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IONOSPHERIC DATA IN JAPAN

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INTRODUCTION

This Series contains data on ionosphere (I) , solar radio emission (S) and radio propagation (P) obtained at the following stations under the Communications Research Laboratory, Independent Administrative Institution in 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°40.5'N	128°09.2'E	16.5°N	161.7°	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

Ionospheric 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. 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 iono-spheric 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*).

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 auto-matic 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 Hand-book 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 spred ***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 transmission 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 by, 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.

X 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 part *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 normal *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 Measurement, 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

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 F10.7 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 2003

LAT. 45°23.5'N LON. 141°41.2'E 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	66	54	54	53	55	60	66	61	66	68	68	76	74	81		71	81	81	82	82	68	66	66	52
2	44	52	53	52	42	59	34				59			63	66	67	72	72	72	79	74	73	54	53
3	51	54	51	54	58	66	73	76	76	77	82	83	83	84	82	84	84	83	78	83	82	66	63	63
4	54	68	54	50	57	58	66	62	70		55	63	A	A	66	70	75		82	A		66	53	53
5	46	53	53	54	53	53	68	76	64	76	76	69	73	76	72	82	84	83	77	78			73	66
6	54	66	58	32	52		44			A	A					57	58	57		66	66	61	60	54
7	55	52	58	45	47	51	60	70	60	A						60	69	68	57	52	54	54	52	62
8	54	54	47														56	57	49	62	62	52		41
9	48	54	48	47	47	45	53		61				63	64	66	66	70	73	74		66		44	53
10	54	49	41					A							62	64	67	70	61			47	34	32
11	40	40	40	38	37	38			A	A		A	A		60	63	56	56	63	66		63	54	53
12	54	47	43	34	37	43	50	A	A				57	60	57	62	63	66	63	66	62	52	46	54
13	44	45	53	47	47	44	52	60	66	57	61		64	C	C	66	66	69	77	81	77	82	64	51
14	53	53	51	44	49	43				A			A	57		57	61	60	66	58	54	54	53	54
15	44	46	46	44	45	54	58					A					57	59	63	66	65	66	54	53
16	51	44	47	44	46	44	52	52	54	A						57	54	55	57	67	62	54	54	55
17	55	55	54	53	52	52	58	58		A						57	58	61	60	66	66	54	53	53
18	44	51	47	48	51	55	55	55	62	58		49	62	59	66	67	68	71	73	74	77	73	67	63
19	55	54	61	54	50	60	65	66	75	77	68	69		77	73	74	71	73	70	76	71	79	76	72
20	63	59	60	61	69	78	76	84	70	71	72	71	82	80	76	70	74	75	76	75	81	82	79	78
21	73	72	70	62	54	51	55	54	62		56		57	72	66	73	68	72	78	74	65		71	72
22	64	55	59	55	52	62	72	73	70	71	A		63		67	77	74	67	73	77	73	73	72	66
23	65	54	55	66	66	64		64	72	72	66	69	62	67	72	72	70	76	82	81	73	80	72	55
24	54	61	55	54	66	70	67	A					64	64	59		70		77	72	73	66	64	65
25	54	61	61	51	47	54	63		66		66	67	82	73	76	75	77	70	73	78	73	80	76	63
26	62	54	55	54	53	67	81	77		A	A		71	76	77	70	70	70	74	77	78	79	64	54
27	54	60	54	58	58	58	62	66	66	62		72			78		80		72	71	76	66	65	72
28	64	55	66	55	54	58	63	63		61					75	77	A		69	82	82	79	75	73
29	73	63			45	A		A						74	66		82	80	A		66			
30	54	52	34	44	44	45					A							A	41	A		61	40	
31					A		A	A	A	A	59	A		63	69	56	76	75	81	75	67	54	61	61
	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	29	27	28	26	23	17	16	11	12	10	14	17	21	25	29	26	29	26	26	27	29	29
MED	54	54	54	52	52	54	62	64	66	71	66	69	64	72	67	67	70	70	73	74	70	66	63	55
U Q	62	59	58	54	54	60	67	74	70	76	70	72	74	76	75	73	75	75	77	78	76	79	71	65
L Q	51	52	47	44	46	45	53	59	62	61	59	67	62	63	66	61	62	61	63	66	65	54	53	53

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Wakkanai

MAY 2003

LAT. 45°23.5'N LON. 141°41.2'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	27	39	51	46	G	G	50	G	G	G	G	G	40	40		27	32		24
2	G	G	G	G	29	G	G	49	60		60	G		G	G	G	G	46	44	43	38	36	G	G
3	G	G	G	G	G	G	39	47		G	G	G	49	60	52	G	G	47	52	35	60	G	G	G
4	G	26	G	G	G	G	41	47	51	76	43	50	72	90	43	51	59	75	73	92	82	28	G	24
5	27	23	G	26	G	G	G	45	46	48	G	45	44	G	42	65	44	G	42	52	52	69	31	39
6	27	30	28	G	29		46	45	G	50	51			52	46	G	G	40		49	29	33	G	G
7	32	G	G	G	G	G	G	43	50	52	67	51	G	G	G	G	G	39	60	52	60	27	45	G
8	32	33	40	76	52	60	44	65	50	46	G	G	G	G	G	G	G	40	42	30	32	29	35	G
9	G	G	G	G	27	39	44	67	G	G	G	50	G	G	G	46	46	56	50	73	55	30	G	G
10	G	28	30	32	36	35	49	60	G	G		G	G	G	G	G	G	46	52	54	38	G	29	50
11	34	30	44	34	31	34	40	45	77	45	47	47	66	47	G	G	52	46	39	32	72	36	26	G
12	G	G	G	G	G	G	G	60	60	51	G	49	G	G	G	48	43	G	39	35	30	34	26	32
13	G	G	G	G	38	33	44	G	52	54	50		G	C	C	41	49	48	40	G	G	G	28	G
14	G	G	26	26	45	40	49	48	G	60	G	48	51	44	42	G	57	50	55	45	49	25	32	34
15	G	G	28	39	50	50	50	44	48	42	64	81	G	51	G	G	G	48	47	31	26	32	G	25
16	G	G	G	11	27	36	40	46	50	60	56		45	58	54	G	45	45	45	54	G	24	G	G
17	G	30	33	G	G	34	42	50	48	52	G	G			G	G	G	G	34	29	26	G	G	25
18	25	G	G	G	G	33	40	49	G	52	65	67	G	G	G	49	79	40	44	G	24	26	27	33
19	25	G	28	G	G		38	42	50	G	G	G	G	G	G	G	42	42	G	32	G	G	G	G
20	G	G	G	29	34	G	52	64	56	G	G	G	106	G	54	40	38	G	39	G	G	G	G	G
21	G	G	G	G	G	G	G	G	48	73	46	G	G	G	G	G	G	49	84	59	67	58	54	26
22	40	26	G	G	33	36	43	45	55	68	97	60	47	G	G	G	G	G	43	49	G	G	G	G
23	25	G	G	G	G	38	69	66	64	48	G	G	G	G	G	G	G	34	34	33	56	38	G	29
24	32	34	33	G	28	41	57	78	70	62	43	44	G	G	G		62	65	53	40	33	30	G	26
25	29	G	G	G	33	37	45	71	60	82	G	46	G	G	G	G	G	39	36	34	39	34	G	26
26	G	G	G	G	G	36	49	56	62	76	98	79	45	45	G	G	38	G	G	34	36	24	G	G
27	G	G	33	37	52	34		54	G	43	G	46		87	69	70	70		61	34	32	G	26	G
28	G	G	26	G	G	37	48	55	49						G	46	123	78	46	41	28	36	39	G
29	60	G	60	60	47	70	68	100	84	61	47	60	44	G	73	98	70	74	87	94	85	72	72	65
30		G	G	G	30	36	43	50	G		61	G			G	44	38		G	60	51	67	41	43
31	G			25	34	40	49	72	81	72	50	61		G	G	43	45	G	30	60	36	40	29	37
	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	30	31	30	28	29	27	24	27	30	30	31	29	30	30	31	31	30	31
MED	G	G	G	G	28	35	44	50	50	52	43	46	G	G	G	G	38	42	44	40	36	30	14	24
U Q	27	26	28	26	34	38	49	64	60	61	58	51	46	47	42	46	52	48	52	54	55	36	31	32
L Q	G	G	G	G	G	G	39	45	46	42	G	G	G	G	G	G	G	17	39	32	26	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Wakkanai

MAY 2003

LAT. 45°23.5'N LON. 141°41.2'E 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	14	15	15	16	14	14	15	18	22	22	21	20	21		16	17	15	15	15	16	14	23	15
2	17	14	17	14	15	15	15	18	20	17	23	20		18	24	20	18	14	15	14	14	14	15	20
3	15	16	15	14	15	21	22	16	20	20	24	20	21	21	22	20	18	26	15	14	14	14	15	15
4	14	15	15	15	14	18	18	18	20	21	21	24	24	22	21	22	20	17	16	14	14	15	15	15
5	14	16	15	15	14	15	18	16	21	20		34	26	24	23	21	20	16	16	14	14	15	14	15
6	16	14	14	20	15		15	21	21	22	23			23	21	20	20	16		14	14	14	18	14
7	14	14	15	15	14	16	14	16	20	20	20	26	24	21	22	17	15	14	14	14	14	17	14	16
8	15	15	15	14	14	15	15	14	18	21	20	23	21	23	21	18	15	16	14	14	14	14	14	15
9	15	15	16	14	15	14	15	18	15	20	38	22	22	21	21	15	14	22	15	14	14	14	20	15
10	16	15	15	18	14	15	15	20	22	21		34	23	23	22	22	21	22	16	14	14	14	14	14
11	14	15	14	14	14	15	18	15	20	20	22	32	27	24	22	20	20	22	16	14	14	14	16	15
12	16	15	14	15	20	21	15	18	21	20	20	22	21	21	18	18	15	14	15	14	14	14	15	14
13	15	15	14	15	14	17	14	15	18	18	21	23	20	C	C	16	14	14	15	14	15	14	14	15
14	14	14	15	15	14	16	22	15	16	20	18	18	20	21	20	14	15	15	14	14	14	15	15	15
15	15	16	15	14	14	15	20	18	16	18	20	21	18	22	20	18	17	16	15	14	15	14	17	17
16	17	15	16	15	17	15	20	17	20	22	32		21	20	21	21	17	16	18	14	14	14	16	14
17	14	14	14	16	15	16	18	17	20	21	20	22			22	20	20	18	14	14	15	15	15	15
18	14	16	15	14	17	14	15	17	20	21	21	22	22	24	22	21	18	26	20	17	15	14	16	14
19	15	14	14	14	16	21	14	16	23	20	20	22	21	21	18	21	20	14	14	14	20	15	15	15
20	15	15	15	14	14	14	14	20	18	23	22	22	21	22	21	21	18	15	18	18	14	15	15	16
21	15	14	15	17	16	16	18	16	18	24	22	23	20	21	23	20	21	18	16	14	15	15	14	15
22	14	14	14	15	14	14	14	18	18	23	23	23	21	22	22	22	21	17	16	15	15	14	14	14
23	14	14	14	14	14	14	20	16	18	23	22	21	24		21	20	20	21	18	15	15	16	15	15
24	17	14	15	14	14	14	16	18	18	22	22	22	24	21	21		20	16	16	14	15	14	15	15
25	14	14	14	14	14	16	16	21	21	21	20	22	22	20	20	20	18	15	17	14	14	15	16	18
26	16	14	16	16	20	17	18	21	23	23	21	23	35	24	21	49	22	14	14	15	14	15	14	15
27	15	15	15	14	14	14	16	18	22	22	22	22	34	24	20	20	26	18	15	14	14	16	16	15
28	15	14	14	14	18	16	18	20	20							33	21	18	16	14	16	14	14	15
29	14	15	14	14	14	15	17	20	22	22	34	38	16	23	21	20	16	18	16	14	14	14	15	14
30	14	16	15	14	14	14	14	15	18	20	23	23	36		24	22	27		18	16	15	14	17	14
31	21			18	15	14	14	20	23	20	35	34		29	24	20	16	14	14	14	15	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	31	30	30	31	31	30	31	31	31	30	28	28	26	26	28	30	31	30	30	31	31	31	31	31
MED	15	15	15	14	14	15	16	18	20	21	22	22	22	22	21	20	18	16	16	14	14	14	15	15
U Q	16	15	15	15	16	16	18	20	21	22	23	23	24	23	22	21	20	18	16	14	15	15	16	15
L Q	14	14	14	14	14	14	14	16	18	20	20	22	21	21	21	18	16	15	15	14	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Kokubunji

MAY 2003

LAT. 35°42.4'N LON. 139°29.3'E 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	63	54	54	60	54	66	73	84	82	71		90	105	102	100	91	86	97	106	106	84	54	63	65
2	54	54	55	54	52	53	53	58		69	69	71	79	77	85	89	88	91	91	91	78	66		54
3	54	64	55	63	55	66	80	84	80	91	91	101	110	113	116	110	105	104		100	86	73	54	66
4	66	54	54	53	48	54	79	83	81	104	86			91	101	101	107	111	106	98	66			
5			66	63	54	59	72	81	85	81	78	A	87	101	111	122	120	101	91	87	79	73	65	66
6	66	C	64	55	59	48	50		A	A	A			61	72	76	74	72	73	67			52	53
7	53	51	54	54	53	58	73	78	71	66			73	64	68	75	67	81	76	81	77	62		54
8	54	54	64	51	52	54			60						66	59	56	59	68	75	52	47	46	47
9	46	42	47	36	A	44	53	73	76	67	72	81	92	94	100	104	93	87	96	87	70	66	66	61
10	66		48	44			42			48		58	A	69	80			82	80	73	60	48		
11			42		44		44	43		A		57		A	72	82	77	69	64		75	43	63	58
12	52	55	52	51	49	49	55	64	69		64	66	69	65	75	84	88	87	88	66	54	46	52	
13	52	52	55			50	61	67	69	64	72	81	85	100	106	90	75	78	87	88		A		72
14	54	54	52	51	53			57					65	65	67	66	65	68	62	68	66	46	54	61
15	54	55	55	47	49	51		61	A	A	48			66	68	67	66	67	83	91	80	52	54	51
16	49	51	48	45	45	46	55				A		A	74	72	76	74	71	71	73				
17		44	47	44		50	54		59				63	81	83	80	74	78	83	87	71	48	54	54
18	54	53	55	54	47	62	69	72	64	62		64	73	84	81	85	81	85	90	97	87		52	
19			71	67	54	62	66	80	82	73	73	69	80	95	98	93			87	96	90			73
20	73	55	54	55	57	72	78	75		79	76		96	84	82	90	88	91	90	87	85	83	85	89
21	87	84	74	66	66	66	69				70			80	88	91	84	77	78	77	77	76	71	
22			66	54	55	54	87	85	85	76	83	77	84	91	93		98	82	74		80		73	
23	63		60	67	62	58	61	75	83	A		83	83	91	91	A	94		91	101	79	75	72	78
24	83	78	73	55	65	72	87	88	84	85	86	88	90	98	94	86	88	110	114	110	90	81	81	65
25	66	63	66	46	49	54	86	96	80	64	74	82	86	88	85	88	87	85	83	87	85	79	75	72
26	73	54	64	56	54	71	96	72	A	71	75	72	85	94	102	96	84	88	91	86	83	77	76	76
27	66	72	54	55	61	71	70	75	77	75	70	70	77	82	85	90	91	91	87	86	74	66	78	78
28	87	74		66	64	73	66		A	A	A	A	A	77	93	96	80	76	86	90	83		81	
29	84		54	54	55	66	81	69	71	72	72		82	99	117	117	124	128	108	117	96	88	80	
30		74	55	61	57		A						A	A	A	A		A	55	66	66	54	46	46
31	47		42	44	32		51		58	A	69	A		80	83	75	78	91	93	93	63	54	54	54
	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	22	30	29	27	26	27	22	19	18	18	16	20	28	30	27	28	28	30	29	28	23	24	22
MED	63	54	55	54	54	58	69	75	77	72	72	74	84	84	85	89	85	85	87	87	78	66	64	63
U Q	69	64	64	60	57	66	79	83	82	79	78	82	88	94	100	96	92	91	91	96	84	76	75	72
L Q	53	53	52	49	49	51	54	67	69	66	70	67	75	75	75	76	74	76	76	76	68	48	54	54

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Kokubunji

MAY 2003

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

DAY \ HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	53	G	50		G	G	G	G	G	G	40	35	43	60	G	25	31
2	G	G	G	G	G	G	42	51	62	48	G	G	G	50	G	49	53	74	49	33	84	58	72	40
3	28	G	30	43	32	35	60	64	63	51	58	51	62	G	G	51	52	58	112	103	95	91	G	40
4	G	G	G	G	G	G	48	73	84	97	88	151	148	60	G	51	61	54	58	43		68	84	46
5	45	G	G	G	G	G	G	G	43	45	83	125	67	65	G	40	G	G	41	50	39	48	50	50
6	39	C	38	29	G	G	G		40	50	65			G	G	48	48	58	55	41	52	39	26	31
7	26	G	27	23	25	G	35	G	G	52			G	G	G	G	59	G	52	G	G	G	45	38
8	33	33	G	G	G	29	61	48	G	58	47				G	G	G	43	60	82	58	G	G	23
9	G	24	G	G	80	G	42	G	44	57	63	G	G	G	G	47	67	71	79	37	46	50	29	39
10	49	35	50	27			43	46	48	G	64	G	80	G	G	85	115	61	62	39	G	34	37	45
11	39	37	G	G	G		G	G		63		G	73	94	G	54	G	G	51	111	69	70	58	45
12	G	40	32	G	24	G	G	40	G	46	G	G	G	G	G	G	G	G	38	33	33	32	33	55
13	42	48	37	39		G	33	43	51	G	G	94	62	G	G	47	G	53	51	60	124	105	52	49
14	50	G	G	31	46	55	42	51	61			74	54	G	G	G	48	50	51	41	42	65	51	41
15	40	34	33	25	33	46	60	73	80	77	52			G	G	G	G	G	54	53	70	35	G	G
16	G	38	26	G	G	G	40	51	57	55	67	53	91	80	62	46	G	55	64	47	91	78	39	58
17		G	G	G	G	27	40	63	60	70	60	56	51	G	G	47	G	41	40	60	37	G	41	G
18	G	G	G	G	G	G	G	G	52	G		52	54	50	60	61	57	52	50	66	102	78	41	40
19	39	33	G	G	26	29	G	48	53	55	G	69	48	G	G	42	106	106	51	59	58	71	50	G
20	G	G	G	G	G	G	G	47	70	66	49		50	62	G	66	53	48	G	37	40	29	71	25
21	23	G	40	G	37	49	59	80	73	54	48	79	110	G	G	42	52	48	62	60	95	58	49	94
22	54	56	G	G	G	G	G	54	62	59	62	62	70	58	50		61	61	52	68	42	71	59	60
23	50	60	27	G	G	G	50	62	64		101	73	87	49	60	99	G	119	84	95	30	G	26	57
24	60	47	40	26	G	33	42	73	71	77	65	64	61	45	67	59	49	86	132	75	104	93	39	32
25	G	G	G	G	G	G	40	49	64	62	62	78	62	G	G	G	G	47	G	39	36	G	G	37
26	27	G	G	25	G	G	40	49	84	61	47	67	56	71	G	G	46	37	39	52	G	36	31	40
27	32	30	G	G	33	45	40	47	51	G	G	G	G	G	G	G	46	71	78	77	71	G	G	80
28	40	39	35	47	G	31	43	91	84	89	122	92	84	47	G	G	G	50	60	31	57	45	71	93
29	67	60	57	G	G	36	41	63	53	80	68		G	47	96	92	63	60	92	108	70	49	33	59
30	39	51	51	49	G	39	49	53	52				60	68	66	77	79	92	-	41	G	G	24	22
31	G	60	37	33	G	42	47	60	53	60	80	90	122	50	45	50	61	65	47	40	34	G	40	32
	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	31	31	29	29	31	30	30	28	25	24	28	30	31	30	31	31	30	31	30	31	31	31
MED	32	32	G	G	G	G	40	51	55	56	62	63	60	23	G	47	48	53	52	50	54	45	39	40
U Q	42	40	37	27	25	35	47	63	64	64	67	78	76	58	45	54	61	65	62	68	71	70	51	55
L Q	G	G	G	G	G	G	G	46	48	49	47	G	24	G	G	G	G	41	47	39	36	G	26	31

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Kokubunji

MAY 2003

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Yamagawa

MAY 2003

LAT. 31°12.1'N LON. 130°37.1'E 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	78	73	54	58	52	61	73	86	83	74	76	90			90		86	108	111		87	72	78	77
2	78	64			60	52	64	67	73	80	80		86	85	86	91	90	88		88	78	66	66	52
3			54	67	60	54	66	82	88	87	85	108			121	112	114	128	126		76	66	87	82
4	76	75	77	66	52	52	66	92	81	75	81	86		112		114	129	129	A	A	81	66		66
5	77	72		62	61	51	67	79	80	82	77	85	87	114	140	151	154	130	115			77	74	74
6	73	66	68	54	67	52	58	56		A				72	80	82	86	81		78	66			64
7	52		51	48	47	54	71	81	78	74	77		87	86	78	83	86	88	84	83	86	54	52	50
8	54	51	54	58	44	47	61	62	72	66	64			80	78	75	67		81	79	54			52
9	54	52	54	53		36	46	67	68	56		74	82	A	87	89	101	84	92	82	75	62	76	
10	76	74	65	54	52				A				77	78	76	A	A		81	80				A
11	43				43	37	50	57	55	60		76		78	83	87	92	78	A	78	74			54
12	54	52	52	50	47	48	62	64	61	63	68	73	80	82	86	92	89	88	87	84	59	50	53	51
13		54		54			55	57	67	64	71	81	86	111		112	86		97					67
14		62		63		38		68	61			67	77	69	70	72	74	72	67	74	65	54	54	61
15	61	55	53	52	36	49	64	66	67	74			77	81	86	84	78	83	98		87			54
16	52	54	52	50	45	53	61	50		66	A	A	A	85	82	82	86	78	74	77		62		
17	54	52	50	48	47	46	59	68		A			80	88		108	105	122		84		65	65	66
18	63	66	67	66	52	64	77	78	71	63	68	77	82	86	110	112				A	81		74	79
19	80	88			77	69	73	80	79	78		A	86				86	82	85		87	80		77
20	76	77	77	75	70	72	78	76	A	A	82	A		80	84	98	104	88		84	77		77	
21	78	77	74	80	66	66	78	81	66	A	74		A	84	86	84	85	86	85	80	80	76		
22	76	66	66	52	54	42	66	76		A			86	111	97				86	86			80	78
23	77	77	74		72	54	51			87			87		A		103		116	110	80	76	78	78
24	81	77	75		55	72	80	83		80	A		A	108	86	87		129	119		82	53	77	85
25	77		66	64	55	52	73	79	66		77	81	86	88		82	89	80	82	A		77	66	74
26	72	72	54	53		61	78	66	64	A		75	84	90			86	108	102		82	77	77	78
27	78	76	71	77	68	66	72	77	80	82	76	78	81	81	82	88	88	91	87	80	66	66	75	74
28	76	66	66	66	61		66	73	A	A		A	78	82	86	85	80	80	92	97	80		81	84
29		77	A	A	66	73	82	70	A	A			83				146	152	147	144			78	
30	84	78	66		78	46		A	A	A	A				A	A					68		53	52
31			52	54	50	43	A	A	A		73		A	85	85	87	82	90	105	86	76		60	53
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	26	24	24	27	28	27	27	19	18	15	13	19	24	22	23	26	24	23	19	23	18	21	25
MED	76	69	66	56	55	52	66	73	71	74	76	78	83	85	86	87	87	88	92	83	78	66	75	67
U Q	78	77	69	66	66	62	73	80	80	80	80	85	86	89	87	108	103	115	111	86	82	76	78	78
L Q	54	55	53	52	47	46	61	66	66	64	71	74	80	80	82	83	86	81	84	79	68	62	62	53

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Yamagawa

MAY 2003

LAT. 31°12.1'N LON. 130°37.1'E 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	60	G	26	G	G	G	G		42	G	G	G	G	G	G		G	G	37	38	28	41	60	38
2	32	26	39		G	27	28	46	57	64	72	110	G	G	G	G	54	52	69	37	36	47	G	55
3	49	87	40	G	G	27	30	39	54	55	85	60	133	G	G	G	G	G	60	86	83	57	60	58
4	50	45	34	35	38	32	44	51	63	61	72	G	G	G	G	G	G	82	129	116	69	56	39	78
5		G	84	43	39	33	33	40	51	57	72	56	84	76	G	G	G	G	35	G	60	39	30	29
6	27	29	35	26	G	G	38	44	47	53		60	60	66	G	G	G	G	G	G	32	45	40	28
7	29	29	27	33	30	38	33	38	39	51	57	50	G	G	G	G	40	49	77	60		32	26	40
8	33	G	42	27	31	26	30	48	83	93	G	50	56	49	G	G	56	77	46	69	51	56	46	50
9	40	26	39	40	28	28	G	44	60	40	50	56	57	107	G	G	40	54	81	58	56	59	55	81
10	49	40	51	51	39	37	52	61	93	87	58	66	G	50	G	108	89	150	61	64	59	60	51	72
11	30	40	44	40	34	25	G	G	54	51	56	74	80	G	G	G	G	75	114	56	57	82	59	70
12	40	40	39	36	30	40	28	G	G	G	G	44	G	G	G	G	40	46	40	23	G	G	G	25
13	G	G	44	60	43	39	30	G	G	G	G	G	96	78	88	52	62	64	60		115	106	114	82
14	91		84	58	44	G	40	44	52	55	55	53	53	G	G	G	G	43	G	52	32	49	42	43
15	29	24	26	G	G	G	31	44	64	50	60	58	G	53	G	G	G	52	49	62	71	71	60	41
16	28	30	G	G	G	G	36	50	56	54	76	184	121	G	G	G	40	48	56	64	91	68	68	84
17	43	G	G	G	G	G	34	67	67	77	73	72	62	61	67	62	80	88	55	50	73	43	G	59
18	38	28	26	G	G	G	G	G	55	49	61	G	G	G	G	105	88	104		124	108	95	34	29
19	40	27	39	32	35	32	G	41	47	52	85	117	82	131	75		61	82	92	64	93	69	78	49
20	69	60	58	82	40	G	35	52	90	90	83	116	84	64	50	56	G	40	39	40	44	41	36	28
21	27	G	G	G	G	G	34	G	53	91	54	118	161	61	58	59	61	64	58	49	59	58	69	83
22	49	56	70	36	36	42	G	42	90	94	136	94	80	60	90	86			56	64	103	86	70	40
23	30	33	34	44	44	31	47	70	87	81	79	88	54	88	105	61	G	G		72	56	57	28	G
24	G	28	30	39	53	29	40	67	90	60	105	92	133	104	G	59	74	60	50	42	53	92	60	80
25	53	94	30	G	G	34	35	42	57	72	79	54	G	69	88	73	41	60	68	93	70	40	G	40
26	32	G	G	G	35	27	G	44	58	104	110	60	57	50	86		51	42	43	60	59	29	29	26
27	26	24	51	29	28	G	G	G	44	56	62	55	G	G	G	44	G	41	37	36	G	30		58
28	40	41	43	51	58	72	45	59	80	81		87	59	59	70	66	47	40	42	45	60	72	69	59
29	83			117	61	36	40	55	104	89	82	63	54		60		G	42	40	43	27	59	49	40
30	51	30	35	59	58	36	41	71	71	96	78	56	G		65	58	49	86	75	152	58	46	32	43
31	43	79	49	30	39	40	58	61	71	63	53	57	87	86	63	48	60	59	44	50	32	40	35	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	30	29	30	30	31	31	31	30	31	31	29	31	31	29	31	27	30	30	29	30	30	31	30	31
MED	40	29	39	34	34	28	33	44	57	60	72	60	57	53	G	44	40	52	55	57	58	56	44	43
U Q	49	40	44	44	40	36	40	55	80	87	80	88	84	72	67	61	60	75	68	64	71	69	60	70
L Q	29	12	27	G	G	G	G	39	51	51	54	53	G	G	G	G	G	41	40	42	36	41	30	29

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Yamagawa

MAY 2003

LAT. 31°12.1'N LON. 130°37.1'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	15	16	15	16	15	21	16	20	36			50	58	50		22	18	15	14	14	14	14	14
2	15	15	14		15	15	15	15	21	21	30	38	66	60	28		34	18	15	14	15	14	16	17
3	15	16	14	15	16	17	15	18	21	22	23	35	34	54		26	34	20	18	14	17	15	15	14
4	16	14	15	14	14	14	15	16	21	22	34		34			30	24	20	20	17	15	14	14	14
5	14	15	14	15	15	14	17	17	22	29	33	36	36	35			27	20	15	17	15	15	16	14
6	16	15	15	16	16	15	17	24	18	23		35	34	34	32	30	23	20	16	17	15	14	14	15
7	16	14	14	14	14	14	15	16	21	21	35	24	46			48	33	18	15	15	14	15	15	15
8	15	15	14	16	15	14	17	14	20	18	27	29	27	28	28		21	18	14	14	14	15	15	15
9	15	15	15	15	14	15	16	21	18	23	36	35	33	36		45	33	17	14	15	15	15	15	15
10	15	15	14	14	14	14	14	16	17	20	36	35		41		34	22	17	15	15	15	15	14	15
11	14	15	15	15	14	16	20	16	18	26	27	29	30	29	52			20	17	14	15	15	14	14
12	14	14	14	14	14	14	14	15	17	22		28					32	17	21	15	15	15	15	20
13	15	17	16	14	14	14	14	17	20	21	20	27	30	32	32	27	23	17	14		14	14	14	14
14	14	14	14	14	14	17	15	16	17	21	27	36	40				20	17	15	15	14	15	15	15
15	14	14	15	17	16	16	15	18	17	30	34	36		34				21	15	15	15	15	16	14
16	15	15	15	14	17	15	17	17	20	33	33	35	40		23		30	21	15	15	15	15	14	14
17	15	15	15	14	18	14	21	18	23	21	34	38	43	35	39	34	22	22	16	15	14	15	17	15
18	16	15	15	18	20	14	22	16	21			26	49		54	40	32	22		14	15	14	15	15
19	15	15	14	14	14	15	23	15	18	22	23	27	34	33	28		21	18	16	15	16	17	15	15
20	16	14	14	14	14	14	18	17	21	22	22	34	33	32	32	27	23	18	14	14	14	14	14	14
21	15	15	22	15	14	15	17	15	21	21	28	29	35			38	21	17	16	14	15	15	15	16
22	14	15	14	15	14	14	15	17	18	27	35	40	38	40					15	15	14	16	14	14
23	15	15	15	15	15	15	14	16	18	32	34	34	34	32	29	28	20	20	16	16	14	14	15	16
24	14	15	15	15	15	14	16	16	18	22	27	28	33	33		36	29	20	16	15	15	15	15	18
25	15	15	15	16	15	14	16	17	20	23	28	32		35	30	30	23	18	20	15	15	14	20	15
26	14	17	15	17	15	14	23	16	29	33	36	38	40	38	34		33	18	15	15	14	14	15	15
27	15	16	15	15	15	15	23	18	18	22	33	32	66	55		35	53	21	15	15	20	15	15	15
28	15	14	14	15	15	14	17	15	20	34		52	44	43	38	30	26	18	14	15	14	15	15	15
29	15	15	14	14	15	14	15	17	21	26	63	38	39		32		24	18	15	14	14	15	15	15
30	15	14	14	15	14	15	16	16	20	29	33	34	34			36	34	20	15	15	15	14	14	15
31	15	15	15	15	14	14	15	17	21	23	32	33	71	36	29	22	17	18	15	15	14	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	31	31	31	30	26	29	27	22	17	18	28	30	30	30	31	31	31	31
MED	15	15	15	15	15	14	16	16	20	22	33	34	36	35	32	32	24	18	15	15	15	15	15	15
U Q	15	15	15	15	15	15	18	17	21	29	34	36	44	41	38	36	32	20	16	15	15	15	15	15
L Q	14	14	14	14	14	14	15	16	18	21	27	29	34	33	28	28	22	18	15	14	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Okinawa

MAY 2003

LAT. 26°16.9'N LON. 127°48.4'E 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	103	87	88	74	62	61	70	98	81	82	90	114	142	127	121	131	123	130	145	146	107	100	88	102
2	107	82	87	83	66	58	63	80	80	101	110	105	115	114	106	121	124	120	127	126	88	88	86	81
3	85	76	72	70	60	54	60	78	87	100	101	120	126	136	137	142	148	148	146	134	87	88	86	100
4		107	107	88	66	61	71	88	90	87	94	111	132	142	146	160	170	170	157	143	107	85		98
5	88	86	88	85			76	86	87	98	93	106	127	153	170	171	170	170	170	151	131	110	107	
6	87	89	107	86	86	88	82	80	62	61	64	A		107	113	120	131	130	126	124	100	87	87	88
7	82	89	78	64	55	54	67	80	72	74	85	77	99	115	98	105	115	124	127	110	110	86	66	65
8	65	66	59	55	46		61	68	65	74	81	79	97	115	103	108	98	101	101	90	74	66		75
9	79	77	88	81	37	37	44	74	62	61	68	82	96	101	102	108	111	93	A	A				82
10	83	89	78	64	55	48	43		58		A	77	102	101	105	107	105		111	109	88	84	66	54
11			47			A	46	61	62		A	94	107	110	120	125	120	111	108	103	87	79		75
12	66	62	60	46	48	51	66	61	62	73	81	87	105	107	126	131	136	123	121	107	88		77	78
13	74	72	76	66	43	29	44	66	67	66	77	94	105	117	127	131	123	118	121	111	72	65		66
14	75	64	63		45	43	47	72	60			74	84	86	82	84	81	72	75	85	65	60	55	60
15	62	61	62	58	52	44	56	63	67	75		88	102	106	116	120	114	110	109	132	88			66
16	64		54	52	50	46	55	61	A	A	70	85	98	115	126		113	106	108	98	77			62
17				60	50	45	59	65	62	A	A	72	98	126	146	144	151	150	144	130	107	87	84	104
18	88	89	101	88	82	76	81	78	70	71	78	87	109	131	145	146	145	146	146	147	110	106		
19	108	109	131	110	78	67	76	78	81	84	72	85	107	116	113	107	108	115	109	110	88	77	84	81
20	88	88	86	81	76	76	78	86	84	76	88			94	107	120	120	111	106	87	83	84	82	77
21	77	82	88	74	66	71	90	80	66	75		85	86	110	106	97	107	112	100	101	86			
22		78	74	66		A	54	74	81		77	88	104	121	116	111	115	125	108	105	88	85	89	
23	87	86	85	71	77	A	58	74		96				116	117	114	124	130	131	108	82			86
24	86	87	79	71	66	74	86	80	82			95	107	116	114		128	146	170	145	104	65	76	82
25		86	76	72	65	65	74	75	A	78	78	A	A	A	A	106	104	100		107	A		80	78
26	75	78	71	66	61	62	72	70	71	86	101	104		116	115	116	118	131	116	88	97	88	88	87
27	87	87	81	76	72	61	66	74	85	84	76	84	100	92		111	108	108	106	90	74	72	73	64
28	76	74	66	66	61	66	73	61	87	75			91	116	107	91	97	100	110	115	80	74	78	86
29	84		C		66	72	71	A	A			101		140	146	168	171	176	170	167	143	131	131	131
30		108	101	101	103			59	A	A	A	72		A			61	64		93	54		A	52
31	54	55	61	61	53	48	47	A	A	A	75	75		108	131	145	132	144	152	147	110		83	86
	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	27	29	28	28	25	30	28	25	21	20	26	23	29	28	28	31	30	28	30	29	22	20	27
MED	83	86	78	71	62	61	66	74	71	76	80	87	104	115	116	120	120	122	121	110	88	85	84	81
U Q	87	89	88	82	69	69	74	80	83	86	91	101	109	123	129	136	132	144	145	134	107	88	87	87
L Q	74	74	64	64	51	47	55	65	62	73	75	79	98	107	106	107	108	108	108	101	81	74	76	66

