ISSN 0021—0382

F—608

IONOSPHERIC DATA IN JAPAN

FOR AUGUST 1999

VOL. 51 NO. 8

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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

AUG. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	70		61	61	63	58	63	A	A	78	A	A			A	66	A	73	68	A	82		81	71
2	70	69	68	64	66	70	80	A	87	90		A	A	A	A	78	88	82	82		81	92	92	78
3	76	76	70	67	64	74	71	A	77	79	A	59	69	74			68	67	78	81	83	95		73
4	74	69	68	70		72	81	112	84	A	A	A	A	A	A		80	76	A	81	70		58	84
5	73	72	72	64	68	80		89	81	80		A		76	74		A	A	A	88	84	94	85	88
6	80	75	74	71	72	71	77	92	A	77	A	A	A		A	59	68	74	73	68	60	73		76
7	68	59	60	68	60	68	70	A	A	A	A	A		70	66	74	75	70		68	70	66	70	70
8	68		69		57	69		57		A	A	A		A		68	A	68	68	67	66	73		62
9	A	58	57	57	56	60	74	80	59	79	58	A		68		76	66	70	80	80	89	84	95	
10	70	68		61		A	A	A	A	A	A	A					64	64	68	64	68	73	70	A
11	55	57	57		56	58	58	77	67	A	A		A	A	A	A	68	67	70	80	81	74	74	68
12	63	60	58	57	58	51	A	66	71	A	A	A	A	A	A	68	60	A	74	93	96	94	70	64
13	57	56	57	56	51	56	58	68	A	A	A				60	63	63	64	70	74	82	74	68	67
14	69	59	58	50	45	56	67	82	81	66	63	68			71	68	68	64	71	58	92	94	70	68
15	68		72	63	62	69	71	90	80	81	78	88	76	79	73	70	71	70	82		82	80	68	67
16	63	68	55	51	56	A	55	A	A	A	A	A	66	58	59	65	A	A	A	74	87	90	58	57
17	57	57	57	A		38	A		A							A	A	A	A		79	68		57
18	A	54	52	A	A	A	A	A	A	A	A		A	A	A		A	A	56		55			61
19	52	36	59	42	38	A	A					A	A			A		A	60	57	60	56	61	
20	58	58	50	40		41	A	49				A			A	63	70	70	60		58	63	54	52
21		25				A	A	56			A		A		A	A	54	58	57	62	67	62	56	57
22	57	54		50	47	A	59	73	69	60	78			66	67	67	64	66	67	82	61	81	58	
23	A	57	A	38	45	A	A	A	A	A	A	A	A	A		67	66	70	66		69	A		58
24	57	45		46	48	A	59	A								64	66	64	62	61	62		69	
25	58	53	58			49	67	70	67	66	A	A	A	A	A	62	67	70	78	68	A	68	68	
26	A	A	69	55		A	A	66	A	A	A	A	A	66	A	A	66	78	91	77	A	76	68	51
27		59	57	56	51	60	70	50	A	59	A			70			77	76	80	66	81		70	68
28	55	61	62	67	56	58	65	70	78	81			A			73	76	78	72	87	82	69		74
29		69	69	67	68	66	68	A	80	66	A	A			80	72	77	81	82	82	76	83	A	68
30	74	69	68		66	60	A	67	A	A	A	A	A	A	A	78	81	76	81	95		73	72	61
31	62	60	57	56	57	A	A	56						80	74	66	78	81	92	74	66	66	66	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	27	26	24	23	21	18	19	13	13	4	3	3	10	9	20	24	25	26	24	28	25	23	24
MED	66	59	60	57	57	60	68	70	78	78	70	68	69	70	71	68	68	70	72	74	78	74	69	68
U Q	70	69	69	65	64	69	71	82	81	80	78	88	76	76	74	72	76	76	80	81	82	87	72	72
L Q	57	56	57	50	51	56	59	57	68	66	60	59	66	66	63	64	66	66	67	66	66	68	61	59

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Wakkanai

AUG. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	33	37	29	36	32	33	36	96	61	60	78	78	G	G	54	60	60	62	58	62	62		34	28
2	32	40	42	61	48	33	57	88	56	43	G	64	82	95	82	42	63	59	70		75	79	70	66
3	34		30	30	29	31	47	46	70	83	96	44	G	G	G	G	43	35	G	26	24	40		35
4	31	33	28	28		G	G	39	72	81	96	75	86	82	94		53	37	81	51	70		89	33
5	58	31	46	33	34	38	39	54	G	G	G	65	G	G	G		107	122	125	64	93	55	64	60
6	46	40	40	43	37	31	G	59	73	64	83	149	106	G	58	G	44	G	34	95	92			41
7	53	60	44	33	G	G	57	95	119	44	50	55	G	G	G	73	43	72	54	60	28	31	42	30
8	46		30		G	43		41	40	44	72	80	G	43	G	46	47	G	34	32	32	33		41
9	60	60	46	37	G	44	45	G	G	G	58	45		56	G	56	G	55	57	66	135	65	60	48
10	29	33		44	38	57	72	64	63	61	43	58	G	G	G	G	G	46	31	32	G	34	34	64
11	44	46	34		29	33	42	38	40	45	69	G	56	44	55	54	59	67	44	36	40	64	74	38
12	32	33	36	38	61	39	74	65	44	72	92	86	62	44	69	46	40	168	83	89	82	69	63	48
13	34	54	45	35	30	43	46	45	44	44	58	G	G	G	G	G	G	40	60	32	29	61	29	29
14	30	40	32	29	27	29	38	G	46	59	54	57	G	G	G	G	G	34	37	40	29	28	33	31
15	26		34	32	30	G	G	G	73	G	G	G	G	G	G	G	G	G	G		32	27	56	43
16	40	43	45	32	28	34	42	78	90	85	64	83	53	G	58	56	69	56	84	69	37	60	30	31
17	28	G	11	34	G	30	36	G	41	G	G	G	G	G	G	42	62	68	156		94	90		70
18	68	42	48	72	89	73	72	39	74	73	69	G	72	93	74	G	58	48	42		38			92
19	40	62	27	29	37	37	46	G	G	G	G	63	55	G	G	41	G	34	35	63	43	24	G	
20	G	G	26	27	29	27	32	G	G	G	G	60	G	G	64	G	G	33	44	43	34	59	70	60
21		34	35		32	41	38	42	G	G	45	G	70	G		64	40	42	44	92	49	43	55	G
22	48	G		32	40	70	33	39	45	55	58	G	G	G	G	G	G	G	31	G	G	54	54	
23	48	30	30	27	G	34	38	59	65	69	52	70	64	47	G	G	G	44	57		G	67		42
24	G	G	G	G	G	30	39	44	G	G	G	G	G	G	G	41	38	38	44	38	37	G	52	G
25	G	G	G	G	G	29	40	46	42	42	83	62	56	90	42	42	40	G	40	G	67	45	43	
26	39	38	G	30	G	42	59	61	64	77	70	60	57	G		85	48	38	44	73	68	61	94	58
27		30	29	G	29	34	41	G	59	65	75	G	G	G	G		G	46	79	78	33	34	29	26
28	28	G	G	G	28	27	46	58	54	G	G	G	68	G	G	G	G	45	72	38	58	G	G	G
29		G	G	34	G	32		72	44	42	53	57	G	G	70	G	G	38	34	39	G	68	68	68
30	67	57	36		50	45	61	66	79	78	69	72	44	89	65	45	43	46	G	70		59	55	36
31	38	38	26	G	G	40	59	G		G	G	G	G	G	53	G	G	34	34	38	26	66	56	45
	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	27	30	31	29	31	30	31	31	31	30	31	29	28	31	31	31	26	30	27	25	28
MED	36	36	30	32	29	34	42	45	50	44	58	57	G	G	G	41	40	42	44	47	38	55	55	41
U Q	47	42	41	36	37	42	57	64	70	69	72	70	62	44	61	50	53	56	70	69	68	65	66	59
L Q	29	15	26	27	G	30	37	G	40	G	G	G	G	G	G	G	G	34	34	36	29	33	33	30

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Wakkanai

AUG. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	14	16	16	16	21	18	18	21	18	17	18	17	15	15	15	15		15	15
2	14	15	15	15	15	15	16	16	17	28		47	22	21	21	22	16	16	15		15	14	15	14
3	16	15	15	14	15	15	15	22	17	17	36	34	35	27	23	17	17	17	18	18	14	15		15
4	15	14	15	15		16	16	16	18	18		47	38	46	18		17	15	15	15	15		15	14
5	14	15	15	15	15	15	16	16	17	17	28	28	63		17		16	15	15	15	15	14	15	15
6	15	15	15	15	15	15	16	17	18	23	23	44	38	71	23	18	16	17	15	14	14	14		14
7	15	15	15	15	15	16	15	16	18	21	35	32	22	20	21	20	17	16	16	15	15	16	15	15
8	15		15		16	15		16	17	20	20	20	23	21	22	21	22	17	15	14	15	15		15
9	15	15	14	15	16	15	16	15	16	29	18	20		23		23	21	22	23	16	20	16	15	16
10	16	16		14	15	15	15	16	24	22	21	22	26	21	22	23	16	17	23	16	15	16	15	15
11	15	15	15		15	16	16	16	18	28	32	21	23	18	23	22	20	22	15	16	15	15	15	15
12	15	15	15	15	15	15	16	16	17	18	21	21	23	27	23	18	16	16	15	14	15	15	15	15
13	15	14	15	14	15	15	15	16	16	17	18	18	18	18	18	16		15	15	16	15	15	15	15
14	15	15	15	15	15	16	15	15	17	18	18	21	29	20	18	17	16	18	15	15	16	15	14	15
15	15		14	15	15	18	16	16	15	18	17	18	24	17	17	20	16	15	15		15	15	15	15
16	15	15	15	15	16	15	15	15	16	16	18	17	20	21	17	17	16	15	15	15	15	15	15	14
17	15	14	15	15	15	15	15	16	16	17	21	20	28	20	22	20	15	16	15		15	17		16
18	15	15	17	20	20	16	23	17	27	24	23		44	38	23	23	23	24	18		15			15
19	15	15	14	15	15	16	15	15	22	22	22	34	30	20	17	18	16	16	14	15	15	16	15	
20	15	15	15	15	15	15	15	16	16	17		21		22	18	20	15	15	15	15	15	15	14	15
21		15	15		15	15	16	16	18	23	23		20	18	23	16	16	17	16	15	15	16	15	16
22	15	15		15	15	15	15	15	16	17	17	18	21		20	18	17	16	15	15	16	15	15	
23	14	15	15	15	14	16	15	16	15	16	18	21	20	20	17	23	22	23	22		16	22		23
24	17	23	16	18	17	22	22	27	20	20	20	71	30		26	24	27	26	18	20	16	16	16	22
25	17	23	18	18	23	27	23	16	20	23	34	27	28	29	35	23	21	18	23	18	15	20	18	
26	18	18	14	17	21	20	16	22	24	23	44	40	48		26	24	22	22	18	18	17	15	15	15
27		15	15	15	15	15	15	15	15	18	20		28	22	27		16	15	15	15	15	15	15	15
28	15	15	15	15	15	17	15	16	17	17		26	28	24	23	22	22	26	17	23	23	26	23	16
29		16	20	16	16	26	23	24	22	21	24	26	26	26	22	23	23	23	18	18	20	20	26	15
30	17	20	17		17	16	23	21	23	21	38	48	34	24	21	17	16	15	20	14		15	15	15
31	15	15	15	15	15	15	16	16		18	32	23	24	22	17	23	17	16	15	14	15	15	15	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	29	27	30	31	30	31	30	31	27	28	29	27	30	28	30	31	31	26	30	28	25	28
MED	15	15	15	15	15	15	16	16	17	20	21	22	26	21	22	20	17	16	15	15	15	15	15	15
U Q	15	15	15	15	16	16	16	16	20	23	32	34	32	26	23	23	21	22	18	16	16	16	15	15
L Q	15	15	15	15	15	15	15	16	16	17	18	20	22	20	18	18	16	15	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Kokubunji

AUG. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	82	68	61	56	66	80	84	87	80	81	81	A	82	81	84	86	81	82	80	94	76	A	76
2	76	82	75	81			87	99	97	93	86	A	92	95	103	99	103	A	98	98	90	94	84	
3	91	84	82	78	93		101	102	94	83	84	79	85	90	82		A	A	A	96	88	89	72	94
4	80	92	81		68	67	84	102	91	87	87	84	85	A	85		91	86	84	85	72	70	71	77
5	A	95	68	69	70	74	87	99	103	91	92	91	A	91	A	93	96	82	82	82	83	94		81
6	94	81	94	82	81	78	91	101		96	A	98	102	101	104	97	87	81	78	82	70	74	68	68
7		68	61	60	55	69	76	94	81	91	A	A	77	97	104	96	85	66	72		57	N	92	94
8	67	95	58	67	61	60	80	93	98	80	82	82	86	86	A	A	77	A	82	82	68	64	69	
9	68	70	69	62	57	58	94	89	86	86	90	79	80	A	86	88	77	73	79	90	93	82	70	74
10	63		70	68	65	69	69		53	A	A	A	A	73	A	72	A	A	94	83	95	95	63	47
11	57	A	50	48	48	58		96		61	A	A	83	A	82	92	81	78	88	83	74	73	68	
12		65	A	50	50	74	94	92	54	73	74	74	A	A	78	73	72	77	88	90	94	82	95	68
13	56	57	56	52	51	58	68	92	98	81	A	78	90	101	102	81	A	93	96	81	72	68	74	
14	68	68	72	67	54	51	74		73	68	78	80	85	82	81	92	83	77		83	83	82	68	
15	57	64	68	68	54	56	68	93	88	82	98	96	91	96	101	98	97	92	94	96	82	92	72	68
16	A	68	62	68	60	55	74	93	78	80	A	A	87	87	A	A	78	82	A	85	93	82	A	71
17	61	56	63	54	47	50	57	A	A	A	A	A	A			A		58	61	67	68	68	63	56
18	58	57	57	57	48	A	50	59		A	A	A		A	A	49	66	60	57	58	62	56	62	68
19	51	58	57	45	45	A	60	58	A		A	A	A	A	109	58	60	66	64	68	58		56	55
20	49	57	58	50	48		57			59		76	67			78	88	82	92	66	56	57	57	49
21	61	56	57	48	43	A	58	58	A	A	A		A	A			65	71		69	56	A	57	57
22	56	57	51	57	46	48	69	82	90	86	82	85	81	84	89	78	68	73		94	80	94	61	57
23	56	57	54	52	48	A		68	72	A		A	A			82	76	86	76	69	63	57	60	A
24	A	55	50	A	47	A	56		A		73	A		A	75	76	68	70	68	A	A	69	68	69
25	69	57	68		56	57	82	113	98	86	101		83	67		81	77	78	82	83	70	A	68	62
26	67	61	69	67	56	54	81	92	92	A	A	86	90	86	90	A	A	92	98	87	74	71	68	64
27	53	58	58	60	60	60	95	94	81	91	81		84	85	84	93	96	93	93	83	70	68	A	66
28	57	68		72	61	67	80	95	98	94		81	84	93	97	97	90	88	100	A	A	73	71	A
29	68	A	A	64	66	66	82		106	106	105	105	106	102	107	97	91	92	85	86	85	82	81	74
30	69	92	82	92	57	57	86	78	73	A	76	89	97	93	86	91	87	92	102	98	82	66	67	A
31	69	69	57	59	54	60	61	95	85	90	82	92	98	97	93	88	86	84	93	83		69	68	60
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	28	28	28	30	23	29	25	23	22	17	18	21	20	21	24	26	27	26	28	28	27	27	23
MED	63	66	62	62	56	60	80	93	88	86	82	83	85	90	89	88	84	81	84	83	74	73	68	68
U Q	69	81	69	68	61	67	86	97	98	91	91	91	91	96	102	94	90	88	94	88	86	82	72	74
L Q	56	57	57	53	48	56	64	83	78	80	79	79	83	84	82	78	76	73	78	80	68	68	63	57

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Kokubunji

AUG. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	130	32	33	29	28	39	47	45	60	45	73	63	52	49	48	46	G	38	34	35	G	57	61	72
2	86	96	33	G			41	48	70	61	60	88	G	G	G	G	60	92	70	69	57	68	70	
3	61	43	37	54	42		34	G	55	55	66	56	49	68	143	125	150	150	96	56	67	38	33	54
4	68	33	29	33	34	41	G	54	51	45	G	59	59	50	59		48	45	42	25	24	69	55	76
5	110	30	26	25	G	G	32	58	53		G	92	119	G	94	98	54	69	48	110	57	59	62	51
6	52	30	33	36	G	30	40	49		56	82	86	88	84	70	60	44	57	53	38	34	35	29	40
7	45	40	34	29	G	29	32	38	47	58	75	46	57	G	G	G	G	89	34		64	40	32	60
8	41	42	46	35	G	G	32	58	58	G	54	G	G	49	68	92	55	84	81	49	34		G	29
9	33	30	23	G	G	26	39	69	163	50	G	G	G	54	G	44	G	G	52	33	58	50	62	50
10	34	27	34	26	G	72	48	44	51	57	87	99	74	58	90	55	89	107	98	73	G	50	102	34
11	31	38	33	33	38	60	51	59	118	59	54	56	59	113	G	55	G	G	52	41	G	G	88	
12		35	62	35	G	27	G	G	G	44	G	G	78	64	G	54	50	70	44	46	59	67	70	70
13	34	31	26	43	28	G	37	44	59	68	84	59	G	51	43	G	60	54	60	86	41	36	39	36
14	32	G	G	42	G	G	34	G	47	55	51	G	G	G	59	G	66	62	92	144	37	58	32	29
15	27	30	32	25	G	26	32	46	58	54	58	53	56	48	G	G	G	34	29	G	41	51	44	66
16	80	53	40	40	24	G	G	43	56	55	76	79	54	70	134	72	61	55	90	56	36	74	77	50
17	30	25	33	28	21	44	101	85	83	89	102	81	59		G	55	G	48	35	36	26	G	G	G
18	G	G	G	G	28	33	40	41	G	42	57	46		48	45	G	G	44	36	49	53	38	34	31
19	33	31	48	24	28	38	37	G	53		59	86	89	126	49	68	50	38	54	83	30	G	34	36
20	G	G	30	34	G	G	G	G	G	G	B	G	G	G	G	59	52	42	72	33	31	G	G	G
21	32	G	G	30	G	11	G	G	50	44	57		119	58	G	G	53	56	32	G	27	60	52	34
22	40	60	45	31	34	27	G	G	G	G	G	G	G	G	G	G	G	33	33	G	G	G	G	30
23	G	30	24	29	24	26	G	47	50	48		46	66	G	G	61	G	33	32	29	G	24	40	68
24	58	40	34	39	24	28	34	37	46	G	G	54	G	68	G	61	61	52	53	69	91	58	58	35
25	72	60	54		43	39	68	57	49	G	G		G	G	G	G	66	58	48	48	28	39	41	25
26	G	28	28	G	G	G	G	36	126	60	54	84	89	57	71	125	85	G	G	G	G	36	36	58
27	66	51	G	G	G	26	39	56	59	50	46		G	G	G	G	69	66	69	84	36	41	90	38
28	35	24		G	G	G	36	52	49	48		46	46	63	56	G	50	67	57	87	50	33	34	27
29	73	82	111	32	39		G	G	G	57	54	G	66	G	52	G	G	G	28	29	55	31	39	34
30	64	52	33	35	28	29	G	G	40	54	56	55	57	G	44	G	54	44	72	45	30	30		104
31	34	26	25	34	32	30	44	45	64	70	G	G	G	G	G	G	G	32	35	49	28	30	30	41
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	30	30	28	31	31	30	29	28	28	30	30	31	30	31	31	31	30	31	30	30	29
MED	38	31	33	30	22	27	34	44	52	54	55	54	55	49	43	45	50	52	52	47	34	38	40	38
U Q	66	43	37	35	28	35	40	54	59	57	69	80	66	63	59	61	61	67	70	69	55	58	62	59
L Q	32	27	26	25	G	G	G	G	47	44	G	G	G	G	G	G	G	34	34	33	26	30	32	30

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Kokubunji

AUG. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	14	15	16	15	16	17	18			38	38	42	24	23	21	16	15	14	14	15	14	14
2	15	14	15	14			15	18	23	33	35	42		66	30	18	15	17	14	14	14	16	14	
3	16	14	15	15	15		15		20		39	43		45	39	22	18	15	16	14	14	15	14	15
4	15	15	14	14	14	14	15	18	17	23		40	40	40	15		20	16	15	16	15	15	14	14
5	14	15	14	14	15	15	15	17	20	18	52	34	23	21		23	18	15	16	14	14	14	14	14
6	14	15	15	14	15	15	16	17		42	42	43	46	42	35	21	18	14	14	14	15	14	14	15
7	14	14	15	14	14	15	15	18	26	32	43	39	35			21	16	14	14		15	14	14	14
8	14	14	14	15	15	17	20	16	18	24	38			29	34	20	24	17	14	15	14	14	15	15
9	15	14	14	15	16	18	15	15	17	21		62	54	44		23	21	15	15	14	14	14	14	15
10	14	15	14	14	15	14	15	15	17	22	36	38	35	38	29	23	16	15	15	15	14	15	14	14
11	14	14	15	14	14	15	14	14	17	24	27	35	33	27	27	21	18	15	14	16	15	15	15	
12		14	14	15	15	15	15	15	14	21	28		29	28	26	27	20	15	15	14	14	15	14	14
13	15	14	15	14	15	14	15	16	18	24	33	35		33	28	18	17	14	14	14	14	15	14	15
14	14	16	15	17	14	15	14	16	17	22	34		57	53	34	21	14	14	14	15	14	14	14	15
15	14	14	15	14	14	15	14	16	16	18	20	28	26	29	21	17	15	15	14	15	14	14	15	14
16	14	15	15	15	15	15	18	16	18	22	40	40	39	36	33	23	17	17	16	14	14	15	14	14
17	15	15	14	15	15	15	15	15	17	20	22		41			17	18	16	14	15	14	16	15	16
18	17	15	16	15	15	14	15	16	17	34	40	39		40	21	22	17	16	15	15	15	15	14	15
19	15	15	15	16	14	15	15	14	20		39	34	38	45	22	17	18	15	14	14	14	14	14	14
20	15	15	14	14	15	16	14	16	18	23		53	50		26		16	15	15	15	15	15	15	15
21	15	15	16	15	14	16	15	16	20		40		38	40	23		17	16	14	14	14	14	15	15
22	15	14	15	14	15	15	16	17	18	22		24		60	59	22	20	15	16	16	14	14	15	15
23	16	15	15	15	14	15	15	18	14			35	29			26	17	15	15	14	14	14	15	14
24	15	15	14	14	14	15	15	16	15	18		36		36	20	22	17	17	16	26	15	14	15	15
25	15	14	14		14	15	15	15	18	14			N	63	53	48	14	14	18	15	15	15	14	14
26	18	14	15	16	16	16	16	17	18	28	29	35	36	36	32	23	15	15	17	15	15	15	15	14
27	15	15	16	15	15	16	15	16	18	33	33		63	63	33	26	20	16	15	15	14	14	15	14
28	15	14		15	15	17	16	16	17	34		39	39	40	28		18	14	14	14	14	15	15	14
29	14	14	14	14	14	15	15	15	17	34	30		26	27	16	17	15	15	14	14	14	15	14	15
30	15	15	14	14	16	18	15	16	20	27	27	40	36	48	36	23	17	15	15	15	15	15	15	15
31	15	14	15	14	14	14	15	20	17	20		64			55	46	16	15	15	15	14	14	14	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	30	30	29	31	30	30	26	21	23	22	26	26	27	31	31	31	30	31	31	31	29
MED	15	14	15	14	15	15	15	16	18	23	35	39	38	40	28	22	17	15	15	15	14	15	14	15
U Q	15	15	15	15	15	16	15	17	18	32	40	42	41	45	34	23	18	16	15	15	15	15	15	15
L Q	14	14	14	14	14	15	15	15	17	21	28	35	33	33	23	20	16	15	14	14	14	14	14	14

HOURLY VALUES OF foF2 AT Yamagawa

AUG. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	82	98	80		59	56	74	80	83	81	79	A	80	93	98	100	97	101	96	96	82		90	A
2	85	86	80		81	84	88	106	92	A	76	91	104	109	110	109	112	120	125	117		94	86	97
3	82	104	86	78	82	86	92	102	83	85	85	A	95	90	A	100	105	110	111	117	86		88	87
4	84	83	80	67	62	54	75	92	94	86	82	80	87	97	92	A	93	93	86	95	77		84	79
5		87	A	A	82	92	81	98	105	84	A		A	94	101	102	A	90	83	84	87		87	92
6	87	87	88	94	90	76	87	106	90	A		101	105	115	109	100	98	A	A	83	A	189		65
7		69	79		65	65	54	92	87	86	96	78	78	98	110	104	87	81	80	77	91		84	75
8	75	67	68	75	64		66	80	78	82	72	80				92	91	92	91	84	86		76	86
9	99	76	99	61		69	63	82	82	81	80			86	90	86	83	A	81	88	90	87		84
10	86	86	78	65	58		73	72	A			75	75		85	77	75	80	89	104	85	A	81	A
11	67	72	66		64	58	81	76	A	A	A	80	91	95	90	101	98	94	99		87	87		
12	86	86	86	A	84	95	84	70	67	71	68		84	88	91	82	87	86	87	86	97			
13										95	74	A	99	112		100	104	103	120	87				
14				52	53	62	69	94	73	68	77	71	86	92	98	104	91	97	87	96	87	A	119	84
15	75	83	78			54	50	94	82	84	87	87	90	91	100	98	100	87	81	90		84	86	
16			A	86	82		79	86	95	75	73	86	91	102	111	108	103	104	106	110	87		A	
17	85	78	86	83	53	A	59	73	79	A	64	79	81	A	73	A	A	78	84	74				89
18							89	A	A		A				67	71	75	66	62	62				
19	54					56	35	A	A						A	78	78	83	93	88	A		69	99
20	A	A			50			60			85	77	80	80	90	86	96	96	78	75		A	99	99
21	89							74	78	A		67	71	71		75	81	94	86	89				
22		59		59	63	56	59	73	85	78		91	96			87	93	87	86	86				99
23			60	62		79	89	71	82	67		74	78		77	83	83	86	87					
24	A	A	38				89	49		69	78	84	84	91	85	82	A	80	81	86	A	A	A	A
25	68	99	89			79	53	82	91	96	98	102		100	91	92	129						90	97
26	91	85		74	73		87	102	82	71	75	86	102	98	98	104	105	117	120	108			78	
27		69	89				78	93	86	89	97	A	97	95	102	106	110	107	105	96		86	A	
28	86	84	77	86	68		76	94	94	86	76	97		112	111	117	108	106	118	108		A	A	
29	85			A	40			96	97	103	98	101	106	120	111	106	102	106	109	119	A		85	98
30	93	84		69	89		79	93	82	84		106	105	110	105	102								
31													107	111		106	103	94		109		90		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	20	18	14	20	16	26	27	23	21	20	21	24	24	24	29	27	27	27	27	12	7	15	15
MED	85	84	80	72	64	67	77	86	83	84	78	84	90	96	98	100	97	94	87	89	87	87	86	89
U Q	87	86	86	83	82	81	87	94	92	86	86	94	100	109	107	104	104	104	106	108	88	94	90	98
L Q	75	74	77	62	58	56	63	73	82	73	74	77	80	91	90	84	87	86	83	84	85	86	81	84

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Yamagawa

AUG. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	60	46	31		26	39	G	G	41	58		86	G	G	74	G	56	61	43	30		40	30	36
2	29		G		G	G	G	G	67	49		57	G	56	G	G	G	93	53	70	49	32	G	32
3	48	58	48	48	48		40	G	58	90	51	89		79		G	55	48	G	G	G		28	60
4	40	41	54	39	G	41	46	56	41	42	G	G	G		G		42	G	51	G	G	G	G	31
5	46	79	77	82	39	42	G	41	42	57	82			76	G	61	85	55	42	84	48	30	31	54
6	26	32	G	G	G	G	G	42	G			86	G	G	46	62	75	110	87	78	40	32	G	G
7	G	31	29		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	G	39	40
8	51	40	G	G	G		G	40	40	77		62				G	G	G	G	31	G	G	G	G
9	G	G	G	G		G	G	G	42	G	G			G	G	G	60	130		G	29	G	28	29
10	30		29	G	G		G	G	60	G		G	G		G	G	58			40	42	31	40	48
11	26	G	32		G	G	G		76	86	81	60	G	59	61	59	70	G	G		32	31	G	
12	38	48	G		51	44	G	G	42	G	G		G	G	G	54		48	57	49	30			
13										80	76	114	54	G		G	45	42	42	32	G	G	G	G
14	G		G	G	G	G	G	G	G	G	G	G	G	G	45		G	G	43	49	49		G	32
15	G	G	G			G	G	G	58	52	G	G	G	G	G	51	G	42	32	28		28	36	35
16	33	G		48	G		G	40	62		61	60	60	82	55		G	G	73	32	50	G	90	72
17	53		33	G		40	43		40		60	78	61	132	56	58	60	52	G	G	30			G
18				28			G	68	54	G	51		G		G	G	42	40	40	32		G	G	G
19	30		G			G	34	60	42		G	G	G	G	60	G	G	G	38	G	26		G	G
20	38	32			G			G			G	G	G	G	G	G	G	42	42		30	39	37	33
21	28	29	G	G		G		40	42	84		G	G	G		73		45	43	40		38		G
22		29	26		G	G	G	G	G	G		G	G			G		G	31	G		G	G	G
23	G		G	G		G	G	38	G	G		59	G	G	G	G	G		G		G	G	G	G
24	40	30	28			53	44	48		58	61	G		74	84	62			47		39		80	45
25	40	28	G		G	G	G	G	41	G	85	81		69	70	68	111			109	64	109	38	31
26	G	G		G	G			40	42	G	G	G		G	44	G	G	G	G	G	G	G	G	
27	G		G	37		G	G	G	42		68	94	62	55	62	G	60	61		66	66	40		
28	35	30	G	G	G		G	G			G			64	75	109	80		70	84		83	41	
29	G			47	29			39	42	G	G		61	G	60		76	39	40	40	51	40	30	31
30	36	G		30	G		G	41	51	G		104	85	80	G	G								
31													78	G		G	G	G	39	32		G		G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	20	23	18	20	19	25	27	26	23	21	24	23	26	25	27	26	25	26	26	23	24	25	25
MED	30	30	G	G	G	G	G	G	42	G	G	58	G	G	44	G	44	42	41	32	30	29	28	31
U Q	40	40	31	39	13	40	G	41	54	58	64	83	60	69	60	59	60	53	47	49	49	38	37	38
L Q	G	G	G	G	G	G	G	G	40	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Yamagawa

AUG. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	20	20	20		23	17	21	21	24	40	45	46	55	63	45	34	27	23	20	15	16	17	20	18
2	20	21	17		15	14	21	34	26	34				45	56	56	48	34	21	15	16	21	15	16
3	18	17	18	20	17	15	21	34	28	34	53	48	48	46	49	55	44	30	27	18	16		15	24
4	16	16	15	21	18	15	26	21	24	58	55	55		63	55		30		23	18	15	15	15	15
5	14	16	18	17	16	16	21	26	27	34	46	47	49	57	62	55	38	23	23	16	15	16	18	18
6	24	16	22	18	17	16	21	33	36	45		46	60	58	49	35	27	22	21	15	18	15	17	16
7	16	16	16		15	15	21	20		57	57	54		63	54	55	24	22	20	20	20	17	16	16
8	18	16	15	15	15		22	23	32	35	35	35				55	47	23	26	16	15	16	16	16
9	16	15	16	15		15	23	30	21	48	51			58	52	52	32	28	21	18	16	15	17	16
10	18	16	17	16	15		18	21	28	34		56	54		54	55	34	23	22	18	15	17	16	16
11	16	16	15		18	15	20	21	26	34	34	47	55	48	50	35	35	30	24		17	17	18	16
12	17	16	16	15	15	16	21	21	24	51	48		54	55	49	32	24	22	22	22	15			
13										35	34	52	34	51		49	22	35	24	21	15	14	15	15
14	14		17	16	16	15	18	20	34	24	49	57	58	58	38	35	51	23	21	15	16	20	16	16
15	14	16	14			17	18	22	21	23	52	54	34	52	53	26	26	21	18	17		16	17	18
16	16	16	17	16	15		21	22	23	37	39	39	40	44	42	45	46	44	20	15	20	15	20	17
17	16	15	17	15	17	15	18	22	27	34	38	43	46	48	43	38	34	22	23	16	16			15
18				18			21	20	26		71					54	51	32	21	16	16	15	14	14
19	14		16			15	17	22	35						48	53	50	22	20	20		16	17	14
20	18	18	16		15	15		27			53	53	54	57	56	50	46	40	21	20	17	16	16	15
21	16	15	15	16	15	16		26	32	34		54	57	53		39	34	42	22	15	16	16	15	14
22	15	15	17	15	15	15	20	27	22	26		53	55			52	50	33	21	16		15	14	15
23	15		14	15		15	20	22		52		59	53		54	54	47	39	21		15	14	15	15
24	16	15	16	16	14	14	20	32		34	44		47	48	36	42	36	24	20	16	23	15	16	17
25	17	17	15		15	16	18	27	24		47	46		48	38	39	34	21		15	16	20	16	18
26	23	18		15	15		16	23	24	42		60	55	58	58	58	52	27	26	16	16	15	15	
27	16	21	16	18		18	18	29	32	34	34	54	52	47	48	50	34	30	21	20	18	16	17	18
28	15	15	15	15	15		18	30		46		56		54	46	35	30	24	21	23		18	24	
29	15		18	17	15			26	33	47	55	48	36		59		39	36	23	17	21	18	16	20
30	26			18	17		17	22	34	51		49	66	47	62	55								
31													48	53		54	44	35	22	20		16		17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	23	26	21	23	21	26	29	24	26	20	24	22	24	25	29	30	29	29	28	25	27	27	27
MED	16	16	16	16	15	15	20	23	26	35	48	52	54	53	50	50	36	27	21	16	16	16	16	16
U Q	18	17	17	18	17	16	21	28	32	47	53	54	55	58	55	55	47	34	23	20	17	17	17	18
L Q	15	15	15	15	15	15	18	21	24	34	38	46	47	48	45	36	30	22	21	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Okinawa

AUG. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	93	96	94	94	66	60	94	94	83	73	82	81	84	94	109	115	113	112		112	92	89	81	83
2	90	94	81		78		93	93	82	82	79	91	116	122	134	134	151	152	167		123	133	151	109
3	117	115	116	94	115	94	92	112	83	85	87	91	93	92	106	116	117	122	124	130	113	125	79	
4	94	114	91	81	77	70	80	93	91	94	93	82	115	109	100		115	109	93	88	92	78	76	94
5	78	A	74	72	A	64		115	92	92		92	87	94	121	105	95		A	A	88	86	87	82
6	94	85	94	93	94	71	77	84	94	A	91	91	93	111	120	121	122	126	121	110	115	82	83	83
7	82	80	73	67	68	60	68	95	83	91		81	93	100	113	117	91	92	92	99	82		82	83
8	A	72	94	79	71	56	49	94	83	74	76	81	A	93	107	113	113	104	87	88	80	82	92	82
9	94	96	93	94	74	70	73	83	93	73	80	84	93	92	91	91	88	86	96	110	94		133	
10	83	114	116	88	83	75	62	71	71	77	76	80	92	94	97	91	91	91	110		83	83	82	76
11	94	73	69	61	69	54	63	90	71	67	A	A	89	116	114	113	116	112	128	123	87	90	111	114
12	115	94	94	82	72	95	70	76	70	71	73	81	92	94	92	106	107	116	110	106	87	53	66	
13	68	66	66	76	71	55	A	94	93	67	82	92		116	113	114	116	125	117	90	78	72	95	72
14		95	68	63	60	58	71	94	65	70	76	91	98	105	122	120	117	114	107	110	82		95	70
15	94	95	69		54	55		94	83	92	82	93	100	102	104	103	107		87	111	82	83	80	93
16	71	95	72	68		66	95	95	76	83	80	77	94	108		134	134	130	132	127	92	79	A	75
17	81	80	94	80	60	56	57	83	92	A	A	A	116	A	78	90	87	94	A	88	94	71	70	67
18	95	95	80	60	52	42		66	94	62	61	72	70	77	80	82	92	78	73	70	72	63	A	56
19		49	53	57		56	58	57	A	A	71	74	91	92	91	91	115	94	110		78	70	57	
20	92	55	62	66	70	56	54	57	92		76	83	92		92	95	105		92	88	81	76	69	61
21	70	79	55	57	57	58	58	95	113	95	73	82	92	91	87	90	92	90	93	85	83	72	64	68
22	67		60	68	70	51	57	73	96	78	84	103	112	118	121	124	122	121	136	138	121	94	82	93
23	78	92	94	67	51	56	56	76	89	72	81	94	94	88	92	94		94	110	139	93	64	69	71
24	59	61	58	60	52	38	44	66	73	94	77	A	102	94	104	96	92	90	90	A	A	A	79	A
25	70	80	72	58	60	54	54	80	92	92	94	94	118	112	114	115	118	124						
26											78	81		116	118	118	127	150	138	139	116	125	112	94
27	94	96	81	93	115	93	94	96	91	90	91	92	109	121	124	122	124	127	123	A	102	115	87	83
28	92	90	118	114	93	74	76	96	104	92		A	A	130	123	117	146	146	147		94	118	83	98
29	N	95	87	95	94	56	61	87	94		94	93	116	116	117	125	124	151	144		90	114	68	98
30	95	94		95	70	58		94	81	91	103	110	115	126	122	117		143	153	129	84	81	A	66
31	68		94	61	34	60	67	93	86	91	91	92	121	124		126	123	117	120	130	117	91	81	92
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	29	28	27	29	25	30	29	25	26	27	27	29	29	30	29	28	27	22	29	26	27	25
MED	91	94	81	74	70	58	67	93	89	83	80	91	94	105	109	114	115	115	110	110	90	82	82	83
U Q	94	95	94	93	78	70	78	94	93	92	91	92	115	116	120	120	122	126	132	129	98	94	92	93
L Q	71	79	68	62	60	55	57	76	81	72	76	81	92	93	92	95	93	94	93	88	82	72	70	70

