	79	89
8	32			25	A		A	61	62	A	A	A	A		A	A	A	77		59		69	59	59
9	59	34		32		30		A	62	61	A	A	60		B	A	60	62	66	72	64	62	52	
10		54		34	32	31	30	60	62	A	A	N	A	A		A		A	57	68	69	A	31	
11	48		59		26	29	32	A	A	A	A	A	A	A	A	A		A	54	A	73	34	35	
12	49	59	A	A	26	A	47	A	A	A	A	A		A	A	55	A	65	73	72		66		
13			32	31	32	31	34	71	A	A	A	A	57	55	A	A	A	65	70		58	59	A	37
14		59	49		30			57	A	A	A	A	A	A	55	A	A	55	66	73	74	79		49
15	A	49	59	69	29	N	A	A	65	A	A	A	A	A	A	62	55	A	60	68	68		60	60
16	58			33	32	30	A	A	61	A	A	A	A	A	67	58	54	60	60	50				59
17	59	69			59	A	33	A	A	A	A	A	B	A	A	56	A	A	A	60	66	68	58	58
18	50	49		42		A	A	A	66		A	A	A	60	A	A	A	66	66	A	60			39
19	A	A	49	32		32	30	A	A	A	A	A	A	A	A	A	A	A		A	59		41	
20		50	59	38		59	31	A	66		A	A	A	A	57	A	A	55	59	61		69		
21	69	32		A	59		A	A	A	A	A	A	A	A	A	58	57	53	58	62	54	32	49	59
22	32	30		49		23	30	A	A	67	A	A	A	A	A	A	A	A	60	58		49	49	
23	31			30	30	A	18	58	52	A	A	A	61	A	A	A	60	A	56	66	70	69		
24	25		A	N	N		59	A	61	A	A	A	A	A	A	A	63	67	71	58	68			48
25					59		31	68	A	A	A	B	A	62	63	A	A	55	57	52	71	59		49
26	47	30		49	30		A	A	62	54	56	A	A	A	56	64	A	60	59		67			
27		49		42	32		32	A	A	A	A	57	A	60	58		60	A	63	70	62		38	
28	29			69	31	30	26	A	62	A	A	A	A	62	61	A	60	57	61	78	70		61	56
29		38	31	31		29	A	57		A	A	A	A	A	57	A	A	65	68	66	58	A	30	34
30	31	30	28			A	A	A	A	A	60	A	A	A	A	A	66	A	67		72	66		34
31	37		32				40	A	A	A	A	A	A	55	55		75	67	76	73	72	73	62	60
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	20	13	17	18	14	20	11	16						11	10	13	19	27	24	24	18	18	15
MED	47	49	49	38	32	30	32	60	62						58	60	60	61	66	67	68	64	49	56
U Q	58	59	59	50	55	32	38	68	63						67	69	64	66	71	72	72	69	59	59
L Q	32	33	31	31	30	29	30	57	54						56	56	56	55	59	59	60	54	38	39

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT YAMAGAWA

JUL. 1997

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	28	24	G	G	G	26	G	38	33	50	60	56	B	32	34	38	31	37	27	41	G		32	30
2	26	30	G	G	G	G	G	30	51	73	111	64		79	28		82	68	54	59	58	25	29	25
3	G	G	G	G	G	G	32	60	60	62	57	64		54	G	58	60			58	41	32	32	G
4		G	G	G	G	G	24	23	27	40		58	72	111	77	80	61	117	55	44	29	27	29	G
5	G	G	G	G	G	G	21	28	N	38	28	31	B	70	64	49	60	50	36					30
6	24	26	G	G	G	G	G	28	35	45	41	55		59	38	30	30	27	38	26	28		G	31
7	26	G		31		G		60		54	44	59	74	150	59	94	53	50	36	G	27	23	26	27
8	G	G		24	29	G	34	33	38	51	57	57			82	32			58	50	28	32	G	32
9	G			32	34	28	32	38	36	38	95	60	30		B	37	32	30	25	G	32	32	31	33
10		31	31	28	G	32	29	32	38		60					58		58	56	G	31		32	32
11	G	G		36	G	G		32	29	70	78	62	66		61	93	94	76		92	84	36	32	31
12	33	32	32			32	34		36	58	93			150	30	G	59	153	58	50		32	37	30
13	G	G	G	G	G	G	28	38	85	79		51	G	78	30	81	76	38	30		32	G	30	24
14				32	28	G	22	32	78	78	105	69	154		58	31	38	47	37	80	31	91	31	33
15	32	G	G	31	G	G	37	46	38	66	66		56	61		31		52	37	33	34	G	G	G
16	32	G		28	G	G		34	35		31	55	53	80	60		39		50	46	39	G	G	57
17		32	39	58			32	83	60	67		60	B	55	62	57	60	55	36	33	33	G	29	28
18	G	G	G		G		35	33		32	56	32	31		70	78		56	60	33	32	28		59
19		32	32	28	G	G	36				93	53	126	51	89	30	27	92	117	114		35	32	34
20	32		30	33	30	26	24	57	49		34	53	50		38	51	29	30	29	G	G	G		32
21		30	29	32	G	G	35	39		79		94	38	52	60		32	32	26	31	G	G	G	G
22	30	G	G	G	G	G	G	29	34	53	54	37	37	84	93	82	60	77		33	31	G	G	32
23	32	G	31	32	32	30	27	30	32	31	31	30	31	36	36		30			36	33	G	32	32
24	G		28	G	32	G	G	36	56	58			60	54	34	32	34	32	35	32	27	G	G	G
25	G	30	32	26	32	26	26	31		30	33	B	35	32	34	31	30	36	34	33	28	G	G	G
26		G	28	G	26	32		35	34	34	31	31	29	36	30	32	61	54	37	34	33	32	32	33
27	33	32		26	G	G	G	31	31	30	29	G	56	92	50	90	37	60	28	34	32	32	33	32
28	33	30	25	G	24	29	34	38	32	55	79		51	51	35	38	32	37	49	54	G	32	32	27
29	23	28	G	G	G	G	55	36	57	60	78	96	116	70	38	72	78	57	59			32	31	32
30	32	31	32	38	G	59	34	34		58	34		82	109	105	93		152	37	33	33	30		G
31	G	G	G	G	G	G	28	32	36	36	51		50	50	38	31	32	34	30	34	31	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	27	24	29	28	29	27	29	24	27	26	23	22	24	28	27	26	27	27	28	27	27	27	31
MED	25	G	13	26	G	G	28	34	36	54	56	56	52	60	44	49	38	52	37	34	31	27	30	30
U Q	32	30	31	32	27	27	34	38	53	66	78	62	72	82	63	80	60	68	55	50	33	32	32	32
L Q	G	G	G	G	G	G	21	31	33	38	34	37	35	51	34	31	32	36	30	32	28	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT YAMAGAWA

JUL. 1997

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

HD \ 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	16	14	15	15	14	16	16	20		38	35	B	22	21		20	17	18	15	14	14	14	15
2	15	15	16	14	14	15	18	20	18	20	22	29		33		23	22	18	18	15	16	16	15	16
3	15	16	15	14	14	14	15	20	21		34	35		35	48	38	20	18	18	15	15	15	14	15
4	15	15	14	14	14	15	20		32	22	24	32	34	44	36	32	20	17	16	15	16	16	15	14
5	14	15	14	14	14	15	21	15	17	20	21		B	33	21	21	18	18	15	15	16	16	14	16
6	14	15	14	15	16	15	15	15	18	20	24	24	30	21	21	20	18	17	15	15	15		15	15
7	15	14	14	14		14	15	15	20	20	23	23		44	26	22	20	21	16	16	15	15	15	15
8	15	15	15	14	16	14	15	16	20	23	23		44	23	22	21	21	20	20	17	15	15	14	15
9	15	16	15	14	16	14	16	16	17	22		29		23	B	24	22	17	18	16	16	15	15	15
10		15	15	15	14	15	15	22	18	22	24		44	45		44		24	22	17	15	15	15	16
11	15	15	16	16	15	14	17	16	21	22	22		44	44	45		23	21	16	18	15	15	15	15
12	15	15	16	15	15	15	16	16	21	22	23			45		45		22	21	18	15	16	15	17
13	18	16	15	15	15	14	15	16	18	20	21	22		44	22		45	23	21	15	17	14	15	15
14	15	15	16	15	15	14	15	17	20	21	22	24		23	23	22	21	20	15	17	16	16	17	14
15	24	15	23	16	14	14	15	17	18	18	21	24	23		22	22	21	18	16	14	16	15	15	14
16	15	15	15	17	16	14	15	15	20	20	22	42	24		45	22	21	17	16	15	16	15	15	15
17	16	16	15	17	17	18	16	17	21	21	22		B	48	44	23		18	16	15	17	15	15	15
18	15	15	15	14	16	17	17	16	20	17	22	22	24		42	22	20	17	18	16	16	16	16	15
19	15	16	15	16	15	15	15	16	18	21	22		44		23	22	21	18	16	17	16	15	15	14
20	15	15	16	15	16	14	15	16	17		21		24		22	21	18	17	16	16	15	14	14	15
21	15	14	14	15	15	15	16	16	17	18	22	23	30			23	20	17	15	15	15	16	18	14
22	15	14	15	15	15	16	18	16	17	18	22		66	24	22	22	20	17	15	16	15	14	15	18
23	16	14	16	15	15	15	16	16	17	21	22		24		28	21	22	18	16	15	14	15	14	14
24	15	17	16	15	15	14	17	16	17	18	21	23	23	27	22	22	20	18	16	17	15	17	15	15
25	14	15	15	15	15	16	17	16	17	20		B	66	23			18	18	17	15	15	17	14	15
26	14	14	15	15	15	14	16	15	18	20	23	23	22		23	22	20	17	16	15	14	15	15	14
27	14	15		14	14	14	17	16	18	20		49		23		48	22	18	16	15	15	16	15	15
28	15	15	15	15	14	15	16	17	21	22	23	23	23	23	24	23	20	20	17	17	15	15	16	16
29	15	17	15	14	14	16	16	17	20	22	21	22	26	23	22	21	22	21	17	16	15	15	16	15
30	16	16	15	14	16	15	17	16	17	20	22	22		42	23	20	20	21	16	18	15	15		17
31	16	14	15	15	16	15	15	16	17	24	20	23	26	22	21	20	18	15	15	16	16	16	15	16
	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	30	31	30	31	31	30	31	28	28	20	19	23	24	27	28	31	31	31	31	30	30	31
MED	15	15	15	15	15	15	16	16	18	20	22	24	26	27	23	22	20	18	16	16	15	15	15	15
U Q	15	16	16	15	16	15	17	17	20	22	23	30	44	44	32	23	21	20	18	17	16	16	15	16
L Q	15	15	15	14	14	14	15	16	17	20	21	23	24	23	22	21	20	17	16	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT OKINAWA

JUL. 1997

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

JUL. 1997

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	28	G	G	G	G	G	G	59	50	46	57	50	54	48	50	44								
2											48	62	66	57	41		53	61	C	C	36	34	27	C
3	C	60	60	40	42	28	G	62	38		42	63	55	45	66	58	58	46	48	46	68	48	28	40
4	50	28	G	G	G	G	28		48	44		64	66	113		92		179	114		78	67	38	48
5	31	G	G	G	G	G	27	28	35	37	36	49	50	42	48	61	58	49	38	47	40	40		60
6		34	G	G	G	G		45	59	51	66				51	47	40	52	40	42	33	28	29	29
7	27			65	37	40	36	42		38	55	63	62	78	83	65	54		48	40	68	60	40	38
8	40	39	34	37	35	38	36	38		75	94	80	94	54	51	39	71	76	93	33	35	58	36	
9	60		38	44	48	57		61	37	37	40	68	66	48	38	60	48	34		50	G	28	35	38
10	37	G	38	29	27	G	B	41	66	60	50	39	37	36	94			69	60	48	G	46	55	
11	30	71	60	71	58	40	36	59	46	70	69	41	57	85	85	66	92	64	60	90	50	86	68	38
12	29	36	26		40	36	39		68	50	96	68	66		47	51	58	41	88		95	81	57	46
13	48	G	G	G	G	G	G	33	38	39	39	62	52	46		85	91	48		56	41	34	25	G
14	B	37	37	39	36	26	30	38	74	47	71	49	64	41	52	63		50	46	33	40		41	
15	38	38	38	26	B	B	36		40	62	82	43	51	51	51	65	56	58		59	40	G	33	26
16	G	46	39	31	37	G	29	41	66	62	66	68	88	79	64	40	36	40	38	24	32	22	G	41
17	44	42	48	42	43	64	61	63	60	54	58	58	54	74	86	67	82	83	108			48	48	42
18	39	37	G	25	24	38	36	38	50	43	50	52	61	64	51	56	56	66	39		34		47	
19	42	60	35	34	34	G	29		70	73			G	58	39	57	67	61	61	71	71	57	48	33
20			61	B	G	B	49	36	58	42	57		58	50	58	51	47	41	40	28	24	32	28	40
21	38	39	G	25	31	30	G	36	59	91	85		92	53	66	38	47	42	40	33	31		25	23
22	26	G	G	34	32	29	G	32	36	38	82	65	74	55	50	59	69	72	69	78	26	G	29	26
23	G	28	G	24	38	38	37	35	60	39	41	40		37		66		27	29	39	26	G	29	24
24		35	52	34	G	27	34	33	36	41	48	60	97	68	93	59		33	39		29	G	G	26
25	29	30	35	26	G	32	39	44	34	39	40	37	56	40	40	39	30	29	36		24	34	25	34
26	40	36	33	56	60	40		28	44	41	42	52	51	G	30	29	50	66	60	55	39	36	G	G
27	46	34		41	34	G	G	33	33	42		39	55	65	58	92	73	118	78	53	59	41	24	26
28	G	G	G	G	G	G	G	48		59	49	34	40	34		49	66	47	36		24	53	38	39
29	G	G	G	G	G	G	B	39	40	48				G	48	39	77	48	31			34	34	42
30	33	28	30	B	60	39	52		80	42	79	36	40	40	47	51	54	35	92	81	38	42	G	G
31	G	G	G	G	G	39	27	35			42	48	42	44	45	44	62	43	59	58		85	44	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	25	27	28	27	29	28	25	25	26	28	27	25	28	29	27	29	25	29	26	21	27	27	29	25
MED	33	34	32	29	32	28	30	38	49	45	55	52	56	50	51	57	58	49	48	48	36	40	33	38
U Q	41	39	38	40	39	38	36	46	60	59	71	63	66	64	66	65	70	66	69	58	50	57	42	41
L Q	26	G	G	G	G	G	G	34	38	40	42	40	51	40	47	44	49	41	39	36	26	28	25	26

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT OKINAWA

JUL. 1997

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	14	14	15	14	15	15	18	14	14	17	22	28	26	27	26	17								
2											17		30	30	23	21	18	16	14	14	15	14	15	15
3	15	15	15	15	14	15	18	14	14		18	20	24	27	21	22	18	16	14	14	14	14	15	14
4	14	14	15	16	15	16	15	14	15	16	20	21	24	24	22	17		15	14		15	15	15	14
5	14	15	14	15	15	15	16	14	14	15	18		26	26	21	18	16	14	14	15	15	15	14	14
6	15	15	14	14	14		15	14	14	16	18	28	22		20	20	16	15	14	14	14	14	15	15
7	14	15	14	15	14	15	15	14		16	18	26	27	26	27	21	17	15	14	14	15	14	14	14
8	14	14	15	15	14	14	15	14	15	16	17	20	20	23	20	23	15	15	14	14	15	14	14	15
9	14	15	15	15	14	14	14	14	15	15	18	21	21	22	26	21	16	14	14	14	17	14	15	14
10	15	14	14	14	15	15	B	14	14	16	20	24	28	27	24			15	14	14	15	14	15	15
11	14	14	14	15	15	14	15	14	15	15	17	22	22	26	32		18	15	14	15	14	14	14	14
12	15	15	14	14	15	14	15	14	15	16	20	27	22		34	23	20	15	14	14	14	15	14	14
13	15	15	15	14	15	16	17	14	14	16	16	17	21		20	17	16	15		15	15	14	14	16
14	B	16	15	14	14	14	15	14	15	16	20	23	28	28	26	20	16	14	14	14	14		15	14
15	14	14	14	15	B	B	14	14	15	16	17	18	22	22			15	15		15	15	14	15	15
16	15	16	14	15	14	14	14	14	15	17	18	18		28	20	18	16	15	14	14	14	14	16	14
17	14	15	15	15	15	15	17	14	15	17	18	23		22	24	20	18	15	15	15	14	15	14	15
18	14	14	15	16	15	14	15	14	15	15	17		21	24	34	15	15	15	14	14	15	14	14	15
19	14	14	15	14	14	14	15	14	15	16	18	28		35			18	15	14	14	16	15	14	14
20	14	14	14	B	18	B	14	14	14	16		20	23	24	20	20	16	15	14	15	15	14	14	15
21	14	14	14	14	15	14	17	14	14	16	21	22	27	33	28	26	17	16	14	14	14	14	14	14
22	15	15	16	14	15	15	26	14	15	15	18	20	21	23	23	22	16	14	14	14	15	14	14	14
23	14	14	15	14	15	15	14	14	14	15	17	26	28	28	35	33	30	15	14	14	14	16	15	15
24	15	15	14	14	15		15	15	15	17	17	24	29	24	20	21	17	14	14	14	14	15	16	16
25	15	14	14	15	15	14	15	14	14	16	22	27	21	23	28	23	17	14	14		15	16	14	15
26	14	14	15	14	14	15	15	14	16	16	20	21	40	50	22		17	15	14	14	15	14	16	16
27	15	14	14	14	15	14	28		14	15		22	28	33	27	18	16	15	14	14	14	15	15	15
28	15	15	14	15	15	16	15	14	15	15	17	20		23	21	18	16	15	14	14	16	15	15	14
29		16	14	15	14	15	B	14	15	16				48	29	28	16	17	15	14	14	14	15	14
30	15	14	15	B	14	15	14	14	15	17	20	29	22	21	20	17	15	15	14	14	15	15	16	20
31	15	16	15	14	15	15	18	14	14	15	16	20	28	24	17	20	18	15	14	15	15	14	15	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	30	30	28	29	26	28	29	29	29	28	27	26	28	29	26	28	30	28	28	30	29	30	30
MED	14	14	14	14	15	15	15	14	15	16	18	22	24	26	23	20	16	15	14	14	15	14	15	14
U Q	15	15	15	15	15	15	17	14	15	16	20	26	28	28	27	22	18	15	14	14	15	15	15	15
L Q	14	14	14	14	14	14	15	14	14	15	17	20	22	23	20	18	16	15	14	14	14	14	14	14

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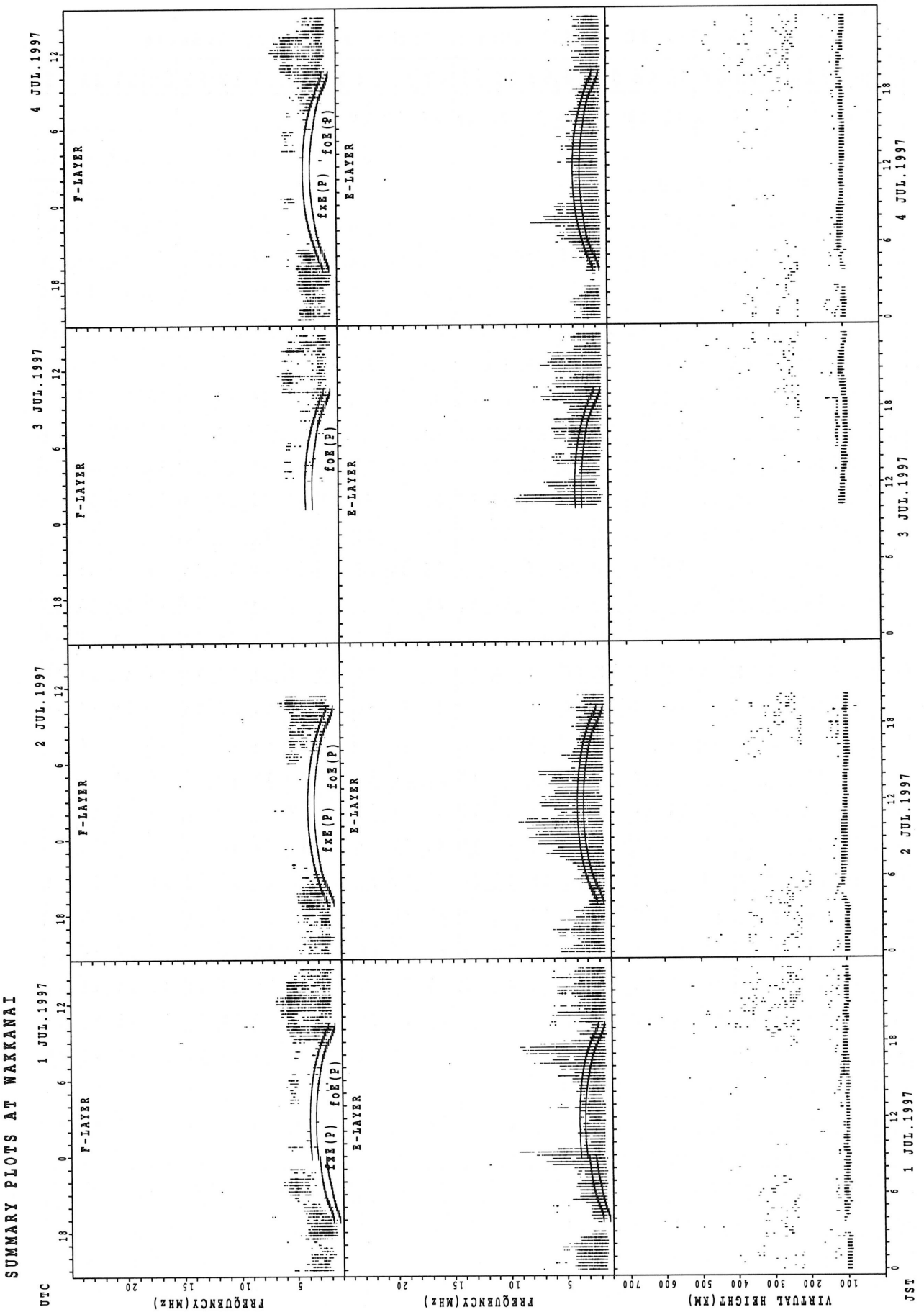
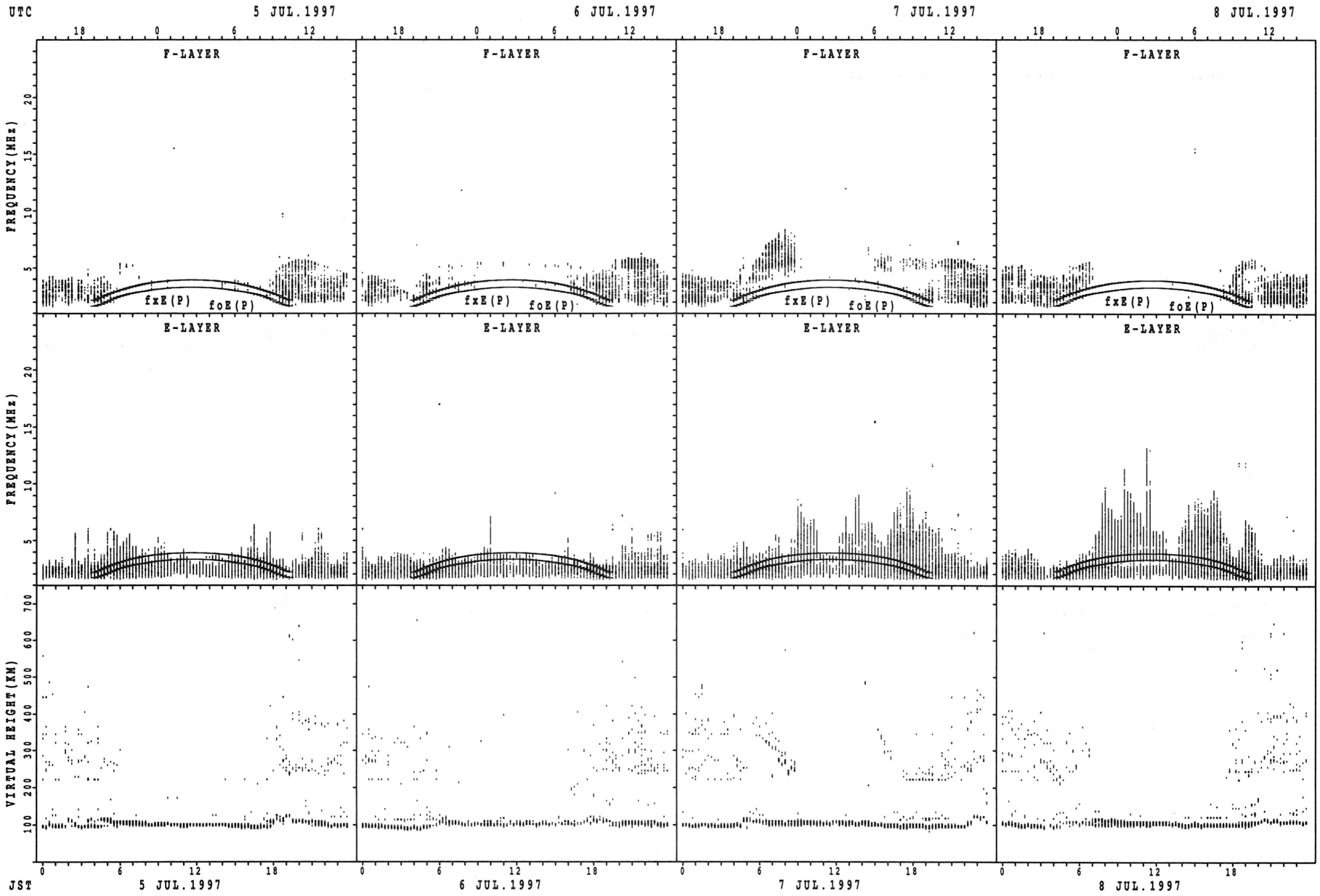
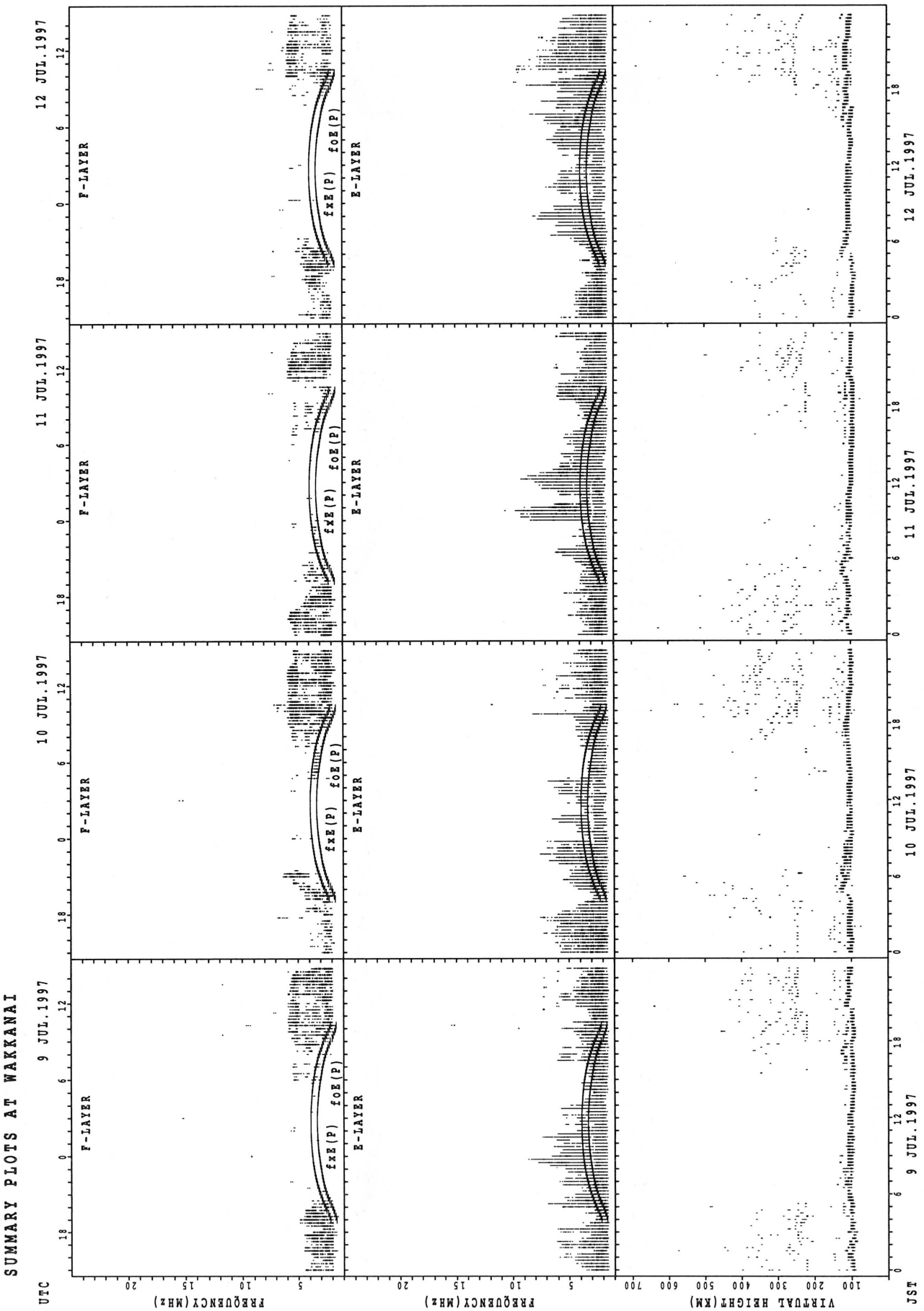

SUMMARY PLOTS AT WAKKANAI
UTC
JST
1 JUL.1997
2 JUL.1997
3 JUL.1997
4 JUL.1997
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE

