ISSN 0021—0382

F—593

IONOSPHERIC DATA IN JAPAN

FOR MAY 1998

VOL. 50 NO. 5

CONTENTS

《 Real time Ionograms on the Web ..... *http://wdc-c2.crl.go.jp/index_eng.html* 》

COMMUNICATIONS RESEARCH LABORATORY
MINISTRY OF POSTS AND TELECOMMUNICATIONS
TOKYO, JAPAN

INTRODUCTION

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

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

A. IONOSPHERE

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

A1. Automatic Scaling

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

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

a. Characteristics of Ionosphere

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

b. Descriptive Letters

The following descriptive letters are used in the tables.

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

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

C Impossible measurement because of any failure in observation.

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

N Impossible automatic scaling because of complex echoes.

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

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

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

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

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

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

A Measurement influenced by, or impossible because of, the presence of a lower thin layer,for example *Es*.

B Measurement influenced by, or impossible because of, absorption in the vicinity of *fmin*.

C Measurement influenced by, or impossible because of, any non-ionospheric reason.

D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range in use.

E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.

F Measurement influenced by, or impossible because of, the presence of spread echoes.

G Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately.

H Measurement influenced by, or impossible because of, the presence of a stratification.

K Presence of particle *E* layer.

L Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.

M Interpretation of measurement questionable because the ordinary and extraordinary components are not distinguishable.

N Conditions are such that the measurement cannot be interpreted.

O Measurement refers to the ordinary component.

P Man-made perturbations of the observed parameter; or spur type spread *F* present.

Q Range spread present.

R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.

S Measurement influenced by, or impossible because of, interference or atmospherics.

T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.

V Forked trace which may influence the measurement.

W Measurement influenced or impossible because the echo lies outside the height range recorded.

X Measurement refers to the extraordinary component.

Y Lacuna phenomena, severe layer tilt.

Z Third magneto-electronic component present.

(ii) Qualifying Letters

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

A Less than. Used only when *fbEs* is deduced from *foEs* because total blanketing of higher layer is present.

D Greater than.

E Less than.

I Missing value has been replaced by an interpolated value.

J Ordinary component characteristic deduced from the extraordinary component.

M Mode interpretation uncertain.

O Extraordinary component characteristic deduced from the ordinary component. (Used for x-characteristics only.)

T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.

U Uncertain or doubtful numerical value.

Z Measurement deduced from the third magneto-electronic component.

(iii) Description of Types of *Es*

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

The types are:

f An *Es* trace which shows no appreciable increase of height with frequency.

l A flat *Es* trace at or below the normal *E* layer minimum virtual height or below the particle *E* layer minimum virtual height.

c An *Es* trace showing a relatively symmetrical cusp at or below *foE*. (Usually a daytime type.)

h An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above *foE*. The cusp is not symmetrical, the low frequency end of the *Es* trace lying clearly above the high frequency end of the normnal *E* trace. (Usually a daytime type.)

q An *Es* trace which is diffuse and non-blanketing over a wide frequency range.

r An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation.

a An *Es* trace having a well-defined flat or gradually rising lower edge with stratified and diffuse traces present above it.

s A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace.

d A weak diffuse trace at heights below 95 km associated with high absorption and large *fmin*.

n The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.

k The designation 'k' is used to show the presence of particle *E*. When *foEs* > *foE* (particle *E*) the *Es* type precedes k.

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

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

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

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

B. SOLAR RADIO EMISSION

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

B1. Daily Data at Hiraiso

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

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

* Measurement impossible because of interference.

B Measurement impossible because of bursts.

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

B2. Outstanding Occurrences at Hiraiso

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

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

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

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

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

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

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

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

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

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

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

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

C. RADIO PROPAGATION

C1. Phase Variation in OMEGA Radio Waves at Inubo

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

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

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

C2. Sudden Phase Anomaly (SPA) at Inubo

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

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

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

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

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

Transmitting Stations

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

HOURLY VALUES OF foF2 AT WAKKANAI

MAY 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	50	56	48	49	50	56	56	68	63	63	71	67		67	58	66	70	72	71	66	80	68	63	50
2	53		57			58	60	62	56	64	59	58	66		66	55	67	71	75	84	79	57	56	37
3		40	A	A	A	A	A	A	A	A	A	A					54	40	47	40	58		38	47
4	38	47		37	A	69	A	56	A	66	A	64	A	72		77		115	77	51	A	A	35	35
5	37	44		A	A	B	A		A		A	A					54	57	53	53	57	A		38
6	40		32	30	30	A		A	A	A	A	A			A	60	64	A	A	A		68	58	57
7	54		52	47	31	46		57							49	61	62	61	57	A	69	68	57	58
8	58	38	48	50	50	53	61	64		A	66	B		71	68	62	73	70	71	67	74	68	68	60
9	68	40	48	39	47	57	A				54		56	B	67	73	70	A	58	A	60		56	57
10	57	A	35	57	A	57	67	64	59	A		66	49	64	78	76	68	71	80	A	A	69	80	68
11	68	57	57	56	58	57	58	60	66	66	67	66	A	64	70	71	71	68		76	67	77	68	64
12	68		56	38	32	57	A	A	A	A	A	A	A		55	70	70	A	76	A	A	57	A	57
13	57	57		40	A	A	61	A	A	A	A	A	49	58	63	67	63	64	69	71	71	68	68	68
14	68	57	57	54	57	56	71	67	69	68	72	66	64		67	67	71	62	76	81	80	67	60	60
15	58	57	58	57	57	70	80	77	76	68	71	70	68	74	76	76	68	66	68	70	76	80	68	70
16	69	60	60	61	68	70	67	67	64	61	66		67	70	A	72	A	73	74	76	70		69	59
17	58	68	68	58	40	37	A	A	A	A	A			A	A	67	A		A	61	68	68	69	A
18	57	57	A	57	57	59	68	59	A	A	A	57	59	59	A	A	A	68	A	69	70	68	71	69
19	53	60	58		53	69	56	A	A	A	A					A	A	A	A	57		58	52	57
20	58	58	54	41	51	58	A	A	A							57	55	A	57	69	69	68	68	57
21	51	56	56	52	38	A	58	A	A	67		A		49	55	67	76	65	76	76	66	69	71	58
22	57	59	58	58	63	71	80	78	60	63	A	A	A	A	A	A	A	A	A	74		68	69	60
23	56	56	57	54	54	61	68	71	A	58	A	60	58	66	61	68	74	67	69	70		92	68	69
24	61	67	67	50	55	55	58	67	72	67	59	74				65	A	80	86	A		55	54	54
25	57	54	51	37	35	63	A	A	64	A	A			57	57	58	A	A	63	A	68	67	69	68
26	38	47	34	35	30	48	51	56	A	A	A			A	A	63	A	A	68	A		58	58	58
27	54	55	56	56	57	57	60	61	A	A	A	A	A	A	A	A	60	62	60	68	68	57	68	56
28	57	50	54	56	54	64	66	66	57	A	A		A			57	56	59	64	73	92	67	57	50
29	56	38	38	A	44	57	58	A	A	A	B					61	61	62	63	66	70	A	A	A
30	A	49	35	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A	A	57	69	54	59
31	58	54	51	50		55	A	A	A	A	A	A	A			A	A	A	A		A	68	68	68
	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	26	26	25	23	25	19	17	11	11		10		12	14	23	20	20	23	21	21	25	28	29
MED	57	56	55	50	51	57	61	64	64	66		66		65	64	67	68	66	69	69	69	68	68	58
U Q	58	57	57	56	57	63	68	67	69	67		67		70	68	71	70	71	76	75	75	68	68	66
L Q	53	47	48	39	38	55	58	59	59	63		60		58	57	61	60	62	60	63	66	62	56	55

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT WAKKANAI

MAY 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	28	33	G	G	G	G	58	G	G	G	G	G	G	32	32	29	32	26	G
2	G	26	G	G	G	32	G	36	40	G	G	G	G	G	G	G	37	45	38	40	29	34	G	G
3	24	32	51	41	36	37	39	41	45	57	58	61	G	G	G	G	G	G	33	37	26	G	28	G
4	G	28	33	30	51	39	56	42	52	56	45	42	64	G	G	G		G	32	36	45	47	40	G
5	G	G	40	34	32		39	G	41	G	71	59	G	G	G	G	G	G	32	27	38	61		29
6	28	32	34	32	28	32	G	46	53	56	42	57	G	G	42	55	48	76	82	72		33	25	24
7	28	29	29	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	45	60	G	G	G	G
8	G	24	33	G	28	28	34	46		56	G	B	G	G	G	G	G	G	37	39	31	28	29	G
9	G	G	G	G	26	32	38	G	G	G	G	G	G	B	G	G	73		60	96	74		60	36
10	34	40	36	58	44	53	48	54	43	80	G	G	65	G	G	40	40	34	62	82	72	41	40	G
11	28	25	G	24	G	30	G	43	53	53	61	59	64	G	G	63	44	42	28	39	34	34	40	46
12	40	33	G	23	33	45	51	58	60	56	53	53	58	G	42	41	60	75	71	93	86	60	58	61
13	40	29	28	28	46	62	55	61	55	60	43	42	G	G	G	G	G	48	36	32	31	27	24	G
14	24	27	27	24	G	36	42	45	46	42	G	G	G	G	G	G	G	G	39	29	29	G	30	33
15	40	38	56	34	G	36	48	50	61	42	42	G	G	G	G	G	G	39	28	30	24	23	25	29
16		29	26	27	G	30	34	54	G	G	42	G	G	G	65	66	61	72	44	34	60	28	G	33
17	38	37	31	27	G	28	40	53	44	87	59	G	G	42	82	44	87			G	32	61	54	62
18	42	26	34	26	27	34	46	65	61	65	60	43	44	47	75	72	66	42	60	37	60	39	37	34
19	G	24	G		G	G	50	63	59	75	64	G	G	G	G	86	76	76	78	60	85	64	62	61
20	62	37	30	29	26	34	57	61	58	G	G	G	G	G	G	47	39	68	50	53	33	51	29	34
21	33	G	36	30	G	41	53	64	64	G	G	42	G	G	G	G	40	56	61	45	36	58	G	45
22	24	26	G	G	G	29	38	G	45	44	66	44	43	64	66	80	81	68	92	58	60	44	46	47
23	56	36	41	38	36	32	63	64	94	54	58	62	43	G	G	43	44	41	54	54	41	24	G	G
24	G	G	27	G	G	37	46	56	55	45	G	56	G	G	G	G	63	71	66			59	44	33
25	24	G	G	G	G	42	76	94	54	58	64	G	G	G	42	45	59	70	47	93	51	33	33	24
26	G	G	24	G	27	35	43	44	58	41	43	G	G	42	53	45	62	58	47	72		44	33	G
27	27		30	G	G	33	41	56	61	91	114	76	85	60	68	75	58	35	46	36	45	38	28	36
28	24	G	G	G	29	30	42	50	54	56	58	G	62	G	G	G	38	44	40	34	29	39	34	28
29	40	32	36	40	35	31	48	66	77	121	B	G	G	G	G	G	G	G	46	34	39	86	59	62
30	77	62	36	61	32	45	46	53	60	93	59	66	64	63	74	G	112	126	124	90	35	72	62	58
31	G	G	G	G		41	78	90	64	78	73	62	44	G	G	62	88	95	76		84	58	57	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	31	30	30	30	31	31	30	31	30	30	31	30	31	31	30	29	30	29	28	30	30	31
MED	26	26	29	25	26	34	43	53	54	56	44	42	G	G	G	G	44	44	46	39	37	39	33	29
U Q	40	32	36	32	32	39	51	61	60	65	60	58	44	G	42	55	63	70	62	66	60	58	46	45
L Q	G	G	G	G	G	30	38	42	44	G	G	G	G	G	G	G	G	17	37	34	30	28	25	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT WAKKANAI

MAY 1998

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

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT KOKUBUNJI

MAY 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	57	57	47	47	46	63		68	70	73	68	76	77	74	82	88	94	92		86	82	68	57	57
2	57	68	52	56	57	48	68	78	81	84	81	A	87	80	78	82	75	90	100	114	94	58	58	57
3		57	61	A	42	39	50	A	A	A	A	A	A	A				54	58	47	A	44	A	A
4	44	41		A	26	A	66	70	A	A	A	A	81	85	79	109	123	124	103	80	A	A	A	48
5	43	48		41	35	51		A	A		A						64	68			47	46	58	44
6	A	41		41	34					B	66	74	A	67	77	78	73	75	82	70	67	68	A	A
7	57	66	67	50	50	56	64	78	60			59			72	72	71	63	66	68	68	70	A	70
8	70	69	54	57	51	64	59		71	76	A	B	A	85	91	90	81	81	82	82		62	67	61
9	63	58	57		52	52	73	A	63	56	A	A	A	B	95	97	91	94	93		70	70	68	72
10	65	61	62	56	48	60	84	A	77	A	A	88	87	86	81	81	82	77	78		83	78	68	81
11		73	68	52		66		A	70	A	A	A	A	84	93	93	95						62	68
12	69	69	58	A	50	57		94	A	A	A	A	A	74	91	88	91	86	96	82	83	94	94	70
13	67	71	70	69	61	74		94	69	A	71	A	A	80	81	82	80	88	A	84	69	68	73	64
14	69	74	57	58	54	74	70	94	79	84	67	68	72	83	87	90	94	92	96		94	80	70	68
15	68	67	61	52	58	74	92		72	67	A	A	A	82	86	93	92	87	86		94	A	61	73
16		56	58	50	56		74	A	A	A	A	69	A	86	93	98	93	83	88	93	83	89		
17	62	61	57	58		47	A	A	A	A	A		63	A		A	A	67	67	80	A	A	69	57
18	57	56	57	54	51	57	69	A	94	A	67	74	77	82	81	82	82	A	A	77			68	56
19	A	46	A	54	51		68	76	53	A	A	A	74	A							58	A	A	A
20	A	57	56	58	48	56	69	67	A	A	62	A	A	A	A	A	72	63	60		64	39	A	A
21	A	A	56	45	46	57	66		A	A	A	56		A	77	88	92	79	82	83			73	60
22	68	58	57	51	56	70	79	68	A	80	A	A	A	75	87	A	101				A	A	57	A
23	56	A	57	51	52	64	76		A	A	A	A	A	A	A	92	A	86	73	82	92	95	73	80
24	74		67	51	60	69	75	A	A	76	A	A	A	83	74	A	92			97	A		A	51
25	A	A	47	A	A	48		93	98		A	A	A	A	68	73	71	A	109	77	A	86		56
26	47	57	56		42	63	A	A	A	A	A	59	59		75	66	78	76	81	77	69	67	57	A
27	56	50	57		47	57	67	73	76	72	A	A	49	A	A	A	91		80		58	A	68	A
28	68	68	63	48	49	55	A	70	68	A	A	64		A	A			62			60		68	A
29	59	56	A	51	48	48	A	78	A	A	B	A	A	A	A	A	101	82	A	72	66	64		56
30	A	56	46		30	A	56	A	A	A	A	A			64	58	54	47	47	58	56	57	57	N
31	A			52	51	57	60	A	A	A	A	A	A	72	A	A	A	A	56		68	68	58	68
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	26	25	23	28	26	20	14	15			10	10	16	21	20	25	23	21	19	21	20	21	21
MED	62	58	57	52	50	57	68	77	71			68	76	82	81	88	91	81	82	80	69	68	68	61
U Q	68	68	61	56	53	64	74	93	79			74	81	84	89	92	93	88	94	84	83	79	69	70
L Q	56	56	56	50	46	52	65	70	68			59	63	74	76	79	74	67	66	72	62	60	58	56

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT KOKUBUNJI

MAY 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	28	31	G	46	46	G	G	G	G	G	G	G	48	53	34	25	40	24	24
2	28	44	G	G	G	25	35	50	48	53	110	89	84	73	G	41	52	70	67	35	36	34	26	33
3	38	G	33	33	26	29	34	41	55	60	58	51	86	57	G	G	G	G	32		48	27	31	30
4	27	G	30	46	29	44	40	56	119	114	110	104	45	G	G	G	G	G	G	44	59	72	70	34
5	24	59	G	40	G	29	G	52	54	G	53			G	B	G	G	36	29	G	G	G	G	30
6	43	G	G	G	G	26	G	G	G	B	G	52	83	G	G	G	51	47	37	58	28	G	71	66
7	57	33	30	30	40	30	39	44	G	G	G	G		G	G	G	G	G	40	G	25	70	59	34
8	33	27	27	G	G	G	G	G	G	47	49	B	70	58	G	52	60	81			59	50	36	33
9	31	29	G	G	G	G	32	46	39	58	68	130		B	G	G	53	35	35		53	65	69	60
10	59	56	33	44	48	G	60	68	62	50	75	83	G	G	G	120	58	56	54		84	35	25	60
11	G	40	34	26		36	45	87	49	117	86	86	73	78	49	G	58		91	118	118			54
12	39	50	59	74	41	34	35	47	59	90	90	110	125	50	G	G	G	40	30	27	57	71	34	35
13	32	34	56	44	42	33	38	50	59	70	58	56	64	72	51	G	G	46	90	61	36	56	G	45
14	G	G	G	G	G	29	36	46	52	50	53	G	49	G	G	G	G	46	50		58	33	25	24
15	G	G	39	44	30	32	58	52	62	54	62	62	92	G	G	G	G	G	34	160	60	105	85	
16		58	43	36	41		56	76	115	77	67	50	64	82	82	55	44	48	47	58	106	116	84	
17	59	40		32	G	34	68	76	82	154	101	153	60	94		94	71	58	60	73	114	89	38	52
18	50	40	49	46	30	37	36	78	91	120	62	43	58	68	68	G	56	81	82	39	34		58	88
19	91	96	85	57	90	55	G	46	54	70	73	74	59	82		178	100	141			55	66	62	110
20	74	59	52	35	28	G	43	62	91	58	G	52	56	68	66	108	56	55	60	118	69	92	90	125
21	58	60	54	50	24	29	35	62	76	148	67	G	G	72	G	57	82	129	49	34	32		34	44
22	56	43	34	49	36	33	38	57	91	88	85	133	107	68	55	90	97	118			137	124	116	123
23	86	97	50	32	30	G	38	57	96	107	97	86	65	74	106	66	96	69	66		34	44	44	57
24	59	G	G	54	55	44	55	80	78	68	78	164	169	48	57	84	80			111	80	58	60	72
25	60	61	46	40	60	G	40	82	90	109	156	166	58	84	68	G	G	74	116	156	94	60		49
26	37	32	29	40	28	40	60	62	71	68	59	47	G		G	G	62	44	44	40	47	60	41	58
27	50	57	50	40	54	38	39	46	62	67	83	59	50	60	71	63	46	40	86	60	54	99	56	71
28	60	45	33	40	43	55	89	64	65	66	89	53	58	102	163		138	69	61		66		64	94
29	63	50	71	36	56	57	81	73	88	87	B	77	133	172	128	94	72	86	85	67	44	38		54
30	72	70	90	34	G	30	39	54	55	60	80	72	118	G	G	G	G	34	31	30	G	55	58	75
31	158	122		53	32	34	56	91	68	146	96	84	54	56			133	121	70	105	55	59	125	50
	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	29	31	30	30	31	31	31	30	30	29	28	29	27	29	31	29	27	22	31	27	28	29
MED	50	43	34	40	30	31	39	56	62	68	70	72	62	60	G	G	53	48	53	58	55	59	57	54
U Q	60	59	51	46	42	37	56	73	88	107	89	96	85	76	68	75	72	77	70	105	69	72	69	71
L Q	31	27	14	30	G	26	35	46	52	54	58	50	52	G	G	G	G	38	35	34	34	38	32	34

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT KOKUBUNJI

MAY 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	15	16	14	14	15	14	15	14	16	23		49	23	23	17	18	15	15	15	14	14	15	15
2	14	14	15	15	14	15	18	16	38	21		36	28	29	46	22	14	15	14	15	15	15	15	14
3	15	15	14	14	15	17	14	15	16	22		23		38		17	14	14	15	15	14	14	14	15
4	16	15	14	14	14	15	14	28	18	21	34	33	28		23		15	15	20	14	15	14	15	14
5	14	14	17	14	15	14	15	16		24	27						18	14	15	15	14	14	16	15
6	15	15	16	14	14	18	15	17	21	B		35	36	26	53	43	18	20	17	15	14	15	14	14
7	15	15	15	15	14	15	15	17	27			53			56	47	41	16	14	15	15	15	14	14
8	14	15	14	15	14	17	14	18		24		B	33	33		39	22	18	16	15	15	14	14	15
9	14	14	15	14	15	17	15	16	21	23	37	44	39			44	18	16	15		14	14	14	14
10	14	14	15	15	14	15	15	16	17		39	38		59		22	17	14	15		15	14	15	15
11	14	14	14	14		14	15	15	20	21		38	38	33	30	24	16		15	15	15		14	14
12	14	14	15	14	15	15	15	15	20	18	23	27	24	32		42	18	14	15	14	15	15	15	15
13	15	14	14	15	15	15	15	18	18	17	23		36	34	24	20	20	15	14	14	15	15	14	14
14	15	15	15	14	14	15	15	15	16	18			33	22	17	16	15	15	15	15	14	14	15	14
15	15	15	14	15	14	15	14	15	17	18	21	20			23		21	15	15	14	14	14	15	15
16		15	14	15	14		15	14	18	21	35	36	32	32	27	21	16	15	15	14	15	14	15	
17	15	15	14	14	15	15	14	14	17	27	21	28		38		17	18	15	15	14	14	15	14	14
18	14	14	14	14	14	14	15	14	17	20	22		40	35	18		18	15	15	14	14		14	14
19	15	15	15	14	14	14	15	14	18	15	18		27			24	18	14			15	15	14	15
20	14	15	14	15	15	14	15	14	16	18		33	34	34	23	18	14	14	15	15	14	14	15	14
21	15	15	15	14	14	15	15	14	16	15	33	32		18		16	16	14	15	15	14		15	15
22	14	15	14	15	14	16	16	14	17	18		28	32	28	18	20	17	15			15	14	15	15
23	14	14	15	15	15	15	15	15	16	20	20	29	32	33	24	18	16	15	15	14	15	15	14	15
24	14	14	18	15	15	14	14	15	16	17	33	32	33	20	18	21	16	15		15	14	15	14	15
25	15	15	15	15	15	15	14	16	16	18	17	29	26	26	20	16	16	14	15	15	15	15		14
26	15	14	15	14	14	14	14	15	17	18	18	22			49	16	15	15	14	14	14	14	15	14
27	15	15	14	14	15	14	15	15	15		35	36	33	33	24	14	15	15	15	15	14	15	14	15
28	14	14	15	14	14	14	14	15	16	16	24	23	24	27	26		15	16	14		14		14	14
29	14	14	15	15	14	14	15	14	23	24	B	42	33	28	22	18	20	15	15	15	15	14		14
30	14	15	15	14	15	15	14	15		17		33	34		47	18	16	16	14	14	14	14	14	15
31	14	15		14	14	15	15	15	15	16		34	35	38	36	42	17	15	15	14	14	15	15	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	31	30	30	31	31	28	27	19	24	23	23	22	26	31	30	28	26	31	27	29	30
MED	14	15	15	14	14	15	15	15	17	18	23	33	33	32	24	20	17	15	15	15	14	14	14	14
U Q	15	15	15	15	15	15	15	16	19	21	34	36	36	34	36	24	18	15	15	15	15	15	15	15
L Q	14	14	14	14	14	14	14	14	16	17	21	28	28	26	22	17	15	14	15	14	14	14	14	14

HOURLY VALUES OF foF2 AT YAMAGAWA

MAY 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	53	59	52	55	N	48	58	68	67	75	82	85	91	98	105	120	118	110	102	107	98	84		85
2	66	60	66	65	59	60	59	75	81	91	77	81	96	92	90	97	92	105	104	110	86	83	81	74
3	64	71	84	89	59	47	34	A	A	A	A	A		B	A	A	53	58	57	94	39		89	
4	69		47		26	26	89	62	67	58	A	92	91	89	109	129	154	128	110	98	79	49		49
5				A	59	50	119	64	54		A	B	59		59	59	83	87	82	66	34		79	69
6	79	37			89	34	34	49	62	A	71	81	78	87	86	95	95	94	95	109	86	84	83	83
7	65	65	66	60	55	56	53	69	78	70	66	72	82	82	83	85	84	82	74	81	84	84		64
8	64	67		63	58	64	82	70	70	75	78	84	84	99	114	110	98	92	88	90	84	75	N	67
9	72	69	56	60	70	58	54	55	62	67	A	80	92	104	110	114	112	108	105	96	86	80	85	76
10	83	73	70			59	67	A	A	A	75	102	115	101	98	104	103	92	82	86	87	86	86	86
11	82	86	99	82	62	63	72	76	72	71	76	75	92	105	118	115	106	94	87	108	99	84		73
12	84	72	66	53	55	54	77	74		84	83	78	76	91	107	104	104	96	96	100	98	86	75	66
13	72	62	62		61	60	66	80	75	76	76	77	87	99	105	105	102	93	91	86	80	81		72
14	73	70	69	53	61	57	73	92	87	70	61	70	75	86	102	117	111	144		106	107		76	86
15	84	81	77	73	66	66	84	75	67	67	71	A	92	96	106	110	111	111	110	110	108	84		77
16	78	74	N	69	60	69	66	77			A	A	79	94	108	120	116	112	94	86	87	84	63	
17	71	74	67	59	58		67	86	68	A	A	A	76	86			94	A	70	75	82	81	72	
18	66	63	66	54	60	62	54	66	70	A	79	78	90	A	97	90	92	98	88	82	83	53	59	66
19	61	70	55	54	53		70	72	67	89	60	A	80	80	72	74	86	93	85	64	66			42
20	58	55	52	50	A	60	60	A		69		A	81	84	82	84	78	74	70		70	66	68	62
21		48	67	51	59	34	64	78	A	59	70		74	78	85	96	98	91	88	87	82		83	76
22	68		56	52	68	63	74	75	61	77	A				98	104	100	95	87	94	99	79		75
23			A	58	61	69	78	68	55	A		A	91			101	105	100	87	75	84		82	81
24	82	67	70	54	59	58		59	69	57	61	70	93	87	83	82	98	102	102	100		79	73	74
25	59		64	28		25	67	109		68	A	70	74	85	86	88	91	87	85	94		79		
26	66	64	70	58	62	52	70	A				A	A	74		87	92	103	94	92	79	72	78	82
27	73	53	58	60	49	A	53	71	84	63	61	A	64	71	80	90	100	90	85	84	83	66	68	A
28		59	66	54	59	59	50	83	82	A	A	A	A	85	78	84	92	76	75	84	92			59
29	61	53	59	53	60	59	67	66	66	89		A				77	80	85	86	84	72	80		49
30	66	75	59			39	58	A	A	A	A	B			67		55	55	53	59	50		79	39
31		39		34			58	69				62	A	76	77	A	86	81	A	88	88	72		
	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	25	25	25	27	30	26	21	19	16	16	24	24	26	27	31	30	29	30	29	23	18	25
MED	68	66	66	55	59	58	66	72	68	70	73	78	83	87	94	97	98	94	87	89	84	80	78	73
U Q	78	72	69	61	61	62	73	77	76	77	77	82	91	97	106	110	105	103	95	100	90	84	83	79
L Q	64	59	57	53	58	48	58	66	64	67	63	71	76	83	82	85	86	87	82	84	79	72	72	63

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT YAMAGAWA

MAY 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	G	47	50	54	56	G	60	149	172	144	60	82	41	33	65	43
2	G	G	G	G	G	G	28	33	G	64	62	66	91	G	G	G	G	44	58	82	57		59	56
3		G	G	G	G	28	32	43	60	59	59	77			78	64	40	G	37	88	84		25	
4	40		41	29	G	32	39	39	66	G		G	60	G	G	G	G	G	G	56	83	40	41	
5				40		28		41	40	G	75		70		G	G	G	G	G	32	36	26	25	G
6	G	32	39	G	40	G	G	G	44		58	61	G	G	75	G	93	62	71	97	58	28		31
7	31	32	25	G	32	G	G	G	40	49	G	G	G	G	G	G	G	G	40	37	41	32		26
8	G	G	G	G	G	G	G	50	53	G	G		G	G	G	G	62	68	59	G	77		32	32
9		G	29	G	32	G	G	G	55	51	84	59	G	G	63	62	62	91	37		32	40	G	28
10	60		60	64	40	32	60	90	111	96	66	83	G	83	84	56	52	50	56	58		G	31	26
11	29	25	G	G	G	G	G	57	54	61	71	88	G	80	G	G	98		112	32	83		58	40
12		58	G	G	G	G	G	G	G	G	G	58	G	G	G	G	51	36	44	41	39	32	G	G
13	G	G	G		G	32	46	45	44	61	62	61	86	62	71	62	50	48	45	36	72	28	G	G
14	G	G	G	G	G	G	32	59	54	60	G	G	78	54	G	55	92	85		96	32	24	G	G
15	58	G		G	G	G	G	39	G	G	G	110	G	G	G	G	59	66	60	59	32		32	29
16	32	40	G	G	G	G	G	G	111		81	115	96	G	G	G	G	64	50	G	60	32	40	
17		39		61	28	28	40	52	54	88	68	92	61	75	103	147	61	86	53	55	76	33	30	29
18	32	G	40	29	32	G	G	G	61	86	91	61	84	105	61	52	G	G	G	G	28	30	40	
19	59	31	41	41	32		32	61	69	96	71	90	76	61	G	61	77	60	68	60	57		60	41
20	32	G	G	G	32	32	G	79		92			81	82		79	G	51	61		78	65	G	28
21		G	G	G	G	G	G	46	91	G	61	G	G	G	G	G	G	36	G	G	32		32	30
22	G		32	41	50	32	40	43	50		83	107	164		G	G	G	39	34	68		93	38	
23			32	31	G	G	G	36	55	66	112	105	102	137	163	82	59	71	56	26	G	28	26	
24	60	G	23	G	G	30	34	70	82	60	60	G	82	G	56	G	G	G	40	72	78	82	60	83
25	G	40	29	G	41	28	33			68	116	68	G	54	G	43	G	47	45	36		170		30
26	41	24	39	31	32	G	73	68		113		162	84	78	91	51	G	43	60	49	58	26	30	31
27	31	38	84	82	79	60	39	57	65	60	60	61	56	55	51	53	53	84	57	85	59	30	29	
28		79	41	G	32		34	63	59	66	91	92	94	152	62	G	G	68	60	58	32	30		45
29	40	32	28		G	G	33	54	62	100		79	142	163	139	70	73	60	59	58	36		66	
30	81	78	78		40	39	32	43	57	59	85			G	G	G	G	G	33	G	G	40	G	31
31		31	40	46	40	43	32	77	112	128		59	61	56	83	125	116	G	75	107		57	40	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	22	26	28	28	30	29	30	30	28	28	26	27	29	28	30	31	31	30	30	29	27	23	27	22
MED	32	24	28	G	14	G	32	44	55	60	64	66	61	54	26	43	50	49	54	56	57	32	32	30
U Q	41	38	40	35	32	32	34	59	65	87	83	92	85	79	75	62	62	68	60	77	76	40	41	40
L Q	G	G	G	G	G	G	G	33	44	48	58	58	G	G	G	G	G	G	37	32	32	28	25	26

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT YAMAGAWA

MAY 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	14	14	14	14	15	22	22	24	46	42	46	34	40		22	20	18	15	14	15	16	16
2	15	14	15	16	14	14	15	18	49	35	38	43	44	46	50	45	45	21	17	15	16	16	16	15
3	14	15	15	17	20	14	16	23	21	34	38	43			40	34	21	18	20	14	15		15	
4	15	14	17	20	16	15	16	18	24	22	35	50	43				44	20	22	15	18	15	18	15
5	14	15		20	15	14	16	18	22		44		40				46	20	22	15	15	15	16	16
6	16	15	14	15	15	14	21	18	21		43	46	52	48	45	47	34	34	26	16	16	14	14	15
7	15	15	15	15	15	14	20	20	22	33	48	55	52	49	53	46	45	27	18	17	17	15		15
8	16	14	14	14	14	16	17	18	22	48	46	58	55	54	54	53	41	20	17	15	16	15	14	15
9	15	14	15	16	16	17	18	17	38	45	42	45	48	68	46	45	44	22	17	15	14	15	15	15
10	15	16	17	15	15	15	17	21	20	44	40	44	52	46	45	46	22	23	20	18	17	15	15	15
11	15	15	15	14	14	14	20	22	21	35	39	42		40	54	49	32	23	18	15	18	15	15	15
12	15	16	15	14	14	14	18	18	18	50	48	43	52	49	17	46	36	21	20	18	15	16	14	17
13	14	15	14		14	16	17	16	21	23	32	39	43	40	40	49	30	20	16	15	15	15	15	14
14	15	15	14	14	14	14	20	21	33	41	47	54	48	48	49	56	38	20		16	15	14	15	14
15	15	14	15	14	14	14	15	17	22	48	50	42	48	48	53	48	40	20	17	15	15	15	15	14
16	14	15	14	14	14	14	16	17	21		41	45	44	54	53	46	45	20	17	16	15	16	16	15
17	15	15	16	16	15	15	17	16	21	41	39	39	44	43	40	45	40	28	20	16	15	15	16	17
18	15	15	15	16	15	14	22	18	21	24	45	44	44	44	42	49	21	20	23	16	15	14	14	14
19	16	14	15	16	15		17	16	18	33	40	44	44	42	50	40	30	24	16	15	15	15	16	15
20	15	14	15	15	18	18	16	20		38		40	45	34	44	40	48	20	21		18	15	18	15
21		16	14	14	14	14	17	17	20	22	30		52	50	52	52	45	18	16	14	15		15	15
22	14		16	15	14	14	17	21	21	22	39	44	48		49	48	46	20	16	16	15	15	15	15
23	16		16	17	18	16	17	21	21	32	41	46	45	44	44	33	28	21	20	16	16	15	15	15
24	15	14	14	15	15	15	17	17	20	23	36	53	39	53	43	50	45	18	21	16	17	14	15	16
25	14	15	15	14	15	14	16	18		30	34	36	47	44	54	30	45	29	18	16		15	15	15
26	15	15	15	16	15	15	17	17		24		37	42	38	30	26	23	18	17	15	16	14	14	15
27	15	15	14	15	15	17	17	18	23	36	36	39	36	51	50	42	36	23	18	16	15	17	15	17
28		16	16	15	15	17	17	22	33	35	43	38	44	38	44	48	23	23	17	18	15	14		15
29	15	16	15	15	15	17	18	22	35	34	B	40	45	42	36	45	39	20	16	15	15	15	15	17
30	15	16	15	15	14	15	16	28	33	35	46				48		45	20	18	16	14	15	17	14
31	15	14	15	15	16	17	16	23	21			43	43	40	45	39	29	32	20	17	15	14	14	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	30	30	31	30	31	31	28	27	27	28	28	26	29	27	31	31	30	30	30	29	29	29
MED	15	15	15	15	15	14	17	18	21	34	41	43	45	45	45	46	39	20	18	16	15	15	15	15
U Q	15	15	15	16	15	16	18	21	23	41	46	45	48	49	51	49	45	23	20	16	16	15	16	15
L Q	15	14	14	14	14	14	16	17	21	24	38	40	43	40	41	40	29	20	17	15	15	14	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT OKINAWA

MAY 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	54	59	47	43	48		57	68	63	A	A	91	104	118	133	154	154	138	125	127	109	82	63	A
2		63	59	68	47	32	47	68	82	86	86	89	93	102		107	122	108	110	130	82	A	A	81
3		A	62	39	A	31	A	A	A	A	A	A	A	A	A	63	A	62		A	A	A	54	A
4	47	A	A	58	A	A	58	68	67	60		87	92	91		149	177	151	136	122	A	A	A	A
5	A	A	58	A	32	A	50	79	76	68		A	66	75	77	78	110	122	100	87	69	A	A	A
6	61	57	54	47	32	34	37	61	68	74	76	94	92	112	114	124	148	163	164	155			111	92
7	90	80		69	59	46	57	72	76	78	83	85			92	94	92	92	84	87	80	74	61	68
8	63	67	61	58	68	60	57	67	78	74	81	B	92	107	124	125	122	124	A	A	95	73	A	68
9	61	69	58	56		58	62	70	55	72	79	91	106	117	A	124	121	133	120	122		94	83	100
10	120	109		82	A	A	57	73	83	74	85	102	114	111	104	110	116	98	94	A	94	77	93	80
11	78	87	94	60	52	68	68	68		A	A	82	104		133	148	146	147	144	153	93	83	86	93
12	92	93		68	57	57	60	78		71	91	93	91	110	118	127	113	113	123	N	91	83	67	68
13	57	65	61	58	56	49	55		83	80	77	81		115	127	133	123	124	110	A	83	A	66	70
14	68	72	69	57	56	46	67	98	80	A	A	A	A	103	126	147	148	123	116	110	114	92	A	73
15	77	87		71		68	93	82	70	A	67	C	86	117	129	130	134	144	141	149	100	A	A	
16	93		93	80	71	71	66	66		61	A	76	92	114	125	147	146	121	116	111	84	84	73	A
17	65		71		59		54	78	A	A	A	85	92		114	121	102	87	86	90	84	83	A	64
18	A	A		51	A	A	A	62	76	A	75	A	A	113	114	113	116	122	104	A	83	A	61	68
19	67	55	61	33	40		A	62	71	60	A	C	C	C	C	C	C	C	C	C	A	A	63	A
20	A	A	57	48	50	48	58		65	A	C	C	C	C	C	92	93	81	82		64	A	A	A
21	58	54	52	57	41	40	57	70	54	A	A	67	76	92	85	92		114	95	A	A	A	71	
22	74	A	62	70	68	71		67	A	A	A	76	84	88	97	120	104	98		91	77	60	60	69
23	A	A		61	65	76	56	A	56	A	68	A	A	A			A	120	93	88	83	85	94	82
24	74	80	67		58	57	70	81	A	A	71	74	110		94	94	112	122	119	107	76	68	63	68
25	A	A		37		69	57	56	A	66	A	72	88	90	92	102	114	119	84	84	90	63	60	60
26	A	55			A	37	58	66		A	61	A	A	83	92	98	114	112	124	87	83	70	68	74
27	80	80	74	76	57	57	60	83	94	A	C	C	C	C	A	92	106	116	110	122	A	64	68	A
28	70	62	63	60	56	38	53	71	68	A	A		88	91	94	106	106	87	91	85	84	69	58	51
29	58	60	59	48	41	46	57	68	A	A	A	A	A	82	92	90	A	87	A	88	A	A	61	A
30	67	61		A	48	56		A	A	A					65	59	56	60	82	57	59	50	58	A
31	49	A	A	A	37	44	57	69	56	A	A	A	67	A	A	92	94	81	A	A	81	A	A	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	23	20	20	25	23	24	26	26	20	13	13	16	19	20	22	29	26	30	25	21	23	18	22	19
MED	67	66	61	58	56	52	57	68	70	72	77	85	92	105	109	110	115	118	110	107	83	76	64	69
U Q	78	80	68	68	59	64	60	78	79	76	84	91	104	113	125	128	134	124	123	124	93	83	73	81
L Q	58	59	58	48	41	42	56	67	64	63	69	76	86	90	92	92	106	92	92	87	80	68	61	68