HOURLY VALUES OF fEs AT Okinawa

AUG. 1999

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	60	77	29	G	G	G	39	38	56	55	84	62	62	59	68	46	84	64	60	38	32	34	G
2	28	G	57	34	G	G	G	50	43			46	G	G	63	G	G	G	36		G	G	G	29
3	G	G	G	G	G	27	G	60	69	56	59	52	52	G	G	G	56	G	G	28	32	66	45	
4	44	37		50	42	58	60	70		69	G		G	G	58		46	50	54	39	G	G	G	40
5	33	85	84	98	67	80	68	33	54	66	G	G	65	G	68	98	59		81	88	30	23	90	66
6	37	34	24	G	44	58	42	70	59	71	173	52	G	56	G	G	G	G	35	56	37	G	G	G
7	G	G	G	G	G	29	28	39	G	42	G	G	G	G	G	G	G	G	34	32	32	28	G	46
8	66	39	35	G	24	28	G	G	G	G	G	G	138	63	G	G	G	G	38		G	G	G	G
9	G	G	G	G	G	G	27	G	G	G	G	G	G	48	48	66	68	103	84	64	29		G	
10	G	G	34	39	G	G	G	39	60	70	64	63	64	56	G	78	58	51	46	26	34	26	37	45
11	28	29	56	25	G	G	G	33	40	42	132	90	84	86	69	58		66	58	35	37	G	G	50
12	G	G	G	G	G	56	G	G	G	88	47	G	G	G	G	G	42	45	35	42	G	G	G	
13	44	37	26	G	G	G	60	47	42	G	G	60	59	63	G	50	G	46	41	29	25	25	G	33
14	44	G	54	38	27	29	33	G	38	G	G	G	G	G	109	49	77	46	51	36	89	30	77	36
15	26	G	G	G	36	G		G	60	78	68	G	46	G	48	47	G		44	49	46	G	G	G
16	74	60	39	42	59	41	34	38	38	58	82	81	80	118		61	46	46	50	49	38	68	89	59
17	43	34	33	38	40	42	32	73	46	97	80	88	60	85	64	70	66	83	86	43		42	G	42
18	G	G	G		G	G	G		G	G	G	G	G	G	G	G	G	42	40	29	G	25	34	45
19		G	34	26	G	G	G	42	59	86	60	G	G	G	G	G	G	38	37			26	57	60
20	33	68	36	34	G	G	26	43	G	G	G	G	G		G	G	G		38	32	24	23	G	G
21	G	G	G	G	G	24	26	39	G	47	G	G	G	G	G	G	60	54	81	34		40	47	37
22	26	G	36	34	32	G	G	G	G	41	66	46	G	G	G	G	G	G	37	G	G	G	G	G
23	G	G	24	24	G	G	G	G	G	G	G	G	G	G	G	G		50	45	42	24	G	G	G
24	G	G	28	G	24	24	32	37	44	69	67	139	G	80	G	G	G	62	54	59	95	84	44	81
25	60	40	39	G	43	41	40	38	38	G	55	58	60	60	67	G	42	61						
26											G	G	G	G	G	64	G	54	71	50	83	79	G	34
27	G	G	G	27	33	28	32	39	44	45	G	G	G	64	71	52	68	61	56	56	42	58	48	34
28	37	34	38	41	37	36	24	G	G	57		96	152	61	G	74	47	60	116	66	25	28	G	65
29	21	G	33	28	69	G	G	48	G		46	G	G	62	66	66	60	39	36	58	69	44	30	26
30	G	45	45	24	G	G	G	G	49	58	49	G	G	G	G	63	G	48	45	39	34	42	86	45
31	38	39	44	30	G	44	24	G	51	65	72	80	68	88	G	G	G	G	43	88	49	44	G	59
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	29	29	30	30	29	29	29	28	29	30	31	30	30	30	29	28	30	27	27	29	30	27
MED	26	G	34	26	G	24	24	38	38	56	47	G	G	24	G	24	42	47	45	42	32	26	G	37
U Q	40	39	41	36	37	41	32	45	50	69	66	63	62	63	63	64	58	60	58	58	42	43	45	50
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	19	37	32	24	G	G	G

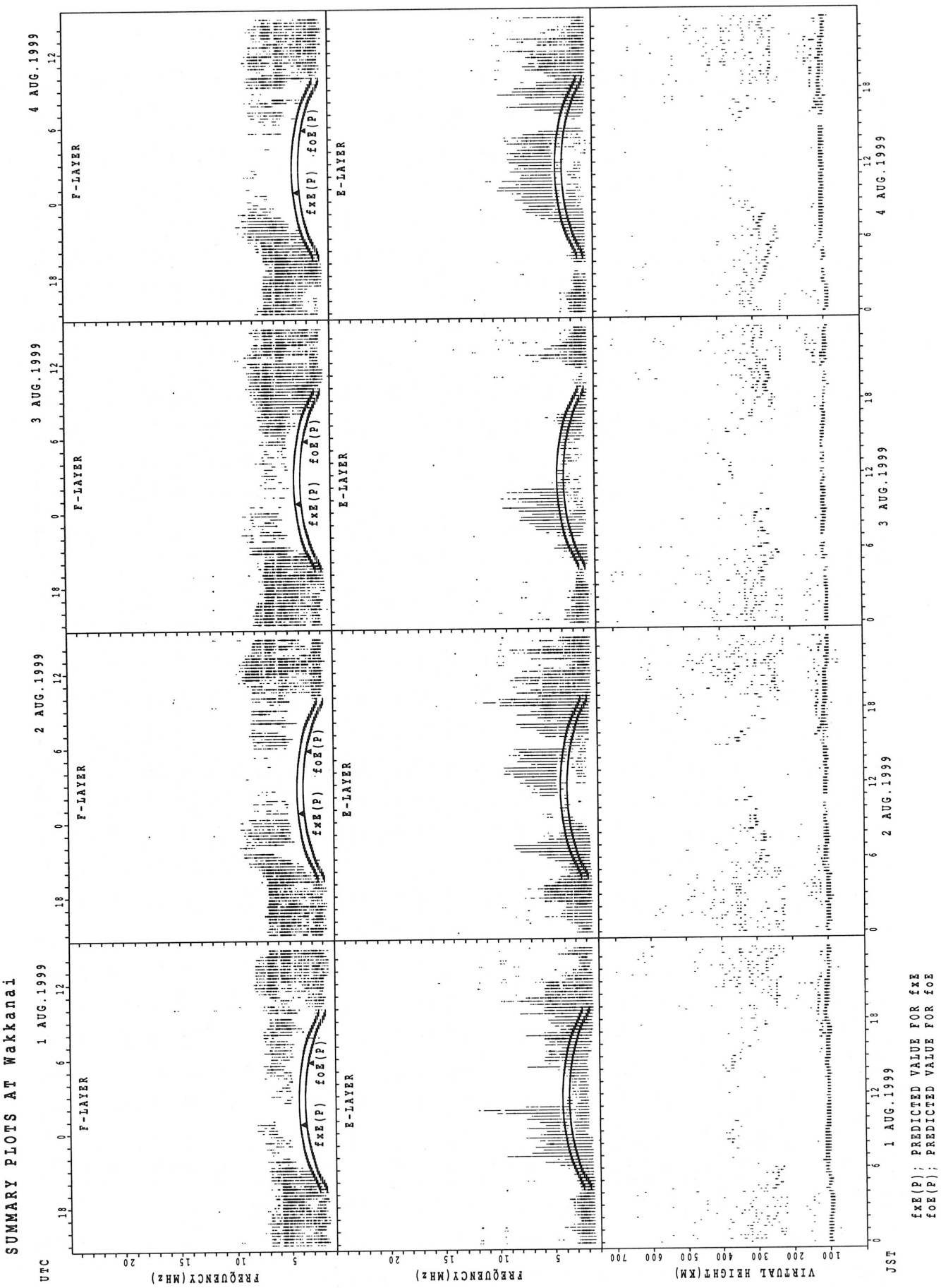
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Okinawa

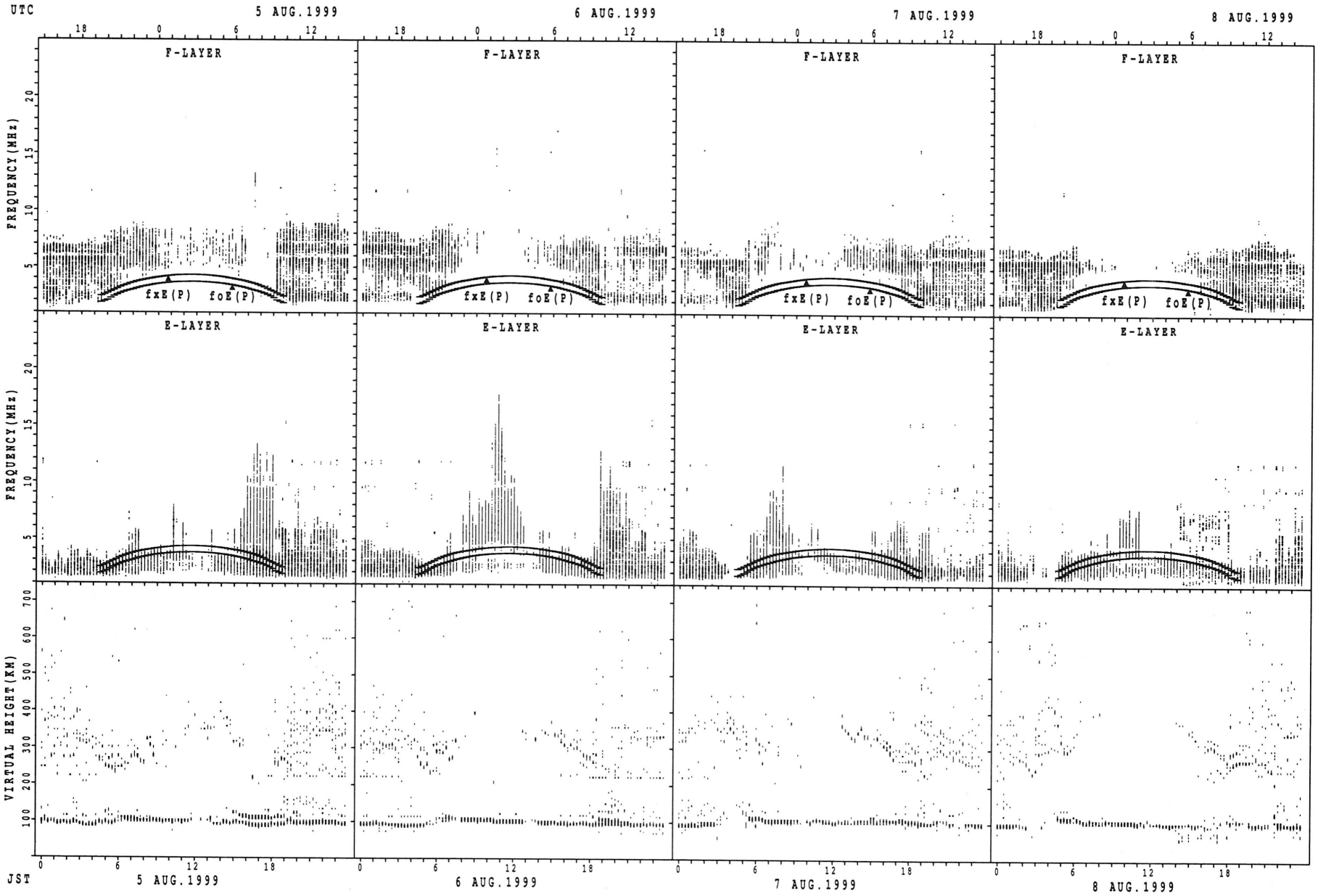
AUG. 1999

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

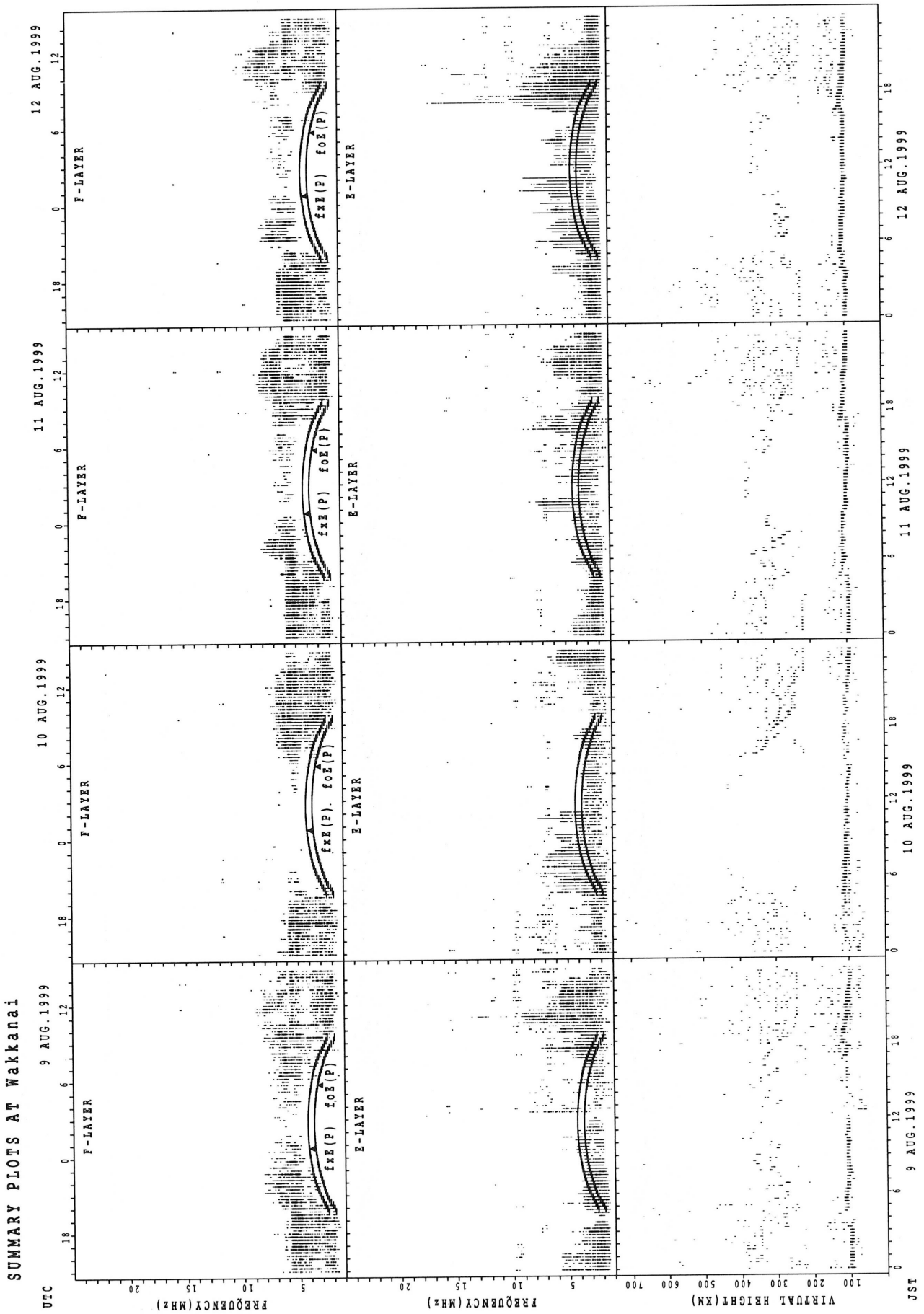
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	17	14	14	15	18	14	21	15	20	29	35	42	38	45	34	32	27	16	16	15	15	14	14	17
2	15	16	14	15	15	15	20	15	17	28	32	33			49	32	29	18	17		14	16	15	15
3	27	15	15	16	15	15	16	17	18	28	29	35	40	58	66	62	42	24	16	14	15	14	15	14
4	16	15	15	16	14	15	17	15	17	27	29		64	62	50		39	27	14	14	15	15	15	14
5	15	14	14	14	14	15	15	15	18	27		55	48	59	43	44	30		16	14	15	16	14	15
6	14	14	15	18	14	15	15	16	27	29	32	40	69	48	58	51	52	28	15	15	15	14	14	15
7	15	17	15	16	15	15	14	15	32	28	53	66	60	33	53	51	48	33	14	14	15	14	15	15
8	15	14	14	15	15	14	15	15	17	30	32	54	34	30		54	49	26	16	15	16	15	15	16
9	17	15	15	15	15	16	16	18	16	24		58	58	58	39	36	29	20	15	14	14		15	
10	15	15	14	14	15	14	21	15	17	21	39	42	40	40	52	33	24	18	15	16	14	14	14	14
11	15	14	14	15	14	15	16	14	17	29	30	33	34	35	34	30	29	17	15	14	14	15	15	14
12	16	15	14	16	17	15	18	26	17	26	27		58	50	53	54	20	17	15	14	15	14	15	
13	15	15	15	15	14	15	14	15	16	22	28	29	32	35	30	28		17	15	14	15	16	15	14
14	15	17	14	15	15	14	15	15	16	21	29		56	57	32	29	35	18	14	14	15	15	14	14
15	15	14	20	16	15	14		14	16	17	29	34	30	35	30	28	21		14	15	14	15	14	14
16	15	15	14	14	15	14	14	15	16	26	35	39	40	42		34	37	20	15	14	15	15	14	14
17	14	15	14	14	14	14	16	15	16	32	38	40	46	43	42	29	29	17	15	14	14	15	15	15
18	14	16	15	14	15	16		15	30		28		52	58	58	54	20	23	15	14	17	17	15	14
19		15	15	14	15	15	17	16	30	33	38	51	56	50	53	49	48	20	15		14	15	14	15
20	15	15	15	14	15	15	14	14	15	18	49	54	53		52	50	17		16	15	15	15	15	15
21	15	15	15	15	15	16	17	17	20	27		33	53	54	53	50	35	30	15	14	16	14	15	14
22	15	18	15	15	14	14	27	15	17	18	23	28	29	59	54	52	24	16	15	14	15	15	16	17
23	15	16	15	14	14	15	16	14	15		55	52	55	58	55	52		32	15	14	15	15	15	15
24	15	18	15	14	15		14	16	18	26	30	40	54	50	55	51	28	17	15	14	14	14	15	14
25	14	14	15	16	14	15	15	15	18		41	46	44	45	46	54	47	16						
26											33	91	57	59	58	45	23	16	16	14	14	15	18	16
27	16	18	15	15	15	14	14	15	16	24	48	59	60	49	48	52	38	33	16	14	15	14	15	15
28	14	14	14	15	14	15	15	14	20	38		45	46	61	32	32		17	15	14	15	14	15	16
29	15	14	15	14	15	16	17	15	16		48	54	56	48	29	26	22	15	14	14	14	15	15	15
30	18	15	15	16	17	18	16	16	20	27	33	55	59	59	60	42	51	17	16	14	14	16	15	15
31	14	14	15	14	29	14	16	15	22	28	44	45	46	48	58	56	28	18	15	15	15	14	15	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	30	30	30	29	28	30	30	26	27	27	30	29	29	30	28	28	30	28	30	29	30	28
MED	15	15	15	15	15	15	16	15	17	27	33	45	52	50	52	47	29	18	15	14	15	15	15	15
U Q	15	16	15	16	15	15	17	16	20	29	41	54	57	58	55	52	40	25	16	14	15	15	15	15
L Q	15	14	14	14	14	14	15	15	16	24	29	35	40	42	36	32	24	17	15	14	14	14	14	14


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

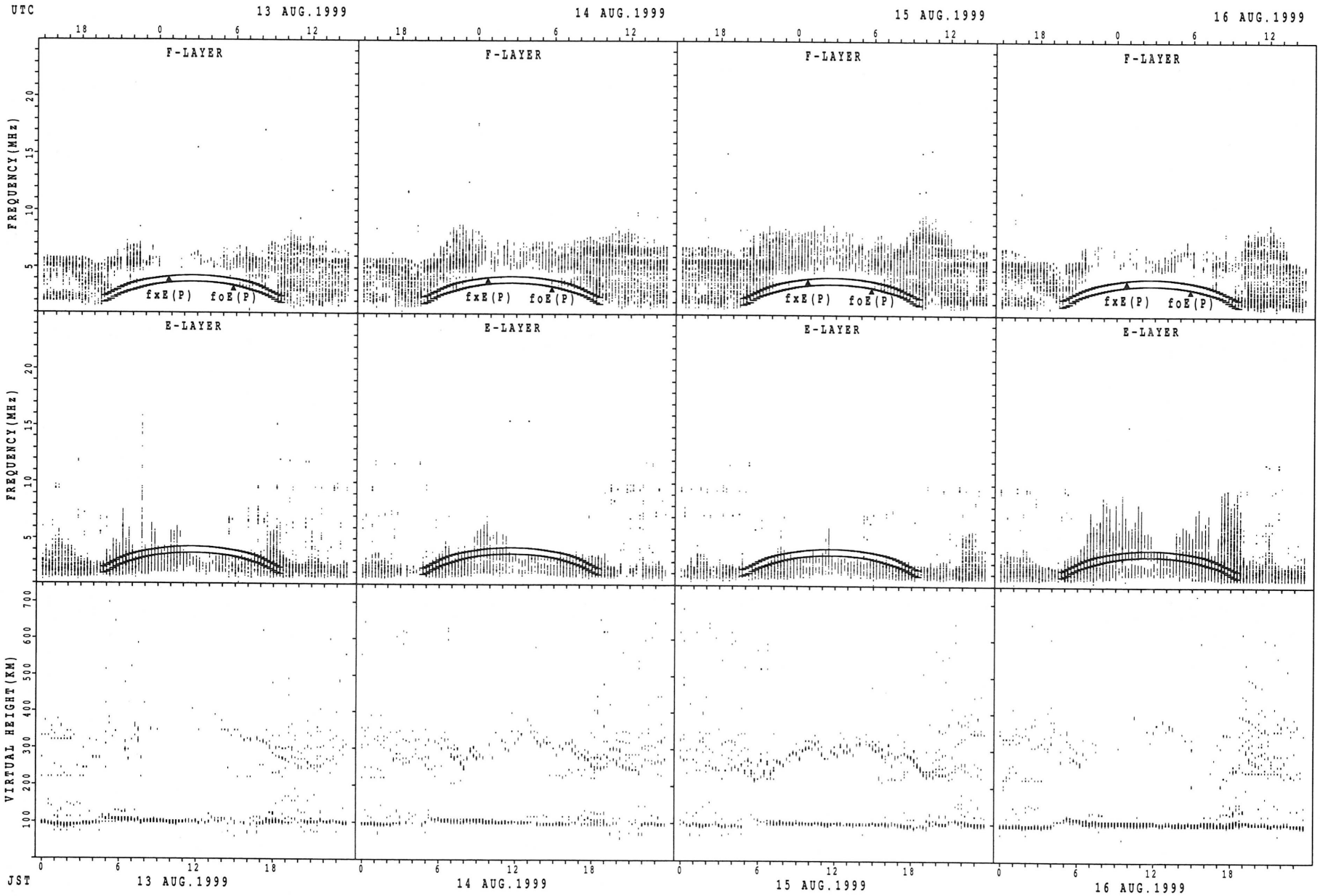
SUMMARY PLOTS AT Wakkanai



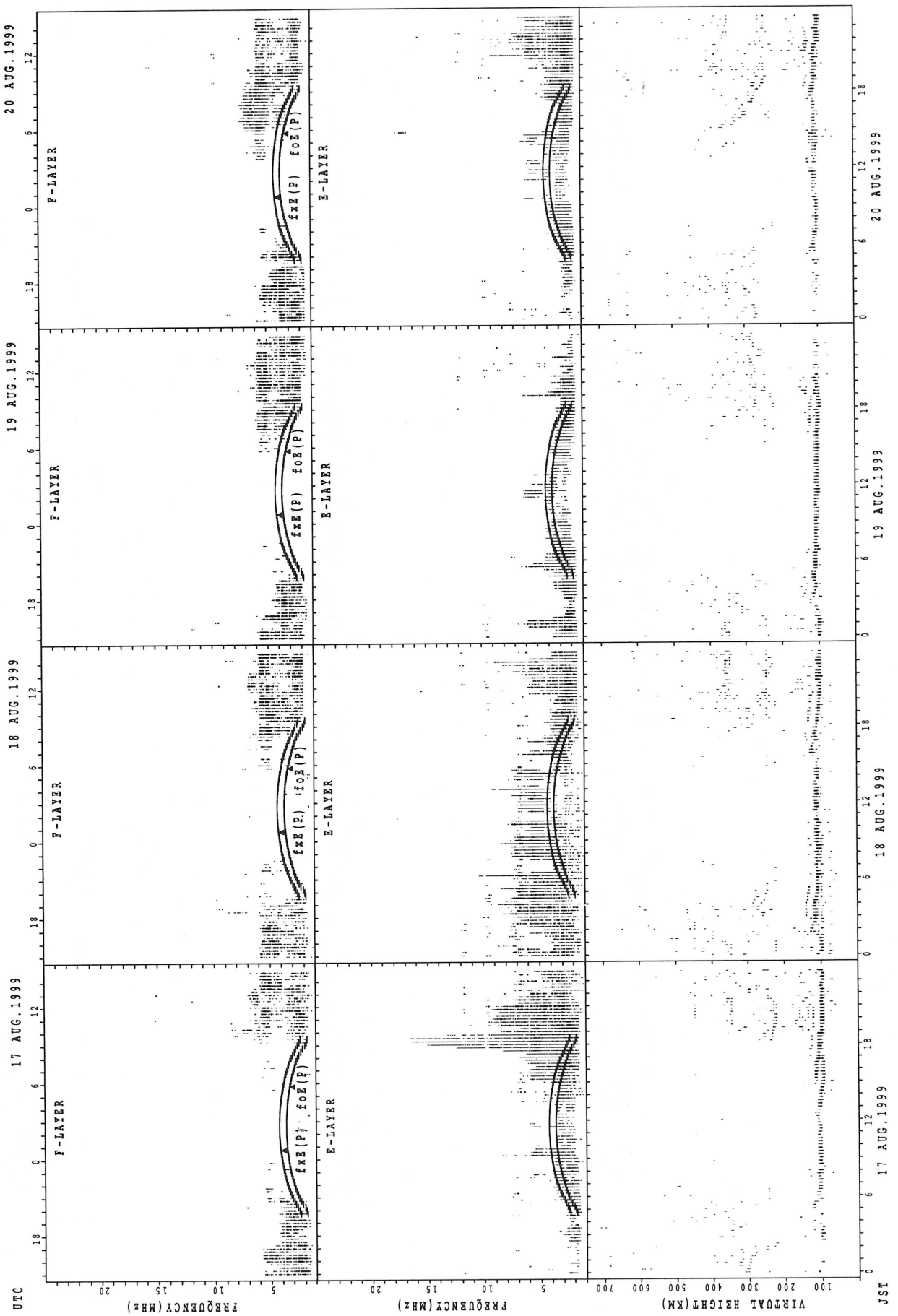
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

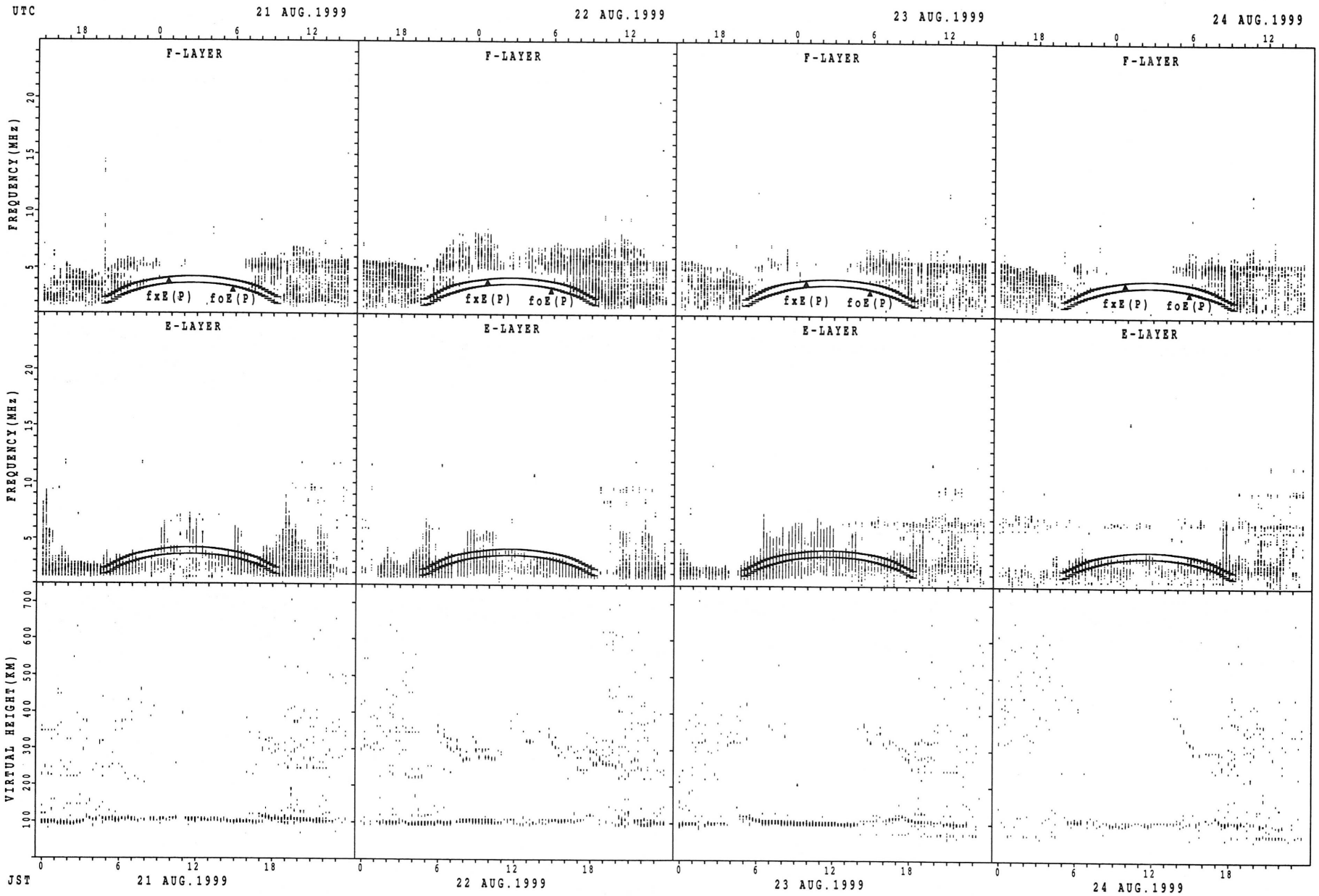
SUMMARY PLOTS AT Wakkanai



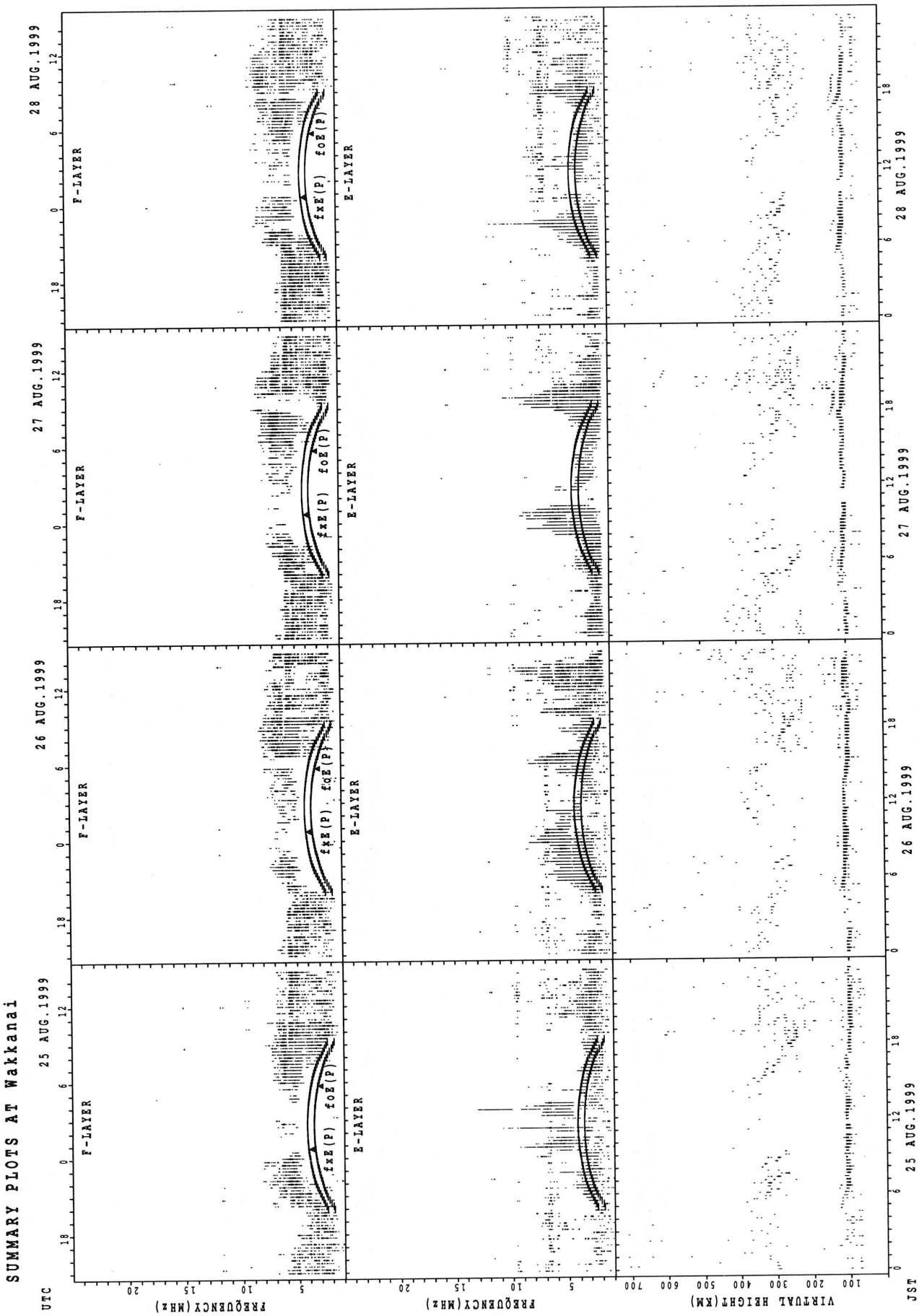
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

