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IONOSPHERIC DATA IN JAPAN

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INTRODUCTION

This Series contains data on ionosphere (I) , solar radio emission (S) and radio propagation (P) obtained at the following stations under the Communications Research Laboratory, Ministry of Posts and Telecommunications of Japan.

Station	Geographic		Geomagnetic		Technical Method
	Latitude	Longitude	Latitude	Longitude	
Wakkanai	45°23.5′N	141°41.2′E	35.3°N	206.5°	Vertical Sounding (I)
Kokubunji	35°42.4′N	139°29.3′E	25.5°N	205.8°	Vertical Sounding (I)
Yamagawa	31°12.1′N	130°37.1′E	20.4°N	198.3°	Vertical Sounding (I)
Okinawa	26°16.9′N	127°48.4′E	15.3°N	196.0°	Vertical Sounding (I)
Hiraiso	36°22.0′N	140°37.5′E	26.3°N	206.8°	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

OCT. 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	46		35	31	31	38	46	37		53	61	60	60	59	58	50	56	57		40		37	35	31
2			38			36	39	55	55	57	N	59	66	60				36	56		A	36	28	35
3	35	A	35	32	28	40	41	52			69	67	65	57	53	61	57	64		60		36	29	35
4	35		35	29	31	29	45	44	A	A	56	A	A	A	A	A	68	A	34	52	56	54		38
5		58	38	41	41	34	35	40	55	A	58	63	A	A		54	56	A	38	A	35	35	35	31
6	36	35	35	31	34	A	A	49	55	A	57	67	60	A	54			30	34		58	56	38	35
7	35	32	35	41	38				39		65	55	58	53	54	50	55	65		31	30	35	35	35
8	35	34	38	34	40	35			55	63	67	66	58	59	60	57	72			34		36	35	31
9	38	33	35	38	32	37	44	65	60	65	82	76		58	58	66	70	71		36			56	49
10	35			38	34	38	39		66	66	72	71	76	66	61	59	55	62	A	A	A	38	A	35
11	36	37	38	38	38	A	35		60	60	67		66	62	58	54	56	58	52	44	48	37		
12	35	38	29	44	34	38	29			66	75		68	60	60	56	55	58	A	26		35	35	36
13	28	31	29	31	30	29	A	37	53		56		71	62	56	57		58	35	36		A	A	36
14	36	35	35	31	A	28		36	58	67	60	66	67	62		60	58	50	A	32	A	37	31	A
15	A	35	36	A	A	29	38	58	58	68		73	67	70	68	60	60	57	A	37	36	A	29	A
16		35		32	38	40	48	56	55	60	58		71	59	61	56	62	60		56	A	40		36
17	37	38	29	28	29	A	38	57	66	66	81	78	72	63	56	60	58	61		36	A	31	A	29
18		35	A	A	27	A	31		69	67	73				65		72		A	A	30	28	35	35
19	35	36	34	A	36	29		61	68			66	57	A	77	69	A	57	36	36	38	29	29	38
20	35	A	35	25	34	28	34	A	56	56	A	76	76	76	67	62	62		37	30	31	30	A	28
21	A	35	35	29	29	29	35	37	A	A	58	57	A	64	58	59	53	44	40	30		A	A	35
22	38	35	A	28	A	A	A	40	55	60	70	A	67	A	A	60	54		40	35	A	29	A	35
23	35	29	A	29	26	29	40	58	61	60	72	72	68	70		59	63	42	A	A	35	40	34	38
24	35		35	A	A	29	35	59	57	55	78	78	N	64	64	70	69			40	A	A	38	A
25	A	A	A	A	32	A	A	47	54	61	71		76	72		60	58		35	35	35	35	38	38
26	29	28		37	36	29	29	54	58	68	70	70	80		61	59	49	54		47	A	29		35
27	37	A	A	A	32	36	31	30	58	63	68	80	77	61	55	60	63		40	34		38	36	39
28		38	38	41	40	38	38	58	68	60	75	71	58	65	66		60		38	40	32	35	35	29
29		A	25		40	35	38	57		76	71	81	71	63	64	68	70	56	A	30	40		35	A
30	38	A	A	59	N	35	29		60	56	83		76	67		58	68	A	A		29	35	29	
31	34	38	35	31	29	29	38	58	57	63	72			65	60	60	70		A	36	38	69	54	57
·	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	22	20	22	23	25	24	23	23	25	23	27	21	24	24	23	26	27	19	13	24	15	25	21	25
MED	35	35	35	32	34	34	38	54	58	63	70	70	68	62	60	60	60	57	38	36	35	36	35	35
U Q	37	37	36	38	38	37	40	58	60	66	73	76	74	65	64	60	68	61	40	40	40	38	37	38
L Q	35	33	35	29	29	29	34	40	55	60	60	64	62	59	56	57	56	50	35	33	31	33	30	33

HOURLY VALUES OF fEs AT WAKKANAI

OCT. 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	G	G	G	G		25	G	29	25	26	29	32	33	28	32	23	34	35		G	28	24	G	G
2		24	G	G	G	30	21	28	26	34	28	36	35	38				40	37	37	35	28	27	24
3	27	37	32	25	G	G	G	24	33	36	47	34	32	29	37	35	29	29	28	26	G	G	G	G
4		27	G		G	G		35		58	39	34	54	61	31	40	42		34	29	33	G	40	34
5	29	27	24	23	G	G	G	27	29	35		58	61	64		45	71	65	53	39	28	25	G	G
6	G	G		27	30	34	38	30	31	36	33	36	34	35	42	36	40	36	38	35	31	30	25	25
7	25	G	G	G	G	G		31	30	32	29	28	34	30	30	29	33	G	29	G	G	G	G	G
8	G	G	G	G	G	G	29		32	34	31	30	29	29	29	42	G	G	G	G	27	G	G	G
9	G	G	G	G	G	G		29	33	35		30	33	32	27	31	23	28	G	G	G		G	G
10	G	G	G	G	G	G	27	36	42	46	38	34	30	29	35	40	44	45		42	46	32	30	26
11	28	G	G	G		35	G	40	40	36	29		44	35	35	32	37	30	25	32	34	G	G	G
12	G	G	G	G	G		26	30	33	46	54		33	36	38	41	G	32	40	39		30	G	G
13	G	25	G	G	G	G		24	30			35	42	38	38	35	23	30	28	26	26	32	29	G
14	G	G		30	37	G	G	36	29		48	42	44	29		26	29	28	41	34	38	28	33	40
15	47	31	27		33	25	30	36	30	29	33	35	36		47	39	33	34	57	41	34	37	35	30
16		25		28	G	G		30	25	21	38	38	27	36	26	23	G	28	32	32	40	30		25
17	G		32	25	26	27	27	32	25	27	34	39	39	33	44	37	32	32	29	25	33	33	57	32
18	35	29	46	62	57	40	37			45	37	45	36	37	43	39	G	39	72	34	24	G		G
19		31	30	39		26	25	33	39	36	34	36	79	96	62	63	55		29	G	G		29	30
20	32	40		30	38	27	33	49	42	33	75	38	84	63	34	26	32	34	39	36	32	30		28
21		35	33	28	26	G	G		32	81	45	32	94	60		28	G	32	37	32		39	44	30
22	26	32	40	38	46	38	34	29	31	37	42		45	38	34	30	34	29	29	30		27	30	30
23	G	G	39	30	24	G	G	G	38	29	28	30	29	38	24	25	27	28	27	30	G	G	G	G
24		36	29	33	29	26	27	30	31	29	30		30	28		42	39	33	G	G	38	33	42	38
25	33	32	40	37	36	29	35	26	35	43	36		38	37	30	29	G	27	25	24	26	29	25	33
26	33	35	34	28	32	26	24	24	37	46	54	47	36	36	38	33	G	G	G	27	33	32	32	36
27		57	55	42	31	28	28	33	38	50	40	41	40	34	25	22	28	33	25	G	G	24	31	33
28	45	34	27	28	G	25	24	G			59	37	60	60	32		G	35	26	28	44	61	34	27
29	37	45		34	30	G	28	28	27	34		35	37	39	34	45	38	34	40	G	26	26	30	65
30	39	44		22	G	G	G		34		40	36	35	39	36	38	37	36	33	G	G	G	G	
31	27	G	G	G		G	G	25		32	30	41	29	26		26	29	G	27	33	G	G	G	27
	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	30	25	29	27	30	26	27	27	27	27	26	31	30	25	29	30	29	29	31	28	29	28	30
MED	26	27	27	27	24	13	26	30	32	35	37	36	36	36	34	35	30	32	29	29	28	28	28	26
U Q	33	35	33	31	32	27	29	33	37	45	45	39	44	39	38	40	37	35	38	34	34	32	32	32
L Q	G	G	G	G	G	G	G	26	29	32	30	34	33	30	30	27	G	28	25	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT WAKKANAI

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

OCT. 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	38			35	29	38	48			54	54	64	67	58	49	58	62	61	58	A	A	36	A	A
2			32	30	28			68	68	56	62	63	62	64	63	66	60	60	52	A	A	A		36
3	36	A	A	A	A	A	59	50	56	61	62	A	A	76	56	67	76			68	A	A	B	35
4		32	A	N		A	42				80	A	57		73	60	58	55	51	A	A	41		A
5		46	36	30	43	N	31		65		55		73	66	64	A	58	67	59		36	B	38	
6	56		24	A	A	B	48	57	57			64	71	68	50	52	56	68	71	57	57			49
7		N	30		59	29	48				59	51	51	60	62	59	57		62	36	B	46		31
8		34		31	28	B	43			63	56	72	63	71	70	75	80		57		59	59	A	A
9	N	38		59		N	58	66	68	56	65	67	83	73	64	68	68		50	44	44	56	56	44
10	58	35	32		59	31	A	62	68	66	66	75	66	68	66	66	71	67	67	A	A	A	A	A
11	A		59	36	36		45	56	67	67	66	64	62	58	52	67	63	57	45	47	46	36	A	A
12	A	A		38	36	28	A	68	63	63	69		88		58	62	58	63	72	A		38	A	A
13	43	35	35	32	A	35		58	70	75	87	88	76	54	59	57	72		58	A	35		39	
14	89			31	N		58	57		69	66		71	64	63	68	60	57	44		31	38		
15	44		49				43		68	77	81		80	66		76	68		62					43
16		37			38	A	59	56	73	68	68	54	72	66	69	74	64		44			46	46	
17	60			59	59	N	32		87	91	82	82	77	66	58	67	61		48	43			A	A
18	58	58			34	32			71	67	81	75	77	70	70	77	91	61	41	38			58	A
19	69	A	37	38		A	A	76	68	66	64		72	70			71		42				36	38
20	A	A	36	34		32	42	68	80		72			74	86		76		A	47			N	89
21			31	34		49	41	44	56	70	66	A	81		62	80	72	50	43	44	41			
22	38	A	35	37	35	28	A	57	60		76	59	60	62	64	60				34		35	A	A
23	44	A	35	A	N	59					82		108	93	74	66	68	54		A			A	35
24		38	34	A	34	N	A		70	78	70	80	83			71	76	61	A	A	29		47	
25	40	A	38	35	36	A	A	57	64	67		95		68	72	68	A	45	A	A	A	A	57	56
26				35	A	A	37		68	73	78	92	80	73	69	68		48	46	A		58	A	A
27	A	A	38	A	37	A		58	66	72	83		63	70	66	68	71		A	B	36			A
28	A	A	A	A	37	30	A	A	63	69	74	71	63	60	66		56	50	41		44	42	46	44
29		58		44	44	34	50		68	84		80	85	73	66	60	66	69	41	34	A		32	A
30	46			35	41	B	38		61		68	80	70	76	86		62	71	A	A	36	46	37	44
31	A	59	A	49	34			58	75	72	74	69	54		81	67	61	48				58	B	69
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	11	16	19	19	12	18	17	25	23	28	20	28	26	28	26	28	19	22	11	12	14	11	13
MED	44	38	35	35	36	32	44	58	68	68	68	72	72	68	65	67	65	60	50	44	38	44	46	44
U Q	58	58	37	38	43	36	50	67	70	73	79	80	80	73	70	68	71	67	59	47	45	56	56	52
L Q	39	35	32	32	34	29	41	56	63	63	64	64	63	64	60	60	60	50	44	36	35	38	37	35

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT KOKUBUNJI

OCT. 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	38	G	G	G	G	G	32	30	40	38	42	27	30	31	28	32	33	G	G	55	46	42	34	49
2	48	29	G	G	23	36		31	40	46	50	52	28	55	31	40	28	58	39	60	39	32	G	33
3	33	59	59	37	41	34	29	32	39	43	60	75	139	87	58	34	24	27	40	40	35	33	B	G
4	28	G	28	G	G	29	31	34	40	44	44	46	46		34	31	30	47	41	54	52	43	28	41
5	G	29	G	G	G	G	G	G	26	66	G	60	51	32	33	30	34	60	33	29	26	B	G	G
6	G	G	G	30	29	B	37	29	52	28	36	30	29	G	26	28	28	28	26	G	G	G	G	G
7	G	G	G	G	G	G	36	30	28	30	30	39	30	35	27	32	40	34	30	32	B	G	G	G
8	G	G	G	G	G	B	25	44	43	43	44	39	38	41	42	40	34	26	G	G	G	G	30	50
9	G	G	G	G	G	G	30	28	31	44	50	43	33	32	45	40	24	31	G	G	23	G	G	G
10	G	G	G	G	G	G	33	29	52	53	50	49	53	34	30	31	73	36	30	34	49	41	58	43
11	45	30	25	27	31	G	37	33	40	32	43	52	55	47	41	54	34	25	28	35	28	28	36	48
12	39	34	29	28	G	G	28	29	58	44	44	39	49	52	48	33	33	40	32	39	46	33	45	41
13	34	33	23	28	30	26		28	30	45	45	57	50	32	34	41	40	32	46	34	G	G	34	30
14	G	G	G	G	G	G	32	26	26	44	49	44	33	30	26	26	32	26	32	29	30	43		56
15	60	G	G	G	G	G	31	32	27	29	29	34	31	41	50	29	41	55	40	29	G	G	G	G
16	G	G	G	G	29	34	29	31	26	29	29	30	27	26	26	38	34	31	25	G	G	G	G	G
17	G	G	G	28	32	G	36	34	29	33	29	31	39	49	25	55	49	41	G	G	G	G	41	61
18	31	G	24	G	G	G	G		26	41	43	45	48	45	47	49	34	G	G	G	G	G	G	29
19	30	34	G	33	28	30	41	34	34	43	26	24	31	54	41	30	24	G	G	G	28	G	G	G
20	40	30	27	G	G	G	36	31	31	33	27	52	76	29	26	42	30	G	58	40	G	G	G	G
21	G		G	G		G	G	34	26	30	57	114	60	40	29	G	22	G	G	G	G	24	G	G
22	G	28	50	31	56	23	34	25	34	54	28	28	26	29	42	40	42	40	31	G	32	G	50	33
23	30	27	26	30	24	G	G	39	50	44	33	46	40	G	32	32	30	30	28	25		G	40	G
24	G	G	30	31	31	G	26		40	40	31	27	34	29	31	26	34	28	32	32	30	30	28	G
25	28	33	30	28	30	30	26	34	30	40	30	43		46	50	50	61	40	53	52	55	34	38	29
26	26	G	G	G	31	28	G		38	58	26	52	G	G	43	73	35	G	28	37		50	54	41
27	53	37	33	46	28	27	G	33	34	60	71		29	68	50	60	40	28	28	B	G	27	G	36
28	42	53	41	38	35	28	33	82	54	32	28	30	54	69	31		44	33	G	27	G	34	G	G
29	28	G	29	27	G	G	24		42	45		50	44	38	27	29	28	28	30	36	35	30	27	32
30	30	98	G	G	29	B	G	31	29	29	30	40	60	32	32	58	40	33	34	30	34	G	G	29
31	26	25	25	G	G	G		34	29	27	28	32	G	G	26	35	22	G	G	G	G	G	B	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	30	28	28	27	31	31	30	30	30	30	31	30	31	31	31	30	28	30	28	31
MED	28	13	G	G	24	G	30	31	34	43	34	43	38	34	32	34	34	30	30	30	27	12	14	29
U Q	38	33	29	30	30	28	33	34	40	45	45	52	51	47	43	42	40	40	34	37	35	33	37	41
L Q	G	G	G	G	G	G	12	29	29	32	29	31	30	29	27	30	28	25	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT KOKUBUNJI

OCT. 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	15	14	15	16	14	15	15	16	21	16	45	40	14	15	14	15	18	14	15	14	15	15
2	14	14	15	15	14	15		15	15	17	17	18	17	15	18	15	14	14	14	14	15	14	15	14
3	15	14	15	15	15	15	15	15	14	18	17	18	17	18	17	16	16	14	17	15	14	14	B	14
4	15	15	14	15	14	15	14	15	15	15	17	17	15		14	15	16	15	22	17	15	15	15	14
5	18	15	15	15	15	15	17	14	17	15	41	18	26	22	18	15	15	15	14	15	15	B	15	14
6	14	15	14	14	14	B	14	15	16	16	17	16	18	44	17	15	15	15	14	16	15	24	15	14
7	15	15	15	16	14	15	14	15	16	15	17	17	18	15	16	14	14	15	15	14	B	16	15	14
8	15	15	15	14	15	B	16	15	15	14	16	45	20	21	15	15	14	18	14	15	15	14	14	14
9	15	15	15	15	15	18	15	14	14	15	18	15	15	16	14	15	15	14	14	15	15	14	14	15
10	14	15	15	22	14	15	15	14	15	16	16	18	17	17	14	18	15	16	15	15	14	14	14	15
11	15	15	15	16	15	14	14	14	15	16	20	16	18	15	16	17	15	15	15	15	14	15	14	14
12	14	14	14	15	15	15	15	18	16	17	17	15	17	15	17	14	15	15	15	14	14	15	14	14
13	14	14	14	15	15	15		15	14	15	14	27	27	14	16	15	18	15	15	14	15	15	15	14
14	14	15	14	15	14	16	15	14	18	14	15	15	15	16	15	14	15	16	14	15	14	14		15
15	15	15	15	15	14	14	17	15	18	15	15	16	22	18	16	15	14	15	14	15	15	18	18	14
16	15	15	14	15	14	15	14	15	14	15	15	15	15	36	18	15	14	15	15	16	14	16	14	14
17	15	14	14	14	14	16	14	14	15	15	14	15	15	15	14	15	14	15	14	14	15	14	15	14
18	14	15	15	15	16	15	14		14	14	15	16	32	17	20	15	14	17	14	15	14	14	14	16
19	14	15	14	14	16	15	16	17	15	16	15	16	16	16	14	15	23	18	14	15	14	15	14	14
20	15	14	15	14	14	15	15	17	15	15	16	29	30	39	34	15	14	15	14	15	15	15	17	15
21	14		15	15		15	15	14	14	14	16	18	18	18	16	33	15	16	15	14	14	15	15	15
22	15	15	14	15	14	15	15	18	14	14	14	16	18	35	16	15	16	14	14	15	15	15	15	15
23	15	14	14	14	14	16	16	15	15	15	15	17	16	34	14	15	15	14	15	15		14	14	14
24	15	15	14	14	15	15	15		14	14	15	16	16	15	16	15	14	14	15	15	14	15	14	15
25	15	15	15	14	14	15	15	18	15	15	14	15		16	15	18	15	15	15	14	14	14	14	14
26	14	15	14	18	14	15	15		15	15	15	15	40	38	23	14	14	14	14	15		14	15	14
27	14	15	15	15	14	15	15	15	16	15	16		17	15	15	14	15	15	15	B	15	15	15	15
28	15	14	14	14	14	14	15	14	16	14	17	15	14	14	14		15	15	14	16	14	14	15	14
29	14	15	15	15	14	15	15		15	14		16	17	15	17	15	14	15	14	15	14	14	14	15
30	15	15	14	16	15	B	16	15	15	16	15	21	16	14	15	15	17	15	15	15	14	15	15	15
31	15	15	15	16	15	16		17	16	15	16	16	40	36	34	16	22	15	17	66	15	16	B	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	30	28	28	27	31	31	30	30	30	30	31	30	31	31	31	30	28	30	28	31
MED	15	15	15	15	14	15	15	15	15	15	16	16	17	16	16	15	15	15	15	15	14	15	15	14
U Q	15	15	15	15	15	15	15	15	16	16	17	18	22	34	17	15	15	15	15	15	15	15	15	15
L Q	14	14	14	14	14	15	14	14	14	14	15	15	16	15	14	15	14	15	14	14	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT YAMAGAWA

OCT. 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	59			32	A	N	26		59	68	66	62	70	68			66		72		A	A	42	
2	37			49	N	37		A	54	66		67		74		84		66	70	A		59	A	A
3	34	A		A	A	69		47	51	66	60	70	81		88	91	91	97	110		53		49	B
4	31	38				26	31			74	84	A	63	76	76	83	70	74	67		30		A	A
5		59		48	48	N	59		55			83	87	80	76	67	58		74	A	A		32	A
6		59		N	69	B	32		51		80	71	67	72	61	60	58	73	82		49			26
7	A	49	32			N		60	61	83			66	76	80	70	70				B		37	
8		59	N	31	N	N	31		63	68	82	68	67	93	85	84	72	82				79	29	31
9		31	31	25		B		A	67	74	69	A	81	94	80		66		75				59	32
10	36				49	A	A	42		66		83	72	73	72	78			69	A	A	A	37	A
11	A	37	32	25	43			45		67		70	66	63	65	73	72		54	A	A	33		
12	32		32	32	A	89	A	53	52		83	89	82		76	84	72	67			A	34		26
13			34		30			32		76		86			66	71	73	95		B	A	A	A	A
14	A	A		59		N		56	66	83	84	91	83	83	68			59	52	A	79		42	
15	A	31		31	31			52		83	86	121	97		72	71			69	59		A	N	37
16		32	31			A	24		66	68	81	84			74	83			53	59		41	40	
17			31			89	31		84	83	82	91		70	71	68	A	A	52			30	31	A
18			N	32		30		31		70		84	82	83	74		93	84	58	A	49	32	41	
19			N	60	54	59				80	83	83	90	94	88		86	84		A	49		N	32
20		36	31	A	43	31	A	52		67	70	97	97											
21										70	68	78	76	67	78	80	85	67	53	A		A	A	32
22		30		49	59				61			70	67	69		83	79	73	31	A	B	59	34	A
23	30	A	A	31		A	A	63	69	83	81	118	98	82	86	71	86	79		A	A	31		
24	32				31	28	31	54	61	73	87	86	91	85	84	98	93	58		30		69		
25	37	A	A	32	41		59	53		81	84	110	112	83	84	84	66	54				A		32
26			32	34		49	N	31		66	84	96	94	84	97	98	84	55	54	A	A	A	A	A
27	A	49	32	31		A	A	A	60	70	68	72	85	81	83	86	83	54	44		32	31	A	A
28	24	31	A	31	47		A		66	67	66		87	80	72	72	66			26			40	
29	34	23	34					66	70	78	84		81	95	86	87	77	81	N	A	36	32	47	A
30		A	32	37		A		52		72	68	86	74	80		92	66	54	51	A			A	A
31	34	31	32		69	N	59	60	70	94	72	72	69	90	99	84	61	53		26				42
	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	15	13	18	13	10	10	17	19	27	23	26	27	25	26	25	24	20	19			12	14	
MED	34	36	32	32	47	43	31	52	61	72	81	84	81	80	77	83	72	70	58			34	40	
U Q	36	49	32	48	56	69	59	58	67	81	84	91	90	84	85	85	84	81	72			59	42	
L Q	31	31	31	31	36	30	31	43	55	67	68	71	69	72	72	71	66	56	52			31	34	

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT YAMAGAWA

OCT. 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	21	G	G	26	24	G	30	36	32	32	31	30	31	31		28	30	24	26	29	30	G	G
2	G	G	G	G	G	G	G		N	32		32		58		34	31	52	58	32	G	37	32	59
3	57		G	55		G	28	29	30	39	36	71	78	36	56	52	25	25	31	24	G	G	G	B
4	G	G	G	G	G	G	24	33	31	33		38			35	30	30	36	33	28	32		57	32
5	31	28	G	G	11	G	25	29	36	34	61	54		32	36	33	49	36	48	32	55	27	G	27
6	G	G	G	G	G	B	G	28	33	29	30	30	31	30	30	37	30	31	26	G	G	31	G	24
7	24	24	G	G	G	G	25	32	31	29	30	28	38	30	30	33	31	33	24	27	B	G	G	G
8	G	G	G	G	G	28		33	39	49	45	51		30	34	46	44	40	33	28	32	31	G	
9			30	31	27	B	26	28	31	29	48			55			31	27	29	33	33	32	24	22
10	G	G	G		28	33	30	42	44	61	48	50	37	30	32	30	35	49	47	70	38	32	44	58
11	32	37	32	31	34	G	25	34		35	39	38	55	58		57		102	59		92	58		25
12		51	30	31	32		33	33		48	51	56	57		38	34	40	39	32		33	33	32	30
13	32	25	G	25	G	G	G	31		44	39	48	40	27	27	28	30	25		B	28	30	30	31
14	30	24	G	G	G	G	G	30	31	36	62		57	34	34	31	35	29	28	39	34	44	39	
15	45		G	G	G	G	G		30		46	38		33	37	40	59	50	50	43		32	25	G
16	28	26	25	G	25	33	29	30	30	30	28	27	28	30	32	38	36	29	24	G	25	G	G	G
17	32	G	G	G	G	G	G	30	30	29	30	29	28	36	31	51	72	70	32	31		31	24	58
18	G			30	25	G	G	32	30	36	39	48	50	26	30	30	28	28		37	G	G	G	G
19	24	G	25	G	G	G	G		37	30	28	37	29	25	30	28	36	29	29	81	58		33	23
20	G	G	G	26			30	32	28	38	46	51												
21										43	62	60	31	92	62	34	36	26	31	34	32	59	59	44
22	31	34		27	G		28	24	31	35	28	62	29	G	29	29	40	40	33	33	B	32		
23	25	32	28	33	30	24	24	30	38		37	71	50		47	27	38	37	31	40	33	G	G	24
24	G	28		48	26	22	32	32	38	44	54	48		30	36	34	37	40	30	26	28	33	G	28
25		44	50	30	26	30	G	29	32	38	49	54	66	59	51	36	37	28	30	30	32	32		26
26	30	32	29	25	26	26	G		30	30	53		58	48	57	50	51	34		34	41	39		32
27			32	32	32	33	27	34	54		54			93		32	29	28	28	25	25	23		
28	58		47	59	34	34	29	28	29	32	36	31	36	34	32	40	34	33		26	G		25	30
29	25	26	24	G	G	G	G	29	31	38	52	45	56	55	37			36	34	33	32	32	32	32
30	26		28	26	G	25	25	30	36	52	68	59	92		31	29	33	34	32	60	57		28	32
31	33	25	G	G	G	G		30	36	31	30	37	30	32	32		52	38	30	32		38	29	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	23	27	29	28	25	28	26	26	28	29	27	22	26	25	26	28	30	26	27	25	26	25	25
MED	26	25	G	25	6	G	24	30	31	35	45	48	39	32	34	34	36	34	31	32	32	32	25	27
U Q	32	32	29	31	26	27	28	32	36	41	52	54	57	55	37	40	40	40	33	37	36	33	32	32
L Q	G	G	G	G	G	G	G	29	30	30	31	32	30	30	30	30	30	29	29	26	25	27	G	11

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT YAMAGAWA

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

HOURLY VALUES OF foF2 AT OKINAWA

OCT. 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	*89	A	A		B		A	A	44			82		82	83	*#68		90				N		
2	B			69		B	B	A	34			67	76	#92		131	#96	98	A		59	A	A	A
3	A	A	A	A					64				82		122	*#152				A	76		A	A
4		50		71			39	43	#69		92	A	68			88	98	#83		A	43			*119
5	38	38	32	#47	B	B	B		38		83	91				126	*128	*130	129	A	A	A	A	63
6	55	57	#46			B	B	59					97	88	96	93	84	#96			70	#48	A	59
7	58			46	36		B		68	71	64		93	99			111	#84		A		A	B	
8	59		B		B	B		A	72	#61	#82	89	83	93		134				A	A	48	A	59
9	#38			38	A	A	A	A	84	A	85		84	92	96	*#71	89	89	A	A	A	A	43	
10	A			A	37	A		A	A	68	#84	#102		84		113	111	N	139	A	A	A	38	A
11	A	A	A	A	45	A	B		54	#66			76	79	83	#97		*55	A		A	A	A	A
12	A	A	34	38	N	B	B	A	42		82	#103	*#120		*133	125		A	A	A			A	A
13		42			40		28	A	66	64	A		*120		92	*82	96	*#124	A		A	A	A	*109
14		43	B	B		B	B			83	86	#99		96			*141	90	A	A	76	A	44	
15	A	A	A	A	A	B	A	A	62		96		*124		*128		97	87	A	A	A	A	A	A
16	A	A	59	#30	A	B	B		70	71			83	77	#90	96	#84	#67		A	40	44		
17	*89		B	59	49		B	A		96	96		84	79	82	*82	67		A		46	42	A	A
18	35		A	59				A	70		76	#97		78		120		89		A	A	A	39	
19		B	37	35					58	#76	78		110	*120	92			90	A	A	57	#42	A	A
20	A	A	A	A		58	B	A	55					84		127			120	A	58	#42		37
21	#59			34			B	49	53	#81		81	81		94	98		90	A	A	A	A	52	
22		A		A	37	B		A	45	#68		85	80	83	92	92	93	95		A	43	A		89
23	*89				41	B	B	49		A	A			88	84	86	87		A			A		109
24		37		B	43	49	A	A		67	#86				*128	132	#78		A	A	A		33	
25		A	30	A	A	A	A	A	54	A	92	96		*125	120			65	A	A	A	A	32	A
26	44		59		38	N			72		85	#98		*120	*147			120	A	A	48		A	A
27	A	A	36	40	47		B		58	67	66	76		96		131	#98		A		38	48		
28		38	A	37	41	A	A	A	A	67	71	#92	#106		93	98	93	85		A	A	59	A	A
29	A	69	A		B	37	B	52		82	84				123	117	113		A		A	A	A	A
30	A	69		A	45	A	B	A	A	83	#67	#94			*134	133			A	A	A	44	44	
31		35	A	69	#38	B	A	A	53		86	#98			*132	125		95			42		A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	11	10		14	13				22	16	20	16	17	19	21	25	18	20			13			
MED	58	42		43	41				58	70	84	93	84	88	96	113	96	90			48			
U Q	89	57		59	45				69	81	86	98	108	96	128	129	111	95			64			
L Q	38	38		37	37				53	67	77	83	80	82	91	90	87	84			42			

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

OCT. 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	48		24	G#	B	G	#28	32		49	45	44	*G#	*G	*G	*G	36	*G#	*G	*G	*G	G	*G	*G
2	B	G	G	G	G	B	B	48	*G#	70	*G#	52	47	42	*G#	36	*G#	*G	55	*G#	32	34	34	34
3	33	42		25			G	G	*G	41	#59	65	#42	*#75	58	52	#27	#38		47	42		59	#39
4		G	G	G	G	G	G	#42		33	43	#55		39	35	*G#	42	50	*G#			G#	*G	33
5	37	30	G#	G	B	B	B	G	#50			61		43	*G#	36	*G#	*G	*G	54		46	38	
6	*G	25	G#	G	G	B	B	25	#40	39	*G#	*G	36	*G#	39	38	36	37		*G	38	G#	#39	38
7	48	G#		G	11	G	B	40	40	37	36	41	46	48	#34		*G	38	*G#	30	*G#	27	B	*G
8	*G	G	B	G	B	B	G			44		50	40	35	#46	#28	35		*G	45	#34	26	29	
9		34	24	28	29	28	24		56	56	58		40	39	#58	67	#38		46	40		48	#34	*G#
10	39	G#	G	#27	G#	#29	G#		59	#44	49	52	50	#39	39	46	41		59	56	#39	36	32	#60
11	#34	40	40			*35	B	G	#28	#39	46	#35	#46	37	36	39	#51	45	#58	*G#	39	31	30	
12	61		26	24	G#	B	B	48	40	47	48	56	53	#36	42	#60	66	58	54	44	#26	G#	#46	
13		25	26	G#	G	G	G			41	*#85		40	44	#33	34	38	46	43	*G#	47	41	43	#24
14	28	27	B	B	G	B	B			59	#48	38	40	39	34	32	39	44		66	*G#	35		
15	39		24		28	B	25		40	50	58	55	56	#39	48	41	45	#29		28	28	#41	38	48
16	41	#30	25	G#	#28	B	B	G	#54	#36	37		40	40	45	*G#	62	*G#	*G	39	*G#	G	*G	*G
17	*G	G	B	G	G	G	B	36	*G#	40	44	44	#66	63		38			37	*G#	*G	27	#41	44
18		40	31	G#	#23	G#	G	#39	36		48	45	46	37		*G	35	*G#	*G	46	42	33	34	*G#
19	*G	B	G	G	G	G	G	G	#38	*G#	36	35	38	36	34	#46	42	*G#		*72	*G	59	56	#33
20		45			G	G	B	48	58	*#77	38	48	#62	#50	47	52	44	35			28	25	*G#	44
21	44	G#	G	G	G	G	B	29			65	#48	#59	38	#54	*#95		29		43	#27	34	40	32
22	*G#	39	G#	*#32		B	G		39	41	39	35	36	34	#51	#62	#48	#35	*G#	40		38		*G
23	*G	G		G	G	B	B	G		60	56	50	53	#37	30	38	36		61	*G#	*G	39	*G#	*G
24	*G	G	G	B	G		26			56	60	58	54	47	46	40	#61	*#87	58	50	44	34		*G
25	41	48	G#		*39	30	28			51	50	#68	61	60	61	#43	40			*85	36		34	
26	29	28	G#	#25	G#	G		G	28		59	58	72	68	69	#53	#37	38					29	
27	60	*#79	30	25	G#	G	B	G	#38	44	47	*#82	68	#37	#48	42	35		40	*G#	40	#20	*G#	*G
28	*G	25	29	29	*#62	*43		36	28	#45	51	48		50	57	#46	43	#32	*G#	50	42	#28	#48	44
29	41	#27	26	G#	B	G	B	39		51	#64	74			66	*#89	*71	*70		*G	48		33	
30		28	32	*36	*37	28	B	32		54	62	64	#50	57	60	#46	38		45		30	G#	#37	*G#
31	*G	G	#41		27	B	24	26		41	45	35	40	41	40	37			*G	*G	29	G#	#48	41
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	26	24	24	24	18	14	22	18	27	29	28	26	30	29	30	28	22	21	27	27	27	27	23
MED	34	26	24	G	G	G	G	30	40	44	48	50	46	39	45	40	38	36	37	40	32	31	34	32
U Q	41	34	27	25	27	28	25	39	50	54	58	58	54	48	55	52	44	45	54	50	42	38	41	41
L Q	G	G	G	G	G	G	G	G	28	40	41	42	40	37	34	36	35	G	G	G	G	G	29	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT OKINAWA

