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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. 1998

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	57	57	57	56	38	A	A	A	A	A	A				A		57	52	56	57	60		68	68
2	56	57	53	A	A	63	70	56	A	A	A	58		49	57	50	61	63	68	67	68	60	68	67
3	55	58	68	40	37	42	A	A	A		A					49	A	57	58	69	72	69	68	69
4	46	59	55	57	57	52	56		52	N	A	65	55	A	A	A	65	66	67	68	68	58	76	57
5	68	68	67	62	58	61	66	63	67		59	69			59	68	71	74	76	81		68	59	76
6	77		62	63	56	69	58	64	A	A	A		A	A		A	61	61	63	56	66	56	68	76
7	77	71	68	61	56	58	72	A	A	58	A	A	73		81	74	81	76	74	91	92	71	69	68
8	58	57	68	68	63	67	63	A	A	A	A						57	56	A	72	77	68	68	57
9	66	60	58	54	58	47		A	A	A	A					55	63	68	68	74	94	83	68	68
10	55	57	57	56	57	50	58	60	49	A	A					54	62	63	66		71		58	68
11	67	57	57	54	A	A	A	58	55	A	A	A	49	A	49	56	A	A	62	92	94	94	68	58
12	A	56	69	50	58	A	A	63	A	A	A	A	A		A	A	A	57	A	81		67	A	67
13	68	59	68	56	69	66	73	74	69	A	A	A		A	A		A	64	71	80	71	68	76	68
14	66	60	58	55	57	60	68	A	A	A	A	A			49			70	76	81	71	69	68	68
15	68	67	56	60	53	A	A	A		A	A	A	A	A			53	A	A		68	67	60	67
16	58	58	58	54	37	A	A	A	A	A	A	A	A	A	A	A	A	56	58	68	57	68	64	59
17	56	56	57	47	46	57	A	58	A		A	59	A	A	A	A	A	60	61	A	58	63	60	68
18	60	50	56	45	56		68	72	77	64						59	66	68	76	81	71	67	60	67
19	68	61	57	56	54	57	63	68	72	59	A	A	60	A	A	A	70	77	80	82		75	78	68
20	68	67		58	55	61	57	A	A	A	A	A	A	A				57	61	68	61	57	68	58
21	60	58	57	38		48		54	A			A	A	A	A	63	64	64	61	64	60	67	68	68
22	67	67	57	A	38	38	A	A	A	A	A	A	A	A		53	A	56	58	69	57	58	68	58
23		60	56	50	54	52	57	62	66	70	A		A	66	65	66	64	60	58	69	67	70	72	68
24		58	57	56	55	53	A	61	60	A	A	A	A	A	A	52	63	64	64	68	68	70	57	68
25	57	58	38	58	69	A		A	A	A	A	A		A		A	A	A	A	A	62	56	54	57
26	58		56	38	40	47		A	A	56	A	A	63		69	74	80	69	60	A	A	60	56	57
27	57	38	A	A	38	A	A	A	A	A	A	A	A	A	A	A	A	55	A	60	A	A	A	A
28	57	59	A	51	40	A	57	A	A	A	A	A	A	A	A	A	A	A	A	79	58	68	A	60
29	58	56	57	56	48	58	61	A	A	49	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	A	A	59	A	A	A	65	64	67	A	94	92	67	A
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	27	26	26	26	20	15	13								13	17	25	23	23	24	26	26	27
MED	59	58	57	56	55	57	63	62								56	64	63	64	69	68	68	68	68
U Q	68	60	62	58	57	61	68	66								67	68	68	71	81	71	70	68	68
L Q	57	57	56	50	40	49	57	58								52	61	57	60	68	60	60	60	58

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT WAKKANAI

JUN. 1998

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	25	28	G	G	28	46	71	94	125	85	53	G	G	G	42	G	G	46	54	32	28	G	G	G
2	26	G	24	55	48	36	70	48	72	71	56	G	G	G	G	G	G	G	30	35	28	26	41	34
3	39	30	24	G	26	33	44	37	40	G	45	G	G	G	G	44	40	36	42	46	41	G	44	35
4	24	G	G	G	G	G	34		G	52	57	G	G	83	66	58	48	G	46	39	37	38	30	37
5	36	35	27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	42	45	57	40	29	45
6	53	45	32	G	G	G	47	62	65	72	43	G	69	60	G	59	40	52	47	66	48	42	62	34
7	33	36	36	57	57	49	58	64	58	43	45	62	63	G	64	G	40	46	60	37	61	61	40	38
8	40	34	29	34	G	44	46	56	64	65	58	G	G	G	G	G	G	36	57	30	36	34	27	G
9	G	G	29	G	G	31	G	46	60	61	44	G	G	G	G	G	G	42	40	36	27	G	33	26
10	61	42	22	G	G	35	47	51	40	41	79	G	G	G	G	G	40	44	G	27	31		25	G
11	G	G	G	34	38	32	45	47	44	53	54	67	G	56	44	G	58	63	47	58	36	28	28	59
12	55	36	G	G	32	54	70	59	63	71	42	62	56	58	76	43	46	46	68	51	60	29	40	26
13	35	26	27	28	G	35	G	58	42	59	131	136	G	44	41		39	54	56	48	32	57	29	38
14	G	31	29	G	G	38	55	82	83	74	70	60	G	G	G	G	G	62	63	80	41	G	29	G
15	G	G	G	27	28	61	94	65	145	130	63	76	70	61	G	G	57	64	136	120	63	58	40	36
16	33	40	42	39	32	30	46	48	58	57	63	59	58	56	62	42	69	71	34	38	56	60	35	40
17	36	62	37	28	28	G	51	60	64	G	60	G	73	43	55	92	87	42	62	79	93	95	61	35
18	30	56	40	37	38	34	58	72	76	65	G	G	G	G	G	G	G	G	42	42	25	31	26	38
19	28	G	G	G	G	30	G	38	56	57	65	64	G	68	81	65	45	40	42	36	36	29	30	26
20	28	32	29	44	36	37	39	57	69	60	64	82	68	58	G	G	G	50	37	41	64	59	24	36
21	31	G	G	27		G	G	G	41	G	G	61	84	78	76	58	G	42	G	29	35	48	34	41
22	52	52	46	37	31	30	35	42	62	68	65	70	46	63	G	G	41	G	G	34	28	42	46	26
23		36	G	G	G	G	43	54	57	62	80	G	45	61	43	G	39	G	47	56	42	29	46	36
24		33	33	32	43	45	39	59	58	71	72	62	43	44	42	44	38	G	34	29	33	28	G	G
25	G	G	G	G	G	30	G	42	56	42	43	44	G	58	G	95	174	57	47	73	61	39	38	G
26	G		28	G	G	31	G	55	69	55	83	72	59	G	46	41	46	46	42	54	63	40	46	45
27	40	27	32	59	38	50	65	65	64	84	95	73	91	112	83	84	97	37	64	61	78	66	63	77
28	65	64	80	57	34	46	47	64	62	75	64	94	124	86	96	120	104	109	65	87	146	63	94	84
29	56	28	28	32	40	35	34	62	78	65	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	55	64	46	70	92	79	60	43	45	71	30	45		64
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	28	29	29	28	29	29	28	29	29	29	29	29	29	29	28	29	29	29	29	29	28	28	29
MED	33	32	28	27	28	34	45	56	62	61	58	60	43	56	42	21	40	43	46	45	41	40	34	36
U Q	40	38	32	37	37	44	56	63	69	71	67	68	65	62	65	58	57	53	58	63	61	57	45	40
L Q	24	G	G	G	G	30	17	46	50	47	44	G	G	G	G	G	G	18	38	35	31	28	28	26

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT WAKKANAI

JUN. 1998

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

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

HOURLY VALUES OF foF2 AT KOKUBUNJI

JUN. 1998

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	57	48	A	51	47	57	A	A	A	61	A	A	A	A	A	71	65	62	A	A	72		68	57
2	57	A	56	25	45	68	69	66	A		A	A	A	71	77	80	74	73	93	81		73	71	68
3	51	60		57		59	68	58	A	A	A	A	A	A	60	A	67	70	70	80		95	78	80
4	68	67	67	60	51	57	68	68	67	A	66	A	A	A	A		A	84		81		81	73	81
5	81	82	94	69	68	70	80	A	68	68	71	A	A	63	A	82	85	90	A		85	93	A	93
6	80		63	62	54	73	93	92	60	A	A	A	A		A	68	67		83		80	74	78	76
7	80		68	68	68	68	66	A		A	A		A	A	100	96	91	95	93			68		A
8		64	68	67	68	69	58		A	A	A	A	A	86	86	75	66	71	81	83	57	78	79	
9	68		68	63		57	57	58	60	A	A	A		A	70	76	78	82	81	93	95		68	
10	74	62	70	69	56	68	71		A	A	A	59	A	71	74	80	78	81	82	76		94	64	68
11				67	68	56	45	A	A	A	A		72	76	A	A	A					78	A	89
12	A	A	66	49	46	57	64	A		A	A	A	A	A	72	73	A				A	A	A	A
13	A	51	57	A	A	56		A	72	A	76	A	A	A	A		67	A	A	100	81	A	69	73
14	68	55	50	49	56		69	A	72	77	A	A	A	A	83	A	76	86	91	94	A	67	69	67
15	A	A	65	A	51	51	A	64	68	A	A	A	A	A	A	64	65	A	73	A	95	57	56	
16	57		55	56	50	49	52	A	A			A	A		A	68	68	A		83	73	68	68	
17	68	57	A	56	51	59	51	68	A	A	A	76	A	A	A	69	A	75	71	70	70	68	57	56
18	61	58	56	51		69	57	67	70	75	58	A		A	68	71	74	77	83	86	95	72		
19	69	73	57	54	55	60	68		63	A	A	A	A	A	81	A					91	87	81	74
20		70	71	57	60	63	68	68	71	A	A	A	A	A	96	99	A	A	58		74	68	68	64
21	73	67	72	51	54	58		55	A	A	A	A	A		A	A	A	A	A	95	64	63	68	62
22	63	57	56	51	48	65	A	68	63	A	A	A	A	A	A	72	A	A	93	94	A	64	58	
23	56	57	46	A	51	53	68	83	70	63		A	70	A	83	A	A	A	A	73	A	73	64	76
24	56	60	50	47	51	58	80	74	57	A	A	A	A	71	70	73	72	82	92	81	68		68	68
25	58	52	57	48	46	53	47	A	A	A	A	A	A	A	A	A	A	49			61	60	57	63
26	60	57	57	49	51	51	55	71	66	A	A	A	A	A	94	104		66	63		A	57	60	57
27	57	57	56	56	54	A	A	57	A		A	A	A	A	A	A		61	52	58	60	57	68	57
28	A	51	57	53	52	51	55	61	49	A			64		59	62	64	60	64	73	67	62	73	57
29		58	57	49	50	47	66	77	90	80	59	A	A	A	79	A	61	A	63	73	74	A	69	
30		57	57	52	54	69	72	66	A	A	A	A	A	A	81	80	80	76	81	94	94	74	68	68
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	21	22	26	27	26	28	24	18	16						17	19	18	18	19	19	19	24	25	21
MED	63	58	57	54	52	58	67	68	68						79	73	70	76	81	81	74	70	68	68
U Q	71	64	68	62	56	68	69	71	70						84	80	78	82	91	94	91	78	72	76
L Q	57	57	56	49	50	54	56	61	61						70	69	66	66	64	73	67	63	64	59

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT KOKUBUNJI

JUN. 1998

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	33	91	88	58	34	38	76	99	134	71	130	56	59	88	70	50	46	58	95	174	66		60	57
2	58	85	85	58	44	34	42	52	69	145	107	84	68	57	48	41	G	36	37	33	G	G	24	32
3	30	59		34		30	42	43	69	76	52	87	100	78	56	62	48	G	47	30	31	45	30	53
4	G	29	33	24	G	G	34	45	48	66	54	58	70	75	113	115	148	112	80	97	36	51	25	37
5	30	54	33	38	32	40	76	58	55	G	G	69	82	60	132	48	55	59	92	95	70	97		63
6	33	51	57	53	52	45	42	58	67	53	67	58	55	G	62	G	41	64	44		57	60	59	48
7	43	45	34	37	44	37	70	72	132	110	80	G	56		68	58	52	134	84			47	90	89
8	141	57	42	57	38	34	G	53	76	75	75	106	118	84	74	50	56	56	48	34	39	32	57	30
9	26	34	30	25		32	44	54	54	69	59	60	G	50	58	58	49	G	30	42	72		52	33
10	23	33	G	28	27	30	41	81	70	61	59	53	62	G	G	G	G	46	48	49	34	G	33	54
11	56	60	35	30	56	45	58	69	78	100	57	G	G	G	78	83	69	73					180	165
12	116	85	57	50	62	36	56	95	134	110	117	104	105	70	68	57	179		86	95	144	117	75	116
13	67	40	34	54	60	30	49	111	62	72	59	139	124	116	80	G	47	139	88	53	164	94	132	68
14	106	27	55	70	34		74	116	77	64	112	87	91	100	75	86	48	57	60	107	109	62	45	63
15	78		58	72	108	46	69	64	63	97	106	104	88	133	97	56	46	61	57	70		53	50	
16	44		54	36	39	37	52	62	108		115	89	86		183	59	48	101	132	72	52	33	32	
17	42	54	54	58	91	45	42	54	57	69	72	54	55	91	84	58	108	59	55	G	G	26	G	28
18	33	35	58	34	30	G	42	G	44	43	45	48	G	78	G	G	G	40	32	33	40	54		
19	32	38	50	34	51	70	44	G	51	56	69	58	64	72	60	86			118	110	55	38	26	34
20	34	37	33	34	54	48	60	59	50	64	70	72	73	98	76	99	104	58	50	117	62	54		50
21	34	37	29	33	30	34		58	58	60	62	85	144	85	64	60	118	127	141	162	40	58	54	51
22	50	42	35	30	27	G	34	45	62	70	79	60	88	86	73	50	87	87	130	46	72	29	55	
23	54	50	58	62	61	89	56	67	71	68			80	99	68	101	108	152	72		44	69	48	G
24	56	34	69	49	62	78	50	52	52	54	110	86	69	60	54	50	52	58	37	57	44	58	32	49
25	G	30	23	32	52	31	G	44	57	53	47	49	73	56	68	72	91	92	94		45	60	57	57
26	48	27	25	G	30	37	43	36	50	54	82	82	66	60	58	65	131	58	50		61	34		33
27	64	39	53	30	36	59	71	45	55	G	56	53	52	76	71	68	G	35	33	G	27	36	28	44
28	38	56	56	55	52	34	37	G	G	46	G	G	G		G	G	G	G	35	35	G	29	25	33
29		50	33	33	38	27	38	74	63	65	58	126	72	62	55	75	55	73	66	38	G		70	
30		68	71	42	33	30	33	65	77	86	86	86	73	102	57	74	62	55	68	72	40	32	32	55
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	29	30	28	29	29	30	30	29	29	29	30	27	30	30	29	28	29	24	27	26	26	25
MED	42	44	50	36	42	36	44	58	62	66	69	69	71	76	68	58	52	58	60	55	44	49	49	50
U Q	57	56	57	55	55	45	59	69	76	75	96	87	88	91	76	74	97	89	90	96	66	60	59	60
L Q	32	34	33	32	32	30	39	45	54	54	56	53	56	60	57	50	46	50	45	34	34	32	30	33

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT KOKUBUNJI

JUN. 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	15	15	15	15	20	18	34	34	32	27	22	16	15	15	15	14		14	14
2	15	14	14	15	14	15	15	15	14		33	38	34	34	23	18	17	15	15	14	15	14	14	14
3	14	14		14		15	16	15	15	22	24		39	42	36	23	15	14	16	15	15	15	15	15
4	14	15	14	14	14	20	15	15	16		36	39	34	36	20	22	17	16	14	14	14	14	15	15
5	15	15	15	15	15	15	15	15	18		50	34	33	29	27	22	15	14	14	15	14	14	15	15
6	15	15	14	15	14	15	15	15	15	21		21			22	17	15	14	15		15	15	14	15
7	14	15	14	14	15	15	15	15	18	22		23		18	23	32	15	16	14			14	14	14
8	14	15	14	14	14	14	15	14	17	23	24	35	32	14	33	20	20	14	14	14	14	14	14	14
9	15	14	14	15		15	15	16	17	18		24		27	22	18	18	15	15	14	14		15	14
10	15	15	15	14	14	15	15	14	18	22		34	34	29		24	15	14	15	14	15	15	15	14
11	14	14	15	15	14	16	14	18	18		36		51	23	24	18	17	15				14	14	15
12	15	14	15	14	15	15	15	14	16		35	36	35	35	36	38	18		15	16	15	15	14	15
13	15	14	14	15	14	15	16	14	17		37	36	34	36	33	26	17	15	14	15	15	15	14	14
14	15	14	14	15	15		14	16	16	24		34	34	34	23	23	17	15	15	15	14	14	14	14
15	14	14	14	15	14	14	14	16	20	20	22	24	35	33	34	16	17	15	15	15	15	14	14	
16	14		14	14	15	16	15	15	17		16		27		41	23	17	16	15	15	15	15	15	
17	15	14	15	15	15	15	15	15	18	23		36	42	41	22	21	14	14	15	15	14	14	20	14
18	15	15	14	15	16	20	15	15	18	23	22		23	32	28	22	15	15	15	15	15	15		
19	14	15	14	14	14	14	14	16	16	20	22	37	39	26	23	20			15	15	15	15	15	14
20	14	14	15	14	15	14	15	15	17	21	24	29	36	27	34	15	16	14	15	15	14	15	15	15
21	15	14	15	14	15	15		16	20	18	26	26	34	22	33	26	16	14	15	14	14	14	14	14
22	15	14	14	14	14	16	15	14	16	18	23	26	34	29	29	18	14	14	14	15	14	15	15	
23	14	15	14	14	15	16	15	15	15	18		18	30	21	20	17	15	14	15	14	14	14	14	14
24	15	14	14	14	15	15	15	14	15	20	24		37	39	20	23	15	15	15	16	15	14	15	15
25	15	14	15	14	15	15	15	14	14	20		42	39	34	24	16	17	15	15		15	14	14	15
26	14	14	15	14	14	15	16	16	18	20	26	29	29	30	32	16	18	15	15		15	14	15	15
27	15	14	14	14	15	15	15	16	18	17		39	36	39	40	14	15	16	16	14	16	15	16	15
28	14	15	15	15	14	15	16	15	18	14	27				27	15	16	16	16	14	15	15	15	15
29		14	15	15	14	16	17	14	17	18		33	33	34	18	18	16	14	14	15	14	14	14	
30		14	15	14	14	15	14	15	20	26	26	42	40	40	21	20	17	15	16	15	14	14	14	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	30	28	29	29	30	30	23	20	24	26	27	29	30	29	28	29	25	28	28	29	25
MED	15	14	14	14	14	15	15	15	17	20	25	34	34	32	27	20	16	15	15	15	15	14	14	14
U Q	15	15	15	15	15	15	15	16	18	22	34	36	37	36	33	23	17	15	15	15	15	15	15	15
L Q	14	14	14	14	14	15	15	14	16	18	22	26	33	27	22	17	15	14	14	14	14	14	14	14

HOURLY VALUES OF foF2 AT YAMAGAWA

JUN. 1998

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	62	59	62	62		58	60	81		A	A	A	71	92	90	88	87	73	67	73	83	83		70
2	73		68	59	64	57	58	62	A	A			72	A	86	85	94	101	103	104	84	87	60	67
3		55	56	70		60	A	68	75	A	59	62	68	74	78	83	83	84	82	83	77		66	84
4	84	83	83	72	58	60	62	71	A	59	61	70	72	78	82	92	97	96	103	85	87	90	85	88
5	98	86	96	77	64	61	81	81	74	81	75	67	A		90	92	95	106	106	98	84	84		86
6	88	87		75		83	81	70	69	72	71	75			96	92	92	104	100	119		78	87	80
7	82	75	70	63	57	58	63	72	104	A	N		84	90	101	104	104	96	96	85	79	73	84	87
8	84	82		73	74	61	66	72	A		79	A	A	99	98		87	84	96	86	96	68		80
9	79	66	64	66	60	55	60	67	68	66	A	A	A	85	78	85	90	95	90	91	104	85	91	86
10	89	77	78	74	58	60	73	80	66	A	72	76	67	82	87	88	93	94	87	84	85	76	80	80
11	82	75	82	80	68	47	59	62	67	A	72	70	A	A	87	86	83	100	101	87	68		69	66
12	N	73	73	54	60	56	59	81	81		A	A	A	94	92	100	106	110		109		61	A	99
13	66	69	85	53		89	A	74	78	72	A	A	77	86	83	87	88	87	86	89	A	86	82	82
14	87		86	75	62	51	63	67	67	A	78	A	81	A	98	A	98	104	112	103	92		99	68
15	84	80	84	84	38		A	A	69	66	A	N			A	A	111	109	A	79	88	78		82
16	A	69	79		57	66	71	67	62	A			89	67	77	99	83	A			85	79	82	84
17				56	54	59	62	60	65	78	75	67	69	A	76	82	85	80	83	74	94			59
18	70	61	79		62	70		69	72		A	A	A	A	77	75	71	77	87	86	80	73	72	72
19	74	82	70	67	67	61	76	87	56	60	70	70	73	74	70	82			117	84	105	116	90	83
20	84	67	74	70	57	48	55	82	62	75	89	A	A	79	79	78	82	89	86		79	80	79	74
21	85	75	64	62	55	57	73	55	75			A	A	87		72	77	72	73	64	79	54		72
22	85	72	66		59	60	56	82	72	A	89		99	72	A	77	90	87		90	92			89
23	66	55	64	52	54	54	71	73	A	A		72	68	A	91	85	75	67	61	72	78	84	59	89
24	71	54		39	54	58	83	61	55	A	57	A	68	79		78	81	86	88	97	70	72	73	66
25	73	67	63	54	62	63	A	A		A	A	A			A	A	61	63	64	68				
26			66	43	34	49	58	82	70	59	A	A	A	74	85	106	86	81	82	86	59	189	169	59
27	61	69	54	63	69		A	A	A	A	A	A	A		A		52	61	66	66	61	43	54	
28	61		61	62	59		59	A	A		63	69	66	62	A	A	A	76	72	65	72		67	
29	59	55	60	54	60	54	62	73	95	79		A	73	82	86	76	74	69	84	84	84	79	80	
30		59	76	80	73	70	70	65	68	62	A	63	70		77	80	88	90	88	84	90		81	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	24	25	26	27	26	27	24	26	22	12	14	11	17	18	23	24	28	28	26	28	26	22	21	26
MED	80	69	70	63	60	59	62	72	69	69	72	70	72	80	86	85	87	87	87	85	84	79	80	80
U Q	84	78	79	74	64	61	72	81	75	76	78	72	79	87	91	92	93	98	100	90	90	85	86	86
L Q	68	60	64	54	57	55	59	67	66	61	63	67	68	74	78	79	81	76	82	76	78	73	68	70

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT YAMAGAWA

JUN. 1998

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	26		59	47	33	G	50	91				69	86	86	71	69	G		84	40	30			32
2			32	66	60	27	G	45	69	68	124	162	71	105	83	G	64	61	41	33	32	G	G	G
3		G	G	G	G	G	43	45	60	61	60	G	G	G	G	53	44	44	39	41	G	G	G	43
4	43	44	G	40	G	G	30	43	59	62	64	61	61	54	G	61	G	G	92	G	G	G	30	28
5	32	25	G	G	G	G	G	47	61	61	81	70	78		64	61	48	G	47	66		50		58
6				61		32	60		75	G	76	84		120	62	G	50	66	68			38	32	32
7	32	60	33	31	32	31	56	78	127		74		74	58	G	G	G	54	70	68	126	58	59	41
8	43	39		G	G	G	G	G	72		88	116		112	97	86	76	90	71	57	G	G		G
9	30	30	26	G	G	G	40	46	60	79	91	92	91	G	78	62	40	55	38	41	39	30	32	
10	G	32	30	G	32	G	33	70	80	70	67	62	54	88	58	81	62	58	44	G	G	G	G	G
11	G	G	G	G	G	G	33	44	38	74	56	56	89	146	87	59	78	83	85	83	133	58	32	40
12	58	57	60	40	39	29	77	76	60	115	83	71	96		G	61	60	86	150	117		151		32
13	40	57	G	40	31	43	59	83	78	84	84	53	61	G	80	79	61	56	85	83	84	G	60	58
14	55		32	32	32	45	53	59	66	82	78	162	93	89	80	99	82	58	70	41	33	G	31	G
15	G	G	58	G	29	G	58	76	88	84	152	140		151	118	96	141	152	118	126	59	82	127	150
16	112	91	60	54	G	32	43	35	G	69		90	147	54	75	108	61	77	160		160	150	92	132
17	60			57	31	G	33	G	57	70	68	62	89		60	54	G	52		40	G	G	29	G
18	G	G	G	G	G	G		39	G		78	62	67	77	G	G	G	G	G	G	33	32	32	26
19	G	G	33	30	32	32	G	G	G	G	47	G	G	G	57	61	83	180	144	78	40	25	G	G
20	32	29	36	G	G	G	34	G	G	60	103	76	60	78	82	G	62	92	162	81	80	31		29
21	27	27	26	G	G	G	G	46	71	G	G	61	62	72			62	68	G	54		53		G
22	G	26	25	28	G	G	30	G	40	64	96	135	151	77	151	70	62	77		56	56	32		29
23	40	30		G	25	G	G	34	60	81	G	G	62	72	G	54	G	G	G	40	32	39	30	32
24		32		43	G		G	G	G	54	60	61	62	71	84	69	51		40	41	40	28	30	
25		57	31	32	32	39	33	55	G	64	60	53	G	G	51	60	53	51	41	32	43	32	28	31
26		28	G		G	G	33	36	38	55	62	92	86	61	G	57	45	54	G	G	30	30	39	30
27	27		57	28	G	G		45	60	83		81	164	76	62		52	51	47	33	G	30	32	41
28	42		43	40		G	44	59	38	G	G	G	G	G	60	100	80	81	54	39	57	27		30
29	G	30	26	28	30	G	33	38	54	94		136	67	160	55	G	51	77	65	32	G	G	26	
30		39	31	32	30	G	33	G	G	44	93	60		115	78	53	G	70	40	G	G	31		31
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	23	23	25	29	28	29	28	29	29	26	26	29	26	27	29	28	30	28	28	28	26	29	21	27
MED	32	30	31	30	13	G	33	45	60	66	75	69	69	76	62	61	52	60	60	41	33	30	31	31
U Q	43	44	39	40	32	30	47	59	70	81	88	92	89	105	81	74	62	79	85	67	57	44	35	41
L Q	G	25	G	G	G	G	15	17	19	55	60	58	61	54	26	53	40	51	40	32	G	G	27	G

HOURLY VALUES OF fmin AT YAMAGAWA

JUN. 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	14	20	23		26	38	42	46	39	44	38	27	22	20	14	15	14	16	15
2	15		15	16	15	16	17	18	22	23	46	43	42	44	35	49	29	18	17	15	15	14	14	15
3		14	14	14	16	15	16	24	32	36	46	50	52	54	53	36	23	20	17	16	21	15	16	18
4	15	15	14	16	15	14	16	17	21	36	39	39	44	38		22		20	16	17	15	15	15	15
5	15	16	15	16	14	16	21	20	21	35	38	45	46		38	38	22	21	20	15	15	16		15
6	16	15		18		15	17	18	21		36	40		45	42	50	35	20	18	24		15	15	15
7	15	16	15	14	15	15	16	17	20	23	35		39	40	50	52	45	20	17	15	18	15	15	16
8	16	15		14	14	21	22	17	18		45	43	43	48	43	44	38	30	17	17	15	15		17
9	15	15	15	17	15	15	17	17	20	22	38	35	42	53	43	40	24	20	16	16	15	14	15	15
10	15	14	15	14	15	15	15	17	20	38	36	42	38	45	38	41	21	20	16	16	14	14	14	16
11	14	14	16	15	15	14	17	20	21	34	43	38	43	42	44	38	22	23	17	20	16	16	18	15
12	15	16	16	15	18	14	15	23	20	22	39	40	42	57	54	42	38	32	20	17	16	15	18	15
13	15	16	14	14	15	16	17	18		36	44	40	48	18		44	40	20	15			15	15	14
14	15		15	14	15	16	17	22	21	44	42	42	43	43	43	38	21	18	22	16	18	14	15	16
15	15	15	15	15	14	15	18	18	21	39	43	43		42	44	43	23	22	20	16	16	16	15	16
16	16	14	14	15	16	15	16		18			45	44	48	45	44	41	18			16	16	16	18
17	15	15		15	15	16	15	16	22	22	43	43	44	42	44	40	46	20	20	16	14	14	14	14
18	16	14	16	15	15	17		16			36	38	42	43	50	53	21	18	17	17	16	15	17	14
19	14	16	17	16	17	15	18	28	21	48	48	52	50	53	49	54	46	20	21	46	17	16	16	20
20	16	16	16	15	15	14	16	20	22	20	42	39	39	43	45	50		21	20	16	16	15	15	15
21	15	16	15	15	14	15	16	17	20			42	44	40		42	36	18		16	18	15	15	15
22	15	15	26	16	15	15	16	17	21	23	43	40	46	44	44	34	23	20		15	15	15		15
23	16	14	14	15	15	15	21	18	20	24		53	44	43	53	46	52	21	22	16	18	15	16	16
24	15	14		16	14	15	15	15	22		42	45	44	44	43	47	36	22	16	16	16	15	15	14
25	15	15	14	15	15	16	16	24	20	36	40	40			71	38	35	21	22	16	15	16	15	16
26	16	15	15	15	14	15	18	20		47	37	38	44	43		33	24	18	23	18	15	16	15	15
27	15	16	17	17	15	14	15	20	20		38	45	43	43	45		34	22	21	15	14	15	15	15
28	15	17	16	16	15	15	18	23	21			53	52		39	44	33	22	22	16	18	15	18	16
29	15	15	15	15	14	14	18	16	20	36		40	40	40		50	36	22	17	17	17	15	16	
30		17	16	16	18	14	21	18	23	33	40	44	40	40	40	50	22	20	22	17	15	15	16	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	28	26	30	29	30	29	29	26	22	25	29	27	27	25	29	28	30	27	28	28	30	27	29
MED	15	15	15	15	15	15	17	18	21	34	40	42	44	43	44	43	34	20	20	16	16	15	15	15
U Q	15	16	16	16	15	16	18	21	21	36	43	45	46	45	49	49	38	22	21	17	17	15	16	16
L Q	15	14	15	15	14	14	16	17	20	23	38	40	42	40	42	38	23	20	17	16	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT OKINAWA

JUN. 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	A	47	47	40		63	A	68	A		A	A	108	118	A	104	103	A	A	93	71	70	72
2	78	80		A	A	70	58	56	A	A	A	A	A	A	91	A	111	127	111	108	108	88		78
3	67		77	70	71	30	41	69	70	64		61	69	87	92	90	106	105	96	82	81	83	74	70
4	72	78	78		60	50	56	71	68	64	68	A	80	A		116	112	A	A	A	A	80	90	98
5	91	94	95	94	39	68	95	87	73	A	83	81	A	96	92	97	96	122	90	A	86	A	83	83
6	A	93		69			60	A	A	A	A	A	98	102	112	114	A	117	105	112	88	90	84	92
7	80		65	58	48	46	67	A	A	69	A	89	114	116	131	133	122	112	104	111	92		80	94
8	87		64	68		68	68	70	67	A	A	A	C	A	108		101	94	87	84	88	77	70	74
9		72	68	58	47	58	58		A		A	73	A	112	109	101	102	110	A	A	87	86	87	A
10	82	82		70	70	61	68	76	A	61	A	A	A	91	94	94	106	105	105	84	87	A	A	80
11		95	79		69	60	61	68	A	A	A	76	A	92	100	104	105	116	100	90	80	69	62	62
12	64	62	62	60	60	54	65	83	71	A	A	81	102	121	126	133	125	123	124	88	58	56	62	
13		91		A	A	A	44	A	87	A	A	A	A	A	A	94	91	90	92		94	91		70
14	81	81	93	94	94		64		A	A	80	A	92	A	A		A	127	A	116	105	71	70	67
15		80	100	53	53	A	58	A	A	A	A	74	83	90	92		112	A	A		107	66	61	60
16		A	58	A		45	60	62		A	68	69	76	90	92	104	92	A		A	86	A	A	62
17	64	61			53	57	56	57	67	78	A	A	A	A	92	A	A	92	93	A	88	72	69	67
18		70	62	58	58	56	58	68	71	A	A	A	71	A	A	81	76	81	93	88	73	70		
19	65	95	93		71	70	93	74	61	58	76	80	82	83	82	87	91	98		90		N	79	78
20	94	71	72		69	48	56		74	61	61	67	73	74	90	93	84	A	64	81	78	63	A	65
21	75	73	71	57	58		57	57	53	60	64	A	70	92	85	75	A	A		83	72	61	A	67
22	A	60	69	60	48	38	57	70	61	57	60	69	81	78	77	96	113	A	79		A	A	A	61
23	61	A	57	A	A	A	56	57	51	A	A	77	82	93	107	115	94	96	96	86	80			A
24	52	59	57	52	50	50	60	55	56	56	61	A	65	82	80	86		112	123	84	81	A		68
25	62	61	60	54	54	55	60	A	A	A	A	A	A	A	A	68	68	81	82	73	73	74	78	66
26	74	61		57	60	34	A	87	94			A	68	86	80	104	92	94	110	94	78	69	59	53
27	A	61	57	57	54	63	51	62	A						A	61	57	64	80	48	50	A	A	57
28			A		A	39	A	60	A	64	68	68		66		76	91	85	93	86	76	63	60	54
29	A	58	52	55	69	A	48	91	94	A	63	A	76	86	87	87	85	93	94	97	82	A	73	73
30	72	70	72	71		61	64	68	70		65		70	A	83	92	97	116	109	93	A	76	83	95
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	23	23	20	22	22	28	21	18	11	12	13	18	20	23	24	25	24	22	21	26	20	19	26
MED	73	72	68	58	58	56	59	68	69	61	66	74	78	90	92	94	97	104	95	88	84	72	73	69
U Q	81	82	78	69	69	61	64	75	73	64	72	80	83	99	108	104	108	116	105	95	88	81	83	78
L Q	64	61	58	56	50	46	56	58	61	58	62	68	70	84	85	86	91	92	90	83	78	67	62	62