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Okinawa

MAY 2003

LAT. 26°16.9'N LON. 127°48.4'E 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	49	46	36	25	24	G	26	37	48	50	62	G	G	G	G	G	G	G	38	56	56	31	27	24
2	49	60	28	34	32	46	44	61	71	75	62	61	G	G	G	G	81	70	116	81	72	80	G	G
3	G	24	43	52	G	G	29	45	60	64	56	72	G	G	G	G	G	41	38		30	49	71	58
4	94	28	34	54	28	25	41	44	45	69	68	89	58	G	G	G	G	G	G	G	G	G	94	40
5	24	78	106	50	94	78	62	80	47	49	46	52	51	G	53	G	G	G	G	34	36	G	70	48
6	33	29	29	40	G	G	31	44	51	52	51	83	99	74	65	77	50	G	43	32	32	G	G	67
7	35	28	26	33	31	44	41	36	40	58	G	G	G	44	G	G	G	G	48	50	60	27	55	33
8	32	G	27	G	28	26	25	45	56	58	54	52	G	G	G	G	58	49	36	33	30	57	47	54
9	58	41	33	35	23	23	G	38	44	47	50	G	50	G	G	G	59	135	156	169	136	92	93	82
10	86	79	52	41	24	25	71	56	50	60	91	50	56	G	53	86	54	104	71	65	82	50	56	39
11	72	54	46	43	52	48	41	35	54	79	112	62	54	59	63	57	65	G	34	41	49	34	79	81
12	57	70	G	33	G	G	G	50	G	G	G	G	44	G	G	59	100	56	78	G	G	G	G	G
13	G	G	G	24	25	24	25	G	G	G	G	44	59	67	59	56	72	51	108	26	26	32	91	88
14	59			111	62	28	31	41	53	63	67	63	46	54	G	G	66	43	49	54	28	67	46	G
15	30	56	60	78	27	36	46	58	52	66	70	58	59	53	G	G	G	49	62		43	68	80	51
16	56	71	65	68	46	52	38	59	137	134	86	44	64	G	G	G	44	46	48	54	40	77	59	56
17	84	90	71	48	36	G	32	34	62	84	108	67	79	73		112	118	67		40	43	G	49	41
18	36	59	27	G	G	G	36	42	G	56	72	64	62	65	61	56	68	50	49	30	28	78	92	92
19	34	49	34	26	G	G	G	G	88	49	53	48	66	59	51	55	G	62	62	29	G	G	39	40
20	36	70	56	56	41	36	32	41	50	62	56	94	110	57	91	72		91	46	79	72	78	40	41
21	36	G	G	24	G	G	G	38	46	61	88	84	54	50	45	48	40	37	37	57	114	90	71	
22	69	69	G	29	71	72	30	46	69	90	72	76	64	48	67	61	51	66	95	58	40	43	36	89
23	72	60	72	78	37	70	27	70	94	92	173	130		65	56	G	G	58	82	28			113	58
24	58	60	60	34	26	41	39	65	72	87	114	102	57	G	56		G	46	96	66	65	36	33	68
25	104	29	36	51	40	30	60	44	82	70	75	136	150	146		88	94	96	110	116	148	152	79	60
26	41	35	33	G	28	29	28	34	39	49	58	116	114	85	58	68	86	51	39	33	30	27	28	25
27	26	G	G	G	G	G	43	37	43	64	77	74	G	G		G	G	51	56	47	45	32	35	29
28	71	35	33	29	47	76	34	42	58	63		70	G	66	79	56	52	G	44	40	27	28	29	80
29	78	125	C	90	61	81	77	114	116	104		47		53	44	59	76	G	G	54	69	57	39	60
30		39	46	43	44	88	78	61	80	106	104	68	55	58		62	57	51	72	59	70	82	114	54
31	38	39	28	27	G	26	45	113	88	90	79	70	57	69	55	94	91	72	70	72	151	94	28	34
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	31	31	31	31	31	31	31	29	31	29	31	27	30	30	31	30	29	30	30	31	30
MED	49	48	34	35	28	28	34	44	53	63	68	64	56	53	51	56	53	50	49	50	43	46	49	52
U Q	71	69	54	52	44	48	44	59	72	84	87	83	64	65	59	62	72	66	78	62	70	78	79	67
L Q	34	29	27	26	G	G	27	37	45	52	53	48	22	G	G	G	G	G	38	32	30	27	33	34

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

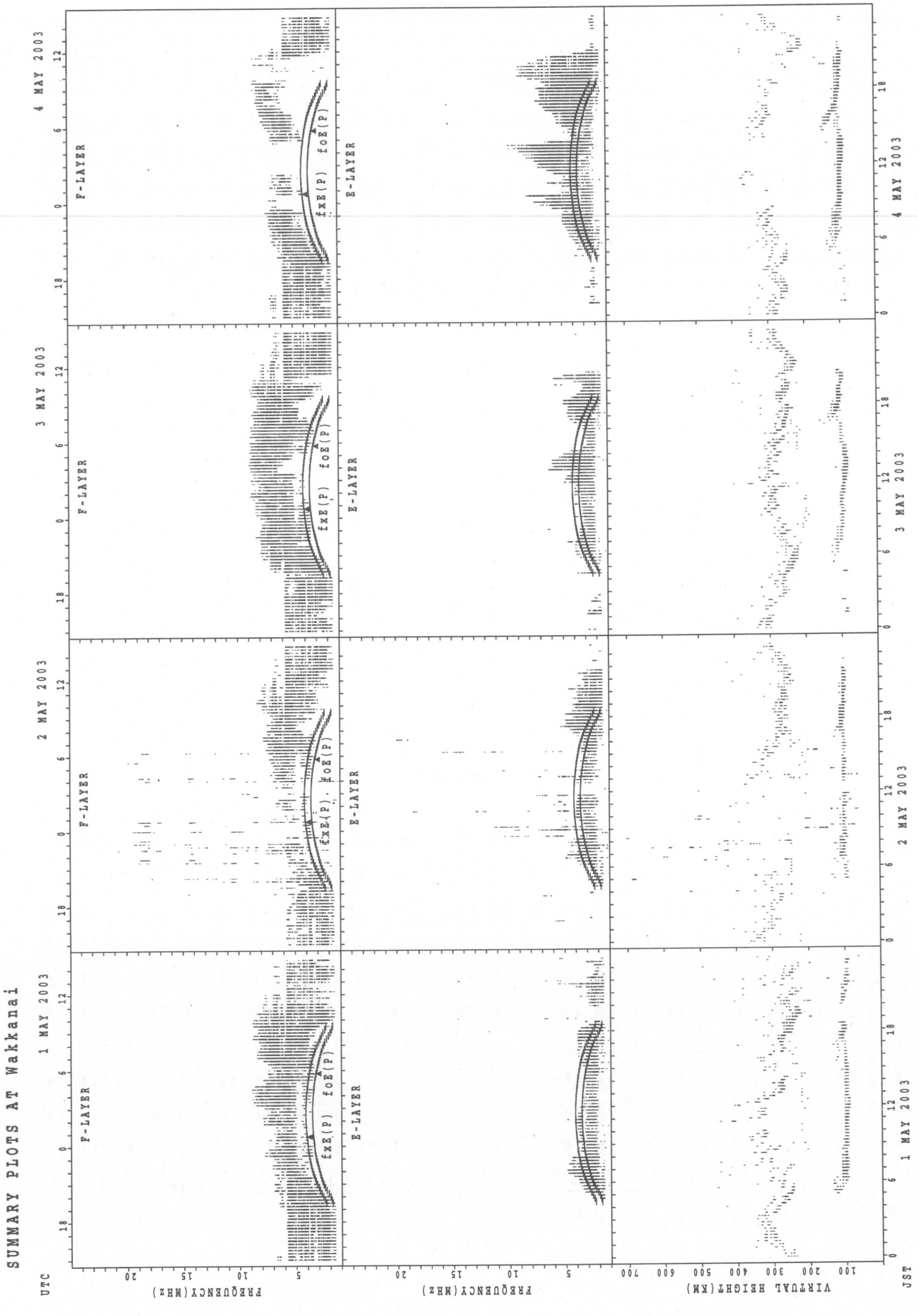
HOURLY VALUES OF fmin AT Okinawa

MAY 2003

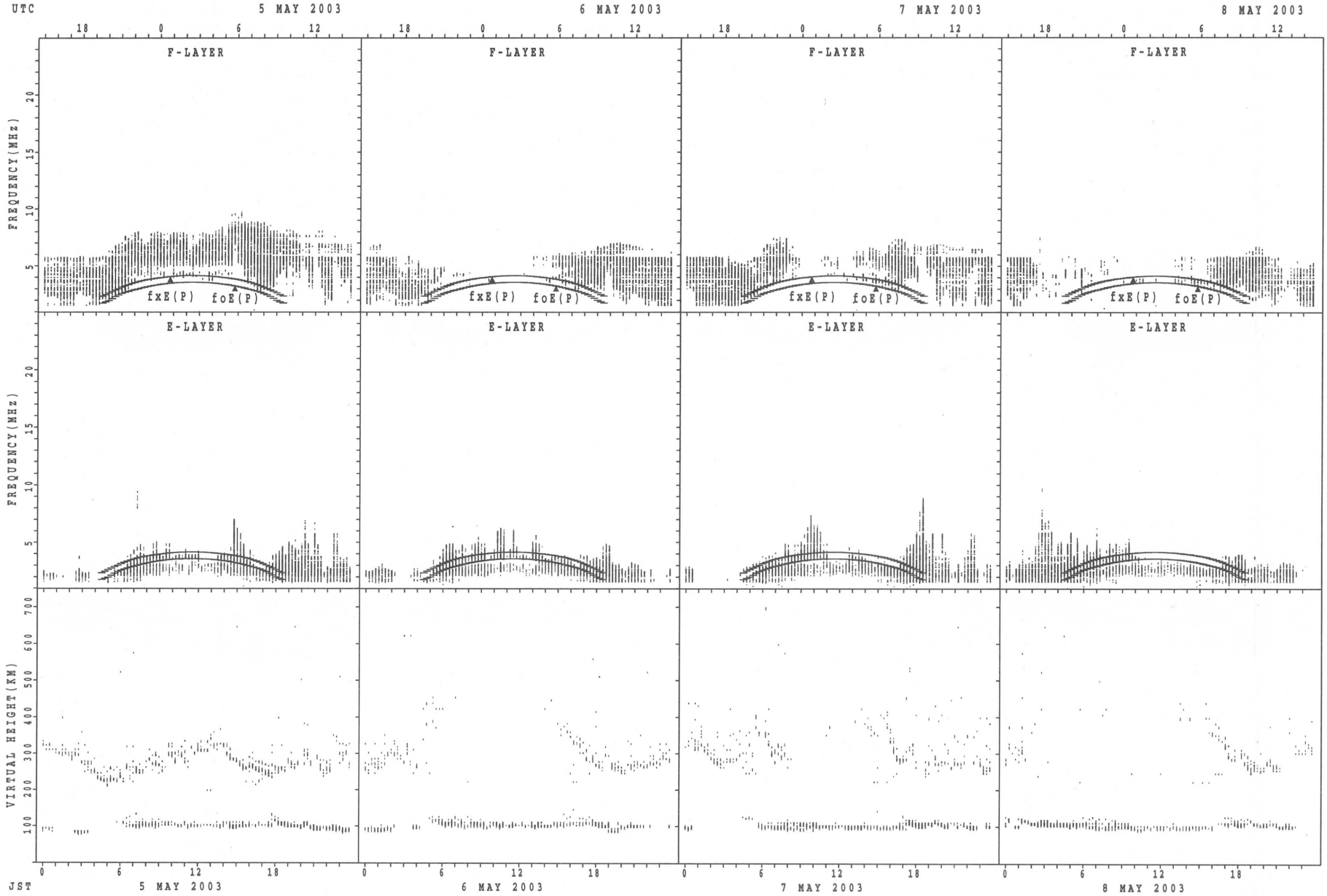
LAT. 26°16.9'N LON. 127°48.4'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

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

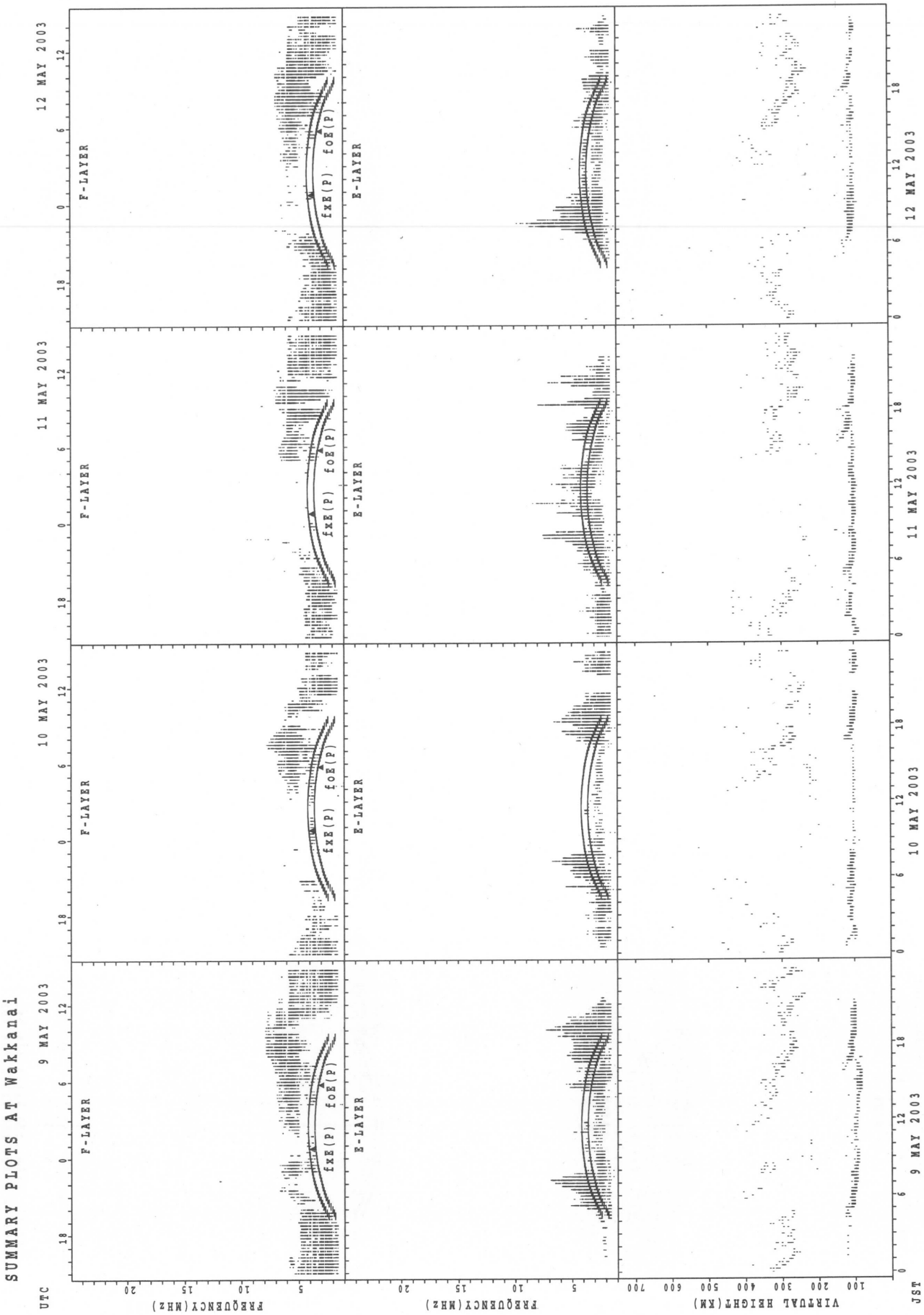
COMMUNICATIONS RESEARCH LABORATORY, JAPAN


SUMMARY PLOTS AT Wakkanai
UTC
JST
1 MAY 2003
2 MAY 2003
3 MAY 2003
4 MAY 2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

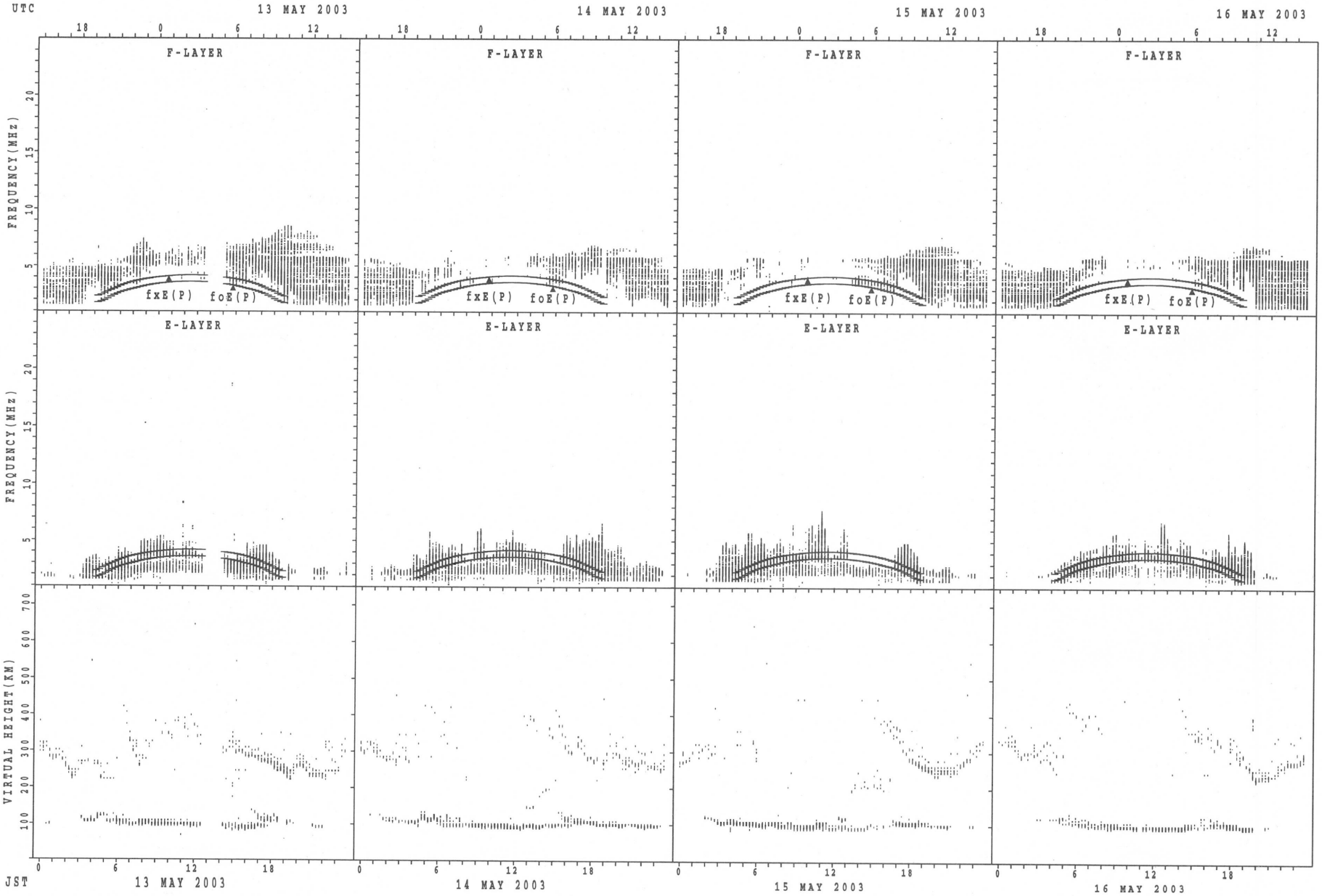
SUMMARY PLOTS AT Wakkanai



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

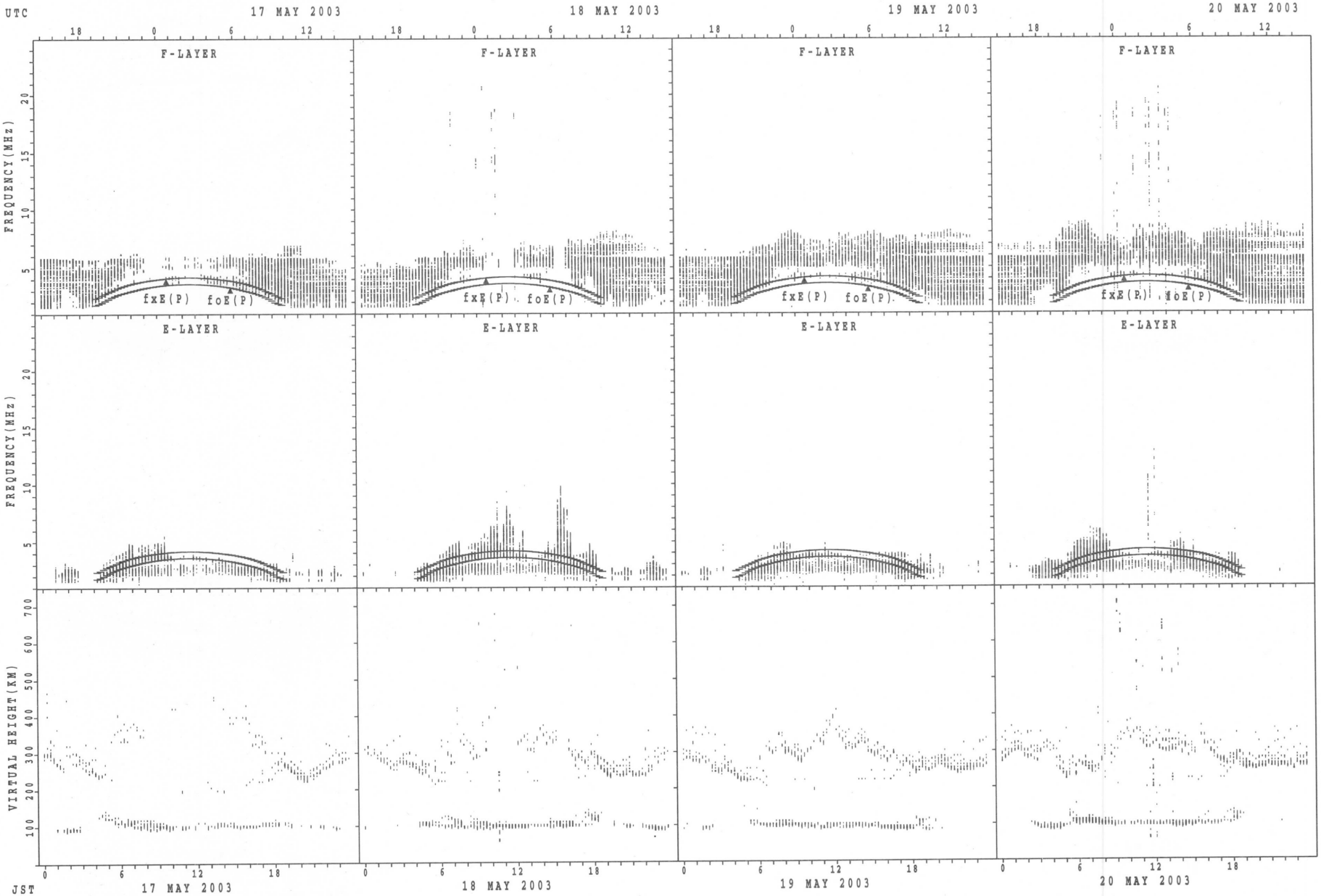

SUMMARY PLOTS AT Wakkanai
UTC
JST
9 MAY 2003
10 MAY 2003
11 MAY 2003
12 MAY 2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



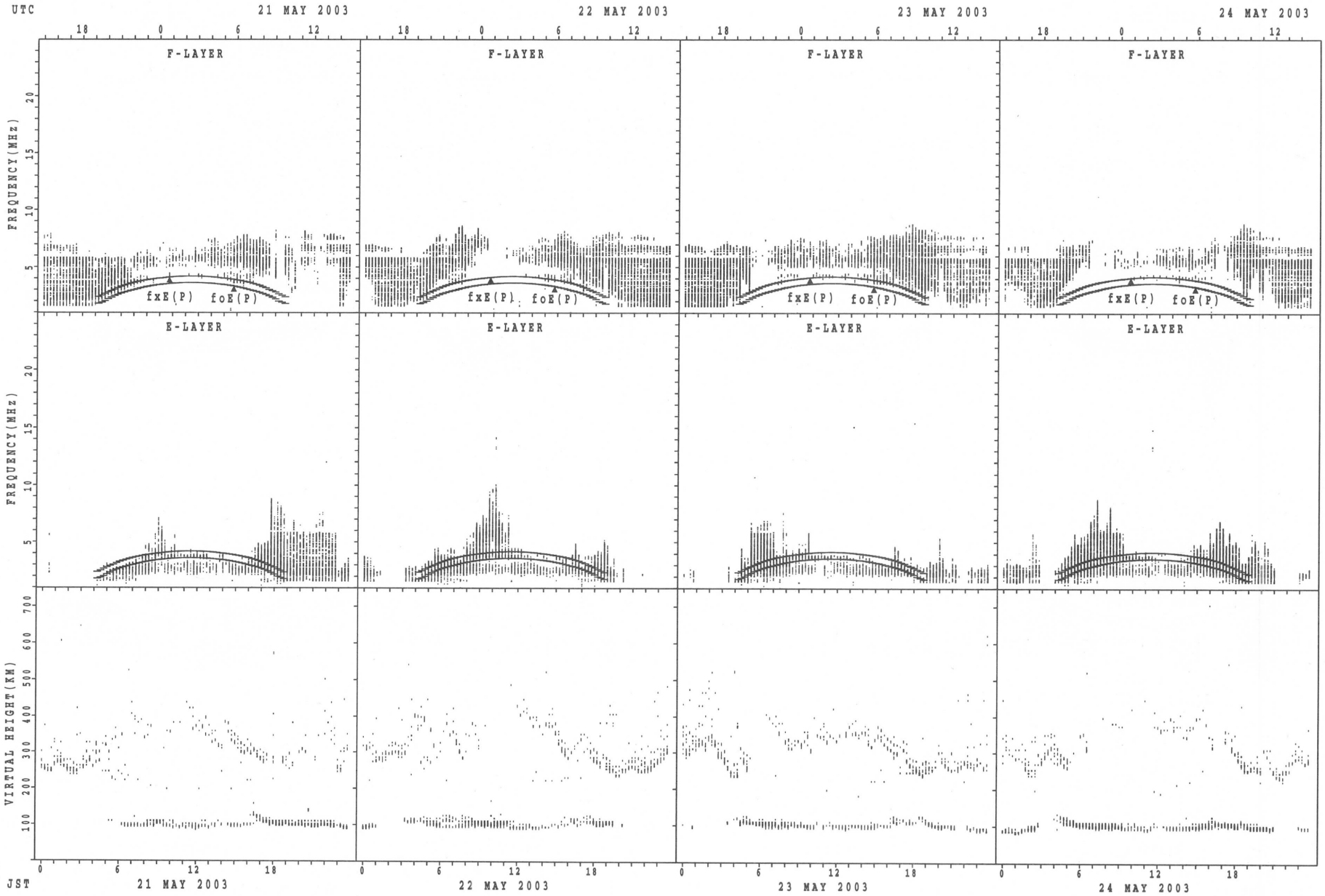
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



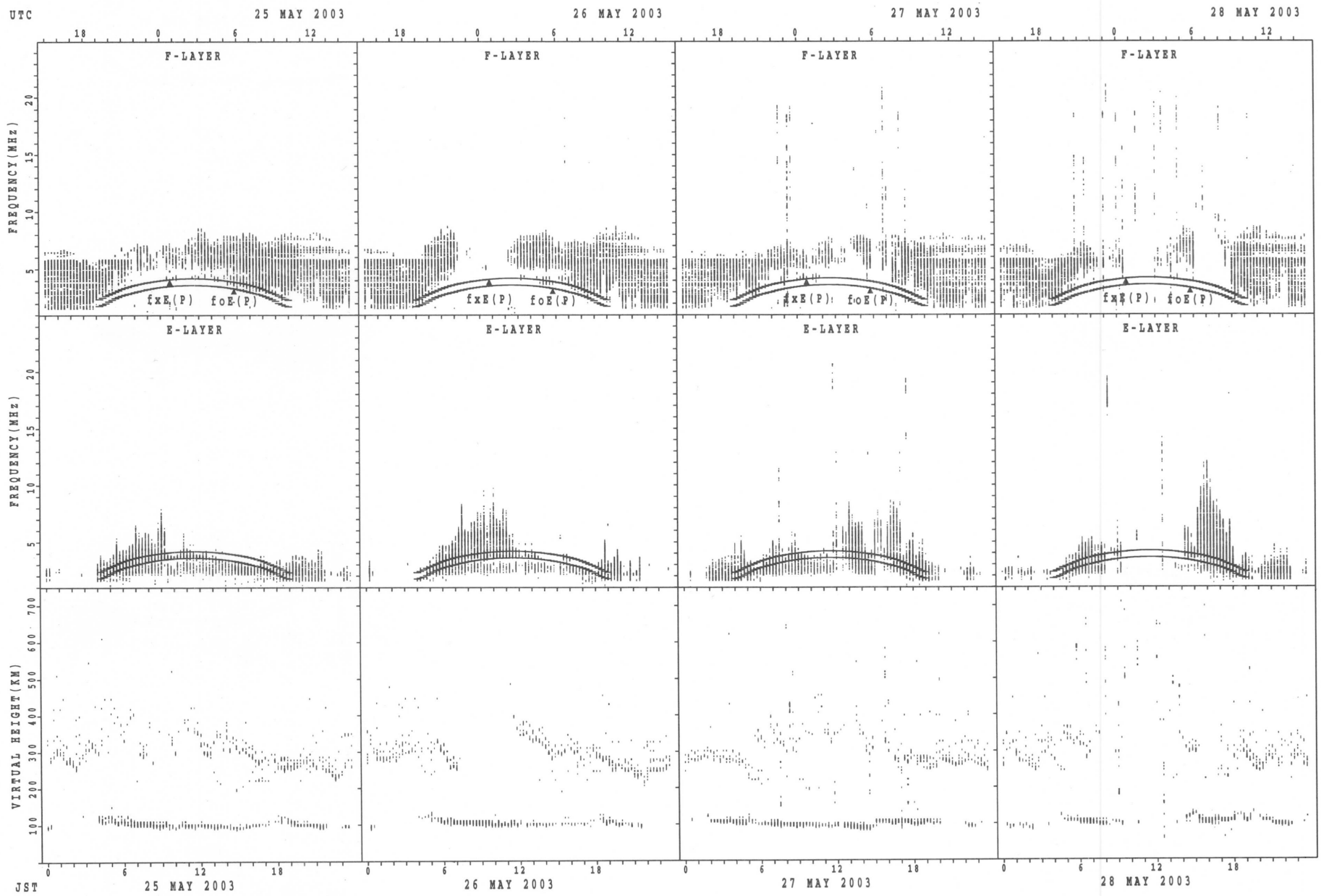
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



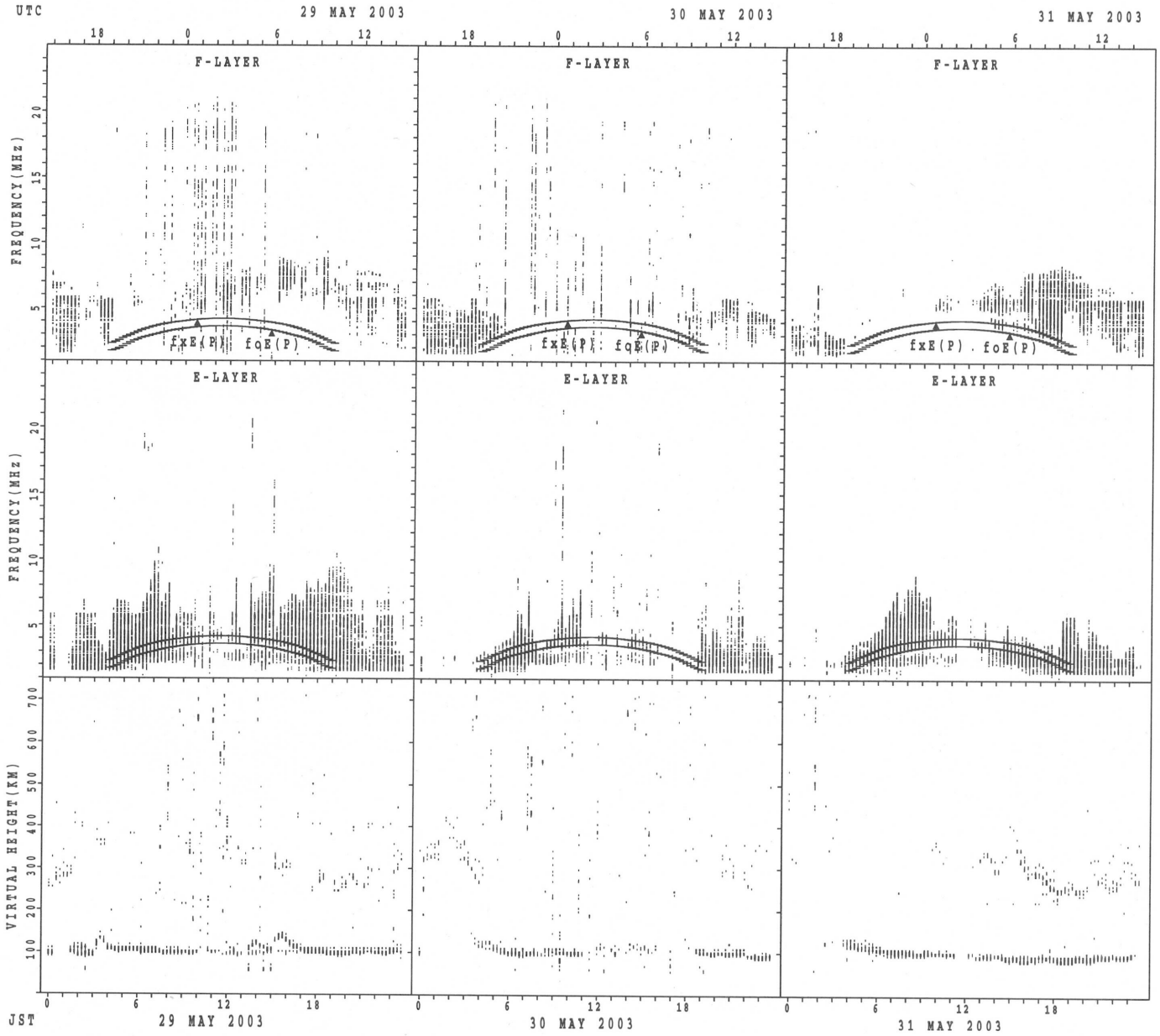
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



