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IONOSPHERIC DATA IN JAPAN

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CONTENTS

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

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INTRODUCTION

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

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

A. IONOSPHERE

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

A1. Automatic Scaling

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

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

a. Characteristics of Ionosphere

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

b. Descriptive Letters

The following descriptive letters are used in the tables.

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

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

C Impossible measurement because of any failure in observation.

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

N Impossible automatic scaling because of complex echoes.

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

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

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

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

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

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

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

(ii) Qualifying Letters

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

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

(iii) Description of Types of *Es*

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

The types are:

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

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

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

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

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

B. SOLAR RADIO EMISSION

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

B1. Daily Data at Hiraiso

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

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

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

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

B2. Outstanding Occurrences at Hiraiso

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

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

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

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

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

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

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

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

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

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

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

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

C. RADIO PROPAGATION

C1. Phase Variation in OMEGA Radio Waves at Inubo

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

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

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

C2. Sudden Phase Anomaly (SPA) at Inubo

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

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

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

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

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

Transmitting Stations

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

HOURLY VALUES OF foF2 AT WAKKANAI

APR. 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	45	57	52	61	50	46	58	68	70		74	77	77	81	75	70	70	73		71	63	57	57	56
2	55	50	57	57	40	46	59	58	71	81	81	81	80	78	74	75	71	73	68	68	57	57	57	59
3	57	54	57	57	48	50	58	68	68	74	78	70	87	90	87	82	78	71	72	69	63	56	57	69
4	57	56	55	69		51	69	77	78	71	77	74	88	90	89	87	84	77	80	67	58	63	70	60
5	59	57	60	56	52	56	69	80	82	87	92	82	86	88	87	82	78	74		68	61	61	69	68
6	58	58	68	57	72	57	57	68	82	92	88	88	88	90	80	78	81	71	72	71	68	69	68	
7	68	62	61	55	58	58	69	67	78	81	88	88	87	80	80	77	78	80	80		70	69	68	68
8	68	63	68	68	58	57	73	80	77	87	78	77	93		79	87	81	77	93	82	94	68	57	60
9	58	58	60	60	58	61		80	78	81		80	80	81	68	87	87	78	80		80	68	68	68
10	70	70	71	62	51	64	57	68	60	75	84	78		80		84	72	81	87	71	68	66		68
11	68	64	61	58	55	66	70	63	80	78		78	71		59	81	90	76	93	71	68	68	58	61
12	70	68	67	56	56	57	61	56	55	70	69	67		66	81	74	75	68	68	70	70	67	58	57
13		41	52	54	54	53	58	69	60	63	67	76	82	80	76	73	68		72	71	68	63	57	57
14	71	52	43	42	42	56	60	68	67	80	78	76			79	80	81	80	81	79	68	68	56	56
15	56	52	57		41	40	28	54	56	49		71	71	70	67	80	76	80		71	68	57	56	51
16	57	50	58	56	44	35	60	67	71	77		78		79	83	79	78	94	82	68	59		68	56
17	57	52	58	56	57	38	58	58	66	67	68	77	80	78	76	74	79	78	68	71	68	57	63	54
18	60	50	56		39	35	A		A	A	A		64	68	72	67	72	68	71	68	70	57		56
19	51	56	56	51	37	40	57	68	66	71	72	70	72	78	77	76	69	68		68	69	68	67	69
20	56		51	37	43		66	70	72	79	71	68	65	66	70	67	80	80	74		71	58	58	68
21	57	58	58	58	38		46	60	58	59	A	60	57	71	N	66	78	71	64	69	57	A	57	57
22	58	58	41	38	44		58	68	67	66	63	70	73	77	79	78	80	78	78	N	71	64	59	57
23	57	54	48	56		41	41			54	A	A	49		58	B		80	71	70	58	59	48	47
24	49	46	46	36	35	29	58	58	A			52			63	67	66	58	64	67	68		57	
25	56	58	56	40	A	A	57	68	70	70	75	55	67	66	64	70	80	78	77	77		58	57	56
26	59	A	56	42	38	53	62	67	70	67	57	75	56	68	79	76	67	68	80	77	80	67	61	58
27	56	48	35	32	40	38	A	A	A	A	A	A	49	A	A	A	A	55	56	67	69		57	38
28	A	A	A		38	51	A	A	A	A	A	A	A	A	58		66	A	A	71	58	67	68	53
29	57	A	37	36	40	51	58	68	72	57	62	54	49	64		58	67	61	63	68	72	68	57	56
30	38	57	51	46	44	55	56	57	51			A	66	64	69	70	64	62	63	73	67	68	53	48
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	26	29	27	27	26	26	26	25	24	19	25	24	23	26	27	28	28	25	26	29	26	28	28
MED	57	56	56	56	44	51	58	68	70	72	75	76	72	78	76	76	78	75	72	70	68	65	58	57
U Q	59	58	60	58	55	57	62	68	77	80	81	78	84	81	80	81	80	79	80	71	70	68	67	64
L Q	56	52	51	42	40	40	57	60	63	66	68	69	64	68	68	70	69	68	68	68	62	58	57	56

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT WAKKANAI

APR. 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	30	29	27	29	24	30	32	37	38		G	G	G	G	G	G	G	34	34	G	G	G	G	G
2	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	36	27	25	G	G	G	G
3	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	26	G	G	G	G	G
4	G	G	G	G		G		33	39	44	61	43	62	G	63	52	G	44	66	32	55	39	G	29
5	G	26	G	G	G	G	28	G	G	G	G	G	G	46	G	G	G	G	32	33	24	G	G	G
6	G	G	G	G	G	G	29	34	G	G	G	G		G	G	G	G	31	30	27	28	G	G	G
7	G	G	G	G	G	G	36	G	G	G	G	G	G	G	G	G	35	30	28	25	G	G	G	G
8	G	G	G	G	G	G	29	G	G	G	G	G	G		G	G	G	G	28	25	G	G	27	G
9	G	G	G	G	G	G		G	G	G		G	G	G	G	G	42	31	30	26	G	G	G	G
10	G	G	G	G	G	G	G	34	G	G	G	G		G		G	G	31	27	25	G	33		G
11	G	G	G	G	G	G	29	35	G	G		G	G		G	G	G	37	32	28	28		27	28
12	32	G	G	G	G	G	G	G	G	G	43	G		G	G	G	G	G	34	G	G	24	G	29
13		G	G	G	G	G	32	G	G	G	G	G	68	62	59	G	36	G	30	28	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G			G	G	G	36	34	30	28	G	G	G
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	35	G	31	30	28	G	G	G
16	G	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G
17	G	G	G	G	G	G	35	G	G	G	G	G	G	G	G	G	G	G	27	G	28	33	G	G
18	G	G	G	G	G	G	32	G	74	86	60	G	45	G	G	G	G	G	34	35	41	60		G
19	G	28	G	G	28	G	G	G	G	G	G	G	G	G	G	G	G	36	33	29	28	G	27	26
20	G	G	G	G	G	G	G	G	G	G	44	G	G	G	G	G	G	G	29	G	31	34	G	G
21	G	G	G	G	G	B	G	G	46	42	53	52	44	43	G	39	G	46	44	40	41	44	G	G
22	G	G	G	G	G		31	G	G	43	54	G	45	41	G	G	G	52	40	44	52	44	23	G
23	G	28	G	G	G	G	G	G	G	G	47	43	G	G	G	B		G	32	28	27	24	G	G
24	G	G	27	25	G	28	33	G	39	G	G	G	G	G	G	G	G	39	34	32	25		G	26
25	G	G	26	29	34	46	45	58	52	51	44	G	43	57	G	G	44	48	52	31	29	32	29	28
26	24	25	G	G	G	G	G	46	52	G	43	G	G	G	G	G	G	40	45	36	38	29	G	G
27	G	26	G	G	G	G	43	61	64	53	74	58	50	82	120	79	62	51	44	46	29		30	30
28	34	62	40	34	28	39	52	67	91	70	43	60	64	43	52		G	82	75	66	52	61	36	27
29	27	29	30	29	28	G	G	42	55	40	G	G	G	G		G	G	54	54	32	32	G	G	G
30	24	G	24	G	G	29	G	G	G	G	G	42	G	G	G	56	38	G	30	27	G	G	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	30	30	29	28	27	30	30	29	27	30	26	27	28	28	29	30	30	30	30	27	28	30
MED	G	G	G	G	G	G	28	G	G	G	G	G	G	G	G	G	G	31	32	28	28	G	G	G
U Q	G	25	G	G	G	G	32	34	39	41	44	G	44	41	G	G	35	40	40	32	31	33	12	26
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	25	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT WAKKANAI

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT KOKUBUNJI

APR. 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	51		57	57	40	40	47	72		77		92	98	90	86	75	75		91	71	42	47	A	A
2	A	47		A	69		56		80	84	80	84	100	92	92	86	78	80	93	68	A	44	48	48
3	50	48	48	48	32		57	67	69	73	75	92	105	113	103	95	92	90	76	A	A	57	54	57
4	68	51	46		44	46		94	72	78	81	88	98	101	105	103	96		81	56	63	A	67	63
5	58	56	63	50	A	A	70	76	93	92	92	105	105	114	108	97	92	82	71	68	68	69	69	63
6	A	60	64	68	50	43	N	72	85	91	91	97	107	111	103	92	90	81	77	68	68	64	60	61
7	58	58	57	68	48	54	62	94		94	90	100	102	98	92	91	91	81	93	94	64	60	57	57
8	57		57	70	52	48	64	92	94	83	83	96	94	102	110	116	107	96	96	83	73	58	52	58
9	68	57	52		57	48	64	82	94	98	86	88	98	108	113	107	102	91		86	68	72	68	62
10	63	68		69	69	69	82	73	93	92	97	98	105	101	106	98	94	101		87	63	57	57	61
11	58	56	54	54	54	51	66	69	87	115	103	92	96	102	106	112	101	99	91	94	69	68	69	61
12	68	69	66	61	55	56	67	76	80	92	93	90	106	107	101	96	84	91	84	81	82	76	69	72
13	66	67	64	57	51	50	64	66	71	75	83	90	97	98	102	98	91	90	86	82	A	56	A	46
14	55	57	56	54	52	57	68	75	94	86	90	96	106	107	105	105	94	92	92	93	72	69	63	68
15	68	68	70	54	52	57		73	73	75	83	97	105	113	103	104	97	86	87	93	95	73	60	57
16	57	58	63	56	38		60	73	81	84	84	85	101	107	110	115	105	115	98	92	76	68	57	68
17	57	57	57	56	56	56	77	71	71	73	92	93	102	106	111	106	102		96	96	68	69	57	63
18	68	52	58	56	51	56	64	76	80	91	91	88	92	103	98	96	90	86	93	92	73	57	57	57
19	56	49	48	47	44	47	62	74	88	75	74	88	92	87	98	96	88	90		92	82	69		57
20	56	52	56	46	45	48	75	90	94	80	66	76	93	104	92	92	A	85		81	83		67	68
21	67	64	69	48	48	56	60	58		73	76	70	82	94	91	88	85	87	85	A		60	A	53
22	57	56	52	47	42	47		70	A	63	68	83	90	93	101	103	112	116	115	81	58	A		51
23	56	A	50	47	48	48	58	57	63	74	67	74	67	81	84	B	112	114	99		A	46		56
24		37	43	47	37	43	62	68	66	54	A	A	70		87	91	91	90		114	83	58	58	56
25	58	56	56	48	42		68	78	93	67	A	A	A	81	78	84	95	106	115	84	83		57	58
26	57	48	47	47	45	55	56	94	70	70	85	92	98	90	97	102	90	80	92	98	115		46	46
27	56	A	A		40	43	A	A	53	A	A	A	A	71	74	71	66	74	70	73	65	A	A	50
28	47	46	46	46	45	A	63		73	A	A	A	77	76	88	96	91	84	93	93		57	53	
29	56	46		48	44	49	61	68	70	A	A	A	A	83	93	98	83	81		81	68	54	56	57
30		50	56	50	47	49		A	65	68	68	70	78	86	91	103	101	81	81	81	93	61	57	68
31																								
	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	26	26	29	24	24	26	26	27	24	25	27	29	30	29	29	27	24	27	24	24	23	28
MED	57	56	56	52	48	49	64	73	80	78	84	90	98	101	100	97	92	90	92	84	70	60	57	58
U Q	66	58	63	57	52	56	67	78	93	91	91	96	105	107	105	103	101	96	94	93	82	69	67	63
L Q	56	49	50	47	43	47	60	69	70	73	75	84	92	88	91	91	89	81	82	81	66	57	56	56

HOURLY VALUES OF fEs AT KOKUBUNJI

APR. 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	G	G	G	G		G	G	G	G	G	G	43	G	G	G	23	33	51
2	56	31	27	29	27	G	G	G	G	G	G	G	G	57	56	46	51	52	41	34	50	44	36	G
3	G	G	G	G	G	G		G	G	G	49	56	G	G	50	58	68	57	58	72	61	66	58	50
4	30	34	28	G	G	G	32	G	G	G	48	G	G	G	G	G	G	33	G	G	G		38	37
5	32	26	32	36	42	37	39	G	52	54	62	69	57	G	G	G	G	31	G	30	63	59	43	33
6	54	35	G	30	G	G	G	G	G	52	51	54	56	64	G	48	45	34	29	28	G	G	G	G
7	G	G	G	G	G	G	G	G	G	G	G	50	G	G	G	G	39	34	30	26	26	G	G	G
8	G		G	G	G	G	G	G	G	G	49	53	G	G	G	G	G	31	G	G	G	G	G	G
9	G	G	G	G	G	G	30	G	G	G	G	G	G	G	G	G	G	G	34	47	36	26	G	G
10	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	49		51	28	34	G	50	G
11	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	34	34	G	G	G	G	23
12		30	23	G	G	G	28	34	G	G	G	G	G	G	G	G	G	G	44	26	25		28	27
13	G	G	G	G	G	G	34	G	G	G	G	G	G	G	G	G	G	40	36		38	34	38	G
14	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	37	G	50	34	39	26	G	G
15	24	G	G	G	G	G	G	G	46	G	45	G	G	G	G	G	60	35	33	59	33	G	G	G
16	G	G	G	G	G	G	30	G	38	G	G	G	G	G	G	57	G	42	29	24	28	G	G	G
17	G	G	G	G	34	G	30	G	G	40	G	G	G	G	G	G	G	G	G	35	28	28	38	31
18	35	28	23	G	G	G	33	G	G	41	73	68	65	59	59	59	37	G	36	31	G	40	44	28
19	50	33	G	G	G	G	G	G	38	G	G	G	G	G	G	G	G	34	33	32	36			31
20	34	23	G	24	G	G	G	G	G	41	G	G	G	48	42	57	89	124	48	48			G	G
21	G	G	G	G	G	G	G	G	G	51	55	55	G	44	G	41	49	47	48	87		31	54	36
22	G	34	34	36	33	G	45	47	53	52	G	G	G	G	G	G	48	42	37	51	33	48	G	32
23	31	43	32	G	G	G	32	G	58	62	61	G	G	G	G	B	G	33	39		40	G	G	G
24		G	G	G	G	G	G	G	39	55	57	43	G	G	G	G	55	82		65	51	32	G	G
25	G	G	G	G	G	G	33	G	57	57	60	69	88	71	50	58	62	62	60	34	55	48	G	G
26	G	29	G	33	G	24	31	35	G	47	46	54	G	G	G	G	G	G	55	37	34		33	38
27	24	34	29	G	G	G	44	51	47	58	150	68	52	54	G	G	G	68	53	40	35	75		58
28	38	24	37	36	34	33	49		74	63	54	85	52	43	G	G	G	42	58	40	35	72	68	
29	69	52		41	23	G	38	49	71	66	68	86	57	82	90	92	64	G	40	42	58	43		54
30		34	43	37	33	34	53	72	59	G	G	G	G	G	G	G	G	G	30	33	29	G	27	G
31																								
	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	29	30	30	30	28	29	30	30	29	30	30	30	30	29	30	29	29	28	28	25	27	29
MED	G	24	G	G	G	G	30	G	G	G	45	G	G	G	G	G	G	34	36	34	34	28	27	G
U Q	34	33	27	29	G	G	33	G	47	52	56	55	G	44	G	47	49	45	49	44	39	46	38	34
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	27	25	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT KOKUBUNJI

APR. 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	15		15	15	14	16	14	15	14	15		21		22	20	15	15	16	17	14	15	14	15	14
2	15	14	14	14	14	15	16	15	15	16	17	36		18	23	14	15	15	14	14	14	14	14	14
3	15	14	14	15	15	14	22	28	14	18	20	33		46		16	14	14	14	15	14	14	15	15
4	15	14	14	14	15	15	16	15	15		34		45	48	45	17	16	15	18	15	15	14	15	15
5	14	15	14	15	15	15	15	15	17	18	24	24	33		44	44	16	15	23	15	14	14	14	15
6	15	14	14	14	15	15	24	21	20	23	36	34	34	33	27	21	15	14	14	15	14	14	14	15
7	15	15	15	15	15	14	23	17	15	18		34		48	48	20	14	15	14	15	15	14	14	14
8	14		15	15	14	14		15	15	18	21	27	27	26	20	17	16	15	22	15	14	15	14	15
9	15	14	15	14	14	14	22	18	16	18		44	53	42	48	44	17	14	16	14	14	15	14	14
10	15	14	15	15	14	15	24	14	14	17				29		20	15	15	15	14	14	15	15	15
11	15	15	15	14	14	15	18	18	18		20		49		48	21	16	15	14	15	15	14	14	15
12	14	14	15	15	15	15	20	17	18		46		58	46	45	20	15	14	15	14	15	14	14	15
13	14	15	14	14	15	15	21		15	21	20					21	16	14	14	15	14	15	14	14
14	14	15	14	15	15	14	26	15	18	21	48	53	48	50	18	17	16	14	15	15	14	15	15	15
15	14	14	15	15	15	14	26	17	15	18	23		49	26		18	15	16	15	15	15	15	15	15
16	14	16	15	15	15	26	17	17	18	20		48		22		16	15	15	20	14	14	14	15	15
17	14	16	15	15	14	17	18		18		22	46	48	46	20	17	14	14	14	15	14	14	15	15
18	14	15	15	15	14	14	20		15	33	34	38	33	33	33	15	16	14	14	15	14	14	15	14
19	15	14	15	20	15	16	27	17	17	24		29	30	23	18		14	17	14	15	14	15		15
20	15	14	15	14	14	15	14		17	34		50	60	23	26	17	16	15	14	14	14		15	15
21	15	15	15	15	15	15	15	17	16	18	20	23		23		17	15	16	15	14		14	14	14
22	15	14	14	14	15	17	21	15	20	17	23	23		49	20	20	15	16	14	15	15	14	15	14
23	14	14	15	14	15	17	22	15	16	16	22		45	50	45	B	49	18	14		15	15	17	15
24		15	14	15	14	15	24	18	17	23	22			46	45	18	14	15		18	15	15	15	15
25	15	15	14	15	14	15	17	15	14		33	33	28	22	21	16	14	14	14	15	14	15	14	14
26	14	14	14	14	14	17	15	18	14	18	22		23	21	21		17	14	14	14	14		14	14
27	14	14	14	14	14	17	14	26	15		22		33	28	23	16	17	16	14	15	15	14	14	15
28	15	14	14	14	15	15	17		15	23	24	32	32	28	26	15		14	14	14	15	14	15	
29	14	15		14	14	16	15	15	14	17		33	30	28	22	20	18	16	15	15	14	15	15	14
30		14	14	15	15	15	20	17	17	22		24		29	21	20	16	14	15	15	15	14	14	16
31																								
	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	30	30	29	25	30	24	21	20	19	27	24	27	29	30	29	29	29	28	29	29
MED	15	14	15	15	15	15	20	17	16	18	22	33	34	29	24	17	15	15	14	15	14	14	15	15
U Q	15	15	15	15	15	16	22	18	17	22	33	41	49	46	45	20	16	16	15	15	15	15	15	15
L Q	14	14	14	14	14	15	15	15	15	17	20	25	30	23	20	16	15	14	14	14	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT YAMAGAWA

APR. 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	43		53	48	C	C	C	C	C	81	86	103	111	110	96	95	86	91	94	82	63	43	52	42
2	31	53	58	47			79	70	93	87	85	84	94	108	111	102	92	91	88	72	64	42		79
3	36	48		55		31	65	61	68	72	86	95	100	116	115	111	111	106	90	83	89	61		62
4	62	54		37	55	48	67	66	72	78	81	87	104	120	116	111	107	107	100	84	89	64	62	39
5	49	69	63	59	23	69		72	83	86	92	104	116	128	128	118	102	86	80	80		59	A	79
6	66	62	67	66	49	26	48	68	77	92	91	101	110	118	118	107	104	105	98	84	72	58	49	
7		59	60	52	59	69	59	70	92	105	94	97	108	116	110	107	107	98	86	87	82	67	59	59
8	68	67	73	62	62	C	C	C	C	82	81	102	104	120	119	118	111	100	94	104	78	61	59	59
9	59	63	64	68	60	38	55	70	86	86	86	90	110	122	127	125	121	110	103	102	83	73	64	72
10	68	70	71	66	62	60	67	81	90	90	91	103	110	120	121	130	121	112	111	102	83	62	52	49
11	61		59	53	42			72	84	106	97	91	110	124	121	127	125	108	78	93	82	66	79	66
12	64	69	84	67	59		54	68	78	92	87	90	111	118	108	112	98	102	101	96	87	73	56	
13	68	65	62	63		53	60	66	66	82	91	100	105	114	122	123	126	120	115	105	90	66	69	60
14		62	62	68	72	43	62	70	76	87	100	106	120	132	134	132	128	118	112	108	85	79	66	68
15	71	66	66	58	59	60	70	68	72	77	85	98	111	126	C	131	122	C	102	104	84	89	60	54
16	60		67	58	52	26	54	77	78	81	80	80	100	116	120	125	124	121	109	120	88	89	31	49
17	58	62	60	56	60	69	67	70	76	91	91	96	110	118	121	116	123	112	108	115	85	68	54	68
18	60		66	59		22	59	73	95	90	91	91	108	120	124	128	118	101	110	120	90		69	79
19		48	53			60	52	86	80	77	78	87	103	103	110	116	111	111	105	113	116	82	47	
20	89		43			58	60	87	90	75	76	82	105	125	130	116	108	105	105	108	103	82	68	69
21	66	54	67	62	50	48	68	78	66	72	72	83	91	105	97	98	100	102	107	90	89		89	60
22	30	50		43	31	34	66	67	66	A	71	84	92	91	104	119	128	117	116	100	65	59	66	
23	53	53	53	52	58			67	70	74	74	83	91	100	106	B	126	120	130	104	62			69
24	72	79	52		62	60	60	77	73	77	70	78	100	101	110	126	110	109	98	110	100	83	62	
25	89	49	62	60	44		54	82	94	67	A	84	100	112	101	110	118	121	107	113	91	64		70
26	69	67	53	58	57	48	60	82	77	76	88	105	105	118	117	108	108	97	108	128	121	43		54
27	61		53	49	47	42	60	61	A	A	71	81	79	87	90	92	92	84	87	88	73		79	34
28	48	59	53	60	52	53	58	73	90		A	99	94	105	111	121	124	101	98	89	87	73	A	40
29	69	60	59		48	44	67	67	A	72	74	85	93	111	127	131	127	121	120	121	86	43	60	42
30	38	55	53	48	49	60	69	67	A	70	74	A	C	C	C	C	C	C	104	84	88	74		64
31																								
	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	24	27	26	23	23	25	28	25	27	28	29	29	29	28	28	29	28	30	30	29	26	22	25
MED	61	61	60	58	55	48	60	70	78	81	86	91	105	116	116	117	111	106	104	102	86	66	61	60
U Q	68	66	66	62	60	60	67	77	90	90	91	100	110	120	121	125	124	114	109	110	89	74	68	69
L Q	49	53	53	52	48	38	56	67	72	75	75	84	97	106	109	109	105	100	94	87	80	59	54	49

