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IONOSPHERIC DATA IN JAPAN

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CONTENTS

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INTRODUCTION

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

Station	Geographic		Geomagnetic		Technical Method
	Latitude	Longitude	Latitude	Longitude	
Wakkanai	45°23.5′N	141°41.2′E	35.3°N	206.5°	Vertical Sounding (I)
Kokubunji	35°42.4′N	139°29.3′E	25.5°N	205.8°	Vertical Sounding (I)
Yamagawa	31°12.1′N	130°37.1′E	20.4°N	198.3°	Vertical Sounding (I)
Okinawa	26°16.9′N	127°48.4′E	15.3°N	196.0°	Vertical Sounding (I)
Hiraiso	36°22.0′N	140°37.5′E	26.3°N	206.8°	Solar Radio Emission (S)
Inubo	35°42.2′N	140°51.5′E	25.6°N	207.0°	Radio Receiving (P)

A. IONOSPHERE

Ionospheic observations are carried out at the above four stations in Japan by means of vertical sounding using ionosondes.The ionosonde produces ionograms,which are recorded digitally on computer storage medium as well as graphically on 35 mm photographic film. The digitally-recorded ionograms are collected from each station by the central computer and reduced to numerical values and Summary Plots by the automatic processing system. The ionograms obtained at Kokubunji are manually scaled as well by experienced specialists to supplement automatically-scaled parameters.

A1. Automatic Scaling

Digital ionograms are automatically scaled by the pattern recognition method. The following five factors of ionospheric characteristics are published for the present. The reliability of these factors has been ascertained by comparison of the automatically-scaled parameters with the manually-scaled values of large amounts of test ionograms.

The published data consist of tabulations of hourly values of three factors (*foF2, fEs, fmin*) and monthly medians of two factors (*h′Es, h′F*) , daily Summary Plots and monthly medians plot of *foF2*.

a. Characteristics of Ionosphere

foF2	Ordinary wave critical frequency for the *F2* layer
fEs	Highest frequency of the *Es* layer whether it may be ordinary or extraordinary
fmin	Lowest frequency which shows vertical ionospheric reflections
h′Es *h′F*	Minimum virtual height on the ordinary wave for the *Es* and *F* layers, respectively

b. Descriptive Letters

The following descriptive letters are used in the tables.

A Impossible measurement because of the presence of a lower thin layer,for example *Es* (for *foF2*).

B Impossible measurement because of absorption in the vicinity of *fmin*.

C Impossible measurement because of any failure in observation.

G Impossible automatic scaling because of too small ionization density of the layer (for *fEs*).

N Impossible automatic scaling because of complex echoes.

Blank No digital record because of trouble in the automatic data processing system, but existence of film record.

c. Definitions of the CNT,MED,UQ and LQ

Median count (CNT) is the number of numerical values from which the median has been computed. In addition to numerical values, the count may include a descriptive letter G.

Median (MED) is defined as the middle value when the numerical values are arranged in order of magnitude, or the average of the two middle values if there is an even number of values.

Upper quartile (UQ) is the median value of the upper half of the values when they are ranked according to magnitude; the *lower quartile* (LQ) is the median value of the lower half.

If CNT is less than 10, there are blank spaces left.

d. Reliability of Automatic Scaling

The results of the comparison between automatically-scaled values and manually-scaled ones showed that hourly values of *foF2* , *fEs* and *fmin* were scaled within a difference of 1 MHz from about 90 , 90 and 99% , respectively of the test ionograms.

e. Summary Plot

Daily Summary Plots which are made from quarter-hourly digital ionograms are published to present general ionosphere conditions. The upper and middle parts of a Summary Plot show the diurnal variation of the frequency range of the echoes reflected from the *F* and *E* regions, respectively. The two solid arcing lines indicate the predicted values of *fxE* and *foE* calculated by the method described in the CCIR report 340. The lower part shows the diurnal variation of the virtual height where the echo traces become horizontal.

A2. Manual Scaling

The published data consist of tabulations of hourly values of the ionospheric characteristics and figures of daily *f*-plot.

All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction (Second Edition) 1972 " and its revision of chapters I-4, published in July 1978.

a. Characteristics of Ionosphere

fxI	Top frequency of spread *F* trace
foF2 *foF1* *foE* *foEs*	Ordinary wave critical frequency for the *F2,F1, E* and *Es* including particle *E* layers, respectively
fbEs	Blanketing frequency of the *Es* layer, e.g. the lowest ordinary wave frequency visible through *Es*
fmin	Lowest frequency which shows vertical ionospheric reflections
M(3000)F2 *M(3000)F1*	Maximum usable frequency factor for a path of 3000 km for transmisson by *F2* and *F1* layers, respectively
h′F2 *h′F* *h′E* *h′Es*	Minimum virtual height on the ordinary wave for the *F2*, whole *F, E* and *Es* layers,respectively
Types of *Es*	See below b.(iii)

b. Symbols

(i) Descriptive Letters

The following letters are entered after, or used to replaced a numerical value on the monthly tabulation sheets, if necessary.

A Measurement influenced by, or impossible because of, the presence of a lower thin layer,for example *Es*.
B Measurement influenced by, or impossible because of, absorption in the vicinity of *fmin*.
C Measurement influenced by, or impossible because of, any non-ionospheric reason.
D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range in use.
E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.
F Measurement influenced by, or impossible because of, the presence of spread echoes.
G Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately.
H Measurement influenced by, or impossible because of, the presence of a stratification.
K Presence of particle *E* layer.
L Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.
M Interpretation of measurement questionable because the ordinary and extraordinary components are not distinguishable.
N Conditions are such that the measurement cannot be interpreted.
O Measurement refers to the ordinary component.
P Man-made perturbations of the observed parameter; or spur type spread *F* present.
Q Range spread present.
R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
S Measurement influenced by, or impossible because of, interference or atmospherics.
T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
V Forked trace which may influence the measurement.
W Measurement influenced or impossible because the echo lies outside the height range recorded.
X Measurement refers to the extraordinary component.
Y Lacuna phenomena, severe layer tilt.
Z Third magneto-electronic component present.

(ii) Qualifying Letters

The following letters are entered in the first column before a numerical value on the monthly tabulation sheets, if necessary.

A Less than. Used only when *fbEs* is deduced from *foEs* because total blanketing of higher layer is present.
D Greater than.
E Less than.
I Missing value has been replaced by an interpolated value.
J Ordinary component characteristic deduced from the extraordinary component.
M Mode interpretation uncertain.
O Extraordinary component characteristic deduced from the ordinary component. (Used for x-characteristics only.)
T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
U Uncertain or doubtful numerical value.
Z Measurement deduced from the third magneto-electronic component.

(iii) Description of Types of *Es*

When more than one type of *Es* trace are present on the ionogram, the type for the trace used to determine *foEs* must be written first. The number of multiple trace is indicated after the type letter.

The types are:

f An *Es* trace which shows no appreciable increase of height with frequency.
l A flat *Es* trace at or below the normal *E* layer minimum virtual height or below the particle *E* layer minimum virtual height.
c An *Es* trace showing a relatively symmetrical cusp at or below *foE*. (Usually a daytime type.)
h An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above *foE*. The cusp is not symmetrical, the low frequency end of the *Es* trace lying clearly above the high frequency end of the normnal *E* trace. (Usually a daytime type.)
q An *Es* trace which is diffuse and non-blanketing over a wide frequency range.
r An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation.
a An *Es* trace having a well-defined flat or gradually rising lower edge with stratified and diffuse traces present above it.
s A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace.
d A weak diffuse trace at heights below 95 km associated with high absorption and large *fmin*.
n The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.
k The designation 'k' is used to show the presence of particle *E*. When *foEs* > *foE* (particle *E*) the *Es* type precedes k.

c. Definitions of the CNT, MED, UQ and LQ

Median count (CND) is the number of values from which the median has been computed. In addition to numerical values, the count may include certain descriptive letters.

Median (MED) is the middle value when the numerical values are arranged in order of magnitude, or the average of the two middle values if there is an even number of values.

Upper quartile (UQ) is the median value of the upper half of the values when they are ranked according to magnitude; *the lower quartile* (LQ) is the median value of the lower half.

B. SOLAR RADIO EMISSION

Solar radio observations at 200, 500 and 2800 MHz are carried out at Hiraiso. The observation equipment consists of three parabolic antennas, one with 10-meter diameter for 200 MHz measurements, one with 6-meter diameter for 500 MHz measurements and one with 2-meter diameter for 2800 MHz measurements, each being equipped with a pair of crossed doublet antennas as a primary radiator, and three appropriate receivers. Each pair of the crossed doublet antennas is used as a polarimeter. Observations are continuously carried out almost from sunrise to sunset.

B1. Daily Data at Hiraiso

The three-hourly mean and daily mean values of the solar radio emission intensities are tabulated for 500 MHz measurements. The intensities are expressed by the flux density in 10^{-22} Wm^{-2} Hz^{-1} unit.

The following symbols are used in the tables, when interference or radio bursts prevented measuring the base-level flux densities or determining the variability indices:

* Measurement impossible because of interference.
B Measurement impossible because of bursts.

Daily data within parentheses mean that the observation time does not exceed one third of the period.

B2. Outstanding Occurrences at Hiraiso

The table is a list of outstanding occurrences of solar radio emission bursts observed at 200, 500 and 2800 MHz during a month.

Listed in the table are the date, frequencies, the type of event, the start time and the time of maximum, both in U.T. expressed in hours, minutes and tenths of a minute, the duration in minutes, the peak and mean flux densities in 10^{-22} $Wm^{-2}Hz^{-1}$ unit, and the polarization.

The type of event is expressed by a combination of a numerical code and a letter symbol in accordance with the "Descriptive Text of Solar Geophysical Data, NOAA" as defined by H. Tanaka in the "Instruction Manual for Monthly Report of Solar Radio Emission, WDC-C2" in January 1975:

SGD Code	Letter Symbol	Morphological Classification
1	S	Simple 1
2	S/F	Simple 1F
3	S	Simple 2
4	S/F	Simple 2F
5	S	Simple
6	S	Minor
7	C	Minor$^+$
8	S	Spike
20	GRF	Simple 3
21	GRF	Simple 3A
22	GRF	Simple 3F
23	GRF	Simple 3AF
24	R	Rise
25	R	Rise A
26	FAL	Fall
27	RF	Rise and Fall
28	PRE	Precursor
29	PBI	Post Burst Increase
30	PBI	Post Burst Increase A
31	ABS	Post Burst Decrease
32	ABS	Absorption
40	F	Fluctuations
41	F	Group of Bursts
42	SER	Series of Bursts
43	NS	Onset of Noise Storm
44	NS	Noise Storm in progress
45	C	Complex
46	C	Complex F
47	GB	Great Burst
48	C	Major
49	GB	Major$^+$

The polarization is expressed by the polarization degree and sense as follows:

R or L	right- or left-handed polarization,
W,M or S	weak,moderate or strong polarization,
0	almost zero or unable to detect polarization due to small increase of flux,
00	polarization degree of less than 1 percent.

One of the following symbols may be attached after numerical values, if necessary.

D	greater than, or later than,
E	less than or earlier than,
U	approximate, or uncertain.

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

The 10.7 cm solar radio flux at Hiraiso is plotted over a one month period. The 10.7 cm flux ($F_{10.7}$) is determined by adjusting the 10.7 cm radio flux measured at Hiraiso to the Pentincton 10.7 cm radio flux. The figure on the right-hand side shows the $F_{10.7}$ index estimated at Hiraiso.

The following symbols are used in the $F_{10.7}$ index:

*	Measurement made not at 3h U.T..
B	Measurement affected by bursts.

C. RADIO PROPAGATION

C1. Phase Variation in OMEGA Radio Waves at Inubo

The phase values of eight OMEGA radio signals as received at Inubo are depicted for an interval of one month, along with the phase deviation defined as a deviation from a value averaged over the six quietest day within the month. Particulars of the received signals are given in the table below.

In each of the four panels of the figure, the phase (ϕ) is shown in the lower part and the phase deviation ($\Delta\phi$) is shown in the upper part. The phase data are sampled every 30 min, so the curves of the phase and phase deviation are composed of 48 data points per day. The phase delay is measured as a positive value.

The polar cap phase anomaly (PCPA) caused by the solar protons are well detected on the Norway signal. The start, end and maximum times of the PCPA are listed in the table next to the figure, where the times are expressed as day / hour & minute in U.T.. The maximum phase deviation in the list is defined as a phase advance (negative values in the figure) in degrees.

C2. Sudden Phase Anomaly (SPA) at Inubo

Data of sudden phase anomaly (SPA) are prepared from the records of phase measurement of VLF radio waves received at Inubo. The transmitting stations are listed in the following table.

Phase advance is shown in unit of degree at its maximum stage. No transmission or no reception during the period is indicated by -, an indistinguishable record is spaced out, and a multi-peak event is marked by *. The most remarkable or distinct phase advance is underlined and listed in the column of *Time*.

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

The following letters may be attached to the value, if necessary.

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

Transmitting Stations

Name	Location (Geographic Coordinates)		Call Sign	Frequency (kHz)	Radiation Power (kW)	Arc Distance from Inubo (km)
Norway	66°25′N	013°08′E	/N	13.6	10	7820
Liberia	06°18′N	010°40′W	/L	13.6	10	14480
Hawaii	21°24′N	157°50′W	/H	13.6	10	6100
North Dakota	46°22′N	098°20′W	/ND	13.6	10	9140
La Reunion	20°58′S	055°17′E	/LR	13.6	10	10970
Argentina	43°03′S	065°11′W	/AR	13.6	10	17640
Australia	38°29′S	146°56′E	/AU	13.6	10	8270
Japan	34°37′N	129°27′E	/J	13.6	10	1040
North West Cape	21°49′S	114°10′E	NWC	22.3	1000	6990

HOURLY VALUES OF foF2 AT WAKKANAI

MAY 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	30	A	A	32	38	38	A	A	54	A	A	A	A	A	A	A	58	A	61	A	64	60	57	49
2	A	A	49		34	35	A	58	A	A	A	A	64	A	A	64	68	58	61	60	58	39	57	57
3			38	37	30	23	26	A	A	A	A	A	A	A	56	50	A	56	56	60	60	56	N	38
4	40	40	35	36	38	36	38	A	A	A	A	A	A	A	A	55	53	52	58	62	68	68	A	A
5	38		34	34	31	32	40	A	A	A	A	A	A	A	55	55	56	54	53	56	57	57	58	58
6	58	37	34	44		51	A	59	A	A	58	A	A	A	49	A	A	55	58	58	60	57	58	58
7	57				40		A	A	A	52	B	A	A	A	A	A	A	A	57	57	58	57	49	
8	69	40	41	36	46	56	56	55	58	58	59	A	A	A	A	54	A	52			57	64	59	56
9			40	40	38	41	A	50		59	58	A	A	A	A	49	A	56	A	64	72	64	57	
10	38	A	35	32	37	39	A	A	56	A	A	A	A	A	A	A	A	52	56		66	57	A	41
11	35	A	32	38	41	39	A	A	55	56	A	55	A	A	A	A	55	56	56	63	64	54	57	57
12	38	38	40	38	38	N	52	55	60	56	A	54	A	A	A	54	56	A	A		60	59		
13		35	37	36	40	38		53	54	A	A	A	A	A	A	A	A	54			58	56	57	
14	56		38	41	40	50	A		A	49	57	A	A	A	A	A	A	52	57	54	57	57	57	56
15	56	54	44			57	56	A	A	A	A	A	A	A	A	56	71	68	83	57	49	58	60	
16	38	29	35	28	29		40	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	35
17	38	40	30	35	36	A	A	A	A	A	A	A	A	A	A	A	A	A	A	38	57		38	41
18		35	A	A	A	A	A	A	A	A	A		A	A	A	A	54	52	58	64	A	56	57	A
19	A	A	A	A	A	51	A	A	A	A	A	A	A	A	A	A	A	55	58	60	A	56	57	51
20		35		37	36	48	56	A	A	A	A	A	A	A	A	A	A	A	A	62	71	67	57	
21	37	40	32	38	37	53	57	55	49	A	A	A	A	A	A	53	A	A	57	56	57	57		56
22	48	37	35	28	30	36	A	A	A	A	A	A	A	A	A	A	A	A	37		56	57	57	
23	40	38	35	35	30	38	A	56	A	A	A	A	A	A	A	A	A	A	A	58	70	68	57	
24		43	36	41	31		51	58	61	A	61	A	A	A	A	A	A	A	A	67	64	71	70	69
25		57		40	35	54	A	A	A	A	A	A	A	A	A	57	57	A	A	58	68	71	67	59
26	55	A	56		29	58	A	A	A	56	A	A	A	A	A	54	A	52	58	63	57	69	61	58
27	58		54	54	A	38	A	A	A	A	A	A	A	A	A	A	A	A	A	A	57	60	60	47
28	A	A	A	38	43	51	57	A	A	A	A	61	54	A	A	58	58	67	69	67	69	60	58	
29			33	46		32	A	55	A	A	A	A	A	A	A	A	A	A	A	A	57	57		68
30		40		41	41	56	58	A	63	A	56	A	A	A	A	A	A	55	A	74	66	59		57
31	56	51	48		38	39	57	56	A	A	A	A	A	A	A	55	A	56	60	67		57	57	56
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	17	23	24	25	25	13	11								13	10	18	18	22	27	29	23	20
MED	40	40	36	38	37	39	56	55								55	56	55	58	60	60	57	57	56
U Q	56	41	41	40	40	52	57	58								56	58	56	60	64	66	64	59	58
L Q	38	36	34	35	31	37	40	55								53	55	52	56	57	57	57	57	48

HOURLY VALUES OF fEs AT WAKKANAI

MAY 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	34	71			G	30	36	44	37	61	60	45	30	36	40	29	50		59	60	55	42	43	55
2	43	38	32	25	G	G	36	32	47	36		37	40	77	34	28	24	41	38	G	29	41	28	31
3	62	33	G	G	G		28	39	63	72	40	33	38	30	30	34	39	29	32	25	48		28	24
4	G	24	G	G	G	26	27	31	38	37	47	38	32	31	35	28	28	25	28	28	35	30	35	34
5	29	G	28	G	30	28	31	38	35	36	44	33	32	31	31	28	58	31	35	G	G	G	30	G
6		25	G	23	G	22	30	30	27	28	32	39	40	37	33	30	26	26	30	G	36	33	G	G
7	G	G	G	G	28	29	39	42	57	31	B	36	32	37	58	55	64	34	32	G	G	G	G	G
8	G	G	G	G	G	30	37	35	33	30	31	32	34	30	31	32	36		30	G	G	G	G	G
9	G	G	G	G	26	32	37	34	47	41	37	32	35	32	31	41	28	36	84	34	36	34	23	G
10	29	36	29	28	G	24	47	61	41	76	60	40	32	30	31	29		43	52	55	30		46	36
11	38	36	G	28	G	36	30		54	36	39	38	35	34	38	41	46		52	29	37	27	33	
12	40	31	36	35	27	26	29	30	40	41	54	44	34	33	28	30	32	57	60		G	G	G	G
13		G	G	27	G		29	35	35	43	38	35	32	29	43	42	31	35	38	26	G	G	G	
14	G		G	G	G		29		28	29	37	28	31	32	32	28	27	23	28	G	G	G	27	34
15	35	27	G	G	G	24		36	36	40			36	35	36	34	34	28	36	G	G	G	G	G
16	G	23	G		26		26	28	32	34	28	31	35	34	32	29	34	50	47	47	50	41	41	38
17	23	G	G	G		33	29	35	40	38	39	87	43	59	30		58	44	42	33	G		G	G
18	G	25	31	28	30	36	54	47	61	42	41	G	36	42	75	40	40	25	34	39	85	63	46	60
19	60	55	40	37	40	35	54	56	67	68	60	56	34	32	41	33	36	35	40	32		87	32	30
20	24	G		25		36	38	47	57	58	52	52	65	66	31	31	54	69	57	41	34	38	23	G
21	25	27	27	G	G	39	44		60	56	76	40	34	36	32	30	33	45	36	G	G	G	28	32
22	28	27	G	G	G	32	40	42	71	42	64	42	37	38	31	37		75	50	56	34		32	24
23	G	22	30	28	28	28		46	39	66	36	32	35	54	60	40	98		58	43		32	45	G
24	G	G		G	G	31	39	44	46	43	39	39	35	34	34	58		58	59	45	32	24	G	G
25	G	G	G	G	G	32	36	46	56	37	42	40	38	37		30	27		87	36	30	46	29	38
26	31	43	37	G	G	30	38	44	35		59	52	43	36	39	44	37	45	30	28	29	27	26	24
27	G		28	24	32	38	38	45	52	58	39	42	38	38	32	30	28	42	44	46		40	34	44
28	35	33	29	33	30	36	31	33	47	42	32	36	39	72	59	33	30	40	40	38	58	58	40	33
29	41	32	36	28	30	27	38	46	36	31	44	61	40	63	89	150	72	63	46	61	43		34	28
30	28	33	G	G	G	32	30		56	81	56	96	41		55	72	46	40		55	65	59		32
31	27	32	30	25	G	27		51	55	42	41	40	38	37	30	34	59	47	37	39		35	30	59
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	28	29	29	27	28	27	31	30	28	30	31	30	30	30	28	25	30	30	27	26	30	29
MED	27	27	G	G	G	30	36	42	46	42	41	39	35	36	34	33	36	40	40	34	32	32	28	28
U Q	35	33	30	28	28	35	38	46	56	58	55	44	39	38	41	41	52	46	52	45	43	41	34	35
L Q	G	G	G	G	G	27	29	34	36	36	37	33	34	32	31	30	29	30	34	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT WAKKANAI

MAY 1997

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

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

HOURLY VALUES OF foF2 AT KOKUBUNJI

MAY 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	57	48	42	38		58	48	94		A	A	A	A	A	68	66	66	71	A	74	60	69	69	57
2	58	57	50	41	43	50	58			68	A	A	A	78	74	74	81	72	69	68		71	46	A
3	44	43	44	38	35		42	A		A	41	67		A	72	74	81	82	81		70	49	48	
4	68	42	34	37		46	A	57	55	A	52	A	A	54	54	66	56	57	70	90	94		A	36
5	37		38	34	31	A	71	57	53	A	A	A	A	60	60	A	71	70	66		69		46	48
6	47	42	38	41	36	48		56	53		63	60		A	A	55	52	A	74	74		45	47	47
7	47	A	42	37	36	43	57	57	58		59	58	54	54	A	52	59	59		71	A	57	60	68
8	59			37			63		64	72	70	A	A	62	A	51	64	71	74	68	70	A	A	A
9	57	A	41	41	38	A	A	A	A	A	A		54	A	A	A	65	A	A	79	70	A	A	A
10	A		41	36	31	A		A	A	A	A	A	A	A	A	A	A		A		80	57		A
11	38		A	35	A	A	A	A	A	A	A	A	62	A	A	A				55	59	57	47	46
12	45							56	57	A	A	A	A	A	A	A	73	A	84	74	A	A	A	47
13		A	A	36		56	57	57	A	58	A	A	49	A						73	64		57	
14	46	45	44	41	31		57	56	56	53					A	62	67	72	69		63	56	57	47
15	58	56		43	38	47	47		A	50	A	A	58	A	A	73		90	A	93		69	74	
16		68		51	57	48	41	45	A	A	A	A	A	B	A	A	A	A	42		49		41	A
17		32	A	37	37	A	A	47	47										B	58	A	A	57	A
18	A	A	A	A	35	A	52	A	A	A	A	A	A	A	73	A	A	77	83	82		A	45	42
19	A	44	38	41	A	A	47	51	56	A	A	A	A	A	160	70	80	71	71	68	68	57		57
20	56	56	58		38	45	58	60	A	A	A	A	A	A	A	52	A	A	92	92	91	69	A	A
21	44		37	38	A	48	47	61	A	A	A	A	A	A	A	A	A	A	56		68			57
22			46	37	37	41	56	A	A	A	A	A	A	A	A	A		A		67	A	A	47	A
23	48	58	41	40			48	60	61	A		A	A	A	A	52	A	61	60				70	A
24	56	48	45	35	37		A	68	71									59	66	69	68	68		57
25	50	47	50	47	38	48	45	52	54	52	A	53	56	61	67	64	56	55	56		69			48
26	57	56	50	48	46	48	57	64	54	A	A	A	A	A	A	64	66	68	69		63	68	60	57
27	A	A	A	44	42	A	A	A	A	A	A	A	A	A	A	50	56	A	54	A	A	57	57	57
28	46	A	35		A	42		48	48	A	A	A	A	59		69	71	64	80	68	68		57	
29	57	57	49	48	47	A	58	50	A	A	A	A	B	A	A	A	55	51	53			A	A	A
30	45	A	A	38	37	45	50	58	63	60	A	A	A	A	53	63	66	72	82	82		A	A	A
31	A	35	A	A	A	A	A	A	68	A	A	A	A	A	A	A		70	70	68	57	A	56	51
	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	17	20	26	20	15	20	20	16							17	18	19	22	20	19	14	19	16
MED	49	48	42	38	37	48	54	57	56							64	66	70	70	72	68	57	57	50
U Q	57	56	47	41	40	48	57	60	62							69	71	72	80	80	70	69	60	57
L Q	45	42	38	37	35	45	47	51	53							52	56	59	60	68	63	57	47	47

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT KOKUBUNJI

MAY 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G		40	49	62	61	92		50	34	49	56		72	55	64		41	51
2		40	58	31	29	35	34	44	49	58	51	49		55	30	28	29	37	49	34	G	G	33	59
3	53	48	26	G	G	G	28	52		32	50	50	31		G	31	28	34	33		49	33	40	
4	32	29	G	G	G	G	40	39	50	44	G	32	31	G	30	30	31	32	32	43	G		53	
5	G	G	G	G	G	32	34	54	60	54	58		32	32	41	48	39	27	30	30	29		48	G
6	G	G	G	G	G		34	32	30	37	31	37	37	51	28	26	25	57	48	G	26		28	29
7	30	39	27		29	26	36	50	40	G	G	G	42	G	75		44		149	92	63	60	G	G
8	G	G	G	G	G	25	27	32	33		43	40		G	27	34	G	30	30	33		39	61	45
9			32	29	G	50	72	70	86	70	52	G	48	52	55	55		70	180		57			58
10	49	56	40	29	G	28		55	142		135	144	135		48	67	125				54	61	31	
11	30	26	28	32	55		53	91	88	64	58	58	56		89	94	72	72		48	60		25	
12	G	22	27	G	G	28	24	44	55	58	39	59	58	55	72	72	55	73		39	56	52	52	G
13	G	34	32	G			44	54	45	34	41	40	33	39						34	G	41	33	28
14	G	G	G	G		48	30	42	50	47				G	32	38	28	60	55	55	49	27		G
15	30	44	33	39	31	27	32		58	56		46	G	35	41		40	30	72		32	29	G	57
16	G	G	37	33	26	29	40	41	44	49	50	51	56	B	50	35	25	62		38	67	59	56	59
17		40	34	32	29	29		49	43										B	60	52	43	41	
18	46	40	36	36	G	40	44	66	59	66	87	51	53	62	74			54	72	68	56	48	32	52
19	56	41	28	30	31	29	29		50	55	61	83	54	91	109	56	46	39	42	37	30	28		40
20	55	50	52	29	28	34	41	52	69	59	56	50	45	38	49	53	60	59			70	56		45
21	38	29	G	G	35	33	28	31	89	84	61	74	90	74	112	86	70	51	32	29	35			30
22	34	34	38	26	G	25	39	49	60	70	61	71	80	91	111	88	125			69			73	71
23	72	69	61	47	G	G	42	56		51	90	60	59		48	47	44	53	58	94	56		54	72
24	40	28	27	30	28	27	38	42	59									49	41	33	43			30
25	27	26	26	24	G	30	37	43		31	39	G	39	52	31	31	48	28	41	55	69			50
26	46	49	45	28	G	G	30	33	50	69	91	65	105		41	33	38	47	34		33	28	35	
27	60	49	61	48	G	35	55	46		56	57	60	56	60	82	31	28	67	37	85	55	70	72	56
28		44	37	G		32	43	41	36		44	53	53	47	42	58		42	64	41	38	G	34	
29	55	52	56	72	50	41	33	44	51	50	53	55	B	42	54	39	56	48	37				60	62
30		42	38	36	42	43	32	49	54	56	57	50	61	145	50	31	60	68	55	47		49		40
31		62	44		58	103	87	60	60			85	90		176	65		30	42	35	34		56	52
	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	30	31	29	28	28	28	29	27	25	26	27	24	22	28	25	24	25	23	24	27	18	23	24
MED	32	40	32	29	G	29	36	46	51	56	54	51	54	50	48	47	44	49	42	42	49	42	41	48
U Q	51	48	40	32	30	35	42	54	60	63	61	65	60	60	74	61	58	61	64	57	57	56	56	57
L Q	G	26	26	G	G	25	31	41	45	45	43	40	38	35	33	31	28	33	34	34	32	28	32	29

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT KOKUBUNJI

MAY 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	14	14	15	15	15	21	16	16	16	24	20	24	30	26	18	15	15	14	15	14	15	14	14
2	14	14	14	15	14	17	18	14	16	18		33	34	34	44		16	14	15	14	15	14	14	14
3	15	15	14	15	16	17	14	15		24	29	27				16	15	14	14	14	15	15	14	
4	14	14	15	15	15	16	16	15	16	22			22			16	14	14	15	17	14		15	14
5	15	15	14	14	15	15	16	15	18	28	23	23	20	26	20	16	15	17	15	14	14		14	14
6	15	14	15	15	15	17	14	15	16	24	23	23			17	16		15	15	15	15	14	15	14
7	14	14	14	15	15	17	14	14	14		27		35		16	16	14	18	14	15	15	14	14	15
8	15	14	14	15	15	18	14	15	18	21	26	26	22		17	17		15	15	15	15	14	15	15
9	14	14	14	14	14	14	14	15	15	21		33	33	35	33		17	14	14	14	14	15	14	15
10	15	14	15	15	15	14		18	15	16	20	22	23	28	21	17	14	14	15		14	15	14	15
11	15	15	15	14	14	14	14	16	15	32	34	32	34	34	33	21	16	14		16	15	15	15	14
12	15	14	14	15	14	15	18	16	15	15	23	24	29	24	29	33	20	16	15	15	16	15	15	15
13	15	15	14	15	15	16	17	15	15	23	21	22	24	28						15	15	15	14	14
14	15	14	15	14	14	15	14	14	16	17					26	15	15	14	14	14	15	14	14	14
15	15	15	14	14	15	14	16	14	15	16	15	22		26	18	18	15	14	14	14	15	14	15	14
16	15	15	14	14	14	14	15	16	15	21	32	33	33	B	17	18	15	15	15	14	15	14	15	14
17		14	15	14	14	15	15	15	17										B	14	15	14	15	15
18	15	14	14	15	14	16	17	17	15	23	28	32	30	35	20	17	16	15	15	15	14	14	14	14
19	14	14	15	15	14	15	15	15	18	16	30	26	33	29		21	15	14	15	15	14	15	15	14
20	14	15	14	15	14	16	14	14	14	16	24	33	33	30	21	20	14	14	14	15	14	14	15	14
21	15	15	14	14	15	15	14	16	15	16	17		33	21	21	14	16	15	15	15	15			14
22	14	14	15	15	14	17	14	15	15	20	21	24	32	30	29	16	17	14		15	14	14	14	14
23	15	14	14	15	15	16	15	15	14	21	23	20	24	20	17	18	15	15	15	15	14		15	14
24	14	14	14	15	14	20	15	15	16									15	14	14	14	14		14
25	15	14	14	14	14	15	14	14	15	21	23		48			20	14	15	16	15	15			15
26	14	15	14	14	15	16	15	15	15	17	20		30	24	18	20	15	15	16	15	15	15	14	14
27	15	14	14	14	15	14	16	15	14	15	21			29	21	16	14	15	15	14	14	14	14	14
28	14	14	14	15	14	15	16	15	14	15	18		36	36	33	17	15	15	14	15	14	16	14	
29	14	14	15	14	15	14	15	15	14	17	17	23	B	17	17	16	15	15	16			15	15	15
30	14	14	14	14	14	15	15	15	20	18	22	21	26	24	23	17	18	15	14	15	14	15	14	15
31	15	14	14	14	15	15	15	15	16	17	20	32	22		21	24		15	15	15	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	30	31	31	31	31	31	30	31	30	28	25	21	23	20	24	26	25	29	27	29	30	26	28	29
MED	15	14	14	15	15	15	15	15	15	18	23	24	30	28	21	17	15	15	15	15	14	14	14	14
U Q	15	15	15	15	15	16	16	15	16	21	26	32	33	32	27	20	16	15	15	15	15	15	15	15
L Q	14	14	14	14	14	15	14	15	15	16	20	22	24	24	17	16	14	14	14	14	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT YAMAGAWA

MAY 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	54	A	48	49	59	N	53	70	66	62	66	71	65	67	82	83	83	90		76	A	A	52	
2	62			24	25		60	60	80	71	A	A	74			80	86	83		72		A	49	53
3	30		A		A	38	30			66	68	66	66	81	78	81	93	94	89	82	A	A	A	69
4		39	34	31	30	31		52		66	66	66	A	A	71	83	83	83	89	86	86	79	79	
5	69					B	53	54		67	A	68	72	72	72	67	67	66	83	90	49	35	42	A
6	26	36		32	30	32		49	72	84			65	66		57	63	73	87	83			22	
7		42	42	32			54		70	57	67	62	67	77	82	80	74	71	70	59	A	59		59
8		32	31		53	A	46	50	69	67		A	60	63	67	70	83	88		66			N	53
9	32		49		30		47	66	71	61	A	A	A	72	A	74		90	86	72		A	A	
10	40	32	32		39	30	52	53	69		57	A	A	A	75	83	83	79	A	A	84	A	A	A
11	32				34	32	49	46	A	A	A	A	122	159	79	A	86	80	A	A	A	A	A	
12	53									55	57	A	A	A	70	84	96	101	A		A	A	A	A
13	A		A	32		37	50	55	57	66	A	A	A	63	71	78	83	74	A	39			B	B
14	B				B				53	A	A	65	57	A	A	A	74	78	78	69		B	B	
15	B		B		B		42	53	54	A	A	A	73	74	74	80			59			B	B	B
16			B	B				39		69		72	A	A	B	B	B	53			B	B		B
17		B	A	B	B	B	39	49	A	A	A	A	A	A	A	A	64		59		B	B	B	
18			B	A			30	55	59	A	79		A	76	72	A	81	90	87			A	B	
19	B				B	B	B	49	52	54	A	A	A	79	89		95	94			B	B	B	B
20	B			B		B	39	A	54	58	A	A	A	A	78	82	74	A	59			B	B	B
21	B		B	B	B	B	50	55	A	A	79	79		A	82	78	73	73			B	B	B	B
22	A	B		A	A	A	36	53	51	A	A		A	A	63		A	A			A	B	B	A
23	B	A	B		B		B	41	49	A	A	A	A	A	A	55	A	53	49	A	B	B	B	B
24	B						29	38	A	91			A	64	66	71	70	74						B
25	B	B	B		B	B	42	A		60	62	63	80	76	A	67	64	54	52		B	B	B	B
26	B	B	B	B	B	B		53		A	57	A		64	64	73	76	74		B	B	B	B	B
27	B	B	B	A		B	40	A	54	A	A	A	A	A	A	63	66	A	49	A		B	B	
28	A	B		B	B		47	A	A	A	A		59	A	73	72	62	54	52		B	B	B	B
29		B	B	A			36	42		60	63	60		63	60	65	64	71		A		B	B	B
30				B	B	B		49	A	A		A	A	A	A	68	78	87			B	B	B	B
31		A				A	28	63	A	A	72	A	A	67	78	74	75	84				B	B	
	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	16	17	12	10	12	17	21	24	26	26	15	11				
MED							44	53	58	66	66	66	66	72	73	74	76	78	70	72				
U Q							50	55	69	68	70	71	73	76	78	80	83	88	87	83				
L Q							36	49	53	59	59	63	62	64	68	67	67	71	52	66				

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT YAMAGAWA

MAY 1997

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	24	G	G	26	G	29	40	37	36	39	30	52	43		50	39	38		46	40	31	46	
2	53		30	30	40	28	24	40	33	50		62	62	53	54	30	29	29	32	33	32	33	40	32
3					30	G	30	32	51	44	63	54	64	66	53	30	36	32	32	G	39			
4		32	33	G	G	G	29	40	45	56	52	37	66	78	60	30	29	50	80		39	G	30	G
5	34		34	34	G	B	32	36	32	34	31	30	56	29	G	30	34	31		36	31	G	28	32
6	28	G	G	G		28		30	31	31		30	30	G	31	30		31	33	29	G	G	36	38
7		G	G	G	G	G	32	38	44	50	49		31	30	29	31		49	40	54		22	31	27
8	30	30	G	G	G		32	30	37	34		32	52	G	31	30	28	27	36	36	G	32	31	40
9	31	32	21	G	G	G		38	45	49	54	79	76	57	77	92	56	59	58	60		41	33	36
10	45	72	34	34	44		30	36	44	55	55	55	88		65	70	55	81	115	141	151	92	40	93
11	39	37	21		48	21		39	35		117	150	126	137	67	91	76	80	86		92	93	58	G
12										55	57	64	63	58	56	78	62	100	118	117		40	58	38
13		G	28	31		G	32	46	55	48	39	73	65	56	G	G	54	60	50	G	G	G	B	B
14	B	G	G	G	B	G	G	G	39	70	78		61	58			48	39	G	G	G	B	B	G
15	B	G	B	G	B	G	G	45	59	60	58	71	G	79	50	G	G	G	G	G	G	B	B	B
16	G	G	B	B	G	G	G		G	48	110	80		61	B	B	B	34	70		B	B	G	B
17	G	B	40	B	B	B	G	60	60	58	66		61	61	94	97	G		46	G	B	B	B	G
18	G	G	B	40	G	G	G	G	G	69	70	71	71	61	92		57	G	58	58	G	41	B	G
19	B	G	G	G	B	B	B	G	49	G	61	72	72	103	98		60	59	G	G	B	B	B	B
20	B	G	G	B	G	B	G	48	49	60	74	67	78	60	72	40		71	59	G	G	B	B	B
21	B	G	B	B	B	B	G	59	60	115	84	90		61	60	70	61	55	53	G	B	B	B	B
22	159	B	G			92	49	44	60	60	86		97	110	G		185	175	111		136	B	B	138
23	B		B	G	B	G	B	G	58	70	57	50	133	91	64	41	78		43	49	B	B	B	B
24	B	G	G	G	G	G	G	49	105		128	117	94	41	58	50	53	57		G	G		G	B
25	B	B	B	G	B	B	G	39		49	50	44	G	52	92	G	G	44	44	49	B	B	B	B
26	B	B	B	B	B	B	G	G	G	40	56	61	104	46	60	61	54	50		B	B	B	B	B
27	B	B	B		G	B	48	93	50	70	72	74	72	71	74	G	55	136	92	70	G	B	B	G
28	128	B	G	B	B	G	48	44	40		86	G	G	68		41	50	39	G	G	B	B	B	B
29	G	B	B	70	G	G	46	57		45	G	51	G	G	G	G	G	43		49	G	B	B	B
30	G	G	G	B	B	B	G			82			42	58	60	G	G	69	58	48	B	B	B	B
31	G	135	G	G	G	58	58	44	59		71	61	71	40	56	39	40	G		G	G	B	B	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	19	20	19	17	19	25	28	27	27	27	26	29	30	27	26	27	29	25	26	19	13	13	16
MED	29	G	G	G	G	G	29	40	45	50	61	62	64	58	60	35	50	49	50	34	G	32	33	30
UQ	42	32	29	31	28	21	32	45	58	60	78	73	77	68	72	61	57	64	75	49	39	41	43	38
LQ	G	G	G	G	G	G	G	31	35	44	52	44	47	43	31	30	29	31	32	G	G	G	29	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT YAMAGAWA