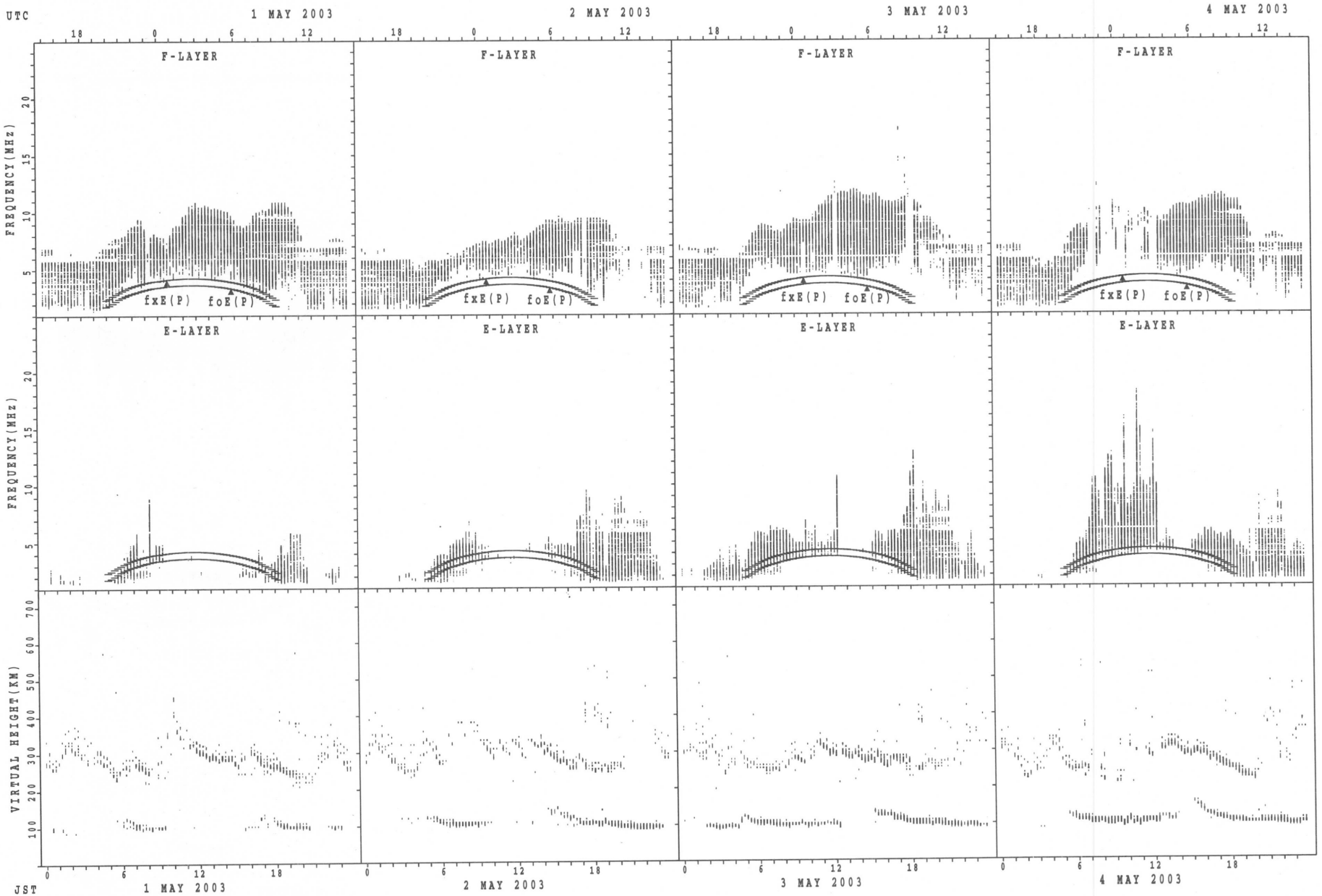
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



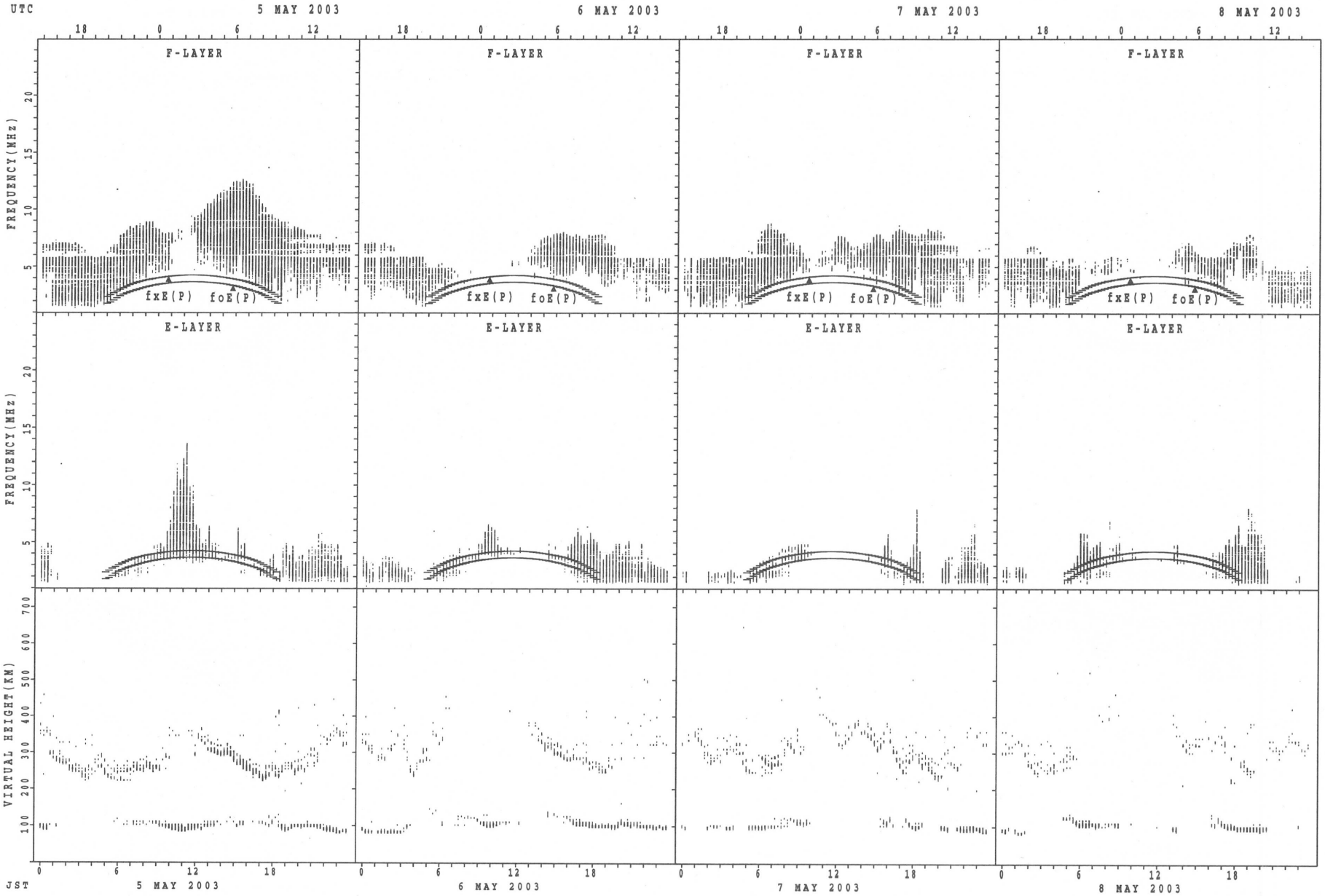
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji

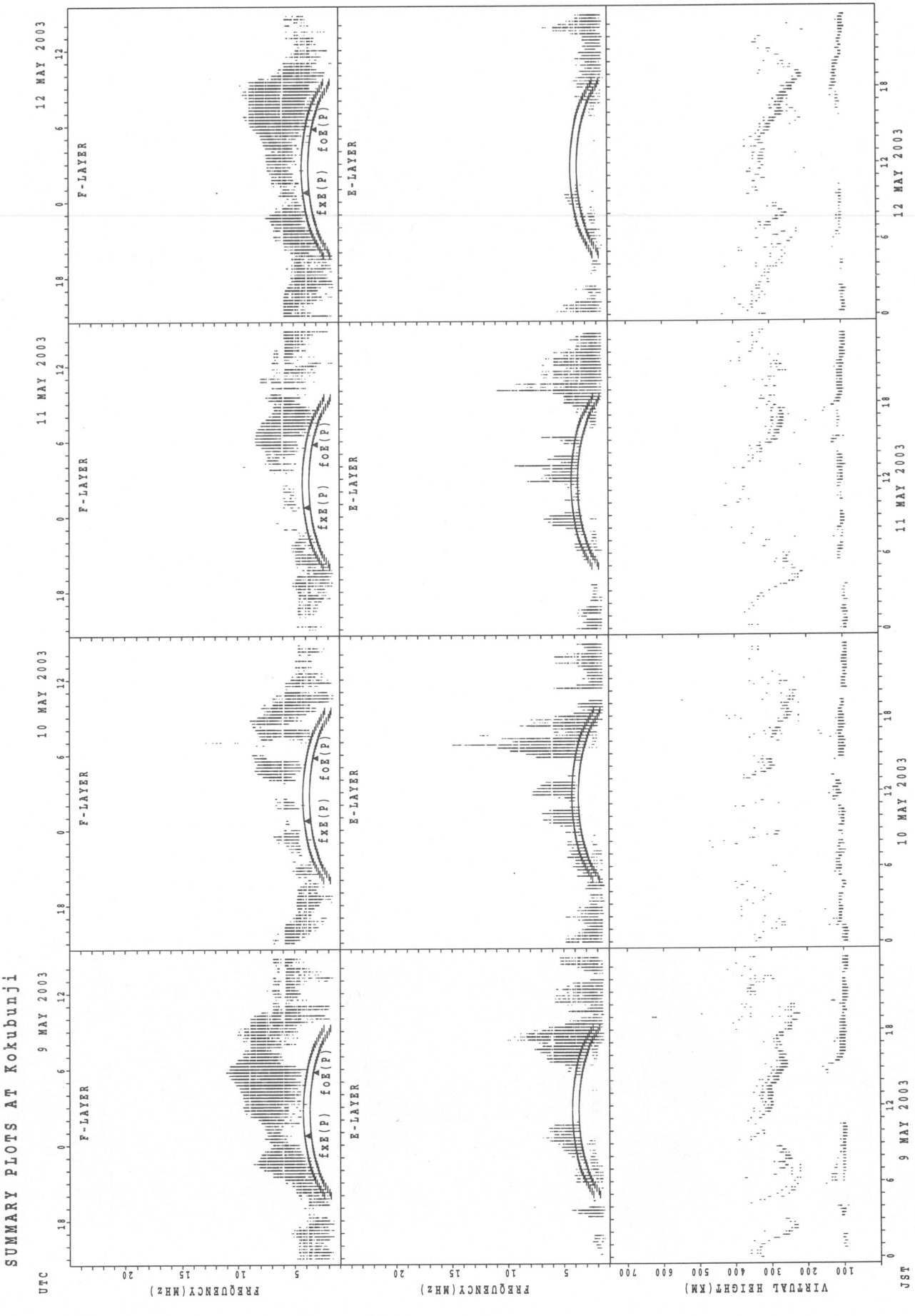


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

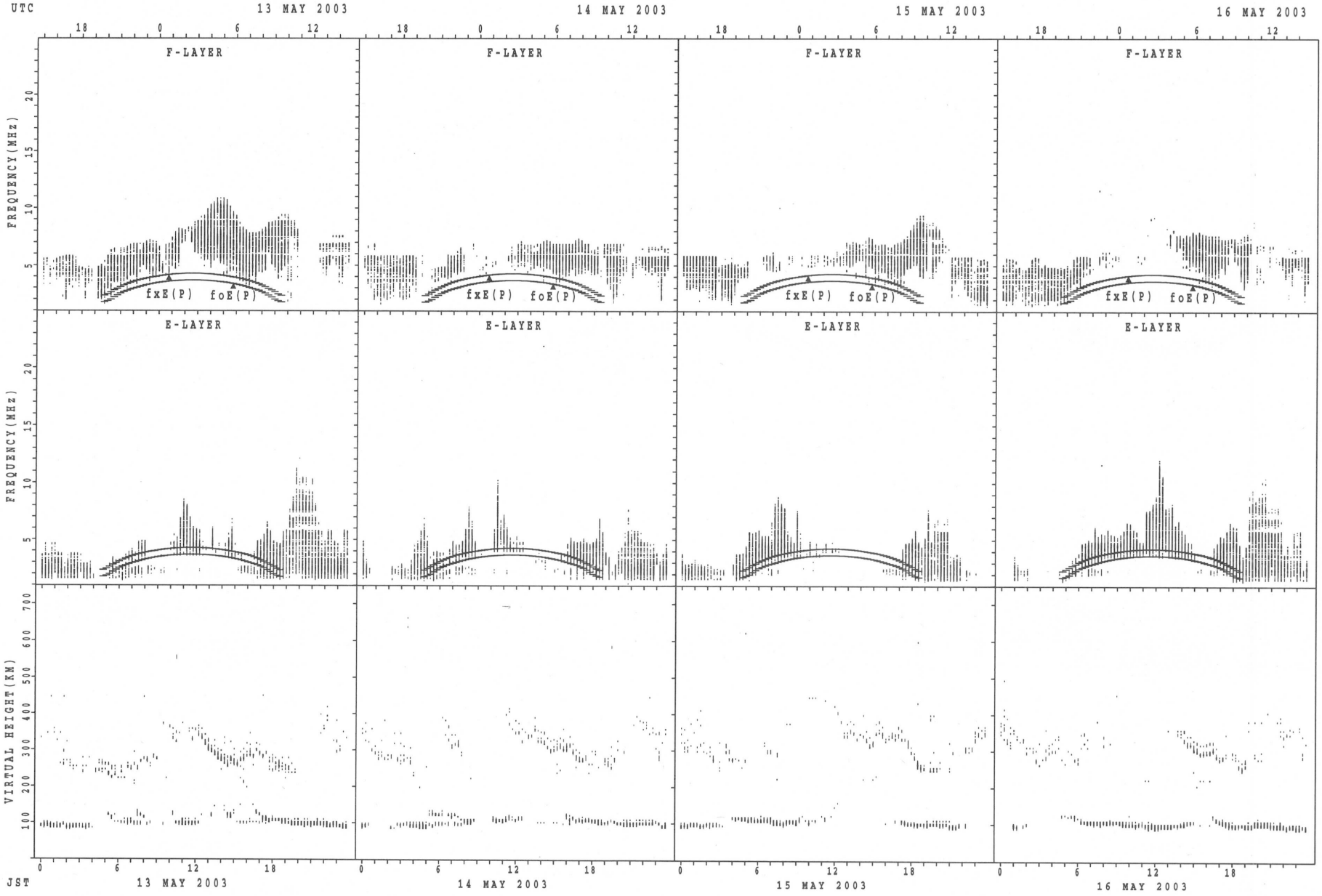
SUMMARY PLOTS AT Kokubunji



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

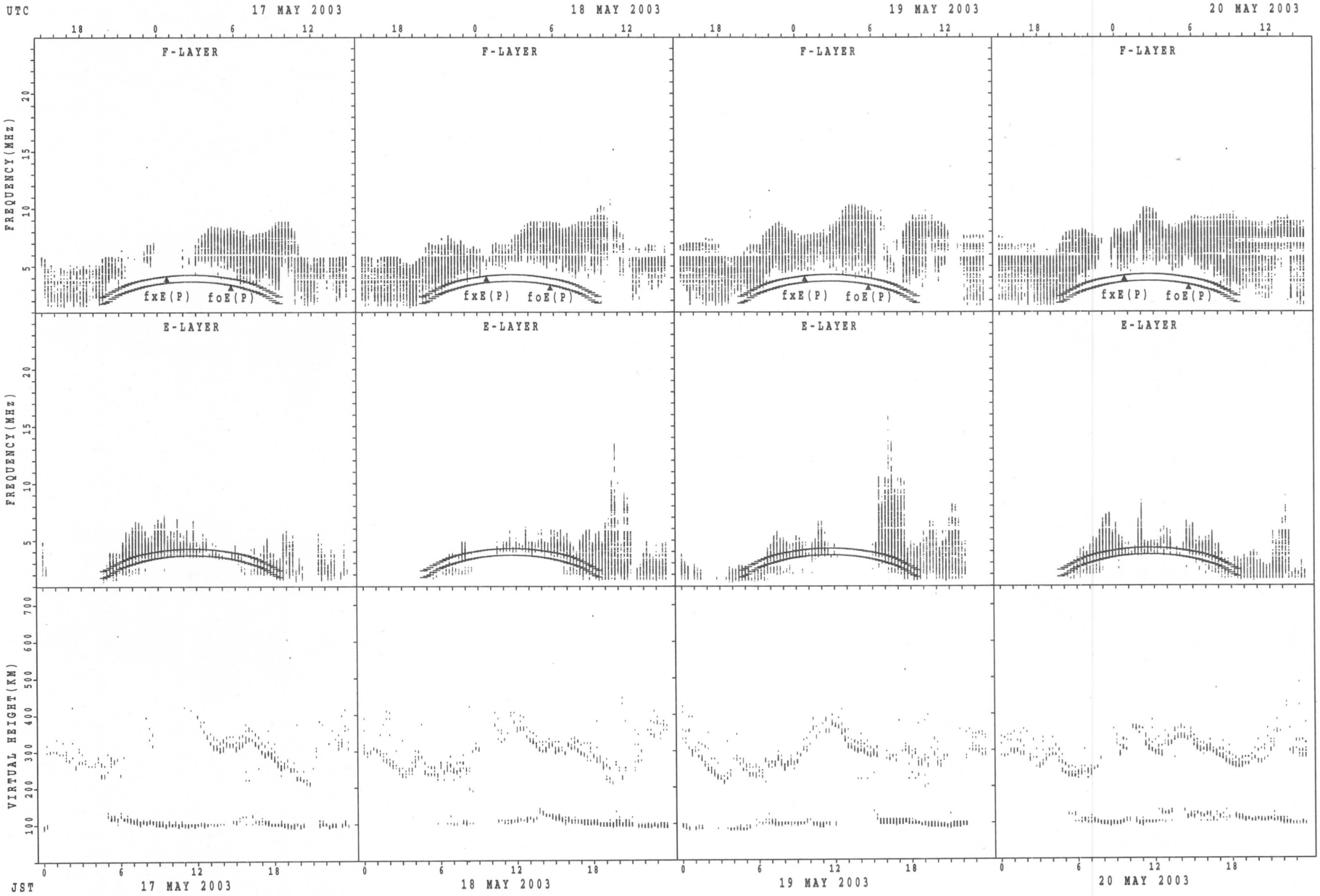

SUMMARY PLOTS AT Kokubunji
UTC
JST
9 MAY 2003
10 MAY 2003
11 MAY 2003
12 MAY 2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



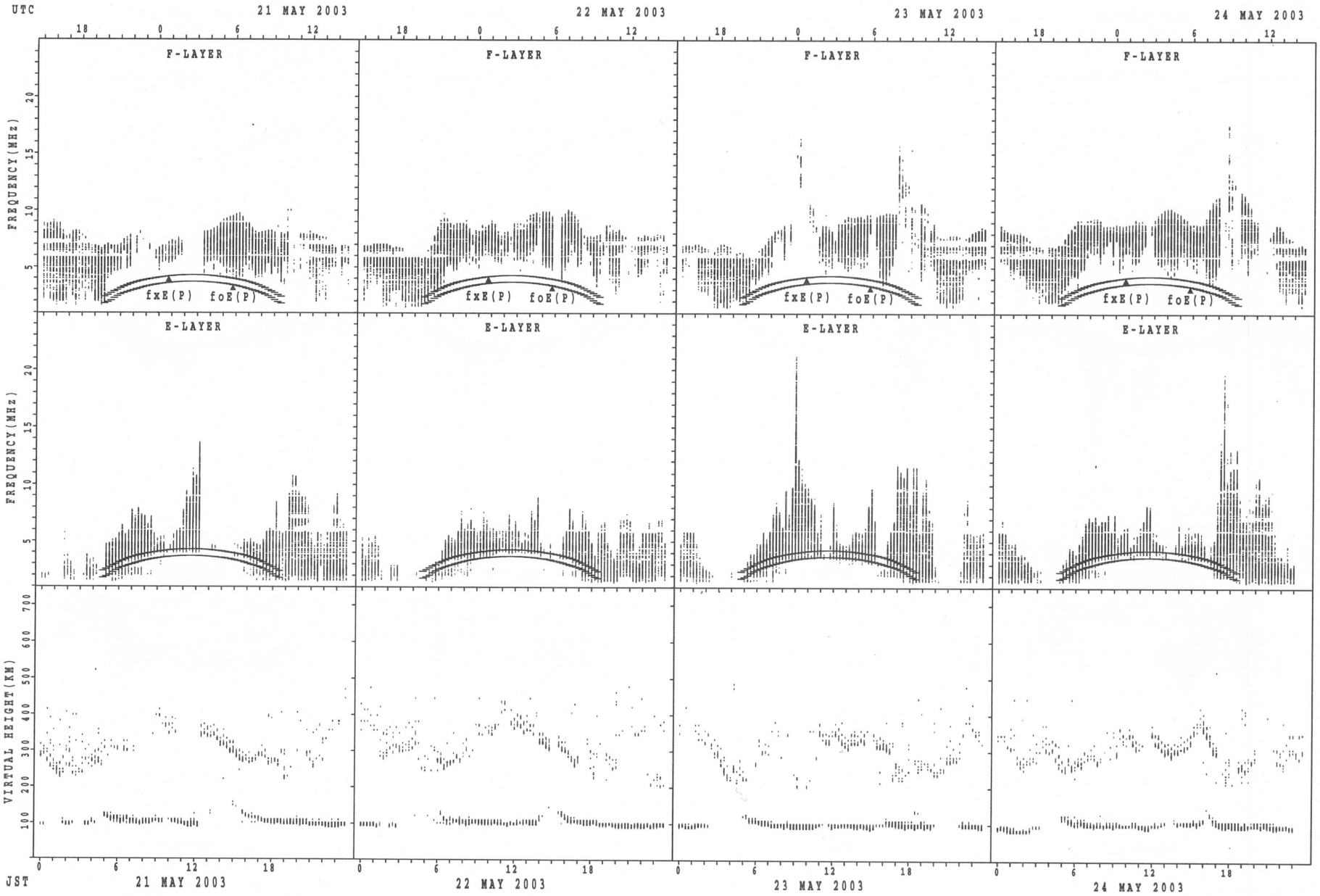
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji

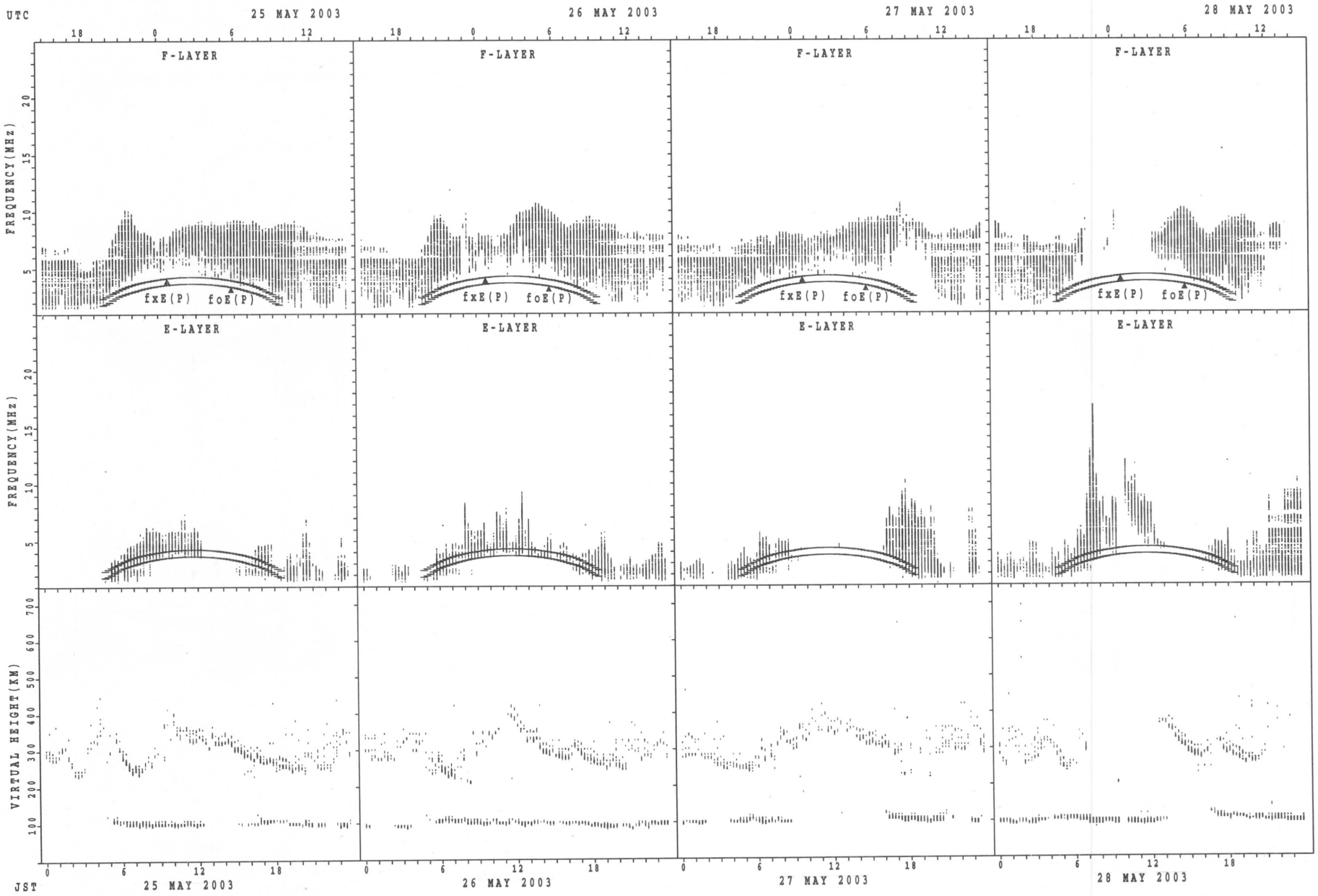


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

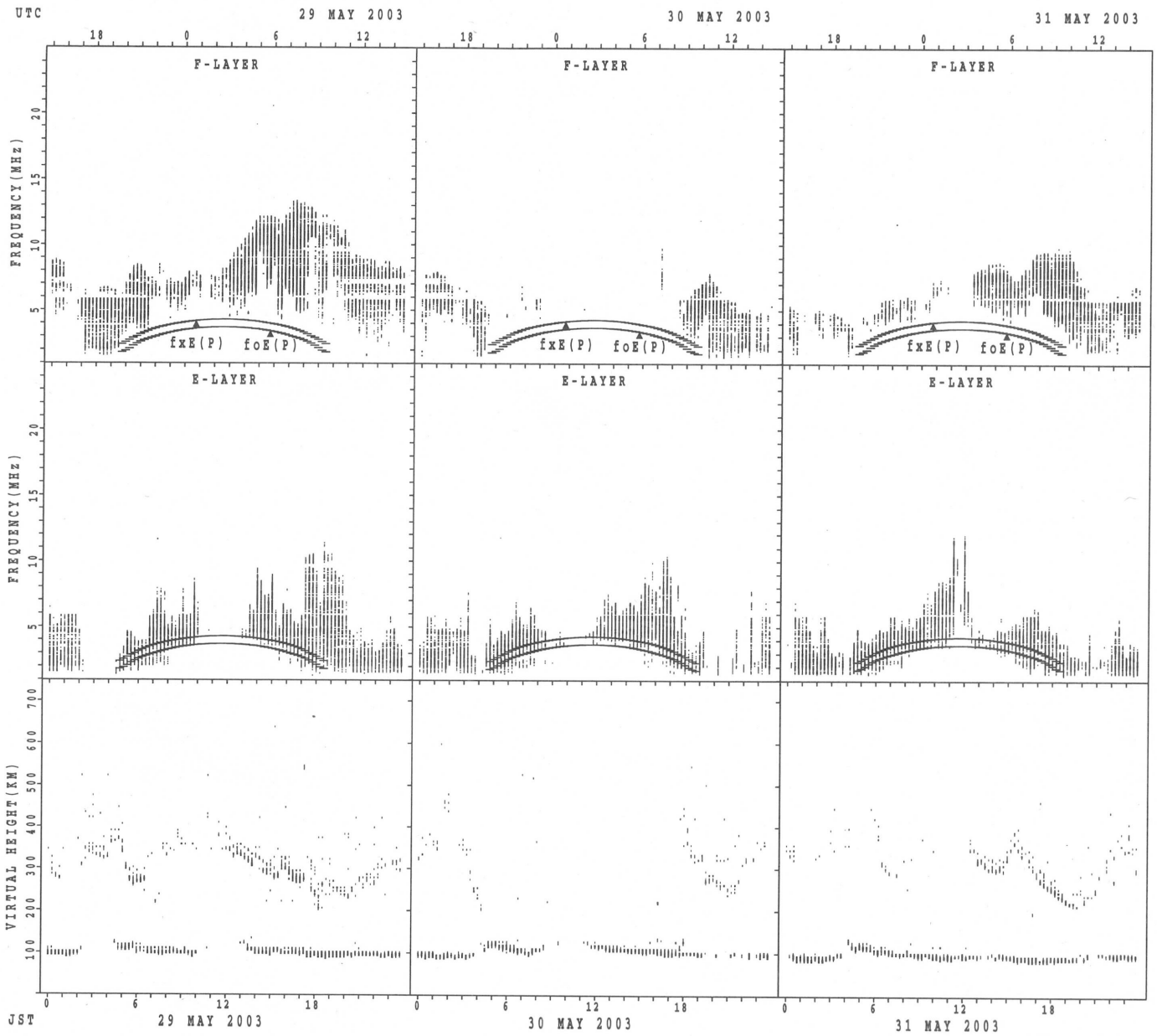
SUMMARY PLOTS AT Kokubunji



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

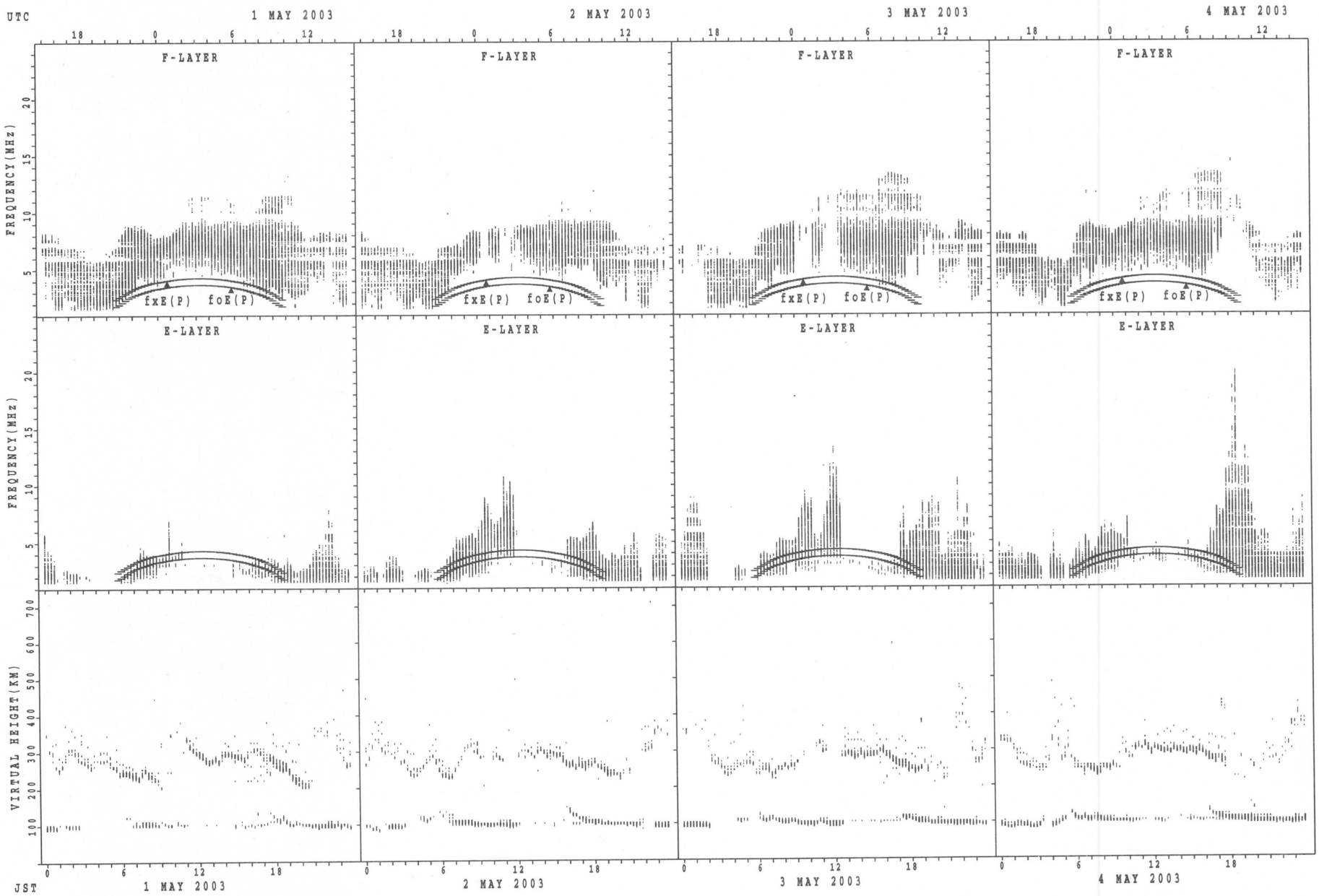

SUMMARY PLOTS AT Kokubunji
UTC
25 MAY 2003
26 MAY 2003
27 MAY 2003
28 MAY 2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