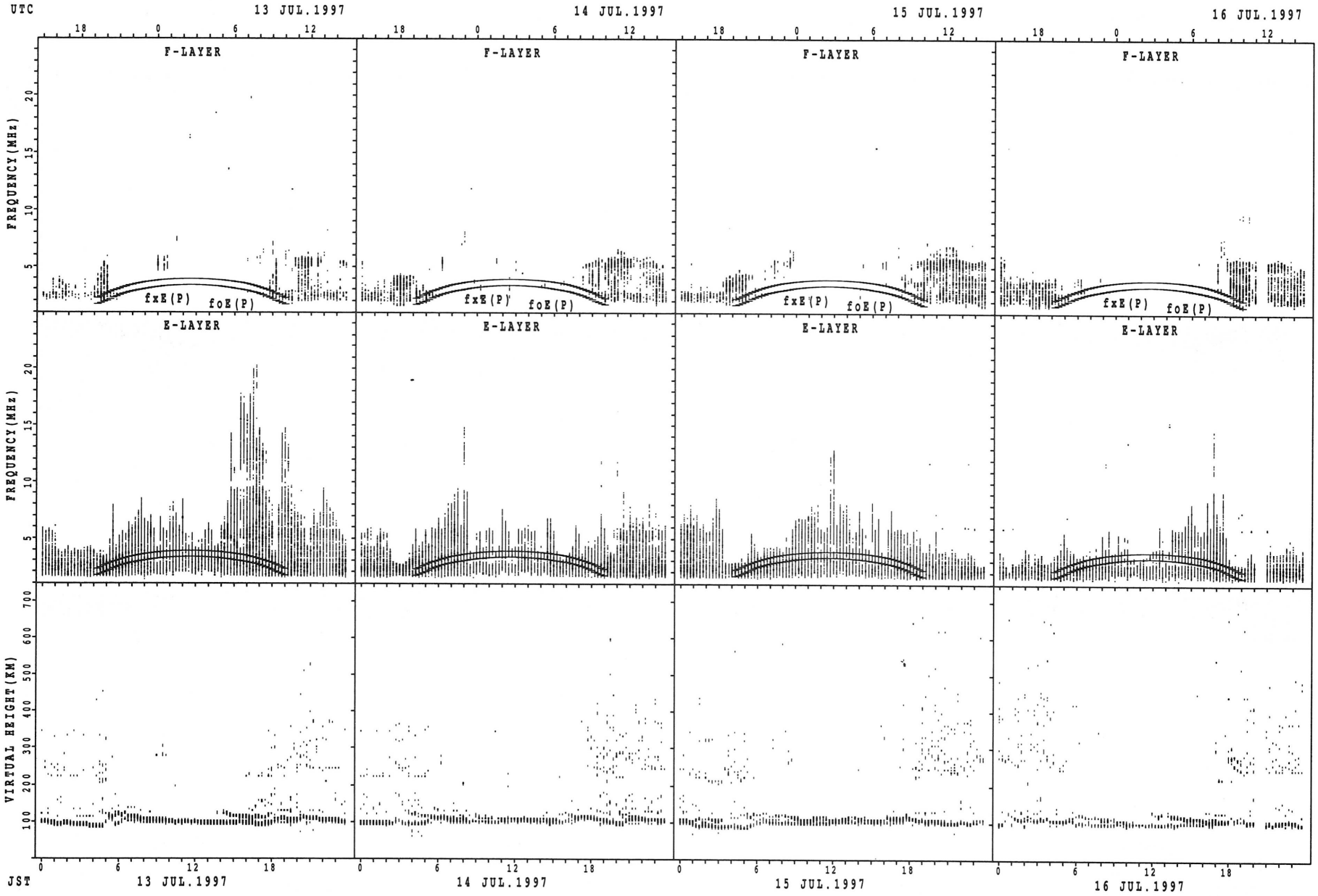
SUMMARY PLOTS AT WAKKANAI



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

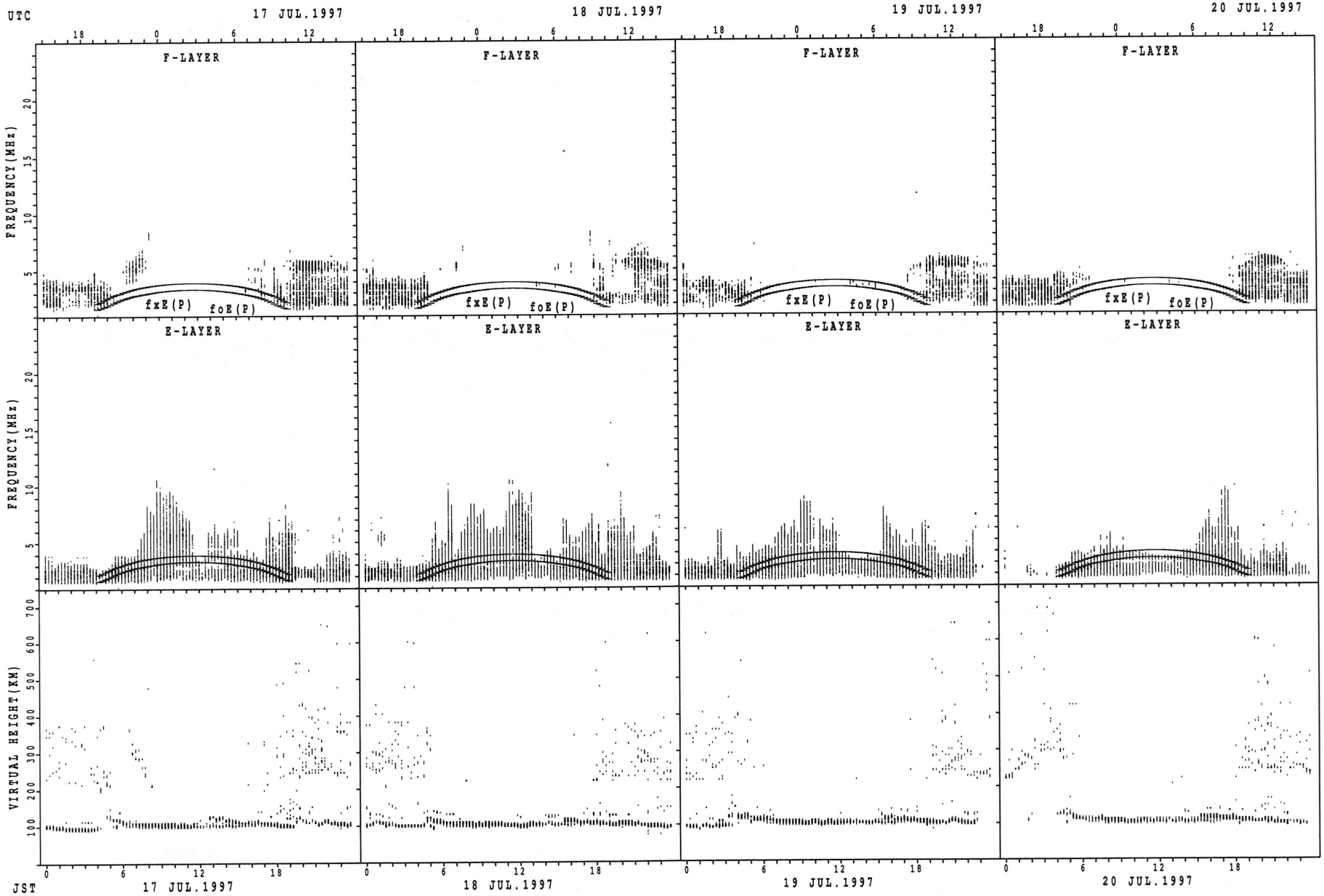

SUMMARY PLOTS AT WAKKANAI
UTC
JST
9 JUL.1997
10 JUL.1997
11 JUL.1997
12 JUL.1997
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT WAKKANAI



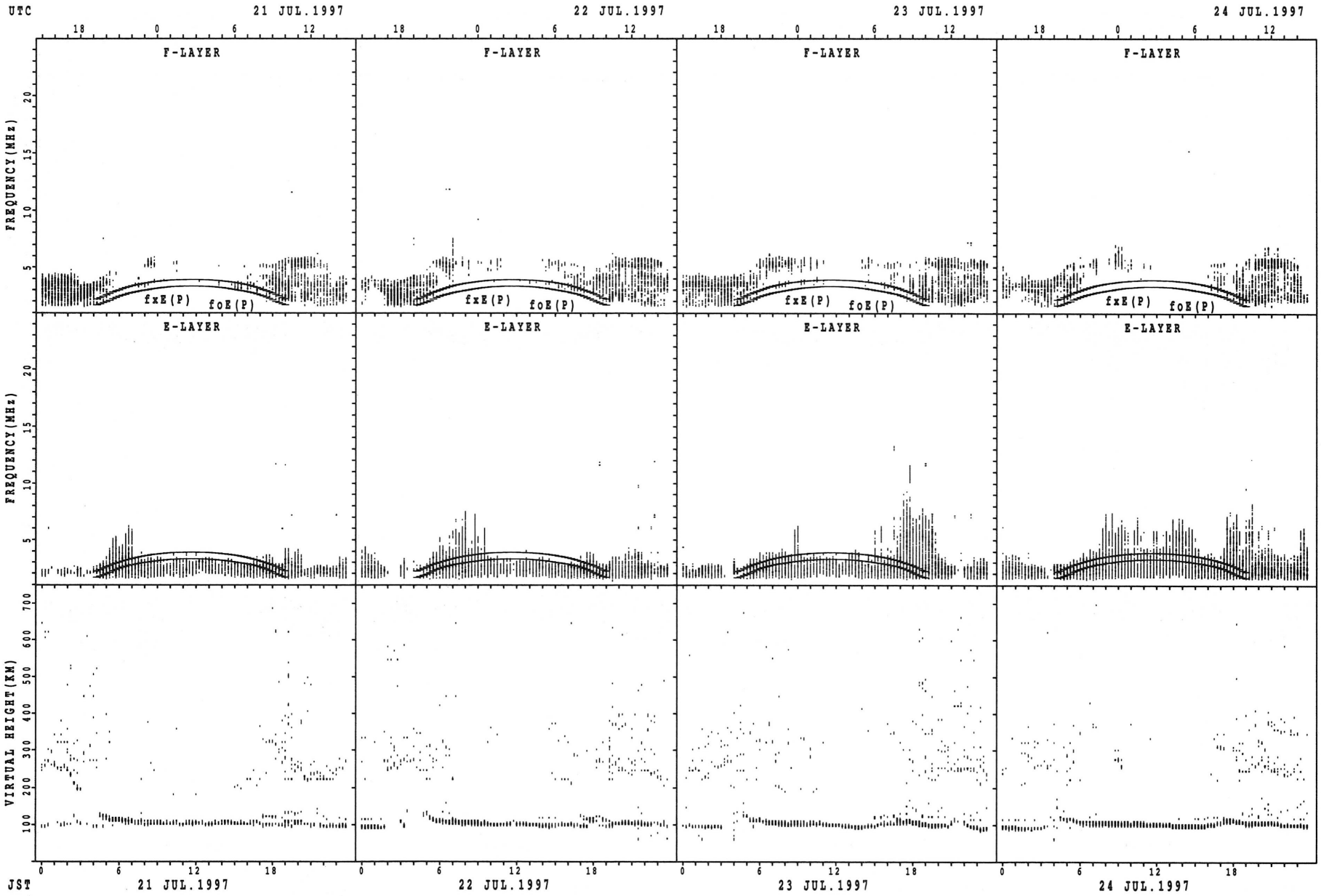
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT WAKKANAI

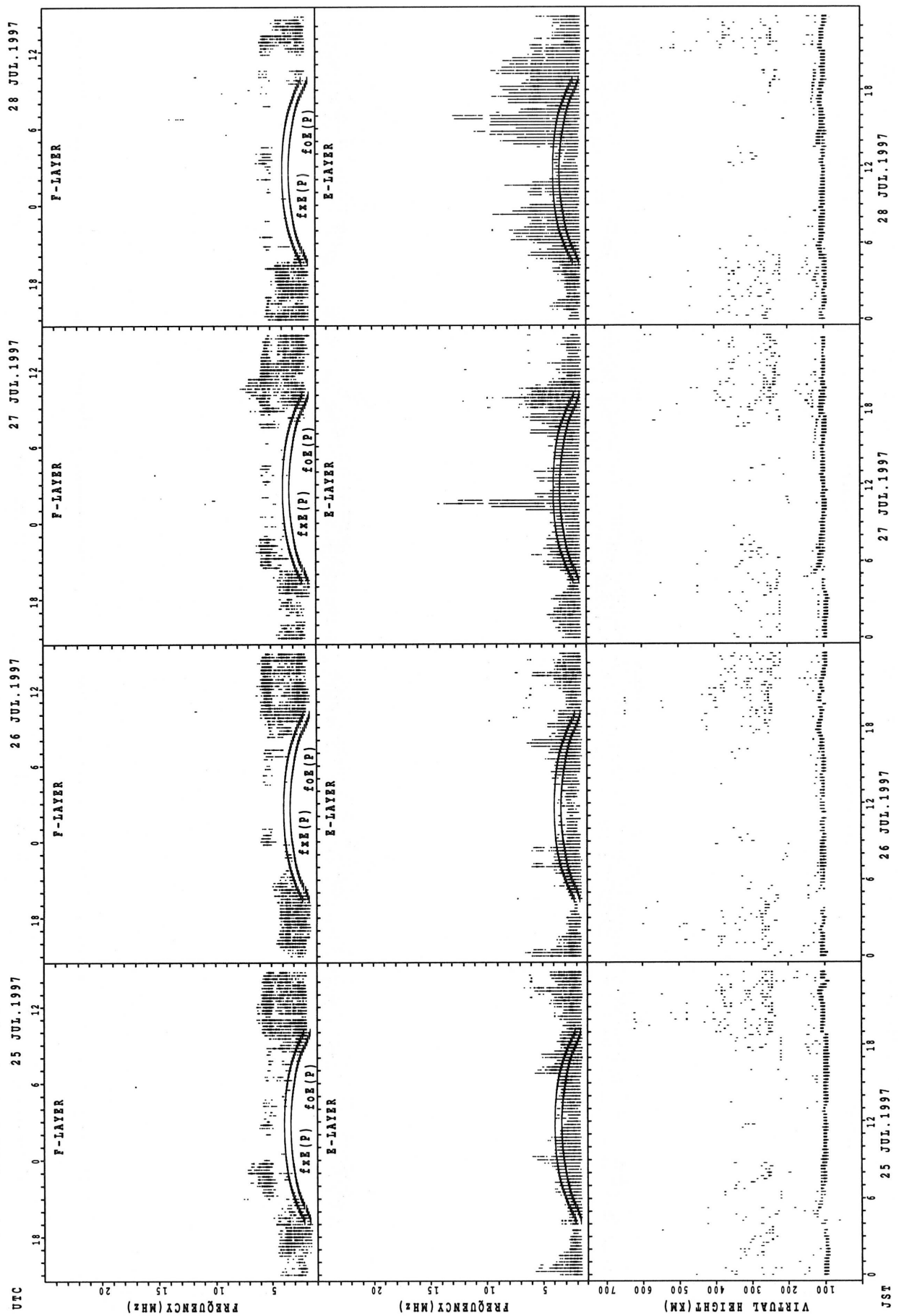


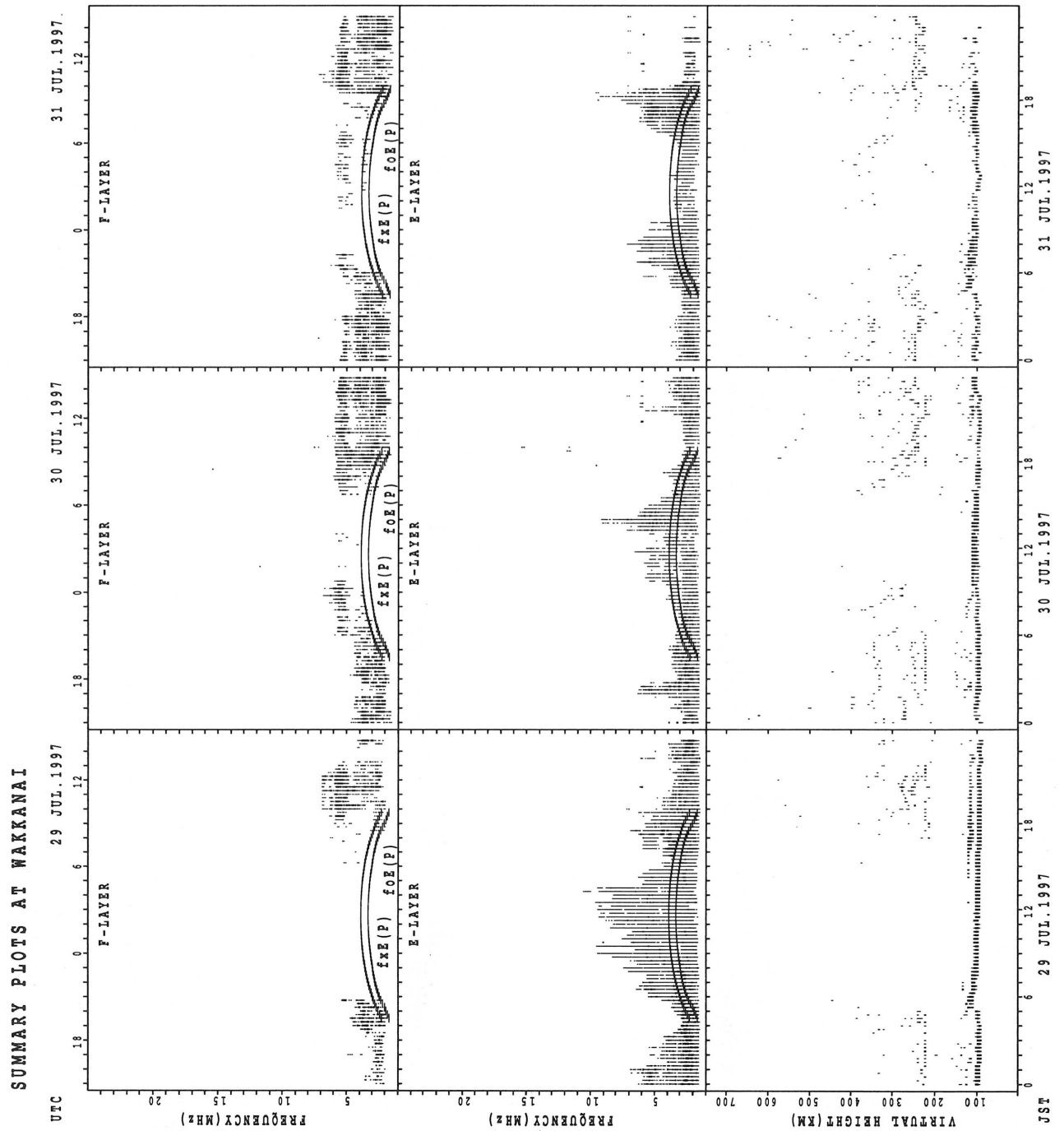
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

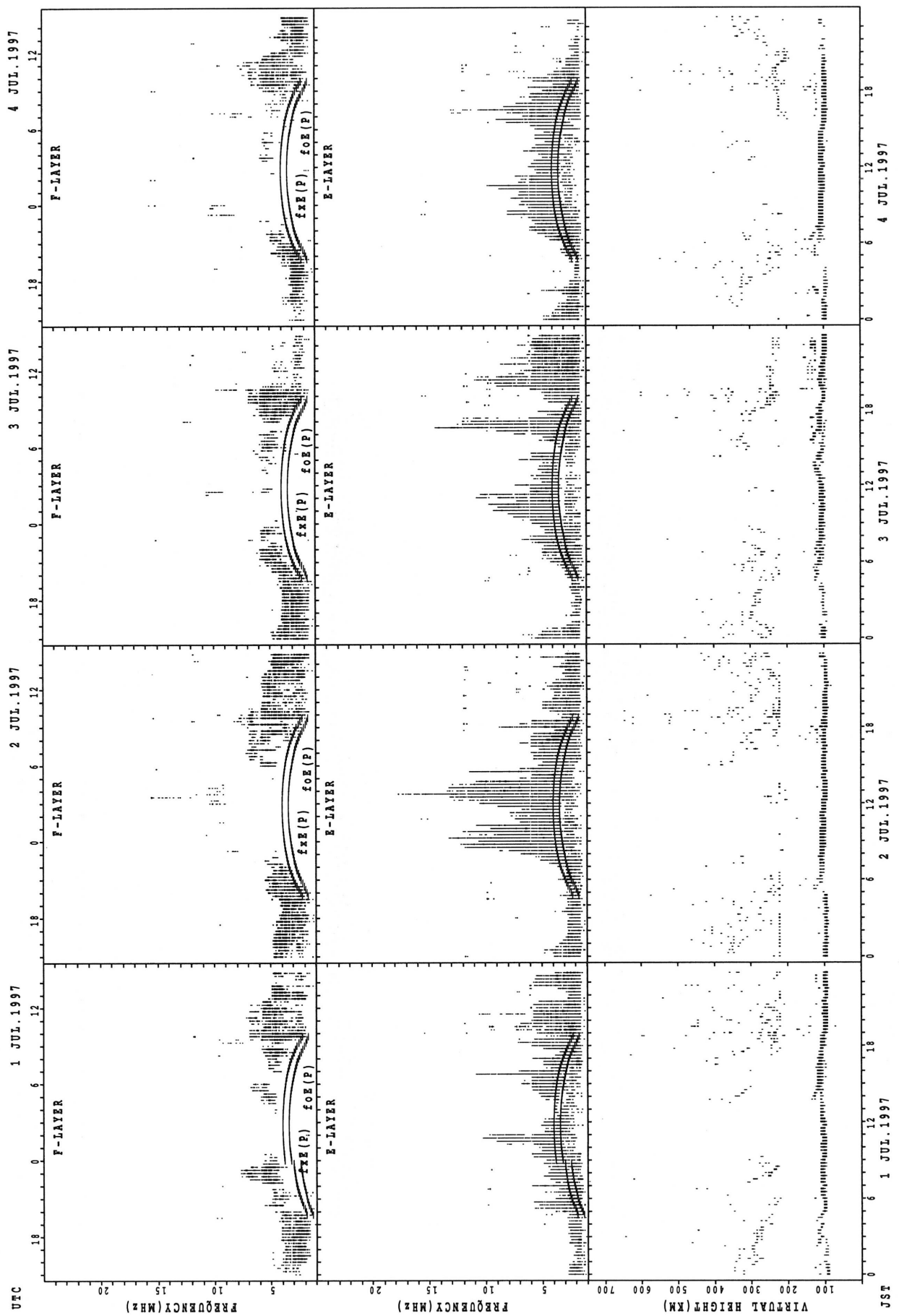
SUMMARY PLOTS AT WAKKANAI



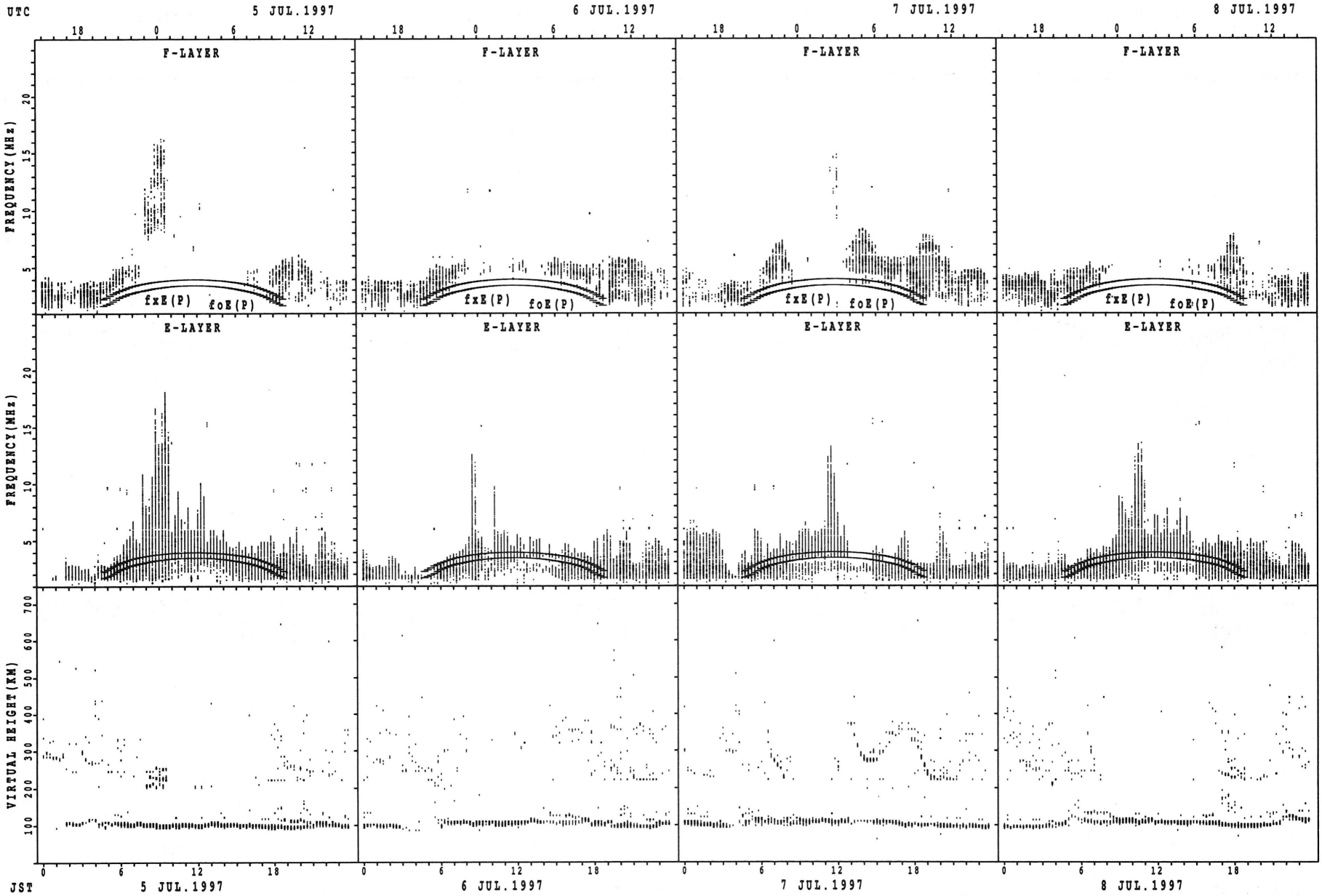
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
25 JUL.1997
26 JUL.1997
27 JUL.1997
28 JUL.1997
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

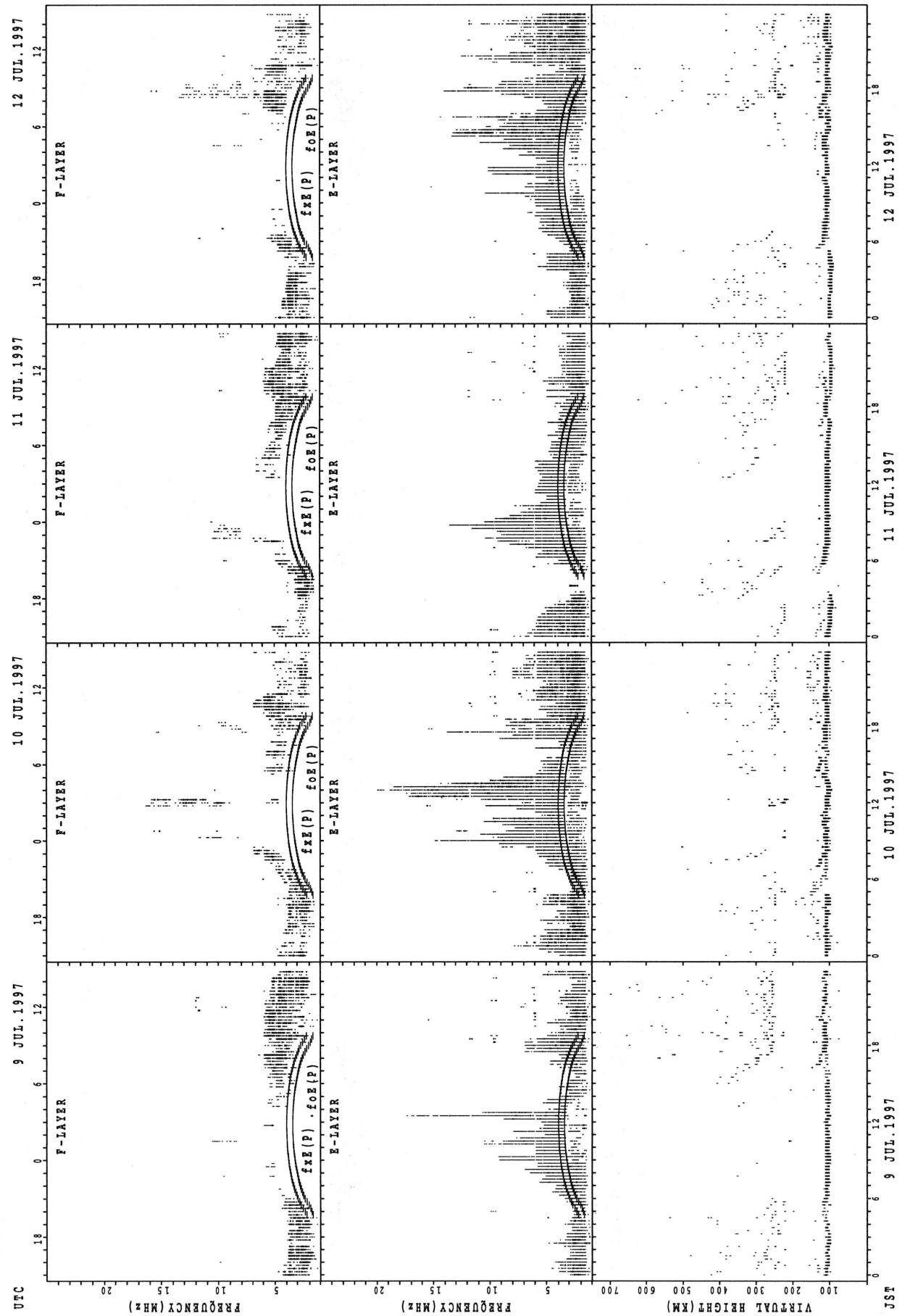

SUMMARY PLOTS AT WAKKANAI
UTC
29 JUL.1997
30 JUL.1997
31 JUL.1997
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
1 JUL.1997
2 JUL.1997
3 JUL.1997
4 JUL.1997
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

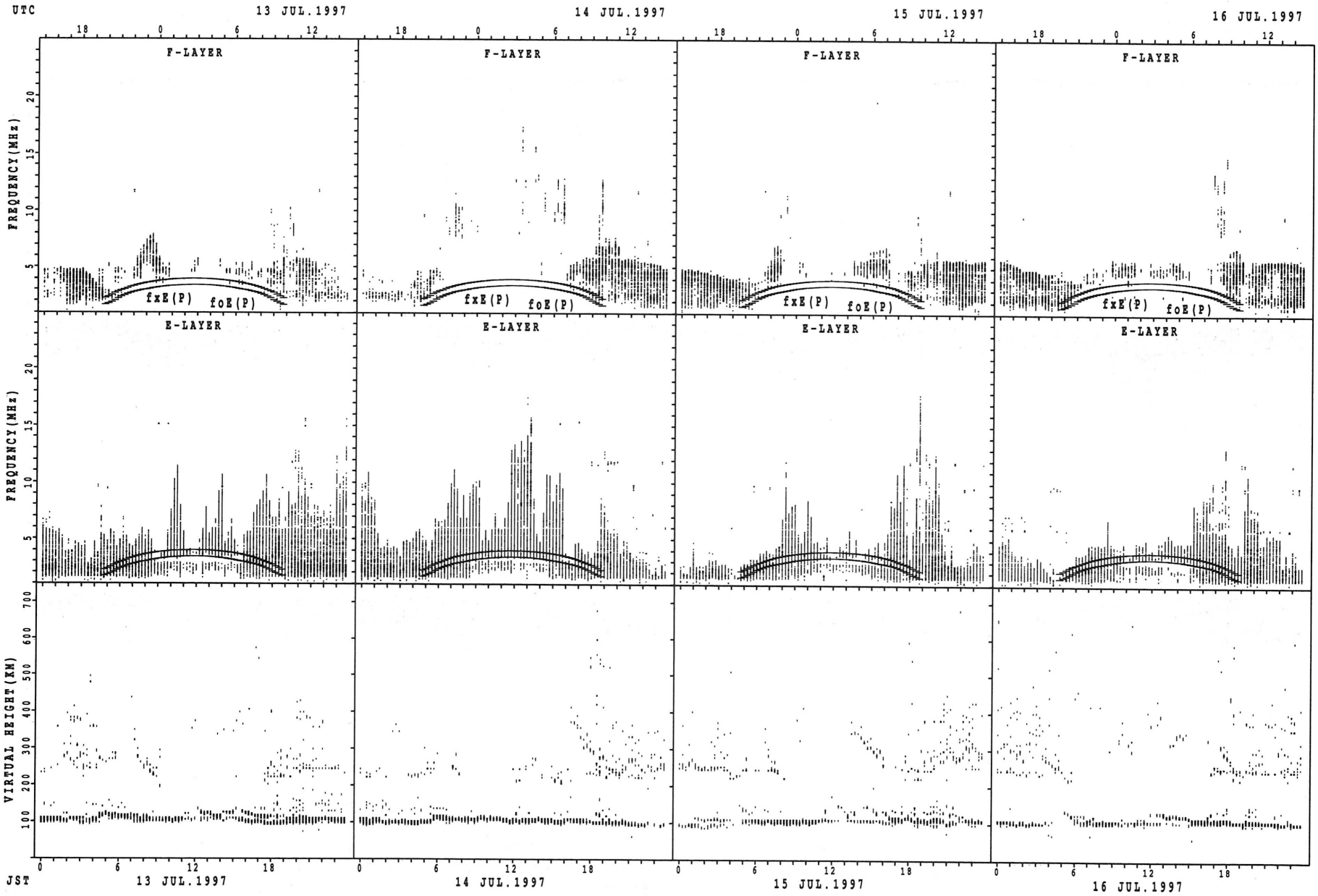
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

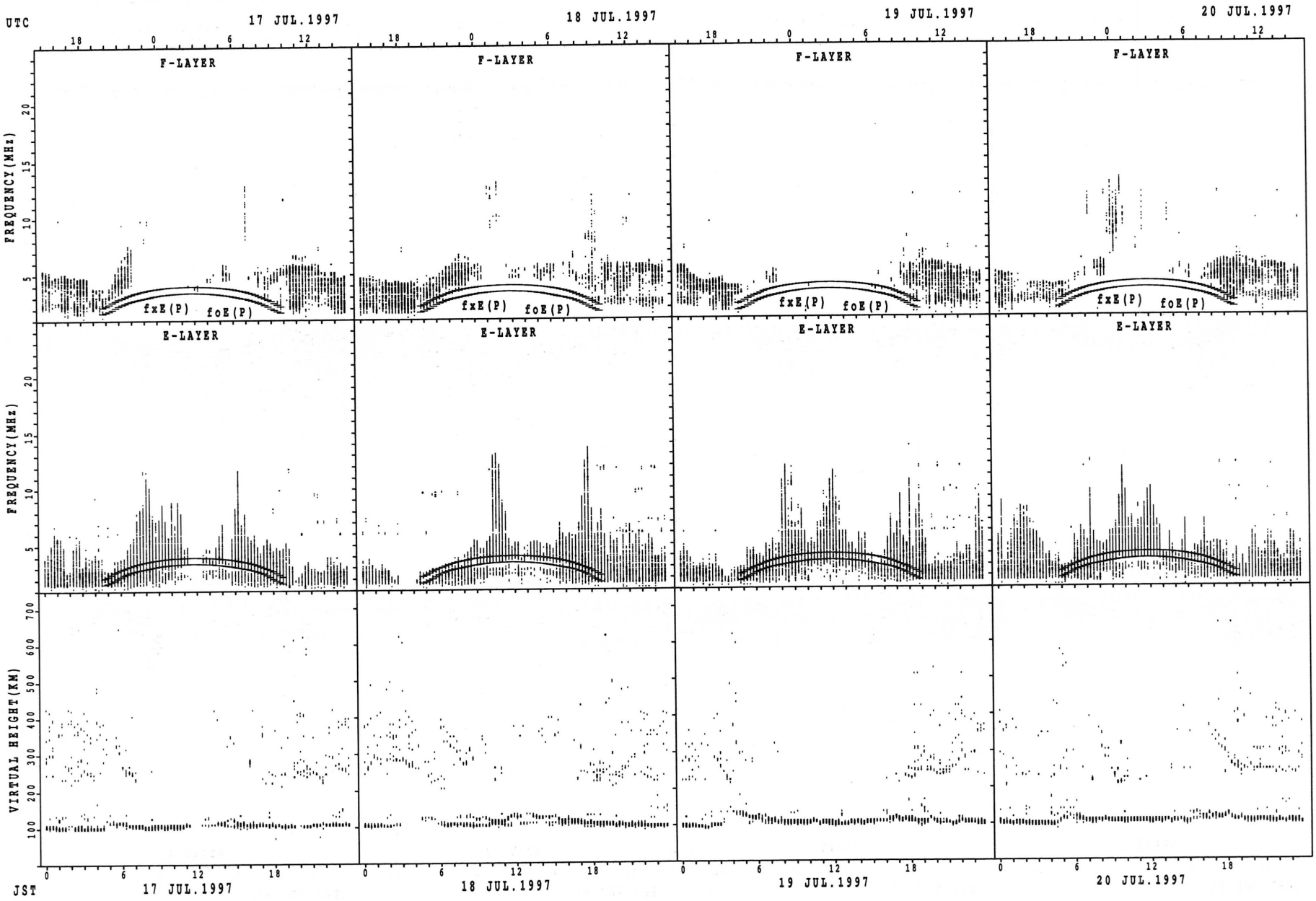

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
9 JUL.1997
10 JUL.1997
11 JUL.1997
12 JUL.1997
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



