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IONOSPHERIC DATA IN JAPAN

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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

JUN. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	71	72	71	68	72	82	90	83	70	A		76			70	70	70	77	93	82	77	82	78	73
2	71	68	71	77	68	77	75	A	77	58	70				59	68	78	78	81	82		59	94	72
3	68	67	68	58	66	83	84	82	79	A	A			A		A	71	76	74	71	68	66	70	66
4	69	71	58	66	49	69	80		81	A	62		A	A	67		A	80	82	82	57	68	74	68
5	76		68	64	49	70	78	A	51	61	A	A	A	A	A	A	A	A	70	A	A	76	58	71
6	68	71	56	60	68	77	68	77			A	A	69	A	A	A	67	A	76	81	70	61	68	72
7	68	76	67	57	49	82	77	80	77	A		A		A	A	74	A	78	78	71		70		77
8	68	70	76	67	58	71	76	82	64	63	80				A		67	A	A	94	74	58	68	69
9	58	68	68	63	57	71	73	69	60						A	A	65	61	A	70	69	69	76	70
10	68	68	68	67	67	68	67	81	59	59					A	A	A	78	78	80	78			72
11	72	66	78	66	68	81	70	80	67	81		59		59	A	67	79	82	78	96		78	80	
12	70	78		66	68	78	78	78	79	59		A	80		A	A	78	A	A	A	A	68	59	70
13	64	68	71	77	68		80	A	77	A	A	A	A	A	A	A	72	73	74	81		63	72	74
14	74	68	59	58	57	68	71	74	71	A	A	70	A	A		A	77	68	76	71	68	73	73	67
15	71	68	70	66	64	71			88				A			79	80	67	76	81	76		72	83
16	69	71	70	71		89	89	90		59	A	66	A		67	77		67	78	93	92		84	74
17	68	69	68	68	69	81	82	A	64	A	59		A	A				56	70	A	78	67		68
18	N	61	60	67	63	82	73	71	60							59	A	A	A		68	81	68	68
19		72	66	54	68	76	72	A	66	A							70	A	78	82		68		68
20	76	69	68	57	68	75	89	A		59		66	A	A	69		74	A	78	82			77	
21	58	58	59	58	57	72	80	81	70	A	A	A	A	A	A	A	A		A	A	A	68		70
22	68	68	68	58	54	73	70	88	77	79					A	A	A	71	77	80	56		68	78
23	65	68	74	68	73	86	93	90	87	76	A		A		A	A	A	A	A	81	80	71	73	57
24	A	68	73	A	57	A	A	62			A		A	A	A		A	68	71		79	93	92	74
25	94	80	79	67	70	74	57	80	79	76	75					A	A	A	82	78	93	83	80	81
26	94	95	71	66	74	78	84	89	87	A	76					A	A	A	76	84	90	94	94	95
27		72	66	55	57	70	62	A	A					A	A	A	A	58	A	57	89	60	70	A
28	71		72	57	57	60	58	68	A	A				A			A	67	72	68	68	68	66	70
29	68	68		66	68	74	59	A	A				A			A	A			A	93	68	67	70
30	73	79	71	66	68	71	74	79	A	A		A	A			A		67	68	71	74	82	84	80
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	28	28	29	29	28	28	20	22	11	6	5	2	1	5	7	13	18	22	23	21	25	25	27
MED	69	68	68	66	67	74	76	80	74	61	72	66	74	59	67	70	72	70	76	81	76	68	73	71
U Q	72	72	71	67	68	81	81	82	79	76	76	73	80	29	69	77	78	78	78	82	84	79	80	74
L Q	68	68	66	58	57	71	70	75	64	59	62	62	69	29	63	67	68	67	74	71	68	66	68	68

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Wakkanai

JUN. 1999

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	26	25	26	26	G	42	42	38	42	43	G	63	G	G	G	G	70	37	G		45	34	25	39
2	G	30	29	G	G	41	60	80	63	58	64	G	G	G	G	G	G	38	43	50	32	45	34	30
3	30	30	24	30	30	40	46	58	54	45	60	G		84	G	57	G	36	57	51	59	65	46	G
4	29	G	G	G	G	G	46		56	79	G	G	47	46	55	G	41	56	45	64	60	44	G	G
5	G	G	G	G	G	G	38	92	59	44	64	58	83	76	132	66	51	66	31	68	83	72	69	62
6	41	G	27	38	G	30	G	43		G	46	60	G	81	86	72	56	98	65	G	40	G	26	25
7	27	27	G	G	G	G	G	44	62	58	G	55	G	61	74	58	63	39	G	37	54	44	30	29
8	24	G	G	G	G	G	G	G	44	43	57	G	G	G	67	G	57	69	79	65	60	33	37	29
9	G	G	27	G	G	G	47	57	63	G	G	G	G	G	44	45	43	51	56	42	25	26	37	39
10	30	25	G	G	G	35	G	G	G	57	G	G	G	G	62	65	67	59	68	52	45	56	29	26
11	G	34	35	G	G	36	G	56	56	44	G	G	G	45	75	G	G	38	44	39	33	24	G	34
12	27	29	24	G	G	G	36	57	45	G	G	58	G	G	73	85	59	108		106	76	26	30	27
13	29	26	42	G	29	32	42	80	74	134	66	68	81	65	70	82	44	43	42	33	34	37	64	30
14	34	29	25	30	27	36	46	57	64	58	45	G	61	58	G	62	G	46	58	44	34	32	41	G
15	G	28	32	31	G	G	46	58	G	G	G	G	57	G	G	G	G	G	G	40	30	34	28	41
16	38	54	28	32	28	33	G	G	41	53	56	G	56	G	45	G		62	56	40	39	33	25	30
17	29	31	27	27	G	44	56	82	56	57	G	G	62	55	G	G	G	39	62	94	45	40	44	G
18	G	33	G	G	G	42	G	39	42	G	G	G		G	G	G	131	70	93		60	40	29	35
19		33	G	26	36	52	55	127	59	56	G	G	G	G	G	G	55	75	61	34	35	24	G	29
20	33	34	27	G	G	39	50	76		G	G	G	56	86	G	G	68	84	92	58	60	59	34	29
21	27	G	G	G	G	G	G	39	53	57	63	76	86	106	44	133	76		71	109	83	33	28	25
22	29	28	26	G	G	31	G	G	G	56	G	G	G	G	56	74	58	45	63	54	60	35	G	G
23	G	39	25	25	30	33	G	55	60	63	60	G		G	60	58	62	64	65	44	42	42	37	
24	64	62	50	60	35	106		42	G	G	66		58	66	79	G	62	41	44	74	134	60	85	G
25		34	26	29	58	46	G	59	46	44	G	G	G	G	G	83	72	126	55	34	34	29	37	28
26	28	32	37	28	29	30	54	56	74	80	G	G	G	G	G	78	67	65	71	62	28	38	40	34
27		29	37	25	37	38	46	43	54	G	G	G	G	62	66	86	83	62	66	51	94	54	53	90
28	65		34	32	32	44	54	53	55	56	G	G	G	45	G	G	57	56	58	40	35	61	22	25
29	26	36		G	28	G	G	40	42	G	G	G	94	G	G	172	66			74	126	96	71	G
30	29	34	G	G	30	30	35	56	76	77	G	58	55	G		42		G	31	38	29	24	27	38
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	29	29	30	30	30	29	29	28	30	30	29	27	30	29	30	28	28	28	28	30	30	30	29
MED	28	29	26	G	G	33	38	56	54	49	G	G	G	G	44	51	58	56	58	50	45	38	32	29
U Q	30	34	30	29	30	41	46	58	61	58	57	56	58	62	68	74	67	67	65	64	60	54	41	34
L Q	G	25	G	G	G	G	G	39	42	G	G	G	G	G	G	G	42	39	43	39	34	32	26	13

HOURLY VALUES OF fmin AT Wakkanai

JUN. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	15	15	18	16	16	16	17	17		21	21	23	17	22	17	16	16	15	15	15	15	15
2	15	15	14	15	18	15	16	16	20	21	21	18	22	21	22	17	17	16	15	15	15	16	14	15
3	15	15	16	14	16	15	16	17	17	20				20	17	18	21	16	16	15	16	15	15	15
4	15	15	15	15	18	15	16		17	18	17		18		21	22	17	16	15	15	15	15	15	15
5	16	16	15	16	20	27	16	16	17	18	18	18		18	20	18	16	17	15	16	15	15	15	15
6	15	15	15	15	17	15	15	18		17	20	18	20	22	21	18	17	16	15	17	15	15	17	16
7	17	16	16	15	17	15	16	16	16	18	18	18		32	23	17	16	15	15	15	15	15	15	15
8	15	16	15	15	18	15	15	16	16	18	18	18	18	20		17	17	17	15	15	15	15	15	15
9	15	15	15	16	17	15	16	16	16	18	17	22		18	18	18	16	16	16	15	16	16	15	15
10	16	16	16	15	20	15	16	16	17	17	20	20	17	20	18	26	17	16	16	15	15	15	15	15
11	16	15	15	15	18	15	15	16	15	17	21	20	18	18	21	18	17	16	15	15	15	15	15	15
12	15	15	15	15	18	16	15	15	15	16		18	17		18	20	15	16	16	15	15	16	16	16
13	15	16	15	15	16	15	15	16	17	17	21	21	20	18	18	17	16	16	15	15	15	15	15	15
14	15	15	16	15	20	15	15	15	18	18	22	21	17	22	32	18	17	16	16	15	15	15	15	15
15	15	15	15	14	18	15	15	16	17	17	18		20	21	18	17	16	16	16	16	15	16	15	15
16	15	15	15	15	16	15	16	16	16	17	18	21	17	16	21	18		16	15	15	15	16	15	15
17	15	16	16	16	20	15	16	16	18	16	20	23			20	16	16	16	15	15	15	15	15	16
18	16	15	16	15	17	16	16	16	17	16	20	20		18	21	18	18	17	16		15	15	16	15
19		15	15	15	16	15	16	16	18	17	17		20	17	18	17	17	16	16	15	15	16	16	16
20	15	15	16	15	17	16	15	16		22	20	18	17	22	26	20	17	17	16	15	15	15	15	16
21	16	15	16	15	17	15	15	16	17	23	20	18	17	20	17	17	18		15	15	15	15	15	16
22	15	16	16	16	16	15	16	17	17	18	20		22	22	17	17	16	16	16	15	15	15	15	15
23	16	15	16	16	15	15	16	16	17	18	23	18	24		21	18	21	16	15	15	16	15	15	16
24	15	16	15	16	16	16	17	17	16		35		23		47	20	16	15	16	15	15	15	15	15
25	15	15	16	15	15	15	15	16	17	20	20	18	18	23	24	17	17	16	15	15	14	15	15	15
26	16	15	14	15	16	15	16	16	17	18	21		22		20	18	16	15	16	16	14	15	15	14
27		14	15	15	15	15	15	16	16	18			20		27	16	17	16	16	15	15	14	14	15
28	15		15	15	16	15	16	22	18	18	22	22	20	28	21	20	16	17	16	15	15	15	15	15
29	15	15		15	15	16	17	17	20	17	20	23	45	21	21	18	20			15	15	15	14	15
30	15	14	16	15	16	15	16	16	20	38	22	91	44			20		15	15	15	15	15	15	15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	29	30	30	30	30	29	28	29	26	22	24	22	28	30	28	28	29	29	30	30	30	30
MED	15	15	15	15	17	15	16	16	17	18	20	20	20	20	21	18	17	16	16	15	15	15	15	15
U Q	16	16	16	15	18	15	16	16	17	18	21	21	22	22	21	20	17	16	16	15	15	15	15	15
L Q	15	15	15	15	16	15	15	16	16	17	18	18	17	18	18	17	16	16	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Kokubunji

JUN. 1999

LAT. 39.7N LON. 140.1E 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	94		81	78	81	93	A	A	85	A	A	85	91	93	94	83		84	84	100	92	92	82	93
2	95	82	93	92	81	75	94	94	96	A	A	94	94	96	102	106	103	116	105	105	97	91	92	94
3	92	95	92	82	81		99	106	91	A	88	A	A	A	96	98	98	101	93		83	82	81	94
4	80	71	70	67	66		98	94	A	82	79	86	81	88	97	91	93	92	93	80	95	A	95	93
5	78	80		75	74	76	88	101	88	A	A	A	A	82	A	A	74	74	82	83	70	70	67	78
6	80	75	75		68	76	76	92	91		A	A	A	89	A	80	82	81	87	94	95	95	84	92
7	94	93	77	67	66	72	93	92	89	86	86	93	97	86	93	87	87	90		88	95	93	84	93
8	94	96	99	94	94	94	92	92	80	79	81	88	86	84	84	87	85	87	93	94	81	82	A	77
9	93	80	68	67	67	82	97	85	66	A	A	A	B	A	77									
10											82	88	90	87	A	94	93	87		89	85	81	94	94
11	A	93	80	94	76	81	84	92	91	92	A		78	86	93	94	102	106	122	104	84	92		93
12	94	94	87	84			91	90	A	A	A	A		94	98	112	107	114	99	93	74	69	94	82
13	81		68	78		94	86	84	77	78	A	A	A	A		99	94	88	88	82	68	66	69	
14	77	81	71		64	71	81	89	A	83	A	90	87	88	94	94	87	86	95		A	93	A	115
15	94	88	81		76	91	96	104		83	85	A	84	84	99	97	97	82	86	100	96	87	83	82
16	94	94	92	82	84	94	93	101	96	N	91	92	86	96	98	A	85	96	93		103	97	92	93
17	92	94	93	76	83		94	A	91	91	81	A	A	A	83	86	80	A		90	93	81	A	75
18	74		95	62	62	74	94	84	85	86	A	A	A			A	81	77	95	82	93	77	81	92
19	81	A	81	91	81	80	95	96	88	90	A	90	91	84	84	91	86	86	96	81	95	A	82	82
20	82		69	75	71	74	92	105	92	82	A		86	90	92	97	97	96	96	85		84	91	93
21	93	81	81	67	68	70	102	98	100	83	A	A			67	74	76	73	70	68	81	76	93	A
22	68		54	61	64	64	84	98	105	84	80	A	A		83	84	A	84	94	94	82		92	85
23	83	81	95	71	70	77	94		103	91		78	82	84	81	A	A	83	90	98	96	68	A	93
24	95	94	94	94	76	80	93	91	82	A	A	A	59	79	77	80	85	81	95	82	68	79	69	84
25	81	94	82	70	67	70	95	101	102	88		83	82		84	85	87	86	84	93	87	92		
26	92	94	85		72	77	93	98	A	95	A	90	84	86	85	78	A	A	81	89	A	A	96	92
27	A	A	A	71	70	74		A	A	A	A	A	A	A	A	A	A	A	70	79	A	68	A	66
28	66	63	69	67	58	59	A	83	A	A														
29	69												A		A	A	71	A	A	90	A	A	81	94
30	71	94	78	67	67	67	83	86	85	81	A	87	87	87		81	75	74	78	94	79	82	94	76
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	21	26	24	26	24	25	24	21	17	9	13	17	19	21	22	23	24	24	25	23	23	21	25
MED	83	93	81	75	70	76	93	93	91	84	82	88	86	87	92	89	87	86	93	90	87	82	84	92
U Q	94	94	92	83	81	81	95	99	96	90	87	91	90	90	96	97	97	94	95	94	95	92	93	93
L Q	78	80	71	67	67	71	87	89	85	82	80	85	82	84	83	83	81	81	84	82	81	76	81	82

HOURLY VALUES OF fEs AT Kokubunji

JUN. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	72	48	47	73	33	52	105	135	86	74	74	62	62	56	53	73	98	49	38	68	72	44	67	46
2	62	70	55	59	36	34	58	58	130	108	92	59	G	G	56	86	76	131	60	52	31	G	146	60
3	90	56	G	38	G	42	47	52	70	78	88	132	186	161	77	88	49	46	57		44	70	93	112
4	G	52	36	34	32	55	41	74	98	109	G	57	130	72	58	91	54	54	74	58	44	40	26	52
5	60	61		35	47	45	38	60	61	82	107	88	72	71	158	71	G	47	34	34	37	29	G	68
6	59	58	47	63	47	34	40	46	G		168	69	58	82	106	58	52	36	46	28	26	34	34	29
7	44	28	42	53	40	38	G	G	62	64	52	84	49	G	G	G	59	47	79	66	G	62	53	67
8	G	G	27	43	25	G	34	38	G	G	G	49	58	65	69	73	72	62	46	44	53	69	86	49
9	37	27	G	G	33	32	38	45	56	53	61	50		49	63									
10											52	G	53	57	157	53	59	60	112	103	34	60	29	32
11	54	29	G	G	G	G	G	46	50	50	78	G	46	G	57	G	G	55	46	38	54	49	82	26
12	26	44	34	30		30	34	45	90	86	89	109	112	60	86	51	G	G	37	29	54	43	34	60
13	70	60	41	30		G	57	55	81	75	121	164	112	134	123	72	66	50	39	30	34	39	51	59
14	68	58	58	60	64	40	58	81	142	67	73	60	84	56	55	G	G	61	45		55	64	60	53
15	36	38	32	30	30	31	40	47	58	G	59	51	60	60	50	G	G	56	55	41	26	46	G	
16	45	37	29	G	26	G	G	48	62	56	G	53	68	54	58	88	40	67	59		53	60	58	59
17	46	56	40	34	30		70	125		55	56	103	132	141	72	G	55	76	136	64	87	30		66
18	39	42	27	29	36	31	48	52	57	60	72	134	91	G	G	56	59	G	37	38	32	31	60	88
19	67	81	87	55	46	49	66	71	79	68	86	58	G	G	G	55	67	74	47	45	40	96	70	33
20	32	33	35	32	31	33	44	46	G	56	56	G	G	G	G	G	G	43	49	34	24	68	69	96
21	55	30	35	28	G	30	35	71	80	56	69	118		G	G	61	58	55	73	56	43	68	72	90
22	49	60	54	38	29	31	39	48	52	G	50	80	59		48	55	78	58	57	55	60		70	67
23	60	29	55	26	G	G	36	G	44	G	G	G	G	50	59	74	61	82	94	56	66	52	70	65
24	53	70	62	60	70	44	42	83	60	64	58	46	G	G	G	68	74	49	53	28	24	61	52	54
25	55	34	32	32	26	28	37	68	91	55	G	56	G		53	60	62	70	60	52	60	60	33	29
26	30	33	38		27	28	G	48	111	62	68	G	52	49	50	124	90	139	71	86	129	124	61	27
27	83	91	85	53	52	34	51	69	62	80	130	84	112	68	83	60	69	72	54	118	73	62	73	60
28	59	91	59	52	40	44	79	60	107	66														
29	52												89		69	48	G	108	81	32	89	85	59	60
30	60	39	37	G	27	38	34	41	54	57	74	70	56	59		G	G	G	G	30	31	30	29	28
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	27	27	26	27	28	28	27	27	28	28	27	26	28	28	28	28	28	25	28	27	27	27
MED	54	46	38	34	32	33	40	52	62	62	68	60	59	56	58	59	58	56	54	45	44	60	60	59
U Q	61	60	55	53	40	42	54	70	90	75	87	86	91	68	74	73	68	71	72	61	60	68	70	67
L Q	38	33	32	29	26	28	34	46	54	55	52	49	46	G	49	24	G	47	45	33	31	39	34	33

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Kokubunji

JUN. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	14	14	14	15	17	16	26	39	39	39	39	38	34	33	21	16	14	15	14	14	15	15
2	14	15	15	14	14	14	16	18	24		38	40		64	39	29	18	15	14	15	14	15	15	15
3	14	15	14	14	14	16	16	27	27		40	44	40	40	39	32	26	18	15		15	14	14	15
4	14	15	14	15	14	14	15	17		38		42	42	24	40	27	28	15	15	15	14	14	16	15
5	14	14		14	15	14	15	15	20		42	40	42	38	41	32	21	17	14	14	15	14	15	14
6	15	14	14	15	15	15	15	15	18		44	44	42	39	23	22	20	16	14	14	15	14	14	14
7	15	14	15	14	15	15	15	16	20	22	35	39		64	63		20	14	16	15	14	14	15	15
8	15	15	14	15	15	22	14	16	18	24		N	49	40	42	20	22	16	15	15	15	14	15	14
9	14	14	15	14	14	14	14	14	18		40	40		43	41									
10											39	N	36	39	45	40	24	16	15	15	15	14	14	15
11	15	14	15	15	15	20	15	16	24		42		61	54	38		15	14	15	14	14	14	14	17
12	15	14	15	14		14	15	15	17		21		42	38	34	20	26	17	16	15	14	15	15	14
13	14	14	14	14		22	14	17	23	38	42	39	38	38	39	24	23	15	14	15	14	14	14	15
14	14	15	14	14	14	15	16	16	15	14	26	36	41	34	27		17	15	15		17	14	14	15
15	14	15	14	15	15	14	14	14	18		40		38	36	34	24	17	17	14	15	14	15	14	16
16	14	15	14	15	14	22	16	16	17	23	24	38	42	36	38	28	21	15	14		15	14	14	14
17	15	15	14	15	15		15	15	20	21	40	42	39	40	24	54	32	16	14	15	15	15	15	15
18	15	14	15	14	15	14	15	18	22	39	40	38	36			18	18	20	14	15	15	14	15	14
19	14	15	15	15	15	15	15	15		36	39	38		60	61		34	17	15	14	15	15	15	15
20	15	14	15	14	14	15	16	20	26	35	36		62	62	58	54	17	15	15	15	15	15	15	15
21	14	14	15	15	14	16	15	15	18	35	36	39			24		17	15	14	14	17	15	15	14
22	15	14	14	15	15	14	15	18	18		42	40	42		59	22	20	16	14	14	15		14	15
23	15	14	14	14	15	22	15	17	20	32		60		43	44	28	38	20	14	15	15	15	14	15
24	14	16	17	15	15	15	18	17	21	35	39			62	60	26	21	14	16	15	15	15	14	15
25	15	14	14	14	14	15	15	16				36			44	38	35	16	16	15	15	15	14	14
26	14	14	15		15	16	14	18		24			42		62		23	17	15	15	14	14	15	15
27	14	15	14	14	14	16	16	17	33	35	38	39	40	46	44	21	24	16	17	14	15	15	15	15
28	15	14	14	14	15	14	16	15	18	28														
29	15												40		40	24		14	15	15	14	14	15	15
30	15	15	15	15	15	15	14	17	20		23	43	42	39		28	23	16	16	15	14	15	15	14
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	27	27	26	27	28	28	24	17	23	20	21	23	27	22	27	28	28	25	28	27	28	28
MED	15	14	14	14	15	15	15	16	20	35	39	40	42	40	40	28	21	16	15	15	15	14	15	15
U Q	15	15	15	15	15	16	16	17	23	37	40	42	42	54	45	32	26	17	15	15	15	15	15	15
L Q	14	14	14	14	14	14	15	15	18	23	36	38	39	38	34	22	18	15	14	14	14	14	14	14

HOURLY VALUES OF foF2 AT Yamagawa

JUN. 1999

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	85	86	86	86	86	82	86	88	82	A	75	86	A	A			101	98	98	100	89	84	86	82
2	93	84	89	94	78	81	86	91	100	A	86	90	104	104	109	120	126	124	125	128	112	104	108	120
3	108	111	94	93	86	86	99	90	82		86	92	101	104	104	107	116	111	102	99	88	84	85	86
4	88	84	83	74	72	68	92	74	78	72	81	83	88	94	94	96	100	104	85	84	80	84	88	97
5	96	90	86	75	74	72	94	111	94	80	80	A	A	105	A	A	101	100	101	90		90	88	89
6	93		A	A	109	66	76	81	86	74	70	76	86	91	85	91	96	94	101	100	85	84	92	97
7	79	93	94	59	65	A	84	84	86	82	A	A	91	88	100	100	105	105	102	91	94	84		92
8	93		96	88	80	74	73	76	89	81	85		87	88	91	96	90	91	98	96	86			86
9	89	87	83	94	83	81	91	84	78	84	80	86	91	90	84	95	101	94	86	78	73	A	80	84
10	77	79	80	71	68	68	75	72	76	76	87	74	85	90	88	91	96	90	89	88	82	87	90	93
11	87	90	88	83	80	79	83	91	106	96	81	80	86	90	91	104	108	108	106	A	83	86	87	90
12	83	88	86	94	84	83	84	76	80	83	80	85	A	98	100	106	115	120	A	96	76	86		93
13	93	84	88	95	79	81	82	A	A	A	A	A	97	105	A	108	110	111	112	86	83	84	78	84
14	76	83	93	86	A	A			78	74			83	96	105	105	100	103	102	102	103	91		94
15	101	88	84	83		95		81	83	83	80	84	94	102	103	106	98	98	113	110	105	89	92	83
16	86	81	84		94	80	80	91	91	90	81	84	100	100	102	95	104	103	107	104	104	81	83	86
17	92		A	92	84	83	88	108	99	90	83	A			102	112	108	98	105	104	96	79	83	86
18		87	84	76	68	70	83	91	92	A	81	75	78	84	87	91	84	94	99	82	81	84	83	79
19	86	86	84	79	95	70	A	92	77	72	89	79	A	A	98	A	98	98	91	A		86		88
20	86	86	88	83	82	81	93	94		75	75	73	85	93	95	96	101	104	88	86	84	83	83	84
21	92	94	91	83	86	80	91	99	91	83	74	77	78	109		83	92	91	A	A	A	82	82	82
22	74	79	73	72	69	60	66	92	86	75	71	73	75	71	86	83	85	103	103	96	A	83	82	78
23	86	85	88	83	82		73	78	100	80	69	79	79	84	86	84	91	96	98	105	90	A	86	
24															74	87	93	A	75	73	69	69	72	75
25	76	77	92	A	62	A	76	87	87	79	72		87	84	84	88	82	84	A	89	83	86	87	98
26	93	83	86	86	83	80	81	87	90	88	A	84	A		98	98	105	103	81	78	A	78	A	94
27	79	A	76	74	73	A	72	A			A	A					A		A	A	A	34	23	A
28	59	A	A	A				A	A		A						A	A	A	74	A	A	A	66
29	65		69	68	64	64	A	82	79	86	82	88	84	91	92	91	87	90	104	91	74	64		81
30	84	87	94	82	75	66	73	95	74	A	76	85	95	98		82	84	91	90	90	86	76	80	80
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	23	26	25	26	23	24	25	25	21	23	20	21	23	23	25	28	27	25	26	23	26	22	28
MED	86	86	86	83	80	80	83	88	86	81	80	84	87	93	94	96	100	98	101	91	85	84	84	86
U Q	93	88	91	90	84	81	89	92	91	85	83	85	94	102	102	105	105	104	104	100	94	86	88	93
L Q	79	83	84	74	72	68	75	81	78	75	75	76	83	88	86	89	91	94	89	86	81	81	82	82

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Yamagawa

JUN. 1999

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	25	G	G	G	G	G	48	117	60	153	58	78	103	167	110	143	56	G	32	G	G	31	28	30
2	31	31	32	G	G	G	31	50		109		85	61	56	G	55	G	38	52	40	G	G	G	G
3	25	G	G	G	G	G	32	G	G	G	57	G	G	G	G	62	G	51	37	40	G	G	G	
4	46		G	G	G	G	G	G	G	G	61	G	69	66	79	56	G		48	28	40	G		29
5	40	G	G	G	G	G	G	50	55	55	G	108	109	88		109	81	61	56	44	G	G	G	G
6	G	28	30	29	40	28	32	36	G	50	70	55	54	63	60	G	G	G	60	50	32	31	30	G
7	30	32	G	29	46	53	43	G	60	77	110	147	61	57	G	G	G	G	G	G	G	G		G
8	28		G	30	38	G	30	G	G	G	48		G	G	G	66	G	55	57	68	G	35		40
9	40	G	30	G	G	G	G	G	G	G	G	G	75	51	61	67	60	38	70	49	65		40	46
10	39	G	26	G	G	G	32	48	51	60	52	G	G	G	65	G	82	84	92	61	32	30	32	30
11	G	32	G	G	G	G	32	35	G	G	G	62	62	G	G	60	G	53	89	150	43	43	41	G
12	29	28	G	G	31	G	G	G	G	G	68	G	80	G	G	61	G	78	84	78	40	G	28	31
13	G	G	G	G	G	25	32	69	91	89	88	84	G	61	151	G	G	61	G	53	47	G	38	G
14	G	22	G	G	56	40	G	G	G	G	104	88	G	G	G	G	G	G	G	G	29	28	G	28
15	26	G	G	26		G	G	G	G	G	53	G	G	G	G	G	G	G	G	32	G	G	G	G
16	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	52	52	59	46	32	31	G	G
17	55	152	150	46	32	G	42	60	52	G	77	84	162	117	81	G	G	G	36	48	40	51	53	30
18		40	92	42	48	G	77	58	62	109	G	G	G	79	G	G	88	46	42	G	G	32	G	G
19	G	27	G	32	G	38	55	58	71	62	92	90	148	72	G	124	62	66	83	109	58	32	41	G
20	G	G	G	G	G	G	G	G	G	G	60	G	G	G	G	G	G	G	59	42	G	G	G	32
21	32	32	32	40	32	50	G	35	G	G	G	G	61	G		G	G	56	60	81		39	40	53
22	40	29	30	G	G	G	G	39	60	G	G	G	G	G	G	G	G	G	40	40	32		26	G
23	G	32	30	32	40	40	G	37	G	G	G	G	G	G	G	G	G	56	G	37	32	32	26	
24															G	G	54	86	G	34	25	G	G	G
25	G	78	34	34	37	34	44	G	G	84	G		G	G	G	G	73	80	91	52	58	34	42	84
26	34	33	G	G	G	G	G	G	G	G	81	G	102		G	G	67	G	G	79	84	43	93	33
27		110	32	G	G	29	59	35			127	128	G			G	74	G	83	49	34	G	G	89
28	G	34	34	33	G			51	81		104	G					61	76	93	79	111	81	37	31
29	22	G	G	G	35	29	34	G		94	66	G	64	G	55	G	G	G	48	53	G	34	G	33
30	33	28	32	32	G	G	29	G	60	96	79	G	G	G	G	G	G	54	G	G	29	28	33	33
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	29	29	28	28	28	29	26	27	28	27	28	26	26	29	30	29	30	30	29	28	27	28
MED	26	28	G	G	G	G	30	35	G	G	59	G	28	G	G	G	G	51	50	47	32	30	28	30
U Q	34	32	32	32	36	29	38	50	60	84	80	84	72	63	60	60	61	61	70	61	41	34	40	33
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Yamagawa

JUN. 1999

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	14	15	14	14	14	15	20	24	23	49	43	67	46	68	46	45	40	45	24	18	20	14	16	15
2	15	17	16	15	14	15	20	29	42	44	44	64	44		67	44	59	22	23	22	15	15	15	15
3	15	14	15	16	15	15	20		45		43		59	59	63	44	48	24	21	17	17	15	15	16
4	17	16	16	14	16	15		42	46		43		46	44	46	44	57	21	18	15	17	16	16	16
5	15	14	16	15	16	18	23	21		41		44		45	44	44	46	24	30	18	15	15	15	15
6	15	18	16	21	18	17	21	27		50	48	46	46	48	44		26	24	22	16	16	15	16	18
7	18	16	17	15	16	17	23	21		40	55	44	44	45		58	53	48	42	21	15	15		16
8	16		15	16	16	15	18		24				59	60	60	45	49	30	21	18	15	18		16
9	16	16	16	14	14	15	23	18		51		55	49		48	44	45	23	22	16	18	16	18	17
10	18		23	17	21	22	17	23	42	44	44		64	63	45	58	43	36	20	15	16	18	15	16
11	15	15	18	14	17	16	18	20	24	52	50	53	48	61	60	45	50	21	18	22	16	20	14	15
12	16	15	16	16	14		20		23		44	60	45	59	60	60	58	22		18	16	16	18	16
13	15	17	15	17	15	15	17	20		44	49	45		68	46	56	56	22	17	20	21	15	16	15
14	15	15	14	15	16	18	20	20		64	46	58	66	N	N	59	65	45		18	16	15	16	16
15		16	16	15		16	22			69	70	66	65	64	69	67		58	23	18	20	15	15	15
16	15	15	16	15	15	14	23	20	21	64	55		N	67	67	68		54	21	16	18	20	15	15
17	15	18	17	16	18	14	18	21	36		45	55		49	40	55	48	48	18	18	14	17	18	16
18		18	22	17	23	22	17	20	44	60	45		62	45	56	54	39	23	20	18	15	18	20	14
19	20	15	24	15	16	16	24	20	22	42	46	50	51	46	70	49	42	22	18	15	16	18	15	16
20	14	15	15	16	15	15	16	20	23	59	56			59	55	58	56	21	22	16	15	15	15	17
21	14	16	16	15	16	20	26	23	23	59	59		61	58		55	55	32	20	20	16	16	16	16
22	15	16	16	20	15	14	24	20	22	59		55			63	55	54	52	18	18	15	16	16	15
23	16	17	16	17	16	16	18	20	27	50				N	91	61	56		18	20	15	20	17	
24																60	60		20	16	15	21	15	16
25	15	17	17	16	16	26	18		48	61	22		69	68	69	59	46	45	20	20	17	15	16	18
26	16	18		20	17	17	24		53		46	66	54		68	62	48	59	48	16	16	26	21	17
27	15	18	15	15	15		22			B	60	56							46	22	16	16	15	15
28	16	16	26	18				20			58						45	45	20	15	17	17	16	15
29	17	16	14	17	18	23	23	21		45	54	70	49	64	63	60	55	55	20	17	17	15	17	20
30	17	16	16	16	16	16	18	22		52	54		68	72			57	21	45	17	15	18	17	16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	28	29	27	26	27	22	18	21	24	17	20	21	23	26	27	27	28	30	30	30	28	29
MED	15	16	16	16	16	16	20	20	26	51	47	55	52	59	60	56	50	30	20	18	16	16	16	16
U Q	16	17	17	17	17	18	23	23	44	59	55	65	63	65	67	60	56	48	23	20	17	18	17	16
L Q	15	15	15	15	15	15	18	20	23	44	44	48	46	47	46	45	45	22	19	16	15	15	15	15

HOURLY VALUES OF foF2 AT Okinawa

JUN. 1999

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	117	108	116	123	93	81	94	96	82	A	85	A	104	120	124	133	124	115	118	84	94		76	83
2	84	95	94	96	80	68	76	98	90	A	A	A	114		N	148	164	167	166	172	131	109	109	116
3		134	116	114	121	93	96	80	80	78	78	114	91	107	107	116	123	112	121	122	87	86	81	81
4	74		78	76	80	81														88	85	81	98	94
5	99	93	92	95	95	80	115	110	95	74	78	81	92	104	102	116	118	123	104	93	83	94	83	
6	111	118	94	95	70	70	95	84	83	72	75	81	94	93	92	94	100	113	126	112	85	98	69	134
7	87	99	98	70	71	69	70	A	87	88	85	89	90	93	A	106	117	123	111	110	80	80	86	84
8	99	94	96	85	74	60	63	94	86	82	78	86	91	92	121	94	91	94	105	92	81	83	94	95
9	93	92	75	76	72	70	A	70	81	91	82	88	115	98	94	115	112	112	A	109	A	A	80	81
10	93	80		71	72	67	65		94	81	92	84	86	92	94	94		95	87	109	81	86	88	93
11	96		94	78	76	71		92	93	85	78	A	85	90	106	112	123		94	87	77	84	92	A
12	94	93	84		75		78	80	81	84	81	93	92	105	111	114	120	122	110		A	88		92
13	91	94	94	92	94	81	93	78	95	85	A	A	92	104	108	118	121	133		132	85	83	80	
14	92	84	86		64	60	63	59	73	77	82	85	91	101	116	105	110	124	121	110	100	99	96	96
15	79	119	116	114	110	93	78	93	96	84	89	A	105	108	112		122	117	127	123	91	83	80	94
16	94	92		71	96	73	82	91	90	91	86	112	101	114	104	124	122	N	121	122	83	79	79	90
17	96	81	81	78	73	77	96	99	A		A	A		91	106	93	125	122	110	110	84	77	76	80
18	88	93		95	70	70	77	94	A	78	81	81	A	92		115	95		112	84	83	83	95	93
19	81	83	95	95	69	58	66	95	68	73	76	84	84	A	102	116	110	103	90	A	92	92	83	83
20	95	95		93	82	92	84	84		76	75	77	90	94		115	103	94	94	86	79	91	76	94
21	98	94	80	87	76	68	94	94	94	93	72	75	92	91	88	92	96	92	87	86	A	77	80	95
22	80	76	77	94	71	71	73	82	92	75	92	74	82	88	77	85	92	106	110	84	80	66	67	75
23	77	80	93	82	78	58	61	80	92	78	A	81	84	92	84	88	91	103	116	99	78	74	N	76
24	80	81	95	95	94	67	71	78	80	A	75	86	80	84	91	91	94	94	83	71	64	63	70	76
25	73	81	94	60	54	62	72	79	A	78	68	83	92	90	90	91	81	87	103	88	87	83	86	93
26	92	81		91	80	72	94	82	92	80	82	76	91	94	112	116	117	94	88	85	84	92	83	83
27	74	80		77	75	72	56	A	A	A	A	A		A	69	69	A	80	80	A		A	A	A
28	A	A	58	68	55	56	57	80	69	A	A	A	A		66	72	72	83	93	84	72	A	68	67
29		66	62	70	56	58	68	81	80	76	76	86	93	102	104	115	100	111	110	90	79	76	68	80
30	92	96	95	93	95	95	95	84	83	A	A	82	95	115	93	92	91	112	105	87	83	77	68	73
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	24	28	30	29	27	26	24	22	22	21	25	25	25	28	27	26	27	27	26	26	27	26
MED	92	93	94	89	76	70	77	84	86	79	80	84	92	94	102	109	110	112	110	92	83	83	80	87
U Q	96	95	95	95	93	80	94	94	92	85	85	87	94	104	109	116	122	122	118	110	87	91	88	94
L Q	80	81	80	76	71	64	66	80	80	76	76	81	88	91	90	92	94	94	93	86	80	77	76	80