MAY 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	14	14	14	14	14	15	15	21	21	22	22	20	22	21	18	14	14	14	14	14	14	
2	14	14	14	14	14	20	15	14	18	20	21	22	21	20	21	20	18	14	14	15	15	14	14	14
3	14		15		15	14	14	15	15	20	21	22	35	41		23	18	15	15	15	14	14	14	14
4	14	14	14	14	15	15	14	15	14	18	22	21	21	24	20	21	17	14	14	15	15	14	14	15
5	14	15	14	14	15	B	14	14	15	17	20	21	21		48		18	15	14	15	15	14	14	15
6	15	15	14	14	15	15		14	15	20	18		22			20	16	14	14	14	14	18	14	15
7	14	14	15	14	14	14	14	15	17	20	22	21	22	21	21	18	17	15	14	14	14	15	15	14
8	14	14	14	14	14	14	14	15	17	20		22	22		23	21	20	14	14	14	15	14	14	14
9	15	14	15	14	14	14	15	15	18	20	23	22	23	23			16	14	14	14	14	14	15	14
10	14	15	15	14	15	15	15	14	15	20	20	20		22	22	18	17	14	14	15	14	15	14	14
11	14	15	15		15	15	15	15	16	20	21		35	21	20	21	18	15	14	15	15	14	15	28
12	15									20	21	23	22	23		23	20	16	14	15	14		14	15
13	14	15	15	14	14	14	15	14	16	20	21	30	30	32	49	45		17	20	15			B	B
14	B		18		B	16	27	34	18	30	34	39	40	32	32	30	29		15	21		B	B	
15	B		B	71	B	15		23	20	29	32	32	32	33	32		23	18	23	21		B	B	B
16		66	B	B			17	20			30	40	32	32	B	B	B	40	20	15	B	B		B
17		B		B	B	B	17	23	30	30	37	34	38	35	33	33			20	28	B	B	B	
18			B	66			27	20	21	30	32	32	33	34	32	32	21	20	16	16			B	
19	B			66	B	B	B	27	30		32	32	32	33			21	17	16	17	B	B	B	B
20	B	66		B		B	24	18	18	32	33	32	33	33	33	32	32	30	18	15		B	B	B
21	B		B	B	B	B	17	23	33	32	32	33		33	32	33	32	18	23	24	B	B	B	B
22		B		71			17	24	33	32	32		34	34	48		32	30	18			B	B	
23	B		B	91	B	71	B	17	20		33	33	33	36	34	33	30	26	20		B	B	B	B
24	B			81			17		33	33	32	32	32	32	33	27	21	20						B
25	B	B	B	91	B	B	18			32	33	33		33	33		46	28	18	15	B	B	B	B
26	B	B	B	B	B	B	26	34	20	32	32	33	33	33	32	22	21	18		B	B	B	B	B
27	B	B	B	81		B	17		32	32	33	34	34	34	34			30	18	16		B	B	
28		B		B	B		26	26	20	32	33			35	34		30	21		17	B	B	B	B
29		B	B	81			15	18		30				49		46	46		22	26		B	B	B
30		66		B	B	B		16	20	32		32	33	33	36		48		18	18	B	B	B	B
31				71			36	32	30	32	32	34	33		33	32	30			17		B	B	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	14	13	20	12	14	25	27	27	28	28	26	26	27	24	21	27	26	27	27	12	11	12	11
MED	14	15	15	40	14	15	17	17	18	30	32	32	32	33	32	23	21	17	16	15	14	14	14	14
U Q	15	15	15	76	15	15	21	23	30	32	32	33	33	34	34	32	30	21	20	17	15	15	14	15
L Q	14	14	14	14	14	14	14	15	16	20	21	22	22	23	22	21	18	14	14	15	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT OKINAWA

MAY 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		73	58		B	69		49	83	A	A	72	72	84	82		105		93	82	92		B	58
2	A	37	A	38	37	A	A	57	67	75	A	A	76	92	86	92	92	82	89	88		42	55	A
3	57	50	58	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B		108			57	57
4	A	A	A	A	35			63		62	66	69	80	80	90	91	91	85	78		93	A	A	
5		35	38	34	A	31		57			67	72		92	96		A	86	84	A	72	49		41
6		29	38	43	35				77			A	70		80	65	A	87	84	A	67	48		46
7		37	38	44			49	52	55	67	A	A	86	92	101	110		83			71			
8	46	A	44	38	A	58	58	66	63	67	A	63	77	77	92	91	91	90	66	74		38		48
9	A	44	38	B		38	37	63			A	68		A	102	107	118		89		68		A	46
10	43	46	A	38	A	A	38	64	67	A	A	58	66	73	81	91		90	84	93	68	59	B	
11	32	A	32	31	31	A	45	48	A	A	A	56	71		92	91	81	93	84	66	A	69	A	A
12	46				A	A	A	57	57	A	56	A	A	78		117		141		A	A	A	A	A
13	A	A	A	A	56			58	56	A	A	A	70	82	92	92	A	92			A	56		70
14		37	46	A	A	A	58	57	A	A	A	A	A	A	81	84	98	92	87			A	71	
15		69	57	A		35		55		A	A					A	123	125	59	A		82		
16	55		60	64	58	63	B	35	A	A	A	A	A	A	A	A	A		A	62	44	38	A	32
17	31	36	A	A	32	A	A	A	A	A	A	A	66	71	A	A	A	70	84	A	71	62	A	A
18	A	A	A	A	B	69	63	56	56	A	42	A	84		108		103	110	113			A		A
19	42		57	41	35	32	46	53	63	56	A	66	71		A	107	A	104	98	88		71	68	
20	43			38	38		58	59		55	57	A		90	107	106		119		112	103	68	A	46
21	44	A	57	57	34	38		A	56	A	A	60	A		88	89	93	91	A	A	67	A	A	48
22	A	59	38	A	A	A	A	A	A	A	A	A	A	71	80	87	87	83	79	A	A	A	41	A
23	A	A	A	A	A	A	A	68	57	A	A	A	66	74	74	73	77	72	70	A	A	63	56	53
24	57	54	56		A	A	A	49	A	A	A	A	A	114	111	111	111	106	94	A	55			A
25	58	56		56	B	59	58	54		58	58	66			91	90	82	76	73	68		56	A	A
26	A	42	A	32	38	37	50	57		54	62	61	A	69	82		91	93	82		A	69	71	48
27	58	A	37	A	38	A	A	A	A		A	A	A	A	77	75	77	80	A	A	A	A	A	48
28	37			38	35	34	45			A	A	A	A	A	60	60		70	76	66	68	66	58	
29	A	A	46	42	35	A	A	55			72	72	66	61	67	77		93		107		67		57
30	56	55	57	56	46		A	A	94	63	A	A	A	A	A	A	96	100	90	86	A	A	69	
31	A	A	37	A	29	31	A	57	63	56	60	56	A	60		93	90	92	84		68	69	60	58
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	15	15	19	16	16	13	12	23	14	10		13	14	17	23	22	18	27	22	13	14	18	10	15
MED	46	46	46	40	35	38	50	57	63	60		66	71	78	88	91	92	91	84	86	68	62	59	48
U Q	57	56	57	50	38	61	58	59	67	67		70	77	91	96	106	103	100	89	100	72	69	69	57
L Q	42	37	38	38	34	33	45	53	56	56		59	66	71	80	84	87	83	78	67	67	49	56	46

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

MAY 1997

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	B	G	G	42	41	38	42	49	51	G	G		46	50	40	33	28	40	B	G
2	41		60	28	40	46	41	35	43	47			44	51	50	48	34	49		48	G	25		37
3	40	26	33	41	41	B	B	B	B	B	B	B	B	B	B	B	B	B	66	50	G	37	40	60
4	65		40	51	38	27	G	34	41	46	52	48	40	41	45	48	56	71		82	58	34	29	G
5	G	G	36	38	38	34	27	38	26		50	43		48	50	65	68	70	60	71		G	G	G
6	26	G	G	G	G	G			32			58		45	45	59	66	47	42	44	39	G	G	G
7	G	G	32	36	25	G			51	60	62	70	86	50	37			77	34	48	G	G	G	G
8	G	38	40	41	41	28	G	36	39		34	35	G	45	G	38	44	37	30	26	28	39	34	34
9	44	G	G	B	G	G	G	38	38	33	37	G		103	87	80	94	88	42	G	28	35	34	33
10	G	32	38	39		48	33	37	46	66	75	38	G	G	45	36	35	38	33	24	G	G	B	
11	59	48		G	G	38	27	42	60	64	60	52	36	36	44	62	80	66	60	59	71	39	62	66
12	33	38	25	32		39	43	41	43	52	56	67	64	70		50	80	73	74	76		72	70	68
13	79	41	36	32	G	33	29	44	50	58	94	74	55	60	68	98		86			60	59		36
14		58		29	32		G	44	52	50	86	87	152	184		50		57	50	73	32	38	42	
15		39	35	40	33	G	G	34	43	40	74						93	72	57	48	26	29	26	G
16	G	G	G	G	59		B	34	34	38	38	35	37	40	52	44	64	41	48	31	36	40	53	37
17	38	23	36	41	31	52	53	55	72	80	144	148	53	56	95	94	72	61	42		41	66	60	73
18	65	60	44	40	B	G	G	35	43	58	51	78	82	66	97	66	66	63	64	59	33	40		39
19	32	26	22	G	G	G	G	35		42	51	51	50	62	91	37	111	76	64	67		48		29
20	26	G	G	G	G	G		40		42		69		68	41	36	52	48	59	68	67	66	65	39
21	36	39	41	37	25	G		48		84	64	61	152			96	52	61	116	70	92	59	56	40
22	41		68	38	70	96	62	66	103	135	91	180	118	62	73	79	73	76	66	90	118		58	67
23		60	60	40	36	26	58	70	67	47	54	58	57	56	G	31		49		66	64	65		59
24	27	32	34	83	59	27	38	59	71	76	91		106	127	56	59	59	42	49	60	41			
25	38	36		30	B	27	31	36	41	52	50	55	46	56	57	39	41	41	59	70	71		40	70
26		71	52	34	27	G	G	34	38	39	49	62	74	62	62	72	50	60	61	60	59	50	26	29
27	26		37	71	35	56		72		87	107	119	92	101	33	26	42	70	94		140	72	36	27
28		44	71	36	32	G	G	35	38	61	52		66	64	48	55	40	44	40	G	G	32	42	G
29	42	40		28		45	41	39	38		58	37	G	50	49	40	39	34			27	G	44	44
30	50	40	36	42	35	36	52	58	37	38	67	40	60	38	78	127	68	86		61	95	88	28	72
31	62	60	48		30	G	40	50		41	40	51	48	37	32	32	34		34		25	28	28	29
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	27	29	25	28	24	28	25	26	27	26	25	28	26	27	26	29	25	26	28	28	23	28
MED	37	38	36	36	32	27	28	40	43	51	56	56	55	56	50	50	58	61	57	60	38	39	40	36
U Q	44	44	44	40	39	38	41	49	51	64	75	70	84	65	68	72	72	72	64	70	65	59	56	59
L Q	26	G	25	28	13	G	G	35	38	41	50	43	42	43	41	38	42	45	41	44	26	28	28	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

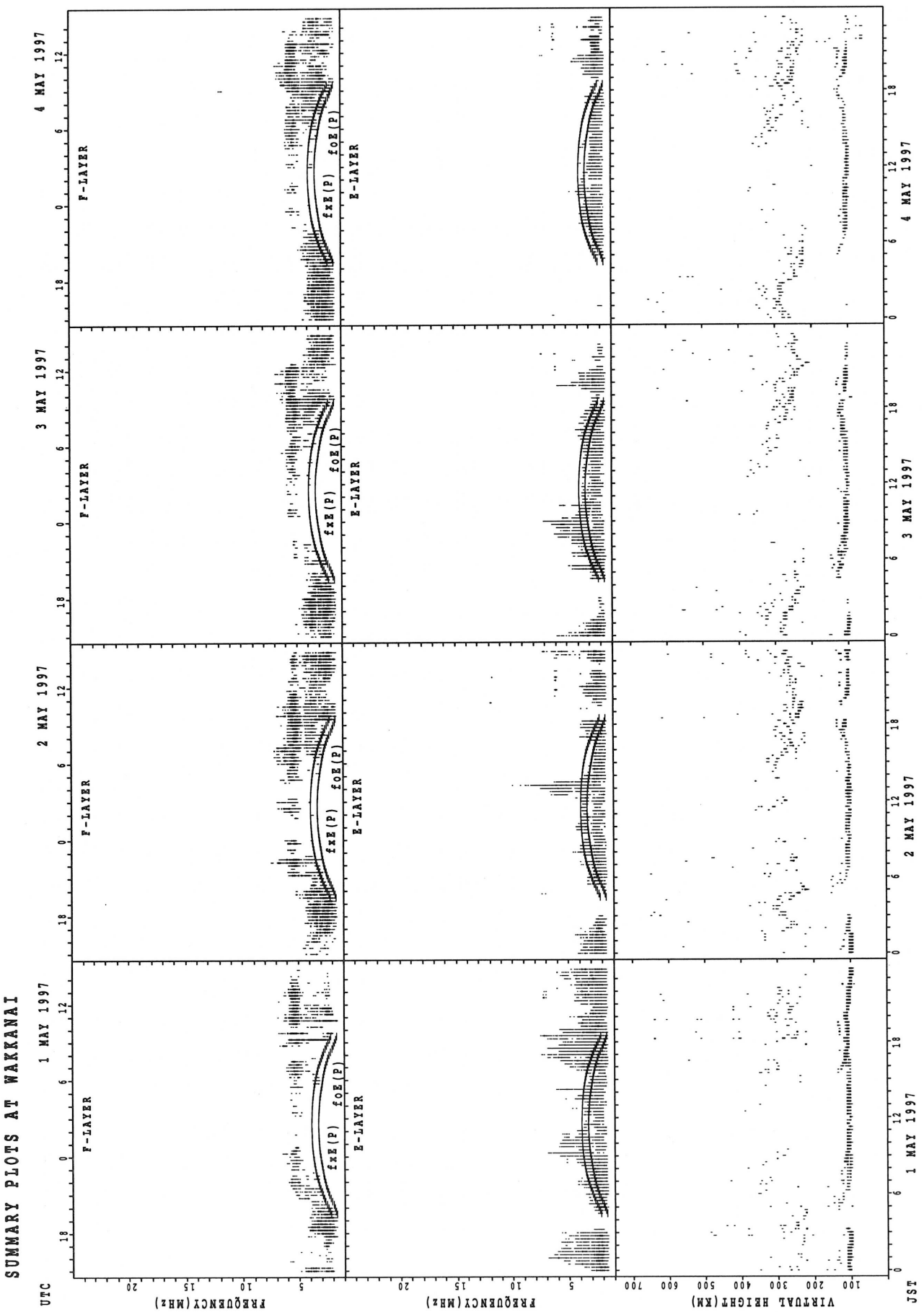
HOURLY VALUES OF fmin AT OKINAWA

MAY 1997

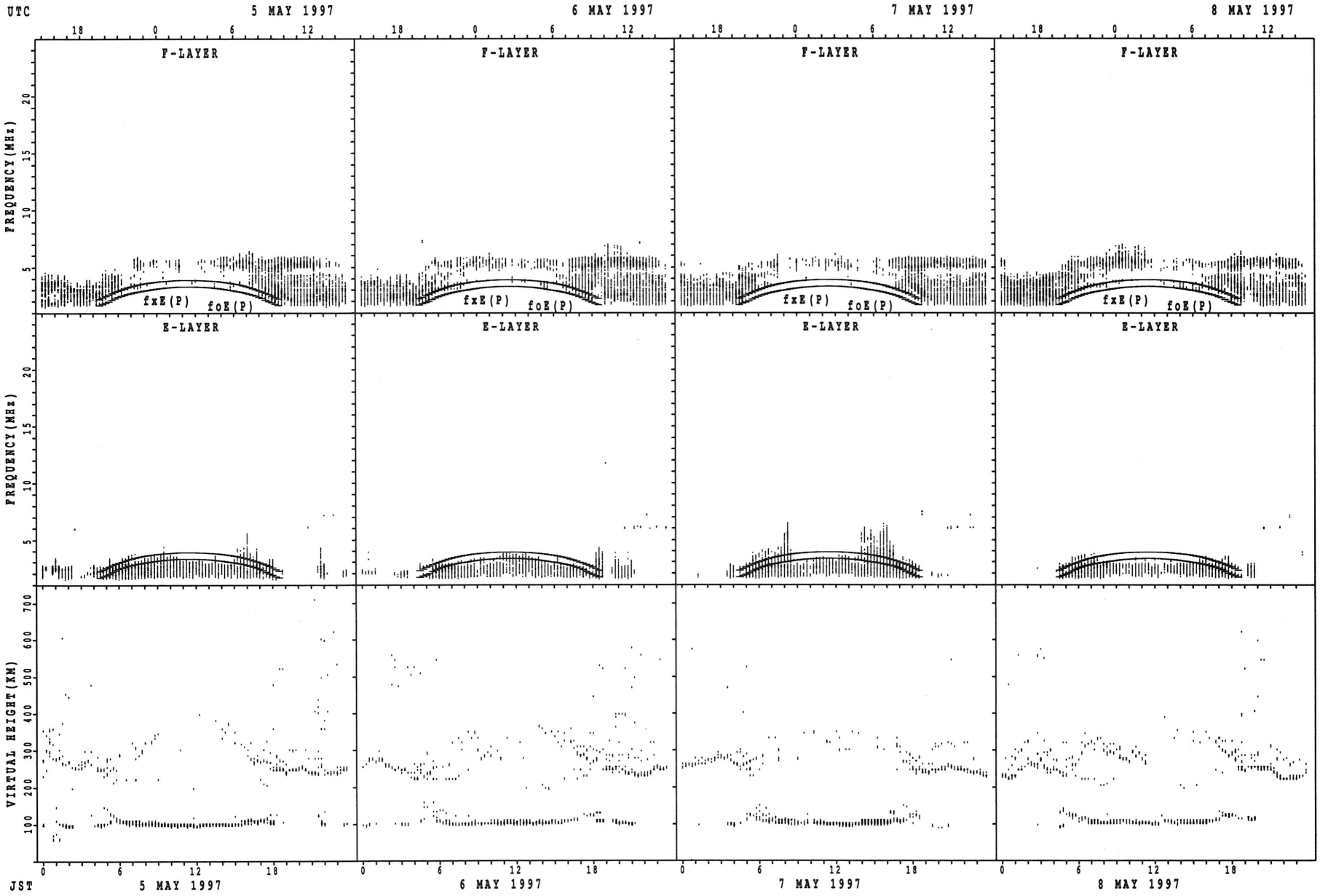
LAT. 26.3N LON. 127.8E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	28	17		B	16	17	15	16	22	26	32	35		49		20	16	15	14	14	18	B	20
2	29	15	17	15	15	15	14	14	15	17			50	36	34	22	16	14	15	14	18	16	15	14
3	14	14	14	15	15	B	B	B	B	B	B	B	B	B	B	B	B	B	14	14	18	16	15	14
4	15	15	15	15	14	15		14	16	18	32	28	28	30	26	21	17	15	14	14	15	15	15	
5	15	14	14	15	15	15	14	14	17	20	35	29		50	27	27	20	15	14	14	14	20		15
6	16	16	15	15	17	17	20	14	14			23	24		50	17	17	15	15	15	15	15		15
7	18	15	15	14	16	17	16	14	16	20	20	28	29	29	26	23		15	16	14	16	15	17	14
8	15	14	14	15	15	14	17	14	16	21	24	28		27			21	16	15	15	14	14	16	14
9	15	21	16	B	15	16	27	14	16	21	27			33	32	18	27	15	14	15	14	15	15	15
10	18	14	15	15	15	14	14	14	15	18	24	30	49	49	28	26	22	17	14	14	15	16	B	
11	15	14	16	15	15	14	14	14	15	17		30		29	26	20	17	14	15	15	16	14	14	15
12	14	15	15	14	14	14	16	14	15	18	32	27	34	33	40	32	18	16	14	14	15	14	15	15
13	15	15	14	14	14	15	15	14	16	17	24	28	30	40	32	24	15	14	14		15	14		14
14		14	15	16	15	15	22	14	15	18	17	30	35	30	32	30	16	17	14	14	16	15	15	
15		15	14	14	16	16	18	14	15	17	22					20	17	15	14	14	14	14	14	
16	18	15	15	15	14	14	B	14	14	16	20	29	26	32	22	23	17	16	14	14	14	14	14	14
17	15	14	15	14	14	15	15	14	15	16	18	28	29	29	28	28	17	16	14	15	15	14	15	14
18	15	15	15	16	B	15	17	14	15	20	24	27	30	28	23	18	20	17	14	14	14	14		14
19	14	15	14	14	15	15	15	14	15	16	15	27	26	28	24	20	16	15	14	14	15	14	15	15
20	15	16	15	15	15	15	14	14		15	23	28		29	24	21	17	15	14	14	14	15	14	14
21	14	15	14	15	14	15	14	15	15	18	18	29	29		28	18	17	15	14	14	14	15	14	15
22	15	14	14	15	14	14	15	14	14	17	21	23	41	24		20	18	14	15	14	15	14	14	14
23	15	14	14	15	14	15	14	14	14	16	23	26	29	38	49	48	18	14	15	14	14	14	16	14
24	14	14	15	15	14	14	14	14	16	17	23	22	27	26	24	21	17	15	14	14	15			15
25	14	14		15	B	14	15	15	16	16	20	24	28	30	30	29	24	15	14	14	14	14	14	14
26	14	15	14	14	14	14	18	14	15	15	16	21	27	26	27	27	18	15	14	14	15	14	15	15
27	15	15	14	14	15	16	14	14	15	15	22	29	30	28	24		18	15	14	14	15	14	14	14
28	15	14	14	14	14	15	17	14	14	16	18	18	20	32	22	18	17	16	14	18	15	15	15	15
29	14	15	14	16	14	15	15	14	16		18			26	21	15	15	14	15	14	14			14
30	15	14	14	14	15	15	18	14	16	18	24	21	26	30	35	16	20	16	14	14	16	15	15	15
31	15	14	14	14	15	16	20	14	15	17	20	28	27	23		21	18	17	14		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	29	31	30	29	28	30	28	30	29	28	27	26	23	26	26	27	29	30	31	29	31	29	23	27
MED	15	15	14	15	15	15	15	14	15	17	22	28	29	30	28	21	17	15	14	14	15	14	15	14
U Q	15	15	15	15	15	15	17	14	16	18	24	29	34	33	32	27	20	16	15	14	15	15	15	15
L Q	14	14	14	14	14	14	14	14	15	16	18	24	27	28	24	18	17	15	14	14	14	14	14	14

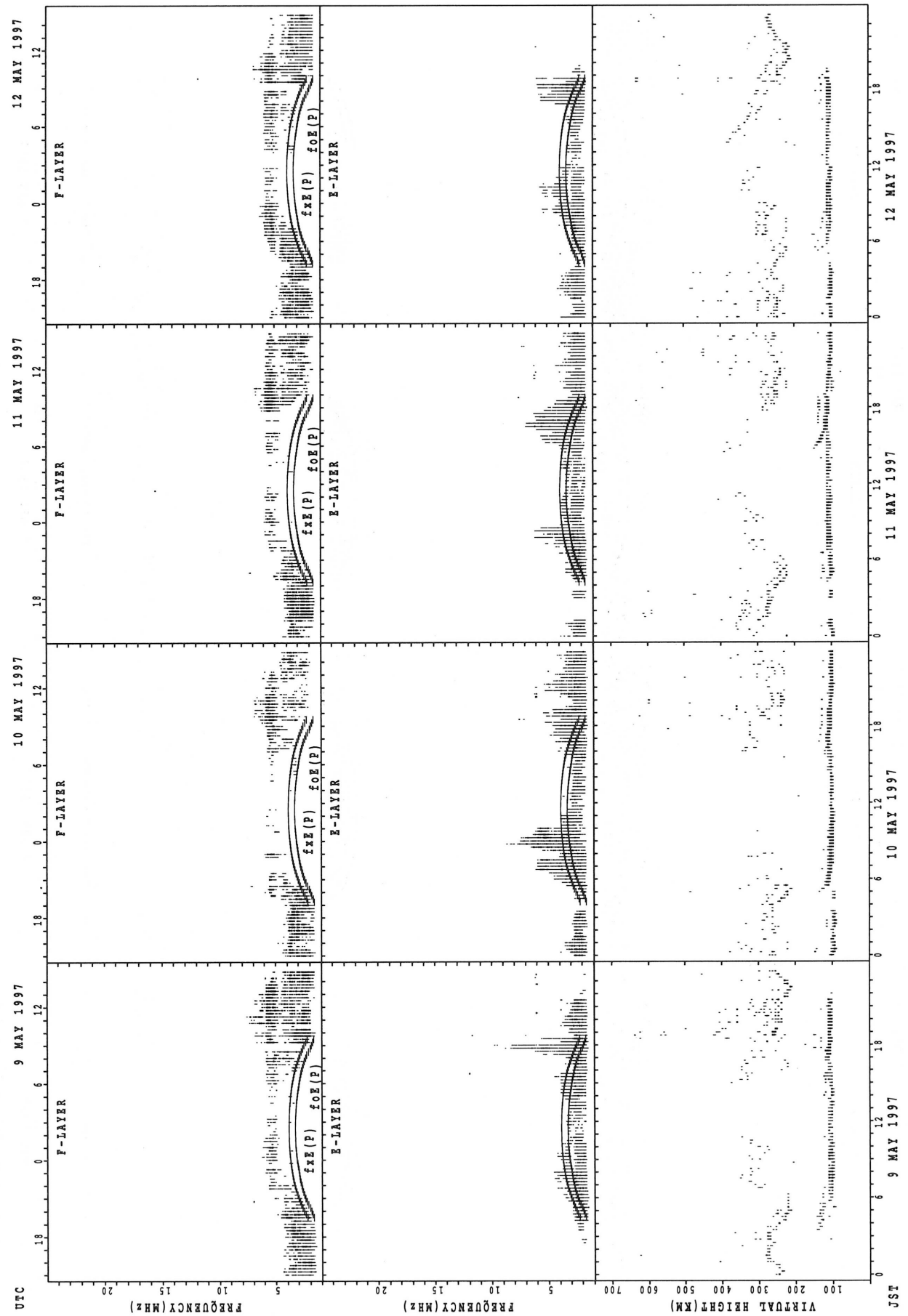
COMMUNICATIONS RESEARCH LABORATORY, JAPAN


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

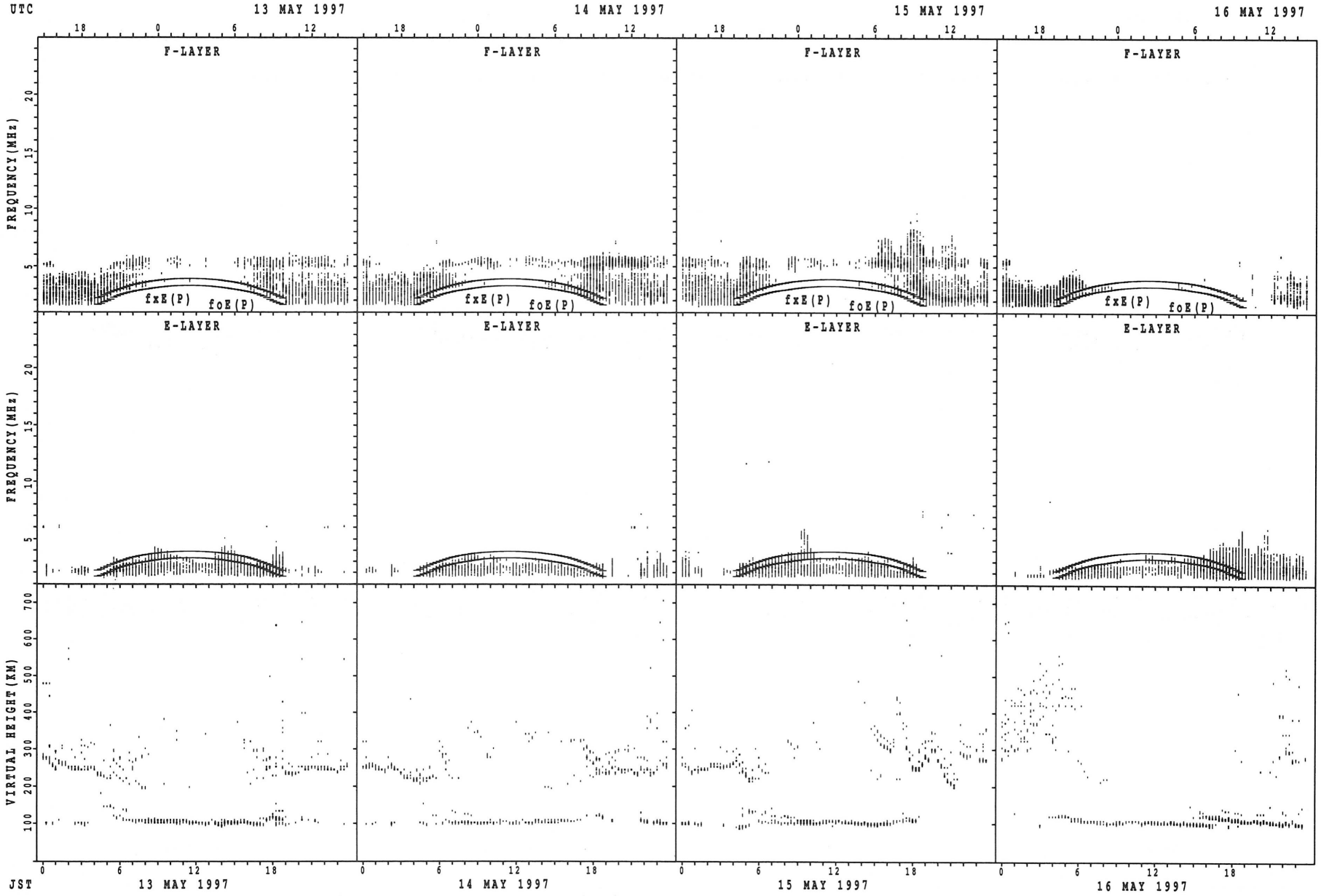
SUMMARY PLOTS AT WAKKANAI



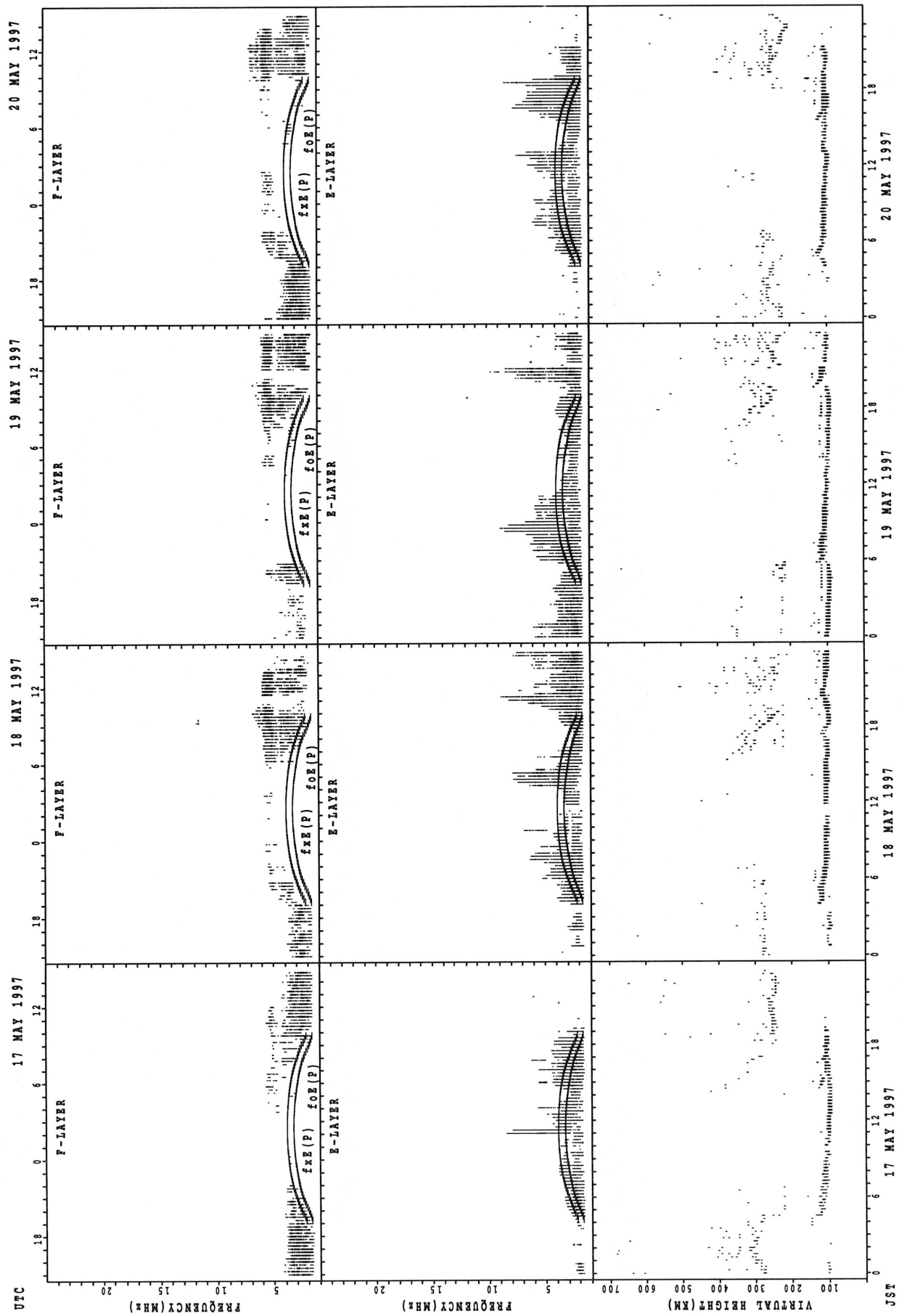
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