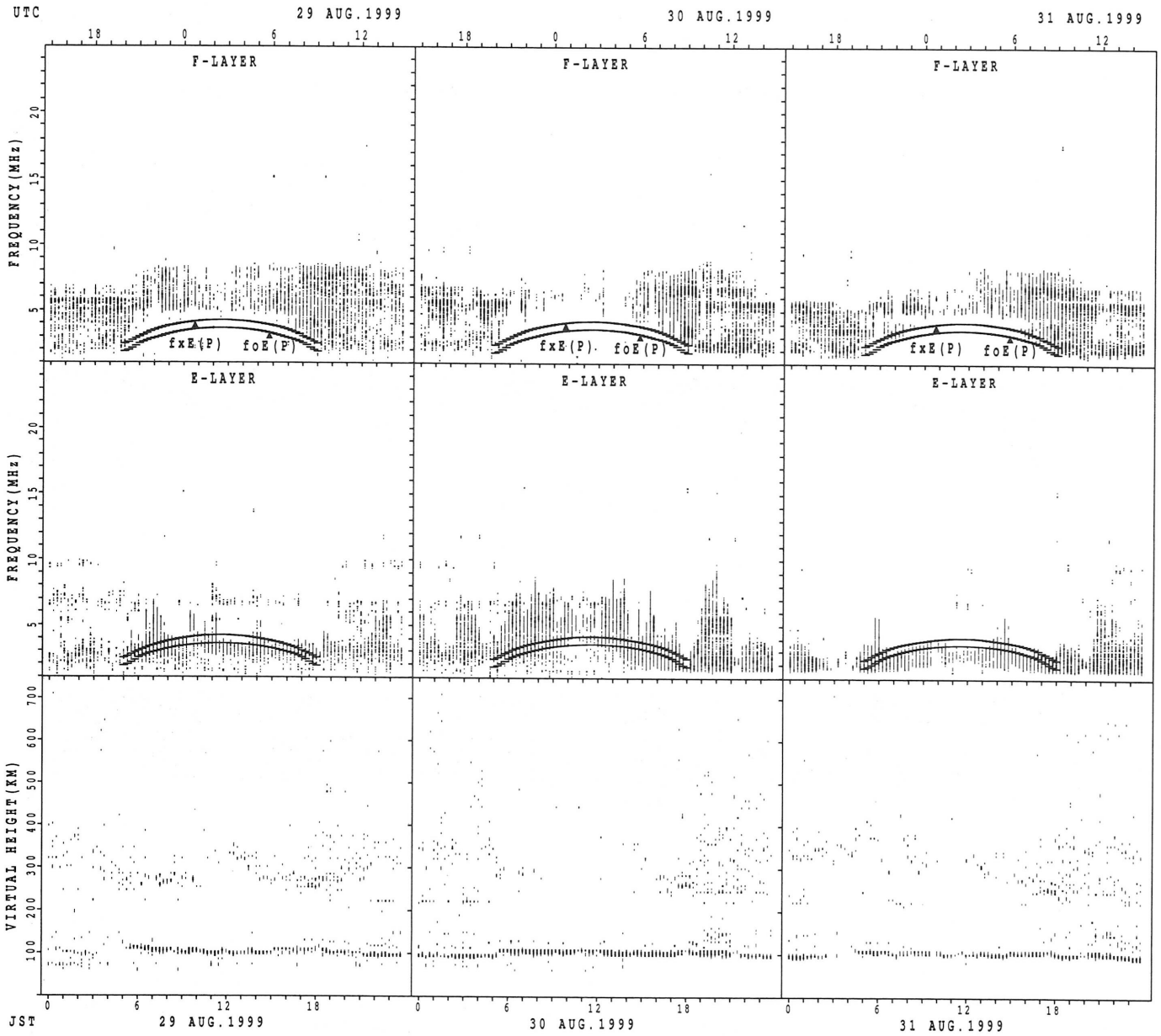
SUMMARY PLOTS AT Wakkanai



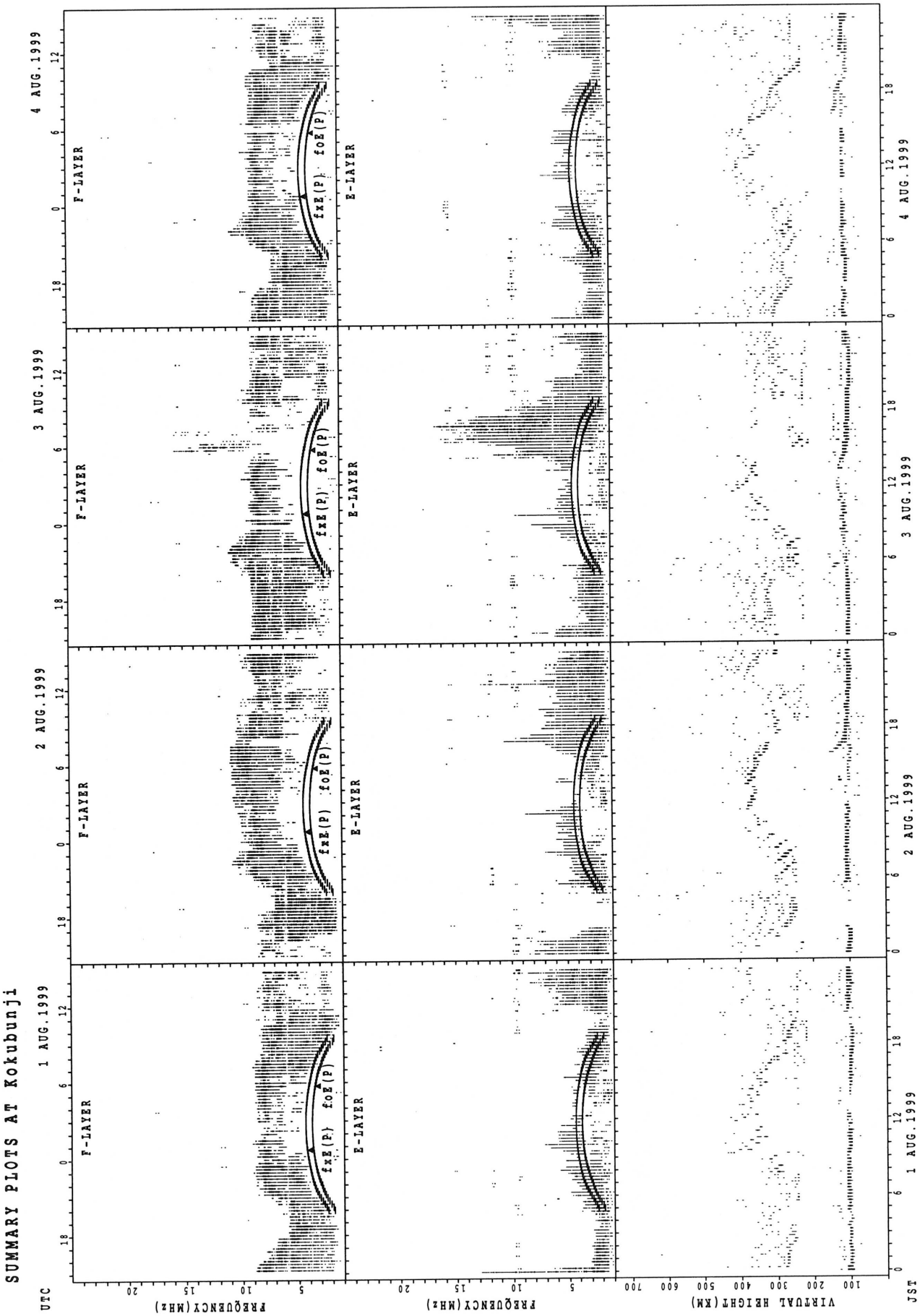
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

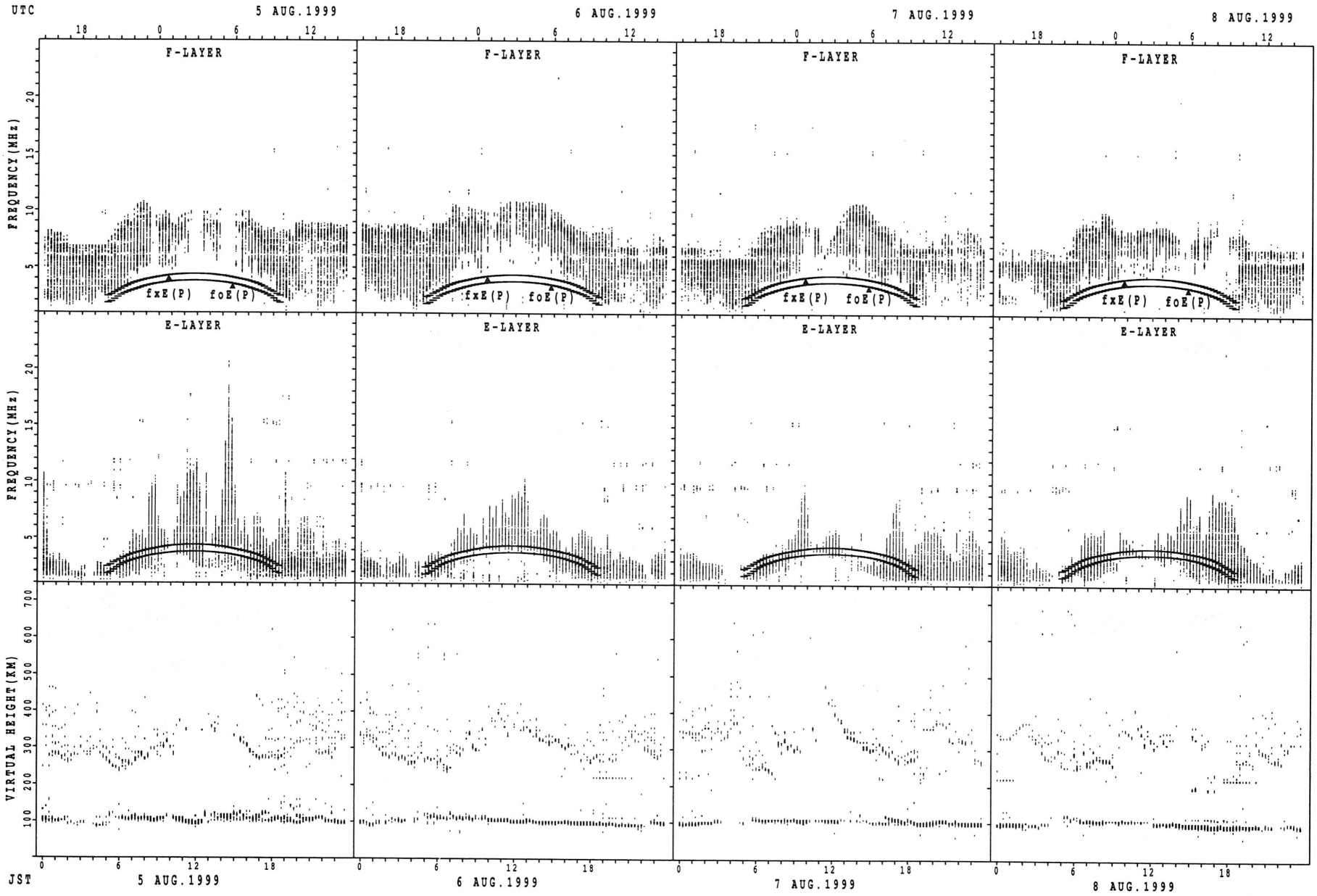

SUMMARY PLOTS AT Wakkanai
25 AUG.1999
26 AUG.1999
27 AUG.1999
28 AUG.1999
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
UTC
JST
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

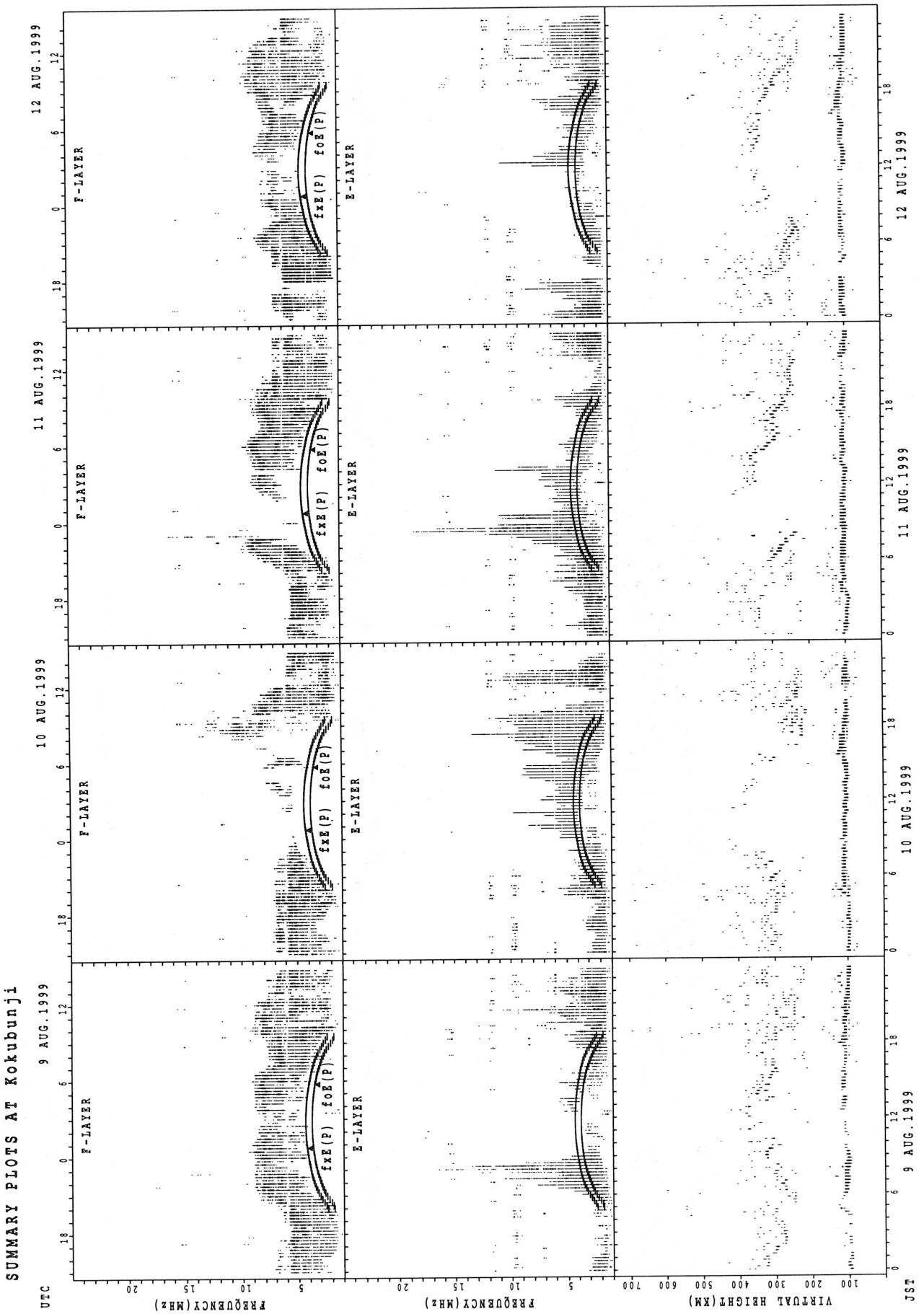
SUMMARY PLOTS AT Wakkanai



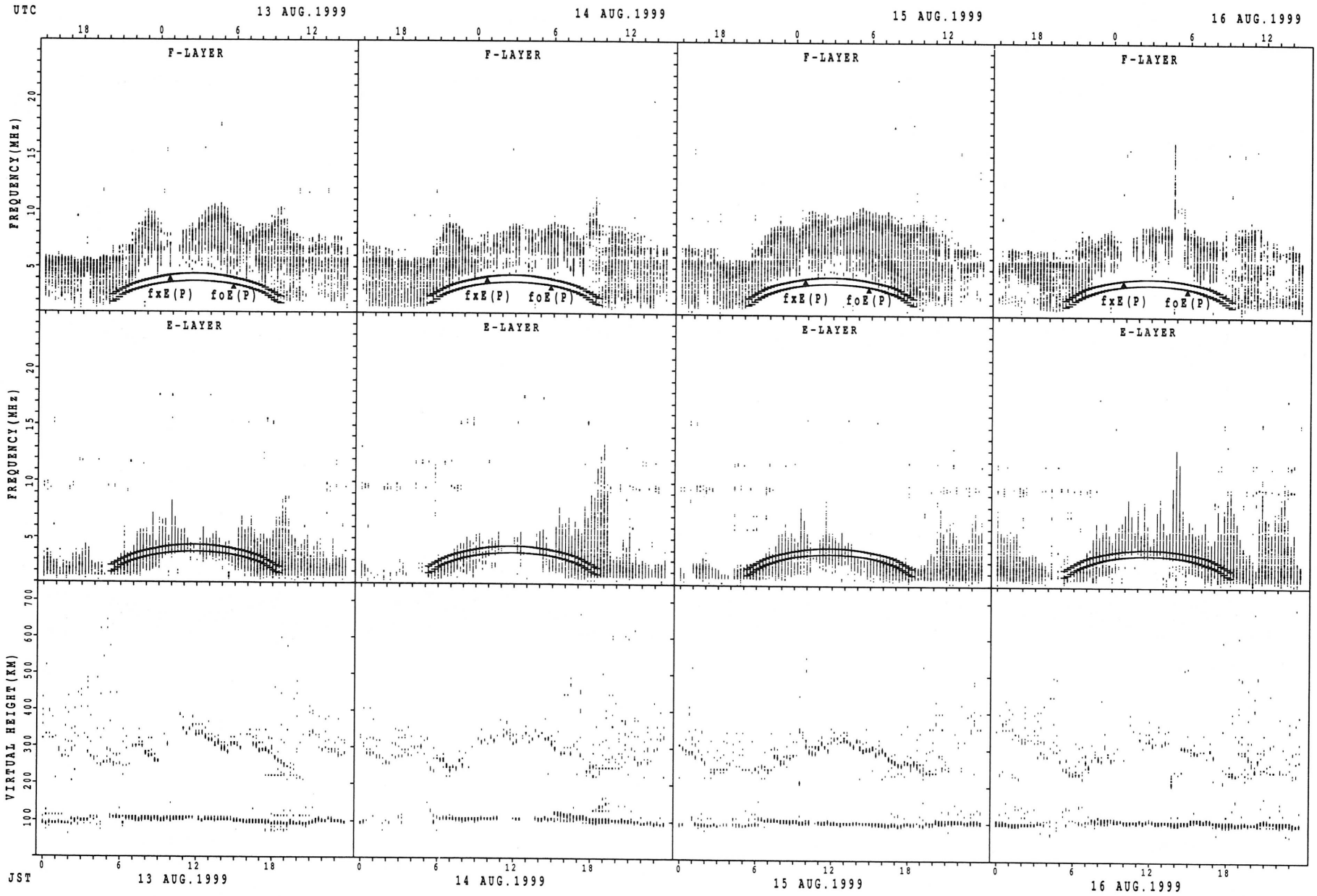
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

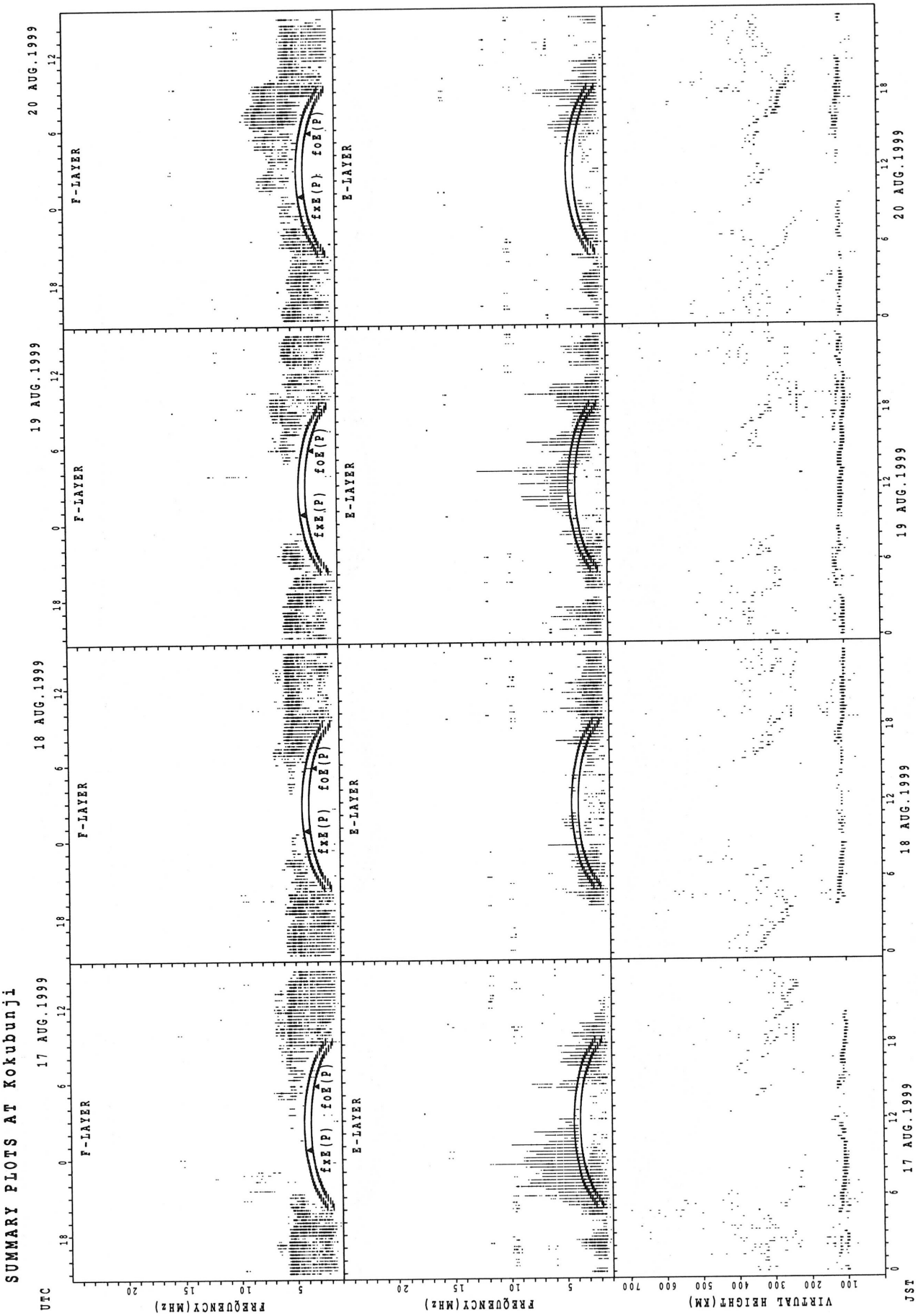

SUMMARY PLOTS AT Kokubunji
UTC
5 AUG.1999
6 AUG.1999
7 AUG.1999
8 AUG.1999
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

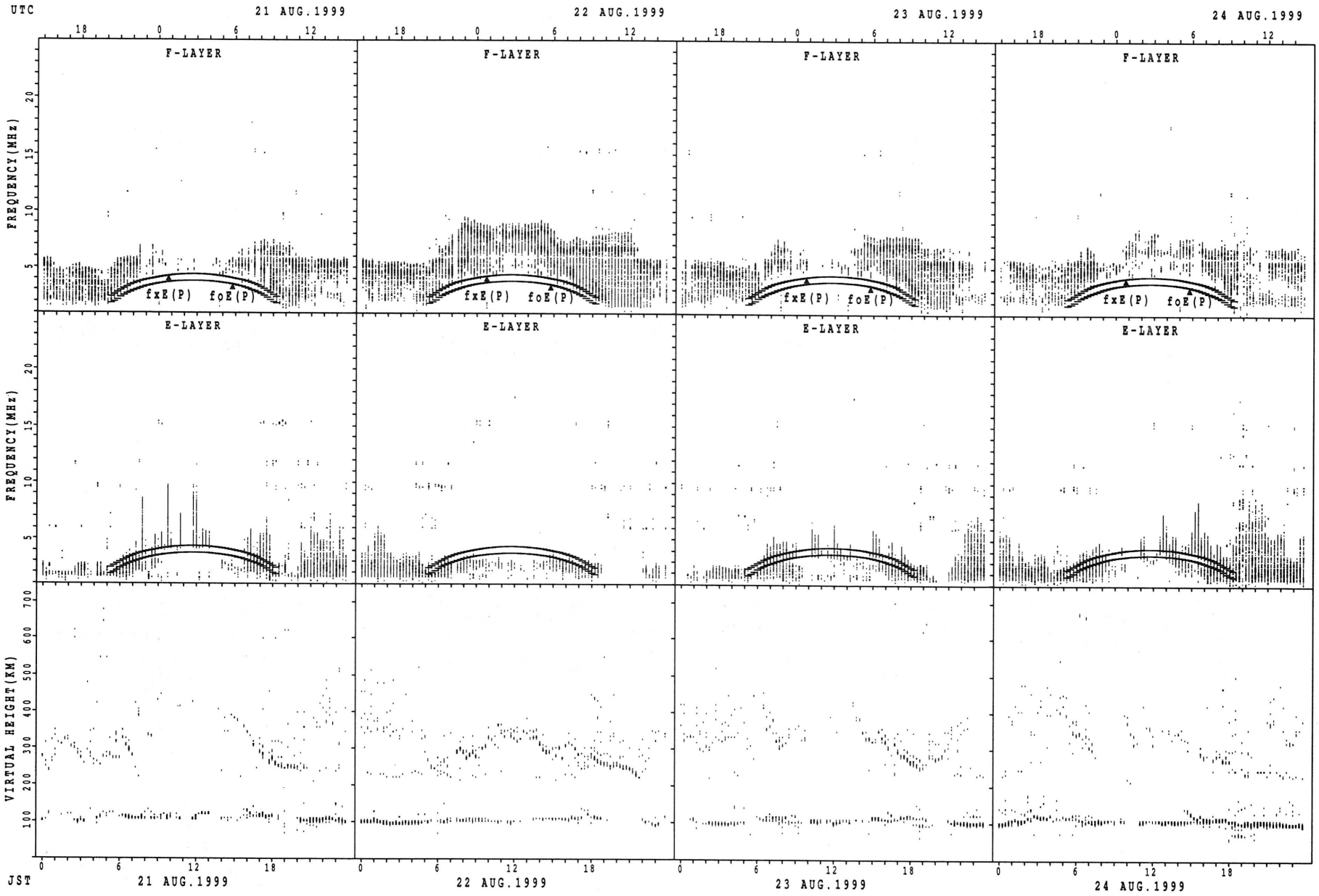
SUMMARY PLOTS AT Kokubunji



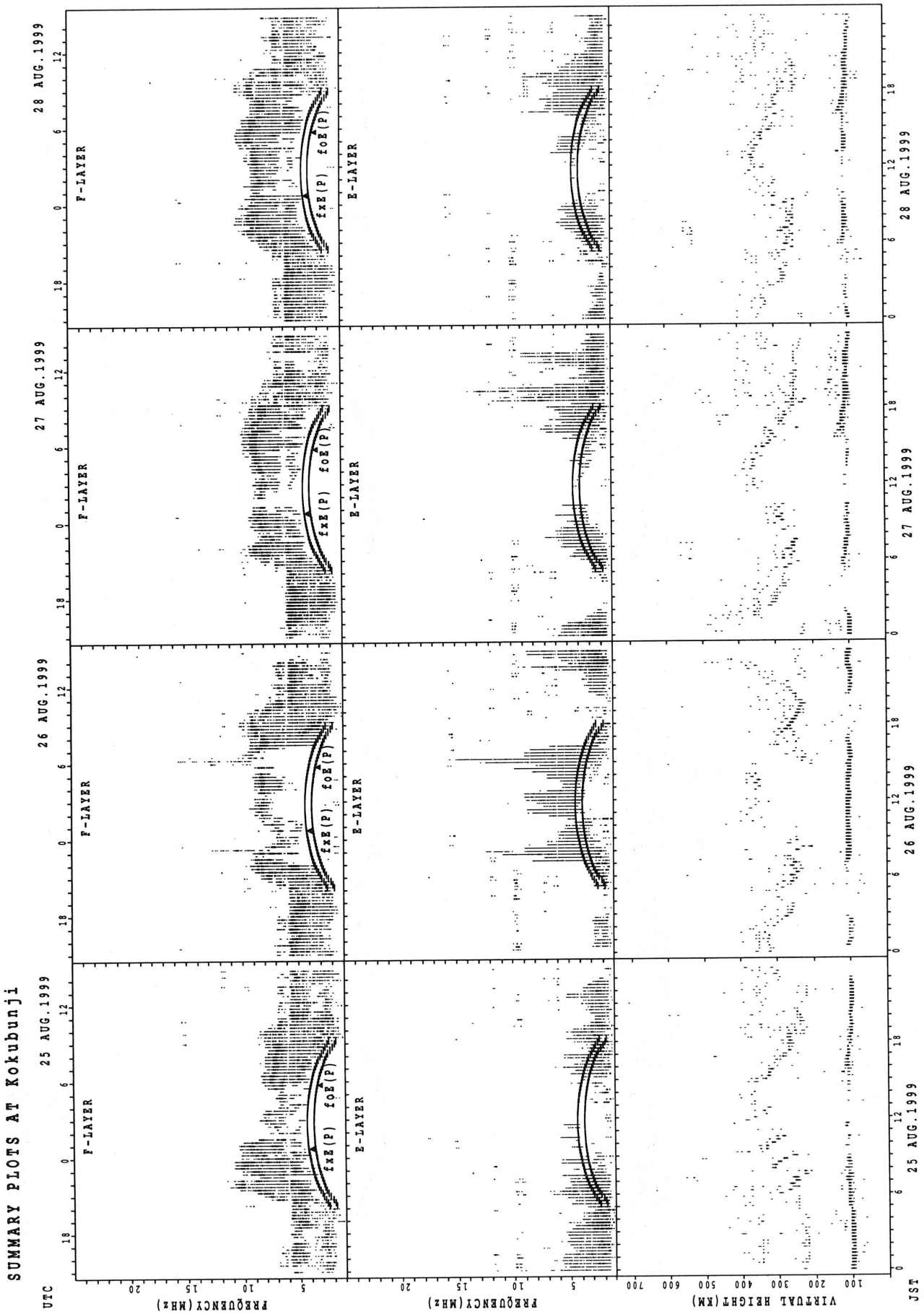
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

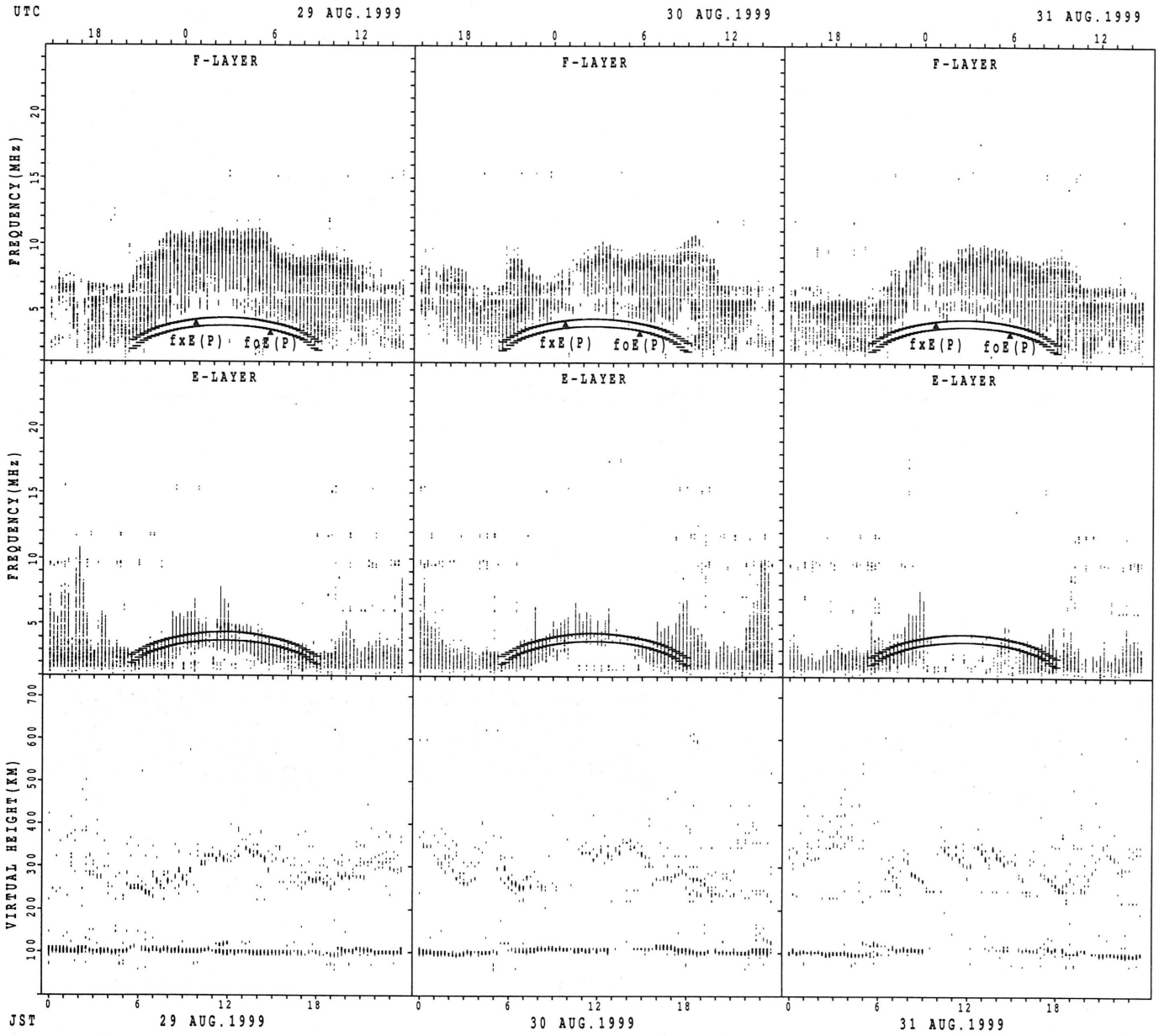
SUMMARY PLOTS AT Kokubunji



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

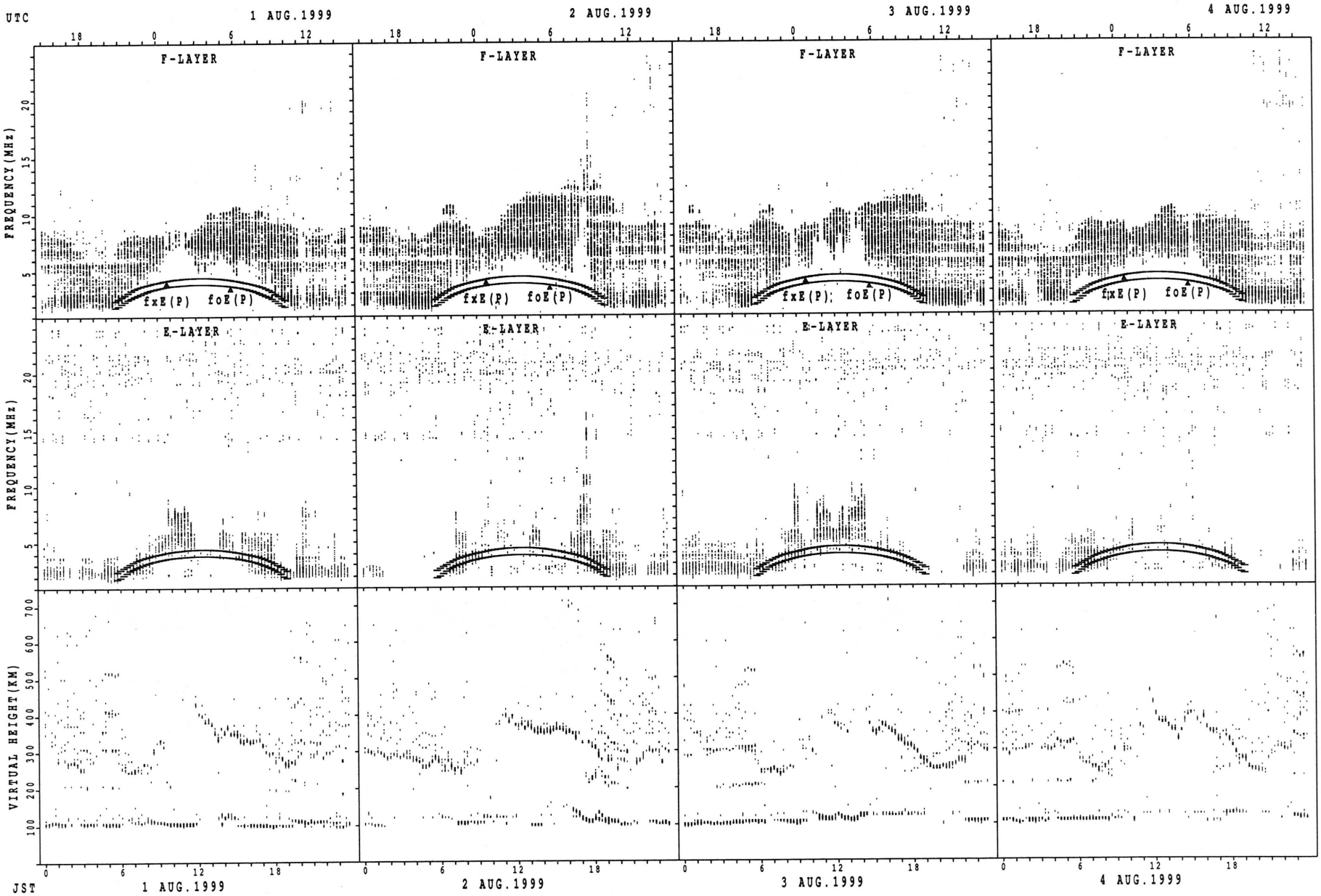

SUMMARY PLOTS AT Kokubunji
25 AUG.1999
26 AUG.1999
27 AUG.1999
28 AUG.1999
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
UTC
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