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Okinawa

JUN. 1999

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

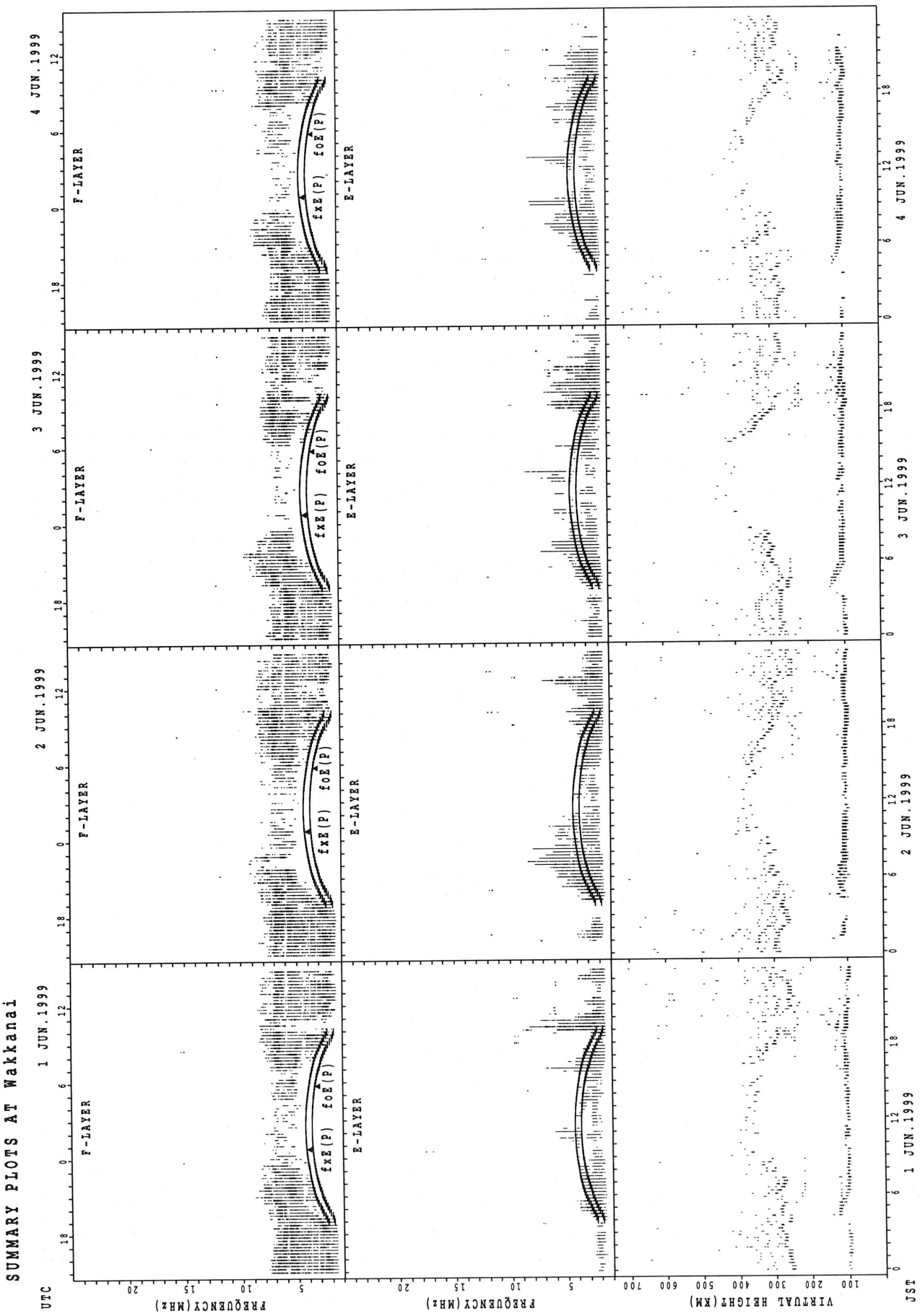
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	27	25	G	G	G	G	35	50	86	161	102	100	64	66	92	72	G		38	48	50		66	38
2	27	26	35	G	G	G	G	35	56	114	90	161	116		84	67	74	52	47	68	50	39	24	G
3		G	G	G	G	G	G	36	44	42	47	G	57	48	57	G	42	G	G	28	43	G	G	G
4	G	62	64	45	72	25														81	68	51	38	
5	39	40	39	32	26	28	38	48	56	78	G	G	G	65	G	62	G	G		G	G	32	G	
6	G	G	G	G	G	G	38	44	50	59	72	67	79	81	90	56	G	G	45	30	41	34	25	33
7	36	38	39	34	35	34	46	78	52	52	G	G	G	71	141	86	57	42	34	28	G	G	G	G
8	G	G	G	G	33	34	39	41	39	G	55	G	G	G	G	64	72	72	60	58	66	45	40	G
9	69	84	98	44	39	26	79	48	78	68	G	55	G	60	61	66	58	68	124	108	94	93	48	44
10	33	42	34	G	G	G	32	60	49	52	G	53	G	G	G	G		45	46	G	44	79	58	34
11	44	43	67	35	26	G	38	46	46	75	61	96	64	G	G	66	132	95	85	43	52	78	65	50
12	32	25	54		36	24	G	36	G	45	57	79	G	74	66	52	46	47	44	40	95	65		24
13	G	G	G	G	G	G	G	G	46	77	114	106	59	58	58	G	G	G	66		42	34	40	
14	47	36	25	G	G	G	36	64	40	G	G	G	G	69	64	G	G	G	40	33	36	27	24	25
15	40	37	27	25	G	G	G	G	G	68	46	97	78	69	94		56	40	42	66	28	24	82	45
16	G	G	G	G	G	G	G	38	43	47	54	G	51	58	59	44	58	67	49	58	72	65	61	33
17	28	25	G	G	G	G	34	116	98		87	80	135	82	92	132	73	53	60	86	76	70	58	46
18	43	60	37	38	42	34	55	72	81	65	96	86	95	G	65	57	G	44	49	50	40	78	24	39
19	G	G	G	G	G	G	G	34	39	42	G	G	82	143	49	46	70	78	85	168	82	42	29	50
20	34	39	26	G	G	G	G	38	42	46	44	G	G	G	G	G	G	49	51	50	32	39	32	G
21	62	36	37	34	75	69	46	47	42	48	G	G	G	56	G	G	48	41	43	56	88	69	64	28
22	28	30	29	26	G	G	G		50	50	60	G	61	80	77	61	G	47	42	38	40	34	40	35
23	34	44	37	45		61	58	57	41	48	67	54	G	G	G	G	G	56	49	36	58	31	40	34
24	33	G	42	G	G	G	42	60	46	74	66	64	62	G	G	52	G	G		29	28	32	64	44
25	41	56	25	G	G	G	27	41	99	46	G	65	G	G	62	66	78	78	67	68	85	38	33	34
26	43	26	G	G	G	G	G	G	46	55	62	58	56	G	G	G	G	G	G	28	28	24	40	69
27		95		77	70	60	44	60	75	77	77	87	G	96	G	48	58	61	69	68		100	66	84
28	82	59	35	28	G	G	G	38	61	66	69	60	63	G	G	56	G	59	57	42	43	69	42	39
29	35	38	43	G	24	G	30	43	65	70	68	81	67	47	51	G	45	47	59	67	59	38	46	38
30	54	66	46	G	28	26	G	39	50	86	96	83	74	G	G	G	47	49	46	45	33	35	33	33
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	30	29	29	29	30	29	28	29	28	29	29	29	28	29	28	28	28	27	29	29	29	29	27
MED	34	36	34	G	G	G	32	44	49	57	60	60	57	57	57	52	46	47	49	48	44	39	40	34
U Q	43	44	40	34	34	26	40	58	63	74	74	84	70	70	71	65	58	60	60	67	70	69	59	44
L Q	27	25	G	G	G	G	G	37	42	46	G	G	G	G	G	G	G	20	42	31	34	32	27	25

HOURLY VALUES OF fmin AT Okinawa

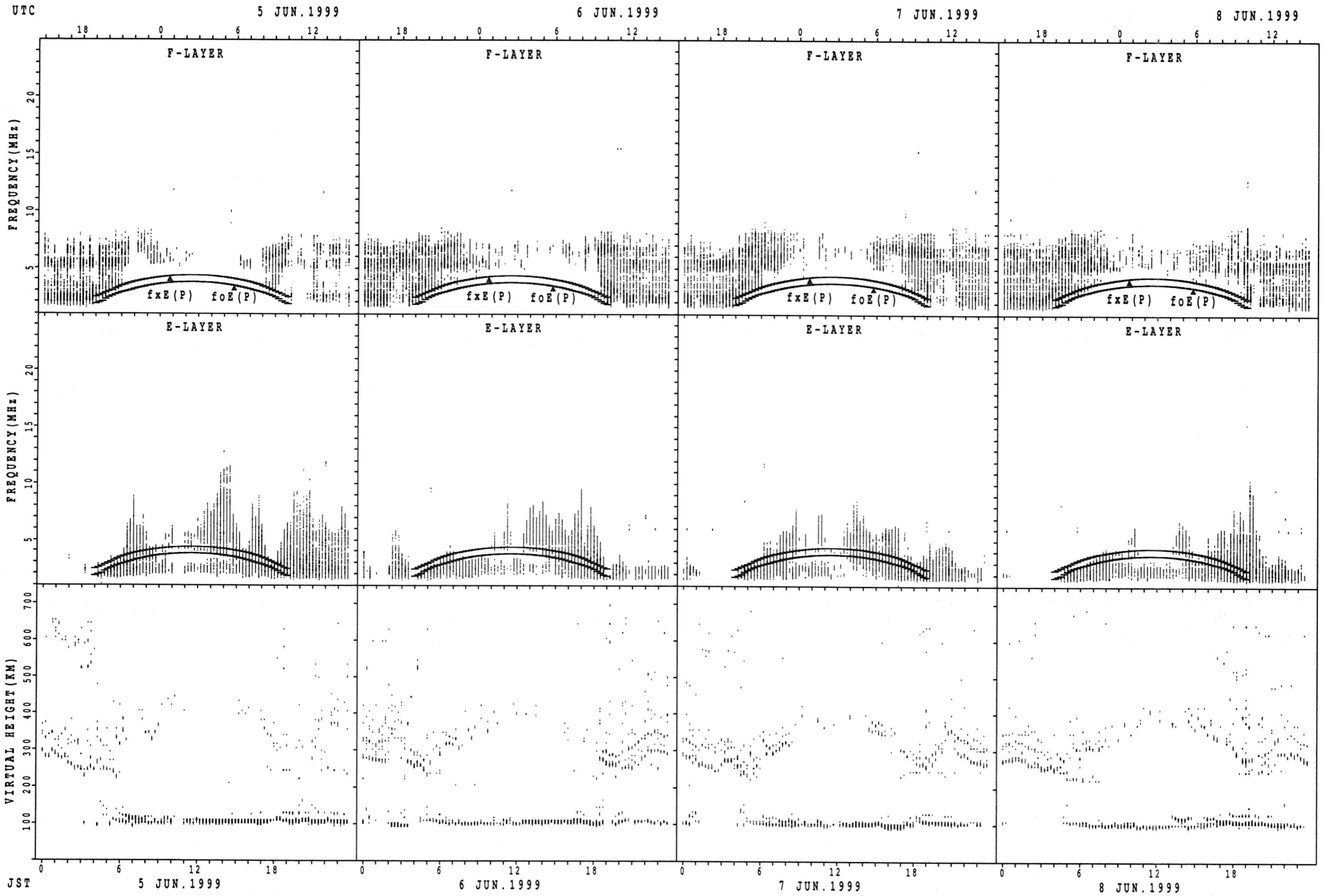
JUN. 1999

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

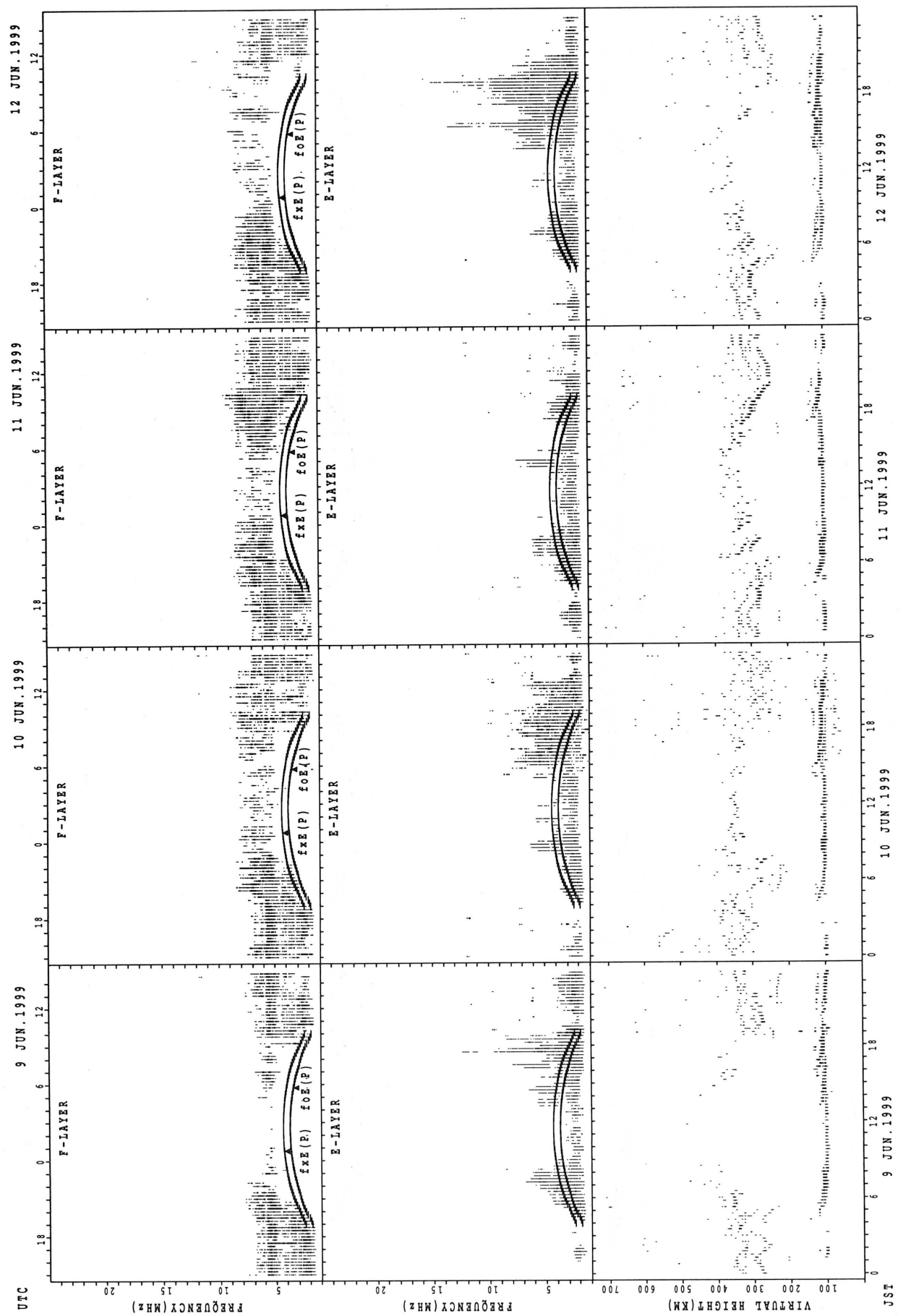
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	14	14	15	15	14	15	15	22	28	30	40	43	43	41	34	29	27	16	14	15		14	15
2	15	14	14	14	15	15	17	16	20	29	28	42	39		36	32	29	20	16	14	16	14	17	15
3		16	15	16	15	15	17	15	27	30	38	58	43	57	39	33	30	23	16	15	14	14	14	16
4	17	15	14	14	14	15														14	14	14	14	15
5	14	15	14	14	14	15	18	16	21	27	30	32	30	30	29	29	27		16	18	15	15	15	
6	15	14	15	14	16	14	16	21	18	28	30	38	40	39	32	27	28	18	15	14	14	15	17	14
7	14	15	15	14	15	14	15	16	18	27	29			39	35	33	24	15	14	14	15	15	14	14
8	15	15	14	15	14	15	16	16	17	28	26	30	32		53	44	35	17	16	15	15	15	15	14
9	14	14	14	14	14	14	17	16	20	24	28	43		46	29	39	26	14	16	15	15	14	14	15
10	15	15	15	15	17	18	15	15	17	27	29	32	33	34	59	49		21	16	14	15	15	14	15
11	15	15	14	14	15	17	15	15	18	28	29	35	46	60	52	43	35	18	14	15	14	15	14	14
12	15	14	14		14	15	18	15	16	29	40	32		44	30	32	34	20	15	14	14	15		15
13	14	15	14	14	14	14	22	16	30	28	35	40	41		41	30	29	17	15	14	14	14	14	
14	14	14	15	15	14	15	16	15	15	28	34	54	56	45	33	51	27	18	14	14	14	14	14	15
15	15	14	14	14	15	15	28	15	29	33	36	40	42	43	40		29	17	15	14	15	14	15	15
16	14	15	15	28	15	14	27	16	18	26	30		50	54	46	29	27	18	15	14	15	15	14	15
17	15	16	15	15	16	15	16	15	17		36	29	42	32	33	32	21	17	15	14	15	14	14	14
18	14	14	14	14	14	15	16	16	20	29	34	38	43	59	34	29	29	17	16	14	14	14	15	14
19	15	15	15	14	14	15	30	15	23	29		58	40	36	35	58	27	17	15	14	15	15	14	14
20	14	14	15	15	14	15	24	15	21	27	33	54		30	57	56	28	16	15	15	14	14	14	15
21	14	14	14	15	14	14	15	15	18	28		30	32	48	58	29	37	17	16	15	14	14	14	14
22	14	14	14	14	14	15	21	15	21	30	30	60	44	36	32	28		17	14	14	15	15	15	15
23	14	15	15	14	14	15	15	16	20	29	33	32	35			32	53	22	15	15	14	14	14	15
24	14	14	15	24	14	15	16	15	17	28	29	38	38	61	36	32		18	14	14	14	14	14	15
25	15	15	16	20	15	15	14	15	18	28	30	48	55	56	45	30	38	20	15	15	14	15	14	14
26	14	15	16	14	15	14	27	15	28	29	34	46	45		72	60	26	17	14	14	14	15	14	15
27	15	15		14	14	14	15	16	21	34	39	46		49		29	29	18	15	14		14	14	14
28	14	14	14	14	14	15	23	16	17	28	28	34	33	33	30		28	18	15	15	14	14	15	15
29	16	15	14		15	15	16	16	17	27	29	30	38	38		30		24	18	15	15	15	15	15
30	16	15	14		14	15	15	16	17	22	30	40	43	36		59	38	18	14	14	15	14	15	15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	29	27	30	30	29	29	29	28	27	27	24	24	25	27	25	28	29	30	29	29	29	28
MED	14	15	14	14	14	15	16	15	18	28	30	40	42	43	36	32	29	18	15	14	14	14	14	15
U Q	15	15	15	15	15	15	21	16	21	29	34	46	43	51	49	44	34	20	16	15	15	15	15	15
L Q	14	14	14	14	14	14	15	15	17	27	29	32	36	36	32	29	27	17	14	14	14	14	14	14


SUMMARY PLOTS AT Wakkanai
1 JUN.1999
2 JUN.1999
3 JUN.1999
4 JUN.1999
UTC
JST
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

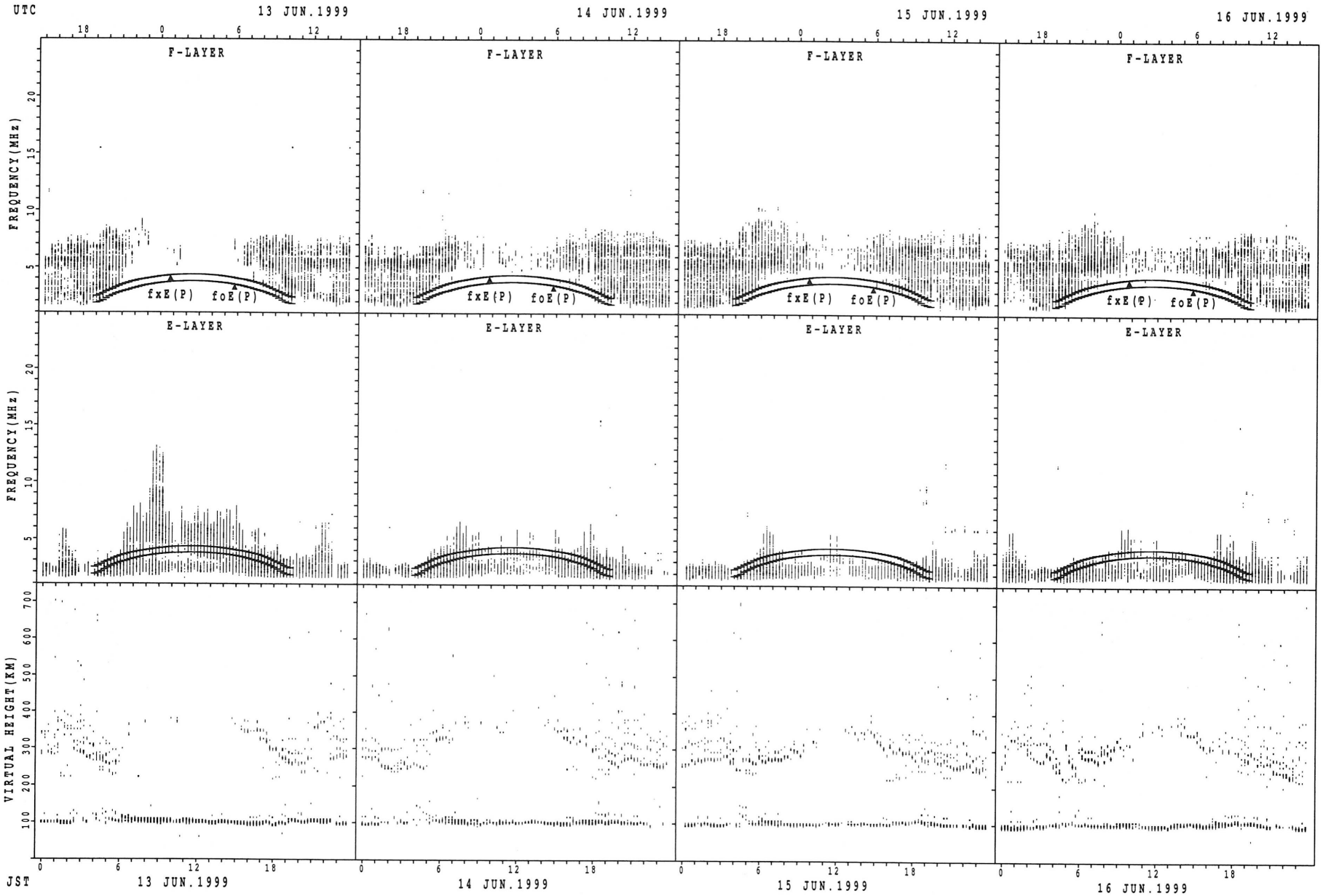
SUMMARY PLOTS AT Wakkanai



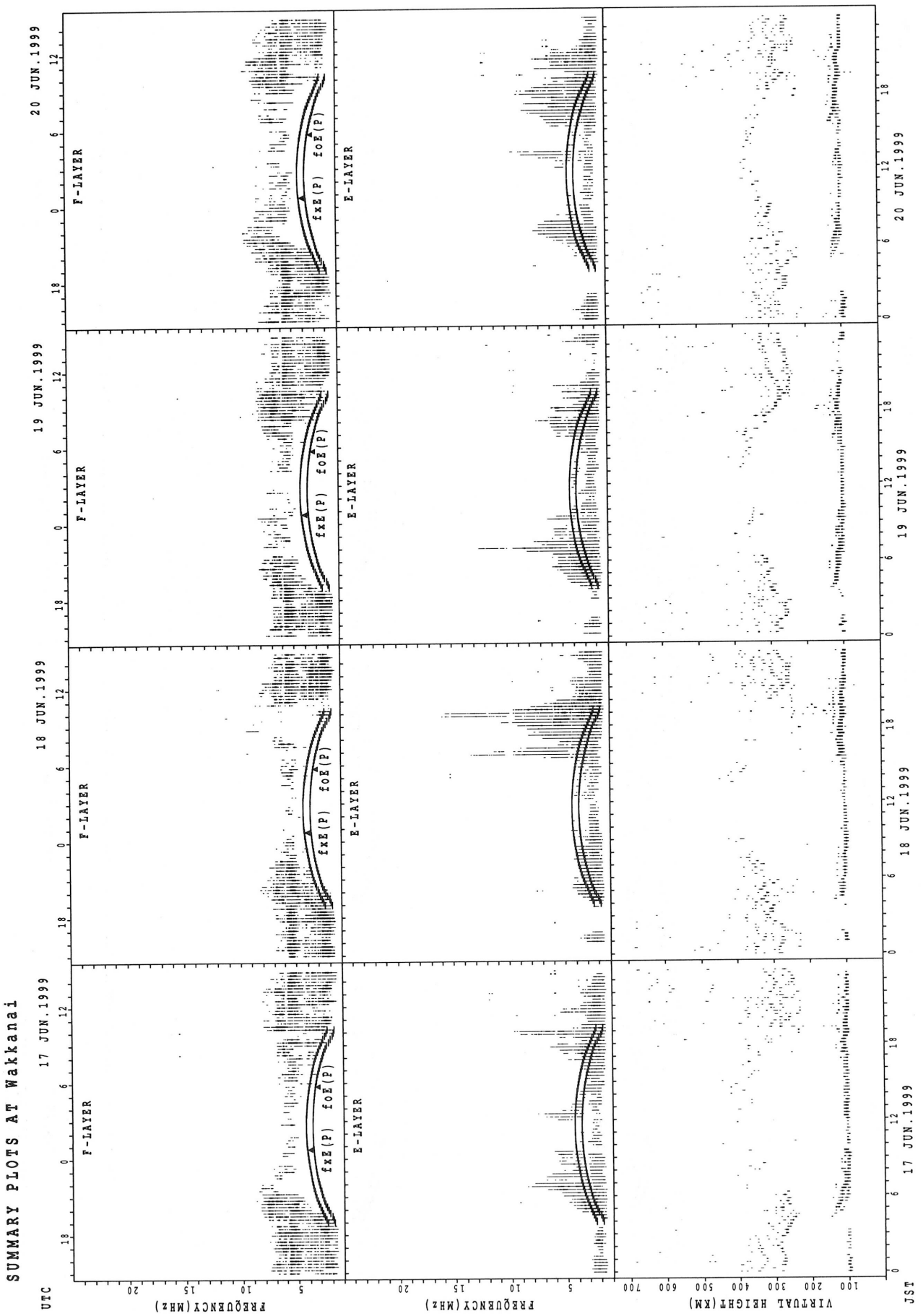
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT Wakkanai
UTC
JST
9 JUN.1999
10 JUN.1999
11 JUN.1999
12 JUN.1999
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

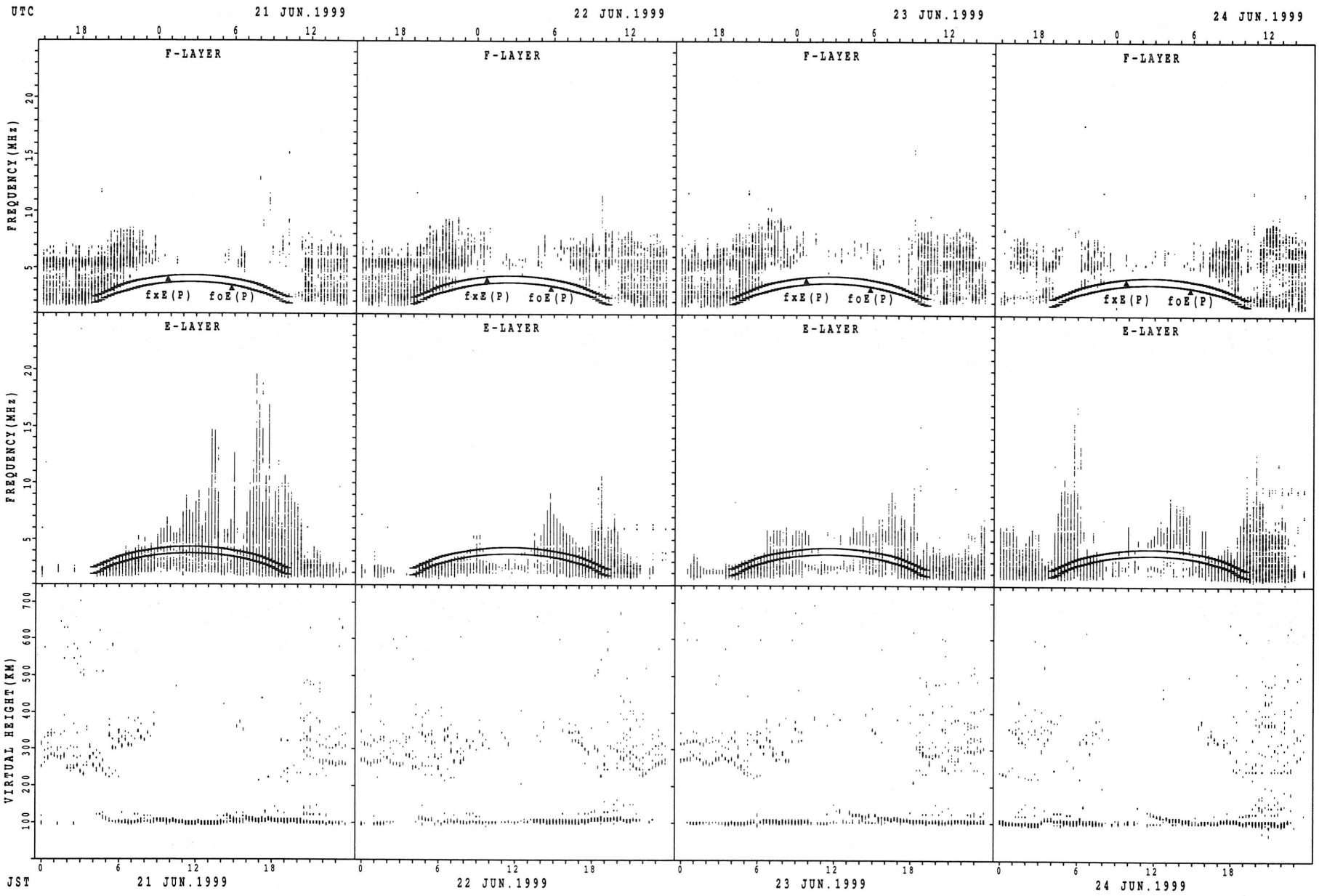
SUMMARY PLOTS AT Wakkanai



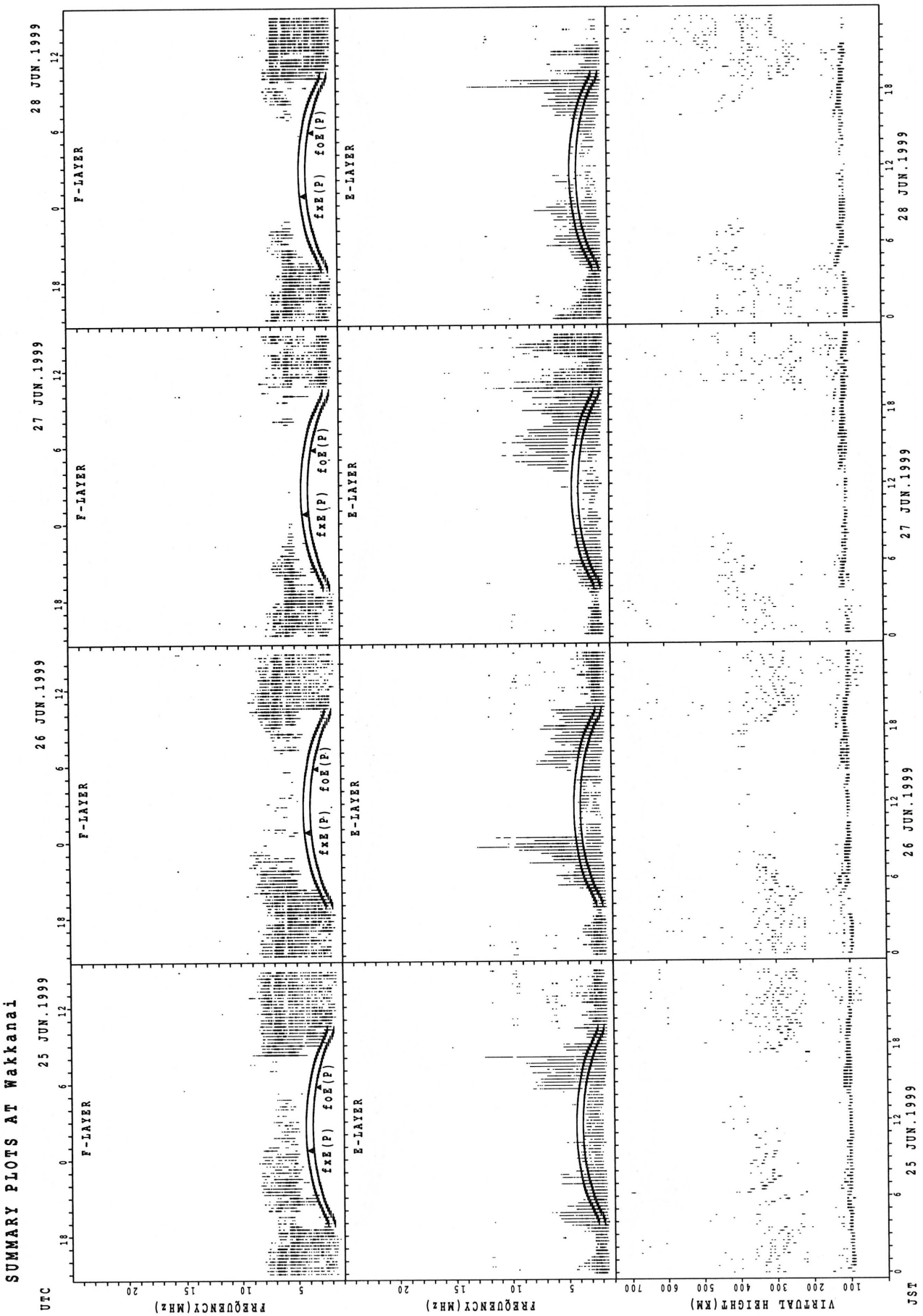
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT Wakkanai
17 JUN.1999
18 JUN.1999
19 JUN.1999
20 JUN.1999
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

