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IONOSPHERIC DATA IN JAPAN

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CONTENTS

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MINISTRY OF POSTS AND TELECOMMUNICATIONS
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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

MAY 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	35		35	29	32	40	40	A	49	A	57	A	A	A	A	55	56	60	60	69	59		35	35
2	29	A	A	30	28	34	40	A	A	A	A	A	A	A	A	A	60	58	A	A	A	A	54	
3	35	38	37	29	29	38	38	A	A	A	A	A	A	A	A	A	50	54	54	59	57	57		48
4		35	37	30	40	39	49	A	A	A	A	A	A	A	53	A	A	53	52	57	57	55	36	35
5	37	35	30	34	28	44	52	57	A	A	A	A	A	A	A	A	A	A	54	57	58		54	
6	35	26	28	32	29	A	A	A	A	A	A	A	A	A	A	A	A	A	55	60	57	A	56	37
7	34	35	35	31	34	40		A	A	A	A	A	B	A	A	A	56	60	62	64	69			
8	35	40	34	40	38	N	A	A	A	A	A	A	A	A	A	A	A	62	60	A	57	58	55	
9	34		28	32			56	A	49	A	A	A	A	A	A	51	58	56	57	N	70	67	57	
10	48	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	34	A	57	56	67	57	49	49
11	35	35	37	30	A	38	56	68	58	55	A	A	A	A	A	A	56	59	58	58	59	57	37	35
12	25	36		37	36		54	55	59	A	A	A	A	A	A	A	A	57	58	60	57	58	A	32
13	35	36	38	40		A	A	59	A	A	A	A	A	A	A	A	57	A	54	63	59	69		40
14	31	30	28	35	31	55	A	A	A	A	B	A	A	A	A	A	A	A	57	62	A	58		
15		36	36	35	36	38	A	A	60	A	A	A	A	A	A	A	A	A	64		57	57		56
16	55	37	36	32	34	36		A	A	A	B	A	A	A	A	A	60	54		72	70	56	58	38
17	54	54	56	56	52	57	51	60	59	A	A	A	A	A	A	A	55	65	72		59	A	72	
18	30	30	30	30	29	30	A	A	A	A	A	A	A	A	A	A	A	A	48		A	57		29
19	29	32	35	34	30	A	A	57	A	A	A	A	A	A	A	A	54	54	A	A	A	59	49	
20	A	32	35	35	40	40	A	55	A	A	A	A	A	A	56	56	A	A	58	56	57	57	58	57
21				38	32	A	A	A	A	A	A	A	51	A	A	A	A	A	53	49	A	57		59
22	52	35	35	28	36	56	A	A	A	A	A	A	A	A	A	49	57	56	56		49	40	A	A
23	37	A	A	29	38	41	A	A	A	49	A	A	A	A	A	A	A	56	57	A	57	57		57
24	60	53	56	57	59		A	A	A	A	A	A	A	A	A	A	A	A	38	35	57	59	56	
25		40	37	40	37	56	A	56	A	A	A	A	A	A	A	A	A	A	49	57	57	56		49
26	35	32	24	32	31	A	A	56	A	A	A	A	A	A	A	A	A	58	A	A	A	28		35
27	29	35	38	35	38	28	A	A	A	A	A	A	B	A	A	B	A	A	A	49	58	57	54	
28	38	32	30	35	30	37	A	A	A	A	A	A	A	A	56	A	A	49	A	49	A	57	56	A
29	56	56	51		A	36	A	A	A	A	A	A	A	A	A	A	A	A	50			38	35	30
30	29	28	35	34	A	36	A	A	A	A	A	A	A	A	A	A	A	A	35	A	A	A	59	A
31	A	A	A	29	31	A	A	A	A	A	A	A	A	A	A	A	A	A	A	58	A	57	A	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	25	24	25	29	25	20											12	16	24	18	21	24	18	18
MED	35	35	35	34	34	38											56	56	56	58	57	57	54	39
U Q	43	37	37	36	38	42											57	59	58	62	59	58	57	56
L Q	30	32	30	30	30	36											54	54	52	56	57	56	49	35

HOURLY VALUES OF fEs AT WAKKANAI

MAY 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	G	27	28	36	53	65		44	43	40	40	30	29	47	38	34	33	30	G	41
2	32	39	44	40	24	23	30	26	38	37	44	43	51	56	60	36	31	62	64	77	44		G	G
3	G	G	G	G	G	28	29	32	39	41	40	42	39	38	34	30	28	34	23	G	24	24	G	G
4	G	G	G	G	G		28	33	34	37	37	30	38	29	30	29	26	35	35	31	24	G	G	G
5	G	G	G	G	G		30	33	34	30	32	33	36	35	30	28	31	41	44	30	40		27	G
6	G		G			40	55	56	52	66	68	29	57	40	34	32		41	43	39	34		29	26
7	29		32	27		G	31	67	73	44	78	38	B	35	34	35	28	24	G	28	32	G	G	
8	35	35	29	27	G	25	30	37	58	62	44	66	65	64	58	67	58	37	32	38	38	30	26	29
9	G	G		27	G	G		26	36	42	30	37	38	38	34	33	32	31	38	28	G	32	36	
10	29	59	60	38	44	48		60	73		27	40	35	34		57		41	36	29	35	G	62	28
11	29	G		G	28	30	42	46	54		41		36	34	31	38	34	45	30	26	27	25	G	25
12	34	G	G	G	G		38	46	36	31	31	37	38	35	31	43	55	34	43	42	28	30	31	24
13	G	G	G	G	G	34	30		56		38	32	31	29	30	36	40	50	38	30	G	25	G	25
14	G	G	G	G	G		46	60	41	34	B	32	32	30	29	39		35	44	42	36	44	36	35
15	26	29	G	G	G	28		56	40		60	60	65	44	N	36	37	34	53	32	G	G		G
16	G	G	G	G		30	33	40	40	44	B	64		57	31	44	58		43	32	25	24	24	G
17	26	G	G	G	G	31	34	43	43	58	58	37	31	33	32	41	40	46	46	39			29	27
18		G	G		G		40	41	44	43	38	37	35	33	32	35	65	62	47	71	64		45	45
19		G		25	G	36	33	57	68	60	86	65	61	64	62		34	51	51	38	39		45	
20	42	28	28	G	G		32	39	41		41	40	38	40	38	39	34	35	32	G	26	G	G	28
21	27			26	25	29	36	37	41	40	38	42	40	39	36	30	28	30	33	G	29	G	G	G
22	G	G	G	G	G	35	45	46	40	77	43	38			60	42	47	58	41	30		37	42	46
23	38	42	63	31	29	28		54	64	63	72	70	63	35	59	30	26	30	33	42	38	28	33	G
24	G	24	39	33	G	34	46	46	42	36	61	38	37	34	31	30	35	33	32	G	30	G	G	27
25	25	25	29	25	25	32	42	45	58	60	66	64	40	54	39	33	29	28	36	30	34	25	33	27
26	G	G	G	G	G			44	39	31	36	36	68		32		38	56	86	74	64	34	G	33
27	34	30	32	33	G	33	46	82	58	36	36	28	B	29	41	B	29	46	57	61		60	31	32
28	23	G	G	G	G	27	47	41	66	37		39	30	29	25	30	44	31	72	32	38	39	41	58
29	34		36	33	27	29	44	43	35	35	96	91	30	30	33	30	28	26	41	G	G	29	34	29
30	33	39	34	25	31	23	28	36	45		30	28	28	30	38	28	40	30	37	77			45	35
31	45	40	36	30	36	35	58	71		60	34	35	32	33	56	54	61	40	42	34	47	41	43	45
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	27	27	29	28	24	26	30	30	25	27	30	27	29	29	28	28	30	31	31	27	24	30	28
MED	26	G	G	G	G	30	35	44	42	42	41	38	38	35	34	35	34	36	41	32	33	26	29	27
U Q	33	30	34	28	25	34	45	56	58	60	61	44	51	40	40	40	42	46	46	42	38	33	36	34
L Q	G	G	G	G	G	27	30	37	39	36	36	35	32	31	31	30	29	31	33	28	25	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT WAKKANAI

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

HOURLY VALUES OF foF2 AT KOKUBUNJI

MAY 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	A	46	37	36		38		56	A	54	A	A	A	65	73	74	82	93	93	84	69		A	59
2	A	A	A	A		43	56		A	A	A	A	A	A	A	N				A	39	47	48	48
3	46		38	38			56		56	49	A	A	63	64	58	A	71	68	74	81	57		48	48
4		44	41	34	37	31			A	A	A	56	49		66	64	62	70	80	82		56	54	A
5	46	56		34			52	55	54	52	54	A	60	58	67	63	61	A	A	95		A		
6	46	A	37	32	30		57	A	A	A	A	A	A	A	74	80	88	80	74	68		58	A	40
7	47	44		35	36	A	59	A	A	53	A	A	A	107			83	77	82	81	58	58	47	48
8	46	A	44	40		A	51		A	53	A	A	A	64	81	90	87	84	85	71	58		47	
9	55		42	35	38	46		68	63	54	A	A	A	57	77	86		77	83	92	69	59	50	46
10	A	A	40	38	38	48	51	A	A	A		A	A	A	A	58	67	71			78	56	47	46
11	A	36	26	32	31	42	57	A		A	A	A	52	A	60	68	77	83	92	82		46		A
12	42	36	A	A	34	43	49			A	53	A	A	A	A	66	69	71	66		84		40	44
13	44	46		32			57	55	A	A	A	A	A	49		78			A	74	82		A	A
14	A	34	A	A	31		64	56		A	A	A	A	54	A	N	A	67	60	70	58	A	A	A
15	A	44	40	40	34	46	A	69	63	A	A	49	A	A	72	78	74	71		58	74	A		A
16		45	45	35	43		57	57	A	63	A	A	A	A	60	74	84	93	91	88		38	A	37
17		37	38	37	32			68	A	A	A	A	A	A	A	A	94		87	88	81			A
18	A	A	34	41	35		A		A		A	A	A	A	A	A				109	A	A	A	46
19	53	30	A	A		41	46		A	A	A	A	A	A	A	A	60		60	55		49	A	A
20	44		35	40	38		69		A	A	A	A	A	A	76		60	58	62			38		57
21	46	44	41	38	35	A	A	A	A	A	A	54	56	A	A	63	60		A	64	58	60	57	52
22	51	57	41	A	A	48	A		A	A	151	151	A	A	A	75	A	93	95	A	57	A	57	
23	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	69	74	68	70	70			
24	51	45	46		45	53	52	A	A	A	A	A	A	A	A	72	68	66		47	A	47	A	A
25	43		42	34	34	41	A	A	58	A				A	63	A	A	A	92	61	A	A	A	A
26	46	40	42	36	31	43	A	A	54	62	A	A	A	A	50		72	74		60	46	A	37	
27	36	A	34	26	29	38	43	53	A	A	66	A	B	A	A	A	A	A	67	69	57	A	A	A
28	43	A	A	A	A	A	A	57	A	A	A	A	A	A	60	63	98	67			A	A	58	56
29	57	A	45	39	42		A	A	A	A	A	A	A	A	A	57	63		66		38	A	56	
30			31	34		A	A	71	53	A	A	A	A	A	A	A	A	A	56	60	57	57		A
31	A		34	A	A	42	40	A	53	A	A	A	A	A	A	A	A	A	60		A	56	A	38
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	18	16	22	22	19	15	17	11							14	17	21	19	21	23	19	14	13	14
MED	46	44	40	36	35	43	56	57							66	72	71	74	74	71	58	56	48	47
U Q	51	45	42	38	38	46	57	68							74	78	83	83	89	84	74	58	56	52
L Q	44	36	35	34	31	41	50	55							60	63	62	68	64	61	57	47	47	44

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT KOKUBUNJI

MAY 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		30	29	G	26	25	34	45	54	54	59	54	53		44	50	50	57	30	34	25		59	55
2	54	60	51	52	30	26	34	47	45	54	63	132	110	62	109	109		56		62	34		50	56
3	58		43	30	33	49	30		42	46	59	56	47	49		60	55	40	53	33		G	30	24
4	G	G	G	G	28		34	34	56	52	40	37	29	30	51	34	45	37	27	26	41	48	52	48
5		G	G	G	G		34	49	46	46	39	37	G	38	48	48	55	87	87	140	62	58	26	G
6	29	38	39	40	G	28	44	72	84	67	58	63	58	66	56	48	47	60	43	50	77	62	68	57
7	61	49		38	58	60	44	59	60	55	55	61	87	109	95	130	65	70	70		G	G	27	27
8	23			30	26	28	32		44	42	38	36	32	40	52	48	57	44	41	36	27	G	G	
9	25	24	28	26	26	25	34	48	51	45	35	39	39	41	43	54		40	54	44	54	59	50	39
10	44	48	51		29	33	45	76		61	116		88	88	59	36	48	62	82		65	58		
11	52	60	48		G	40	41	72	64	71	74	54	54	60		52	61	37	30	32	33	32		60
12	83	61		60	40	51	44	58	70	68	54	74	53	47	53		35	42	50		62	88		41
13	27	37	33	26		28	35	51	55	64	88	84	60	38	46	38	69		60	62	57		62	68
14	50	48	54	44	G		44	51		37	50	62	49	40	40	57	76	58	62	34	31	26	85	60
15	58		28	G	G	28	52	50	53		58	47	39	63		30	28	40		62		82		41
16	G	G	24	G	G		41	54	83	68	66	56	35	58	32	37	57	56	61	36	48	32		48
17		29	42	30	26	G	30	47	62	90	122	96	60	61		73	84			94		131		
18	78		87	51				93	116		136	61		66	56	64	152			107	132		52	34
19	80	50	66			36	51	48		73	86	96	66	56	64	74	56	46	55	34			59	96
20	54		53	41	35	38	46	52	55	78	54	51	51	72	38	38	37	33		41	26	32		G
21	G	G	32	31	30	48	57		69	53	61	50	53	46	31	44	30	51	62		G	30	30	28
22	32	G	G	47	53	40	53		64	72	174	170	72	61	64	66	82	99	91		59	71	46	33
23	38	55	53	62	36	62	48	52	58	78	72	58	65	60	56	56	53	49	30	33	30	38	34	58
24	56		34		32	30	39	61	72	69	56	60	69	54	75	62	38	48	40	40	58	51	44	34
25	33		27	G	G	29	52	60	50	47				69	57	93	91		86	85	70	60	71	49
26	30	G	32	G	29	30		77	30	37	30	35	49	37	32	41	46	34	36	28	32	55	62	
27	44		33	32	35	26	34	42	55	68	66	32	B	34	33	64	66	87	39	G	75	61	69	37
28	32		52	52			80	48		72	85	38	94	118	38			59	60			79	28	34
29	36	45	34		41	38	49	56	72	54	74	32	49	47	48	53	47		31		25	26	G	G
30	G	G	58	58		33		33	35	57	52	61	56	66	57	80		84		30	35	32	32	41
31		36	52	37	36	29		75	53	93	69	61	60	67	55	51	85		91	132	125	60	38	39
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	22	28	25	26	25	27	27	27	29	30	29	28	30	27	29	27	25	25	24	26	26	24	27
MED	38	36	36	31	29	30	44	52	55	61	60	56	54	59	52	53	55	51	54	38	44	53	48	41
U Q	56	49	52	45	35	40	49	61	69	71	74	62	65	66	57	65	69	61	66	62	62	61	60	56
L Q	27	G	28	G	G	28	34	48	50	49	54	38	48	41	40	42	46	40	37	33	30	32	30	33

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT KOKUBUNJI

MAY 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	14	14	14	16	14	14	15	15	16	15	20	18	20	16	16	15	14	15	15	15		14	15
2	15	14	14	14	14	15	17	14	15	16		34	35	23	18	16	15	15		14	15	14	14	15
3	15		14	14	15	15	14		18	20	18	21	23	18	17	15	15	14	15	15	15	15	14	14
4	15	16	15	14	14	17	15	14	14	17	18	21	18	17	22	20	15	14	14	15	15	15	15	14
5	15	15	15	14	15	15	15	14	15	20	23	17			20	15	14	14	15	15	14	14	15	14
6	14	14	14	15	15	17	16	14	16	18	18	30	18	15	20	17	15	15	14	15	15	15	14	14
7	14	15		14	14	14	15	15	15	17	18	20	24	22	26	16	15	15	15	14	15	14	14	14
8	15	15	14	14	14	14	15		15	18	17	26	21	21	20	17	16	14	14	14	15	15	15	
9	17	15	15	14	15	15	16	14	17	18	17	17	17	17	15	15	15	14	16	15	15	14	14	15
10	14	15	14	14	14	15	16	16	16	17	20	16	16		22	16	15	16	15		14	15	15	15
11	15	14	14	15	14	15	17	15	14	15	17	17	22	22	18	18	16	15	15	15	14	14		15
12	14	14	14	14	14	15	15	15	16	18	21	22	18	26	17	17	15	16	14		14	14	15	15
13	15	14	14	15		14	15	14	16	16	16	18	18	18	17	16	15		15	14	14		14	14
14	14	15	15	14	14	15	14	15		15	17	23	17	18	17	16	17	16	14	14	14	15	15	15
15	15	14	15	14	15	17	14	15	14	17	17			21	20	17	15	14		14	14	14		15
16	15	15	15	15	14	15	15	15	15	21	24	27		21		20	15	15	15	14	15	15	14	14
17		14	15	14	14	16	15	15	15	15	15	15	21	18	17	16	15		15	15	14	15	15	14
18	14	14	15	15	15	15	14	16	16		20	20	27	26	18	17	16		15	15	15	14	14	14
19	14	15	15	14	14	14	15	14	15	17	18	22	28	23	24	17	16	14	15	15		15	14	15
20	14		14	14	14	15	15	15	14	15	16	21	23	21	17	15	14	15	14	14	15	15		14
21	15	15	14	14	14	15	15	15	15	16	18	22	17		17	15	16	15	15	15	15	15	14	15
22	15	14	14	14	15	14	15		14	16		26	23	18	17	16	14	16	14	14	15	20	14	14
23	15	15	14	14	15	16	14	14	15	16	21			26	16	22	16	15	14	15	14	14	15	15
24	14	14	14		14	15	15	14	15	16	15	16	23	17	17	16	15	14	15	15	15	14	14	14
25	14		14	14	15	15	14	15	15	16				17	17	16	15	14	15	15	14	15	14	14
26	15	15	15	15	15	17	14	15	16	17	16		23	18	16	15	14	14	14	15	15	15	15	
27	14	15	14	14	15	18	14	14	15	17	17	17	B	24	22	15	15	15	14	15	15	14	15	14
28	15	14	14	15	15	15	15	14	15	17	17	21	20	22	21	17	16	15	14		14	14	14	14
29	14	14	14	14	15	15	17	15	14	16			21	16	20	15	14		15		14	14	15	14
30	15	17	14	14		15	14	15	15	16	17	18	16	26	20	18	14	15	15	15	14	15	15	14
31	14	14	14	15	15	15	14	15	15	17	16	17	24	24	18	17	15	14	14	15	15	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	28	30	30	29	31	31	28	30	30	27	26	25	28	30	31	31	27	29	27	30	29	28	29
MED	15	14	14	14	15	15	15	15	15	17	17	20	21	21	18	16	15	15	15	15	15	15	14	14
U Q	15	15	15	15	15	15	15	15	16	17	18	22	23	23	20	17	16	15	15	15	15	15	15	15
L Q	14	14	14	14	14	15	14	14	15	16	16	17	18	18	17	15	15	14	14	14	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT YAMAGAWA

MAY 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	A	59	A	77			55	54	47		A	A	71	72	81	77	86			83	A	A	A	A
2	A		43		24	54	53	54	58	62	62	A	A	65	66	80	84				71	A		A
3	26	34	A	A	A	79	42	53	67	67	59	A	66	73	66	74	81	86	66	55	54	A	169	
4	32	22		54	50	49		60		59	57	61	68	71	82	83	79	73	86	A	A	A	A	
5	37	26	32	32		69		62	67	A	A	65	A	79	78	86	80	82	88	86	86	79		A
6		79	34		59		53	51	A	A	68	A	A	72	78	84	93	86	87	66		A	A	A
7	A	A	A	50	A	37	30	54	A	66	A	69		A	A	91	86	97		84	A	79		A
8	42	26			69		53				A	A	A	73	91	97	101	105	83	86		A	149	
9		32	34		34	A	49		62	A	A	A	A	73	81	88	101	111	110		67	A	A	59
10	A	28	34		40	49	53		A	68	A	A	A	A	62	68	81	85	A	87	A	109		34
11	A	A	A		34		A	72	70	58	A	57	66	66	67	80	83	84	A	84	A	A	169	26
12		41	34	42		32		52	A	A	71	62	A	A	49	72	86	74	84	86	86	A	A	A
13	A	A	A	A	A	A	43	A	61	A	A	A	66	84	86	A	109			A	86	A	A	A
14	A	A	A	49		34	A	50		A	A	A	A		66	66	68	84	84	86	A	A	A	A
15	A			50	59		49	52	A	A	A	A	A	89	91	91	86	84	76	86	A	A	A	84
16	A	49	A	31		38	46	54				49	65		77	86	86	100	88	100	A		A	A
17	A		A	32			54	49	54	A	A	A	A	A	67	72		84	86	85	86	A	A	A
18	37	A	49	A	53	48	A	A		A	A	A	A	A	58	62	A	A	A	66	85	A	A	A
19	A	A	A	34		49	46	A	79		A			A	67	74	83	84	89		A	A	A	A
20	A	59	A		53		60	60	A	89	A	A	A	63	67	81		60	55	83	71	A	A	99
21	A		54				A	53	A	A	59	61	60	A		81	A	A	A	82	A	A	A	A
22	A	A		59	39		A	73	A	A	A	A	A	A	70	83	97	86	86	88		A	A	99
23	A	A	A	A	A	A	A	A	A	A	A	A	A	A	66	82	86	84	81	86	A	A	A	A
24	32			54	A	A	53	51	A	54	A	A	A	60	70	74	81	84	84	85	A		A	A
25	A		54	25		48	A	A	62	A	A	57	58	A	A	A	A		160	52	A	A	A	
26	A	A		56	48	37	A	48	71	A	A	A	A	55	70	85	86	83	82	53	52	A	169	34
27	36	31	37	A	69		A	50	66	83	56	A	A	A	A	70				A	A	65	A	A
28	A	A	48	42	A	79	49		A	A	A	A	A	67	67	84	N	86	59		81	A		A
29	53	A	48		A		A	A	A	A	A	A	A	A	62	64	81	84	60	A	A		A	36
30		51	A		69	A		A	44	46	A	A	A	A	A	A	63	66	A				A	
31		38		A	A	59	50	50	A	A	89	A	A	A	58	A	A	A	A	67	A	A	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		14	12	15	14	15	17	20	13	10				15	26	27	23	23	20	22	11			
MED		36	40	49	52	49	50	53	62	64				72	67	81	86	84	84	84	81			
U Q		51	48	54	59	59	53	57	68	68				73	78	85	86	86	87	86	86			
L Q		28	34	32	39	37	46	50	56	58				65	66	72	81	83	78	67	67			

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT YAMAGAWA

MAY 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	52	59			50	28	30	31	50		78	60	54	54	41	36		42	34	33	36			45
2		50	48			26		28	36		48	56	60	68	60	56	53	130	106		69	59	38	59
3		35	47	80	36		29		57	50	48	56	62	40	41	49	54	44	36	34		39	32	28
4	30	29		26	G	G		29	43	49	49	47	56	57	58	49	46	38	38		29	28	30	38
5	32	33	27	25	G	38	30	38	49	59	59	58	88	51		75	61	42	54	58	58		91	33
6	39	38	29	G	G	G	48	50	60	62	62	58	70	61	67	66	60	41	32	30	28		41	68
7		58		48	36	30	30		67		54			112	97	54		60		142	45		28	28
8			G	G	G	G	30	31				51	37	40	48	54	58	55	46	33	30	46	28	33
9	37		48	46	46		48	39			68	66	40	42	52	38	37	66	82		59		71	116
10	44	36	38		41	G	50	55	90	59	88	180	91	104	42	51	53				168		58	
11		45	56		44	40	50	49	59		62	55	72	38	63	63	67	62	94	90	39	32	38	28
12		34		39	G	G		50	76	113	41		56	70	52	42	37	40	40	48	59			
13	89	48	30		48	43	40	59	52	79	67	61	67	56	40	134	92				116	156	52	47
14	39	38	32	37	37	38	57	49		89	77	60			52	44	35	60	71	79	78	88	44	44
15	43	26	28	27	30	30		48	69	74	93	90	92	105	91	61	30	51	54	58		32		
16	79	30	59		48	G	29	39	60	60	93	39	47	48	40	39	53	41	36		58	30	33	33
17			56	46	36	28		40	46	79	83		78		64	51	134	81			39	33	92	33
18		57	49		26	32	50	179			66	60	40	31	72	50	71	68	68	66	58	43		87
19	88	59		53	47	50		50		76	80	95	103	69	54	64	48	28	38	43	167			
20		92			G		47	50	71	86		66	66	38	31	31		40	30	32	32	32	28	G
21	32	G	50			G			90	88	85		78	71		80	105		81	47	88	137	33	38
22	33		91	58			53	56		90	137	78			56	52	51	62	72	84	70	82	80	72
23			60	59		30	48		68	68	81	68		55	40	39	49	44	40	33	41	32	70	
24	36	32	39	32	38	40	38	51	51	51	62	80	49	40	55		43	60	48	40	33	34	41	30
25	40	32	53	51	43		44	67	52	88	71	50	55	52		128	146	135	141	87	86		44	93
26	48	49		41	30	G	41	58	63	73	67	92	51	33	44	52	50	55	54		33	29	32	32
27	35	40	39	34	40		39	48	54	88		48	80	75		60				171			90	108
28	59	29		49	47	40	38		116	82	77	47	76	66	48	47	90	47	50		40	45		34
29		59			60		38	45	71	72	68	63	37		41	43	43	48	39	48			38	25
30	26	G	32	30		28		60	40	32		31	64	50	48	29	37	49	82	40		33	32	
31	29	29	40	47		30	31	41		72		80	56	52	48	55	49	54	81	49	44			46
	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	26	22	21	25	24	23	26	24	24	26	27	27	27	27	30	27	27	25	22	26	19	24	25
MED	39	37	44	41	37	29	40	49	60	74	68	60	62	54	52	52	53	51	50	48	52	34	40	38
U Q	50	50	53	50	46	38	48	55	70	87	81	78	78	69	60	61	67	62	76	79	70	59	64	63
L Q	32	30	32	28	13	G	30	39	50	59	62	51	51	40	41	43	43	42	38	34	36	32	32	31

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT YAMAGAWA

MAY 1996

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

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

HOURLY VALUES OF foF2 AT OKINAWA

MAY 1996

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	A	A	A	A		A	53	56	A	A	A	97			120	125	142		90	A	A	A	A
2	42	A	A	A	A	37	A		74		56	A	A	95	80	90	84	92	84	84	A	59	A	32
3	A	A	A	A	A	43	A	42				61		A	91	96	90	91	A	A	60		A	A
4				69	A	A		A	59		81		90	81	90		121	91	91	94	A	A	A	49
5	A			48	A	59	A	55	A	76	60	57			88	96		111		A	86	A	A	A
6	A	A		41		89	A	44	A	A	A	92	89	92	92				113	87	A	52	A	A
7	A		58	A	A	A	A	A	A	55	A	A	65	90	88	A	131	118	116	93	A	42	60	A
8	A	55	50	48	A	A	A	A	56	A	A	A	92	91	90		108		97		A	34		A
9	A	A	A	44	A	89			56	A	A	A	91				139		124	84	87			
10	A	A				A	A	A	A	63			A	63	76		89	90	91	104		A	A	A
11		A	A	41	A	A		A	A	61	A	A	A	A	95	93	96	90	88	A	A			A
12	55	54	A	35		N	46	A	69	A	A	A	A		64		82	89	82	93	81		A	A
13	A	A	A			38	A	A	A	A	A	A	A	91	87	A	A	A	66	69	A	A	A	A
14	38		39	35		42	A	A		A	A	A	A	A	81	72	78	A	96	A		A	A	
15	44	A	A	A	48	A	A	A	A	A	68	72	A	88			110		93	A	86	A	A	A
16	A	A	A	A	A	A	A		84	64	59	62			95	95			127	84		A	A	A
17	A	A	A		A	A	A	A	56		A	A	68	72	76		86	A	97	98		52	A	A
18	A	A	A	44	46	A	A		A	A	A	A	A	64	76	91	97	100	96		94	A	A	A
19	A	A	A	A	89		A	57	A	A	A	A	A	67			98	90	82	89		A	A	A
20	A	51	47	46					A	A	A	A	A	A	A	81	86	80	72	83	A	A		89
21	A	A	A	A	109	A	A	A	A	A	A	A	A	A	A			A	A	A	A	A	41	A
22	A	A			A	89	A	A		A	A	67	72	82		119	106		126		83	A	72	66
23			A	A	89	A	A	A	A	A	A	A	A		A									
24																						43	A	
25	A	A			59	A	A	A	A	A	A	A	A	A	A	83	87	A	85	A	A	A	38	A
26	44	A		42			A	A	76	A	A	54	A	A			A	A	A	70	A	A	A	A
27	A	42		A	89		A	53	68		A	A	A	60	67	80	89		86		A	A	A	43
28		43	44	35			49		A	A	A	A	A	A	72	86	87		A	A	A		64	A
29	A	A	54	44		39	A	A	A	A	A	A	A	A	82	92	91	82	90	82	A		A	59
30	A	59		32		A	A	50	44	48	A	A	A	A	A		70	A	A	68	66		58	A
31	A	A	A		35	69	A	A	A	A	A	A	A		A	A	68	60	70		A	A	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				14		10			11					13	18	14	23	14	22	16				
MED				43		51			59					82	84	92	90	90	91	86				
U Q				46		89			74					91	90	96	108	100	97	93				
L Q				35		39			56					65	76	83	86	89	84	82				

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

MAY 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	77	72		38	50	32		39		67	76	76	73	73	75	42	48	58		68	92		50	92
2	59	34	41	34	32	24	26		33		37	52	55	51	65	60	39	46	50	70		48	46	60
3	59	119	38		66	32	39	46	44	46	45	38	42	93	58	62	50			38	42		42	
4	G	G	G	25	39	28	30		38		40		40	50	51	49	46		44		44	58	48	
5	40			26		G	44	40	60	48	53	41	84	56	42	49	58	61	60	76	43	70	68	60
6		41	34	38	G	G	38	41		116	133		78	40	40	N	33		G	34	42	48	44	46
7	43		41	47	46		48	46	60	61	66	40	96	60	60	125	40	59	40	83	58	40	46	46
8		53	43	44	42	36		59	61	176	64	70	42	43	42	51	69	53	58	45	53	45		43
9		24	32		48	42	G		60	60	85	145	170	77	50	47	35	48	46	38	45	45		
10	28	47			60	47	55	50		60	60	45	63	39	32	40	40	59	37			24		49
11	G	43		G	52	60		69	73	78	59	86	110	126	73	62	59	53	50	58		48	48	32
12	29	41		35	G	G	48	58	59	79	87		79	57	41	42	46	50	46	41	32	24		48
13	48	76	48			74	69	56	94	70	86	76	117	93	61	80	68	80	62	62	99		72	47
14			73	30	G	44	48	60		71	60	118	81	71	58	62	62	98	89				78	
15	38	34	34	38	52	32		58	60		71	64	81	57	72	47	88	84	59	72		37	38	
16	79	56	50	38		44	58		59		66	50	54	48	45	41	43	40	35	44		40	48	38
17	55		70					38		56			98	54	51	51	59	116	60	34	50	45	44	39
18		61	43	42	39	34	39		77	96	80	41	42	41	50	40	48	62	62	50	44	43	44	38
19		36	46	39	32		36	35		57	55	49	44	35	39	49	46	38	71				72	
20	59			33	25	71	50	37	66		97	96	96	132	97	97	42	50	34	29		45	G	G
21	72		98	47	27		52	180	92	66	149	178	96	76	179		169		71	94	93	48	40	58
22	85	93			89	G	48	66	175	86	53	62	66	59	54	58	66		61	59		70		70
23	67	80	66	48	45	45	46	46	81	82	117	96	85		125									
24																						36	33	28
25	39	34	25	24	34	32		50	90	101	82		85	66	60	50	68	94	86		95		36	60
26		39	23	G	G	54			91	105	72	49	82	95			96	78	79	59	56	47	44	38
27	46	G	G	32	G	G	58	52	39	45	60		42	48	56		48		53		60	65	45	47
28		44	G	G	48	G	G		63	51	44		56		50	63	58	62	73		66		49	46
29	44	45	35	G	G	27	34	60	50	82	60		94	86	82	76	48	36	46	29	33	42	30	38
30	33		37	27	G	27	30	33	38	43		40	54		64	56		84	66	45			54	48
31	45	43	41	35	27	G	30	44		59	68	162	131		92	131	105	67	58	50	59		48	48
	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	23	23	24	26	26	23	23	23	25	28	22	30	26	29	25	28	23	27	22	19	21	25	24
MED	46	43	41	34	36	32	44	50	60	67	66	63	80	58	58	51	49	59	58	50	53	45	46	46
U Q	59	61	48	38	48	44	50	59	81	84	83	96	96	77	72	62	67	80	66	68	66	48	49	53
L Q	38	34	32	25	G	G	30	40	50	56	57	45	54	48	47	47	44	50	46	38	43	40	41	38

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT OKINAWA

MAY 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	15	14	14	14	14	14	14	14	14	15	17	20	18	18	18	16	16	14	14	15	14	14	14	14
2	14	14	14	15	15	14	14		14	15	18		38	38	20	17	15	17	14	14	14	14	14	14
3	14	15	15	14	14	14	14	14	14	16	17	22	27	27	23	18	16	15	14	14	14		15	14
4	15	14	14	15	14	14	14	14	14		22		27	26	33	30	16	14	14	14	14	14	14	14
5	14			14	14	15	14	14	14	16	17	20	21	18	24	30	17	15	15	14	14	14	14	14
6	14	14	14	14	14	14	14	14	14	15	17	22	23	17	18	20	16	14	14	14	14	14	15	15
7	14		14	14	14	14	14	14	14	16	20	18	26	21	20	17	15	14	14	14	14	14	14	14
8	14	14	14	14	14	14	14	14	14	15	16	24	21	27	27	18	17	14	14	14	14	14		14
9	14	14	15	14	14	14	16		14	14	17	15	22	17	23	16	16	14	15	14	14	14	14	
10	14	14			14	14	14	14	14	16	20	23	17	22	23	17	16	14	14	14	14	18	14	15
11	14	14	14	14	15	14		14	15	15	16	22	21	18	20	16	16	14	14	15	14	14	15	15
12	14	14	14	14	14	14	14	14	14	15	16	21	21	18	20	18	16	14	14	14	14	14	14	15
13	14	14	14			14	14	14	14	16	18	20	24	21	17	16	15	14	15	14	14	14	14	14
14	14		14	14	14	14	14	14		15	18	18	23	20	20	18	15	14	14	14		14	14	
15	14	14	14	14	14	14	15	14	14	14	16	18	21	18	17	16	15	14	14	15	14	14	15	14
16	14	14	14	14	14	14	14		14	15	16	17	23	24	18	16	15	15	15	14	15	14	14	14
17	14	14	14		15	14	14	14	14	14	15	21	18	18	16	17	15	15	14	14	14	14	14	14
18	14	15	15	15	14	14	14		14	15	16	17	18	15	16	16	15	15	14	14	14	14	14	14
19	14	14	14	14	14		14	14	14	15	17	20	29	20	21	17	17	15	14	17	14	14	14	14
20	14	14	14	14	14	14	14	14	15	16	16	18	18	26	15	16	16	14	15	14	14	14	15	15
21	14	14	14	15	15	15	14	14	14	15	15	16	18	24	18		15	14	14	14	14	14	14	14
22	14	14		14	15	14	14	14	14	14	16	16	20	20	17	17	15		14	14	14	14	14	14
23	14	14	14	14	14	14	14	14	14	16	15	17			21									
24																						14	14	14
25	14	14	14	14	14	15	14	14	14	14	15	18	18	20	18	17	16	14	14	14	14	14	14	14
26	14	14	14	14	15	15	14	14	14	15	18	21	17	20		16	15	14	15	14	14	14	14	14
27	14	14	15	15	14	14	14	14	14	15	14	16	20	20	17	17	16		14		14	14	14	14
28		14	14	14	14	14	16		14	14	15	15	17	17	17	16	16	15	14	14	14		14	14
29	14	15	15	15	14	14	14	14	15	15	16	17	18	26	18	17	15	14	14	14	14	14	14	14
30	14	15	14	15	15	14	14	14	14	15	15	18	21	20	21	18	15	14	14	14	14	14	14	14
31	14	14	14	14	14	14	14	14	15	15	16	17	18	27	18	16	15	15	14	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	27	27	27	29	29	29	25	29	29	30	28	29	29	29	28	29	27	29	28	28	28	29	28
MED	14	14	14	14	14	14	14	14	14	15	16	18	21	20	18	17	16	14	14	14	14	14	14	14
U Q	14	14	14	15	14	14	14	14	14	15	17	21	23	25	21	18	16	15	14	14	14	14	14	14
L Q	14	14	14	14	14	14	14	14	14	15	16	17	18	18	17	16	15	14	14	14	14	14	14	14