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

MAY 1998

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	36	44	G	G	24	G	G	42	58	80	96	74	58	57	G	43	G	44	46	47	28	85	60	60
2		46	38	26	G	G	G	38	G	47	77	G	G	G	G	G	76	82	64	79	113	94	93	84
3		67		34	69	21	56	49	56	58	73	69	65	60	47	61	69	G	48	66	55	79	83	35
4	43	69	49	45	35	29	29		42	48	G	59	66	G	G	G	G	G	G	41	76	42	39	65
5	68	94		94	56	50	46	40	42	47	G	77	63	82	56	G	G	G	34	33	38	58	64	54
6	42	G	34	55	G	28	G	48	60	G	64	79	65	62	55	74	58	49	G	32			115	94
7	45	45	35	27	G	29	G	36	42	41	45	G	G		G	G	43	39	38	45	39	G	G	G
8	G	G	G	G	G	G	G	35	G	75	46	B	G	G	61	47	75	62	89	94	47	41	67	
9	34	41	40	24		G	25	37	57	67	59	97	76	92	99	73	66	62	60		48	41	G	G
10	64	75	52	41	68	68	26	46	50	62	62	G	64	79	61	66	46	71	61	94	60	48	24	G
11	38	38	38	44	G	G	G	41	60	74	69	64	73		G	118	96	90	108	86	94	82	68	58
12		60	52	36	35	33	G	G	G	54	G	G	G	G	G	G	63	61	57	36	33	34	36	
13	34	26	24	G	G	24	G	36	G		62	72		G	G	62	81			173	36	67	69	26
14	G	37	27	G	G	G	98	43	72	118	65	109	153	G	G	G	G	43	43	45	94	94	94	
15	52	66		47		G	37	46	49	85	G	C	G	G	G	59	71	64	62	114	86	78	47	50
16	56	61	56	42	43	G	G	72	66	96	80	62	97	78	G	70	63	56	33		48	59	40	70
17	126		93		70		61	60	73	70	86	52	86	G	74	65	58	74	58	73	147	135	90	
18	59	99	39	G	64	52	40	35	48	70	74	84	97	85	67	G	G	G	38	56	44	93	33	40
19	60	36	77	G	60		67	49	38	49	52	C	C	C	C	C	C	C	C	C	127	43	67	79
20	69	54	40	28	25	G	30		47	82	C	C	C	C	C	46	48	37	44		41	77	68	67
21	24	26	38	G	G	41	27	34	50	84	98	52	63	71	77	56	45	62	86	92	109	92	64	
22	60	85	61	44	60	60	G	72	94	133	137	73	66	61	56	43	41	52	42	40	27	80	99	68
23	87	71		83	89	24	40	113	46	56	71	111	114	95				125		58	34	34	G	60
24	59		62		42	38	41	44	95	84	43	G	68		G	G	52	55	35	33	G	G	134	65
25	73	82		38	26	51	38	47	66	83	86	52	59	56	G	G	69	78	58	34	24	28	G	40
26	66	55			61	39	36	81			146	137	115	60	G	G	G	G	68	G	36	G	G	25
27	44	50	66	40	25	G	31	40	83	136	C	C	C	C		G	42	48	36	28	86	24	58	59
28	52	60	40	44	34	G	39	34	50	101				G	44	46	59	84	45	30	G	G	G	G
29	38	40	28	34	24	G	G	44	66	134	85	62	153	84	142	59	100	83	79	76	76	59	79	84
30	46	61		68	43	25		60	38	40	G	G	G	G	43	G	G	G	37	G	G	G	39	69
31	60	58	77	40	29	32	G	47	50			81	58	147	96	78	71	63	73	96	50	71	78	107
	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	29	24	28	29	29	30	29	30	28	27	25	26	25	27	29	29	29	28	27	30	30	31	26
MED	52	55	40	37	34	24	28	44	50	72	65	64	65	60	43	46	58	56	47	47	48	58	64	60
U Q	62	68	58	44	60	38	40	49	66	84	85	80	86	80	61	63	70	72	63	86	86	80	79	69
L Q	38	39	34	12	G	G	G	36	42	51	45	26	58	G	G	G	21	38	37	33	34	34	33	35

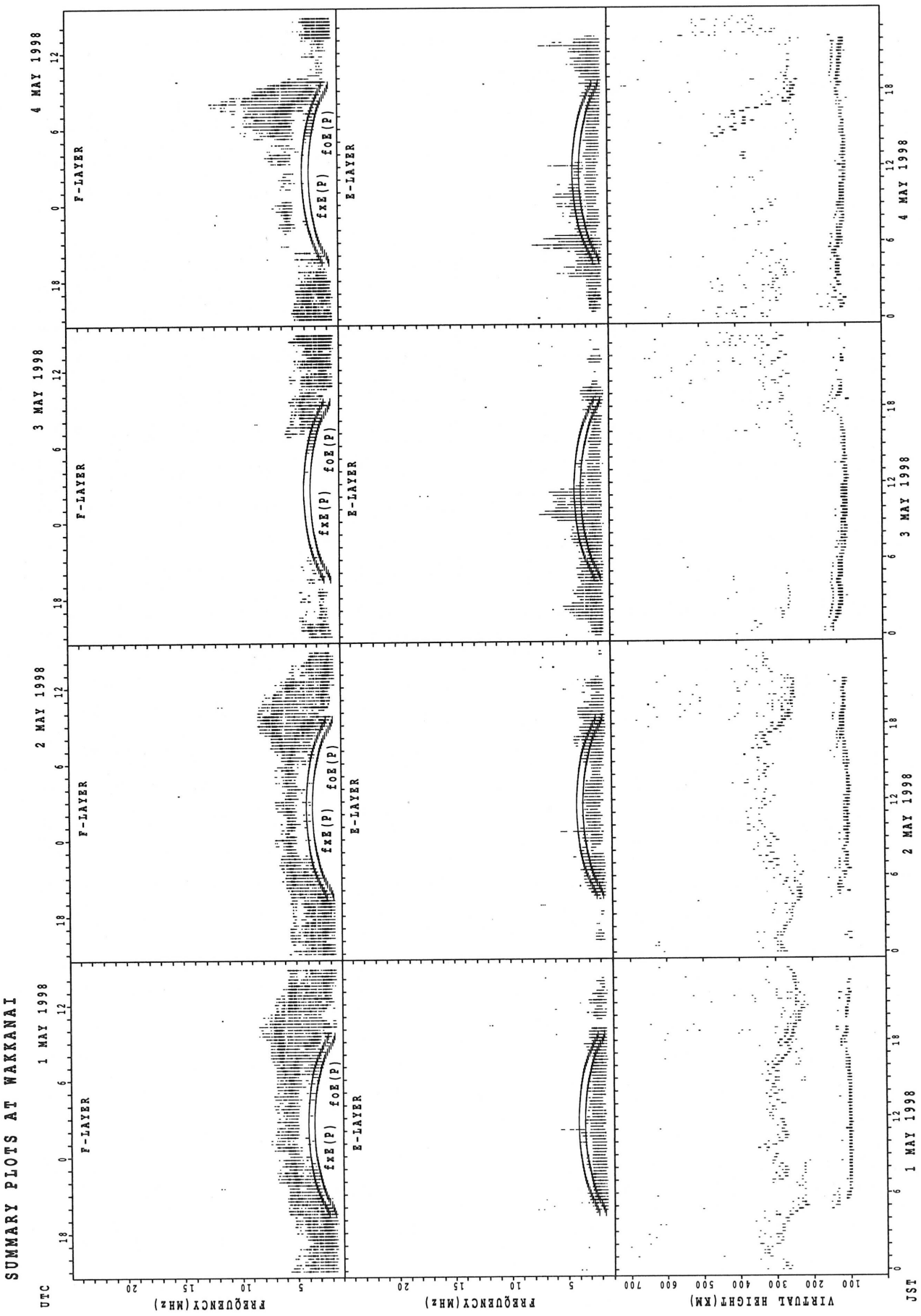
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT OKINAWA

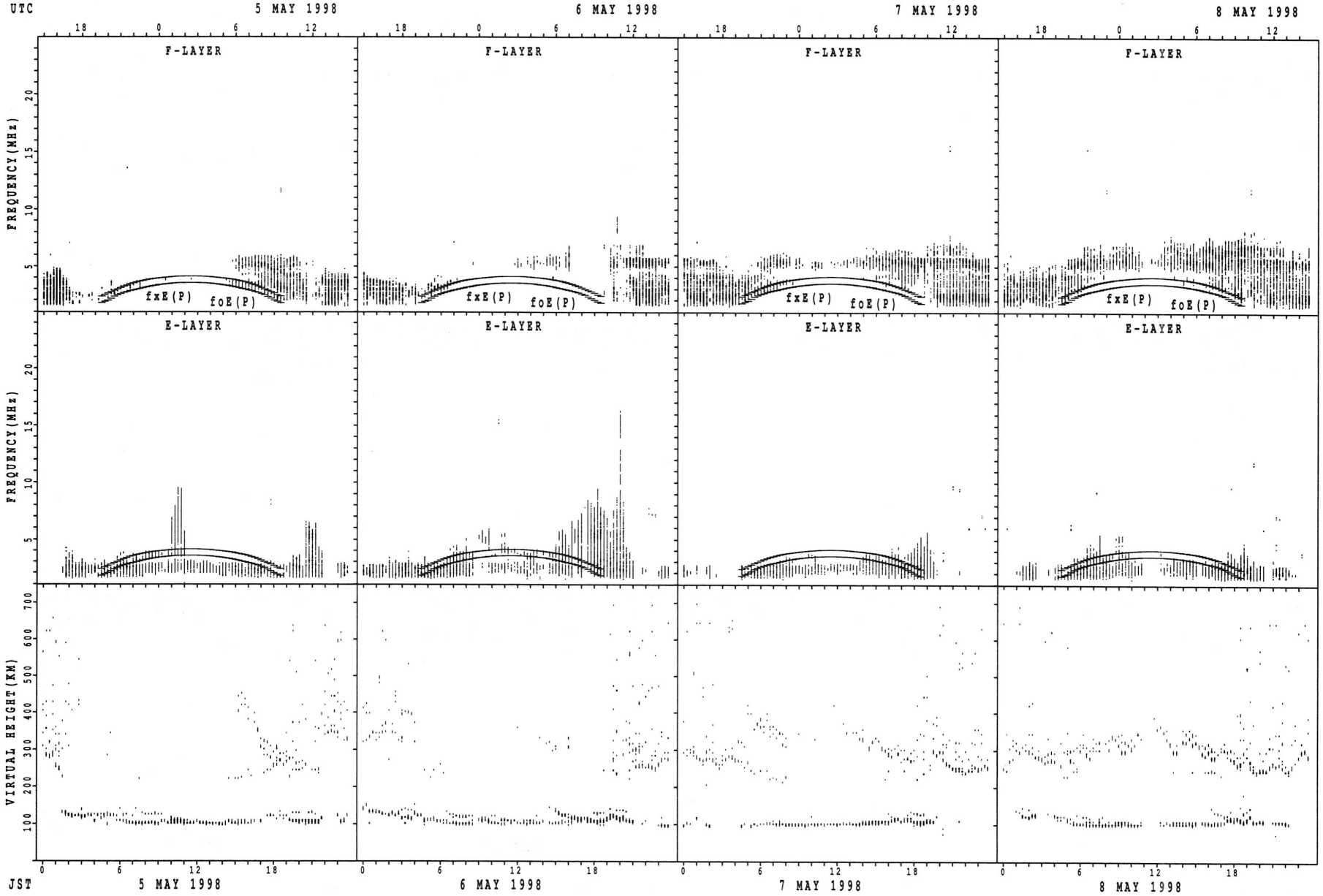
MAY 1998

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

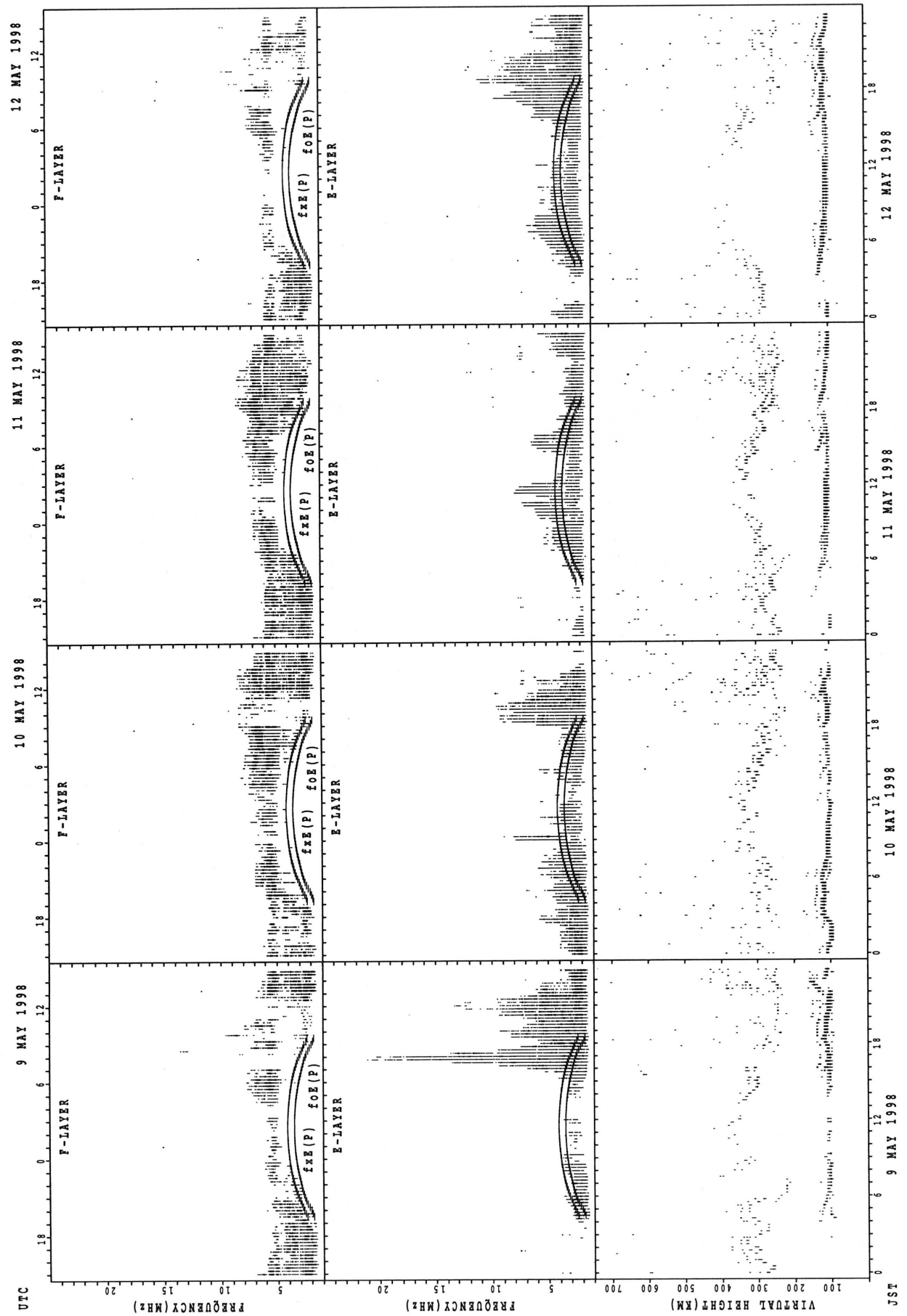
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	15	15	15	15	14	16	15	15	18	28	30	35	35	53	36	42	29	16	15	14	15	14	15
2		15	14	14	14	15	17	15		18	27		52	53	58	48		27	15	15	15	15	14	14
3		14	15	14	14	15	15	14	16		27	33	39	35	30	27	26	18	16	14	15	14	15	14
4	14	14	15	14	15	14		15	17	26	29	34	35			66			15	14	16	15	15	16
5	17	15	15	14	15	14	14	15	18	29	28	33	33	36	32		51		16	14	15	14	15	15
6	14	15	14	16		15	18	16	29	53	40	42	46	45	55	38	29	33	32	14			15	15
7	14	14	15	14	15	15	20	15	27	30	33		58		48	52	26	21	15	14	14	16	14	15
8	15	15	15	15	16	17	20	15	24	27	28	B	59	52	46		33	18	16	15	15	14	15	14
9	15	14	15	15		16	18	17		34		45	48	63	40	36	30	17	15	14	14	15	16	15
10	15	14	14	14	14	14	16	15	17	27	38	54		46	42	34	30	17	17	15	15	15	16	15
11	15	14	15	14	16	15	20	16	17	28	33	35	44		50	32	26	17	16	14	14	15	14	14
12	14	14	14	15	15	14	17	14	18	27		56	32	30		48		16	15	14	14	15	14	14
13	15	14	16	15	17	14	21	15	16	27	29	28		55	53	33	20	18	16	15	14	15	14	14
14	15	14	14	20	15		15	15	16		33	39	36	58	52	53	45	16	16	15	14	14	14	15
15	14	15		15		15	16	15	16	29		C	48	52	50	39	26	18	15	15	14	14	15	15
16	15	14	14	14	14	15	17	15	16	28	33	38	40	40	50	38	28	17	15	14	14	14	14	15
17	15		14		14		16	16	17	22	30	44	43			29	33	21	15	15	15	14	15	14
18	14	14	15	15	14	14	15	15	16	24		35	41	41	38		51	17	15	14	15	14	14	14
19	14	14	14	14	15		14	14	15		38	C	C	C	C	C	C	C	C	C	15	14	14	14
20	14	14	14	14	14	15	15		16		C	C	C	C	C	33	33	16	14		14	14	14	14
21	15	14	15	16	15	14	14	14	16	16	22	27	28	30	29	36	32	17	14	14	15	14	14	
22	15	14	15	14	14	15	17	14	16	20	28	29	29	29	32	29	27	16	14	14	14	15	14	14
23	14	14		15	15	15	16	14	16	21	22	28	29	30			20	16	15	15	15	14	14	15
24	15	14	14		14	14	15	16	15	20	28	30	36		30		32	17	14	14	14	15	14	14
25	14	15		14	14	14	15	14	16	20	29	29	30	30	28	26	20	16	15	14	15	14	14	14
26	14	15			14	14	16	15		17	23	29	29	29	29	28	18	16	15	16	14	15	14	15
27	14	15	14	14	14	15	15	15	15	17	C	C	C	C	30		24	17	14	14	15	14	14	14
28	15	14	14	15	14	15	14	14	17		32		29	30		51	17	16	15	14	14	15	16	14
29	15	14	14	14	14	15	16	16	20	22	N	34	33	29	27	23	27	16	15	15	15	14	14	14
30	14	14		14	14	14		15	17	27	30	30	29		27	26	18	15	15	15	14	15	15	15
31	15	14	15	14	15	15	16	15	16	16	24	28	37	38	39	36	22	23	17	15	14	14	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	29	30	26	28	28	28	29	30	28	26	24	23	26	22	24	24	27	28	30	29	30	30	31	30
MED	15	14	14	14	14	15	16	15	16	25	29	33	36	37	40	36	27	17	15	14	14	14	14	14
U Q	15	15	15	15	15	15	17	15	17	28	33	39	44	52	50	43	33	18	16	15	15	15	15	15
L Q	14	14	14	14	14	14	15	14	16	20	27	29	30	30	30	29	22	16	15	14	14	14	14	14


SUMMARY PLOTS AT WAKKANAI
1 MAY 1998
2 MAY 1998
3 MAY 1998
4 MAY 1998
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
UTC
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

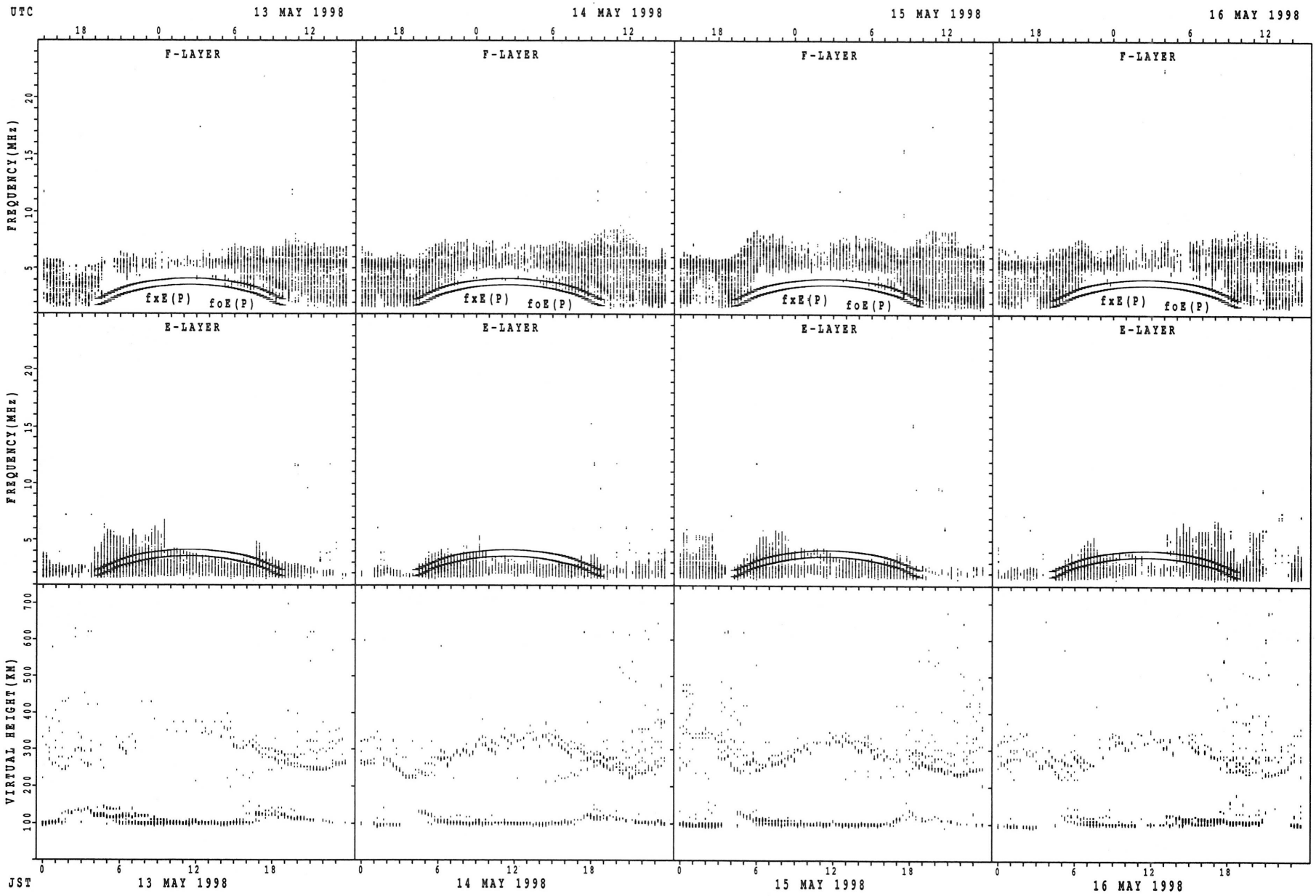
SUMMARY PLOTS AT WAKKANAI



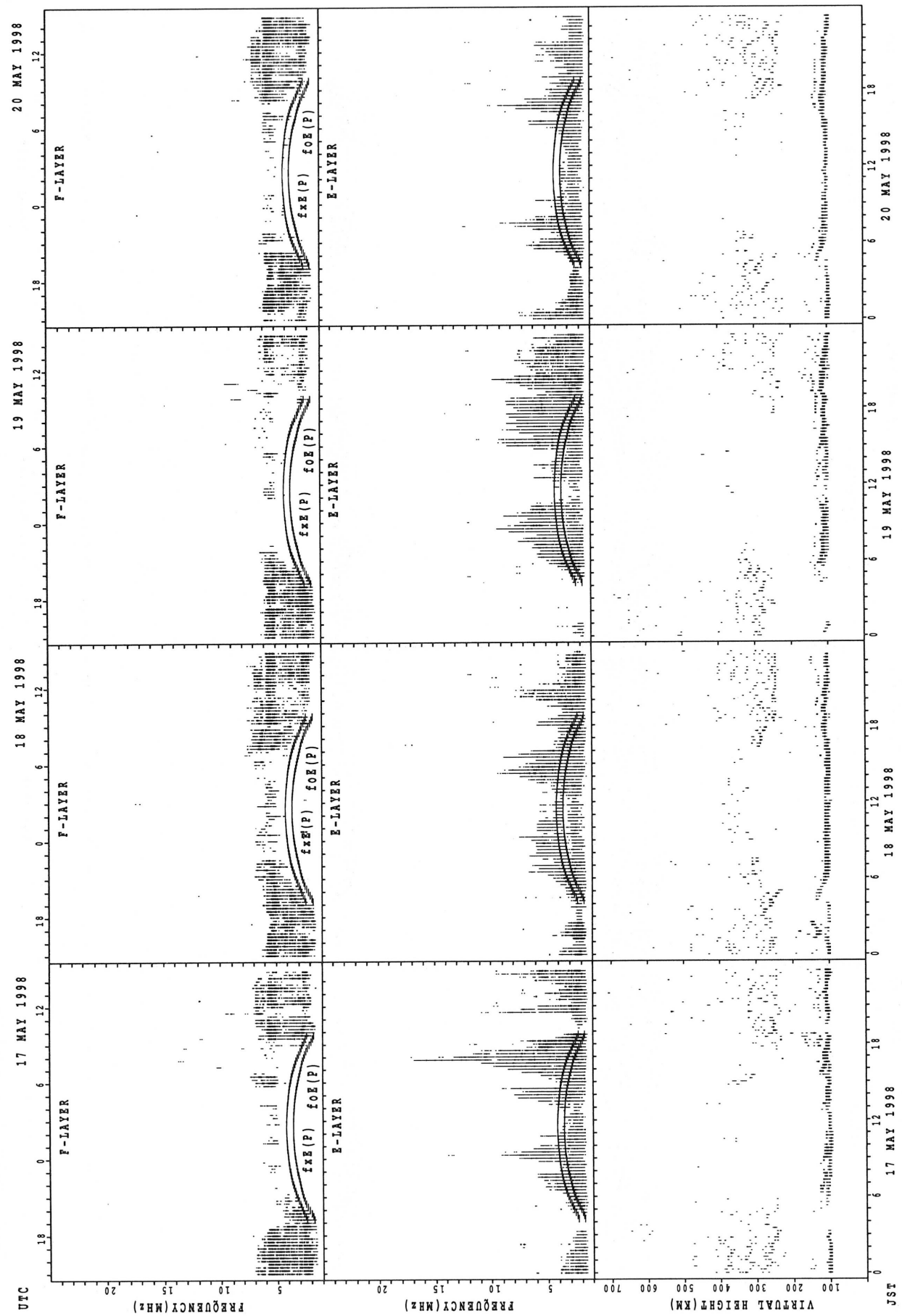
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
9 MAY 1998
10 MAY 1998
11 MAY 1998
12 MAY 1998
UTC
JST
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

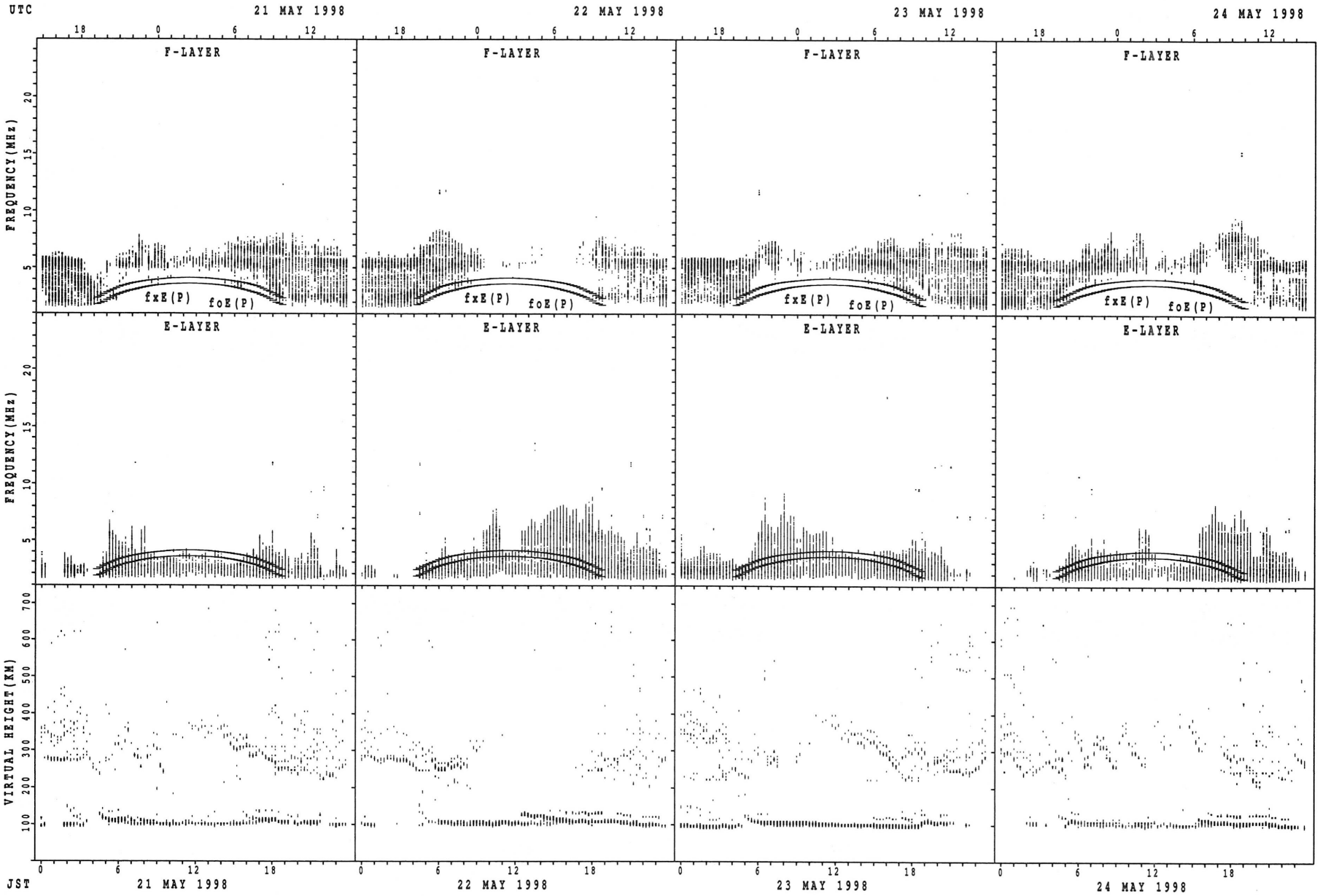
SUMMARY PLOTS AT WAKKANAI



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

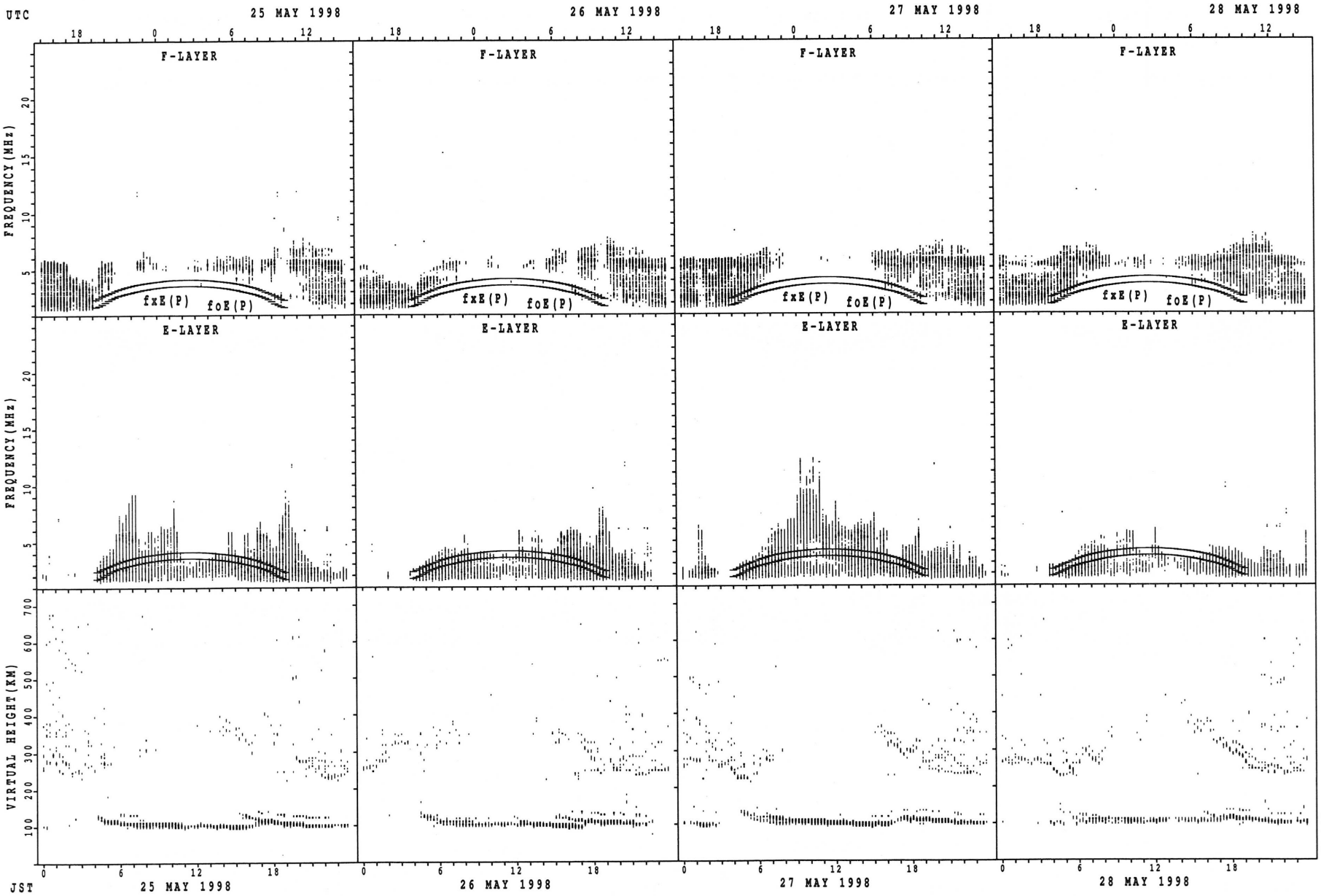

SUMMARY PLOTS AT WAKKANAI
17 MAY 1998
18 MAY 1998
19 MAY 1998
20 MAY 1998
UTC
JST
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT WAKKANAI



