ISSN 0021—0382

F—575

IONOSPHERIC DATA IN JAPAN

FOR NOVEMBER 1996

VOL. 48 NO. 11

CONTENTS

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°	Radio Receiving (S,P)
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 descriptivel etter 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 two parabolic antennas, one with 10-meter diameter for 200 MHz measurements and one with 2-meter diameter for 500 and 2800 MHz measurements, 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 separately for 200 and 500 MHz measurements. The intensities are expressed by the flux density in 10^{-22} Wm^{-2} Hz^{-1} unit.

The table for 200 MHz measurements also presents the variability indices defined by the number of impulsive radio bursts within the three-hour intervals as follows:

0 quiet or no burst,

1 a few bursts,

2 many bursts,

3 very many bursts.

The daily variability index is defined as the daily mean of three-hourly indices.

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.

C. RADIO PROPAGATION

C1. H.F. Field Strength at Hiraiso

Field strength observation of 15 MHz standard waves transmitted from WWV and WWVH stations which are located respectively at Fort Collins, Colorado and Kauai, Hawaii, is carried out at Hiraiso. In order to avoid interference among the same frequency waves, the upper sideband of WWV or WWVH with the audio tone 600 Hz is picked up by the use of a narrow band-pass filter with 80 Hz bandwidth.Particulars of the transmitters and the receiver are summarized in the following table.

The tabulated *field strength* expressed in dB above one microvolt per meter is the average of quasi-peak values of the incident upper sideband field intensity for 45 seconds after the universal time indicated on the table. Abbreviated symbols are as follows:

CNT	number of observed values,
MED	median,
UD	value of the uppermost decile when they are ranked according to magnitude,
LD	value of the lowest decile when they are ranked according to magnitude,
U	uncertain,
E	less than,
C	innuenced by, or impossible because of, any artificial accident,
S	influenced by, or impossible because of, interferences or atmospherics.

C2. Radio Propagation Quality Figures at Hiraiso

The tabulated six-hourly quality figures are calculated for standard waves WWV transmitted from Fort Collins and WWVH transmitted from Kauai.

Quality figures expressing radio propagation conditions range over five grades as follows:

1	very poor(very disturbed),
2	poor(disturbed),
3	rather poor(unstable),
4	normal,
5	good.

Whole day quality figure ranged in grades of 1o, 1+, 2-, 2o, 2+, 3-, 3o, 3+, 4-, 4o, 4+, 5-, 5o stands for an average of six-hourly quality figures of the two circuits. Abbreviated symbols are as follows:

C	artificial accident,
S	propagational accident,
U	inaccurate.

Characteristics	Transmitter		Receiver
Station Call	WWV	WWVH	
Location	Fort Collins, Colorado	Kauai, Hawaii	Hiraiso, Ibaraki
latitude	40°41′N	22°00′N	36°22′N
longitude	105°02′W	159°46′W	140°38′E
Distance	9150 km	5910 km	--
Carrier Power	10 kW	10 kW	--
Power in each sideband	625 W	625 W	--
Modulation	50 %	50 %	--
Antenna	λ / 2 vertical	λ / 2 vertical	4.5 m vertical rod
Bandwidth	--	--	80 Hz for upper sideband
Calibration	--	--	Every hour

The column of conditions presents a record of the forecast of *radio propagation conditions* which is applicable to forthcoming 12 hours and broadcast six times par hour from JJY (Japan Standard Wave) staion. The conditions are denoted as follows:

N normal,
U unstable,
W disturbed.

Data on *geomagnetic storms* which are often correlated with radio propagation disturbances are tabulated based on reports from observation at Kakioka Magnetic Observatory, Japan Meteorological Agency. *Time* (U.T.) is expressed in hours and minutes (or tenths of an hour) , and *range* in nanotesla. When they are uncertain quantitatively, / 's are used to replace the numerical values. Continuation of a geomagnetic storm is denoted by ---.

C3. 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.

C4. Sudden Ionospheric Disturbances

a. Short Wave Fade-out (SWF) at Hiraiso

The table of short wave fade-out (SWF) is prepared from the record of field intensities measured at Hiraiso.

Drop-out intensities of the 10 MHz, the 20 MHz. and the 25 MHz waves are respectively distinguished by marks ', '', and ''' from those of the 15 MHz wave for WWV and WWVH. Values of *start, duration, type,* and *importance* are obtained from data of the circuit whose drop-out intensity in dB is underlined as xx. When these quantities could not be determined accurately, they are accompanied by one of the following symbols.

D greater than,
E less than,
U uncertain or doubtful.

Types of fade-out are as follows:

S sudden drop-out and gradual recovery,
SL slow drop-out taking 5 to 15 minutes and gradual recovery,
G gradual and irregular in both drop-out and recovery.

Importance of fade-out is scaled according to its amplitude into nine ascending grades as 1-, 1, 1+, 2-, 2, 2+, 3-, 3, 3+.

Correspondence of solar optical and X-ray flares, and solar radio burst to SWF is marked by X, being determined with data from interchange messages of IUWDS and observations at Hiraiso.

In table (a) SWF, *date* indicates the day to which the *start-time* of the event belongs.

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	57	56	56	51	58		38	57	60	67	70	70	60	67	61		67	57		35	32	29	30	
2	38	35	40	32	37	43	40		57	55	56	66	67	58	58	60	67	46	A	30	A	A	35	38
3	35	30	35	29	A	29	30	57	58		60	77		68		50	58		A	29	30	35	31	32
4	38	30	35	37	30	29	30	55	66	60	56		66	56	56	58	61		30	35	35	35		38
5	36	40		34	A	36	32	58	67	A		54	56	72	71	60	57		40	35	40	A	35	38
6	40	37	40	35	37	32	37	59	57	57	74	71	68		58	66	68	52		40	40	40	37	40
7			54	56	42	44	31		57	56	58	74	72	58	58	60	54	A	32	40	36	40	40	38
8	40	38	41	35	36	38		57	57	63	60	76	N	64	63	57	57	A	28	35		30	35	29
9		35	31	38	38	38	35	60	56	56	65	58	67	67	58	57	52	A	34	35	29	35	36	38
10	35	38	35	36	28	29	32	56	60	56	53			80		59	57	35	A	36	34	37	35	38
11		36	35	38	38	31	29	28		68	60	72			60	57		29	30	30	30	24	29	35
12	28	32	36	28	28	38	35	38		57	52	71	70	A	69	57	57	A	31	35	35		31	29
13	N	59		36	32		38	58	64	69		61	68	64	59			28	A	36	35	28	25	29
14	35	29	29	30	28		28	58	54	76	67	71	77	67	58	68	59	69	58		56	57	57	56
15	55	52	58	58		30	29	35	39		75	69	67	70	58	60	54	A	A	28	35	35	29	
16	32	35	29	31	29	N	B	32	59	57	67	N	72		49	65	57	A	A	B	A		38	35
17	36	38	35	31	35	35	26	57	60	63	61	74	71	71		60	69		A	29	29	38	A	A
18	37	29	30	32	31	30	29		60	69	70	71	65	64	60		58		28	A	38	35	35	35
19		35	36		29	37	29	39		68	62	78	73		59	68		A	A	A	A	A	A	35
20	35	N	35	34	32	28	28		68	68	64	70	64	56	58	64	59	A	A	35	28	37		28
21	35	35	35	32	28	26		56	49	55	64	74	64	62	68	A	A	31	40	A	A	35	35	42
22	44	35	32	37	29	36	31	39	56	59	68		N	64	57	58	57		32		29	A	A	22
23	28	A	35	29	26	32	28		58	58	54	72	79		59	46		35	28	32			38	35
24	35	32	35	38	34	35	29			68	64	71	72		57	54		A	A	A	35		A	30
25	27	31	29	31	26	23	29		57	68	65		67	64	59	60		A	A	29	35	37	40	35
26	35	37	35	38	29	38	29	57		65	70	70	73	67	57	70	57	59		A	A	A	A	38
27	38	35	30	30	30	34	A	28	58	68	66	77	75	64	60	57	47	A	28	35	36	35	35	37
28	40	36	A	A	29	29		29	68	70	68	66	66	58	56	62	52		28	32		35	38	38
29		54	A	38	40	A	A	39	57	61	63	70	67	39	57	57		22	30	A	A	A	35	36
30	41	32	30	26	29	28	B	31	56	57	60	N	61	65	60	A	40	A	A	35	A	29	57	57
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	26	28	27	25	23	22	25	27	28	24	25	23	27	25	22	11	15	21	20	20	23	27
MED	36	35	35	34	30	32	30	56	58	63	64	71	67	64	58	60	57	35	30	35	35	35	35	36
U Q	40	38	36	38	37	37	35	57	60	68	67	74	72	67	60	63	59	57	34	35	36	37	38	38
L Q	35	32	31	31	29	29	29	35	56	57	60	69	65	58	57	57	54	29	28	30	30	32	31	32

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT WAKKANAI

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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	28	G	G	G	26	26	G		25	30	27	42	37		26	23	G	G	G	26	G	G	G	G
2	25	G		29	G	30		32	27	26	30	30	37	33	28	36	33	36	33	34	36	30	G	G
3	G	G	G	33	34	29	G	29	30		36	38	59	38	32	39	29	33	30	24	G	26	25	G
4	G		33	28	29	28	26		28	33	42	33	28	29	25	G	G	28	G	G	G	G	G	27
5	26	29	35	29	30	24	G	G	29			32	38	33	26	27	37	36	30	30	G	36	30	29
6	26	G	G	G	33	25	G	26	26	24	36	35	29	26	31	G	G		G	G	29	G	G	G
7	G		28	25	G	G			42	35	N	44	35	36	35	32	30	32	28	G	G	G	G	27
8	27		27	23	G	G	G	11		32	32	34	31	32	31	39	35	30	G	28		G	G	G
9	G	G	G	G	G	G	G	25	31	27	31	36	39	29	25	27	34	32	26	G	G	G	G	G
10	G	G	G	G	G	G	G	27	28	30		33	31	34	34	24	G	11	29	G	G	G	G	
11		G	26	G	G	G	G	28		32		39		32	26	23	31	G	G	30	G	G	G	G
12	G	G		28	G	G			32	38	42	42	48	65	35	39	26	38	28	28	32	G	G	G
13	G	G		G	G		G	G		34	38	41	36	37	31	36	33	28		24	G	28	34	42
14	33	25	G		G	G	G		33	47	40	41	32	34	32	28	30	39	30	28	30	36	39	33
15	29		30	28	28	34	G		36	33	34	31	29	34	29	30	G	32	32	G	G	G	G	
16	G	G		27	28	G	B	23	39	45	36	37	34	44	29	28	30	34	41	B	28	G	G	32
17	32	29	27	G	G	G	G		24	39	42	43	41	59		30	G	29	28	38	36	30	38	41
18		G	G	G	G	G	G	G	G	38	32	39	30	35	28	G	29	33	33		G	34	29	31
19	29	G	29		25	G	G	G		29	37	41	31	26	31	G	G		37	34	34		33	G
20	G	G	29	29	27	G	G	G	29	28	31	27	N	25		45	37	47	31	G	G	G	G	G
21	G	G	G	G	G	G	G		41	45	N	32	31	35	28	56	72	32	33	60	45	26	G	32
22	25	27	25	27	G	G	G		61		32		37	44	39	31	28	36	G		G	30	32	34
23	28	31	G	G	G	G	G	34	40	29		34	26	26	G	28	G		30	26	G	32	26	29
24	33	36	29	29	24	28		40		32	29	28	27	36	36	27	G	45	48	34	28	32	30	G
25		24	27	29	29	26	G	37		56	54	86	28	28	28	G	38	37	55	27	27	29	G	G
26	G	G	27	25	30	28	28	32	40	36	30	32		62	44	30	36	G	G		46	54	43	37
27	G		25	G		G	34	28	59	35	36	38	28	34	24	28	29	32	27	28	33	G	G	G
28		G	30	38	33		G	30		58		31	33	37	28	G	30	34	G	30	29	29	26	G
29	G	G	34	33	41	57	56	34	31	G	24	28	34	36	26	G		36	34	38	42	40	34	26
30	G	G	G	G	G	G	B	28	26	N	38	35	46	39	29	39	25	34	40	33	40	32	29	29
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	25	26	28	29	28	24	21	23	26	23	29	27	29	28	30	29	27	29	26	29	29	30	28
MED	G	G	26	25	G	G	G	28	31	33	36	35	33	34	29	28	29	33	30	28	27	26	G	14
U Q	28	24	29	29	29	27	G	32	40	38	38	41	37	37	32	36	33	36	33	33	33	32	30	31
L Q	G	G	G	G	G	G	G	6	27	29	31	32	29	30	26	23	G	29	G	G	G	G	G	G

HOURLY VALUES OF fmin AT WAKKANAI

NOV. 1996

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

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

HOURLY VALUES OF foF2 AT KOKUBUNJI

NOV. 1996

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	35		56		28	A	38		57			69	66	70	70		58	56	52			59		
2	A		32	34	32	29	36		56	54	62	70	67	66	60	68	57	55		89		B	B	58
3	49				46	49	59	68	70	66	70	66	81	64	70	60	53	A	A	A	A	A	89	
4	N	39	B	B	29	B			70		71		58	66	66		54	A	A			A	A	56
5	A	A	34	N	59	59	N	69	74	68	A	A	A	60	69	67	60	A	31		A	A	A	N
6	A	N	29	N	29	29	37	57	58	66		75	67	58	A	68	57	58	A		46	43		A
7	37	42		38	41	38	46	57	54		A	66	72	73	72	74		A	A	89	A	A	37	
8		35	A	36	36	40	A	57	56				54	62	60	66	A	A	A	89			29	A
9	32			N	B		34		56	55	65	85	69	61	64	66	58		A	A	B	B	B	29
10		B		34	B	29	38		68	65	61	74	A	87		68	56	42	A	A	A	A	A	36
11	38	38	A	A	35	N	32		56	63	66	68	64	73	82		48		A	A	A	A	B	B
12	N	B	32		N	N	32		54	61	65	73		70	66	53	53	48			32	N	A	A
13	A	56	30	N	N	B	36	52		61	60	56		68	73	59	49	38	A	A	A	A	B	A
14	N	A	56		A	A			71	63	55	69	87	100	A	69	71			47	B	89	A	46
15	A	A	A	37	41	A		A	76	93	90		68	74	84		57	A	38	N		69	59	
16	A	31		35	29	B	N	69	69	71	74	79		82		58	66		N	A		A	49	
17	N	B	A	A	B	B		69		61	67	71	65		78		63	47		89				
18	30	B	A		35		30	57		68	66	66	56	92	64	68	63	57		59		38		
19	A	60	31	35		N	N	A	66	69		81	72	80	74	68	67	41	N		56	59	69	
20	B	A	A		30		31	58		73	67	84	70	60	65	62	58		35	38	38	47	46	
21	60	32		59	26	N	49		50		60	66	75	83	80	60		46	A	41		A	35	
22	49	A	A	34	A	B		58	69	61	68	64	80	75	63	67		42			30	N	A	58
23		30	31	31	30	N		47	69	68	67	72	52	77	66	59	46	41	A	N		49		
24		35	34		24	29		68	57	70	70	86	66	60	60		52	A		59	59	A	89	A
25	29			30	29	A	A	70	56	68	80		74	63	63	60	58	48			A	A	A	36
26	36	30		29	32	31		49	55	68	66		78	68	70	62	57	43		69	38		35	B
27	59	A	34			N			68	68				73	63	60		47	32			A	69	30
28	31	36	28	B	N	A	A	A	60	60	81	71	64	66	64	57	56		29	N		32	31	38
29	36	B	36	37	38	34	A	51			45	73		65	72	63		40	28		58	N	59	A
30	28	A	33	28		49	A	56	56	56	70	74		66	55	54	48	A	A	A	31			
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	14	12	13	15	19	11	13	17	25	24	23	23	22	29	26	24	24	16		10			13	
MED	36	36	32	35	32	34	36	57	58	66	67	71	68	68	66	62	57	46		64			49	
U Q	49	40	34	37	38	49	42	68	69	68	70	75	74	76	72	68	59	51		89			69	
L Q	31	31	30	31	29	29	32	54	56	61	62	66	64	63	63	59	53	41		47			35	

HOURLY VALUES OF fEs AT KOKUBUNJI

NOV. 1996

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	G	G	G	G	28	25	33	40	26	33		G	32	50		G	G	G	G	G	G	G	G
2	50	G	G	26	G	G	G		30	43		51	42	48	44	58	43	G	G	G	G	B	B	G
3	G	G	G	G	G	G	G	33	29	41	54	34	47	34	26	G	G		42	34	30	30	28	G
4	G	G	B	B	G	B	G		34	51	33	42	56	68	50	54	44	60	28	G	G	43	51	
5	51	51	G	26	G	G	G	G	21	60	71		56	46	50	38	39	41	29		34	28	40	G
6	29	G	G	G	G	G	G		30	44		G	39	G	57	55	36	33	41	29	30	33	34	32
7	26	22	29	32	26	G	24	27	33		48	33	46	46	G	32	36	50	60	28	29	29	24	G
8	G	G		G	28	G	25	28	30	33	32	34	57		41	48	57	33	28	G	G	G	G	32
9	34	G		G	B	G	G		34	32	50	39	30	36	27	27	G	G	38	27	B	B	B	G
10	G	B	G	G	B	G	G	27	29	30	34	34	52	54	48	54	G	G	29	30		34	29	G
11	G	27		37	G	26	31	33	41	31	44		43	50	41	25	26	28	38	41	40	28	B	B
12	G	B	G	G	G	G	G		25	26		36	36	G	28	24	G	G	G	G	G	28	44	
13		24	G	G	G	B	G	40	55			24		36	45	52	36	27	25	33	34	39	B	24
14	G	31	G	G	28	28	G		30	40	50	54	49	72	60	30	G		G	G	B	G	29	28
15		82	37	32	35	29	G	42		54	59	58	36	30	29	29	G	28	G	G	G	G	G	G
16	24	G	G	24	G	B	G	26	33	54	54	57	29	26	54		60	40	G		G	28	28	
17	G	B	27	29	B	B	G		31	34	25	31	28	29	30		34	G	G	G	G	G	G	G
18	G	B	29	G	G	G	G	G	29	28	30	30	26	33	40	33	G	G	G	G	G	G	G	G
19	28	28	G	G	G	G		28	40	40	32	30	33	G	27	30	G	G	G	G	G	G	G	G
20	B	25	26	G	G	G	G	30		30	30	32	29	29	30	G	28	G	G	G	G	G	G	G
21	G	G	G	G	G	G	G	G		31	30	31	32	33	30	39	34	33	29	G	G	29	25	G
22	G	32	31	26	28	B	G	27	28	38	55	57	57	29	34	32		G		29	G	G	27	G
23	G	G	G	G	G	G	G	29	32	33	34	39	31	34	91	47	31	26	31	34	G	G	29	G
24	G	G	G		G	29	25	G	25	33	30	31	32	29	34	46	34	28	G	G	G	28	G	29
25	G	G	G	G	G	31	27	28	31	34	43			39	59	53	53	G	28		27	52	39	38
26		25	G		33	G	G	26	39	31	33		33	31	32	48	G	G	G	G	30	G		B
27	G	52	G	G		G	G		29	50				43	36	30	44	40	46	28	29	41	29	28
28	G	G	G	B	24	28	40	40	32	35	41	43	40	40	29	29	31	G		29	48	33	32	29
29	G	B	G	G	25	26	48	55	34		33	29	29	32	41	36	25	29	G	G	G	G	G	
30	G	26	G	G		G	26	31	33	34	36	44		35	59	46	49	107		39	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	26	25	26	26	25	25	29	22	27	27	25	24	26	29	30	27	29	28	27	27	27	28	25	24
MED	G	G	G	G	G	G	G	28	31	34	34	34	36	34	40	36	31	26	25	G	G	28	27	G
U Q	24	27	G	26	25	27	25	33	34	43	50	43	47	44	50	48	41	33	31	29	30	31	30	28
L Q	G	G	G	G	G	G	G	26	29	31	32	31	30	29	30	29	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT KOKUBUNJI

NOV. 1996

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

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT YAMAGAWA

NOV. 1996

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	37	31	31			59	32	60	52	59	71	74	66	66		111	82	71	53			34		32
2		30		89		30					61	69	66	68	83	84	73		53	41	32	27		
3	30		37		54	N		60	54	54		69	74	68	82	74	64	52	59	69	31	A	27	
4	42		42		N	B	31	31			67	68	63	72	83				A	31	32			37
5		A	69	N	38		59		53		67	83	82			83	60	53	A	A	59		N	42
6	32	39			31	29	30	48	52	62		83			A	82	84	70		A	42	A	A	A
7	31	N	40		A	A	A		50		60	66	68	78	85	82	86	A	39	A	49	N	31	A
8	N	A	A	A	A	69	A		54	66	69	72	69	67	68	92			A	A	A	32	36	
9	31	A	A	A		A			53	67	68	81	72		66	74	85	53	54		N	A	A	30
10	A	N		49	31	A	N	30	72	57		75	66		79	70		61	A	A	A	N	31	A
11	79	N	69		31	A	N	A	53		83	83	78	67	80	84	58	48		60			31	30
12	A	49				N	N	30		58	67			74	84	84	72			A	41	30		
13		A	N	31		59	N	23			73	68	66	55	82	71	61	54	60	69	69			40
14		48				B	A	31		59	56		100	120	84	66	78		49			A	A	A
15	59		N	59	53		N		66	83	92		70			78		51		42		49	31	
16		A	A	A	A	89	B	31	54	65	74	83		81	84		67	61		43		A	42	32
17		N			48		B	44	54		69	71	68	75	71	92	60	51	54	59	59	42		31
18		59	A	37	42	A	A	41	57	60	69	66			100	83	78	72				28		A
19	69		35		53	49	49	41	60		90	83	66	83	81		69	62	31			49		69
20		32		A	31		B		65		76	83		62	66	67	71		50	41		49	59	59
21			32			31		62	53	59	67	66	72		81	75	52		A		A	A		69
22		26	24		A	A		48	55	66	73	70	67	68	85	72	69	54	31	A	28	28	A	59
23	A	42	31		37		30	32		72	86		62	65	70	71	60		30	24		32	28	
24	31	N	34			A	N		49		67		82	71	69	66	72		69	34		36	N	
25		32	32	A	37	A	30	32		60	74	78	86		76	78			34		A	39	32	
26	31	31		89	32	37	38		55	73	79	72	85	87	93		62		A	A	69			79
27	A	31	A	A	69	69		26			86	83	85	83	73	66	64	52		A	42		42	49
28	A	32		A	A	A	26	32		75	90	84		73	77	70		52	A	A	25	31		A
29	79		N	59	59		A	A	61	66	66	69	62		82	73		54		41	42	31	B	N
30		28	32			32	30	32		51	83	84	84		72	65	53		A	A	A	A	A	
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12	14	13		15	11	10	19	20	19	27	25	24	20	26	26	23	17	14	12	14	15	11	14
MED	34	32	34		38	49	30	32	54	62	71	74	70	72	81	74	69	54	52	42	42	32	31	41
U Q	64	42	41		53	69	38	48	58	67	83	83	82	79	84	83	78	61	54	59	59	42	42	59
L Q	31	31	31		31	31	30	31	53	59	67	69	66	67	72	70	60	52	34	37	32	30	31	32

HOURLY VALUES OF fEs AT YAMAGAWA

NOV. 1996

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	24	G	G		G	24	30	31	28	29	37			28	30	30	G	26	26		25	24	24
2	G		24	30	27	26	G		29	30	36	31	29		30	28	24	30	32	G	G	G	G	G
3	G	G	G	G	G	26	G	29	30	30	29		52	47		38	27	G	24	26	31	37	44	33
4	25	G	G	G	G	B	26	26	30	32	38	37	30		48	55	40		60			41		44
5			33	28	G	G	26	27	30	29	29	62	70		30	37		35	93	92	32	33	36	G
6	G	26	26	28	28	24	27	29	39	46	34	36	78	64	78	104		33	29	32	36	37	33	33
7	39	32	25	27	38	43	38	58		28	67	56	65	53	69	58	32	49	49	68	40	34	33	31
8	28	34	32	42	37	37	26		33	38		60	115		78	67	56	33	136	94	58	48	39	44
9				34	30	26	G		30	45	46	36	34	61	61	32	30	32	37	32	33	31	24	G
10	28	26	G		34	28	G	26	30	30	29	30	31	29	31	38	56	55	30	36	30	28	24	26
11	31	28	26		38	32	33	37	30	32	57	49	67		31	36	36		26	28	25	G	G	G
12		G	G	G	G	G	G		30	30	30	36	31	30	31	30	27		28	33	G	G	27	G
13		32	30	27	G	G	G		34		31	36	29	29	30	28	28	25	G		32	24	G	G
14	G		G	28	G	B	26	22	31	32	46		31	30	28	25	28	27	36	G	G	27	28	24
15	G	G	G	G	G	G	G	25	31	33	55	30	38	31		26	29	24	G	26	G	G	G	G
16	24	32	28	32	30	32	B	27		54	79	32		57	30	28	28	G	G	G	G	25	G	G
17	G	G	G	27	24	G	B	32	30	32	32	52	58	31	32	31	29	G	G	G	G	27	G	27
18	G		27	27	25	26		30	29	31	31	32	31	31	29	28	55	34	26	G	G	G	G	
19	G		33	30	30	27	G	G	31	32	38	54	40	32	29	27	28	25	G	G	G	G	G	24
20	G	G	G	28	G	24	B	24	29	28	38	30	30	31	30	38	30	25	G	G	G	G	G	G
21	G	G	G	G	G	32	G		29	31	34	28	31		36	45	54	30	34	26		30	38	30
22	28	32	33	G	26	26	32	33	30	36	32	34	31	36	36	30	28		G		G		38	23
23	26	G	G	G	G	G	26	34	32	30	31	33		56	48	32	31		G	G	G	32	31	G
24	30	31	26	G	30	26	30	24	30	32	30	32	32	31	30	29	30	G	25	G	G	G	G	G
25	G	G	24	24	30	29	G		30	34	36	32	36	49	45	60	37	32	28	25	30	32	28	G
26	24	G		27	26	25	G	26	37		82		55	67	44	38	37	43	40	38	29	G	G	25
27		33	26	30	26	G	G	26	34	30		51	37	30	29	30	30	32	38	39	32	28	G	30
28	26	27	24	28	69	71	27	36			37	46	37	36	35	51	54	44		92	25	25	30	43
29	28	25	30	27	26	29	30	36	30	40	52	38	39	31	31	28	28	G	G	G	25	G	B	G
30	G	G	G	G	G	G	G	G	29	30	29	38	45	29	34	47	29		54			48	25	24
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	24	28	28	29	28	26	23	27	27	28	27	27	23	28	30	28	24	29	26	26	29	28	29
MED	G	24	24	27	26	26	12	27	30	32	35	36	37	31	31	32	30	30	28	26	25	27	24	24
U Q	28	31	27	28	30	29	27	33	31	34	46	49	55	53	44	45	37	33	37	36	32	32	32	30
L Q	G	G	G	G	G	G	G	25	30	30	30	32	31	30	30	28	28	12	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT YAMAGAWA

NOV. 1996

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

HOURLY VALUES OF foF2 AT OKINAWA

NOV. 1996

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	A	A	B	B	B	B	59	A	70		85	80	73	A		141	124	A	A	71		49	
2	B	69	B	37	35			A	62	63	63	65	61		97	96	98		A	A	44	48		59
3		31			38	A	A	A		70		80	83		128			100	A	A	A	A	A	A
4	46		A	49		B	69	A	70	59		86	93	92		112		A	A	A	47	42	52	54
5			A	58	46		B		62			87	88	95	83	93	98			A		46		
6	A	89		N	69		B	A	53		A	88					89	A	A	A	A	A	A	A
7	A	A	A	41		N	A	A	A	65	64	65	66	92	106	A		76		A	A	49	48	
8	B	A	A	A	A	A	A	A	60	64		82	82	111		108	109		A	A	A	B	43	
9	B	59			A	A	A	A	44		74	82	92		92	93	103		A	A	50	41	B	79
10			A	A	A	A	B	A	49	57	56	70	102	96	97		92		66	A	A	A	A	A
11	B		35		B	69	B		A	68	68		90		104			87			38	49	56	48
12		38		69	41	B		54	59	A	84	91		117	129	147		87		A	A	A	56	
13	59		A	B	B	59	B	A	54	A		67	67		78	87	84	A	A	A	A	A	46	46
14	B	59	56				B	A	49		60				125	83	79	74		A		B	A	
15	59					A	B		53	84	84	81	93	104	117		88		59	A	43	38	43	
16			41	44		N	B	79			83	83	92	92	86	95	59					48		79
17				32			B	89			88	83			87	92	86		87	A	64	69		48
18		69	59				B		64	69	64	73	80	94	134	158	98		87		73		43	
19			44		59	B	B		54		90	84	90			98	91	68	A	A		54	46	49
20		B	36	30		B	B		54		70		76	81	84	78	70	56	A		49	41	46	49
21	46			B	38		N		65	59		85	74		84		82	A	A		41		59	B
22	A	37	A	A	46		A	A	A	64	66		89		97	89	78		A	A	48	A	69	43
23	43	38	44	44	38		B	A	A	75		108		83			62	54	A	A				79
24	89	A	B	41	31	A	A			72	82	88		117	107		56	84			59			89
25		59		69		N	B	A			83		103	114	81		102	A	A		49		A	89
26		89		41			N	A		85	95			110	125	111	N		A	A	44	43		48
27	A	A	49			89	B		43	69	86	84			92	86		65	59		44	48	B	A
28	48	46		59	A	A		A	62	70								62		A	38	A	A	A
29	A	59		34	32	B	89		52		81	81	73	83	85	92	96		60		46		B	B
30	B	B	30		B	29	B		64	70		93	77	81	93	94		60			A	A	A	A
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		13		14	11				19	18	19	23	21	17	23	18	21	13			17	13	13	14
MED		59		42	38				54	69	81	83	83	94	97	94	89	74			47	48	48	52
U Q		69		58	46				62	70	84	87	92	110	117	108	98	87			54	49	56	79
L Q		38		37	35				52	64	64	80	75	83	85	89	78	61			43	41	44	48

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

NOV. 1996

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			24	B	B	B	B	G	33	36	37	40	50	46	103	90	113	142	55			41	50	32
2	B	24	B	G	G	G	G	36	29	32	42	37	44	40	35	33	32	41	59			G	G	G
3	G	G			G		25	35		38	43	44	51	49	62	49	38		44	45	54	41	41	
4		28		27	30	B	G			41	46	40	45	49				65	46	82	39	39	39	32
5	31	G				24	B	G	40	32	34	67	46	44	41	34	41		G	45	G		49	
6	60	29	G	G	G	G	B	34	31	46	66		60	59	56		60	57	58	55	40	36	38	41
7			26	27		34	32		57		66	64	87	41	68	92	152	132	150	70	41	29	G	G
8	B	38			36	38	30	30	36	40	43		60	72	41	42	71		44	39		B	G	G
9	B	25	G		39	27	30	41	48	32	38	47	40	47		50	82		71	46	37	24	B	G
10	G	G		41	26	36	B	43	50	34	30	36		36	42	43	41	43	G	41	38	34	25	32
11	B	G	26	G	B	G	B		35	36	39	38			40	41		G	34	G	G	G	G	G
12	G	G	G	G	26	B	G			38	39	48	45	53	39	42	40	G		32	44	47	28	G
13	G	G		B	B	G	B	29				62	37	36	28	35	34	58	55	56	42	28	G	G
14	B	G	G	G	G	G	B	41	40	34	37	37	38	60	34	34	29		70		G	B	25	G
15	23	24	G	G	G		B	42	47	38	40	43		33		38	38		41	31	29	G	G	G
16	G	G	G	G	G	G	B	56	31			58	32		36	30	70		G	G		G		G
17	G	G	G	G	G	G	B	40	38		52	44	58	43	38		52		76	71	G	G	47	G
18	G	G	G	G	G	G	B	42	31	34	40		52	36	35	34	G			G	G	G	G	
19	G	G	G	G	G	B	B	24	33	38	36	38		62	41		32	G		32	G	G	G	G
20	G	B	G	G	G	B	B	G	47		35	36	36	38	56	40	46	31	44	G	G	G	G	G
21	G	G	G	B	G	26	G	G	24	26	26	33	33		48	57	66		57	G	G		47	B
22	27		27			36	28	29		32	38	42	43	36	49	43	31		48	37	G		G	G
23	G	G	G	G	G	G	B	48		33	33	35	30	50	42	39	34				G		G	25
24	G	43	B	G	G	39	42	G	43	49	29	35	35	28	40	37	33	29	G	G	G	G	G	G
25	G	G	G	G	G	G	B	43	51		36		33	48	54	59	50	39		G	G	G		G
26	G	G	G	G	G	G	G			48		39	59	39		47	34		37	88	27	39	24	G
27	37	33	G	G	G	28	B	G	38		33	46	45	42	37	37	36	G	G	G	G	G	B	38
28			28	27		25	G		44	52	40							G	20	25	G	42	26	
29	38	29	G	G	G	B	24	26	47	34	36	36	31	35	40	37	38	28		32	G	G	B	B
30	B	B	G	G	B	G	B	39	27	32	36	31	38	25	28	34	31			G	42	27	44	38
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	20	24	22	22	22	22	13	24	23	23	27	25	25	26	25	25	27	16	23	26	26	24	25	24
MED	G	G	G	G	G	G	24	34	38	36	38	40	44	42	41	40	38	35	44	32	G	12	24	G
U Q	25	26	G	G	G	28	30	41	47	40	42	46	51	49	51	48	60	57	58	46	39	37	40	28
L Q	G	G	G	G	G	G	G	12	31	32	35	36	35	36	36	34	33	G	20	G	G	G	G	G

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HOURLY VALUES OF fmin AT OKINAWA