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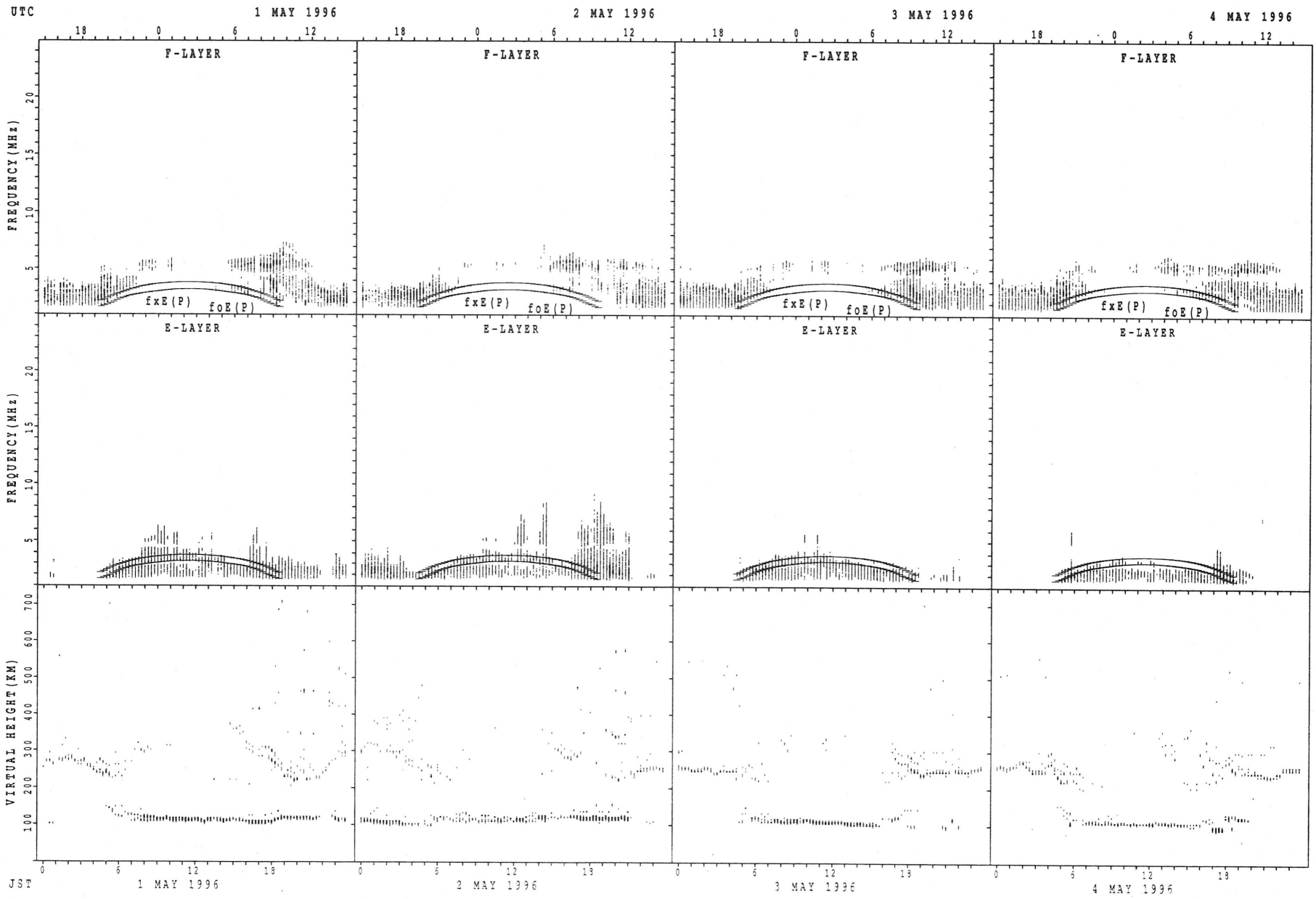
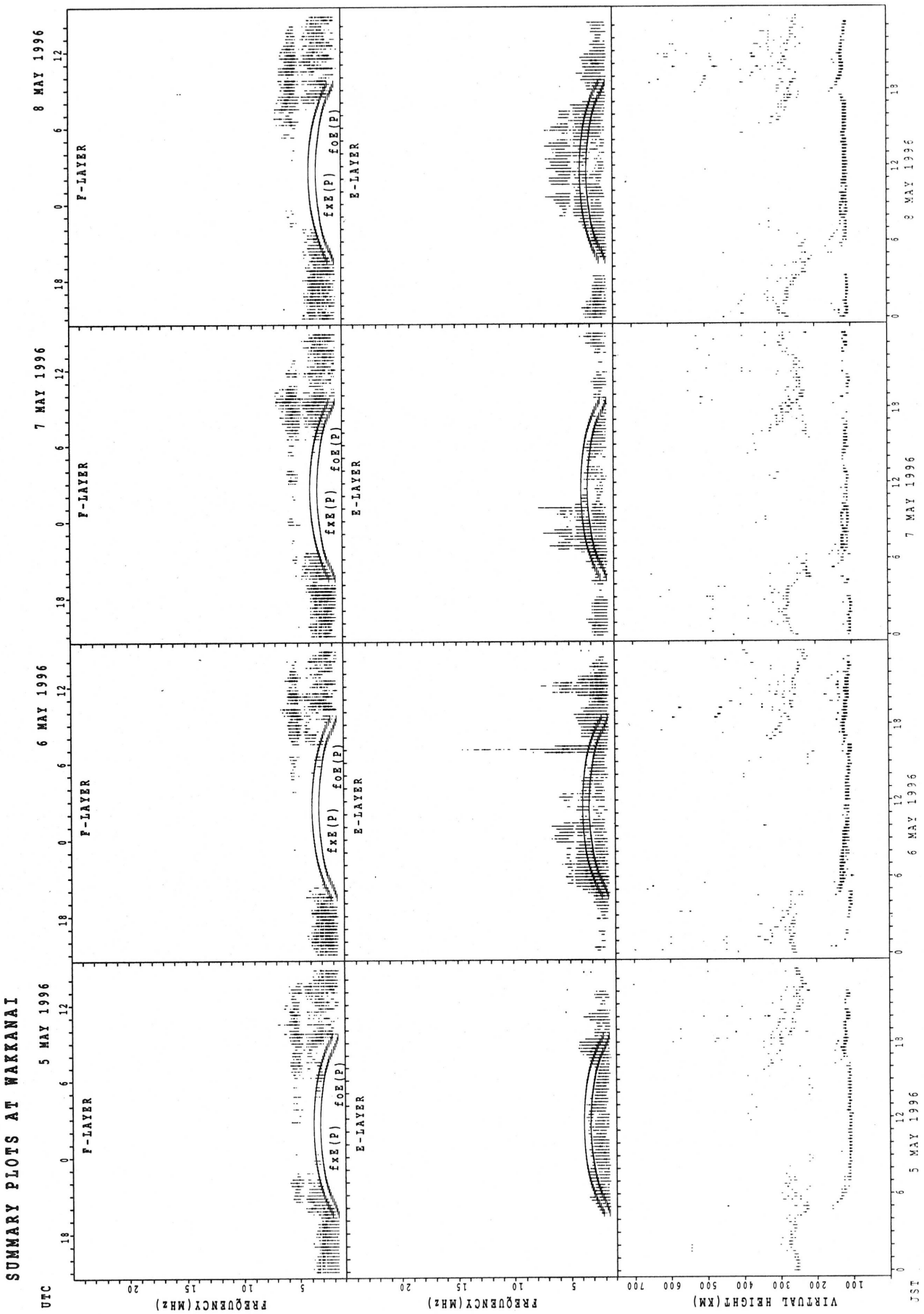
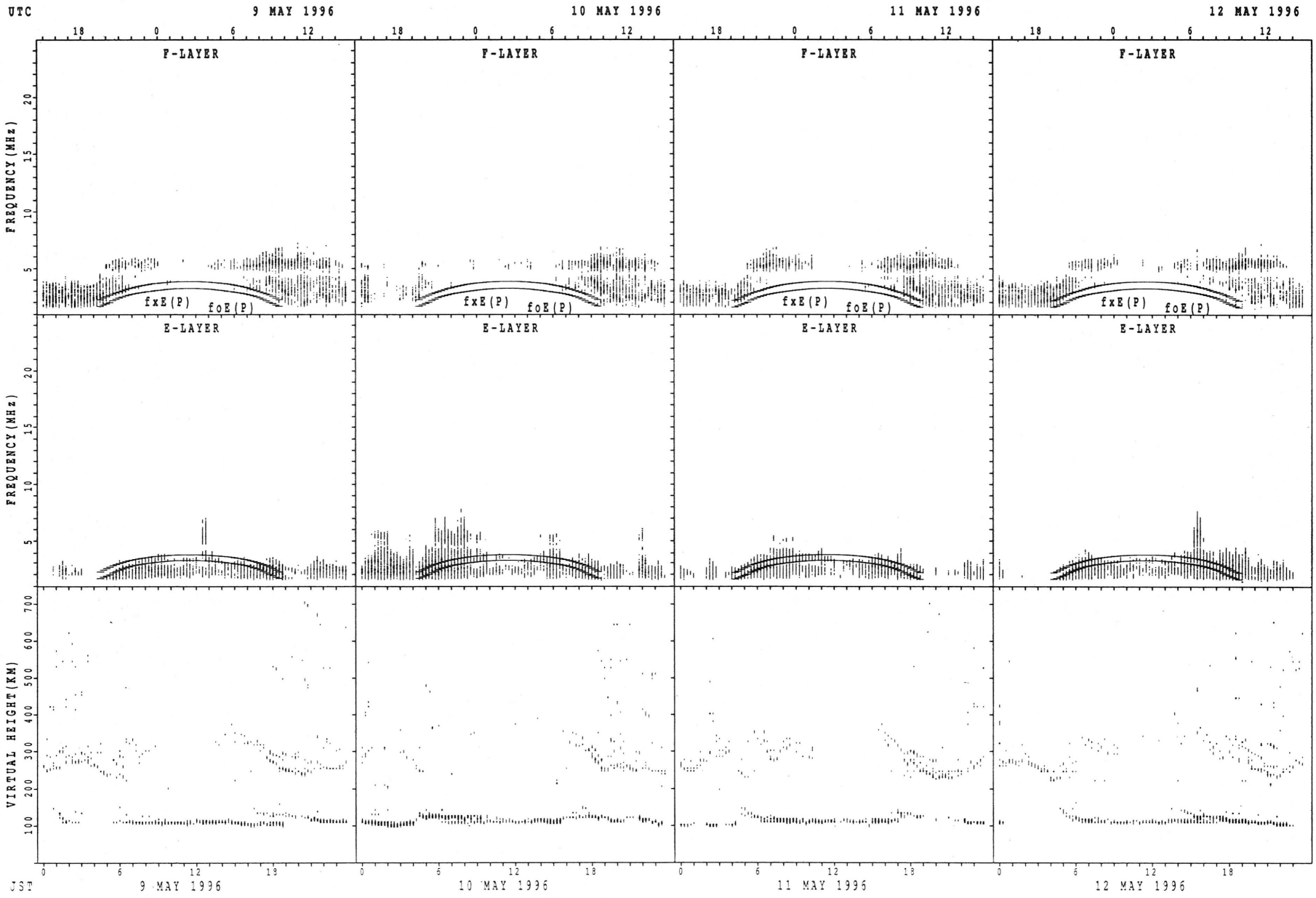
SUMMARY PLOTS AT WAKKANAI



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

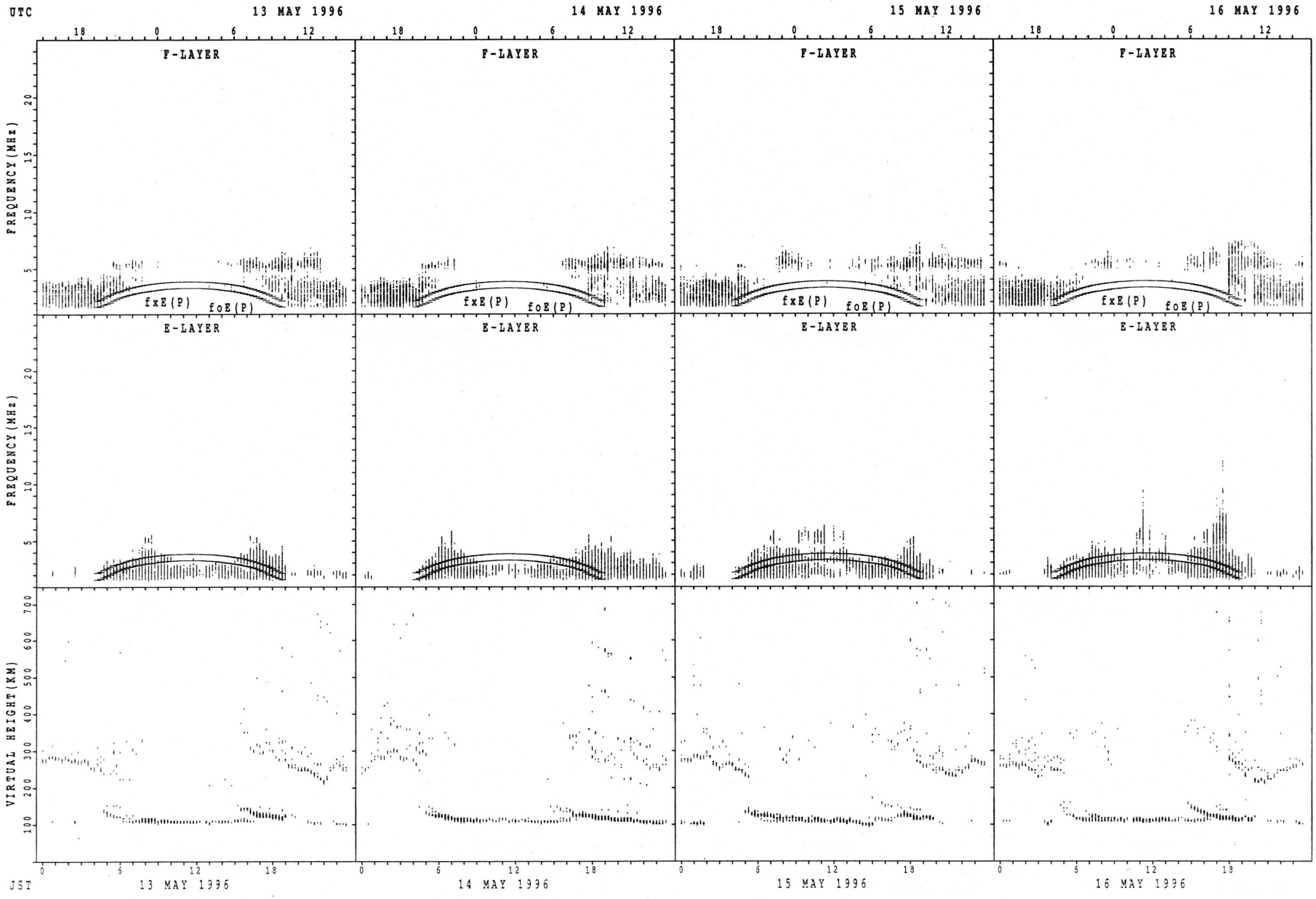

SUMMARY PLOTS AT WAKKANAI
UTC
JST
5 MAY 1996
6 MAY 1996
7 MAY 1996
8 MAY 1996
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

SUMMARY PLOTS AT WAKKANAI



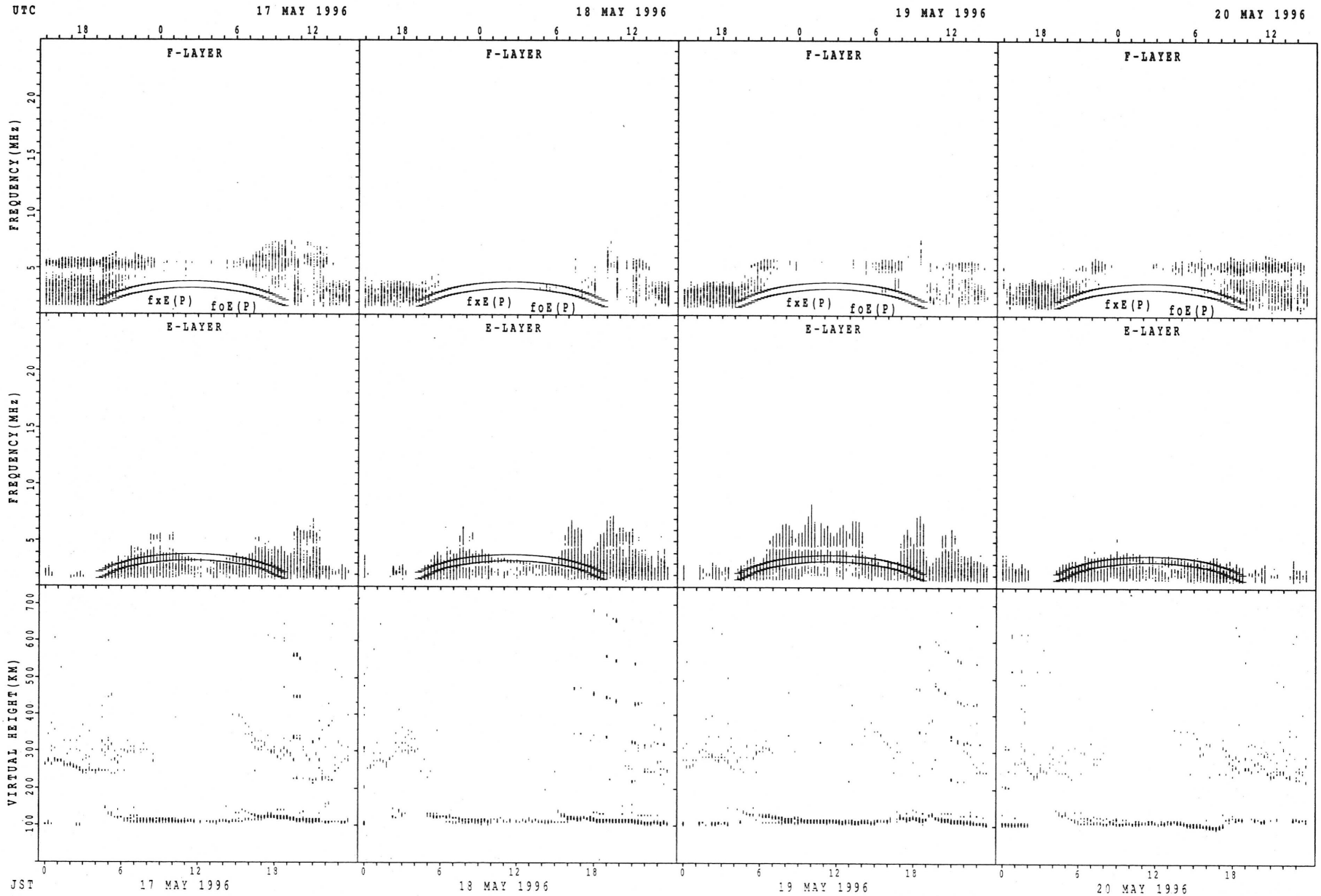
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

SUMMARY PLOTS AT WAKKANAI

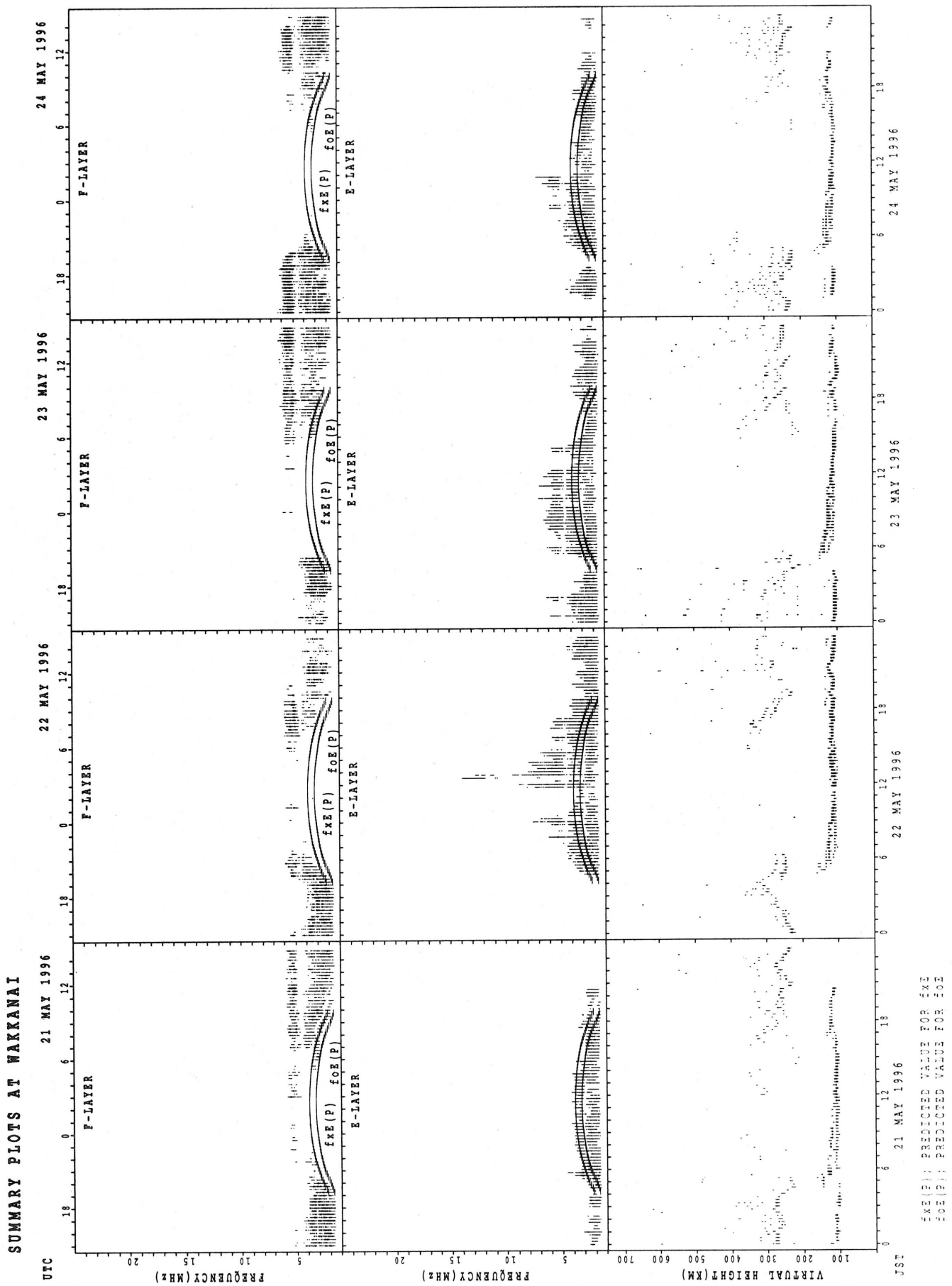


fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

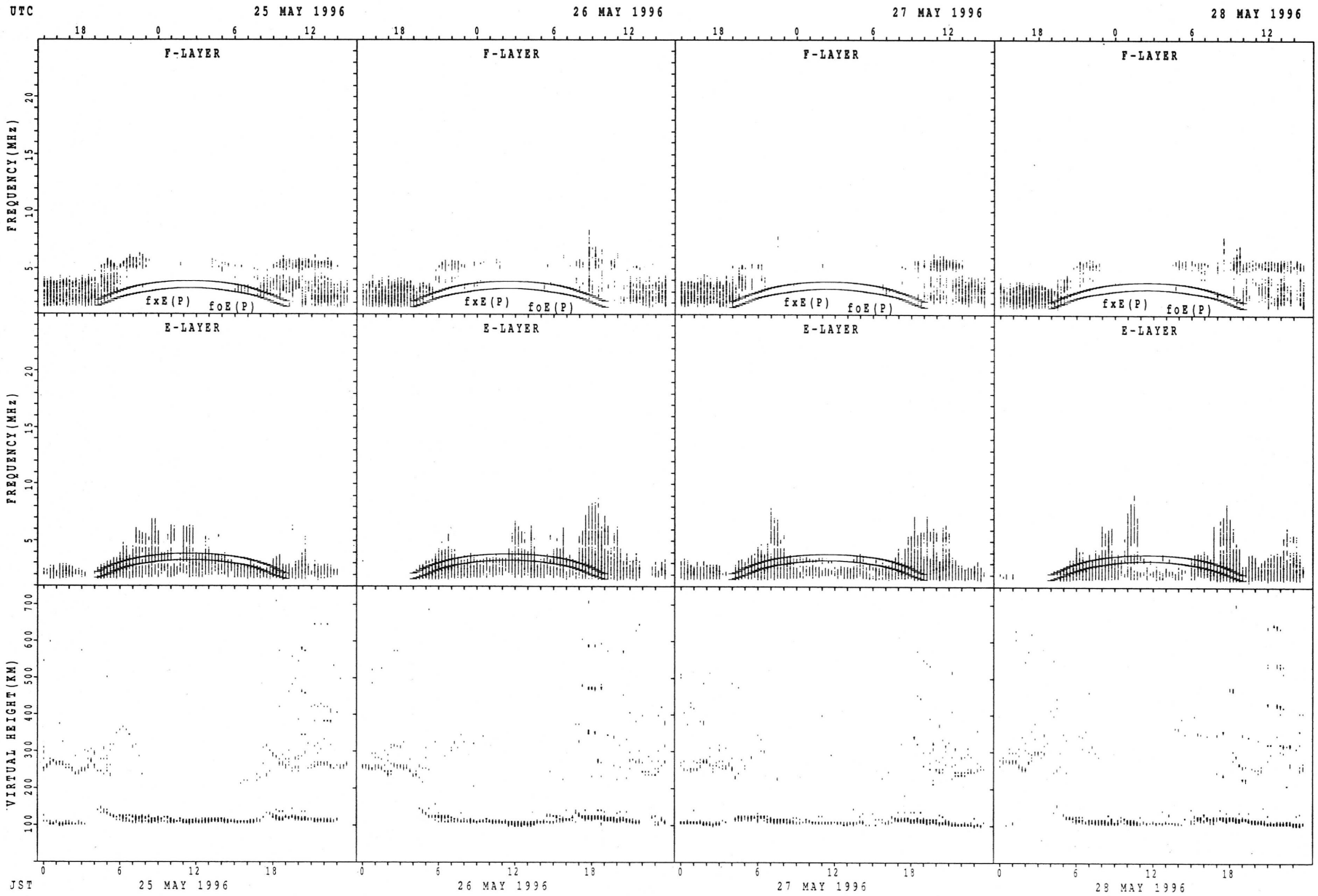
SUMMARY PLOTS AT WAKKANAI



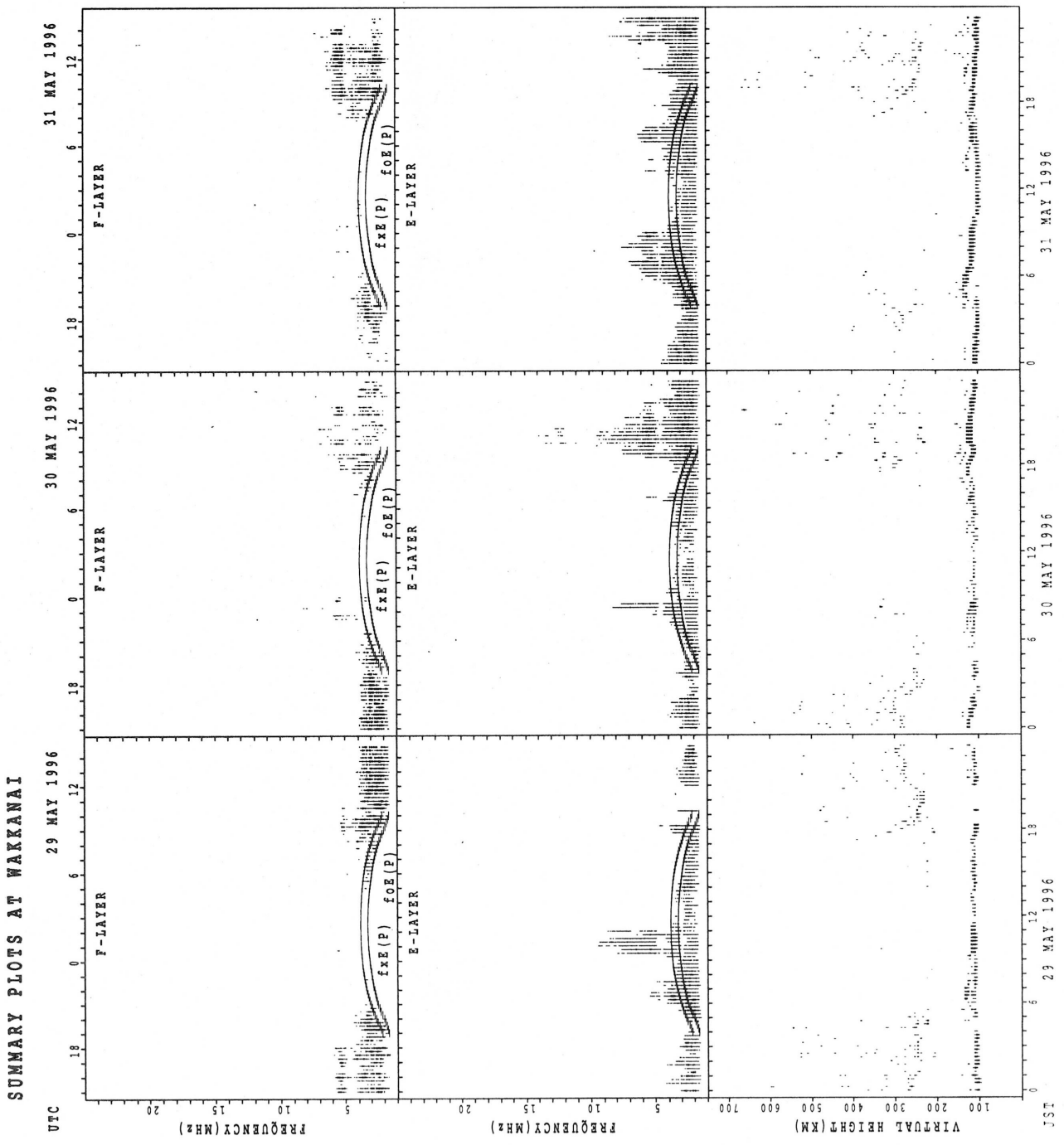
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
21 MAY 1996
22 MAY 1996
23 MAY 1996
24 MAY 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

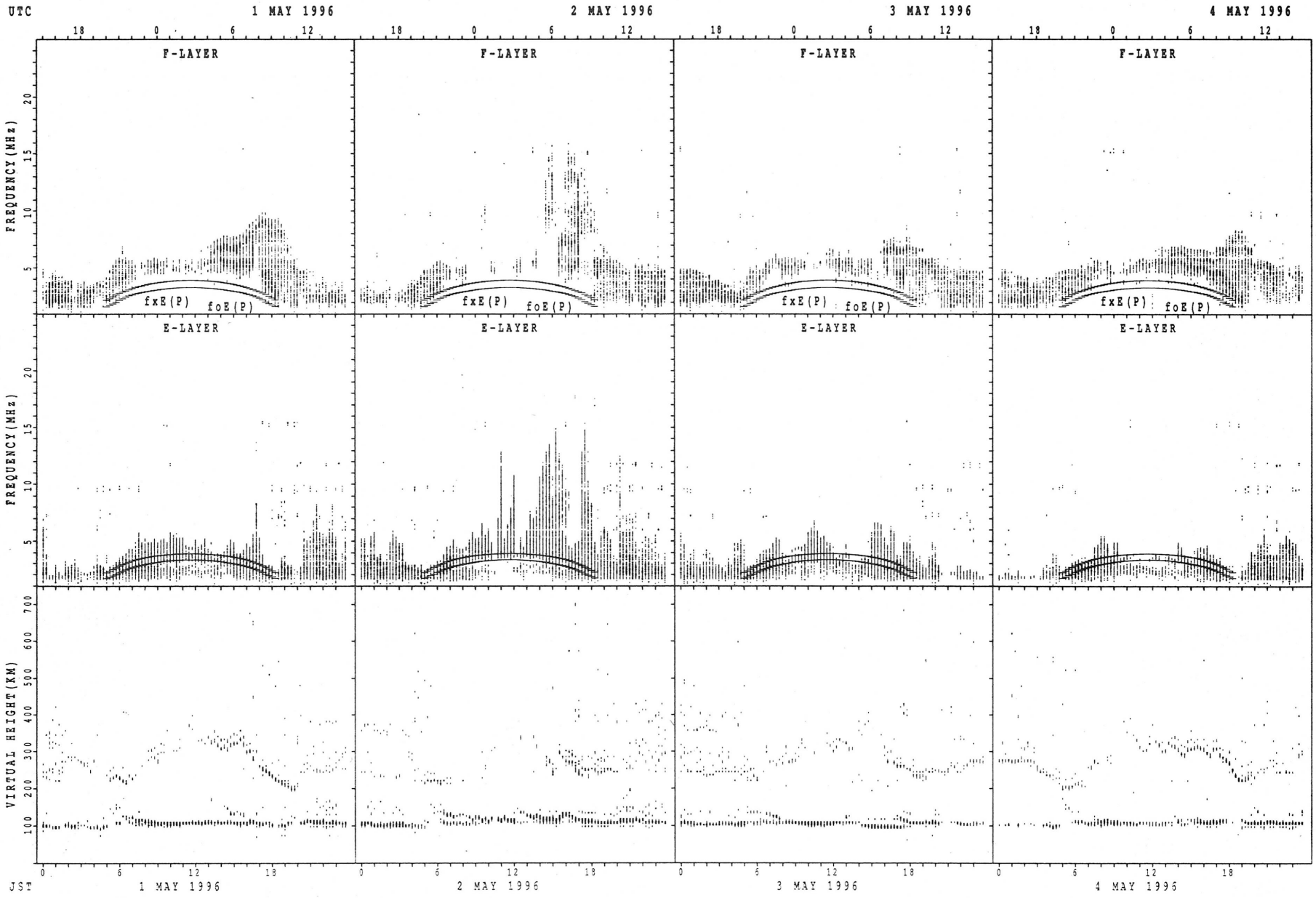
SUMMARY PLOTS AT WAKKANAI



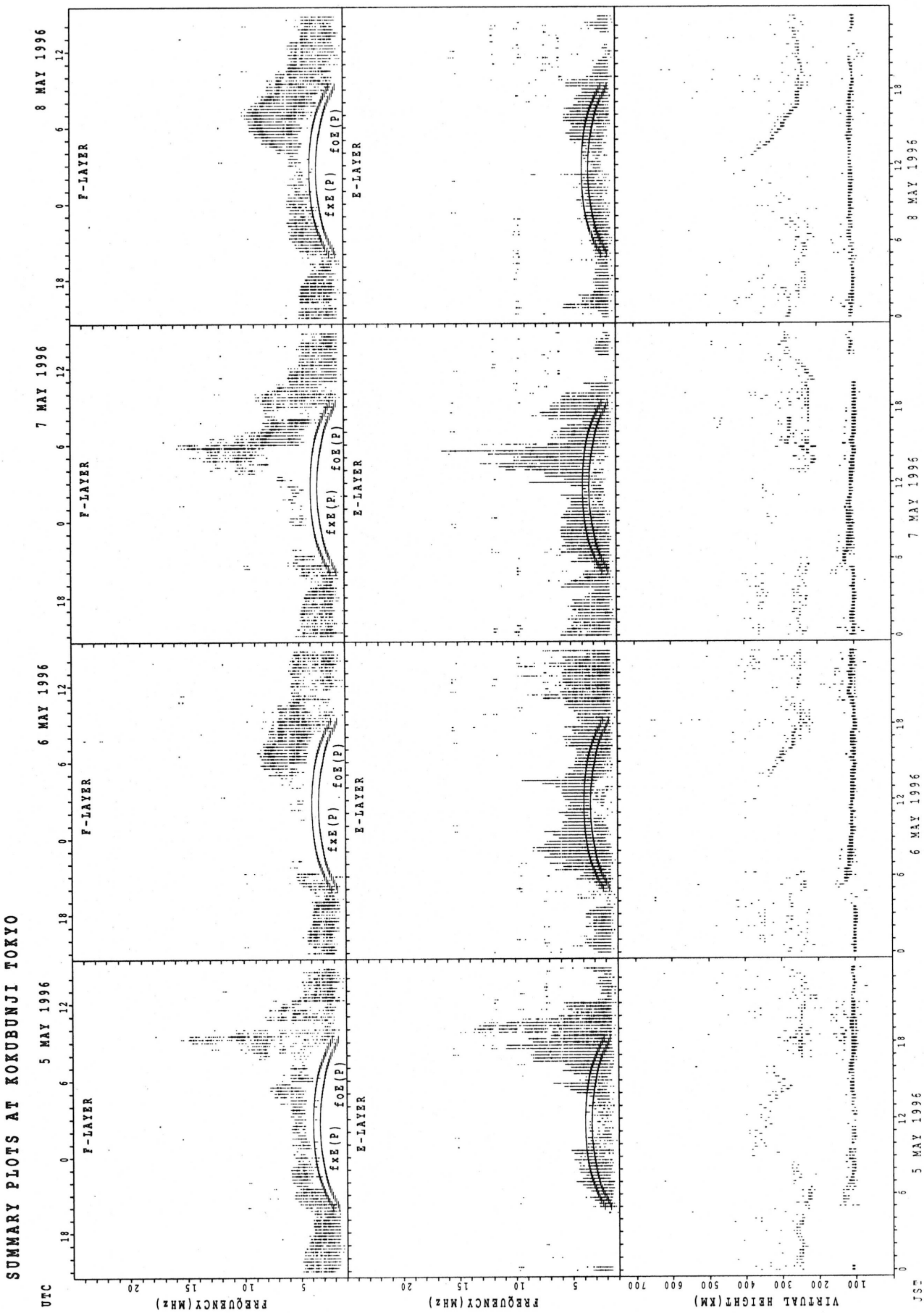
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
29 MAY 1996
30 MAY 1996
31 MAY 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