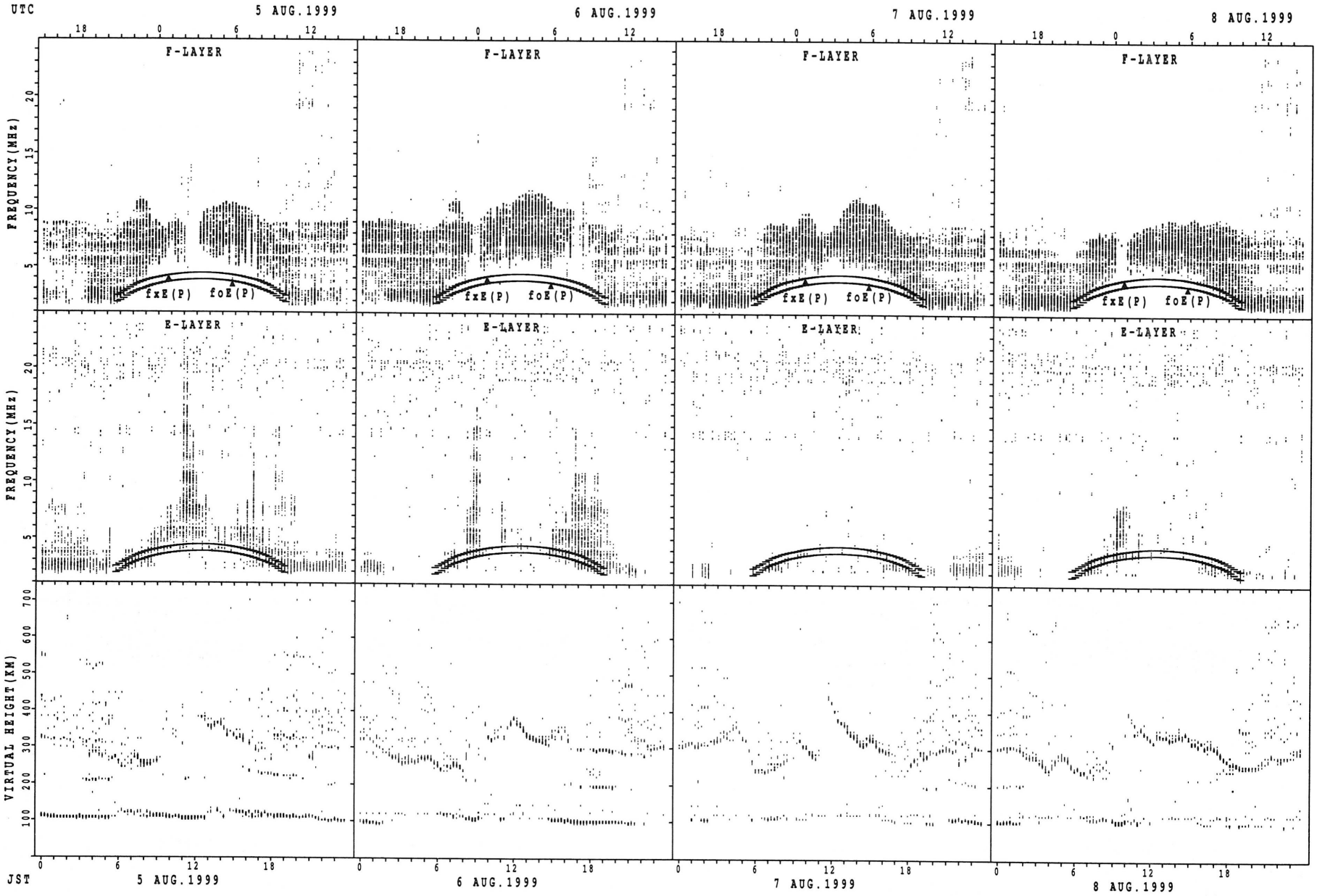
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa

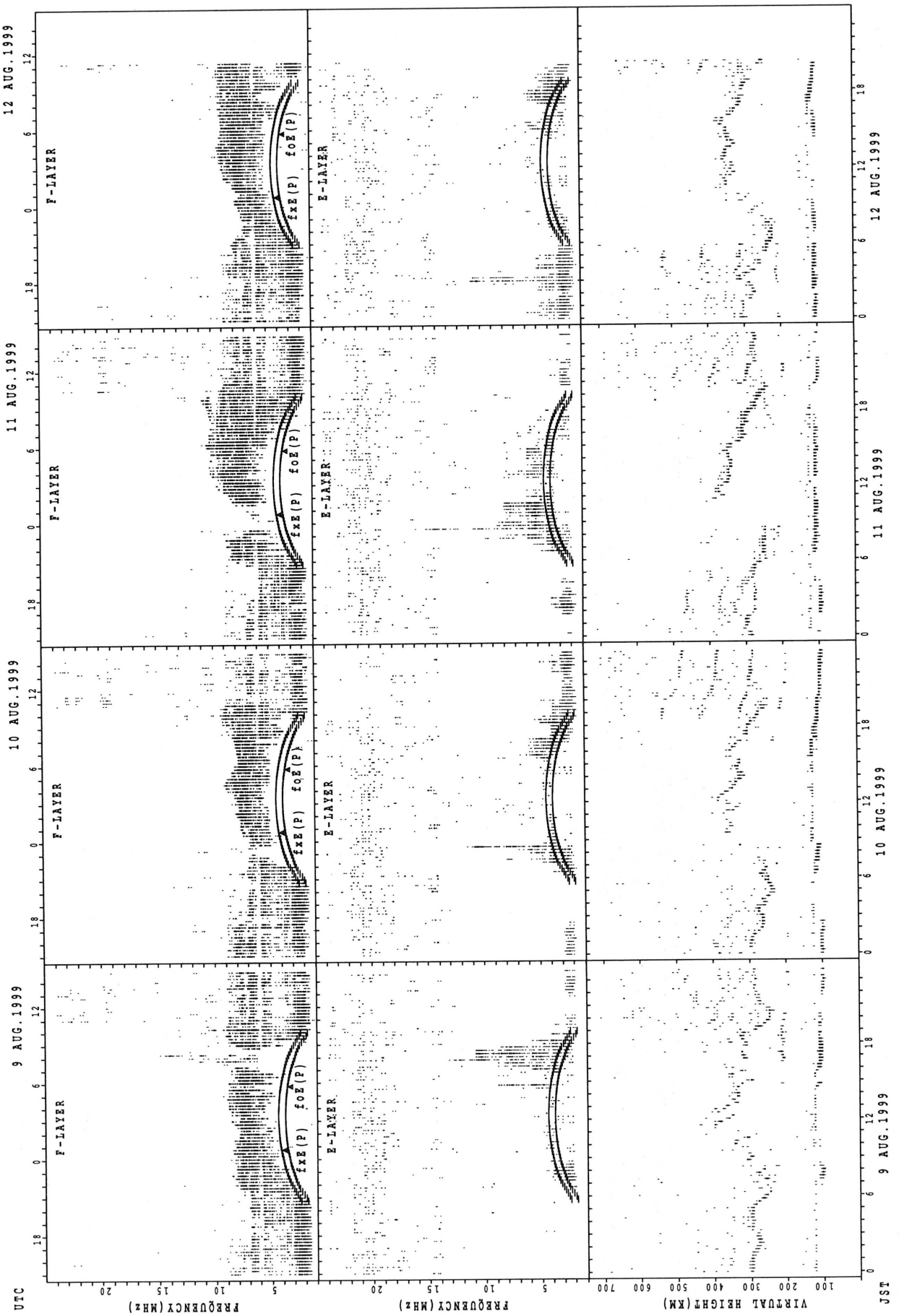


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

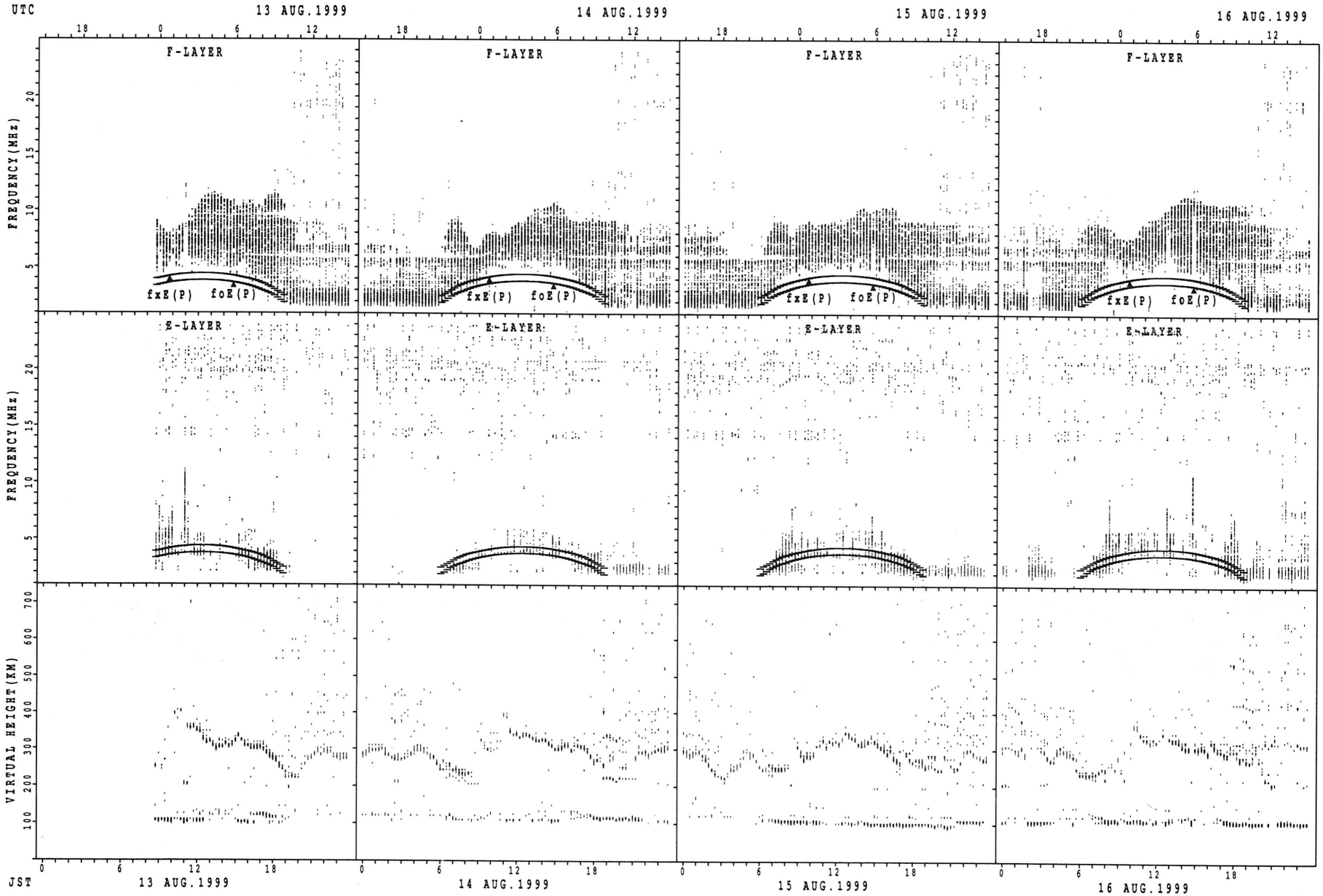
SUMMARY PLOTS AT Yamagawa



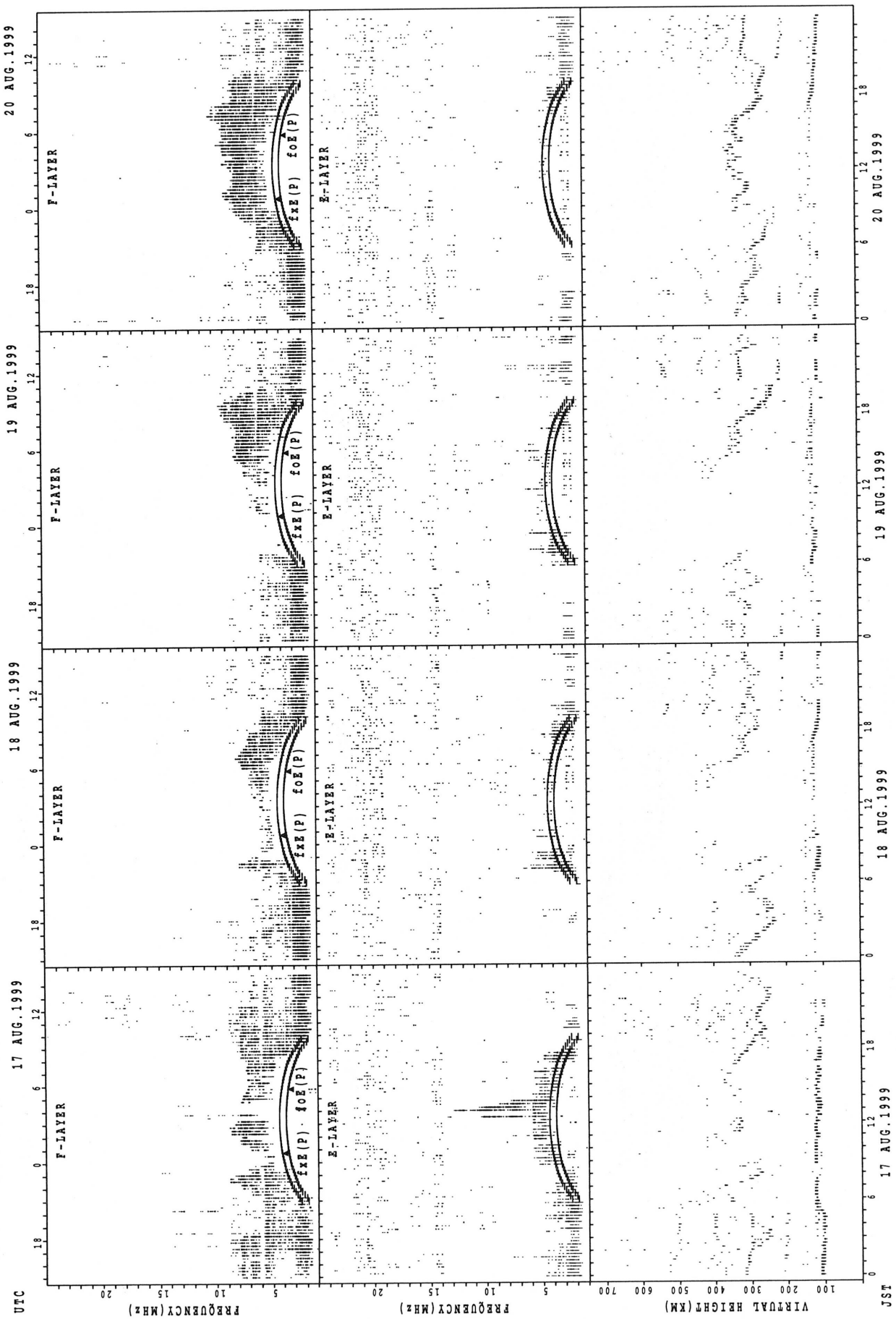
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

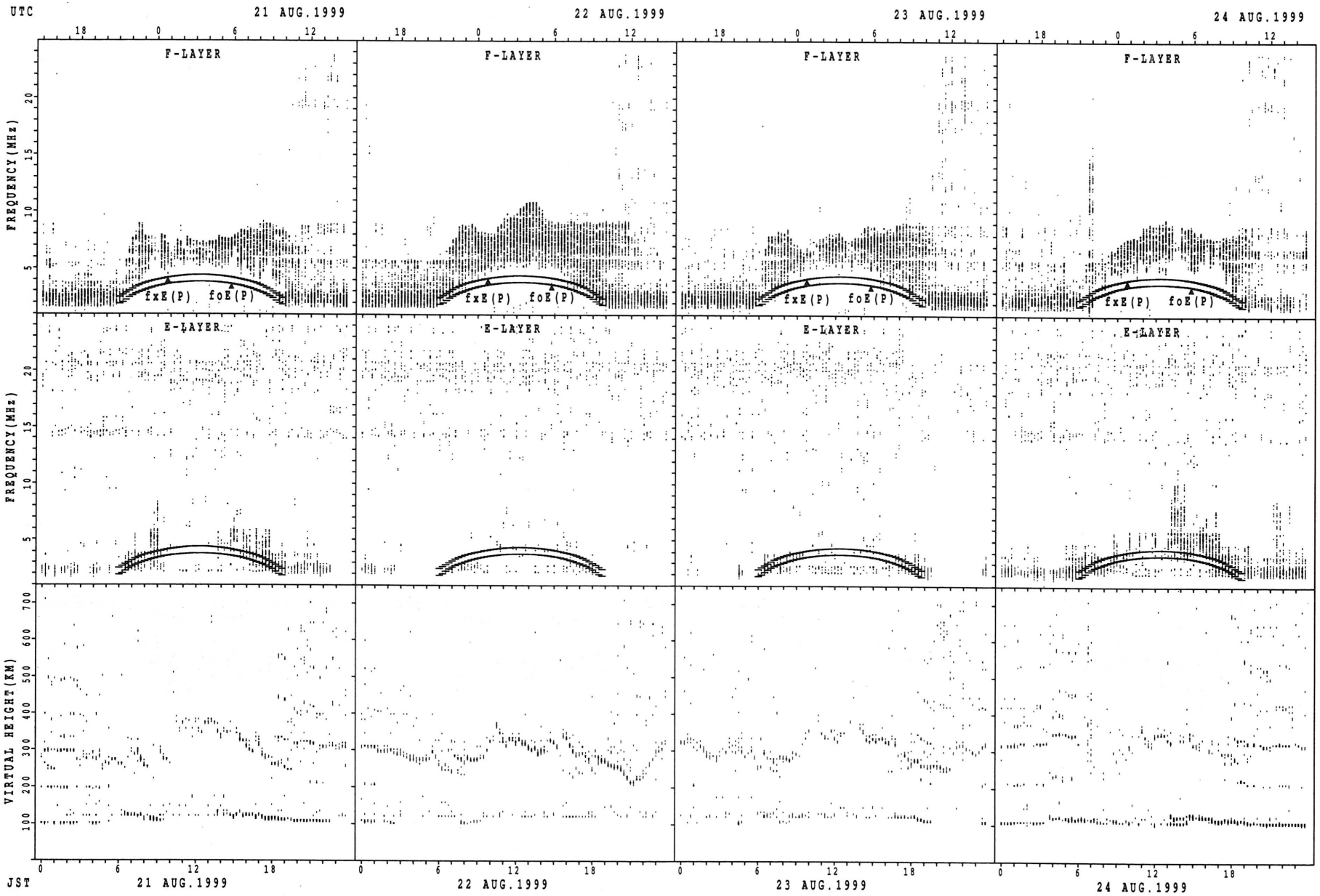
SUMMARY PLOTS AT Yamagawa



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

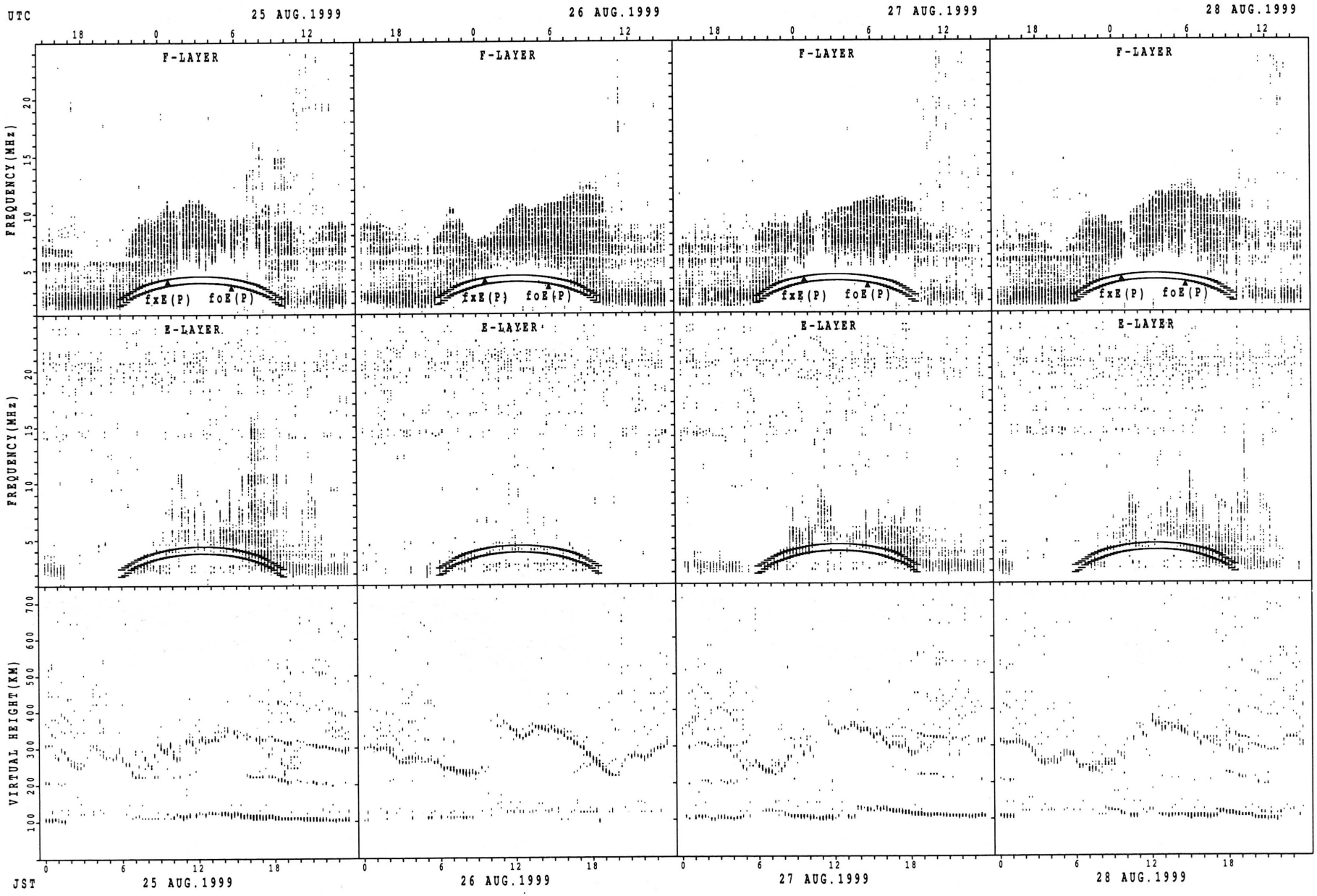

SUMMARY PLOTS AT Yamagawa
17 AUG.1999
18 AUG.1999
19 AUG.1999
20 AUG.1999
UTC
JST
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



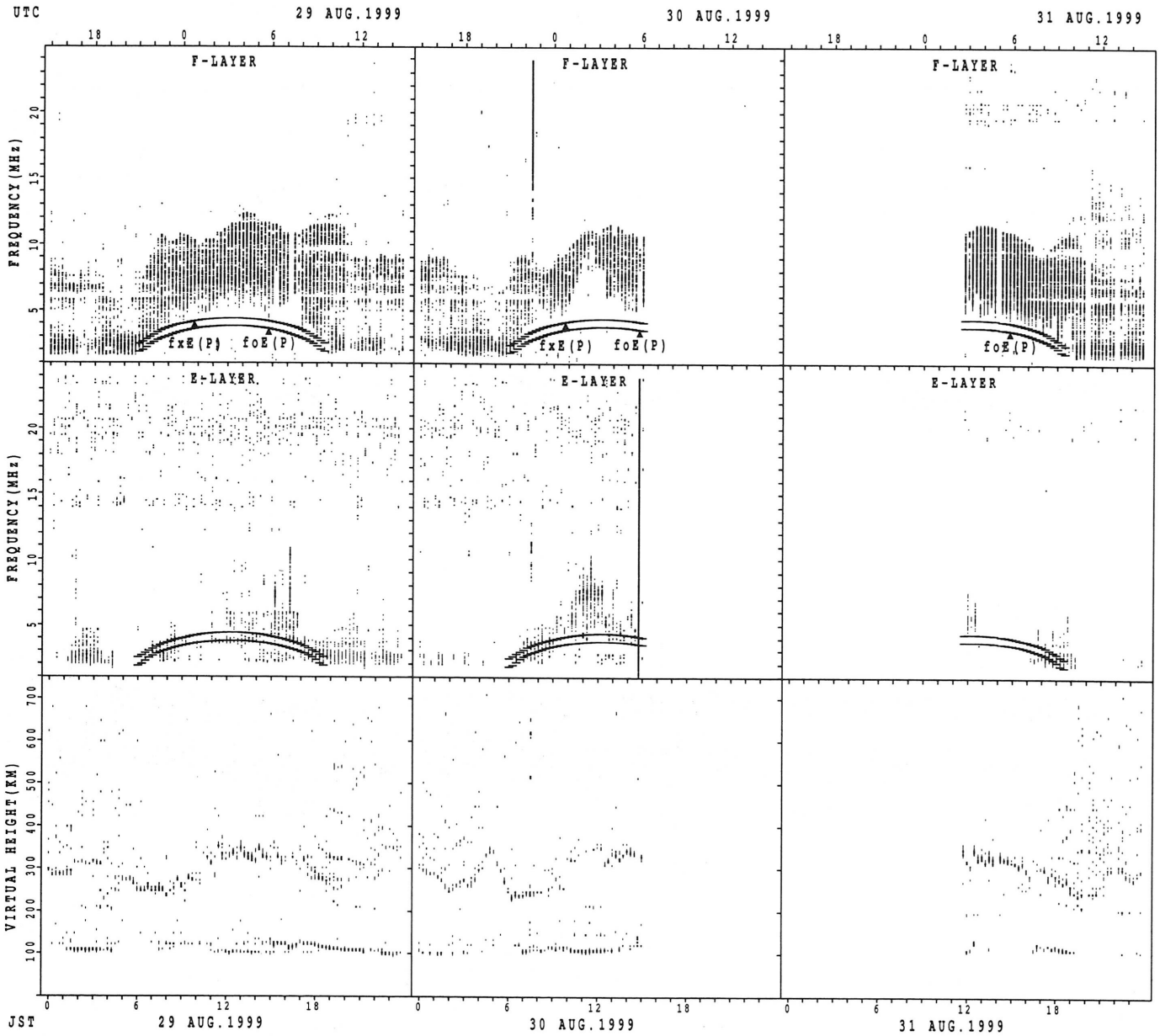
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



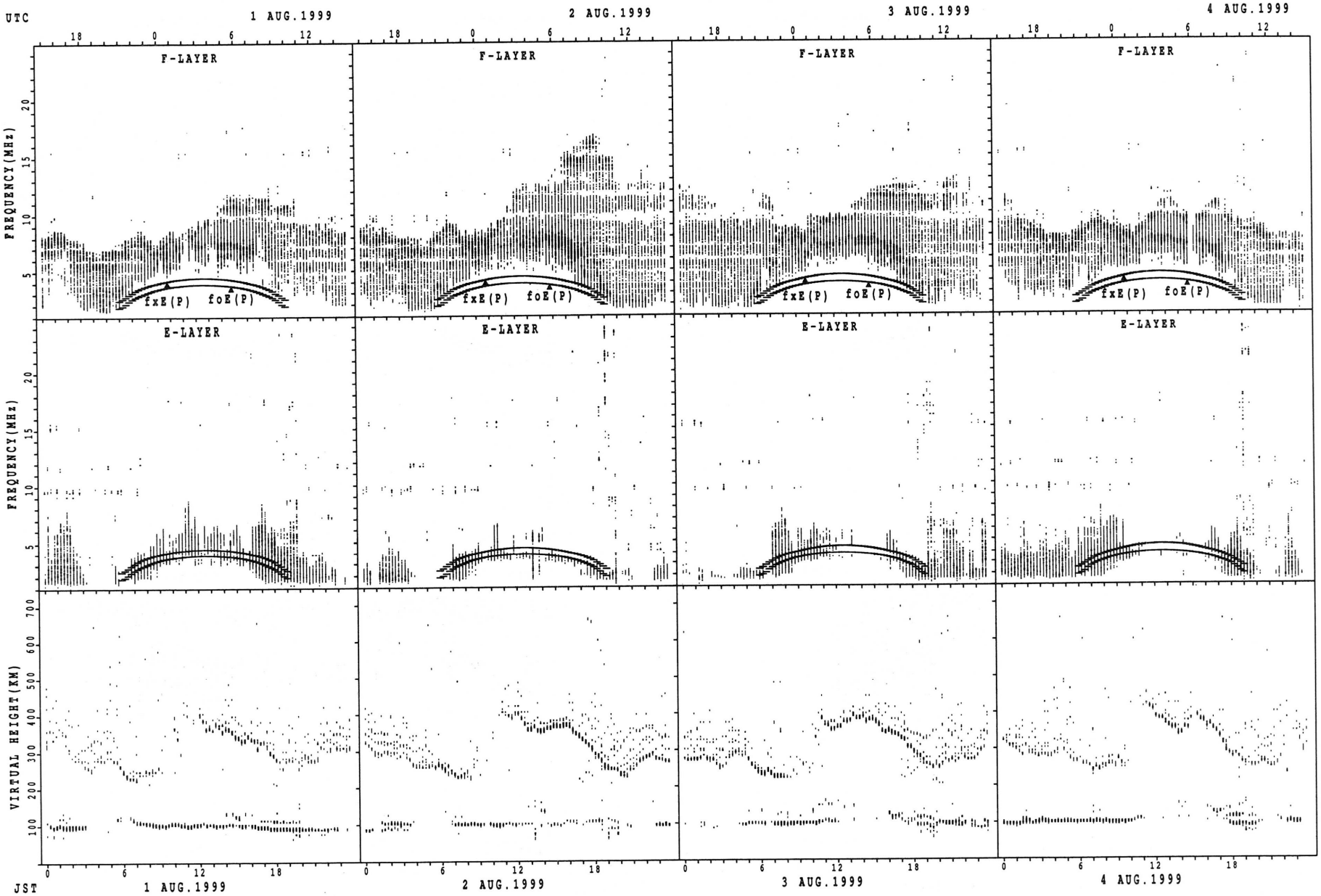
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



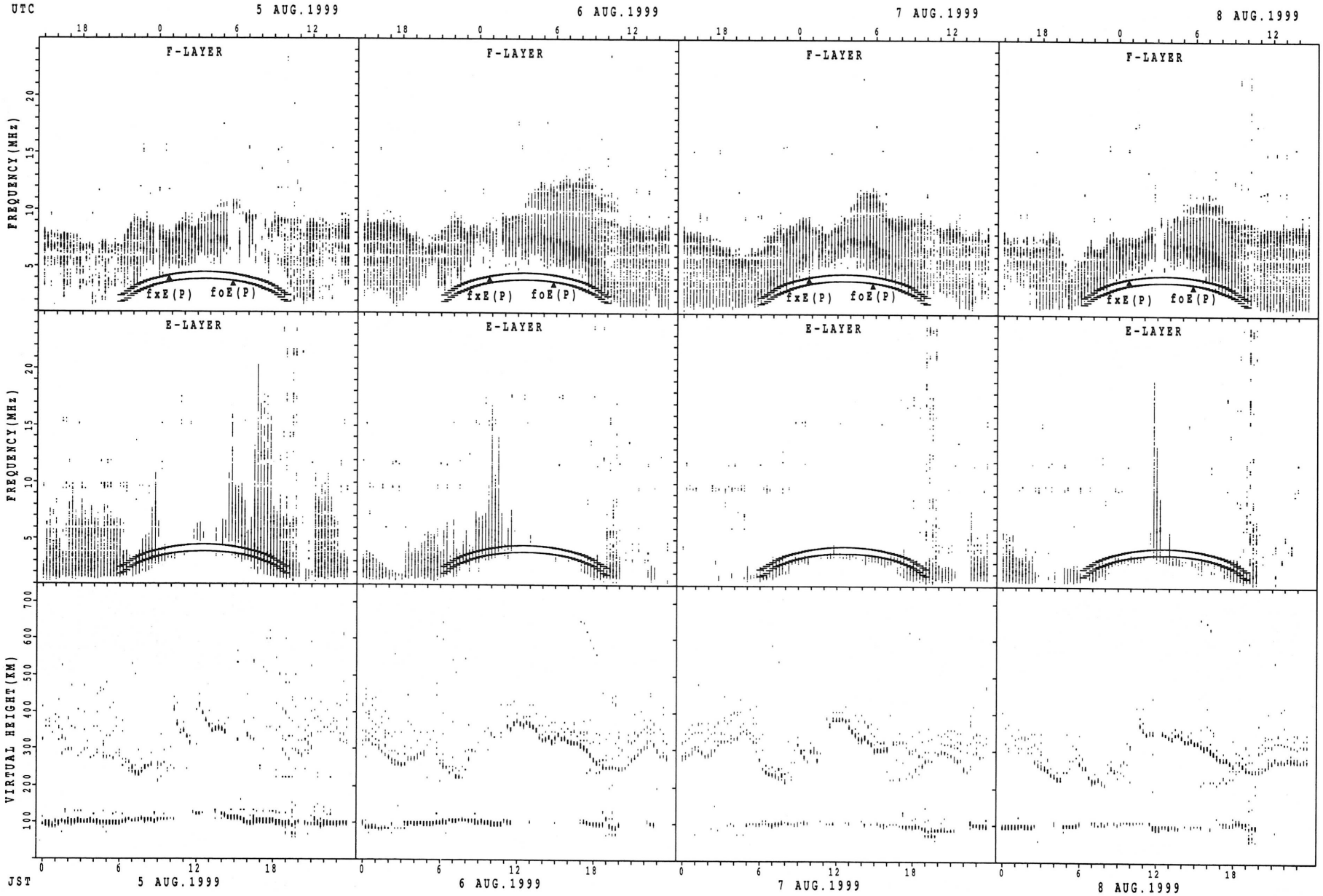
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