NOV. 1996

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

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

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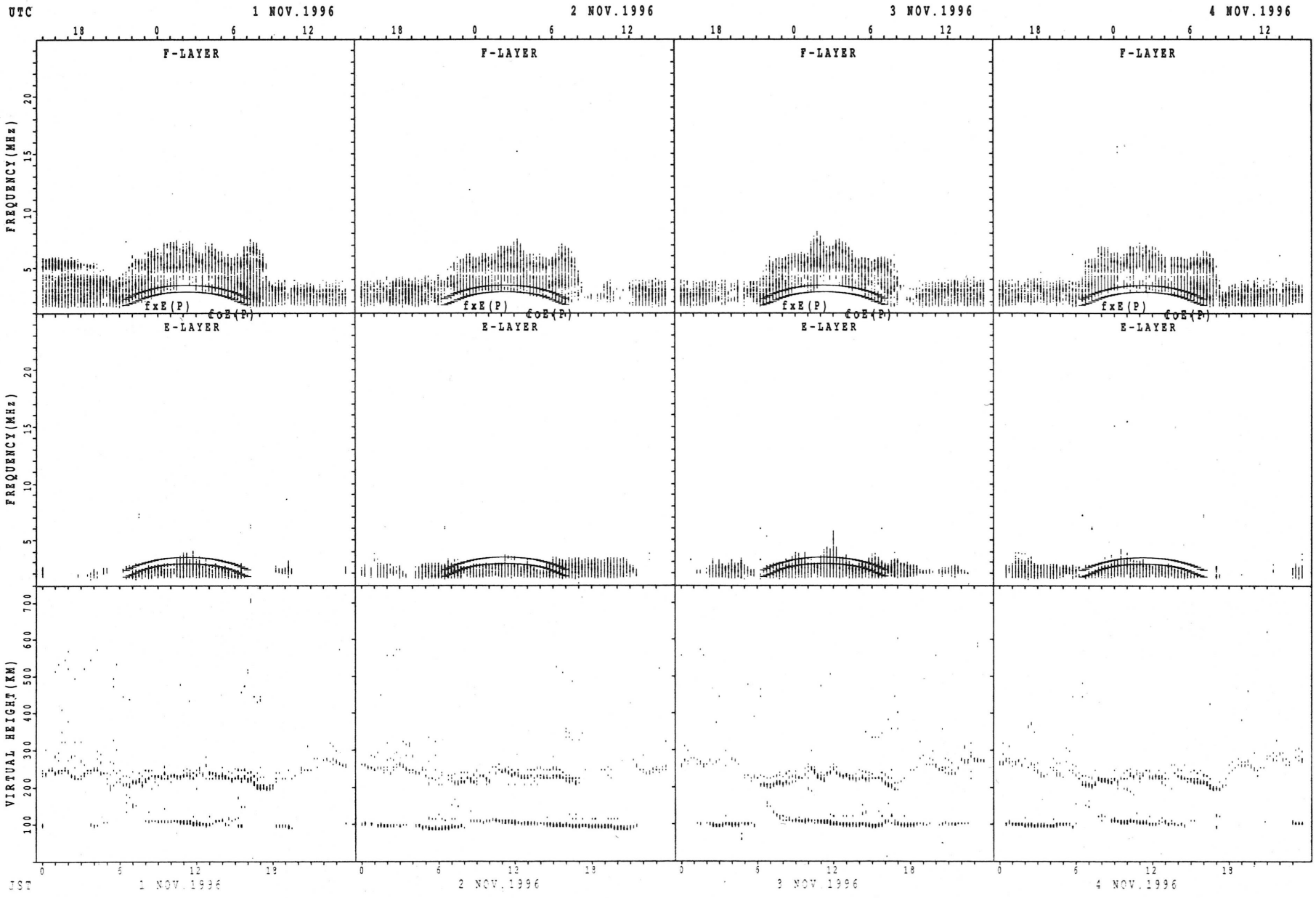
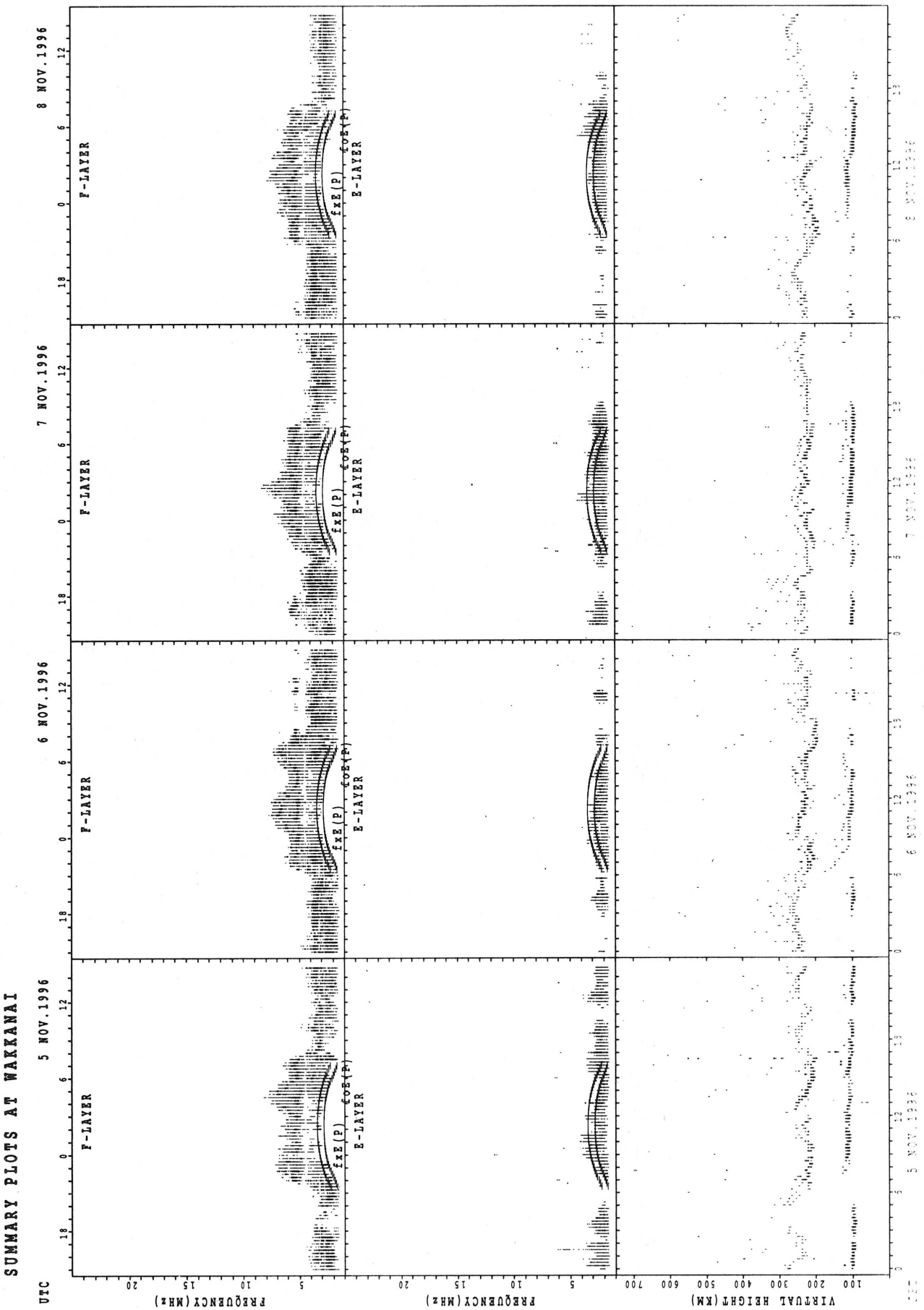
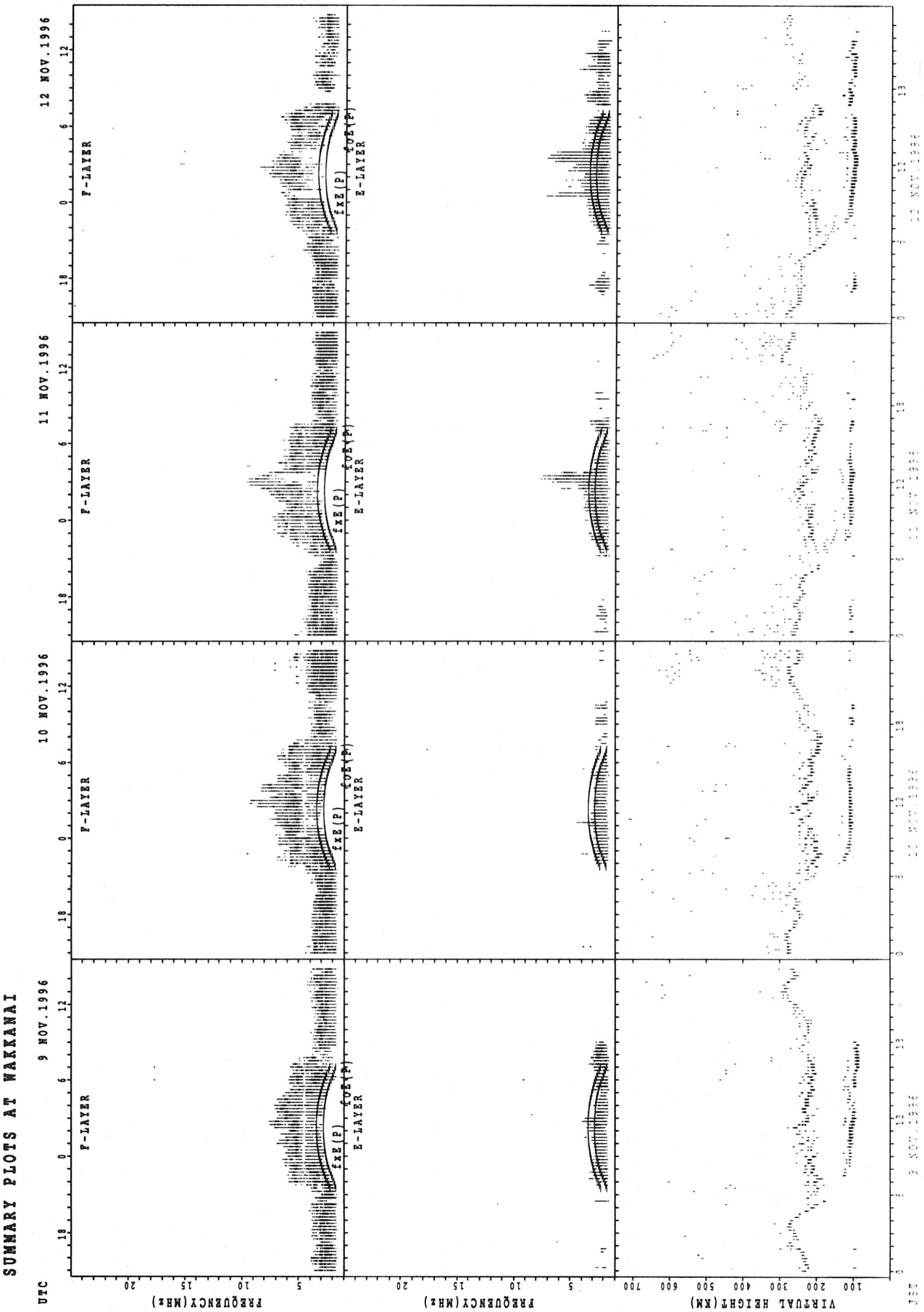
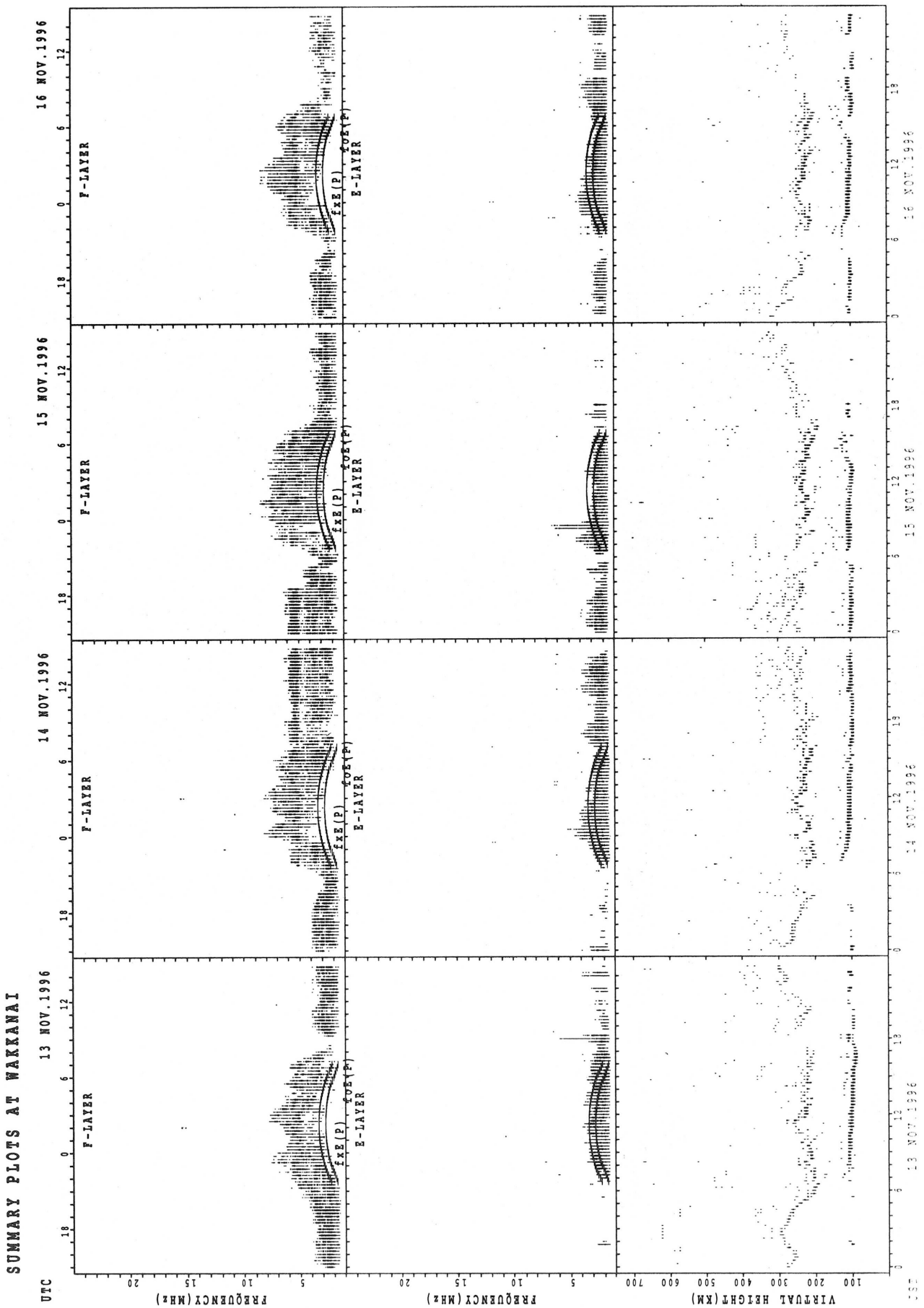
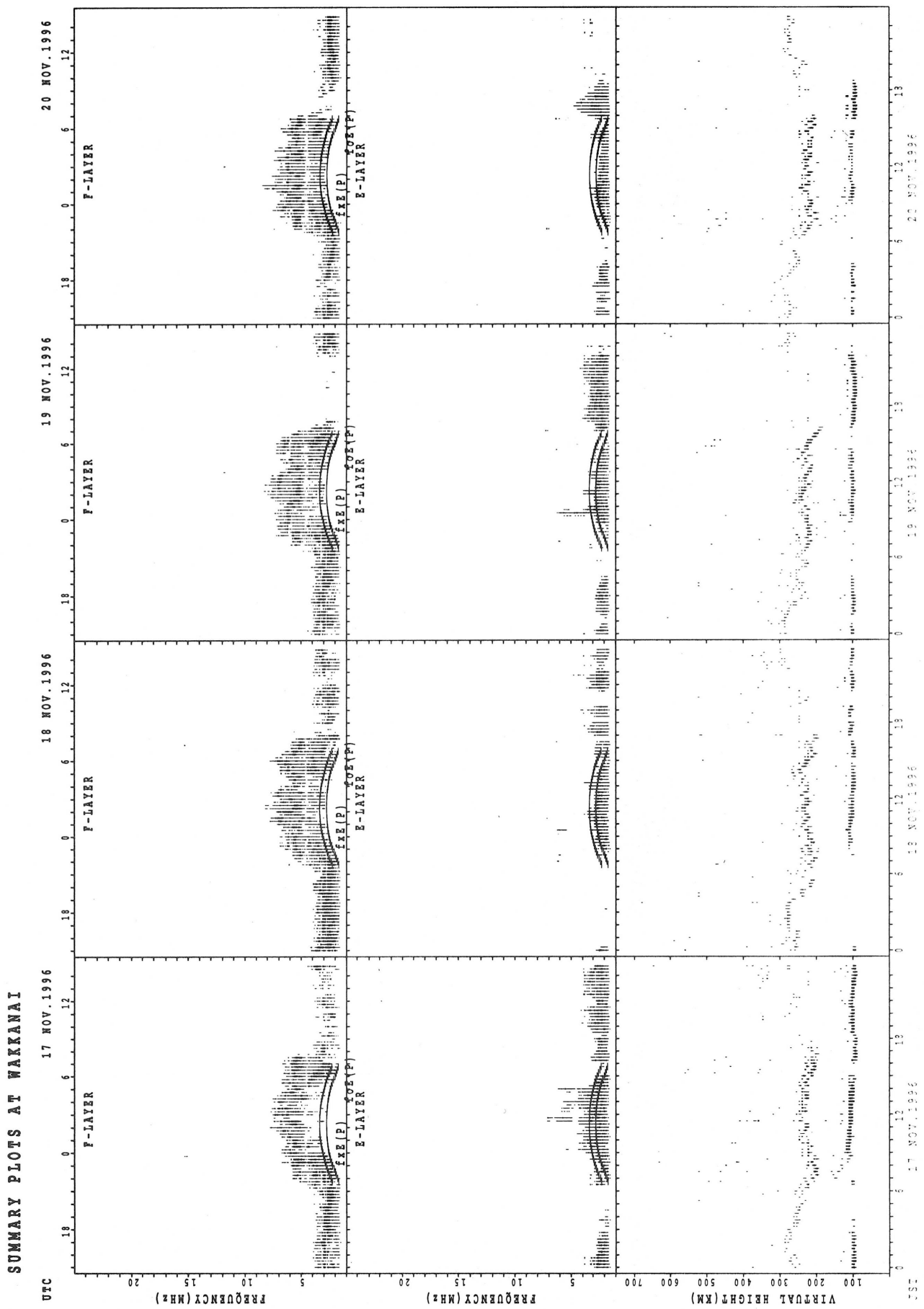
SUMMARY PLOTS AT WAKKANAI

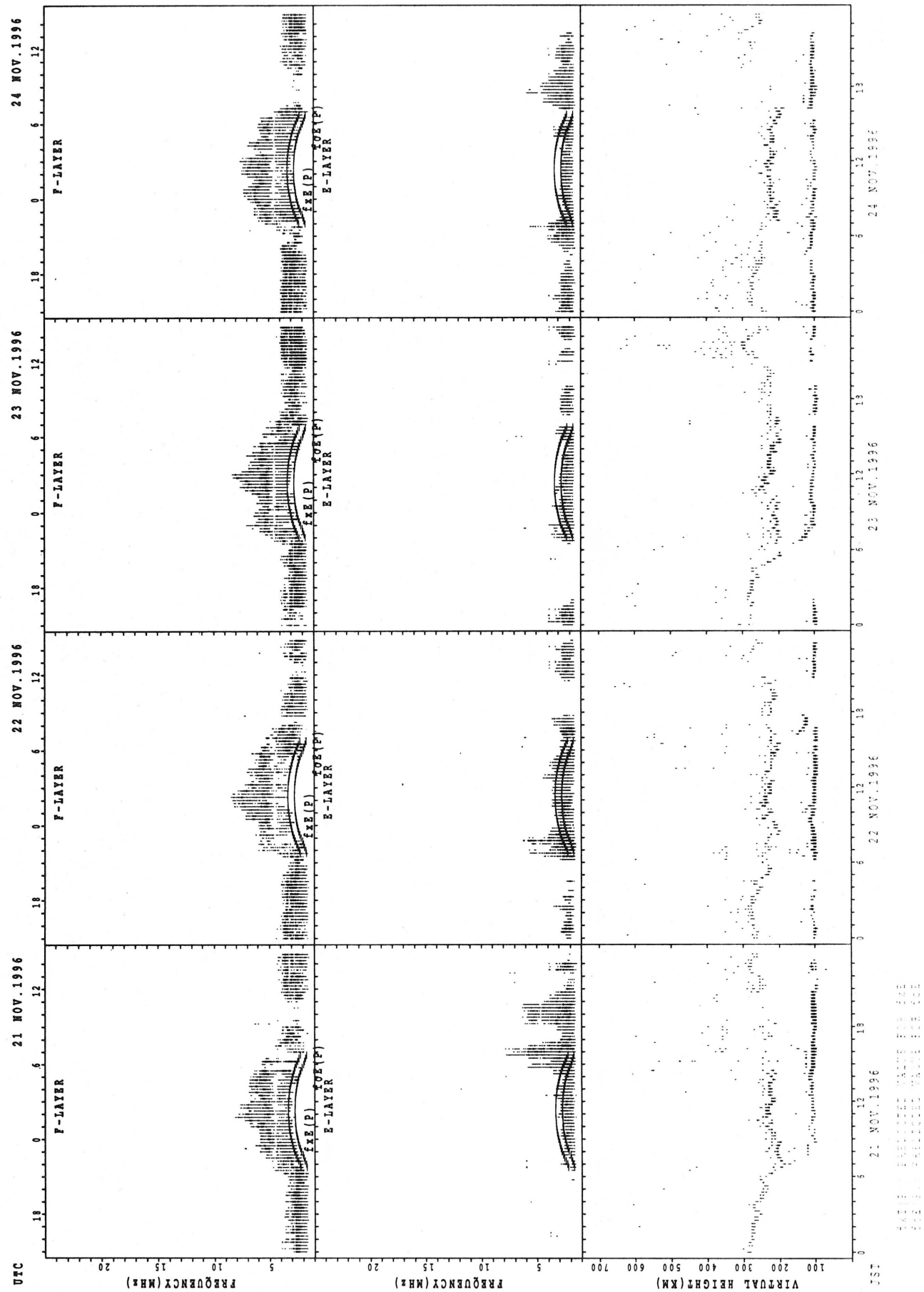



SUMMARY PLOTS AT WAKKANAI
UTC
5 NOV.1996
6 NOV.1996
7 NOV.1996
8 NOV.1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)

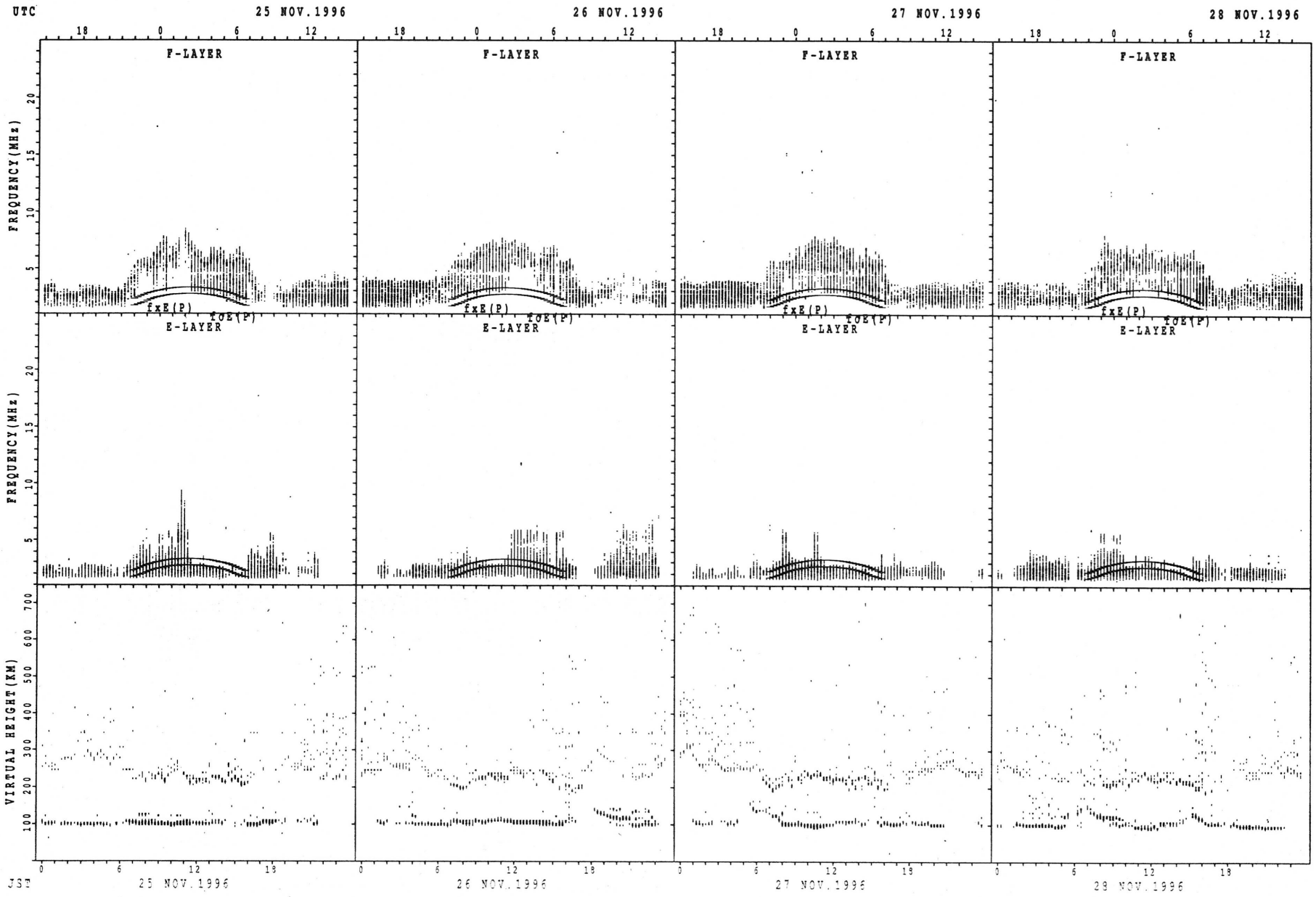

SUMMARY PLOTS AT WAKKANAI
UTC
9 NOV.1996
10 NOV.1996
11 NOV.1996
12 NOV.1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST


SUMMARY PLOTS AT WAKKANAI
UTC
13 NOV.1996
14 NOV.1996
15 NOV.1996
16 NOV.1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
13 NOV.1996
14 NOV.1996
15 NOV.1996
16 NOV.1996


SUMMARY PLOTS AT WAKKANAI
17 NOV.1996
18 NOV.1996
19 NOV.1996
20 NOV.1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
UTC

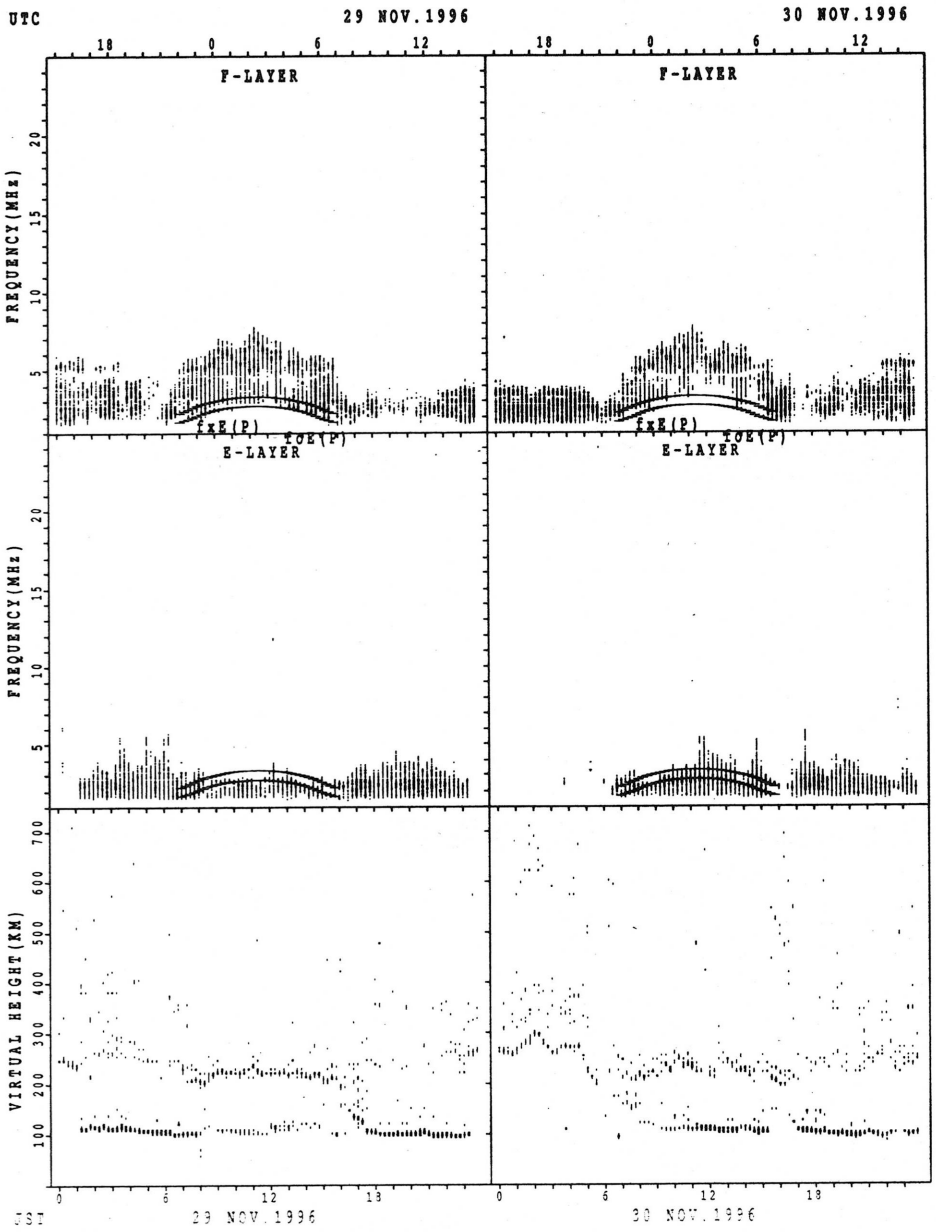

SUMMARY PLOTS AT WAKKANAI
UTC
21 NOV.1996
22 NOV.1996
23 NOV.1996
24 NOV.1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST

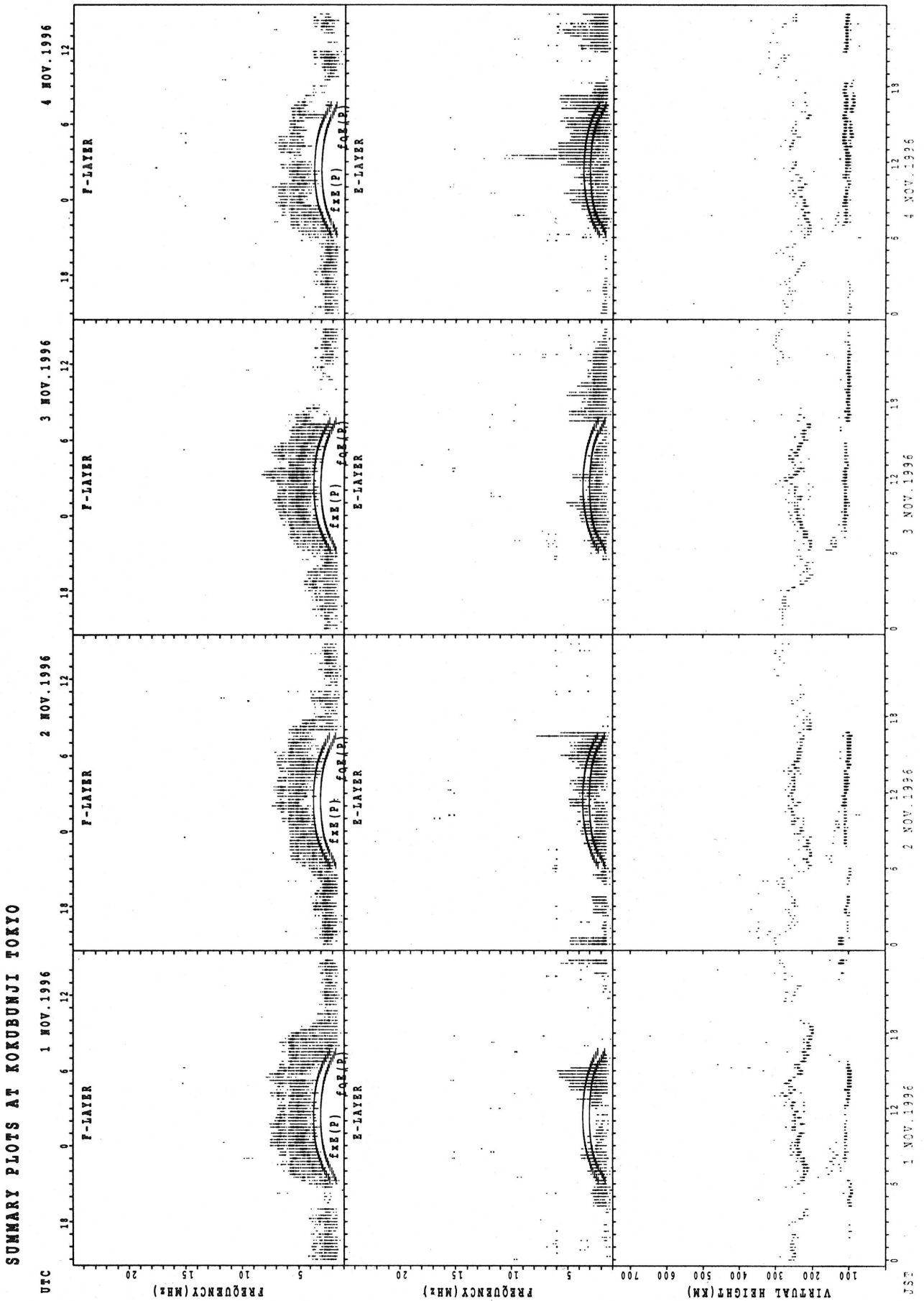
SUMMARY PLOTS AT WAKKANAI



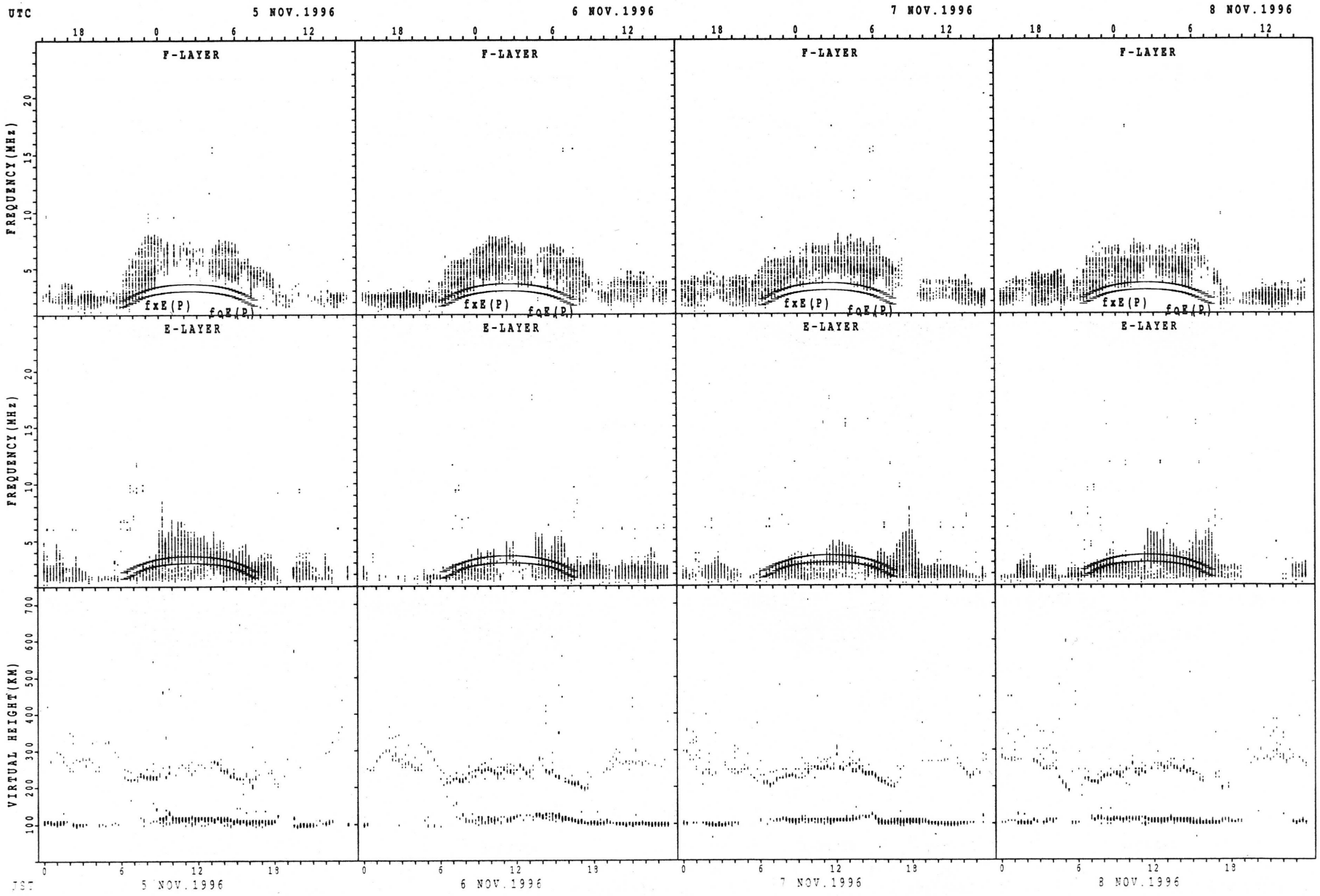
fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE

SUMMARY PLOTS AT WAKKANAI



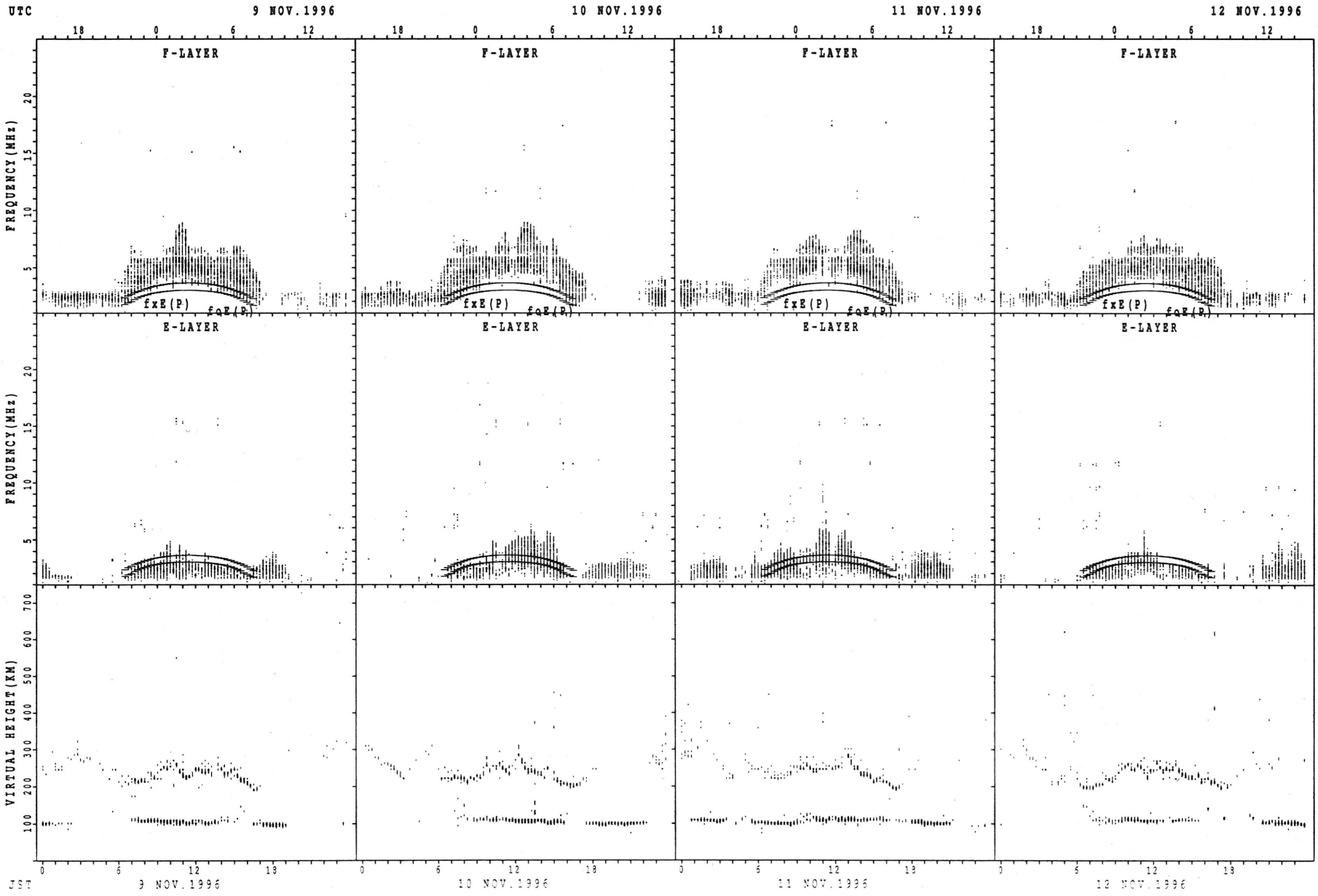

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
1 NOV.1996
2 NOV.1996
3 NOV.1996
4 NOV.1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)

SUMMARY PLOTS AT KOKUBUNJI TOKYO

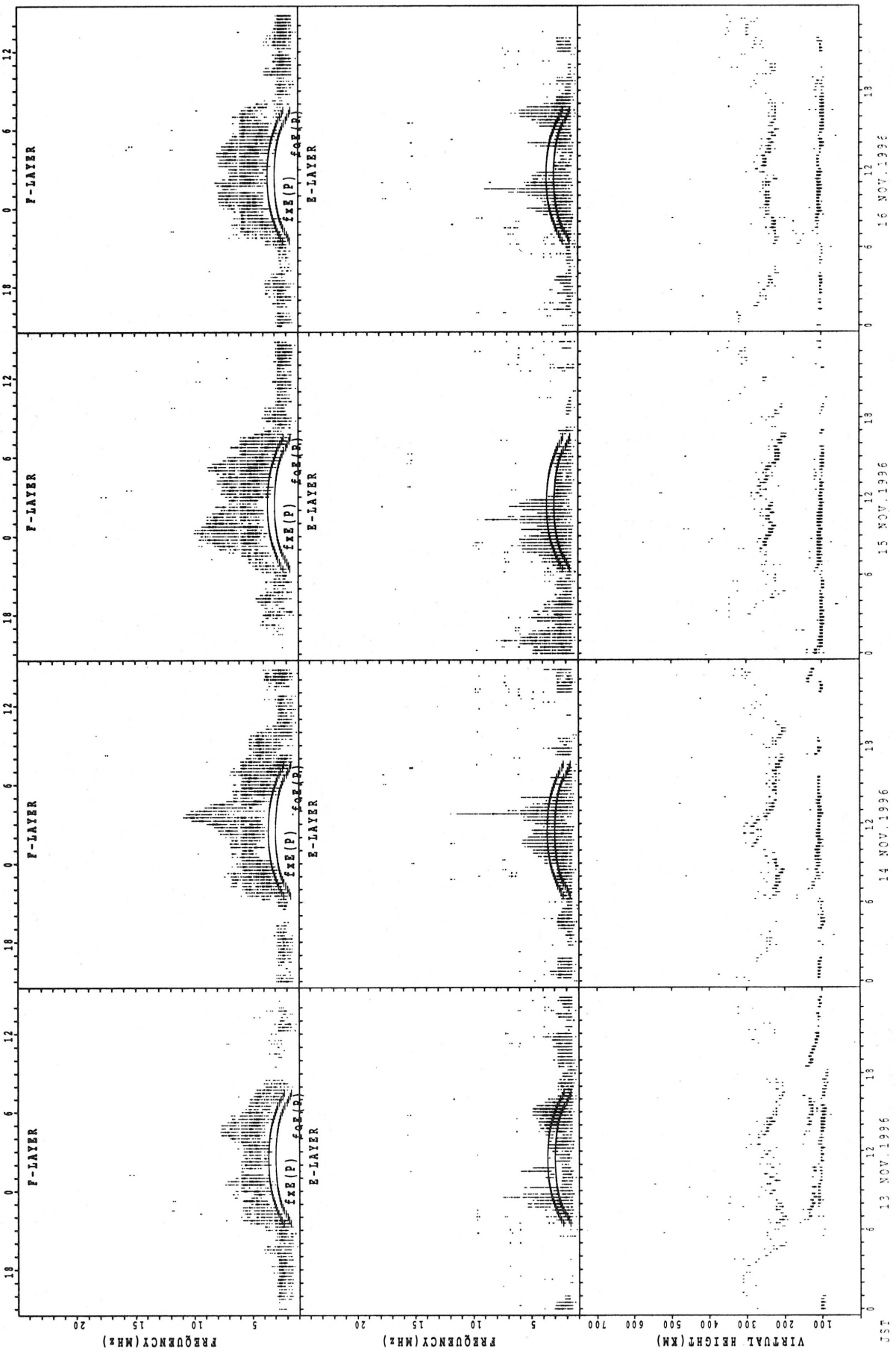


fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE

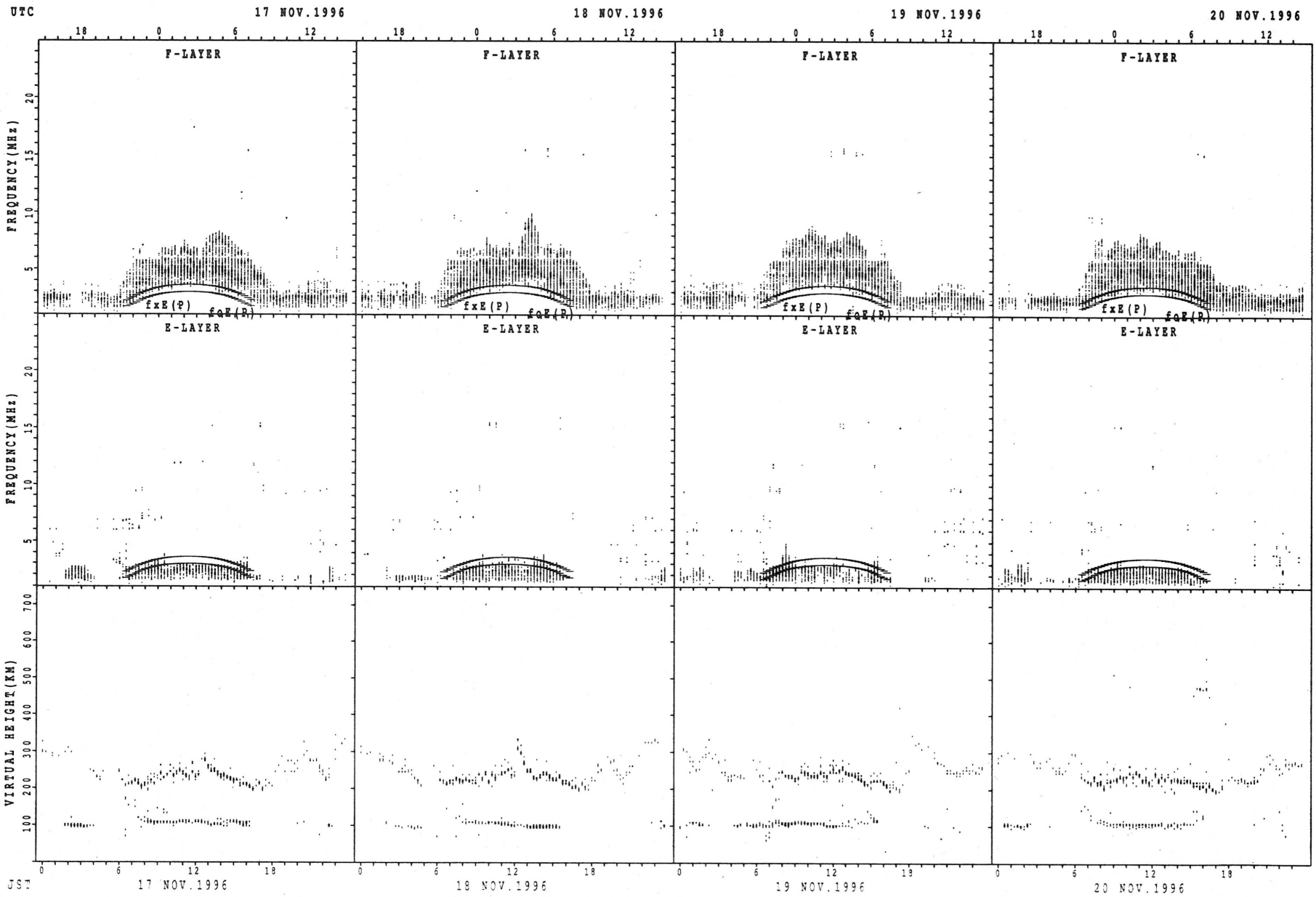
SUMMARY PLOTS AT KOKUBUNJI TOKYO



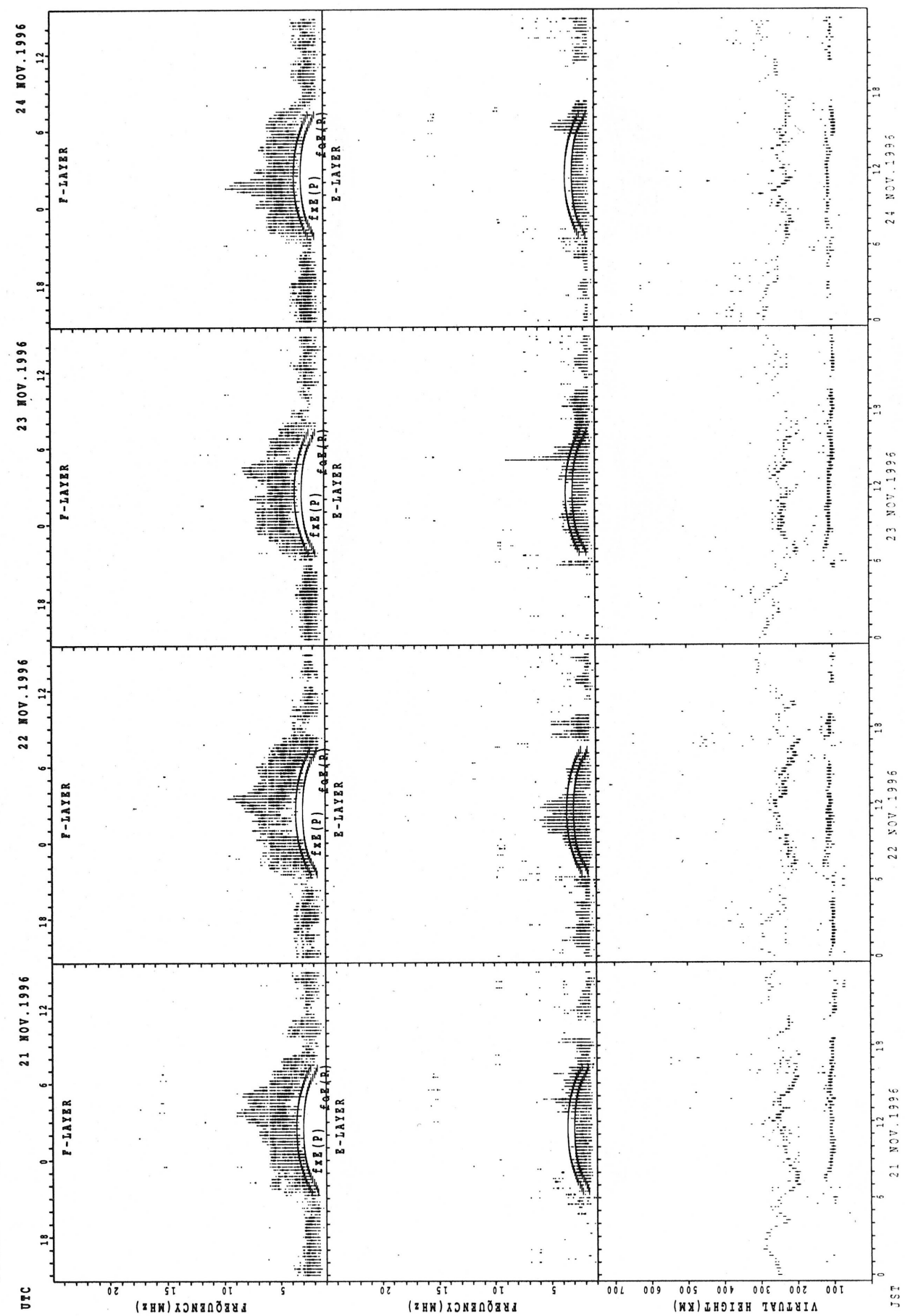
foE : PREDICTED VALUE FOR foE
fxE : PREDICTED VALUE FOR fxE

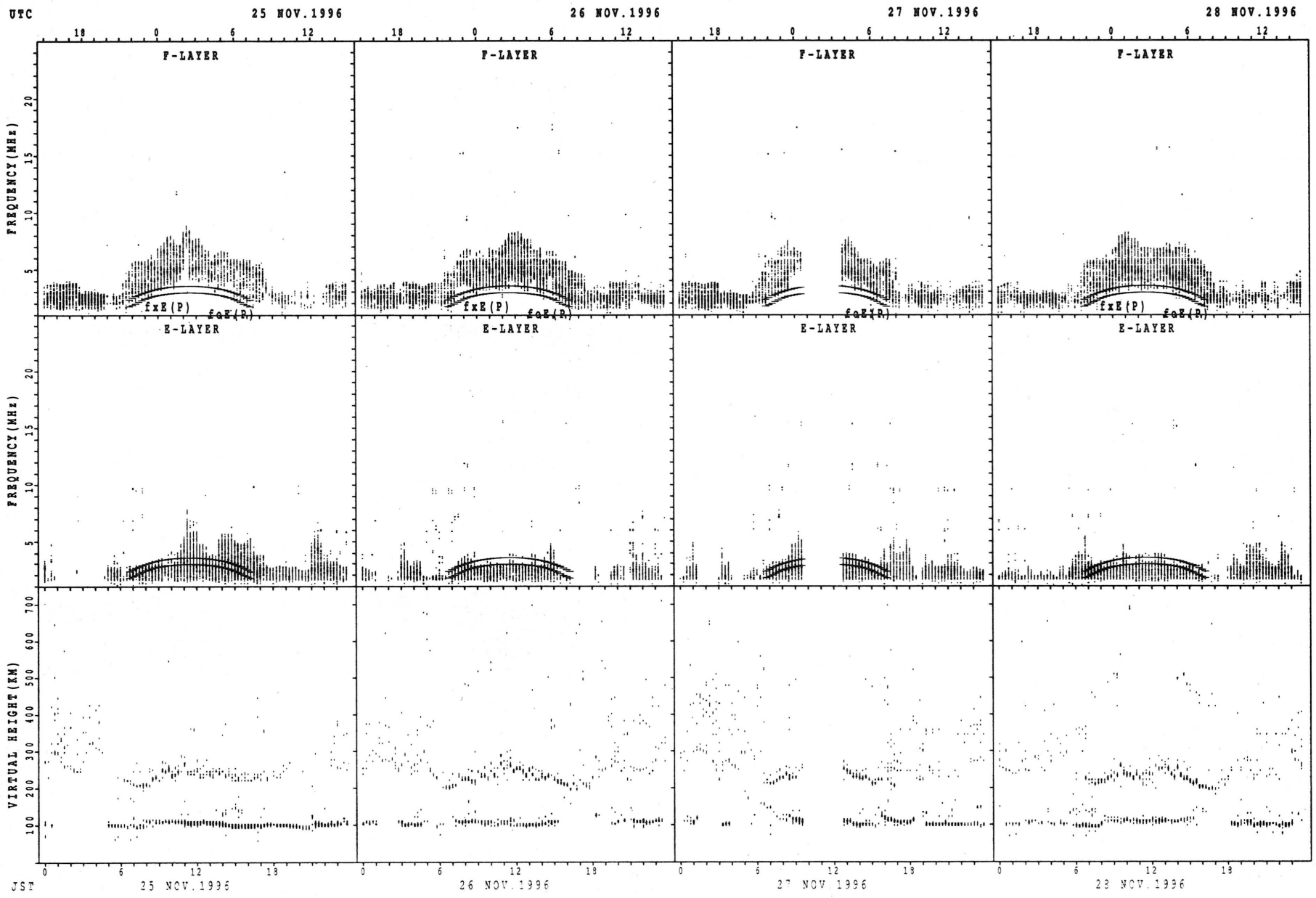

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
13 NOV.1996
14 NOV.1996
15 NOV.1996
16 NOV.1996
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST

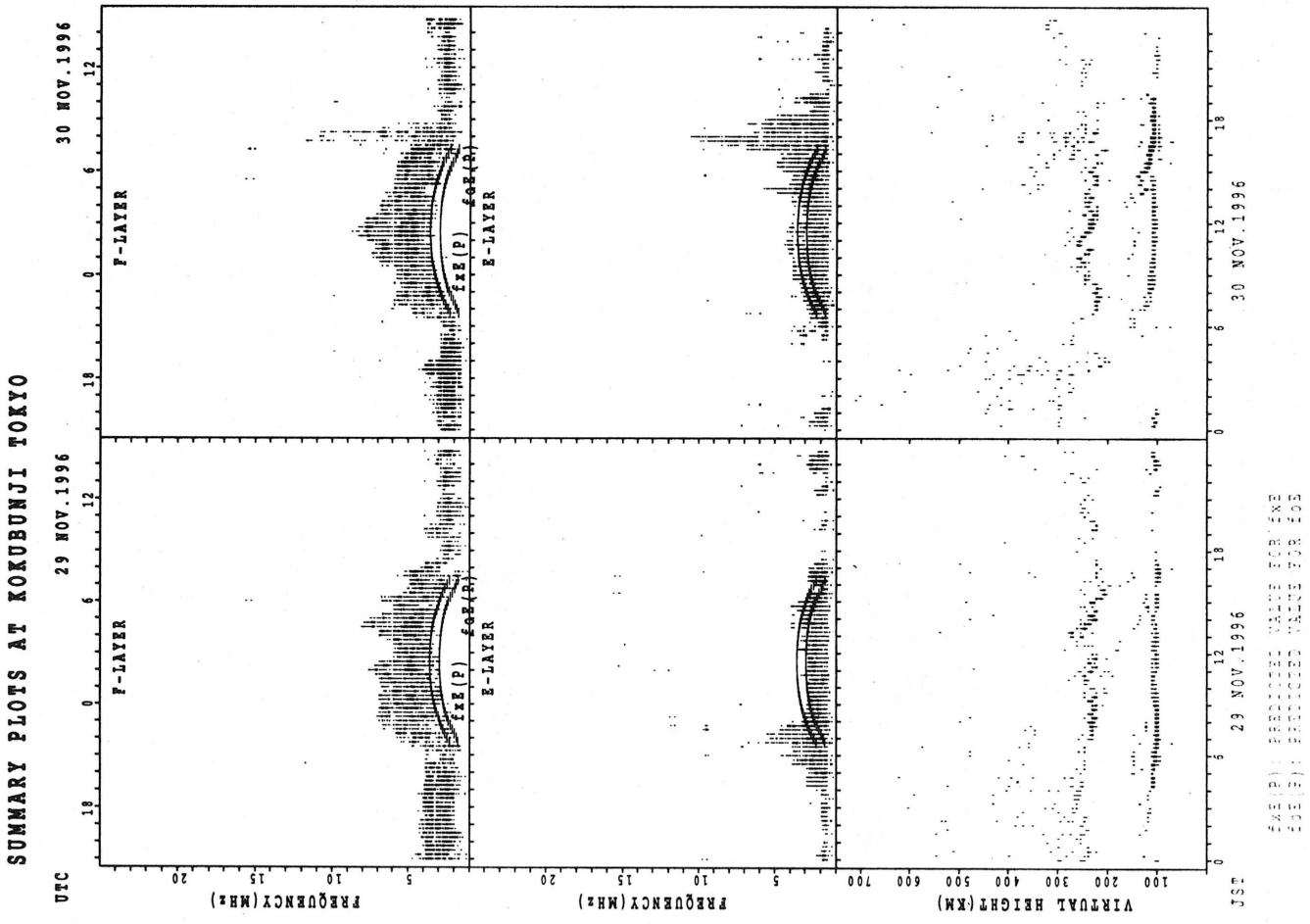
SUMMARY PLOTS AT KOKUBUNJI TOKYO



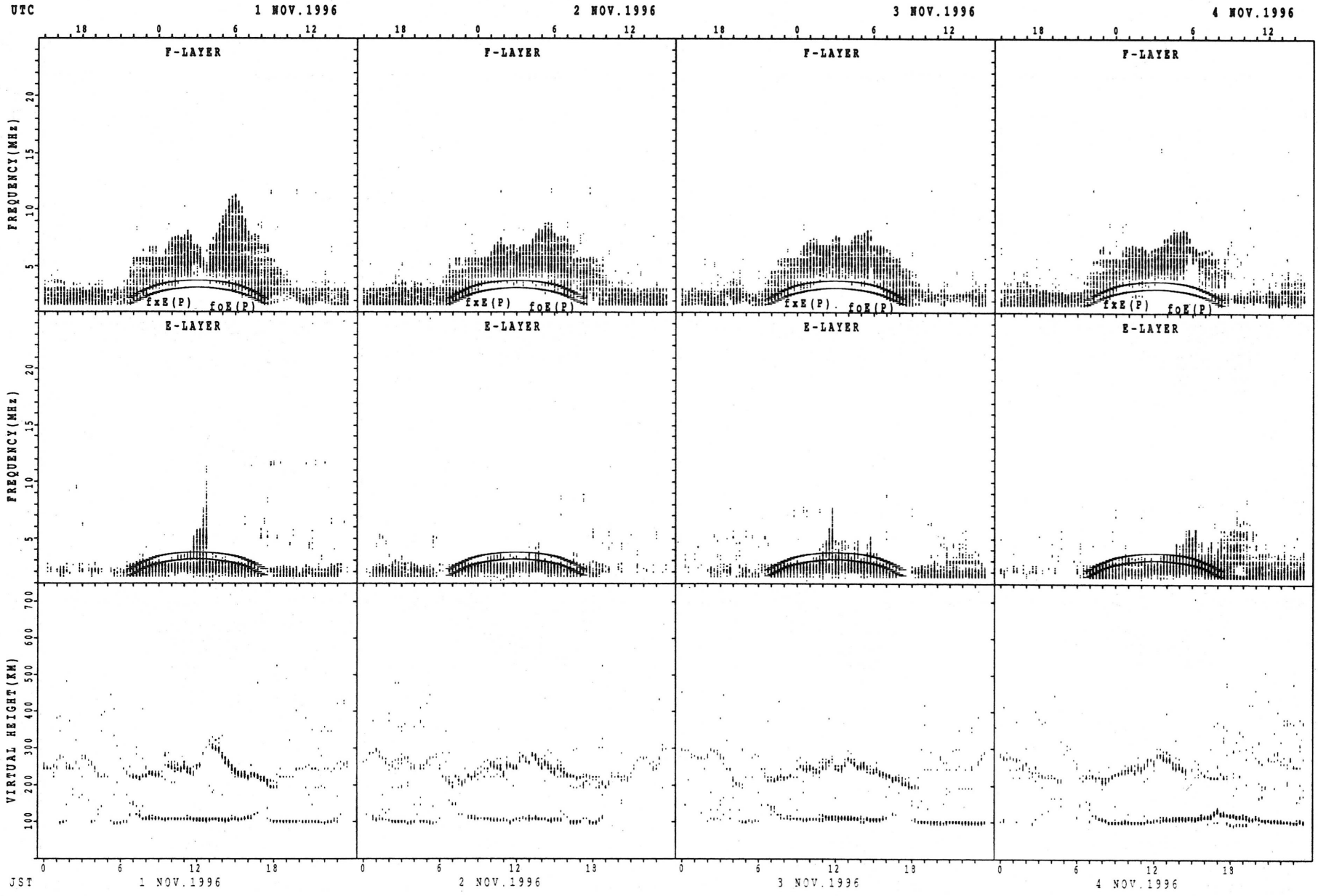
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
21 NOV.1996
22 NOV.1996
23 NOV.1996
24 NOV.1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)

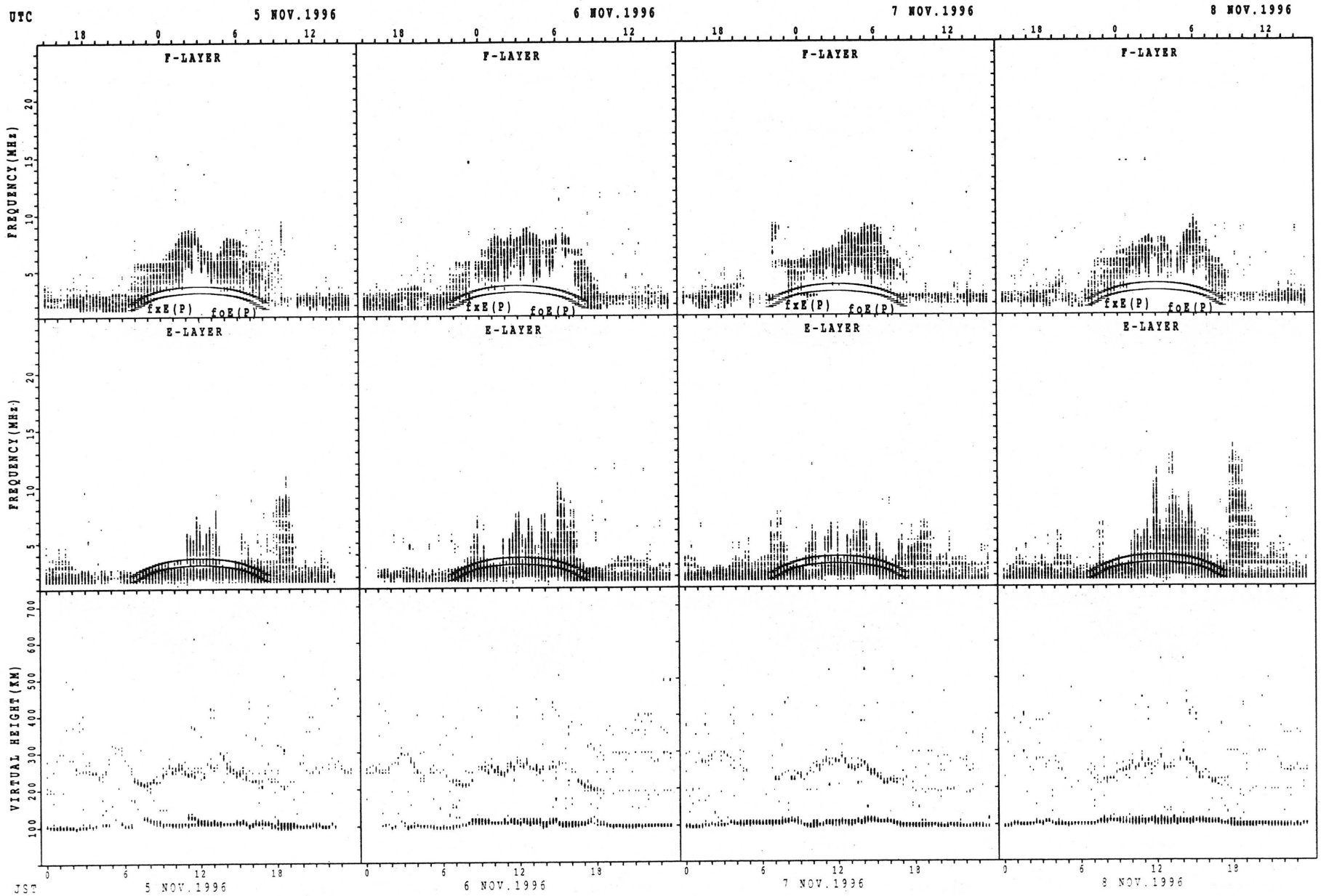

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
25 NOV.1996
26 NOV.1996
27 NOV.1996
28 NOV.1996
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
JST
25 NOV.1996
26 NOV.1996
27 NOV.1996
28 NOV.1996
fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
29 NOV.1996
30 NOV.1996
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
29 NOV.1996
30 NOV.1996

SUMMARY PLOTS AT YAMAGAWA

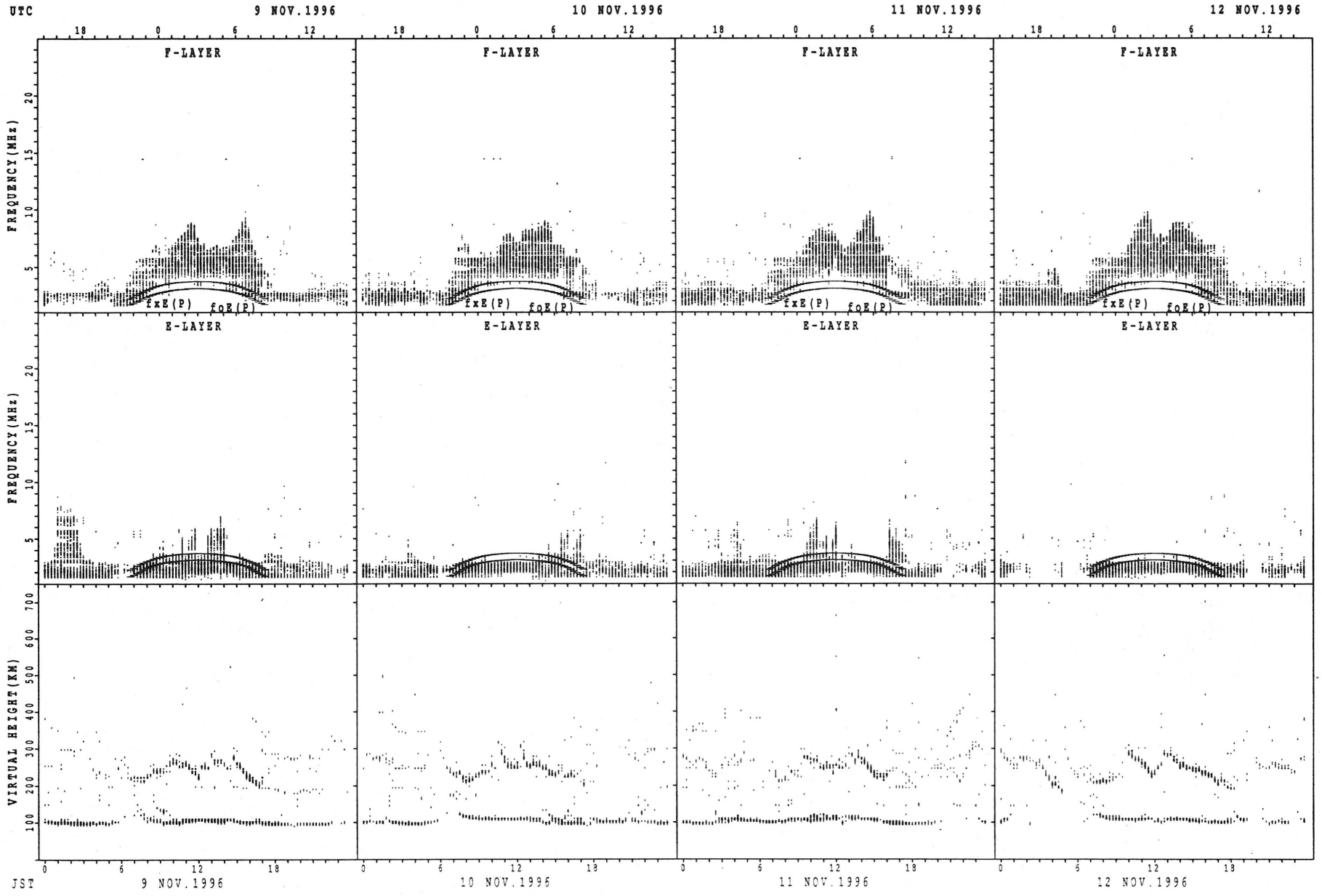


fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE



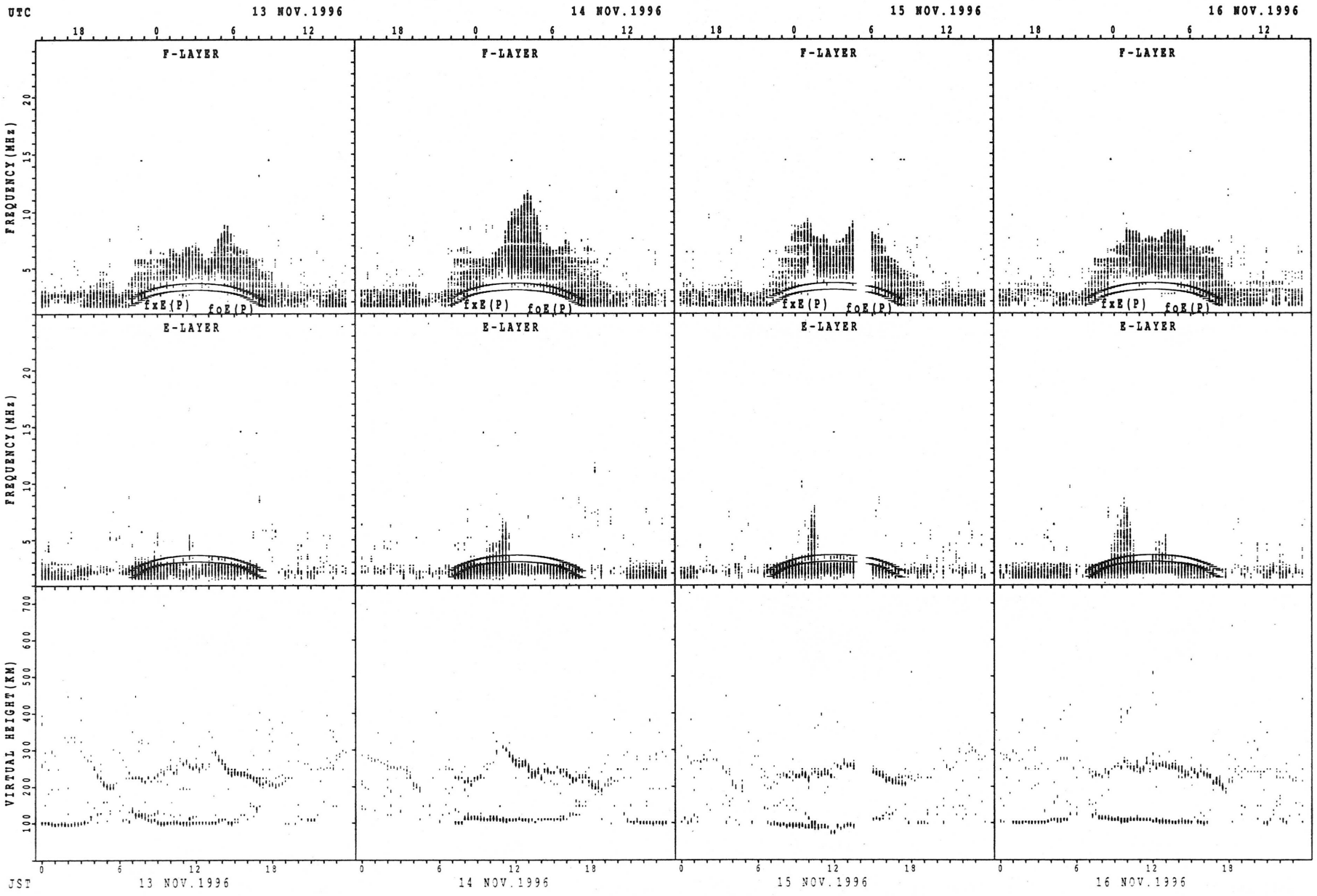
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA

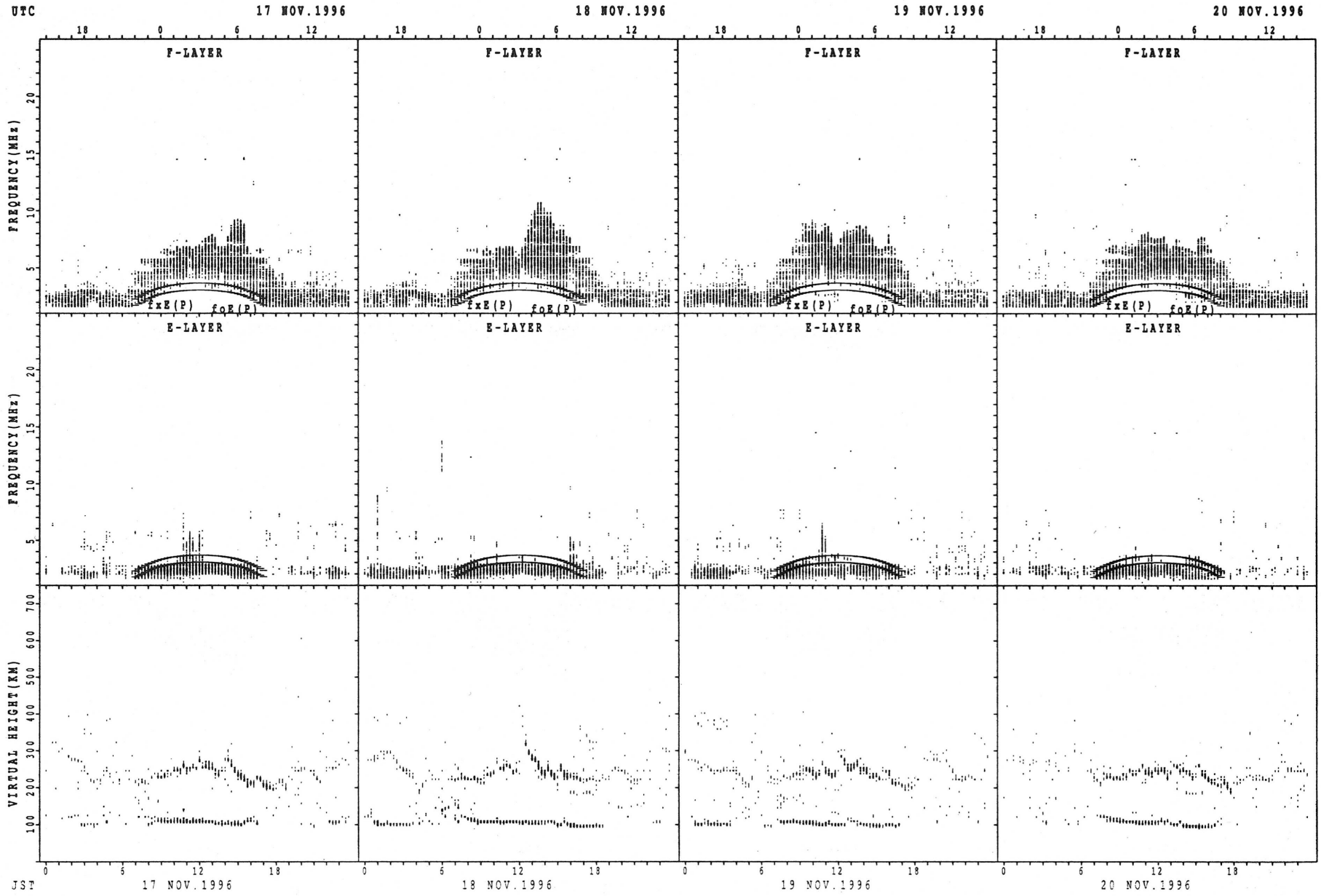


fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE

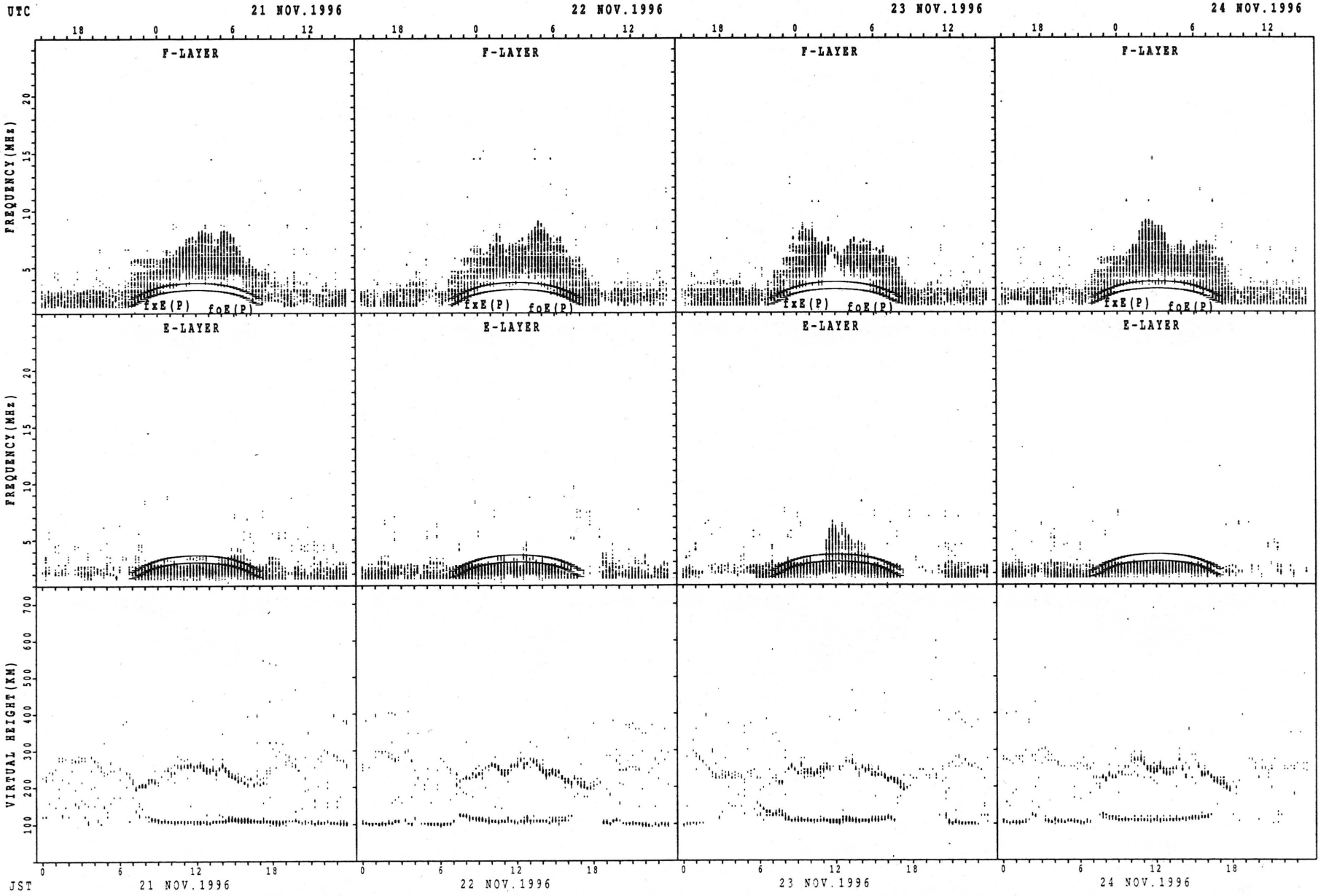
SUMMARY PLOTS AT YAMAGAWA



SUMMARY PLOTS AT YAMAGAWA

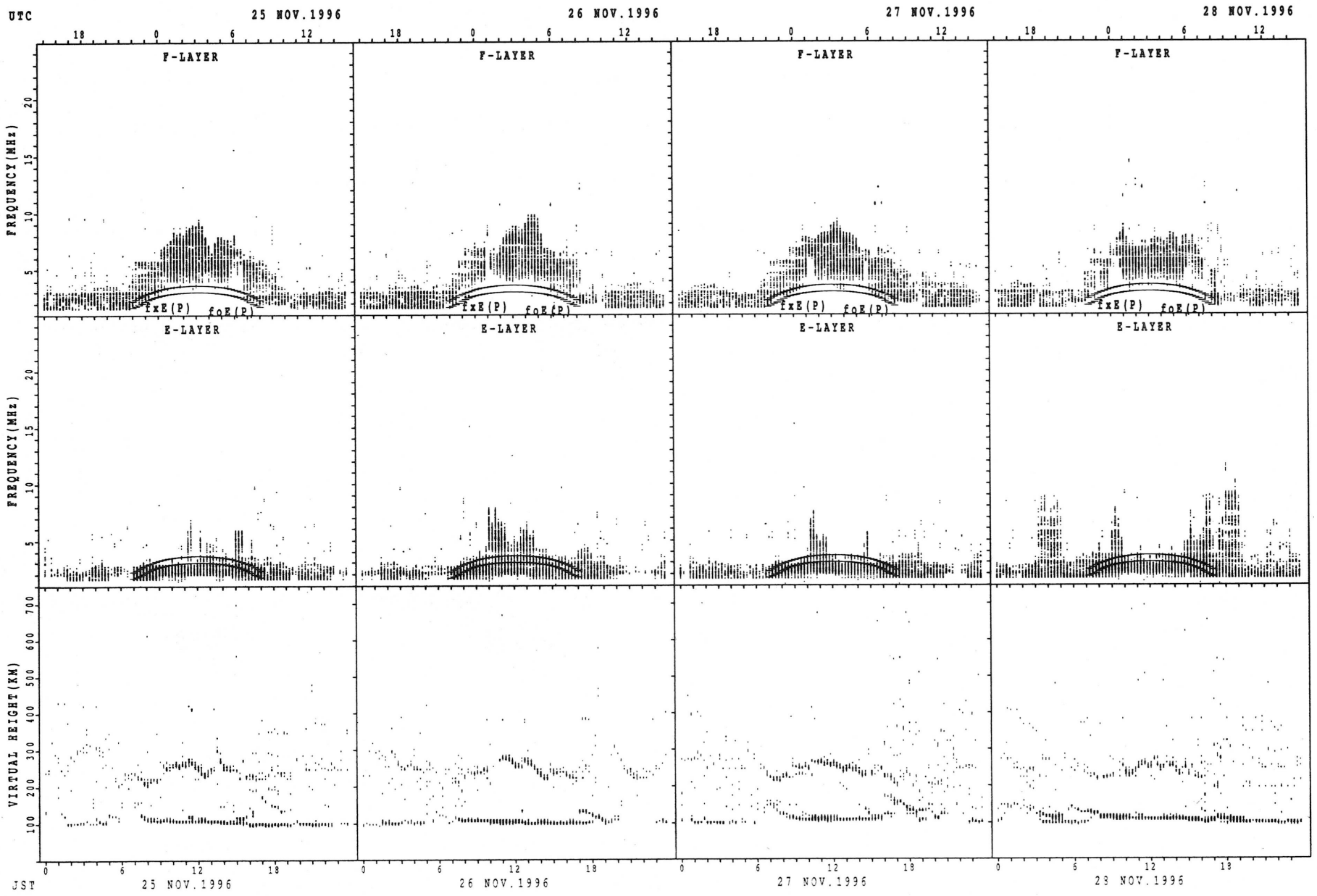


SUMMARY PLOTS AT YAMAGAWA

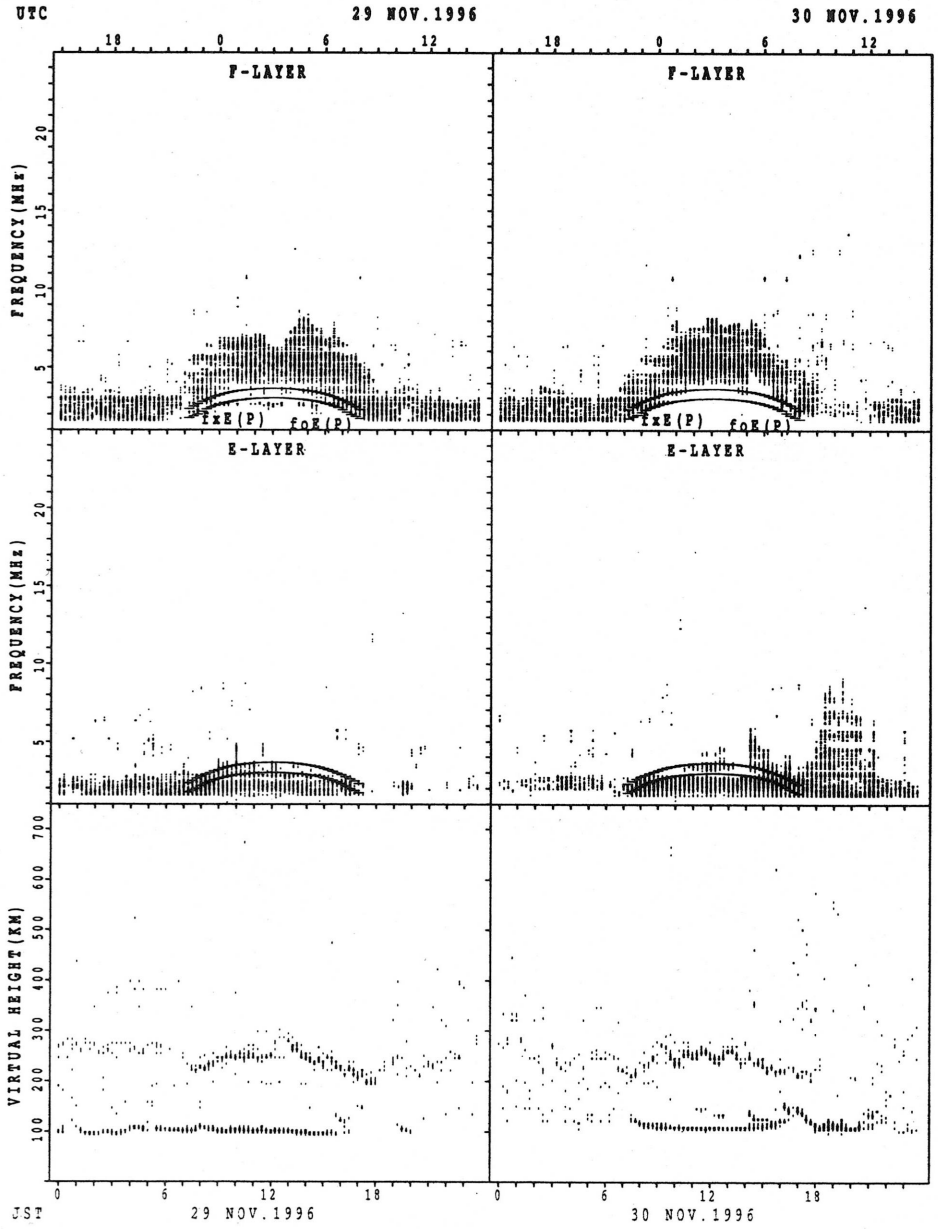


fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

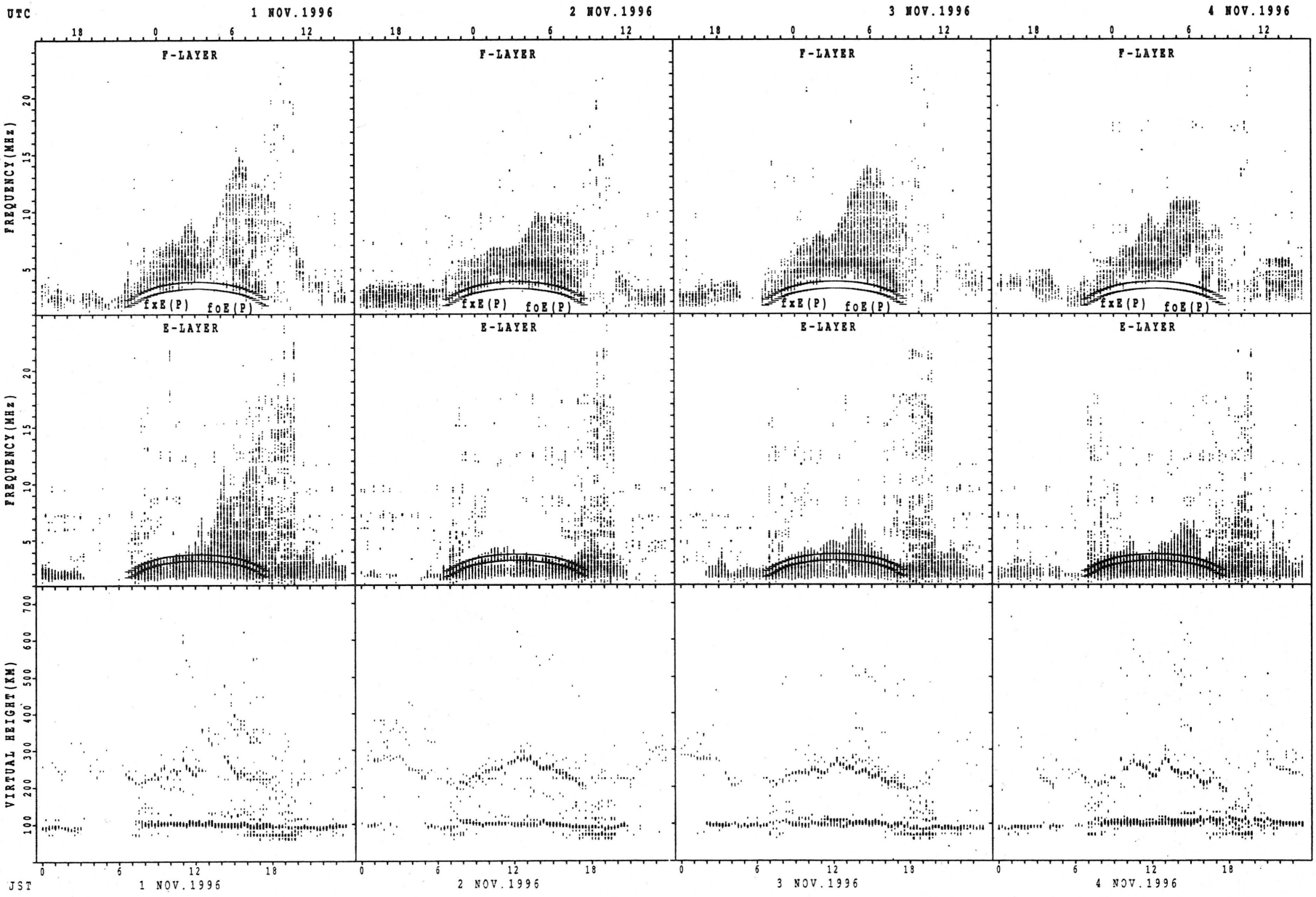
SUMMARY PLOTS AT YAMAGAWA



SUMMARY PLOTS AT YAMAGAWA

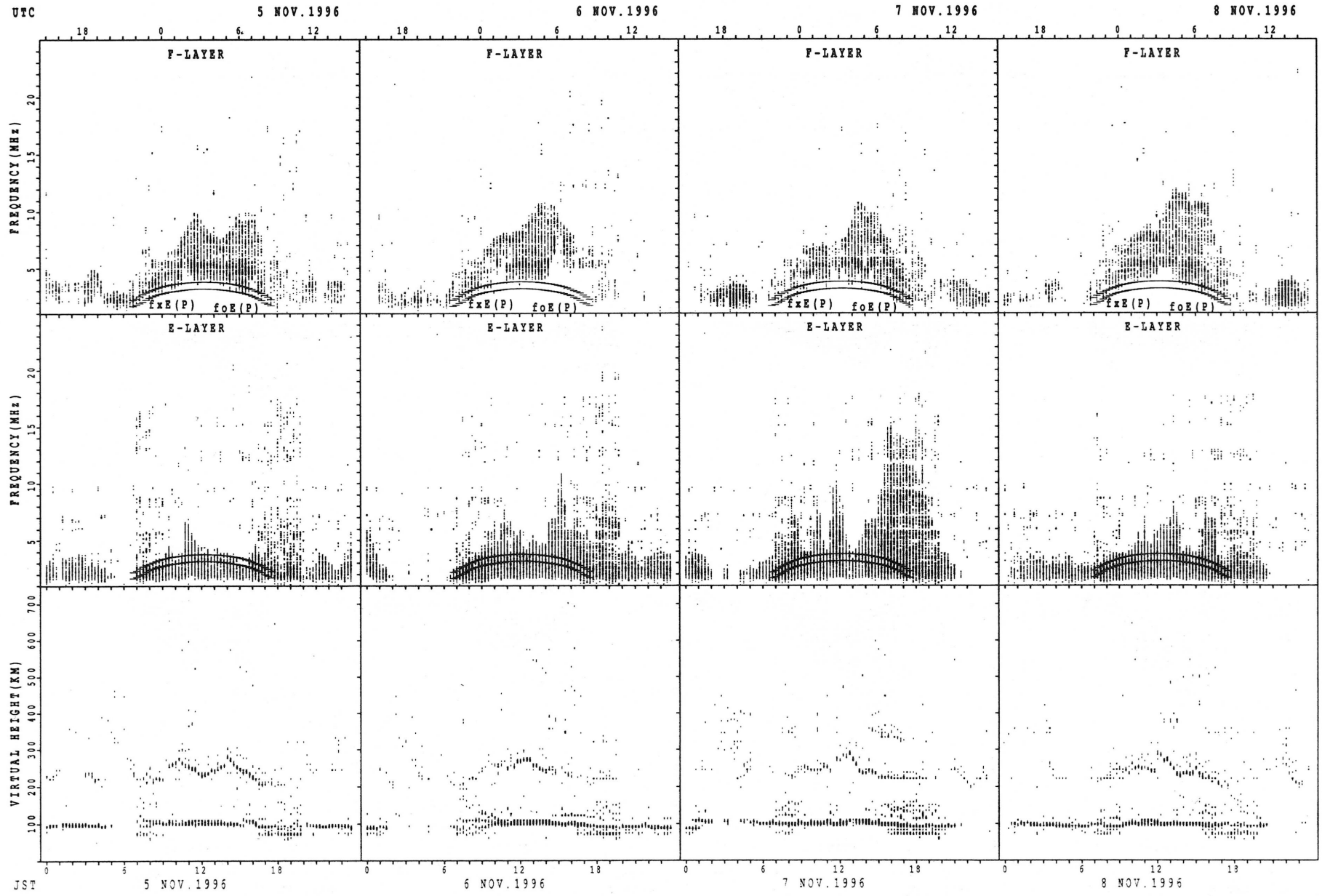


SUMMARY PLOTS AT OKINAWA



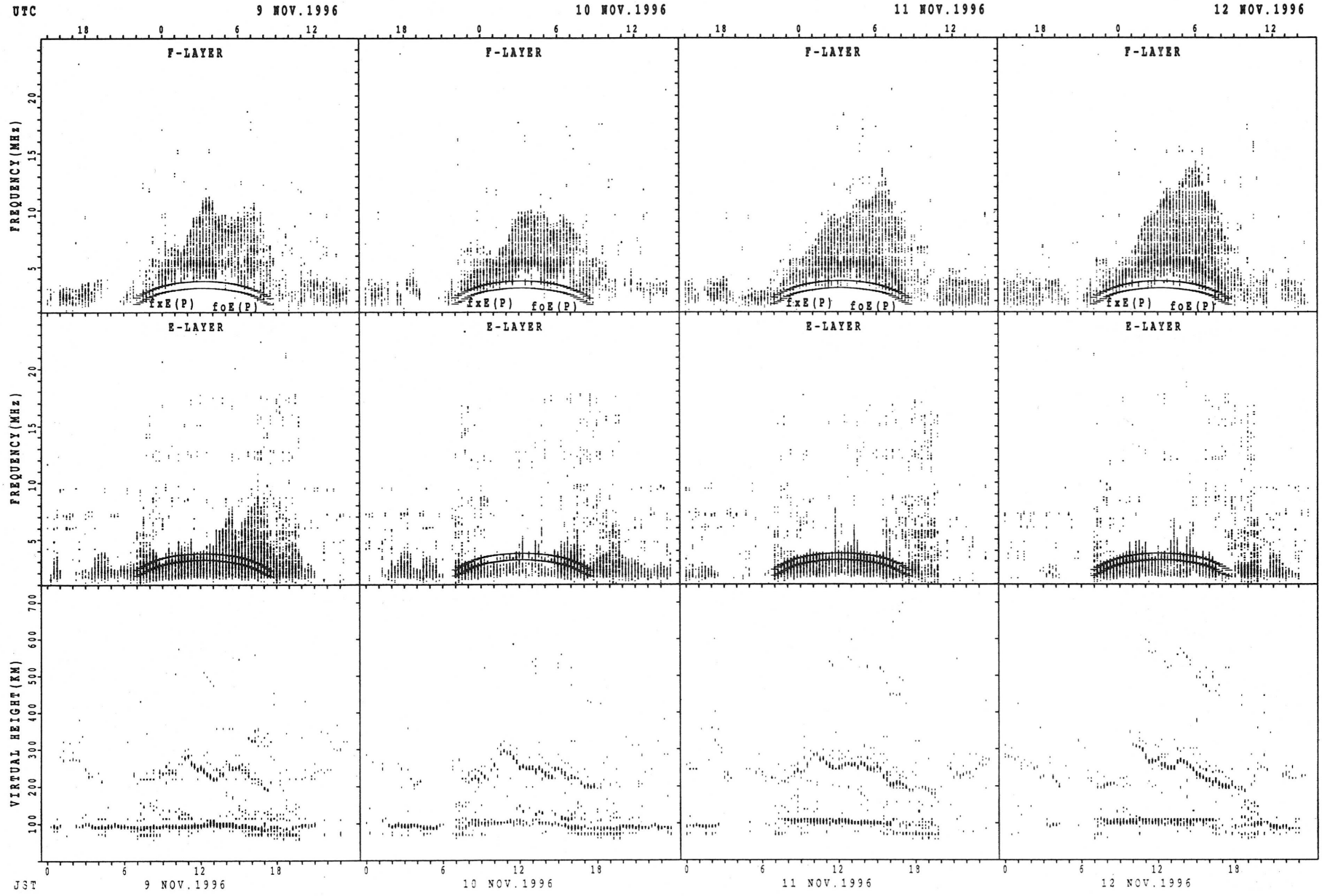
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA

