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IONOSPHERIC DATA IN JAPAN

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COMMUNICATIONS RESEARCH LABORATORY
MINISTRY OF POSTS AND TELECOMMUNICATIONS
TOKYO, JAPAN

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

NOV. 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	31	37	37	30	30	36	29	57	68	91		80		69	69	72	75	41	38		29	35	36	35
2	35	30	35	A	A	26		60	70	78	71	72		80	72		66		A	40	37	24		37
3			43	37		34			60	72	67	74	77	71	69	58	58	37	37	36	39	A	38	37
4	37	35	40	40	38	35	A	60	73	68	73	79		71	66		72	46		A	38	38	38	42
5			41	57	38	30		70	70	69	81	98	87	70	72	71	67			23	38	38	35	36
6	32	38		36	27	24	36	71	71	70		86	80		74	68		56	40	A	32	A	A	A
7	A	37	32	38		40	34	69		81		81	91	102	92	78	57		35	A	58	56	35	A
8	38		A	31	A		25	56		83	90	89	91	88	77	74	71	54	38		69	59	59	
9	56	58	38	37	38	A	26	58	78	70	73	68	73	73		67	55	32	35	38	40	38	34	
10	34	35	35	38	30	35	30	54	71	69	67		80	70	77	71	67	53	32	38	35	40	38	36
11	38		41		38	44	30	58	72	66		82	77	71	67	76		31	32	29	56	40	A	59
12	56	36	32	23	28	25	35	57		78	67		71	70	70	64	58	A	A	29	28	35	37	35
13	35	34	38	37	37	42	32	58	71	63	57	72	86	68	62	70	53	34	30		A	30	34	A
14	35	A	59	35		31	35	57	69	62	56	67	54	70	68	62		38		30		40	40	40
15		40	32	41	37	34	40		70	72	80	70	80	70	66	72	68	57	A	38	A	32	37	40
16	38	36	40	34	38	35	35	36	73	69	76	76	70	75	70	58	68	32	30	29	29	A	41	35
17	38	35	41	37		28	31		74	80	81	70	97	67	78	66	61	42	31	29	36		A	
18	32	38	35	38	38		38	58	67	67	80	86	71	72	73	68	57	A	35	38	35	35	35	35
19	41	46	50	56	38	36	35	58	74	77	67	81	66	62	64	63	56	36	30	31	24	30	26	29
20	36	36	A	31	38	29	32	70	57	77	70	65	64	64	63	58	47	38	28	N	A	A	A	A
21	A	A	A	25	32	35		56	58	64	68	59	A	B		58	50	A	20	A	A	A	31	38
22	29	35	38	32	35	30	32	51	58	76	66	63	72	57	71	63		56	41	32	32	29		59
23	30	40	36	28	31	31	A	57	86	92	118	89	81	67	72	61	57	40		29		34	38	38
24	31	38	40		35	28	32		71	80	90	86	74	71	76	76	58	A	24	A	A	A	59	35
25	A			A	A	35	35	57	89	78	88	83	67	63	70	64	53	39	27	31	30	35	A	A
26	A	35	35	A	35	30	32	57	71	72	76	75	76	74	76	68	62		29	40	35	34		37
27	38	42	44	37	43	44		59	71	79	76	87	77	71	64	68	60	20	36	38	36	38	A	36
28	40	34	29	35	35	35	38	58	68	69	97	88	74	73	68	65	57	37	30	A	59	35	40	37
29	46	38	40	37	35	48	42	64	68	70		81	68	65	65	68	50			35	35		A	
30	38		38	40	40	32	38	59		71	79	71	73	64	67	60	55	40		37	40	46	37	48
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	22	25	25	23	27	23	26	26	30	25	28	26	28	28	28	26	21	21	20	23	22	20	21
MED	37	36	38	37	37	34	34	58	71	72	76	80	75	70	70	68	58	39	32	34	36	35	37	37
U Q	38	38	41	38	38	36	36	60	73	78	81	86	80	72	73	71	67	49	36	38	40	40	39	40
L Q	32	35	35	31	32	30	31	57	68	69	67	70	71	67	66	62	55	35	29	29	32	34	35	35

HOURLY VALUES OF fEs AT WAKKANAI

NOV. 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G		37	37	36	38	34	32	40	52	25	G	G	29	35	38	34		G
2	G	G	G	28	33	30	35	42	37	36	44	46		52	29		37	37	33	G	G		28	G
3	G	G	G	G	29	27	33		36	34	34	32	41	58	72	34	30	24	43	38	42	44	37	33
4	34	33	30	24	24	30	32	27	34	32	46	67	G	41	37	G	34	39	26	55	35	29	G	24
5	34	28	33	G	28	G	G	32	48	75	34	41	44	37	32	28	37	71	G	G	27	30	G	G
6	G	27	32	26	33	36	30	29	29	34		35	35	33	29	38	38	36	G	29	30	32	30	29
7	27	G	G	G	G	G	G	34	32	33	29	29	33	27	29	23	33	45	33	38	26	G	G	36
8	39		32	36	32		30	22	30	30	37	40	53	57	60	50	56	45	58	38	23	G	28	41
9	G	G	G	G	G	30	25	G	29	27	27	34	32	28	26	25	G	G	G	G	G	G	G	G
10	G	G	G	G	G	G	G	34	26	27	34		28	29	26	23	G	G	G	26	38	28	32	26
11	G	G	G	G	G	G	G	G	23	26		49	27	31	42	46	33	40	30	30	G	29	33	30
12	G	G	G	28	30	35	24	G	23	28	27		30	37	42	34	42	60	79	63	39	29	28	G
13	24	23	G	G	27	G	30	26	23	27	28	36	32	32	25	29	47	G	29	32	34	28	28	29
14	28	27	23	29	33	G	G	G	24	25	27	28	32	30	29	25		G	G	G	G	G	G	G
15	G	G	G	G	G	G	G		38	29	37	29	33	30	30	26	29	G	34	34	30	30	G	28
16	24	G	25	G	G	G	28	G	23	28	30	27	30	28	26	25	G	G	G	G	36	38	39	32
17	24	G	G	29		28	G		48	27	34	57	33	N	24	G	G	G	G	32	33	31	29	31
18	30	28	G	25	28		29	G	27		30	30	31	30	34	30	29		31	27	G	34	39	
19	30	34	30	25	27	28	30	38	36	28	27	30	34	32	28	31	G	28	G	G		34	36	G
20	28	29	38	28	30	G	G	36	40	46	34	47	56	32	29	G	G	G	G	34	40		38	34
21	34	29	28	26	28	G	G	G	G	G	G	34	32	B	G	31	G	33	33	29	30	28	G	G
22	G	G	G	G	G	29	38	30	24	24	30	29	32	28	28	G		G	29	G	25	G	G	G
23	26	25	29	G	24	33	39	34	29	26	27	28	28	28	24	24	22	G	G	G	G	G	G	G
24	G	G			G	G	G	G	23	29	30		34	36	26	36		37	30	40	47	45	G	
25	31	27	26	39	39	29	37	42	91	33	42	39	30	30	27	G	29	G	32	35	29	29	29	35
26	27	25	G	32	28	29	G		24	40	27	28	27	27	29	23	25	29	24	27	24	G	28	27
27	G	30	G	34	G	G		G	23	40	44	46	34	29	32	29	31	30	24	G	G	G	33	25
28	28	24	32	G	G	G	G		30	33	27	30	31	29	28	23	G	G	G	32	G	33	32	28
29	26	G	25	29	G	24	G	27	35	28		31	40	35	24	23	28	G	G	G	G	36	28	G
30	G	G	G	G	G	G	G	G		30	30	33	N	49	33	33	26	G	G	G	G	G	G	32
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	29	29	29	28	28	25	29	29	27	27	28	28	30	29	27	29	30	30	29	28	29	28
MED	24	G	G	24	24	G	12	27	29	29	30	34	32	32	29	25	29	G	25	29	27	29	28	26
U Q	28	27	29	28	29	29	30	34	36	34	37	41	34	37	33	32	34	37	32	35	35	33	32	31
L Q	G	G	G	G	G	G	G	G	23	27	27	29	30	29	26	23	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT WAKKANAI

NOV. 1997

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

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT KOKUBUNJI

NOV. 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	N	31	A	31	36		37		73	71	84		64	66	83	68	62	67	42	B	56	59		58
2	A			36	38	35	A	94	70	76	82	85	76	84	91	83	60	60	A	56	59			A
3	56	56	40	40	42	29	37	57	69		65	85	68	68	72	73	58	60	38	35	36	A	A	A
4	36		59	31	37	29	46	57	70	82	74	63	90	96	73	B	A	51	34	43	41		34	
5	56	A	58	47	23	28	37	71	94	81	96	76	96	80	78	80	72	56	A	A	A	47		44
6	46	46	47	44	35	35		70	81	76	76	78	101	84	78	78	73	56	A	42		A	A	32
7			34		32	32		73	74	78	98	89	90	103		93	66	52		22	46		69	
8	43	44		32	38	31	46	69	72	92	106	96	80	96	106	94	73	56	A	44	A	A	41	
9	38	37	37	42	41	B		62	76	92	76	90	72	76	92	72	71	42	31	35	36		N	
10	49	28		N	31	B	30	57		61	61	55	87	80	77	77	60	56	46	42			56	58
11	58	35		38	43	35			58	66	76		82	75	72	76	71	37	37	41	36	43		38
12	44		38	38	38	28	31			86	87	85	76	71	72	65	57	46	31			B	35	N
13	A	58	38		37	B	A	68	73	65	68	72	76	84	74	68	48	41	30	35			69	
14	A	38	35	31	35	N		58	59		69	68		71	64	70	64	45	30		89		32	35
15		35	35	40	37	36		58	75	75	75	71	71	69	78	72	71	A	A	36	A	34		34
16	36	38		32		32	36	95	95	81	82	88	72	69	86	81	59	44		32	36	A	36	38
17		29	37	41	28	B		69	77	76	84	82	83	93	85	71	62	46	44	N	35		A	A
18	59	58	35	38	40	38	34	60	69	80	76	83	90	96	92	77	66	51	58			A	A	N
19	A	A	A	35	36	N		59	79	80	81	72	70	77	63	66	73	43	29	A	35	36	B	N
20	B	35	35	35	28			61		92	72	73	68	66	69	66	55	42	A	69			B	
21	28	N	31	35		59		68	61	66	54	74	71	64	62	54	55	A	38		35		35	34
22		56	32	35		31	32	58	70	61	67	67	73	66	62	60	81	58	48			56		
23	44	36		N	36	34	32	59	116	115	116	88	97	75	66	70	70	57	46	A	40	47		A
24	43	A	28	31	A	B		70	70	76	80	85	96	87	76	71		61	41	A		A	31	25
25		A	35	32	31	A	A	69	70	81	100	91	87	74	71	65	68	57	47	38		56	35	31
26	34	36	31	A	32	29		70	73	60	71	78	76	72	66	60	70		32	36	36			N
27	35		35	40	38	37	A	73	93	71	86	92	80	87	67	74	71	46	A	A		69	69	35
28	35	35		40	41	49		65		75	96	102	81	78	74	71	60	46		29	A		A	46
29	41		42		42	38	A	68		82	76	77	73	80	73	63	68	40		A	36	35	34	34
30		37	36	36	38		49		70	73	75		75	67	64	75	57	47	N	B	49		34	35
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	18	19	21	24	26	19	12	26	25	28	30	27	29	30	29	29	28	27	18	16	16	10	14	15
MED	43	37	35	36	37	34	36	68	73	76	76	82	76	76	73	71	66	51	38	37	36	47	35	35
U Q	49	46	39	40	38	37	41	70	78	81	86	88	88	84	80	77	71	57	46	42	47	56	56	44
L Q	36	35	34	32	32	29	32	59	70	71	72	72	72	69	66	66	59	44	31	35	36	36	34	34

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT KOKUBUNJI

NOV. 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	24	28	G	G	G	24	28	26	44	52		50	43	41	48	32	28	28	B	G	41	29	33
2	29	30	28	25	G	G		36		43	30	28		34	27	43	21	G	30	G	G	27	25	40
3	30	G	G	G	G	G	28	36	30	37	31	30	26	26	28	30	28	G	G	G	29	50	40	34
4	34	29	24	24	G	25	G	32	37	44	46	55	G	40	56	B	72	26	G	29	G	G	28	28
5	G	28	G	G	G	G	G	31	30	40		104	87	40	61	50	43	30	80	58	40	41		G
6	G	G	G	G	G	G	G	26	25	28	31	51	30	57	58	47	61	54	53	49	G	27	26	G
7		G	G	G	G	G	G	29	34	40	31	51	53	50	51	44	50	40	60	29	31	34	31	G
8	G	26	G	G	27	G	24	26	30	32	40	31	32	32	47	47	30	71	72	58	45	30	29	26
9	G	G	G	G	G	B	G	34	29	35	42	38	29	28	43	45	28	G	G	G	G	G	30	G
10	G	G	G	G	G	B	G	28	26	31	30	33	32	39	44	38	31	35	40	30	29	G	G	G
11	G	G	G	G	G	G			31	32	28		36	31	44	40	34	G	G	G	G	42	G	G
12	G	G	G	G	G	G	G	28	29	31	32	33	40	35	28	30	G	G	G	G	G	B	G	29
13	33	26	G	G	28	B	29	28	28	29	30	30	32	26	39	25	G	G	G	G	G	G	30	26
14	26	G	G	G	G	G	G		28		37	28		44	47	37		G	G	G	G	G	G	G
15	G	G	G	G	G	G	G	30	33	46	31	47	39	36	43	44	36	48	30	G	45	G	G	30
16	29	26	G	G	25	G	G	G	27	30	31	29	28	47	29	32	34	32	25	G	G	48	G	G
17	G	G	G	G	G	B	G	G	30	30	30	32	42	29	24	26	G	G	G	G	G	G	38	45
18	29	46	29	G	G	G	28	G	31	29	32	32	G	30	30	27	G	G	28	25	26	27	25	G
19	35	35	29	G	30	28	G	26	31	29	30	56	55	85	50	30	33	30	29	24	23	G	B	G
20	B	G	G	G	G	G	G	G	26	29	29	44	30	G	32	25	28	G		G	25	G	B	G
21	G	G	G	G	G	24	G	G	26	24	G	G	G	G	48	44	28	37	29	24	G	G	G	G
22	G	G	G	G	G	G	G	G	29	28	48	29	30	29	28	28	31	36	28	31	26	G	G	G
23	G	G	G	G	28	G	G	35	38	40	50	48	69	58	54	54		44	28	56	G	25	30	38
24	33	31	G	G	26	B		G	30	31	30	G	G	34	37	39	65	37	30	50		29	G	G
25	28	29	32	28	52	33	29	40	31	31	30	31	33	57	69	45	G	G	G	G	G	G	G	G
26	G	G	24	26	G	G	G	G	31	25	31	32	32	31	29	23	30	G	G	G	G	G	G	G
27	G	G	G	G	32	28	26	25	28	40	32	44	30	31	29	30	28	G	29	28	G	28	G	G
28	G	30	G	G	G	G	G	G	30	40	40	43	40	42	48	28	29	G	G	26	37	32	32	G
29	G		G		G	G	26	30	31	44	42	40	52	50	26	34	30	26	28	35	G	G	29	28
30	G	G	G	G	G	G	G	32	G	30	31		35	33	31	33	29	28	G	B	G	G	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	29	30	25	27	28	29	29	29	27	28	30	30	29	28	30	29	28	29	29	27	30
MED	G	G	G	G	G	G	G	28	30	31	31	33	32	34	42	37	30	26	28	24	G	G	25	G
U Q	29	28	G	G	25	G	24	31	31	40	40	47	41	44	48	44	34	36	30	30	27	31	30	28
L Q	G	G	G	G	G	G	G	G	27	29	30	30	29	30	29	29	28	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT KOKUBUNJI

NOV. 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	17	16	15	14	15	16	16	14	14	15	16		21	18	21	15	15	14	15	B	14	15	15	15
2	15	15	14	16	15	15	15	17	15	15	18	21	17	17		15	14	15	14	21	15	16	14	15
3	14	15	16	14	16	16	14	14	14	15	14	16	16	17	20	15	15	16	15	15	14	15	15	14
4	14	14	15	14	14	14	15	15	15	16	32	23		32	20	B	15	15	14	15	14	15	15	14
5	15	14	14	14	14	15	15	14	14	15	21	23	20		18	17	15	14	14	14	14	14		15
6	15	15	14	14	14	14	16	16	16	16	20	18	22	21	14	15	15	16	15	14	15	15	14	15
7		14	14	14	15	17	15	15	15	14	15	17	18	16	17	15	15	15	14	15	15	15	15	14
8	14	15	15	15	14	15	15	17	15	16	16	22	21	20	17	15	15	15	15	14	15	15	14	14
9	14	15	14	14	14	B	14	14	14	15	16	16	17	18	17	16	14	15	14	15	15	15	15	15
10	15	14	14	15	15	B	16	23	17	16	21	15	14	14	17	16	15	15	14	15	15	14	14	14
11	16	14	14	15	15	15			15	14	16		38	38	21	16	15	14	16	15	15	14	15	15
12	14	15	15	15	16	14	16	15	16	20	18	18	16	16	15	14	17	15	15	15	14	B	15	15
13	15	14	14	14	15	B	14	15	15	16	15	15	18	18	14	14	17	15	17	15	16	16	14	15
14	15	14	15	16	14	15	16	23	15		17	17		18	15	15	15	15	17	14	16	16	14	15
15	15	14	15	14	15	14	15	15	14	14	15	20	21	15	17	15	15	15	14	15	15	14	14	15
16	14	14	14	15	14	15	15	20	15	14	15	20	15	14	14	15	15	14	16	16	14	14	15	15
17	15	15	15	14	14	B	15	14	15	16	15	18	20	20	24	17	22	15	20	15	15	14	14	15
18	14	15	14	15	14	14	15	22	17	18	24	24	24	23	17	17	21	16	15	15	15	15	17	17
19	15	15	15	15	14	18	16	21	16	15	14	17	14	15	15	14	15	15	14	15	14	16	B	21
20	B	15	14	16	14	14	16	22	15	17	18	22	20	34	20	15	15	15	15	17	15	14	B	66
21	14	14	15	15	16	14	16	17	16	33	36	40	39	35	33	20	14	14	14	14	15	14	16	14
22	15	15	15	15	15	15	15	21	15	14	16	20	18	18	14	15	15	15	14	15	14	18	15	16
23	14	15	15	15	15	15	14	15	14	16	17	18	17	14	15	15	15	15	14	15	16	16	15	15
24	14	14	15	14	15	B		15	17	21	21		35	24	21	20	16	14	14	14	14	14	15	15
25	14	14	14	14	14	14	14	16	14	21	21		24	20	16	15	23	15	15	15	16	15	15	15
26	15	15	14	15	15	14	15	14	15	14	20	20	20	17	18	14	15	15	14	14	14	14	18	21
27	15	15	15	14	15	14	15	16	15	16	16	16	17	16	17	14	16	15	15	14	14	14	17	15
28	15	15	14	15	15	15	16	16	14	15	18	15	16	16	22	18	22	15	14	15	14	15	14	15
29	15		15		15	14	18	15	14	16	15	16	18	16	16	14	14	14	15	14	14	15	14	14
30	14	14	15	15	14	15	16	16	33	15	14		17	17	17	14	15	15	18	B	14	15	14	15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	29	30	25	28	29	30	29	30	25	28	29	29	29	30	30	30	28	30	29	27	30
MED	15	15	15	15	15	15	15	16	15	16	16	18	18	18	17	15	15	15	15	15	15	15	15	15
U Q	15	15	15	15	15	15	16	18	16	16	20	21	21	20	20	16	16	15	15	15	15	15	15	15
L Q	14	14	14	14	14	14	15	15	14	15	15	16	17	16	15	14	15	15	14	14	14	14	14	15

HOURLY VALUES OF foF2 AT YAMAGAWA

NOV. 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	32		32		50		N	60	69	73	94	112	91	74	88	87	74	72	60	29		34	38	A
2	59	30				28	25	60	63	68	75	95	84	86	92	99	78	73	72		59	43	42	30
3	32	32	30	69	41			56	61	70	66	96	81	78	87	87	66	67	53		59	N	69	
4			59	28	31	89	N	54	58	72	76	91	91	97	95	B	71	60	A	20	37			69
5	40	49		47	58	30	24	60	83	92	85	106	105	103	95	97	84	72	70	53		53	62	60
6	51	53	58	61	36	37	42	70	75	72	78	81	92	91	95		85	62	47	A	79	A	32	79
7	43	34		60	69		29	53	66	87	101	107	93	116	134	102	88		66	50	59	42		
8	A	48		26	31	29	26	69	72	85	102	100	86	92	110	112		66	A	61			69	60
9	50	43		70	55	B	N	58	84	80	81	84	82	75	92	86	66	54	60	34		60		N
10	30		60	59	32		25	58	67	79	67	74	75	100	94	72	73	73	66	48		56		31
11	32		59	37			31	59	67	73	C	96	80	87	76	76	66	66	61	49	44			32
12	A	69				B	N	59	71	87	94	95	74	82	78	78	63	61	54	35		32	32	
13	N		38	35		59	69	54	73	72	82	81	80	94	100	74	71	60	69			59	25	42
14	38		38		42	29		61	66	63	72	88	83	76	75	83	66	65	59	59	34		69	69
15	69	N	50	59	60		38	61	74	80	82	70	72	66	86	83	86	71	53		37			A
16	42	36	69	59		36			76	84	80	87		75	91	100	83			59	69	79	N	N
17	69	N	59	62	B	B		53	67	77	80	84	87	105	110	100	81	67	57	34		59	49	59
18	31	34	59	N	32		B	48	74	67	67	82	90	108	111	108	77	80	59	69	40			N
19	31	32			59	B	26	53	77	92	78	82	A	87	105	100	83	63	59	60	34		N	B
20	59	59	28	59	69	29	28	53	71	81	71	80	80	75	90	90	94	77	70		38	38		30
21		59	31		60	32	B	28	68	70		81	82	74	71	67	68	56	45		47		59	N
22	32		59		58	47	25		53	68	65	69	74	72	68	66	72	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	74	85	100	87	80	80	78	75	65	74		79	A		34
26	N			32		N		31	65	81	71	75	80	72	75	72	72	76	43	A	69		31	
27	49	31	N	34		60	30	50	83	79	75	84	96	96	88	87	74	73		34	34	31	35	
28	27	41		36		N	49		72	80	85	94	100	86	92	87	76		89		38	43	36	42
29		40		47		49		89	72	97	93	86	81	94	86	75	72	74			N		42	34
30		38		32			34		70	88	85	80	74	82	74	74	69	51	47		50	56	N	41
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	17	15	19	16	13	15	23	27	28	26	28	26	28	28	26	27	24	22	15	18	14	15	15
MED	40	40	58	47	52	36	29	58	71	79	80	85	82	86	90	86	74	66	60	49	46	48	42	42
U Q	51	51	59	60	59	54	38	60	74	84	85	95	91	95	95	99	83	73	69	59	59	59	62	60
L Q	32	33	32	34	34	29	25	53	66	72	72	81	80	75	79	75	69	61	53	34	37	38	32	32

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT YAMAGAWA

NOV. 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	38	36	32	37	30	28	54	56	60	G	24	G	G	G	G	29
2	G	G	G	G	G	G	G	24	40	33	60	81	45	32	30	27	40	G	G	G	G	G	G	G
3	G	29	28	G	G	G	G	G	30	26	28	32	G	G	G	28	30	G	G	G		G		G
4	G	G	G	G	G	G	G	G	29	34	28	G	G	G	55	B	69	53	68	G	G	G	G	G
5	G	G	G	G	G	G	G	30	29	32		G	60	55	57	57	39	G	G	G	33	31	30	29
6	28	G	G	G	G	G	G	G	25	29	30	42	62	54	50	126	60	32	38	59	G	40	28	G
7	G	G	G	G	G	G	G	G	39	50	60	76	30	28	38	32	32	G	G	G	G	25	28	31
8		G	G	G	G	G	G	G	28	31	38	32	31	38	G	60		37	150	32	29	45	G	G
9	G	G	G	G	G	B	G	28	32	29	32	29	32	30	31	29	45	34	G	25	29	G	G	G
10	G	G	G	G	G	G	G	G	25	29	56	57	53	30	40	36	52	38	G	G	G	G	G	G
11	G	G	G	G	G	G	G	G	26	34	C	39	40	39	39	35	37	26	G	G	G	G	32	G
12	30	24	G	G	G	B	G	G	32	38	33	38	32	32	45	27	32	G	G	G	G	G	G	G
13		28	27	26	G	G	G	G	32	32	30	30	31	31	45	28	25	G	G	G	32	G	G	G
14	G	G	G	G	G	G	G	G	27	28	28	39	38	30	30	61	39	50	33	G	30	G	G	G
15	G	G	G	G	G	G	G	G	26	32	38	31	60	39		70	40	G	G	G	G	G	G	28
16	G	G	G	G	G	G	G	G	26	G	27	28	G	39	37	38	24	G	G		G	G	G	24
17	G	G	G	G	B	B	G	G	30	27		29	28	27	30	28	24	32	32	G	G	G	G	G
18	G	G	G	G	28	G	B	G	28	28	29	37	30	36	36	38	30	G	G	G	G	G	G	G
19	G	G	G	G	G	B	G	G	32	30	32	31	136	38	52	38	32	36	32	G	29	G	G	B
20	G	G	G	G	G	G	G	G		33	44	29	33	32	53	46	40	32	40	25	32	G	G	G
21	G	G	G	G	G	G	B	G	31	33	36	28	30	38	29	30	51	32	28	25	28	G	G	G
22	G	G	G	G	G	G	G	33	27	38	28	37	32	31	29	38	26	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	33	38	51	G	G	32	28		32	G	27	25	28	G	G
26	G	G	G	G	G	G	G	G		34	37	G	G	38	32	28	30	26	G	25	G	G	G	G
27	G		28	G	G	G	G	G	24	28	39	38	27		32	28	26	G	G	26	28	G	30	G
28	29	G	G	G	G	G	G	G	22	32	32	34	36	35	G	G	G		G	G		26	31	G
29	G	G	G	G	G	G	G	G	26	30	28	40	36	44	44	27	28	26	G	G	31	G	G	30
30		G	G	G	G	G	G		G	27	27	28	31	36	33	32	32	G	24	G	G	G	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	26	27	27	26	23	25	26	25	28	25	28	28	27	27	27	26	26	27	26	25	27	26	26
MED	G	G	G	G	G	G	G	G	28	32	32	33	32	32	36	32	32	26	G	G	G	G	G	G
U Q	G	G	G	G	G	G	G	G	32	33	38	39	39	38	45	46	40	32	32	25	29	G	G	G
L Q	G	G	G	G	G	G	G	G	26	28	28	29	29	30	30	28	28	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT YAMAGAWA

NOV. 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	14	14	15	14	14	16	15	16	21	23	22	21		21	21	18	17	17	16	14	15	14	20
2	17	14	15	14	14	14	14	17	16	18	21	23	20	21	21	18	18	18	14	14	14	14	14	15
3	14	14	15	16	14	14	15	20	17	17	21	21	45	44	43	40	18	17	15	14	16	15	14	14
4	14	17	15	14	15	81	15	21	18	18			58	44	24	B	18	20	21	15	15	14	16	14
5	14	14	15	14	14	14	14	15	16	18	21		36	39	34	21	18	17	15	14	15	15	15	15
6	15	15	14	14	15	14	14	17	27	32	22	23	21	23	23	21	17	15	15	15	14	15	15	14
7	16	14	15	14	14	15	14	15	18	18	20	20	20	20	18	21	18	15	15	14	14	14	15	15
8	15	15	14	17	14	15	15	15	16	18	20	20		44	43	21		15	15	14	15	14	14	14
9	14	14	14	14	14	B	16	14	16	18	20	21	21		20	17	21	16	16	15	15	14	14	14
10	14	14	14	14	14	16	15	18	16	18	20	20	32	22	23	20	18	15	14	15	15	15	14	14
11	14	15	14	14	14	15	14	18	20	16	C	20	44	41	21	21	18	15	14	14	14	16	15	14
12	16	16	14	14	14	B	14	17	16	20	20	20	20	21	21	18	16	17	14	14	14	15	15	14
13	16	14	15	15	14	15	15	18	17	18	20	20	22	21	20	20	18	18	14	15	15	17	17	15
14	14	14	14	14	14	14	14	16	24	20	18	21		22	21	18	24	17	15	14	14	15	15	15
15	14	18	14	14	14	14	14	16	16	18	18	21	20	20	21	17	17	16	15	14	14	14	15	16
16	15	14	14	14	14	15	15	16	27	32		43	45	21		20	24	18	15	15	15	15	15	16
17	17	14	16	15	B	B	15	17	30	33	20	21	46	39	20	29	26	15	15	16	14	14	14	14
18	14	14	14	15	15	15	B	17	17	20	20	18	21	20	20	18	16	18	16	15	16	14	14	15
19	14	14	14	14	14	B	15	17	17	17	17	20	20	20	18	18	16	16	17	15	17	15	16	B
20	16	14	14	15	15	14	14	15	17	17	18	20	22	18	18	18	20	17	14	16	17	14	14	14
21	14	14	15	14	14	14	B	15	15	18	18	20	20	21	20	18	17	16	15	14	15	15	15	15
22	14	14	14	14	14	14	15	16	15	17	18	21	20	18	20	17	24	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	32	40	21	43	43	35	35	18	18	17	18	18	14	14	15
26	15		15	16	14	14	18	17	21	20		42	45	21	22	18	22	18	15	17	15	14	14	14
27	14	15	14	14	14	14	15	16	16	17	17	20	18	18	20	18	16	15	14	15	17	14	14	14
28	15	14	14	14	14	17	14	16	16	18	20	22	22	21		44	27		16	14	14	15	15	14
29	14	14	16	14	14	14	15	16	15	16	18	20	20	20	20	18	24	18	14	15	15	14	14	14
30		14	14	14	14	15	15		30	17	18	20	21	21	20	17	16	17	14	14	15	14	14	14
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	26	27	27	26	23	25	26	27	28	24	26	26	26	26	27	27	26	27	27	27	27	27	26
MED	14	14	14	14	14	14	15	16	17	18	20	20	21	21	21	18	18	17	15	15	15	14	14	14
U Q	15	15	15	15	14	15	15	17	20	20	20	21	43	39	23	21	22	18	16	15	15	15	15	15
L Q	14	14	14	14	14	14	14	15	16	17	18	20	20	20	20	18	17	15	14	14	14	14	14	14

HOURLY VALUES OF foF2 AT OKINAWA

NOV. 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	43	37	46	44	43	58	B	41	69	76	99	120	122	118	122	123	92	80		A	43		44	46
2		48		44	37			48	70	95	87	106	104	105	102	112	122	112		104	68	77	96	80
3		68		43	A	A	A		66		78	95	96	88	95	91		66		48	38	44		38
4	32	27		A	69	59	B	60	55	58	71	94	104	123	156		118		A	63	56			119
5	48	43		57	B			54		90	117	124	111	142	150	143	144	146		A		A	83	82
6		80	69		37	34		44	71	C	C	C	C	C	C	C	C	C	C	119	60		109	A
7	A	A	A	69	A	58		60	67	81	105	122	149	162	173	152		114	90	A	A	58		A
8	A	44	44	38		59		41	83	88	92	100	92	116	105	117	112	96		A	50	56	A	58
9	50	57	44	44	38	B	B	48	52	90	87	96	92	94	110	112	94		84	A	A	69	61	59
10	44	47		44	34	B		53	53	76	81	70	70	101	93	87	73	66	88		59	68	68	48
11	42	42	37	43	50	B	B	42	69	68	81	92	94	95	81	80	82	66	60		60	67	54	
12		59	A	49		B	B	54	73	94	94	99	75	87		91		66	74	A	44	44	69	59
13	59	A	43	46	A	B	A	48	62	81	94	101	114	146	131	122	94	80		84	73	73	58	55
14	57		46	54	42		B		95	66	71	81	116	107	130	93	92	81		A	46	44	43	41
15	37				47		N	62	61	86	83	87	81	77	94	107	96	94			54	63	53	57
16		A	43		41		31	A	76	82	90	94	106	114	110	149		93		65	A		A	A
17	B	30		44	B	B	N	42	69		88	97	101	130	150	150	132	124	78		47		59	59
18	49		69		43				71	67	76	75		131	133		136	128	125	89	63	46	42	46
19		59		37	30	B	B	48	52		96	90	92	121	163	167		114	A	A	58	71		43
20		28	35		69	69	59		67	70	87	102	116	132	138	150	145	124		82		A	A	48
21	B	69	34	35	35			44	63	76	94	88	90	121	91	87	82	64	A	A	72	44	46	109
22	37	69	44	59	69	A	A	A	53	63	71	76	82	86	84	91	82	94	84	A	56	51	69	49
23	82	71	37	37	36	59	69	46	83	125	102	114	111	92	86	81	86	93	85	A	54	40	58	60
24	70		89	37		B	B	60	82	93	72	80	93	94	100	86	92		85	36	44	43	69	59
25	59	38	30	38			B		94		88	95	102	123	91	101	81	74		A	51			
26					30	31	B	A	53	68	169	71	78		81		80	73	74	65	55	48	44	44
27	B	32	36	43		30	B		67	91	84	86	96	117	117	116	86	83		69	69		43	
28	59	A	A	89	43	34	37	42		94	93	92	102	107	121	118	85		A	A	52	57	44	A
29	A	44	41	58	36			A	44	101	122	101		102	105	86	93	A	A	59	52		44	
30	59	69			48		B	59	70	93	94	79			94	94	80	A	A	A	A	53		60
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	21	17	22	20	10		20	28	25	29	29	26	27	28	26	24	23	11	12	24	20	21	22
MED	50	47	43	44	42	58		48	68	82	88	94	98	114	108	110	92	93	84	67	54	54	58	58
U Q	59	68	46	54	47	59		56	72	93	95	101	111	123	132	123	115	114	88	86	60	67	69	60
L Q	42	37	36	38	36	34		43	58	69	81	83	92	94	93	91	82	73	74	61	48	44	44	46