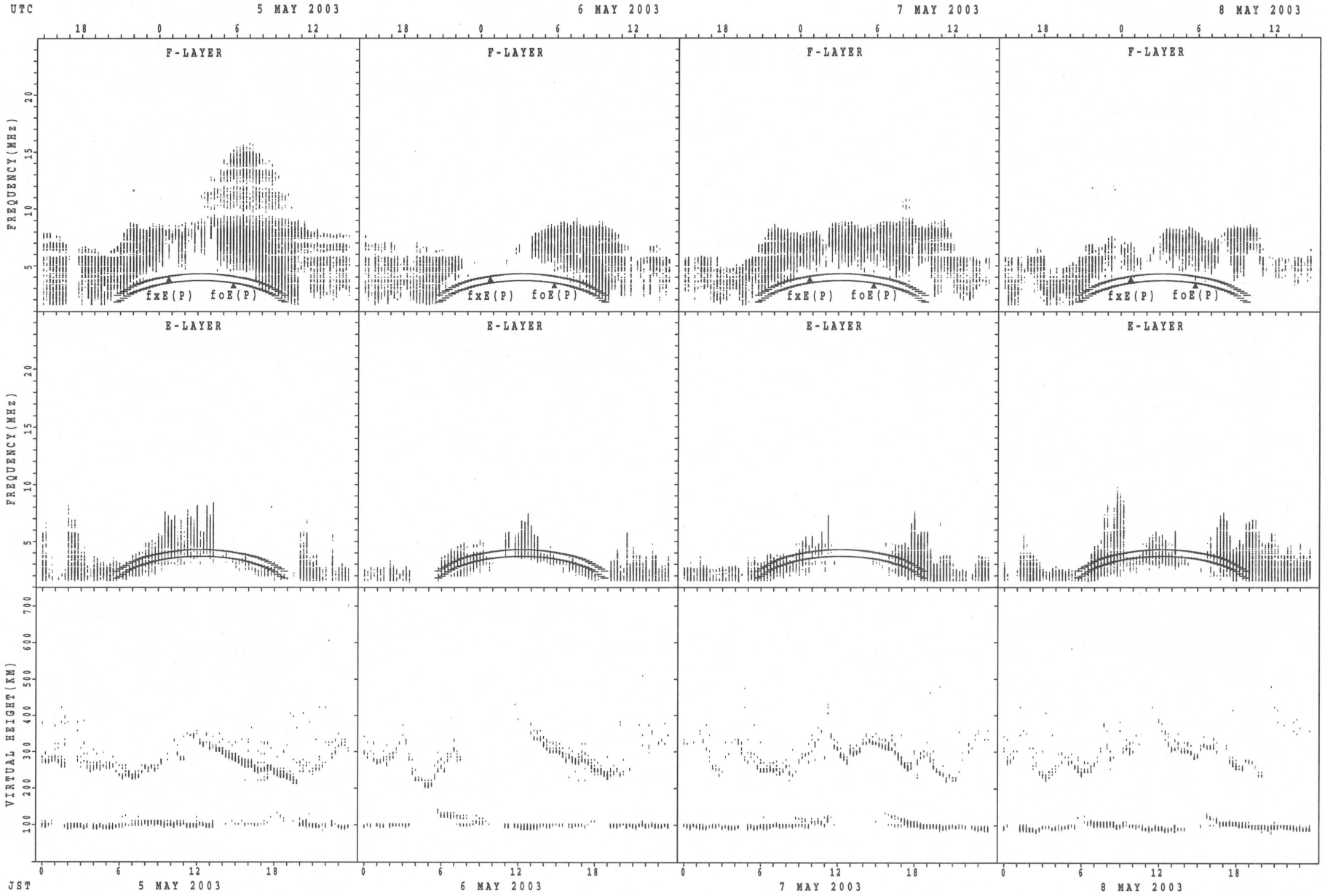
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



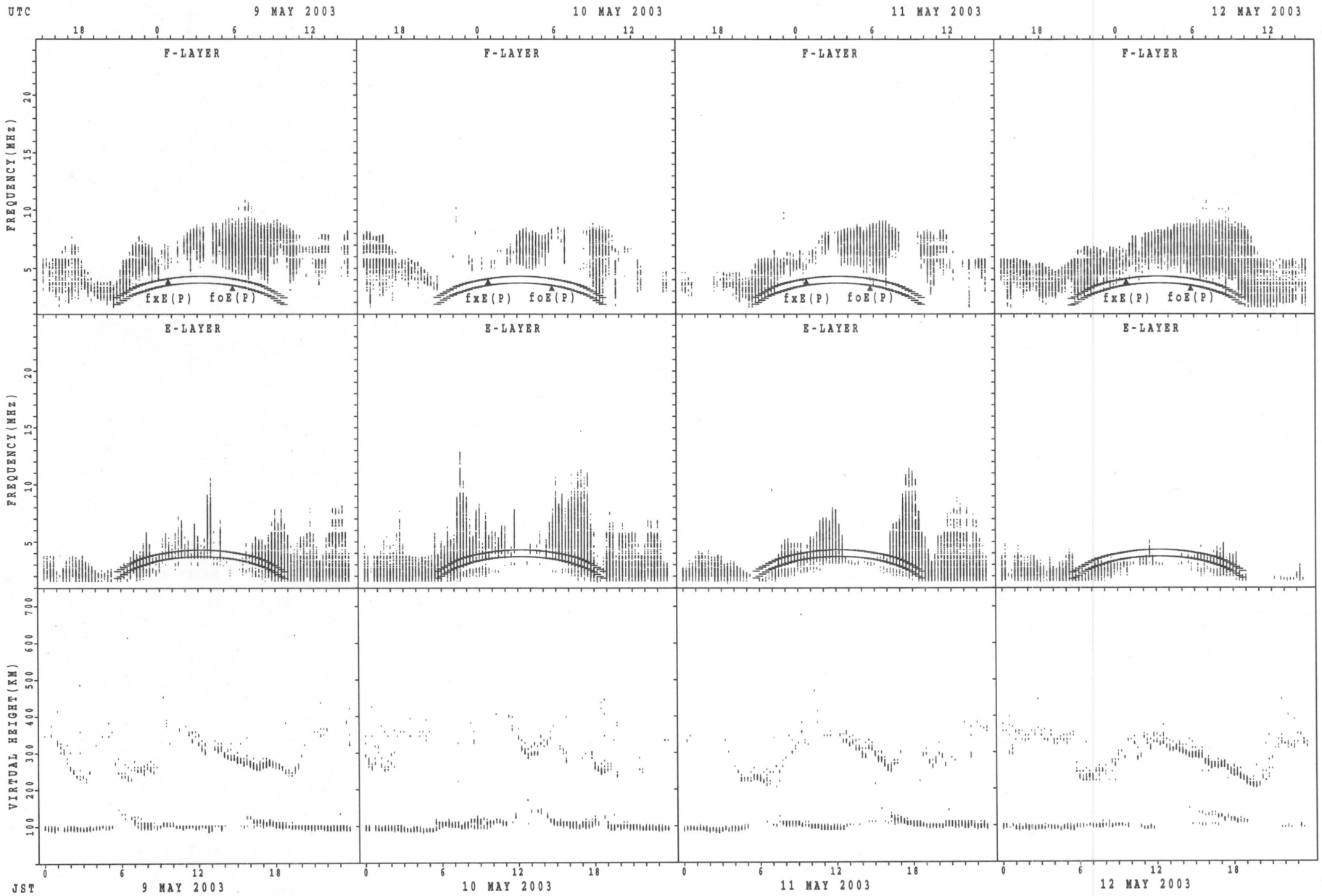
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



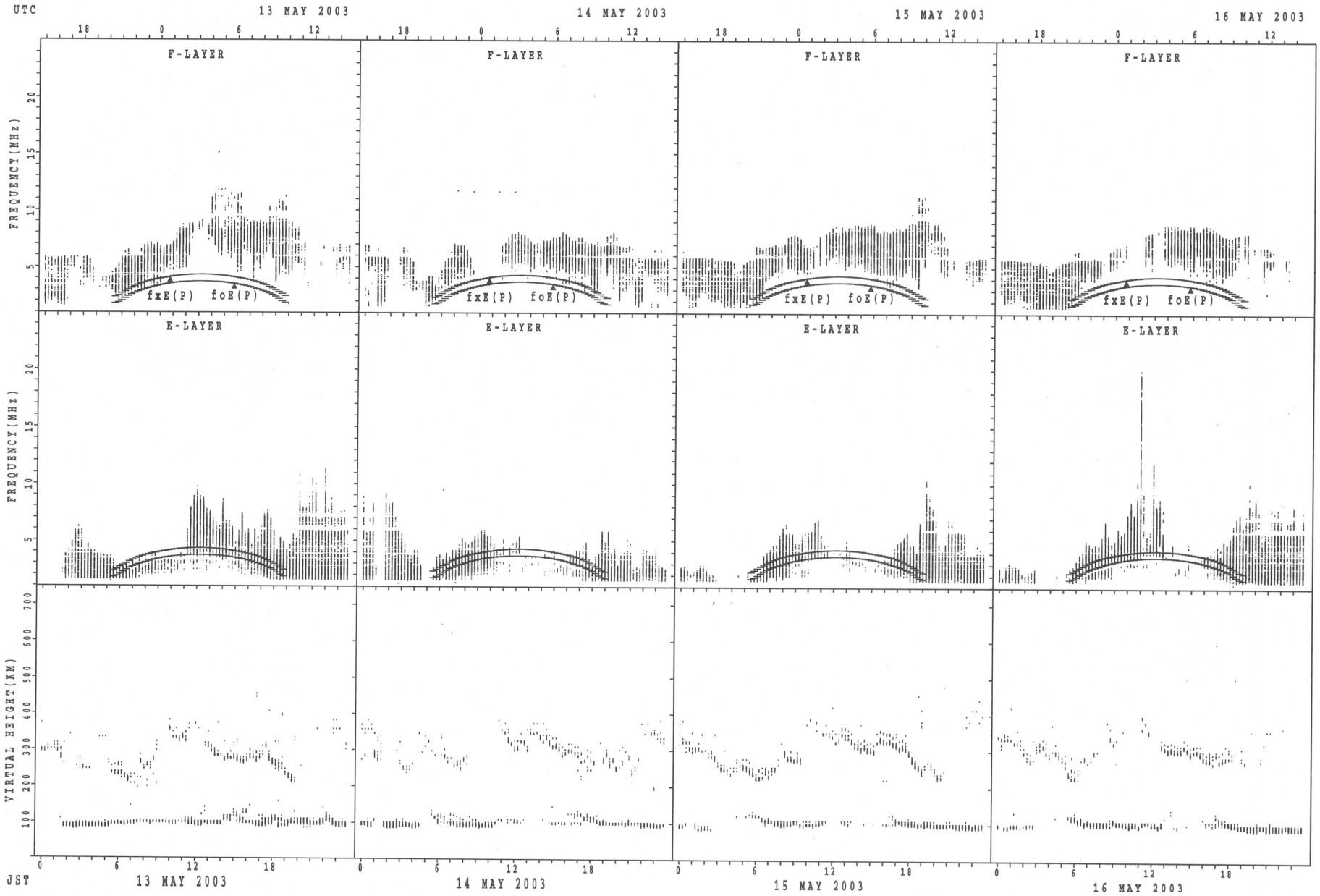
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



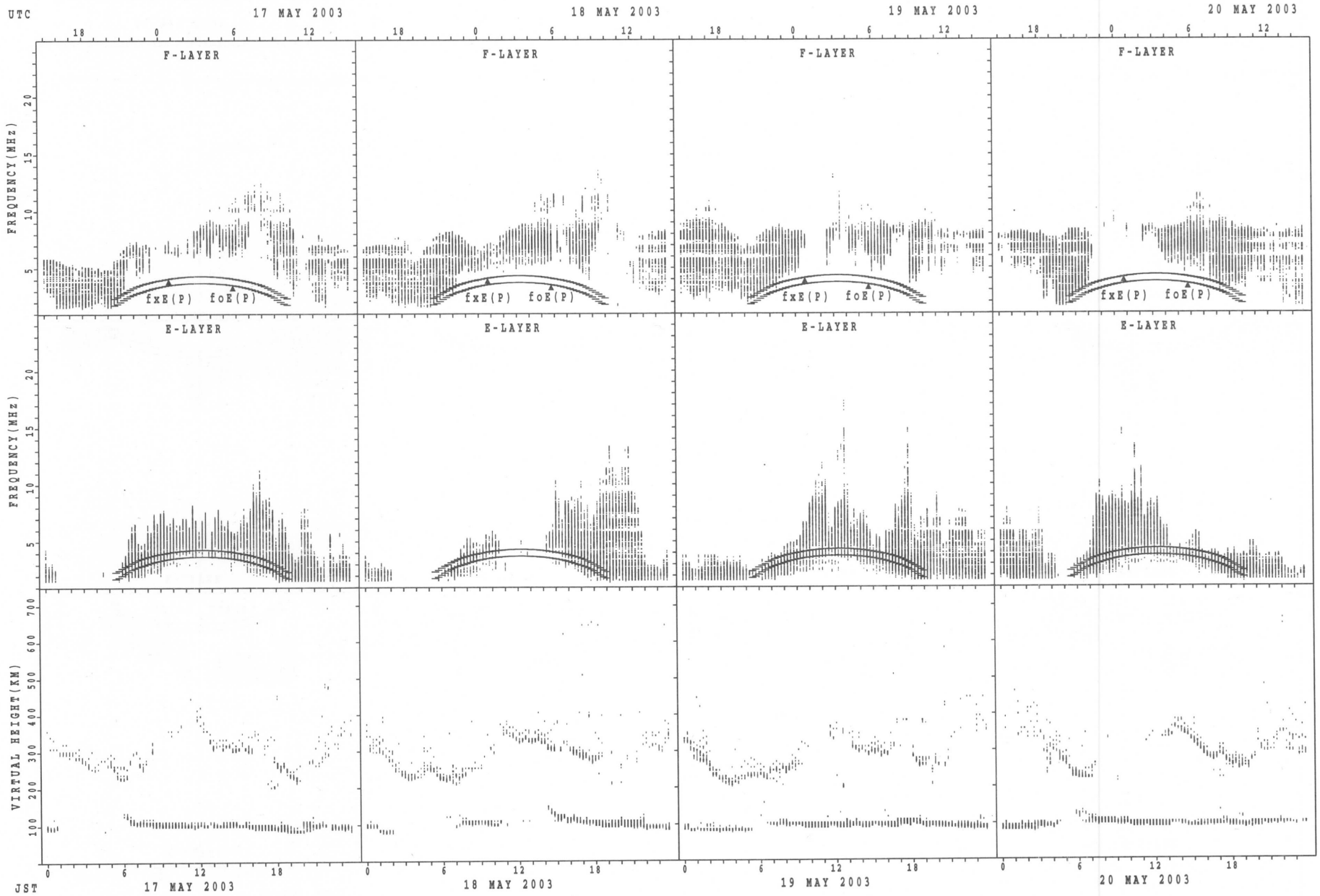
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



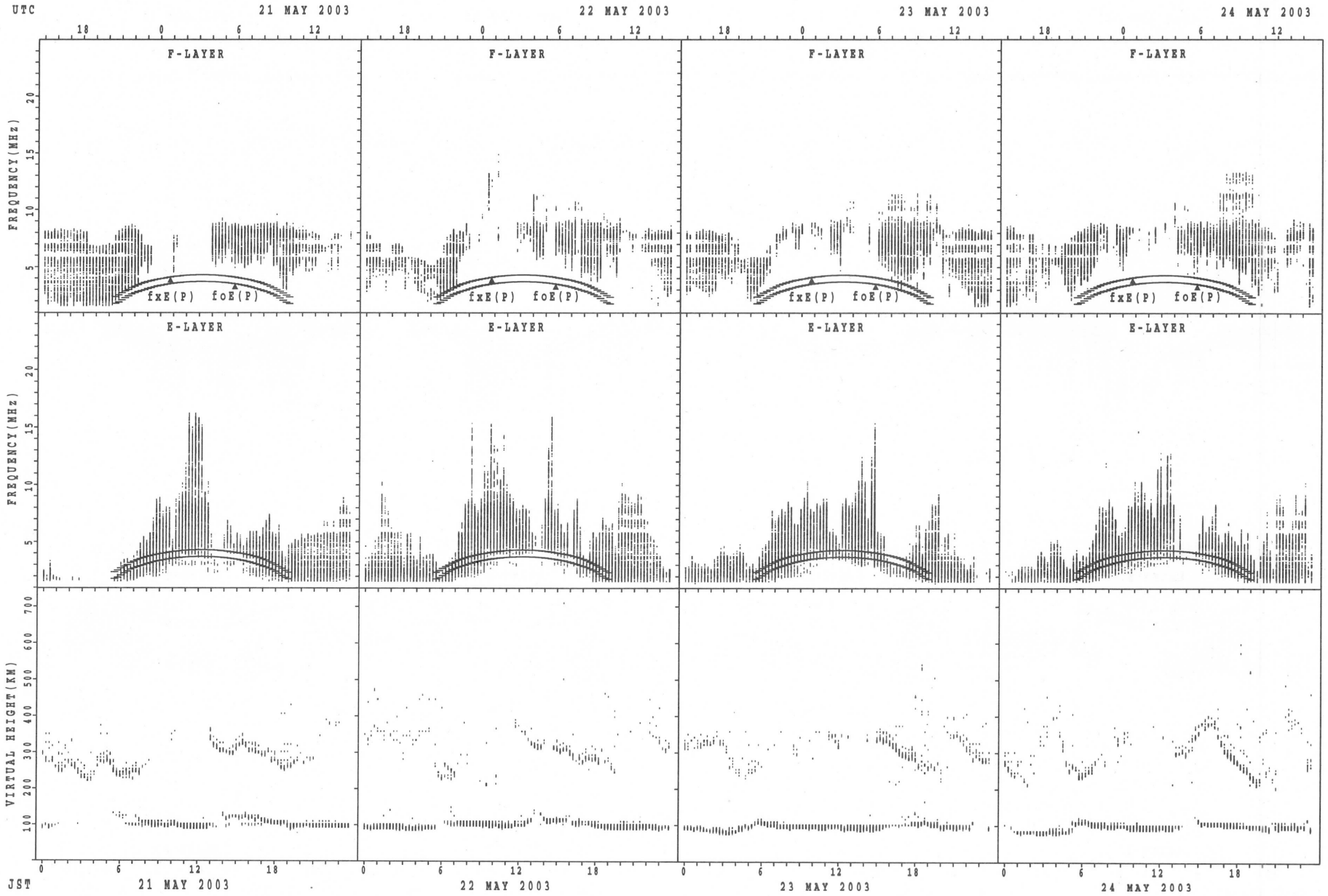
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



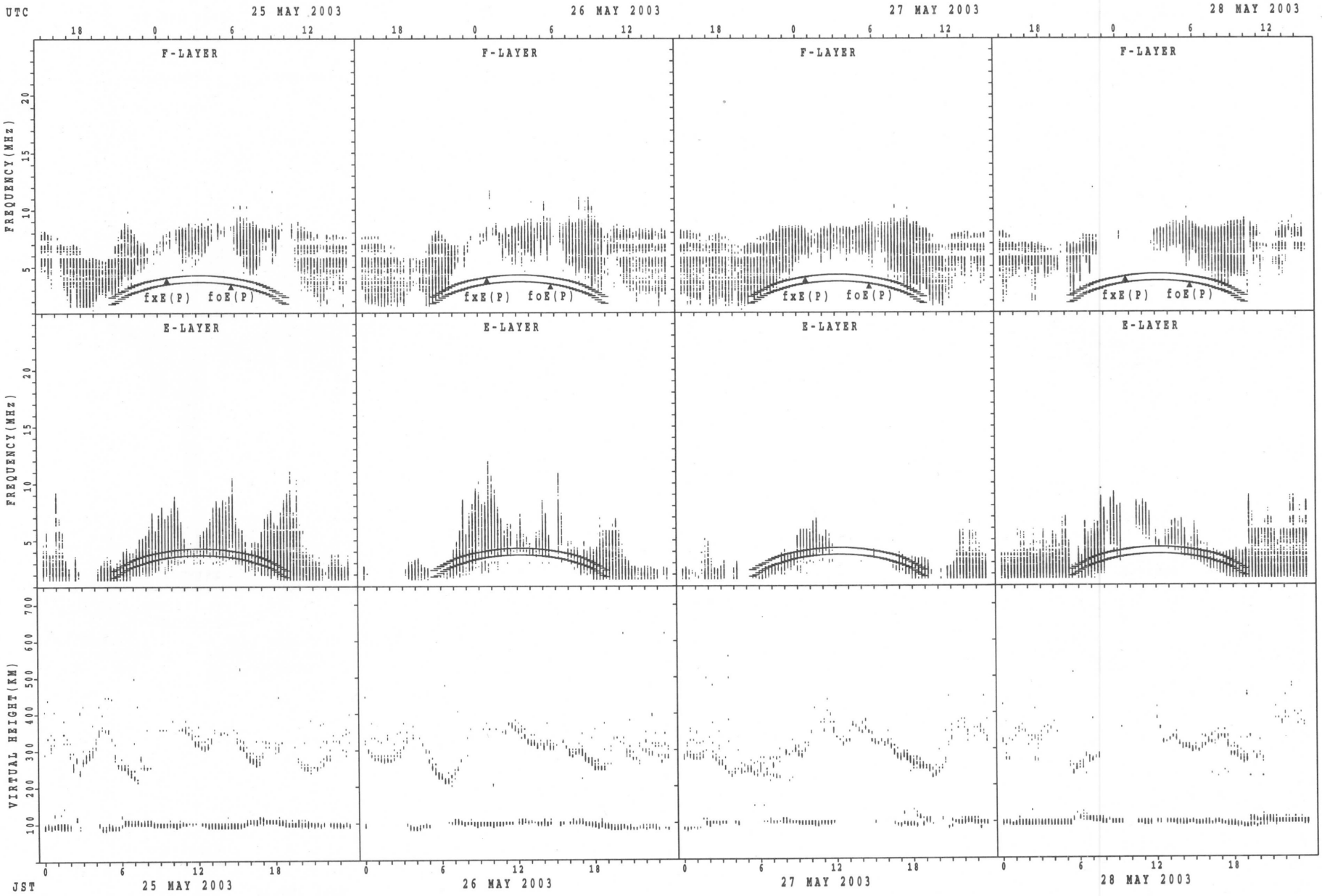
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



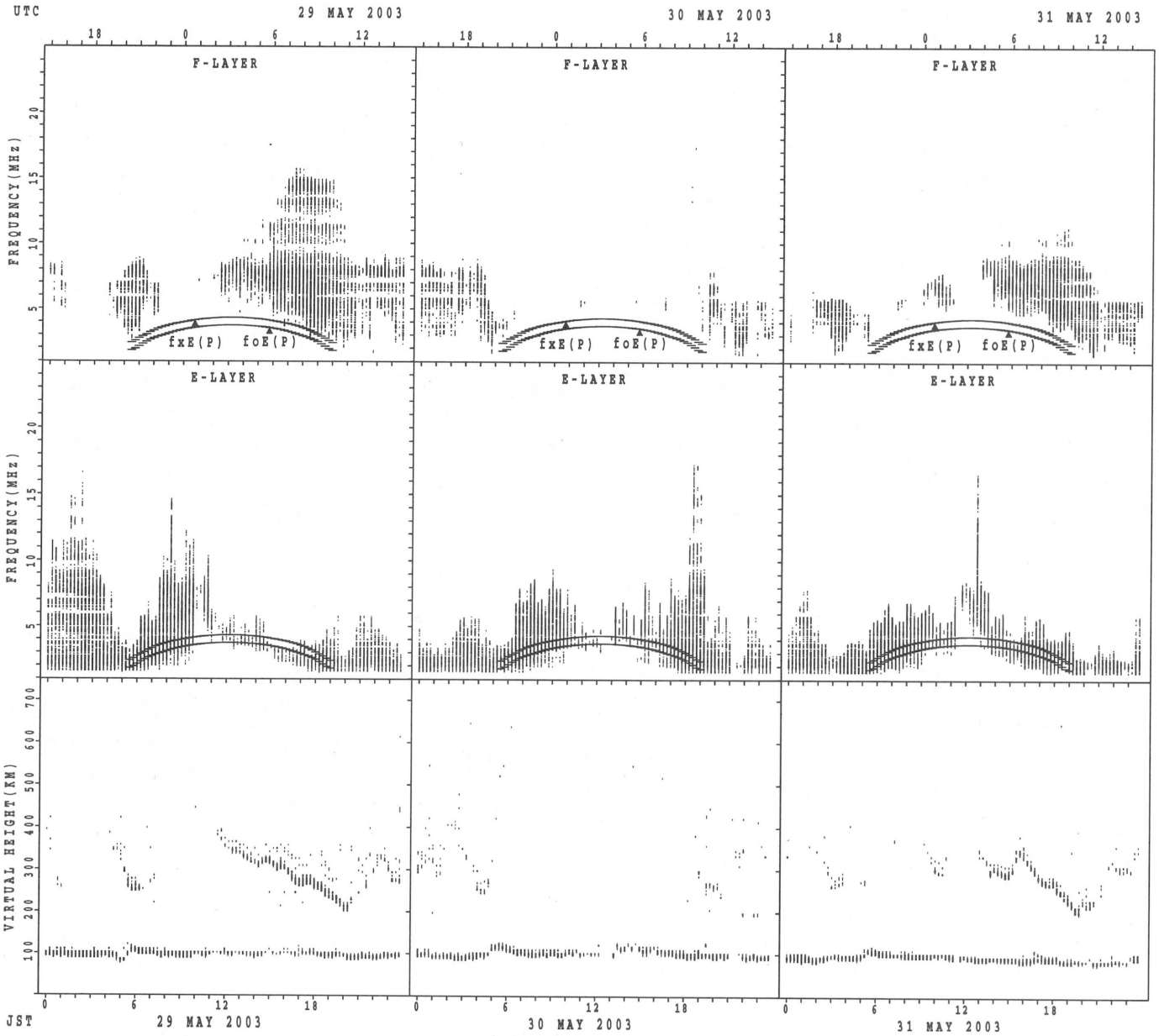
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



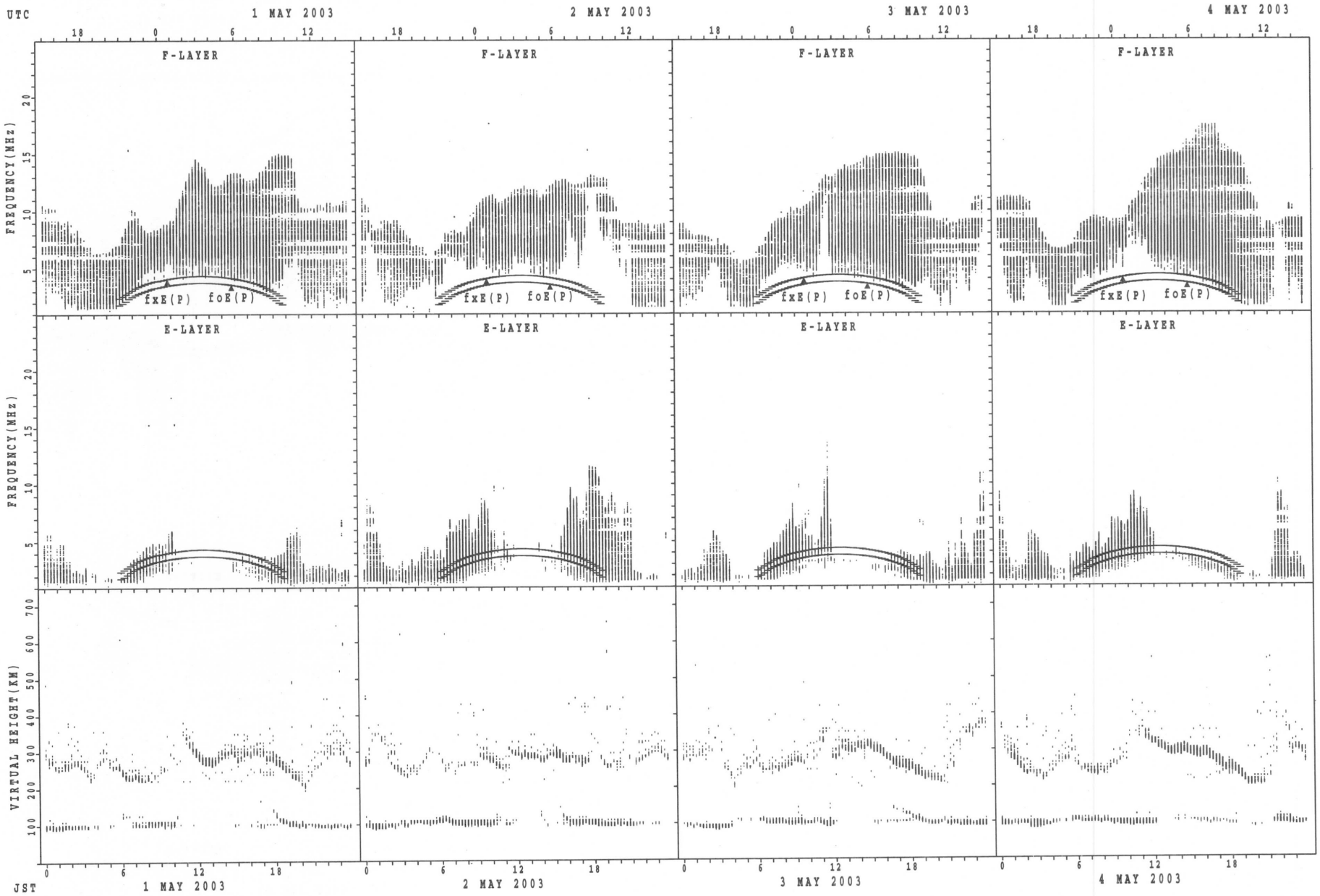
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa

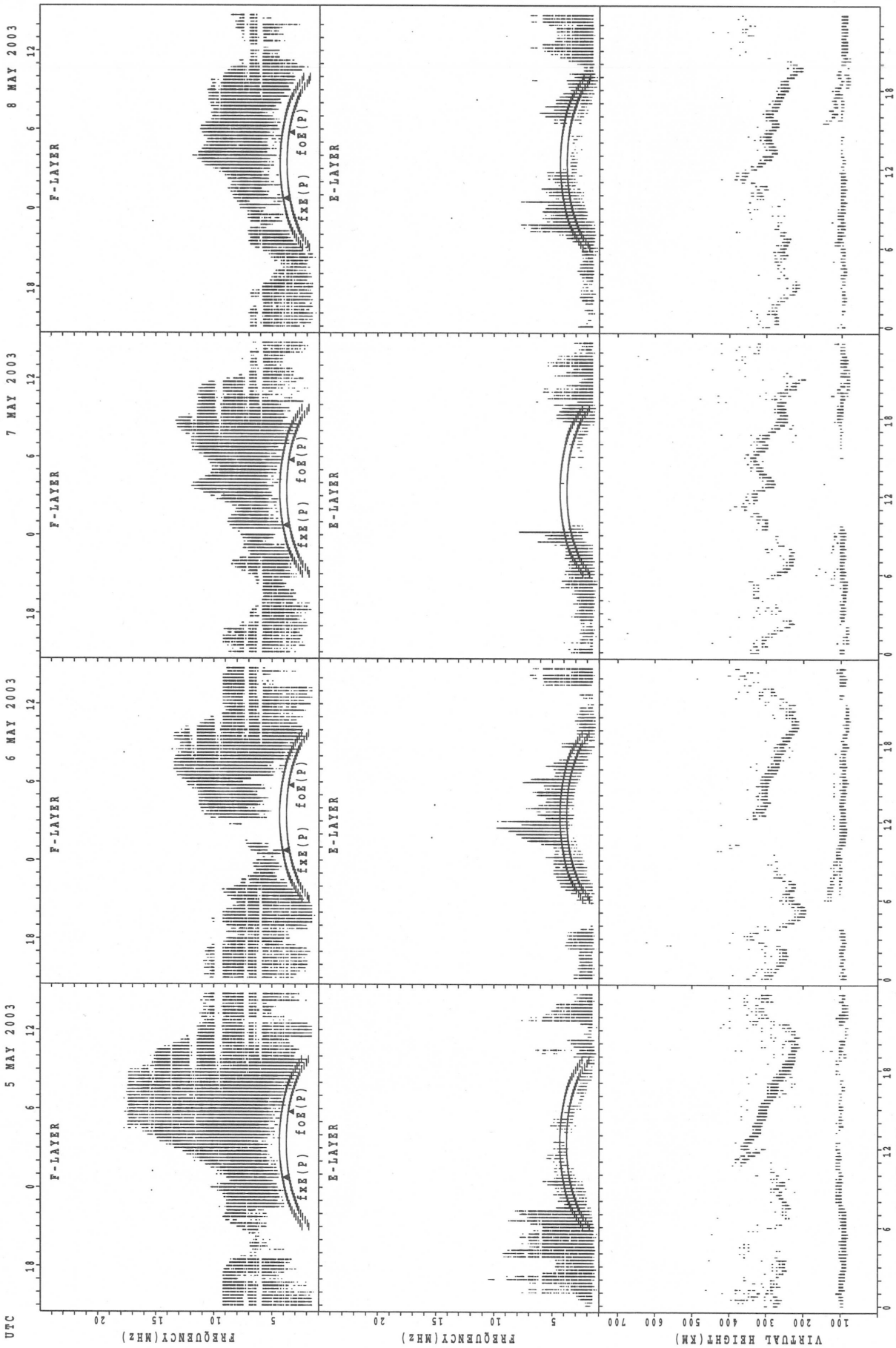


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

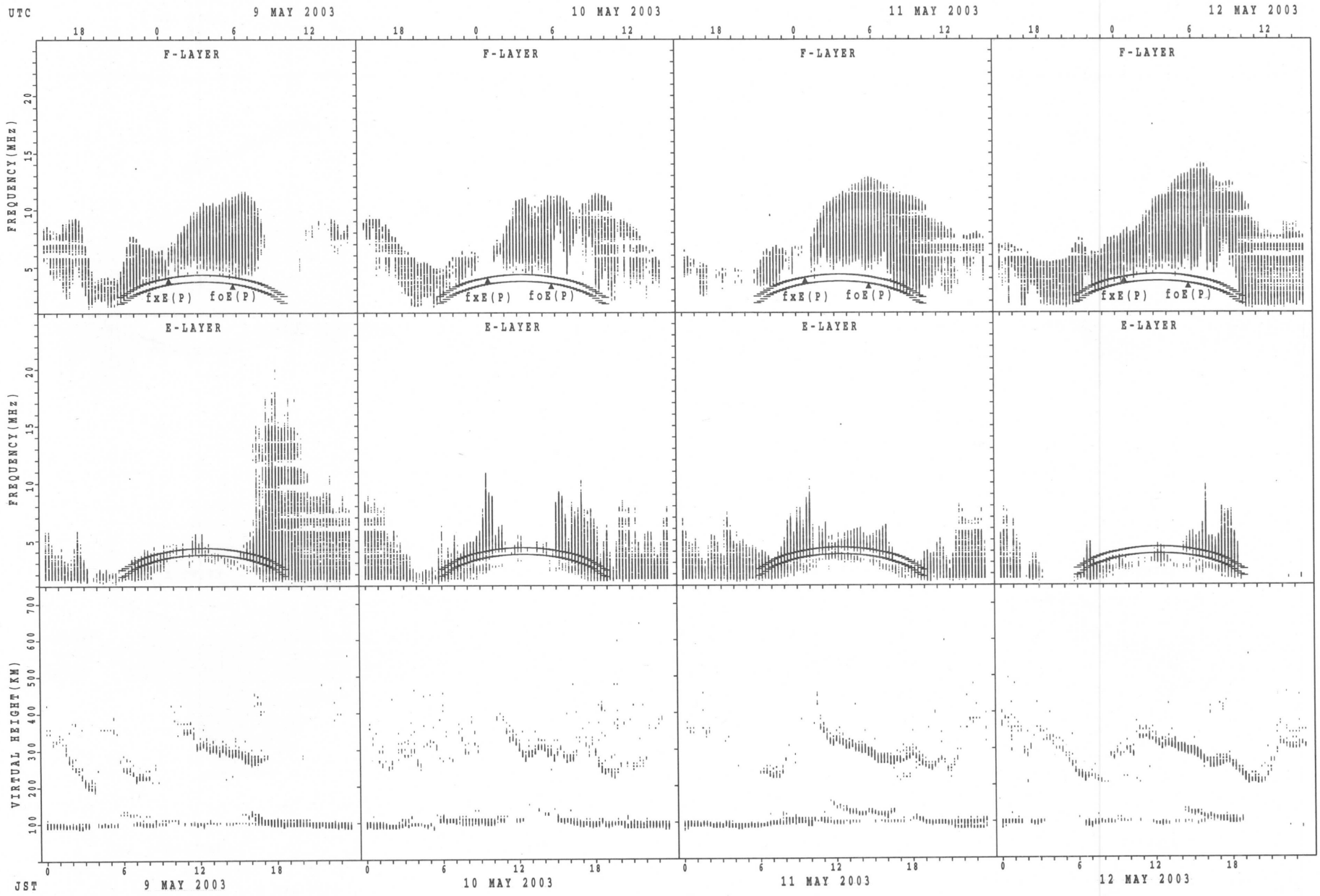
SUMMARY PLOTS AT Okinawa



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

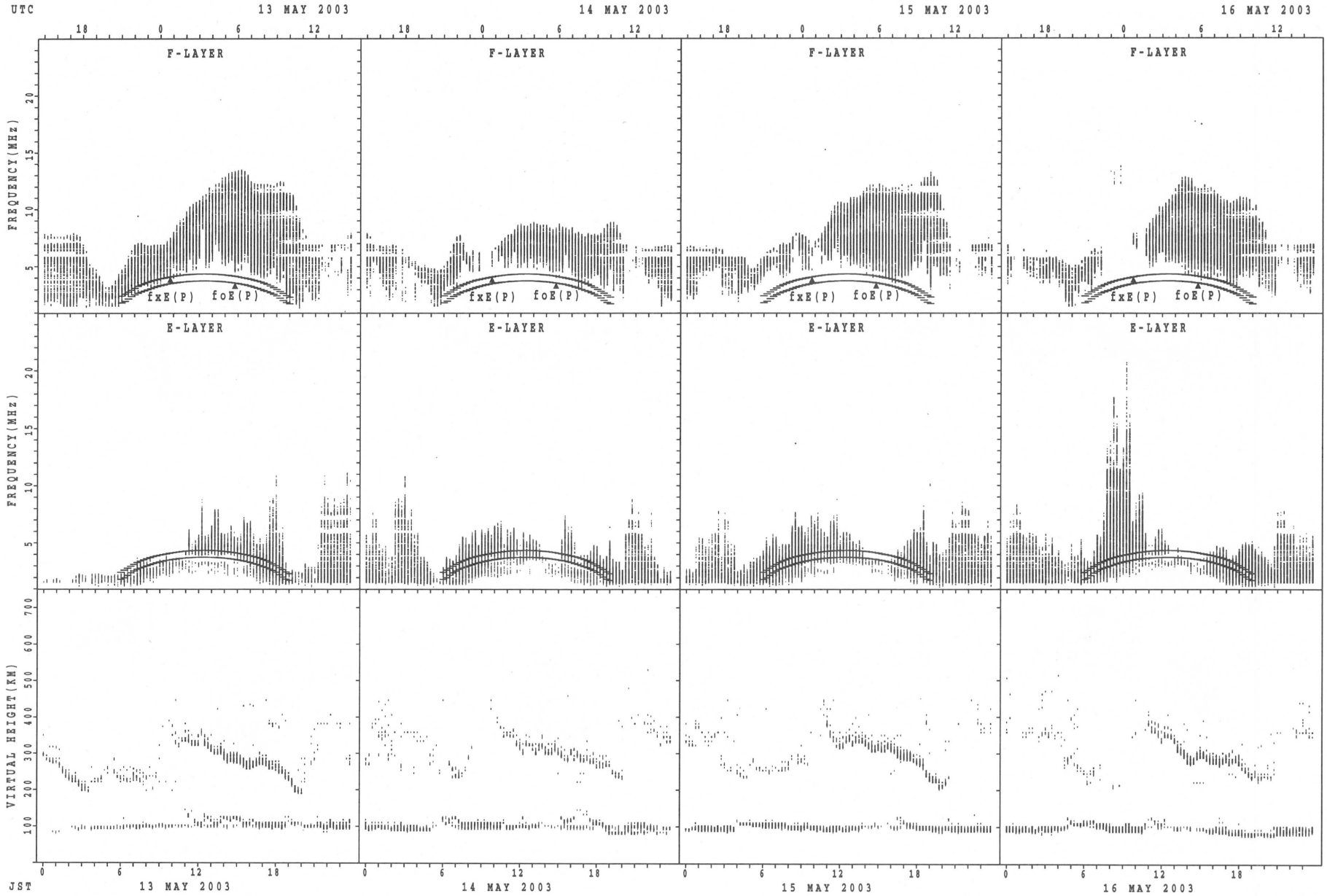

SUMMARY PLOTS AT Okinawa
UTC
JST
5 MAY 2003
6 MAY 2003
7 MAY 2003
8 MAY 2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