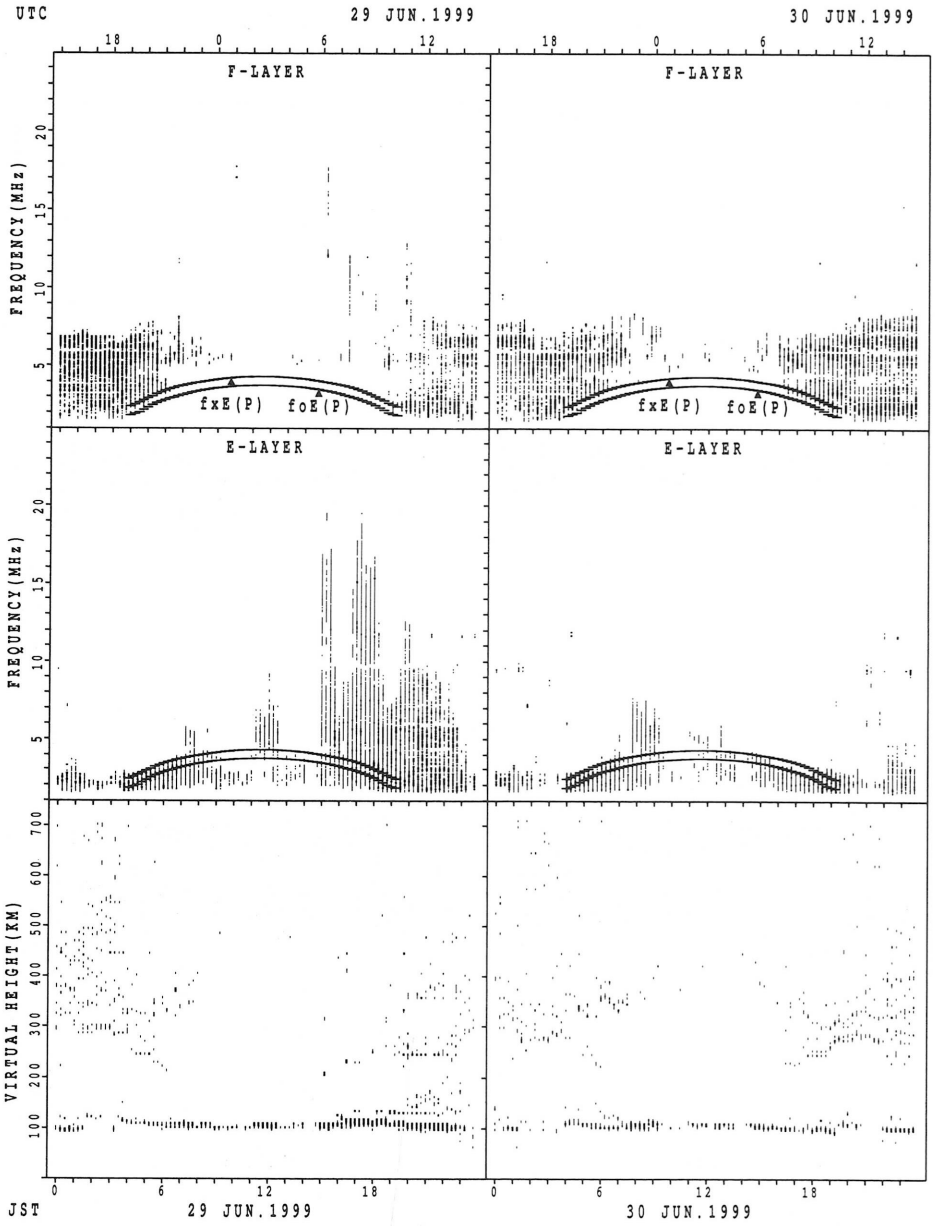
SUMMARY PLOTS AT Wakkanai



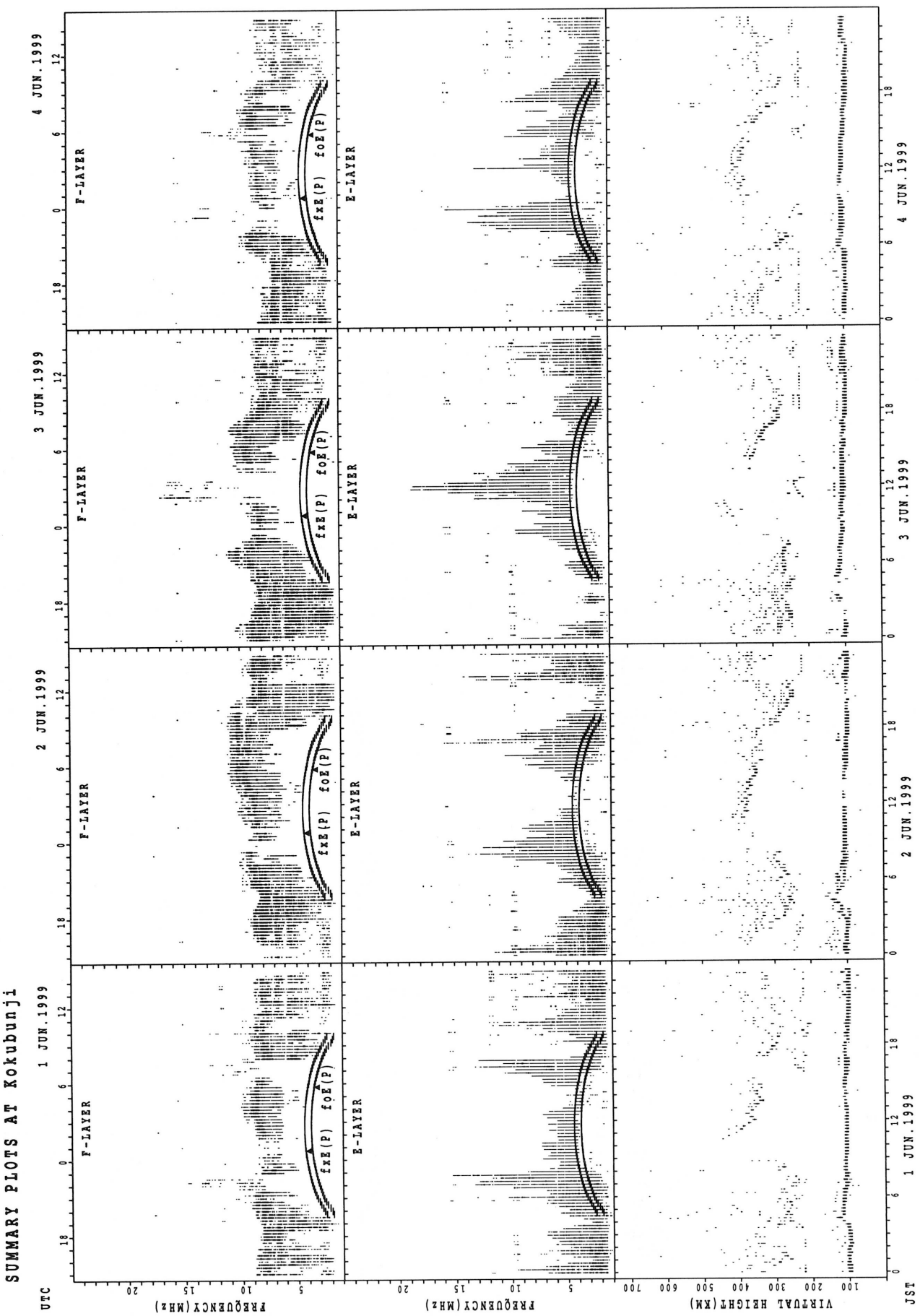
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

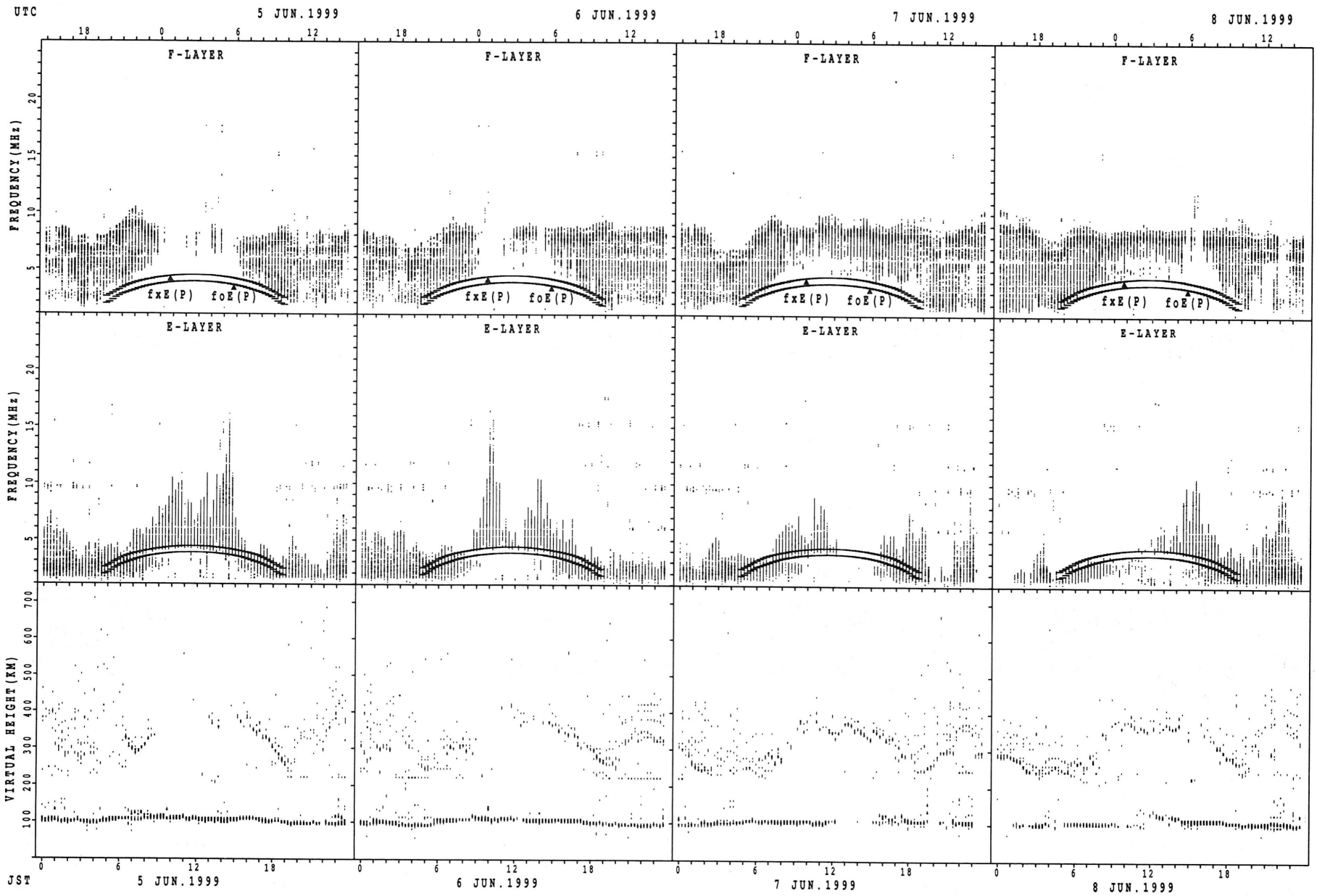

SUMMARY PLOTS AT Wakkanai
UTC
JST
25 JUN.1999
26 JUN.1999
27 JUN.1999
28 JUN.1999
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai

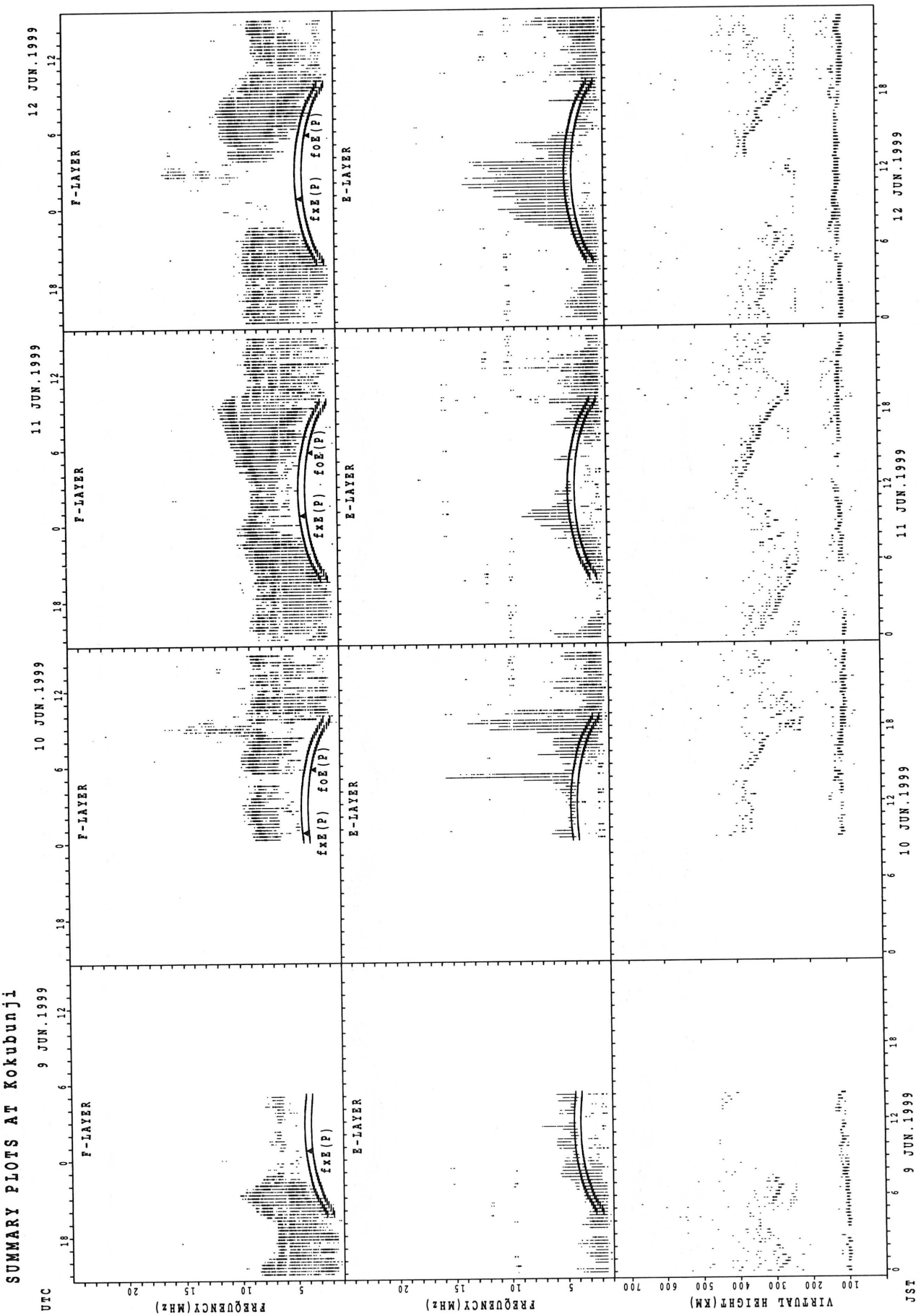


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

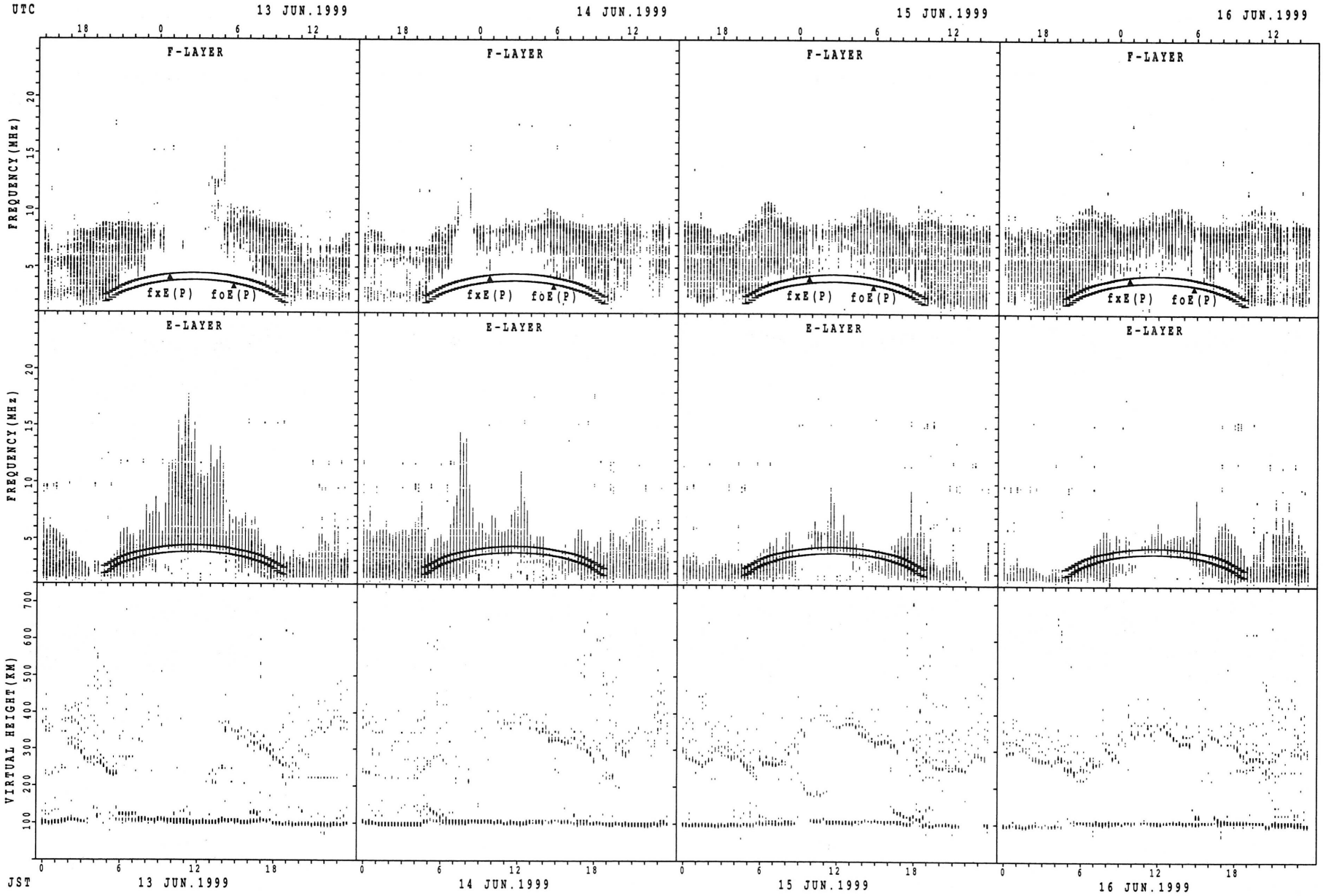

SUMMARY PLOTS AT Kokubunji
1 JUN.1999
2 JUN.1999
3 JUN.1999
4 JUN.1999
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
UTC
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE



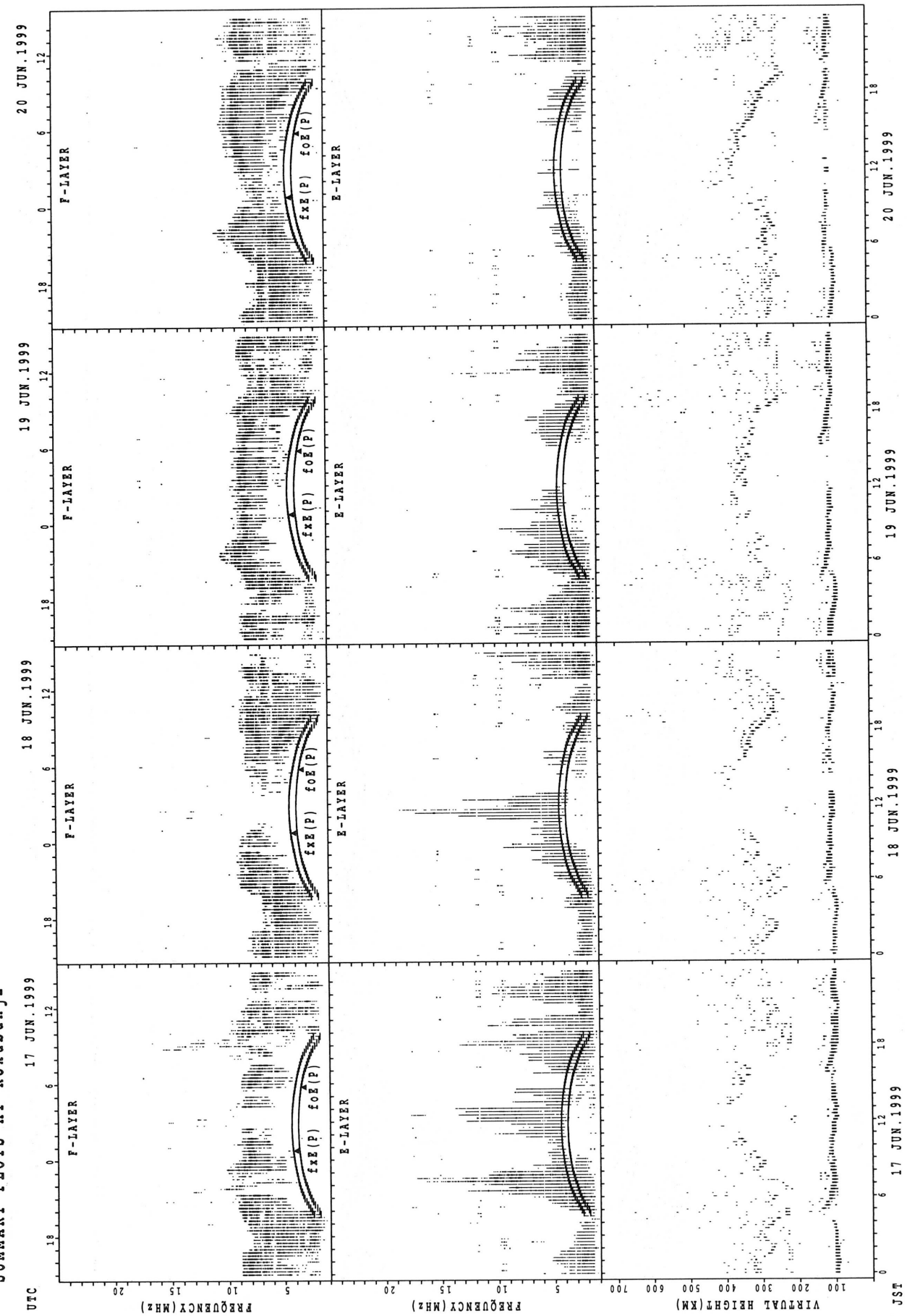
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT Kokubunji
UTC
JST
9 JUN.1999
10 JUN.1999
11 JUN.1999
12 JUN.1999
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

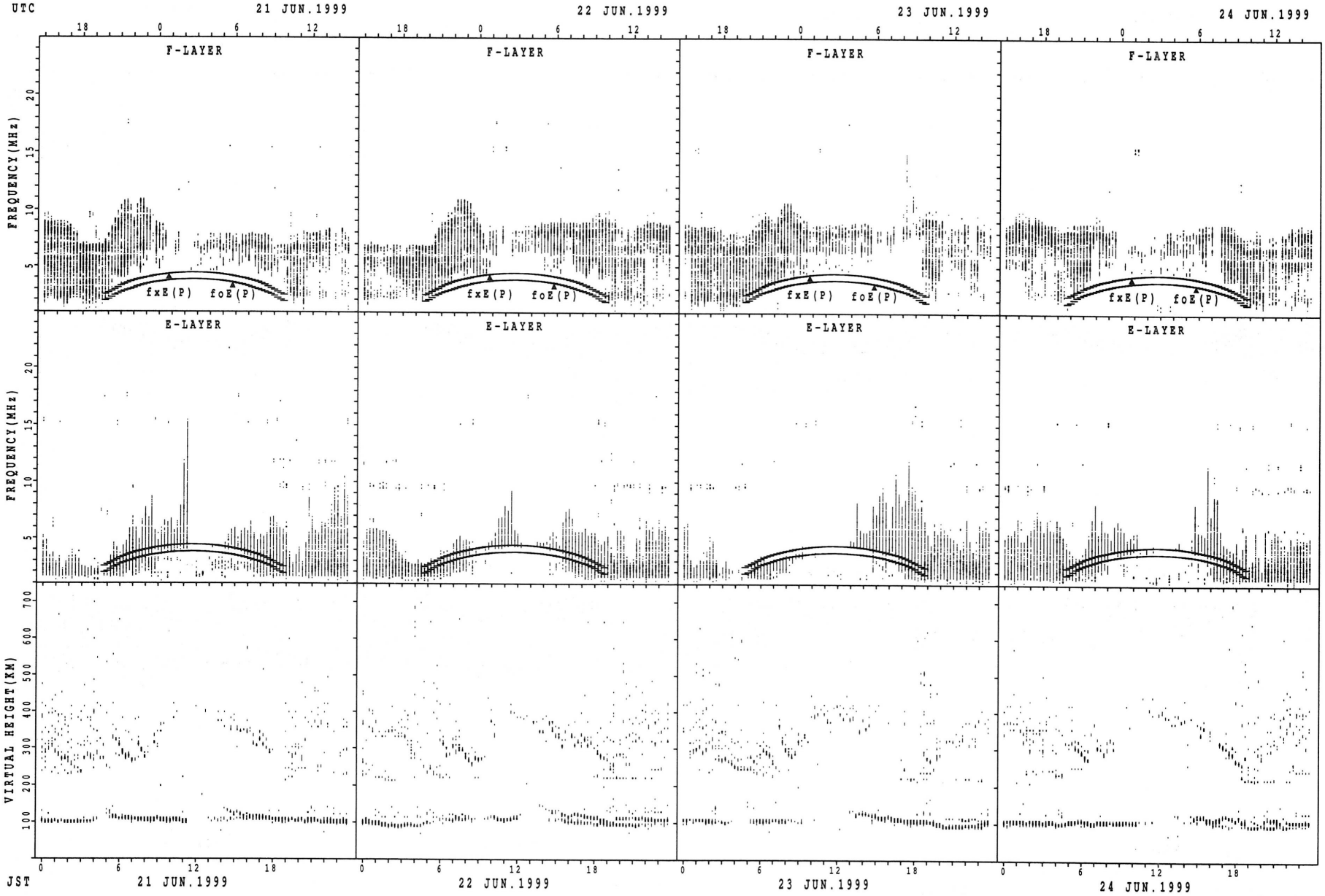
SUMMARY PLOTS AT Kokubunji



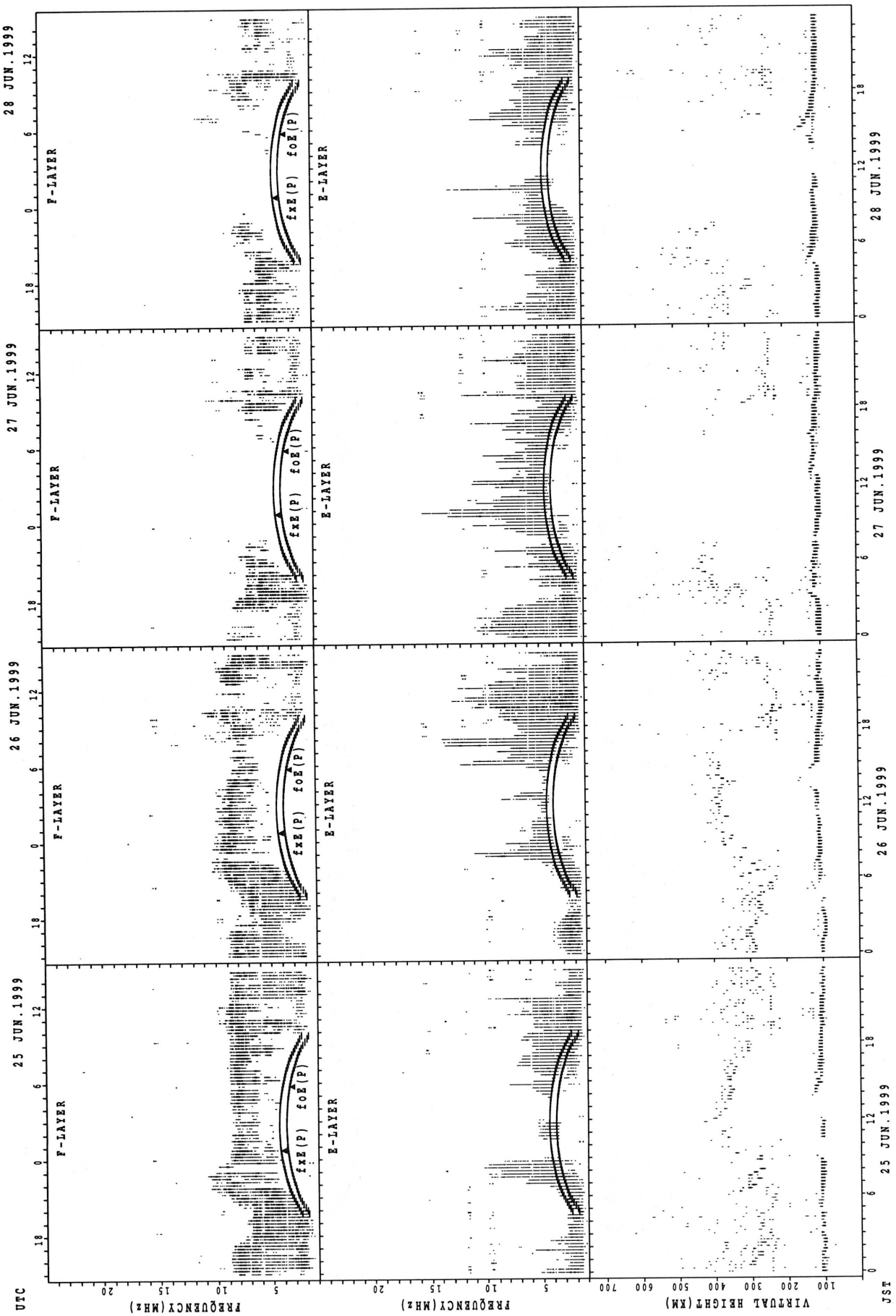
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT Kokubunji
17 JUN.1999
18 JUN.1999
19 JUN.1999
20 JUN.1999
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

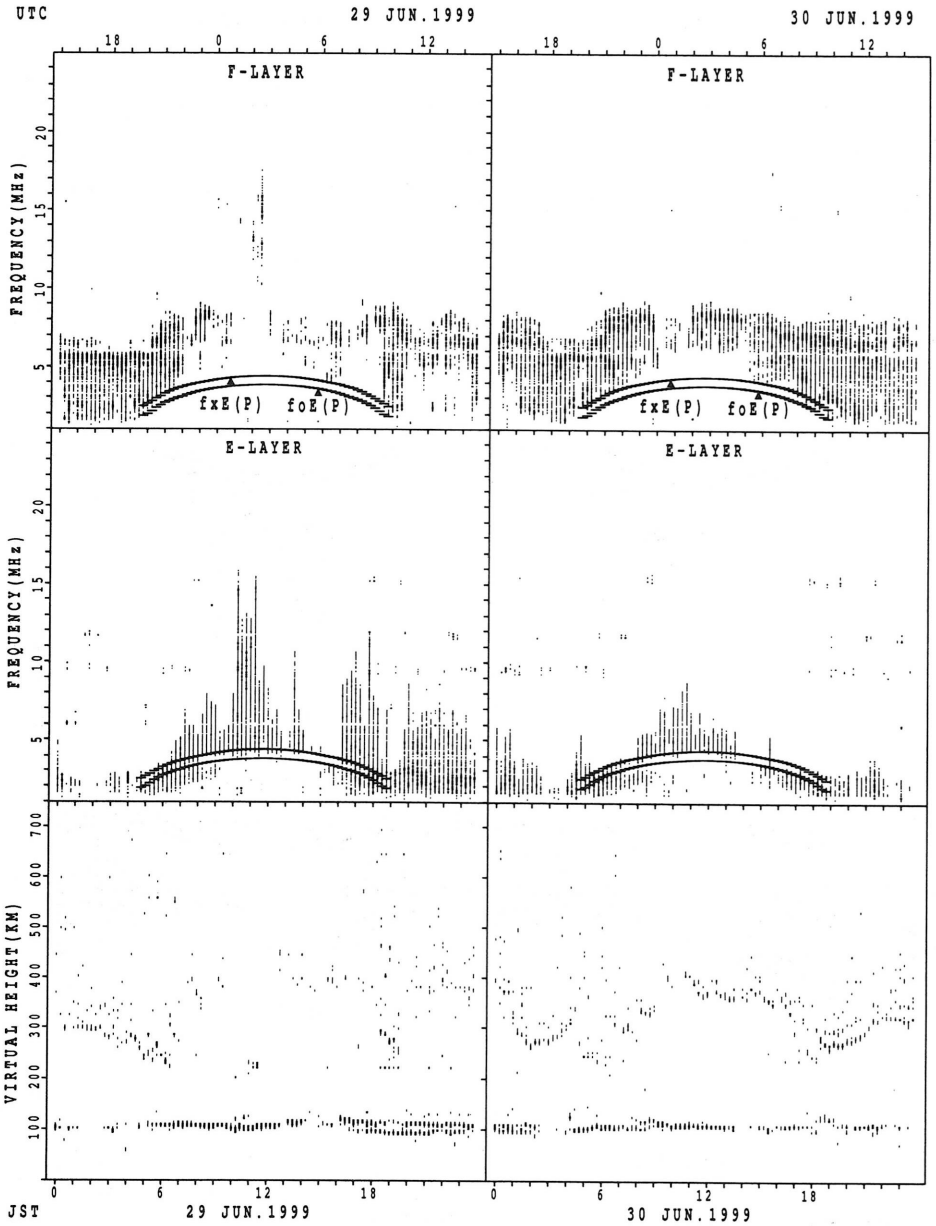
SUMMARY PLOTS AT Kokubunji



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

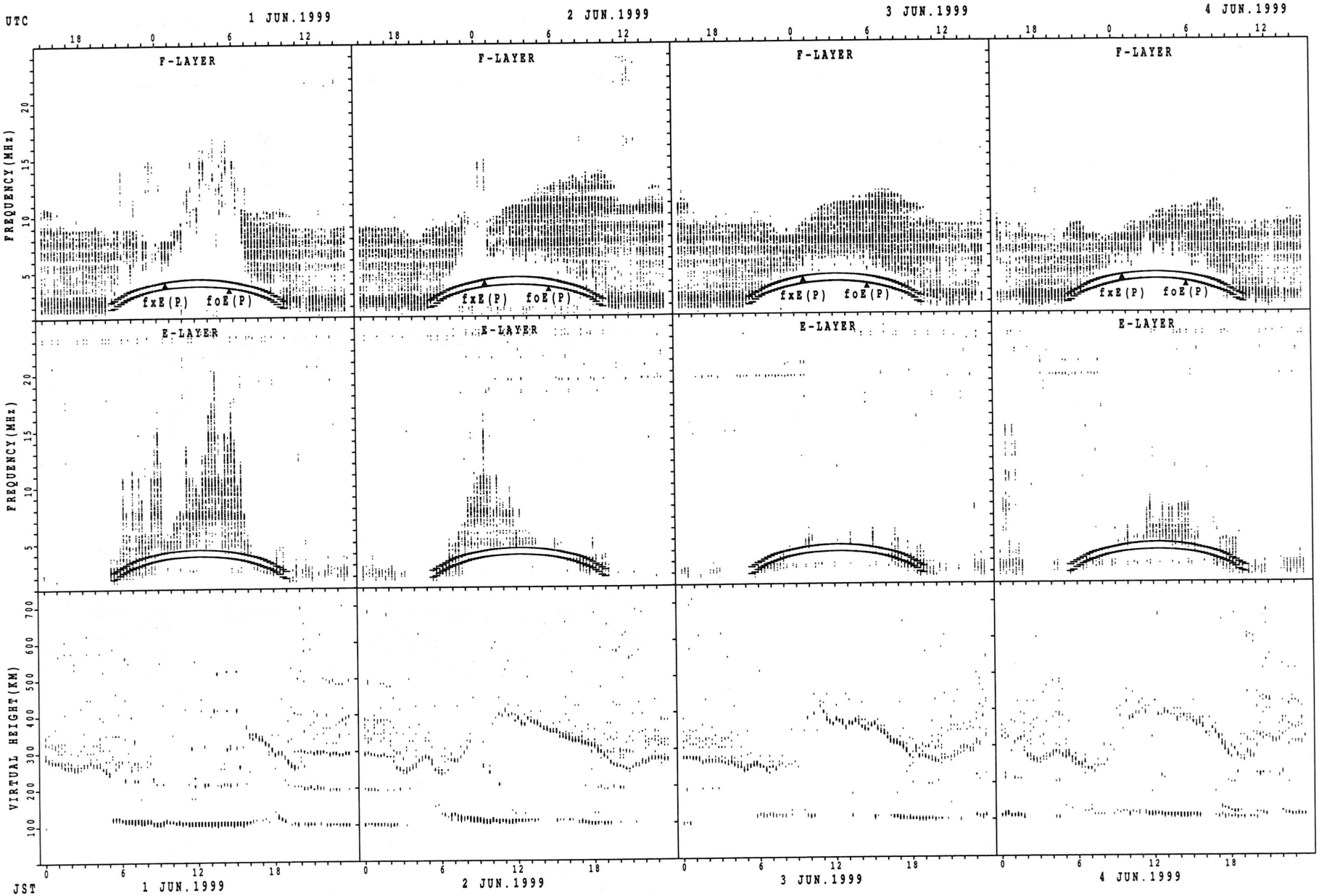

SUMMARY PLOTS AT Kokubunji
UTC
JST
25 JUN.1999
26 JUN.1999
27 JUN.1999
28 JUN.1999
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