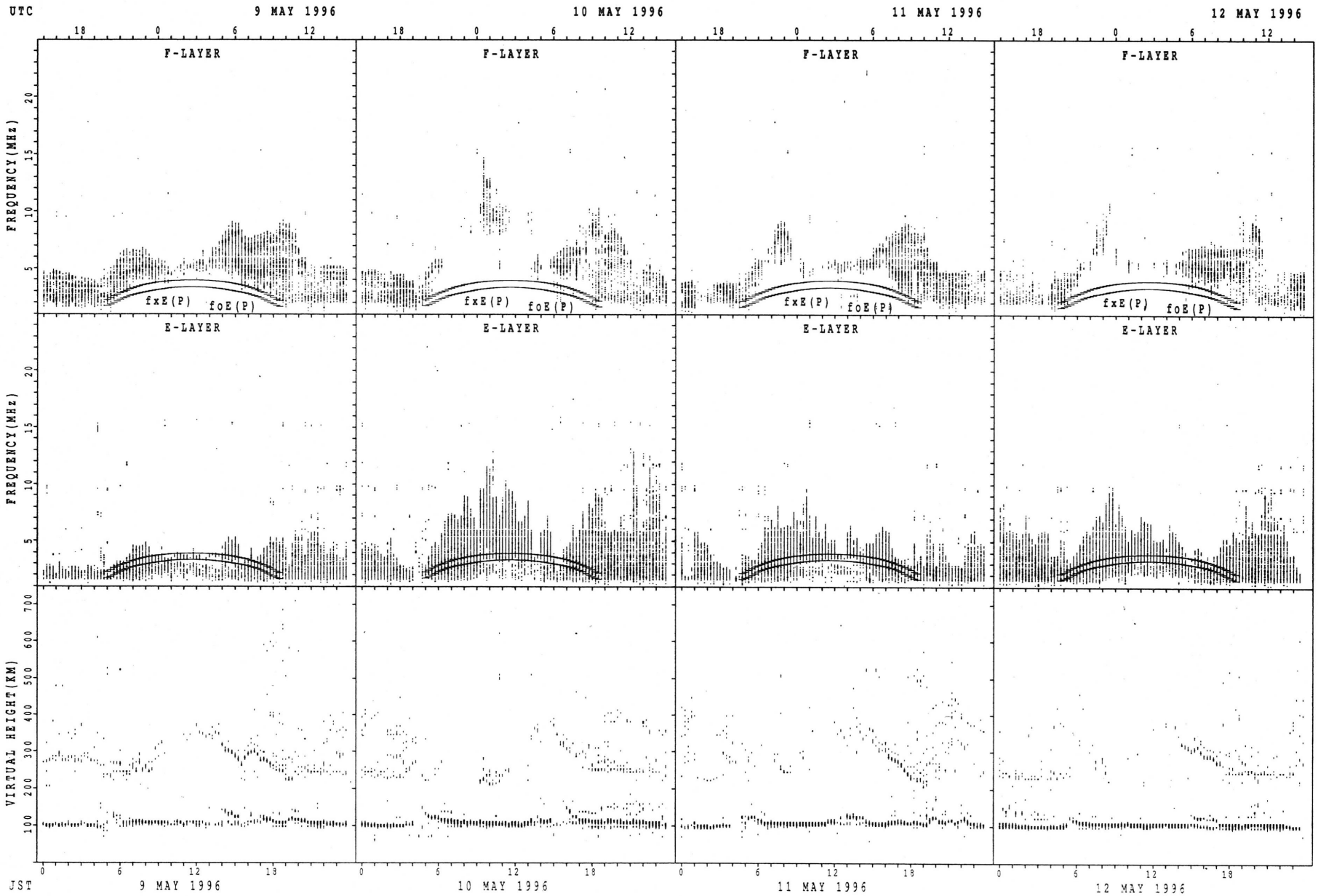
SUMMARY PLOTS AT KOKUBUNJI TOKYO



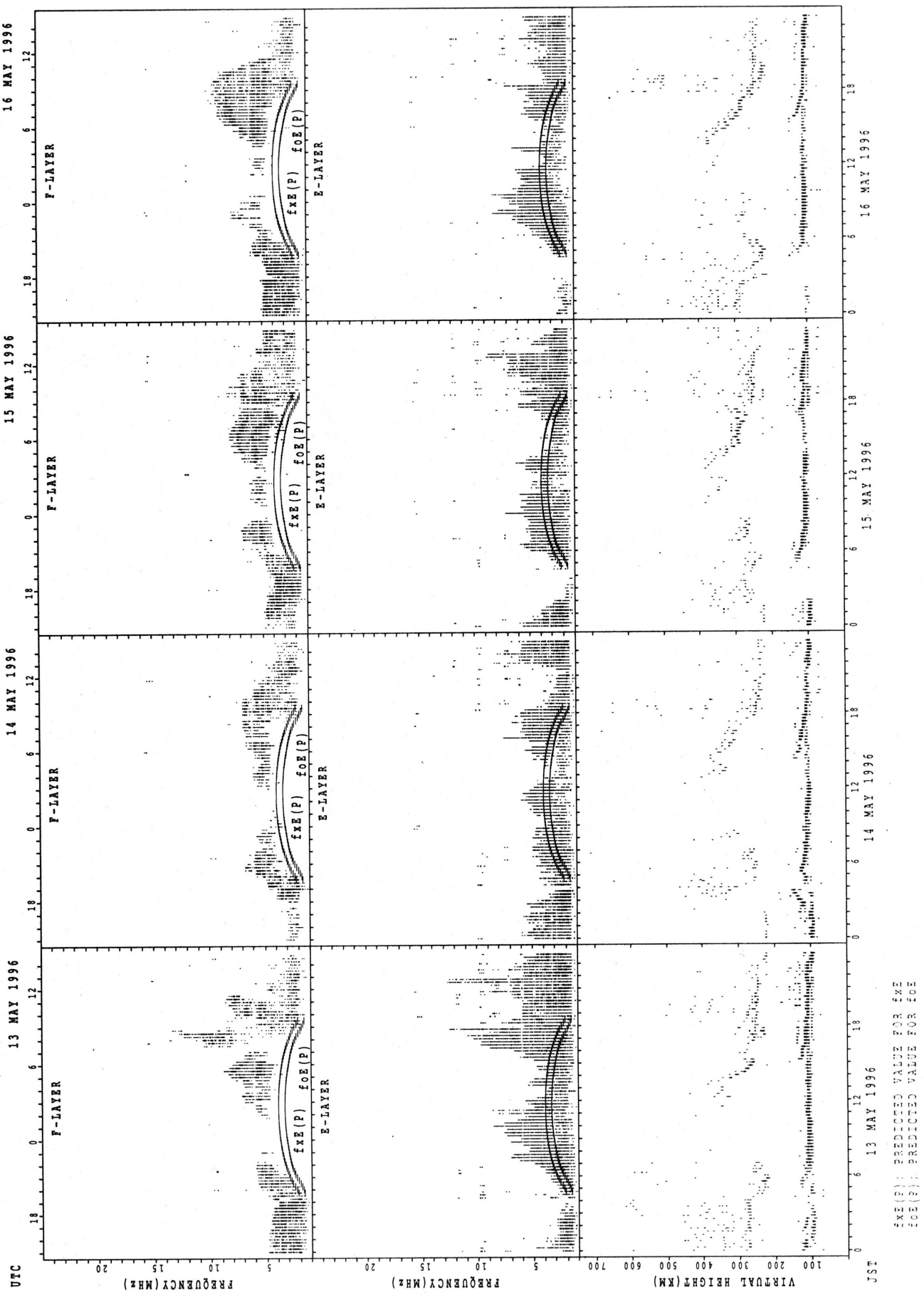
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE


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

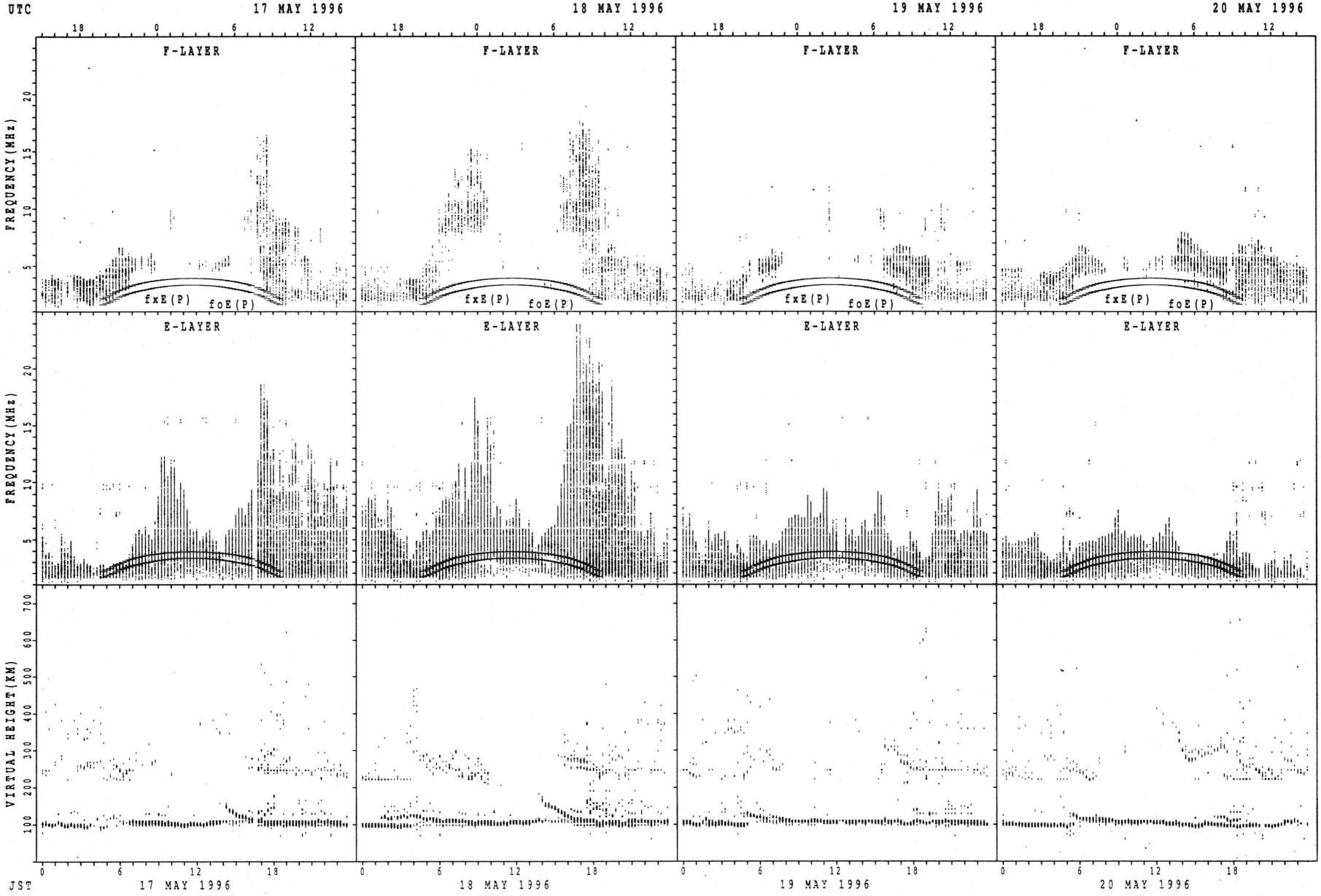
SUMMARY PLOTS AT KOKUBUNJI TOKYO



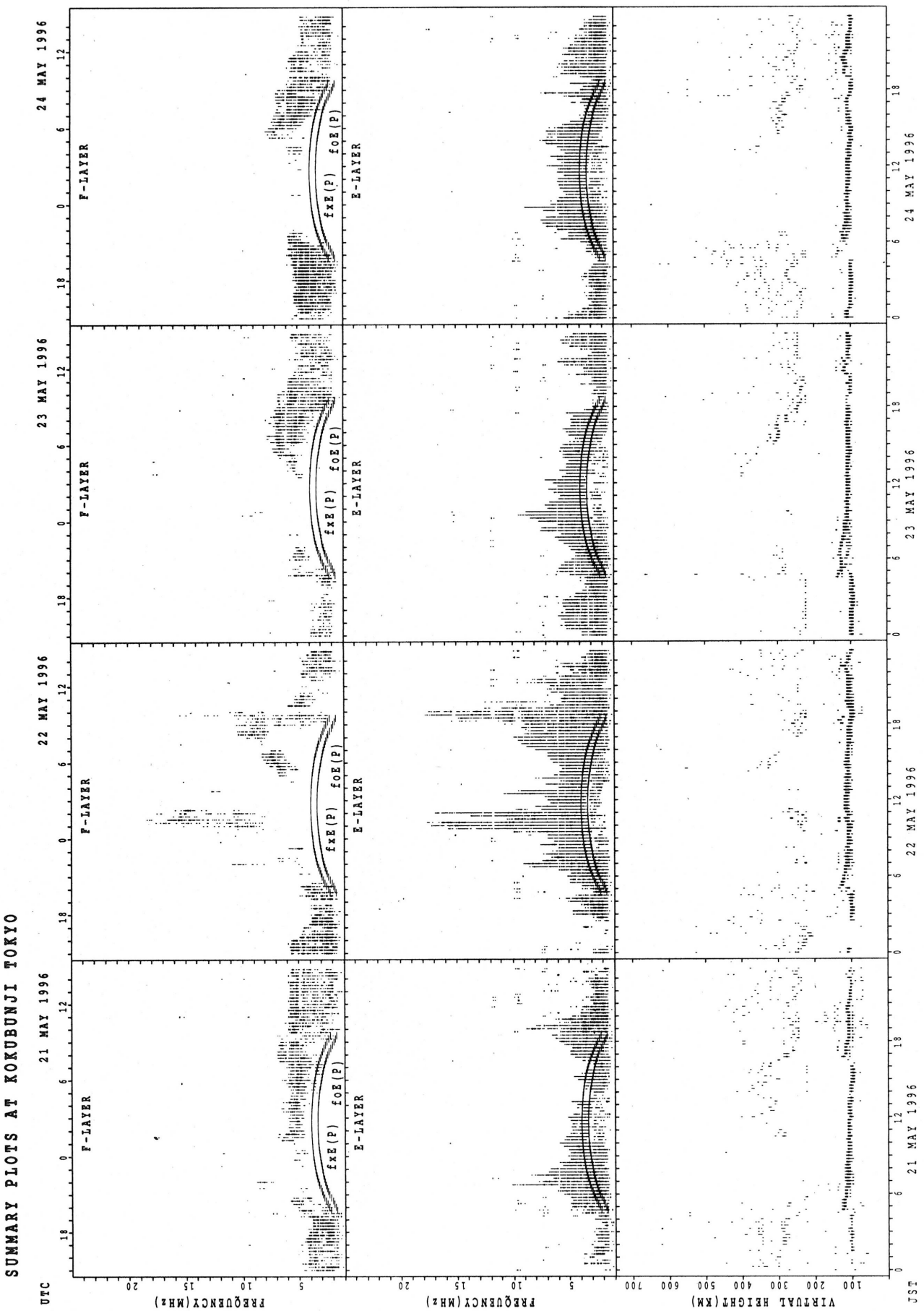
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
13 MAY 1996
14 MAY 1996
15 MAY 1996
16 MAY 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

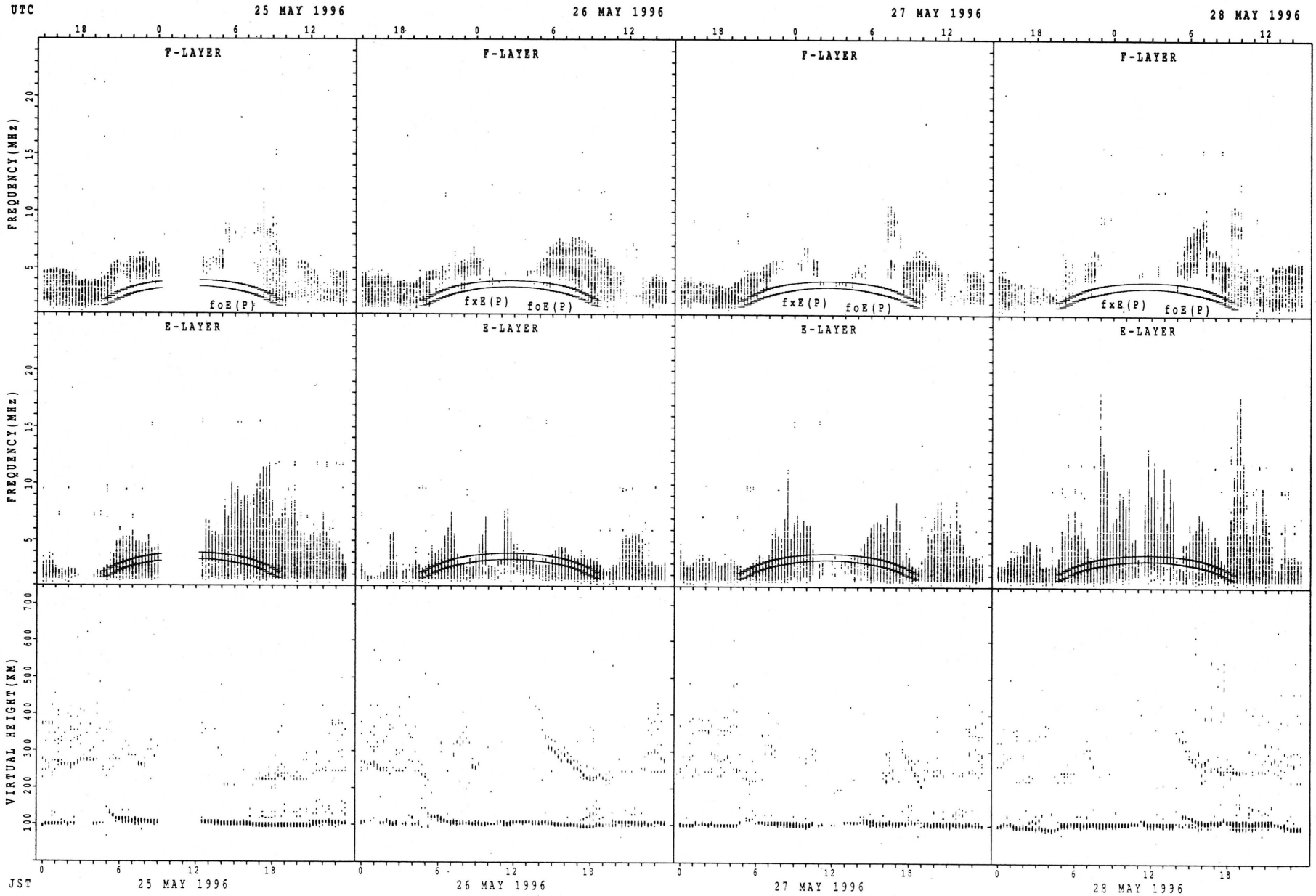
SUMMARY PLOTS AT KOKUBUNJI TOKYO



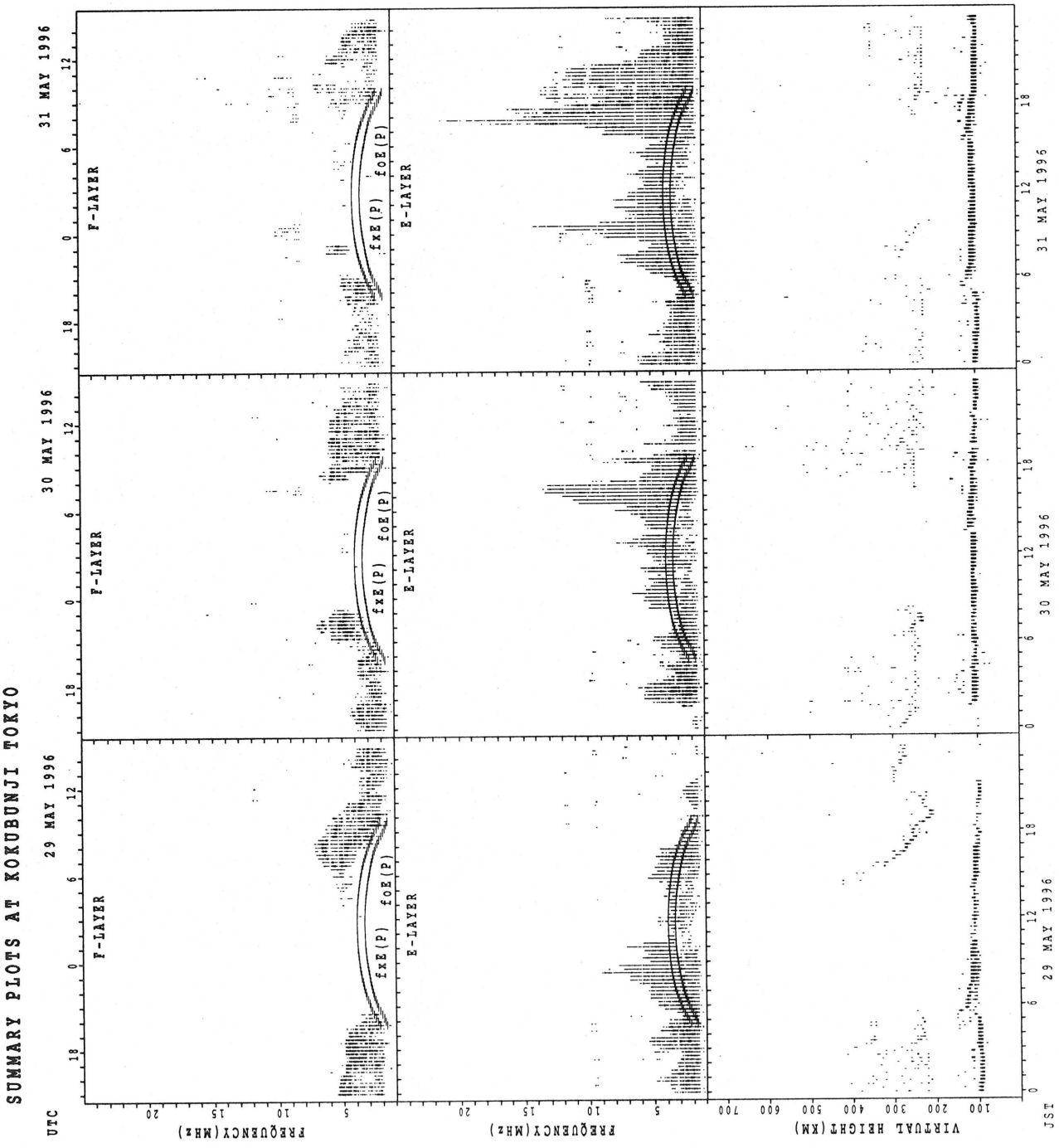
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

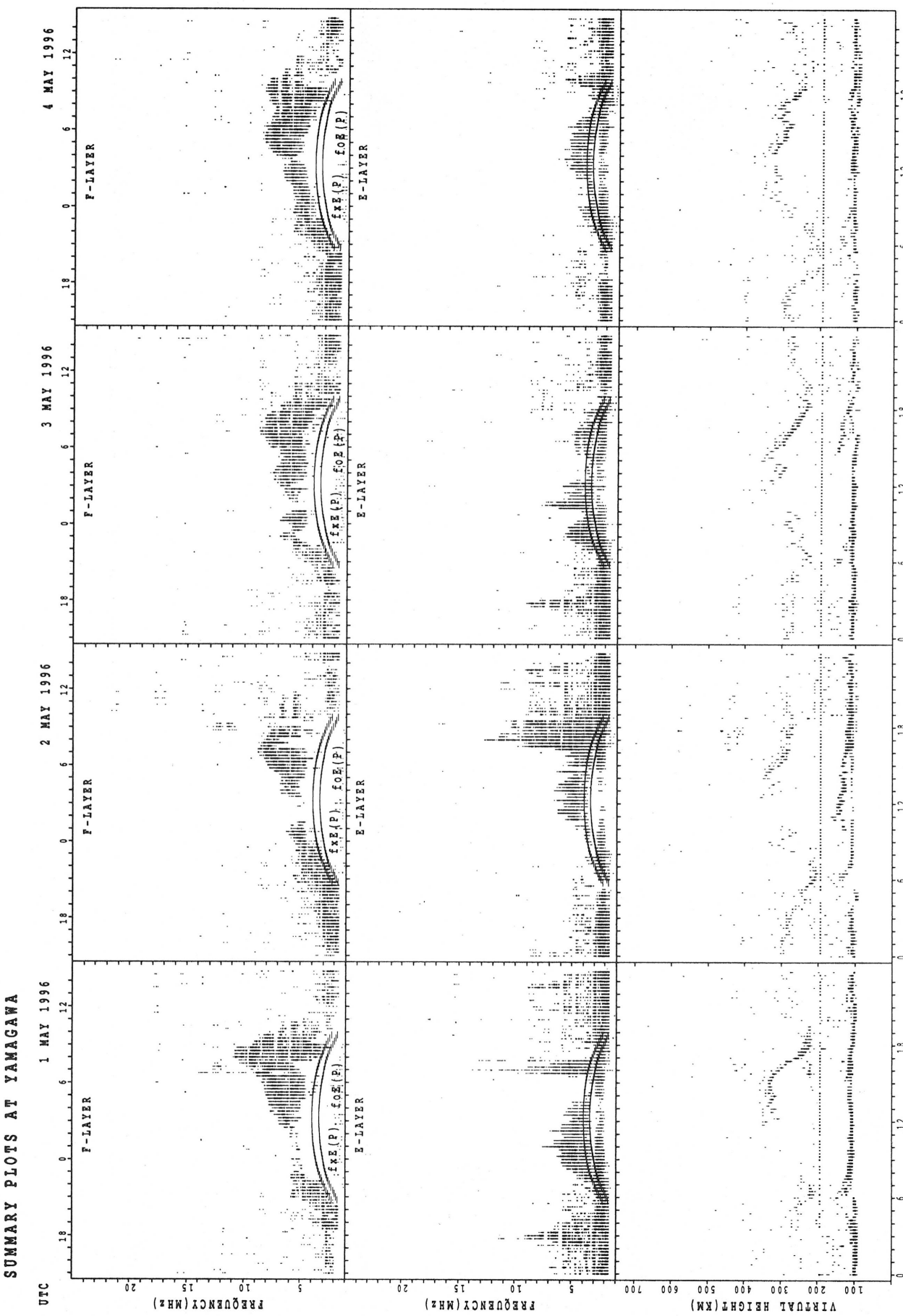

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
21 MAY 1996
22 MAY 1996
23 MAY 1996
24 MAY 1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

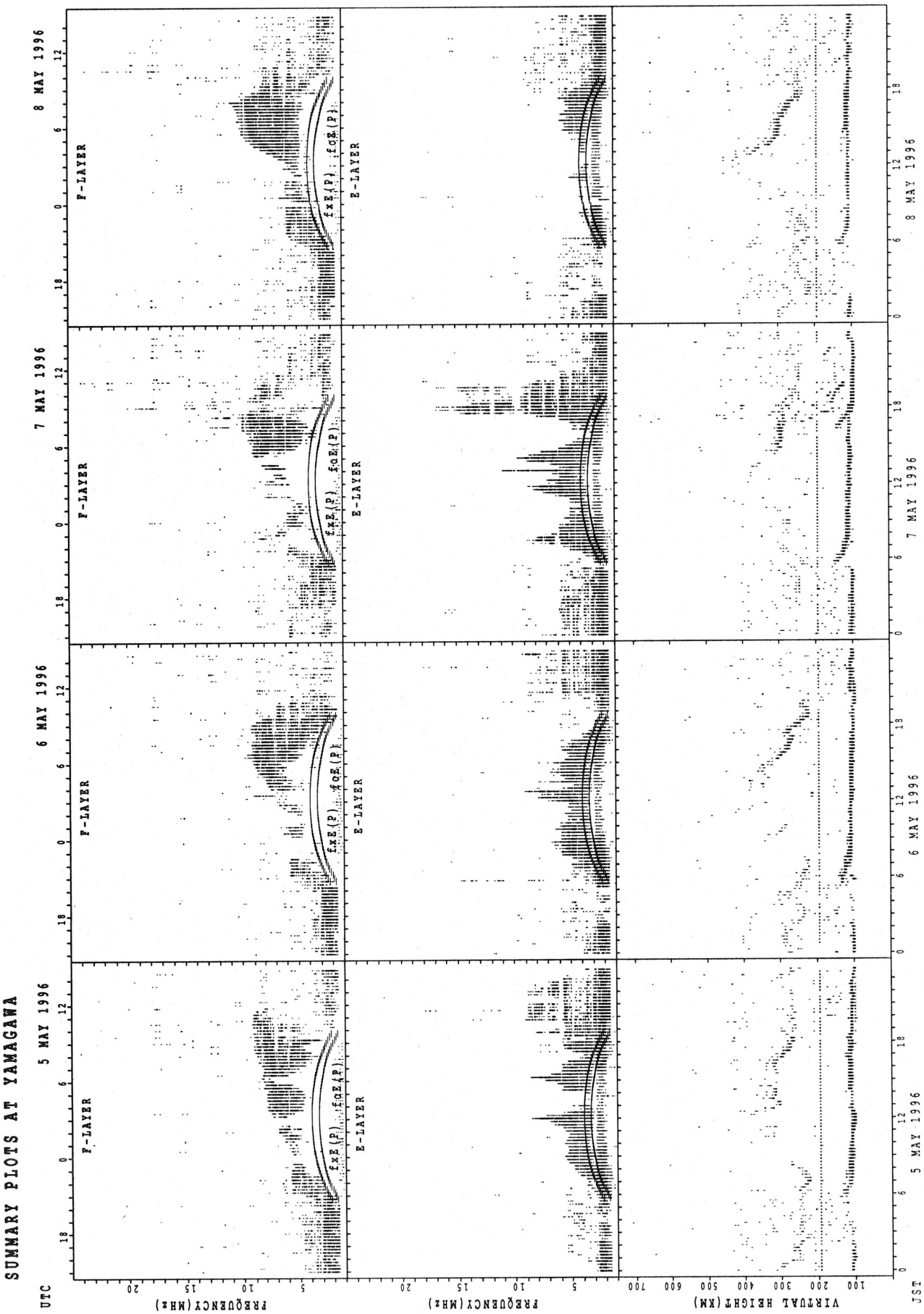
SUMMARY PLOTS AT KOKUBUNJI TOKYO

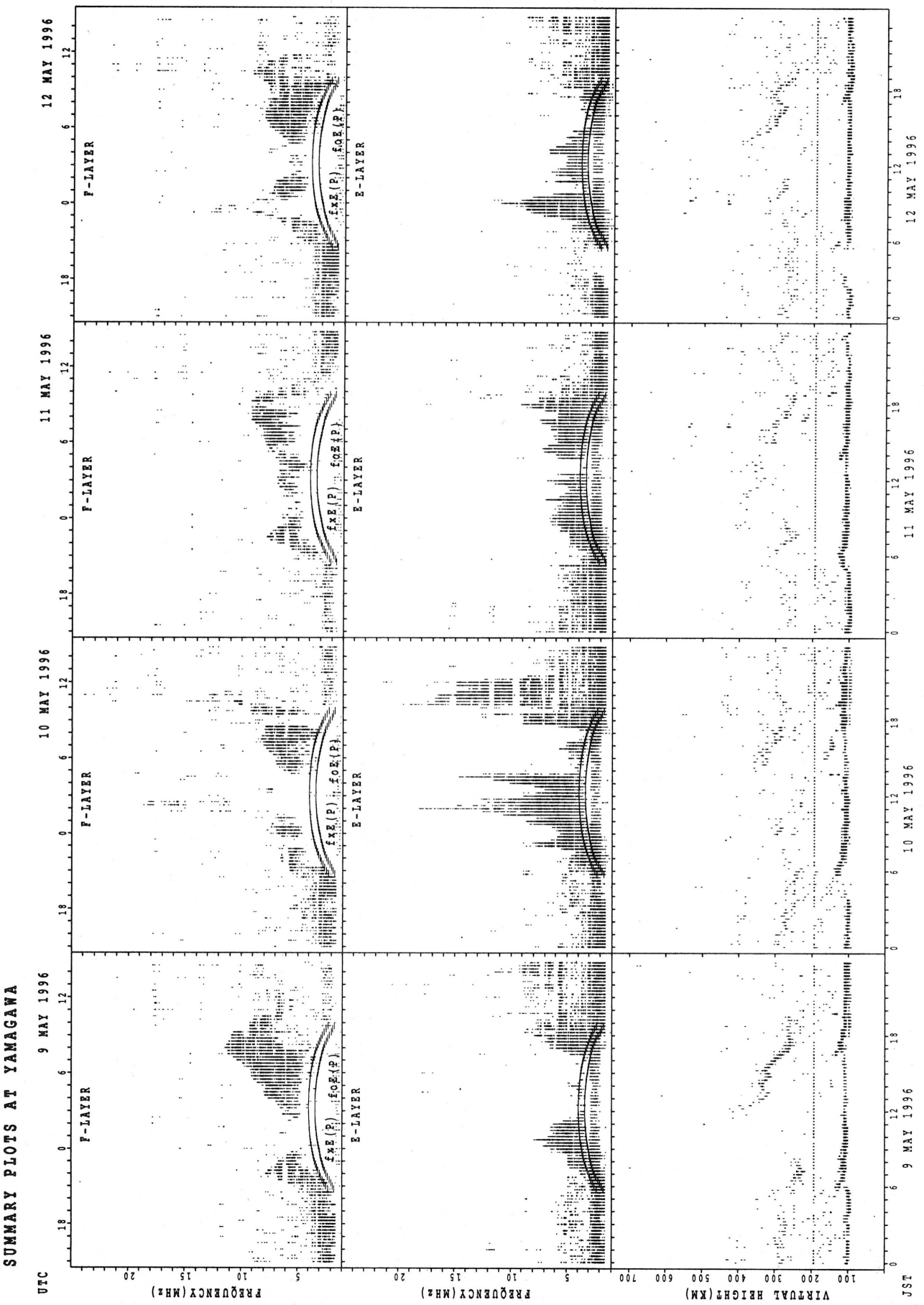


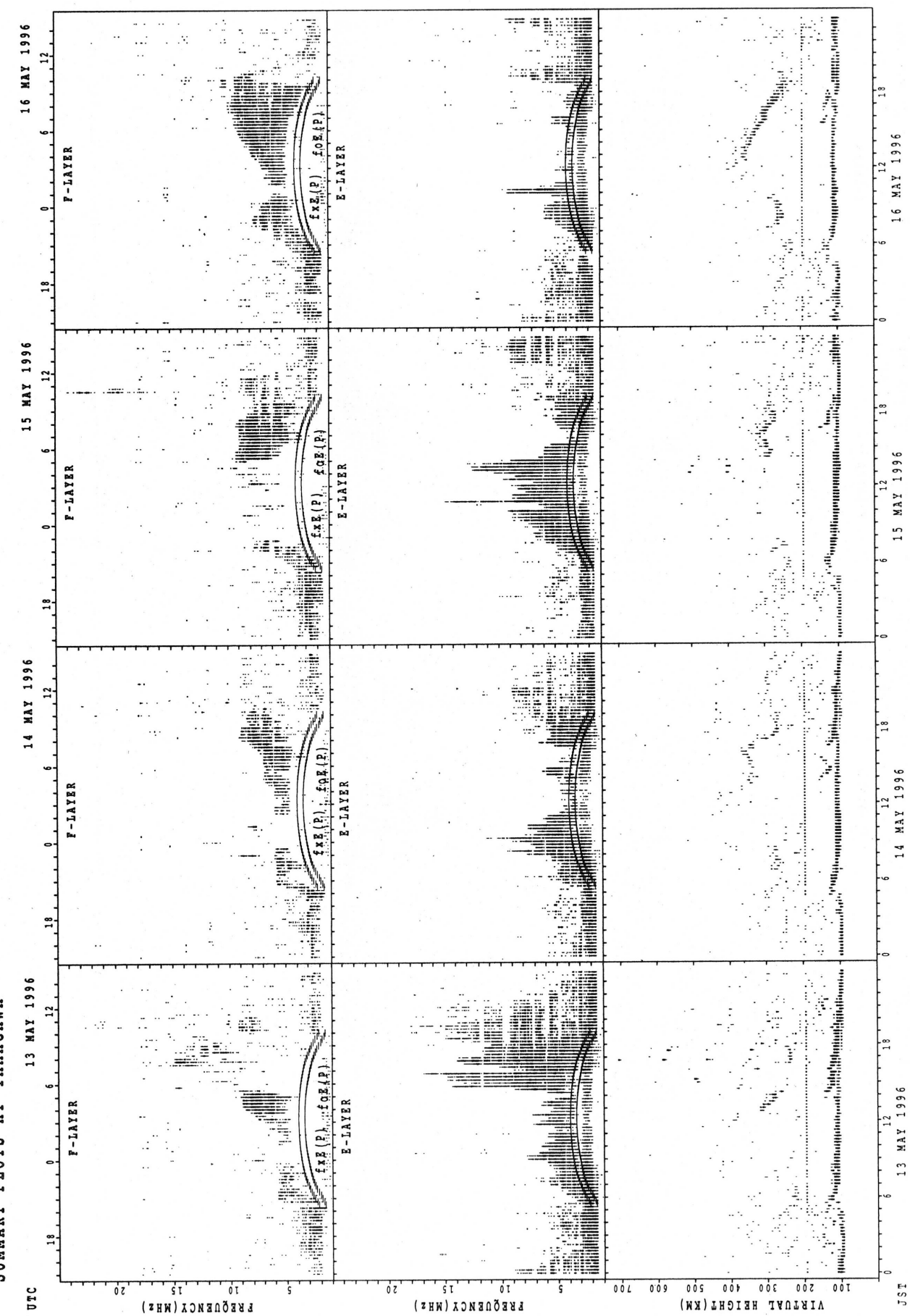
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
29 MAY 1996
30 MAY 1996
31 MAY 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