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

JUN. 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	88	60	43	40	60		38	78	95	98				92	85	144	98	77	95	90	33	66	68	67
2	56	62		47	55	39	37	43	76	78	117	80	140	93	60	96	80	51	124	48	37	41	50	29
3	26	G	G	G	G	G	G		66	G		G	45	G	44	50	48	44	68	69	50	32	G	G
4	43	38	40	45	37	43	44	36	50	67		55	G	136		71	70	112	128	88	84	76	44	36
5	48		34	24	G	G	G	44	81	77	45	64	168	G	G	59	61	66	60	88	67	83	45	39
6	51	G	25	34			50	102	124	169		86	G	54	52	80	97	74	75	152	87	67	83	79
7	43	41	34	26	28	33	34	50	100	66	49	60	51	73	G	G	70	81	94	114	68	50	39	
8	56		35	G	G	G	G	33	45	59	119	185	C	124	106		62	62	80	65	58	59	43	42
9		98	26	34	32	36	30	50	96		81	74	95	G	48	60	68	68	93	103	69	88	96	88
10	72	86		97	53	33	29	47	96	110	112	164	82	77	76	80	76	83	78	58	82	90	68	78
11	42	41	37	31	32	26	33	80	146	96	124	83	114	G	G	G	62	56	44	46	28	30	59	68
12	81	42	49	40	39		40	50	63	104	82	71	51	G	47	88	65	49	G	60	94	88	67	
13		66		65	69	75	36	127	72	77	96	68	137	141	110	G	42	75	74	64	67	63		G
14	26	29		23	G		41	95	94	117	77	90	80	153	128		124	111	144	84	65	34	43	27
15	51	37	G	32	G	36	34	81	116	69	94	44	61	94	87		90	114	160	94	83	40	27	62
16		69	69	72	57	28	35	38	44	65	G	90	62	74	137	66	94	142		94	58			98
17	46	67			34	30	41	50	54	51	82	82	65	98	98	98	89	60	48	66	40	47	42	39
18	30	G	G	31	G	G	G	35	59	70	66	102	78	75	79	79	45	60	70	68	40	26	G	G
19	66	67	42		G	39	32	39	38	40	45	50	G	61	G	62	43	58	59	39	59	24	33	23
20	G	29	26	G	G	G	G	41	46	47		G	G	G	118	78	64	78	48	43	60	67	84	68
21	40	54	43	49	40		G	G	42		56	76	57	G	65	63	77	97		93	37	53	68	68
22	67	42	33	G	30	G	31	44	49	G	G	75	46	G	G	60	79	160	146		88	96	54	53
23		84	66	70	57	58	37	G	G	66	76	48	45	G	46	G	G	G	G	39	36	43		54
24	42	60		28	48	40	55	60	40	56	58	96		G	G	60	G	G	54	42	G			44
25	40	77	42	61	35	43	44	56	64	80	68	90	52	76	146	67	50	43	50	39	60	39	26	28
26	32	58	26	G	G	34	80		G	G	G	46	G	49	45	48	84	46	35	51	28	24	26	G
27	60	G	25	54	54	G	G	36	39	G	G	B	G	G	44	G	50	46	44	36	24	38	40	51
28			61		74	48	34	40	104	44	46	52	G	G	G	G	76	68	67	33	30		42	28
29	62	38	G	26	35	41	G	42	38	44	44	65	84	60	G	G	56	54	50	61	86	42	40	52
30	46	64	26	25		G	G	38	39	44	G	G	58	88	G	58	70		G	37	83	55	44	34
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	25	27	24	27	28	25	30	28	30	28	25	28	27	30	29	27	30	29	28	29	30	27	26	28
MED	46	54	34	32	34	33	34	44	61	66	66	72	57	60	48	60	69	66	68	64	60	50	44	43
U Q	61	67	42	49	53	40	40	58	95	79	88	88	82	92	92	79	80	82	93	89	82	67	67	67
L Q	40	37	25	24	G	G	G	38	42	44	44	51	G	G	G	G	50	50	48	42	37	38	39	28

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

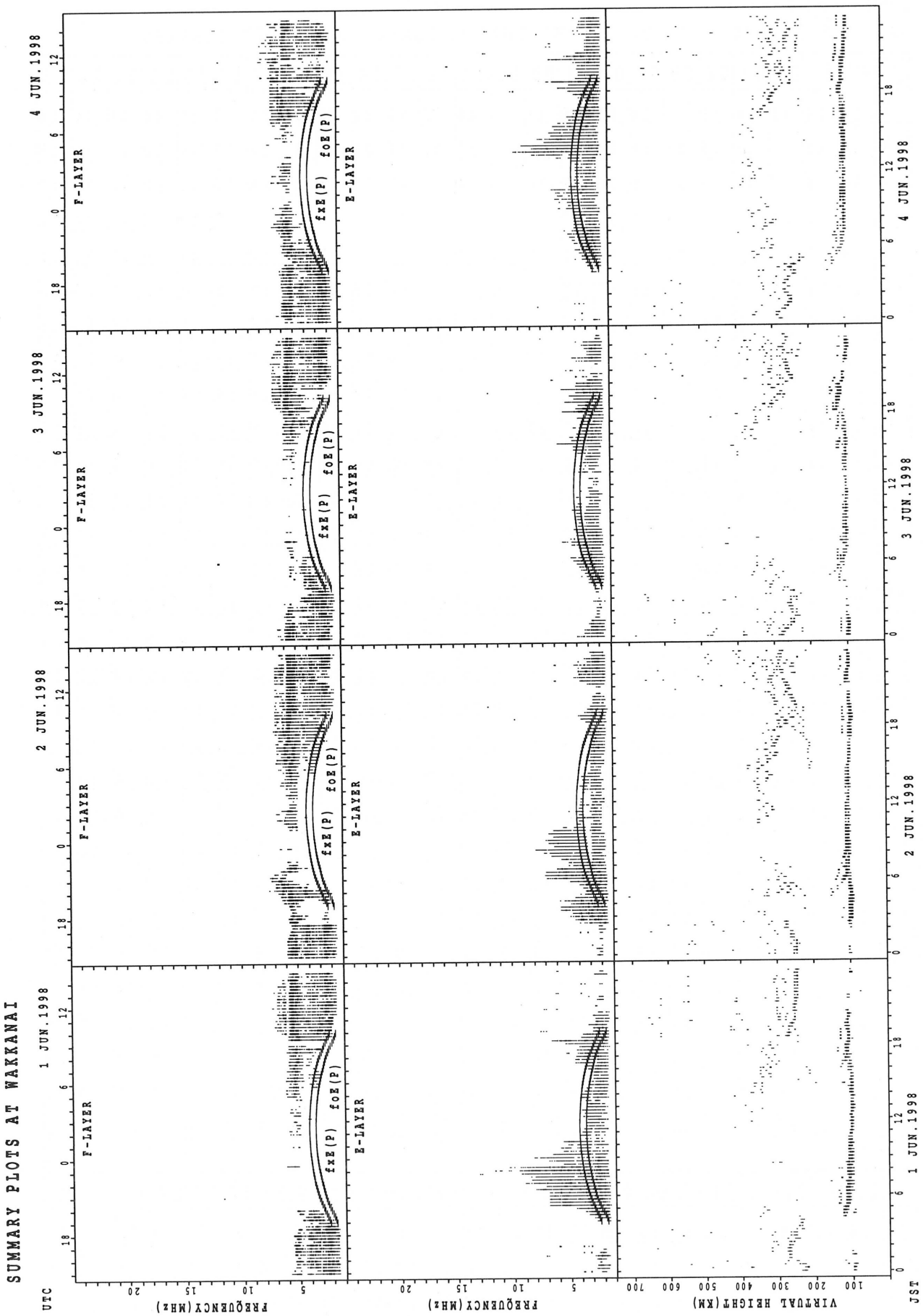
HOURLY VALUES OF fmin AT OKINAWA

JUN. 1998

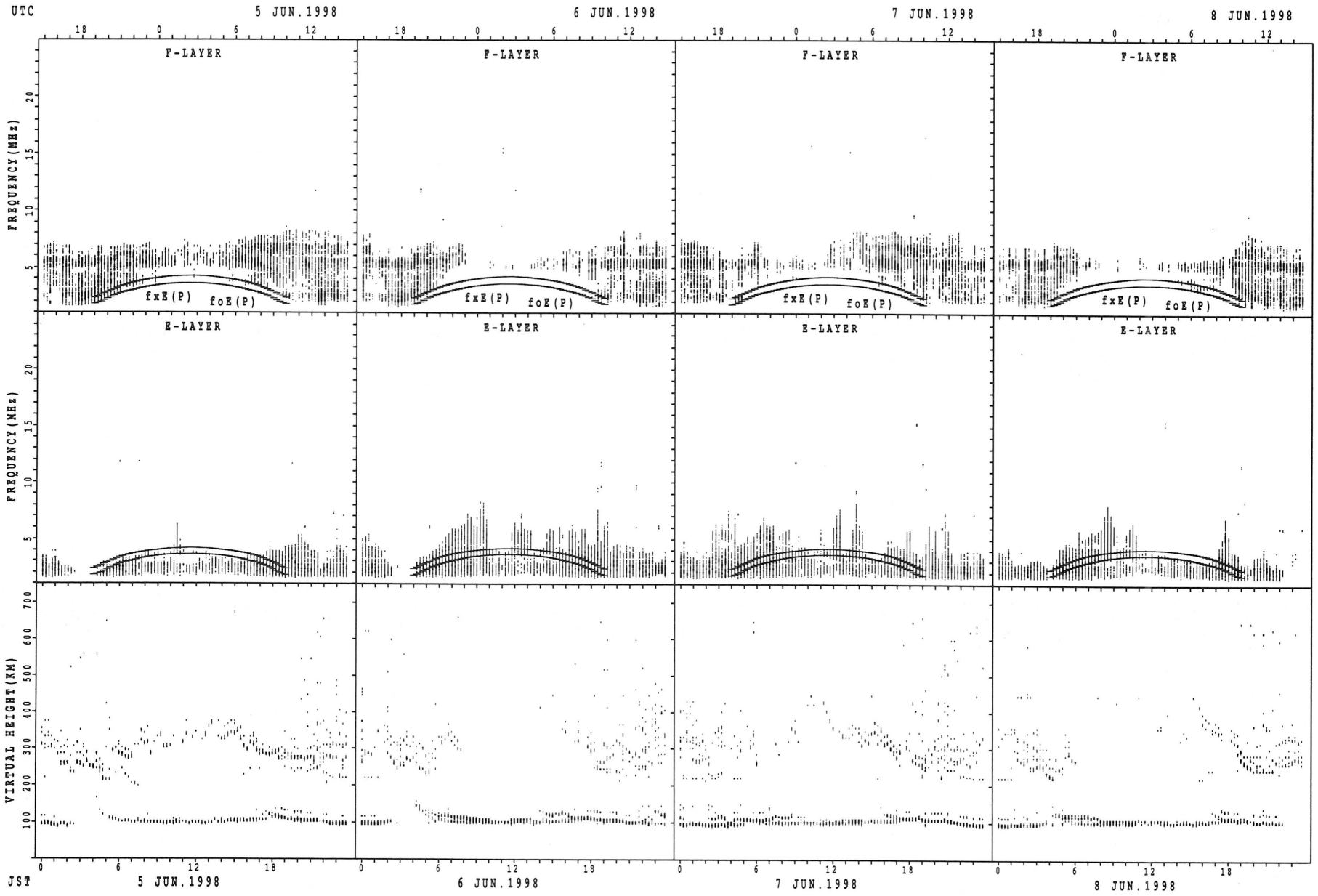
LAT. 26.3N LON. 127.8E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	14	15	14	15		14	15	18	17		28	15	39	30	29	27	17	16	15	14	14	14	14
2	14	15		15	15	16	14	14	15	15		35	35	28	32	28	23	16	15	14	14	14	15	15
3	14	14	16	16	15	17	15	16	17	18		34	36	32	30	28	23	16	15	14	14	14	16	15
4	15	14	14	14	14	14	14	15	17	27	30	37		39		34	24	18	15	14	15	14	14	14
5	14	15	14	15	26	16	22	15	16	27	33	39	41		62	38	34	17	15	15	15	15	15	15
6	14	15	15	15			15	15	15		30			46	45	42	21	18	15	14	15	14	15	15
7	14	14	14	15	14	15	15	15	16	20	27	30	40		62		39	18	15	15	15	15	15	15
8	15		15	15	16		26	15		27	29	30	C	39	32		24	17	14	14	14	14	15	15
9		14	14	14	15	15	14	14	17		30	35	35	30	29	33	24	18	15	14	15	14	14	15
10	15	14		14	14	15	14	14	15	20	30		28	29	33	29	21	17	15	14	14	14	14	14
11	14	14	14	14	15	15	17	16	18		32	28	29	54	56	28	32	16	15	14	14	14	15	14
12	15	14	15	14	14	15	15	15	20	18	28	32	30			37	18	15	14	14	14	14	15	
13		14		15	14	14	15	14	17	28	30	35	39	40	35	33	28	32	16	15	14	15	15	15
14	15	14	14	14	15		17	15	18	26	29	30	36	32	29		22	16	15	14	15	14	14	14
15	15	16	15	14	15	15	16	15	15	21	27	29	32	30	30		21	21	15	15	15	14	15	14
16		14	14	15	14	14	15	15	14	20		28	29	18	29	29	20	16		15	15	15	14	14
17	14	14			14	15	14	14	17	22	27	36	29		28	33	18	16	14	15	15	14	15	15
18	15	15	15	14	17	15	23	15	16	30	33	26	32	30	30	27	22	17	14	14	14	14	16	15
19	15	14	15	14	15	15	15	15	16	16	28	28	32	30	30	29	26	15	15	15	14	15	15	14
20	15	14	14	14	16	15	15	14	16	20	18	29	29		43	20	20	16	15	14	15	14	15	14
21	15	14	14	14	14		23	15	17	18	27	30	32		42	36	17	17		15	15	14	14	14
22	15	14	14	15	14	17	15	15	16	17	23	27	29	32			18	15	14	14	14	14	15	15
23	14	14	14	15	15	14	14	14	17	20	24	28	28		36		21	17	14	14	14	14		14
24	15	14	14	14	14	14	14	14	16	18	29	27	32		52	39	18	16	15	14	15	15		15
25	14	14	14	14	15	14	16	14	17	17	27	30	34	38	29	29	26	16	15	14	15	15	15	14
26	15	15	14	17	15	17	27	16	16	20		30		30	28	27	17	16	14	14	14	14	15	16
27	14	14	15	14	14	17	21	14	15	18	27		30	29		28	32	16	15	15	15	14	14	14
28			15		15	16		14	16	20	28	29	34		29	28	27	17	14	14	15	14	15	15
29	15	15	14	14	15	14	14	15	15	20	29	30	33		28	28	18	16	16	14	14	14	14	14
30	14	15	15	15		14		15	18	24	28		29	34	30	26	23	16	14	14	14	15	14	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	26	28	26	28	28	25	28	30	29	27	25	26	26	20	26	24	30	30	28	30	30	30	28	29
MED	15	14	14	14	15	15	15	15	16	20	28	30	32	32	30	29	22	16	15	14	14	14	15	15
U Q	15	15	15	15	15	16	17	15	17	24	30	34	35	39	42	33	26	17	15	15	15	15	15	15
L Q	14	14	14	14	14	14	14	14	15	18	27	28	29	30	29	28	20	16	14	14	14	14	14	14

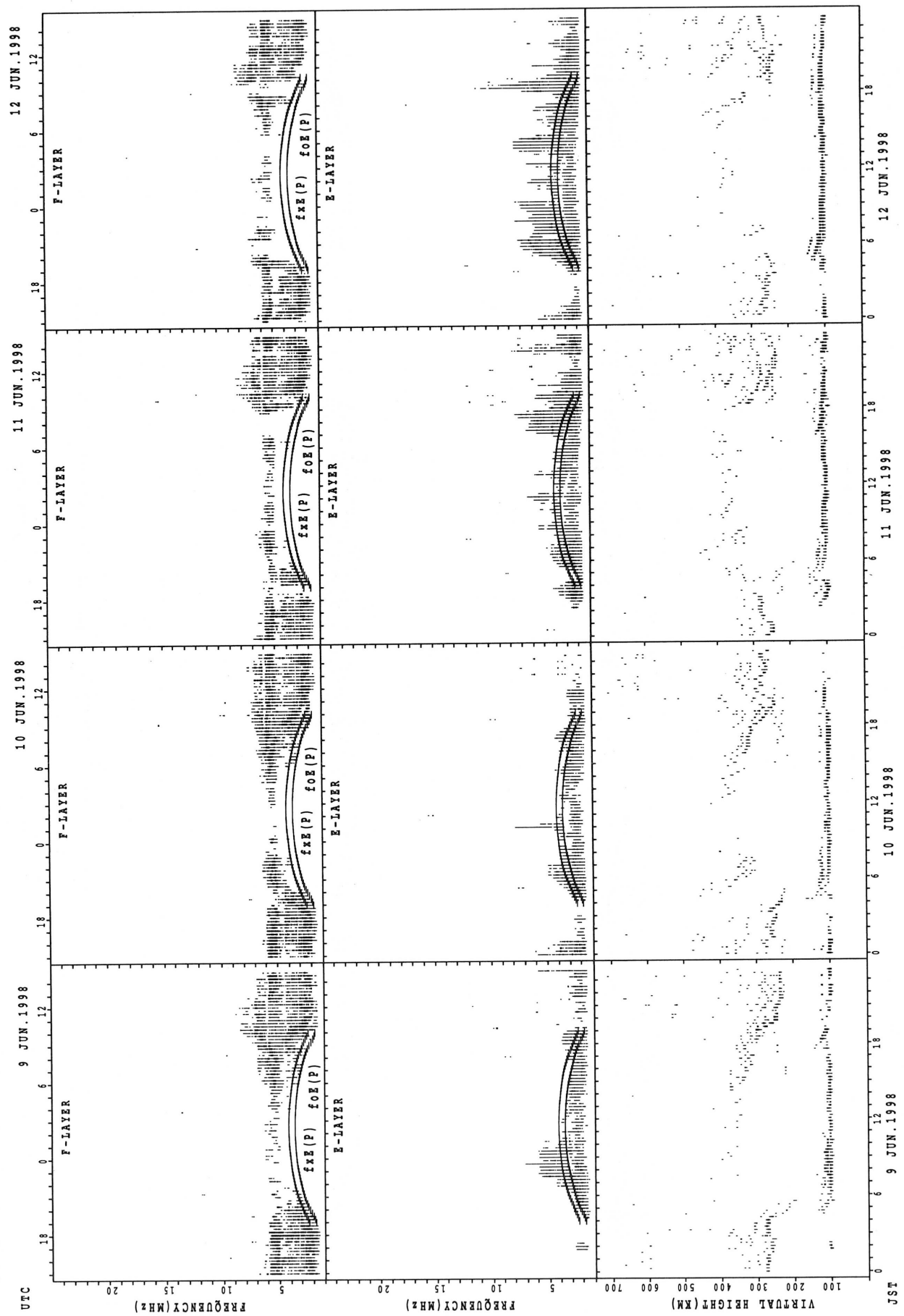
COMMUNICATIONS RESEARCH LABORATORY, JAPAN


SUMMARY PLOTS AT WAKKANAI
1 JUN.1998
2 JUN.1998
3 JUN.1998
4 JUN.1998
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

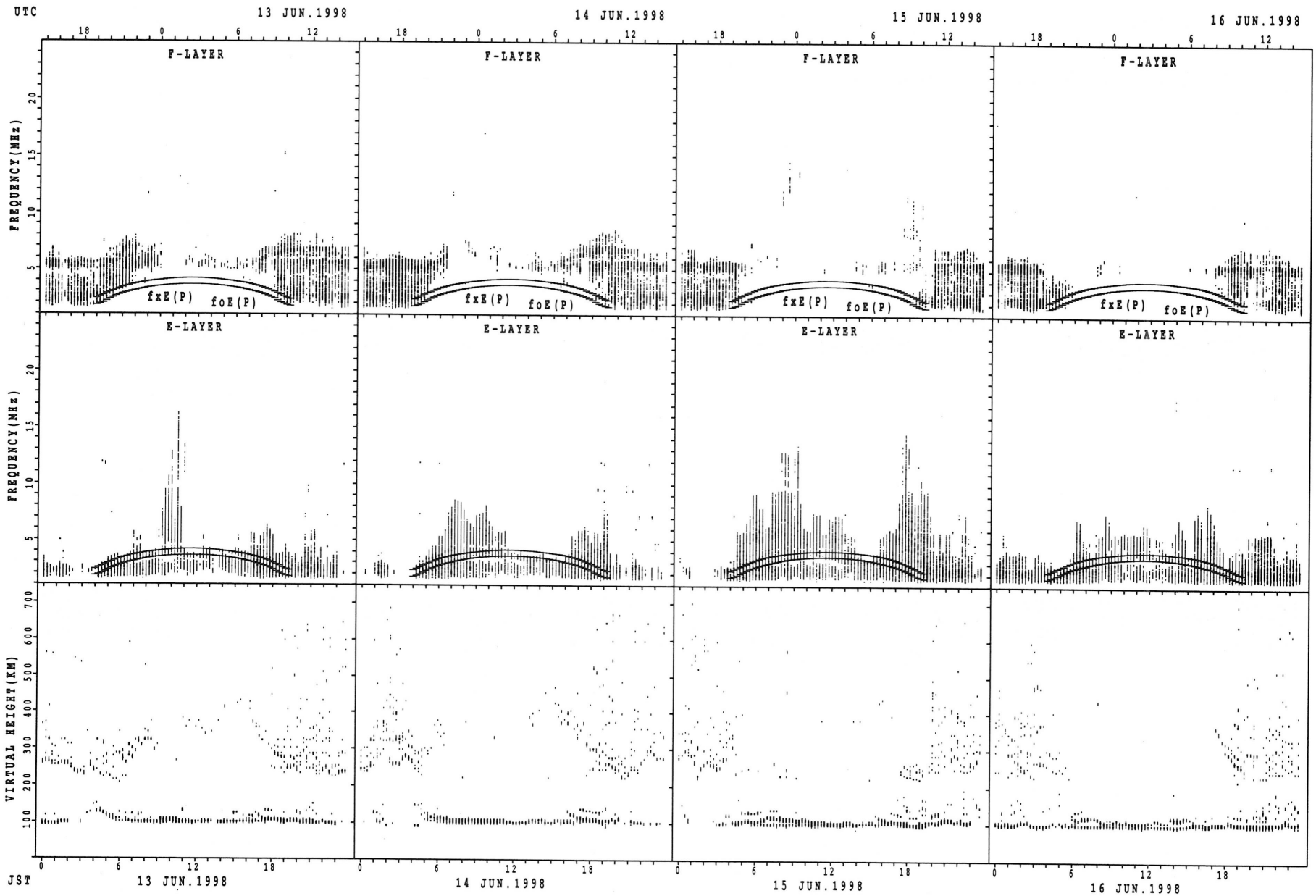
SUMMARY PLOTS AT WAKKANAI



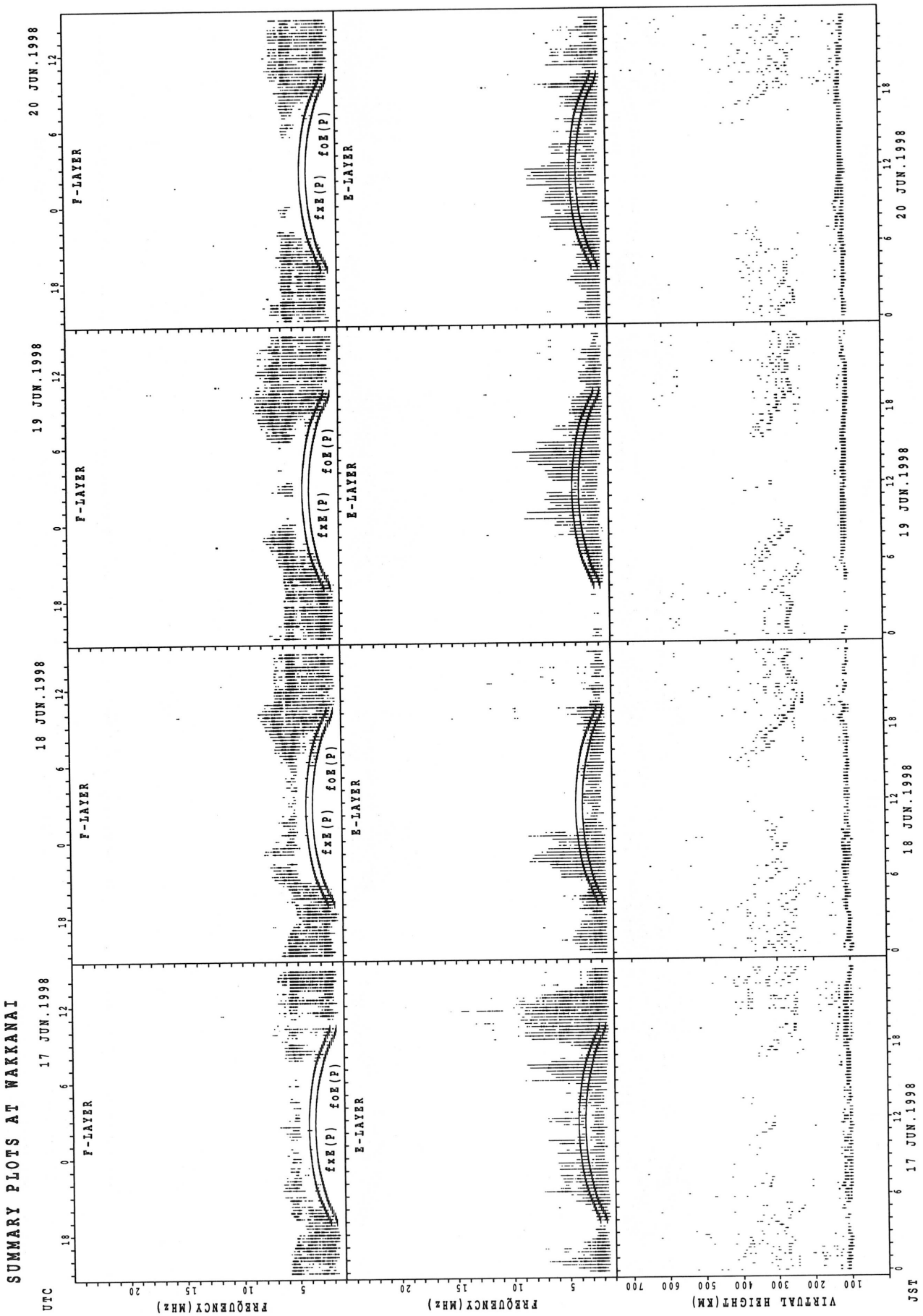
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
9 JUN.1998
10 JUN.1998
11 JUN.1998
12 JUN.1998
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

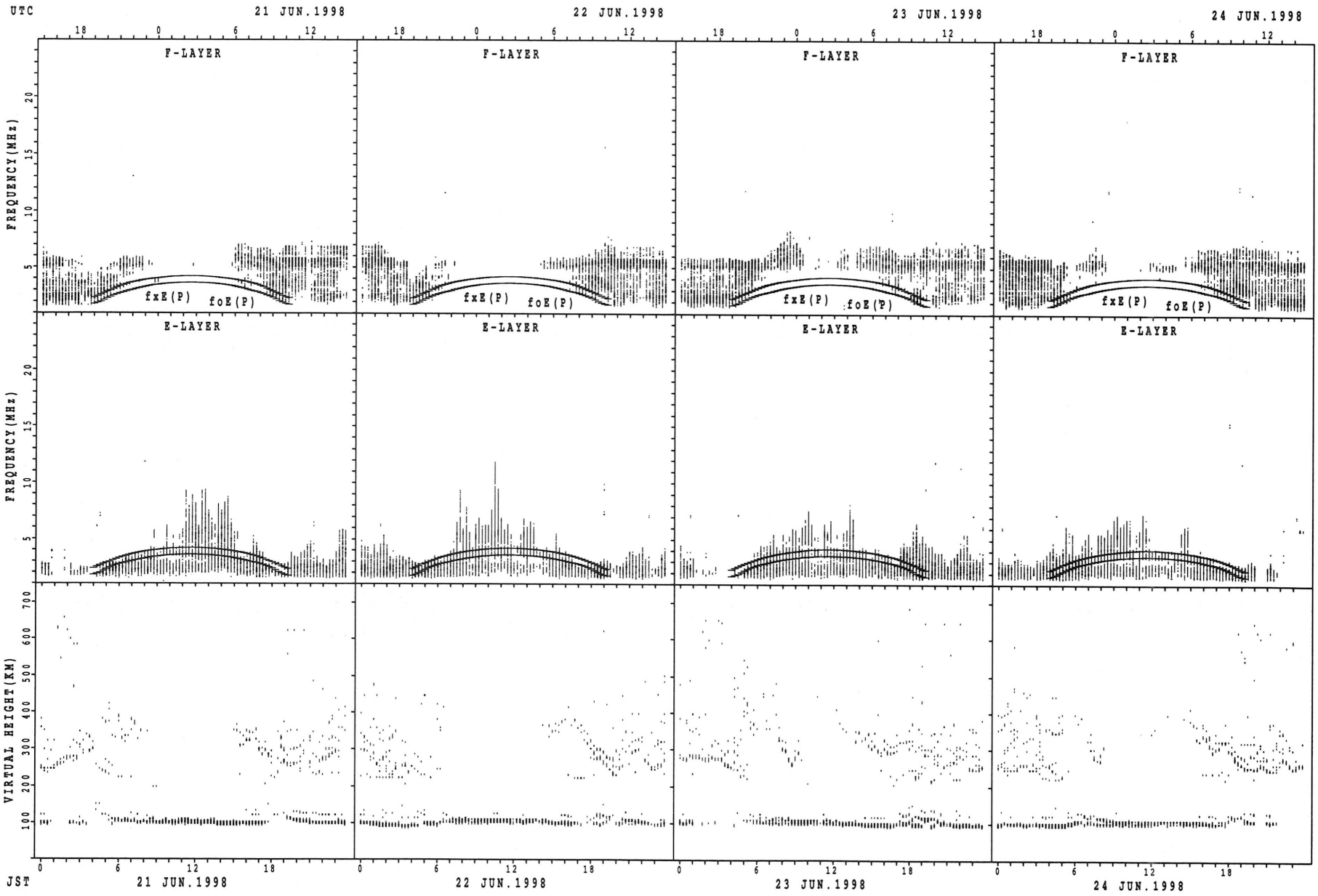
SUMMARY PLOTS AT WAKKANAI



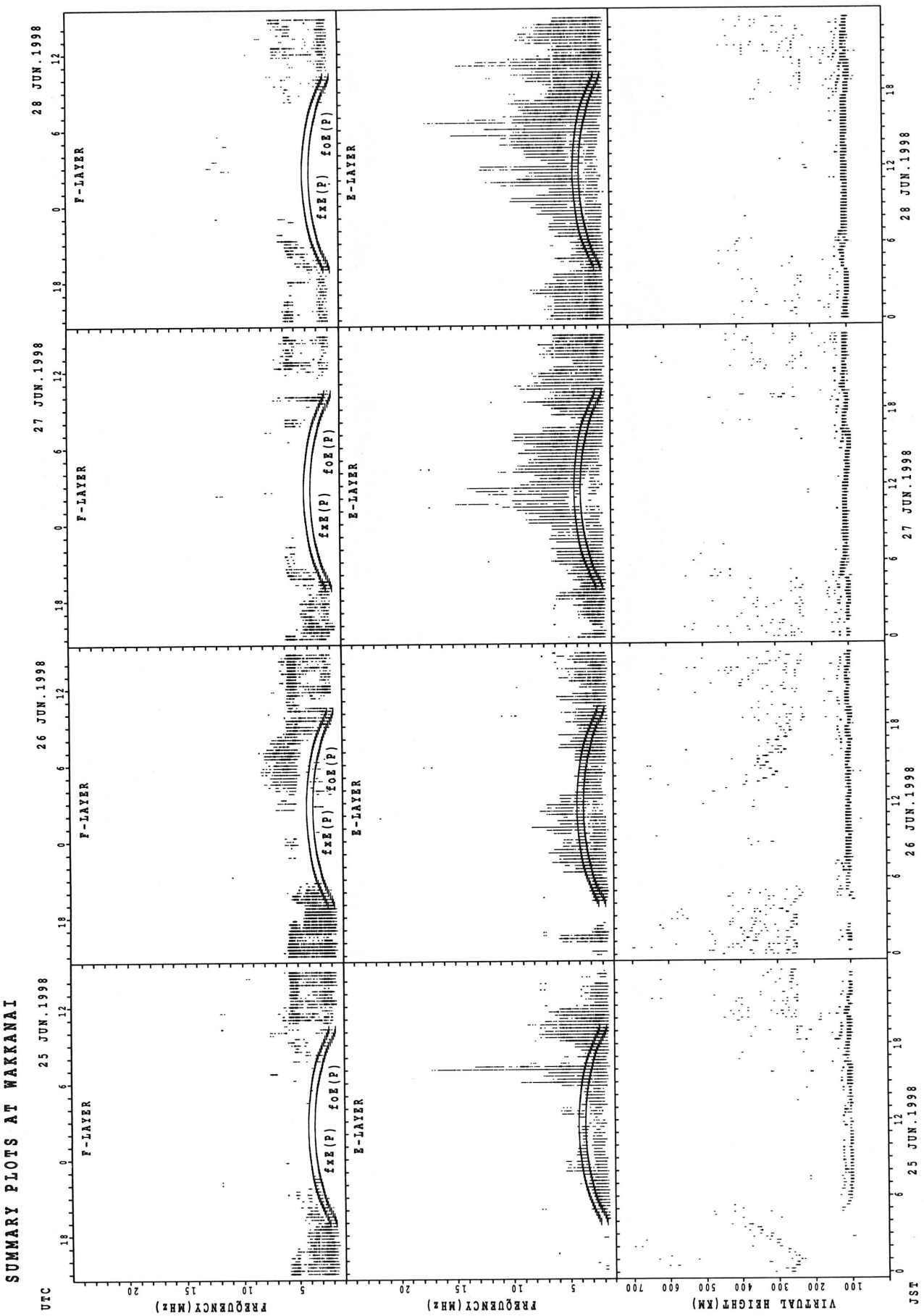
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
17 JUN.1998
18 JUN.1998
19 JUN.1998
20 JUN.1998
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