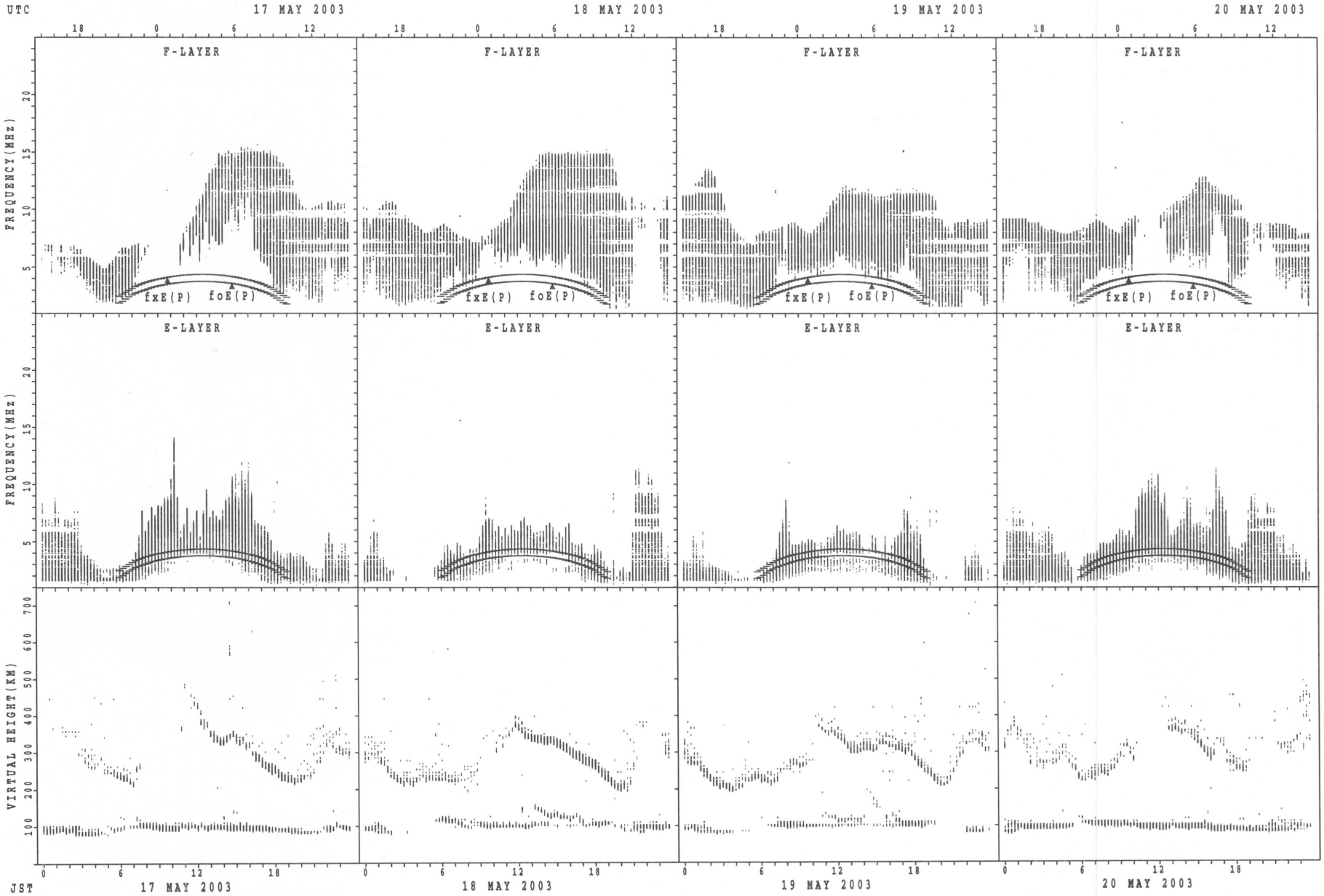
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



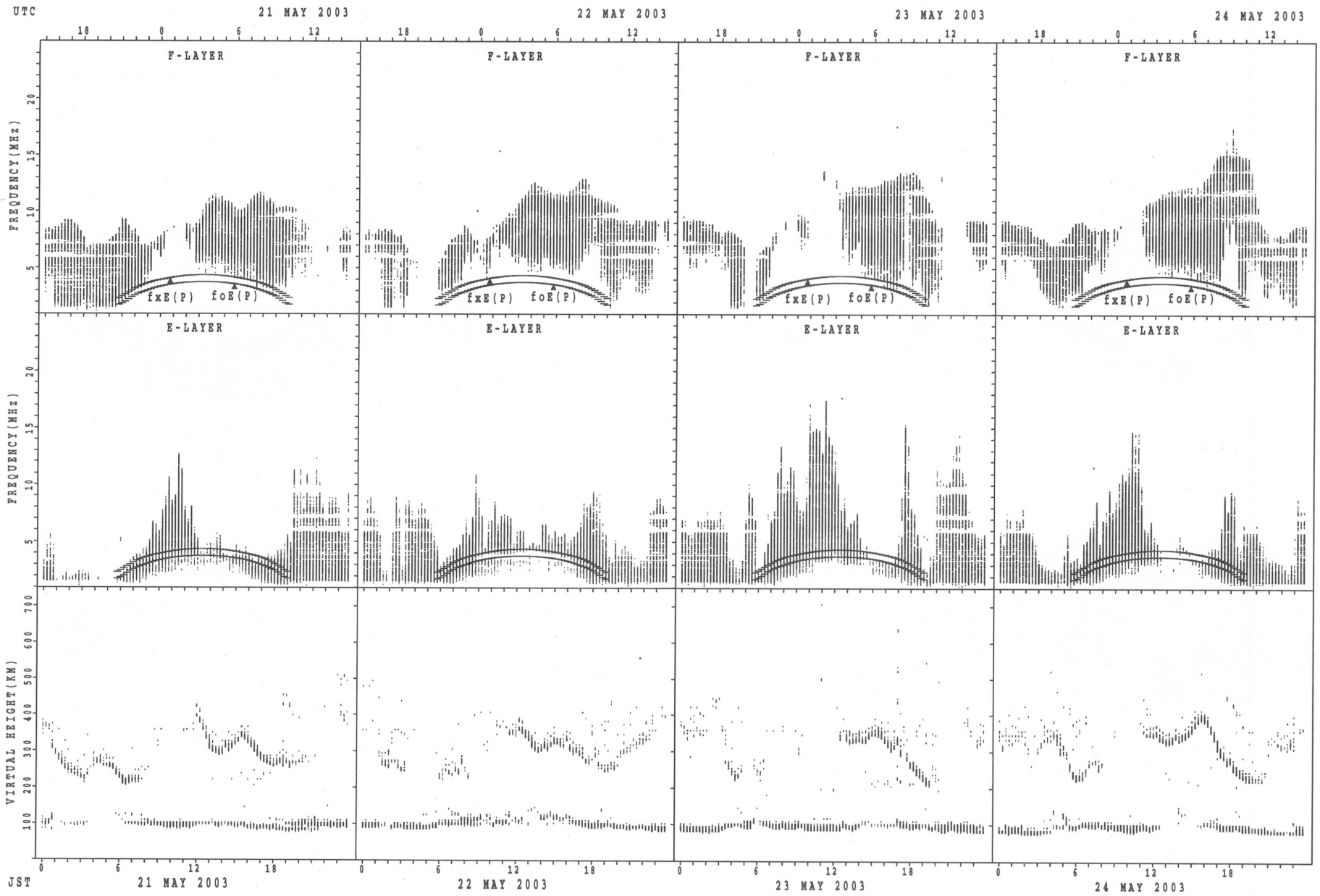
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa

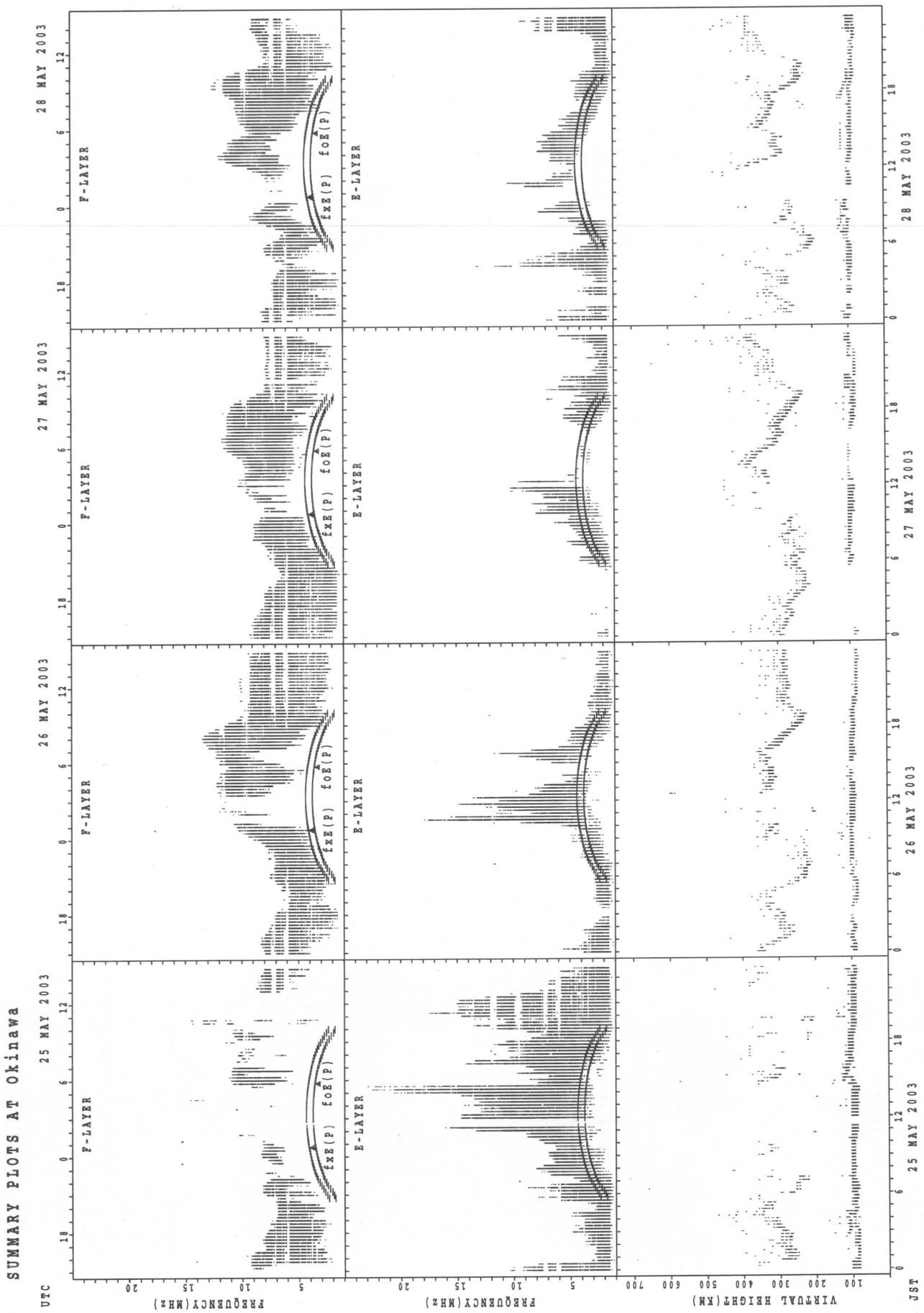


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

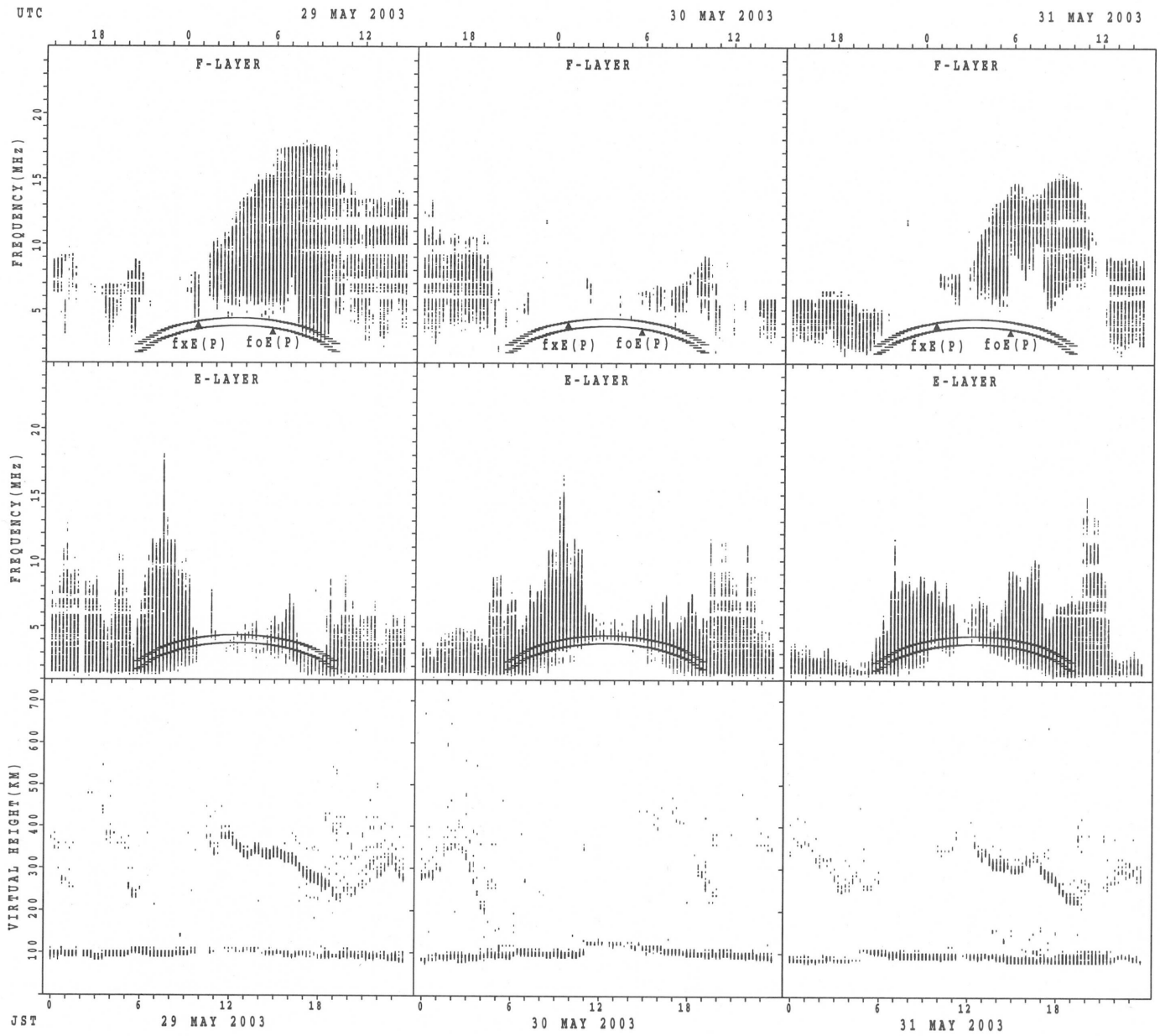
SUMMARY PLOTS AT Okinawa



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


SUMMARY PLOTS AT Okinawa
UTC
JST
25 MAY 2003
26 MAY 2003
27 MAY 2003
28 MAY 2003
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

MONTHLY MEDIANS OF h'F AND h'Es

MAY 2003 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

h'F STATION Wakkanai LAT. 45°23.5'N LON. 141°41.2'E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	1					2	7	8									19	17	18	17	11	8	2	4
MED	312					280	314	306									312	304	290	286	286	290	308	323
U Q	156					282	332	320									320	323	310	292	306	301	322	335
L Q	156					278	260	264									302	284	270	273	282	267	294	316

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	12	9	12	10	17	21	25	29	23	22	16	17	10	9	9	12	18	22	27	27	26	23	15	16
MED	96	99	107	111	113	113	111	109	107	105	103	103	100	103	97	112	112	113	109	105	104	103	103	101
U Q	101	102	113	113	122	117	113	113	109	105	105	105	105	115	113	114	119	117	115	109	107	105	105	103
L Q	95	89	93	109	111	107	107	104	103	101	101	100	95	95	94	105	105	111	105	103	103	99	97	96

h'F STATION Kokubunji LAT. 35°42.4'N LON. 139°29.3'E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	5	4	1	1		3	10	17									23	23	26	25	16	4	6	5
MED	318	322	312	332		262	270	272									288	286	273	262	272	308	340	338
U Q	332	341	156	166		272	284	291									312	292	292	286	286	315	356	395
L Q	313	297	156	166		262	256	247									270	264	248	246	253	291	324	329

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	20	17	15	12	9	13	22	25	26	24	20	17	21	15	8	20	19	26	28	30	26	22	26	28
MED	96	95	97	95	99	119	111	107	103	104	103	103	103	107	105	117	117	111	104	103	105	101	100	97
U Q	99	99	99	100	106	121	113	111	107	108	107	105	107	113	113	136	123	113	110	105	109	105	103	101
L Q	95	94	91	93	95	104	107	104	103	102	100	98	98	101	103	107	105	105	103	99	103	99	97	95

h'F STATION Yamagawa LAT. 31°12.1'N LON. 130°37.1'E

	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	4	6	1	4		10	16	10								19	27	26	23	14	1	3	7
MED	342	312	337	230	271		263	255	261								282	282	263	256	249	306	354	328
U Q	356	334	370	115	339		280	271	268								306	294	286	288	282	153	354	366
L Q	320	286	314	115	251		250	246	246								266	262	258	240	232	153	300	308

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	28	22	26	21	21	21	23	24	29	28	25	27	20	18	13	14	18	25	27	28	28	30	26	30
MED	97	95	94	95	93	97	111	108	105	103	103	103	99	98	99	108	112	111	107	103	103	101	99	97
U Q	97	97	97	99	96	98	121	111	107	106	103	105	104	105	114	115	119	113	113	105	105	103	103	103
L Q	94	89	89	91	90	93	107	104	102	101	99	97	97	95	95	97	101	103	103	98	97	97	97	95

MONTHLY MEDIANS OF h'F AND h'Es

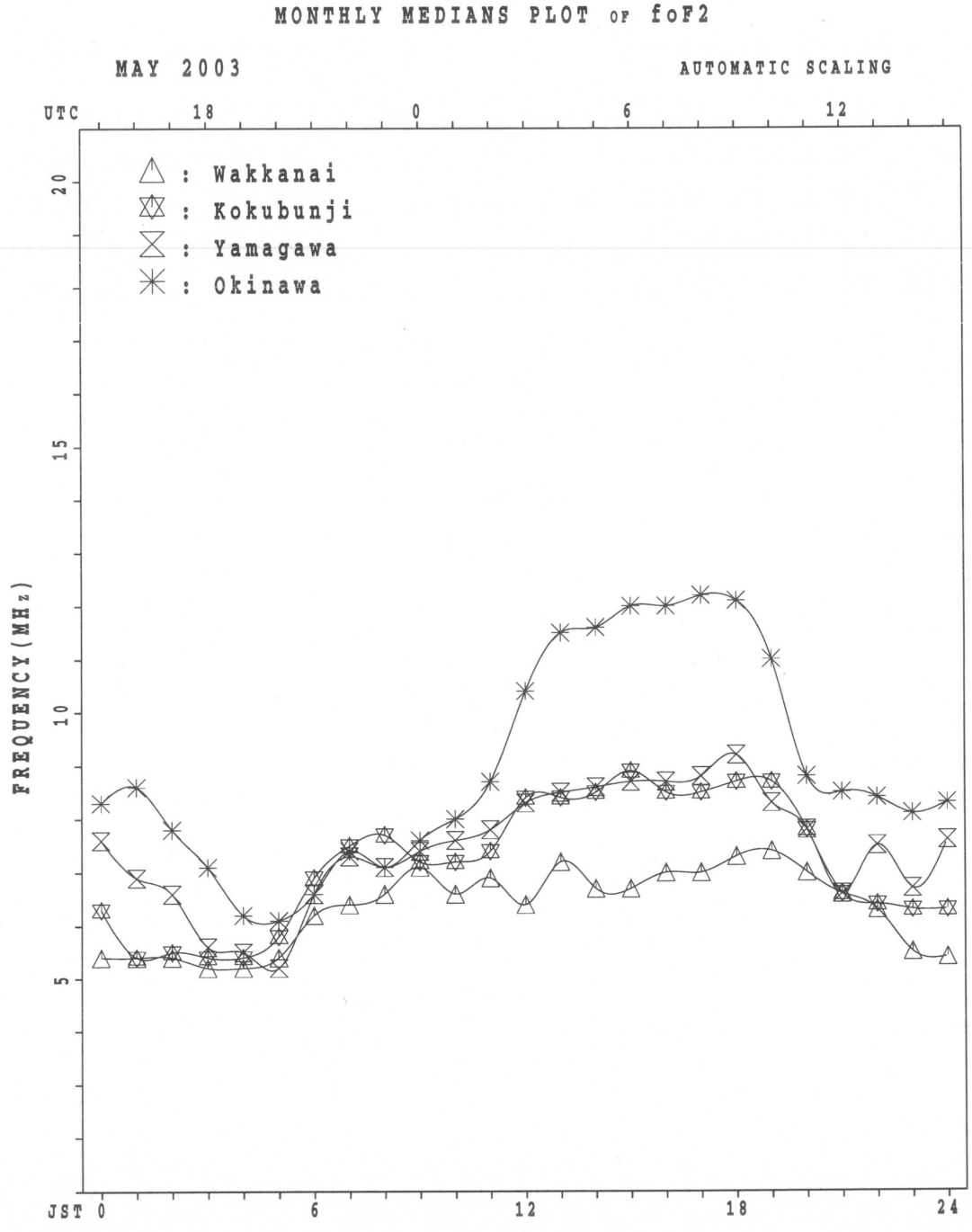
MAY 2003 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

h'F STATION Okinawa LAT. 26°16.9'N LON. 127°48.4'E

	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	17	17	9	4	3	11	21	14								23	29	28	29	22	10	10	11
MED	308	316	278	288	265	348	256	248	257								278	272	255	238	247	302	335	336
U Q	342	344	317	305	289	432	282	265	278								302	286	272	259	272	322	354	352
L Q	302	287	266	238	235	228	234	234	238								264	254	243	227	232	274	322	316

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	28	26	24	27	23	22	27	29	28	29	26	27	22	19	16	17	20	23	27	27	27	24	28	27
MED	99	97	95	97	97	97	107	105	103	103	101	103	103	103	114	113	111	107	103	99	97	99	98	97
U Q	101	103	97	97	101	105	119	113	111	108	105	105	111	117	122	121	118	113	111	103	105	102	102	103
L Q	92	95	89	93	95	95	97	101	103	98	97	95	97	97	99	95	96	95	97	95	91	95	95	95


MONTHLY MEDIANS PLOT OF foF2
MAY 2003
AUTOMATIC SCALING
UTC
18
0
6
12
△ : Wakkanai
✡ : Kokubunji
⧖ : Yamagawa
✳ : Okinawa
FREQUENCY(MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 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 76	X 71	X 69	X 68	X 65															X 113	X 90	X 76	X 76	X 81
2	X 72	X 69	X 71	X 67	X 60															X 97	X 84	X 74	X 74	X 75
3	X 72	X 70	X 69	X 68	X 62															X 106	X 94	X 80	X 73	X 74
4	X 72	X 72	X 69	X 59	X 56															X 104	X 78	81	81	78
5	75	76	X 70	X 68	X 60							A								X 94	X 85	X 79	X 76	X 74
6	X 74	C	X 70	X 64	X 65															X 75	X 69	X 64	X 63	X 62
7	X 62	X 59	X 61	X 60	X 59															X 88	X 83	X 74	X 68	X 67
8	X 69	X 64	X 70	X 64	X 57															X 81	X 58	X 56	X 55	X 55
9	X 53	X 53	X 57	X 44	X 42															X 93	X 77	X 75	X 75	X 67
10	X 71	69	X 54	X 49	X 48															X 78	X 68	X 60	X 53	X 52
11	X 51	X 48	X 48	X 49	X 51															X 76	X 81	X 70	X 68	X 66
12	64	X 61	X 58	X 56	X 56	X 56														X 72	X 63	X 57	X 60	X 59
13	X 58	X 58	X 60	X 56	X 51															X 100	X 78	76	78	X 77
14	X 70	X 69	X 64	X 63	X 59															X 75	X 74	X 69	X 67	X 67
15	X 66	X 63	X 61	X 55	X 56															X 98	X 85	X 66	X 62	X 58
16	X 57	X 57	X 56	X 54	X 50															X 78	X 75	X 68	69	69
17	X 60	X 54	X 53	X 52	X 52															X 93	X 77	X 61	X 63	X 63
18	X 63	X 58	X 60	X 58	X 53															X 103	X 95	X 71	X 70	74
19	74	76	X 75	X 74	X 61	X 66														X 102	X 97	X 86	X 81	X 81
20	X 80	X 74	X 73	X 70	X 67															X 94	X 92	X 92	X 94	X 97
21	X 96	X 96	X 83	X 82	X 71															X 84	X 83	X 82	X 76	O X 71
22	72	76	X 72	X 68	X 64											C				X 88	X 86	X 76	X 79	X 78
23	X 76	X 73	X 70	X 74	X 68															X 106	X 86	X 82	X 80	X 85
24	X 88	X 84	X 79	X 71	X 70															X 117	X 101	X 89	X 87	X 76
25	X 75	X 70	X 72	X 59	X 59															X 93	X 92	X 87	X 81	X 80
26	X 78	X 74	X 71	X 65	X 65															X 93	X 91	X 84	X 84	X 83
27	X 81	X 78	X 73	X 71	X 68															X 92	X 82	X 84	X 86	X 86
28	X 92	X 80	X 79	X 74	X 70															X 97	X 96	X 82	X 89	X 82
29	X 88	X 77	X 65	X 66	X 67															X 126	X 105	X 94	X 88	X 91
30	X 86	X 80	X 67	X 67	X 58															X 72	X 72	X 64	X 57	X 55
31	X 56	X 56	X 54	X 51	X 41															X 98	X 76	X 66	X 67	X 66
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	2														31	31	31	31	31
MED	X 72	X 70	X 69	X 64	X 59	X 61														X 93	X 83	X 76	X 75	X 74
U Q	X 78	X 76	X 72	X 68	X 65															X 102	X 92	X 82	X 81	X 81
L Q	X 63	X 59	X 60	X 56	X 53															X 81	X 76	X 66	X 67	X 66

MAY 2003 fxI (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 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	70	65	63	62	59	68	73	85	84	77	78	94	104	102	99	90	87	98	105	107	84	70	70	75
2	66	63	65	60	54	54	54	58	62	69	69	71	78	77	84	89	88	90	92	91	78	68	68	69
3	66	64	63	62	56	64	80	84	79	90	90	101	110	113	115	110	107	104	107	100	88	74	67	68
4	66	66	63	53	50	62	78	83	80	81	85	93	92	92	101	101	108	110	107	98	72	F	F	F
5	F	F	64	62	54	58	71	81	84	80	78	A	91	103	111	121	120	101	90	87	79	73	70	68
6	68	C	64	58	59	50	51	48	R	A	A	56	58	63	72	76	74	73	74	69	63	58	57	56
7	56	53	55	54	53	56	74	82	71	66	S 60	63	73	65	67	75	70	80	75	82	77	68	62	61
8	63	58	64	58	51	53	54	52	55	56	52	R	56	58	65	60	57	59	68	75	52	50	49	49
9	47	47	51	38	36	44	50	73	76	66	72	82	92	93	100	105	93	88	96	87	71	69	69	60
10	65	F	47	43	42	41	48	R 48	56	55	58	64	A	69	80	82	S 76	82	80	72	62	54	47	46
11	45	42	42	43	45	41	47	46	54	A	58	60	58	A	73	81	78	68	66	70	75	64	62	59
12	F 55	55	52	50	50	50	63	63	68	56	63	65	68	68	75	84	88	86	88	66	57	51	54	52
13	52	52	54	50	45	55	62	65	69	64	73	81	85	100	105	92	76	78	87	94	72	F	F	71
14	64	63	58	57	52	R 49	48	58	53	52	56	59	66	65	67	65	65	68	62	69	68	63	61	61
15	60	57	55	48	50	51	S 54	59	A	A	55	57	59	67	68	67	65	68	83	92	79	60	56	52
16	51	51	50	47	44	45	56	54	60	56	A	60	A	75	75	76	72	69	72	72	68	62	F	F
17	54	48	47	46	46	55	54	56	61	64	56	63	65	80	81	81	74	76	82	87	71	55	57	57
18	57	52	54	52	47	61	Z 69	72	64	62	62	67	74	84	86	84	81	85	91	97	89	65	64	F
19	F	F	69	68	55	60	67	79	83	74	74	78	84	98	99	93	82	74	88	96	91	80	75	75
20	74	68	67	64	61	72	79	75	70	80	76		96	84	82	89	88	90	93	88	86	86	88	91
21	90	90	77	76	65	64	69	75	70	65	70	66	76	80	88	94	86	77	79	78	77	76	70	S 65
22	F	F	66	62	58	60	87	84	86	80	87	79	87	92	96	C	96	82	74	82	80	70	73	72
23	70	67	64	68	62	57	60	75	84	A	89	83	82	92	92	A	94	A	102	100	80	76	74	79
24	81	78	73	65	64	71	87	88	84	86	86	88	91	99	94	87	94	110	115	111	95	83	81	70
25	69	64	66	53	53	61	86	95	79	70	77	85	87	89	86	89	88	84	82	87	86	81	75	74
26	72	67	65	59	59	70	95	74	A	72	76	76	89	96	103	96	85	88	91	87	85	78	78	77
27	75	72	67	65	62	70	70	73	78	75	72	75	80	83	88	92	90	92	88	86	76	78	80	80
28	86	74	72	68	64	71	67	79	A	A	A	A	A	81	94	97	80	76	86	91	90	76	83	76
29	82	71	59	60	61	68	80	69	69	71	75	74	85	102	118	119	124	129	122	120	99	87	82	85
30	80	74	V 61	61	52	38	A	52	58	R 65	R 64	55	A	A	A	A	50	A	55	66	66	58	50	49
31	50	50	48	45	34	41	48	58	58	A	70	A	73	80	84	75	79	92	93	92	70	60	61	60
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	26	31	31	31	31	30	31	27	25	28	26	27	29	30	28	31	29	31	31	31	29	28	28
MED	66	64	63	58	53	57	67	73	70	69	72	72	82	84	87	89	85	84	88	87	77	69	68	68
U Q	73	68	66	62	59	64	78	81	80	78	78	82	91	97	99	95	93	92	93	96	86	77	75	75
L Q	56	52	54	50	47	50	54	58	60	63	61	63	68	72	75	78	74	75	75	75	70	60	59	58