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

NOV. 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	B	G	38	42	40	40	46	36	66	38	26	32	11	36	G	G		G
2	G	G	G	G	G	G	G	46	40	66	71	39	47	48	86	46	39	23		46	37	G	G	G
3		G	G	38	40	32	27		42	36	30	30	26	39	G	48	42	36		46	34	G	28	G
4	G	G	27	24	G	G	B	G	29	35	G	G	G	60	58	G	69	73	78	67	G	G		
5	G	G	G	G	B	G	G	35	32	42	50	58	72	66	58	68	54	48	48	29				
6			G		G	G	G		24	C	C	C	C	C	C	C	C	C	C	G			26	
7					25	G	G	35		65		50	73	50	46	45	39	35	26	47	50			34
8	40	G	G	G	G	G	G	38		34	48	57	38		52	43		G			40	28		
9	G	G		28	G	B	B	48	28	43	39	49	40	44	58	41	42		60	30	40	32	31	G
10	G	G	G	G	G	B	G	G	24	40	53	48	42		50	55	59		G	G	G	G	G	G
11	G	G	G	G	G	B	B	G	50	35	37		50	41	48	50	42	26	25	24	G		G	G
12	G				G	B	B	G	33	39	38	37	39					G	G	45	G	G	G	G
13	G	30	32	G	26	B	26	G	36	36	40	36	31	36	30	28	34	35		G	40	39	32	G
14	G	G		G	G	G	B		24	29	38	38	41	39	39	38	35	38		54	G	G	G	G
15	G	G		G	G	G	G	G	45	34	38	40	39	38	41	59	61	32		G	G	G		G
16	G	32	G	G	26	G	G		24	30	28	28	30	G	29	27	33	34		36	40	G	31	29
17	B	G	G	G	B	B	G		48	32	36	29	37	38	38	33	28	31		G	G	G	G	G
18	G	G	G	37	G	G	G		32	27	37	37	38	42	40	40	26	G	23	37	G	G	G	G
19	G	G		G	G	B	B	48	44	33	35	41	38		40		75	47	58	34	G	G	G	G
20	G	G	G	G	G	G	G	G	27	32	34	39	32	42	40	37	29	23		48				26
21	B	G	G	G	G	G	G	G	35	39	34	37	39	33	38	39	33			40	G	G	G	G
22	G	23	28	G	G	25	27	49	47	28	35	37	34	37	32	36	35	31	G	35	G	G	G	23
23	G	G	G	24	G	G	G	G	29	36	41	34	G	30	32	40	73	81	34	44	25	32	G	G
24	G	G	G	G	G	B	B	41	26	G	40	N	38	42	49	41	25		29	37	G	G	G	G
25	G	24	27	42	G	G	B	G	42	34	24	39	40	39	38	37	66	92		44	G	G		G
26	G	G	G	G	G	G	B	41	47	50	37	38	52	59	41	38	40	37	44	30	G	G	G	G
27	B	G	G	G	G	G	B	28	30	35	37	33	40	41	36	26	49	27		47	G	G	G	G
28	G	40	26	G	G	G	G	39	40	34	37	42	41	44	G	G	38		48	47	38	33	38	34
29	39	26	G	G	G	G	G	42	42		40	44	52	42		61	34		56			72	G	G
30	G	G	G	G	G	11	B	G	G	35	44	49	59	39	42	42	46	65	68	70	35			G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	27	24	27	28	22	18	24	28	28	28	27	29	25	27	27	27	23	17	28	26	24	21	26
MED	G	G	G	G	G	G	G	14	34	35	38	39	39	41	40	40	39	34	34	37	G	G	G	G
U Q	G	G	G	G	G	G	G	41	42	39	40	44	46	44	50	46	54	47	57	46	37	14	27	G
L Q	G	G	G	G	G	G	G	G	27	32	35	36	35	37	36	36	33	26	17	29	G	G	G	G

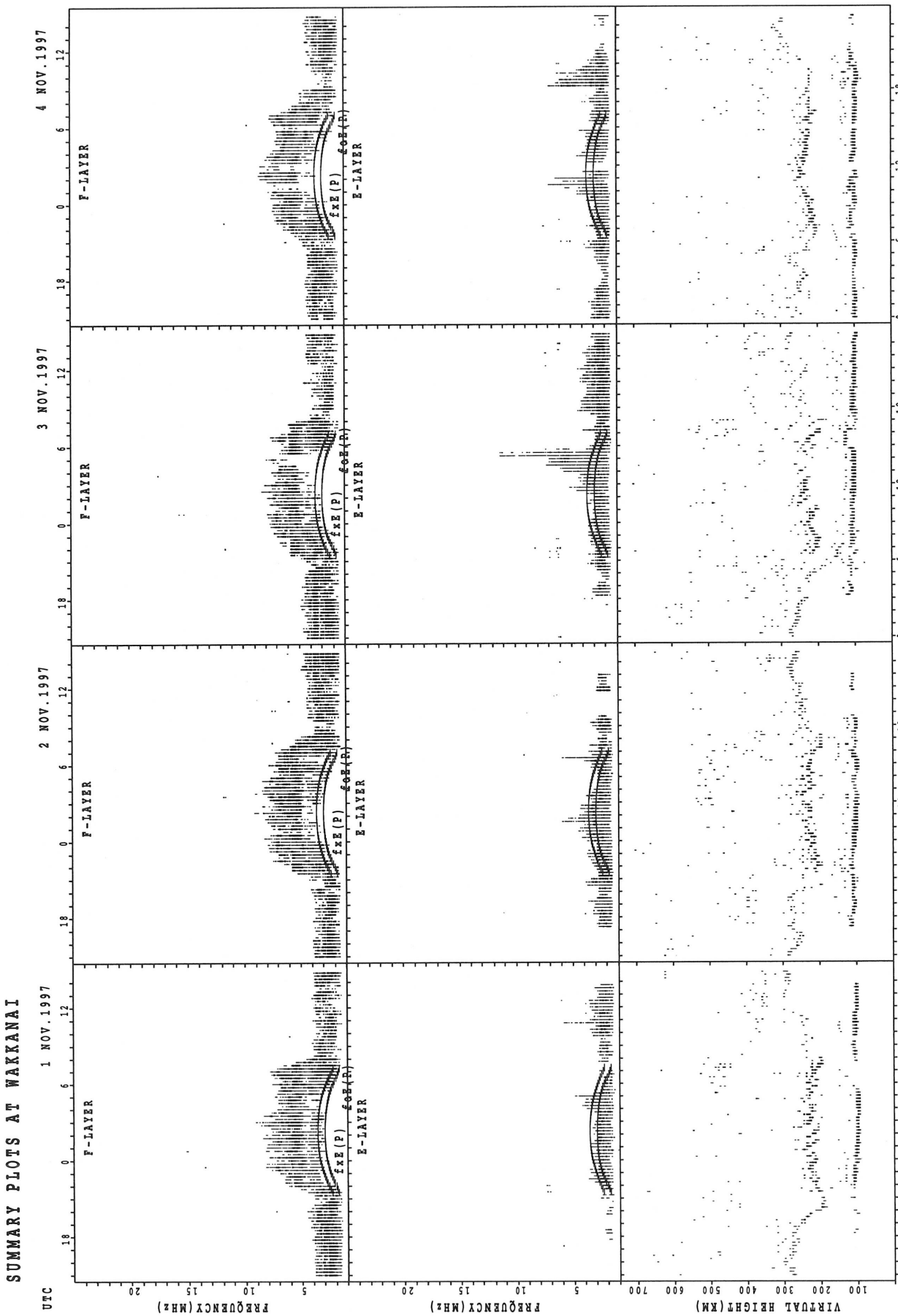
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT OKINAWA

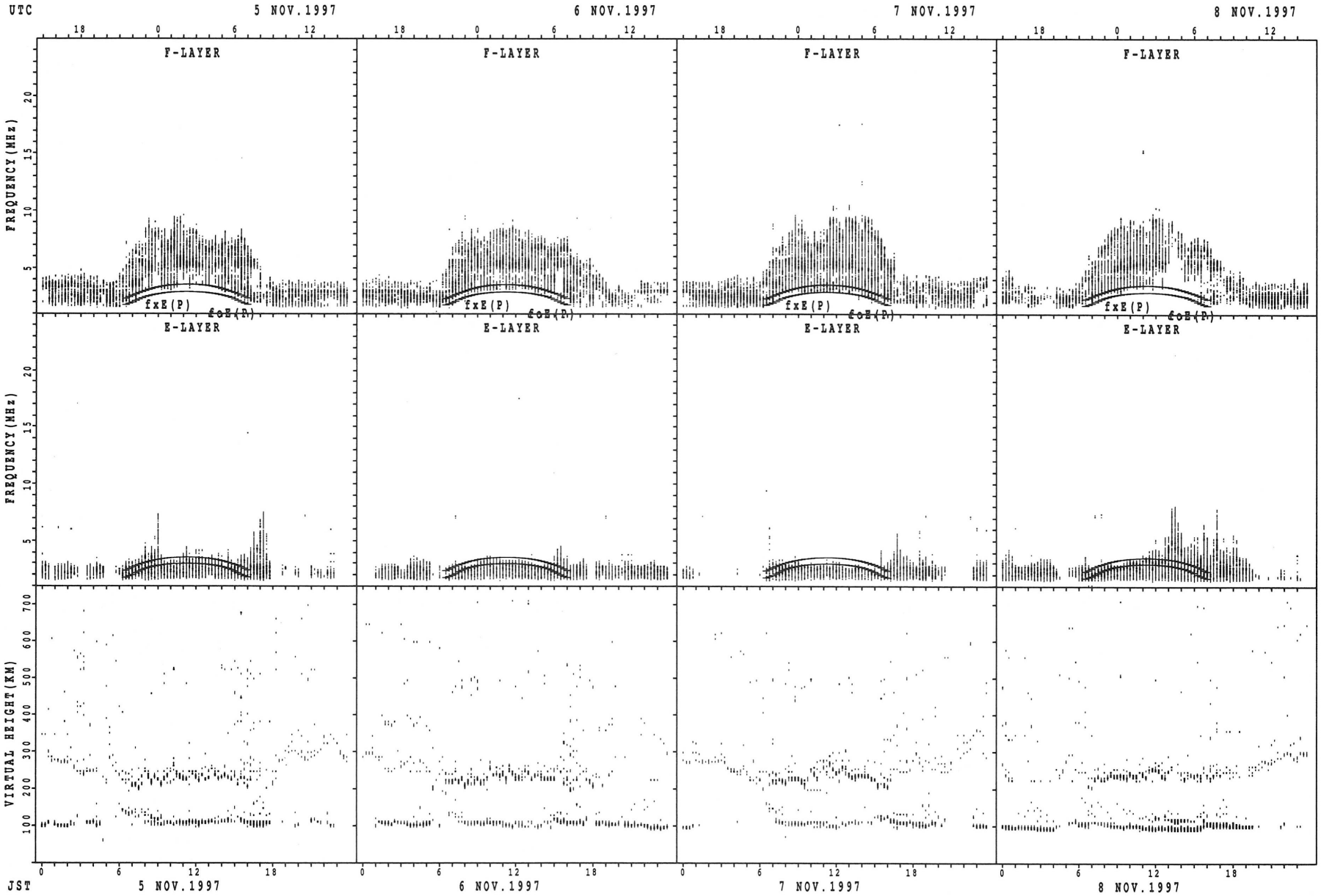
NOV. 1997

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

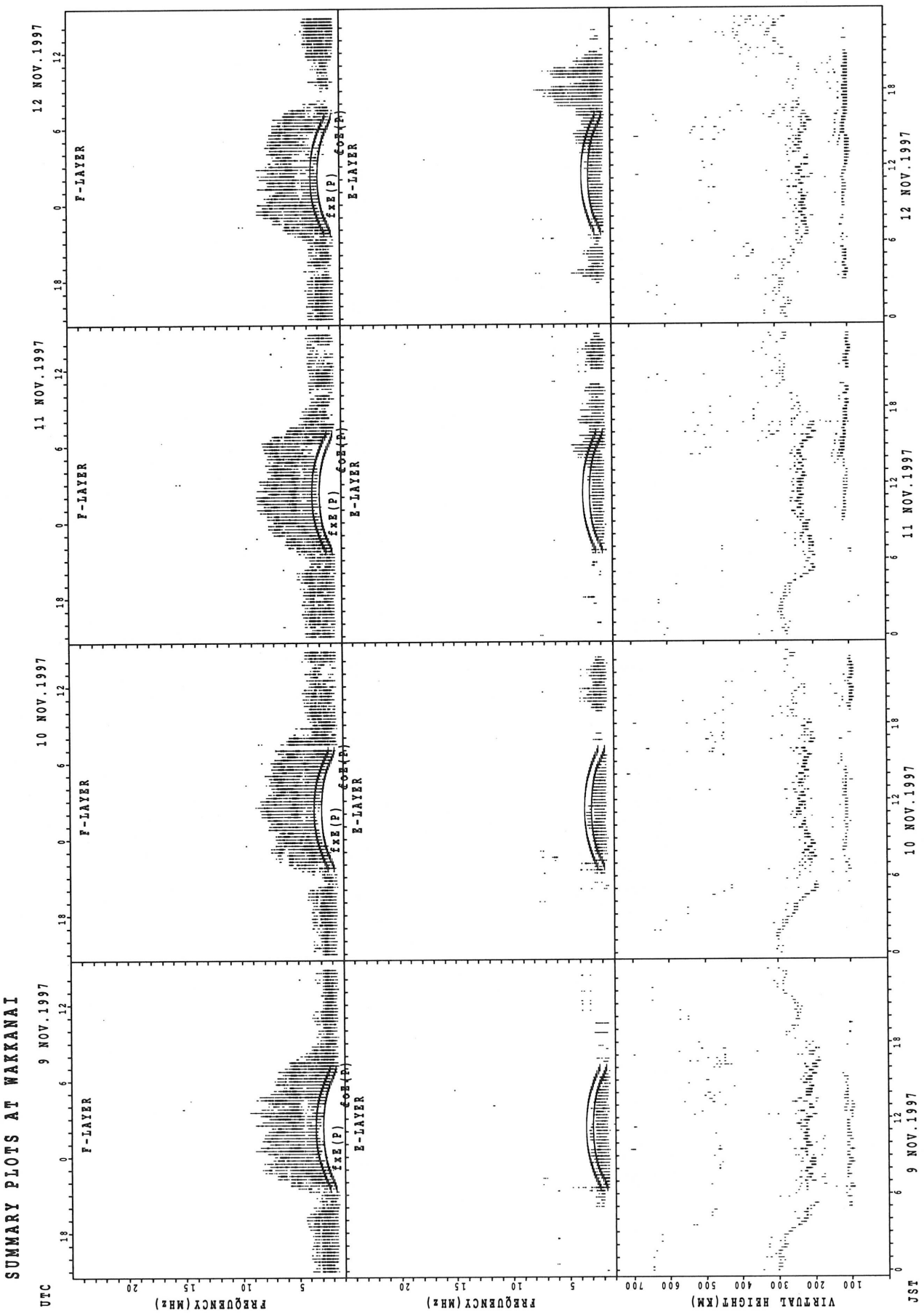
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	15	15	15	15	15	B	20	14	15	16	30	29	28	33	18	17	16	15	14	16	15	15	15
2	15	15	16	14	14	15	16	14	15	17	17	24	27	28	18	26	16	16		14	16	16	15	15
3		14	15	14	14	14	14		14	15	16		20	20		20	14	14		14	15	15	15	15
4	15	15	14	15	15	15	B	21	15	17			50	43	32		21	14	14	15	15	14		14
5	18	24	14	15	B		17	14	15	16	24	35	35	34	33	30	20	16	14	14	15	15	15	14
6	15	15	14		15	15	15	15	14	C	C	C	C	C	C	C	C	C	C	15	14		14	14
7	14	14	14	14	16	16	15	14	15	16	16	23	23	30	22	20	16	15	15	15	15	14		14
8	15	15	16	14	15	15	15	14	15	14	15	26	27	24	22	16	17	14		15	15	15	16	15
9	14	15	14	15	18	B	B	14	15	18	16	18	17	15	16	14	14		14	14	14	15	14	14
10	14	14	14	14	15	B	16	15	14	14	17	18		30	17	20	15	15	14	15	15	15	15	15
11	14	16	15	14	15	B	B	20	14	14	16	16	17	17	16	16	15	14	14	15	15	14	14	15
12	15	15	14	15		B	B	18	16	14	16	17	23	20	17	16		24	15	14	14	15	14	14
13	16	14	14	15	14	B	15	18	16	15	16	18	18	20	18	16	14	14		14	15	14	15	15
14	15	15	15	14	16	15	B		16	15	16	18	17	17	15	14	14	14		14	14	15	14	15
15	15	14		15	14	15	16	20	14	17	16	23	22	18	18	15	15	14		14	14	15	15	14
16	15	15	14	14	14	15	15	14	14	15	17	17	20	34	33	17	15	15		14	16	14	15	15
17	B	15	15	14	B	B	15	17	14	14	16	20	20	21	16	16	14	14	15	14	14	15	14	
18	15	14	14	14	15	14	16		14	15	17		21	28	18	18	15	18	15	14	14	15	15	15
19	15	15		15	14	B	B	16	15	15	16	17	18	23	18	15	15	15	14	14	27	15	15	15
20	16	16	15	15	15	15	14	17	15	15	17	21	21	22	32	16	15	22		14	15	14	14	18
21	B	16	15	15	16	15	16	17	15	15	17	22	21		18	17	15	14	14	14	15	15	15	15
22	15	14	15	14	15	14	15	15	14	14	15	18	26	18	16	15	14	14	14	14	15	15	15	15
23	14	15	14	14	14	14	17	16	14	14	16	20		17	17	18	14	14	14	15	15	15	14	15
24	15	16	14	16	15	B	B	16	15		20		26		22	18	17		14	15	15	15	18	15
25	14	15	15	15	15	15	B	15	14	16	17		45	24	17	20	16	15		14	14	16		14
26	18	15	15	18	14	14	B	14	15	15	17	21	23	28	34	20	15	14	14	15	17	15	16	14
27	B	15	15	14	15	14	B	14	14	15	16	17	17	17	17	17	15	14	14	15	14	15	15	15
28	15	14	15	15	14	15	18	15	14	14	16	22	24	20		46	16	14	14	14	15	15	15	14
29	14	14	16	15	14	15		14	14	15	16	18	18	17	17	15	14	14	14	14	15	14	15	18
30	15	14	14	15	15	14	B	15	28	15	16	17	18	20	17	17	15	14	14	14	15	15		15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	30	28	29	27	21	17	27	30	28	28	24	27	27	27	28	28	27	20	30	30	29	26	29
MED	15	15	15	15	15	15	15	15	14	15	16	19	21	21	18	17	15	14	14	14	15	15	15	15
U Q	15	15	15	15	15	15	16	17	15	15	17	22	26	28	22	20	16	15	14	15	15	15	15	15
L Q	14	14	14	14	14	14	15	14	14	14	16	17	18	18	17	16	14	14	14	14	14	14	14	14


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

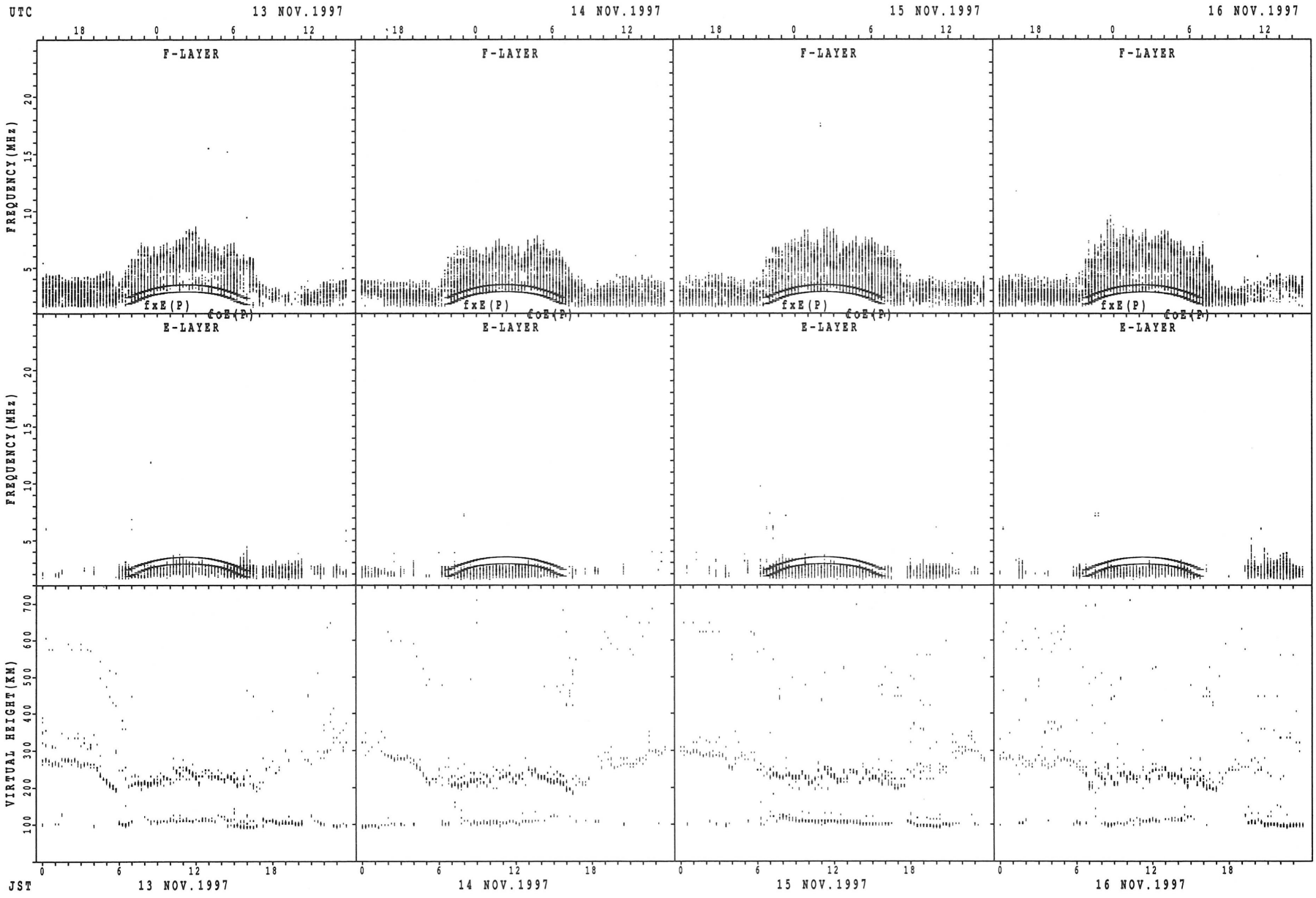
SUMMARY PLOTS AT WAKKANAI



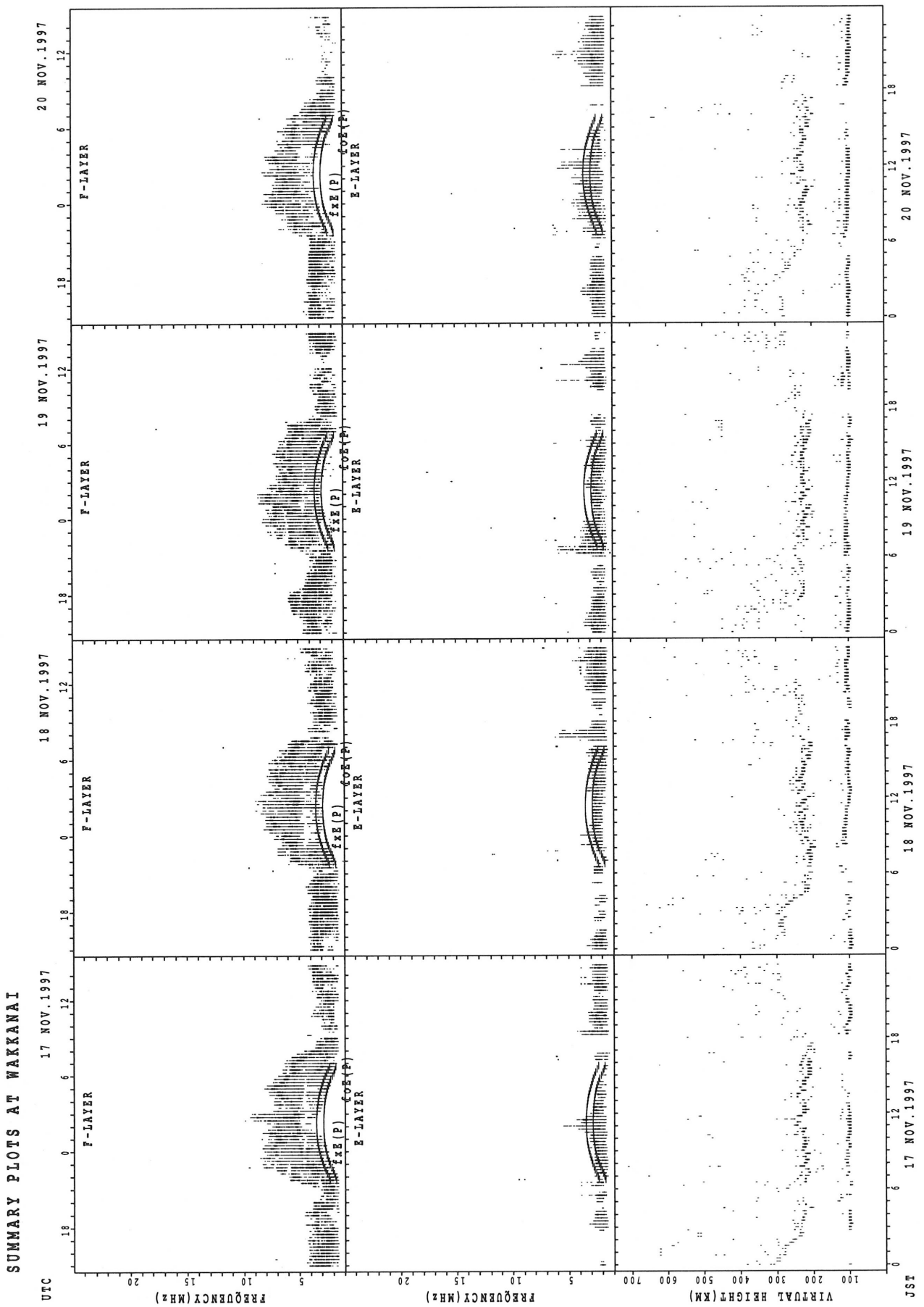
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

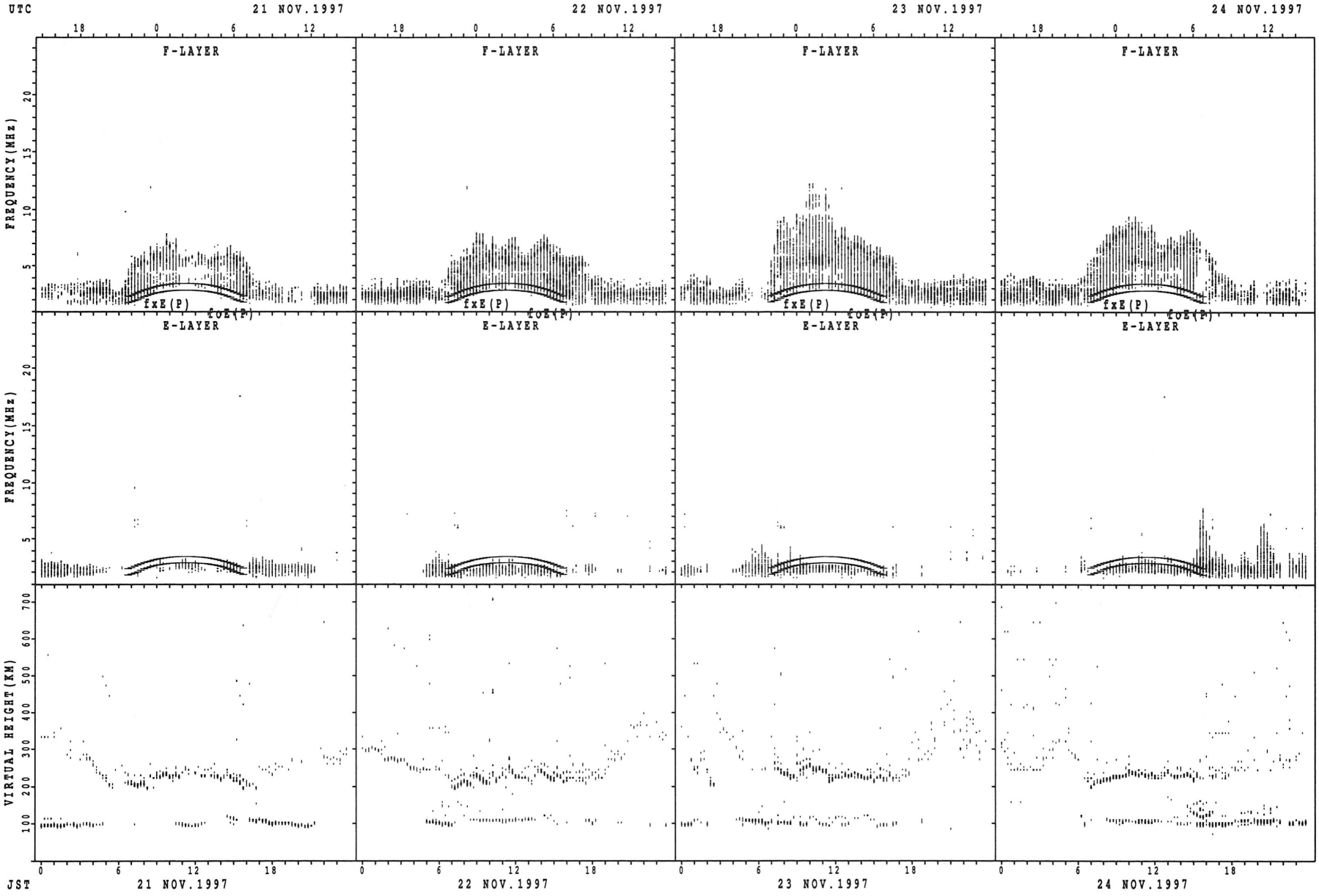
SUMMARY PLOTS AT WAKKANAI



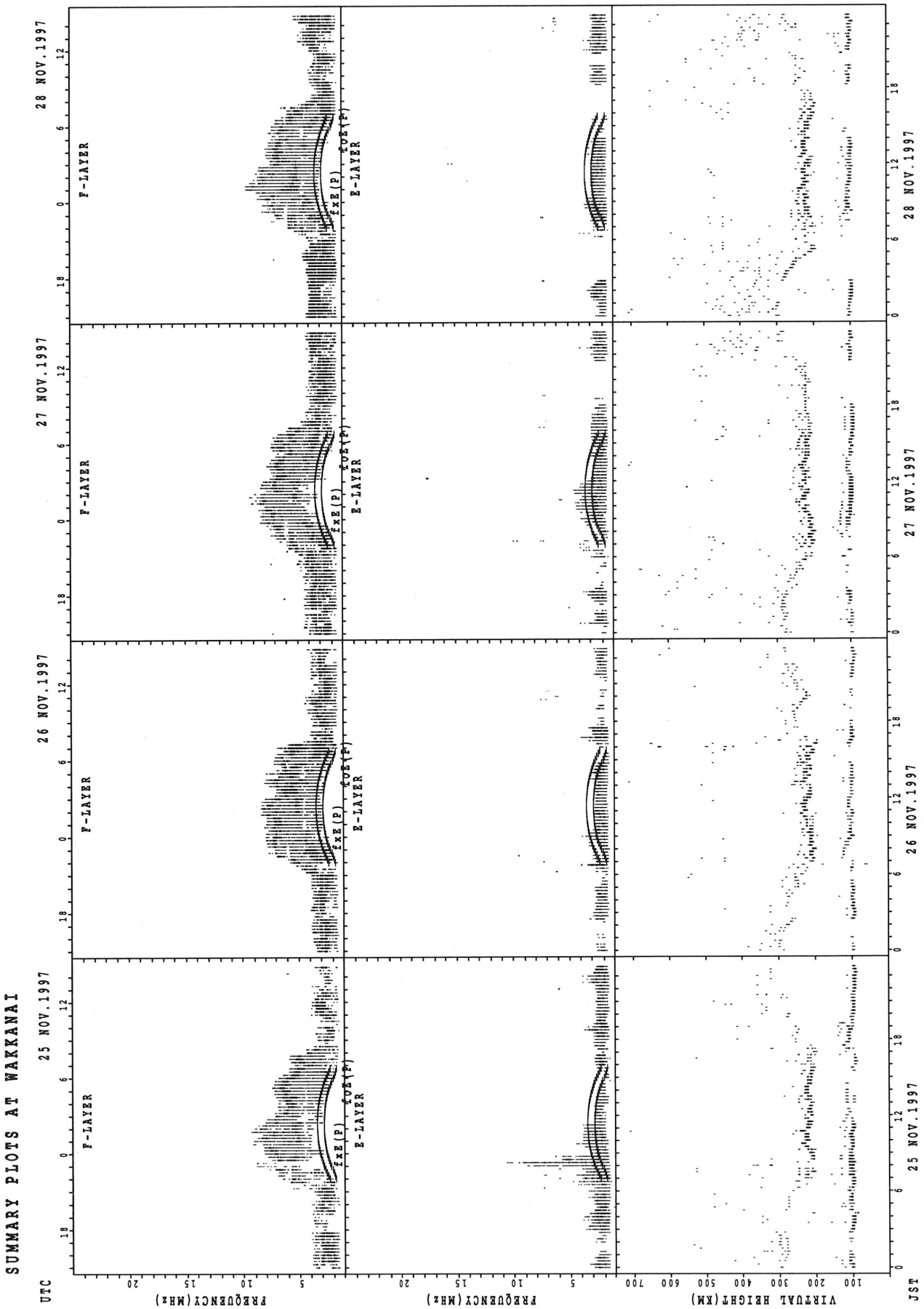
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