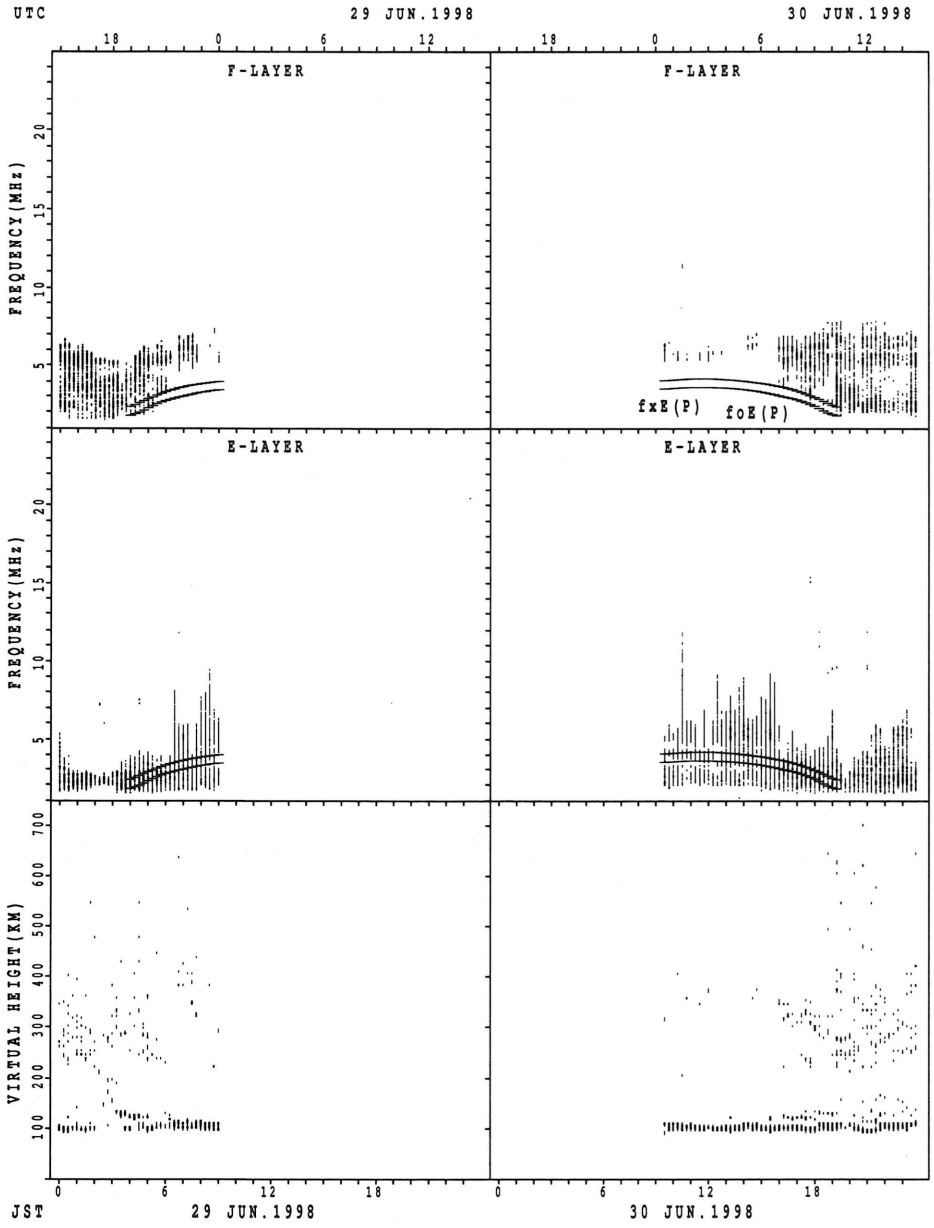
SUMMARY PLOTS AT WAKKANAI



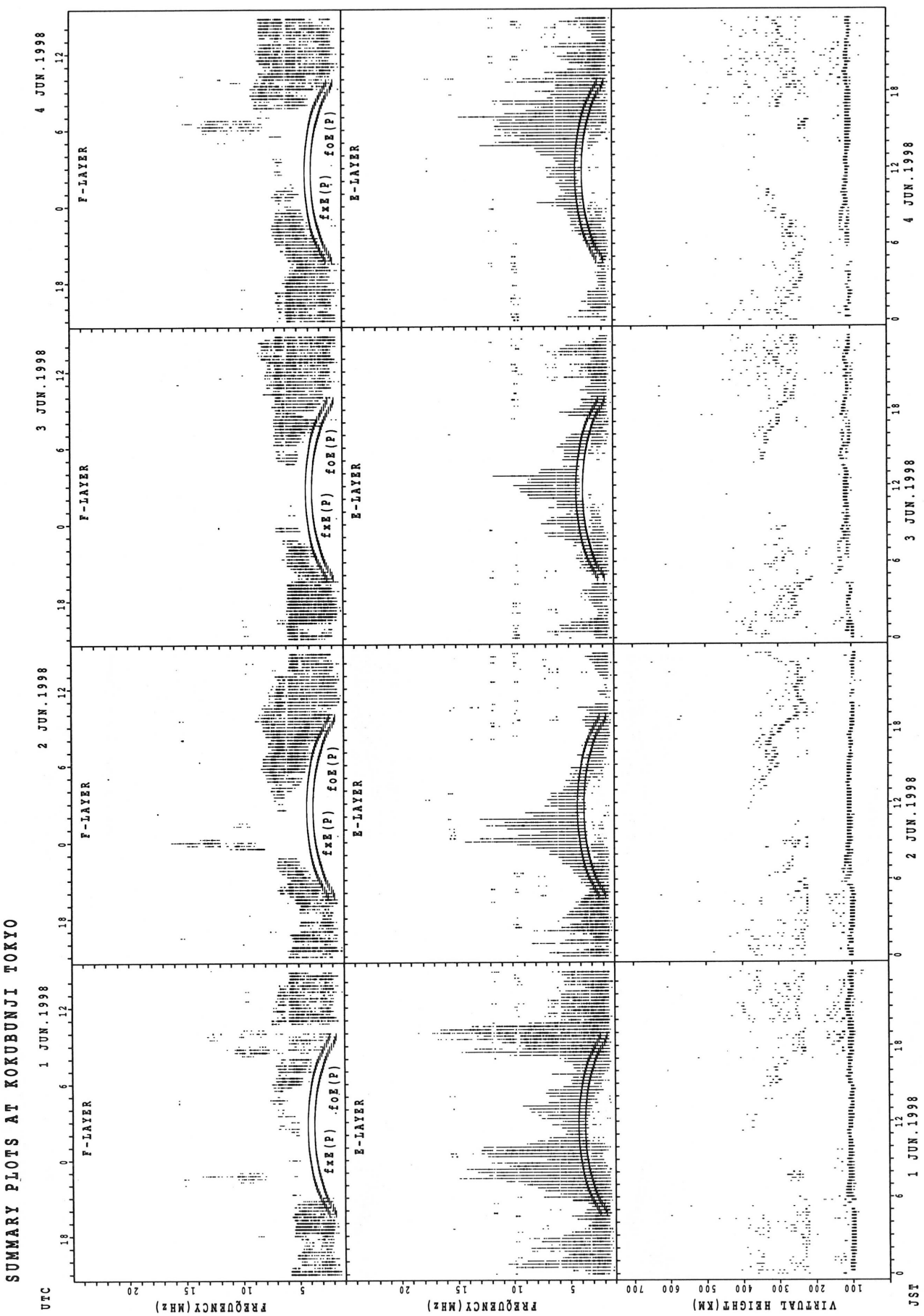
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
25 JUN.1998
26 JUN.1998
27 JUN.1998
28 JUN.1998
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

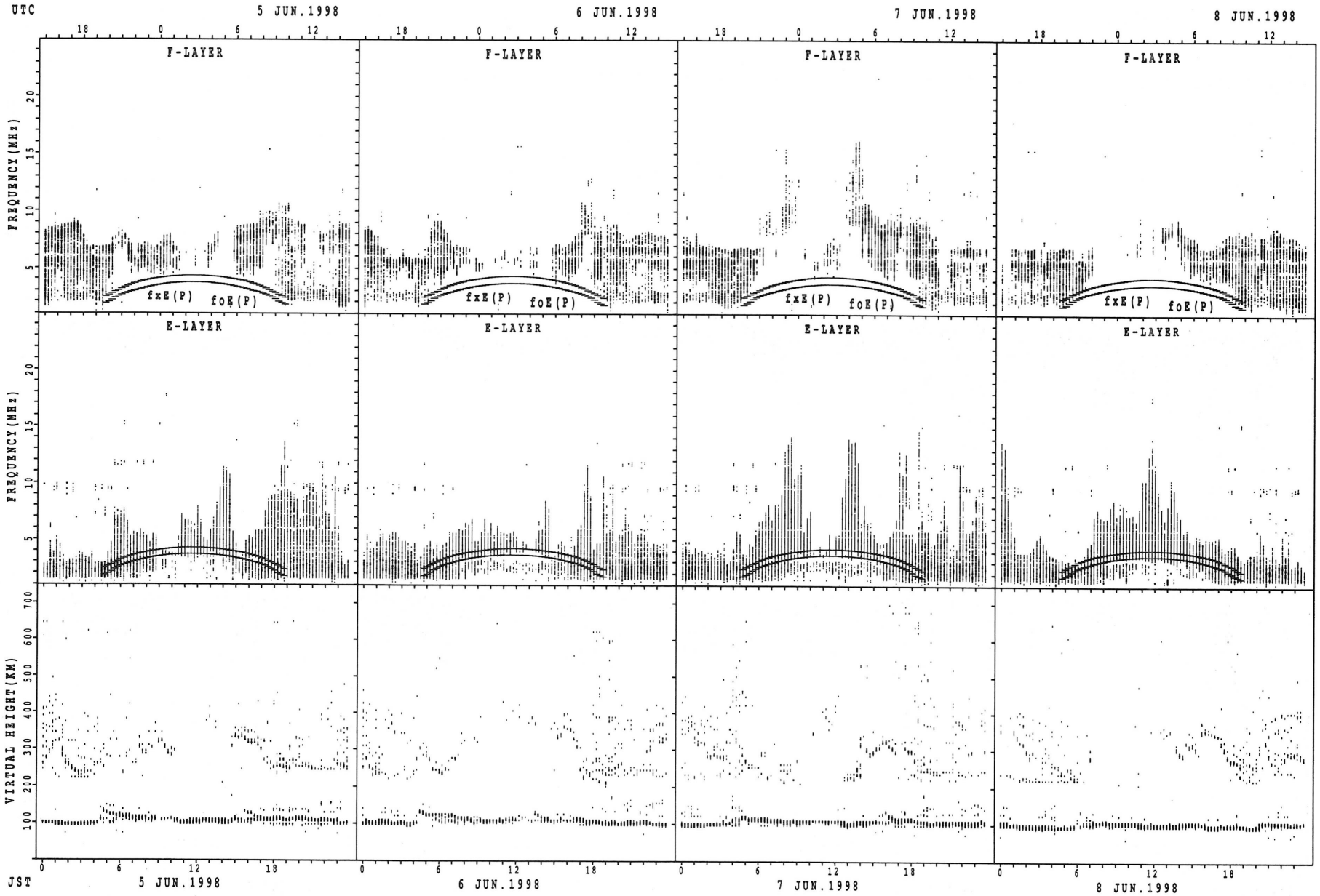
SUMMARY PLOTS AT WAKKANAI



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

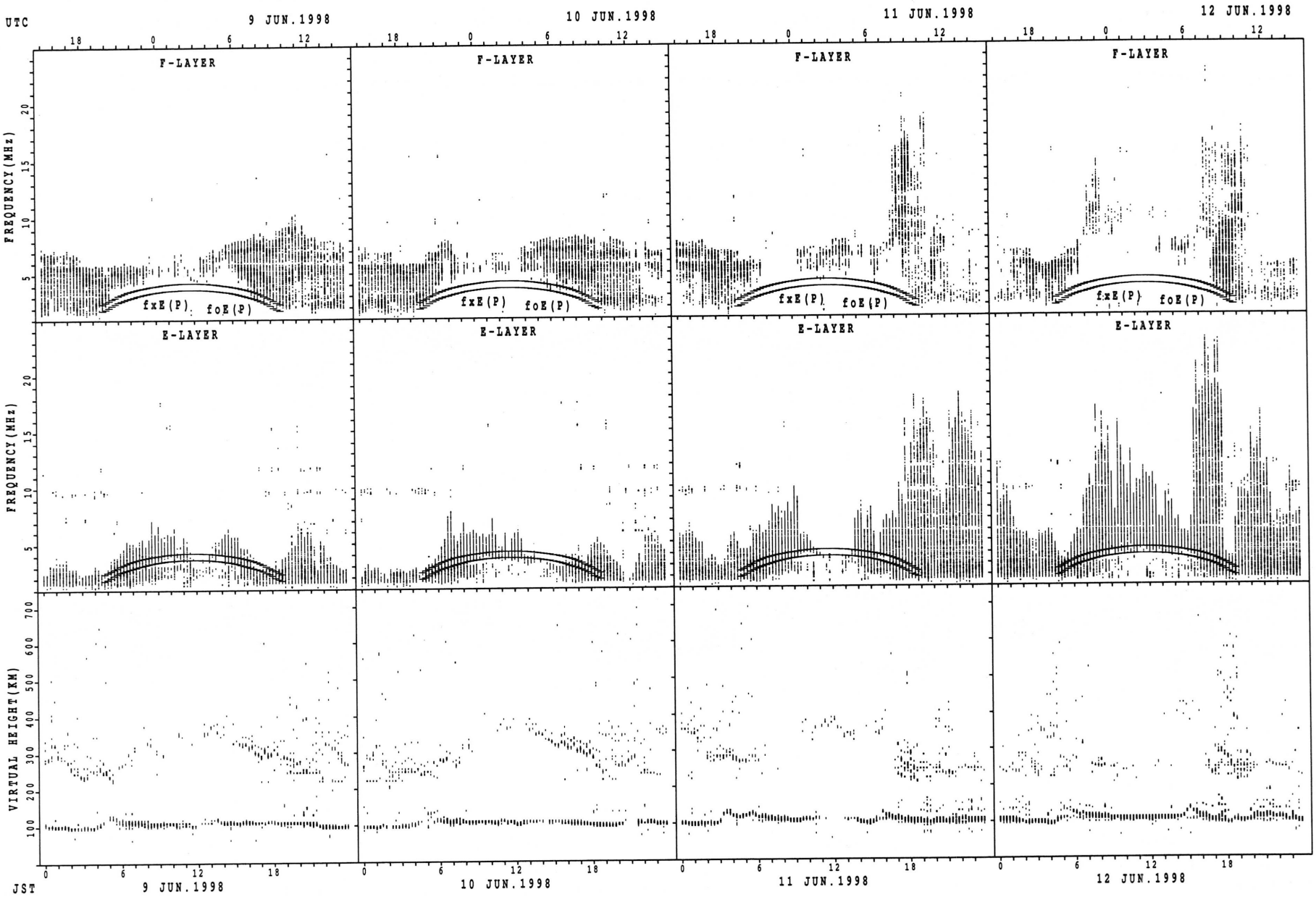

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
1 JUN.1998
2 JUN.1998
3 JUN.1998
4 JUN.1998
F-LAYER
E-LAYER
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



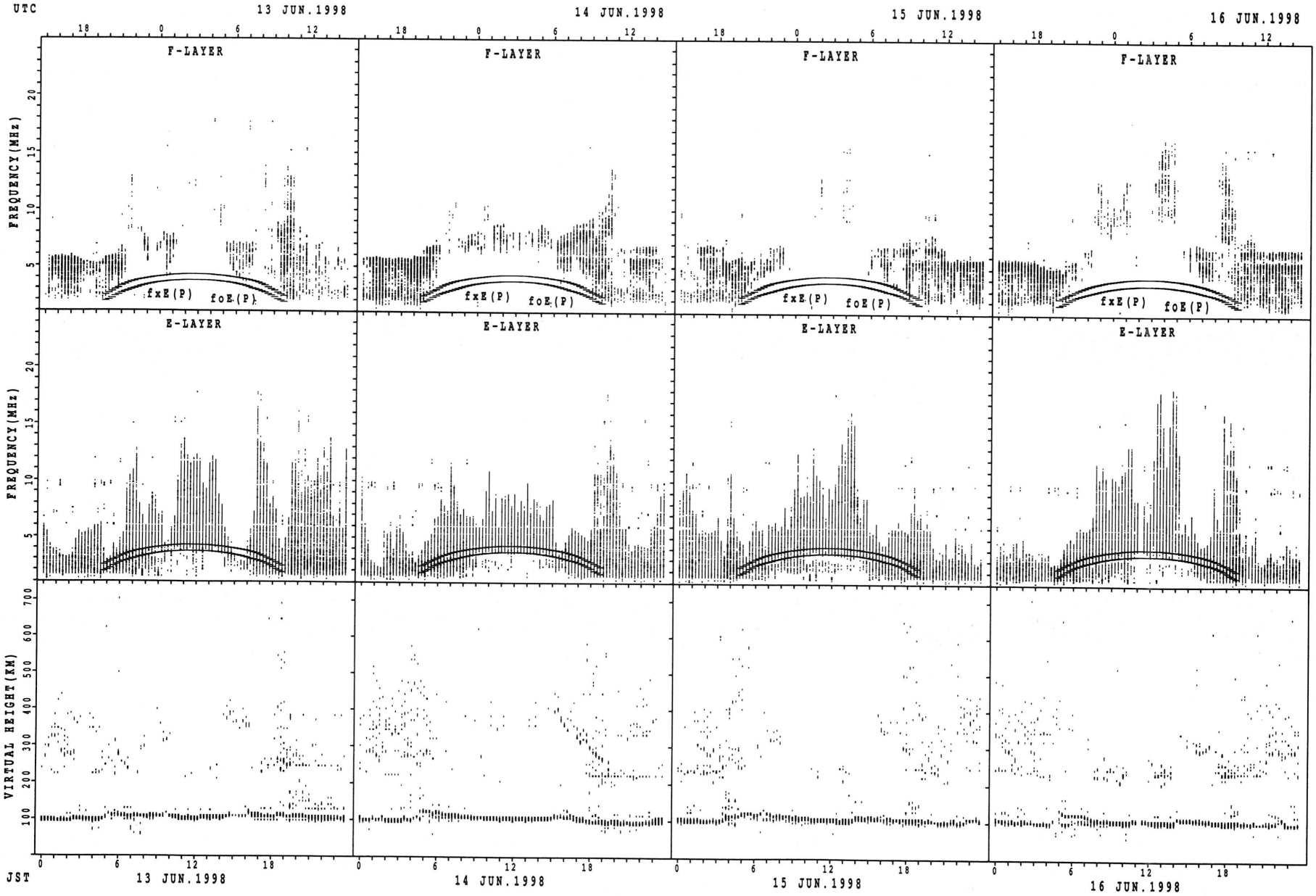
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

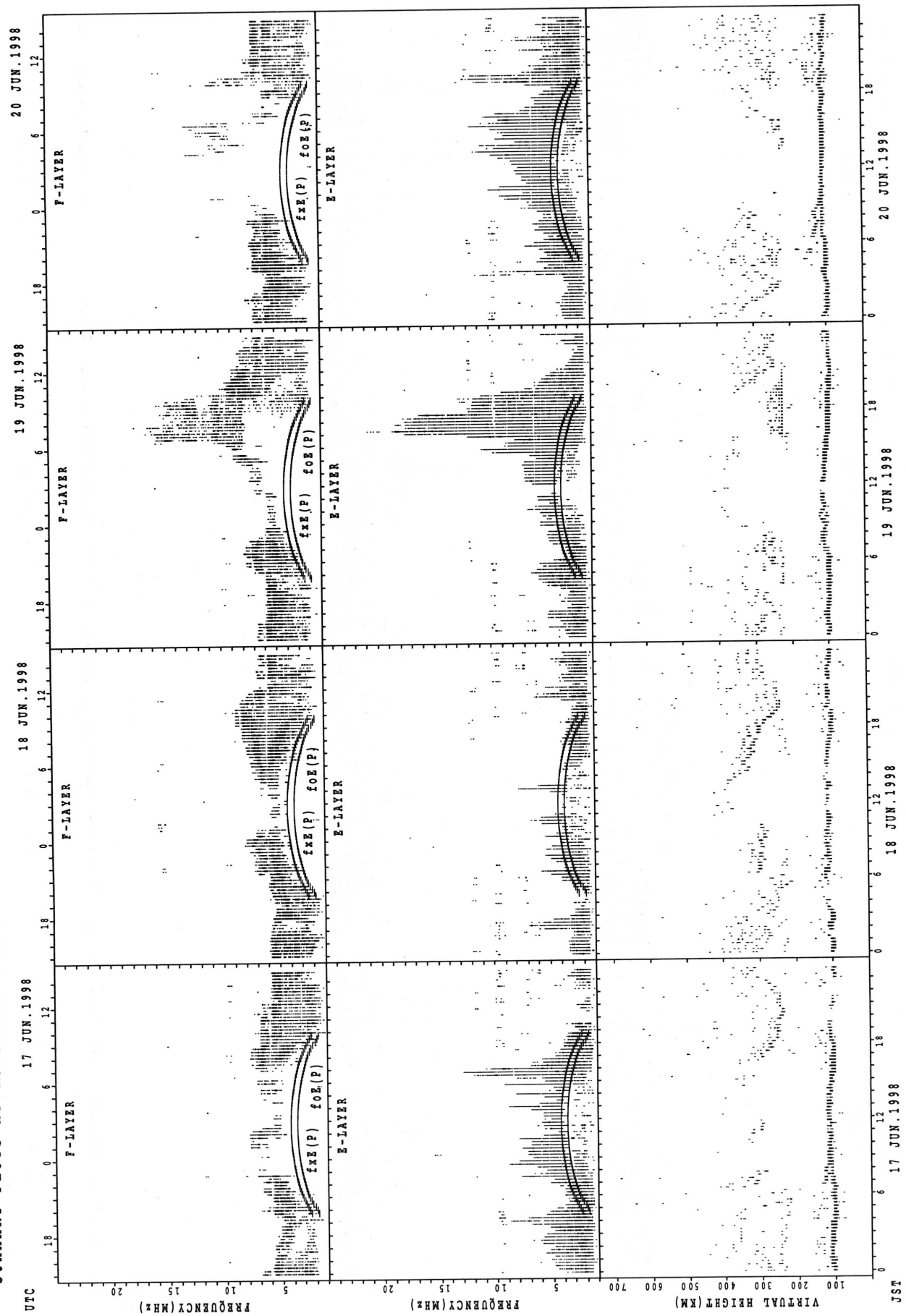


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

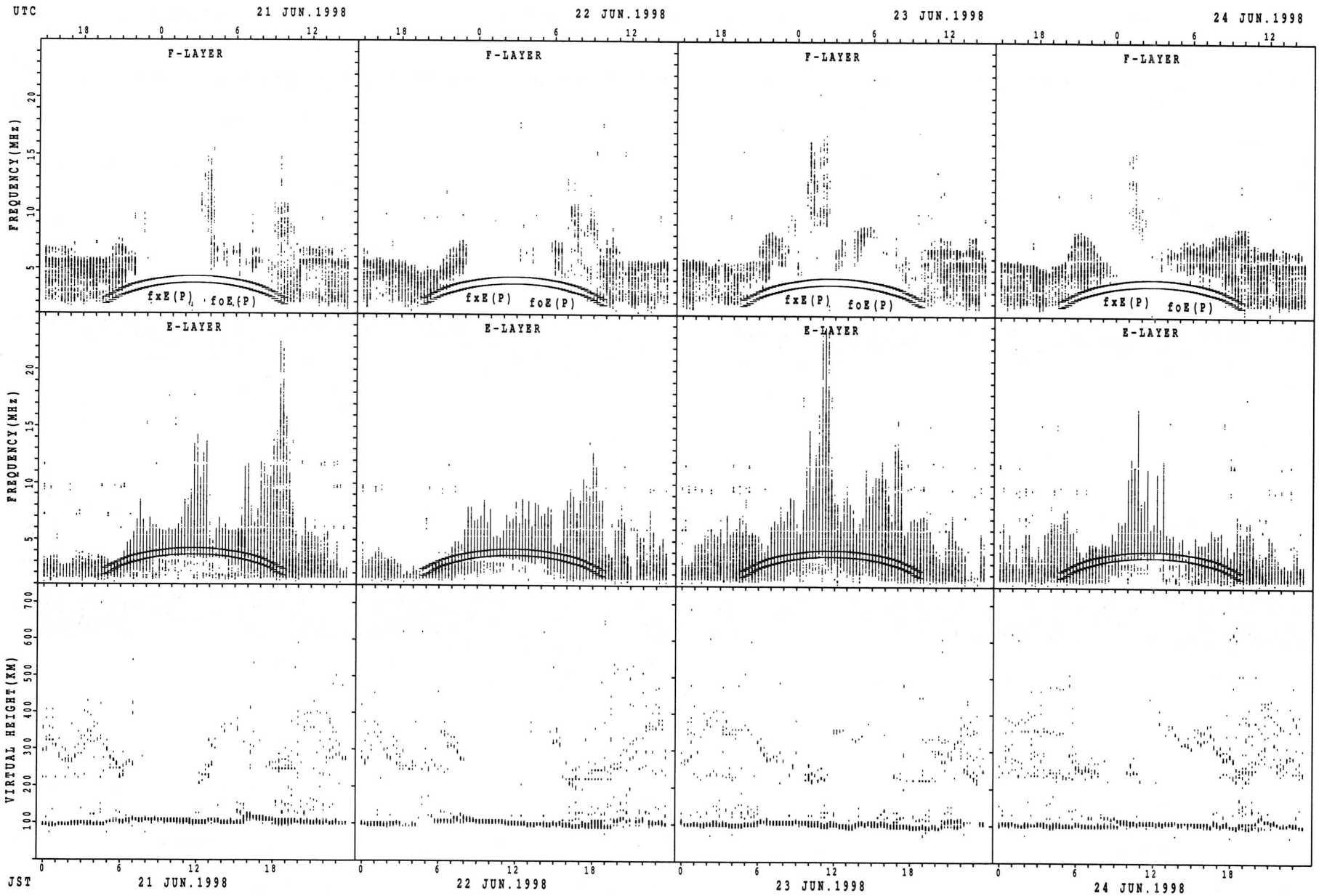
SUMMARY PLOTS AT KOKUBUNJI TOKYO



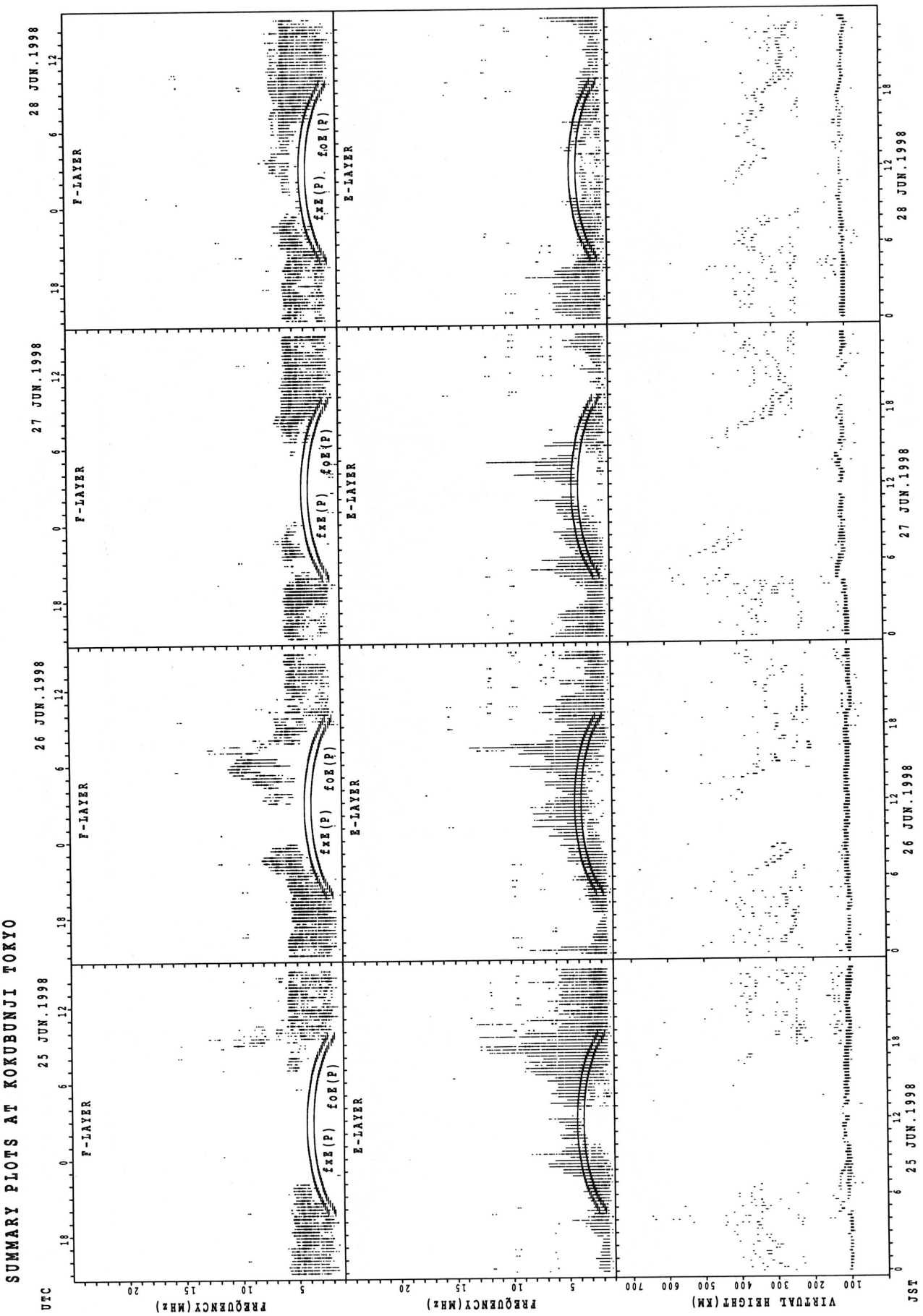
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
17 JUN.1998
18 JUN.1998
19 JUN.1998
20 JUN.1998
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

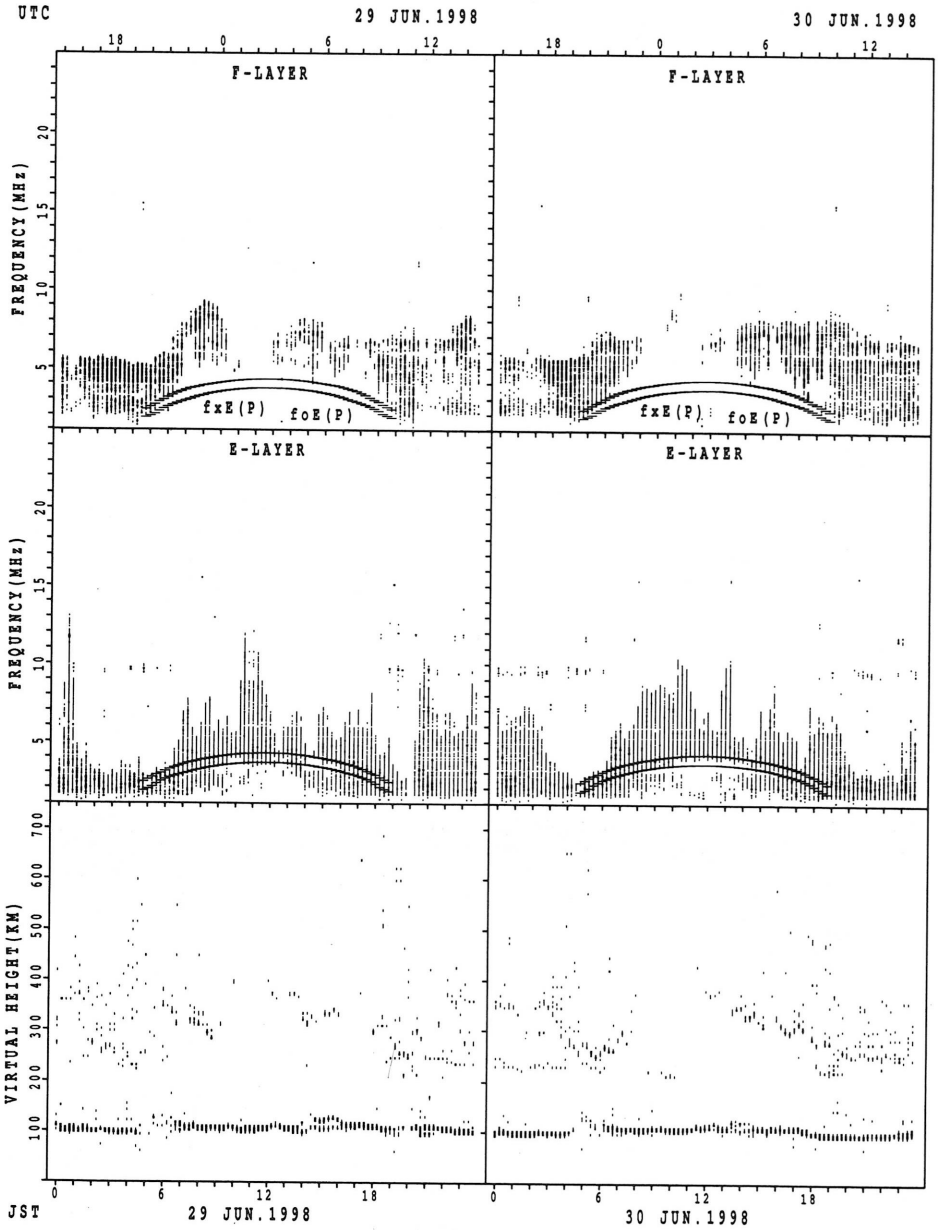
SUMMARY PLOTS AT KOKUBUNJI TOKYO



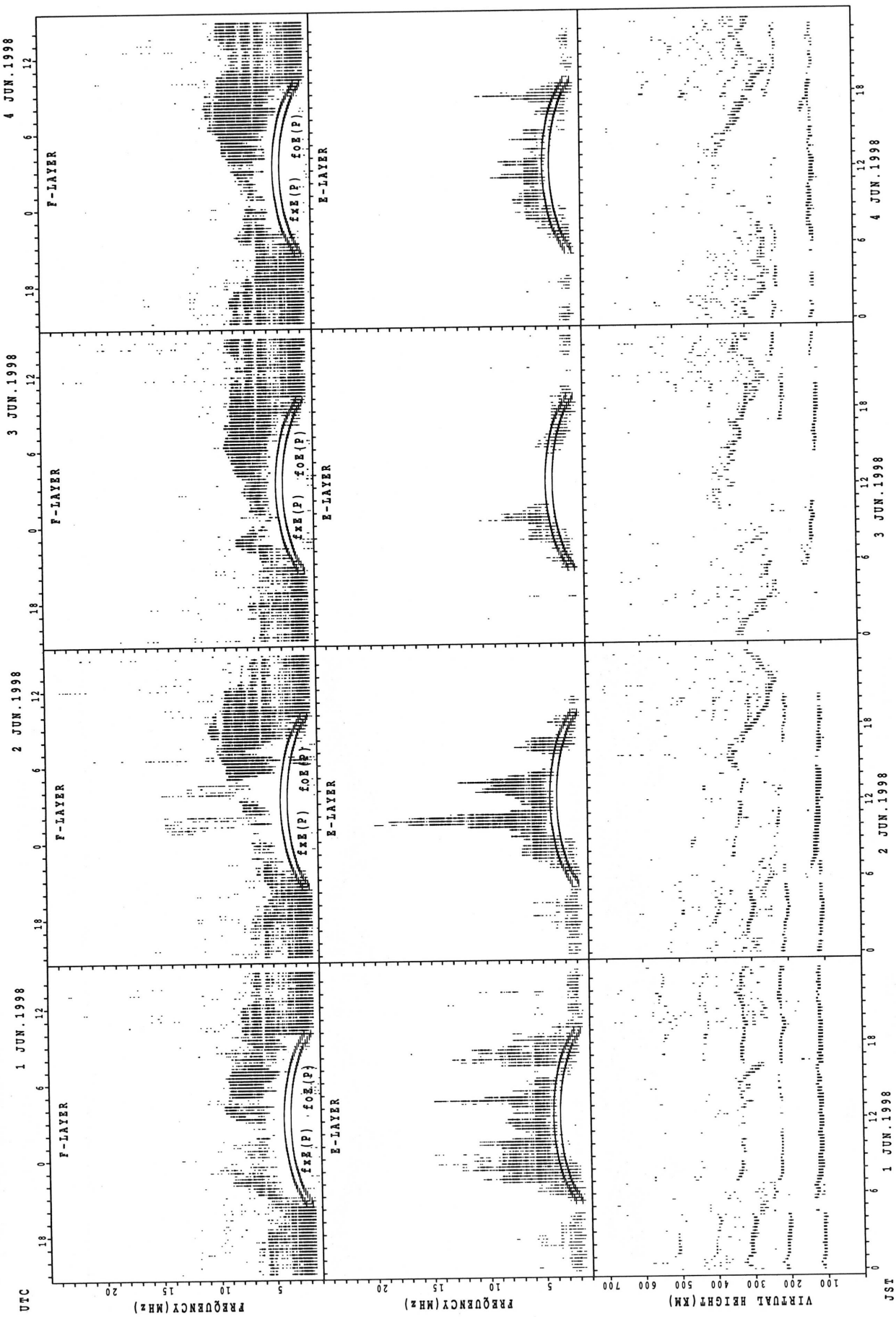
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
25 JUN.1998
26 JUN.1998
27 JUN.1998
28 JUN.1998
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