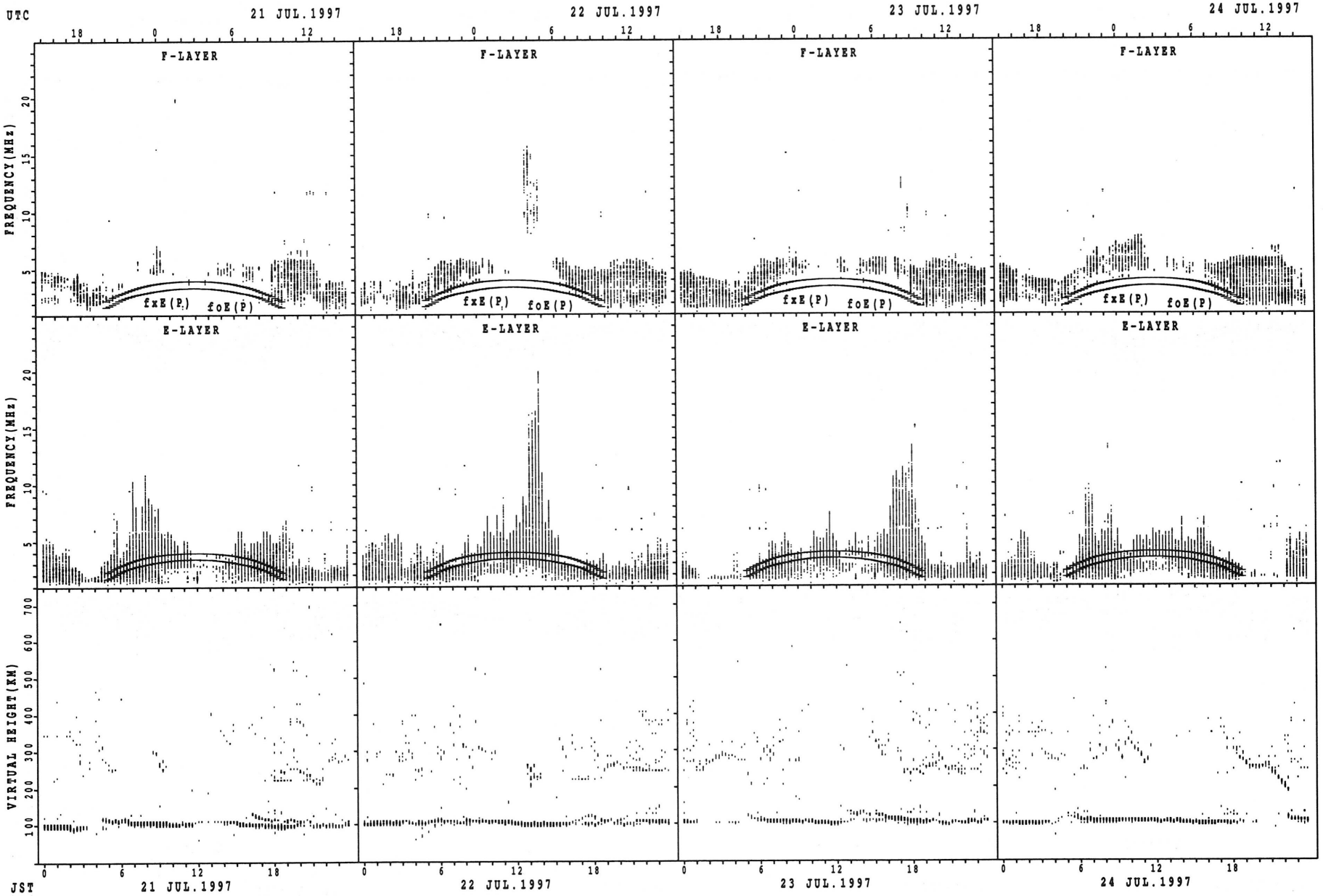
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

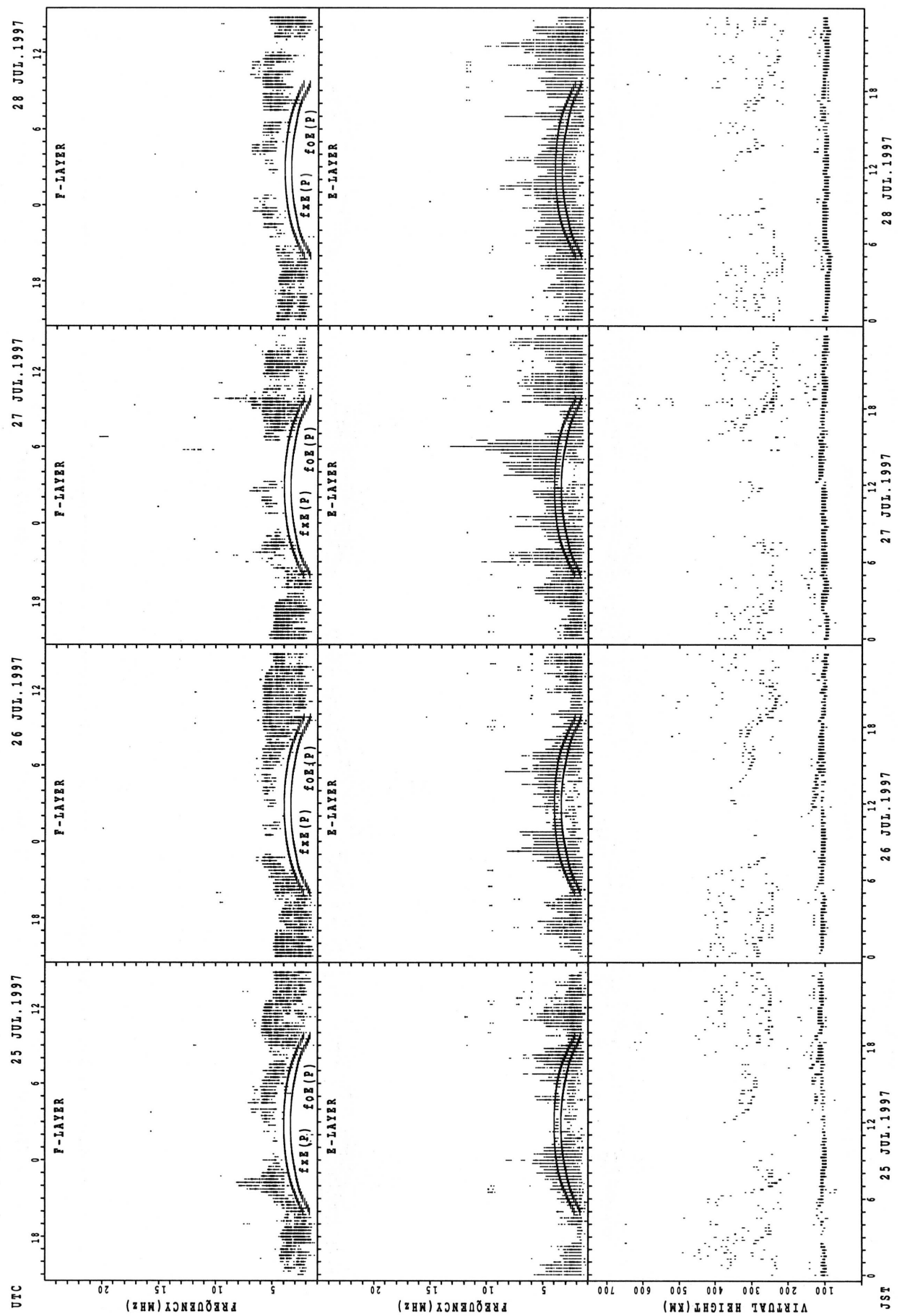


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

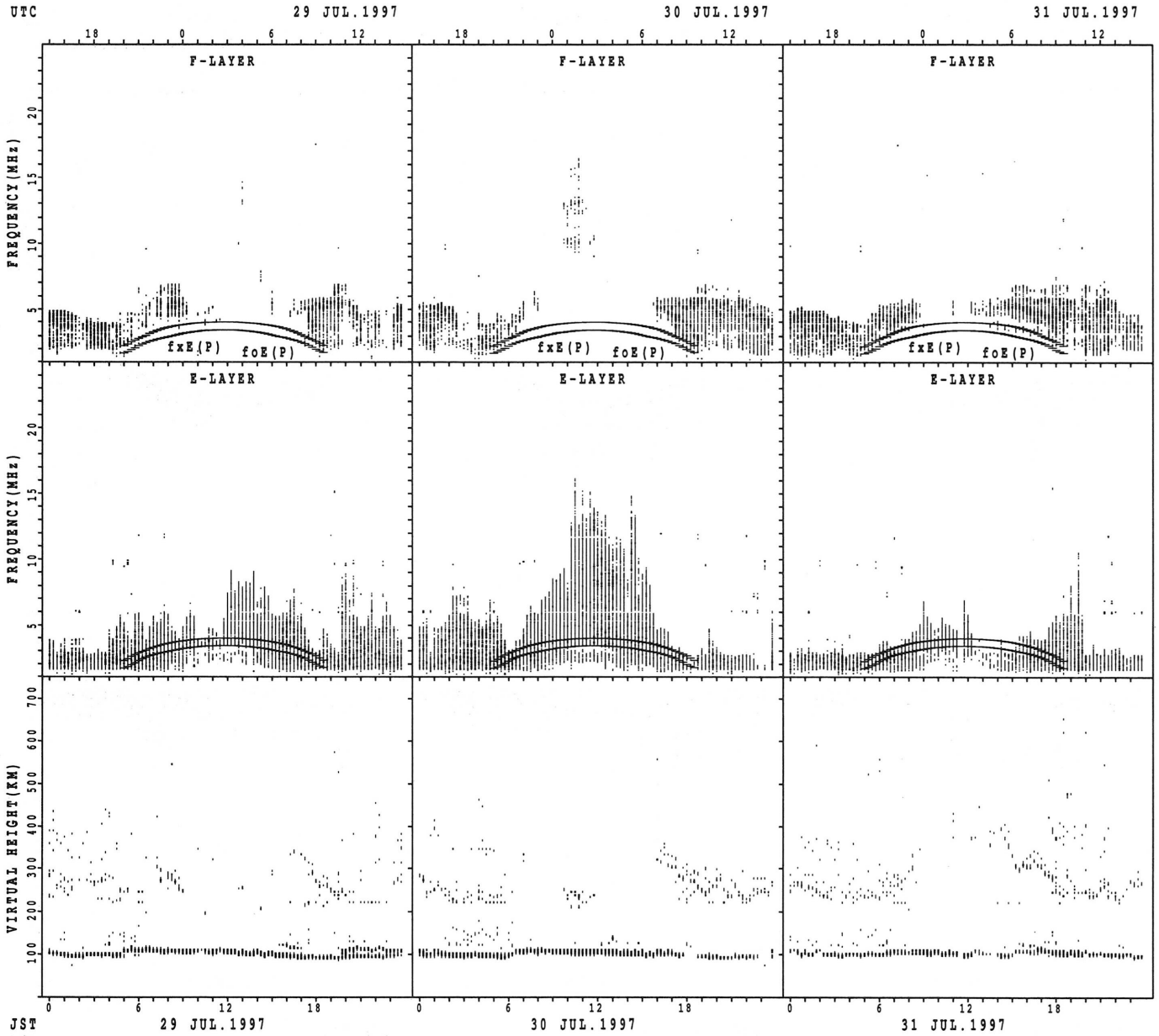
SUMMARY PLOTS AT KOKUBUNJI TOKYO



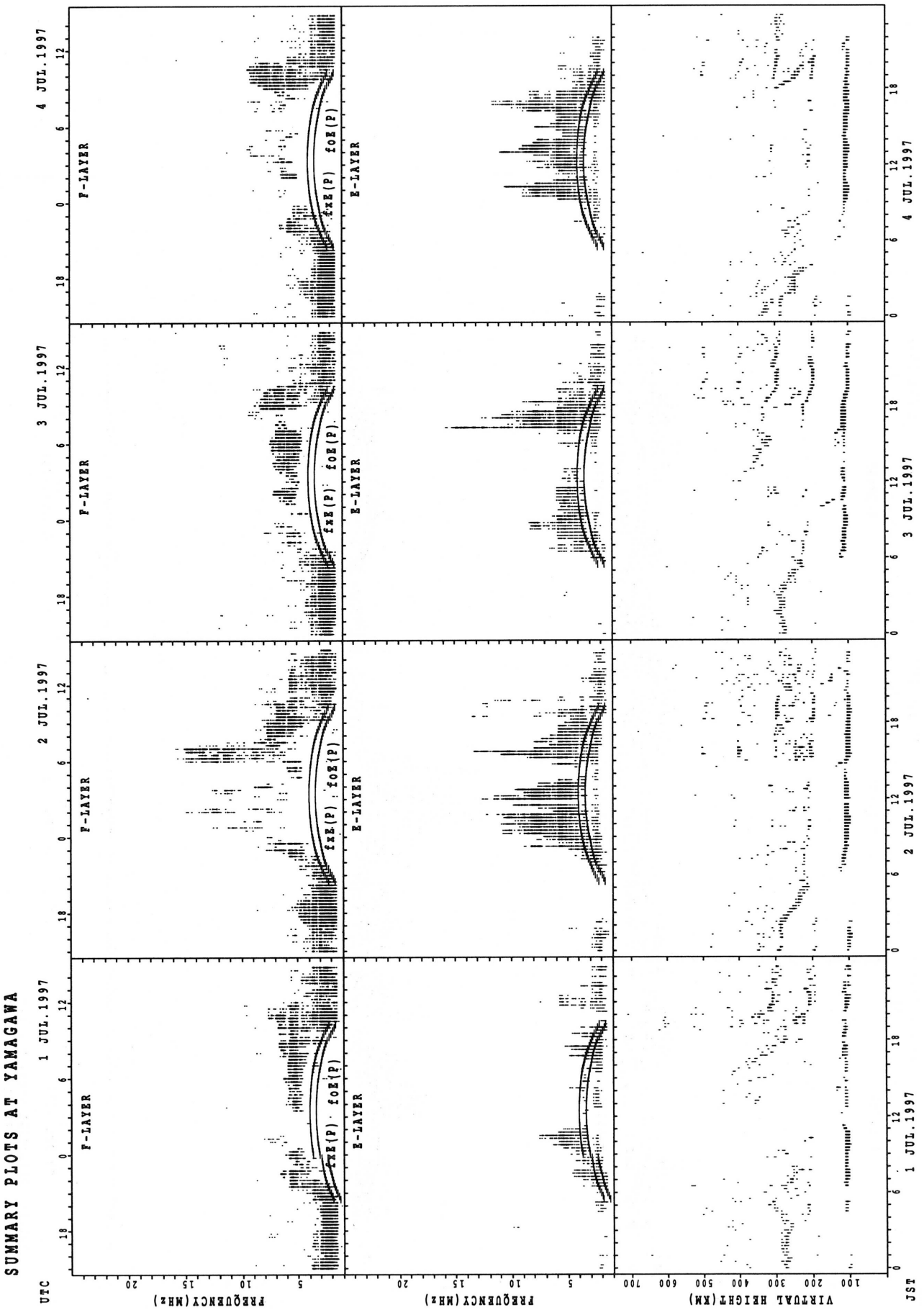
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
25 JUL.1997
26 JUL.1997
27 JUL.1997
28 JUL.1997
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

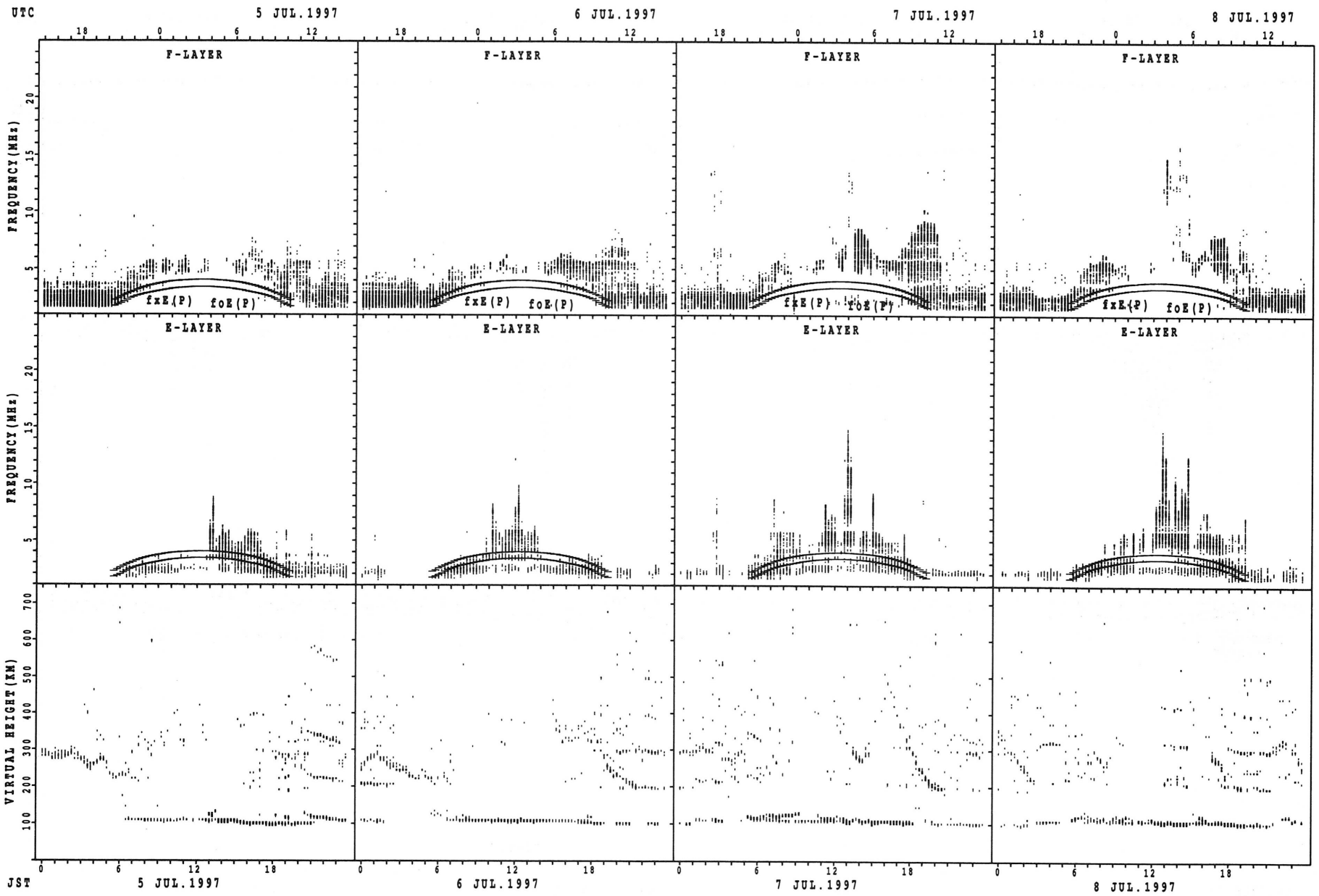
SUMMARY PLOTS AT KOKUBUNJI TOKYO



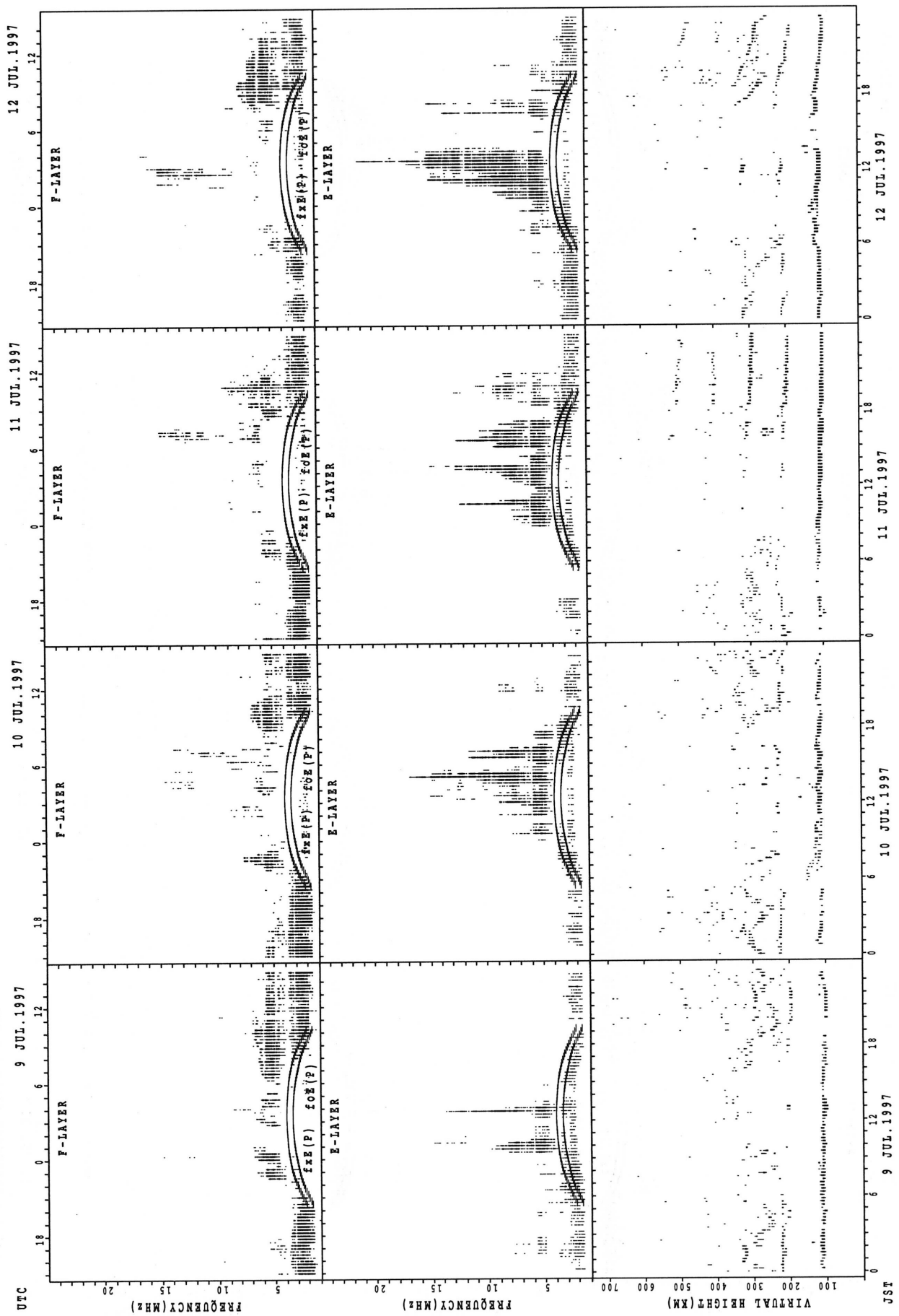
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
1 JUL.1997
2 JUL.1997
3 JUL.1997
4 JUL.1997
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

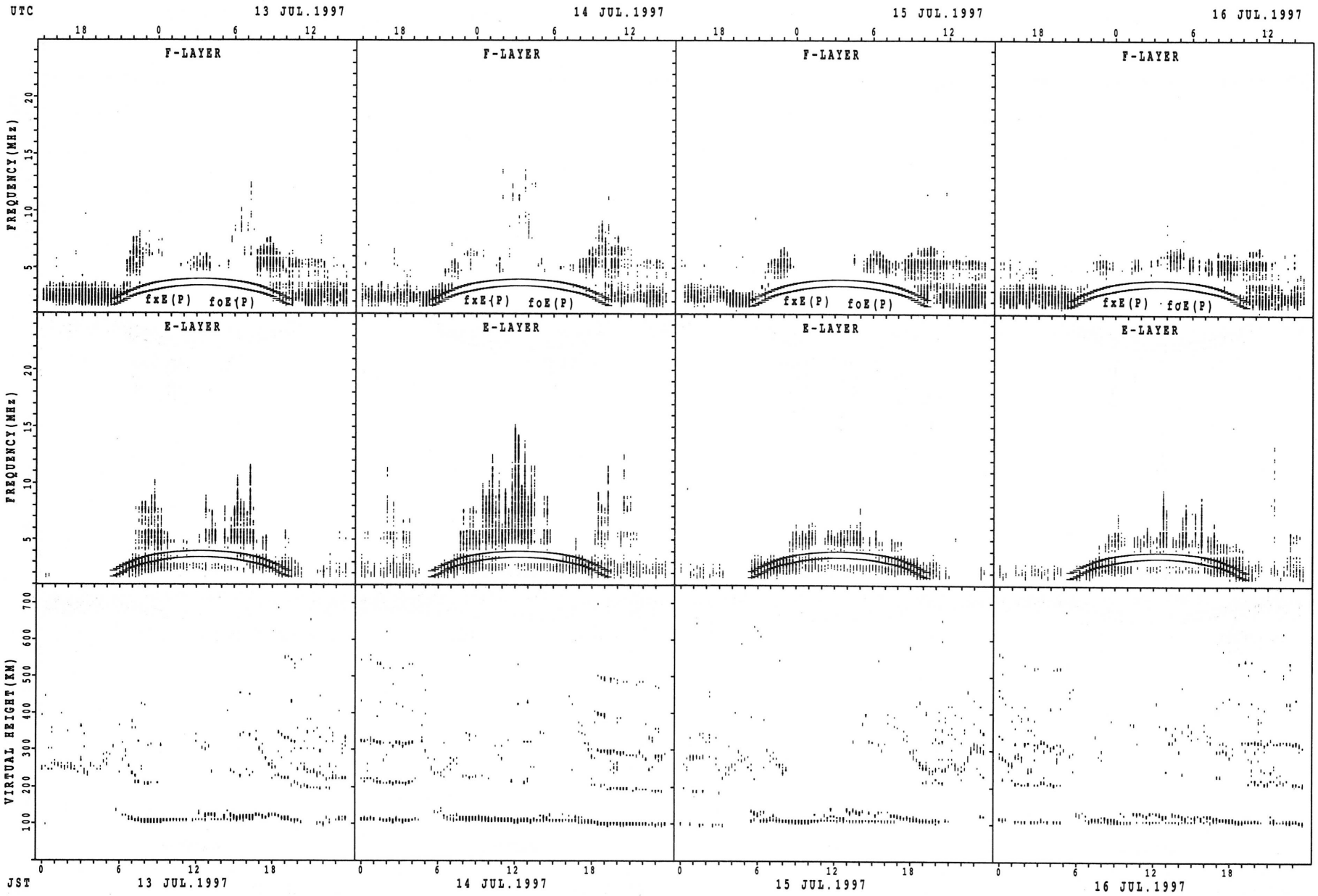
SUMMARY PLOTS AT YAMAGAWA



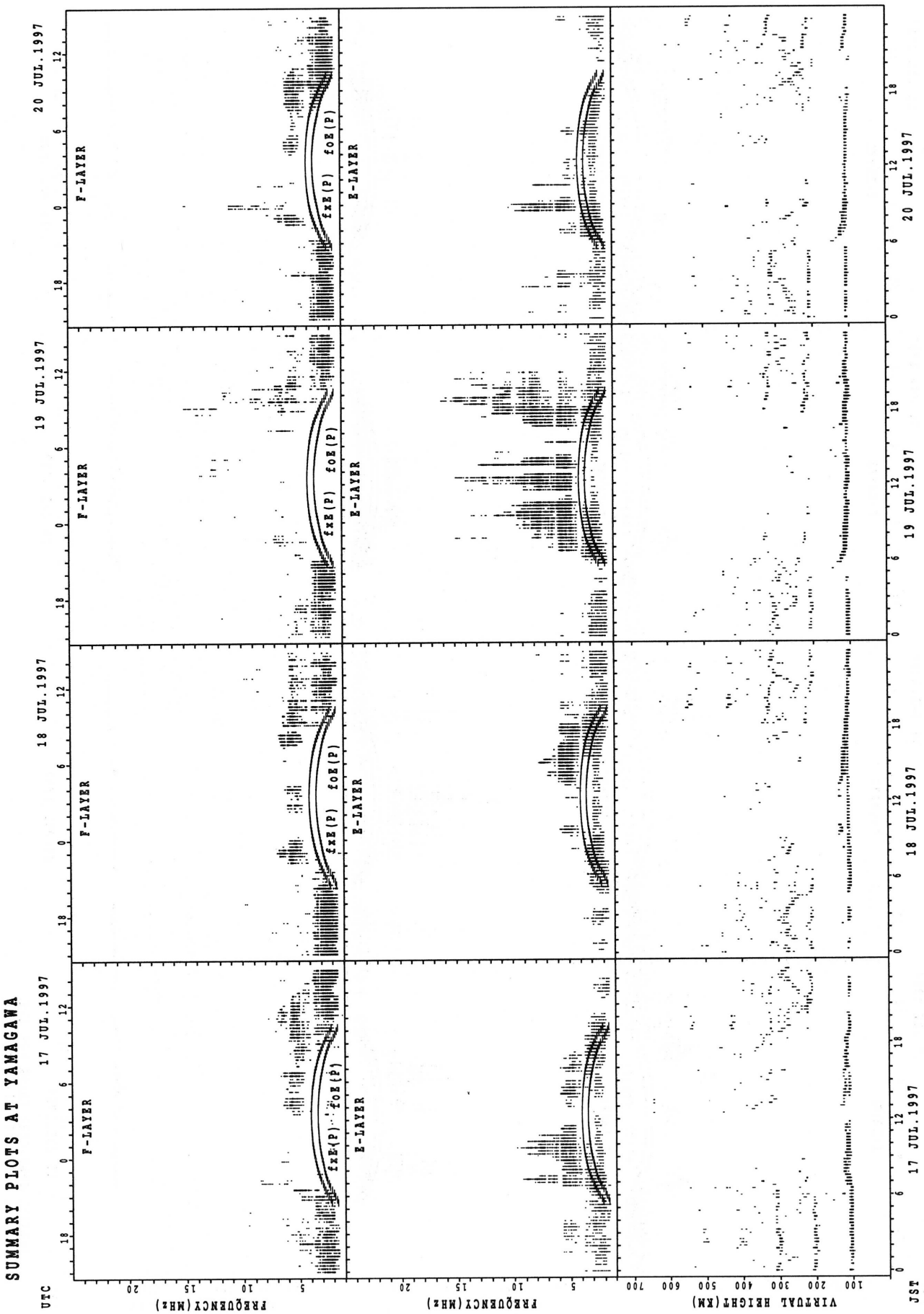
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
9 JUL.1997
10 JUL.1997
11 JUL.1997
12 JUL.1997
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