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT YAMAGAWA

APR. 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	26	C	C	C	C	C	G	G	G	G	G	G	G	40	45	39	40		28	G	G
2	24	G	G	G	28	28	24	G	G	G	G	G	G	G	G	G	G	58	60	33	G	32	G	G
3	G	G	G	G	G	G	G	G	G	G	G	G	G	57	G	G	39	80	95	79	60	G	31	24
4	G	27	G	G	G	G	G	G	43	39	G	G	G	G	G	G	G	G	29	G	30	32		
5	32	40	G	G	31	28	31	32	G	G	G	66	58	64	58	G	G	G	39	G	42	91	26	
6	G	G	31	26	28	29	G	G	G	G	G	G	G	51	53	47	G	G	32	G	G	G	G	G
7	G	G	G	G	G	G	23	G	G	G	G	G	G	G	G	G	G	G	32	32	G	G	G	G
8	G	G	G	G	G	C	C	C	C	G	G	G	G	G	61	46	G	G	31	G	G	G	G	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	46	39	31	G	G
10	G	G	G	G	G	G	G	G	G	45	G	G	G	G	G	G	G	G	41	45	32	27	30	G
11	G	G	G	G	G	G		G	G	40	G		G	G	G	58	54	70	91	85	31	32	G	28
12	26	G	G	G	G	G	G	31	G	G	51	G	G	G	G	G	G	G	33	G	30	G	G	G
13	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	31	26	G	28	30	G
14	G	G	G	G	G	G	G	31	G	39	G	G	G	59	G	G	G	G	34	G	32	29	31	G
15	G	G	G	G	G	G	G	G	G	G	G		G	G	C	G	G	C	G	30	G	G	G	G
16	G	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G	G	G	G	27	G	G	G	G
17	G	G	G	G	G	G	G	39	G	54	G	G	G	G	G	G	G	G	G	G	G	G	G	30
18	G	G	G	27	G	25	G	G	G	G	G	51	56	G	64	57	G	G	40	G	32	G	32	59
19	29		40	30	G	G	G	G	G	54	G	G	G	G	G	G	G	37	47	39	27	G	G	G
20	G	G	G	G	G	G	32	G	36	G	51		G	G	70	77	85	66	40	26	G	G	G	G
21	G	G	G	G	G	G	G	G	44	G	G	77	G	G	G	73	G	G	74	68	93	31	G	29
22	32	G	29	G	26	29	G	G	66	61	64	61	62	59	62	G	G	G	46	32	G	G	G	
23	G	G	G	G	G	G		G	43	42	56	78	58	56	G	B	G	G	G	28	G	G	G	30
24	24	G	G	G	G	G	G	G	G	45	50	G	G	55	G	G	58	82	68	68	65	93	31	26
25	G	G	G	G	G	G	G	32	45	51	57	72	G	G	G	57	66	86	90	68	39	60	39	40
26		G	G	G	32	38	G	36	55	46	45	G	62	G	G	G	G	G	33	32	25	26	28	26
27		32	G	G	G	G	G	50	63	62	78	66	96	78	G	G	42	43	50	66			31	31
28	27	25	32	26	G	G	G	46	60		92	114	84	91	61	G	G	G	68	115	50	30	30	G
29		30			24	G	40	44	60	53	G	G	64	101	55	59	54	37	32	G	40	G	G	32
30	32	29	G	G	27	G	26	50	84	79	62	98	C	C	C	C	C	C	37	46	G	26	32	G
31																								
	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	29	29	29	29	28	26	28	28	29	30	27	29	29	28	28	29	28	30	30	28	29	29	27
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	39	32	28	26	G	G
U Q	24	G	G	G	12	G	G	32	44	48	51	66	57	56	54	46	39	44	50	46	39	31	30	29
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT YAMAGAWA

APR. 1998

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

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT OKINAWA

APR. 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	143	134	123	129	96	84	82	82
8	94	81	91	88	47		35		97	91	86	101	116	123	138	133	126	125		132	80	76		79
9			93	93	58			66	94		88		121	150	162	142	143	133	122	A	82	67	A	86
10	92	94	92	94	71	59	56	80	93	94	93	101	116	144	171	178	166	152	147	148	92	82	68	93
11	89	94		95	44	69	57	69	95	94		94	116	N	150	153	137	132	135	142	92	A	A	A
12	95		76	93		47		68	94	93	91	90	122	132	116	115	117	116	110	A	88	A	A	53
13	58	48	60	48	58	54	58	55		84	92	102	110	127	150	166	172	173	156	159	114	76	72	
14	95	76		68	78	60	57	61	72	82	92	106	116	158	175		168	172	149	159	83	70	68	68
15	80		95	67	69	56	58	73		95	83	89	116	143	169	163	151		169		A	79		92
16	83	92	95	71			43	69	83	93	85	92	107	N	143	147		172	167	148	92	60	A	67
17	56	57	57	68	57		54	69	79	88	C	C	C	C	C	C	C	C	C	C	91	66	61	63
18		A	62	57			A	69	94	93	87			99	154	170	172	170	170	180	118	76	69	57
19	43	38	50	47	A	A	58	74	79	94	78	87	111	117	126	154	154	151	173	189	148	88	78	A
20	73	63	60	49	41	36	58	88	81	71	82	90		152	166	153	152	166	152		144	84	73	
21	93	94	78	75	50	50	57	84	68	74	87	84	101	116	111	104	117	125	124		84	68	63	A
22	A	56	61	46	48	38	51		68		72	A	91	101	112	133	149		124	142	90	79	78	77
23	55		95	71		57	57	75	69	73	77	78	95	113	122	B	129	134	140	145	C	78	65	62
24	83	67	82	85		49	58	75	94	78		77	91	114	134	133	134	133	125	129	115	93	A	A
25	79	59	68	60			48	83		67	67	81	114	126	143	152	153	138		151		62	A	A
26	68	70	71	72		A	57	49	84	80	86	102	116	119	134	120	116	111	128	157	110	69	78	69
27	58		61	56	60	67	73	92	67	70	N	103	116	115	117	123	116	117	111	A	70	A	A	43
28	57	57		78	60	58	57	86	93	A	64	A	94	122	123	135		140		131	A	A	A	A
29	A	48	43	69	44	40	66		A	A	81	A	112	152	159	164	164	162	163	142	89	A	A	41
30	43		54		56		58		70	72	68	82	96	116	147	169	166	152		133	94	A	A	52
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	16	20	22	15	14	20	19	19	19	19	17	20	20	22	20	21	21	19	17	20	18	12	16
MED	79	65	70	70	57	55	57	73	83	84	85	90	113	122	143	150	149	138	140	145	92	76	70	68
U Q	92	86	91	85	60	59	58	83	94	93	88	101	116	143	159	163	165	164	163	158	112	82	78	80
L Q	57	56	60	57	47	47	55	68	70	73	77	83	98	115	123	133	127	128	124	132	86	68	66	55

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

APR. 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	44	G	53	43		28	28	G
8	G	G	G	G	G	G	G	G	35	G	G	G	G	G	G	G	52	58	93	50	G	G	G	G
9	G	G	G	G	G	G	G	G	G	39	G	G	53	G	G	G	48	44	54	56	56	41	48	G
10		G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	43	46	58	55	45	40	G
11	23	G	G	G	G	G	G		G	40	48	85	45	G	G	G	39	G	38		49	45		40
12	G	G	G	G		24	G	G	40	G	50	G	45	G		44	40	42	57	78	46	41	40	48
13	G	G	G	G	48	33	38	31	G	G	G	G	G	G	G	G	G	G	33	G	G	G	29	G
14	G	G	G	G	G	G	G	36	36	G	54	52	59	G	G	G	G	G	38	35	38	34	G	G
15	38	G	G	G	G	G	G	34	41	39	43	G	44	G	G	57	39	38	39	59	50	30	24	24
16	30	G	G	G	G	B	G	36	41	51	G	G	G	G	G	G	G	G	42	28	42	48	44	27
17	34	23	G	G	G	G	G	35	42	41	C	C	C	C	C	C	C	C	C	C	34	G	G	G
18		24	32	24	36	G	25	33	36	G	50	61	G	G	G	52	58	48	39	54	44	24	G	G
19	32	34	G	G	37	25	G	32		G	G	52	G	G	G	G	G	G	40	44	48	49	41	32
20	G	G	G	G	G	24	G	35	36	47	43	G		57	63	51	54	43	34	36	59	33	34	45
21	24	27		G	27	G	G	30	46	60	47	G	G	G	87	77	G	G	G	27	56	42	60	44
22	60	43	58	40	32	33	G		45	50	56	73	80	78	87	80	82		76	35	78	59	41	36
23	G	G	G	G		G	G	G	41	58	59	77	86	81	65	B	G	G	G	G	C	G	G	G
24	48	36	41	28		G	G	49	59	50		G	76	45	G	63	G	44	49	59	24	G	81	70
25	33	G	G	G		G	26	34	49	52	56	81	59	48	76	76		91	148	94		84	60	41
26	50	41	39	G	G	57	38	80	49	50	49	49	69	56	98	52	G	G	33	39	24	24	24	26
27	G		G	G	G	G	24	37	67	66	59	60	44	48	59	48	61	54	68		55	59	44	G
28	25	G		G	G	G	34	34	50	66		82	69		108	98	86	74		44			65	34
29	33	29	G	24	G	G	G		67	66	63	88	60	46	G	64	54	56	94	105	71	48	32	28
30	32		G	G	G	B	G	38	59	73	59	78	59	73	57	44	40	65	37	32	33		43	G
31																								
	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	21	21	23	19	21	23	19	22	23	20	22	21	21	21	21	22	22	22	21	20	22	23	24
MED	25	G	G	G	G	G	G	34	41	47	48	50	45	G	G	48	40	42	41	44	47	38	40	25
U Q	33	28	G	G	27	24	24	36	49	58	56	77	64	52	70	63	54	54	57	58	55	48	44	38
L Q	G	G	G	G	G	G	G	30	36	G	G	G	G	G	G	G	G	G	37	33	33	24	24	G

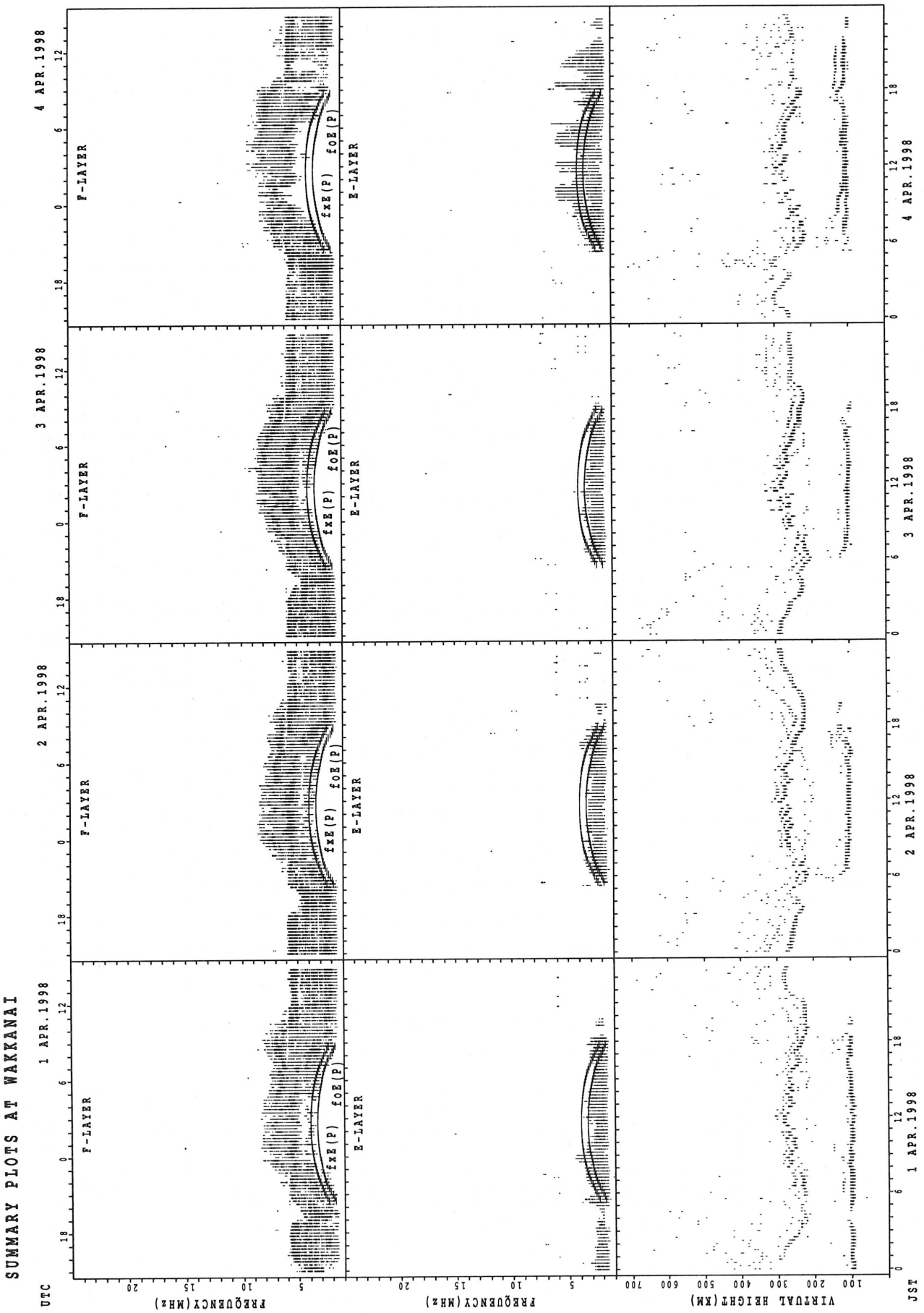
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT OKINAWA

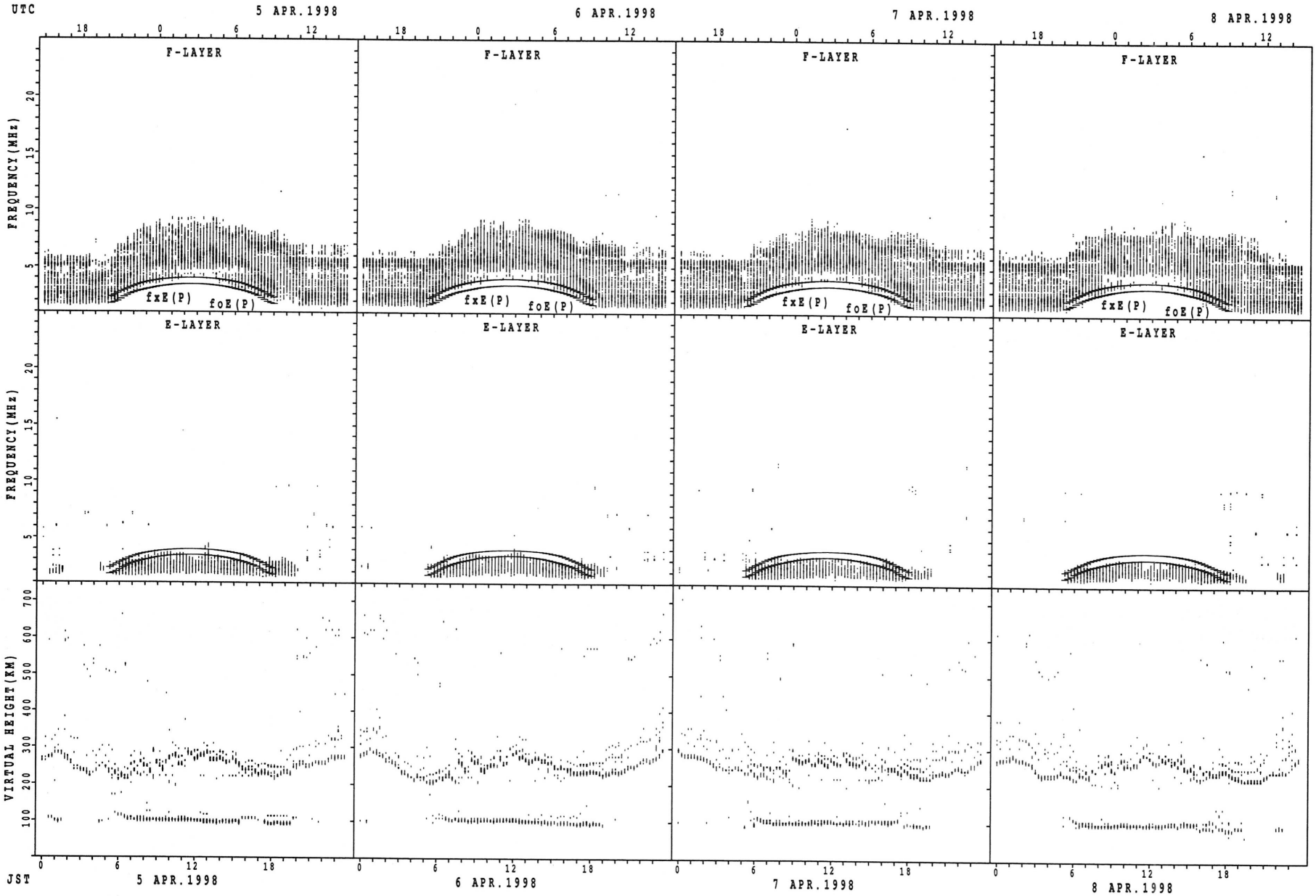
APR. 1998

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

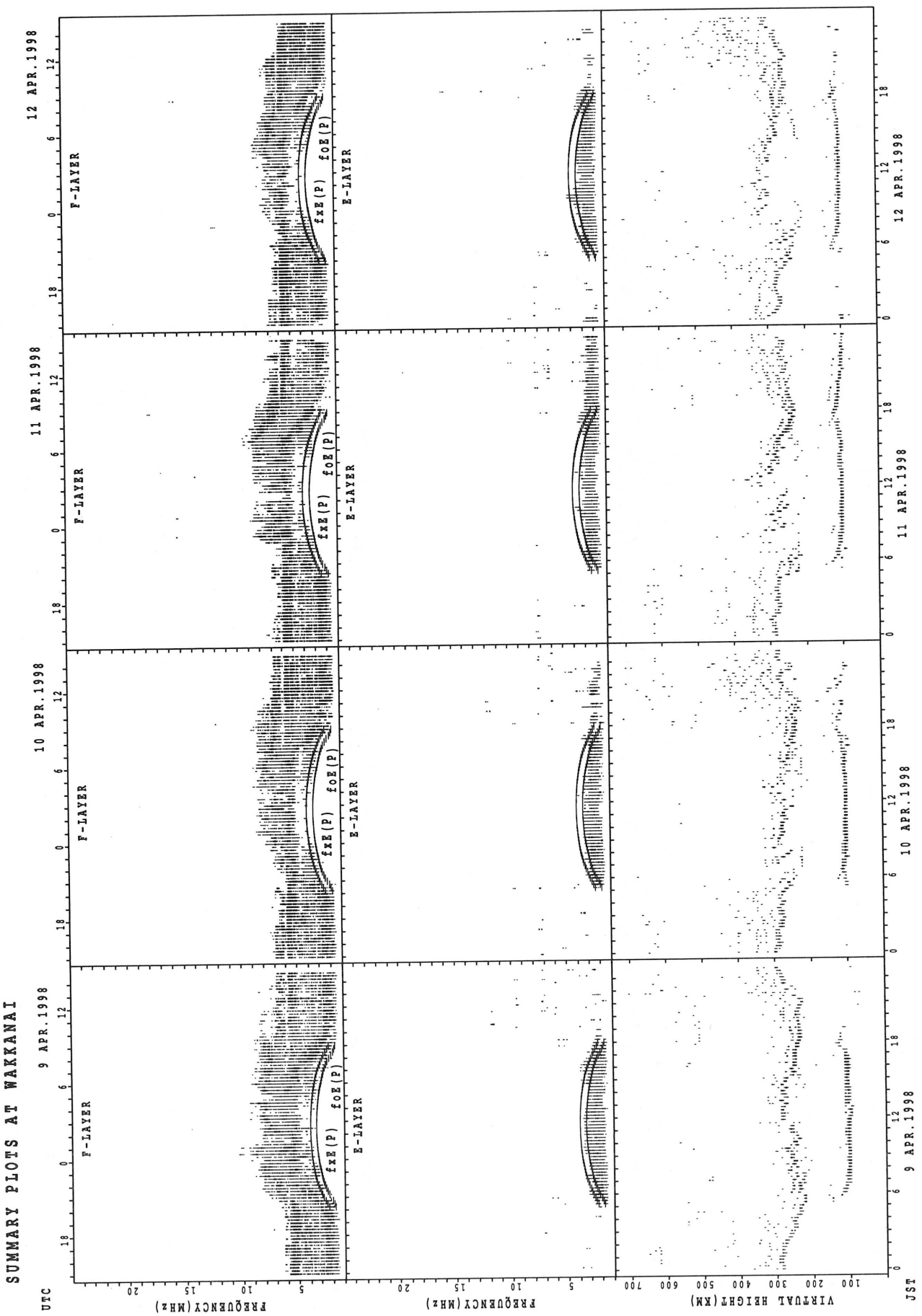
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	23	15	14	15	14	15	15	15
8	14	15	15	15	14	16	14	17	16	18		50	50	54	49	48	20	15	14	14	14	15	15	16
9	14	15	15	15	15	15	14	18	16			48	35	52	50	48	34	16	15	14	14	15	15	14
10	15	15	16	15	15	14	15	14	15	18		49	51	50	49	50	26	16	14	15	14	15	16	15
11	15	15	15	15	15	14	15	15	16		30	38	49	49	46	46	41	17	15	14	15	14	14	15
12	15	15	15	14		15	15	18	18	20	35	48	35		35	46	32	20	15	14	14	14	15	14
13	15	14	15	15	14	15	15	16	16		46	33	22	57	30	29	20	17	15	14	15	17	15	14
14	14	14	15	15	15	14	15	15	16	17	22	38	43	32		46	23	32	14	15	15	14	15	17
15	15	15	15	17	14	15	15	16	16	20	33	53	52	50	34	28		21	15	14	14	14	15	15
16	14	16	14	14	15		15	15	16	20	48	50	54	49	32	46	22	20	18	14	14	15	15	15
17	14	15	15	15	15	14	15	14	17	18	C	C	C	C	C	C	C	C	C	C	15	15	16	14
18	15	16	15	15	15	18	15	18	17		33	41		59		34	30	17	14	14	14	14	16	15
19	15	14	15	15	14	15	17	15	17	21	28	32	56	58	50	49	34	18	15	14	14	15	16	15
20	16	16	18	16	15	15	17	15	17		24			43	27	27	22	15	14	15	14	14	14	14
21	14	14	14	15	14	15	15	15	15	18	32		59	57	42	34		16	16	14	14	14	14	14
22	14	15	15	14	14	15	16		17	18		38	37	43	36	32	20		14	15	14	14	14	15
23	15	17	15	16		15	16	27	17	27	28	32	32	32	28	B	62	46	26	16	C	14	15	15
24	15	14	14	14		16	16	15	16	26		18	28	30	28	35	40	17	20	15	15	15	14	15
25	16	15	15	15		16	18	15	15	28	29	30	42	48	39	34	32	20	14	14		14	14	14
26	16	15	14	17	14	16	15	15	17	24	29	28	18	33	29	27	17	16	17	14	15	15	14	15
27	14		16	15	15	15	15	14	15	17	27	30	33	30	32	30	32	16	16	14	15	15	15	15
28	16	15		15	15	16	15	15	16	29	28	30	28	28	27	24	20	16		15	14	15	14	14
29	15	14	17	15	14	15	17		15	18	28	30	33	33	47	32	20	16	15	15	14	14	15	15
30	14		15	15	18		17	14	16	18	29	30	29	28	28	24	22	17	18	15	15	14	15	15
31																								
	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	21	22	23	19	21	23	21	23	18	17	20	20	21	20	21	21	22	22	23	22	24	24	24
MED	15	15	15	15	15	15	15	15	16	19	29	36	36	48	34	34	23	17	15	14	14	14	15	15
U Q	15	15	15	15	15	16	16	16	17	24	33	48	50	53	46	46	33	20	16	15	15	15	15	15
L Q	14	14	15	15	14	15	15	15	16	18	28	30	30	32	28	28	20	16	14	14	14	14	14	14