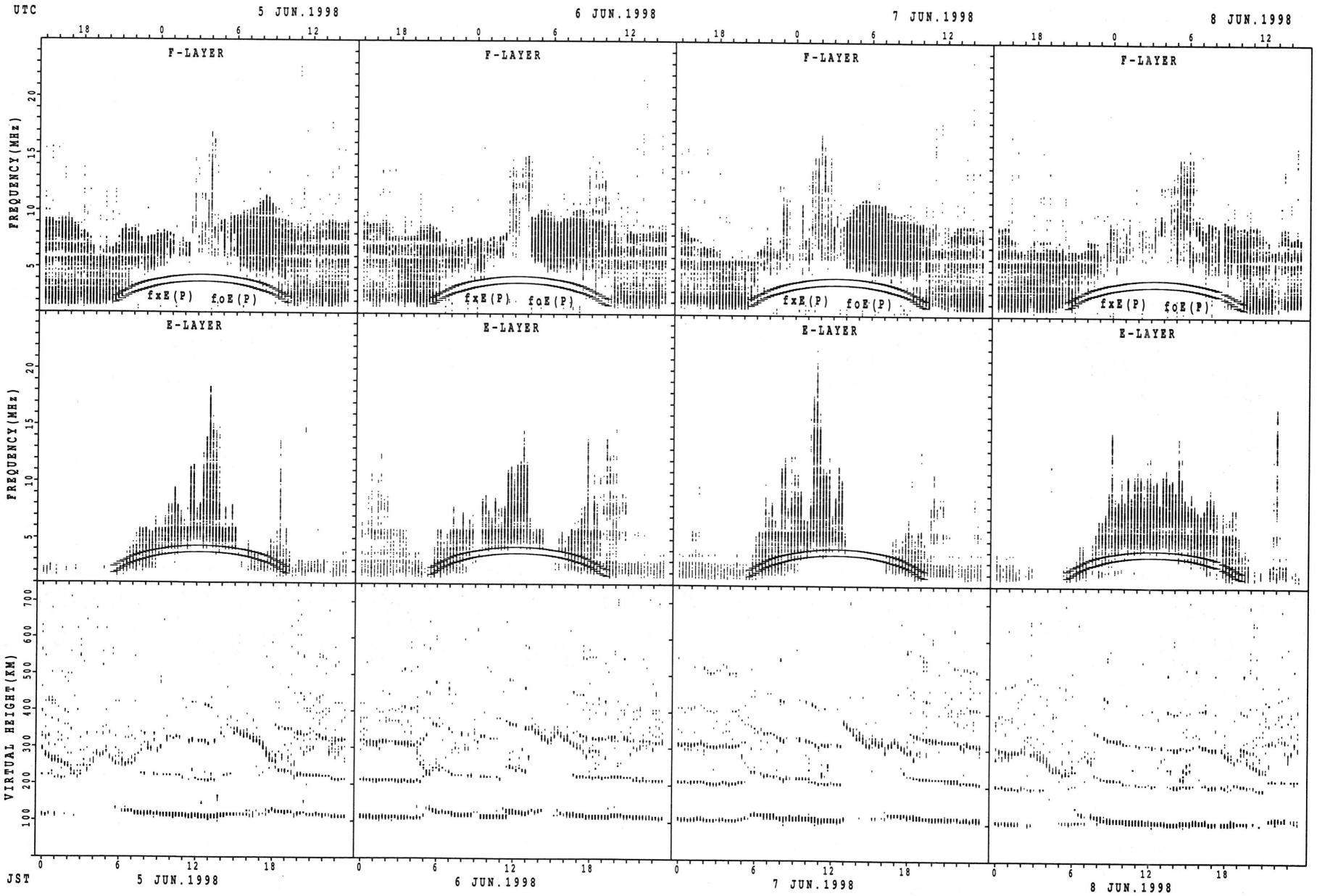
SUMMARY PLOTS AT KOKUBUNJI TOKYO



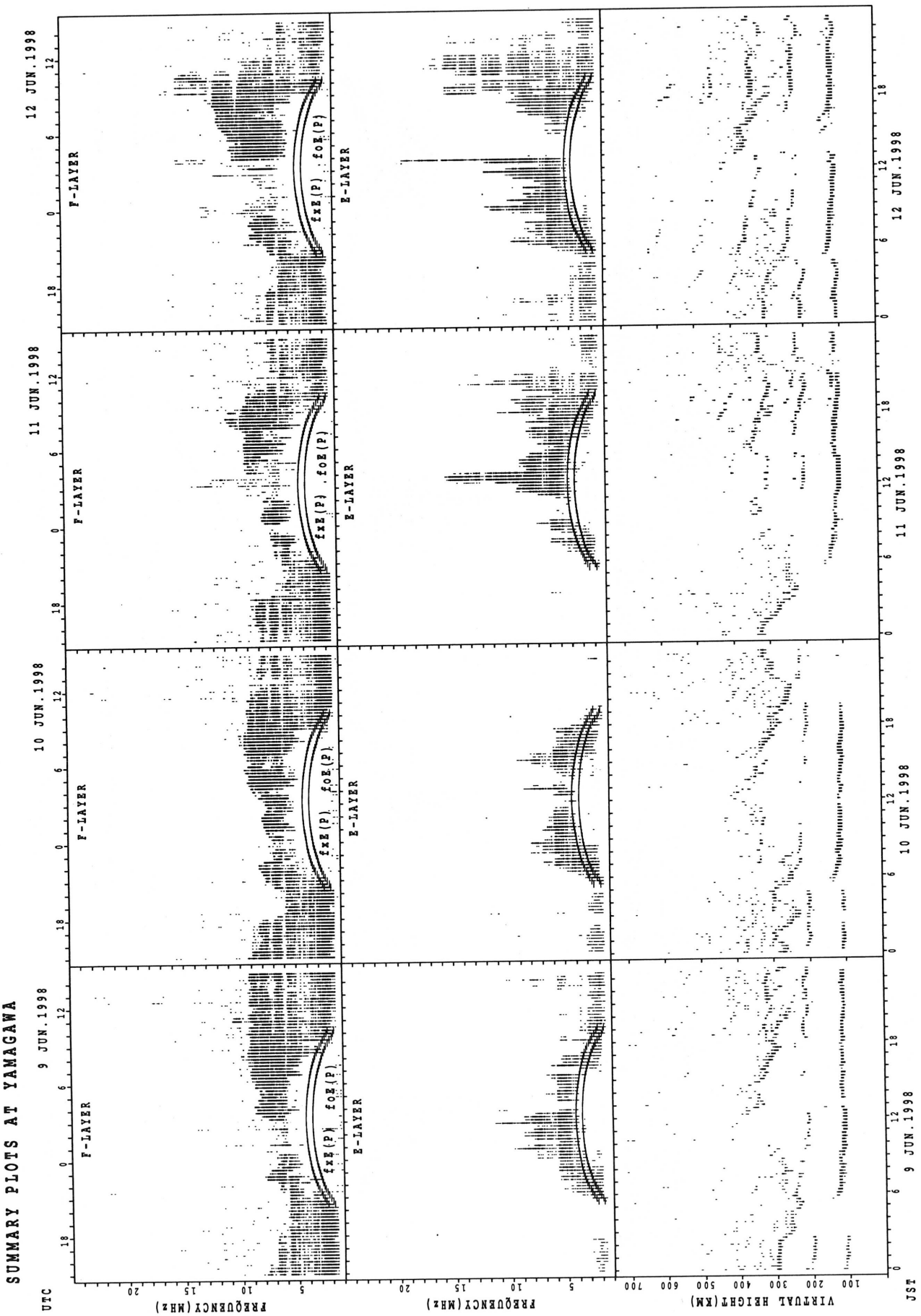
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
1 JUN.1998
2 JUN.1998
3 JUN.1998
4 JUN.1998
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
UTC
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

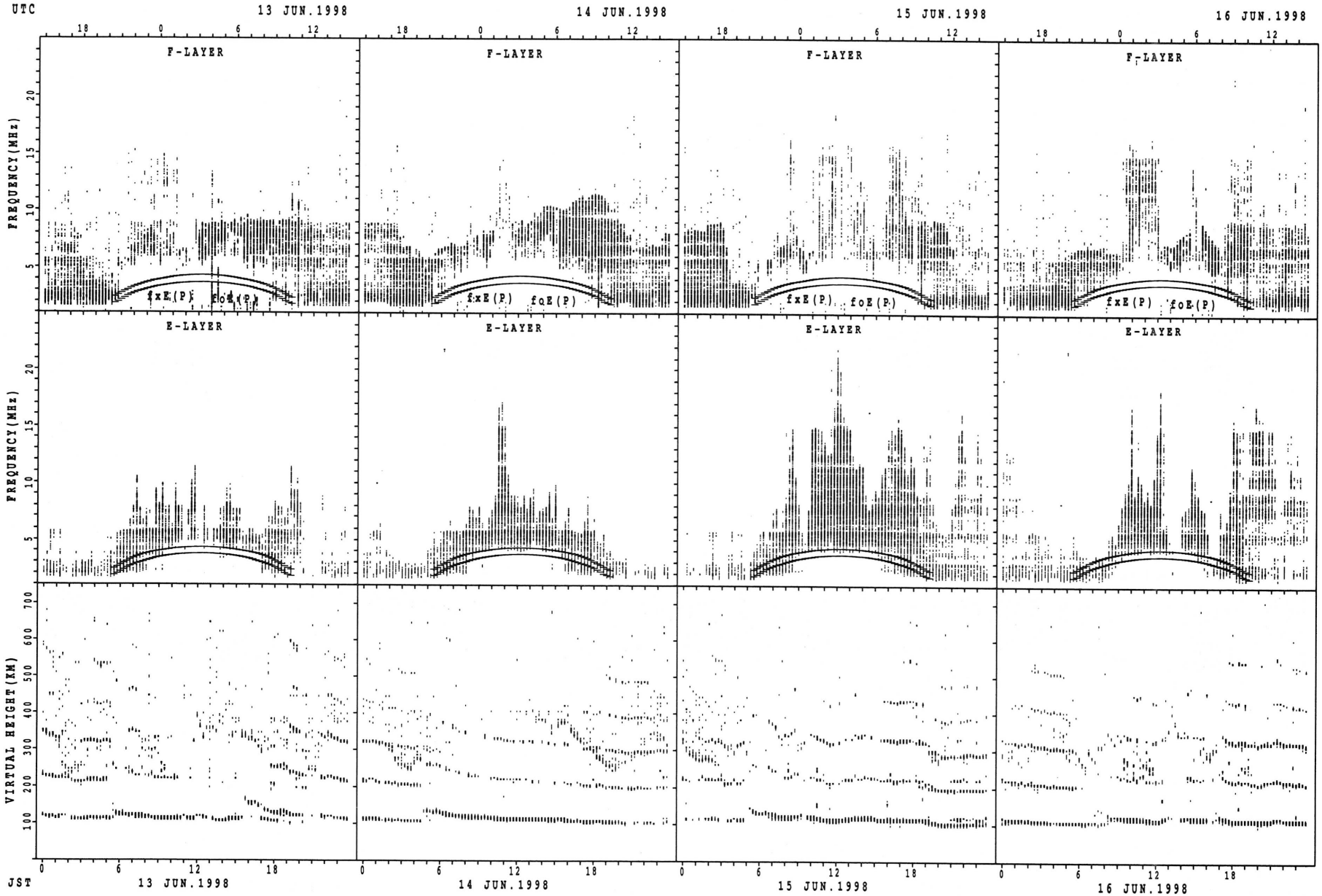
SUMMARY PLOTS AT YAMAGAWA



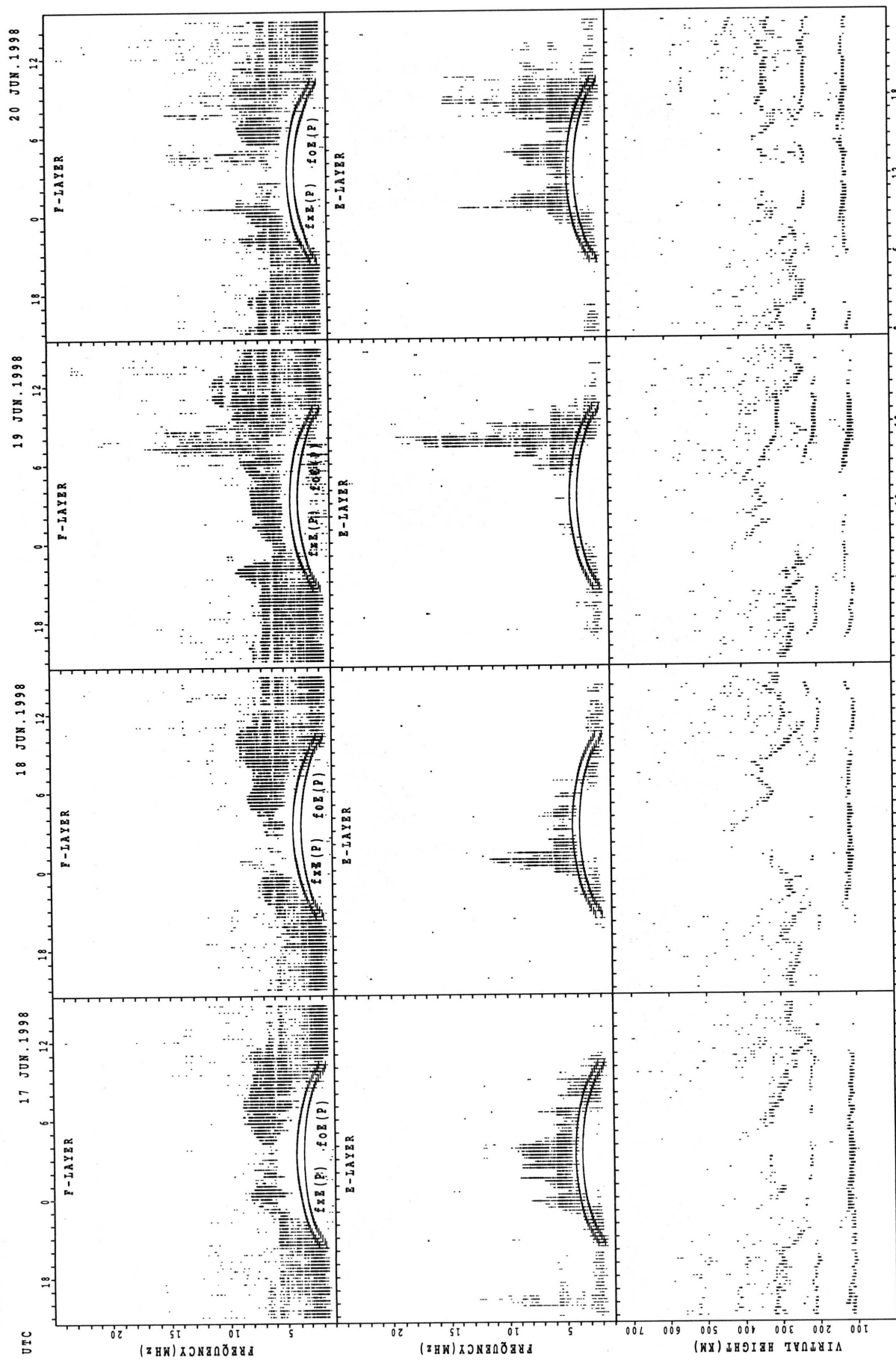
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
9 JUN.1998
10 JUN.1998
11 JUN.1998
12 JUN.1998
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

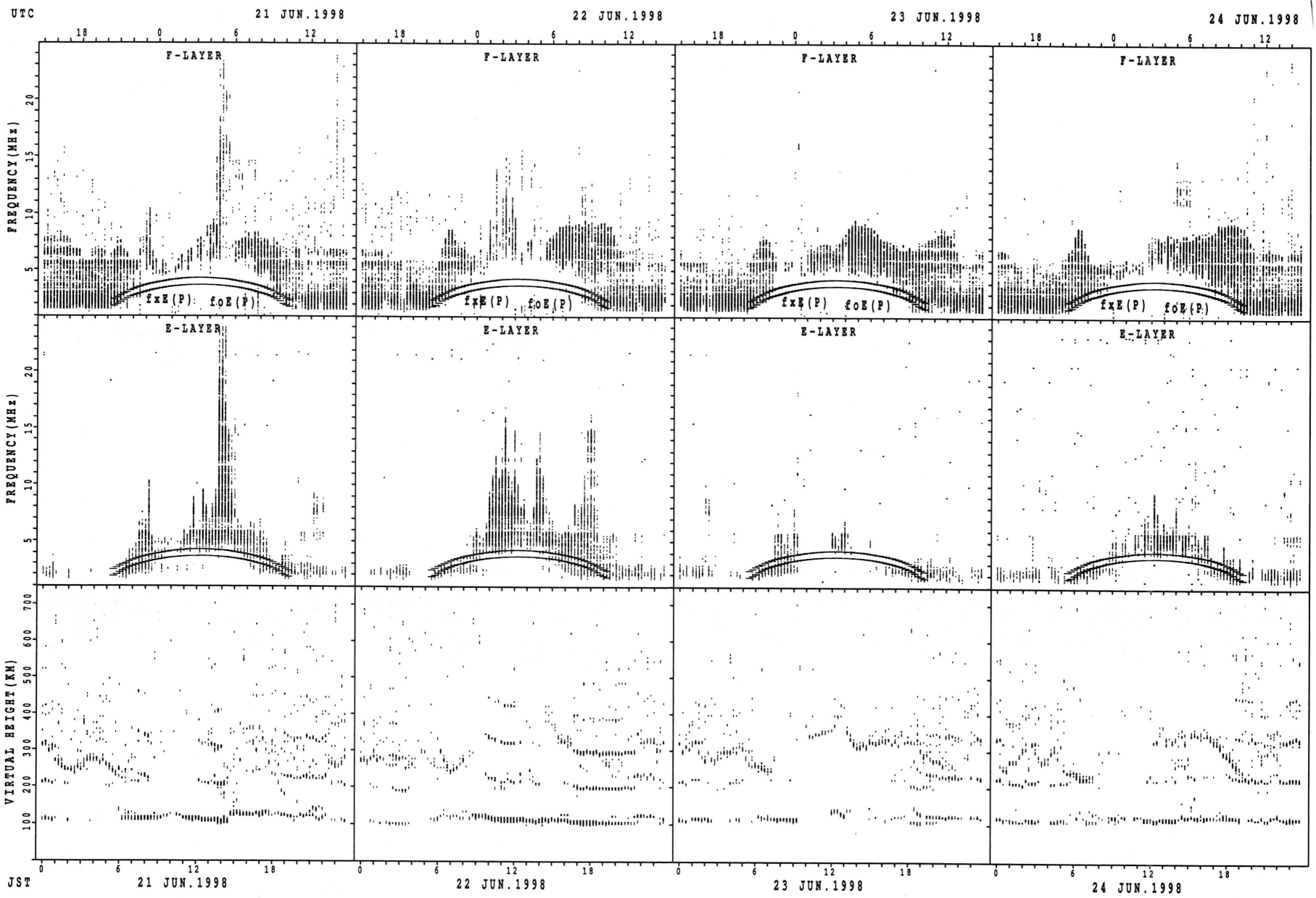
SUMMARY PLOTS AT YAMAGAWA



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

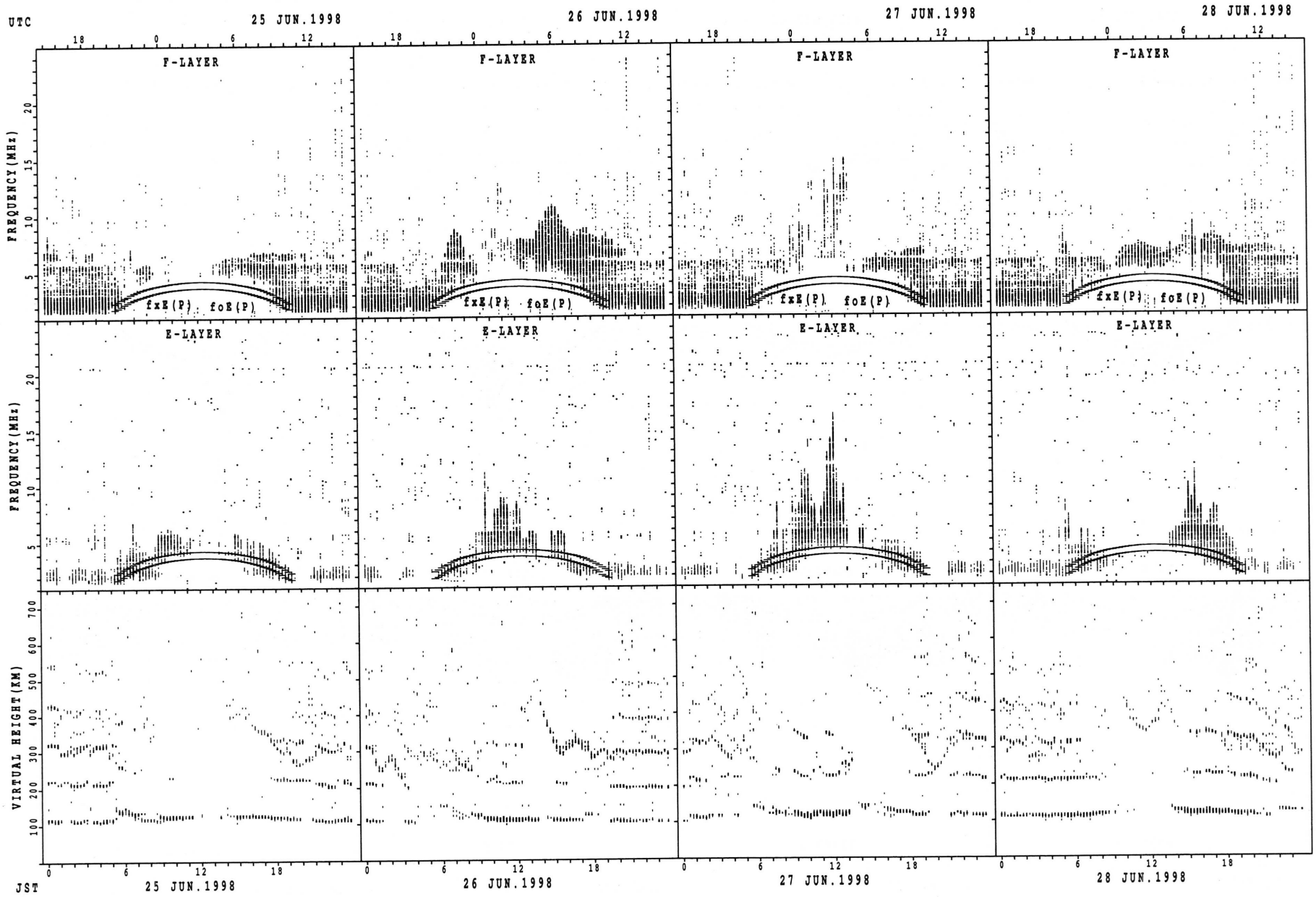

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
17 JUN.1998
18 JUN.1998
19 JUN.1998
20 JUN.1998
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA



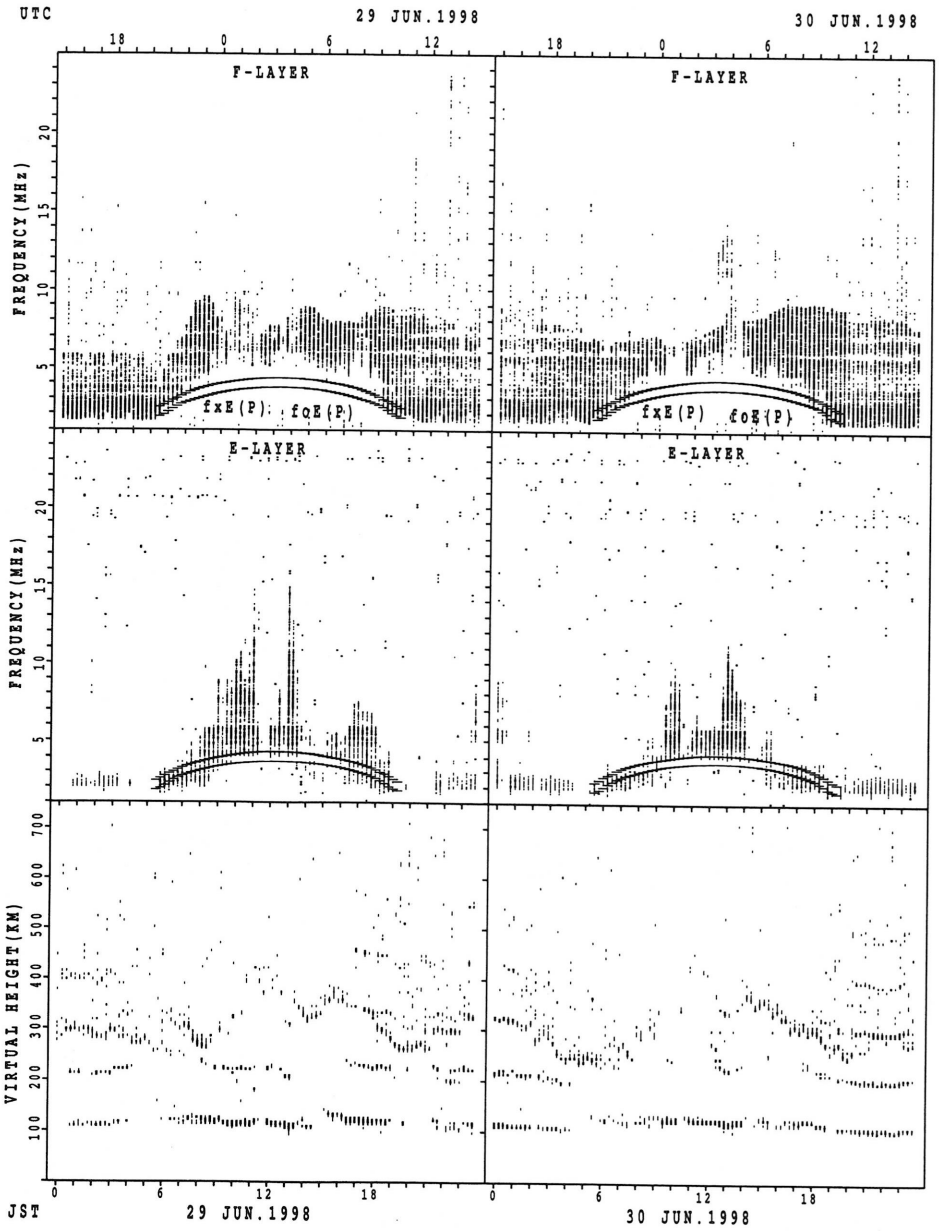
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA

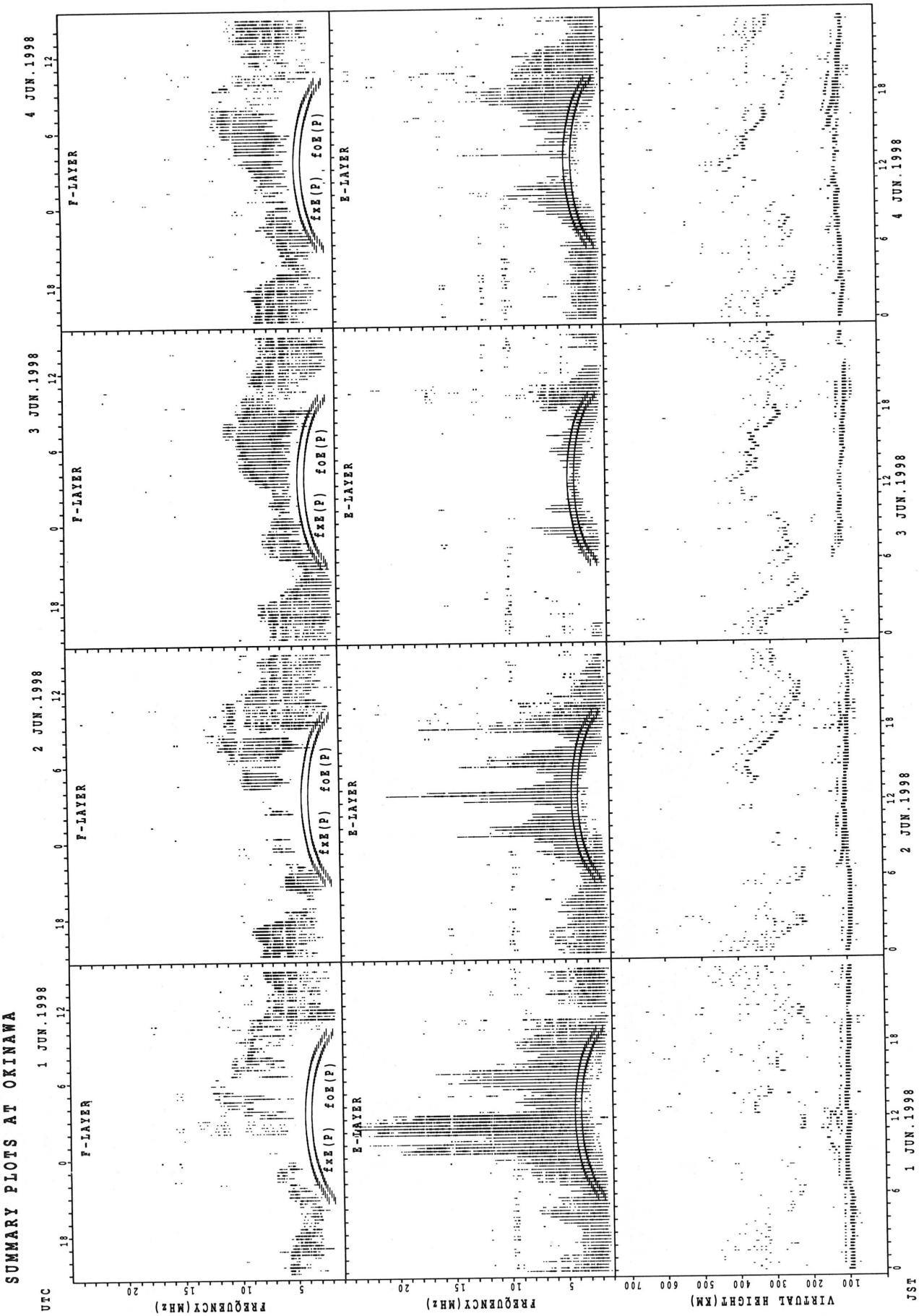


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

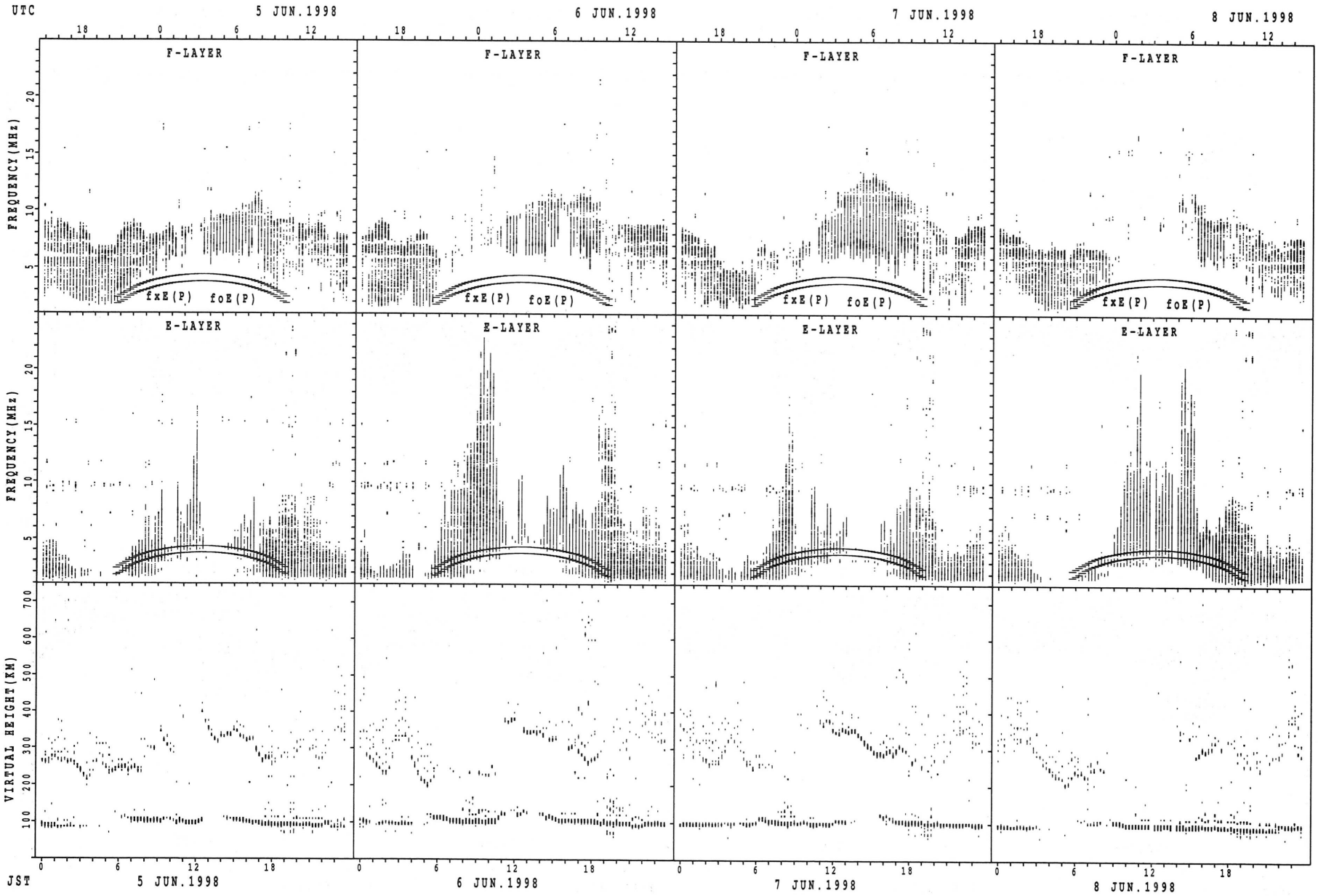
SUMMARY PLOTS AT YAMAGAWA



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

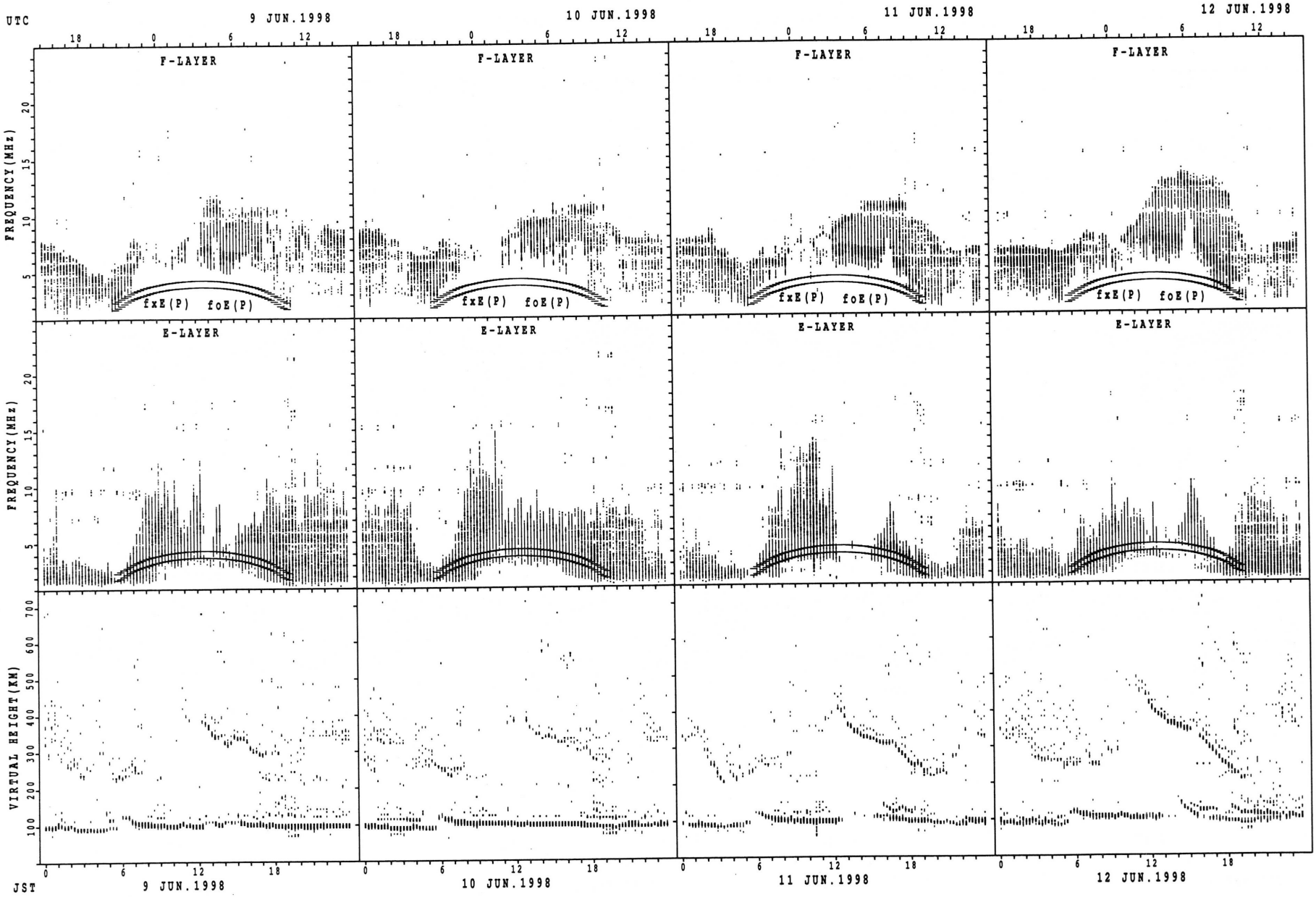

SUMMARY PLOTS AT OKINAWA
UTC
JST
1 JUN.1998
2 JUN.1998
3 JUN.1998
4 JUN.1998
F-LAYER
E-LAYER
fxE(P) foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