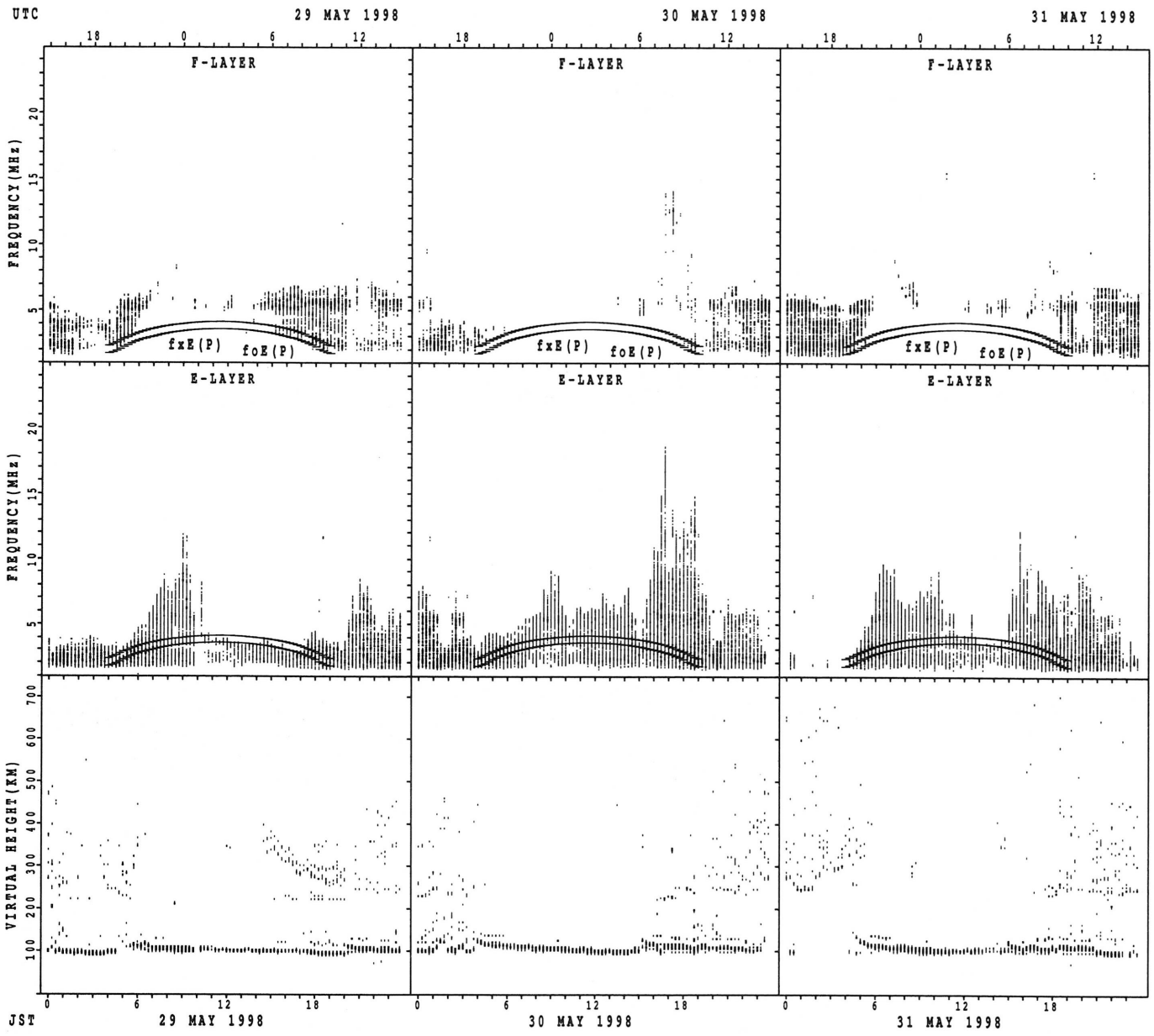
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT WAKKANAI



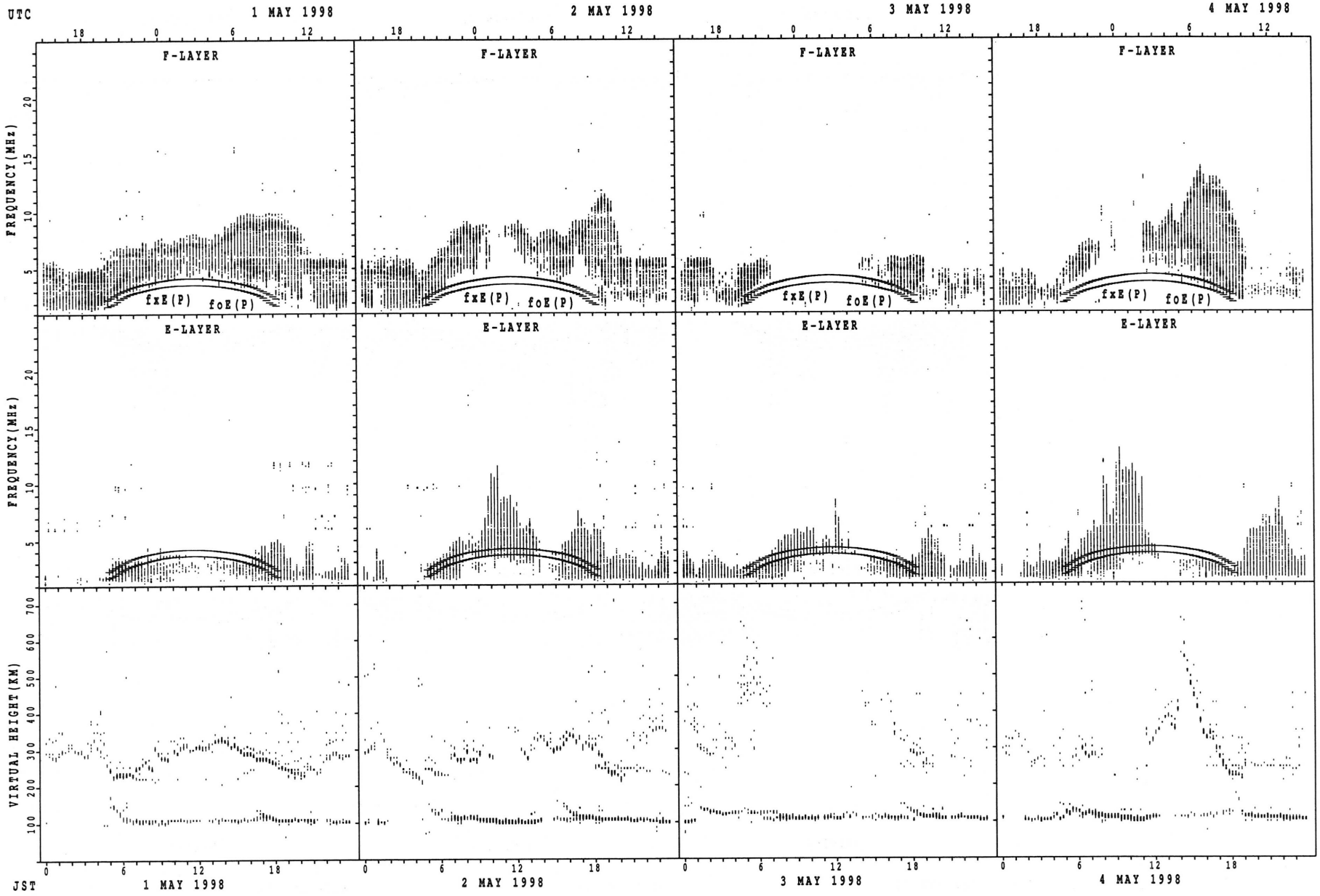
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT WAKKANAI



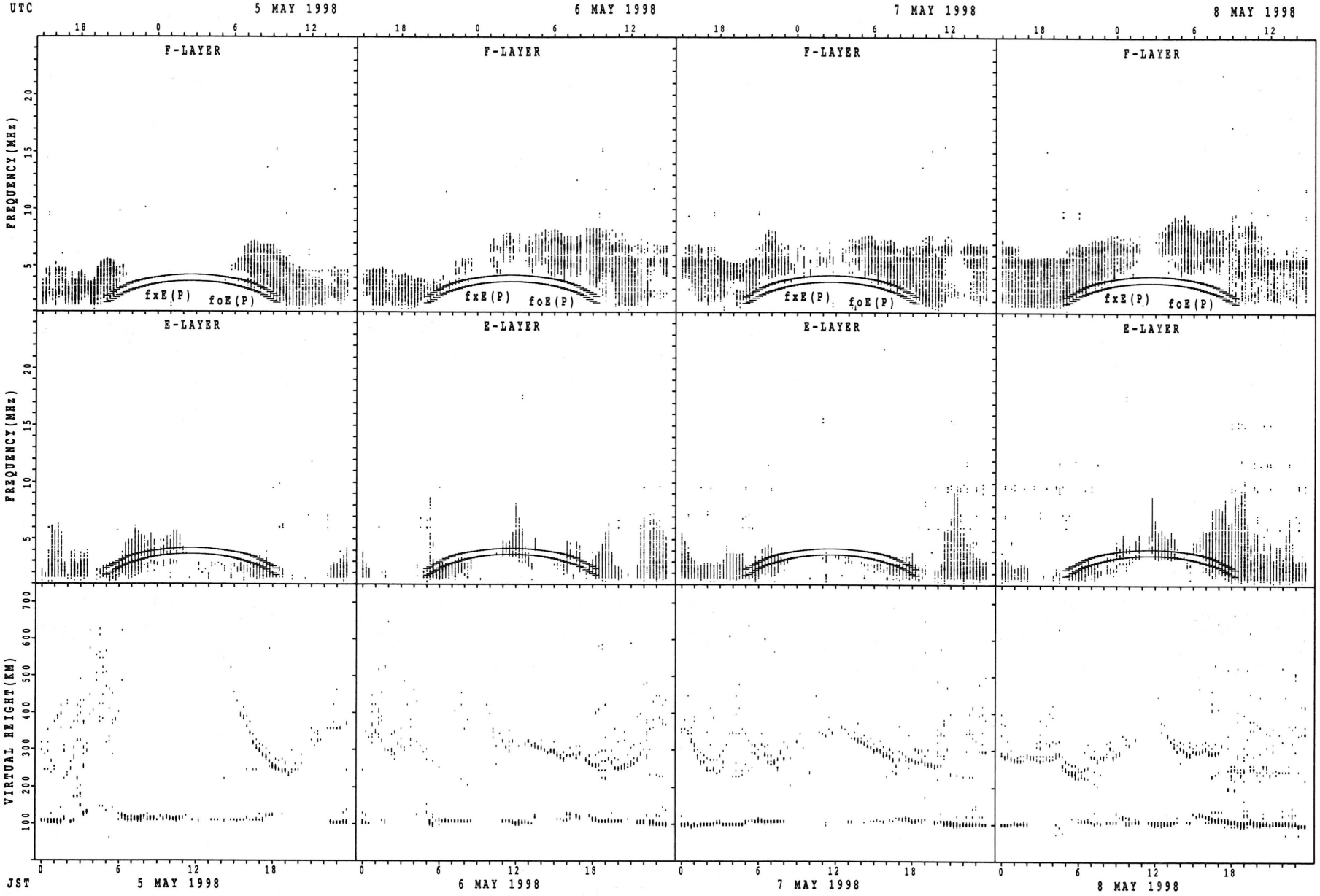
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

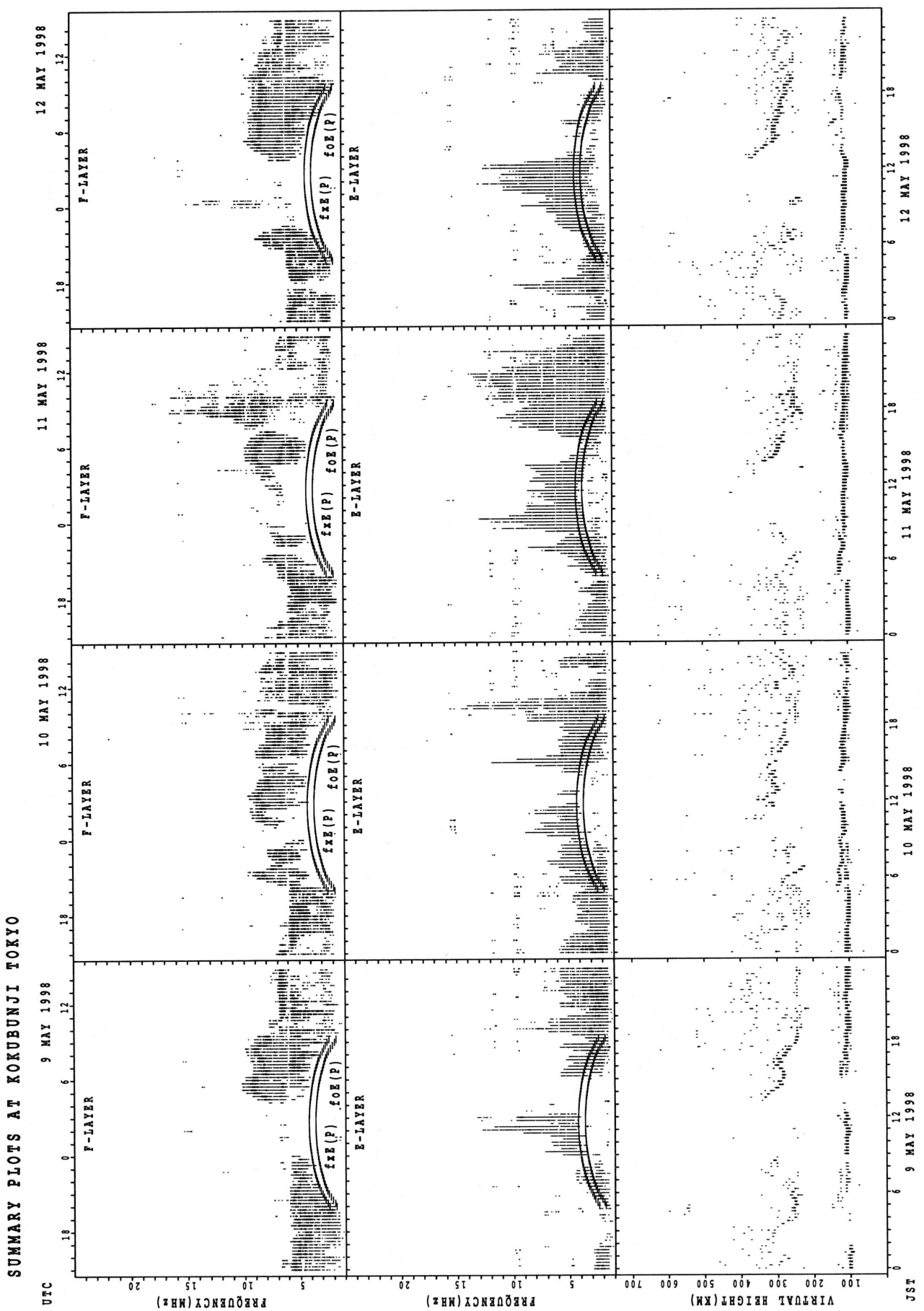


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

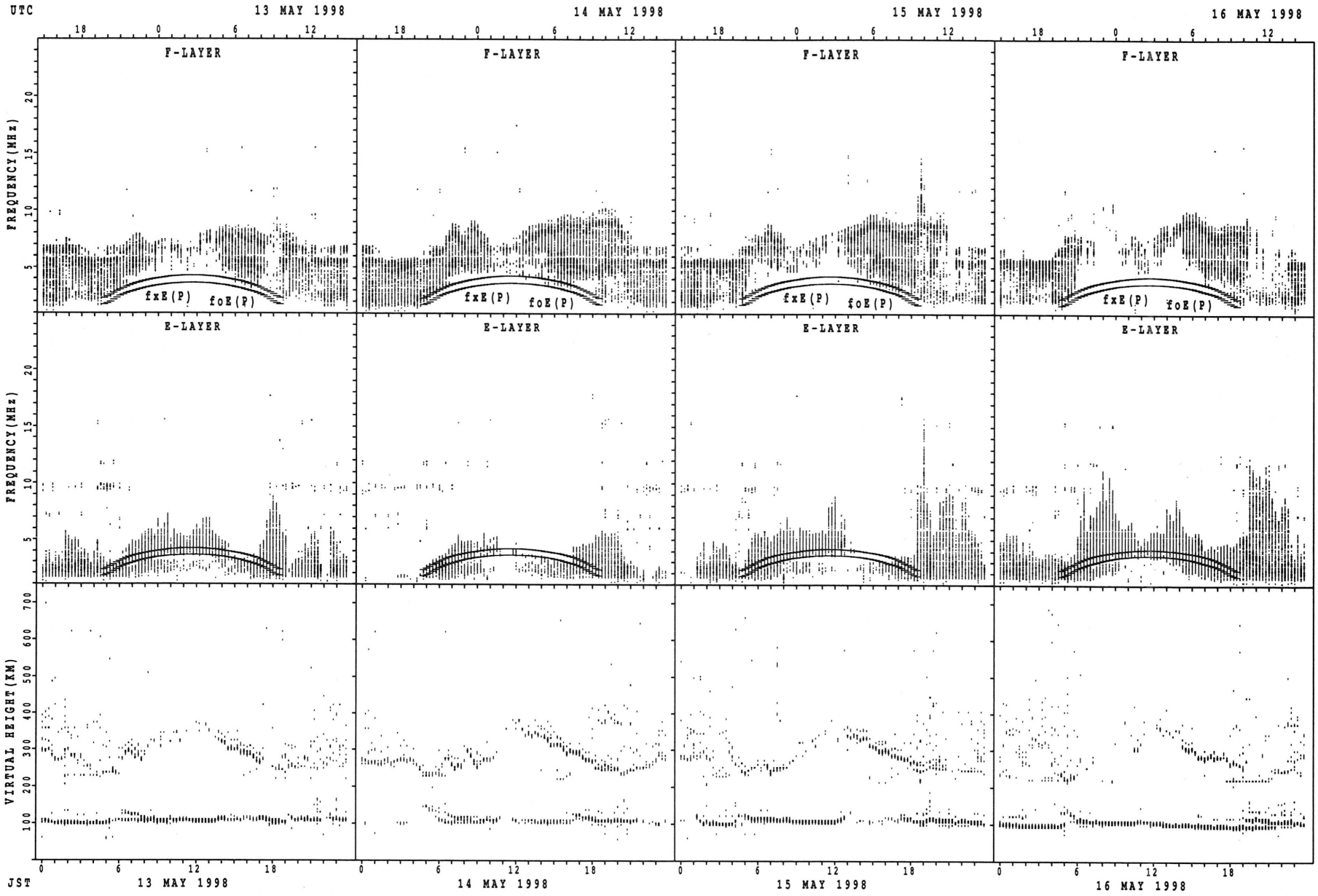
SUMMARY PLOTS AT KOKUBUNJI TOKYO



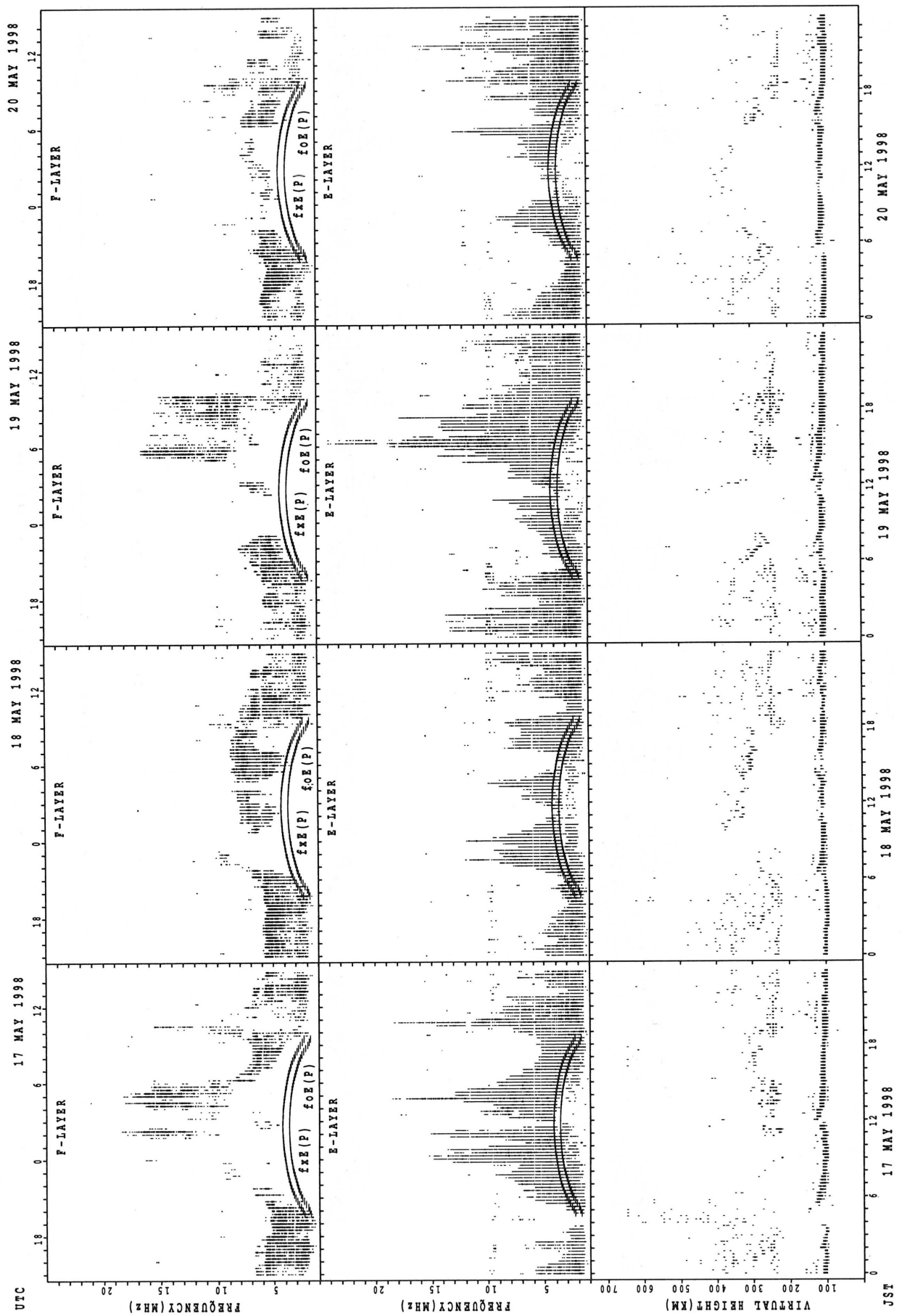
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
9 MAY 1998
10 MAY 1998
11 MAY 1998
12 MAY 1998
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

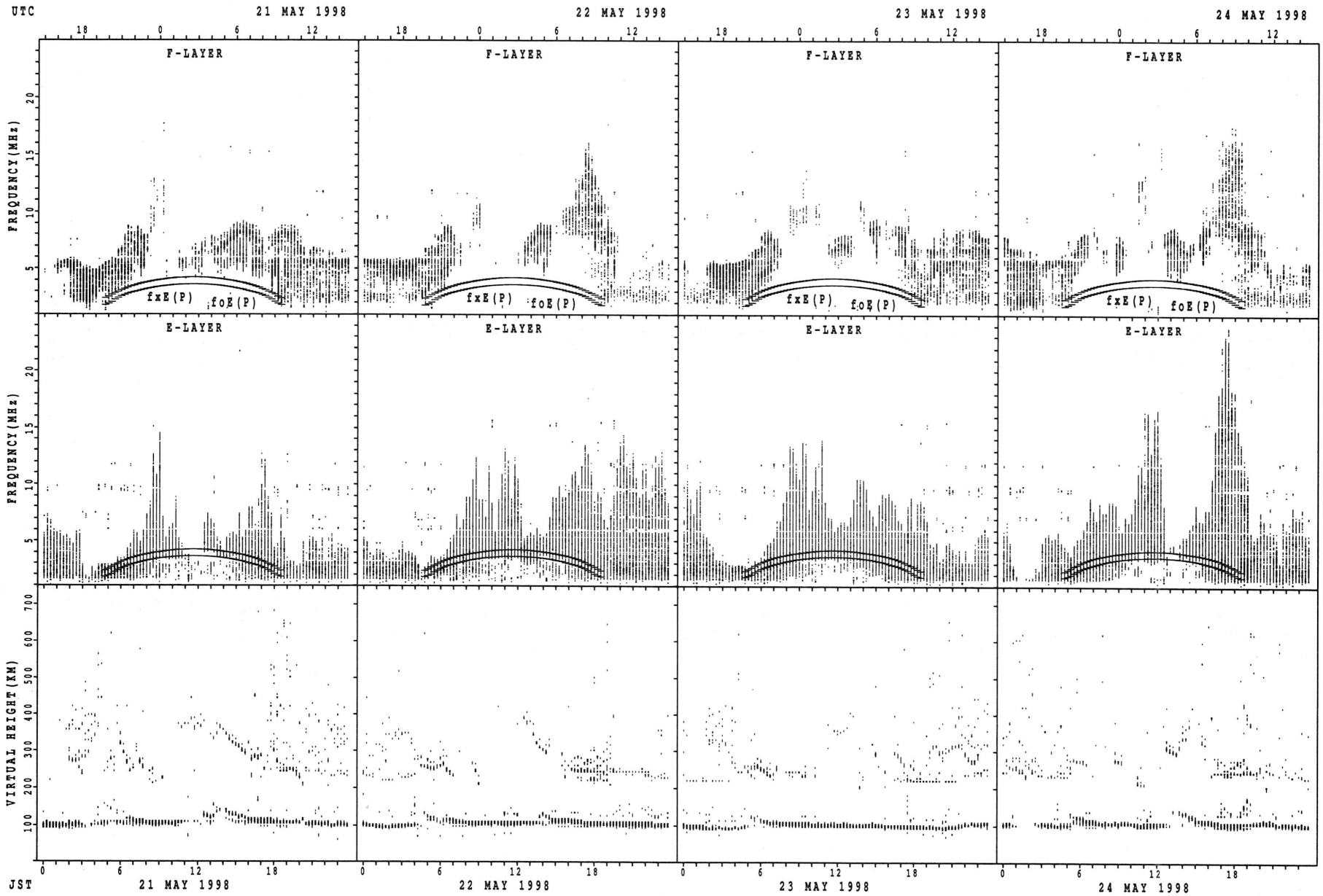
SUMMARY PLOTS AT KOKUBUNJI TOKYO



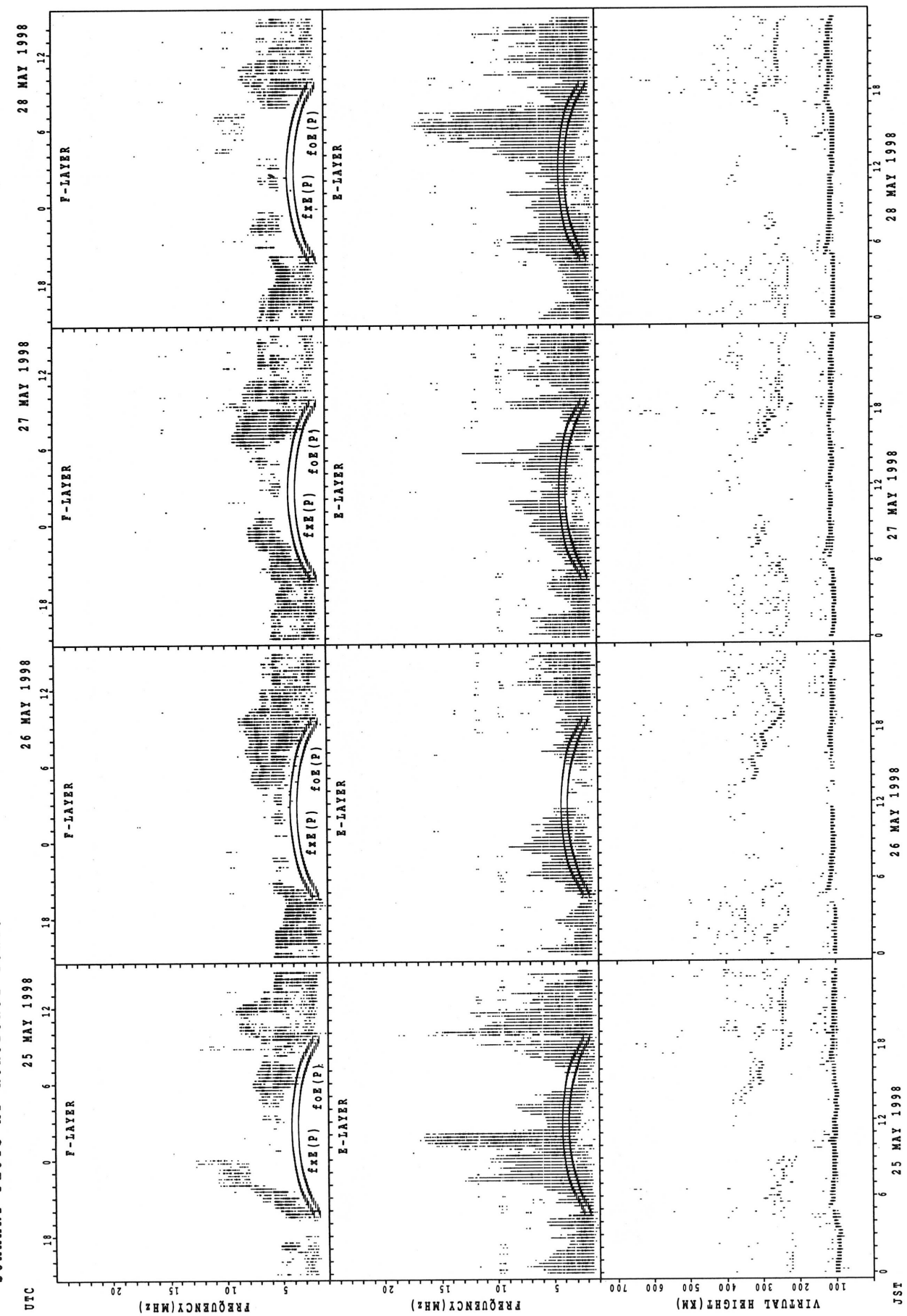
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
17 MAY 1998
18 MAY 1998
19 MAY 1998
20 MAY 1998
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

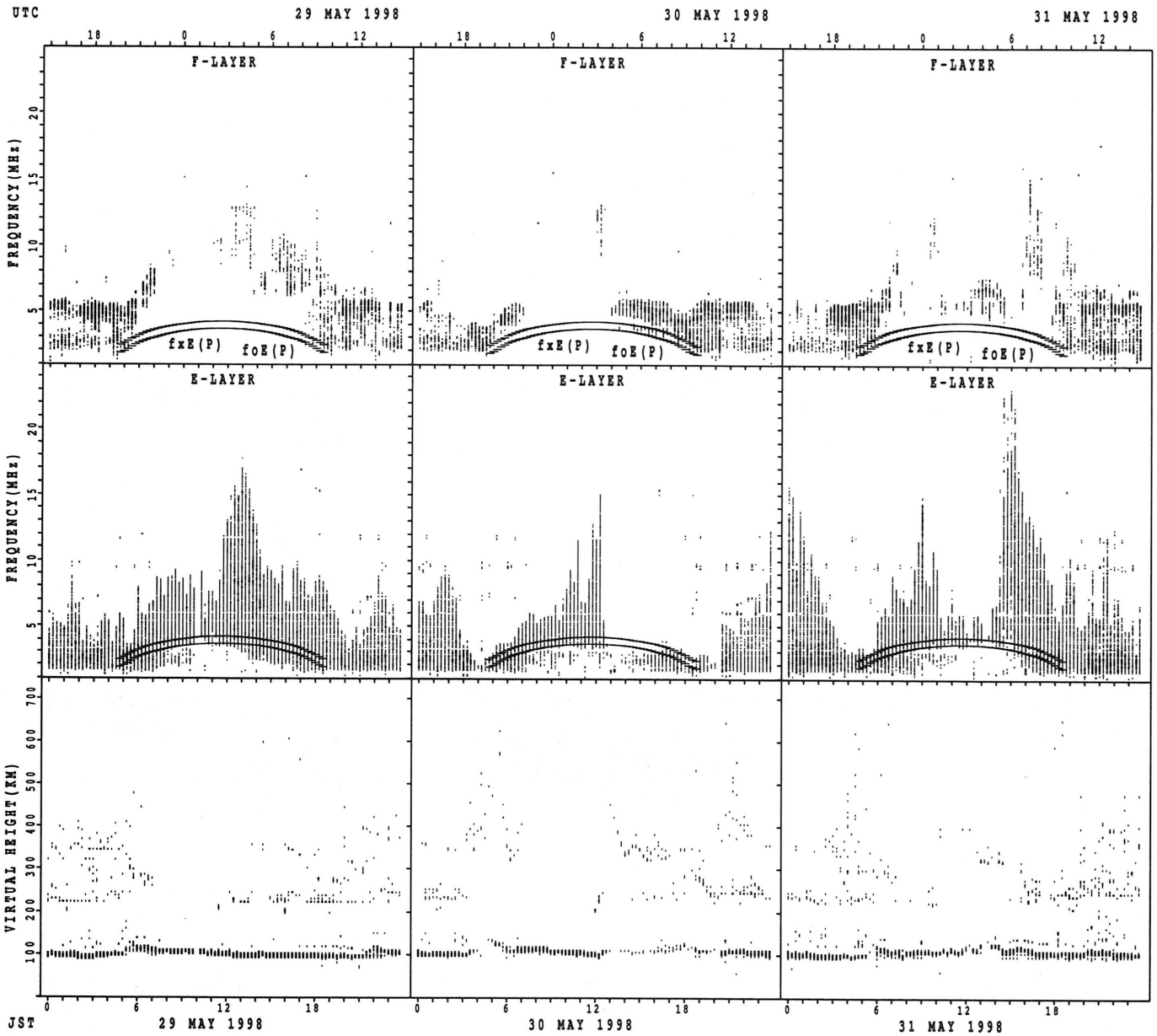
SUMMARY PLOTS AT KOKUBUNJI TOKYO



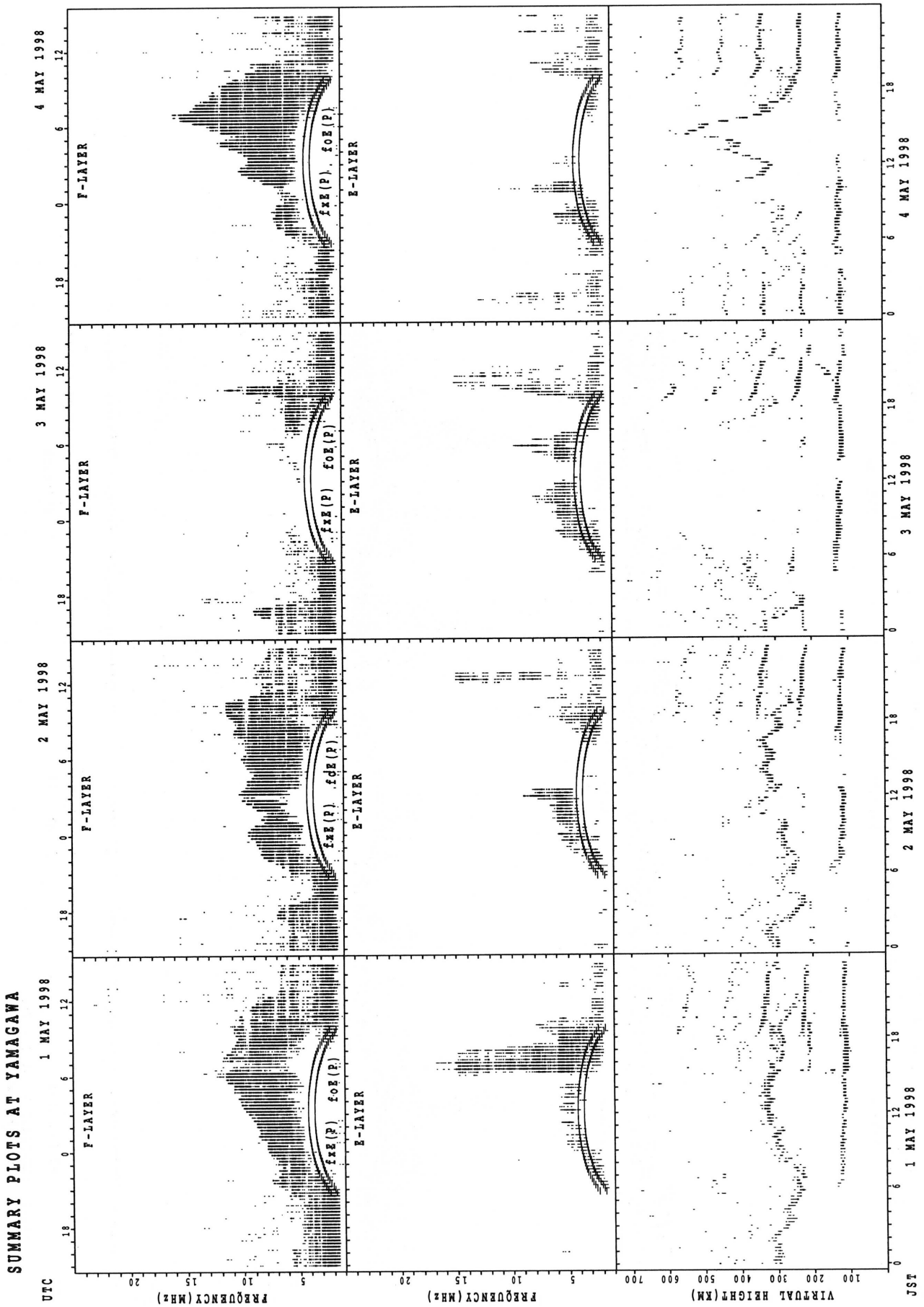
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
25 MAY 1998
26 MAY 1998
27 MAY 1998
28 MAY 1998
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