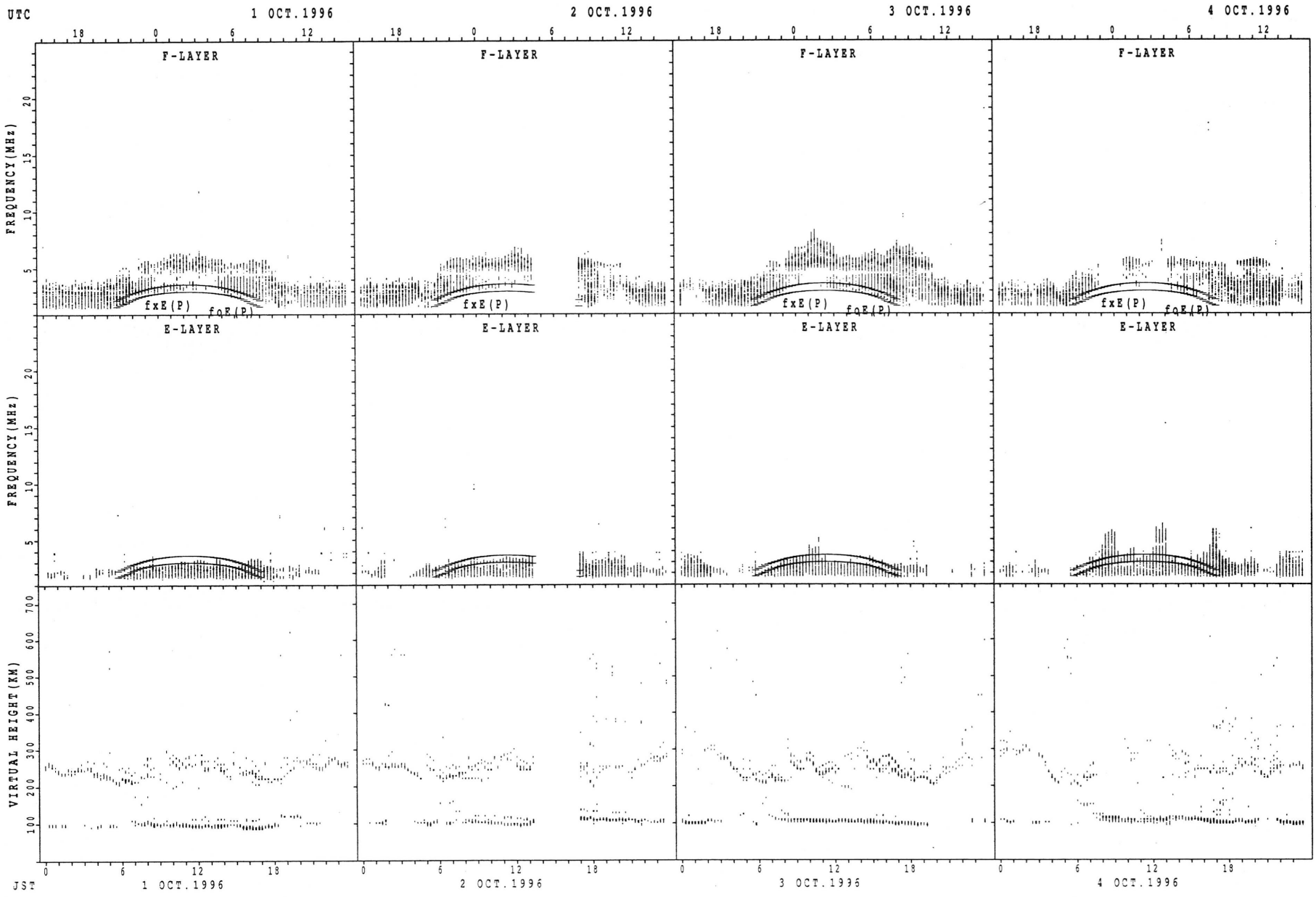
OCT. 1996

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

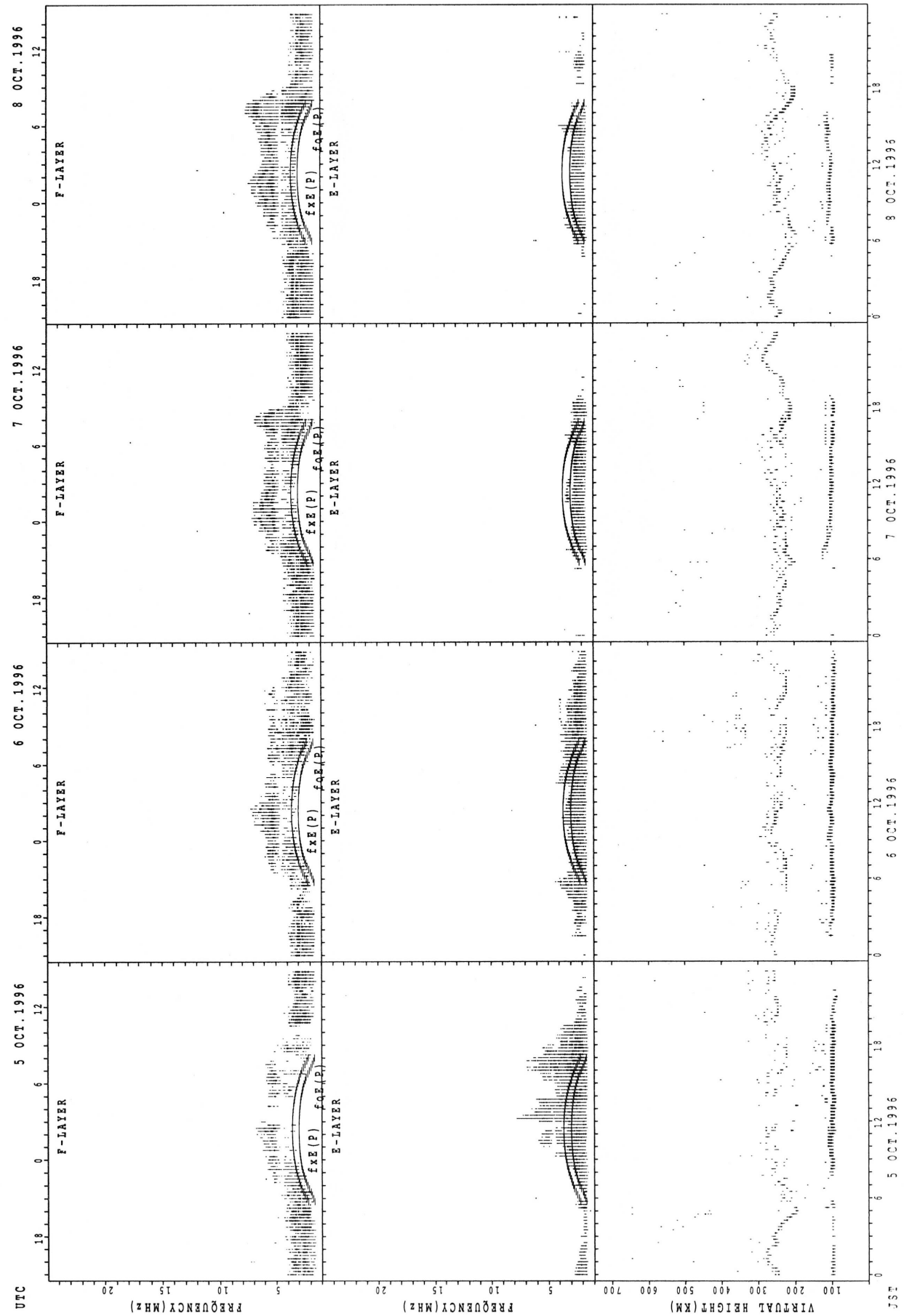
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	15	18	14	B	15	14	14	14	14	17	16	14	16	16		14	14	15	14		15	18	14
2	B	14	15	15	14	B	B	14	15	14	16	18	23	23	15	15	15	15	14	14	14	15	14	14
3	16	14	15	14			14	18	14	15	18	17	18	20	17	17	16	14		14	15	14	14	15
4	15	16	14	15	15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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

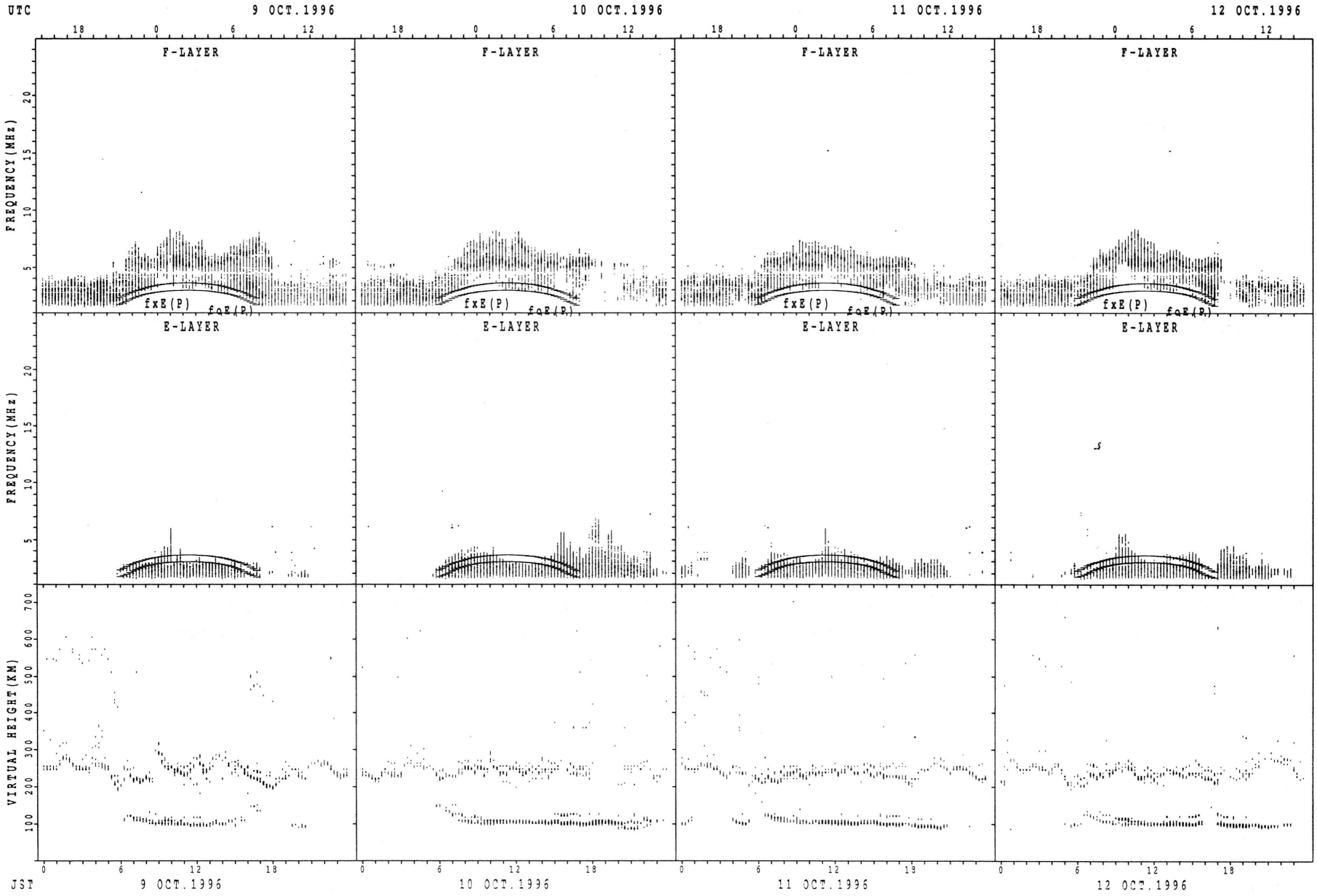
SUMMARY PLOTS AT WAKKANAI



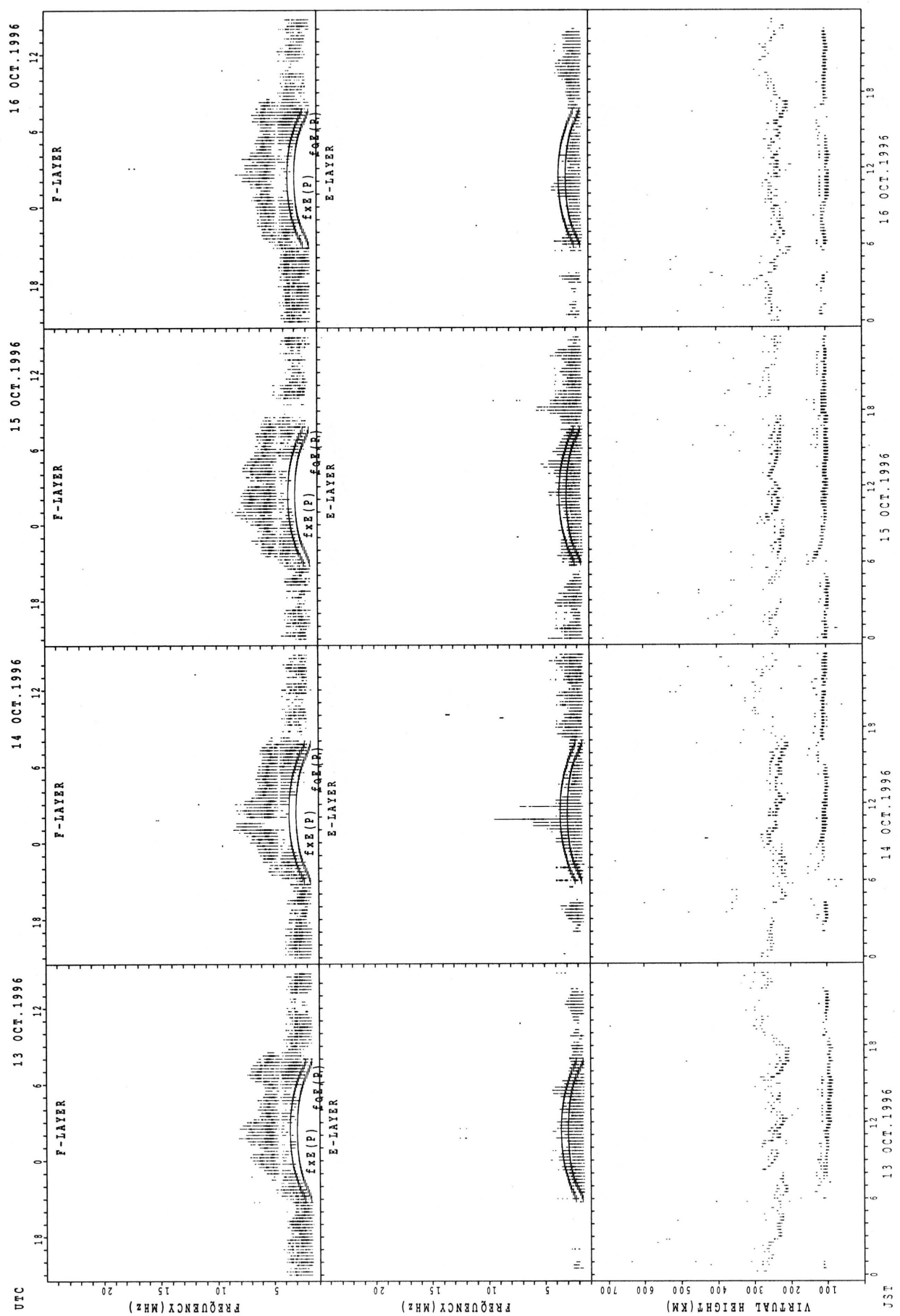
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
5 OCT.1996
6 OCT.1996
7 OCT.1996
8 OCT.1996
F-LAYER
E-LAYER
fxE(P)
foF(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P) : PREDICTED VALUE FOR fxE
foF(P) : PREDICTED VALUE FOR foF

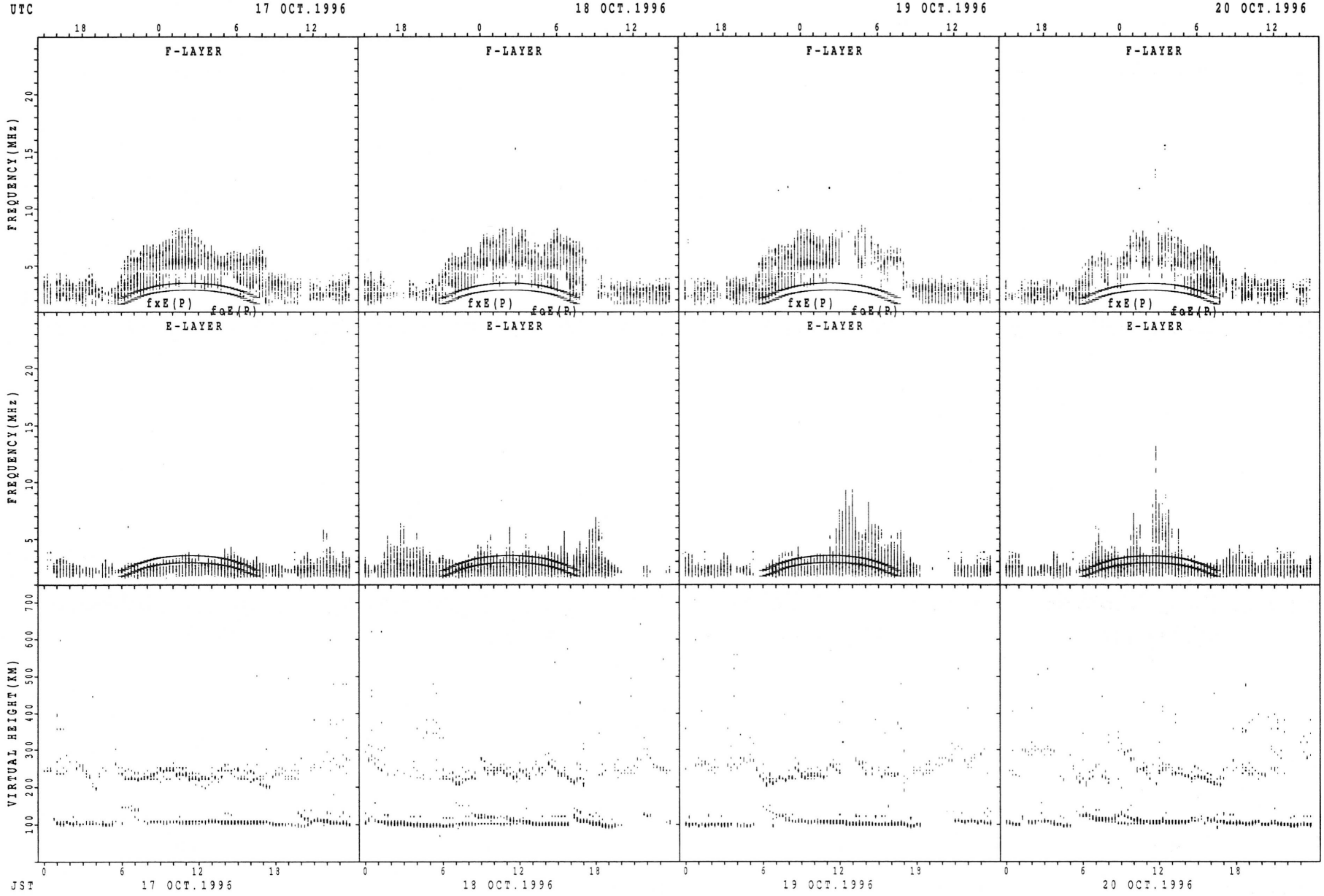
SUMMARY PLOTS AT WAKKANAI



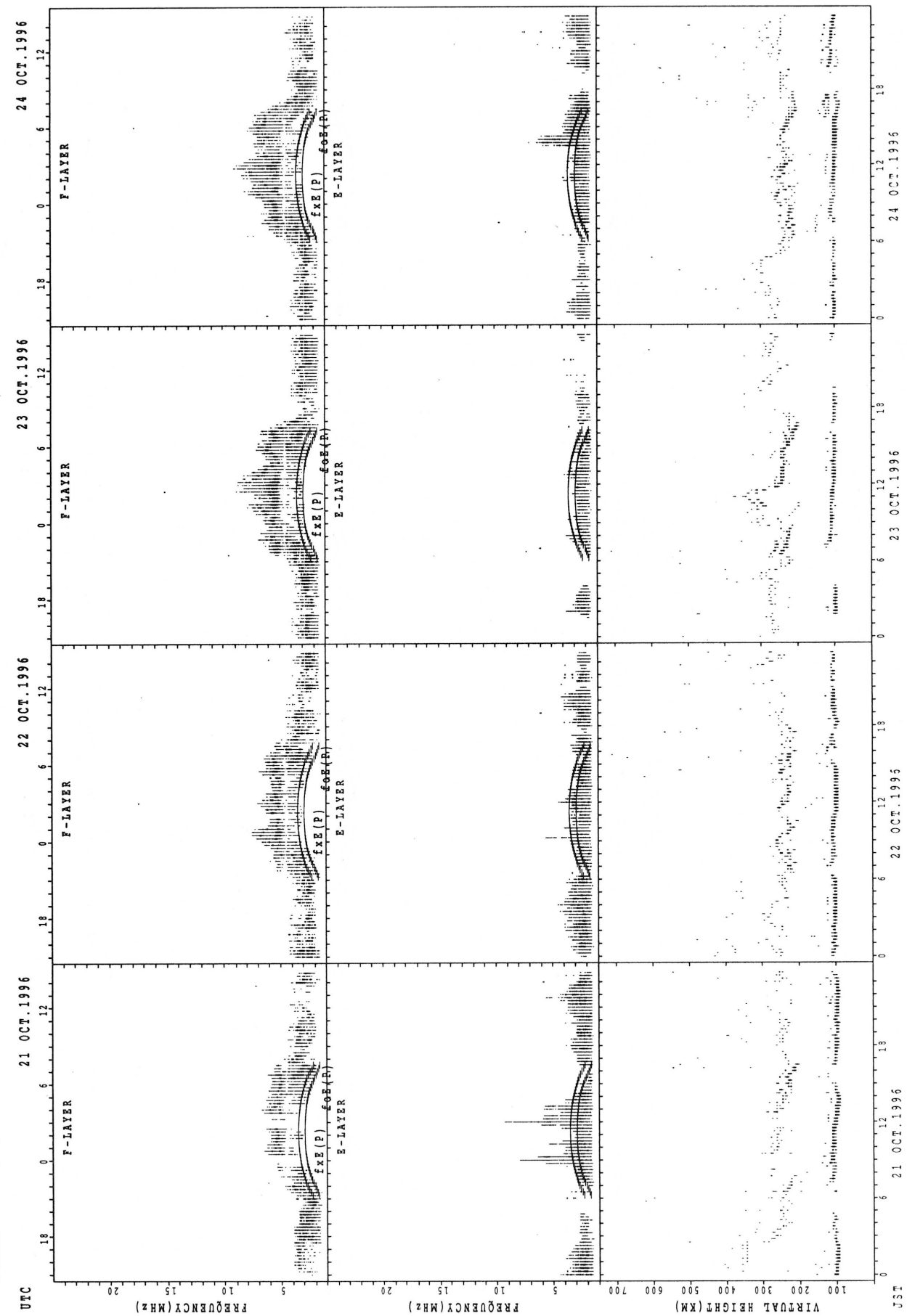
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
13 OCT.1996
14 OCT.1996
15 OCT.1996
16 OCT.1996
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE: PREDICTED VALUE FOR fxE
foE: PREDICTED VALUE FOR foE

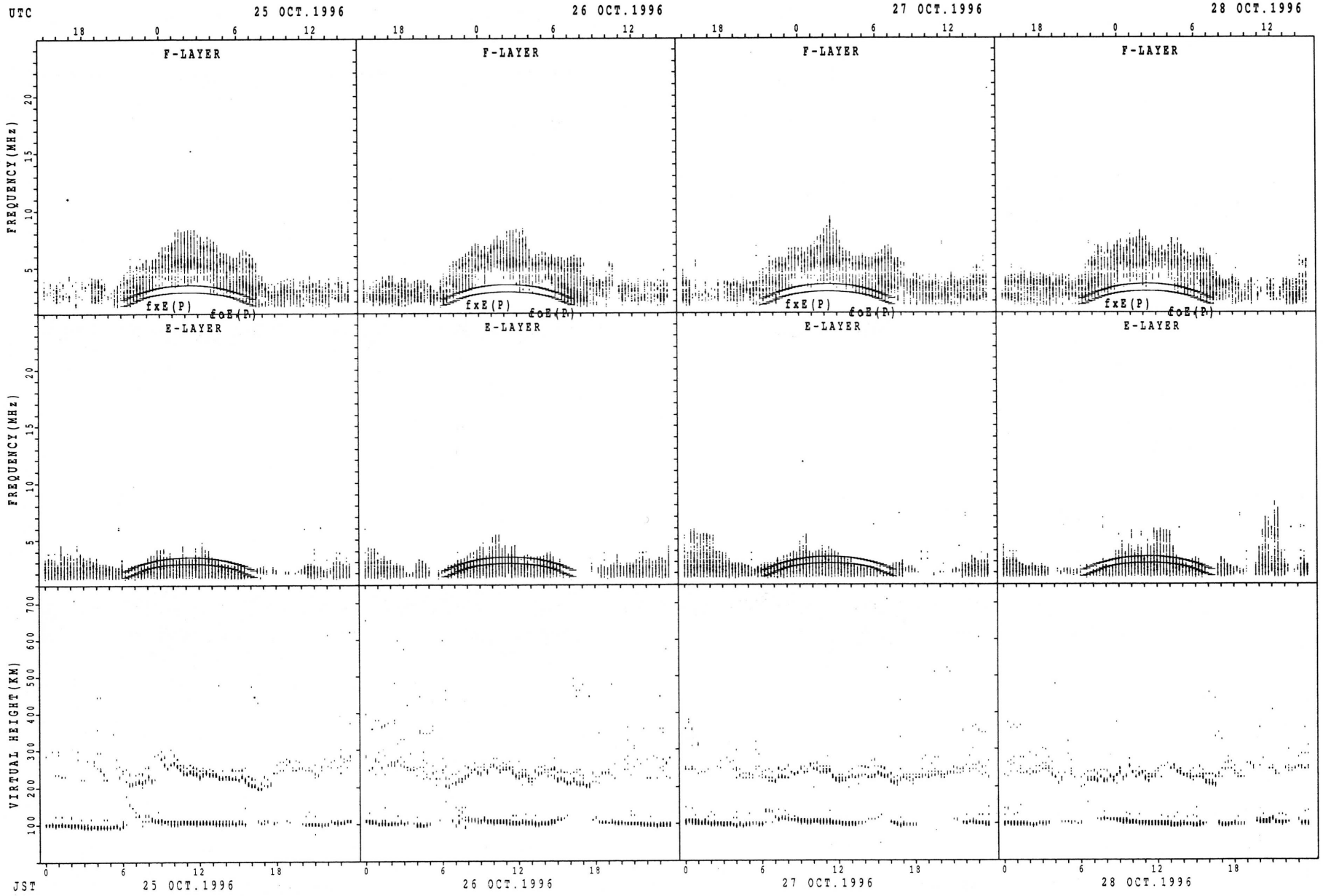
SUMMARY PLOTS AT WAKKANAI



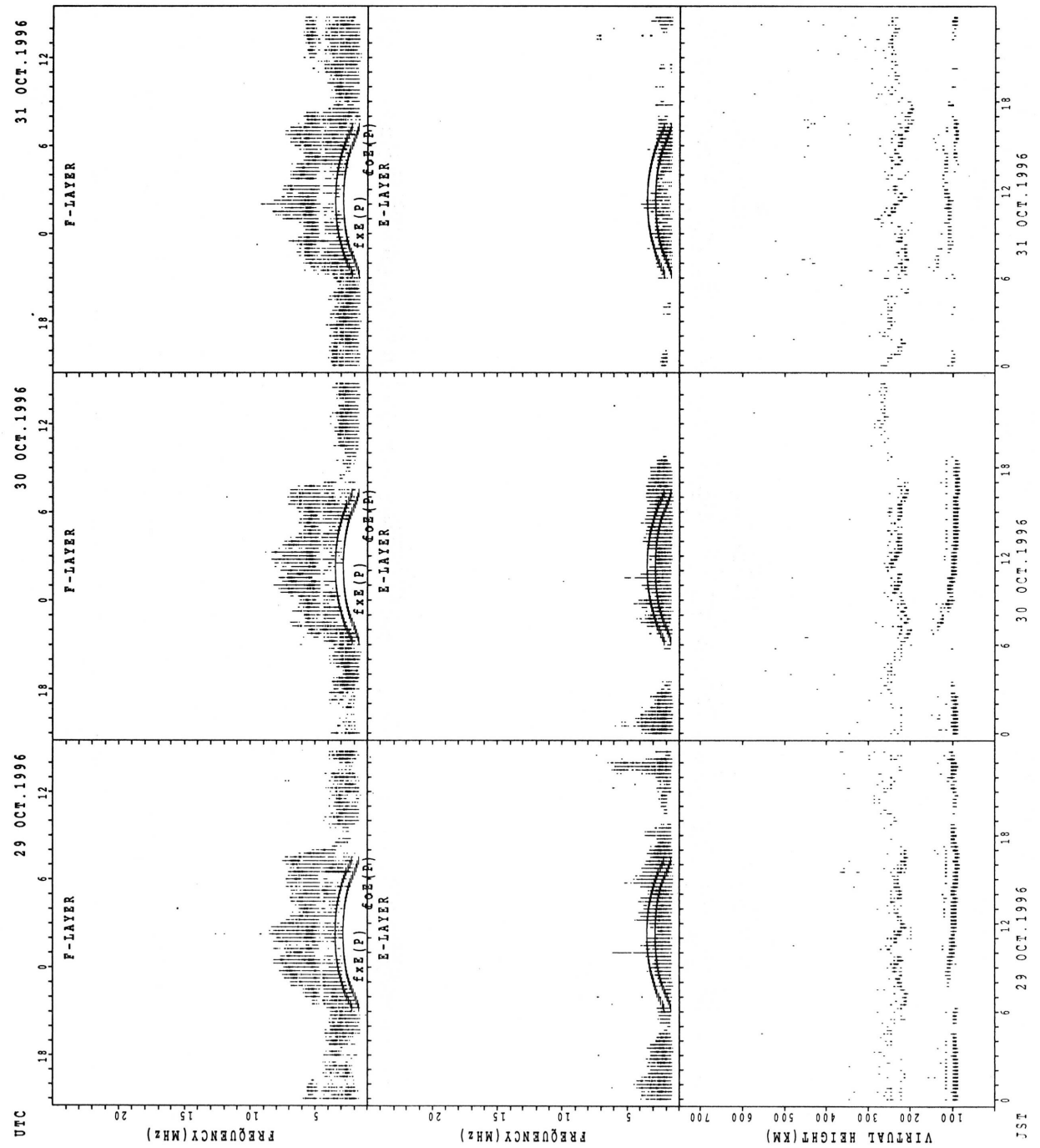
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE


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

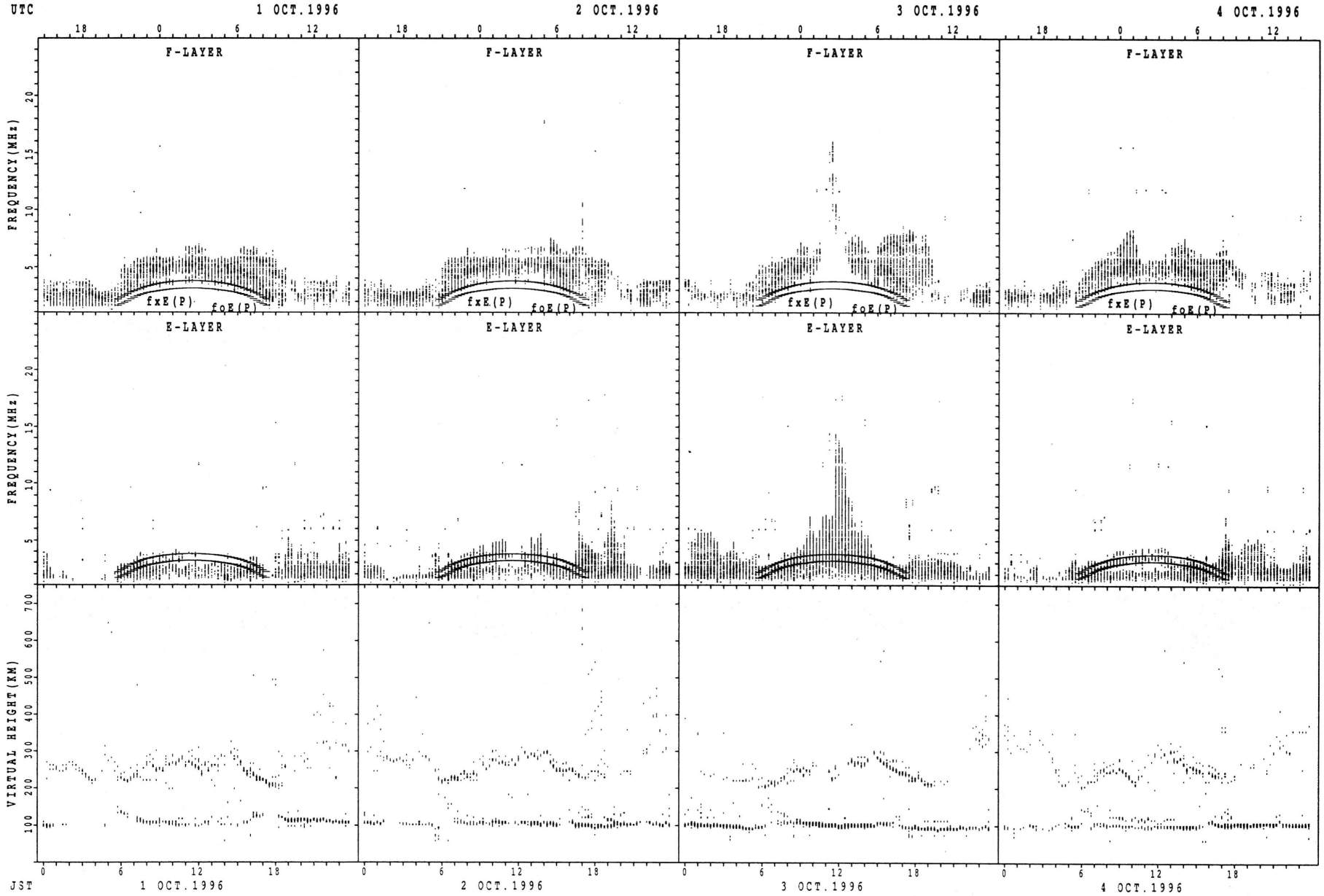
SUMMARY PLOTS AT WAKKANAI



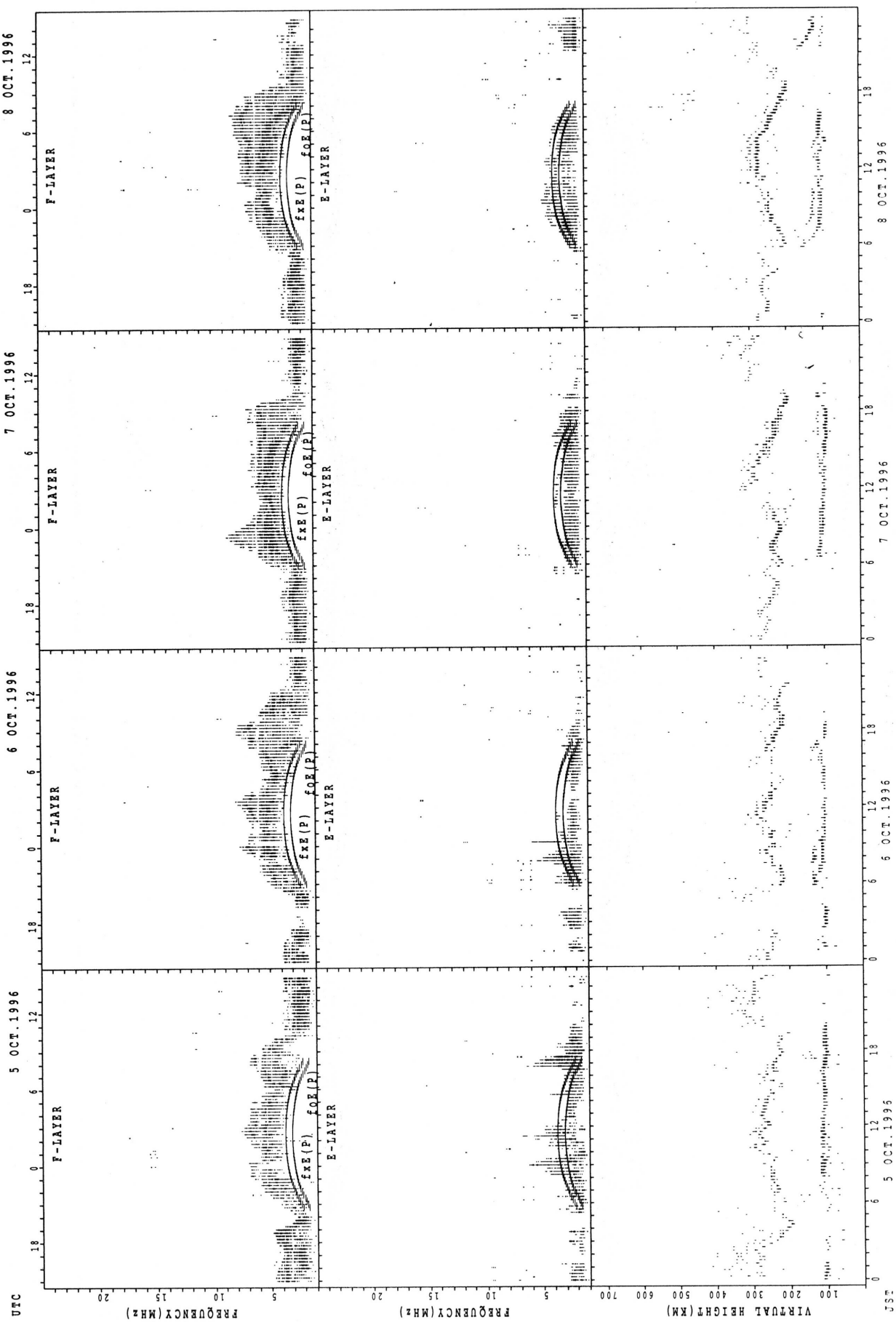
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
29 OCT.1996
30 OCT.1996
31 OCT.1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE