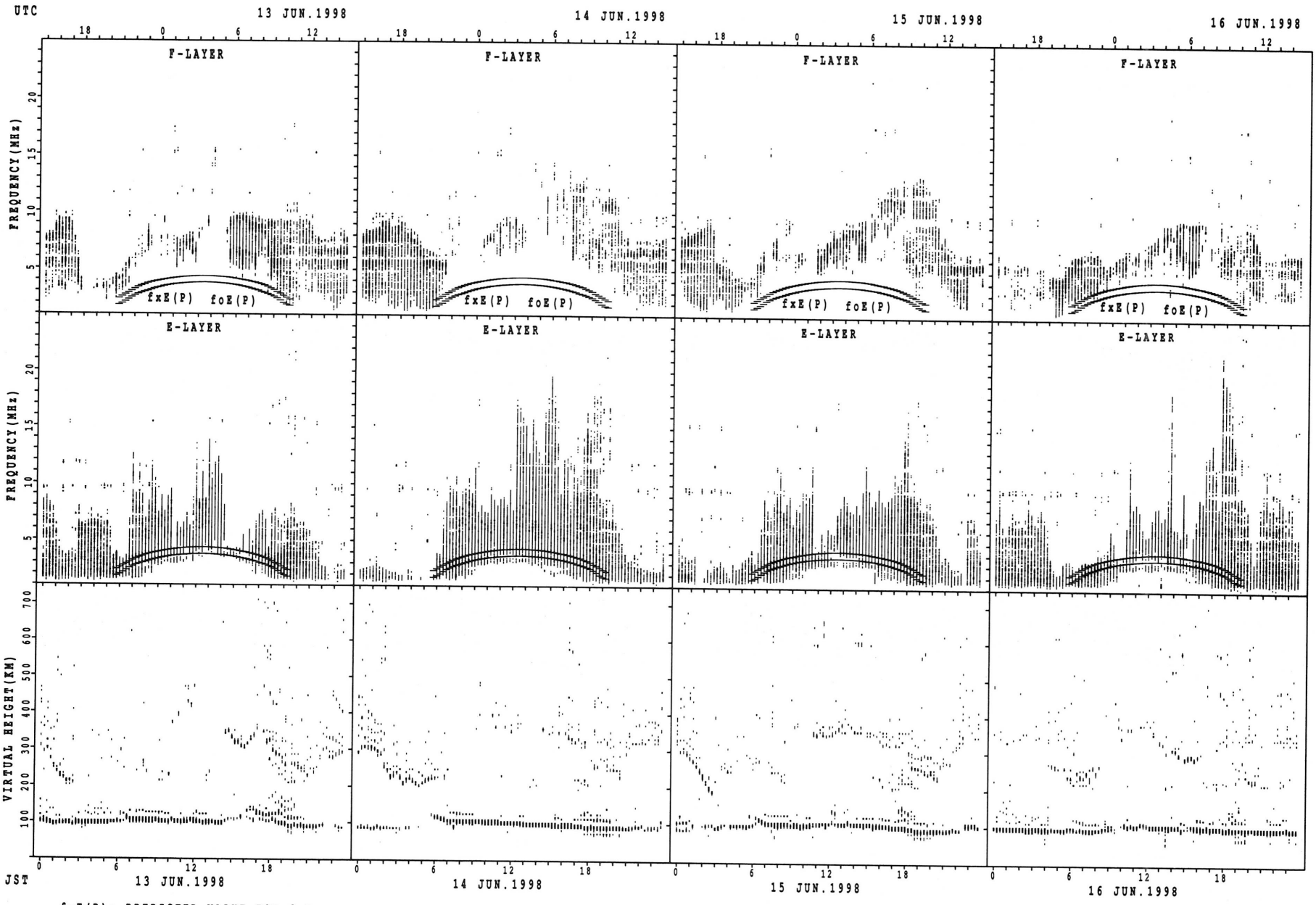
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



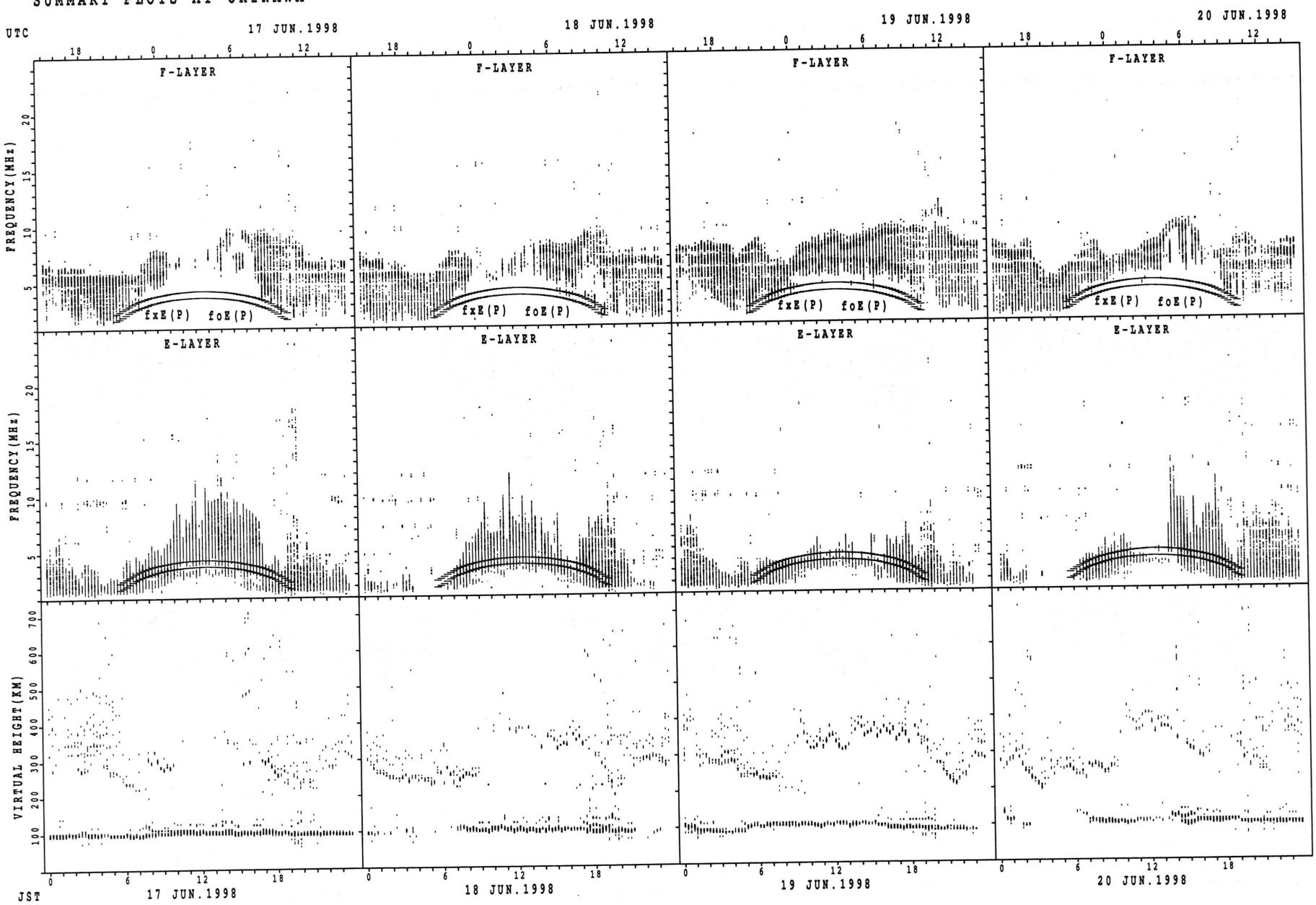
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



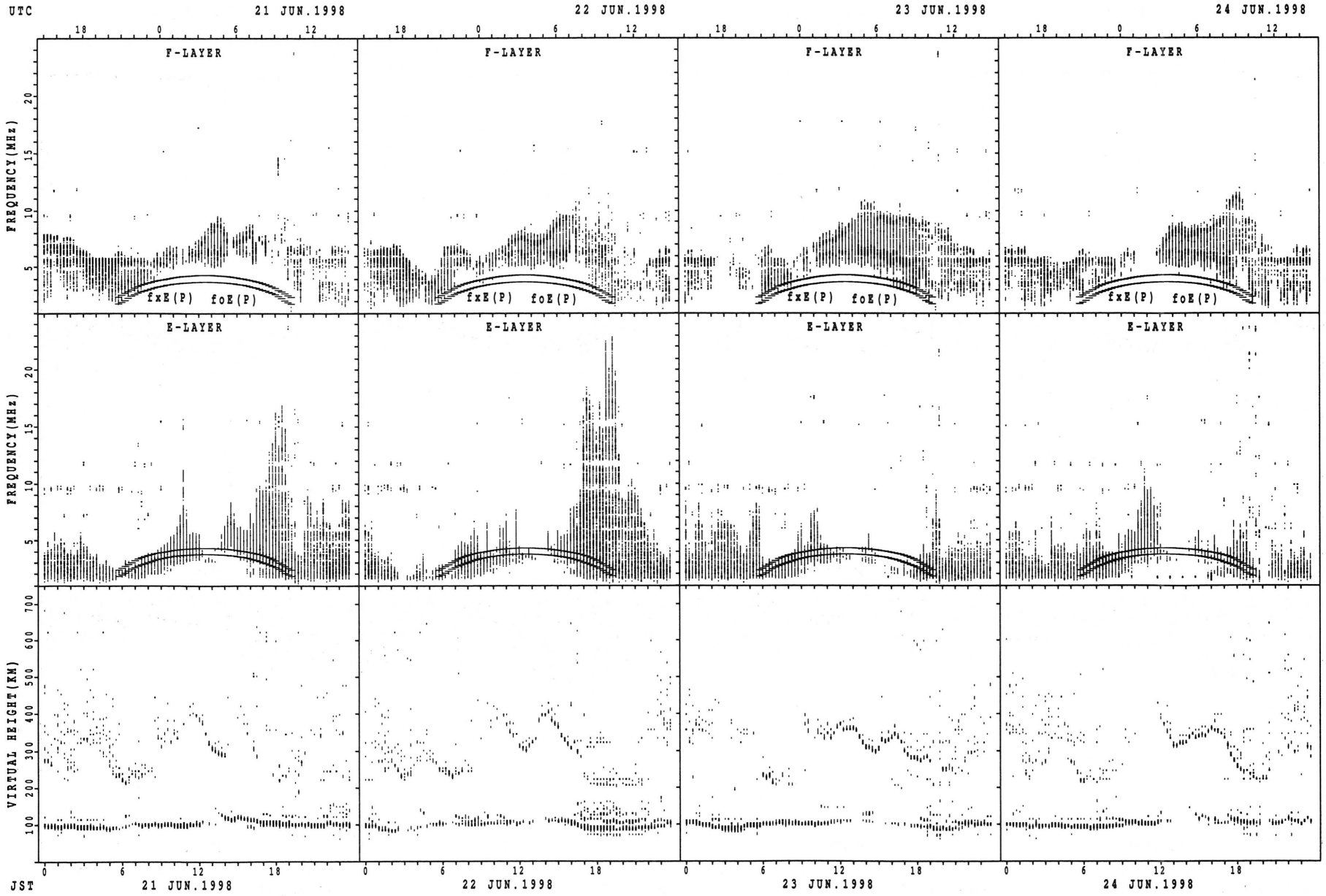
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA

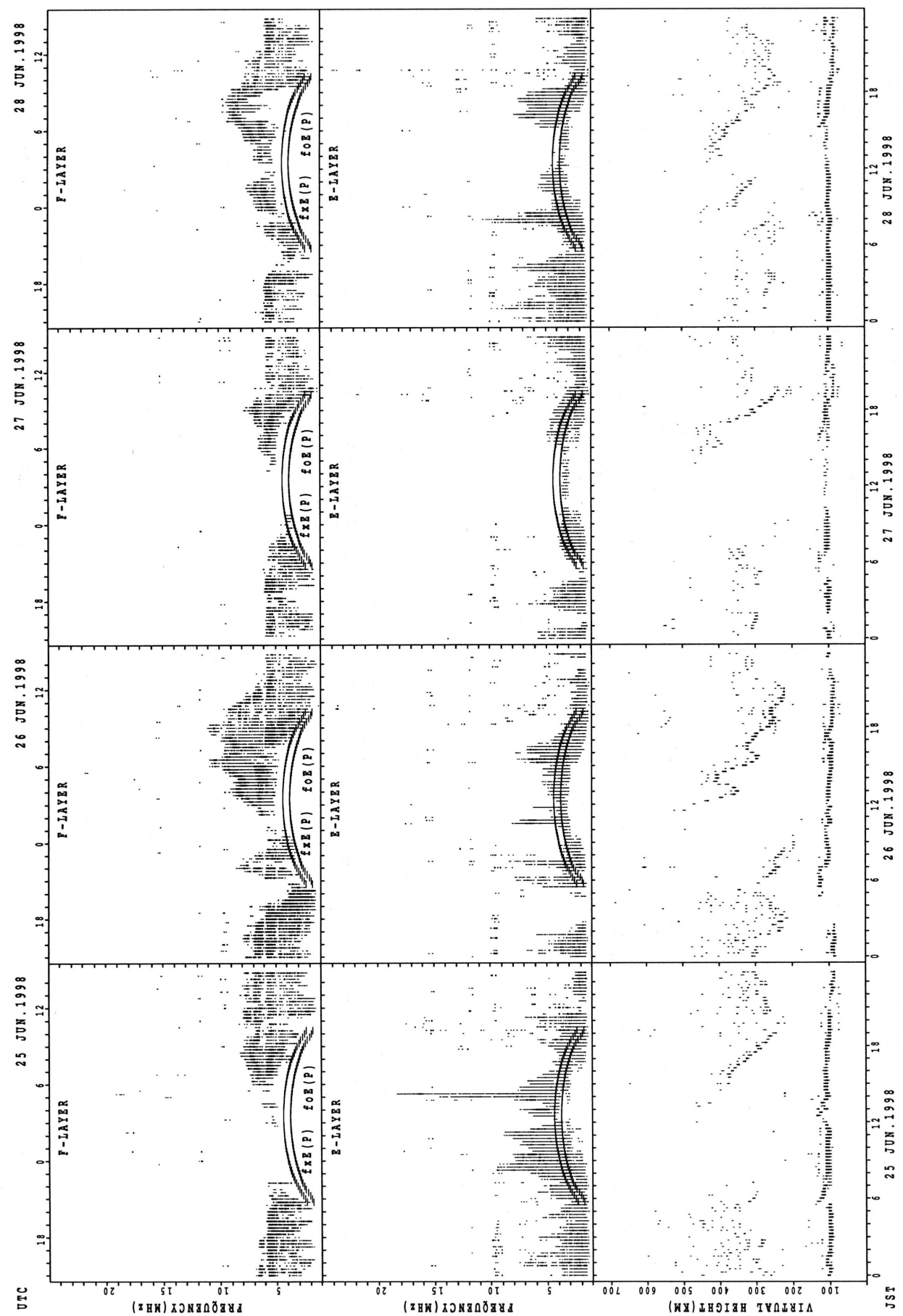


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

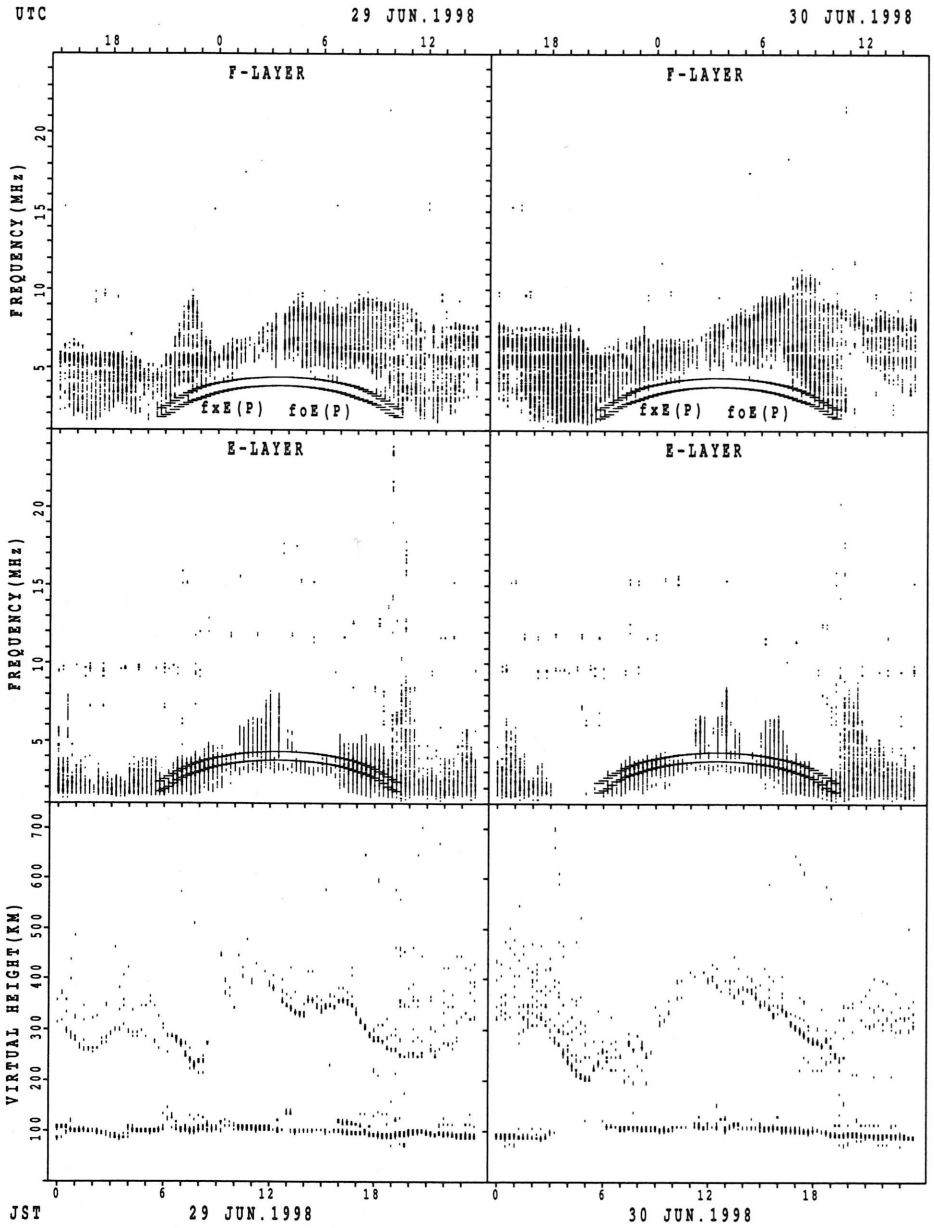
SUMMARY PLOTS AT OKINAWA



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


SUMMARY PLOTS AT OKINAWA
UTC
JST
25 JUN.1998
26 JUN.1998
27 JUN.1998
28 JUN.1998
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

MONTHLY MEDIANS OF h'F AND h'Es

JUN. 1998 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																		11		15	14	11	10	
MED																		330		310	303	306	330	
U Q																		350		340	328	320	364	
L Q																		314		280	272	294	322	

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	20	20	16	16	23	22	26	27	25	26	17	15	18	16	14	20	22	26	29	29	24	27	23
MED	101	102	103	103	108	121	115	115	113	111	108	107	105	106	103	107	107	109	113	111	111	107	107	103
U Q	106	107	105	107	113	131	119	119	115	113	111	111	107	109	109	113	111	117	117	113	113	111	109	107
L Q	99	98	100	101	100	111	113	113	111	107	107	105	105	105	103	105	105	107	107	107	107	105	103	101

STATION KOKUBUNJI LAT. 35.7N LON. 139.5E

h'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								11									13	13	18	16	15	13		11
MED								298									326	306	298	264	308	334		334
U Q								322									339	335	328	302	332	370		356
L Q								274									320	279	244	236	294	310		324

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	29	28	29	27	26	27	27	29	27	27	27	26	25	27	25	24	25	29	23	24	26	28	24
MED	105	105	103	103	101	120	119	117	113	113	111	111	109	107	109	111	115	111	107	107	106	111	109	105
U Q	109	107	105	105	109	127	123	121	117	113	111	113	113	111	115	115	121	113	113	113	113	113	113	111
L Q	103	99	100	99	99	103	107	111	111	111	107	105	105	104	105	105	111	108	105	101	102	105	105	101

STATION YAMAGAWA LAT. 31.2N LON. 130.6E

h'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							10	20	14									25	26	24	21	15		10
MED							271	283	271									302	292	286	294	296		319
U Q							292	305	318									316	304	301	317	352		366
L Q							254	246	266									226	228	235	259	274		234

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	23	19	19	15	10	22	23	22	24	25	25	24	23	22	23	23	26	25	24	21	21	23	22
MED	115	115	115	113	111	117	130	123	121	121	119	117	115	117	121	119	121	119	119	119	117	117	121	119
U Q	121	119	117	115	117	119	137	129	123	125	122	122	120	123	127	125	131	125	122	122	121	120	127	123
L Q	115	113	113	111	109	111	127	121	119	119	115	114	112	113	115	119	115	113	116	112	111	111	115	115

MONTHLY MEDIANS OF h'F AND h'Es

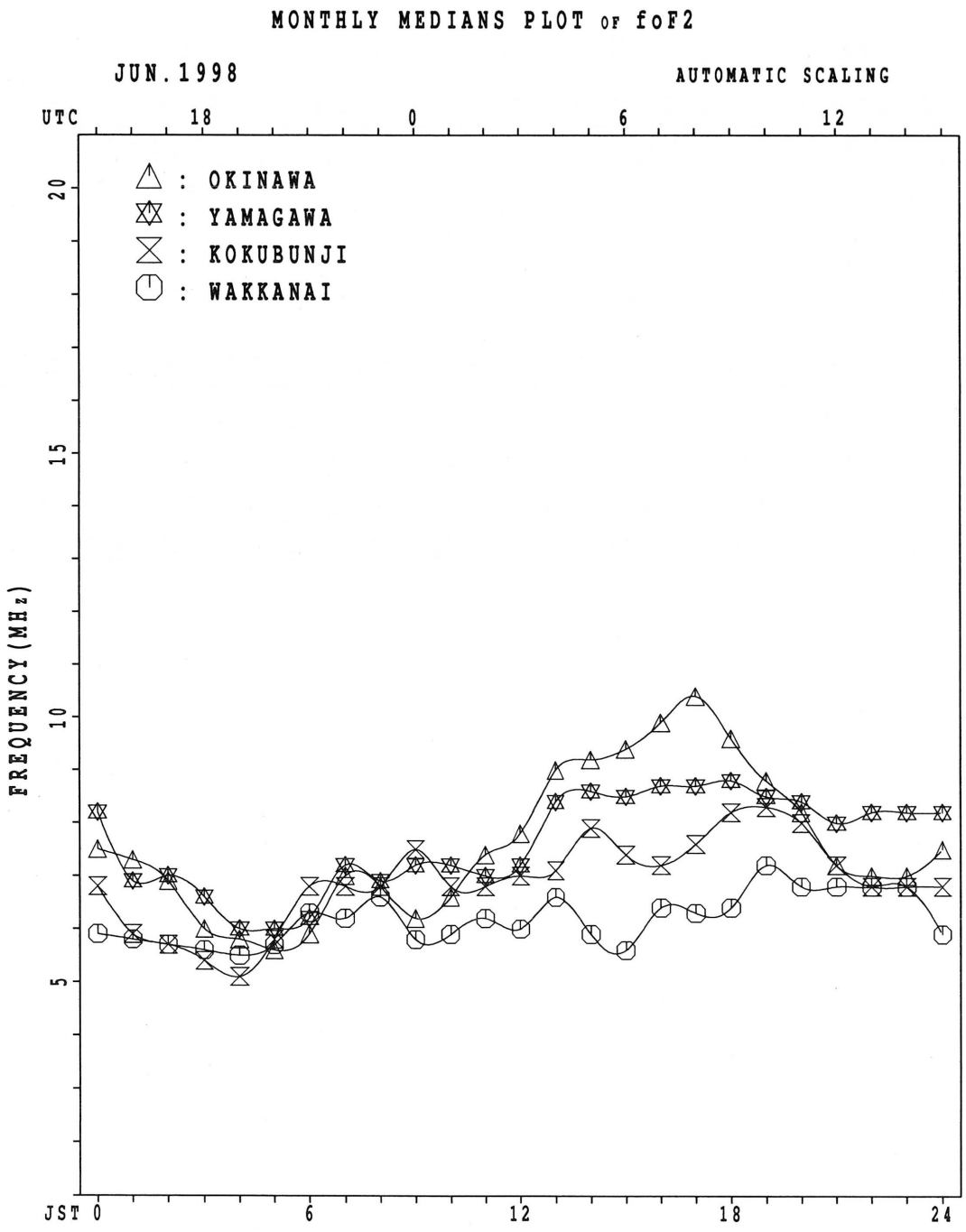
JUN. 1998 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	15	15	13	16				13	12									22	21	22	21			10
MED	342	328	296	314				256	274									303	286	277	276			343
U Q	388	370	354	348				270	303									326	318	296	299			394
L Q	322	314	276	253				253	256									288	266	246	259			332

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	25	24	22	23	19	18	21	28	28	25	23	26	22	18	20	20	28	28	25	30	29	30	26	25
MED	99	100	99	95	99	97	105	111	108	107	105	103	106	104	107	113	107	107	105	99	97	100	99	99
U Q	105	105	103	101	99	101	121	112	112	110	107	107	113	107	124	121	117	114	112	105	105	105	107	103
L Q	92	95	91	91	91	91	102	107	106	103	101	103	103	103	102	103	103	103	98	91	94	95	93	92


MONTHLY MEDIANS PLOT OF foF2
JUN. 1998
AUTOMATIC SCALING
UTC
18
0
6
12
△ : OKINAWA
⊠ : YAMAGAWA
⧖ : KOKUBUNJI
⏲ : WAKKANAI
FREQUENCY(MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 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	64	56	54	57	55																76	75	74	67
2	64	O X 56	58	O X 47	51																X 81	X 80	X 76	X 68
3	X 63	65	63	X 62	63																X 79	X 80	83	86
4	X 71	X 69	X 68	X 67	X 57																X 83	X 88	X 85	X 86
5	X 84	89	94	81	71																90	X 84	X 85	X 91
6	87	80	67	X 66	X 64																X 85	X 78	83	X 80
7	81	82	X 76	72	74		72														X 72	X 71	X 76	76
8	60	74	75	72	70	73															X 76	X 87	X 82	X 80
9	X 76	X 74	X 72	X 68	X 60																X 106	X 85	X 84	X 82
10	X 80	X 73	X 76	X 67	X 62																X 84	X 79	X 77	X 76
11	80	80	X 79	72	73																X 90	84	A	76
12	A	X 73	70	60	56																A	A	60	64
13	X 62	62	61	55	55																X 83	X 75	X 73	74
14	67	62	59	59	62	70	75														A	X 70	X 72	71
15	A	A	74	X 69	58																X 82	X 67	X 64	62
16	63	62	62	58	55	54															X 79	X 69	72	72
17	X 70	61	X 58	X 56	57	65															X 77	X 70	X 64	63
18	66	63	X 60	58	X 55																X 87	X 78	X 70	X 69
19	X 68	70	X 61	X 61	60																99	X 92	X 85	X 82
20	X 76	X 71	X 78	X 62	73	70	74														X 76	X 74	74	72
21	74	X 70	X 70	X 62	62																X 68	X 68	X 70	X 68
22	X 68	64	62	X 60	X 52																O X 71	X 64	62	61
23	63	63	57	58	58	59															X 80	X 79	72	82
24	61	X 64	58	54	57																X 75	74	X 74	X 73
25	X 63	X 60	X 61	X 58	56																67	X 64	63	69
26	62	60	55	56	57		64														X 68	O X 65	X 65	63
27	62	X 61	X 61	62	59	53															X 65	X 65	X 64	X 61
28	X 60	58	58	59	57																X 74	X 73	X 72	X 64
29	60	58	58	58	55	55															X 81	O X 65	X 75	86
30	65	63	X 66	60	59																X 82	X 80	X 76	X 74
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	30	30	30	8	4														28	29	29	30
MED	66	64	62	60	58	62	73														X 80	X 75	X 74	72
U Q	75	73	X 72	67	62	70	74														X 84	X 80	X 80	X 80
L Q	62	61	58	58	56	54	68														X 74	X 68	X 68	67

JUN. 1998 fxI (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 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	F 55	F 48	F 46	F 50	F 46	49	A	A	A	60	A	58	62	69	71	70	64	63	58	65	F 70	F 68	64	F 58
2	F 54	50	50	U R 41	F 43	62	56	65	A	A	A	A	68	71	76	78	R 75	73	82	83	75	74	70	62
3	57	F 57	F 54	56	F 54	44	58	58	58	A	52	A	A	A	66	U R 66	67	69	69	73	73	74	F 76	F 78
4	R 65	63	62	61	51	54	R 64	68	68	64	66	64	71	68	A	A	84	84	88	82	R 77	82	79	80
5	78	F 78	F 86	F 72	F 64	67	78	H 66	67	70	72	65	A	71	A	83	85	90	93	88	R 82	R 78	J R 79	84
6	F 80	F 72	F 60	60	58	68	88	68	66	57	61	67	63	66	R 70	68	68	78	83	83	79	72	76	74
7	F 74	F 70	70	F 62	F 60	F 67	66	69	A	A	66	67	73	A	99	94	91	88	91	91	R 65	65	70	F 69
8	F 52	F 64	F 68	F 64	F 62	F 64	58	67	A	67	70	A	82	89	86	74	66	71	80	79	R 70	81	76	74
9	70	68	66	62	54	53	55	58	60	U R 65	60	66	66	68	69	76	77	82	80	92	100	79	78	76
10	74	67	70	61	56	61	70	76	65	59	63	64	Y	70	75	78	77	80	80	75	77	73	71	70
11	F 72	F 72	73	F 65	F 64	58	57	60	R 64	A	70	68	71	74	A	A	68	76	86	A	84	F 78	A	F 69
12	A	67	F 61	F 51	F 46	F 55	63	82	A	A	A	A	A	74	74	74	A	86	90	87	A	A	F 52	F 54
13	V 57	F 53	F 52	F 49	F 48	54	65	A	71	72	75	A	A	A	A	68	67	A	A	83	77	69	67	F 65
14	F 57	F 54	F 52	F 52	F 53	F 57	F 66	A	71	78	A	82	77	79	83	A	79	86	92	90	A	64	66	F 64
15	A	A	F 67	63	F 49	50	U A 54	64	67	A	A	A	A	A	A	64	65	66	73	73	76	61	58	F 54
16	F 54	F 55	F 54	F 51	F 47	F 49	54	64	A	A	A	A	A	A	A	69	67	63	A	74	73	63	F 62	F 64
17	64	F 54	52	50	48	F 58	57	62	65	A	76	76	58	A	A	68	68	74	72	69	71	64	58	F 55
18	F 56	F 55	54	F 51	49	53	60	68	70	75	64	60	U R 53	69	68	R 69	74	77	82	84	81	72	64	63
19	62	F 62	55	55	F 53	58	72	74	R 62	55	59	U R 58	68	70	81	90	A	A	A	92	F 90	86	78	R 76
20	70	65	72	56	F 66	F 62	F 66	62	69	65	70	R 58	A	A	A	A	71	61	59	60	Z 70	68	66	F 64
21	F 66	64	64	56	54	58	73	59	54	A	A	A	A	75	67	68	A	61	59	A	62	F 63	64	62
22	61	F 57	55	54	46	49	51	R 64	67	A	A	57	A	A	67	72	A	A	A	74	U A 65	58	F 54	F 51
23	F 54	F 54	F 50	F 50	F 51	F 50	65	81	74	64	A	A	71	A	85	84	73	A	58	66	74	73	F 65	F 73
24	F 53	57	F 50	F 46	F 46	57	78	73	58	53	A	A	A	68	72	73	72	82	81	85	V 69	F 65	68	66
25	57	54	55	52	F 48	52	50	49	50	48	E G 44	Y	A	A	A	A	57	56	A	54	F 59	57	F 53	F 61
26	F 54	F 52	F 49	F 49	F 49	50	57	70	67	55	A	A	74	R 76	97	104	92	71	62	A	62	59	59	F 56
27	F 52	55	55	F 55	F 49	F 45	54	60	62	53	A	E G 46	A	A	A	60	55	63	58	58	59	59	58	55
28	54	F 52	F 50	F 51	F 52	50	56	61	54	E G 47	56	R 62	68	69	62	62	63	60	R 65	65	68	67	66	58
29	F 53	F 50	F 49	F 48	F 46	F 49	60	76	88	78	U R 65	A	70	72	79	73	67	A	61	71	75	59	69	F 78
30	F 56	F 56	60	F 52	F 52	60	70	68	68	A	A	A	71	A	77	80	79	76	80	83	76	74	70	68
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	30	30	30	30	29	27	24	19	17	16	17	18	20	25	26	25	25	27	28	29	29	30
MED	F 57	F 57	55	F 53	F 51	54	60	66	66	64	65	64	70	70	74	73	70	74	80	79	74	68	66	F 64
U Q	68	66	66	61	F 54	60	68	70	68	70	70	67	72	74	82	79	77	82	84	85	77	74	74	74
L Q	F 54	F 54	F 52	F 50	F 48	50	56	61	61	55	60	58	64	69	68	68	67	63	62	69	68	63	60	F 58