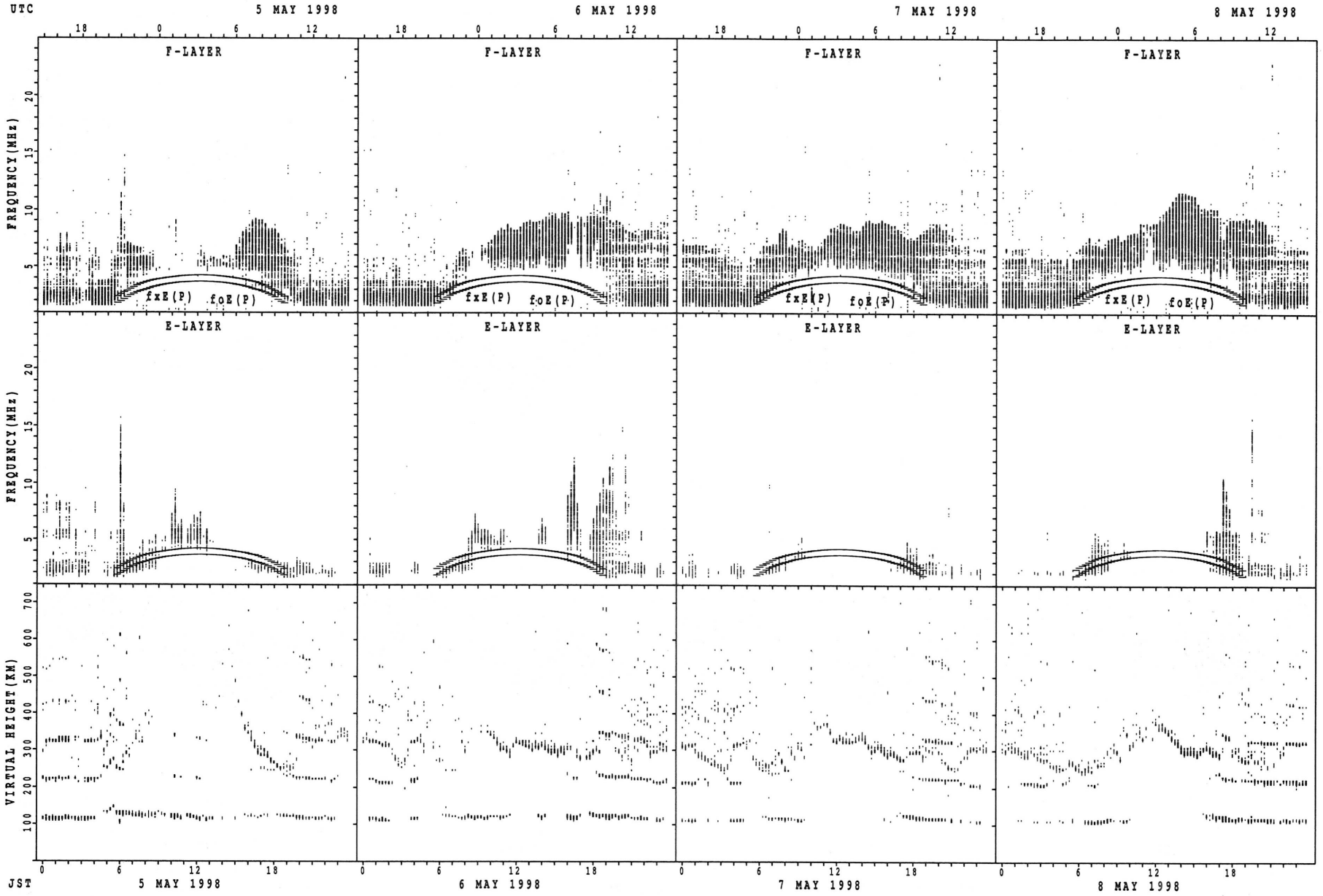
SUMMARY PLOTS AT KOKUBUNJI TOKYO



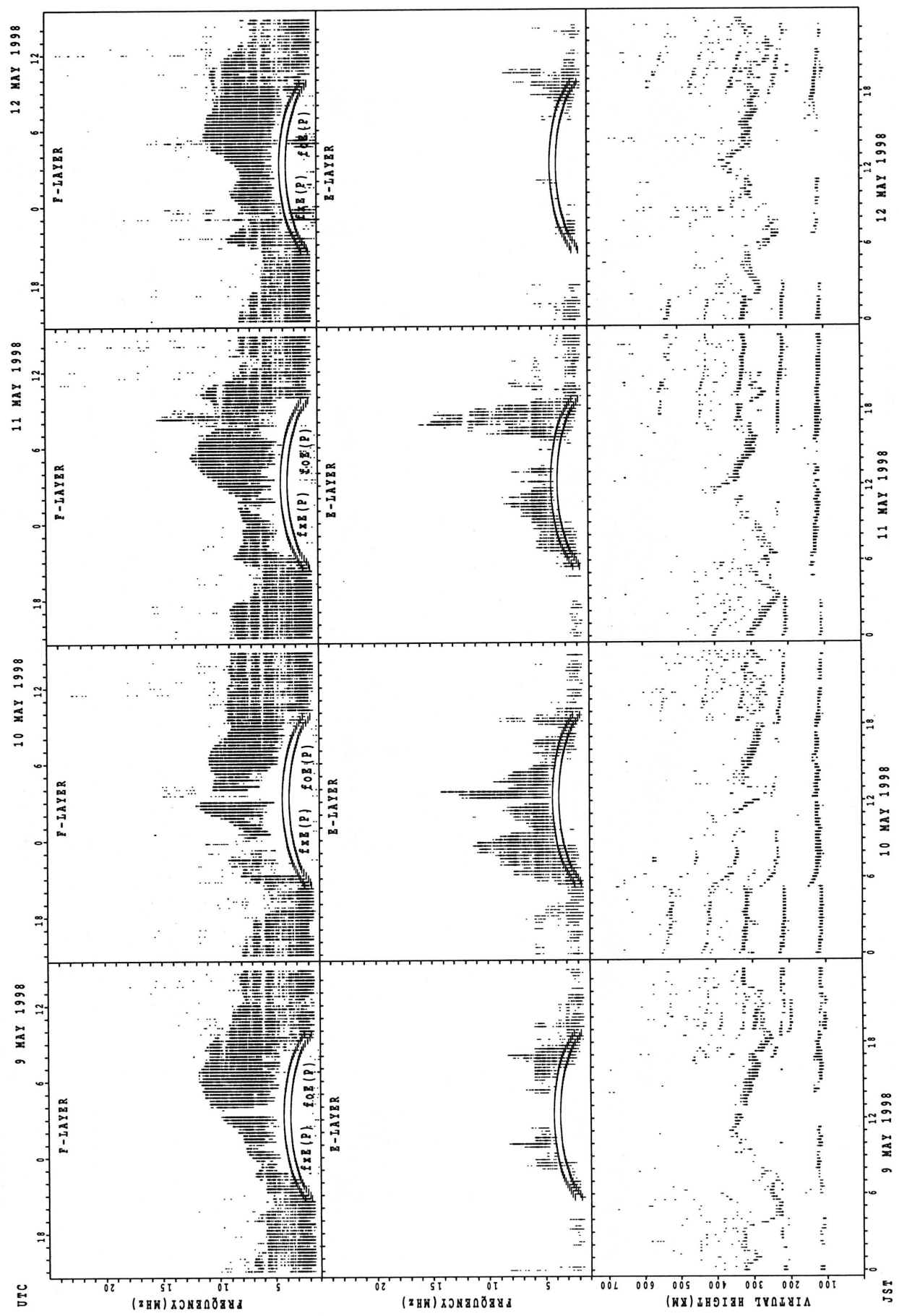
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
1 MAY 1998
2 MAY 1998
3 MAY 1998
4 MAY 1998
F-LAYER
E-LAYER
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
fxE(P), foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

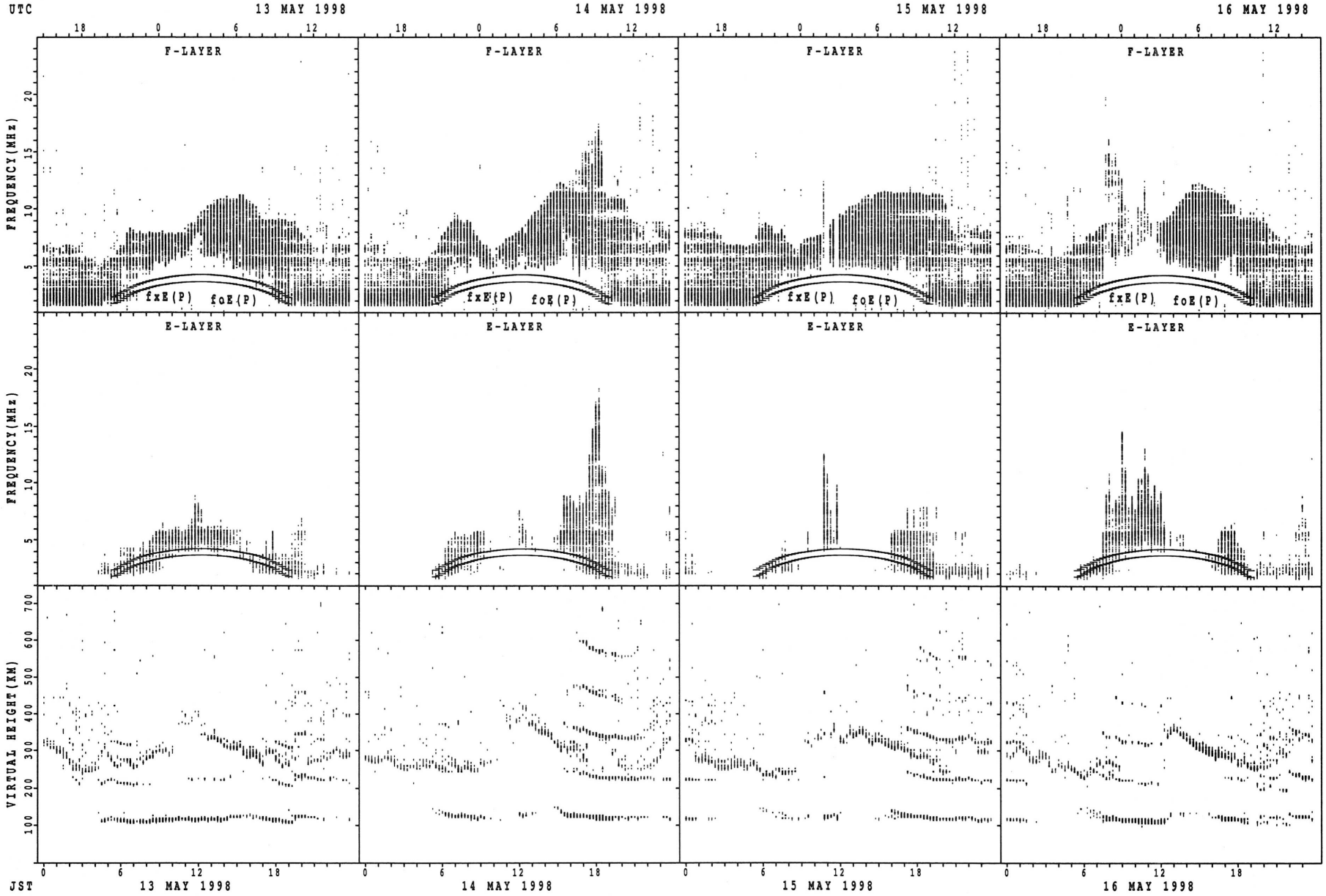
SUMMARY PLOTS AT YAMAGAWA



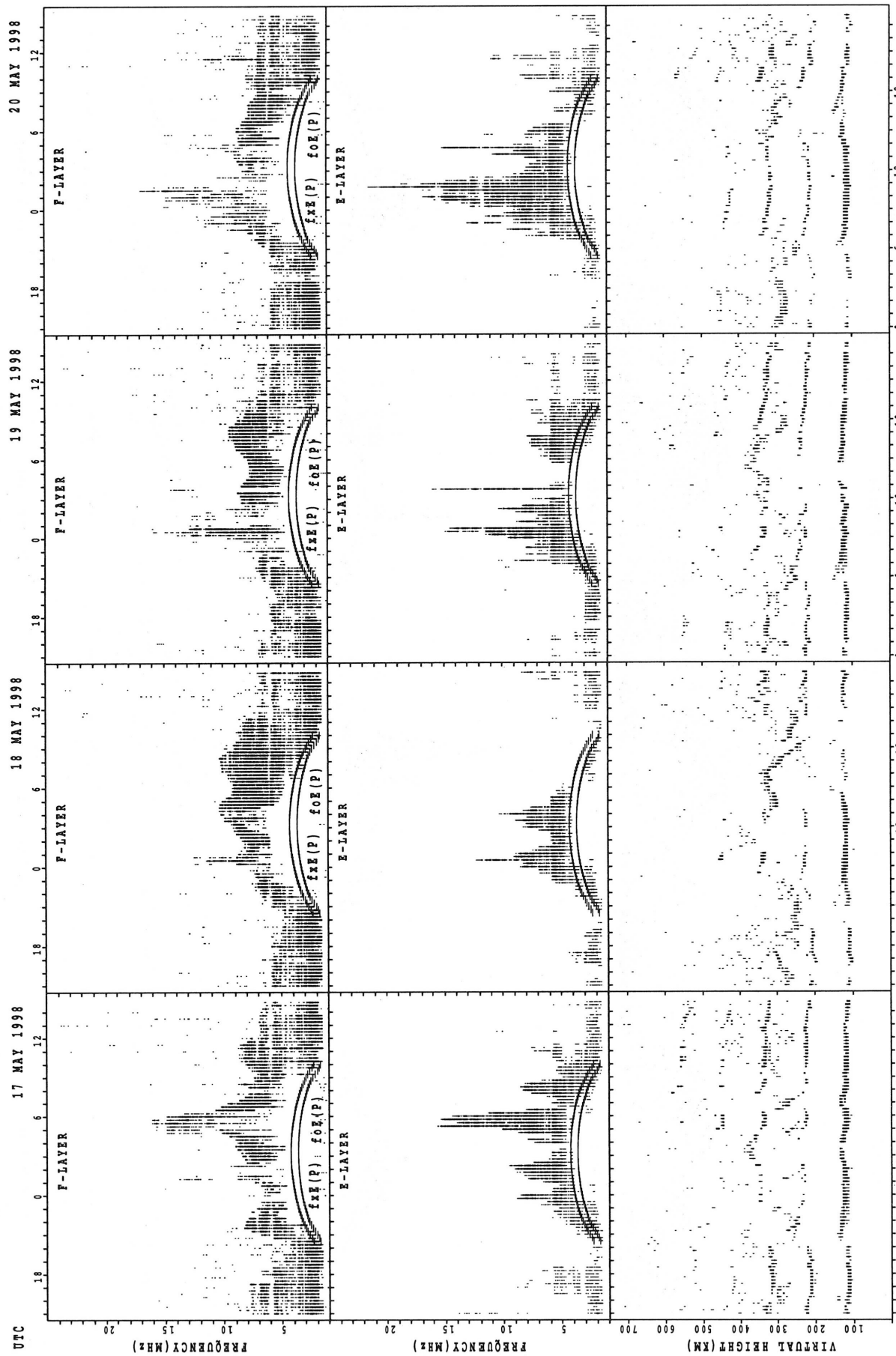
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
9 MAY 1998
10 MAY 1998
11 MAY 1998
12 MAY 1998
F-LAYER
E-LAYER
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

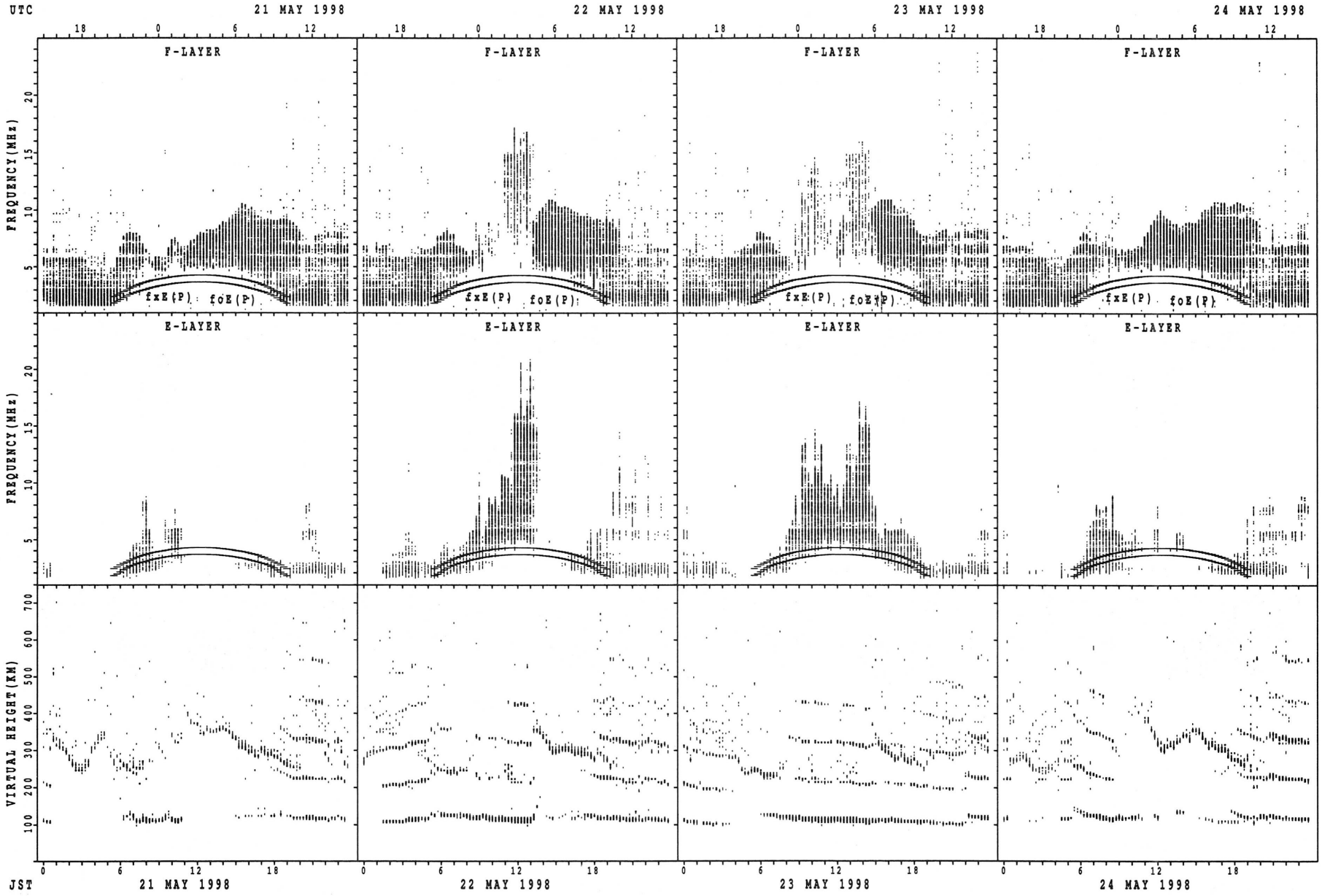
SUMMARY PLOTS AT YAMAGAWA



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

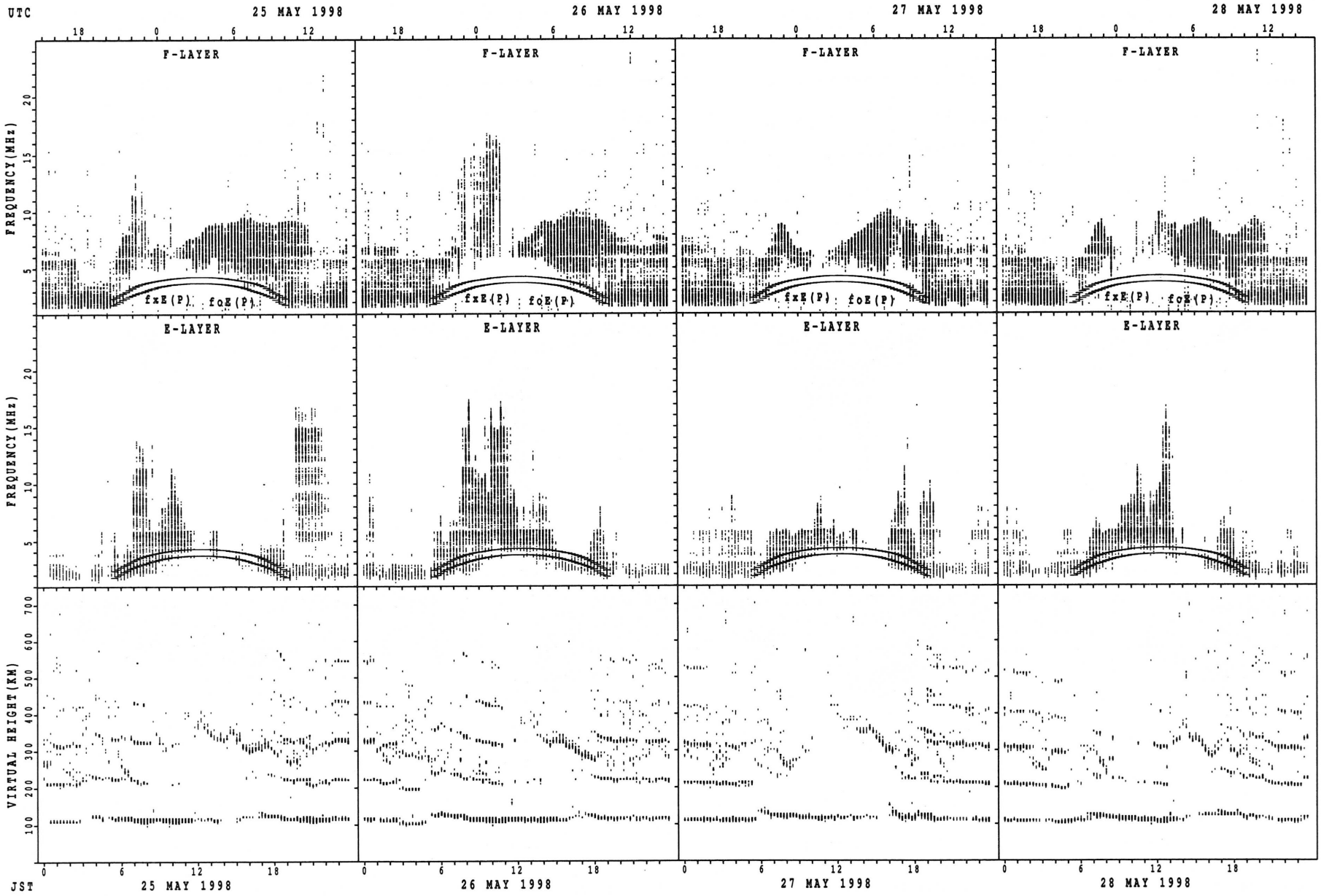

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
17 MAY 1998
18 MAY 1998
19 MAY 1998
20 MAY 1998
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA



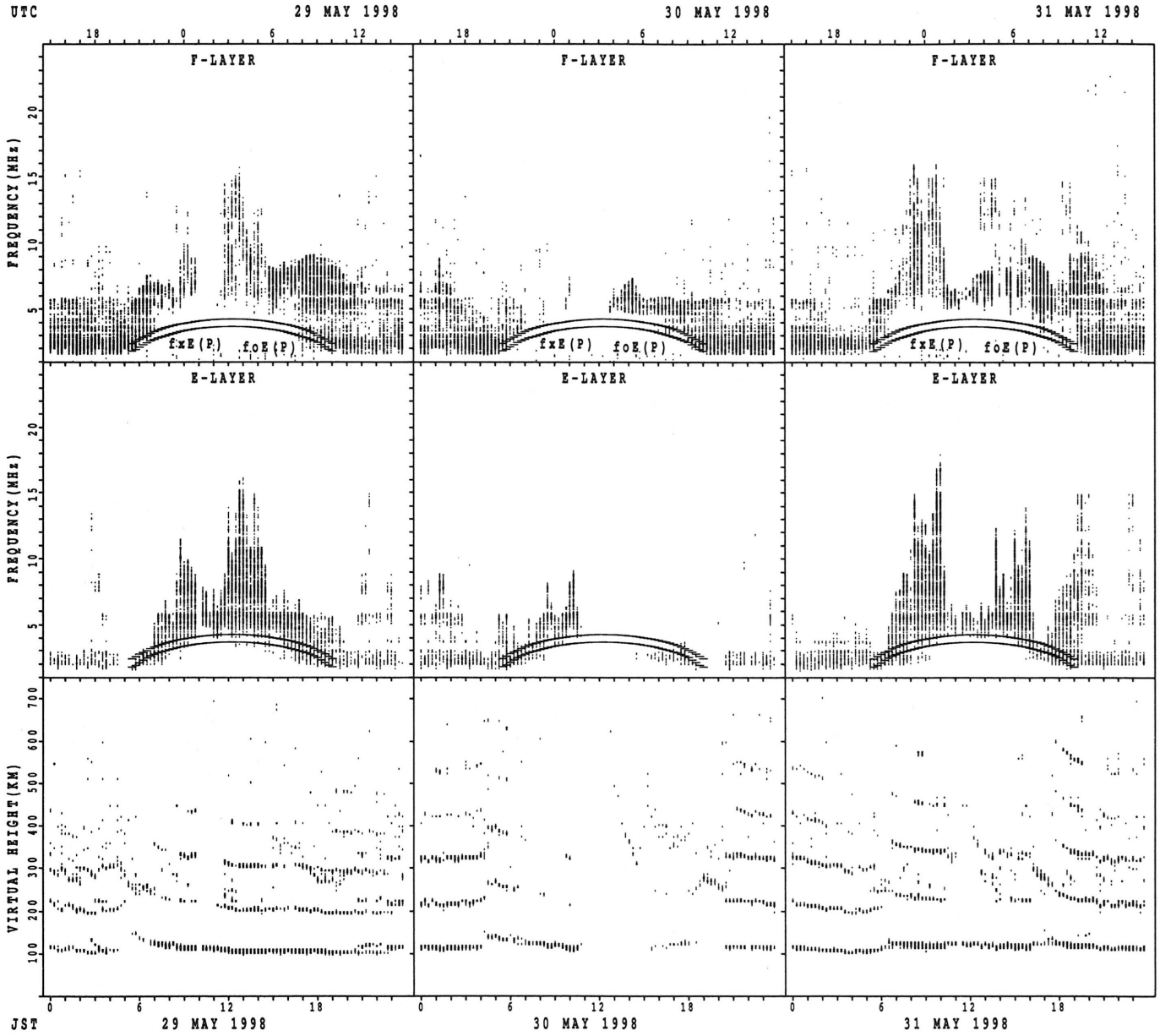
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA

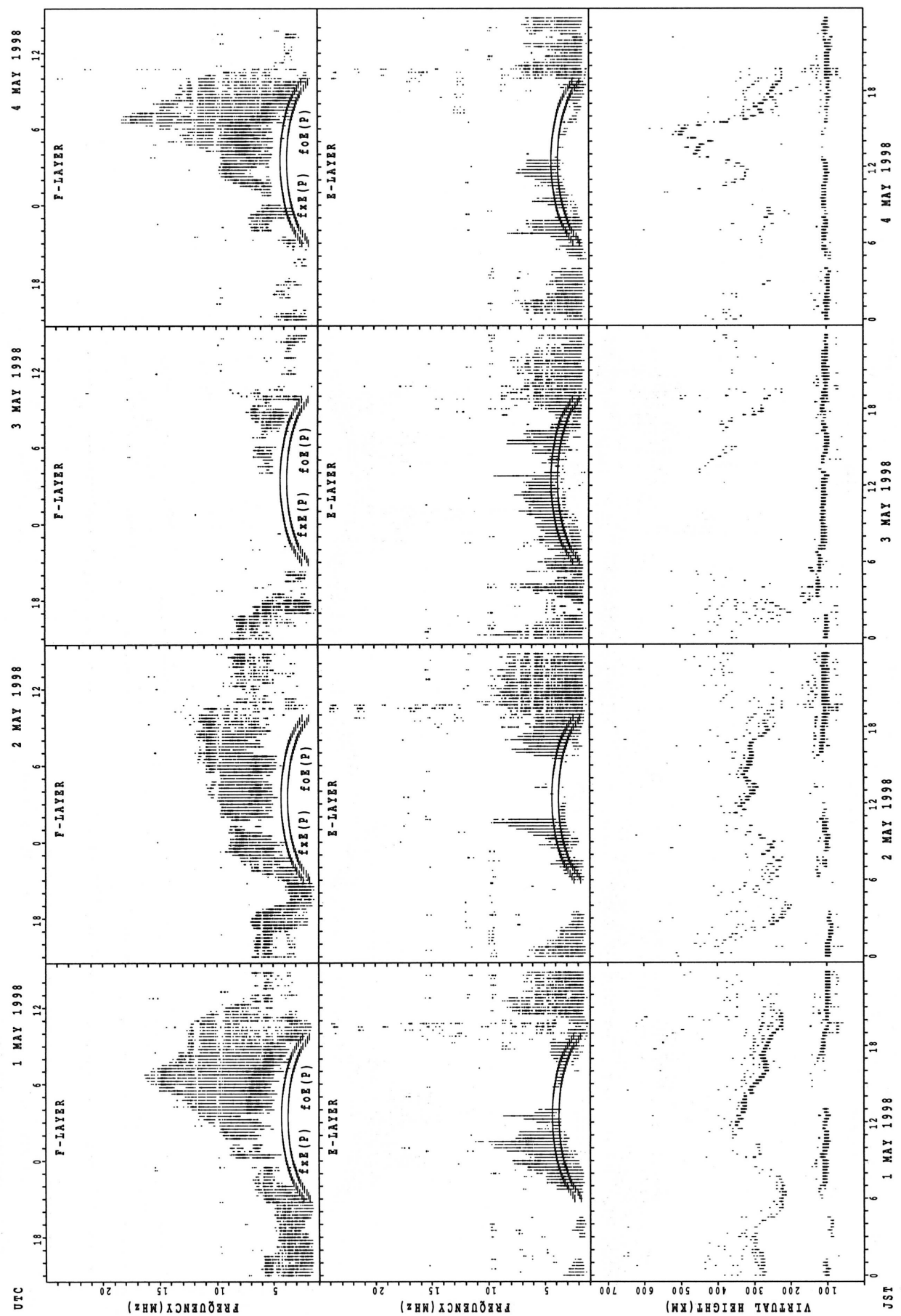


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

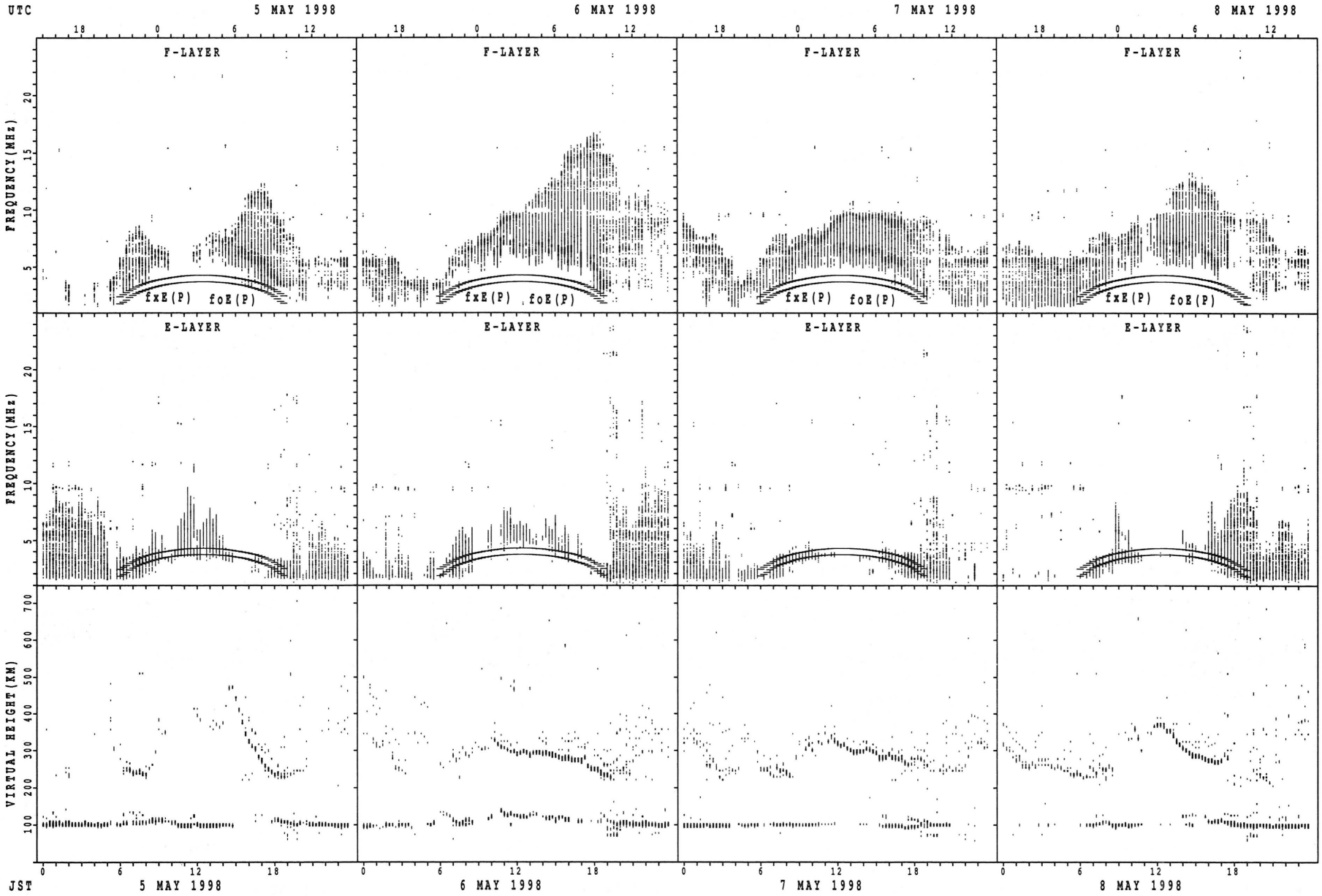
SUMMARY PLOTS AT YAMAGAWA



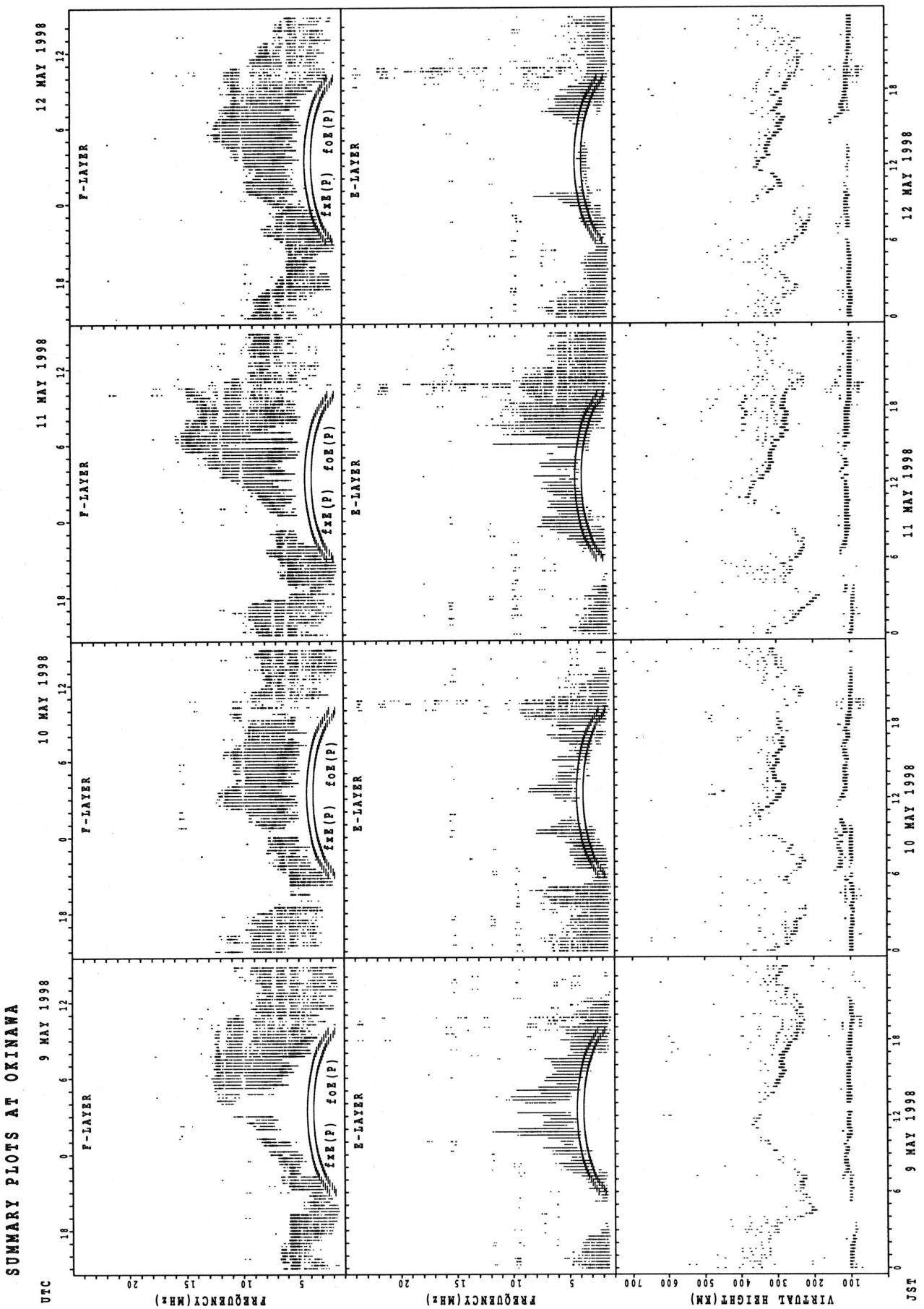
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
JST
1 MAY 1998
2 MAY 1998
3 MAY 1998
4 MAY 1998
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