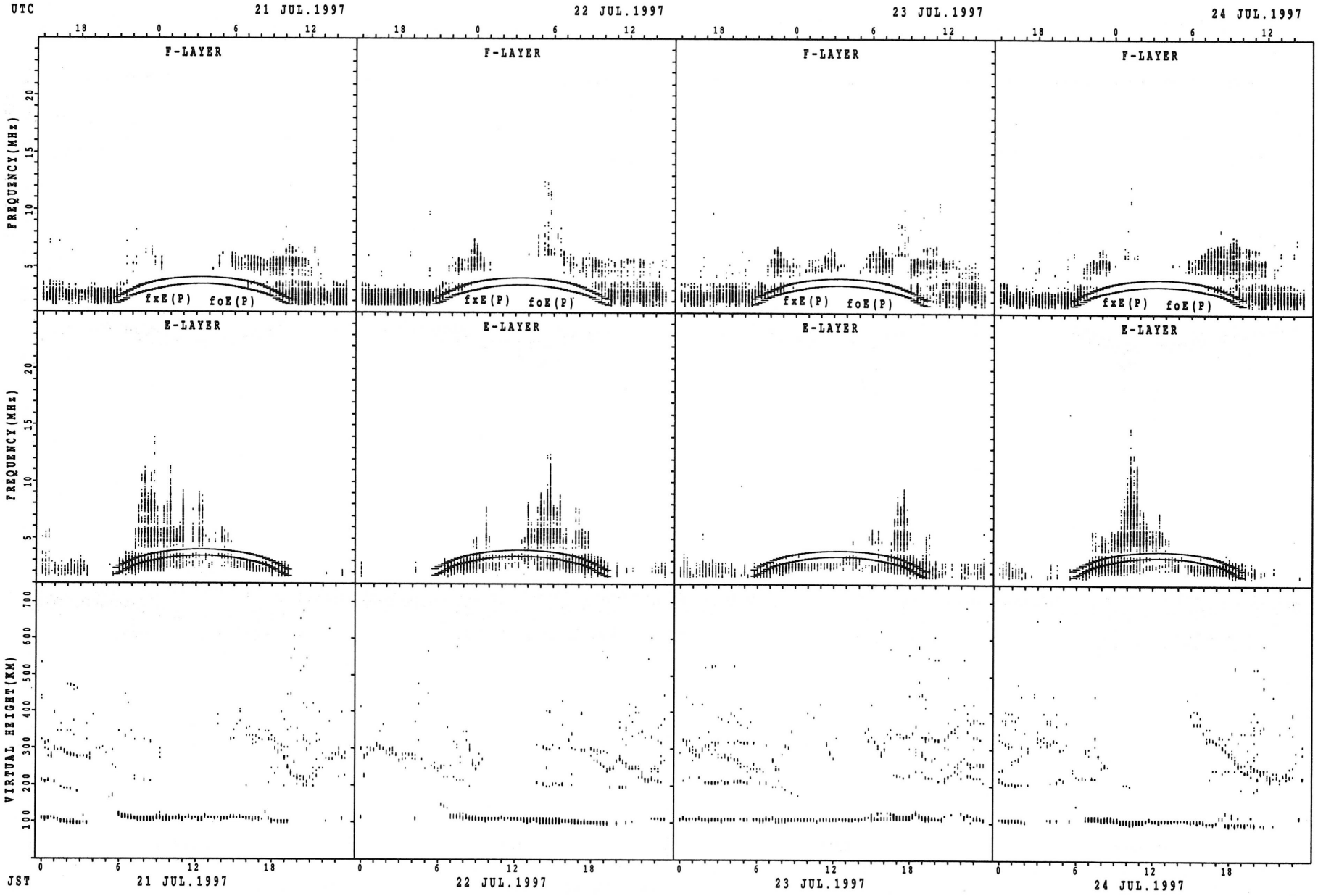
SUMMARY PLOTS AT YAMAGAWA



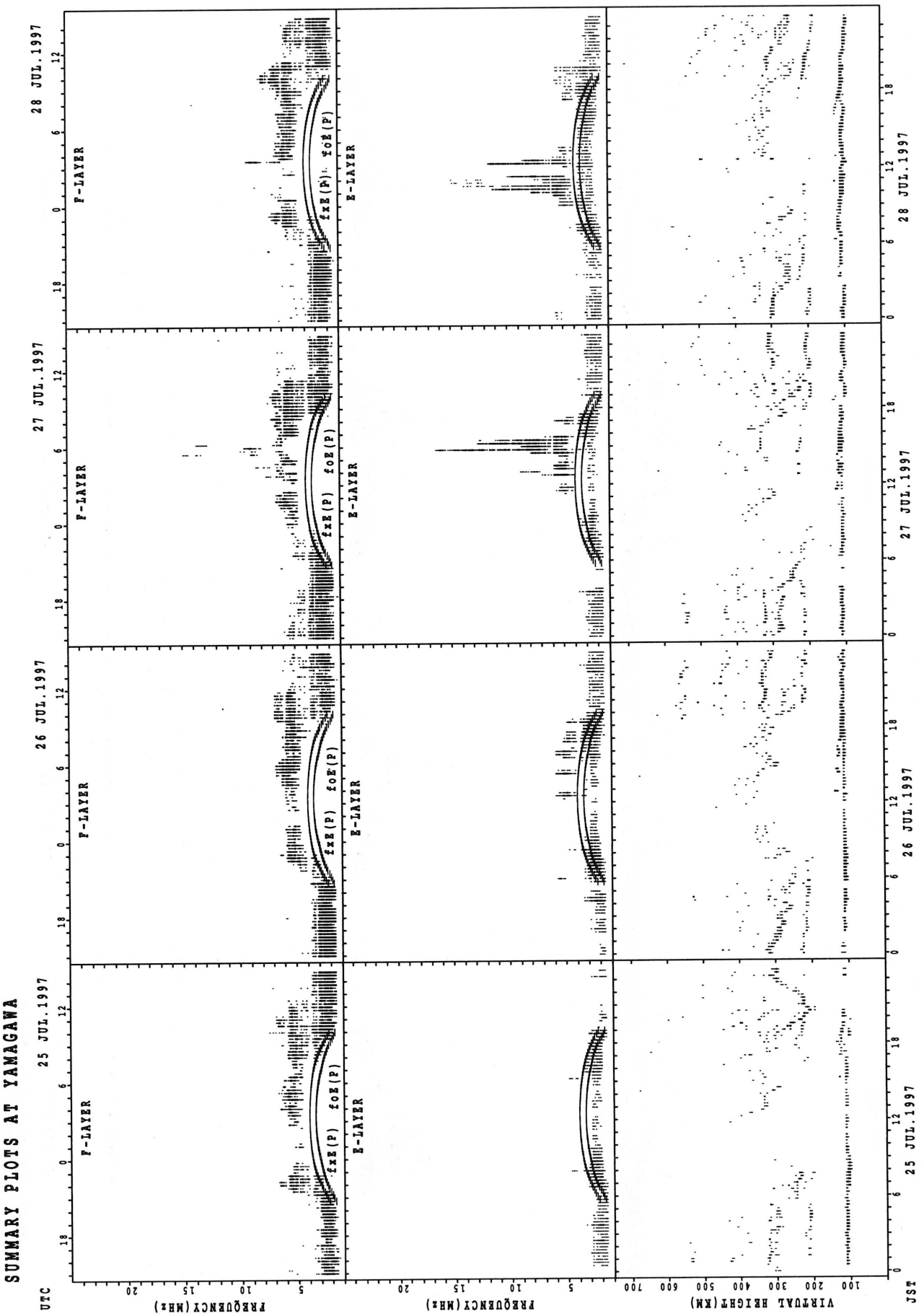
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
17 JUL.1997
18 JUL.1997
19 JUL.1997
20 JUL.1997
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
UTC
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

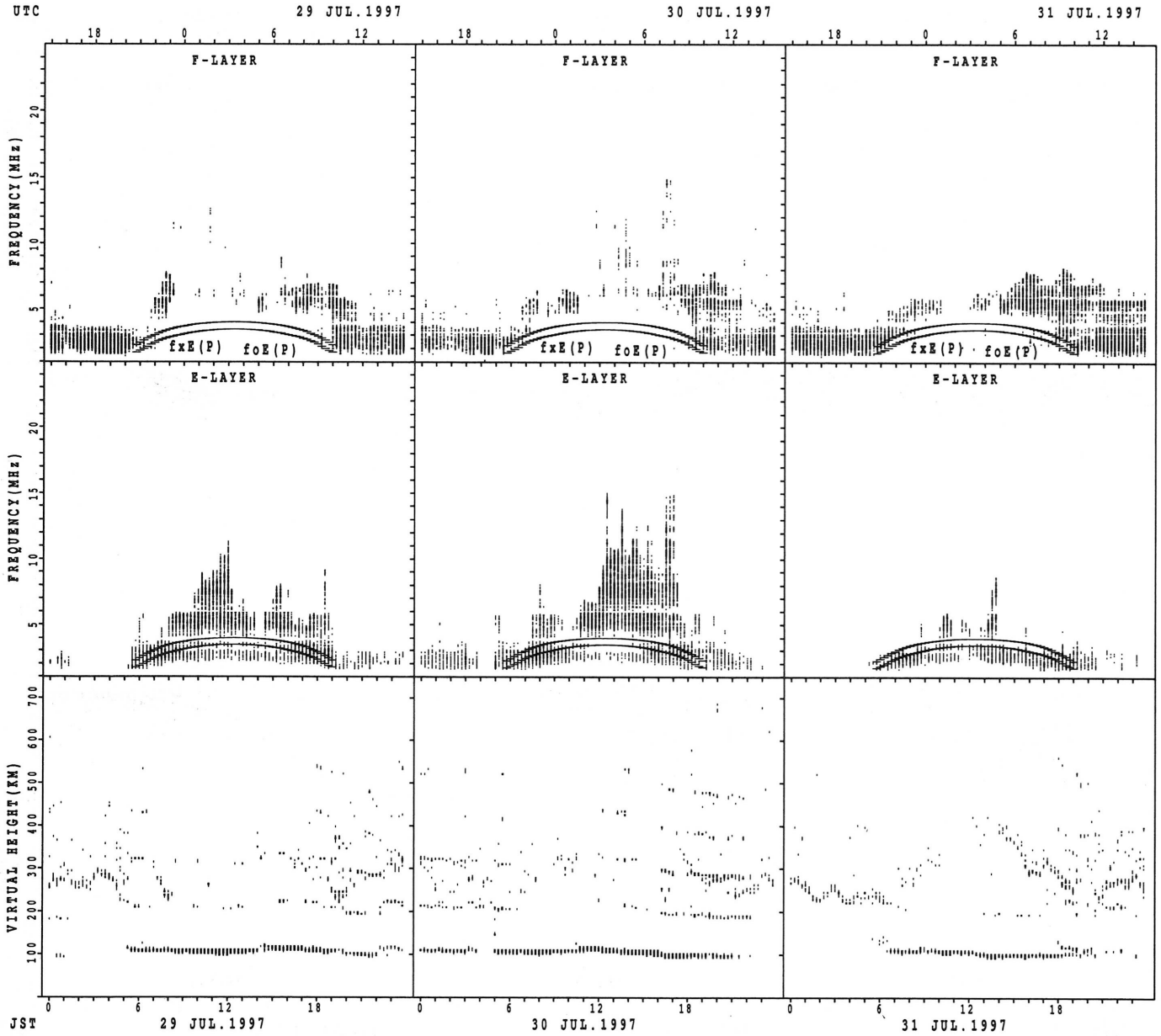
SUMMARY PLOTS AT YAMAGAWA



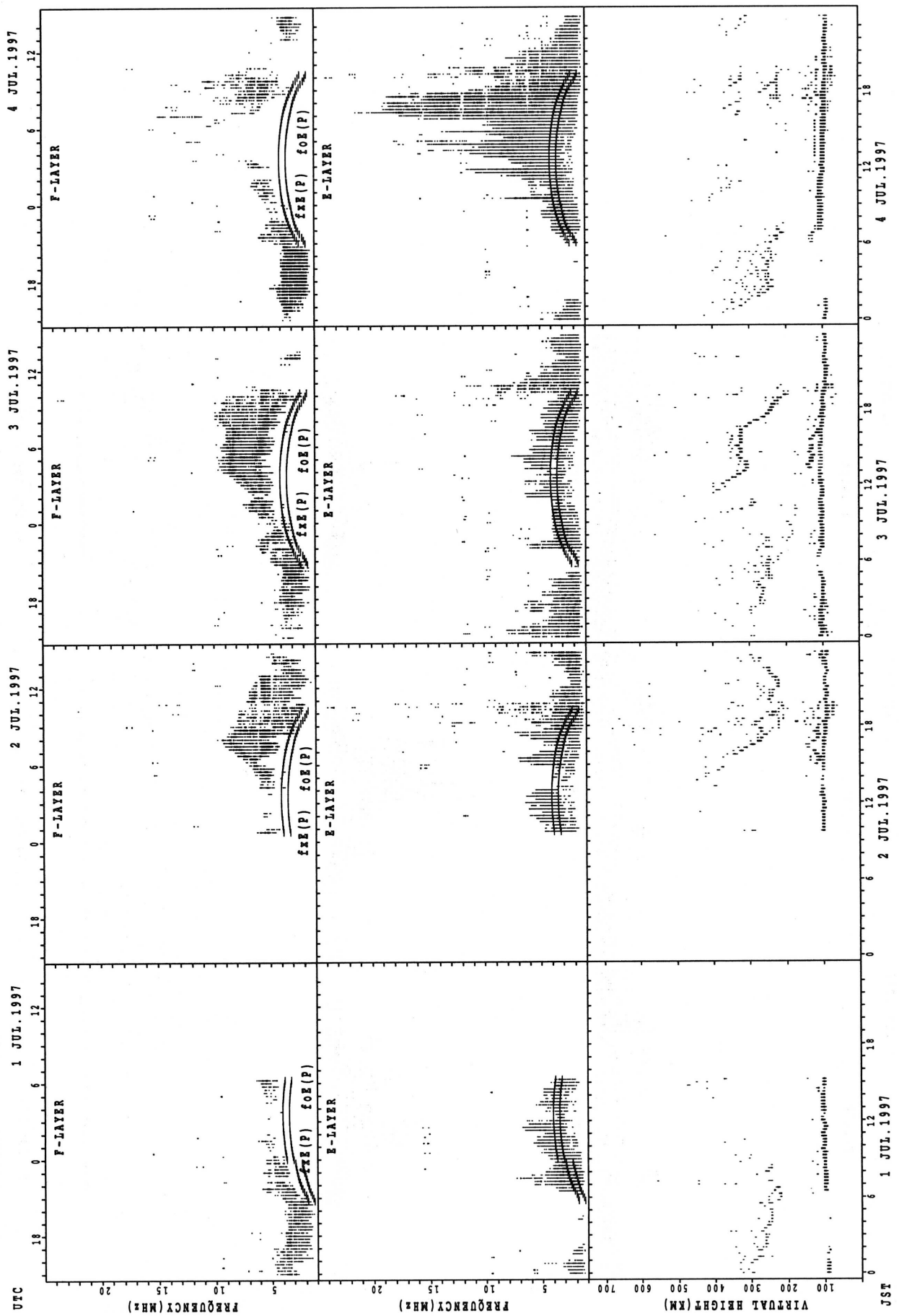
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
25 JUL.1997
26 JUL.1997
27 JUL.1997
28 JUL.1997
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

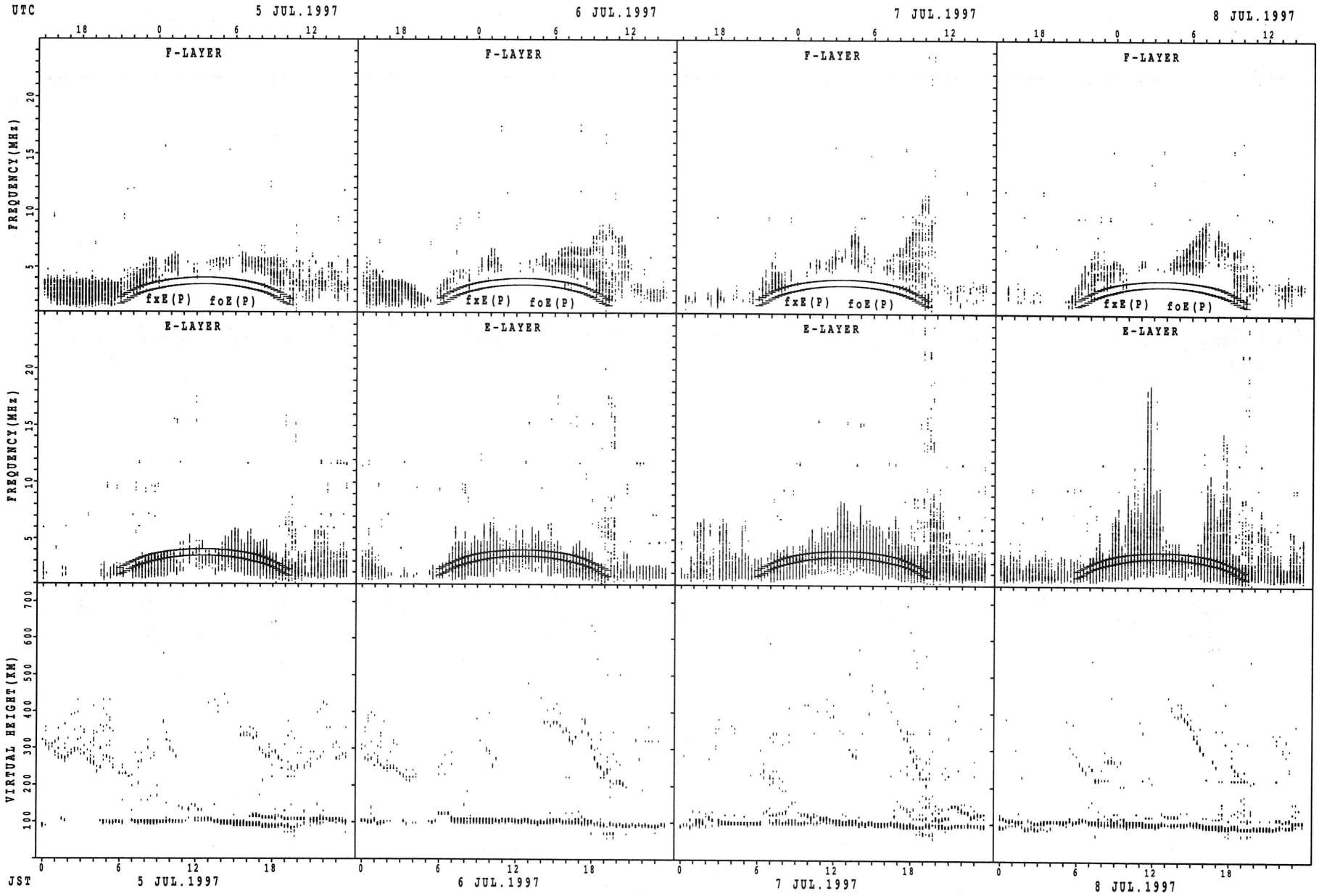
SUMMARY PLOTS AT YAMAGAWA



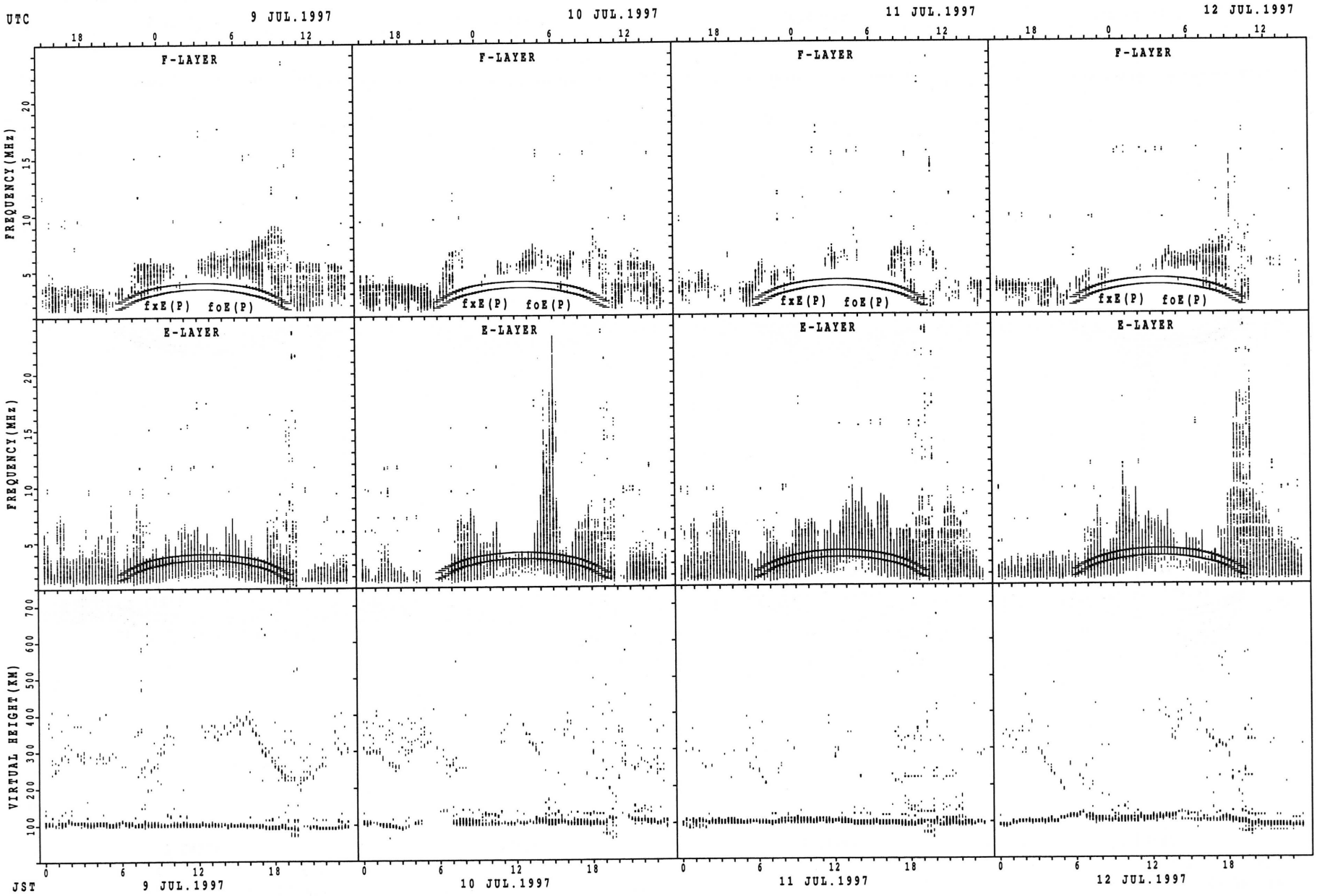
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
JST
1 JUL.1997
2 JUL.1997
3 JUL.1997
4 JUL.1997
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

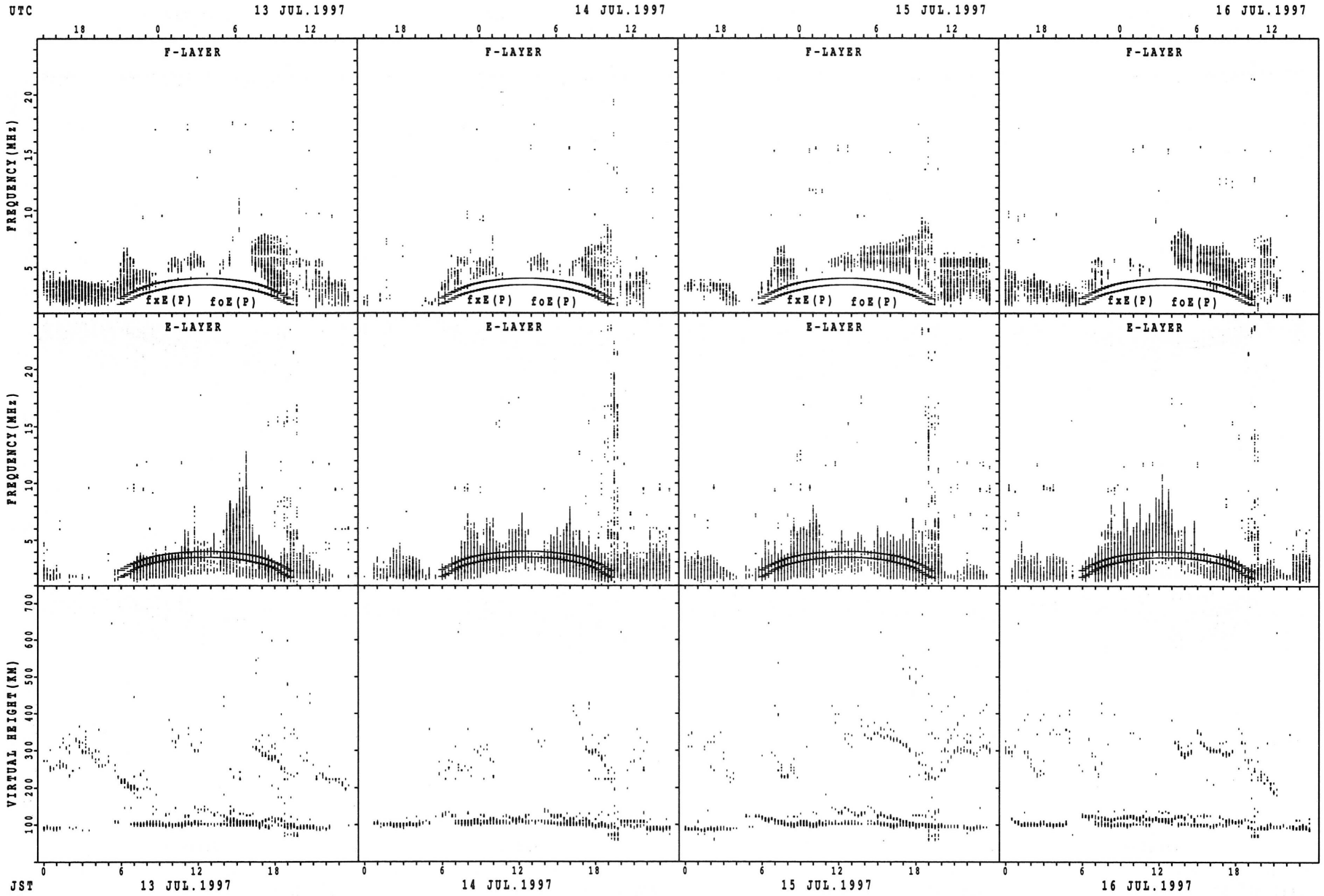


SUMMARY PLOTS AT OKINAWA



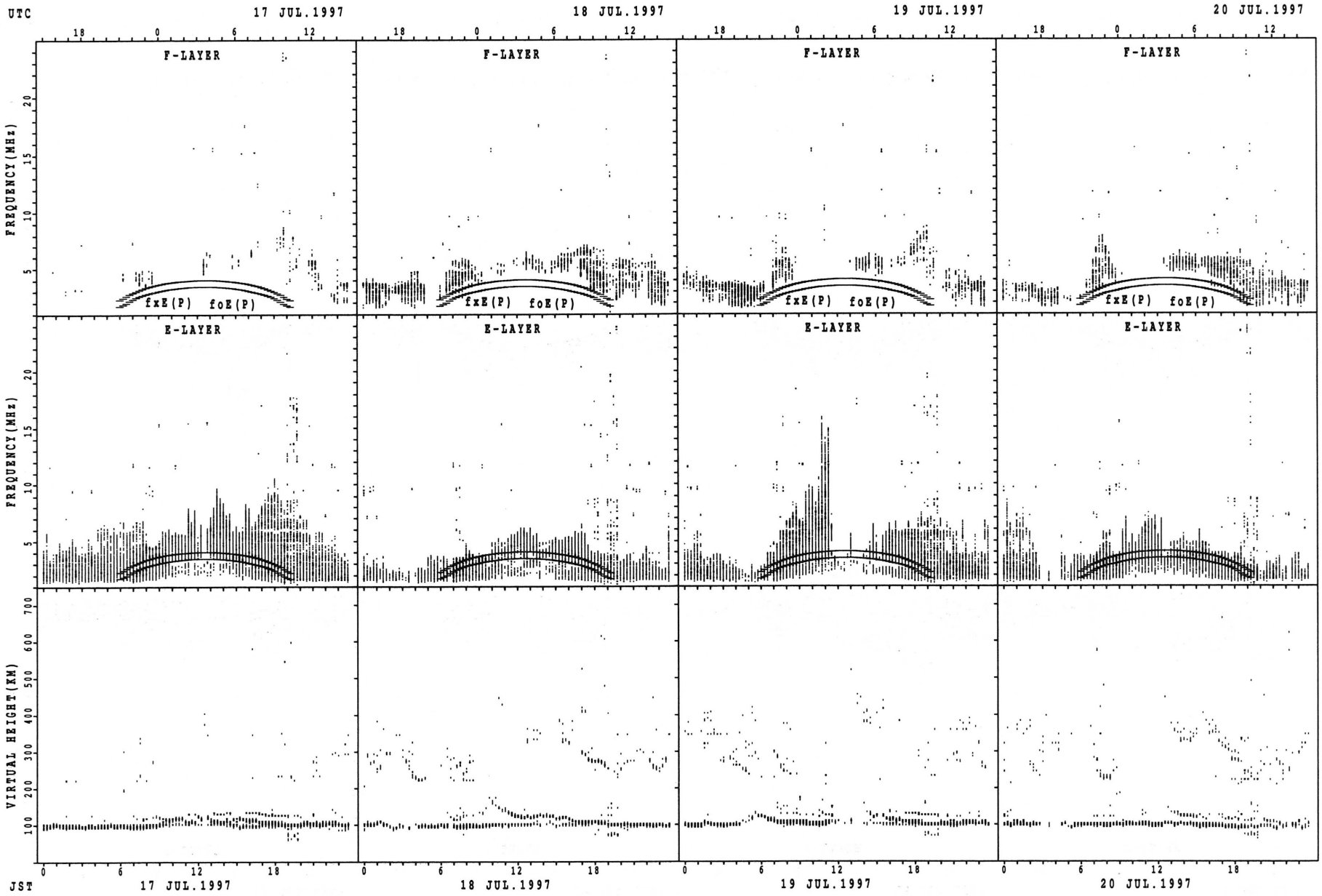
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



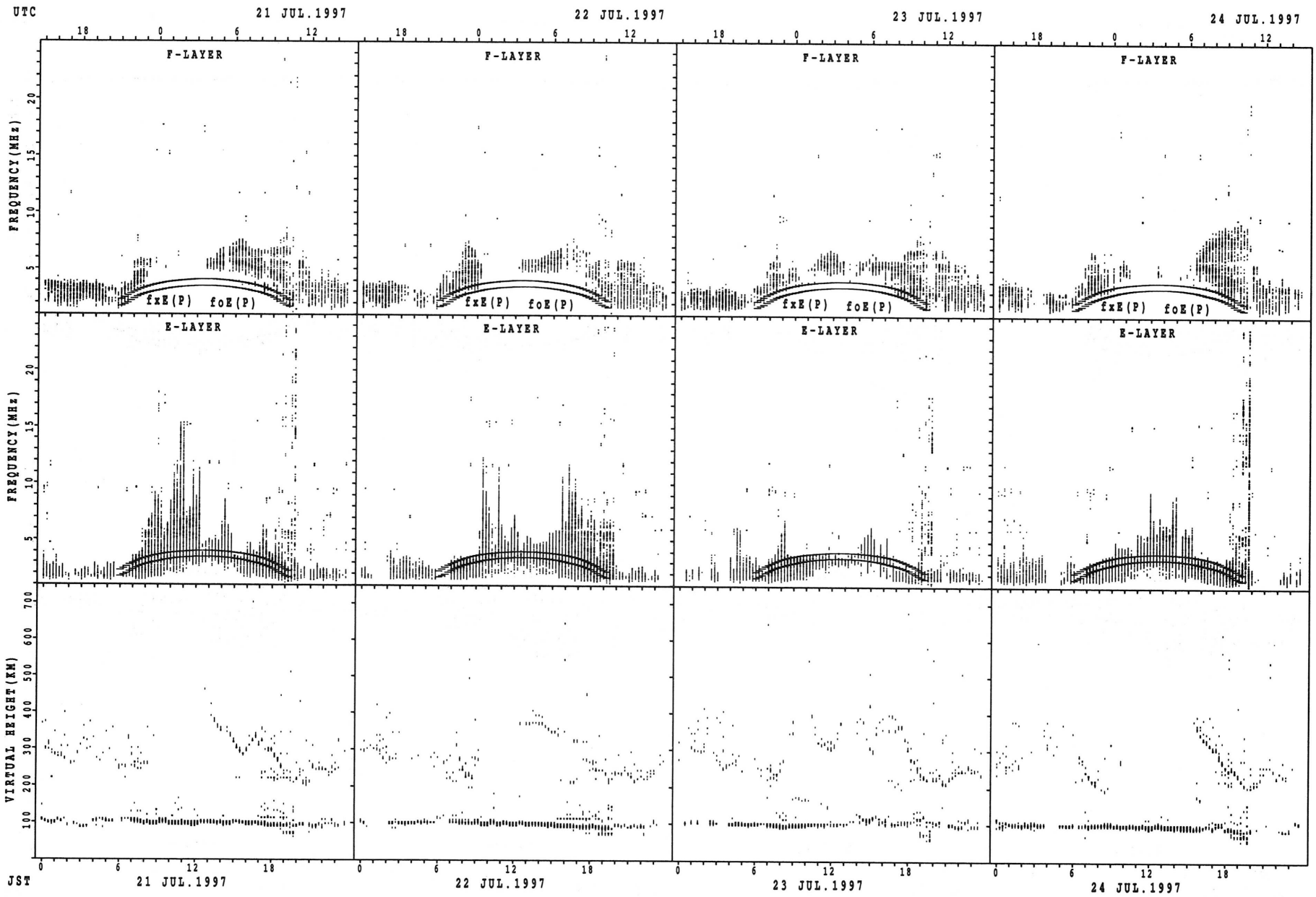
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