MAY 2003 foF2 (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 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								A	L	L	576	L	L 552	L	L		L	L						
2						L	A	A	A	L 500	L 492	L 540	L 544	L 544	L 512	L	A	A						
3								A	A	L	L	L 556	A	L	L 504	A			A					
4								A	A	A	L	A	A	L 532	L 500	A	A	A						
5							L	L	L	L	L		A	A	L 484	L 500	L							
6						E C	A	L 420	U L 420		A	A	A	A	U L 480	L 476	L 464	L 436	A					
7							L	L	L	L 500	U L 496	U L 472	L 492	L 472	L 488	L 460	A	L						
8							A	E C	L 432	A	U L 456	U L 444	472	464	452	448	L 444	L 440	A					
9								L	L	A	A	L 492	L 504	L 488	L 468	L	A	A						
10						L 332	A	U L 432	U L 436	U L 432	A	492	A	480	L 468	A	L	A						
11							L	396	444	A	460	U L 484	A	A	464	A	L 412	L						
12								L 440	L	L 480	L 468	492	L 484	L 484	468	L 472	L 432	L						
13								L	A	L 464	L 532	A	A	476	472	L 460	L 452	A						
14						U L 460	L 396	A	A	460	468	A	A	L 468	468	456	A	A						
15							A	A	A	A	A	484	L 492	476	480	L 472	L 452	L 436						
16							L	A	A	A	A	A	A	A	A	464	L 448	A	A					
17							L	A	A	A	A	A	488	U L 488	484	476	444	L 408						
18							L	L	A	L 504	L 536	L 508	L 512	484	A	A	A	A						
19								L	A	A	L 548	L 544	L 516	L 504	496	L	L							
20							L	L	A	A	L 564		L 520	A	L 540	A	L	L						
21						A	A	A	A	L 552	L 524	A	A	L 516	L 504	L 500	A	A						
22						L 400	L	A	A	L 584	L 576	L 540	A	L 524	L 512	C	A	A						
23								A	A	A	A	L 564	L	L 520	L 520	A	L	A	A					
24								A	A	A	A	A	A	L 536	A	A	L 512	A						
25						L	L	L	A	A	A	L 520	L 552	L 548	L 516	L 520	L	A	L					
26							L	A	A	L	L 540	A	U L 536	A	L 496	L	A	L						
27								L 456	L	L 512	L 496	L 524	E B	E B	L 500	L 500	L	A	A					
28							L	A	A	A	A	A	A	L 532	L 512	L 476	L	A	A					
29						U L 332	L	A	L 492	L 504	U L 552	L 524	L 512	L 528	A	A	A		A					
30							A	A	A	U L 456	U L 460	460	A	A	A	A	A	A	L 364					
31						A	A	A	A	A	A	A	A	480	L 508	L 484	L 476	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	1	5	5	12	17	17	14	22	25	15	10	3	1					
MED						L 366	L 396	L 432	L 436	L 500	L 524	L 508	L 512	L 488	L 496	L 472	L 446	L 436	L 364					
U Q						L 430		L 448	468	L 508	L 550	L 540	L 536	L 528	L 510	L 500	L 452	L 440						
L Q						L 332		408	L 426	L 462	L 468	U L 484	492	480	470	460	L 436	L 408						

MAY 2003 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 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	236	A	A	A	B	B	R	R	B	R	R	260	U A 176					
2						B	U A 236	A	A	A	A	A	B	B	B	U A 340	B	U A 236	U A 184					
3						B	A	A	A	A	A	A	A	B	R	U A 344	A	264	U A 172					
4						B	244	A	A	A	A	A	A	B	B	B	U A 312	A	B					
5						B	U A 232	A	A	A	A		A	A	A	B	B	U A 280	U A 216					
6						E C	U A 236	U A 300	A	A	A	A	R	B	B	A	A	256	B					
7						B	A	A	A	A	A	A	A	A	U R 356	R	A	R	B					
8						B	228	E C	A	A	A	U R 372	A	A	A	R	U R 304	A	B					
9						B	244	A	A	A	A	B	B	B	B	U A 336	U A 296	A	B					
10						B	220	A	A	B	A	B	U A 384	B	B	A	A	E C	B					
11						B	B	R	A	A	A	A	A	A	A	A	R	U R 260	B					
12							U R 244	A	A	A	A	U R 376	R	R	R	R	U R 296	252	B					
13						B	A	A	E C	U R 356	U A 364	A	A	U R 360	U R 348	U A 328	300	U A 256	U A 184					
14						B	236	B	A	A	R	A	B	B	R	U R 332	A	U A 248	B					
15						B	U A 232	A	A	A	A	A	A	R	B	R	R	252	A					
16						U A 180	B	A	A	A	A	A	A	A	A	A	R	A	A					
17						U A 192	U A 252	A	A	A	A	A	A	A	A	A	R	A	A					
18						U A 156	B	A	A	A	A	A	A	B	372	A	U A 304	U A 260	B					
19							U R 252	A	A	A	A	A	A	R	R	U A 352	A	A	A					
20						180	A	A	A	A	A		A	A	A	A	U A 328	A	U R 244					
21						U A 196	U A 260	A	A	A	A	A	A	B	B	344	A	A	U A 200					
22						184	R	A	A	A	A	A	A	A	U A 352	C	B	B	U A 196					
23						188	U A 268	A	A	A	A	A	A	A	A	A	U A 316	U A 260	B					
24						184	268	A	A	A	A	A	A	A	A	A	A	A	A					
25						E C	E C	A	A	A	A	A	A	A	A	R	R	U A 272	U A 192					
26						U R 180	A	A	A	A	A	A	A	A	A	B	A	A	A					
27						A	A	A	A	A	A	A	B	B	U A 356	B	B	U A 288	U A 216					
28						A	U A 252	A	A	B	B	B	B	B	B	B	A	A	A					
29						U A 208	A	A	A	A	B	B	A	A	A	A	A	A	A					
30						A	U A 256	A	A	U A 336	B	B	A	B	A	A	A	A	A					
31						U A 196	A	A	A	A	A	A	B	B	A	A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						11	18	1		2	1	2	1	1	5	7	8	14	10					
MED						U A 184	U 244	U A 300		U 346	U A 364	U R 374	U A 384	U R 360	U 356	U A 340	U A 304	U A 260	U A 194					
U Q						U A 196	U A 252								364	U A 344	U A 314	U A 264	U A 216					
L Q						U A 180	236								U 350	U 332	U 298	252	U A 184					

MAY 2003 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 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 16	21	20	E B 15	E B 14	E B 16	30	J A 51	38	49	E B 41	E B 44	G	G	E B 45	G	G 26	33	28	J A 39	J A E B 60	16	J A 20	J A 27
2	E B E B 16	E B 15	E B 15	22	J A 17	19	J A 36	J A J A 46	J A 57	42	41	40	E B 44	J A E B 47	38	42	54	J A 68	J A J A 46	J A J A 37	J A J A 85	J A J A 52	J A J A 67	J A J A 41
3	J A J A 26	J A 22	J A J A 28	J A J A 38	J A J A 32	J A J A 30	J A 54	J A J A 58	J A J A 57	J A J A 44	J A J A 54	J A J A 50	J A E B 57	43	G 27	50	J A J A 48	J A J A 52	J A J A 108	J A J A 98	J A J A 100	J A J A 87	32	J A 41
4	J A 18	20	E B 15	19	18	23	J A 43	J A J A 69	J A J A 67	J A J A 96	J A J A 86	J A J A 145	J A J A 141	J A E B 54	40	46	J A J A 56	J A 48	J A J A 53	J A J A 38	J A J A 33	62	J A J A 92	J A J A 45
5	J A E B 41	16	E B E B 16	E B E B 14	E B E B 15	E B E B 17	28	35	J A 39	J A J A 45	J A J A 68	J A J A 125	J A J A 64	60	40	41	35	31	J A J A 35	J A J A 45	J A J A 33	J A J A 43	J A J A 45	45
6	J A 34	C	J A J A 33	J A J A 25	J A E C 19	28	31	34	40	44	J A 59	51	39	E B E B 43	E B 42	42	J A J A 42	J A 52	J A J A 48	J A J A 35	J A J A 47	J A J A 36	J A 21	J A 24
7	J A 21	22	J A J A 20	J A J A 19	J A 20	25	28	34	40	46	45	43	43	44	G 28	G 26	J A 55	G	J A E B 46	J A J A 14	J A J A 16	53	J A J A 44	33
8	J A J A 27	32	J A E B 21	15	20	22	J A 56	J A J A 42	38	J A 52	41	G 31	39	38	J A 37	G 26	37	J A 40	58	J A J A 77	54	19	E B J A 16	17
9	E B 14	24	J A E B 17	J A E B 14	J A E B 26	20	35	34	38	J A J A 50	J A E B 65	39	E B E B 40	E B 42	E B 38	40	J A J A 63	J A 65	J A J A 72	J A J A 32	J A J A 51	J A J A 47	J A J A 23	34
10	J A J A 43	31	J A J A 44	A E C 24	30	22	J A 37	38	40	38	J A E B 65	41	J A E B 74	44	B E B 36	J A 82	J A J A 126	J A 61	J A J A 58	J A J A 36	J A J A 17	30	32	J A J A 40
11	J A J A 32	32	J A J A 30	A E B 19	15	18	28	G 23	J A J A 43	57	37	42	J A J A 70	90	J A J A 42	48	G	31	J A J A 44	J A J A 104	J A J A 66	77	J A J A 54	40
12	E B J A 16	39	J A J A 33	J A J A 20	J A E B 20	16	G	J A J A 35	37	40	39	44	G 26	G 33	G 28	G 27	G 24	31	J A J A 33	J A J A 26	J A J A 28	J A 28	J A 28	J A 51
13	J A J A 39	A J A 46	J A 32	J A E C 34	J A 22	28	28	J A J A 37	46	G	44	J A J A 89	J A 64	46	42	J A 43	G J A 27	48	J A J A 45	A J A J A 54	141	J A J A 100	J A J A 49	J A J A 47
14	J A J A 53	19	J A J A 20	A J A 27	J A J A 42	52	35	J A 46	J A J A 58	J A 43	G 26	J A 67	J A J A 50	A E B 41	G 32	G 26	J A J A 43	45	J A J A 48	J A J A 36	J A J A 37	71	J A 48	J A J A 46
15	J A J A 36	32	J A J A 27	A J A 22	J A 28	40	A J A 56	J A 71	J A J A 74	J A 72	J A J A 56	44	45	G 28	E B 37	G 24	G 26	30	J A 52	J A J A 47	J A 68	40	E C 30	J A 17
16	E B J A 14	32	J A 22	19	E B 14	22	34	J A J A 44	J A 51	J A 48	J A 60	J A 50	J A J A 89	J A 76	J A 57	41	G J A 26	50	J A J A 57	J A J A 40	J A 98	J A 64	J A 34	J A 65
17	J A 51	19	E B E B 16	E B 15	E B 15	25	32	J A J A 57	J A 54	J A J A 66	J A J A 55	J A 55	J A 46	J A 45	38	J A 42	G 28	34	J A 35	J A J A 55	J A 32	22	J A 40	J A 29
18	E B 16	20	E B E B 15	E B 14	E B 15	19	E B 30	J A 39	47	38	41	47	J A J A 52	J A 48	J A 55	J A 59	J A J A 51	46	50	J A J A 60	J A J A 100	J A 75	J A 39	J A 38
19	J A J A 34	A J A 26	J A 16	18	J A J A 21	24	G 20	J A J A 42	J A 49	J A 49	J A 55	J A 65	J A 42	G 35	G 33	42	J A J A 100	J A 102	J A 51	J A J A 53	J A 62	78	E B 54	15
20	E B E B 16	E B 15	E B E B 16	E B 15	E B 13	21	31	J A 42	J A J A 64	A 61	44		J A J A 52	56	43	J A 61	J A J A 52	A 42	G	J A J A 31	J A J A 34	J A 23	J A 64	J A J A 23
21	22	20	J A J A 34	A J A 22	J A 33	J A 42	A J A 53	J A J A 73	J A J A 68	J A 48	J A 48	J A 75	J A E B 110	44	43	42	J A J A 48	J A 42	J A J A 56	J A J A 55	J A J A 90	J A 56	J A 43	J A 89
22	J A J A 50	A E B 50	J A 16	20	22	21	G 23	J A J A 50	J A J A 64	J A 60	J A 69	J A 60	J A J A 64	A 54	48	C	J A 56	62	J A 45	J A J A 64	J A 39	70	J A 58	J A 59
23	J A J A 43	A J A 54	J A 23	20	J A 20	22	J A 43	J A J A 56	J A J A 67	J A 209	J A 96	J A 76	J A 84	J A 46	J A 56	J A 94	35	J A 114	J A 84	J A 90	J A 32	E B 16	J A 21	J A 51
24	J A J A 54	A J A 44	J A 36	A J A 23	A E B 16	26	36	J A 68	J A J A 66	A 73	63	J A 60	J A J A 63	A 45	J A 60	53	J A J A 44	90	J A J A 126	A J A 71	J A 97	89	J A 37	J A 28
25	E B E B 16	E B 15	E B 15	18	18	E C 29	33	J A 42	J A J A 58	J A 60	J A 59	J A 88	J A 61	A 41	37	G 28	G J A 28	41	26	J A J A 37	32	34	E B 16	J A 32
26	J A 21	18	E B 16	J A J A 22	20	G	34	J A 42	J A J A 81	J A 56	J A 55	J A 72	J A 50	A 65	44	44	J A J A 46	33	J A J A 37	J A J A 56	J A 24	31	J A 28	J A 41
27	J A J A 26	A J A 26	J A E B 18	J A 15	B J A 28	J A 40	33	J A J A 41	49	37	42	43	E B E B 54	56	43	E B 44	45	J A 68	J A J A 70	J A J A 72	J A 65	J A 19	J A 19	J A 79
28	J A J A 36	A J A 33	J A 30	A J A 44	J A J A 23	28	A J A 38	J A 86	J A 78	J A 82	J A 115	J A 90	J A 78	48	E B 43	E B 35	37	J A 45	J A J A 55	A J A 26	J A 52	46	J A 69	J A J A 98
29	J A J A 64	A J A 54	J A 52	E B 14	E B 15	B 28	34	J A 57	J A J A 52	A 76	J A 71	J A 45	46	48	J A 92	J A 89	J A J A 59	A 54	J A 88	J A J A 104	J A 65	38	J A 28	J A 64
30	J A J A 41	A J A 47	J A 46	A J A 43	E B 15	32	J A 44	J A 48	J A 46	38	E B 38	41	J A 54	A 70	J A 60	J A 73	J A J A 77	A 90	J A J A 40	A J A 36	E B 14	E B 16	23	23
31	J A J A 42	A J A 54	J A 38	A J A 28	J A J A 19	A 39	40	J A 54	J A J A 47	A 57	J A 75	J A 85	J A 124	46	J A 44	A 44	J A J A 55	A 59	J A J A 44	A J A 34	J A 31	J A 17	J A 34	A J A 28
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	31	31	31	31	31	31	30	31	31	31	30	31	31	31	31	31	31	31	31
MED	J A J A 32	A J A 26	J A J A 21	A J A 20	J A 20	23	34	J A 44	J A J A 51	A J A 49	J A 55	J A 50	J A 54	46	41	42	J A 45	J A 48	J A 48	J A 45	J A 51	J A 43	J A 34	J A 40
U Q	J A J A 42	A J A 39	J A 33	A J A 24	J A 23	A J A 29	A J A 40	J A 57	J A J A 64	A J A 61	J A 65	J A 75	J A 70	A 54	J A 45	A J A 50	J A J A 55	A 62	J A J A 58	A J A 64	J A 68	J A 70	J A 49	A J A 51
L Q	E B 16	20	E B 16	E B E B 15	E B 15	20	30	38	40	43	41	43	44	42	G 37	G 35	G	34	J A 40	J A J A 36	A 32	23	J A 23	J A 28

MAY 2003 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 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 16	E B 15	E B 15	E B 15	E B 14	E B 16	26	43	37	46	E B 41	E B 44	G	G	E B 45	G	G 26	31	27	36	44	E B 16	16	22
2	E B 16	E B 15	E B 15	E B 16	E B 14	18	34	41	46	40	40	40	E B 44	44	E B 38	41	52	64	23	22	44	35	44	20
3	E B 15	18	E B 15	30	20	25	44	53	51	44	46	44	50	E B 43	U Y 27	48	45	46	101	63	37	50	E C 28	E B 15
4	E B 15	E B 16	E B 15	E B 16	E B 15	21	36	63	58	70	45	56	60	48	E B 40	45	53	46	49	36	E C 29	36	41	29
5	30	E B 16	E B 16	E B 14	E B 15	E B 17	27	34	38	43	46	A A 125	52	56	38	40	34	30	34	42	26	32	30	30
6	24	C	31	22	17	E C 28	U Y 31	34	37	A A 44	A A 59	48	U Y 39	E B 43	E B 42	40	36	49	48	32	36	22	18	21
7	19	20	17	E B 14	17	20	26	33	37	45	44	42	42	41	G 28	U Y 26	44	G	37	E B 14	E B 15	E C 28	34	24
8	20	21	E B 16	E B 15	E B 15	20	46	40	36	46	40	G 31	38	37	35	G 26	35	34	56	36	36	E B 15	E B 16	E B 15
9	E B 14	20	E B 15	E B 14	22	E B 20	34	32	36	45	57	E B 39	E B 40	E B 42	E B 38	39	58	46	34	19	20	29	20	30
10	43	24	20	21	E C 30	21	35	38	38	38	55	E B 41	A A 74	E B 44	E B 36	54	46	39	43	32	E B 15	23	30	29
11	22	32	E B 20	16	E B 15	18	26	G 23	41	A A 57	36	40	50	A A 90	38	46	G	30	44	57	33	22	29	34
12	E B 16	18	E B 16	E B 14	16	E B 16	G	33	34	40	37	42	U Y 26	U Y 33	U Y 28	G 27	G 24	29	22	23	26	20	23	40
13	20	28	22	32	20	E C 28	26	35	44	G	41	69	50	42	40	39	G 27	42	41	39	64	36	33	27
14	35	E B 16	16	18	25	24	32	43	48	39	U Y 26	56	48	E B 41	G 31	G 26	39	40	40	34	34	34	E C 36	29
15	31	20	16	E B 15	25	36	49	42	A A 74	A A 72	47	40	43	G 28	E B 37	G 24	G 26	29	48	41	36	23	E C 30	E B 15
16	E B 14	20	16	E B 16	E B 14	20	31	42	48	46	A A 60	48	A A 89	54	48	39	U Y 26	48	54	35	21	36	30	36
17	40	E B 15	E B 16	E B 15	E B 15	24	30	48	51	58	48	49	41	44	38	37	G 28	33	32	52	29	E B 15	32	E B 15
18	E B 16	E B 15	E B 15	E B 14	E B 15	18	E B 30	36	44	37	40	46	47	45	52	48	46	46	48	36	28	30	29	32
19	22	E B 14	E B 15	17	20	20	G 17	37	44	47	40	44	40	G 35	G 32	40	40	47	34	46	44	53	22	E B 15
20	E B 16	E B 15	E B 16	E B 15	E B 13	20	29	36	60	55	41		46	55	41	52	41	38	G 29	24	21	44	18	
21	E B 16	E B 15	32	20	17	36	48	70	66	46	42	61	65	E B 44	41	40	46	40	49	53	40	34	E B 16	37
22	17	31	E B 16	E B 15	E B 15	20	G 23	45	55	46	45	48	51	50	46	C	54	55	42	60	33	51	43	56
23	41	46	18	E B 15	E B 16	21	36	51	58	A A 209	73	43	47	41	46	A A 94	34	A A 114	66	22	19	E B 16	19	46
24	42	39	29	19	E B 16	25	35	64	56	64	61	57	53	44	57	49	41	48	64	69	37	58	21	20
25	E B 16	E B 15	E B 15	E B 16	E B 15	E C 29	32	36	54	50	57	43	46	38	U Y 37	G 28	U Y 28	38	24	28	E C 28	33	E B 16	23
26	16	E B 15	E B 16	16	E B 15	G	32	40	A A 81	46	44	58	46	63	41	43	41	31	34	34	19	28	24	32
27	24	19	E B 14	E B 15	23	36	31	38	41	37	41	41	E B 54	E B 56	42	E B 44	44	62	68	69	30	E B 15	E B 15	23
28	25	25	E B 15	E B 14	E B 15	24	36	72	A A 78	A A 82	A A 115	A A 90	A A 78	46	E B 43	E B 35	36	42	45	24	35	44	42	55
29	45	44	34	E B 14	E B 15	28	33	53	42	40	50	E B 45	43	44	83	70	55	48	84	74	36	34	25	44
30	32	36	32	29	E B 15	29	A A 44	41	42	38	E B 38	41	A A 54	A A 70	A A 60	A A 73	46	A A 90	24	28	E B 14	E B 16	16	E B 16
31	20	32	21	22	16	34	37	44	44	A A 57	54	A A 85	61	44	41	38	41	55	36	26	26	E B 15	16	20
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	31	31	31	31	31	31	30	31	31	31	30	31	31	31	31	31	31	31	31
MED	20	20	E B 16	E B 16	E B 15	20	32	41	44	46	45	44	47	44	39	40	41	42	42	36	30	29	26	26
U Q	31	28	20	19	20	28	36	48	56	A A 57	55	56	54	50	45	48	46	48	49	52	36	36	33	34
L Q	E B 16	E B 15	E B 15	E B 15	E B 15	20	27	36	38	40	40	41	42	41	37	G 35	G 28	33	34	28	24	E B 20	18	E B 20

MAY 2003 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	15	15	15	14	16	15	15	20	21	41	44	36	29	45	20	18	16	14	15	14	16	14	16
2	16	15	15	16	14	13	14	21	20	20	36	35	44	40	38	20	32	16	15	14	15	15	15	14
3	15	14	15	15	13	16	19	18	22	24	25	35	36	43	20	22	20	18	14	15	15	14	E C 28	15
4	15	16	15	16	15	15	16	19	32	35	35	36	39	39	40	36	25	20	18	13	E C 29	14	16	14
5	14	16	16	14	15	17	18	20	28	30	34	35	30	36	30	36	31	16	16	14	14	14	16	16
6	15	C	15	16	12	E C 28	18	21	20	21	24	34	22	43	42	21	20	18	15	14	14	14	16	15
7	14	15	14	14	12	20	13	18	20	28	23	34	30	32	22	20	20	14	14	14	15	E C 28	14	16
8	14	14	16	15	15	15	16	E C 30	20	22	22	20	21	19	18	20	20	20	16	14	15	15	16	15
9	14	13	15	14	12	20	15	16	19	21	24	39	40	42	38	21	20	16	13	14	13	15	14	15
10	15	13	14	14	E C 30	15	20	16	21	34	26	41	36	44	36	22	20	E C 29	16	15	15	14	14	15
11	15	E C 29	20	14	15	14	24	20	24	24	20	22	32	35	25	20	20	15	20	15	15	15	15	15
12	16	14	16	14	14	16	15	28	20	22	30	28	22	29	18	20	17	14	16	15	15	14	13	16
13	15	16	14	14	15	E C 28	14	16	E C 33	32	20	20	22	19	20	20	16	15	15	14	19	16	15	15
14	14	16	14	14	12	16	14	29	17	16	18	20	38	41	20	20	16	17	20	28	15	14	15	E C 29
15	16	16	14	15	14	19	16	17	33	34	36	19	21	19	37	20	19	15	15	14	15	14	E C 30	15
16	14	14	14	16	14	14	E C 29	20	23	21	26	25	34	35	31	22	15	16	14	13	14	14	15	15
17	14	15	16	15	15	15	16	20	23	24	20	23	30	36	23	22	20	18	14	20	15	15	14	15
18	16	15	15	14	15	14	30	18	20	23	23	23	22	38	31	20	18	17	16	14	14	21	15	15
19	16	14	15	15	13	14	12	16	20	21	22	22	31	23	23	20	23	16	16	14	15	15	15	15
20	16	15	16	15	13	15	16	18	21	20	23		36	36	24	21	17	14	15	14	14	15	15	14
21	16	15	16	16	14	15	16	20	29	22	22	23	23	44	38	26	19	16	15	15	16	16	16	16
22	15	15	16	15	15	13	16	16	21	22	22	32	24	37	24	C	35	29	15	14	14	16	16	15
23	15	15	14	15	16	15	17	20	21	29	23	35	34	31	21	27	18	15	15	14	13	16	14	16
24	15	14	15	15	16	14	16	16	20	20	34	35	24	22	19	20	18	15	16	14	15	15	15	15
25	16	15	15	16	15	E C 29	E C 28	16	20	23	22	34	21	22	22	17	17	14	16	14	E C 28	E C 28	16	16
26	12	15	16	14	15	15	16	20	17	20	23	35	35	35	25	36	20	16	15	14	15	13	15	15
27	15	14	14	15	15	16	15	20	18	19	23	24	54	56	23	44	36	19	16	16	16	15	15	14
28	13	15	15	14	15	14	16	20	35	36	71	52	40	36	43	35	20	17	14	14	14	14	15	16
29	15	16	15	14	15	14	15	20	20	21	38	E B 45	30	23	24	22	18	16	15	15	14	15	15	16
30	15	15	15	15	15	13	15	18	22	20	38	E B 37	34	37	31	20	22	14	13	14	14	16	14	16
31	16	15	14	14	12	14	16	21	22	18	34	22	42	35	28	22	18	20	16	13	15	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	30	31	31	31	31	31	31	31	31	31	30	31	31	31	30	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	16	20	20	22	24	32	32	36	25	21	20	16	15	14	15	15	15	15
U Q	16	15	16	15	15	16	18	20	23	28	34	35	36	40	37	22	20	18	16	15	15	16	16	16
L Q	14	14	14	14	13	14	15	16	20	20	22	23	23	29	22	20	18	15	14	14	14	14	14	15

MAY 2003 fmin (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 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	282	288	268	280	275	299	316	312	333	302	268	272	294	304	311	307	288	291	296	316	326	263	264	288
2	276	269	284	303	286	286	330	284	280	300	320	310	317	302	309	322	328	323	316	318	309	261	268	281
3	270	279	268	303	288	320	322	337	324	313	294	287	302	306	311	299	309	305	317	326	314	278	274	273
4	264	286	329	296	270	306	325	320	317	308	305	294	300	292	304	300	308	315	328	341	302	F	F	F
5	F	F	291	306	296	309	332	341	319	336	297	A	275	297	296	309	320	327	310	308	299	291	277	265
6	269	C	281	270	305	305	312	229	R	A	A	279	286	292	305	312	313	309	316	318	297	279	276	275
7	271	260	287	277	282	304	290	328	306	312	S 270	278	289	303	297	301	281	311	291	292	309	298	274	259
8	280	275	293	308	307	306	301	272	278	287	228	R	275	281	319	314	303	300	310	328	316	268	263	278
9	273	282	323	295	280	305	340	315	339	308	310	292	300	303	304	327	324	313	334	329	293	271	281	263
10	286	F	280	274	280	278	319	R 259	275	312	297	304	A	290	311	308	S 290	313	331	319	298	276	285	276
11	280	272	279	283	353	333	338	343	322	A	295	299	270	A	294	323	326	323	295	288	277	291	286	273
12	F 278	277	276	274	291	267	308	313	353	307	306	308	307	310	304	301	321	321	339	347	290	271	276	258
13	283	272	307	319	319	337	337	325	312	325	279	285	274	299	322	325	308	304	308	327	321	F	F	289
14	278	282	293	283	351	R 286	271	318	310	260	266	S 282	299	305	310	322	310	328	299	302	286	284	278	279
15	285	286	282	288	316	334	S 283	332	A	A	281	273	278	301	297	303	294	285	295	317	342	297	279	260
16	257	276	280	301	279	298	337	280	317	281	A	265	A	307	293	313	313	324	317	294	295	291	F	F
17	285	290	294	295	308	322	301	309	296	328	242	276	281	301	300	291	283	307	298	319	337	276	269	276
18	283	276	289	320	296	333	Z 336	353	363	324	271	308	294	297	304	308	294	297	295	318	333	283	277	F
19	F	F	305	321	294	329	318	319	331	336	291	276	270	291	299	312	319	289	285	301	302	299	273	269
20	276	279	281	300	275	323	329	336	324	310	285		305	304	286	299	300	298	309	297	283	272	264	277
21	281	309	285	298	291	293	304	310	315	275	297	307	290	293	300	305	313	303	311	302	282	292	279	S 288
22	F	F	276	273	264	250	292	308	287	270	272	255	270	269	283	C	305	314	287	291	291	264	278	275
23	266	266	260	281	298	315	282	296	304	A	311	291	284	296	283	A	289	A	307	313	302	272	269	268
24	282	289	294	270	274	295	297	304	310	295	285	303	282	300	301	285	264	290	298	321	319	270	283	270
25	278	263	301	274	263	263	305	337	303	300	278	291	286	287	288	298	303	315	302	299	299	282	280	272
26	280	281	281	267	269	287	334	344	A	295	296	273	268	287	304	305	309	302	302	299	289	271	281	284
27	284	288	287	298	300	333	298	328	293	301	287	274	290	287	285	289	289	310	305	308	286	266	266	267
28	291	271	298	278	280	327	287	323	A	A	A	A	A	275	295	309	300	279	292	297	303	259	265	272
29	283	291	272	253	262	279	323	312	299	296	299	297	271	276	294	299	294	308	308	307	329	292	285	283
30	270	260	V 248	275	314	264	A	255	300	R 269	R 261	254	A	A	A	A	235	A	258	271	283	285	256	251
31	263	260	280	270	264	300	280	330	324	A	312	A	297	312	306	299	287	309	310	334	304	270	294	271
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	26	31	31	31	31	30	31	27	25	28	26	27	29	30	28	31	29	31	31	31	29	28	28
MED	279	278	284	283	288	305	314	318	312	302	289	286	286	297	300	306	303	309	307	313	302	276	276	273
U Q	283	286	294	301	305	323	330	332	324	312	298	299	299	304	306	312	313	315	316	321	316	291	280	278
L Q	270	271	279	274	275	286	297	304	299	291	272	274	275	288	294	299	289	299	295	299	290	270	268	268

MAY 2003 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 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								A	L	L	334	L	L 343	L	L		L	L						
2						L	A	A	A	L 352	L 378	L 361	L 363	L 346	L 367	L	A	A						
3								A	A	L	L	L 349	A	L	L 360	A			A					
4								A	A	A	L	A	A	L 355	L 372	A	A	A						
5							L	L	L	L	L		A	A	L 367	L 347	L							
6						E C	A	L 350	U L 392	A	A	A	A	U L 348	352	L 362	L 364	A						
7							L	L	L	L 321	U L 384	U L 384	L 366	L 382	L 367	L 358	A	L						
8							AE	C	L 361	A	U L 321	U L 394	371	377	414	355	L 342	L 325	A					
9								L	L	A	A	L 372	L 332	L 379	L 378	L	A	A						
10						L 289	A	U L 331	U L 354	U L 410	A	342	A	353	L 375	A	L	A						
11							L	373	393	A	404	U L 387	A	A	376	A	L 384	L						
12								L 359	L	L 392	L 416	373	L 409	L 383	370	L 355	L 369	L						
13								L	A	L 396	L 356	A	A	379	380	L 382	L 353	A						
14						U L 299	L 334	A	A	393	391	A	A	L 386	377	355	A	A						
15							A	A	A	A	A	396	L 348	382	374	L 365	L 340	L 318						
16							L	A	A	A	A	A	A	A	A	379	L 365	A	A					
17							L	A	A	A	A	A	391	U L 390	386	361	378	L 347						
18							L	L	A	L 381	L 360	L 354	359	384	A	A	A	A						
19								L	A	A	L 367	L 365	L 391	L 359	387	L	L							
20							L	L	A	A	L 344		L 351	A	L 338	A	L	L						
21						A	A	A	A	L 337	L 351	A	A	L 362	L 374	L 353	A	A						
22						L 312	L	A	A	L 332	L 338	357	A	L 324	L 339	C	A	A						
23								A	A	A	A	L 357	L	L 380	L 331	A	L	A	A					
24								A	A	A	A	A	A	L 358	A	A	L 331	A						
25						L	L	L	A	A	A	L 387	L 341	357	L 373	L 345	L	A	L					
26							L	A	A	L	L 371	A	U L 354	A	L 385	L	A	L						
27								L 369	L	L 377	L 385	L 365	E B	E B	L 370	L 352	L	A	A					
28							L	A	A	A	A	A	A	L 356	365	370	L	A	A					
29						U L 313	L	A	L 355	355	U L 346	374	L 379	L 360	A	A	A		A					
30							A	A	A	U L 387	R 391	362	A	A	A	A	A	A	L 300					
31						A	A	A	A	A	A	A	A	390	L 354	L 363	L 339	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	1	5	5	12	17	17	14	22	25	15	10	3	1					
MED						L 306	L 334	L 359	L 361	L 379	L 367	L 365	L 361	L 370	L 372	L 358	L 358	L 325	L 300					
U Q						L 312		371	392	L 392	388	U L 386	L 379	L 382	378	L 365	L 369	L 347						
L Q						L 294		L 340	L 354	L 344	L 345	L 357	L 348	L 356	L 362	L 353	L 340	L 318						

MAY 2003 M(3000)F1 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 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								272	254	290	410	340	308	290	288		318	278						
2						336	254	E A 290	E A 334	338	286	314	322	336	304	284	260	270						
3								246	260	290	292	318	290	286	274	270			E A 348					
4								E A 282	E A 272	E A 328	314	308	294	312	300	290	286	262						
5							262	260	266	262	288		292	310	300	282	262							
6						278	324	630	R	A	A	434	402	378	330	300	284	280						
7							306	264	302	338	S 606	406	354	342	360	332	350	276						
8							E A 340	422	398	404	582	R	436	410	322	318	342	330	E A 308					
9								284	256	270	302	338	304	302	286	266	264	268						
10						358	272	U R 526	430	344	E A 388	342	A	360	292	292	288	284						
11							276	304	344	A	392	378	440	A	328	284	272	268						
12								302	254	320	334	324	320	314	324	300	268	268						
13								266	272	280	362	E A 358	340	304	274	268	286	290						
14						U R 556	402	312	E A 354	502	464	E A 436	348	344	324	302	306	270						
15							A	294	A	A	436	448	420	342	344	316	334	346						
16							276	E A 334	314	414	A	458	A	314	330	306	298	278	E A 284					
17							336	340	E A 360	E A 312	A	418	392	324	306	308	336	302						
18							274	246	242	312	428	336	354	328	300	296	314	292						
19								280	254	272	338	370	372	312	302	290	278							
20							252	256	E A 298	316	332		292	314	338	316	300	284						
21						E A 304	E A 304	E A 364	E A 366	402	350	E A 380	E A 370	342	314	300	278	288						
22						416	296	266	276	380	356	406	362	362	326	C	298	280						
23								294	288	A	E A 302	352	340	322	326	A	314	A	288					
24								276	258	E A 318	E A 324	310	346	302	304	322	366	300						
25						370	282	252	278	E A 264	374	346	340	342	324	310	288	268	278					
26							252	232	A	306	336	360	370	324	296	290	278	294						
27								282	340	308	340	358	344	344	326	316	316	284	E A 304					
28							334	E A 336	A	A	A	A	A	370	316	286	290	320	286					
29						344	272	E A 304	338	336	322	342	348	338	E A 310	280	300		E A 280					
30							A	468	350	326	R 426	498	A	A	A	A	E A 574	A	410					
31						E A 344	412	290	E A 284	A	334	A	E A 344	320	306	320	332	E A 282						
	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	19	31	27	25	27	26	27	29	30	27	30	25	9					
MED						344	279	285	280	317	339	354	345	324	312	300	296	282	E A 288					
U Q						393	334	334	344	341	410	406	370	343	326	316	318	293	E A 328					
L Q						320	272	266	260	290	322	338	320	312	300	284	278	270	E A 282					