SUMMARY PLOTS AT WAKKANAI
UTC
JST
1 APR.1998
2 APR.1998
3 APR.1998
4 APR.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

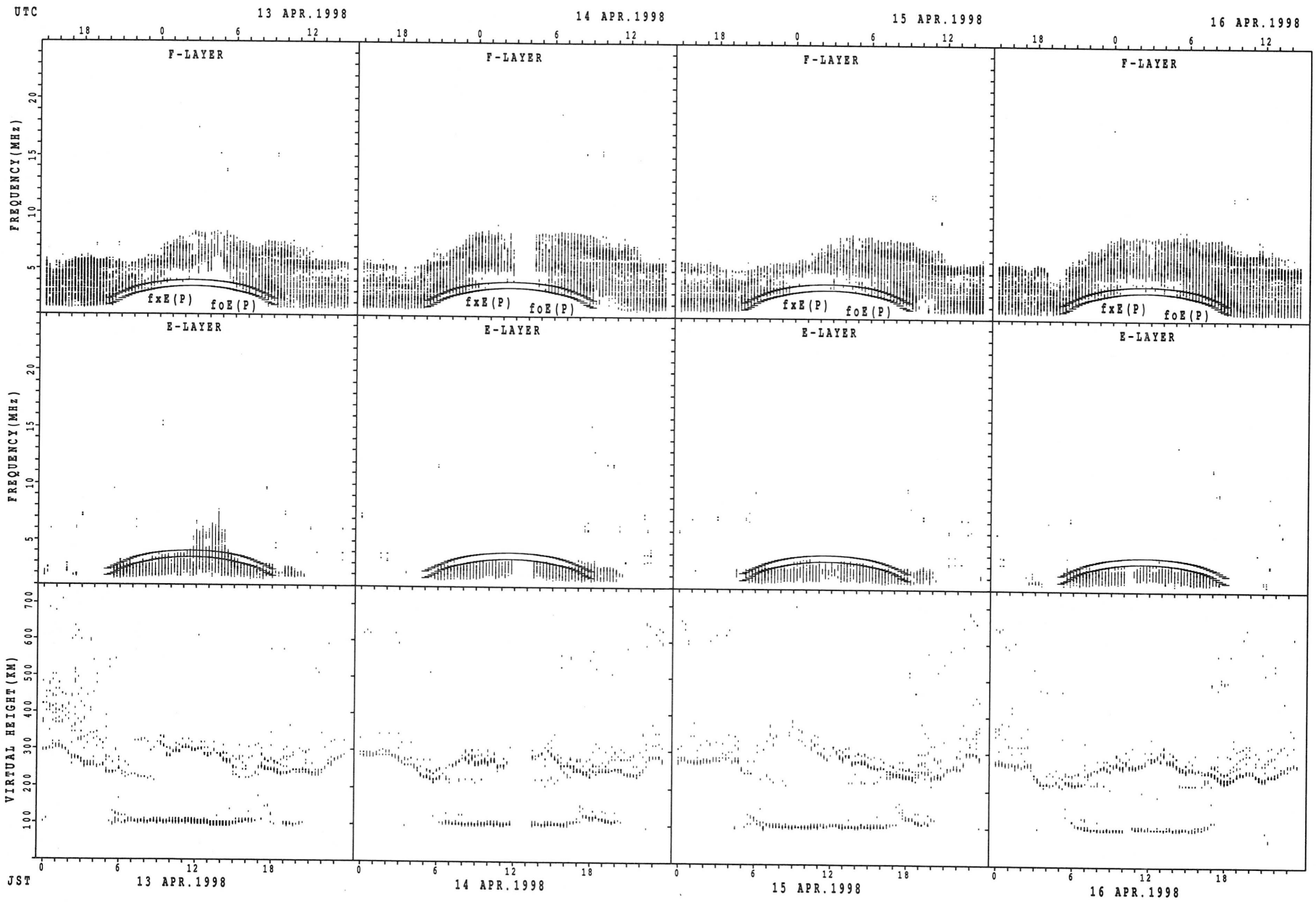
SUMMARY PLOTS AT WAKKANAI



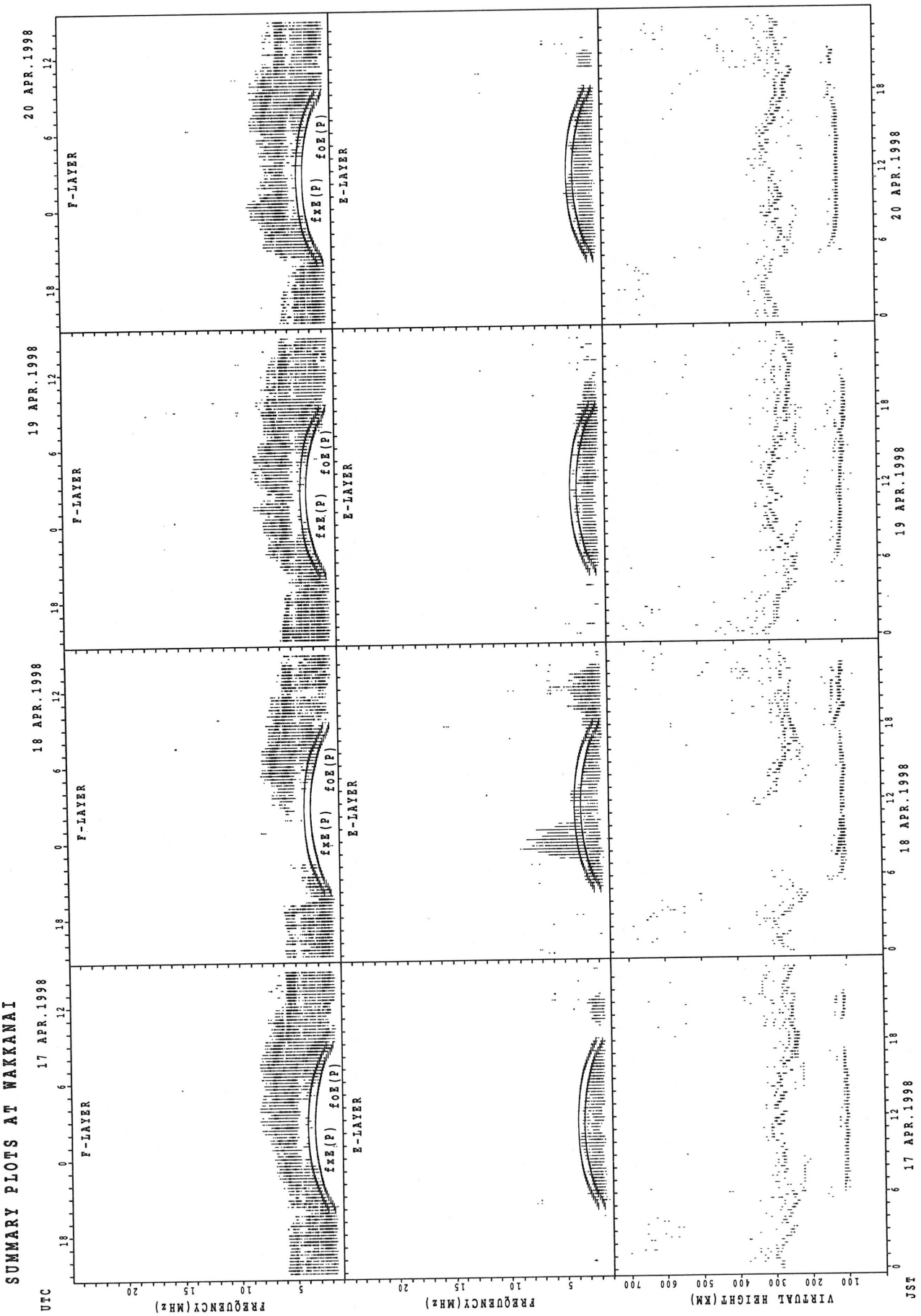
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
9 APR.1998
10 APR.1998
11 APR.1998
12 APR.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

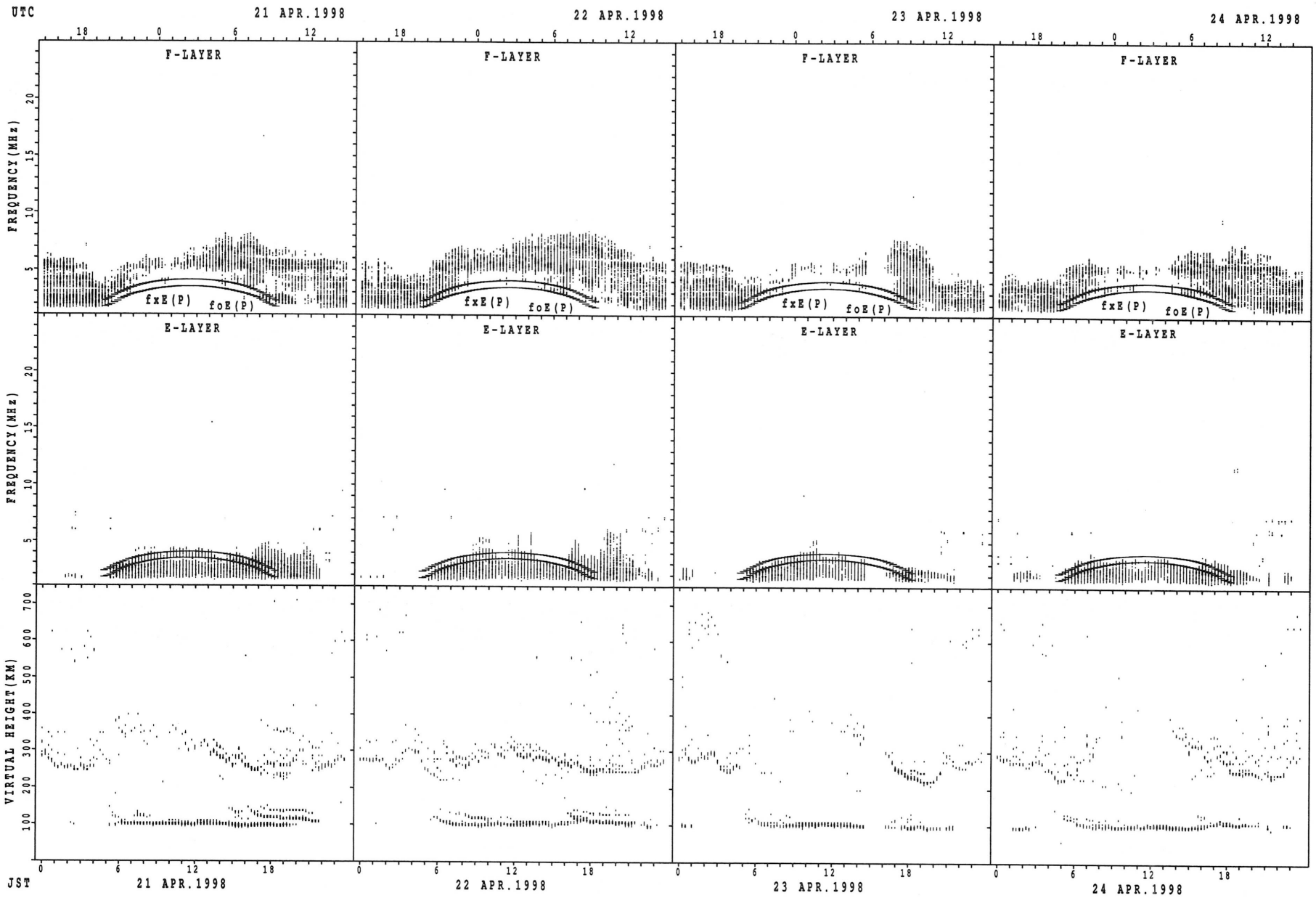
SUMMARY PLOTS AT WAKKANAI



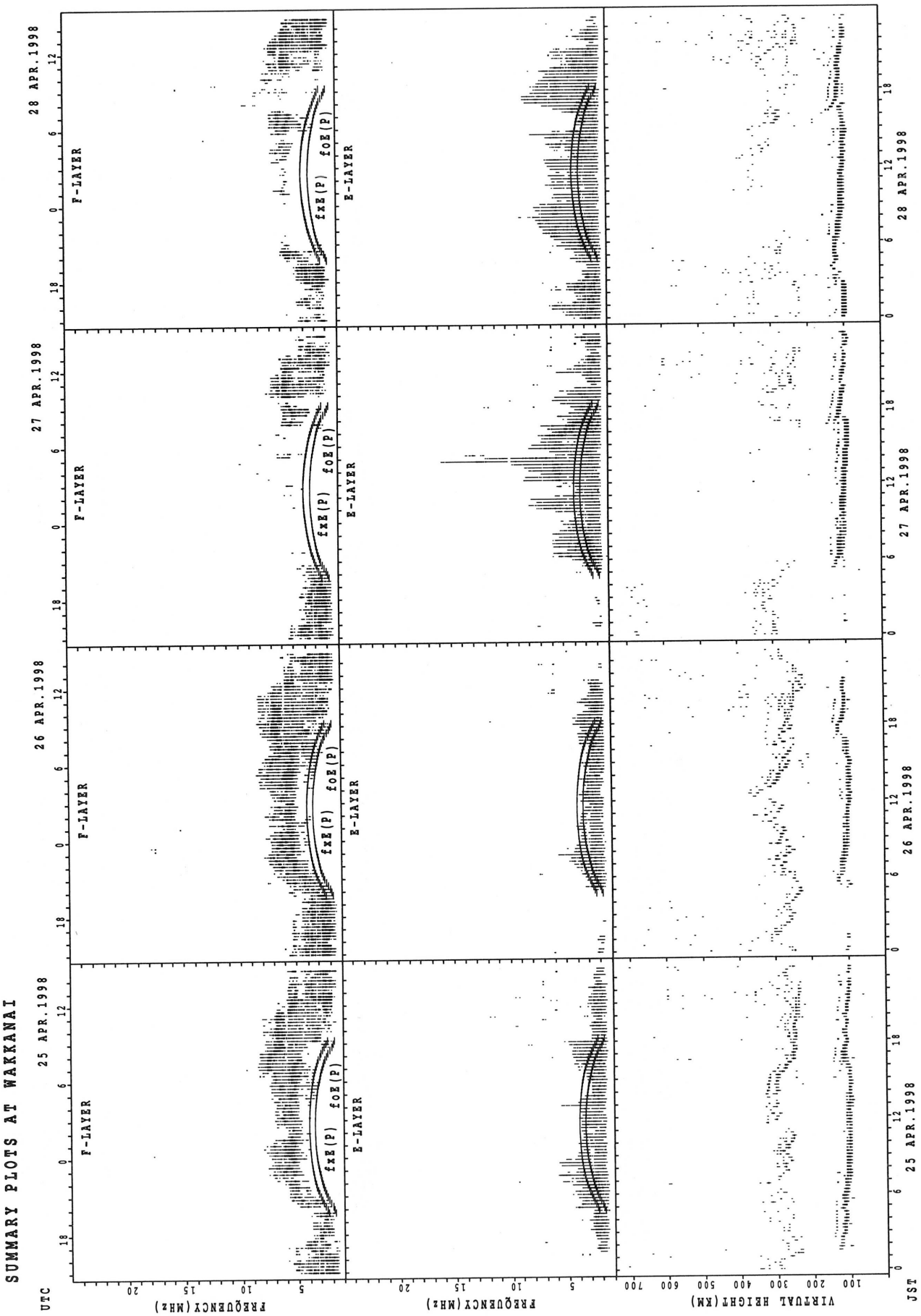
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
17 APR.1998
18 APR.1998
19 APR.1998
20 APR.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

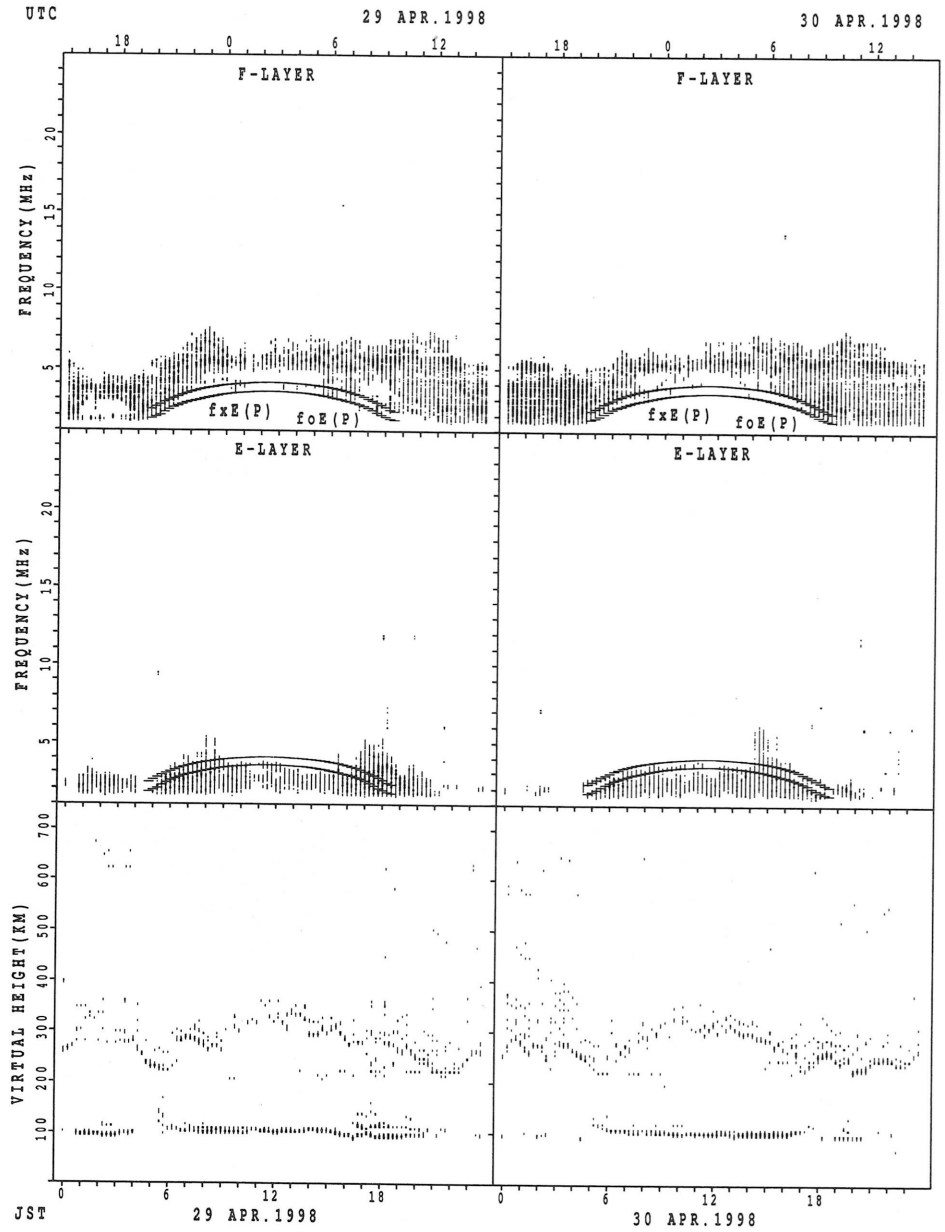
SUMMARY PLOTS AT WAKKANAI



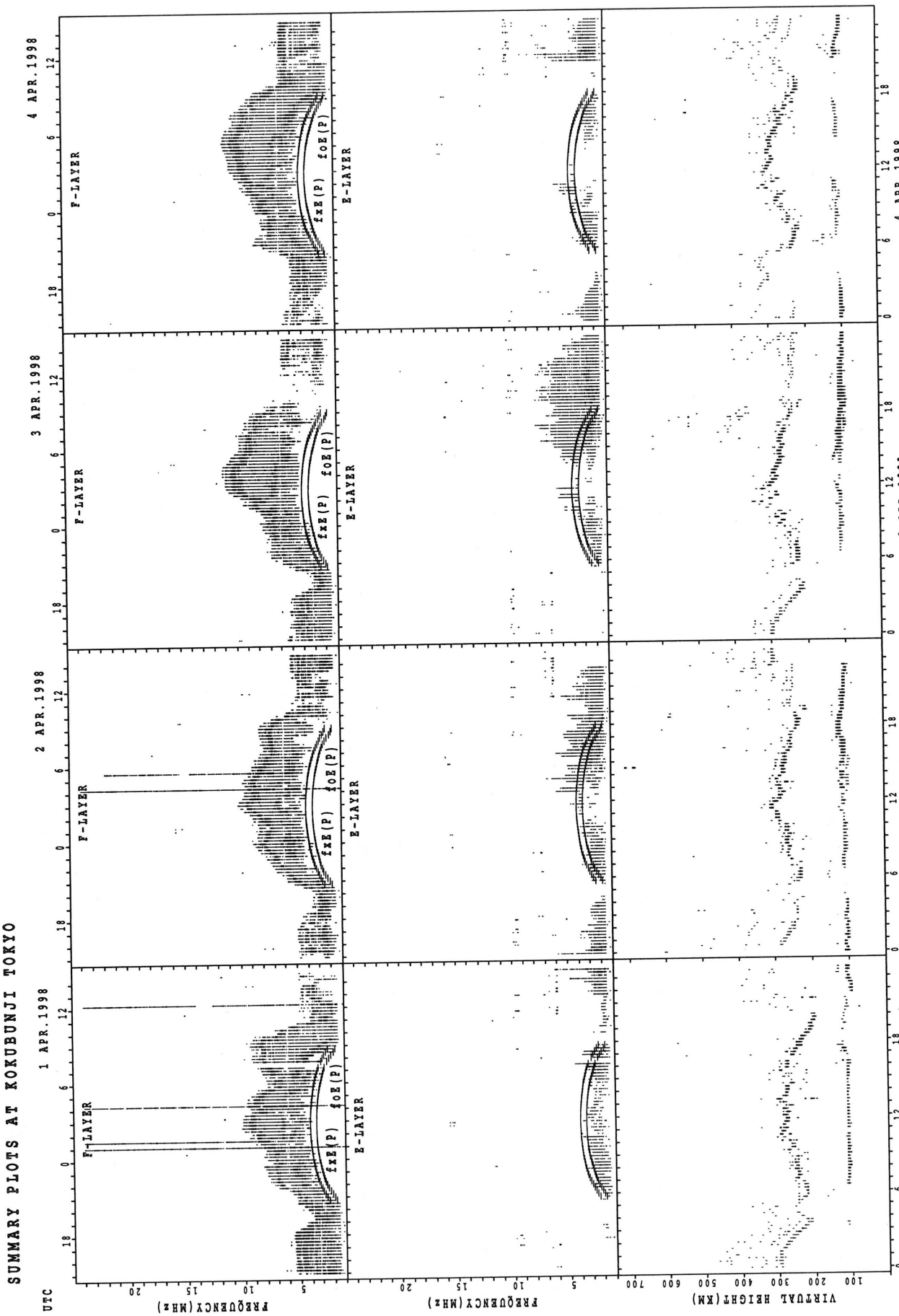
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
25 APR.1998
26 APR.1998
27 APR.1998
28 APR.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