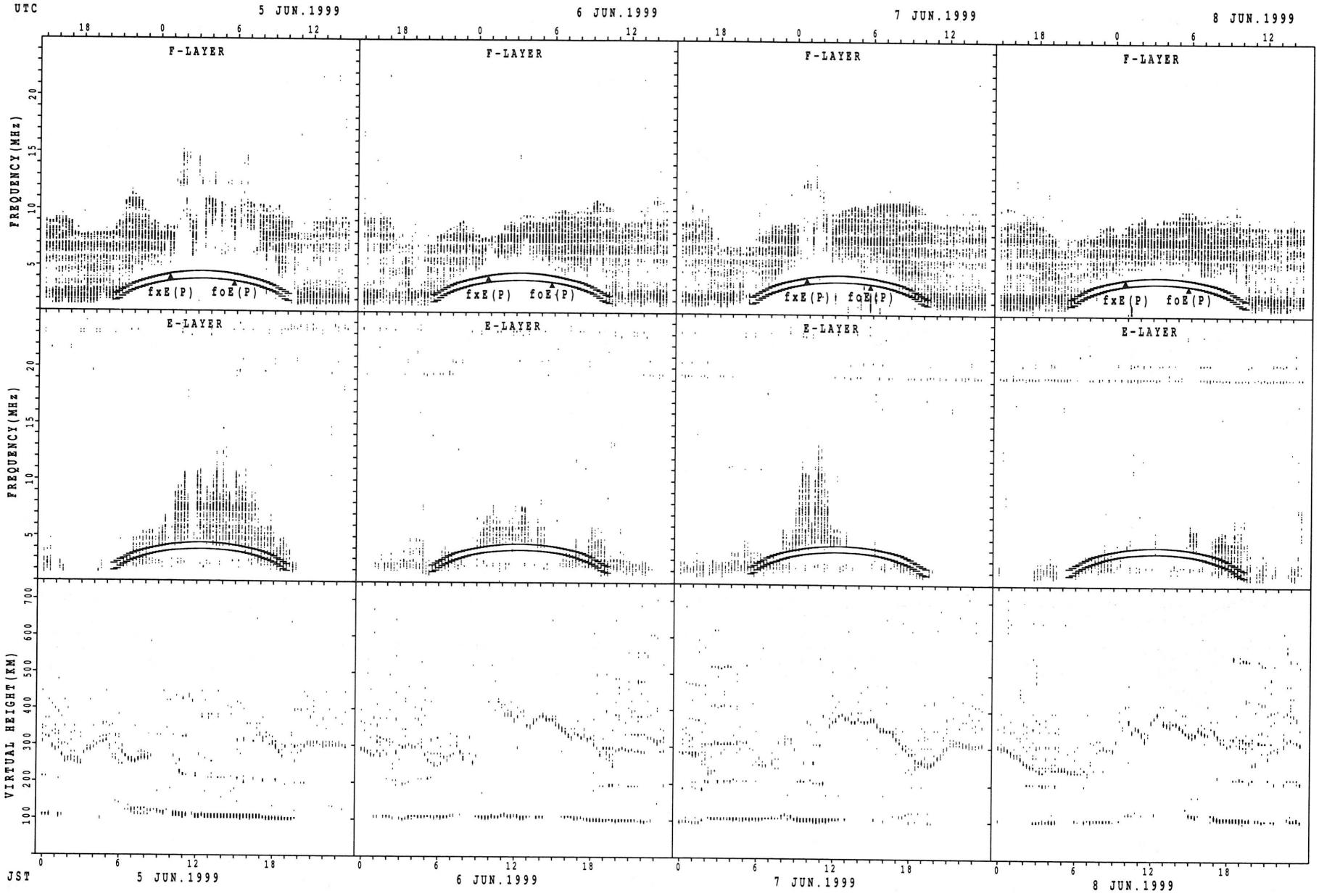
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



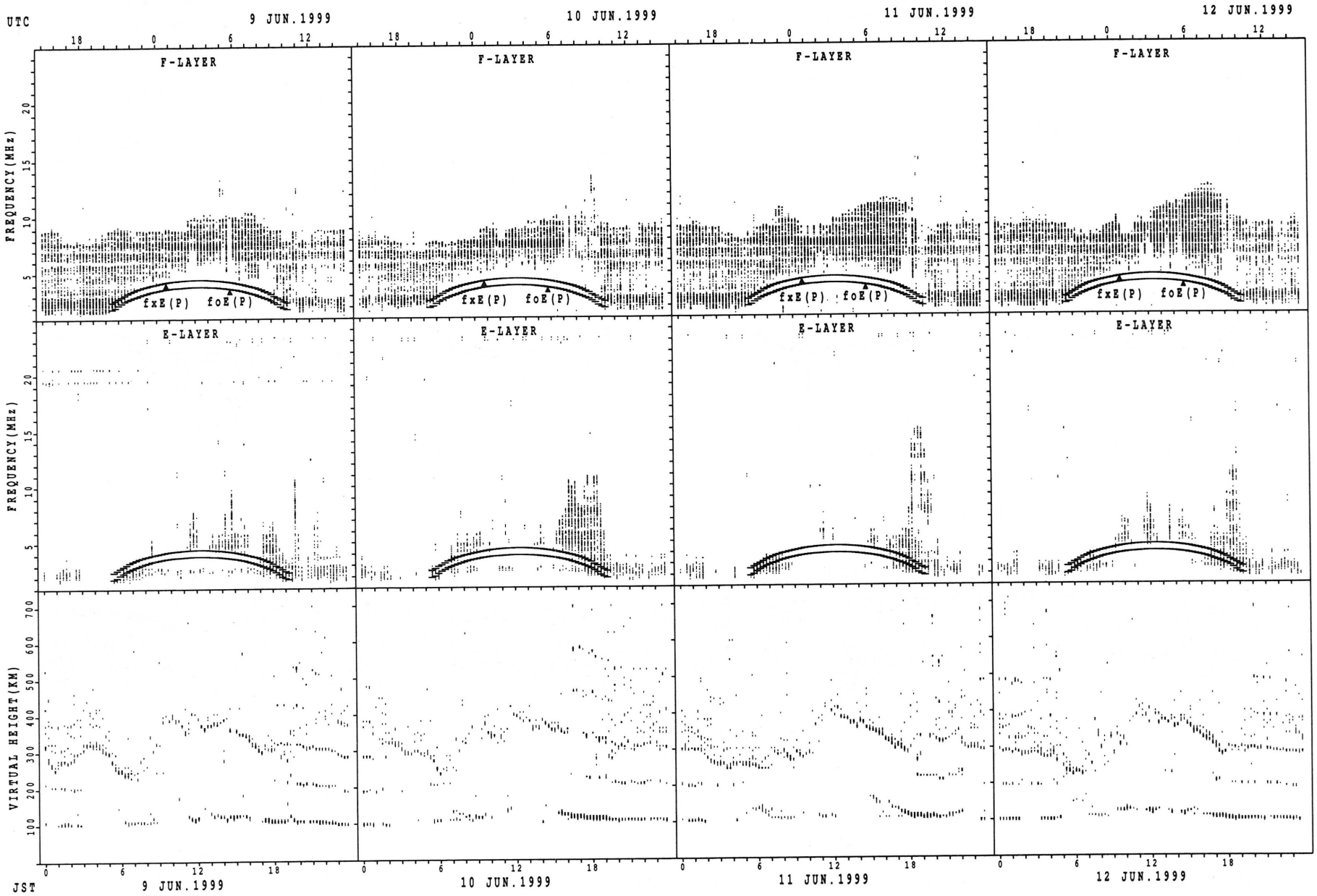
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



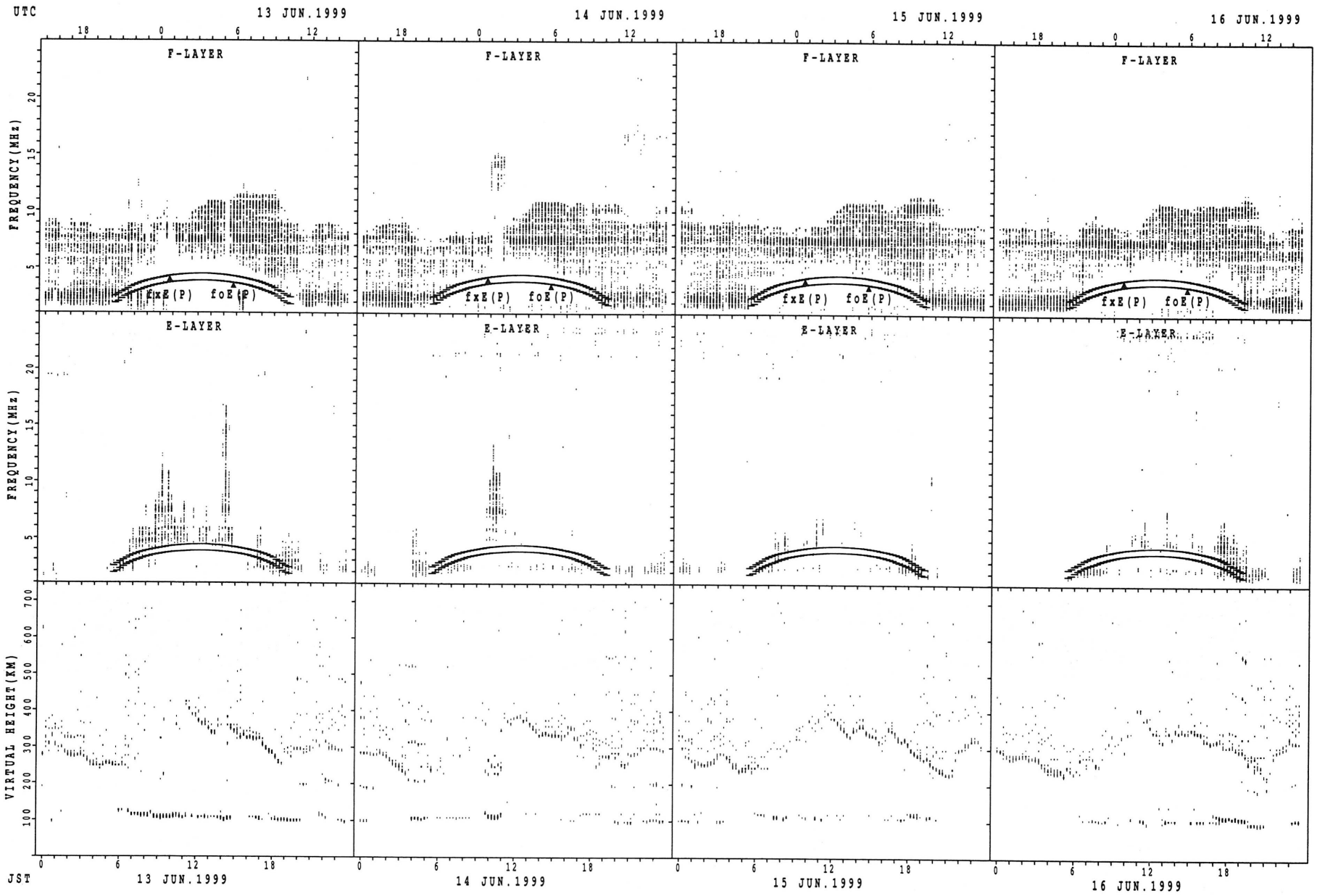
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa

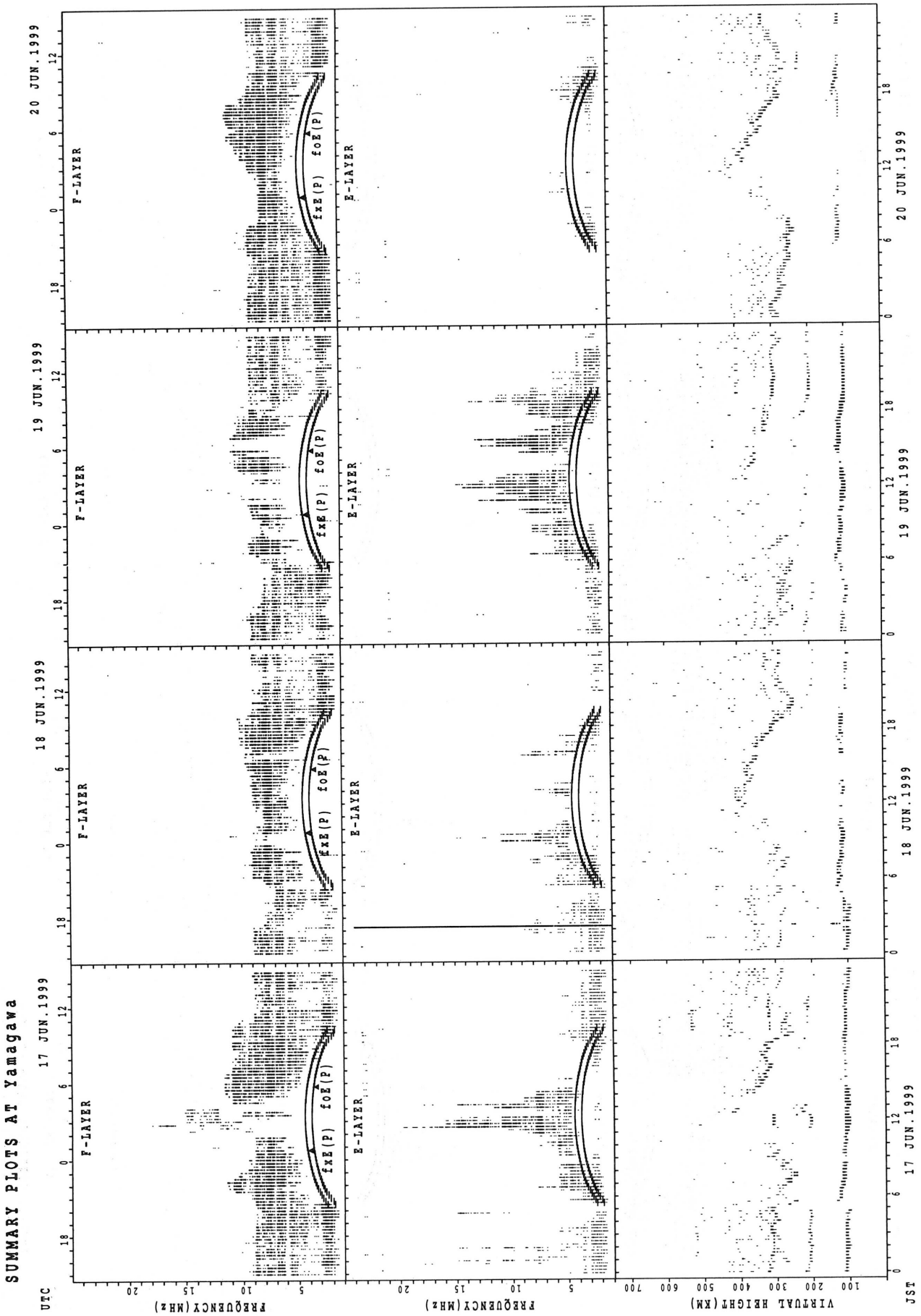


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

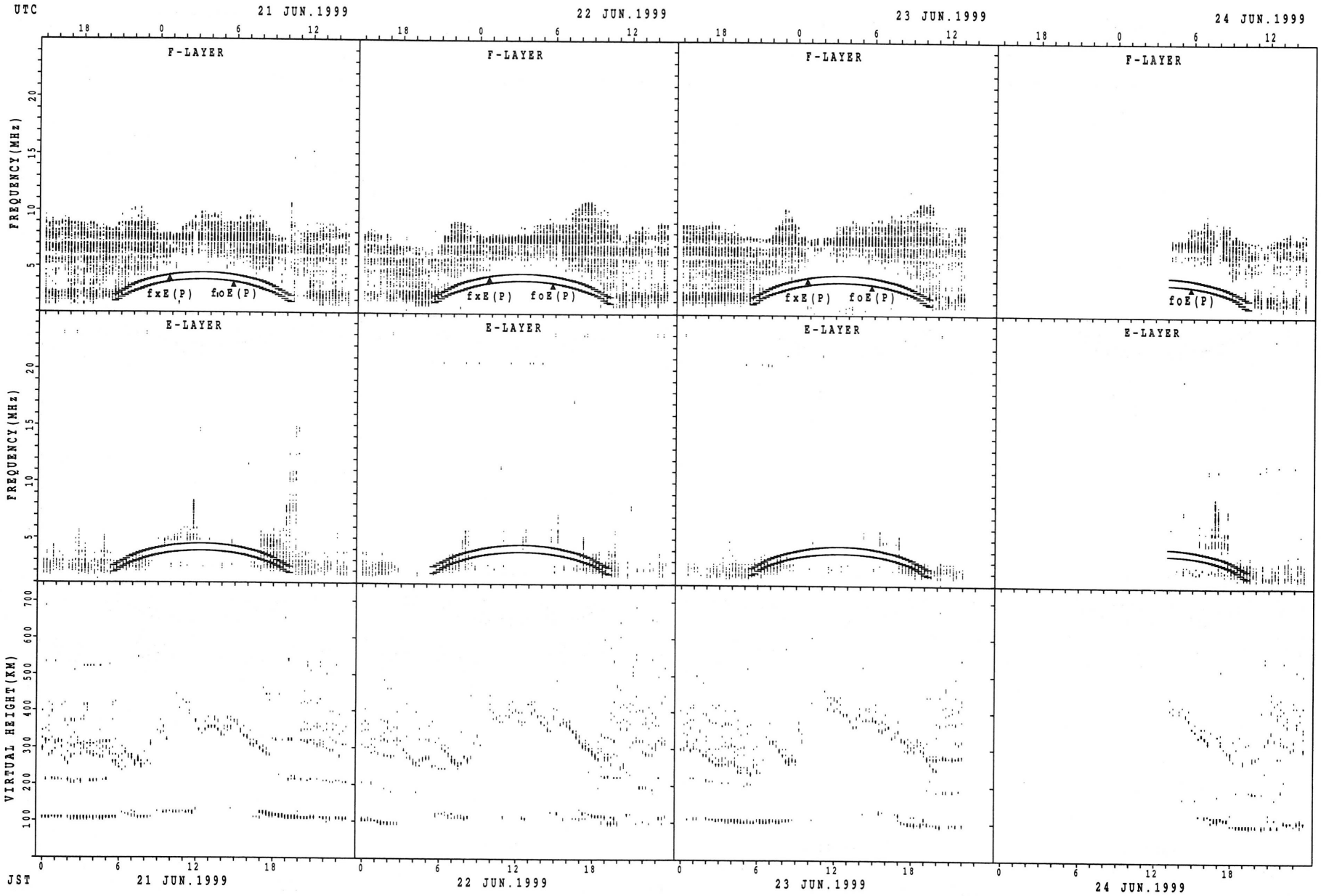
SUMMARY PLOTS AT Yamagawa



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

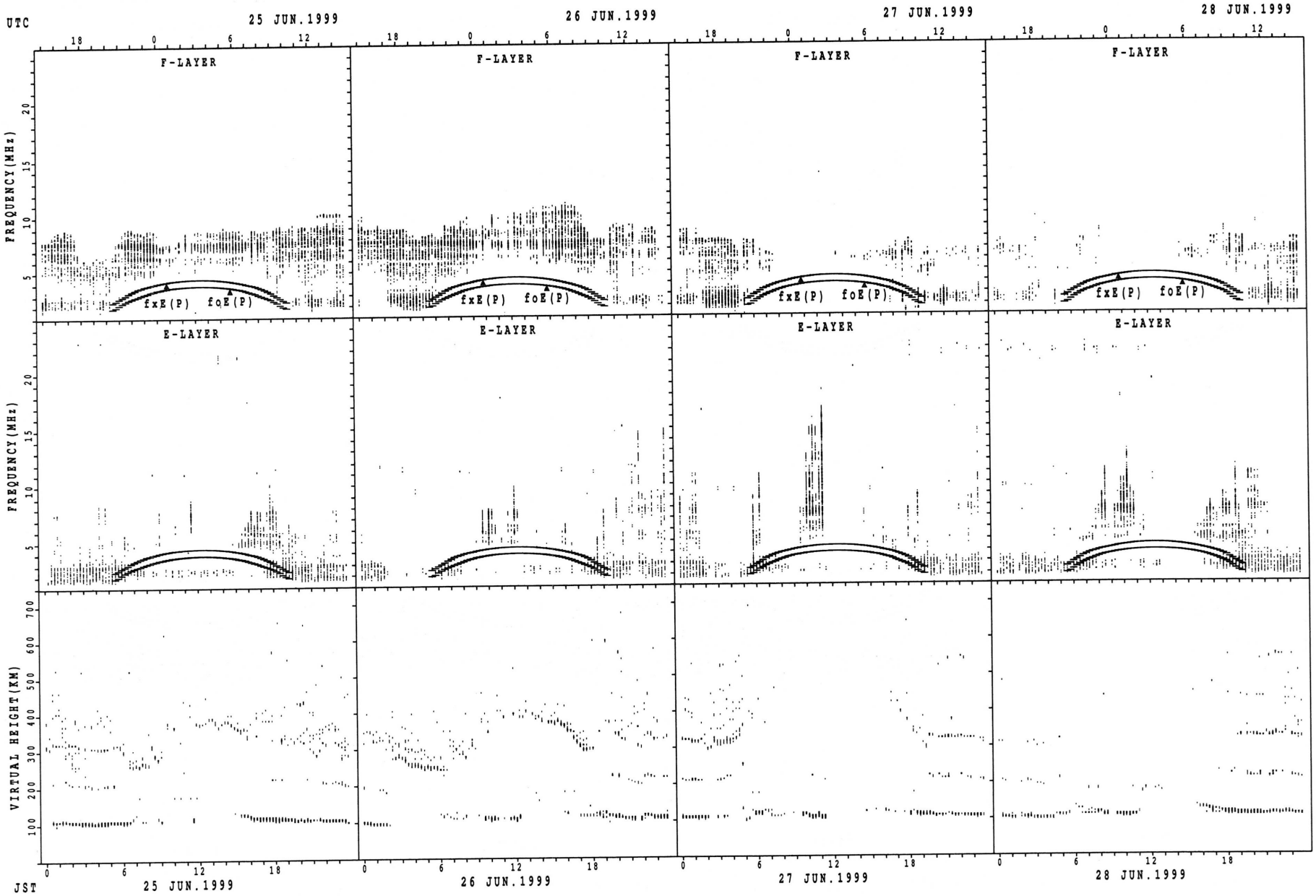

SUMMARY PLOTS AT Yamagawa
17 JUN.1999
18 JUN.1999
19 JUN.1999
20 JUN.1999
UTC
JST
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



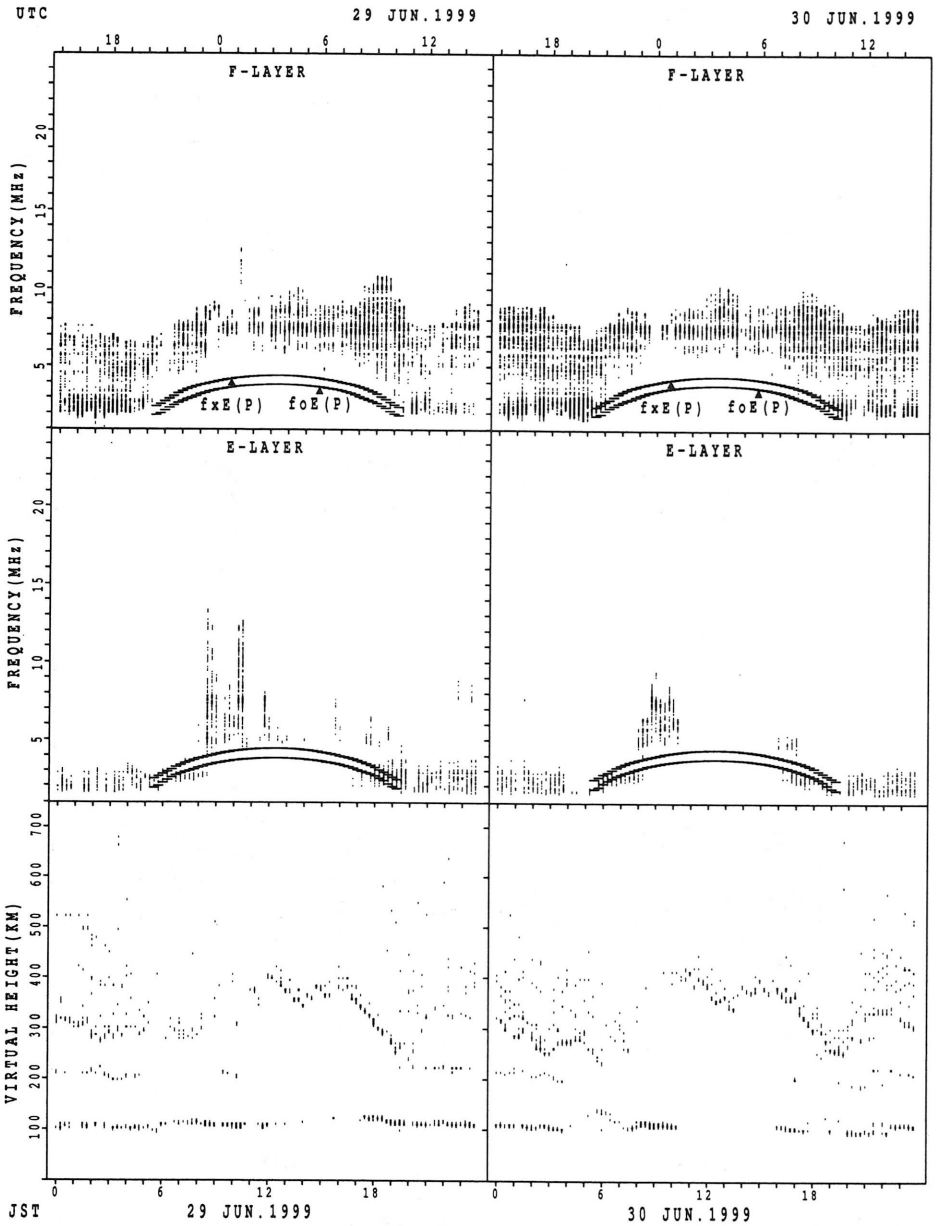
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa

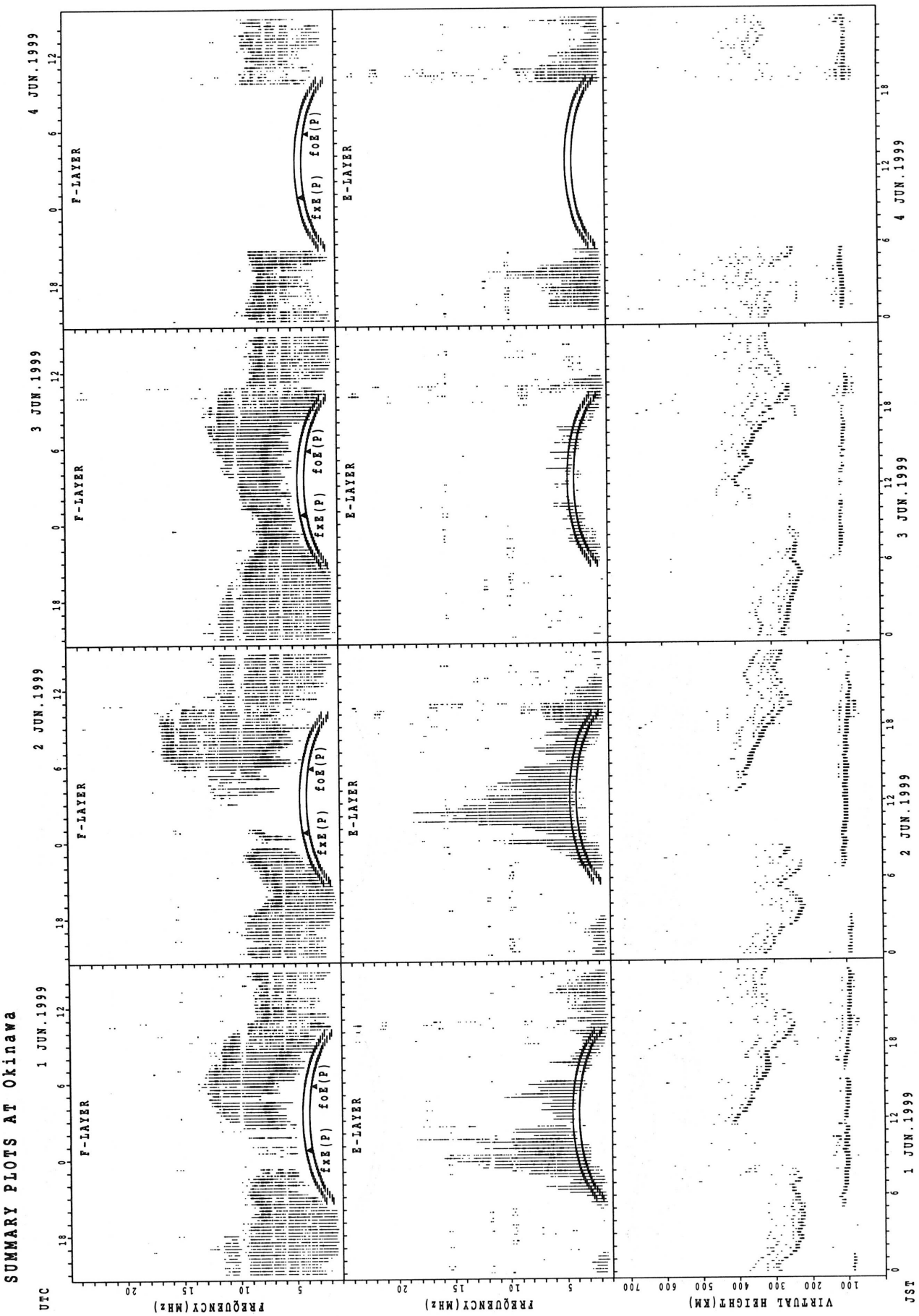


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

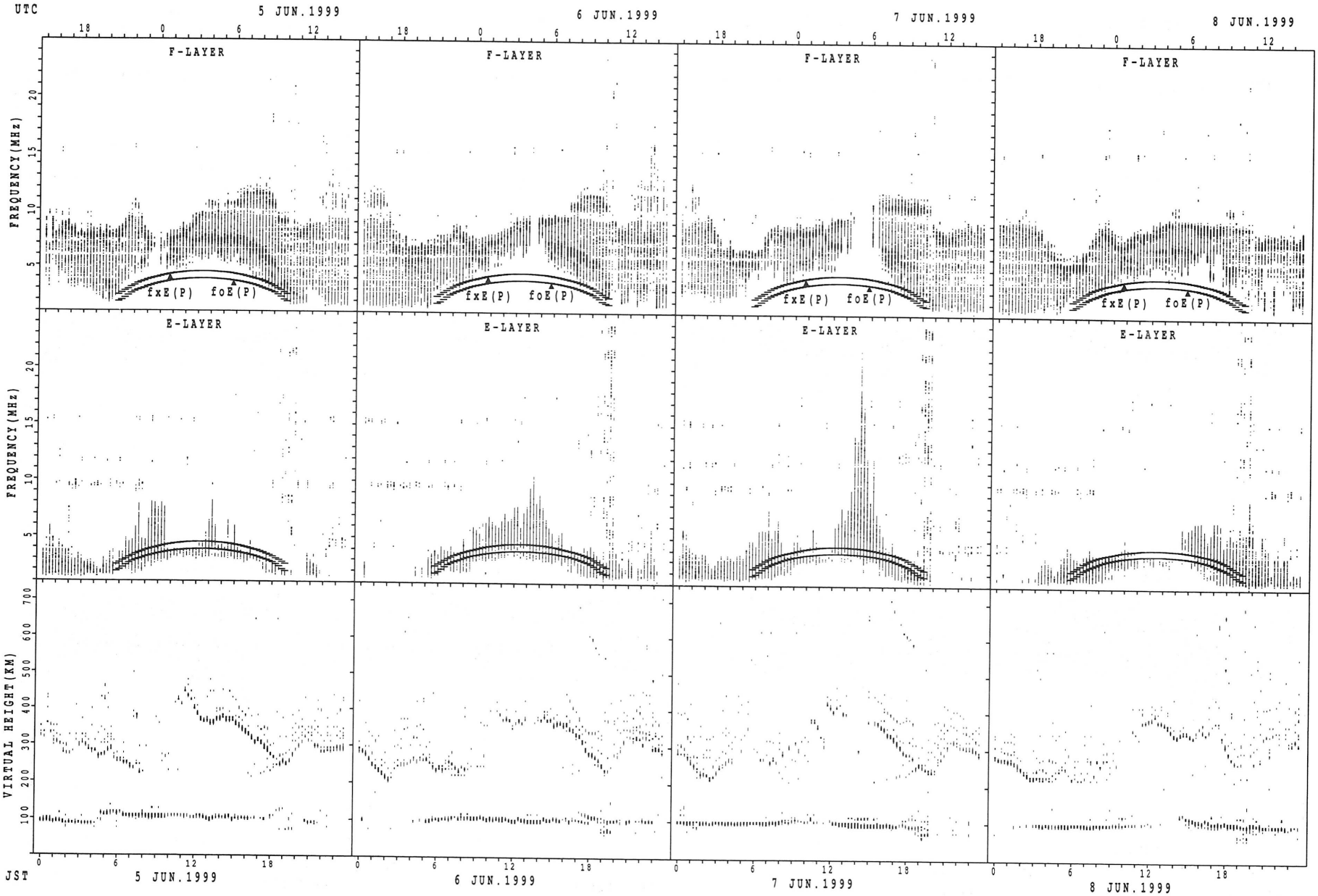
SUMMARY PLOTS AT Yamagawa



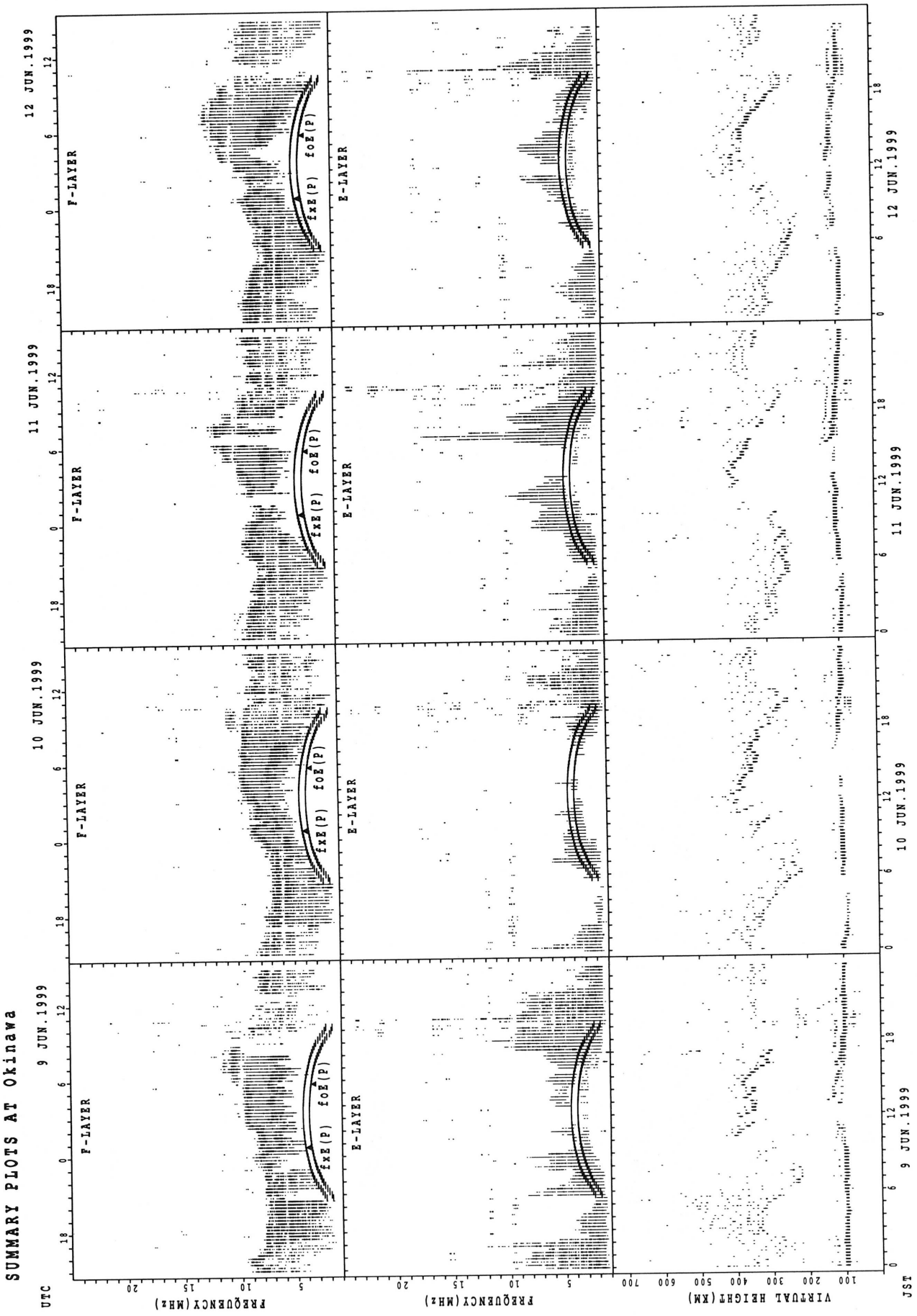
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT Okinawa
1 JUN.1999
2 JUN.1999
3 JUN.1999
4 JUN.1999
UTC
JST
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