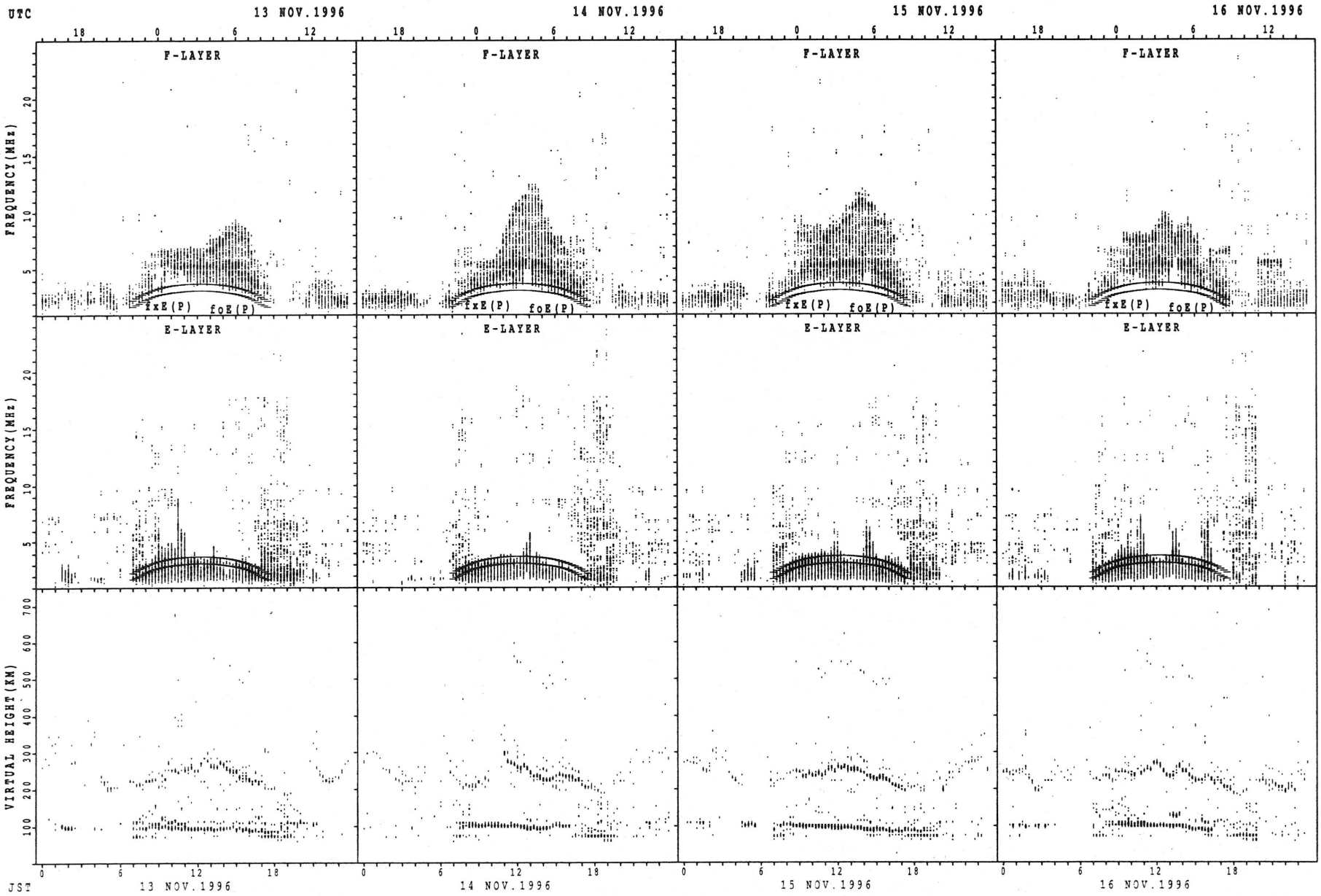


fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

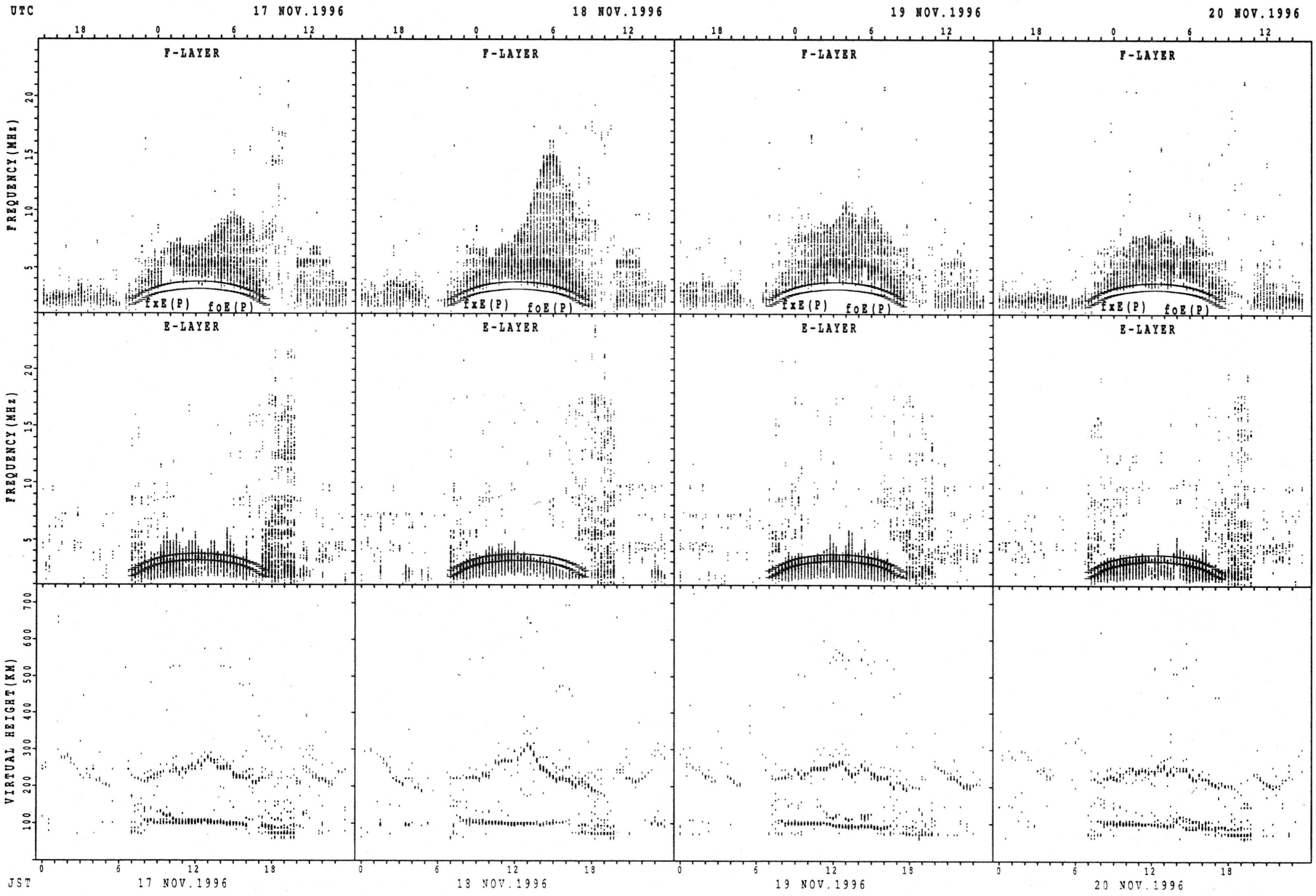
SUMMARY PLOTS AT OKINAWA



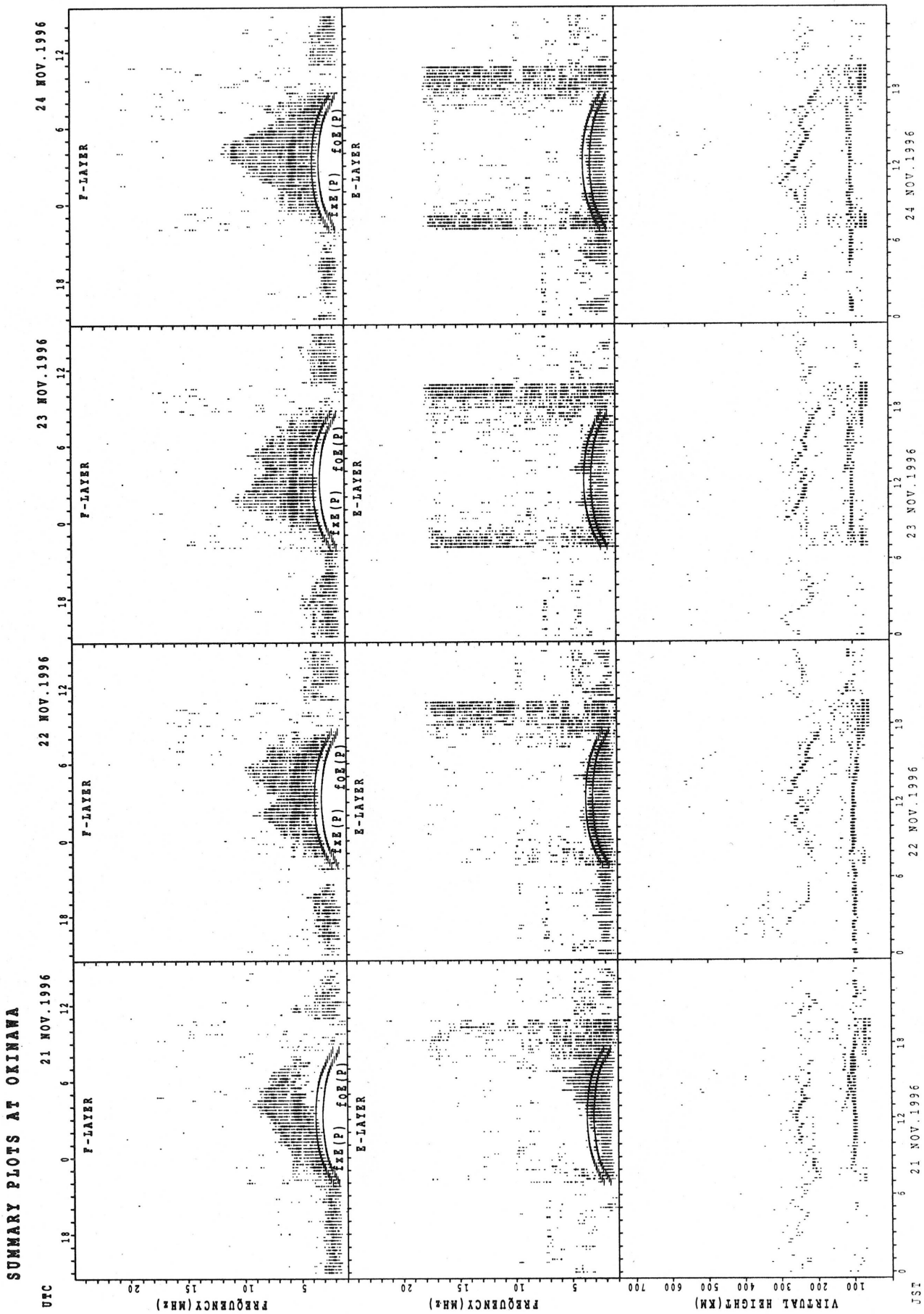
SUMMARY PLOTS AT OKINAWA



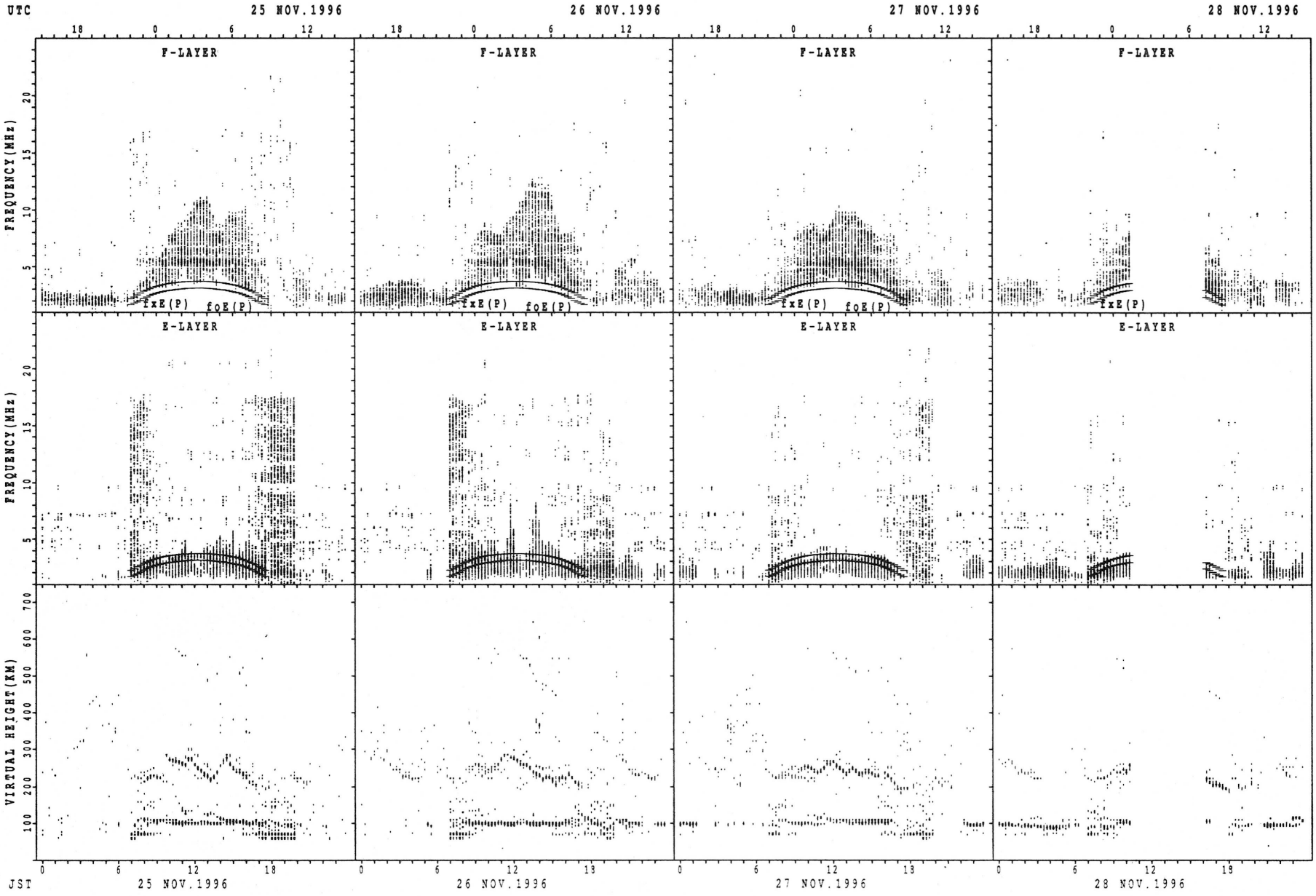
SUMMARY PLOTS AT OKINAWA



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

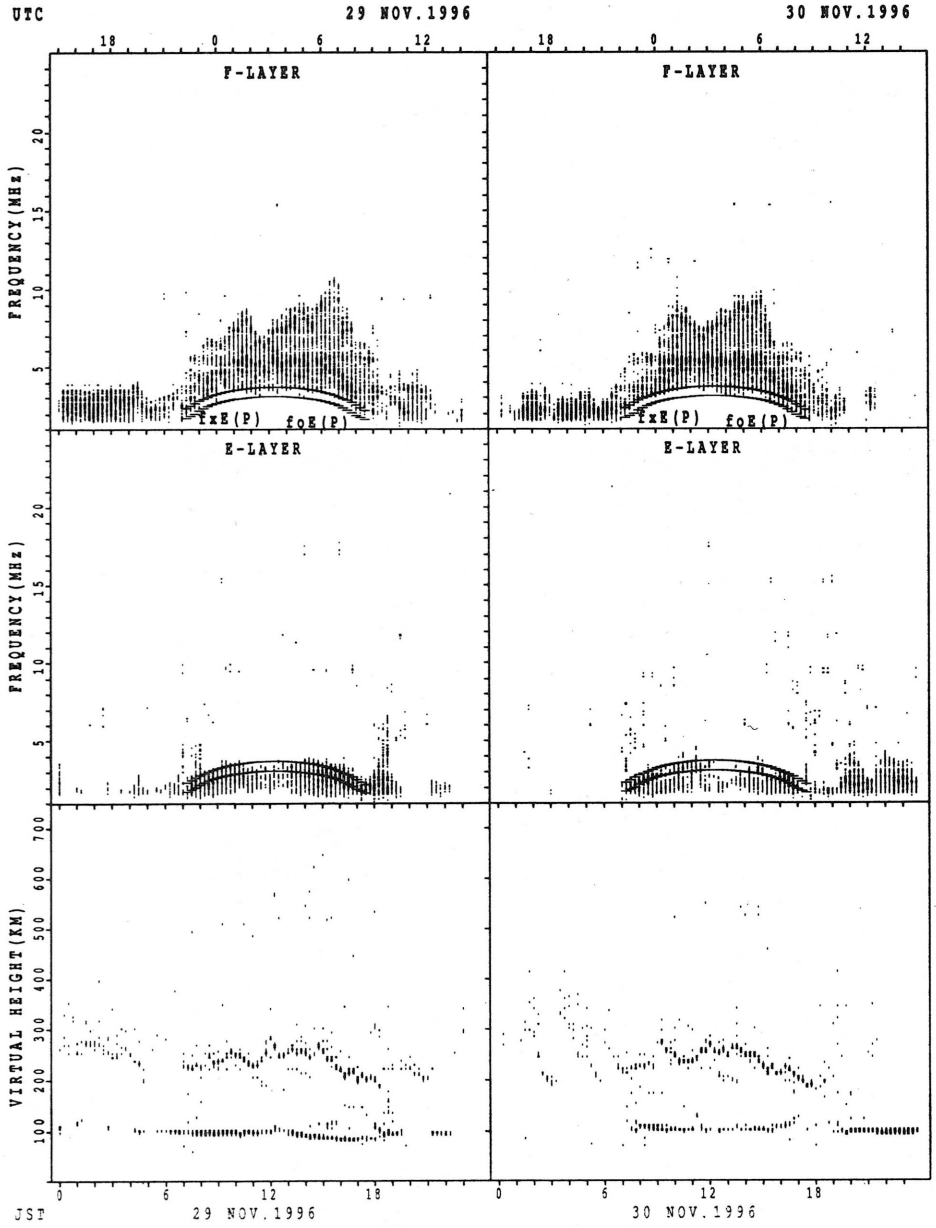

SUMMARY PLOTS AT OKINAWA
UTC
JST
21 NOV.1996
22 NOV.1996
23 NOV.1996
24 NOV.1996
F-LAYER
E-LAYER
fxE(P) foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



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

SUMMARY PLOTS AT OKINAWA



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

MONTHLY MEDIANS OF h'F AND h'Es

NOV. 1996 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										17	18	26	28	14	11	10								
MED										242	255	242	234	249	238	240								
U Q										251	264	254	246	260	240	252								
L Q										229	240	232	226	242	234	230								

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	11	20	17	15	12		23	28	27	27	29	29	30	29	23	21	26	22	21	15	17	14	15
MED	103	105	105	103	101	103		143	121	113	111	107	105	107	107	105	105	103	103	103	103	105	105	105
U Q	107	105	111	105	109	110		161	155	119	113	112	113	113	114	113	112	111	107	107	107	109	107	105
L Q	101	101	101	99	99	100		107	109	111	107	103	103	103	102	99	96	97	97	97	97	103	103	101

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									15	14	19	24	16	21	21	15								
MED									240	245	250	253	274	252	246	238								
U Q									248	266	260	266	281	268	256	248								
L Q									232	242	238	244	262	246	236	230								

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					10	23	29	28	28	26	26	27	29	26	20	16	17	14	11	15	16	11
MED	107	107					105	131	113	113	112	111	109	109	109	112	106	105	105	105	103	103	105	105
U Q	111	111					109	155	119	120	118	113	113	119	114	115	119	109	110	113	105	111	107	109
L Q	103	105					99	107	110	110	109	107	105	107	105	103	100	99	100	103	99	99	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										14	21	30	22	24	26	26	19							
MED										248	248	253	260	259	250	242	234							
U Q										260	263	264	266	283	264	250	240							
L Q										244	236	242	246	253	242	234	228							

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	19	18	20	18	19	14	26	29	30	29	30	30	29	29	30	30	23	21	20	17	20	16	17
MED	105	105	104	104	107	107	105	151	115	113	113	111	111	111	113	110	112	111	111	105	105	103	103	105
U Q	107	111	105	105	109	127	107	163	120	125	119	115	113	117	129	115	119	141	120	112	112	108	104	107
L Q	101	105	103	103	105	103	103	119	112	111	109	107	109	107	107	107	103	103	102	103	102	101	100	101

MONTHLY MEDIANS OF h'F AND h'Es

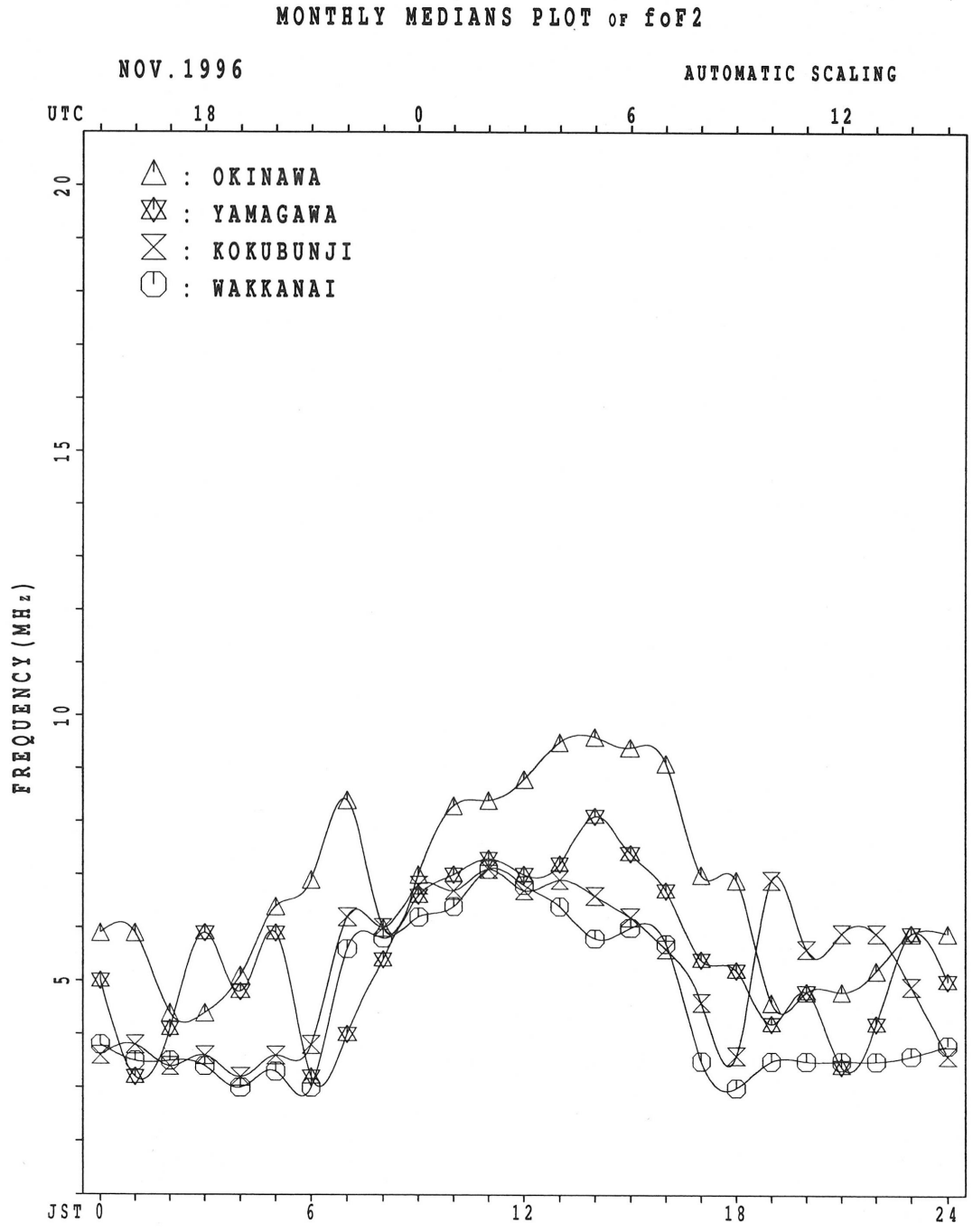
NOV. 1996 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									11	15	22	26	28	29	27	28	25	14						
MED									258	250	254	257	262	254	248	236	226	248						
U Q									386	266	264	278	271	264	254	250	232	300						
L Q									236	244	242	242	250	244	238	231	220	212						

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	13	11			12		23	28	27	29	29	29	29	28	29	27	17	24	21	14	15	15	11
MED	94	97	97			98		119	108	105	107	107	107	107	106	107	103	99	89	97	95	95	91	97
U Q	99	110	103			101		153	146	113	119	121	117	116	114	114	107	129	118	119	103	101	97	99
L Q	91	96	95			96		91	98	101	103	104	103	105	101	99	95	91	80	83	95	91	91	89


MONTHLY MEDIANS PLOT OF foF2
NOV.1996
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. 1996 fxI (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 42	42	X 38	X 40	X 36	X 32												X 67	X 60	X 36	X 35	X 35	X 33	X 34
2	X 38	35	X 37	X 39	37	X 35												X 60	X 45	X 40	X 40	X 30	X 34	X 36
3	X 37	X 39	X 41	X 44	X 47	X 38												X 53	O X 36	X 33	X 36	X 38	X 36	X 37
4	X 38	X 38	X 37	X 39	X 34	X 34												X 52	X 40	X 33	X 38	X 40	O X 40	X 41
5	X 37	42	40	36	X 34	X 33												X 54	X 44	X 40	X 41	X 37	36	X 35
6	X 39	X 37	36	35	34	34												X 65	X 41	X 39	X 45	47	X 46	X 41
7	44	44	47	X 43	X 45	44												X 46	A	X 39	X 40	X 41	X 42	37
8	37	42	44	46	45	X 45												X 48	X 30	X 35	X 36	38	39	X 36
9	X 39	X 36	X 34	X 34	X 35	X 33												X 40	A O X 33		X O 36	X 35	X 36	X 36
10	X 37	X 37	X 39	X 39	X 33	X 32												X O 45	X O 37	X 36	A	A	O X 37	42
11	42	X 40	40	39	X 36	X 32	X 35											X 43	X O 35	X 36	A	X 35	X 34	X 34
12	X 36	X 36	X O 37	X 37	X 39	X 31	X 38											X 54	X 34	X 34	X 37	X 37	A	X 34
13	X 37	X 36	X 36	X 35	X 37	X 40	X 39											X O 43	X 30	A	X 40	A	X 30	X 32
14	X 33	X 34	X 34	X 32	X 31	A	X 36											X 57	X 54	X 50	X 31	X 37	X 37	X 38
15	O X 40	A	44	44	X 46	35	X 36											X 42	X 44	X 34	X 33	X 34	X 34	37
16	34	X 35	X 39	X 39	X 33	X 27	X 33											X 47	X 34	X 39	X 37	X 34	38	33
17	X 34	X 35	X 35	X 38	X 37	X 31	X 35											X 53	X 35	X 35	X 38	X 40	X 44	X 34
18	X 37	X 38	X 37	X 39	X 40	X 34	X 34											X 54	X 38	X 37	X 41	X 35	X 33	X 36
19	X 37	X 40	X 38	X 40	X 40	X 33	X 34											X 45	X 29	X 33	X 37	X 40	X 40	X 37
20	X 35	X 35	X 34	X 36	X 35	X 33	X 32											X 45	X 39	X 41	X 34	X 33	X 34	X 37
21	X 38	X 38	X 36	X 36	X 37	X 34	X 38											X 50	X 36	X 46	X 41	X 37	X 38	X 38
22	X 39	X 39	X 38	X 39	X 39	X 34	X 38											X 50	X 44	X 41	X 35	X 29	X 33	X 34
23	X 34	X 36	X 37	X 36	37	X 33	X 32											X 44	X 38	X 36	X 35	X 38	X 36	X 33
24	X 35	36	37	39	X 32	X 33	X 33											X 40	X 29	X 39	X 38	X 36	X 38	X 38
25	X 35	40	42	34	34	X 28	X 33											X 56	X 36	X 32	X 33	X 34	X 36	X 40
26	X 37	X 35	40	X 40	40	37	X 41											X 48	X 34	X 37	X 41	X 42	X 38	X 34
27	X 38	39	36	37	34	29	X 35					C	C	C				X 49	X 37	X 37	X 36	A	34	36
28	X 36	X 37	X 32	X 31	32	X 31	X 35											X 41	X 34	X 36	X 38	40	37	42
29	45	43	43	42	44	40	X 40											X 45	X 32	X 41	X 34	X 34	X 35	34
30	33	34	34	36	39	X 32	X 28											A	O X 36	X 36	X 34	X 36	X 34	X 39
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	30	30	29	20											29	28	29	28	27	29	30
MED	X 37	X 37	X 37	X 39	X 37	X 33	X 35											X 48	X 36	X 36	X 37	X 37	X 36	X 36
U Q	X 39	40	40	X 40	X 40	35	X 38											X 54	X 40	X 40	X 40	X 40	X 38	X 38
L Q	X 35	X 36	X 36	36	34	X 32	X 33											X 44	X 34	X 34	X 35	X 34	X 34	X 34

NOV. 1996 fxI (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV. 1996 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	36	F 34	32	34	29	26	37	58	58	70	70	70	66	71	68	65	60	61	54	30	29	29	27	28
2	32	F 28	31	33	30	29	39	54	55	56	60	69	R 66	65	64	62	56	54	39	34	34	24	28	30
3	31	33	36	38	41	32	37	51	60	63	68	66	76	63	70	56	52	47	U R 30	27	30	32	30	31
4	32	32	31	33	28	28	39	54	R 63	64	70	56	55	66	66	58	53	46	34	27	32	34	U R 34	35
5	31	31	F 32	F 29	28	27	32	56	76	75	66	70	J R 64	59	68	68	56	48	38	34	35	31	R 28	29
6	33	31	F 28	F 29	F 28	F 26	36	52	57	64	74	74	67	60	65	68	59	59	35	33	39	F 41	40	35
7	F 35	F 36	F 39	37	39	36	43	53	56	55	Y	65	72	73	71	72	56	40	A	33	34	35	36	F 32
8	F 31	F 35	F 37	F 39	F 36	39	S 36	58	J R 64	65	58	69	61	62	H 61	71	56	42	24	29	30	F 31	F 31	30
9	33	30	28	28	29	27	31	54	56	55	R 64	84	66	59	R 62	65	55	34	A	27	30	29	30	30
10	31	R 31	33	33	27	26	32	58	72	65	60	74	66	85	73	72	52	39	31	R 30	A	A	31	F 35
11	F 33	34	F 31	F 31	30	26	29	56	57	61	72	67	64	73	77	63	54	37	29	R 30	A	29	28	28
12	30	30	31	31	33	25	32	48	52	56	65	73	68	71	68	52	53	48	28	28	31	31	A	29
13	32	30	30	29	R 31	R 34	33	50	50	60	61	57	56	70	72	56	48	37	24	A	34	A	R 24	27
14	27	28	28	26	25	A	S 30	57	70	60	56	65	86	98	R 64	60	R 65	51	48	44	25	31	31	32
15	U R 34	A	R 35	F 35	40	F 27	30	48	S 72	93	82	72	68	75	82	66	59	36	38	28	27	28	28	F 28
16	F 28	29	33	33	27	21	27	51	61	70	73	77	69	76	67	58	64	41	28	33	31	28	F 31	F 27
17	28	29	29	32	31	25	R 29	52	60	60	65	71	R 66	76	79	67	60	46	29	29	32	34	38	28
18	31	32	31	33	34	28	28	54	62	61	69	66	H 62	91	69	64	64	48	32	31	35	29	27	30
19	31	34	32	34	34	27	28	50	70	75	84	78	72	80	74	56	61	39	R 24	27	31	34	34	31
20	29	29	28	30	29	27	26	54	75	J R 72	66	79	69	65	65	63	53	39	33	35	28	27	28	31
21	32	32	30	30	31	28	32	57	50	60	58	66	75	78	80	60	51	44	30	40	35	31	32	32
22	33	33	32	33	33	28	32	59	R 61	60	68	70	80	74	62	66	H 53	R 44	38	35	29	24	27	28
23	28	30	31	30	F 30	27	26	46	60	68	66	71	58	76	61	52	45	38	V 31	30	29	32	30	27
24	F 28	F 30	F 32	F 31	26	27	26	53	56	65	70	86	65	59	56	57	52	34	24	33	32	30	32	32
25	29	F 30	F 34	F 27	F 26	22	27	R 53	56	64	76	81	72	62	62	58	55	50	30	26	27	28	30	32
26	31	29	F 32	34	F 34	F 30	35	46	J R 63	R 62	64	68	77	72	65	62	53	42	28	31	35	36	32	28
27	32	F 32	F 27	F 26	F 26	F 22	J R 29	55	64	66	C	C	C	72	62	52	53	43	31	31	30	A	F 25	F 28
28	30	31	26	25	F 25	25	29	54	58	64	79	70	62	66	68	63	53	35	28	30	32	F 34	F 29	F 33
29	F 37	F 32	F 35	F 34	F 36	F 33	34	54	68	64	64	73	55	65	70	63	45	39	26	35	28	28	29	F 27
30	26	F 27	F 27	F 28	F 33	F 24	22	48	54	55	69	74	74	65	60	54	50	A	30	30	28	30	28	33
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	30	30	30	29	30	30	30	30	28	29	29	30	30	30	30	29	28	29	28	27	29	30
MED	31	31	31	32	30	27	32	54	60	64	67	70	66	71	68	62	54	42	30	30	31	31	30	30
U Q	33	32	33	34	34	28	35	56	64	66	71	74	72	76	71	66	59	48	34	34	34	34	32	32
L Q	29	30	29	29	28	26	28	51	56	60	64	66	63	65	62	57	52	38	28	28	29	28	28	28

NOV. 1996 foF2 (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV. 1996 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										U L 412	L 424	L 432	L 400	L 432	U L 408	U A 344	L							
2									U L 340	L	L 404	L 428	U L 436	L	U L 408	U L 372								
3									L	U L 416	L 420	424	L 440	L 408	L 416	L	L							
4									L	A	L 416	L 420	L 420	A	U A 388	A								
5								280	L	U A 384	A	A	A	U L 400	L	L								
6										U L 416	U L 420	L 416	L 408	U L 412	A	A								
7									L	L	L	L 424	L 472	L 412	L	L 360								
8									L	L	U L 404	U L 420	A	U L 420	L	U L 360								
9								L	L		L 420	L 428	L 416	U L 392	U L 400	U L 376	L							
10									L 312	L 404	U L 416	L 420	L	U A 428	U A 360	A								
11										L	L 424	U A 424	412	U L 432	L 408	U L 336	212							
12									L		L 424	L 436	U L 424	L 416	L 400	L	240							
13										U L 388	L 416	U L 432	L 404	L 412	L	U A 340								
14									L 320	L	A	A	U L 452	U L 432	U L 392	U L 336	228							
15									A	L	A	L 436	U L 432	L 424	U L 432	L								
16									L	L	L 436	L	U L 464	U L 428	U L 404	L 324								
17										L	U L 432	L 436	L 412	L 428	L 416	U L 364	U L 240							
18									L	U L 376	L 416	L 416	400	L 424	L	L								
19								L 276	L	L	U L 428	L	U L 432	L 432	L 396	L 348								
20									L	L	L 416	L 428	L	L 396	L	L								
21									U L 304	U R 368	U L 392	L	L 448	L 428	U L 408									
22									L	L	U L 416	L 436	A	L	L 360	L								
23										U L 404	L 432	L 432	U L 416	U L 412	L									
24									316	U L 400	L 448	424	L 416	U L 400	U L 368	A								
25									L 308	U L 440	L	A	U L 432	L 416	L									
26									L 304	L	L	L 432	L 428	L 424	U L 380									
27										L	C	C	C	U L 416	L	L								
28									L	L	U L 428	L 400	L	L	U L 392	L								
29									L	L 392	396	384	L 392	L	L	L								
30											U L 428	L 420	L 416	L 408	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								2	7	12	23	23	23	25	18	11	4							
MED								278	L 312	U L 402	L 420	L 424	L 420	L 416	U L 400	U L 348	234							
U Q									L 320	U L 414	L 428	L 432	L 436	U L 428	U L 408	U L 364	240							
L Q									L 304	U 386	L 416	L 420	L 412	L 410	U L 388	U L 336	220							

NOV. 1996 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV. 1996 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	208	248	284	296	U R 304	R	300	A	A	220							
2							B	184	256	284	300	A 304	A	A	A	A	A							
3							B	192	252	A	U A 296	A	A	292	276	252	188							
4							B	228	256	284	A 292	A	A	A	A 272	A 240	A							
5							B	200	252	284	300	308	U A 308	292	A	A	A							
6							B	196	252	280	U A 296	A	A	296	280	252	A							
7							B	204	A	A	A	A	A	A	A	260	A							
8							B	200	244	A	A	A	A	A	A	A	A							
9							B	192	252	292	A	A	R	A	264	236	168							
10							B	H 196	264	288	A	304	A	A	A	A	192							
11								A	A	276	296	A 308	A	A	A	228	200							
12								188	244	288	A 308	A	A	R	276	R	188							
13								180	248	280	304	304	308	304	284	A	192							
14								188	A	288	A	A	A	A	A	244	176							
15								A	A	A	A	A	308	292	280	A	A							
16								196	248	A	A	A	304	R	276	236	A							
17								H 192	260	280	300	312	312	296	R 280	A	A							
18								B	240	284	300	304	304	296	A	A	B							
19								A	260	A	A	304	A	300	276	244	U R 176							
20								176	252	284	304	A	308	292	268	232	A							
21								176	244	288	300	320	316	300	280	A 244	A							
22								196	256	300	A	A	A	300	272	228	180							
23								A	248	288	304	308	A 308	300	A	A	208							
24								A	244	284	304	312	A	296	280	A	A							
25								184	A	284	308	308	308	292	A	A	A							
26								172	A	272	292	300	U A 308	A	A	A	168							
27								A	260	A	C	C	C	U A 304	284	236	A							
28								A	248	280	304	A	A	A	A	252	180							
29								A	A	252	288	304	304	292	268	224	176							
30								176	252	288	300	308	308	292	272	244	176							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								21	23	23	20	16	13	18	17	16	15							
MED								192	252	284	300	306	308	296	276	242	180							
U Q								198	256	288	304	308	308	300	280	248	192							
L Q								182	248	280	296	304	306	292	272	234	176							

NOV. 1996 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV. 1996 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	E B 14	E B 13	E B 14	18	E B 13	J A 22	24	26	32	32	32	G	G 29	J G 27	J A 44	J A 57	G	E B 14	E B 14	E B 13	E B 14	E B 16	E B 14	E B 14
2	J A 44	20	20	J A 21	E B 15	20	20	24	31	36	33	J A 45	J A 36	J A 42	J A 39	J A 50	J A 36	E B 15	E B 17	E B 15	E B 14	E B 17	E B 17	E B 15
3	E B 15	E B 14	E B 14	E B 14	E B 14	E B 14	18	26	31	J A 36	J A 49	35	J A 41	G 28	G 25	27	G	J A 44	J A 38	J A 28	29	29	26	19
4	22	19	20	E B 14	E B 14	E B 16	18	26	28	J A 45	34	36	J A 50	J A 61	J A 44	J A 48	J A 38	J A 52	27	E B 14	E B 16	J A 37	J A 45	J A 34
5	J A 45	J A 46	J A 21	J A 21	E B 14	21	E B 16	G	29	J A 55	J A 64	66	J A 50	J A 40	J A 44	J A 33	J A 33	J A 36	J A 23	E B 14	J A 28	J A 22	J A 34	E B 16
6	J A 24	E B 14	E B 15	18	18	20	19	24	27	J A 38	J A 37	34	39	G	J A 50	J A 48	J A 30	J A 26	J A 34	J A 22	28	J A 27	J A 26	J A 26
7	J A 23	21	28	J A 26	25	E B 15	22	G 20	30	31	41	32	J A 39	J A 40	32	J G 25	J A 30	48	J A 54	J A 23	J A 22	27	24	19
8	19	20	J A 26	J A 18	27	20	25	23	28	30	32	33	J A 50	J A 38	J A 35	J A 43	52	32	J A 22	22	E B 14	E B 15	16	31
9	J A 29	20	18	17	E B 14	18	E B 16	J A 21	34	J A 40	J A 44	38	G 30	J A 29	G 19	26	G	J A 22	J A 32	J A 22	19	18	E B 16	E B 14
10	E B 16	E B 14	E B 16	E B 13	E B 15	E B 14	18	G	29	G	36	34	J A 47	J A 47	J A 42	J A 48	G	E B 16	31	28	J A 28	34	28	E B 14
11	E B 14	J A 25	J A 27	J A 31	18	J A 22	J A 26	32	J A 34	35	J A 38	J A 92	J A 37	J A 44	J A 36	24	27	J A 21	32	J A 36	39	J A 22	E B 15	22
12	22	E B 15	E B 14	E B 15	E B 16	E B 14	E B 14	G	G	32	J A 42	J A 36	35	G 27	G 25	G 23	G	E B 16	E B 14	E B 15	E B 16	J A 22	J A 38	J A 46
13	J A 30	24	E B 14	E B 14	E B 14	E B 14	20	J A 34	J A 48	33	40	32	G 24	35	38	J A 46	30	J A 23	23	32	J A 30	J A 34	22	23
14	J A 22	J A 25	E B 14	19	J A 22	28	21	G	J A 26	34	J A 44	J A 48	J A 44	J A 78	J A 53	G 22	20	E B 15	22	E B 14	E B 14	E B 14	28	J A 23
15	J A 47	J A 75	J A 36	J A 39	J A 33	J A 22	20	J A 36	J A 53	J A 49	J A 53	J A 52	J A 31	G 28	G 22	25	21	26	E B 15	19	E B 14	E B 13	E B 14	E B 15
16	23	E B 15	20	J A 20	21	20	19	24	28	J A 48	J A 51	J A 50	G 27	G 24	J A 49	25	J A 54	J A 35	J A 23	J A 22	18	24	J A 22	E B 15
17	E B 14	E B 15	B J A 21	J A 22	20	E B 14	19	G	27	33	32	G	34	G 24	G 23	27	J A 25	E B 14	E B 15	E B 15	19	20	E B 16	25
18	E B 14	E B 14	B J A 23	20	20	20	E B 15	E B 21	G 21	31	33	33	G 26	33	J A 34	J A 26	E B 18	E B 15	E B 15	E B 16	E B 14	E B 15	18	20
19	J A 23	J A 22	20	E B 15	E B 14	17	24	J A 22	J A 36	J A 33	31	G 29	32	G 20	G	29	G	E B 16	E B 16	E B 15	18	E B 14	E B 16	E B 15
20	E B 16	24	J A 20	E B 13	20	18	E B 15	G	G	30	G	32	G 22	G 22	G 22	G	20	E B 14	E B 15	E B 13	E B 15	E B 15	E B 15	E B 13
21	E B 13	E B 14	E B 14	E B 14	E B 15	E B 14	E B 15	G	28	G 26	G	G	32	33	30	33	34	J A 26	J A 22	A E B 14	J A 23	J A 22	24	21
22	21	31	28	26	28	20	24	J A 22	G	33	J A 48	J A 54	J A 50	G	G	25	G	21	30	J A 23	E B 15	19	J A 21	19
23	19	E B 15	E B 15	E B 14	E B 12	E B 14	E B 16	22	32	33	33	34	33	34	J A 87	J A 41	J A 24	J A 21	J A 25	J A 30	20	22	28	20
24	20	19	21	23	18	J A 22	J A 19	J A 20	G	32	G	34	32	33	G	J A 40	J A 27	J A 21	19	J A 20	E B 15	J A 21	20	28
25	J A 23	E B 15	E B 14	E B 14	E B 14	J A 24	23	23	J A 26	32	36	J A 50	60	J A 33	J A 53	J A 47	J A 46	J A 36	J A 21	J A 22	27	J A 44	33	J A 36
26	J A 22	24	21	J A 44	J A 27	20	21	26	J A 32	J G 26	32	31	33	31	31	J A 41	G	E B 15	E B 13	B J A 16	J A 24	J A 22	J A 36	J A 23
27	E B 14	J A 45	E B 14	J A 19	J A 23	19	21	24	29	J A 44	C	C	C	J A 36	32	J G 23	J A 38	J A 34	J A 38	J A 22	28	J A 36	J A 22	J A 22
28	20	J A 19	20	20	22	J A 22	J A 32	J A 32	32	30	35	J A 36	33	33	J A 29	G	24	20	J A 23	J A 24	J A 42	J A 28	29	J A 23
29	21	E B 15	18	21	J A 20	25	J A 44	J A 49	J A 28	J A 27	G 27	G	G 26	34	34	29	24	J A 23	20	21	E B E B 12	15	18	J A 25
30	20	24	21	E B E B 14	E B 16	E B 15	22	24	28	34	36	37	36	35	J A 52	J A 41	J A 43	107	J A 65	J A 35	20	21	22	20
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	29	29	29	30	30	30	30	30	30	30	30	30	30	30
MED	21	20	20	18	18	20	20	23	28	33	36	34	34	33	34	J 29	24	22	22	22	19	22	22	20
U Q	J A 23	J A 24	J A 21	J A 21	22	J A 22	23	26	J A 32	J A 36	J A 43	J A 46	J A 42	J A 38	J A 44	J A 43	J A 34	J A 34	J A 31	J A 23	28	J A 27	28	J A 25
L Q	E B 16	E B 15	E B 14	E B 14	E B 14	E B 15	E B 18	G	G 27	31	32	G 32	G 30	G 28	G	G 25	G	E B 16	E B 16	E B 15	E B 15	E B 16	E B 16	E B 15