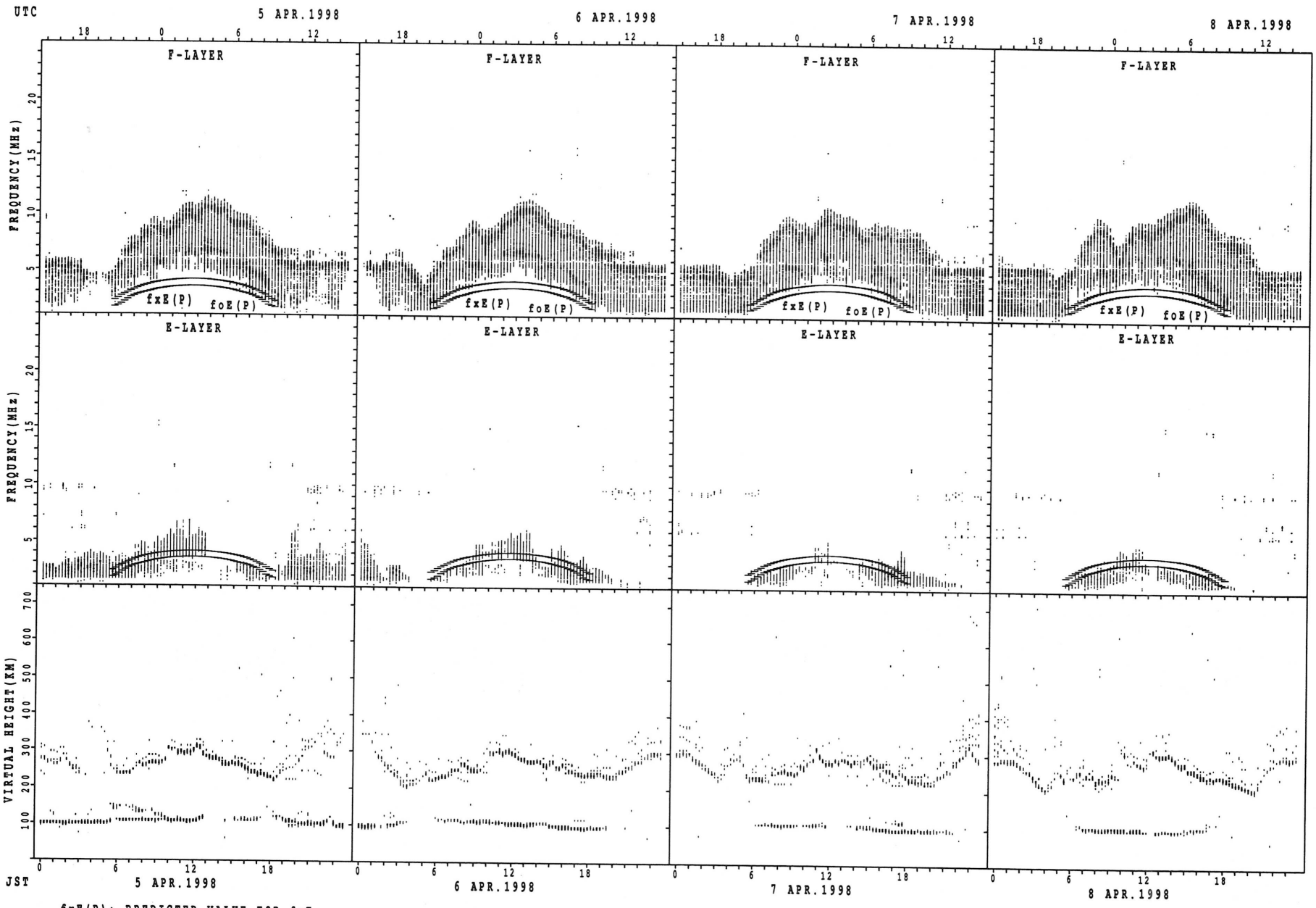
SUMMARY PLOTS AT WAKKANAI



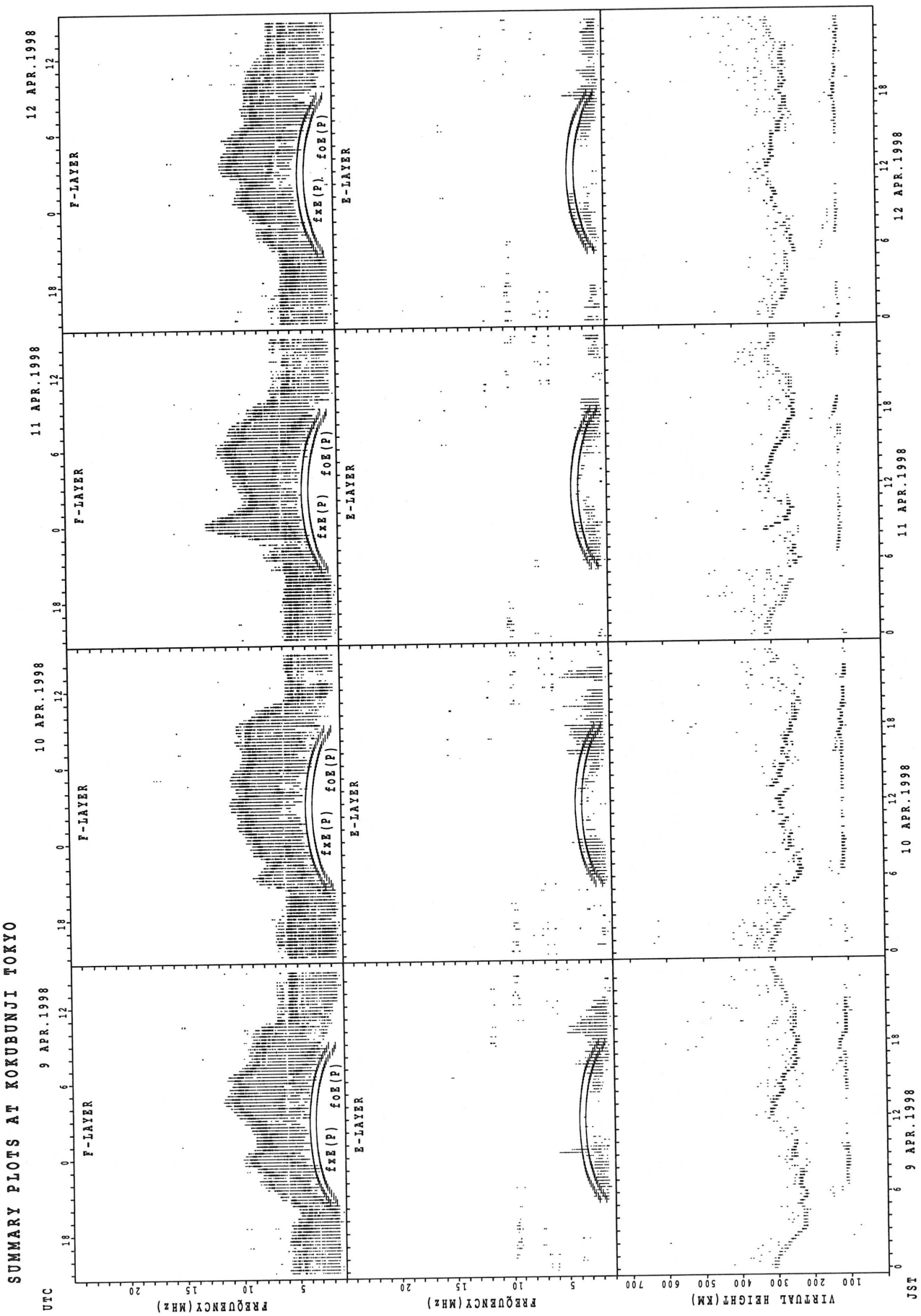
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
1 APR.1998
2 APR.1998
3 APR.1998
4 APR.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

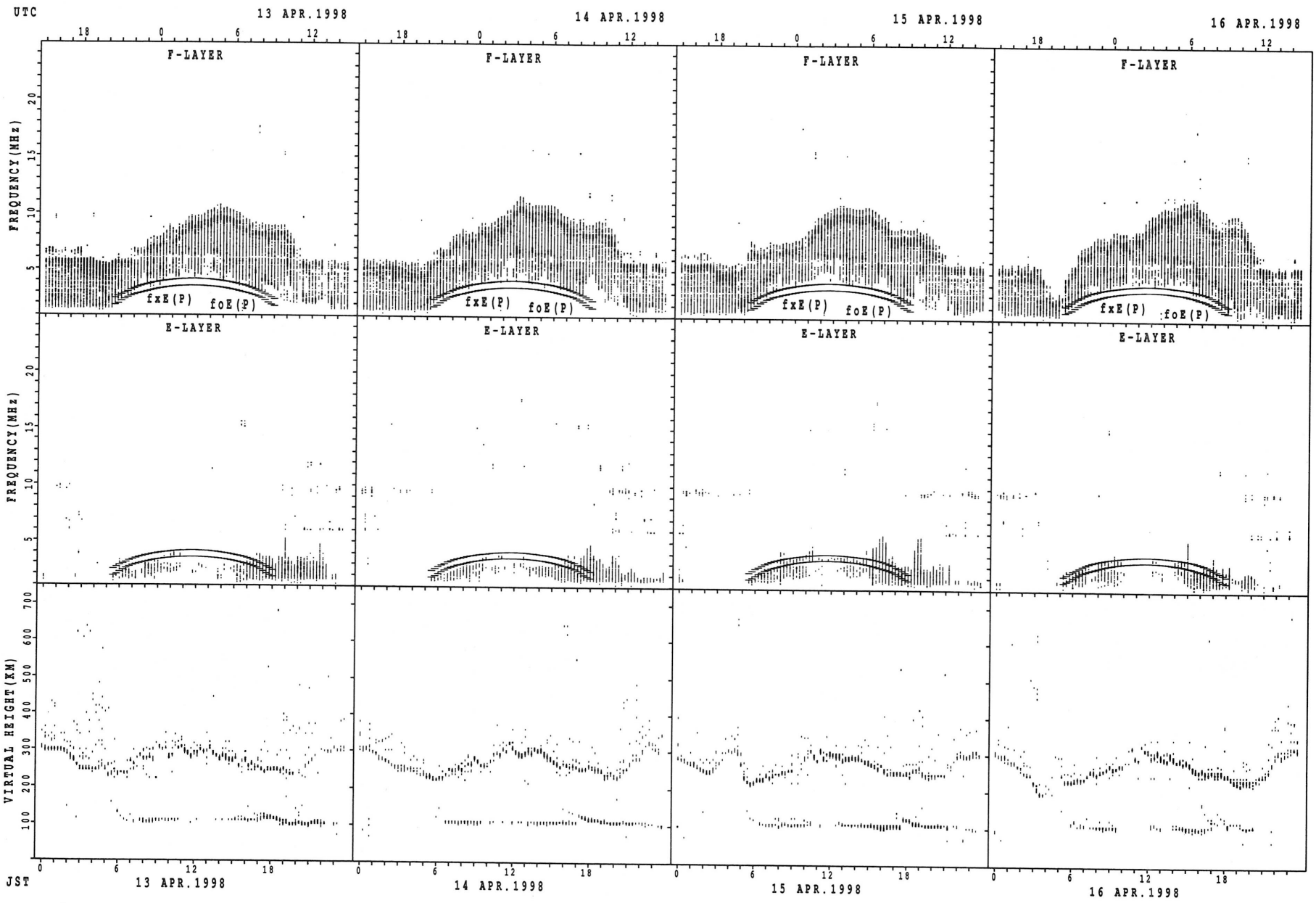
SUMMARY PLOTS AT KOKUBUNJI TOKYO



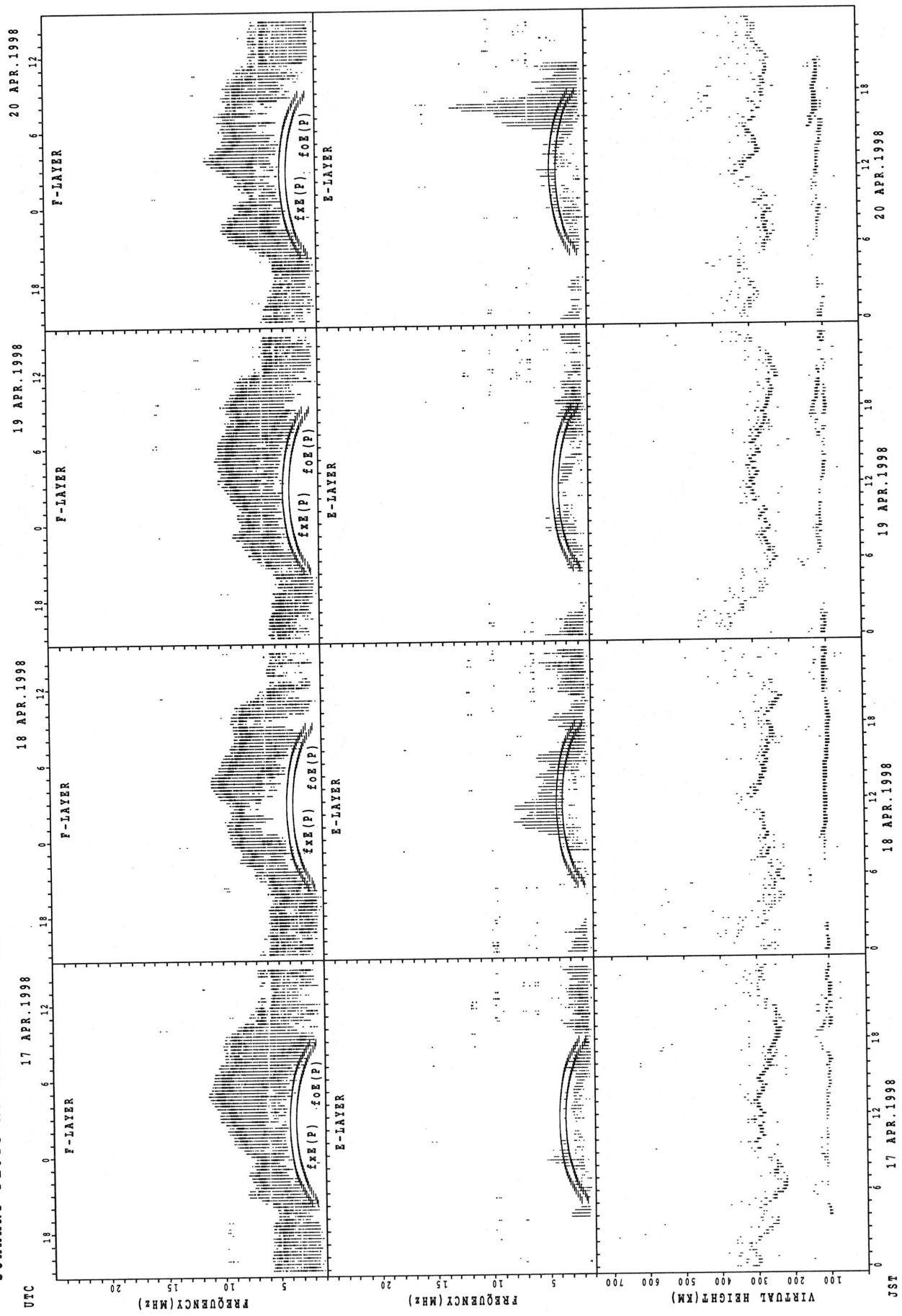
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
9 APR.1998
10 APR.1998
11 APR.1998
12 APR.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

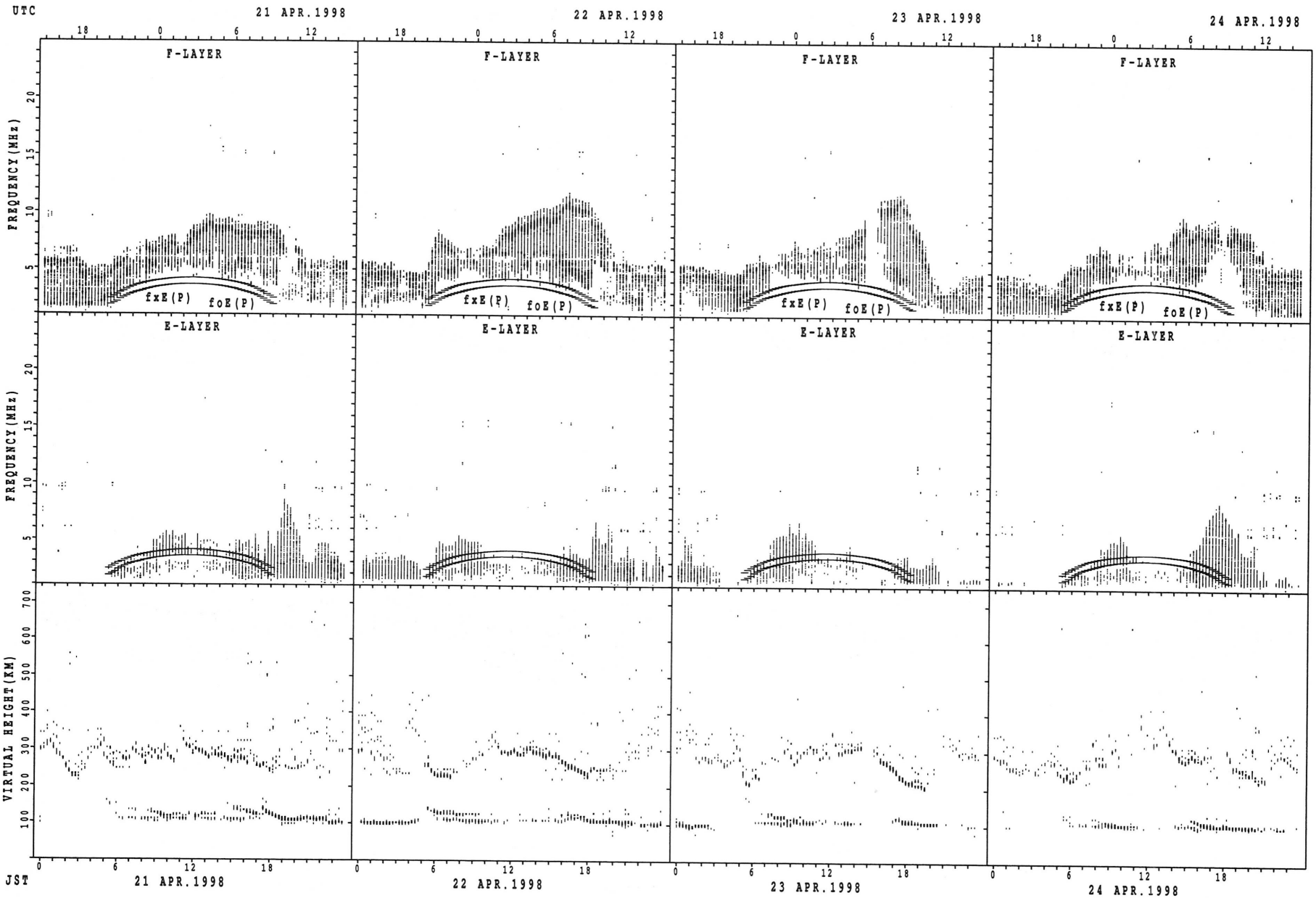
SUMMARY PLOTS AT KOKUBUNJI TOKYO



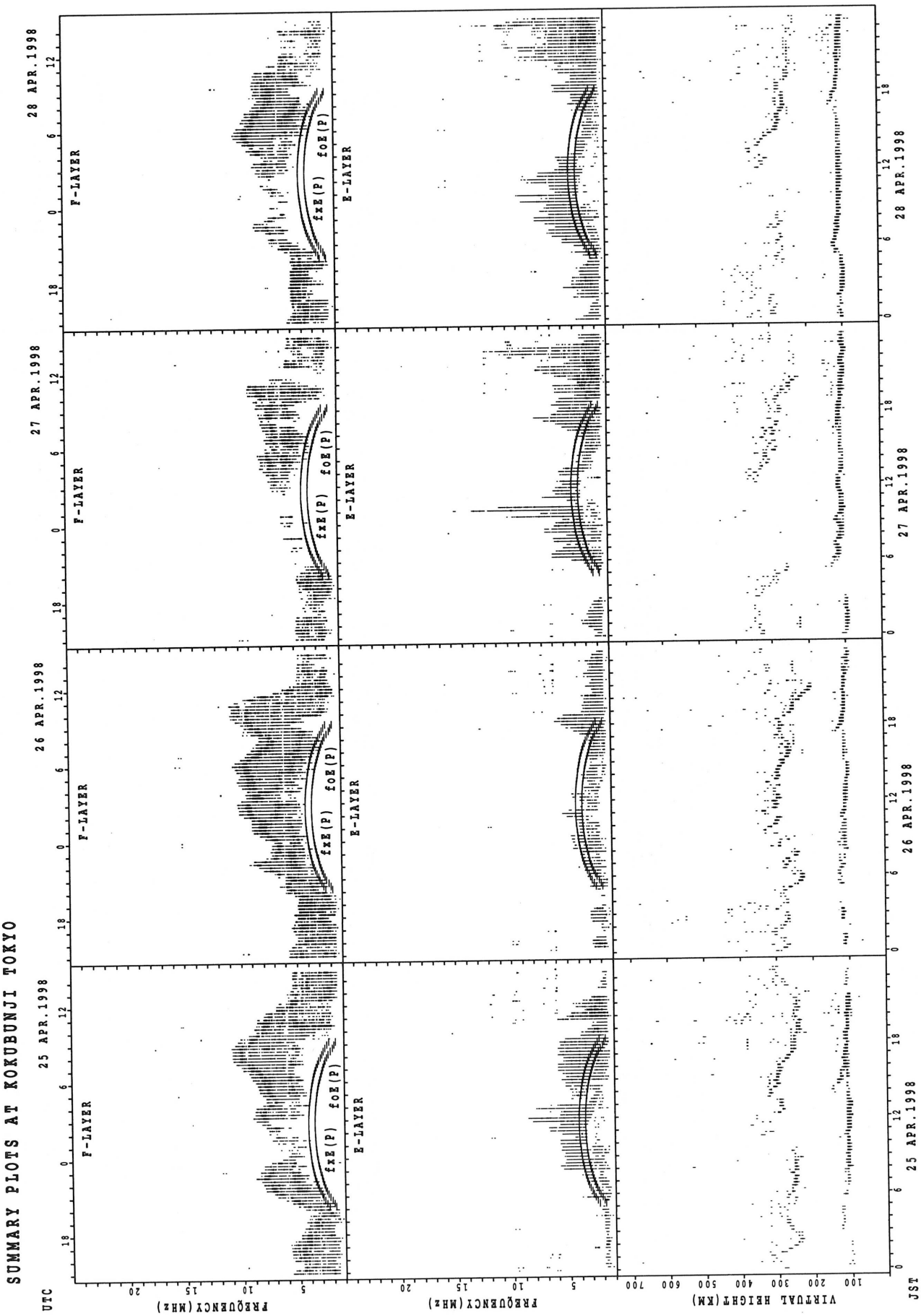
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
17 APR.1998
18 APR.1998
19 APR.1998
20 APR.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