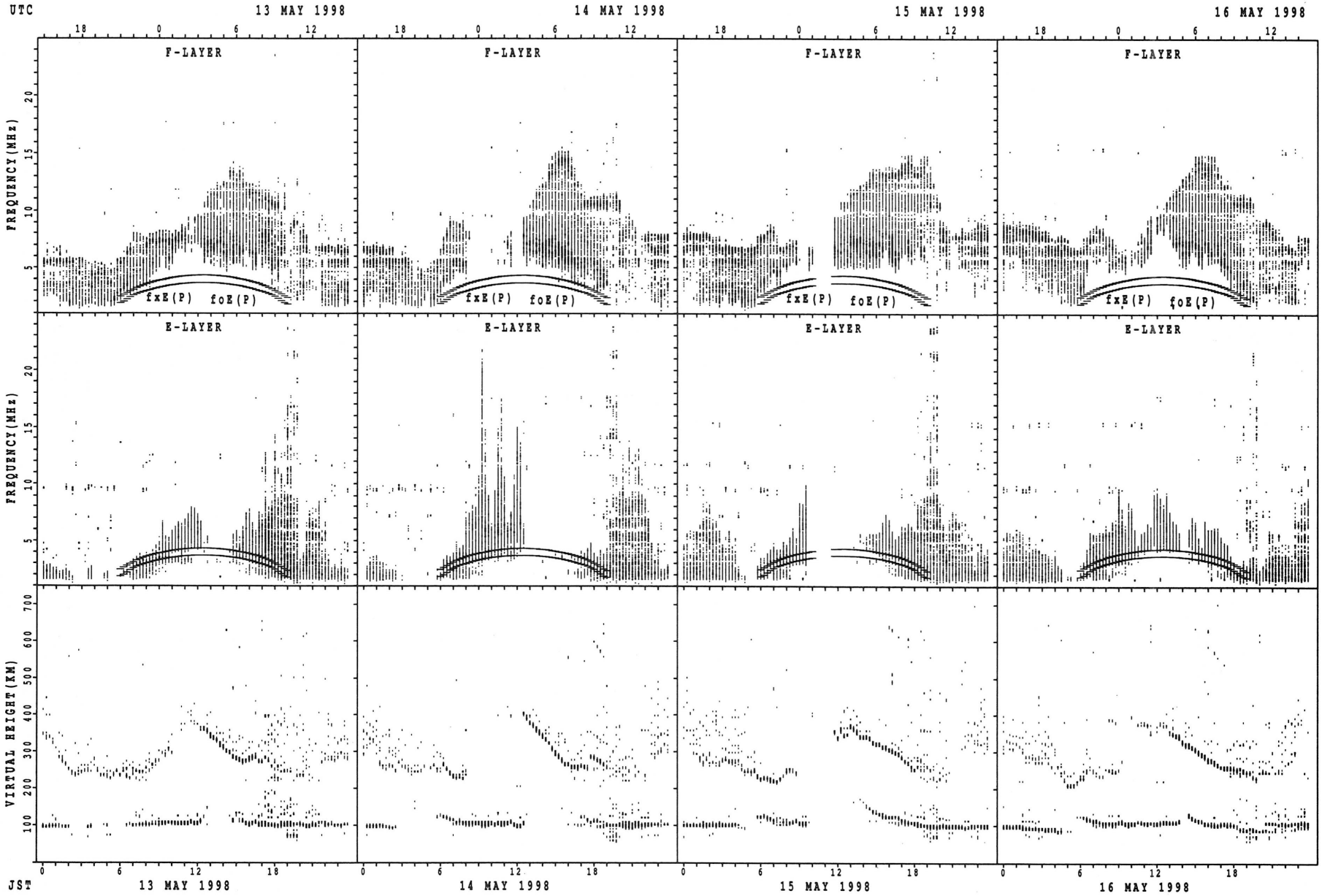
SUMMARY PLOTS AT OKINAWA



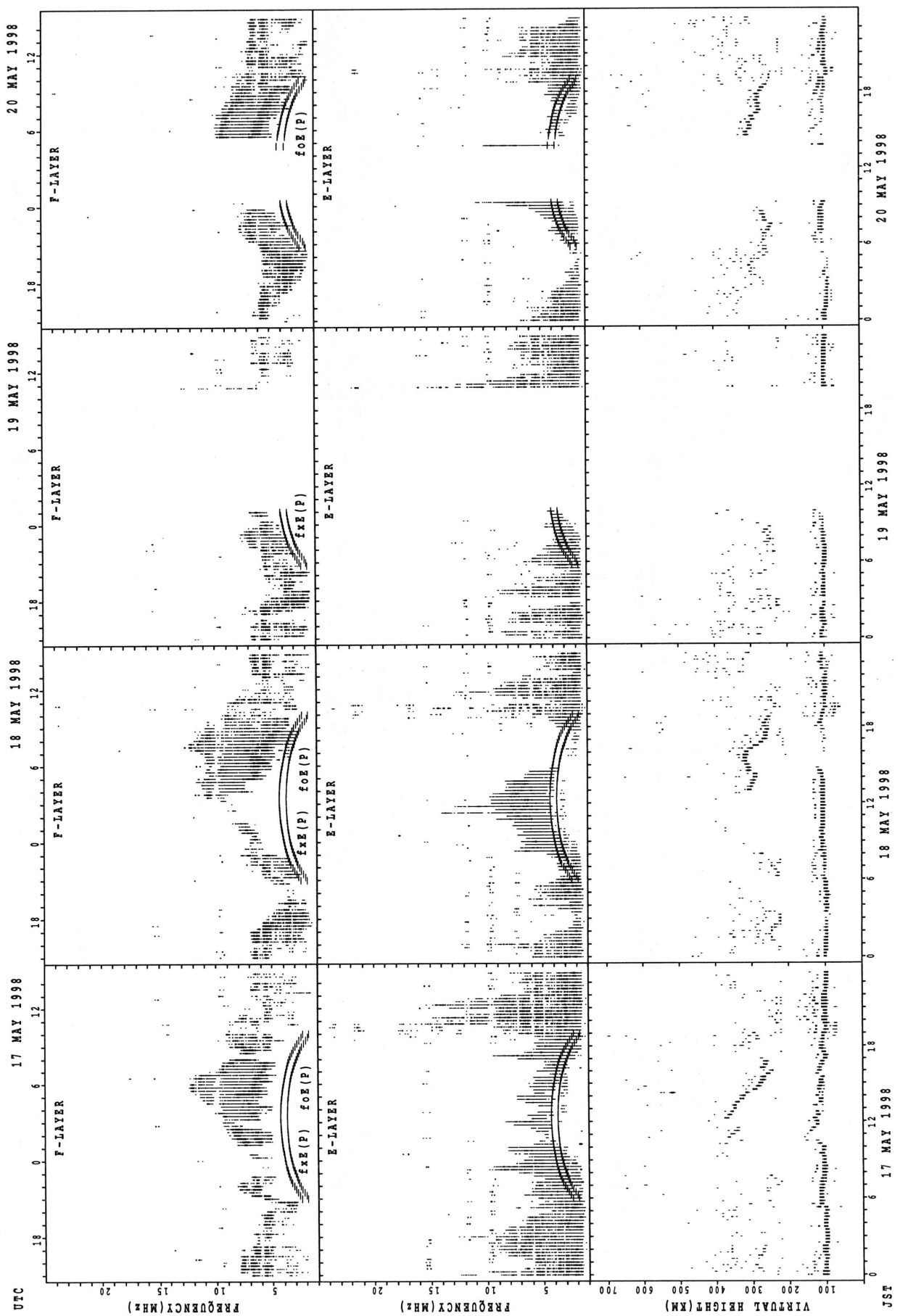
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
JST
9 MAY 1998
10 MAY 1998
11 MAY 1998
12 MAY 1998
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

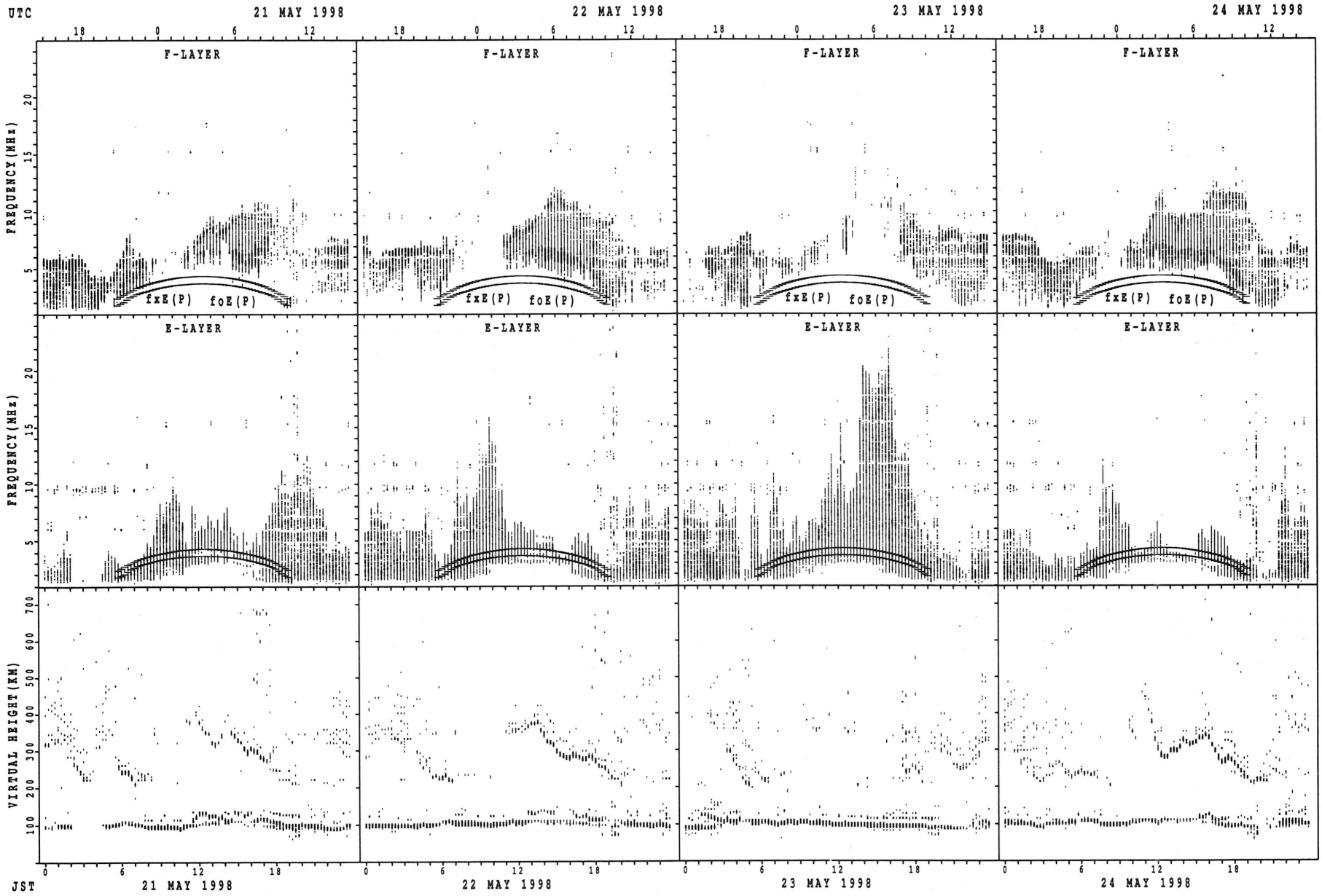
SUMMARY PLOTS AT OKINAWA



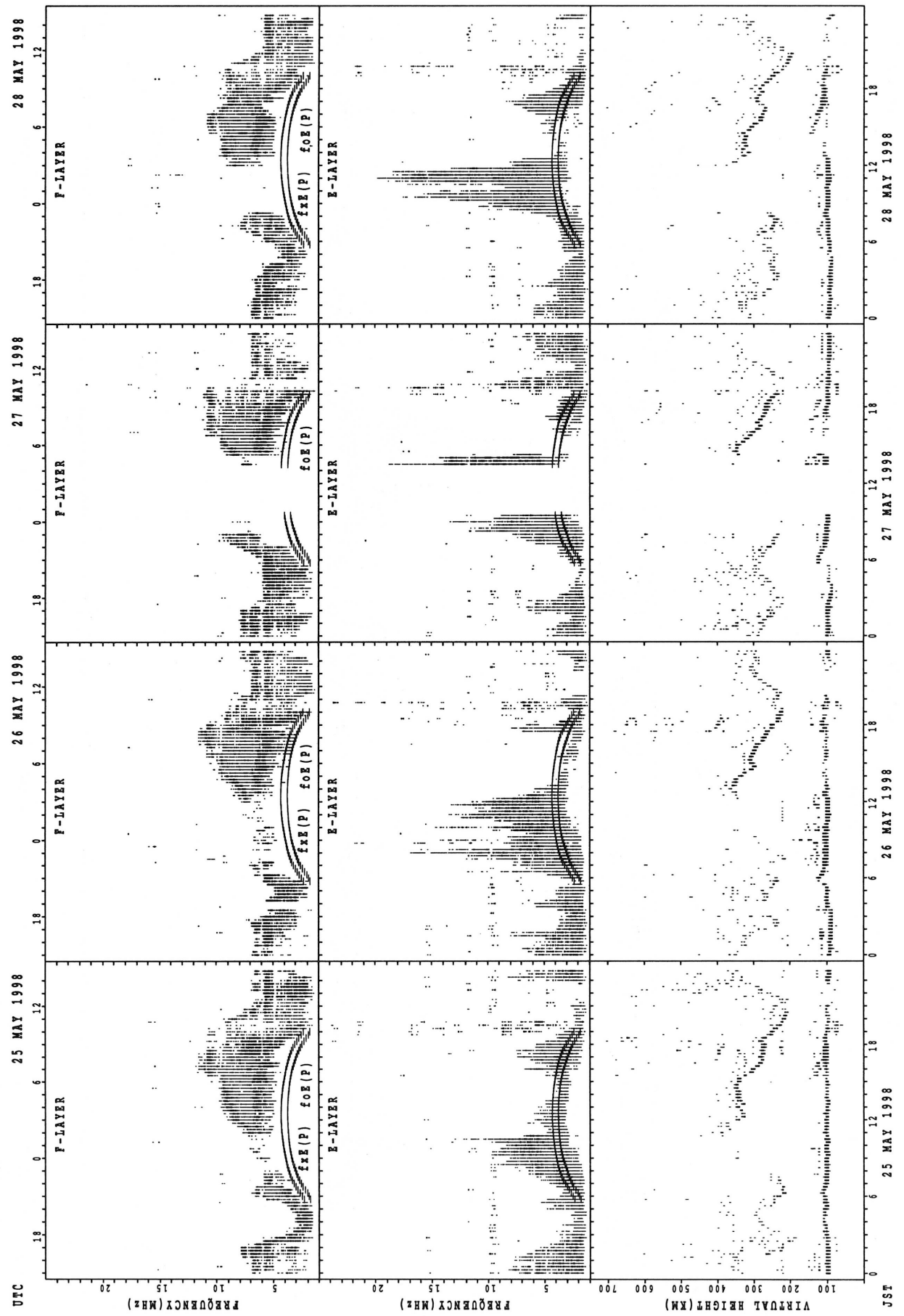
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
17 MAY 1998
18 MAY 1998
19 MAY 1998
20 MAY 1998
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

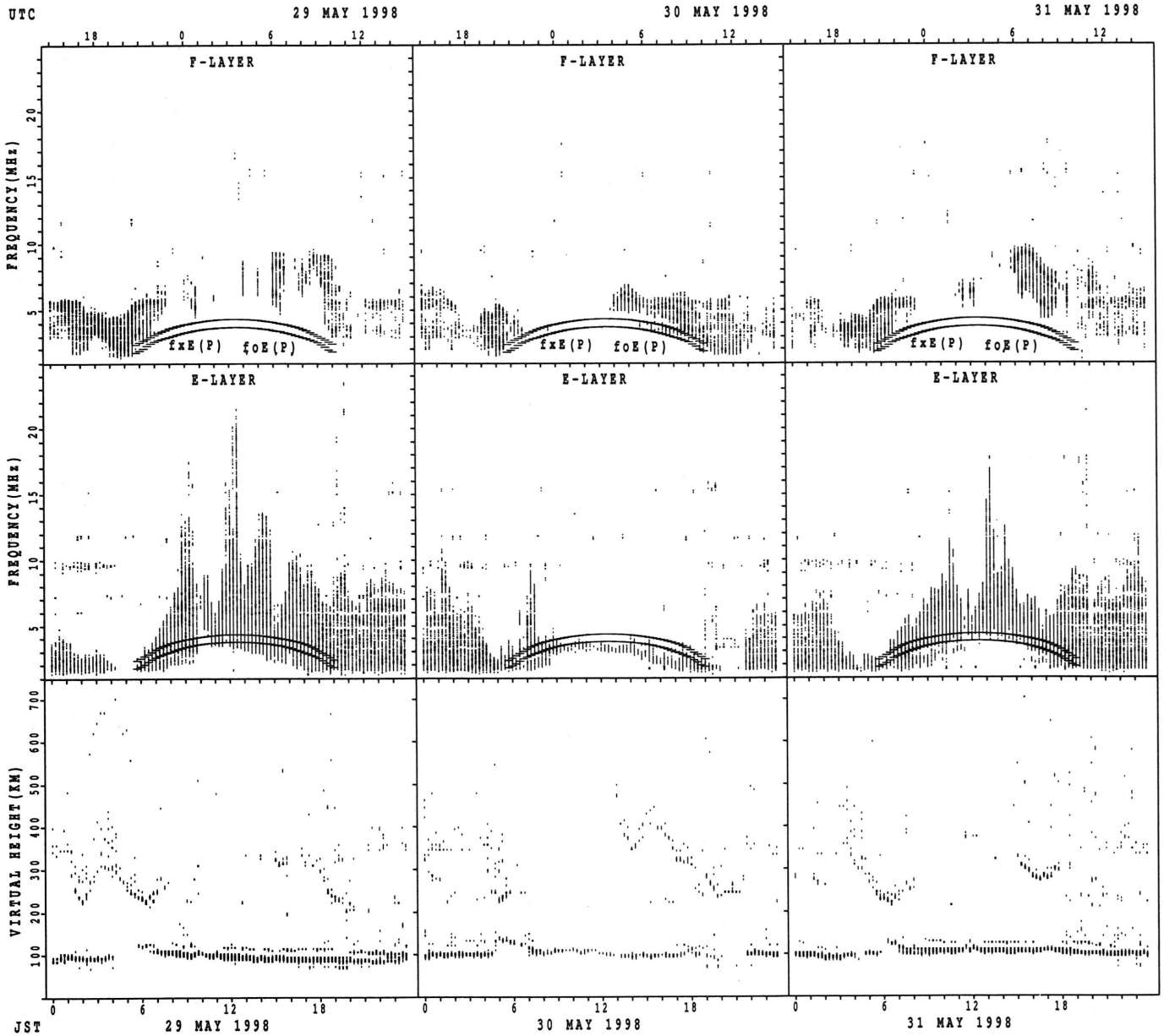
SUMMARY PLOTS AT OKINAWA



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


SUMMARY PLOTS AT OKINAWA
UTC
JST
25 MAY 1998
26 MAY 1998
27 MAY 1998
28 MAY 1998
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 1998 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																	12	10	10	11	16	14	11	
MED																	320	319	294	290	288	311	318	
U Q																	330	342	304	314	320	316	324	
L Q																	305	302	276	284	281	292	280	

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	22	21	18	16	28	27	26	26	23	20	16	11		10	15	21	23	31	29	27	27	25	20
MED	105	103	105	105	120	123	117	113	113	111	109	108	105		107	113	113	113	113	113	113	109	107	105
U Q	107	107	122	121	127	130	119	115	115	113	111	112	109		123	119	119	119	119	115	115	113	113	109
L Q	101	99	99	97	107	117	113	111	111	107	106	105	103		101	103	108	113	111	111	107	107	103	103

h'F STATION KOKUBUNJI LAT. 35.7N LON. 139.5E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							13	16									23	20	17	19	16			
MED							276	272									292	284	280	266	274			
U Q							310	289									312	309	297	296	345			
L Q							265	246									280	278	248	250	265			

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	24	23	25	21	24	27	28	28	28	26	25	25	20	13	14	20	26	27	24	29	25	27	30
MED	107	105	105	103	105	121	121	115	111	111	110	111	109	109	111	112	116	114	111	111	111	111	109	107
U Q	111	105	107	104	108	134	125	119	115	113	111	113	113	115	125	119	120	121	113	113	113	113	113	109
L Q	105	102	99	97	99	105	115	113	111	107	107	107	105	105	104	105	111	109	107	106	108	106	107	105

h'F STATION YAMAGAWA LAT. 31.2N LON. 130.6E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							14	19	17									28	25	26	23	13		13
MED							280	258	276									285	280	276	264	268		346
U Q							290	272	296									300	290	294	290	324		366
L Q							258	240	244									244	266	234	236	224		282

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	17	19	13	16	14	18	24	24	24	22	23	19	15	16	16	17	23	26	25	28	28	23	25
MED	119	117	115	115	114	117	131	125	122	121	119	119	119	123	120	119	123	127	123	121	121	121	119	117
U Q	123	120	119	118	119	127	137	128	125	123	121	123	121	127	121	133	133	127	127	123	125	121	121	121
L Q	115	115	113	111	109	115	121	122	119	119	115	115	113	117	119	116	118	119	121	119	120	115	117	115

MONTHLY MEDIANS OF h'F AND h'Es

MAY 1998 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

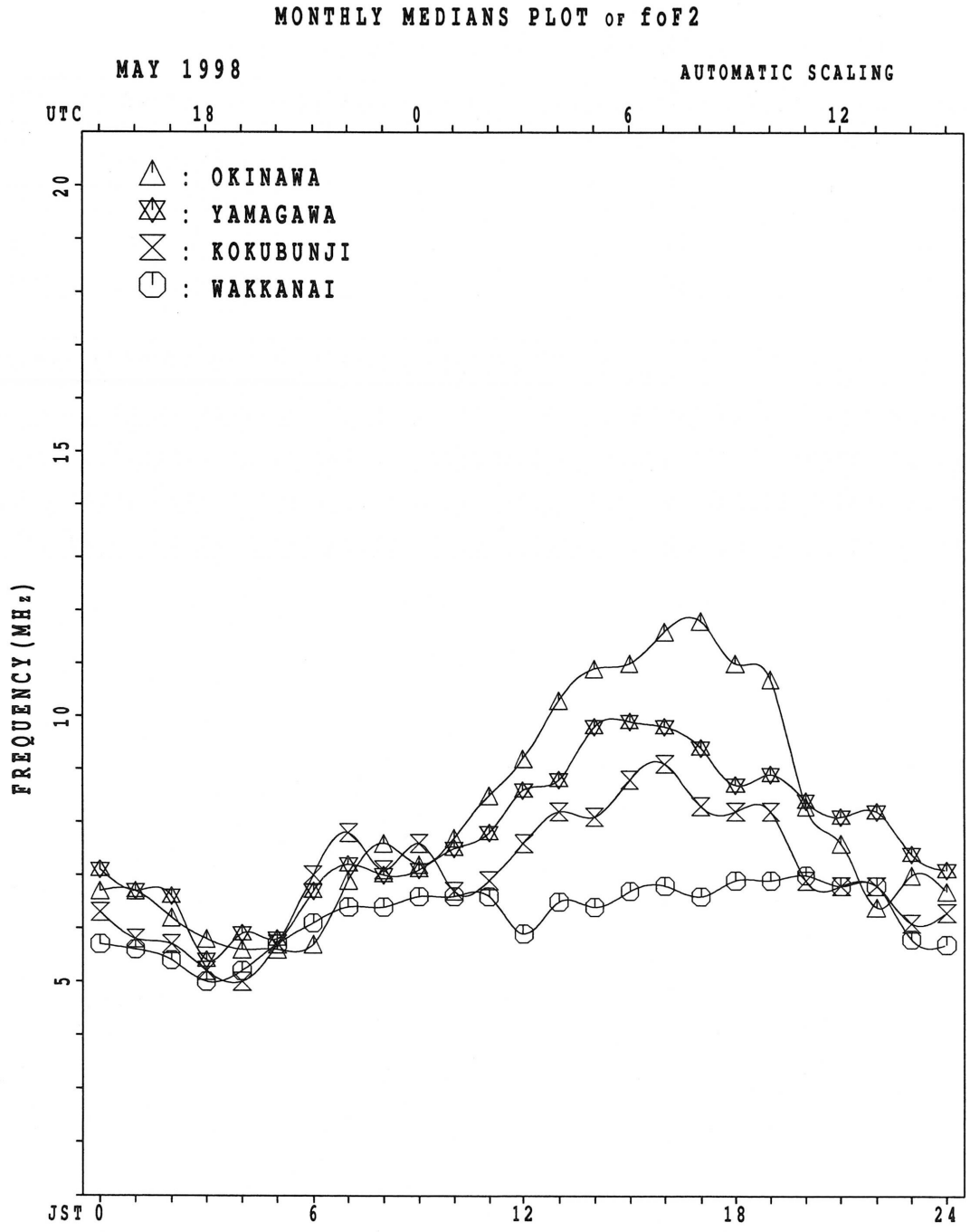
STATION OKINAWA LAT. 26.3N LON. 127.8E

h'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12	13	15					20	17									28	24	21	21			11
MED	340	348	306					248	266									278	266	264	256			378
U Q	368	403	346					257	279									283	281	279	267			396
L Q	323	316	272					239	251									270	252	241	238			338

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	28	24	21	21	17	18	29	26	29	24	19	21	15	15	17	23	24	28	27	27	25	25	26
MED	99	101	97	97	103	101	107	113	108	107	107	105	107	107	111	119	115	112	110	101	103	103	105	104
U Q	105	105	103	104	107	105	119	117	111	113	112	109	118	113	125	135	119	117	113	107	105	107	111	105
L Q	97	99	95	93	93	99	103	106	105	104	104	103	105	101	103	106	105	107	103	97	99	99	98	99


MONTHLY MEDIANS PLOT OF foF2
MAY 1998
AUTOMATIC SCALING
UTC
18
0
6
12
△ : OKINAWA
⛛ : YAMAGAWA
⧖ : KOKUBUNJI
◯ : WAKKANAI
FREQUENCY(MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 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 60	X 58	X 52	X 52	X 51															X 99	X 88	X 70	X 68	X 66
2	X 62	X 60	X 60	X 60	X 56															X 121	X 88	X 67	X 68	X 64
3	X 58	61	X 63	X 46	X 49		58													X 59	X 49	X 52	X 46	X 48
4	X 50	X 46	X 49	X 43	X 38															X 79	X 50	A	A	X 53
5	X 49	X O 55	X 51	47	43					Y					Y					X 61	X 53	X 49	X 49	X 50
6	X 50	50	X 48	X 46	X 42															X 88	X 82	X 74	X 76	X 73
7	74	74	72	62	X 54															X 80	X 80	78	X 76	75
8	76	X 72	X 64	X 62	X 63															X 94	O X 86	X 69	X 69	X 67
9	X 69	X 66	X 62	X 57	X 59															X 84	X 76	73	75	78
10	75	68	X 67	X 62	X 59															X 92	X 89	X 87	X 86	X 84
11	X 84	X 78	X 74	X 60	59															X 96	X 94	A	X 74	X 71
12	X 68	X 64	X 60	X 56	58		81	82												X 98	X 89	X 87	X 81	X 75
13	X 74	X 74	76	X 71	X 67															X 83	X 79	X 73	X 70	70
14	75	X 70	X 67	X 66	X 64															X 103	X 98	X 81	X 75	X 72
15	X 73	X 70	X 66	X 63	X 63															X 93	X 99	A	66	X 69
16	70	63	60	66	63															X 95	X 88	A	A	67
17	X 70	67	69	63	54															X 78	A	78	X 71	X 65
18	64	60	63	62	57															X 81	X 78	74	74	X 58
19	X 58	X 58	A	60	X 56															A	X 65	X 65	62	A
20	62	62	61	58	54															A	73	A	X 67	X 56
21	57	61	61	53	52															X 91	X 81	71	X 69	66
22	67	X 64	X 62	62	X 62															X 91	A	A	A	X 75
23	61	A	59	56	58															X 82	X 83	X 80	X 84	86
24	X 79	X 74	X 69	X 61	X 66															X 104	X 84	X 53	X 56	A
25	59	58	54	O X 38	O X 32															86	94	97	A	62
26	59	57	57	50	47															X 87	X 75	X 68	67	70
27	66	64	62	X 56	X 52															X 86	X 83	X 70	74	76
28	X 70	70	X 65	55	54															X 92	X 83	A	74	A
29	65	64	60	60	56															X 78	X 70	X 70	64	58
30	X 58	O X 60	54	39	41															X 62	X 63	60	60	A
31	A	A	A	58	58															A	X 74	X 70	63	73
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	29	31	31		2	1												28	29	24	27	27
MED	X 66	X 64	X 62	X 58	X 56		70	82												X 88	X 82	X 70	X 69	X 69
U Q	73	X 70	X 66	X 62	X 59															X 94	X 88	X 78	X 75	75
L Q	X 59	59	58	X 52	X 51															X 80	X 74	X 68	64	X 62

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 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	54	52	46	46	45	54	66	67	70	72	73	77	77	73	81	90	94	92	94	93	82	64	62	60
2	56	54	54	54	50	49	62	77	88	83	80	82	88	78	79	81	75	90	99	115	82	62	62	58
3	52	F 54	57	40	43	F 44	F 50	49	49	A	A	J R 50	A	A	54	58	R 51	53	54	53	43	46	40	42
4	R 44	40	43	37	32	46	59	70	A	70	A	A	81	90	84	118	128	125	103	73	U A 44	A	A	47
5	43	49	45	F 40	F 32	F 50	46	R 45	A	Y	A	A	Y	U R 53	Y	57	66	68	65	55	47	43	43	44
6	44	F 42	42	40	36	36	37	46	54	B	66	74	68	73	77	78	72	74	82	82	76	R 70	70	67
7	F 63	68	62	55	48	50	63	74	65	67	R 59	67	U R 64	70	72	71	70	63	64	74	74	F 70	70	F 69
8	F 68	66	58	56	57	63	68	71	72	75	72	B	74	86	90	85	80	80	80	88	U R 80	63	63	61
9	63	60	56	51	V 53	58	58	54	64	62	A	A	A	78	95	97	90	94	90	78	70	F 66	F 67	F 70
10	F 69	F 62	61	56	53	59	Z 85	71	76	R 55	76	90	87	86	81	80	85	75	79	86	84	81	80	R 78
11	78	72	67	54	F 53	F 65	77	A	71	80	A	U R 64	76	83	93	93	82	A	A	90	88	A	68	65
12	62	58	54	50	F 49	F 54	F 72	F 74	57	62	A	68	A	R 74	90	88	91	86	88	92	83	81	75	69
13	68	69	F 68	65	61	63	66	75	68	V 70	72	70	73	80	80	81	80	76	74	77	74	66	64	F 63
14	F 66	64	61	60	58	60	69	84	78	84	67	69	73	82	86	90	92	92	95	97	92	75	69	66
15	67	64	60	57	57	70	76	85	71	68	70	75	A	82	88	93	92	86	85	87	Z 94	A	F 55	63
16	F 63	F 54	58	F 54	F 55	F 71	73	73	A	76	71	70	76	86	94	98	89	82	87	88	82	A	A	F 62
17	F 62	F 56	F 61	F 56	F 45	F 47	A	68	A	A	A	A	R 64	A	A	86	73	68	68	73	A	F 71	R 65	59
18	F 57	F 51	F 53	F 54	F 50	55	62	74	A	A	68	74	77	R 78	79	82	84	83	79	75	72	F 67	F 67	52
19	J R 52	R 52	A	F 53	50	F 57	65	76	56	A	A	58	74	A	A	A	71	A	A	A	59	59	F 54	A
20	F 53	F 54	F 52	F 49	F 46	F 56	58	63	68	R 62	62	R 63	66	72	68	A	71	V 63	61	A	F 65	A	61	50
21	F 52	F 54	F 52	F 44	F 44	F 50	70	76	76	A	A	62	67	74	76	88	87	79	81	85	R 75	F 62	63	F 58
22	F 60	58	56	F 55	56	66	78	75	A	A	A	A	68	79	87	84	82	A	88	85	A	A	A	J R 69
23	F 54	A	F 50	F 49	F 50	58	74	73	A	A	A	A	74	77	A	92	83	85	74	76	R 77	74	R 78	F 78
24	73	68	63	55	60	63	S 72	75	69	77	A	A	A	82	R 73	A	91	A	A	S 98	78	R 47	49	A
25	F 54	F 49	F 46	32	26	49	67	72	A	A	68	A	61	A	68	R 73	69	63	U A 63	F 79	R 84	F 87	A	F 54
26	F 52	F 50	F 51	F 43	F 39	50	56	53	A	66	52	62	58	U R 66	74	72	78	76	80	81	69	62	F 58	F 64
27	F 56	F 54	F 54	50	46	56	56	67	73	72	64	57	R 62	62	72	81	89	88	79	80	77	64	F 64	F 70
28	64	F 62	59	F 49	F 46	F 54	A	70	68	A	A	64	66	A	A	A	A	62	72	86	77	A	F 62	A
29	F 58	F 54	F 52	F 49	F 48	F 46	A	78	A	A	B	A	A	A	R 75	77	71	79	80	72	64	64	F 55	F 49
30	F 54	54	F 47	F 30	F 34	39	52	51	A	A	A	A	A	57	R 64	58	54	49	47	56	57	F 52	F 53	A
31	A	A	A	F 50	F 49	55	61	A	62	A	A	R 54	U R 60	72	70	A	A	A	68	A	68	64	F 55	F 63
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	29	31	31	31	28	29	20	17	15	20	23	25	26	26	29	26	28	28	29	24	27	27
MED	F 58	54	54	50	49	55	66	72	68	70	68	68	73	78	79	83	82	79	80	82	76	64	63	63
U Q	64	63	60	55	53	60	72	75	72	76	72	74	76	82	87	90	90	86	88	88	82	70	68	F 69
L Q	53	52	50	44	44	49	58	65	63	64	64	62	R 64	72	72	77	71	68	68	74	66	62	F 55	54

MAY 1998 foF2 (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L 452	L 480		L 480	L 504	L 516	L 512	L 500	L 488	L 460	L	A					
2								L 460	U A	L	A	A	A	A	L 500	L 480	L	A	A					
3						F 280	336	388	A	A	A	A	A	A	428	432	420	L 396	U L 336					
4							U L 404	A	A	A	A	A	508	524	500	464	436	U L 400	L 272					
5						L	364	A	A	Y	A	A	U R 448	U Y 448	Y	420	432	L 392						
6								408	448	B	508	U A 476	A	500	468	L 488	A	L	A					
7						L	U L 392	420	456	520	500	500	U R 504	496	L 488	476	L 452	L						
8							L	L 464	L 476	468	516	B	A	516	500	U L 492	A	A	A					
9							U L 376	L	L 452	A	A	A	A	B	476	464	L 464	L 436	L					
10							L	A	A	L	A	A	540	484	496	U A 476	L	A	A					
11								A	L 472	A	A	A	U A 532	A	488	480	A	A	A					
12						U L 384	L 400	416	A	A	A	A	A	512	468	492	464	U L 448	L					
13							L	440	U A 444	A	488	A	A	A	512	476	464	L 428	A					
14							L	L 460	U L 548	488	500	L 560	L 532	512	512	L 496	464	L 424	A					
15							A	L	A	L 500	L 524	A	A	532	520	480	L 468	L 452	U L 376					
16								A	A	A	A	L 512	U A 524	U A 552	A	U A 468	460	U A 420						
17						L 328	A	A	A	A	A	A	U A 512	A	A	A	A	A	A					
18							L	A	A	A	U A 524	496	U A 520	A	A	472	452	A						
19							L 416	420	452	A	A	U A 480	U A 476	A	A	A	A	A	A					
20								A	A	A	476	480	U A 472	A	A	A	U A 440							
21						L	L 448	A	A	A	A	488	468	A	468	U A 464	A	A	A					
22						L	L		A	A	A	A	A	U A 492	468	A	A	A	A					
23							U L 392	U A 404	A	A	A	A	A	A	A	A	A	A						
24							A	A	A	U A 472	A	A	A	476	U A 480	A	A	A	A					
25							U L 400	A	A	A	U A 480	A	U A 476	A	U A 500	444	440	A	A					
26						L	A	A	A	A	R 456	472	496	492	460	456	A	404	U L 348					
27								L 460	A	A	A	A	484	A	U A 488	A	420	400	A					
28						A	A	A	U A 480	A	A	R 488	472	A	A	A	A	L 408	A					
29							A	A	A	A	B	A	A	A	A	A	A	A	A					
30						268	344	U A 408	A	A	A	A	A	U Y 444	Y 448	428	424	U R 356	U L 352					
31						U L 356	U A 396	A	A	A	A	A	480	U A 476	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						5	12	11	11	6	11	11	18	16	21	21	16	13	5					
MED						L 328	L 394	420	456	484	500	488	500	498	488	476	452	L 408	U L 348					
U Q						U L 370	L 402	L 460	U L 476	500	516	L 504	U A 520	514	500	L 484	464	L 432	U L 364					
L Q						274	370	408	452	472	480	480	U 476	U 480	468	460	434	398	L 304					