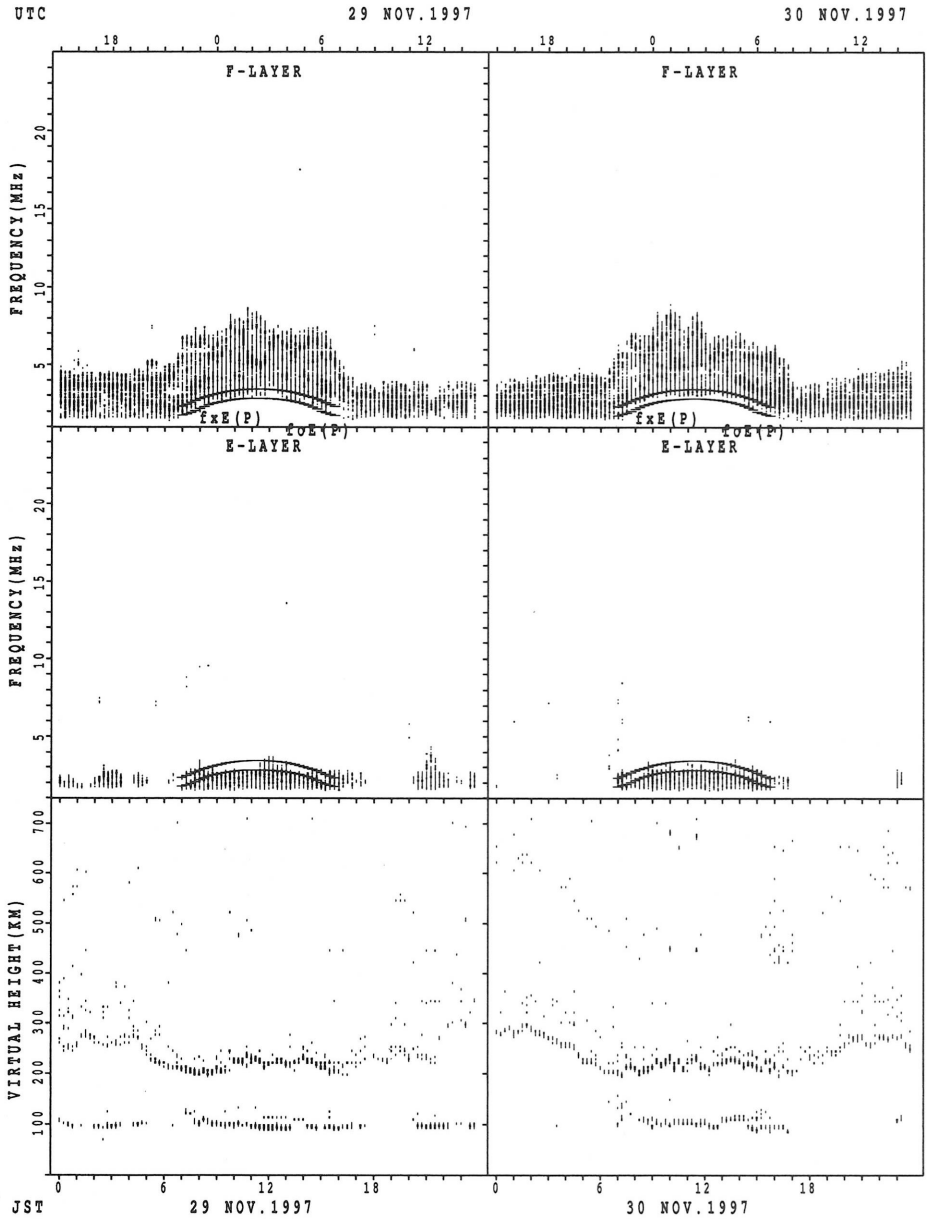
SUMMARY PLOTS AT WAKKANAI



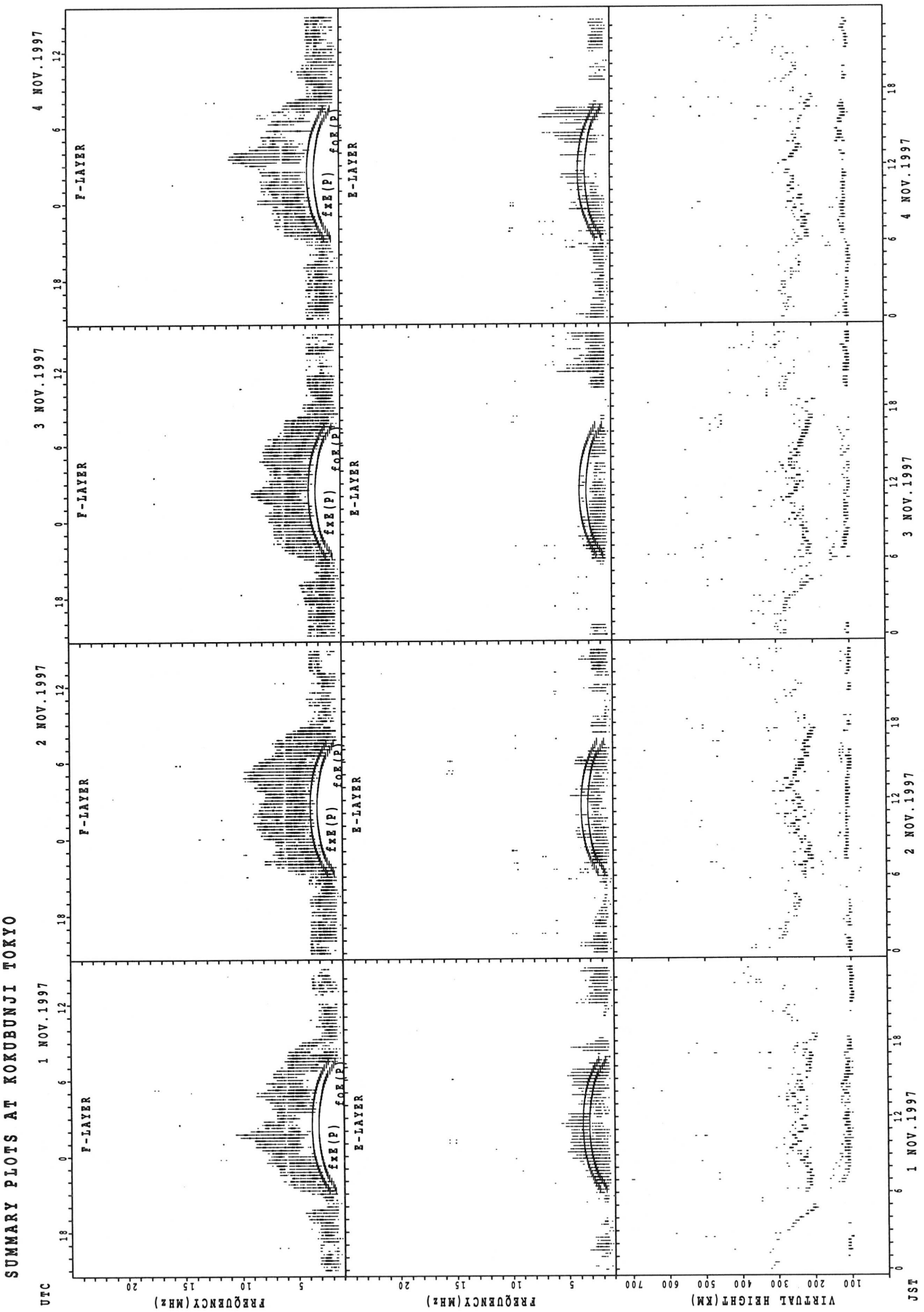
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
25 NOV.1997
26 NOV.1997
27 NOV.1997
28 NOV.1997
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

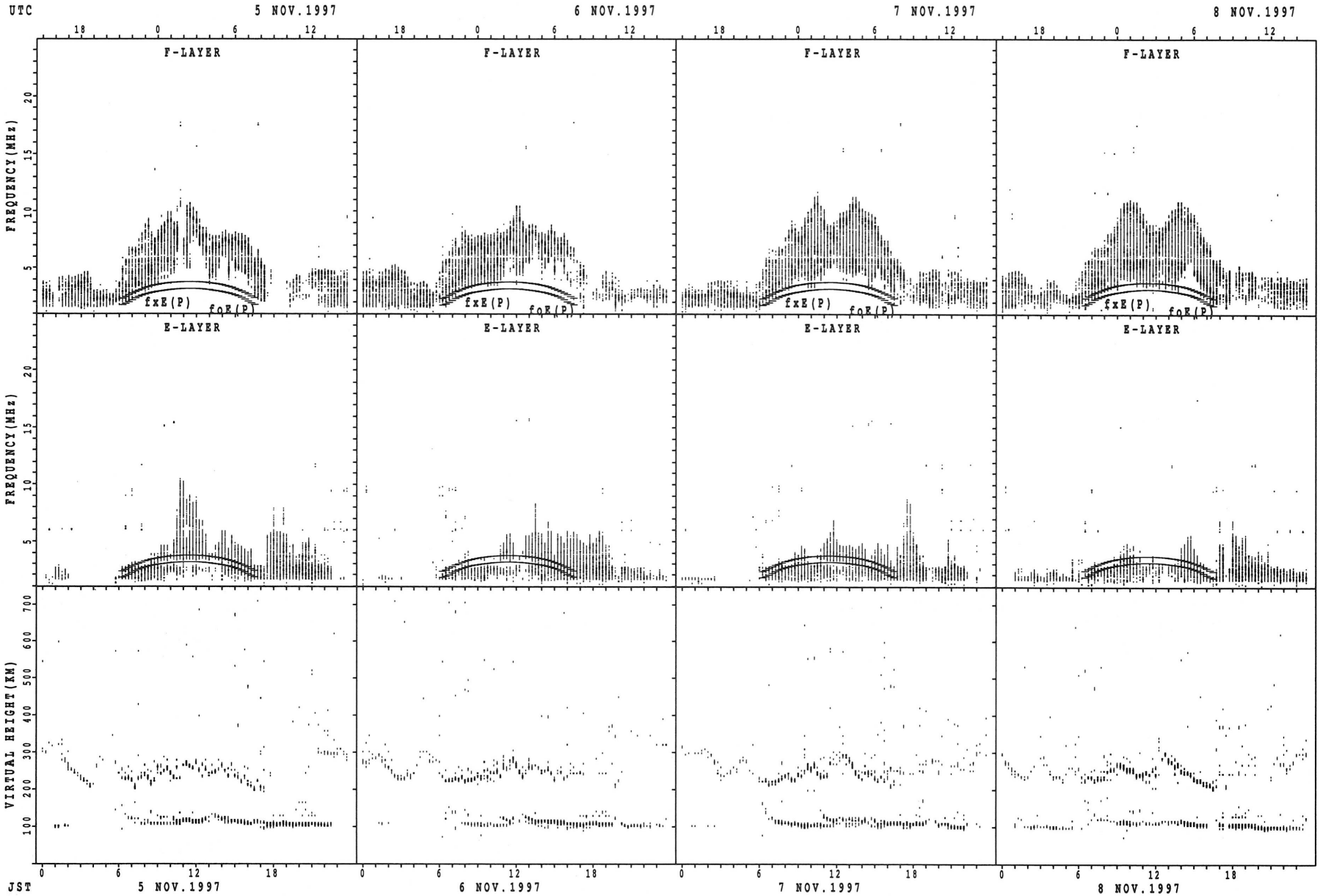
SUMMARY PLOTS AT WAKKANAI



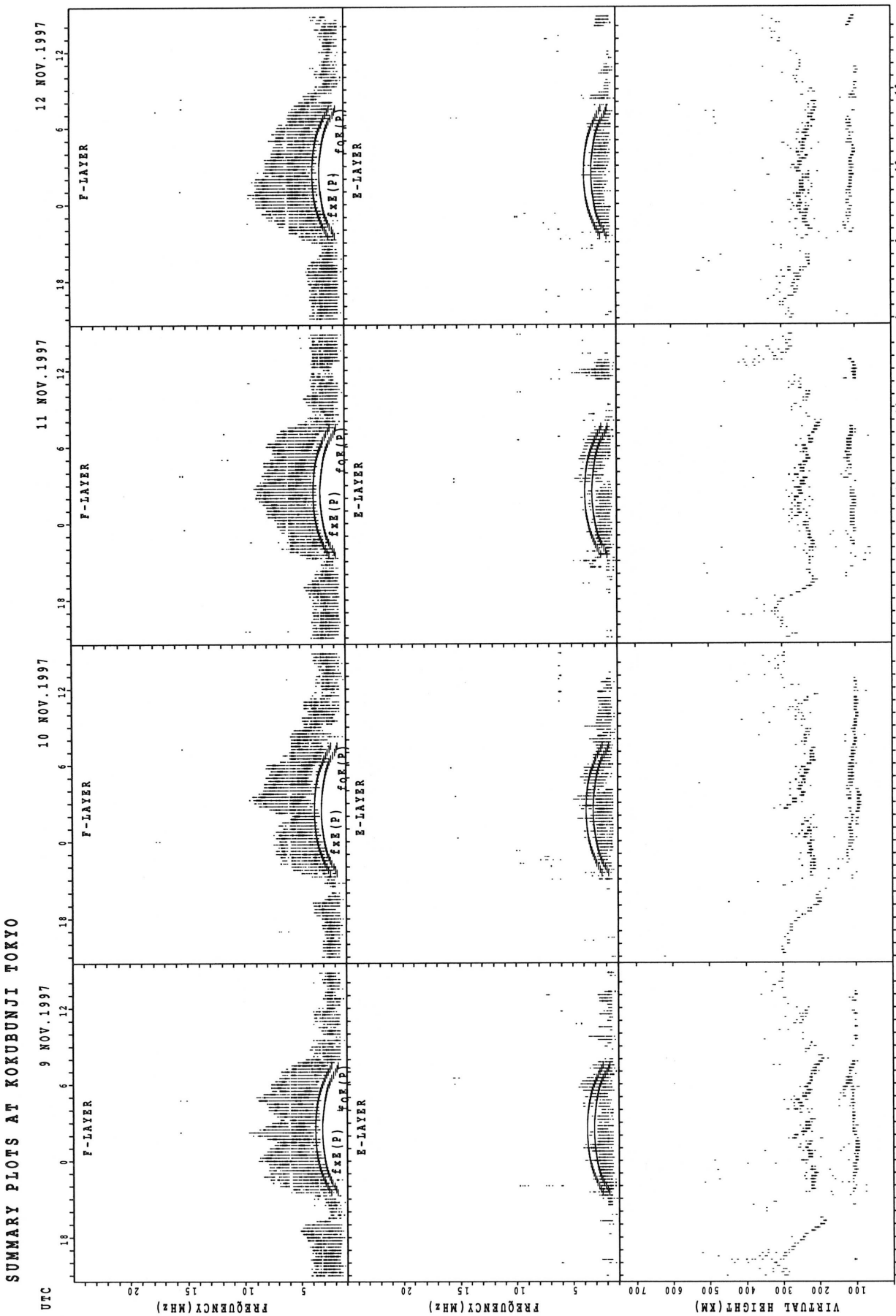
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

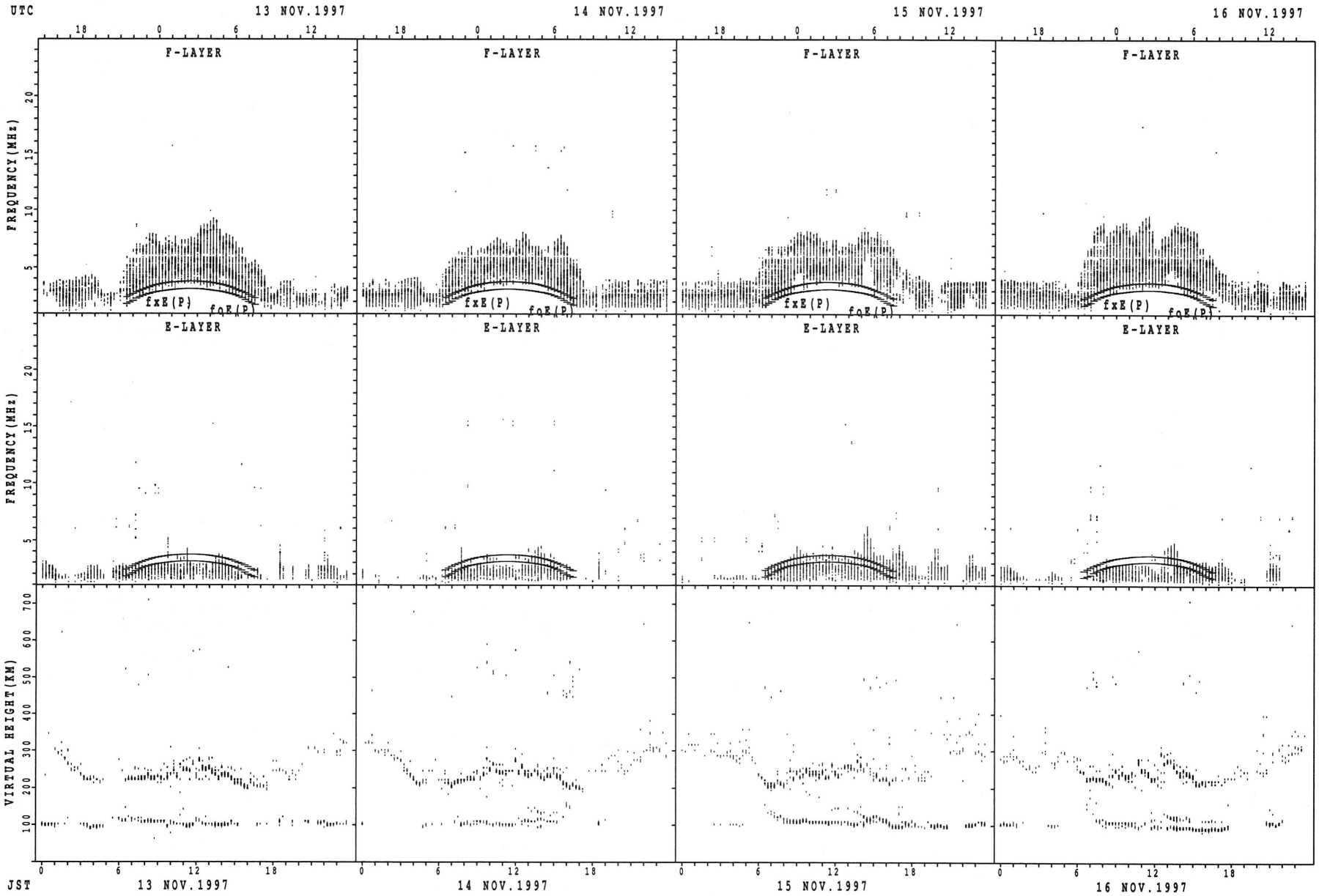
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

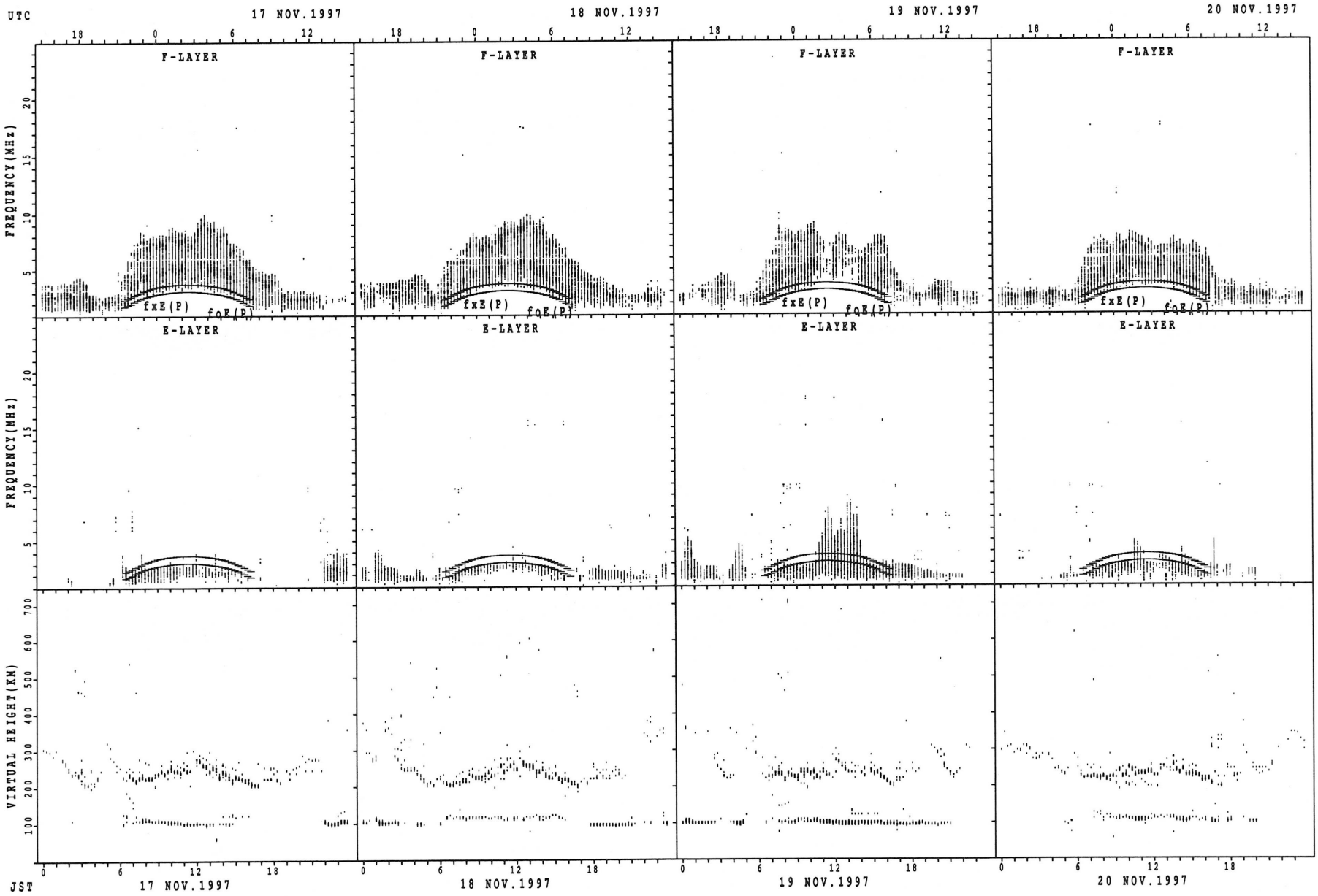

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
9 NOV.1997
10 NOV.1997
11 NOV.1997
12 NOV.1997
F-LAYER
E-LAYER
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
fxE(P)
foE(P)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



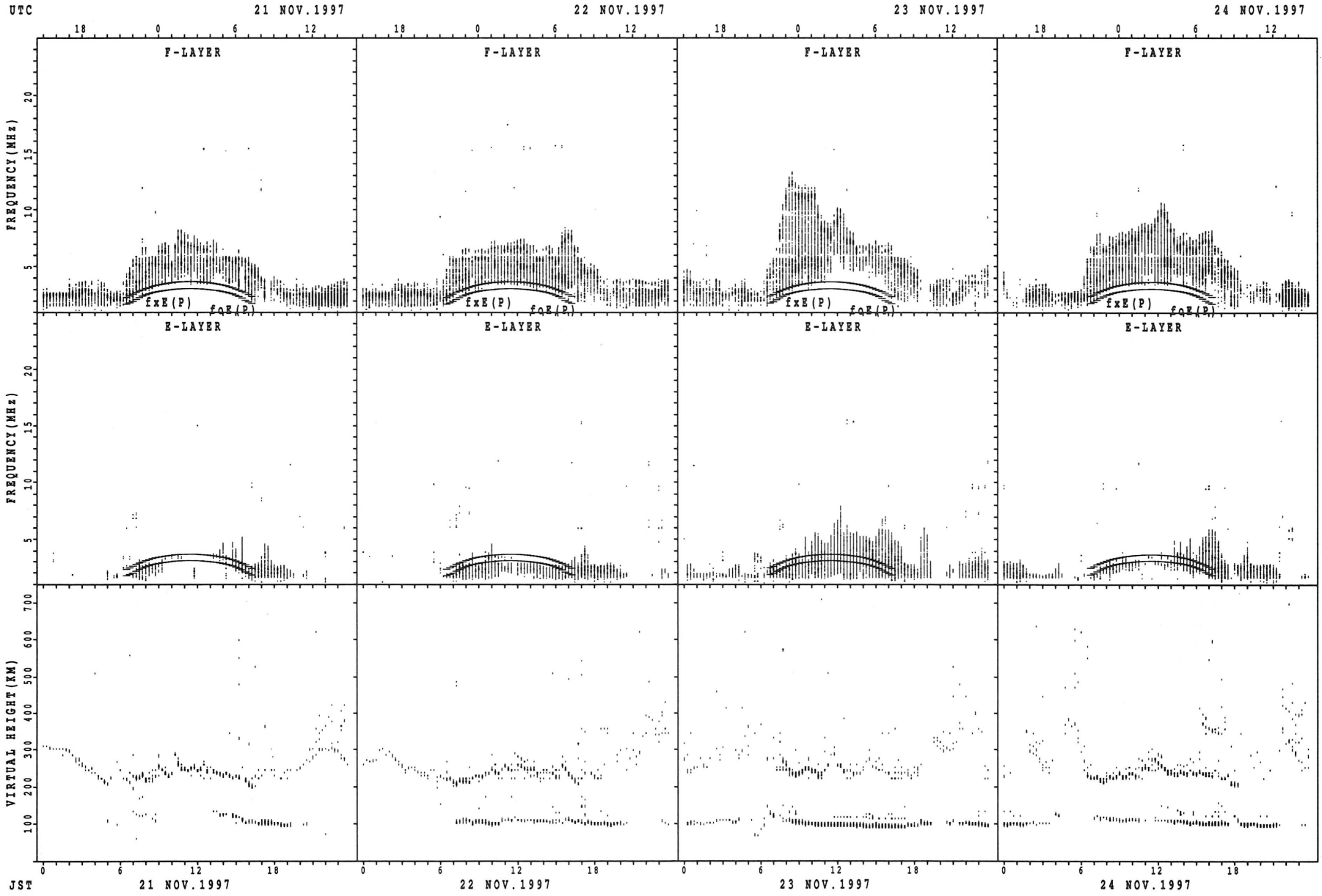
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

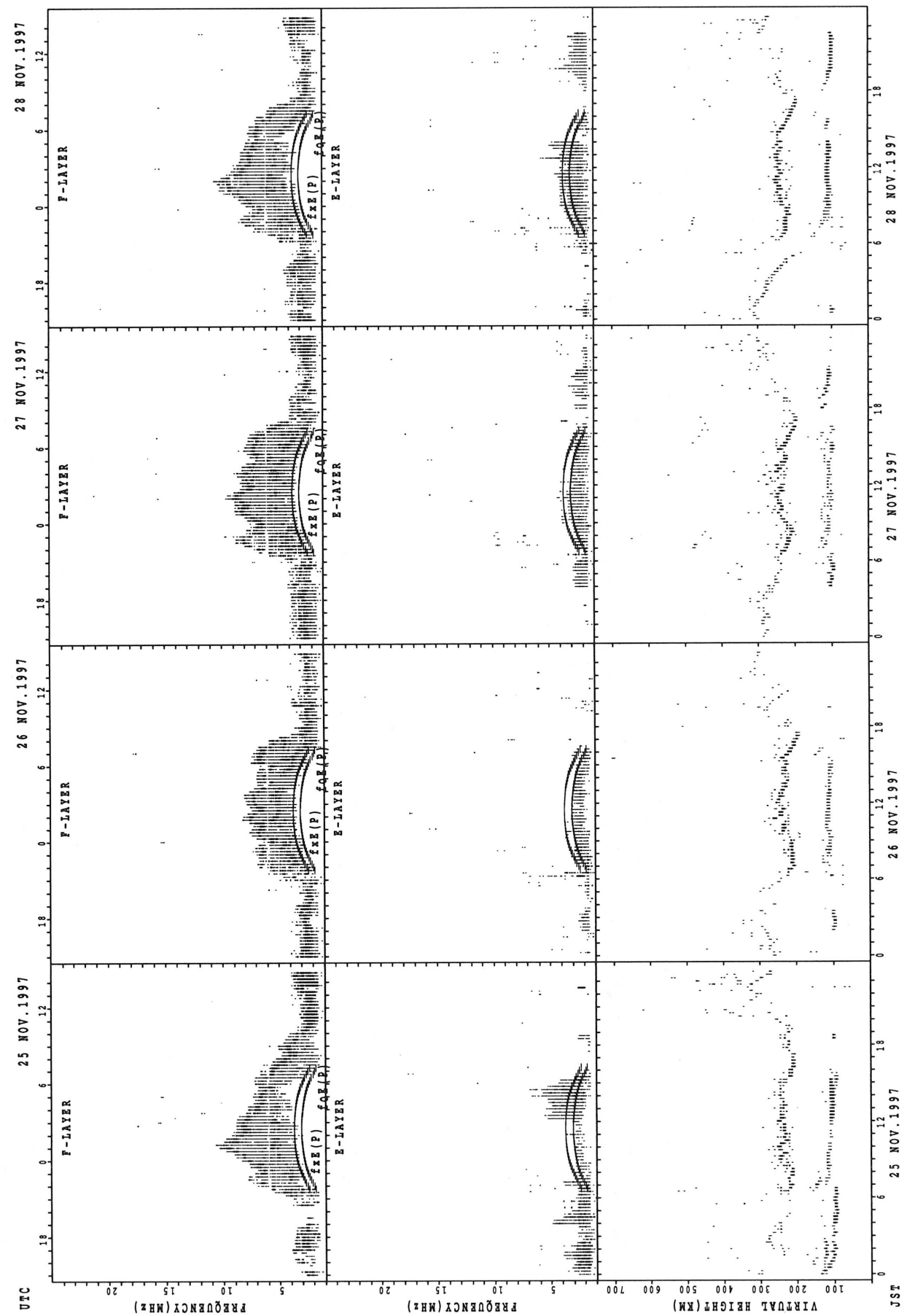


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

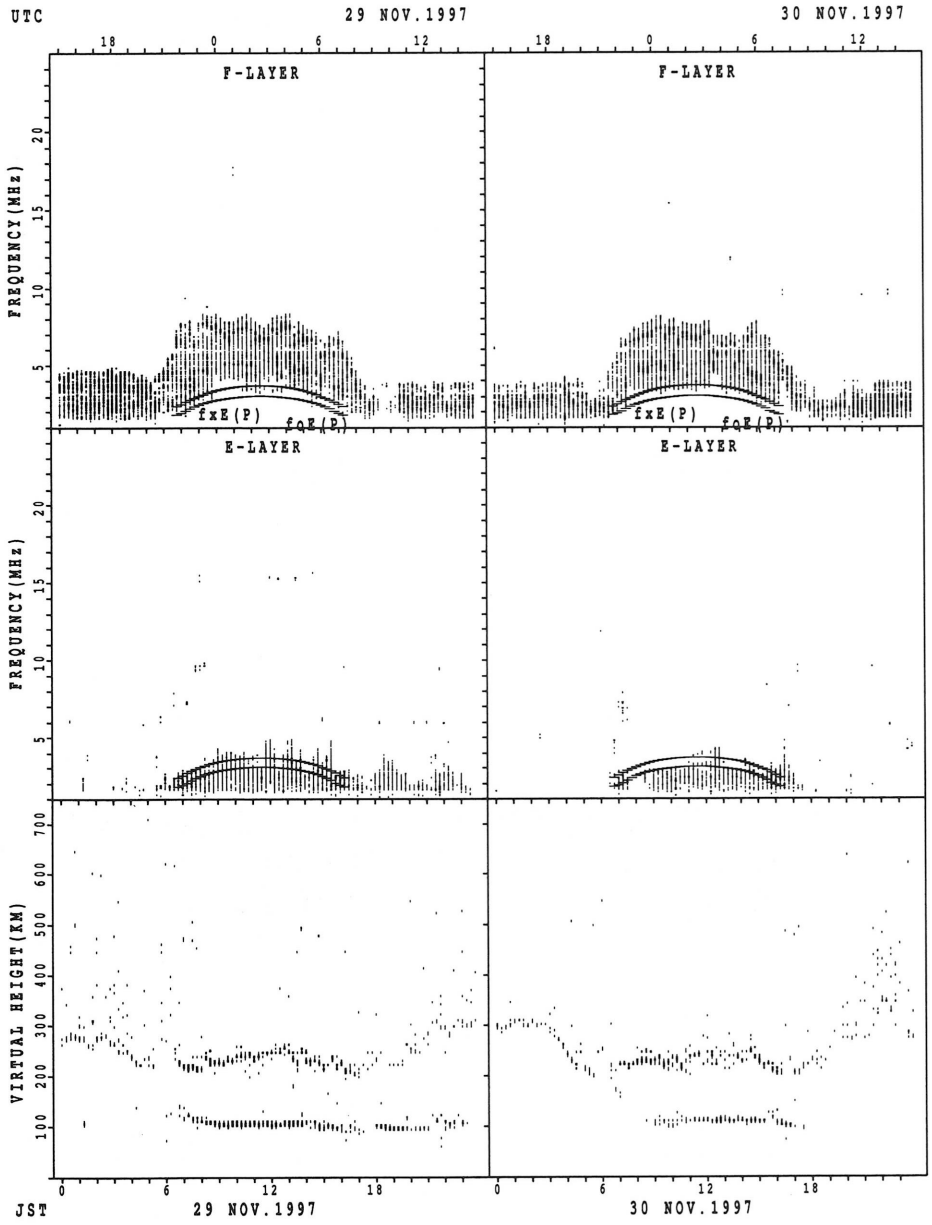
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

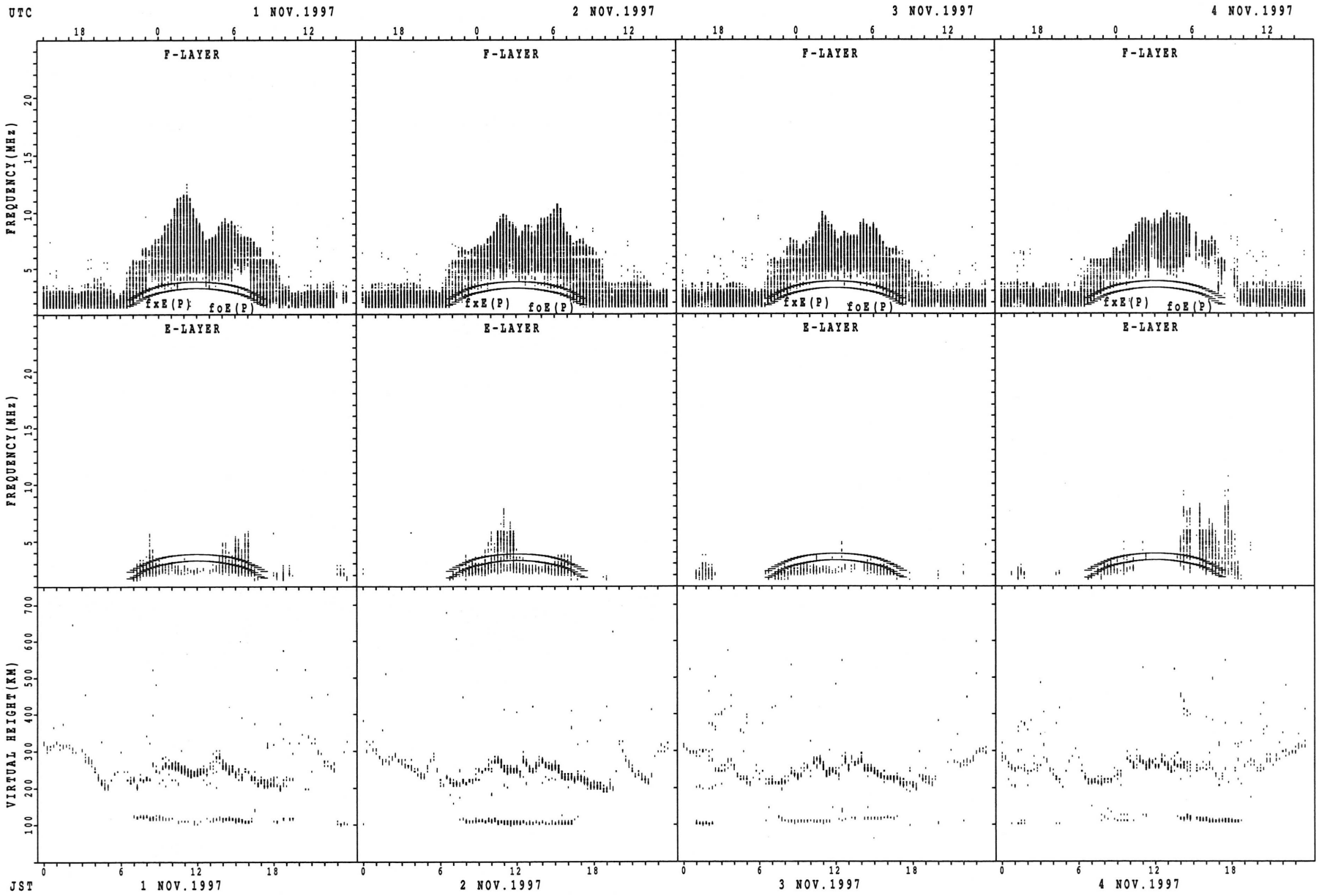

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
25 NOV.1997
26 NOV.1997
27 NOV.1997
28 NOV.1997
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