NOV. 1996 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV. 1996 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 14	E B 13	E B 14	E B 14	E B 13	18	17	24	31	32	U Y 31	G	U G 29	G 24	30	34	G	E B 14	E B 14	E B 13	E B 14	E B 16	E B 14	E B 14
2	E B 14	16	E B 14	17	E B 15	E B 13	17	24	28	34	32	38	34	34	30	33	26	E B 15	E B 17	E B 15	E B 14	E B 17	E B 17	E B 15
3	E B 15	E B 14	E B 14	E B 14	E B 14	E B 14	E B 14	23	29	22	33	34	35	G 24	G 23	27	G	29	23	17	19	19	17	E B 13
4	17	E B 15	E B 15	E B 14	E B 14	E B 16	E B 15	24	28	40	34	34	34	45	39	37	35	38	24	E B 14	E B 16	23	19	19
5	21	18	17	17	E B 14	E B 14	E B 16	G	28	38	62	64	44	37	34	28	23	20	18	E B 14	25	18	16	E B 16
6	20	E B 14	E B 15	E B 14	E B 16	16	E B 14	22	26	34	35	34	36	G	44	34	25	22	22	19	21	20	23	23
7	18	E B 14	20	22	E B 15	E B 15	E B 16	G 18	26	28	36	U Y 32	37	37	31	G 22	25	32	A A 54	18	19	21	18	16
8	E B 14	E B 15	21	E B 15	17	17	18	22	25	28	31	U Y 33	46	34	32	32	44	22	18	E B 15	E B 14	E B 15	E B 14	18
9	18	16	18	E B 13	E B 14	U Y 18	E B 16	G 17	27	G 24	33	36	U G 30	29	G 18	25	G	17	A A 32	20	E B 16	U Y 18	E B 16	E B 14
10	E B 16	E B 14	E B 16	E B 13	E B 15	E B 14	16	G	28	G	35	33	40	43	36	34	G	E B 16	26	28	A A 28	A A 34	20	E B 14
11	E B 14	18	19	18	E B 14	E B 14	19	26	29	33	35	42	34	36	31	G 20	G 18	18	22	23	A A 39	18	E B 15	18
12	17	E B 15	E B 14	E B 15	E B 16	E B 14	E B 14	G	G	31	35	34	33	U G 27	G U G 24	23	G	E B 16	E B 14	E B 15	E B 16	18	A A 38	18
13	18	E B 15	E B 14	E B 14	E B 14	E B 14	E B 16	24	36	33	36	32	G 23	34	34	34	23	17	17	A A 32	24	A A 34	16	17
14	E B 16	18	E B 14	E B 14	18	A A 28	E B 16	G	24	32	36	40	37	34	38	G 21	18	E B 15	E B 15	E B 14	E B 14	E B 14	26	18
15	18	A A 75	22	21	22	18	18	30	44	34	45	34	G 25	G 22	G 21	23	19	17	E B 15	18	E B 14	E B 13	E B 14	E B 15
16	17	E B 15	18	17	17	16	18	22	27	32	31	36	G U G 23	24	G 20	24	44	27	16	18	16	18	18	E B 15
17	E B 14	E B 15	E B 16	18	E B 14	E B 14	E B 16	G	G 21	31	32	G	34	G 22	G 20	26	20	E B 14	E B 15	E B 15	E B 14	16	E B 16	18
18	E B 14	E B 14	17	17	17	19	E B 15	E B 21	G 19	30	31	33	G 24	32	31	24	E B 18	E B 15	E B 15	E B 16	E B 14	E B 15	E B 14	E B 14
19	19	16	E B 14	E B 15	E B 14	E B 14	16	20	G 20	28	31	G 28	31	G 18	G	26	G	E B 16	E B 16	E B 15	17	E B 14	E B 16	E B 15
20	E B 16	E B 15	17	E B 13	17	E B 15	E B 15	G	G	30	G	32	G 20	G 20	G 20	G	20	E B 14	E B 15	E B 13	E B 15	E B 15	E B 15	E B 13
21	E B 13	E B 14	E B 14	E B 14	E B 15	E B 14	E B 15	G	27	G 24	G	G	32	32	29	32	26	21	17	E B 14	16	17	16	15
22	E B 15	19	19	16	17	17	18	G 17	G	G 27	36	34	45	G	G	G 21	G	17	25	17	E B 15	E B 16	17	E B 15
23	17	E B 15	E B 15	E B 14	E B 12	E B 14	E B 16	20	30	32	32	33	32	33	33	28	G E B 17	15	20	18	E B 16	17	19	16
24	E B 16	E B 14	E B 16	17	16	17	16	19	G	31	G	34	32	32	G	33	22	E B 15	16	E B 16	E B 15	17	16	16
25	E B 15	E B 15	E B 14	E B 14	E B 14	16	18	G	25	31	35	48	G 27	G 22	32	33	25	22	15	17	17	17	19	18
26	17	E B 14	E B 14	17	18	E B 14	E B 15	20	22	G 21	32	31	U Y 33	30	27	28	G	E B 15	E B 13	E B 14	E B 15	E B 15	20	16
27	E B 14	17	E B 14	E B 16	17	E B 13	E B 15	22	28	33	C	C	C	33	31	G 20	32	23	18	17	18	A A 36	16	E B 14
28	17	E B 14	14	E B 15	17	16	18	24	27	30	33	32	32	32	28	G	21	E B 15	E B 15	18	19	18	17	17
29	17	E B 15	E B 14	18	E B 14	E B 15	21	35	25	G 21	G 21	G	G 23	34	33	27	22	E B 17	E B 15	17	E B 12	E B 15	E B 15	17
30	18	18	E B 14	E B 14	E B 16	E B 15	17	22	28	32	35	36	34	32	38	29	33	A A 107	23	16	17	17	17	E B 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	30	30	30	30	30	30	30	30	30	30	29	29	29	30	30	30	30	30	30	30	30	30	30	30
MED	16	E B 15	E B 15	E B 15	E B 15	E B 15	E B 16	20	27	31	33	34	33	32	30	27	20	17	17	16	E B 16	17	16	16
U Q	18	16	17	17	17	17	18	24	28	33	35	36	36	34	33	33	25	22	22	18	19	18	19	18
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 22	G 28	31	G 32	G 28	G 24	G	G	G	E B 15	E B 15	E B 15	E B 14	E B 15	E B 16	E B 14

NOV. 1996 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV.1996 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	14	13	14	14	13	15	14	15	15	15	14	15	18	18	15	15	14	14	14	13	14	16	14	14
2	14	14	14	14	15	13	15	14	14	16	15	16	17	18	14	16	15	15	17	15	14	17	17	15
3	15	14	14	14	14	14	14	15	15	16	16	18	15	16	14	15	16	14	14	14	16	14	15	13
4	15	15	15	14	14	16	15	14	15	14	14	14	14	15	14	13	15	14	14	14	16	16	14	15
5	13	15	15	14	14	14	16	15	15	16	15	16	15	16	15	16	15	16	13	14	15	14	14	16
6	14	14	15	14	16	15	14	14	14	14	15	15	26	18	14	14	16	14	14	14	15	14	15	14
7	15	14	15	15	15	15	16	15	16	15	15	15	16	16	17	16	15	15	14	14	14	15	15	15
8	14	15	12	15	14	15	15	14	14	15	16	16	15	17	16	13	14	15	15	15	14	15	14	15
9	13	15	15	13	14	14	16	13	15	14	16	14	15	14	16	15	15	14	14	15	16	15	16	14
10	16	14	16	13	15	14	16	13	16	16	14	18	17	18	18	16	16	16	15	13	14	14	15	14
11	14	15	14	15	14	14	16	15	15	14	17	15	18	17	18	15	16	14	15	14	15	15	15	15
12	15	15	14	15	16	14	14	14	14	16	17	15	17	16	16	15	15	16	14	15	16	14	14	14
13	16	15	14	14	14	14	16	14	14	16	15	14	17	16	15	15	14	16	14	14	14	14	14	15
14	16	14	14	14	14	14	16	14	14	16	16	15	17	16	16	15	14	15	15	14	14	14	13	14
15	13	13	15	14	14	15	16	16	15	14	14	16	16	14	15	15	14	16	15	14	14	13	14	15
16	14	15	14	15	15	14	16	14	16	15	14	15	17	19	16	14	15	16	15	15	14	15	15	15
17	14	15	16	15	14	14	16	15	15	16	16	16	17	16	16	16	16	14	15	15	14	14	16	14
18	14	14	14	14	14	15	15	21	14	15	15	16	16	14	15	16	18	15	15	16	14	15	14	14
19	14	15	14	15	14	14	14	17	14	15	16	20	18	16	17	16	15	16	16	15	16	14	16	15
20	16	15	14	13	15	15	15	15	14	15	16	14	15	16	15	15	15	14	15	13	15	15	15	13
21	13	14	14	14	15	14	15	15	15	15	15	15	14	16	16	14	14	16	15	14	14	14	14	15
22	15	14	14	15	16	16	15	15	13	15	15	14	14	19	16	15	14	15	15	15	15	16	15	15
23	15	15	15	14	12	14	16	14	14	15	17	16	18	14	15	14	14	15	14	15	16	15	12	14
24	16	14	16	14	14	13	14	14	15	14	16	14	16	16	16	16	16	15	14	16	15	15	13	15
25	15	15	14	14	14	14	16	15	14	15	17	15	16	14	17	15	15	16	14	15	14	14	14	13
26	13	14	14	16	14	14	15	13	15	15	14	15	15	15	15	16	15	15	13	14	15	15	15	15
27	14	14	14	16	14	13	15	15	15	15	C	C	C	16	14	14	16	16	14	15	14	15	16	14
28	14	14	13	15	13	14	14	16	16	15	16	14	14	15	15	16	13	15	15	16	15	15	14	16
29	14	15	14	14	14	15	16	15	13	15	15	14	15	15	15	14	15	17	15	14	12	15	15	15
30	16	15	14	14	16	15	16	15	16	15	15	15	14	15	14	15	14	16	14	14	14	14	14	14
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	29	29	29	30	30	30	30	30	30	30	30	30	30	30
MED	14	14	14	14	14	14	15	15	15	15	15	15	16	16	15	15	15	15	14	14	14	15	14	15
U Q	15	15	15	15	15	15	16	15	15	16	16	16	17	17	16	16	16	16	15	15	15	15	15	15
L Q	14	14	14	14	14	14	15	14	14	15	15	14	15	15	15	14	14	14	14	14	14	14	14	14

NOV.1996 fmin (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV. 1996 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	319	F 338	339	348	382	294	355	373	368	371	373	352	344	339	334	360	349	352	371	356	326	325	334	317
2	306	F 343	325	335	321	322	359	391	391	377	369	358	R 342	353	355	367	369	362	355	322	359	343	335	309
3	311	329	304	329	349	360	348	373	361	358	367	360	355	335	357	384	381	379	U R 336	301	298	313	332	298
4	299	318	311	331	328	323	362	373	R 367	369	372	360	367	353	359	366	368	363	359	302	313	304	U R 311	318
5	308	317	F 319	F 313	349	314	330	346	359	366	372	359	J R 328	346	345	375	388	349	364	299	344	333	R 317	293
6	341	310	F 303	F 317	F 325	F 323	358	372	358	343	357	352	356	355	357	363	375	369	355	323	311	F 304	312	334
7	F 301	F 326	F 346	324	334	322	337	351	367	360	Y	350	321	341	355	369	381	354	A	308	318	317	321	F 320
8	F 333	F 320	F 315	F 322	F 335	387	S 316	380	J R 384	366	338	348	359	344	H 335	362	383	366	338	300	320	F 313	F 307	311
9	325	338	330	330	314	346	355	360	375	343	R 337	376	345	364	R 358	359	389	367	A	320	327	320	315	302
10	301	R 344	332	335	345	313	338	369	370	370	362	352	298	363	372	378	384	361	364	R 338	A	A	334	F 302
11	F 312	324	F 319	F 325	352	333	342	367	355	351	361	353	340	331	356	391	374	372	340	R 312	A	331	304	309
12	314	308	300	330	360	382	348	393	366	358	344	354	336	356	362	387	348	366	355	332	319	336	A	304
13	317	301	304	317	R 346	R 359	350	378	372	354	357	356	363	339	366	376	363	361	362	A	312	A	R 328	307
14	320	315	333	348	366	A	S 323	347	382	376	341	311	325	350	R 376	371	R 354	347	347	379	324	321	318	299
15	U R 280	A	R 302	F 319	337	F 337	316	337	S 338	350	358	360	339	350	355	379	377	368	339	359	306	345	314	F 318
16	F 305	301	337	343	382	322	349	361	354	338	350	366	329	346	347	379	351	392	318	326	349	320	F 305	F 319
17	316	316	316	307	351	335	R 350	368	376	346	359	358	R 355	344	363	374	382	367	376	330	312	303	341	298
18	303	306	323	331	326	358	343	364	363	362	374	357	H 313	355	352	356	360	341	352	308	321	337	307	286
19	295	313	308	314	338	357	339	365	352	349	348	347	349	355	373	346	371	356	R 356	312	314	341	341	329
20	323	322	311	316	322	335	340	359	379	J R 371	359	360	344	356	363	360	377	373	314	352	370	321	330	304
21	333	312	306	309	324	325	343	386	369	373	364	347	333	359	366	368	389	366	300	339	351	288	312	309
22	306	306	303	296	318	329	366	357	R 365	363	359	352	333	358	341	385	H 331	R 391	349	341	335	349	298	305
23	304	312	324	323	F 317	354	340	380	346	360	368	374	338	355	374	362	378	364	V 367	328	312	328	343	317
24	F 301	F 293	F 312	F 321	346	349	337	362	363	358	324	382	371	344	358	354	375	362	301	321	312	306	306	306
25	316	F 310	F 309	F 329	F 313	312	357	R 364	376	329	365	342	351	372	357	341	351	349	350	346	328	314	314	324
26	324	311	F 312	303	F 309	F 308	356	364	J R 374	R 364	353	338	342	353	368	371	379	350	338	333	308	321	336	299
27	305	F 296	F 296	F 339	F 332	F 331	R	362	366	367	C	C	C	342	362	368	346	361	341	365	323	A	F 323	F 333
28	329	348	323	311	F 300	317	310	374	382	339	360	377	347	335	343	381	368	362	348	306	332	F 324	F 335	F 319
29	F 318	F 297	F 322	F 329	F 320	F 323	344	342	366	352	360	365	361	339	371	370	353	382	336	353	342	344	348	F 283
30	318	F 310	F 302	F 302	F 334	F 343	325	376	370	353	338	336	373	351	363	365	387	A	341	352	336	328	315	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	29	30	30	30	29	29	30	30	30	28	29	29	30	30	30	30	29	28	29	28	27	29	30
MED	313	313	314	324	334	331	343	366	367	359	359	356	344	350	358	368	374	363	348	328	322	321	318	308
U Q	320	325	324	331	349	352	355	374	375	367	366	360	356	355	366	378	381	368	358	349	336	336	334	F 318
L Q	304	307	304	314	F 321	322	337	360	361	350	349	349	333	342	355	362	354	355	338	310	312	313	312	299

NOV. 1996 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV.1996 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										U L 378	L 380	L 383	L 409	L 356	L	A	L							
2									L	L	L 389	A 386	U L 369	L	U L 375	A 406								
3									L	U L 383	L 377	394	L 358	L 385	L 365	L	L							
4									L	A	L 384	L 394	L 391	A	A	A								
5								400	L	A	A	A	A	A 390	L	L								
6										U L 383	U L 378	L 392	L 399	U L 395	A	A								
7									L	L	L	L 376	L 350	A	L	L 373								
8									L	L	U L 406	L	A	U L 387	L	A								
9								L	L		L 386	A	L 397	U L 388	U L 351	L	L							
10									L 402	L 395	U L 384	L 374	L	A	A	A								
11										L	L 374	A	395	U L 354	L 370	L	436							
12									L		L 369	L 369	U L 386	L 377	L 366	L	389							
13										A 395	A 387	U L 387	L 397	L 381	L	A								
14									L 382	L	A	A	U L 365	U L 381	A	U L 404	417							
15									A	L	A	L 382	U L 374	L 364	U L 370	L								
16									L	L	L 381	L	U L 348	U L 375	U L 390	L 377								
17										L	U L 368	L 365	L 395	L 359	L 374	U L 384	L							
18									L	U L 402	L 379	L 398	414	H 374	L	L								
19								L 410	L	L	U L 369	L	H 362	L 356	L 373	L 394								
20									L	L	L 385	L 367	L	L 384	L	L								
21									U L 441	U R 392	U L 391	L	L 352	L 370	U L 382									
22									L	L	A	L 361	A	L	L 395	L								
23										U L 374	L 374	L 378	U L 409	L	L									
24									401	U L 372	L 355	384	L 381	U L 392	U L 382	A								
25									L 420	U L 368	L	A	U L 380	L 373	L									
26									L 412	L	L	L 355	L 373	L 361	U L 375									
27										L	C	C	C	U L 376	L	L								
28									L	L	U L 380	L 388	L	L	U L 366	L								
29									L	L 380	398	412	L 402	L	L	L								
30											U L 364	L 380	L 386	L 386	L	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								2	6	11	22	20	23	22	14	6	3							
MED								405	L 407	U L 383	L 380	L 382	L 386	L 376	U L 374	L 389	L 417							
U Q									L 420	L 395	L 386	L 390	L 397	U L 386	U L 382	404	436							
L Q									401	U L 374	L 374	L 372	L 365	L 364	L 366	L 377	389							

NOV.1996 M(3000)F1 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV. 1996 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										244	234	250	258	272	270	232	226							
2									216	234	242	248	258	254	246	238								
3									232	242	242	248	260	244	246	222	214							
4									216	230	234	246	244	264	236	236								
5								230	230	238	E 260	A E 270	248	258	244	228								
6										252	250	252	248	246	252	234								
7									232	234	244	250	290	262	246	234								
8									228	236	246	246	254	256	244	234								
9								228	220		262	232	246	248	250	248	214							
10									224	234	250	254	H 280	244	236	224								
11										256	252	246	254	286	240	214	220							
12									234		266	256	252	252	246	228	224							
13										232	238	244	246	276	242	226								
14									220	228	236	262	282	238	232	230	228							
15									262	244	230	248	270	258	250	222								
16									232	262	244	244	276	254	234	222								
17										236	248	244	236	262	234	226	218							
18									224	220	222	246	244	250	236	230								
19								230	254	238	246	248	260	250	236	224								
20									226	268	242	244	238	236	234	234								
21									212	230	238	250	268	236	240									
22									232	230	242	240	266	232	228	224								
23										238	242	236	252	248	222									
24									216	248	294	226	234	258	238	238								
25									214	276	238	268	252	244	248									
26									232	246	252	258	258	250	234									
27										234	C	C	C	244	230	218								
28									218	246	240	232	242	270	260	222								
29									232	230	234	240	234	260	230	230								
30											260	264	234	244	242									
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								3	22	27	29	29	29	30	30	25	7							
MED								230	227	238	242	247	252	251	240	228	220							
U Q								230	232	246	251	253	263	260	246	234	226							
L Q								228	218	232	238	244	244	244	234	223	214							

NOV. 1996 h'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV. 1996 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	258	H 232	244	248	214	A 324	242	224	228	A 240	224	194	198	232	236	A	226	214	202	218	266	254	228	264
2	286	274	250	246	258	272	214	212	224	A 232	220	E A 248	220	A 236	232	234	224	212	212	240	220	B 270	274	286
3	268	266	268	266	212	212	214	210	220	224	210	214	218	216	224	230	228	224	250	286	304	298	274	292
4	278	256	258	250	220	276	222	216	220	A	228	210	208	A	A	A	218	A 244	244	266	284	A 300	314	280
5	E A 308	292	254	270	248	298	242	208	232	A	A	A	A	A 236	A	244	218	A 222	216	276	252	254	294	328
6	270	250	B 300	276	256	282	222	224	224	240	A 250	222	228	232	A	A	220	A 210	214	246	274	270	268	274
7	300	256	248	258	242	250	218	212	226	216	A 240	226	A 240	A	230	218	210	A 250	A	270	274	278	256	234
8	274	272	276	258	254	204	234	218	208	H 216	208	244	A	226	226	A	A 218	208	A 246	278	254	272	280	276
9	246	252	264	272	268	248	214	H 180	218	226	220	A	204	190	210	228	230	200	A	A 300	244	E Y 352	278	304
10	302	278	260	232	246	290	242	224	218	222	228	226	A 244	A	A	A	210	210	248	A	A	A	286	266
11	278	288	296	266	226	270	250	230	224	234	240	A	206	A 246	242	226	204	198	A 252	A 308	A	256	272	330
12	296	288	284	256	214	218	224	200	212	222	A 236	214	216	216	210	218	218	204	214	250	268	260	A	318
13	264	278	286	292	242	206	220	206	218	A 226	A 236	216	188	214	A	A	218	214	230	A	268	A	242	320
14	298	306	264	236	230	A	250	230	194	224	A	A	264	236	A	220	202	212	232	210	252	268	A	306
15	314	A	316	306	254	258	220	A 236	A	A 250	A	218	196	212	232	224	212	202	232	212	286	240	288	306
16	312	296	254	244	224	A 344	240	224	228	224	H 208	A 250	188	238	222	206	A 228	206	244	260	226	292	278	284
17	286	278	288	280	238	240	250	214	212	210	198	214	210	H 198	232	226	232	216	202	256	262	288	246	284
18	304	280	284	262	242	206	244	220	H 190	218	H 204	204	200	H 178	232	230	220	202	230	254	246	242	294	324
19	312	272	280	270	230	228	268	182	238	H 196	212	238	H 188	A 238	228	208	222	206	232	288	292	252	248	254
20	266	280	300	260	272	246	276	226	228	H 204	220	214	220	204	H 186	216	218	202	230	232	224	270	256	264
21	252	262	286	282	232	262	250	202	204	198	200	H 182	238	224	242	214	210	212	302	246	220	290	268	282
22	262	300	318	274	242	250	214	218	222	212	A	210	A	H 182	216	H 190	210	198	A 252	242	210	242	294	276
23	296	280	248	272	254	210	258	208	236	242	228	220	198	A	236	226	208	202	230	248	270	246	250	274
24	282	282	274	264	250	246	248	224	202	214	H 196	236	210	224	218	A	216	208	240	264	250	270	286	298
25	284	288	260	254	308	312	248	220	208	226	248	A	A 232	220	A 244	240	232	234	226	236	268	272	292	258
26	252	292	264	274	266	278	210	208	202	210	A 228	210	226	H 190	204	224	212	218	212	234	268	232	254	276
27	280	300	304	226	268	276	258	222	232	238	C	C	C	226	234	226	242	224	244	226	236	A	304	270
28	272	228	262	284	296	282	250	216	222	222	236	216	216	238	202	228	206	194	218	270	276	294	248	294
29	258	244	246	268	260	268	246	242	234	214	208	196	194	254	242	238	220	210	242	232	238	238	260	316
30	282	312	306	294	212	266	290	228	226	244	234	232	238	220	A	234	A 226	A	A 278	218	248	244	278	292
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	30	30	29	30	30	29	28	25	24	26	26	23	23	30	29	28	28	28	27	28	30
MED	280	278	271	266	244	262	242	218	222	223	224	216	213	224	230	226	218	210	232	249	258	269	274	284
U Q	298	290	288	274	258	280	250	224	228	233	A 236	229	228	A 236	236	230	226	217	245	270	272	288	287	306
L Q	266	259	258	254	230	234	220	208	210	214	208	210	198	H 212	216	218	210	202	217	233	241	246	255	274

NOV. 1996 h'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV. 1996 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	124	116	116	118	114	A	A 130	A	A	126							
2							B	144	A 144	118	120	116	A	A	A	A	A							
3							B	136	118	A	110	112	A	A 130	A 128	136	130							
4							B	B 138	E A 142	116	114	A	110	110	A	118	A							
5							B	144	118	118	116	118	116	116	116	A	A							
6							B	148	116	116	110	110	A	124	118	118	A							
7							B	E A 166	A	A	116	A	A	116	A	A 130	A							
8							B	142	A 132	A	A	112	112	A	A	A	A							
9							B	A	A 136	A	A	A	A	A	122	124	134							
10							B	120	120	120	118	116	A	A	A	A	130							
11								A	A	A 124	120	116	A	A	A	A 130	E A 166							
12								146	120	A 126	116	A	A	A	126	A	152							
13								132	126	116	122	122	122	130	A	A	148							
14								140	A	118	116	114	112	A	A	A 148	162							
15								A	A	A	A	A	A 128	A 124	122	A	A							
16								170	A	A 114	A	A	A 128	A	A 130	122	A							
17								156	A 140	A 136	126	122	124	124	124	A	A							
18								B	124	130	120	124	128	120	A	A	B							
19								A	138	A	A	A 128	A	122	118	126	178							
20								130	126	118	114	114	118	120	116	116	A							
21								142	126	A 128	118	112	112	112	112	112	A							
22								E A 176	122	A 138	116	110	106	116	116	A 134	140							
23								A	E A 142	A	A 142	A	A	114	A	A	A 148							
24								A	120	A 138	116	116	A	116	118	A	A							
25								152	A	120	A	A	E A 138	A 134	A	A	A							
26								118	A	A 118	A 136	120	120	A	A	A	152							
27								A	128	114	C	C	C	114	A 136	B 144	A							
28								A	132	120	120	A	114	112	A	118	134							
29								A	A	A 130	122	118	122	118	128	112	140							
30								144	A 138	132	118	114	114	A 130	A 138	126	132							
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								20	22	23	23	20	17	21	16	16	15							
MED								142	126	120	118	116	117	120	122	125	140							
U Q								150	A 138	A 130	120	119	A 126	A 127	A 128	A 132	152							
L Q								134	120	116	116	113	112	115	117	118	132							

NOV. 1996 h'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV. 1996 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	B	B	B	104	B	100	100	150	142	140	144	G	116	106	102	102	G	B	B	B	B	B	B	B
2	122	108	112	112	B	104	102	164	140	140	142	116	114	106	106	102	102	B	B	B	B	B	B	B
3	B	B	B	B	B	B	116	142	140	114	112	120	116	108	112	166	G	106	108	106	104	106	104	108
4	104	104	102	B	B	B	168	152	138	116	120	118	110	114	118	114	114	112	118	B	B	114	112	112
5	110	108	114	106	B	106	B	G	178	122	122	118	120	116	114	114	108	110	112	B	102	102	108	B
6	104	B	B	106	108	102	100	180	144	120	118	120	124	G	122	126	118	112	106	112	106	104	106	102
7	106	110	104	102	108	B	114	112	118	110	116	114	112	114	124	116	106	110	110	110	104	104	110	108
8	110	112	104	114	112	120	108	154	138	114	116	118	108	112	112	106	104	106	110	112	B	B	146	106
9	108	106	106	106	B	106	B	114	124	114	108	112	108	106	108	158	G	110	100	104	98	100	B	B
10	B	B	B	B	B	B	112	G	150	G	122	122	112	108	110	108	G	B	104	102	104	106	108	B
11	B	114	114	110	104	120	108	108	104	134	124	114	124	116	114	116	116	116	112	106	106	106	B	100
12	104	B	B	B	B	B	B	G	G	128	118	116	112	116	116	118	G	B	B	B	B	110	108	108
13	106	104	B	B	B	B	106	140	130	136	136	154	106	158	140	130	134	96	94	136	126	116	116	114
14	126	112	B	114	106	108	108	G	114	126	118	112	114	110	110	114	166	B	116	B	B	B	110	138
15	120	108	104	116	104	104	108	110	110	108	104	104	108	104	104	106	108	102	B	100	B	B	B	B
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17	B	B	106	102	106	B	184	G	120	148	148	G	182	112	108	118	110	B	B	B	112	104	B	106
18	B	B	110	106	100	98	B	B	116	158	136	128	108	172	102	102	B	B	B	B	B	B	126	118
19	102	116	114	B	B	112	108	106	114	114	112	114	106	108	G	134	G	B	B	B	106	B	B	B
20	B	112	104	B	110	112	B	G	G	166	G	120	110	108	110	G	132	B	B	B	B	B	B	B
21	B	B	B	B	B	B	B	G	140	112	G	G	150	124	128	116	110	112	108	B	124	100	104	102
22	118	108	104	108	106	110	120	124	G	112	118	114	110	G	G	114	G	130	116	110	B	110	106	106
23	108	B	B	B	B	B	B	122	160	152	158	164	152	178	104	104	108	114	102	116	114	104	102	104
24	106	114	112	114	114	108	108	118	G	182	G	174	116	192	G	96	100	118	120	134	B	108	112	108
25	108	B	B	B	B	110	108	102	114	160	150	122	108	110	106	102	102	102	108	106	100	126	106	110
26	110	112	112	110	104	116	106	126	114	112	166	136	120	104	116	110	G	B	B	120	114	118	114	118
27	B	118	B	128	120	186	152	148	138	120	C	C	C	116	184	106	120	112	110	138	104	104	108	106
28	106	106	112	114	110	108	104	102	146	186	118	118	118	118	116	G	140	130	122	106	116	104	102	110
29	138	B	122	122	118	116	108	106	104	106	106	G	104	174	140	122	176	102	108	110	B	B	106	110
30	118	108	108	B	B	B	160	158	164	162	158	148	144	168	126	134	120	112	114	116	144	106	108	106
31																								
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CNT	21	18	19	19	16	20	23	22	26	29	26	25	29	28	27	28	21	20	21	19	18	21	22	21
MED	108	109	110	110	108	108	108	125	138	122	119	118	112	113	112	114	110	111	110	110	106	106	108	108
U Q	118	112	112	114	111	114	116	152	144	150	142	125	120	121	122	124	126	113	116	120	114	110	112	111
L Q	106	108	104	106	105	105	106	110	114	113	116	114	108	108	106	106	105	104	107	106	104	104	106	106

IONOSPHERIC DATA STATION Kokubunji

NOV.1996 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

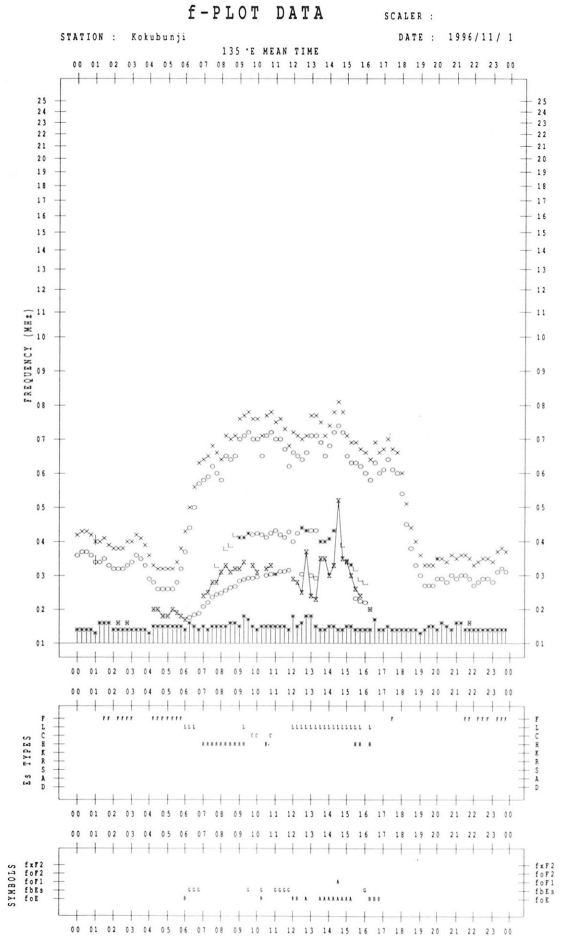
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