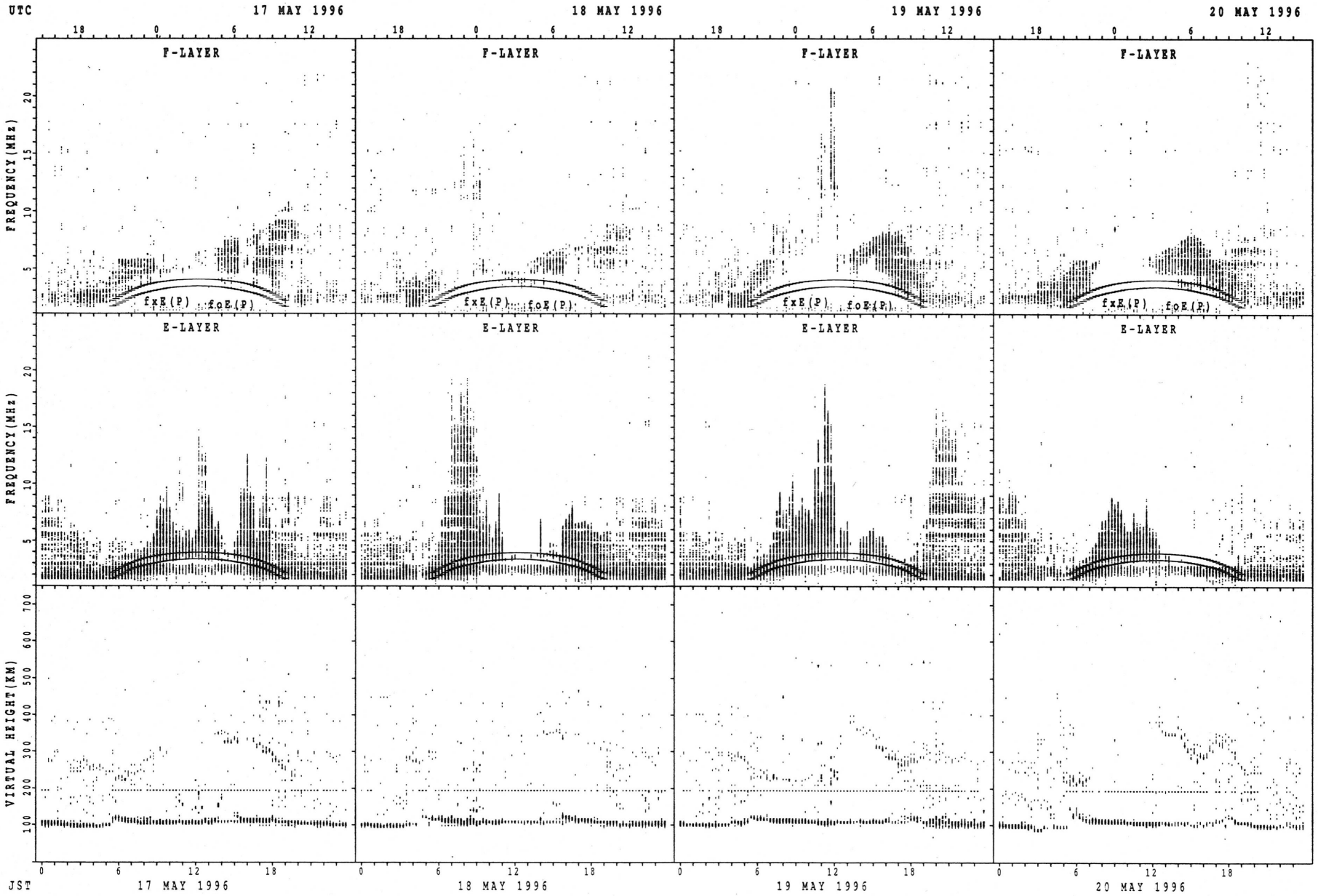

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
1 MAY 1996
2 MAY 1996
3 MAY 1996
4 MAY 1996
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P), foE(P)
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
5 MAY 1996
6 MAY 1996
7 MAY 1996
8 MAY 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

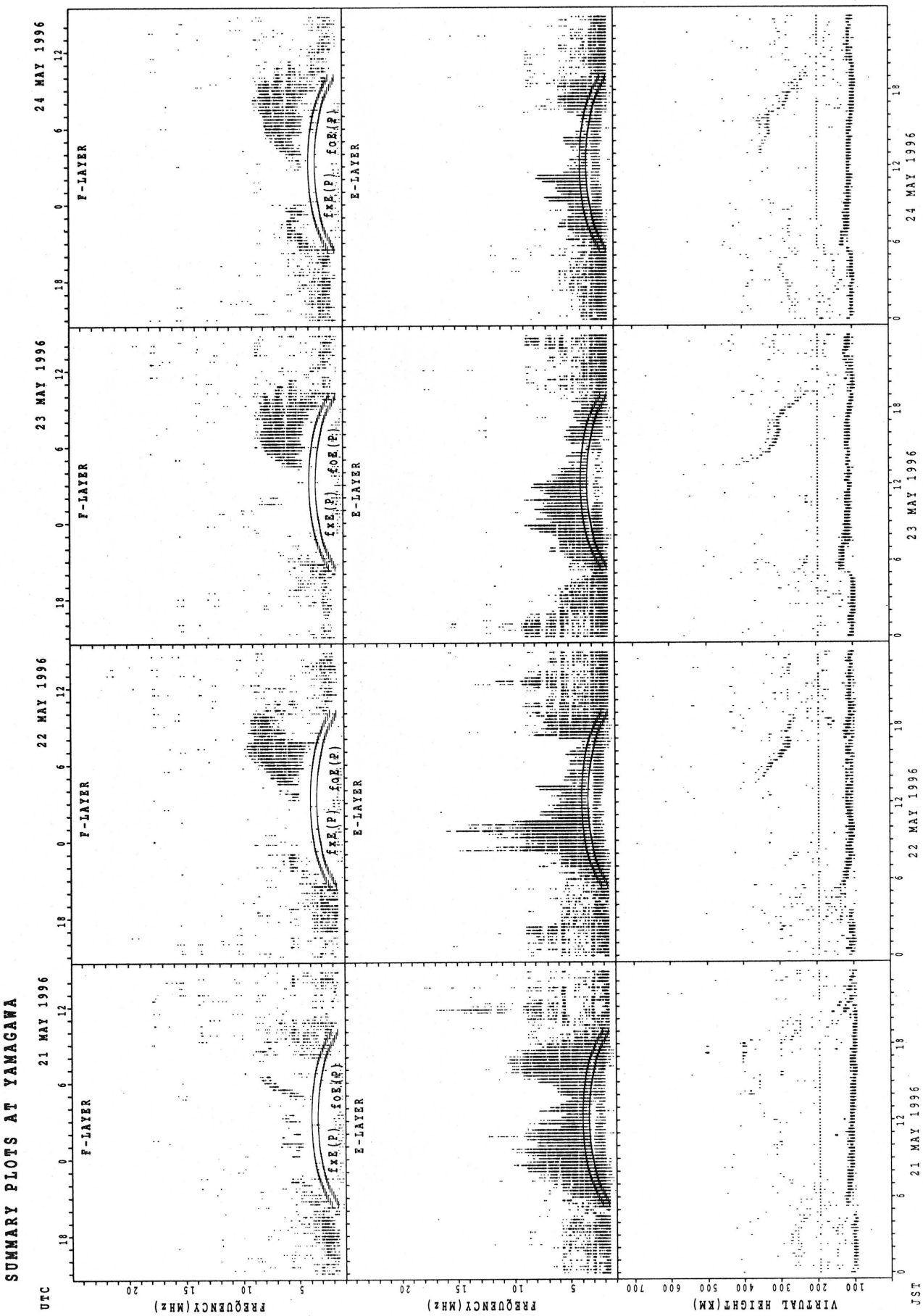

SUMMARY PLOTS AT YAMAGAWA
UTC
9 MAY 1996
10 MAY 1996
11 MAY 1996
12 MAY 1996
F-LAYER
E-LAYER
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
fxE(P)
foE(P)
JST
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE


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

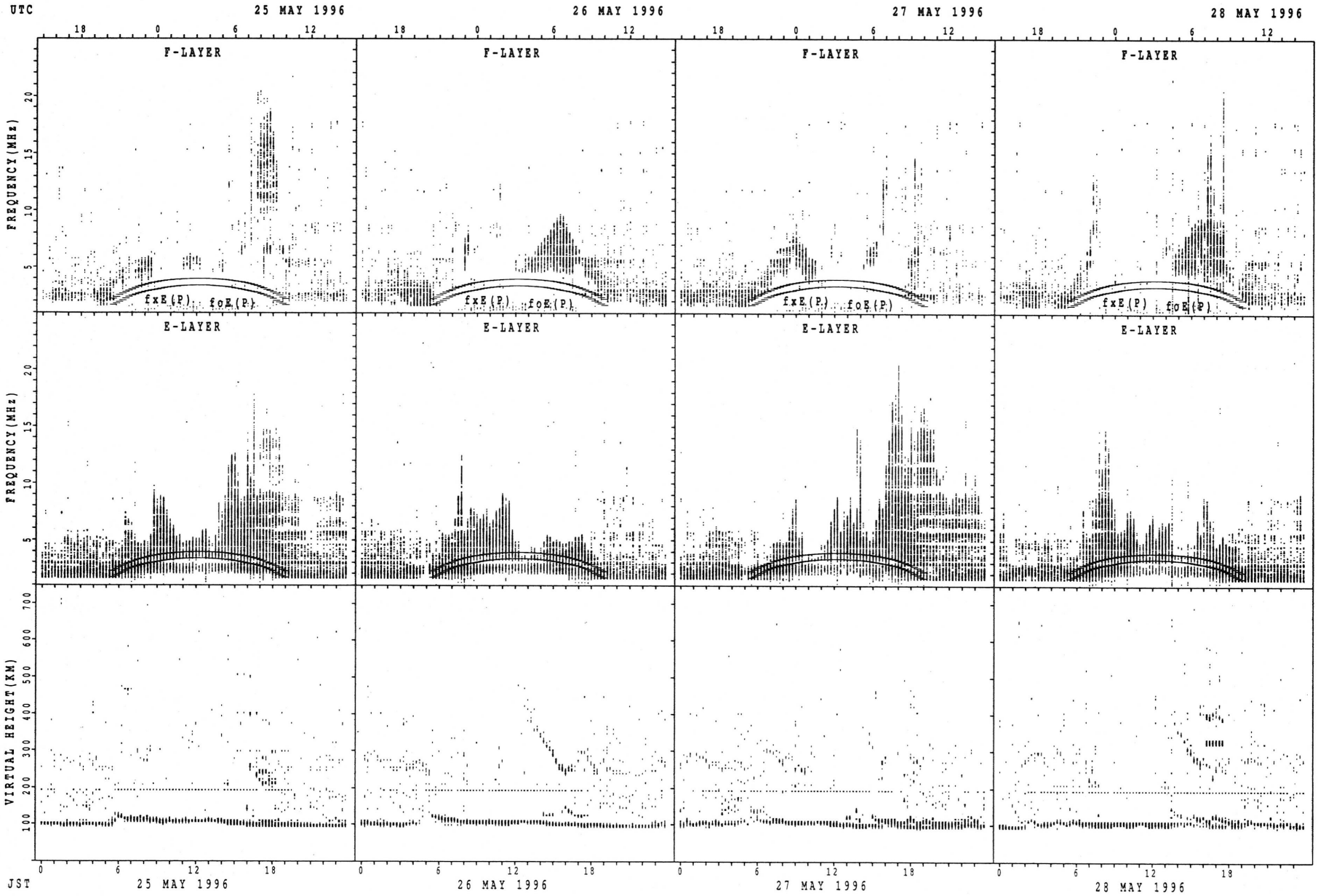
SUMMARY PLOTS AT YAMAGAWA



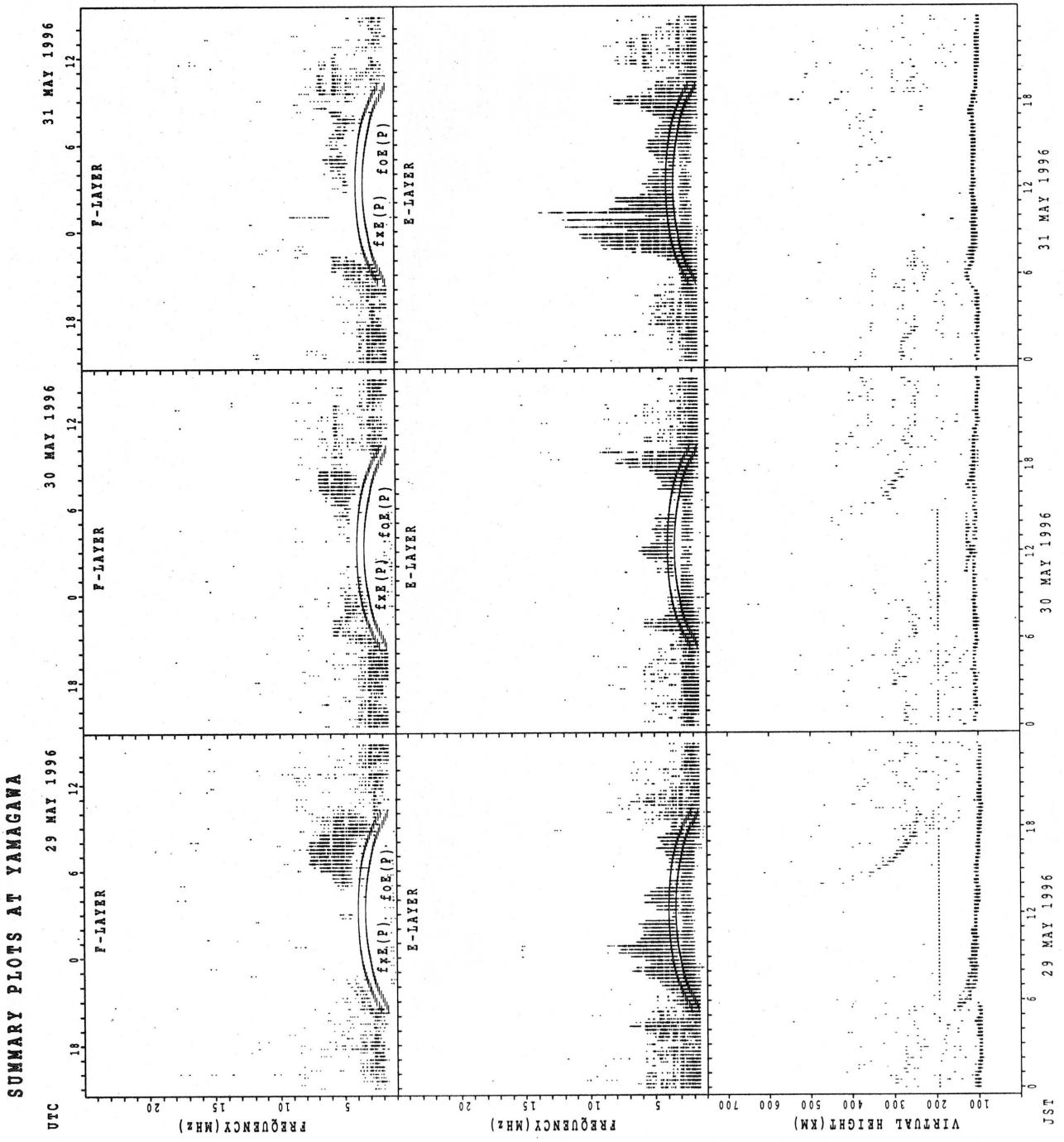
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

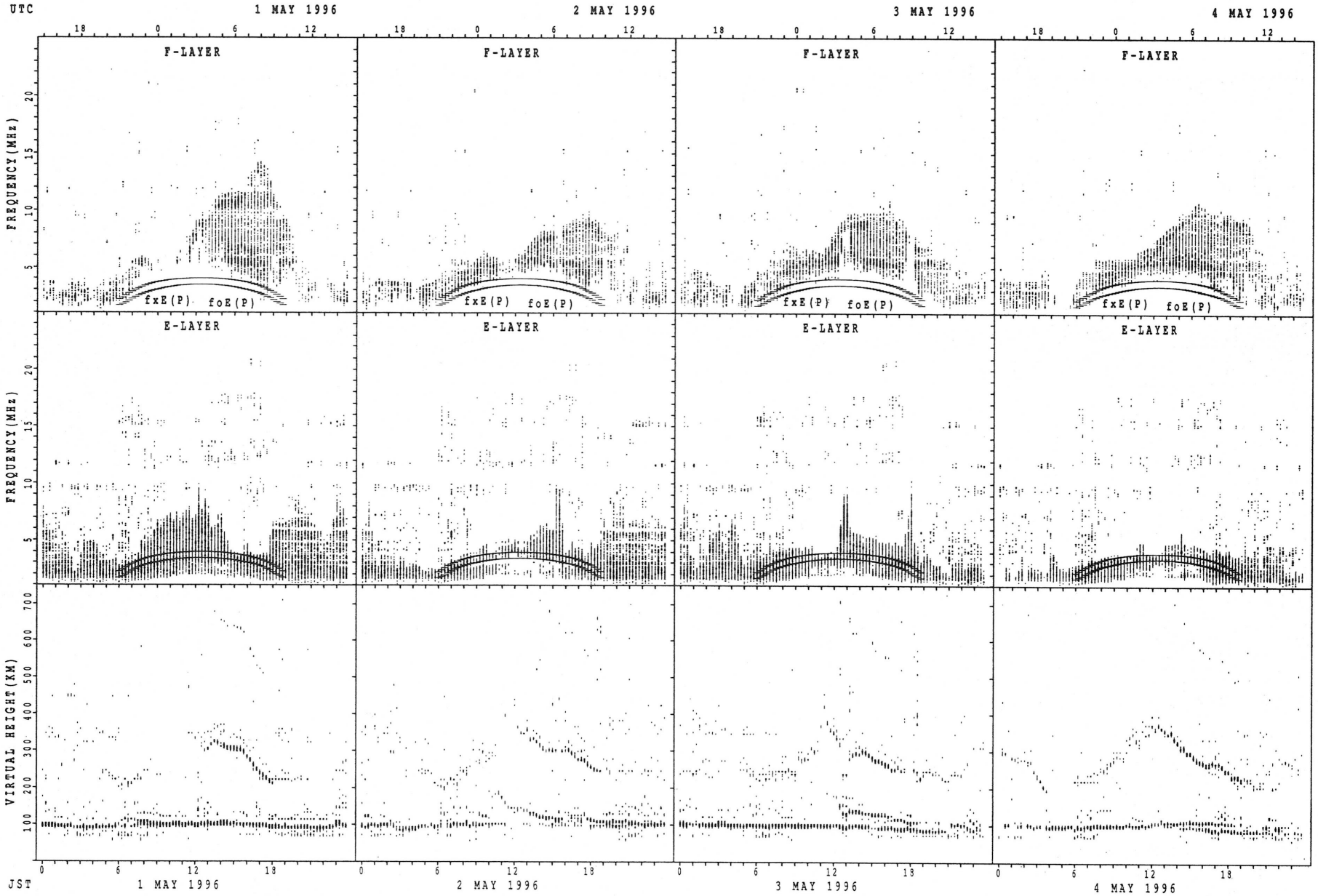
SUMMARY PLOTS AT YAMAGAWA



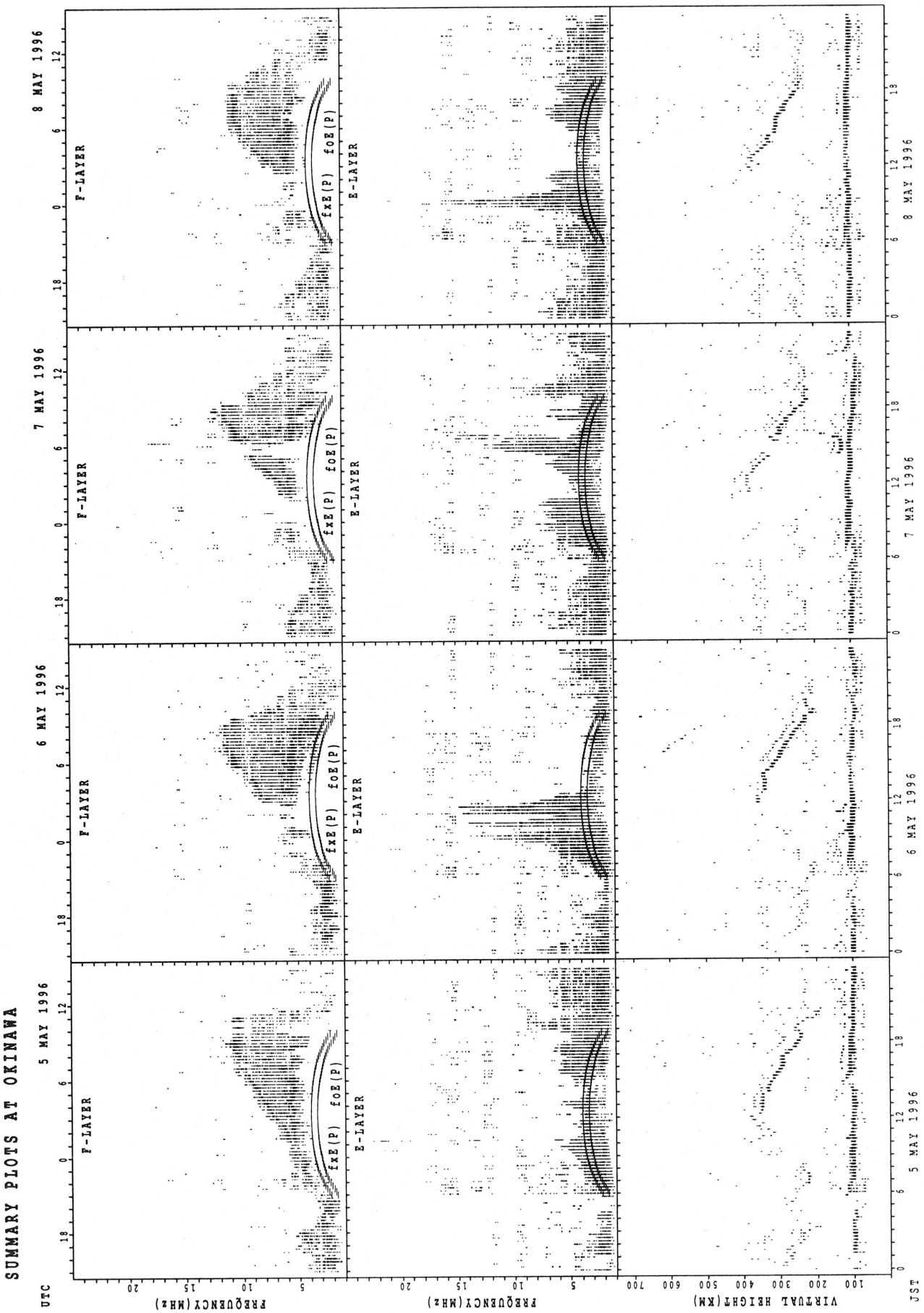
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

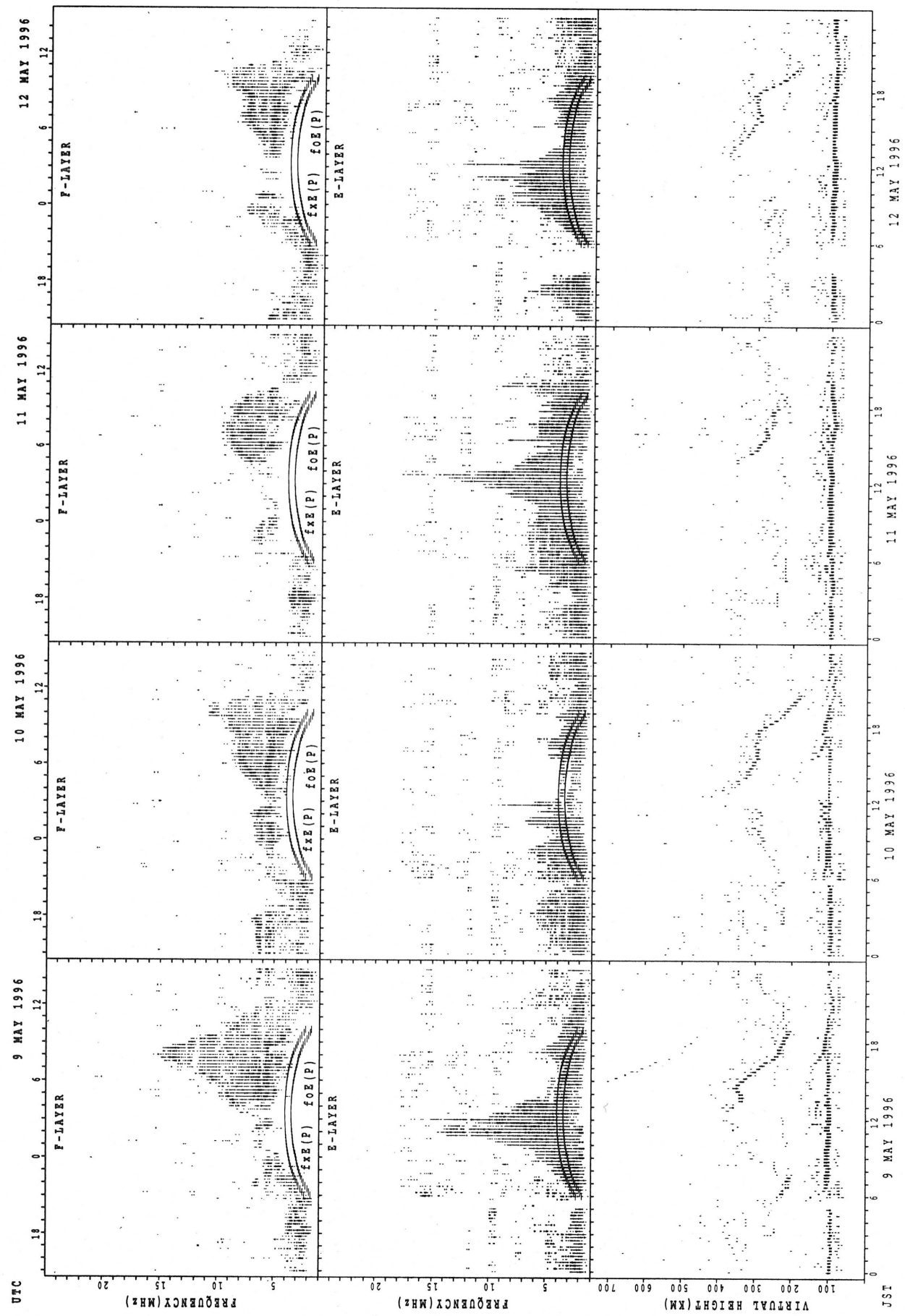

SUMMARY PLOTS AT YAMAGAWA
UTC
29 MAY 1996
30 MAY 1996
31 MAY 1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
JST
fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE

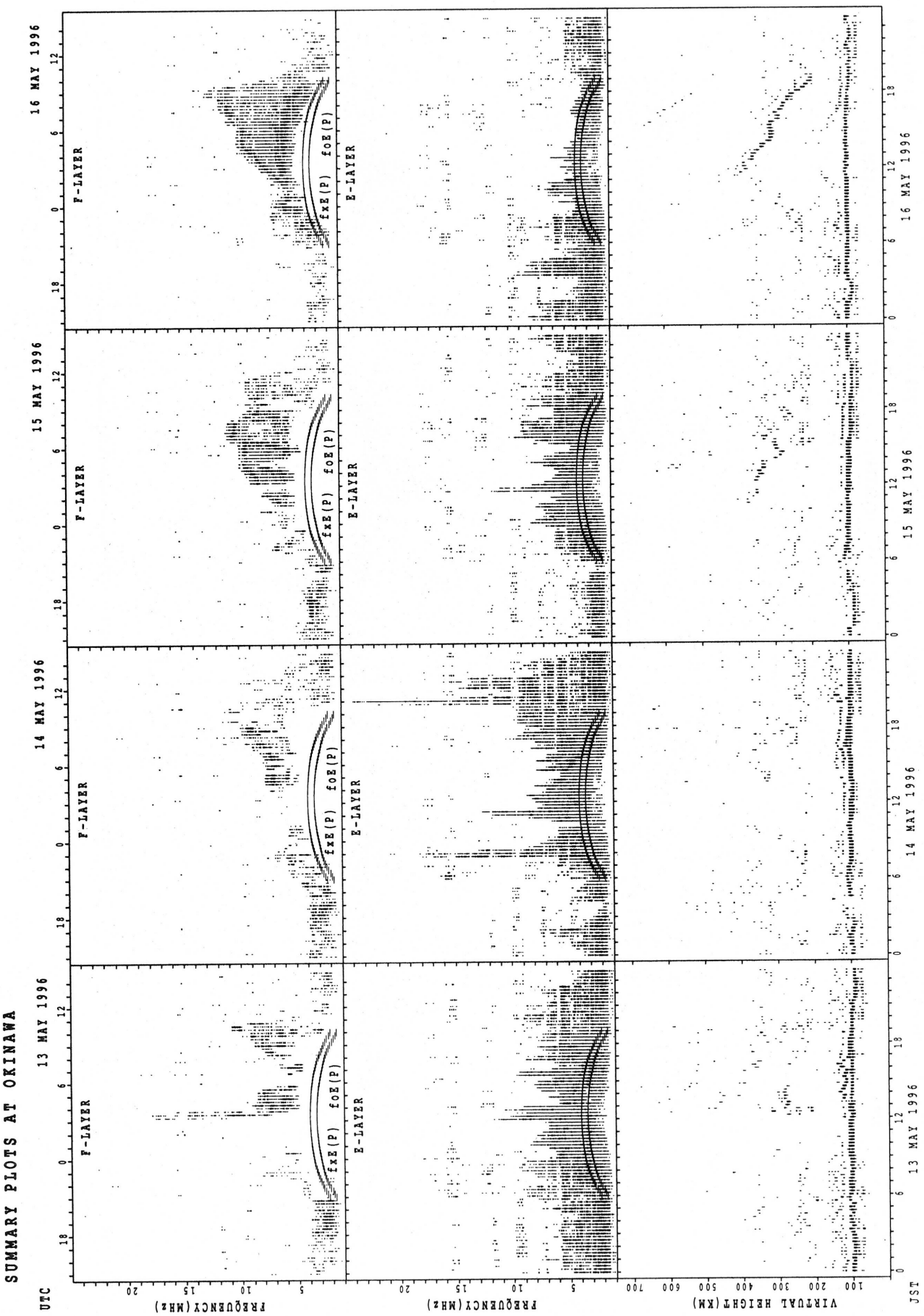
SUMMARY PLOTS AT OKINAWA



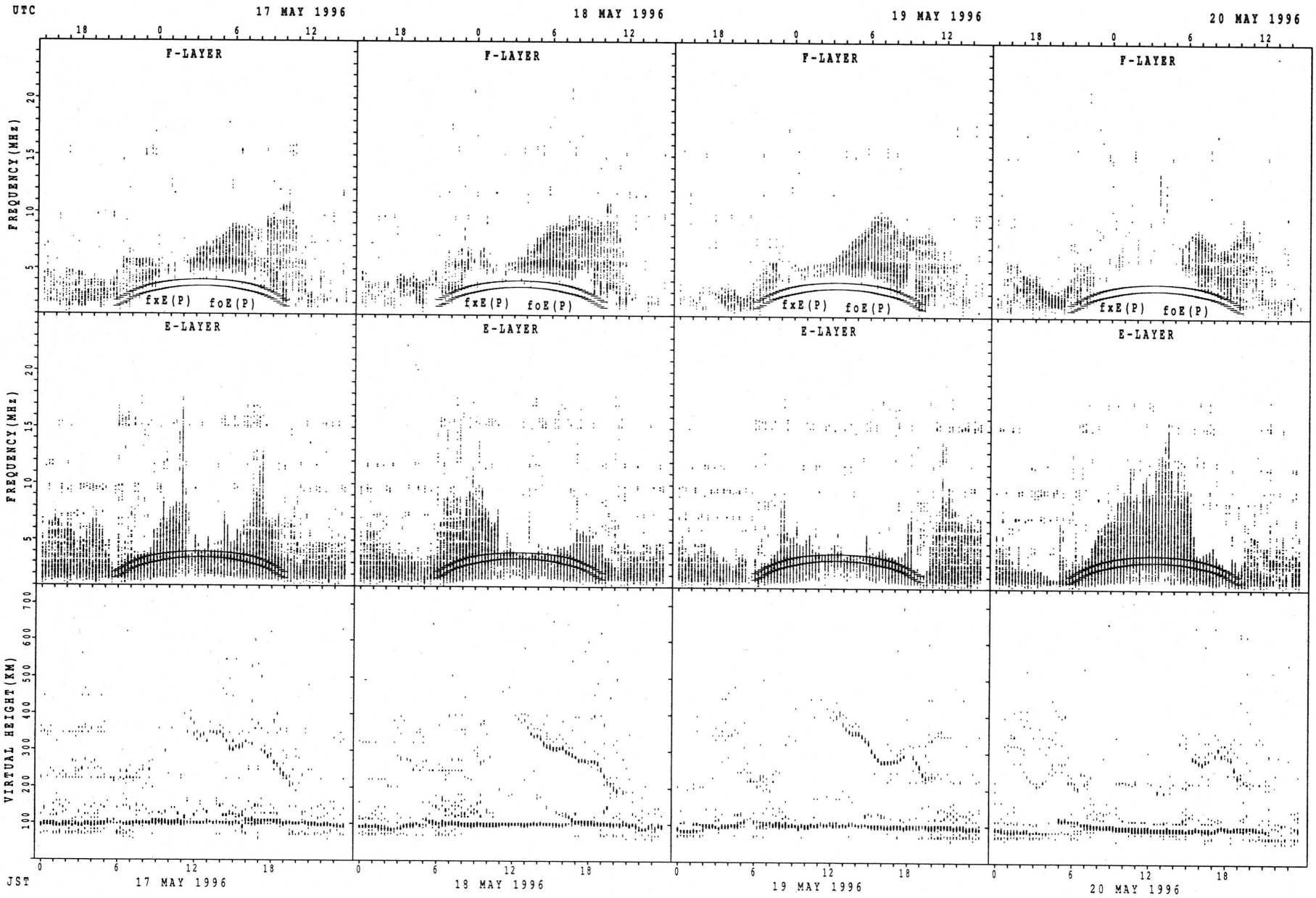
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
5 MAY 1996
6 MAY 1996
7 MAY 1996
8 MAY 1996
UTC
JST
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) foE(P)
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE