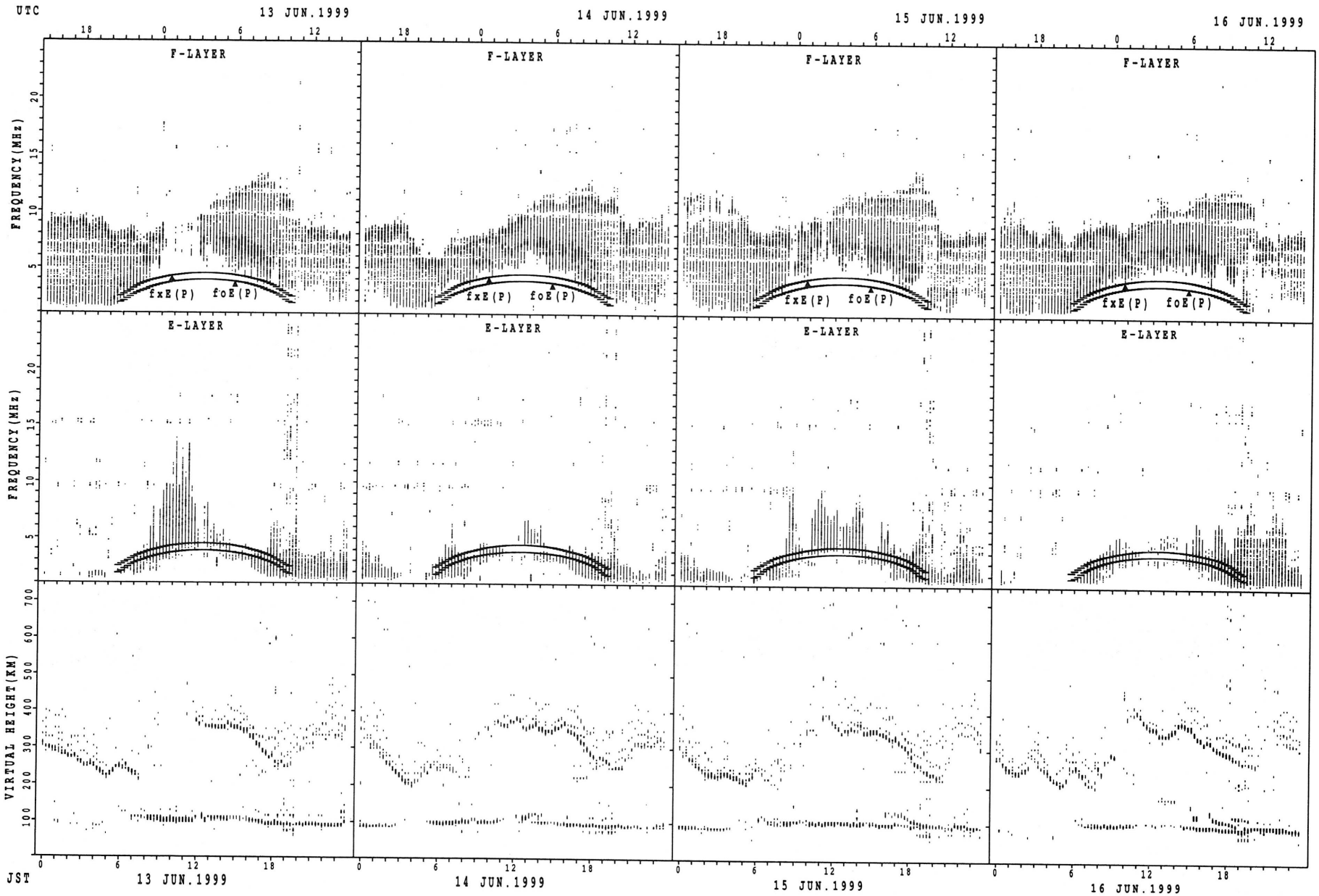
SUMMARY PLOTS AT Okinawa



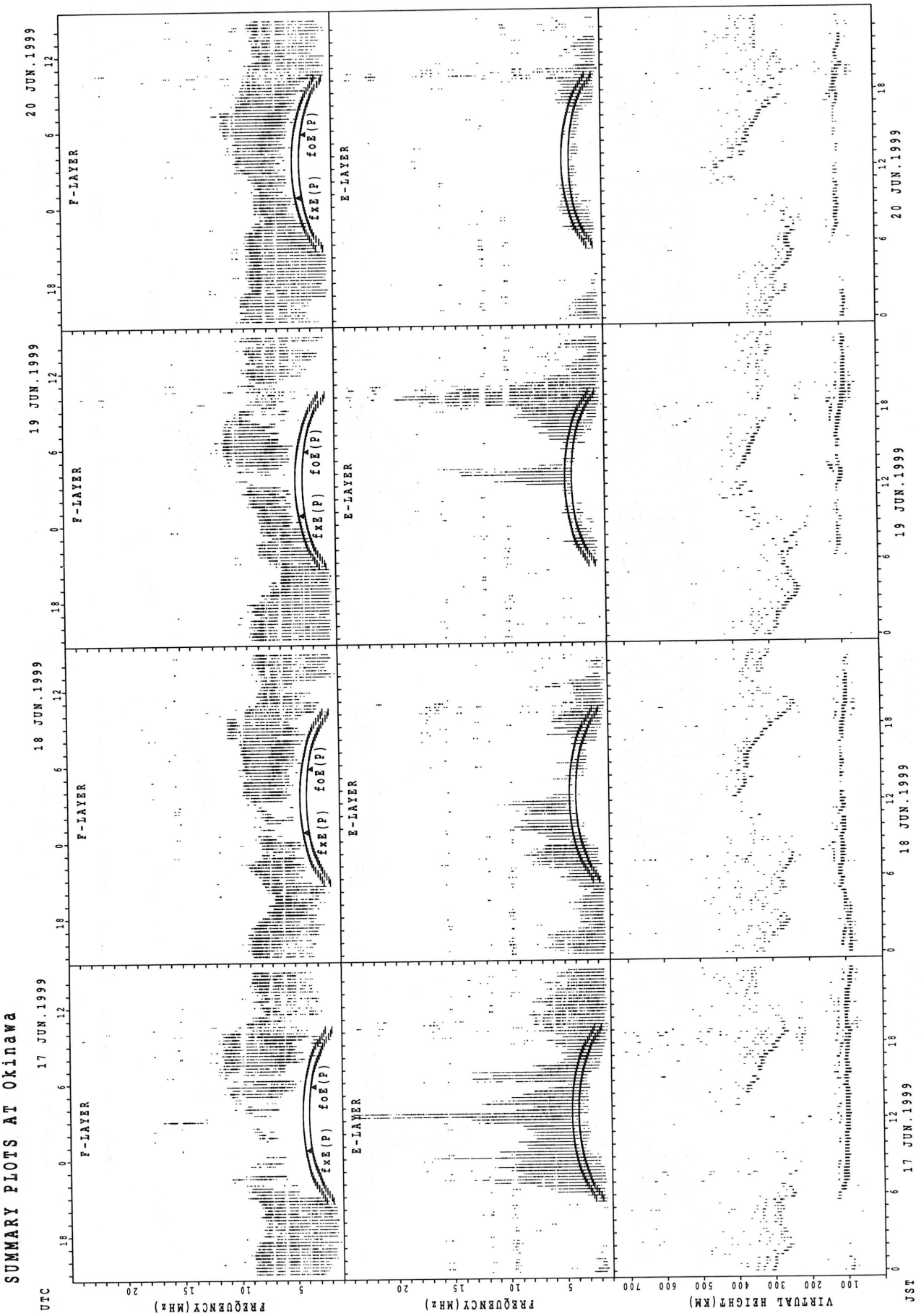
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT Okinawa
UTC
JST
9 JUN.1999
10 JUN.1999
11 JUN.1999
12 JUN.1999
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

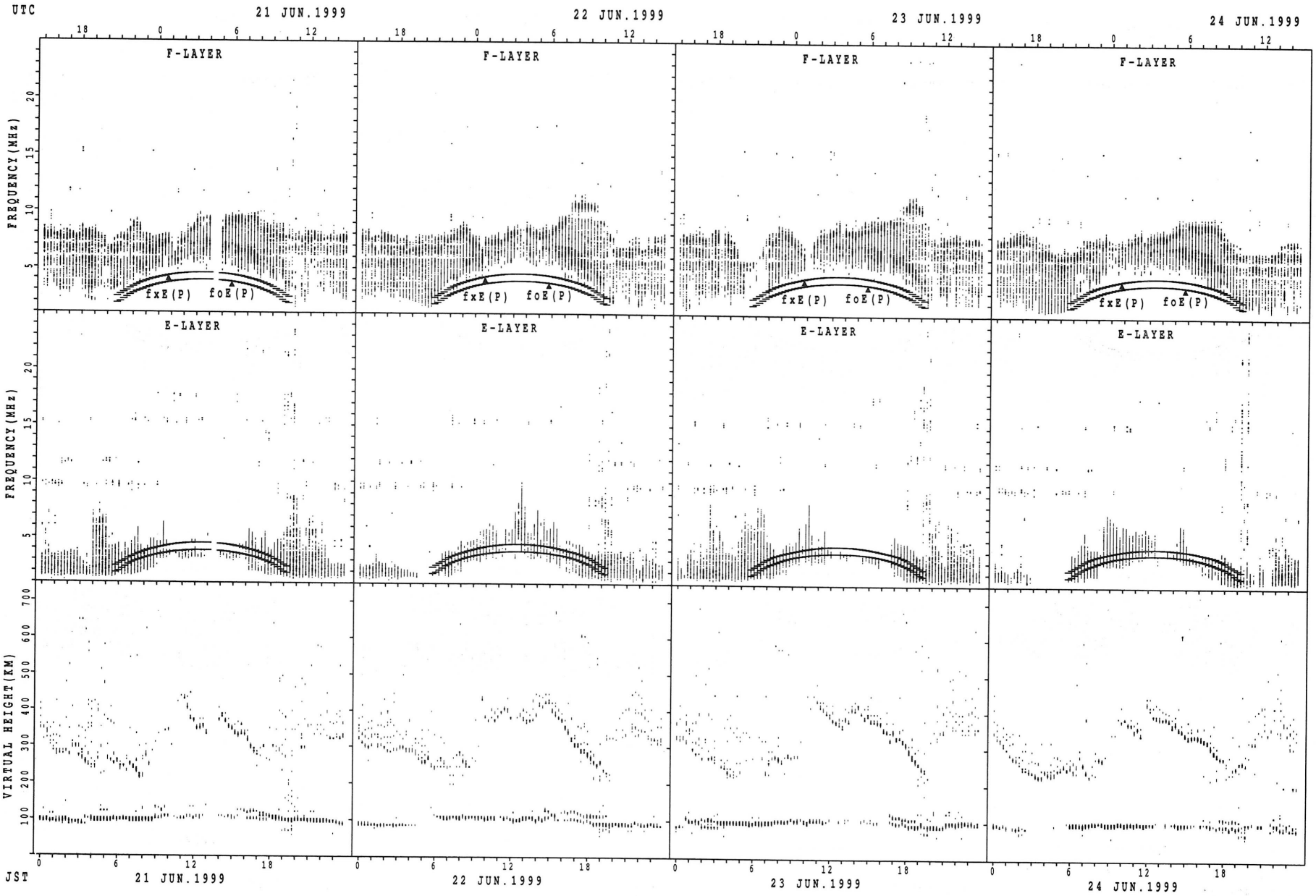
SUMMARY PLOTS AT Okinawa



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

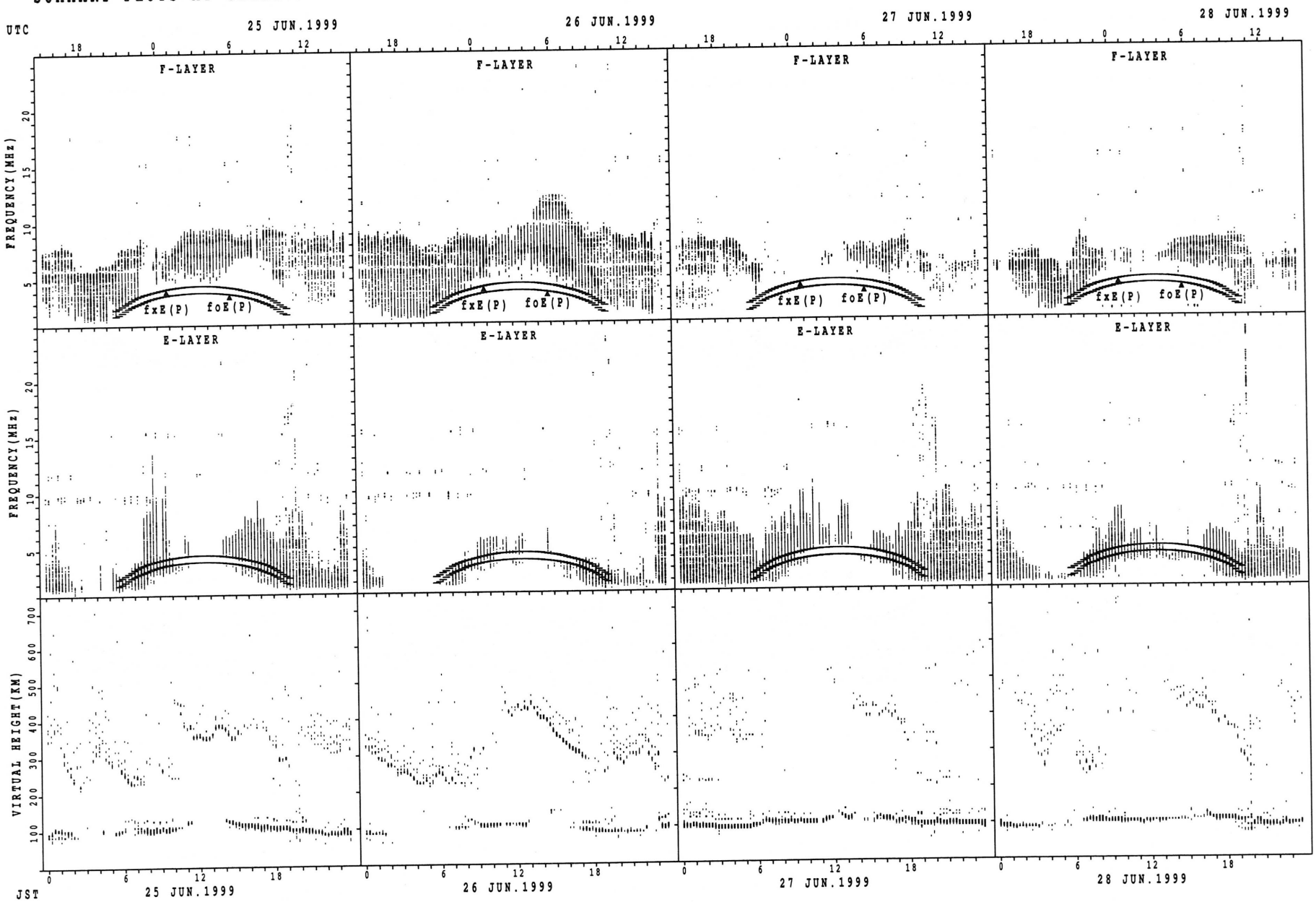

SUMMARY PLOTS AT Okinawa
17 JUN.1999
18 JUN.1999
19 JUN.1999
20 JUN.1999
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
UTC
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



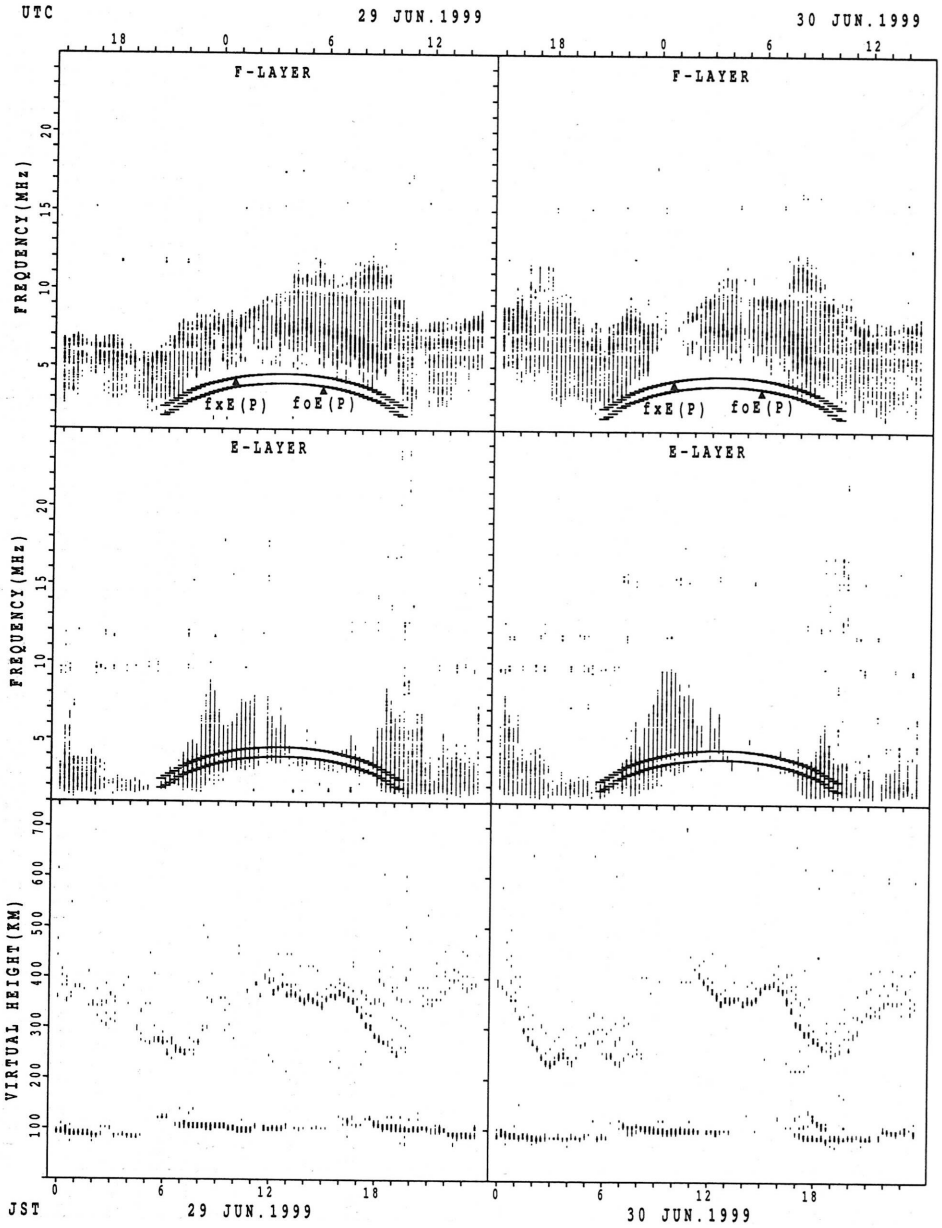
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

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

JUN. 1999 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

STATION Wakkanai LAT. 45.4N LON. 141.7E

h'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	17	10	14	9	3	16	16	19									9	11	8	18	17	17	17	16
MED	352	366	356	364	338	316	304	312									338	348	337	316	310	330	344	338
U Q	376	386	368	377	466	331	316	336									353	350	350	336	337	364	362	359
L Q	334	356	336	344	322	312	296	294									328	344	325	298	295	305	317	333

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	21	23	20	14	13	21	18	25	24	21	11	8	13	14	16	17	22	26	26	28	30	29	26	23
MED	101	101	103	104	113	117	116	111	111	111	107	113	111	107	110	107	113	113	111	107	109	107	105	103
U Q	105	103	105	105	122	123	119	115	113	115	111	117	117	113	117	115	119	115	113	111	113	111	107	105
L Q	99	97	99	101	107	113	113	109	107	107	105	106	103	107	107	106	107	105	109	105	107	103	103	99

STATION Kokubunji LAT. 39.7N LON. 140.1E

h'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	20	18	15	15	17	23	19									18	21	25	23	15	10	10	18
MED	354	342	331	348	350	314	288	290									327	320	304	290	326	345	375	352
U Q	388	359	354	368	404	342	312	304									340	344	325	312	342	352	400	384
L Q	328	322	304	334	328	274	278	278									322	300	279	276	300	330	348	346

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	24	23	22	22	24	26	25	23	23	23	21	18	22	21	20	25	27	25	27	26	26	28
MED	107	103	103	103	101	110	114	113	111	111	111	109	111	110	114	119	117	115	111	105	103	106	110	107
U Q	109	107	105	107	105	119	119	117	116	115	113	113	114	123	123	122	119	120	113	109	111	113	113	113
L Q	103	99	98	99	97	103	110	109	107	109	107	107	106	105	107	106	106	111	105	101	99	99	103	107

STATION Yamagawa LAT. 35.7N LON. 139.5E

h'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	11	18	17	17	11	10	14	19	21								3	23	23	21	18	5	2	8
MED	336	345	330	326	318	314	280	278	304								330	326	308	296	315	346	346	386
U Q	354	356	340	342	338	336	294	300	322								342	334	314	326	332	354	354	409
L Q	326	314	314	308	312	292	272	266	280								326	310	296	287	290	316	338	359

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	18	17	13	12	11	10	16	15	13	12	20	11	14	11	9	10	12	19	22	25	20	19	17	17
MED	108	111	111	108	109	111	121	121	119	113	113	111	111	111	113	114	121	119	115	113	106	113	109	113
U Q	113	115	112	111	111	113	129	125	121	115	117	115	117	113	121	125	125	121	119	117	114	113	115	115
L Q	103	105	104	103	109	107	112	115	116	112	110	107	109	107	107	109	115	107	109	106	103	103	105	106

MONTHLY MEDIANS OF h'F AND h'Es

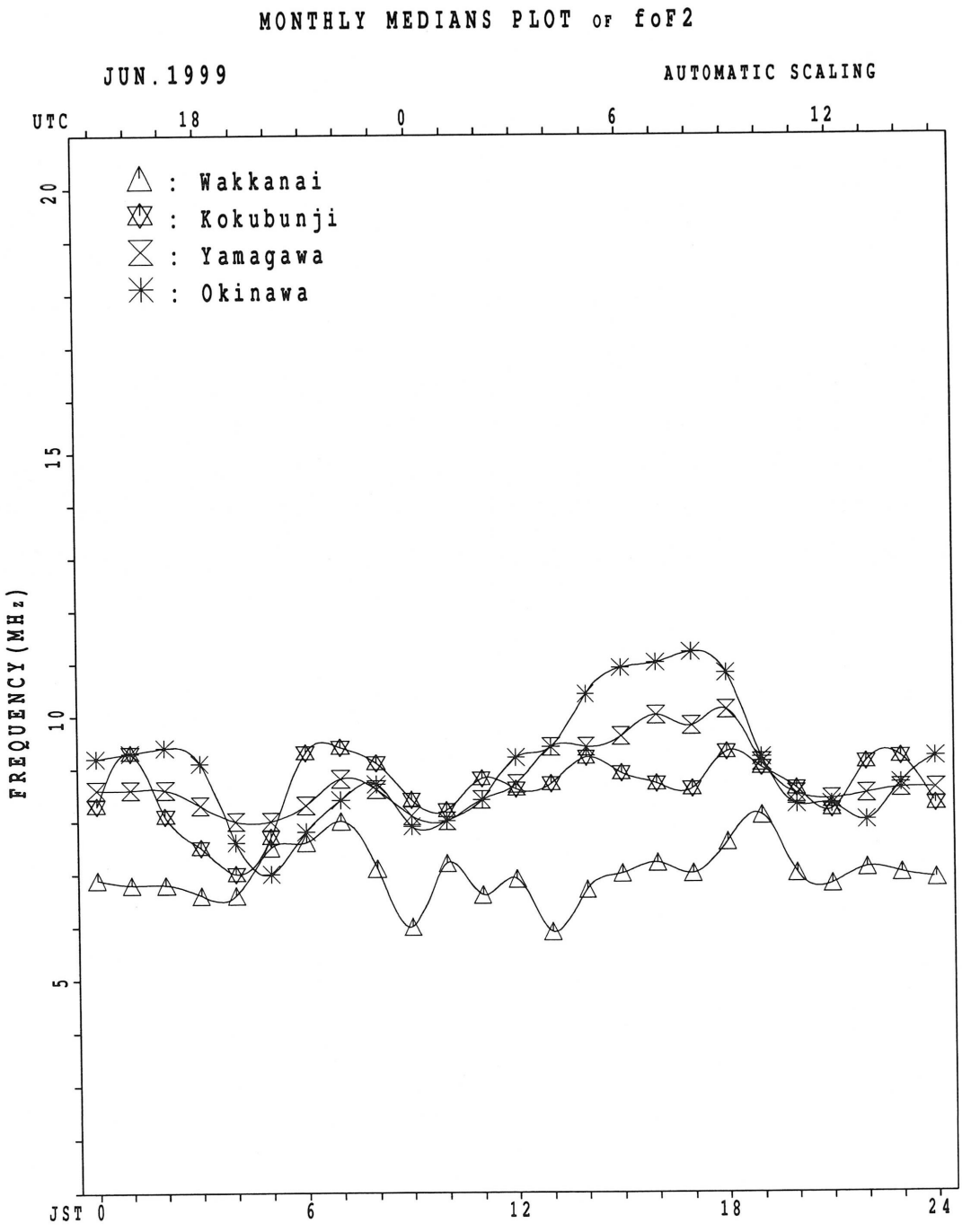
JUN.1999 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

h'F STATION Okinawa 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	21	27	25	24	20	12	14	25	20	1							8	25	22	26	19	15	12	11
MED	342	322	296	297	290	297	275	262	272	490							334	320	294	278	308	342	360	354
U Q	365	338	321	323	334	407	290	281	291	245							347	333	310	296	338	370	382	378
L Q	314	292	273	261	268	263	258	245	264	245							324	304	280	260	278	332	336	330

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	23	20	12	13	11	17	26	27	26	21	19	17	17	17	18	16	22	27	28	27	27	26	23
MED	95	95	91	91	97	101	103	107	107	107	105	105	105	111	109	109	113	111	111	99	97	95	100	95
U Q	103	103	96	97	101	107	115	111	113	111	109	113	113	123	127	119	115	117	113	105	103	105	103	103
L Q	91	91	89	89	90	97	100	99	103	105	103	101	103	104	100	101	101	107	105	91	93	91	93	91


MONTHLY MEDIANS PLOT OF foF2
JUN. 1999
AUTOMATIC SCALING
UTC
18
0
6
12
△ : Wakkanai
⛛ : Kokubunji
⧖ : Yamagawa
✳ : Okinawa
FREQUENCY (MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 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 90	X 92	90	85	84	91															X 96	X 87	92	X 91
2	X 86	86	96	98	90	85															X 109	X 101	X 98	100
3	100	X 104	95	88	88																X 89	X 88	88	86
4	86	78	X 77	X 76	76																X 83	X 87	X 89	X 88
5	87	X 94	X 81	X 80	X 79	84	96														X 82	X 84	X 82	86
6	X 87	X 85	82	X 76	74	77															X 92	X 92	X 95	X 96
7	X 96	X 96	X 89	X 75	X 71																X 88	X 91	92	97
8	108	X 103	X 103	X 92	X 83																X 88	X 88	X 85	85
9	87	X 83	X 76	X 74	75	90	103	92								C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C											X 94	X 89	X 92	X 95
11	X 94	X 92	X 89	X 86	X 82																X 92	X 96	X 101	X 99
12	X 99	X 97	X 97	X 93	X 96																X 80	X 84	X 86	89
13	90	X 79	82	86	88																X 78	X 76	X 78	75
14	86	86	76	X 74	X 67	76															X 99	X 94	X 92	X 93
15	X 96	X 92	X 86	X 80	X 81																X 102	X 98	X 91	X 92
16	X 93	X 89	X 89	X 88																	X 110	104	X 95	X 98
17	X 96	X 93	X 86	X 81	88	93															X 95	X 88	X 86	X 83
18	X 80	82	X 81	X 70		81			96												X 91	X 84	87	X 85
19	87	88	X 86	X 80	84	86	99														X 83	X 84	93	92
20	X 87	82	73	81	76	80															R	93	107	X 100
21	100	94	90	75	84	81															X 83	X 80	X 84	X 86
22	72	X 74	X 71	68	70	72															X 90	X 86	95	X 91
23	X 88	X 86	86	X 84																	X 101	X 92	X 92	X 92
24	X 92	94	X 98	X 94																	X 81	X 79	X 86	X 92
25	X 90	X 91	X 88	X 76	74	74															X 100	X 99	X 98	X 100
26	X 94	X 92	X 93	X 82																	X 86	A	102	X 98
27	X 88	X 88	A	82	74	74															X 69	X 74	X 76	X 74
28	X 73	70	75	X 73	66																X 72	X 70	X 69	X 72
29	C	X 70	X 69	X 69	X 67																X 81	X 79	86	X 83
30	80	X 85	X 84	X 72	X 73																X 85	X 84	X 85	X 88
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	28	29	24	14	3	1	1												28	28	29	29
MED	X 89	X 88	X 86	X 80	78	81	99	92	96												X 88	X 88	X 91	X 91
U Q	X 95	X 94	90	X 86	84	86	103														X 96	X 92	X 95	X 96
L Q	86	82	X 79	X 74	X 74	76	96														X 82	X 84	X 86	X 86

JUN. 1999 fxI (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 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	84	86	80	F 77	R 76	F 82	U A 90	A	86	79	78	85	92	96	96	92	A	84	87	92	90	R 81	F 86	85
2	80	R 76	F 85	F 86	F 79	F 76	94	96	98	A	90	96	100	102	106	108	107	106	108	109	103	95	92	F 89
3	F 90	98	F 86	R 76	76	86	99	105	90	83	92	A	A	96	100	101	101	100	88	83	83	82	80	F 76
4	R 77	F 70	71	70	F 67	74	97	V 92	81	82	84	R 87	86	92	96	90	94	92	90	78	77	81	83	82
5	F 78	88	75	74	73	F 76	F 86	100	92	80	A	75	81	86	A	75	74	76	82	81	76	78	R 77	F 77
6	81	R 79	F 75	70	F 64	F 69	76	88	89	80	A	79	84	89	A	83	83	84	88	94	86	86	89	90
7	90	90	83	69	65	72	86	96	90	89	90	95	98	92	94	89	88	90	92	87	82	85	F 85	F 88
8	F 100	97	97	86	R 77	80	89	90	83	84	86	90	86	84	85	89	86	88	88	90	82	V 81	79	F 76
9	F 77	R 78	70	68	F 67	F 81	F 95	F 83	R 74	55	69	R 73	72	R 72	78	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	88	94	94	90	84	94	94	89	A	A	88	84	86	89
11	88	86	83	80	76	80	85	90	92	R 93	86	83	84	92	96	98	102	106	111	106	86	90	95	93
12	93	91	91	87	90	92	91	85	75	73	A	A	92	100	103	110	109	109	R 98	92	75	78	80	F 80
13	F 80	J R 73	R 74	F 76	F 76	82	86	84	82	82	A	A	82	A	94	98	96	88	87	84	72	70	72	R 65
14	F 80	F 76	F 68	68	61	F 66	80	88	A	83	85	90	89	91	94	94	88	85	82	83	93	88	86	87
15	90	86	R 80	74	75	87	101	104	93	86	86	89	92	92	R 100	99	95	86	92	100	96	92	85	86
16	87	83	83	82	84	94	98	100	96	90	91	94	95	99	98	91	86	88	90	96	104	95	89	92
17	90	87	80	75	F 79	F 84	92	97	95	90	R 88	85	A	A	90	86	80	A	83	92	89	82	R 80	77
18	74	F 73	75	64	65	F 72	85	84	F 84	86	76	A	A	74	73	79	81	81	85	84	85	78	F 80	R 79
19	80	F 82	80	74	F 73	F 77	F 89	94	89	92	89	90	92	R 92	90	90	86	85	92	83	R 77	78	F 82	F 86
20	81	F 74	F 64	F 73	F 69	F 71	90	105	90	83	R 77	82	86	93	94	97	98	96	96	90	R	F 84	F 94	F 93
21	F 89	F 83	F 82	F 67	F 65	F 71	100	97	98	84	77	A	73	74	R 75	74	75	73	70	70	77	74	78	80
22	F 65	68	J R 65	F 60	F 63	F 64	83	98	104	85	81	84	R 78	82	84	88	85	85	91	94	84	80	84	85
23	82	80	80	78	74	76	88	89	103	92	83	82	83	84	85	80	81	85	92	97	95	86	R 86	86
24	86	F 88	92	88	81	79	88	87	82	R 68	70	U R 69	77	80	79	83	87	86	80	75	R 75	R 73	R 80	86
25	84	85	82	70	F 66	67	86	101	100	90	84	84	83	85	86	85	87	86	88	88	94	93	91	91
26	88	86	87	76	72	79	92	99	A	96	R 92	96	94	R 96	85	79	82	82	81	A	80	A	F 92	92
27	82	82	A	F 73	F 65	F 65	70	70	U R 63	A	A	A	A	A	A	U R 60	64	A	70	67	63	67	70	68
28	67	F 62	67	66	F 58	59	U R 72	78	A	A	A	A	E G 51	E G 53	A	67	A	71	80	79	66	64	63	66
29	C	64	63	63	61	64	R 78	R 79	87	80	A	A	84	76	79	R 75	74	77	86	89	75	73	F 79	77
30	F 70	79	78	R 66	67	71	84	88	90	84	80	88	90	90	86	82	78	76	78	79	79	78	79	82
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	28	29	29	29	29	28	26	26	23	22	26	27	26	29	27	27	28	27	28	28	29	29
MED	82	82	80	74	72	76	88	91	90	84	85	86	86	90	90	89	86	86	88	88	82	81	83	85
U Q	88	86	83	78	76	82	93	98	95	90	89	90	92	93	96	96	95	90	92	94	90	86	88	89
L Q	79	F 75	72	68	65	70	84	86	83	80	78	82	82	82	84	80	81	82	82	81	76	78	79	77