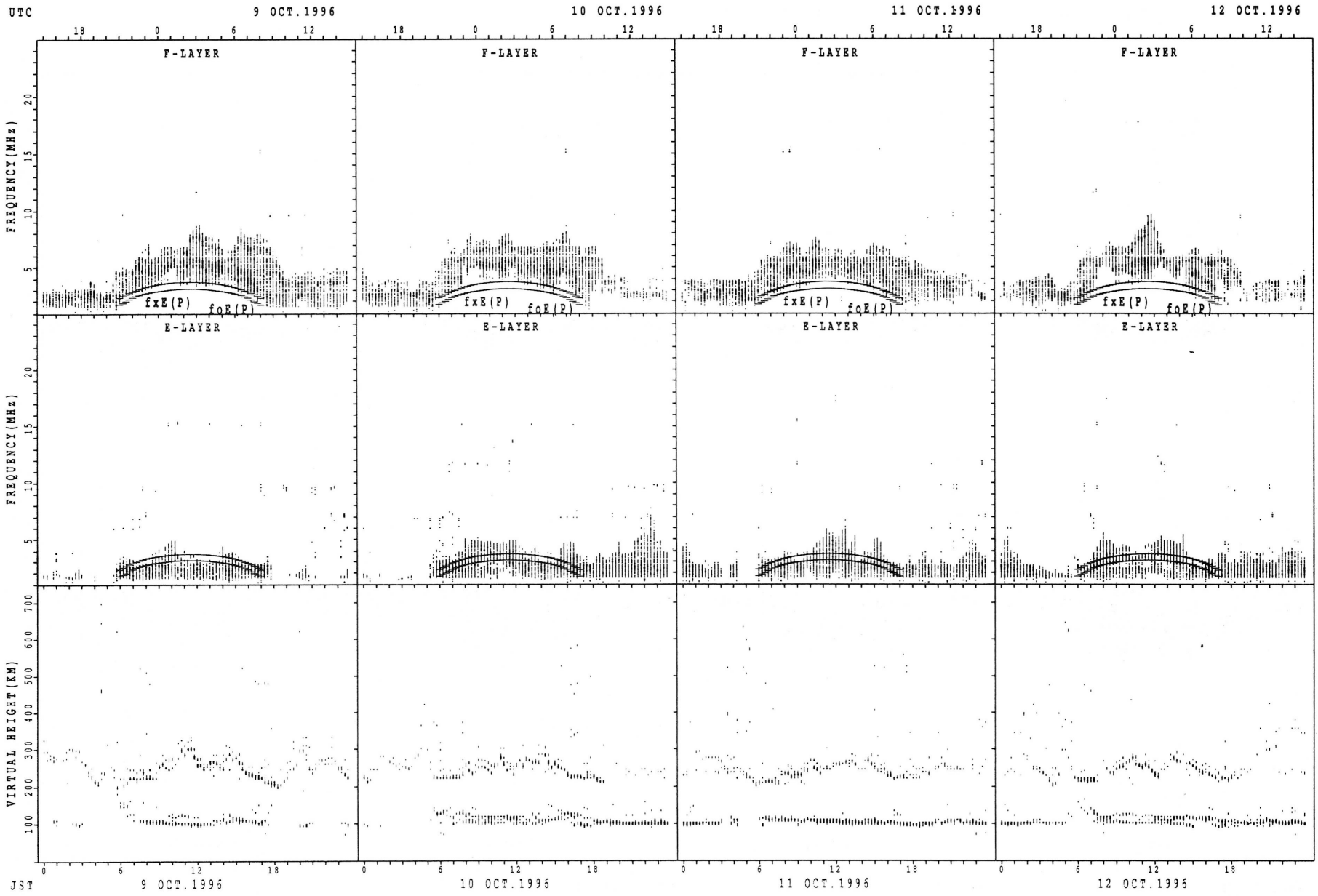
SUMMARY PLOTS AT KOKUBUNJI TOKYO



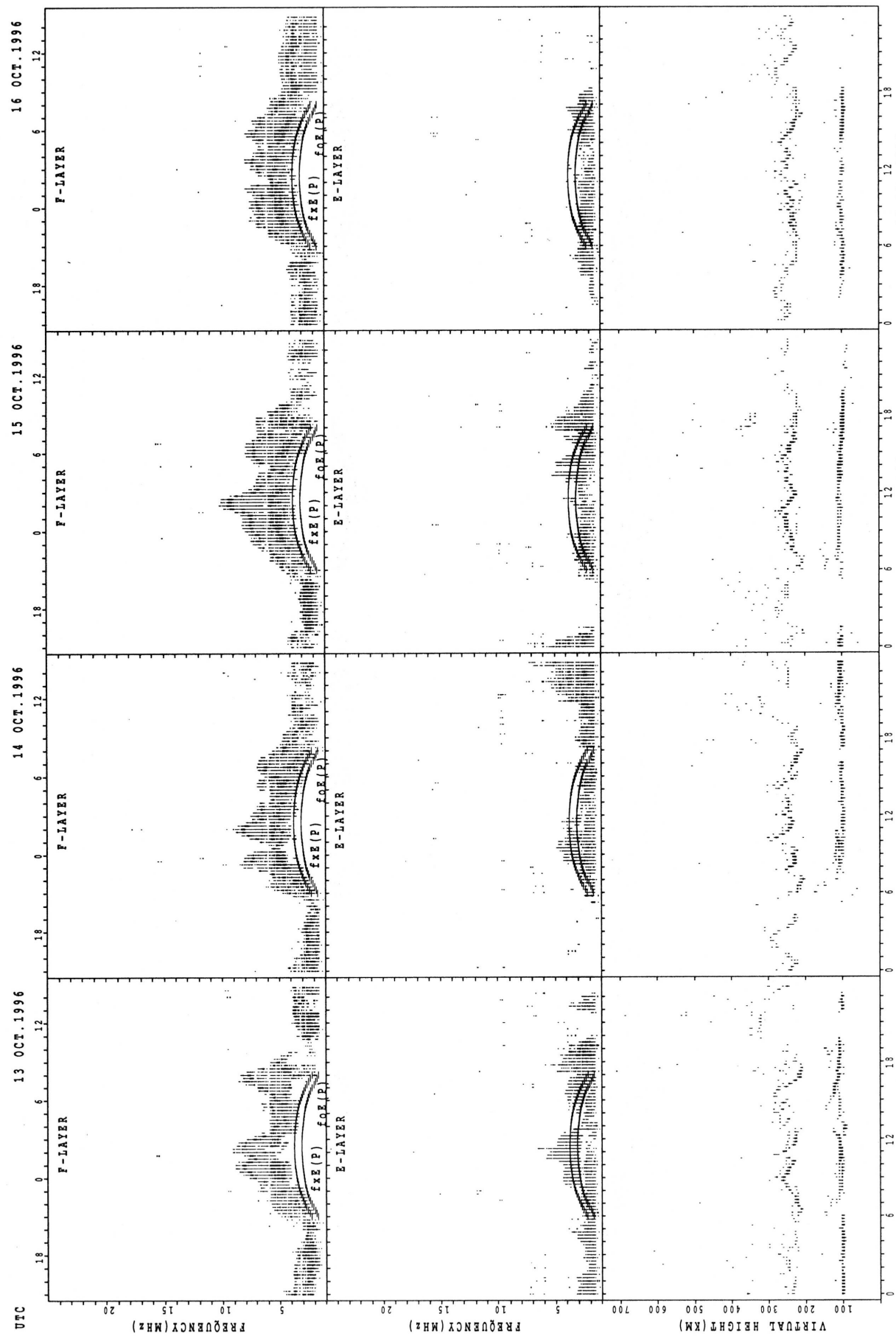
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
5 OCT.1996
6 OCT.1996
7 OCT.1996
8 OCT.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

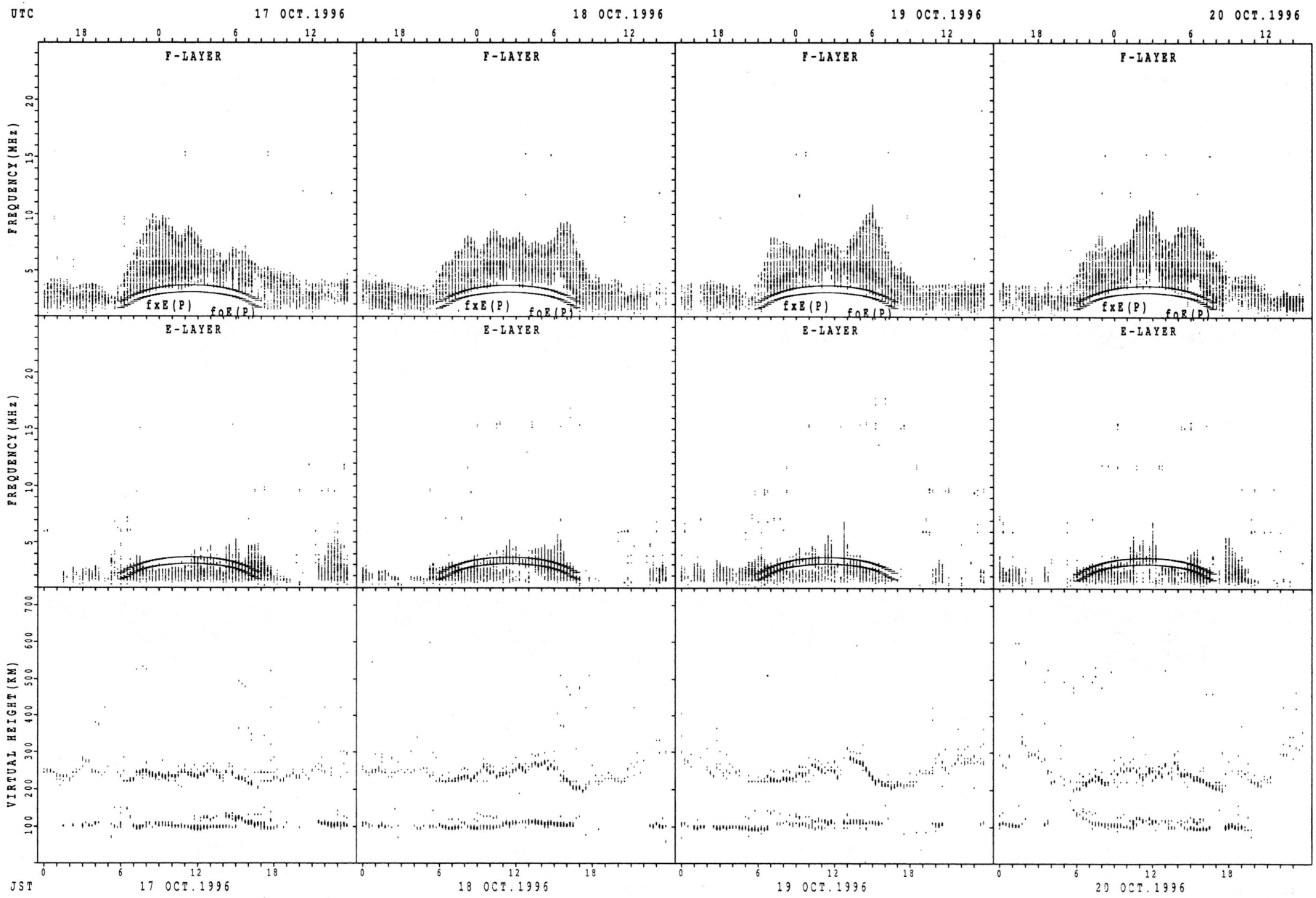
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

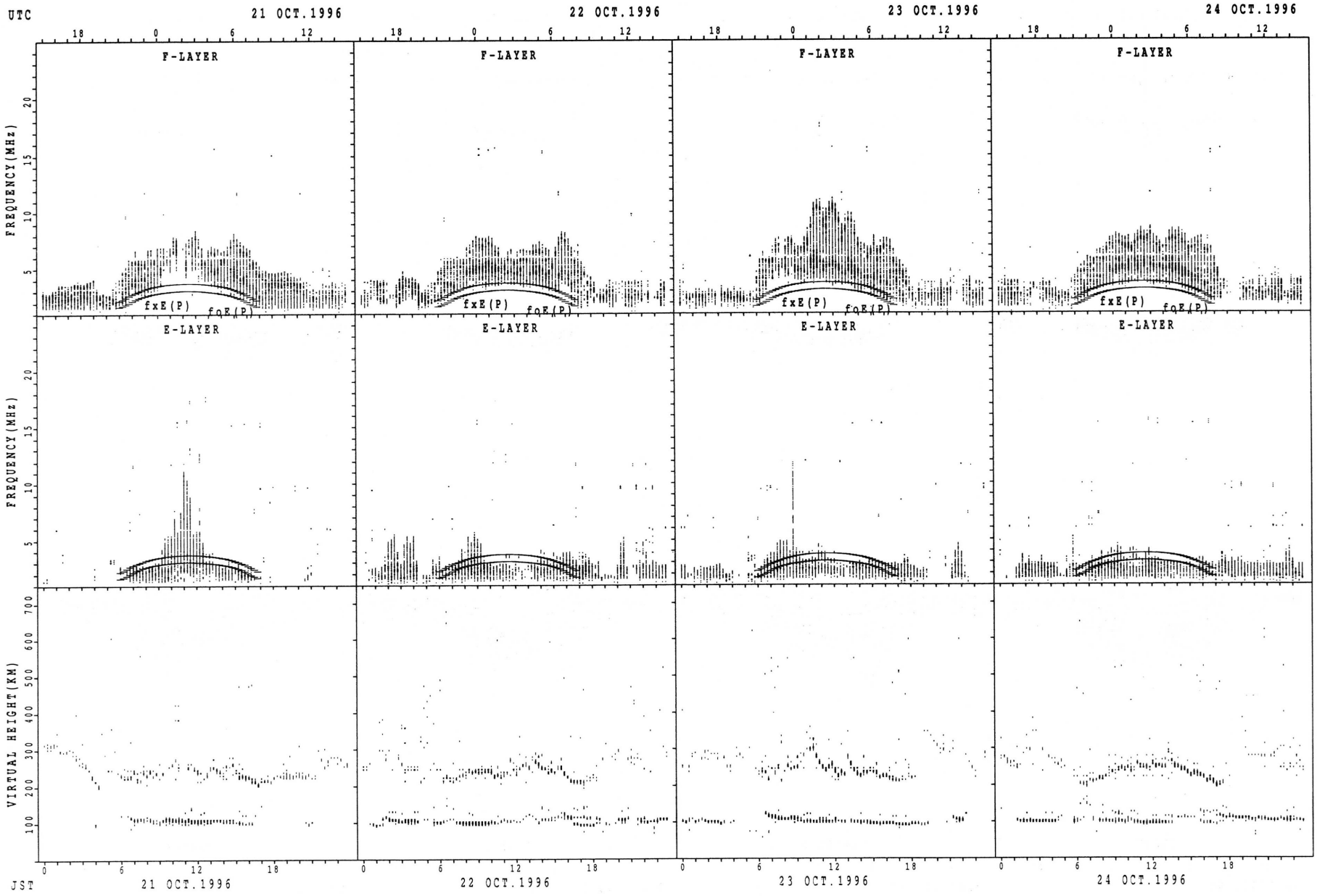

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
13 OCT.1996
14 OCT.1996
15 OCT.1996
16 OCT.1996
F-LAYER
E-LAYER
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
fxE(P)
foE(P)
fxE(2): PREDICTED VALUE FOR fxE
foE(2): PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



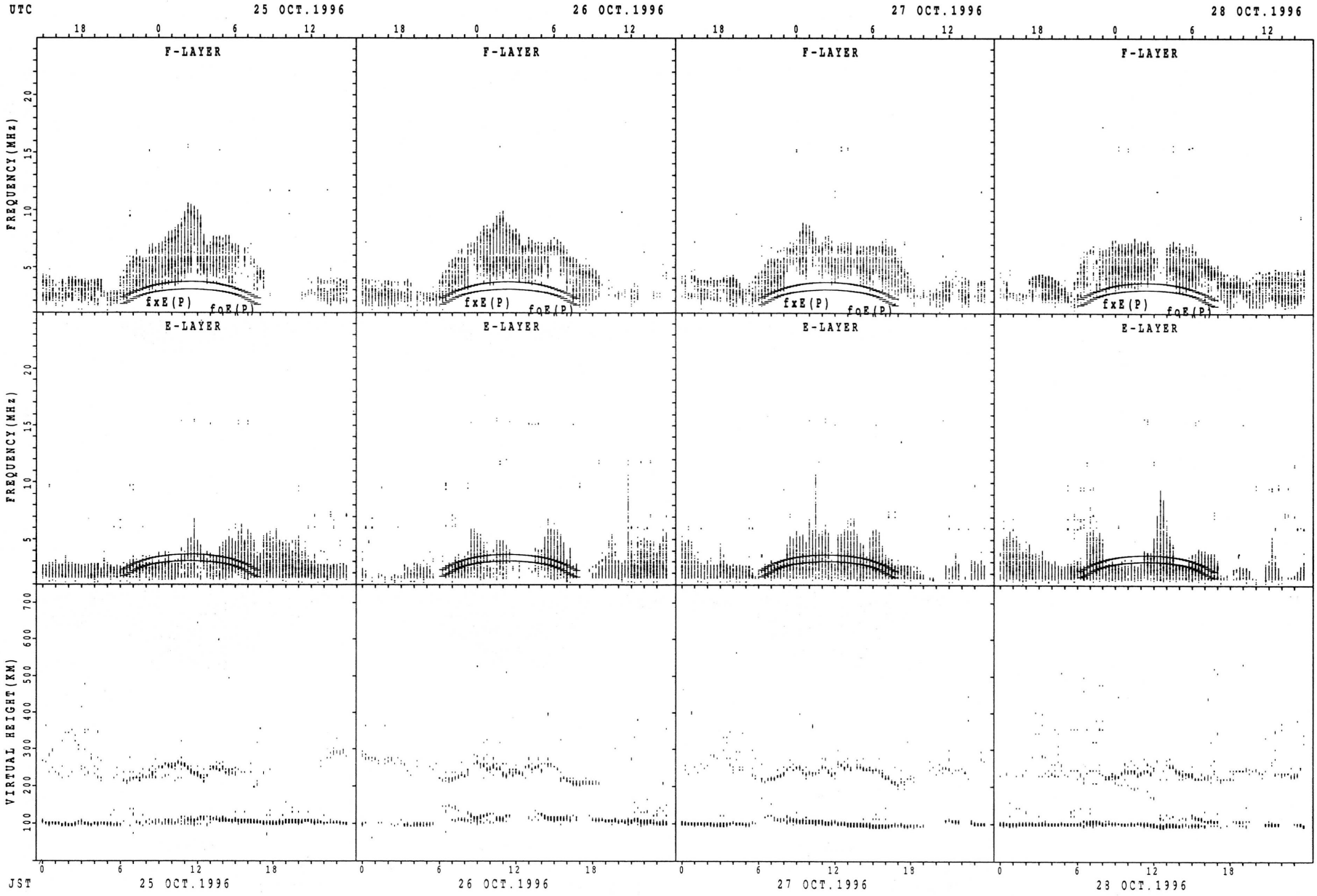
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

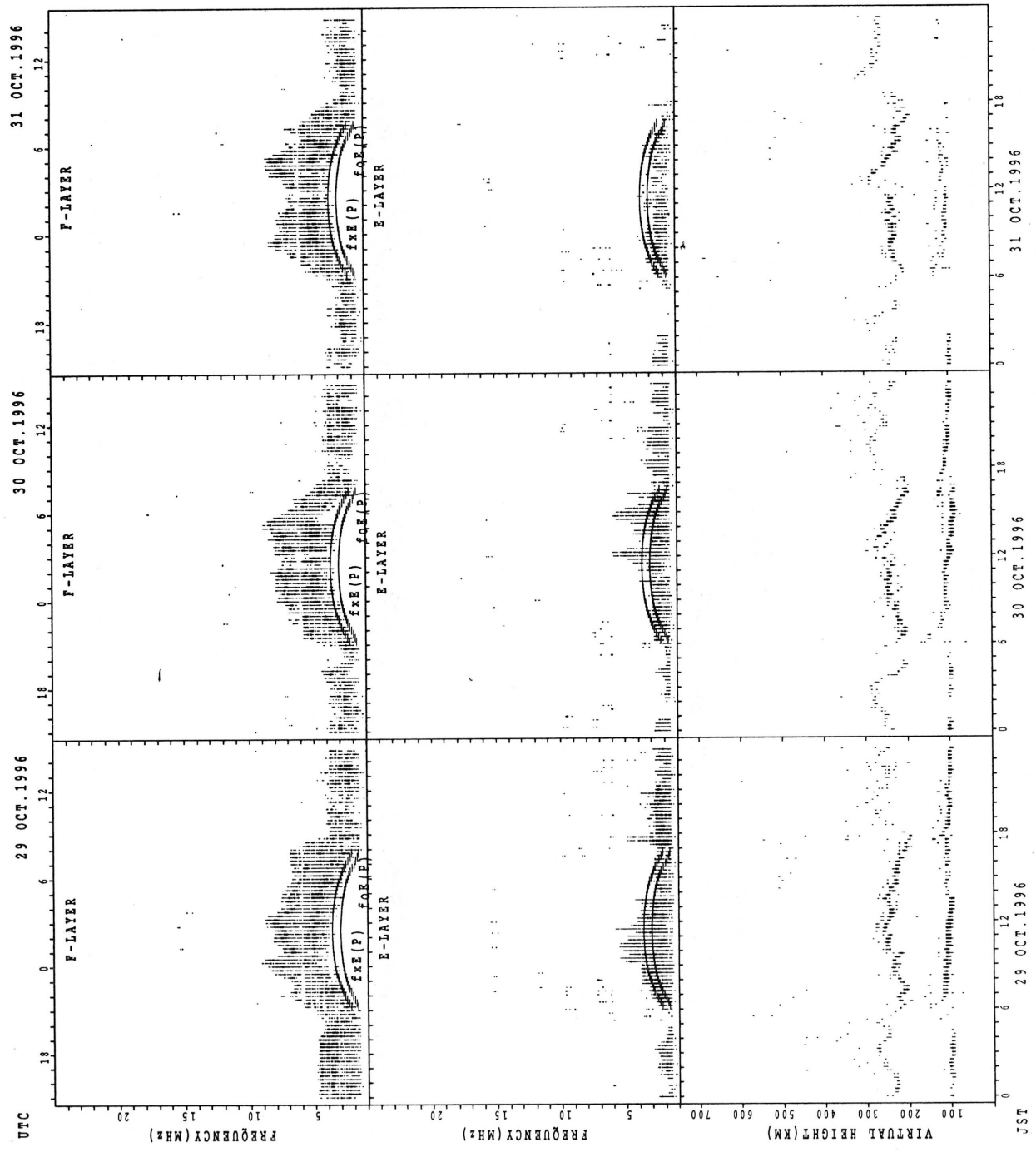


fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

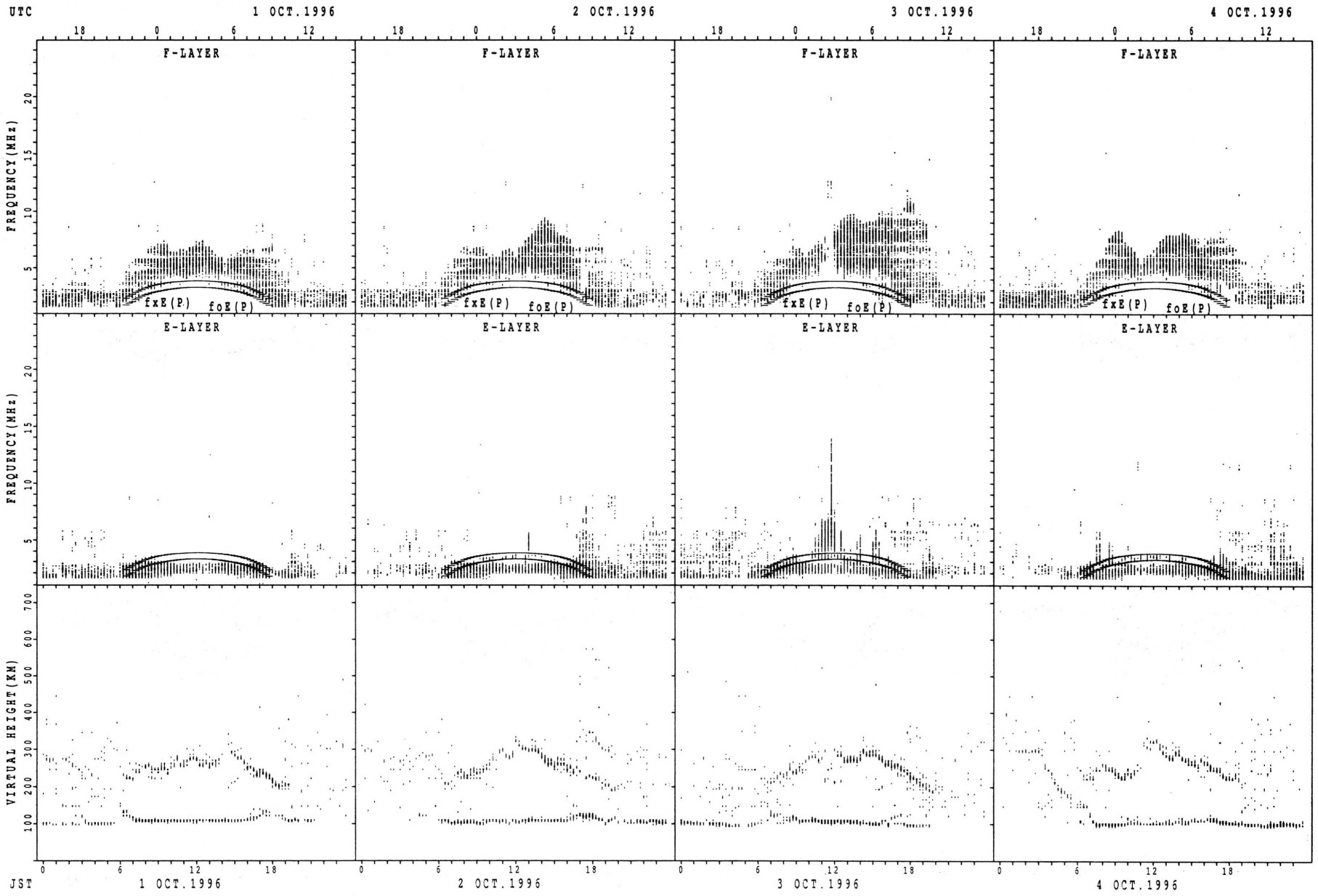
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

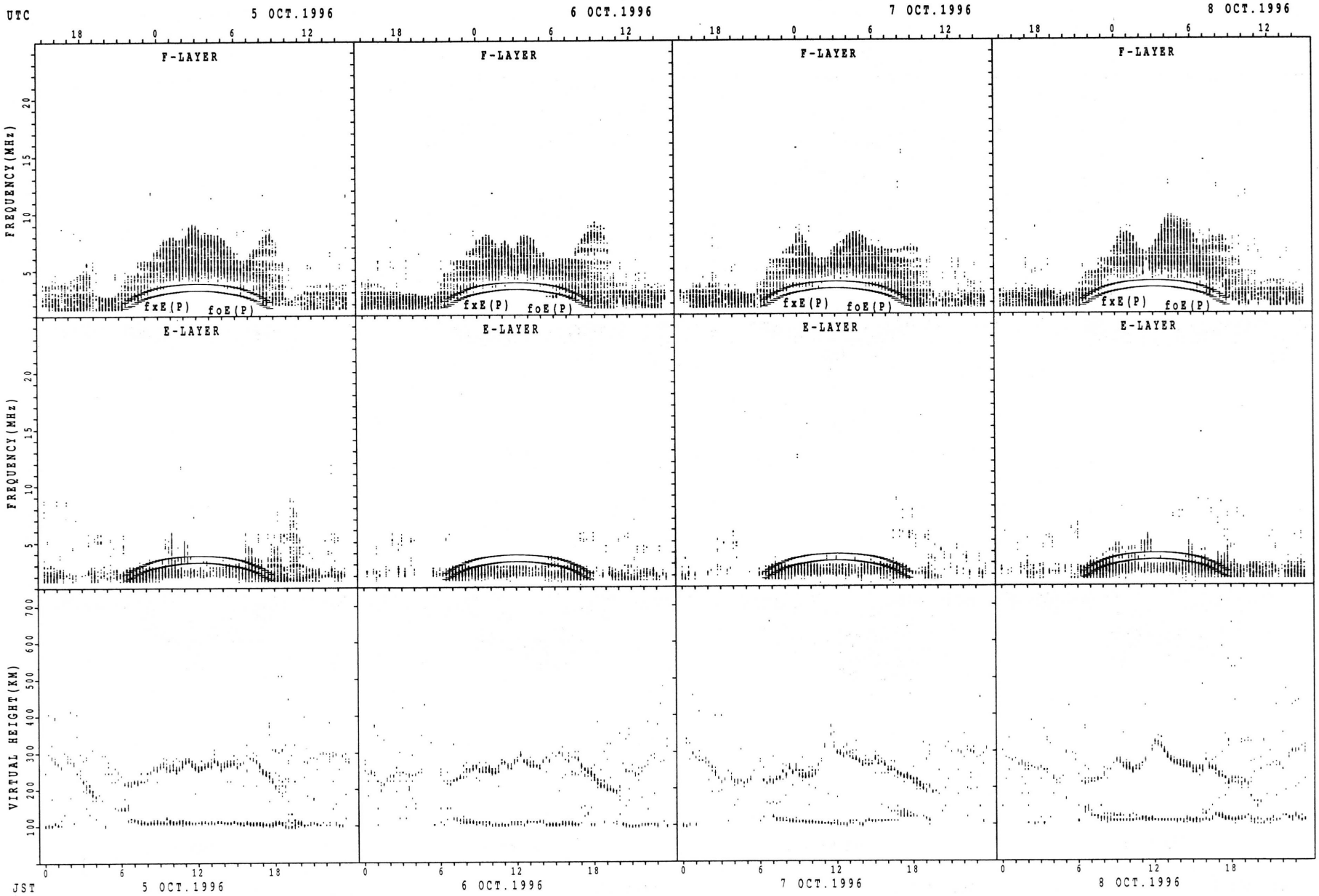

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
29 OCT.1996
30 OCT.1996
31 OCT.1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA



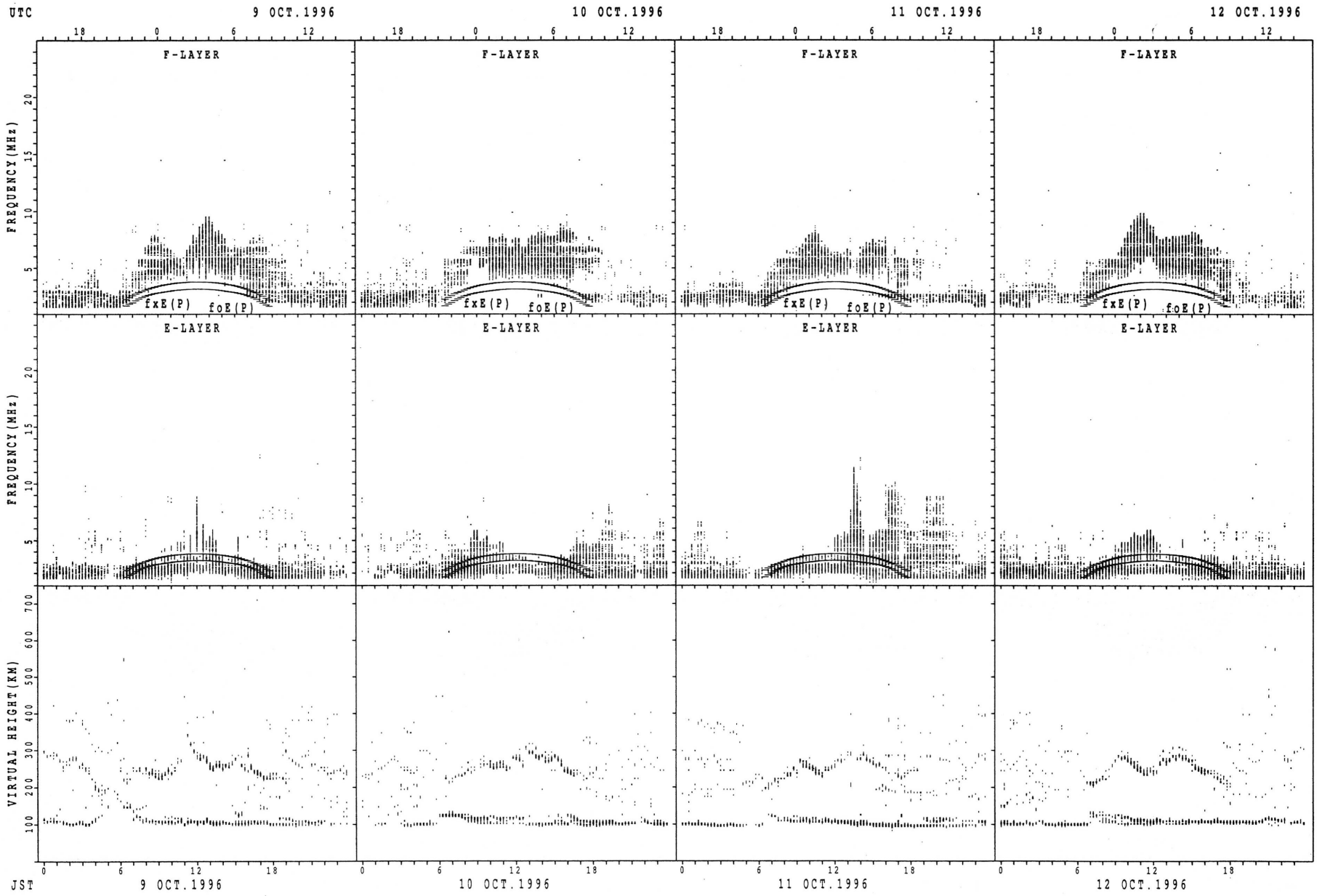
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA



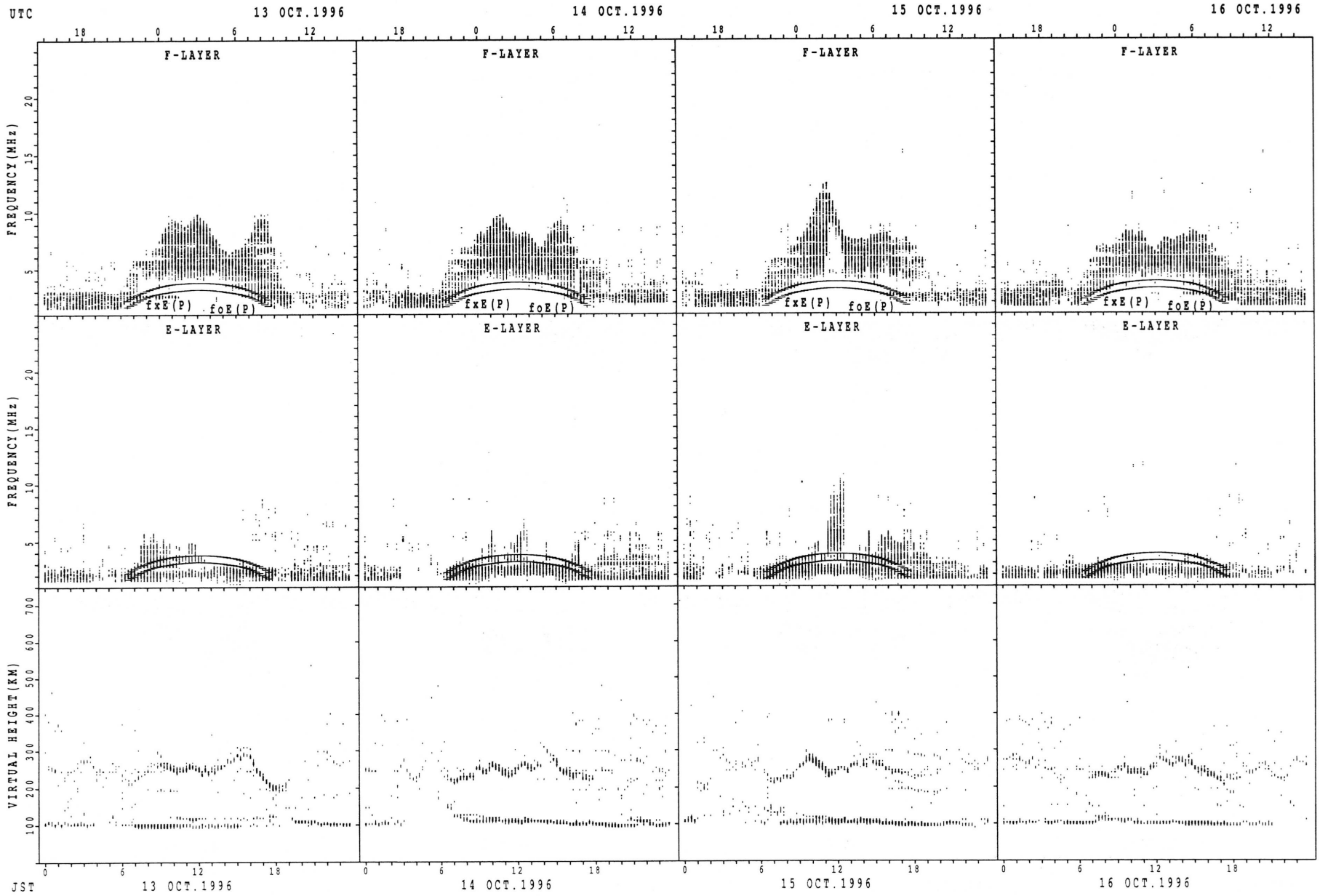
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA



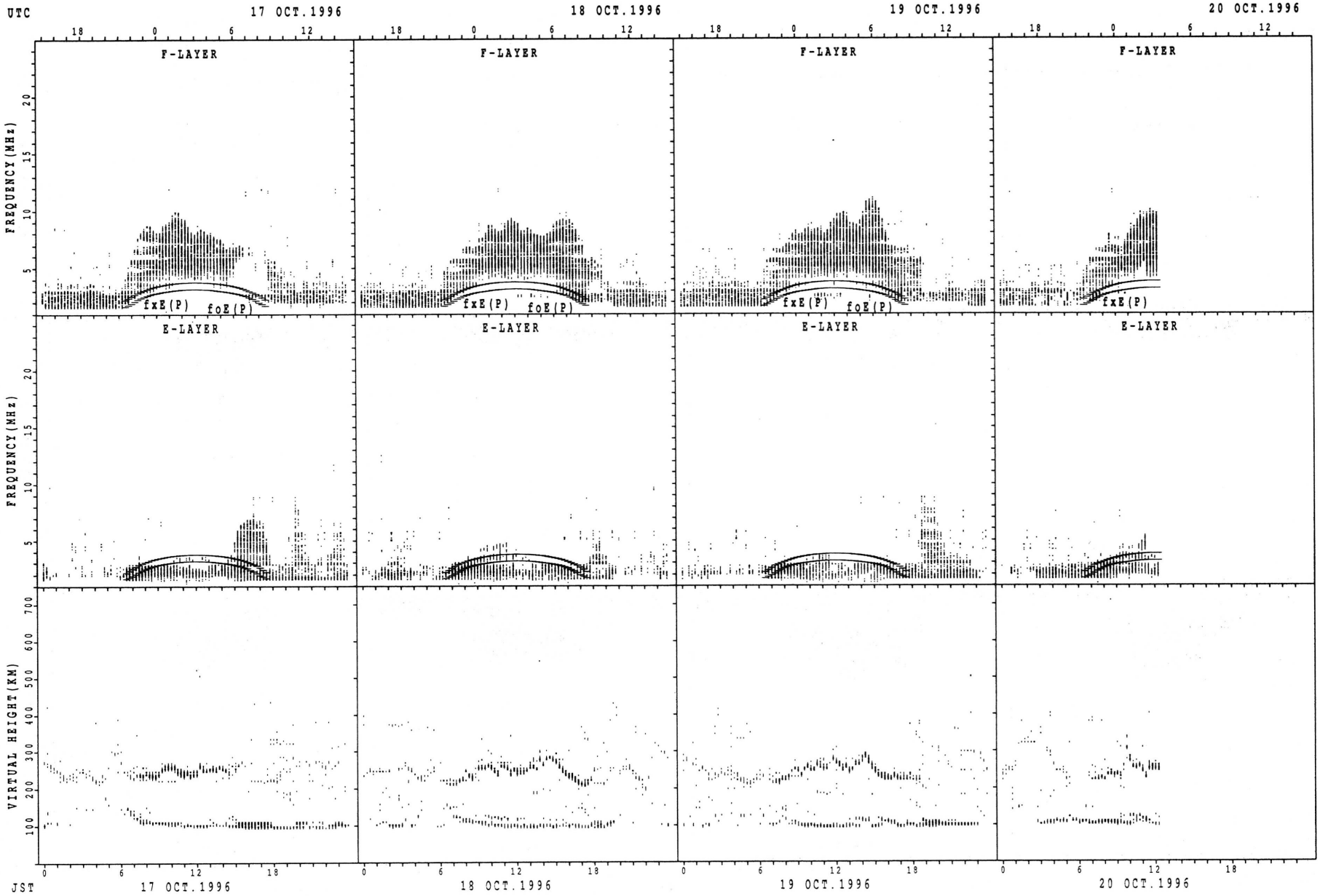
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA

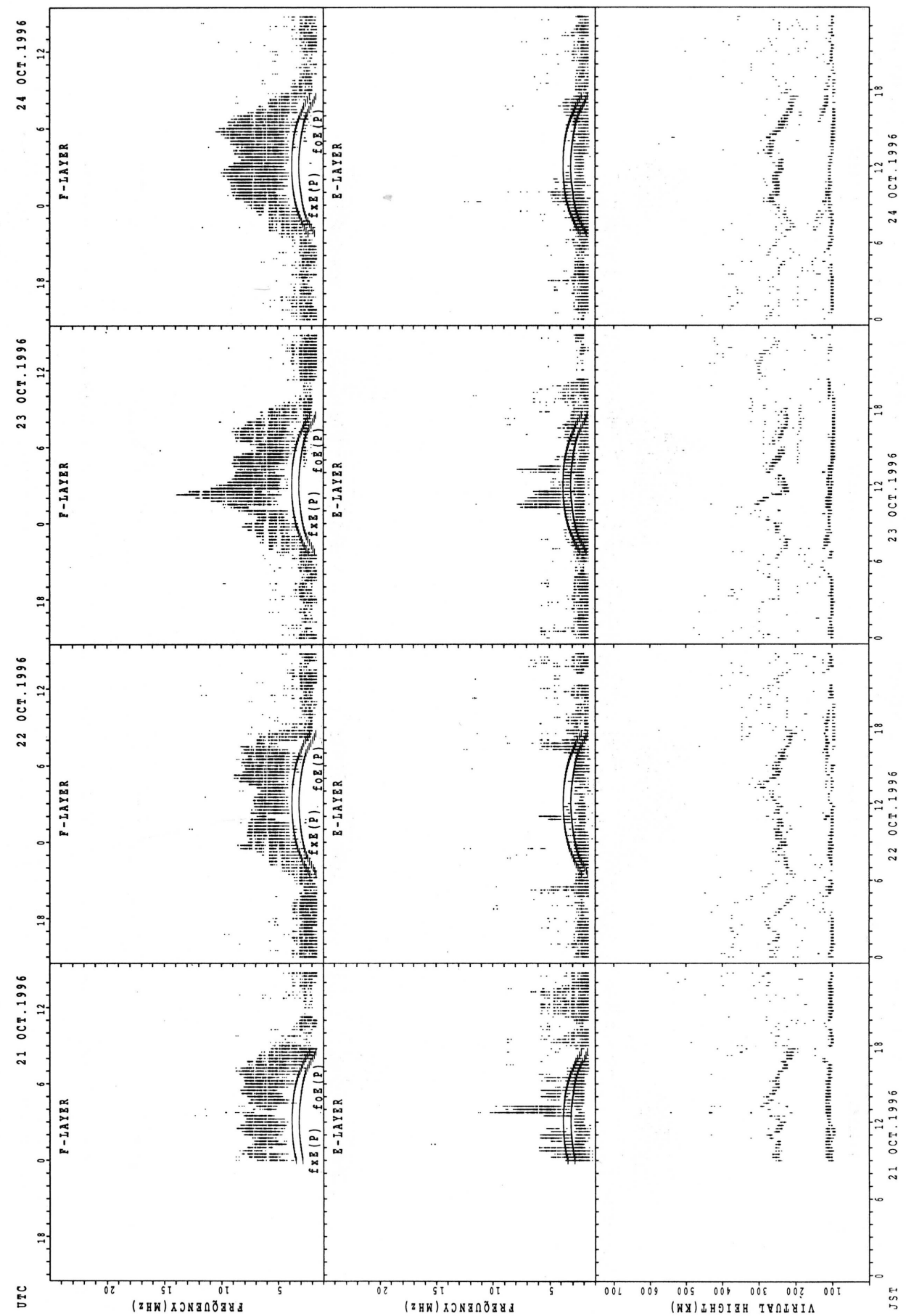


fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

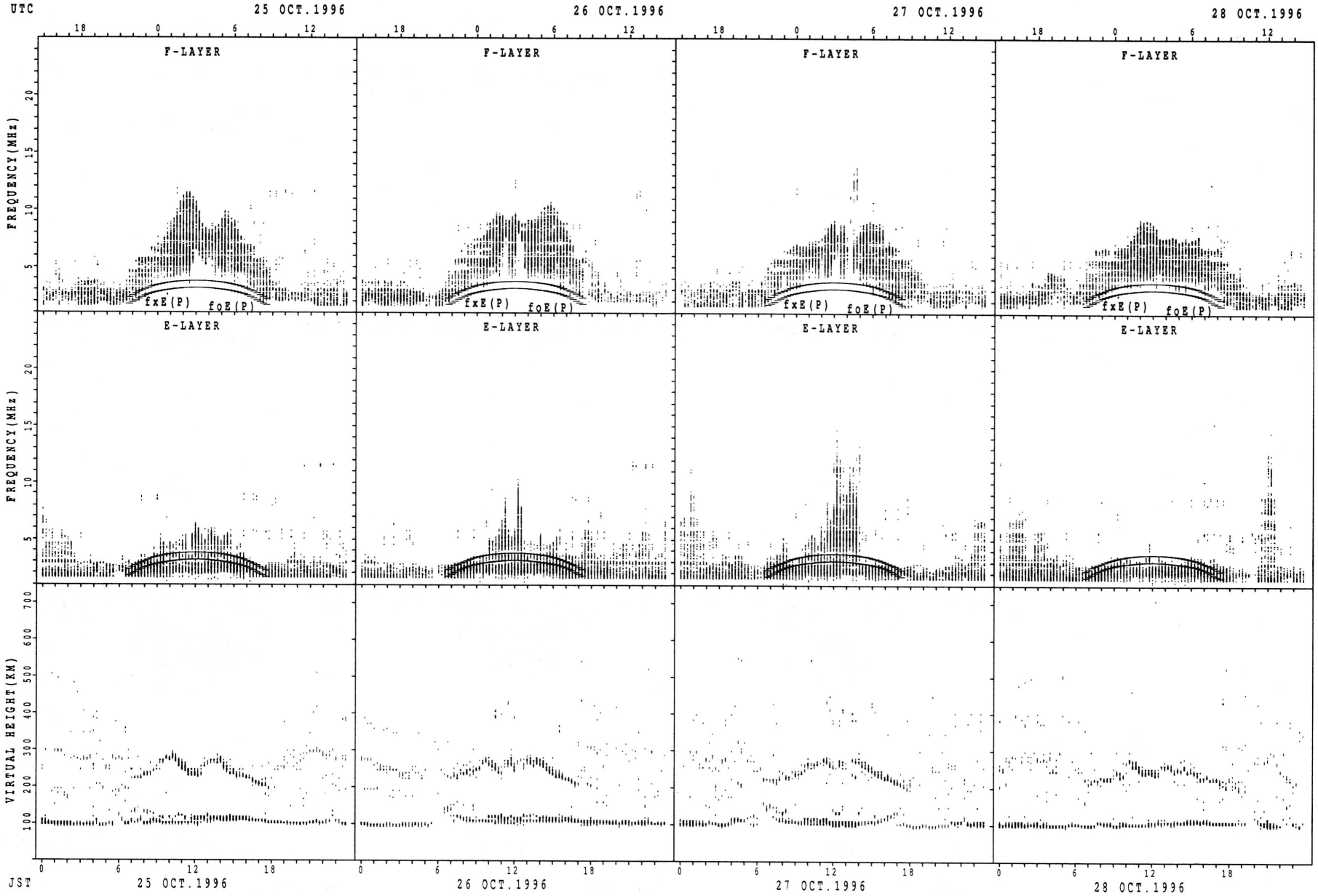
SUMMARY PLOTS AT YAMAGAWA



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

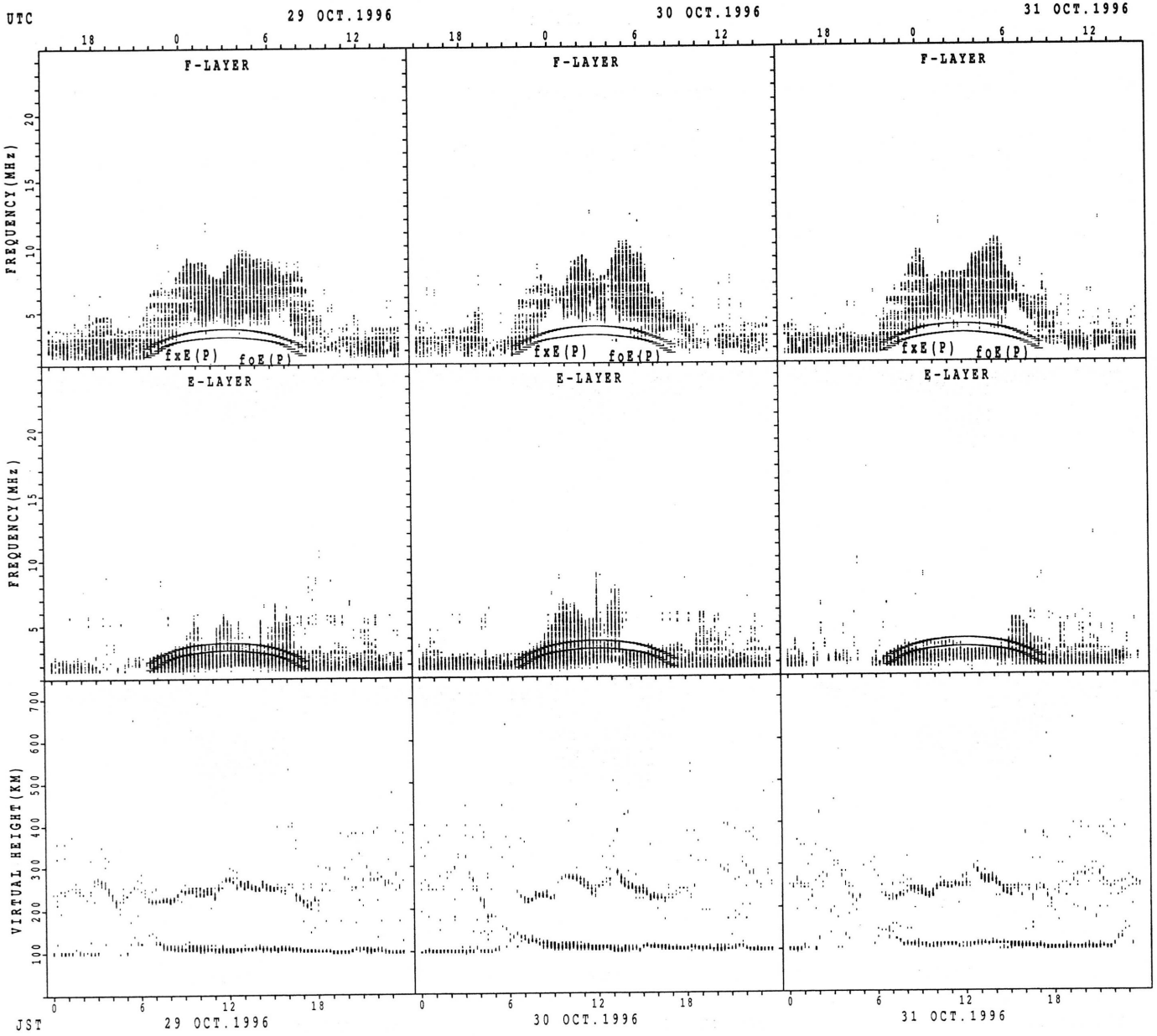

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
21 OCT.1996
22 OCT.1996
23 OCT.1996
24 OCT.1996
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA



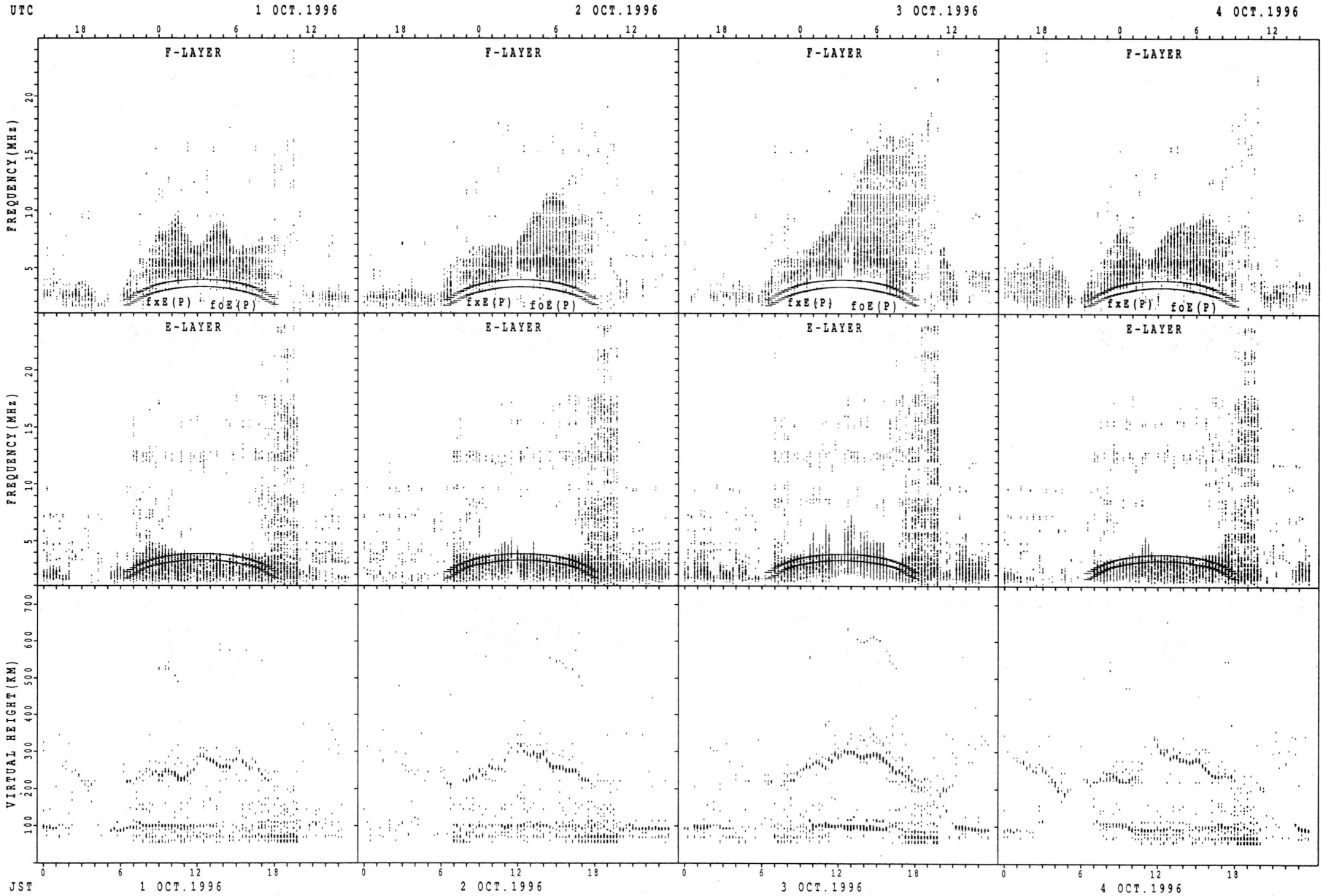
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA



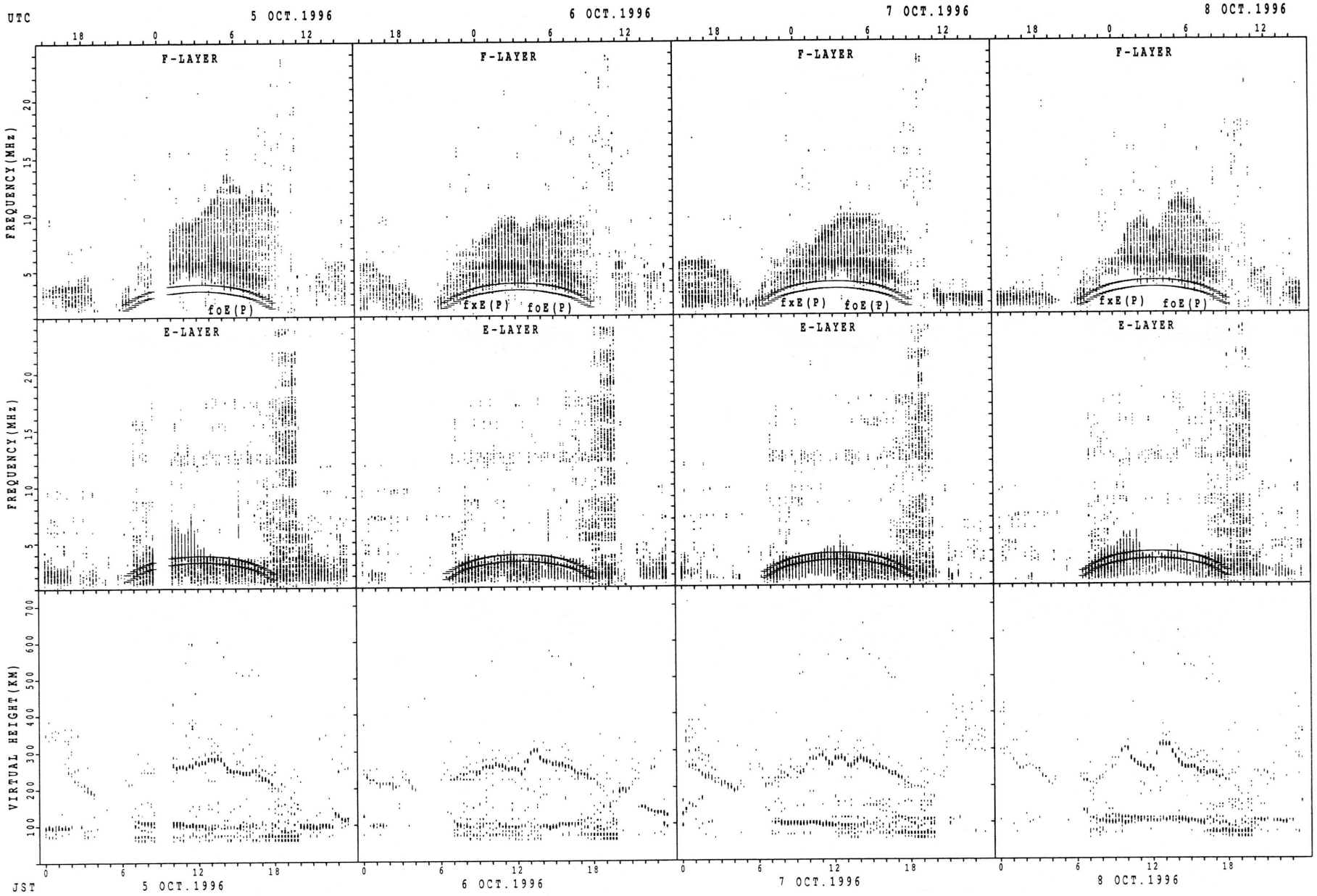
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



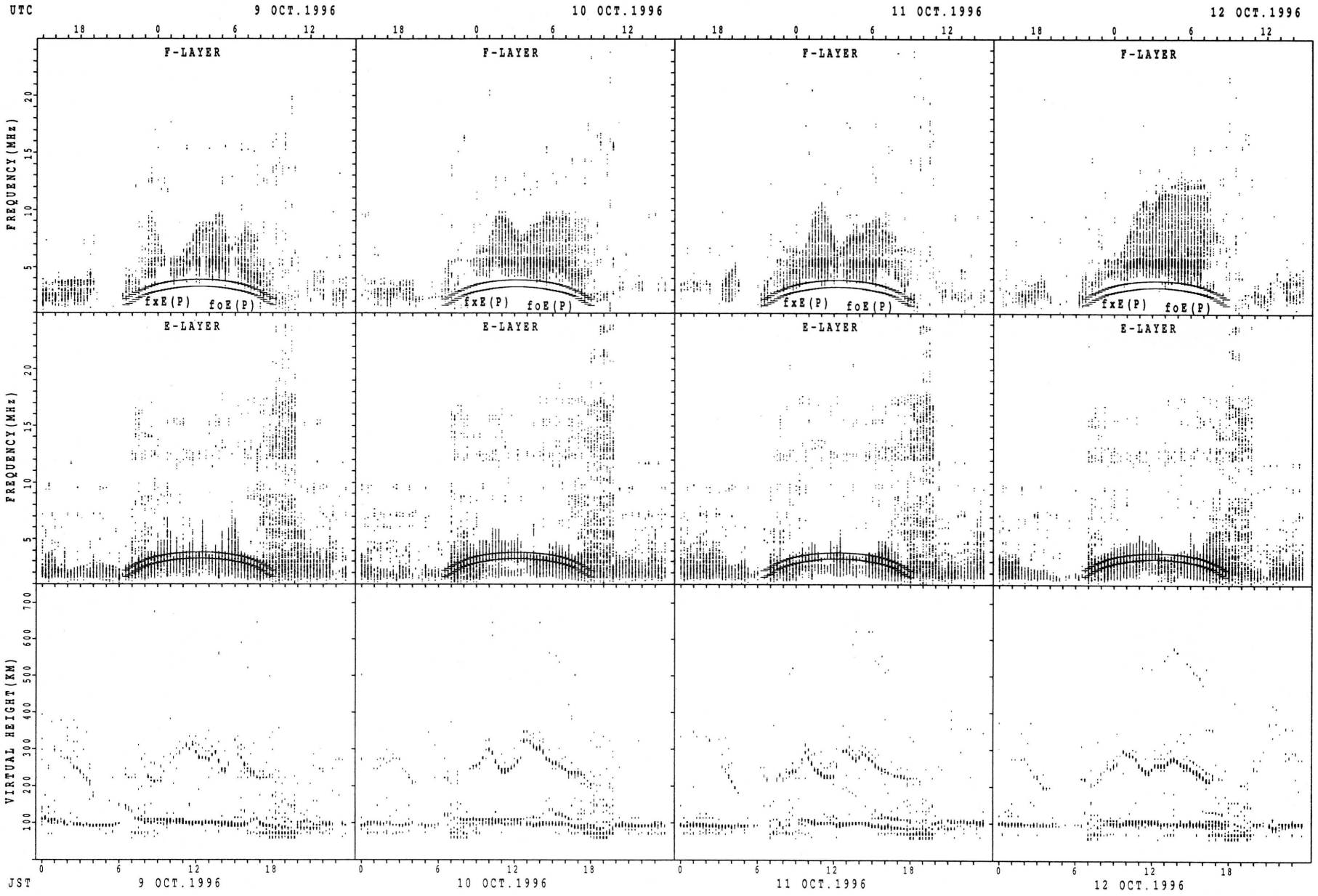
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA

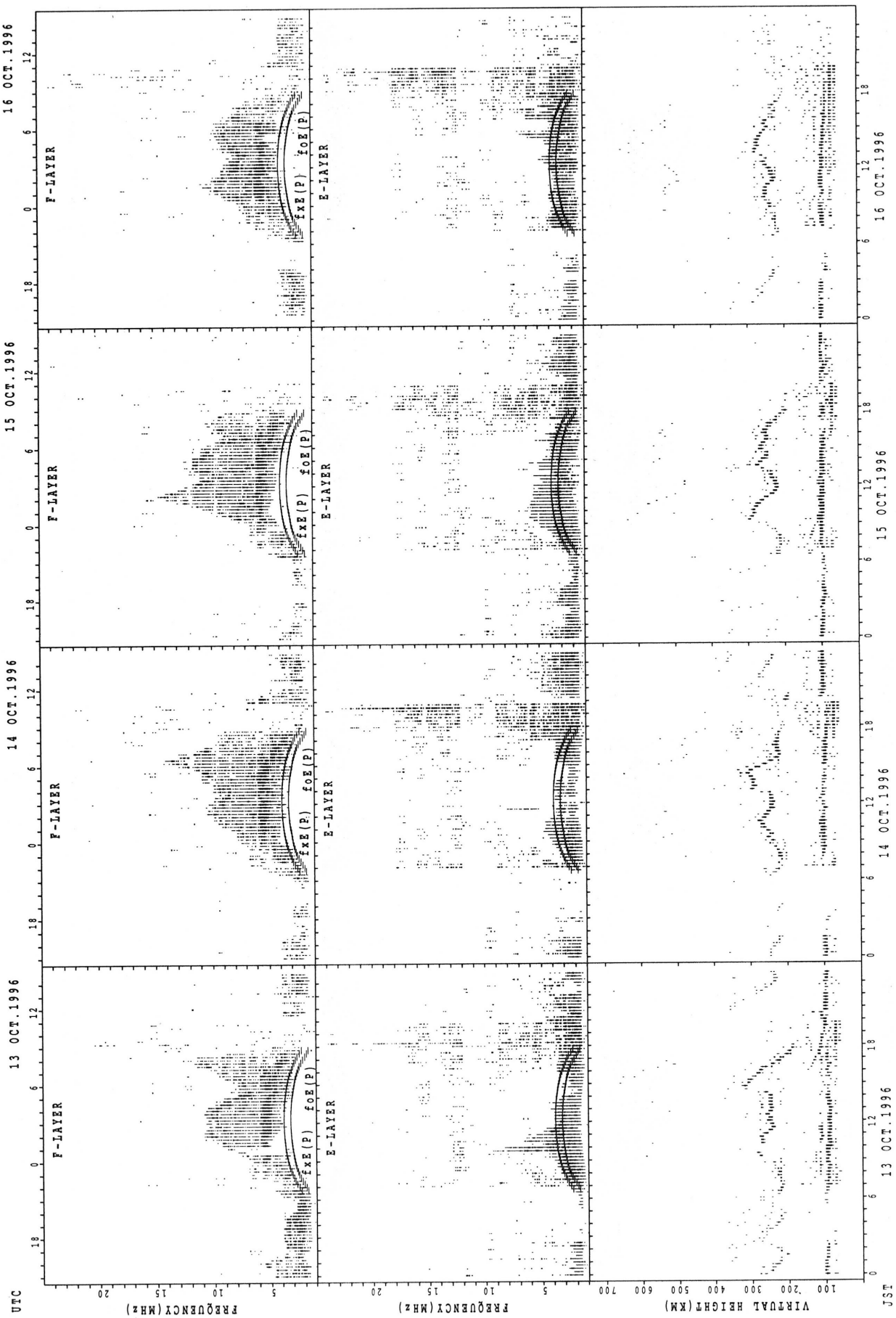


fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

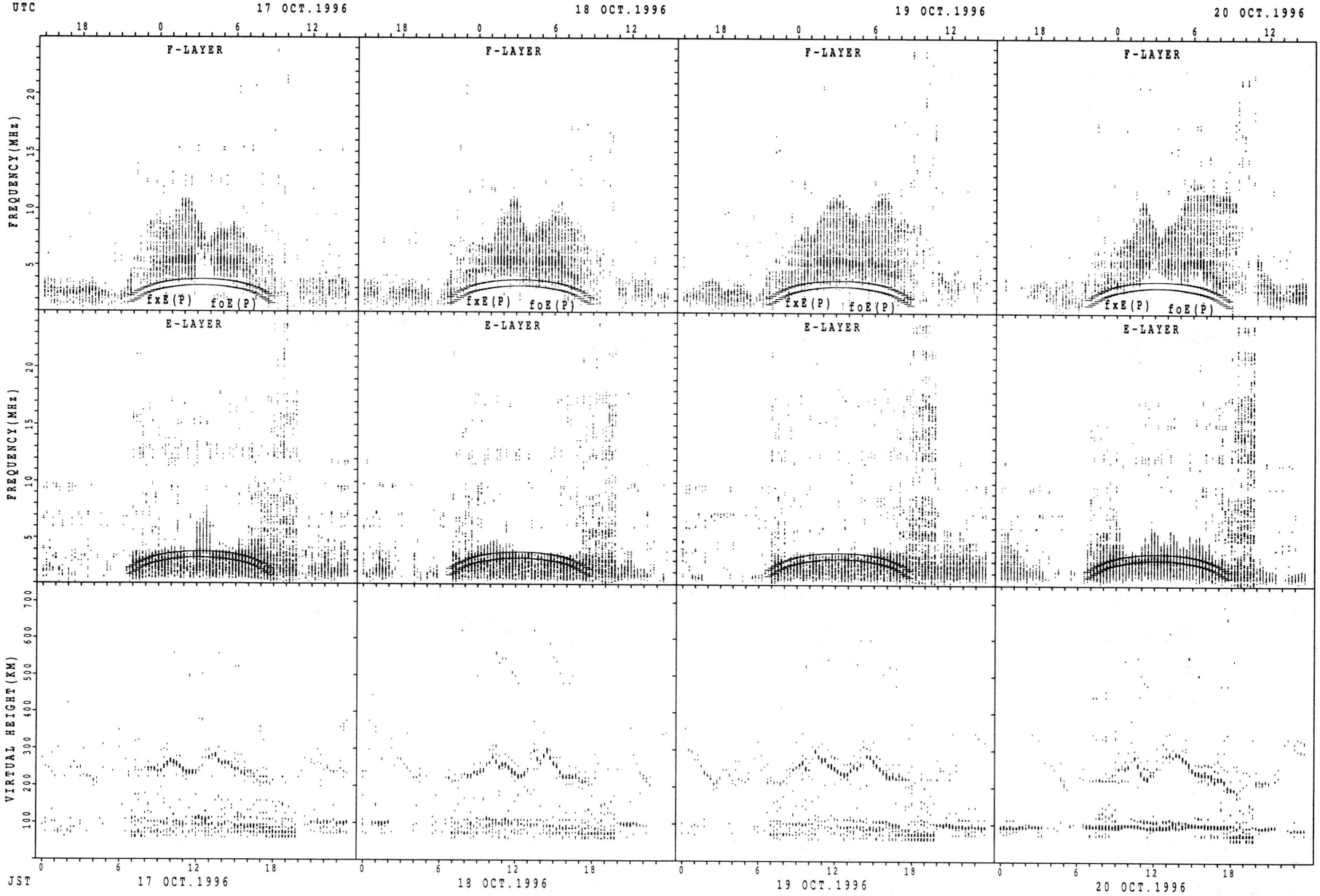
SUMMARY PLOTS AT OKINAWA



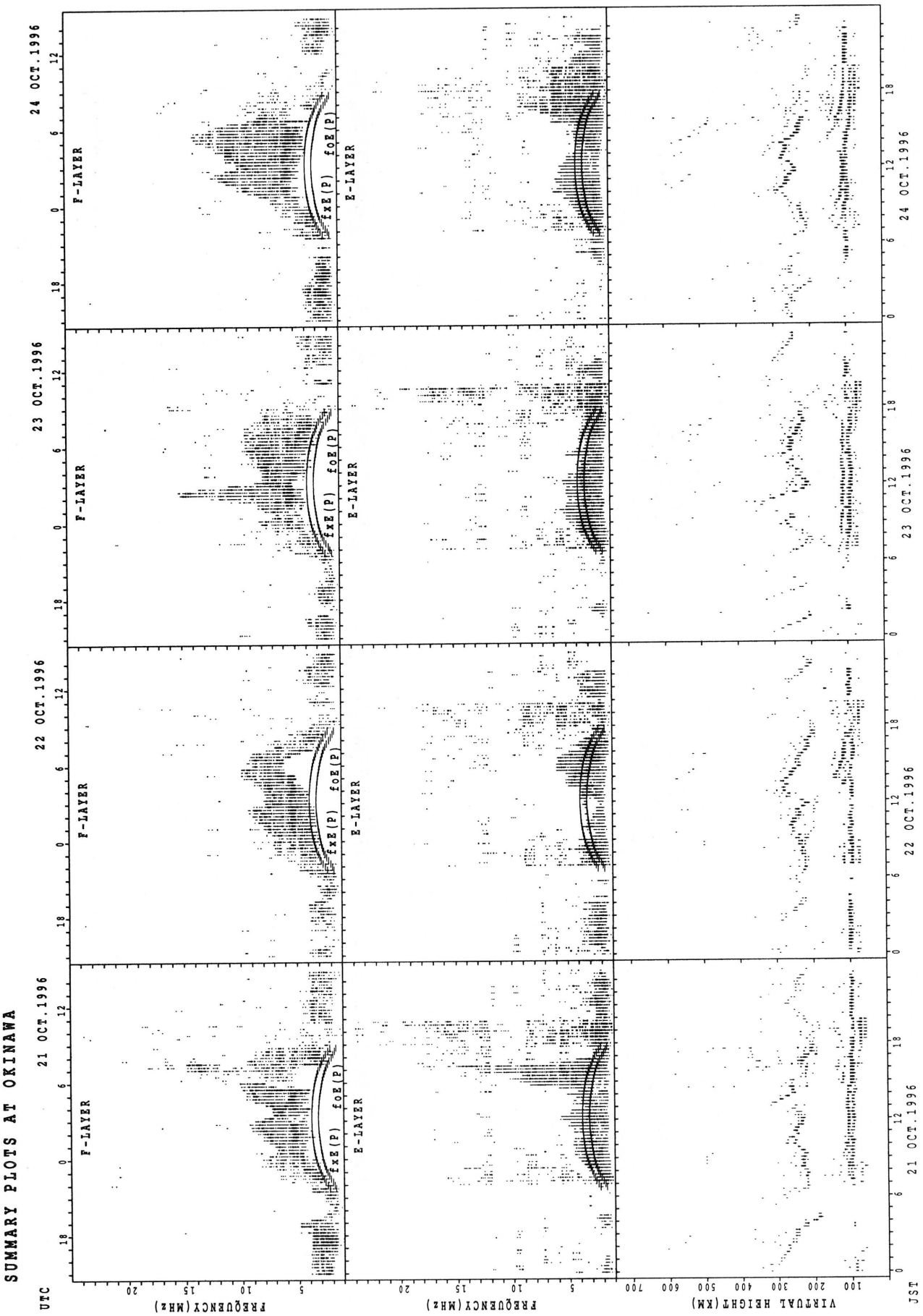
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
JST
13 OCT.1996
14 OCT.1996
15 OCT.1996
16 OCT.1996
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