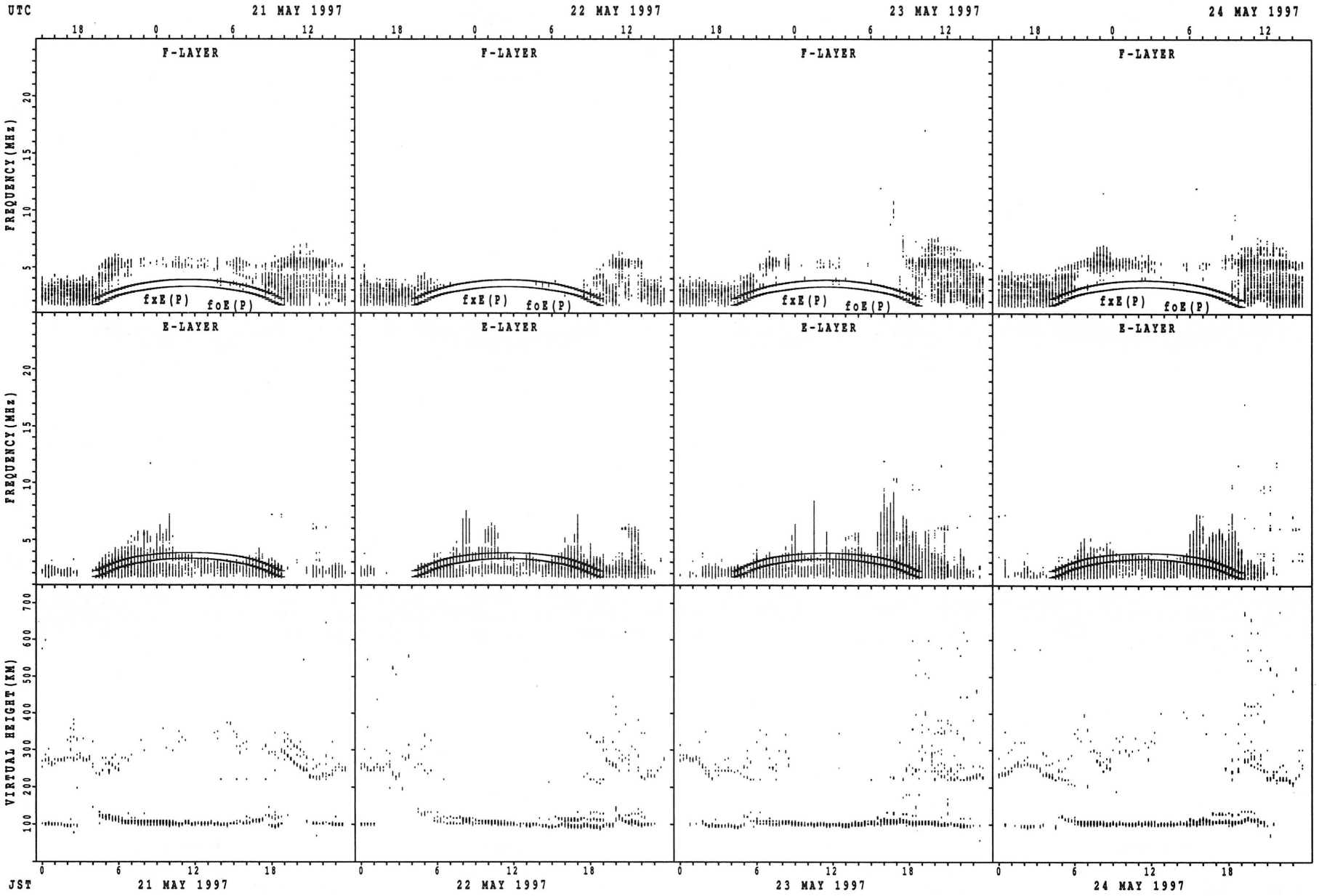
SUMMARY PLOTS AT WAKKANAI



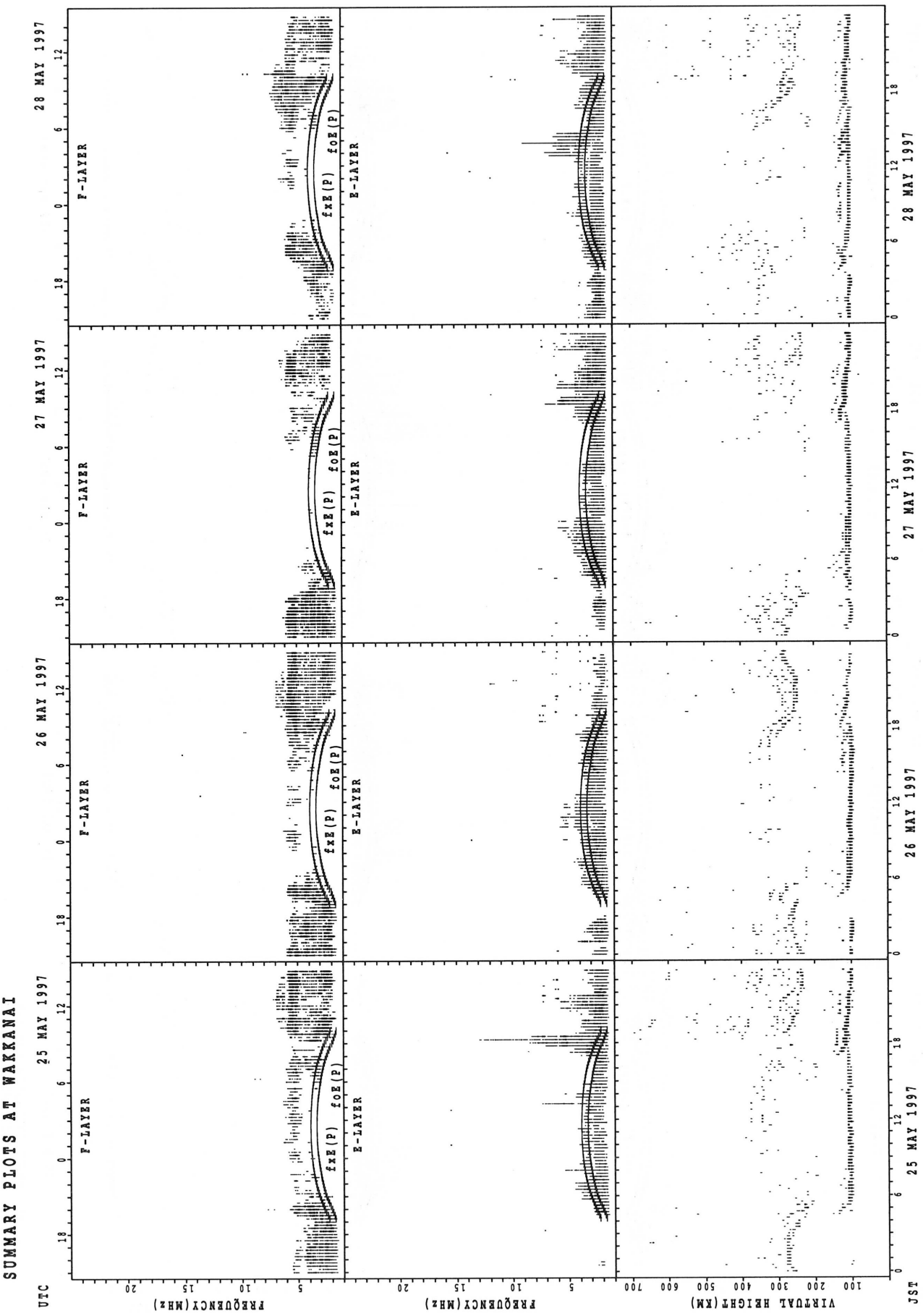
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

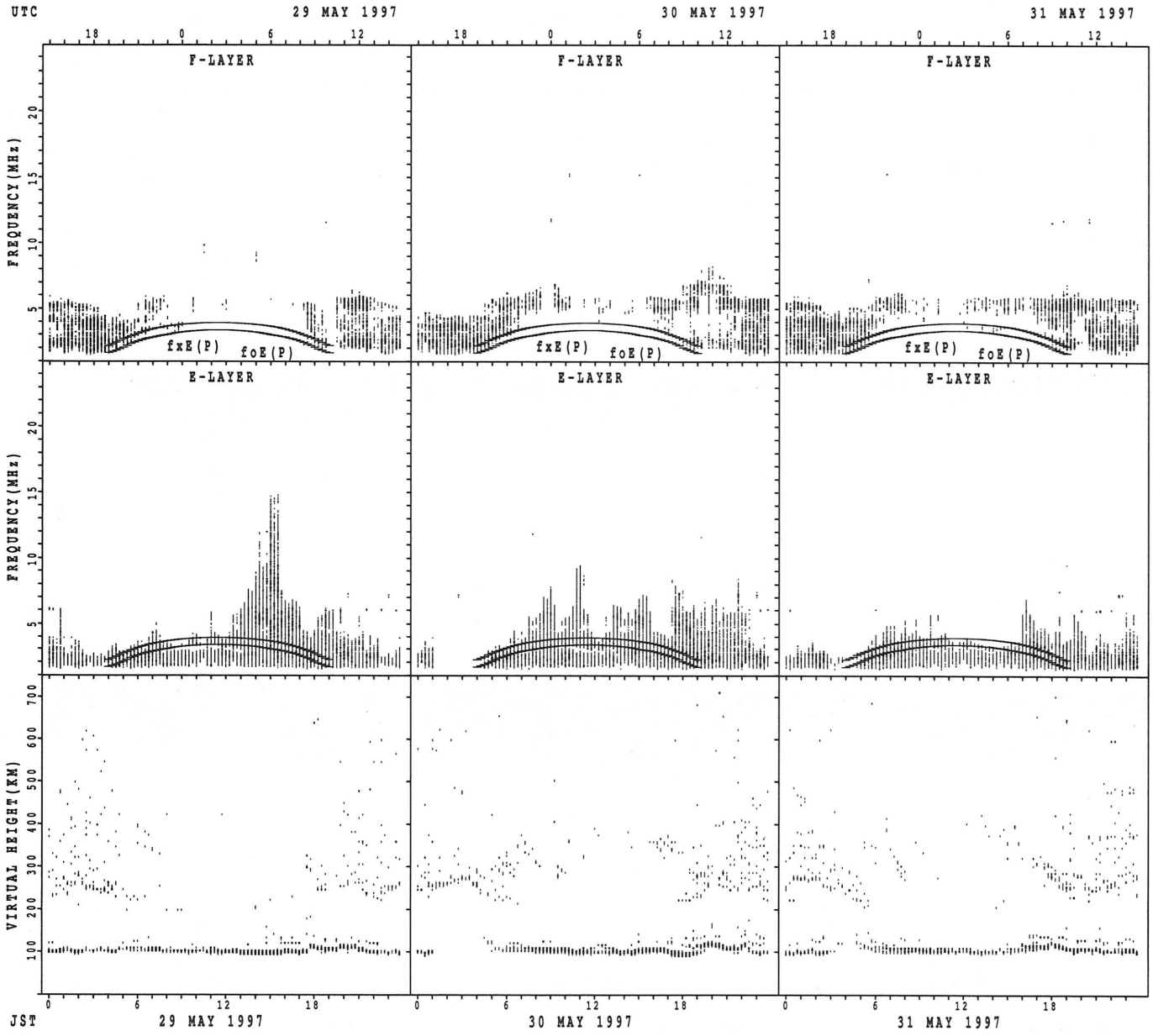
SUMMARY PLOTS AT WAKKANAI



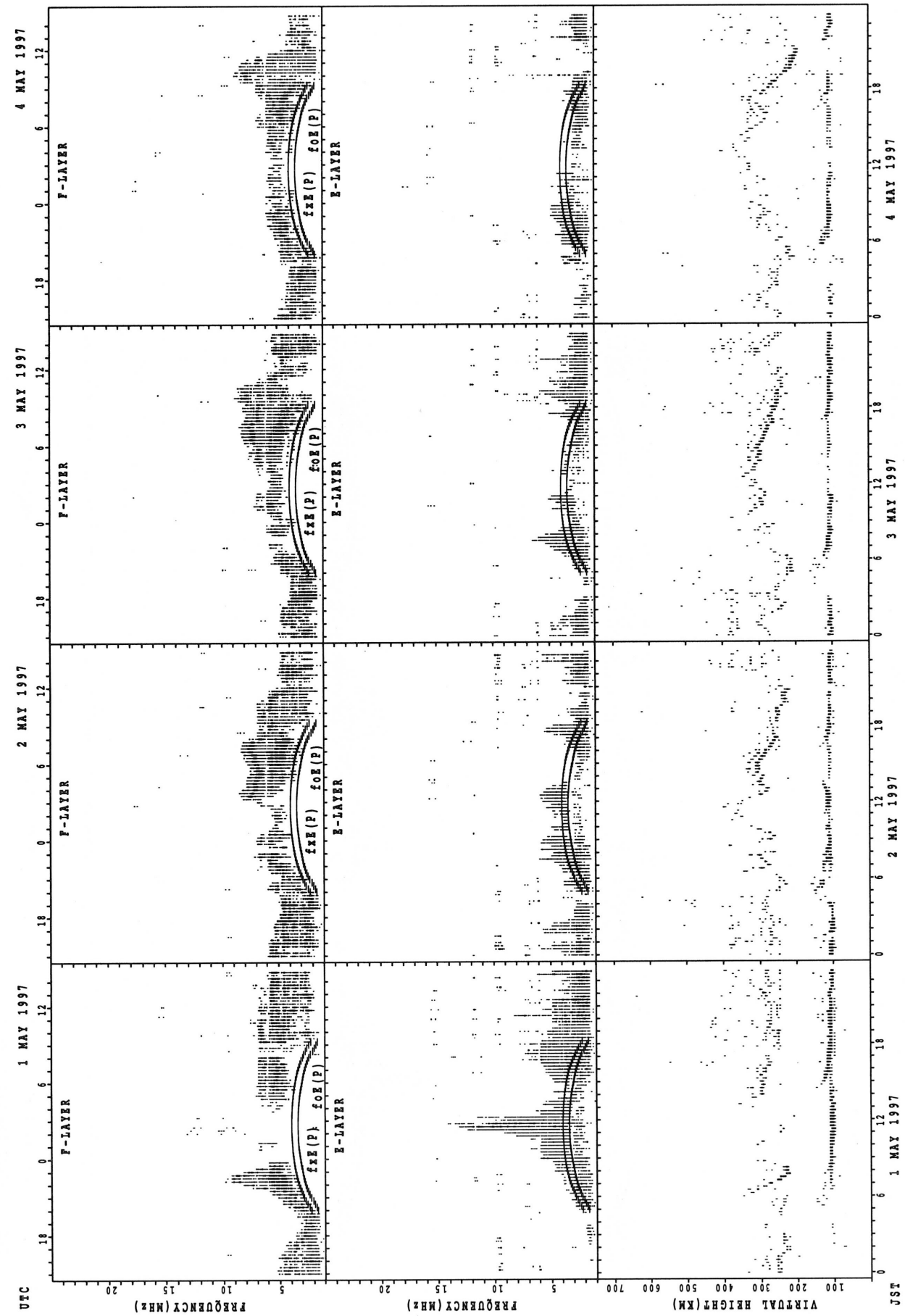
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

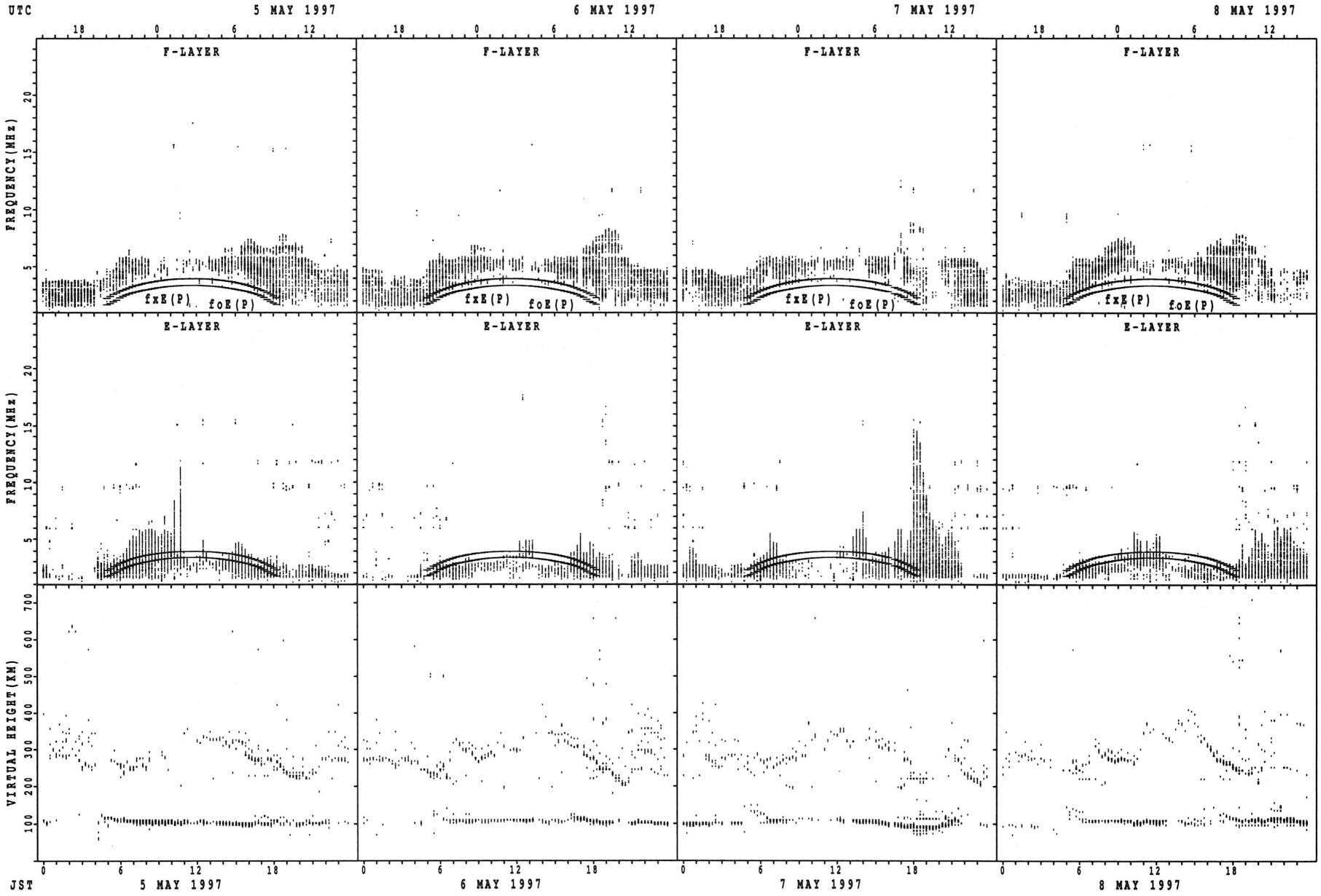
SUMMARY PLOTS AT WAKKANAI



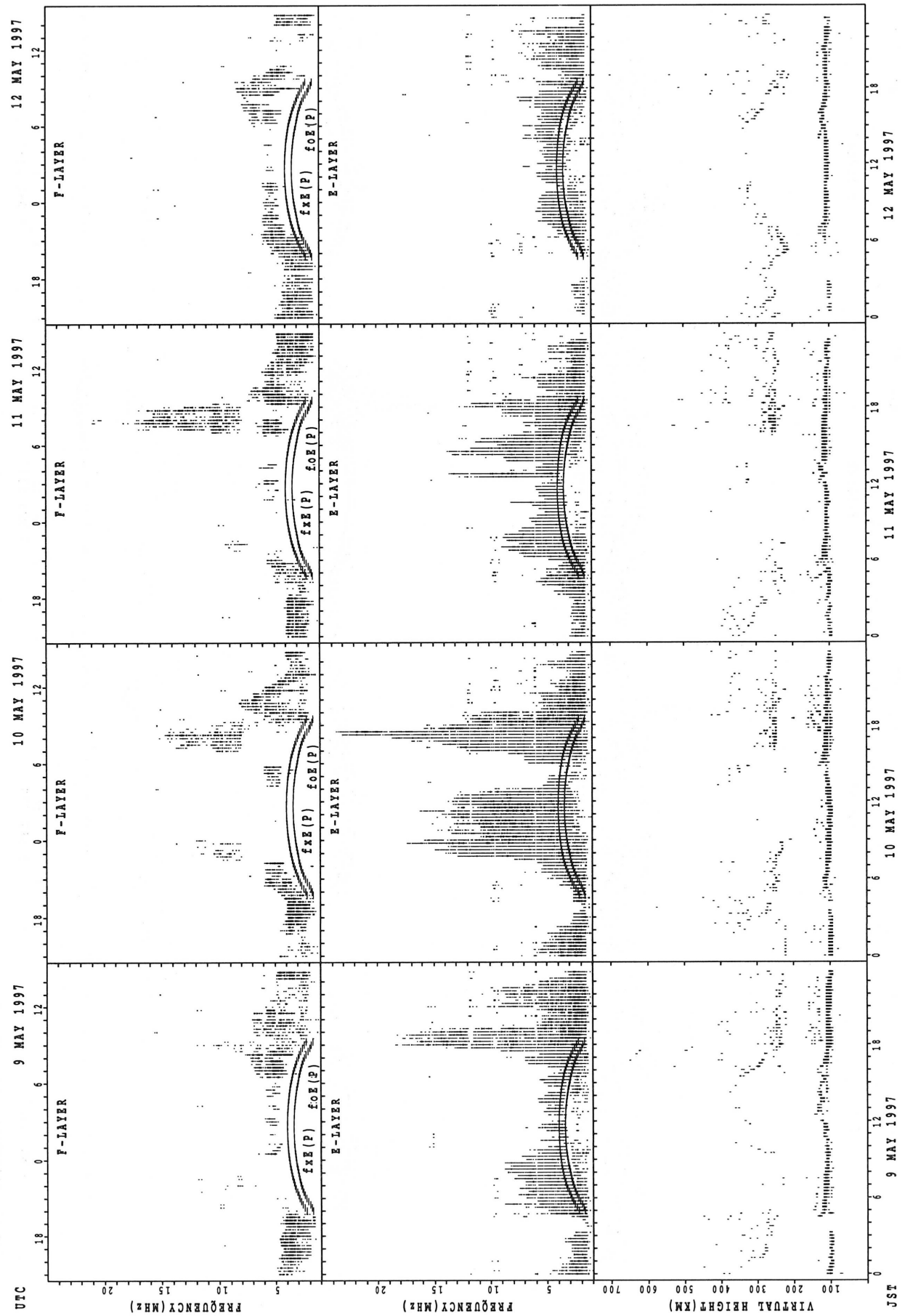
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

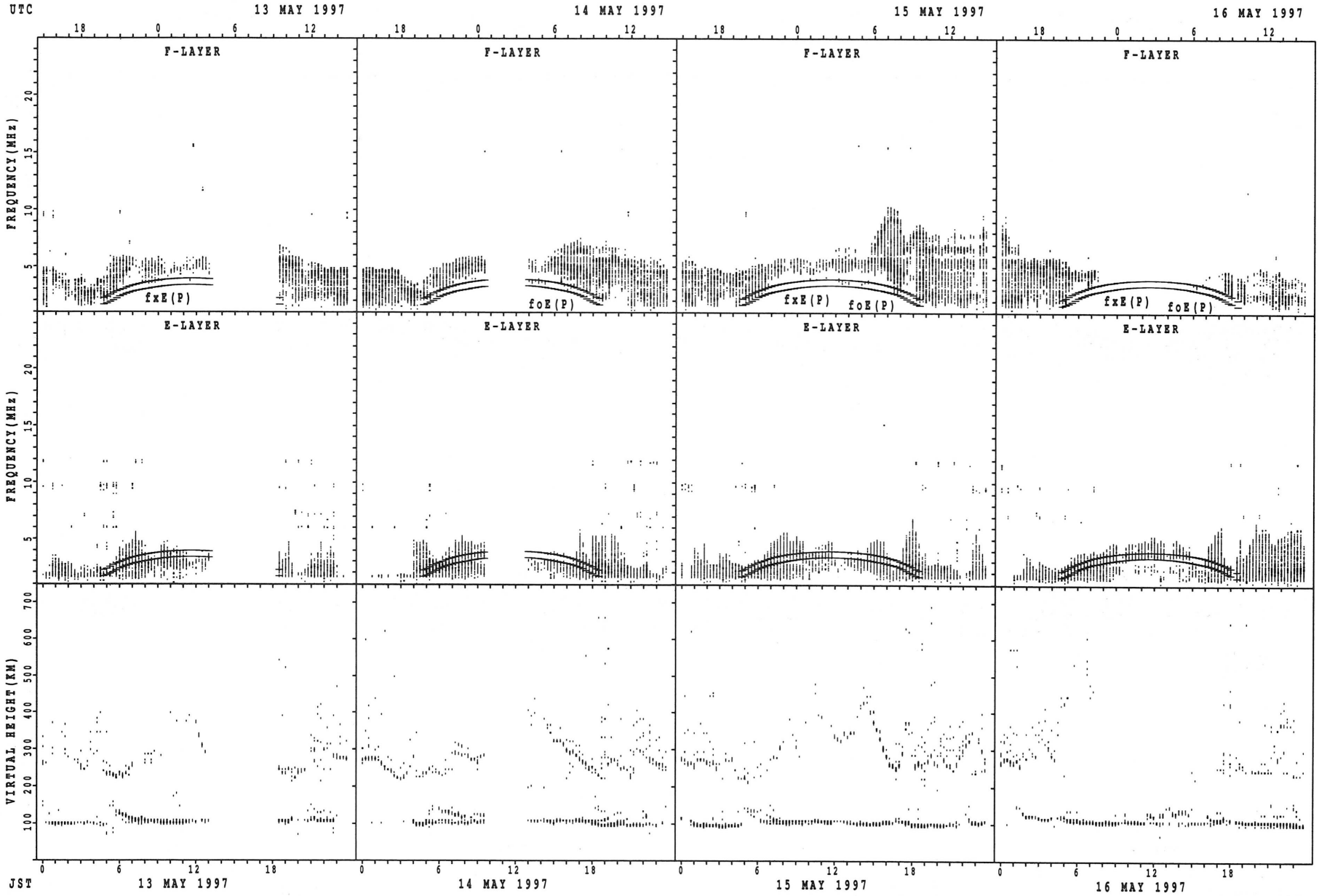

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
1 MAY 1997
2 MAY 1997
3 MAY 1997
4 MAY 1997
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

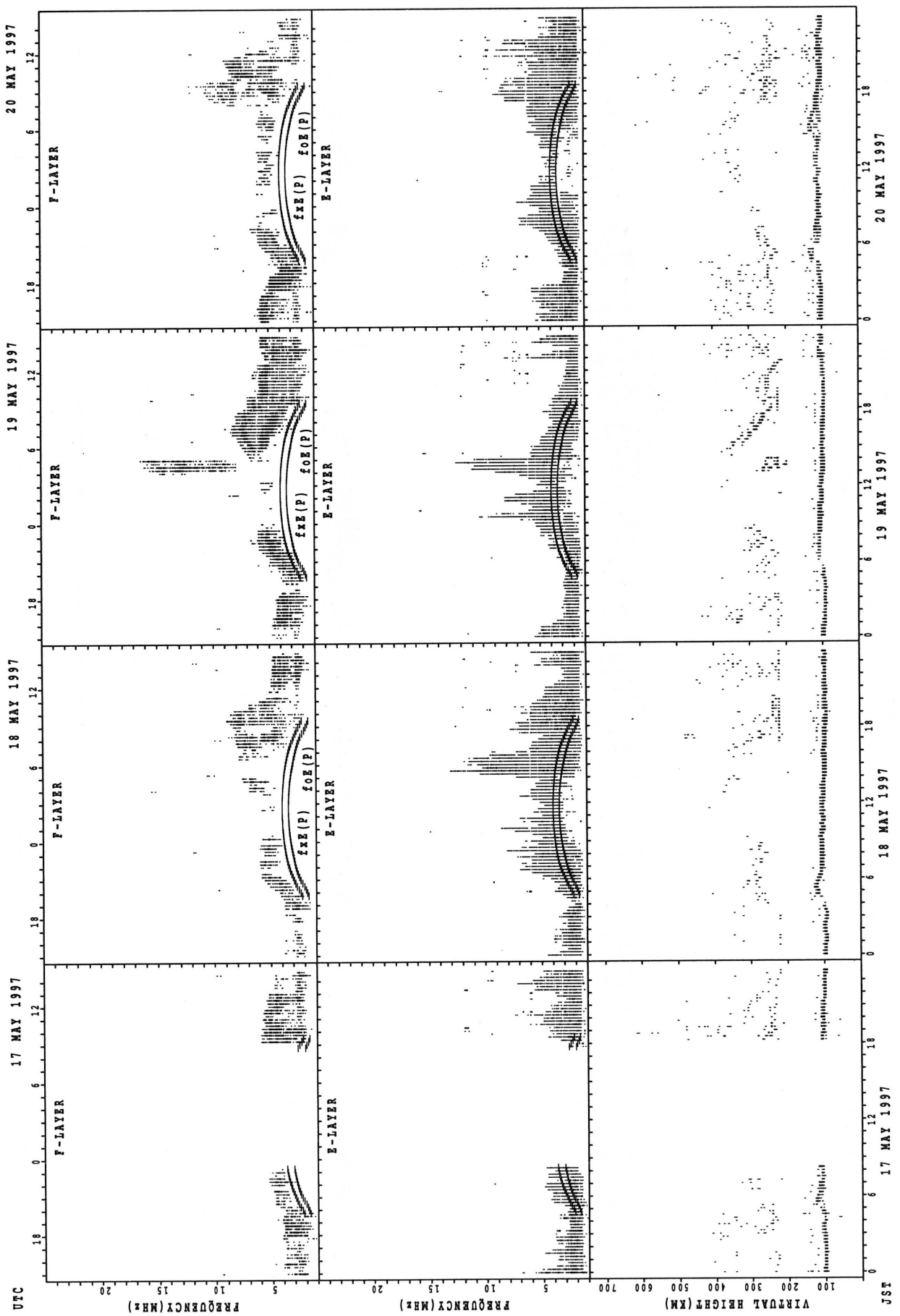
SUMMARY PLOTS AT KOKUBUNJI TOKYO



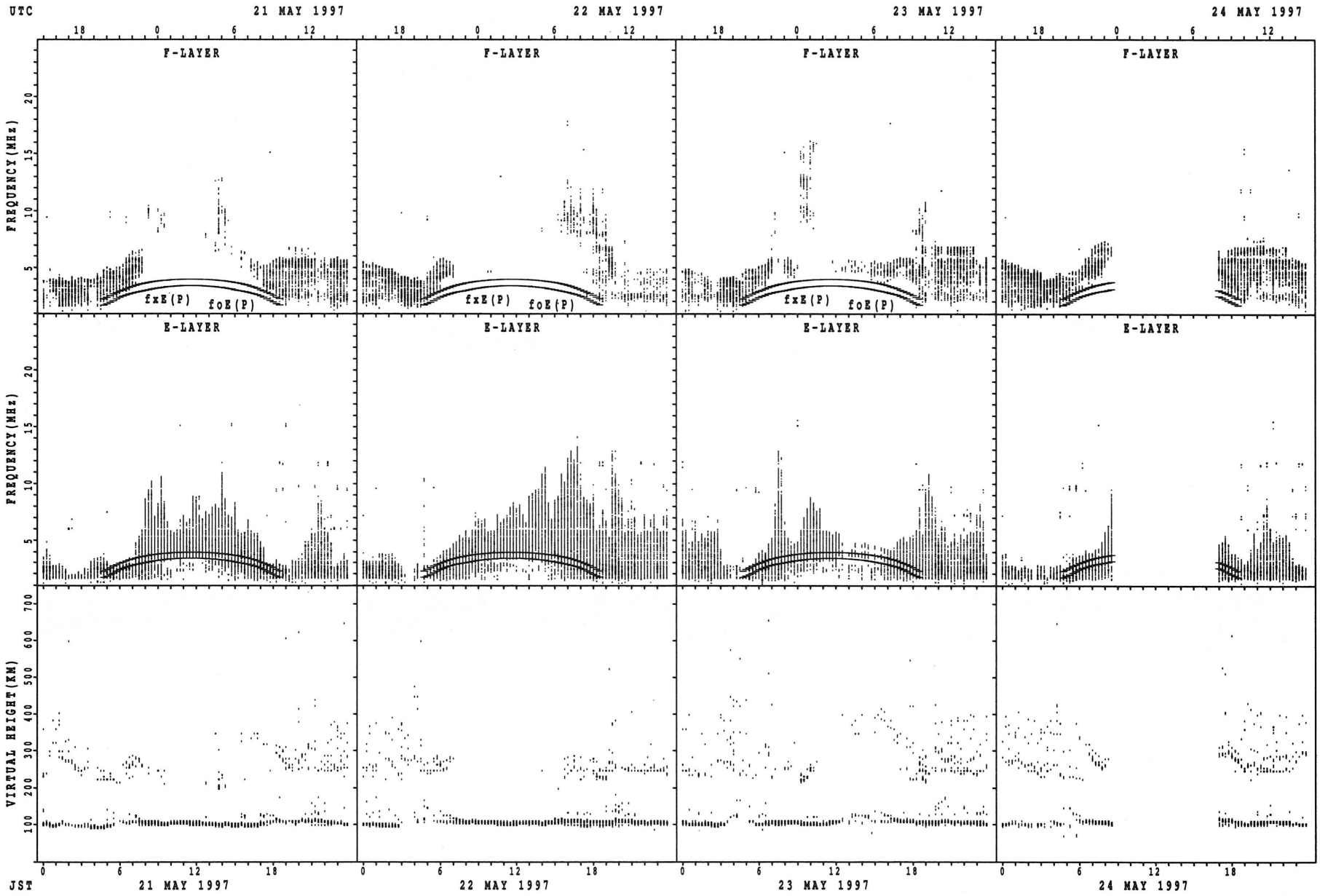
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

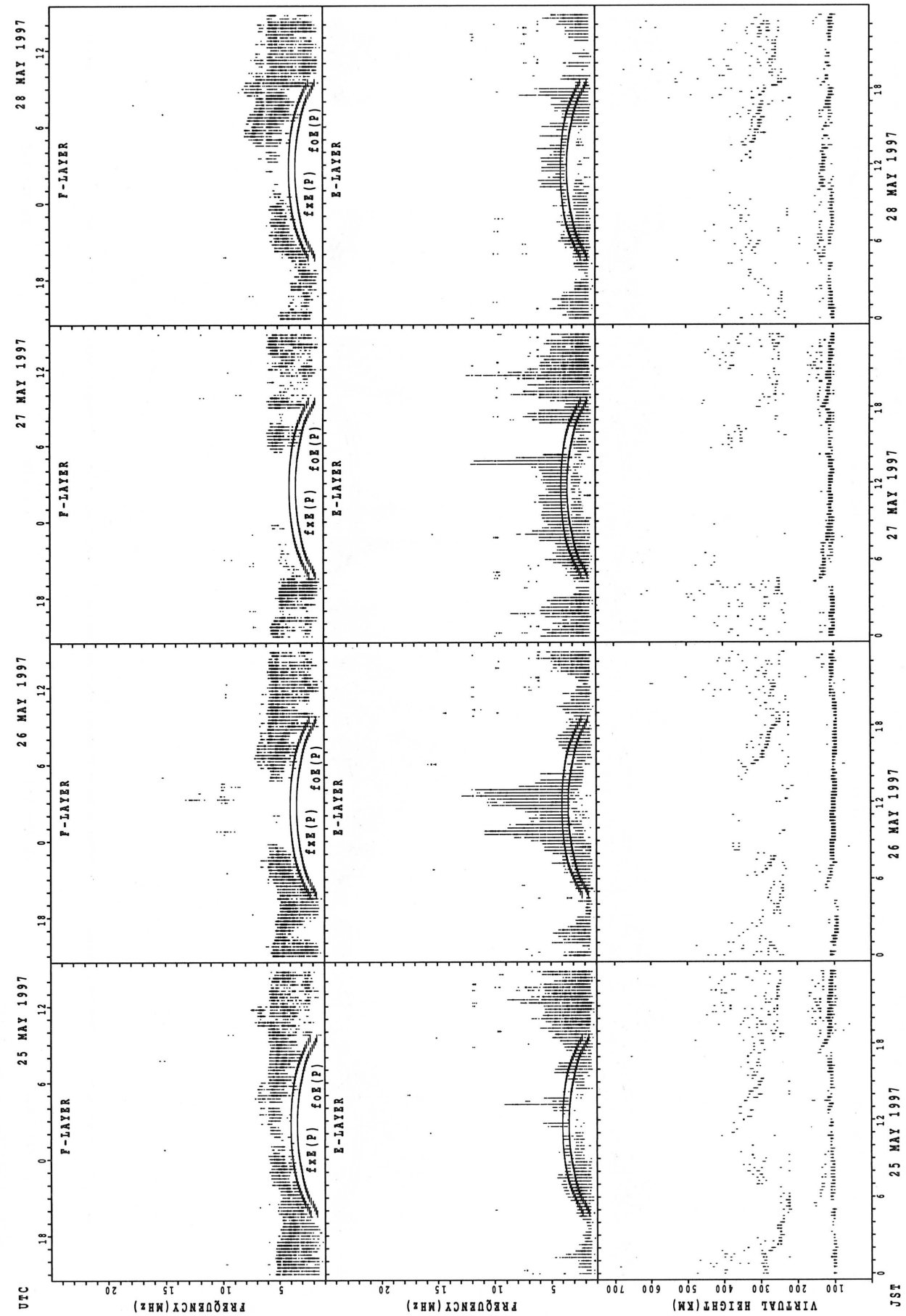

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
13 MAY 1997
14 MAY 1997
15 MAY 1997
16 MAY 1997
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