JUN. 1999 foF2 (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 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						A	A	A	A	A	A	A	A	A	L 568	A	A	L 496	L					
2							L	L	U L 520	A	A	L 580	576	548	R 552	A	A	A	A					
3						L	L	L	A	A	A	A	A	A	A	A	L 528	L 452	A					
4							L	A	A	A	L 560	540	A	A	U A 536	A	L 524	L	A					
5							L	L 488	A	A	A	A	A	A	A	A	524	L	L 428					
6								L 496	L 536	L	A	568	A	A	A	532		L 476	A					
7							L	L	A	L	L 576	A	560	572	544	L 540	A	L	A					
8							L	L	L	L 588	L	556	L	U A 548	A	A	A	A	A					
9						L	L 444	472	500	U L 508	U A 524	U R 544	552	548	A	C	C	C	C	C				
10						C	C	C	C	C	U L 580	R 548	556	L	A	L 528	U A 512	A	A	A				
11							L		L	528	A	L	600	564	556	552	L 512	U A 448	L					
12						L	L	L	U R 572	U A 588	A	A	A	564	U A 536	520	U L 572	L 464	L					
13							L		A	A	A	A	A	A	U A 520	A	U A 500	L	L					
14								A	A	A	A	R 588	A	L 580	L 544	528	L 508	A	L					
15						L	L	L	A	R 548	A	588	L 572	560	528	U L 532	U L 516	A	U L 416					
16						L	L	U L 484	A		L 552	L 560	L	548	U A 512	A	U L 532	A	A					
17							A	A	A	516	L 548	U A 508	A	A	A	508	504	A	A					
18						L	L		500	U A 508	A	A	A	L 540	536	508	U A 492	L 484	U L 416					
19							A	A	A	A	A	L 592	544	528	520	520		A	A	U L 384				
20						L	L	L 488	U L 496	L	L	552	536	532	576	520	488	464	U L 392					
21							L 452	U A 500	U A 528	U L 512	A	A	520	520	524	A	504	A	A					
22							L 504	U L 496	L 524	L 520	564	A	A	B	528	520		A	L	A				
23							U L 444	U L 456	516	U L 552	L 616	560	564	548	U R 580	A	A	A	A					
24							L 436	A	L 516	A	A	556	556	528	544	U A 540	A	U L 504						
25						L	L	A	U L 536	L 512	L	U Y 592	580	R 576	560	U A 524	U A 536	A	A					
26							U L 524	U L 508	A	L	A	L 556	R 592	592	R 576	U A 556	A	A	A	A				
27						L 360	U A 432	U A 444	A	A	A	A	A	A	A	A	A	A	L	A				
28						U A 364	A	A	A	A	A	A	U R 512	528	A	A	A	A	A					
29								L	536	A	A	A	U A 548	560	540	R 536	520	A	A					
30								U L 492	L	L 536	A	U A 612	U A 540	U A 580	U B 540	544	L	L						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						2	7	11	12	12	8	17	16	20	21	17	16	8	5					
MED						362	444	L U 488	522	L 524	L 562	560	556	548	540	528	514	L 470	U L 416					
U Q							504	L U 496	536	550	L 578	588	574	568	558	540	U L 526	L 490	L 422					
L Q							436	U 472	508	U L 512	550	550	542	536	528	520	504	458	U L 388					

JUN. 1999 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 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						200	272	336	UA 352	A	A	B	A	A	A	A	A	A	A	B				
2						A 292		336	A	A 380	A	A	A	B	A	A	A	A	A	B				
3						A	A	UA 340	A	A	B	A	A	A	A	A	A	A	A	B				
4						A	A 332		A 360	UA 376	B	A	B	A	A	A	A	A	A	B				
5						A	A 344		368	UA 388	A	B	B	UA 392	A	A	A	A	236	B				
6						A	A	A	364	UA 392	A	A	B	A	A	A	A	A	A	B				
7						A	284	332		A	A	B	A	B	R	R	340	304	240	B				
8						H 212	276	A	R	400	R	UR 416	UR 428	UR 400	B	356	336	304	A	B				
9						A	A	A 312	352	UA 372	R 388	B	R	R	UA 396	C	C	C	C	C				
10						C	C	C	C	C	A	B	A	A	A	376	344	UA 296	UA 212	B				
11						196	280	320	352	UR 368	A	A	A	R	B	A	A 344	292	A	B				
12						208	268	308	352	UR 372	R	R	B	A	A	A	A	276	UA 216	B				
13						200	276	332	352	B	B	A	A	A	B	A	A	288	A	B				
14						220	284	UA 308	UA 344	A	A	A	A	A	A	R	340	296	A	B				
15						216	276	316	344	360	400	A	A	A	A	A	A	A 280	224	B				
16					B	H 216	280	A	356	360	A	A	A	A	A	A	336	288	UA 228	B				
17					B	200	288	A 316	A	372	B	B	A	A	A	B	332	292	A	B				
18					B	208	A 272	332	UA 356	R	A	A	A	A	R	368	332	296	UA 204	B				
19					B	A	280	324	352	UA 372	A	A	A	B	R	R 372	340	296	A	B				
20					B	220	276	328	UA 352	A	A	B	R	B	R	R	340	296	A	B				
21					B	196	288	A 328	A	A	A	A	R	R 392	UR 392	376	340	296	A	B				
22					B	A	272	316	348	R	B	B	B	B	UR 400	372	340	296	UA 244	B				
23					B	200	R 272	A	A	A	R	B	B	B	UR 404	UA 380	UR 348	A	A	B				
24					B	A	A	A	A	A	A	A	B	B	R 396	376	348	304	UA 240	B				
25					B	208	280	A	A	A	B	A	A	B	B	380	344	300	UA 224	B				
26					B	196	276	324	356	A	A	A	A	UR 416	B	400	356	312	A	B				
27					B	A 184	268	304	A	A	A	A	A	A	400	380	340	300	240	B				
28						A	284	A 336	UA 356	A	B	A	R	R	B	408	356	304	A	B				
29						200	268	UA 328	UA 352	A	A	A	A	B	A	UR 396	R	312	A 244	B				
30						A	284	320	364	R	UR 396	B	B	A	B	R 392	372	308	248	B				
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						17	23	23	19	12	3	1	1	4	6	14	19	22	13					
MED						200	276	328	352	U 372	R 396	UR 416	UR 428	UR 396	UR 398	378	340	296	UA 236					
U Q						214	284	332	356	A 384	400			UR 408	UR 400	392	348	304	A 242					
L Q						198	272	316	352	370	R 388			392	R 396	372	340	292	UA 220					

JUN. 1999 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 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	J A 65	30	J A 40	J A 66	J A 26	52	103	133	J A 79	J A 68	J A 67	60	61	56	52	72	97	49	36	65	J A 69	J A 36	J A 63	J A 39
2	J A 56	J A 66	J A 50	J A 61	J A 31	J A 28	J A 51	J A 51	J A 124	106	J A 85	J A 54	43	E B 42	J A 50	84	J A 68	J A 127	58	J A 45	J A 23	22	J A 146	J A 55
3	J A 86	J A 49	18	J A 32	E B 13	40	J A 41	J A 46	J A 64	J A 70	J A 81	130	J A 179	J A 158	76	J A 82	48	J A 40	55	J A 52	J A 39	J A 63	J A 87	J A 107
4	19	J A 46	J A 31	J A 27	J A 25	J A 48	J A 36	71	97	113	E B 46	55	J A 124	J A 74	56	88	52	J A 47	J A 68	J A 52	J A 40	40	J A 20	J A 47
5	J A 78	J A 54	J A 44	J A 28	J A 40	J A 38	J A 31	J A 53	J A 54	J A 76	J A 100	J A 81	71	70	J A 152	69	38	47	J A 26	J A 27	J A 33	28	20	J A 82
6	J A 54	J A 51	J A 40	J A 62	42	J A 32	J A 34	J A 40	40	56	J A 165	J A 64	58	J A 75	105	J A 51	J A 44	31	44	J A 20	25	33	J A 30	27
7	J A 38	28	J A 36	J A 47	J A 32	J A 32	G 23	38	J A 57	J A 56	J A 49	J A 78	47	E B 46	G	G	58	39	J A 72	63	20	20	J A 46	J A 62
8	19	E B 16	26	J A 39	24	G	G 27	38	G 35	G	G 32	48	58	J A 60	J A 62	J A 66	71	J A 57	J A 40	J A 36	51	J A 66	J A 79	J A 40
9	J A 26	25	J A 27	E B 13	J A 26	J A 27	J A 32	39	J A 50	48	J A 55	49	G	49	62	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	45	46	52	J A 53	J A 149	51	J A 52	J A 54	112	103	33	J A 58	J A 28	J A 29
11	J A 48	28	20	19	E B 16	24	G	37	J A 44	J A 45	J A 72	J A 47	46	G	J A 50	39	36	J A 48	J A 39	J A 32	J A 53	J A 45	J A 76	27
12	25	J A 38	33	29	J A 23	23	32	39	J A 84	84	87	106	J A 115	58	J A 81	J A 47	33	28	J A 31	J A 23	J A 48	J A 38	J A 30	J A 52
13	J A 72	J A 52	J A 40	28	J A 23	G	J A 50	J A 49	J A 73	J A 67	J A 118	J A 161	J A 115	J A 127	J A 117	69	J A 60	J A 46	J A 32	28	32	38	J A 46	J A 56
14	J A 61	J A 51	J A 53	J A 53	J A 60	32	J A 50	J A 75	J A 134	J A 60	72	J A 52	J A 77	55	J A 49	G 32	40	J A 56	44	40	53	J A 65	58	J A 47
15	J A 29	J A 32	J A 25	J A 25	J A 23	26	33	J A 41	J A 52	39	67	59	58	J A 53	J A 44	40	42	J A 50	J A 48	J A 36	24	J A 40	E B 15	18
16	J A 38	J A 30	27	20	J A 20	G	30	J A 42	J A 55	J A 49	44	52	J A 62	J A 48	56	J A 81	43	J A 60	J A 53	J A 24	52	J A 53	J A 54	J A 53
17	J A 40	J A 49	J A 34	J A 29	J A 23	J A 34	J A 64	J A 118	J A 99	J A 48	51	J A 98	J A 125	139	J A 65	J A E B 42	J A 49	76	135	60	J A 84	26	J A 100	J A 60
18	J A 35	28	J A 20	28	J A 31	29	J A 41	J A 46	J A 51	J A 54	65	132	90	41	G	J A 49	J A 52	G	J A 31	J A 33	J A 28	J A 24	J A 55	J A 83
19	J A 62	J A 80	J A 82	J A 51	J A 39	J A 42	J A 59	J A 65	J A 72	66	J A 80	57	47	E B 43	G	J A 52	67	J A 67	J A 41	44	38	J A 85	J A 64	33
20	28	J A 25	J A 29	J A 26	J A 26	J A 25	J A 38	J A 41	40	J A 51	J A 52	E B 43	G 38	E B 46	G	G 25	40	J A 37	J A 43	J A 27	24	J A 54	J A 62	J A 87
21	J A 48	28	J A 29	26	22	22	34	J A 65	J A 72	J A 50	67	117	G	G	43	60	J A 52	J A 48	J A 66	J A 49	J A 37	J A 62	J A 62	J A 83
22	J A 44	J A 55	J A 48	J A 34	27	J A 27	31	J A 40	J A 45	G	48	79	58	E B 60	47	J A 49	J A 71	J A 50	57	J A 47	J A 52	J A 48	J A 62	J A 54
23	J A 52	J A 22	J A 49	26	J A 17	G	J A 30	33	37	44	G	E B 46	E B 47	50	58	J A 68	62	81	92	54	J A 59	51	J A 63	J A 63
24	J A 46	J A 63	J A 58	J A 52	J A 62	J A 39	J A 34	76	J A 53	J A 57	56	44	E B 47	E B 45	46	J A 62	73	J A 42	J A 46	J A 28	24	60	J A 48	J A 48
25	J A 47	J A 28	30	J A 28	J A 19	28	30	66	J A 84	J A 52	E B 44	55	J A 48	E B 44	50	J A 55	J A 56	J A 63	J A 54	50	J A 60	J A 55	31	27
26	27	J A 29	J A 34	J A 25	J A 22	24	31	41	111	J A 57	67	47	52	50	48	J A 116	89	J A 134	J A 64	85	J A 121	J A 117	J A 60	24
27	J A 77	J A 86	J A 80	J A 48	J A 47	J A 29	J A 45	63	61	J A 73	J A 122	83	J A 108	69	83	58	J A 62	70	J A 50	J A 111	J A 65	J A 60	J A 74	J A 53
28	J A 52	J A 83	J A 53	J A 46	J A 34	J A 40	81	J A 53	J A 100	64	80	J A 60	G	G 38	67	58	93	J A 62	65	59	J A 71	J A 81	J A 53	J A 52
29	C	24	E B 14	J A 22	J A 18	23	33	J A 46	J A 48	J A 67	81	129	J A 87	E B 47	J A 66	46	G	J A 102	80	J A 26	J A 81	J A 78	J A 54	J A 53
30	J A 56	J A 31	J A 31	20	J A 22	J A 31	29	41	J A 47	52	J A 68	J A 68	54	58	E B 56	G 35	G	33	26	J A 24	J A 24	28	28	26
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	29	29	29	29	29	29	29	29	30	30	30	30	30	29	29	29	29	29	29	29	29	29
MED	J A 48	J A 32	J A 34	J A 28	J A 25	28	J A 34	J A 46	J A 57	J A 56	67	60	58	51	56	55	52	J A 50	J A 50	J A 44	J A 40	J A 51	J A 55	J A 52
U Q	J A 58	J A 53	J A 48	J A 48	J A 33	J A 36	J A 48	J A 65	J A 84	J A 68	J A 81	83	J A 87	J A 60	67	69	68	J A 65	66	56	J A 60	J A 62	J A 64	J A 61
L Q	32	28	27	26	J A 22	24	30	40	48	48	49	49	47	45	47	44	41	41	J A 40	J A 28	26	34	30	31

JUN. 1999 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 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	43	18	24	50	E B 13	50	U A 69	A A 133	64	66	65	58	60	U Y 56	46	65	A A 97	40	31	27	48	34	23	28
2	41	42	39	26	22	22	38	43	44	A A 106	72	48	43	E B 42	48	76	56	74	49	34	20	E B 13	49	31
3	45	29	E B 13	E B 14	E B 13	31	36	41	60	68	64	A A 130	A A 179	93	68	76	44	36	50	37	34	23	33	54
4	17	25	21	19	18	30	30	63	62	62	E B 46	48	59	62	54	83	48	42	46	41	34	26	17	41
5	33	42	25	17	20	34	31	42	51	72	A A 100	62	69	68	A A 152	62	38	38	24	20	28	20	E B 15	36
6	39	31	31	45	33	22	30	36	40	50	A A 165	54	56	72	A A 105	45	42	29	40	17	18	22	25	19
7	24	E B 15	20	20	21	26	G 20	36	50	54	47	67	46	E B 46	G	G	58	39	67	57	E B 14	E B 14	38	40
8	16	E B 16	18	20	E B 13	G	G 23	35	G 34	G	U G 32	46	54	55	57	60	66	54	36	23	43	29	61	18
9	18	17	17	E B 13	20	22	28	36	47	44	52	47	G	48	59	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	45	44	50	49	74	49	51	47	A A 112	A A 103	24	20	18	17
11	38	19	E B 14	17	E B 16	21	G	36	39	42	66	45	46	G	47	U Y 39	36	45	32	26	24	18	18	20
12	18	32	27	E B 14	E B 15	23	30	38	53	59	A A 87	A A 106	85	52	54	41	33	G 23	25	19	33	21	21	38
13	35	27	23	18	E B 14	G	37	41	62	64	A A 118	A A 161	75	A A 127	52	62	50	42	30	20	23	31	39	29
14	43	40	42	42	23	29	40	69	A A 134	54	71	49	65	47	46	U G 31	40	51	32	22	44	45	50	33
15	26	21	20	18	E B 15	24	31	37	48	39	64	53	50	51	44	40	40	48	31	20	16	17	E B 15	E B 14
16	18	22	16	E B 13	E B 15	G	29	36	54	46	43	48	46	44	51	78	39	58	42	20	42	41	24	20
17	20	40	30	26	E B 16	23	48	75	62	44	48	51	A A 125	A A 139	61	E B 42	46	A A 76	74	55	42	18	51	E B 15
18	18	18	18	18	24	G 16	38	42	46	51	61	A A 132	A A 90	41	G	47	49	G	27	18	20	21	24	46
19	42	40	43	42	18	36	50	60	61	61	76	48	44	E B 43	G	44	58	60	34	20	30	38	44	E B 14
20	E B 14	20	23	21	18	G 19	34	36	39	49	48	E B 43	U G 38	E B 46	G	U G 25	39	34	29	19	E B 15	40	19	30
21	18	19	20	17	E B 14	22	32	50	53	46	U Y 67	A A 117	G	G	43	58	46	46	48	30	30	36	49	57
22	18	37	40	28	18	22	29	37	42	G	48	79	58	E B 60	47	46	65	45	51	40	24	20	44	46
23	42	17	23	E B 14	E B 15	G	G 22	33	37	44	G	E B 46	E B 47	48	55	63	58	73	65	38	44	44	45	46
24	34	48	37	26	26	34	32	72	49	56	54	U Y 44	E B 47	E B 45	45	54	66	38	42	20	16	20	37	31
25	27	20	19	16	E B 14	G 18	G 22	62	45	41	E B 44	U Y 55	45	E B 44	50	52	54	62	48	42	24	45	20	20
26	19	18	32	22	E B 14	24	30	38	A A 111	53	60	46	50	50	47	56	77	70	63	A A 85	41	A A 117	46	18
27	68	23	A A 80	16	17	21	43	44	60	A A 73	A A 122	A A 83	A A 108	A A 69	A A 83	57	52	A A 70	35	63	51	45	50	25
28	23	17	41	28	21	36	70	51	A A 100	A A 64	A A 80	A A 60	G	U G 38	A A 67	54	A A 93	53	52	52	52	40	41	42
29	C	E B 14	E B 14	E B 15	E B 14	20	G 25	42	44	60	A A 81	A A 129	55	E B 47	47	46	G	64	72	18	56	48	44	20
30	46	22	E B 15	E B 14	E B 14	24	G 24	38	44	50	60	61	54	58	E B 56	G 35	G	32	26	19	20	17	17	17
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	29	29	29	29	29	29	29	29	30	30	30	30	30	29	29	29	29	29	29	29	29	29
MED	26	22	23	18	E B 16	22	31	41	50	53	62	54	52	48	50	52	49	46	42	26	30	26	37	29
U Q	42	34	34	26	20	30	38	56	62	63	A A 76	A A 79	65	60	59	62	58	61	52	42	42	40	46	40
L Q	18	18	18	E B 16	E B 14	G	G	36	44	44	48	47	46	44	46	42	40	38	31	20	20	20	20	18

JUN. 1999 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 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	16	16	15	14	13	14	15	14	19	26	29	40	37	26	21	24	19	15	15	15	14	15	16	15
2	15	14	14	14	13	14	12	14	21	24	26	26	39	42	28	22	20	14	15	15	15	13	16	15
3	15	14	13	14	13	14	14	23	21	25	39	39	28	27	27	25	26	16	14	16	13	14	15	16
4	14	15	16	15	14	15	15	18	18	22	46	35	41	24	33	22	29	15	12	15	15	15	14	14
5	14	12	15	14	15	16	16	16	18	20	24	41	42	35	35	26	21	16	14	15	14	14	15	13
6	14	14	15	15	16	15	14	15	18	17	28	30	41	38	20	21	18	15	14	15	14	14	14	14
7	15	15	16	15	14	15	15	15	17	21	23	42	40	46	23	25	17	15	15	15	14	14	15	15
8	14	16	15	14	13	15	15	15	18	22	24	22	27	28	41	21	18	16	14	15	14	15	15	15
9	14	14	14	13	15	15	14	14	18	18	19	41	26	25	20	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	38	41	26	35	22	21	19	15	14	16	15	15	14	13
11	14	15	14	14	16	15	14	16	21	20	32	20	39	22	39	21	18	16	14	15	15	14	14	14
12	15	14	15	14	15	16	14	14	14	18	20	23	41	28	25	19	22	17	14	15	13	14	15	14
13	14	14	12	13	14	14	14	15	17	38	41	25	35	26	40	22	22	16	14	14	14	14	14	14
14	14	13	14	14	13	14	16	15	14	21	20	23	26	24	26	23	18	15	16	14	14	16	15	15
15	15	15	16	14	15	14	15	15	16	18	24	38	37	28	23	22	17	18	14	16	13	16	15	14
16	14	15	13	13	15	14	14	16	16	18	24	36	40	24	28	28	22	15	13	16	15	14	15	16
17	15	15	14	15	16	14	16	12	18	20	41	43	27	30	22	42	20	16	15	16	15	14	14	15
18	14	15	14	15	16	16	15	18	18	28	28	24	23	33	20	17	19	15	15	15	15	13	15	15
19	16	14	14	15	14	16	14	16	19	22	19	35	34	43	23	26	16	15	16	15	15	16	14	14
20	14	14	15	15	15	15	13	18	23	21	32	43	24	46	28	19	16	14	15	15	15	15	14	15
21	15	15	15	12	14	14	15	16	18	25	24	22	28	25	22	22	18	16	13	13	16	15	14	14
22	13	14	14	15	16	14	14	16	20	24	42	42	42	60	29	22	18	15	14	14	14	15	15	14
23	14	14	14	14	15	14	16	15	20	29	31	46	47	43	30	20	27	19	14	14	14	14	15	16
24	15	14	14	14	14	16	18	20	18	26	36	38	47	45	24	24	20	14	14	15	14	15	14	13
25	14	15	14	15	14	14	14	16	18	22	44	34	31	44	44	24	18	14	16	14	14	14	14	15
26	14	14	15	14	14	14	14	17	20	23	24	40	40	38	42	22	20	15	14	14	14	12	15	14
27	15	14	14	14	14	14	14	15	22	19	26	35	36	36	35	21	18	14	14	15	13	16	14	16
28	16	13	14	14	14	13	14	14	15	24	43	31	34	32	41	23	16	16	15	14	14	13	15	14
29	C	14	14	15	14	15	16	17	21	23	39	40	40	47	39	24	28	13	13	14	15	14	15	14
30	15	16	15	14	14	15	14	15	18	22	22	43	42	27	56	22	24	16	14	15	15	14	13	14
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	29	29	29	29	29	29	29	29	30	30	30	30	30	29	29	29	29	29	29	29	29	29
MED	14	14	14	14	14	14	14	15	18	22	28	37	37	32	28	22	19	15	14	15	14	14	15	14
U Q	15	15	15	15	15	15	15	16	20	24	39	41	41	43	39	24	22	16	15	15	15	15	15	15
L Q	14	14	14	14	14	14	14	15	18	20	24	26	28	26	23	21	18	15	14	14	14	14	14	14

JUN. 1999 fmin (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 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	275	282	280	F 284	R 292	F 304	A	A	307	A 267	268	258	274	273	273	278	A	277	277	291	281	R 273	F 260	266
2	281	R 265	F 287	F 290	F 303	F 279	300	285	279	A	262	256	260	262	268	277	275	268	278	279	291	285	283	F 278
3	F 287	287	F 297	R 294	295	291	292	312	290	254	256	A	A	A	269	272	281	293	294	285	270	264	259	F 289
4	R 274	F 268	269	286	F 275	266	305	V 294	295	273	258	R 271	264	266	273	A 282	281	295	289	280	257	257	267	266
5	F 258	277	296	275	273	F 261	F 269	289	282	A	A	249	257	265	A	275	272	279	282	286	264	257	R 265	F 257
6	287	R 290	F 278	277	F 286	F 295	287	302	299	300	A	264	279	279	A	271	275	292	278	291	272	258	260	262
7	273	296	307	287	277	286	295	301	291	256	262	277	278	272	268	273	278	276	289	280	265	262	F 261	F 284
8	F 277	280	291	295	R 289	286	300	287	269	265	265	277	279	277	276	281	274	275	281	274	262	V 269	271	F 262
9	F 287	R 284	269	259	F 254	F 264	F 284	F 287	R 282	332	261	R 268	261	R 262	261	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	265	267	269	269	293	280	280	280	A	A	275	260	261	264
11	271	275	283	284	283	279	295	280	288	R 301	288	263	261	266	273	270	280	291	294	308	267	255	264	272
12	273	276	279	276	275	296	302	270	292	301	A	A	A 265	271	267	272	271	291	R 306	293	280	258	261	F 276
13	F 271	R	R 269	F 287	F 286	322	297	276	263	271	A	A	A 260	A	273	281	289	288	291	298	266	264	268	R 256
14	F 265	F 292	F 290	295	296	F 310	288	280	A	278	270	275	271	271	275	288	291	284	274	269	276	277	277	271
15	281	290	R 281	281	287	298	302	304	280	273	272	267	258	266	R 275	279	287	270	281	290	288	291	276	271
16	273	278	281	281	279	294	298	304	286	284	282	259	262	278	282	283	271	282	271	274	293	299	269	275
17	278	284	297	279	F 287	F 280	305	290	293	290	R 280	266	A	A	272	278	289	A	A 276	288	293	277	R 261	271
18	277	F 286	303	273	263	F 273	307	276	F 274	291	297	A	A	277	269	275	287	275	291	281	281	270	F 264	R 273
19	268	F 285	284	287	F 294	F 278	F 277	298	287	278	270	268	280	R 279	290	292	295	287	305	293	R 277	272	F 280	F 282
20	293	F 290	F 298	F 300	F 278	F 288	296	319	313	304	R 272	275	271	274	277	280	291	297	298	309	R	F 253	F 274	F 295
21	F 283	F 282	F 305	F 291	F 282	F 268	293	306	306	281	A	A	275	278	R 285	280	295	294	304	266	273	271	264	280
22	F 284	287	J R 273	F 274	F 283	F 275	270	288	310	309	281	A 273	R 274	273	285	282	284	280	287	300	289	265	268	272
23	277	275	274	283	299	293	287	292	295	297	260	264	256	274	270	276	271	277	283	288	290	272	R 268	274
24	268	F 266	280	282	283	267	294	288	292	R 285	296	U R 278	275	275	272	274	291	297	298	271	R 273	R 261	R 253	267
25	266	277	294	287	F 276	252	259	297	304	271	266	275	271	279	279	280	281	279	274	262	271	275	271	273
26	284	284	286	284	283	279	280	279	A	266	R 268	259	268	R 268	272	275	A	305	273	A	250	A	F 264	271
27	265	271	A	F 258	F 254	F 242	263	265	A	A	A	A	A	A	A	U R 291	263	A	288	290	A 256	247	263	254
28	254	F 253	270	280	F 249	237	U R 240	257	A	A	A	A	G	G	A	263	A	259	286	296	267	245	241	258
29	C	267	271	279	287	296	R 307	R 300	271	263	A	A	281	264	275	R 269	274	274	280	296	292	260	F 263	266
30	F 261	270	282	R 289	267	269	264	288	275	279	258	263	273	277	288	275	270	274	272	281	274	256	254	257
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	29	29	29	28	28	25	25	22	22	26	26	26	29	26	27	28	27	28	28	29	29
MED	274	281	282	284	283	279	294	288	290	279	268	267	270	272	273	278	280	280	284	288	274	264	264	271
U Q	282	286	295	288	288	294	300	300	297	298	280	275	275	277	279	281	289	292	292	293	284	272	270	F 276
L Q	268	273	276	278	275	268	278	280	280	269	262	263	261	266	270	274	274	275	278	279	266	258	261	263

IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 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						A	A	A	A	A	A	A	A	A	L 330	A	A	A 324	L					
2							L	L	U L 359	A	A	L 324	350	354	A 348	A	A	A	A					
3						L	L	L	A	A	A	A	A	A	A	A	A	A 353	A					
4							L	A	A	A	L 361	363	A	A	A	A	A 329	L	A					
5							L	A 351	A	A	A	A	A	A	A	A	328	L	L 314					
6								L 354	L 354	L	A	A	A	A	A	343	L	328	A					
7							L	L	A	L	L 354	A	365	341	363	L 343	A	L	A					
8							L	L	L	L 337	L	359	L	A	A	A	A	A	A					
9						L	L 345	356	A	U L 367	A	U R 339	349	341	A	C	C	C	C	C				
10						C	C	C	C	C	U L 329	R 366	A 344	L	A	A	A	A	A	A				
11							L		L	373	A	L	338	348	334	336	L 334	A	L					
12						L	L	L	U R 374	A	A	A	A	A	A	354	U L 311	L 331	L					
13							L		A	A	A	A	A	A	A	A	A	L	L					
14								A	A	A	A	R 327	A	L 327	A	347	L 343	A	L					
15						L	L	L	A	R 356	A	A 323	A 336	A	374	U L 347	U L 335	A	U L 324					
16						L	L	U L 350	A	L	365	A 342	L	365	A	A	U L 328	A	A					
17							A	A	A	A 386	A 352	A	A	A	A	346	A	A	A					
18						L	L		A	A	A	A	A	A	348	A	A	L 321	U L 317					
19							A	A	A	A	A	L 318	378	382	349	352	A	A	A					
20						L	L	L 356	U L 371	L	L	355	385	357	Y	336	339	345	U L 348					
21							L 318	A	A	A 379	A	A	Y 347	364	339	A	A	A	A					
22							L 333	U L 345	L 348	L 364	367	A	A	B	A 338	A 338	A	L	A					
23							U L 352	U L 379	350	U L 373	L 330	367	350	338	A	A	A	A	A					
24							L 353	A	A	A	A	Y 339	373	400	350	A	A	U L 332						
25						L	L	A	U L 352	L 389	L	Y	351	R	B 331	A	A	A	A					
26							U L 336	U L 344	A	L	A	L 362	R 341	321	R 327	A	A	A	A	A				
27						L 311	A	A	A	A	A	A	A	A	A	A	A	A	L	A				
28						A	A	A	A	A	A	A	Y	Y 327	A	A	A	A	A					
29								L	362	A	A	A	A	359	372	R 338	334	A	A					
30								U L 359	L	A 348	A	A	A	A	B	341	L	L						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	6	9	8	10	7	13	13	14	13	12	9	7	4					
MED						L 311	L 340	U L 354	L 356	370	L 354	342	350	351	348	343	L 334	331	U L 320					
U Q							L 352	U L 358	U 366	379	365	362	369	364	356	347	L 337	345	U L 336					
L Q							L 333	U L 348	L 351	356	L 330	326	342	338	332	338	U L 328	324	L 316					

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IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 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						276	A	A	294	A	A 410	414	364	360	356	350	A	340	312					
2							284	302	300	A	A 408	392	382	376	358	A 344	336	A 348	310					
3						276	286	276	A 312	E A 412	390	A	A	A	360	A 356	328	296	288					
4							292	A 282	A 298	A 364	406	378	398	386	368	A	340	290	296					
5							326	304	314	A	A	484	A 438	A 388	A	A 378	394	352	312					
6								312	320	334	A	418	390	366	A	370	348	318	306					
7							280	294	272	L 412	364	360	354	376	366	336	350	326	A 320					
8							282	274	H 266	380	364	364	368	374	372	344	A 366	336	288					
9						L 348	302	308	362	330	458	432	Y 456	450	414	C	C	C	C	C				
10						C	C	C	C	C	382	362	360	388	A 380	356	334	316	A	A				
11							270		274	286	A 334	L 312	392	370	360	360	326	310	286					
12						256	284	264	Y	360	A	A	A	366	362	336	332	298	264					
13							310		A 362	A 388	A	A	A	A	352	350	312	314	284					
14								A 348	A	350	E A 398	376	376	364	356	334	326	310	274					
15						264	284	266	A 272	306	392	376	368	378	352	326	330	306	318					
16						256	260	266	316	346	356	362	356	354	330	A 380	336	326	320					
17							268	A 320	320	322	362	364	A	A	366	358	342	A	A					
18						330	262		312	326	A 334	A	A	392	408	374	338	336	302					
19							A 312	A 282	A 302	340	E A 394	376	340	346	332	326	322	A 328	278					
20						L 288	288	280	278	324	L 358	370	374	366	356	342	314	302	284					
21							316	274	282	314	A	A	398	390	376	A 372	350	326	A 294					
22							336	310	288	278	382	A	388	388	354	344	A 332	324	304					
23							296	274	302	328	394	402	422	392	384	380	368	A	E A 334					
24							300	A 360	312	A 300	350	444	408	380	390	384	A 340	316						
25						L 422	334	290	276	284	L 408	380	408	386	362	366	352	A 330	A 314					
26							326	294	A	358	366	354	378	386	390	380	A	A 354	A 370	A				
27						420	398	394	A	A	A	A	A	A	A	A	A 420	A	334	E A 406				
28						492	A	A 410	A	A	A	A	G	G	A	450	A	418	330					
29								L 310	370	A 334	A	A	378	434	394	410	390	398	E A 370					
30								298	358	344	A 392	412	376	374	374	382	L 372	302						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						11	23	25	24	24	22	21	24	26	26	27	26	26	25	1				
MED						288	292	294	302	333	380	376	380	379	364	358	339	325	304	E A 406				
U Q						420	316	311	318	359	398	413	403	388	380	380	352	336	A 320					
L Q						264	282	275	280	318	362	363	368	366	356	344	330	310	287					

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JUN. 1999 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	A 340	268	286	A 326	268		A	A	A	A	A	A	A	A	E A 276	A	A	E A 266	A 274	A 280	A 302	306	330	320
2	324	A 376	330	280	262	248	A 260	A 244	A 232	A	A	E A 264	208	214	A 264	A	A	A	A	A 284	270	264	A 322	314
3	348	286	260	270	256	254	A 244	E A 256	A	A	A	A	A	A	A	A	A	A	A	A 270	294	310	A 342	A 362
4	282	326	324	290	282	A 270	250	A	A	A	226	240	A	A	A	A	A	A	A	A 276	326	340	304	346
5	350	A 316	272	276	292	A 278	260	E A 276	A	A	A	A	A	A	A	A	230	A	254	262	296	298	302	A 382
6	310	322	310	A 336	308	250	244	240	216	A	A	A	A	A	A	A 264	E A 278	232	A	272	254	316	334	320
7	314	272	244	262	286	256	248	232	A	A	236	A	222	B 248	H 202	220	A	A 268	A	A 304	270	304	350	330
8	290	286	264	256	248	256	238	224	222	200	H 222	244	A	A	A	A	A	A	A	266	A 304	316	E A 384	336
9	314	276	300	318	334	258	258	242	A	248	A	A 266	240	E A 266	A	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	A 242	218	E A 282	A	A	A	A	A	A	A	276	276	316	310
11	A 328	304	288	276	252	240	228	238	210	228	A	224	206	194	A 262	220	250	A	A	250	264	314	324	308
12	298	316	308	288	288	248	232	236	A 262	A	A	A	A	A	A	218	224	220	254	260	A 288	318	316	340
13	A 356	342	318	298	264	246	A 252	A 244	A	A	A	A	A	A	A	A	A	A	A 268	256	272	322	A 350	384
14	368	310	A 330	A 306	282	264	A 274	A	A	A	A	E A 276	A	E A 278	A	242	236	A	A	276	316	A 306	A 334	342
15	298	278	280	294	284	248	234	240	A	218	A	A	A	A	214	H 220	A 258	A	E A 276	282	258	254	250	290
16	298	310	294	278	276	246	230	228	A	H 240	218	A 266	242	210	A	A	228	A	A	280	282	A 282	302	302
17	302	312	278	306	278	238	A	A	A	210	A	A	A	A	A	B 242	A	A	A	A	284	270	A 388	308
18	306	304	268	286	324	254	A	A 262	A	A	A	A	A	A	238	A	A	228	244	266	270	278	332	A 340
19	348	316	A 302	296	290	A 276	A	A	A	A	A	A 240	H 196	206	Y 242	246	A	A	A	244	278	332	A 334	270
20	270	268	272	264	268	250	244	240	228	A	E A 280	224	214	B 232	Y	H 218	244	240	A 260	244	244	A 374	312	286
21	292	298	276	H 250	274	260	252	A	A	A 244	A	A	Y	224	A 270	A	A	A	A	A 290	292	334	A 382	360
22	276	322	A 348	322	280	246	228	244	E A 270	220	232	A	A	B	A	A	A	A	A	A 262	280	276	A 340	332
23	A 332	306	312	270	262	250	220	H 204	H 206	200	218	222	B 244	E A 278	A	A	A	A	A	A 276	288	A 314	A 342	A 338
24	A 338	A 354	306	294	286	A 306	A 250	A	A	A	A	Y	232	202	252	A	A	E A 274	A 270	270	290	316	A 372	330
25	348	298	262	250	270	250	240	A	A 254	H 200	H 240	A	212	214	B	A	A	A	A	E A 300	300	A 322	274	288
26	294	300	298	256	276	248	230	A 252	A	A	A	224	E A 264	E A 264	E A 278	A	A	A	A	A	A 322	A	348	276
27	E A 412	330	A	328	338	276	A	A	A	A	A	A	A	A	A	A	A	A	E A 288	A	A	A 418	E A 376	A 352
28	362	338	A 356	288	338	A	A	A	A	A	A	A	220	Y	A	A	A	A	A	A 290	E A 382	E A 394	E A 412	A 384
29	C	304	296	284	274	246	248	E A 258	238	A	A	A	A	B 244	A 242	A	224	A	A	282	A	A 382	A 394	320
30	A 388	322	276	274	302	250	238	222	276	A	A	A	A	A	B	226	256	232	256	270	280	298	322	326
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	28	29	29	27	23	19	11	10	9	12	13	14	11	10	10	8	10	25	27	28	29	29
MED	316	310	295	286	280	250	244	239	230	219	229	232	218	218	A 247	223	236	233	A 260	271	283	313	332	330
U Q	348	322	311	302	291	A 260	252	E A 252	A 262	240	A 241	A 265	243	E A 264	E A 270	242	A E 256	E A 267	E A 274	A 282	A 300	A 327	A 361	344
L Q	298	292	274	270	268	248	232	232	216	200	220	224	210	210	238	220	228	230	254	262	270	290	316	308