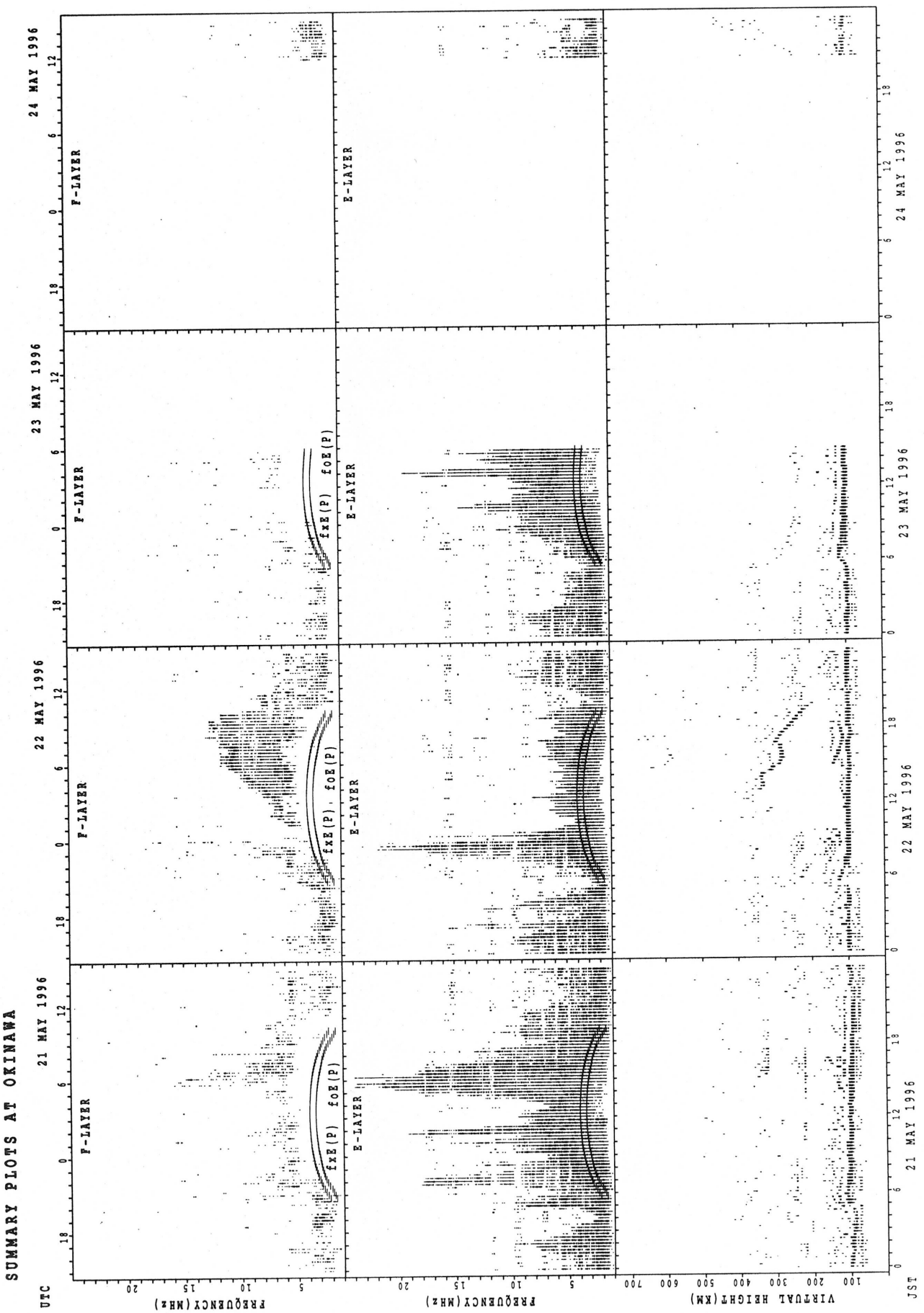

SUMMARY PLOTS AT OKINAWA
UTC
JST
9 MAY 1996
10 MAY 1996
11 MAY 1996
12 MAY 1996
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P): PREDICTED VALUE FOR fxE
foE(P): PREDICTED VALUE FOR foE


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

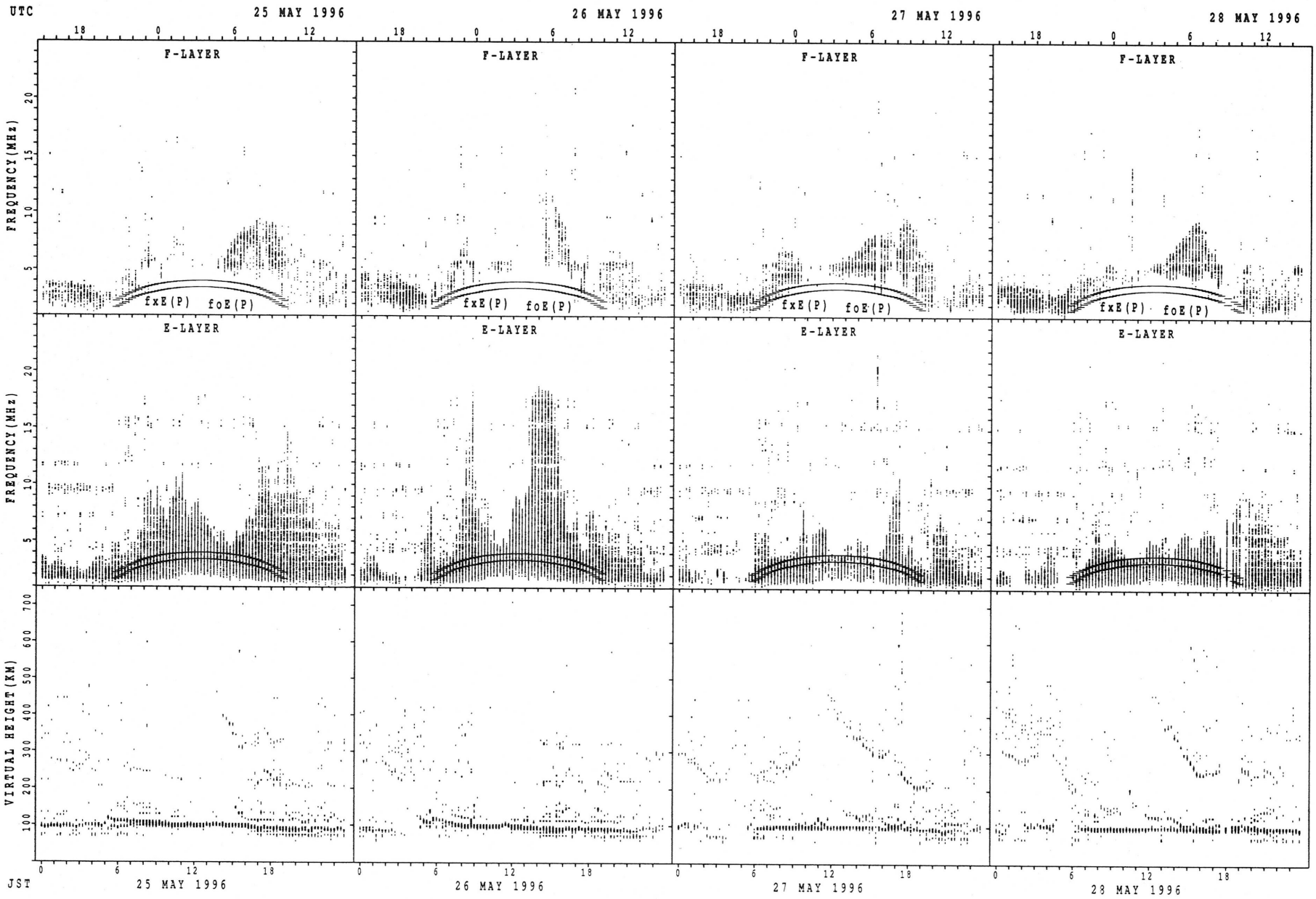
SUMMARY PLOTS AT OKINAWA



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

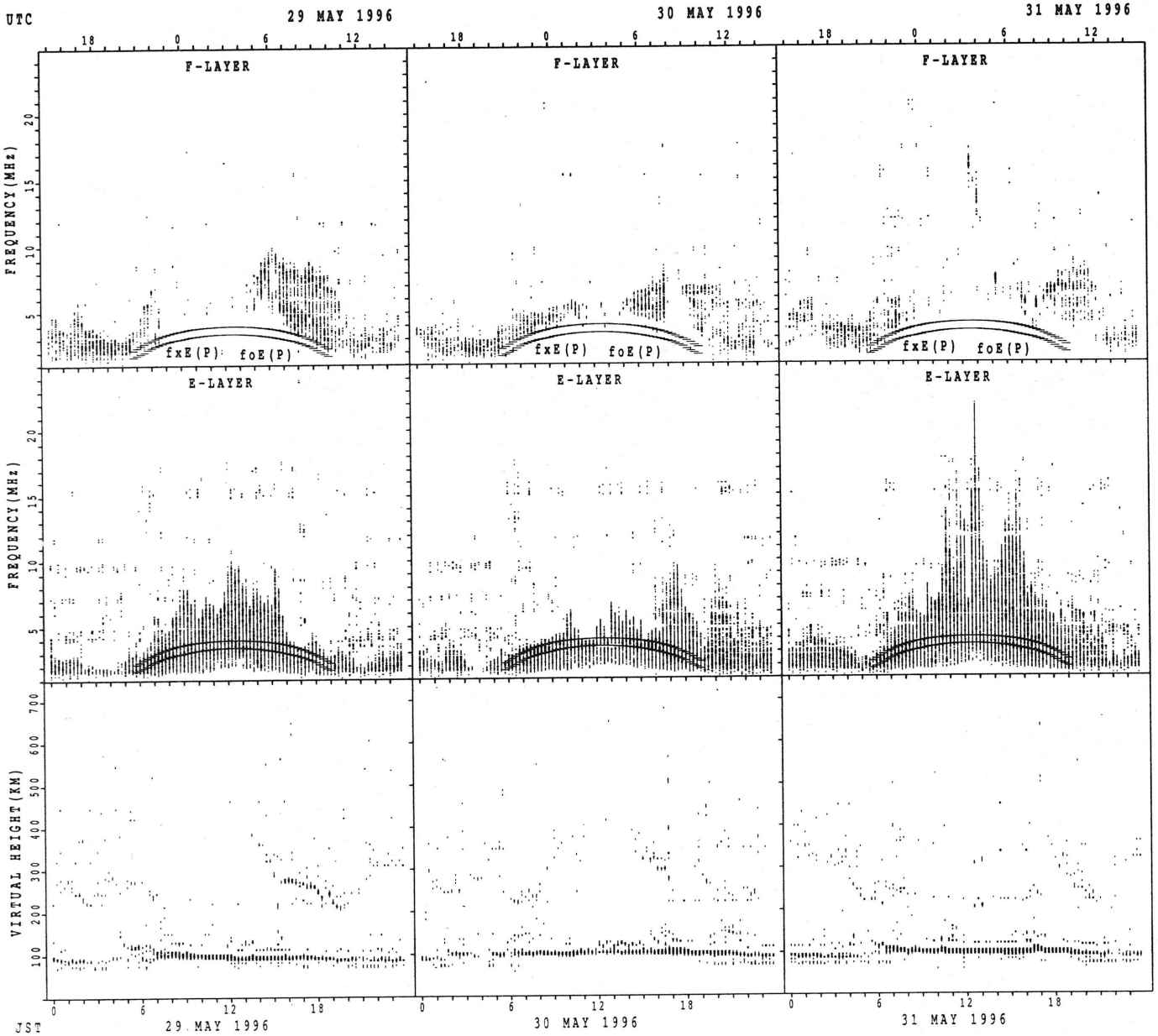

SUMMARY PLOTS AT OKINAWA
UTC
JST
21 MAY 1996
22 MAY 1996
23 MAY 1996
24 MAY 1996
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P), foE(P)
fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



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

SUMMARY PLOTS AT OKINAWA



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

MONTHLY MEDIANS OF h'F AND h'Es

MAY 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																								
MED																								
U Q																								
L Q																								

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	16	12	29	31	31	31	31	29	31	29	31	30	29	31	31	30	26	27	23	19	20
MED	111	111	107	107	110	137	127	121	119	117	115	113	113	113	114	117	119	121	122	121	117	117	113	113
U Q	115	115	111	112	114	147	129	125	121	121	119	115	115	115	117	121	125	127	125	123	121	119	115	117
L Q	107	107	107	106	108	134	121	119	115	113	113	111	113	111	111	111	113	117	119	119	113	111	109	108

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															10	16	18	15	18	20				
MED															314	297	304	290	264	261				
U Q															326	337	320	300	288	283				
L Q															304	287	274	264	246	241				

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	21	27	23	22	30	31	28	30	30	30	30	28	31	30	31	31	27	29	26	28	26	26	26
MED	105	103	103	103	103	116	121	115	113	111	109	110	107	109	113	113	111	111	109	107	113	111	111	107
U Q	113	107	107	107	105	137	125	119	113	113	111	111	109	113	117	127	119	117	114	111	115	113	113	111
L Q	103	99	99	101	99	107	119	112	111	107	107	105	107	107	107	107	107	107	105	103	106	107	107	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																21	24	22	19	19				
MED																318	296	276	262	260				
U Q																325	328	302	274	266				
L Q																297	287	262	252	238				

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	30	29	29	27	24	21	29	30	29	29	31	31	30	30	30	31	30	29	30	29	30	31	30	30
MED	107	105	101	103	105	109	123	117	113	111	111	111	111	111	114	113	116	119	112	109	109	107	108	110
U Q	111	107	107	105	113	123	131	119	117	115	111	113	113	113	133	129	131	122	115	113	115	117	113	115
L Q	103	100	99	99	103	102	119	113	111	108	109	109	107	107	109	107	111	113	107	102	103	103	105	99

MONTHLY MEDIANS OF h'F AND h'Es

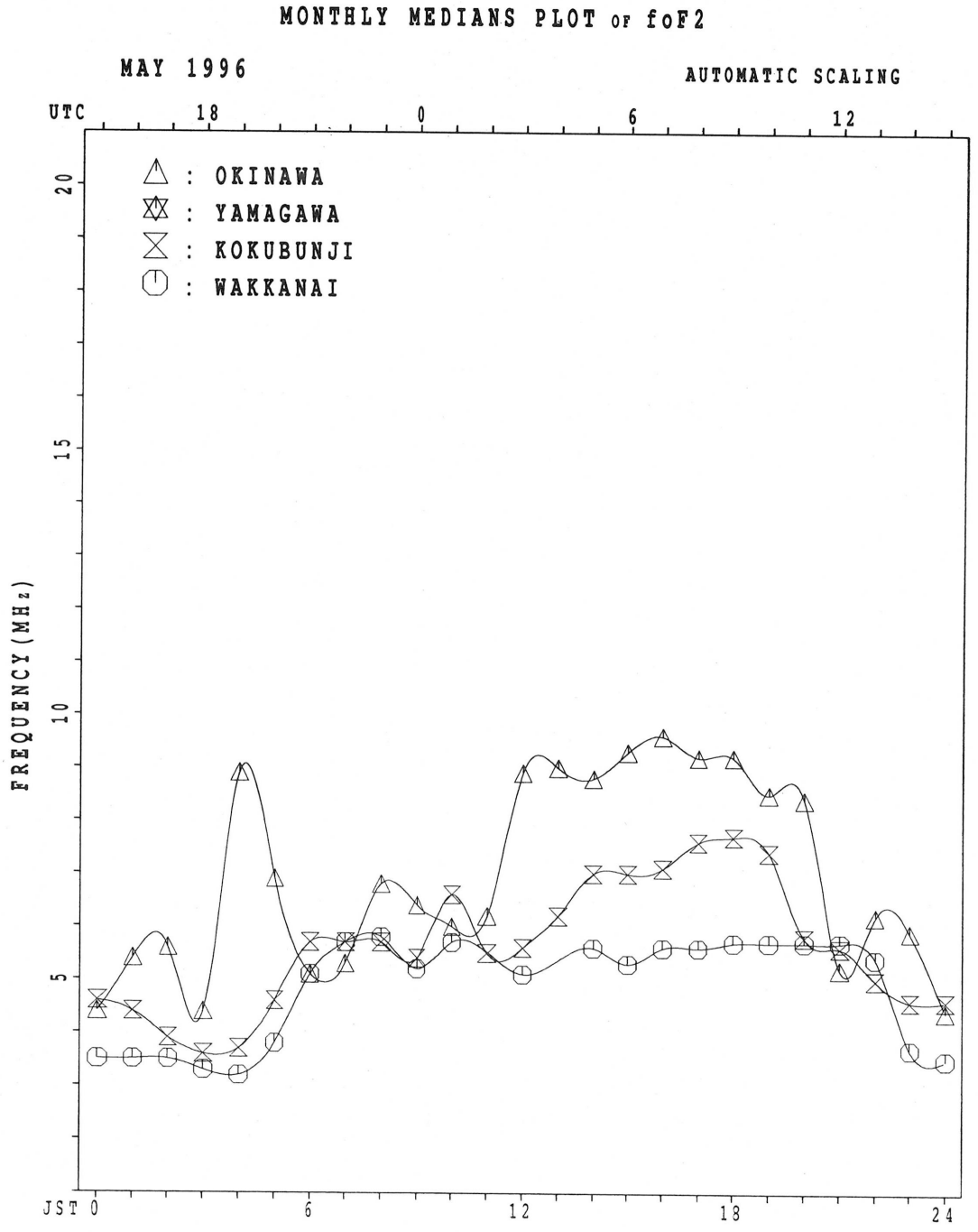
MAY 1996 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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														12	22	23	25	19	22	18				
MED														339	326	304	286	270	247	241				
U Q														351	340	314	295	280	274	256				
L Q														314	310	296	271	262	232	232				

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	25	24	23	22	22	27	25	29	29	30	29	29	29	29	27	29	27	28	28	28	28	28	27
MED	97	95	95	95	96	99	103	103	107	105	103	105	105	107	107	113	111	107	103	99	95	96	95	97
U Q	105	102	99	103	99	105	113	107	111	111	107	128	119	119	132	125	127	113	107	104	103	109	101	105
L Q	91	87	88	89	91	95	97	100	103	103	99	100	99	97	101	101	103	97	100	95	89	87	89	91


MONTHLY MEDIANS PLOT OF foF2
MAY 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

MAY 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	A	46	X 42	X 40	X 39															X 84	X 55	X 50	44	39
2	36	37	35	X 32	38															X 64	X 60	56	55	54
3	52	51	47	40	X 35															X 70	X 59	X 54	X 54	X 51
4	O X 50	X 48	X 45	X 43	X 43															X 85	X 66	X 57	X 56	52
5	X 49	X 50	45	44	40															A	X 83	X 69	X 50	X 47
6	X 47	45	43	40	40															X 75	X 64	62	61	60
7	56	51	50	47	X 40															X 87	X 66	X 57	X 54	X 50
8	X 50	A	50	45	X 37															X 76	X 66	X 62	X 57	X 54
9	X 51	X 48	X 47	X 43	X 43															X 92	X 76	A	55	54
10	53	50	46	46	41															X 82	X 83	X 65	A	56
11	42	40	A	38	38															84	X 59	50	50	44
12	52	A	A	A	40															X 83	X 94	A	A	47
13	52	46	45	46	46															X 80	X 90	51	38	A
14	A	A	X 40	39	47															X 76	X 63	X 48	X 46	A
15	A	50	47	43	41															X 82	X 76	A	56	51
16	52	51	50	44	48															X 92	X 70	X 43	A	A
17	A	44	44	45	40															X 97	X 86	X 56	A	A
18	A	A	A	X 46	41															X 72	X 72	A	55	50
19	A	A	40	42	40															X 63	A	A	56	A
20	52	51	A	46	45															X 74	X 75	X 69	X 56	X 56
21	X 47	X 45	46	44	42															X 67	X 61	X 62	X 59	X 58
22	X 58	58	47	40	40															A	X 56	A	49	X 46
23	X 43	A	A	A	33															X 70	X 67	X 52	X 52	X 55
24	56	54	56	53	56															X 57	X 59	X 54	X 48	X 50
25	X 48	52	47	40	40							C	C	C						A	X 59	X 54	51	47
26	44	45	46	41	38															X 62	X 50	A	X 46	45
27	X 42	42	41	38	37									Y						X 69	X 61	54	X 50	50
28	47	44	42	X 38	34															X 59	X 55	X 54	X 55	58
29	57	55	52	51	X 47								Y							X 60	X 48	X O 40	X 41	44
30	X 41	44	X 42	39	40															X 63	X 65	X 62	X 56	50
31	A	48	40	41	40															X 71	A	X 63	X 45	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	24	25	26	29	31															28	29	24	27	26
MED	50	48	46	43	40															X 74	X 65	X 55	X 54	50
U Q	52	51	47	46	43															X 84	X 76	X 62	X 56	X 54
L Q	46	44	42	40	38															X 66	X 59	X 52	X 48	47

MAY 1996 fxI (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 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	A	F 38	36	34	33	38	58	53	49	55	55	54	57	64	72	72	80	92	91	78	49	43	F 37	F 32
2	F 31	F 29	F 28	26	F 28	F 43	51	47	48	A	A	A	U A 54	A	A	71	76	76	58	58	54	F 48	F 47	F 45
3	F 44	43	F 39	F 32	29	37	47	55	54	58	60	57	63	63	55	59	71	70	72	64	53	48	48	45
4	44	42	39	37	37	43	R 45	48	52	48	51	62	58	63	67	64	62	64	74	79	60	51	50	F 46
5	43	44	F 38	F 34	F 32	42	53	52	V 56	51	54	56	59	61	73	63	60	A	69	A	76	63	R 44	41
6	41	F 38	F 34	F 33	F 31	38	50	A	A	A	51	A	55	60	73	79	82	74	71	69	58	F 54	F 53	F 51
7	F 48	F 40	F 40	F 39	34	43	49	A	A	53	53	61	A	80	83	86	81	74	78	81	60	51	48	44
8	44	A	F 40	F 38	31	38	50	52	50	58	R 54	52	53	64	80	89	93	84	74	70	60	56	51	48
9	45	42	41	37	37	42	60	64	61	54	48	58	58	63	77	86	72	76	80	86	70	A	49	F 47
10	F 43	F 41	F 36	F 38	F 33	46	55	A	A	59	A	A	A	A	59	58	66	69	A	76	77	59	A	F 48
11	F 32	F 34	A	F 32	F 30	40	54	72	86	A	55	56	57	60	59	66	R 76	79	79	S 75	53	F 41	F 41	F 36
12	F 44	A	A	A	F 32	F 40	49	60	75	66	59	U A 58	56	56	61	65	69	69	65	77	88	A	A	F 40
13	F 41	F 38	F 38	F 38	F 36	44	52	55	56	A	A	58	66	R 62	77	76	61	A	A	74	Z 84	F 44	F 32	A
14	A	A	34	F 30	F 39	Z 42	60	56	52	46	U R 46	A	50	58	56	60	A	66	64	70	57	42	40	A
15	A	F 40	F 39	F 36	F 34	43	50	62	63	A	55	57	56	59	71	78	72	66	64	J R 76	70	A	F 48	F 44
16	F 42	F 44	F 41	F 35	F 41	53	50	56	72	62	51	53	58	R 51	60	71	84	85	91	87	64	37	A	A
17	A	F 36	F 35	F 34	F 31	42	J R 62	57	54	A	A	A	55	54	57	A	A	82	88	91	V 80	50	A	A
18	A	A	A	F 39	F 33	A	A	A	A	A	A	52	A	A	A	A	A	A	A	66	67	A	F 46	F 42
19	A	A	F 30	F 32	F 29	38	52	60	A	A	A	A	53	51	A	A	60	64	59	57	A	A	F 49	A
20	44	F 42	A	F 37	F 36	46	63	56	50	A	48	50	56	A	76	66	59	54	60	68	69	R 63	50	50
21	41	39	38	F 35	F 32	46	A	A	A	48	57	60	56	60	54	60	57	66	63	61	55	56	53	52
22	52	F 50	F 38	F 32	F 32	R 39	A	A	A	A	A	A	A	56	63	75	77	A	A	A	50	A	F 42	40
23	37	A	A	A	F 27	A	46	46	52	A	A	A	A	56	60	72	71	71	66	64	62	46	46	50
24	F 49	F 45	F 49	F 48	F 49	F 51	F 54	55	A	A	A	A	U R 54	J R 56	65	72	67	64	64	51	53	48	42	44
25	42	F 42	F 39	F 33	F 32	40	52	55	57	50	C	C	C	56	63	A	52	A	A	A	53	48	43	F 39
26	F 38	F 37	F 38	F 33	F 32	42	44	A	54	63	51	E G 44	A	49	55	69	71	73	66	56	44	A	40	F 38
27	36	F 34	F 32	F 29	F 27	R 41	44	52	55	A	66	E G 44	Y	E G 41	50	A	57	A	57	63	54	F 47	44	F 41
28	F 41	F 36	F 35	32	F 27	A	A	55	60	A	A	49	A	A	64	78	79	65	55	54	49	48	49	F 49
29	F 49	F 48	F 44	F 45	41	34	A	A	A	47	A	Y	E G 42	J R 46	R 47	54	62	68	60	54	42	34	U R 35	38
30	35	F 38	36	F 31	F 29	32	47	64	53	A	45	A	A	U A 50	48	A	A	62	58	57	59	R 56	50	F 42
31	A	F 41	F 33	F 34	F 33	40	44	A	52	A	A	47	56	R 51	50	48	A	52	59	65	A	57	39	F 33
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	25	26	29	31	28	26	22	22	15	18	19	21	26	28	25	26	25	26	28	29	24	27	26
MED	42	F 40	F 38	F 34	F 32	42	50	55	54	54	54	56	56	57	62	71	71	69	66	68	59	48	46	F 44
U Q	F 44	F 42	F 39	F 38	F 36	43	54	60	60	59	55	58	58	62	72	77	77	76	74	76	70	56	49	48
L Q	40	F 38	F 35	F 32	F 30	38	47	52	52	48	51	50	54	51	56	62	61	64	60	60	53	45	41	F 40

MAY 1996 foF2 (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 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	UL 380	A	UA 436	A	UA 452	UA 440	456	440	UA 428	UA 400	A	UL 280					
2								A	L	A	A	A	UA 456	A	A	A		UA 392 352						
3								L 388	L 420	432	A	448	436	444	432	424		A	L 364	A				
4							L	UL 392	A	UA 436	UY 428	448	R 452	428	UA 428	420	408	L 380	UL 304					
5							L	A	408	432	440	444	440	440	432	424		A	A					
6							A	A	A	A	A	A	UA 460	UA 460	UA 436	428	UA 404	UA 372						
7							A	A	A	448	UA 448	A	A	A	A	UA 440		A	UA 348	A				
8								L	L	436	456	460	R 468	YUA 472	428	432	412	380	L					
9							UL 376	L 412	UA 424	L 444	L 444	452	464	444	R 456	UA 428	408	L 380	L					
10								A	A	A	A	A	A	A	A	440	UA 400	A	A					
11							UL 376	A	A		476	A	A	A	UA 432	UA 420	A	372	UL 296					
12								L	A	A	440	A	UA 456	448	UA 460	432	400	UA 340	A					
13								L	UA 396	UL 496	A	A	UA 460	452	432	420		A	A	A				
14								A	A	UA 420	440	UR 432	A	440	440	424		A	A	A				
15								A	UA 408	UA 420	A	UA 432	UA 448	440	A	428	416	400	L 380	A				
16								UA 412	A	A	A	UA 456	452	A	436	424		A	UA 384	L				
17							L 352	384		A	A	A	A	A	R 436	A	A	A	A	A				
18							A	A	A	A	A	A	A	A	A	A	A	A	A	A				
19								AUA 396	A	A	A	A	436	A	A	A	UA 392	UA 348	L					
20							L	360	UA 396	A	A	A	444	UA 440	A	436	412	404	L 388	A				
21							A	A	A	A	428	A	UA 432	UA 440	432	432	408	392	L 388	A				
22								A	A	A	A	A	A	A	A	A	A	A	A	A				
23							A	A	A	A	A	A	A	A	A	A	A	UA 360	L					
24							UL 352	A	A	A	A	A	A	UA 444	A	460	392	364	L 308					
25								A	A	400	424	C	C	C	A	A	A	A	A	A				
26								A	A	404	420	432	440	A	Y 424	424	400	392	352	L 292				
27								388	UA 432	A	A	436	Y	412	428	A	A	A	L 312					
28							A	A	380	A	A	A	428	A	A	UA 424	444	A	A	A				
29								A	A	A	A	A	Y	R 420	412	A	UA 424	UA 384	360	312				
30							UA 344	376	400	A	424	A	A	A	A	A	A	A	A	L				
31							UL 352	A	UA 404	A	A	432	A	A	420	UA 424	A	A	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								7	13	11	11	11	15	17	15	20	21	15	18	7				
MED							UL 352	UL 392	U 420	436	440	448	440	444	432	424	400	368	L 304					
U Q							UL 376	UA 402	UA 424	440	448	UA 452	UA 458	452	436	432	404	L 380	312					
L Q								352	382	404	428	432	436	440	428	428	420	392	UA 352	L 292				

MAY 1996 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 1996 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B	244	276	300	312	320	A	A	A	A	A	276	A	A					
2						B	228	276	304	320	332	R 348	R 344	R 348	328	304	276	240	A					
3						B	228	288	320	A	A	A	A	340	336	A	A	248	A					
4						B	212	264	304	320	A	R 336	344	R 328	324	304	276	A 232	A					
5						156	232	268	300	328	U A 336	A 340	R 344	332	328	300	280	240	A					
6						A	240	272	308	328	336	340	A 340	A	A	A	A	220	A					
7						172	240	272	312	328	344	344	A 344	A 336	A	A	A	A	A					
8						A	220	264	304	A	A	A	R 352	340	332	312	U A 272	U A 236	A					
9						152	228	268	300	316	A 332	A 336	A	344	344	312	284	248	164					
10						A	236	276	308	A 328	U A 340	A	A	A	324	308	292	260	U A 184					
11						A	232	272	300	A 312	A	A 340	A 344	352	336	A 300	A 276	A	A					
12						A	240	A 288	308	A 332	344	A	A	A	A	A 316	292	248	A 188					
13						A	228	284	300	A 320	A 336	U A 348	A	A	A	324	296	A 248	168					
14						A	232	272	296	324	U A 328	A	A	360	344	316	288	240	A					
15						168	240	280	300	A 312	A	A	A 340	A	336	316	276	244	A					
16						A	A	A	U A 304	A	A	A	A	U A 340	328	316	276	236	U A 168					
17						A	232	284	U A 300	A 316	A	A	A	A	348	324	284	A 240	B					
18						A	U A 220	280	308	A	A	A	A	A	360	324	288	240	A					
19						A	228	272	300	328	U A 336	A	A	A	A	A	A	A	A					
20						A	240	284	A 312	A	A	A	A	A	A	A	A 280	244	A					
21						160	244	A 280	A 304	A 332	A 340	U A 348	U A 344	A	R	A	280	244	164					
22						A	232	280	296	312	A U A 324	344	348	336	324	A 312	284	A 232	A					
23						A	248	284	304	312	328	340	A	A	A	A	A	A	A					
24						A	248	292	A	A 328	A	A	A	A	A	A	288	A	A					
25						A	236	A	304	320	C	C	C	A	A	A	A	A	A					
26						A	236	A 280	A 304	A	R	A	A	A	R	A	A	A	168					
27						164	244	A	A 316	A	A	R	R 348	344	332	308	276	232	A					
28						A	U A 220	A	A	U A 308	A	R 348	A	A	324	304	276	236	A					
29						A	228	264	300	320	U A 340	A	U A 348	336	A	A	A	A	A					
30						A	A	292	A 312	A	A	A	A	A	328	304	276	A 236	B					
31						168	256	A	A 292	A	A	A	A	A	A	A 304	280	236	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						7	29	26	29	22	15	12	12	13	17	19	23	22	7					
MED						164	232	278	304	320	A 336	342	344	340	332	312	280	240	168					
U Q						168	240	284	308	A 328	340	348	348	346	340	316	288	244	A 184					
L Q						156	228	272	300	312	328	340	A 344	336	326	304	276	236	164					

MAY 1996 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 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	J A 66	28	J A 23	J A 20	J A 22	J A 20	J A 30	J A 41	J A 48	J A 48	58	J A 48	J A 46	44	41	44	J A 44	53	J A 24	J A 29	J A 23	J A 49	J A 54	J A 50
2	J A J A 49	56	31	J A 44	J A 23	23	28	J A 42	38	J A 47	J A 56	J A 126	J A 103	J A 56	J A 103	109	J A 102	J A 99	86	J A 54	34	J A 78	J A 46	J A 51
3	J A J A 51	J A 41	J A 44	J A 24	J A 27	J A 44	29	39	J A 37	40	58	J A 49	J A 42	42	38	58	54	34	52	31	J A E B 47	13	29	26
4	20	22	19	E B 14	25	E B 15	28	32	J A J A 51	44	40	36	37	38	44	34	J A 40	J A 31	20	J A 20	39	J A 44	J A J A 46	43
5	J A E B 28	15	E B 12	E B 14	E B 14	21	27	J A 42	39	39	38	37	G	G	41	J A 43	J A 49	86	86	J A 137	J A J A 51	54	24	28
6	28	J A 33	J A 32	J A 34	20	21	J A 39	J A 66	J A J A 78	62	J A 52	57	J A 51	J A 61	J A 50	J A 41	J A 42	J A 54	42	50	J A 69	J A 49	J A J A 65	52
7	J A 54	J A 42	J A 43	J A 32	J A 54	J A 53	J A 38	J A 53	J A 54	J A 49	J A 49	J A 54	J A 81	J A 103	93	J A 124	J A 60	J A 64	J A 65	J A 48	20	E B 14	J A J A 22	20
8	22	J A 53	J A 26	J A 24	J A 19	25	27	J G 28	39	36	38	36	40	40	44	J A 41	J A 51	J A 37	J A 35	35	27	E B E B 16	J A 14	29
9	J A 20	23	J A 22	J A J A 21	24	J A 19	27	J A 42	J A 44	38	38	40	38	40	42	J A 48	36	34	J A 48	J A J A 39	52	57	J A 44	J A 32
10	J A 40	J A 44	J A 46	J A 25	J A 23	J A 26	J A 41	J A 69	J A J A 86	55	110	88	87	J A 81	J A 52	36	40	J A 55	81	J A 62	J A J A 61	56	82	J A 107
11	J A 47	J A 54	J A 44	J A 26	E B 14	J A 32	J A 34	J A 65	J A J A 58	67	J A 70	J A 48	47	J A 54	43	J A 46	J A 55	J A 29	J A 24	J A 25	J A J A 27	J A 34	J A J A 22	J A 52
12	J A 77	J A 56	J A 68	J A 56	J A J A 41	J A 45	J A 38	J A 52	J A J A 64	62	J A 50	J A 68	J A 47	41	J A 46	37	36	J A 36	50	J A 50	J A J A 56	83	58	J A 37
13	J A 20	J A J A 28	28	26	E B 14	22	30	J A 45	J A J A 49	61	J A 81	77	J A 53	38	J A 42	37	J A 62	104	60	J A 55	J A J A 50	64	J A J A 58	62
14	J A 43	J A 42	J A J A 48	40	23	J A 30	J A 38	J A 44	J A 48	36	J A 44	J A 60	J A 42	40	40	J A 50	J A 69	57	J A 58	35	J A 24	25	J A 78	J A J A 56
15	J A 52	J A 38	J A J A 22	19	E B 14	20	J A 46	J A 44	J A J A 46	67	J A 52	49	38	J A 57	38	G	G	34	48	52	J A J A 63	79	30	J A 35
16	27	22	J A 21	E B 12	E B 13	24	34	J A 47	83	J A 65	J A J A 60	50	38	J A 53	G	36	J A 50	J A 50	59	J A 31	48	J A 25	57	J A 42
17	J A 48	J A 22	J A 35	J A 25	J A J A 20	24	26	J A 40	J A 54	J A 81	J A 114	J A 89	J A 54	J A 56	40	J A 66	84	187	134	J A 87	J A J A 118	J A 126	J A J A 80	86
18	76	J A 88	J A 85	J A 47	J A J A 34	J A 59	J A 73	J A 88	J A 110	156	134	J A 55	J A 92	J A J A 61	J A 50	J A 58	J A 145	D D 250	J A 199	J A J A 100	J A J A 131	J A 110	J A J A 47	33
19	J A J A 74	J A 44	J A 54	J A J A 49	J A J A 37	J A 30	J A J A 44	J A 42	J A J A 56	J A 67	J A J A 82	J A 89	J A J A 63	J A 50	J A J A 60	J A 67	J A J A 52	J A 39	J A 49	33	J A 89	J A 87	J A J A 53	J A 89
20	J A 47	J A 44	J A 46	J A J A 36	J A 30	J A 37	J A 42	J A 45	J A 49	J A 71	J A 49	J A 46	49	J A 65	38	37	J A 31	32	J A 50	J A 34	24	J A 27	J A 30	26
21	E B E B 14	14	22	26	J A 23	49	J A 51	J A 76	68	J A 47	J A J A 55	45	J A 47	40	G 29	J A 38	31	J A 44	J A 57	J A 77	J A J A 44	30	J A 24	24
22	J A 26	18	E B 13	J A 42	J A 49	J A 34	53	J A 100	J A 57	70	J A 167	J A 164	J A J A 66	J A 55	J A 59	J A 59	J A 75	99	90	J A 170	J A J A 52	J A J A 67	J A 42	32
23	J A J A 33	J A 48	J A 48	J A 43	J A J A 30	J A 55	J A 40	J A 46	J A 51	J A 71	J A 68	J A 52	J A J A 58	J A 54	55	J A 49	J A 46	48	J A 24	31	J A 25	38	J A 29	J A 50
24	J A 50	32	J A 27	J A J A 26	J A J A 25	J A 24	34	J A 54	J A 65	J A 63	J A 49	J A 53	J A 63	J A 48	J A 68	J A 61	34	J A 42	J A 34	J A 33	J A J A 50	J A 47	J A J A 39	J A 30
25	32	24	24	E B 16	21	22	J A 46	J A 54	J A 43	40	C	C	C	J A 64	56	92	J A 86	J A 104	84	J A 81	J A J A 64	J A 50	J A J A 63	J A 44
26	J A J A 25	J A 18	J A E B 27	15	J A J A 24	J A 24	J A 38	76	J A 40	36	G 28	35	49	40	G 31	36	J A 40	35	30	J A J A 22	25	J A J A 51	48	30
27	J A 38	33	J A 27	J A J A 25	J A 30	20	29	J A 37	J A 53	J A 62	64	G 31	40	G 34	38	J A 60	60	J A 80	J A J A 32	J A J A 22	J A 80	J A J A 52	J A 66	J A 32
28	J A 27	J A J A 44	J A 47	J A 46	J A J A 26	J A 56	79	J A 41	182	J A 64	J A 80	38	J A 86	116	37	J A 47	J A 80	57	J A 54	J A J A 176	J A 80	J A 76	27	J A 31
29	J A J A 32	J A 40	J A 28	J A J A 46	J A J A 34	J A 30	J A 42	J A 50	J A 67	J A 49	J A 67	38	J A 42	40	42	J A 46	J A 40	30	29	22	24	25	E B E B 16	14
30	18	E B 14	J A J A 52	J A 52	J A J A 34	J A 28	J A 44	G	40	J A 50	J A 45	J A 54	J A 50	64	J A 50	J A J A 73	J A J A 117	J A 77	J A 49	27	J A 31	31	32	J A 38
31	J A J A 54	J A 30	J A J A 45	J A 31	J A 30	24	J A 37	70	J A 47	J A 90	69	J A 54	J A J A 54	J A 62	J A 49	J A 44	J A J A 80	J A 149	89	J A 125	J A J A 118	J A 55	J A J A 33	J A 33
	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	30	30	30	31	31	31	31	31	31	31	31	31	31	31
MED	J A 38	J A 33	J A 31	J A 26	J A J A 24	J A 25	J A 38	J A 45	J A 51	J A 61	J A 57	J A 51	J A 49	J A 53	43	J A 46	J A J A 51	J A 53	50	J A 39	J A J A 50	J A 50	J A J A 44	J A 35
U Q	J A 51	J A 44	J A 46	J A 43	J A J A 30	J A 37	J A J A 44	J A 65	J A 65	J A 67	J A 70	J A 60	J A J A 63	J A 61	J A 52	J A 60	J A 75	86	81	J A 77	J A J A 64	J A 67	J A J A 58	J A 51
L Q	26	22	23	E B 21	E B 20	22	29	J A 41	44	44	49	40	42	40	38	37	40	35	J A J A 34	31	27	30	29	30