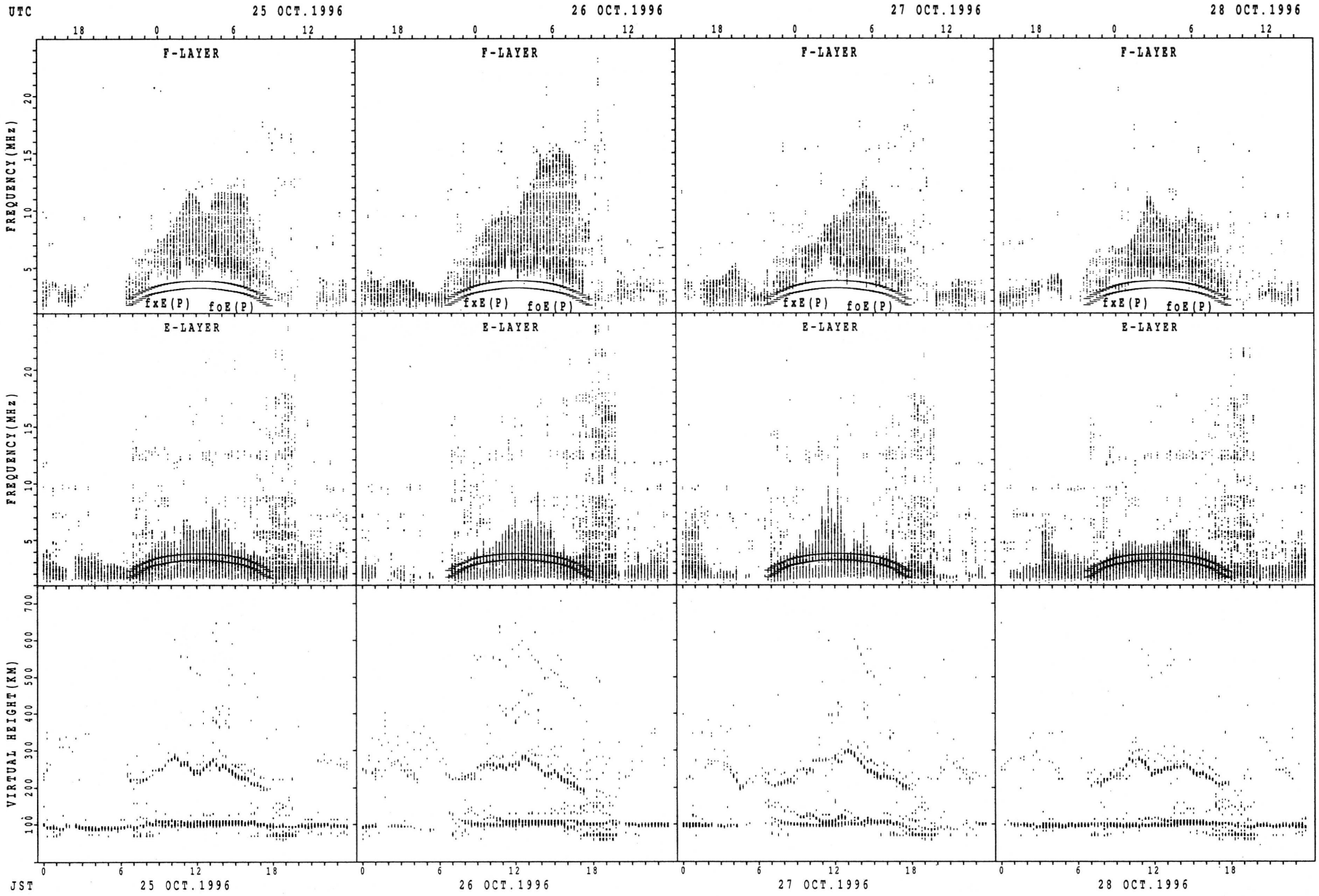
SUMMARY PLOTS AT OKINAWA



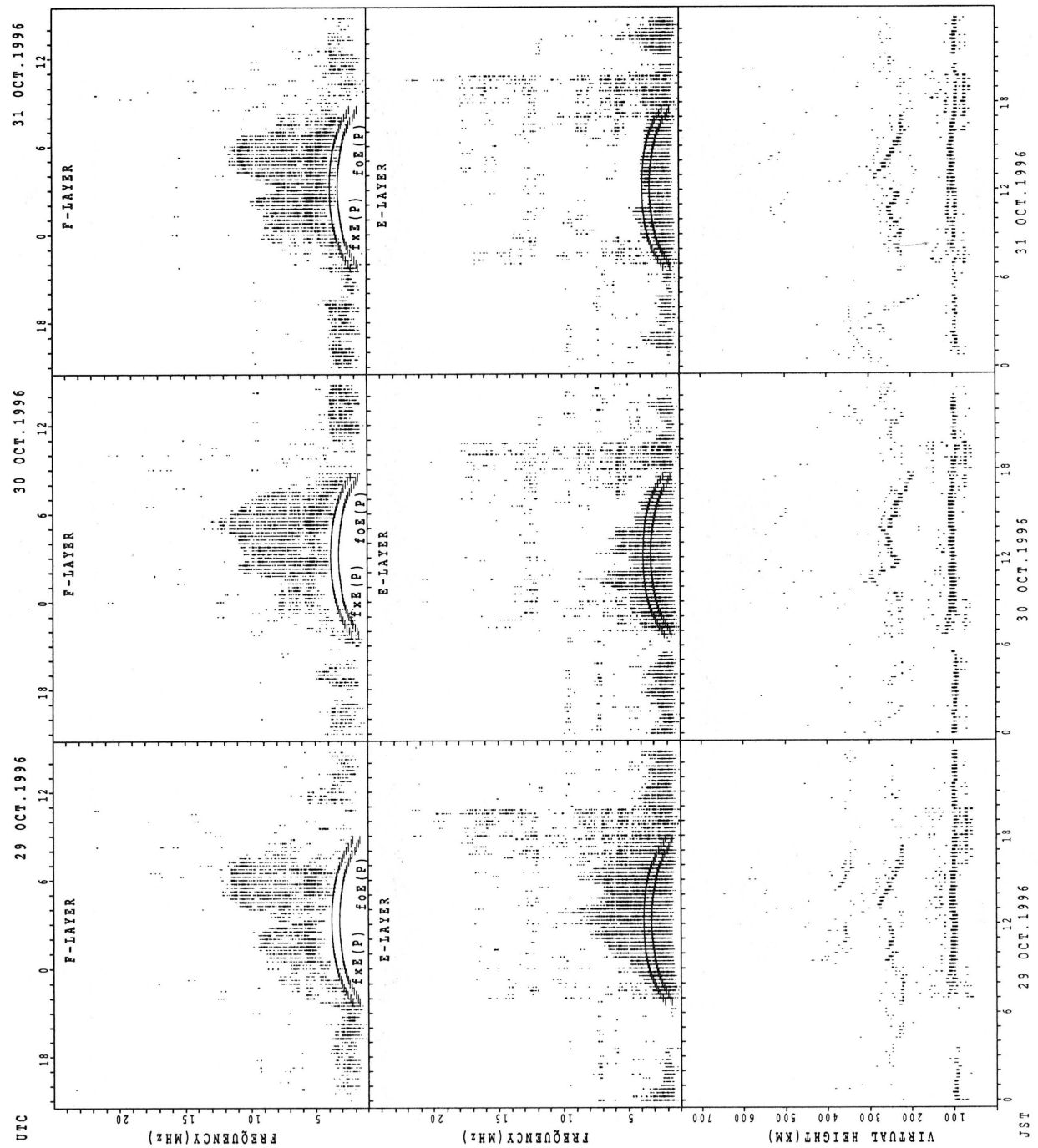
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

SUMMARY PLOTS AT OKINAWA



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


SUMMARY PLOTS AT OKINAWA
UTC
JST
29 OCT.1996
30 OCT.1996
31 OCT.1996
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

MONTHLY MEDIANS OF h'F AND h'Es

OCT. 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										19	28	20	25	19	11		12							
MED										256	261	249	246	262	252		242							
U Q										270	282	259	252	266	260		247							
L Q										248	244	238	224	250	246		235							

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	20	20	19	21	18	16	22	28	31	31	31	28	31	31	28	29	22	27	26	22	22	21	19	19
MED	105	103	103	103	101	101	109	131	119	113	107	105	105	103	104	105	105	103	102	105	104	103	103	105
U Q	109	107	107	106	103	105	151	146	121	119	111	109	109	111	107	113	111	109	105	105	105	113	113	107
L Q	102	99	99	98	95	99	99	119	109	107	105	103	101	97	100	102	99	99	99	99	101	97	101	99

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									18	25	23	21	24	17	15	22	18							
MED									243	250	254	248	256	278	258	255	234							
U Q									256	264	272	258	280	285	270	268	258							
L Q									238	237	242	245	244	270	250	240	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	19	15	15	14	16	11	21	26	31	31	29	30	28	26	31	28	31	24	22	20	16	15	14	17
MED	105	103	103	103	103	101	137	125	119	115	113	110	107	113	111	111	113	107	101	106	105	107	106	105
U Q	107	107	107	105	104	105	153	143	125	121	116	115	113	119	119	116	119	113	109	110	109	111	111	107
L Q	101	101	103	99	100	99	102	113	111	111	107	107	103	105	105	101	101	100	97	102	104	105	105	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									13	26	26	27	27	26	27	25	25	13						
MED									250	250	255	254	254	265	266	256	246	240						
U Q									266	266	268	272	274	274	286	271	264	257						
L Q									240	240	248	240	240	254	256	243	233	229						

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	22	14	15	16	14	18	30	27	31	30	31	30	29	30	29	30	30	28	26	23	24	18	22
MED	105	105	104	105	105	105	108	138	119	113	112	113	111	111	111	113	113	111	107	105	105	107	107	107
U Q	110	107	105	105	107	111	127	149	131	123	119	117	115	112	113	118	121	127	111	107	111	110	109	111
L Q	103	103	103	101	103	103	107	125	111	109	109	107	107	107	107	105	107	105	102	101	103	105	105	105

MONTHLY MEDIANS OF h'F AND h'Es

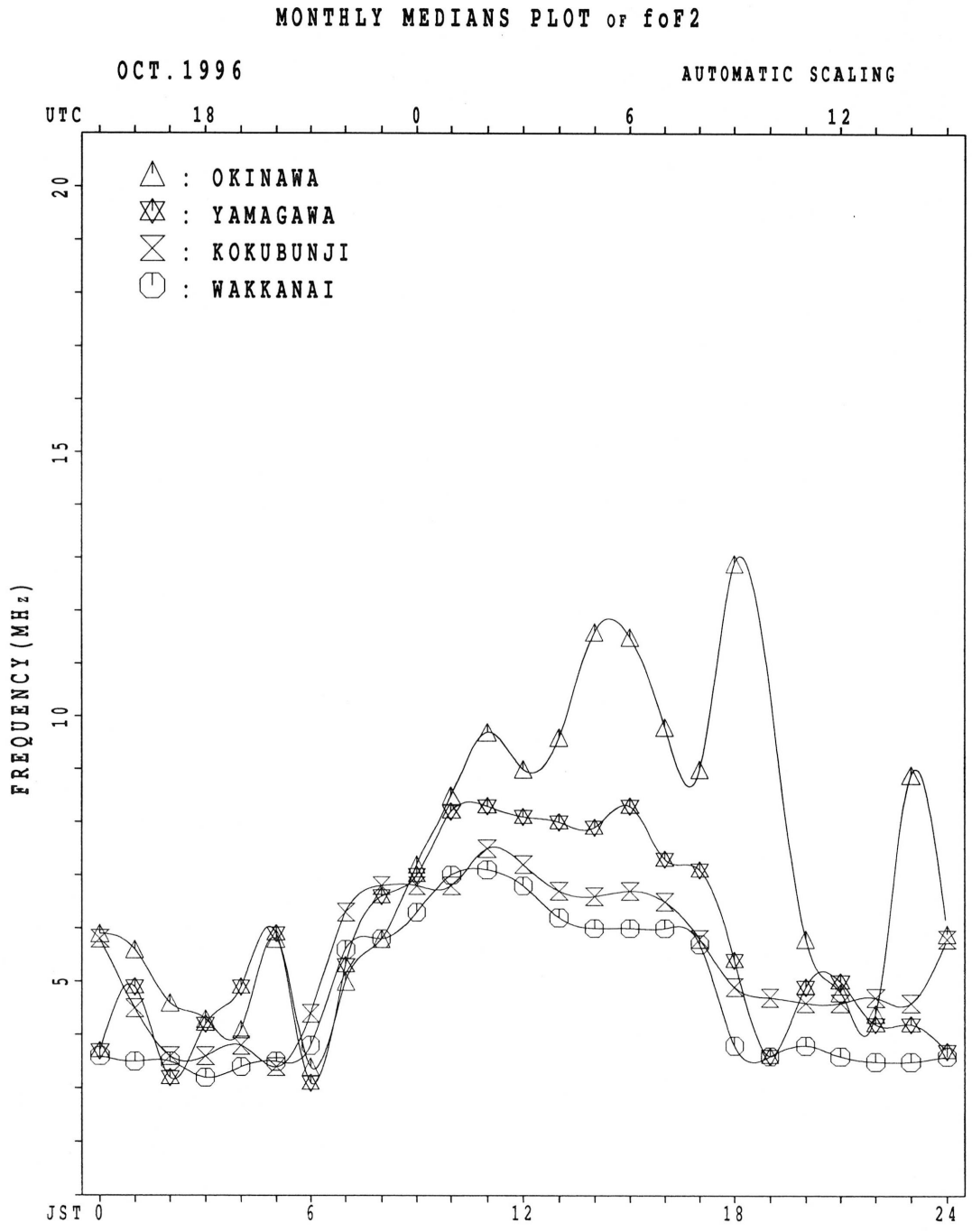
OCT. 1996 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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									10	23	28	27	28	30	30	29	30	25						
MED									252	246	264	254	246	278	262	250	239	226						
U Q									282	260	284	264	270	290	278	265	248	240						
L Q									244	238	256	240	238	256	256	240	224	224						

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	20	16	14	11			22	24	28	29	27	29	29	27	26	28	20	20	21	24	24	23	21
MED	97	99	97	95	93			108	107	107	107	107	107	103	105	104	101	101	91	101	97	98	97	99
U Q	103	101	99	97	99			125	113	113	111	109	110	110	113	109	107	109	100	133	103	101	99	112
L Q	95	95	97	91	89			93	95	104	101	103	102	95	95	99	95	94	83	85	95	95	91	94


MONTHLY MEDIANS PLOT OF foF2
OCT.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

OCT. 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 41	X 41	X 38	X 40	X 36	X 33													X 57	A	X 41	X 39	40	X 37
2	38	36	X 36	X 35	33	36													X 58	56	X 44	X 36	40	41
3	41	40	A	X 36	35	X 38													X 80	X 72	A	A	X 36	38
4	38	X 37	X 37	X 35	X 39	X 35													X 56	X 49	X 50	46	44	X 41
5	49	47	42	49	51	X 34													X 63	X 49	X 42	41	40	41
6	41	42	X 36	X 34	X 30	30													X 82	X 60	58	X 50	X 35	X 37
7	X 36	X 36	X 37	X 40	X 38	X 33													X 69	X 47	X 33	X 34	34	37
8	X 37	X 38	X 37	36	36	X 29													X 63	X 40	X 35	X 37	38	X 37
9	X 37	X 37	X 34	X 35	X 38	X 32													X 69	X 46	X 46	X 48	X 48	X 49
10	X 49	X 37	X 40	X 41	X 38	X 39													X 71	X 48	O X 43	X O 43	X 43	A
11	A	X 41	X 40	X 39	41	X 40													X 56	X 54	X 48	X 46	X 45	X 40
12	X 37	X 38	X 39	X 43	X 42	33													X 59	X 42	X 39	40	A	41
13	46	X 40	X 41	38	X 34	X 33													X O 61	X 38	39	38	40	40
14	X 44	X 37	X 35	X 36	X 32	X 26													X 50	X 41	X 43	44	A	44
15	X 46	X 43	33	33	35	34													X 66	X 46	X 44	X O 44	X 44	X 43
16	X 40	X 40	X 40	X 40	X 42	X 40													X 50	X 49	X 50	X 50	X 46	X 46
17	X 44	X 45	X 40	X 38	X 39	X 33													X 54	X 49	X 45	X 40	X 44	X 43
18	X 43	X 43	42	X 39	X 39	X 38													X 46	X 43	X 44	X 37	X 37	X 36
19	X 40	X 40	X 42	X 40	X 39	X 35													X 49	X 42	X 41	X 41	X 42	X 42
20	X 42	X 40	X 39	X 38	X 40	X 37													X 48	X 48	X 48	X 37	36	35
21	X 35	36	37	39	X 41	X 29													X 48	X 49	X 46	X 38	X 40	X 40
22	X 41	X 42	42	44	45	33													X 44	X 38	X 40	X 42	X 44	X 30
23	X 40	X 34	X 37	X 36	X 32	X 33												X 62	X 44	X 39	X 42	X 40	X 44	X 43
24	X 42	X 42	X 38	X 38	X 38	X 32												X 62	X 36	X 39	X 40	X 43	X 43	X 44
25	X 46	X 43	43	X 40	41	X 31												X 52	A	X 38	A	43	42	42
26	42	X 41	X 39	X 38	A	X 33												X 55	X 52	A	X 36	41	A	44
27	50	X 44	X 40	42	43	X 38												X 64	X 46	X 40	X 41	X 45	X O 43	X 36
28	43	X 40	X 42	46	44	X 36												X 55	X 46	X 46	X 48	52	X 50	X 48
29	X 50	X 50	X 50	X 49	50	45												X 71	X 45	X 44	X 41	X 43	X 43	X 42
30	X 44	X 40	X 41	X 39	X 46	X 28												X 50	X 43	X 42	44	44	43	45
31	X 43	X 40	X 34	X 38	X 38	X 35												X 51	X 40	X 34	X 38	X 41	X 41	X 40
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	31	30	31												9	30	29	29	30	28	30
MED	X 42	X 40	X 39	X 39	X 39	X 33												X 55	X 53	X 46	X 43	X 42	X 42	X 41
U Q	X 44	X 42	41	40	42	X 37												X 63	X 63	X 49	X 46	X 44	X 44	X 43
L Q	X 40	X 37	X 37	X 36	36	X 32												X 52	X 46	X 40	X 40	X 39	40	X 37

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

IONOSPHERIC DATA STATION Kokubunji

OCT. 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	35	35	32	34	30	27	46	R 51	54	60	59	63	66	58	54	57	62	59	51	A	35	33	F 32	31
2	F 30	F 29	30	29	F 26	F 30	44	57	63	54	J R 61	63	60	R 64	62	65	60	65	52	F 50	38	30	F 32	F 32
3	F 33	F 32	A	30	F 28	32	47	50	57	67	62	A	A	76	R 64	67	76	76	74	66	A	A	30	F 30
4	F 31	31	31	29	33	29	39	52	60	66	80	57	58	65	72	60	59	R 62	50	R 43	44	F 39	F 37	35
5	F 40	F 40	F 34	F 40	F 42	F 25	37	52	62	66	59	65	R 73	66	64	H 52	56	66	57	43	36	F 34	F 30	F 33
6	F 35	F 34	30	28	24	F 24	R 47	52	57	73	64	64	71	70	50	51	54	65	76	J R 54	F 51	44	29	31
7	30	30	31	34	32	27	44	60	81	70	58	51	58	60	61	59	56	60	R 63	41	27	28	F 28	F 30
8	31	32	31	30	F 28	23	42	50	61	62	57	72	69	70	69	75	76	71	57	34	29	31	F 32	31
9	31	31	28	29	32	26	49	50	64	58	66	67	82	72	62	67	73	75	62	40	40	42	42	43
10	43	31	34	35	32	33	46	R 62	R 64	67	69	74	66	68	64	69	77	66	65	43	37	37	37	A
11	A	35	34	33	33	34	49	54	64	67	66	64	61	60	54	66	64	53	50	48	42	40	39	34
12	31	32	33	37	37	F 27	46	60	60	63	65	78	87	58	58	61	57	60	53	36	33	F 33	A	F 32
13	F 40	34	35	F 32	29	27	43	55	R 62	74	86	89	75	59	59	58	72	81	55	32	F 30	F 31	F 34	F 34
14	38	31	29	30	26	20	43	51	81	75	64	86	71	63	63	59	64	52	44	35	F 36	F 36	A	F 36
15	40	37	F 26	F 27	F 28	F 25	43	55	70	76	79	98	78	64	R 62	74	68	67	60	40	38	38	38	37
16	34	34	34	34	36	34	40	57	71	69	68	60	71	68	65	73	64	54	44	43	44	44	40	40
17	38	39	34	32	33	27	38	62	85	92	84	83	76	64	59	64	60	49	48	43	39	34	R 38	37
18	37	37	F 35	33	33	32	45	61	75	66	80	74	77	68	69	76	88	61	40	37	38	31	31	30
19	34	34	36	34	33	29	43	76	71	65	64	74	70	70	86	104	69	50	43	36	35	35	36	36
20	36	34	33	32	R 34	31	45	65	77	70	72	98	99	74	85	87	75	61	42	42	R 42	31	27	F 28
21	29	F 30	F 31	F 32	35	23	38	62	58	65	65	71	82	65	62	80	66	49	42	43	40	32	34	34
22	35	36	F 34	F 37	F 37	F 26	43	53	60	74	76	59	59	62	70	59	78	60	38	32	34	36	38	24
23	34	28	31	30	26	27	42	60	J R 69	69	81	107	109	90	72	69	73	56	38	33	36	34	38	37
24	36	36	32	32	32	26	R 42	53	62	R 74	V 72	80	83	64	79	69	76	56	30	33	34	37	37	38
25	40	37	36	34	F 34	25	37	58	60	66	79	95	96	68	72	67	63	46	A	33	A	F 37	F 33	34
26	F 35	35	33	32	A	27	38	52	62	72	80	96	81	72	67	72	61	49	46	A	30	F 33	A	F 38
27	42	38	34	F 34	F 36	32	42	57	64	72	83	69	62	69	67	65	67	58	40	34	35	39	37	30
28	F 36	34	36	F 38	F 37	30	40	62	64	70	69	69	64	64	69	66	54	49	40	40	42	F 44	44	42
29	44	44	44	42	F 41	F 38	47	S 73	66	82	70	79	85	72	71	64	64	65	39	38	35	37	37	36
30	38	34	35	33	40	22	36	54	60	74	74	80	H 70	76	86	R 70	60	44	37	36	F 38	F 38	F 34	F 36
31	37	34	28	32	32	29	38	56	74	74	74	69	R 64	79	81	63	61	45	R 34	28	32	35	35	S 34
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	31	30	31	31	31	31	31	31	30	30	31	31	31	31	31	30	29	29	30	28	30
MED	36	34	33	32	33	27	43	56	64	69	69	73	71	68	65	66	64	60	47	40	36	36	36	34
U Q	38	36	34	34	F 36	31	46	61	71	74	79	83	82	72	72	72	73	65	57	43	40	38	38	37
L Q	33	31	31	30	29	25	39	52	60	66	64	64	64	64	62	60	60	50	40	34	34	33	32	31

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

IONOSPHERIC DATA STATION Kokubunji

OCT. 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									L 404	420	420	436	432	428	U L 420	L 404	L	L						
2								L	L 400	U L 420	U A 416	440	L 448	A	440	L 396	U L 380							
3								L	L 412	408	U A 428	A	A	U A 424	L 420	L 420	U L 376	L						
4									L 400	412	420	424	U L 452	U L 456	428	L	U L 356							
5							220	L	U L 408	A	L 428	L 440	L 432	432	420		L							
6									L	424	428	416	436	420	U L 416	L	L							
7								U L 352	L 396	404	428	U L 432	448	428	408	L 400	U L 344							
8									U L 392	L 416	L 428	432	L 440	420	416	392	L 344							
9										U L 440	L 428	440	440	U L 432	L 408	U L 424	U L 344							
10										A	L 428	L 436	U L 428	L 428	L	U L 400	U A 336							
11								L	L 372	L 416	L 468	U L 436	L 424	L 416	L	U L 356	L							
12								L	A	U L 428	L 432	440	L 440	A	A	L	L							
13								L	L	L 420	L 436	A	U A 412	U L 432	U L 452		L							
14									L	420	L 452	L 432	L 432	U L 424	L	L								
15									U L 420	U L 456	404	420	L 432	L 436	U L 392	L								
16									U L 400	L 428	L 436	428	420	L 432	L 424	U L 384								
17									U L 412	L 432	440	440	U L 428	U L 416	L	A								
18									L	U L 428	U L 440	436	L 428	L	U L 416	A	L							
19								L	L	L 404	L 428	424	L 416	L 472	U L 436	U L 408	L							
20								L	U L 420	U L 444	L 436	L 432	A	L 440	L 432	L	L							
21								L 296	L 368	L	A	A	A	U L 428	L	L 368								
22								260	U L 392	L 412	L 440	L 432	404	L	U L 416									
23										L 408	L 456	L 452	L 444	U L 496	U L 400		U L 260							
24								L		L	L 436	U L 436	L 448	U L 424	U L 424	U L 384	L							
25										L	L 448	L 448	U A 432	L 428	U L 420	U A 348	A							
26										U L 444	U L 440	424	404	U L 432	U L 424	A								
27									L	A	A	L	L 432	L	U L 416	L	L							
28									L	U L 432	L 432	L 428	U L 408	L 460	U L 396	L								
29									L	U L 436	L 420	L 444	H 428	L	L	L								
30										L	L 420	424	U L 432	L	L 420	A								
31									L	L 416	L 420	L 416	L	U L 424	U L 416	U L 360								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	3	14	24	29	27	27	24	24	14	8							
MED							220	L 296	L 400	L 420	L 428	L 432	L 432	L 428	L 420	U L 394	U L 344							
U Q								U L 352	U L 412	U L 432	L 440	L 440	L 440	L 434	L 424	L 404	U L 366							
L Q								260	L 392	L 414	424	424	424	U L 424	U L 416	U L 368	U L 340							

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

IONOSPHERIC DATA STATION Kokubunji

OCT. 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							164	244	284	304	320A	328	336R	324UR	308	284	240	180						
2							176	240	272	296	312	324R	332UR	A	312	A	248	A						
3							A	252	284A	A	308UA	A	A	A	A	A	232A	A						
4							A	224	272	300	312	324R	328	312	300	280	244	A						
5							A	232	280	300UA	A	A	A	A	A	A	224A	A						
6							188A	252	280	304	316A	R	332R	R	296	268	244	B						
7							160	228A	284	304	316	328	328R	312	300	260	A	B						
8							A	232	272	292	308	320	328	304	288	260	A	B						
9							172	228	276	300	316	316	324	312	300	272	220	A						
10							A	240	272	296	312	316	324A	316A	292	268	224	B						
11							B	A	A	292A	304	A	A	A	296	A	A	B						
12							B	224	264	296	308	316	320A	304	288	268	248	B						
13							164	236	268	284	300	A	A	304	288	260	212	B						
14							B	224	260	292	304	A	A	R	R	264	A	B						
15							B	220	268	296	308	320	R	A	A	256	A	B						
16							B	A	264	292R	304	312	R	308	292	A	A	B						
17							B	212	264	292	308R	R	320A	308	292	264	A	B						
18							B	A	268	292	312	312	A	300UA	284UA	A	A	B						
19							B	212	264	292	304	316	324	312	292	272	220	B						
20							B	212	268	288	312	320	320A	312R	292	268	A	B						
21							B	216	252	288	312	320A	A	A	284	A	212	B						
22							B	H 212	A	A	292	312R	320R	304	292	260	212	B						
23							144	204	248	280	292A	300A	A	R	284	A	A							
24							B	204	256	284	304	312	312	296	276	256	216							
25							B	216	260	284	304	308	A	292	264UA	A	A							
26							B	204	268	288	300	A	R	308	292	264	208							
27							B	228	272	292A	308A	A	312R	A	A	A	A							
28							B	A	A	292	A	R	A	A	284	252	200A							
29							B	232	A	A	A	A	A	300	280	244	192							
30							B	208	268	288	R	A	A	300	A	A	204							
31							B	A	252	280	300	308A	316UR	300A	272	244	192							
	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							7	26	27	28	27	19	17	20	25	20	19	1						
MED							164	224	268	292	308	316	324	306	292	264	220	180						
U Q							176	232	272	296	312	320	328R	312	296	268	240							
L Q							160	212	264	288	304	312	318	300	284	258	208							

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

IONOSPHERIC DATA STATION Kokubunji

OCT. 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	JA 25	16	EB 15	EB 14	EB 14	EB 15	24	28	32	38	40	G 24	G 21	G 22	G 25	G 20	28	JA 23	EB 16	JA 48	JA 42	JA 35	JA 34	JA 43
2	JA 43	27	EB 16	20	22	22	G	29	33	39	JA 43	JA 45	G	JA 48	33	JA 34	28	JA 51	JA 30	JA 52	39	JA 26	20	JA 27
3	JA 29	JA 51	JA 53	JA 33	JA 39	JA 27	JA 22	28	33	JA 37	JA 55	73	JA 133	JA 86	JA 52	30	30	JA 23	JA 34	JA 33	34	32	23	23
4	JA 21	21	JA 21	22	20	JA 22	24	28	33	37	38	40	JA 40	36	32	32	31	45	J 36	AJ 48	AJ 48	AJ 41	27	JA 37
5	24	JA 22	18	19	18	EB 14	20	28	31	JA 60	35	JA 53	JA 45	33	32	30	28	JA 54	AJ 32	AJ 23	21	EB 13	EB 13	EB 15
6	JA 20	JA 22	EB 13	JA 26	JA 25	EB 14	JA 29	30	JA 44	34	37	G 27	36	24	33	28	JG 23	JA 23	AJ 21	A 19	19	EB 17	EB 14	19
7	EB 13	EB 15	EB 14	EB 14	EB 13	EB 15	20	25	G	G	G 24	G 24	G 25	G 22	33	30	JA 34	AJ 28	AJ 25	AJ 26	21	EB 15	EB 14	EB 15
8	EB 14	EB 13	EB 15	EB 14	EB 15	EB 16	JA 20	27	35	37	37	38	37	34	35	32	JA 28	EB 17	EB 14	EB 14	EB 16	EB 15	JA 26	32
9	19	24	EB 15	21	EB 14	EB 13	24	27	30	37	43	36	G 28	34	40	32	GJ 21	A 24	E 18	B 16	22	EB 14	EB 14	EB 14
10	21	18	EB 16	EB 14	EB 13	EB 14	JA 27	28	JA 46	JA 47	JA 43	JA 43	JA 47	34	G	31	JA 41	JA 32	AJ 23	AJ 30	JA 42	40	JA 50	JA 44
11	JA 39	29	24	JA 23	AJ 25	AE 16	BJ 21	AJ 28	32	32	JA 37	JA 46	AJ 50	AJ 44	34	JA 47	AJ 27	A 22	J 22	AJ 33	AJ 22	AJ 22	AJ 30	AJ 41
12	JA 34	JA 31	AJ 23	AJ 22	20	18	JA 21	28	JA 52	37	38	38	JA 43	AJ 46	AJ 42	AJ 25	AJ 26	AJ 33	AJ 26	38	J 40	AJ 27	AJ 40	AJ 36
13	32	32	22	24	28	JA 22	20	G	29	JA 39	38	JA 50	AJ 44	32	33	35	32	JA 27	46	35	23	EB 16	BJ 27	AJ 23
14	17	EB 12	EB 13	EB 14	EB 15	16	JA 19	26	29	38	JA 43	JA 41	33	G 29	G 26	G 24	JA 26	AJ 20	AJ 28	AJ 22	AJ 26	AJ 36	AJ 49	AJ 49
15	JA 54	AJ 25	AE 14	BE 15	EB 14	EB 16	EB 16	26	30	33	32	G 28	G 30	JA 36	AJ 47	G 24	JA 35	AJ 48	AJ 34	AJ 22	22	24	19	21
16	EB 14	EB 14	19	20	JA 22	AJ 30	29	JA 26	29	G 28	G 20	34	G 26	G	31	JA 32	AJ 27	AJ 26	24	E 14	BE 14	EB 15	19	EB 14
17	EB 15	EB 12	20	JA 22	AJ 28	AE 14	BJ 31	27	30	32	G	G 24	40	JA 42	34	JA 48	AJ 42	AJ 36	25	19	E 14	BE 14	BJ 34	AJ 48
18	JA 26	21	23	EB 15	19	18	JA 23	AJ 28	28	35	37	39	JA 41	AJ 39	AJ 40	AJ 42	AJ 27	AJ 20	AE 14	B 18	E 14	BE 12	BE 13	BJ 23
19	JA 22	AJ 27	18	JA 26	AJ 22	AJ 23	JA 34	28	34	38	37	G 24	G 19	GJ 49	37	30	G	J 17	AE 16	BE 15	BJ 22	A 21	21	EB 16
20	JA 35	AJ 26	AJ 24	AE 14	B 19	E 15	BJ 26	A 26	30	33	35	JA 47	JA 74	G	G	JA 37	30	E 15	BJ 51	AJ 35	20	J 18	AE 14	BE 13
21	EB 14	EB 15	EB 14	EB 13	JA 23	AE 15	BJ 23	AJ 28	27	32	JA 50	AJ 107	AJ 54	35	G 27	26	GE 20	BE 14	BE 14	BE 15	BE B	E 14	BE 23	B 15	14
22	EB 14	26	JA 46	30	JA 49	22	JA 30	G 20	33	JA 50	G 22	G	G 22	G 20	36	33	JA 36	AJ 22	AJ 24	20	J 26	AE 14	BJ 44	AJ 27
23	JA 26	AJ 20	AJ 20	AJ 23	22	EB 13	GJ	A 33	49	JA 38	33	JA 40	AJ 34	G 26	G 25	32	JA 24	29	J 22	A 24	EB 15	BE 13	BJ 36	AE 14
24	EB 14	20	29	30	JA 23	AJ 18	A 24	25	33	34	33	37	J 29	G 29	G 31	28	27	JA 20	AJ 27	AJ 26	A 22	J 23	A 27	JA 27
25	JA 22	AJ 30	AJ 25	AJ 22	29	JA 25	AJ 22	28	29	32	33	38	J 47	A 38	J 46	AJ 44	60	J 34	AJ 46	AJ 46	AJ 48	A 28	J 28	28
26	26	EB 14	EB 14	EB 15	30	JA 20	EB 15	27	31	JA 52	38	JA 46	G	G	JA 38	AJ 62	AE 30	BJ 13	A 22	36	J 29	AJ 50	AJ 48	AJ 36
27	JA 48	AJ 32	AJ 26	AJ 44	AJ 23	27	18	26	31	JA 54	AJ 64	A 54	G 28	J 63	A 46	J 54	AJ 34	AJ 20	AJ 23	21	E 15	BJ 22	AE 15	BJ 30
28	JA 36	AJ 49	AJ 36	AJ 32	AJ 29	AJ 21	AJ 27	AJ 81	JA 46	G 26	32	G 29	JA 48	AJ 64	31	32	J 38	AJ 26	A 20	27	E 14	B 28	20	20
29	28	19	28	JA 21	22	16	JA 19	AJ 27	AJ 36	AJ 40	AJ 50	AJ 44	AJ 41	AJ 33	A 22	G 22	22	J 22	AJ 26	AJ 32	AJ 28	AJ 23	AJ 20	AJ 26
30	28	18	EB 14	19	JA 22	20	JA 18	25	30	31	GJ 25	A 35	JA 54	AJ 33	A 32	J 52	AJ 34	AJ 28	AJ 28	A 27	J 27	AJ 20	19	28
31	26	22	24	EB 16	EB 14	BE 14	B 22	26	29	33	32	34	G 24	33	31	29	23	E 16	BE 14	BE 16	BE 14	BE 13	BE 15	19
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	25	22	20	21	22	16	JA 22	27	31	37	37	38	J 37	34	33	32	JA 28	AJ 23	AJ 24	26	22	22	21	26
U Q	JA 32	AJ 27	AJ 24	AJ 24	AJ 25	AJ 22	AJ 26	AJ 28	AJ 34	AJ 39	AJ 43	AJ 46	AJ 47	AJ 42	AJ 38	AJ 37	AJ 34	AJ 32	AJ 30	AJ 35	AJ 29	AJ 28	AJ 34	AJ 36
L Q	EB 17	EB 16	EB 15	BE 15	BE 15	BE 15	19	26	29	32	G 32	G	G 28	G	G 31	28	26	E 20	BE 20	BE 19	BE 15	BE 15	BE 15	EB 16