JUN. 1998 foF2 (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 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	U A 476	A	480	A	A	A	456	444	U L 420	L					
2						U L 324		L 432	A	A	A	A	A	U A 484	472	464	440	432	U L 368					
3							384	L	A	A	484	A	A	A	U A 476	A	456	U L 416	L					
4							L	U L 452	460	A	L 492	A	A	A	A	A	A	A	A					
5							A		L 472	476	488	A	A	U A 520	A	500	464	A	A					
6							L	A	A	L 484	A	A	U A 512	496	A	476	464	A						
7						U L 344	A	A	A	A	A	508	540	A	U A 532	U A 484	468	A	A					
8								U A 452	A	A	A	A	A	A	U A 540	484	456	440						
9								L 468	476	A	A	A	512	504	U A 484	U A 496	444	L 424	L 400					
10							U L 416	A	A	A	U A 496	508	U R 516	500	492	480	460	440	L 392					
11							A	A	A	A	500	508	520	500	A	A	A	A	A	A				
12						L	A	A	A	A	A	A	A	A	A	U A 488	A	404	L 380					
13							L 424	A	A	A	U A 480	A	A	A	A	480	448	A	A					
14							A	A	A	A	A	A	A	A	A	A	U A 444	A	A					
15						U L 376	U A 420	472	A	A	A	A	A	A	A	464	444	U A 436	L 400					
16						324	A	A	A	A	A	A	A	A	A	A	444	A	A					
17						L 352		U A 444	A	A	A	488	A	A	A	472	A	420	L 352					
18								448	464	452	484	500	L 492	A	484	464	452	420	L 376					
19						L	L 388	L 444	452	488	A	496	A	A	U A 488	A	A	A	A	A				
20							A	L 448	444	A	A	A	A	A	A	A	A	464	L 368					
21						L 332	L 360	U A 444	A	A	A	A	A	U A 468	A	A	A	A	A	A				
22						U L 348	420	424	A	A	A	A	A	A	A	464	A	A	A					
23						L 360	400	A	A	540	A	A	U A 484	A	A	A	U A 448	A	A					
24						A	384	420	448	L	A	A	A	U A 500	U A 472	456	456	A	U L 388					
25						304	368	400	A	A	444	A	A	A	A	A	A	420	A					
26							408	432	U A 432	A	A	A	U A 508	A	U A 472	A	A	A	A	A				
27						300	A	Y 408	U A 432	Y 448	A	464	A	A	A	U A 504	452	400	L 376	L				
28						L	384	444	476	472	480	492	492	484	472	484	460	L 448	L 400					
29							436	A	A	A	508	A	U A 512	U A 520	492	A	U A 448	A	L					
30						L	L 424	A	A	A	A	A	A	A	492	A	532	A	A					
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						10	14	16	10	8	10	9	10	10	13	17	20	14	11					
MED						L 338	404	444	456	476	486	496	512	500	U A 484	480	452	422	L 380					
U Q						L 352	420	L 450	472	486	496	508	516	U A 504	492	U A 486	460	440	L 400					
L Q						324	384	428	U A 444	462	480	484	492	U A 484	472	464	444	420	L 368					

JUN. 1998 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 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						B	A 256	A 292	328	A 340	A	A	A	A	A	A	U A 312	A	A	B				
2						A	A 252	300	324	340	U A 356	A	A	A	A	A	R	A	A	B				
3						192	272	308	332	356	U A 364	U A 376	U A 384	A	364	336	312	276	220	B				
4						192	260	304	332	356	R 364	A	A	360	A	328	A	A	A	B				
5						192	256	312	336	360	A	A	A	A	A	A	332	304	A	B				
6						A	260	304	336	352	A	A	U A 380	R	364	348	324	284	A	B				
7						176	268	A 308	328	348	A	A	A	A	A	A 340	344	276	A	B				
8						A	264	304	332	356	A	A	A	A	A	A	A	A	A	B				
9						A	268	296	328	A 356	A	A	388	U A 376	360	336	U A 316	272	220	B				
10						A	264	308	340	360	U A 368	A	A	A	R	R	A	A	A	B				
11						192	260	308	332	A 352	U A 372	A	R	R	A	A	340	A 292	U A 184	B				
12						204	264	304	336	A	A	A	A	A	A	364	320	A 244	A	B				
13						A	A 256	A 304	348	A	A	A	A	A	A	R 372	332	U A 284	A 216	B				
14						192	264	308	344	A	A	A	A	A	A	A	A	A 284	A	B				
15						200	260	296	332	U A 372	A	A	A	A	A	A 348	324	A 280	A	B				
16						A	260	292	328	356	A	A	U A 376	A	A	340	320	A	A	B				
17						A	A 308		336	360	364	A 380	R	A	A	A 336	A	A	A	B				
18						A	256	292	328	A	A	U A 368	A	A	364	A	A	272	A	B				
19						A	A 308		336	A 352	A 376	A	A	A 376	A	A	A	A	A	B				
20						A	A 304		340	356	A	A	A	A	A	A	A 312	A	A	B				
21						A	A 260	A	A	A	A	A	A	A	A	A	328	U A 284	A	B				
22						196	260	296	324	A 344	A	A	A	A	A	A	A	A	A	B				
23						A	A	A	U A 336	A	A	A	A	A	A	A	A	A	A	B				
24						A	A	A	A 344	356	376	A	A	A	A	A	A	A	A	B				
25						200	260	308	344	A	A	A	A	A	356	336	312	A 284	A	B				
26						A	A 304		A 336	A	A	A	A	A	A	A	A	A	A	B				
27						A	256	292	328	A 364	A	A	A	A	A 372	348	312	A 280	A	B				
28						A	A 300		340	U A 364	U R	R	R	R	368	348	324	284	A	B				
29						172	264	304	336	360	U A 376	A	A	A	A 372	352	324	284	A	B				
30						208	256	U A 300	U A 348	U A 360	A	A	B	U A 388	364	348	312	A 268	A	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						12	23	27	29	22	9	3	4	4	9	15	18	17	4					
MED						192	260	304	336	356	U A 368	U A 376	U A 382	A 376	364	348	322	A 284	218					
U Q						200	264	308	340	A 360	A 376	A 380	386	U A 382	A 370	348	328	A 284	220					
L Q						192	256	296	328	352	364	U A 368	U A 378	368	362	336	312	274	A 200					

JUN. 1998 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 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 27	J A 85	J A 82	J A 53	J A 31	J A 31	J A 69	J A 93	J A 128	J A 66	J A 125	J A 51	J A 52	J A 82	68	J A 43	J A 40	J A 54	J A 85	J A 178	J A 62	J A 64	J A 53	J A 50
2	J A 53	J A 78	J A 78	J A 55	J A 37	J A 30	J A 36	J A 46	J A 62	J A 140	J A 100	84	J A 61	J A 51	J A 42	37	G 30	J A 30	J A 31	J A 27	E B 15	19	22	J A 27
3	J A 24	J A 53	J A 20	J A 27	J A 25	25	36	39	62	69	J A 46	80	93	76	J A 50	60	J A 42	G 19	J A 40	J A 24	30	J A 41	J A 24	J A 46
4	20	J A 26	J A 26	23	J A 19	26	29	40	42	J A 61	J A 48	J A 52	J A 64	J A 68	J A 109	J A 109	J A 143	J A 104	J A 73	84	J A 32	J A 46	24	J A 29
5	27	J A 48	J A 26	J A 33	J A 26	J A 34	J A 70	J A 52	J A 49	39	39	J A 62	76	J A 54	J A 126	J A 42	J A 49	J A 53	J A 85	96	J A 63	J A 89	74	J A 51
6	32	J A 44	J A 50	J A 46	J A 45	J A 41	J A 36	J A 52	J A 60	J A 47	J A 60	56	52	G	J A 56	38	J A 46	J A 59	42	58	J A 50	J A 54	J A 52	J A 47
7	J A 38	J A 39	J A 30	J A 33	J A 37	J A 32	70	70	J A 126	J A 103	J A 73	42	J A 49	J A 136	J A 64	J A 52	J A 45	J A 128	J A 77	J A 54	J A 54	38	J A 83	J A 80
8	J A 135	J A 49	J A 36	J A 50	J A 32	J A 28	30	J A 46	J A 68	J A 74	J A 68	105	J A 114	J A 78	J A 67	J A 44	J A 49	J A 50	J A 41	J A 28	J A 39	J A 27	J A 50	J A 23
9	25	J A 28	J A 26	23	J A 28	J A 25	J A 39	J A 48	J A 47	63	J A 53	60	G	43	J A 51	J A 51	J A 43	29	26	J A 37	J A 64	J A 54	52	32
10	22	J A 27	20	24	26	J A 24	34	J A 74	J A 63	60	J A 52	48	J A 58	39	G 36	G 31	31	J A 40	J A 42	J A 43	J A 29	19	32	J A 48
11	J A 51	J A 56	J A 28	28	J A 49	J A 38	J A 50	69	J A 70	99	J A 51	43	G	G 37	76	82	J A 62	72	J A 108	149	J A 147	J A 126	J A 177	J A 159
12	J A 110	J A 80	J A 50	J A 46	J A 55	J A 30	J A 48	J A 89	J A 128	108	J A 111	J A 97	104	69	66	50	J A 178	J A 181	J A 132	94	143	J A 110	J A 66	J A 108
13	J A 57	J A 34	J A 27	J A 49	J A 54	28	J A 43	J A 104	J A 58	66	J A 53	J A 133	J A 117	J A 110	J A 74	G	J A 42	J A 134	87	51	J A 166	J A 89	J A 125	J A 61
14	J A 98	25	J A 51	J A 54	32	J A 43	J A 68	J A 109	J A 69	J A 59	J A 105	J A 80	J A 84	J A 94	J A 74	85	46	J A 51	J A 54	J A 101	J A 102	45	J A 39	J A 53
15	J A 72	J A 71	J A 51	J A 64	J A 103	J A 41	J A 62	J A 59	J A 57	J A 92	J A 102	J A 99	J A 80	J A 128	J A 92	J A 49	40	J A 54	56	J A 64	44	J A 47	J A 48	J A 48
16	J A 37	J A 36	47	30	J A 32	30	51	62	J A 101	J A 103	110	J A 81	76	J A 150	J A 178	J A 52	J A 41	J A 99	131	J A 53	J A 46	J A 27	J A 42	J A 38
17	J A 29	J A 48	J A 49	J A 52	J A 100	40	J A 34	J A 47	J A 51	68	J A 65	J A 47	52	J A 84	77	J A 62	J A 103	J A 62	J A 32	J A 22	E B 15	24	E B 17	28
18	30	J A 29	J A 52	J A 28	J A 24	23	J A 36	33	J A 41	41	40	48	39	J A 72	G	37	34	33	J A 26	J A 26	J A 34	J A 48	J A 33	J A 38
19	31	J A 33	J A 44	J A 28	J A 41	J A 56	J A 40	34	J A 45	J A 50	J A 64	J A 52	63	J A 64	J A 53	86	J A 178	J A 172	116	J A 106	55	36	26	J A 27
20	J A 27	J A 30	J A 27	J A 27	J A 48	J A 42	J A 54	J A 52	J A 46	J A 58	J A 64	J A 69	72	J A 91	75	99	J A 96	J A 52	J A 46	116	J A 52	J A 47	J A 66	J A 45
21	J A 30	J A 32	28	27	30	J A 28	30	J A 52	J A 51	59	J A 60	J A 78	J A 138	J A 80	62	59	J A 113	J A 121	J A 136	J A 157	J A 34	J A 51	J A 50	J A 39
22	J A 39	J A 36	J A 30	J A 24	J A 21	22	J A 28	J A 40	J A 55	J A 63	J A 72	J A 54	J A 82	J A 80	J A 66	J A 46	86	86	J A 123	46	70	27	J A 49	J A 37
23	J A 48	J A 43	J A 53	J A 55	J A 54	J A 85	J A 50	60	69	J A 64	J A 150	J A 244	J A 76	J A 94	J A 62	J A 95	J A 102	J A 153	70	J A 68	J A 40	J A 53	J A 42	20
24	J A 49	J A 28	J A 63	J A 44	J A 56	J A 72	J A 43	J A 46	J A 46	J A 48	J A 103	86	68	J A 54	J A 48	J A 46	J A 45	J A 52	34	56	J A 40	J A 52	32	J A 34
25	22	30	22	32	J A 45	23	30	37	J A 50	J A 45	J A 44	47	J A 68	50	J A 61	J A 65	J A 85	J A 87	93	59	J A 45	J A 54	J A 52	J A 51
26	J A 42	25	24	18	J A 24	J A 30	J A 39	36	J A 45	53	J A 76	J A 76	J A 64	60	57	J A 58	129	J A 52	48	72	60	J A 29	J A 28	J A 29
27	J A 60	J A 38	J A 50	29	J A 29	J A 52	J A 64	38	J A 49	39	J A 50	52	52	74	J A 66	J A 62	32	34	25	E B 18	27	J A 29	27	J A 40
28	J A 33	J A 48	J A 50	J A 51	J A 45	J A 28	J A 30	32	37	J A 40	G	G	G	G	42	38	G	32	J A 28	J A 28	24	J A 22	24	J A 28
29	J A 38	J A 44	J A 28	J A 26	31	22	34	J A 68	J A 56	J A 58	J A 52	J A 122	J A 67	J A 56	53	J A 68	J A 49	72	J A 60	36	E B 14	J A 81	J A 64	J A 52
30	J A 80	J A 63	J A 65	J A 34	J A 26	J A 24	32	J A 60	J A 69	J A 80	J A 86	85	J A 66	101	J A 51	J A 67	J A 57	J A 48	J A 66	J A 67	J A 34	J A 26	30	J A 48
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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	J A 38	J A 38	J A 40	J A 32	J A 32	J A 30	J A 39	J A 52	J A 56	J A 62	J A 64	J A 66	J A 66	J A 73	J A 63	J A 52	J A 48	J A 54	J A 58	J A 57	J A 44	J A 46	J A 45	J A 42
U Q	J A 53	J A 49	J A 51	J A 50	J A 48	J A 41	J A 51	J A 68	J A 69	J A 74	J A 100	J A 85	J A 80	J A 91	J A 74	67	J A 96	J A 99	87	94	J A 62	J A 54	J A 53	J A 51
L Q	27	J A 30	J A 27	27	J A 26	25	34	40	J A 47	J A 50	J A 51	51	52	54	J A 51	43	41	48	J A 40	J A 36	32	27	28	J A 29

IONOSPHERIC DATA STATION Kokubunji

JUN.1998 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	E B 15	18	23	22	18	23	A A 69	A A 93	A A 128	48	A A 125	43	51	62	64	42	35	37	25	51	33	21	34	24
2	37	42	17	26	24	20	32	39	A A 62	A A 140	A A 100	A A 84	60	48	41	36	U G 30	23	27	18	E B 15	15	E B 14	17
3	18	25	E B 15	16	19	23	32	34	52	A A 69	44	A A 80	A A 93	A A 76	48	60	41	G 18	34	19	24	19	18	22
4	17	17	18	E B 14	E B 13	G	29	36	40	49	45	52	62	65	A A 109	A A 109	73	40	59	27	17	18	19	18
5	16	24	20	18	20	26	65	43	42	39	U Y 39	54	A A 76	52	A A 126	38	43	50	78	78	35	70	57	17
6	18	30	33	32	20	28	34	42	54	43	58	55	51	G	52	37	38	56	33	49	34	33	28	29
7	22	27	23	20	19	26	46	66	A A 126	A A 103	61	42	46	A A 136	53	48	40	74	44	40	30	18	28	40
8	18	36	31	28	26	22	30	45	A A 68	60	64	A A 105	77	68	54	42	35	36	36	20	25	18	19	18
9	18	19	20	18	18	21	34	41	40	57	52	59	G	42	48	50	40	29	25	22	52	44	40	23
10	E B 14	25	E B 15	E B 15	E B 15	20	32	60	56	54	50	43	48	U Y 39	U G 36	U G 31	30	29	24	20	18	16	21	34
11	26	29	E B 15	19	30	24	48	54	59	A A 99	42	40	G	U G 37	A A 76	A A 82	60	64	74	A A 149	22	35	A A 177	23
12	A A 110	44	26	20	25	23	42	76	A A 128	A A 108	A A 111	A A 97	A A 104	64	62	49	A A 178	32	27	79	A A 143	A A 110	40	27
13	37	22	21	34	24	23	31	A A 104	54	62	48	A A 133	A A 117	A A 110	A A 74	G	40	A A 134	A A 87	41	22	46	34	40
14	20	17	17	20	18	27	50	A A 109	60	56	A A 105	66	75	73	56	A A 85	44	48	45	28	A A 102	38	36	41
15	A A 72	A A 71	38	46	23	27	42	44	53	A A 92	A A 102	A A 99	A A 80	A A 128	A A 92	40	38	44	25	46	34	23	24	26
16	21	17	24	22	25	24	44	57	A A 101	A A 103	A A 110	A A 81	A A 76	A A 150	A A 178	52	38	54	A A 131	22	31	18	17	23
17	23	20	21	22	25	22	29	44	50	A A 68	62	45	52	A A 84	A A 77	43	47	32	22	E B 13	E B 15	E B 15	E B 17	18
18	22	20	23	24	19	20	31	32	38	38	38	41	U Y 39	64	G	36	34	32	23	18	22	30	18	19
19	22	21	24	22	21	24	27	33	41	42	48	47	62	62	49	69	A A 178	A A 172	A A 116	67	45	28	19	19
20	20	22	24	18	34	26	46	40	36	54	60	54	A A 72	A A 91	A A 75	A A 99	65	44	26	45	22	16	43	20
21	20	24	18	18	18	21	26	44	49	A A 59	A A 60	A A 78	A A 138	47	55	52	A A 113	53	46	A A 157	19	28	18	18
22	20	29	24	19	E B 15	21	G 22	35	52	A A 63	A A 72	51	A A 82	A A 80	64	38	A A 86	A A 86	A A 123	27	43	17	26	23
23	18	22	34	39	25	25	36	55	54	45	A A 150	A A 244	48	A A 94	60	73	45	A A 153	52	50	32	21	26	E B 14
24	23	16	18	18	20	36	34	40	G 28	44	A A 103	A A 86	A A 68	50	47	36	43	46	31	51	21	32	22	18
25	E B 14	19	E B 16	20	22	22	28	36	44	44	39	U Y 47	A A 68	A A 50	A A 61	A A 65	45	40	A A 93	50	21	17	27	18
26	18	17	21	E B 14	18	22	28	34	43	52	A A 76	A A 76	51	U Y 60	47	54	79	44	38	A A 72	56	22	19	E B 14
27	22	19	25	18	17	25	47	U Y 38	43	U Y 39	A A 50	42	A A 52	A A 74	A A 66	50	32	30	24	E B 18	E B 15	22	16	19
28	21	18	22	28	19	20	26	30	36	40	G	G	G	G	41	38	G	30	25	20	17	18	18	22
29	18	23	18	19	19	21	30	61	54	56	46	A A 122	51	52	44	64	45	A A 72	34	30	E B 14	48	50	35
30	20	24	43	26	20	24	30	48	61	A A 80	A A 86	A A 85	64	A A 101	44	56	40	46	46	42	24	18	17	18
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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	20	22	22	20	20	23	32	44	52	56	60	57	62	64	56	50	42	44	35	40	24	22	23	21
U Q	22	27	24	26	24	25	44	57	A A 60	A A 69	A A 100	A A 85	A A 76	A A 84	A A 74	A A 64	60	A A 56	A A 59	51	34	33	34	26
L Q	18	19	18	18	18	21	29	36	42	44	46	45	51	50	47	38	38	32	25	20	19	18	18	18

JUN.1998 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

JUN. 1998 fmin (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 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	F 312	F 297	F 288	F 309	F 315	339	A	A	A	335	A	272	290	290	312	318	316	313	295	294	F 299	F 302	300	F 280
2	F 299	313	331	U R 299	F 296	344	332	345	A	A	A	A	304	294	296	297	R 291	288	292	302	311	308	308	290
3	280	F 285	F 298	312	F 323	305	332	307	313	A	277	A	A	A	305	A	302	296	294	304	289	289	F 276	F 295
4	R 301	297	302	314	314	309	R 332	332	333	311	301	283	304	A 287	A	A	A 291	293	307	306	R 278	290	278	274
5	286	F 270	F 311	F 329	F 308	296	331	H 311	324	309	322	310	A	276	A	283	286	294	309	A 309	R 296	R 292	J R 272	295
6	F 291	F 321	F 280	285	287	302	347	310	318	322	A 257	278	289	295	R 268	288	285	304	278	302	314	276	281	282
7	F 274	F 283	292	F 290	F 263	F 312	288	A 291	A	A	317	280	262	A	290	294	289	294	295	318	R 284	284	282	F 285
8	F 279	F 274	F 301	F 298	F 309	F 322	305	336	A	309	A 282	A	288	291	310	305	285	287	298	300	R 298	279	285	281
9	286	287	300	306	300	322	327	318	307	U R 327	288	306	285	288	293	294	294	298	280	283	313	281	278	286
10	293	283	303	301	310	315	310	335	326	326	273	285	Y	289	296	303	303	294	301	286	292	281	281	278
11	F 272	F 281	289	F 284	F 307	323	353	A	R 293	A	299	292	277	291	A	A	292	289	A 277	A	312	F 278	F A	F 309
12	A	295	F 294	F 318	F 287	F 314	321	A 325	A	A	A	A	A	277	277	274	A	283	308	A 326	A	A	A 269	F 268
13	V 310	F 287	F 301	F 305	F 317	316	324	A	308	295	295	A	A	A	A	284	293	A	A	296	297	298	312	F 275
14	F 301	F 288	F 277	F 295	F 290	F 297	F 306	A	281	271	A	277	A	A	278	A	272	282	290	309	A	291	278	F 273
15	A	A	F 296	307	F 282	314	A	292	316	A	A	A	A	A	A	293	292	285	288	291	317	283	272	F 281
16	F 281	F 278	F 287	F 288	F 276	F 269	286	309	A	A	A	A	A	A	A	312	315	A 296	A	287	305	295	F 261	F 283
17	289	F 285	287	281	286	F 310	340	308	307	A	299	322	A 263	A	A	298	293	310	313	303	307	305	297	F 274
18	F 286	F 298	301	F 297	302	319	313	308	307	335	329	289	U R 305	287	297	R 303	297	289	290	308	302	298	282	277
19	285	F 301	315	301	F 286	312	345	339	R 349	268	287	U R 283	A 307	294	281	297	A	A	A	276	F 279	302	284	R 294
20	289	295	318	294	F 309	F 311	F 322	313	320	314	308	R 289	A	A	A	A	A 323	316	289	301	Z 302	290	282	F 296
21	F 311	286	293	294	274	303	357	355	A 315	A	A	A	A	308	293	303	A	318	320	A	281	F 279	290	275
22	291	F 289	293	305	314	317	267	R 303	337	A	A	263	A	A	A 293	308	A	A	A	302	A	276	F 300	F 284
23	F 294	F 295	F 283	F 293	F 286	F 283	295	322	318	285	A	A	291	A	291	315	303	A	A 287	285	288	293	F 276	F 326
24	F 284	315	F 307	F 296	F 290	292	335	345	341	281	A	A	A	305	299	306	287	298	301	326	V 292	F 273	300	288
25	286	275	282	267	F 255	284	286	305	255	257	G	Y	A	A	A	A	297	294	A	A	F 290	289	F 281	F 300
26	F 290	F 291	F 305	F 315	F 285	285	278	317	339	A 284	A	A	257	R 239	270	300	310	324	304	A	300	283	281	F 279
27	F 279	284	279	F 283	F 281	F 246	243	255	287	264	A	G	A	A	A	268	277	305	306	304	285	280	270	281
28	286	F 270	F 275	F 307	F 295	302	290	285	329	G	263	R 290	300	309	305	293	301	291	R 289	297	281	291	293	319
29	F 294	F 275	F 300	F 311	F 296	F 275	289	288	301	314	U R 268	A	286	282	304	311	300	A	303	292	296	301	290	F 273
30	F 286	F 297	295	F 296	F 287	312	323	318	303	A	A	A	291	A	288	298	298	298	296	296	306	289	295	299
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	30	30	30	30	28	26	24	19	17	16	16	17	20	24	26	25	25	26	27	29	29	30
MED	F 288	F 287	296	F 298	F 292	310	322	312	316	309	288	284	290	290	293	298	294	294	295	302	297	289	282	F 282
U Q	F 294	F 297	302	F 307	F 309	316	332	332	328	322	304	291	302	294	302	306	302	304	305	306	306	296	294	F 295
L Q	F 284	F 282	F 287	F 293	F 286	296	290	305	305	271	270	278	281	284	284	293	289	289	289	292	288	280	277	F 277

JUN. 1998 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 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 338	A	A	A	A		A 368	L					
																	351							
2						L		A 368	A	A	A	A	A	A	357	357	366	338	U L 349					
3							362	L	A	A	385	A	A	A	A	A	346	U L 350	L					
4							L	U L 360	386	A	A 360	A	A	A	A	A	A	A	A					
5							A		A 362	377	376	A	A	A	A	329	A	A	A					
6							L	A	A	L 363	A	A	A	371	A	358	353	A						
7						L	A	A	A	A	A	377	A 322	A	A	A	343	A	A					
8								A	A	A	A	A	A	A	A	356	359	324						
9								L 358	362	A	A	A	359	361	A	A	A 340	L 340	L 316					
10							U L 364	A	A	A	A	369	U R 359	360	359	357	H 361	327	L 334					
11							A	A	A	A	363	364	369	358	A	A	A	A	A	A				
12						L	A	A	A	A	A	A	A	A	A	A	A	350	L 341					
13							L 349	A	A	A	A	A	A	A	A	364	371	A	A					
14							A	A	A	A	A	A	A	A	A	A	A	A	A					
15						U L 336	A	A	A	A	A	A	A	A	A	348	356	A	L 336					
16						315	A	A	A	A	A	A	A	A	A	A	365	A	A					
17						L 329		A	A	A	A	A	A	A	A	A 338	A	345	L 363					
18								365	375	417	382	393	L 365	A	368	363	354	358	L 349					
19						L	L 365	L 350	A 380	365	A	A	A	A	A	A	A	A	A	A				
20							A	A 352	366	A	A	A	A	A	A	A	A	A	L 333					
21						L 324	L 368	A	A	A	A	A	A	A	A	A	A	A	A	A				
22						U L 337	333	359	A	A	A	A	A	A	A	362	A	A	A					
23						L 308	A 334	A	A	328	A	A	A	A	A	A	A	A	A					
24						A	A 370	A	389	L	A	A	A	A	A	360	A	A	L					
25						320	361	375	A	A	403	A	A	A	A	A	A	A	A					
26							341	378	A	A	A	A	A	A	A	A	A	A	A	A				
27						309	A	A	A	Y	A	365	A	A	A	A	365	363	L 342	L				
28						L	340	360	358	399	382	381	384	372	398	357	351	L 342	L 333					
29							337	A	A	A	A 326	A	A	A	A 346	A	A	A	L					
30						L	L 370	A	A	A	A	A	A	A	A 332	A	328	A	A					
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						8	13	10	8	6	8	7	6	5	6	12	15	11	10					
MED						L 322	361	360	370	371	379	369	362	361	358	357	354	345	L 338					
U Q						U L 332	L 366	368	383	399	384	381	369	372	368	361	365	358	L 349					
L Q						312	338	L 358	362	363	A 362	364	359	359	A 346	352	346	338	L 333					

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IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 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							A	A	A	302	A	440	376	E A 370	E A 344	314	316	298	302					
2						256		268	A	A	A	A	A 348	350	338	308	318	328	296					
3							290	L 356	A 358	A	478		A	A	A	346	A	338	302	320				
4							266	276	286	A 322	328	382	E A 358	A	A	A	E A 368	300	A 292					
5							A 284		294	330	292	A 346	A	390	A	340	328	308	E A 330					
6							248	268	A 314	330	A	432	394	376	A 412	378	368	A 312						
7						274	342	E A 416	A	A	E A 346	410	414	A	320	300	330	E A 356	298					
8								286	A	E A 342	A	A	E A 396	A 330	302	322	360	344						
9								316	340	A 324	A 418	A 358	400	376	358	338	322	296	314					
10							284	A 282	A 322	A 332	422	394	Y	368	348	320	316	310	288					
11							A 264	A	E A 384	A	344	374	388	350	A	A	A 384	E A 356	A	A				
12						270	282	E A 358	A	A	A	A	A	A 388	A 388	382	A	314	282					
13							284	A	A 294	A 376	338		A	A	A	364	358	A	A					
14							A 298	A	A 380	A 354	A	A 354	A	A	352	A	366	336	300					
15						302	A	A 362	322	A	A	A	A	A	A	A 360	364	352	304					
16						370	A 368	A 356	A	A	A	A	A	A	A	A 322	298	A	A					
17						296		324	A 310	A	A 334	304	A	A	A	354	348	308	274					
18								304	324	290	296	404	386	E A 402	354	342	326	324	294					
19						282	254	268	264	470	396	430	A 372	A 372	348	A 332	A	A	A	E A 356				
20							A 274	310	300	A 326	A 338	E A 408	A	A	A	A	A	328	326					
21						306	222	262	A 350	A	A	A	A	326	A 362	334	A	A 306	A 296	A				
22						310	458	316	274	A	A	464	A	A	A	328	A	A	A					
23						364	332	280	282	392	A	A	360	A	330	A 324	326	A	A					
24						A 330	266	260	270	L	A	A	A	336	348	318	340	308	294					
25						348	382	352	488	A 498	G	Y	A	A	A	A	370	360	A					
26							380	314	268	A	A	A	414	Y 526	362	294	A 320	280	A 298	A				
27						462	A 512	428	374	456	A	G	A	A	A	472	426	332	302	270				
28						314	358	370	324	G	472	398	354	340	348	368	352	340	320					
29							354	A 354	318	298	398	A	376	368	320	A 334	338	A	306					
30						284	264	A 290	E A 356	A	A	A	A 382	A	356	330	334	312	296					
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						15	23	25	24	17	15	16	15	16	19	24	25	24	21	2				
MED						306	284	309	316	331	346	398	379	364	348	333	338	312	298	313				
U Q						348	358	356	A 353	424	422	431	396	382	A 358	357	365	338	310					
L Q						282	266	278	290	323	334	A 366	360	345	338	321	324	307	294					

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IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 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	252	270	A 328	300	244	234	A	A	A	A	A	E A 278	A	A	A	A	A 240	A	A 244	A	270	296	290	336
2	A 332	E A 330	248	A 322	A 342	242	234	A	A	A	A	A	A	A	262	202	216	224	A 264	254	240	254	250	256
3	320	330	254	264	246	248	E A 264	H 222	A	A	224	A	A	A	A	A	A 268	244	E A 288	264	270	276	310	284
4	260	286	268	242	232	250	228	224	228	A	A	A	A	A	A	A	A	A	A	274	276	280	282	300
5	276	306	264	230	266	272	A	H 252	E A 266	228	216	A	A	A	A	234	A	A	A	A	278	A	E A 374	274
6	264	252	A 344	A 340	300	282	A 248	A	A	E A 250	A	A	A	212	A	230	244	A	A 258	A 284	262	324	316	314
7	320	334	296	294	318	A 268	A	A	A	A	A	210	E A 276	A	A	A	A 276	A	A	A 266	266	304	334	A 350
8	354	A 364	300	284	262	226	H 234	A	A	A	A	A	A	A	A	244	218	A 268	278	266	262	298	276	296
9	288	300	270	246	260	244	258	E A 256	232	A	A	A	240	236	A	A	E A 310	226	248	284	A 278	288	A 300	296
10	258	304	258	242	252	248	244	A	A	A	A	216	E A 268	Y 268	230	210	H 216	224	254	250	268	284	292	326
11	342	316	286	284	284	260	A	A	A	A	232	200	204	Y 264	A	A	A	A	A	A	248	300	A	274
12	A	A 338	286	240	320	232	A	A	A	A	A	A	A	A	A	A	A	242	240	A	A	A	E A 400	360
13	310	304	284	A 298	278	248	244	A	A	A	A	A	A	A	A	260	E A 260	A	A	A 256	274	A 310	274	A 366
14	272	294	300	300	290	278	A	A	A	A	A	A	A	A	A	A	A	A	A	274	A	A 318	352	A 362
15	A	A	A 306	A 304	282	A 266	A	A	A	A	A	A	A	A	A	A 268	A 258	A	242	E A 292	256	282	336	A 354
16	334	300	318	302	A 330	A 258	A	A	A	A	A	A	A	A	A	A	A 250	A	A	268	256	264	310	306
17	274	292	304	310	344	246	224	A	A	A	A	A	A	A	A	A	A	244	236	260	250	258	258	308
18	316	290	286	282	272	242	H 240	228	214	194	232	208	H 190	A	200	222	224	242	224	250	260	262	284	316
19	300	292	266	284	316	A 258	224	224	A 248	A 236	A	A	A	A	A	A	A	A	A	A	304	252	276	256
20	260	304	250	254	302	250	A	E A 282	222	A	A	A	A	A	A	A	A	A	248	A	274	274	E A 336	288
21	290	312	276	292	304	A 252	246	A	A	A	A	A	A	A	A	A	A	A	A	A	286	A 336	298	286
22	286	A 302	284	258	248	262	242	248	A	A	A	A	A	A	A	A 232	A	A	A	258	A	278	A 322	344
23	272	300	A 370	E A 380	A 336	274	E A 298	A	A	E A 286	A	A	A	A	A	A	A	A	A	A	290	270	294	234
24	256	272	268	262	286	A	E A 264	A	220	260	A	A	A	A	A	222	A	A	A	252	256	A 344	274	292
25	246	314	296	336	376	278	248	232	A	A	234	A	A	A	A	A	A	A	A	A	282	302	A 356	284
26	278	286	266	248	270	244	244	222	A	A	A	A	A	A	A	A	A	A	A	A	A	300	286	290
27	320	306	338	312	296	A 324	A	A	A	Y	A	A 254	A	A	A	A	222	234	238	262	272	286	306	332
28	296	342	348	310	298	252	230	224	H 204	200	202	224	210	242	218	228	212	228	248	266	274	274	274	256
29	274	A 320	276	268	268	264	248	A	A	A	A	A	A	A	E A 272	A	A	A	A	A 286	254	A	A 344	310
30	296	332	A 338	306	294	240	226	A	A	A	A	A	A	A	A	A	A 250	A	A	286	264	262	258	258
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	30	30	30	29	20	11	8	7	6	7	6	5	5	11	15	10	14	20	26	27	29	30
MED	287	304	286	286	288	252	240	226	223	U 218	228	213	U 211	242	224	230	A 234	238	247	266	269	284	294	298
U Q	318	325	A 306	306	316	267	A 248	E A 252	A 240	260	232	A 254	E A 268	Y 266	267	244	A 260	244	A 258	279	276	A 302	A 335	332
L Q	268	292	268	258	266	244	232	224	217	200	216	208	204	224	209	222	218	226	240	257	256	270	276	284

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IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 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						B 128	114		114	114	114	A	114	A	114	A	114	A	A	B				
2						A 126	A 130		112	112	112	118	120	A	118	A	A	A	A	B				
3						138	128	118	116	116	118	120	120	A	120	A	126	124	124	B				
4						130	128	122	114	114	114	118	118	120	112	112	114	A	A	B				
5						A 142	122	122	122	118	118	118	A	118	A	118	118	124	A	B				
6						132	126	118	114	116	116	A	116	116	116	116	116	116	120	B				
7						132	124	120	118	114	116	118	118	118	118	122	116	116	118	B				
8						A	126	124	118	116	A	A	A	A	A	A	A	A	A	B				
9						A 120	A 132		112	110	A	A	116	120	118	118	118	118	A	B				
10						A 120	116		116	116	116	A	A	A	A	A	A	A	A	B				
11						128	122	120	120	116	116	A	116	A	A	A	120	120	116	B				
12						124	124	118	116	A	114	A	114	114	114	116	116	114	A	B				
13						A 122	120		120	116	A	A	A	A	A	116	116	116	116	B				
14						A 134	126	120	118	120	120	110	A	A	114	116	A	A	A	B				
15						124	122	118	112	112	116	116	116	A	118	118	118	118	A	B				
16						A 126	A 134		A 132	118	108	116	118	A	A	122	120	118	118	B				
17						A	A	A 130	116	116	116	116	116	114	114	114	A	A	A	B				
18						A 124	118		116	116	116	116	116	116	118	118	A	118	A	B				
19						A	A	120	118	114	114	114	116	116	118	A	A	A	A	B				
20						A	A	116	130	128	130	116	116	116	116	118	120	120	A	B				
21						A	A	A	120	116	A	A	A	A	A	A	116	120	A	B				
22						140	A 146	A 130	112	112	112	114	A	110	A	A	A	A	A	B				
23						A	A	120	114	112	112	112	A	A	114	A	A	A	A	B				
24						A	A	A	A 124	A 130	120	118	118	A	116	116	A	A	A	B				
25						140	118	130	116	114	A	120	A	A	120	116	116	116	A	B				
26						A	A	A 134	126	116	114	A	A	A	A	A	A	A	A	B				
27						A 120	118		118	118	118	120	120	A	122	118	116	116	A	B				
28						A	A	A 134	120	118	118	118	118	118	A 126	A 126	118	118	118	B				
29						120	118	118	116	114	114	A	A	A	118	118	114	114	116	B				
30						140	122	116	116	116	118	A	B	118	118	118	118	120	A	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						13	22	28	30	29	25	18	18	13	21	19	19	18	8					
MED						132	124	120	116	116	116	117	116	116	118	118	116	118	118					
U Q						140	126	A 130	120	117	118	118	118	118	118	118	118	120	119					
L Q						126	122	118	114	114	114	116	116	115	114	116	116	116	116					