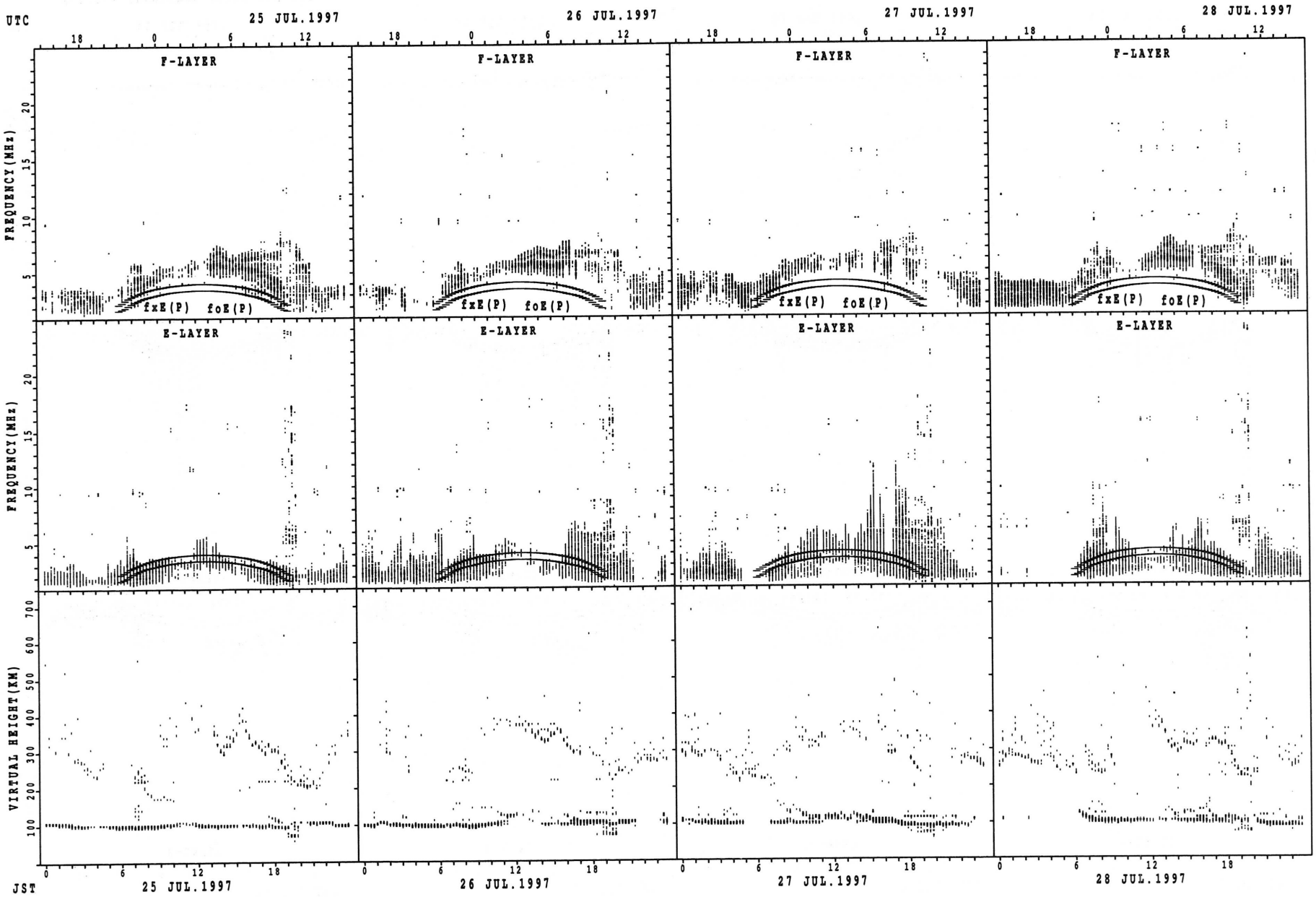
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



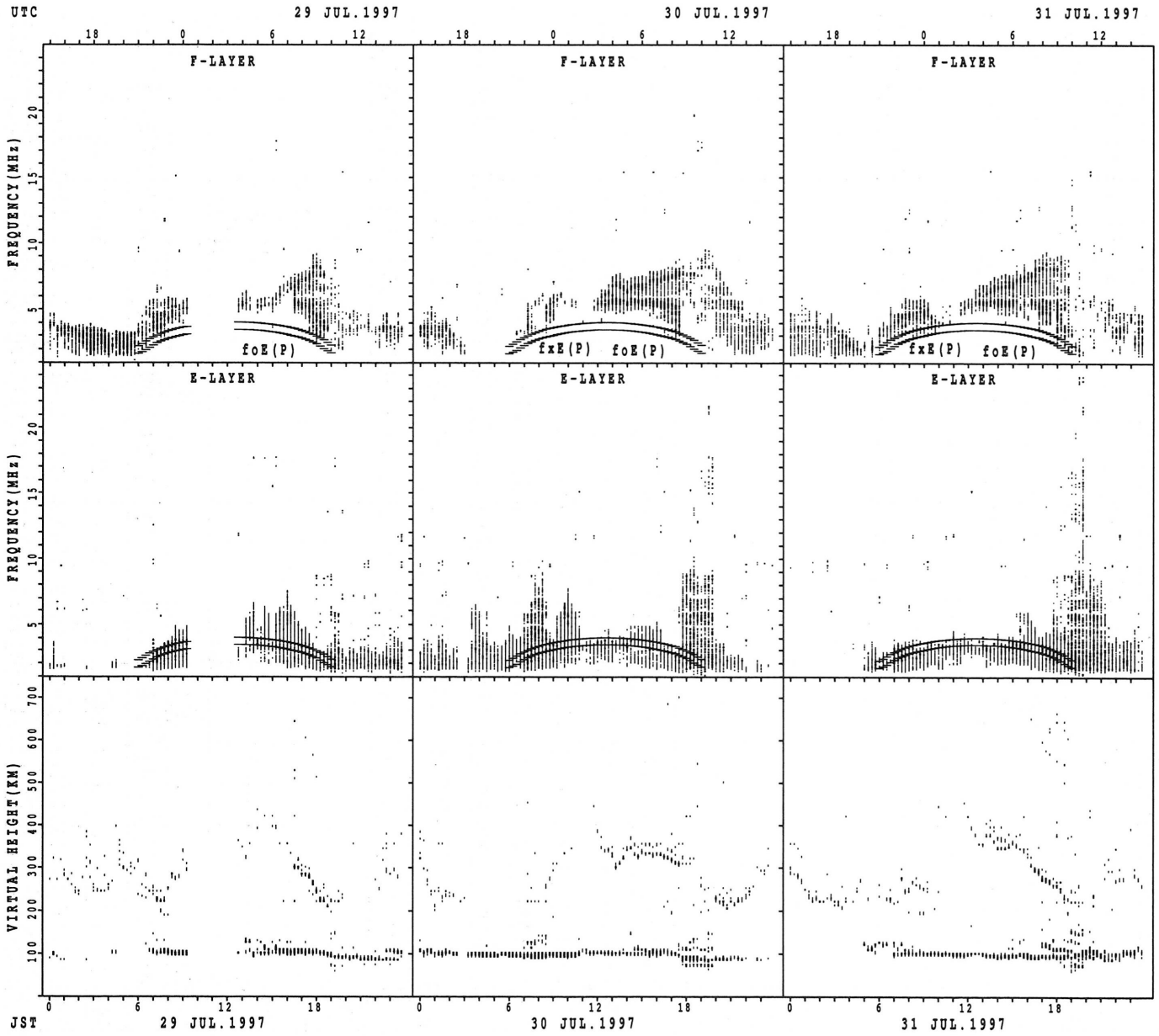
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



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

MONTHLY MEDIANS OF h'F AND h'Es

JUL.1997 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	26	27	28	29	27	29	30	29	30	30	30	30	31	31	31	31	31	31	31	30	31	30	28	29
MED	103	99	101	101	103	119	113	113	107	107	107	105	105	105	105	107	107	113	109	107	107	106	105	103
U Q	105	107	107	107	111	128	119	116	111	109	107	107	107	107	113	113	115	117	115	111	113	113	110	109
L Q	97	97	97	95	97	110	111	109	107	105	105	103	103	101	99	99	101	107	103	103	101	103	103	98

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																								
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	28	29	29	26	18	28	30	31	31	30	30	31	29	30	31	30	31	30	30	30	28	27	28	27
MED	106	105	103	103	103	114	113	111	111	107	107	109	107	111	113	112	115	113	111	109	107	107	107	107
U Q	110	108	107	107	109	120	119	119	113	111	111	113	115	119	123	121	119	115	113	111	112	111	111	113
L Q	99	100	97	99	99	107	111	107	107	105	105	105	103	105	105	105	105	107	107	103	103	99	101	103

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									11										13	13				
MED									270										296	264				
U Q									288										321	287				
L Q									250										229	229				

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	20	17	18	18	11	12	25	31	30	29	31	29	25	31	28	30	30	31	31	27	27	19	21	23
MED	111	111	111	113	113	113	121	115	113	113	113	113	113	113	113	113	113	113	115	109	105	107	107	111
U Q	115	113	113	115	113	113	134	119	119	119	113	117	117	123	117	119	119	121	117	113	113	115	117	115
L Q	105	106	105	111	111	111	113	111	111	111	109	111	110	109	109	109	111	107	105	105	103	105	103	103

MONTHLY MEDIANS OF h'F AND h'Es

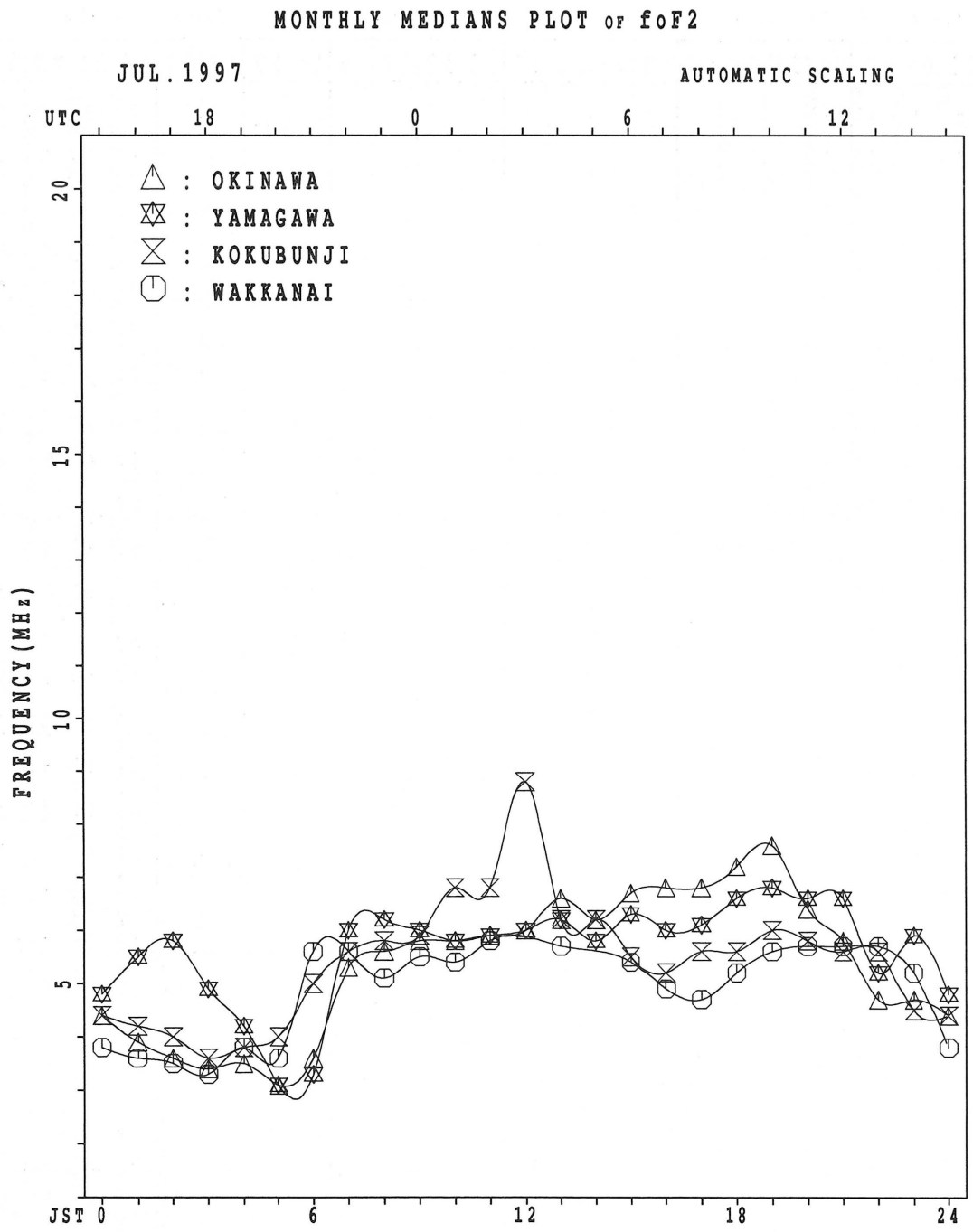
JUL. 1997 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

h'F STATION OKINAWA LAT. 26.3N LON. 127.8E

	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	14	17	14				
MED																	332	311	306	301				
U Q																	346	330	319	356				
L Q																	322	278	259	260				

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	22	18	20	18	17	21	30	29	29	29	30	28	27	31	30	28	30	28	28	28	25	26	27
MED	103	105	104	99	103	105	105	107	105	111	105	111	111	109	113	107	107	107	104	95	97	97	95	101
U Q	111	107	107	105	105	108	123	115	112	120	121	117	120	121	125	119	114	111	107	102	105	107	105	105
L Q	95	103	101	96	101	103	103	103	102	103	103	105	104	103	103	103	100	101	96	95	95	93	93	95


MONTHLY MEDIANS PLOT OF foF2
JUL. 1997
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. 1997 fxI (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	X 42	X 42	X 40	X 42	X 42																X 71	X 65	50	X 50
2	50	50	47	45	44																X 61	X 60	X 60	52
3	52	45	42	42	42																A	A	A	A
4	A	39	36	34	36																X 81	X 52	X 42	X 41
5	45	X 43	X 40	X 39	X 37																X 64	X 52	X 47	X 42
6	42	X 40	X 39	41	X 37																X 62	X 64	X 54	50
7	49	AO	X 46	35	39																X 71	X 53	X 49	51
8	46	45	46	41	39																X 45	X 42	45	46
9	45	44	40	X 39	39																X 64	X 62	X 58	55
10	X 49	X 45	44	42	42				69												68	51	A	54
11	55	A	X 37	33	34																X 63	X 60	X 49	49
12	51	45	42	41	A																A	52	54	52
13	52	50	50	50	39																68	X 62	55	A
14	41	A	X 41	X 35	A																X 76	63	X 56	54
15	52	50	48	46	42																X 71	58	61	58
16	X 59	56	52	49	50																X 62	63	63	X 62
17	56	55	52	50	41																X 69	X 68	X 57	54
18	51	X 46	46	45	X 45																O X 61	X 63	62	62
19	57	50	45	46	40																X 67	X 58	54	54
20	51	49	A	42	42																X 59	X 56	56	55
21	52	47	X 46	45	37															X 65	X 70	X 68	X 40	X 42
22	X 41	45	A	41	X 37															X 53	X 60	X 60	X 58	52
23	49	47	X 42	X 40	X 39															X 54	X 60	X 57	X 55	54
24	54	50	46	42	41															X 67	X 68	X 66	X 64	46
25	A	44	45	46	X 42															X 65	X 68	63	X 52	X 49
26	50	51	49	46	45															X 68	X 70	X 63	X 57	52
27	54	51	50	47	X 40															A	X 60	59	57	A
28	51	48	46	46	44															X 71	X 74	X O 58	X 57	55
29	54	52	47	44	42															X 68	X 72	52	51	55
30	56	55	56	A	44															X 72	X 70	X 66	X 62	X 56
31	X 52	52	52	46	X 43															X 73	X 72	X 65	X 66	X 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	29	28	29	30	29				1											10	29	30	29	28
MED	51	48	46	42	41				69											X 68	X 68	X 60	X 56	52
U Q	54	50	48	46	42															X 71	X 71	X 63	X 59	55
L Q	48	45	X 42	41	39															X 65	X 62	X 56	X 50	X 49

JUL. 1997 fxI (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	U S 36	36	34	36	36	43	45	52	73	53	50	A	A	48	59	62	51	49	55	67	65	59	F 44	J R 44
2	F 42	F 40	F 39	F 38	F 37	F 48	F 48	44	A	A	A	51	A	A	50	57	R 69	65	A	74	55	54	54	F 42
3	F 42	F 37	F 34	34	F 34	40	51	55	61	49	A	A	A	54	56	R 59	57	R 57	58	68	A	A	A	A
4	A	31	F 29	F 26	F 30	40	41	A	R 56	A	A	A	A	55	56	A	A	A	52	66	75	46	36	35
5	F 36	37	R 34	33	31	38	47	A	A	A	A	A	A	U R 52	A	46	R 45	47	46	54	58	46	41	36
6	F 34	34	33	F 33	31	38	47	49	53	E G 42	54	48	58	49	52	54	50	48	48	A	R 56	58	48	F 42
7	F 34	A	40	F 30	F 30	35	F 42	61	57	A	55	A	A	65	79	64	56	54	62	75	65	47	43	F 42
8	F 38	F 36	F 38	F 34	F 30	44	43	47	48	A	A	A	52	55	51	46	49	56	75	43	39	36	F 37	F 39
9	F 38	F 36	F 33	33	F 28	36	37	42	A	A	A	51	54	53	51	52	55	60	54	59	58	R 56	52	F 49
10	43	39	F 37	F 33	F 35	35	38	48	60	A	A	48	54	A	A	51	52	A	49	R 57	F 62	F 44	A	F 46
11	F 46	A	F 30	F 25	R 26	35	45	A	A	A	A	A	50	62	61	51	52	48	45	52	57	55	43	F 40
12	F 41	F 38	F 34	F 33	A	39	49	R 45	A	A	A	50	A	A	A	A	R 53	62	A	66	A	F 45	F 45	F 44
13	F 41	F 41	F 40	F 38	F 30	32	A	46	70	59	A	A	R 54	50	51	50	49	R 53	54	A	F 60	56	F 48	A
14	F 33	A	J R 35	29	A	37	A	A	A	A	50	56	A	A	51	A	48	52	58	72	70	F 54	50	F 47
15	F 45	F 42	F 40	F 38	F 35	36	38	55	68	A	A	50	49	R 50	56	62	65	A	45	57	65	F 51	F 53	F 50
16	53	F 49	F 44	F 40	F 40	38	38	J R 43	50	54	57	55	54	55	56	52	51	53	60	64	56	F 56	F 55	55
17	F 50	F 48	F 44	F 41	F 33	32	56	72	A	A	A	A	E G 44	49	A	A	52	49	47	57	63	62	51	F 46
18	F 45	40	F 39	F 38	F 37	37	45	54	61	54	A	A	55	50	55	55	56	R 60	58	59	U R 55	57	F 55	F 53
19	F 50	F 43	F 38	F 38	J S 33	31	R 36	44	A	A	U R 46	A	A	A	A	E G 40	R 45	A	A	64	61	52	F 46	F 45
20	F 44	F 42	A	R 34	F 34	F 31	A	46	54	A	A	A	A	E G 42	51	50	R 48	R 51	57	56	53	49	F 48	F 46
21	F 44	F 41	40	34	F 28	30	40	A	A	69	A	A	Y	R 51	53	55	50	49	52	59	R 64	62	34	36
22	35	F 35	A	F 34	31	37	50	V 50	R 56	59	57	A	A	A	A	56	52	47	46	47	54	54	52	F 45
23	F 39	F 40	36	34	33	38	J R 49	54	56	60	J R 49	R 54	55	50	55	60	56	56	51	48	54	51	49	F 45
24	F 45	F 40	F 38	F 34	F 33	F 35	43	J R 56	60	68	V 69	73	55	55	A	50	51	49	52	61	61	60	58	F 38
25	A	F 37	F 37	F 36	S 36	33	46	75	55	52	U R 50	U R 50	59	67	62	62	53	43	51	59	62	F 54	46	43
26	F 43	F 43	F 42	F 39	38	F 42	46	54	60	57	54	U R 50	56	58	R 60	R 62	56	52	53	62	64	57	51	F 45
27	F 43	F 42	F 41	F 39	34	36	R 51	60	R 50	50	R 54	62	59	A	55	A	52	53	63	A	54	F 52	F 49	A
28	F 42	F 40	F 39	F 38	F 37	F 40	43	56	58	60	60	R 55	58	64	62	56	A	56	U A 54	65	68	52	U R 51	F 48
29	F 40	F 41	F 38	F 36	F 35	F 36	A	54	64	61	50	55	A	A	A	62	52	52	58	62	66	F 46	F 40	F 48
30	F 49	F 47	F 47	A	F 32	F 38	41	52	58	A	58	A	A	A	51	59	54	56	57	66	64	60	56	50
31	46	F 44	F 43	F 39	37	R 38	48	50	51	48	U Y 46	54	55	54	55	64	63	63	70	67	66	V 60	60	43
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	29	30	29	31	27	26	22	16	16	16	17	22	23	26	29	27	28	28	29	30	29	28
MED	F 42	F 40	F 38	F 34	F 33	37	45	52	58	56	54	52	55	54	55	56	52	53	54	62	61	54	49	F 45
U Q	F 45	F 42	F 40	F 38	36	39	48	55	61	60	57	55	57	55	59	62	56	56	58	66	65	57	52	F 48
L Q	F 38	37	F 34	F 33	F 30	35	41	46	54	51	50	50	53	50	51	51	50	49	50	57	56	49	44	F 42

JUL. 1997 foF2 (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	A			U A	A	A		U A	A			A					
									400	424	444			432	436		404	384						
2						L	L	L	A	A	A		A	A	U A	U A	A	A	A					
								400				448			444	444								
3									A	A	A	A	A	A	A		U A	U A						
							364	396								416	412	392	340					
4								A	A	A	A	A	A	U A		A	A	A	U A					
							396							440	424				332					
5							L	A	A	A	A	A	A	A	A	A		A	L					
							372										392		340					
6						U R	L	L				A	A	A	U R					A				
						300	348		404	420	436				460	412	396	376	336					
7										A	A	A	A											
							372	388	420					460	436	416	392	392	352					
8								L		A	A	A	A	A	A	L	U A	A						
								400	408							420	404							
9									A	A	A	U A	U A						A					
								384				444	440	424	444	412	400	388						
10								A	A	A	A	A	A	A	A	A			L					
							344									416	392		348					
11							U A	A	A	A	A	A	A	A		L	U A	U L	L					
							340								424	416	392	380	360					
12						A		A	A	A	A	U A	A	A	A	A	A	A	A					
							356					440												
13							A	U A	A		A	A	R	A	A	U A			A	A	A			
								384		420			440			412	404							
14							A	A	A	A	A	A	A	A	U A	A								
															432		392	372	328					
15									A	A	A	432	428	U A	428	428	404	A		A				
							352	376						436					340					
16								A	U A				U A	U A	U A	A	A	A	L					
							340		400	420	444	440	432	432	420				340					
17						L	U A	U A	A	A	A	A		U A	A	A	A							
							328	392					440	408				416	328					
18										A	A	A	U A	U A	U A	U A	U A	A	A	A				
							360	380	404				460	432	448	408	408							
19								U A	A	A	R	A	A	A	A			A	A					
							344	364			424					404	384							
20							A	A	U A	A	A	A	A		R									
						300			412					424	420	412	404	364	324					
21								A	A	A	A	A	U R			R			A					
							332						428	436	440	428	412	400						
22									L		U A	A	A	A	A				U L					
							344	400	444	432	448					416	404	384	344					
23							L	U A			R			U A	U A	R		A	U A					
								356	420	420	448	444	448	436	432	408			336					
24							A	U A	U A	U A		U A	U A	A	A				L					
								400	412	424	440	452	444			412	400	384	340					
25							L					R	R						L					
							368	388	420	432	448	444	448	452	448	436	420	400	348					
26							L			A	A		U A	U A	U A	U A			A					
							368	392			448	456	448	460	464	444	408	392						
27							A								U A	A			L					
								396	428	440	456	444	452		448		416	392	340					
28							L	A		A	U A	A	A	U A		U A		A	A					
							396		440		464			456	448	420		380						
29							A	A			L		A	A	A	U A		A	U A	L				
									424	428	460	456				464		424	340					
30									A	A	A	A	A	A		A	L		L					
								384							444		440	368	344					
31							L	L					A						L					
							360	396	412	432	444	440		440	444	424	400	380						
	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						2	19	18	15	11	13	12	12	15	20	22	23	20	19					
MED						300	356	390	412	424	448	444	442	U A 436	442	416	404	384	L 340					
U Q							L 368	L 396	424	432	452	450	448	452	U 448	428	408	392	L 344					
L Q							344	384	404	420	442	440	436	432	430	412	392	378	336					

JUL. 1997 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	A	A	352	344	328	296	256	A	B				
2						164	240	292	A 308	A	A	A	A	A	A	A	A	A	A	B				
3						A	228	A	304	U A 332	U A 340	A	A	348	344	328	304	U A 264	A	B				
4						A	248	A	A	A 316	A	A	A	A	A	A	A	A	A	B				
5						A	A	A	U A 288	A	A	A	A	A	A	A	A	A	A	B				
6						B	228	U A 268	A	A	A	A	A	A	344	336	292	256	A	B				
7						A	A 220	A 260	312	336	352	360	A	340	336	316	R	A	A	B				
8						184	232	288	312	340	352	A	A	U A 356	A	A	A	A	A	B				
9						A	A	A 276	U A 300	A	A 332	A	A	A	A	A	288	248	200	B				
10						A	236	284	308	U A 336	U A 348	A	A	A	A	328	300	256	A 204	B				
11						164	A 244	A	A	U A 312	A	A	A	A	A	A	A	A 256	184	B				
12						A	216	268	296	324	U A 328	A	A	A	A	A	292	268	A	B				
13						A	A	280	308	324	A 336	A	352	348	340	328	A 300	256	A	B				
14						A	U A 248	284	304	A 332	U A 352	A	A	A	A	A	A	A	A	B				
15						172	A	288	A	A	A	A	360	352	348	332	296	256	196	B				
16						B	224	276	288	312	332	R 348	360	352	336	316	284	252	A 192	B				
17						A	224	264	A	A	A	A	B	352	336	320	280	244	U A 176	B				
18						B	216	A 256	316	340	348	R 352	360	R 356	340	328	288	256	A 192	B				
19						A	228	264	288	A	A	A	A	A	A	A	284	248	U A 188	B				
20						A	236	A	A 296	U A 320	A	A	A	A	A 340	A 324	284	256	A	B				
21						B	U A 232	A	U A 296	A	A	A	R	B	A 356	A	A	248	A					
22						A	A 220	288	308	A 328	U A 348	A	A	A	A	A	288	248	A 192					
23						A	228	A	A	A	A	A	A	356	340	328	296	A 260	A					
24						A	A 228	U A 284	U A 316	A	A	A	A	A	A	A	304	248	196					
25						B	A 224	A	A	A	A	U R 368	R 372	360	344	336	308	A	A					
26						B	256	A	U A 312	U A 328	A	A 372	368	360	348	324	292	U A 260	A					
27						B	A	A	A	A	A	A	364	352	340	324	300	252	A					
28						B	A	U A 276	U A 292	A	A	A	A	A	A	320	280	248	U A 192					
29						B	A	A 276	A	A	U A 344	A	A	A	A	A	A	A	A					
30						B	240	A	316	A 336	A	A	A	A	A	A	A	A	184					
31						B	236	280	304	A	A	A	A	R	324	312	284	248	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						4	23	19	21	15	12	5	7	13	16	17	21	22	12					
MED						168	228	276	304	A 328	A 346	R 360	360	352	340	328	292	256	A 192					
U Q						178	240	284	312	336	350	370	368	356	344	328	300	A 256	196					
L Q						164	224	268	296	A 320	A 334	R 350	360	350	338	320	284	248	186					

JUL. 1997 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	28	J A 21	20	27	J A 22	40	41	61	J A 40	J A 42	J A 46	J A 97	51	38	46	J A 66	J A 74	J A 54	61	J A 51	J A 54	J A 50	27	J A 53
2	J A 36	J A 31	28	26	28	20	30	J A 31	J A 63	J A 101	J A 93	J A 76	J A 100	135	J A 66	54	61	J A 56	87	32	J A 45	40	J A 25	J A 32
3	J A 55	J A 23	23	21	24	J A 26	J A 38	J A 44	J A 56	J A 52	J A 87	112	J A 68	J A 48	J A 65	36	J A 69	J A 116	J A 30	48	93	62	J A 75	J A 68
4	49	J A 34	J A 36	26	20	J A 23	30	J A 55	J A 63	J A 66	69	67	J A 56	J A 47	J A 41	54	66	72	49	J A 53	30	21	22	26
5	E B 15	20	J A 24	26	J A 20	J A 24	J A 34	J A 62	82	136	58	67	75	60	60	46	J A 35	50	J A 46	40	35	J A 21	J A J A 54	J A 29
6	J A 40	J A 22	J A 26	22	J A 21	20	J A 32	J A 34	J A 44	J A 52	36	J A 56	J A 50	J A 48	40	40	J A 43	34	J A 44	J A 61	J A 53	J A 25	J A 48	J A 48
7	J A 44	59	J A 52	J A 37	21	J A 26	J A 48	J A 38	J A 46	J A 55	J A 48	J A 57	76	38	G	J A 42	G 29	J A 46	J A 20	28	J A 51	28	J A 29	33
8	J A 35	28	28	26	31	20	29	34	39	J A 84	J A 100	J A 100	74	58	J A 49	J A 40	J A 43	48	J A 40	J A 44	J A 44	J A 31	28	J A 42
9	J A 36	J A 38	32	J A 34	J A 30	26	J A 29	J A 37	J A 59	J A 86	J A 56	J A 50	J A 53	J A 42	J A 38	33	33	34	J A 65	J A 43	J A 37	34	J A 32	24
10	J A 37	J A 53	J A 46	J A 42	J A 48	J A 25	J A 26	J A 43	J A 51	J A 144	J A 73	J A 49	J A 74	J A 195	J A 84	J A 50	36	J A 85	J A 81	J A 44	J A 63	J A 50	J A 76	J A 52
11	J A 65	J A 54	J A 45	28	E B 16	21	J A 36	J A 66	90	106	J A 60	J A 50	J A 52	J A 52	J A 39	J A 40	44	J A 34	J A 38	J A 49	J A 47	J A 32	J A 34	J A 26
12	J A 42	J A 26	J A 25	J A 26	J A 53	J A 45	J A 36	J A 50	60	J A 54	60	J A 52	59	J A 62	J A 95	J A 98	J A 78	53	123	J A 62	81	J A 66	J A 85	J A 106
13	63	J A 54	J A 47	J A 43	J A 44	49	50	J A 40	J A 50	G	J A 68	57	39	J A 50	J A 103	J A 44	J A 55	J A 81	70	73	114	J A 75	71	J A 118
14	J A 98	J A 84	J A 50	35	J A 46	J A 45	66	J A 96	J A 86	J A 97	J A 50	J A 65	J A 128	145	J A 44	85	32	J A 42	J A 30	J A 123	J A 51	J A 35	J A 26	25
15	25	J A 39	27	29	J A 20	24	J A 36	34	70	82	J A 80	J A 40	40	44	38	38	J A 46	J A 103	J A 31	49	J A 124	32	28	J A 44
16	J A 43	J A 42	J A 27	J A 30	19	J A 20	J A 32	J A 42	J A 44	J A 40	38	J A 43	43	J A 48	44	52	J A 84	106	J A 50	40	J A 76	J A 52	J A 51	J A 41
17	J A 36	J A 53	28	33	J A 36	J A 22	J A 36	J A 53	J A 105	J A 69	J A 85	48	E B 34	42	J A 67	J A 78	J A 53	J A 38	46	53	23	30	28	J A 28
18	J A 32	J A 29	J A 22	20	20	J A 22	26	30	38	J A 49	J A 52	91	46	J A 46	J A 48	41	J A 53	70	83	59	57	J A 66	J A 40	J A 34
19	J A 36	28	J A 26	J A 28	25	J A 27	J A 34	J A 39	J A 102	J A 66	55	J A 64	J A 108	61	J A 54	J A 36	J A 36	J A 62	J A 100	J A 65	J A 31	J A 28	J A 36	J A 31
20	J A 54	J A 52	J A 76	J A 53	J A 36	J A 24	J A 49	51	J A 44	60	101	82	J A 93	J A 39	38	38	J A 44	J A 45	J A 44	J A 23	J A 54	J A 42	J A 44	J A 53
21	J A 43	J A 37	J A 41	24	18	J A 30	J A 32	J A 99	J A 108	J A 75	57	53	G 32	39	40	J A 48	J A 37	J A 44	51	J A 67	J A 31	28	24	J A 24
22	J A 34	J A 42	J A 54	J A 46	J A 24	J A 27	J A 38	G 28	J A 46	J A 43	59	J A 77	J A 68	J A 163	111	53	G 24	G 19	J A 28	J A 23	J A 28	J A 22	J A 26	J A 47
23	J A 30	26	16	19	19	J A 20	J A 35	J A 45	J A 51	42	J A 41	J A 46	J A 45	45	43	J A 45	J A 52	J A 101	135	J A 46	J A 29	26	30	J A 29
24	J A 25	32	J A 47	J A 26	25	J A 21	J A 50	J A 85	J A 53	J A 65	40	J A 46	J A 50	J A 52	J A 64	J A 48	J A 43	29	J A 26	J A 19	E B 15	E B 16	E B 15	J A 48
25	59	J A 36	J A 31	19	J A 24	J A 21	J A 33	J A 37	J A 52	J A 77	J A 43	41	40	39	J A 65	J A 42	33	J A 74	J A 36	J A 26	J A 83	J A 46	J A 47	J A 32
26	E B 14	J A 31	J A 44	J A 40	41	32	31	J A 42	J A 56	J A 64	J A 44	41	48	J A 48	J A 53	J A 54	J A 56	J A 46	J A 37	42	J A 20	J A 44	J A 36	J A 45
27	J A 34	32	28	J A 45	J A 56	J A 37	J A 100	J A 52	J A 44	J A 52	J A 43	J A 52	40	69	J A 62	J A 126	J A 44	29	J A 23	71	J A 62	J A 37	J A 44	80
28	J A 44	32	J A 35	J A 33	J A 55	J A 44	J A 61	J A 62	J A 49	J A 56	J A 67	J A 65	56	59	J A 44	J A 44	J A 80	31	J A 62	J A 50	J A 80	J A 64	J A 69	J A 62
29	J A 33	J A 35	J A 34	J A 24	J A 44	J A 48	61	57	J A 54	J A 44	J A 42	J A 43	75	80	J A 64	J A 58	J A 65	60	J A 26	J A 32	J A 85	J A 48	J A 46	J A 67
30	J A 44	J A 44	J A 54	J A 67	J A 49	J A 48	31	J A 43	J A 54	J A 82	J A 84	J A 151	136	J A 128	59	J A 85	48	J A 29	21	33	J A 28	26	28	E B 15
31	J A 26	J A 24	J A 25	J A 34	J A 23	29	J A 30	32	36	J A 65	J A 44	J A 42	J A 61	G 31	G 28	G 24	J A 37	J A 33	58	J A 81	28	J A 25	J A 28	26
	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 36	J A 34	J A 31	J A 28	J A 25	J A 26	J A 35	J A 43	J A 53	J A 65	J A 57	56	56	J A 48	J A 49	J A 46	J A 44	J A 48	J A 46	J A 48	J A 51	J A 34	J A 34	J A 41
U Q	J A 44	J A 44	J A 46	J A 37	J A 44	J A 37	J A 48	J A 57	J A 63	J A 82	J A 73	J A 76	75	J A 62	J A 65	J A 54	J A 61	J A 72	65	J A 61	J A 76	J A 50	J A 48	J A 53
L Q	32	J A 28	J A 26	26	20	21	31	37	J A 44	J A 52	J A 44	J A 46	45	42	40	40	36	34	J A 30	J A 33	30	26	28	28