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

IONOSPHERIC DATA STATION Kokubunji

OCT. 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	17	E B 15	E B 15	E B 14	E B 14	E B 15	22	28	32	32	34	G 22	G 20	G 21	G 24	G 19	26	20	E B 16	A A 48	20	18	18	23
2	E B 16	17	E B 16	E B 15	17	17	G	29	33	38	42	42	G	44	33	31	27	24	21	23	24	22	E B 14	E B 16
3	18	19	A A 53	19	22	21	19	G	31	34	43	A A 73	A A 133	42	31	30	27	20	22	28	A A 34	A A 32	17	17
4	18	E B 14	17	E B 15	16	18	22	27	31	35	36	38	37	36	G 23	31	25	32	31	40	25	19	20	22
5	18	17	E B 13	16	E B E B 14	14	18	27	30	46	34	36	39	33	U Y 32	29	26	23	22	19	17	E B E B 13	13	E B 15
6	E B E B 14	13	E B 13	20	19	E B 14	21	G	33	U Y 33	35	G 27	36	U G 23	31	27	G 18	18	E B E B 13	16	17	E B E B 17	14	17
7	E B E B 13	15	E B 14	E B 14	E B E B 13	15	19	25	G	G	G 23	G 23	G 24	G 21	32	30	23	20	20	20	17	E B 15	E B E B 14	15
8	E B E B 14	E B 13	E B 15	E B 14	E B E B 15	E B 16	19	26	32	36	35	37	36	34	34	31	26	E B 17	E B E B 14	E B 14	E B E B 16	E B 15	20	25
9	17	E B 15	E B 15	E B 15	E B E B 14	13	22	26	30	34	38	35	G 25	34	35	31	G 19	17	E B E B 15	16	17	E B 14	E B E B 14	14
10	E B E B 14	15	E B 16	E B 14	E B E B 13	14	23	26	43	44	38	36	40	34	G	30	34	27	17	26	29	33	18	A A 44
11	A A 39	18	22	E B 14	E B E B 14	16	19	26	29	31	34	36	36	33	U Y 34	28	22	19	18	22	18	19	24	24
12	24	19	17	17	E B 14	17	E B 16	26	50	35	36	36	37	43	40	G 16	G 22	20	23	30	20	17	A A 40	22
13	18	21	17	18	20	17	20	G	28	36	36	48	41	U Y 32	32	33	29	24	34	20	E B 15	E B 16	22	23
14	E B E B 13	E B 12	E B 13	E B 14	E B E B 15	16	18	24	29	36	40	37	U Y 33	U G 28	U G 25	G 21	23	E B 16	18	E B 14	17	21	A A 49	17
15	E B E B 15	E B 15	E B 14	E B 15	E B E B 14	E B 16	E B 16	25	30	U Y 33	32	G 26	U G 30	33	32	G 21	23	18	22	18	19	E B 13	17	16
16	E B E B 14	14	16	E B 15	18	22	22	22	28	G 26	G U Y 19	34	G 20	G	31	28	23	17	E B E B 14	E B 14	E B E B 14	E B 15	E B E B 14	14
17	E B E B 15	E B 12	E B 13	E B 14	E B E B 15	E B 14	18	26	28	31	G	G 23	G 26	35	33	44	30	20	E B 15	16	E B E B 14	14	20	21
18	E B E B 15	E B 14	E B 14	E B E B 15	E B 14	16	E B 15	25	28	34	35	37	39	37	38	38	23	18	E B E B 14	16	E B 14	E B E B 12	13	18
19	E B 13	26	E B 14	19	16	17	22	27	32	35	35	G 22	G 18	34	35	28	G	17	E B E B 16	15	20	E B 15	E B E B 13	16
20	19	17	E B 14	E B 14	E B E B 13	15	E B 15	24	28	33	34	35	66	G	G	28	22	E B 15	23	E B 14	E B E B 14	15	E B E B 14	13
21	E B E B 14	15	E B 14	E B 13	E B E B 14	15	E B 16	G 20	26	31	47	67	48	33	G 26	25	G E B 18	E B 14	E B E B 14	E B 15	E B E B 14	16	E B E B 15	14
22	E B 14	19	17	17	19	18	24	G 17	28	34	G 20	G	G 21	G 19	34	32	33	18	22	17	18	E B 14	19	19
23	17	18	17	18	16	E B 13	G	22	36	35	33	36	34	U G 26	G 22	26	21	27	19	16	E B E B 15	13	32	E B 14
24	E B E B 14	13	17	17	18	E B 14	E B 15	24	31	33	32	34	G 26	G 22	U Y 30	27	24	18	23	19	18	22	E B 15	18
25	18	23	22	18	18	17	17	26	28	31	32	36	43	36	34	35	56	28	A A 46	23	A A 48	24	18	18
26	E B 16	E B E B 14	E B E B 15	A A 30	17	E B 15	24	31	38	34	39	G	G	34	49	27	E B 13	21	A A 36	18	18	A A 48	23
27	27	24	21	18	E B 15	17	E B 15	25	29	46	60	40	G 26	39	35	32	27	18	17	20	E B E B 15	15	E B 15	22
28	25	23	20	24	20	E B 15	20	26	29	G 22	32	U G 29	36	33	G 24	31	33	22	E B 14	18	E B 14	21	E B E B 14	14
29	19	E B 14	17	16	16	E B 14	E B E B 14	G	30	30	35	36	33	G 24	G 20	G 21	22	17	16	18	18	16	16	20
30	17	E B E B 15	14	17	17	17	E B 17	24	28	31	G 23	34	35	G 20	32	44	30	18	23	21	21	E B E B 13	14	18
31	18	16	E B 13	E B 16	E B E B 14	14	E B 15	24	28	32	32	33	U G 23	32	31	28	22	E B 16	E B E B 14	E B 16	E B E B 14	13	E B E B 15	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	17	E B 15	E B 15	E B 15	E B 15	E B 16	18	25	30	34	34	36	34	33	32	30	24	18	18	18	17	E B 16	16	18
U Q	18	19	17	18	18	17	21	26	32	36	36	37	39	35	34	32	27	22	22	23	20	19	20	22
L Q	E B 14	E B 14	E B 14	E B 14	E B 14	E B 14	E B 16	G 22	28	31	G 32	G	G 26	G 26	G	G 27	G E B 22	E B 17	E B E B 15	E B 16	E B E B 15	E B 14	E B E B 14	E B 15

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

IONOSPHERIC DATA STATION Kokubunji

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

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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	321	324	338	327	332	330	338	R 347	337	357	348	351	359	354	338	333	344	356	364	A	295	297	F 296	290
2	F 312	F 311	315	327	F 328	F 324	378	374	368	354	J R 371	349	331	R 323	325	356	343	358	350	F 338	334	315	F 298	F 289
3	F 291	F 303	A	290	F 307	338	377	380	356	365	339	A	A	329	R 337	322	333	335	351	378	A	A	309	F 299
4	F 290	296	293	302	334	375	366	348	363	347	388	339	314	327	342	346	351	R 358	352	A 318	333	F 297	F 298	302
5	F 296	F 305	F 299	F 352	F 372	F 367	362	363	349	357	327	318	R 335	334	347	H 311	342	344	357	348	318	F 295	F 314	F 289
6	F 322	F 328	360	329	370	F 322	R 368	377	355	359	363	332	337	352	353	331	328	338	349	J R 303	F 333	338	318	312
7	307	321	325	325	353	334	370	361	376	390	369	343	321	333	336	350	358	358	R 360	372	294	312	F 288	F 291
8	312	323	326	318	F 362	331	379	375	365	360	349	348	341	335	327	353	353	374	380	335	305	307	F 305	314
9	316	321	308	328	378	312	370	348	325	351	347	323	346	341	361	327	341	341	371	324	293	319	302	321
10	350	321	308	330	312	305	344	R 358	R 346	350	357	343	334	324	324	337	352	363	355	358	337	A 310	328	A
11	A	296	309	335	345	350	359	372	352	381	334	351	337	334	334	359	361	341	326	337	322	334	344	324
12	331	318	330	337	366	F 316	355	375	343	350	328	346	371	349	340	345	350	352	361	352	329	F 299	A	F 301
13	F 342	310	317	F 325	310	321	364	377	R 358	340	359	341	371	330	331	333	336	368	367	368	F 293	F 296	F 301	F 306
14	348	339	329	324	363	315	364	378	368	371	312	356	352	355	333	331	364	363	333	308	F 294	F 277	A	F 321
15	339	378	F 332	F 317	F 338	F 363	359	341	353	349	342	358	354	355	R 338	354	372	364	373	362	343	307	318	320
16	312	331	317	321	329	347	357	346	367	373	354	360	350	359	334	356	376	351	328	300	315	343	322	335
17	324	330	343	319	338	327	334	346	351	353	366	341		346	338	367	378	346	329	327	320	320	R 345	342
18	342	318	F 307	334	324	333	358	356	354	363	346	353	323	327	325	325	361	371	329	322	342	324	316	317
19	305	305	328	321	324	311	341	367	369	350	348	358	344	307	326	352	384	355	339	313	312	314	303	306
20	313	296	304	311	R 349	342	375	359	373	344	324	339	356	349	345	352	365	360	329	329	R 342	370	298	F 300
21	302	F 301	F 310	F 327	388	340	355	353	352	346	345	358	363	332	343	363	375	357	336	334	336	336	321	313
22	342	314	F 300	F 327	F 348	F 310	359	367	345	367	364	369	353	343	355	332	374	382	358	287	296	309	337	271
23	339	316	300	313	320	303	334	342	J R 338	342	292	340	337	327	370	335	347	374	355	281	294	302	309	312
24	308	304	310	303	320	328	R 357	374	365	R 333	V 347	344	332	329	349	363	354	383	396	282	312	320	299	304
25	294	303	297	291	F 324	331	353	361	350	348	343	337	362	338	341	366	383	367	A	297	A	F 319	F 327	319
26	F 312	315	308	326	A	335	343	371	354	342	341	369	346	347	357	358	377	364	372	A	338	F 322	A	F 317
27	336	348	335	F 296	F 334	325	353	364	350	348	368	349	365	346	344	356	374	368	358	321	318	334	321	336
28	F 328	310	314	F 300	F 336	335	349	377	374	367	361	358	336	332	353	369	367	368	328	323	319	F 294	334	335
29	317	321	306	313	F 316	F 307	355	S 377	368	354	365	336	333	350	359	345	342	353	341	329	314	308	313	312
30	321	335	315	315	365	320	341	370	345	367	360	352	H 312	321	353	R 375	396	351	335	313	F 318	F 329	F 310	F 328
31	337	342	323	306	370	306	359	360	352	363	369	366	R 325	336	349	359	349	334	R 381	310	299	311	325	S 332
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	31	30	31	31	31	31	31	31	30	29	31	31	31	31	31	30	29	29	30	28	30
MED	319	318	314	321	337	328	358	364	354	354	348	348	341	335	341	352	358	358	354	324	318	313	314	312
U Q	337	328	328	327	363	338	366	375	367	365	364	358	355	349	353	359	374	368	364	343	334	324	324	321
L Q	308	305	307	311	324	315	349	353	349	348	341	340	332	329	334	333	344	351	335	309	298	F 302	F 302	F 301

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L 384	376	H 405	389	396	381	U L 378	H 356	L	L						
2								L	L 380	U L 394	A	A	L 377	A	353	L 361	U L 363							
3								L	L 387	385	A	A	A	A	L 362	L 334	U L 357	L						
4									L 376	384	377	397	U L 368	U L 351	365	L	U L 368							
5							420	L	U L 362	A	L 391	L 389	A	371	365		L							
6									L	381	389	424	375	386	U L 380	L	L							
7								U L 396	L 371	406	397	U L 400	379	H 371	347	L 375	U L 371							
8									U L 390	L 380	L 386	395	L 384	373	358	355	L 365							
9										U L 368	A	386	378	U L 373	A 375	U L 356	L							
10										A	L 382	L 374	A	L 365	L	U L 367	A							
11								L	L 402	L 380	L 355	U L 373	L 389	L 386	L	A 367	L							
12								L	A	U L 382	L 380	373	L 369	A	A	L	L							
13								L	L	L 373	L 366	A	A	U L 378	U L 346		L							
14									L	382	L 371	A 373	L 378	U L 375	L	L								
15									L	U L 376	401	387	L 388	L 367	U L 401	L								
16									L	L 370	L 379	403	402	L 375	L 363	L								
17									L	L 367	377	366	U L 378	U L 380	L	A								
18									L	U L 378	U L 369	383	A 386	L	A	A	L							
19								L	L	A 399	L 383	388	L 392	L 353	L	L	L							
20								L	L	U L 367	L 381	L 392	A	L 361	L 348	L	L							
21								L 386	L 386	L	A	A	A	U L 382	L	H 362								
22								418	U L 392	L 380	L 372	L 402	414	L	L									
23										L 382	L 353	L 368	L 377	U L 352	L		A 410							
24								L		L	L 384	U L 369	L 366	U L 381	U L 370	L	L							
25										L	L 362	L 373	A	L 382	L	A	A							
26										A 372	U L 374	A 378	417	U L 370	U L 371	A								
27									L	A	A	L	L 379	L	A 380	L	L							
28									L	U L 380	L 382	L 392	U L 406	L 364	U L 368	L								
29									L	L	L 401	L 377	H 375	L	L	L								
30										L	L 377	381	U L 386	L	L 364	A								
31									L	L 377	L 381	L 405	L	A	L	U L 402								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	3	10	23	26	26	23	22	18	10	6							
MED							420	L 396	L 385	L 380	L 380	386	L 379	L 373	L 365	L 362	U L 366							
U Q								418	U L 390	382	386	395	392	L 381	U L 375	U L 367	371							
L Q								L 386	L 376	L 373	L 372	L 373	L 377	L 365	358	356	U L 363							

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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									274	258	274	270	258	264	270	288	254	228						
2								234	238	256	280	270	284	296	298	252	258							
3								214	248	254	268	A	A	278	270	292	262	246						
4									250	260	226	264	330	304	270	260	252							
5							226	242	260	260	288	284	260	280	270		266							
6									254	246	246	280	272	254	262	288	L 284							
7								244	232	224	238	L 272	320	294	280	260	238							
8									244	252	252	264	280	282	280	254	242							
9										260	254	290	260	272	254	286	240							
10										252	242	264	256	276	288	264	234							
11								218	238	234	278	246	266	272	260	254	234							
12								220	A 268	250	268	254	236	254	270	262	250							
13								232	246	264	242	262	234	266	288		260							
14									244	238	300	242	260	248	278	240								
15									250	250	256	248	232	258	256	246								
16									234	244	252	234	254	244	270	238								
17									252	246	240	250	238	256	242	238								
18									242	244	250	244	258	264	272	260	230							
19								230	234	242	256	254	256	312	276	234	216							
20								230	224	260	264	246	250	270	264	244	228							
21								244	234	262	256	E A 280	240	256	242	242								
22								218	240	244	240	238	234	258	256									
23										254	306	256	244	280	234		230							
24								218		254	250	250	260	252	254	234	224							
25										258	258	264	234	252	250	230	A							
26										268	250	240	242	262	246	250								
27									240	250	234	256	242	264	258	248	224							
28									228	230	244	240	252	270	242	236								
29									228	236	244	250	254	250	242	244								
30										248	244	250	252	276	252	236								
31									240	234	228	242	256	280	246	230								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	12	24	31	31	30	30	31	31	27	19	2						
MED							226	230	241	250	252	253	255	266	262	248	240	237						
U Q								238	250	258	268	264	260	280	272	260	258							
L Q								218	234	244	242	246	242	256	250	238	230							

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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	272	258	260	246	226	276	236	234	220	216	204H	202	196	208	228	190H	230	230	208	A	292A	322	334	354EA
2	286	298	288	276	272	280	224	230	226	232A	A	A	230	A	230	250EA	226	228	226	240	242A	304A	294	324
3	316	336	A	330	352EA	256	212	226	220	210	A	A	A	A	240A	238	238	248	230	214	A	A	304	320
4	334	302	308	308	254	212	210	226	234	230	244A	228	210	232	218	250	228	234	228	A	270	298	316	334
5	294	290	286	240	210	216	194	236	236	A	206	204	A	220	238	230	234	242	224	220	260	280	290	294
6	262	248	234	282	224	306	222	228	240	228	204	190	206H	214	218	176H	242	244	224	216	240	222	266	266
7	266	252	262	252	230	242	218	226	230	206	206	188	190	182H	230	246	208	236	222	202	290	288	312	302
8	276	248	266	264	222	236	206	222	236A	234	210	210	208	228	238	236	232	222	202	232	246	270	302	336A
9	314	270	292	272	214	290	198	226	230	206	256EA	196	188H	248	250A	246	230	226	214	228	280	242	266	252
10	222	244	274	256	254	296	228	228	248	A	234	236	A	212	230	236	A	228	222	212	260A	A	260	A
11	A	296	286A	260	242	228	214	216	208	222	206	226A	214	194	234A	252EA	242	226	220	240	250	250	250	278A
12	326A	286	282	244	208	282	222	224	A	232A	222	222A	230A	A	A	240	236	228	224	250A	288	290	A	312A
13	256	272	250	264	270A	274	218	230	228	242A	228	A	A	204	238	256	250	222	226	254A	328	322	328A	330A
14	246	232	274	270	232	310	228	214	228	232	262EA	232A	198	230	240	226	232	216	228	244	326	332	A	250
15	240	210	274	274	244	248	212	218	234	224	210	206	216	202	206	200H	230	228	222	212	246	278	268	258
16	250	246	264	266	258	246A	230	226	234	226	204	196H	190	200H	210	238	220	218	228	274	260	230	242	242
17	250	238	228	264	240	244	236	232	238	228	214	210	228	224	228	A	224	224	232	232	234	234	254	274
18	252	254	236	240	242	250	226	226	232	228	238	222	242A	248EA	A	A	232	206	218	232	224	248	258	308
19	296	306A	264	258	248	270	242	238	240	238A	214	208	198	214	270A	232	232	220	220	246	276	250	274	282
20	284	304	314	292	228	220	206	224	234	214	224	220	A	224	246	252	234	210	252	238	220	226	302	294
21	306	310	292	266	214	230	234	210	208	220	A	A	A	214	222	176H	228	220	224	232	232	234	256	264
22	246	278	290	264	244	290	236	214	224	220	210	198H	184	204H	256A	242	228	212	224	292	290	266	250	382EA
23	260	274	274	282	266	288	236	238	230	230	244	246A	218	220	228	240	228A	216	218	326	302	292	352EA	244
24	272	254	278	304	272	252	210	200	222	218	226	206H	222	230	244	228	234	202	222	314	276	276	288	294
25	276	308	330	318	258	226	230	224	228	222	226	248	A	224	242A	A	A	220	A	352EA	A	284	268	294
26	288	270	266	266	A	248	218	224	230	258EA	244	A	204	216	232A	A	220	212	212	A	274	276	A	300
27	262	248	264	288	242	268	218	224	236	A	A	A	190	250EA	A	A	A	208	216	244	238	236	232	262A
28	288A	316A	278	296	238	230	230	218	220	218	204	192	240	222	224	242A	220	222	228	236	252	262	238	230
29	252	232	260	272	250	260	226	220	228	226	220	218	192	204H	250	222	230	214	208	266	300	264	258	280
30	240	246	270	284	218	252	234	210	222	226	216	214	216	242	242A	A	210	210	256	290	286	250	262	278
31	244	234	252	278	218	290	224	226	240	228	220	202	198	A	230	218	226	198	208	270B	288	264	258	262
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	31	30	31	31	31	30	28	27	25	24	27	28	25	28	31	30	28	29	29	28	30
MED	269	270	274	270	242	252	224	226	230	226	217	210	207	217	233	237	230	222	223	240	270	266	266	284
U Q	288	298	286	284	254	282	230	228	236	231A	234	224A	220	230	242A	246	234	228	228	268	289	289	302	312A
L Q	250	246	262	260	224	236	212	218	224	219	206	200	194	204H	228	224H	226	212	218	230	244	245	257	262

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

IONOSPHERIC DATA STATION Kokubunji

OCT. 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 152	122	112	112		A 116	116	116	A 122	120	126	130						
2							152	120	114	114	114	110	114	112	A 128	A	126	A						
3							A	122	116	114	114	112	A	A	A	A	A	A						
4							A	128	A 128	120	124	118	118	122	A 130	A 128	120	A						
5							A	122	122	114	A	A	114	A	A	A	112	A						
6							A	A 138	A 136	A 126	122	116	116	A	122	A 126	A 136	B						
7							166	A	124	106	116	118	116	122	116	126	A	B						
8							A	122	134	124	118	A 124	118	116	A 120	116	116	B						
9							E B 164	A 128	112	A 126	118	120	122	120	118	112	A 128	A						
10							A	124	120	118	120	A 124	118	124	116	118	120	B						
11							B	A	114	112	112	108	A	A	A 122	A	A	B						
12							B	A 136	E A 146	112	A 126	A 120	122	118	118	A 122	E A 152	B						
13							118	124	116	118	118	114	116	A 126	114	114	118	B						
14							B	A 130	116	116	118	114	A	A	A	A 128	A	B						
15							B	120	A 142	A 128	126	A 128	A	A	A	124	A	B						
16							B	A	118	E A 142	116	114	A 118	112	120	A	A	B						
17							B	124	A 128	114	110	118	A 124	A 130	A 122	118	A	B						
18							B	A	130	A 120	118	118	120	112	118	118	A	B						
19							B	A 134	116	114	110	A 120	116	116	116	118	112	B						
20							B	118	116	A 124	110	116	116	122	118	A 122	A	B						
21							B	A	120	112	114	112	114	A	E A 138	A	A 134	B						
22							B	134	A	A	118	114	120	120	120	116	118	B						
23							E B 188	116	A 120	116	A 122	A	A	A	A 120	A	A							
24							B	138	126	A 122	116	A 122	A 122	A 124	120	126	A 128							
25							B	118	124	112	116	120	118	116	114	A	A							
26							B	122	116	116	116	114	120	118	122	120	120							
27							B	118	116	110	114	A	A 124	A	A	A	A							
28							B	A	A	A 120	A	A	A	A	126	120	A 120							
29							B	138	A	A	110	A	A	A 130	124	A 118	A							
30							B	122	118	116	120	A	A	120	A	A	122							
31							B	A	120	118	120	116	A 130	A	118	120	A 126							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							6	24	28	29	28	25	23	20	25	21	18	1						
MED							U 146	123	120	116	117	116	118	120	120	120	120	130						
U Q							166	A 132	A 127	A 121	120	A 120	A 122	A 123	A 122	125	A 128							
L Q							152	121	116	113	114	114	116	116	118	118	118							

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

IONOSPHERIC DATA STATION Kokubunji

OCT. 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	106	132	B	B	B	B	140	146	124	122	118	106	106	106	106	110	146	134	B	116	120	120	118	114
2	134	114	B	112	108	106	G	144	128	120	116	112	G	112	160	104	154	110	100	122	108	110	116	108
3	106	106	104	104	100	98	100	154	132	120	110	104	104	112	106	108	136	124	102	96	94	94	98	102
4	100	104	108	100	106	110	146	148	134	124	122	120	120	124	104	156	136	108	110	110	114	110	114	110
5	114	110	108	112	106	B	168	164	168	118	120	120	116	116	114	112	120	110	108	110	108	B	B	B
6	120	108	B	104	106	B	134	144	136	134	124	108	168	108	134	120	116	126	106	102	110	B	B	106
7	B	B	B	B	B	B	164	180	G	G	108	108	104	102	178	150	96	98	96	120	100	B	B	B
8	B	B	B	B	B	B	148	166	136	126	122	120	124	126	124	116	110	B	B	B	B	B	144	130
9	110	112	B	104	B	B	156	156	160	142	122	122	104	136	122	120	112	110	108	B	102	B	B	B
10	104	100	B	B	B	B	130	130	124	120	120	120	118	126	G	150	130	122	110	106	106	106	104	106
11	104	104	106	110	114	B	120	118	116	120	118	110	108	110	136	116	108	124	104	106	114	110	108	106
12	104	104	106	110	106	106	164	146	120	124	122	122	118	116	120	100	118	112	112	110	116	112	108	108
13	106	106	106	106	104	108	152	G	136	120	116	108	116	140	154	140	126	114	116	114	118	B	106	106
14	112	B	B	B	B	124	172	148	146	124	116	116	114	106	104	110	106	114	104	104	112	116	112	120
15	108	116	B	B	B	B	B	152	148	130	128	110	114	110	104	108	102	102	102	102	100	100	98	94
16	B	B	112	104	102	100	100	108	162	110	100	122	102	G	166	104	102	102	100	B	B	B	102	B
17	B	B	114	108	116	B	112	146	144	150	G	106	102	122	152	122	116	110	104	110	B	B	114	110
18	110	110	108	B	110	106	108	100	164	134	124	120	116	116	114	112	108	128	B	98	B	B	B	112
19	110	104	102	102	104	104	98	142	136	130	126	102	106	132	120	168	G	106	B	B	114	114	112	B
20	112	110	130	B	120	B	138	146	150	132	132	126	118	G	G	126	102	B	108	108	104	108	B	B
21	B	B	B	B	102	B	122	112	152	136	116	112	108	108	108	110	106	B	B	B	B	104	B	B
22	B	98	114	108	110	114	104	118	104	100	108	G	108	108	146	132	122	120	98	100	110	B	114	108
23	106	108	108	104	106	B	G	118	114	116	124	114	114	114	104	102	98	98	98	96	B	B	108	B
24	B	124	106	106	104	114	108	174	142	128	134	122	100	100	182	144	124	124	116	110	110	110	110	110
25	108	106	102	114	106	104	106	132	136	126	128	122	114	120	116	112	112	108	106	108	110	110	108	110
26	104	B	B	B	102	100	B	154	136	120	128	118	G	G	128	116	120	B	120	114	110	110	110	108
27	106	102	104	104	104	102	108	154	138	114	110	108	110	104	100	100	98	100	100	100	B	116	B	108
28	106	104	104	104	106	106	104	110	106	108	104	106	102	100	98	128	116	112	104	112	B	106	110	110
29	104	106	106	100	100	114	158	160	114	114	114	110	106	102	112	108	132	112	120	108	106	112	106	104
30	102	108	B	98	98	106	162	154	142	134	108	112	102	106	96	94	130	128	114	112	106	114	112	102
31	102	102	102	B	B	B	140	142	148	130	138	130	108	178	144	122	142	B	B	B	B	B	B	128
	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	24	19	20	23	17	27	30	30	30	30	30	29	28	29	31	30	26	25	25	22	19	22	23
MED	106	106	106	104	106	106	134	146	136	124	120	113	108	112	120	116	116	112	106	108	110	110	110	108
U Q	110	110	108	109	108	112	156	154	148	130	124	120	116	123	145	128	130	124	111	112	114	114	114	110
L Q	104	104	104	104	102	103	108	130	124	120	114	108	104	106	105	108	106	108	101	102	106	106	106	106

IONOSPHERIC DATA STATION Kokubunji

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

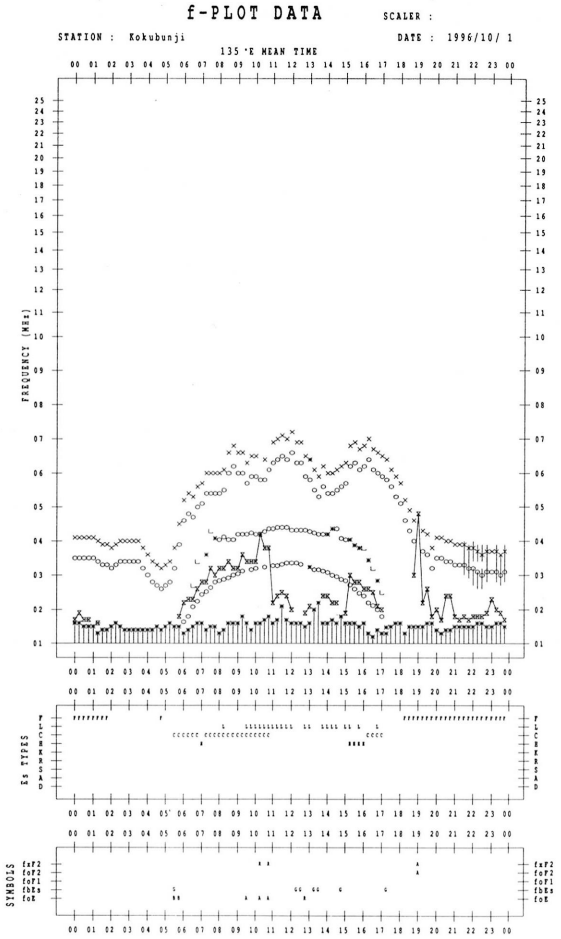
LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

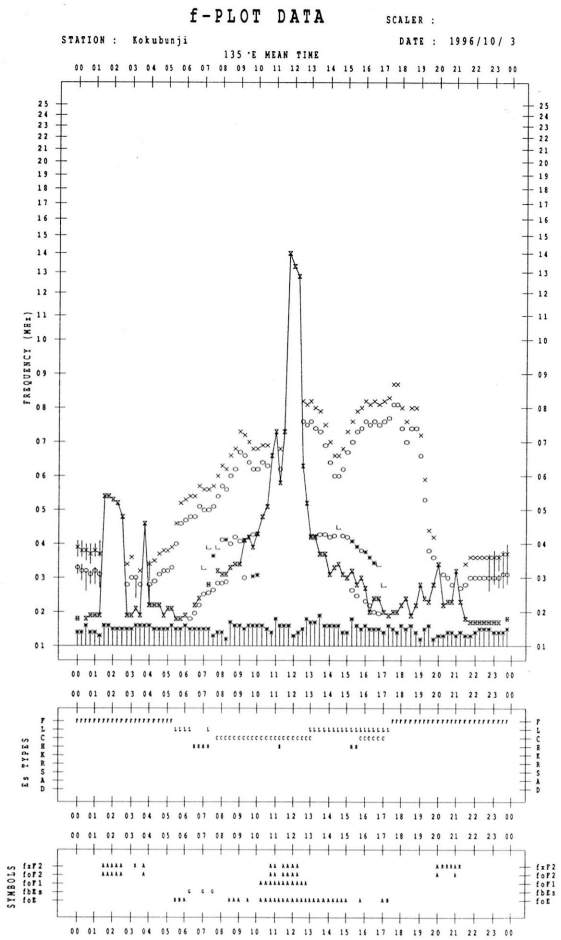
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F2	F1					C2	H1	C2	C1	CL11	L1	L1	L1	L1	L1	H1	C1		F4	FF21	F2	F3	F3
2	FF12	F2		F2	F2	F2		C1	C1	C1	C1	C2		C2	HL11	L2	H1	L2	F3	FF22	FF31	F3	F1	F2
3	F2	F3	F3	F3	F4	F4	L2	H1	C1	C1	C2	C3	C3	CL12	L2	L2	CL11	CL11	F2	F3	F4	F3	F3	F2
4	F1	F1	F1	F1	F1	F1	CL11	CL11	HL11	CL11	CL11	CL11	CL11	CL11	L2	HL11	C1	L3	F2	F2	F1	F2	F2	F2
5	F1	F2	F1	F1	F1		C1	H1	HC11	C2	L1	C1	C1	L1	L1	L1	C1	L2	F2	F1	F1			
6	F1	F2		F2	F1		LC21	CL12	CL21	CL11	CL11	L1	H1	L1	HL11	CL11	L1	C2	F1	F1	F1			F1
7							C1	HL12			L1	L1	L1	L1	HL11	HL12	L3	L3	F2	F1	F1			
8							C1	H1	CL22	CL11	C1	CL11	C1	C1	CL12	C2	C2						FF21	FF31
9	F1	F1		F1			C1	HL21	H1	HL11	CL21	CL11	L1	CL11	CL11	C2	L2	L1	F1		F2			
10	F1	F1					C2	C2	CL21	CL21	CL11	CL11	CL21	CL11		H1	C3	CL21	F1	F3	F4	F5	F3	F4
11	F4	F3	F2	F2	F1		L1	C2	C2	C1	C2	C2	C1	C1	CL12	CL21	L3	CL21	F1	F2	F1	F2	F3	F3
12	F4	F2	F2	F2	F1	F1	H1	HL11	CL21	CL11	CL11	CL11	CL11	CL21	CL21	L3	L1	CL22	FF21	FF42	FF13	FF21	F3	F3
13	F5	F4	F2	F3	F4	F2	HL12		HL11	CL21	CL11	C2	CL21	CL11	H1	H2	C3	C3	F6	FF42	F2		F5	F5
14	F1					F1	H1	CL11	H1	CL11	CL21	CL11	CL11	L1	L2	L1	L2	L1	F2	F1	F2	F3	F5	FF23
15	F3	F1						HL21	CL11	CL11	CL11	L1	L1	L2	L2	L1	L3	L3	F4	F2	F1	F1	F2	F2
16			F2	F2	F3	F4	L3	L2	HL11	L1	L1	C1	L1		HL11	LC21	L3	L2	F1				F1	
17			F1	F1	F1		LC11	CL21	HL12	H1		L1	LC11	CL11	CL11	CL21	L3	L2	F1	F1			F3	F3
18	F2	F1	F1		F1	F1	L1	L3	HL12	CL12	CL11	CL11	CL11	CL11	C2	C2	L3	L1		F1				F1
19	F2	F2	F1	F3	F2	F2	L4	CL12	H2	C2	C1	L1	L1	CC11	C1	HC11		L1			F3	F1	F1	
20	F2	F3	FF11		F1		C1	C1	C1	CL11	H1	C1	C3			CL11	LC11		F3	F2	F1	F1		
21					F1		L1	L2	C1	C1	C2	C2	C2	L1	L2	L1	L1					F1		
22		F1	F2	F2	F2	F1	L3	L1	L3	L2	L1		L1	L1	H1	C2	C4	CL22	F2	F1	F2		F2	F3
23	F2	F2	F2	F3	F1			C1	C2	C2	CL11	CL21	CL21	L1	L2	L2	L2	F4	F2	F2			F3	
24		FF11	F2	F2	F2	F1	L1	H1	HL22	CL21	CL11	CL11	L1	L2	H1	CL11	CL21	FF21	F4	F4	F2	F3	F2	F3
25	F3	F4	F4	FF21	F2	F2	L2	C2	CL11	C1	CL11	CL21	CL21	CL11	C2	C2	L4	F2	F3	F2	F2	F2	F2	F2
26	F2				F2	F1		H1	C2	C1	C1	C1			C1	C2	C2		F2	F2	F2	F2	F3	F3
27	F4	F4	F3	F2	F2	F3	L1	H1	C1	C3	CL21	L1	L1	L2	L2	L2	LH21	F1	F1	F1		F1		F2
28	F2	F3	F3	F4	F5	F3	L2	L3	L3	L2	L1	L1	LH21	L2	L2	CL21	CL42	F3	F1	FF21		F4	F1	F1
29	F2	F1	F1	F2	F1	F1	HL11	HL11	L2	L1	C2	C1	L2	L2	L1	L2	CL12	F1	F1	F2	F3	F2	F2	F2
30	F3	F1		F2	F3	F1	H1	H1	H1	C1	L1	L1	L2	L1	L2	L2	CL21	FF21	F2	F1	F2	F1	F2	F2
31	F2	F1	F2				C1	C1	H1	C1	CL11	C1	L1	HL11	HL11	C2	CL11							F1
	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																								