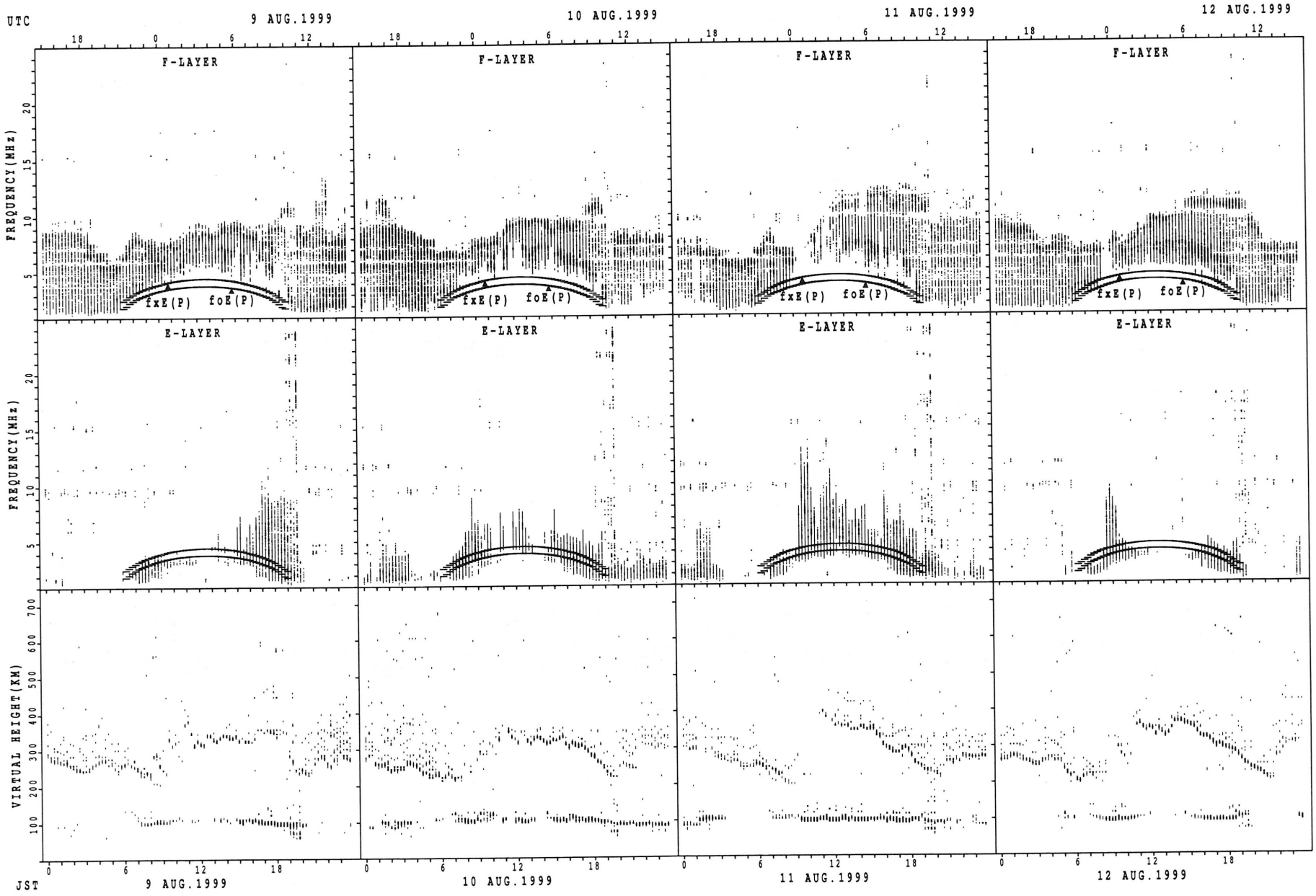
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



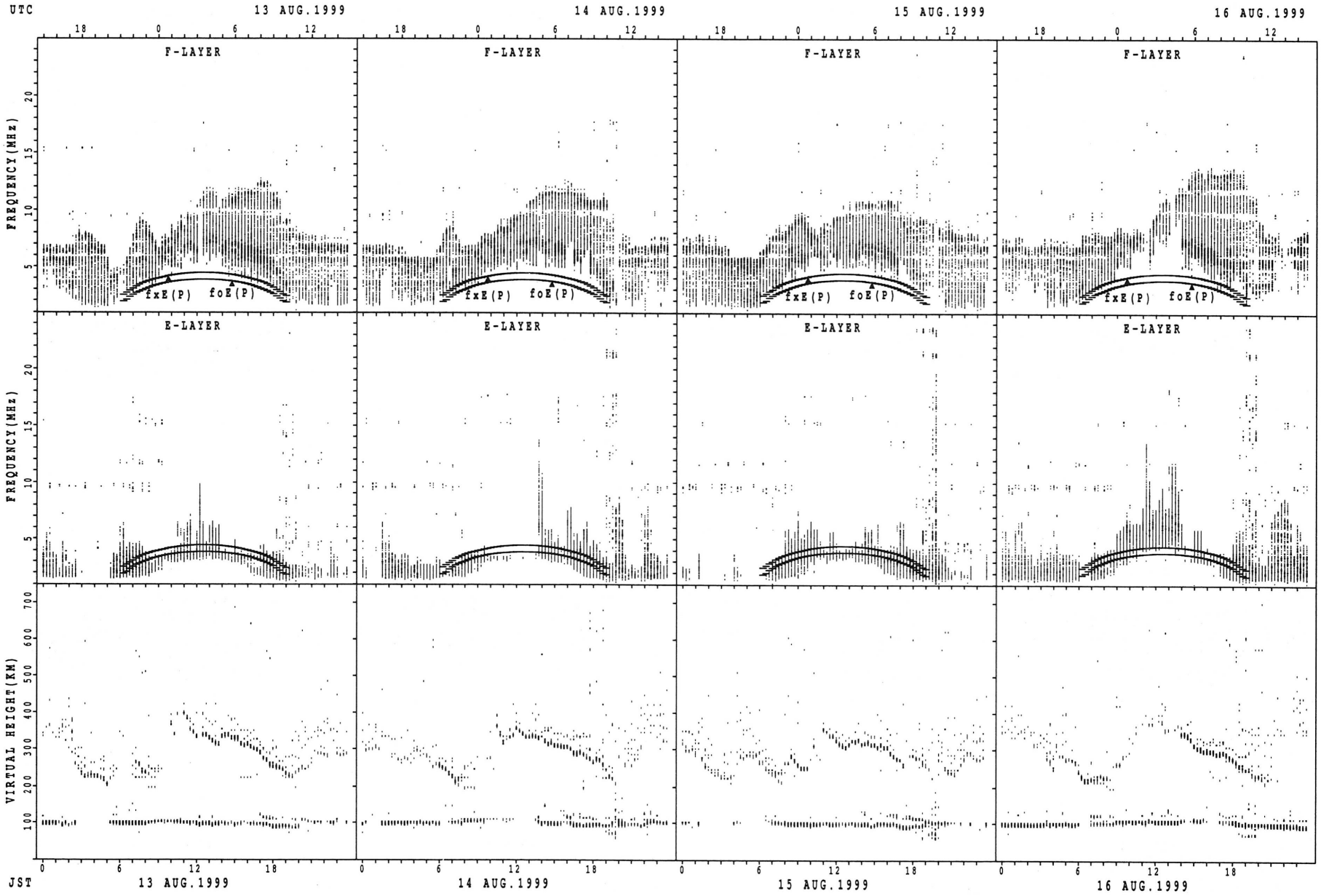
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa

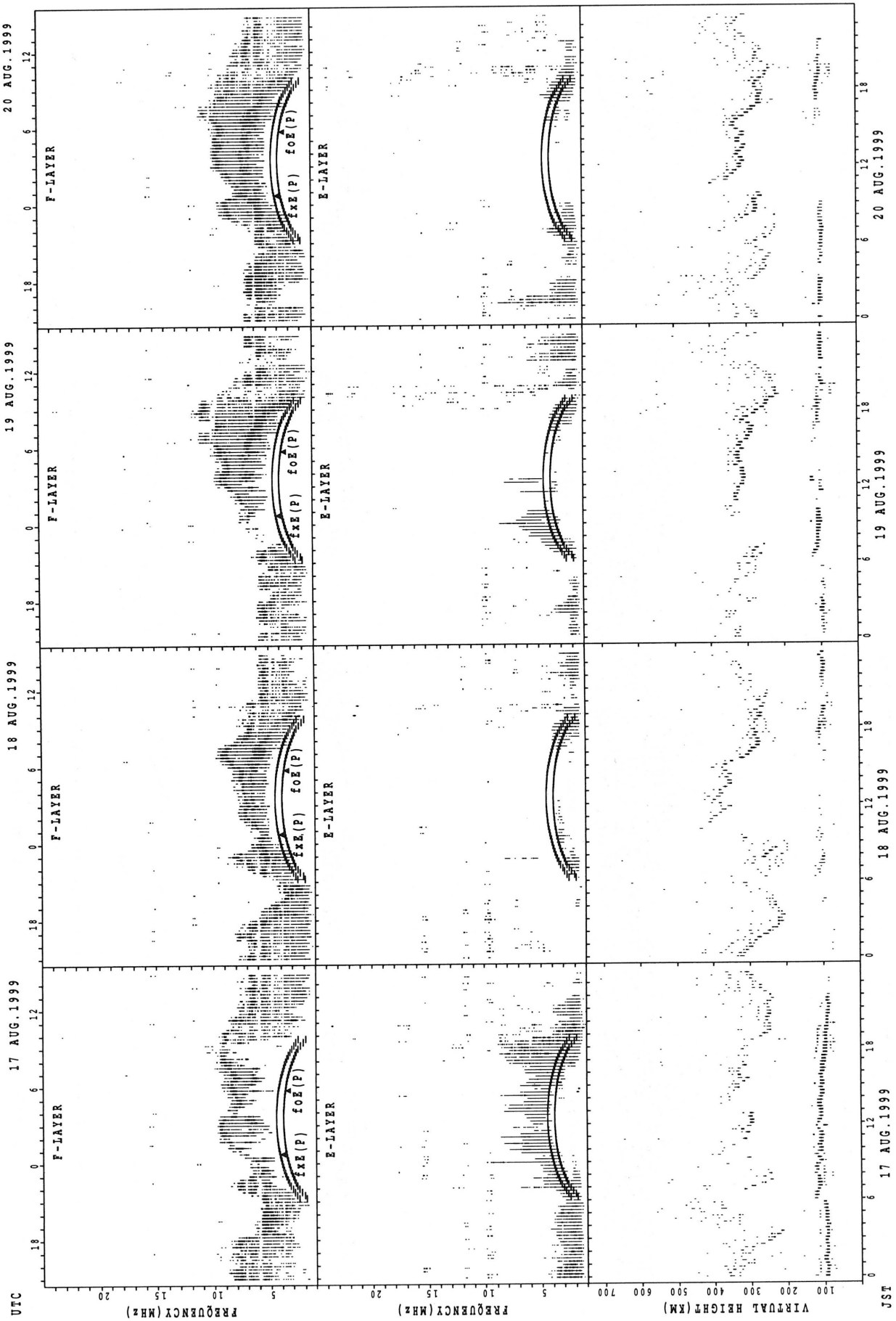


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

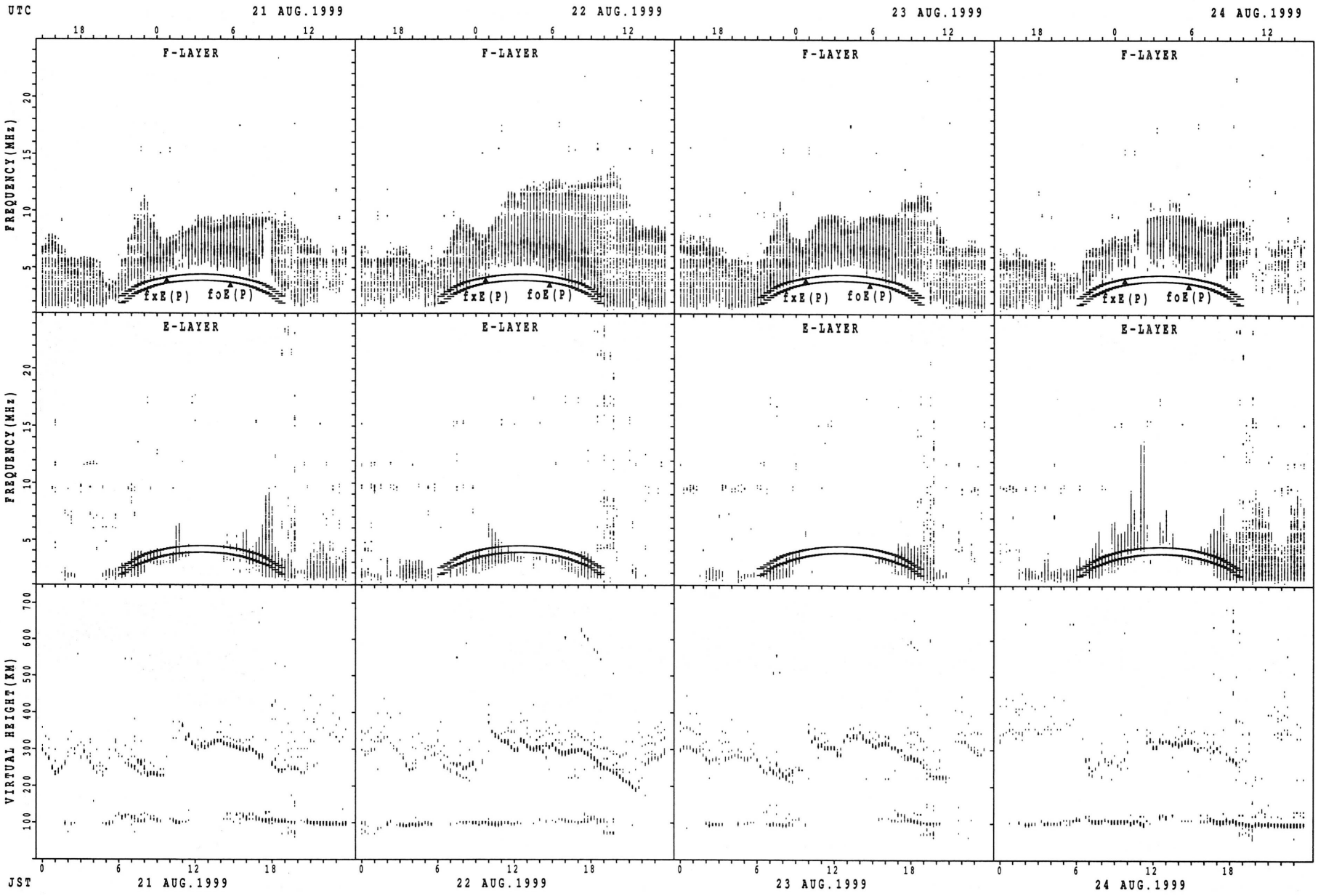
SUMMARY PLOTS AT Okinawa



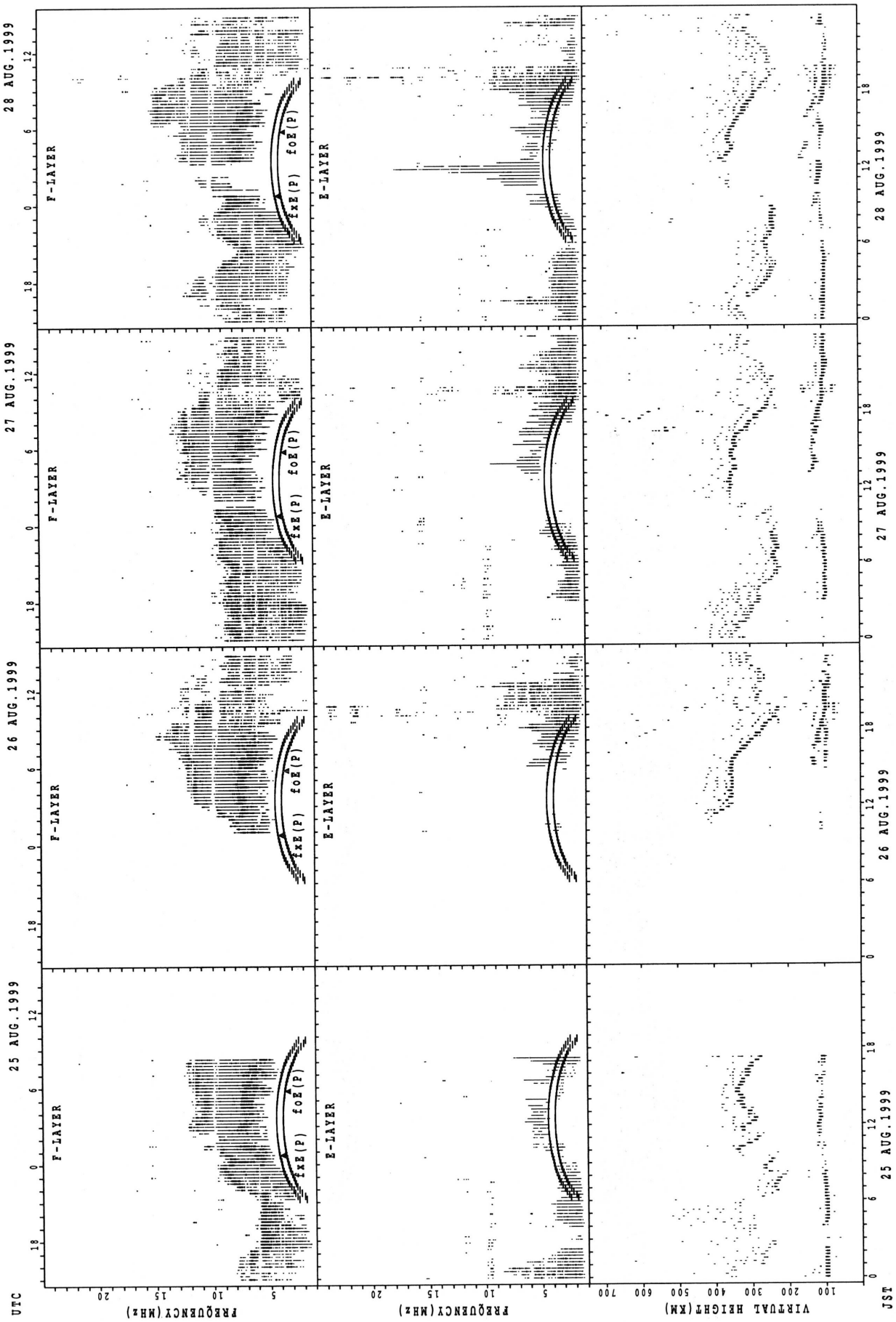
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

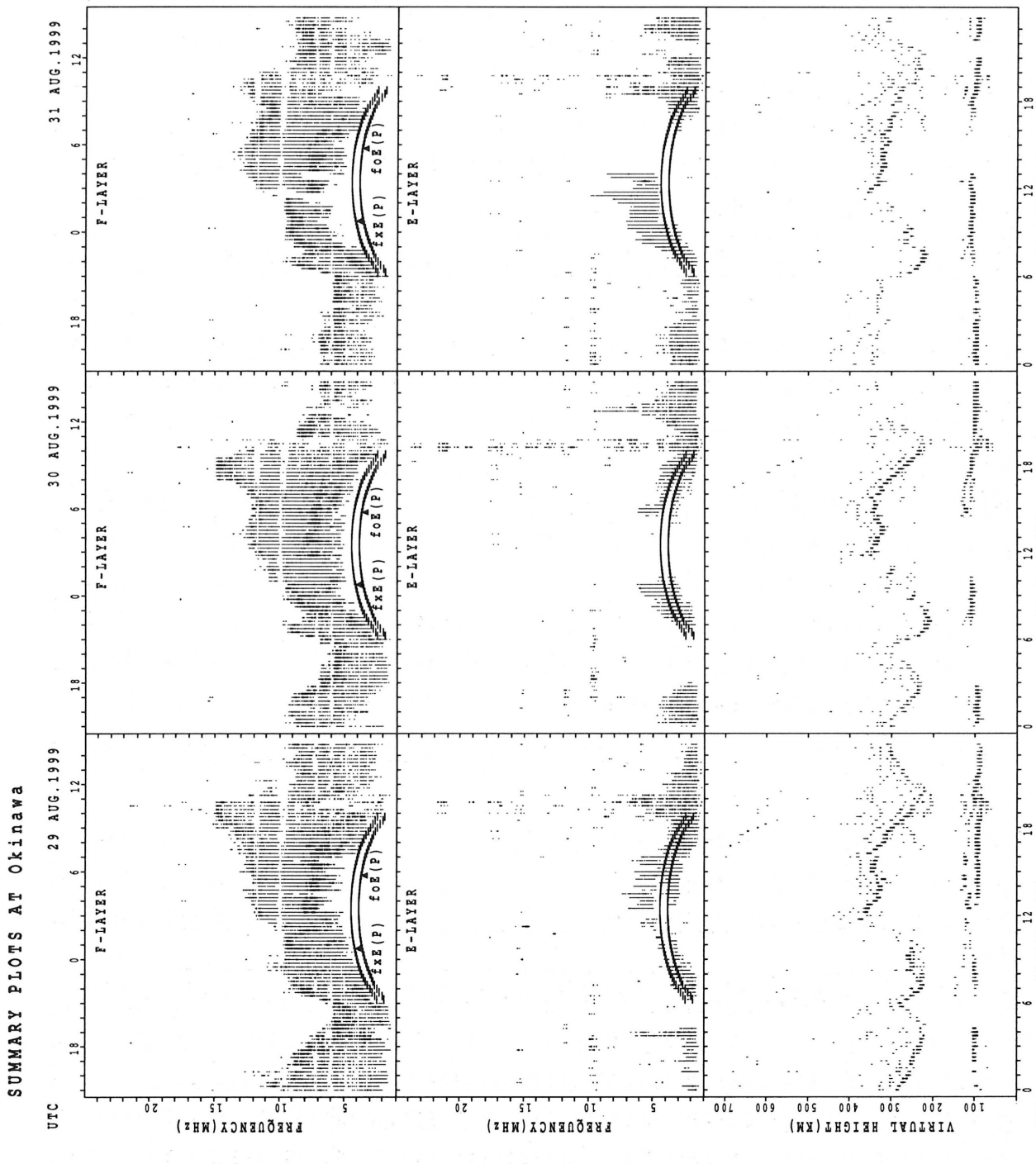

SUMMARY PLOTS AT Okinawa
UTC
JST
17 AUG.1999
18 AUG.1999
19 AUG.1999
20 AUG.1999
F-LAYER
E-LAYER
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



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


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


SUMMARY PLOTS AT Okinawa
UTC
29 AUG.1999
30 AUG.1999
31 AUG.1999
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

MONTHLY MEDIANS OF h'F AND h'Es

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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	6	4	5	2	2	1	7	14	2							1	9	15	16	12	13	15	12	6
MED	355	431	360	385	396	368	300	296	284							330	332	306	306	306	330	312	352	363
U Q	362	469	416	470	428	184	312	312	284							165	341	326	314	322	356	372	362	386
L Q	354	380	351	300	364	184	282	280	284							165	315	298	287	299	313	290	323	342

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	21	23	22	20	28	26	23	24	21	22	20	14	10	13	15	18	26	28	24	26	25	23	25
MED	99	99	97	98	101	111	111	109	107	107	107	106	107	105	109	105	106	111	111	109	106	107	105	103
U Q	105	103	99	105	106	117	113	111	109	110	109	108	113	107	114	113	115	117	113	113	111	113	113	109
L Q	97	96	95	95	97	103	107	107	105	105	105	104	105	103	104	103	103	107	105	106	103	102	99	97

h'F STATION Kokubunji LAT. 39.7N LON. 140.1E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	3	8	10	5	2	4	19	23	20							2	20	21	25	23	16	9	11	10
MED	364	373	337	366	367	362	294	270	281							337	311	308	296	304	305	338	346	351
U Q	382	383	358	381	430	381	306	296	311							344	324	322	318	322	325	351	412	362
L Q	318	356	332	313	304	331	276	250	263							330	301	299	284	276	295	313	336	328

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	26	24	16	19	21	22	25	24	20	20	19	18	16	16	20	27	30	26	25	25	26	27
MED	103	105	99	103	103	107	113	111	111	110	107	107	107	107	107	106	119	113	107	103	105	105	105	105
U Q	105	111	105	106	110	119	115	113	114	115	111	113	115	115	114	116	124	117	111	105	108	112	111	107
L Q	97	99	97	99	99	105	109	109	107	106	107	105	103	105	103	103	110	111	105	97	101	100	103	103

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	5	7	6	3	5	2	9	21	21	7							27	24	26	24	11	5	5	8
MED	372	352	330	338	336	348	288	264	258	276							326	310	295	285	294	338	354	349
U Q	416	366	356	340	354	350	297	281	273	296							342	320	306	306	318	351	383	364
L Q	341	346	320	296	302	346	258	247	248	260							306	302	280	260	286	265	334	278

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	19	14	10	8	5	6	5	13	21	11	10	13	7	11	12	10	15	15	19	18	17	13	13	15
MED	111	108	108	110	111	111	121	119	113	113	114	109	113	113	122	115	115	123	117	112	111	111	109	107
U Q	111	111	111	113	112	113	123	128	116	117	115	118	115	123	131	121	123	125	121	115	113	113	114	111
L Q	107	105	105	108	108	109	111	112	111	109	111	107	107	111	114	107	105	111	115	111	106	103	105	103

MONTHLY MEDIANS OF h'F AND h'Es

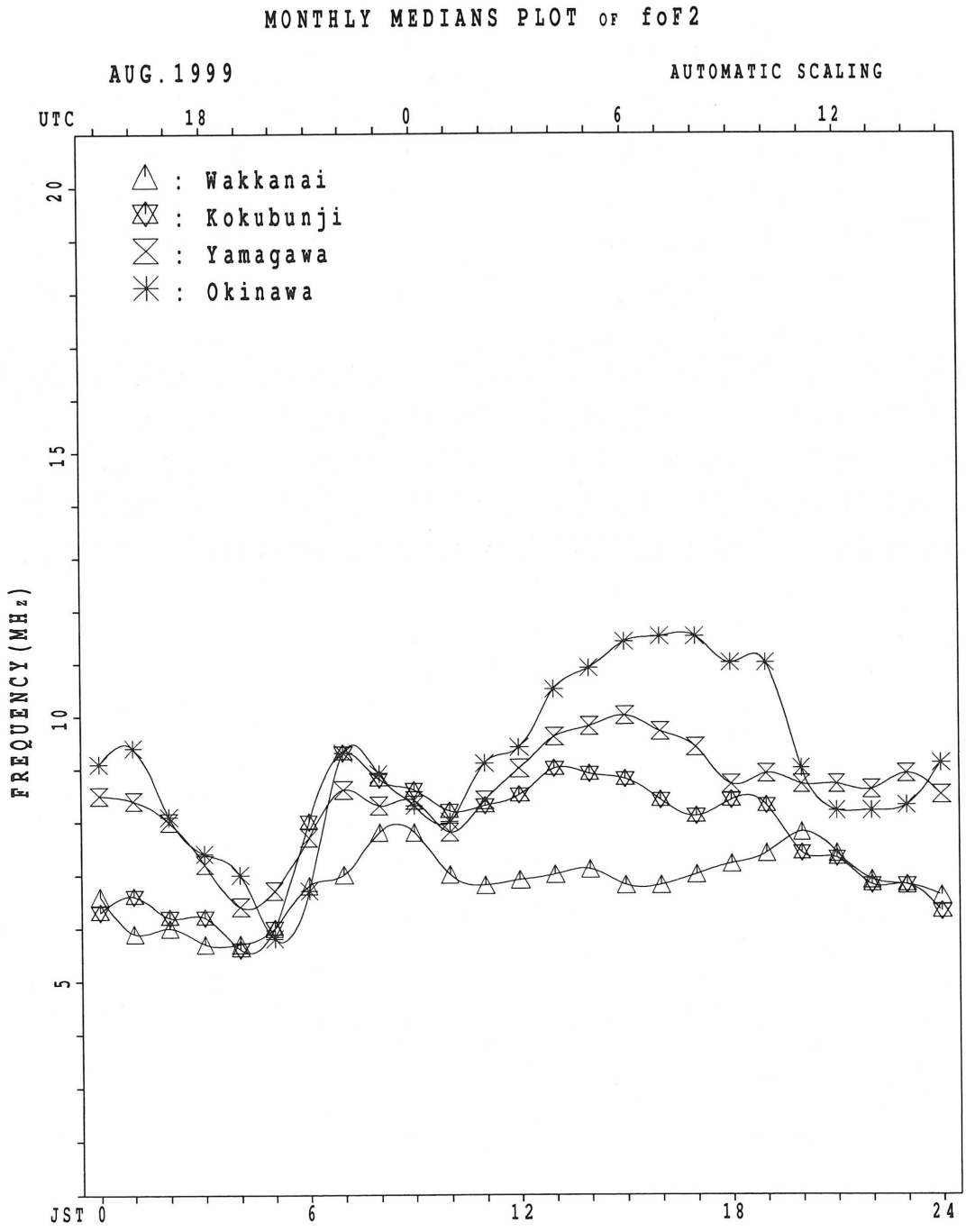
AUG. 1999 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	20	16	18	15	6	11	26	24	19							27	28	28	24	26	20	17	19
MED	336	334	299	315	316	283	280	253	248	262							312	297	279	269	286	308	332	344
U Q	352	354	339	348	354	302	292	266	263	296							328	315	291	286	308	331	343	374
L Q	317	300	279	294	280	278	264	234	243	254							302	290	268	252	264	286	307	320

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	17	14	21	18	14	16	16	19	18	20	16	14	13	15	12	15	15	21	29	26	21	20	13	20
MED	99	97	99	99	102	101	104	109	110	106	111	106	109	111	122	105	119	113	107	97	97	97	103	98
U Q	103	103	103	103	109	103	110	113	113	111	113	109	123	119	136	121	125	119	111	105	104	103	105	105
L Q	95	93	95	95	97	98	100	101	105	103	108	105	104	103	111	97	107	104	101	91	95	95	97	96


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

IONOSPHERIC DATA STATION Kokubunji

AUG. 1999 fxI (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	O X 91	X 84	X 79	X 70	X 61															X 85	X 82	X 84	X 87	X 82
2	X 84	X 86	87	X 82	75															X 104	X 96	X 89	X 88	97
3	100	93	90	X 91	92	94	107	111												X 101	X 96	X 92	X 94	X 93
4	X 89	X 87	X 86	X 76	X 72															X 97	X 81	X 80	X 83	X 87
5	X 85	X 82	X 75	X 74	X 71															X 89	X 92	X 94	X 94	X 92
6	X 90	90	X 87	X 90	X 87															X 86	X 83	X 81	O X 85	X 87
7	X 76	X 76	X 68	X 69	X 65															X 77	X 82	X 88	X 87	X 90
8	X 76	X 74	X 70	X 73	X 67															X 87	X 76	X 80	X 76	X 74
9	X 74	X 74	X 75	X 67	X 65															X 96	X 96	X 92	X 80	X 81
10	O X 79	X 75	X 72	X 71	X 69															X 88	X 90	76	X 69	X 60
11	X 59	X 57	X 55	X 55	X 54															X 88	X 80	X 80	X 74	X 72
12	68	69	72	62	62	71														X 100	X 99	X 89	X 84	X 68
13	X 62	X 62	62	X 58	58															X 98	X 80	X 79	X 81	X 81
14	X 77	X 74	X 70	X 68	X 65															X 92	X 90	X 86	X 83	X 78
15	X 78	X 77	X 78	X 69	X 62															X 101	X 88	X 84	X 78	75
16	69	74	72	X 71	70	65														X 92	X 98	X 84	X 78	76
17	X 68	X 66	X 70	X 66	X 53	56														X 72	X 76	X 72	X 74	X 60
18	X 60	X 61	X 64	X 56	54	54						Y								X 63	X 68	X 66	X 69	X 68
19	X 66	X 61	63	57	X 53					Y										A	X 62	X 57	X 59	X 60
20	X 57	X 56	X 54	X 55	X 52															X 69	X 65	X 65	X 61	X 61
21	X 66	X 53	X 54	X 52	X 49															X 72	X 67	X 62	58	60
22	61	58	57	X 56	X 55															X 84	X 85	X 83	X 69	X 62
23	X 61	X 62	X 60	X 58	X 56															X 74	X 74	X 68	X 68	X 65
24	X 64	X 66	X 59	X 58	X 57															X 80	X 74	X 73	X 74	X 74
25	X 74	X 71	X 70	X 62	X 61															X 85	X 77	X 71	X 74	X 74
26	X 71	X 73	X 71	X 71	X 62															X 98	X 81	X 77	73	72
27	65	68	67	X 63	X 65															X 90	X 81	X 75	A	X 78
28	X 70	X 70	X 69	X 72	X 66															X 100	O X 77	X 80	X 82	X 80
29	X 79	X 76	A	72	X 70															X 98	X 91	X 88	X 84	X 85
30	X 85	X 87	X 86	X 82	X 68															X 103	X 84	X 72	X 73	X 78
31	X 76	X 74	X 69	X 66	X 64															X 87	X 77	X 76	X 79	X 69
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	31	31	5	1	1												30	31	31	30	31
MED	X 74	X 74	X 70	X 68	X 64	65	107	111												X 88	X 81	X 80	X 78	X 75
U Q	X 79	X 77	X 75	X 72	X 69	82														X 98	X 90	X 86	X 84	X 82
L Q	X 65	X 62	X 63	X 58	X 56	55														X 84	X 76	X 72	X 73	X 68

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

IONOSPHERIC DATA STATION Kokubunji

AUG. 1999 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	U R 85	78	73	64	55	59	72	82	87	82	83	84	84	86	84	85	87	81	81	79	76	78	R 81	76
2	77	80	F 78	76	F 67	64	87	98	98	94	R 92	97	101	100	103	102	104	100	98	98	90	83	82	F 89
3	F 88	F 82	F 83	85	F 84	F 85	F 98	F 102	94	87	91	84	92	90	85	A	A	86	92	95	90	86	88	87
4	83	81	80	70	66	66	85	101	92	86	88	87	88	R 92	86	R 88	90	86	84	91	R 75	74	77	81
5	79	76	69	68	65	70	87	R 99	103	92	93	92	R 98	93	95	93	94	84	79	83	86	88	88	86
6	84	82	81	84	81	78	90	102	97	99	U R 92	104	104	104	104	96	88	81	78	80	77	75	U R 79	81
7	70	70	R 62	63	59	61	78	V 83	86	92	86	78	84	100	104	95	86	J R 81	71	71	R 76	82	R 81	84
8	70	68	64	67	61	61	85	92	98	87	82	86	92	86	R 77	76	79	77	82	81	70	74	70	68
9	68	68	69	61	59	61	81	86	88	87	90	82	80	86	86	88	U R 77	73	76	90	90	86	74	75
10	Z 73	69	66	65	63	67	67	66	58	59	A	A	72	74	A	72	A	A	A	82	84	F 67	63	54
11	53	51	49	49	48	52	72	92	U R 90	62	62	72	84	A	84	92	81	78	83	82	74	74	68	65
12	J R 61	F 62	F 63	F 55	F 55	F 62	77	74	59	73	74	76	A	R 80	78	73	72	77	85	94	93	84	78	62
13	56	56	F 55	52	F 50	58	66	78	97	84	A	82	91	100	100	85	78	85	95	92	74	73	75	75
14	71	68	R 64	62	59	58	77	89	73	73	78	80	85	81	80	87	82	R 77	A	86	84	80	77	72
15	72	71	72	63	56	58	71	84	88	82	99	96	92	94	100	98	97	92	87	95	82	78	72	F 69
16	62	F 67	F 64	65	F 62	F 58	70	76	78	80	A	82	87	88	A	86	78	76	75	86	92	78	72	F 69
17	62	60	64	60	47	F 48	56	A	72	A	A	A	U R 63	U R 62	69	57	59	60	62	66	70	66	68	54
18	54	55	58	50	F 47	F 46	48	55	57	R 56	51	Y	E G 49	R 58	U R 52	R 62	65	61	57	57	62	60	63	62
19	60	55	56	F 49	47	39	57	57	A	Y	A	A	A	A	R 60	64	59	R 63	67	A	57	51	52	53
20	51	50	48	49	46	44	54	54	U R 54	63	69	75	70	71	R 78	78	88	81	78	63	59	59	55	55
21	V 60	47	48	47	43	40	56	57	Y	60	Y	U R 58	U R 60	57	U R 59	R 62	66	70	71	66	61	56	F 50	F 52
22	F 53	F 51	F 50	50	49	49	65	77	92	87	83	86	86	83	89	79	70	72	75	78	78	77	63	56
23	55	56	54	52	50	49	52	R 64	71	R 62	57	U R 61	68	E G 55	74	74	75	76	74	68	68	63	62	59
24	58	60	53	52	51	50	60	65	55	R 59	R 73	74	81	73	76	74	68	69	69	74	68	67	68	68
25	68	65	64	56	55	54	83	108	98	99	99	R 80	83	74	74	80	78	78	78	79	71	65	R 68	68
26	65	67	65	65	56	58	80	90	89	71	R 74	85	90	86	89	A	92	90	98	92	75	71	67	F 65
27	F 58	F 60	F 59	57	59	59	79	92	82	90	86	85	84	86	90	R 94	94	92	88	84	75	69	A	72
28	64	64	63	66	60	65	79	96	V 96	94	89	86	90	92	97	97	90	88	96	94	U R 71	74	76	R 74
29	73	70	A	F 65	64	64	85	95	106	106	105	104	107	105	106	97	90	88	92	92	86	82	R 78	79
30	U R 78	81	80	76	62	60	85	78	72	74	R 79	89	97	93	89	91	89	90	102	97	80	66	67	72
31	70	68	63	60	58	53	62	80	84	94	84	90	98	96	94	90	87	85	90	81	71	70	73	64
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	31	31	31	31	30	29	29	25	27	29	29	29	29	29	30	29	30	31	31	30	31
MED	68	67	64	62	58	58	77	84	88	84	84	84	86	86	86	86	82	81	81	82	75	74	72	69
U Q	73	71	69	66	62	64	85	95	96	92	92	89	92	94	96	94	90	86	91	92	84	80	78	76
L Q	58	56	56	52	50	50	62	74	72	67	74	78	80	74	76	74	74	76	74	78	70	66	67	62