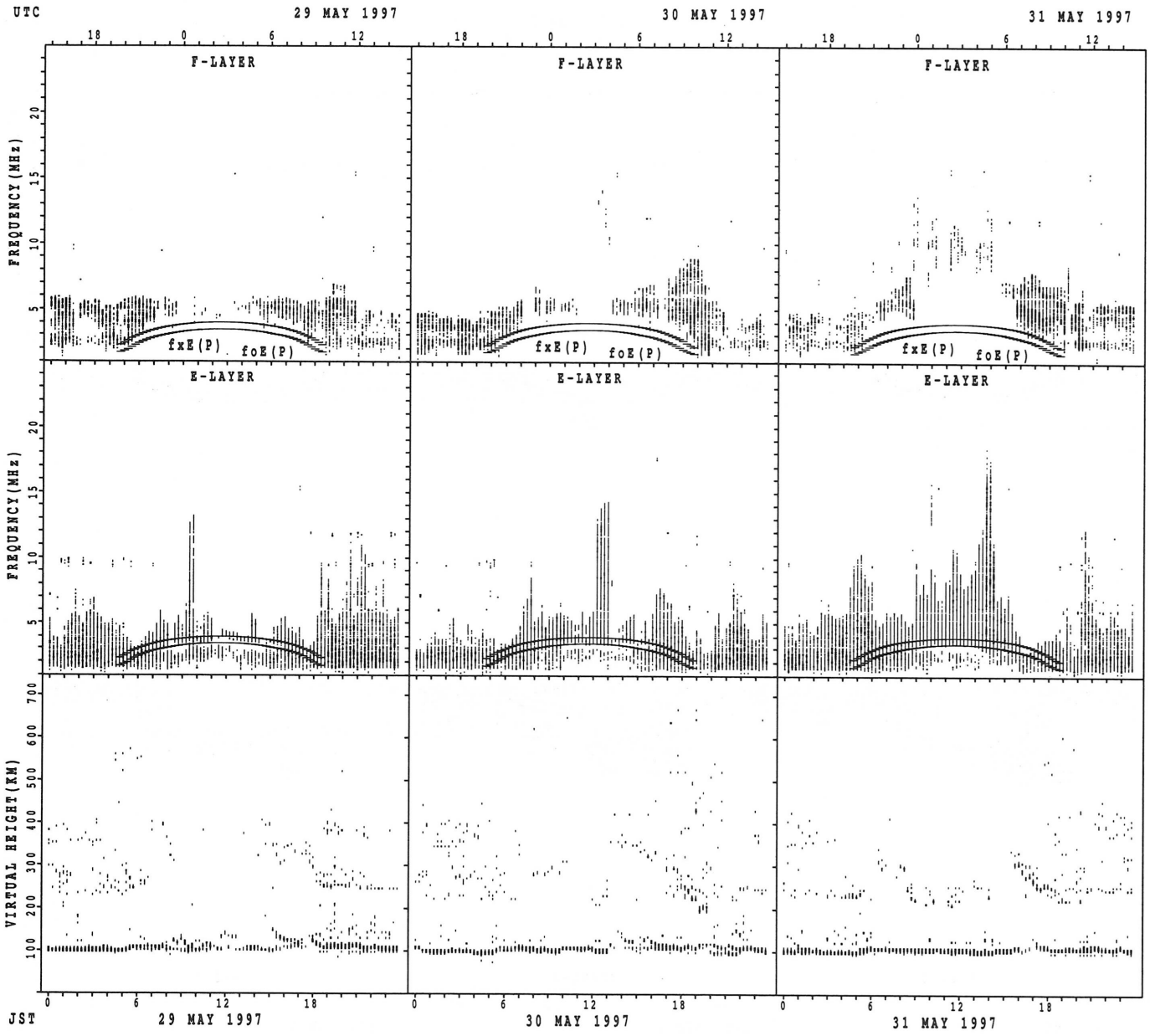
SUMMARY PLOTS AT KOKUBUNJI TOKYO



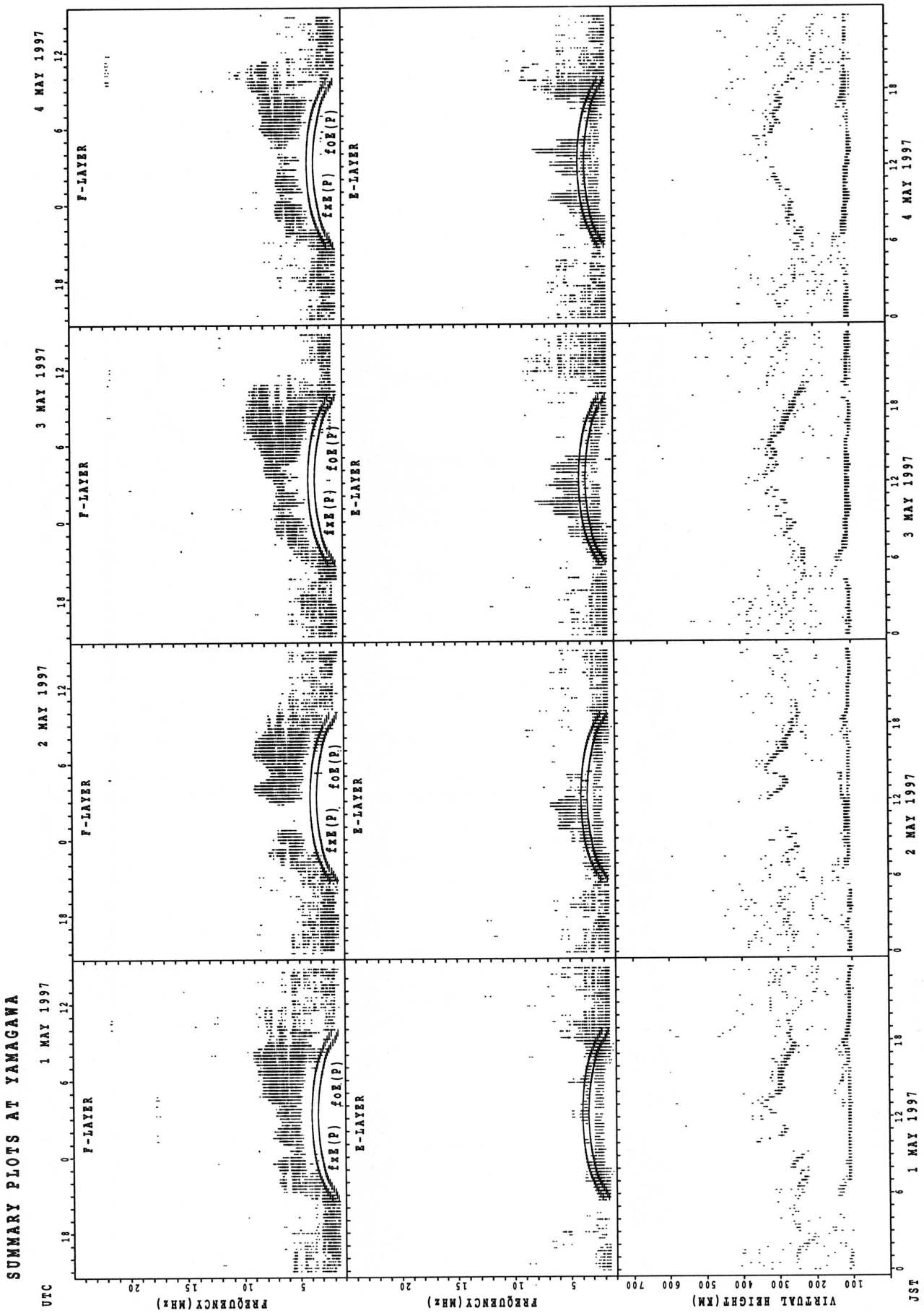
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

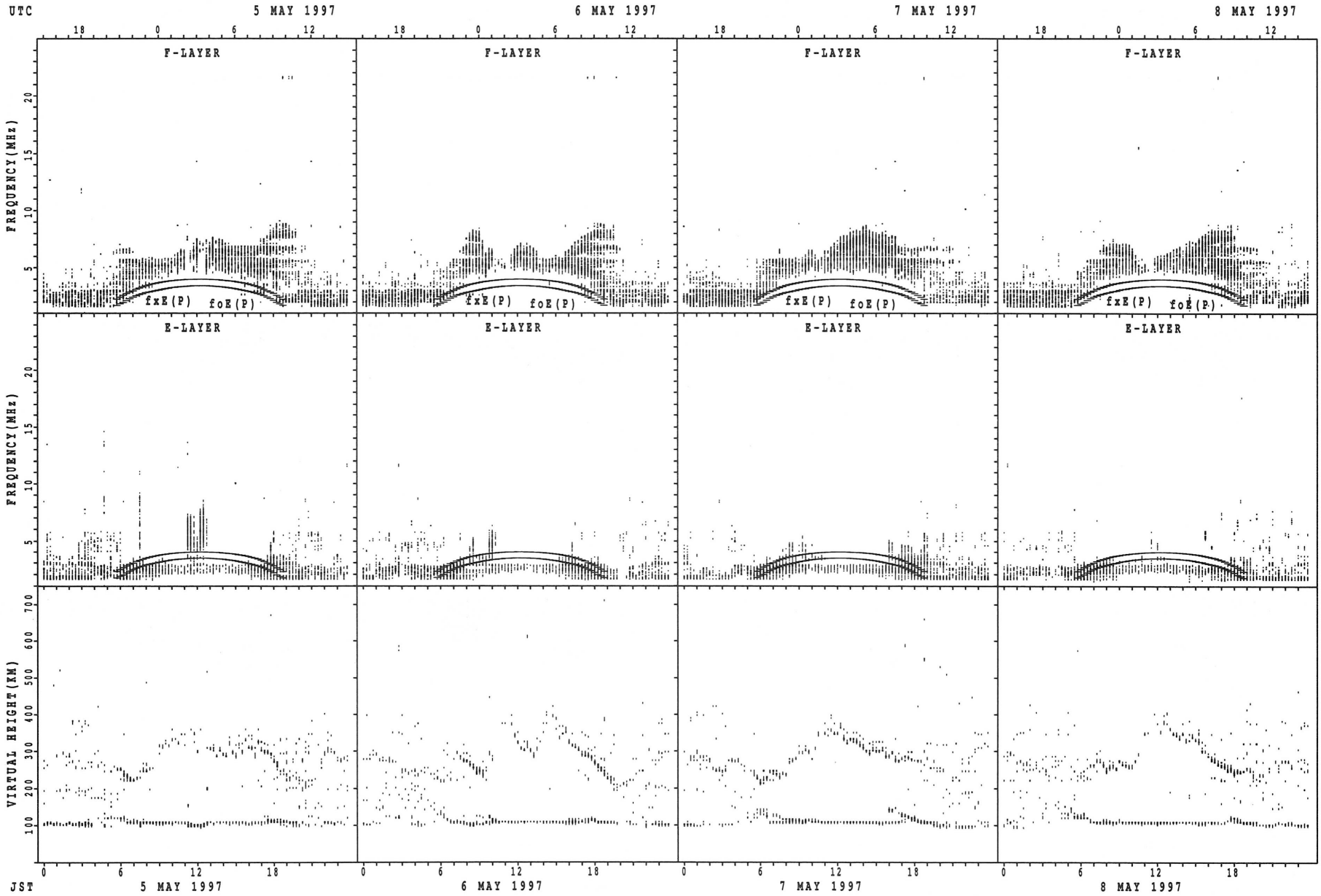
SUMMARY PLOTS AT KOKUBUNJI TOKYO



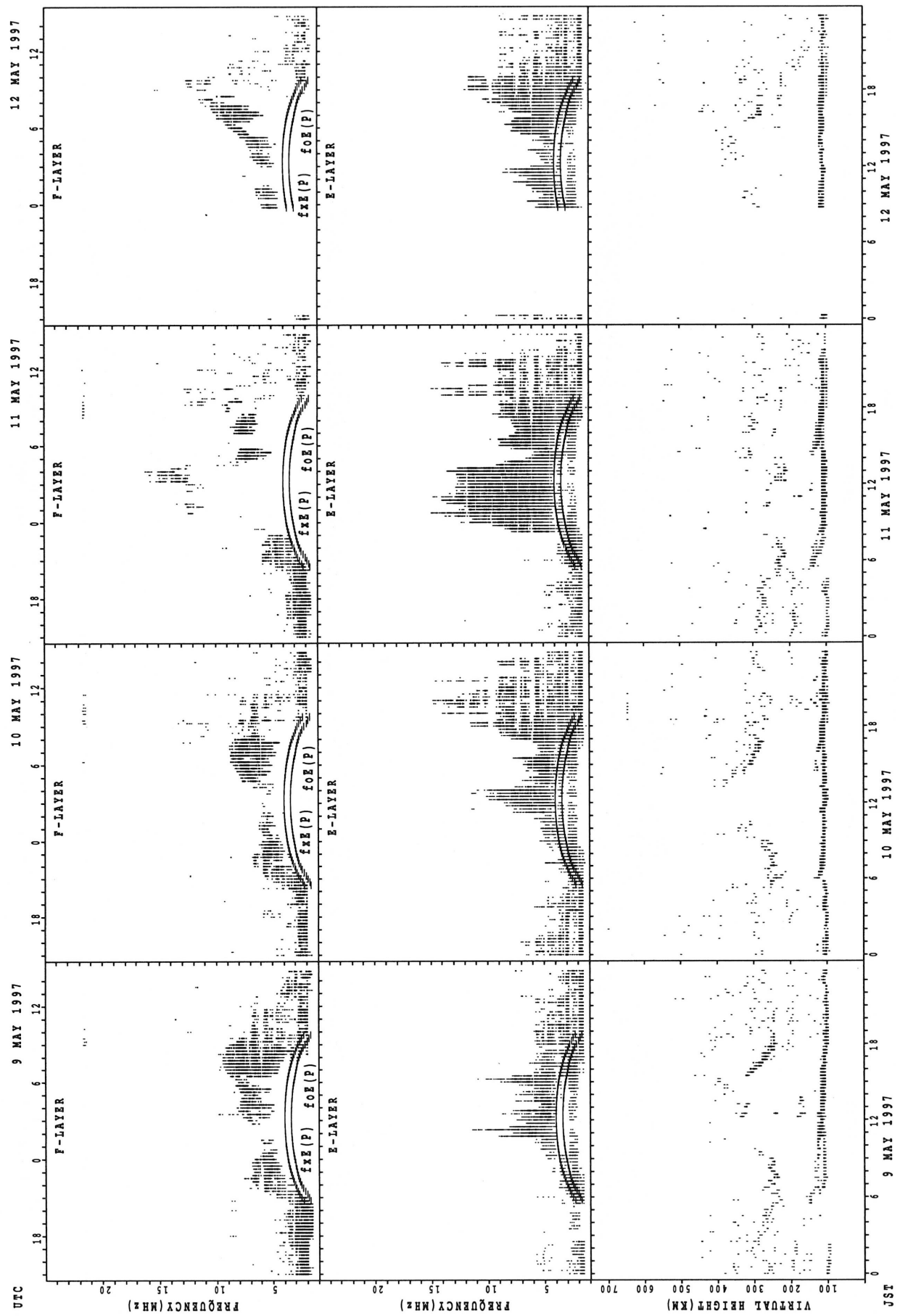
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

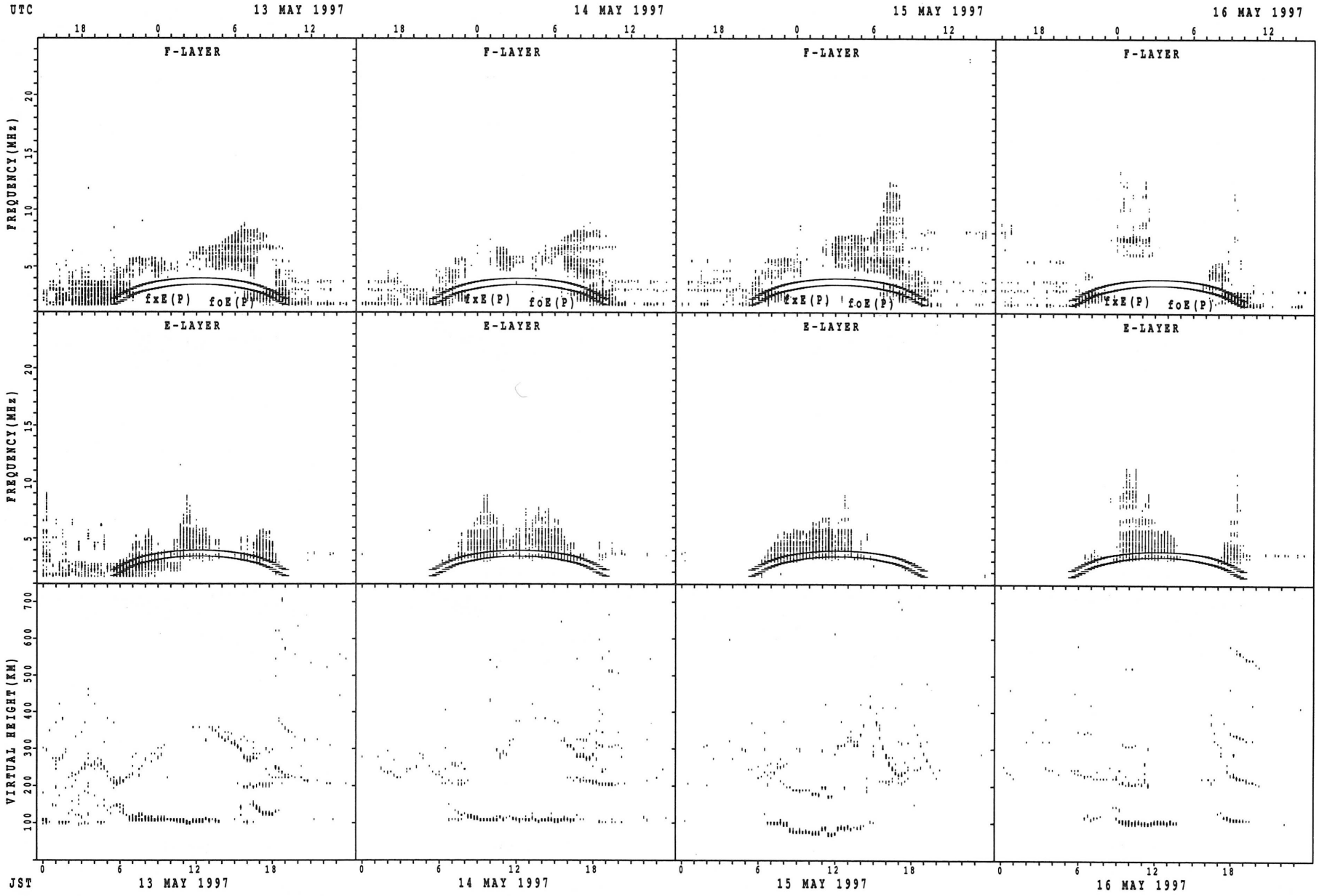
SUMMARY PLOTS AT YAMAGAWA



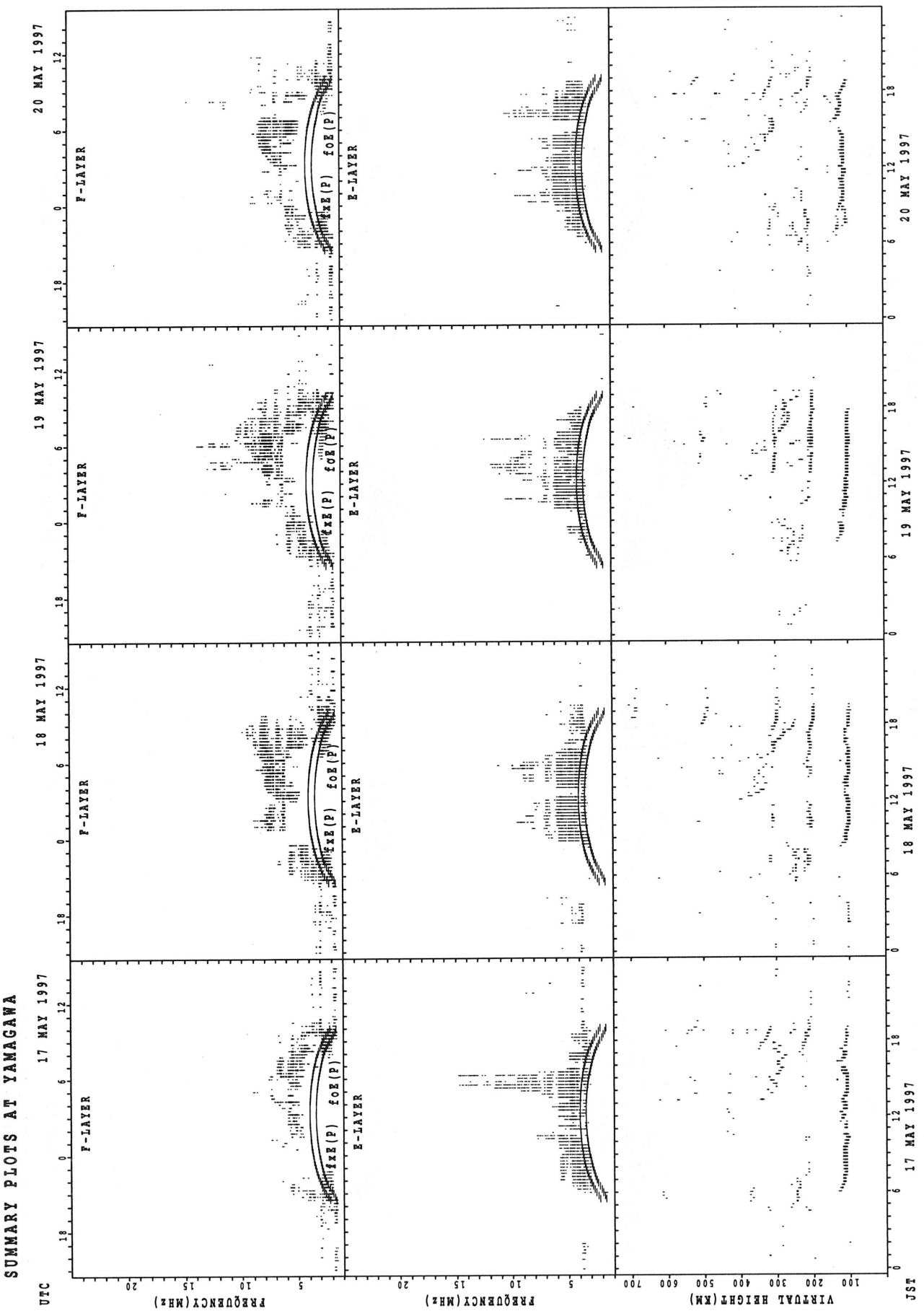
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

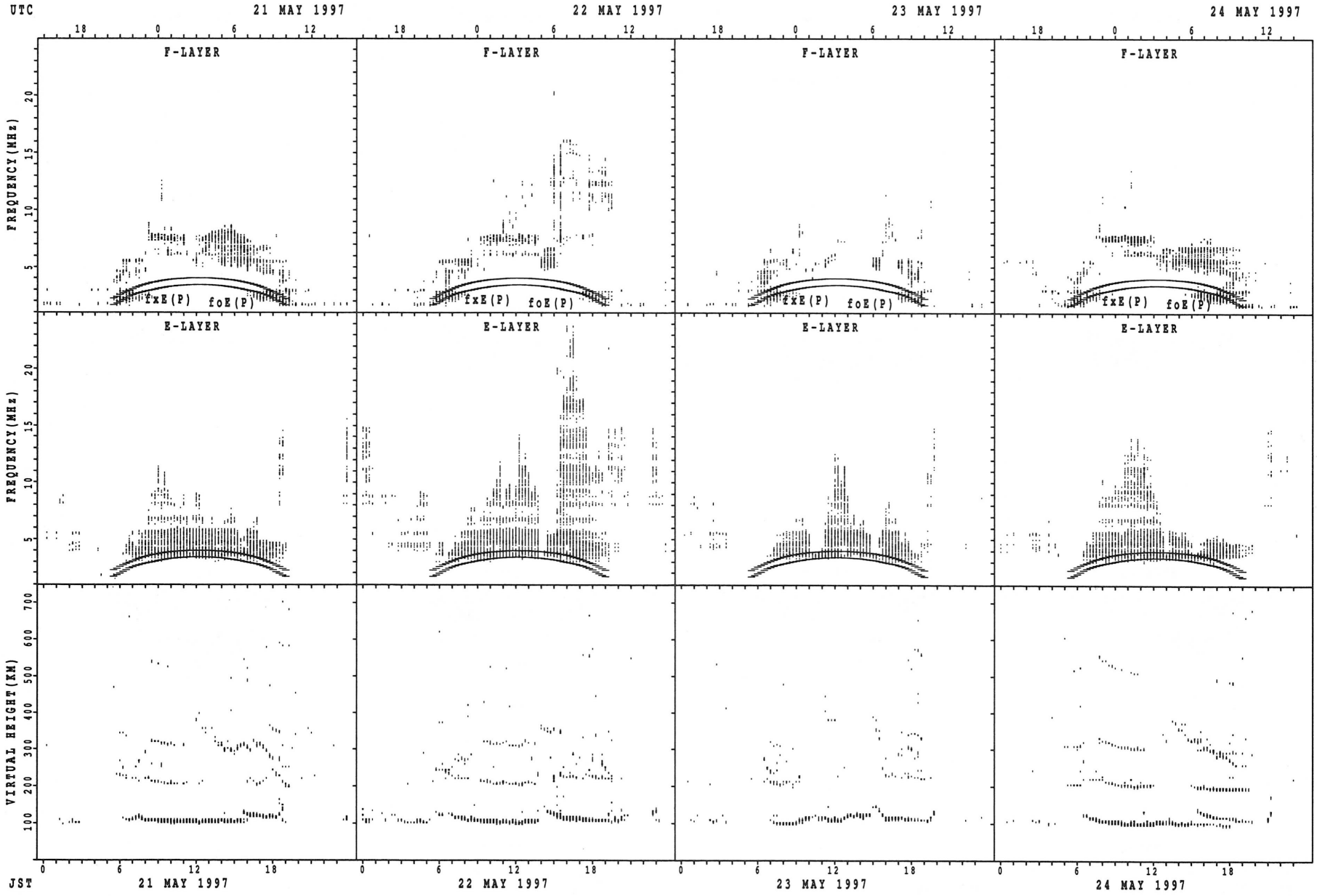
SUMMARY PLOTS AT YAMAGAWA



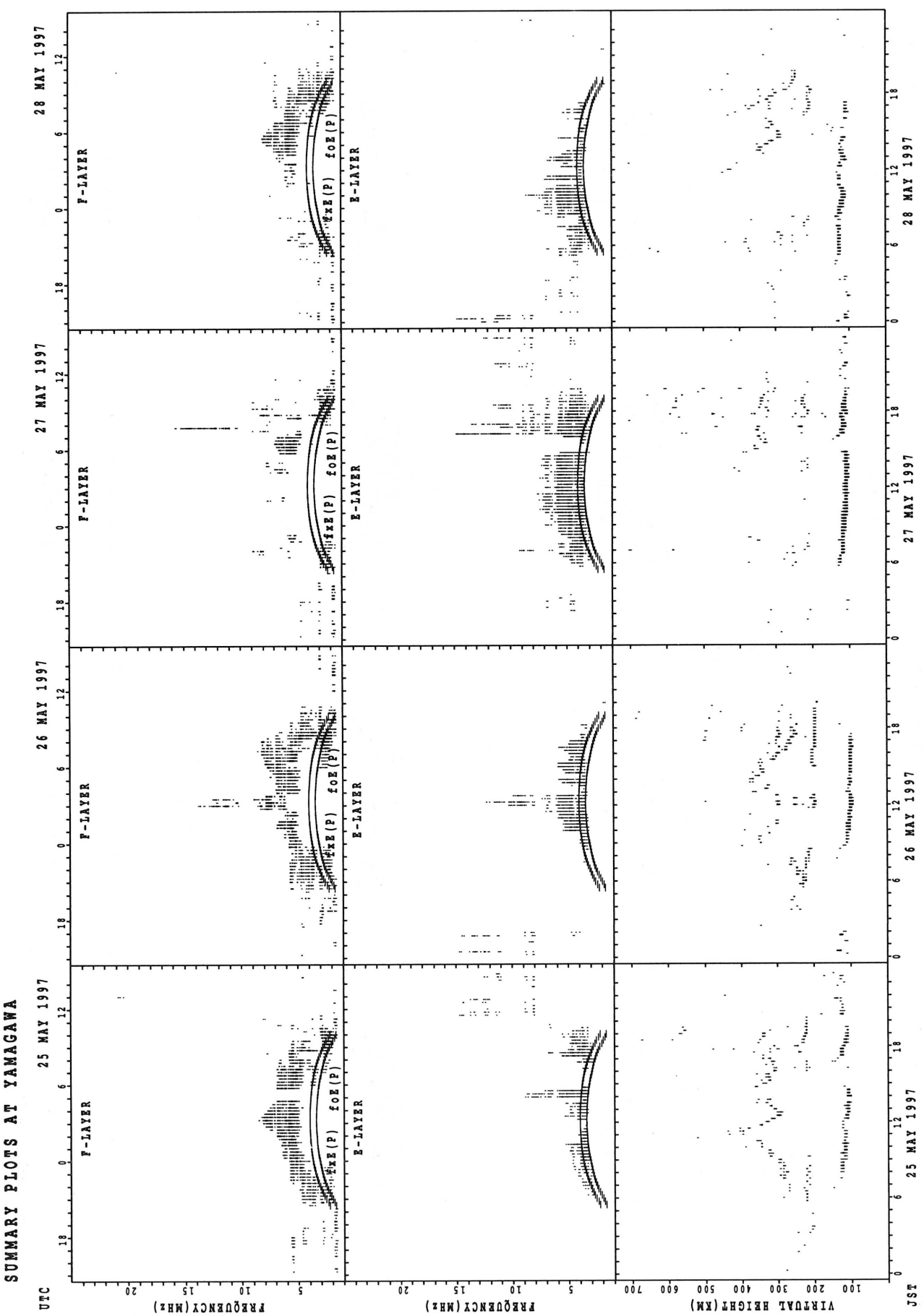
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

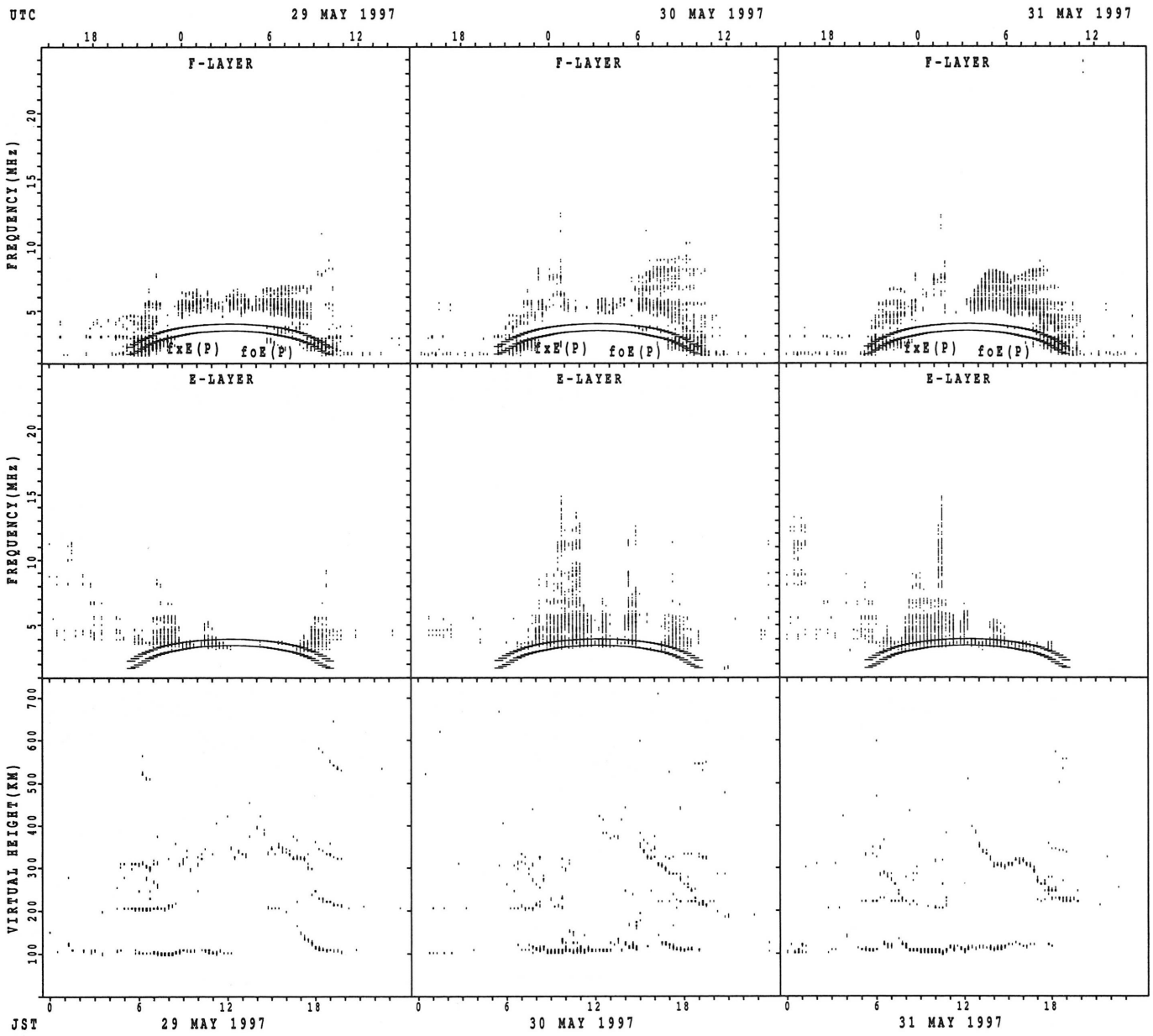
SUMMARY PLOTS AT YAMAGAWA



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

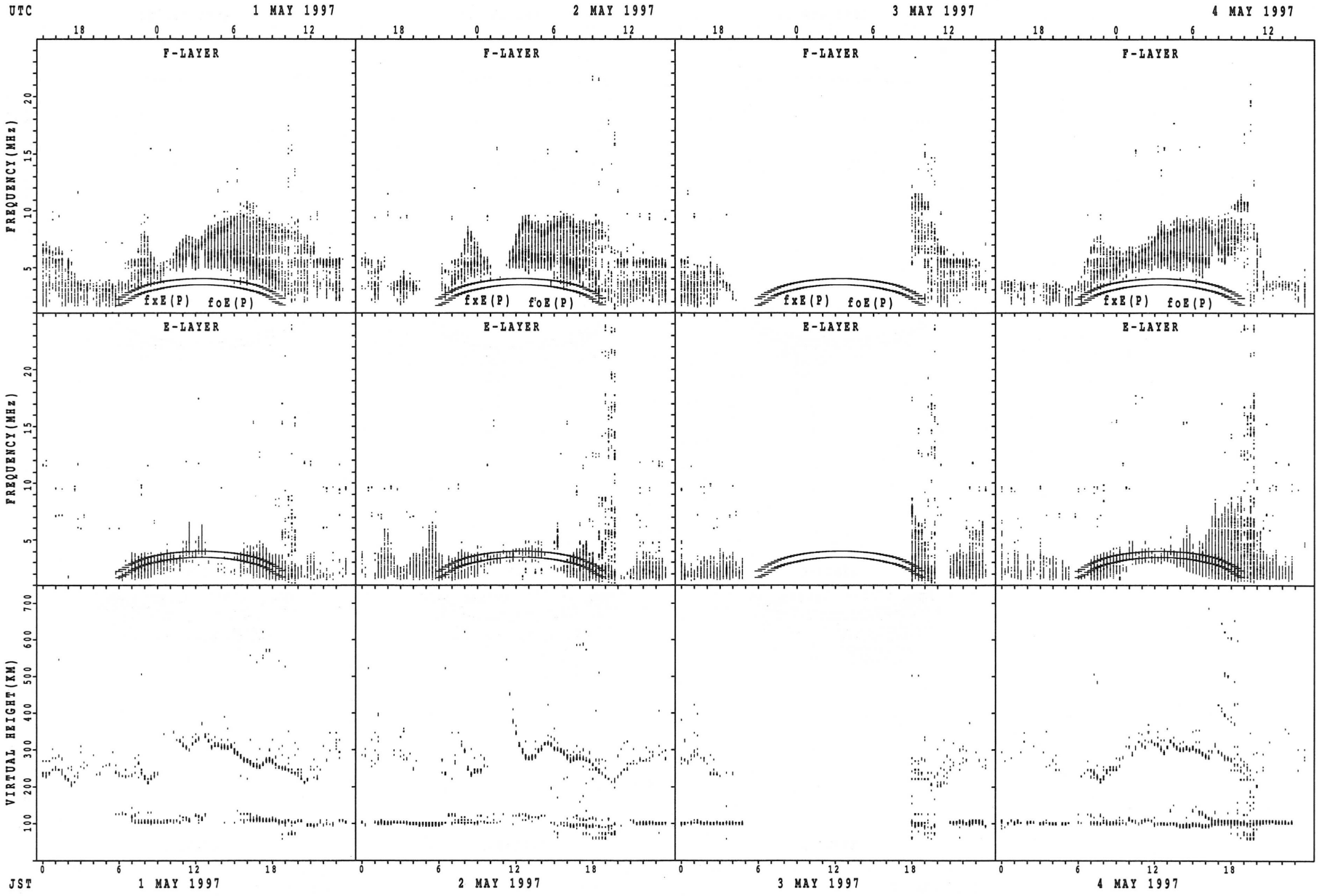

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
25 MAY 1997
26 MAY 1997
27 MAY 1997
28 MAY 1997
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA



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

SUMMARY PLOTS AT OKINAWA



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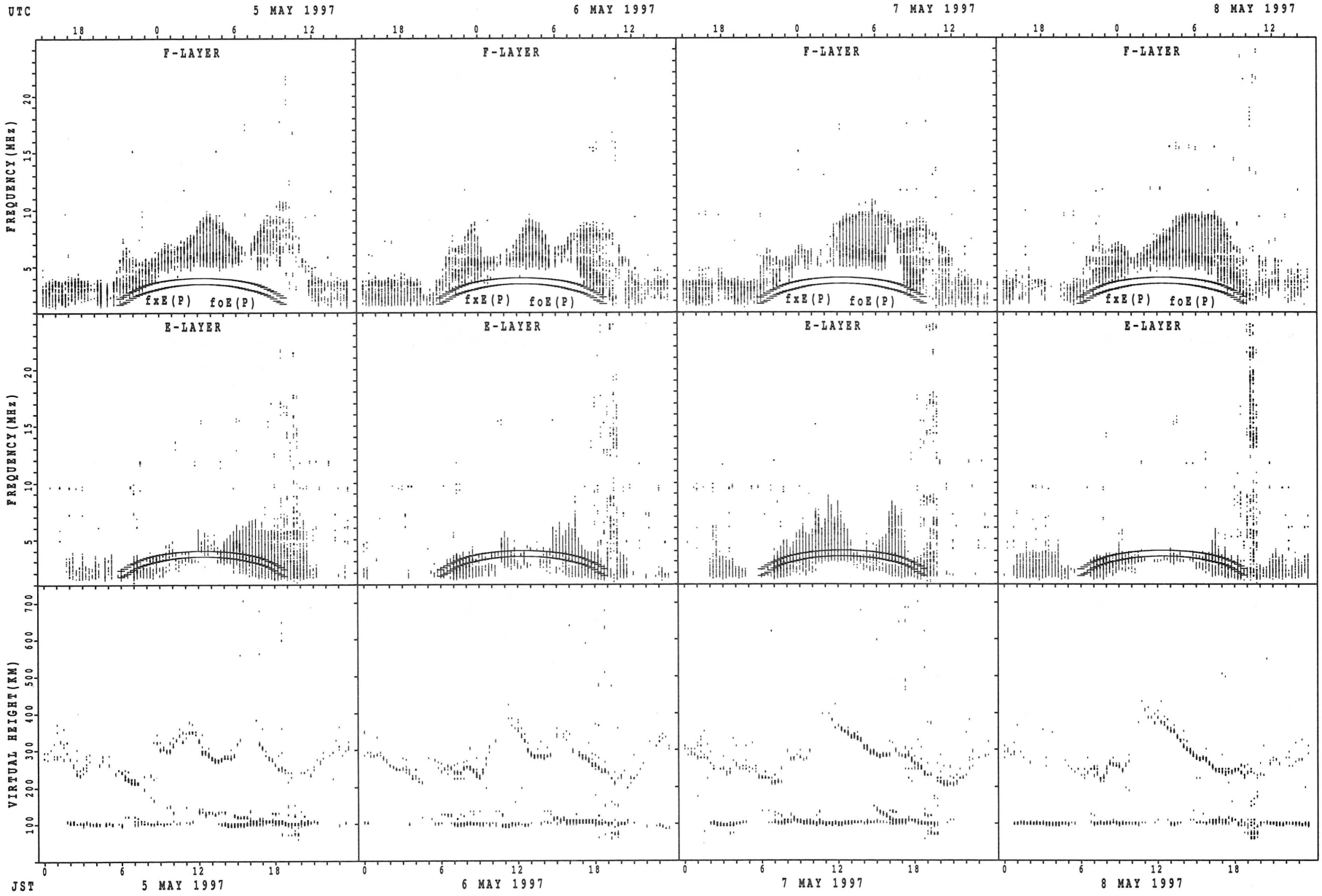
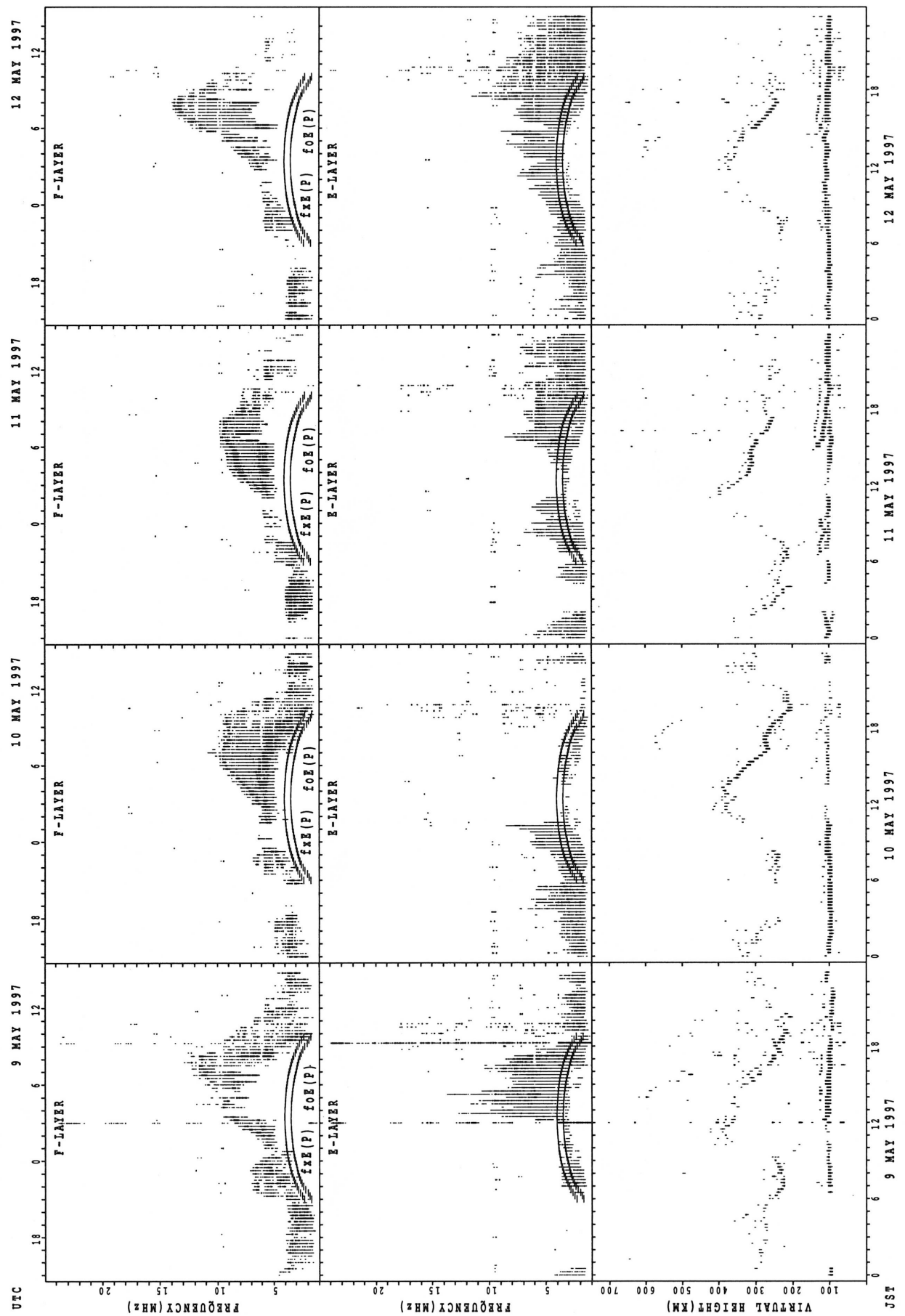
foE(P); PREDICTED VALUE FOR foE

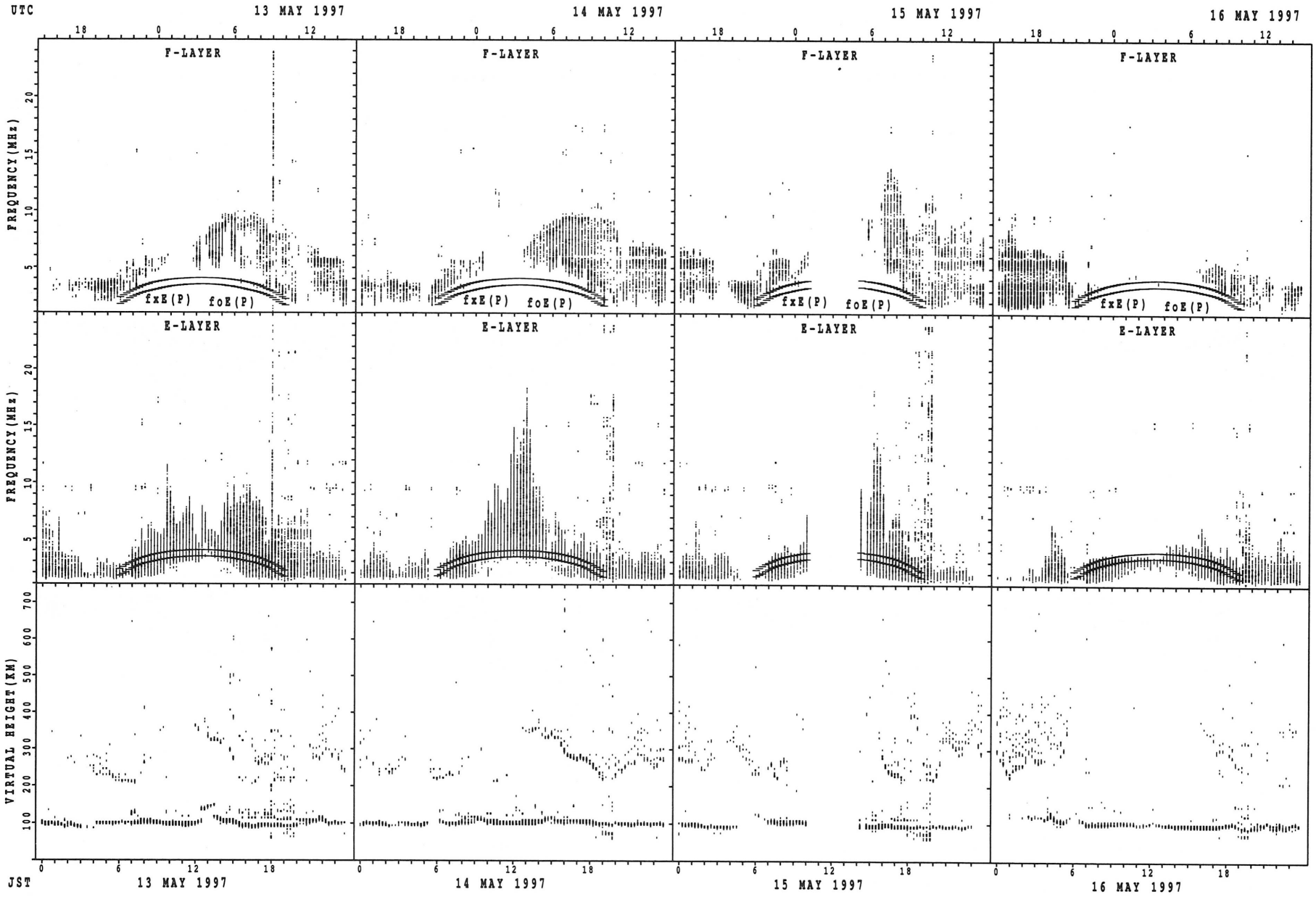
SUMMARY PLOTS AT OKINAWA



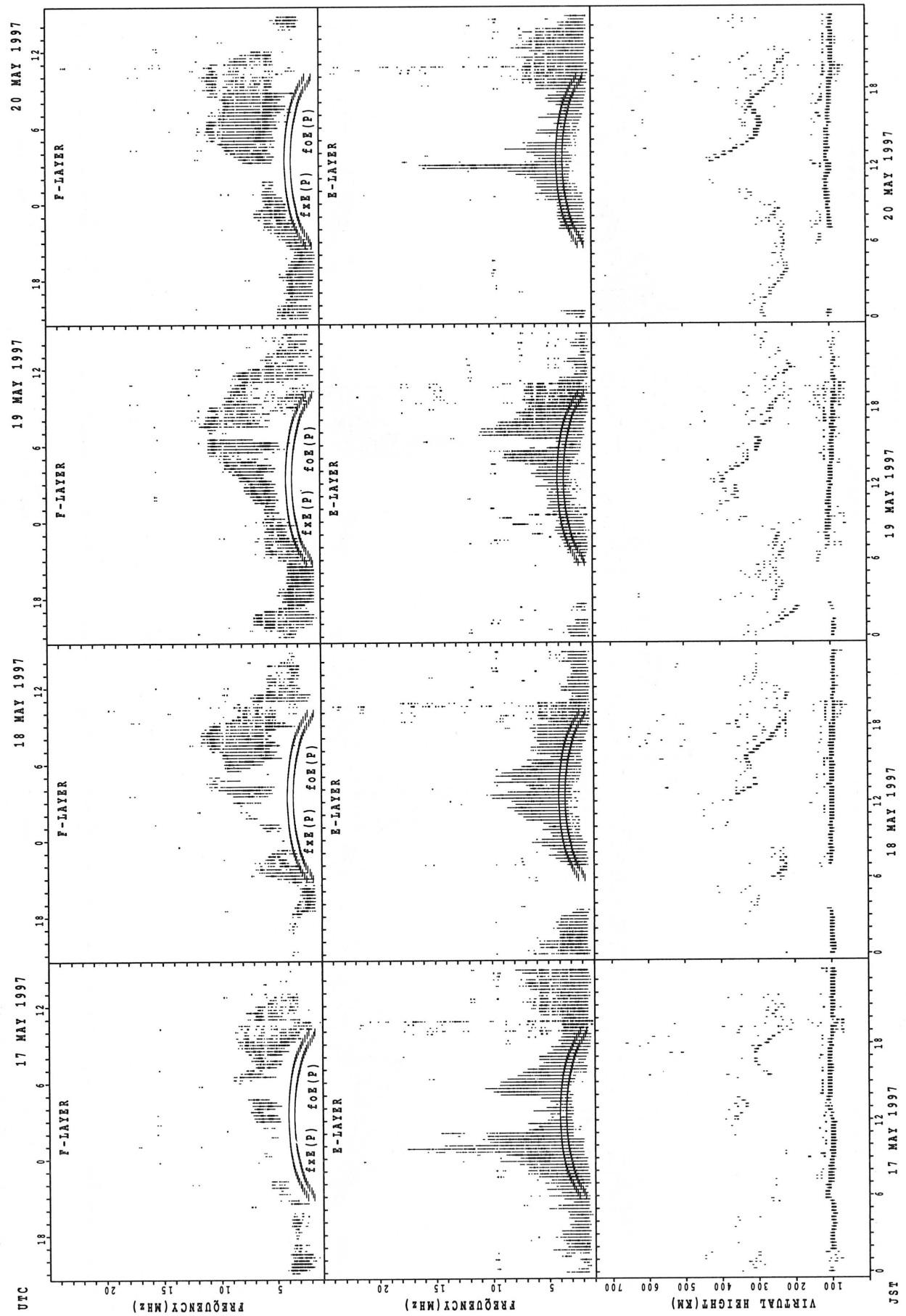
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

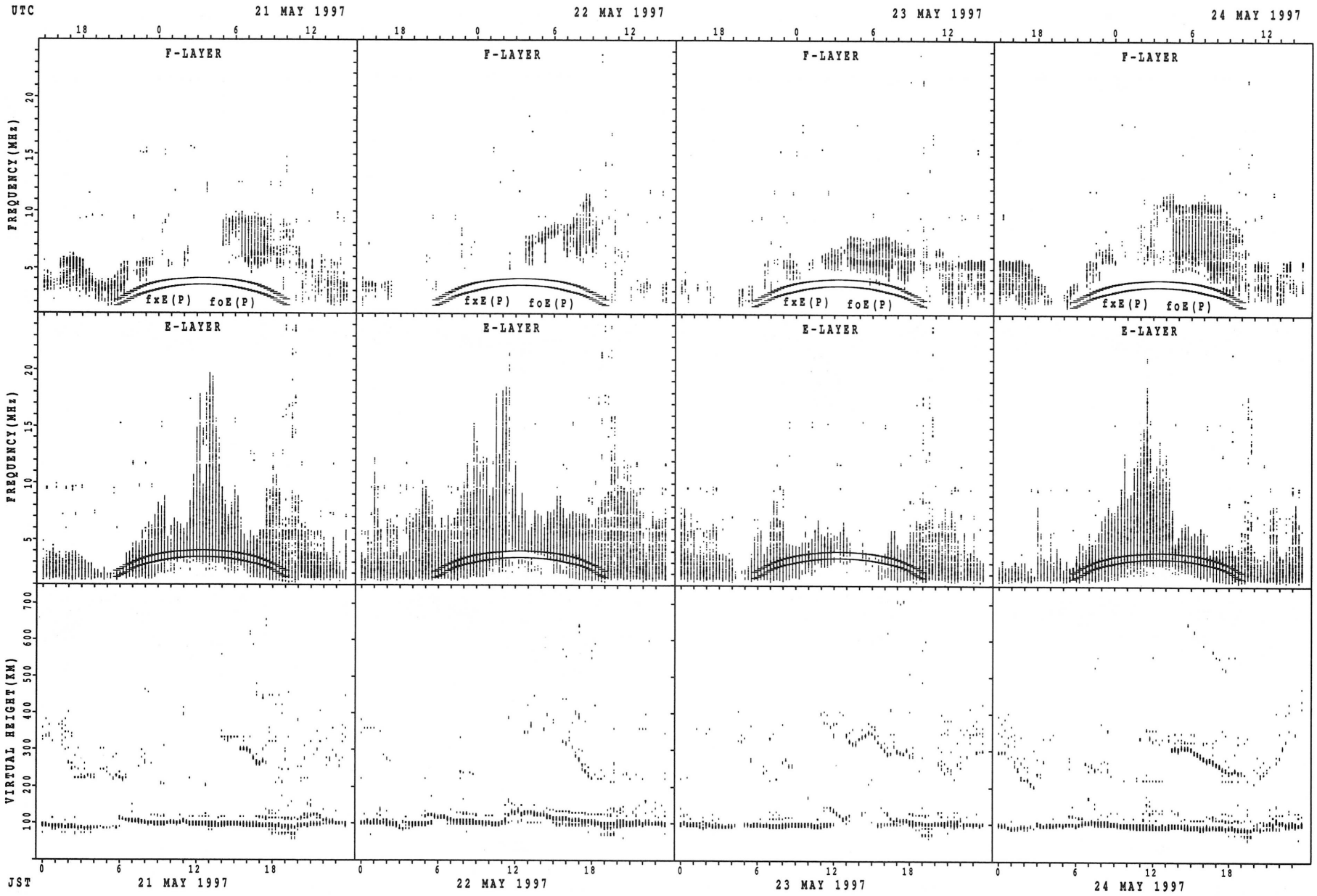
SUMMARY PLOTS AT OKINAWA



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

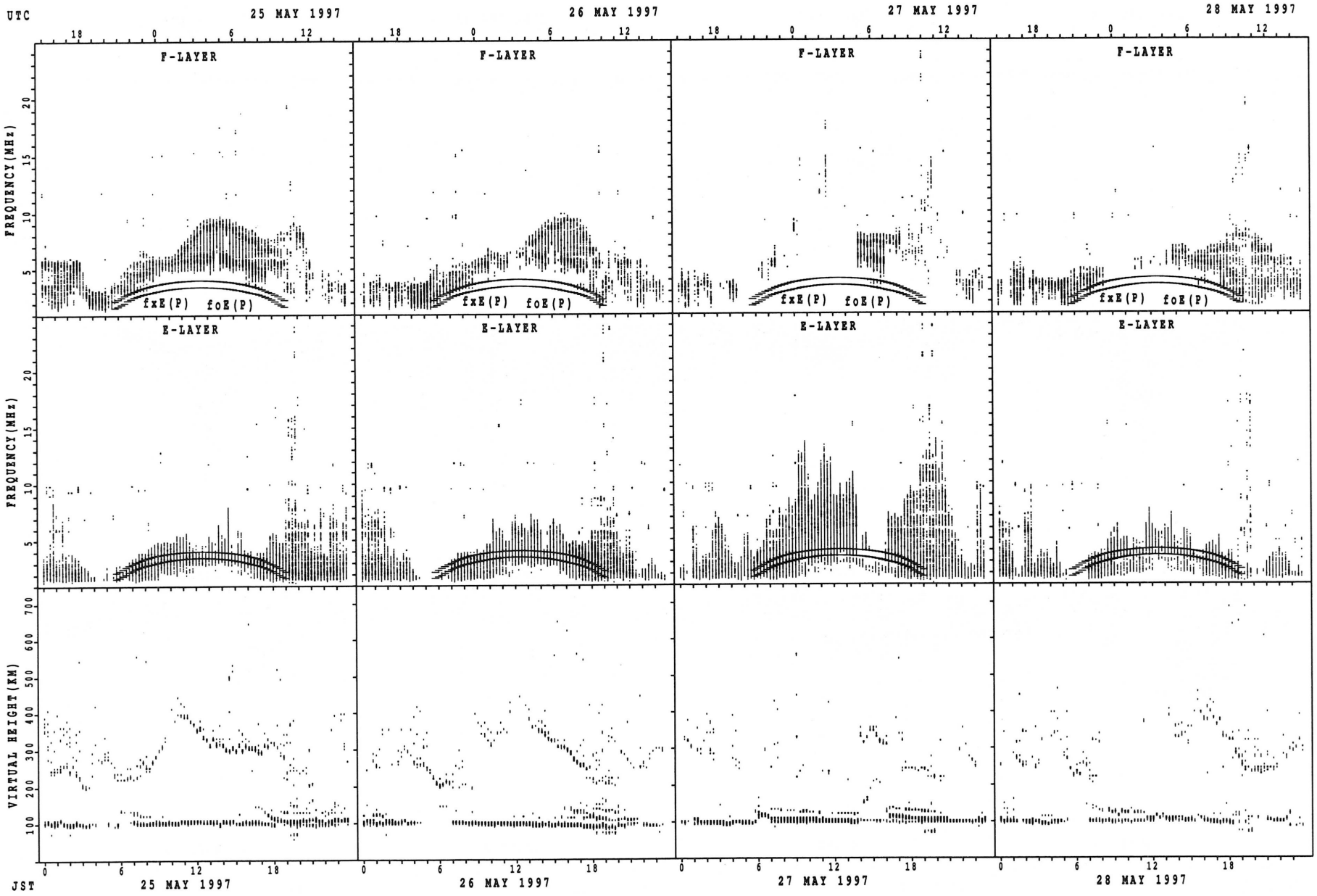

SUMMARY PLOTS AT OKINAWA
17 MAY 1997
18 MAY 1997
19 MAY 1997
20 MAY 1997
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
UTC
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



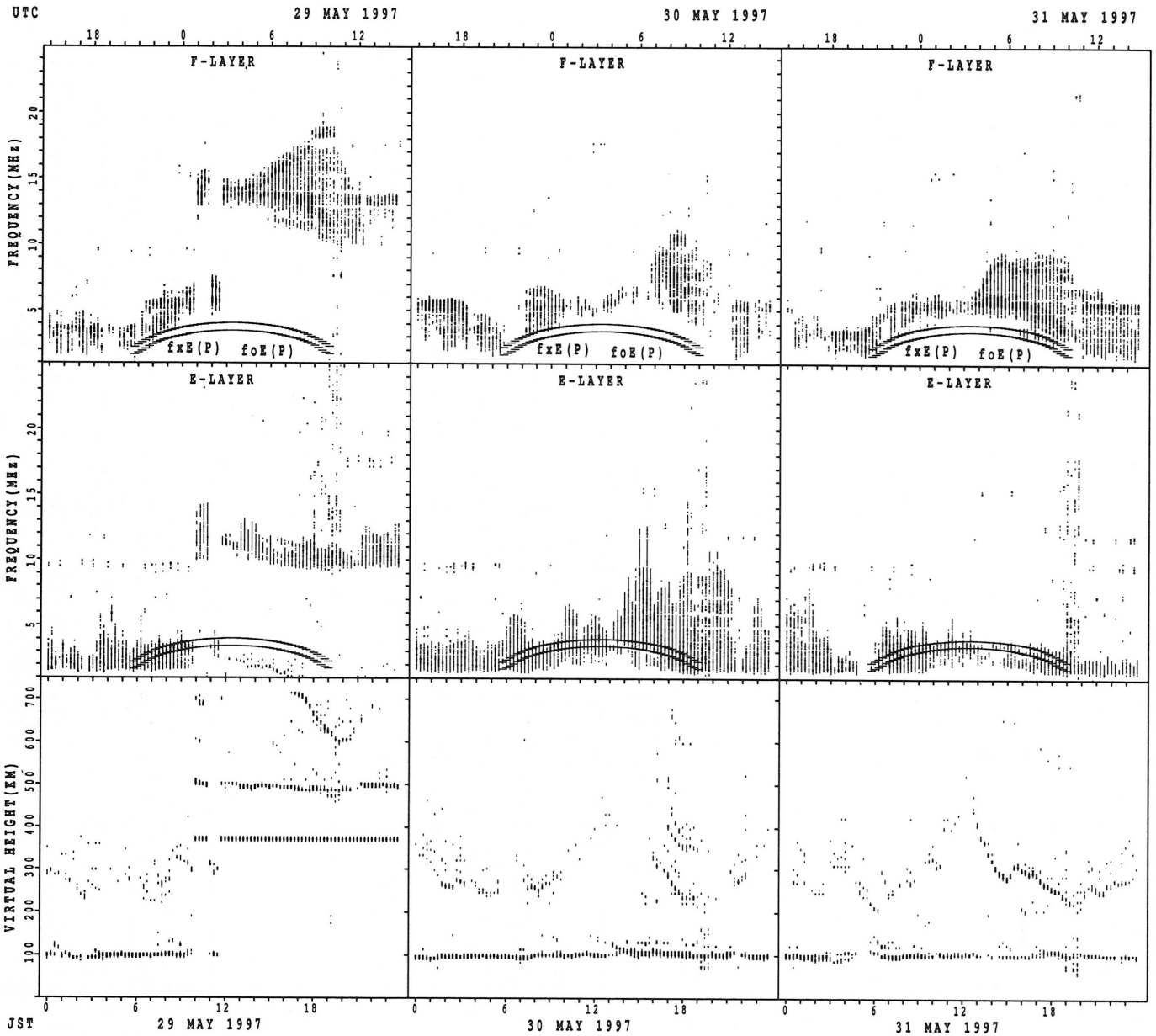
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



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

SUMMARY PLOTS AT OKINAWA



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

MONTHLY MEDIANS OF h'F AND h'Es

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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																					11	12		
MED																					308	312		
U Q																					320	322		
L Q																					296	274		

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	21	15	16	13	29	31	30	31	31	30	30	31	31	31	31	31	31	31	22	21	22	23	19
MED	103	105	101	103	105	127	119	113	111	107	107	105	105	105	107	107	111	113	113	111	113	110	105	105
U Q	105	105	103	105	124	131	125	115	113	111	111	107	107	107	107	113	115	119	121	113	116	113	107	105
L Q	101	102	97	99	101	115	113	109	107	105	105	103	103	103	103	105	107	111	107	107	107	107	103	103

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	14		20	12			
MED																	293	280		262	275			
U Q																	320	296		299	295			
L Q																	284	242		232	247			

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	22	25	24	20	16	26	30	31	30	28	26	25	26	24	27	28	26	29	27	28	27	24	26	25
MED	105	103	103	105	105	120	120	115	111	111	111	105	109	110	111	110	116	115	111	107	109	111	111	107
U Q	107	107	106	105	109	143	131	121	115	113	113	111	113	121	117	121	125	116	113	112	113	113	111	111
L Q	103	99	99	97	102	105	115	111	109	107	105	105	105	105	105	105	107	111	107	103	107	105	107	105

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										10				12	14	17	19	19						
MED										259				321	312	304	292	284						
U Q										274				335	332	318	312	296						
L Q										244				298	296	293	280	270						

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	14	10					16	25	25	30	28	29	26	28	26	23	24	27	24	18	11	10	12	10
MED	108	108					130	119	115	113	111	111	107	110	111	111	114	119	116	113	113	111	107	110
U Q	111	113					136	122	119	117	113	115	113	113	113	119	124	125	119	115	121	115	113	113
L Q	105	101					125	113	111	109	106	106	105	106	107	109	110	113	112	111	103	107	104	107

MONTHLY MEDIANS OF h'F AND h'Es

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

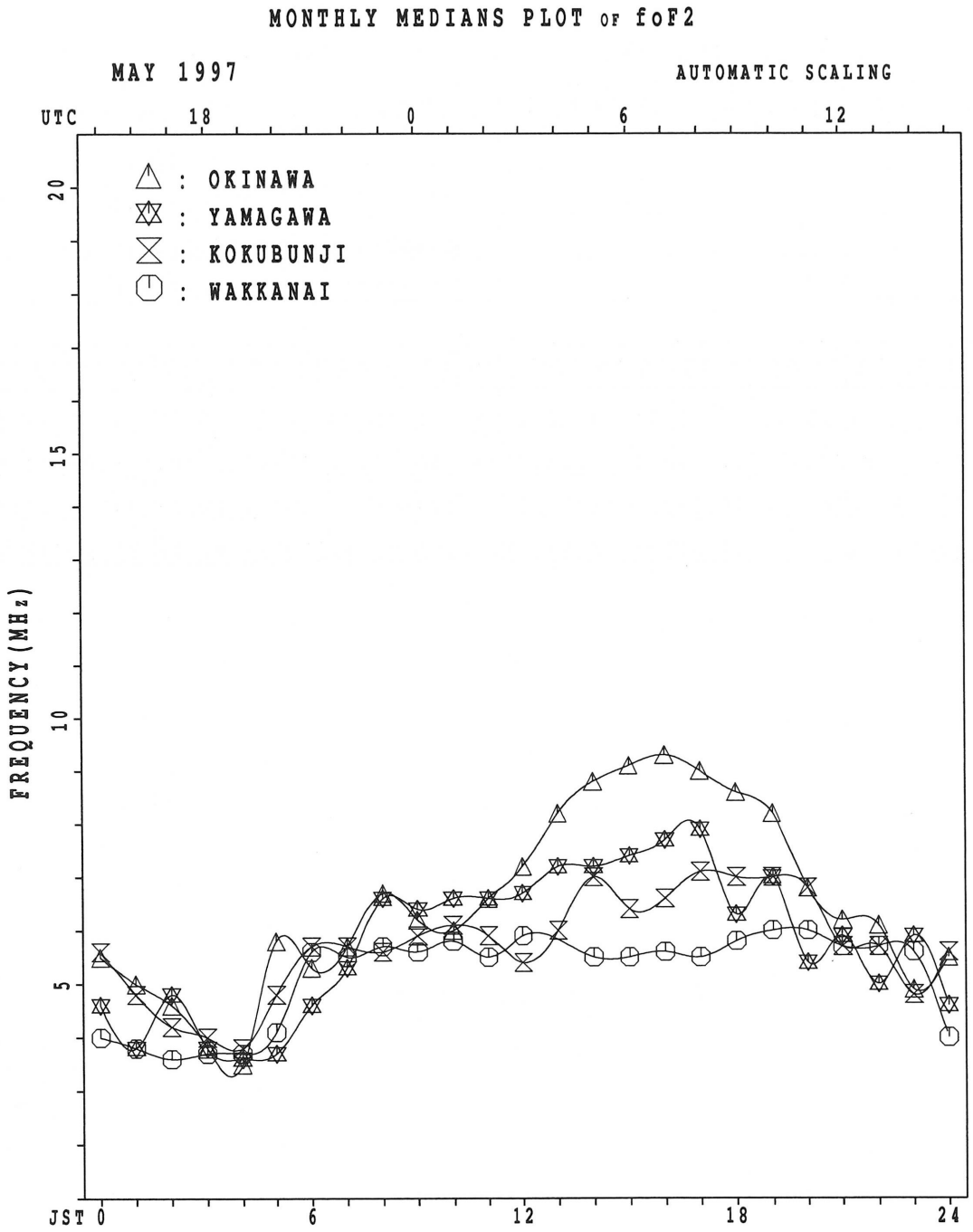
STATION OKINAWA LAT. 26.3N LON. 127.8E

h'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT														17	22	21	22	26	27	16	15			
MED														322	310	306	296	272	266	258	252			
U Q														346	336	324	302	290	280	318	280			
L Q														306	302	292	280	258	256	230	234			

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	23	24	25	24	22	18	19	30	29	28	28	28	24	26	26	29	29	30	31	27	26	25	23	22
MED	105	103	101	99	101	102	103	112	111	107	104	105	103	106	107	107	111	107	105	101	105	105	103	103
U Q	107	105	105	104	103	103	119	119	117	111	113	112	111	119	113	115	117	113	113	105	109	107	107	107
L Q	97	96	96	95	97	99	99	101	105	104	103	103	101	103	99	99	103	103	97	89	97	100	99	97


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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 56	X 51	X 48	X 40	X 38															X 78	X 77	X 74	69	62
2	X 63	63	56	X 50	49															X 74	X 70	X 55	X 50	X 52
3	X 50	52	50	44	X 39															X 90	X 76	X 55	54	56
4	X 54	X 46	X 43	X 42	X 42															X 92	X 84	X 49	43	42
5	43	42	43	39	40															X 80	X 72	X 57	X 52	X 52
6	X 52	X 49	X 45	X 45	X 44															X 84	X 82	X 56	53	X 49
7	X 50	51	49	44	X 42															A	X 66	64	X 64	X 56
8	X 46	X 43	X 43	X 42	X 42															X 79	X 68	X 56	54	48
9	51	48	47	47	44															X 80	X 76	O X 60	A	O X 54
10	50	44	45	44	41															X 78	82	X 59	X 42	X 41
11	42	42	41	X 39	O X 36															X 73	X 65	X 61	52	51
12	51	X 46	X 43	X 42	X 41															X 72	O X 53	51	X 46	52
13	52	50	44	44	38										C	C	C	C	C	X 69	X 60	X 55	53	53
14	52	50	X 48	X 46	38						C	C	C							X 70	X 68	X 61	X 59	X 59
15	X 56	X 56	51	X 48	X 46															X 86	X 82	X 80	X 80	R
16	X 91	X 74	X 65	X 63	X 67									Y						X 44	A	A	48	47
17	43	42	42	44	X 41					C	C	C	C	C	C	C	C	C	S	X 64	61	X 58	X 55	A
18	A	X 38	X 38	X 37	X 39															X 88	X 66	X 51	52	52
19	49	50	46	46	O X 34															X 71	X 68	X 66	X 55	59
20	60	62	58	51	42															X 80	X 91	X 74	A	X 38
21	42	41	44	X 42	X 42															X 68	X 68	X 68	X 64	62
22	X 57	X 52	52	44	43															X 77	A	A	A	A
23	X 52	X 47	47	44	44															A	74	74	75	O X 69
24	X 60	55	50	48	43					C	C	C	C	C	C	C	C			X 74	X 77	X 68	X 70	X 60
25	55	55	54	X 52	X 49															X 68	X 73	75	X 68	58
26	57	X 55	55	X 54	X 52															X 66	X 68	X 66	X 64	X 61
27	59	X 57	A	52	49															A	X 65	X 59	57	63
28	50	44	X 40	X 36	X 34															X 74	X 74	X 70	X 69	X 68
29	X 63	61	57	58	55															X 69	70	54	53	50
30	50	50	46	45	43															X 90	X 63	X 47	A	45
31	46	47	50	X 46	46															X 70	60	X 57	57	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	30	31	30	31	31															28	29	29	27	28
MED	52	50	47	X 44	X 42															X 74	X 70	X 59	X 55	54
U Q	X 57	55	51	X 48	46															X 80	X 76	X 68	X 64	X 60
L Q	50	44	X 43	X 42	X 39															X 70	X 66	X 55	52	50

MAY 1997 fxI (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	50	45	42	34	32	37	49	78	79	A	65	A	A	57	67	65	66	65	66	72	71	68	F 62	F 55
2	57	F 54	F 48	44	F 41	48	44	63	66	R 71	56	59	72	R 79	72	74	80	71	62	68	R 64	49	44	46
3	44	F 42	F 41	F 36	33	44	51	53	V 50	51	65	66	R 61	65	72	74	79	76	76	84	70	49	F 45	F 49
4	48	40	37	36	36	42	43	50	55	56	57	58	57	56	60	65	R 62	56	69	86	78	43	F 33	F 34
5	F 33	F 32	F 33	F 30	F 30	38	56	57	54	50	46	57	R 66	60	60	R 60	72	64	64	74	66	51	46	46
6	46	43	39	39	38	47	58	52	58	64	63	62	U R 61	51	52	56	58	61	70	77	76	50	F 43	43
7	44	F 41	F 41	F 37	36	42	53	57	54	59	56	61	59	63	59	58	60	A	61	A	60	F 56	58	50
8	40	37	37	36	36	41	56	53	65	72	70	55	59	60	57	57	65	69	73	73	S 64	50	F 45	F 39
9	F 40	F 39	F 38	F 40	F 37	A	A	A	A	65	52	56	58	56	54	58	65	69	81	74	70	54	A	U S 48
10	F 40	F 36	F 38	F 35	F 34	43	60	55	A	A	A	A	A	A	56	60	A	A	71	R 72	F 74	53	36	35
11	F 34	F 34	F 34	33	30	42	52	A	A	A	52	55	62	60	A	A	62	64	A	67	58	55	F 45	F 42
12	F 43	40	37	36	35	48	52	51	56	58	57	55	57	58	A	62	72	73	80	66	47	F 44	S 40	44
13	F 44	F 43	F 38	F 36	F 31	44	56	54	53	54	R 50	53	58	56	C	C	C	C	C	63	54	49	F 44	F 44
14	F 44	F 43	42	40	F 30	37	47	49	55	59	C	C	C	53	53	61	67	69	64	64	62	55	53	53
15	50	50	F 44	42	40	45	48	50	54	56	52	56	62	64	60	74	98	90	83	80	76	74	73	R
16	85	68	58	57	61	51	45	F 44	A	A	45	A	A	Y	A	E G 38	F 42	A	42	38	A	A	F 39	F 38
17	F 35	F 36	F 34	F 36	35	37	44	48	46	C	C	C	C	C	C	C	C	C	S	58	54	52	49	A
18	A	32	32	31	33	39	51	56	58	54	A	52	53	66	72	A	72	77	80	82	60	44	F 45	F 40
19	F 40	F 39	F 38	F 40	28	35	46	56	60	52	A	A	R 57	A	64	70	78	76	70	65	62	60	V 49	F 51
20	F 51	F 54	F 50	F 42	F 34	43	52	60	A	R 48	56	58	56	56	53	53	58	61	67	74	85	68	A	32
21	F 34	F 34	F 35	36	36	46	47	60	A	A	48	A	A	A	A	A	A	50	52	62	62	62	58	F 54
22	51	46	F 43	F 36	F 35	40	54	48	48	A	49	A	A	A	A	A	A	A	A	71	A	A	A	A
23	46	41	F 40	F 35	F 36	42	47	59	61	52	A	A	U R 52	53	51	51	51	54	57	A	F 66	F 65	F 66	U S 63
24	54	F 50	F 41	F 39	F 35	38	47	63	70	C	C	C	C	C	C	C	C	62	64	68	71	62	64	54
25	F 48	F 47	F 48	46	43	47	44	52	54	58	57	60	62	62	66	R 63	58	54	54	62	67	F 66	62	F 49
26	F 48	49	F 48	48	46	48	51	61	54	A	A	58	56	A	59	R 64	66	62	62	60	62	60	58	55
27	F 50	51	A	F 41	F 40	34	45	49	A	51	A	A	50	U R 57	A	56	56	A	54	A	59	53	F 49	F 54
28	F 40	F 36	34	30	28	40	51	49	49	54	53	54	59	65	72	74	70	67	78	68	68	64	63	62
29	57	F 51	F 48	F 50	F 46	R 52	56	52	54	E G 44	50	U R 52	A	54	59	55	55	50	52	63	F 62	F 48	F 44	F 43
30	F 40	F 40	F 36	F 37	F 36	F 42	48	53	63	60	56	46	A	A	59	62	67	70	80	84	57	41	A	F 37
31	F 40	F 37	F 40	40	F 38	A	49	58	66	A	A	A	A	A	A	68	69	74	66	64	F 51	51	F 49	F 47
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	31	31	29	30	29	24	21	21	19	20	21	21	24	25	24	27	28	29	29	27	28
MED	F 44	F 41	F 40	37	36	42	50	53	55	56	56	56	58	58	59	62	66	66	66	68	64	53	49	F 46
U Q	50	49	F 43	41	38	46	53	58	62	60	57	59	62	64	66	66	72	72	76	74	70	62	58	54
L Q	F 40	F 37	F 37	36	33	38	47	50	54	52	50	54	56	56	55	56	58	61	61	64	60	49	F 44	F 41