OCT. 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


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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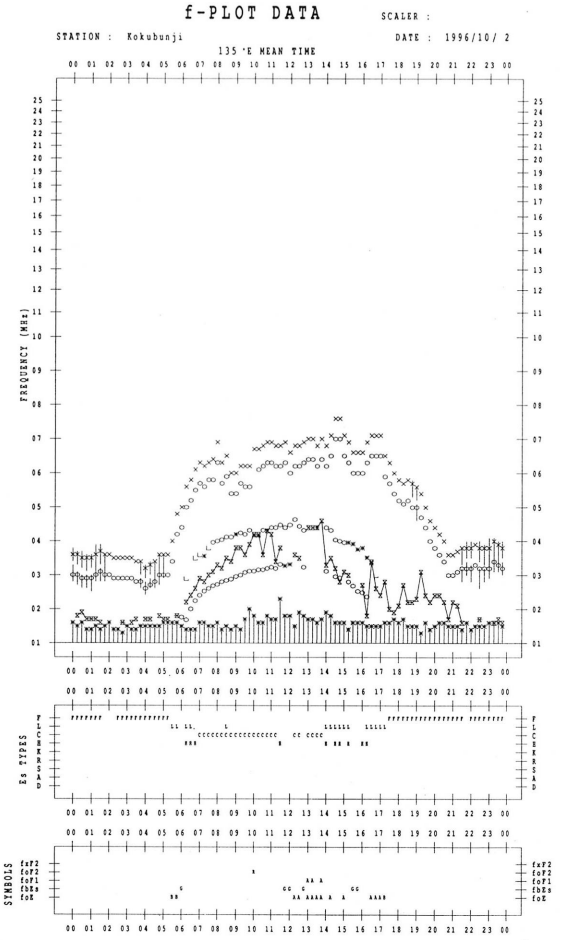
STATION : Kokubunji
DATE : 1996/10/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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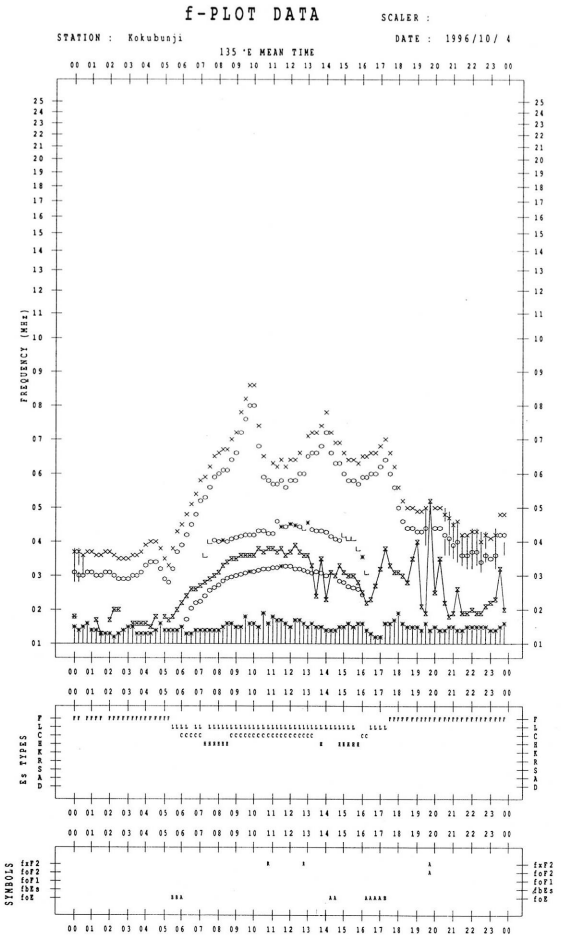
STATION : Kokubunji
DATE : 1996/10/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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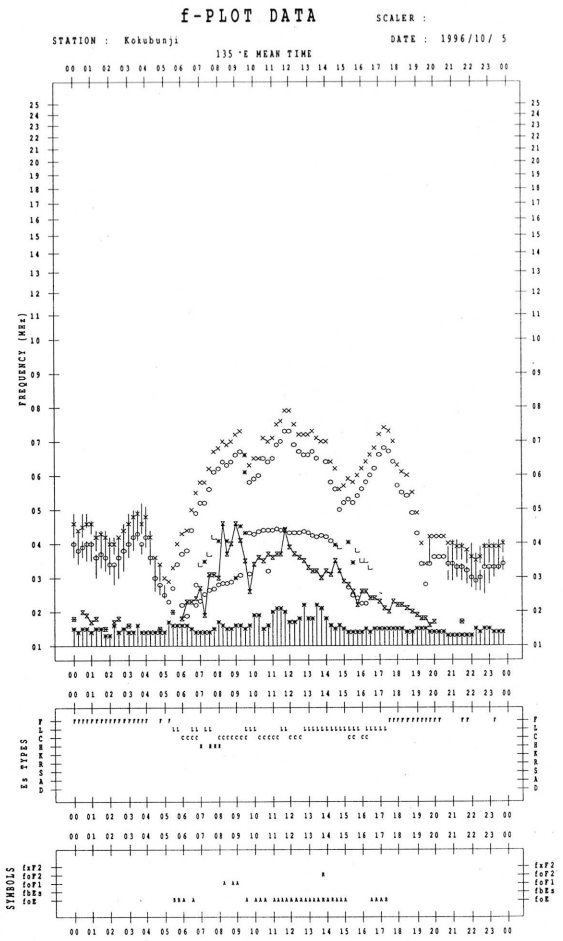
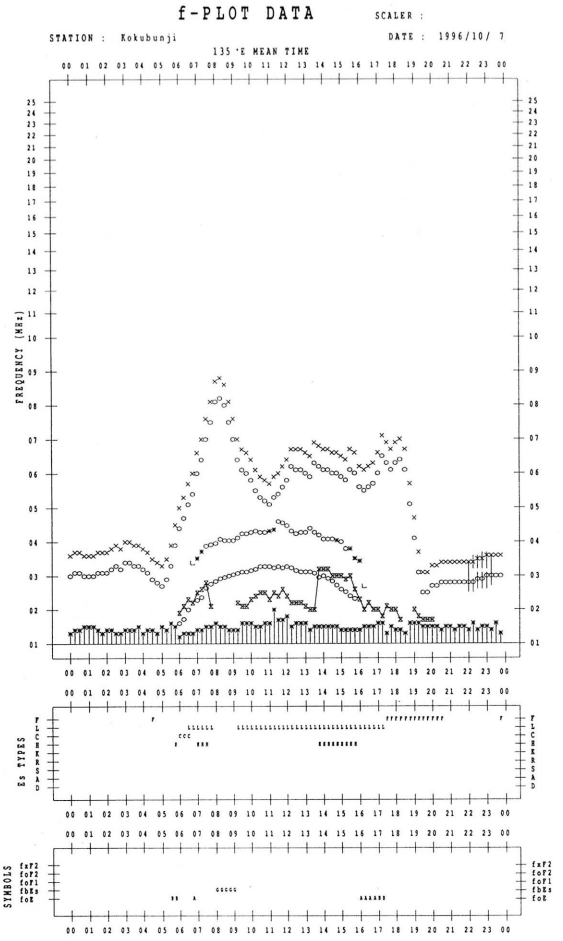
SCALER :
STATION : Kokubunji
DATE : 1996/10/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE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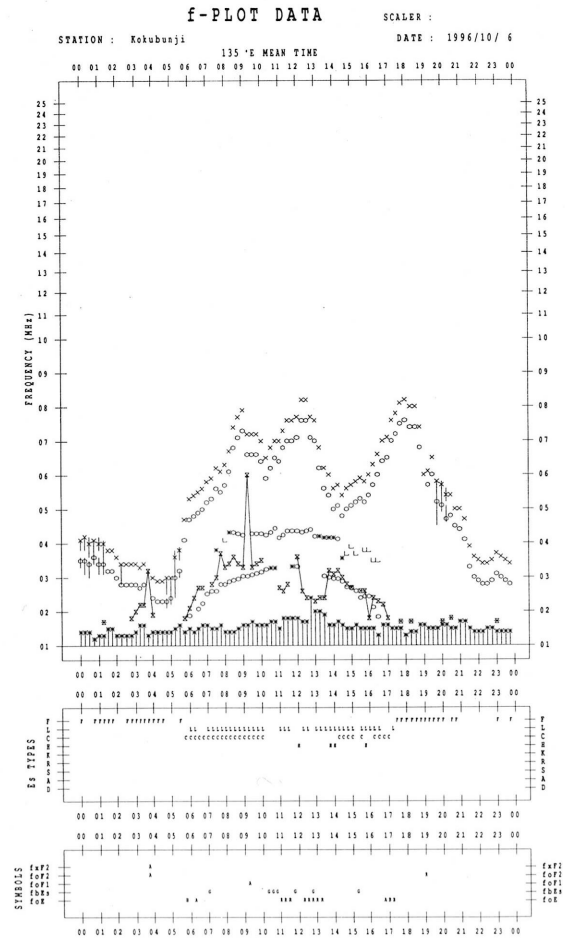
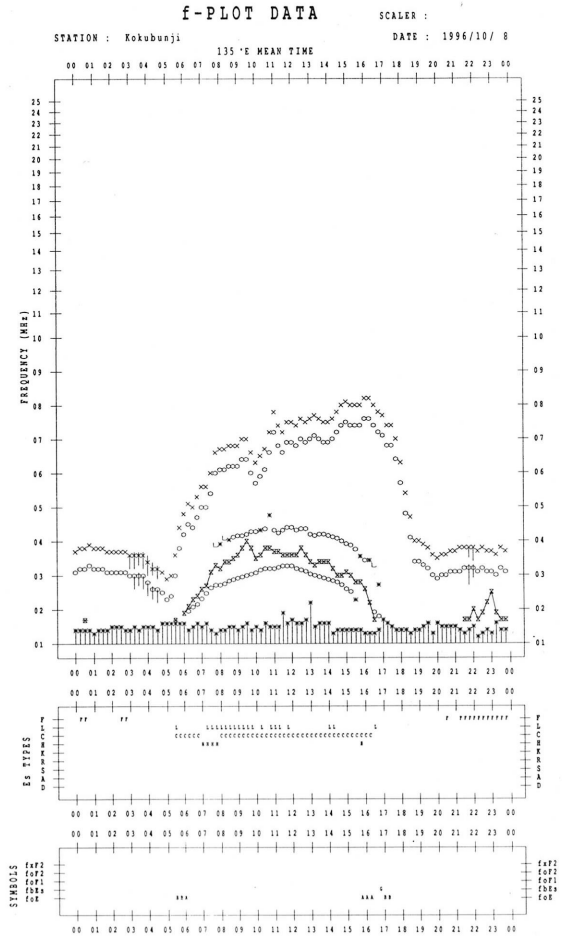
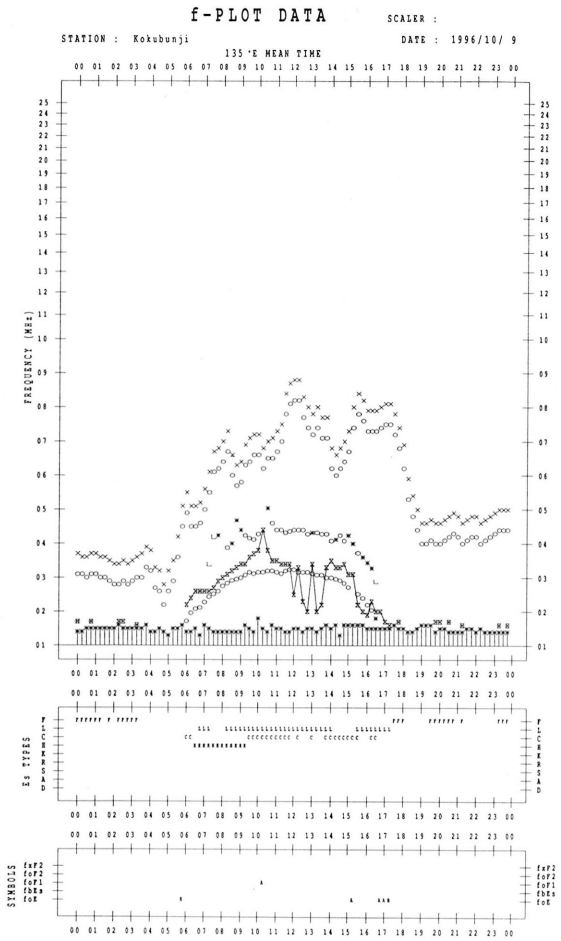
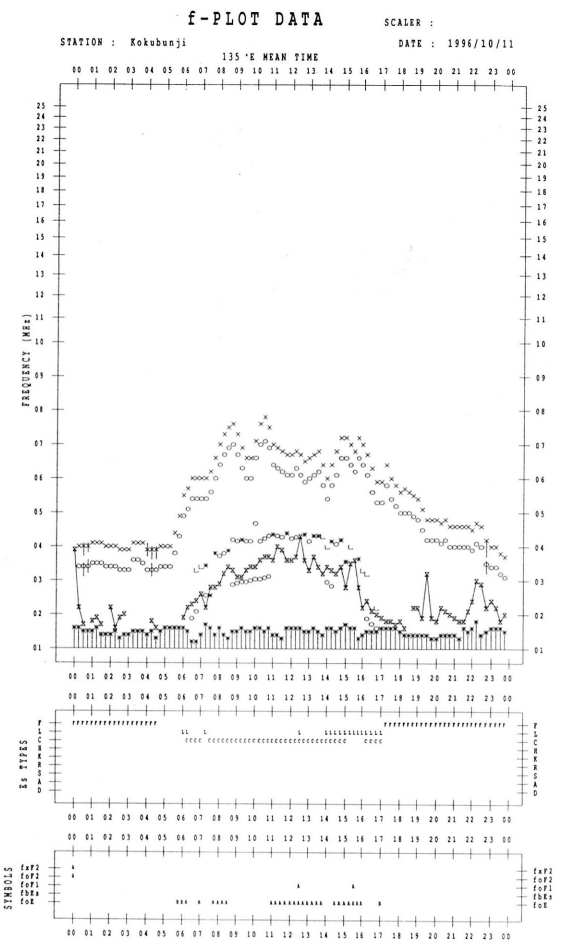
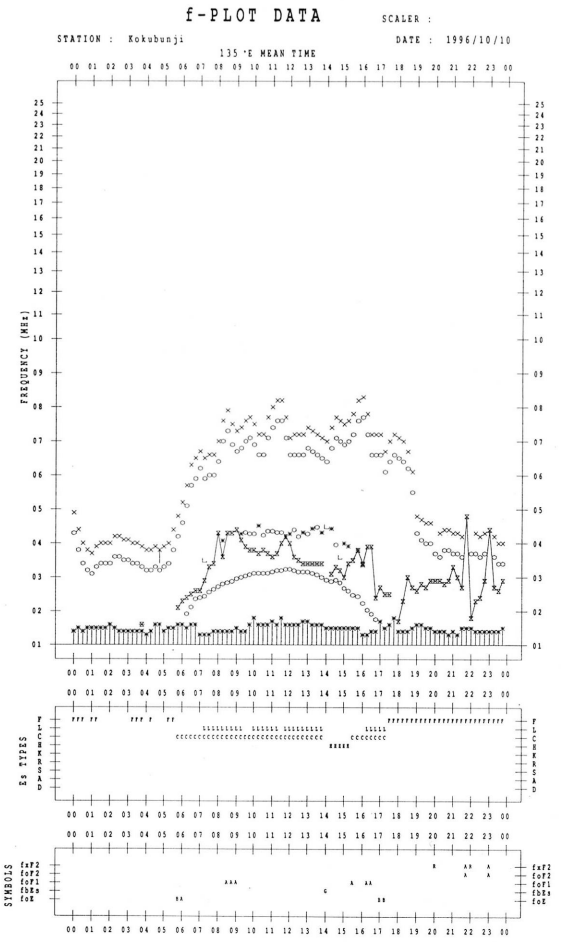
SCALER :
STATION : Kokubunji
DATE : 1996/10/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE

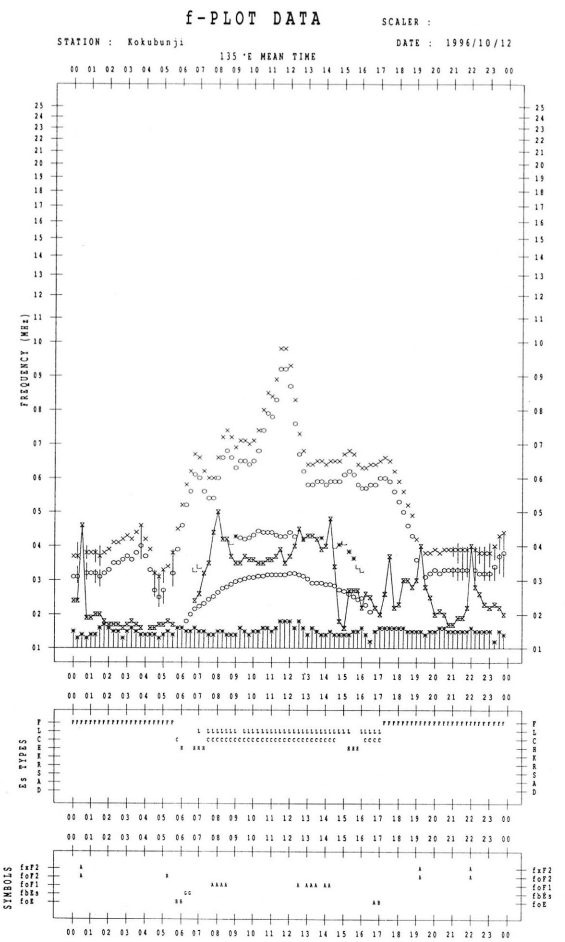

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE

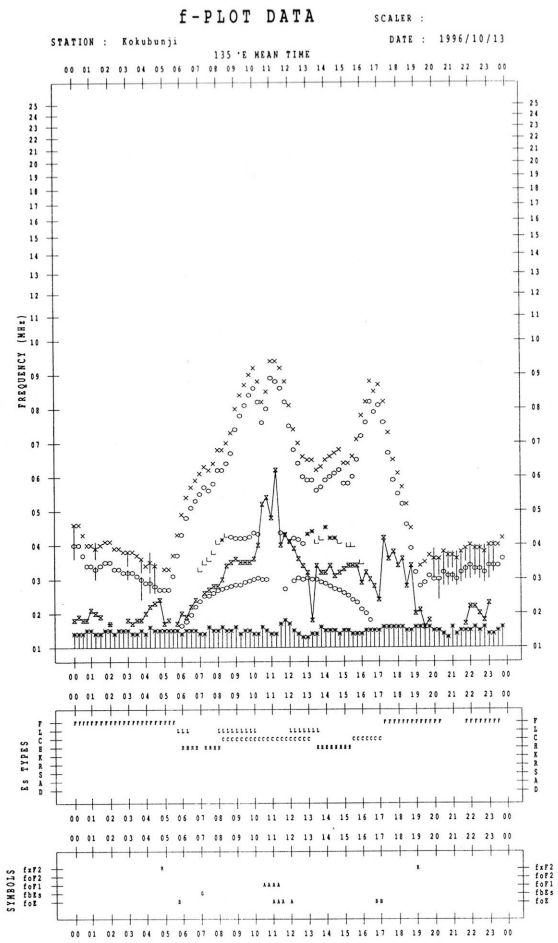

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE

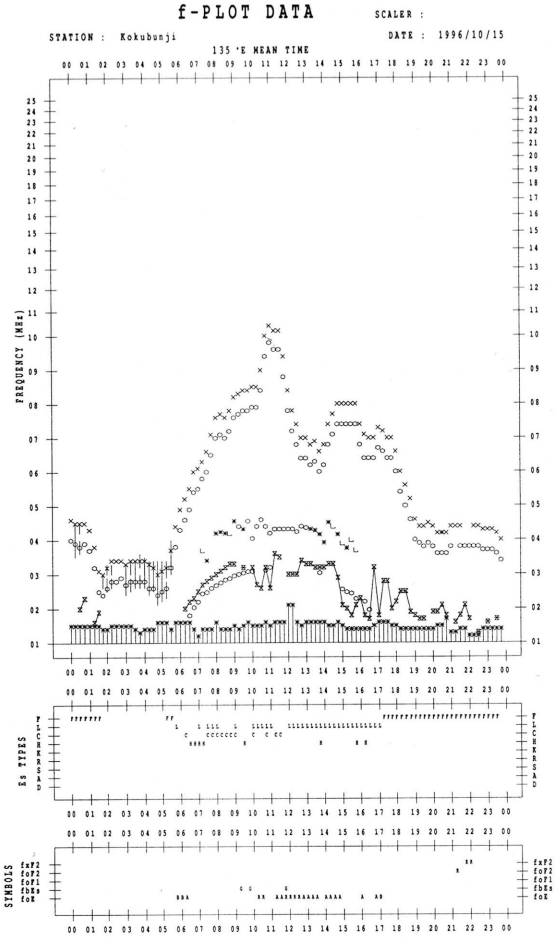

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

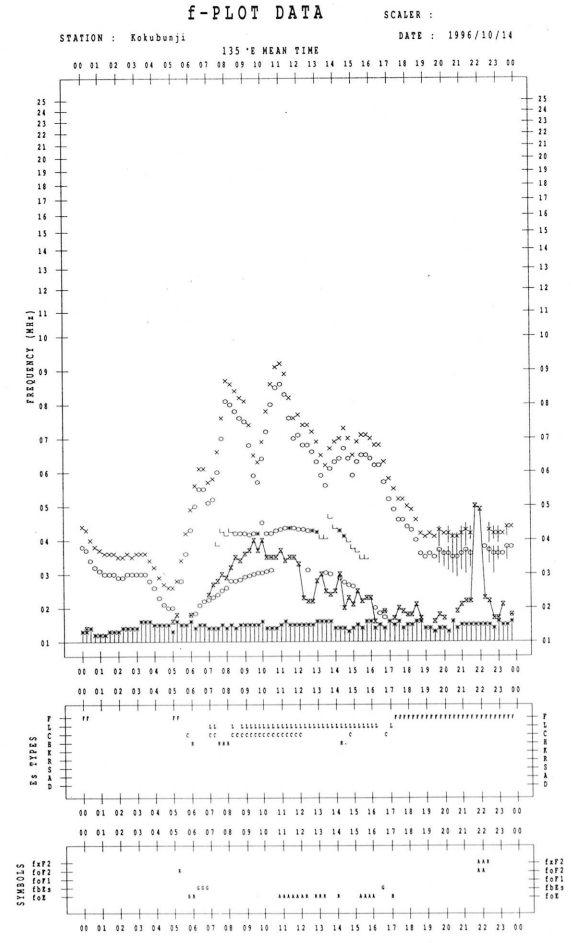

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

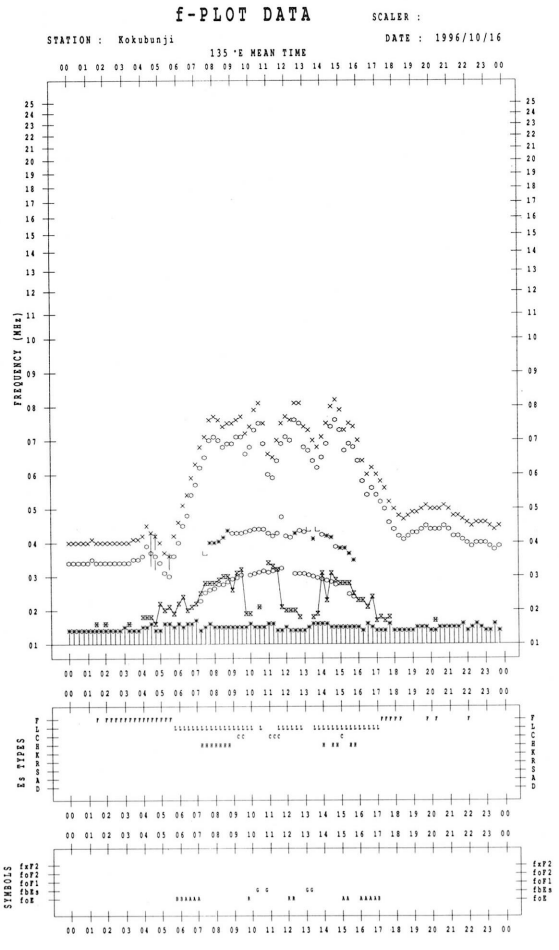

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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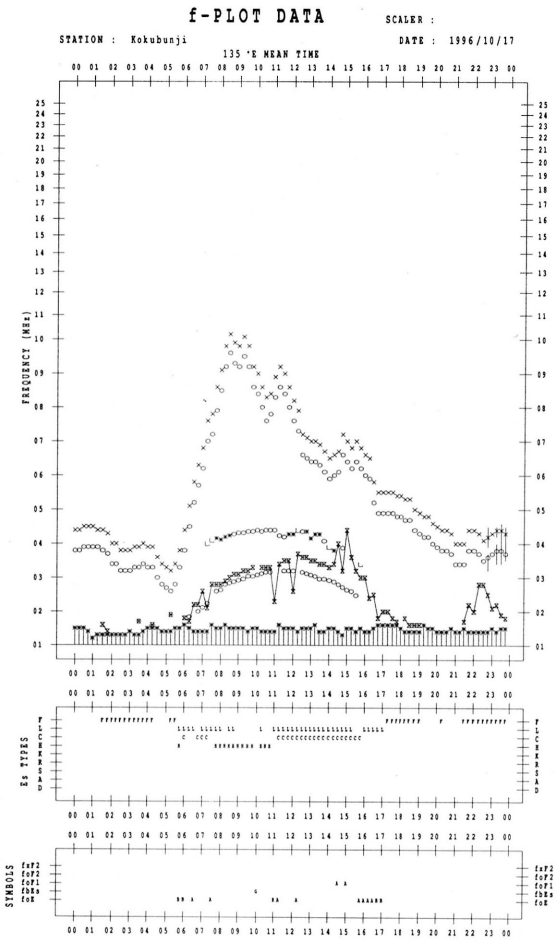
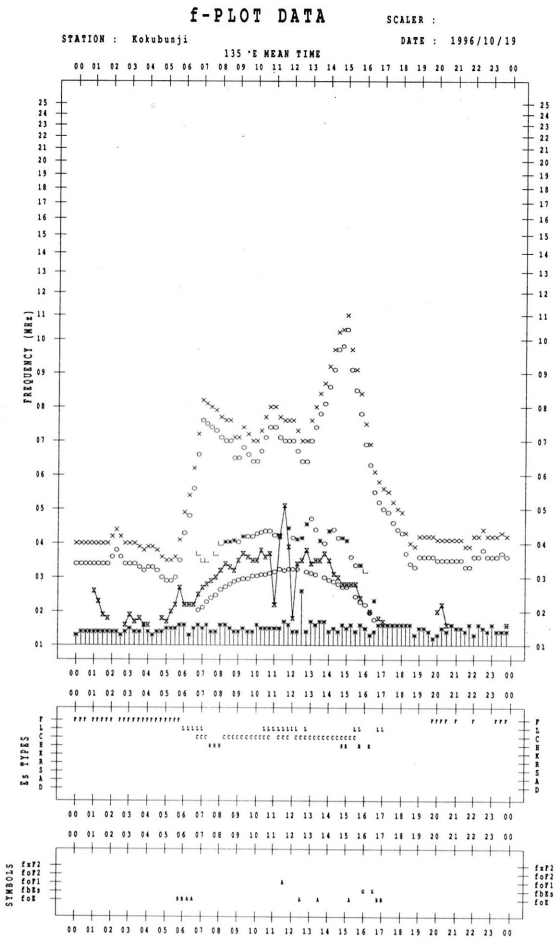
STATION : Kokubunji
DATE : 1996/10/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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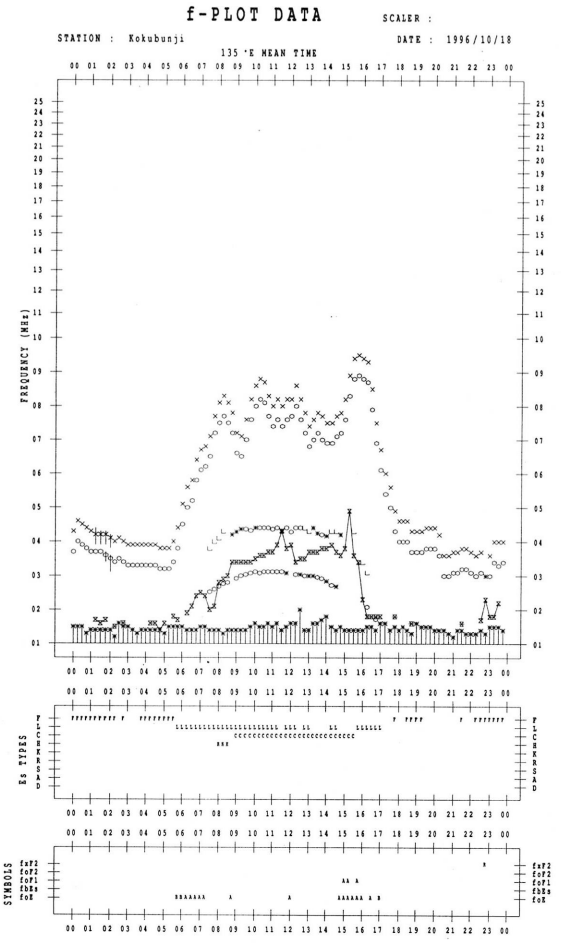
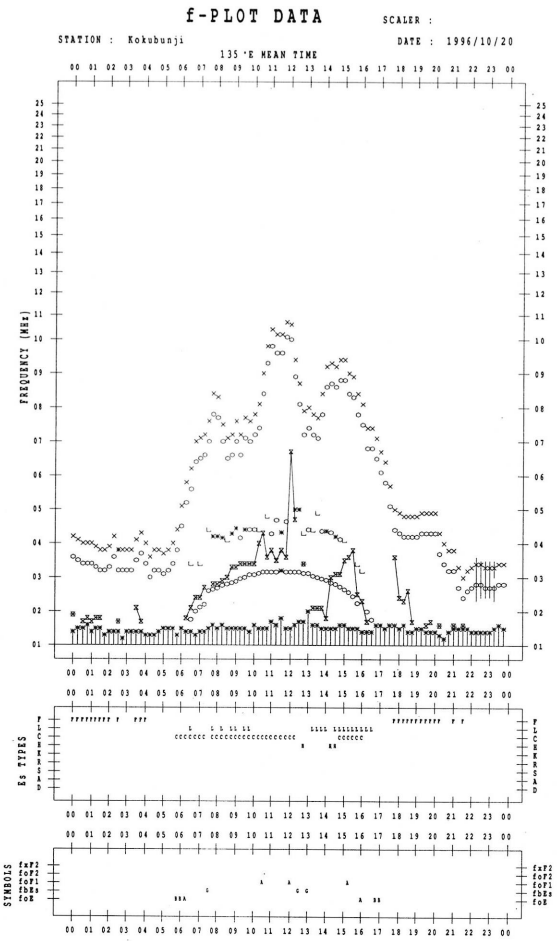
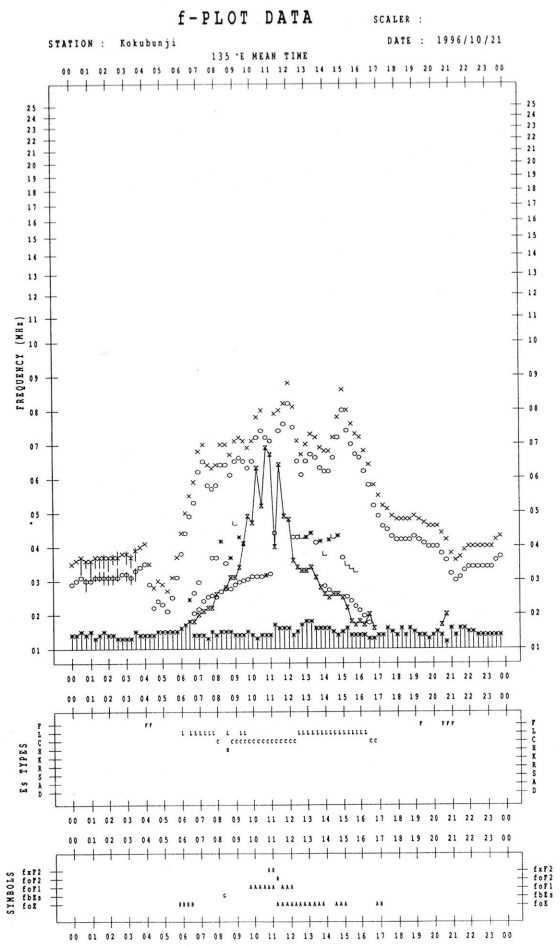
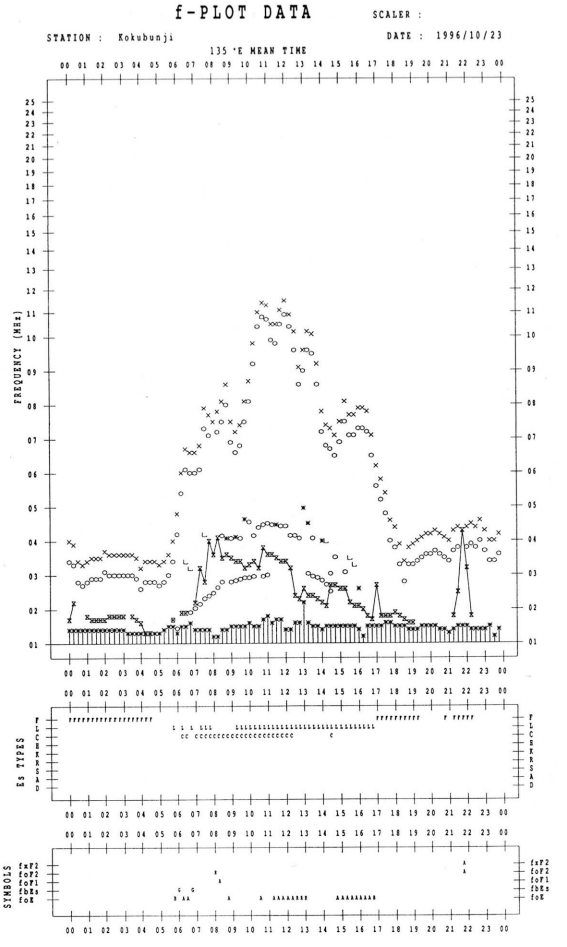
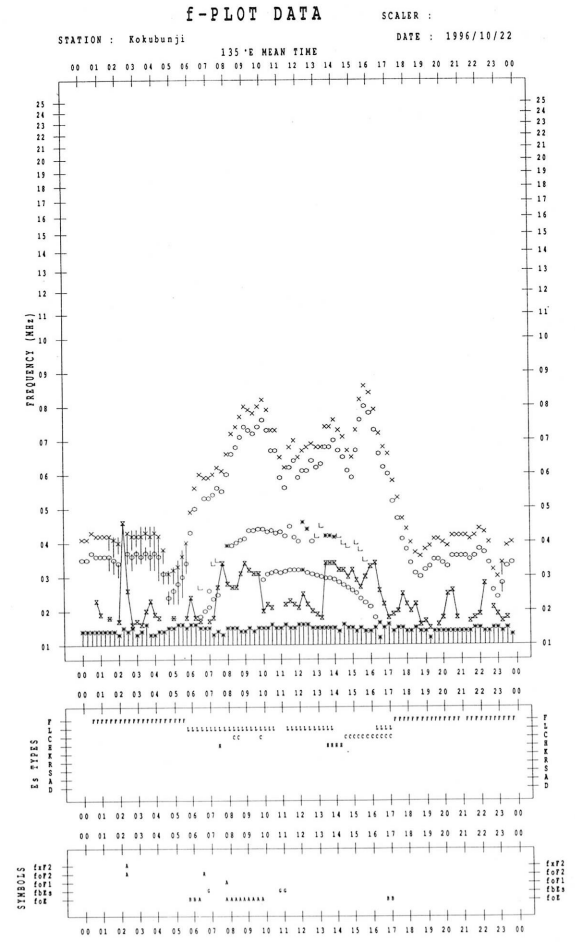
DATE : 1996/10/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