MAY 1998 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 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	256	296	324	344	A	A	R	R	A	R 328	300	260	A					
2						B	244	292	B	A	A	A	A	A	B	336	292	252	A					
3						A	A 228	280	312	336	A	U A 360	A	B	R 348	U A 324	A	A	184					
4						A	232	296	A 328	A 344	A	A	A	R	R	320	288	248	180					
5						A	224	292	328	R 332	U A 368	U A 372	B	356	R	R	292	252	172					
6						176	260	300	R 332	B	U R 368	A	A	A	B	R 336	316	280	192					
7						B	U A 224	A	A	R	B	R	R	R 372	A	R 336	312	268	A					
8						B	244	R 292	R	A 352	A 372	B	A	A	A	B	324	272	U A 180					
9						172	240	308	332	344	U A 364	A	A	B	B	A	324	A 260	A					
10						A	268	288	328	R 356	U A 376	376	U R 384	B	364	344	312	A 272	A					
11						A	A 264	296	A 328	348	372	A	A	A	A	344	J H 320	A 268	A					
12						A	248	284	A 316	A	A	A	A	A	352	344	320	272	A 200					
13						A	244	296	328	352	A 364	A	A	A	A	A	316	260	A 188					
14						A	240	296	332	A	A	A	A	A	A	A	308	264	188					
15						A	244	300	328	A 356	A	A	A	R	R 352	332	304	276	A					
16						184	252	296	324	340	A	A	A	A	A	A	A	A	A					
17						184	264	308	340	A	A	A	388	368	356	336	316	276	A					
18						A	248	A 296	328	A	A	A	A	364	348	336	304	A 264	A					
19						A	240	292	324	A 344	A	A	A	368	352	336	300	U A 256	A					
20						180	A	292	A 316	A 340	A	A	A	A	A	A	304	260	A					
21						A	252	280	A 316	U A 344	A	A	380	R 376	352	336	300	256	A					
22						A	A	288	A 320	A 348	A	A	A	A	356	332	300	252	A					
23						184	252	288	328	U A 352	A	A	A	A	A	A	A	A	A					
24						A	240	296	328	A	A 360	A	A	R 396	360	344	308	A	A					
25						168	252	A 296	A	U A 336	A	A	A	A	A	332	304	268	U A 192					
26						180	244	288	A 328	U A 340	A	A	R	A	348	336	304	A 264	A					
27						A	264	A 304	328	A 344	A	U A 368	A	A	A	A	A	A	A					
28						A	256	U A 296	A	A	A	A	A	A	A	A	A	A 296	U A 196					
29						A	248	300	A 324	A 348	B	A	A	A	A	A	A	A	A					
30						A	244	A 300	328	U A 348	A	A	A	R	R	320	304	264	A					
31						A 200	A	288	312	U A 340	U A 352	A	A	U R 372	348	A	316	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						9	28	30	26	22	10	4	3	8	12	19	25	24	10					
MED						180	246	296	328	A 344	A 366	U A 370	384	370	352	336	304	264	188					
U Q						184	254	296	328	A 348	A 372	374	388	R 374	356	336	316	272	U A 192					
L Q						174	240	288	A 324	340	A U A 364	A 364	380	366	348	332	300	258	180					

MAY 1998 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 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	23	22	E B 15	19	E B 15	20	31	32	38	39	38	39	G 30	G	35	G 30	32	J A 41	52	34	24	J A 32	22	23
2	27	J A E 38	B E 15	B E 14	B E 14	J A 19	30	J A 44	46	J A 47	J A 103	J A 82	J A 77	J A 68	44	42	J A 45	J A 63	J A 60	35	37	34	25	J A 26
3	J A 33	18	J A 26	J A 26	J A 19	20	28	34	55	J A 54	58	J A 45	J A 79	50	G	35	37	27	J A 29	51	J A 42	26	30	29
4	J A E 22	B 15	J A 22	J A 39	J A 22	J A 36	J A 34	J A 49	J A 98	J A 108	110	J A 97	J A 46	G	G	G	G	G	21	43	J A 53	J A 66	J A 63	J A 28
5	23	J A 52	18	J A 35	E B 14	21	29	J A 46	J A 47	G	J A 48	45	E B 38	38	G	G	32	31	22	E B 15	E B 14	E B 14	E B 14	J A 22
6	J A E 39	B 15	18	18	E B 14	23	G	32	G	B	G	52	J A 77	39	E B 43	G	J A 44	46	34	J A 50	J A 21	18	J A 63	J A 61
7	J A 50	J A 28	J A 24	J A 24	J A 33	J A 23	33	J A 38	34	G E B 32	42	G 32	G 36	G 35	G 32	G	G	30	40	J A 19	24	J A 64	J A 52	J A 30
8	J A 26	J A 20	J A E B 21	14	21	E B 16	27	G	G 29	46	49	B	J A 64	J A 52	38	50	59	80	68	J A 82	J A 54	J A 44	35	J A 30
9	30	J A 22	J A E B 19	14	22	21	31	J A 39	39	J A 51	J A 62	129	99	70	E B 42	43	J A 47	34	J A 28	J A 85	J A 48	J A 60	62	J A 52
10	J A 53	J A 50	J A 27	43	J A 42	37	J A 53	J A 62	J A 58	48	74	82	G	E B 46	41	J A 118	J A 51	J A 51	54	J A 66	J A 81	J A 29	24	J A 53
11	20	J A 33	32	25	J A 24	J A 30	J A 40	J A 80	J A 44	J A 108	84	J A 82	J A 67	J A 71	J A 43	38	58	J A 99	90	J A 110	J A 111	J A 103	J A 81	48
12	J A 38	J A 47	J A 60	J A 68	J A 36	J A 29	J A 28	J A 42	J A 53	J A 83	J A 83	J A 103	J A 119	49	G	39	36	33	J A 24	J A 20	J A 51	J A 66	J A 31	J A 28
13	J A 25	J A 28	J A 50	J A 41	J A 35	J A 27	32	J A 44	J A 52	J A 63	J A 52	J A 50	J A 59	J A 66	J A 45	36	G 27	J A 40	J A 84	53	J A 29	J A 50	E B 14	J A 42
14	E B 15	E B 15	E B 15	20	E B 14	J A 22	28	39	J A 46	J A 43	J A 46	42	43	39	38	34	G 28	38	J A 43	J A 52	J A 50	J A 26	24	23
15	J A 18	J A 25	J A 25	J A 37	J A 24	J A 26	57	J A 47	J A 58	J A 48	J A 55	62	J A 87	G	G	G	G	33	J A 28	J A 147	59	J A 99	J A 76	J A 52
16	J A 46	J A 51	J A 40	J A 30	J A 36	28	J A 49	J A 70	J A 108	J A 70	65	J A 48	J A 58	J A 77	J A 75	J A 51	J A 37	47	46	J A 52	J A 102	J A 115	J A 77	J A 30
17	J A 53	J A 34	J A 81	J A 25	E B 15	25	J A 61	J A 69	J A 74	150	J A 94	J A 147	J A 54	J A 88	133	93	J A 64	J A 52	J A 53	72	J A 117	J A 82	38	J A 43
18	J A 47	J A 33	J A 38	J A 39	J A 24	30	29	76	J A 84	J A 114	J A 57	J A 45	J A 52	J A 63	J A 63	G	J A 49	J A 74	80	J A 32	33	J A 52	J A 52	J A 81
19	J A 87	J A 83	J A 80	J A 50	J A 83	49	28	39	J A 48	J A 64	J A 66	J A 68	J A 53	J A 76	98	J A 177	J A 93	J A 135	117	94	53	J A 59	J A 54	J A 105
20	J A 65	J A 53	J A 46	J A 30	J A 24	20	J A 38	J A 56	J A 86	56	40	J A 45	J A 50	J A 62	60	105	J A 50	J A 43	J A 52	J A 112	J A 62	J A 84	J A 82	J A 123
21	J A 54	J A 53	J A 50	J A 46	23	J A 25	J A 30	J A 54	J A 69	J A 142	66	40	41	J A 65	41	J A 50	J A 75	J A 123	J A 45	J A 29	J A 28	J A 52	J A 28	J A 39
22	J A 50	J A 38	J A 28	J A 45	J A 28	J A 28	J A 32	J A 51	J A 84	87	J A 78	J A 128	J A 100	J A 66	J A 50	J A 83	J A 92	117	J A 78	J A 57	J A 132	J A 119	J A 109	J A 118
23	J A 80	J A 90	J A 45	J A 28	J A 23	J A 21	31	J A 51	J A 91	106	J A 90	J A 85	J A 60	J A 68	104	J A 59	J A 90	67	J A 56	J A 62	33	J A 38	J A 43	J A 51
24	J A 51	20	18	J A 48	J A 48	J A 38	J A 48	78	J A 71	J A 66	J A 74	J A 156	J A 162	47	J A 50	J A 78	J A 74	J A 218	J A 178	J A 104	J A 73	J A 52	J A 55	J A 67
25	J A 53	J A 55	J A 35	J A 39	J A 56	20	33	81	90	J A 103	J A 143	J A 162	J A 52	J A 79	J A 61	G 30	34	J A 68	115	J A 150	J A 90	58	J A 82	J A 40
26	J A 31	J A 26	J A 31	J A 33	J A 22	J A 34	60	J A 56	J A 66	67	J A 53	J A 43	G 36	38	G	38	J A 55	J A 37	J A 38	J A 34	J A 41	J A 53	J A 34	J A 50
27	J A 46	J A 51	J A 30	J A 34	J A 48	J A 32	33	J A 41	J A 55	J A 60	J A 77	J A 54	J A 46	J A 54	J A 66	62	J A 40	J A 34	86	J A 54	J A 50	J A 87	J A 50	J A 64
28	J A 53	J A 40	J A 26	J A 35	J A 36	54	J A 82	J A 60	J A 59	65	J A 84	J A 49	J A 52	J A 96	J A 157	J A 158	J A 132	J A 41	J A 54	60	J A 55	J A 75	J A 60	J A 82
29	J A 46	J A 46	J A 64	J A 30	J A 49	J A 51	J A 74	J A 66	J A 82	J A 81	B	J A 71	J A 127	J A 168	J A 123	93	72	J A 81	J A 76	68	J A 44	40	J A 65	J A 48
30	J A 69	J A 64	J A 84	32	20	23	J A 32	J A 47	J A 48	58	J A 74	J A 67	117	G 28	G	G	G	33	J A 24	J A 23	21	J A 48	51	J A 69
31	J A 151	J A 118	J A 84	J A 47	J A 26	28	J A 49	J A 84	J A 61	J A 139	96	J A 78	56	50	J A 63	J A 242	J A 126	120	J A 66	104	J A 49	J A 52	J A 126	J A 45
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31
MED	J A 46	J A 38	J A 30	J A 33	J A 24	J A 26	32	J A 49	J A 58	J A 64	J A 66	J A 64	J A 56	J A 54	43	42	J A 47	J A 46	J A 53	J A 54	J A 50	J A 52	J A 52	J A 48
U Q	J A 53	J A 52	J A 50	J A 41	J A 36	J A 32	J A 49	J A 66	J A 82	J A 103	J A 84	J A 85	J A 79	J A 70	J A 63	J A 83	J A 72	J A 80	78	J A 85	J A 62	J A 75	J A 65	J A 64
L Q	26	22	21	25	E B 20	21	29	39	46	48	52	45	46	G 39	G	G	G 32	34	J A 34	J A 34	33	38	30	J A 30

MAY 1998 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 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 15	E B 14	E B 15	E B 13	E B 15	18	28	32	38	38	38	U Y 39	U G 30	G	U Y 35	G 29	32	35	44	24	E B 16	24	E B 15	E B 15
2	18	20	E B 15	E B 14	E B 14	E B 15	28	40	46	44	56	77	63	60	44	41	43	62	56	32	25	21	16	18
3	25	E B 15	23	23	18	20	25	34	46	A A 54	A A 58	44	A A 79	A A 50	G	35	32	26	22	37	36	18	28	E B 14
4	16	E B 15	22	23	17	21	27	47	A A 98	55	A A 110	A A 97	43	G	G	G	G	G	20	30	U A 36	A A 66	A A 63	20
5	E B 15	18	17	E B 15	E B 14	20	28	41	A A 47	G	A A 48	A A 45	E B 38	U Y 38	G	G	31	29	20	E B 15	E B 14	E B 14	E B 14	20
6	21	E B 15	E B 14	E B 13	E B 14	G	G	31	G	B	G	48	61	U Y 39	E B 43	G	42	40	32	26	18	E B 14	48	55
7	35	20	18	20	29	20	28	36	U Y 34	U G 31	E B 42	U G 32	U G 36	G 35	U G 32	G	G	30	31	E B 15	E B 14	32	36	19
8	19	16	E B 14	E B 14	E B 15	E B 16	26	G	U G 29	42	46	B	58	46	U Y 38	45	55	49	68	40	22	36	22	18
9	19	18	E B 14	E B 14	E B 14	G	29	36	38	49	A A 62	A A 129	A A 99	U Y 69	E B 42	42	40	28	20	35	36	17	44	40
10	29	23	22	23	21	30	42	51	52	45	69	68	G	E B 46	U Y 41	48	41	42	34	45	21	17	20	41
11	17	30	U S 32	17	18	27	28	A A 80	40	73	A A 84	57	53	66	40	37	51	A A 99	A A 90	41	81	A A 103	19	30
12	20	18	E B 15	44	21	19	27	37	51	55	A A 83	60	A A 119	46	G	38	34	32	23	16	30	47	19	24
13	18	17	34	20	22	21	29	40	44	62	42	48	58	62	42	35	G 24	34	58	46	23	25	E B 14	26
14	E B 15	E B 15	E B 15	E B 14	E B 14	20	27	36	41	41	44	42	43	U Y 38	38	34	G 27	36	37	43	32	18	E B 15	18
15	E B 14	E B 15	E B 14	26	18	24	52	40	50	45	48	U Y 62	A A 87	G	G	G	G	30	23	75	44	A A 99	42	24
16	21	34	19	27	21	23	42	68	A A 108	68	62	44	52	55	68	47	35	42	37	36	59	A A 115	A A 77	18
17	22	23	E B 16	24	E B 15	21	A A 61	66	A A 74	A A 150	A A 94	A A 147	51	A A 88	A A 133	85	63	46	50	65	A A 117	34	21	37
18	40	29	17	24	18	20	28	68	A A 84	A A 114	52	42	52	58	54	G	42	72	69	22	22	21	32	36
19	24	E B 14	A A 80	34	31	26	27	38	43	A A 64	A A 66	48	48	A A 76	A A 98	A A 177	58	A A 135	A A 117	A A 94	44	49	42	A A 105
20	43	33	24	18	E B 14	G 18	30	49	55	54	39	41	47	56	58	A A 105	44	36	28	A A 112	40	A A 84	40	37
21	42	46	24	20	18	20	G 19	45	64	A A 142	A A 66	40	41	61	41	46	69	44	39	22	19	22	19	23
22	41	28	22	23	22	20	28	41	A A 84	A A 87	A A 78	A A 128	54	49	43	79	77	A A 117	66	47	A A 132	A A 119	A A 109	50
23	24	A A 90	24	20	18	G	30	40	A A 91	A A 106	A A 90	A A 85	51	62	A A 104	53	77	60	47	57	26	26	33	32
24	40	E B 15	E B 15	17	38	22	43	66	57	47	A A 74	A A 156	A A 162	44	48	A A 78	67	A A 218	A A 178	50	58	22	23	A A 67
25	28	35	28	22	19	G	30	64	A A 90	A A 103	48	A A 162	48	A A 79	50	G 30	U Y 34	49	U A 40	23	76	30	A A 82	19
26	17	18	17	18	17	24	51	45	A A 66	63	41	42	U G 36	U Y 38	G	36	54	32	29	32	35	22	26	40
27	17	37	19	20	21	19	29	38	50	57	59	52	43	51	49	61	38	32	46	24	43	48	31	46
28	44	34	22	29	33	36	A A 82	48	48	A A 65	A A 84	42	42	A A 96	A A 157	A A 158	A A 132	37	43	58	28	A A 75	36	A A 82
29	32	32	26	23	32	20	A A 74	62	A A 82	A A 81	B	A A 71	A A 127	A A 168	64	71	62	57	67	66	18	31	22	21
30	37	50	28	21	E B 14	20	30	41	A A 48	A A 58	A A 74	A A 67	A A 117	U G 28	G	G	G	32	22	18	E B 14	32	30	A A 69
31	A A 151	A A 118	A A 84	24	18	26	40	A A 84	56	A A 139	A A 96	47	44	48	60	A A 242	A A 126	A A 120	53	A A 104	28	19	18	19
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31
MED	22	20	19	20	18	20	29	41	50	58	60	50	51	50	42	41	42	40	40	37	30	30	28	26
U Q	37	34	24	24	21	23	42	62	A A 74	A A 81	A A 78	A A 77	A A 63	A A 62	58	A A 71	62	A A 60	58	57	44	A A 49	42	41
L Q	17	E B 15	E B 15	E B 17	E B 15	G 18	27	37	43	45	46	42	43	G 38	G	G	G 32	32	28	24	21	21	19	19

MAY 1998 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 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

H / D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	15	13	15	14	16	17	14	18	20	21	22	19	21	16	18	15	16	16	16	16	15	15
2	15	14	15	14	14	15	16	15	33	20	21	33	26	27	41	18	17	14	14	15	16	15	15	16
3	16	15	14	15	15	14	14	15	16	17	23	20	24	38	21	19	16	16	14	16	14	15	15	14
4	15	15	14	14	14	15	15	22	17	19	34	20	26	26	20	18	19	16	16	16	14	15	15	15
5	15	14	14	15	14	14	15	15	20	20	27	20	38	27	23	18	17	16	14	15	14	14	14	14
6	13	15	14	13	14	15	14	14	20	B	29	34	29	25	43	25	19	20	15	16	14	14	14	14
7	15	14	15	14	14	16	15	17	23	24	42	30	34	28	25	19	20	20	13	15	14	14	15	16
8	14	14	14	14	15	16	15	18	22	23	24	B	33	32	29	36	22	16	15	16	14	13	15	15
9	14	15	14	14	14	14	16	16	21	22	32	33	36	64	42	31	18	16	16	16	15	16	14	15
10	14	15	15	14	15	15	16	18	16	23	22	20	24	46	25	20	16	16	15	16	14	16	15	14
11	15	13	13	14	14	15	15	14	16	17	21	35	36	19	19	18	17	15	14	14	14	14	14	15
12	16	15	15	15	16	16	14	14	18	18	21	21	20	23	17	20	16	16	16	15	14	14	14	14
13	16	15	13	16	15	16	14	16	16	16	19	22	24	20	23	17	18	15	13	15	13	14	14	14
14	15	15	15	14	14	16	14	16	15	19	21	34	20	22	18	15	15	16	13	15	14	14	15	14
15	14	15	14	14	14	15	14	15	14	16	21	19	21	22	20	17	18	16	16	14	15	14	16	16
16	16	15	13	14	14	13	14	16	15	18	34	26	24	30	27	21	16	15	14	16	13	15	17	15
17	16	16	16	14	15	14	14	14	14	18	20	26	24	23	21	18	18	16	15	14	15	16	14	15
18	15	15	14	14	14	14	15	14	16	18	21	22	18	22	20	20	16	15	15	16	15	15	16	15
19	15	14	16	14	14	15	14	14	18	14	16	22	21	21	20	21	16	14	15	16	15	16	15	16
20	16	15	13	15	14	14	16	14	14	18	21	23	33	30	21	18	16	14	14	15	15	14	16	14
21	16	16	16	15	15	16	16	15	14	14	29	26	22	18	20	16	16	14	15	15	15	14	16	16
22	15	15	15	15	15	15	14	15	16	16	20	22	26	27	18	21	18	15	13	15	15	13	15	15
23	14	15	15	15	14	14	14	15	16	15	18	19	30	23	20	17	16	15	16	15	15	15	14	15
24	16	15	15	14	16	15	14	15	15	17	23	22	24	20	18	18	16	14	14	16	15	15	15	16
25	16	14	14	15	14	15	14	16	18	14	19	27	20	26	17	18	16	15	14	16	15	15	14	15
26	15	14	13	14	14	16	14	14	14	15	18	19	31	29	18	16	16	15	15	15	15	14	13	14
27	14	15	15	15	14	14	14	14	15	16	20	24	25	34	25	21	15	15	16	16	13	15	16	16
28	15	15	14	16	14	13	14	15	20	23	25	20	17	26	26	16	16	15	14	15	15	16	16	15
29	16	15	15	15	14	16	14	15	19	18	B	30	22	27	21	19	20	15	15	15	16	14	15	16
30	15	16	15	15	14	14	14	14	19	18	20	20	29	22	20	19	15	15	15	15	14	16	16	16
31	17	16	15	15	15	14	14	16	15	18	21	22	29	22	28	23	21	15	16	15	16	16	16	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	14	14	15	14	15	16	18	21	22	24	26	21	18	16	15	15	15	15	15	15	15
U Q	16	15	15	15	15	16	15	16	19	20	27	30	30	29	25	21	18	16	16	16	15	16	16	16
L Q	15	14	14	14	14	14	14	14	15	16	20	20	22	22	20	17	16	15	14	15	14	14	14	14

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 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	288	289	286	293	280	326	350	345	356	331	307	313	312	306	293	298	309	308	314	324	316	308	280	289
2	288	277	303	320	339	301	326	320	316	318	309	A 291	303	318	304	309	278	296	293	335	332	278	263	254
3	256	F 279	306	268	265	F 256	F 253	247	A 237	A	A	J R 237	A	A	268	310	R 265	307	311	321	A 271	288	270	270
4	R 290	275	297	309	302	317	313	332	A	300	A	A	290	259	218	240	268	285	302	298	A	A	A	275
5	280	311	309	F 289	F 250	F 284	276	R 249	A	Y	A	A	Y	U R 245	Y	257	282	310	327	320	282	271	267	265
6	264	F 268	293	292	271	301	339	257	311	B	299	309	327	310	315	324	317	311	307	305	304	R 293	284	263
7	F 265	273	314	304	281	290	306	323	327	319	R 282	295	U R 298	300	309	323	322	313	297	287	296	F 288	275	F 277
8	F 283	290	285	288	282	316	333	319	317	327	304	B	300	285	301	315	306	303	A 296	293	U R 315	269	272	272
9	267	280	270	267	V 287	340	336	325	311	323	A	A	A	B 285	301	314	306	306	313	307	305	F 268	F 270	F 277
10	F 284	F 281	283	297	295	315	Z 330	352	337	R 327	A 280	295	293	314	305	309	307	300	288	295	294	280	312	R 282
11	282	296	305	299	F 281	F 290	330	A	320	A 320	A	U R 292	297	292	305	318	320	A	A	304	A 316	A	279	283
12	290	292	287	A 295	F 286	F 275	F 317	F 326	295	A 309	A	313	A	R 291	306	307	306	299	295	298	296	294	292	288
13	274	288	F 295	299	293	304	317	322	314	V 306	288	282	283	300	297	301	316	323	308	303	298	281	292	F 269
14	F 291	296	290	285	291	324	330	338	307	348	333	276	288	290	287	290	300	295	303	315	334	302	291	285
15	282	283	289	279	304	336	336	358	365	316	300	296	A	288	284	295	296	302	296	305	Z 319	A	F 301	292
16	F 297	F 298	305	F 298	F 293	F 316	330	A 332	A	A 331	293	303	277	284	288	297	311	298	295	307	317	A	A	F 293
17	F 292	F 300	F 303	F 310	F 267	F 261	A	A	A	A	A	A	R 292	A	A	A	314	307	298	299	A	F 298	R 301	288
18	F 294	F 291	F 286	F 314	F 312	321	322	A 309	A	A	295	300	296	R 310	292	303	308	307	A 315	297	295	F 292	F 281	315
19	J R 282	R 275	A	F 303	288	F 306	304	331	354	A	A	262	305	A	A	A	308	A	A	A	287	288	F 286	A
20	F 287	F 295	F 298	F 288	F 291	F 290	307	313	314	R 293	301	R 283	279	311	311	A	332	V 301	317	A	F 302	A	294	285
21	A 273	F 278	F 294	F 298	F 276	F 295	294	325	318	A	A	299	281	300	277	287	307	306	292	309	R 331	F 281	277	F 296
22	F 290	299	288	F 273	292	323	318	351	A	A	A	A	282	283	308	A 311	A 312	A	305	307	A	A	A	R
23	F 294	A	F 296	F 278	F 303	323	337	368	A	A	A	A	287	273	A	315	A 299	316	309	287	R 280	281	R 293	F 294
24	297	298	296	318	299	297	S 322	A	321	322	A	A	A	309	R 299	A	288	A	A	S 318	R 336	R 292	269	A
25	F 271	F 321	F 295	333	307	312	335	341	A	A	291	A	283	A	297	R 309	303	297	A	F 274	R 306	F 322	A	F 284
26	F 281	F 290	F 300	F 281	F 270	321	A 345	333	A	A 350	269	303	257	U R 285	309	299	314	300	307	327	306	296	F 288	F 283
27	F 303	F 294	F 304	316	289	317	297	292	319	337	322	A 256	R 298	280	296	286	317	308	300	315	310	296	F 278	F 302
28	292	F 294	306	F 299	F 299	F 317	A	328	335	A	A	288	294	A	A	A	A	300	294	314	320	A	F 308	A
29	F 300	F 307	F 317	F 315	F 307	F 312	A	341	A	A	B	A	A	A	R 303	A 298	295	297	321	A 325	284	283	F 281	F 275
30	F 293	312	F 296	F 274	F 253	264	290	300	A	A	A	A	A	264	R 303	303	296	308	281	289	295	F 282	F 288	A
31	A	A	A	F 284	F 284	298	310	A	306	A	A	R 320	U R 298	307	304	A	A	A	320	A	302	290	F 288	F 285
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	29	31	31	31	28	27	20	17	15	20	23	25	26	25	29	26	27	28	28	24	27	26
MED	288	291	296	297	289	312	322	326	318	322	299	295	293	291	301	303	307	304	303	306	304	288	284	284
U Q	F 292	298	304	309	299	321	334	341	331	331	307	303	298	308	305	312	314	308	313	316	316	295	292	F 289
L Q	280	280	288	F 284	F 280	F 290	306	313	311	312	288	282	283	284	292	296	296	299	295	298	295	281	275	275

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L	L		L	Y	L	L		H	L	L	A				
									363	353	373	345	351	349	342	334	339							
2								L	A	L	A	A	A	A	A	A	L	A	A					
															334	344								
3						F		A	A	A	A	A	A	A				L	U L					
						281	324	307							378	370	347	344	336					
4							U L	A	A	A	A	A						U L	L					
							339						346	325	327	334	332	342	407					
5						L		A	A	Y	A	A	U R	Y	Y			L						
							330						406			387	344	326						
6										B		A	A		B	L	A	L	A					
								360	368		349			360		336								
7						L	U L						Y		Y		L	L						
							378	374	368	354	380	378		366	354	351	357							
8							L	L	L	A	A	B	A		A	A	A	A	A					
								358	356	347	349			349	346									
9							U L	L	L	A	A	A	A	B		A	A	L	A					
							382		367						361	360	343	338	L					
10							L	A	A	L	A	A		B		A	L	A	A					
													344		351									
11								A	L	A	A	A	A	A			A	A	A					
									368						350	354								
12						U L	L	A	A	A	A	A	A	A				U L	L					
						307	322	386						338	377	343	347	339						
13							L	A	A	A		A	A	A	A			L	A					
											386				338	352	337	349						
14							L	L	U L			L	L					A	A					
								352	328	366	383	350	360	357	338	340	334	351						
15							A	L	A	A	A	A	A					L	L	U L				
										375	341			346	351	362	348	340	343					
16								A	A	A	A	A	A	A	A	A			A					
												344					344							
17						L	A	A	A	A	A	A	A	A	A	A	A	A	A					
						316																		
18							L	A	A	A	A		A	A	A			A	A					
												347				353								
19							L	A	A	A	A	A	A	A	A	A	A	A	A					
							345	359																
20								A	A	A			A	A	A	A	A							
											367	384												
21						L	L	A	A	A	A			A		A		A	A					
							316					367	383		348									
22						L	L		A	A	A	A	A	A	A	A	A	A	A					
															332									
23							U L	A	A	A	A	A	A	A	A	A	A	A	A					
							382																	
24							A	A	A	A	A	A	A	A	A	A	A	A	A					
25							L	A	A	A	A	A	A	A	A				A					
																372	351							
26						L	A	A	A	A	Y		367	355	350	359		A						
												365						354	A					
27								L	A	A	A	A	A	A	A	A	A	A	A					
								337					347				352	349						
28						A	A	A	A	A	A	R	370	A	A	A	A	A	A					
												344						352						
29							A	A	A	A	B	A	A	A	A	A	A	A	A					
30							A	A	A	A	A	A	A	Y	Y			U R	U L					
						315	337									364	358	383	330					
31						U L	A	A	A	A	A	A	A	A	A	A	A	A	A					
						342																		
	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	10	8	7	5	8	9	9	9	16	17	14	12	4					
MED						L	L		L									L	U L					
						315	338	358	367	354	370	350	360	349	349	353	346	346	340					
U Q						L	U L												L					
						329	378	367	368	370	382	372	376	358	352	363	351	352	375					
L Q							L	L	L		A				A			L	U L					
						294	324	344	356	350	349	344	346	342	338	342	339	340	333					

MAY 1998 M(3000)F1 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 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								252	260	284	306	316	312	318	328	310	290	280	266					
2								288	300	290	284	A	A 310	294	328	304	342	308	A 308					
3						436	454	498	A	A	A	A 458	A	A	456	346	446	330	298					
4							306	284	A	346	A	A	342	394	556	440	332	282	234					
5						334	408	A	A	Y	A	A	Y 528		Y	458	368	304						
6								514	362	B	368	330	A 320	328	310	302	284	296	264					
7						L 336	290	270	280	334	408	352	354	346	330	302	292	284						
8							256	290	288	294	320	B	A 350	346	312	304	308	304	A					
9							264	270	324	304	A	A	A	B	320	290	306	282	252					
10							266	248	278	308	E A 404	A 334	338	300	316	306	294	282	276					
11								A	290	E A 330	A	E A 382	344	A 346	314	292	272	A	A					
12						372	274	252	E A 380	A 346	A	A 340	A	358	304	302	290	284	270					
13							288	298	296	A 356	326	326	372	330	328	304	292	272	E A 306					
14							256	266	312	260	284	406	366	352	344	318	298	298	276					
15							254	248	248	296	348	Y 358	A	344	336	312	302	290	276					
16								A	A	A 312	A 370	326	380	342	340	314	286	292						
17						410	A	A	A	A	A	A	392	A	A	A	A 312	302	A 302					
18							284	A	A	A	354	328	342	316	332	310	298	A 338						
19							312	280	272	A	A	468	340	A	A	A	A 332	A	A					
20								326	332	A 368	354	394	384	328	A 328	A	292							
21						306	326	256	A 302	A	A	376	376	A 346	366	324	A 310	292	308					
22						268	270		A	A	A	A	378	362	306	A	A	A	314					
23							258	240	A	A	A	A	352	A 378	A	296	E A 376	A 284						
24							274	A	A 298	282	A	A	A	312	344	A	A 334	A	A					
25							268	A 284	A	A	368	A	360	A	350	308	312	A 340	A					
26						302	E A 294	A 292	A	E A 308	460	354	476	374	322	328	302	302	274					
27								326	286	A 276	A 334	E A 480	358	412	350	350	284	280	284					
28						290	A	276	284	A	A	380	354	A	A	A	A	324	A 312					
29							A	A 266	A	A	B	A	A	A	A 346	E A 386	E A 352	A 314	E A 308					
30						436	362	372	A	A	A	A	A	456	340	352	358	290	364					
31						326	290	A	E A 364	A	A	340	386	328	A 342	A	A	A	A 280					
	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	21	23	19	17	15	19	23	24	26	24	28	25	20					
MED						334	279	280	292	306	351	347	354	346	331	310	302	292	279					
U Q						410	309	298	324	A 340	370	394	378	368	344	337	333	306	308					
L Q						302	265	256	280	287	320	330	342	328	320	303	292	283	272					

MAY 1998 h'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 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	286	288	312	288	312	252	236	232	226	230	218	E Y 266	224	212	212	H 224	242	E A 272	A	242	230	244	272	286
2	294	326	272	244	232	248	238	A	A	A	A	A	A	A	A	E A 280	A	A	A	244	222	308	324	360
3	368	314	284	352	310	348	288	A	A	A	A	A	A	A	242	218	240	254	246	A 274	A	280	E A 396	330
4	292	314	282	274	292	272	236	A	A	A	A	A	242	248	264	240	252	242	216	260	A	A	A	332
5	300	264	236	310	380	308	260	A	A	Y	A	A	220	Y	Y	234	248	250	260	248	256	290	336	360
6	356	344	298	300	316	272	256	234	226	B	238	A	A	236	B	220	A	A	A	268	260	260	A 332	E A 424
7	A 348	304	256	246	A 336	262	A 248	236	202	224	228	218	Y	214	E Y 272	224	228	236	A 274	272	266	304	A 322	312
8	296	278	284	282	284	252	232	228	224	A	A	B	A	A 262	A 264	A	A	A	A	A 280	244	A 312	306	300
9	324	288	318	H 310	262	260	232	A 232	222	A	A	A	A	B	B 234	E A 264	A	234	246	260	A 274	310	358	A 358
10	300	318	288	284	272	248	A	A	A	A	A	A	226	B	Y 250	A	A	A	A	A 280	262	298	264	288
11	274	282	E S 298	246	282	262	250	A	232	A	A	A	A	A	A 242	226	A	A	A	266	A	A	262	316
12	292	278	294	A	332	256	254	E A 252	A	A	A	A	A	A	234	A 242	236	242	250	254	262	A 298	266	288
13	308	288	304	264	274	238	238	A	A	A	230	A	A	A	A 262	232	236	A 238	A	E A 280	256	280	268	328
14	276	268	274	272	270	240	240	A 240	230	A 238	A 232	206	236	232	228	228	230	A	A	262	238	242	256	278
15	290	286	290	A 308	294	244	A	A 240	A	A	A	A	A	240	H 208	204	H 212	240	252	A	A 264	A	E A 356	298
16	288	340	274	318	274	234	232	A	A	A	A	E A 258	A	A	A	A	242	A	266	262	A 278	A	A	260
17	308	306	250	238	316	270	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A 296	260	A 308
18	A 310	A 332	296	278	246	240	228	A	A	A	A	E A 254	A	A	A	228	A	A	A	258	258	270	A 320	A 298
19	A 326	368	A	A 314	A 336	258	242	A	A	A	A	A	A	A	A	A	A	A	A	A	E A 336	A 366	A	A
20	A	A 342	A 304	290	258	260	236	A	A	A	240	224	A	A	A	A	A	H 252	254	A	A 322	A	A 314	E A 336
21	A	E A 390	296	252	332	258	232	A	A	A	A	222	222	A	E A 274	A	A	A	A	250	228	296	276	294
22	A 344	A 302	292	328	298	248	238	232	A	A	A	A	A	A	A	A	A	A	A	A 264	A	A	A	E A 348
23	288	A	332	310	268	254	236	A	A	A	A	A	A	A	A	A	A	A	E A 270	A	296	306	302	292
24	316	262	250	242	A 302	258	A	A	A	A	A	A	A	A	A	A	A	A	A	264	A 256	256	354	A
25	A 328	326	320	A 292	338	252	A 264	A	A	A	A	A	A	A	A	234	228	A	A	288	A	242	A	284
26	278	286	274	342	310	268	A	A	A	A	226	250	214	210	228	234	A	A 250	A	240	264	266	A 342	A 332
27	274	A 344	272	262	294	250	238	A 258	A	A	A	A	E A 262	A	A	A	A	228	A	A 266	268	E A 334	A 350	A 332
28	A 340	A 322	256	A 292	A 328	A	A	A	A	A	A	E A 262	242	A	A	A	A	A	A	E A 290	244	A	A 350	A
29	A 310	A 318	276	280	A 322	252	A	A	A	A	B	A	A	A	A	A	A	A	A	A	272	A 304	318	354
30	A 346	A	A 338	A 422	366	312	E A 294	A	A	A	A	A	A	Y	Y	252	244	A 250	250	286	232	A 368	A 330	A
31	A	A	A	348	294	262	A	A	A	A	A	A	A	A	A	A	A	A	A	A	272	270	254	298
	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	28	29	30	31	30	23	10	7	3	7	9	9	8	14	17	12	13	11	24	25	24	26	27
MED	304	308	286	289	298	257	238	234	226	230	230	U 228	225	234	238	230	238	242	251	263	261	294	314	305
U Q	A 327	329	301	310	328	262	254	A 240	230	A 238	238	E A 260	242	244	264	A 241	243	251	A 266	A 277	A 272	A 307	A 342	A 336
L Q	289	286	273	264	274	248	236	232	222	224	226	220	221	213	228	224	229	237	246	256	244	268	268	292

MAY 1998 h'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 h'E (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B	A 134	A 134	116	112	114	A	A	118	A	122	128	120	A					
2						B 134	120		B	116	116	A	A	A	B	116	120	116	A					
3						A 120	120	120	120	118	120	120	A	B	116	116	A	A	A 136					
4						A	A 128	A	120	116	A	A	A	118	118	120	118	128	130					
5						A	120	120	116	116	116	120	B	114	114	116	112	120	B 130					
6						154	124	120	118	B	120	A	A	A	B	120	120	120	124					
7						B	122	A	A	A	B	A	A	122	A	114	124	122	A					
8						B	126	124	A	A	A	B	A	A	A	B	118	122	124					
9						138	A 130	118	A 124	120	116	A	A	B	B	124	122	120	A					
10						A	A 134	120	118	122	122	116	116	B	120	120	118	118	A					
11						A	126	122	122	114	116	A	A	118	A	124	A 122	118	120					
12						A	120	120	114	114	A	A	A	A	114	118	122	122	122					
13						A	A 132	120	A 126	118	114	114	114	A	A	118	130	124	118					
14						A	122	114	112	112	112	A	114	118	A	A	A 134	120	124					
15						A	124	116	120	114	114	114	118	118	116	116	122	122	A					
16						A	124	120	116	114	A	A	A	A	A	A	A	A	A					
17						150	126	118	116	116	116	A	A 126	118	118	118	118	118	A					
18						A	A 130	116	116	116	114	A	A	116	114	116	116	118	A					
19						A	A 140	118	118	114	112	112	A	120	120	120	122	120	A					
20						A 134	A	116	116	112	110	112	A	A	A	114	118	118	A					
21						A	A 144	A	116	110	A	A	114	114	122	118	118	118	A					
22						A	A	118	118	118	118	A	118	A	122	122	122	122	A					
23						124	120	120	120	122	118	114	A	114	A	A	A	A	A					
24						A	128	116	116	112	112	A	A	114	114	120	116	118	A					
25						154	122	118	114	112	116	A	A	A	A	A 126	122	118	120					
26						126	122	116	116	118	118	A	A	A	118	118	118	120	A					
27						A	126	124	116	112	110	110	A	A	A	A	A	116	A					
28						A	122	114	114	114	A	A	A	A	A	A	A	114	120					
29						A	118	124	114	112	B	A	112	A	A	A	A	A	A					
30						A	120	120	114	114	114	116	A	A	116	116	114	112	A					
31						A	A	116	116	116	118	A	A	118	124	120	120	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						7	28	28	28	28	23	10	8	14	15	24	25	26	11					
MED						138	125	120	116	114	116	114	115	118	118	118	120	120	124					
U Q						154	A 130	120	119	117	118	116	118	118	120	120	122	122	130					
L Q						126	122	116	116	112	114	112	114	114	114	116	118	118	120					