JUN. 1998 h'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 1998 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	128	106	106	104	102	102	116	114	110	112	110	114	112	110	106	110	114	114	108	128	122	116	112	108
2	104	108	104	106	102	102	130	126	116	114	112	110	110	110	114	112	108	112	104	102	B	104	102	100
3	102	112	114	108	108	144	138	138	122	120	118	118	114	114	126	128	126	108	124	114	114	114	120	110
4	110	114	106	108	112	112	156	128	128	114	118	118	112	114	108	110	108	112	106	128	116	114	112	110
5	110	104	104	100	102	134	126	124	122	126	122	108	108	110	110	118	132	122	116	114	116	116	114	114
6	108	108	108	108	106	136	128	126	120	118	114	116	120	G	124	138	128	120	114	112	106	108	110	112
7	108	106	104	104	114	122	118	114	112	112	114	116	116	106	106	114	136	126	126	112	110	110	112	108
8	112	106	104	100	100	100	152	126	114	114	112	108	106	106	106	112	108	104	104	104	104	116	112	110
9	112	106	104	102	122	138	124	122	122	112	112	116	G	120	118	118	116	E 164	G 126	112	112	110	104	104
10	100	100	102	102	104	138	128	114	114	116	112	118	106	112	112	112	110	108	106	100	106	104	112	108
11	108	106	104	110	126	122	126	120	116	112	116	118	G	114	110	102	128	118	112	106	124	134	114	110
12	112	108	104	104	100	138	130	120	118	110	110	106	108	110	110	138	126	108	126	108	112	114	116	108
13	106	104	102	104	102	136	118	112	112	112	120	108	108	110	106	G	134	122	114	120	128	112	114	110
14	108	108	104	104	106	128	124	118	118	114	110	112	110	108	112	112	114	120	108	122	100	100	100	122
15	108	106	106	108	124	122	128	128	124	118	116	112	112	106	112	118	122	114	114	110	110	106	126	116
16	112	112	112	112	104	142	130	128	118	112	106	116	116	112	106	118	118	114	110	110	110	110	132	110
17	106	118	116	110	116	102	106	130	126	118	118	120	120	120	116	114	110	110	106	116	B	108	B	102
18	106	102	114	104	122	152	126	140	118	122	118	120	124	110	G	118	138	126	102	122	114	112	110	108
19	108	106	106	102	102	102	100	130	122	120	120	118	116	114	114	106	104	100	100	102	102	100	100	112
20	110	100	100	104	110	104	104	134	134	126	114	112	112	112	110	114	116	114	112	112	112	138	112	108
21	104	98	104	104	104	106	134	120	114	114	114	108	106	114	108	108	126	118	114	112	108	112	108	108
22	106	102	102	108	104	160	108	130	124	116	110	110	108	106	104	104	118	114	114	118	112	114	116	110
23	112	108	108	104	102	122	112	116	114	112	108	104	104	102	108	108	122	120	100	100	100	118	122	118
24	112	112	108	108	106	106	106	108	108	124	116	116	116	112	122	120	112	114	110	114	116	124	116	112
25	110	106	108	106	108	136	142	140	126	118	118	126	118	118	118	116	116	116	110	110	112	114	112	108
26	132	106	108	112	104	106	106	132	124	118	108	108	108	108	110	104	104	106	108	112	98	98	114	126
27	112	108	110	108	110	128	124	128	122	124	120	118	118	114	122	122	120	128	116	B	122	114	116	110
28	110	110	110	104	108	112	110	152	126	124	G	G	G	G	128	130	G	130	118	110	110	110	106	104
29	112	108	108	104	104	128	140	120	114	114	114	110	110	110	118	126	132	118	116	110	B	114	112	106
30	104	104	102	106	104	140	130	118	114	112	112	112	114	116	124	118	116	116	108	106	104	104	104	112
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	30	30	30	30	30	30	30	30	30	30	29	29	27	28	29	29	29	30	30	29	27	30	29	30
MED	109	106	106	104	105	125	126	126	118	115	114	114	112	111	112	114	118	114	111	112	112	112	112	110
U Q	112	108	108	108	110	138	130	130	124	120	118	118	116	114	118	119	127	120	116	115	116	114	116	112
L Q	106	104	104	104	102	106	112	118	114	112	111	109	108	109	108	110	111	112	106	107	106	108	109	108

JUN. 1998 h'Es (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

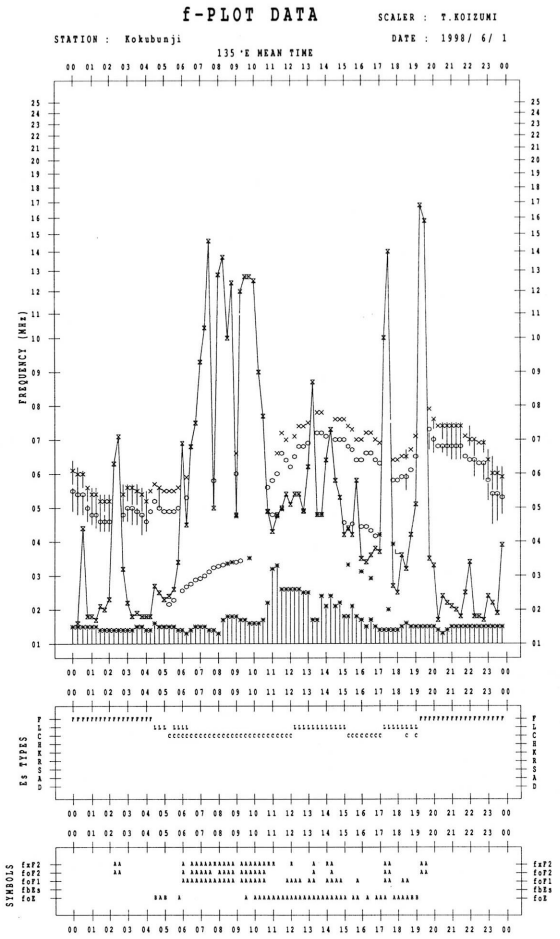
JUN. 1998 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

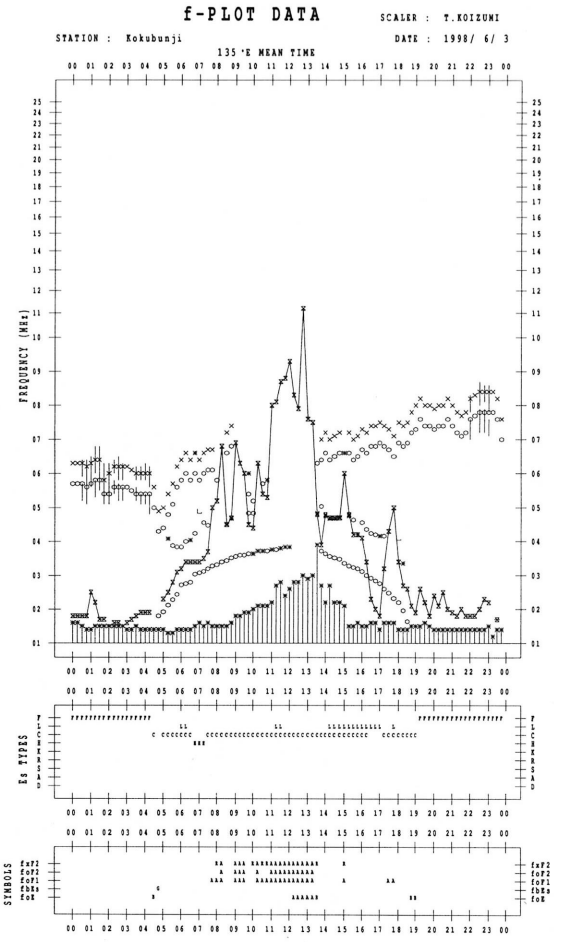
LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

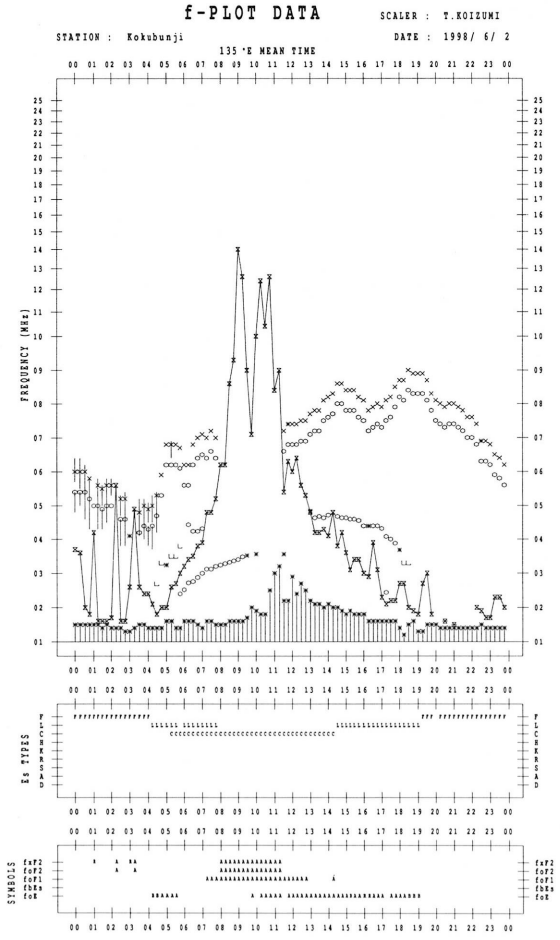
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 2	F 3	F 5	F 4	F 3	L 3	CL 32	C 3	C 3	C 1	C 2	C 1	C 2	L 2	L 2	L 2	C 2	C 3	L 2	CL 14	FF 13	F 3	F 5	F 3
2	F 5	F 4	F 3	F 3	F 3	L 2	CL 21	CL 21	C 2	C 3	C 2	C 2	C 3	C 2	C 1	L 2	L 1	L 2	L 3	L 3		F 2	F 2	F 2
3	F 2	FF 21	F 1	F 1	F 2	C 1	CL 21	H 1	C 2	C 2	C 1	C 2	C 2	C 2	C 2	CL 21	CL 21	L 1	C 3	C 4	F 2	FF 21	F 2	F 4
4	F 1	F 3	F 3	F 1	F 1	L 1	HL 12	CL 22	CL 11	C 2	C 1	C 1	C 2	C 2	C 2	C 3	C 3	C 2	L 4	CL 25	F 2	F 3	F 3	F 2
5	F 3	F 2	F 2	F 3	F 5	CL 21	CL 41	C 2	C 2	C 1	C 1	C 2	C 1	C 2	C 3	C 2	C 2	CL 41	L 4	L 5	F 6	F 6	F 6	F 3
6	F 3	F 4	F 4	F 5	F 3	C 3	CL 21	C 2	C 2	C 1	C 2	C 1	C 1		C 1	H 1	C 1	C 3	C 3	C 4	F 3	F 3	F 3	F 4
7	F 3	F 3	F 4	F 3	F 2	C 3	C 2	C 2	C 2	C 2	C 2	C 1	C 1	C 3	C 2	C 2	C 2	CC 25	C 4	L 5	F 4	F 3	F 4	F 3
8	F 3	F 4	F 5	F 3	F 4	L 3	HL 11	CL 21	C 2	C 2	C 2	L 2	L 2	L 2	L 2	L 2	L 1	L 2	L 4	L 4	FF 14	F 2	F 3	F 3
9	F 2	F 2	F 2	F 2	FF 11	C 1	C 2	CL 21	C 1	C 2	L 2	C 1		C 1	C 1	C 1	C 2	H 1	CL 12	L 4	F 6	F 4	F 5	F 4
10	F 3	F 4	F 2	F 2	F 2	CL 11	C 2	C 3	C 2	C 2	C 2	C 1	L 1	L 1	L 1	L 1	L 2	L 2	L 2	L 3	F 3	F 1	F 3	F 5
11	F 3	F 3	F 2	F 2	F 5	C 4	CL 31	C 2	C 3	C 3	C 1	C 1		L 1	L 2	L 2	C 2	C 4	L 4	L 6	FF 15	FF 13	F 4	F 4
12	F 5	F 3	F 3	F 3	F 3	CL 21	C 2	C 3	C 2	C 3	C 3	L 2	L 3	C 2	C 2	CL 21	CL 31	C 3	CC 23	L 5	F 5	F 4	F 5	F 6
13	F 3	F 3	F 3	F 3	F 4	CL 12	C 2	C 4	C 2	C 2	C 1	C 2	C 3	C 2	L 2		C 1	C 3	C 3	L 6	FF 13	F 3	F 4	F 4
14	F 3	F 2	F 2	F 2	F 2	CL 21	CL 41	C 3	C 3	C 3	C 3	C 2	C 2	C 2	C 2	C 2	LC 11	CL 42	L 4	L 5	F 4	F 4	F 5	FF 34
15	F 5	F 4	F 4	FF 31	FF 34	C 3	C 2	C 2	C 3	C 2	C 2	C 2	C 2	C 2	C 2	C 1	C 1	C 2	LC 31	L 3	F 4	F 4	FF 22	F 4
16	F 5	F 3	F 3	F 6	F 5	CL 31	CL 31	CL 51	CL 31	C 3	C 2	C 2	C 2	C 3	L 2	C 2	C 2	C 3	C 4	L 3	F 4	F 2	FF 12	F 6
17	F 3	F 3	F 3	F 3	FF 13	L 2	L 2	CL 22	C 1	C 2	C 2	C 1	C 1	C 2	C 2	C 2	C 2	C 2	L 2	L 1		F 2		FF 21
18	F 4	F 2	F 3	F 3	F 2	CL 11	C 3	C 1	C 1	C 1	C 1	C 1	C 1	C 2		C 1	CL 11	CL 11	L 3	CL 12	F 4	F 2	F 2	F 4
19	F 4	F 3	F 3	F 3	F 3	L 3	L 2	C 1	C 1	C 1	C 2	C 1	C 2	C 2	C 2	L 2	L 3	L 3	L 4	L 5	F 4	F 3	F 1	FF 21
20	FF 21	F 3	F 2	F 2	F 5	L 3	L 3	C 2	CL 11	CL 21	CL 21	C 2	C 2	C 3	C 2	C 2	C 3	C 3	L 2	L 5	F 3	FF 22	F 3	F 2
21	F 3	F 3	F 2	F 2	F 2	L 2	CL 12	CL 31	C 2	C 2	C 2	C 2	C 2	C 1	C 2	L 3	C 2	C 3	C 4	F 5	F 5	F 3	F 4	F 2
22	F 2	F 4	F 1	F 1	F 1	C 1	L 2	CL 11	C 2	C 2	C 2	C 2	C 2	C 2	L 2	L 2	CL 33	CL 33	CL 45	CL 23	F 6	F 2	F 5	F 4
23	F 2	F 3	F 4	F 4	F 5	L 2	L 3	C 2	C 3	C 2	C 3	C 3	C 1	L 2	L 2	L 2	CL 12	CL 22	L 3	L 4	F 3	FF 31	FF 41	F 1
24	F 4	F 2	F 4	F 2	F 5	L 3	L 3	L 2	LC 21	CL 11	C 2	C 2	C 2	C 1	C 1	C 1	C 2	LC 21	L 3	L 5	F 2	F 6	F 3	F 3
25	F 1	F 2	F 2	F 2	F 6	C 2	C 2	CL 11	C 2	C 1	C 1	C 1	C 2	C 2	C 2	C 2	C 2	C 2	L 4	L 4	F 3	F 2	F 3	F 2
26	FF 12	F 2	F 2	F 1	F 1	LC 31	L 2	CL 12	CL 11	C 1	C 2	C 2	L 2	L 2	L 1	L 2	L 3	L 3	L 4	L 5	F 4	F 2	FF 12	FF 21
27	FF 22	F 2	F 3	F 2	F 3	C 4	C 3	C 2	C 2	C 1	C 1	C 1	C 1	C 2	C 2	C 2	C 1	C 1	C 2		F 2	F 3	F 2	F 3
28	F 5	F 4	F 3	F 5	FF 23	L 3	L 2	CL 11	CL 11	C 1					CL 11	CL 11		C 1	C 2	L 3	F 2	F 2	F 2	F 2
29	FF 21	F 4	F 2	F 4	F 4	CL 11	C 2	C 2	C 3	C 2	C 2	C 1	L 1	L 1	CL 11	C 2	C 1	C 2	C 3	L 3		F 5	F 5	F 6
30	F 4	F 4	F 5	F 3	F 3	C 1	CL 11	C 2	C 2	C 2	C 2	C 2	C 2	C 2	C 1	C 2	C 2	C 2	C 3	L 4	F 2	F 3	F 3	FF 32
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																								

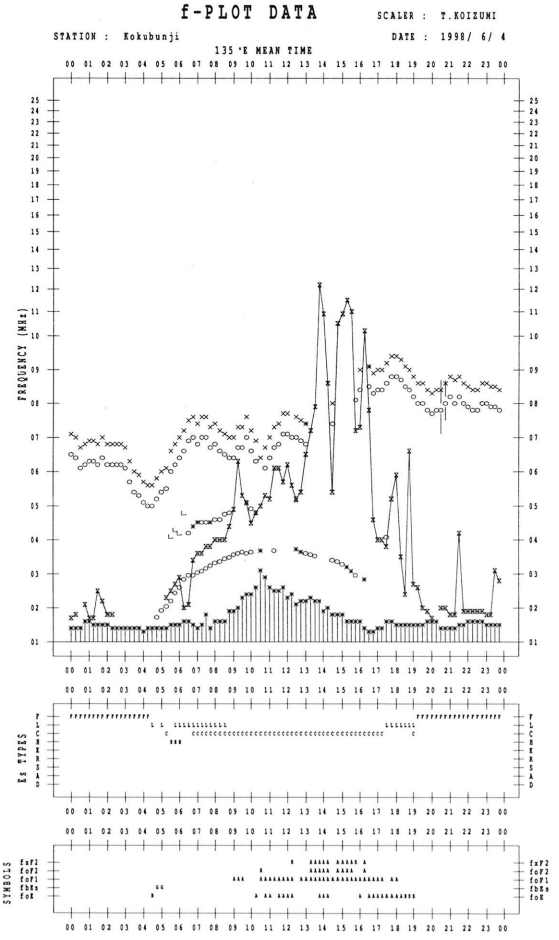
f-PLOTS OF IONOSPHERIC DATA

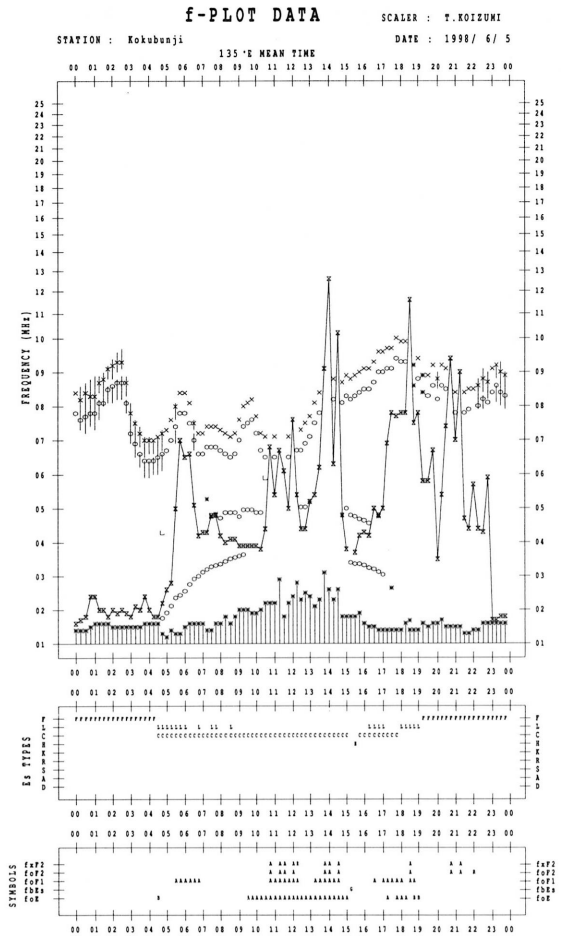
KEY OF f-PLOT	
	SPREAD
	foF2, foF1, foE
	fxF2
	DOUBTFUL foF2, foF1, foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