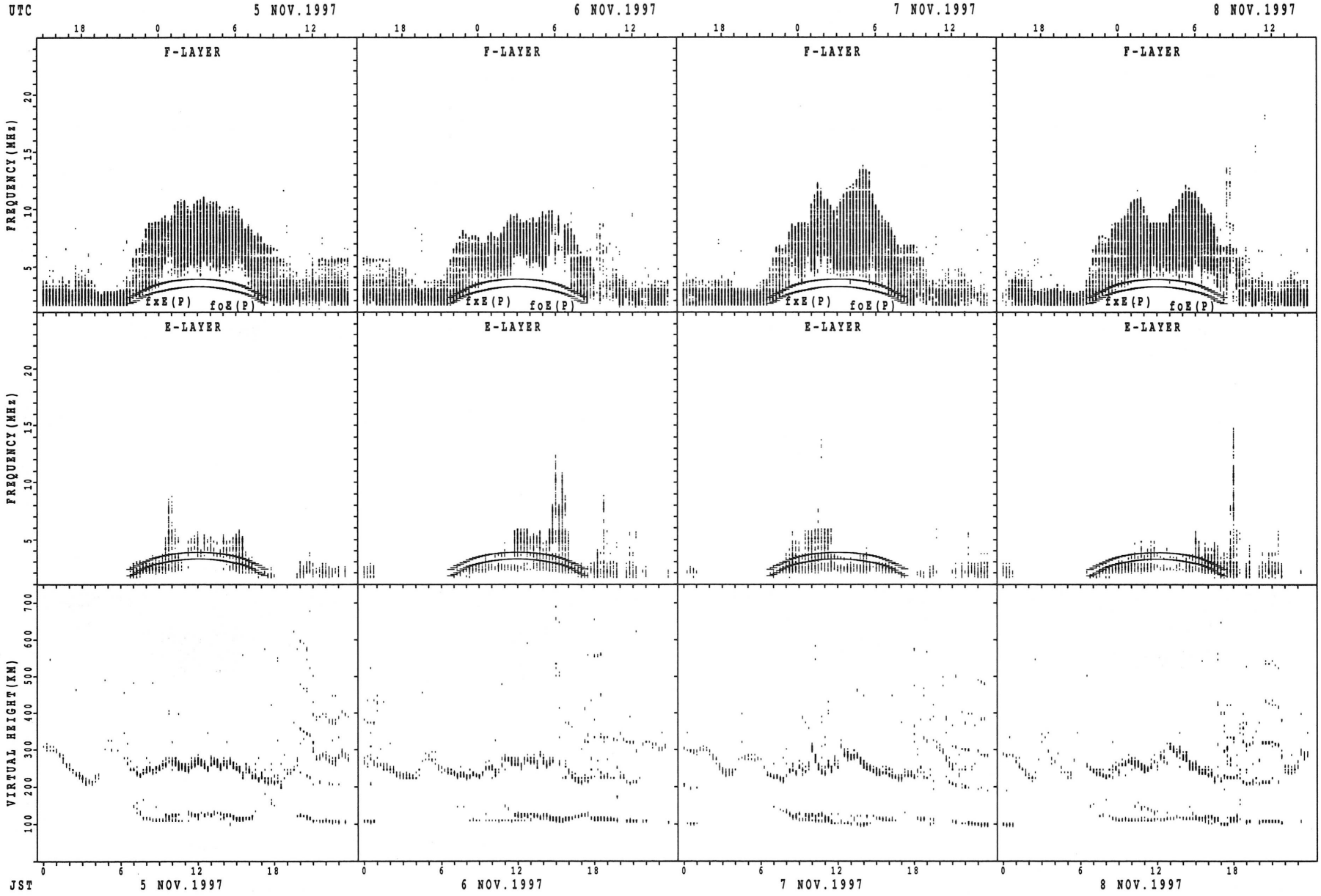
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA

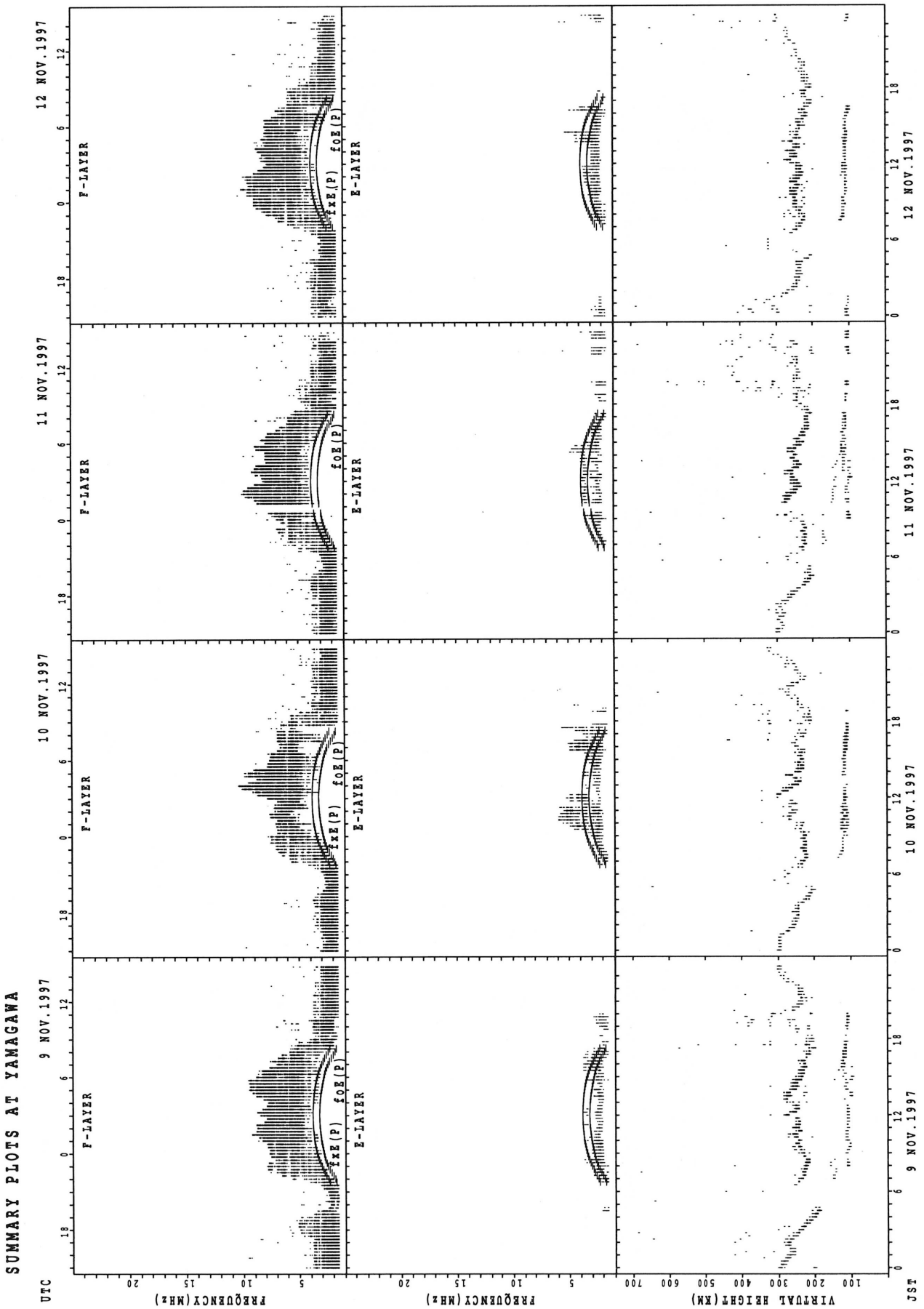


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

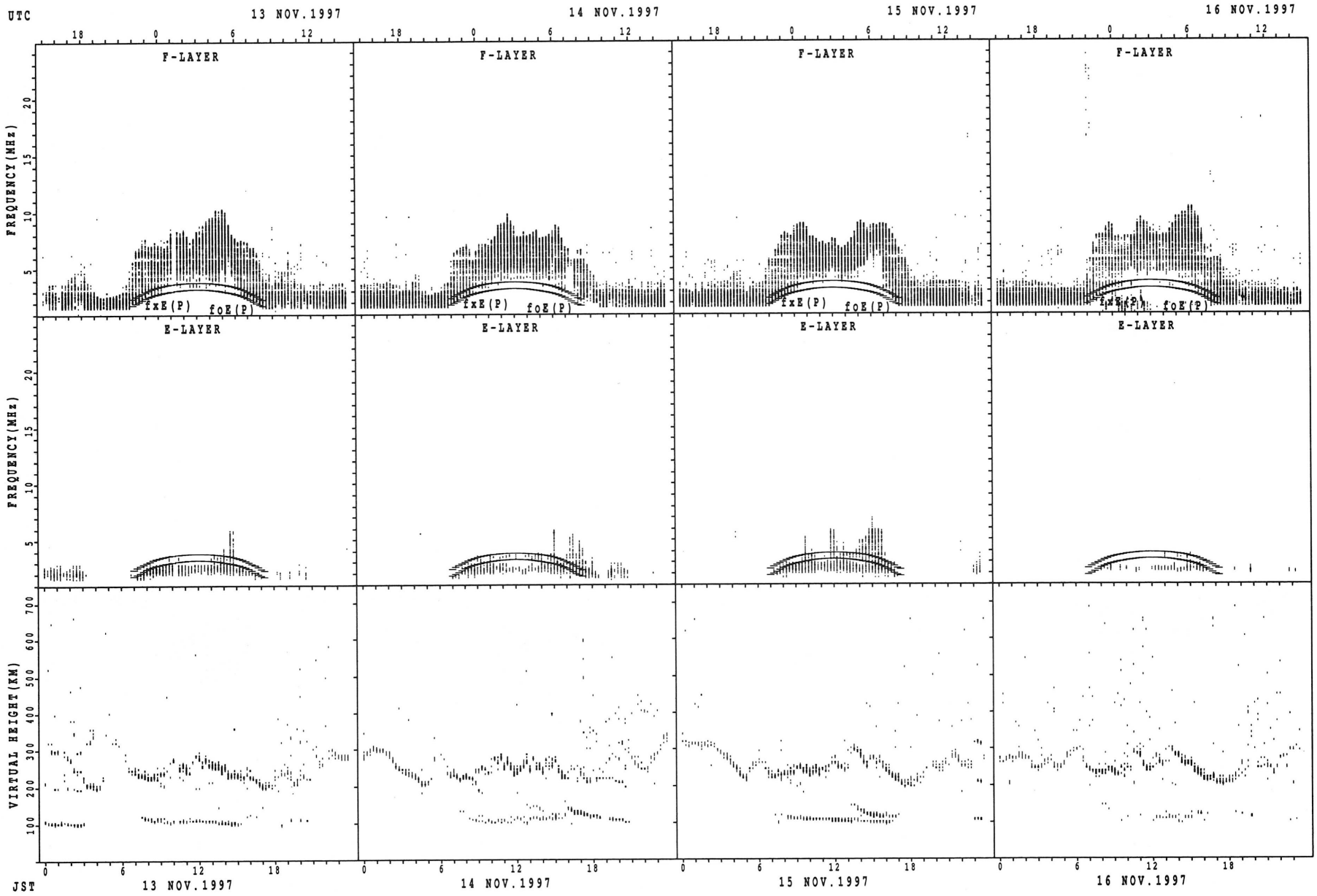
SUMMARY PLOTS AT YAMAGAWA



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

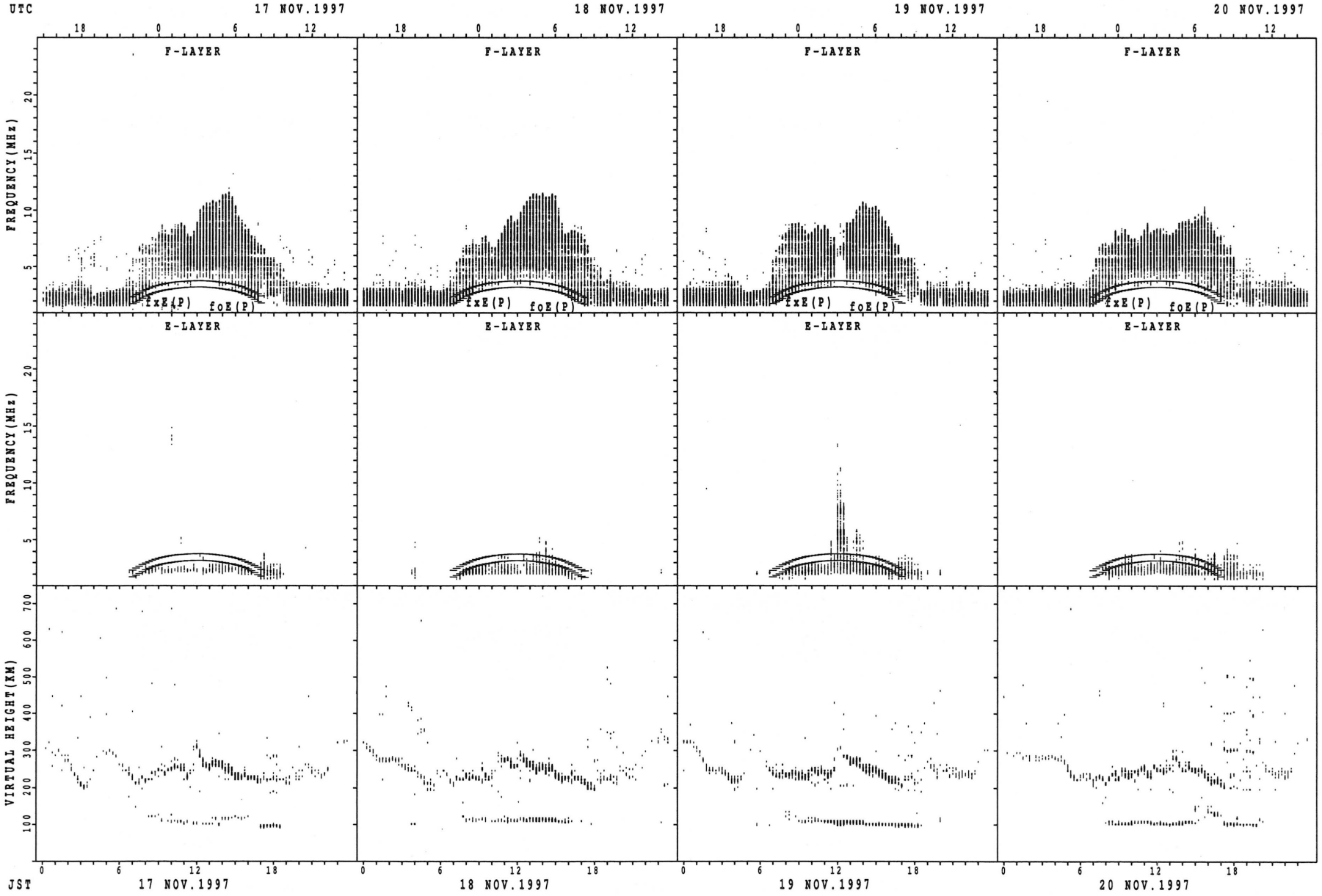

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
9 NOV.1997
10 NOV.1997
11 NOV.1997
12 NOV.1997
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA



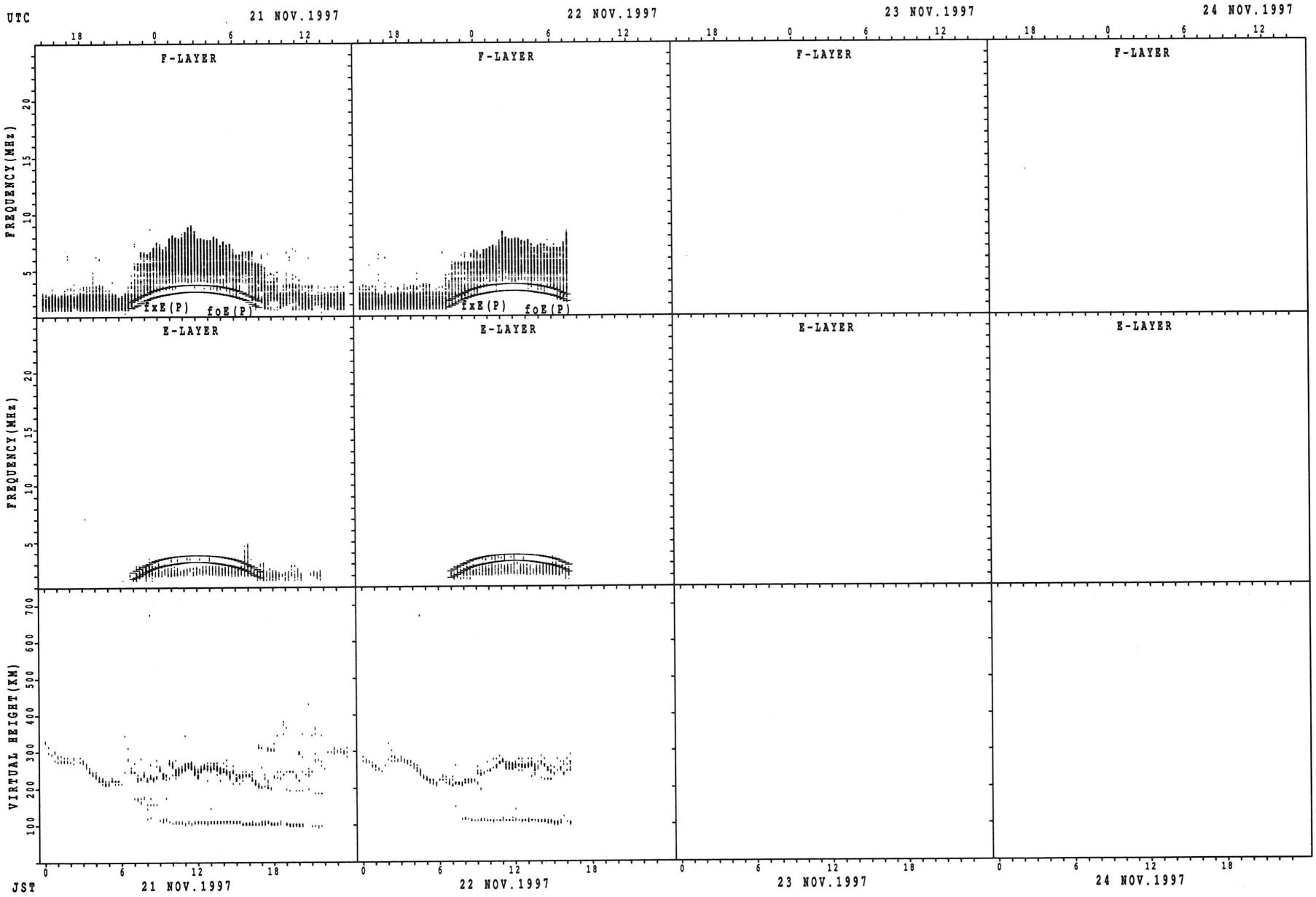
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA

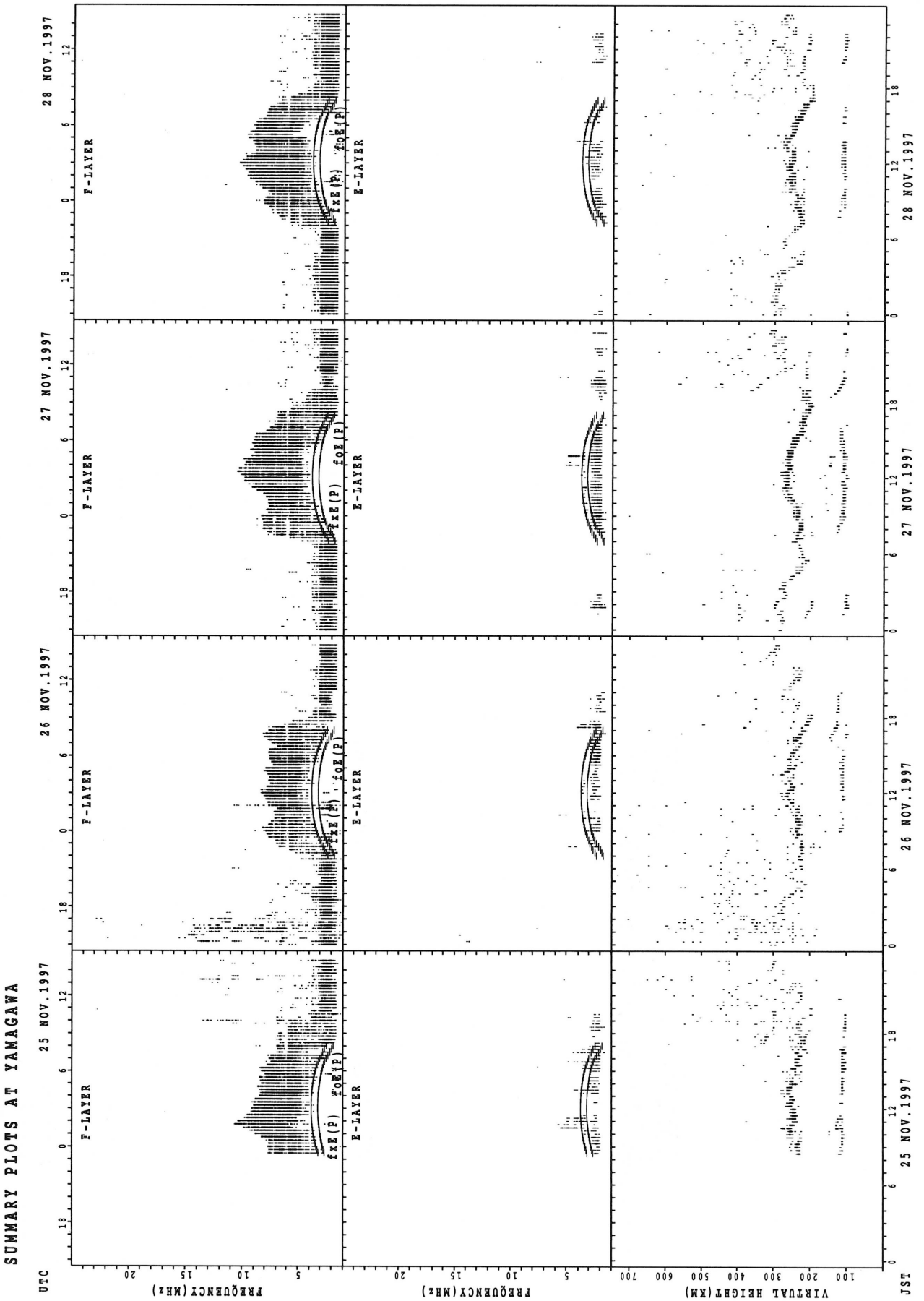


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

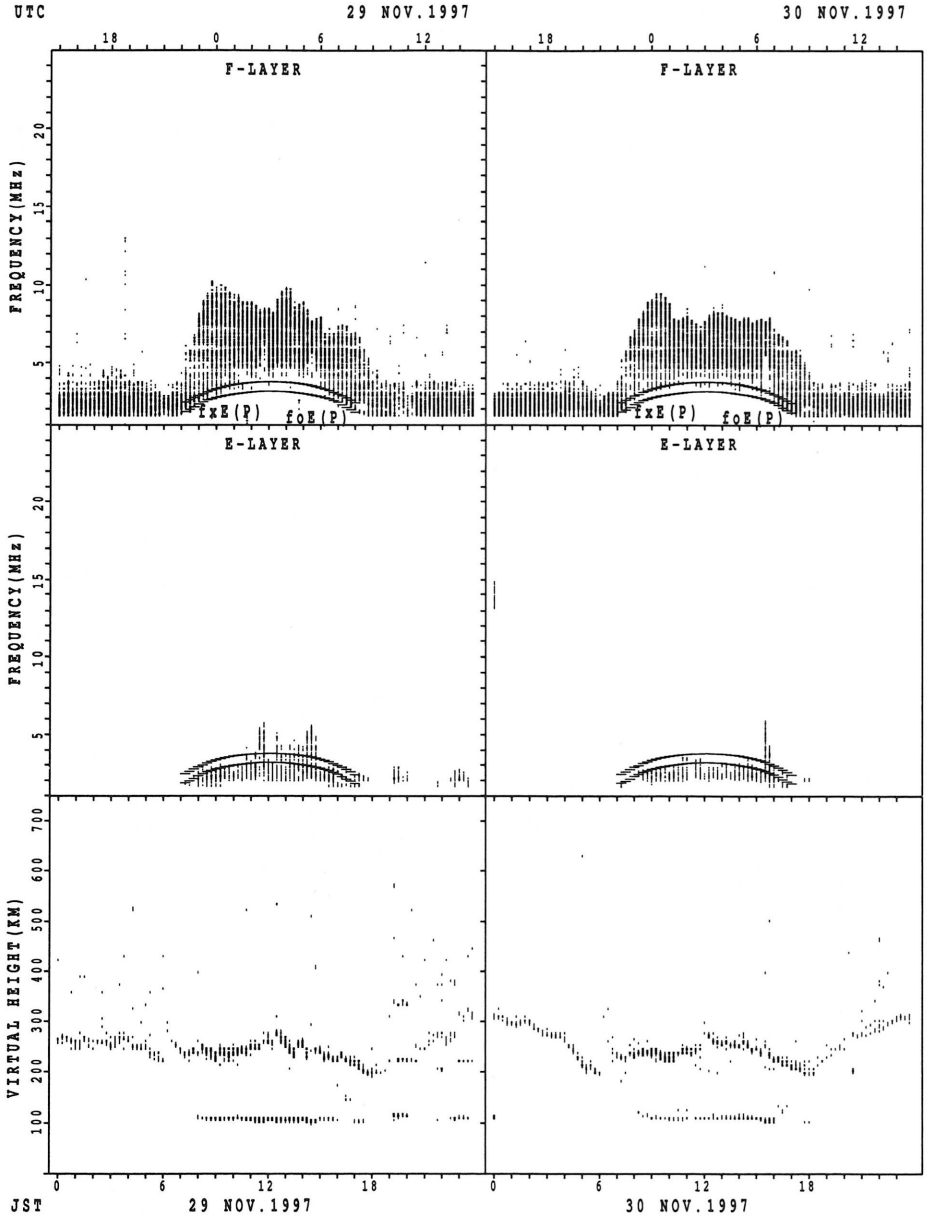
SUMMARY PLOTS AT YAMAGAWA



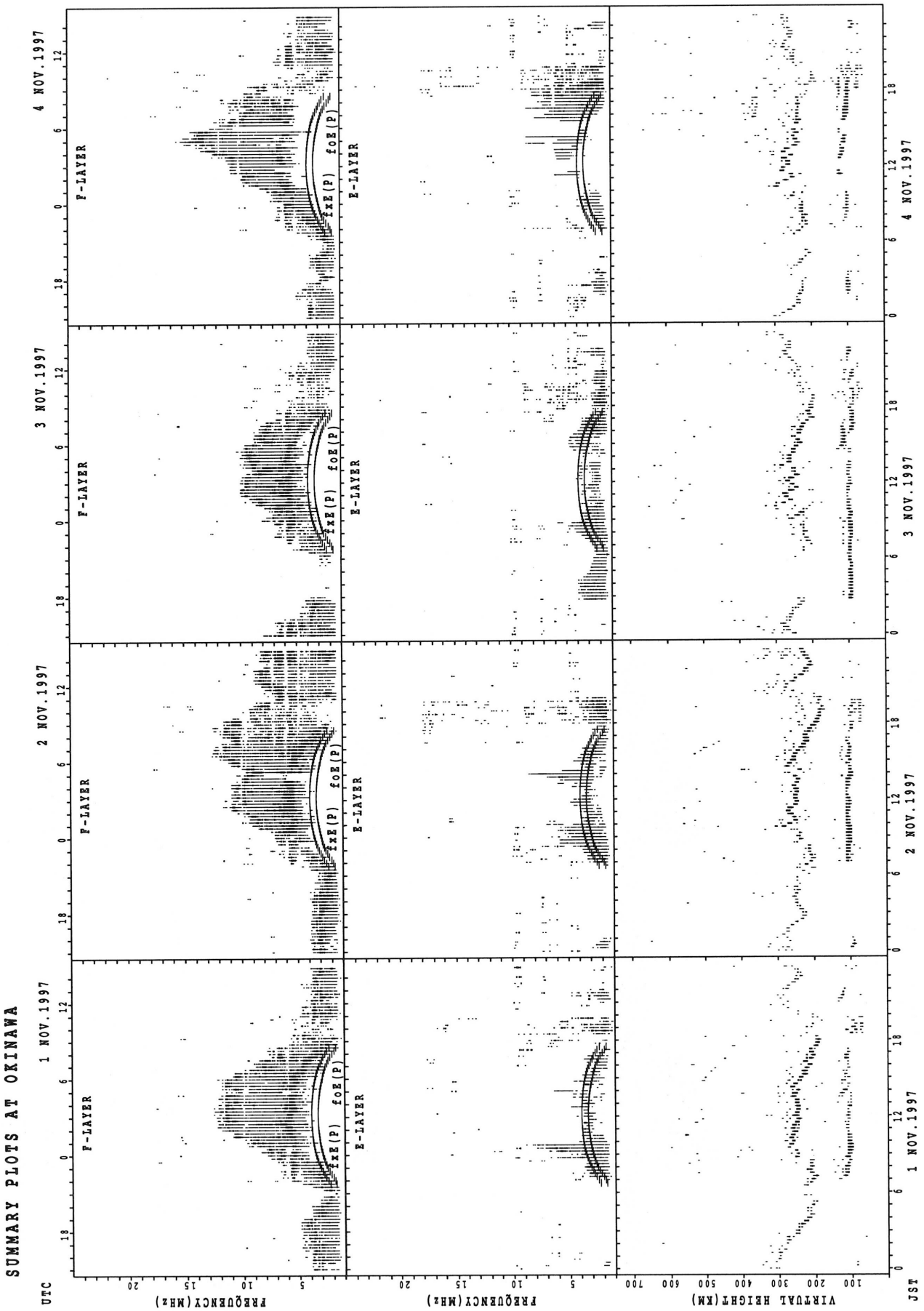
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
25 NOV.1997
26 NOV.1997
27 NOV.1997
28 NOV.1997
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

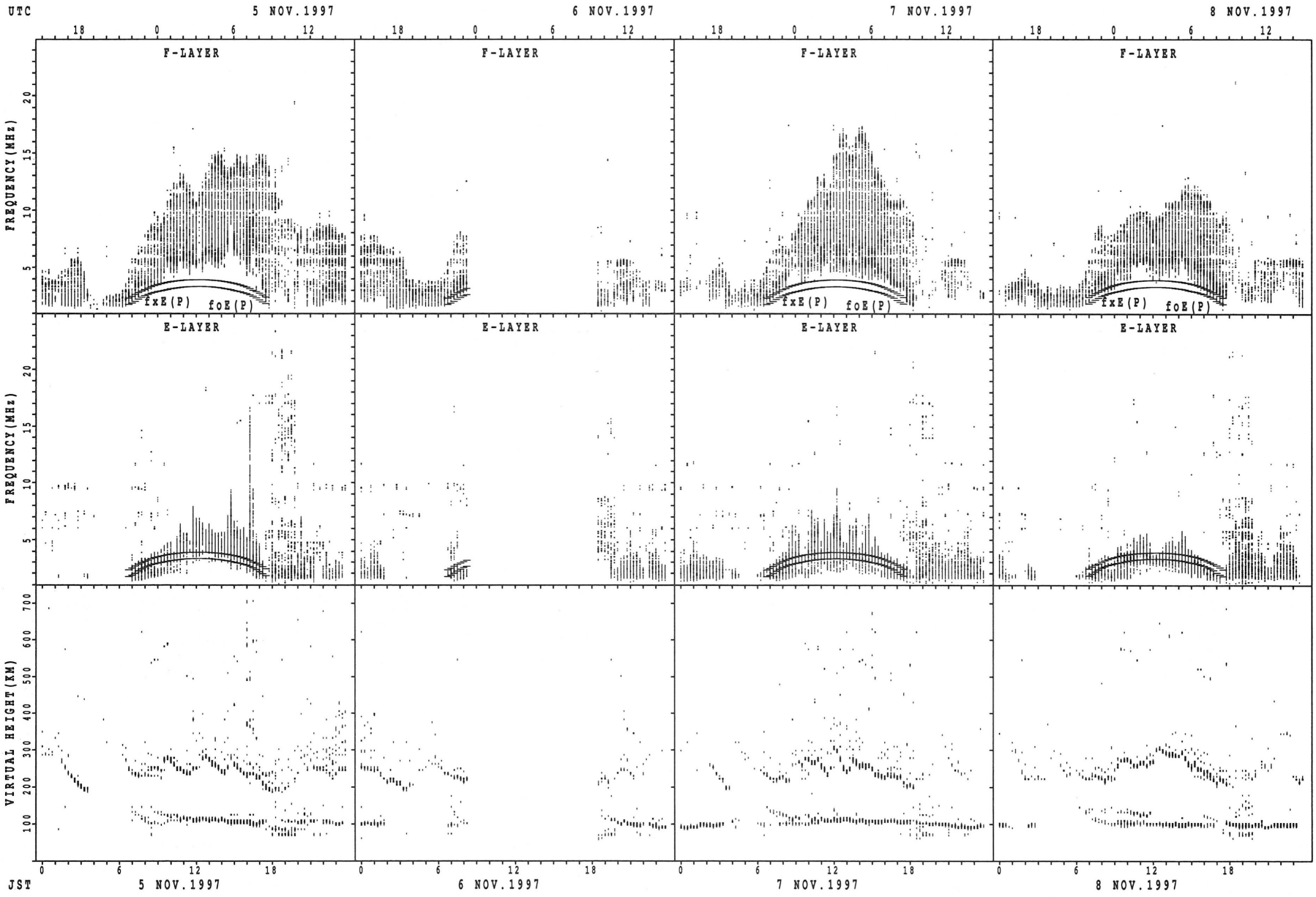
SUMMARY PLOTS AT YAMAGAWA



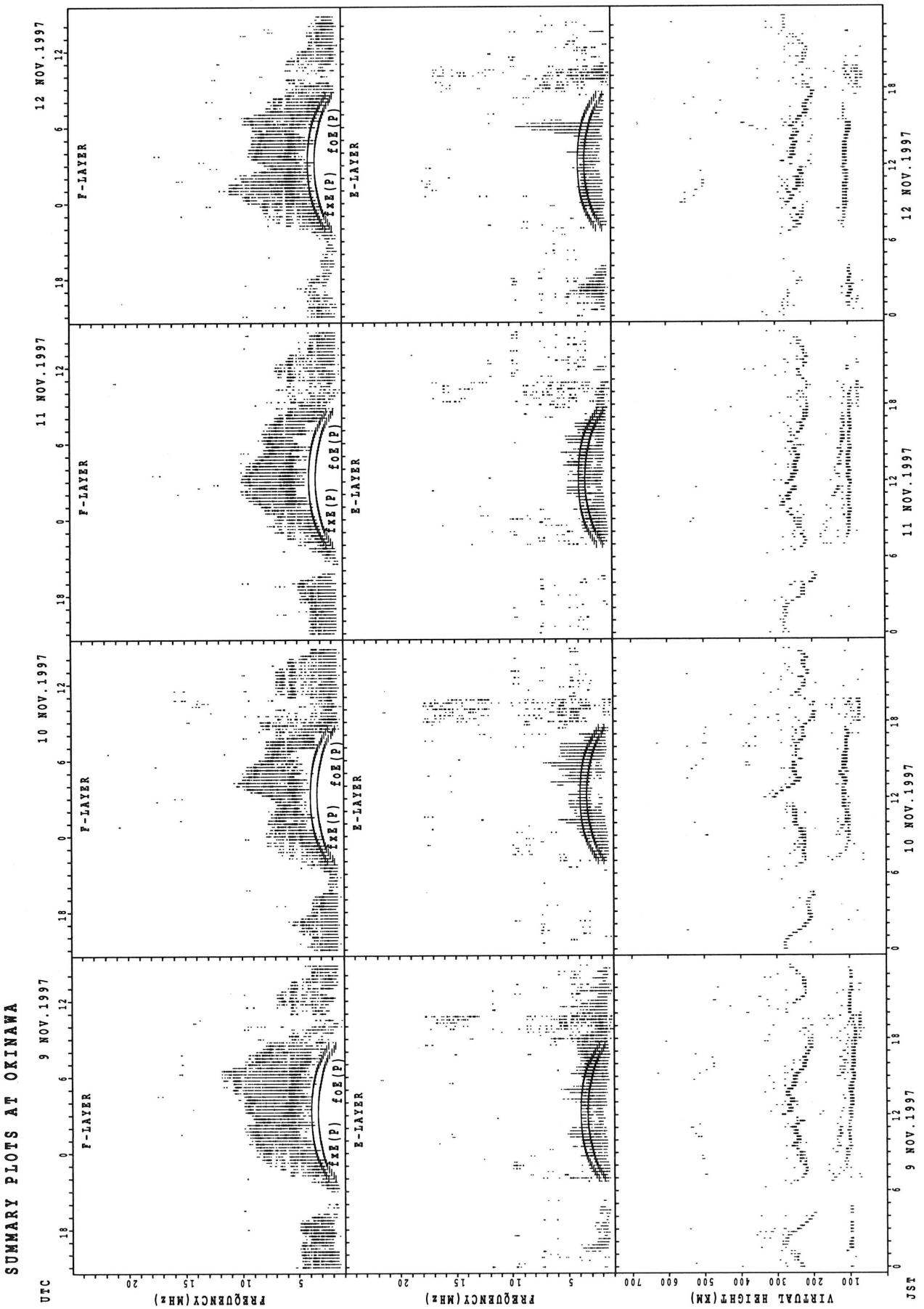
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