IONOSPHERIC DATA STATION Kokubunji

MAY 1998 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	110	110	B	110	B	154	146	160	124	120	120	120	110	G	120	112	166	126	118	114	116	112	112	108
2	108	112	B	B	B	152	132	120	118	118	108	106	106	126	166	162	132	118	114	112	114	112	112	106
3	106	120	136	128	128	134	128	132	122	116	116	122	114	120	G	120	118	148	132	120	124	114	118	114
4	114	B	108	108	116	124	132	124	114	116	108	106	114	G	G	G	G	G	128	120	112	112	112	108
5	114	110	122	154	B	138	134	124	124	G	122	122	B	126	G	G	162	136	130	B	B	B	B	108
6	110	B	100	114	B	136	G	140	G	B	G	112	108	110	B	G	128	128	122	112	116	122	112	112
7	106	104	104	112	106	108	116	114	114	114	B	112	110	110	112	G	G	136	114	114	112	108	106	108
8	106	110	108	B	110	B	128	G	112	132	124	B	116	110	122	132	130	124	116	108	108	108	110	112
9	106	108	112	B	110	148	134	132	130	114	112	108	112	120	B	136	128	118	114	112	108	112	112	112
10	110	110	110	108	106	108	126	122	122	124	118	118	G	B	144	120	120	116	114	110	112	110	106	110
11	106	106	106	106	110	126	126	116	122	114	112	114	112	108	112	142	132	114	114	114	110	108	108	110
12	108	106	110	106	102	102	126	118	110	110	110	106	104	116	G	162	142	130	134	118	114	110	118	108
13	110	108	108	106	106	106	136	130	120	114	118	120	116	112	118	122	120	124	112	110	116	116	B	118
14	B	B	B	108	B	148	140	122	122	122	118	116	118	118	112	110	110	130	118	114	112	112	112	108
15	112	152	110	106	108	126	120	122	118	118	114	112	110	G	G	G	G	132	120	112	118	116	116	112
16	110	106	112	100	100	138	120	114	112	112	112	112	112	106	104	104	104	102	104	102	120	120	116	112
17	116	110	118	110	B	150	128	120	118	110	108	112	130	124	120	118	118	116	116	112	112	112	110	110
18	108	108	106	100	102	102	130	120	116	112	112	118	120	114	124	G	124	114	112	110	110	112	118	114
19	112	110	108	108	106	106	182	128	120	114	114	112	116	128	120	112	116	108	110	112	112	110	106	106
20	104	106	104	104	102	102	122	112	112	110	116	112	114	112	112	108	120	116	104	100	102	112	112	108
21	106	110	108	110	116	112	116	120	114	108	108	116	158	126	150	132	126	122	116	114	114	112	112	108
22	110	106	102	104	108	126	130	122	118	110	110	130	126	112	136	122	120	118	112	110	110	108	108	106
23	104	102	100	100	96	104	124	118	116	106	104	106	106	106	106	106	104	104	102	102	100	100	114	112
24	108	110	108	112	110	106	128	120	114	114	114	106	108	154	142	126	120	112	112	112	114	120	112	112
25	104	102	98	96	108	128	122	116	108	106	114	108	108	102	104	110	150	124	112	112	112	112	112	108
26	118	108	122	104	112	126	122	116	112	110	112	114	118	122	G	138	116	120	112	110	110	112	112	108
27	110	106	106	100	108	106	130	126	116	116	114	112	118	112	106	108	114	114	112	108	110	110	110	108
28	104	102	102	102	100	126	116	114	114	112	108	110	104	106	120	110	102	128	114	112	110	116	116	112
29	106	102	112	98	104	104	120	118	114	114	B	110	104	100	100	104	102	102	100	100	100	114	124	114
30	110	104	104	106	118	138	130	124	116	116	112	108	104	114	G	G	G	128	126	116	120	116	114	108
31	106	108	104	104	104	130	128	116	118	114	112	116	120	128	128	114	120	110	112	110	128	116	118	110
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	28	28	28	25	30	30	30	30	29	28	30	29	27	22	24	27	30	31	30	30	30	29	31
MED	108	108	108	106	108	126	128	120	116	114	112	112	112	114	120	119	120	119	114	112	112	112	112	110
U Q	110	110	111	110	110	138	132	124	120	116	116	116	118	124	128	132	130	128	118	114	116	116	116	112
L Q	106	106	104	103	103	106	122	116	114	110	110	108	108	110	112	110	116	114	112	110	110	110	110	108

IONOSPHERIC DATA STATION Kokubunji

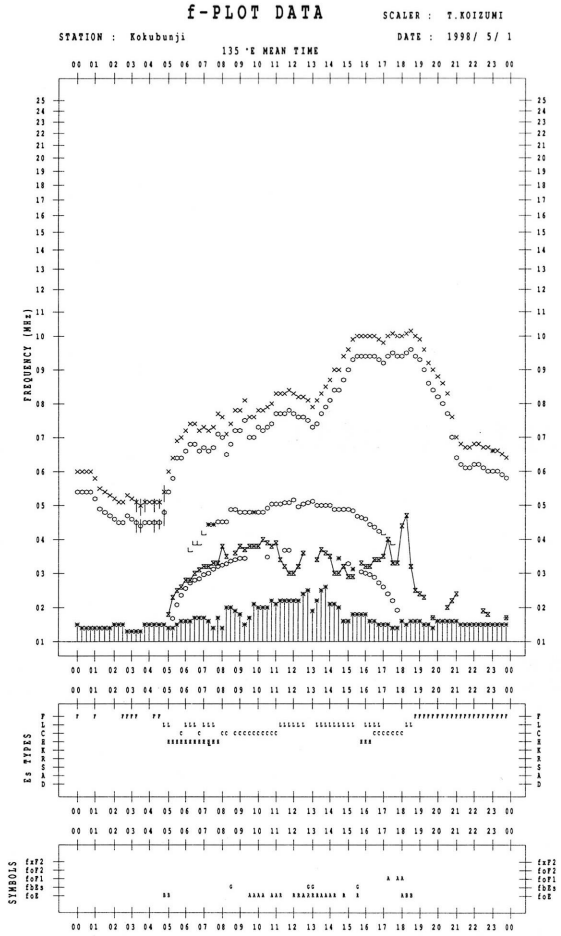
MAY 1998 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

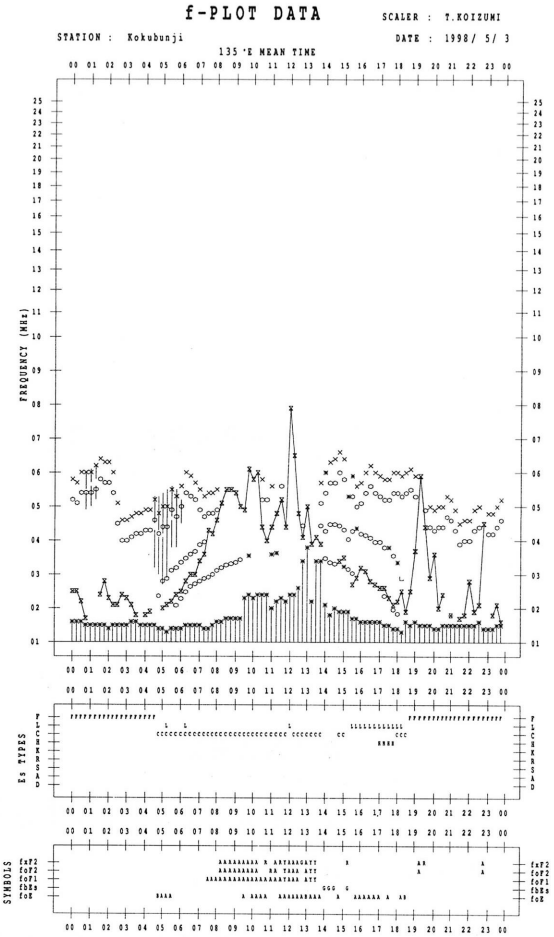
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

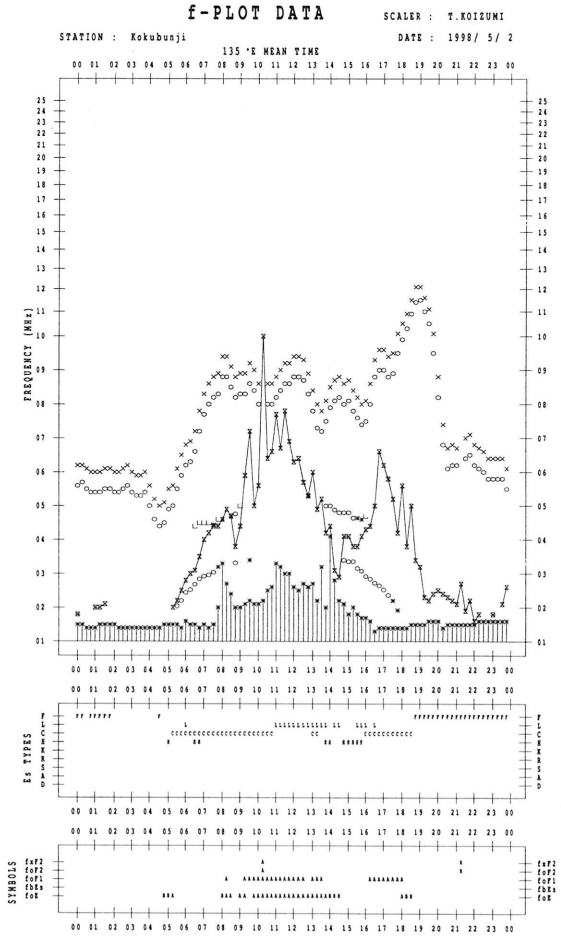
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F1	F1		F1		HL11	HL21	HL11	C1	C1	C1	C1	L1		L1	L1	HL11	C3	C3	F3	F1	F3	F1	F2
2	F3	F3				H1	CL11	C2	C1	C1	C2	L2	L2	CL22	H1	H1	CL21	C3	C3	F5	F3	F4	F2	F3
3	F3	FF11	F3	F5	F2	C2	C1	C1	C2	C2	C2	C1	L1	C1		C1	L1	HL12	CL22	F6	FF25	F2	F3	F2
4	F2		F2	F2	F3	L2	C2	CL21	C3	C2	C2	C2	C1						C1	F6	F3	F5	F4	F4
5	F2	F3	F1	FF11		C3	C1	C2	C2		C1	C1		C1			H1	C1	C2					F2
6	F3		F1	F1		L1		C1				L1	L1	L1			C1	C1	C2	F4	F2	F1	F3	F4
7	F3	F2	F2	F2	F4	L2	C2	L2	L1	L1		L1	L1	L1	L1			H1	L2	F1	F2	F4	F3	F2
8	F3	F2	F2		F1		CL11		L1	CL11	CL11		CL11	L1	L1	C1	C2	C4	C4	F4	F3	F4	F4	F2
9	F2	F2	F1		F1	H1	HL21	C1	CL11	C2	C1	L2	L2	L1		C1	C2	C1	L2	F4	F6	F4	F3	F5
10	F4	F4	F5	F6	F5	L4	CL21	CL21	C2	C1	CL21	C2			H1	C2	C2	C2	L3	F5	F3	F4	F1	F4
11	F1	F3	F3	F2	FF21	C3	C1	C3	CL11	CC13	C2	C1	C2	C2	L1	CL11	CL21	C3	C5	F5	F5	F5	F4	F4
12	F4	F2	F2	F4	F3	L2	C2	C2	C2	C2	C2	L2	L2	L1		H1	H1	CL21	C1	F2	F4	F4	FF21	F3
13	F2	F2	F3	F3	F3	L3	CL21	C2	CL21	C2	C1	C1	C1	C2	L1	C1	L1	C2	C5	F5	F4	F3		F5
14				F1		C2	C1	C2	C1	C1	C1	C1	C1	C1	C1	L1	L1	C2	C4	F6	F3	F2	F1	F2
15	F1	FF11	F2	F4	F3	C3	C3	C2	C2	C2	C2	C2	C2					C1	C3	L4	F6	F4	F4	F4
16	F3	F4	FF13	F4	F3	CL23	C4	C3	C3	C2	C2	C1	C1	C2	L2	L2	L2	L3	L4	F4	FF33	FF43	F5	F3
17	FF23	F3	F2	F2		C2	C3	C3	C3	C3	C2	C3	CL11	CL21	C3	C3	C3	C3	C3	F6	F4	F3	F4	F4
18	F6	F5	F3	F4	F3	L3	CL12	C3	C3	C2	C2	C1	CL11	C2	C2		C2	C3	L5	F3	F5	F3	F4	F3
19	F4	F3	F5	F5	F3	L4	HL12	CL21	C2	C2	C2	C1	LC11	CL21	C2	C3	C3	C3	L5	F5	F6	F5	F3	F4
20	F4	F3	F4	F2	F1	L1	C2	C2	C2	C1	C1	C1	C2	C2	C2	C2	C2	C3	L3	F4	F3	FF23	FF23	FF22
21	F2	F3	FF22	FF22	F1	L2	LC21	CL21	C3	C3	C3	C1	H1	C2	C1	C2	C3	C3	C3	F3	F3	F3	F2	F6
22	F5	F3	F3	F2	F4	L1	CL21	C3	C3	C3	C2	CC11	CC12	L1	CL11	C3	C3	C5	L4	F5	F4	F3	F3	F4
23	F4	F3	F3	F3	F2	L1	C2	C2	C3	C3	C3	C2	C2	C2	L3	L2	L3	L4	L4	F5	F3	F4	F4	F3
24	F4	F2	F1	F3	F4	L3	CL21	C3	C3	C2	C2	L2	L3	HL11	H1	C4	C3	C3	L4	F5	F6	FF15	F4	F6
25	F5	F4	F3	F3	FF31	L1	C2	C4	C3	C3	C1	L2	L1	L2	L2	L1	HL11	C3	C4	F3	F4	F4	F6	F3
26	FF13	F3	FF13	F4	F2	C3	C5	C3	C3	C3	C1	C1	L1	L1		H2	C2	C2	C3	F5	F4	F3	F4	F4
27	F3	F6	F2	F4	F3	L3	CL21	C2	C2	C2	C2	C2	C1	C2	C2	L3	L2	C2	L3	F5	F5	F4	F4	F4
28	F4	F5	F3	F5	F5	CL43	C5	C3	C2	C2	C2	L1	L1	L2	CL13	L2	L3	C2	C3	F4	F4	F5	F4	F5
29	F3	F4	FF23	F3	F3	L3	C4	CL31	C2	C2		C2	C2	L2	L2	L2	L3	L3	L4	F5	F2	FF24	FF32	F6
30	F5	F5	F3	F3	F1	C2	C2	C2	C2	C2	C2	C2	C3	L1				C1	C1	F3	F1	F4	F4	F5
31	F5	F4	F4	F4	F3	CL32	CL31	C4	C2	C2	C2	C1	L1	C1	C1	C2	C3	L3	L6	F4	FF33	F2	FF23	F5
	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																								

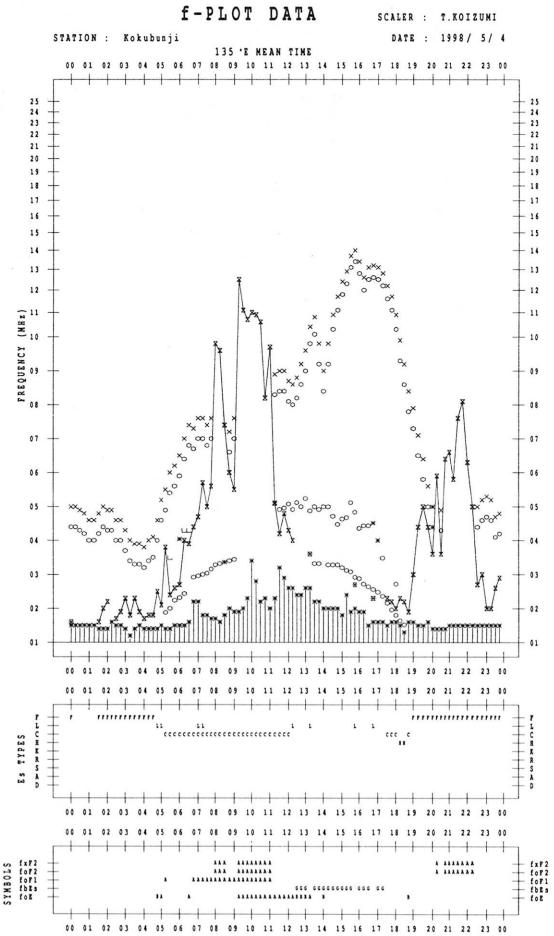
f-PLOTS OF IONOSPHERIC DATA

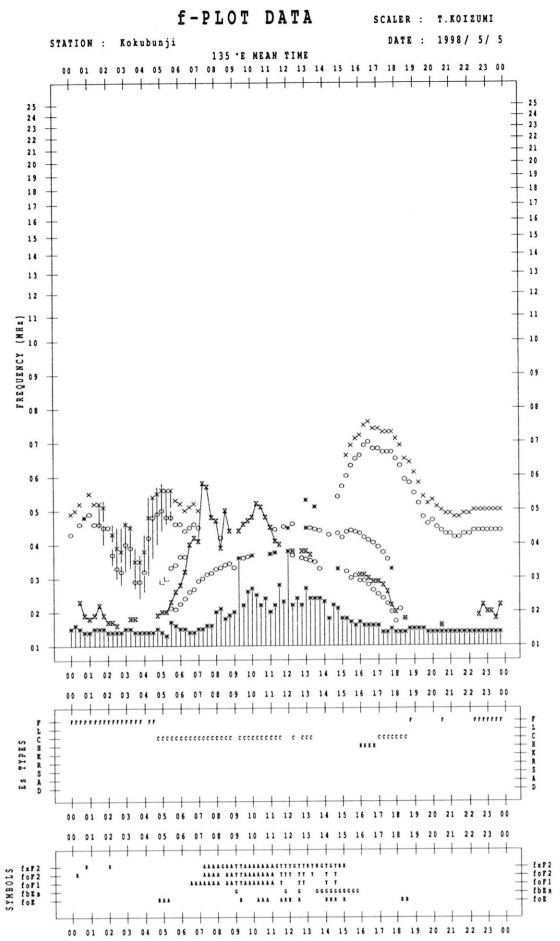
KEY OF f-PLOT	
	SPREAD
	foF2,foF1,foE
	fxF2
	DOUBTFUL foF2,foF1,foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