MAY 1996 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 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	A A 66	20	E B 13	E B 13	17	E B 15	26	34	44	44	51	45	44	43	U Y 40	43	40	47	18	E B 16	16	21	17	17
2	20	20	17	18	17	18	26	39	35	A A 47	A A 56	A A 126	U A 45	A A 56	A A 103	63	37	35	30	44	26	E B 13	E B 13	E B 15
3	18	22	20	16	18	19	28	36	35	38	50	36	39	41	36	34	44	G 22	43	22	27	E B 13	20	17
4	19	E B 15	E B 15	E B 14	17	E B 15	26	30	44	44	U Y 40	36	37	U Y 37	43	34	36	28	19	E B 15	18	23	23	30
5	20	E B 15	E B 12	E B 14	E B 14	19	26	39	36	36	37	36	G	G	39	37	45	A A 86	61	A A 137	28	36	17	20
6	19	29	16	20	E B 14	18	34	A A 66	A A 78	A A 62	48	A A 57	46	46	44	36	40	37	24	39	26	32	30	19
7	26	27	25	16	20	G	34	A A 53	A A 54	43	45	50	A A 81	75	76	44	48	35	48	30	E B 15	E B 14	17	E B 14
8	E B 15	A A 53	17	18	E B 14	17	26	G 21	36	35	36	35	39	U Y 40	43	39	35	32	24	34	18	E B 16	E B 14	22
9	17	E B 15	17	16	E B 15	G	26	36	42	37	35	38	38	39	42	43	34	30	29	36	48	A A 57	34	22
10	27	32	22	19	E B 14	20	38	A A 69	A A 86	50	A A 110	A A 88	A A 87	A A 81	46	34	40	53	A A 81	45	44	47	A A 82	20
11	17	18	A A 44	20	E B 14	23	30	63	55	A A 67	43	47	46	50	43	42	51	26	20	24	21	18	17	21
12	26	A A 56	A A 68	A A 56	E B 15	E B 15	34	49	62	54	42	U A 53	46	40	46	35	35	34	43	41	50	A A 83	A A 58	29
13	16	E B 16	E B 14	17	E B 14	18	28	40	44	A A 61	A A 81	47	46	38	38	36	49	A A 104	A A 60	32	44	22	18	A A 62
14	A A 43	A A 42	27	22	E B 16	24	35	42	42	34	41	A A 60	40	U Y 40	38	49	A A 69	51	49	31	19	18	24	A A 56
15	A A 52	24	17	16	E B 14	18	43	41	42	A A 67	43	45	38	49	36	G	G	32	42	40	44	A A 79	18	24
16	20	16	E B 14	E B E B 12	E B 13	22	24	41	65	48	47	46	38	48	G	36	47	38	23	25	44	19	A A 57	A A 42
17	A A 48	16	23	17	E B 14	19	26	G 22	52	A A 81	A A A 114	A A 89	48	47	U Y 40	A A 66	A A 84	45	50	62	66	21	A A 80	A A 86
18	A A A 76	A A 88	A A 85	25	16	A A 59	A A 73	A A 88	A A 110	A A 156	A A 134	48	A A 92	A A 61	A A 50	A A 58	A A 145	A A 250	A A 199	41	38	A A 110	22	18
19	A A 74	A A 44	E B 15	22	16	18	38	40	A A 56	A A 67	A A 82	A A 89	36	46	A A 60	A A 67	39	35	22	18	A A 89	A A 87	41	A A 89
20	34	26	A A 46	20	18	18	33	40	45	A A 71	46	40	44	A A 65	35	32	G 26	30	44	19	E B 14	24	25	17
21	E B 14	E B 14	16	16	17	41	A A 51	A A 76	A A 68	41	48	43	44	40	U G 29	34	30	36	53	26	19	E B 15	18	17
22	E B 14	E B 14	E B 13	E B 14	23	E B 15	A A 53	A A 100	A A 57	A A 70	A A 167	A A 164	A A 66	50	56	57	70	A A 99	A A 90	A A 170	34	A A 67	20	18
23	25	A A 48	A A 48	A A 43	23	A A 55	36	42	49	A A 71	A A 68	A A 52	A A 58	52	51	48	42	36	20	19	18	28	18	27
24	20	20	18	18	20	21	31	51	A A 65	A A 63	A A 49	A A 53	49	44	60	43	32	32	26	26	44	28	22	21
25	20	E B 16	E B 14	E B 16	E B 13	20	43	46	37	38	C	C	C	47	48	A A 92	45	A A 104	A A 84	A A 81	39	21	33	20
26	E B 14	E B 14	17	E B 15	E B 13	20	34	A A 76	32	36	U G 28	U Y 35	A A 49	U Y 39	U G 31	32	33	28	21	19	20	A A 51	17	20
27	17	21	21	E B 15	16	18	26	31	43	A A 62	54	U Y 30	U Y 40	G 30	37	A A 60	51	A A 80	25	E B 15	22	34	36	22
28	18	17	19	21	20	A A 56	A A 79	32	54	A A 64	A A 80	37	A A 86	A A 116	36	44	77	50	49	32	41	22	17	E B 14
29	20	27	20	21	22	23	A A 42	A A 50	A A 67	43	A A 67	U Y 37	40	38	U Y 41	42	38	25	21	E B 16	E B 14	17	E B 16	E B 14
30	E B 13	E B 14	20	23	18	19	34	G	34	A A 50	38	A A 54	A A 50	A U 46	47	A A 73	A A 117	56	32	18	17	E B 14	22	23
31	A A 54	25	22	24	25	20	G A 20	A A 70	40	A A A 90	A A 69	40	53	47	36	42	A A 80	47	38	38	A A 118	26	25	18
	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	30	30	30	31	31	31	31	31	31	31	31	31	31	31
MED	20	20	18	18	16	19	34	41	45	A A 50	48	46	46	46	42	42	42	36	38	31	27	23	22	20
U Q	A A 34	A A 29	A A 23	21	18	22	A A 38	A A 63	A A 62	A A 67	A A 69	A A 54	A A 50	A A 50	48	A A 57	A A 51	A A 53	A A 50	41	44	A A 47	33	A A 27
L Q	E B 17	E B 16	E B 15	E B 16	E B 14	18	26	36	40	41	42	37	39	40	36	35	35	32	23	19	18	E B 18	17	17

MAY 1996 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

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

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MAY 1996 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	F 328	313	328	311	330	369	380	A 336	354	330	322	300	300	304	293	302	329	344	354	323	318	F 311	F 308
2	F 284	F 309	F 291	293	F 326	F 348	381	391	335		A	A	A	A	A	305	329	329	310	319	326	F 305	F 290	F 301
3	F 310	308	F 340	F 328	319	332	358	345	354	349	322	302	326	312	296	295	317	328	338	334	322	301	296	306
4	310	318	307	331	332	382	R 376	355	353	295	312	316	299	319	316	308	310	301	318	339	347	315	313	F 295
5	298	326	F 329	F 322	F 338	346	363	343	V 358	312	308	301	307	299	315	316	304	A	314	A	334	351	R 293	309
6	306	F 310	F 310	F 300	F 303	340	354	A	A	A	A 292	A	301	297	297	307	319	320	332	333	289	F 289	F 283	F 312
7	F 310	F 281	F 305	F 328	305	362	370	A	A	317	290	320	A	A 301	A 306	316	314	319	313	342	341	310	295	300
8	307	A	F 311	F 339	327	352	335	355	339	341	R 315	313	270	291	298	313	324	342	326	331	313	307	305	306
9	310	311	296	309	312	313	341	330	364	329	338	308	300	304	305	317	310	309	315	335	348	A	298	F 296
10	F 299	F 312	F 302	F 296	F 305	355	359	A	A	317	A	A	A	A	314	290	303	320	A	313	341	356	A	F 322
11	F 322	F 293	A	F 304	F 305	325	303	317	351	A	284	297	305	325	300	305	R 301	319	343	S 360	332	F 285	F 297	F 299
12	F 299	A	A	A	F 323	F 333	305	319	340	333	347	A	319	300	303	315	316	318	306	314	339	A	A	F 283
13	F 307	F 312	F 308	F 286	F 303	334	346	373	303	A	A	276	296	R 291	310	345	344	A	A	307	Z 347	F 292	F 331	A
14	A	A	318	F 309	F 277	Z 324	348	361	326	285	U R 279	A	254	305	295	299	A	318	321	333	328	331	296	A
15	A	F 294	F 308	F 309	F 310	342	316	333	337	A	302	312	300	297	305	312	312	310	297	J R 323	332	A	F 329	F 302
16	F 298	F 297	F 300	F 361	F 336	355	338	306	361	366	334	269	307	R 307	284	302	307	310	332	349	364	302	A	A
17	A	F 322	F 304	F 306	F 311	324	J R 389	370	A 307	A	A	A	316	295	299	A	A	294	310	327	V 357	303	A	A
18	A	A	A	F 301	F 304	A	A	A	A	A	A	312	A	A	A	A	A	A	A	324	331	A	F 285	F 291
19	A	A	F 288	F 303	F 342	336	335	356	A	A	A	A	338	287	A	A	311	330	326	324	A	A	F 307	A
20	297	F 301	A	F 309	F 322	323	355	380	346	A	A 317	278	299	A	318	332	325	315	296	311	314	R 339	312	318
21	302	305	313	F 300	F 323	352	A	A	A	305	308	332	299	321	291	320	306	336	332	327	315	302	308	309
22	319	F 324	F 344	F 303	F 324	R 359	A	A	A	A	A	A	A	292	299	309	A 318	A	A	A	329	A	F 300	312
23	313	A	A	A	F 315	A	346	354	A 337	A	A	A	A	A 292	280	298	311	311	325	324	333	311	311	318
24	F 322	F 334	F 316	F 295	F 316	F 329	F 313	A 300	A	A	A	A	U R 310	300	J R 312	320	323	317	337	330	319	333	304	312
25	325	F 308	F 319	F 307	F 321	333	342	333	356	348	C	C	C	301	324	A	306	A	A	A	309	318	293	F 306
26	F 323	F 326	F 344	F 324	F 318	346	330	A	307	353	336	G	A	283	287	311	314	348	352	346	316	A	329	F 293
27	313	F 316	F 305	F 307	F 341	R 328	328	313	311	A	348	G	Y	G	299	A	332	A	329	347	362	F 320	313	F 296
28	F 315	F 319	F 315	303	F 303	A	A	307	343	A	A	273	A	A	293	316	A 334	338	338	303	A 292	307	299	F 305
29	F 324	F 330	F 325	F 322	365	368	A	A	A	312	A	Y	G	J R 280	R 277	295	318	332	341	345	327	297	U R 317	312
30	309	F 316	348	F 349	F 303	327	321	358	348	A	319	A	A	A	A 296	A	A	338	331	307	302	R 320	331	F 293
31	A	F 315	F 278	F 303	F 332	349	333	A	337	A	A	324	291	R 306	313	312	A	301	304	303	A	349	321	F 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	24	25	26	29	31	28	26	22	22	15	18	18	20	25	28	25	26	25	26	28	29	24	27	26
MED	310	F 312	F 310	F 307	F 318	338	344	350	340	329	316	305	300	300	300	311	314	319	326	328	329	310	305	F 306
U Q	F 317	F 323	F 319	F 326	F 327	352	359	361	353	349	334	316	308	306	311	316	323	331	337	340	341	326	313	312
L Q	F 300	F 306	F 304	F 302	F 305	328	330	319	335	312	302	276	298	292	296	300	307	310	313	316	316	302	296	F 296

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MAY 1996 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							L	A 395	A	A	A	A	A	A	A	A	A	A	U L 364					
2								A	L	A	A	A	A	A	A	A	A	A						
3								A	L 375	373	A	378	394	A	361	356	A	L 354	A					
4							L	U L 394	A	A	Y	390	R 391	Y	A	372	A 341	L 339	U L 357					
5							L	A	386	385	385	378	390	386	A 356	A 360	A	A						
6							A	A	A	A	A	A	A	A	A	364	A	A						
7							A	A	A	A	A	A	A	A	A	A	A	A	A					
8								L	L	409	387	389	R 369	Y	A	A 356	356	A 358						
9							U L 363	A 376	A	L 382	L 380	385	380	369	A	A	375	L 349	L					
10							A	A	A	A	A	A	A	A	A	369	A	A	A					
11							U L 364	A	A	A	A 341	A	A	A	A	A	A	353	L					
12							L	A	A	A	A	A	A	397	A	358	361	A	A					
13							L	A	A 342	A	A	A	A	374	386	353	A	A	A					
14							A	A	A	377	U R 405	A	407	Y	365	A	A	A	A					
15							A	A	A	A	A	A	384	A	379	397	356	L 369	A					
16								A	A	A	A	A	376	A	371	357	A	A	L					
17							L 379	A 398	A	A	A	A	A	A	Y 340	A	A	A	A					
18							A	A	A	A	A	A	A	A	A	A	A	A	A					
19								A	A	A	A	A	H 397	A	A	A	A	A	L					
20							L	A	A	A	A	376	A	A	374	360	361	L 342	A					
21							A	A	A	A	A	A	A	A	370	372	371	A 385	A					
22								A	A	A	A	A	A	A	A	A	A	A	A					
23							A	A	A	A	A	A	A	A	A	A	A	A	L					
24							U L 369	A	A	A	A	A	A	A	A	A	356	A	A					
25								A	A 369	384	C	C	C	A	A	A	A	A	A					
26								A	A 393	408	407	398	A	A	372	366	372	372	L 385					
27								360	A	A	A	413	Y	416	377	A	A	A	L 360					
28							A	A 368	A	A	A	388	A	A	391	A	A	A	A					
29								A	A	A	A	Y	R 369	404	A	A	A	368	367					
30								A 373	384	A	397	A	A	A	A	A	A	A	L					
31							U L 378	A	A	A	A	418	A	A	380	A	A	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							5	7	6	7	7	10	10	6	13	13	9	10	5					
MED							U L 369	376	380	384	387	388	387	392	372	360	361	356	L 364					
U Q							L 378	A 395	386	408	405	398	394	404	380	370	372	369	376					
L Q							U L 364	368	A 369	377	380	378	R 376	374	363	356	356	L 349	L 358					

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MAY 1996 h'F2 (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							232	234	A	278	A 330	326	368	342	312	324	302	266	238					
2								218	L 298	A	A	A	A	A	A	E A 354	270	260						
3								274	272	280	A 314	368	304	324	362	354	298	264	248					
4							244	264	264	406	360	320	374	308	312	310	310	314	276					
5							228	270	262	356	356	370	342	368	308	300	326	A						
6							244	A	A	A	A	A	372	368	334	300	278	268						
7							A 232	A	A	340	400	322	A	A	A	284	280	278	A 268					
8								252	L 268	298	360	356	462	368	322	294	274	250						
9							272	262	262	294	322	352	376	348	322	290	296	282	268					
10							244	A	A	A 324	A	A	A	A	334	370	316	A 292	A					
11							308	E A 322	248	A	422	E A 342	366	318	362	334	310	278	234					
12							L 326	A 310	A 276	A 280	294	A	344	378	352	308	294	274	E A 298					
13							238	242	L 384	A	A	414	354	356	310	264	280	A	A					
14							254	252	326	440	Y	A	512	354	374	A 340	A	292	A 300					
15							E A 318	282	268	A	372	348	366	366	326	304	292	298	A					
16								350	A	256	E A 326	464	362	E A 390	380	320	296	286	266					
17							246	240	A	A	A	A	336	A 374	A 364	A	A	A 304	282					
18						A	A	A	A	A	A	A 354	A	A	A	A	A	A	A					
19							280	256	A	A	A	A	318	428	A	A	304	272	258					
20						264	244	228	A 290	A	A	444	386	A	302	282	296	312	A					
21						A	A	A	A	380	350	298	372	314	388	306	330	282	A					
22							A	A	A	A	A	A	A	E A 390	E A 372	A 310	A	A	A					
23						A	286	A 294	A	A	A	A	A	E A 406	A 392	316	298	280	250					
24							298	A	A	A	A	A	A 368	364	A	288	282	286	248					
25							A 268	A 290	262	296	C	C	C	364	294	A	A	A	A					
26							A 256	A	328	258	312	G	A	434	388	310	294	258	232					
27								324	338	A	A 272	G	Y	G	394	A	E A 312	A	276					
28						A	A	318	A 296	A	A	452	A	A	362	292	A	268	A					
29							A	A	A	A	A	Y	G	550	Y	370	306	270	260					
30							322	250	276	A	372	A	A	A	A	A	A	E A 308	270					
31							290	A	290	A	A	350	A	A 386	354	356	A	E A 356	E A 310					
	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	21	21	18	14	15	18	19	24	24	25	23	25	18					
MED						264	255	263	276	297	350	355	368	366	348	309	296	279	263					
U Q							294	302	298	356	372	444	376	390	373	337	310	A 295	A 276					
L Q							244	246	264	280	314	342	344	351	317	293	282	268	248					

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MAY 1996 h'F (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A 270	282	268	270	242	232	A 230	A	A	A	A	A	A	A	A	A	A	230	212	206	272	264	272	
2	A 344	334	326	A 334	286	218	224	A	208	A	A	A	A	A	A	A	A	256	E A 308	244	248	288	294	
3	290	A 274	264	246	A 276	244	232	A	A 234	230	A	A 230	216	A	242	220	A	E A 260	A	230	246	248	272	272
4	278	278	278	254	234	204	218	214	A	A	Y	196	190	Y	A	218	A	A 236	250	226	226	264	268	E A 310
5	280	254	244	260	244	238	224	A	A 232	206	212	222	204	186	E A 266	E A 264	A	A	A	A	244	234	236	272
6	284	A 336	282	308	276	240	A	A	A	A	A	A	A	A	A	A 248	A	A	A 246	254	272	A 326	A 330	270
7	286	A	A 304	262	A 316	236	A	A	A	A	A	A	A	A	A	A	A	A	A	230	214	234	278	288
8	280	A	260	238	246	234	226	222	210	190	198	H 190	244	Y	A	A	A 248	A 240	242	A 234	240	252	250	282
9	266	282	288	274	272	236	240	A 250	A	A 224	194	202	224	240	A	A	228	E A 272	A 258	A 236	A 238	A	A 318	300
10	E A 320	A 342	A 334	294	270	228	A	A	A	A	A	A	A	A	A	A 216	A	A	A	A 272	A 254	A 252	A	256
11	244	276	A	A 330	264	288	A 246	A	A	A	A	A	A	A	A	A	A	238	222	222	244	324	326	312
12	A 348	A	A	A	268	244	A	A	A	A	A	A	A	212	A	A 236	A 234	A	A	274	236	A	A	E A 358
13	274	288	280	278	268	228	222	A	A	A	A	A	A	222	216	A 258	A	A	A	A 274	230	A 286	264	A
14	A	A	A 332	E A 362	322	264	A	A	A	208	224	A	212	Y	A 244	A	A	A	A	240	232	216	336	A
15	A	A 334	268	264	278	250	A	A	A	A	A	A	220	A	226	198	H 192	A 248	A	A 256	A 260	A	236	302
16	296	290	288	216	244	224	248	A	A	A	A	A	208	A	Y 234	246	A	A	256	220	220	A 256	A	A
17	A	A 270	A 320	260	260	230	228	A 232	A	A	A	A	A	A	Y	A	A	A	A	E A 274	A 252	270	A	A
18	A	A	A	A 314	298	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A 260	A 288	A	320	312
19	A	A	318	A 346	278	256	A	A	A	A	A	A	H 192	A	A	A	A	A	254	252	A	A	E A 338	A
20	E A 336	A 306	A	270	282	236	A	A	A	A	A	A 238	A	A	212	222	232	A 256	A	260	244	240	278	238
21	270	306	286	288	282	A	A	A	A	A	A	A	A	A	220	232	226	E A 256	A	A 256	254	282	264	258
22	252	230	228	306	E A 296	232	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A 290	A	306	284
23	A 294	A	A	A	E A 362	A	A	A	A	A	A	A	A	A	A	A	A	A	230	240	226	A 266	264	272
24	258	282	246	266	260	228	A 266	A	A	A	A	A	A	A	A	A	228	A	A	256	A	A 242	A 294	276
25	272	270	266	264	266	240	A	A	E A 260	A 242	C	C	C	A	A	A	A	A	A	A	A 304	240	A	314
26	258	262	250	246	256	238	A	A	208	188	206	206	A	A	228	244	A 240	222	220	230	242	A	260	304
27	256	A 296	A 312	290	262	238	224	238	A	A	A	198	Y	204	236	A	A	A	244	214	238	314	A 328	320
28	258	286	292	A 326	A 320	A	A	244	A	A	A	226	A	A	212	A	A	A	A	A 272	A	290	278	272
29	270	276	244	256	230	234	A	A	A	A	A	Y	E A 282	218	A	A	A	222	212	214	220	286	298	276
30	278	250	270	A 286	308	252	A	H 224	232	A	224	A	A	A	A	A	A	A	A	264	258	236	246	A 274
31	A	A 316	A E A 320 334		A 292	214	238	A	A	A	A	202	A	A	236	A	A	A	A	E A 284	A	238	A 270	240
	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	26	29	31	27	14	8	7	7	6	10	10	6	12	12	8	10	13	28	27	24	26	26
MED	276	282	282	271	271	236	230	231	U 221	208	209	204	212	215	229	230	230	A 236	244	246	244	254	276	277
U Q	A 292	A 306	A 312	A 311	A 292	244	240	241	A 234	230	224	A 226	224	222	239	A 247	A E A 237 256		255	A 268	A 254	A 284	A 318	304
L Q	262	270	264	260	260	228	224	223	208	190	198	198	204	204	218	219	227	236	226	230	230	240	264	272

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

IONOSPHERIC DATA STATION Kokubunji

MAY 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	A 134	116	118	112	108	108	114	A	A	A	A 132	A	A					
2						B	134	A 132	112	114	114	116	120	116	114	116	118	120	A					
3						B	E A 146	118	114	112	114	A	A	114	112	A	A	A 128	A					
4						B	A 140	E A 140	112	114	110	114	114	112	114	114	116	118	A					
5						E B 150	124	114	110	114	116	110	116	112	112	112	114	114	A					
6						A	120	116	116	114	112	112	112	110	A	A	A	A 122	A					
7						120	132	A 124	112	114	114	114	112	116	A	116	A	A	A					
8						A	126	A	A 132	A	114	A	112	116	114	112	112	114	A					
9						126	122	110	110	110	110	108	110	112	112	112	116	116	122					
10						A	122	112	112	110	112	110	110	108	116	112	114	120	124					
11						A	116	110	110	110	110	110	110	A 132	114	114	114	A	A					
12						A	116	110	110	110	110	112	110	112	A	A	A 126	A 128	106					
13						A	120	A 126	114	108	108	112	112	A	110	112	110	116	122					
14						A	118	112	110	108	108	108	106	A	108	112	114	118	A					
15						126	124	114	110	110	110	112	112	A	120	120	118	120	A					
16						A	A	A	106	110	A	A	A	112	112	A 124	116	118	122					
17						A	118	A 118	108	108	108	A	106	A	A 134	118	116	114	B					
18						A	118	114	114	108	110	110	A	A	A	118	118	118	A					
19						A	116	110	110	110	114	114	A	A	116	110	A	A	A					
20						A	118	114	112	112	112	110	110	A	A	A	A	A 128	A					
21						134	116	116	116	110	110	110	110	112	A	A	A 118	116	A 128					
22						A	120	114	106	110	110	118	114	114	112	112	112	114	A					
23						A	A 132	112	A 130	110	112	110	112	114	112	116	A	114	A					
24						A	122	110	110	110	110	110	110	110	A	A	A 130	A	A					
25						A	116	A	112	108	C	C	C	110	110	110	A	A	A					
26						A	116	112	110	A	A	A	A	A	A	A	A	A	A					
27						132	124	A	110	106	106	A	130	A 124	116	114	110	112	A					
28						A	112	A	A	110	110	A 124	A	A	114	112	116	118	A					
29						A	122	114	120	112	110	114	110	110	116	110	108	A	A					
30						A	A	112	110	108	112	112	A	112	114	114	112	112	B					
31						124	120	110	110	110	108	106	112	112	112	112	110	114	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						7	29	26	30	29	28	24	23	21	22	23	23	23	6					
MED						126	120	114	111	110	110	111	112	112	114	112	116	118	122					
U Q						134	125	A 116	114	112	112	114	114	115	116	116	A 118	A 120	124					
L Q						124	117	112	110	109	110	110	110	111	112	112	112	114	122					

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

IONOSPHERIC DATA STATION Kokubunji

MAY 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	102	106	112	104	100	142	126	118	116	110	114	110	186	164	134	122	112	108	104	120	114	114	114
2	110	104	106	106	106	100	146	130	130	124	118	116	112	130	124	120	136	124	116	112	114	120	118	120
3	122	110	108	110	112	114	140	134	128	112	108	110	110	128	164	104	100	102	114	114	116	B	112	108
4	112	128	114	B	108	B	150	140	116	116	120	122	124	126	120	128	116	114	120	124	112	116	112	112
5	112	B	B	B	B	138	134	120	118	126	122	122	G	G	120	120	116	110	110	118	110	108	108	112
6	108	106	102	102	126	142	126	120	116	114	114	108	112	110	108	108	104	112	104	106	120	112	114	108
7	108	108	104	102	104	108	126	122	118	120	120	112	108	106	104	126	102	100	102	100	118	B	114	110
8	114	110	106	104	108	108	158	110	124	110	112	108	194	122	120	116	114	112	106	108	108	B	B	106
9	108	110	108	114	106	110	128	116	112	116	124	116	116	146	144	128	140	130	114	110	118	112	112	110
10	108	108	102	104	110	138	124	114	112	116	108	106	110	108	120	126	150	120	114	114	116	112	114	108
11	124	114	102	104	B	126	124	114	112	106	114	114	116	130	126	112	108	116	112	110	128	132	124	110
12	118	106	102	102	106	106	122	114	112	112	114	108	108	114	110	138	128	122	110	110	112	110	112	106
13	130	120	124	100	B	134	126	110	114	114	112	114	112	116	118	152	126	118	116	112	112	108	116	112
14	100	98	130	132	134	120	120	116	114	118	110	108	104	166	158	128	124	120	112	112	112	112	118	102
15	102	98	96	100	B	138	122	120	116	110	110	114	116	110	132	G	G	126	116	116	118	114	106	106
16	108	110	104	B	B	134	118	118	110	110	110	114	118	114	G	154	128	104	114	112	110	116	108	108
17	106	104	100	102	106	100	152	114	110	110	104	102	104	106	174	130	122	116	108	110	124	112	108	106
18	104	100	118	126	128	116	114	114	112	108	112	108	112	108	172	146	126	118	114	142	114	114	112	112
19	110	106	112	110	104	134	122	122	116	114	114	110	108	110	110	110	110	108	108	110	110	112	108	106
20	106	104	100	102	102	98	126	120	118	110	114	112	108	104	104	100	108	124	114	116	102	98	110	114
21	B	B	112	106	106	126	120	114	116	116	114	116	108	110	110	100	170	120	116	110	110	114	108	110
22	112	130	B	102	104	112	124	114	114	112	108	112	116	116	114	116	112	108	106	104	110	110	114	114
23	100	100	100	98	102	128	128	128	122	114	114	114	108	112	110	110	110	112	110	106	106	120	112	108
24	116	108	104	104	104	142	130	120	114	114	112	108	108	108	100	102	132	110	100	112	118	122	110	104
25	104	106	106	B	106	138	120	114	116	120	C	C	C	108	106	106	104	102	102	100	102	116	112	110
26	110	120	114	B	126	146	126	112	122	116	108	114	110	136	108	108	104	118	130	122	116	110	108	112
27	106	108	108	106	106	138	136	122	112	106	104	106	188	116	136	116	114	108	120	114	106	108	108	106
28	106	112	112	114	96	110	110	108	112	110	108	154	110	106	146	130	116	116	118	112	112	118	114	102
29	100	98	98	108	100	106	130	126	118	124	116	126	120	118	116	112	112	110	106	104	104	102	B	B
30	102	B	106	108	112	108	106	G	120	108	116	110	110	110	120	114	114	110	108	108	108	106	106	104
31	104	100	98	98	100	118	118	110	112	108	108	104	106	106	110	112	114	110	108	114	102	102	102	100
	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	28	29	26	26	30	31	30	31	31	30	30	29	30	30	30	30	31	31	31	31	28	29	30
MED	108	107	106	104	106	119	126	117	116	114	112	112	110	113	120	116	115	112	112	112	112	112	112	108
U Q	112	110	112	110	110	138	134	122	118	116	114	114	116	126	136	128	126	120	116	114	118	116	114	112
L Q	104	103	102	102	104	108	120	114	112	110	108	108	108	108	110	110	110	110	108	108	108	109	108	106

IONOSPHERIC DATA STATION Kokubunji

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

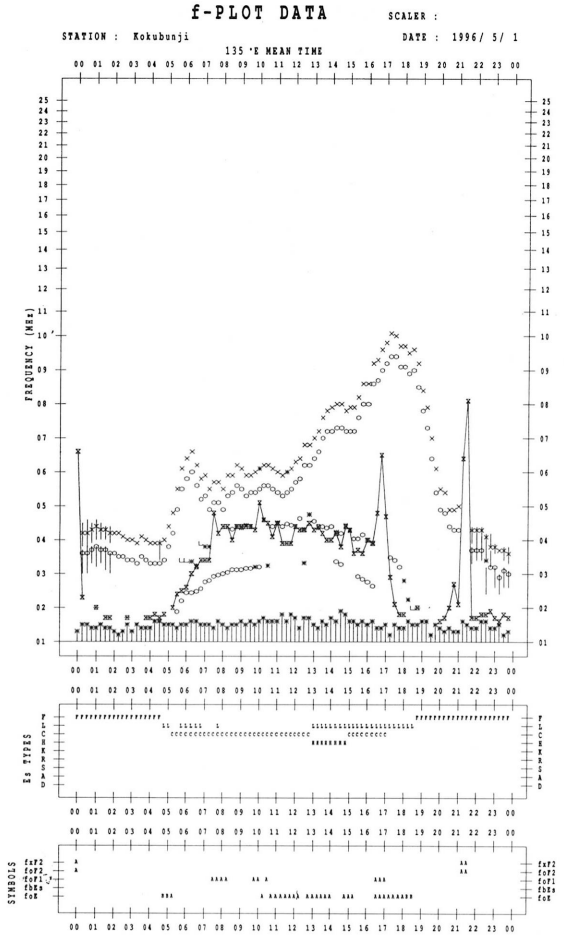
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