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JUN. 1999 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						126	122	114	118	120		A B	A	A	A	A	A	A	A	B				
2						A 112		116	A	114	A	A	A	B	A	A	A	A	A	B				
3						A	A 118		A	A	B	A	A	A	A	A	A	A	A	B				
4						A	A 118		120	118	B	A	B	120	A	A	A	A	A	B				
5						A	A 116		116	120	120	B	B	B 122	A	A	A	A	A	B				
6						A	A	A	118	120	A	A	B	A	A	114	A	A	A	B				
7						A	120	124	A	A	A	B	A	B	116	116	116	122	118	B				
8					116		A	A	A	118	A	A	112	112	B	114	114	114	A	B				
9						A	A	A	114	114	110	B	114	118	116	C	C	C	C	C				
10						C	C	C	C	C	A	B	A	A	116	116	116	116	110	B				
11						122	116	122	120	114	A	118	A	110	B	A	A 136		A	B				
12						E A 154	120	124	112	114	116	116	B	A	A	A	A	124	126	B				
13						140	116	122	114	B	B	A	A	A	B	A	A	120	A	B				
14						A 140	118	114	106	A	A	A	A	A	A	A	132	122	A	B				
15						126	120	126	118	116	116	A	A	A	A	A	A	A	A 132	B				
16					B 130		A	A	112	114	112	A	A	A	A	A	124	122	116	B				
17					B 130	124	110		112	112	B	B	A	A	A	B	114	122	A	B				
18					B 132	118	126		118	120	122	114	A	A	118	118	118	114	116	B				
19					B	A 122	114		114	116	A	A	A	B	112	120	114	114	A	B				
20					B 122	122	118		118	116	A	B	A	B	116	A	112	114	A	B				
21					B 120	120	112		110	A	A	A	118	116	120	118	122	122	A	B				
22					B	A 118	116		114	112	B	B	B	B	110	116	A 124	124	124	B				
23					B 116	134	A		A	A	114	B	B	B	126	116	118	A	A	B				
24					B	A	A	A	A	A	A	A	B	B	114	118	114	122	120	B				
25					B 186	128	A		A	A	B	A	A	B	B	116	114	114	120	B				
26					B 132	122	114		114	A	A	A	A	126	B	118	116	116	114	B				
27					B 124	116	114		A	120	A	A	A	A	126	116	118	120	120	B				
28					134	118	114		112	A	B	A	118	A	B	118	118	116	A	B				
29					116	A 130	116		112	112	A	A	A	B	A	112	126	116	122	B				
30					A	A 146	118		116	120	116	B	B	116	B	124	120	A 134	A 128	B				
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						18	21	22	21	19	8	3	4	8	11	16	19	21	13					
MED						127	120	116	114	116	116	116	116	117	116	116	118	120	120					
U Q						134	123	122	118	120	118	118	118	121	120	118	122	122	125					
L Q						122	118	114	112	114	113	114	113	114	114	116	114	115	116					

IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 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	100	106	102	104	118	124	114	110	112	110	108	112	110	112	110	114	108	114	112	104	106	104	116	106
2	112	104	106	116	134	124	126	118	112	110	108	114	116	B	114	108	108	104	102	100	108	108	110	104
3	110	104	106	124	B	124	118	124	116	118	114	108	110	122	106	104	112	110	100	100	100	116	110	108
4	104	102	102	102	100	98	118	114	110	108	B	118	110	112	112	104	108	100	100	100	98	96	104	106
5	110	110	100	106	102	106	112	126	124	120	112	116	116	110	122	110	118	114	106	100	102	100	102	118
6	108	108	110	100	100	94	114	112	132	126	142	116	118	112	106	110	112	106	104	106	104	102	98	104
7	116	100	108	106	106	108	112	140	110	118	112	108	118	B	G	G	126	128	114	112	120	120	112	110
8	118	B	106	106	110	G	110	108	106	G	110	134	134	132	128	120	116	120	114	112	110	110	112	110
9	110	106	114	B	106	106	106	126	120	124	122	124	G	134	124	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	116	114	140	112	116	132	124	118	110	114	108	104	112	108
11	104	100	104	100	B	164	G	132	124	120	112	120	128	G	118	124	176	128	120	116	114	110	114	110
12	102	100	102	106	106	170	136	134	118	116	114	112	112	116	108	116	114	108	120	100	100	102	100	110
13	114	110	114	110	148	G	128	128	114	114	110	106	102	100	116	112	104	118	108	100	102	102	102	120
14	110	104	106	100	102	146	124	114	106	112	114	104	108	110	112	110	140	114	114	104	106	102	102	118
15	104	102	104	102	106	156	130	120	114	120	182	190	110	110	114	116	160	134	124	104	104	106	B	104
16	100	98	100	102	100	G	148	112	114	118	120	116	112	118	116	132	134	118	116	116	114	110	112	108
17	104	100	104	104	110	138	124	112	116	122	120	110	104	104	110	B	130	116	112	112	114	98	106	112
18	108	100	106	100	100	114	124	128	122	114	116	106	108	116	G	128	124	G	114	110	108	104	118	112
19	110	108	102	96	110	130	122	114	116	114	106	110	116	B	G	128	122	118	110	106	108	112	114	112
20	112	100	96	94	98	98	124	126	120	116	112	B	108	B	G	112	140	132	114	112	118	120	116	112
21	108	106	106	106	106	136	124	116	110	116	108	106	G	G	156	126	124	116	110	114	110	106	106	106
22	108	104	96	96	98	132	132	126	122	G	118	114	120	B	148	132	120	124	118	112	120	138	116	112
23	112	114	110	112	110	G	106	110	110	116	G	B	B	134	130	124	122	116	112	108	100	98	116	114
24	110	110	110	108	108	112	116	108	110	108	112	112	B	B	144	126	116	128	116	116	106	120	118	112
25	110	112	108	114	112	120	118	114	110	122	B	114	114	B	130	120	122	116	114	108	112	112	108	106
26	108	104	96	102	110	140	136	122	110	112	112	116	120	130	160	118	120	114	110	106	104	112	112	114
27	106	112	106	118	118	128	128	122	112	110	110	110	108	130	122	124	128	120	120	120	112	114	110	110
28	108	110	104	104	108	124	118	120	108	118	116	112	G	114	124	150	126	118	110	108	108	110	110	112
29	C	108	B	110	126	134	118	118	118	114	106	104	114	B	122	130	G	120	114	100	112	118	114	116
30	112	110	114	104	110	108	110	128	124	124	116	116	116	114	B	114	G	150	144	128	116	114	120	118
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	27	25	28	29	29	27	27	28	25	20	25	27	27	28	29	29	29	29	28	29
MED	109	105	106	104	108	124	120	120	114	116	112	113	114	114	118	120	122	118	114	108	108	110	112	110
U Q	111	110	108	109	110	137	127	126	120	120	116	116	118	126	129	128	128	122	116	113	113	114	115	113
L Q	105	101	102	101	102	108	114	113	110	112	110	109	109	111	112	112	114	114	110	102	104	102	106	107

IONOSPHERIC DATA STATION Kokubunji

JUN. 1999 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

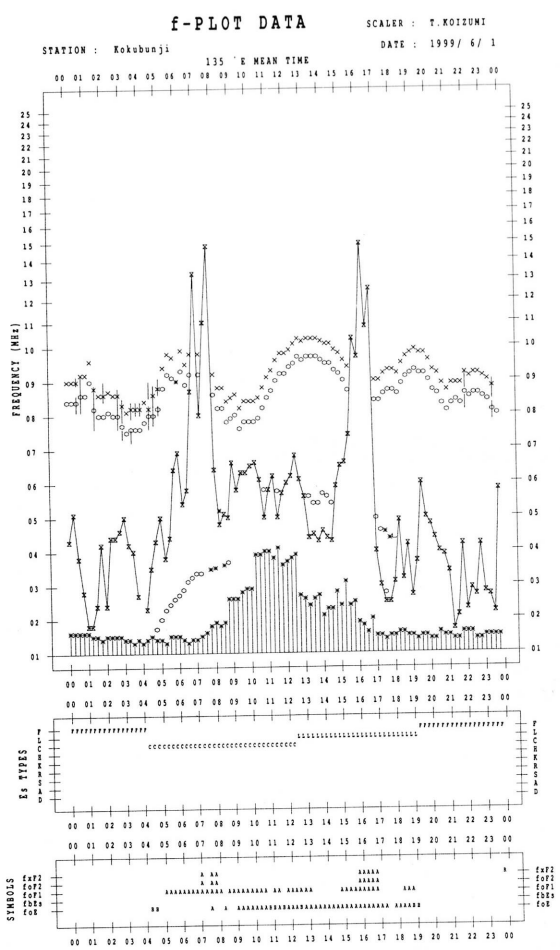
LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

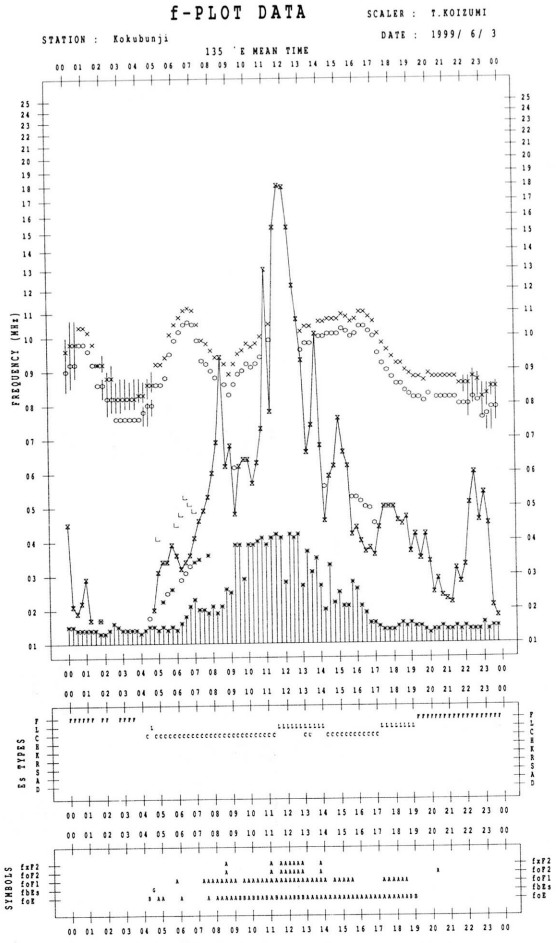
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 3	F 2	F 3	F 3	F 2	C 4	C 4	C 3	C 2	C 2	C 2	C 1	C 2	L 1	L 1	L 2	L 4	L 2	L 2	L 4	F 3	F 4	FF 13	F 4
2	F 4	F 4	F 3	FF 22	F 1	C 2	C 2	C 2	C 1	C 2	C 2	C 1	C 1		C 2	C 2	C 2	L 2	L 3	L 3	F 3	F 1	FF 13	FF 22
3	F 4	F 3	F 1	F 1		C 3	C 2	C 1	C 2	C 2	C 2	C 2	L 2	CL 12	L 2	C 2	C 1	C 2	L 2	L 5	F 4	FF 23	F 3	F 3
4	F 2	F 5	F 4	F 2	F 3	L 3	L 2	C 3	C 2	C 2		C 1	L 2	C 1	C 1	L 2	L 1	L 2	L 4	L 3	F 3	F 3	F 2	F 4
5	F 4	F 6	F 2	F 3	F 3	L 2	L 2	C 2	C 2	C 2	C 2	C 2	C 2	C 2	CL 22	L 2	L 1	L 2	L 2	L 4	F 3	F 2	F 2	FF 24
6	FF 32	FF 32	F 3	F 4	F 5	L 2	L 2	L 2	CL 11	C 2	CL 22	C 1	C 1	C 2	C 3	C 2	L 1	L 2	L 3	L 2	F 2	F 3	F 4	F 2
7	FF 23	F 2	F 2	F 2	F 3	L 2	L 1	HL 11	C 2	C 2	C 1	C 2	L 1				C 1	C 1	C 3	C 5	F 1	F 1	F 4	F 3
8	F 1		F 2	F 5	F 1		L 2	L 1	L 1		L 1	CL 11	C 1	C 2	C 1	C 2	C 2	C 2	C 2	L 3	F 3	F 5	F 3	F 3
9	F 3	F 2	F 2		F 3	L 3	L 3	CL 11	C 2	C 1	C 1	C 1		C 1	C 1									
10											C 1	C 1	HC 11	C 1	C 2	C 1	C 2	C 3	C 4	CL 41	FF 31	F 2	F 2	FF 21
11	F 4	F 3	F 1	F 1		H 1		CL 11	C 1	C 1	L 2	C 1	C 1		L 1	C 1	HL 11	CL 21	CL 32	L 5	F 3	F 3	F 3	F 1
12	F 2	F 3	F 4	F 2	F 2	HLC 11	CL 11	C 1	C 2	C 2	C 2	C 2	C 2	C 1	C 2	C 1	C 1	L 1	CL 22	L 2	F 4	F 3	F 2	F 2
13	FF 22	F 2	F 4	F 2	F 1		C 2	C 1	C 2	C 2	C 2	C 2	C 2	C 2	C 2	C 2	L 2	CHL 21	L 2	L 2	F 2	F 5	F 3	FF 33
14	F 5	F 5	F 3	F 3	F 3	CL 21	CL 21	C 4	C 3	C 2	C 1	L 2	L 2	L 1	L 1	L 1	CL 11	CL 32	CL 22	L 3	F 3	F 3	F 3	FF 12
15	F 3	F 2	F 2	F 2	F 2	CL 12	CL 22	CL 11	CL 21	C 1	HL 11	HL 11	L 1	C 1	L 1	L 1	HL 11	HL 22	CL 32	F 4	F 2	F 2		F 1
16	F 2	F 3	F 2	F 1	L 1		CL 11	L 1	C 2	C 2	C 1	L 1	L 1	L 1	C 1	CL 21	CL 11	C 4	C 3	C 4	F 6	F 3	F 3	F 3
17	F 4	F 3	F 3	F 4	L 2	C 3	C 3	C 2	C 2	C 1	C 1	C 2	C 2	L 2	L 2		C 2	C 3	CL 31	CL 43	FF 32	F 2	F 3	F 2
18	F 2	F 2	F 2	F 2	L 3	L 1	C 3	C 1	C 1	C 1	C 1	C 2	C 2	C 1		CL 11	C 1		C 3	C 2	F 3	F 2	FF 23	FF 42
19	F 4	F 3	F 3	F 3	LL 13	CL 31	C 3	C 2	C 2	C 2	C 2	L 1	L 1			C 1	C 2	C 2	C 3	L 5	F 5	F 3	F 4	FF 21
20	FF 21	F 2	F 3	F 2	L 2	L 1	C 1	C 1	C 1	C 1	C 1		L 1			L 1	C 1	C 1	C 3	C 4	F 1	F 5	F 2	F 4
21	F 4	F 4	F 4	F 3	L 2	C 2	C 2	C 2	C 2	C 1	C 2	L 2			HL 11	C 1	CL 21	C 2	C 3	L 4	F 3	F 3	F 4	F 3
22	F 3	F 4	F 4	F 2	L 3	CL 11	C 1	CL 21	C 1		C 1	C 2	C 1		H 1	C 1	CL 21	CL 21	CL 42	CL 63	FF 32	FF 12	FF 52	F 4
23	F 4	F 2	F 3	F 1	L 1		L 2	L 1	L 1	L 1				C 1	C 1	C 1	C 1	C 2	C 3	L 5	F 2	F 3	FF 23	FF 33
24	F 3	F 3	F 3	F 3	L 3	L 3	L 2	L 3	C 2	C 1	C 2	L 1			C 1	C 2	C 2	CL 11	CL 32	CL 22	F 2	FF 22	FF 41	F 3
25	F 4	F 2	F 4	F 2	L 2	L 1	L 1	C 2	L 2	L 1		L 1	L 1		C 1	C 1	C 2	C 2	C 3	L 5	F 3	F 5	F 4	F 2
26	F 3	F 2	F 2	F 1	L 1	C 1	CL 11	C 1	C 3	C 2	L 1	C 1	C 1	C 1	H 1	C 2	C 2	C 3	C 3	L 4	F 3	F 4	F 5	F 1
27	F 4	F 3	F 4	F 2	L 2	C 2	C 2	C 2	C 2	C 2	C 2	C 1	C 1	C 1	C 2	C 2	C 2	C 2	C 2	L 5	F 5	F 4	F 4	F 4
28	F 3	F 2	F 2	F 3	F 3	C 3	C 3	C 3	C 3	C 2	C 2	C 1		L 1	C 1	H 2	C 2	C 3	C 3	L 4	F 3	F 4	F 4	F 3
29		F 1		F 2	F 1	CL 11	L 1	C 1	C 2	C 2	L 2	L 2	C 1		C 1	CL 11		C 2	CL 41	L 2	FF 32	FF 22	F 4	FF 21
30	F 3	FF 21	FF 22	F 1	FF 11	L 2	L 2	C 1	C 1	C 1	C 2	C 2	C 1	C 1		L 1		HL 11	HL 11	C 2	FF 21	F 2	F 2	F 1
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

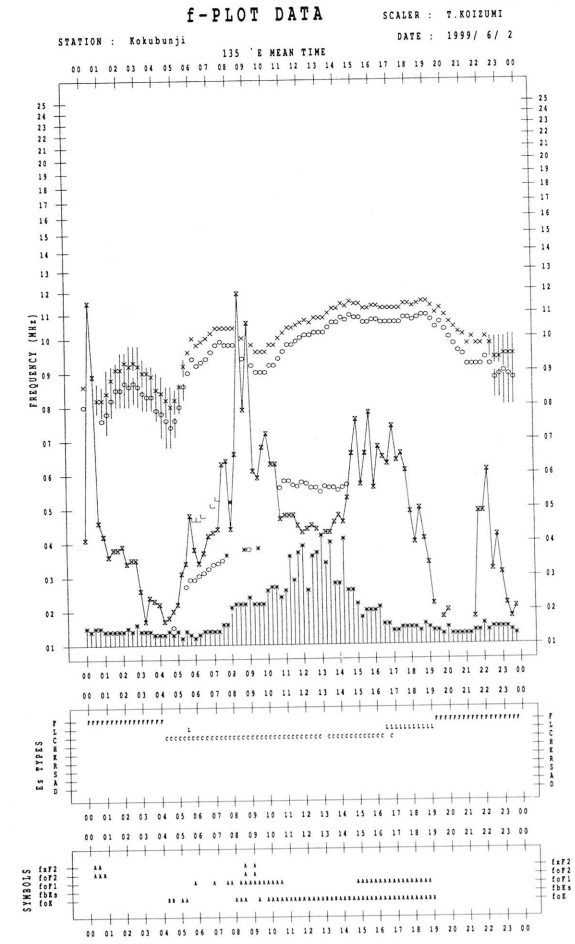
JUN. 1999 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

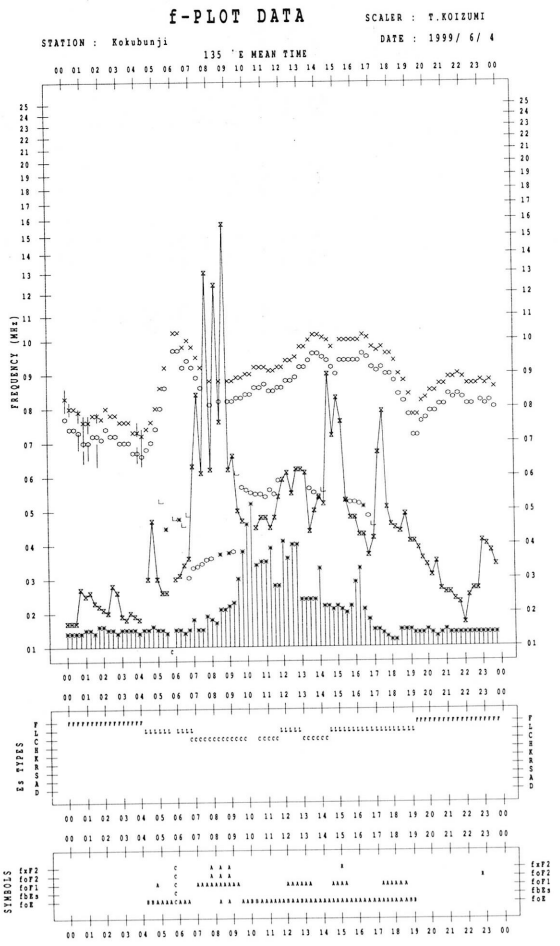
f-PLOTS OF IONOSPHERIC DATA

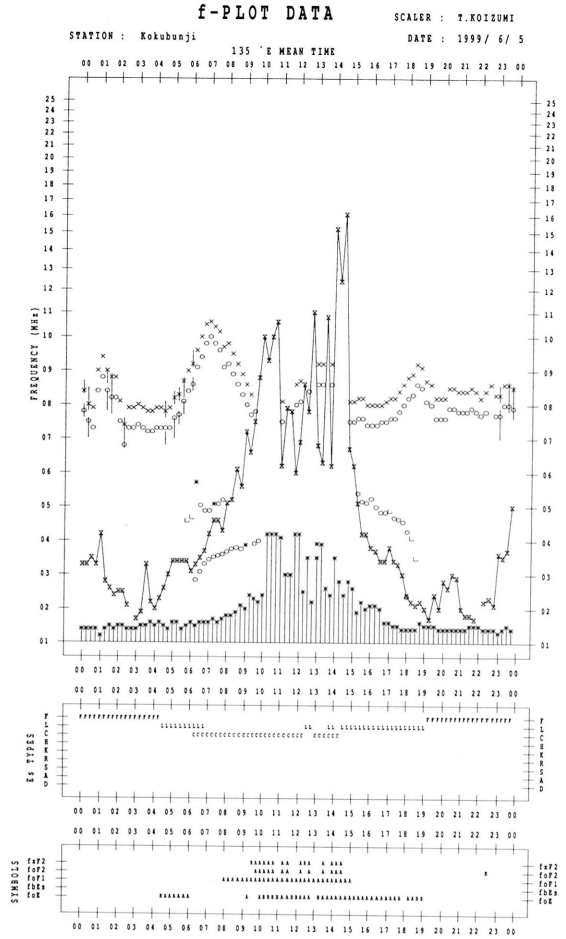
KEY OF f-PLOT	
	SPREAD
	foF2, foF1, foE
	fxF2
	DOUBTFUL foF2, foF1, foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

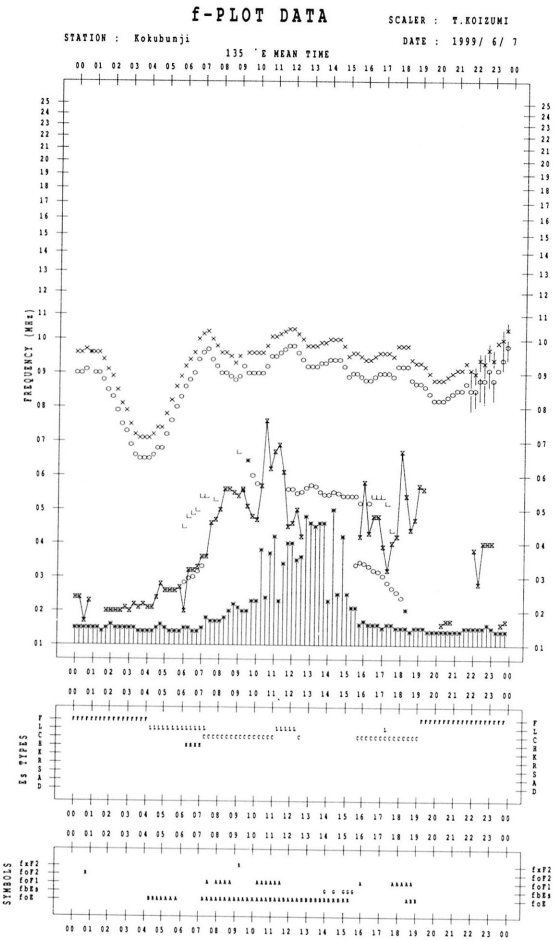

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1999/ 6/ 1
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

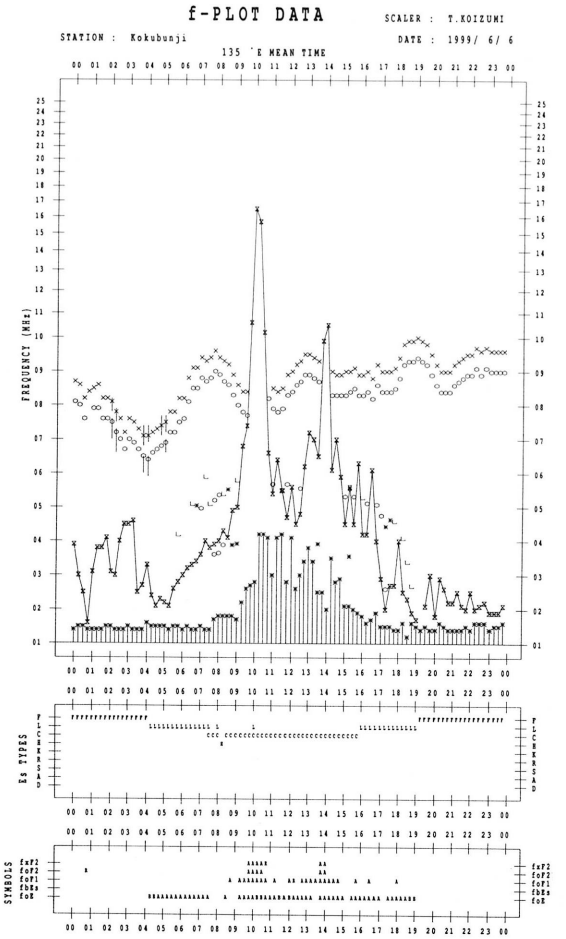

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1999/ 6/ 3
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

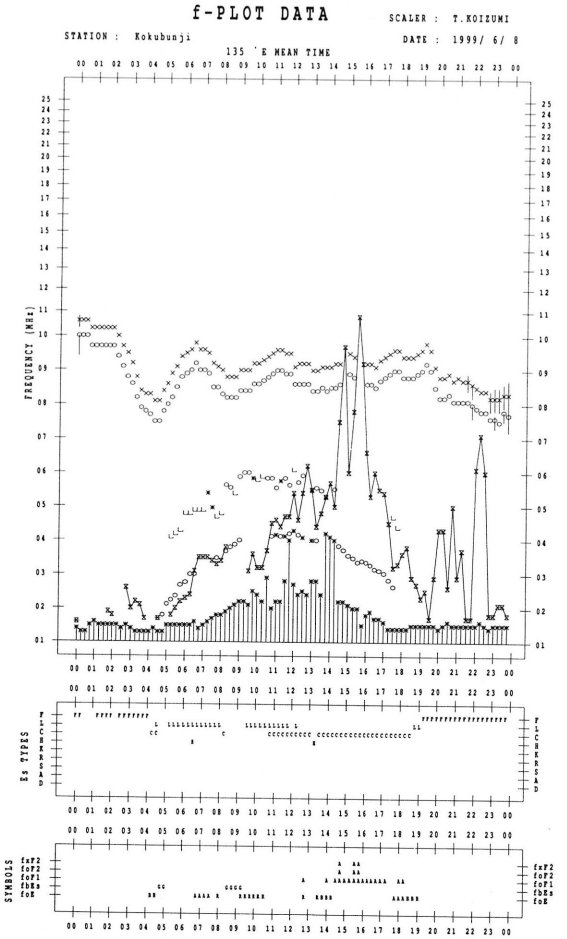

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1999/ 6/ 2
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

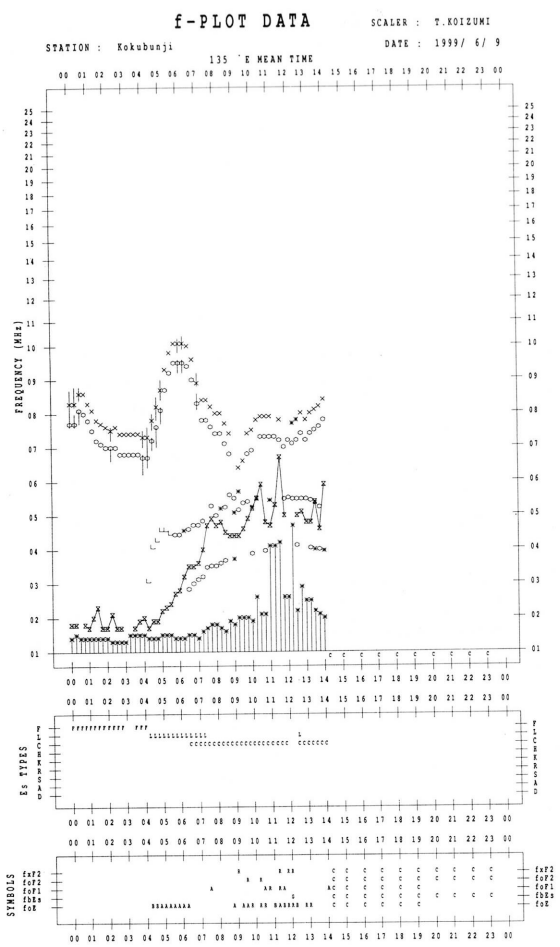

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1999/ 6/ 4
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