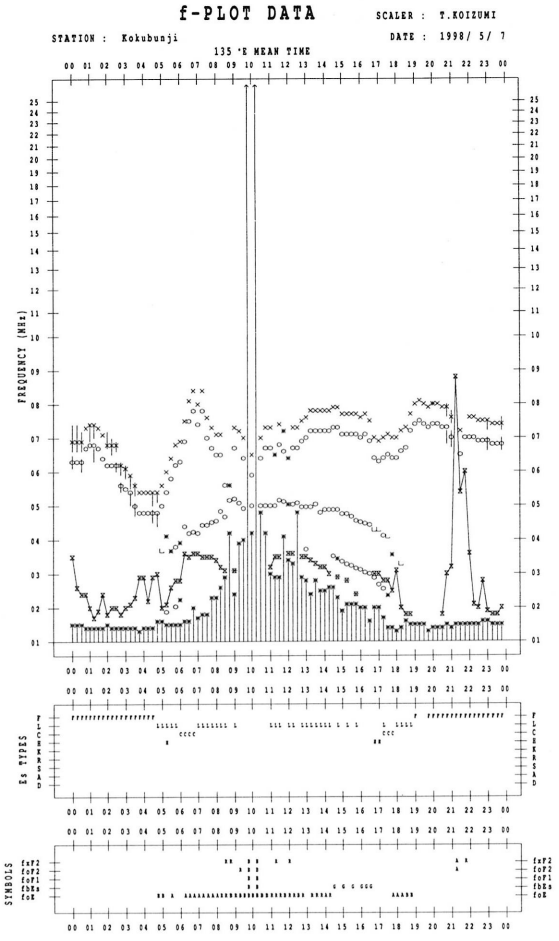

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

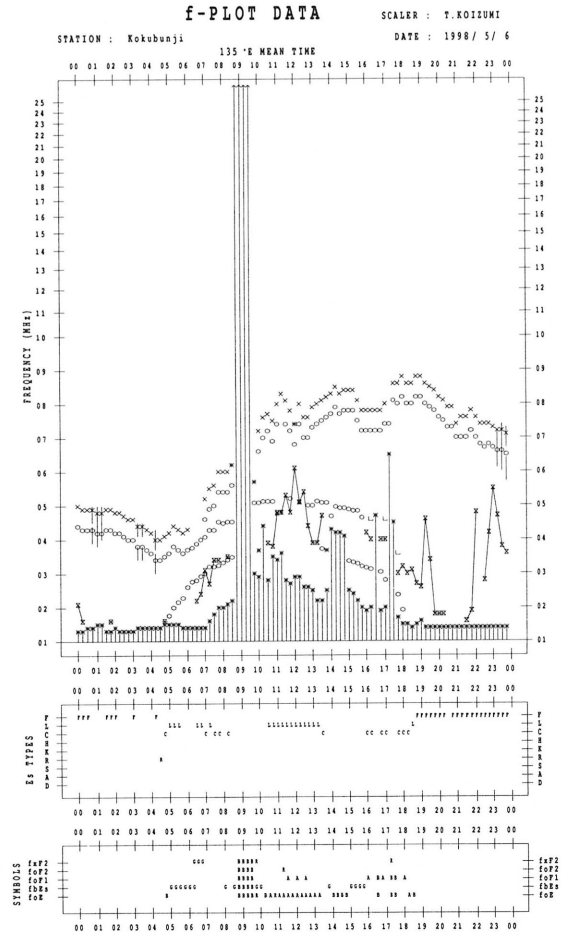

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

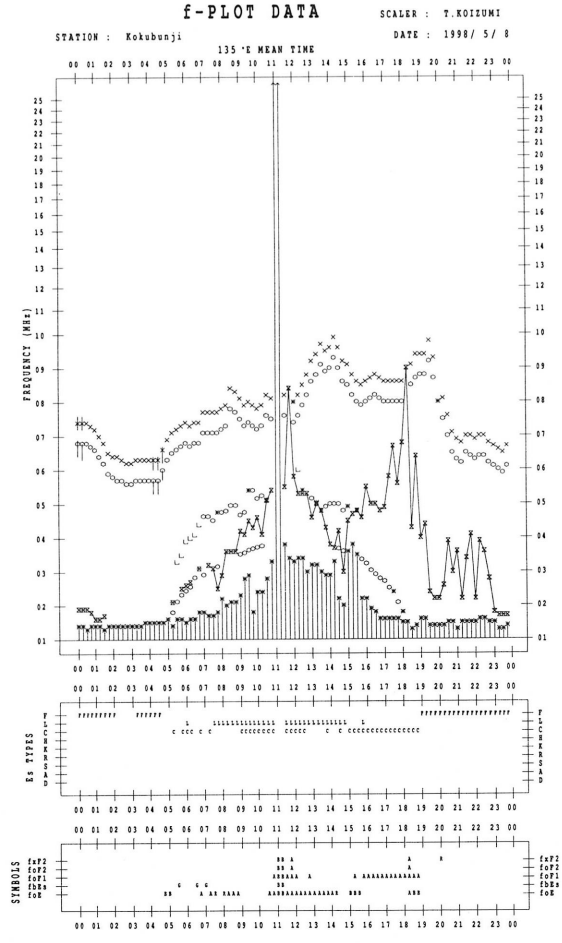

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

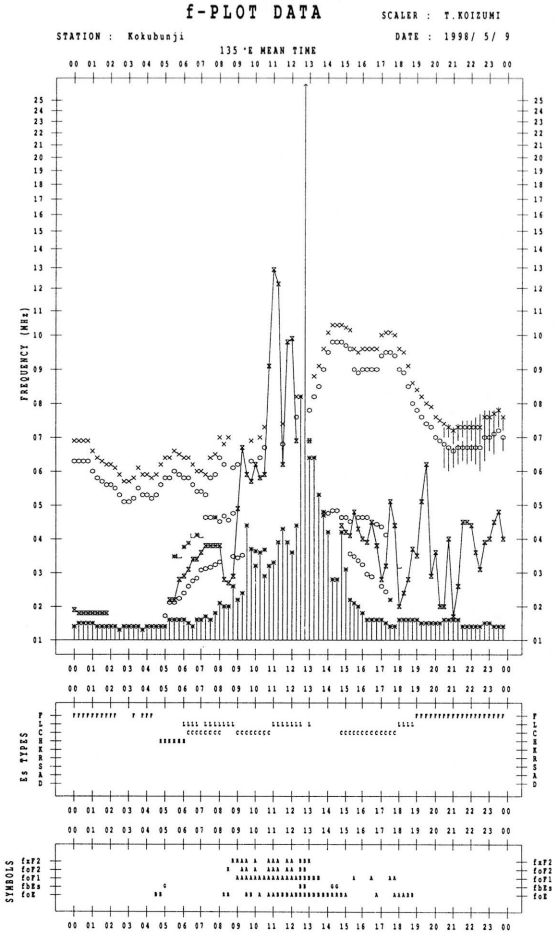

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

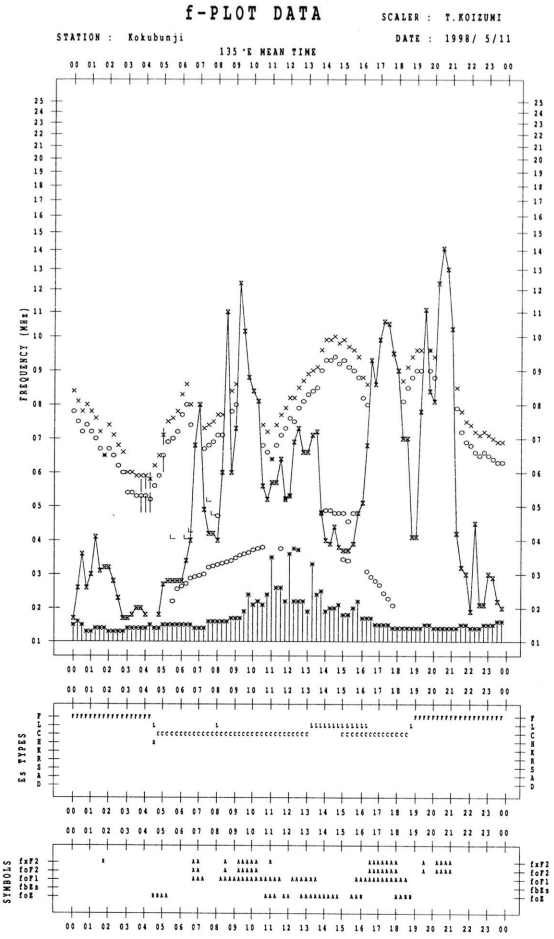

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

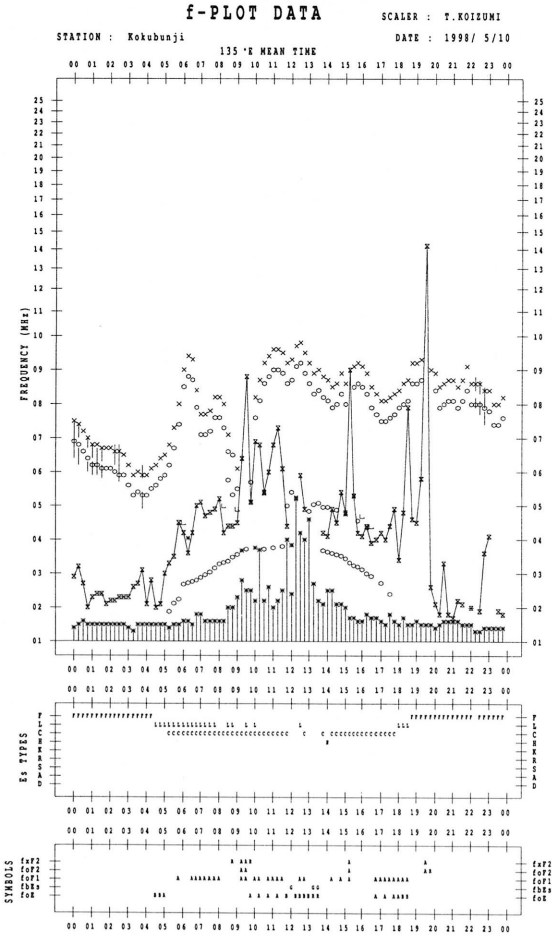

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

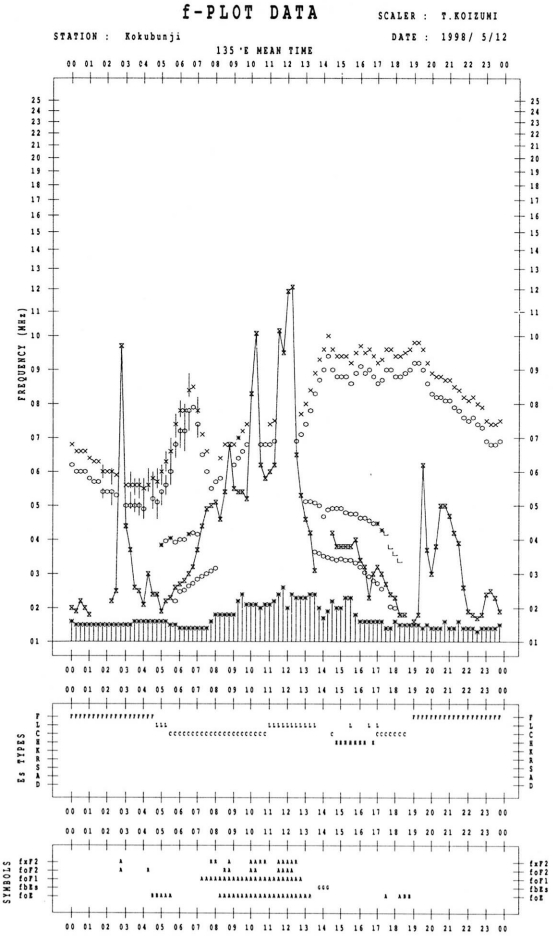

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

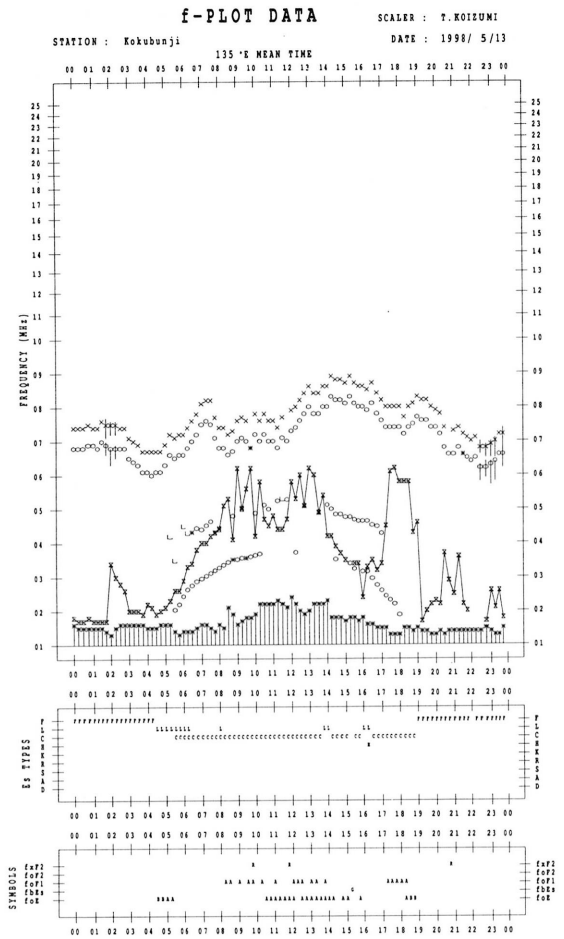

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

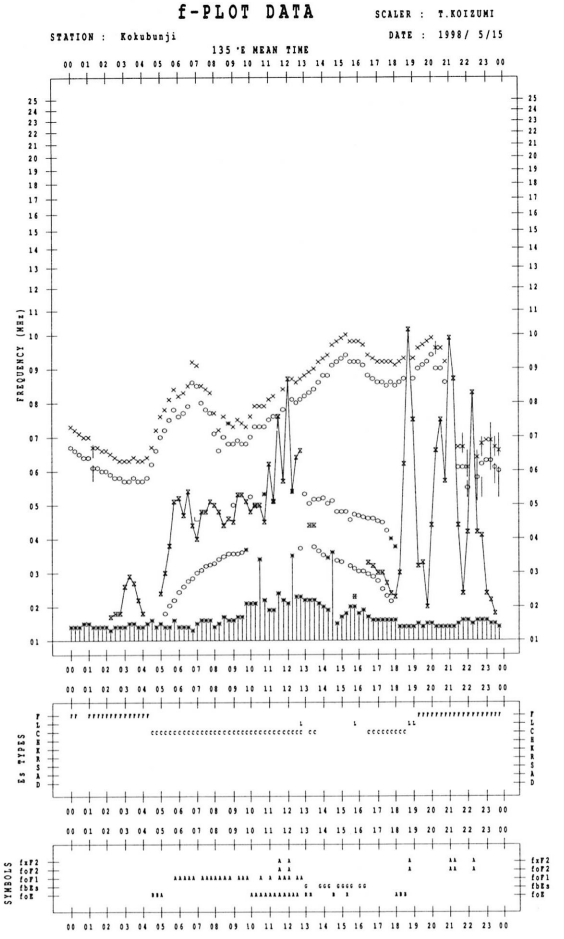

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

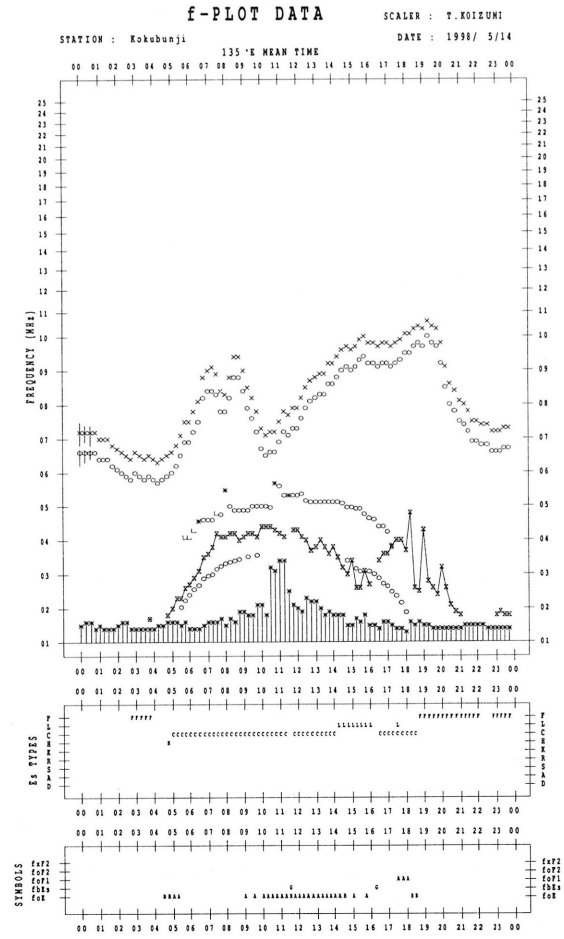

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

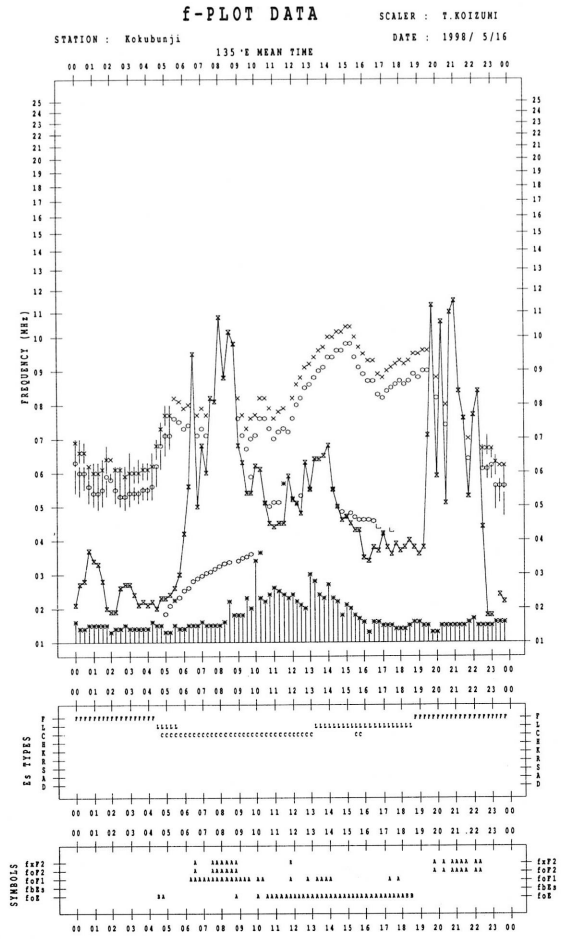

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

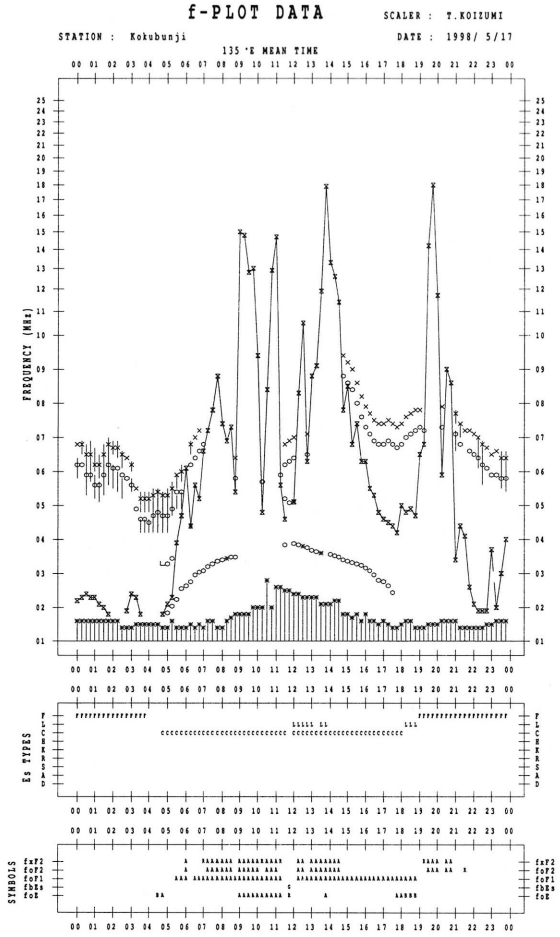

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

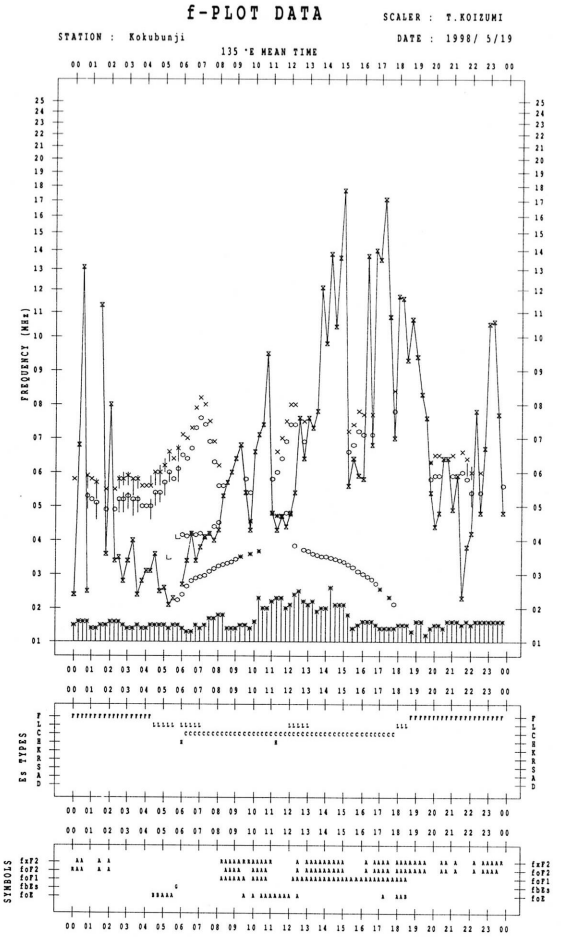

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

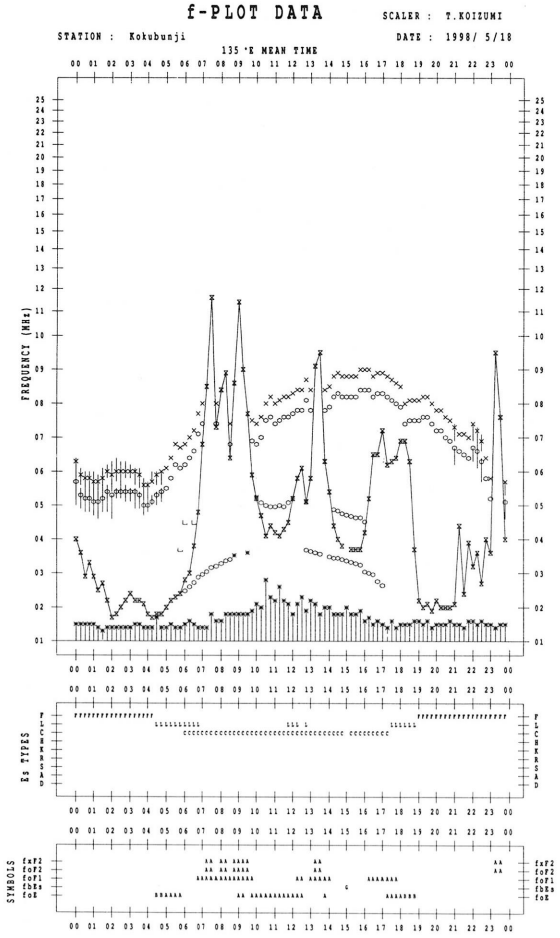

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

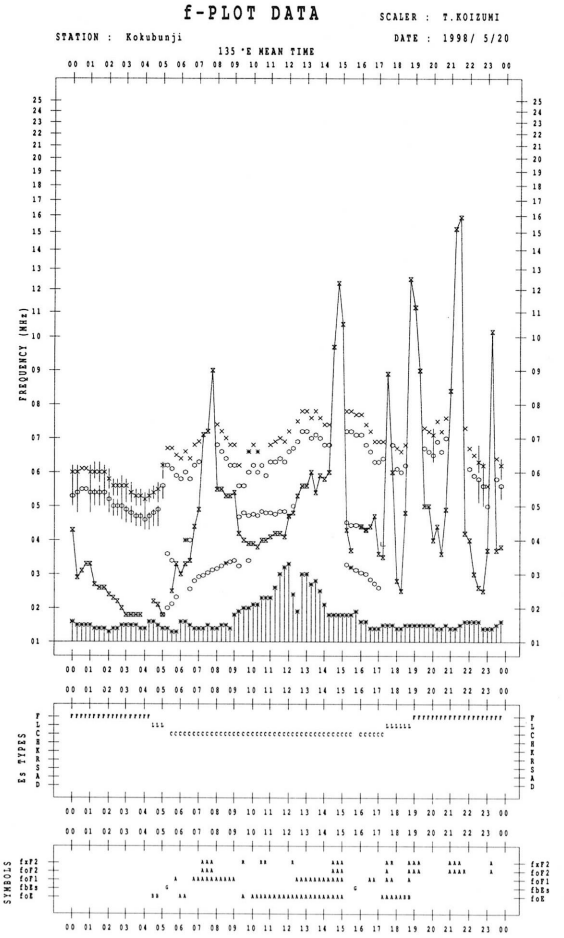

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

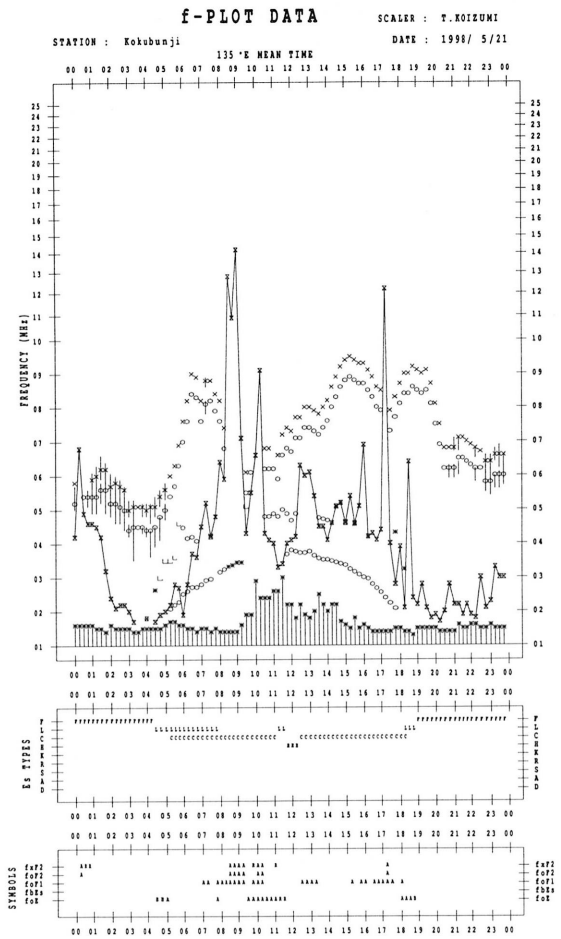

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

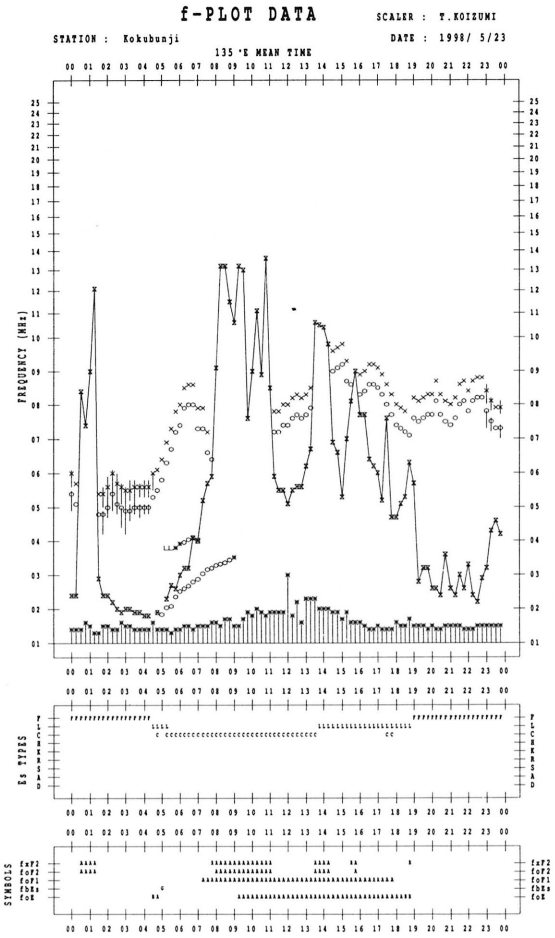

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

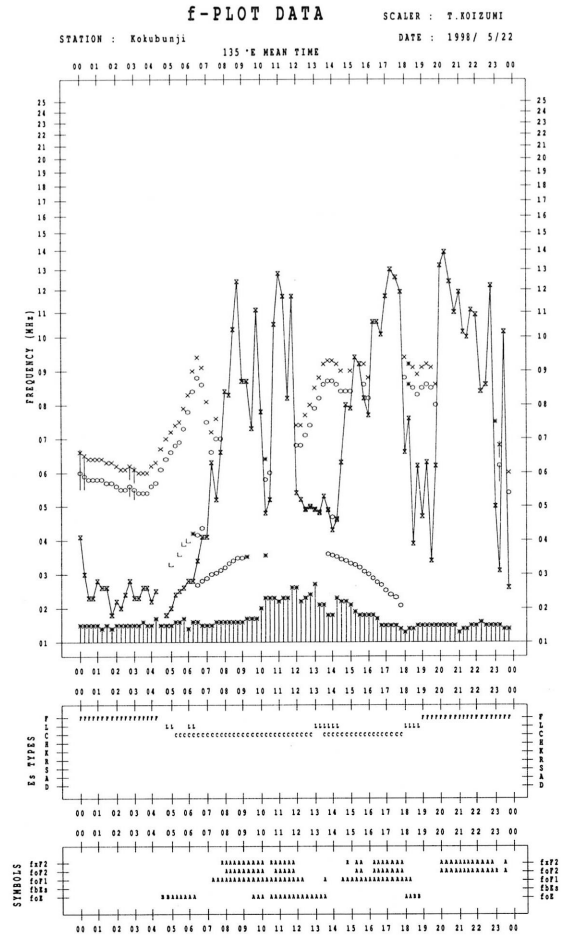

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

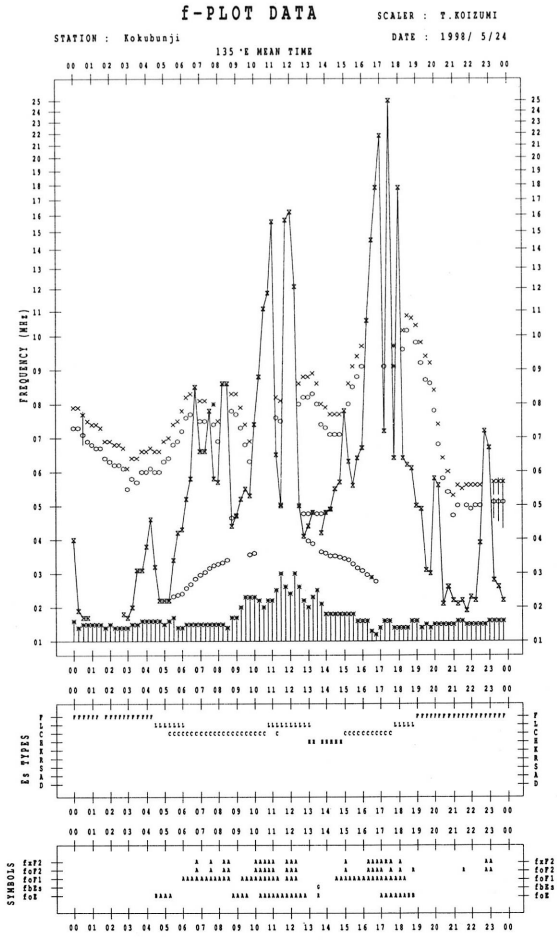

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

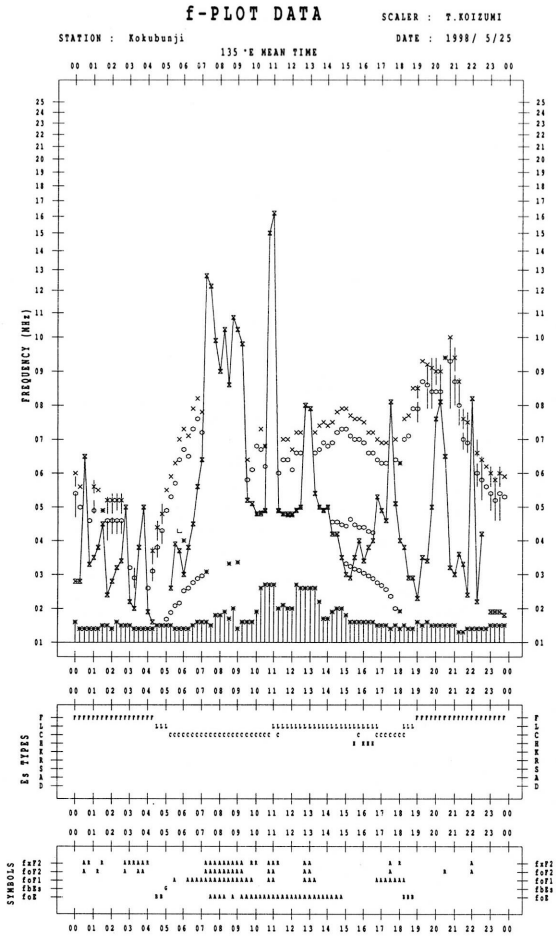

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

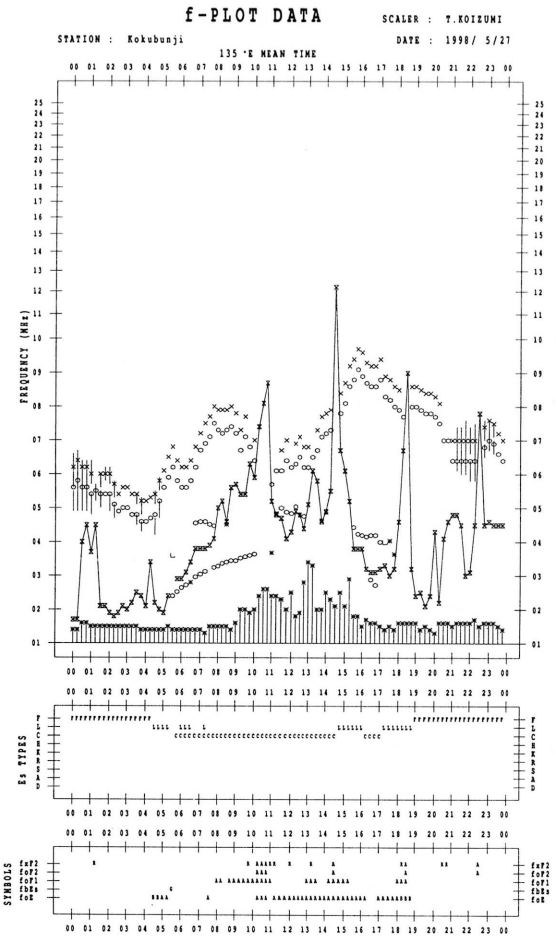

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE

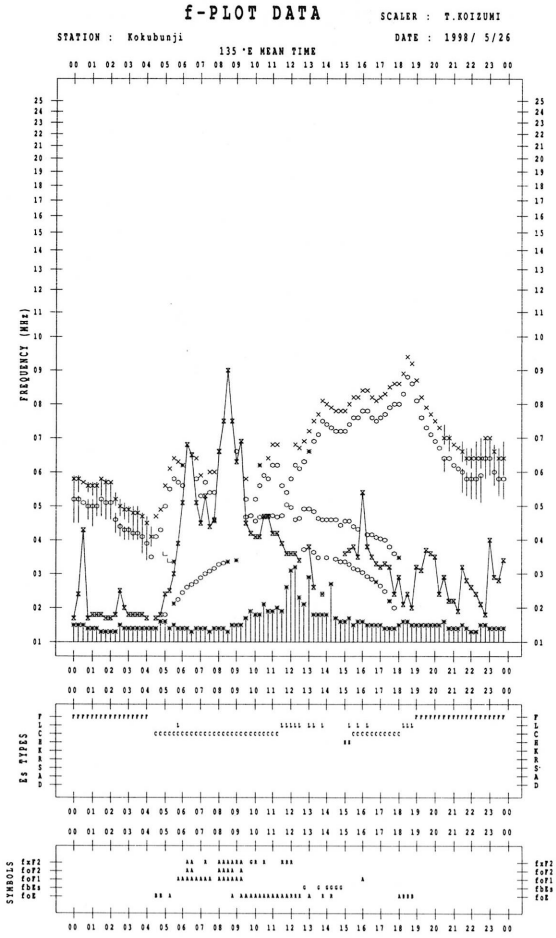

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE

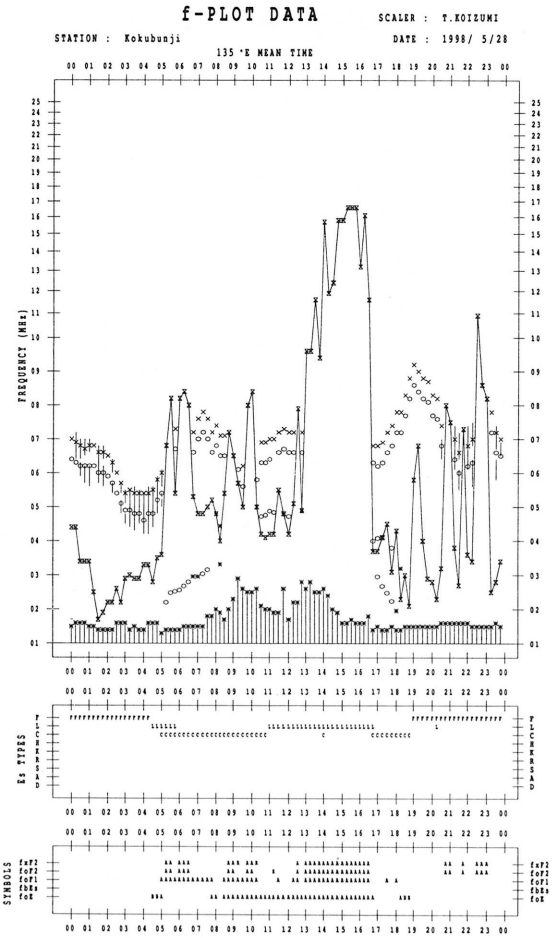

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE

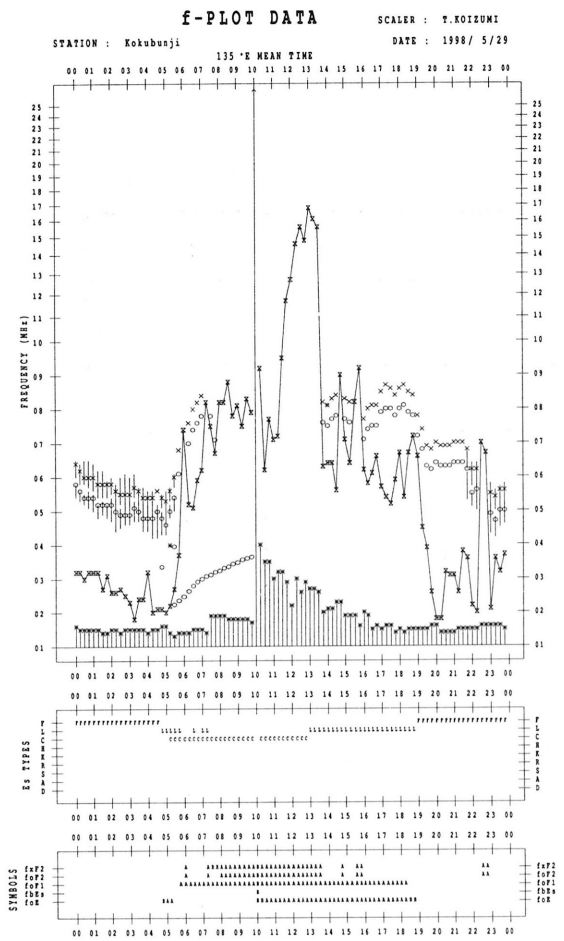

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE

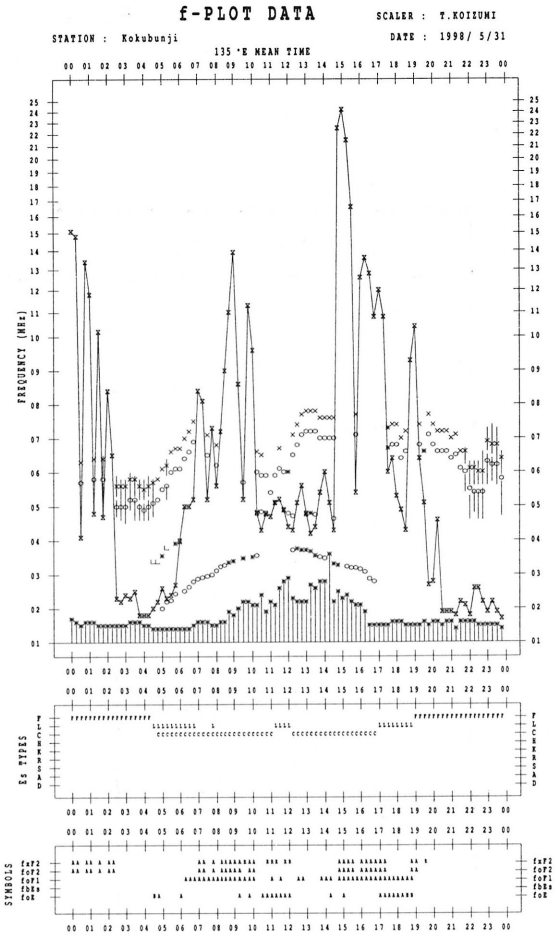

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE

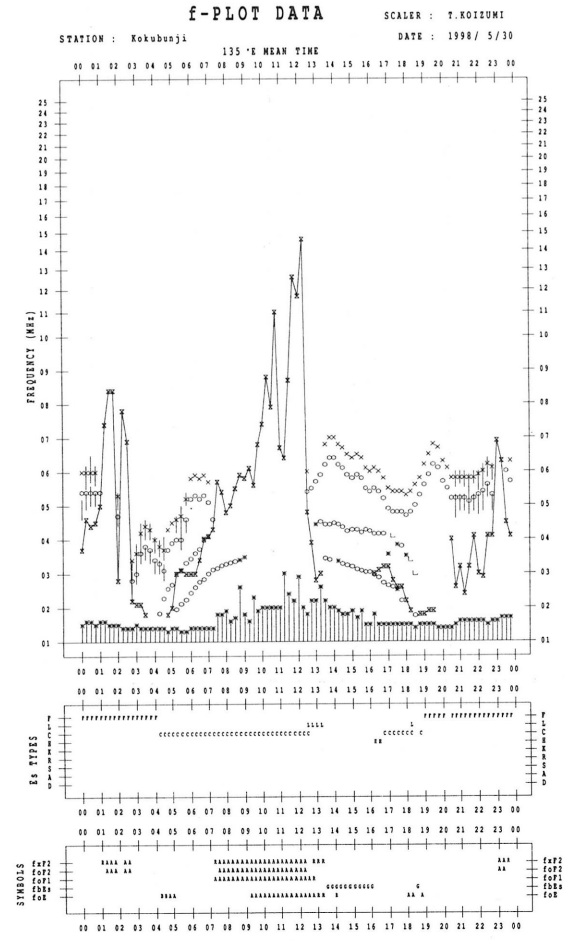

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF1
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 5/31
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 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 1998

Single-frequency total flux observations at 500 MHz					
Flux density: 10^{-22} $Wm^{-2}Hz^{-1}$					
UT	00-03	03-06	06-09	21-24	Day
Date					
1	30	29	29	33	30
2	32	30	31	30	31
3	29	29	30	36	31
4	38	39	44	38	40
5	48	46	39	43	44
6	45	41	40	53	45
7	46	46	54	36	45
8	36	34	33	37	35
9	36	35	33	37	35
10	35	33	33	35	34
11	35	34	35	34	34
12	35	35	34	32	34
13	33	32	32	33	33
14	33	32	30	33	32
15	33	33	32	33	33
16	33	31	30	31	31
17	32	30	29	30	30
18	30	29	29	28	29
19	29	29	29	29	29
20	28	28	29	27	28
21	27	27	26	29	27
22	29	29	28	29	29
23	28	28	27	29	28
24	30	30	30	31	30
25	29	29	30	30	30
26	30	30	29	30	30
27	29	29	28	31	29
28	30	29	29	28	29
29	28	28	27	30	28
30	29	29	28	29	29
31	28	27	27	28	28

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso May 1998

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} Wm^{-2}Hz^{-1})		POLARIZATION
1998	(MHz)		(U.T.)	(U.T.)	(MIN.)	PEAK	MEAN	REMARKS
1	200	42 SER	0325.0	0325.6	22.0	660	-	0
	500	42 SER	0608.0	0608.2	0.5	10	-	0
	200	46 C	0618.0	0619.5	3.0	60	10	WL
	500	46 C	0618.5	0620.0	3.0	150	25	WR
	200	8 S	2101.7	2102.2	1.0	240	-	ML
	200	46 C	2132.4	2132.6	4.5	170	35	0
	500	8 S	2139.1	2139.2	0.2	20	-	0
	500	46 C	2225.5	2244.7	29.0	160	30	MR
	2800	46 C	2226.0	2245.2	33.0	140	50	WL
	200	46 C	2233.7	2244.0	19.0	350	100	ML
	200	42 SER	2254.2	2258.0	14.0	1200	-	0
	500	8 S	2300.7	2300.8	0.2	30	-	0
2	200	42 SER	0351.2	0402.7	15.0	320	-	ML
	500	46 C	0434.2	0454.2	41.0	430	-	MR
	200	46 C	0438.2	0438.4	6.0	210	35	0
	2800	46 C	0451.5	0457.7	29.0	430	-	WL
	200	48 C	0451.7	0457.5	7.0	950	-	ML
	500	42 SER	0517.2	0521.1	8.0	120	-	WL
	200	42 SER	0518.5	0525.7	8.0	510	-	WL
	500	46 C	2038.5	2048.5	26.0	180	20	MR
	500	43 NS	2300.0	0055.0	195.0	12	-	WR
4	2800	3 S	2114.0	2114.7	2.0	8	3	0
	500	42 SER	2131.0	2142.7	18.0	19	-	WL
5	2800	3 S	0002.0	0003.2	4.5	18	6	0
6	500	46 C	0000.0	0047.7	90.0	410	-	MR
	2800	45 C	0454.5	0455.7	6.0	50	15	0
	2800	3 S	0713.7	0716.0	17.0	20	6	0
	500	46 C	0800.0	0815.0	65.0	830	-	MR
	2800	46 C	0801.2	0804.2	21.0	380	60	0
	200	46 C	0803.0	0806.0	8.0	940	-	0
7	500	42 SER	0107.5	0108.7	3.0	840	-	WL
	2800	1 S	0109.2	0109.7	1.0	12	4	0
	500	42 SER	0532.2	0532.6	0.5	340	-	0
	2800	8 S	0533.1	0533.2	0.2	40	-	0

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso May 1998

Single-frequency observations

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

MAY 1998	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
7	200	42 SER	2235.0	2236.4	2.0	330	-	0
8	200	4 S/F	0156.5	0156.6	3.0	660	-	0
	500	4 S/F	0156.5	0158.0	6.0	150	20	0
	2800	3 S	0157.2	0159.0	8.0	30	11	0
	500	46 C	0555.5	0558.2	14.0	15	4	MR
	2800	46 C	0555.5	0611.5	20.0	370	110	WR
	200	46 C	0557.2	0600.9	5.0	210	25	WL
	200	42 SER	0625.2	0628.2	5.0	90	-	WL
	200	8 S	2340.7	2340.9	0.7	2000	-	0
9	2800	46 C	0310.7	0324.5	39.0	190	40	0
	500	46 C	0321.5	0345.2	29.0	1400	-	WR
	200	42 SER	0323.5	0324.9	6.0	200	-	0
	500	46 C	0415.7	0418.5	8.0	40	11	WR
	2800	3 S	0536.5	0537.2	3.0	16	6	WL
	200	8 S	2001.3	2001.6	0.7	40	-	0
	200	8 S	2213.0	2213.2	0.5	240	-	WL
10	200	42 SER	0647.0	0647.1	0.7	30	-	0
13	500	4 S/F	2043.0	2043.5	1.0	20	5	0
14	200	8 S	2210.6	2211.0	0.7	40	-	0
16	200	8 S	2001.1	2001.6	1.0	50	-	WR
	200	8 S	2049.9	2050.1	0.5	30	-	0
	200	46 C	2159.5	2201.1	2.0	10	3	WR
17	200	6 S	0439.5	0441.2	2.0	50	10	MR
22	200	42 SER	2126.7	2127.0	5.0	60	-	0
23	200	42 SER	0112.6	0122.5	10.0	110	-	0
	200	46 C	0322.1	0325.5	4.5	40	7	0
	200	46 C	2002.9	2004.4	3.0	80	20	0
	200	8 S	2011.0	2011.3	0.6	80	-	0
25	200	8 S	0537.4	0537.7	0.7	380	-	WR
	500	4 S/F	0849.7	0850.0	1.5	13	4	0
	200	46 C	0849.7	0850.2	2.0	150	35	0
	500	8 S	0851.2	0851.3	0.3	100	-	WL
	200	8 S	2133.2	2133.5	0.6	90	-	0
26	2800	1 S	2032.2	2032.5	0.6	19	4	0

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso May 1998

Single-frequency observations

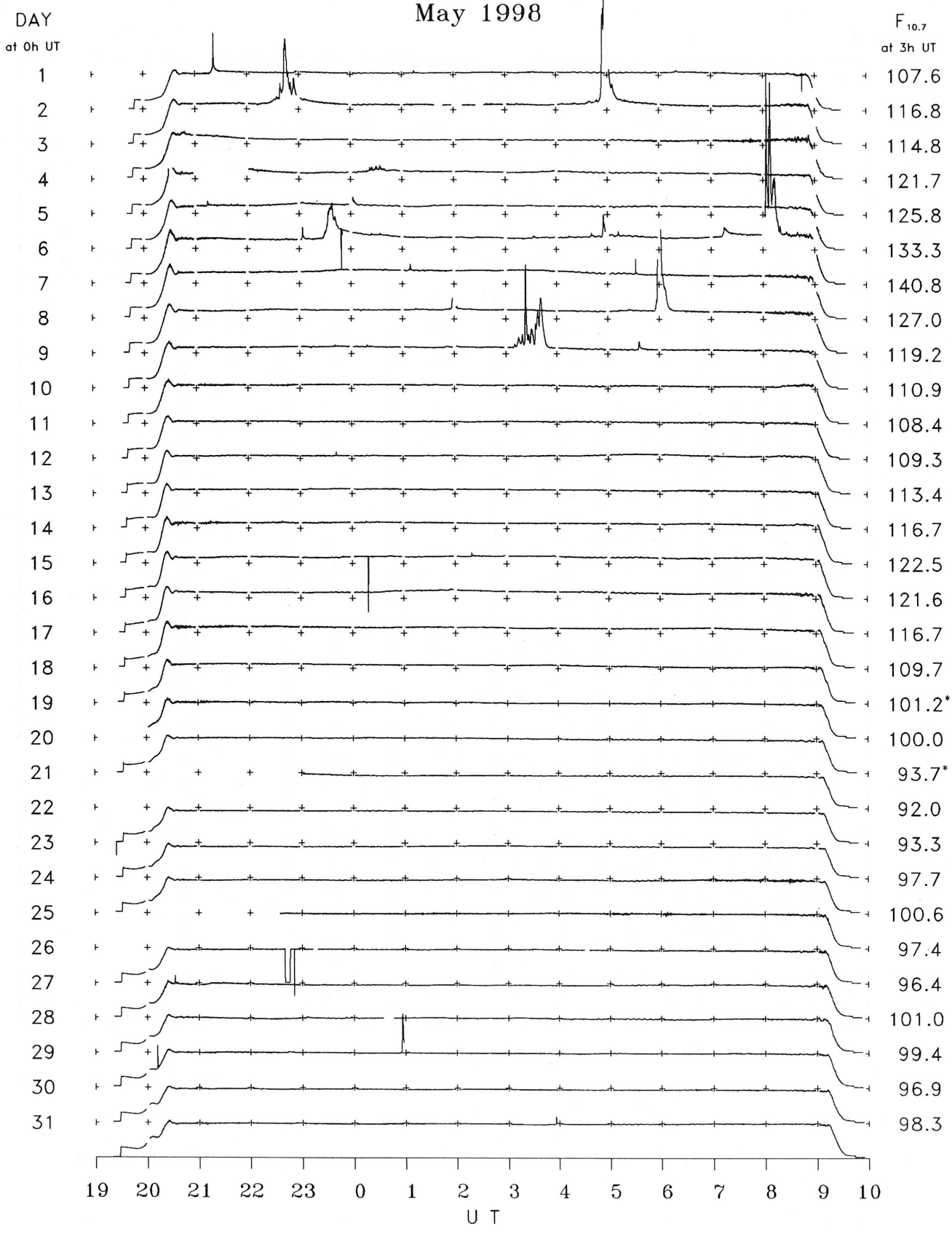
Normal observing period: 1930 - 0940 U.T. (sunrise to sunset)

MAY 1998	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
27	200	46 C	0312.5	0312.9	4.0	90	11	0
	500	46 C	0500.2	0500.4	0.8	120	20	0
	2800	3 S	0500.5	0501.0	1.5	10	3	0
	200	8 S	0817.5	0817.6	0.3	290	-	WR
	200	8 S	1946.0	1946.2	0.5	90	-	0
	500	42 SER	2032.0	2032.1	0.3	30	-	0
	200	42 SER	2032.2	2032.5	15.0	40	-	0
	200	8 S	2302.2	2302.3	0.2	90	-	0
28	200	4 S/F	0621.5	0621.7	1.0	80	11	WR
	500	8 S	0622.1	0622.2	0.2	20	-	0
	200	42 SER	0632.6	0634.6	3.0	50	-	WR
	200	42 SER	0726.2	0730.9	5.0	60	-	0
	200	42 SER	0813.0	0814.1	1.3	11	-	0
	500	42 SER	0833.0	0833.2	0.3	11	-	0
	200	46 C	0849.0	0852.0	4.0	17	4	0
	200	3 S	2011.9	2012.5	1.2	30	10	0
	2800	8 S	2012.0	2012.1	0.2	50	-	WL
	200	42 SER	2104.0	2127.0	33.0	330	-	0
29	2800	46 C	0055.5	0056.7	5.0	90	30	WL
	500	46 C	0055.9	0056.5	5.0	170	20	0
	200	8 S	0057.0	0057.1	0.2	50	-	0
	200	46 C	0058.5	0059.0	6.0	680	-	WR
	500	8 S	2309.0	2309.1	0.2	30	-	WR
30	500	42 SER	2247.5	2249.6	2.5	12	-	0
	200	46 C	2248.0	2252.0	7.0	1300	-	0
31	2800	3 S	0355.5	0355.7	2.0	16	5	0
	200	8 S	2024.7	2025.0	0.6	300	-	0

B. Solar Radio Emission

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

May 1998



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

IONOSPHERIC DATA IN JAPAN FOR MAY 1998
F-593 Vol.50 No.5 (Not for Sale)

電離層月報（1998年５月）
第50巻 第５号（非売品）
1998年８月25日 印刷
1998年８月31日 発行
編集兼 郵政省通信総合研究所
発行所 〒184-8795 東京都小金井市貫井北町４丁目２－１
☎（042）（327）７４７８(直通)

Queries about "Ionospheric Data in Japan" should be forwarded to :
Communications Research Laboratory, Ministry of Posts and Telecommunications,
2-1 Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184-8795 JAPAN