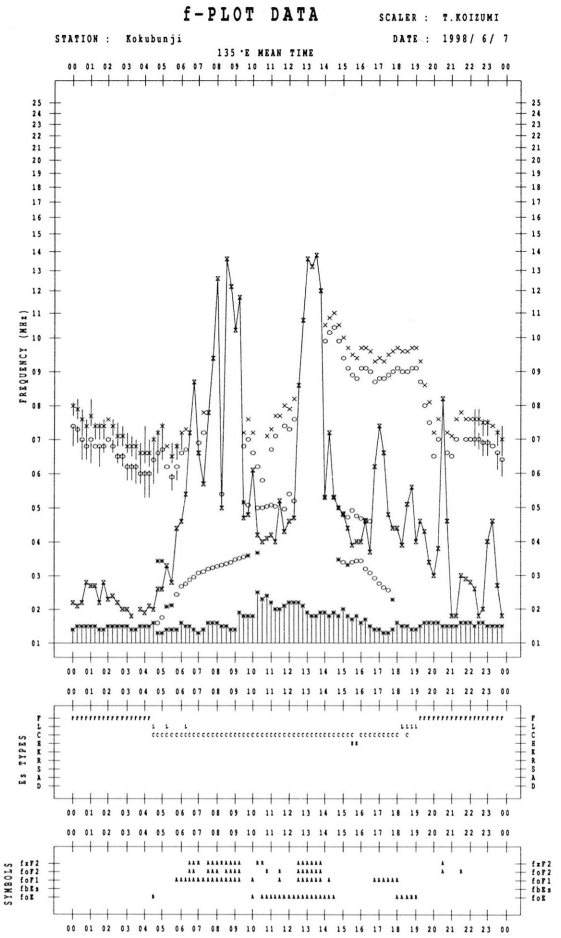

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

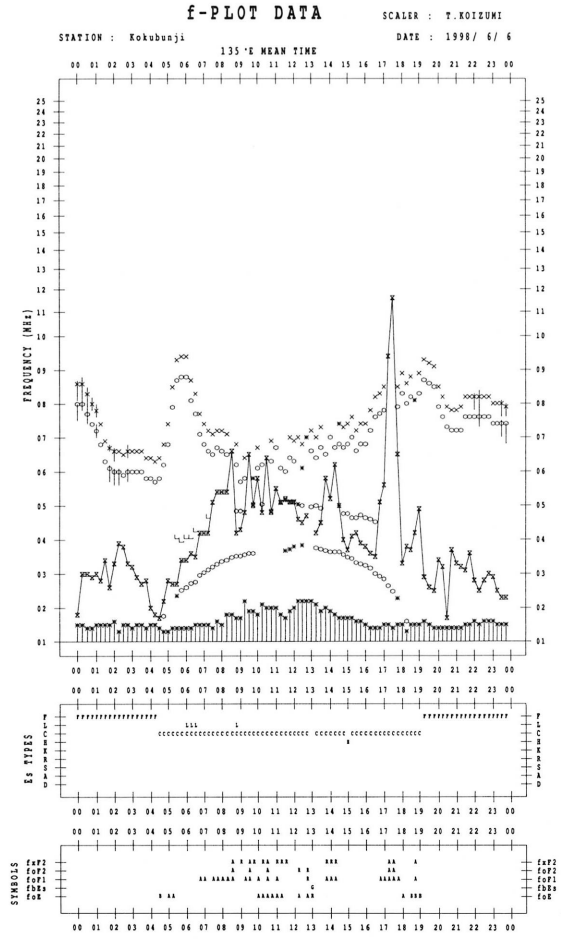

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

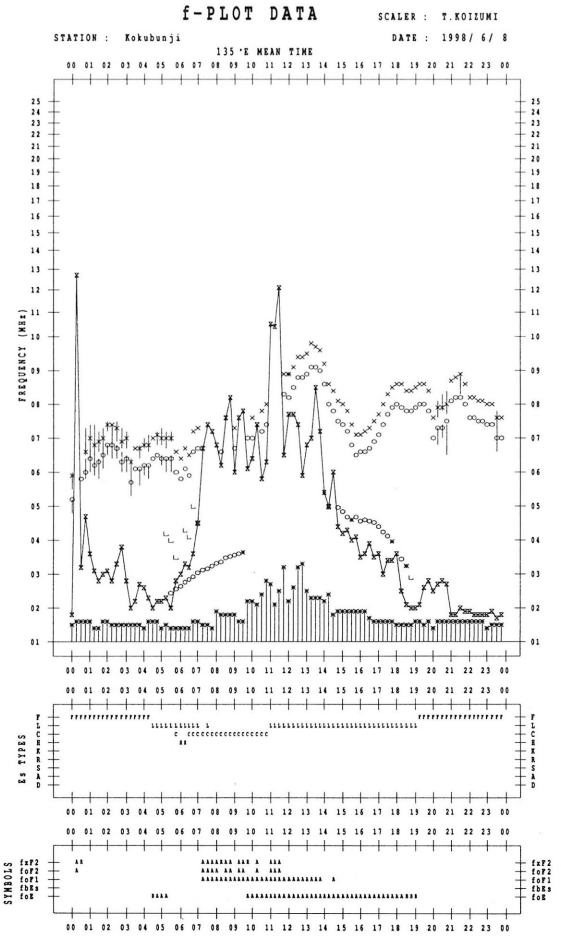

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

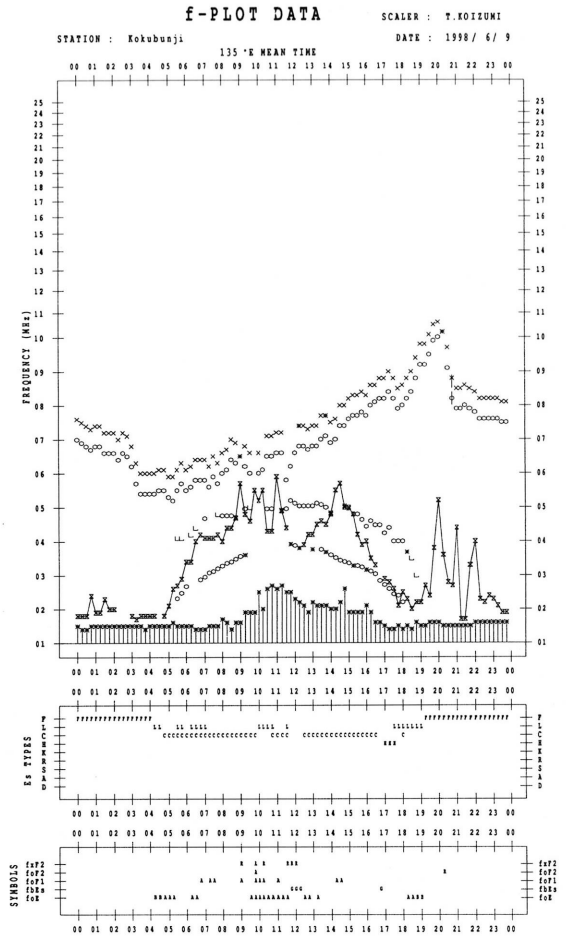

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

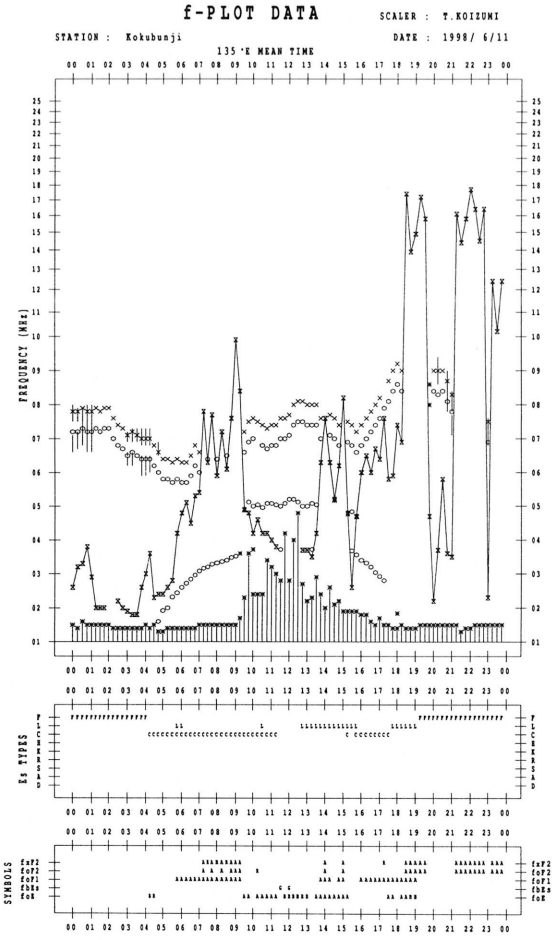

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

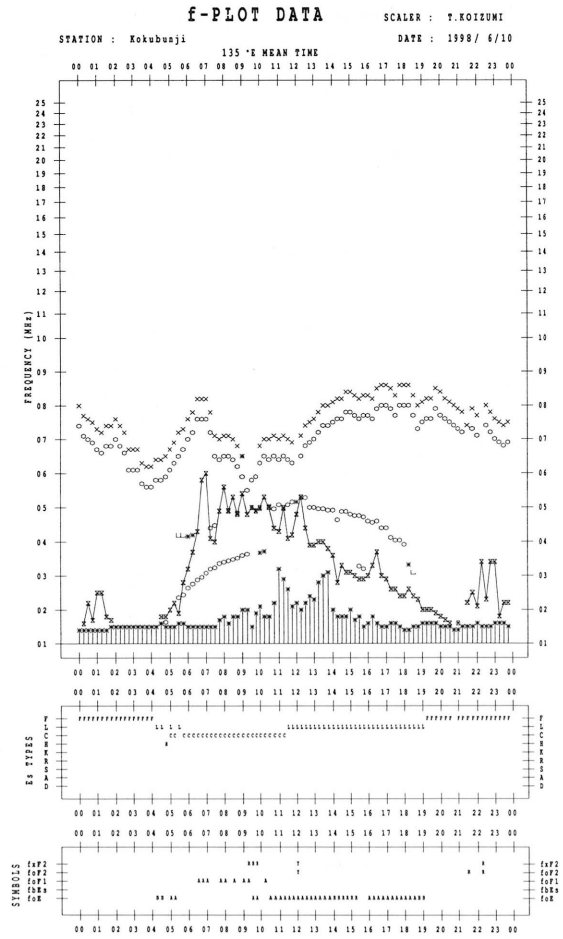

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

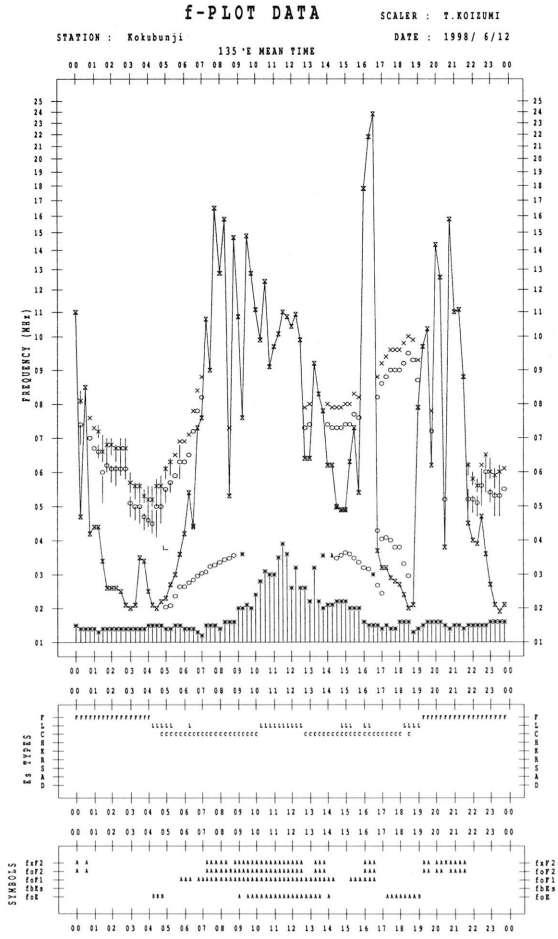

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

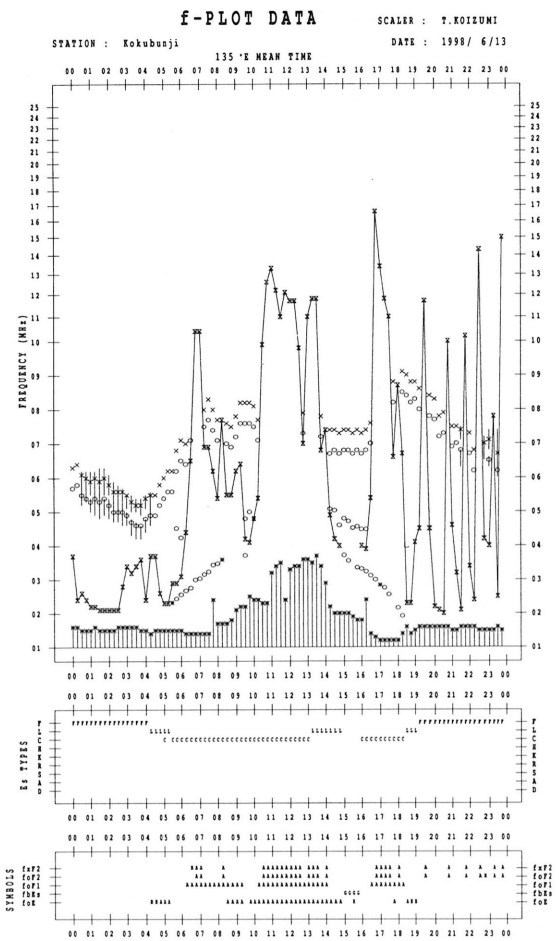

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

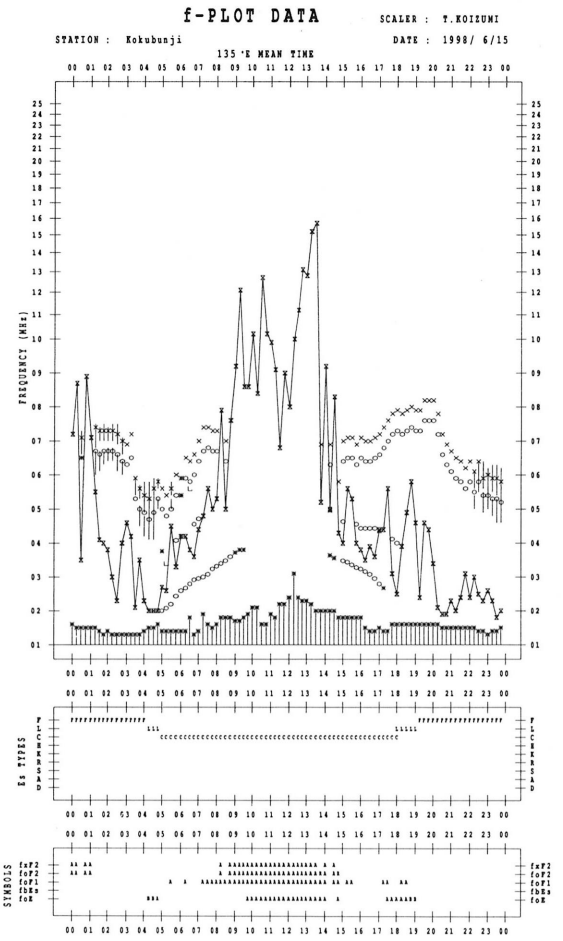

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

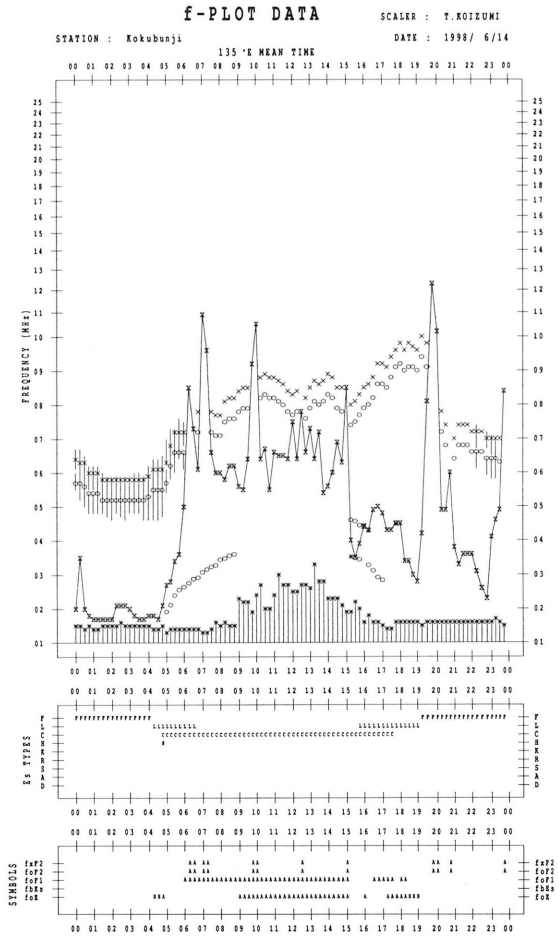

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 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 : 1998/ 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 : 1998/ 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 : 1998/ 6/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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STATION : Kokubunji
DATE : 1998/ 6/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
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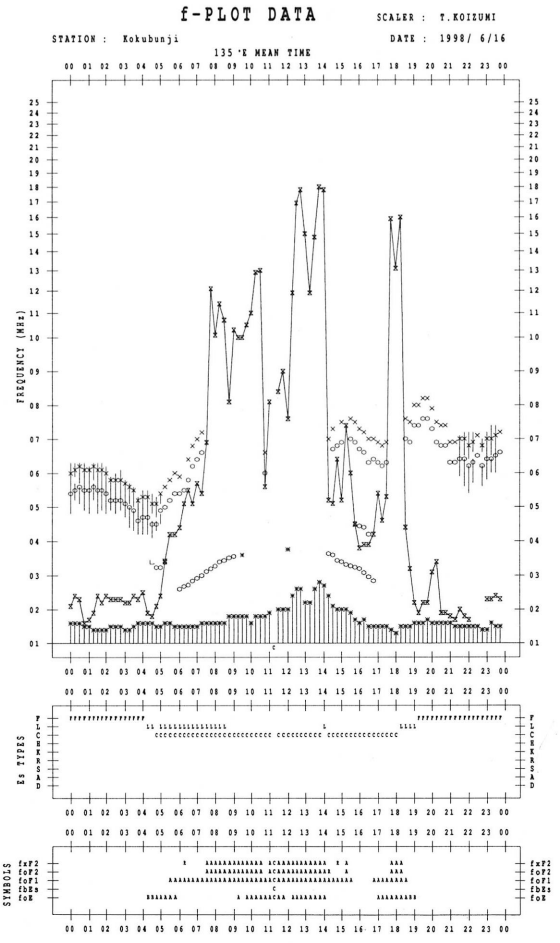
foF2
foF1
fbEs
foE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STATION : Kokubunji
DATE : 1998/ 6/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
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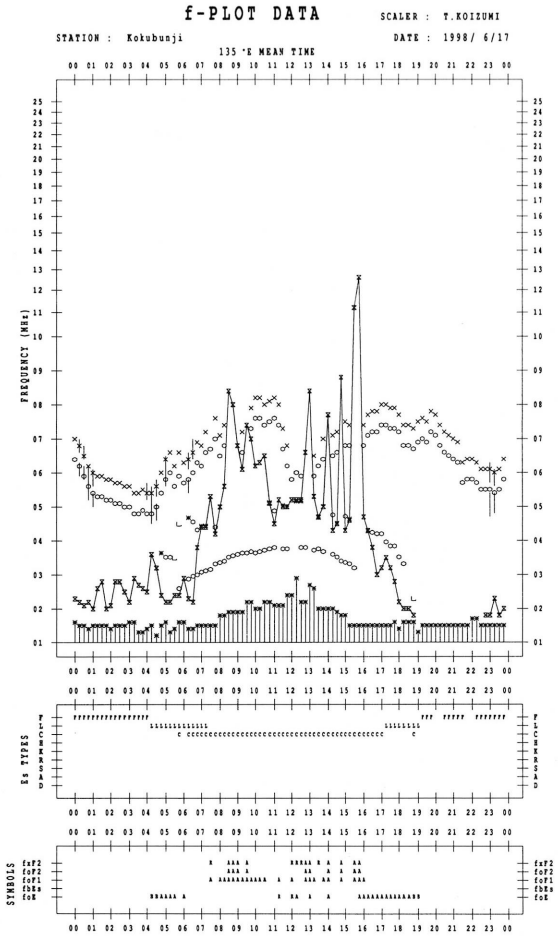
foF2
foF1
fbEs
foE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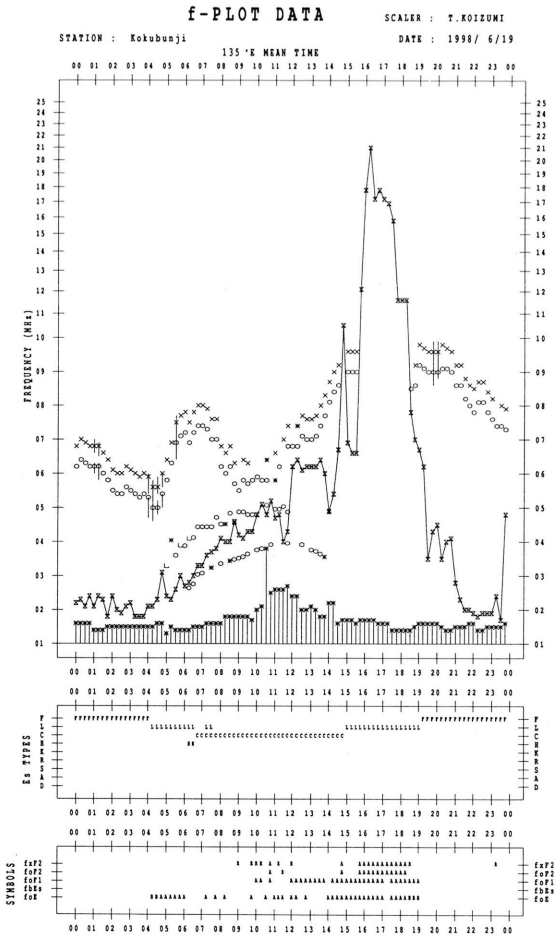
STATION : Kokubunji
DATE : 1998/ 6/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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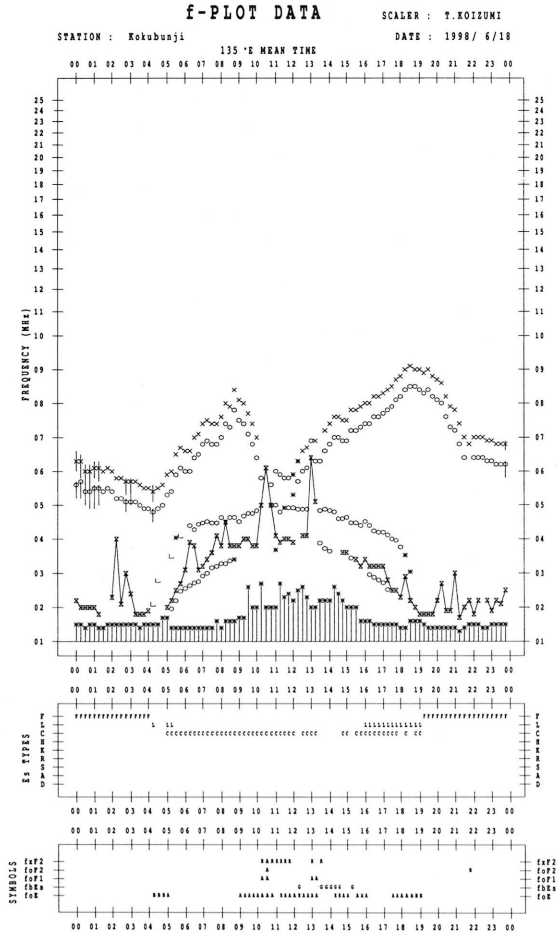
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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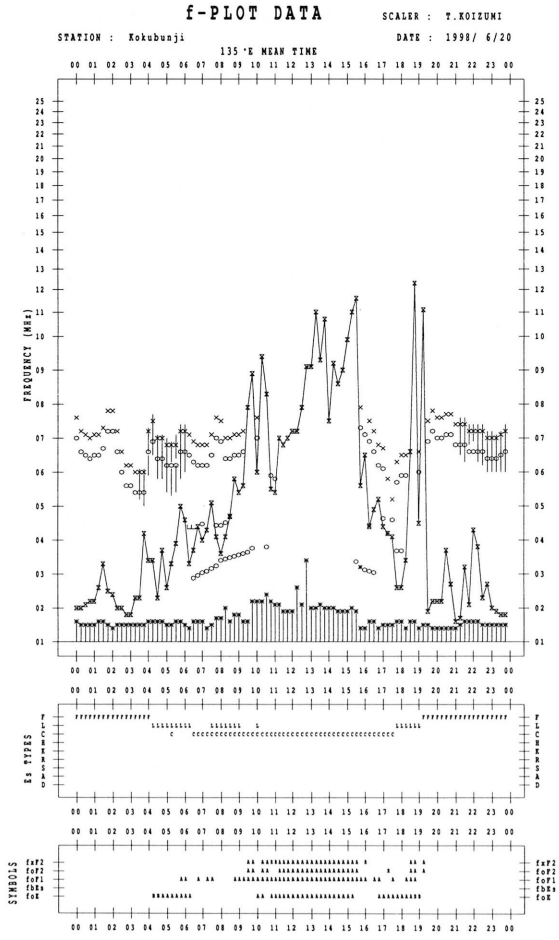
STATION : Kokubunji
DATE : 1998/ 6/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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STATION : Kokubunji
DATE : 1998/ 6/20
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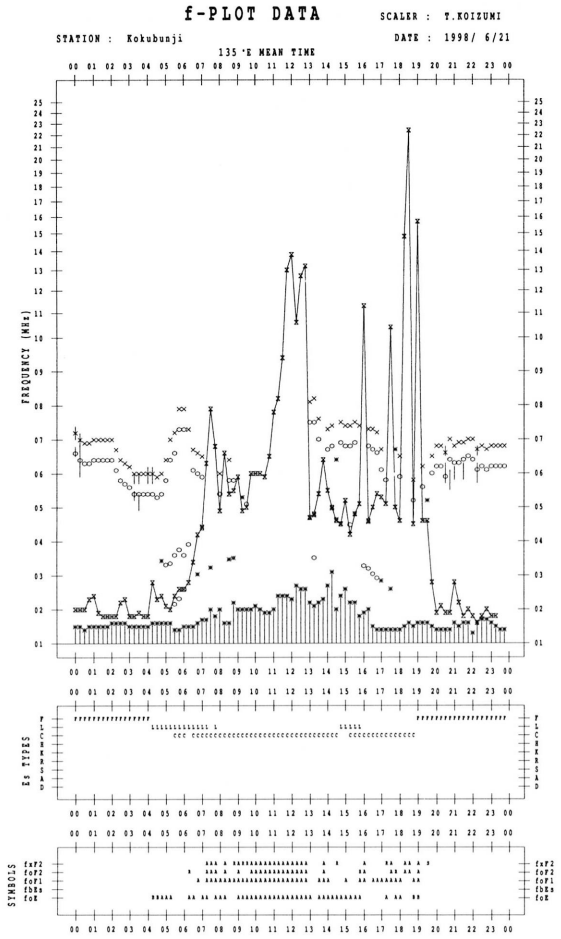
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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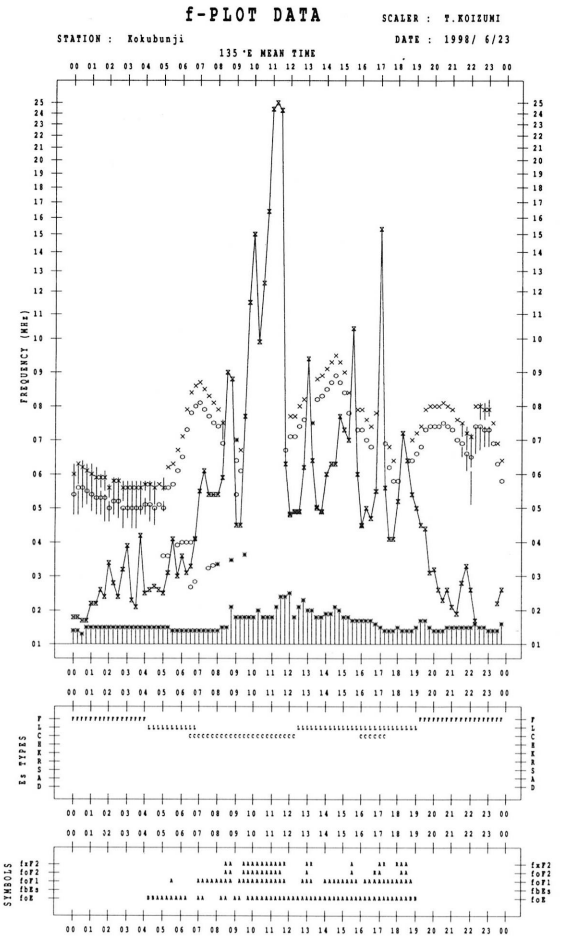
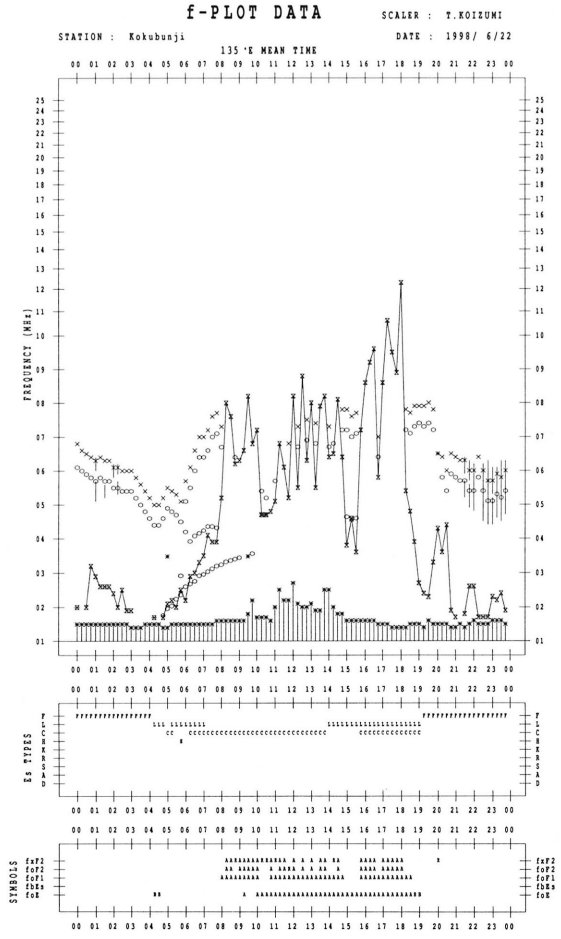
STATION : Kokubunji
DATE : 1998/ 6/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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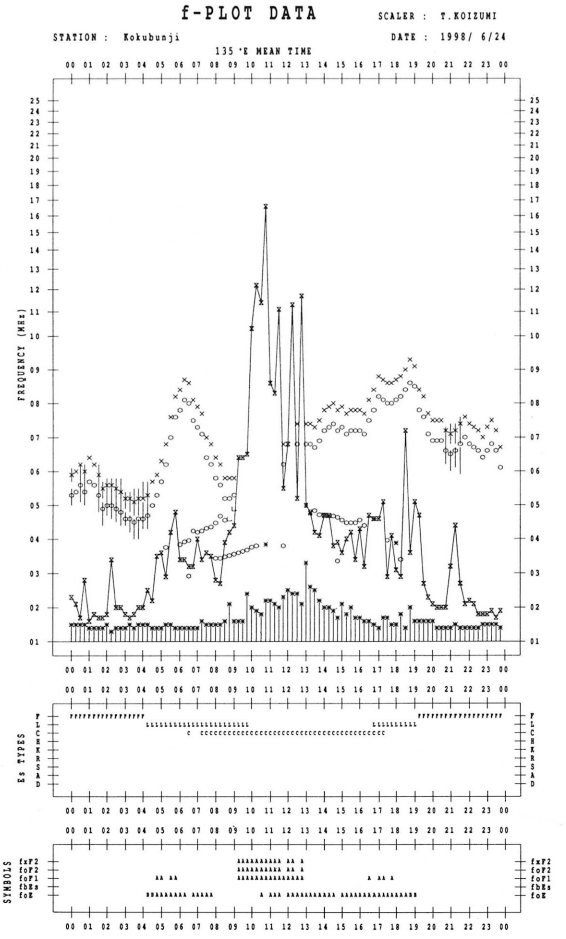
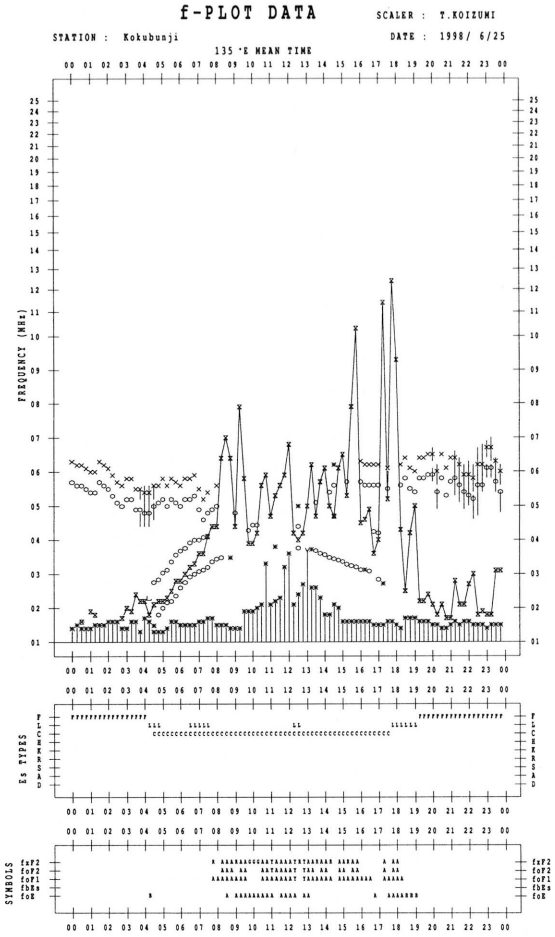
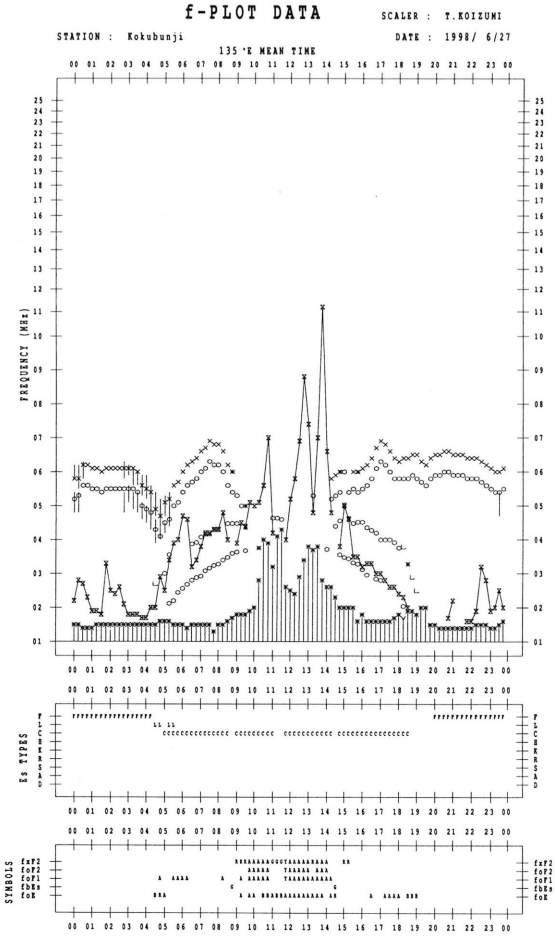
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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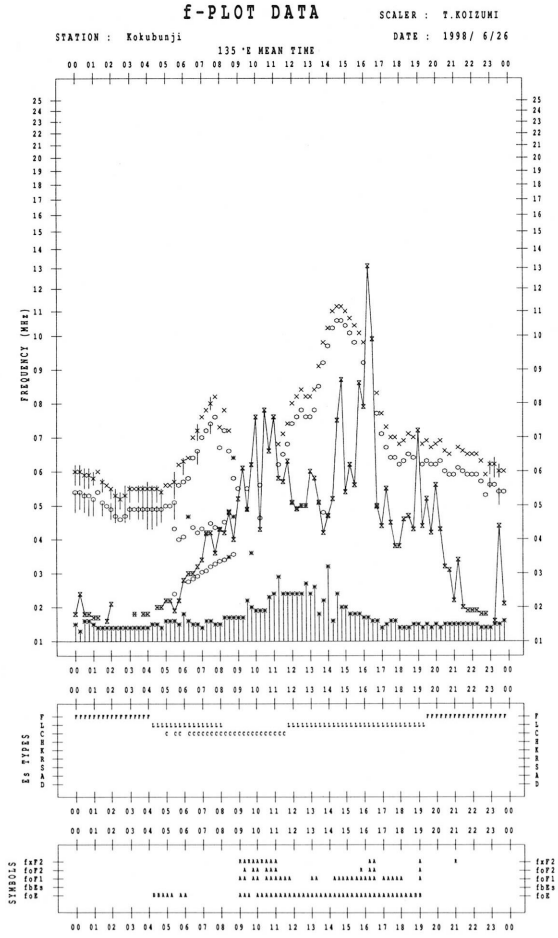
STATION : Kokubunji
DATE : 1998/ 6/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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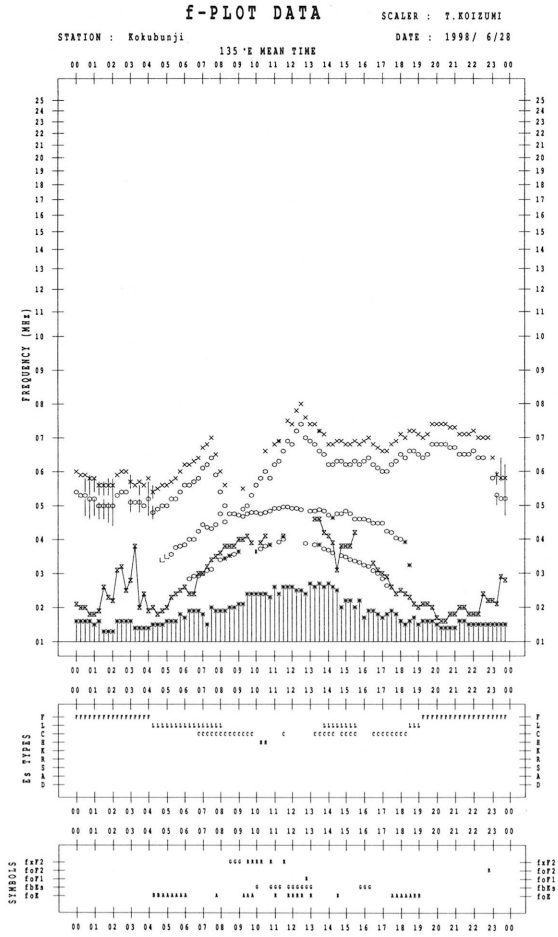
STATION : Kokubunji
DATE : 1998/ 6/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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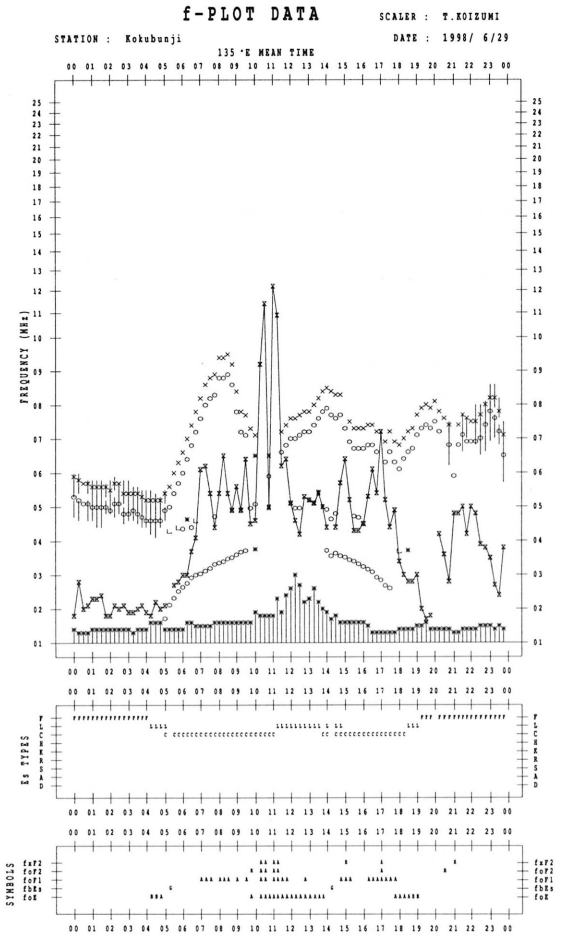
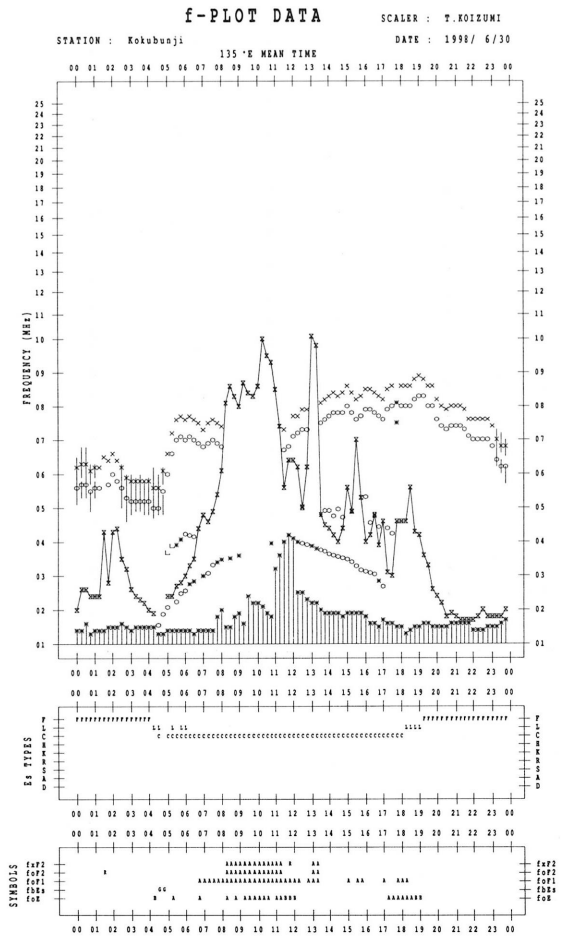
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 6/30
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso June 1998

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

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso June 1998

Single-frequency observations

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

JUN. 1998	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
1	200	8 S	0746.1	0746.4	0.6	30	-	0
3	200	42 SER	2008.6	2009.4	2.5	220	-	0
	200	42 SER	2030.6	2031.1	0.6	70	-	0
	500	8 S	2031.1	2031.2	0.2	40	-	0
4	200	42 SER	0329.2	0329.5	1.5	50	-	0
	200	42 SER	2036.0	2039.0	4.0	390	-	ML
	500	27 RF	2052.0	2132.0	110.0	20	7	WR
5	200	42 SER	0002.4	0002.7	0.9	70	-	0
	200	8 S	0443.5	0443.7	0.6	50	-	ML
6	200	42 SER	0425.0	0430.7	6.0	190	-	WL
7	500	8 S	0615.0	0615.1	0.2	10	-	WR
10	500	42 SER	0402.5	0404.2	2.7	20	-	0
	2800	1 S	0404.0	0404.7	2.5	10	2	0
11	200	8 S	0802.6	0802.7	0.2	20	-	0
	500	8 S	0802.6	0802.7	0.2	10	-	0
12	2800	3 S	2108.0	2109.7	4.0	40	12	WL
	500	46 C	2108.2	2108.7	3.0	10	3	WL
	200	42 SER	2131.0	2133.5	9.0	50	-	0
	200	8 S	2229.7	2230.0	0.6	10	-	0
	500	46 C	2312.0	2313.7	6.0	20	4	WL
	200	42 SER	2312.7	2313.2	2.0	40	-	0
	2800	46 C	2314.5	2314.7	3.5	40	12	ML
	200	8 S	2333.5	2333.7	0.4	30	-	0
13	200	42 SER	0109.8	0110.0	0.9	20	-	0
	500	8 S	0110.2	0110.3	0.2	10	-	0
	500	46 C	0306.0	0308.9	4.5	20	4	WL
	2800	8 S	0307.8	0307.9	0.2	20	-	0
	200	46 C	0416.5	0418.5	3.0	2800	-	0
	500	46 C	0418.5	0418.7	3.0	130	20	0
	2800	8 S	0418.6	0419.1	1.0	40	-	0
	200	42 SER	0850.0	0857.5	8.0	440	-	0
14	200	42 SER	0104.7	0105.2	8.0	270	-	0
	200	8 S	0519.6	0519.9	0.5	20	-	0
19	500	46 C	0639.5	0655.5	46.0	300	-	MR

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso June 1998

Single-frequency observations

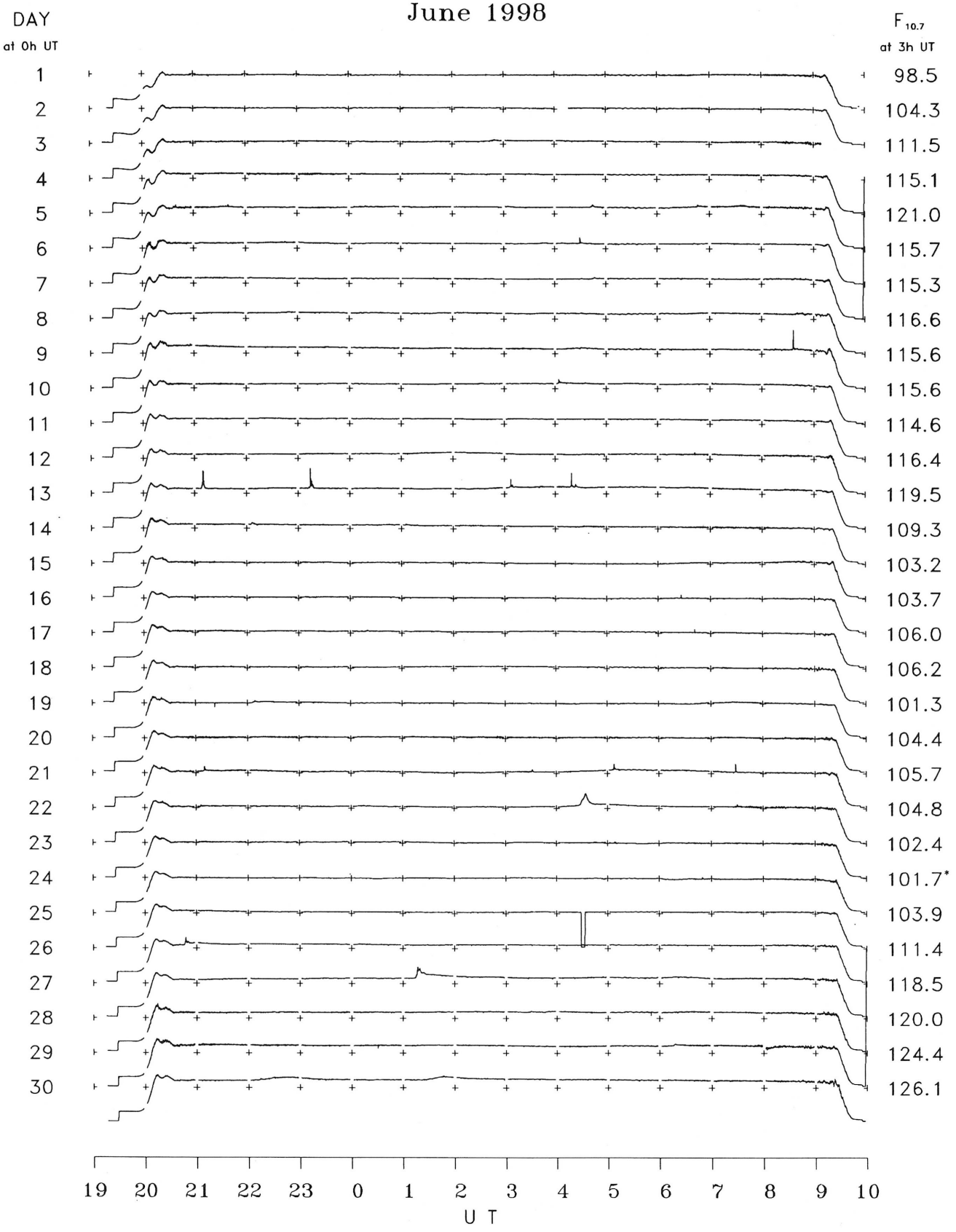
Normal observing period: 1920 - 1000 U.T. (sunrise to sunset)

JUN. 1998	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
20	500	46 C	2108.2	2109.7	5.0	380	-	ML
	200	8 S	2109.9	2110.2	0.6	60	-	MR
	2800	1 S	2112.5	2113.0	1.2	10	3	0
	500	42 SER	2323.2	2324.7	2.5	80	-	ML
21	500	42 SER	0258.2	0301.0	3.5	20	-	WL
	500	46 C	0506.2	0507.9	6.0	100	25	WR
	2800	8 S	0508.4	0508.7	0.6	10	-	0
	500	8 S	0727.5	0727.7	0.8	330	-	ML
	2800	8 S	0728.0	0728.5	1.0	20	-	0
	200	8 S	2105.2	2105.5	0.7	30	-	0
22	2800	3 S	0428.5	0434.5	13.0	30	9	WR
24	500	8 S	0353.4	0353.5	0.2	30	-	0
	200	8 S	0354.0	0354.2	0.4	30	-	0
	500	42 SER	0449.2	0449.3	3.0	50	-	0
	200	42 SER	0450.7	0451.2	0.7	40	-	0
26	200	8 S	0558.5	0558.7	0.4	20	-	0
27	2800	29 PBI	0114.2	0116.0	40.0	20	4	0
29	200	42 SER	2222.7	2223.1	2.0	90	-	0
	500	8 S	2224.0	2224.2	0.4	10	-	0

B. Solar Radio Emission

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

June 1998



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

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F-594 Vol.50 No.6 (Not for Sale)

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2-1 Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184-8795 JAPAN