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 2	L 1	H 2	H 2	H 1	C 1		L 1	L 1	L 1	L 3								
2	F 2	F 1	F 1	F 1		F 1	L 1	H 1	CL 11	H 1	C 1	C 2	C 1	L 1	L 2	L 2	L 2							
3							L 1	C 1	C 1	LC 11	C 1	C 1	C 1	L 1	L 1	HL 11		F 3	F 2	F 2	F 2	F 2	F 2	F 1
4	F 3	F 1	F 2				H 1	CL 11	CL 12	C 2	C 1	C 1	C 1	C 2	CL 21	CL 21	CL 31	FF 22	FF 21			F 2	F 3	F 3
5	F 2	F 3	F 1	F 2		F 1			H 1	C 2	C 3	C 2	C 1	C 2	CL 11	C 3	L 2	F 3	F 2		F 2	F 2	F 2	
6	F 3			F 1	F 1	FF 21	L 1	HL 11	C 1	C 1	C 2	C 1	C 1		C 2	C 2	C 2	F 2	F 2	F 1	F 3	F 2	F 3	F 3
7	F 2	F 1	F 3	F 2	F 1		L 1	L 1	L 2	L 1	L 1	L 1	C 2	C 2	L 1	L 1	L 2	F 3	F 3	F 1	F 1	F 2	F 1	F 1
8	F 1	F 1	F 2	F 1	F 1	F 1	L 1	CL 11	CL 12	L 1	L 1	C 1	C 2	C 1	C 2	L 3	L 3	F 4	F 2	F 1			F 1	F 2
9	F 2	F 1	F 1	F 1		F 1		L 1	CL 12	L 2	L 1	L 2	L 1	L 2	L 1	HL 11		F 1	F 3	F 1	F 1	F 1		
10							L 1		H 1		C 1	C 2	C 2	C 3	L 2	L 2			F 1	F 2	F 2	F 2	F 1	
11		F 2	FR 21	F 2	F 1	F 1	F 4	L 2	L 2	CL 11	CL 11	C 2	C 1	C 1	L 1	L 1	L 1	F 2	F 2	F 1	F 2	F 1		F 1
12	F 1									CL 11	C 1	C 1	C 1	L 1	L 1	L 1						F 1	F 2	F 2
13	F 2	F 1					F 1	C 2	C 2	C 1	HL 11	HL 11	L 1	HL 11	HL 12	CL 13	CL 31	F 3	F 2	F 3	F 3	F 4	F 1	F 2
14	F 1	F 3		F 1	F 2	F 2	F 1		L 1	C 1	C 1	C 2	C 2	L 1	L 2	L 1	C 1		F 1				F 2	FF 12
15	F 2	F 3	F 2	FF 14	F 3	F 2	FF 11	L 4	L 3	L 2	L 2	L 2	L 2	L 1	L 1	L 2	L 1	F 1		F 2				
16	F 1		FF 21	F 2	F 1	F 2	F 1	H 1	HL 12	C 2	C 1	L 1	L 1	L 1	L 2	HL 12	L 3	F 3	FF 12	FF 11	F 1	F 1	F 1	
17			F 1	F 2	F 2		F 1		L 1	HL 11	HL 11		H 1	L 1	L 1	L 2	C 1				F 1	F 1		F 1
18			F 1	F 1	F 2	F 1			L 1	HL 11	CL 11	CL 11	L 1	HL 11	L 2	L 2							F 1	F 1
19	F 2	F 2	F 1			F 1	F 1	LC 12	LH 21	L 2	L 1	L 1	L 1	L 1		C 1					F 1			
20		F 1	F 2		F 1	F 1				H 1		C 1	L 1	L 1	L 1		C 1							
21									HL 11	L 1			HL 11	C 2	C 1	C 2	L 3	F 3	F 2		F 1	F 2	F 1	F 1
22	F 1	F 3	F 3	F 3	F 3	FF 11	FF 11	L 1		L 1	C 2	C 1	C 2			L 2		F 1	F 3	F 2		F 1	F 2	F 2
23	F 1							C 2	HL 11	HL 12	HL 11	HL 11	HL 11	HL 11	L 2	L 2	L 1	F 1	F 1	FF 12	F 1	F 1	F 2	F 2
24	F 2	F 1	F 2	F 2	F 1	F 3	F 1	L 2		HL 11		H 1	L 1	H 1		L 3	L 2	FF 11	F 1	F 1		F 2	F 1	F 2
25	F 2					F 2	F 3	L 1	L 1	H 1	HL 11	CL 21	L 2	L 2	L 2	L 2	L 3	F 4	F 2	F 2	F 3	FF 12	F 3	F 2
26	F 1	F 1	F 1	F 2	F 3	F 1	F 1	C 1	C 2	L 1	HL 11	HL 11	CL 11	CL 11	C 1	L 3				F 1	F 1	F 1	F 2	F 2
27		FF 21		FF 11	F 1	F 1	FF 11	C 2	CL 11	CL 21				C 2	HL 12	L 2	L 3	F 4	F 3	F 2	F 2	F 4	F 3	F 2
28	FF 21	F 1	F 1	F 2	F 2	F 3	F 3	LH 31	HL 12	H 1	C 2	L 2	CL 21	C 2	C 1		C 1	F 1	F 1	F 3	FF 12	F 2	F 3	F 1
29	FF 11		F 1	F 2	F 2	F 2	F 5	L 4	L 3	L 2	L 1		L 1	HL 11	HL 11	CL 11	HL 11	F 1	F 1	F 1			F 1	F 2
30	F 1	F 3	FF 11				FF 11	HL 21	H 1	HL 12	H 2	H 1	H 1	HL 11	CH 21	C 2	C 5	F 6	F 6	F 2	FF 11	FF 11	FF 21	FF 11
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.1996 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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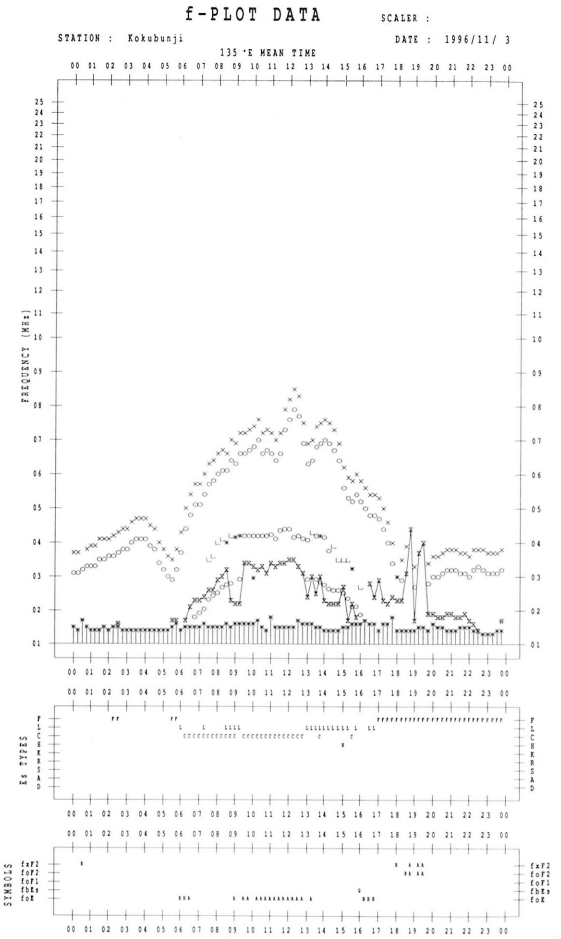
SCALER :
STATION : Kokubunji
DATE : 1996/11/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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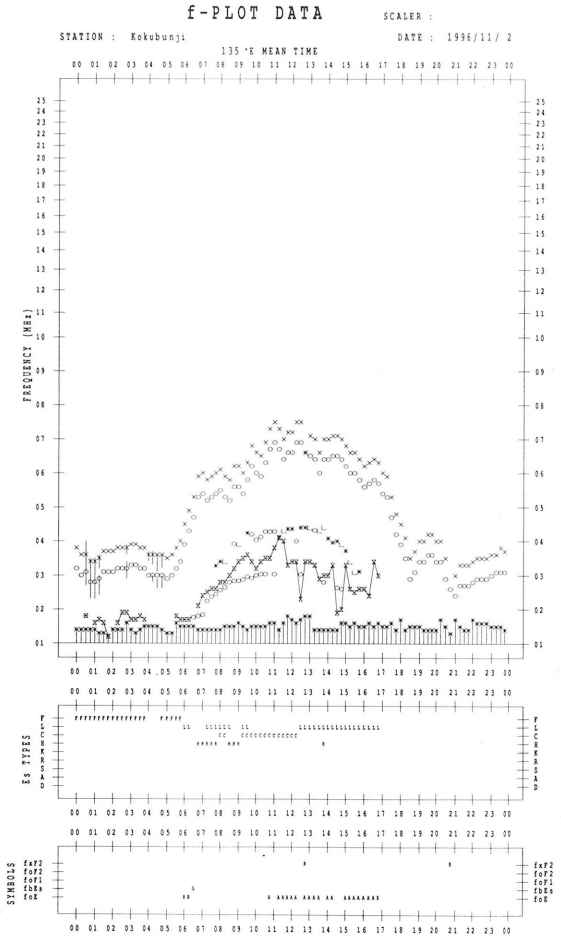
STATION : Kokubunji
DATE : 1996/11/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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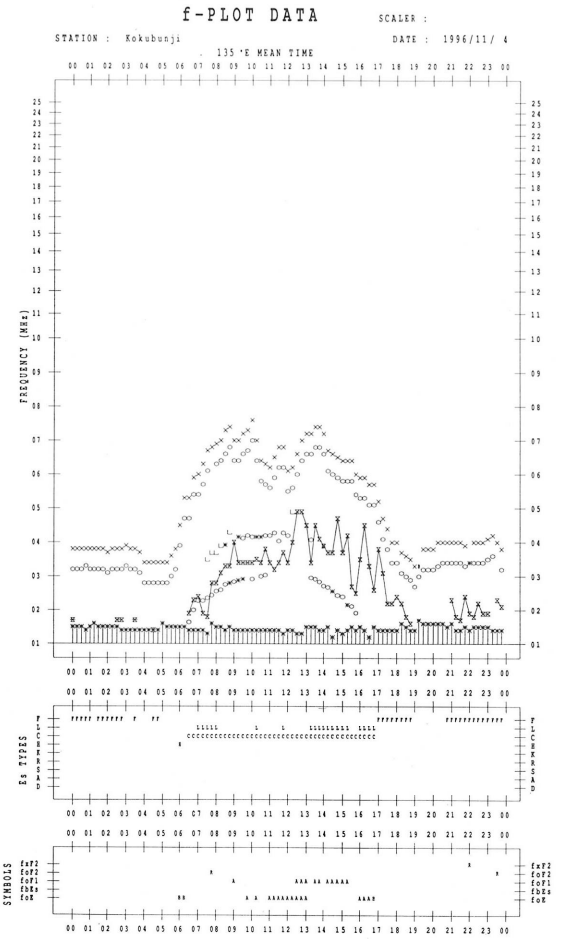
STATION : Kokubunji
DATE : 1996/11/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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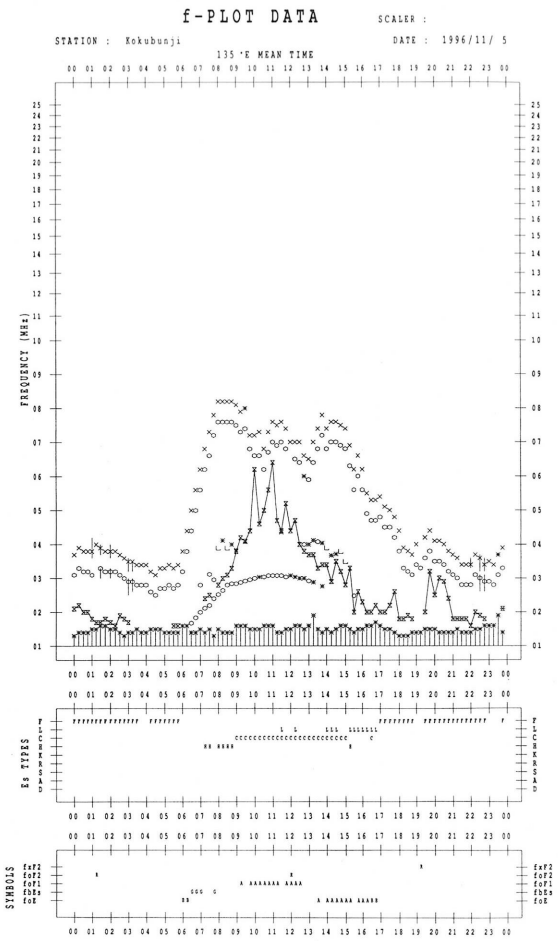
SCALER :
STATION : Kokubunji
DATE : 1996/11/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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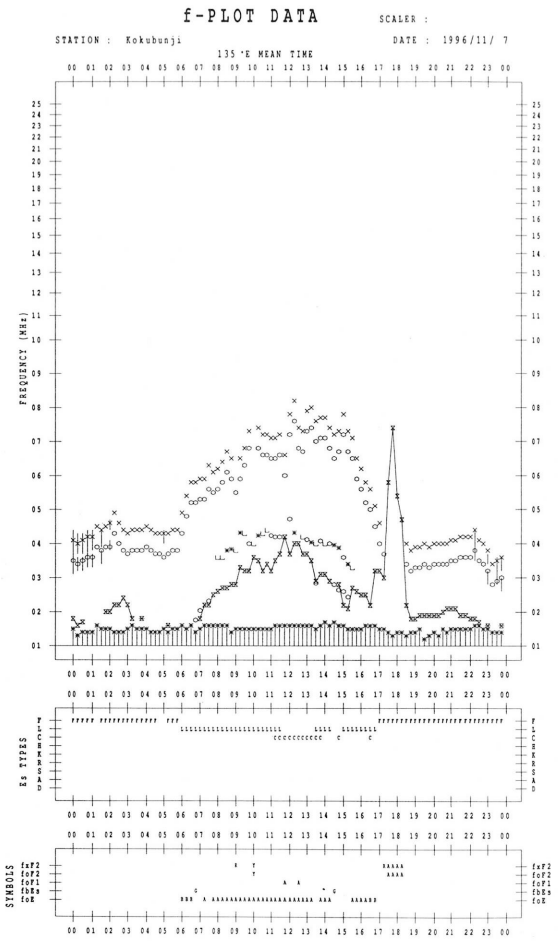
SCALER :
STATION : Kokubunji
DATE : 1996/11/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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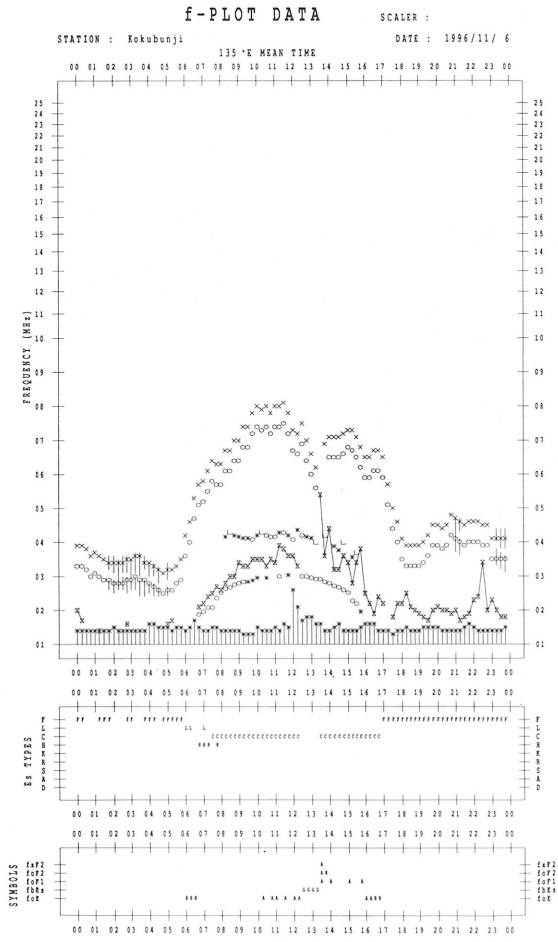
STATION : Kokubunji
DATE : 1996/11/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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STATION : Kokubunji
DATE : 1996/11/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
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foF2
foF1
fbEs
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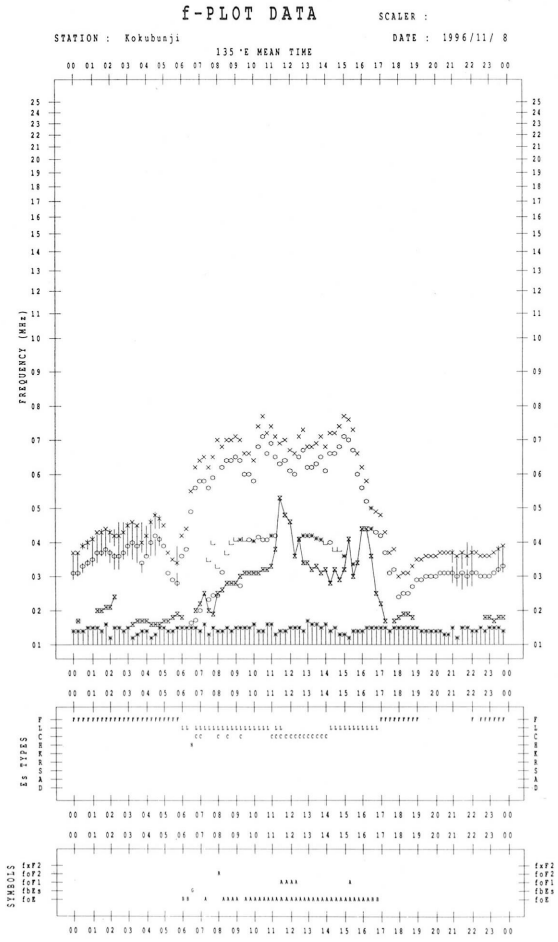
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STATION : Kokubunji
DATE : 1996/11/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
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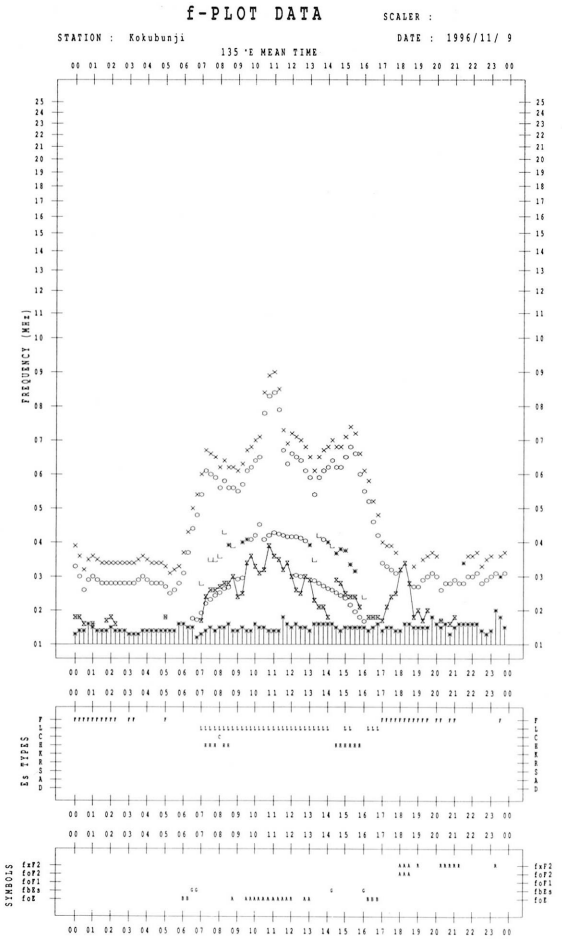
foF2
foF1
fbEs
foE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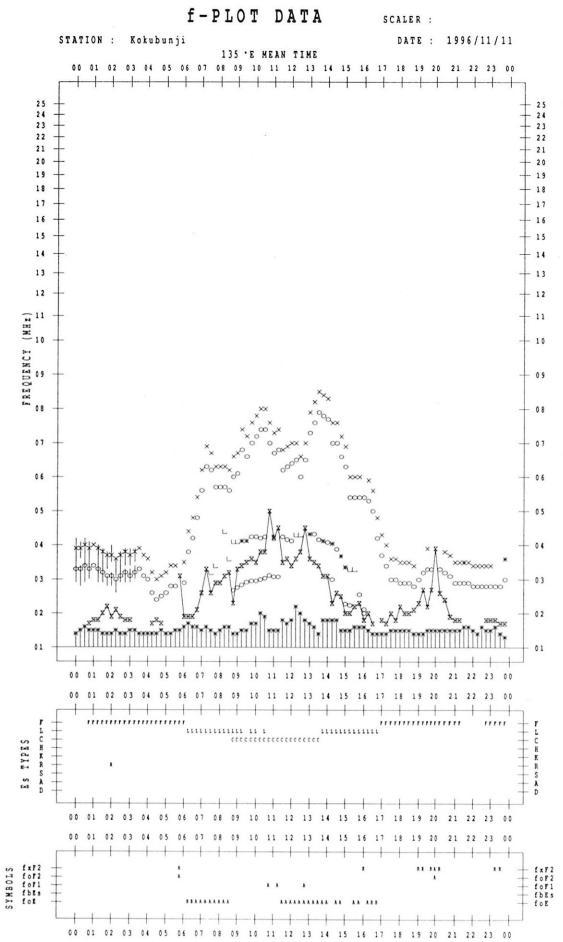
DATE : 1996/11/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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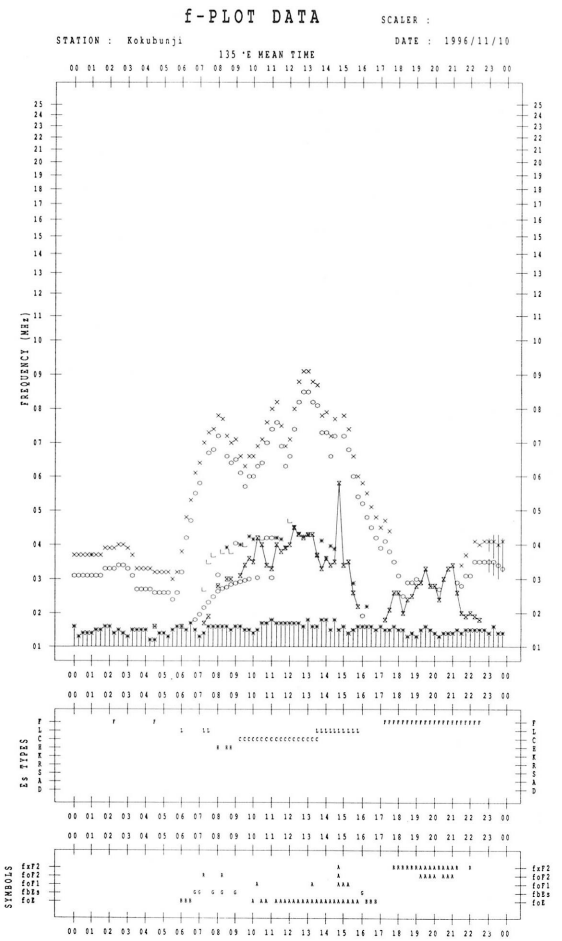
SCALER :
STATION : Kokubunji
DATE : 1996/11/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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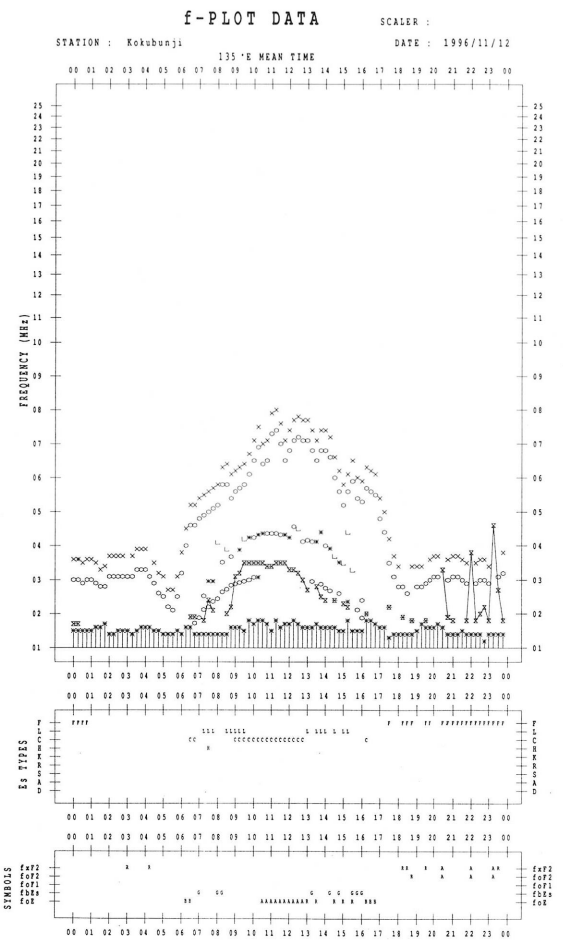
DATE : 1996/11/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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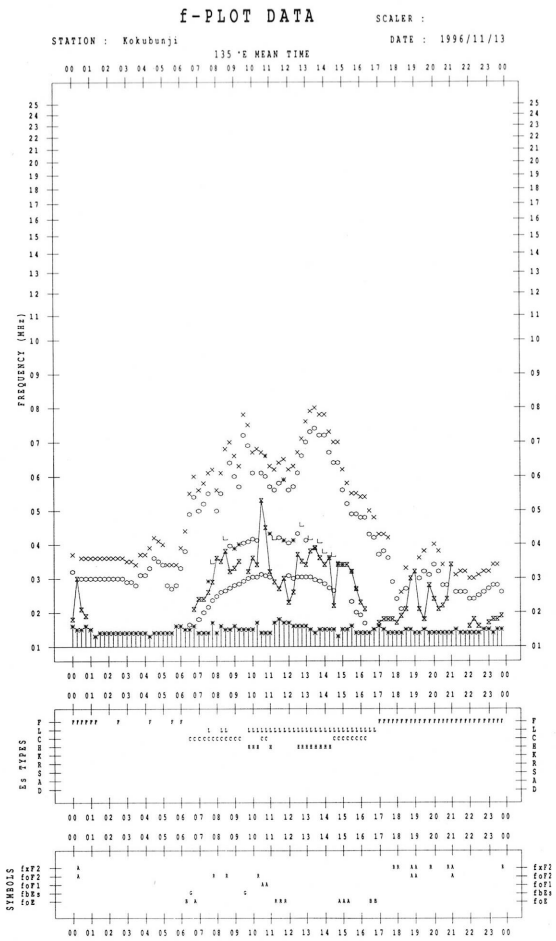
SCALER :
STATION : Kokubunji
DATE : 1996/11/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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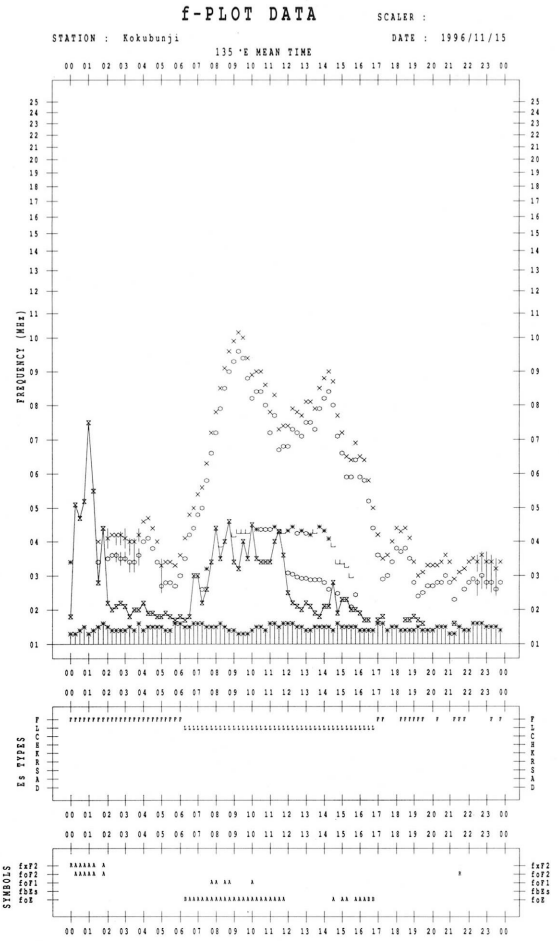
SCALER :
STATION : Kokubunji
DATE : 1996/11/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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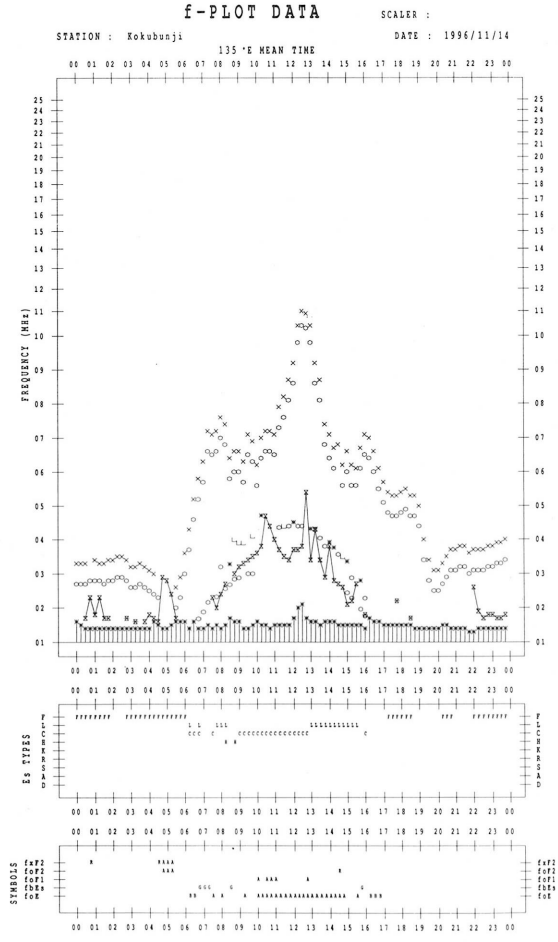
SCALER :
STATION : Kokubunji
DATE : 1996/11/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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SCALER :
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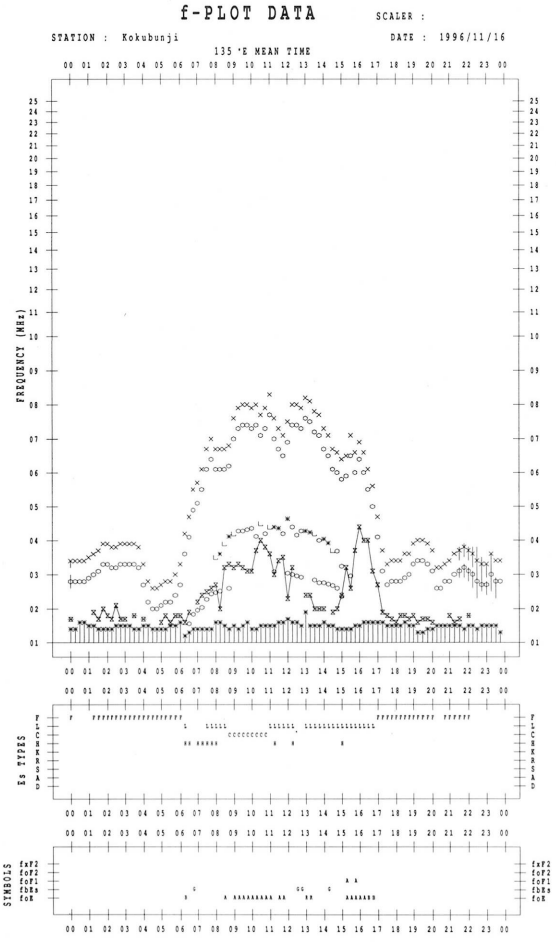
DATE : 1996/11/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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SCALER :
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DATE : 1996/11/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
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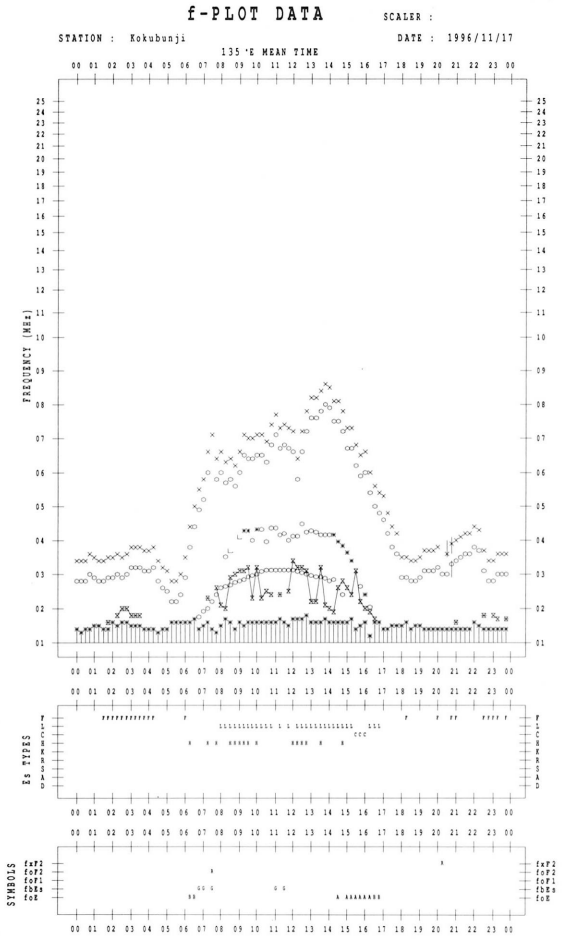
foF2
foF1
fbEs
foE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DATE : 1996/11/17
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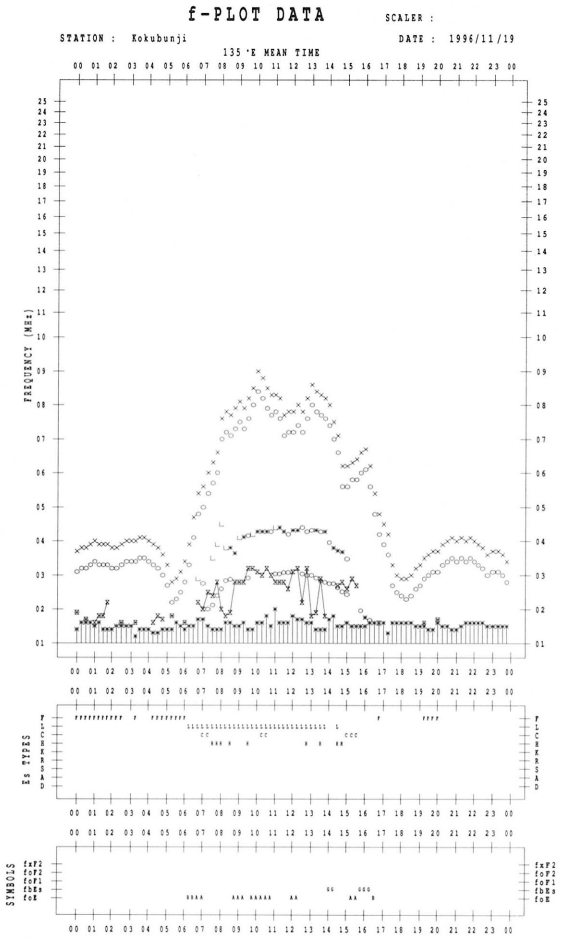
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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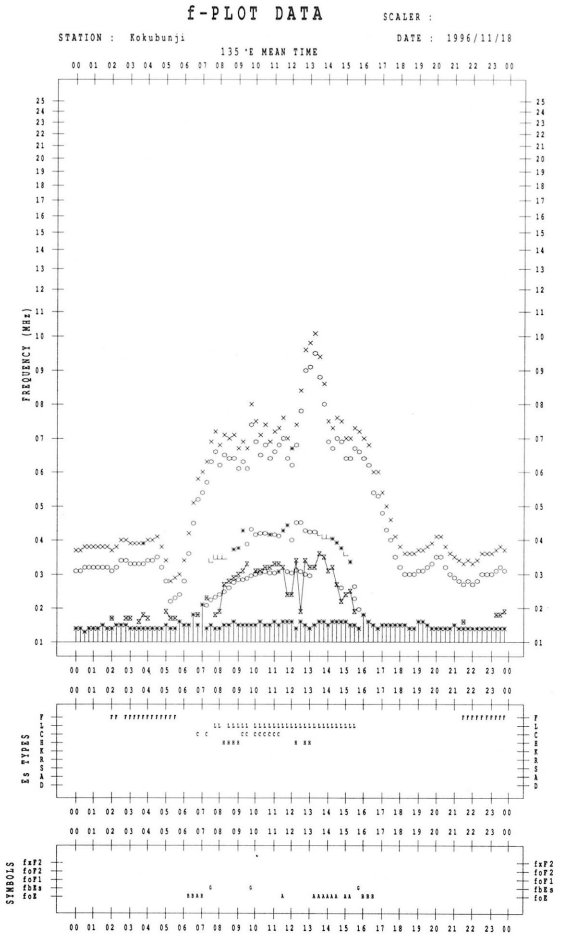
DATE : 1996/11/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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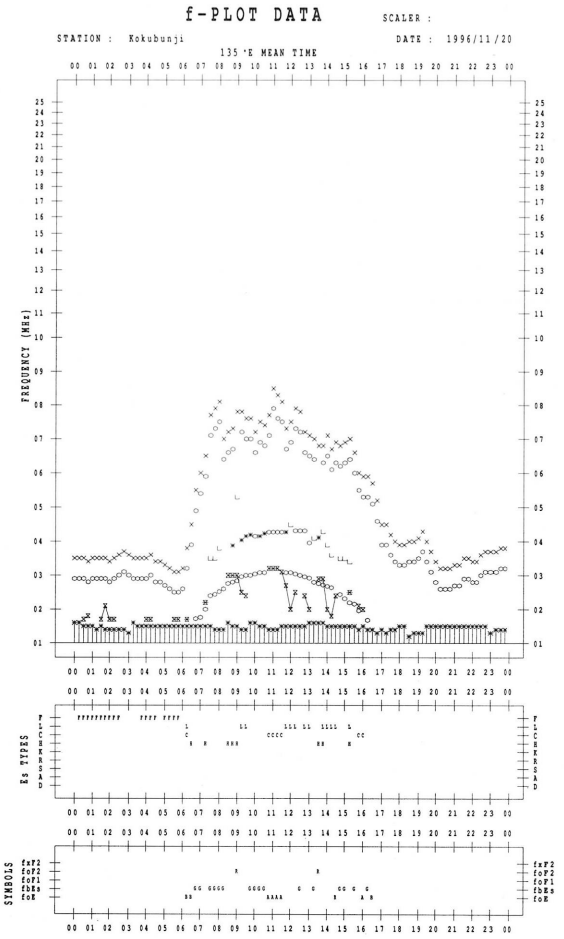
DATE : 1996/11/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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DATE : 1996/11/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
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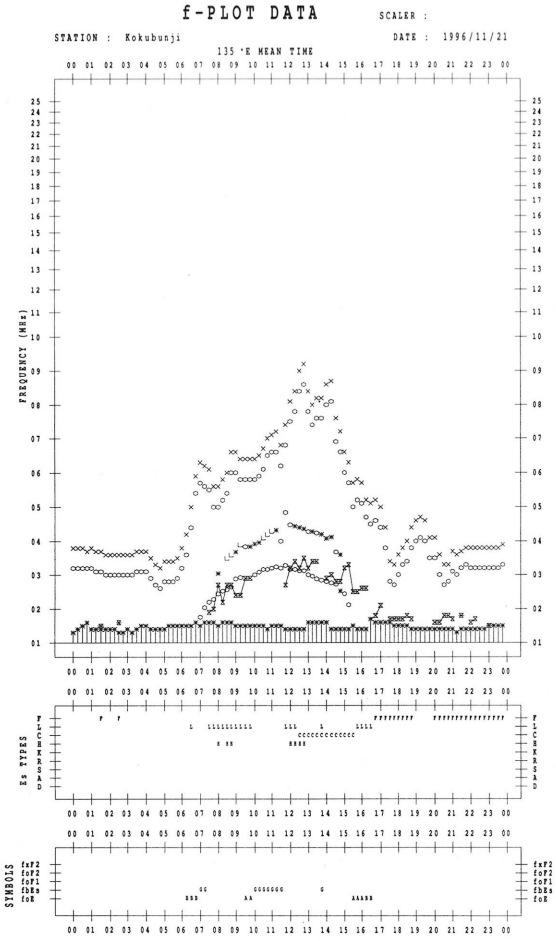
foF2
foF1
fbEs
foE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SCALER :
STATION : Kokubunji
DATE : 1996/11/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
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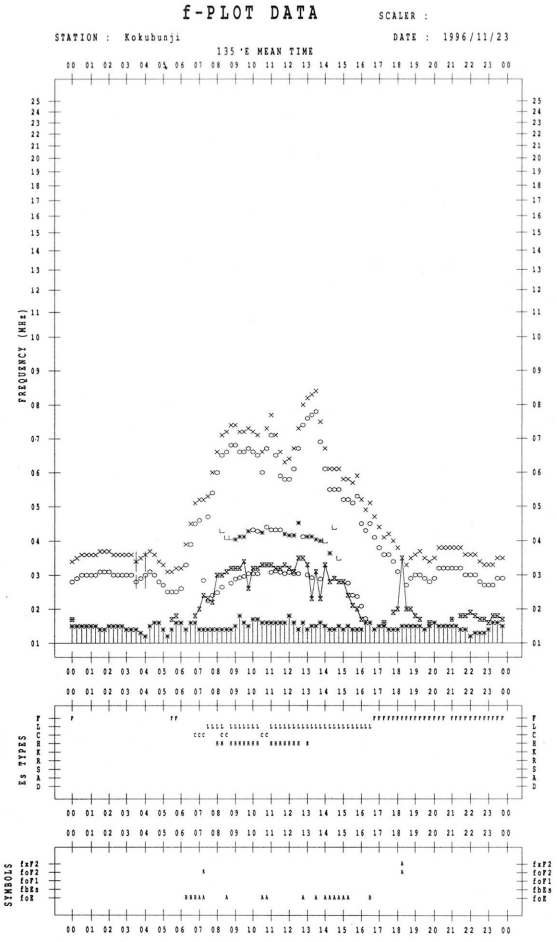
foF1
foE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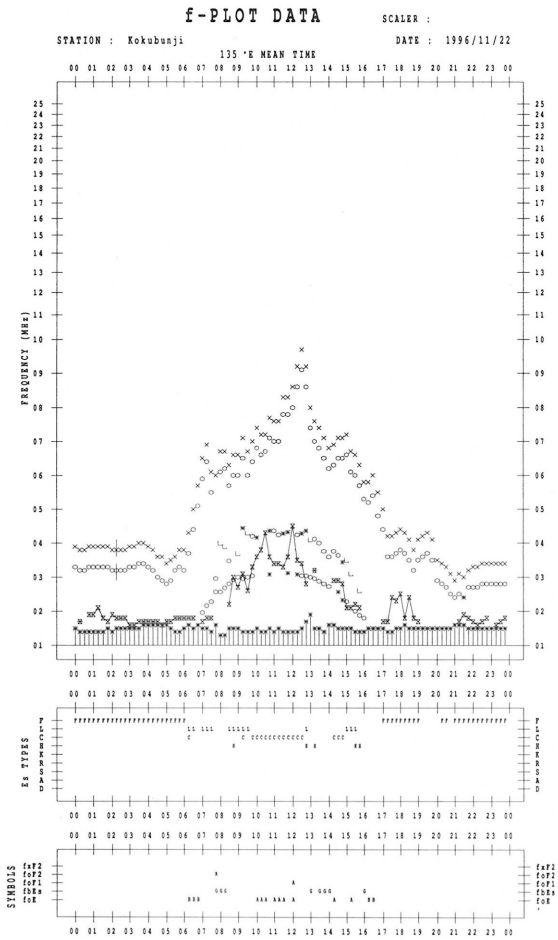
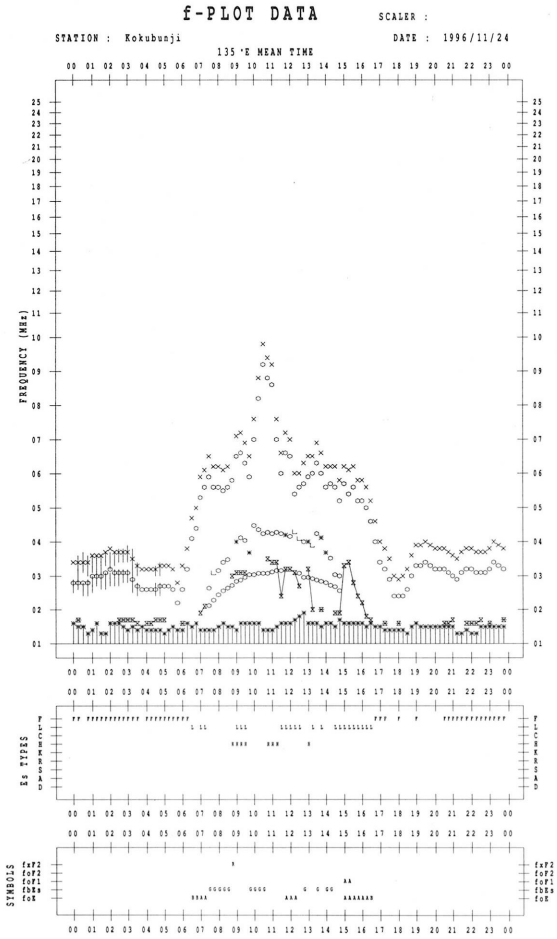
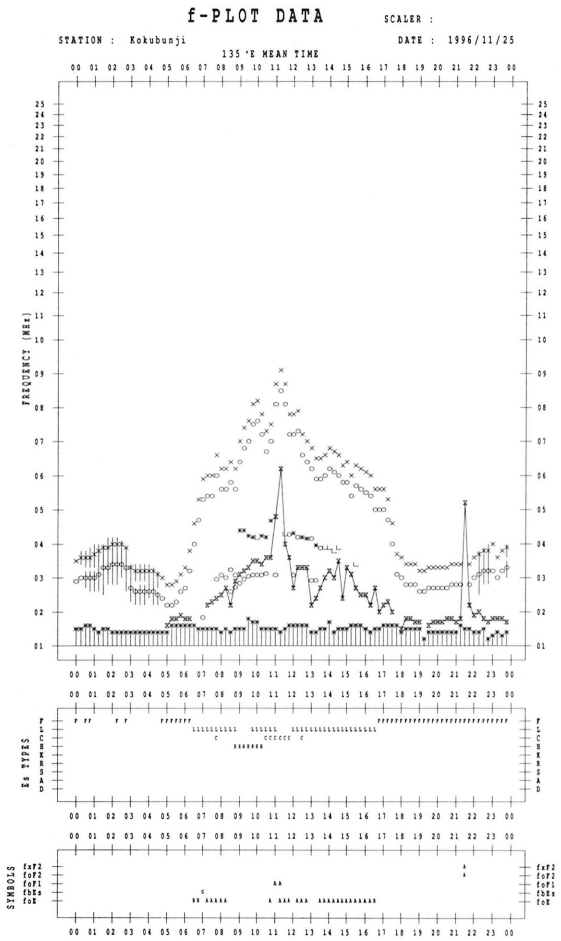
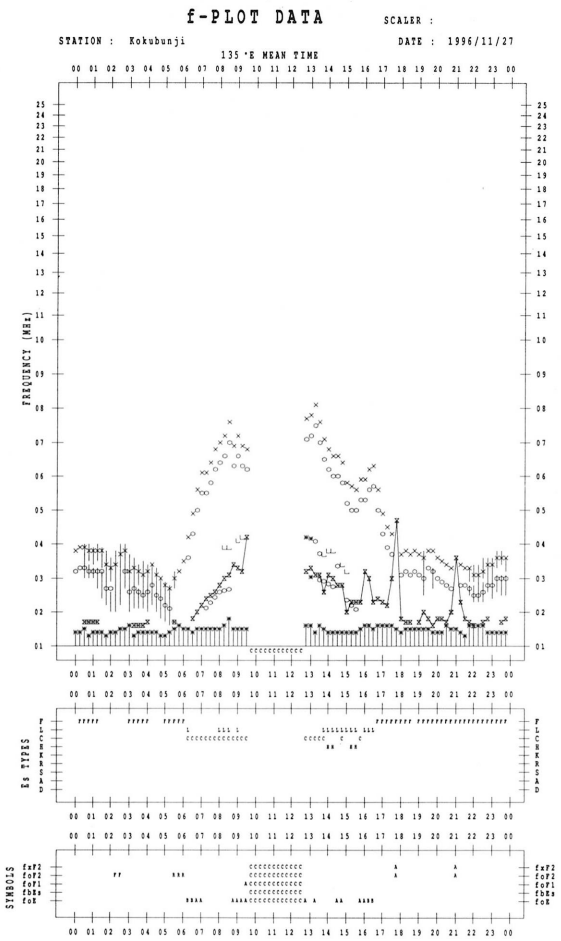
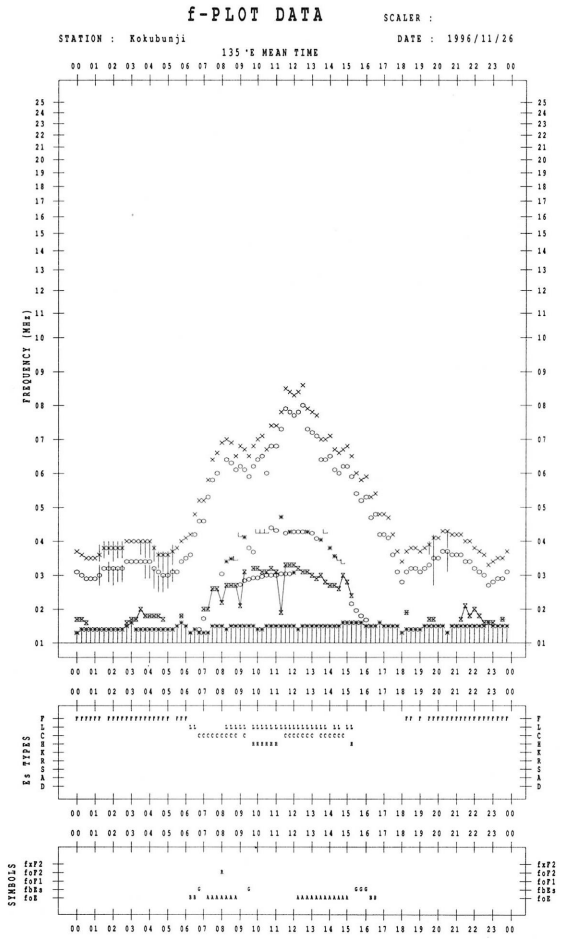
SCALER :
STATION : Kokubunji
DATE : 1996/11/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE