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							L	404	416	A	A	A	A	444	444	428	UA 416	A	A					
2								L 404	UA 412	UA 468	UA 432	456	UA 488	452	444	H 440	424	UL 368						
3								A	A	UL 432	444	444	456	452	444	432	420	L 392	L					
4							A	UL 408	L 420	436	444	444	448	448	436	424	408	396	L 332					
5							UL 360	L 388	428	A	A	448	448	448	444	440	404	L 372						
6							L 348	UL 432	420	444	444	460	444	440	440	424	396	A	A					
7						L	L 352	UA 404	420	444	448	460	448	440	A	428	412	A	A					
8							UL 360	L	412	420	436	460	A	444	452	428	408	384	UL 308					
9						A	A	A	A	A	A	448	444	UA 440	UA 444	A	404	A						
10							L		A	A	A	A	A	A	444	A	A	A	A					
11							A	A	A	A	A	A	UA 440	A	A	A	428	A	A					
12							L	UL 384	A	A	440	A	A	A	A	A	UA 416	A	L					
13							A	A	416	432	448	444	452	440	C	C	C	C	C					
14								L 408	416	432	C	C	C	448	436	428	404	368						
15							L	L	A	UA 424	436	448	452	448	448	UA 428	396	368	UL 336					
16						252	UA 308	356	A	A	A	A	A	Y	A	384	372	A	L					
17							A	UA 396	404	C	C	C	C	C	C	C	C	C						
18							L	A	UA 424	432	A	448	A	A	A	A	A	A	A					
19						204	L	396	412	UA 432	A	A	460	A	A	UA 440	UA 416	360	A					
20							L	UA 392	A	A	444	444	440	448	A	UA 424	A	A	A					
21								404	A	A	A	A	A	A	A	A	A	UL 396	UL 360					
22							L 360	A	A	A	UA 440	A	A	A	A	A	A	A	A					
23							L	L	432	UA 432	A	A	UA 440	R 444	432	420	412	A	A					
24							L 392	396	A	C	C	C	C	C	C	C	C	380	L 336					
25								L 456	424	440	444	460	456	UA 440	452	428	UA 412	L 392	A					
26							UL 400	404	420	A	A	A	A	A	444	440	416	392	L 340					
27							A	R 416	A	A	A	A	A	A	A	424	404	A	L					
28						L 304	UA 340	388	412	440	456	L 460	UA	A	456	440	424	412	L 408	A				
29						308	L 388	424	UA 428	UR 440	448	464		A	452	UA 452	436	A	A	UL 352				
30						L	L	392	UA 476	UA 452	456	A	A	A	444	440	A	UA 404	A					
31						A	A	A	A	A	A	A	A	A	A	A	400	392	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						4	10	20	18	16	15	15	14	17	17	20	21	15	7					
MED						278	L 360	404	420	434	444	448	448	448	444	428	412	392	UL 336					
U Q						306	L 388	L 408	UA 424	U 442	448	460	456	450	446	438	416	396	UL 352					
L Q						228	UA 348	392	412	432	440	444	444	440	440	424	404	368	L 332					

MAY 1997 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B	212	264	296	328	A	U A 344	A	A	A 320	316	292	240	A					
2						B	208	272	300	A 316	A 336	344	A 352	A 348	R	B 308	284	244	A					
3						B	220	264	A	A	A	A	R	344	328	308	276	232	A					
4						B	232	268	A	A	A	R	R 348	340	324	324	280	248	A					
5						B	216	A	A	A	A	A	352	A 340	A	A	A	236	B					
6						B	220	268	300	A	R	A	A	A	R	308	284	244	A					
7						B	220	264	280	316	A 328	R	A	340	A 328	A	A	A	A					
8					172	232	264	292	U A 312	A	A	A	A	324	300	280	236	160						
9						A	212	272	296	U A 324	A	A	A	352	332	312	288	U A 232	A					
10						A	U A 228	272	A	A	A	A	A	A	A	320	284	A 232	A					
11						A	220	268	292	316	A	A	A	340	332	312	272	240	A					
12					156	240	H 276	316	A 332	A	A	A	A	A	A	A 336	296	252	A					
13						B	232	272	A	A	A	A	R	A	C	C	C	C	C					
14						A	H 228	280	316	332	C	C	C	A	A	A	300	U A 240	A					
15					176	220	268	296	316	A	A	A	A	A	A	A	280	A	A					
16						A	A	A 272	292	A	U A 316	U A 336	348	R 348	340	316	272	228	A					
17						A	232	A 268	296	C	C	C	C	C	C	C	C	C						
18						A	224	A	A 284	A	A	A	A	A	A	A	A	A	A					
19						A	244	276	296	U A 316	A	A	A	A	A	A	A	A	A					
20						A	240	A 292	A 320	U A 332	A	A	U A 348	A	A	328	292	248	168					
21						A	240	284	308	A	A	A	A	A	A	A	A	A	180					
22					164	256	280	308	A 336	A	A	A	A	A	A	A	288	240	A					
23					176	A	288	A	A	A	A	A	A	R 344	348	328	292	244	A					
24					188	240	U A 272	A	C	C	C	C	C	C	C	C	C	256	U A 168					
25						A	228	280	316	R 336	A	U R 356	A	R 352	340	316	288	H 256	204					
26					188	268	300	A 320	U A 340	A	A	A	A	A	A	312	A 292	A	B					
27					196	A	284	316	336	A 348	A	A	A	A	A	U R 332	R	240	188					
28					180	224	284	304	336	344	356 R	352	U R 348	340	324	292	248	A						
29						A	244	272	300	340	U A 352	A 360	U R 372	348	A	328	296	252	208					
30						A	A	A	U A 308	A	A	340	A	A	348	328	292	A 236	A					
31						A	A	276	308	328	A	A	A	A	A	A 316	A	256	A 196					
	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						9	26	28	24	18	6	7	7	12	12	20	21	23	8					
MED						176	228	272	300	330	A 340	344	352	346	332	316	288	240	184					
U Q						188	240	280	312	336	A 348	356	352	R 348	340	328	292	248	200					
L Q						168	220	268	296	316	A 328	340	348	340	326	312	280	236	168					

MAY 1997 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 14	E B 14	E B 16	18	E B 14	20	28	32	41	62	J A 55	J A 85	J A 95	J A 43	37	42	J A 50	J A 63	70	54	J A 47	J A 47	J A 32	39
2	J A 35	29	J A 51	32	28	J A 22	27	37	J A 42	J A 52	J A 44	42	J A 54	J A 48	G 28	G	32	31	48	J A 31	21	20	J A 26	J A 62
3	J A 48	J A 44	J A 22	21	20	E B 16	28	J A 46	J A 49	33	J A 44	J A 44	G 32	42	37	35	G 27	29	J A 26	54	J A 45	J A 28	J A 33	27
4	J A 25	J A 24	20	20	E B 15	E B 15	J A 35	J A 34	J A 44	J A 38	34	G 31	G 29	G	G 27	G	32	32	31	28	E B 14	E B 15	J A 46	J A 32
5	21	19	19	E B 16	E B 14	J A 23	28	J A 48	J A 54	J A 48	J A 54	42	G 33	36	41	47	38	28	J A 24	29	J A 22	28	26	19
6	20	E B 15	20	E B 16	19	J A 20	27	32	34	36	30	36	37	J A 45	G 27	34	30	56	J A 42	36	24	31	27	28
7	28	J A 32	26	26	28	J A 20	28	J A 44	33	G	35	G	J A 42	38	J A 69	J A 36	44	72	J A 155	J A 88	J A 50	J A 51	E B 15	E B 15
8	21	19	20	20	E B 14	20	27	32	32	38	J A 42	40	55	38	35	34	31	29	23	J A 36	J A 51	J A 38	J A 56	46
9	J A 40	30	J A 28	30	E B 14	52	72	J A 66	J A 81	J A 64	J A 45	J A 45	43	44	J A 48	J A 48	35	J A 65	J A 181	J A 160	J A 51	J A 98	J A 105	J A 52
10	J A 45	J A 51	J A 37	28	19	J A 21	J A 44	53	J A 136	J A 160	111	J A 141	J A 132	86	J A 43	J A 60	J A 119	J A 200	J A 139	J A 123	J A 48	J A 37	23	40
11	30	21	28	30	J A 47	J A 44	J A 46	J A 85	87	J A 58	J A 51	J A 52	J A 52	J A 79	88	J A 96	J A 65	J A 72	J A 108	J A 42	J A 53	32	24	31
12	20	21	J A 20	E B 14	E B 14	J A 22	G 19	J A 38	J A 50	J A 51	38	J A 52	J A 52	J A 50	J A 65	J A 65	J A 48	J A 66	J A 36	J A 33	J A 50	J A 47	J A 48	21
13	19	33	J A 24	J A 20	23	22	J A 36	J A 47	J A 40	39	J A 40	J A 37	G 31	39	C	C	C	C	C	32	20	J A 34	32	J A 25
14	E B 16	E B 16	18	20	J A 42	J A 44	29	34	J A 44	40	C	C	C	34	32	34	G 28	J A 52	J A 47	54	J A 44	26	24	20
15	J A 26	J A 37	J A 27	J A 31	J A 26	20	27	J A 42	J A 52	J A 49	38	J A 42	35	35	J A 36	J A 45	J A 38	28	J A 66	31	J A 25	J A 22	E B 15	55
16	18	J A 14	J A 30	J A 28	25	J A 22	J A 34	J A 36	J A 39	J A 42	J A 44	J A 45	J A 49	40	J A 44	35	34	J A 56	33	36	J A 61	J A 55	J A 50	J A 54
17	J A 64	J A 32	J A 30	J A 26	J A 22	J A 23	J A 37	J A 43	J A 38	C	C	C	C	C	C	C	C	C	S	J A 39	J A 47	J A 38	J A 35	61
18	J A 40	J A 33	J A 33	J A 30	22	J A 33	J A 37	J A 59	J A 52	J A 62	J A 77	45	52	61	J A 68	J A 110	74	J A 48	J A 67	J A 62	J A 52	43	31	J A 46
19	J A 49	J A 36	27	J A 24	30	J A 22	27	34	J A 44	J A 50	60	82	J A 47	J A 84	J A 102	J A 50	45	J A 33	41	J A 34	J A 24	27	J A 76	J A 32
20	J A 50	J A 44	J A 47	28	27	J A 28	J A 33	J A 44	J A 62	J A 53	J A 49	43	44	39	48	J A 46	J A 54	58	J A 88	J A 76	60	J A 50	J A 86	39
21	36	J A 22	20	21	J A 31	J A 27	27	31	J A 82	J A 78	J A 55	J A 67	J A 86	72	110	80	64	J A 45	24	J A 23	J A 31	J A 50	J A 64	J A 25
22	J A 27	J A 27	J A 32	26	J A 20	24	31	J A 43	J A 54	J A 64	J A 54	J A 64	J A 75	J A 85	J A 105	86	123	J A 116	92	J A 65	89	J A 109	J A 66	58
23	J A 66	J A 61	J A 60	J A 45	J A 23	G	J A 35	54	J A 62	J A 45	90	61	J A 53	40	40	39	37	J A 46	J A 51	94	J A 51	J A 46	J A 48	J A 68
24	J A 38	26	26	28	J A 21	22	J A 32	J A 36	J A 52	C	C	C	C	C	C	C	C	J A 43	J A 36	J A 29	J A 38	J A 74	J A 49	29
25	26	J A 21	23	J A 20	20	J A 24	29	36	39	G 30	39	G	39	J A 44	37	G	J A 42	30	J A 35	J A 48	J A 65	J A 51	J A 51	J A 42
26	J A 43	J A 42	J A 40	27	20	G	G 22	32	J A 45	J A 63	J A 87	J A 59	J A 101	J A 124	41	G 29	37	J A 40	34	J A 30	J A 27	J A 22	J A 30	J A 51
27	J A 53	J A 43	J A 55	J A 42	E B 14	J A 32	J A 50	J A 40	J A 83	J A 50	J A 51	J A 55	J A 52	J A 54	J A 76	39	27	G J A 60	J A 31	J A 79	55	J A 65	J A 64	J A 50
28	J A 27	J A 38	J A 31	J A 21	J A 27	25	J A 37	34	36	40	44	48	48	46	41	J A 52	37	J A 42	J A 58	J A 32	J A 32	22	34	J A 38
29	J A 50	J A 45	J A 50	J A 65	J A 44	J A 36	27	J A 38	J A 44	45	53	J A 50	45	G 25	J A 48	38	J A 49	J A 42	J A 30	J A 78	J A 76	J A 79	J A 55	60
30	28	J A 34	J A 32	J A 32	32	J A 36	J A 30	J A 43	53	J A 50	J A 52	J A 44	61	J A 138	42	37	J A 53	67	54	46	32	J A 45	J A 54	J A 33
31	J A 47	J A 55	43	J A 62	J A 53	J A 96	86	J A 53	J A 54	105	J A 153	84	89	J A 95	J A 172	J A 59	J A 37	30	J A 36	35	J A 28	J A 88	J A 50	J A 47
	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	29	28	28	28	29	28	28	28	29	29	31	31	31	31	31
MED	J A 30	J A 32	J A 28	26	22	J A 22	30	J A 40	J A 49	J A 50	J A 50	J A 45	50	44	42	40	38	J A 46	J A 42	J A 39	J A 47	J A 43	J A 46	J A 39
U Q	J A 47	J A 42	J A 37	J A 30	J A 28	J A 32	J A 37	J A 47	J A 54	J A 62	J A 55	J A 60	J A 58	J A 76	J A 68	J A 56	J A 52	J A 64	J A 68	J A 65	J A 52	J A 51	J A 55	J A 52
L Q	21	21	20	20	E B 19	20	27	34	40	40	41	42	40	38	37	34	33	32	32	32	27	28	27	28

MAY 1997 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 14	E B 14	E B 16	16	E B 14	18	26	32	40	A A 62	51	A A 85	A A 95	42	36	41	42	46	61	46	23	18	20	22
2	22	17	18	18	E B 16	18	25	35	41	47	43	41	49	43	U G 28	G	32	28	35	20	E B 16	E B 16	E B 16	33
3	17	E B 16	E B 15	E B 15	E B 15	E B 16	25	46	42	33	42	42	U G 32	40	36	35	G 23	27	22	31	19	20	22	17
4	19	17	E B 14	E B 14	E B 15	E B 15	32	31	36	35	33	U G 31	G 29	G	G 26	G	31	29	22	28	E B 14	E B 15	18	19
5	18	17	E B 14	E B 16	E B 14	19	27	35	38	45	41	38	G 31	35	34	34	31	26	21	26	17	E B 14	E B 14	E B 14
6	E B 16	E B 15	E B 16	E B 16	14	19	26	30	33	36	27	36	37	38	G 27	33	30	48	33	20	16	19	20	21
7	18	23	17	17	18	18	26	40	32	G	35	G	38	37	54	34	35	A A 72	40	A A 88	37	40	E B 15	E B 15
8	E B 13	E B 14	17	E B 14	E B 14	19	26	32	32	36	34	39	49	36	U Y 34	34	30	27	19	E B 15	23	18	30	24
9	24	22	18	19	E B 14	A A 52	A A 72	A A 66	A A 81	62	43	37	40	44	44	48	33	51	40	30	21	41	A A 105	37
10	19	18	23	19	E B 14	20	28	37	A A 136	A A 160	A A 111	A A 141	A A 132	A A 86	39	58	A A 119	A A 200	66	20	29	27	16	24
11	20	E B 16	18	21	25	23	33	A A 85	A A 87	A A 58	48	48	44	56	A A 88	A A 96	40	44	A A 108	E B 15	43	18	17	16
12	E B 14	17	E B 14	E B 14	E B 14	18	G 18	33	45	49	38	48	49	47	A A 65	56	42	65	25	27	38	36	26	E B 16
13	17	30	E B 21	14	18	E B 14	36	46	34	36	37	36	U G 31	37	C	C	C	C	C	30	E B 14	23	22	E B 16
14	E B 16	E B 16	17	E B 14	E B 14	22	26	33	39	38	C	C	C	33	U Y 32	33	G 26	29	38	34	32	17	17	E B 14
15	17	E B 14	19	22	22	E B 16	26	36	46	42	36	37	U Y 35	35	34	43	G 24	25	24	21	18	17	E B 15	35
16	E B E 15	B 15	19	22	18	18	31	30	A A 39	A A 42	41	A A 45	A A 49	U Y 40	A A 44	34	32	A A 56	23	20	A A 61	A A 55	17	19
17	17	20	22	18	18	18	36	40	34	C	C	C	C	C	C	C	C	C	S	20	35	32	21	A A 61
18	A A 40	18	22	21	E B 15	28	34	48	42	37	A A 77	40	51	56	59	A A 110	49	44	63	45	31	32	22	21
19	33	25	19	17	24	17	26	32	36	43	A A 60	A A 82	44	A A 84	47	44	42	30	33	19	19	18	E B 16	16
20	32	32	32	18	18	25	32	39	A A 62	41	42	40	41	38	47	42	44	49	42	36	36	32	A A 86	19
21	22	17	16	E B 14	25	18	26	30	A A 82	A A 78	45	A A 67	A A 86	A A 72	A A 110	A A 80	A A 64	35	23	18	20	32	36	17
22	18	17	20	E B E 14	B 13	22	29	40	45	A A 64	44	A A 64	A A 75	A A 85	A A 105	A A 86	A A 123	A A 116	A A 92	44	A A 89	A A 109	A A 66	A A 58
23	35	33	18	16	E B 16	G	34	G 25	40	43	A A 90	A A 61	44	39	39	38	36	43	38	A A 94	25	34	26	42
24	18	E B 14	E B 15	E B 13	E B 14	20	29	33	51	C	C	C	C	C	C	C	C	34	25	20	24	46	32	17
25	18	16	17	E B 15	E B 14	22	28	34	35	G 28	37	G	38	44	36	G	41	29	34	40	24	21	17	23
26	E B E 15	B 14	33	18	E B 14	G	G 20	32	39	A A 63	A A 87	50	52	A A 124	36	G 27	G 28	36	24	21	22	E B 15	20	18
27	30	27	A A 55	19	E B 14	28	40	38	A A 83	47	A A 51	A A 55	46	53	A A 76	37	U G 27	A A 60	28	A A 79	44	17	32	18
28	18	23	22	E B 14	20	20	34	32	34	37	42	46	45	44	38	39	32	29	37	17	17	E B 13	24	19
29	22	20	34	35	19	22	26	36	43	42	38	42	A A 45	G 24	45	37	41	40	26	31	30	32	34	30
30	18	19	22	16	20	20	26	34	48	45	41	42	A A 61	A A 138	40	36	48	40	42	38	U Y 32	26	A A 54	22
31	30	16	27	35	22	A A 96	45	49	50	A A 105	A A 153	A A 84	A A 89	A A 95	A A 172	57	36	29	34	27	21	39	32	26
	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	29	28	28	28	29	28	28	28	29	29	31	31	31	31	31
MED	18	17	18	16	E B 15	19	28	35	41	43	42	42	45	43	40	38	36	40	34	27	24	23	22	19
U Q	22	22	22	19	19	22	34	40	A A 50	A A 60	A A 51	A A 58	A A 52	A A 64	A A 56	52	42	A A 50	41	38	35	34	32	26
L Q	E B E 17	B 16	E B 16	E B 14	E B 14	18	26	32	36	36	38	38	38	37	35	34	G 30	29	24	20	19	E B 17	E B 17	E B 17

MAY 1997 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

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

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

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	315	318	326	322	319	331	289	327	373	A	321	A	A	317	331	321	323	325	A 311	310	317	304	F 301	F 319
2	301	F 306	F 300	318	F 287	333	346	334	349	R 332	323	290	307	R 315	313	308	319	337	323	321	R 332	308	292	294
3	312	F 284	F 327	F 304	348	352	367	327	V 357	353	328	334	R 325	304	317	315	314	317	320	333	346	303	F 294	F 304
4	325	299	300	313	325	360	347	337	339	331	298	329	319	305	311	317	R 336	304	309	334	354	365	F 270	F 288
5	F 310	F 312	F 302	F 330	F 328	311	361	364	367	304	317	309	R 305	313	320	R 318	323	333	308	333	335	322	299	296
6	305	300	315	304	324	339	357	323	334	346	333	323	U R 331	291	297	328	312	311	310	323	352	328	F 295	315
7	307	F 292	F 300	F 290	306	333	334	356	368	318	325	326	315	318	A	312	321	A	336	A	307	F 308	336	344
8	307	315	304	311	315	317	335	314	324	340	337	302	304	312	299	293	302	325	327	334	S 358	299	F 311	F 277
9	F 304	F 317	F 299	F 305	F 311	A	A	A	A	A 329	337	300	313	309	295	298	304	311	319	327	342	325	A	U S 339
10	F 302	F 292	F 297	F 302	F 307	322	359	339	A	A	A	A	A	A	299	A 321	A	A	A 323	326	F 335	338	316	311
11	F 294	F 300	F 295	316	332	353	359	A	A	A	A 286	301	311	A 306	A	A	325	322	A	319	321	330	F 307	F 310
12	F 323	323	324	323	322	360	356	368	341	336	326	327	307	302	A	306	314	323	328	353	296	F 298	S 302	303
13	F 306	F 307	F 316	F 311	F 307	340	366	369	356	347	R 298	299	295	325	C	C	C	C	C	329	320	298	F 294	F 302
14	F 310	F 299	321	335	F 312	349	346	335	346	357	C	C	C	302	286	309	313	327	325	315	319	316	293	307
15	305	313	F 313	326	320	365	337	344	331	325	306	290	302	293	269	269	314	324	279	287	280	294	280	R
16	288	302	286	264	284	244	241	F 265	A	A	250	A	A	Y	A	G	F 266	A	329	301	A	A	F 291	F 307
17	F 275	F 279	F 299	F 309	335	324	324	326	324	C	C	C	C	C	C	C	C	C	S	323	298	299	316	A
18	A	290	304	305	319	325	334	346	360	325	A	281	A 269	296	298	A	301	319	311	346	360	319	F 309	F 289
19	F 310	F 287	F 315	F 351	335	334	335	346	346	331	A	A	R 304	A	300	304	307	329	328	321	311	325	V 300	F 309
20	F 319	F 310	F 314	F 323	F 326	355	340	351	A	A	318	310	323	307	306	306	310	299	294	298	332	389	A	298
21	F 314	F 301	F 306	328	320	360	342	351	A	A	A 306	A	A	A	A	A	A	307	301	298	296	308	319	F 313
22	307	322	F 320	F 316	F 317	342	348	353	A 305	A	286	A	A	A	A	A	A	A	A	352	A	A	A	A
23	304	312	F 327	F 315	F 327	329	334	345	354	327	A	A	U R 321	289	297	311	301	302	302	A	F 294	F 315	F 327	U S 341
24	305	F 298	F 318	F 335	F 334	325	308	331	337	C	C	C	C	C	C	C	C	323	304	304	318	327	301	299
25	F 292	F 302	F 307	327	332	362	374	328	324	336	319	292	303	293	320	R 326	311	306	300	293	306	F 317	F 328	F 295
26	F 301	306	F 299	F 302	299	328	314	339	329	A	A	299	A 302	A	296	R 312	319	325	331	319	298	301	300	288
27	F 296	300	A	F 307	F 319	322	303	233	A	293	A	A	275	U R 290	A	288	307	A	299	A	286	293	F 285	F 321
28	F 315	F 300	295	293	300	303	317	305	317	318	294	286	296	311	313	318	308	289	307	301	295	309	299	295
29	291	F 303	F 297	F 315	F 313	R 308	323	293		G	317	U R 300	A	294	311	288	315	304	312	306	F 329	F 308	F 301	F 289
30	F 322	F 307	F 299	F 311	F 317	F 338	325	302	341	341	336	A 309	A	A	304	292	295	292	313	356	331	331	A	F 296
31	F 265	F 300	F 292	323	F 312	A	A 293	331	311	A	A	A	A	A	A	299	311	336	327	340	F 292	284	F 287	F 292
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	31	31	29	30	29	23	20	21	19	20	21	20	24	25	24	27	28	29	29	27	28
MED	F 306	F 302	F 304	315	319	333	336	335	341	331	318	301	306	305	302	308	312	320	312	322	319	309	300	F 302
U Q	F 312	312	F 316	323	327	352	356	348	356	340	327	323	317	312	313	318	319	325	327	334	335	326	311	312
L Q	F 301	F 299	F 299	305	311	323	323	324	324	322	298	292	302	294	297	296	306	305	304	305	297	300	F 293	F 294

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							L 353		A	A	A	A	A	A 342	359	A	A	A	A					
2								A 364	A	A	A	345	A	A	359	H 369	338	U L 366						
3								A	A	U L 384	A	A 367	371	383	384	363	350	L 357	L					
4							A	U L 371	L 376	377	386	Y	389	384	375	364	353	337	L 345					
5							U L 365	A 386	388	A	A	379	392	390	372	353	362	L 354						
6							L 384	U L 355	366	381	377	399	406	398	392	H 383	372	A	A					
7						L	L 382	A	397	395	388	H 384	398	388	A	376	357	A	A					
8							U L 385	L	387	385	389	391	A	389	361	369	359	341	L					
9						A	A	A	A	A	A	389	A 365	A	A	A	349	A						
10							L		A	A	A	A	A	A	356	A	A	A	A					
11							A	A	A	A	A	A	A	A	A	A	A	A	A					
12							L	U L 391	A	A	390	A	A	A	A	A	A	A	L					
13							A	A	406	404	400	407	372	369	C	C	C	C	C					
14								L 366	373	390	C	C	C	391	392	373	372	348						
15							L	L	A	A	412	398	388	380	363	A	370	356	L					
16						313	A	345	A	A	A	A	A	Y	A	384	371	A	L					
17							A	A 374		C	C	C	C	C	C	C	C	C						
18							L	A	A	369	A	368	A	A	A	A	A	A	A					
19						409	L	363	370	A	A	A	A	A	A	A	A	368	A					
20							L	A	A	A	A	A	A 373	387	A	A	A	A	A					
21								378	A	A	A	A	A	A	A	A	A	A 349	U L 339					
22							L 372	A	A	A	A	A	A	A	A	A	A	A	A					
23							L	L	383	A	A	A	A	R 398	386	373	354	A	A					
24							L 356	385	A	C	C	C	C	C	C	C	C	A	L 345					
25								L 339	372	387	392	381	381	A	367	382	A	L 349	A					
26							U L 348	375	389	A	A	A	A	A	367	365	364	A	L 364					
27							A	R 356	A	A	A	A	A	A	A	387	369	A	L					
28						L 327	A	367	381	383	A 331	A	A	A	395	367	368	L 342	A					
29						349	L 372	368	A	U R 358	387	385	A	407	A	362	A	A	U L 347					
30						L	L	394	A	A	A 353	A	A	A	A 349	370	A	A	A					
31						A	A	A	A	A	A	A	A	A	A	A	361	353	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						4	8	17	13	11	11	12	10	13	15	16	16	12	5					
MED						338	L 372	367	381	384	388	384	384	388	367	370	362	351	L 345					
U Q						379	L 383	382	388	390	392	394	392	394	386	379	370	356	L 356					
L Q						320	U L 360	356	372	377	A 377	374	372	382	359	364	354	345	L 342					

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							L 350	278	234	A	312	A	A	328	304	300	294	286	A					
2								282	270	280	316	366	334	284	298	312	288	260						
3								A 328	A 272	276	314	292	314	320	310	306	288	266	266					
4							244	284	288	320	336	308	330	364	330	314	286	330	278					
5							264	252	258	A 368	A 354	348	326	332	320	310	286	270						
6							248	322	304	272	294	316	302	366	402	316	322	A 314	282					
7						276	274	260	270	318	318	306	346	312	A	330	308	A	270					
8							258	L 300	296	280	276	354	352	336	378	380	320	274	262					
9						A	A	A	A	A	322	372	342	358	386	366	316	A 302						
10							244		A	A	A	A	A	A	380	A	A	A	A					
11							254	A	A	A	E A 430	A 360	338	E A 372	A	A	292	284	A					
12							234	246	282	294	326	324	A 354	350	A	A 348	300	E A 318	248					
13							238	248	270	294	406	386	380	314	C	C	C	C	C					
14								298	292	270	C	C	C	388	420	332	304	284						
15							256	280	A 306	316	368	390	346	344	418	382	294	268	294					
16						430	488	442	A	A	A 558	A	A	Y	A	G	486	A	280					
17							A 284	310	344	C	C	C	C	C	C	C	C	C						
18							284	A 286	262	316	A	434	A	A 350	A 346	A	310	282	A 304					
19						238	290	286	268	310	A	A	370	A	346	324	302	270	246					
20							260	264	A	A	354	334	334	364	A 374	350	332	A 332	318					
21								268	A	A	E A 380	A	A	A	A	A	A	336	310					
22							270	280	A 388	A	432	A	A	A	A	A	A	A	A					
23							L 296	274	254	326	A	A	374	414	396	354	370	A 330	302					
24							340	286	264	C	C	C	C	C	C	C	C	292	298					
25								316	312	294	328	384	352	360	308	306	332	340	304					
26							310	278	300	A	A	386	E A 388	A	366	324	298	284	268					
27							A 366	604	A	E A 402	A	A	482	436	A	388	356	A	310					
28						356	310	340	336	320	374	414	380	326	318	308	304	306	278					
29						310	278	386	336	G	350	404	A	394	340	394	314	338	308					
30						286	284	336	284	292	320	A	A	A	360	354	320	300	272					
31						A	A	304	304	A	A	A	A	A	A	A 344	314	274	262					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						6	24	28	24	19	21	18	19	21	20	23	25	24	21					
MED						298	276	286	286	302	331	363	346	350	353	332	308	287	280					
U Q						356	303	319	305	320	377	386	374	369	383	366	321	324	304					
L Q						276	255	276	269	280	317	324	334	327	319	312	294	274	267					

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	258	256	230	236	268	254	236	252	A	A	A	A	A	A	226	A	A	A	A	278	264	258	290	280
2	282	274	274	272	288	264	248	A	A	A	A	E A 258	A	A	226	H 206	258	242	260	250	236	234	284	A
3	268	290	248	254	238	218	218	A	A	206	A	A	214	220	212	226	230	236	256	254	236	240	316	276
4	252	280	282	258	234	226	A	226	218	210	198	Y	200	202	198	220	236	242	248	240	214	202	312	340
5	306	298	290	262	262	254	234	A	A 232	A	A	210	222	194	210	230	220	242	252	244	230	226	270	274
6	274	284	278	264	264	250	228	218	230	224	204	204	196	212	200	H 200	230	A	A	248	220	232	304	282
7	282	336	286	262	284	254	234	A	210	208	202	H 188	206	198	A	224	A 256	A	A	A	A 298	A 326	238	222
8	240	274	276	270	270	250	230	220	212	212	194	206	A	198	228	224	234	232	244	230	226	254	A 326	A 358
9	316	304	278	272	268	A	A	A	A	A	A	192	E A 264	A	A	A	E A 270	A	A 264	262	242	E A 328	A	A 318
10	286	334	A 346	300	266	248	242	218	A	A	A	A	A	A	A 256	A	A	A	A	276	234	232	246	338
11	314	314	310	286	A 320	230	A	A	A	A	A	A	A	A	A	A	A	A	A	252	E A 296	246	252	276
12	254	278	254	276	266	228	228	A 242	A	A	208	A	A	A	A	A	A	A	A 256	228	A	E A 362	A 346	280
13	270	A 302	294	262	290	242	A	A	206	206	192	182	230	A 250	C	C	C	C	C	238	232	286	308	288
14	272	276	252	224	258	240	234	234	A 268	220	C	C	C	202	200	212	222	A 244	A 254	A 268	268	240	290	270
15	270	262	274	266	272	232	208	E A 258	A	A	196	194	202	202	212	A	H 216	236	A 272	268	268	266	292	A 338
16	268	274	300	A 332	294	280	A	262	A	A	A	A	A	Y	A	248	260	A	E A 264	286	A	A	282	A 336
17	316	348	348	288	260	254	A	A	224	C	C	C	C	C	C	C	C	C	S	258	A 300	A 314	278	A
18	A	318	336	314	268	A 272	A	A	A	A 240	A	A 238	A	A	A	A	A	A	A	A 240	232	A 302	276	320
19	E A 358	332	278	242	A 290	226	240	242	232	A	A	A	A	A	A	A	A	A 240	A	248	252	244	234	254
20	A 314	A 302	A 302	234	238	242	250	A	A	A	A	A	A 252	228	A	A	A	A	A	A 296	262	224	A	314
21	334	300	280	252	282	230	218	232	A	A	A	A	A	A	A	A	A	A	244	268	268	276	A 286	260
22	254	262	274	236	274	248	244	A	A	A	A	A	A	A	A	A	A	A	A	A 246	A	A	A	A
23	A 344	A	252	262	260	242	A 250	A 246	A 240	A	A	A	A	216	A 248	E A 270	A 254	A	A	A	302	280	248	A 282
24	264	272	262	236	254	224	230	236	A	C	C	C	C	C	C	C	C	A	A 242	258	258	A 290	290	272
25	294	294	276	244	240	224	228	226	224	220	204	220	228	A	224	220	A	226	A	E A 302	280	256	238	306
26	252	270	326	278	260	246	238	236	A 250	A	A	A	A	A	234	226	242	A	A 250	252	274	270	284	280
27	A 342	326	A	294	254	E A 306	A	266	A	A	A	A	A	A	A	226	H 216	A	E A 292	A	A 358	274	384	262
28	250	282	302	294	324	268	A	240	224	222	A	A	A	A	222	A 280	H 208	218	A	234	264	258	276	288
29	300	282	A 338	A 288	270	A 256	220	234	A	A	202	230	A	188	A	258	A	A	A 256	262	252	A 326	A	A 376
30	272	286	A 332	282	272	240	216	228	A	A	E A 262	A	A	A	E A 292	224	A	A	A	232	E Y 280	256	A	A 366
31	E A 394	306	A 342	A 338	292	A	A	A	A	A	A	A	A	A	A	A	A 256	H 212	A	240	270	E A 362	A 346	A 358
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	31	31	29	21	19	13	10	10	11	10	12	15	16	16	11	15	28	28	29	26	28
MED	275	288	281	266	268	244	234	235	224	216	201	205	214	202	223	224	234	236	A 254	252	259	257	285	285
U Q	A 314	306	310	288	284	254	241	246	A 236	222	204	A 230	A 230	218	A 234	239	A 256	242	A 264	268	277	A 296	308	A 337
L Q	264	274	274	252	260	230	224	226	215	208	196	192	202	198	210	220	H 221	226	248	240	235	240	270	275

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B 122	126		116	114	A	116	116	A	A	126	118	116	A					
2						B 138	116		118	114	116	116	116	116	A	116	116	116	A					
3						B 122	116		114	A	A	A	A	118	118	114	130	118	A					
4						B 122	118		A	A	A	A	120	120	118	110	128	120	A					
5						B 120	A		A	112	A	A	A 126	A	A	A	A	116	B					
6						B 122	A 126		116	A	124	A	A	A	A 128	114	120	120	A					
7						B 136	116		118	120	120	120	A	118	114	A	A	A	A					
8					134	124	124		114	116	A	A	A	A	118	124	118	116	122					
9					A 124	120			116	118	122	A	A	118	118	128	122	120	A					
10					A 120	116			118	A	A	A	A	A	A	120	118	116	A					
11					A 122	120			114	114	116	118	118	118	118	118	116	116	A					
12					142	122	120		118	114	116	116	A	A	A	128	126	124	A					
13					B 132	112			A	A	A	A	A	A	C	C	C	C	C					
14					A 120	A 132			118	120	C	C	C	A	A	A	128	126	A					
15					134	124	126		A 122	114	114	A	A	A	A	A	A 134	A	A					
16					A	A	118		118	110	110	112	112	114	114	116	124	114	A					
17					A 124	118			118	C	C	C	C	C	C	C	C	C						
18					A 124	A			116	112	116	118	A	A	A	A	A	A	A					
19					A 126	118			116	112	A	114	A	A	A	A	A	A	E B					
20					130	A 144	118		116	114	114	A 114	118	A	116	116	122	118	118					
21					A	126	124		112	110	112	112	112	A	112	A	A	A	122					
22					138	122	118		114	116	116	A	116	114	118	A	122	A 126	A					
23					164	A	A 136		112	112	114	A	A	114	114	122	118	116	116					
24					142	122	116		112	C	C	C	C	C	C	C	C	A 126	130					
25					A	124	A 136		116	126	120	118	116	116	118	118	118	120	130					
26					154	126	122		112	114	112	114	A	A	A	A 120	A	A	B					
27					138	120	120		114	114	114	114	114	114	112	110	A	A 134	130					
28					138	122	124		116	112	A 122	114	114	118	118	118	114	114	A					
29					A	132	116		112	114	118	116	A	120	120	124	122	120	124					
30					A	A 120			114	A	116	116	116	112	120	120	A	A	A					
31					A	A	116		118	116	A	114	114	114	A	118	118	118	120					
	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	27	29	28	23	19	17	14	15	17	20	20	22	9					
MED						138	124	120	116	114	116	116	116	116	118	118	121	118	122					
U Q						142	126	124	118	116	120	117	118	118	118	123	125	120	130					
L Q						134	122	116	114	112	114	114	114	114	114	116	118	116	119					