MAY 2003 h'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 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	262	254	E B 308	E B 276	272	252	232	A	218	A	226	250	E A 250	212	E B 242	238	220	E A 246	E A 264	240	232	244	E A 286	E A 288
2	270	E B 310	E B 276	242	242	E A 268	A	A	A	224	218	210	206	232	198	E A 244	A	A	248	238	E A 256	312	E A 346	E A 306
3	E B 284	E A 298	E B 276	270	E A 262	248	230	A	A	232	A	220	A	E B 248	234	A	256	264	A	E A 256	238	E A 324	E C 286	E B 292
4	E B 300	E B 278	222	236	E B 310	240	234	A	A	A	238	A	A	E A 268	H 206	A	A	A	E A 238	226	216	E A 340	E A 294	E A 314
5	E A 336	E B 280	266	248	230	244	222	214	230	A	E A 250	A	A	A	212	E A 246	224	232	248	246	248	E A 280	E A 304	E A 346
6	E A 308	C	E A 288	E A 320	238	E C 280	A	E A 252	228	A	A	A	A	E B 268	252	244	238	A	E A 266	242	E A 274	E A 282	E A 282	E A 312
7	E A 302	E A 338	272	272	E A 288	254	234	228	230	E A 318	232	232	230	238	232	232	A	226	E A 286	274	226	268	E A 312	E A 338
8	E A 282	E A 310	266	232	242	254	A	A	238	A	234	218	226	214	208	216	228	E A 256	A	E A 248	E A 260	E B 294	E B 300	E B 314
9	E B 302	E A 316	246	232	E A 344	254	E A 236	216	218	A	A	214	236	206	214	A	A	A	244	228	238	E A 320	E A 294	E A 370
10	E A 328	E A 276	E A 306	E A 334	E C 316	E A 280	A	E A 294	E A 266	210	A	266	A	E B 274	H 192	A	E A 258	A	E A 242	250	224	E A 262	E A 304	E A 342
11	E A 320	E A 364	E B 318	E A 292	220	236	228	206	224	A	196	208	A	A	224	A	204	E A 238	E A 290	E A 340	E A 276	248	274	E A 340
12	E B 306	E A 302	E B 306	E B 298	258	216	232	216	A	206	H 180	226	H 174	208	H 194	218	214	234	240	212	E A 246	E A 292	E A 310	E A 396
13	E A 308	E A 318	256	E A 256	236	240	220	210	A	202	H 204	A	A	E A E 238	E A 232	216	202	A	E A 260	252	E A 302	E A E 308	A 336	294
14	E A 310	E B 284	272	258	234	250	E A 248	A	A	216	214	A	A	212	H 196	230	A	A	E A E 268	A 266	E A 282	E A 260	E A 328	E C 304
15	E A 312	E A 294	E A 278	240	270	E A 250	A	A	A	A	A	204	E A 280	H 202	208	218	212	240	E A 292	E A 252	234	E A 246	E C 306	E B 318
16	E B 338	E A 312	E A 292	258	E B 286	266	238	A	A	A	A	A	A	A	A	230	222	A	A	E A 256	252	E A 300	E A 292	E A 326
17	E A 338	E B 286	E B 270	262	252	234	240	A	A	A	A	A	208	204	206	218	216	E A 240	E A 278	252	216	224	E A E 336	B 302
18	E B 288	E B 294	262	232	254	236	210	208	A	196	H 190	E A 274	232	E A 246	A	A	A	A	E A 282	248	224	230	E A 304	E A 346
19	E A 314	E B 282	246	222	E A 252	240	228	216	A	A	H 188	220	198	H 186	218	226	E A 236	E A 298	E A 270	E A 268	E A 264	E A 288	E A 272	E B 290
20	E B 282	E B 286	E B 276	248	E B 284	234	216	214	A	A	216		E A 268	A	222	A	E A 258	E A 242	260	256	260	E A 290	E A 336	E A 282
21	E B 278	244	E A 256	230	250	A	A	A	A	E A 260	208	A	A	E B 246	218	E A 250	A	A	E A 264	E A 288	E A 280	E A 270	E B 266	E A 336
22	E A 344	E A 348	E A 282	E B 292	E B 304	248	E A 240	A	A	E A 254	226	236	A	E A 294	E A 290	C	A	A	E A 282	E A 326	E A 254	E A 362	E A 326	E A 372
23	E A 352	E A 376	E A 308	282	216	222	E A 248	A	A	A	A	206	E A 252	202	E A 276	A	216	A	A	234	228	264	E A 272	E A 354
24	E A 304	E A 296	252	264	E B 296	252	232	A	A	A	A	A	A	E A 236	A	A	E A 252	A	E A E 284	A 256	E A 266	E A 338	E A 262	E A 288
25	E B 282	E B 280	256	236	E B E 312	C 278	238	218	A	A	A	204	E A 252	212	202	224	216	A	242	252	252	274	244	E A 292
26	E A 286	258	274	E A E 304	B 298	248	E A 240	A	A	E A 250	214	A	E A 238	A	210	A	A	218	E A E 268	A 252	E A 248	E A 274	E A 274	E A 300
27	E A 274	E A E 284	E B 274	248	248	E A 250	228	E A 228	218	194	210	204	B	B	220	208	E A 274	A	A	E A 304	E A 278	E B 292	E B 294	E A 318
28	E A 284	E A 302	252	272	E B 290	E A E 246	E A 240	A	A	A	A	A	A	E A 242	210	212	226	A	A	262	E A 258	E A E 330	E A 336	E A 336
29	E A 310	E A 286	E A E 324	A E 326	E B 326	E B E 318	A E 252	A	E A 240	222	E A 268	224	212	222	A	A	A	264	A	E A 262	222	E A 244	E A 264	E A 300
30	E A 312	E A 344	E A 414	E A 324	234	E A 372	A	A	A	214	210	E A 256	A	A	A	A	A	A	272	E A 300	266	236	E A 270	E B 318
31	E A 334	E A 360	E A 288	E A 322	E A 358	A	A	A	A	A	A	A	A	238	226	220	E A 280	A	252	222	234	228	E A 286	E A 324
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	29	23	13	10	14	19	18	15	24	26	18	20	13	24	31	31	31	31	31
MED	E A E 306	A E 295	E 274	U 249	U 246	245	231	215	225	212	212	218	U 215	U 218	212	222	220	236	E A 265	243	U 238	E A E 280	E A E 294	E A E 318
U Q	E A E 320	A E 316	E A 292	E A 292	E B 298	E 260	E A 240	E A E 228	E A E 238	E A 250	232	236	E A 252	E A E 246	B E 232	E A 238	E A 254	260	E A E 280	A E 266	E A E 266	308	E A E 312	E A E 340
L Q	E 284	E 282	256	240	242	240	228	212	218	206	H 204	208	208	210	H 206	218	216	233	248	242	232	248	E A E 274	E A E 300

MAY 2003 h'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 h'E (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

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						B 122	118		112	A	B	B	110	110	B	110	116	114	114					
2						B 116	114		A	A	A	A	B	B	B 114		B	108	122					
3						B 116	112		A	A	A	A	A	B	112	114	112	114	118					
4						B 116	A		A	A	A	A	A	B	B	B	110	112	B					
5						B 110	116		A	A	A		A	A	A	B	B	118	122					
6						E C 108	112		112	112	A	A	112	B	B	112	120	116	B					
7						B	A 120		114	110	A	A	114	122	112	112	116	114	B					
8						B 112	E C		116	A	A	114	A	A	A	110	112	112	B					
9						B 118	118		A	A	A	B	B	B	B	114	114	A	B					
10						B 116	110		A	B	A	B	E B 122	B	B	A	A	E C	B					
11						B	B 114		A	A	A	A	A	A	A	116	116	112	B					
12						114	A		A	A	A	112	A	A	116	116	112	116	B					
13						B 116	A	E C	114	116		A	A	116	114	112	118	118	122					
14						B 120	B	116	A	A	112		B	B	112	114	112	114	B					
15						B 122	114		A	A	A	110	110	110	B	110	118	110	A					
16						124	B	A	A	A	A	A	A	A	A	A	A	114	A					
17						130	118	110	A	A	A	A	A	A	A	A	120	116	A					
18						E B 126	B	110	A	A	112	A	A	B	114	110	110	116	B					
19							110	114	A	A	A	A	A	110	112	116	A	A	A					
20						116	116	A	A	A	A		A	A	A	116	118	118	114					
21						122	116	112	A	A	A	A	A	B	B	112	110	114	116					
22						114	120	118	A	A	A	A	A	A	116	C	B	B	116					
23						118	114	110	A	A	A	A	A	A	A	A	112	112	B					
24						118	112	A	A	A	A	A	A	A	112	A	A	A	A					
25						E C	E C	A	A	A	A	A	A	A	A	112	114	116	114					
26						118	110	A	A	A	A	A	A	A	A	B	A	A	A					
27						A	A	A	A	A	A	112	B	B	114	B	B	116	116					
28						A	110	A	A	B	B	B	B	B	B	B	110	110	114					
29						122	114	A	A	A	B	B	A	112	A	A	A	A	A					
30						120	122	A	A	112	B	B	116	B	116	A	A	A	A					
31						120	116	A	A	A	A	A	B	B	A	A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						12	25	16	5	4	2	5	6	6	11	17	19	22	11					
MED						120	116	114	114	112	114	112	112	111	114	112	114	114	116					
U Q						123	118	117	116	113		113	116	116	116	115	118	116	122					
L Q						118	112	111	112	111		111	110	110	112	111	112	112	114					

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 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	100	84	B	B	B	116	118	112	104	B	B	G	G	B	G	102	122	114	106	102	B	106	100
2	B	B	B	116	122	120	114	112	106	106	108	108	B	110	B	140	124	114	112	108	102	100	98	98
3	112	112	98	92	96	118	108	108	100	104	102	104	104	B	102	134	126	120	108	106	106	100	98	98
4	94	96	B	90	92	114	114	104	106	102	108	108	108	116	B	158	128	116	110	104	102	106	104	100
5	100	B	B	B	B	B	116	118	104	104	102	98	100	102	102	114	116	118	116	98	102	104	98	90
6	92	C	88	90	104	C	132	124	124	118	102	106	106	B	B	134	126	114	106	104	104	108	102	100
7	100	102	100	102	100	104	100	126	114	112	104	112	120	132	100	102	112	G	104	B	104	108	98	98
8	92	92	92	B	112	116	112	112	116	104	104	104	102	102	98	100	132	116	104	102	102	102	B	106
9	B	98	100	B	112	B	136	122	106	104	100	B	B	B	B	158	108	106	104	104	108	98	102	94
10	92	94	112	110	C	108	114	112	106	110	104	B	118	B	B	104	102	110	104	104	108	98	94	94
11	96	92	98	94	B	110	110	102	108	100	104	104	104	102	108	120	G	166	114	104	104	104	98	94
12	B	94	94	98	100	B	G	104	102	102	104	158	102	102	100	102	104	122	120	118	114	106	106	100
13	96	92	90	90	92	C	116	106	124	G	126	100	100	130	156	128	104	126	114	106	100	100	100	96
14	92	100	94	96	96	94	126	126	114	108	98	110	112	B	102	100	122	114	114	104	104	102	102	108
15	96	100	100	98	116	116	114	114	104	104	102	122	138	96	B	98	104	118	104	102	104	102	C	98
16	B	98	100	106	B	126	118	106	108	108	104	104	100	100	102	108	104	112	104	100	106	104	100	98
17	94	98	B	B	B	124	126	112	108	106	104	102	104	106	104	108	108	116	102	100	98	106	104	98
18	B	100	B	B	B	144	B	124	104	106	114	108	106	116	130	120	116	116	106	102	104	102	96	96
19	96	90	90	90	88	90	94	112	102	102	104	100	100	100	104	120	106	104	104	100	96	96	98	B
20	B	B	B	B	B	132	116	106	100	100	102		102	128	152	116	120	120	G	108	106	108	106	96
21	96	100	98	104	104	124	118	114	104	108	108	104	102	B	132	152	126	122	110	104	108	104	100	100
22	100	100	B	102	118	118	108	116	106	108	104	104	102	106	112	C	118	116	108	102	98	98	98	98
23	98	96	98	100	98	114	116	112	100	98	98	104	96	98	100	98	122	108	102	106	102	B	100	100
24	96	90	90	94	B	124	116	104	104	102	102	100	100	104	110	104	108	108	100	100	104	104	98	98
25	B	B	B	96	96	C	112	104	106	104	102	104	102	112	100	100	104	114	116	102	102	102	B	98
26	98	96	B	94	98	G	112	108	104	102	102	102	104	98	102	102	102	102	100	94	94	90	94	100
27	100	102	102	B	104	104	106	102	102	104	104	116	B	B	128	B	122	110	112	108	104	116	108	102
28	98	96	98	102	108	106	112	98	98	100	100	100	98	98	B	B	120	116	112	110	106	102	106	100
29	102	100	102	B	B	114	118	102	102	102	102	B	104	124	106	106	104	104	98	98	98	100	100	96
30	96	94	94	94	B	122	118	106	108	122	B	134	118	112	110	108	106	102	104	100	B	B	96	94
31	100	90	94	94	98	118	116	108	102	100	96	96	100	96	98	96	92	90	92	92	98	100	100	100
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	26	22	22	20	23	29	31	31	30	29	26	27	23	23	27	30	30	30	30	30	28	28	30
MED	96	97	98	96	100	116	116	112	106	104	104	104	102	104	104	108	110	115	106	104	104	102	100	98
U Q	100	100	100	102	110	124	118	116	108	108	104	108	106	116	112	128	122	118	112	106	106	105	103	100
L Q	94	94	92	94	96	108	112	104	102	102	102	102	100	100	100	102	104	108	104	100	102	100	98	96

MAY 2003 h'Es (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2003 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

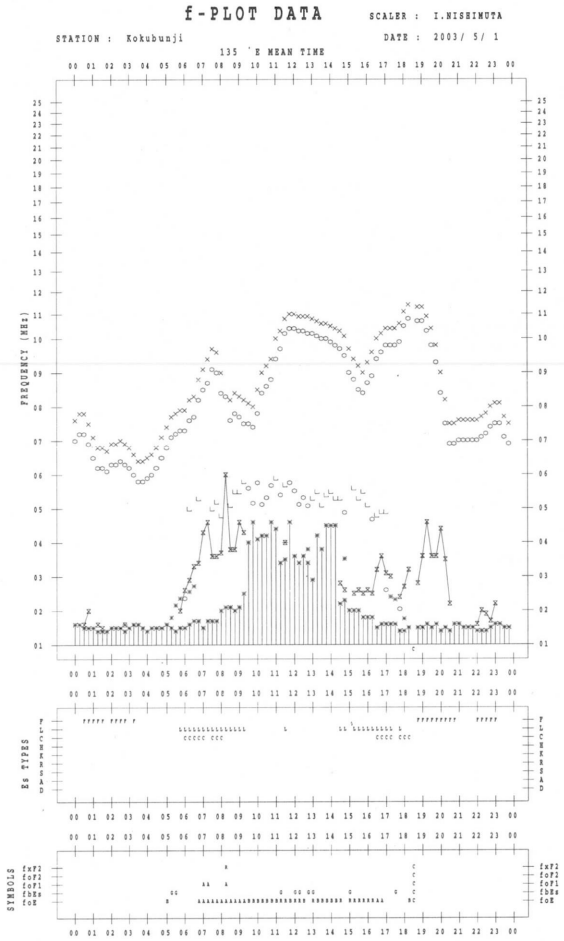
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

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

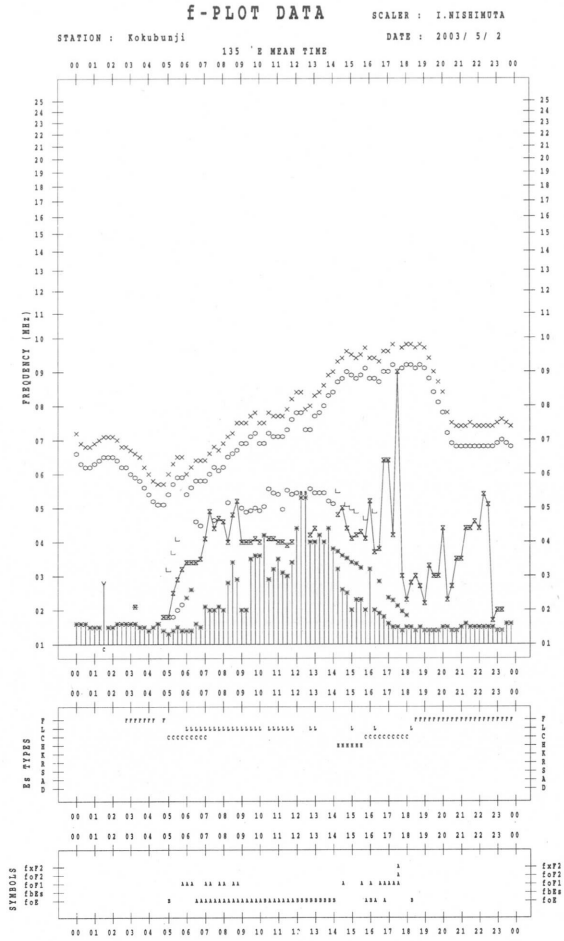
MAY 2003 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

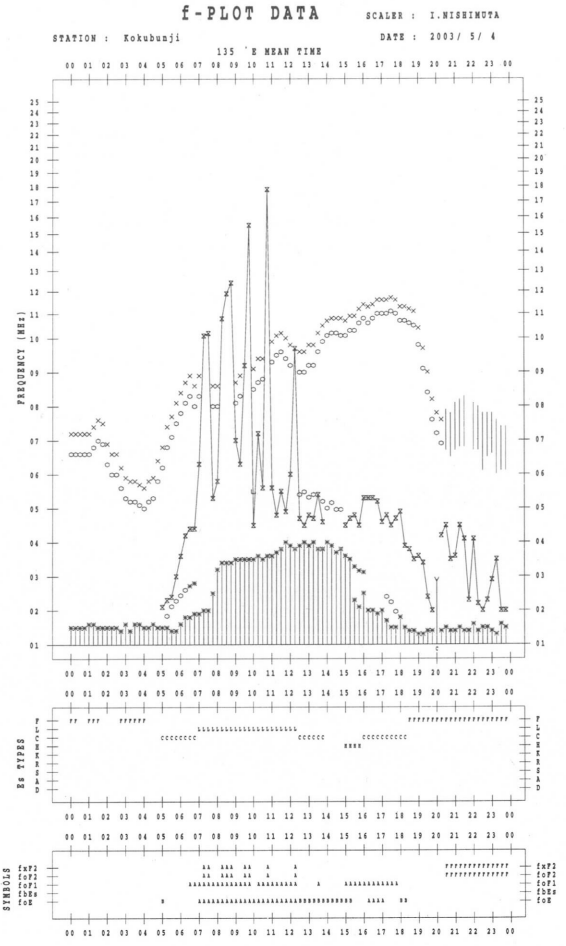
f-PLOTS OF IONOSPHERIC DATA

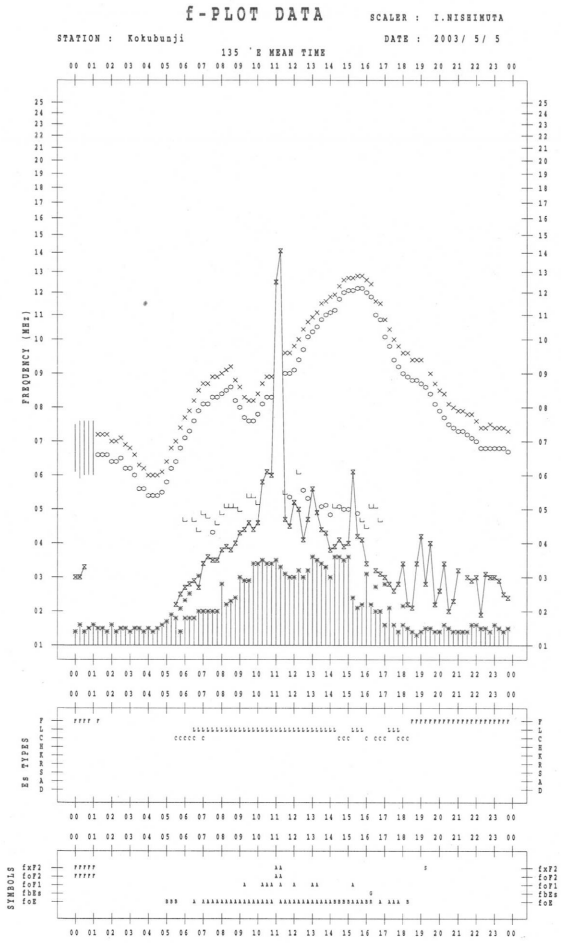
KEY OF f-PLOT	
	SPREAD
	foF2,foF1,foE
	fxF2
	DOUBTFUL foF2,foF1,foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