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

IONOSPHERIC DATA STATION Kokubunji

AUG. 1999 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							L	L	U L 556	536	U A 540	L 612	580	L 596	L 568	560	L	U L 472	L					
2							L	L	A	A	L	A	R 580	R 580	580	548	U A 508	A	A					
3							L	L	U L 552	548	L	L	U R 584	A	A	A	A	L	A					
4							L	L	L	L	L 552	U L 680	U L 632	U L 580	560	B	U L 516	L	L					
5							L		L	U L 548	L 560	U L 584	A	U R 608	A	560	U L 544	L						
6								L	A	U A 484	A	A	A	A	A	L	L 504	L						
7									L 500	L 536	A	R 560	556	524	L 560	L 532	L 492	A						
8							L	L 488	A	L 476	U L 572	R 556	556	560	A	U L 532	U L 500	A	A					
9						L		A	A	L 532	L 572	580	540	U Y 568	544	520	U L 484	L 468	L					
10							L 384	L 448	500	A	A	A	A	U A 512	A	U L 512	A	A	A					
11							U L 420	L 444	A	L 472	536	U A 492	520	A	520	L 504	L 484	U L 456	L					
12							L	U L 428	L	L 520	524	L 520	A	A	524	U L 508	L 500	L	L					
13							L	U L 464	468	U A 484	A	U A 496	540	520	520	L 512	L 484	L	A					
14						L	L	U L 440	U L 472	L	L 512	L 560	540	540	L 536	488	A	A	A					
15								L	L	U L 528	524	L 528	L 540	540	528	L 492	L 484	U L 440	L					
16								L	A	L 492	A	A	540	U A 532	A	U A 488	L	A	A					
17							A	A	A	A	A	A	A	R 488	484	R 468	L 464	L	L					
18							L 368	464	460	472	U A 464	Y	U R 488	R 488	A	476	440	L 424	A					
19							348	400	A	Y	A	A	A	A	488	A	U L 468	U L 436	A					
20							384	432	480	468	520	524	L 520	L 556	L 532	U A 500	L 468	L						
21							L		468	496	U R 500	R	A	A	508	L 508	L 484	U L 408	L					
22							L	L	L 500	500	U L 556	568	524	548	512	U L 524	L 480	L	L					
23						L	L	432	464	L 504	L 528	Y 516	A	548	532	A	U L 488	L						
24						240	L 368	432	500	U L 540	548	L 548	R 560	U L 572	L 556	A	A	A						
25								L	L 600	U L 568	524	L	R 540	R	L 544	520	L	L						
26							L	L	A	U L 508	U L 608	A	A	U L 600	A	A	A	L						
27							L	A	L	U L 532	U L 572	B	L 592	L 604	U L 596	L	A	A	A					
28								L	L	L 500	B		U L 576	A	U L 608	L	L	A						
29								L	L	L	U L 656	U L 616	A	U L 688	L 620	L	U L 564							
30						L	L	U L 452	U L 500		U L 612	U L 616	L	L 620	U L 624	L 580	L	L						
31						L	L	L	A	L	L	592	L	L 600	576	L		L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	6	12	14	22	20	18	19	23	23	20	19	7						
MED						240	L 376	L 442	500	L 506	544	560	540	560	L 544	512	L 484	U L 440						
U Q							L 384	L 458	U L 500	L 536	U L 572	U L 592	580	L 600	L 576	532	U L 504	L 468						
L Q							368	432	468	484	524	524	540	532	520	496	L 480	L 424						

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

IONOSPHERIC DATA STATION Kokubunji

AUG. 1999 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						A	A	A	A	A	A	A	A	R 408	396	A	A	296	212					
2						A	A	A	A	A	A	A	A	R	A	R 376	R 364	296	A					
3						A	A	A	368	A	U A 392	R	B	B	A	A	A	A	A					
4						A	A	A	A	A	U R 404	A	A	A	A	B	360	304	240					
5						A	A	316	U A 360	A	B	A	A	A	A	384	356	276	A					
6						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
7						A	240	A	A	A	A	A	A	A	A	R 348	324	284	A					
8						160	256	A	A	U A 364	A	A	R	A	A	A	A	A	A					
9						B	A	A	A	A	U R 380	R 396	B	A	U A 372	U A 360	324	268	A					
10						B	A	U A 292	U A 328	A	U A 372	A	A	A	A	A	332	280	U A 180					
11						B	A	328	A	A	A	A	A	A	A	A	A	320	272	U A 192					
12						B	232	A	A	R	R	R	A	A	R	A	324	284	A					
13						B	A	A	A	A	A	A	A	A	A	A	A	A	A					
14						B	216	A	A	A	A	A	A	R	A	R 376	324	280	A					
15						B	A	A	U A 332	A	A	A	A	A	A	R	292	272	A					
16						B	208	280	328	A	A	A	A	A	A	A	U A 328	A	A					
17						A	224	280	324	A	A	U A 380	R 408	U A 380	R	356	328	A 276	A					
18						B	A 232	288	312	A	A	R 376	R 380	A	372	U R 344	316	268	A					
19						B	236	288	A 328	R	A	U A 376	A	A	A	A	A 320	A 260	A					
20						B	236	288	332	U R 356	R	B	R	380	R 368	344	320	280	A					
21						B	244	308	344	R	A	U R 384	A	400	R	R	324	280	A					
22						B	A	292	332	356	U R 384	U R 392	R	R	U R 368	352	A	260	A 168					
23						B	228	296	336	360	U R 372	A	A	A	R	360	R 332	276	A					
24						B	A	304	U A 332	A 356	U R 388	A	R	A	A	380	340	280	A					
25						B	A	A	U A 324	A	R 388	A	R	R	R	364	A	A	B					
26						B	R 244	U A 300	A	A	A	A	A	A	A	A	A	272	B					
27						B	A	U A 284	A	A	A	B	A	R	A	R	336	272	A					
28						B	224	A 284	A	U A 344	B	B	A	A	A	R	340	U A 288	A					
29						B	244	A	A	A	A	R	A	A	A	356	320	R 272	A					
30						B	228	A 280	A	A	A	A	A	A	U A 380	364	332	U A 276	A					
31						B	A 240	292	U A 340	A	A	A	R	A	A	A	A	268	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	16	17	15	6	8	6	2	4	6	14	22	25	5					
MED						160	234	292	332	356	U R 386	U R 382	R 394	390	372	360	326	276	A 192					
U Q							242	302	340	360	U R 390	R 392		404	380	376	336	282	226					
L Q							226	A 284	328	356	U R 376	376		380	R 368	352	320	272	A 174					

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

IONOSPHERIC DATA STATION Kokubunji

AUG. 1999 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	JA 131	26	JA 25	JA 21	25	JA 33	JA 42	JA 39	JA 52	44	72	JA 61	JA 46	48	48	45	36	38	33	JA 29	EB 14	JA 50	JA 55	JA 70
2	JA 80	JA 80	JA 27	EB 13	25	JA 23	JA 36	46	JA 66	60	JA 59	88	54	G 37	47	G	JA 54	90	JA 66	67	JA 51	JA 64	JA 73	JA 52
3	JA 61	JA 40	JA 30	JA 48	JA 35	JA 30	33	40	JA 48	JA 48	JA 62	54	49	66	JA 149	JA 119	JA 145	JA 149	JA 98	JA 55	JA 59	JA 34	JA 28	JA 48
4	61	JA 27	JA 22	JA 27	JA 27	JA 35	34	JA 47	JA 48	JA 45	G	58	JA 53	52	JA 53	EB 79	42	JA 39	JA 35	22	22	JA 62	JA 49	JA 76
5	JA 106	30	JA 22	JA 20	21	23	JA 31	JA 51	52	JA 146	EB 40	JA 99	JA 118	47	JA 87	JA 96	JA 48	JA 64	JA 41	JA 102	JA 49	JA 52	JA 47	JA 44
6	JA 45	JA 26	JA 27	JA 29	EB 13	JA 24	JA 34	JA 42	JA 67	54	82	JA 80	86	JA 86	68	JA 52	JA 40	JA 51	JA 47	JA 32	JA 26	30	28	JA 36
7	JA 33	JA 33	JA 25	JA 22	EB 13	29	JA 27	34	JA 42	JA 52	81	46	56	44	44	G 29	JA 47	JA 82	JA 34	JA 46	JA 56	35	32	JA 53
8	JA 35	JA 34	JA 41	JA 28	JA 21	G	31	JA 53	57	41	JA 48	42	G 39	47	66	JA 84	54	82	JA 73	JA 48	32	22	21	27
9	JA 27	JA 24	22	18	EB 15	JA 21	JA 32	JA 67	166	JA 44	G	G	EB 42	53	48	JA 44	38	30	JA 46	JA 28	JA 52	JA 47	JA 55	34
10	JA 29	25	JA 27	JA 20	20	JA 54	JA 42	JA 38	JA 43	55	86	JA 92	JA 68	56	JA 82	JA 49	88	104	96	72	JA 20	JA 48	JA 101	28
11	JA 24	JA 31	JA 26	JA 26	JA 39	JA 54	JA 46	JA 53	JA 114	JA 62	JA 51	JA 50	JA 52	JA 110	43	JA 50	38	34	JA 45	JA 35	20	22	JA 88	JA 47
12	JA 51	JA 32	JA 56	JA 33	22	JA 23	G 21	30	35	G 35	G 38	G 36	77	63	G 36	JA 48	JA 43	JA 63	JA 38	JA 40	JA 52	JA 55	JA 67	JA 79
13	JA 27	JA 24	27	JA 39	JA 22	EB 15	JA 31	JA 38	JA 53	JA 62	82	JA 53	42	JA 45	43	41	JA 55	JA 49	JA 54	JA 82	JA 38	JA 31	33	JA 32
14	JA 26	EB 15	EB 15	JA 30	EB 14	JA 18	JA 26	32	JA 41	JA 52	JA 43	44	JA 47	G 37	JA 53	41	JA 60	60	90	JA 140	JA 30	JA 49	JA 25	27
15	24	JA 24	JA 26	24	EB 15	JA 20	JA 26	JA 39	JA 52	JA 48	JA 53	JA 49	JA 50	48	41	G 33	35	32	JA 24	JA 21	JA 37	JA 48	JA 46	60
16	JA 80	JA 51	JA 36	JA 35	22	20	25	JA 36	JA 50	JA 50	75	JA 82	JA 50	JA 64	JA 127	JA 66	JA 54	52	88	JA 49	JA 29	JA 73	JA 73	JA 45
17	JA 24	JA 19	JA 28	JA 22	JA 23	JA 40	JA 94	85	JA 76	87	JA 95	79	JA 52	42	G	JA 49	G	JA 40	JA 30	JA 31	24	19	EB 15	EB 14
18	EB 14	EB 15	EB 14	EB 15	JA 20	JA 28	JA 33	JA 36	37	44	JA 51	45	G	46	44	G	G	JA 36	JA 30	JA 45	JA 46	JA 31	JA 27	JA 24
19	JA 26	JA 26	JA 42	22	JA 23	JA 30	JA 30	35	52	G	58	84	JA 84	JA 119	JA 45	JA 60	JA 44	35	53	JA 77	28	20	32	JA 32
20	21	JA 20	JA 23	JA 27	18	21	G	G 27	G 30	G 33	GEB	39	G 38	43	44	JA 53	JA 44	JA 36	JA 66	32	JA 26	EB 14	EB 15	EB 14
21	JA 27	19	20	JA 23	JA 14	JA 20	G 21	36	JA 51	44	JA 50	G	JA 119	JA 51	G	G	JA 53	JA 49	JA 28	26	JA 21	JA 52	JA 44	35
22	JA 34	JA 54	JA 41	JA 25	JA 28	JA 24	JA 25	G 26	36	38	G	G 30	G 30	G	G	38	34	27	JA 26	JA 21	EB 14	EB 14	25	JA 24
23	EB 13	JA 23	23	JA 22	23	24	25	JA 40	JA 44	JA 46	40	45	65	39	G	JA 55	37	J 34	JA 25	JA 28	EB 14	22	40	JA 78
24	JA 50	JA 45	JA 30	JA 34	23	27	JA 28	JA 35	JA 43	43	G	52	G 36	JA 63	41	JA 55	JA 55	JA 46	JA 32	60	JA 98	JA 50	JA 52	JA 31
25	JA 64	JA 54	JA 46	JA 49	JA 37	JA 32	JA 62	JA 50	JA 42	41	44	45	G	G	G	40	JA 72	JA 52	JA 41	JA 45	28	JA 30	40	24
26	EB 15	JA 22	JA 22	22	EB 17	EB 16	28	36	JA 119	JA 54	JA 50	82	JA 84	JA 51	JA 64	124	84	30	EB 19	EB 15	EB 14	JA 30	JA 29	JA 52
27	JA 60	JA 46	JA 18	EB 14	EB 14	JA 20	JA 34	JA 50	JA 53	JA 44	46	EB 61	40	G 36	41	G 32	68	JA 60	67	JA 86	JA 30	JA 36	JA 83	JA 31
28	JA 28	24	JA 21	20	19	EB 14	JA 30	JA 45	JA 41	JA 45	EB 77	45	45	JA 64	JA 49	G	JA 46	JA 60	56	84	JA 46	32	34	28
29	JA 65	JA 75	JA 105	JA 28	36	32	G 20	36	38	JA 51	55	G 36	66	48	51	G 30	G 31	JA 32	JA 22	JA 22	JA 50	JA 24	JA 32	33
30	JA 61	JA 46	JA 27	JA 29	29	JA 22	G 20	34	JA 41	54	JA 51	57	JA 52	43	43	40	JA 48	JA 37	JA 65	JA 38	29	29	JA 43	JA 98
31	JA 27	24	22	JA 28	JA 25	JA 26	JA 38	JA 39	63	JA 64	42	42	42	42	45	39	33	JA 32	JA 29	JA 44	JA 21	27	JA 23	JA 38
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	JA 33	JA 26	JA 26	JA 25	22	JA 24	JA 31	JA 39	JA 50	JA 48	50	50	50	48	45	44	JA 46	JA 46	JA 41	JA 44	JA 29	JA 32	JA 40	JA 35
U Q	JA 61	JA 45	JA 30	JA 29	JA 25	JA 30	JA 34	JA 47	JA 57	JA 54	72	79	JA 66	JA 63	JA 53	JA 55	JA 55	JA 60	66	JA 67	JA 49	JA 50	JA 55	JA 52
L Q	26	24	22	21	EB 17	20	G 25	35	41	44	G 40	G 42	G 42	G 42	G 41	G	37	34	JA 30	JA 28	21	24	28	28

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

IONOSPHERIC DATA STATION Kokubunji

AUG.1999 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	78	17	19	18	18	20	31	35	43	42	54	52	43	47	46	41	34	G 24	G 17	20	E B 14	27	49	30
2	46	46	14	E B 13	E B 14	20	30	39	48	58	50	75	49	U G 37	45	G	51	87	56	58	44	35	48	41
3	40	23	23	25	26	23	27	34	45	48	56	U Y 54	U Y 48	62	61	A A 119	A A 145	34	58	44	47	23	20	21
4	20	E B 14	16	18	20	21	28	38	40	40	G	52	46	48	48	E B 79	40	36	30	17	17	25	38	43
5	45	18	E B 15	18	E B 14	18	29	46	48	46	E B 40	52	81	45	63	48	46	32	33	20	19	28	E B 14	23
6	24	19	22	21	E B 13	18	26	38	61	48	64	71	77	65	62	46	34	35	24	18	22	21	20	18
7	25	28	18	18	E B 13	19	G 19	33	39	43	77	U Y 46	48	43	42	G 28	36	47	22	30	30	32	21	37
8	22	27	35	25	18	G	29	36	46	40	47	U Y 42	U G 39	40	65	44	45	64	63	22	23	E B 14	E B 14	20
9	20	18	14	E B 14	E B 15	17	27	45	47	41	G	G	E B 42	U Y 52	42	42	37	28	30	20	38	19	33	23
10	19	18	22	16	E B 14	18	24	33	39	51	A A 86	A A 92	62	51	A A 82	45	A A 88	A A 104	A A 96	66	E B 14	E B 12	20	18
11	16	25	19	19	17	18	25	G 26	65	40	43	49	47	A A 110	42	41	36	30	22	18	E B 14	E B 14	E B 13	18
12	26	22	34	21	E B 14	E B 14	G 20	29	34	U G 35	U G 38	U G 36	A A 77	56	U G 36	40	40	41	30	29	E B 14	24	33	34
13	18	18	18	24	18	E B 15	25	34	40	48	A A 82	50	42	42	41	38	40	33	42	42	32	24	21	21
14	21	E B 15	E B 15	E B 13	E B 14	E B 14	25	30	36	42	40	43	44	U G 37	48	40	56	51	A A 90	41	18	20	20	19
15	E B 14	E B 15	22	E B 15	E B 15	17	23	33	44	43	43	42	46	43	40	U G 33	G 26	G 20	21	E B 15	22	20	28	38
16	34	27	24	23	E B 13	E B 14	24	34	47	46	A A 75	62	43	53	A A 127	49	42	43	67	42	25	44	46	21
17	18	E B 14	21	19	E B 13	29	42	A A 85	62	A A 87	A A 95	A A 79	50	40	G	41	G	37	24	26	18	E B 13	E B 15	E B 14
18	E B 14	E B 15	E B 14	E B 15	18	21	32	33	36	42	46	U Y 45	G	45	U Y 44	G	G	33	26	18	26	20	20	18
19	16	E B 14	20	E B 14	18	21	25	33	A A 52	G	A A 58	A A 84	A A 84	A A 119	42	50	38	30	41	A A 77	20	E B 15	17	E B 15
20	E B 14	E B 14	E B 14	19	16	E B 14	G	G 26	G 29	G 32	G	E B 39	U G 38	42	43	50	35	35	22	30	20	E B 14	E B 15	E B 14
21	20	E B 14	E B 14	14	E B 13	18	G 19	32	43	42	44	G	55	50	G	G	36	33	21	E B 14	E B 14	25	34	22
22	18	16	25	20	20	E B 14	24	G 24	35	38	G	G 30	U G 30	G	G	37	33	G 23	20	E B 14	E B 14	E B 14	E B 14	18
23	E B 13	18	E B 14	17	20	18	25	38	41	42	U Y 40	U Y 45	65	39	G	52	35	32	20	17	E B 14	E B 14	30	43
24	36	17	16	20	E B 14	18	26	34	40	41	G	43	G 35	52	U Y 41	53	49	44	21	55	41	39	41	20
25	34	42	32	42	22	25	37	35	40	40	44	43	G	G	G	40	39	28	22	21	18	26	28	E B 16
26	E B 15	18	20	E B 14	E B E B 17	E B 16	27	34	50	44	45	72	63	49	61	A A 124	62	G 21	E B 19	E B 15	E B 14	24	24	29
27	41	25	E B E B 15	E B 14	E B 14	18	26	46	38	43	45	E B 61	U Y 40	U G 36	U Y 41	U G 32	62	49	62	20	E B 16	21	A A 83	22
28	22	E B 14	E B E B 14	E B 13	E B E B 14	E B E B 14	24	37	40	43	E B 77	U Y 44	44	62	47	G	42	54	49	82	32	20	19	18
29	24	43	A A 105	E B 12	20	24	G 17	34	37	45	44	U G 36	59	46	42	G 28	G 27	31	20	E B 15	40	22	29	24
30	21	26	24	22	23	17	G 17	31	41	46	46	50	46	42	41	38	43	35	54	32	19	21	32	44
31	22	17	E B 15	24	20	18	34	34	60	47	40	U Y 42	42	41	41	U Y 39	33	30	19	40	18	20	21	30
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	21	18	19	18	E B 16	18	25	34	41	43	44	46	46	45	42	40	39	34	26	22	19	21	21	21
U Q	34	25	23	21	20	20	29	38	48	46	A A 58	61	59	52	48	49	46	44	54	42	30	25	33	30
L Q	E B 18	E B 15	E B 15	E B 14	E B 14	E B 16	G 24	33	39	40	G 40	G 42	G 42	G 40	G 41	G	34	30	21	E B 18	E B 14	E B 15	E B 19	18

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

IONOSPHERIC DATA STATION Kokubunji

AUG. 1999 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	16	14	14	15	16	16	21	24	21	16	28	33	22	21	21	14	13	15	14	14	15	15
2	15	14	13	13	14	14	15	18	20	24	34	32	36	34	25	18	17	18	17	15	15	15	16	15
3	14	14	14	14	14	13	13	22	19	22	26	27	42	44	37	18	19	16	14	14	15	15	15	14
4	14	14	14	14	14	15	16	18	21	18	28	30	32	37	26	79	20	18	13	14	13	14	14	14
5	15	14	15	15	14	14	15	18	16	17	40	26	22	21	20	17	17	14	14	15	14	15	14	14
6	14	15	15	15	13	14	16	18	27	26	25	38	41	37	30	21	19	15	14	15	14	15	14	13
7	16	14	14	13	13	15	16	19	25	30	40	38	34	26	26	21	15	14	12	16	14	14	14	15
8	14	14	14	14	15	14	16	16	16	22	32	24	36	27	32	20	16	15	13	14	14	14	14	15
9	14	14	14	14	15	14	15	14	14	20	21	23	42	27	22	20	18	14	14	16	15	15	15	14
10	14	14	14	13	14	16	14	14	16	20	22	28	21	18	20	18	16	12	13	14	14	12	13	15
11	13	16	14	15	14	15	15	14	17	20	26	24	30	26	24	17	18	16	14	16	14	14	13	15
12	16	14	14	14	14	14	16	14	17	20	24	31	27	23	23	20	18	14	14	17	14	14	15	15
13	14	14	13	14	14	15	14	16	18	20	22	30	29	27	19	19	16	14	15	14	15	15	14	15
14	14	15	15	13	14	14	13	15	17	21	28	28	27	25	25	20	14	15	13	16	15	15	14	14
15	14	15	14	15	15	15	14	15	14	18	15	23	20	22	20	18	16	14	15	15	14	15	16	15
16	14	15	15	14	13	14	14	15	18	21	26	26	22	35	21	20	18	17	12	14	14	14	15	15
17	15	14	15	14	13	14	14	12	17	16	16	20	22	22	20	16	20	13	15	15	15	13	15	14
18	14	15	14	15	14	14	16	15	17	27	22	20	20	27	21	18	19	16	13	14	15	15	16	14
19	15	14	14	14	13	14	14	14	20	32	29	28	29	26	20	17	17	14	15	15	15	15	14	15
20	14	14	14	15	16	14	16	16	19	20	29	39	32	24	18	19	16	15	14	15	14	14	15	14
21	14	14	14	14	13	15	14	16	20	25	37	31	32	27	21	20	15	16	14	14	14	14	14	16
22	15	14	14	14	15	14	14	16	16	20	22	23	21	26	22	20	20	14	12	14	14	14	14	13
23	13	14	14	14	13	14	14	15	18	18	20	23	22	21	21	22	17	15	14	14	14	14	15	14
24	16	14	14	15	R 14	14	16	16	15	20	26	24	29	24	20	20	18	15	18	14	15	14	14	15
25	16	15	13	15	17	15	14	14	15	20	23	37	26	27	28	21	15	15	20	18	15	14	15	16
26	15	13	14	14	17	16	15	17	19	24	26	34	36	30	23	20	15	16	19	15	14	15	14	14
27	16	15	15	14	14	15	14	14	18	22	26	61	36	30	28	26	20	15	13	16	16	15	15	15
28	15	14	14	13	14	14	14	16	14	21	77	39	32	37	21	22	20	15	14	15	16	15	15	16
29	15	16	15	12	14	16	14	16	18	22	25	28	22	22	22	17	16	16	15	15	14	14	15	15
30	15	15	14	14	15	14	14	15	20	26	23	37	34	33	25	24	19	15	14	15	14	15	15	14
31	16	14	15	14	14	14	14	20	18	20	37	R 36	31	25	17	26	17	16	14	16	15	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	14	14	14	14	14	14	16	18	21	26	28	29	27	22	20	17	15	14	15	14	14	15	15
U Q	15	15	15	15	15	15	16	17	20	24	29	36	34	33	25	21	19	16	15	16	15	15	15	15
L Q	14	14	14	14	14	14	14	14	16	20	22	24	22	24	20	18	16	14	13	14	14	14	14	14

IONOSPHERIC DATA STATION Kokubunji

AUG. 1999 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	U R 287	279	295	281	269	282	303	295	298	282	281	295	273	273	281	278	281	291	300	288	277	261	R 268	271
2	253	282	F 268	289	F 290	283	283	296	288	276	R 285	267	267	266	270	268	278	281	291	288	280	277	261	F 276
3	F 297	F 272	F 280	272	F 267	F 277	F 315	F 311	304	288	274	279	277	283	267	A	A	277	292	288	291	273	269	272
4	265	272	293	280	286	278	291	305	302	302	290	267	262	R 278	281	R 281	279	281	280	296	R 301	258	250	277
5	271	279	292	277	278	285	296	R 299	295	291	287	274	R 278	270	288	282	305	300	291	277	264	265	268	271
6	273	260	274	286	288	277	281	282	281	279	U R 270	263	275	271	286	281	295	301	281	281	273	266	U R 264	283
7	267	268	R 276	269	243	269	275	V 272	283	294	A 311	279	259	280	285	294	298	J R 287	294	272	R 255	253	R 280	283
8	270	270	271	289	281	269	296	312	297	306	285	279	297	300	R 295	291	297	312	293	304	270	272	271	276
9	273	270	291	280	270	264	290	294	291	286	288	282	281	285	294	304	U R 301	285	272	283	290	298	260	272
10	Z 282	286	284	276	284	285	292	304	281	259	A	A	283	292	A	314	A	A	A	294	300	F 296	276	290
11	273	269	266	270	275	280	303	324	U R 271	338	251	275	287	A	282	302	307	294	308	311	288	287	271	284
12	R	F 275	F 270	F 265	F 289	F 298	322	343	353	304	310	295	A	R 291	296	294	301	285	277	287	299	289	294	294
13	274	291	F 297	294	F 300	312	294	293	315	325	A	285	287	293	303	300	294	297	301	321	269	271	267	275
14	279	280	R 297	282	280	282	309	338	346	289	291	285	305	291	295	306	323	R 303	A	293	288	284	283	273
15	268	279	294	300	291	284	316	305	320	292	296	292	283	289	291	297	301	317	301	306	296	298	273	F 276
16	268	F 279	F 290	278	F 286	F 281	320	322	327	325	A	291	291	299	A	302	300	300	A 287	279	296	278	283	F 294
17	268	262	275	275	269	F 263	266	A	288	A	A	A	U R 265	U R 282	305	294	276	296	293	287	273	286	298	273
18	257	266	280	287	F 304	F 287	289	266	271	R 296	247	Y	G	R 272	U R 274	R 277	304	307	304	290	265	259	272	272
19	278	265	270	F 254	267	247	281	304	A	Y	A	A	A	A	R 288	304	298	R 291	306	A	286	270	258	276
20	277	284	265	277	283	279	297	298	U R 238	308	291	300	305	289	R 289	287	313	312	318	303	262	261	261	259
21	V 292	277	270	286	284	302	292	321	Y	280	Y	U R 298	U R 296	279	U R 290	R 288	295	307	309	306	295	285	F 273	F 283
22	F 279	F 268	F 277	273	268	274	315	289	314	315	294	285	297	292	309	302	302	304	292	284	286	301	279	269
23	265	262	273	273	272	267	266	R 274	310	R 296	237	U R 275	A 268	G	278	300	297	298	301	294	278	272	263	256
24	250	265	245	254	239	249	276	319	298	R 289	R 290	313	308	282	289	312	322	307	290	289	286	266	262	264
25	277	258	274	266	268	271	285	330	292	305	305	R 283	286	289	285	295	295	300	297	302	281	265	R 275	270
26	277	270	274	287	271	286	327	330	343	316	R 271	284	278	284	279	A	295	293	300	314	284	283	268	F 265
27	F 261	F 261	F 263	276	279	286	317	334	299	294	309	291	291	282	286	R 294	297	303	297	293	290	269	A	272
28	255	261	268	284	288	279	309	334	V 315	321	303	289	282	279	287	291	295	290	303	307	U R 301	251	263	R 265
29	256	280	A	F 284	278	283	321	309	318	299	285	286	279	271	284	289	290	292	284	294	288	274	R 280	270
30	U R 270	272	282	301	273	262	314	326	317	292	R 272	284	283	282	281	291	287	293	290	299	301	266	260	282
31	271	265	255	261	242	250	263	310	306	339	282	284	288	292	296	291	291	290	303	284	267	263	274	278
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	31	31	31	31	30	29	29	25	27	29	29	29	29	29	30	29	30	31	31	30	31
MED	271	270	274	278	278	279	296	307	299	296	287	284	283	282	287	294	297	296	294	293	286	272	270	273
U Q	277	279	290	286	F 286	285	315	324	316	312	295	291	291	291	294	302	302	303	302	303	295	285	276	282
L Q	265	265	270	272	269	269	283	295	288	288	273	279	274	276	281	288	292	290	290	287	273	265	263	270

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AUG. 1999 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							L	L	U L 340	372	A	L 338	351	L 341	L 344	345	L	U L 349	L					
2							L	L	A	A	L	A	R 353	R 362	342	338	A	A	A					
3							L	L	U L 357	382	L	L	Y	A	A	A	A	L	A					
4							L	L	L	L	L 377	U L 314	U L 328	A	361	B	U L 341	L	L					
5							L		L	U L 364	L 360	A 339	A	U R 332	A	A 339	A 338	L						
6								L	A	A	A	A	A	A	A	L	L 345	L						
7									L 360	L 348	A	Y 348	383	359	L 331	L 339	L 359	A						
8							L	L 345	A	L 406	A 332	R 342	369	347	A	U L 332	A	A	A					
9						L		A	A	L 347	L 348	348	367	A	348	355	U L 343	L 313	L					
10							L 352	L 343	347	A	A	A	A	A	A	U L 352	A	A	A					
11							U L 352	A	A	L 418	364	A	A	A	355	L 351	L 358	U L 338	L					
12							L	U L 379	L	H 383	355	L 346	A	A	350	U L 333	L 323	L	L					
13							L	U L 354	383	A	A	A	350	365	L 351	L 344	L 339	L	A					
14						L	L	U L 367	U L 386	L	L 379	L 363	353	342	A 343	359	A	A	A					
15								L	L	U L 355	373	L 374	L 362	362	L 350	L 350	L 344	U L 352	L					
16								L	A	A	A	A	349	A	A	A	L	A	A					
17							A	A	A	A	A	A	A	R 374	354	R 372	L 337	L	L					
18							A 348	335	377	377	A	Y	U R 385	A	A	334	343	A 337	A					
19							331	353	A	Y	A	A	A	A	322	A	U L 333	U L 317	A					
20							323	354	359	404	348	340	L 364	L 348	L 349	A	L 355	L						
21							L		A 316	368	U R 366	R	A	A	358	L 334	L 329	U L 361	L					
22							L	L	L 338	379	H 357	355	Y	347	375	U L 349	L 369	L	L					
23						L	L	A 339	375	L 356	356	Y	A	339	337	A	U L 338	L						
24						295	L 337	346	347	U L 347	361	L 358	R 357	A	L 335	A	A	A						
25								L	L 351	U L 365	393	L	R 365	R	Y 321	346	L	L						
26							L	L	A	U L 397	U L 334	A	A	U L 331	A	A	A	L						
27							L	A	L	U L 357	U L 363	B	L 343	L 327	U L 317	L	A	A	A					
28								L	L	L 390	B		U L 354	A	U L 318	L	L	A						
29								L	L	L	U L 354	U L 336	A	U L 315	L 333	L	U L 331							
30						L	L	U L 376	U L 363		U L 338	U L 327	L	L 330	U L 327	L 325	L	L						
31						L	L	L	A	L	L	342	L	L 345	337	L		L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	6	11	14	19	18	15	16	17	23	18	17	7						
MED						295	342	L 353	358	L 372	358	L 342	356	345	343	L 344	L 341	U L 338						
U Q							L 352	U L 367	375	L 390	366	L 355	366	360	351	351	L 350	U L 352						
L Q							331	343	347	L 356	L U 348	U L 338	350	U L 332	L 331	L 334	L 335	L 317						

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AUG. 1999 h'F2 (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							282	292	312	316	364	356	404	396	364	362	344	286	290					
2							304	274	270	308A	346	378A	366	368	370	356	332	A	300A					
3							264	262	296	326	338L	368	374	366	396	A	A	350	316A					
4							292	262	296	316	334	400	400	354	378	404EB	328	338	300					
5							274		274	296	296	362	362A	384	350	338	312	286						
6								308	298A	296	340A	384	360	354	328	318	308	302						
7									302	302	A	334	410	360	332	302	308	286A						
8							298	266	288	272	364	370	336	336	344EA	334	320	320A	A					
9						372L		282	300	330	352	376	376	364	334	320	314	344	320					
10							302	316	428	472	A	A	420	364	A	314	A	A	A					
11							302	272	A	268	500	408	350	A	362	314	296	302	276					
12							262	232	244	336	318	342	A	350	342	334	334	328	314					
13							298	308	290	266	A	354	342	322	304	310	330	300	288					
14						326	274	244	256	294	316	352	318	344	340	324	286	300A	A					
15								248	270	292	314	310	326	332	324	306	304	272	272					
16								272	282	280	A	362	332	326	A	314	314	286	A					
17							412	AE	A 376	A	A	A	464	420	338	386	408	324	308					
18							360	464	436	386	582	Y	G	452	480	412	332	314	296					
19							382	328	A	Y	A	A	A	A	404	346	344	332	292					
20							344	376	610	350	372	344	330	372	338	354	280	270						
21							314		Y	H 354	Y	394	A 392	A 410	418	392	352	296	276					
22							276	322	292	282	334	350	336	350	318	310	316	294	292					
23						366L	370	370	318	364	580	444	A	G	388	322	332	302						
24						424	352	314	402	L 434	384	316	322	L 380	350	312	284	288						
25								252	324	260	322	H 300	H 376	330	374	342	310	292						
26							266	252	252	256	436	A 380	A 342	356	358	A	A 316	304						
27							278	254	296	286	294	334	342	372	344	328	A 312	284	A					
28								274	266	272	EB 360		332	358	336	314	308	A 302						
29								286	270	280	346	330	316	366	336	L 308	326							
30						380	276	256	276		376	344	348	330	366	336	L 318	300						
31						372	430	290	318	266	336	324	314	342	334	320		296						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						6	23	27	28	28	24	26	28	29	29	29	28	28	14					
MED						372	298	274	295	296	344	355	349	360	344	323	316	300	294					
U Q						380	352	314	318	333	374	378	384	376	372	350	332	317	308					
L Q						366	276	256	272	276	328	334	332	343	335	314	308	287	288					