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

IONOSPHERIC DATA STATION Kokubunji

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	112	B	140	140	130	122	116	112	110	108	108	136	132	122	116	114	114	116	116	116	112
2	108	108	108	108	112	146	144	130	122	114	120	120	118	122	116	G	146	130	116	112	116	118	114	112
3	112	114	114	118	150	B	134	116	114	112	108	108	112	124	128	126	114	120	114	112	112	108	110	112
4	110	108	110	112	B	B	130	124	112	110	114	112	108	G	106	G	160	132	114	112	B	B	124	110
5	114	112	110	B	B	124	116	110	110	110	108	106	110	132	106	106	104	126	114	112	106	108	110	114
6	114	B	106	B	108	144	144	132	126	124	112	114	114	112	108	148	150	118	112	108	110	110	108	106
7	104	102	102	106	108	142	134	116	116	G	118	G	120	124	108	110	104	100	98	96	96	116	B	B
8	100	98	100	100	B	154	136	126	122	118	114	110	112	116	126	120	154	132	124	118	118	120	118	116
9	112	102	104	104	B	124	122	120	116	114	116	120	120	134	128	124	140	116	110	108	108	108	106	110
10	116	100	102	102	122	118	118	112	108	106	106	102	104	106	112	124	118	114	112	134	108	110	112	106
11	104	106	106	112	106	112	126	118	116	116	114	108	114	122	118	116	120	120	114	112	112	114	112	108
12	108	100	106	B	B	140	114	128	116	114	114	110	108	112	124	122	122	118	112	112	112	118	112	110
13	108	110	106	106	104	106	134	122	120	114	108	108	114	112	C	C	C	C	C	112	118	118	112	122
14	B	B	112	112	112	114	148	136	124	122	C	C	C	118	114	108	114	116	114	114	110	104	102	106
15	122	114	104	100	100	110	138	128	118	116	114	116	114	112	106	106	108	116	106	102	104	108	B	110
16	128	B	130	130	124	124	120	118	118	116	118	114	128	146	142	146	138	120	120	118	116	110	110	108
17	110	104	108	108	110	116	128	122	126	C	C	C	C	C	C	C	C	C	S	110	110	108	108	106
18	102	100	100	98	104	120	124	114	112	112	108	112	110	108	104	100	104	102	102	98	98	98	102	108
19	104	100	98	100	98	102	156	130	124	110	110	108	108	102	104	104	106	106	100	100	100	102	110	108
20	108	108	108	110	148	130	136	124	116	114	114	120	116	118	114	136	130	118	114	112	108	112	110	108
21	108	104	106	100	100	102	152	142	114	110	106	108	108	108	104	100	102	106	122	112	114	112	112	110
22	106	106	102	108	122	148	136	126	118	114	116	108	108	110	108	122	116	114	114	112	116	118	110	110
23	110	106	104	106	132	G	106	110	112	110	104	106	114	134	130	144	126	116	114	108	114	114	110	110
24	106	114	106	106	114	162	130	116	110	C	C	C	C	C	C	C	C	120	120	112	108	112	112	108
25	106	106	104	112	112	110	150	138	138	112	124	G	118	122	134	G	118	154	134	120	124	118	116	114
26	112	108	100	100	102	G	114	148	116	108	108	110	108	104	106	106	102	102	100	100	104	112	110	122
27	108	104	106	108	B	134	126	128	120	118	114	110	112	106	112	E 218 G	112	118	128	120	116	114	110	108
28	106	108	110	116	116	134	136	140	148	136	138	134	132	132	126	124	136	122	108	122	120	120	116	110
29	110	106	108	108	106	106	142	126	116	128	116	122	144	108	114	174	132	124	136	116	118	120	114	112
30	114	104	104	108	106	102	130	116	108	108	110	116	112	106	142	142	130	120	114	116	122	116	116	112
31	104	116	112	108	106	106	116	112	112	114	136	108	108	108	106	108	118	142	118	114	116	114	114	118
	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	30	28	24	27	31	31	31	28	28	26	28	28	28	25	28	29	29	31	30	30	29	30
MED	108	106	106	108	109	124	134	124	116	114	114	110	112	112	114	122	119	118	114	112	112	113	112	110
U Q	112	108	108	112	119	140	140	130	122	116	116	116	117	123	127	139	134	123	119	116	116	118	114	112
L Q	106	102	104	103	105	110	122	116	112	110	108	108	108	108	106	107	110	115	111	108	108	108	110	108

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

IONOSPHERIC DATA STATION Kokubunji

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

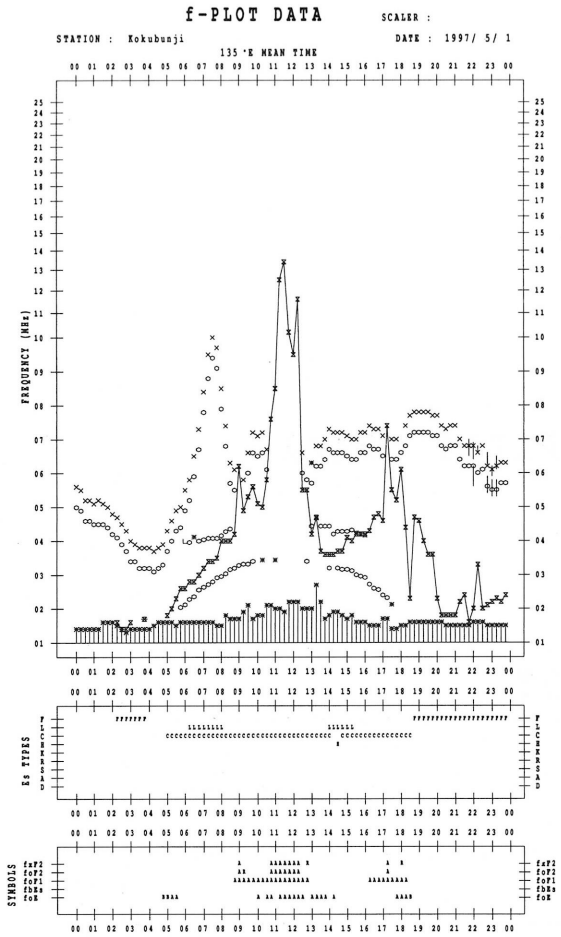
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

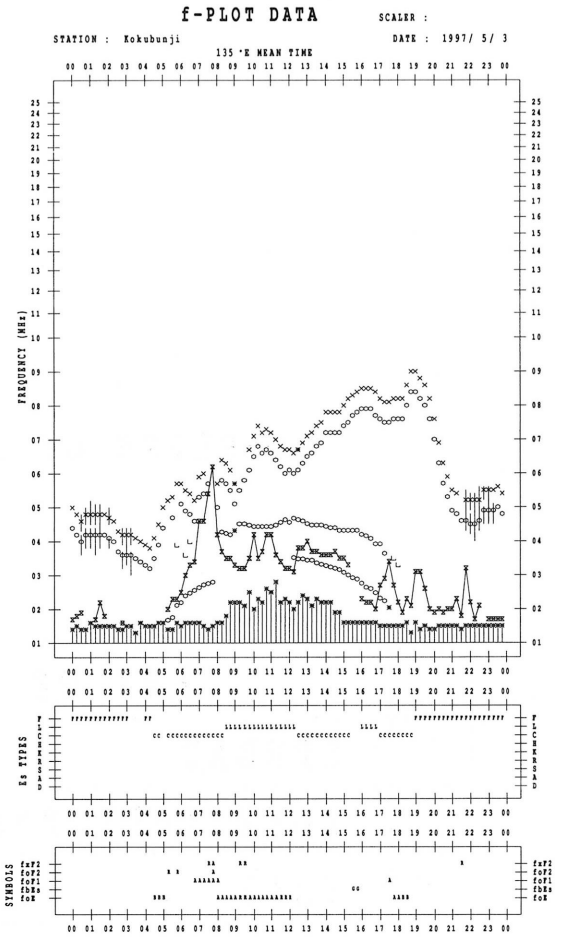
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1				F 2		C 1	C 1	CL 11	CL 11	C 2	C 2	C 2	C 2	C 2	CL 11	CL 11	C 2	C 3	C 4	F 6	F 3	F 2	F 3	F 3
2	F 3	F 2	F 2	F 6	F 2	C 2	CL 11	C 1	C 2	C 2	C 1	C 1	C 2	C 2	L 1		H 1	C 2	C 5	F 3	F 1	F 1	F 2	F 5
3	F 2	F 2	F 1	F 1	F 1		C 1	C 2	C 2	L 1	L 1	L 1	L 1	C 1	C 1	C 1	L 1	C 2	C 3	F 4	F 3	F 2	F 2	F 2
4	F 2	F 3	F 1	F 1			C 2	C 2	L 1	L 1	L 1	L 1	L 1		L 1		HL 11	C 2	L 3	F 2			FF 12	F 3
5	F 2	F 1	F 1			L 2	C 2	L 2	C 2	C 2	L 2	L 1	L 1	CL 11	L 2	L 2	L 2	CL 11	L 2	FF 22	F 2	F 1	F 1	F 1
6	F 1		F 1		F 1	C 1	C 1	CL 11	CL 11	CL 11	L 1	L 1	C 1	L 1	L 1	HL 11	H 1	C 2	C 3	F 3	F 1	F 5	F 2	F 2
7	F 3	F 4	F 2	F 1	F 2	L 1	C 2	C 2	C 1		C 1		C 1	C 1	C 3	C 1	L 2	L 4	L 4	F 5	F 3	FF 32		
8	F 2	F 2	F 2	F 2		H 1	CL 11	CL 11	C 1	C 1	L 1	L 1	L 1	L 1	C 1	C 1	HL 11	C 1	C 2	FF 11	F 2	F 3	F 5	F 4
9	F 3	F 2	F 2	F 2		C 3	C 4	C 3	C 2	C 3	C 1	C 1	C 1	CL 11	C 1	CL 21	C 1	C 3	L 3	F 3	F 3	F 4	F 3	F 3
10	FF 13	F 3	F 4	F 2	FF 11	C 1	C 2	C 3	C 3	C 3	C 2	L 3	L 2	L 2	L 2	C 2	C 3	C 3	C 5	FF 14	F 3	F 3	F 3	F 3
11	F 2	F 1	F 2	F 3	F 3	L 3	CL 31	C 3	C 2	C 2	C 2	C 2	C 1	C 2	C 2	C 3	C 2	C 3	C 4	F 2	F 5	F 2	F 2	F 2
12	F 1	F 2	F 1			C 1	L 1	C 2	C 2	C 2	C 2	C 2	C 1	C 1	CL 11	CL 21	C 2	C 3	C 2	F 4	F 3	F 2	F 4	F 1
13	F 2	F 3	F 3	F 1	F 1	L 1	CL 21	C 3	C 1	C 1	C 1	C 1	L 1	L 1						F 4	F 1	F 4	F 4	FF 11
14			F 1	F 1	F 2	L 2	CL 12	CL 11	CL 21	C 1				L 1	L 1	L 2	L 1	CL 21	CL 33	FF 63	F 2	F 2	F 1	F 1
15	F 1	FF 12	F 2	F 3	F 2	L 1	C 1	CL 21	CL 21	C 2	C 1	C 1	L 1	L 1	L 1	L 2	L 1	L 2	L 2	F 2	F 3	F 2		F 4
16	F 1	F 1	F 3	F 5	F 3	L 3	C 3	CH 21	C 1	C 3	C 1	C 1	CL 21	H 1	H 1	H 1	HL 11	C 3	C 2	F 5	F 4	F 5	F 2	F 5
17	F 3	F 5	F 2	F 3	F 3	L 2	C 3	C 2	C 1											F 3	F 6	F 5	F 4	F 6
18	F 3	F 3	F 2	F 3	F 1	L 3	CL 21	C 3	C 2	C 2	C 2	C 1	C 2	C 2	C 2	L 3	L 3	L 4	L 4	F 4	F 2	F 3	F 4	FF 26
19	F 4	F 5	F 3	F 3	F 2	L 1	HL 11	C 2	C 1	C 2	C 2	C 3	C 2	L 2	L 2	L 2	L 2	L 3	L 3	F 5	F 3	F 1	F 2	F 6
20	F 3	F 3	F 3	F 2	FF 13	C 3	CL 21	CL 21	C 3	C 2	C 2	C 1	C 1	C 1	C 1	C 2	CL 21	C 5	C 4	F 5	F 3	F 4	F 4	F 2
21	F 4	F 2	F 2	F 3	F 3	L 2	HL 11	HL 11	C 3	C 3	C 2	C 2	C 2	C 2	C 3	C 3	L 3	LC 32	C 3	F 3	F 4	F 3	F 5	F 2
22	F 3	F 3	F 2	FF 11	F 1	C 1	CL 21	C 2	C 2	C 2	C 2	C 2	C 2	C 2	C 2	CL 22	CL 32	CL 41	CL 42	FF 62	F 4	FF 13	F 4	F 6
23	F 5	F 6	F 4	F 2	F 1		L 4	L 2	L 2	C 2	C 3	C 2	C 1	C 1	C 1	CL 11	C 2	C 3	C 4	FF 61	F 3	F 4	F 3	F 4
24	F 2	F 2	F 1	F 1	F 1	C 1	C 2	C 2	C 2									CL 21	CL 31	F 4	F 4	F 5	F 3	F 2
25	F 2	F 2	F 2	F 1	F 1	L 2	HL 11	CL 11	C 1	L 1	CL 11		C 1	C 1	C 1		C 2	HC 11	C 3	F 5	F 3	F 3	F 1	F 5
26	F 2	F 2	F 3	F 2	F 1		L 1	HL 11	C 2	C 2	C 2	C 2	C 2	C 3	L 1	L 1	LH 21	L 3	L 3	F 3	F 2	F 2	F 2	FF 13
27	F 3	F 3	F 4	F 2		C 3	C 2	C 2	C 2	C 2	C 2	C 2	C 1	C 2	C 2	H 1	L 1	CL 31	C 3	F 6	F 5	F 3	F 4	F 3
28	F 3	F 3	F 4	F 2	F 3	C 2	CL 32	CL 11	H 1	H 1	H 1	C 1	C 2	C 1	C 2	C 2	C 1	C 2	C 3	F 2	F 3	F 1	F 5	F 2
29	F 4	F 3	F 4	F 4	F 3	L 4	CL 13	C 2	C 2	CL 11	CL 11	C 1	HL 11	L 1	CL 21	HL 11	HL 21	C 2	C 2	F 4	F 3	F 3	F 4	F 3
30	F 2	F 4	F 3	F 2	F 6	L 2	CL 22	C 1	C 3	C 2	C 1	C 1	C 2	C 3	HL 11	HL 11	CL 21	CL 22	CL 42	F 3	FF 11	FF 31	FF 42	F 5
31	F 3	FF 22	F 6	F 3	F 3	L 4	LC 51	C 4	C 2	C 2	CC 23	C 2	C 2	C 3	C 2	C 3	C 1	H 1	C 2	F 5	F 3	F 3	F 3	F 4
	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																								

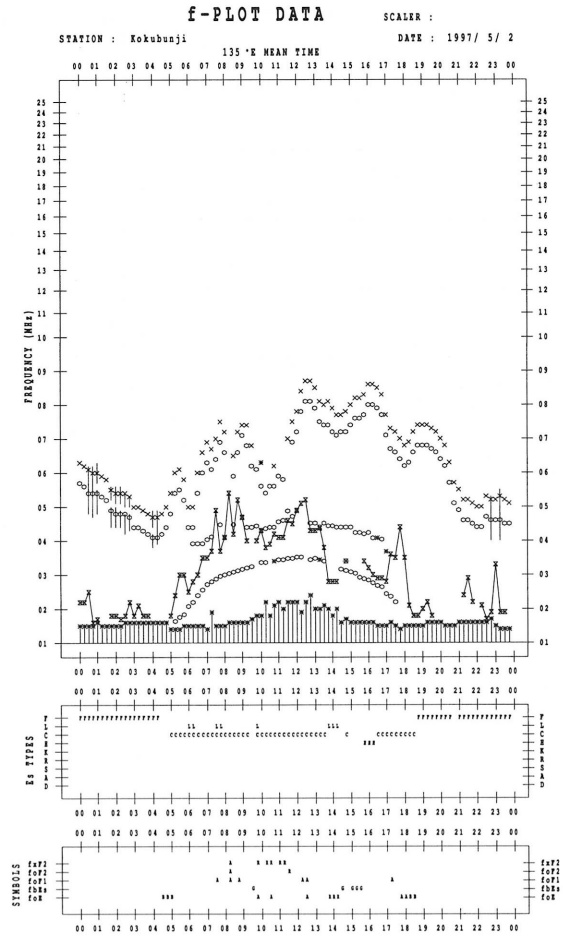
MAY 1997 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

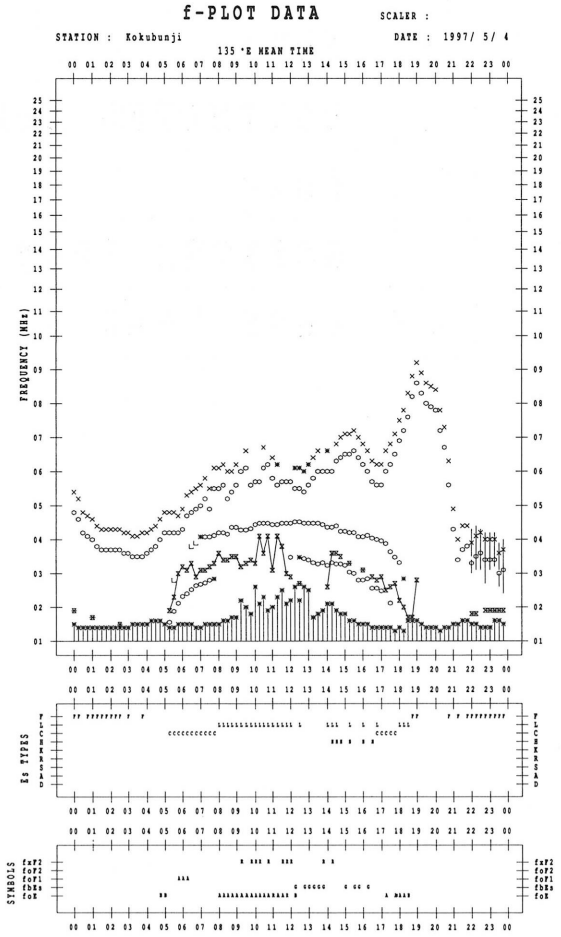
f-PLOTS OF IONOSPHERIC DATA

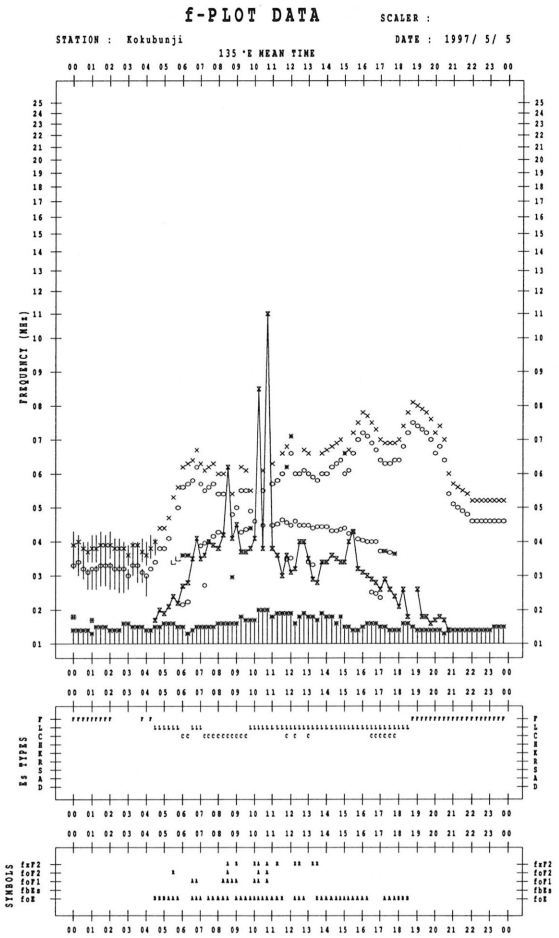
KEY OF f-PLOT	
	SPREAD
	foF2, foF1, foE
	fxF2
	DOUBTFUL foF2, foF1, foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