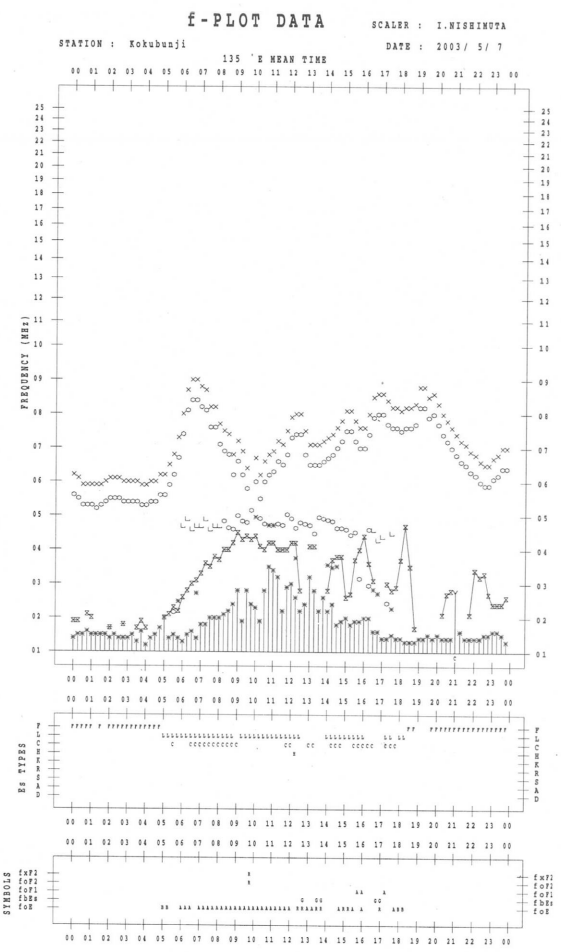

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

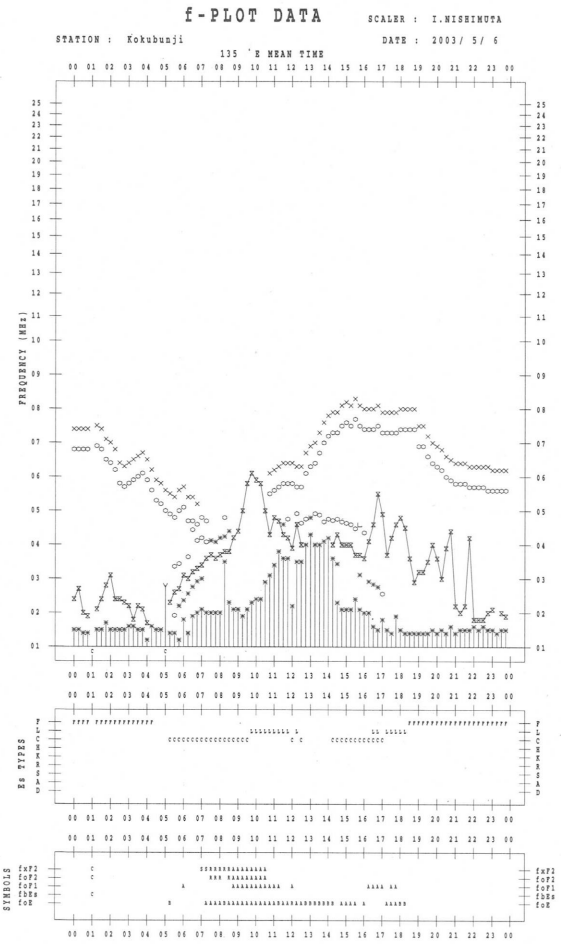

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

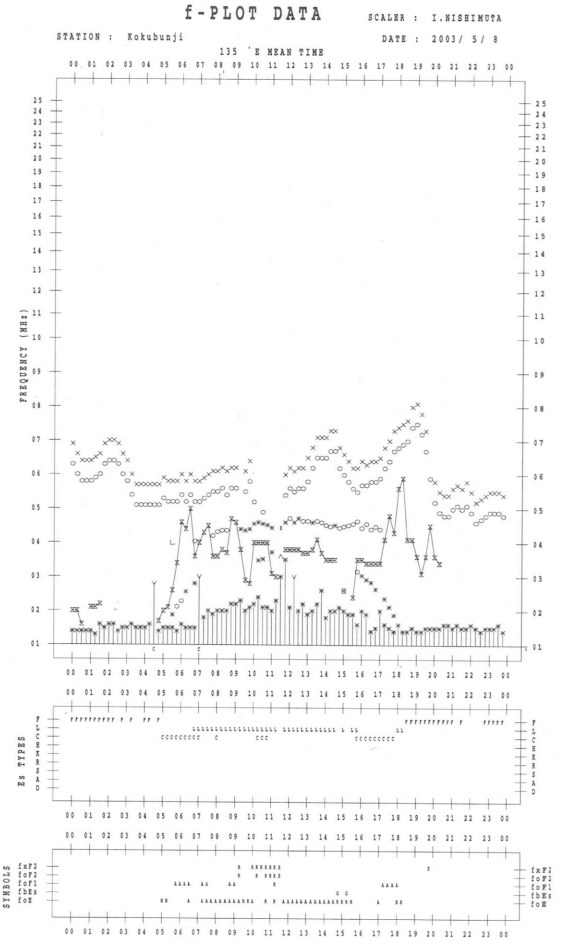

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

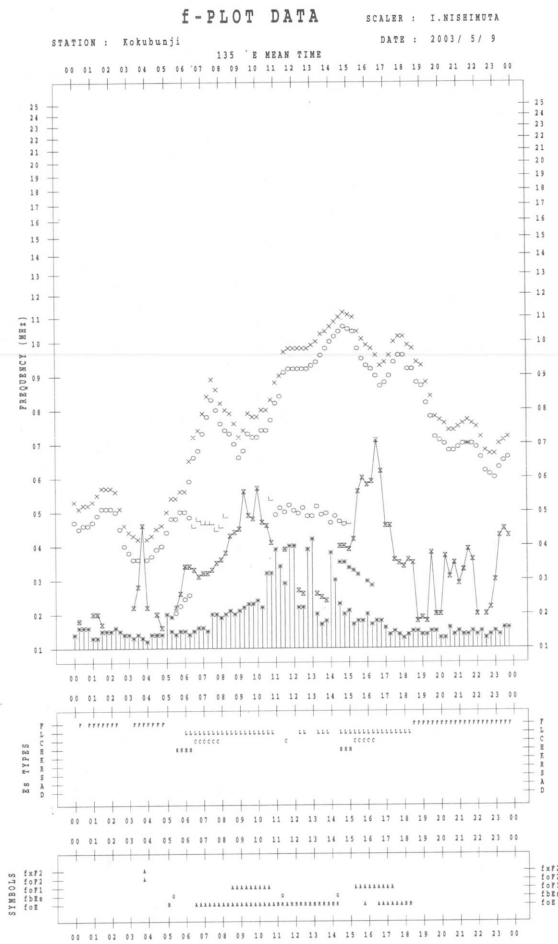

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

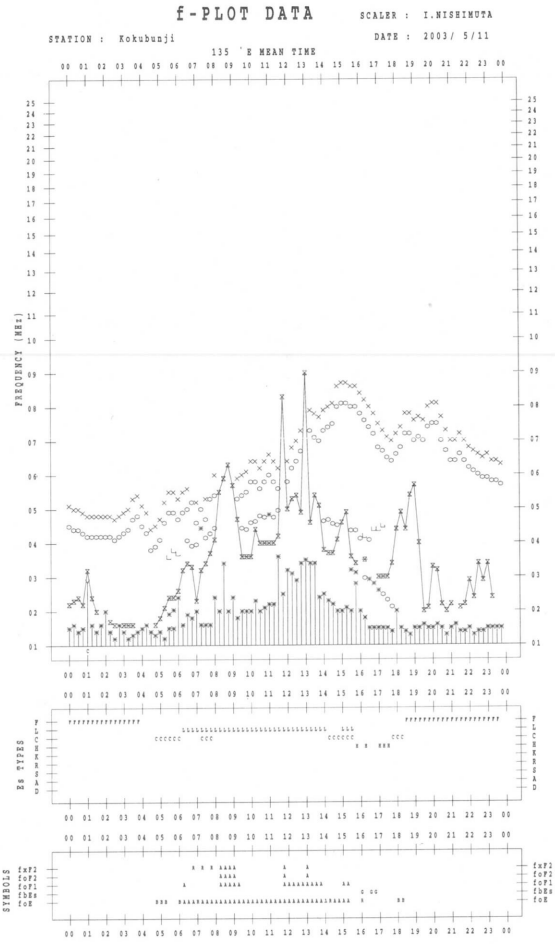

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

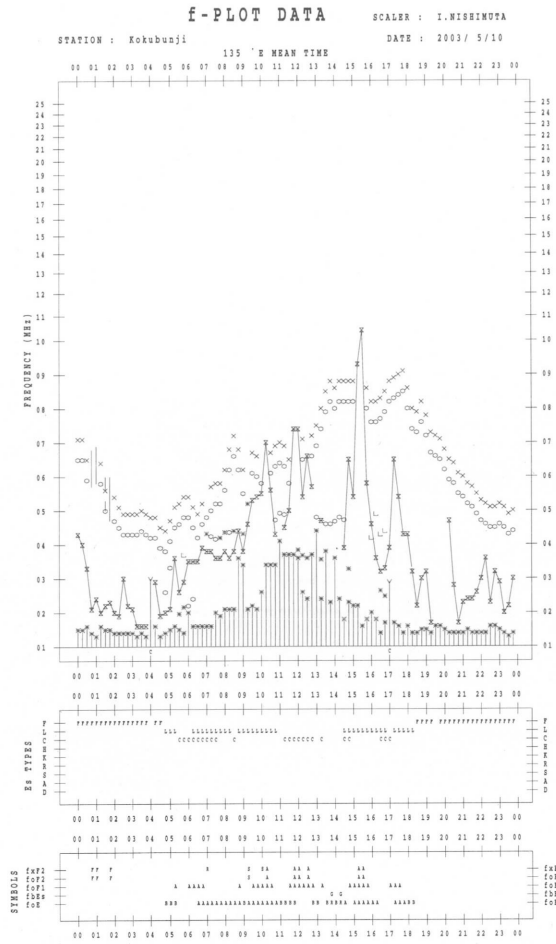

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

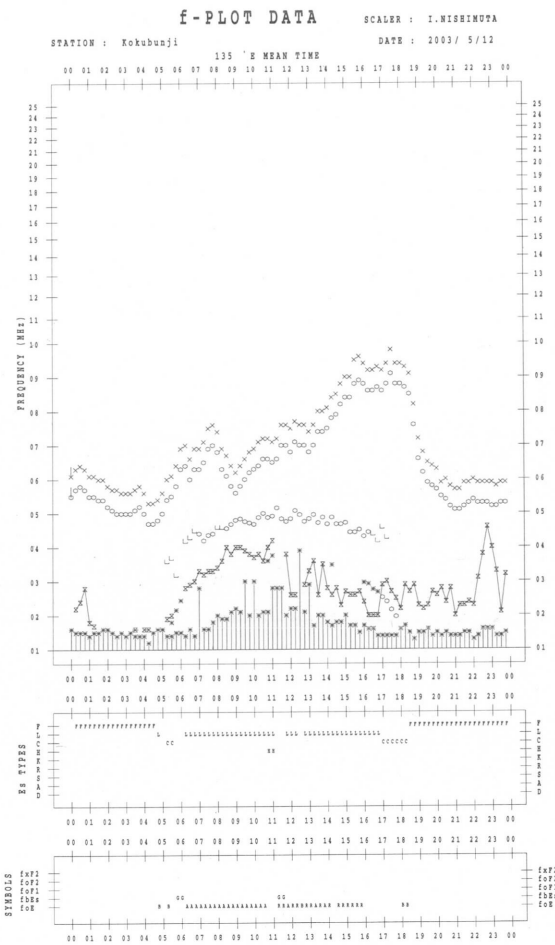

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

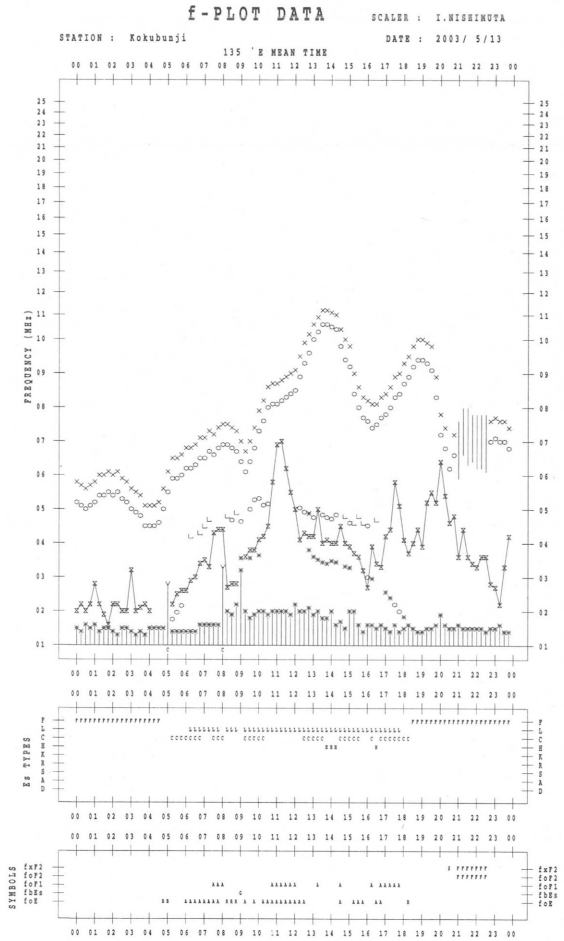

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

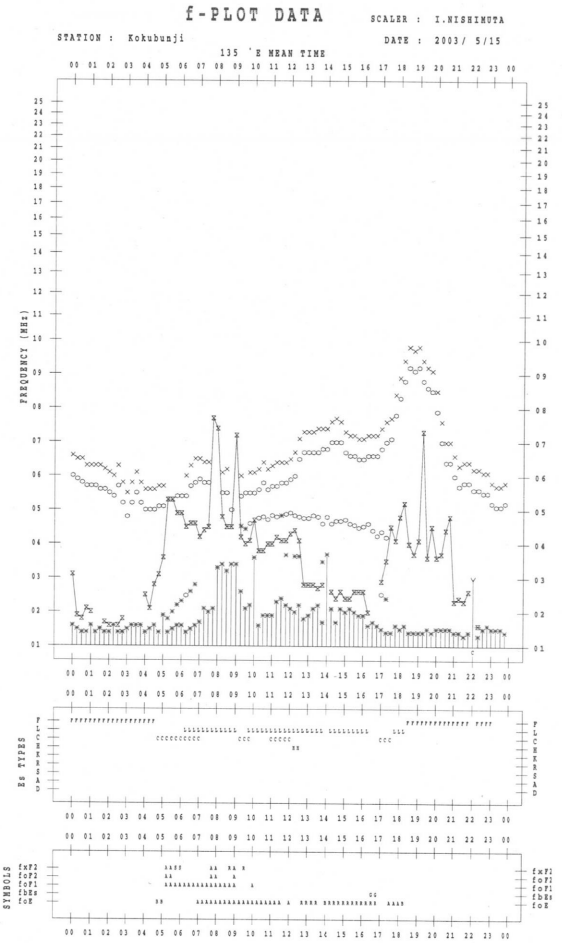

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

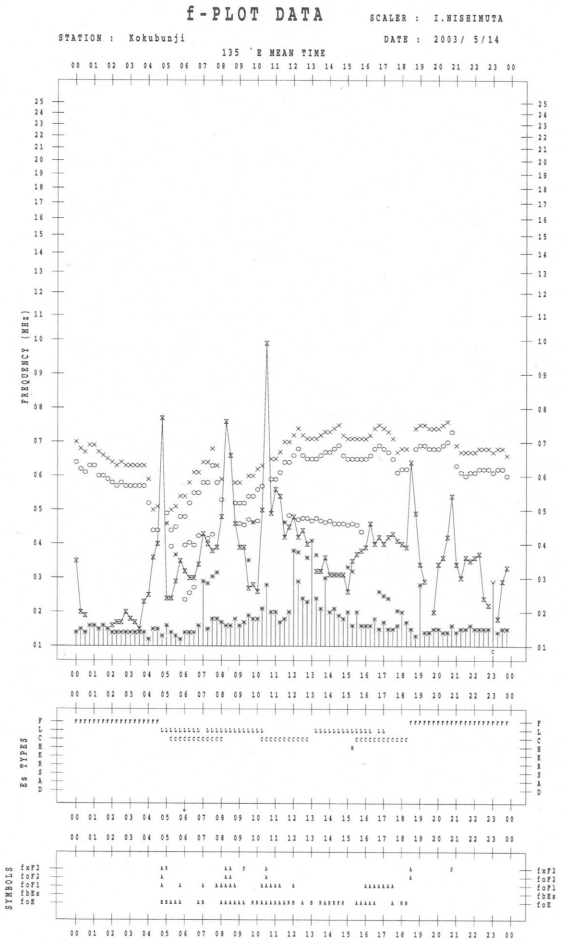

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

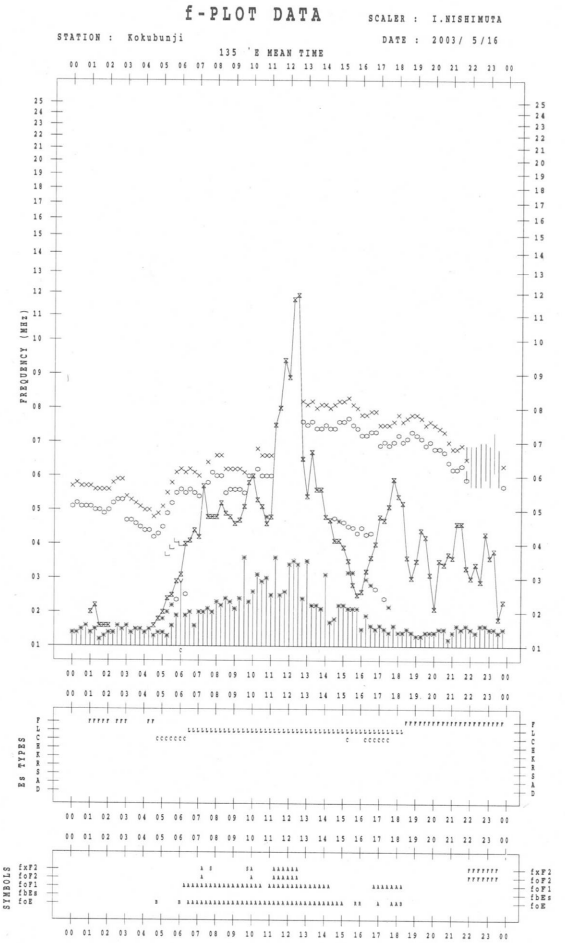

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

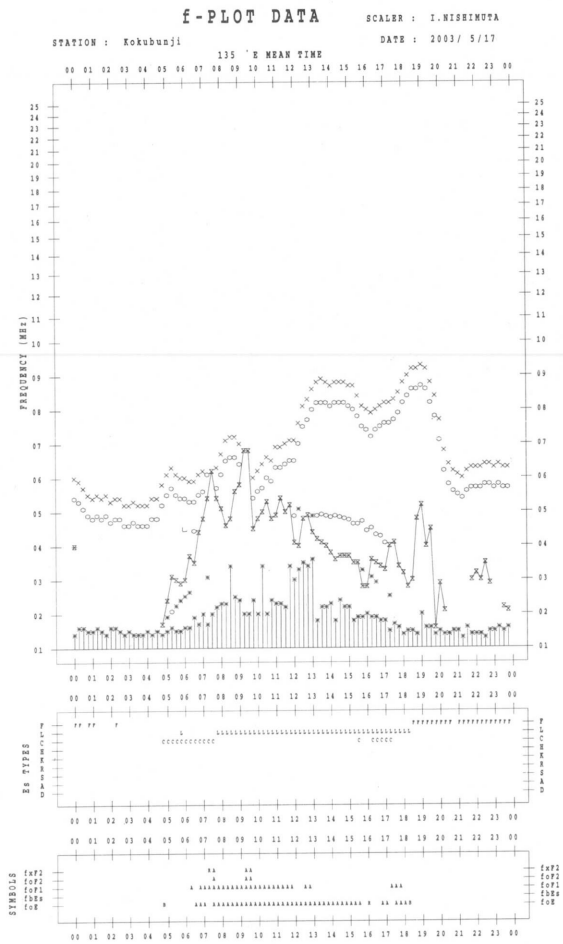

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

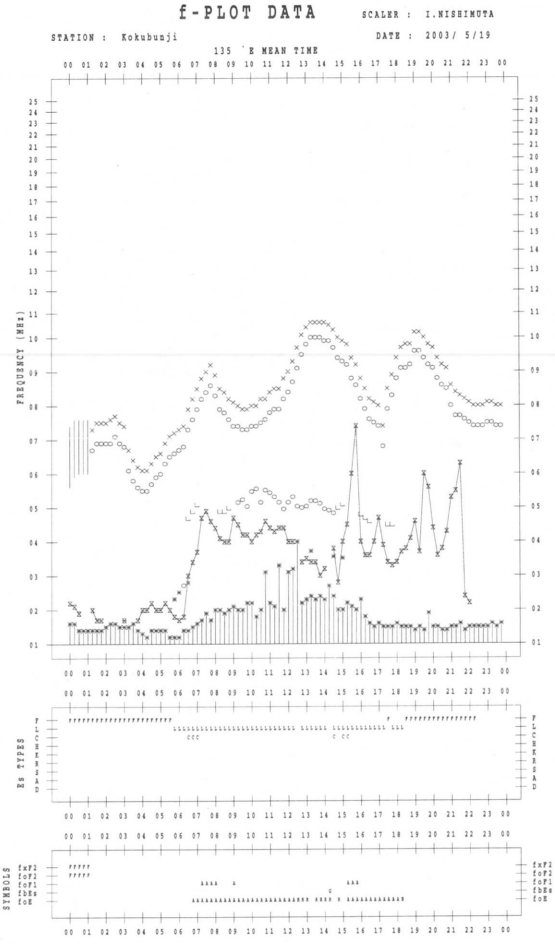

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

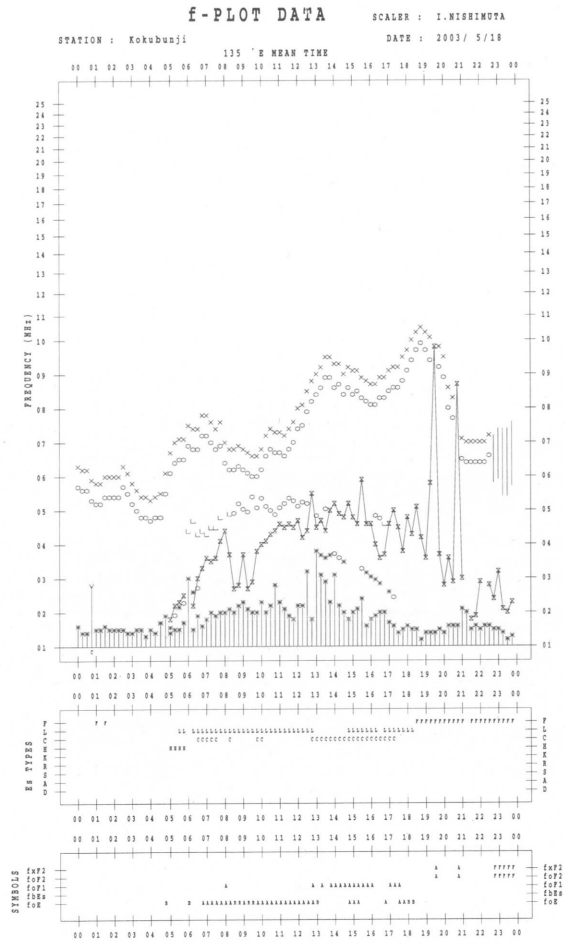

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

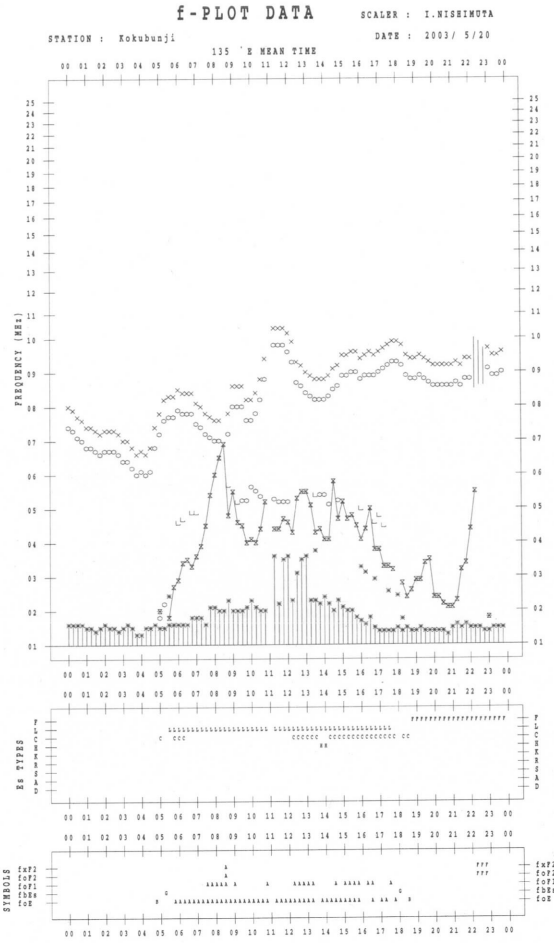

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

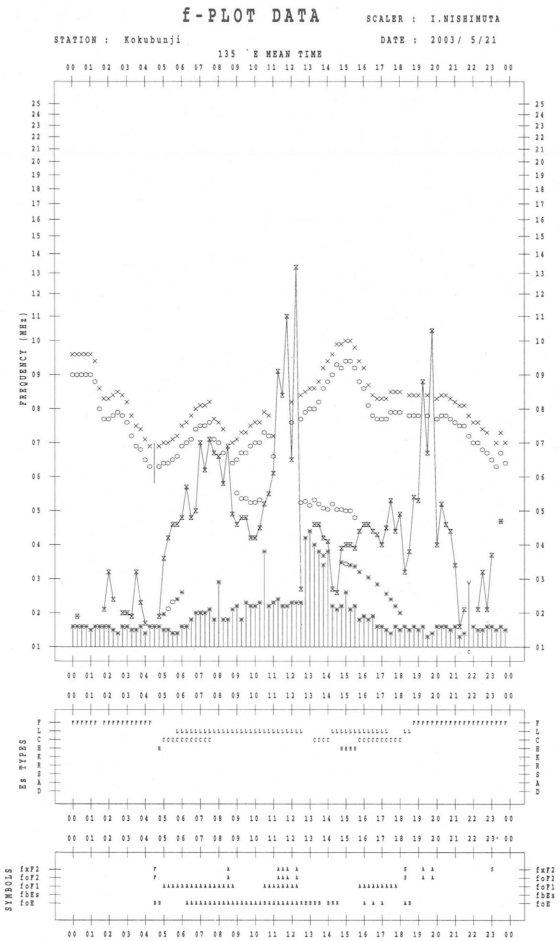

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

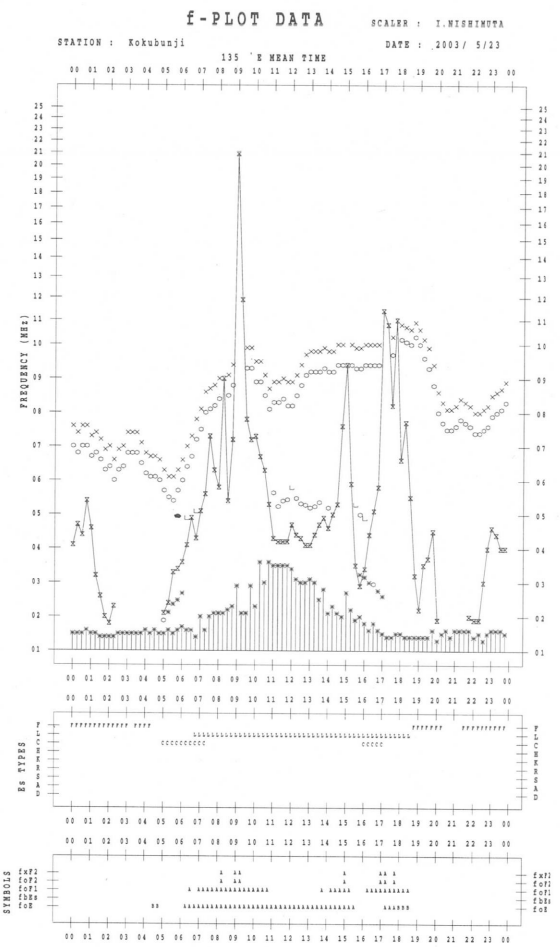

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

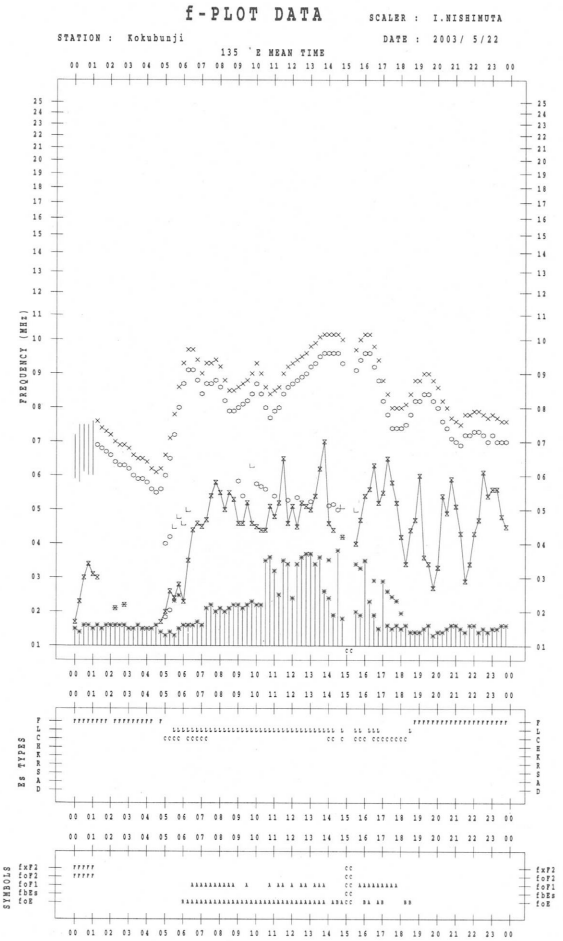

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

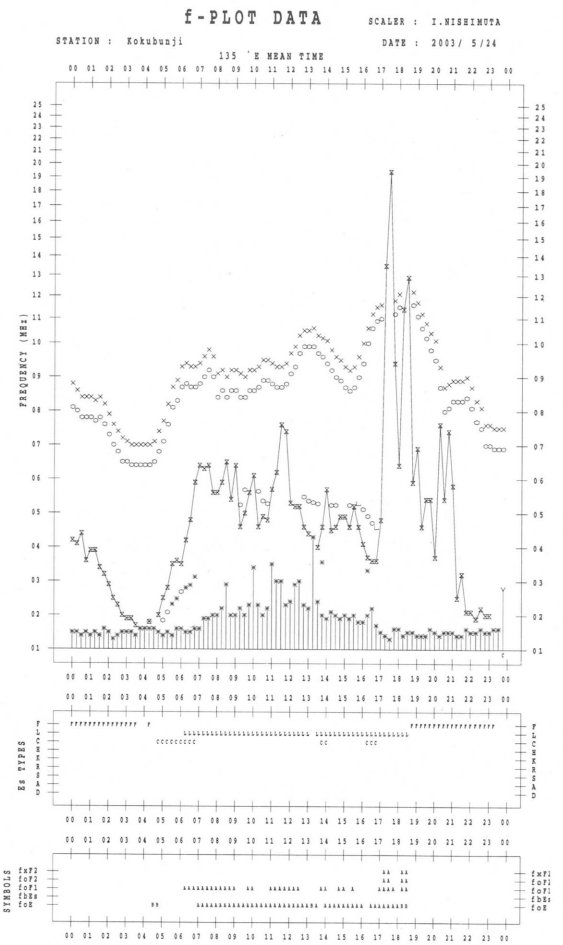

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

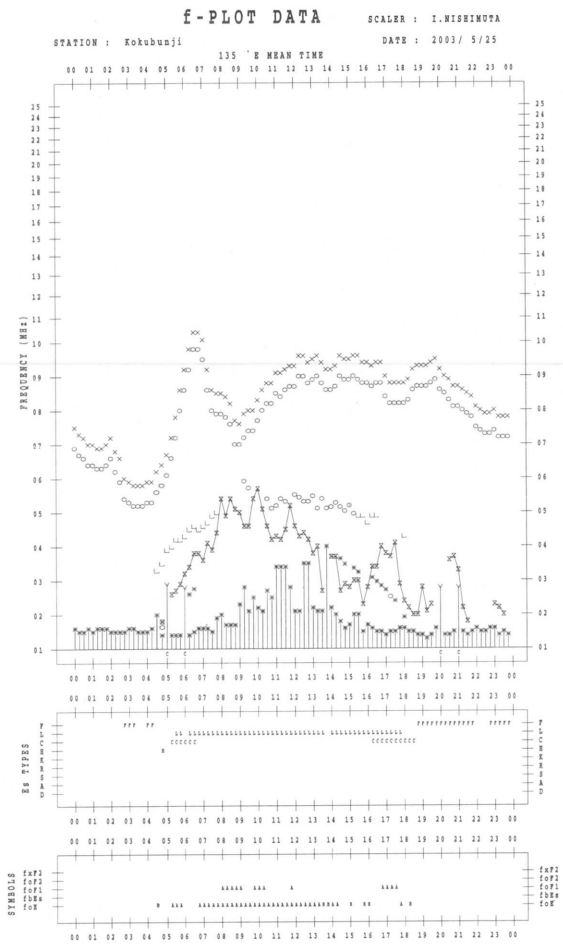

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

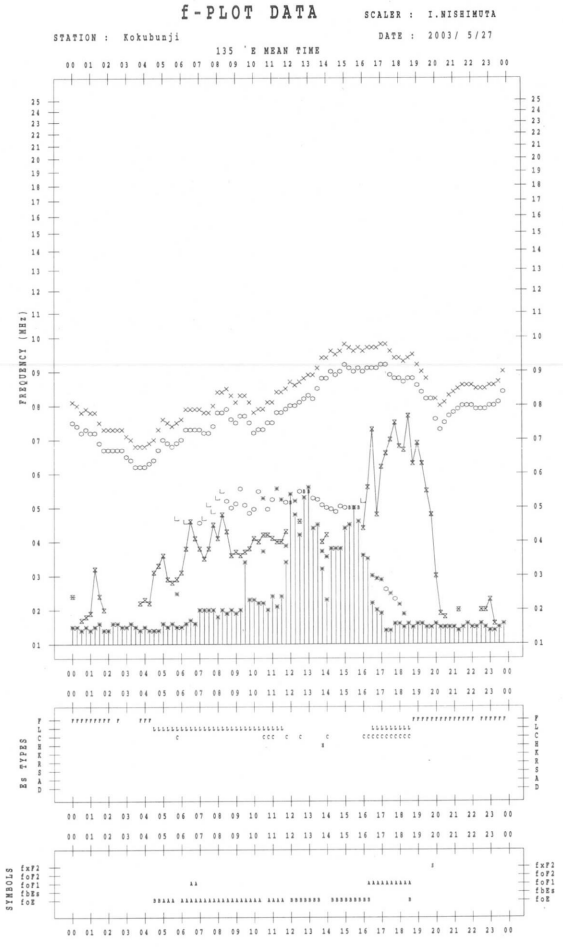

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

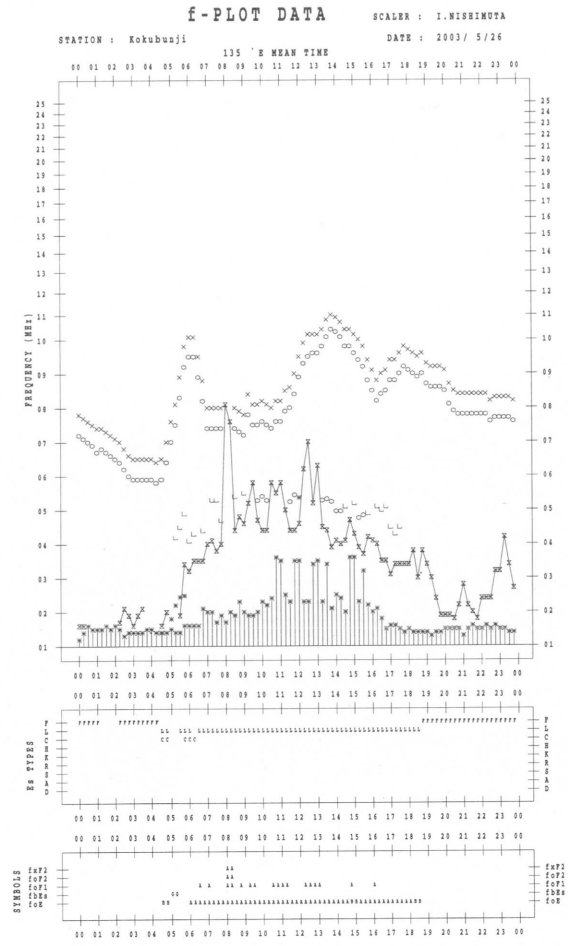

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

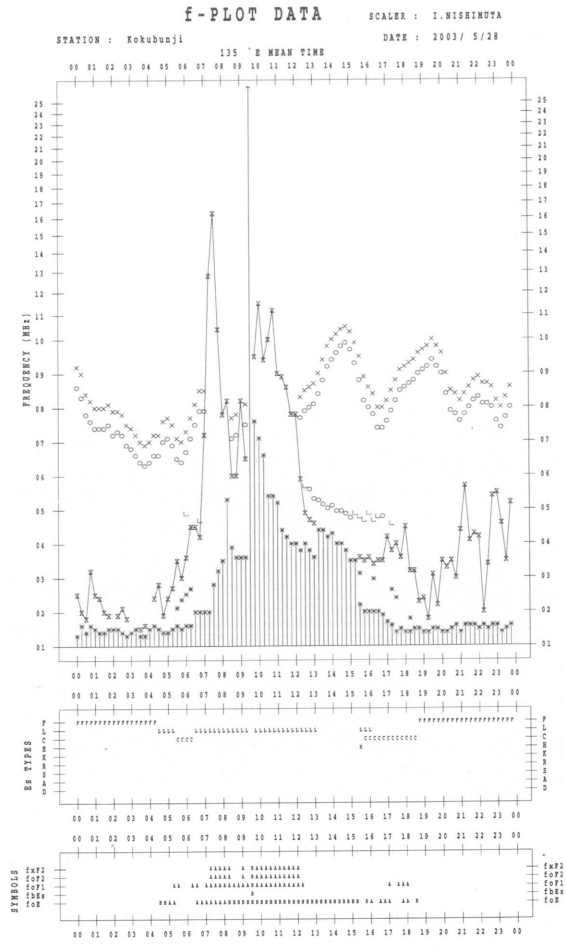

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

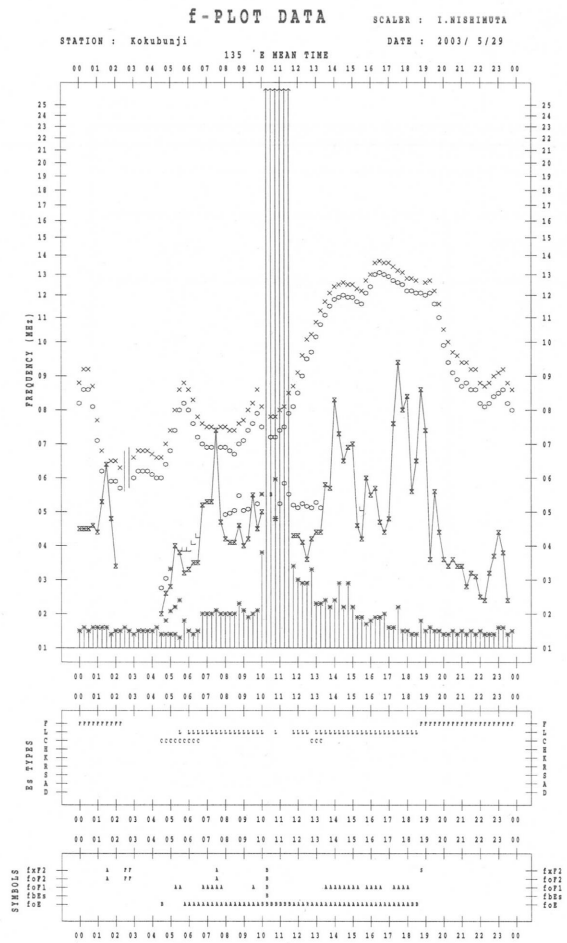

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

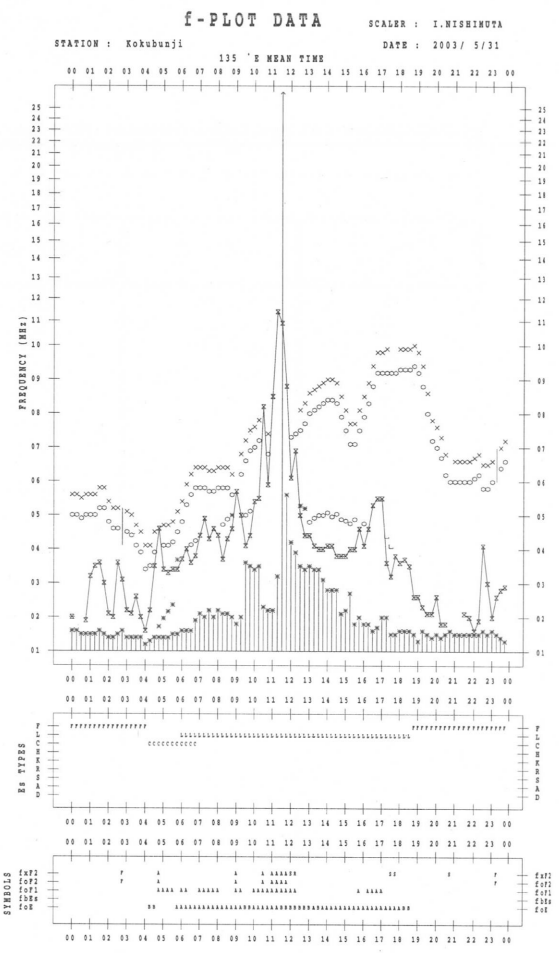

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

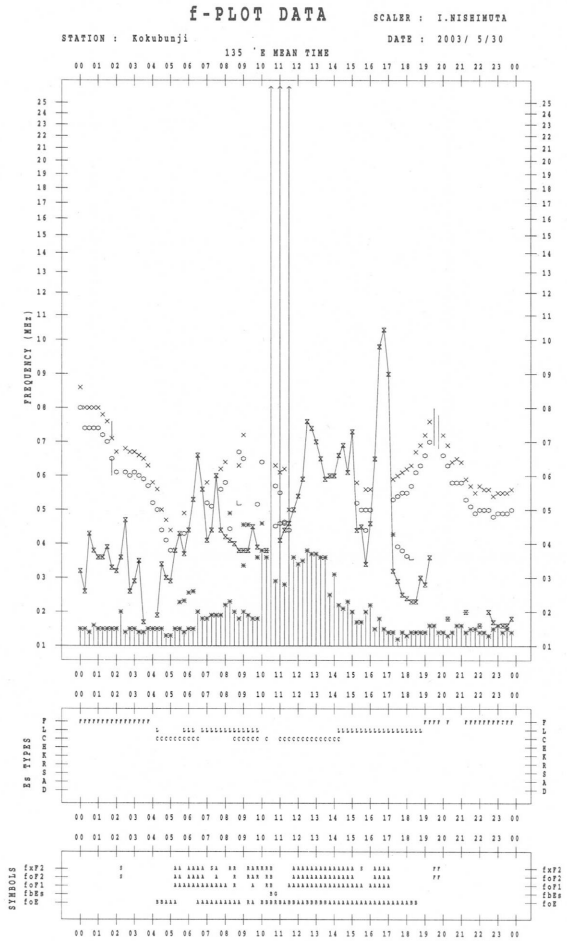

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/31
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 5/30
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

B. Solar Radio Emission
B1. Daily Data at Hiraiso
500 MHz

Hiraiso May 2003

Single-frequency total flux observations at 500 MHz					
Flux density: 10^{-22} W m^{-2} Hz^{-1}					
Date \ UT	00-03	03-06	06-09	21-24	Day
1	37	35	38	41	38
2	36	32	32	–	33
3	–	–	–	–	–
4	–	–	–	–	–
5	–	–	–	–	–
6	–	–	–	–	–
7	–	–	–	–	–
8	–	–	–	–	–
9	–	–	–	–	–
10	–	–	–	–	–
11	–	–	–	29	29
12	28	27	27	31	28
13	29	26	27	31	28
14	28	27	28	26	27
15	27	26	26	29	27
16	29	28	28	31	29
17	30	29	29	31	30
18	31	30	30	28	30
19	29	29	29	33	30
20	32	31	30	32	31
21	31	30	30	32	31
22	33	33	32	35	33
23	34	32	32	34	33
24	32	31	31	33	32
25	33	30	31	–	31
26	32	31	31	36	32
27	34	46	42	–	41
28	–	–	–	–	–
29	–	–	–	–	–
30	29	29	–	–	29
31	–	–	–	–	–

Note: No data is available during the following periods.
2nd 2000 - 11st 0930 25th 2000 - 26th 0100 28th 2100 - 30th 0200
30th 0600 - 31st 2400
A superscript * stands for being superposed on a burst.

B. Solar Radio Emission
B2. Outstanding Occurrences at Hiraiso

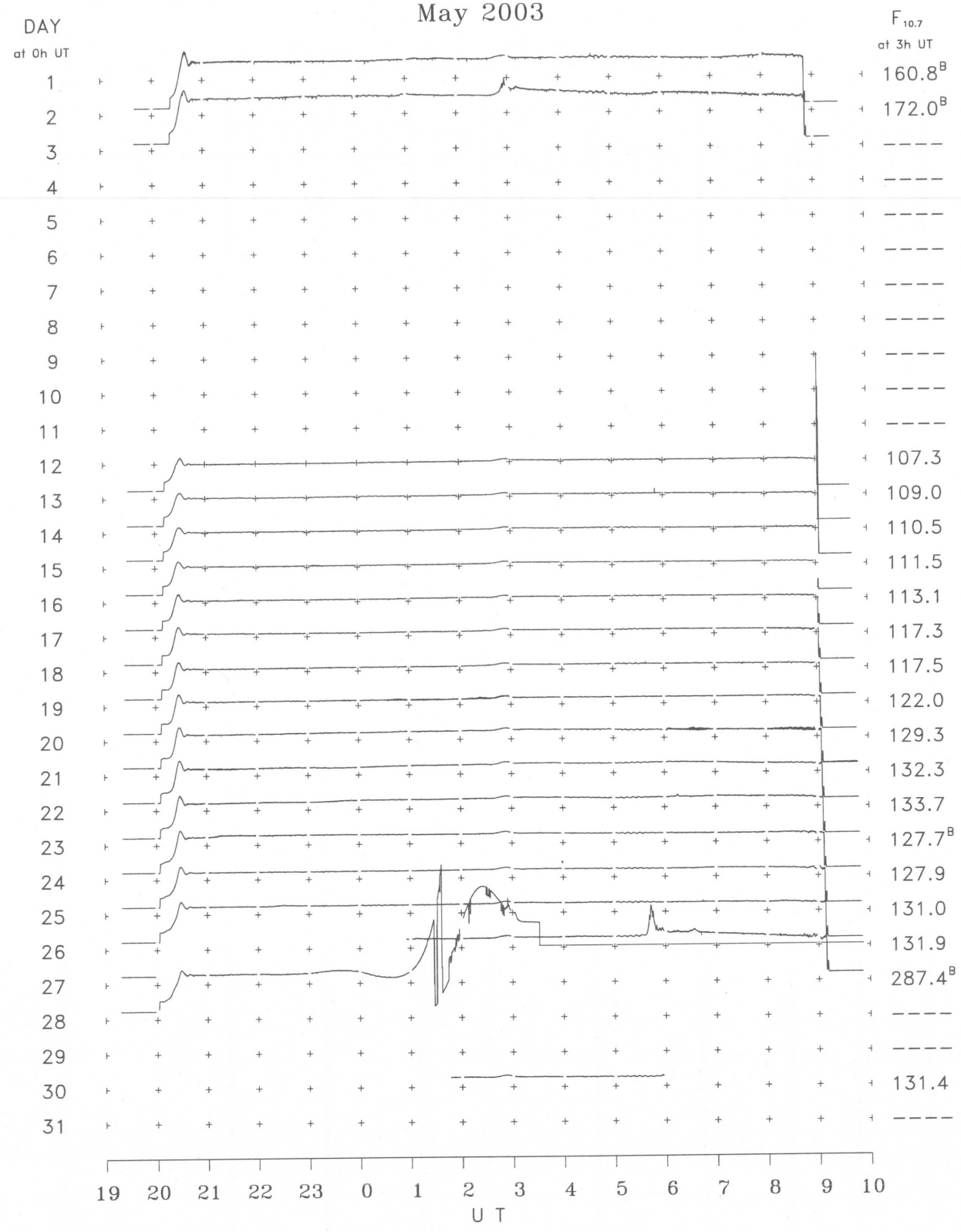
Hiraiso May 2003

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

MAY	FREQ.	TYPE	START TIME	TIME OF MAXIMUM	DUR.	FLUX DENSITY (10^{-22} W m^{-2} Hz^{-1})		POLARIZATION
2003	(MHz)		(U.T.)	(U.T.)	(MIN.)	PEAK	MEAN	REMARKS
2	500	8 S	0045.0	0045.0	1.0	20	-	0
2	2800	1 S	0248.0	0257.0	17.0	40	-	0
12	500	8 S	2139.0	2139.0	1.0	10	-	0
13	500	8 S	0251.0	0251.0	1.0	10	-	0
26	2800	4 S/F	0537.0	0543.0	22.0	85	-	0
26	500	7 C	0538.0	0546.0	62.0	155	-	0
27	500	7 C	0246.0	0254.0	27.0	125	-	0
27	500	7 C	0548.0	0643.0	56.0	165	-	0
27	500	8 S	0801.0	0802.0	3.0	70	-	0
30	500	8 S	0555.0	0555.0	1.0	30	-	0

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°.

IONOSPHERIC DATA IN JAPAN FOR MAY 2003
F-653 Vol.55 No.5 (Not for Sale)

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☎ (042) (327) ７４７８(直通)

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