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AUG.1999 h'F (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A						A		A			A	E	A									A	
		276	270	262	306	282	248	236	246	212			294	222	246	240	254	232	244	258	264	270	310	354	310
2	A							A	A		A	E	A	A						A	E	A		A	
	384	322	288	262	262	262	254	244		A		268		250	230	224	238		A		300	290	290	376	336
3					A						A		A					A		A	A	A	A	
	298	322	302	312	308	276	250	242	244	230		A		A	A	A	A		256		272	288	276	278	298
4								A									A		A					A
	306	286	270	256	274	276	246	244	216	216	202	A	220	A	238	B	246	250	278	266	228	326	360	344
5	A								A	A		A	A		A	E	A						A	
	354	286	272	292	288	272	242	254		230	184			256		286	274	240	270	280	304	308	282	294
6									A	A	A	A	A	A	A	A		A						
	322	306	282	276	260	268	242	246									228	242	266	270	276	296	314	290
7										A		A	E	Y				A		A		A		
	314	332	306	334	354	280	254	244	212	248			266	228	230	242	228	224	264	302	358	362	300	308
8			A						A		A				A	E	A	A	A					
	250	322	356	322	278	268	254	228		200		224	208	226		266				270	266	298	276	310
9								A	A					A			E	A		A		A		A
	326	312	286	278	302	282	246			234	230	228	216		222	232	230	224	294	286	292	272	330	292
10										A	A	A	A	A	A	A	A	A	A	A				
	294	296	300	296	288	280	244	242	228												244	236	282	278
11		A						A	A			A	A	A		A								
	308	354	334	318	302	286	240			196	208				238	244	226	240	252	256	248	248	248	286
12			A							H		Y	A	A		A	E	A	E	A			A	A
	336	312	338	330	270	268	230	206	200	184	214	254			224	252	278		292	284	246	266	264	322
13										A	A	A					E	A	A	A				
	318	308	274	308	272	264	232	216	214				228	214	224	216	286	264		258	270	318	298	296
14													H		A					A				
	302	288	258	276	284	284	242	226	216	206	198	200	182	232		228		A	A	280	260	280	266	290
15									A															A
	306	296	270	242	264	258	250	226		238	214	200	228	212	222	234	216	232	258	252	240	266	312	346
16	A								A	A	A	A												
	344	328	308	314	296	274	242	228					224	A	A	A	A	A	A	A	300	272	304	324	286
17						A									Y									
	300	326	322	294	316	356	A	A	A	A	A	A	A	228	246	232	228	A	278	286	290	266	254	258
18							E	A								E	A							
	336	326	290	268	262	296	290	218	202	198	A	Y	228	A	A	284	250	A 266	A	282	336	330	308	284
19						A									E	A								
	280	346	316	326	290	426	258	248	A	Y	A	A	A	A	292	A	242	240	A	A	260	288	358	304
20													Y					A						
	310	294	308	322	306	302	252	240	224	198	240	226	252	234	228	A	238	258	260	236	314	298	328	336
21								A			E	A				E	Y						A	
	284	264	322	284	260	288	272	258	A	236	274	Y	A	A	236	254	254	264	264	258	254	284	368	330
22											H		Y	Y										
	320	320	338	314	326	296	236	224	214	218	198	234		244	216	222	234	248	260	260	256	250	232	294
23							E	A	A		Y	A	A			A		A						A
	326	342	292	316	326	298	266	294	252	242	252			236	224		262	252	264	254	276	310	336	
24	A					A									Y					A	A			
	424	336	364	368	380	362	274	254	236	238	216	224	214	A	260	A	A	A	274	318	316	372	392	304
25		A		A		A	A		H			E	A		Y		A							
	340	376	330		340	326	288	244	214	218	202	262	218	Y	250	232	258	248	268	252	236	326	336	296
26									A			A	A	A	A	A	A							A
	318	318	314	266	286	290	258	238		212	228			246				254	260	244	246	284	302	354
27	A							A				B				Y	A	A	A	262			A	
	424	360	338	298	276	278	246		220	224	208		218	240	232	258					240	280		310
28								A			B	Y		A	A		A	A	A	A				
	338	322	324	276	268	290	246	246	230	216		252	230		268	238	252		284		246	304	330	318
29		A	A							A			A								A			
	350	328		278	260	272	256	234	218	244	212	216		226	216	224	234	252	272	258	276	282	296	304
30										A		A	A				A		A					A
	324	316	296	268	312	318	254	224	214	248	222	252	258	224	244	240	254	256	280	262	244	266	356	352
31							A		A	A														A
	314	314	308	356	372	346	280	240		258	216	216	218	210	228	250	246	260	268	278	254	318	316	298
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	30	31	31	30	27	18	24	19	15	18	17	22	21	22	20	21	28	31	31	30	30
MED	319	320	307	295	288	282	250	240	217	221	213	226	223	230	232	235	239	251	266	266	266	290	313	304
U Q	A 338	328	324	318	312	298	258	246	230	A 238	230	E 254	228	242	244	E 254	A 254	A 257	A 278	283	290	310	336	A 322
L Q	306	296	286	276	270	272	242	226	214	209	202	216	218	225	224	230	230	241	260	258	246	272	282	292

AUG.1999 h'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

AUG. 1999 h'E (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						A	A	A	A	A	A	A	A	120	126	A	A	A 134	A 128					
2						A	A	A	A	A	A	A	A	A	A	116	116	A 128	A					
3						A	A 118		114	114	114	114	B	B	A	A	A	A	A					
4						A	A	A	A	A	120	A	A	A	A	B	118	118	122					
5						A	A	112	114	A	B	A	A	A	116	114	124	108	A					
6						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
7						A	A 138	A	A	A	A	A	A	A	A	120	120	116	A					
8						122	122	A	A	110	A	A	A	A	A	A	A	A	A					
9						B	A	A	A	A	114	116	B	A	116	116	116	114	A					
10						B	A	114	112	A	108	A	A	A	A	A	114	112	114					
11						B	A	A 130	A	A	A	A	A	A	A	A	A	128	120					
12						B	128	A	A	A	A	A	A	A	A	A	120	116	A					
13						B	A	A	A	A	A	A	A	A	A	A	A	A	A					
14						B	122	A	120	A	A	118	A	A	A	130	112	120	A					
15						B	A	A	116	114	A	A	A	A	A	A	A 132	A 132	A					
16						B	120	118	A 130	A	A	A	116	A	A	116	118	120	A					
17						A	120	116	114	114	116	116	116	118	116	120	116	116	A					
18						B	124	114	114	118	A	118	116	A	116	118	118	122	A					
19						B	124	116	112	120	A	120	A	A	A	A	A	134	A					
20						B	124	A 130	124	124	116	B	A	118	116	114	114	116	A					
21						B	138	138	114	114	A	116	A	116	114	114	120	122	A					
22						B	A	124	126	120	110	122	A	122	116	116	A	A 150	126					
23						B	130	122	122	112	112	A	A	A	116	114	A	122	A					
24						B	A	128	114	114	118	A	118	A	A	120	118	118	A					
25						B	A	A	116	A	112	A	116	118	118	116	122	A	B					
26						B	128	120	A	A	A	A	A	A	116	A	A	A 126	B					
27						B	A	114	A	A	A	B	A	A	A	A	118	118	A					
28						B	122	118	114	114	B	B	A	A	A	116	116	120	A					
29						B	122	A	A	A	A	A	A	A	A	120	122	124	A					
30						B	126	A	A	A	A	A	A	A	116	128	116	118	A					
31						B	132	114	118	A	A	A	A	A	A	A	A	132	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	16	17	17	12	10	8	5	6	12	17	20	26	5					
MED						122	124	118	114	114	114	117	116	118	116	116	118	120	122					
U Q							129	126	121	119	116	119	117	120	116	120	120	A 128	127					
L Q							122	114	114	114	112	116	116	118	116	115	116	116	117					

AUG. 1999 h'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

AUG. 1999 h'Es (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	114	104	106	110	102	110	110	112	110	112	106	104	110	136	134	104	106	104	100	102	B	108	112	108
2	110	100	114	B	100	128	108	114	112	114	106	108	110	112	108	G	138	116	112	108	108	108	104	112
3	102	106	102	104	100	106	108	126	122	118	116	120	126	118	132	112	134	106	102	104	100	96	98	110
4	110	112	108	108	106	108	112	112	112	114	G	112	112	112	112	B	134	126	122	124	102	114	114	112
5	114	108	100	98	96	92	126	120	118	110	B	114	100	126	116	126	124	118	110	114	124	110	118	108
6	104	94	100	110	B	124	118	124	114	116	108	106	104	110	104	104	106	104	102	100	96	96	98	108
7	102	102	106	112	B	104	116	112	112	114	110	114	112	116	140	106	136	112	112	102	106	112	108	106
8	102	102	100	100	106	G	124	114	112	122	114	114	114	108	108	102	102	98	98	100	100	102	100	104
9	98	98	100	108	B	124	114	112	122	106	G	G	B	118	120	122	120	120	124	116	108	124	118	104
10	104	102	100	104	124	118	112	114	118	116	112	106	106	110	104	110	122	116	108	104	112	138	110	106
11	110	102	100	96	112	104	108	110	104	108	110	108	108	98	130	106	132	122	114	108	110	112	120	112
12	102	114	112	114	118	112	108	110	112	110	112	106	102	104	108	106	128	116	110	110	112	110	108	104
13	98	96	110	110	112	B	114	110	110	110	110	110	114	110	110	106	100	100	96	98	98	98	106	108
14	102	B	B	114	B	144	122	118	112	110	116	116	114	112	112	138	124	120	112	114	108	108	102	100
15	104	118	100	98	B	100	124	112	110	108	106	106	106	106	108	106	102	100	124	102	112	106	112	106
16	108	104	104	108	114	122	146	132	124	122	116	112	116	112	108	112	116	114	104	108	108	120	110	110
17	108	134	122	110	108	124	122	114	114	110	112	116	138	128	G	126	G	116	110	110	112	102	B	B
18	B	B	B	B	124	120	122	122	120	114	118	126	G	124	126	G	G	128	112	112	110	110	112	106
19	106	126	106	112	128	122	130	124	118	G	114	112	110	104	116	102	124	128	100	116	98	106	106	112
20	118	110	112	102	116	108	G	110	108	110	G	B	110	148	124	118	126	118	110	110	110	B	B	B
21	108	128	124	110	136	130	122	132	128	122	122	G	122	126	G	G	140	130	124	98	116	106	114	112
22	108	110	104	100	100	126	124	106	124	128	G	104	102	G	G	118	116	118	122	120	B	B	114	96
23	B	116	104	104	108	138	136	124	120	122	118	112	104	110	G	122	146	130	122	120	B	114	108	102
24	106	114	112	126	128	126	124	126	120	124	G	110	110	110	110	130	124	122	118	106	108	108	106	106
25	106	102	100	102	106	110	112	118	120	122	124	118	G	G	G	136	120	110	104	110	112	106	104	108
26	B	104	110	110	B	B	132	122	108	110	108	110	110	110	108	104	104	110	B	B	B	100	102	110
27	100	102	114	B	B	118	118	112	104	110	108	B	114	108	108	106	124	122	112	110	146	108	112	106
28	102	112	108	106	104	B	122	114	114	116	B	114	116	126	108	G	134	118	108	104	112	106	104	106
29	108	108	106	110	106	106	106	110	116	106	106	106	124	124	104	102	100	122	110	100	108	114	108	106
30	106	104	106	100	106	114	106	120	118	116	114	112	112	118	122	136	124	122	114	112	108	108	106	108
31	110	108	106	104	106	104	122	128	116	112	118	122	120	122	116	120	118	130	120	106	112	108	108	102
	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	28	24	27	30	31	31	30	24	27	28	29	26	26	29	31	30	30	27	29	29	29
MED	106	106	106	108	107	118	120	114	114	114	112	112	111	112	111	111	124	118	111	108	108	108	108	106
U Q	109	113	111	110	117	124	124	124	120	118	116	114	115	124	122	122	133	122	118	112	112	112	112	110
L Q	102	102	100	102	105	106	112	112	112	110	108	106	107	110	108	106	111	110	104	102	106	106	104	105

IONOSPHERIC DATA STATION Kokubunji

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

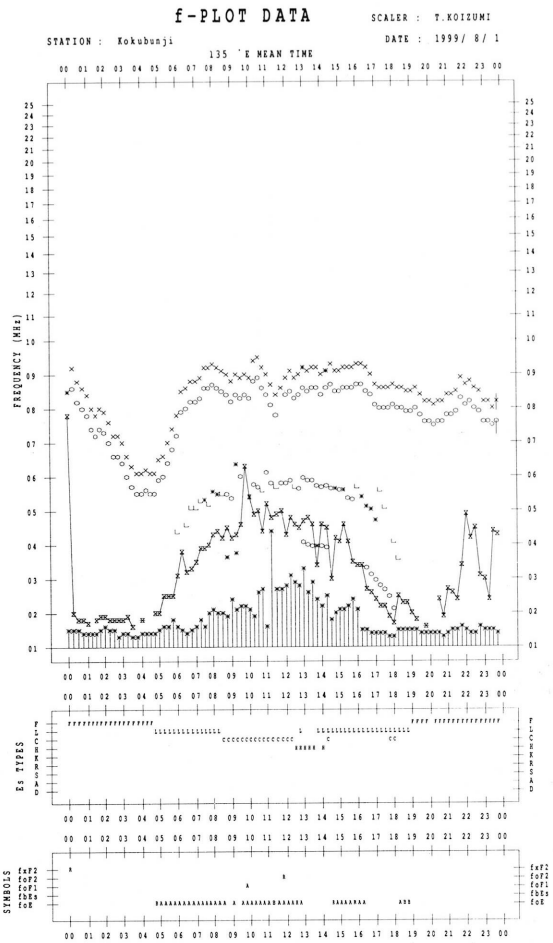
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

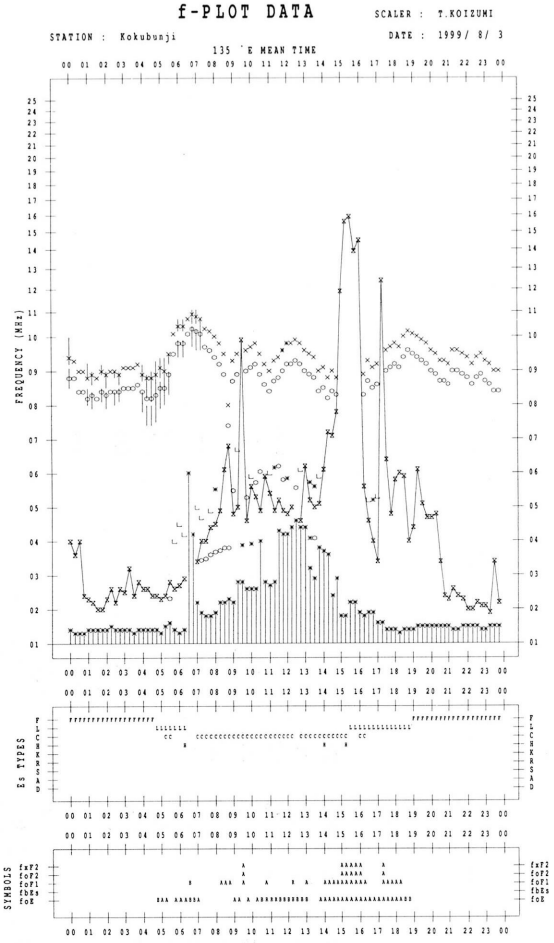
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	FF 22	F 2	F 2	F 3	F 2	L 4	L 2	L 2	L 2	C 1	C 2	C 2	C 1	H 1	HL 11	L 1	L 2	L 2	LC 21	F 2		F 3	F 6	F 3
2	F 3	F 3	F 1		F 1	CL 12	L 2	L 2	C 2	L 1	C 1	L 2	L 1	L 1	L 1		HL 11	CL 21	C 3	F 6	F 6	F 3	F 2	FF 32
3	F 2	F 2	F 3	F 2	F 5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

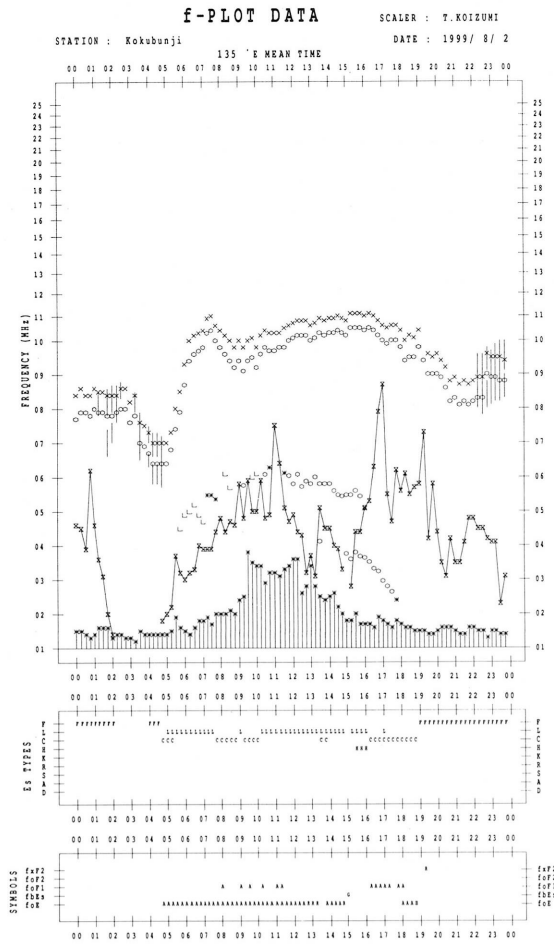
AUG. 1999 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

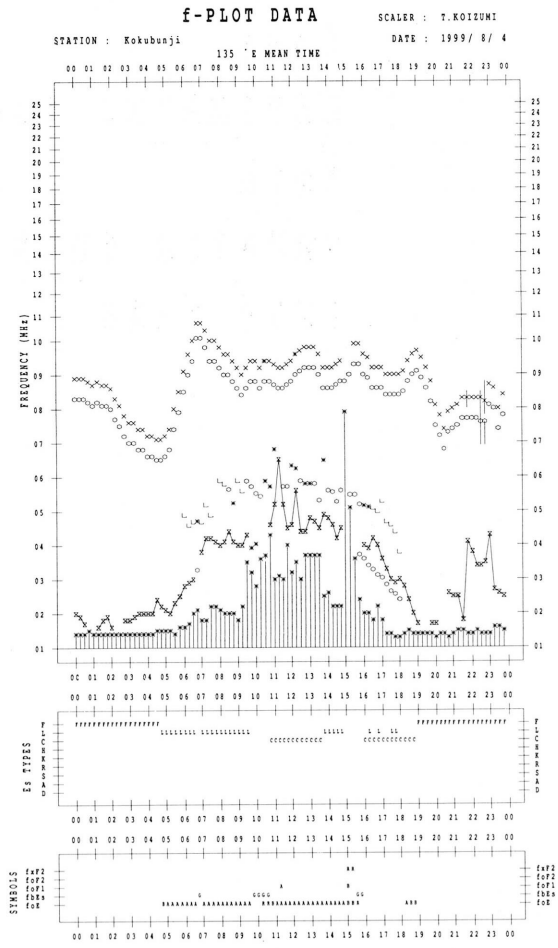
f-PLOTS OF IONOSPHERIC DATA

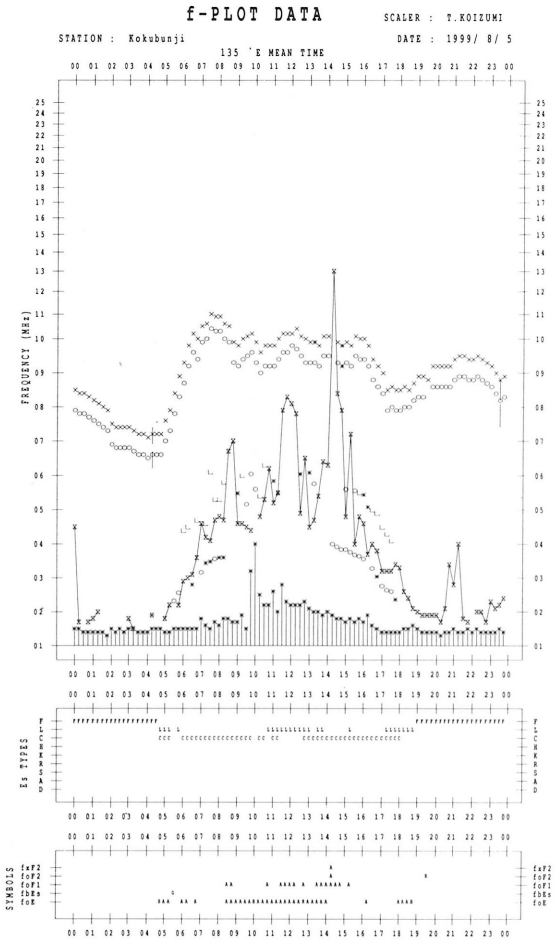
KEY OF f-PLOT	
	SPREAD
	foF2, foF1, foE
	fxF2
	DOUBTFUL foF2, foF1, foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