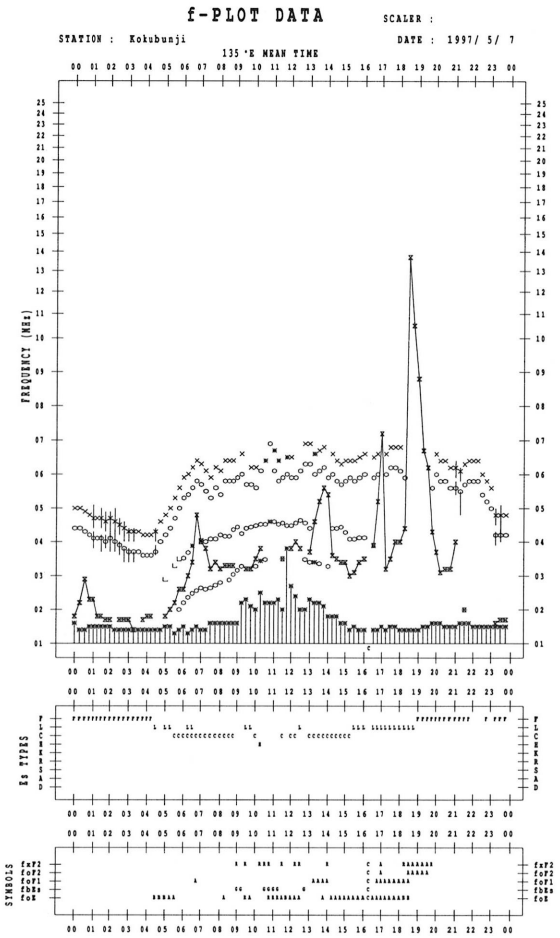

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF2
foF1
fbEs
foE

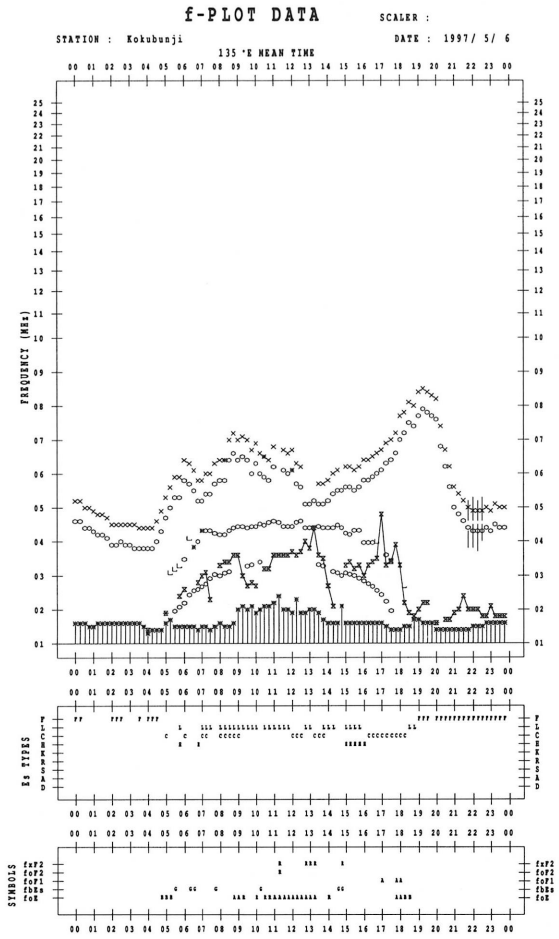

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF2
foF1
fbEs
foE

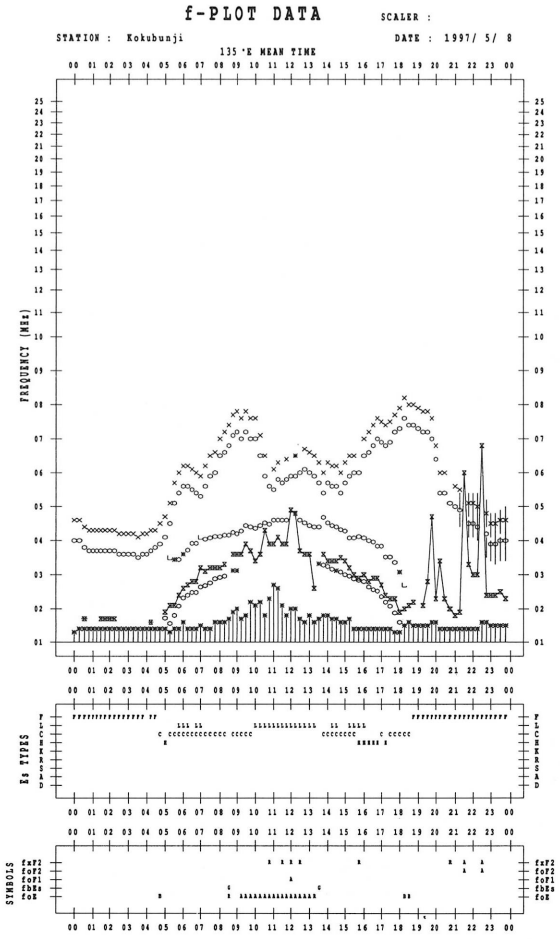

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF2
foF1
fbEs
foE

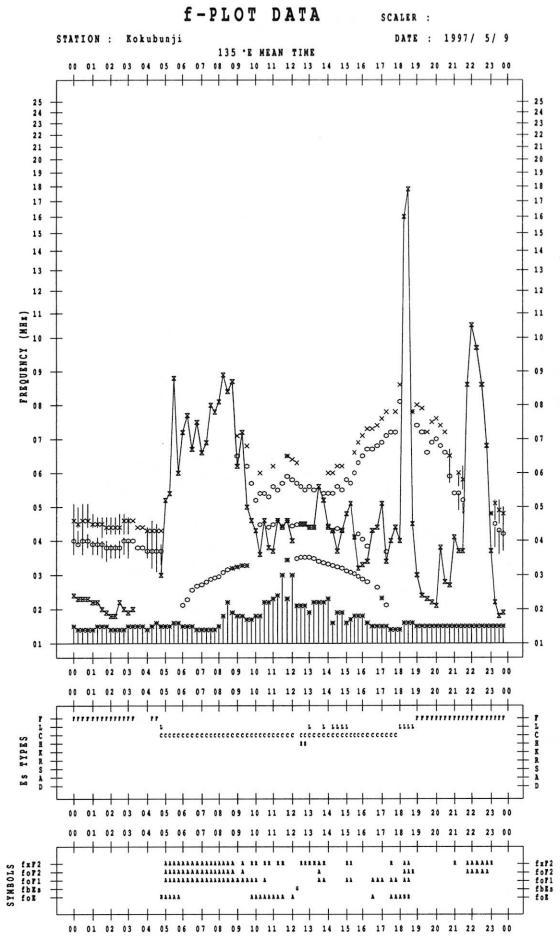

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF2
foF1
fbEs
foE

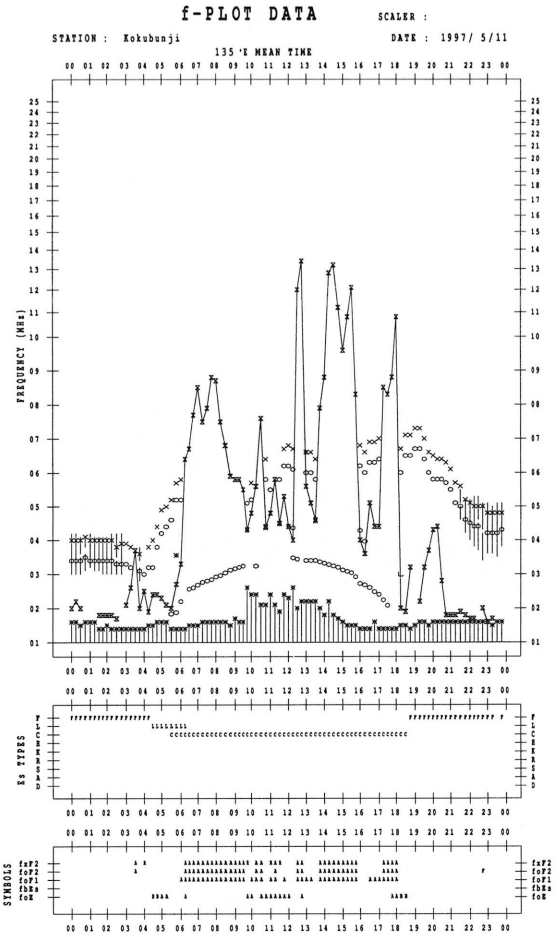

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF2
foF1
fbEs
foE

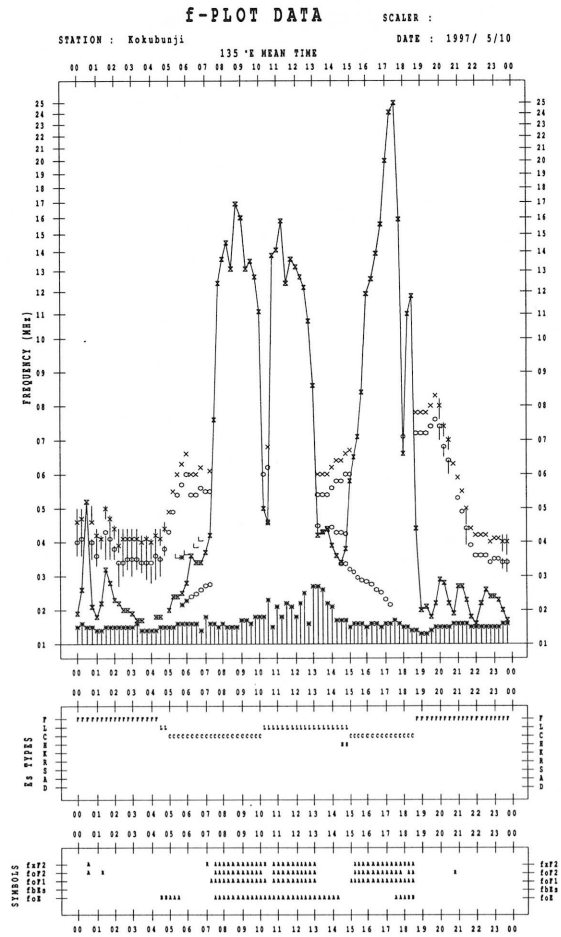

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF2
foF1
fbEs
foE

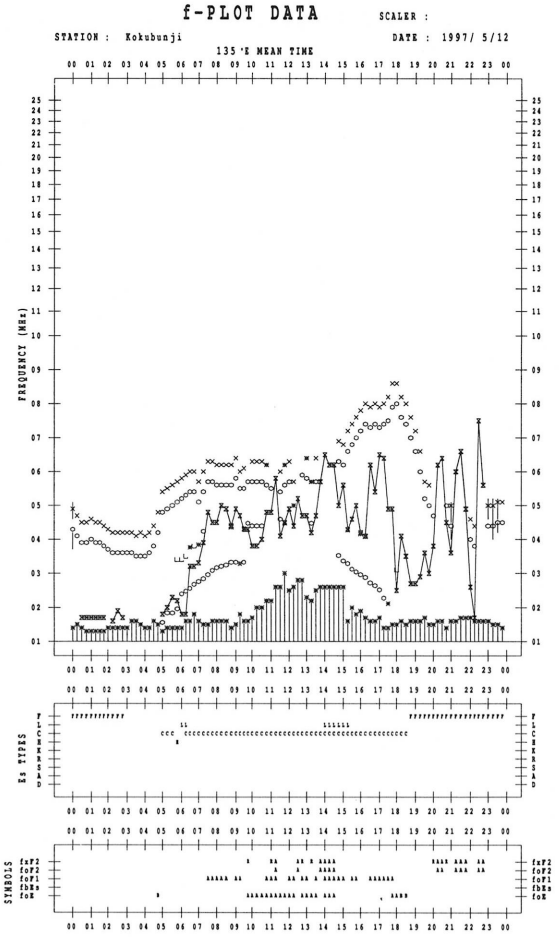

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF2
foF1
fbEs
foE

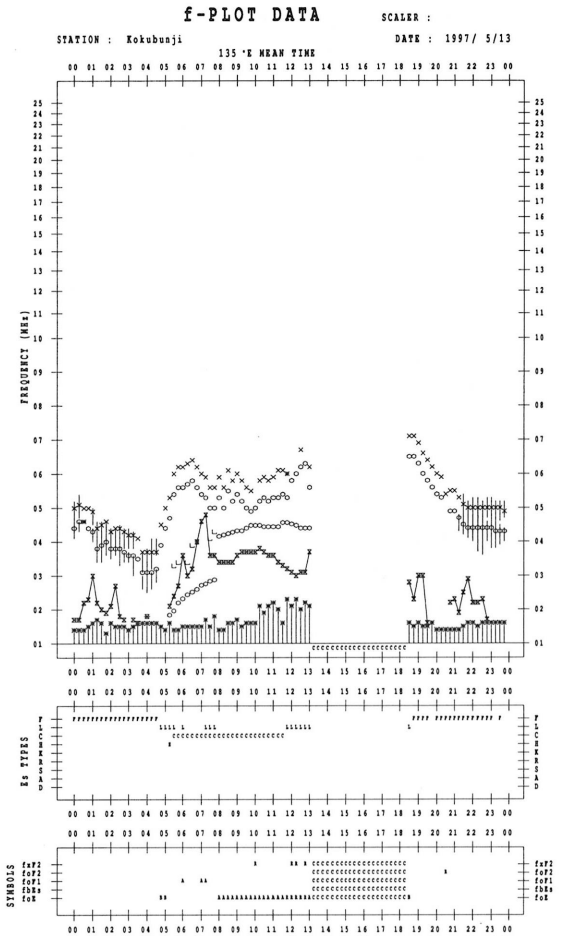

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF2
foF1
fbEs
foE

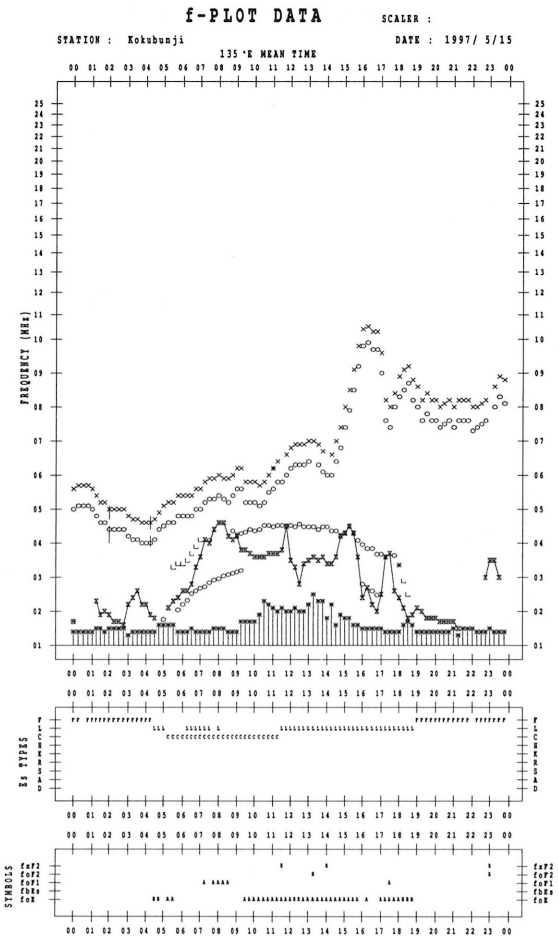

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

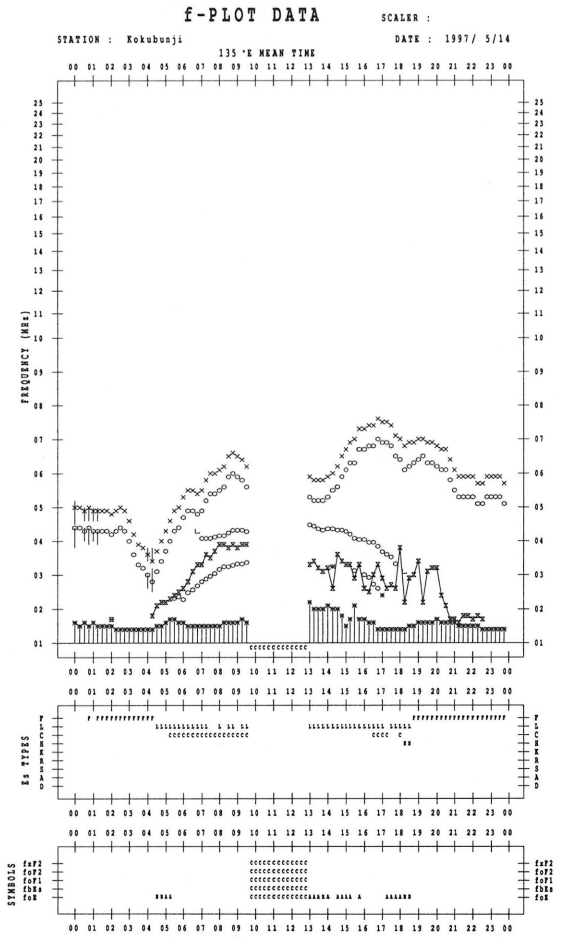

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

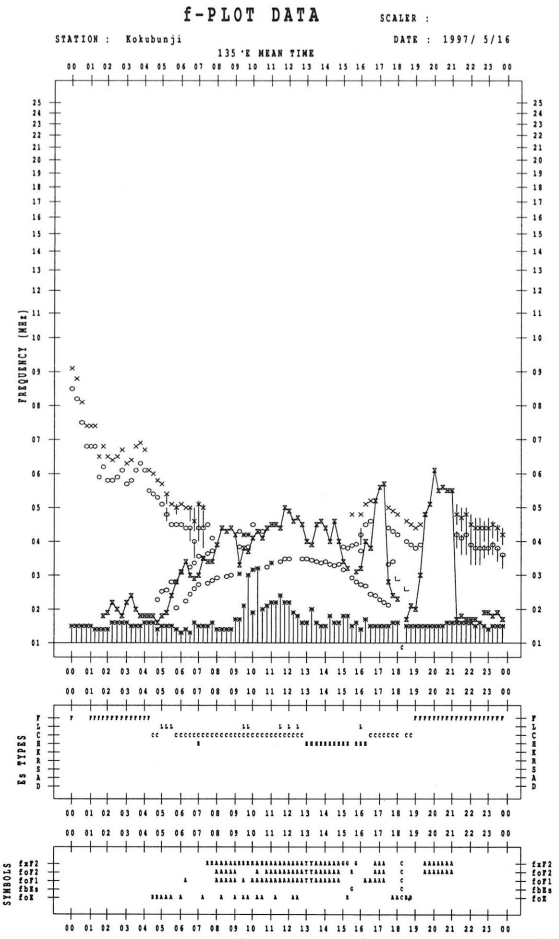

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

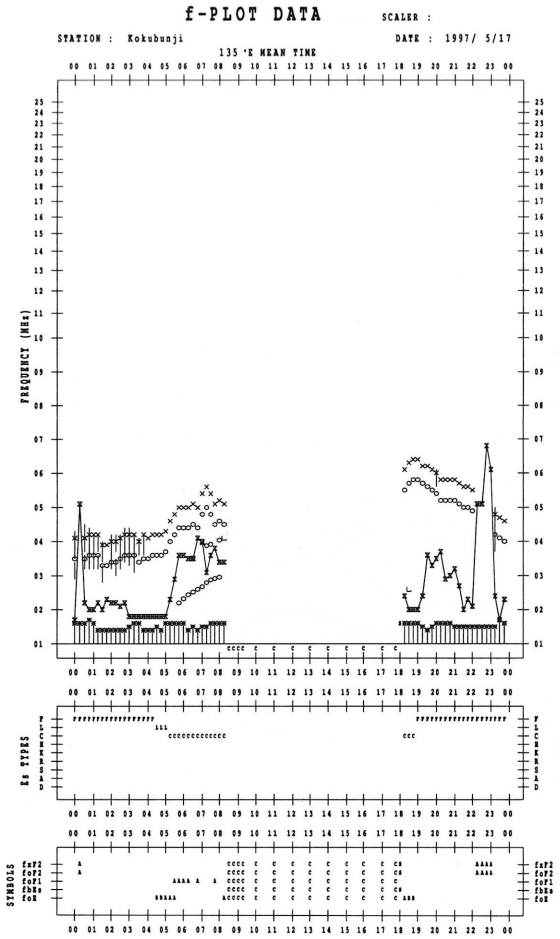

f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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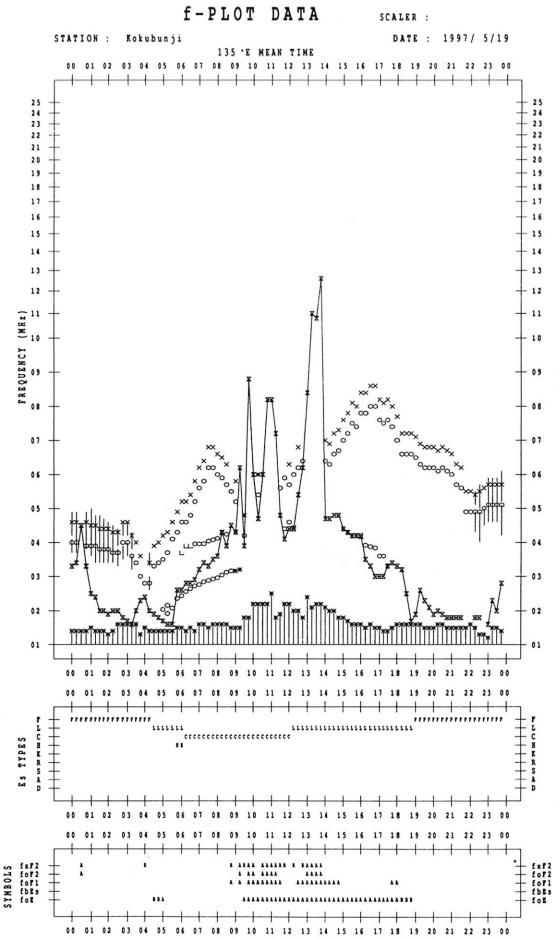
STATION : Kokubunji
DATE : 1997/ 5/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE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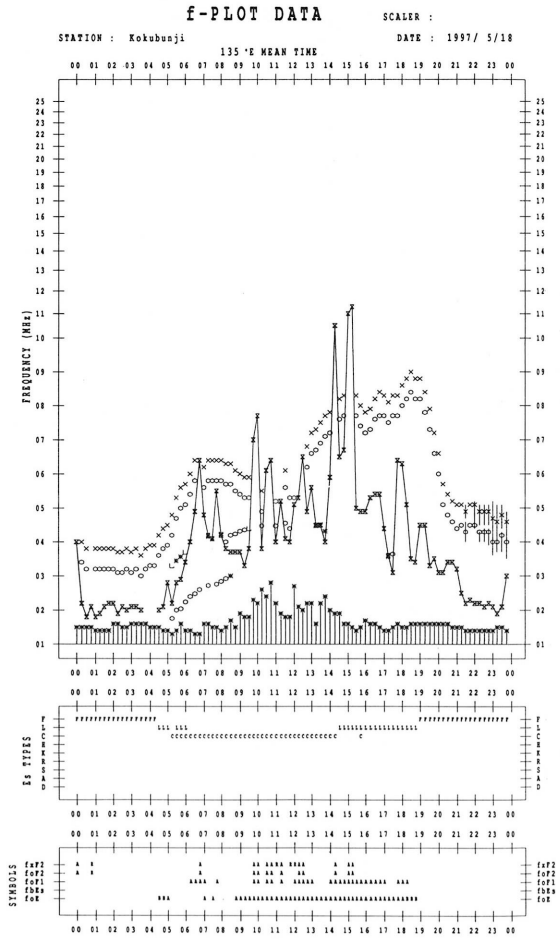
STATION : Kokubunji
DATE : 1997/ 5/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE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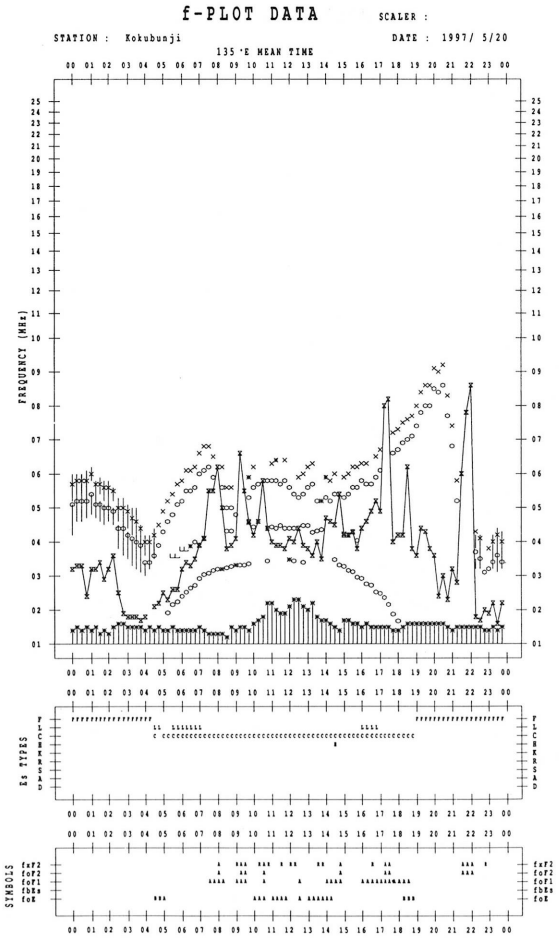
STATION : Kokubunji
DATE : 1997/ 5/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE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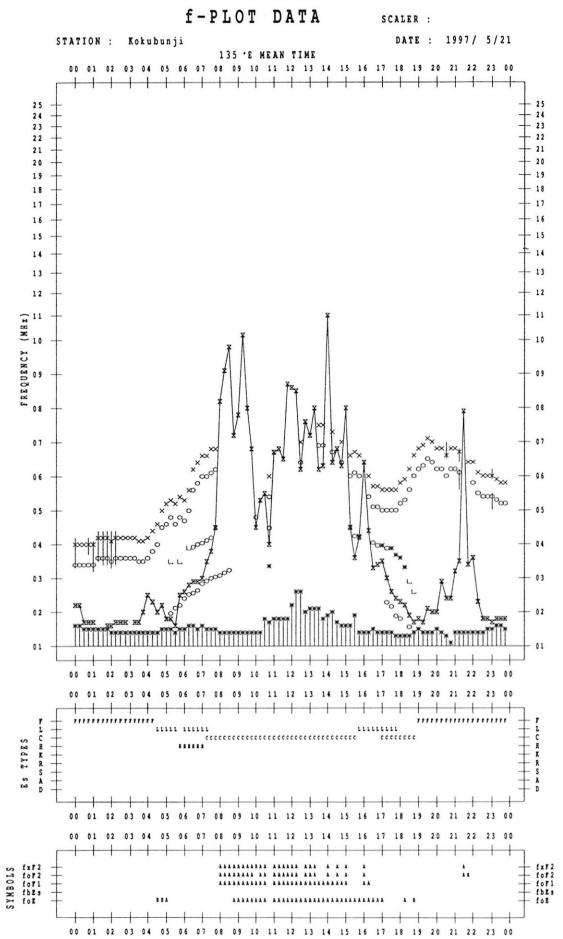
STATION : Kokubunji
DATE : 1997/ 5/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE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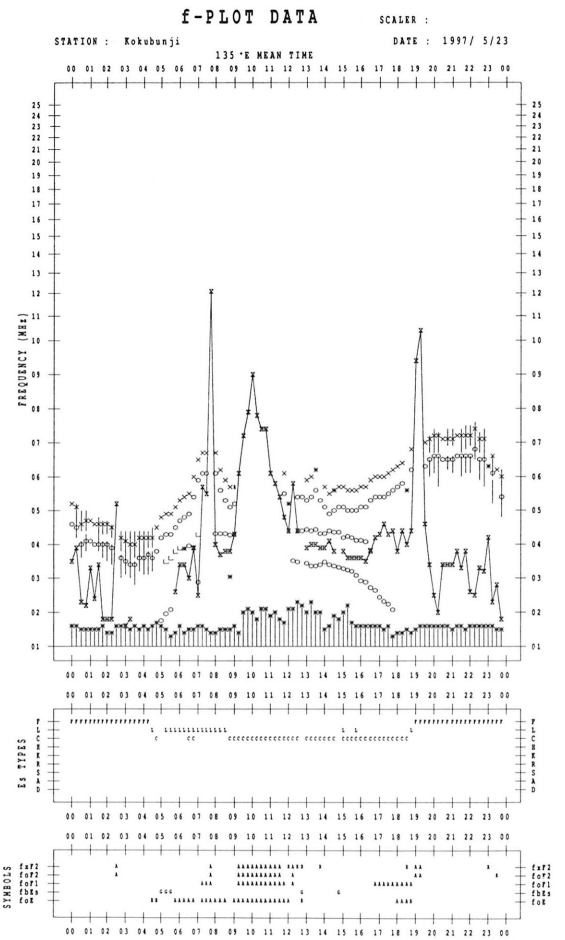
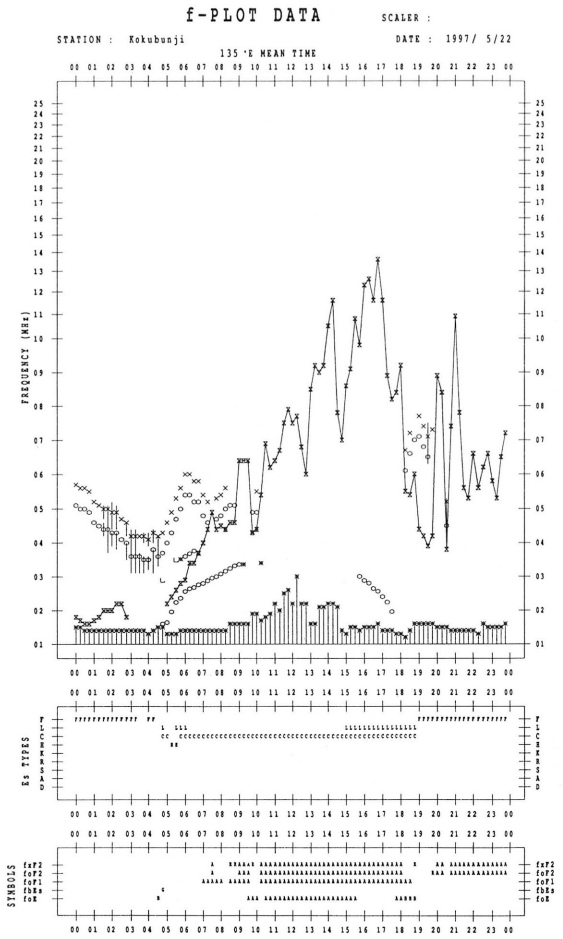
STATION : Kokubunji
DATE : 1997/ 5/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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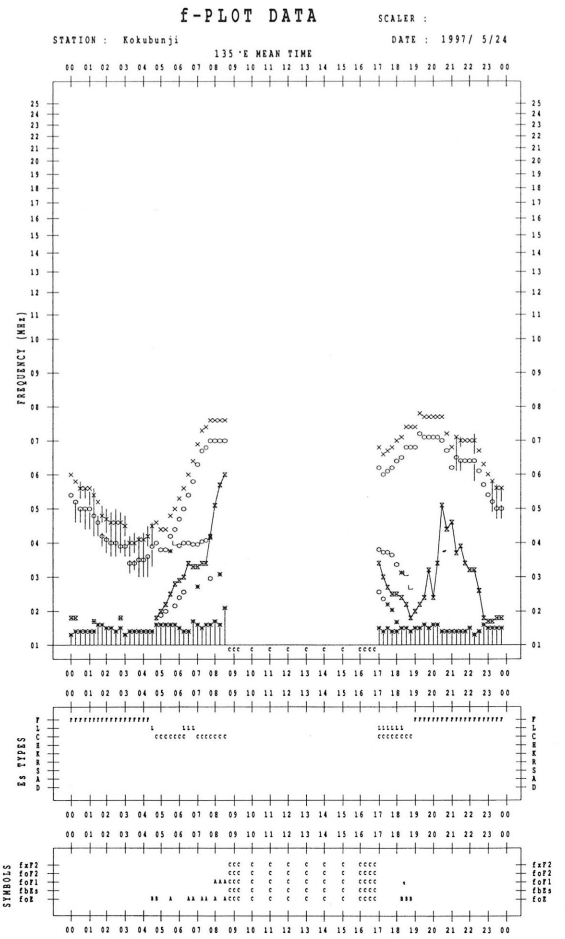
STATION : Kokubunji
DATE : 1997/ 5/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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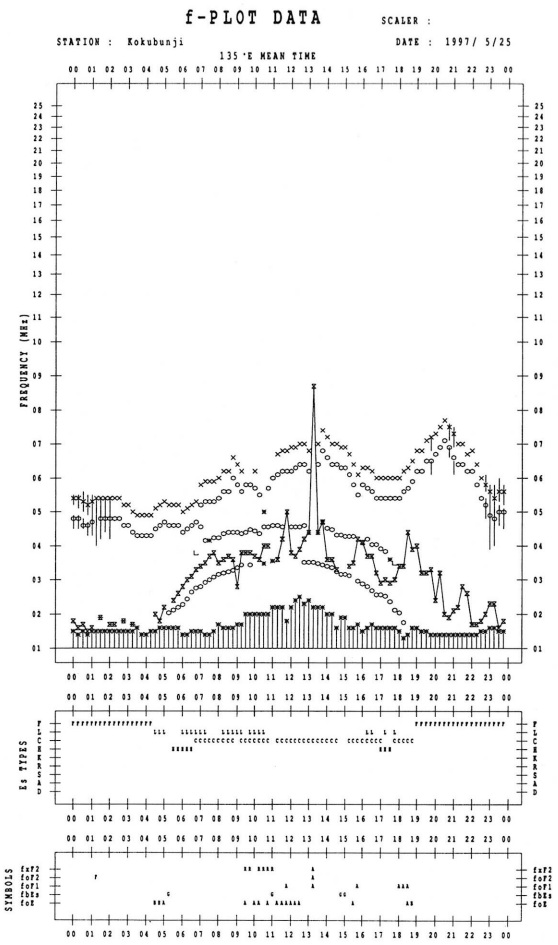
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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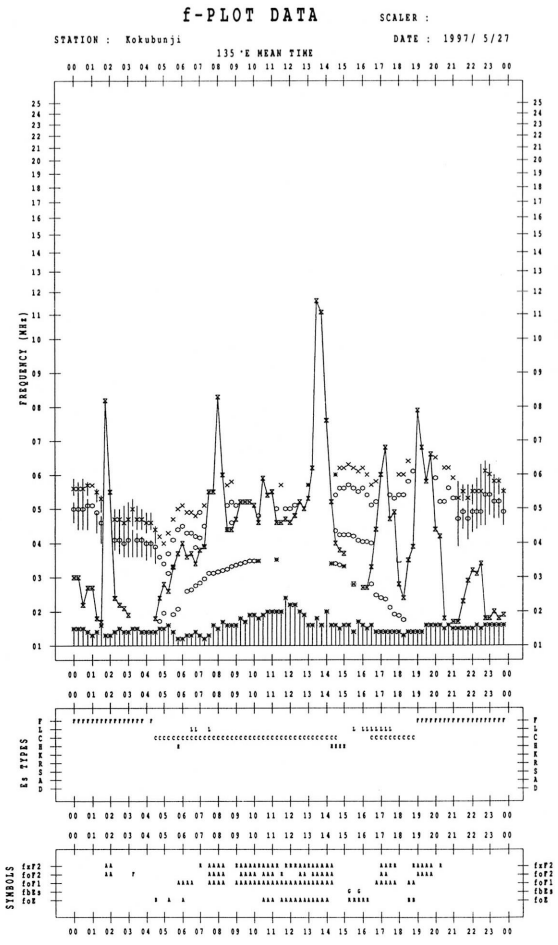
DATE : 1997/ 5/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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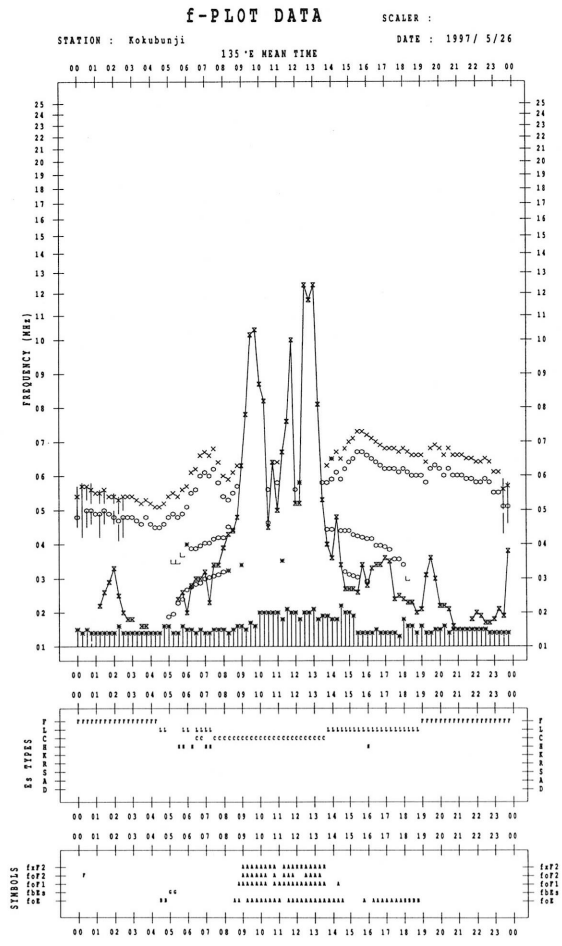
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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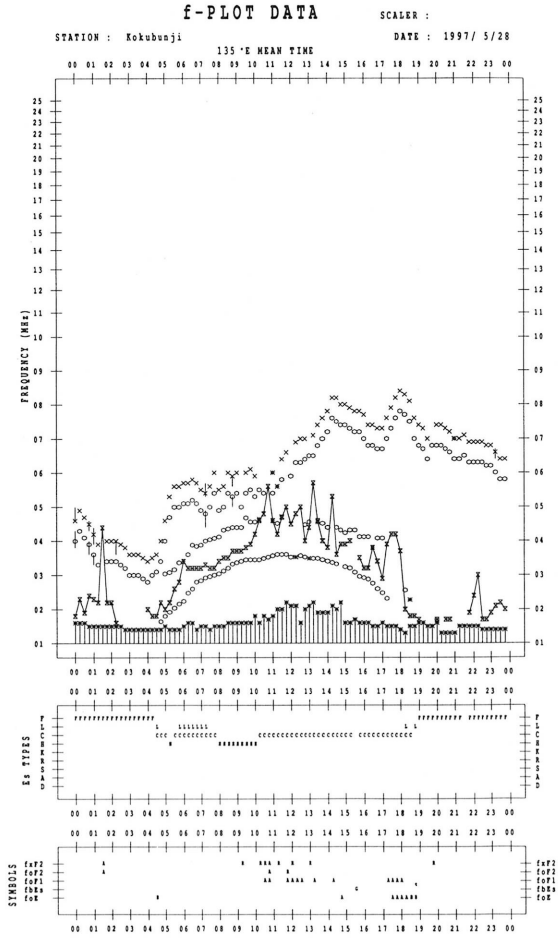
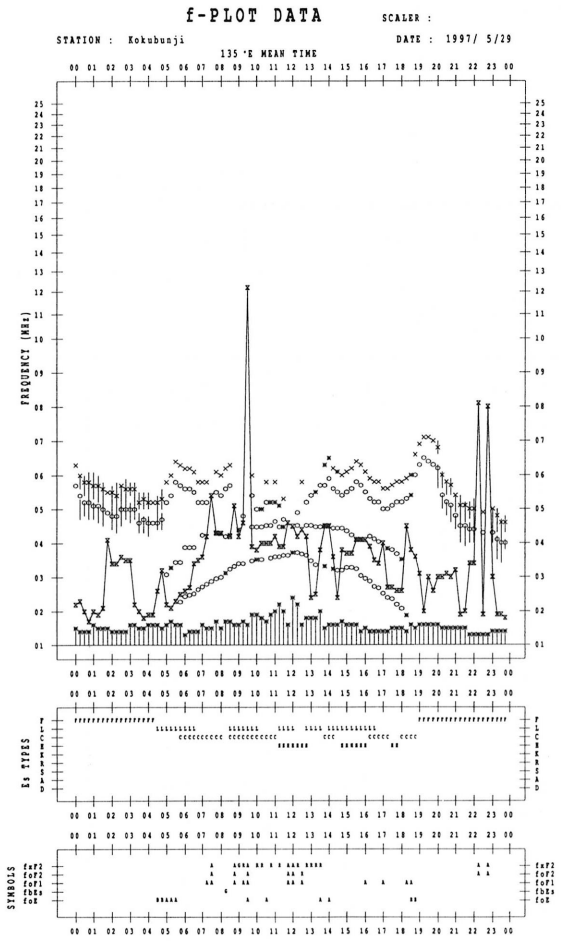
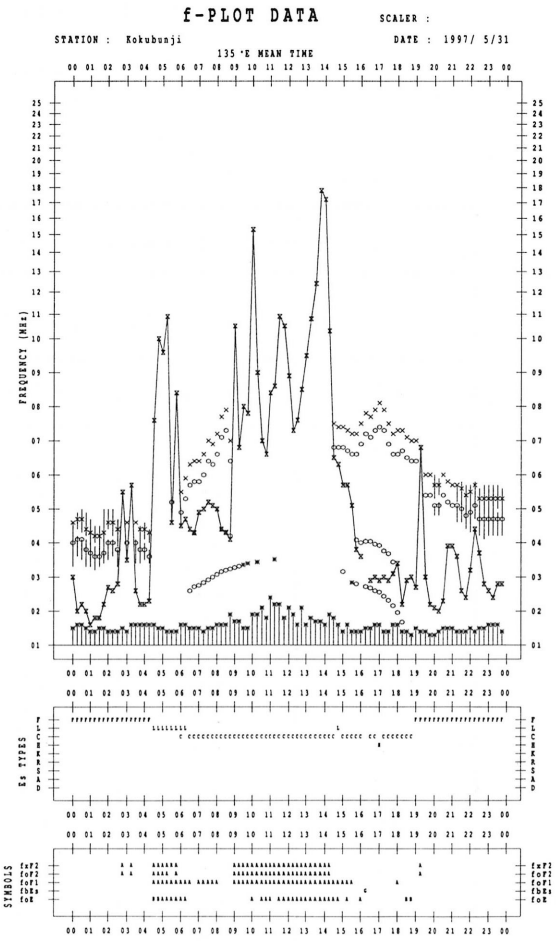
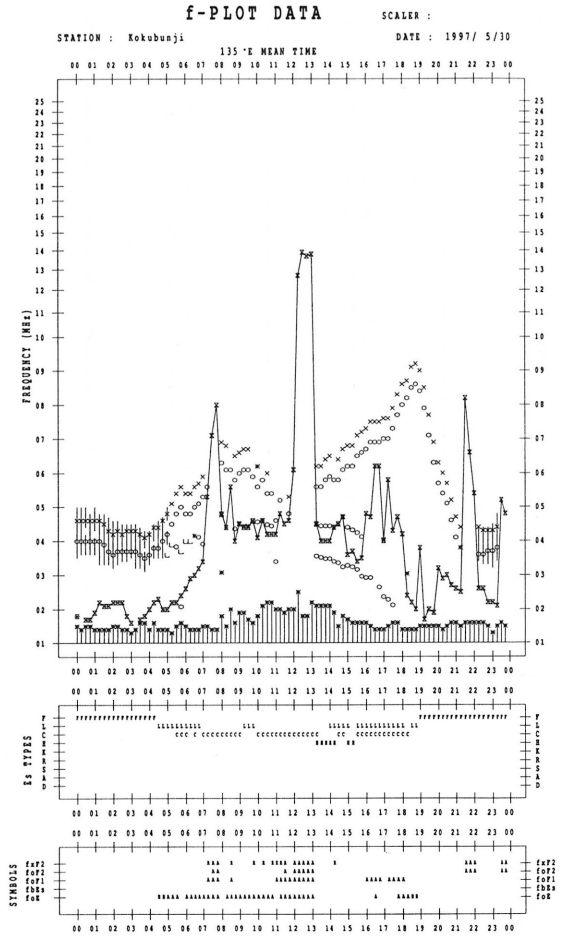
STATION : Kokubunji
DATE : 1997/ 5/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/31
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER :
STATION : Kokubunji
DATE : 1997/ 5/30
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF2
foF1
fbEs
foE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso May 1997

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

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso May 1997

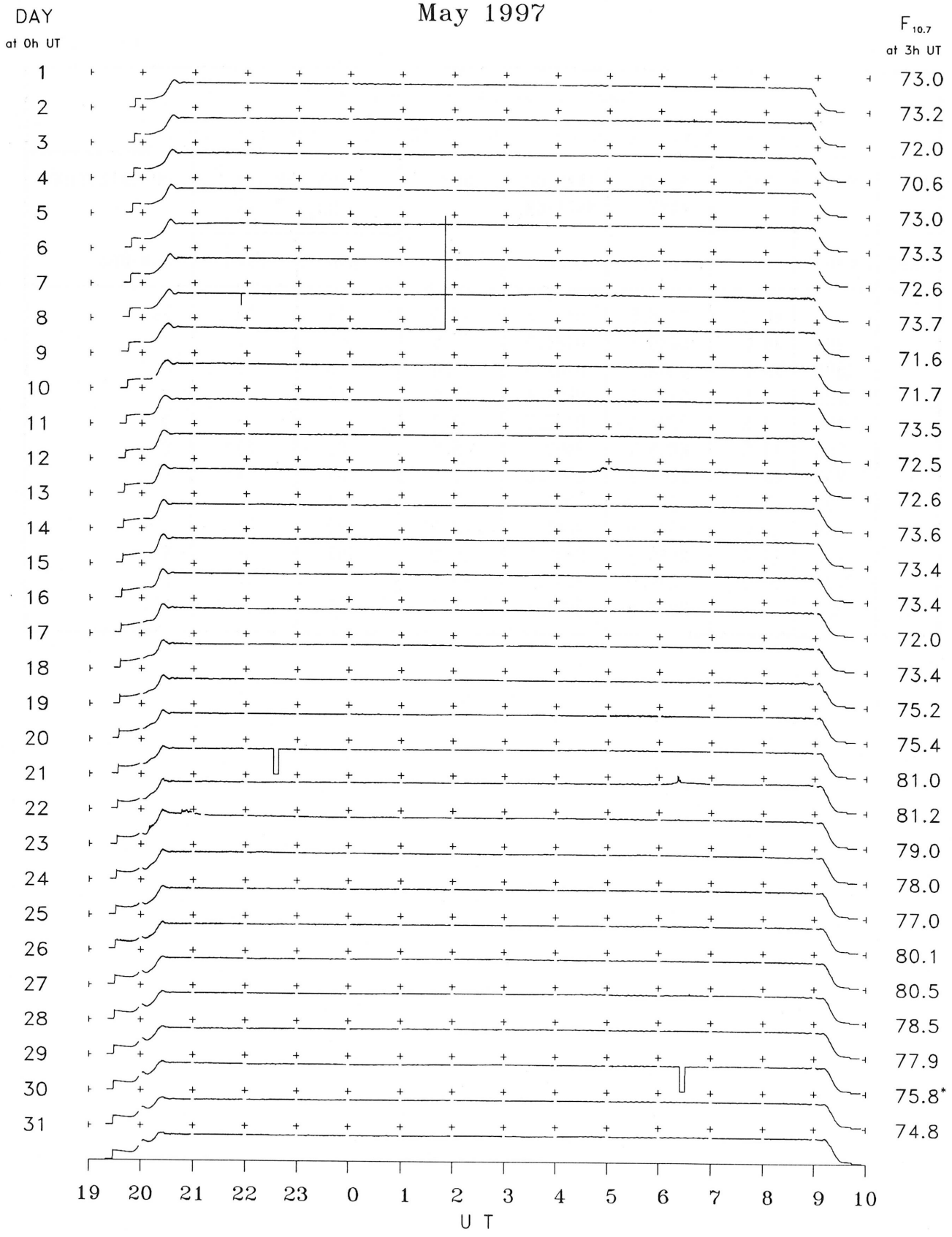
Single-frequency observations

Normal observing period: 1930 - 0940 U.T. (sunrise to sunset)

MAY 1997	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
12	500	46 C	0446.5	0452.5	47.0	73	18	WL
	200	46 C	0449.5	0454.5	27.0	51	8	0
	2800	45 C	0449.7	0453.5	15.0	9	3	0
21	2800	4 S	0621.0	0621.5	3.5	15	-	0
	500	4 S	0621.0	0622.7	3.7	17	-	0
	500	46 C	2008.7	2009.7	8.0	120	23	0
	200	46 C	2009.2	2012.0	7.0	60	8	WL
	500	27 RF	2015.2	2020.5	20.0	14	5	WL
	500	46 C	2040.0	2047.0	28.0	400	60	ML
	200	46 C	2040.5	2046.7	26.0	400	30	WL
	2800	46 C	2046.0	2047.0	12.0	9	3	0
29	200	8 S	0034.0	0034.1	0.9	60	-	ML

B. Solar Radio Emission

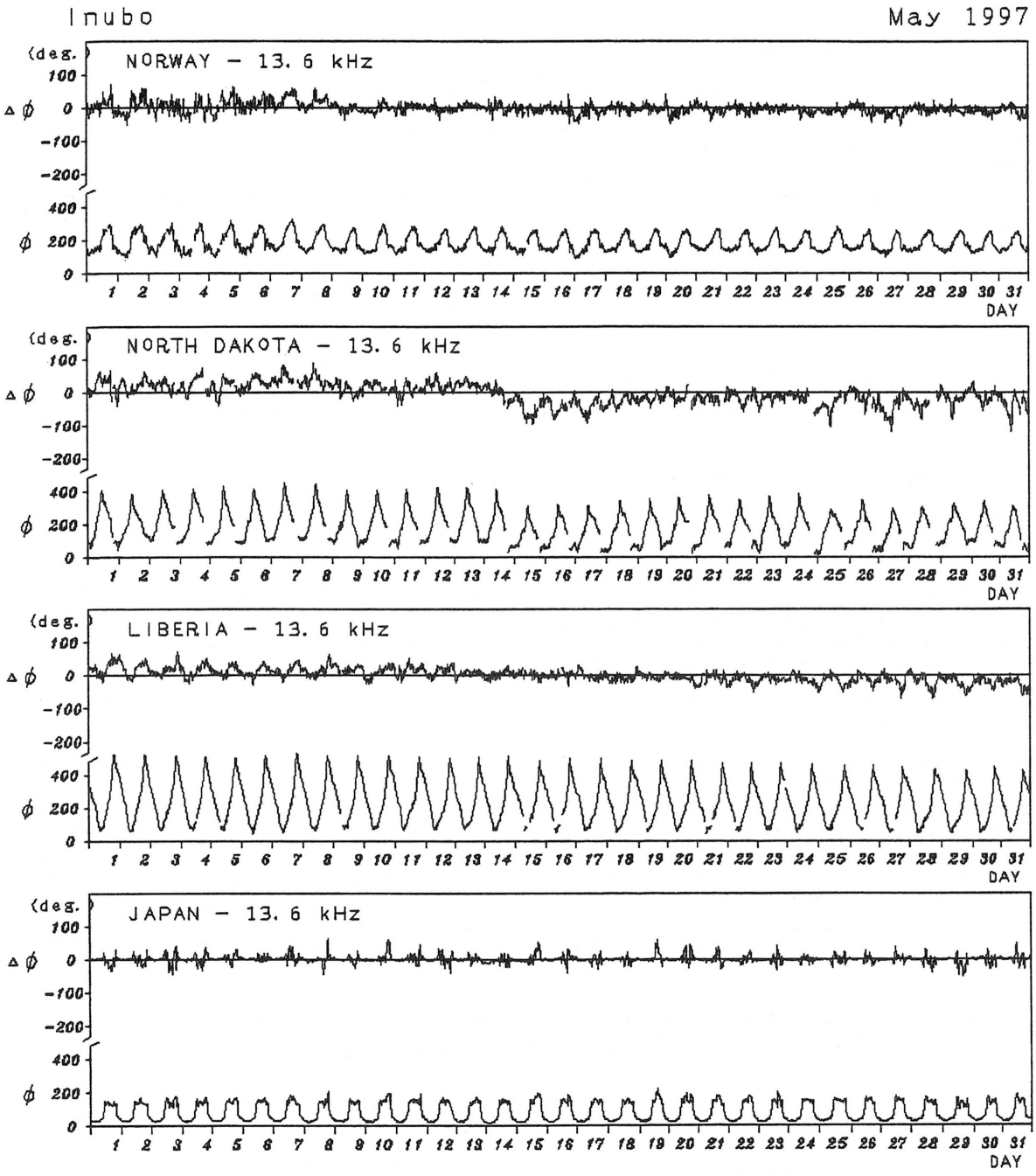
B3. Summary Plots of $F_{10.7}$ at Hiraiso

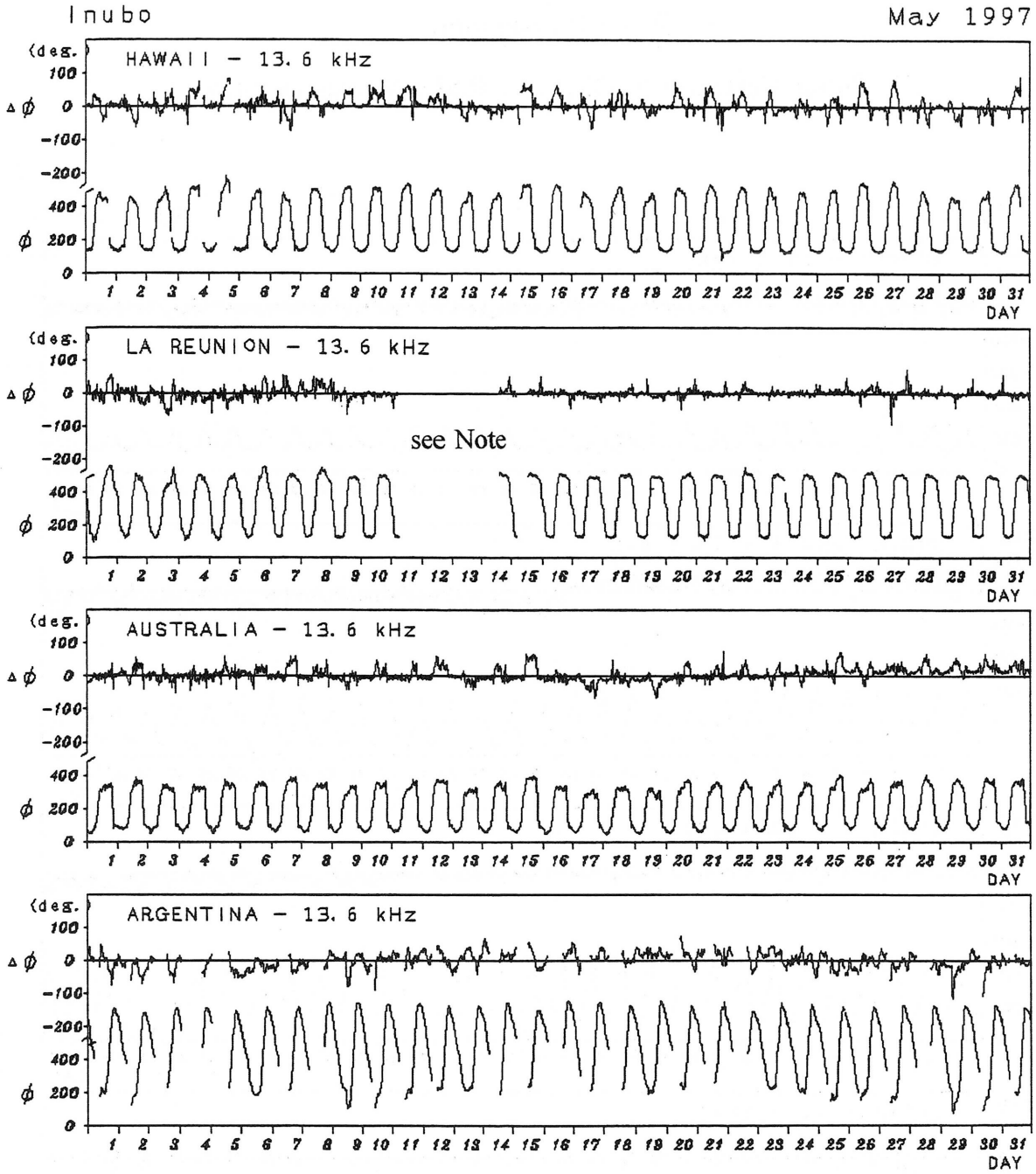


Note: A vertical grid space corresponds to a 100 sfu.
Elevation angle range ≧ 6°.

C. Radio Propagation

C1. Phase Variation in OMEGA Radio Waves at Inubo





Note : As for LA REUNION-13.6 kHz, no record during 11 May 0530 UT to 15 May 1320 UT, due to transmitter maintenance.

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

NONE

C2. Sudden Phase Anomaly (SPA) at Inubo

Inubo

May 1997	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
12			–	4			0452	0530	0500
20	27	22	13	40	59	44	2158	2330	2210
21		–	22	27			0610	0710	0628
21					58	–	2010	2130	2020
27		–	18				0940	1026	0951
28			4	11			0337	0430	0345

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F-581 Vol.49 No.5 (Not for Sale)

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☎（0423）（27）７４７８(直通)

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Communications Research Laboratory, Ministry of Posts and Telecommunications,
2-1 Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184 JAPAN