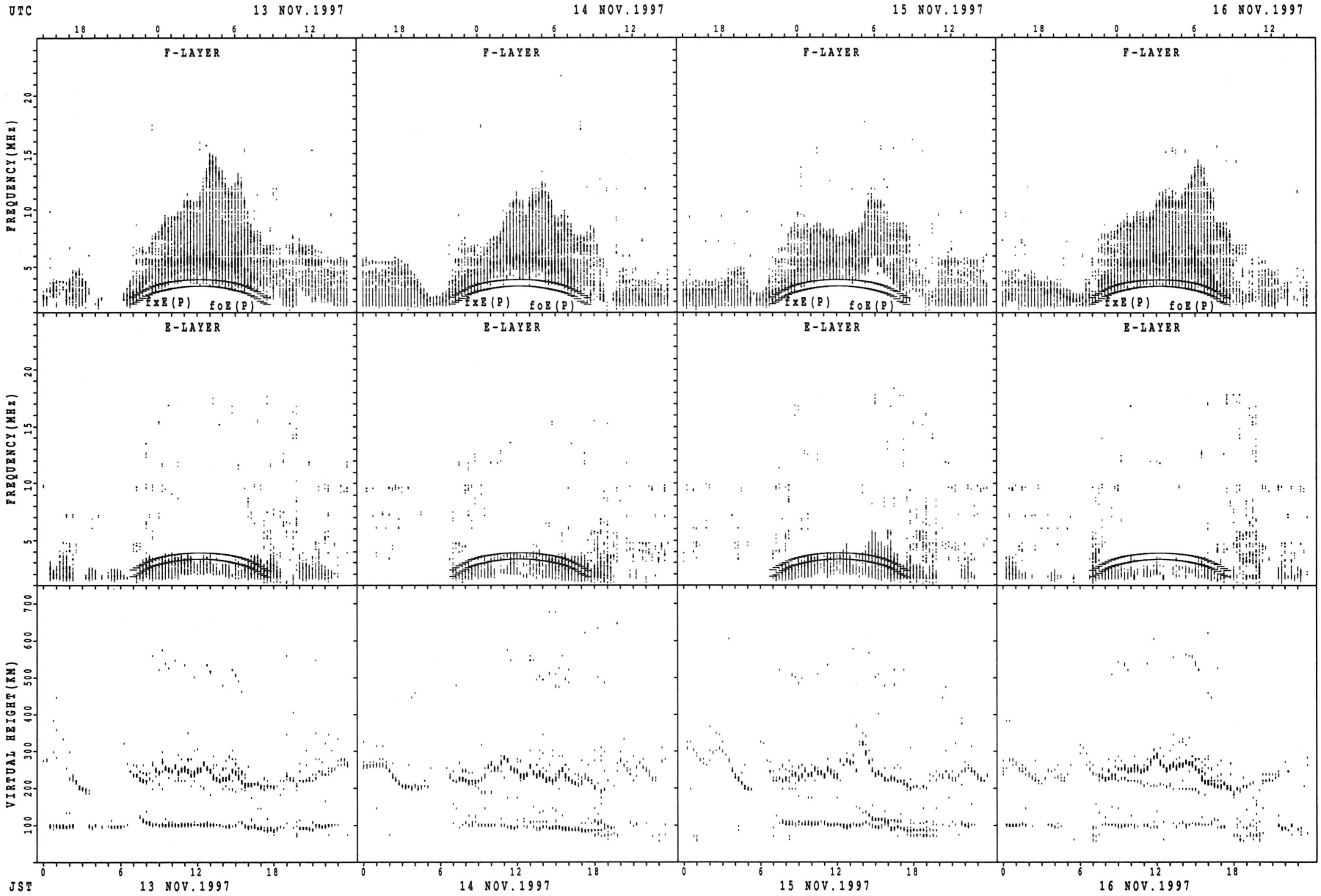
SUMMARY PLOTS AT OKINAWA



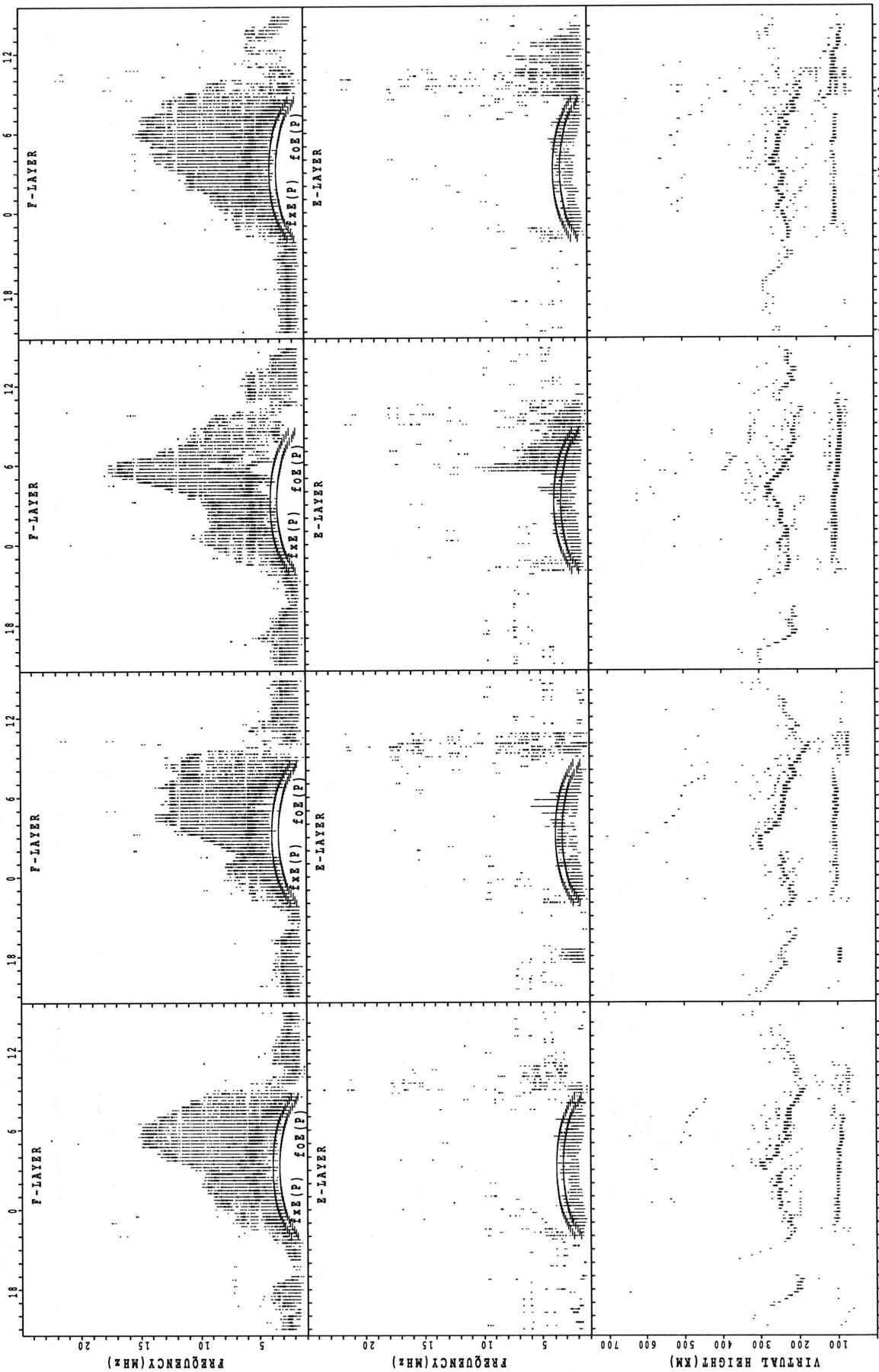
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

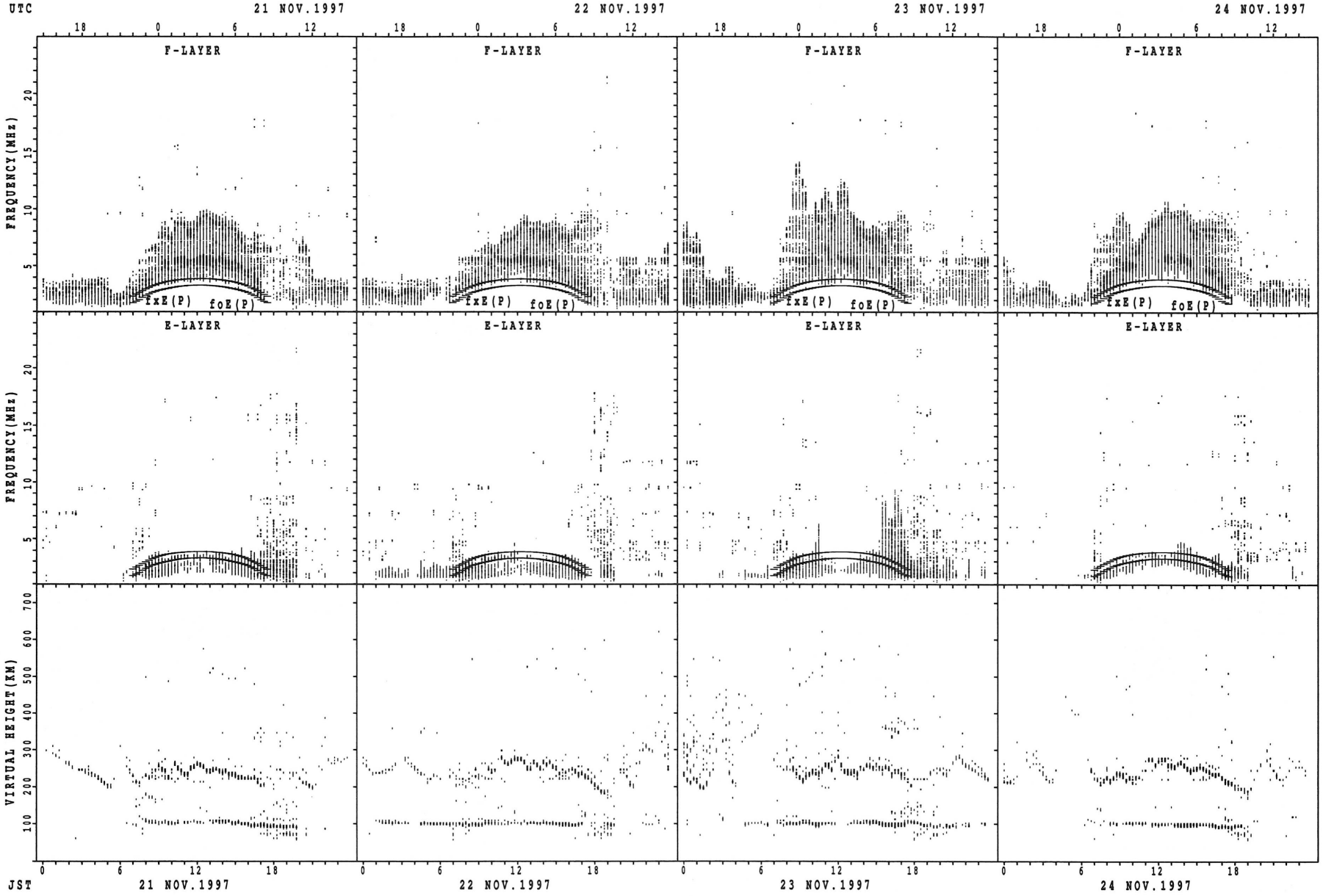
SUMMARY PLOTS AT OKINAWA



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

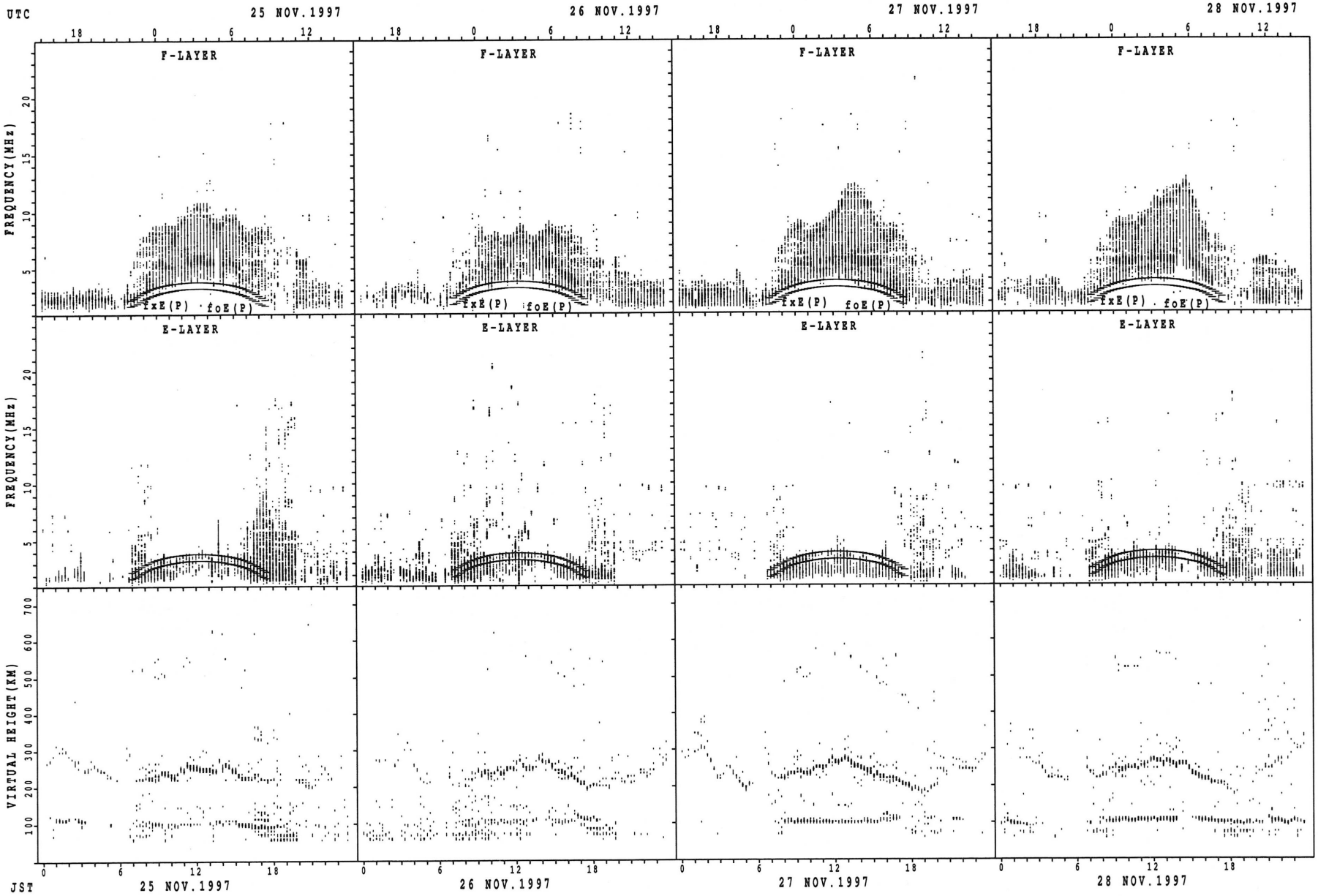

SUMMARY PLOTS AT OKINAWA
UTC
JST
17 NOV.1997
18 NOV.1997
19 NOV.1997
20 NOV.1997
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



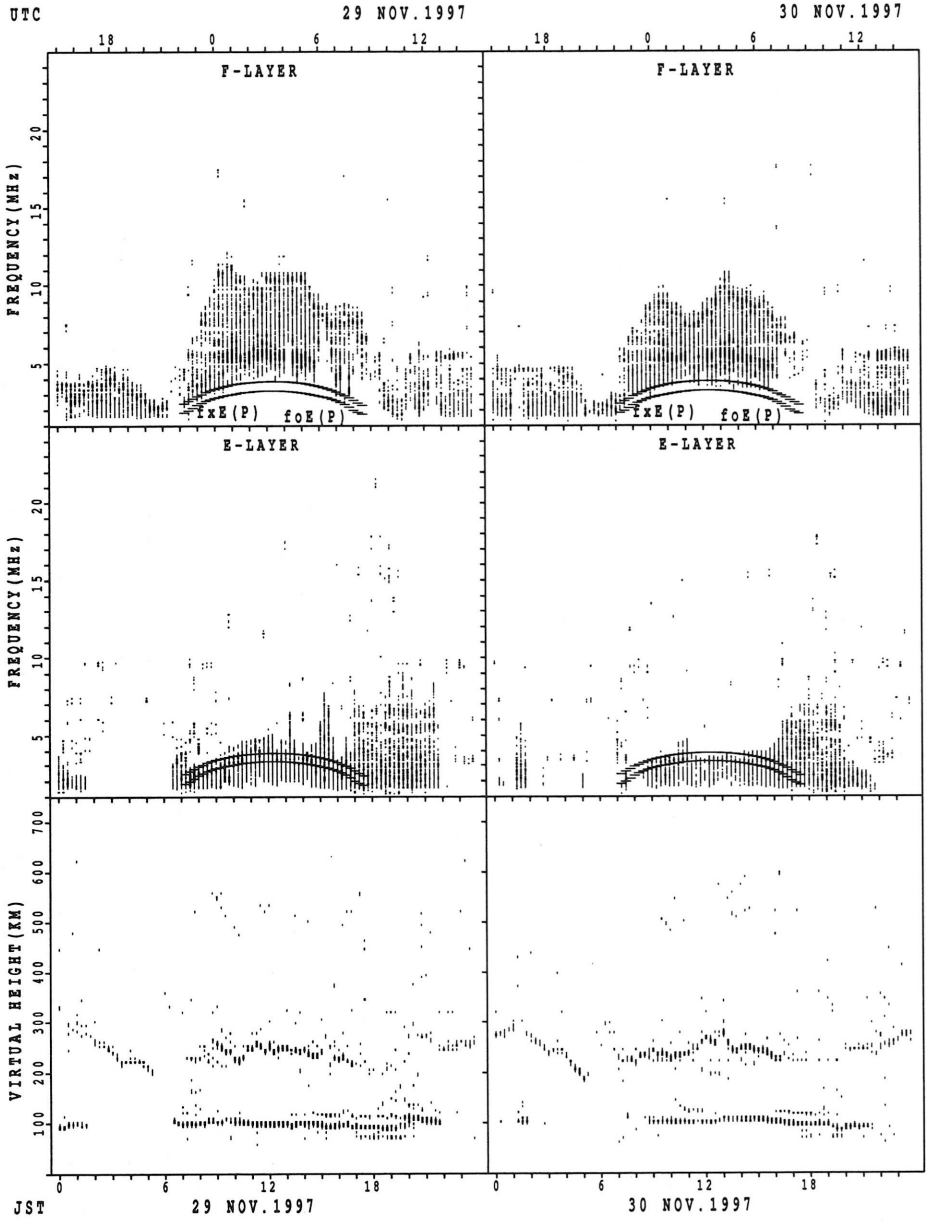
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



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

SUMMARY PLOTS AT OKINAWA



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

MONTHLY MEDIANS OF h'F AND h'Es

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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									22	28	26	25	26	22	28	22	12							
MED									240	234	236	238	232	248	240	240	232							
U Q									248	243	246	248	240	256	247	242	248							
L Q									230	224	232	229	226	244	238	234	229							

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	17	14	14	15	16	13	15	17	28	29	25	28	26	28	28	24	19	15	17	19	20	21	19	19
MED	103	101	101	103	104	107	107	135	119	109	109	106	111	108	113	117	105	107	105	105	103	103	103	105
U Q	104	107	109	107	107	113	115	155	129	119	113	112	125	120	124	131	111	111	109	107	107	111	107	107
L Q	98	99	99	99	99	100	105	103	111	105	104	99	103	102	103	105	95	99	103	103	98	99	99	97

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								16	26	27	28	26	29	25	25	24	16							
MED								241	240	248	249	250	256	256	248	241	239							
U Q								249	250	258	256	262	272	266	255	259	242							
L Q								233	224	240	241	240	248	242	242	236	231							

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	10	12						20	29	29	29	25	25	28	30	29	25	16	18	15	12	14	14	11
MED	105	105						139	115	113	113	111	113	111	113	113	111	104	105	103	104	105	105	105
U Q	107	110						161	123	128	119	120	116	120	119	119	119	115	111	113	106	109	107	109
L Q	103	103						123	110	108	107	107	107	107	107	107	107	100	103	99	100	103	103	103

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									23	24	24	28	27	28	27	25	22	10						
MED									242	248	256	249	262	262	254	244	241	243						
U Q									252	253	264	262	264	266	264	256	248	256						
L Q									236	234	248	244	246	254	250	237	232	232						

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	27	23	23	25	25	26	26	14	10		13			
MED									125	119	117	113	115	115	115	115	116	112	110		113			
U Q									151	137	147	121	123	128	121	119	129	123	115		117			
L Q									119	113	113	111	107	110	111	113	107	107	105		107			

MONTHLY MEDIANS OF h'F AND h'Es

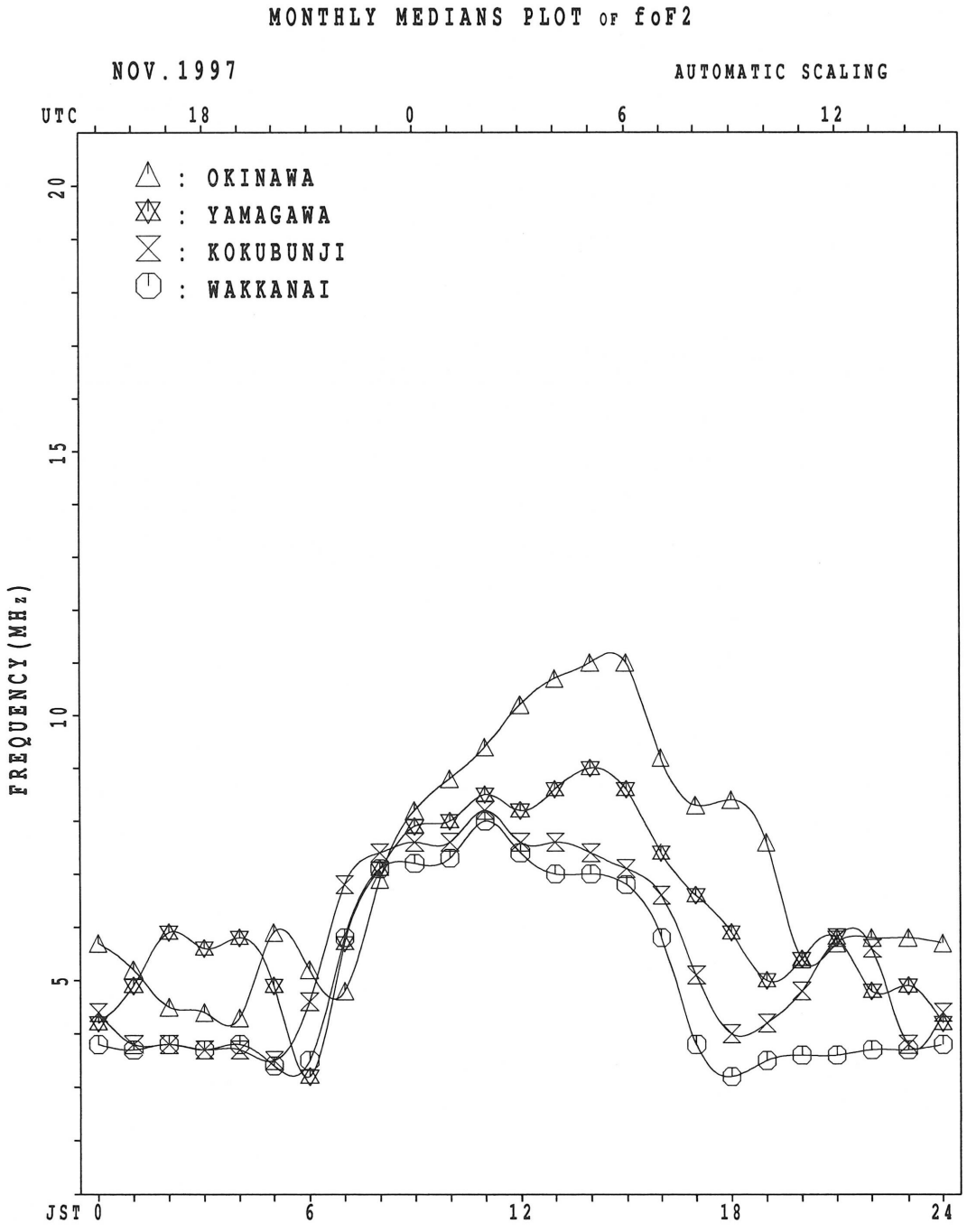
NOV.1997 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									22	26	28	29	29	29	29	28	28	22						
MED									246	250	246	254	266	256	250	243	230	226						
U Q									254	258	262	264	280	265	262	252	239	240						
L Q									230	240	234	240	254	246	242	233	224	218						

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								15	29	28	28	26	27	28	27	27	28	24	17	25	14	11	11	
MED								131	113	111	113	114	111	110	107	107	104	104	95	95	104	97	103	
U Q								137	145	137	145	141	145	136	115	119	112	111	107	121	107	103	105	
L Q								97	107	105	105	105	105	105	101	101	101	95	90	89	97	95	95	


MONTHLY MEDIANS PLOT OF foF2
NOV.1997
AUTOMATIC SCALING
UTC
18
0
6
12
△ : OKINAWA
✡ : YAMAGAWA
⧖ : KOKUBUNJI
⏀ : WAKKANAI
FREQUENCY(MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 37	X 36	X 36	X 38	X 42	X 28												X 64	X 48	X 34	X 36	X 36	X 39	X 40
2	41	X 40	X 40	X 41	X 42	X 37												X 67	X 42	X 37	X 45	X 40	X 38	X 40
3	X 41	X 38	X 42	45	X 47	X 32												X 60	X 45	37	X 41	42	42	42
4	43	X 40	X 40	X 39	X 42	X 34												X 57	X 41	X 48	X 46	X 41	X 40	42
5	X 43	X 43	X 46	X 47	X 34	X 33												X 63	A	X 43	46	52	52	X 47
6	X 49	X 48	X 51	X 50	X 39	X 38												X 58	X 44	X 50	X 38	X 34	X 36	X 37
7	X 38	X 38	X 38	X 43	X 39	X 36												X 58	X 47	X 48	X 50	X 50	X 47	X 43
8	X 46	X 49	X 40	X 39	X 40	X 31												X 60	A	50	45	44	45	X 42
9	X 44	43	X 43	X 47	X 48	X 26												X 47	X 42	X 38	X 41	X 33	X 33	X 34
10	X 36	X 36	X 35	X 38	X 42	X 24												X 62	X 50	X 48	X 48	X 40	X 38	X 41
11	X 44	X 41	X 41	X 42	X 47	X 38												X 47	X 43	X 46	X 40	41	43	X 41
12	X 42	X 40	X 43	X 43	X 44	X 34												X 52	X 36	X 38	X 39	X 34	X 35	X 37
13	X 38	X 40	42	X 46	X 43	X 32												X 50	X 35	X 40	X 33	X 34	X 36	X 37
14	X 38	X 39	X 38	X 40	X 43	X 32												X 50	X 35	X 38	X 41	X 38	X 39	X 41
15	X 40	X 39	X 40	X 40	X 41	X 41												X 56	X 46	X 42	X 36	41	41	41
16	41	X 41	X 40	X 38	X 40	X 37	X 42											X 49	X 42	X 40	X 41	X 36	X 40	X 39
17	X 40	X 40	X 42	X 45	X 32	X 28	X 37											X 52	X 50	X 37	X 34	X 35	X 32	O X 36
18	40	X 40	42	45	45	X 44	X 37											X 56	X 46	X 44	X 39	X 31	X 34	X 35
19	X 36	X 37	X 38	X 46	X 41	X 29	X 36											X 48	X 37	X 32	X 41	X 41	X 32	X 33
20	X 34	X 35	X 36	X 36	X 38	X 34	X 39											X 47	X 40	X 34	X 37	X 34	X 30	X 33
21	X 35	X 36	X 36	X 39	X 40	X 34	X 33											X 46	X 42	X 36	X 35	36	36	38
22	X 38	X 36	X 36	X 40	X 38	X 36	X 37											X 59	X 54	X 36	X 40	X 41	41	X 41
23	X 47	X 40	X 38	X 31	X 41	X 38	X 36											X 60	X 52	X 37	X 44	X 42	X 46	X 47
24	X 46	X 34	35	X 37	X 29	29	X 34											X 67	X 51	X 38	X 39	X 36	41	40
25	X 34	X 36	X 39	X 36	X 35	O X 33	X 38											X 55	X 52	X 44	X 36	X 33	X 34	39
26	39	X 36	X 35	X 37	X 37	X 34	X 40											X 60	X 39	X 38	X 42	X 36	X 34	X 38
27	X 40	X 39	X 40	X 41	X 44	X 42	X 43											X 52	X 40	X 40	X 36	X 34	X 36	X 38
28	X 40	X 40	X 43	X 44	X 46	X 37	X 40											X 51	X 36	X 34	X 36	X 34	X 40	X 42
29	46	48	48	48	48	44	X 49											X 48	X 39	X 38	X 40	X 38	41	40
30	X 40	X 40	X 40	X 40	X 43	X 40	X 36											X 52	X 36	X 30	X 36	X 37	40	41
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	15											30	28	30	30	30	30	30
MED	X 40	X 40	X 40	X 40	X 42	X 34	X 37											X 56	X 42	X 38	X 40	X 36	X 39	X 40
U Q	X 43	X 40	X 42	X 45	X 44	X 38	X 40											X 60	X 48	X 44	X 42	X 41	41	X 41
L Q	X 38	X 36	X 38	X 38	X 39	X 32	X 36											X 50	X 39	X 37	X 36	X 34	X 35	X 37