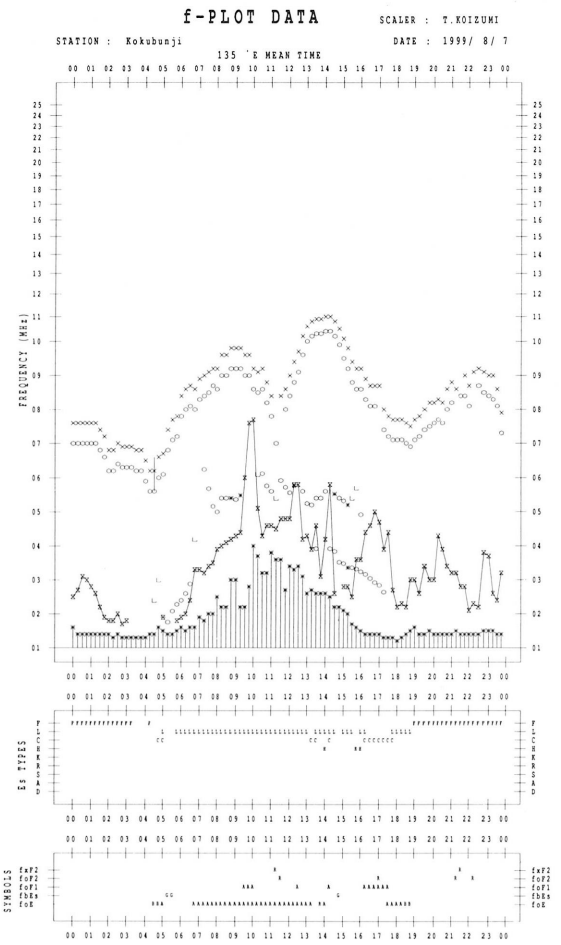

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

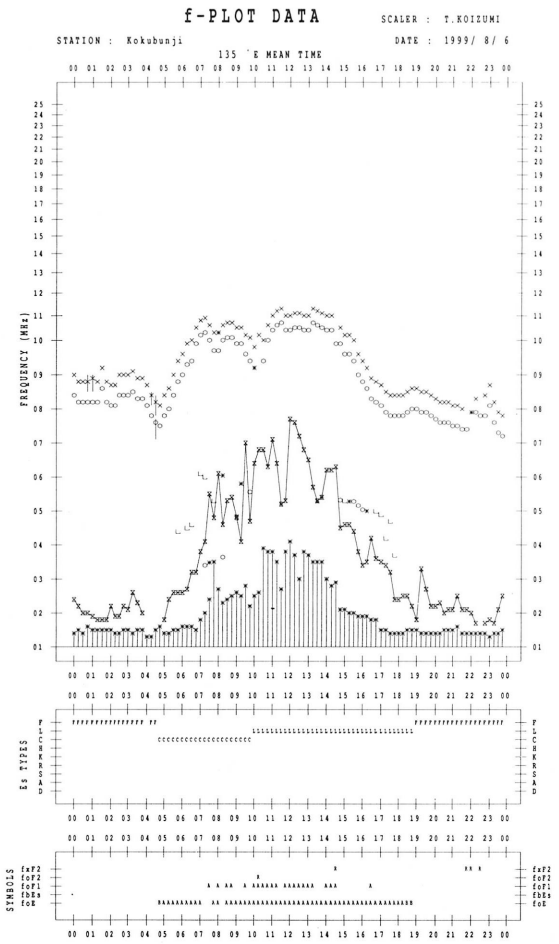

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

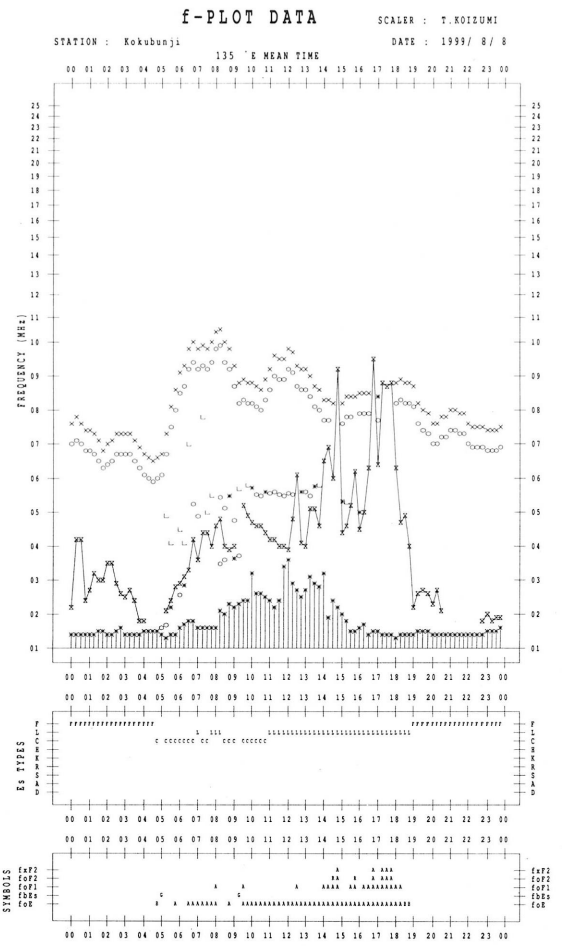

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

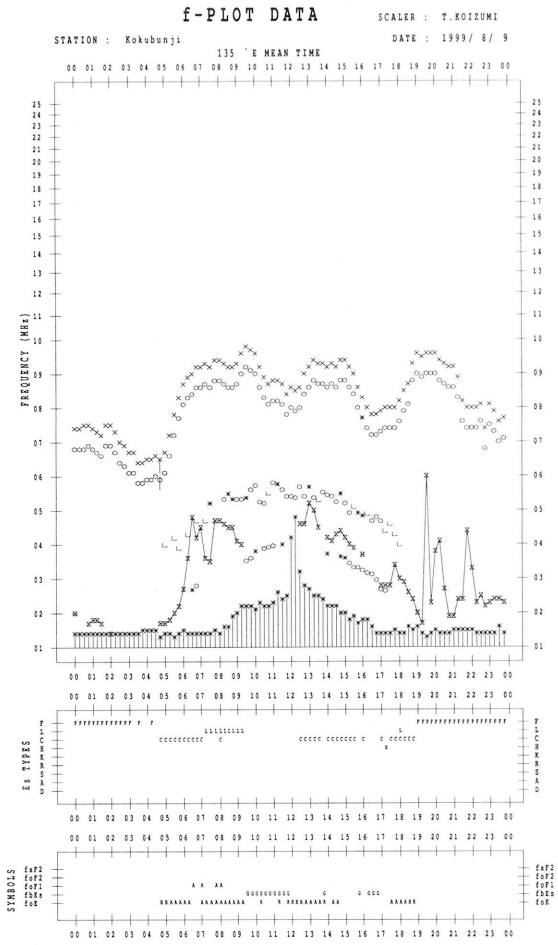

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

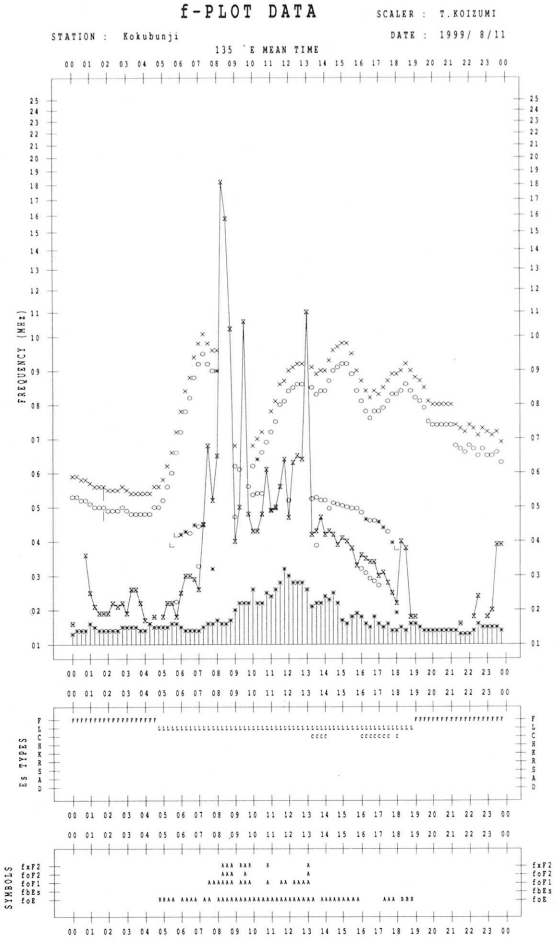

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

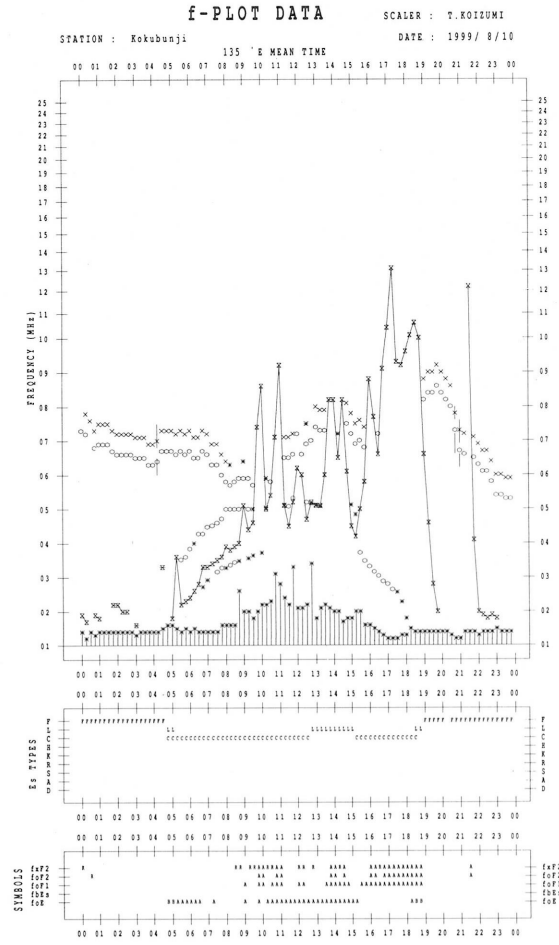

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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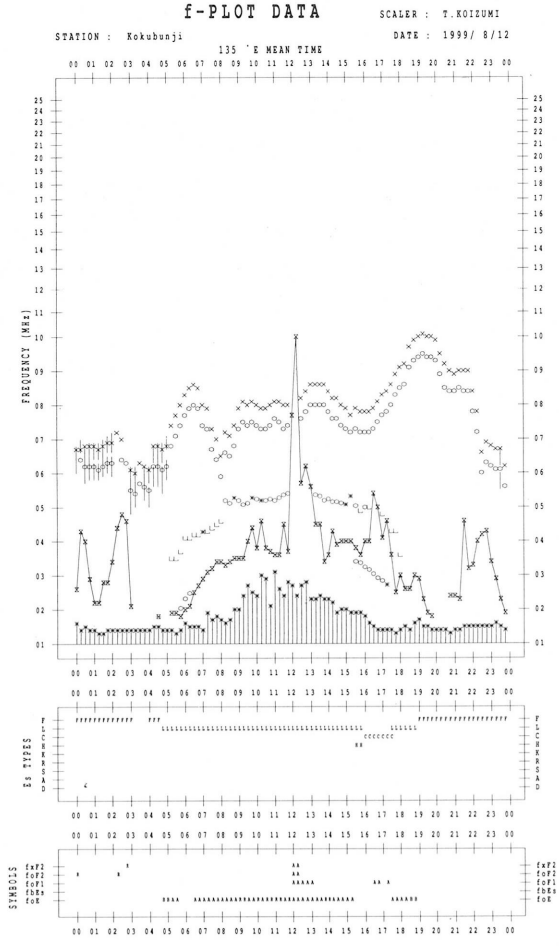
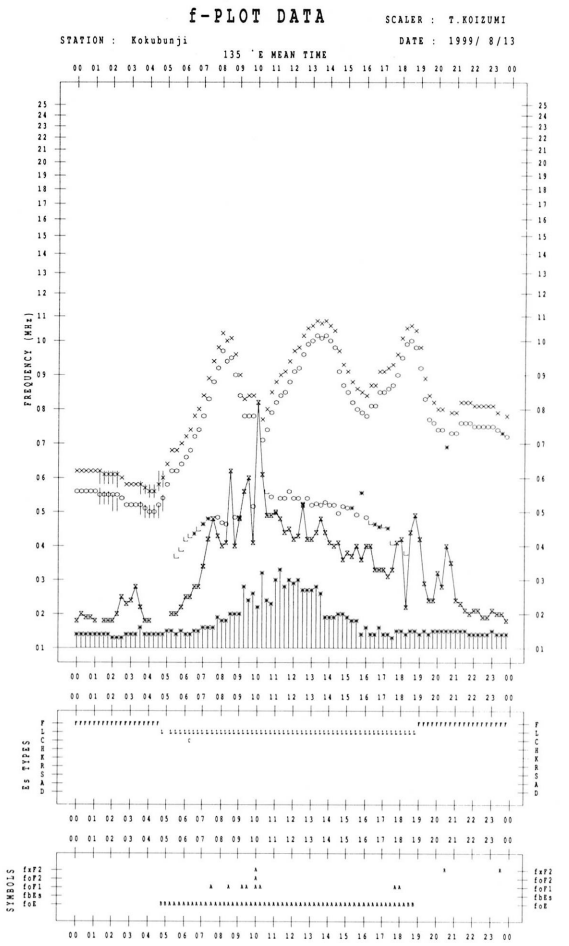
STATION : Kokubunji
DATE : 1999/ 8/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
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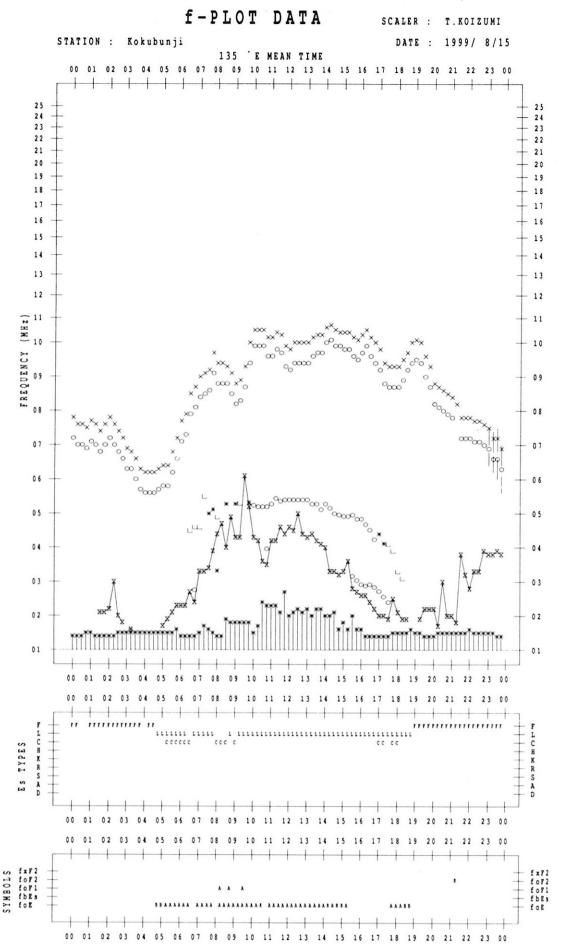
STATION : Kokubunji
DATE : 1999/ 8/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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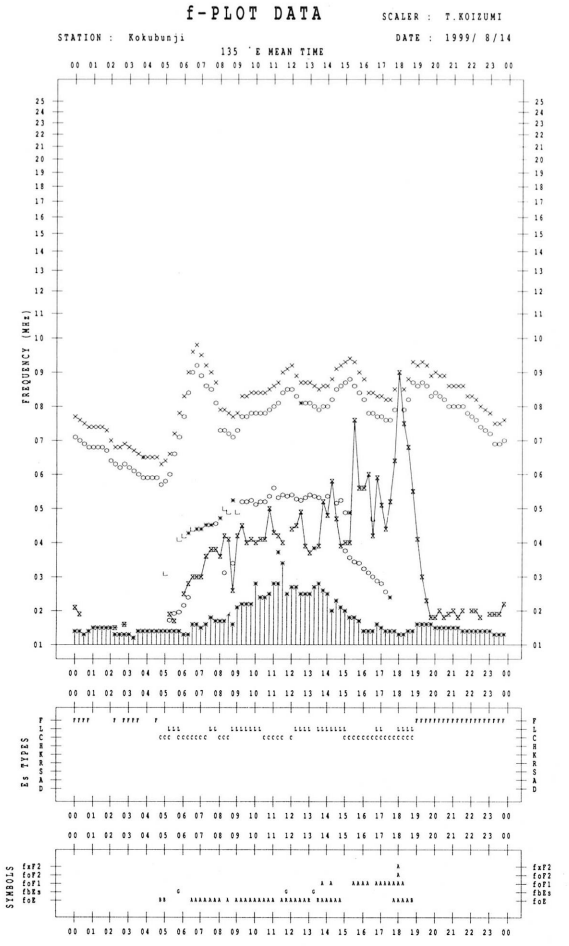
STATION : Kokubunji
DATE : 1999/ 8/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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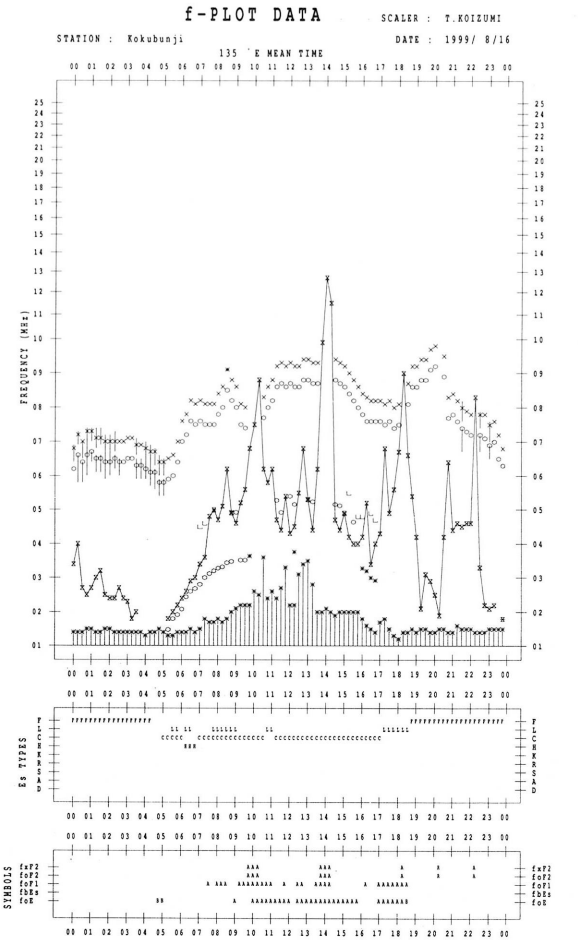
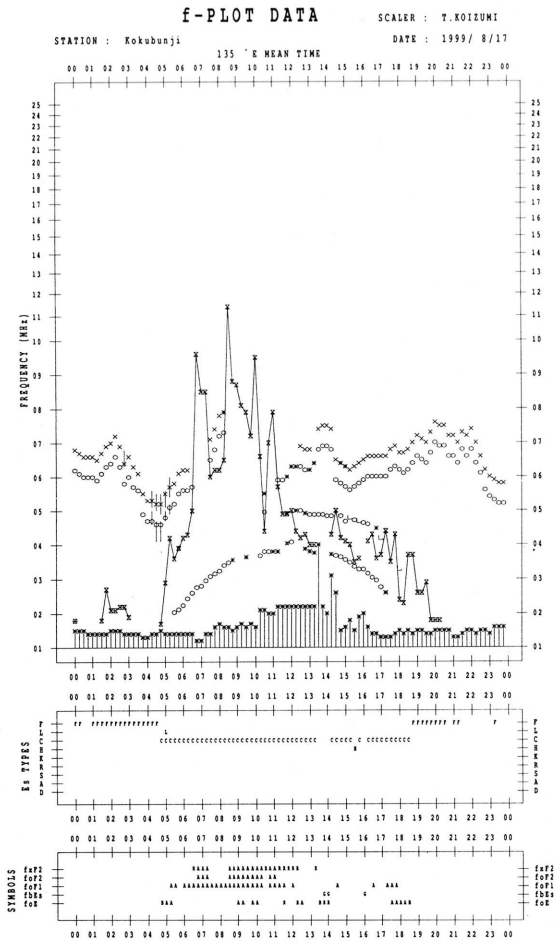
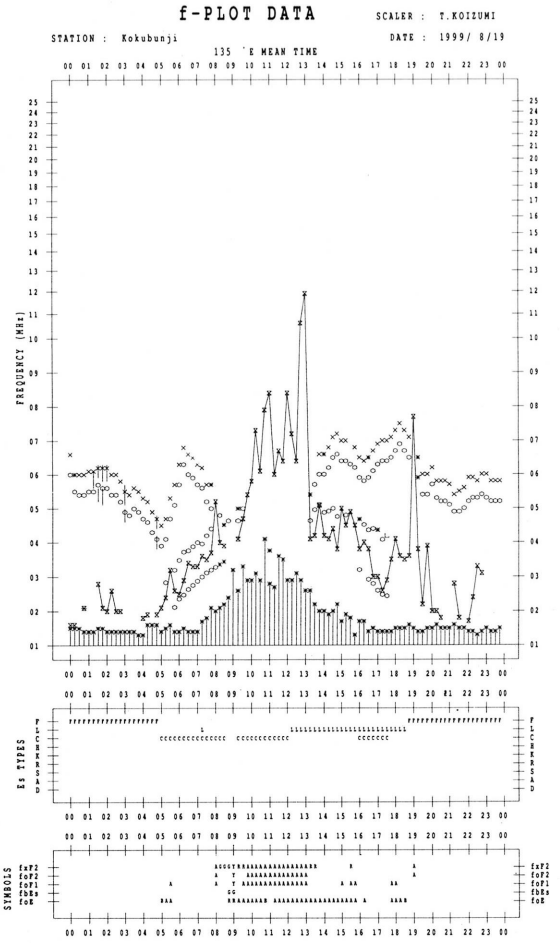
STATION : Kokubunji
DATE : 1999/ 8/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
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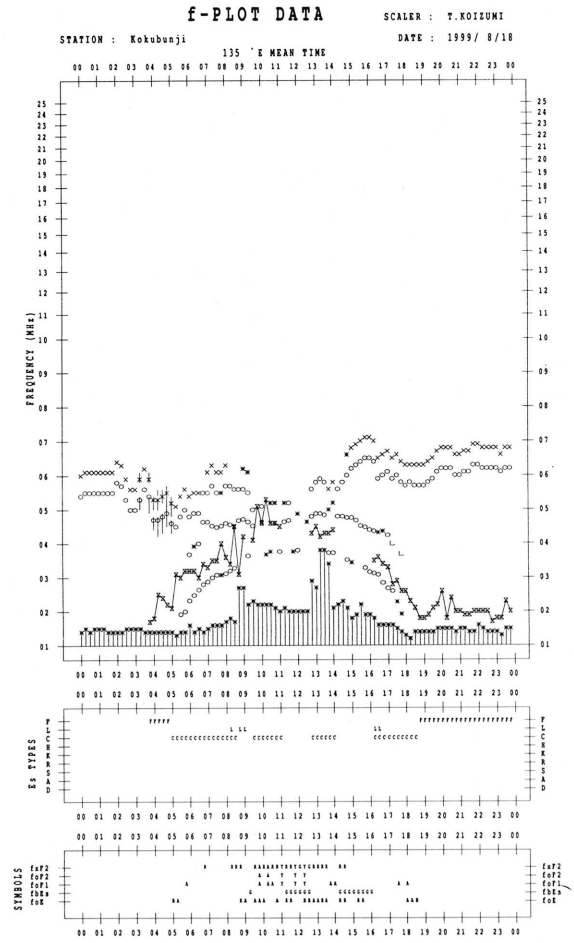
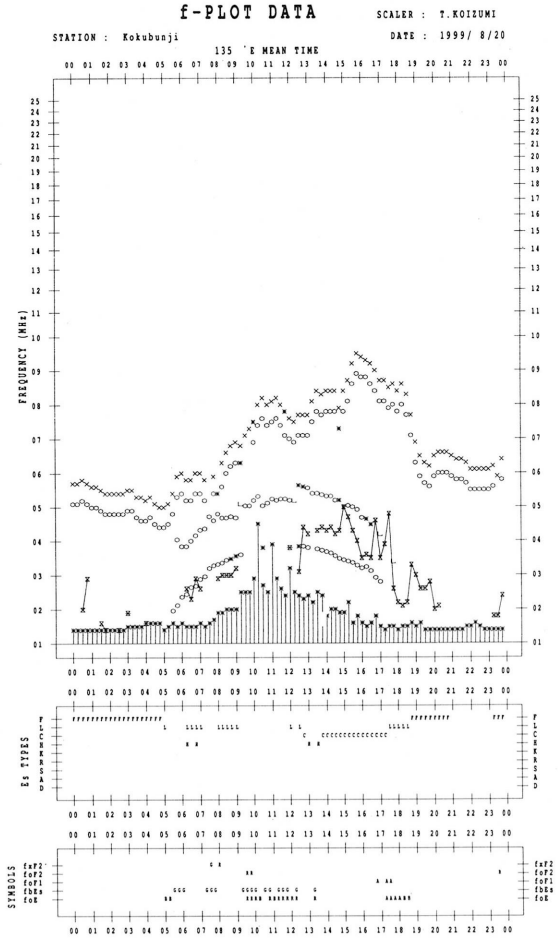
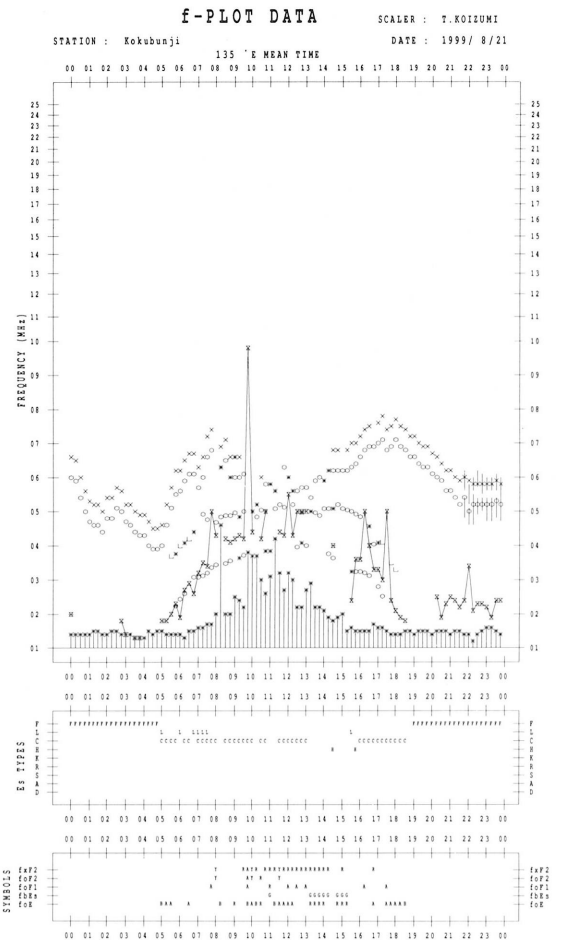
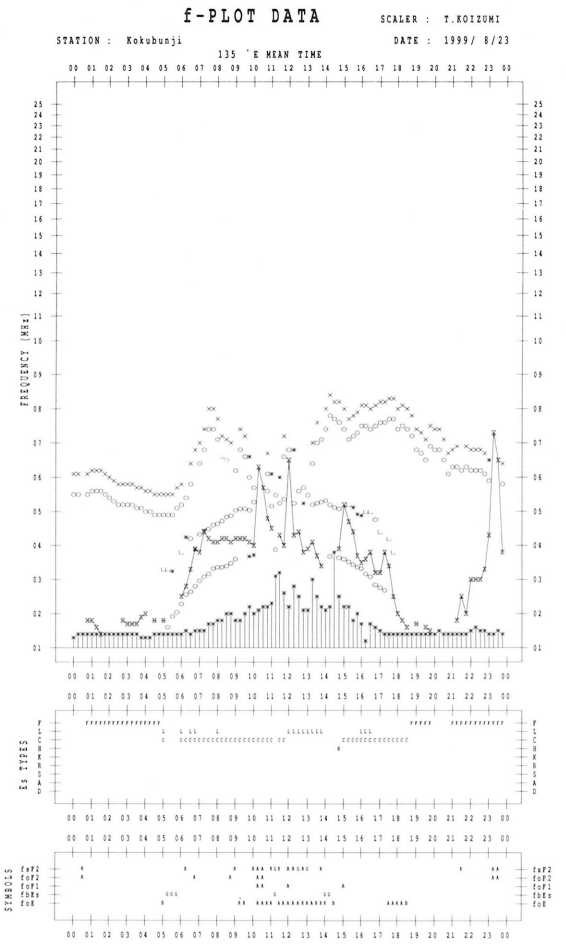
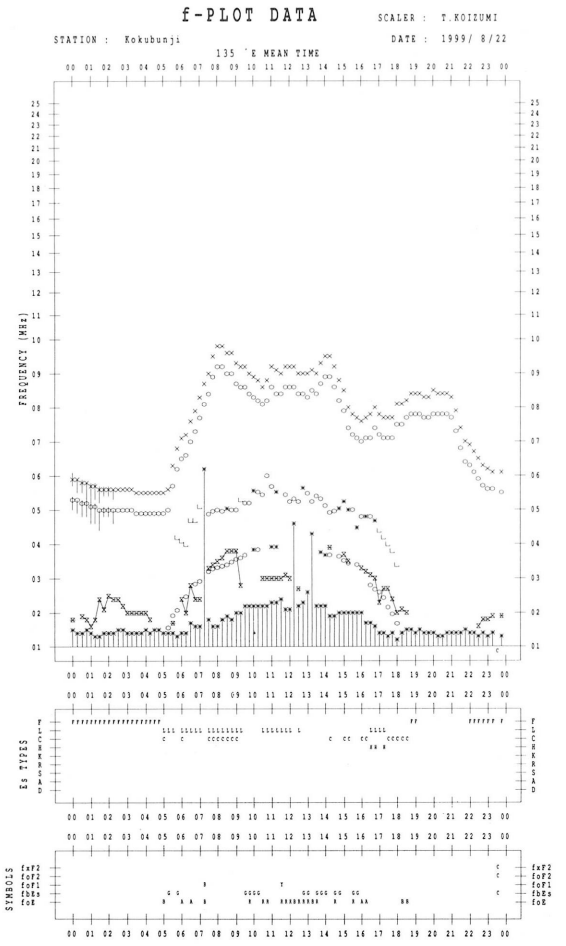
STATION : Kokubunji
DATE : 1999/ 8/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

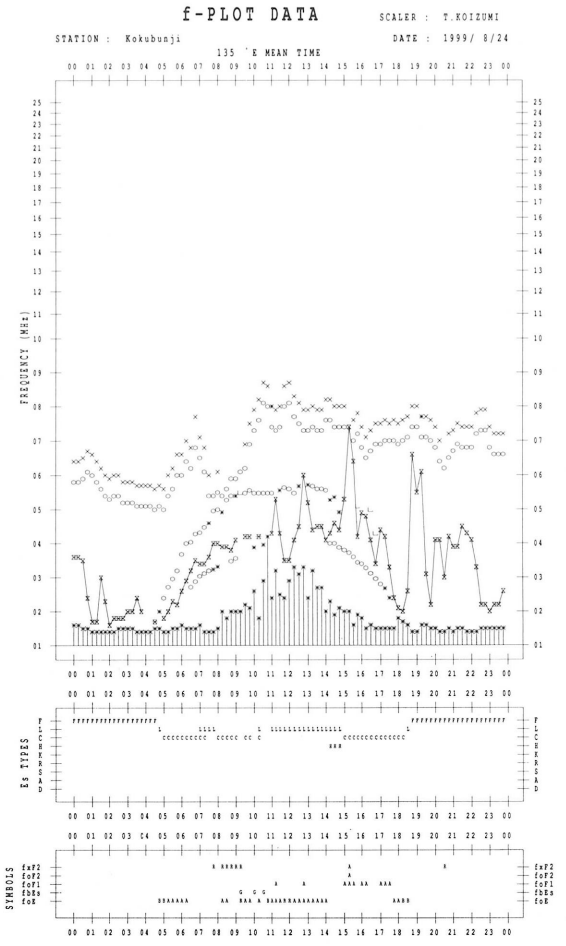

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

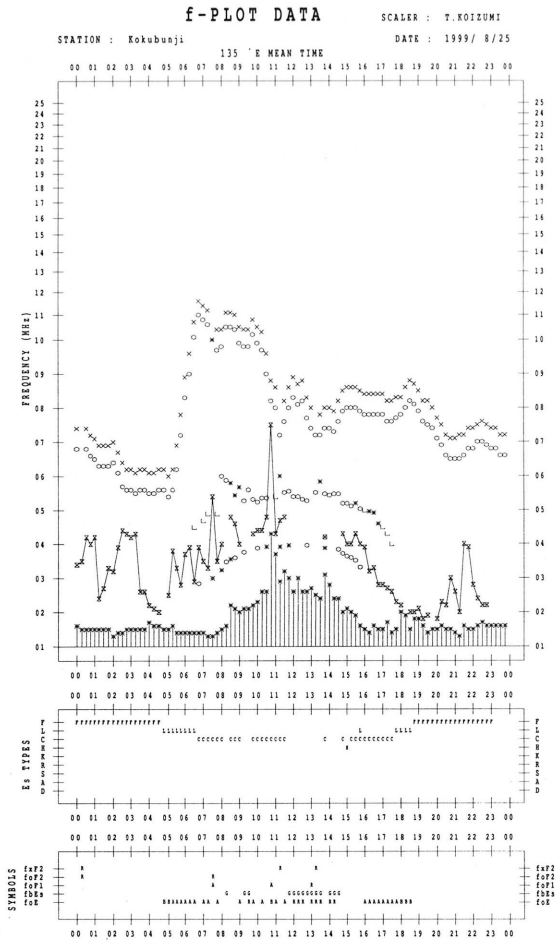

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

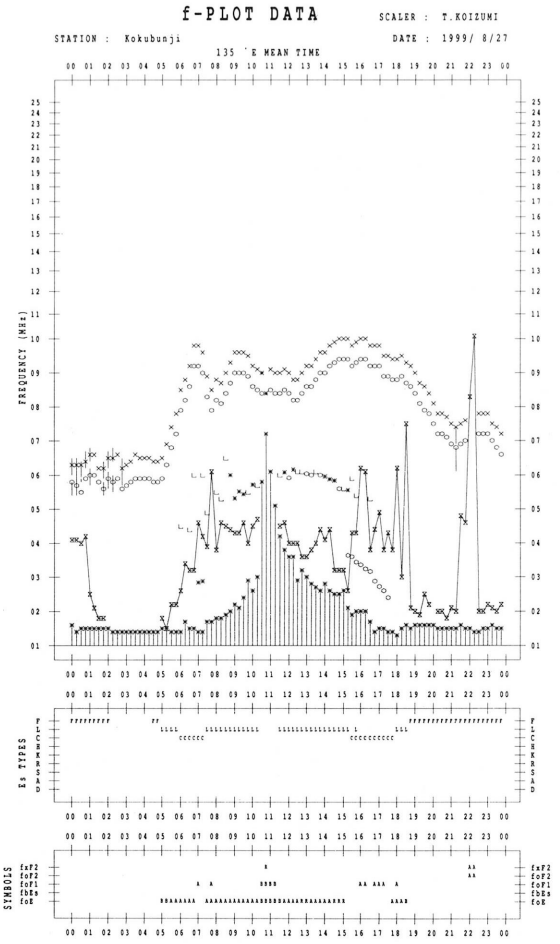

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/21
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

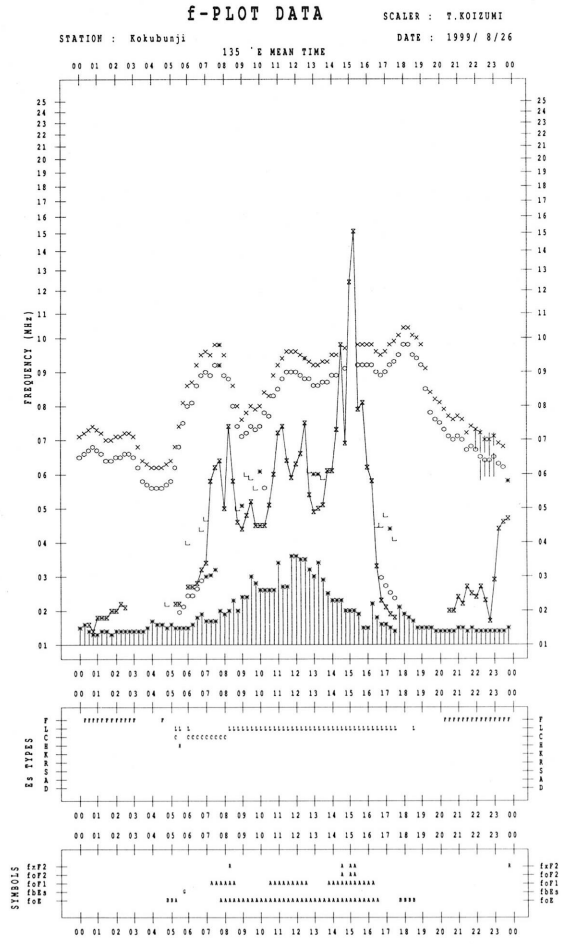

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/23
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

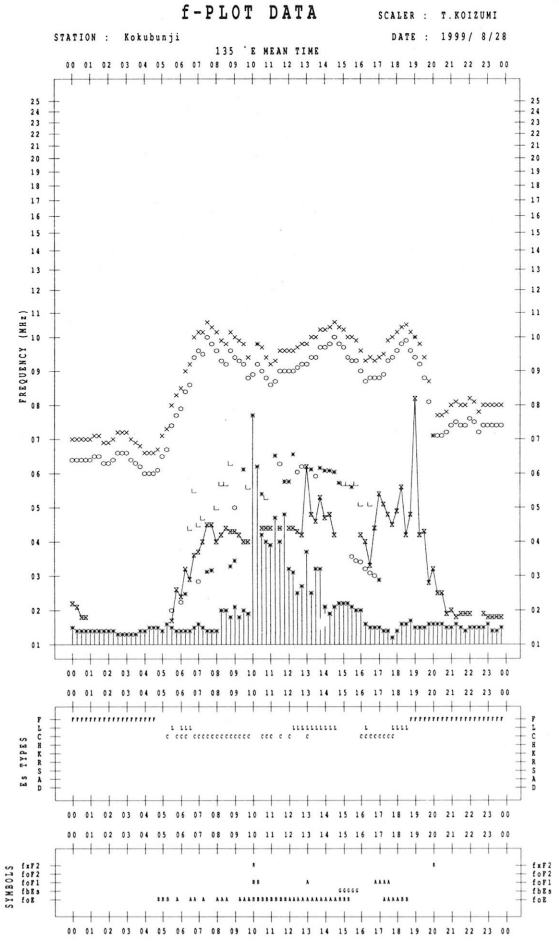

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/22
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

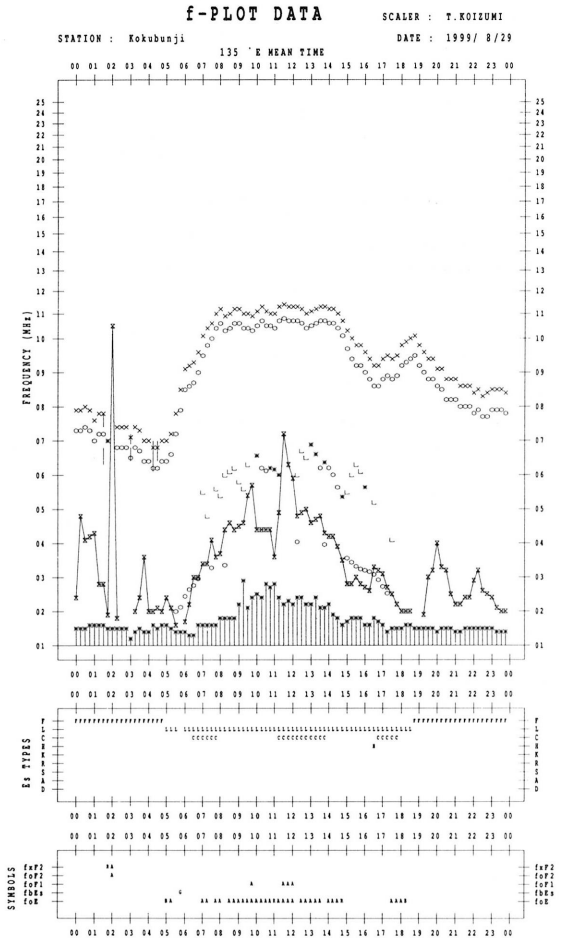

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/24
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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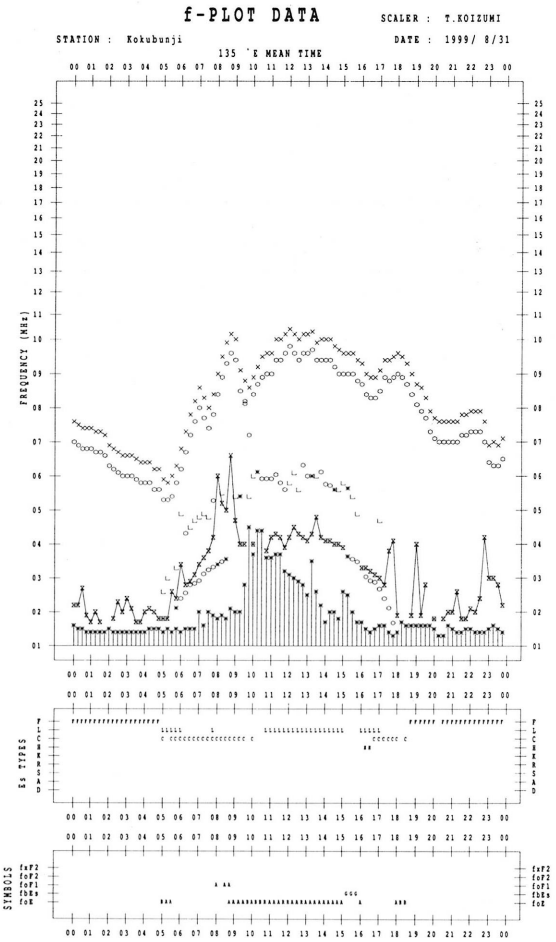
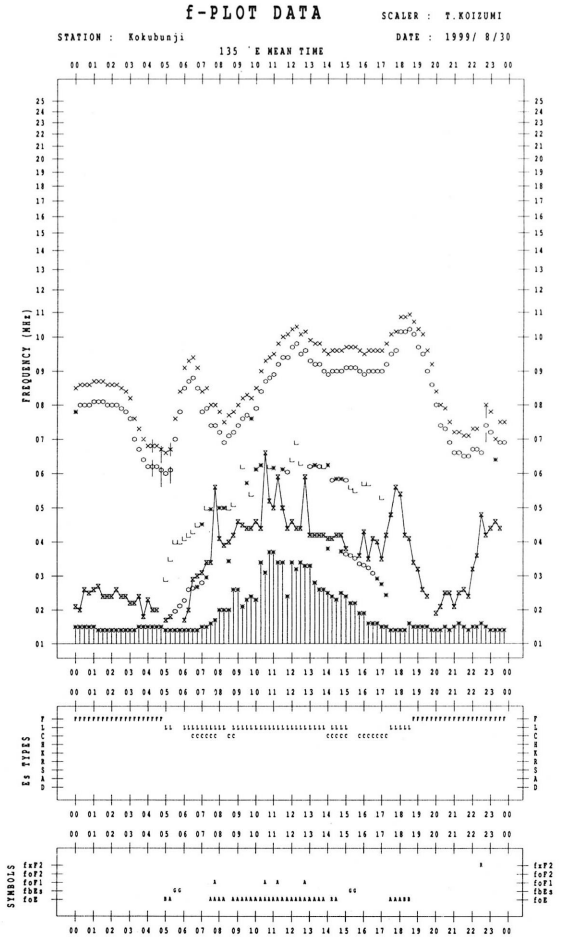
STATION : Kokubunji
DATE : 1999/ 8/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/31
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1999/ 8/30
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 August 1999

Single-frequency total flux observations at 500 MHz					
Flux density: 10^{-22} Wm^{-2} Hz^{-1}					
UT	00-03	03-06	06-09	21-24	Day
Date					
1	-	-	-	-	-
2	-	-	-	48	48
3	49	50	49	49	49
4	50	50	51	48	50
5	46	46	-	45	46
6	42	42	42	40	42
7	39	39	39	38	39
8	38	37	36	37	37
9	37	37	37	37	37
10	37	37	37	37	37
11	36	36	37	36	36
12	36	37	37	37	37
13	36	36	37	35	36
14	34	34	34	35	34
15	35	35	35	-	35
16	-	-	-	-	-
17	-	-	-	36	36
18	35	35	34	36	35
19	36	36	36	37	36
20	37	38	39	39	38
21	39	38	38	37	38
22	36	36	36	37	36
23	37	38	38	42	39
24	41	40	40	40	40
25	39	39	38	40	39
26	40	41	42	44	42
27	42	42	44	40	42
28	40	40	40	40	40
29	41	42	41	42	41
30	42	42	42	43	42
31	-	-	-	-	-

Note: No observations during the following periods.
1st 0000 - 2nd 0900 5th 0500 - 5th 0900
15th 2100 - 17th 0900 30th 2300 - 31st 2400

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso August 1999

Single-frequency observations

Normal observing period: 1950 - 0930 U.T. (sunrise to sunset)

AUG. 1999	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2} Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2} Hz^{-1}) MEAN	POLARIZATION REMARKS
2	2800	6 S	2122.0	2124.0	8.0	460	-	0
	200	47 GB	2129.4	2129.6	0.8	650	-	0
	200	46 C	2136.0	2137.0	5.0	120	-	0
	500	46 C	2136.0	2139.0	7.5	380	-	0
	2800	29 PBI	2136.2	2137.6	3.8	80	-	0
	200	47 GB	2252.2	2252.6	0.8	750	-	0
3	200	47 GB	0025.0	0025.2	0.4	600	-	0
	200	8 S	0224.8	0225.0	1.0	260	-	0
	200	46 C	0429.8	0431.0	2.6	70	-	WL
4	500	42 SER	0238.0	0242.6	12.0	320	-	ML
	2800	4 S/F	0242.6	0243.2	1.2	50	-	0
	200	8 S	0243.0	0243.4	0.8	50	-	0
	2800	45 C	0547.4	0550.0	10.0	180	-	0
	200	4 S/F	0551.2	0551.8	1.2	460	-	0
	500	46 C	0557.0	0603.6	20.0	380	-	WL
5	2800	8 S	2215.3	2215.4	0.2	30	-	0
6	200	42 SER	0004.6	0004.8	5.0	220	-	0
	200	8 S	0519.6	0520.0	0.8	180	-	0
	200	8 S	2301.0	2301.4	0.8	140	-	0
7	200	42 SER	0153.6	0153.8	5.0	120	-	0
	200	4 S/F	2304.6	2306.6	5.5	50	-	MR
9	2800	3 S	0248.4	0251.0	6.0	30	-	WR
	500	46 C	0252.6	0258.6	15.0	60	-	WR
	200	46 C	0255.0	0256.2	11.0	50	-	0
11	200	4 S/F	2318.0	2318.8	1.6	340	-	0
12	200	8 S	2039.6	2040.0	0.8	60	-	0
13	200	42 SER	0747.6	0747.8	2.6	160	-	0
	200	8 S	2333.4	2333.8	0.8	160	-	0
	500	8 S	2341.6	2341.8	0.4	140	-	0
18	200	8 S	2001.0	2001.2	0.4	50	-	WL
19	200	8 S	0107.8	0108.2	0.8	120	-	0
	200	47 GB	2318.8	2319.2	0.8	2500	-	WR
20	200	8 S	0050.0	0050.2	0.4	100	-	0
	200	8 S	0135.0	0135.2	0.4	50	-	0

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso August 1999

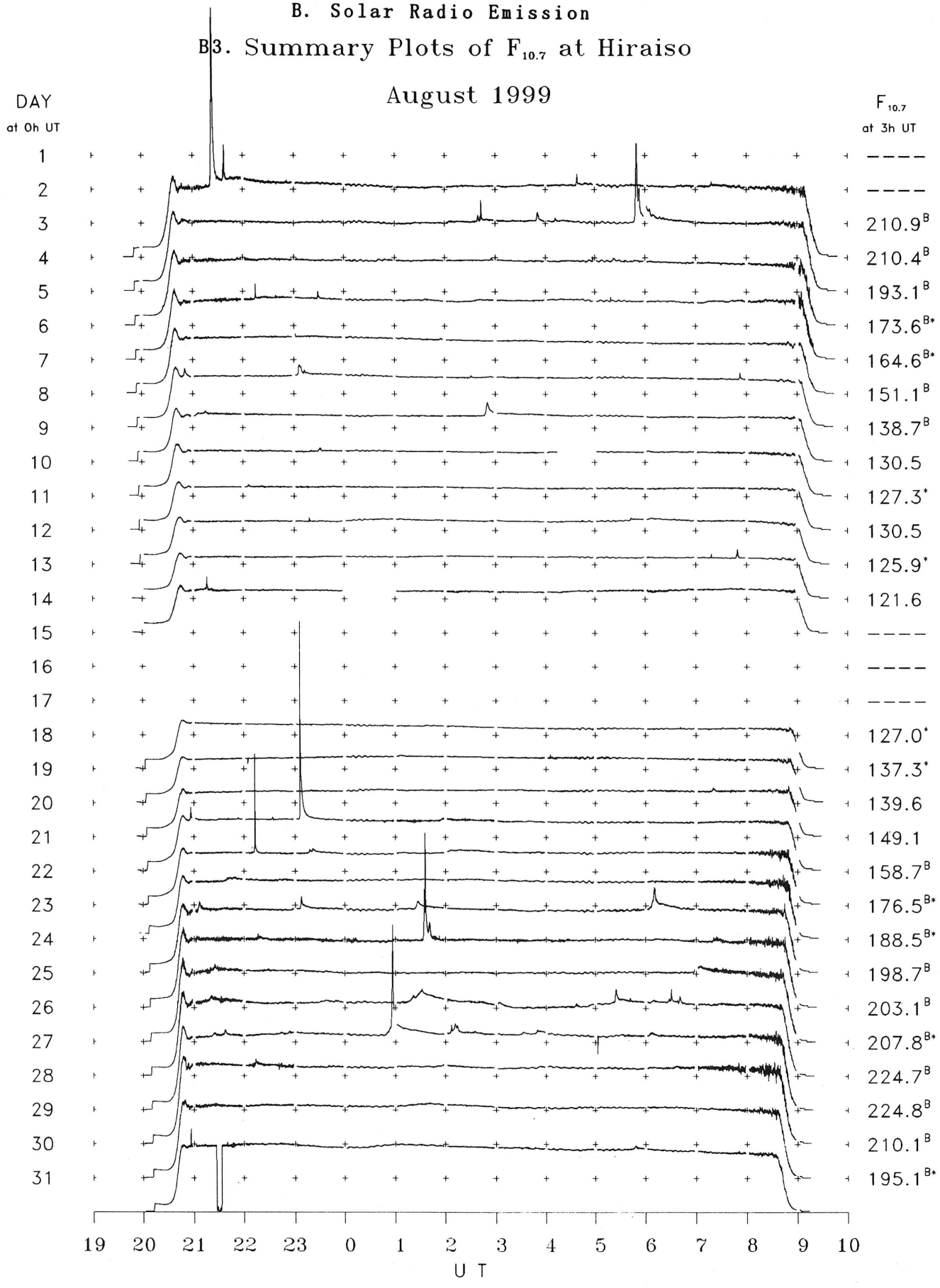
Single-frequency observations

Normal observing period: 1950 - 0930 U.T. (sunrise to sunset)

AUG. 1999	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	200	42 SER	0447.2	0447.4	2.0	300	-	WR
	200	47 GB	0549.4	0549.8	0.8	2700	-	WR
	200	47 GB	0624.8	0625.0	0.4	700	-	WR
	200	8 S	2056.0	2056.4	0.8	160	-	O
	200	47 GB	2305.8	2306.0	6.5	5000	-	WR
	2800	29 PBI	2306.0	2306.2	15.0	460	-	O
	500	29 PBI	2306.0	2306.6	20.0	80	-	WL
21	200	47 GB	2212.6	2212.8	3.2	650	-	WR
	2800	29 PBI	2212.6	2213.0	4.6	240	-	WR
24	200	8 S	0421.0	0421.2	0.4	180	-	O
	2800	29 PBI	0604.0	0610.0	11.0	50	-	O
25	2800	46 C	0133.4	0135.6	9.5	260	-	O
	200	8 S	0133.6	0133.8	1.0	420	-	O
	500	29 PBI	0134.0	0136.6	13.0	30	-	O
26	200	47 GB	2120.0	2120.6	2.2	750	-	O
27	200	42 SER	2202.2	2202.6	2.0	100	-	WR
	200	8 S	2312.8	2313.0	0.4	60	-	O
28	200	42 SER	0022.2	0023.6	1.6	80	-	O
	2800	29 PBI	0054.4	0056.2	7.5	260	-	O
	200	8 S	0200.4	0200.8	0.8	120	-	O

B. Solar Radio Emission

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



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

IONOSPHERIC DATA IN JAPAN FOR AUGUST 1999
F-608 Vol.51 No.8 (Not for Sale)

電離層月報（1999年８月）
第51巻 第８号（非売品）
1999年11月25日 印刷
1999年11月30日 発行
編集兼 郵政省通信総合研究所
発行所 〒184-8795 東京都小金井市貫井北町４丁目２－１
☎ (042) (327) ７４７８(直通)

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