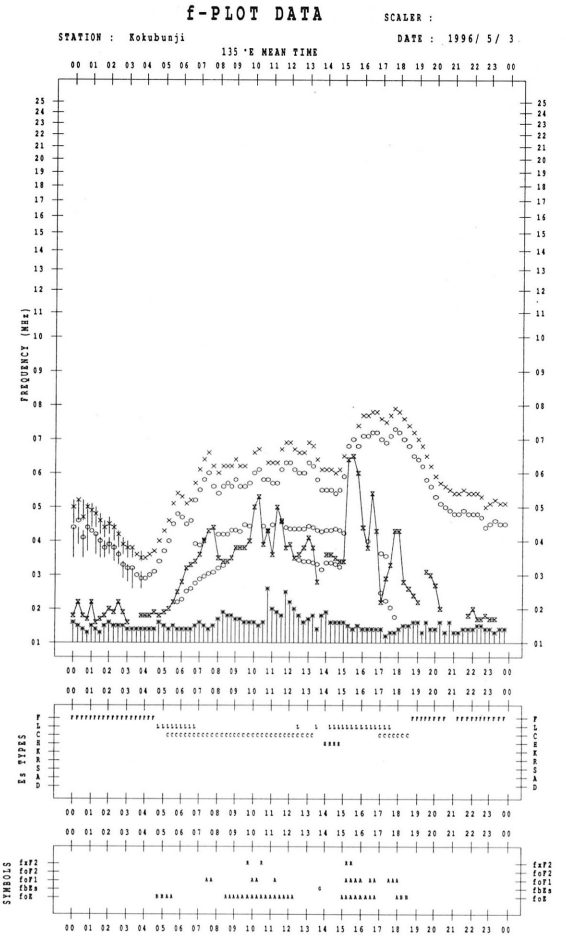
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 6	F 2	F 2	FF 21	F 2	L 2	CL 21	C 2	C 2	C 2	C 2	C 2	C 1	HL 11	HL 11	CL 12	CL 22	CL 32	L 2	F 1	F 1	F 5	F 2	F 2
2	F 4	F 3	F 2	F 3	F 1	L 1	CL 21	CL 22	C 2	C 2	C 2	C 3	CL 21	C 1	C 3	C 3	C 2	CC 23	C 6	F 5	F 4	FF 21	F 3	FF 23
3	FF 13	F 4	F 4	F 3	F 3	L 2	CL 22	C 2	C 1	C 1	C 2	C 2	C 1	C 1	H 1	L 2	L 3	LC 22	C 4	F 3	F 3		F 2	F 2
4	F 1	FF 11	F 1		F 2		HL 11	CL 12	C 2	C 1	C 1	C 1	C 1	C 1	C 1	C 1	C 2	C 3	C 2	FF 11	F 2	F 3	F 4	F 5
5	F 3					C 2	C 2	C 2	C 2	C 1	C 1	C 1			C 1	C 2	C 2	C 4	L 4	FF 36	F 3	F 4	F 3	F 3
6	F 4	F 4	F 2	F 3	F 1	C 1	C 3	C 3	C 4	C 3	C 2	C 2	C 2	C 2	C 1	L 2	CL 22	C 2	L 4	F 6	FF 32	F 4	F 5	F 4
7	F 4	F 5	F 4	F 4	F 3	L 4	CL 31	C 3	C 3	C 2	C 2	C 2	C 2	C 2	L 3	CL 22	L 3	L 4	L 3	F 4	F 1		F 2	F 3
8	F 2	F 4	F 2	F 3	F 2	LC 11	HL 11	L 1	CL 11	L 2	L 1	L 1	H 1	C 1	C 2	C 2	C 2	C 2	L 4	F 4	F 3			F 3
9	F 2	F 2	F 2	F 1	F 1	L 1	CL 21	C 2	C 3	C 1	C 1	C 1	C 1	H 1	H 1	C 1	H 2	C 2	C 4	F 5	F 4	F 4	F 6	F 5
10	F 6	F 6	F 3	F 4	F 2	C 3	C 5	C 3	C 3	C 2	C 2	C 2	C 2	C 3	C 2	C 1	H 2	C 3	C 5	F 6	F 5	F 5	F 5	F 3
11	FF 12	FF 22	F 5	F 3		CL 41	C 3	C 3	C 3	C 2	C 2	C 1	C 2	CL 11	C 2	C 2	C 2	L 2	L 2	F 5	FF 11	FF 23	F 2	F 5
12	FF 15	F 5	F 4	F 4	F 6	L 2	C 2	C 3	C 4	C 2	C 2	C 2	C 2	C 1	C 1	CL 11	CL 11	CL 22	CL 32	F 5	F 6	F 3	F 5	F 5
13	FF 21	FF 11	FF 22	F 1		CL 21	C 2	L 2	CL 21	C 2	C 2	C 1	C 1	C 1	C 1	H 1	C 2	C 4	C 6	F 4	F 4	F 4	F 3	FF 34
14	F 5	F 3	FF 22	FF 32	FF 11	L 3	C 3	C 3	C 2	C 1	C 1	C 2	C 1	HL 11	H 1	C 2	C 2	C 3	C 4	F 6	F 6	F 1	FF 13	F 5
15	F 5	F 3	F 2	F 1		C 1	C 3	C 2	C 2	C 3	C 2	C 1	C 1	L 2	CL 11			C 3	CL 62	FF 52	FF 51	F 6	F 3	F 6
16	F 2	F 1	F 1			C 2	C 2	C 3	C 2	C 2	C 2	C 1	C 1	C 2		H 1	CL 21	LC 13	C 4	F 6	F 4	F 3	F 4	F 6
17	F 5	F 2	F 3	F 2	F 1	LC 11	HC 11	LC 21	C 2	C 3	C 3	L 2	C 2	C 1	HL 11	C 3	C 4	C 3	L 3	F 5	FF 13	F 3	F 6	F 5
18	F 5	F 5	FF 14	FF 14	FF 21	L 4	L 4	C 4	C 3	C 3	C 2	C 2	C 2	C 2	HL 11	H 2	C 4	C 5	C 4	FF 24	FF 23	FF 43	F 4	F 4
19	F 4	F 5	FF 22	F 4	F 2	CL 22	C 4	C 2	C 3	C 3	C 2	C 2	L 1	L 2	C 2	C 3	C 3	L 3	L 4	F 6	F 5	F 4	F 4	F 5
20	F 5	F 5	F 4	F 3	F 3	L 2	C 3	C 2	C 2	C 3	C 2	C 1	L 1	C 2	L 2	L 2	LH 21	CL 32	CL 32	FF 42	F 2	FF 31	F 2	F 2
21			F 1	F 2	F 2	C 5	C 4	C 3	C 3	C 1	C 2	C 1	C 1	C 1	L 1	L 2	HL 12	C 3	C 5	F 6	F 3	F 3	F 3	F 2
22	F 3	F 1		F 2	F 3	LC 22	C 5	C 4	C 3	C 3	C 3	C 3	C 2	C 2	C 2	C 2	C 3	C 4	L 4	F 5	F 2	F 4	F 2	F 2
23	F 3	F 5	F 5	F 3	F 3	CL 53	CL 32	C 2	CL 21	C 3	C 2	C 2	C 2	C 2	C 2	C 2	L 2	C 3	L 3	F 3	F 3	F 4	F 4	F 4
24	FF 14	F 3	F 2	F 2	F 3	C 1	C 2	C 3	C 3	C 2	C 2	C 2	C 2	C 2	L 2	L 2	CL 11	L 3	L 3	F 4	F 5	F 3	F 4	F 3
25	F 5	F 2	F 2		F 1	C 1	C 3	L 2	C 2	C 1				C 2	C 2	C 3	L 2	L 3	L 4	F 5	F 4	FF 12	F 4	F 4
26	F 3	F 1	F 1		FF 22	C 1	C 4	C 3	C 1	CL 11	L 1	C 1	C 1	CL 11	L 1	L 2	L 2	CL 12	CL 22	FF 21	FF 21	F 3	F 3	F 4
27	F 4	F 2	F 5	F 2	F 2	C 2	CL 11	C 2	C 2	C 3	C 2	L 1	HL 11	L 1	C 1	C 3	C 4	C 4	CL 21	F 1	F 2	F 3	F 3	F 3
28	F 2	F 2	FF 12	FF 22	F 1	L 5	C 4	L 2	C 2	C 2	C 2	HL 11	C 2	C 2	H 1	C 2	C 3	C 3	C 2	F 5	F 4	F 3	F 2	F 3
29	F 3	F 3	F 3	FF 13	F 3	L 3	CL 31	C 3	C 3	C 2	C 2	C 1	C 1	C 1	C 1	C 2	C 2	C 2	L 2	F 1	F 2	F 2		
30	F 1		F 5	F 3	F 2	L 3	L 3		C 1	C 2	C 1	C 1	C 1	C 2	C 2	C 2	C 3	C 3	C 3	F 4	F 3	F 2	F 3	F 5
31	F 5	F 4	F 4	F 3	F 3	C 2	L 1	C 3	C 2	C 2	C 2	C 1	C 2	C 2	C 1	C 2	C 4	C 3	L 4	FF 24	F 4	F 4	F 3	F 3
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

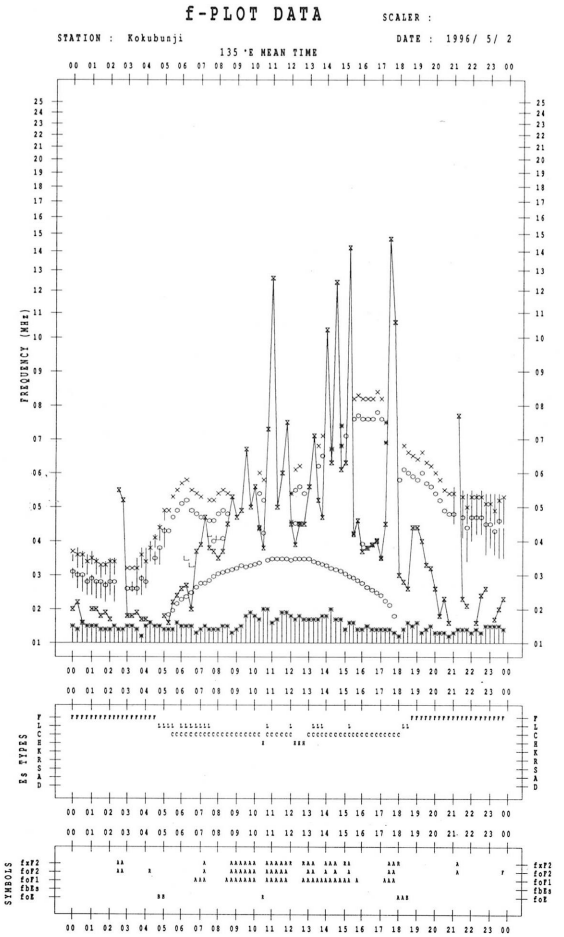
MAY 1996 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

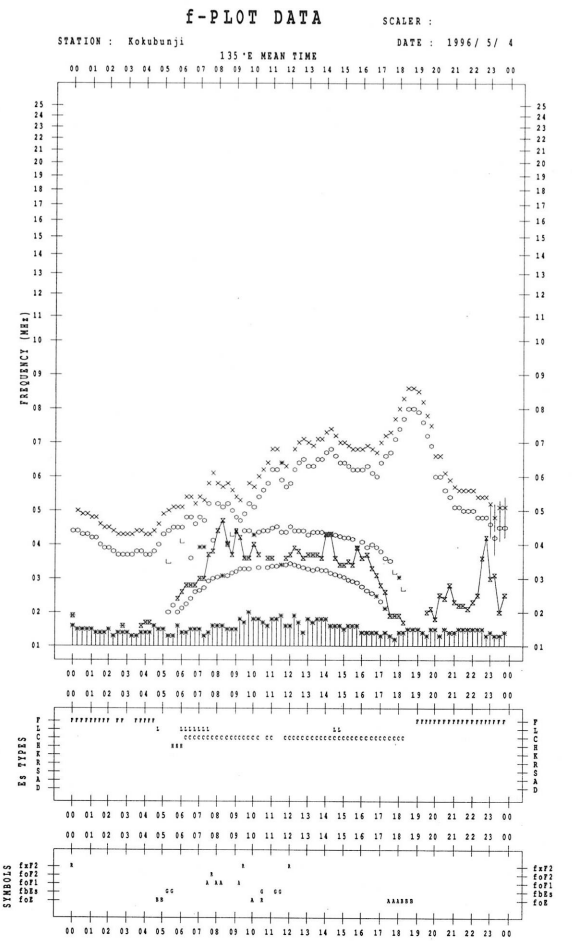
f-PLOTS OF IONOSPHERIC DATA

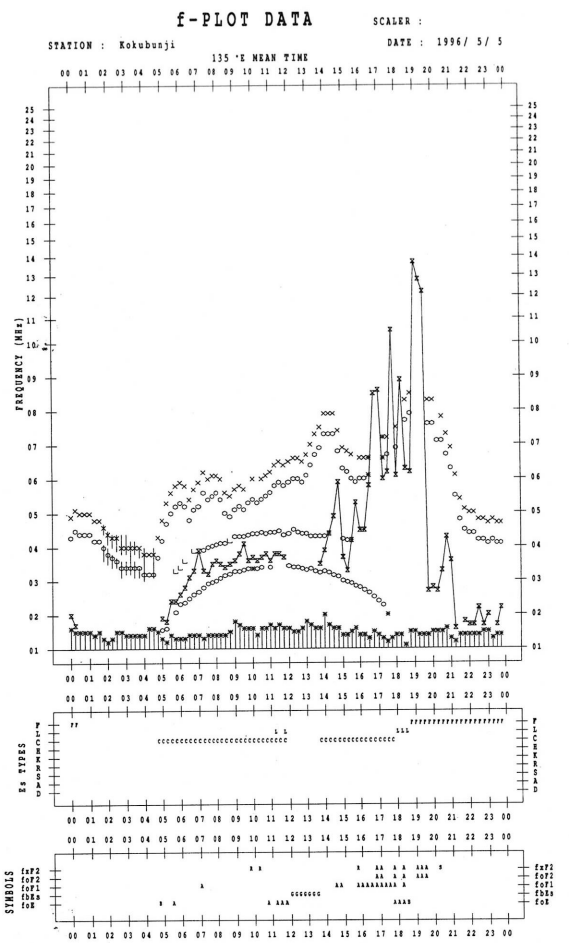
KEY OF f-PLOT	
	SPREAD
	foF2, foF1, foE
	fxF2
	DOUBTFUL foF2, foF1, foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

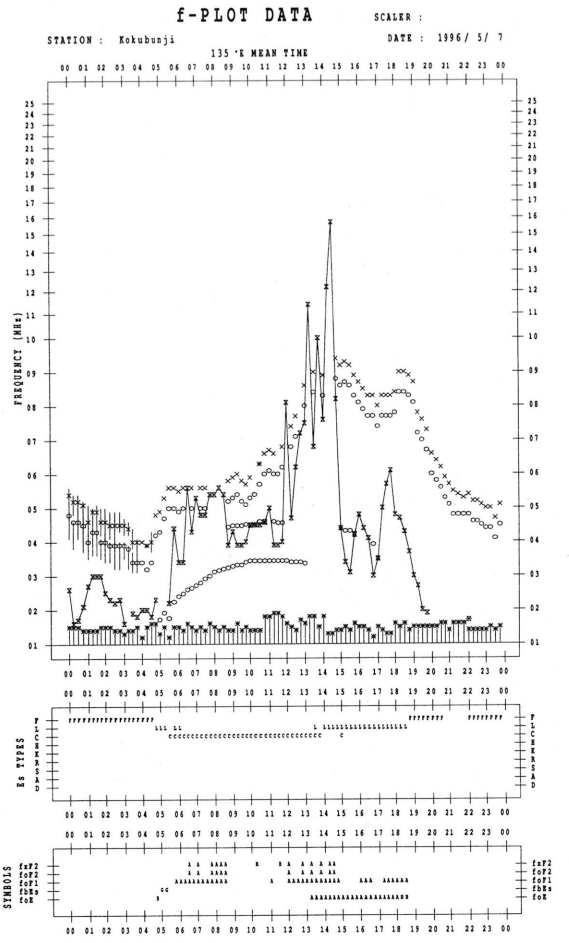

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

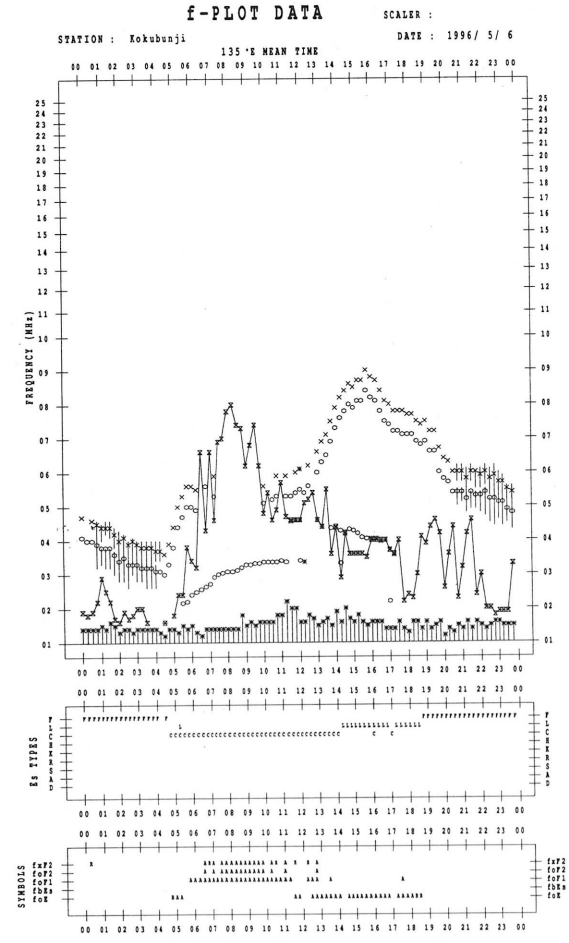

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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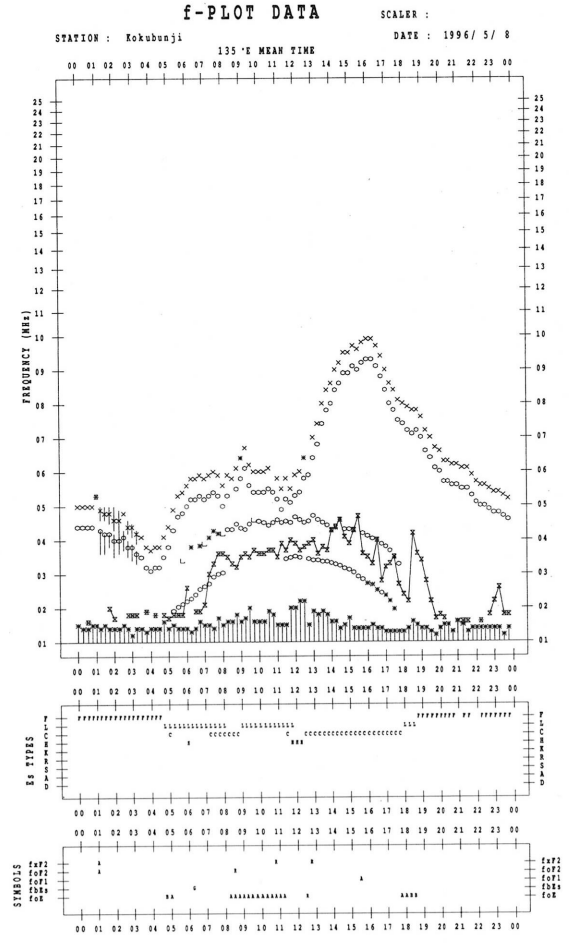
STATION : Kokubunji
DATE : 1996/ 5/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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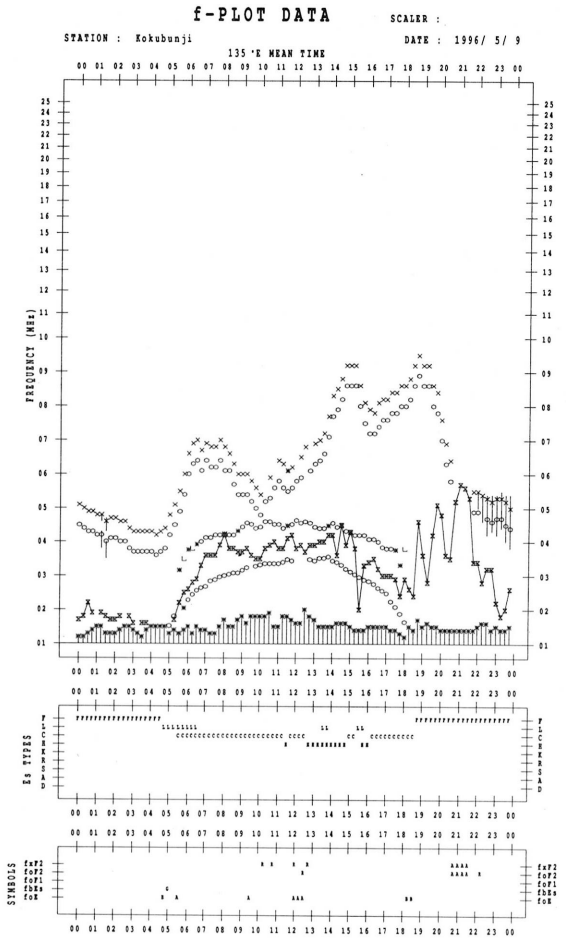
DATE : 1996/ 5/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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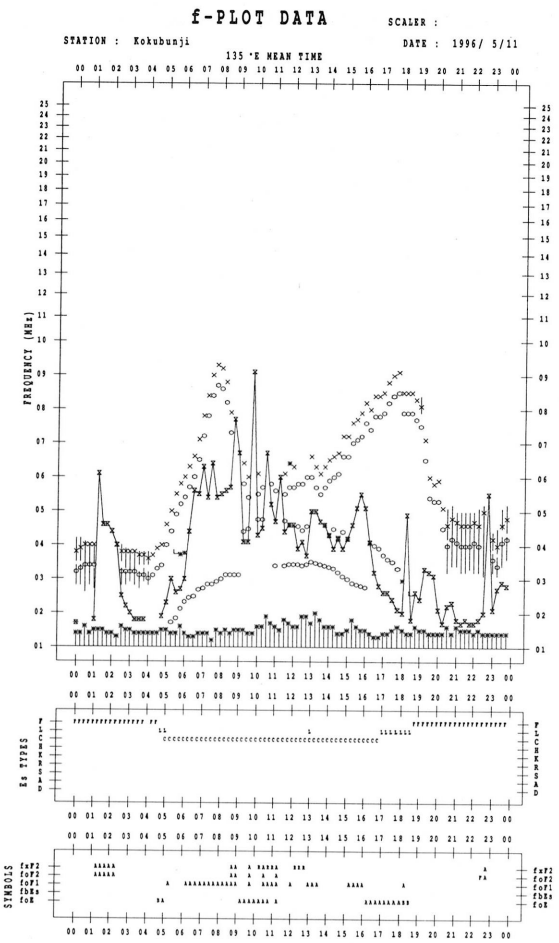
DATE : 1996/ 5/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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DATE : 1996/ 5/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
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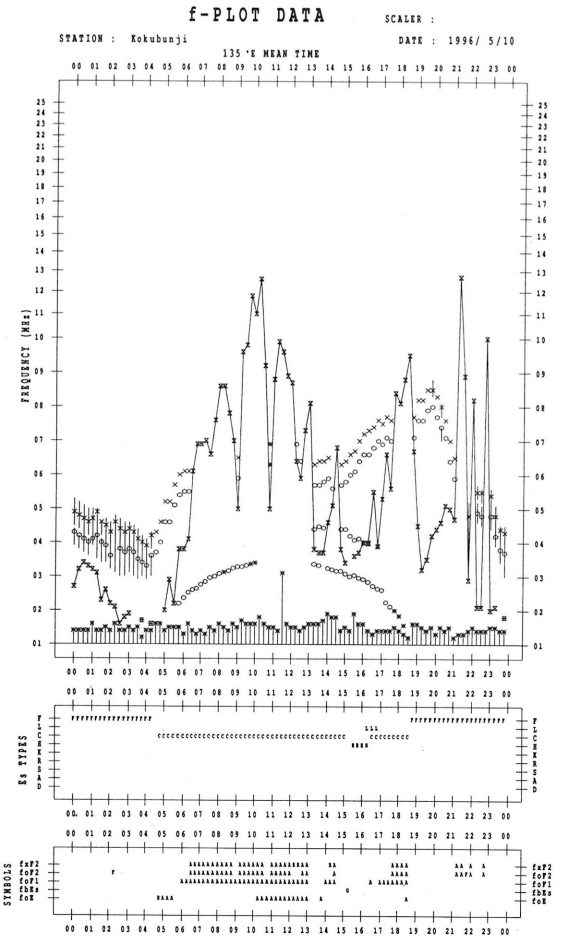
foF2
foF1
fbEs
foE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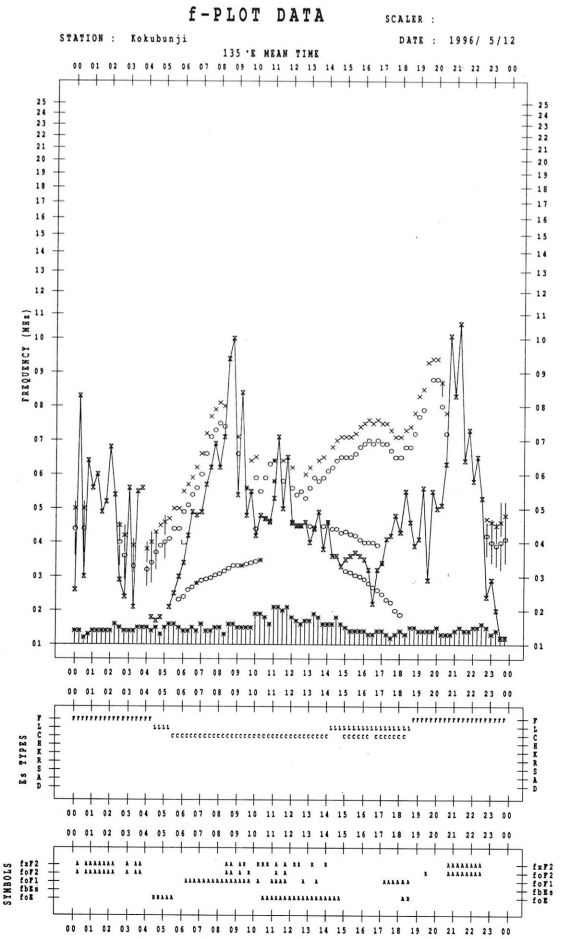
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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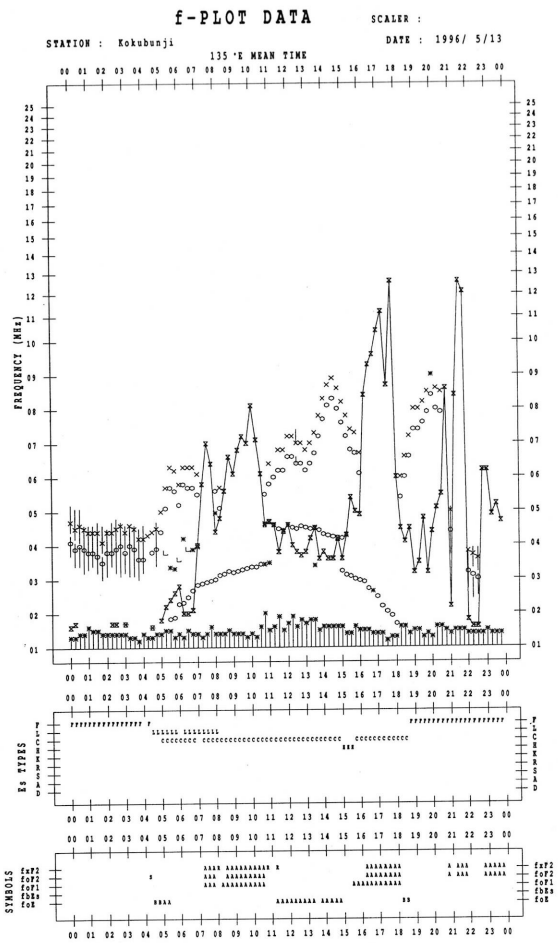
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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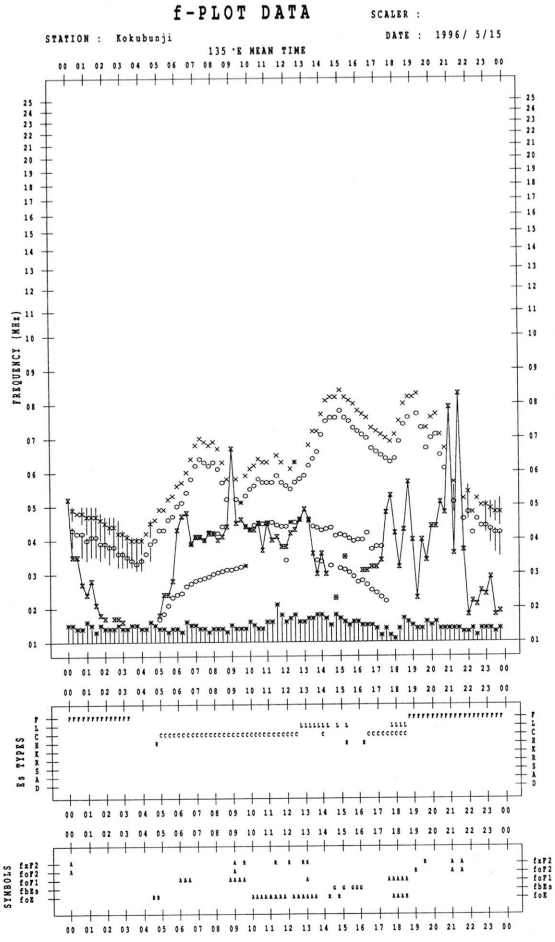
STATION : Kokubunji
DATE : 1996/ 5/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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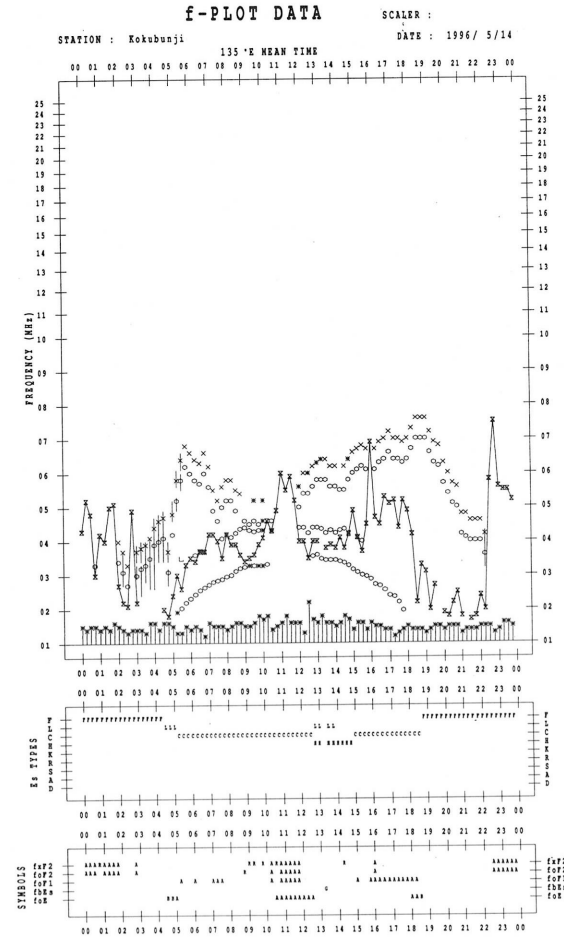
STATION : Kokubunji
DATE : 1996/ 5/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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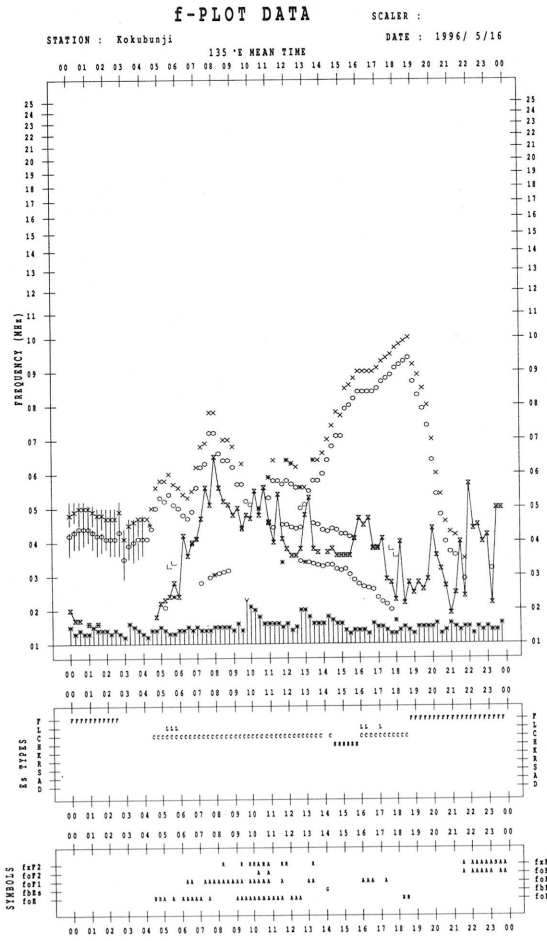
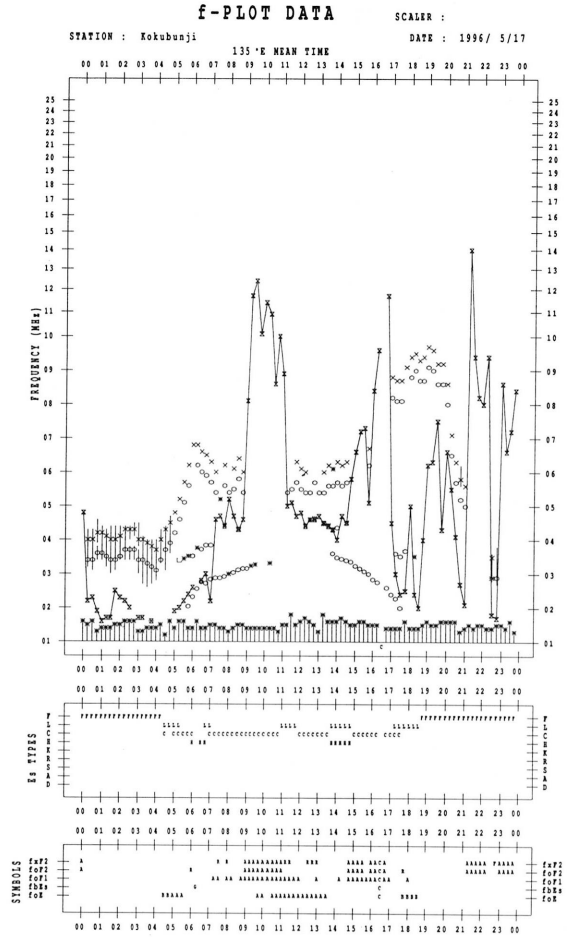
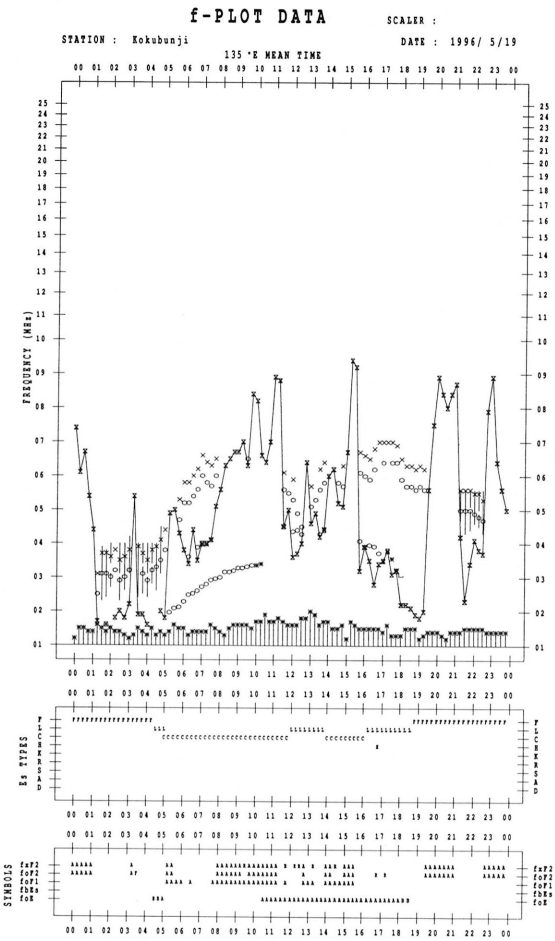
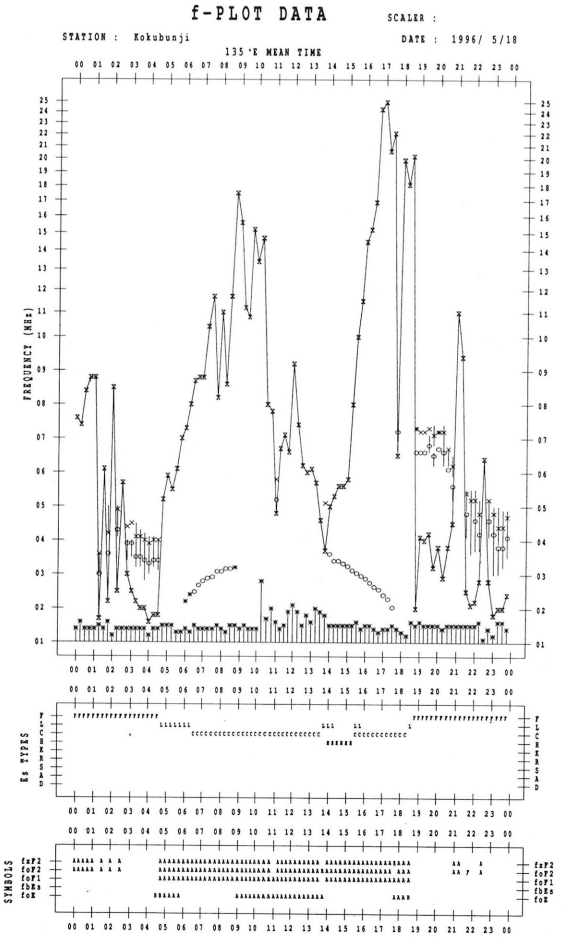
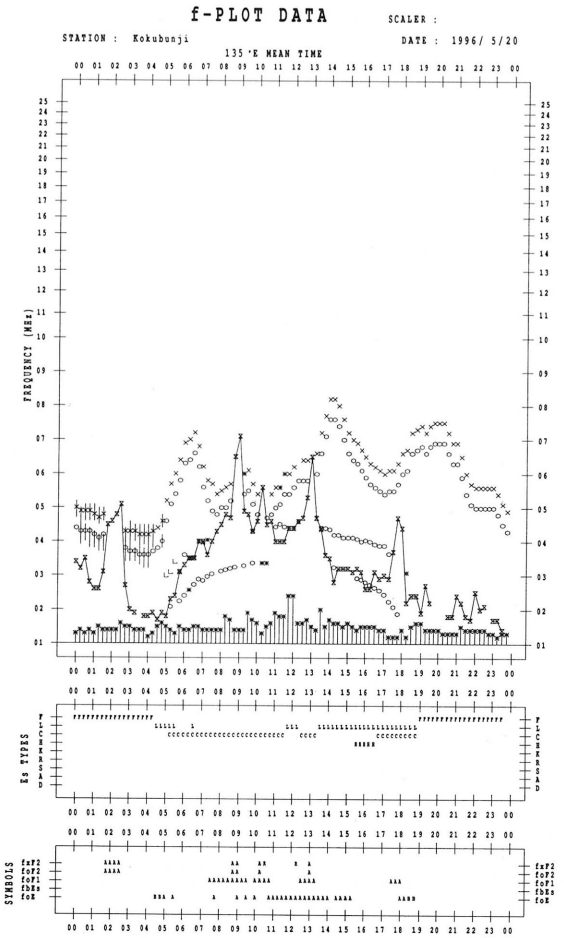
STATION : Kokubunji
DATE : 1996/ 5/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