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	31	30	30	32	36	22	36	R 62	64	70	84	90	70	68	82	69	61	58	42	29	30	30	R 33	34
2	33	34	34	35	36	31	39	R 75	66	R 75	81	84	74	84	90	79	65	61	35	31	39	34	32	34
3	35	R 32	36	F 38	41	26	R 38	57	65	70	66	85	71	71	73	72	58	54	39	F 29	35	F 34	F 32	F 34
4	F 35	34	34	33	36	28	R 42	61	61	78	74	70	92	98	72	B	U A 63	51	35	42	40	35	34	F 35
5	37	37	40	41	28	27	41	S 72	88	80	96	U R 86	96	79	78	80	72	57	A	37	F 38	F 41	F 43	41
6	43	42	45	44	33	32	42	67	80	74	76	78	100	84	77	78	71	52	38	44	32	28	30	31
7	32	32	32	37	33	30	37	R 63	75	80	98	94	91	103	99	92	71	52	41	42	44	43	41	37
8	40	43	34	33	34	25	38	R 65	72	91	106	94	80	94	104	94	72	54	A	F 43	F 37	F 37	F 38	36
9	38	F 35	36	41	42	20	32	66	74	85	74	92	71	76	87	73	64	41	36	32	35	28	27	28
10	30	30	29	32	36	18	31	57	68	65	61	60	86	79	77	76	60	56	44	42	42	34	32	35
11	38	35	35	36	41	32	U S 32	R 62	60	64	75	86	85	77	71	76	66	41	37	40	34	F 33	F 35	35
12	36	34	37	37	38	28	34	59	76	84	88	83	76	70	71	64	55	46	30	R 32	33	28	29	31
13	32	34	F 34	40	37	26	33	R 63	72	68	69	70	Z 75	87	73	67	50	44	29	34	27	28	30	31
14	32	33	32	34	37	26	31	54	59	61	69	68	72	70	62	69	66	44	29	32	34	32	33	33
15	34	33	34	34	35	35	46	R 65	65	77	78	70	70	70	78	72	71	50	40	36	30	F 33	33	F 33
16	F 34	35	34	32	34	31	36	71	88	88	80	88	68	74	83	80	60	43	36	34	35	30	34	33
17	34	34	36	39	26	22	31	64	78	75	83	80	82	93	83	70	61	46	43	31	28	29	26	30
18	F 31	34	F 33	F 36	F 38	38	31	54	64	74	R 75	83	88	95	91	78	R 65	50	40	38	33	25	28	29
19	30	31	32	40	35	24	30	59	78	76	84	74	70	R 77	62	71	73	42	31	26	35	35	26	27
20	28	29	30	30	32	28	33	63	70	68	73	73	67	65	68	65	58	41	34	28	31	28	24	27
21	29	30	30	33	34	28	27	52	63	66	58	76	70	66	62	60	56	40	36	30	29	28	F 28	F 31
22	R 32	30	30	34	32	30	31	59	S 66	62	69	68	71	65	61	60	81	53	48	30	34	35	F 33	35
23	41	34	32	R 25	35	32	30	56	116	117	116	88	97	77	65	69	68	54	46	R 31	38	36	40	41
24	40	28	F 29	31	23	21	28	69	69	76	80	86	97	86	75	70	78	61	45	32	33	30	F 30	F 30
25	28	30	V 33	30	29	27	32	S 65	70	81	100	90	85	73	70	66	62	49	46	38	30	27	28	F 30
26	F 32	30	29	31	31	28	34	63	70	60	70	78	75	71	66	62	70	54	33	31	36	30	28	32
27	34	33	34	35	38	36	37	71	79	69	86	92	79	82	65	75	71	46	34	34	30	28	30	32
28	34	S 34	37	38	40	31	34	66	80	74	95	102	85	80	73	70	63	45	30	28	30	28	34	36
29	F 38	F 39	F 39	F 38	F 39	F 35	42	S 72	S 74	80	75	77	72	81	72	63	68	42	33	32	34	32	F 33	F 33
30	34	34	34	34	37	34	30	56	71	76	76	73	75	67	64	73	57	46	30	24	30	31	F 31	F 34
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	28	30	30	30	30	30
MED	34	34	34	34	36	28	34	63	70	75	77	83	76	77	73	71	65	50	36	32	34	30	32	33
U Q	37	34	36	38	38	32	38	66	78	80	86	88	86	84	82	77	71	54	42	38	36	34	34	35
L Q	32	30	32	32	33	26	31	59	65	68	73	73	71	70	66	66	60	44	33	30	30	28	28	31

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	U L 440	L 464	L	L	U L 432									
2									L	L	L 460	L 456	U L 468	L 424	U L 452		L 260							
3										U L 456	548	L 448	L 464	L 428	U L 432	L								
4									L 360	U L 468	U L 452	U L 444	B	L 476	L	B	A							
5									L	L	U L 472	L	A	L 464	A									
6									L	U L 432	L	452	444	L	U L 440	U L 400								
7										L	U L 464	L 464	L	L	A									
8										L	U L 460	U L 452	L 456	U L 472	L	L								
9									324	L	L 436	U L 504	U L 452	U L 468	L									
10									L	L	L		U L 472	L 440	U L 432	L								
11										L	L	U L 472	U L 464	L 444	L									
12									L	U L 468	L 456	L 452	L 432	U L 432	L									
13								L 260	L	L	L	L 440	L	L 440	U L 424	L	L 256							
14									L	U L 424	L 464	L 436	L 440	U L 436	L	L								
15									U L 328	L	L 416	L	U L 440	L	L	L								
16									L	L	L	L 404	L	L	L	U L 340	U L 268							
17									L	U L 444	L	U L 448	U L 464	L	L	U L 320								
18									L 300	L	U L 440	U L 452	U L 440	U L 460	L 392	U L 356								
19										U L 436	L	L	U L 480	L	L									
20									L	U L 428	L 444	L 444	U L 440	U L 428	L	L								
21										L	L 384	L 440	U L 440	L	L 404									
22									L 300	U L 396	L	L 436	L 456	U L 444	L 364	L								
23									L	U L 444	L	L	A	A	A									
24									L	L	L	L 444	L	U L 456										
25										L	U L 492	L	U L 464	L	A									
26										L	L 380	U L 460	L	L	L									
27										L 420	U L 432	U L 456	L	U L 468	L									
28									L	L	U L 468	L	L	L	L									
29										L	L	U L 464	L	L 432	L	L								
30									L	L	L	U L 460	L	L		L								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	5	11	18	23	17	17	9	4	3							
MED								L 260	L 324	U L 436	L 454	L 452	U L 456	U L 444	U L 432	U L 348	L 260							
U Q									L 344	U L 456	U L 464	U L 460	U L 464	U L 466	U L 436	U L 378	U L 268							
L Q									L 300	U L 424	L 436	L 444	U L 440	L 432	L 398	U L 330	L 256							

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B 228		276	308	A 324	R 336	328	312	304	A 284	A							
2							B 240		276	300	316	R	A	A	R	A	192							
3							B 220		264	308	R 328	R 344	340	U R 332	308	268	204							
4							B 216		A	A	A	A	B	A	312	B	A							
5							B 236		288	312	R 324	340	336	324	308	272	A							
6							B 228		272	304	R 320	340	R 336	R 336	304	272	200							
7							B 212		A 252	308	316	R 344	324	312	292	264	A							
8							B 200		276	300	332	340	R	R 328	296	A	A							
9							B 212		256	292	308	332	U R 340	R 324	292	252	192							
10							B 212		264	296	316	328	324	312	284	A	A							
11							B 200		248	288	312	328	332	316	296	252	A							
12							B 196		260	R	R 320	R	R 328	304	284	A 264	196							
13							B 192		268	288	312	328	328	308	A	240	176							
14							B 196		252	296	R 320	R 328	R 340	316	292	248	196							
15							B A		256	A	316	332	328	316	280	236	A							
16								176	R	A	300	R 320	R 332	308	288	A	A							
17								200	R 252	288	R 316	A	A	R	288	R	192							
18								184	248	292	R	R	R	R 316	R	A	184							
19								200	244	280	304	A	A	A	A	244	A							
20								192	248	284	316	A	R 316	R	276	244	A							
21								196	252	292	308	B	U R 344	U R 328	300	256	A							
22								176	248	276	A	332	336	308	276	244	A							
23								A	236	A	300	A	A	A	A	A	A							
24								196	A	A 300	R	R	R	320	A	A	A							
25								204	252	A	312	328	R	A	A	A	A							
26								180	252	296	320	344	340	328	300	252	A 192							
27								192	264	296	312	324	336	320	300	248	180							
28								184	264	A	A	A	A	A	A	280	188							
29								192	A	A	A	A	A	A	284	A	A 196							
30								192	B	R 308	320	332	324	A	A	244	A							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								28	25	22	24	18	19	20	21	19	13							
MED								198	256	296	316	332	332	316	292	252	192							
U Q								212	266	304	R 320	340	R 340	R 326	302	268	196							
L Q								192	250	288	312	328	328	312	284	244	186							

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

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	19	23	J A 22	E B 15	18	E B 15	E B 14	28	33	J A 39	J A 45	J A 43	49	J A 38	34	J A 41	J A 26	J A 21	J A 22	E B 16	J A 18	J A 37	28	J A 28
2	J A 24	J A 24	J A 22	23	20	19	24	27	30	J A 36	36	G	J A 37	34	G 26	J A 38	20	E B 14	J A 24	J A 18	A E 16	E B 21	J A 19	J A 34
3	J A 26	22	E B 13	E B 14	E B 14	E B 14	E B J A 22	31	29	36	G	38	36	G 22	33	29	G 18	20	E B 14	E B 16	J A 22	J A 46	J A 35	J A 34
4	J A 28	J A 21	24	23	21	24	19	27	J A 30	J A 38	J A 40	J A 50	E B 52	39	J A 50	B	71	J A E B 19	13	28	22	J A 21	J A 22	28
5	E B 14	27	21	E B 14	E B E B 12	E B 15	18	30	G 22	38	39	J A 98	J A 86	J A 40	J A 55	J A 45	J A 37	J A 25	J A 75	J A 56	J A 36	J A 36	J A 28	E B 14
6	E B 14	E B 15	19	19	E B 14	E B 14	E B 15	25	J A 39	33	G	J A 44	G 22	J 50	A J 52	J A 42	J A 54	J A 46	J A 47	J A 45	J A 20	26	J A 21	20
7	18	20	18	E B 13	E B 15	E B 14	E B 14	G	32	32	G J 30	A 45	J A 49	J A 43	J A 44	J A 37	49	J A 36	J A 53	J A 23	J A 23	J A 31	J A 24	A E B 15
8	E B 14	J A 21	J A 20	20	27	20	J A 18	26	30	33	39	37	G 31	G	40	J A 39	J A 24	J A 64	J A 66	J A 51	A J A 44	30	J A 22	J A 21
9	24	18	E B 13	E B 14	E B 15	E B 14	B J A 20	G	28	35	35	37	G	G 22	36	J A 39	26	E B 16	J A 16	16	20	20	29	E B 14
10	E B 15	E B 15	E B 14	E B 13	E B 13	E B 12	J A 21	G 20	G	32	34	35	36	38	J A 39	J A 32	J A 24	J A 29	J A 33	28	J A 22	20	A E B 14	E B 16
11	17	E B 15	E B 14	E B 14	E B 14	18	E B 18	G	30	G	34	36	36	35	36	32	J A 29	E B 15	E B 14	E B 14	B J 13	A E 40	E B 14	E B 15
12	E B 15	E B 12	E B 14	E B 14	E B 15	E B 14	20	25	G	G	G 31	G 31	G J 28	A 35	G	29	G	E B 16	21	E B 14	20	E B 15	E B 13	J A 22
13	J A 27	J A 21	18	20	J A 22	18	J A 22	J A 23	G 26	G 26	G	G 24	G	G 21	J A 33	G 21	G	20	E B 14	E B 14	E B 14	J A 23	J A 25	25
14	J A 18	20	E B 14	E B 14	E B 14	19	E B 15	G	G 20	G 20	37	G 26	38	37	40	30	23	E B 15	E B 15	B J 22	A E 16	E B 16	E B 15	E B 15
15	E B 15	E B 14	E B 15	20	18	19	18	25	G	J A 40	38	39	38	38	38	J A 40	J A 32	J A 41	J A 25	28	J A 40	E B 14	E B 14	28
16	J A 22	J A 22	18	18	25	19	J A 22	22	G 26	31	33	G 19	36	40	33	32	J A 27	32	J A 20	19	J A 18	J A 36	J A E B 23	E B 15
17	E B 14	E B 14	19	E B 14	E B 13	E B 15	E B 15	21	J G 23	G 26	G 28	32	J A 35	G 30	30	G	G	17	E B 16	E B 15	E B 13	17	J A 35	J A 39
18	J A 22	J A 44	28	21	21	19	J A 21	J A 24	25	G	G 31	G 30	G 32	G 29	G 28	27	19	E B 13	J A 22	25	25	J A 22	24	E B 14
19	J A 28	J A 29	J A 24	J A 20	J A 26	A E 24	B 14	24	27	31	G	J A 53	J A 51	J A 85	J A 43	28	J A 26	J A 22	J A 23	23	20	19	20	18
20	E B 16	E B 14	E B 13	E B 13	E B 14	20	E B 15	G 18	G 22	G 24	G 28	J A 37	G	G 28	J A 34	G 20	J A 23	J A 21	J A 22	22	J A 18	A E B 14	17	E B 14
21	E B 14	E B 13	E B 14	E B 14	E B 13	J A 17	E B 14	24	G	G 24	G	E B 37	G	G	46	42	26	J A 32	J A 22	22	20	E B 14	E B 13	E B 14
22	E B 16	E B 14	E B 14	E B 14	E B 14	E B 16	B J A 25	G	27	28	J A 41	36	35	33	G 28	28	J A 26	J A 30	J A 22	J A 24	24	E B 15	E B 15	21
23	22	20	21	20	27	19	E B 14	J A 29	30	39	J A 44	J A 42	J A 63	56	J A 48	J A 50	60	J A 42	29	J A 51	A E B 14	24	J A 25	J A 33
24	J A 26	J A 26	21	18	J A 20	A E B 14	E B 14	20	28	34	G 30	G 30	G 32	36	39	J A 34	J A 59	J A 33	J A 22	J A 43	J A 23	28	E B 15	E B 14
25	J A 22	J A 27	J A 35	J A 22	J A 48	J A 30	J A 23	J A 34	30	30	G 30	34	G J 31	A 50	J A 62	J A 39	J A 22	A E B 14	19	E B 14	E B E B 14	E B 15	18	E B 15
26	E B 13	E B 14	B J A 18	A J A 22	A E B 13	E B 15	19	G	28	G 22	G	36	G	35	G 27	28	22	E B 14	E B 15	B E 13	B J 18	A E 14	E B 13	E B 18
27	E B 14	E B 15	E B 14	E B 14	B J A 26	A J 22	A J A 21	23	G 20	32	34	37	G 24	G 24	G J 22	G 22	23	E B 16	J A 23	J A 22	A J 22	J A 22	20	E B 14
28	E B 14	21	E B 14	E B 15	E B 14	E B 15	E B 14	22	G	J A 34	J A 35	J A 38	35	J A 40	J A 44	G	19	E B 15	20	J A 20	35	J A 26	J A E 26	B 15
29	E B 14	E B 16	E B 16	19	E B 14	E B 14	22	25	30	J A 39	J A 36	J A 34	J A 46	J A 44	G J 25	A 30	26	J A 21	J A 23	34	20	20	J A 24	28
30	E B 15	E B 14	E B 12	E B 15	E B E B 13	E B 16	E B 16	24	E B 29	G 22	34	36	35	33	31	26	J A 25	J A 21	18	E B 16	E B 13	E B 16	E B 15	E B 16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30
MED	16	20	18	E B 15	E B 15	16	18	24	28	32	34	36	35	36	36	32	26	J A 21	J A 22	22	20	21	20	E B 17
U Q	J A 22	J A 22	21	20	21	19	J A 21	26	30	J A 36	37	J A 39	J A 38	J A 40	J A 44	J A 39	J A 29	J A 32	J A 24	J A 28	J A 23	J A 28	J A 25	J A 28
L Q	E B 14	E B 14	E B 14	E B 14	E B 14	E B 14	E B 15	G	G 26	G	G	G 32	G	G	G 30	G 28	22	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	E B 15

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 15	16	18	E B 15	E B 14	E B 15	E B 14	25	31	35	39	38	42	34	33	35	20	E B 14	19	E B 16	E B 15	16	E B 15	19
2	E B 14	17	E B 14	17	E B 15	16	19	27	30	34	35	G	34	32	U G 25	33	G 17	E B 14	19	16	E B 16	15	17	22
3	17	E B 14	E B 13	E B 14	E B 14	E B 14	19	28	G 22	36	G	37	35	G 19	33	28	G 16	16	E B 14	E B 16	18	21	17	17
4	18	17	17	16	16	16	16	25	30	35	36	40	E B 52	36	39	B U 42	A E 15	B E 13	B 18	17	E B 14	16	E B 15	
5	E B 14	21	E B 15	E B 14	E B 12	E B 15	17	26	G 20	35	36	41	80	36	48	34	34	20	A A 75	20	22	19	18	E B 14
6	E B E 14	B E 15	B E 14	17	E B 14	E B 14	E B 15	G 18	G 21	33	G	41	G 21	45	36	35	41	42	19	17	E B E 13	B E 14	B E 15	18
7	16	E B 14	15	E B 13	E B E 15	B E 14	B E 14	G	30	G 25	G 27	42	44	38	43	32	39	22	20	16	18	18	18	E B 15
8	E B E 14	B E 13	B E 14	E B 14	18	17	E B 16	24	29	32	36	35	U G 31	G	36	33	22	28	A A 66	21	22	17	E B 14	17
9	E B E 14	B E 14	B E 13	B E 14	E B E 15	B E 14	B E 16	G	27	34	34	36	G	G 19	35	35	25	E B 16	E B 15	B E 14	E B 14	16	18	E B 14
10	E B E 15	B E 15	B E 14	B E 13	E B 13	E B 12	E B 14	G 17	G	31	33	34	36	35	34	30	22	26	17	18	17	E B 14	B E 14	B E 16
11	E B E 15	B E 15	B E 14	B E 14	E B E 14	B E 14	B E 18	G	30	G	33	35	35	35	36	30	23	E B 15	E B 14	B E 14	E B 13	20	E B 14	E B 15
12	E B E 15	B E 12	B E 14	B E 14	E B E 15	B E 14	B E 15	23	G	G	G 25	U G 31	G 23	G 22	G	27	G	E B 16	16	E B 14	E B 14	B E 15	B E 13	16
13	17	17	E B 14	E B 14	17	17	18	G 18	G 22	G 24	G	G 23	G	G 20	30	G 20	G	E B 12	E B 14	B E 14	E B 14	B E 14	B E 14	18
14	E B E 14	B E 14	B E 14	B E 14	E B E 14	B 17	E B 15	G	G 20	G 19	36	G 23	37	35	36	27	G E 18	B E 15	B E 15	B E 13	E B 16	B E 16	B E 15	B E 15
15	E B E 15	B E 14	B E 15	B E 13	E B 14	16	E B 15	22	G	32	36	38	38	35	34	28	24	20	17	17	23	E B E 14	B E 14	17
16	17	17	E B 14	16	16	E B 14	B E 16	22	U G 26	29	32	G 18	35	38	32	28	22	26	E B 15	17	E B 14	17	17	E B 15
17	E B E 14	B E 14	B 16	E B 14	E B 13	B E 15	B E 15	G 18	G 21	G 20	G 26	32	33	U G 30	30	G	G	16	E B 16	B E 15	E B 13	16	16	23
18	16	16	16	E B 15	16	E B 14	B E 14	G	G 20	G U 30	G U 30	G U 32	G U 27	G U 28	26	G E 16	B 13	18	18	16	E B E 14	B E 14	B E 14	
19	18	18	21	E B 15	17	E B 14	B E 14	G	G 20	29	G	37	36	37	33	G 20	19	18	18	17	17	18	18	17
20	E B E 16	B E 14	B E 13	B E 13	E B 14	B E 14	B E 15	G 18	G 20	G 23	G 25	34	G U 28	G 22	18	20	E B 14	16	17	17	E B 14	16	E B 14	
21	E B E 14	B E 13	B E 14	B E 14	E B E 13	B 15	E B 14	23	G	G 24	G	E B 37	G	G	36	34	22	19	17	17	16	E B E 14	B E 13	B E 14
22	E B E 16	B E 14	B E 14	B E 14	E B E 14	B E 16	B E 15	G	G 19	G 22	36	35	34	33	G 25	27	20	20	E B 13	17	18	E B E 15	B E 15	B E 14
23	E B E 14	B E 14	B 17	E B 15	16	E B 13	B E 14	20	30	33	G 24	34	62	49	46	39	29	20	20	24	E B 14	E B 13	19	24
24	18	17	16	E B 14	E B E 13	B E 14	B E 14	G 18	28	34	U G 30	U G 30	U G 31	36	35	27	36	17	E B 13	19	18	18	E B 15	B E 14
25	17	18	18	E B 13	16	22	19	28	27	U Y 30	G 28	34	U G 31	37	44	32	21	E B 14	B E 13	B E 14	B E 14	B E 15	B E 15	B E 15
26	E B E 13	B E 14	B E 14	17	E B E 13	B E 15	B E 16	G	28	G 20	G	35	G	34	G 25	27	22	E B 14	B E 15	B E 13	B E 14	B E 14	B E 13	B E 18
27	E B E 14	B E 15	B E 14	B E 14	18	16	E B 15	21	G 19	31	32	35	G 22	G 23	G 20	G 18	21	E B 16	18	19	16	16	E B 14	B E 14
28	E B E 14	B E 15	B E 14	B E 15	E B E 14	B E 15	B E 14	21	G	29	33	33	34	33	35	G	G E 16	B E 15	B E 16	16	26	17	19	E B 15
29	E B E 14	B E 16	B E 16	B E 14	E B E 14	B E 14	B E 14	23	26	33	32	32	36	33	G 23	28	25	E B 16	17	26	17	17	18	17
30	E B E 15	B E 14	B E 12	B E 15	E B E 13	B E 16	B E 16	23	E B 29	G 19	33	35	34	33	30	G 22	20	16	16	E B 16	E B E 13	B E 16	B E 15	B E 16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30
MED	E B E 15	B E 15	B E 14	B E 14	E B E 14	B E 15	B E 15	20	G	30	32	34	34	34	34	28	22	16	16	17	16	16	E B 15	B E 16
U Q	16	17	16	15	16	16	16	23	29	33	35	37	36	36	36	33	25	20	18	18	18	17	17	17
L Q	E B E 14	B E 14	B E 14	B E 14	E B E 14	B E 14	B E 14	G	G 21	G 24	G 30	G 32	G	G 30	G	G	G E	B E 15	B E 15	B E 15	B E 14	B E 14	B E 14	B E 14

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	15	15	14	15	14	14	15	15	16	16	16	15	15	16	15	14	16	16	15	14	15	15
2	14	14	14	14	15	14	15	14	14	16	16	15	15	16	18	14	13	14	14	14	16	14	15	14
3	14	14	13	14	14	14	15	14	15	15	16	16	15	16	20	15	12	14	14	16	14	14	14	14
4	14	15	15	14	13	14	15	15	16	18	18	19	52	21	17	B	14	15	13	15	15	14	14	15
5	14	14	15	14	12	15	14	14	16	15	21	17	19	21	16	16	15	15	14	14	15	16	14	14
6	14	15	14	14	14	14	15	15	15	15	18	16	15	18	14	14	14	16	14	14	13	14	15	15
7	15	14	14	13	15	14	14	13	15	15	14	16	16	15	14	15	13	16	15	14	15	15	14	15
8	14	13	14	14	14	14	16	15	15	13	16	18	18	19	16	15	15	16	14	15	14	15	14	14
9	14	14	13	14	15	14	16	13	13	14	14	16	15	16	18	15	14	16	15	14	14	14	13	14
10	15	15	14	13	13	12	14	15	14	14	14	16	14	13	16	18	15	13	13	14	14	14	14	16
11	15	15	14	14	14	14	18	15	15	14	14	14	14	17	17	16	16	15	14	14	13	14	14	15
12	15	12	14	14	15	14	15	15	15	15	17	16	16	15	16	14	13	16	14	14	14	15	13	14
13	15	16	14	14	15	14	15	16	16	14	19	16	17	16	16	15	14	12	14	14	14	14	14	15
14	14	14	14	14	14	14	15	14	14	14	14	16	16	15	15	15	15	15	15	13	16	16	15	15
15	15	14	15	13	14	13	15	14	15	15	15	16	19	16	14	16	15	16	14	15	14	14	14	16
16	14	14	14	14	14	14	16	15	18	15	16	14	15	15	14	14	14	15	15	14	14	14	14	15
17	14	14	14	14	13	15	15	13	16	15	16	18	20	18	18	18	15	14	16	15	13	14	14	14
18	14	14	13	15	13	14	14	14	15	18	18	22	22	20	17	16	15	13	14	13	14	14	14	14
19	14	14	14	15	13	14	14	15	14	14	15	17	15	14	15	15	13	15	14	14	13	14	15	16
20	16	14	13	13	14	14	15	14	15	18	17	23	19	20	17	16	15	14	13	15	14	14	13	14
21	14	13	14	14	13	12	14	16	13	19	26	37	31	26	25	19	16	15	15	14	14	14	13	14
22	16	14	14	14	14	16	15	14	15	14	15	19	19	17	14	14	14	14	13	13	15	15	15	14
23	14	14	14	15	16	13	14	16	16	16	16	17	16	16	15	16	15	15	14	14	14	13	14	15
24	14	13	14	14	13	14	14	14	18	19	21	26	24	23	21	18	16	15	13	14	15	15	15	14
25	14	14	14	13	13	14	16	16	16	20	20	20	22	20	17	15	16	14	13	14	14	15	15	15
26	13	14	14	14	13	15	16	17	15	15	15	19	17	19	18	16	15	14	15	13	14	14	13	18
27	14	15	14	14	14	14	15	14	16	14	16	14	19	16	16	14	14	16	14	14	14	15	14	14
28	14	15	14	15	14	15	14	14	16	15	18	16	15	17	21	20	14	15	16	14	14	14	15	15
29	14	16	16	14	14	14	14	15	15	16	15	14	16	16	15	15	14	16	15	15	14	14	16	15
30	15	14	12	15	13	16	16	16	29	16	15	16	16	16	16	14	14	15	14	16	13	16	15	16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	14	14	14	14	14	14	15	14	15	15	16	16	16	16	16	15	14	15	14	14	14	14	14	15
U Q	15	15	14	14	14	14	15	15	16	16	18	19	19	19	18	16	15	16	15	15	15	15	15	15
L Q	14	14	14	14	13	14	14	14	15	14	15	16	15	16	15	15	14	14	14	14	14	14	14	14

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	297	293	297	328	352	393	326	R 367	355	346	356	383	364	337	374	356	364	363	383	275	302	288	R 311	273
2	263	305	306	304	348	302	316	R 363	391	R 312	354	365	361	338	340	359	342	369	337	301	309	331	306	294
3	304	R 311	301	F 305	367	350	R 367	366	362	365	323	350	344	336	356	369	364	368	346	F 304	307	F 319	F 306	F 303
4	F 311	309	307	320	355	318	R 344	369	376	361	356	350	327	360	357	B	A	361	312	308	314	312	282	F 286
5	284	287	314	339	362	327	317	S 352	348	337	354	U R 335	344		341	349	355	364	A	286	F 285	F 280	F 286	283
6	301	292	320	337	311	298	327	347	378	365	349	343	339	344	358	363	365	323	303	344	345	285	285	285
7	299	295	301	337	302	319	358	R 356	333	347	334	349	295	304	327	345	358	320	267	296	316	301	308	284
8	305	335	348	290	349	323	313	R 347	319	320	337	345	314	312	341	350	355	330	A	F 305	F 301	F 312	F 319	297
9	298	F 274	300	339	388	315	318	354	367	352	355	331	371	342	366	355	365	363	369	314	333	361	299	306
10	301	308	313	334	383	381	333	361	365	363	363	338	335	349	355	375	371	333	321	318	335	300	299	278
11	307	297	291	299	358	350	U S 361	R 369	345	346	335	341	352	358	364	354	366	339	301	349	333	F 284	F 289	301
12	303	308	317	323	343	334	318	351	336	348	358	375	349	349	364	371	368	367	373	R 333	336	306	290	298
13	288	295	F 312	336	365	303	334	R 351	353	350	329	342	Z 312	344	350	380	371	355	319	335	320	307	299	301
14	294	290	313	321	355	360	334	379	363	356	359	365	343	367	364	346	366	376	315	303	293	295	292	292
15	289	292	300	300	303	291	325	R 365	330	348	350	344	364	335	342	337	356	359	324	344	301	F 291	F 286	F 291
16	F 310	306	312	307	319	308	325	345	363	352	353	346	339	336	346	361	361	325	328	327	316	310	304	288
17	294	307	318	350	374	304	337	356	372	354	342	338	316	334	348	366	366	336	349	345	315	322	289	290
18	F 290	308	F 277	F 323	F 328	361	358	378	349	364	R 363	330	326	331	338	355	R 356	325	342	349	340	309	278	281
19	275	298	297	337	372	328	329	344	376	350	357	367	331	R 344	348	333	382	359	340	293	306	338	299	291
20	298	303	301	326	319	360	321	351	359	344	336	363	365	334	351	345	354	363	341	299	337	332	290	296
21	299	313	316	322	350	358	331	358	371	355	344	351	360	331	362	351	383	346	350	334	336	300	F 288	F 301
22	R 303	304	306	320	333	334	345	361	S 361	362	338	341	342	352	340	339	353	345	358	317	289	301	F 273	276
23	291	316	312	R 318	294	288	285	270	325	342	340	320	331	344	345	332	345	319	327	R 305	286	286	266	275
24	359	260	F 279	323	309	280	320	349	354	353	354	332	332	358	353	330	346	352	358	306	311	320	F 271	F 304
25	317	303	V 321	327	335	305	322	S 365	366	344	346	353	348	347	357	347	361	351	358	347	330	323	279	F 298
26	F 306	323	312	298	317	306	338	370	380	375	359	359	343	365	345	334	355	359	351	295	317	318	314	302
27	288	302	296	301	314	323	309	356	377	360	349	335	326	351		359	369	379	334	340	321	286	315	306
28	292	S 289	307	308	332	318	304	346	365	343	350	337	344	340	356	359	364	373	343	346	329	332	290	299
29	F 309	F 304	F 301	F 312	F 326	F 344	320	S 361	S 334	350	352	361	346	340	360	357	367	369	325	325	327	297	F 300	F 301
30	293	300	291	300	348	353	327	351	360	352	339	347	334	350	330	368	365	373	331	333	309	296	F 287	F 302
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	29	30	28	30	30	30	30	30
MED	298	303	306	322	346	323	326	356	362	351	350	346	342	344	351	355	364	359	338	318	316	306	290	295
U Q	305	308	313	334	358	350	337	365	371	360	356	359	349	350	359	362	366	367	350	340	333	320	304	F 301
L Q	291	293	300	305	319	305	318	351	348	346	339	338	331	336	342	345	355	336	322	303	306	295	286	285

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	U L 388	L 389	L	L	L									
2									L	L	L 372	L 378	U L 377	L 384	U L 357		L 418							
3										U L 393	349	L 376	L 373	L 382	U L 375	L								
4									L 401	U L 364	U L 378	U L 391	B	L 365	L	B	A							
5									L	L	U L 353	L	A	L 356	A									
6									L	U L 376	L	372	389	L	L	U L 401								
7										L	U L 354	A 385	L	L	A									
8										L	L	U L 392	L 383	U L 350	L	L								
9									414		L 376	U L 336	U L 371	U L 364	L									
10									L	L	L		U L 354	L 368	U L 372	L								
11										L	L	U L 346	U L 366	L 371	L									
12									L	U L 359	L 362	L 369	402	U L 385	L									
13								L 366	L	L	L	L 386	L	L 364	L	L	L 415							
14									L	U L 391	L 354	L 392	L 366	L	L	L								
15									U L 409	L	L 379	L	A 374	L	L	L								
16									L	L	L	L 399	L	L	L	U L 363	A 408							
17									L	U L 397	L	U L 378	U L 359	L	L	U L 402								
18									L 408	L	U L 375	U L 374	U L 378	U L 366	L 378	U L 370								
19										U L 365	L	L	U L 357	L	L									
20									L	U L 391	L 393	L 388	U L 388	U L 375	L	L								
21										L	L 434	B 374	U L 375	L	L 396									
22									L 424	U L 406	L	L 374	L 367	U L 364	L 395	L								
23									L	L	L	L	A	A	A									
24									L	L	L	L 369	L	L										
25										L	U L 371	L	U L 377	L	A									
26										L	433	U L 368	L	L	L									
27										L 397	U L 381	U L 376	L	U L 355	L									
28									L	L	U L 375	L	L	L	L									
29										L	L	U L 362	L	L 389	L	L								
30									L	L	L	U L 369	L	L		L								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	5	10	17	23	17	15	6	4	3							
MED								L 366	L 409	U L 391	L 375	L 376	U L 374	L 366	L 376	U L 386	L 415							
U Q									419	U L 397	L 384	L 388	L 380	L 382	L 395	U L 402	L 418							
L Q									L 404	U L 365	L 358	U L 369	U L 366	L 364	U L 372	U L 366	A 408							

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										240	248	228	232	244	240									
2									216	280	258	252	244	264	254		218							
3										250	318	258	234	256	246	230								
4									214	262	258	252	290	244	246	B	A							
5									252	270	252	262	272	244	258									
6									226	242	256	268	274	266	250	234								
7										244	262	244	294	292	238									
8										276	260	246	250	286	254	238								
9									218	252	240	274	238	270	244									
10									228	226	232		268	254	248	226								
11										236	258	258	246	244	228									
12									242	250	242	234	254	256	236									
13								230	230	234	246	252	244	256	242	222	206							
14									222	248	254	246	280	238	236	258								
15									212	248	244	248	248	268	264	248								
16									226	250	238	254	234	278	244	238	218							
17									228	242	256	254	284	252	244	234								
18									220	230	232	246	254	262	250	238								
19										230	240	240	278	244	244									
20									232	246	256	238	234	258	242	240								
21										266	240	252	246	264	236									
22									220	232	254	262	266	254	246	236								
23									268	238	250	248	264	250	A 252									
24									240	242	242	260	272	242										
25										250	252	238	252	244	248									
26										222	240	248	258	238	240									
27										226	244	252	252	254	236									
28									228	242	250	256	254	256	242									
29										232	246	236	252	254	234	220								
30									230	236	236	244	250	254		236								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	19	30	30	29	30	30	28	14	3							
MED								230	228	242	249	252	253	254	244	236	218							
U Q									232	250	256	257	272	264	249	238	218							
L Q									220	234	240	244	246	244	239	230	206							

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	312	310	326	274	240	202	230	218	226	226	A 240	228	A	230	242	226	220	216	208	260	270	294	278	368
2	344	286	280	258	238	268	234	224	226	220	220	202	H 198	186	220	234	224	210	224	262	262	238	286	A 332
3	282	278	274	254	220	234	232	212	212	232	208	214	222	236	234	234	220	206	238	258	264	290	308	300
4	282	274	278	262	230	270	232	220	188	238	218	A 232	B	246	A 248	B	A	210	244	264	244	260	316	322
5	300	316	268	234	216	258	254	228	244	232	H 220	A 254	A	234	A	244	220	210	A	318	364	338	312	294
6	274	288	266	232	242	290	250	228	242	214	230	A 254	202	A 260	A 244	232	216	A	276	240	218	314	328	322
7	314	294	298	236	260	262	240	222	242	232	204	A 246	A 258	A 262	A	234	226	228	258	254	258	280	264	272
8	292	246	230	292	240	258	264	240	236	H 228	246	230	210	H 204	258	A 238	218	236	A	280	276	290	272	282
9	294	324	288	248	200	292	262	226	202	238	208	192	218	220	248	234	218	198	218	238	254	232	320	308
10	290	288	278	254	212	204	246	220	H 214	214	214	216	244	232	A 244	240	222	234	214	248	242	268	280	296
11	274	294	310	298	226	224	222	222	226	232	228	218	230	218	230	238	218	200	244	230	252	376	310	280
12	270	292	264	262	240	230	270	224	H 208	226	220	218	188	H 196	238	222	218	208	212	256	244	250	304	310
13	330	304	268	244	220	268	252	210	H 204	H 196	210	H 188	226	226	224	234	202	204	240	232	240	294	294	292
14	320	302	286	270	230	216	230	212	H 202	222	232	210	230	246	A 240	H 228	212	204	268	250	254	262	282	292
15	288	304	294	286	288	294	240	212	206	230	236	A	A 240	A 242	256	228	228	216	222	232	A 318	290	298	310
16	282	280	260	254	264	282	266	230	232	202	226	200	228	E A 274	244	222	218	218	224	242	262	304	284	300
17	304	294	252	224	210	304	246	232	226	H 206	H 192	H 206	194	240	232	212	220	212	236	224	240	252	278	E A 366
18	334	276	326	260	244	208	214	210	204	222	212	216	228	250	226	212	222	208	224	228	232	240	310	334
19	356	334	334	250	226	280	258	232	222	216	240	A 246	206	224	A 236	H 224	220	206	246	250	286	240	308	312
20	298	276	286	260	268	224	256	228	222	210	204	220	202	H 180	232	224	220	204	236	H 268	244	240	288	314
21	300	284	282	264	240	212	234	232	222	H 182	172	B 242	232	220	228	230	212	208	232	230	242	270	304	294
22	260	276	290	260	248	234	220	216	196	206	236	200	220	232	216	228	238	212	220	236	278	280	340	332
23	282	256	262	280	302	292	336	266	248	240	238	224	A	A	A	A 250	240	242	238	A 330	312	296	342	338
24	230	362	304	262	290	364	278	226	222	234	240	214	256	244	240	236	232	212	212	288	274	266	322	274
25	274	314	266	266	252	A 352	282	222	218	226	222	222	240	232	A	230	222	218	224	224	244	266	296	314
26	262	268	274	296	262	286	236	212	216	H 210	176	220	228	238	220	234	222	204	222	264	256	242	290	298
27	288	286	284	284	276	236	238	228	220	202	198	210	H 206	234	228	232	216	202	234	264	244	276	282	278
28	304	304	282	266	246	208	266	230	228	220	216	216	216	216	A 246	236	218	200	216	238	A 306	266	316	290
29	270	278	272	268	242	226	254	226	220	A 224	214	200	A 232	208	H 188	224	230	206	236	A 290	264	268	292	306
30	302	300	302	296	244	220	242	222	232	230	220	208	212	218	232	228	212	208	218	252	280	286	352	290
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	29	26	29	26	29	29	29	28	30	30	30	30	30
MED	291	290	281	262	241	258	246	224	222	223	220	216	224	232	235	232	220	208	228	251	257	269	301	302
U Q	304	304	294	274	260	286	262	228	228	232	232	A 229	232	243	A 244	235	223	216	239	264	276	290	316	322
L Q	274	278	268	254	226	224	234	218	208	210	208	207	206	218	228	225	218	204	219	236	244	252	284	292