JUL. 1997 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	22	17	E B 14	E B 14	17	23	32	48	37	38	44	A A 97	A A 51	38	44	52	36	33	52	23	25	24	E B 14	36
2	23	21	17	19	18	20	29	G 24	A A 63	A A 101	A A 93	42	A A 100	A A 135	44	44	54	47	A A 87	20	23	32	20	18
3	17	E B 14	17	E B 14	E B 15	21	34	35	54	44	A A 87	A A 112	A A 68	U Y 46	48	35	41	39	21	32	A A 93	A A 62	A A 75	A A 68
4	A A 49	22	13	E B 14	18	21	30	A A 55	52	A A 66	A A 69	A A 67	A A 56	44	39	A A 54	A A 66	A A 72	33	30	24	E B 14	E B 16	19
5	E B 15	16	24	17	E B 14	18	30	A A 62	A A 82	A A 136	A A 58	A A 67	A A 75	46	A A 60	43	31	44	24	28	32	E B 15	31	21
6	18	19	18	17	17	18	G 17	33	34	36	U Y 36	46	47	46	U Y 39	38	35	32	27	A A 61	26	E B 15	18	30
7	18	A A 59	35	21	17	19	31	34	39	A A 55	44	A A 57	A A 76	36	G	U G 39	29	37	19	20	20	20	22	19
8	18	17	18	17	E B 16	G	26	33	36	A A 84	A A 100	A A 100	49	53	48	36	40	41	24	33	27	16	E B 14	18
9	19	19	18	17	19	20	23	34	A A 59	A A 86	A A 56	44	44	40	34	33	U Y 32	32	39	21	22	21	20	18
10	22	31	20	19	20	18	G	38	46	A A 144	A A 73	45	48	A A 195	A A 84	38	34	A A 85	26	34	27	36	A A 76	27
11	22	A A 54	24	17	E B 16	18	34	A A 66	A A 90	A A 106	A A 60	A A 50	47	49	38	36	39	33	29	33	36	20	26	22
12	20	19	20	17	A A 53	32	32	42	A A 60	A A 54	A A 60	44	A A 59	A A 62	A A 95	A A 98	45	42	A A 123	30	A A 81	28	26	19
13	24	34	20	26	20	22	A A 50	38	49	G	A A 68	A A 57	38	46	47	41	36	46	43	A A 73	20	20	31	A A 118
14	22	A A 84	26	22	A A 46	22	A A 66	A A 96	A A 86	A A 97	47	49	A A 128	A A 145	43	A A 85	U Y 32	29	25	41	20	21	18	17
15	18	20	18	18	E B 14	22	26	34	64	A A 82	A A 80	39	39	44	36	37	34	A A 103	28	40	29	18	18	23
16	25	34	17	26	E B 14	E B 16	28	39	40	37	36	40	43	43	42	48	48	45	24	33	18	34	18	18
17	18	30	E B 14	17	18	19	33	39	A A 105	A A 69	A A 85	A A 48	E B 34	41	A A 67	A A 78	46	35	30	43	E B 14	25	20	E B 14
18	E B 14	17	18	E B 14	E B 14	17	24	30	36	47	A A 52	A A 91	46	43	45	41	41	42	34	38	24	27	24	22
19	22	18	19	18	16	23	28	36	A A 102	A A 66	38	A A 64	A A 108	A A 61	A A 54	34	32	A A 62	A A 100	35	22	18	21	18
20	18	22	A A 76	18	22	19	A A 49	38	41	A A 60	A A 101	A A 82	A A 93	37	37	36	37	29	22	18	40	25	22	22
21	23	22	26	21	17	23	24	A A 99	A A 108	46	A A 57	A A 53	U G 32	38	U Y 40	38	35	34	34	33	25	18	17	18
22	18	19	A A 54	17	18	22	31	G 22	35	37	45	A A 77	A A 68	A A 163	A A 111	36	G 20	G 18	22	19	18	17	18	E B 15
23	17	16	14	E B 14	E B 15	17	27	36	37	34	37	42	39	44	43	36	45	38	26	16	19	17	19	20
24	17	19	21	19	E B 15	17	38	40	41	42	37	45	44	48	A A 64	35	32	28	22	E B 15	E B 15	E B 16	E B 15	23
25	A A 59	21	18	E B 15	18	19	27	34	36	37	37	40	U Y 40	U Y 39	42	38	32	33	25	17	18	18	18	17
26	E B 14	17	18	17	19	18	G 21	33	48	46	41	41	45	46	46	44	36	31	34	35	E B 15	19	18	22
27	20	17	17	19	18	19	47	31	35	39	39	40	U Y 40	A A 69	45	A A 126	38	28	20	A A 71	46	27	27	A A 80
28	20	18	16	22	22	24	33	50	34	46	46	53	53	46	38	42	A A 80	28	U A 42	44	35	43	27	32
29	19	20	20	19	17	21	A A 61	50	37	38	39	38	A A 75	A A 80	A A 64	46	45	42	20	23	50	21	25	37
30	24	18	24	A A 67	26	23	28	32	47	A A 82	53	A A 151	A A 136	A A 128	36	51	39	27	20	23	22	19	19	E B 15
31	17	18	E B 15	17	18	19	G 20	31	33	38	41	38	49	U G 31	G 27	G 22	34	32	24	33	E B 16	E B 15	21	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	19	19	18	17	18	19	30	36	46	47	52	49	49	46	44	39	36	35	26	33	24	20	20	20
U Q	22	22	24	19	19	22	34	A A 48	A A 63	A A 82	A A 69	A A 67	A A 75	A A 62	A A 54	A A 48	45	44	34	38	32	27	26	27
L Q	18	17	17	E B 17	E B 16	18	26	33	36	38	39	42	43	41	38	36	32	31	22	21	19	E B 17	18	18

JUL. 1997 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	15	13	14	14	14	14	15	14	16	18	18	20	22	18	19	17	16	14	14	15	15	14	14	13
2	15	14	15	15	16	14	15	15	15	14	16	16	18	15	21	19	15	16	14	15	15	15	15	15
3	14	14	13	14	15	16	16	15	14	14	14	15	17	16	16	17	16	13	14	16	14	15	14	14
4	16	15	13	14	16	16	14	14	14	18	17	18	20	18	21	15	16	14	14	16	16	14	16	15
5	15	14	14	15	14	14	14	16	16	16	16	17	23	19	20	15	14	14	14	14	14	15	14	14
6	16	14	16	15	16	15	14	17	17	18	19	18	21	20	16	17	16	14	16	15	15	15	15	15
7	15	16	14	13	15	15	14	13	16	15	15	18	20	13	16	16	15	13	16	15	16	15	16	15
8	15	14	16	15	16	15	16	16	16	15	16	16	18	20	20	20	14	15	14	16	16	14	14	14
9	15	13	14	14	16	14	16	14	14	16	16	18	18	18	17	15	14	15	14	16	16	16	14	15
10	16	13	16	14	14	16	14	14	14	14	14	15	14	15	21	16	15	15	15	16	15	16	14	16
11	16	15	14	14	16	13	14	15	16	18	16	23	16	21	18	16	15	14	14	14	14	15	15	16
12	15	13	16	15	16	14	15	14	14	14	14	22	18	20	18	15	14	14	14	16	19	14	14	15
13	14	14	14	14	15	14	14	12	16	16	14	18	18	19	19	15	15	14	14	14	14	16	14	14
14	15	15	15	14	14	15	14	15	15	15	14	18	18	23	15	14	14	16	15	14	14	13	14	15
15	16	14	15	16	14	14	15	16	16	18	16	18	22	22	20	17	15	15	14	13	14	14	15	16
16	14	15	14	13	14	16	14	13	14	14	16	18	18	18	18	16	16	14	15	16	15	15	14	13
17	15	13	14	15	15	14	14	13	16	14	18	19	34	24	17	16	14	14	13	16	14	15	16	14
18	14	14	14	14	14	15	14	14	16	16	17	18	20	18	18	16	13	14	13	14	15	15	15	14
19	16	15	15	15	14	16	14	14	14	14	18	20	18	18	21	15	15	16	13	15	15	14	16	16
20	15	16	16	16	14	14	14	14	16	15	23	22	22	18	16	16	15	13	17	15	15	14	16	15
21	14	14	14	14	14	16	15	14	15	16	22	18	20	36	15	14	16	16	15	12	17	15	14	15
22	14	15	12	14	14	13	15	17	13	14	14	19	25	24	18	14	14	14	14	15	16	15	15	15
23	15	13	14	14	15	13	13	15	20	15	17	18	22	20	18	18	15	14	15	15	14	13	15	13
24	14	14	15	13	15	14	14	14	14	15	16	18	17	18	16	15	15	15	14	15	15	16	15	14
25	15	14	16	15	16	16	15	16	16	14	21	22	26	18	21	17	16	15	13	13	15	13	14	16
26	14	14	16	15	16	15	14	14	20	14	15	16	20	18	16	19	14	15	14	16	15	15	15	14
27	13	14	15	14	15	16	15	16	15	20	16	15	16	19	18	16	15	15	14	15	15	14	14	15
28	15	13	14	16	15	16	16	14	16	16	21	21	18	18	18	16	15	16	15	14	14	14	15	13
29	13	16	15	14	15	16	15	15	14	15	18	21	17	21	19	17	14	15	14	15	15	13	14	13
30	15	14	12	14	14	16	16	15	14	17	18	19	16	18	16	15	16	15	14	15	15	15	16	15
31	14	15	15	15	14	15	13	14	15	14	20	18	24	17	16	16	16	15	14	14	16	15	15	16
	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	15	14	14	14	15	15	14	14	15	15	16	18	18	18	18	16	15	15	14	15	15	15	15	15
U Q	15	15	15	15	16	16	15	15	16	16	18	20	22	20	20	17	16	15	15	16	16	15	15	15
L Q	14	14	14	14	14	14	14	14	14	14	15	18	18	18	16	15	14	14	14	14	14	14	14	14

JUL. 1997 fmin (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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	US 300	304	314	297	300	318	354	A 308	346	340	321		A	A	261	311	340	325	293	A 306	322	317	339	F 322	JR 305
2	F 300	F 287	F 297	F 309	F 320	F 347	F 355	292	A	A	A	282		A	A	272	287	R 306	314	A	342	298	307	329	F 286
3	F 312	F 300	F 308	306	F 324	356	330	339	342	318	A	A	A	302	281	R 324	318	R 328	336	348	A	A	A	A
4	A	307	F 311	F 305	F 347	373	310	A	R 317	A	A	A	A	320	335	A	A	A	306	318	352	350	304	300
5	F 308	304	R 309	304	324	339	333	A	A	A	A	A	A	UR 309	A	282	R 299	A	300	317	339	320	320	309
6	F 294	307	305	F 309	325	348	349	298	334	G	313	A 272	322	A	263	307	303	300	290	A	R 317	359	343	F 285
7	F 289	A	314	F 291	F 322	314	F 254	337	373	A	309	A	A	268	322	326	310	292	277	334	341	330	292	F 292
8	F 282	F 303	F 325	F 332	F 331	343	338	352	292	A	A	A	A 292	A 320	293	279	289	306	344	338	309	326	F 293	F 307
9	F 314	F 297	F 325	335	F 339	343	361	300	A	A	A	282	311	311	317	298	308	327	304	316	301	R 322	321	F 306
10	312	A 294	F 302	F 290	F 329	344	263	263	326	A	A	A 264	305	A	A	324	327	A	300	R 321	F 339	F 295	A	F 314
11	F 326	A	F 326	F 306	R 306	323	301	A	A	A	A	A	279	315	329	299	318	333	297	308	332	340	302	F 313
12	F 301	F 313	F 297	F 296	A	356	336	A 319	A	A	A	281	A	A	A	A	R 297	309	A	341	A	F 304	F 315	F 320
13	F 317	F 311	F 315	F 342	F 315	324	A	285	359	369	A	A	R 313	290	314	313	287	R 313	312	A	F 321	342	F 315	A
14	F 304	A	JR 309	316	A	338	A	A	A	A	297	326	A	A	306	A	283	304	314	327	342	F 323	313	F 309
15	F 314	F 316	F 318	F 316	F 322	319	265	340	A 354	A	A	321	292	R 287	313	315	349	A	288	311	321	F 282	F 299	F 286
16	303	F 289	F 305	F 307	F 303	322	273	JR 274	277	284	308	312	303	303	311	300	A	307	309	329	322	F 303	F 308	330
17	F 293	F 293	F 303	F 302	F 307	285	344	374	A	A	A	A	G	282	A	A	318	313	296	297	300	320	312	F 296
18	F 306	310	F 301	F 293	F 310	332	295	303	330	332	A	A	306	286	315	300	295	R 310	316	A	UR 315	306	F 295	F 293
19	F 317	F 303	F 313	F 316	JS 281	354	R 242	299	A	A	UR 281	A	A	A	A	G	R 275	A	A	309	337	308	F 290	F 297
20	F 311	F 314	A	R 285	F 300	F 274	A	304	323	A	A	A	A	G	317	310	R 277	R 317	327	334	314	296	F 299	F 319
21	F 317	F 288	304	314	F 299	331	268	A	A	349	A	A	Y	R 293	315	290	299	293	312	307	R 320	337	319	309
22	316	F 302	A	F 302	319	307	324	V 307	R 332	325	347	A	A	A	A	311	321	333	319	311	310	315	318	F 294
23	F 305	F 319	311	310	312	316	JR 336	314	298	351	JR 285	R 299	299	303	301	318	316	343	334	319	298	313	316	F 273
24	F 293	F 321	F 305	F 309	F 319	F 304	292	JR 345	313	314	V 303	345	316	306	A	278	300	305	312	313	310	329	379	F 282
25	A	F 297	F 280	F 319	S 289	297	283	346	363	363	UR 289	UR 276	296	320	326	329	327	281	300	307	335	F 332	320	306
26	F 293	F 293	F 309	F 292	313	F 310	306	318	344	314	323	UR 273	312	306	R 312	R 318	320	311	306	314	322	323	315	F 303
27	F 295	F 296	F 316	F 343	349	314	A 308	346	R 332	278	R 298	328	327	A	307	A	299	296	318	A	A 312	F 311	F 300	A
28	F 294	F 298	F 314	F 314	F 335	F 336	299	283	308	312	325	A	A 295	304	329	330	A	325	A	306	336	328	U R 294	F 322
29	F 303	F 313	F 312	F 312	F 318	F 304	A	A 283	332	363	289	327	A	A	A	334	313	313	326	325	354	F 307	F 317	F 314
30	F 310	F 322	F 357	A	F 328	F 350	314	322	340	A	324	A	A	A	279	315	320	310	303	316	299	319	327	312
31	307	F 304	F 320	F 326	344	R 325	344	343	340	329	U Y 245	293	290	278	280	306	311	312	314	309	305	V 303	332	310
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	29	30	29	31	27	26	22	16	16	15	17	21	23	26	28	26	27	27	29	30	29	28
MED	F 305	F 304	F 311	F 309	F 319	325	310	311	332	327	306	293	303	303	312	310	309	310	309	317	320	320	315	F 306
U Q	F 313	F 312	F 316	F 316	F 328	344	338	340	344	350	322	326	312	310	317	324	319	317	318	329	336	330	320	F 312
L Q	F 294	F 296	F 304	F 302	306	314	283	298	317	313	UR 289	276	292	284	293	298	298	304	300	309	310	307	F 300	F 294

JUL. 1997 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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	A	406	A 375	A	A	A	414	A	A	A 363	363	A					
2						L	L	L 371	A	A	A	A	A	A	A	A	A	A	A					
3							A	386	A	A	A	A	A	A	A	381	A	A	343					
4							351	A	A	A	A	A	A	A	388	A	A	A	A					
5							L 378	A	A	A	A	A	A	A	A	A	374	A	L 349					
6						U R 382	L 394	L	414	422	402	A	A	A	U R 377	A 354	371	368	338	A				
7							354	388	A 394	A	A	A	A	379	388	A	390	A	291					
8								L 372	361	A	A	A	A	A	A	L 371	A	A						
9								383	A	A	A	A	A	A 381	374	385	371	354	A					
10							340	A	A	A	A	A	A	A	A	378	377	A	L 336					
11							A	A	A	A	A	A	A	A	412	L 384	A	A 364	A 325					
12						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
13							A	A	A	406	A	A	R 420	A	A	A	346	A	A	A				
14							A	A	A	A	A	A	A	A	A	A	385	370	349					
15							376	375	A	A	A	433	439	A	388	379	368	A	A 344	A				
16							356	A	A	405	404	A 365	A	A	A	A	A	A	L 340					
17						L	A	A	A	A	A	A	374	A	A	A	A	A 313	A					
18							365	H 373	386	A	A	A	A	A	A	A	A	A	A	A				
19							359	A	A	A	R 384	A	A	A	A	381	390	A	A					
20						339	A	A	A	A	A	A	A	383	R 378	383	384	363	352					
21							351	A	A	A	A	A	U R 427	409	Y	R 379	349	338	A					
22							A 377	361	L 379	412	A	A	A	A	A	387	368	359	U L 346					
23							L	A	378	443	R 402	369	402	A	A	R 400	A	A	L 360					
24							A	A	A	A	H 404	A	A	A	A	407	381	358	L 341					
25							L 334	376	417	405	409	R 411	R 406	386	A 351	381	361	355	L 338					
26							L 349	366	A	A	A	400	A	A	A	A	380	358	A					
27							A	406	395	380	414	414	Y	A	A	A	A 347	360	L 367					
28							L 340	A	354	A	A	A	A	A	386	A	A	361	A					
29							A	A	386	392	L 383	402	A	A	A	A	A	A	L 339					
30								378	A	A	A	A	A	A	391	A	A 336	364	L 350					
31							L 364	L 375	394	401	405	426	A	389	369	373	376	354	L					
	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						2	15	13	12	10	9	8	6	7	11	15	19	16	17					
MED						360	356	375	390	405	404	406	413	386	386	381	371	360	L 343					
U Q							376	384	400	412	407	420	427	409	388	385	381	364	L 350					
L Q							L 349	372	378	392	393	384	402	381	374	378	361	354	338					

JUL. 1997 M(3000)F1 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 h'F2 (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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						282	240	A	252	312	362	A	A	506	342	280	314	376	A					
2						260	256	410	A	A	A	428	A	A	460	390	320	296	A					
3							296	264	A 280	A 344	A	A	A	Y 378	412	308	320	306	270					
4							U L 388	A	A	A	A	A	A	324	306	A	A	A	326					
5							288	A	A	A	A	A	A	344	A	E A 440	372	A	348					
6						270	260	L 336	304	G	336	E A 466	322	A	512	344	368	352	390	A				
7							498	280	234	A	342	A	A	374	288	282	328	354	342					
8								274	394	A	A	A	A	A 362	A 396	424	404	336						
9								L 392	A	A	A	438	352	356	352	378	340	300	312					
10							518	420	292	A	A	A	A 360	A	A	332	316	A	346					
11							352	A	A	A	A	A	A	318	302	358	332	300	344					
12						A 276	288	A	A	A	A	438	A	A	A	A	358	322	A					
13							A	420	256	252	A	A	354	E A 422	E A 342	356	408	A 334	A	A				
14							A	A	A	A	E A 402	A 326	A	A	378	A	398	342	306					
15							488	288	A 298	A	A	Y	426	422	348	314	268	A	360	A 300				
16							428	A 414	432	338	346	350	376	364	344	E A 382	A	A 346	294					
17						L 406	276	234	A	A	A	A	G	436	A	A	A 328	348	338					
18							372	330	276	A 314	A	A	368	430	346	354	362	322	A 278	A				
19							584	362	A	A	462	A	A	A	A	G	438	A	A					
20						470	A	362	316	A	A	A	A	G	356	350	426	328	280					
21							444	A	A	270	A	A	Y	410	350	414	356	376	304					
22							290	316	324	316	280	A	A	A	A	330	318	322	304					
23							288	286	364	278	Y	378	382	388	368	328	330	280	284					
24							A 408	280	306	302	318	268	348	364	A	440	368	362	308					
25							392	254	256	276	Y	444	374	320	300	294	318	L 438	322					
26							330	316	276	332	320	472	352	362	332	312	312	342	308					
27							A	254	330	436	380	320	308	A	356	A	366	362	276					
28							L 390	A	348	298	288	A	A 384	336	296	308	A	304	A					
29							A	A	286	254	418	324	A	A	A	292	A 342	324	278					
30								320	286	A	A 332	A	A	A	440	330	320	310	290					
31							286	274	298	350	526	384	A 404	424	420	342	310	312	268					
	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	23	22	21	16	14	13	15	21	23	26	28	26	24	1				
MED						279	352	316	298	313	342	381	368	369	350	337	336	331	307	A 300				
U Q						406	428	362	327	341	402	441	384	423	396	382	368	352	340					
L Q						270	288	274	276	277	320	325	352	350	332	312	319	310	282					

JUL. 1997 h'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 h'F (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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	316	290	286	282	276	236	A	A	A 228	E A 258	A	A	A	H 192	A	A	E A 264	A 254	A	258	258	246	228	A 366
2	304	324	286	282	264	234	218	202	A	A	A	A	A	A	A	A	A	A	A	236	248	286	248	300
3	262	260	294	282	270	226	A	238	A	A	A	A	A	A	A	222	A	A	228	240	A	A	A	A
4	A	332	290	300	234	228	230	A	A	A	A	A	A	A	A 250	A	A	A	A	260	228	200	264	294
5	290	290	A 310	302	264	238	A 238	A	A	A	A	A	A	A	A	A	H 204	A	A 256	256	254	222	A 308	284
6	308	274	284	258	264	228	218	A 228	208	190	H 188	A	A	A	E A 254	A	232	A 244	A 250	A	256	228	222	E A 374
7	312	A	A 372	310	292	240	A 260	A 240	E A 254	A	A	A	A	228	206	A	206	A	218	242	222	228	304	276
8	302	294	266	220	278	252	236	A 246	A 256	A	A	A	A	A	A	252	A	A	A 228	A 252	A 294	290	300	290
9	280	298	270	262	260	244	224	232	A	A	A	A	A	A 264	216	196	228	248	A	254	260	260	270	256
10	280	A	308	324	278	228	254	A	A	A	A	A	A	A	A	A 242	242	A	246	A 282	240	E A 368	A	A 308
11	284	A	A 326	330	306	256	A	A	A	A	A	A	A	A	212	230	A	A	A	A 282	258	230	A 286	290
12	264	294	308	308	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	236	A	288	298	284
13	304	A 334	280	274	A 268	264	A	A	A	H 200	A	A	188	A	A	A	A	A	A	A	252	248	306	A
14	312	A	A 326	A 330	A	A 258	A	A	A	A	A	A	A	A	A	A	230	228	A 242	A 274	238	268	252	258
15	258	278	252	254	228	A 236	222	A 238	A	A	A	212	184	A	240	232	228	A	A 254	A	258	286	288	318
16	304	A 328	282	A 308	278	256	A 256	A	A	212	194	A	A	A	A	A	A	A	252	246	254	A 314	284	254
17	280	A 338	260	272	274	258	A	A	A	A	A	A	222	A	A	A	A	A	A	A	258	248	228	268
18	262	298	288	290	264	252	214	H 202	226	A	A	A	A	A	A	A	A	A	A	A	274	282	308	300
19	286	258	290	272	238	258	A 258	A	A	A	A 244	A	A	A	A	A 234	228	A	A	270	238	242	304	296
20	274	280	A	330	A 330	254	A	A	A	A	A	A	A	228	228	230	A 254	A 252	236	236	A 310	286	310	280
21	276	326	322	304	280	288	A 262	A	A	A	A	A	202	204	Y	A 268	A 254	A 278	A	274	248	226	228	280
22	280	298	A	288	288	246	A	A 224	208	192	A	A	A	A	A	218	238	224	234	264	268	254	248	250
23	284	262	268	286	286	242	246	A	236	172	208	A 242	210	A	A	222	A	A	A 240	256	252	256	250	308
24	294	250	322	304	272	240	A	A	A	A	H 190	A	A	A	A	210	220	230	238	262	254	246	206	A 300
25	A	334	312	276	272	266	240	242	200	206	198	220	204	220	A	220	230	A 236	242	258	246	240	246	264
26	284	294	286	294	284	252	242	246	A	A	A	214	A	A	A	A	246	242	A	A 262	242	242	250	A 280
27	274	276	270	250	264	266	A	210	210	234	196	208	Y	A	A	A	A	216	234	A	A	288	304	A
28	284	286	272	282	280	A 262	246	A	230	A	A	A	A	A	224	A	A	224	A	A 278	256	A 288	A 332	A 318
29	288	268	276	278	280	284	A	A	238	230	216	194	A	A	A	A	A	A	222	248	A 244	256	A 306	A 324
30	280	256	240	A	A 340	254	232	A 246	A	A	A	A	A	A	218	A	E A 288	212	228	258	258	242	238	244
31	254	262	244	254	238	242	232	222	210	202	214	190	A	220	226	220	224	A 256	A 250	A 264	254	256	240	272
	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	27	29	30	29	30	19	14	12	10	9	7	6	7	10	14	17	14	18	25	28	30	29	28
MED	284	290	286	284	274	252	238	235	222	202	198	212	203	220	223	226	229	239	239	258	254	253	270	286
U Q	303	324	309	304	282	258	A 254	242	237	230	215	220	210	228	A 240	A 234	A 250	A 252	A 250	A 267	258	286	304	A 304
L Q	275	268	270	272	264	238	224	222	209	192	H 192	194	188	204	216	220	226	224	228	247	245	242	243	270

JUL. 1997 h'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 h'E (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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	112	110	A	A	A	116	114	112	112	A	B				
2						146	126	A 124	112	112	112	112	112	A	A	A	A	A	A	B				
3						A 118		A	114	114	114	112	110	110	118	A 124	120	120	A	B				
4						A 132	114		114	112	A	110	110	A	A	A	A	A	A	B				
5						A	A 116		112	112	A	A	A	A	A	A	A	A	A	B				
6						B 118	116		116	A	112	112	112	112	112	112	116	116	A	B				
7						A 118	118		112	112	116	114	108	110	114	112	A	A	A	B				
8						136	116	A 128	110	108	114	112	116	110	110	114	112	A	A	B				
9						A	A 114		110	110	110	110	110	112	A	A	114	114	126	B				
10						A 124	116		116	116	116	112	112	116	110	116	114	118	118	B				
11						126	120	A	A	112	112	A	114	114	A	A	A	A	112	B				
12						A 112	116		112	112	112	112	112	A	112	112	A 134	122	122	B				
13						A	A 120		114	114	114	114	114	114	114	114	A	A	A	B				
14						A 132	114		114	114	114	114	114	A	114	114	A	A	A	B				
15						B 140	A	A 138	116	114	112	A	112	118	118	118	118	120	A 130	B				
16						B 128	120		112	112	108	114	114	108	108	114	114	114	118	B				
17						A 118	116		112	112	112	112	B	116	116	116	116	116	116	B				
18						B 120		A	A 134	114	114	114	114	116	116	112	112	112	112	B				
19						A 124	122		114	114	116	A	A	A	A	A	126	112	114	B				
20						A 118	114		114	114	116	116	118	114	A	A	114	114	A	B				
21						B 118		A	110	110	A	A	A	B	A	A	A	A 134	A					
22						A 120	128		114	112	112	112	A	A	A	A	124	118	126					
23						A 116		A	A	A	A	A	A	120	118	118	116	116	A					
24						A 116	114		116	A	A	112	112	A	A	A	112	128	128					
25						B 118		A	112	112	A	A	A	118	118	126	128	118	A					
26						B	A 142	A	114	112	112	A	122	116	120	116	118	120	A					
27						B	A	A	A	A	112	112	112	112	112	112	112	112	A					
28						B	A	112	112	110	A	A	A	A	A	110	116	124	124					
29						B	A	116	116	114	118	A	A	A	116	A	A	A	A					
30						B 134		A	112	112	112	112	114	114	A	A	A	A	122					
31						B	A 138	136	112	112	A	A	A	A	A 116	116	114	114	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						4	23	21	27	27	23	19	20	18	19	19	21	21	13					
MED						138	120	116	114	112	112	112	112	114	116	114	116	116	122					
U Q						143	128	123	114	114	114	114	114	116	118	116	119	120	126					
L Q						131	118	114	112	112	112	112	112	112	112	112	113	114	115					

JUL. 1997 h'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 h'Es (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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	96	100	100	116	116	108	104	106	110	108	106	106	108	162	130	118	116	118	112	106	100	110	100	102
2	100	98	98	98	100	166	152	106	110	108	106	106	106	104	102	106	104	118	114	102	100	100	100	118
3	108	110	104	110	108	122	120	124	112	112	108	108	108	116	118	148	128	112	112	104	112	110	104	134
4	100	100	122	96	98	124	150	114	112	110	108	104	106	108	114	106	102	100	102	102	104	108	106	118
5	B	100	112	110	120	116	108	106	106	102	102	106	102	106	104	108	102	102	98	100	116	104	108	106
6	102	104	104	98	94	146	102	112	116	110	114	108	108	112	144	128	128	126	116	110	122	106	118	110
7	112	108	104	110	104	112	118	122	122	120	120	116	112	132	G	116	110	106	108	102	102	102	98	102
8	100	100	98	102	112	120	150	138	134	116	116	114	112	114	112	130	126	104	118	106	102	106	140	122
9	116	108	110	106	112	118	118	114	110	106	110	110	112	110	108	110	164	126	118	118	122	124	116	116
10	114	110	112	112	110	140	142	134	116	110	114	122	110	102	118	128	140	112	116	106	114	112	112	112
11	108	104	102	100	B	136	124	114	110	110	110	110	108	110	112	106	106	122	110	118	114	100	98	102
12	104	104	104	104	104	104	122	118	118	114	110	116	110	122	120	108	126	122	112	110	110	106	114	114
13	118	110	124	114	112	122	120	122	116	G	110	108	160	128	120	128	126	120	116	114	116	112	112	110
14	108	106	118	104	102	104	118	114	114	112	116	116	108	106	114	108	108	108	106	120	104	104	98	100
15	98	98	112	116	114	136	108	126	112	112	110	108	172	144	146	152	136	114	122	114	116	136	126	116
16	112	110	108	108	118	138	134	118	116	112	118	120	138	134	130	126	118	128	120	112	114	114	112	110
17	108	108	116	106	106	144	124	114	104	106	108	114	B	130	120	120	116	112	112	110	114	110	114	112
18	110	110	108	122	144	126	126	138	130	122	120	118	132	140	126	128	120	118	112	108	106	108	106	104
19	104	100	98	104	140	132	124	120	112	108	106	108	106	104	106	110	134	120	116	110	112	108	114	108
20	108	114	102	104	102	116	124	116	112	112	108	112	108	112	140	132	122	126	128	122	110	124	110	110
21	102	102	104	96	98	118	120	110	108	106	102	108	110	196	174	110	104	122	122	114	116	114	104	112
22	106	108	108	112	108	110	118	114	120	118	110	108	104	114	102	104	104	106	122	114	116	118	114	110
23	110	112	114	116	108	120	118	110	108	108	110	106	104	134	134	134	122	114	124	110	130	106	106	106
24	108	102	104	106	114	126	114	114	112	110	112	112	110	108	104	104	112	152	130	116	B	B	B	112
25	108	108	108	118	112	116	116	112	110	106	106	170	144	140	126	138	178	124	116	118	118	120	116	118
26	B	114	110	112	110	112	118	118	114	112	112	160	138	138	126	120	118	116	114	110	108	110	112	106
27	102	100	104	112	110	110	108	112	112	110	112	110	136	120	120	116	118	124	112	106	108	114	108	106
28	108	104	102	102	118	98	106	108	110	108	106	106	106	106	104	124	118	128	114	112	108	106	106	116
29	110	104	102	104	130	112	112	116	114	114	116	108	110	106	108	106	102	98	98	100	108	118	116	114
30	110	108	104	100	104	104	186	110	114	112	110	126	110	136	106	106	106	106	128	100	98	98	100	B
31	112	110	116	106	104	104	104	136	126	108	108	106	106	108	106	100	126	118	108	108	110	108	104	104
	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	31	31	30	31	31	31	31	30	31	31	30	31	30	31	31	31	31	31	30	30	30	30
MED	108	106	104	106	110	118	118	114	112	110	110	110	110	114	118	116	118	118	114	110	111	109	109	110
U Q	110	110	112	112	114	132	124	122	116	112	114	116	112	134	126	128	126	124	120	114	116	114	114	116
L Q	102	100	102	102	104	110	112	112	110	108	108	108	106	108	106	106	106	108	112	106	106	106	104	106