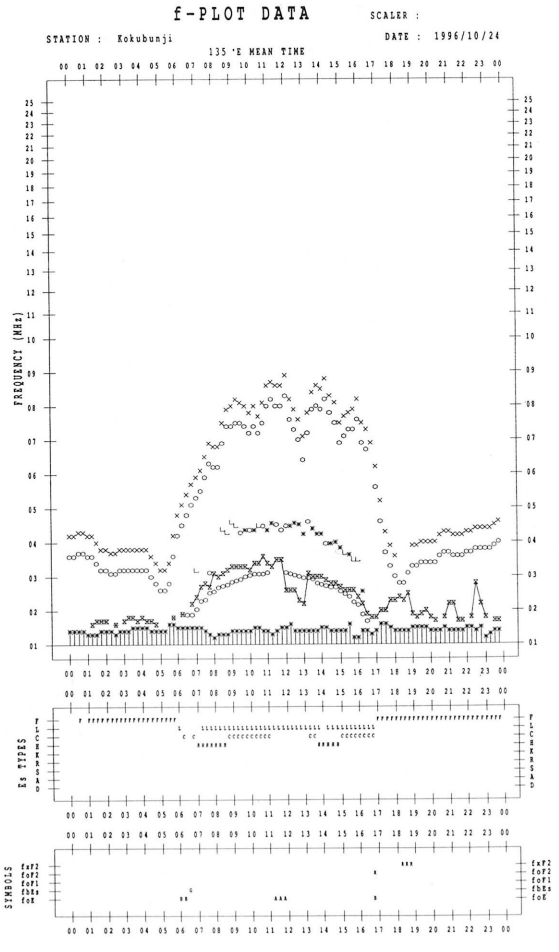

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

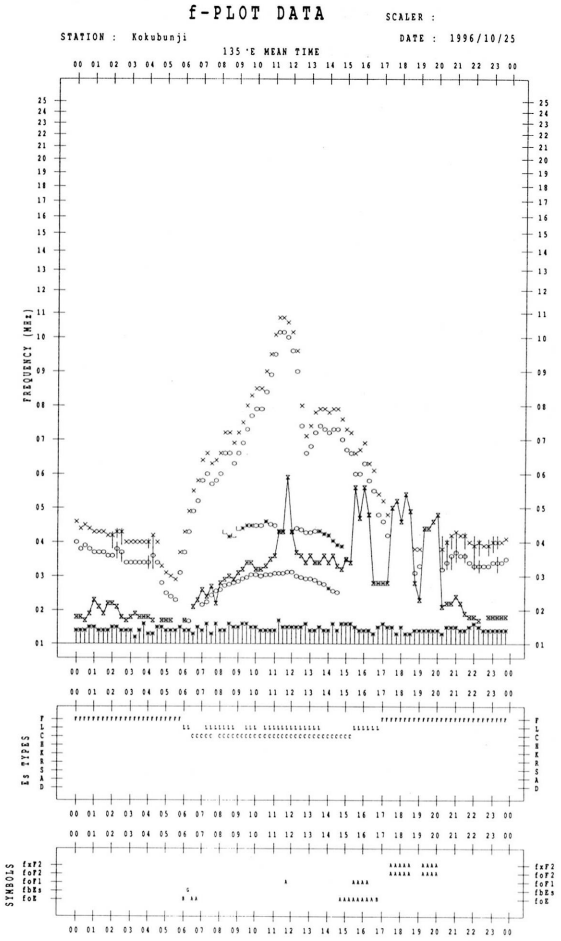

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

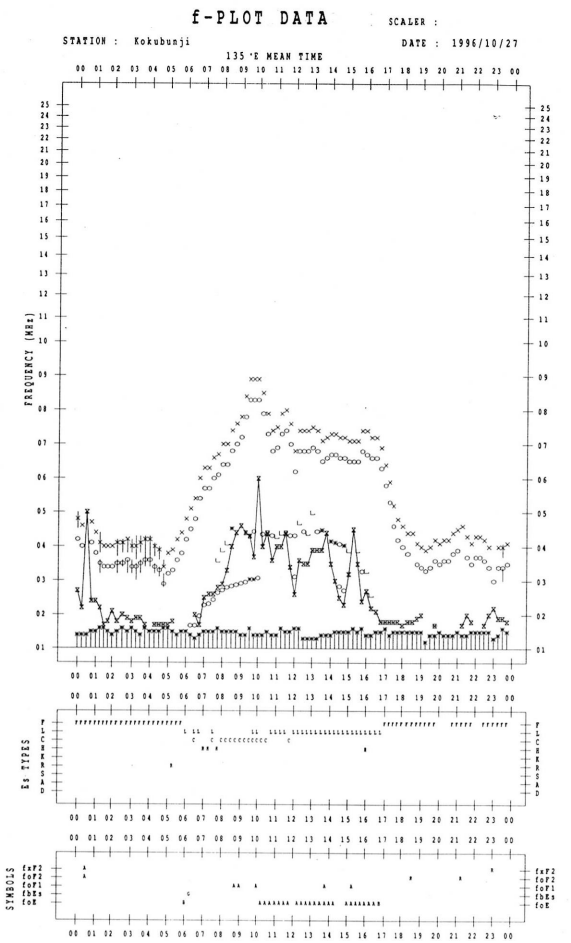

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

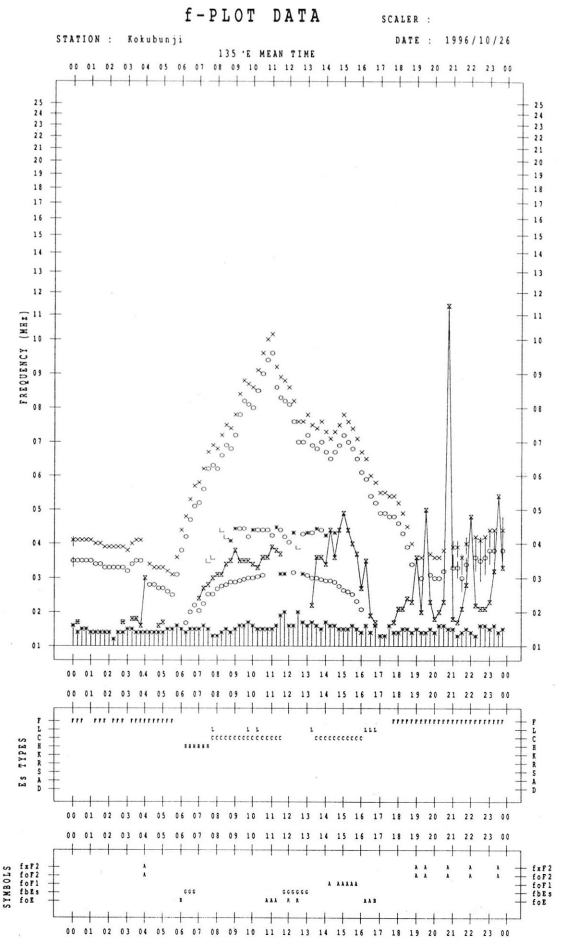

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

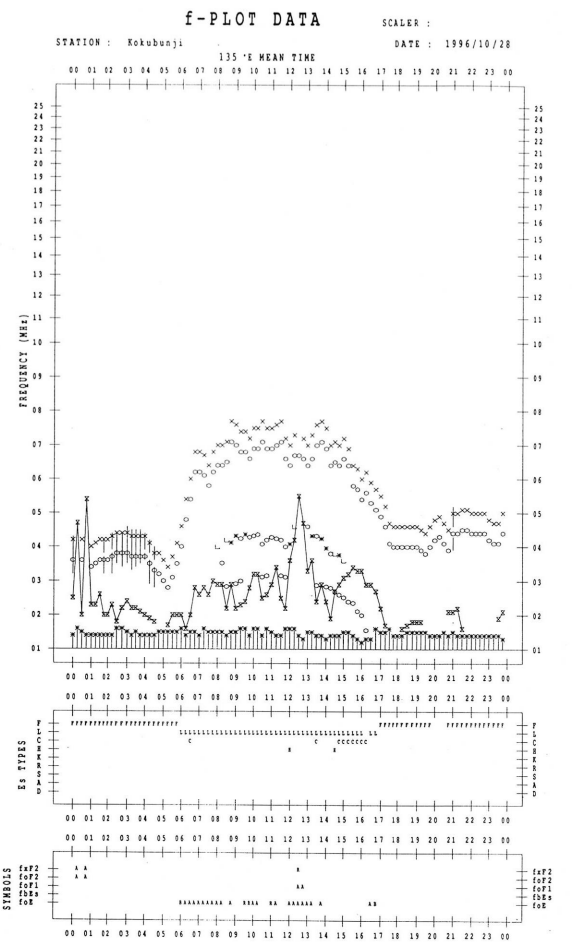

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

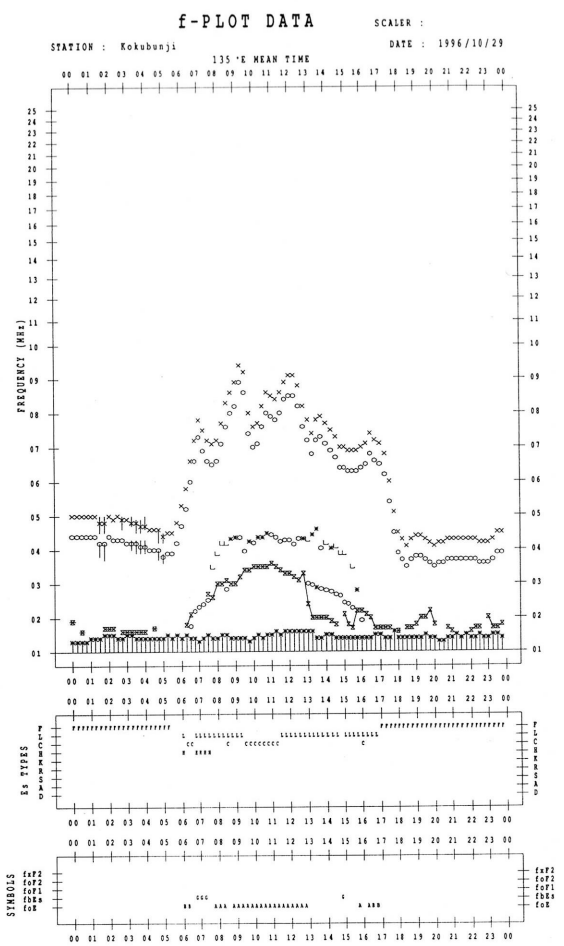

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

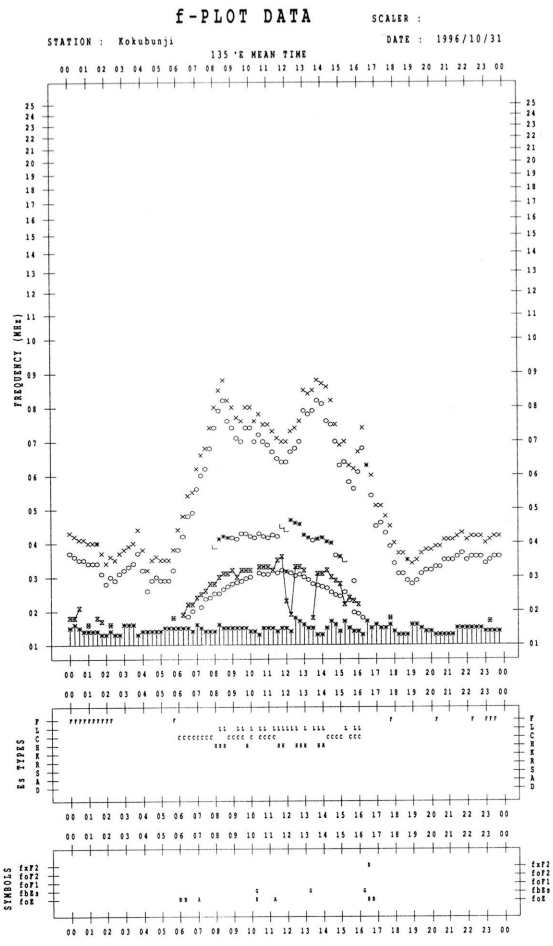

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

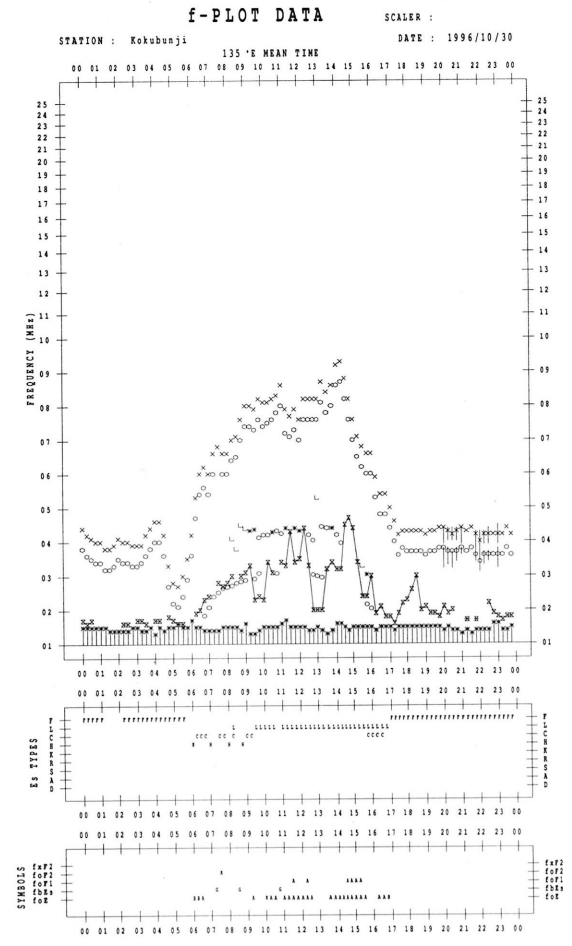

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/31
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/10/30
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 October 1996

Not available until system improvement is completed.

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

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

Note: No observations during the following periods.
01st 0000 - 07th 0720 09th 2130 - 13th 0720
22nd 0410 - 0720

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso October 1996

Single-frequency observations

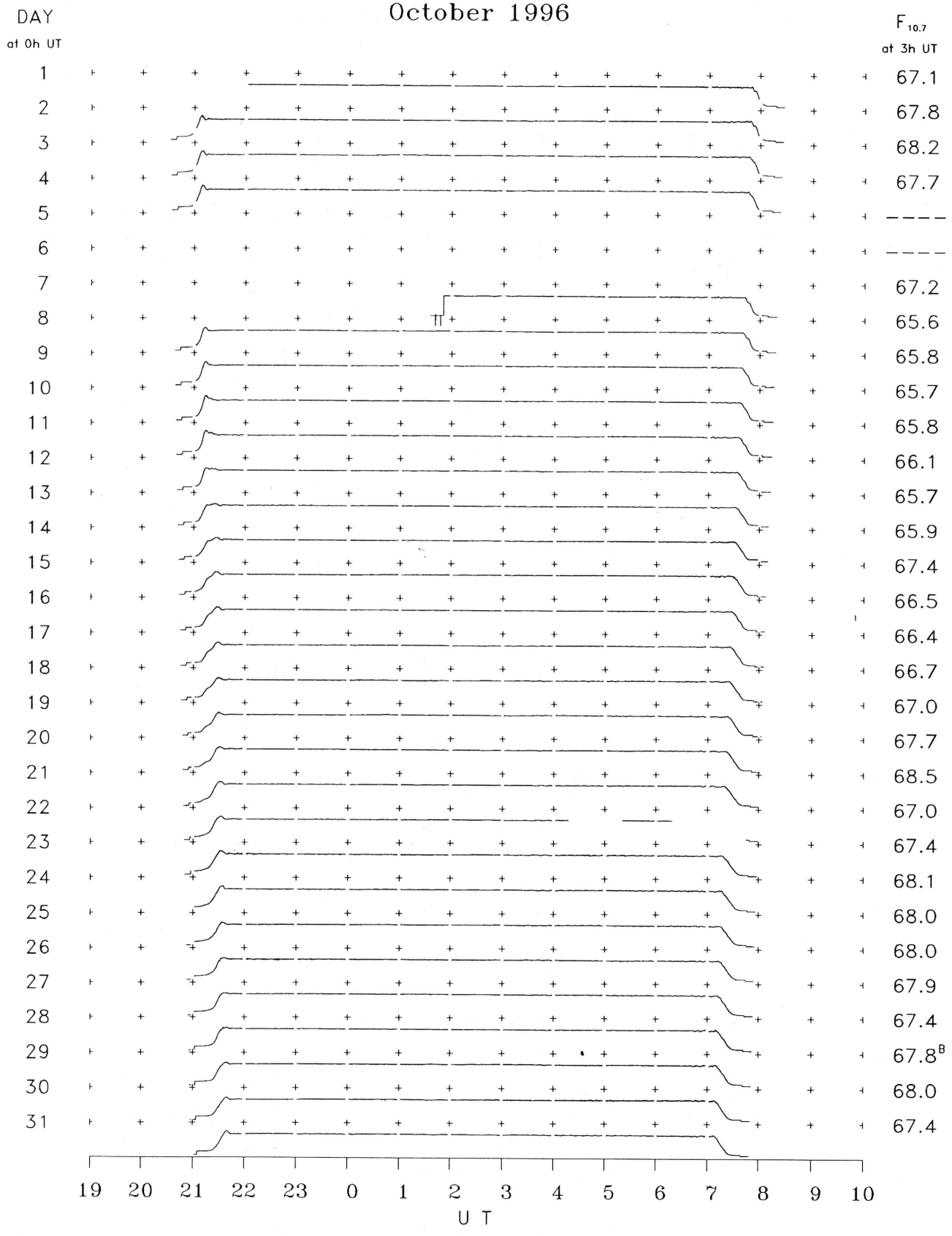
Normal observing period: 2105 - 0810 U.T. (sunrise to sunset)

OCT. 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
	(N o n e)							

B. Solar Radio Emission

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

October 1996



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

C. RADIO PROPAGATION

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

OCT 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
				US	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
1	2	-1	2	6	3	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-8	-2	0
	ES		ES	ES	ES			S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
2	-24	6	2	-8	-8	6	6				-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-8	3	2
			ES	ES			ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		
3	-2	4	-3	-24	6	5	2			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-14	-6
	ES	ES	ES	ES	ES		ES	S	S	S	S	S	ES	ES	ES	ES	ES	ES		ES				
4	-24	-24	-24	-3	-3	6	-24						-24	-24	-24	-24	-24	-24	12	-3	-1	7	9	6
		ES	ES		ES	ES	ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
5	0	2	2	4	-8	2	-3			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	6	-1	3	7
		S		S	ES	ES	ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES		ES				
6	3		5		-24	-24	-24				-24	-24	-24	-24	-24	-24	-24	-24	7	-24	3	7	6	14
			ES	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		ES		
7	7	2	-24								-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	7	-24	4	5
			ES	ES	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
8	4	4	-24	5	•						-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-3	9	4	5
		ES				ES		ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		
9	5	-3	-3	-3	-3	-24	2	-3			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-3	-3
		S	S	S	ES	ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES		ES	ES			
10	-3				-3	-8				-24	-24	-24	-24	-24	-24	-24	-24	-24	2	-24	-24	3	-3	-1
					ES	ES	ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
11	-3	-8	4	2	-3	-3	-6				-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	4	3	2
			ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		ES	ES			
12	-10	-14	-24	-3	-8	-8	-8	-8	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-10	-24	-24	-3	-2	-7
		ES	ES	ES	ES	ES	ES	ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		
13	-5	2	6	-8	-24	-24	-8	1			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	3	3
	ES	S	ES	S	ES	ES	S	S	ES	ES	ES	ES	ES	ES		ES	ES	ES	ES	ES				
14	-24		-8		2	5			-24	-24	-24	-24	-24	-24	-3	-24	-24	-24	-24	-24	-8	-1	6	6
		S		US	US		US	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
15	-3		7	12	12	22	6				-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	2	1	2
		S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
16	-6								-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-1	2	8	2
		S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
17	-1					-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	2	2	6
		S	S	S	ES	ES	ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
18	-3				-3	4	9			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-1	-2	-3
	ES	S		ES	ES	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		ES	ES
19	-24		-3	-24	-3		-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	3	-24	-24
	ES	S	ES	ES	ES	ES	ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
20	-24		-3	-1	-1	2	2			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-1	-3	-1
		S	S	ES	ES	ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
21	-6			-3	-3	6				-24	-24	-24	-23	-24	-24	-24	-24	-24	-24	-24	-24	6	3	4
	ES	ES	ES	ES	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			ES
22	-24	-24	-24	-24		-14	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	3	1	-24
	ES	S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
23	-24									-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	0	1	2
		S	ES	ES	ES	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
24	-1		7	7	8					-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-3	-1	3
	ES	S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
25	-24									-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	2	-2	-2
		S	S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
26	-6										-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-2	2	-1
		S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				ES
27	-2									-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-1	-8	-3	-24
	S	S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			ES
28										-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-2	-2	-24
	ES	S	S	ES	ES	ES	ES	ES	ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		ES
29	-24			-3	-3	-24	-24	-24	-24				-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-8	-24
	ES	S	S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		ES
30	-24										-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-1	-24
	ES	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
31	-24								-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-6	-8	-1
CNT	30	12	18	17	19	19	17	8	9	19	29	29	31	31	31	31	31	31	31	31	31	31	31	31
		S	ES	ES	ES	ES	ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES			
MED	-6		-3	-3	-3	-3	-8			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-1	1	0
		S	ES	ES	ES		ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES		ES				
UD	4		7	7	8	6	6			-24	-24	-24	-24	-24	-24	-24	-24	-24	2	-24	3	7	6	6
	ES	S	ES	ES	ES	ES	ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		ES
LD	-24		-24	-24	-24	-24	-24			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-8	-24

C. RADIO PROPAGATION

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

OCT 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
								ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
1	9	4	10	7	6	12	6	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	9	9	8	4
								S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					
2	9	8	9	12	12	17	11			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-1	4	3	6	6
								S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
3	3	7	8	9	12	17	12			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	2	2	9	7
				ES				S	S	S	S	S	ES	ES	ES	ES	ES				ES			
4	9	4	12	-3	10	24	20						-24	-24	-24	-24	-24	6	4	9	-24	6	11	6
		ES						S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					
5	8	2	6	12	8	12	10			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-3	7	17	10	12
								S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
6	10	11	17	20	24	24	16			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	11	11	12	11
									S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					
7	3	9	15	16	12	20	13	6		-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	4	12	11	6	10
									S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					
8	15	17	14	16	24	22	22	10		-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	4	9	16	17	11
								S	S		ES	ES	ES	ES	ES	ES	ES	ES	ES					
9	12	11	16	14	19	24	17			-3	-24	-24	-24	-24	-24	-24	-24	-24	-24	13	20	18	19	12
		S					S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					
10	14		16	12	12	12			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-8	12	4	9	10
							S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES		ES				
11	4	11	14	12	13	12				-24	-24	-24	-24	-24	-24	-24	-24	-24	3	-24	3	7	17	9
								ES	ES		ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
12	-6	13	11	13	19	4	-3	2	-24	-10	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	8	15	9	3
							ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
13	6	25	19	8	19	-1	-24				-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	7	6	10	7
							S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
14	4	6	6	7	6	23		-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	12	15	8	12
			S	S	S	S	S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES					
15	4	4									-24	-24	-24	-24	-24	-24	-24	-24	-24	-6	3	14	11	9
		S				S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					
16	9		17	14	14			-3	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-1	0	4	18	13
		S				ES	ES	ES	ES		ES	ES	ES	ES	ES	ES	ES			ES				
17	14		9	16	11	-24	-24	-24	-24	-1	-24	-24	-24	-24	-24	-24	-24	-1	-3	-24	17	12	8	8
								S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					
18	7	4	14	14	9	15	12			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-1	8	9	14	2
							ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
19	2	7	10	10	20	17	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	12	17	9	10
								S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
20	11	12	14	9	18	19	20			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	7	9	16	9
							S	S	S	ES	ES	ES		ES	ES	ES	ES	ES	ES	ES				
21	10	6	11	16	6	12				-24	-24	-24	6	-24	-24	-24	-24	-24	-24	-24	6	11	10	7
		ES	ES				ES	ES		ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					
22	9	-24	-24	14	19	6	-24	-24	3	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	13	8	19	8	11
						S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES					
23	8	13	13	12	10				-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	2	16	10	8	0
							S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
24	6	16	12	13	13	7			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	15	9	8	8
							S	S	S	ES	ES	ES	ES		ES	ES	ES	ES	ES	ES				
25	7	12	16	15	17	13				-24	-24	-24	-24	-1	-24	-24	-24	-24	-24	-24	9	10	9	16
						S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES		ES					
26	7	15	13	11	13					-24	-24	-24	-24	-24	-24	-24	-24	2	-24	-3	4	9	4	6
						S	S	S		ES	ES	ES	ES	ES	ES	ES	ES	ES						
27	6	8	7	9	12				-2	-24	-24	-24	-24	-24	-24	-24	-24	-24	-6	12	3	14	6	2
						S	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
28	9	10	18	13	16					-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	4	10	6	12
						ES	ES	ES	ES	S	S	S	ES	ES	ES	ES	ES	ES	ES	ES				
29	6	9	14	6	9	-24	-24	-24	-24				-24	-24	-24	-24	-24	-24	-24	-24	9	6	4	7
		S	S					S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
30	7			15	14	9	10			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-4	-14	13	3
		S				S	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
31	11		6	9	7				-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-5	4	3	0
CNT	31	26	29	30	30	24	18	10	13	27	29	29	31	31	31	31	31	31	31	31	31	31	31	31
								S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	US				
MED	8	9	13	12	12	12	10			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	8	10	9	8
								S	S		ES	ES	ES	ES	ES	ES	ES	ES						
UD	14	16	17	16	20	24	20			-10	-24	-24	-24	-24	-24	-24	-24	-1	-3	12	16	17	17	12
						ES	ES	S	S	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
LD	3	4	6	7	6	-24	-24			-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-4	3	4	2

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

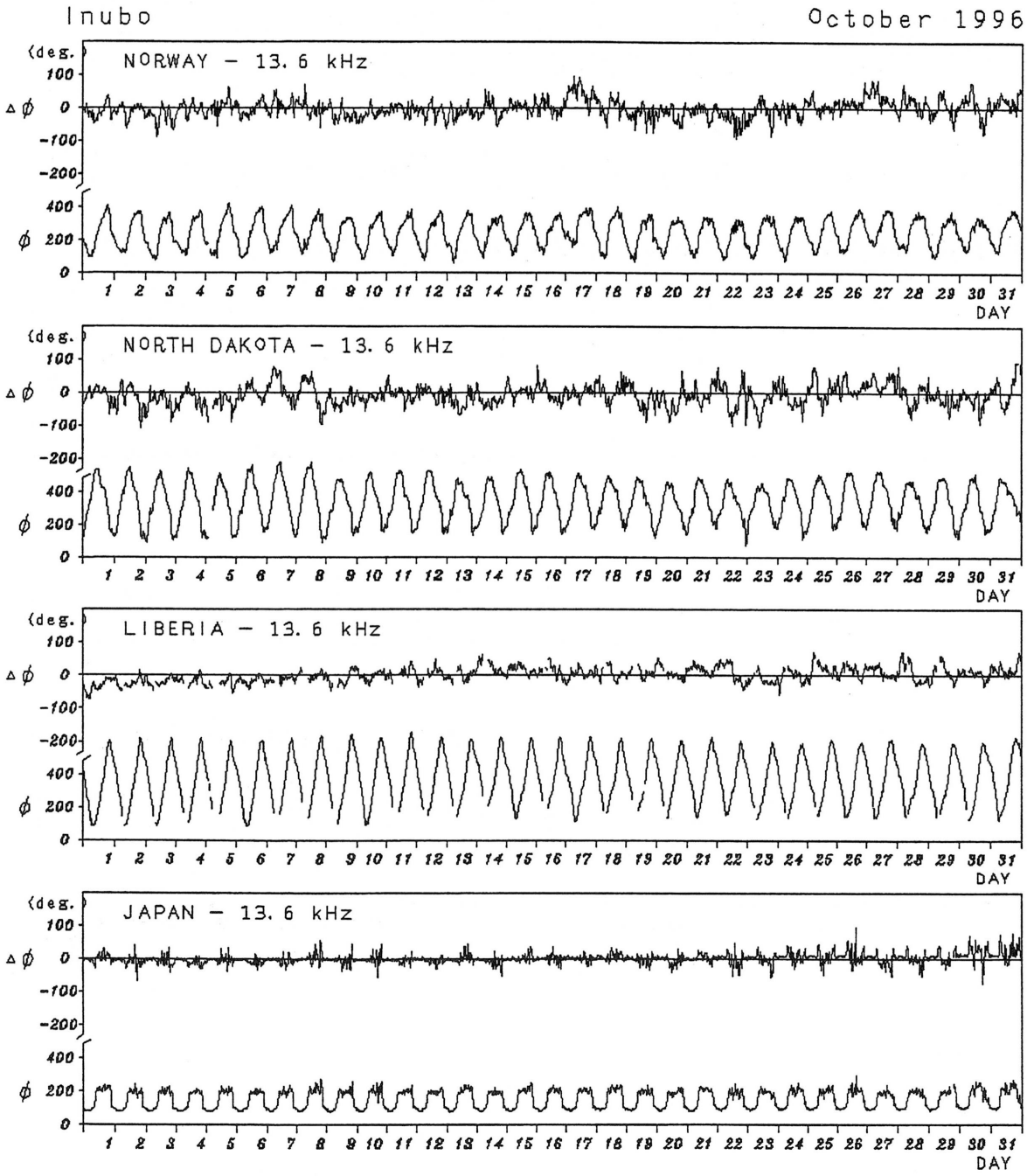
Hiraiso

Time in U.T.

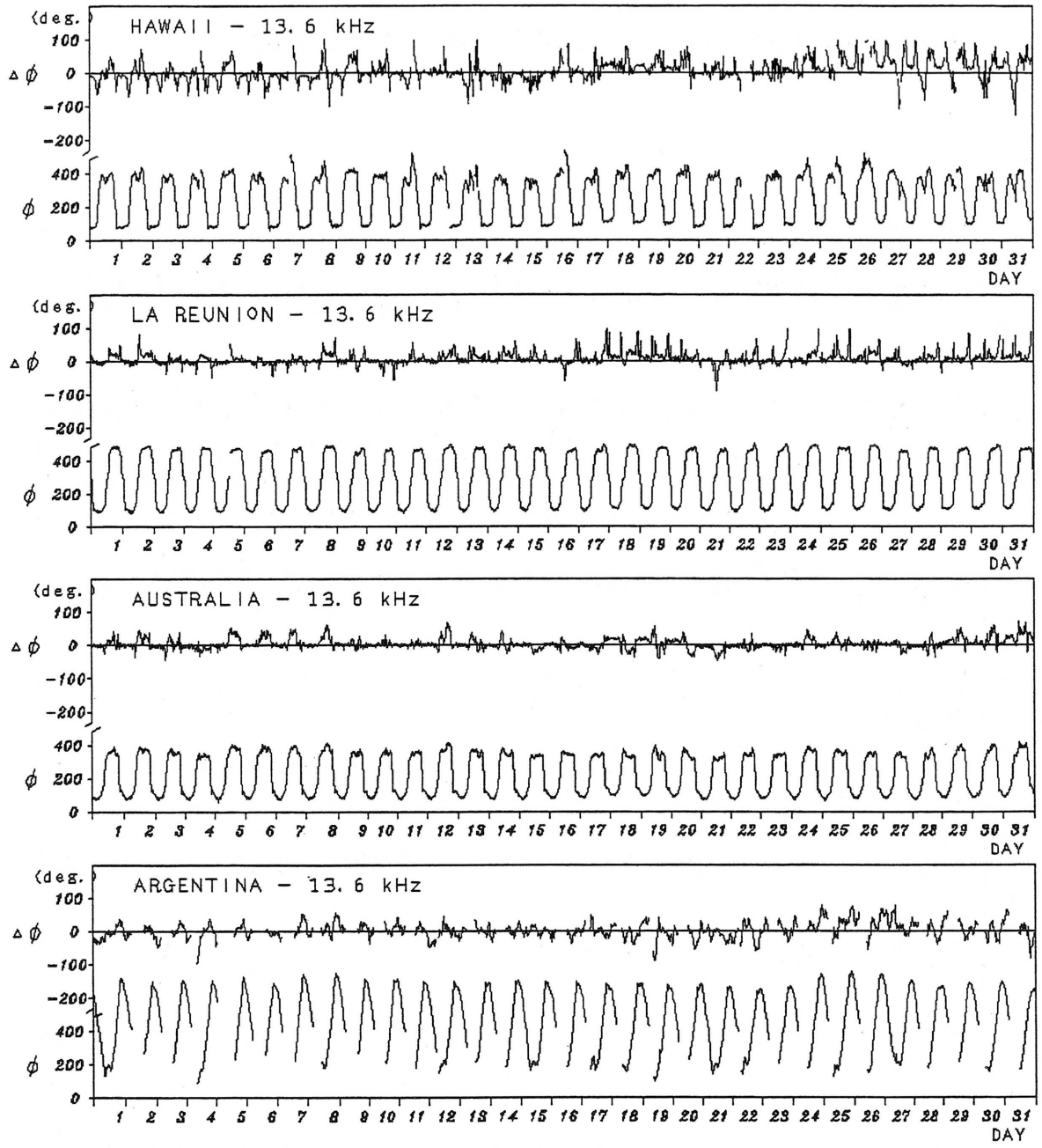
OCT. 1996	Whole Day Figure	WWV 00 06 12 18 / 06 12 18 24	WWVH 00 06 12 18 / 06 12 18 24	Condition 00 06 12 18 / 06 12 18 24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	4o U	5U - - 3U	4 - - 4	N N N N			
2	4+ U	4U 5U - 4	4 - - 4	N N N N			
3	3+ U	4U - - 2U	4 - - 4U	N N N N			
4	4+ U	3U S - 5	4 S 5U 4	N N N N			
5	4+ U	4U - - 5	4 - - 4	N N N N			
6	4+ U	4U - - 5	5 - - 4	N N N N			
7	4- U	3U S - 4U	4 - - 4	N N N N			
8	4+ U	4U S - 5	5 - - 4	N N N N			
9	4+ U	4 - - 3U	4 5U - 5	N N N N			
10	4o U	4U - - 4	4 - - 4	N N N N			
11	4o U	4U - - 4	4 - - 4	N N N N			
12	4- U	3U - - 4	4 4U - 4	N N N N			
13	3+ U	3U - - 3U	4 2U - 4	N N N N			
14	4- U	3U - - 4	4 - - 4	N N N N			
15	4o U	5 - - 4	3U S - 4	N N N N			
16	4o U	S - - 4	4 - - 4	N N N N			
17	4- U	S - - 4	3 3U 5U 4	N N N N			
18	4- U	4U - - 3U	4 - - 4	N N N N			
19	3o U	3U - - 2U	4 2U - 4	N N N N			
20	4- U	3U - - 4	4 - - 4	N N N N			
21	4o U	4U - - 4U	4 - - 4	N N N N			
22	3- U	2U - - 3U	3 2U - 4	N N N N	21.4	23.20	114
23	4o U	S - - 4	4 - - 4	N N N N			
24	4o U	5U - - 3U	4 - - 4	N N N N			
25	4o U	S - - 4	4 - - 4	N N N N			
26	4o U	S S - 4	4 - - 4	N N N N			
27	4o U	S - - 4U	4 - - 4	N N N N			
28	4- U	S - - 3U	4 - - 4	N N N N			
29	3o U	3U - - 2U	3 - - 4	N N N N			
30	3+ U	S S - 3U	4 - - 3	N N N N			
31	3o U	S - - 3U	3 - - 3	N N N N			

C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo



Inubo October 1996



C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso

Time in U.T.

OCT. 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

Oct. 1996	S P A								
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	Ω/AU	Ω/H	Ω/ND	Start	End	Maximum
			NONE						

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