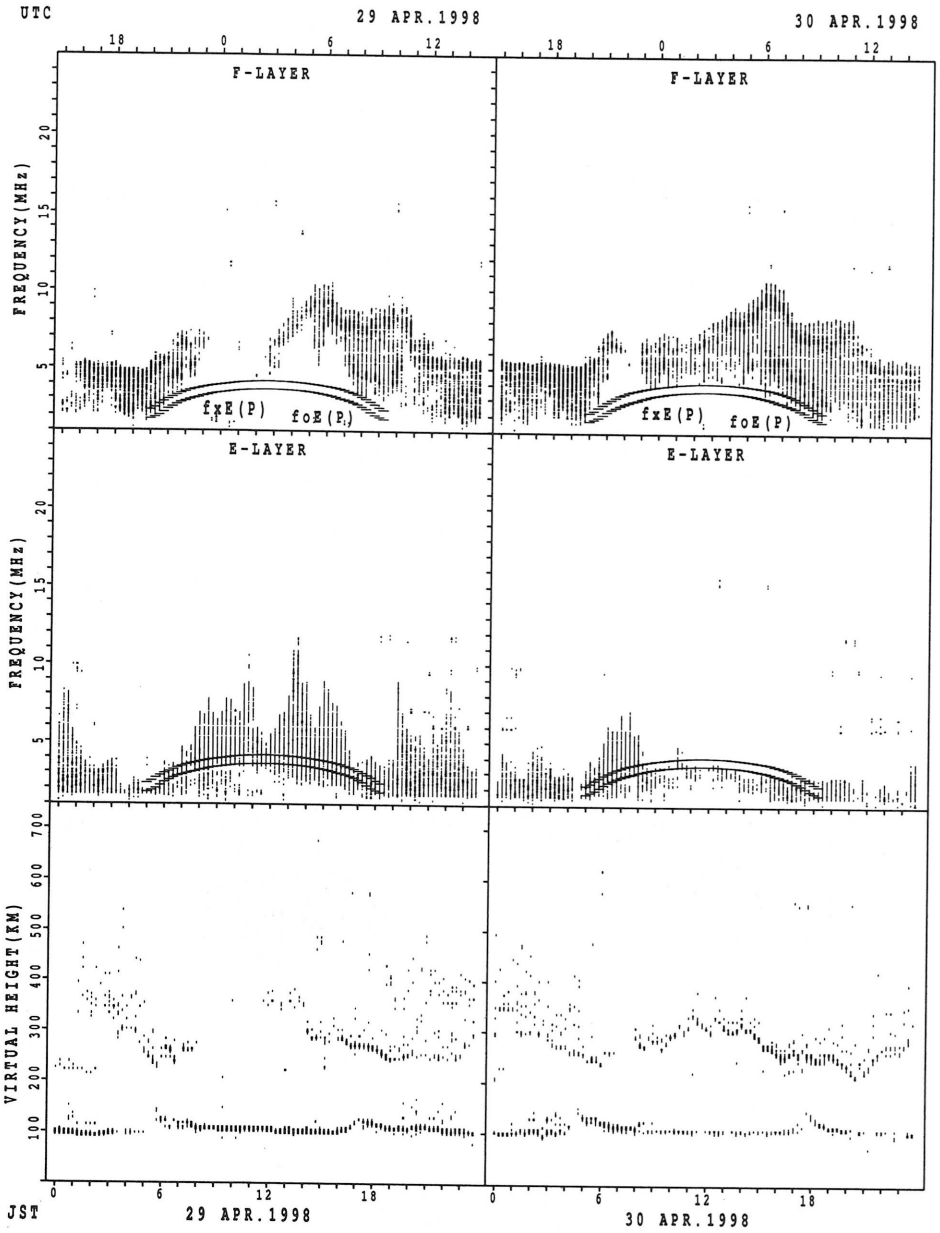
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

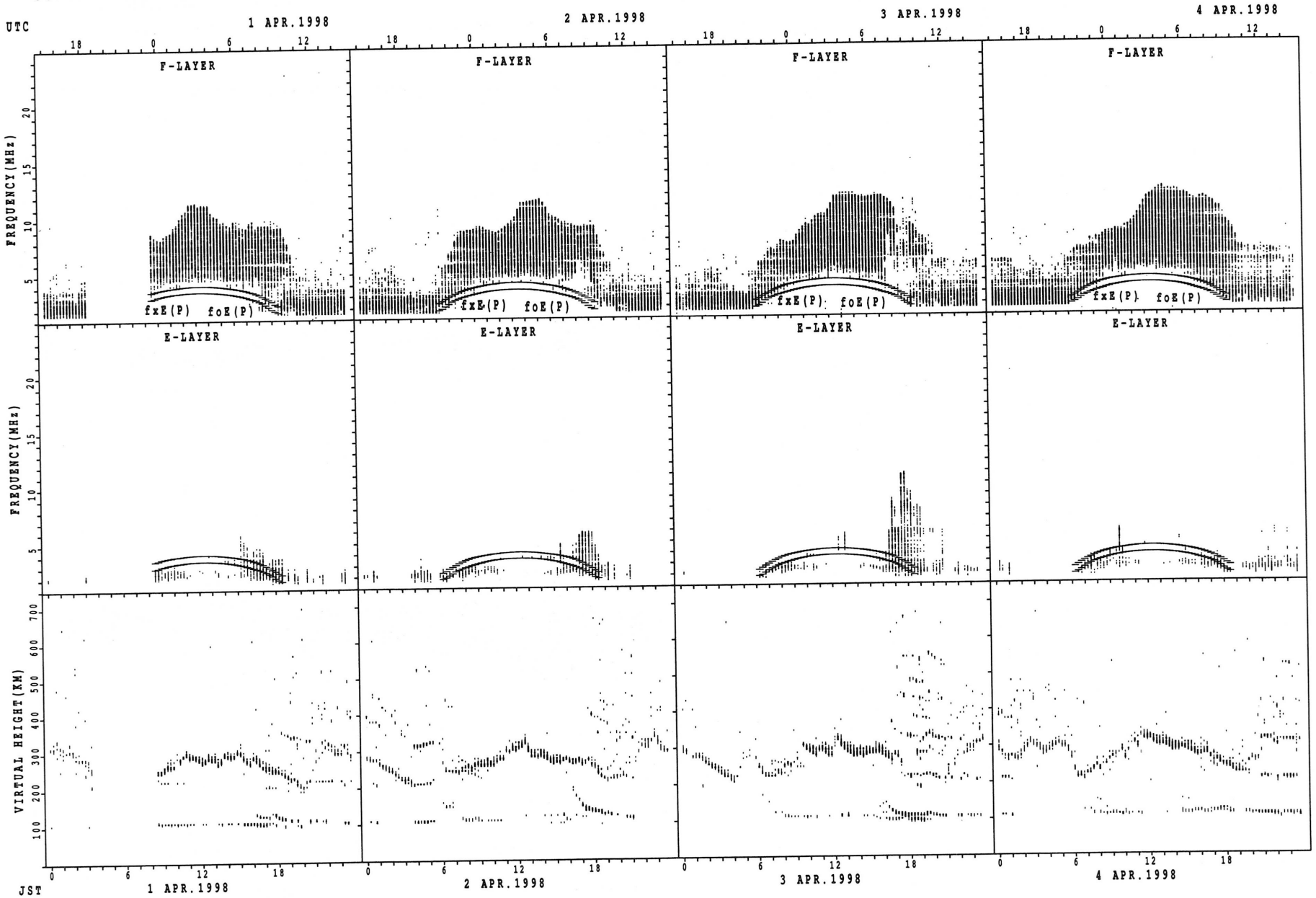

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
25 APR.1998
26 APR.1998
27 APR.1998
28 APR.1998
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) foE(P)
fxE(P) : PREDICTED VALUE FOR fxE
foE(P) : PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



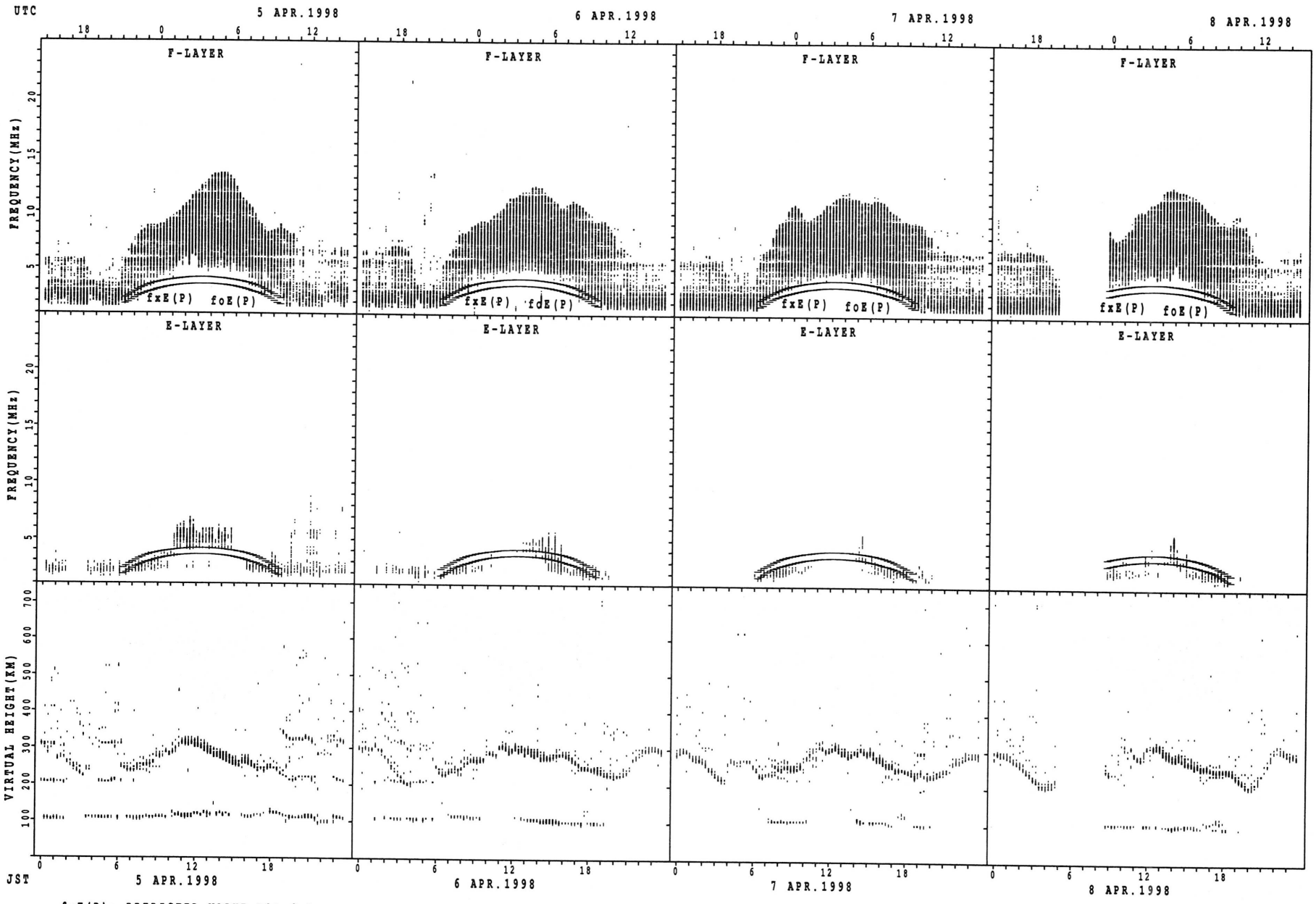
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA

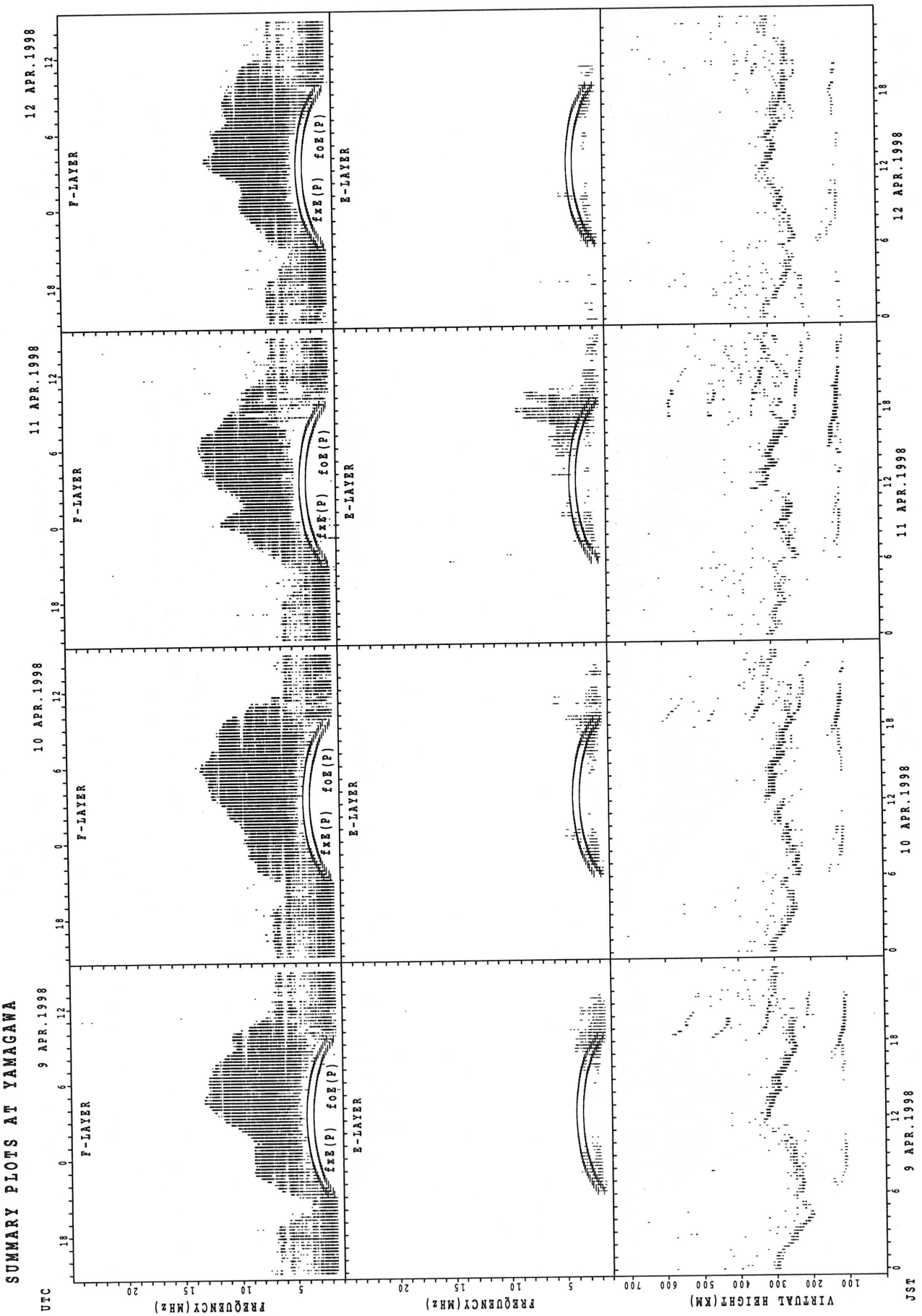


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

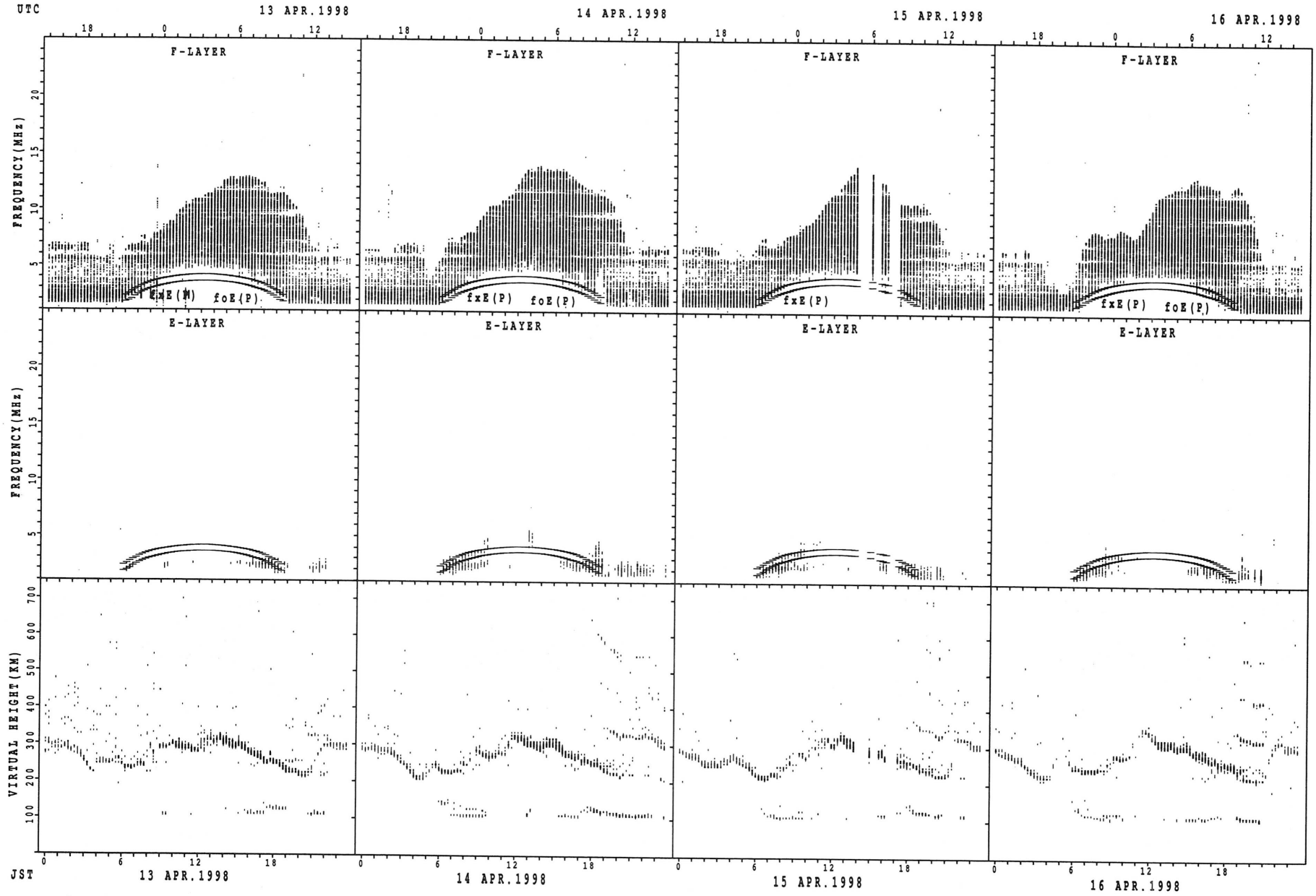
SUMMARY PLOTS AT YAMAGAWA



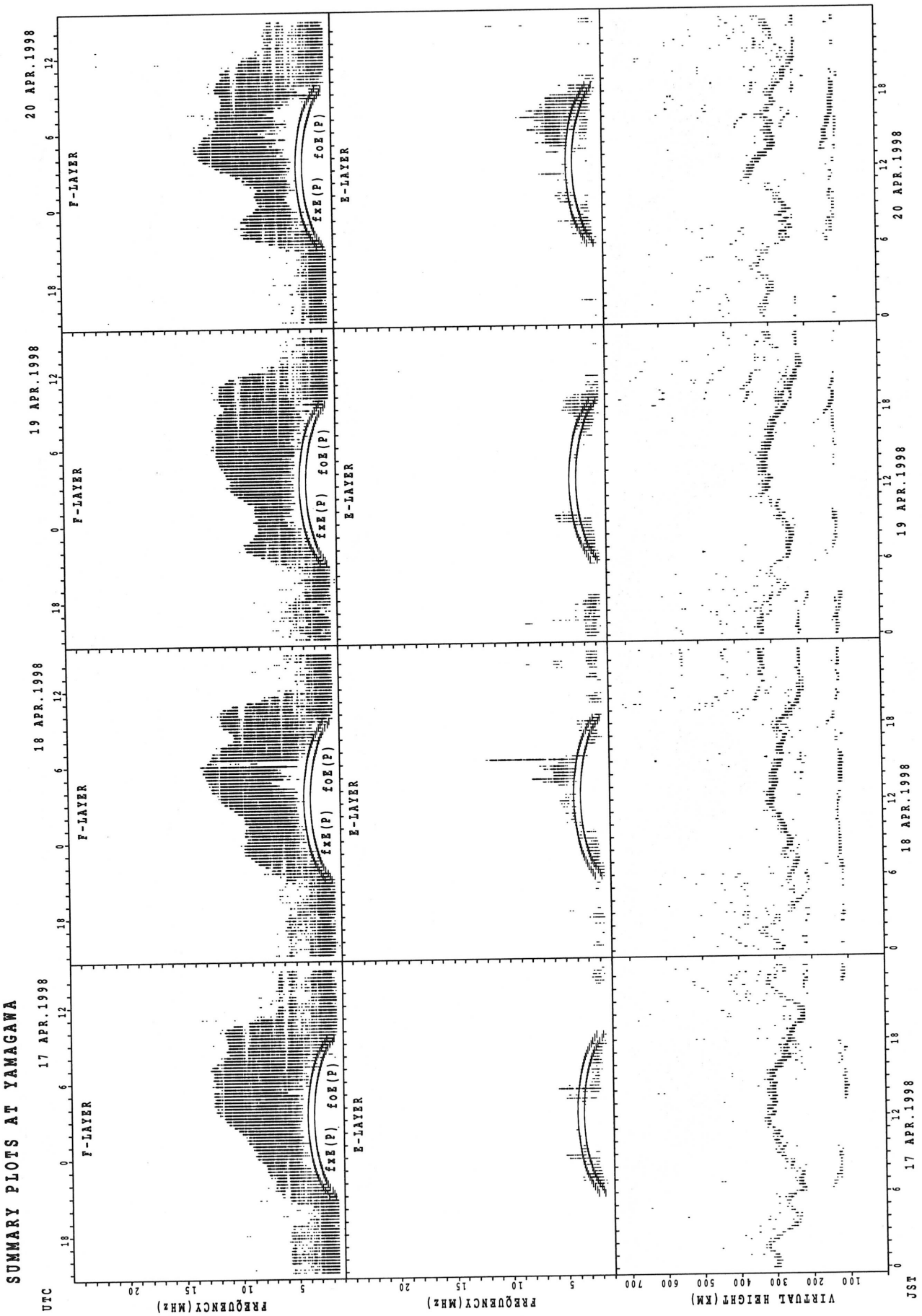
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
9 APR.1998
10 APR.1998
11 APR.1998
12 APR.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