JUL. 1997 h'Es (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 1997 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

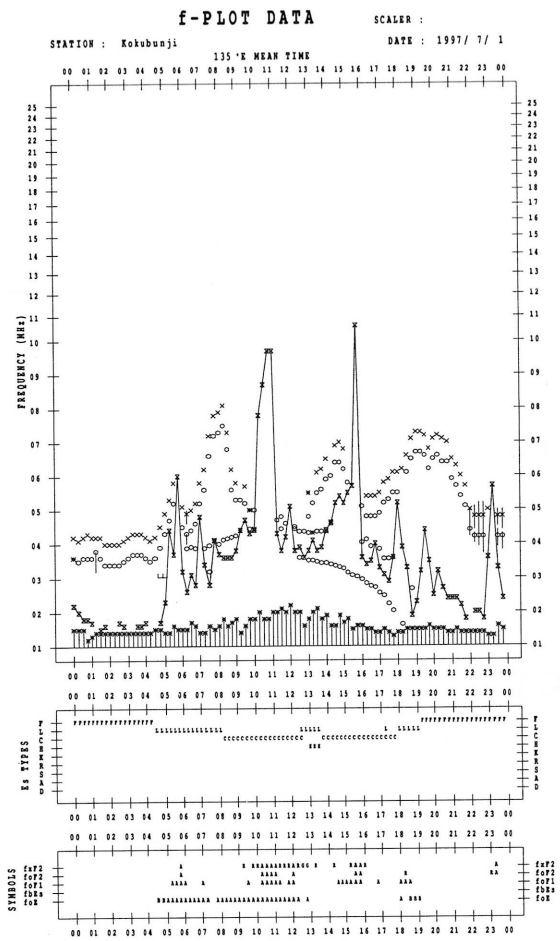
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

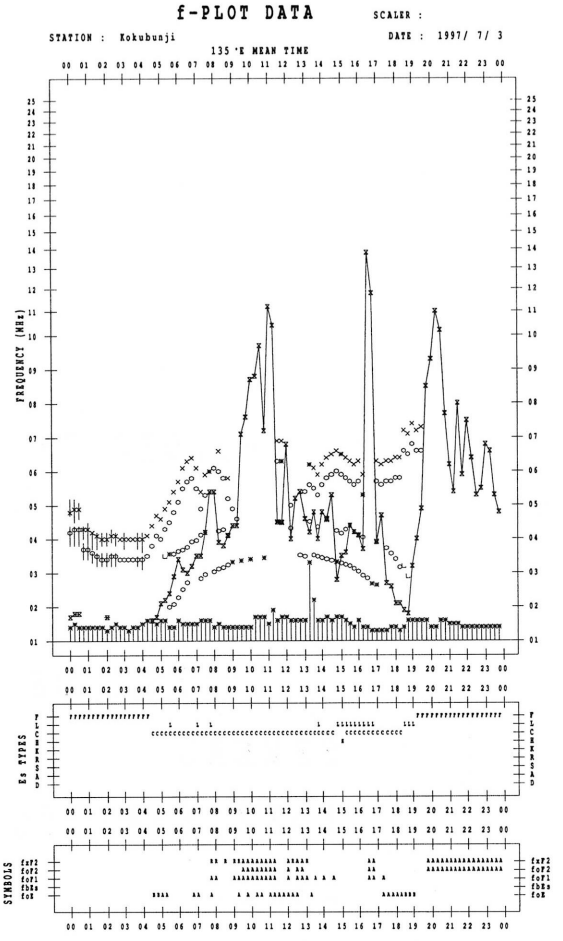
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 3	F 1	F 2	F 2	F 3	L 3	L 3	L 3	L 2	C 2	C 2	C 1	C 1	HL 11	C 1	C 2	C 2	C 2	L 3	L 4	F 3	FF 23	F 3	F 3
2	F 4	F 3	F 2	F 2	F 2	HL 11	HL 11	L 1	C 2	C 3	C 2	C 2	C 3	C 2	L 2	L 3	L 3	CL 33	CL 33	L 3	F 4	F 6	F 4	FF 22
3	F 2	F 1	FF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

JUL. 1997 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

f-PLOTS OF IONOSPHERIC DATA

KEY OF f-PLOT	
	SPREAD
	foF2, foF1, foE
	fxF2
	DOUBTFUL foF2, foF1, foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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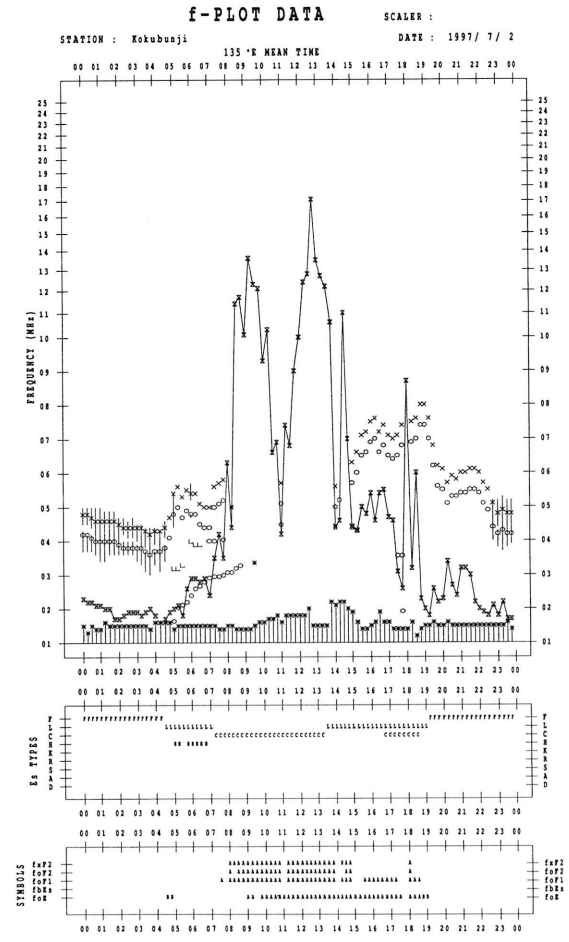
STATION : Kokubunji
DATE : 1997/ 7/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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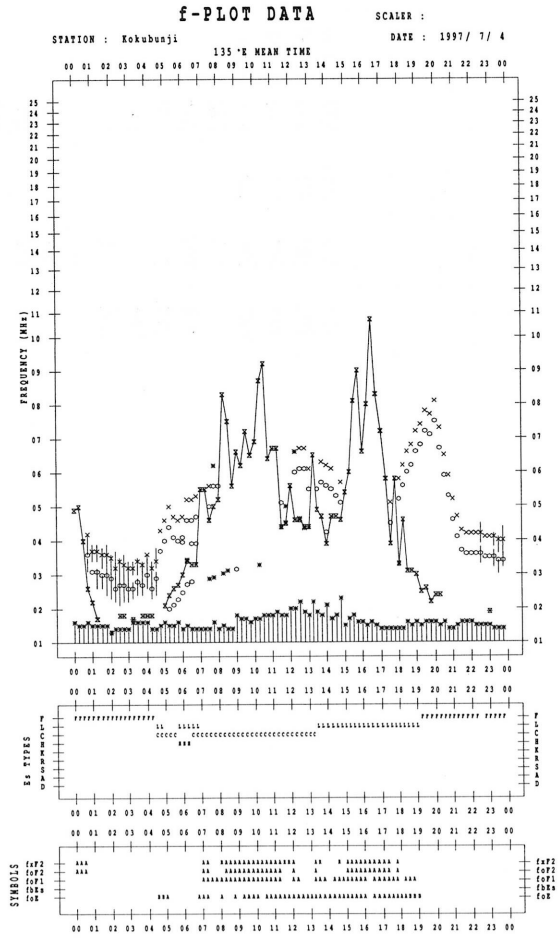
STATION : Kokubunji
DATE : 1997/ 7/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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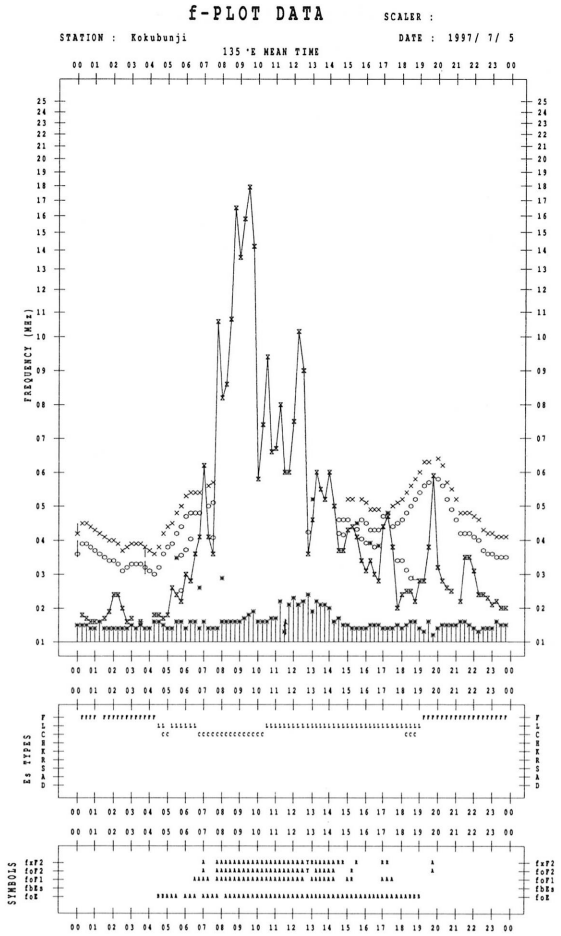
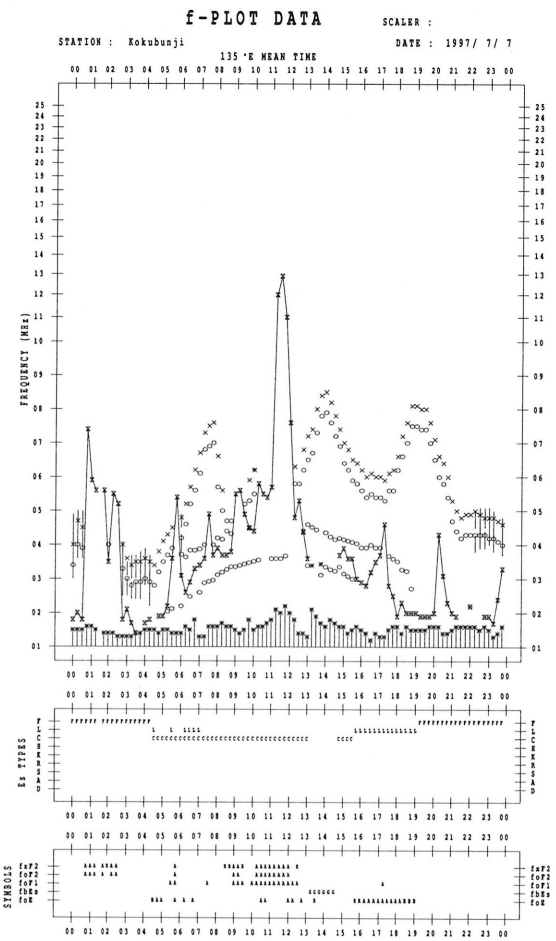
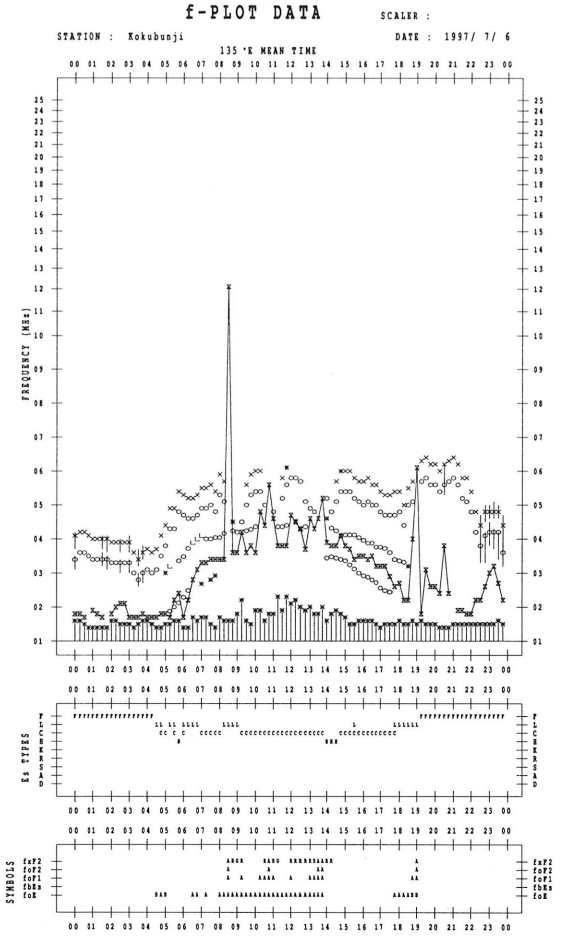
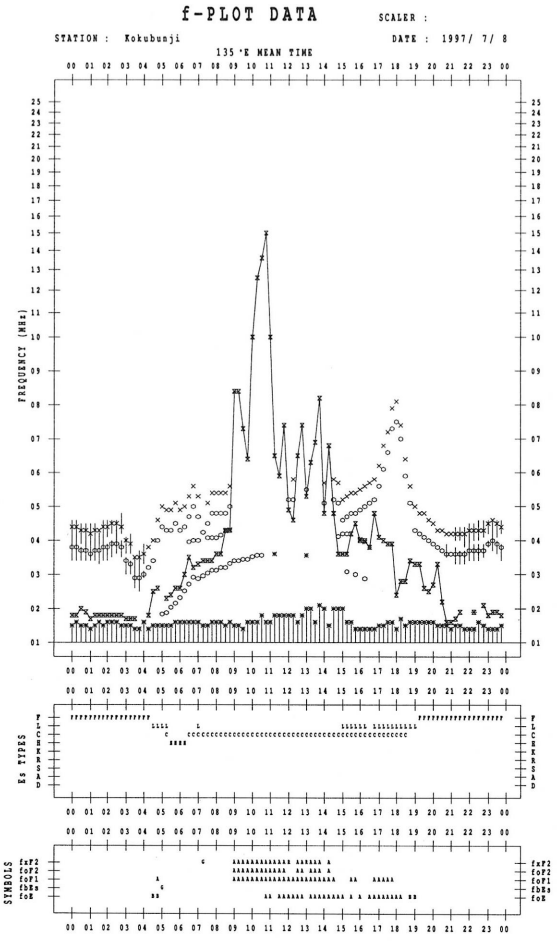
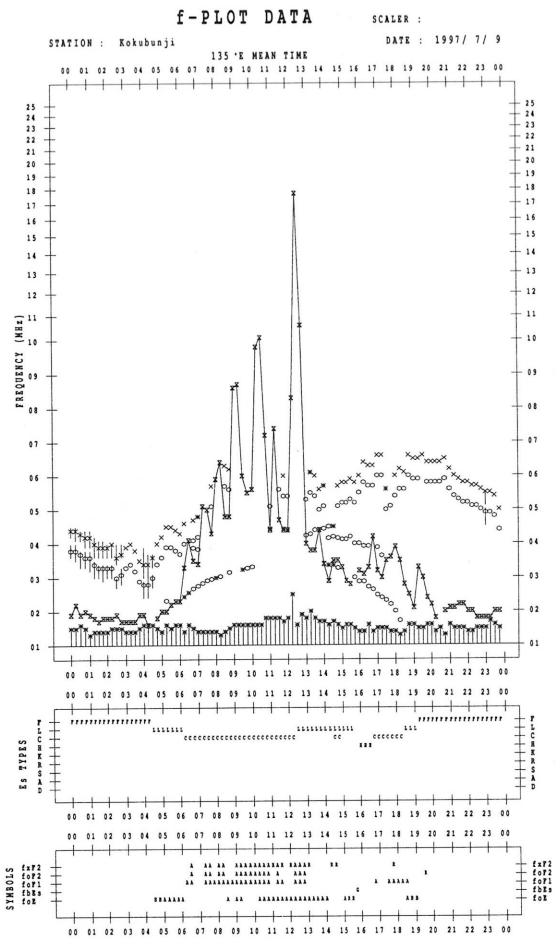
STATION : Kokubunji
DATE : 1997/ 7/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