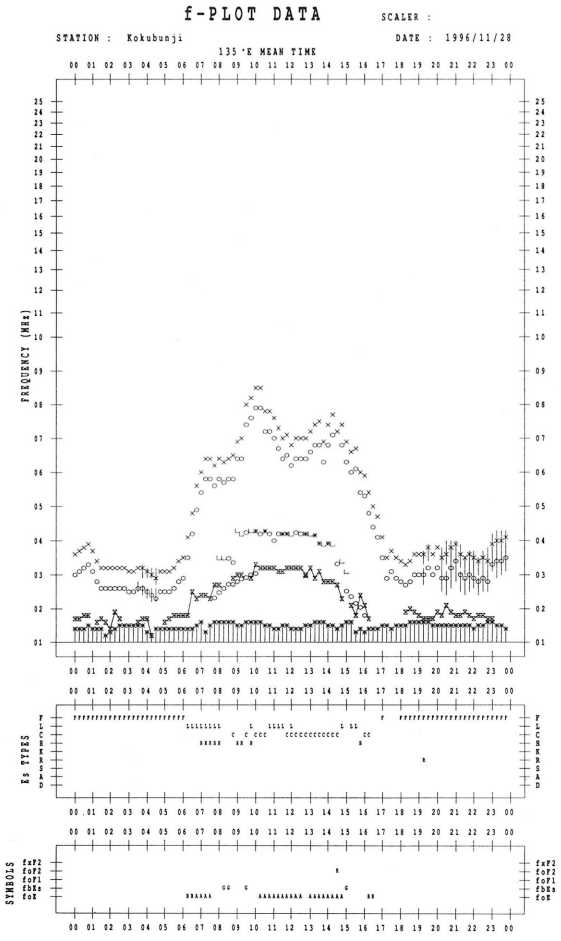

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/11/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE

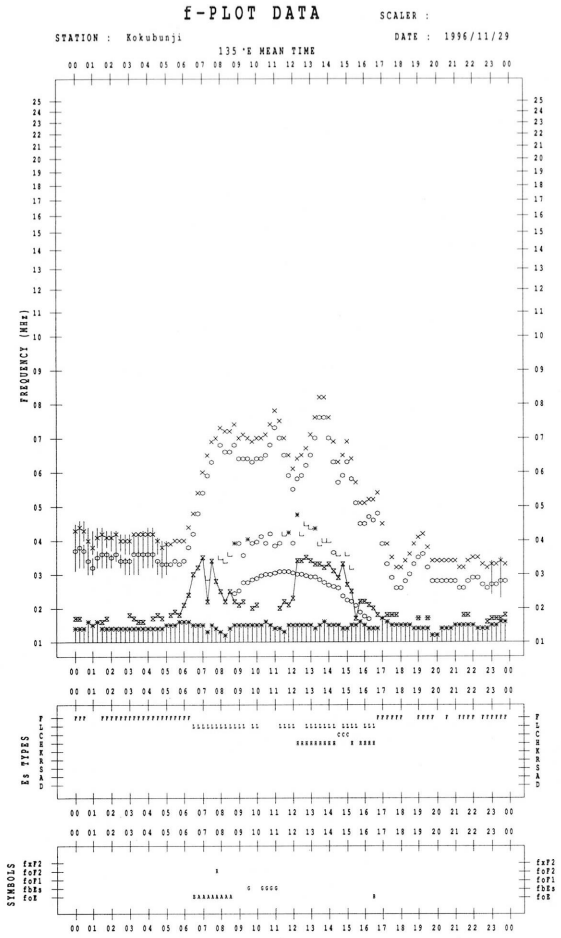

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/11/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE

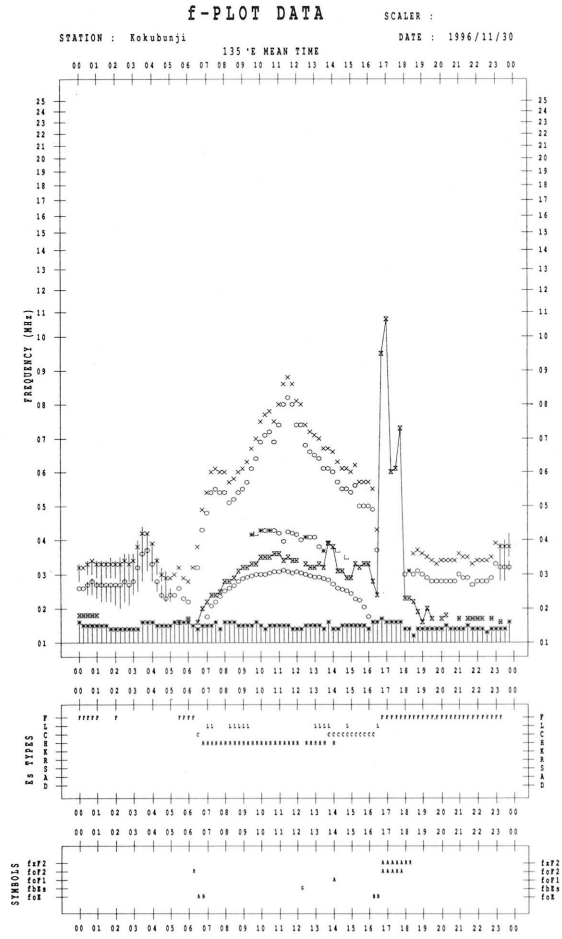

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/11/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/11/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/11/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/11/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/11/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/11/30
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

200 MHz

Hiraiso November 1996

Not available until system improvement is completed.

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso November 1996

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	23	24	(23)	23	23
2	24	24	(24)	24	24
3	24	23	(22)	25	24
4	23	23	(23)	24	23
5	24	23	(23)	24	23
6	23	23	(23)	25	23
7	24	23	(23)	-	24
8	-	-	-	25	25
9	24	22	(22)	25	24
10	24	23	(23)	25	24
11	24	23	(23)	25	24
12	25	24	(23)	26	25
13	26	25	(24)	27	26
14	26	25	(25)	28	26
15	26	26	(26)	28	27
16	27	26	(26)	28	27
17	27	26	(26)	28	27
18	28	25	(24)	27	26
19	27	26	(26)	28	27
20	27	26	(25)	26	26
21	26	25	(25)	28	26
22	27	26	(26)	28	27
23	28	27	(28)	-	28
24	-	-	-	-	-
25	46	37	(38)	31	39
26	30	30	(32)	31	31
27	32	33	(34)	37	34
28	30	29	(27)	29	29
29	30	28	(27)	-	28
30	-	-	-	-	-

Note: No observations during the following periods.
07th 2200 - 08th 0650 23rd 2210 - 25th 0040
29th 2210 - 30th 2400

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso November 1996

Single-frequency observations

Normal observing period: 2135 - 0740 U.T. (sunrise to sunset)

NOV. 1996	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
9	200	8 S	0544.1	0544.3	0.7	33	-	0
	200	46 C	2318.0	2323.1	6.5	19	3	0
	500	46 C	2318.0	2323.6	6.5	123	4	WL
11	2800	1 S	0107.0	0107.6	5.2	2	-	0
25	200	8 S	0409.9	0410.0	0.6	102	-	WL
	500	8 S	0410.0	0410.0	0.1	7	-	0
	2800	1 S	0514.3	0514.6	0.8	8	-	0

C. RADIO PROPAGATION

C1. H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWV)

NOV 1996 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT	00H	01H	02H	03H	04H	05H	06H	07H	08H	09H	10H	11H	12H	13H	14H	15H	16H	17H	18H	19H	20H	21H	22H	23H
DAY	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M	17M
		S	S	S	ES	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	
1	-2				-2					-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	1
		ES	S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
2	0	-23									-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-10	-10	0
		S	S	ES	ES	ES	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
3	3			-23	-23	-23					-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-2	-2	-2
	ES	S	ES	ES	ES	ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
4	-23		-7	-23	-23	-23				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-4	-5	3
		S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		
5	6									-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-13	3
		S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
6	3									-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-2	2	1
		ES	ES	ES	ES	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
7	9	3	3	3	8					-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-2	3	2
	C	C	C	S	S	S	ES	ES	ES				ES	ES	ES	ES	ES	ES	ES	ES	ES			
8							-22	-22	-22	2	3	3	-23	-23	-23	-23	-23	-23	-23	-23	-23	-7	-1	0
			S	ES	ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
9	-13	5		-2	-2				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	0	8	5
	ES	S	ES	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
10	-23		-23							-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	1	8	8
		S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
11	1									-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	2	4	3
		S	ES	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
12	0		-2		-7	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	9	8	9
				ES	ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
13	3	-7	3	-23	-2			-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	0	10	8
				ES	ES	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
14	5	7	3	-23	0					-23	-23	-23	-22	-22	-22	-22	-22	-22	-22	-22	-22	5	6	7
		S	S	ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
15	0			0				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	0	1	1
		S	S		ES	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
16	1			0	3					-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	0	1	6
		S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
17	3									-22	-22	-22	-23	-23	-23	-23	-23	-23	-23	-23	-23	-7	-2	3
			S	S	ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
18	5	1			4				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-13	1	1
		S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
19	3								-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-13	0	0
	ES	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
20	-23							-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-7	1	-10
	ES		S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		
21	-23	1						-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	1	1
	ES	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	
22	-23							-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-2
	ES	ES	ES	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		
23	-22	-7	8							-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-2	3
		S	S	ES	ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
24	-2			-23	-23				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	1	0	6
	ES	ES	ES	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
25	-23	-23	-23						-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-4	-1	1
	ES	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		
26	-23								-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-7	-13
		ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
27	1	-2	6	-7	-7	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	1	0	0
	ES	S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	
28	-23									-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-7
			S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
29	-5	-5				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-2	1
		ES	ES	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
30	1	-23	-7								-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23
CNT	29	12	10	10	12	5	4	9	15	27	30	30	30	30	30	30	30	30	30	30	30	30	30	30
		SC	SC	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
MED	0								-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-6	0	1
		SC	SC	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
UD	5								-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	2	8	8
	ES	SC	SC	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	
LD	-23								-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-10

C. RADIO PROPAGATION

C1. H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWVH)

NOV 1996 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 46M	01H 46M	02H 46M	03H 46M	04H 46M	05H 46M	06H 46M	07H 46M	08H 46M	09H 46M	10H 46M	11H 46M	12H 46M	13H 46M	14H 46M	15H 46M	16H 46M	17H 46M	18H 46M	19H 46M	20H 46M	21H 46M	22H 46M	23H 46M
					S		S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
1	6	10	10	15		10				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	9	11	11	8
		S	S		S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
2	9			14						-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	13	8	12	11
		S					S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
3	16		14	14	9	6				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	10	16	13	16
						S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					
4	8	15	10	13	20					-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-13	10	14	10	11
		S					S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
5	10		15	18	11	9				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	2	9	13	12
					S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES		ES					
6	16	13	13	13					-23	-23	-23	-23	-23	-23	-23	-23	-23	8	-23	8	3	8	14	6
				ES	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
7	13	17	18	-23					-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	8	13	11	13
	C	C	C	S	S	S	ES	ES					ES	ES	ES	ES	ES	ES	ES	ES				
8							-22	-22	11	12	15	13	-23	-23	-23	-23	-23	-23	-23	-23	6	6	11	12
		S			ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
9	7		13	10	3			-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	11	10	10	12
		S			S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
10	13		22	18						-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-2	9	14	12
					S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
11	18	13	13	13					-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	10	2	16	12
						ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
12	8	15	23	17	10	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	14	21	12	9
						S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
13	13	16	11	13	8		-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	13	11	10
						S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
14	8	11	9	10	6					-23	-23	-23	-22	-22	-22	-22	-22	-22	-22	-22	5	13	13	18
		S					ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
15	7		15	11	15	7	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	0	9	11	11
		S				S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
16	12		17	16	16					-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	11	8	21	11
						S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
17	13	16	16	13	14					-22	-22	-22	-23	-23	-23	-23	-23	-23	-23	-23	6	-2	5	11
						S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
18	5	5	12	11	18				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	12	18	8	11
		S					S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
19	10		16	16	16	21			-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	8	3	11	13
		S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
20	8							-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	1	5	2	6
			S			S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
21	15	11		11	8		-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	8	3	11	13
						S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
22	6	12	12	12	12			-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	12	13	13	8
						S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
23	13	10	16	16	11					-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	2	13	18	13
						S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
24	13	16	15	11	13				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	1	11	15	9
							S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
25	8	10	18	16	16	16			-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	11	8	16	8
						S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
26	6	11	15	11	13			-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	10	18	11	6
						ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
27	13	18	20	22	10	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	11	11	10	-7
		S				S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
28	11		10	20	11					-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	3	9	11	9
						ES	ES	ES			ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
29	9	13	13	13	12	-23	-23	-23	-2	-7	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-7	-1	13	15
						S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
30	6	16	15	16	15					-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	3	1	3	3
CNT	29	19	26	28	22	9	7	11	18	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
						S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
MED	10	13	15	13	12				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	8	9	11	11
						S	S	S		ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
UD	16	17	20	18	18				-2	-22	-23	-23	-23	-23	-23	-23	-23	-23	-23	-22	12	18	16	15
						S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
LD	6	10	10	10	6				-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-2	1	5	6

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

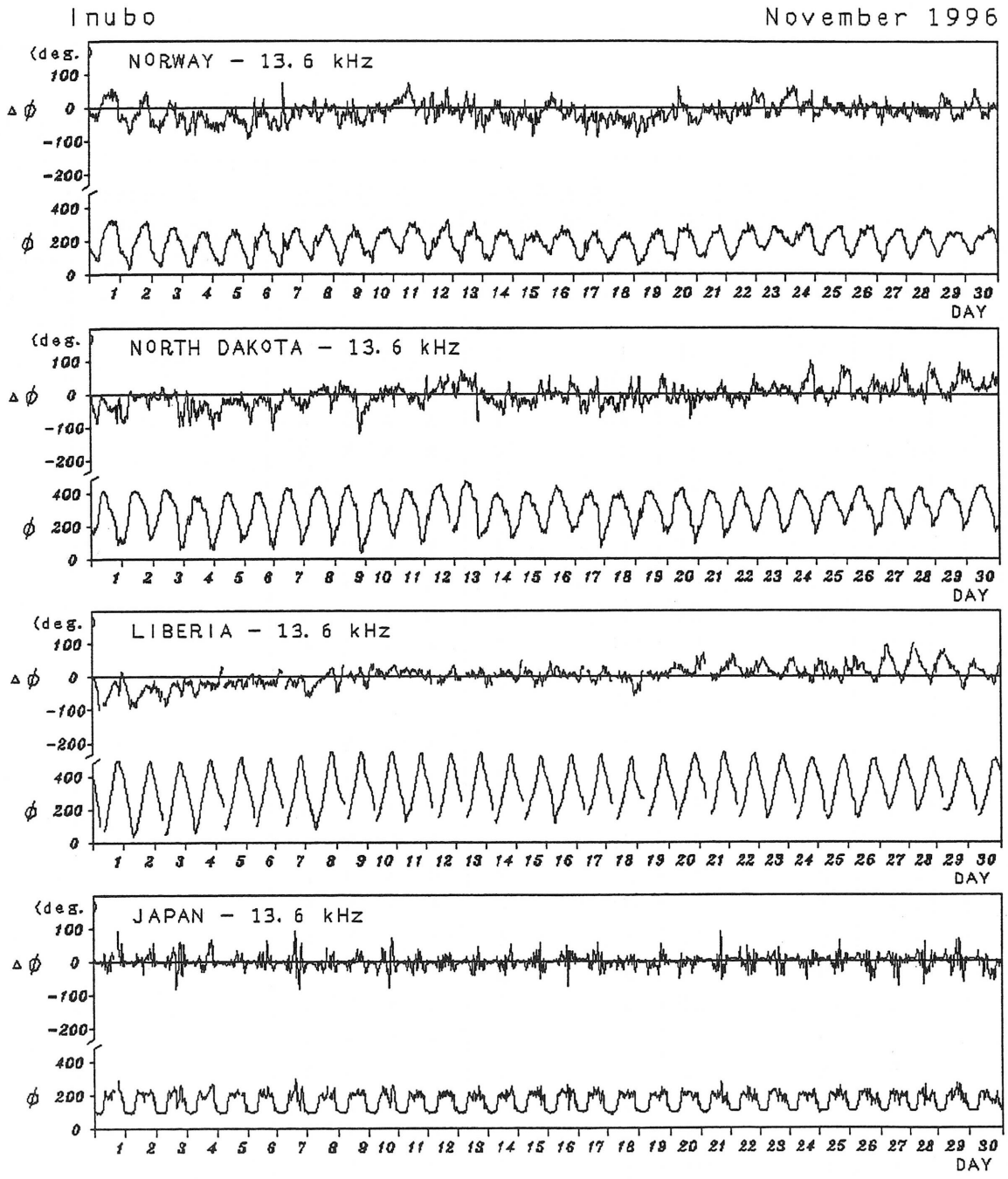
Hiraiso

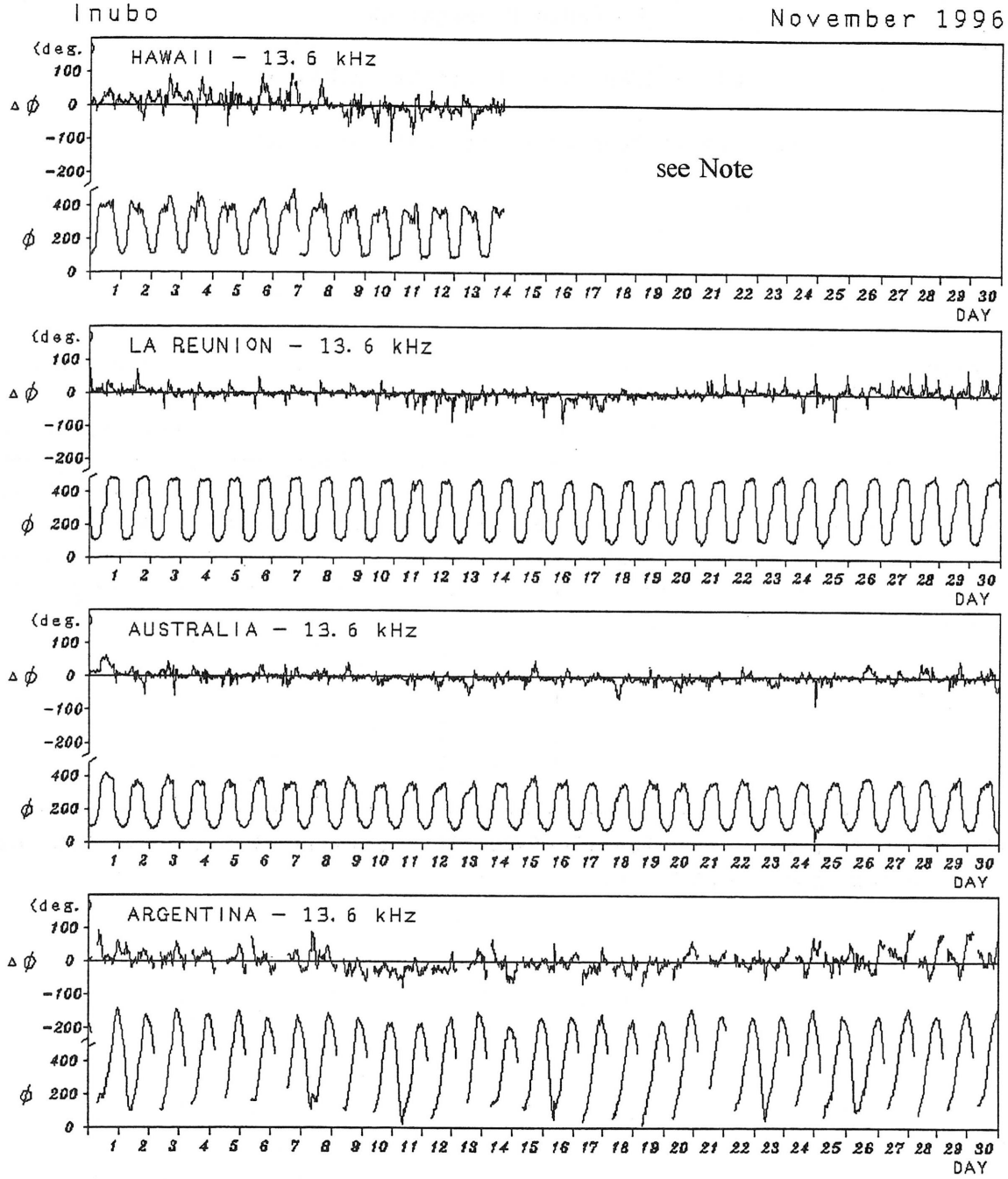
Time in U.T.

Nov. 1996	Whole Day Figure	W W V 00 06 12 18 / 06 12 18 24	W W V H 00 06 12 18 / 06 12 18 24	Condition 00 06 12 18 / 06 12 18 24	Principal Geomagnetic Start h m	End h	Storms Range nT
1	4- U	S - - 3U	4 - - 4	N N N N	None		
2	4o U	S - - 4	4U - - 4	N N N N			
3	4- U	- S - 3U	4U - - 4	N N N N			
4	4o U	- - - 4	4 - - 4	N N N N			
5	4- U	S - - 3U	4 - - 4	N N N N			
6	4o U	S - - 4	4 - - 4	N N N N			
7	4o U	- - - 4U	4 - - 4	N N N N			
8	4+ U	S 5U - 4	C 5U - 4	N N N N			
9	4- U	S - - 3U	4 - - 4	N N N N			
10	4+ U	- - - 5	4U - - 4	N N N N			
11	4o U	S - - 4	4 - - 4	N N N N			
12	4+ U	- - - 5	4 - - 4	N N N N			
13	4o U	- - - 5	4 - - 3	N N N N			
14	4+ U	- - - 5	4 - - 4	N N N N			
15	4o U	- - - 4	4 - - 4	N N N N			
16	4o U	- - - 4	4 - - 4	N N N N			
17	4- U	S - - 4	4 - - 3	N N N N			
18	4o U	S - - 4	4 - - 4	N N N N			
19	4- U	S - - 3U	4 - - 4	N N N N			
20	3+ U	S - - 4U	S - - 3	N N N N			
21	4- U	S - - 3U	4 - - 4	N N N N			
22	3+ U	S - - 2U	4 - - 4	N N N N			
23	4- U	S - - 3U	4 - - 4	N N N N			
24	4o U	S - - 4U	4 - - 4	N N N N			
25	4- U	S - - 3U	4 - - 4	N N N N			
26	4o U	S - - 4U	4 - - 4	N N N N			
27	4o U	- - - 4U	4 - - 4	N N N N			
28	3+ U	S - - 2U	4U - - 4	N N N N			
29	4- U	S - - 3U	4 5U - 3	N N N N			
30	3o U	S - - 2U	4 - - 3	N N N N			

C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo





Note : As for HAWAII-13.6 kHz, no record during 14 November 1500 UT to 6 December 2320 UT, due to transmitter maintenance.

Polar Cap Phase Anomaly (PCPA) on Norway-Inubo Circuit

NONE

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

(a) Short Wave Fade-out (SWF) at Hiraiso

Hiraiso

Time in U.T.

NOV. 1996	S W F					Correspondence	
	Drop-out Intensities(dB)			Start	Dur.	Type	Imp.	Solar * Flare	Solar Burst
	CO	HA	AUS	MOS	BBC						
None											

NOTE CO:Colorade(WWV) HA:Hawaii(WWVH) AUS:Australia MOS:Moscow BBC:London

* Optical and X-ray Flares

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Nov. 1996	SPA								
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	Ω/AU	Ω/H	Ω/ND	Start	End	Maximum
23		–	4		–		0632	0705	0640
24		–	14	5	–		0600	0650	0611
24		–	5		–		0712	0744	0722
25	27	24		79	–	39	0013	0117	0024
25		20	4	14	–		0240	0305	0248
25			34	18	–		0515	0613	0523
25		–	4		–		0620	0640	0625
25			7		–		0710	0735	0715
25			7		–		0907	0936	0912
25		39			–		1310	1400	1319
26		20			–		1305	1340	1312

IONOSPHERIC DATA IN JAPAN FOR NOVEMBER 1996
F-575 Vol.48 No.11 (Not for Sale)

電離層月報（1996年11月）
第48巻 第11号（非売品）
1997年3月10日 印刷
1997年3月14日 発行
編集兼 郵政省通信総合研究所
発行所 〒184 東京都小金井市貫井北町4丁目2－1
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