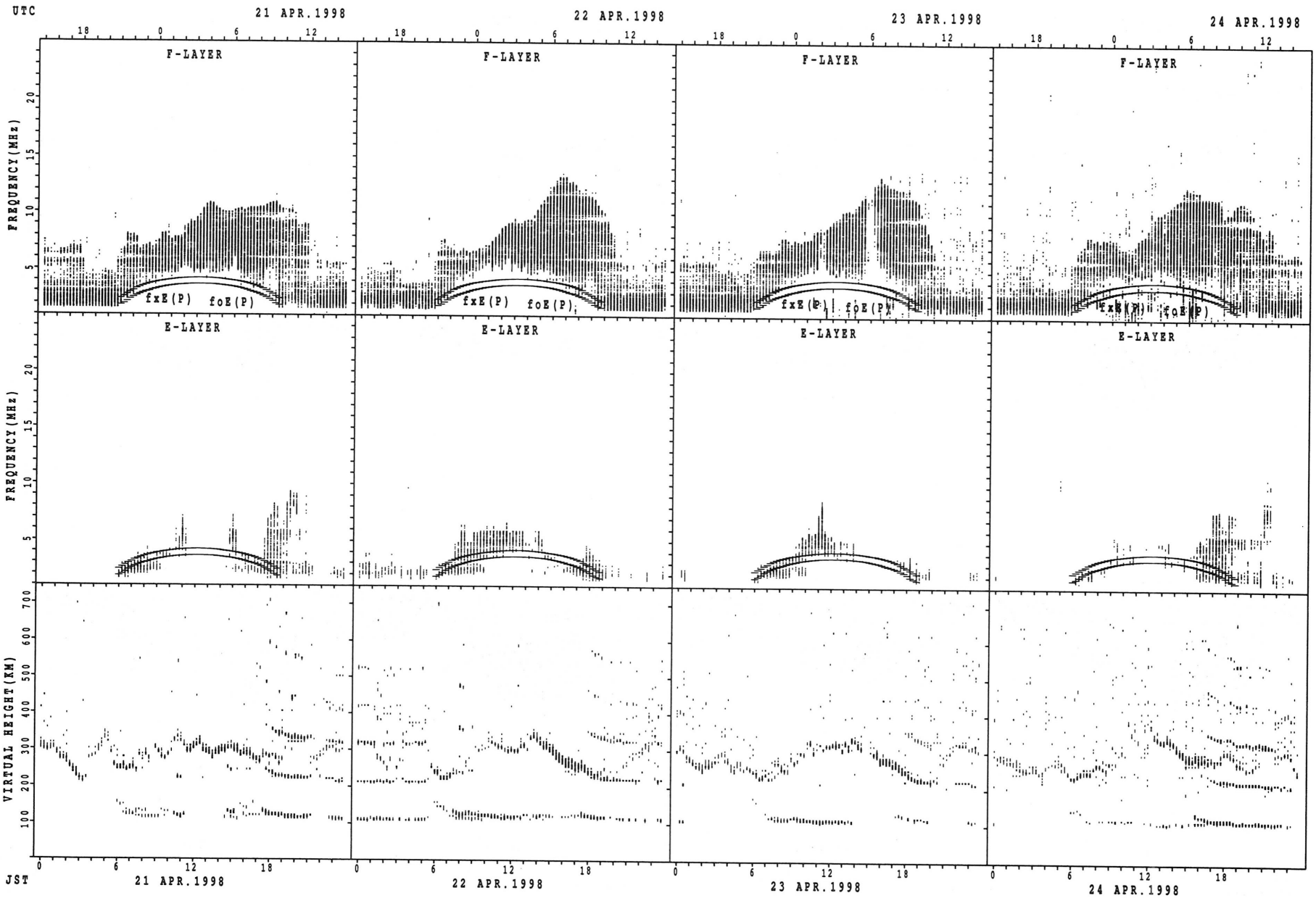
SUMMARY PLOTS AT YAMAGAWA



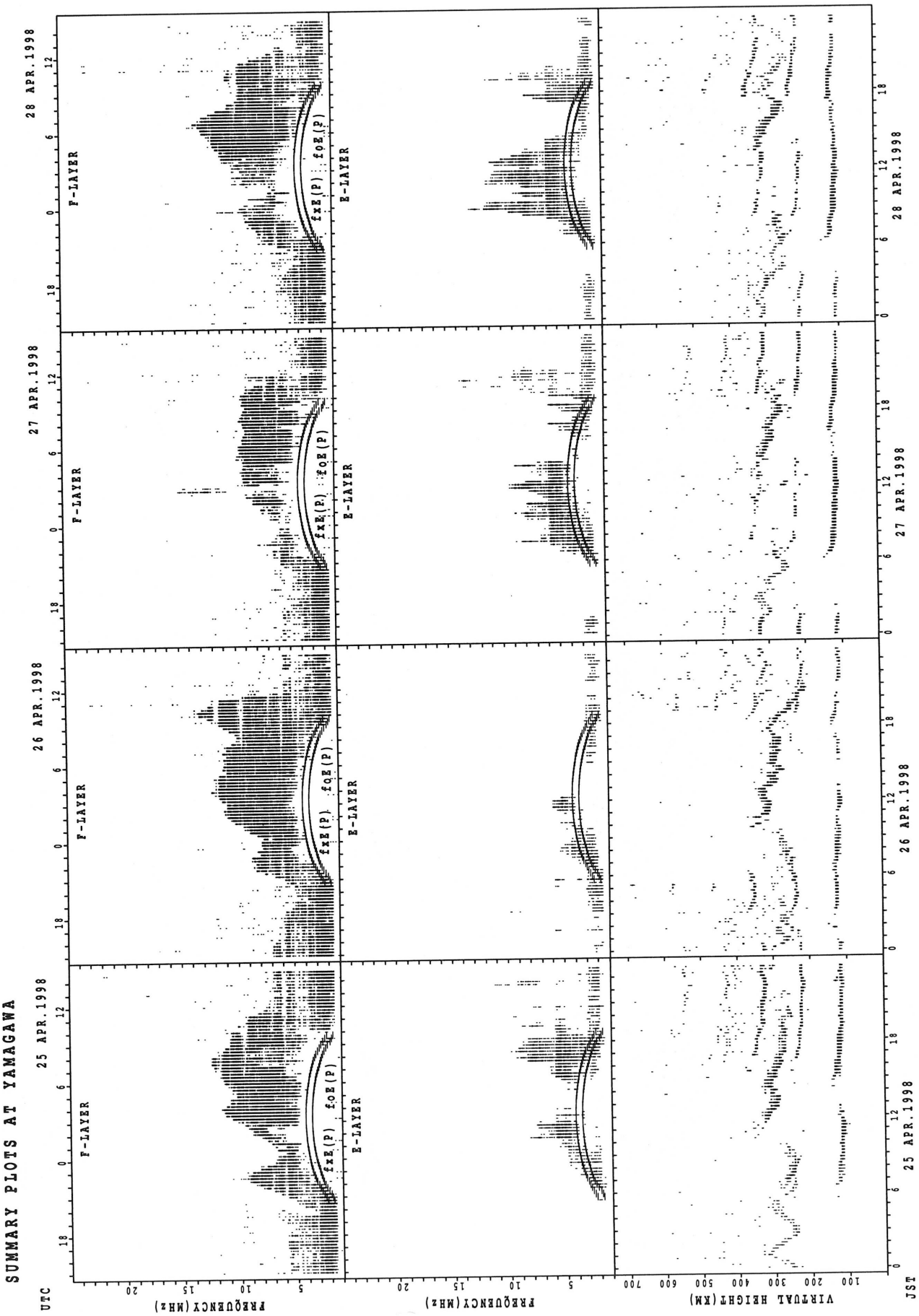
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
17 APR.1998
18 APR.1998
19 APR.1998
20 APR.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

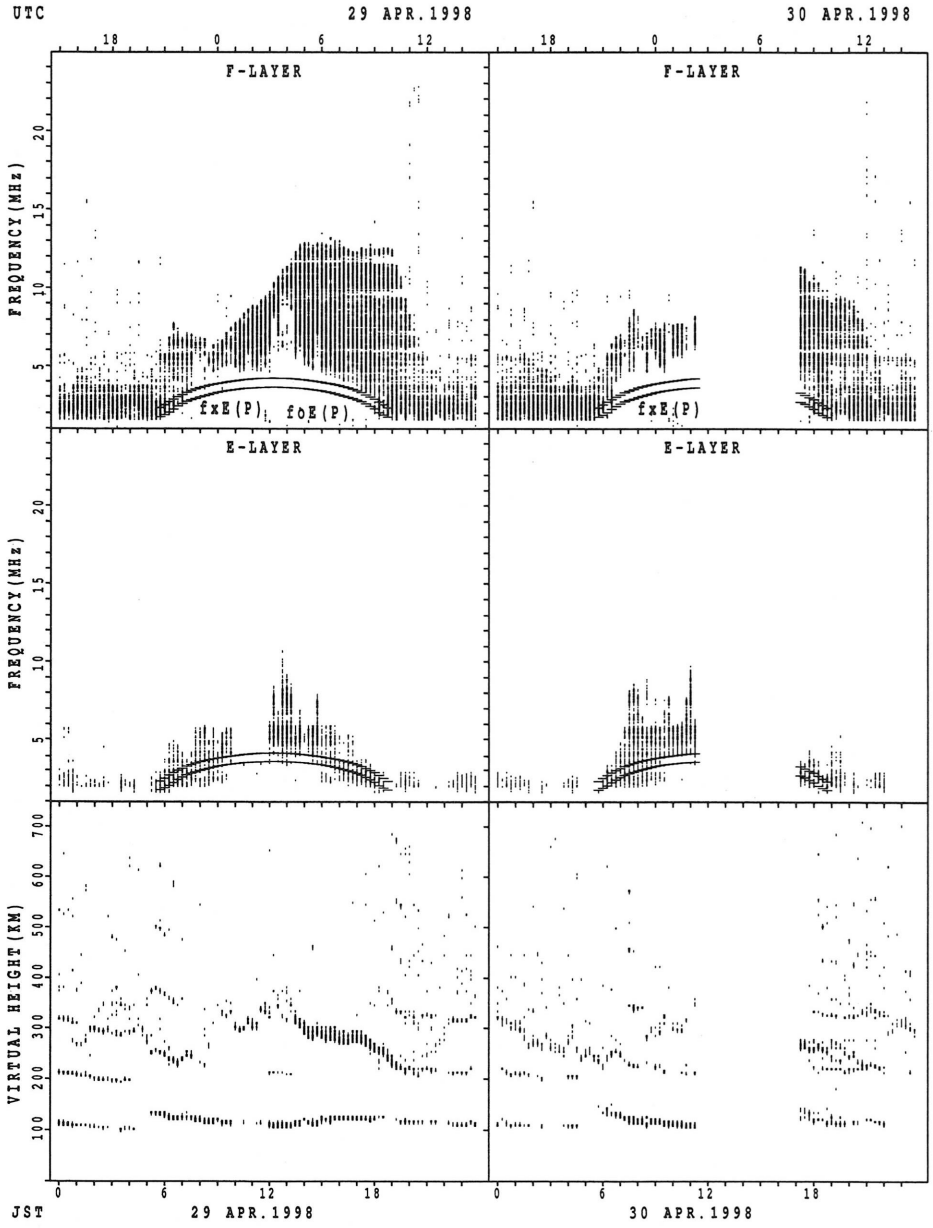
SUMMARY PLOTS AT YAMAGAWA



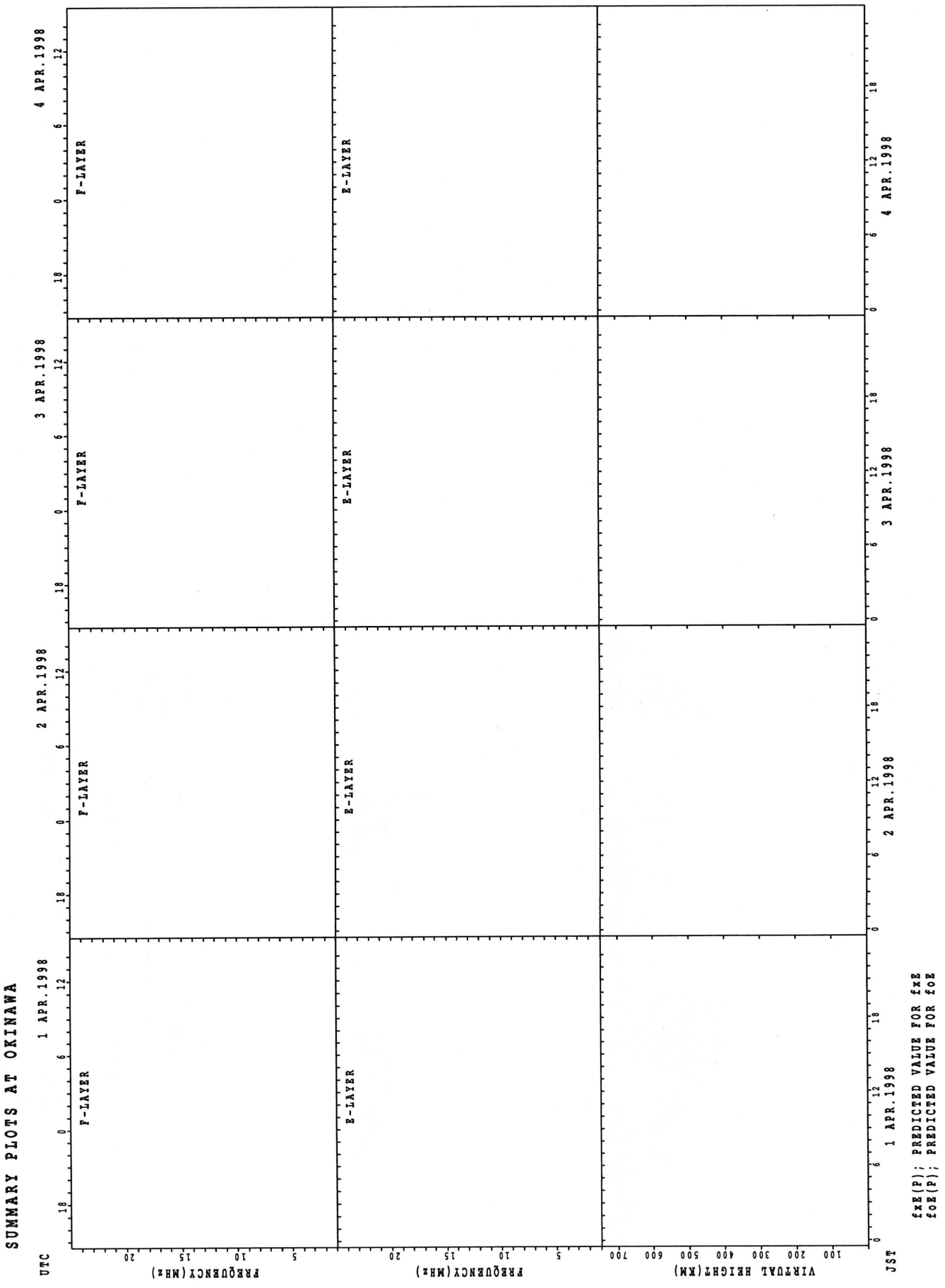
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
25 APR.1998
26 APR.1998
27 APR.1998
28 APR.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

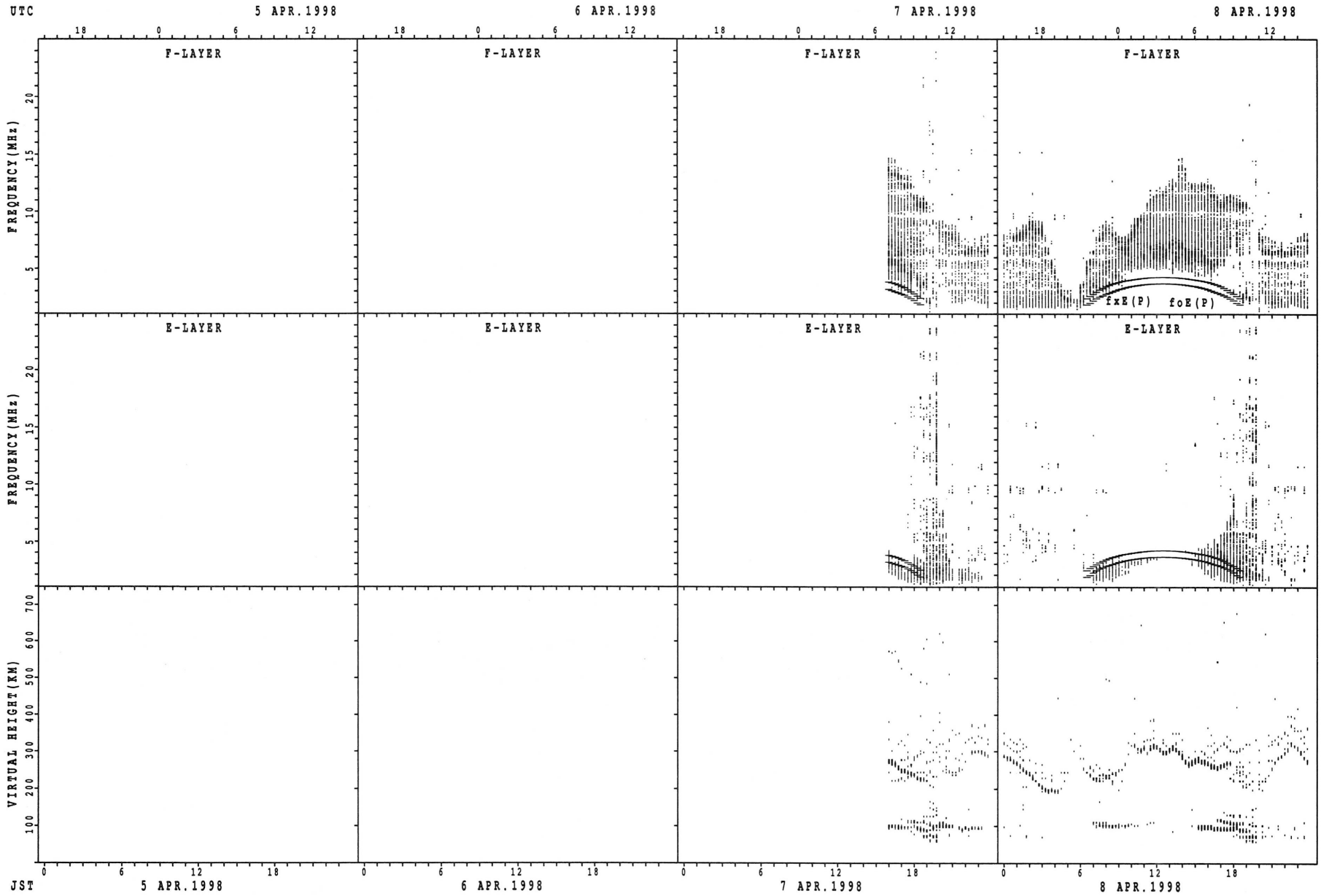
SUMMARY PLOTS AT YAMAGAWA



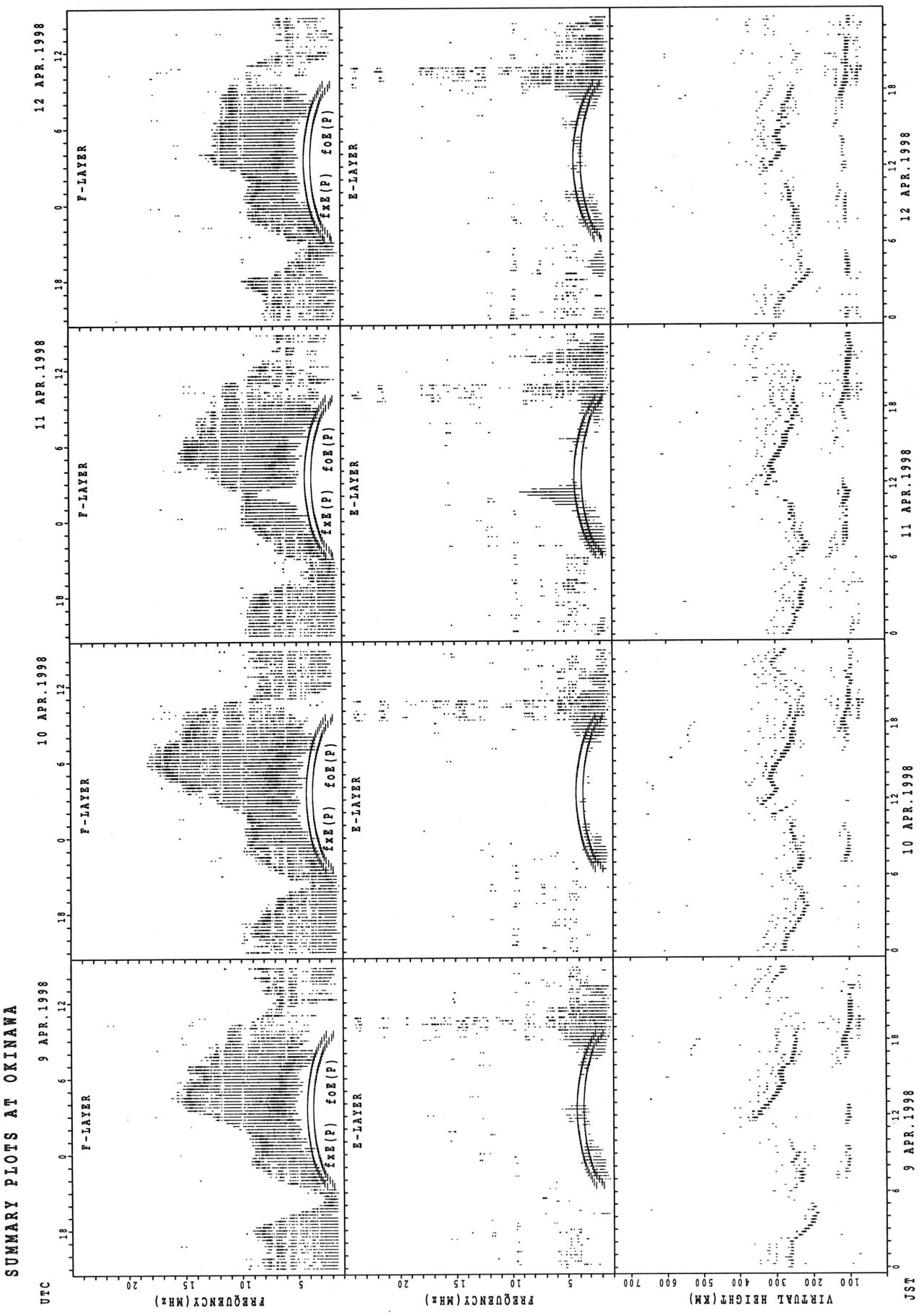
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