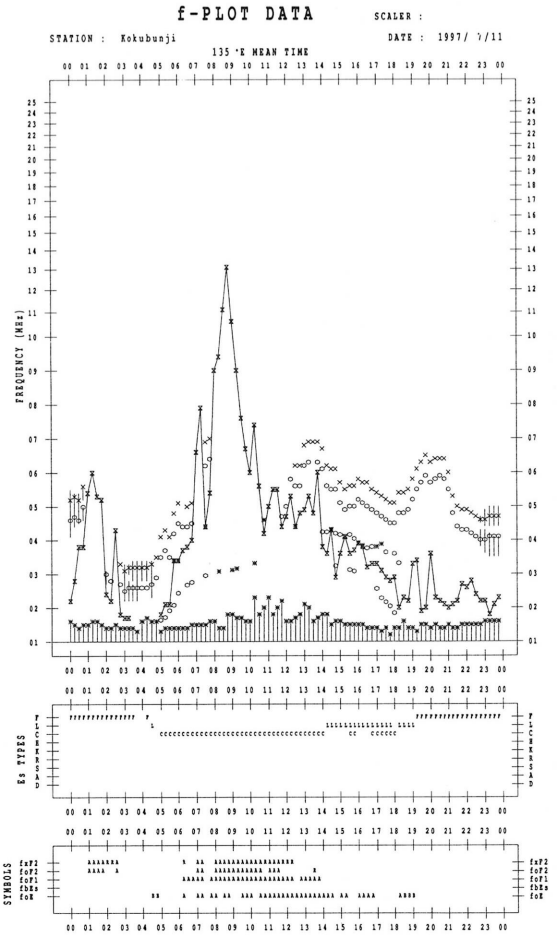

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
fbEs
foE

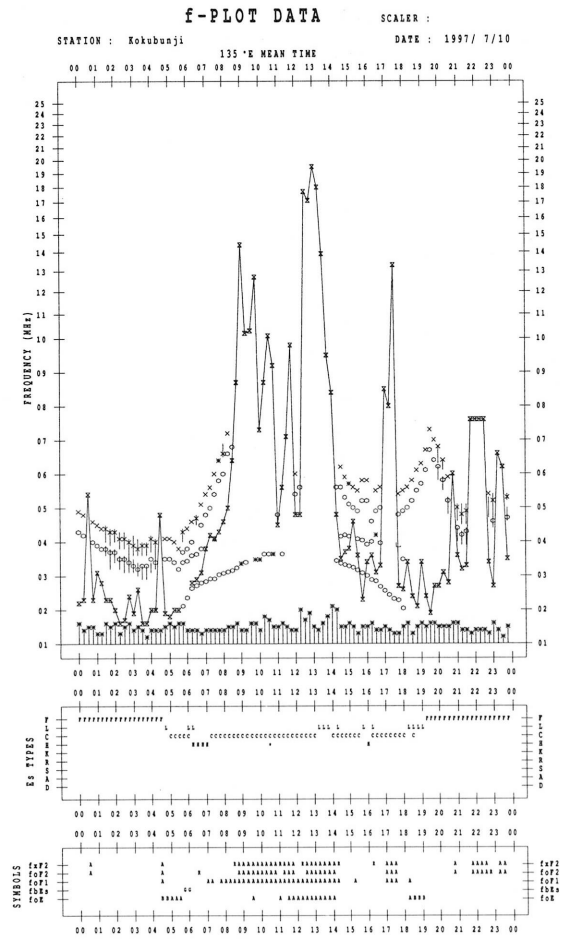

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
fbEs
foE

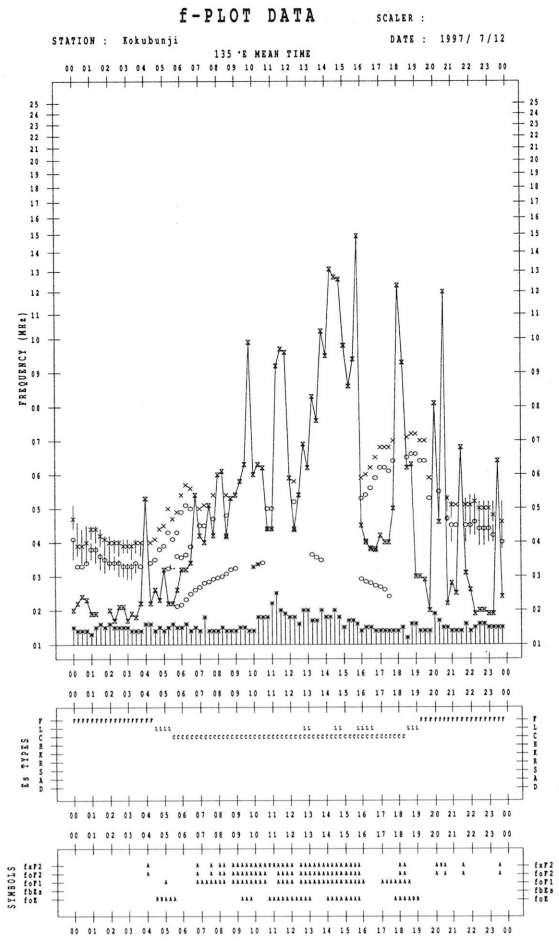

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
fbEs
foE

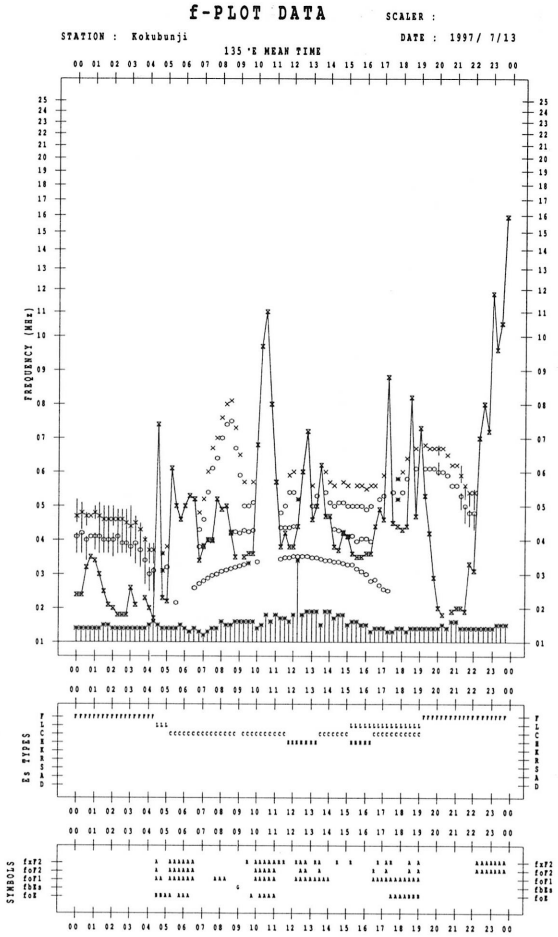

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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SCALER :
STATION : Kokubunji
DATE : 1997/ 7/13
135 °E MEAN TIME
FREQUENCY (MHz)
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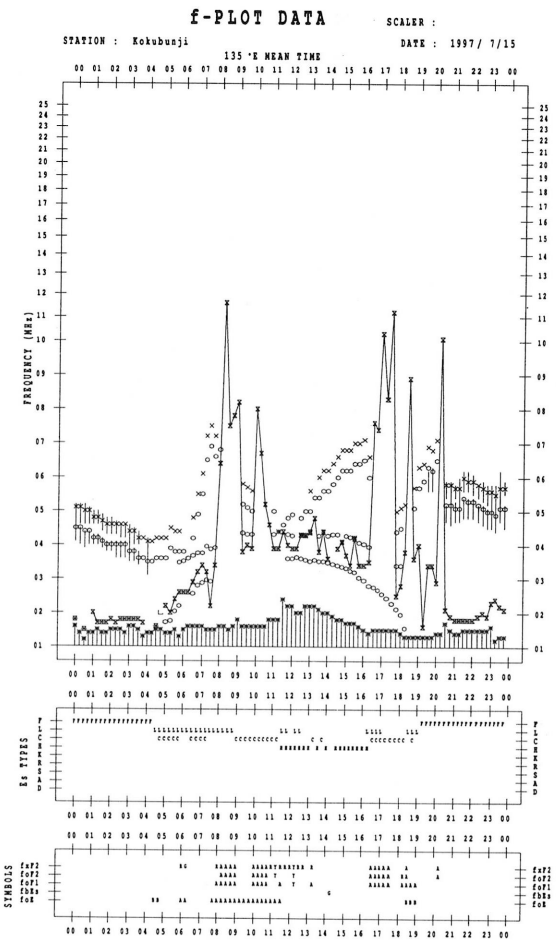
SYMBOLS
foF2
foF1
foEs
foE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DATE : 1997/ 7/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
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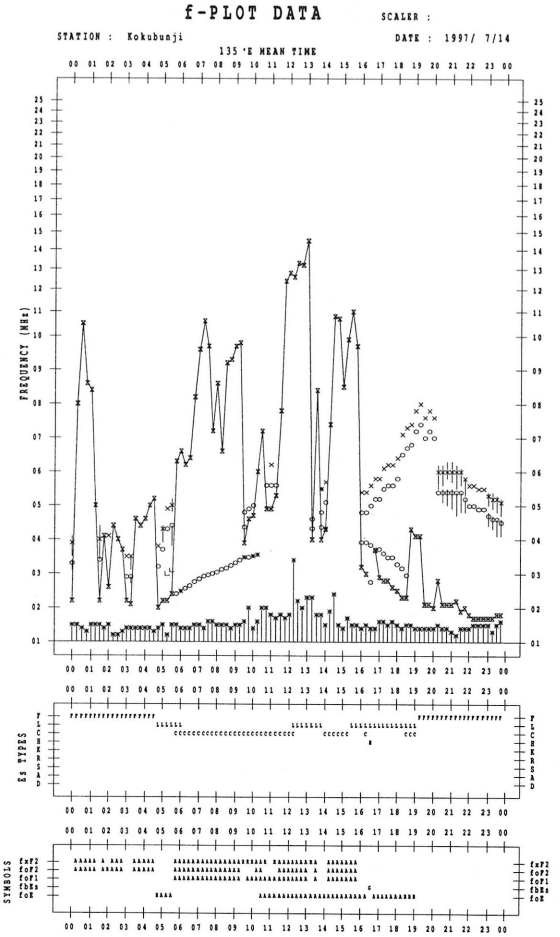
foF1
foEs
foE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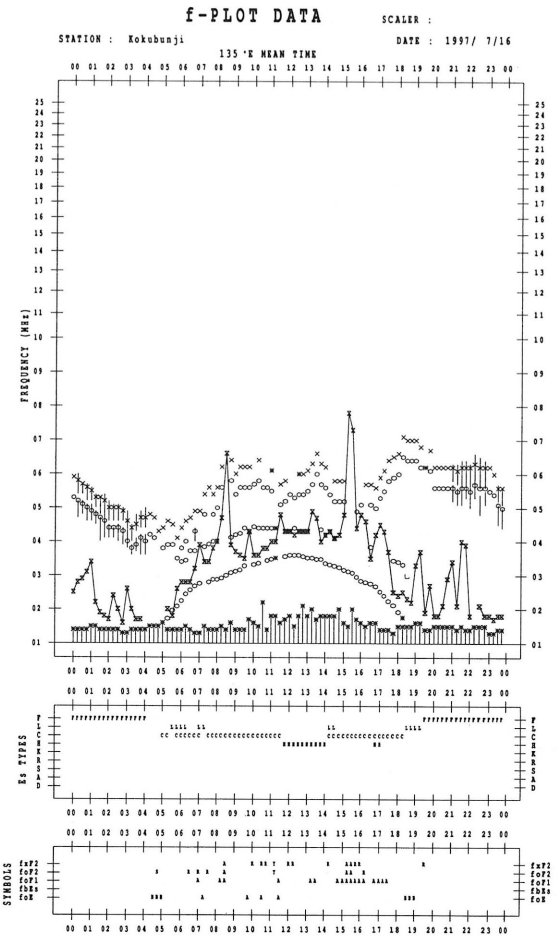
DATE : 1997/ 7/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foEs
foE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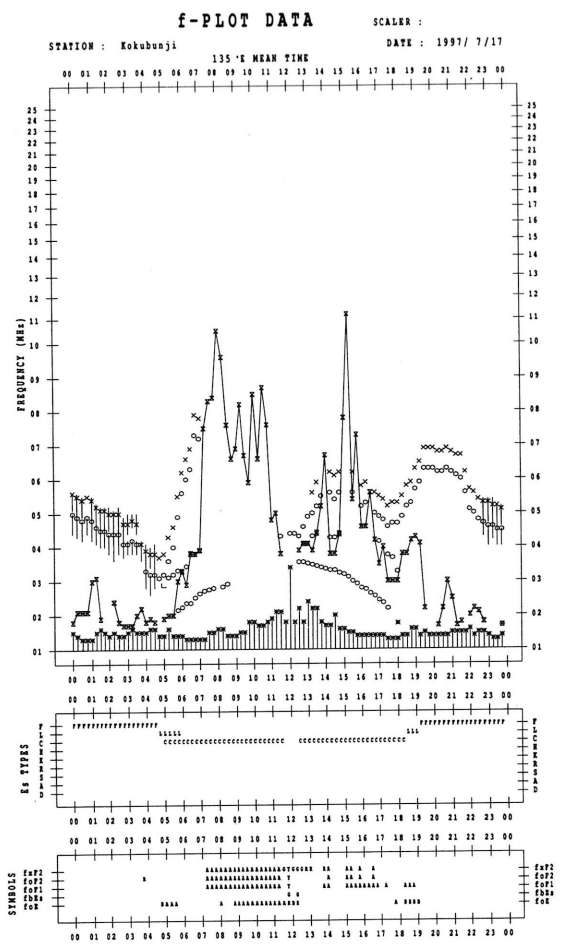
STATION : Kokubunji
DATE : 1997/ 7/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foEs
foE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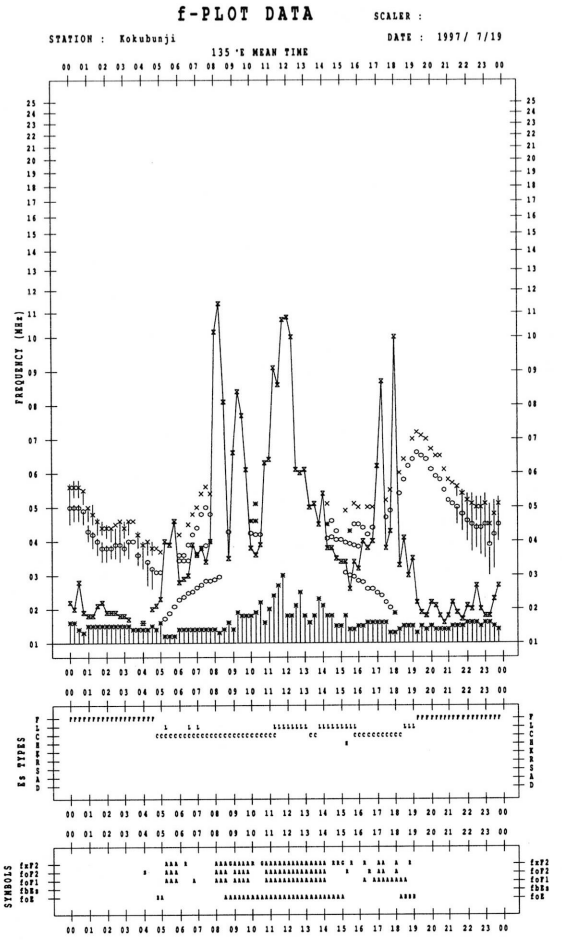
STATION : Kokubunji
DATE : 1997/ 7/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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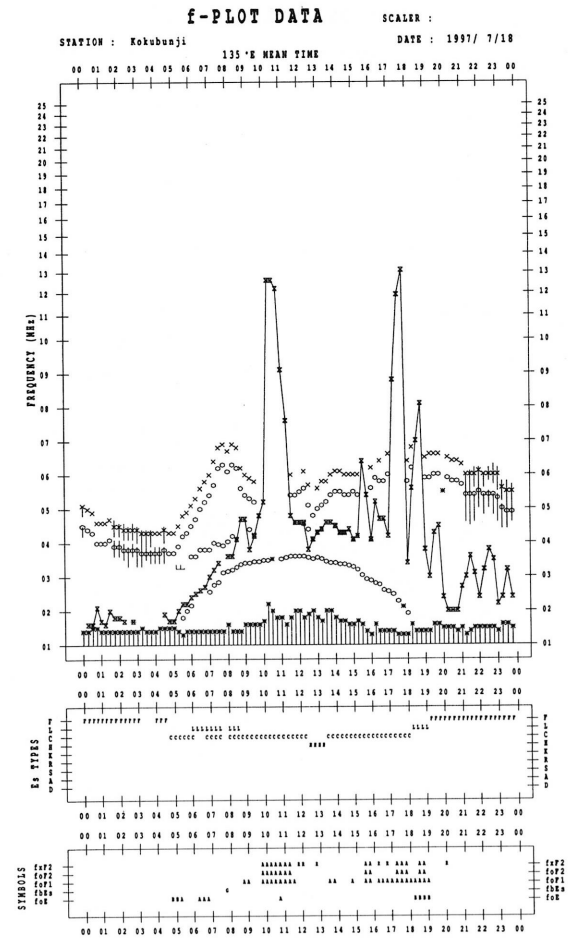
STATION : Kokubunji
DATE : 1997/ 7/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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DATE : 1997/ 7/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
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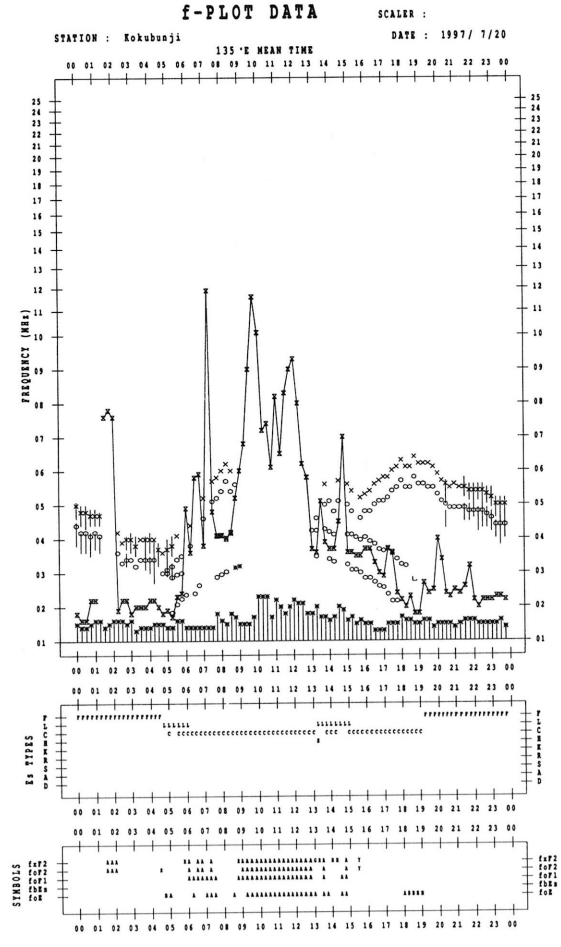
foF2
foF1
fbEs
foE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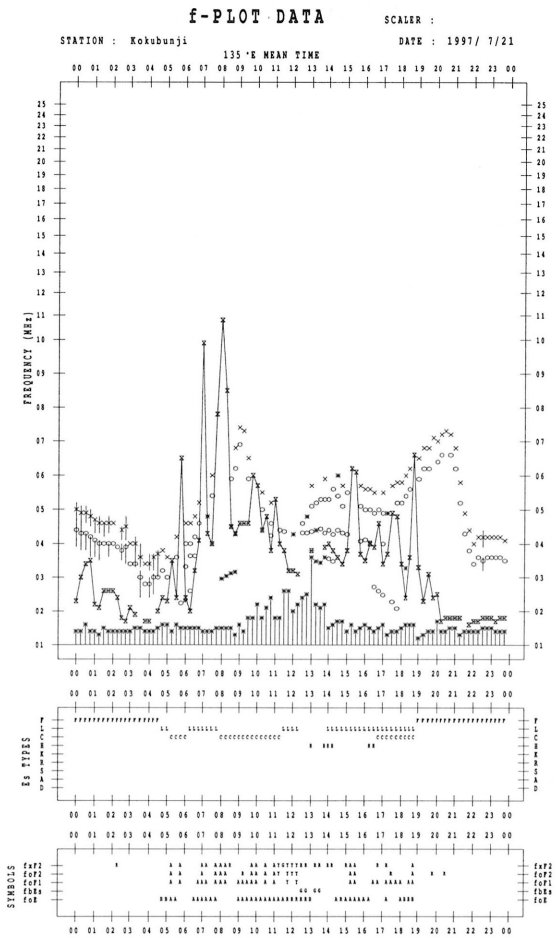
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
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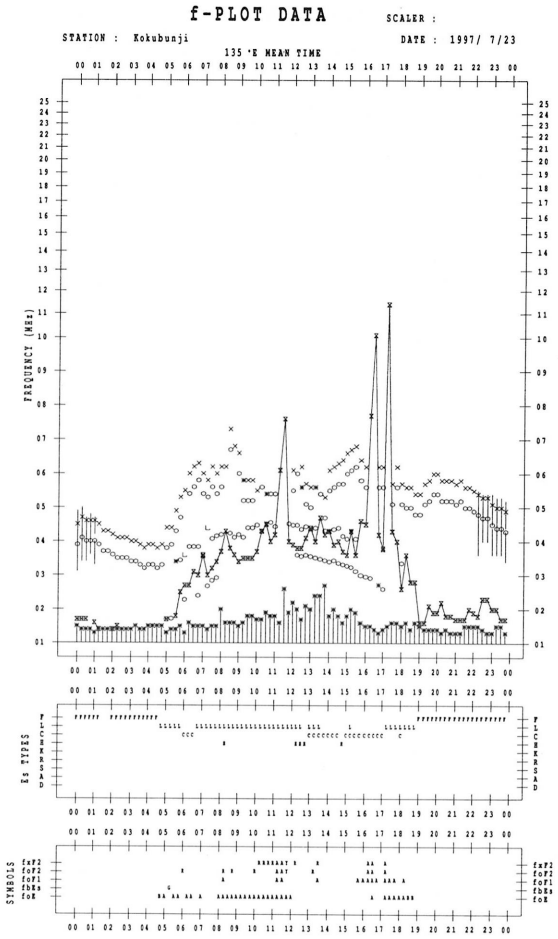
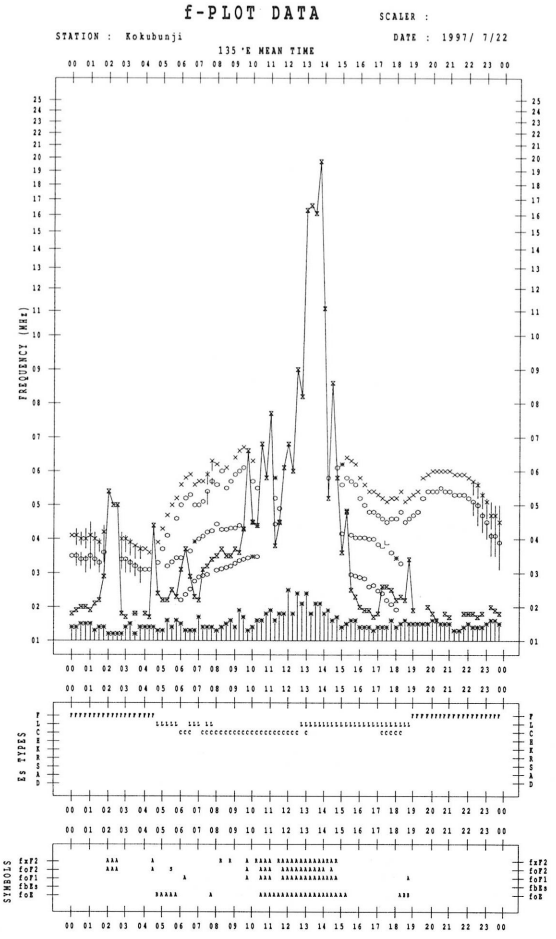
STATION : Kokubunji
DATE : 1997/ 7/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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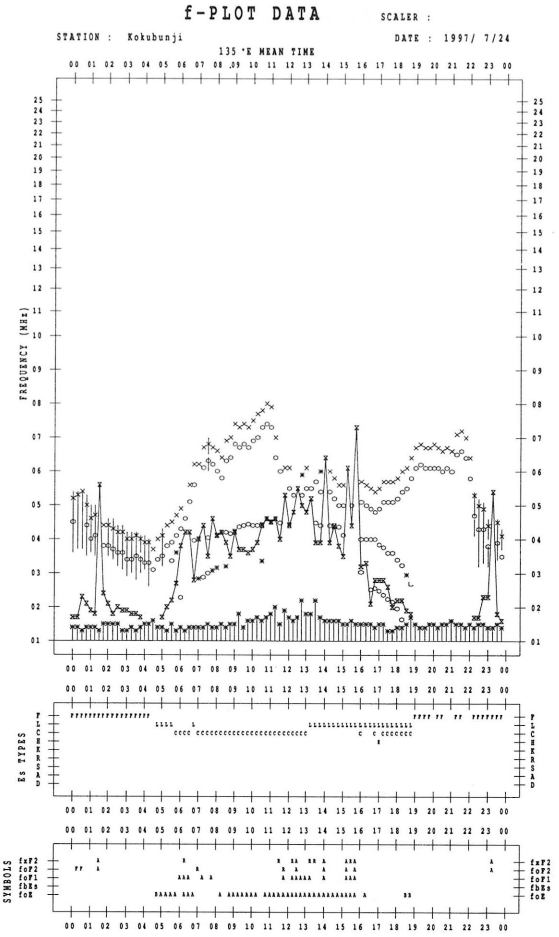
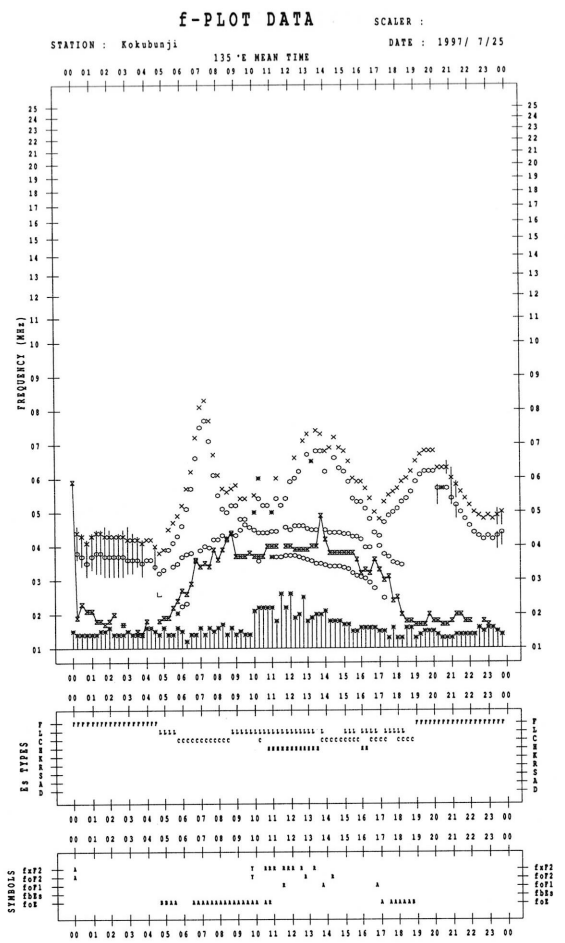
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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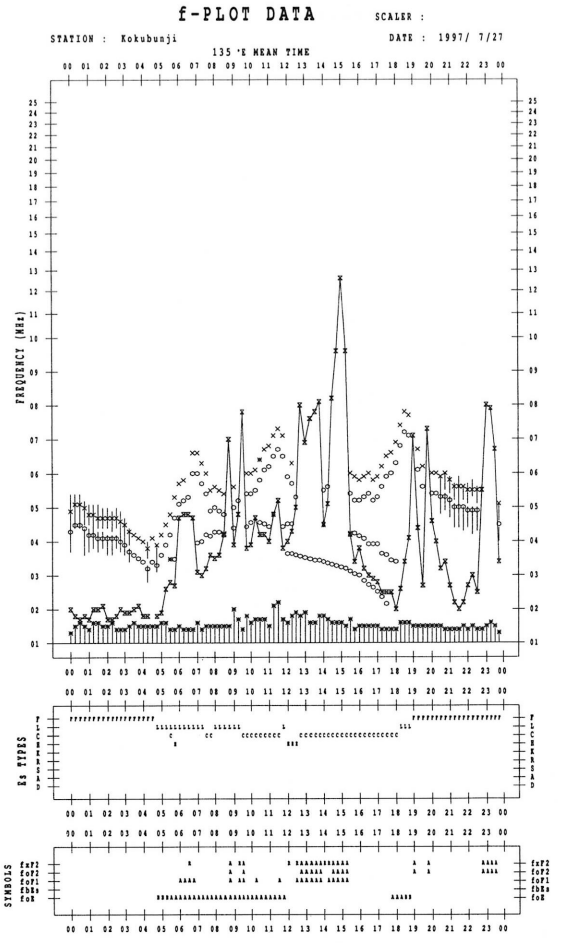
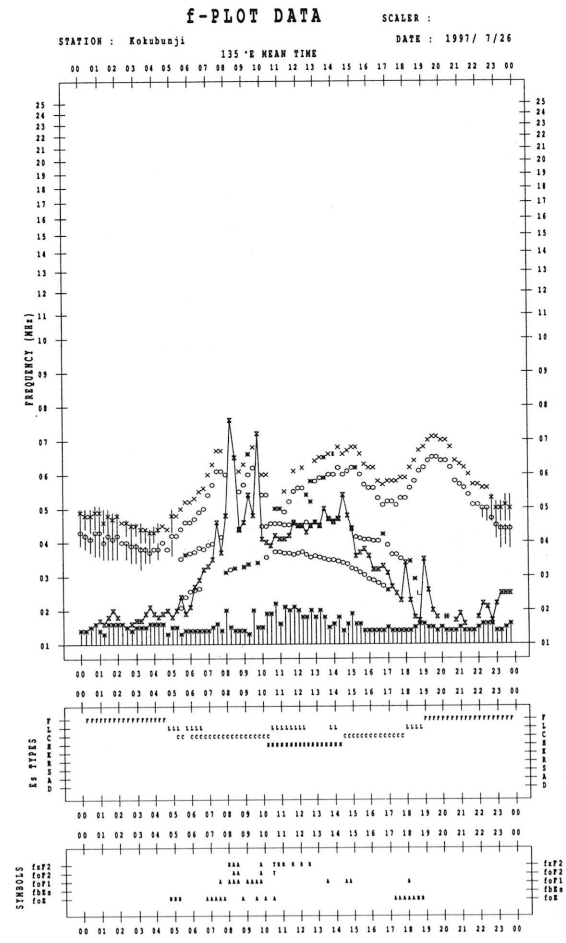
STATION : Kokubunji
DATE : 1997/ 7/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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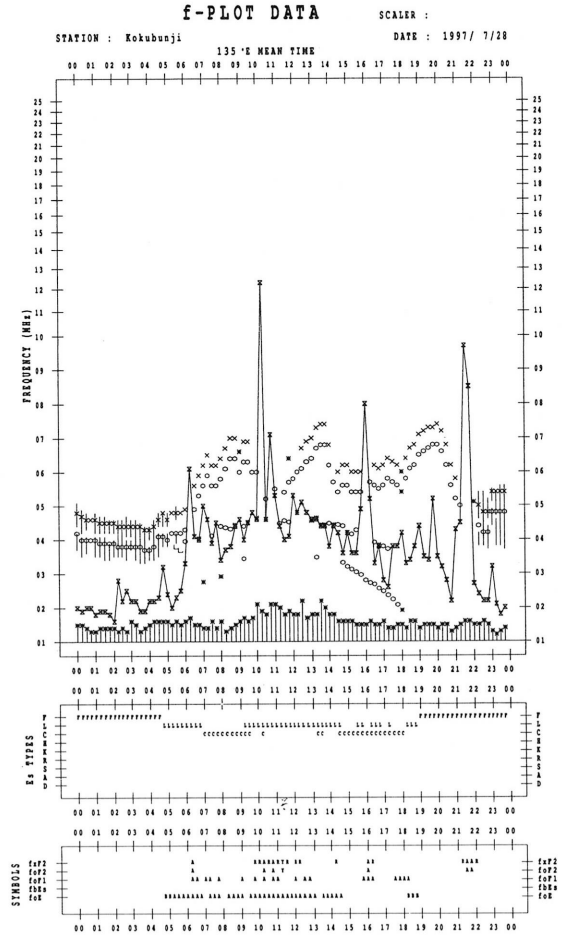
STATION : Kokubunji
DATE : 1997/ 7/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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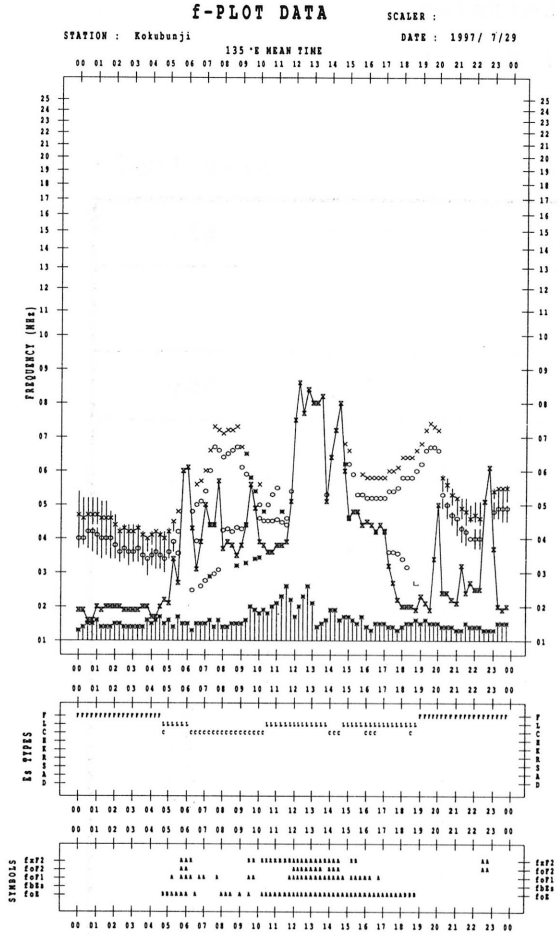
DATE : 1997/ 7/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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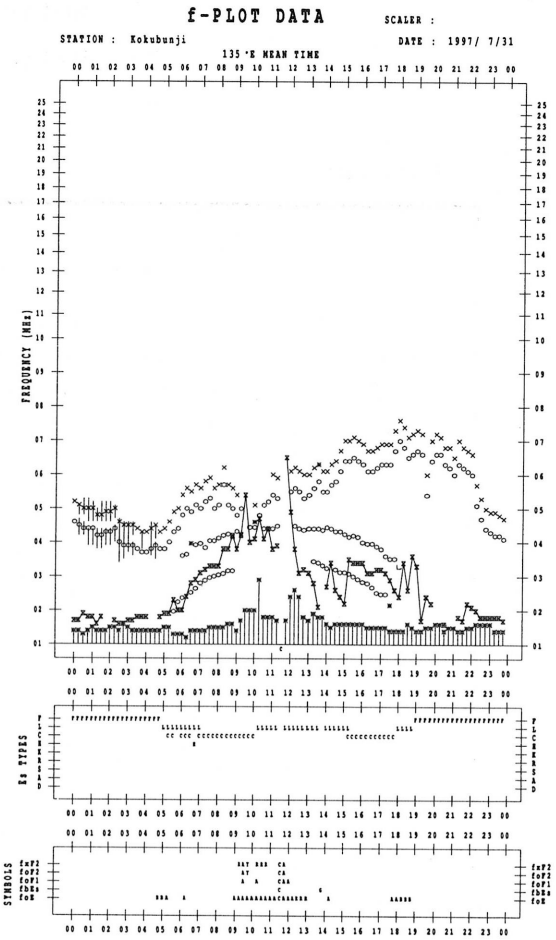
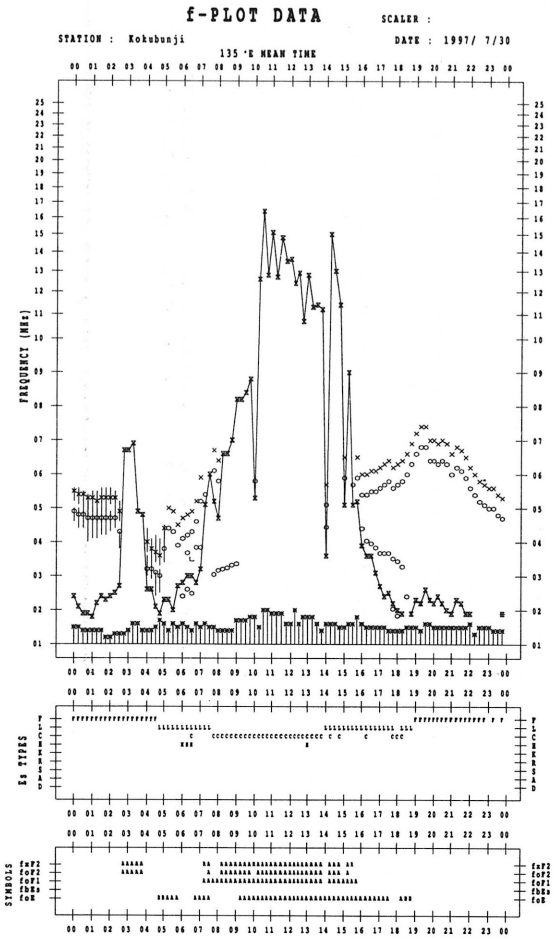
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/31
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 7/30
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso July 1997

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

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso July 1997

Single-frequency observations

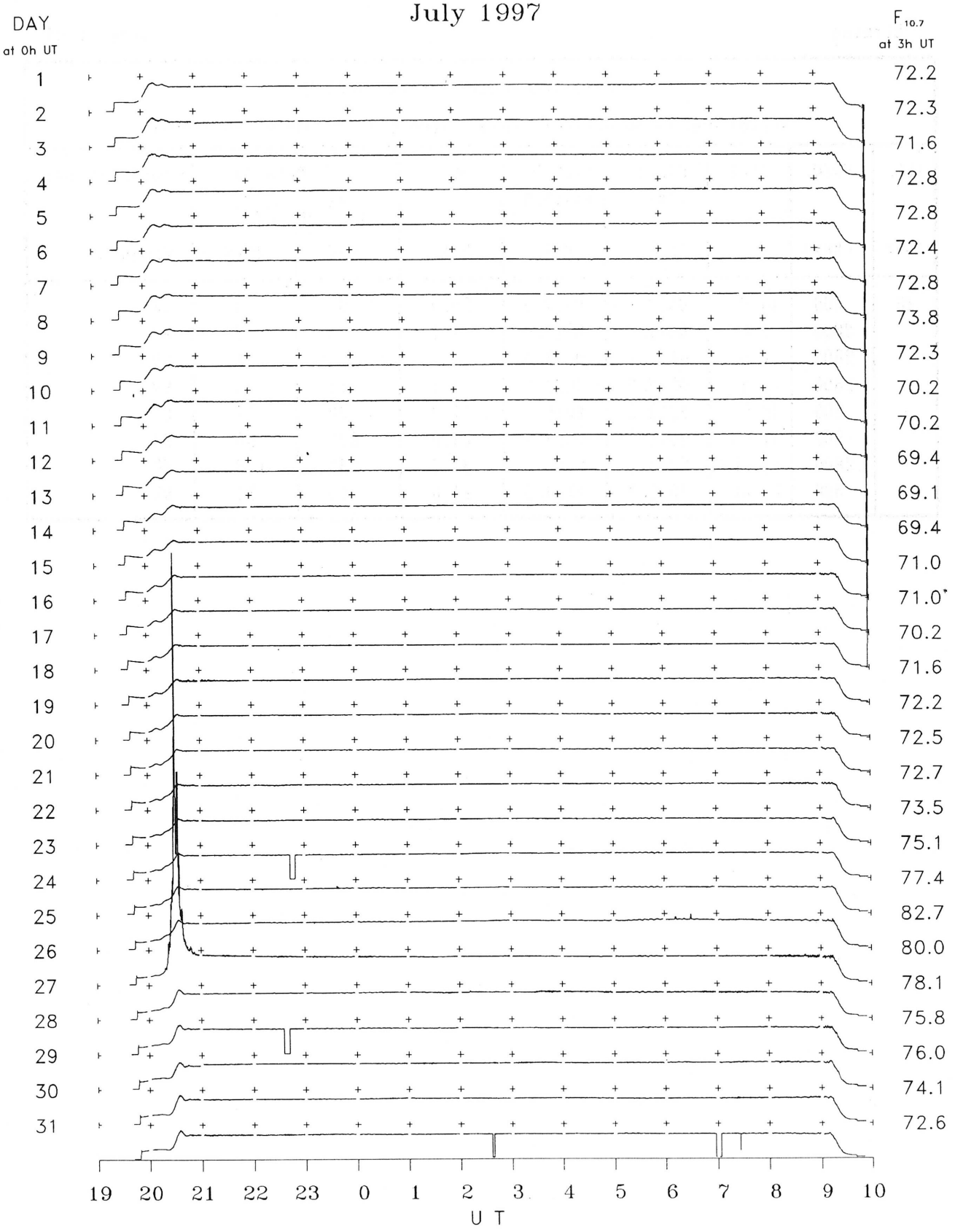
Normal observing period: 1930 - 1000 U.T. (sunrise to sunset)

JUL. 1997	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
25	500	46 C	0556.2	0617.5	39.0	95	18	MR
	2800	1 S	0611.5	0612.0	1.7	5	2	WR
	2800	1 S	0621.2	0621.6	1.0	2	1	WR
	2800	3 S	0629.5	0630.2	1.7	11	4	WR
	200	46 C	2018.5	2019.0	11.0	90	17	0
	500	47 GB	2018.7	2028.1	24.0	525	80	MR
	2800	47 GB	2019.0	2030.5	31.0	950	115	MR
	500	27 RF	2047.0	2126.0	74.0	90	35	MR

B. Solar Radio Emission

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

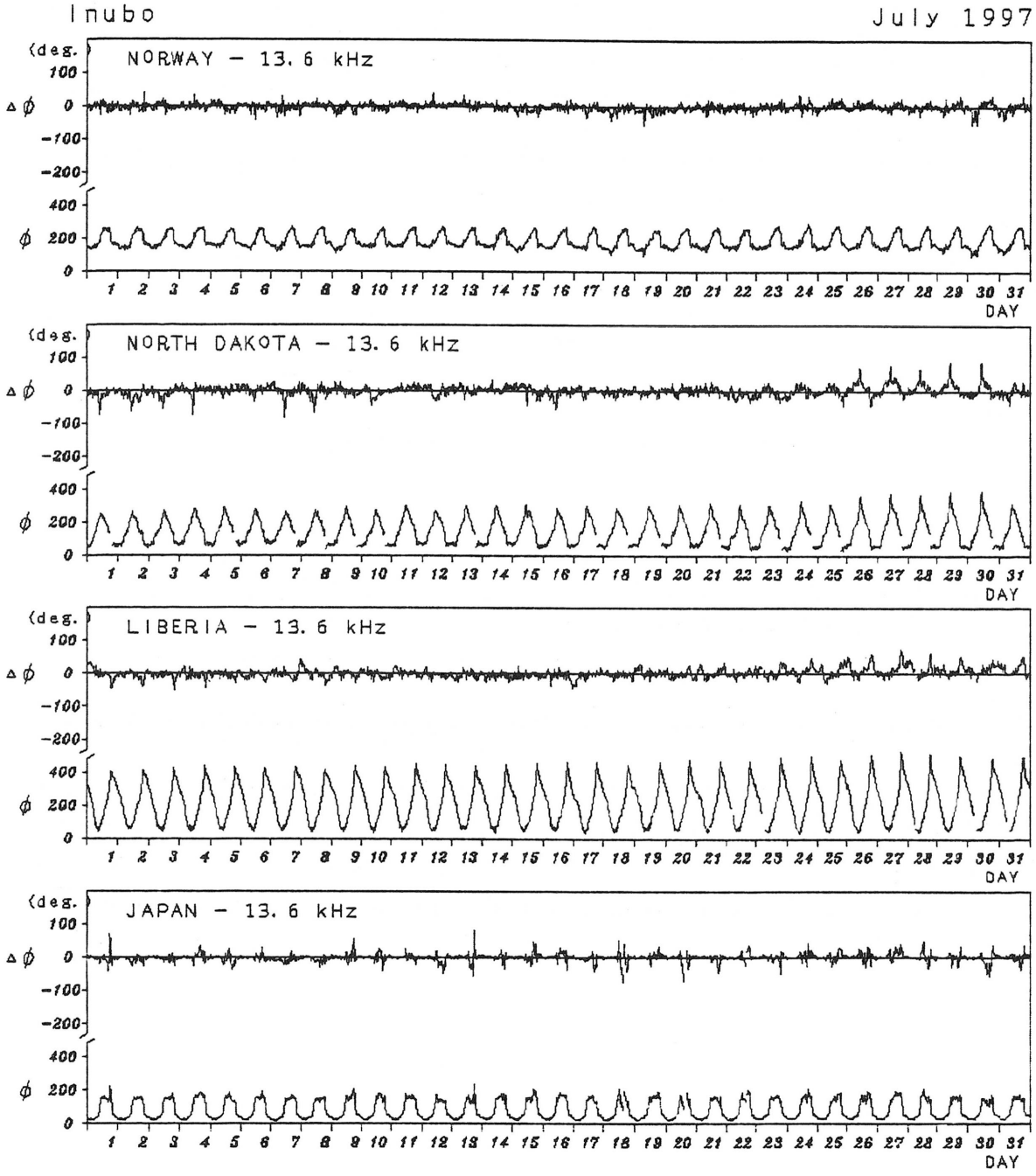
July 1997



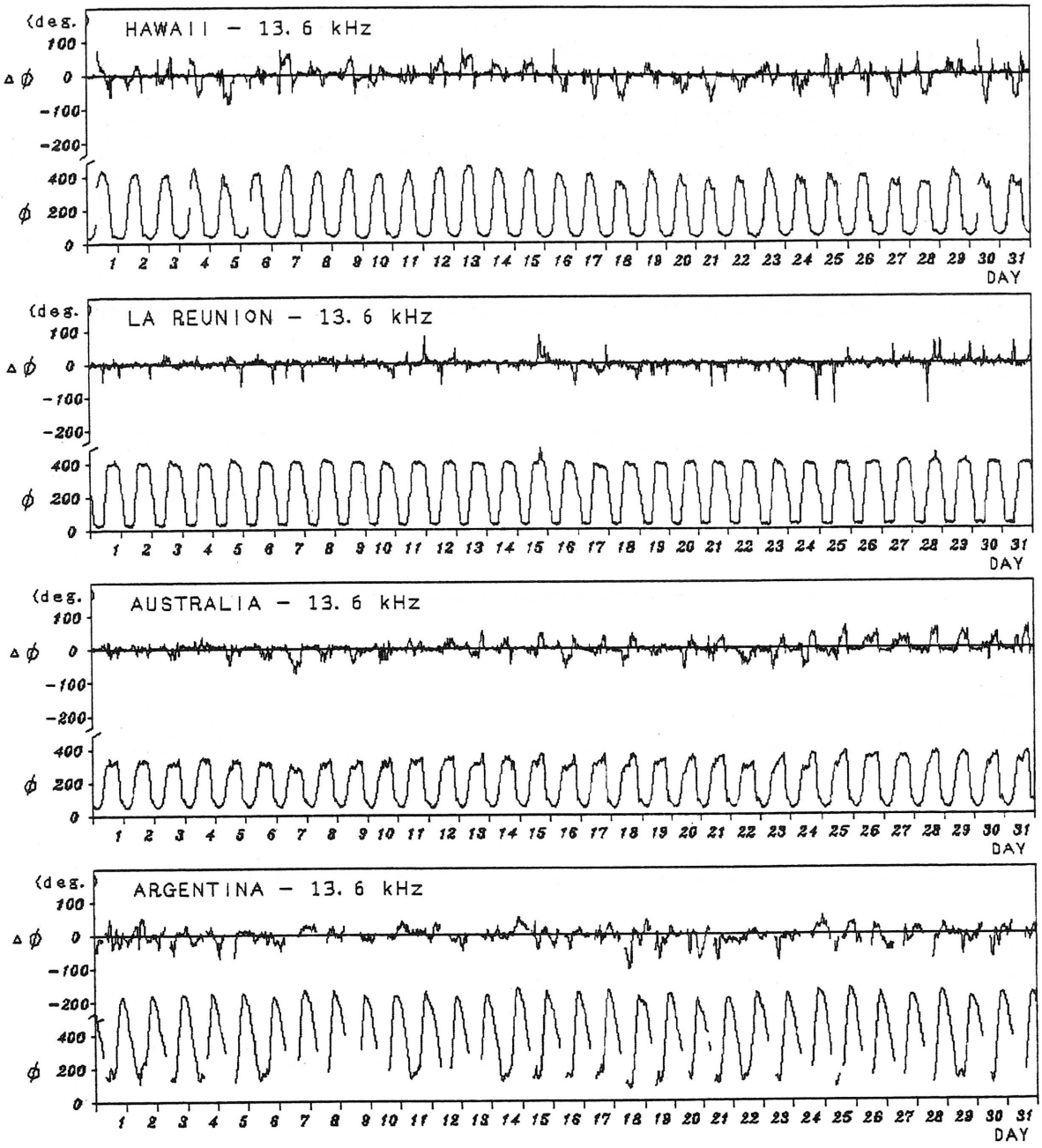
Note: A vertical grid space corresponds to a 100 sfu.
Elevation angle range ≧ 6°.

C. Radio Propagation

C1. Phase Variation in OMEGA Radio Waves at Inubo



Inubo July 1997



C2. Sudden Phase Anomaly (SPA) at Inubo

Inubo

Jul. 1997	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
25			9	11			0524	0645	0540
25					29	34	2020	2200	2040
27				9	7		0210	0244	0217

IONOSPHERIC DATA IN JAPAN FOR JULY 1997
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☎ (0423) (27) ７４７８(直通)

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2-1 Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184 JAPAN