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B	136	120	118	116	112	114	120	124	118	A							
2							B	A 140	140	128	116	120	A	A	A	A	A 144							
3							B	A 148	132	122	114	114	118	118	124	118	128							
4							B	A	A	118	A	A	B	A	128	B	A							
5							B	140	130	A 134	122	120	124	124	120	120	A							
6							B	E A 168	126	A 126	116	120	124	120	120	120	122							
7							B	124		A 140	A 130	120	116	120	120	122	A							
8							B	126	124	140	132	122	A	122	122	A	A							
9							B	130	128	130	A 126	122	118	124	A 138	120	120							
10							B	A 152	126	122	122	118	118	124	118	118	A							
11							B	176	130	116	116	120	116	116	116	114	A							
12							B	130	128	120	A 130	A	126	A 128	120	116	E B 154							
13							B	A 146	A 136	128	118	120	120	122	A	A 122	136							
14							B	134	120	120	120	120	118	114	118	A 136	E A 174							
15							B	A	124	120	116	A 130	A 130	A 124	126	118	A							
16								140	A	A	A 138	118	120	122	122	A	A							
17								A 134	A 142	126	126	A	A	A	A 128	126	128							
18								128	134	124	128	A	A	A 132	A	A	E A 178							
19								B 170	E A 148	122	114	A	A	A	A	A 128	A							
20								146	126	126	A 130	A	124	A	A 146	128	A							
21								142	124	134	E B 134	B	E B 152	124	B 134	A 132	A							
22								132	A 142	A 138	A	120	120	118	A 134	A 136	A							
23								A	120	A	A 136	A	A	A	A	A	A							
24								A 160	A	A	A	A	A	A 136	A	A	A							
25								E A 156	A 142	A	A 132	A 130	A	A	A	A	A							
26								E B 194	130	A 134	118	118	118	116	126	126	138							
27								A 142	128	118	118	116	120	124	124	110	132							
28								150	120	A	A	A	A	A	A	118	A 150							
29								126	A	A	A	A	A	A	128	A	A							
30								150	B	122	124	122	126	A	A	132	A							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								27	24	24	25	19	19	20	21	21	12							
MED								141	128	125	122	120	120	122	124	120	132							
U Q								A 152	A 135	A 132	A 130	122	124	A 124	A 128	A 128	E A 152							
L Q								132	124	120	116	118	118	119	120	118	128							

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	118	116	112	B	120	B	B	168	140	130	120	122	118	126	122	118	116	118	110	B	112	108	106	102
2	106	112	108	108	110	114	170	160	176	132	130	G	110	110	108	104	124	B	110	112	B	106	110	106
3	110	114	B	B	B	B	140	146	110	162	G	168	160	102	148	136	102	102	B	B	112	108	108	106
4	108	112	108	106	104	102	114	162	116	118	116	112	B	120	126	B	114	120	B	112	116	120	108	116
5	B	108	108	B	B	B	122	152	112	134	132	122	120	128	126	122	118	118	112	108	110	112	112	B
6	B	B	114	112	B	B	B	144	110	150	G	126	110	128	122	120	112	110	112	112	116	110	110	110
7	112	110	110	B	B	B	B	G	160	108	108	136	124	124	122	122	114	116	112	122	112	108	104	B
8	B	110	110	110	104	106	160	148	152	172	156	176	116	G	122	112	112	122	112	110	108	106	108	108
9	136	114	B	B	B	B	122	G	176	164	136	174	G	110	138	128	122	B	116	132	114	112	106	B
10	B	B	B	B	B	B	112	124	G	188	150	132	124	120	120	116	114	106	108	102	104	106	B	B
11	106	B	B	B	B	122	B	G	174	G	174	154	142	138	128	122	112	B	B	B	B	106	B	B
12	B	B	B	B	B	B	118	186	G	G	118	112	110	106	G	124	G	B	100	B	104	B	B	122
13	110	106	118	108	100	104	120	120	114	114	G	106	G	110	106	106	G	106	B	B	B	138	116	110
14	108	110	B	B	B	104	B	G	106	110	170	104	160	146	134	132	158	B	B	116	B	B	B	B
15	B	B	B	110	108	110	108	134	G	114	186	162	150	148	142	126	118	116	112	116	104	B	B	108
16	110	110	116	110	108	110	112	156	122	110	180	106	140	128	124	100	96	98	102	100	122	116	118	B
17	B	B	108	B	B	B	B	116	120	114	110	108	106	106	126	G	G	104	B	B	B	106	112	104
18	110	118	106	106	110	106	102	116	120	G	124	116	114	120	124	124	122	B	102	100	96	100	108	B
19	106	106	106	114	106	124	B	112	106	148	G	104	106	102	104	102	100	100	102	100	98	100	98	96
20	B	B	B	B	B	104	B	126	118	114	114	110	G	118	110	110	110	104	110	114	106	B	104	B
21	B	B	B	B	B	114	B	200	G	112	G	B	G	G	130	124	112	108	106	102	104	B	B	B
22	B	B	B	B	B	B	154	G	116	110	102	174	176	174	114	136	118	110	104	106	106	B	B	112
23	110	108	108	118	110	114	B	128	138	110	104	100	102	100	100	102	96	98	102	106	B	114	106	106
24	102	104	106	110	132	B	B	122	120	178	114	114	112	150	136	110	104	110	126	104	102	104	B	B
25	134	134	130	108	108	100	102	148	150	124	116	164	112	108	108	112	100	B	110	B	B	B	106	B
26	B	B	108	102	B	B	106	G	192	112	G	178	G	166	112	184	142	B	B	B	108	B	B	B
27	B	B	B	B	108	112	106	168	118	128	130	126	108	112	106	100	176	B	126	126	120	116	112	B
28	B	106	B	B	B	B	B	158	G	112	116	116	116	112	112	G	116	B	126	116	108	104	106	B
29	B	B	B	118	B	B	150	146	116	108	110	112	108	110	112	106	174	98	108	104	104	102	114	110
30	B	B	B	B	B	B	B	168	B	110	168	156	128	118	118	110	128	150	98	B	B	B	B	B
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	15	17	16	14	13	15	17	24	24	27	24	28	24	28	29	27	27	20	23	21	22	21	20	14
MED	110	110	108	110	108	110	118	147	120	114	122	122	116	119	122	118	114	109	110	110	108	108	108	108
U Q	112	114	113	112	110	114	145	161	151	148	153	159	134	128	127	124	122	117	112	116	112	113	112	110
L Q	106	107	108	108	105	104	107	125	115	110	114	111	110	110	111	106	110	103	102	103	104	105	106	106

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

IONOSPHERIC DATA STATION Kokubunji

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

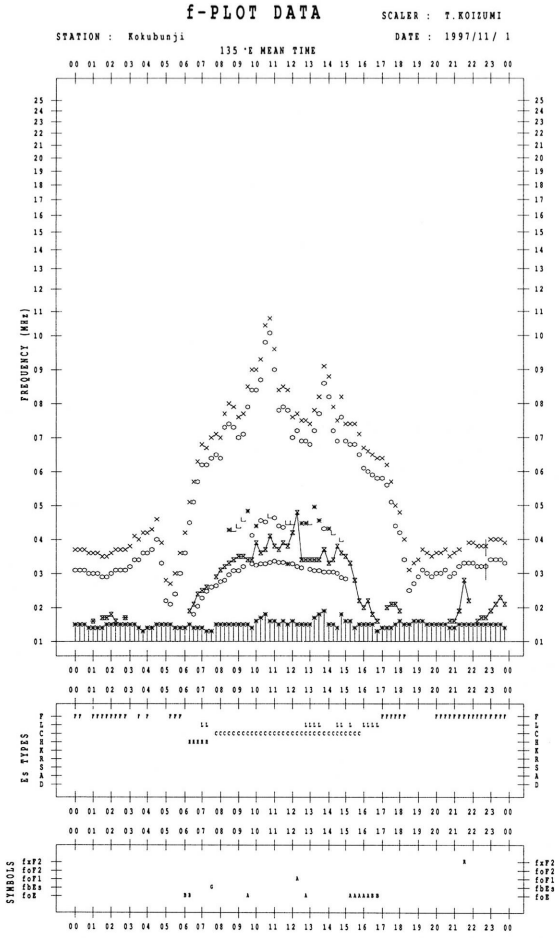
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

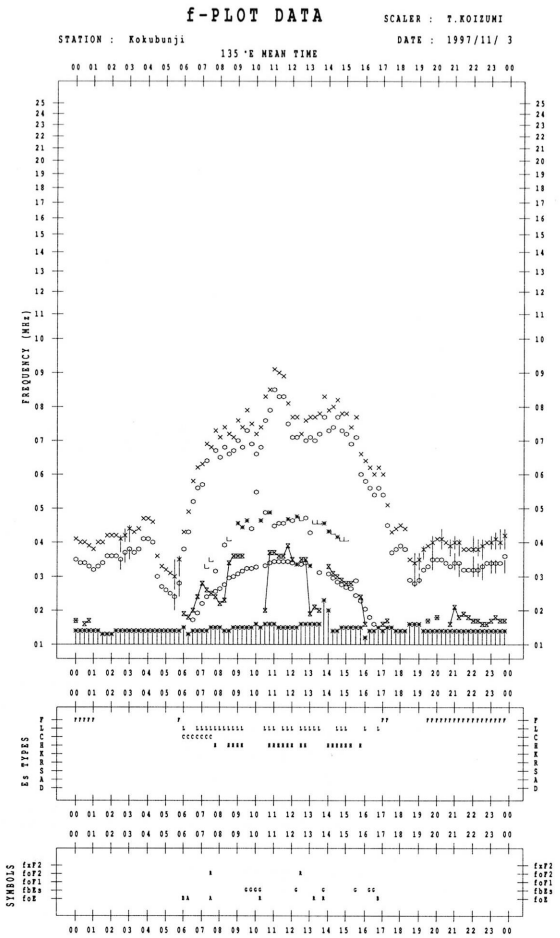
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 1	F 1	F 2		F 1			HL 11	C 1	C 2	C 2	C 2	C 3	CL 11	C 1	C 2	L 2	F 1	F 1		F 1	F 1	F 2	F 2
2	F 2	F 1	F 1	F 1	F 1	F 1	HL 11	HL 11	HL 11	CL 11	C 1		L 1	L 1	L 1	LC 21	L 1		F 3	F 1		F 1	F 1	F 3
3	F 1	F 1					CL 11	CL 22	L 1	HL 11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

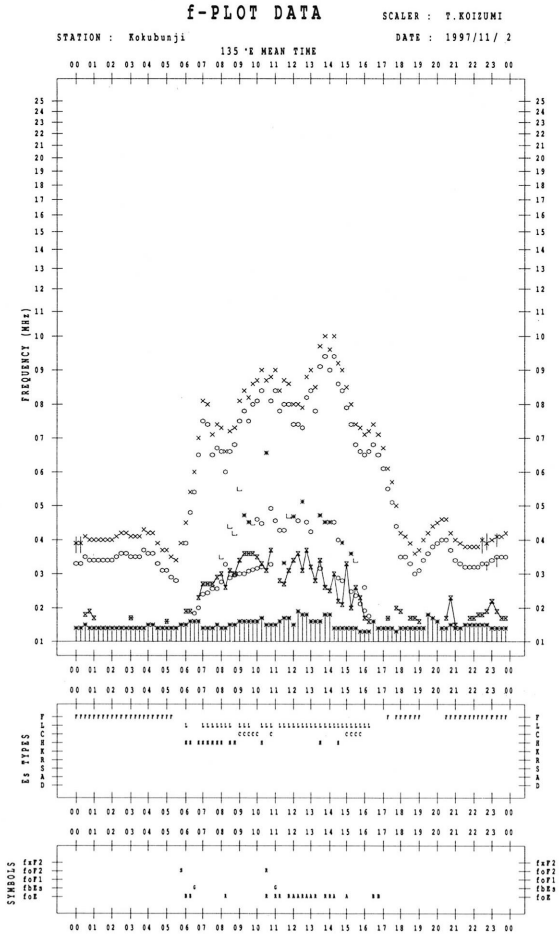
NOV. 1997 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

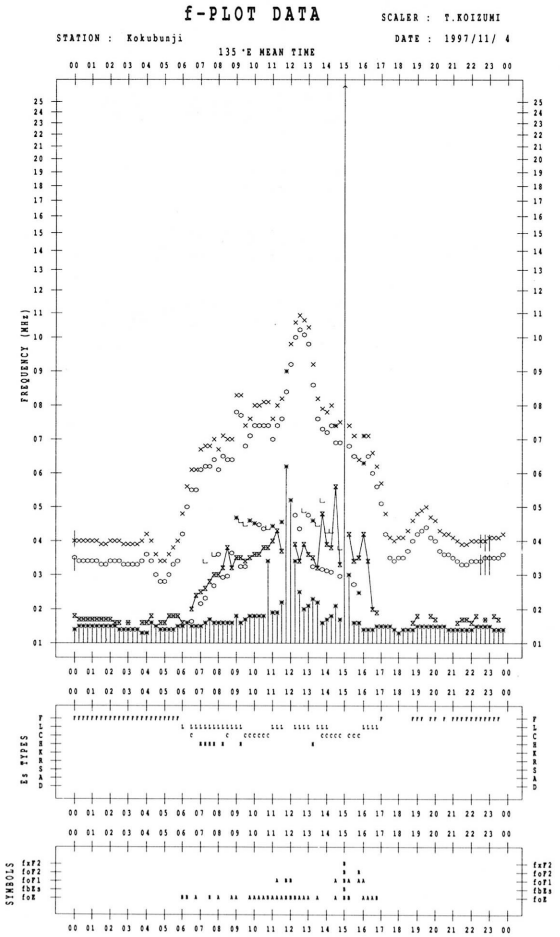
f-PLOTS OF IONOSPHERIC DATA

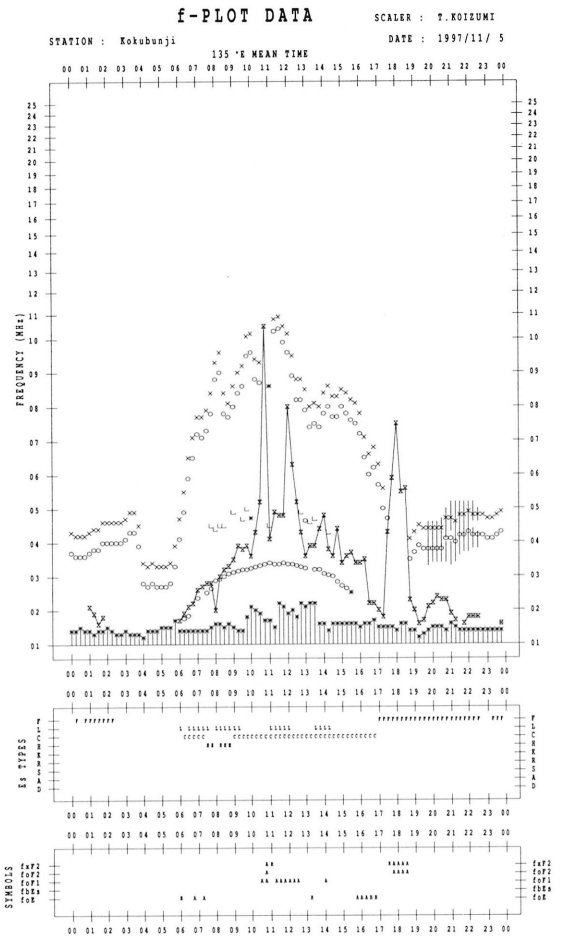
KEY OF f-PLOT	
	SPREAD
	foF2, foF1, foE
	fxF2
	DOUBTFUL foF2, foF1, foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