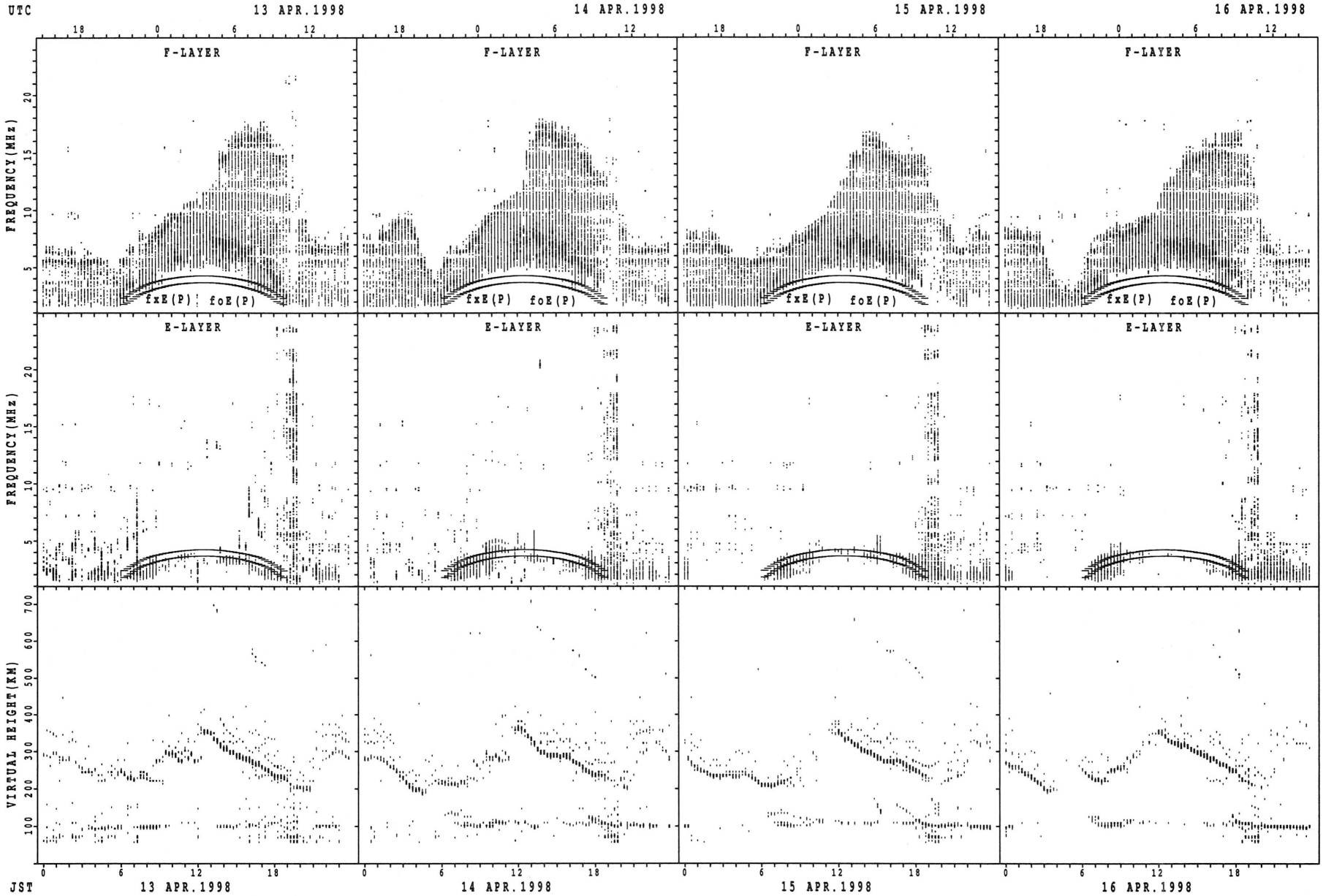
SUMMARY PLOTS AT OKINAWA



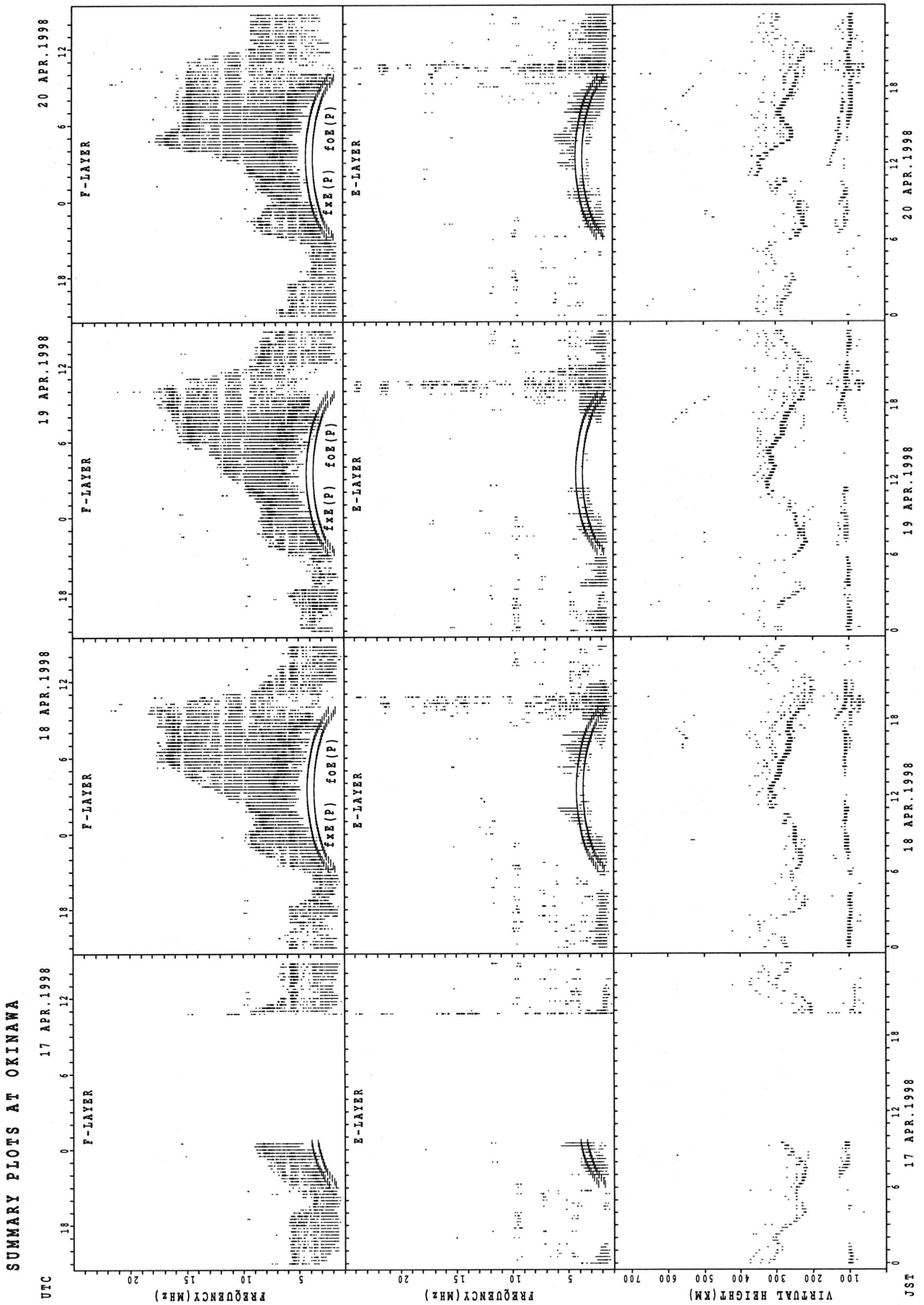
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
9 APR.1998
10 APR.1998
11 APR.1998
12 APR.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

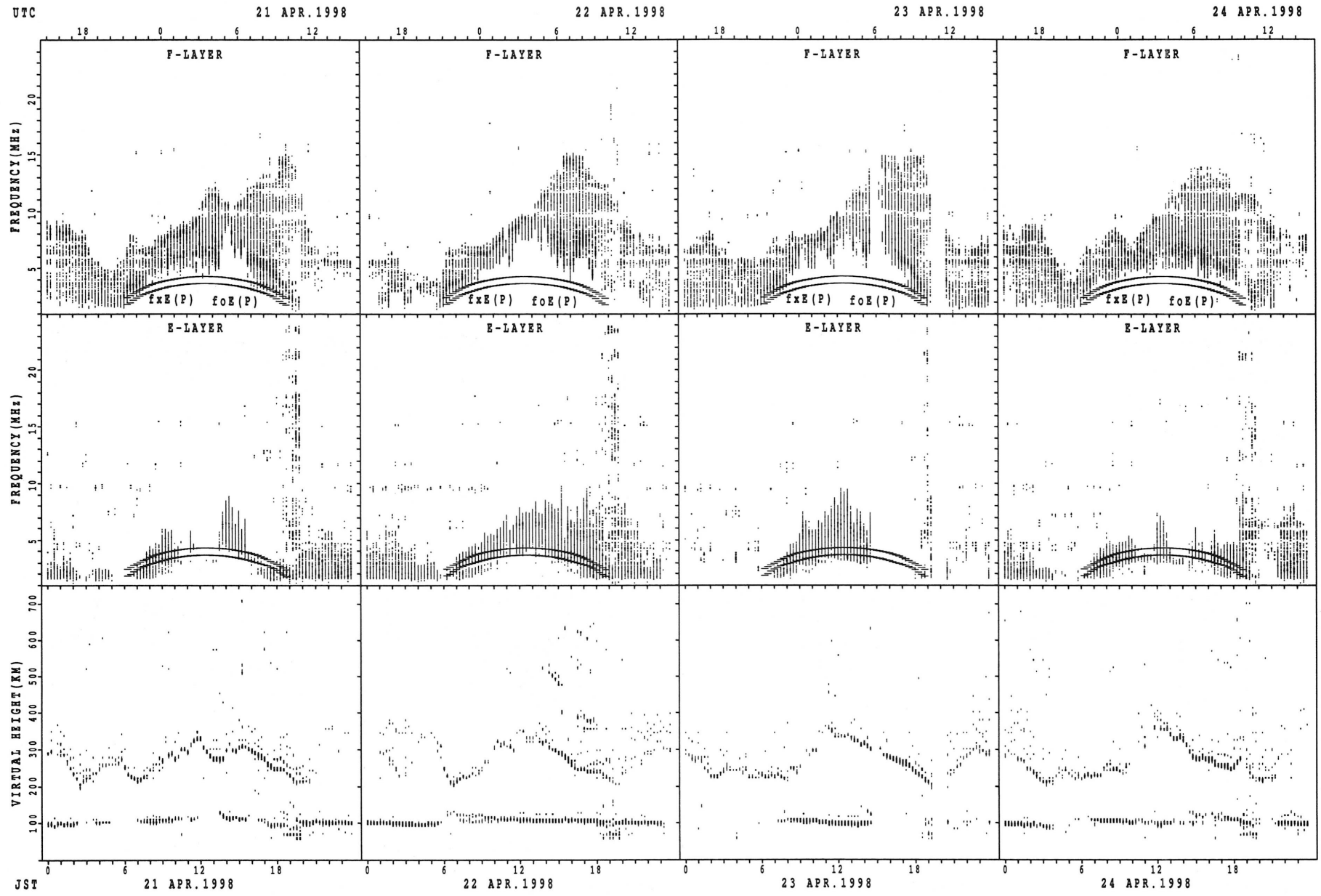
SUMMARY PLOTS AT OKINAWA



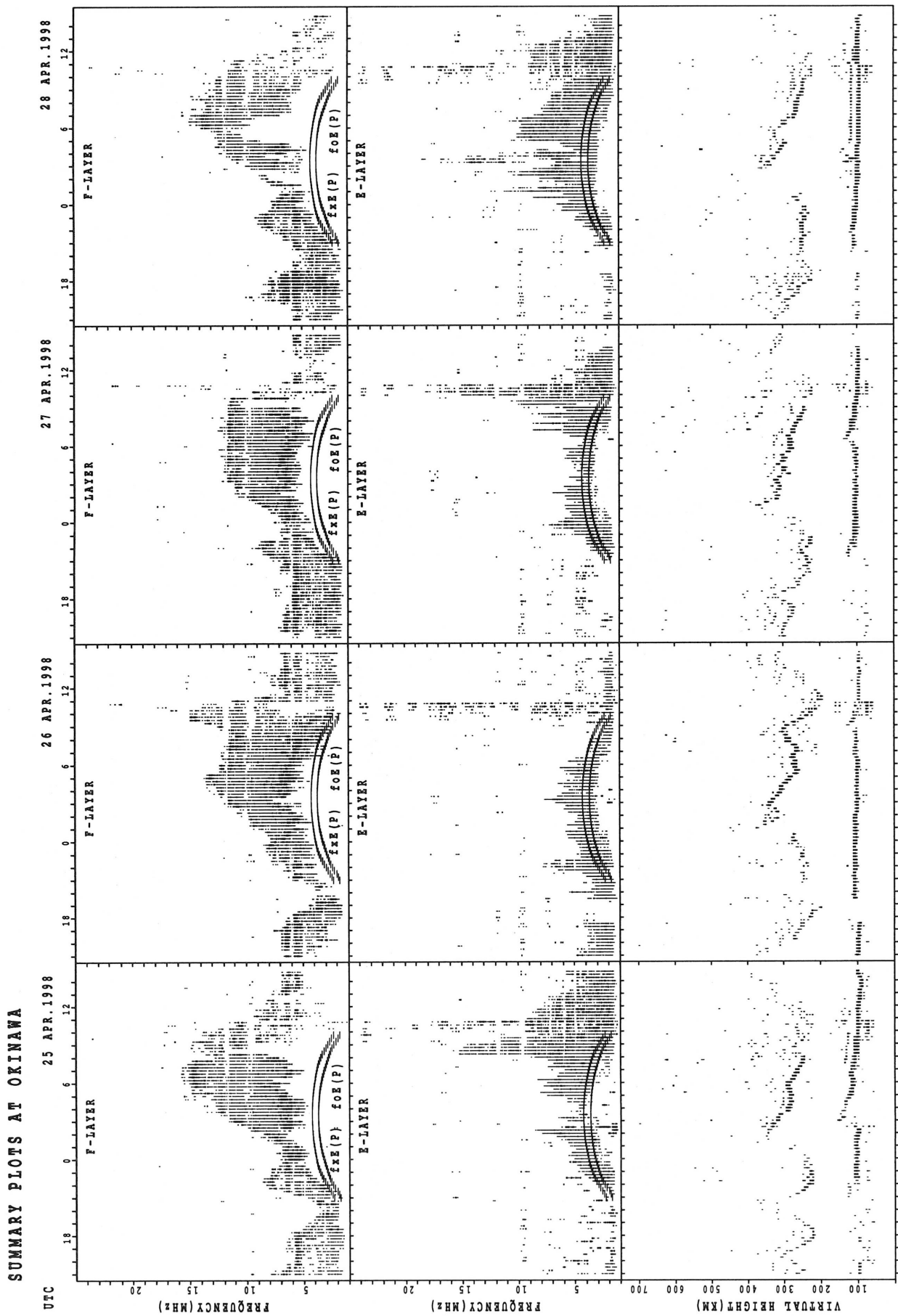
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
JST
17 APR.1998
18 APR.1998
19 APR.1998
20 APR.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

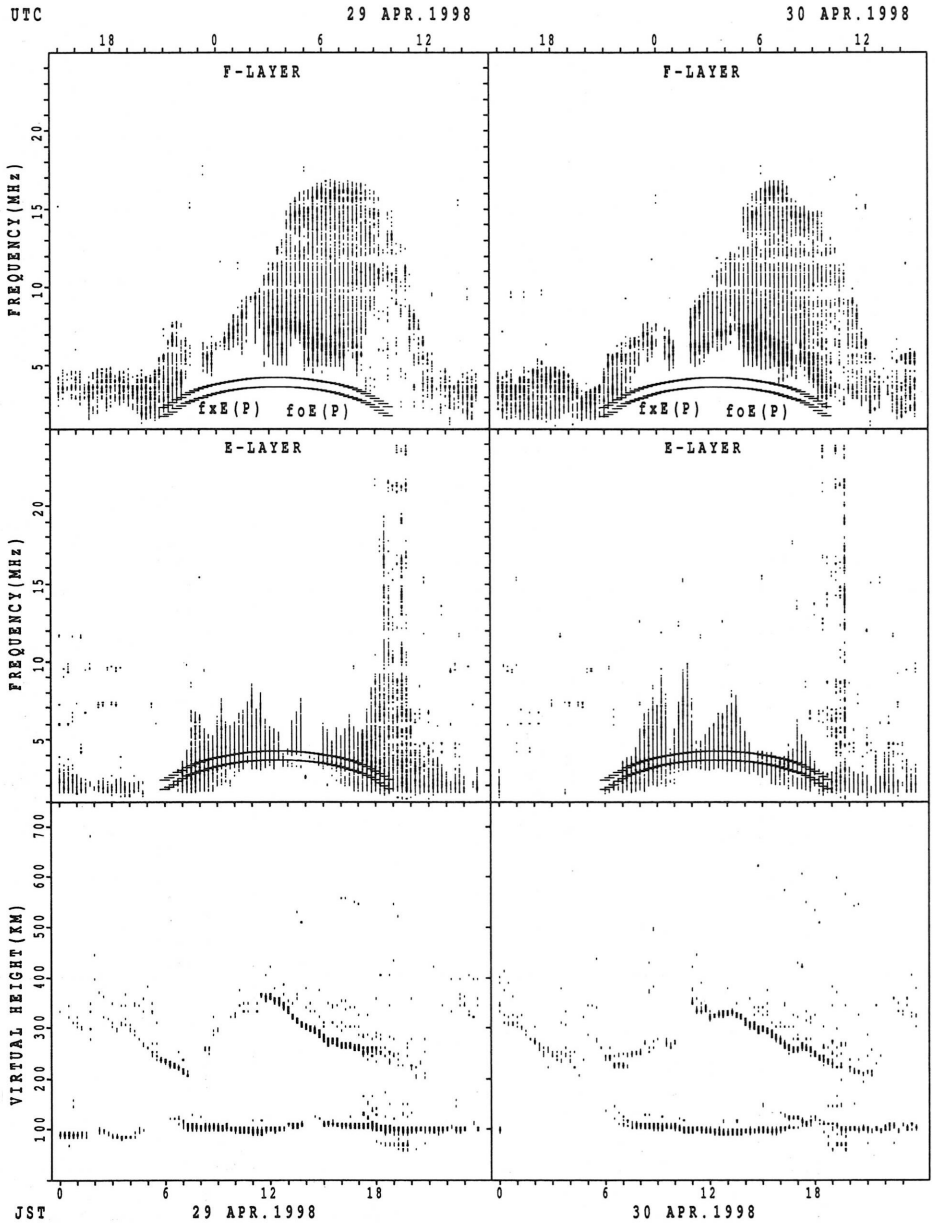
SUMMARY PLOTS AT OKINAWA



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


SUMMARY PLOTS AT OKINAWA
UTC
JST
25 APR.1998
26 APR.1998
27 APR.1998
28 APR.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

MONTHLY MEDIANS OF h'F AND h'Es

APR. 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								16									26	20	21	22	17			
MED								270									280	270	272	298	310			
U Q								301									290	280	286	306	340			
L Q								256									266	264	256	266	290			

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							14	10	10		11							18	29	24	19	12		
MED							119	116	113		109							119	113	109	113	111		
U Q							143	117	119		115							127	122	114	115	113		
L Q							115	107	109		107							109	103	97	111	109		

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								20	17								28	30	28	23	15			
MED								268	264								272	264	265	264	276			
U Q								281	276								278	280	280	280	284			
L Q								255	254								264	256	257	256	264			

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12	15	10				16		12	14	15	13					14	21	24	24	22	16	14	14
MED	105	103	103				133		115	119	113	111					116	119	119	112	111	111	106	105
U Q	107	105	107				150		122	121	119	113					125	125	122	115	113	113	107	107
L Q	103	101	103				126		111	115	111	107					103	113	113	109	107	106	103	103

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								21	24								29	28	30	30	18			
MED								260	259								278	267	256	256	256			
U Q								273	268								286	274	264	262	266			
L Q								247	250								271	261	250	242	242			

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								11	11	14	10			10				10	26	21	16	15	12	11
MED								129	121	121	121			115				125	126	121	118	115	115	115
U Q								137	125	125	125			119				127	131	123	121	119	116	117
L Q								121	121	117	115			113				119	121	116	114	113	112	113

MONTHLY MEDIANS OF h'F AND h'Es

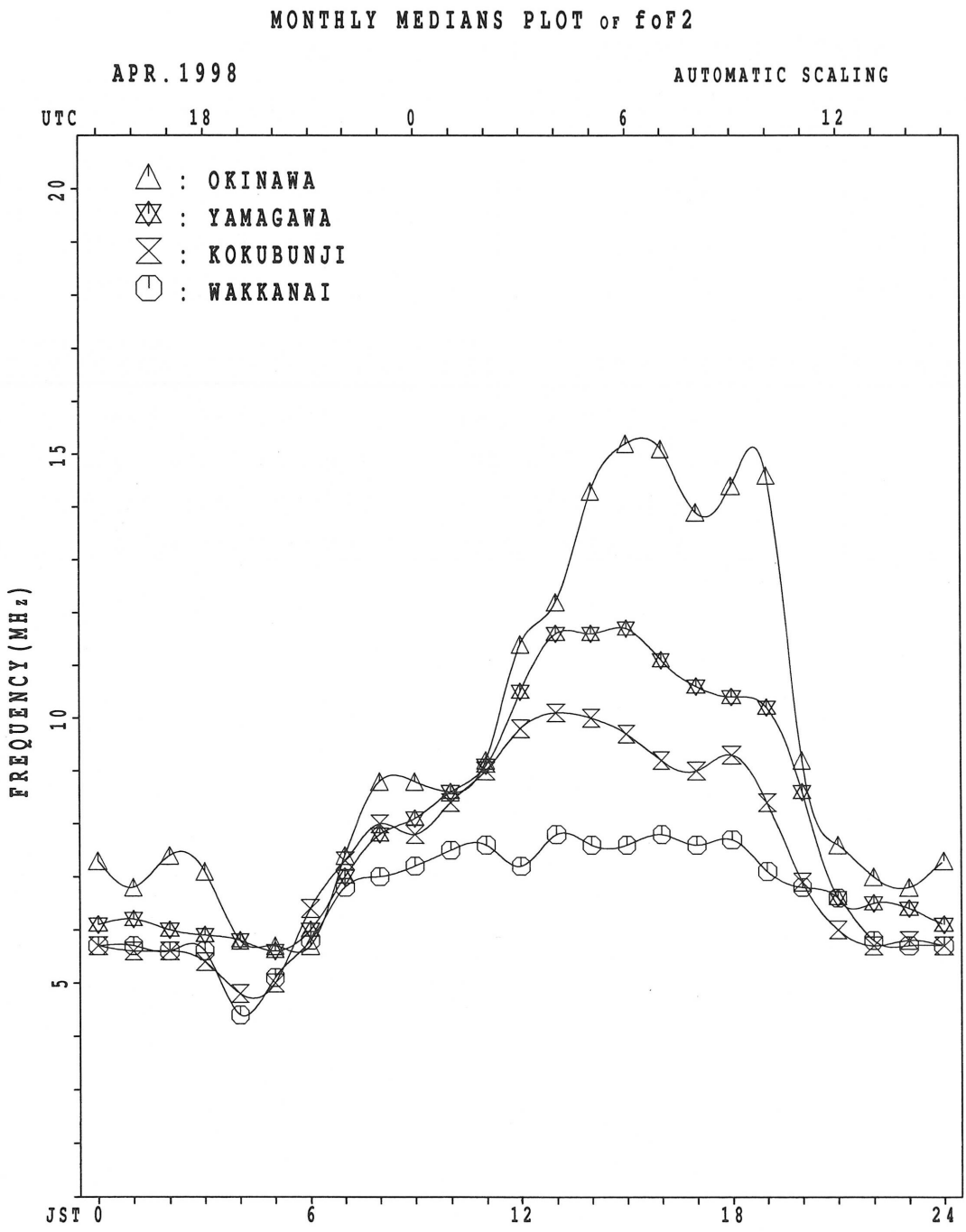
APR. 1998 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

h'F STATION OKINAWA LAT. 26.3N LON. 127.8E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	11	11	13	11				16	17								18	22	22	20	20	11		
MED	330	318	274	262				240	248								272	261	246	237	232	280		
U Q	342	334	292	380				256	254								278	266	256	264	249	330		
L Q	312	304	259	234				233	238								266	256	242	230	223	262		