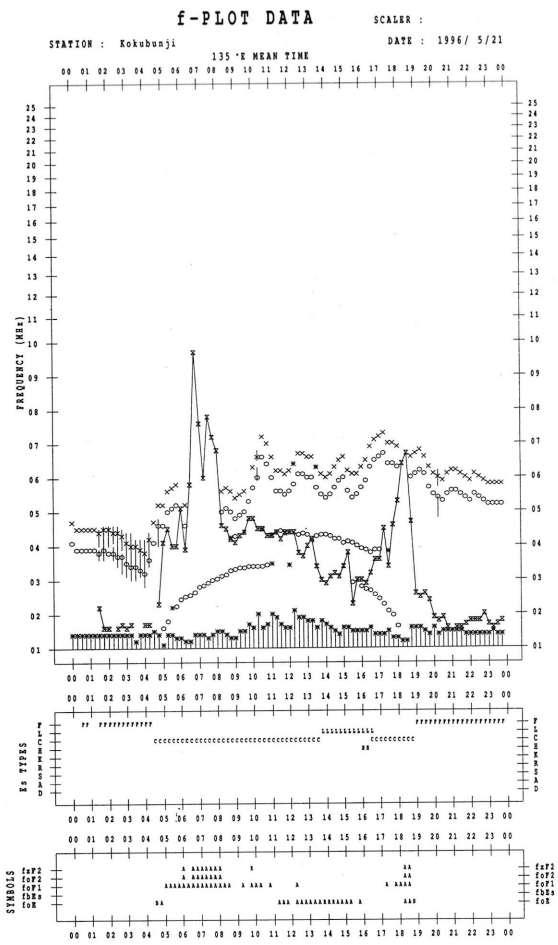

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

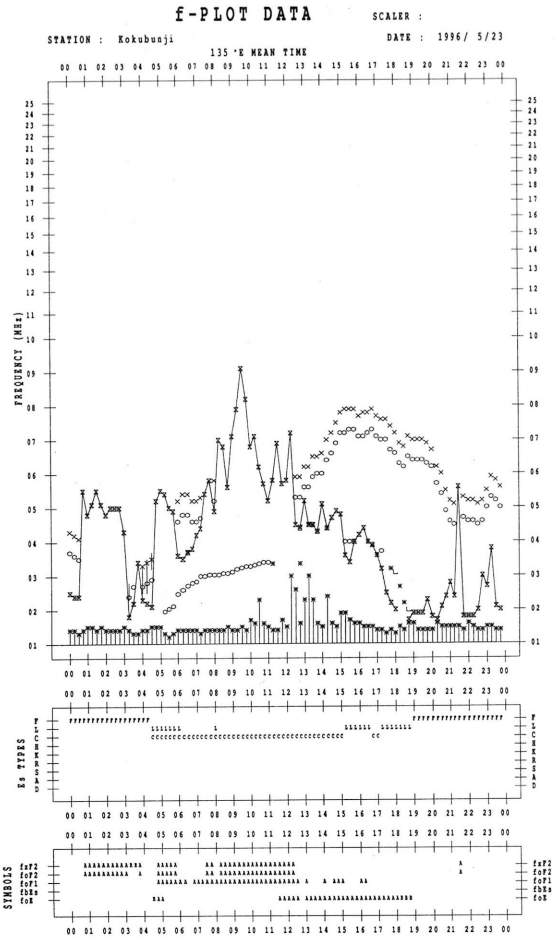

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

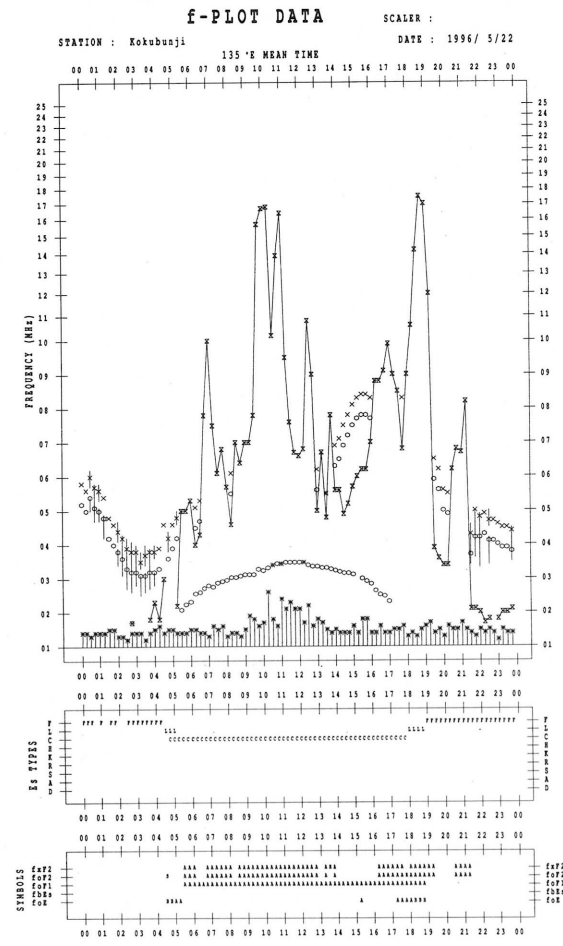

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

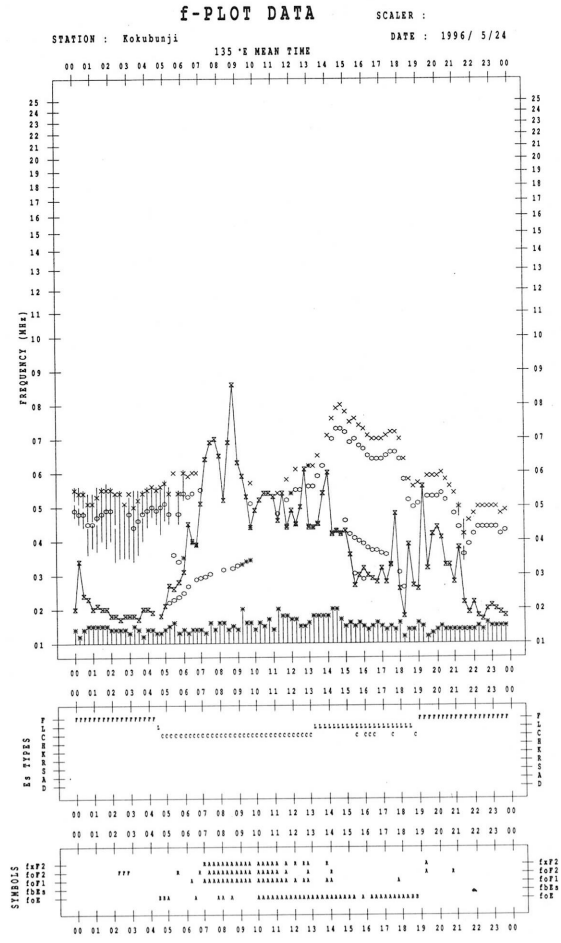

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

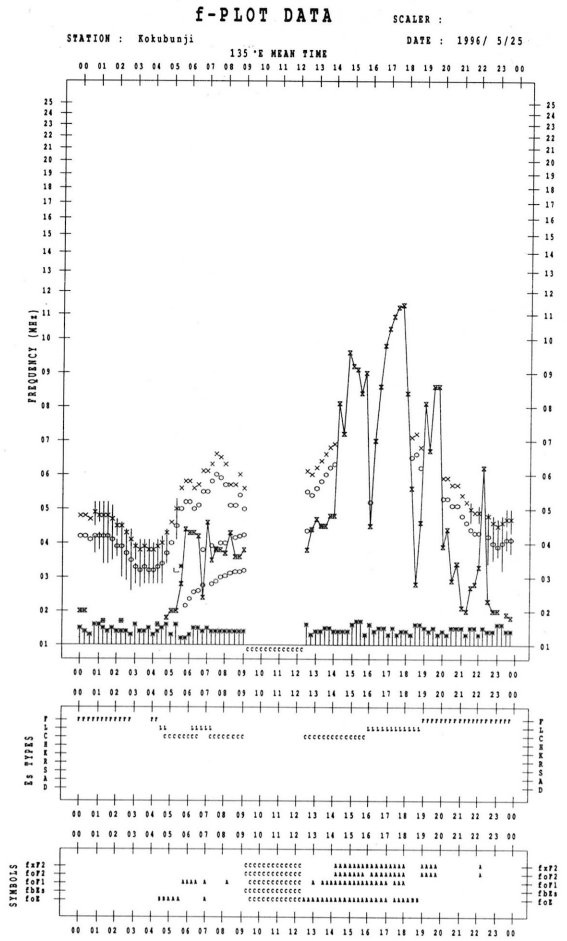

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

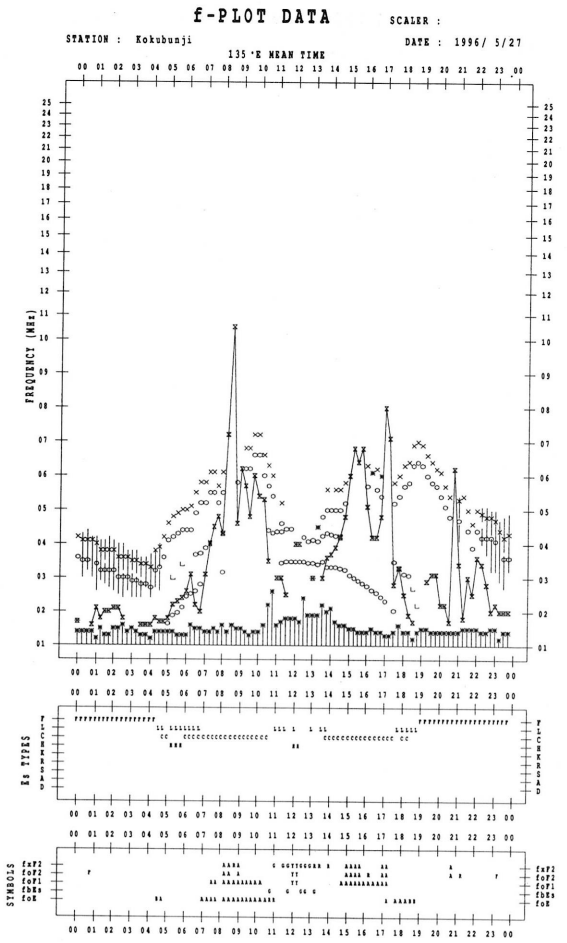

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

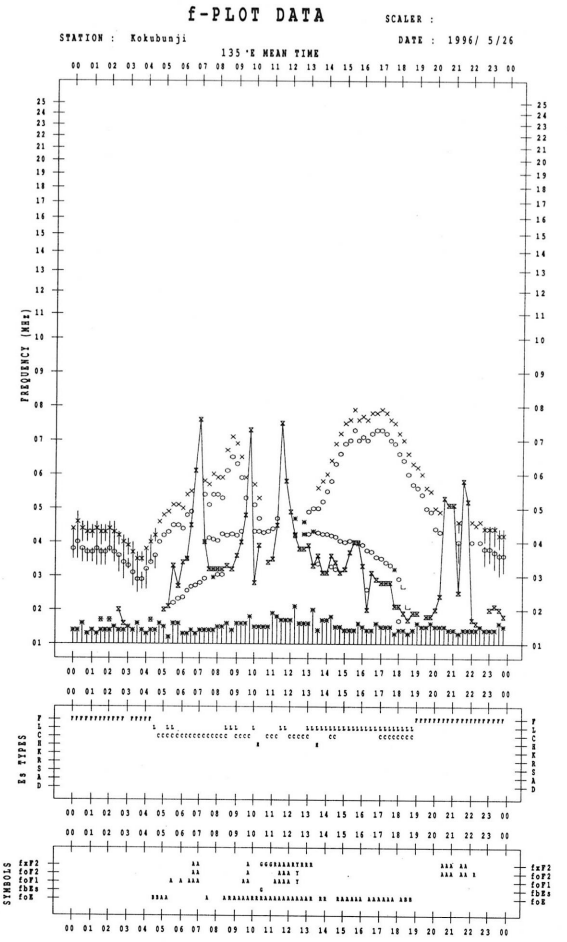

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

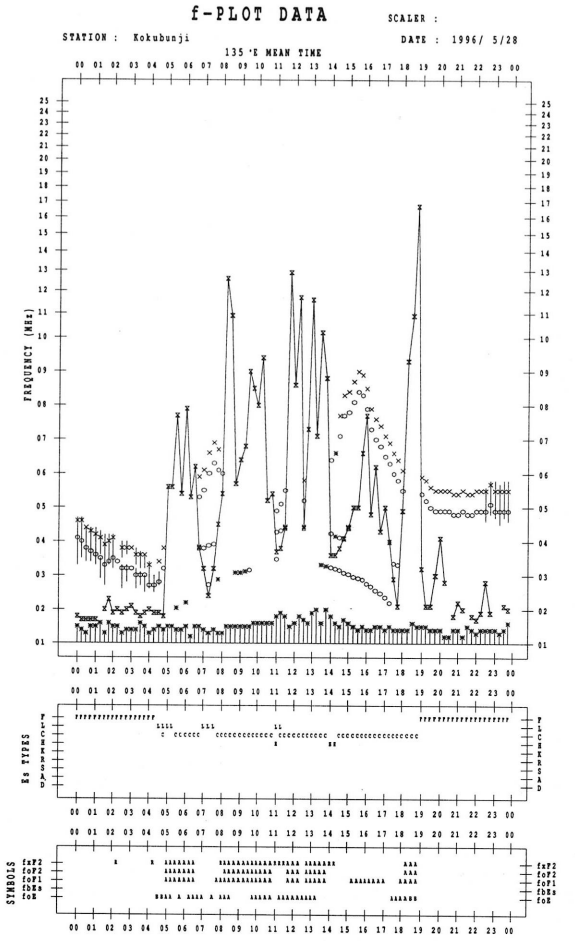

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

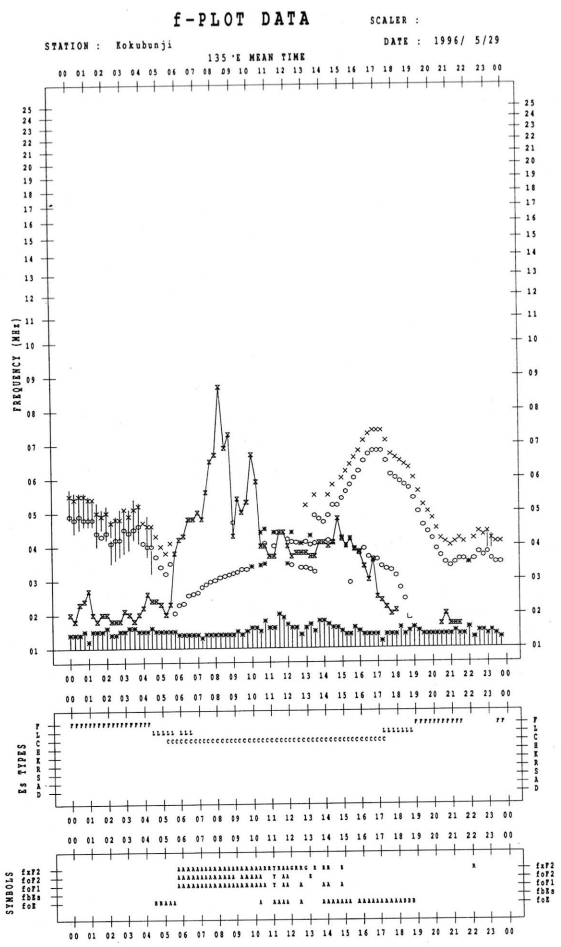

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

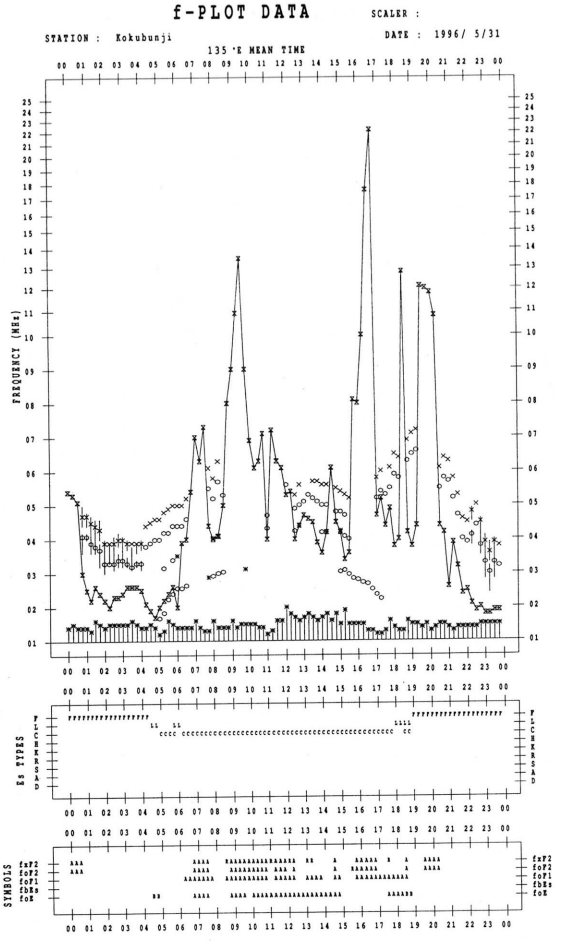

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

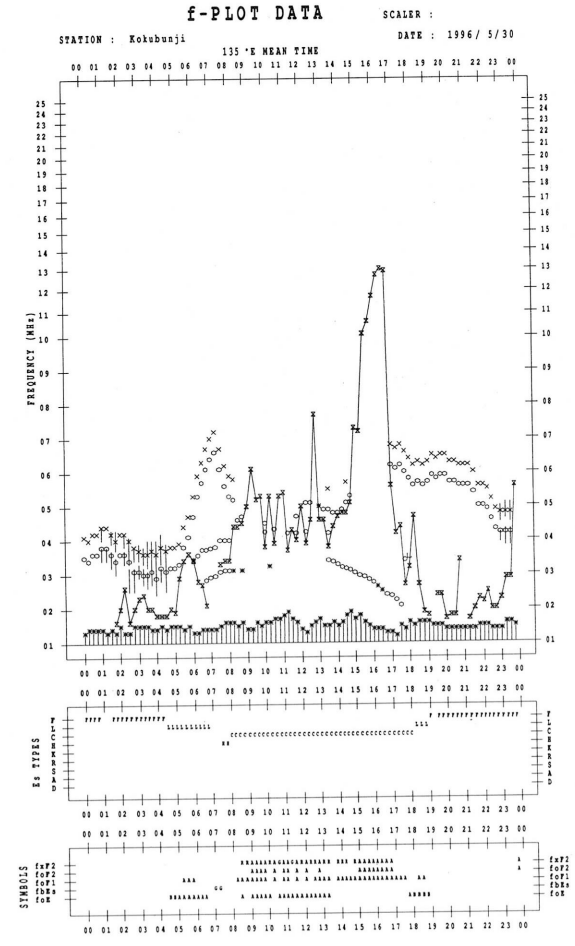

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/31
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1996/ 5/30
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

200 MHz

Not available until system improvement is completed.

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso May 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	-	-	-	-	-
8	26	26	26	26	26
9	26	25	26	26	26
10	25	25	24	26	25
11	26	25	26	26	26
12	26	26	26	27	26
13	27	27	27	26	27
14	26	26	26	25	26
15	25	24	24	25	25
16	25	24	24	-	25
17	25	25	25	25	25
18	25	25	24	25	25
19	25	24	24	25	24
20	24	(24)	24	-	24
21	24	23	23	23	23
22	23	23	23	24	23
23	24	23	-	-	24
24	24	24	24	-	24
25	-	-	-	-	-
26	-	-	-	-	-
27	23	23	23	23	23
28	23	23	23	24	23
29	23	23	23	23	23
30	23	23	23	25	23
31	24	24	23	24	24

Note: No observations during the following periods.

1st 0000 - 7th 2355 16th 2050 - 2347 20th 0420 - 0607
20th 2020 - 2355 23rd 0511 - 24th 0003 24th 2010 - 26th 2400

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso May 1996

Single-frequency observations

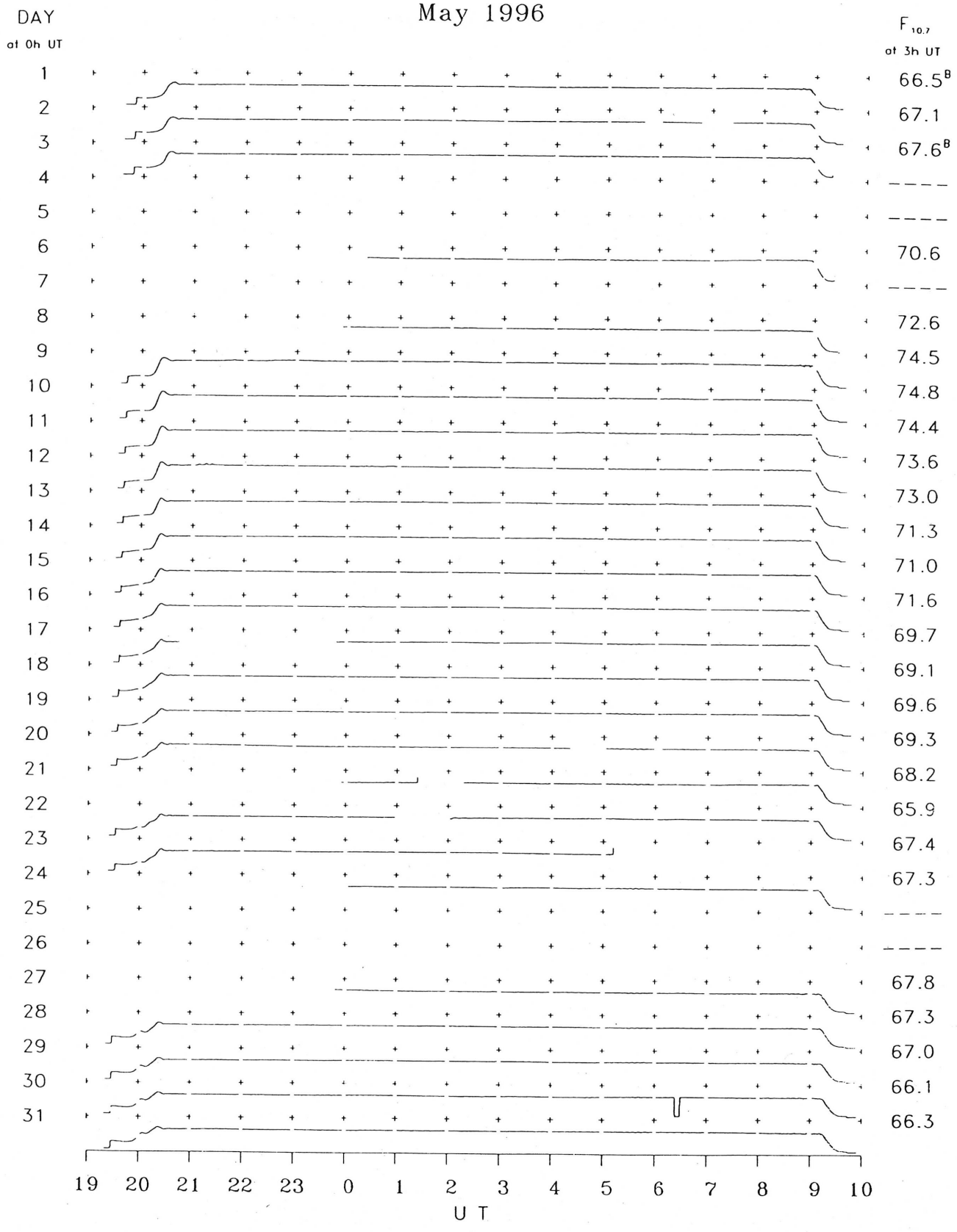
Normal observing period: 1930 - 0935 U.T. (sunrise to sunset)

MAY 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
6	200	8 S	0346.3	0346.5	0.5	7	-	0
11	2800	3 S	2106.0	2107.4	3.0	5	3	0
	2800	3 S	2113.7	2115.4	4.0	6	4	0
	2800	1 S	2121.1	2121.7	2.0	5	3	0
	2800	8 S	2258.0	2258.0	0.1	4	-	0
12	200	42 SER	0625.2	0625.5	4.5	66	-	WL
	500	42 SER	0625.2	0628.6	4.5	41	-	ML
	2800	8 S	0625.5	0625.5	0.1	2	-	0
	500	42 SER	0724.7	0738.8	18.0	5	-	WL
	200	42 SER	0734.8	0736.5	6.0	47	-	WL
13	2800	8 S	0127.0	0127.2	0.6	5	-	0
17	500	6 S	0204.6	0205.5	1.0	4	2	0
	200	8 S	0205.5	0205.5	0.8	100	-	0

B. Solar Radio Emission

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

May 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)

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

C. RADIO PROPAGATION

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

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

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

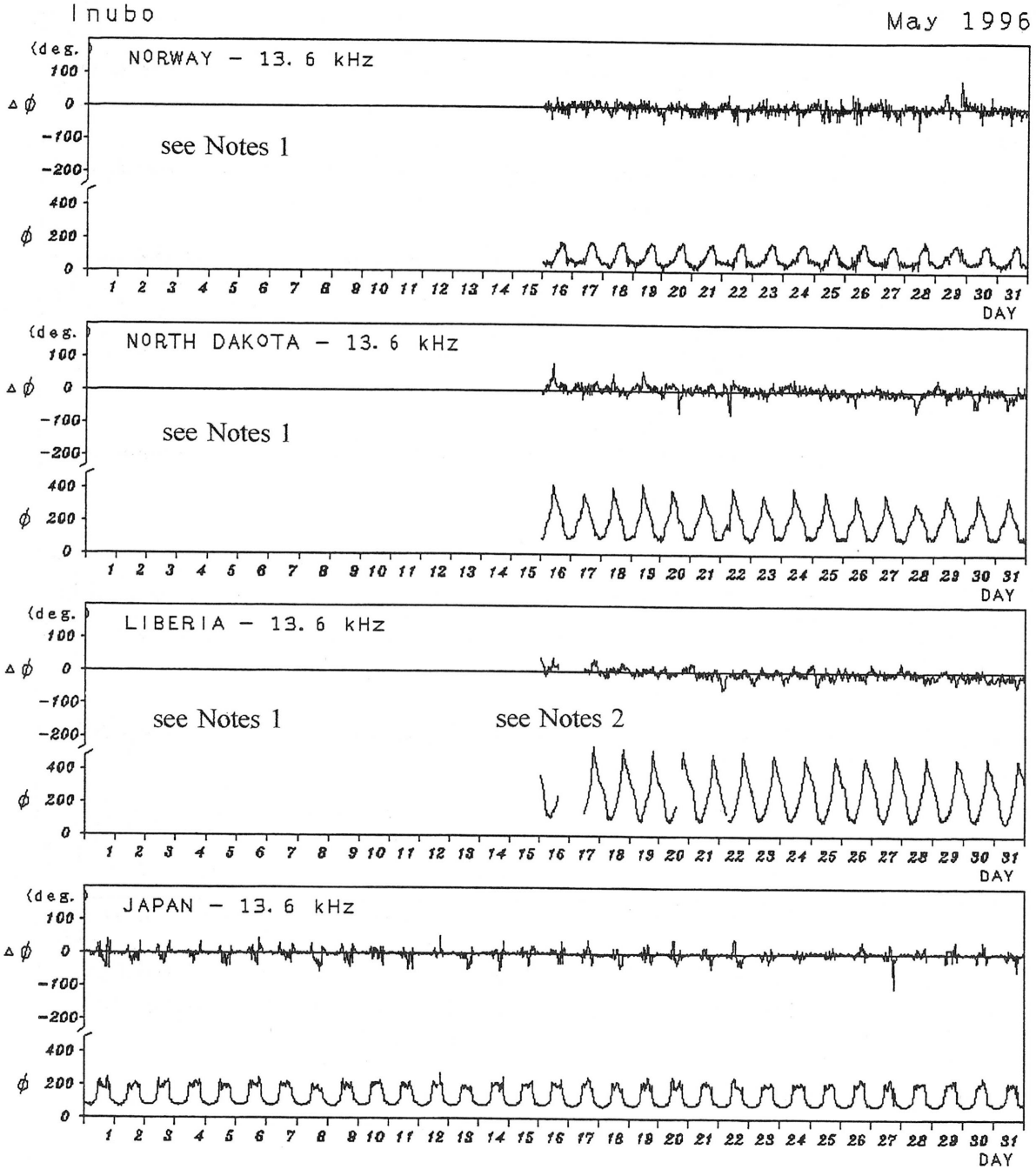
Hiraiso

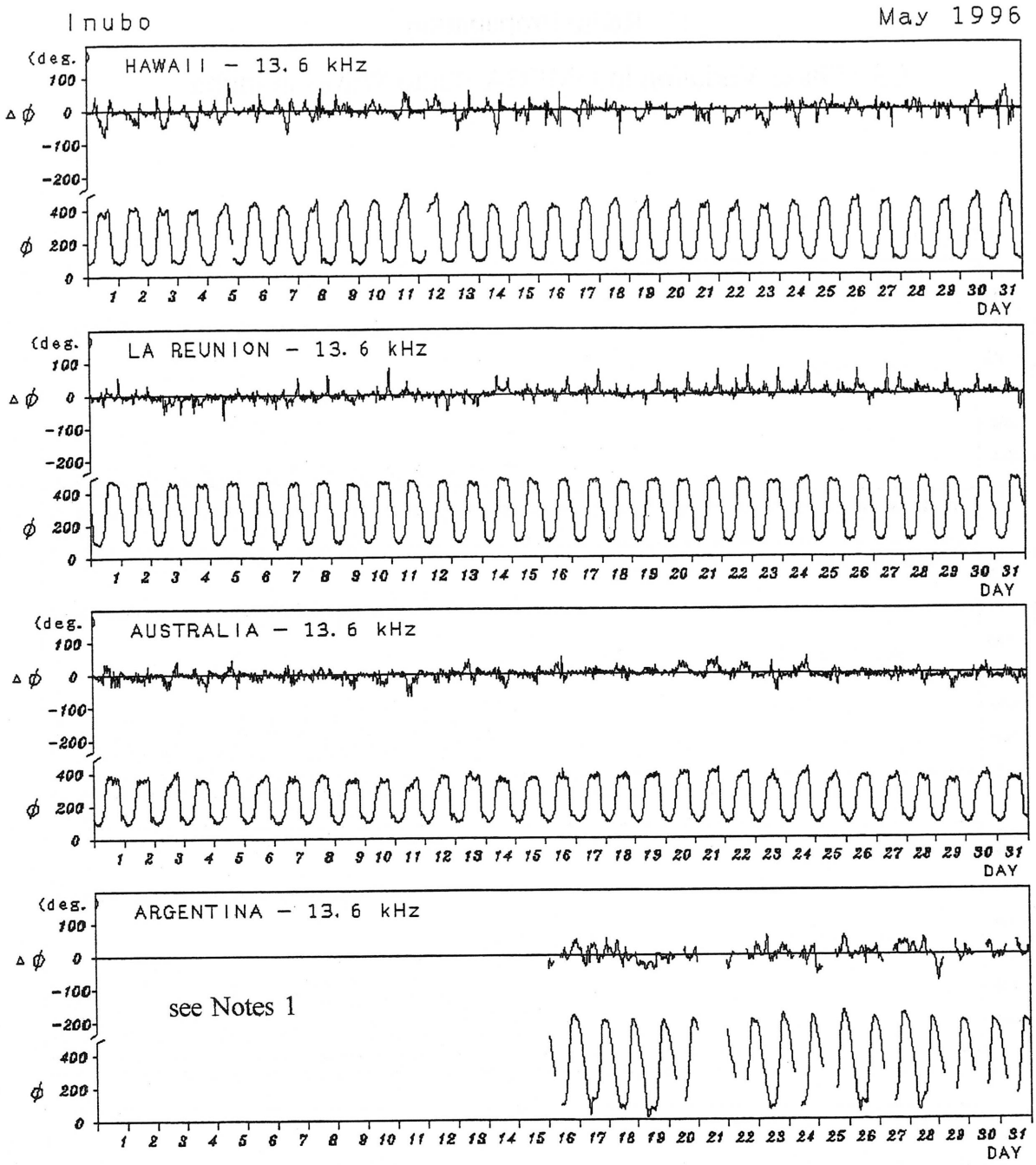
Time in U.T.

MAY 1996	Whole Day Figure	W W V 00 06	W W V 12 18	W W V 06 12	W W V 18 24	W W V H 00 06	W W V H 12 18	W W V H 06 12	W W V H 24	Condition 00 06	Condition 12 18	Condition 06 12	Condition 18 24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	3+ U	-	-	-	-	4	4	3U	3	N	N	N	N	None		
2	4- U	C	C	-	5U	4	C	2U	4	N	N	N	N			
3	3o U	-	-	-	-	3	4	1U	4	N	N	N	N			
4	4- U	-	-	-	-	4	4	3U	4	N	N	N	N			
5	3+ U	-	-	-	-	3	4	3U	3U	N	N	N	N			
6	3o U	-	-	-	-	3	3	3U	3	N	N	N	N			
7	4- U	-	5U	-	-	4	3	2U	4	N	N	N	N			
8	3+ U	-	-	-	-	4	4	2U	4	N	N	N	N			
9	4o U	-	-	-	-	4	4	4U	4	N	N	N	N			
10	4+ U	5U	-	-	5U	4	4	4U	4	N	N	N	N			
11	4+ U	5U	-	-	5U	4	4	4U	4	N	N	N	N			
12	3+ U	-	-	-	-	4	4	1U	4	N	N	N	N			
13	3+ U	S	-	-	-	4	4	3U	3	N	N	N	N			
14	4o U	-	-	-	-	4	4	4U	4	N	N	N	N			
15	C	C	C	C	C	C	C	4U	4	N	N	N	N			
16	3+ U	-	-	-	-	4	4	3U	3	N	N	N	N			
17	4o U	-	-	-	-	4	4	4U	4	N	N	N	N			
18	4- U	-	-	-	-	4	3	4U	4	N	N	N	N			
19	4+ U	5U	5U	-	-	4	3	5U	4	N	N	N	N			
20	4+ U	5U	-	-	-	4	4	5U	4	N	N	N	N			
21	4- U	-	-	-	-	4	4	4U	3U	N	N	N	N			
22	4- U	-	-	-	-	4	4	3U	4	N	N	N	N			
23	4o U	-	-	-	-	4	4	4U	4	N	N	N	N			
24	C	-	C	C	C	4	4	C	C	N	N	N	N			
25	4+ U	-	-	-	-	4	4	5U	4	N	N	N	N			
26	4- U	-	-	-	5U	4	4	2U	4	N	N	N	N			
27	3+ U	-	-	-	-	4	4	1U	4	N	N	N	N			
28	3+ U	S	-	-	-	4	4	1U	4	N	N	N	N			
29	3- U	-	-	-	-	3	3	1U	4	N	N	N	N			
30	3+ U	5U	-	-	-	4	3	2U	3	N	N	N	N			
31	4- U	C	5U	-	-	C	4	2U	4	N	N	N	N			

C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo





Notes 1 : As for NORWAY-13.6 kHz, NORTH DAKOTA-13.6 kHz, LIBERIA-13.6 kHz and ARGENTINA-13.6 kHz, no record during 9 April 0108 UT to 16 May 0020 UT, due to the receiver trouble.

Notes 2 : As for LIBERIA-13.6 kHz, no record during 16 May 1440 UT to 17 May 1104 UT, due to the maintenance of transmitter.

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

NONE

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso

Time in U.T.

May 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

May 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
7	–	–	40	22	11	–	0404	0453	0420
8	–	–			7	–	2140	2158	2150
8	–	–			7	–	2235	2250	2240

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