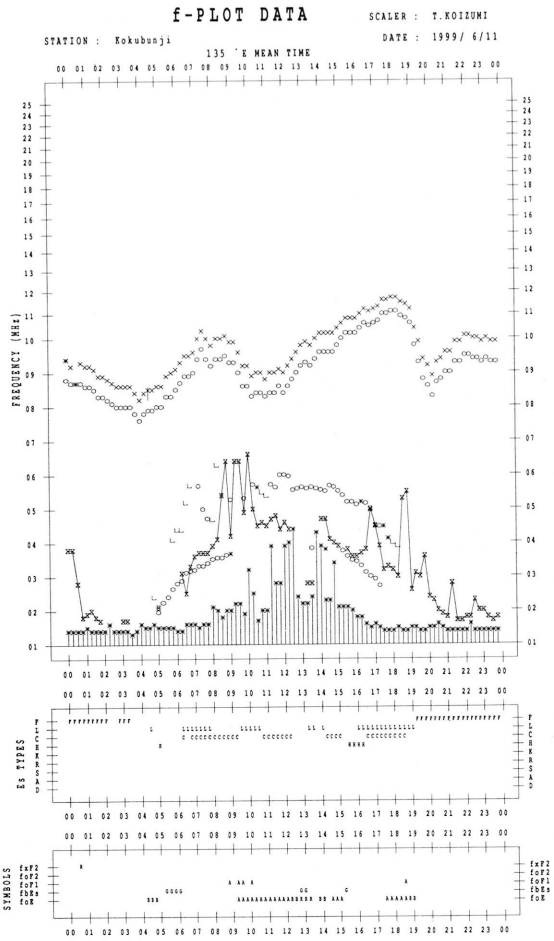

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

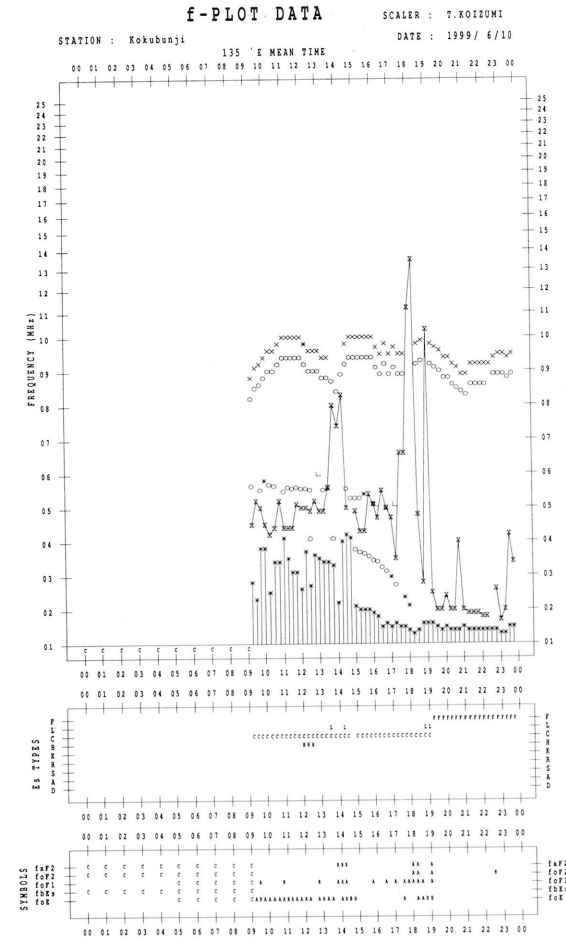

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

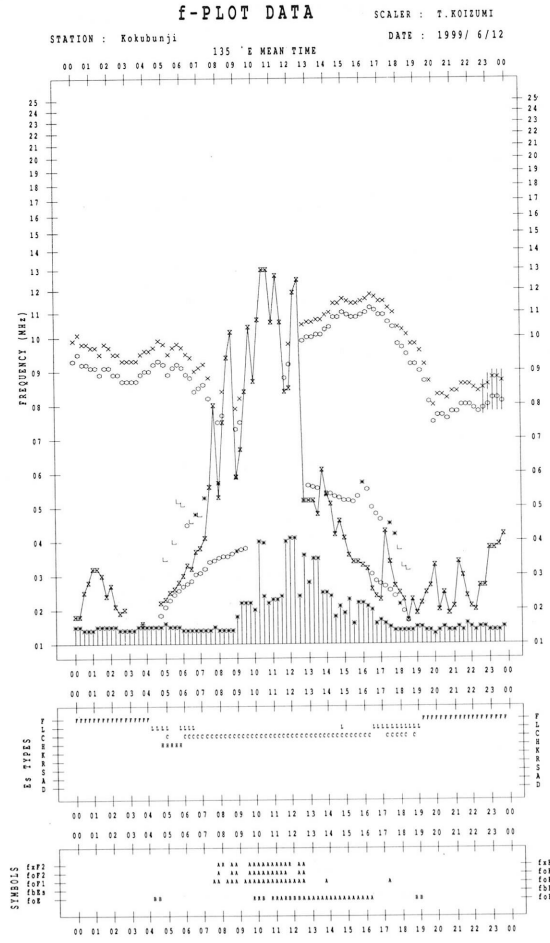

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

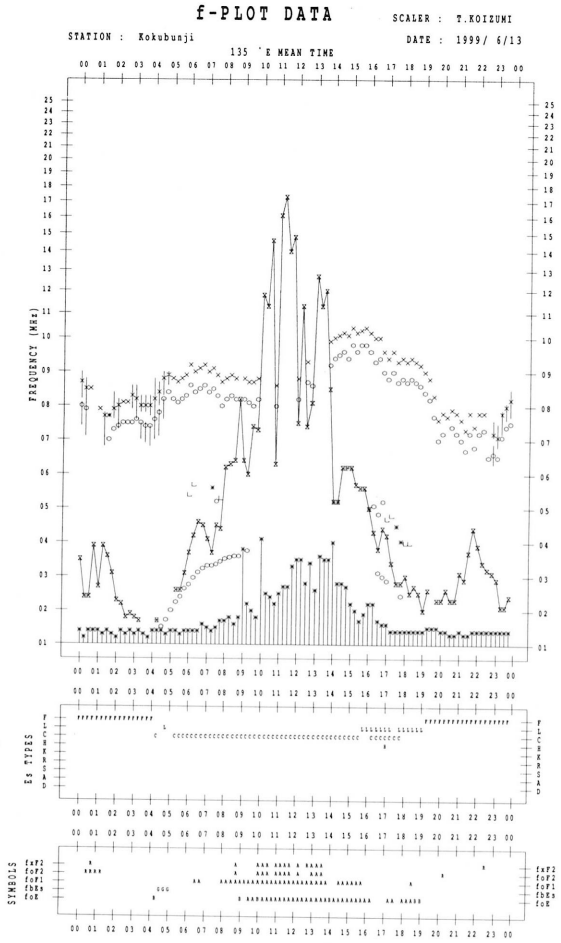

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

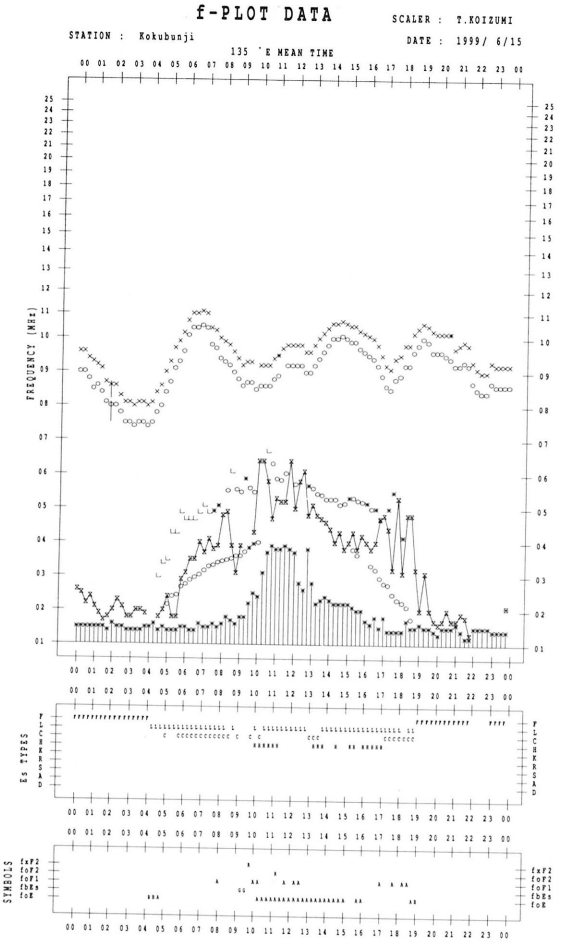

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

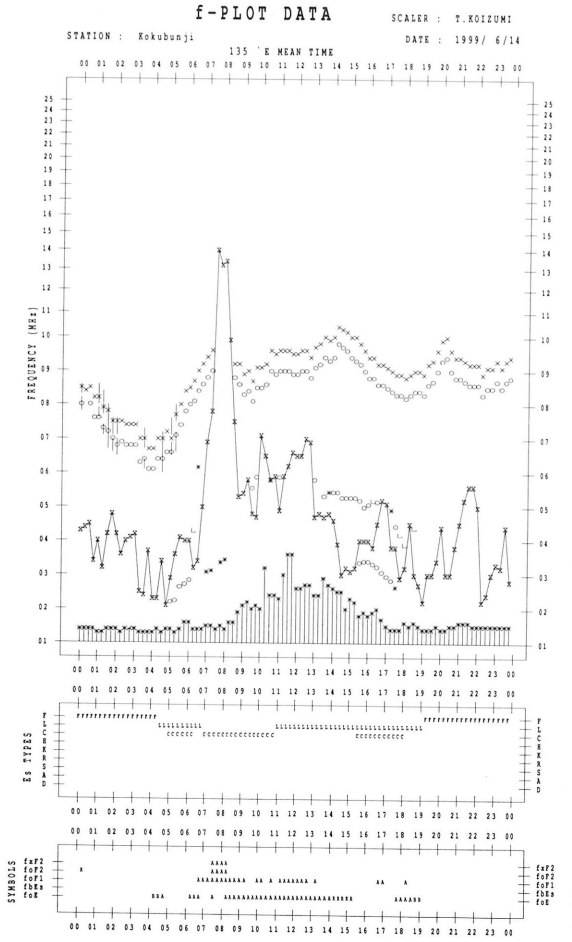

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

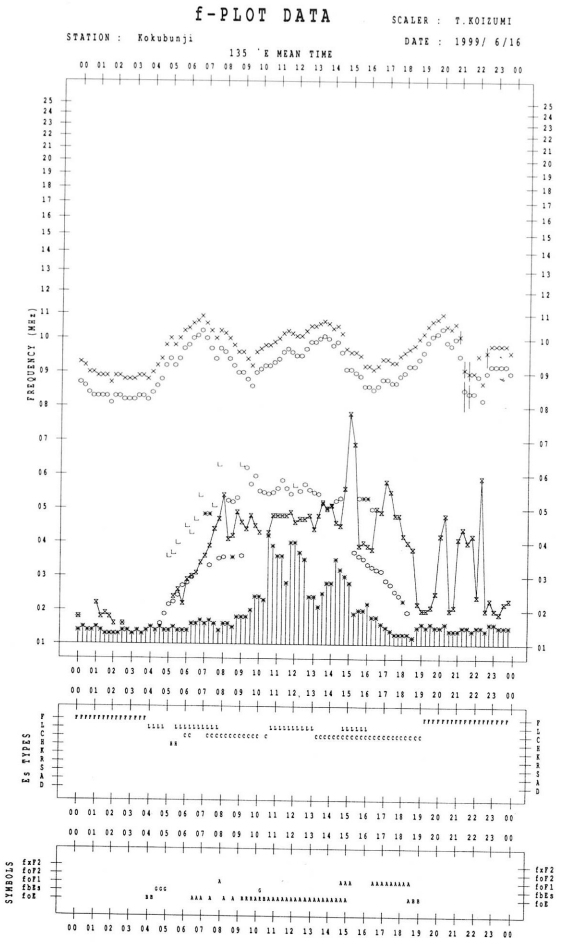

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

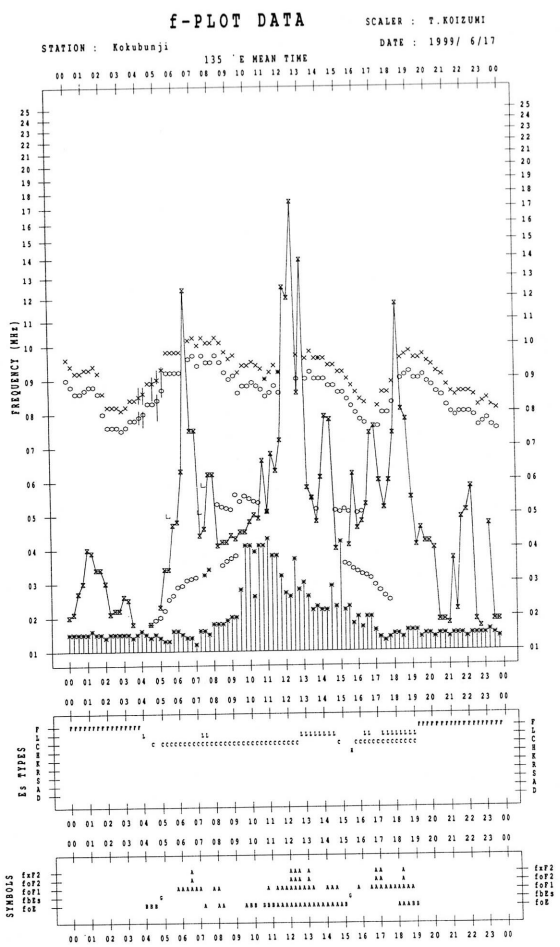

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
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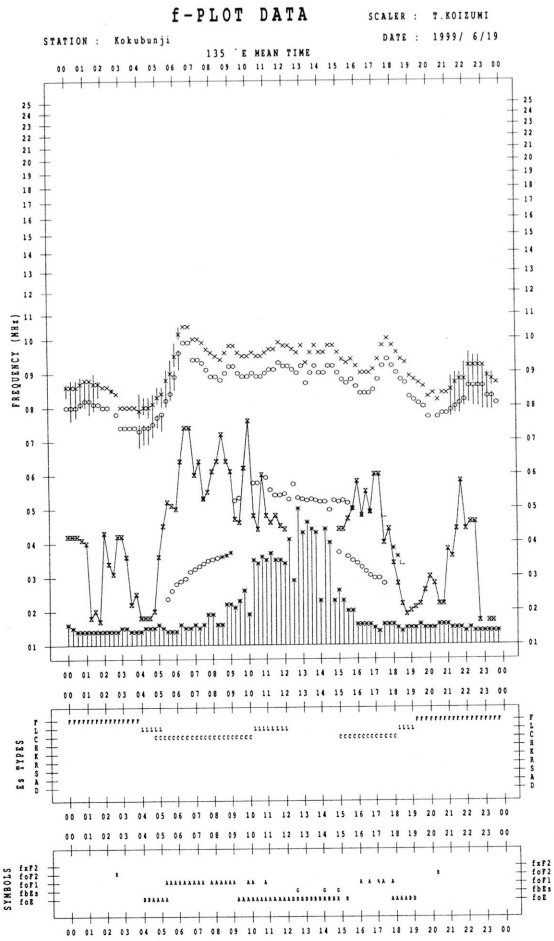
STATION : Kokubunji
DATE : 1999/ 6/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
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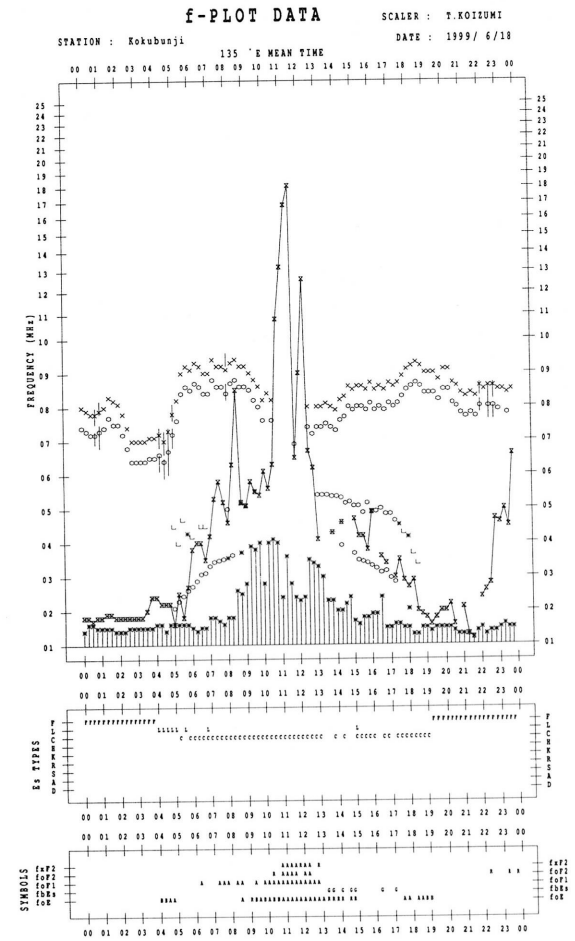
STATION : Kokubunji
DATE : 1999/ 6/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
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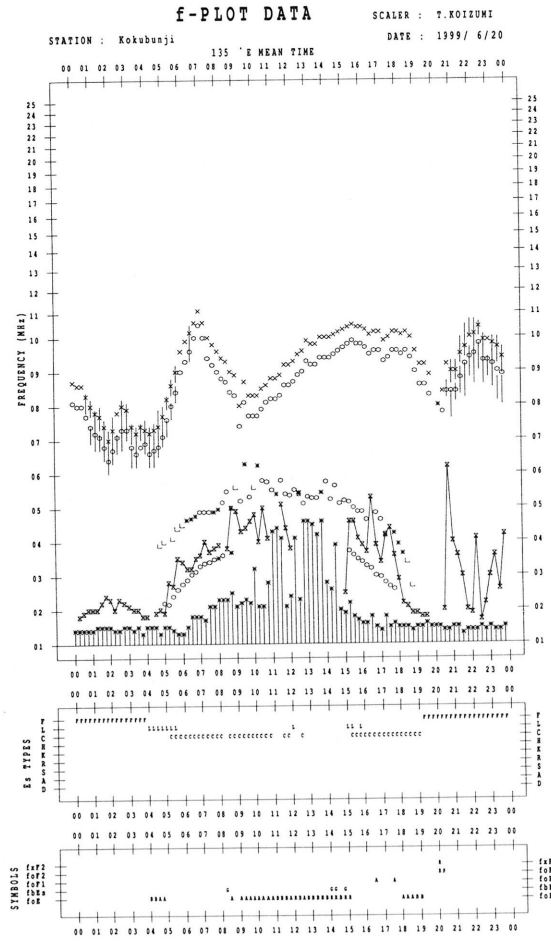
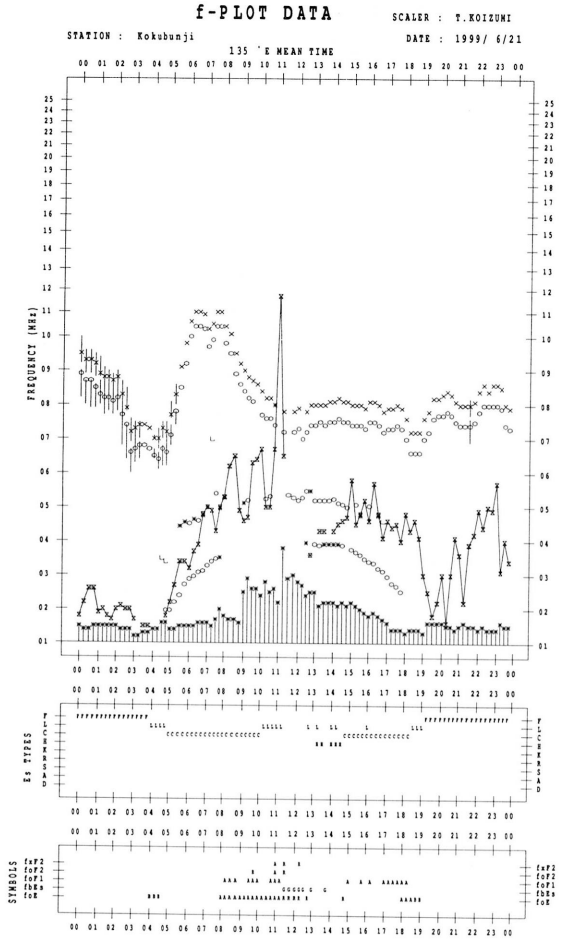
STATION : Kokubunji
DATE : 1999/ 6/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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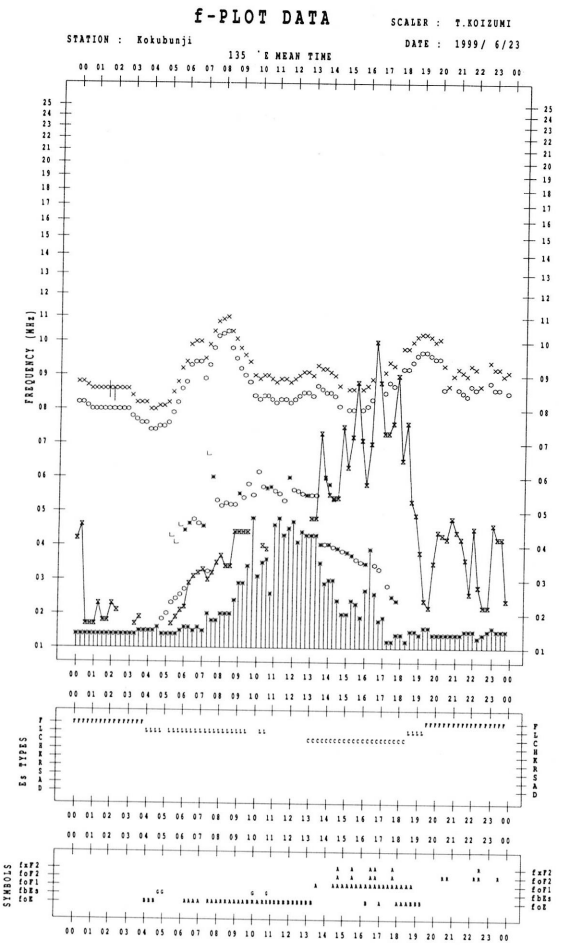
STATION : Kokubunji
DATE : 1999/ 6/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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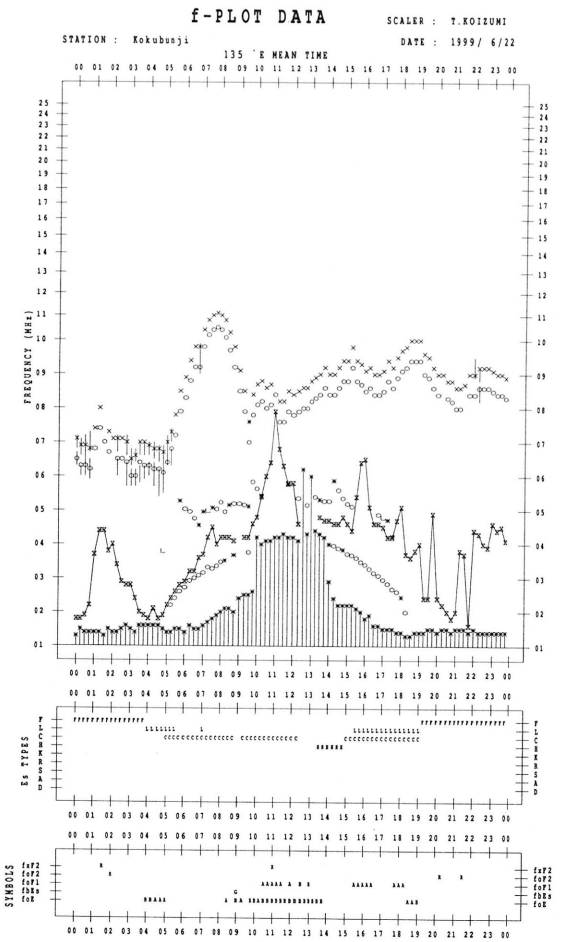
STATION : Kokubunji
DATE : 1999/ 6/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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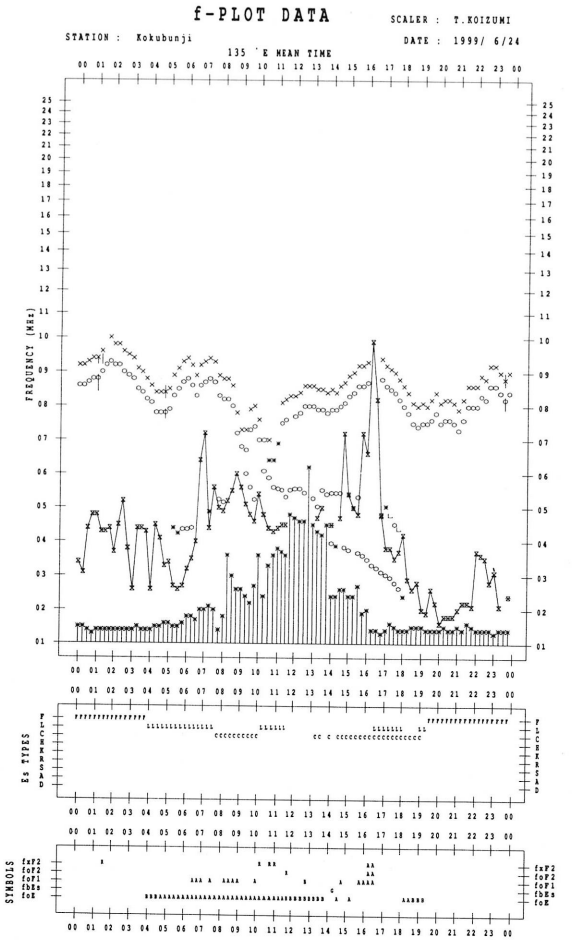
STATION : Kokubunji
DATE : 1999/ 6/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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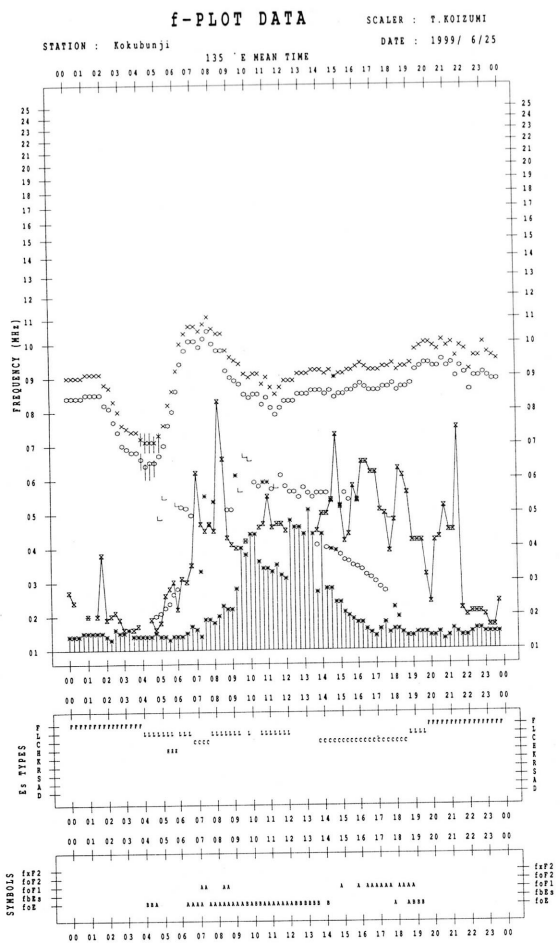
STATION : Kokubunji
DATE : 1999/ 6/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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STATION : Kokubunji
DATE : 1999/ 6/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
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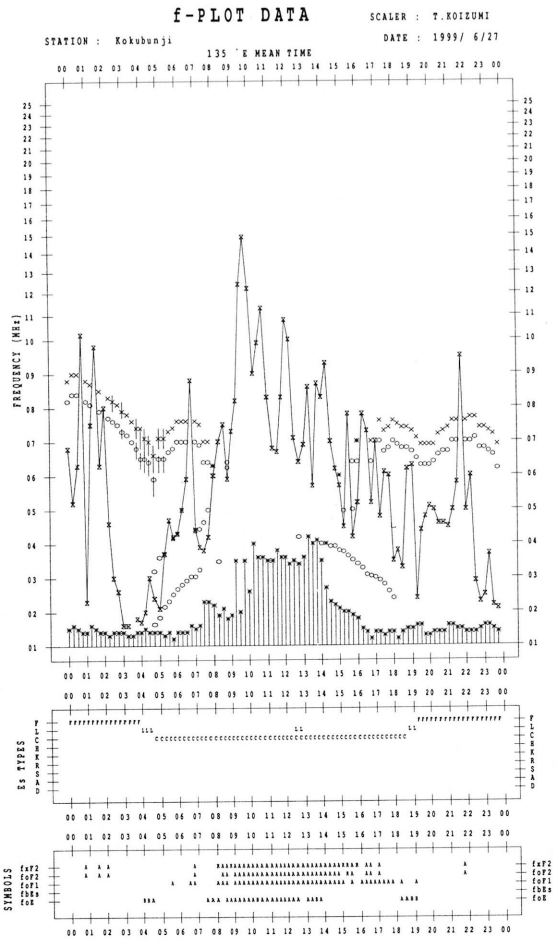
foF2
foF1
fbEs
foE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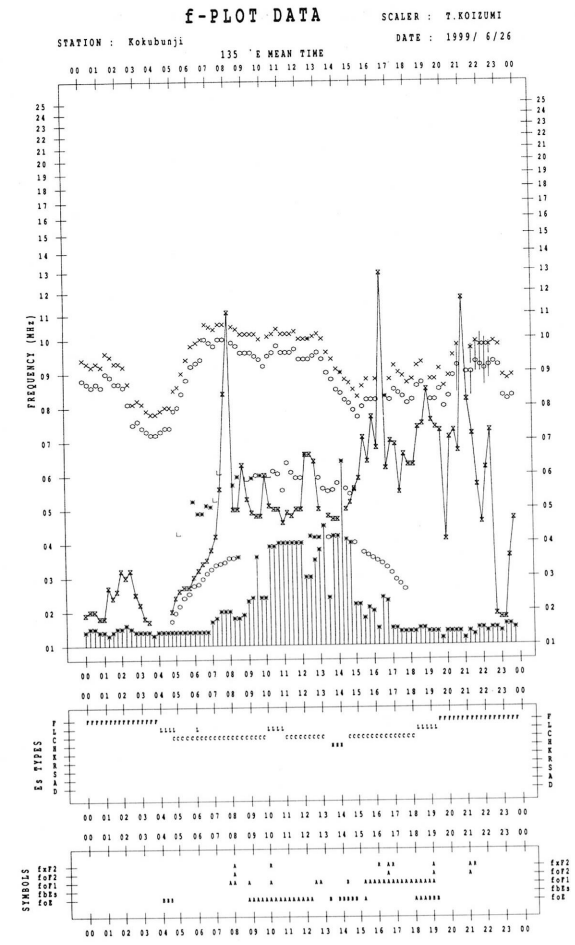
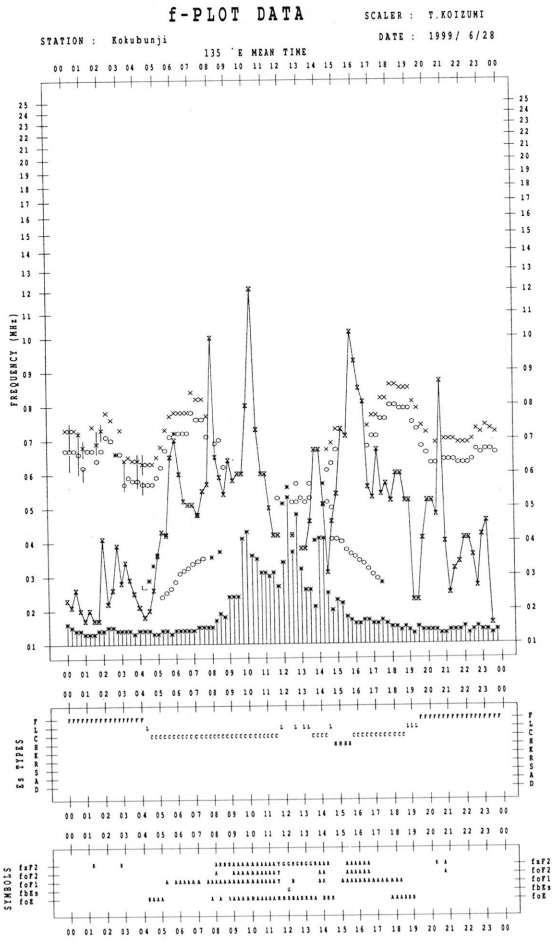
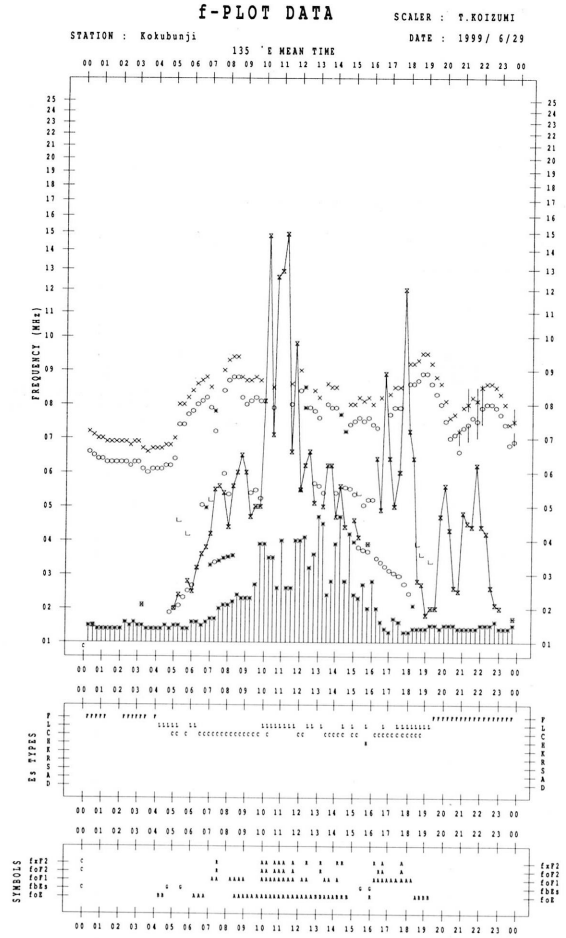
STATION : Kokubunji
DATE : 1999/ 6/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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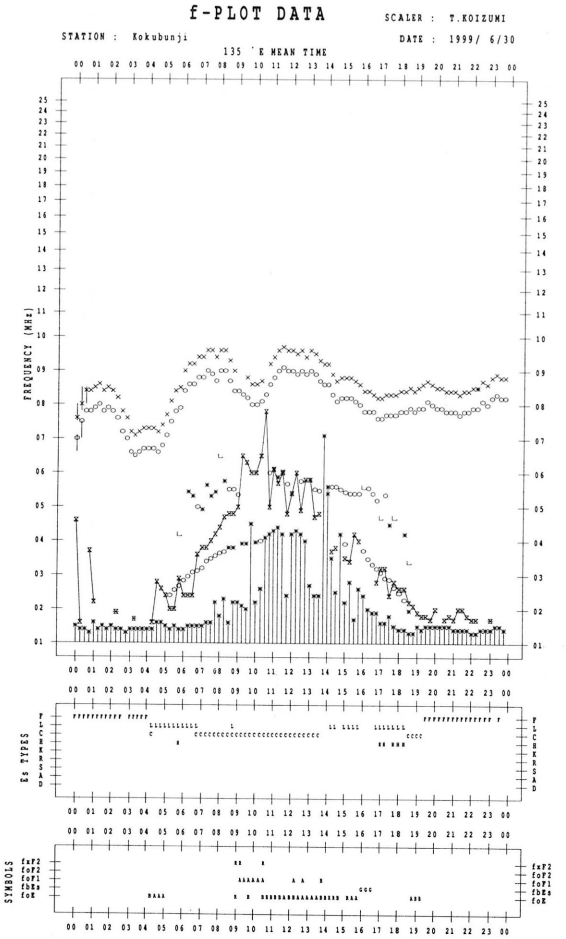
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 6/30
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
fbEs
foE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso June 1999

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	50	49	49	51	50
2	50	-	-	-	50
3	-	-	-	51	51
4	50	48	49	50	49
5	50	49	48	50	49
6	51	50	49	48	49
7	48	47	47	45	47
8	45	45	43	47	45
9	46	45	46	47	46
10	45	43	43	46	44
11	44	44	44	46	44
12	44	43	44	-	44
13	-	-	-	-	-
14	44	44	44	44	44
15	45	45	44	44	44
16	45	44	46	42	44
17	42	43	43	43	43
18	43	44	43	43	43
19	43	44	43	41	43
20	40	40	39	41	40
21	40	40	40	42	40
22	42	41	41	43	42
23	42	41	42	43	42
24	43	42	43	44	43
25	45	44	44	47	45
26	47	45	45	46	46
27	46	45	44	44	45
28	44	45	45	46	45
29	46	45	44	44	45
30	45	44	44	47	45

Note: No observations during the following periods.
2nd 0200 - 3rd 0900 12th 2100 - 14th 0100

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso

June 1999

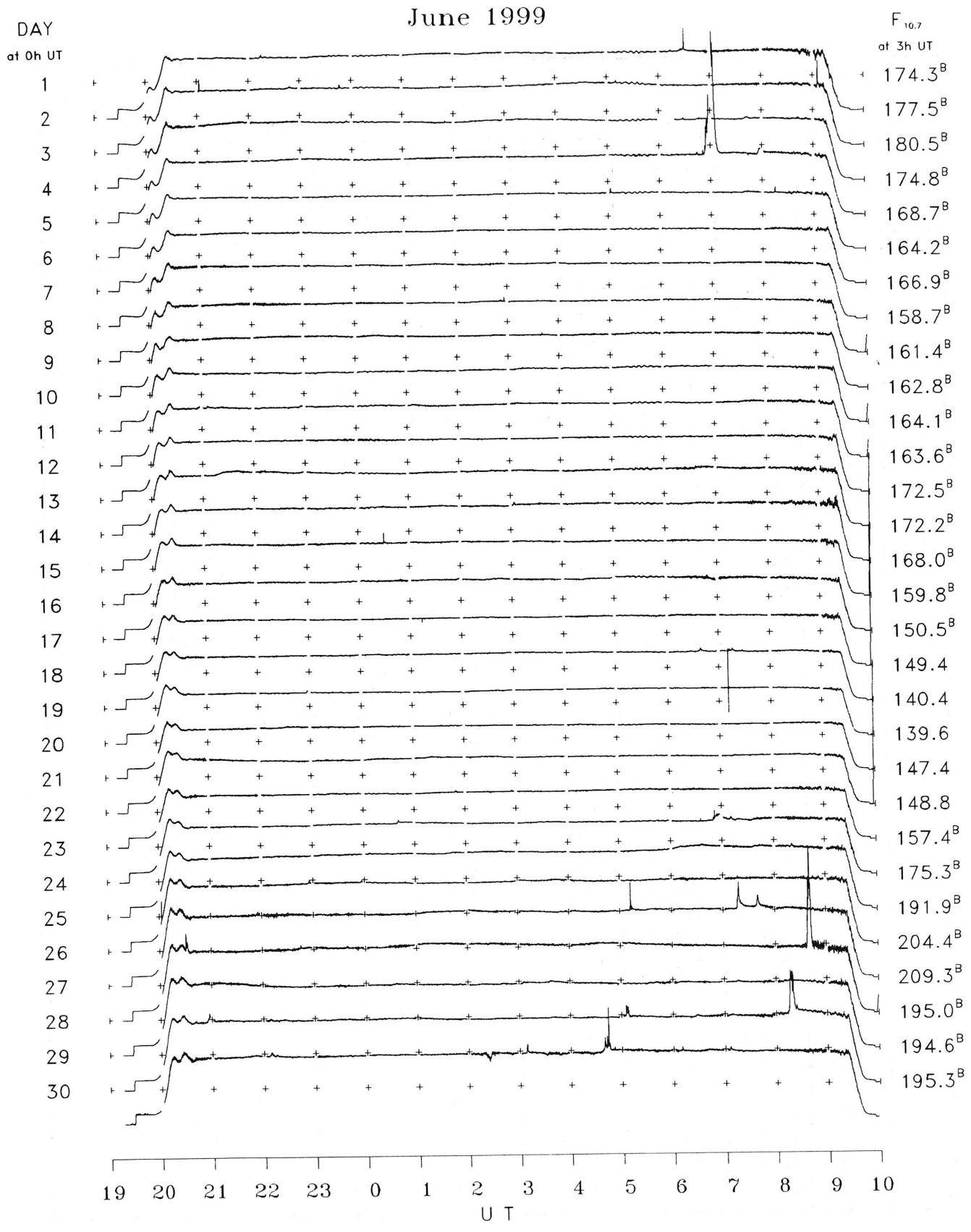
Single-frequency observations

Normal observing period: 1920 - 1000 U.T. (sunrise to sunset)

JUN.	FREQ.	TYPE	START TIME	TIME OF MAXIMUM	DUR.	FLUX DENSITY (10^{-22} Wm^{-2} Hz^{-1})		POLARIZATION
1999	(MHz)		(U.T.)	(U.T.)	(MIN.)	PEAK	MEAN	REMARKS
1	200	47 GB	0614.0	0614.5	1.2	700	-	0
	500	42 SER	0614.2	0614.4	0.5	40	-	0
	200	8 S	0908.2	0908.3	0.2	180	-	0
3	200	8 S	2101.2	2101.3	0.2	120	-	0
4	200	8 S	0324.0	0324.2	0.4	300	-	0
	200	8 S	0607.5	0607.7	0.4	110	-	0
	2800	46 C	0653.0	0701.5	15.0	310	-	0
	500	46 C	0657.0	0700.5	10.0	330	-	0
	200	46 C	0658.0	0705.5	15.0	50	-	0
	500	46 C	0754.5	0756.0	4.5	380	-	WL
21	500	46 C	2111.6	2112.0	0.8	40	-	ML
22	200	46 C	0915.8	0916.2	2.5	70	-	0
23	500	46 C	0652.0	0700.5	14.0	130	-	ML
	2800	3 S	0659.5	0700.5	1.5	50	-	MR
26	200	46 C	0715.0	0717.5	7.5	90	-	WR
	2800	29 PBI	0716.0	0718.0	8.5	60	-	WR
27	2800	46 C	0836.5	0839.5	6.0	220	-	WR
	500	46 C	0836.5	0841.5	7.0	40	-	WL
	500	8 S	0837.7	0837.8	0.2	230	-	0
28	500	42 SER	0431.7	0431.8	0.7	40	-	0
	200	42 SER	0431.7	0432.0	1.0	500	-	0
	200	8 S	0719.7	0720.0	0.6	50	-	0
	500	8 S	0720.0	0720.1	0.2	30	-	0
	500	42 SER	0916.2	0916.4	1.2	230	-	WR
	200	8 S	0916.4	0916.6	0.4	360	-	0
29	500	8 S	0457.5	0457.7	1.2	280	-	MR
	200	4 S/F	0457.5	0458.5	2.2	140	-	WR
	500	46 C	0503.5	0505.5	4.5	40	-	WR
	200	47 GB	0503.5	0506.0	5.2	750	-	0
	2800	46 C	0815.5	0817.0	7.0	100	-	0
	500	4 S/F	0818.0	0820.0	4.5	120	-	0
	500	6 S	0823.4	0823.6	1.5	70	-	0
30	200	4 S/F	0038.2	0038.5	2.2	250	-	ML
	2800	46 C	0437.5	0444.5	11.0	100	-	ML
	500	42 SER	0644.5	0645.0	0.7	30	-	WR
	500	42 SER	2009.7	2010.0	9.5	350	-	WR
	2800	46 C	2010.0	2010.5	7.5	110	-	WL

B. Solar Radio Emission

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



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

IONOSPHERIC DATA IN JAPAN FOR JUNE 1999
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2-1 Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184-8795 JAPAN