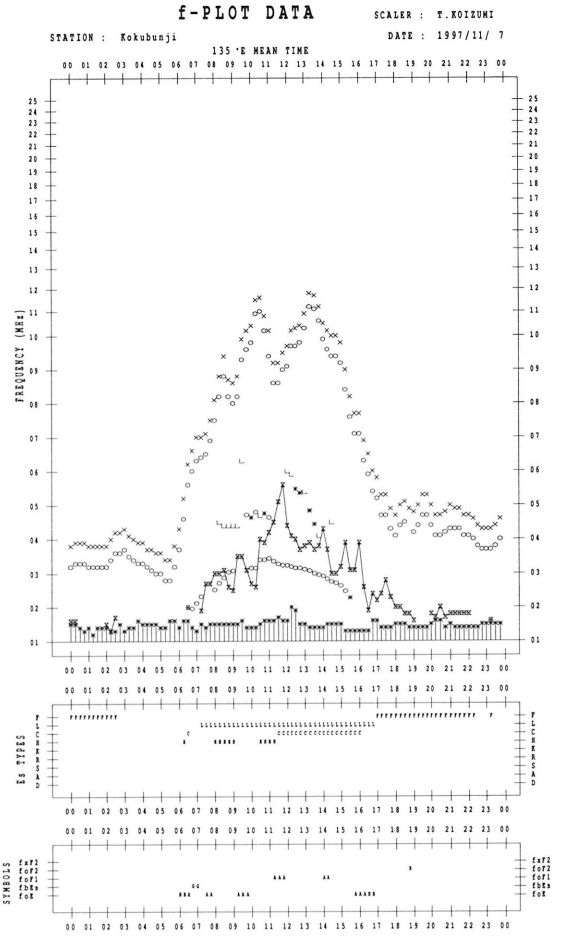

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

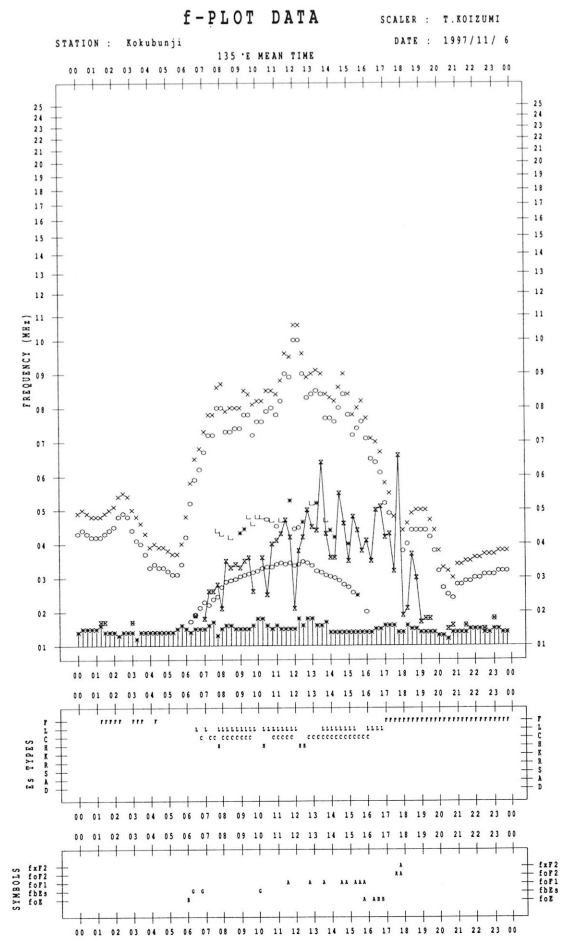

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

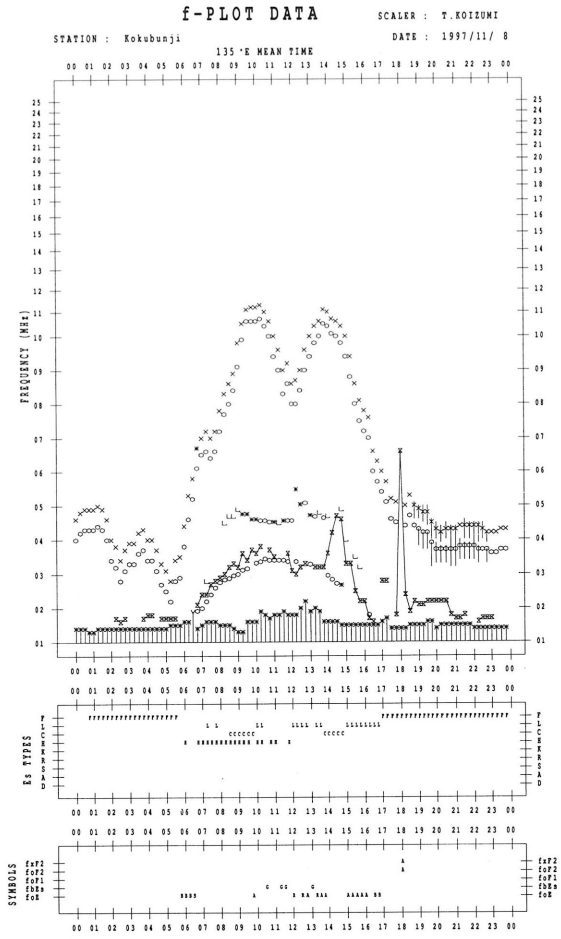

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

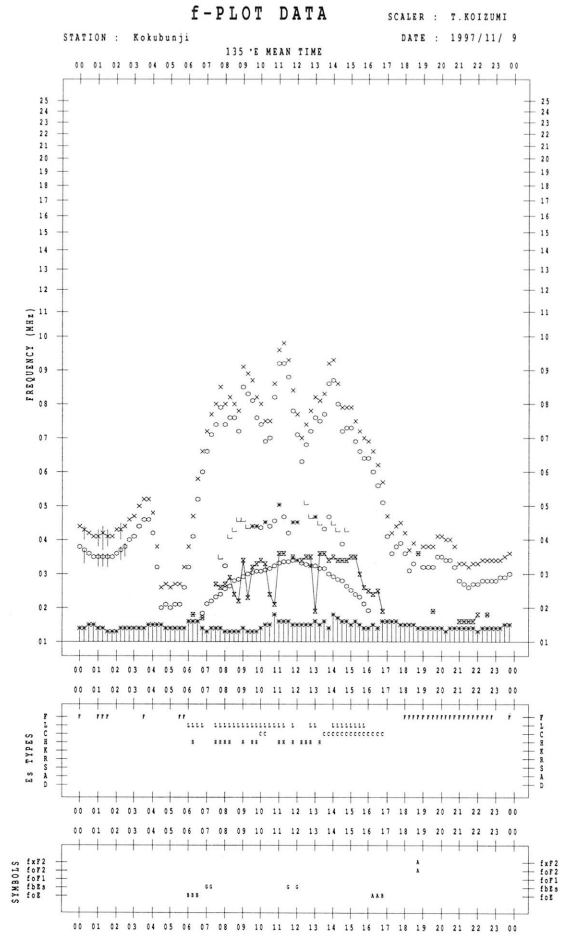

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

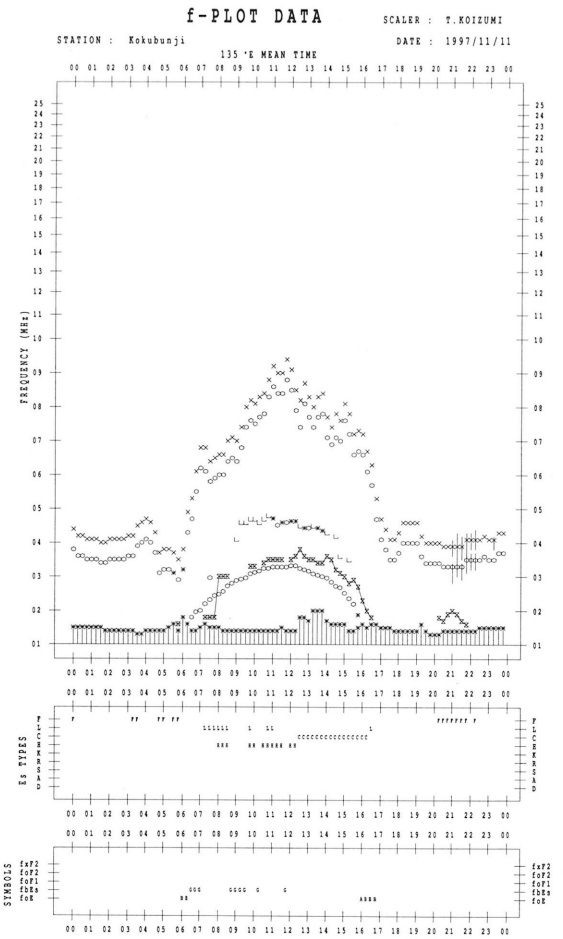

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

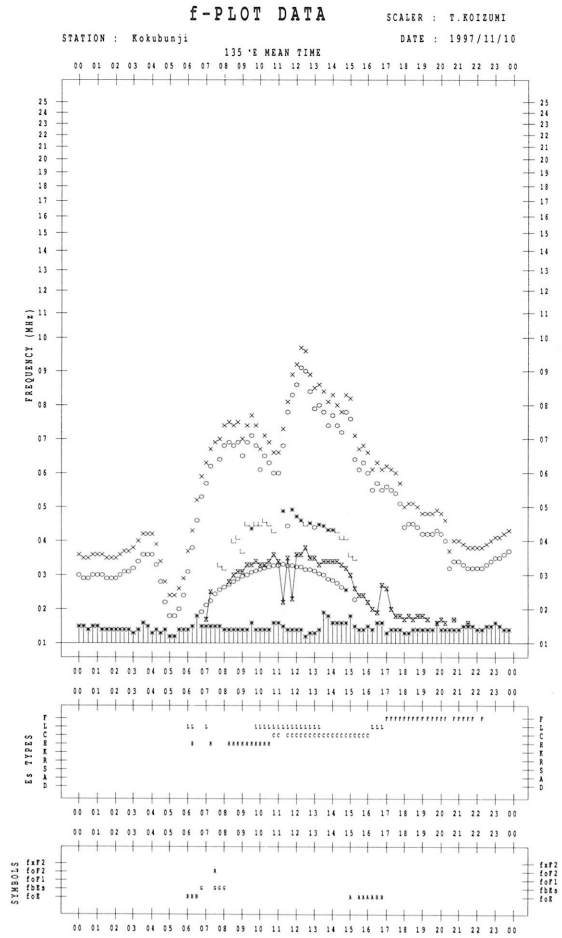

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

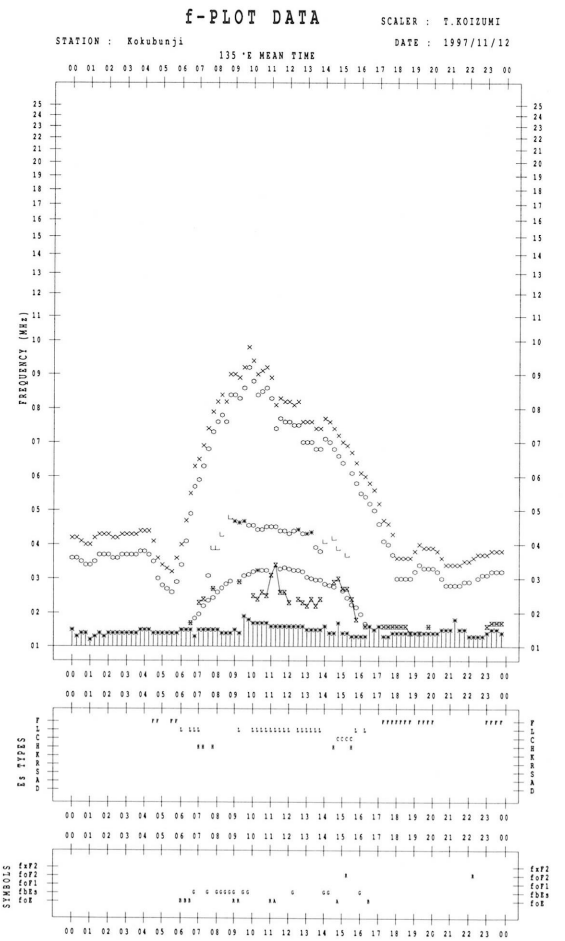

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

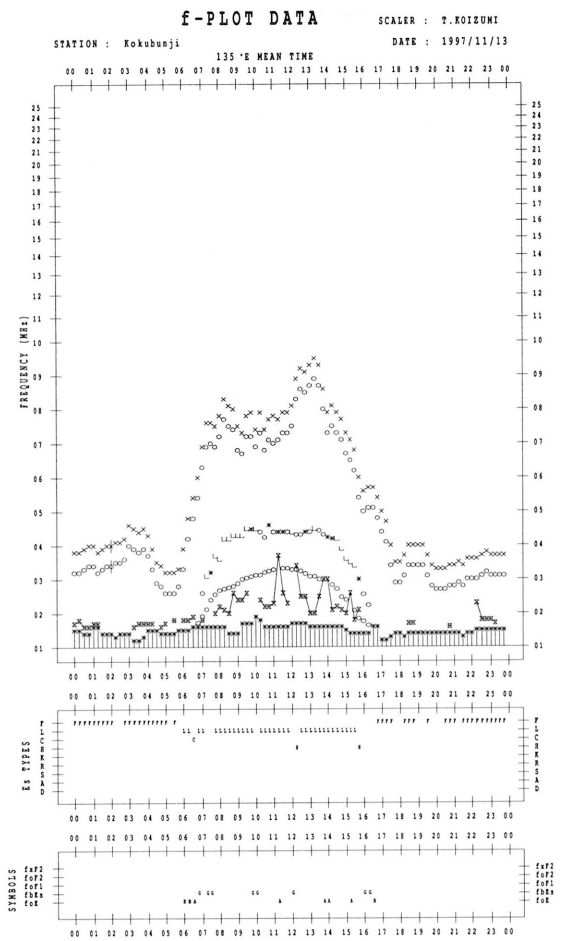

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

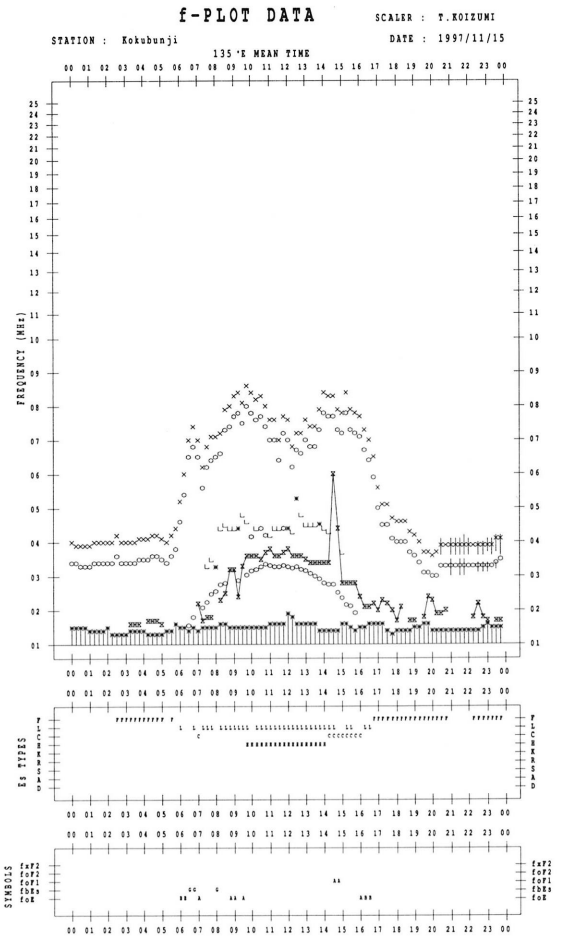

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

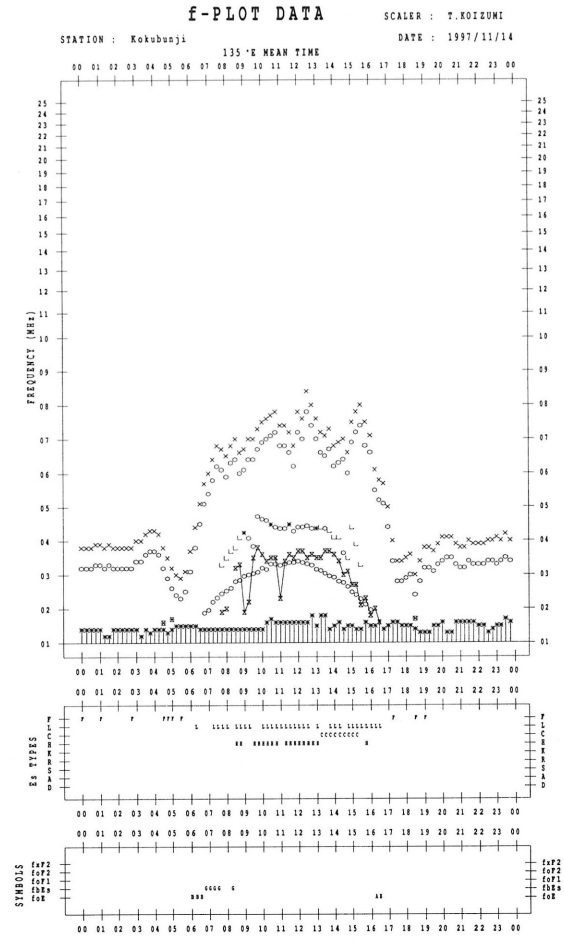

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

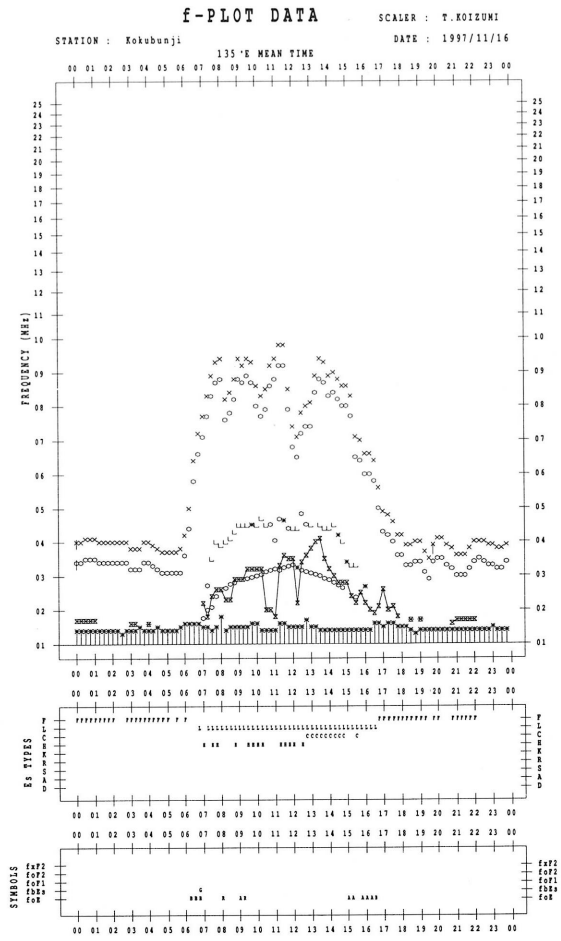

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

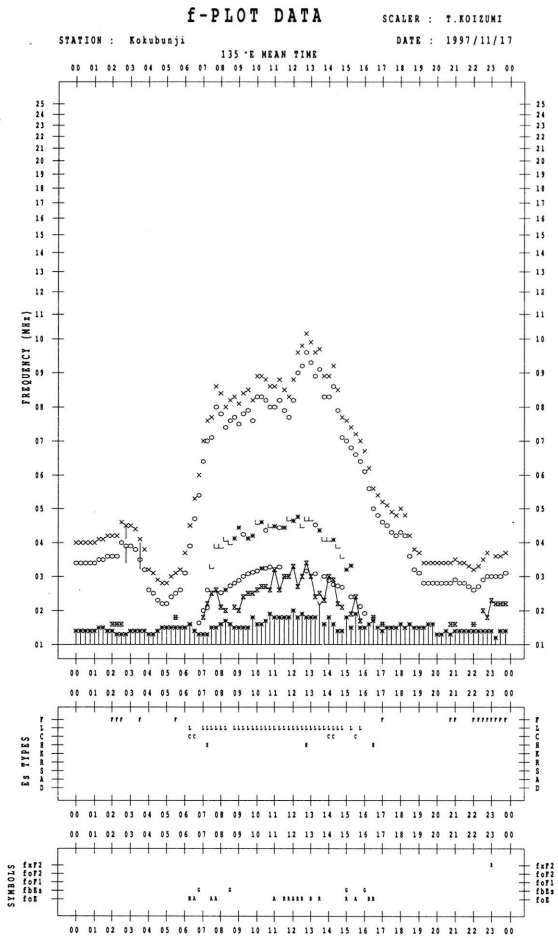

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

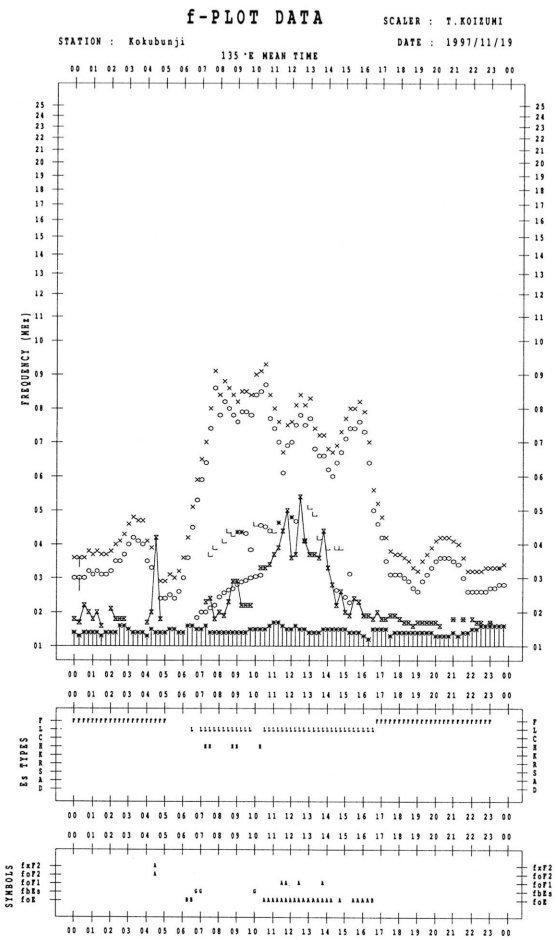

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

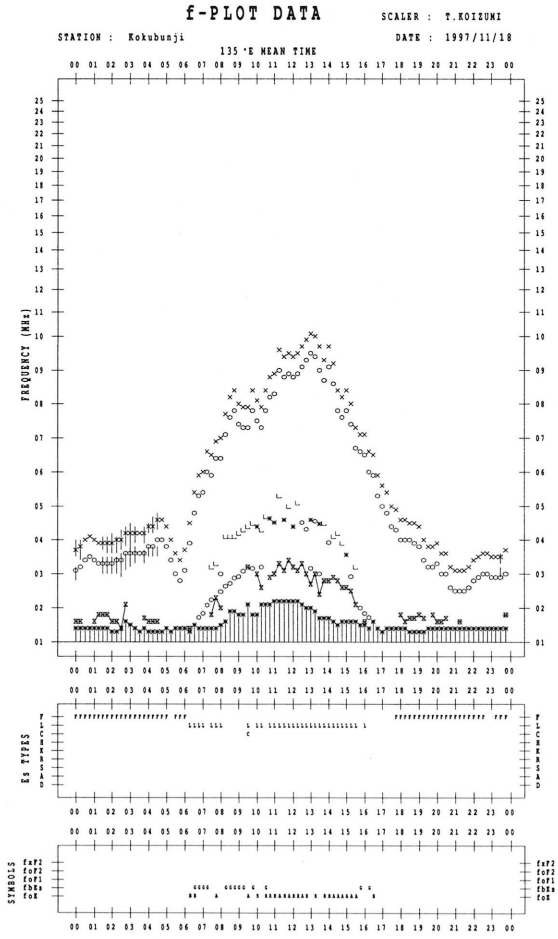

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

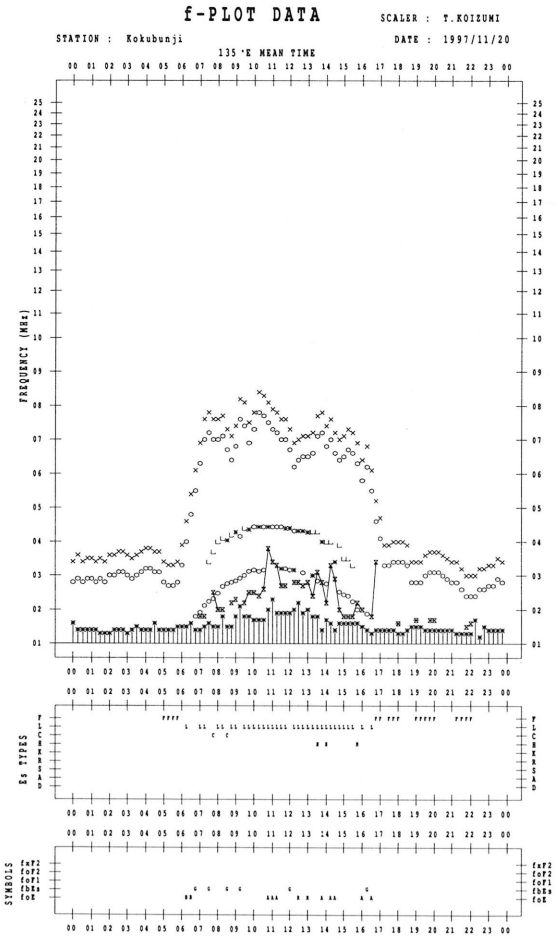

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

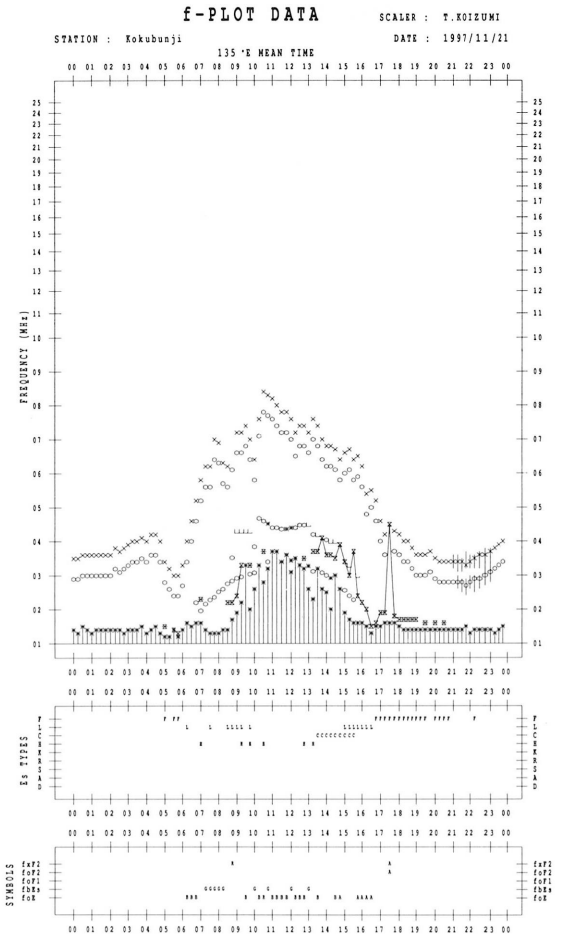

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

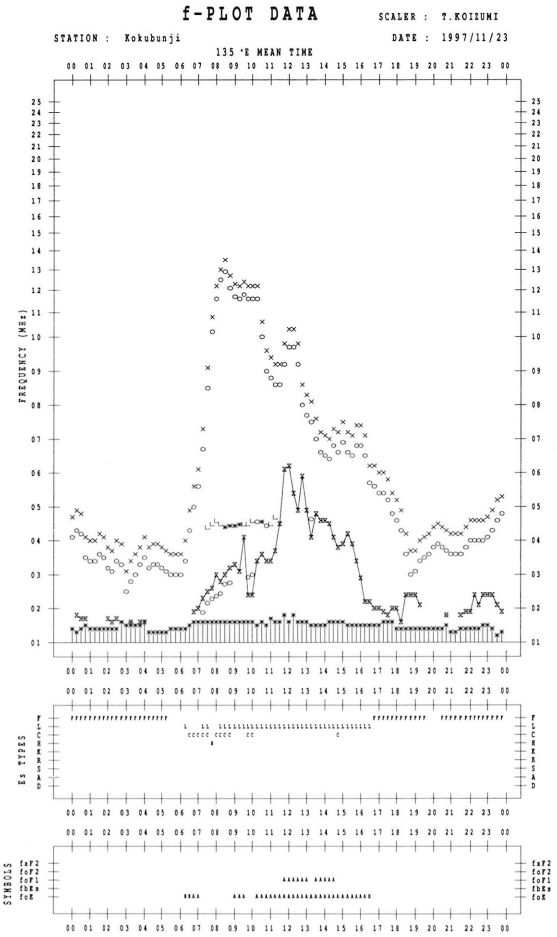

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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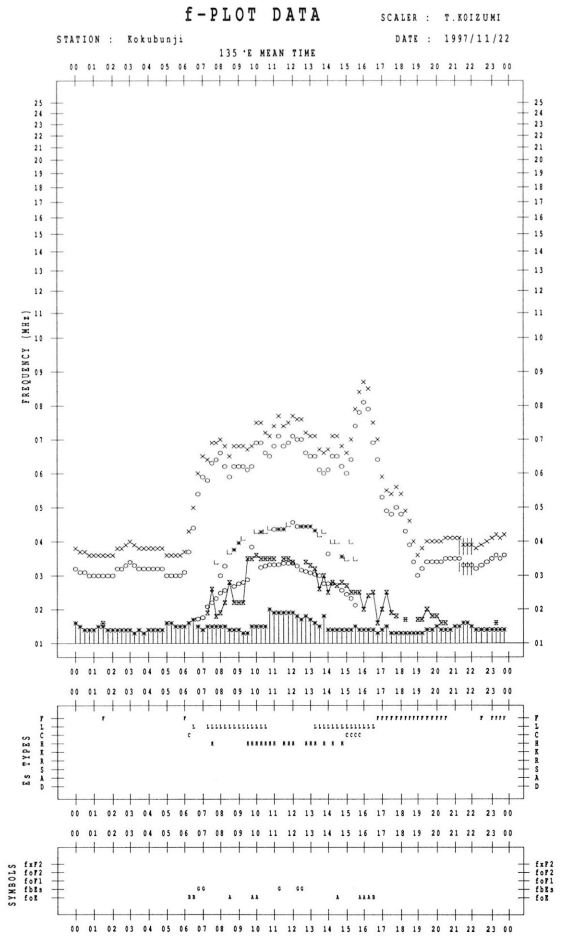
STATION : Kokubunji
DATE : 1997/11/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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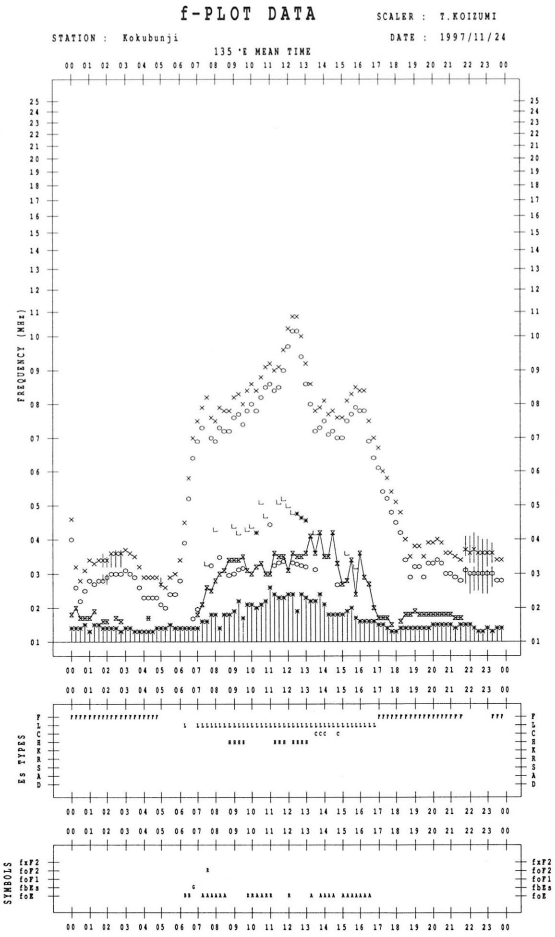
STATION : Kokubunji
DATE : 1997/11/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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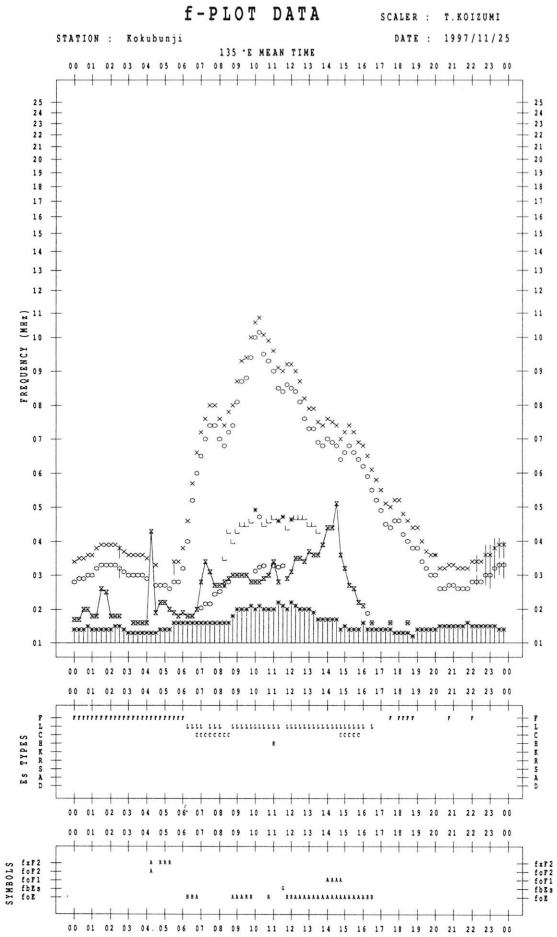
STATION : Kokubunji
DATE : 1997/11/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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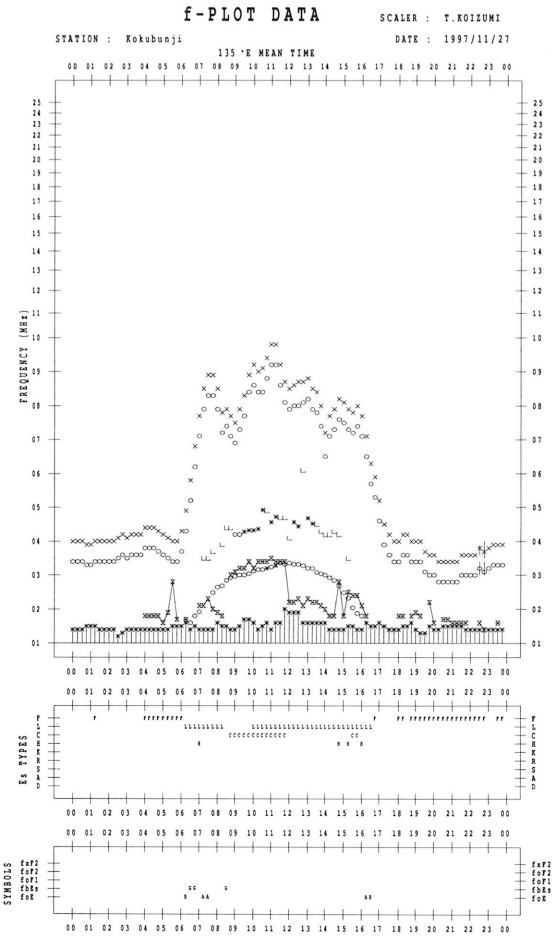
STATION : Kokubunji
DATE : 1997/11/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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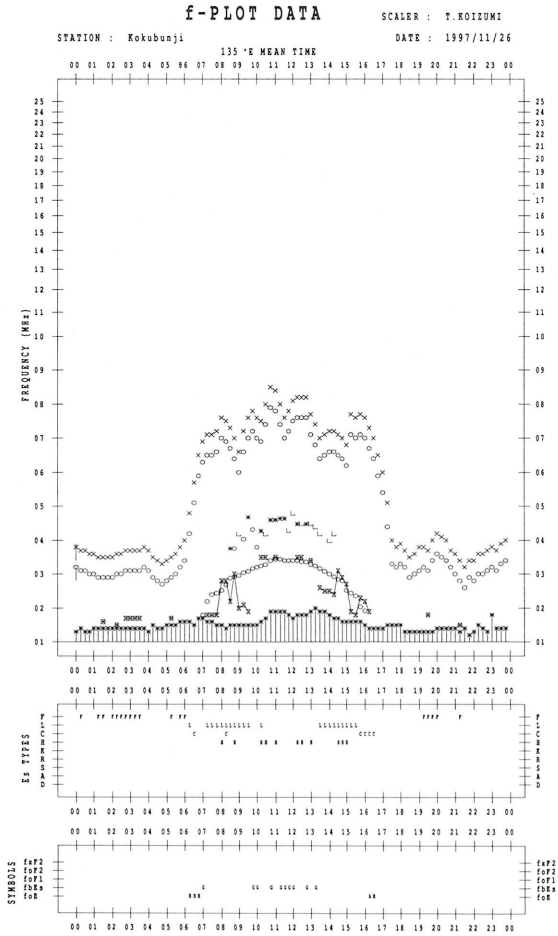
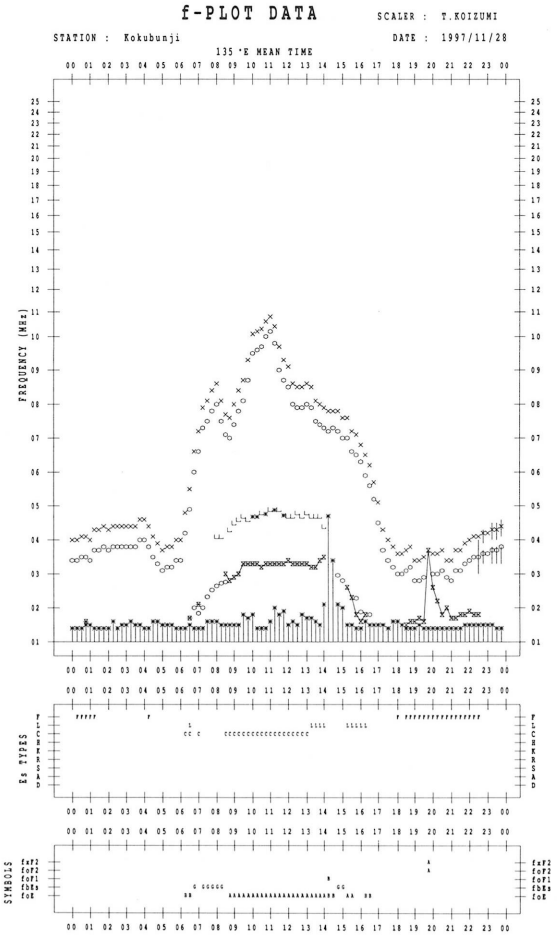
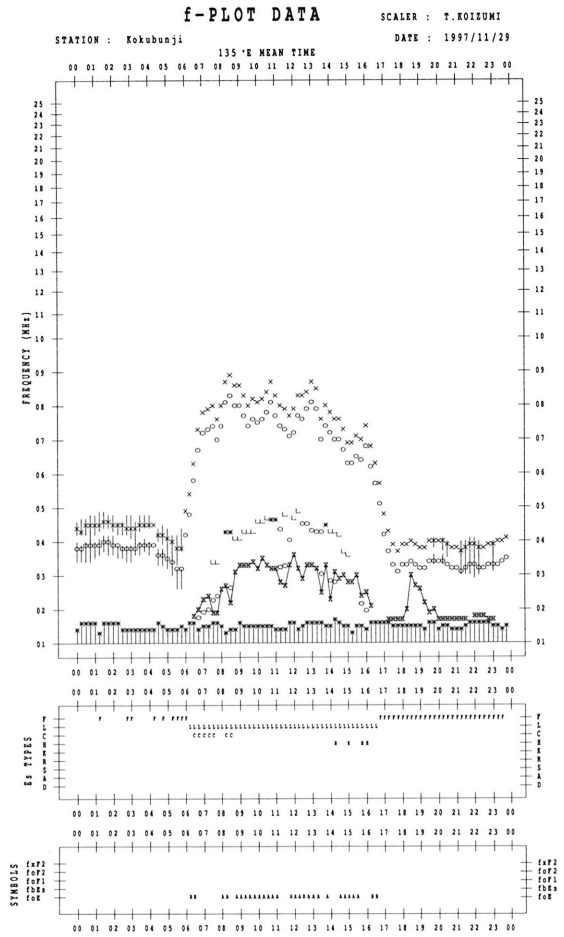
STATION : Kokubunji
DATE : 1997/11/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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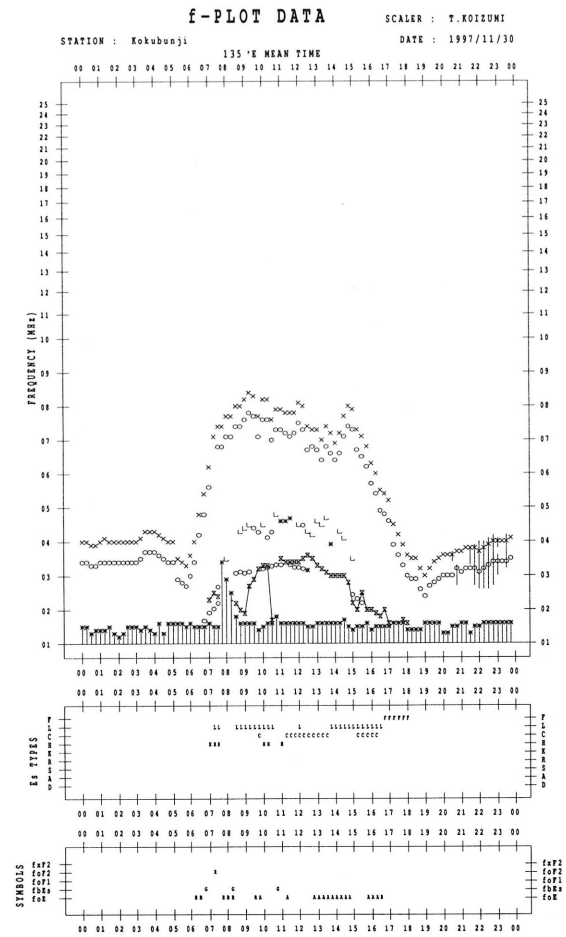
STATION : Kokubunji
DATE : 1997/11/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1997/11/30
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso November 1997

Single-frequency total flux observations at 500 MHz					
Flux density: 10^{-22} Wm^{-2} Hz^{-1}					
UT	00-03	03-06	06-09	21-24	Day
Date					
1	31	29	(29)	32	30
2	31	29	(29)	32	30
3	31	31	(31)	32	31
4	32	35	(40)	40	36
5	36	36	(35)	40	36
6	38	(34)	(33)	36	36
7	34	32	(32)	-	33
8	-	-	(-)	-	-
9	-	-	(-)	-	-
10	30	29	(29)	-	29
11	-	-	(-)	-	-
12	-	-	(-)	31	31
13	31	29	(29)	30	30
14	30	29	(28)	31	30
15	31	30	(29)	31	30
16	30	29	(29)	30	29
17	31	30	(29)	31	30
18	30	29	(30)	31	30
19	31	29	(28)	65	37
20	33	30	(31)	31	31
21	30	30	(30)	30	30
22	31	30	(30)	30	30
23	30	30	(30)	33	31
24	32	29	(29)	33	31
25	32	30	(29)	32	31
26	32	31	(29)	33	31
27	33	31	(30)	34	32
28	34	34	(33)	34	34
29	33	33	(31)	33	33
30	33	31	(31)	33	32

Note: No observations during the following periods.
7th 2200 - 10th 0030 10th 2200 - 12th 0630

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso November 1997

Single-frequency observations

Normal observing period: 2110 - 0740 U.T. (sunrise to sunset)

NOV. 1997	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
2	500	42 SER	0302.0	0302.5	3.7	40	-	WR
	200	42 SER	0302.0	0304.7	4.1	240	-	0
	2800	42 SER	0302.1	0302.5	3.2	5	-	0
3	500	46 C	0433.2	0435.2	6.0D	110	35	ML
	2800	45 C	0433.2	0437.0	6.0	40	12	0
	200	47 GB	0434.0	0438.0	9.0	1800	-	0
	500	27 R	0439.2E	0449.5	25.0D	10	4	WL
4	2800	20 GRF	0236.0	0238.9	7.0	10	3	0
	200	46 C	0506.7	0511.2	7.0	35	7	0
	500	46 C	0507.0	0511.2	7.0	16	4	WR
	2800	20 GRF	0509.2	0510.7	4.5	6	2	0
	200	47 GB	0554.5	0558.0	9.0	3300	-	MR
	2800	46 C	0555.0	0556.0	10.0	550	120	WR
	500	29 PBI	0555.0	0558.7	60.0	500	90	ML
5	500	46 C	0233.7	0234.2	1.5	40	9	WR
	500	42 SER	0253.6	0254.9	1.4	17	-	WR
6	200	46 C	0055.0	0055.5	1.2	180	25	WL
	2800	3 S	0056.0	0056.6	2.1	30	13	0
7	200	46 C	0011.0	0014.7	6.0	120	10	0
	500	4 SF	0011.5	0013.5	4.2	12	3	0
	2800	20 GRF	0011.7	0013.5	3.7	5	2	0
10	500	42 SER	0603.8	0604.5	2.5	11	-	0
	200	42 SER	0604.0	0606.2	2.5	15	-	0
14	200	46 C	0126.0	0128.6	4.5	70	7	WL
	500	46 C	0126.2	0129.0	4.5	13	4	0
	2800	46 C	0126.7	0128.7	3.0	12	3	0
15	200	46 C	2236.5	2240.5	10.0	20	3	0
	500	46 C	2237.2	2240.2	8.0	14	3	0
	2800	46 C	2237.5	2243.0	10.0	90	30	0
17	200	42 SER	0323.9	0324.0	2.0	130	-	0
	500	8 S	0325.0	0325.1	0.2	4	-	0
	2800	1 S	0325.4	0325.5	0.7	5	2	0
19	500	27 RF	2153.0E	2204.5	108.0D	160	40	ML
20	500	42 SER	0015.2	0015.5	4.2	30	-	MR

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso November 1997

Single-frequency observations

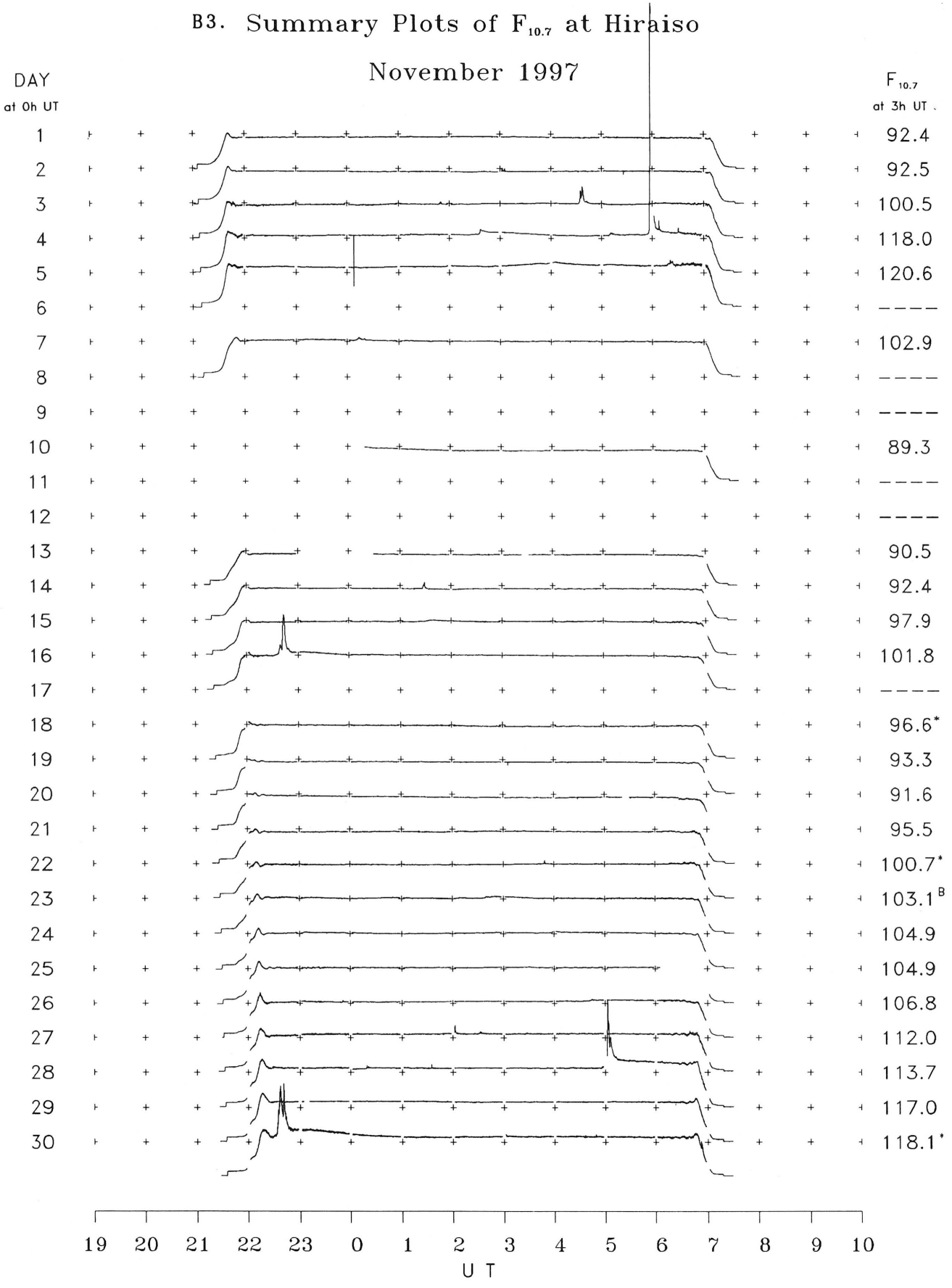
Normal observing period: 2110 - 0740 U.T. (sunrise to sunset)

NOV. 1997	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
22	2800	42 SER	0348.2	0348.3	0.5	7	-	0
	200	8 S	0349.7	0350.0	0.5	20	-	0
23	200	42 SER	0134.4	0135.9	2.0	45	-	WL
	200	42 SER	0534.5	0535.2	3.0	150	-	WL
24	200	8 S	0252.2	0252.5	0.6	50	-	WL
	200	8 S	0647.0	0647.1	0.2	1100	-	0
25	500	42 SER	0331.2	0331.3	0.7	8	-	0
	200	8 S	2350.2	2350.4	0.4	200	-	0
	2800	1 S	2350.2	2350.4	0.5	4	-	WR
	500	8 S	2350.4	2350.5	0.3	25	-	0
27	500	42 SER	0201.2	0201.5	0.8	850	-	0
	2800	1 S	0201.4	0201.5	0.8	20	5	WR
28	200	8 S	0445.2	0445.5	0.5	35	-	WL
	2800	29 PBI	0457.0	0502.9	13.0	140	35	WR
	500	42 SER	0459.5	0512.2	13.5	60	-	0
29	2800	46 C	2232.9	2240.7	13.0	110	30	0
30	500	46 C	0651.7	0654.7	2.9	50	6	0
	2800	46 C	0652.5	0652.6	1.2	16	3	0
	500	8 S	0707.5	0707.6	0.3	450	-	0
	200	42 SER	2223.4	2225.7	4.0	25	-	ML
	200	8 S	2345.1	2345.3	0.4	21	-	ML

B. Solar Radio Emission

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

November 1997



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

IONOSPHERIC DATA IN JAPAN FOR NOVEMBER 1997
F-587 Vol.49 No.11 (Not for Sale)

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☎ (0423) (27) 7478 (直通)

Queries about "Ionospheric Data in Japan" should be forwarded to :
Communications Research Laboratory, Ministry of Posts and Telecommunications,
2-1 Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184 JAPAN