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	13							15	18	16	14	12	14			13	13	13	20	19	18	17	18	13
MED	99							119	110	107	109	104	107			111	113	115	115	101	103	101	98	97
U Q	103							125	113	112	113	107	113			122	137	124	119	111	105	104	105	102
L Q	98							109	105	105	107	100	99			104	100	107	110	95	99	98	95	93


MONTHLY MEDIANS PLOT OF foF2
APR. 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

APR. 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	54	56	56	57	45	45														X 78	X 50	X 48	X 49	X 48
2	X 49	X 51	X 51	X 47	X 38	X 38														X 69	X 53	X 50	54	54
3	X 54	X 54	X 53	X 52	X 39	X 39														X 68	X 59	X 59	X 60	X 62
4	X 59	X 56	X 50	X 50	X 50	X 50														X 67	X 65	X 63	X 68	X 66
5	X 64	X 62	X 64	X 55	X 48	X 49														X 73	X 69	X 70	X 68	X 69
6	X 67	X 66	X 69	X 71	X 56	X 49														X 78	X 73	X 69	X 67	X 67
7	X 63	X 64	X 62	X 60	X 54	X 56														X 87	X 76	X 70	64	66
8	X 70	67	66	X 68	X 57	54														X 90	X 79	X 63	X 62	X 64
9	X 62	X 62	X 61	X 62	X 56	X 55														X 92	X 77	X 72	X 72	X 71
10	X 69	X 71	X 70	X 68	X 65	X 64														X 92	X 74	X 64	X 64	X 67
11	X 65	X 62	X 61	62	X 59	58														X 80	X 73	X 69	X 72	X 74
12	X 70	X 69	X 70	X 62	X 60															90	89	X 81	72	X 69
13	X 70	X 69	70	64	59															X 88	X 72	X 62	O X 61	X 60
14	X 62	X 62	X 64	X 61	X 58															X 96	X 81	X 69	X 68	X 68
15	X 70	X 68	X 70	X 60	X 58															X 88	X 83	X 68	X 65	X 67
16	X 62	X 64	X 64	X 64	X 44															X 103	X 82	X 70	X 65	X 65
17	X 68	X 64	X 62	X 63	X 57															X 93	X 80	X 74	X 72	X 74
18	X 73	X 61	X 64	X 61	X 59															X 91	X 79	X 62	X 60	X 58
19	X 56	56	54	X 52	X 50															X 94	X 86	X 72	X 62	X 60
20	X 60	X 59	X 56	X 52	X 50															X 88	X 80	X 74	X 72	X 72
21	X 70	X 68	X 74	X 58	X 54															X 80	X 76	X 61	X 62	X 62
22	60	X 58	X 57	X 52	X 49															X 89	X 65	X 58	X 57	X 56
23	57	57	X 56	X 52	X 50															X 84	X 48	X 44	X 46	X 50
24	X 49	X 50	X 49	X 46	X 42															X 92	X 85	X 65	X 62	X 64
25	X 59	X 57	X 59	X 52	X 46															X 96	X 88	X 75	X 58	X 57
26	X 59	X 54	X 54	X 52	X 50															X 110	X 108	X 65	X 50	X 50
27	X 52	X 50	X 47	X 46	47															X 86	91	O X 57	56	56
28	X 53	X 48	52	52	51															X 87	X 75	62	A	63
29	60	54	55	54	50															X 98	X 77	74	X 69	60
30	59	56	56	58	56															X 87	X 84	X 68	X 61	X 61
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	11														30	30	30	29	30
MED	X 61	X 60	X 60	X 58	X 50	X 50														X 88	X 77	X 66	X 62	X 64
U Q	X 68	X 64	X 64	X 62	X 57	X 56														X 92	X 83	X 70	X 68	X 67
L Q	X 57	X 56	X 54	X 52	X 48	X 45														X 80	X 72	X 62	X 59	X 58

APR. 1998 fxI (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 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	F 46	F 49	F 50	F 50	F 38	F 37	52	70	75	77	79	90	98	90	90	76	80	88	90	72	44	42	43	42
2	43	45	45	41	32	32	54	66	74	84	80	84	98	91	92	84	77	78	80	63	47	44	F 45	F 48
3	48	48	47	46	33	33	55	66	69	72	74	90	105	108	102	94	92	87	78	62	53	53	54	56
4	53	50	44	44	44	44	70	72	73	78	82	88	98	101	104	102	96	89	80	61	59	57	62	60
5	58	56	58	49	42	43	63	76	87	91	93	105	104	111	107	96	92	80	70	67	S 63	64	62	R 63
6	61	60	63	65	50	43	62	72	85	90	85	97	107	110	103	92	88	84	76	72	67	63	61	61
7	57	58	56	54	48	50	68	82	94	93	90	100	102	98	90	91	90	88	89	81	70	64	56	F 57
8	64	F 60	F 57	62	51	F 46	R 64	87	99	84	84	96	94	102	109	115	107	93	87	84	73	57	56	58
9	56	56	R 55	56	50	49	64	81	84	97	86	89	97	109	110	108	102	91	91	86	72	66	66	65
10	63	65	64	62	59	58	82	74	85	91	97	98	104	99	104	97	94	100	98	86	68	58	58	62
11	59	56	55	F 54	53	F 50	64	69	88	124	103	92	94	101	105	113	100	99	87	74	67	63	66	68
12	64	63	64	56	54	54	68	75	78	88	94	89	106	106	100	96	84	88	84	F 80	81	75	F 64	63
13	64	63	F 64	F 54	F 51	48	60	68	72	74	81	90	95	98	101	96	91	87	86	82	66	R 56	R 55	54
14	56	56	58	55	52	54	68	76	80	86	89	95	109	107	104	104	94	91	90	90	75	63	62	62
15	64	62	R 64	54	52	58	70	73	72	76	84	95	104	106	103	103	96	86	86	82	78	62	59	61
16	56	58	58	58	38	34	60	72	80	84	83	87	100	108	109	114	104	93	98	97	76	64	59	59
17	62	58	56	57	51	56	77	71	V 71	74	90	93	100	106	110	105	101	95	95	87	74	68	R 66	68
18	67	55	58	55	53	57	63	75	78	90	91	88	94	102	104	96	89	85	86	85	73	56	54	52
19	50	F 50	F 48	46	44	46	62	R 75	84	76	74	85	92	92	99	96	92	86	91	88	80	66	56	54
20	54	53	50	R 46	44	49	75	90	86	78	71	76	93	103	90	88	93	89	88	82	74	68	66	66
21	64	62	68	52	48	49	59	R 63	71	72	76	71	85	94	90	87	85	87	85	74	70	55	56	55
22	F 52	V 52	51	46	43	F 45	79	69	63	63	69	83	90	94	100	102	112	109	101	83	59	52	51	50
23	F 50	F 50	50	46	44	F 48	59	58	62	74	68	R 74	69	80	84	B	R 111	113	99	R 78	43	38	40	44
24	43	R 44	43	40	36	43	60	65	71	59	58	R 58	70	74	89	91	90	90	84	86	79	59	56	58
25	53	51	53	46	40	43	R 66	79	81	68	62	72	86	84	79	84	95	105	102	90	82	69	52	51
26	53	48	48	46	44	54	58	82	70	73	86	92	99	90	96	102	89	79	94	104	R 102	59	44	44
27	46	44	41	40	F 40	42	40	50	53	55	A	62	67	71	74	70	69	74	76	80	F U 85	S 51	F 48	F 48
28	47	42	F 43	F 45	F 44	45	63	74	74	63	64	69	77	77	90	95	89	79	77	81	U R 69	F 55	A	F 56
29	F 52	F 48	F 46	F 46	F 44	F 48	62	F 68	71	62	64	63	71	82	94	97	83	82	85	R 92	71	F 59	63	F 53
30	F 51	F 50	F 48	F 49	F 49	53	71	66	65	68	68	69	78	85	91	103	98	79	80	81	78	62	55	55
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	29	30	30	30	30	30	30	29	30
MED	55	54	54	50	44	48	63	72	74	76	82	88	96	98	100	96	92	88	86	82	72	59	56	56
U Q	62	58	58	55	51	53	68	76	84	88	90	93	102	106	104	103	98	93	91	86	78	64	62	62
L Q	50	49	48	46	42	43	60	68	71	72	70	74	86	90	90	91	89	84	80	74	66	55	53	52

IONOSPHERIC DATA STATION Kokubunji

APR. 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	L	L	U L 480	484	484	U L 508	L 472	U L 476	L 448	L 332						
2								L	U L 448	L 464	L 480	L 500	500	L 500	L	L 480	L	A						
3								L	U L 444	L 480	L 516	U L 492	472	500	L 484	A	A	L						
4								L	L 440	L	L	L 500	504	516	L 512	L 464	U L 420		200					
5									L	L	A	A	U L 540	512	492	L 472	U L 444	U L 300						
6								L	U L 480	L 476	L	528	U A 516	A	L 500	U L 468	L	L						
7									U L 480	L 488	L 492	L 572	L 540	L 504	U L 512	L 488	L	L						
8									L 484	480	U L 552	L 540	L	L 544	L 536	L 508	U L 456	L						
9								L	L	U L 504	484	L 464	L	L 548	U L 536	L 524	U L 464							
10									L 488	L 476	L 536	L	L 552	L 564	U L 540	L	L	L						
11									U L 556	488	500	L 496	U L 556	U L 548	L 544	L 500	U L 468	L						
12									L	U L 552	L 520	L	L 556	U L 520	L 520	U L 496	L							
13								L	U L 460	L 492	L 500	L 516	L 524	U L 552	L 528	U L 500	L 464	L						
14								U L 408	U L 476	U L 508	B	L	552	536	532	U L 512	U L 476	L						
15								U L 440	U L 456	L 476	U L 540	U L 540	536	524	L 524	504	L	L						
16									L	U L 496	U L 500	L 520	552	524	520	L	L							
17								L	L 448	U L 544	L 528	U L 508	496	L 536	500	484	U L 468	L						
18								L	L 472	L 520	A	A	A	520	532	A	U L 448	L						
19								U L 424	L 468	L 468	L 492	524	L 516	L 512	L 516	L 524	U L 472							
20							L	U L 428	L 468	L 500	U L 492	508	524	L 500	L 488	L 476	A	A						
21							L	U L 412	448	L 480	U A 480	548	500	504	480	L	A	L						
22										L	U L 488	L 520	L 500	L 500	476	L 476	428	U L 400						
23						L 220		L	L	U A 448	U A 476	U A 480	500	L 496	492	L 496	B	B	L					
24								U L 428	452	A	A	512	480	488	480	460	A	A	A					
25							L	L	A	A	L	A	A	U A 480	L 500	A	A	A						
26								U L 452	U L 448	L	492	520	500	L 484	492	L 476	U L 428	U L 432	A					
27							A	A	420	444	A	A	480	468	476	448	U L 440	A	A					
28							A	A	A	A	A	U A 500	480	500	476	452	440	L						
29								A	A	A	A	L	508	A	A	A	A	L	L					
30							A	A	A	480	480	500	500	484	492	472	L 432	L 408	L					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1		7	20	21	20	22	26	28	28	22	16	5	1					
MED						L 220		U L 428	L 458	L 480	L 492	L 510	506	510	L 500	L 478	U L 448	U L 400	200					
U Q								U L 440	U L 478	U L 502	L 518	524	L 540	L 530	L 526	L 500	U L 466	L 420						
L Q								U L 412	448	L 476	482	500	496	500	486	472	L 436	L 316						

APR. 1998 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 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							172	256	300	R 332	R	U R 368	R	R	U R 340	320	280	220	B					
2							172	248	312	R 332	A 348	A	A	A	A 348	A 320	U A 284	240	B					
3							188	264	300	328	344	U A 352	A	R	U A 352	320	280	A	B					
4							180	272	312	A 352	A	A	A	R	U R 360	320	292	A	B					
5							228	276	324	344	U A 356	A 364	A	U R 364	B	R 336	A	A	R 160					
6							196	288	R 336	A	A	U A 372	A	A	A	A	A	A	B					
7							196	268	A	U R 344	R	A	A	R	A	A	A	A 244	A					
8							208	272	308	A	A	A	R	R	356	328	296	248	168					
9							200	276	R 308	340	U R 356	B	R	B	R 352	336	304	252	A					
10							200	272	316	352	R	A	R	A	R 368	U R 336	300	244	A					
11							200	276	A	U A 340	360	R	R	R	B	336	308	252	B					
12						B	208	288	312	R 340	360	B	B	B	B	332	296	236	A					
13						B	204	R 268	312	336	364	R	R	B	R	336	300	256	A					
14						B	212	300	324	R 352	B	R 364	R 376	368	348	324	304	252	168					
15						B	224	280	320	348	360	A 368	A	A	A	A	A	A	A					
16						B	224	292	320	344	368	A	A	A	A 368	A	300	260	168					
17						B	200	272	316	340	360	B	R	R	R 348	R 332	296	244	184					
18						B	204	284	320	348	U A 368	A	A	A	A	A	292	244	A					
19						B	228	R 284	332	U A 352	A	R 368	R	R	R	324	292	244	184					
20						B	232	280	312	R 340	360	A	A	A	A	336	288	244	A					
21						B	216	284	312	344	356	R 368	A	364	340	332	300	240	160					
22						B	224	276	320	340	356	R	364	360	344	320	288	256	A					
23						B	220	272	320	348	A 356	368	R	A	R 356	B	B	264	156					
24						B	216	272	304	332	A 340	A 348	A	R	R	320	292	236	A					
25						B	220	264	300	A	A	A	A	A	356	328	288	244	U A 152					
26						B	224	280	308	328	A 352	A	A	R	A	R 316	292	244	A					
27						B	212	272	296	324	A	A	A	A	348	R 324	288	248	A					
28						B	232	268	300	U A 332	U A 340	A	A	364	R	316	284	248	A					
29						B	220	280	308	A	A	A	A	A	A	A	A	260	A					
30						A	232	284	312	344	364	R	R	R	R	U A 308	292	240	156					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							30	30	28	26	19	10	2	5	15	23	24	25	10					
MED							212	276	312	340	356	368	370	364	352	324	292	244	164					
U Q							224	284	320	348	360	U R 368		366	R 356	336	300	252	168					
L Q							200	272	308	332	A 352	A 364		362	348	320	288	242	156					

APR. 1998 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 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	E B 14	E B 16	E B 15	E B 16	E B 14	E B 14	G	29	G 29	G 32	G 34	G	G 36	G	G	G 30	34	J A 37	17	J A 16	21	22	J A 25	J A 44
2	J A 49	J A 25	26	J A 23	26	E B 15	22	30	32	G	39	43	41	J A 50	J A 52	38	J A 44	J A 46	42	J A 32	J A 47	J A 40	J A 30	E B 16
3	E B 15	E B 14	E B 15	E B 15	E B 15	E B 15	22	G 20	33	G	42	J A 49	41	G	43	J A 50	J A 61	J A 50	J A 52	J A 67	J A 59	J A 59	J A 51	J A 43
4	30	34	J A 21	20	E B 14	E B 15	25	30	G	40	J A 42	40	40	G	40	G	G	26	E B 15	E B 13	E B 13	J A 78	J A 31	J A 30
5	J A 24	J A 20	J A 26	J A 30	J A 36	J A 31	32	36	J A 44	J A 47	J A 56	J A 64	J A 51	41	E B 38	G	30	24	G	J A 26	J A 51	J A 34	J A 38	J A 29
6	J A 49	J A 29	J A 22	J A 25	19	E B 15	G	G	G	J A 45	44	J A 48	55	J A 56	37	J A 40	J A 39	J A 28	J A 23	J A 22	E B 15	E B 15	18	E B 14
7	E B 16	E B 16	E B 15	E B 15	E B 14	E B 15	24	G 26	32	G	G 31	J A 44	38	G	35	34	38	29	J A 24	25	25	20	18	E B 15
8	E B 15	E B 15	E B 16	E B 16	E B 14	E B 15	G	G 25	34	36	J A 43	J A 47	G 34	G 32	40	G 26	G 27	27	G	E B 14	E B 15	E B 15	E B 15	E B 16
9	E B 15	E B 15	E B 16	E B 16	E B 15	E B 15	24	30	G	36	G	E B 42	G 37	43	G	G	36	30	J A 28	J A 40	J A 31	24	E B 14	E B 16
10	E B 15	E B 15	20	E B 15	E B 15	E B 15	24	32	36	39	G	37	G 36	40	40	G	J A 42	J A 38	J A 44	27	34	E B 16	J A 44	E B 15
11	19	E B 14	E B 14	19	E B 15	E B 15	26	G	35	39	G	G	G 37	G 34	E B 42	G 26	34	33	J A 27	E B 15	E B 16	E B 15	20	22
12	J A 24	J A 22	22	21	E B 15	E B 14	27	33	36	38	40	E B 42	E B 49	E B 45	E B 41	G	G	26	44	J A 18	24	28	26	J A 22
13	18	E B 14	E B 13	E B 14	E B 15	E B 14	J A 28	G 20	34	G	39	G	G	E B 44	G	G	33	34	J A 30	J A 48	J A 31	J A 28	J A 31	21
14	E B 15	E B 15	E B 14	E B 15	E B 15	E B 14	24	G	33	G	E B 46	40	G	G	G	G	36	30	49	J A 26	J A 33	J A 20	19	20
15	23	E B 15	E B 15	E B 15	E B 15	E B 15	G 20	32	38	40	45	41	40	40	38	33	J A 54	J A 32	J A 26	J A 53	32	20	21	19
16	18	E B 15	E B 16	E B 16	E B 14	J A 17	26	33	37	39	G	40	38	39	39	J A 50	G 24	35	22	J A 17	27	18	E B 16	E B 16
17	E B 16	E B 15	E B 13	E B 14	J A 29	E B 14	27	30	38	40	40	E B 44	G 30	G 32	G 30	G	G 24	G	G	J A 28	27	25	J A 32	J A 26
18	J A 30	26	22	E B 15	E B 15	E B 14	26	G	G	41	72	J A 62	64	J A 52	J A 53	J A 52	J A 30	28	35	31	18	J A 34	J A 39	27
19	J A 44	J A 26	J A 18	E B 15	E B 15	21	27	G	37	39	39	G	G 36	G 34	G 29	G 20	34	33	J A 29	J A 27	J A 30	27	J A 19	J A 25
20	J A 28	22	E B 14	22	E B 15	E B 14	G	G	34	41	40	44	38	J A 41	43	J A 51	J A 82	122	J A 43	46	J A 48	E B 15	E B 16	E B 16
21	E B 16	E B 14	E B 16	E B 15	E B 15	E B 15	25	34	37	43	49	48	42	44	G	40	J A 45	J A 40	46	86	60	29	J A 49	J A 30
22	22	J A 28	J A 27	J A 30	32	E B 16	39	J A 41	46	J A 45	38	G	39	G	37	36	J A 41	J A 35	J A 30	49	J A 31	J A 44	E B 14	J A 27
23	J A 24	J A 45	J A 26	25	E B 15	E B 14	32	32	J A 51	J A 57	J A 56	G	G 37	40	G	B	E B 44	32	J A 34	J A 22	J A 33	E B 15	18	18
24	E B 15	17	17	E B 14	E B 14	E B 14	24	30	38	J A 48	J A 50	43	38	G	G	36	J A 48	J A 76	J A 72	64	J A 35	31	19	20
25	18	20	19	19	20	J A 17	26	32	J A 50	J A 52	J A 54	J A 63	J A 82	J A 65	44	J A 52	J A 56	J A 55	J A 54	J A 28	J A 50	J A 42	E B 16	20
26	E B 14	J A 22	20	J A 27	18	J A 18	26	34	36	J A 41	40	J A 48	40	G 34	42	G 30	G	30	J A 48	37	34	J A 27	32	J A 32
27	22	J A 26	28	22	E B 14	E B 15	J A 38	J A 44	J A 42	J A 53	J A 145	J A 62	J A 49	J A 48	G 30	G	34	68	51	J A 37	J A 30	J A 68	J A 79	J A 53
28	J A 30	23	J A 30	33	J A 28	J A 26	J A 43	J A 56	J A 68	J A 56	53	J A 80	J A 45	J A 41	G 33	G	G	35	J A 50	39	38	J A 65	J A 63	J A 100
29	J A 63	J A 46	J A 29	J A 35	21	20	32	J A 42	J A 64	J A 58	66	J A 80	J A 53	82	J A 84	J A 86	J A 58	32	J A 37	J A 36	J A 51	J A 38	J A 63	J A 49
30	27	J A 27	J A 42	J A 29	J A 26	J A 28	J A 46	J A 64	J A 52	37	G	G 34	36	G 35	G 30	33	32	26	23	32	28	22	26	E B 13
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30
MED	20	20	18	18	E B 15	E B 15	26	30	36	40	40	42	38	E G 40	37	G	34	32	J A 32	J A 30	31	27	26	22
U Q	J A 28	J A 26	J A 26	J A 25	20	J A 17	28	J A 34	J A 42	J A 45	J A 50	J A 48	J A 45	J A 44	42	J A 40	J A 44	J A 38	J A 46	40	J A 38	J A 38	J A 38	J A 30
L Q	E B 15	E B 15	E B 15	E B 15	E B 15	E B 14	G 24	G	G 33	G 36	G 38	G 37	G 37	G	G	G	G 30	28	23	J A 22	25	E B 20	E B 18	E B 16

APR. 1998 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR.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 E B 14 16	E B E B 15 16	E B E B 14 14	G 28	G 26	G 32	U G 34	G	U G 34	G	G	G 29	32	26	16	E B 15	E B E B 15	E B E B 14	19	18
2	27	17	E B 15 17	E B E B 15 15	22	30	32	G	38	43	U Y 41	43	42	36	36	35	34	22	24	23	26	E B 16
3	E B E B 15 14	E B E B 15 15	E B E B 15 15	20	G 20	33	G	42	46	41	G	41	49	46	30	30	50	46	42	45	30
4	20	27	17	17	E B E B 14 15	24	U Y 30	G	40	40	40	U Y 40	G	U Y 40	G	G	26	E B E B 15 13	E B 13	21	20	21
5	20	18	21	24	30	25	29	33	40	46	54	50	48	U Y 41	E B 38	G	29	24	G 17	18	28	30	17
6	32	21	E B 14 18	E B E B 14 15	G	G	G	42	43	45	52	54	37	37	38	25	18	18	E B E B 15 15	E B E B 14 14
7	E B E B 16 16	E B E B 15 15	E B E B 14 15	24	G 25	32	G	U G 31	43	U Y 38	G	U Y 35	34	35	28	21	17	17	E B E B 15 15	E B E B 15 15
8	E B E B 15 15	E B E B 15 16	E B E B 14 15	G	G 22	33	U Y 36	40	42	U G 34	U G U G 32	U Y 40	24	G	19	26	G	E B E B 14	E B E B 15 15	E B E B 15 16
9	E B E B 15 15	E B E B 16 16	E B E B 15 15	24	30	G	36	G	E B U G 42 37	42	G	G	34	28	23	35	27	18	E B E B 14 16
10	E B E B 15 15	E B E B 15 15	E B E B 15 15	24	32	36	38	G	36	U G 36	U G U Y 40	40	G	41	35	41	17	29	E B 16	40	E B 15
11	E B E B 14 14	E B E B 14 14	E B E B 15 15	24	G	34	38	G	G	U G 36	U G U G 34	E B 42	G 26	33	29	23	E B 15	E B E B 16 15	E B E B 16	E B 13
12	17	18	E B E B 14 13	E B E B 15 14	26	33	36	38	40	E B E B 42 49	E B E B 45	41	G	G	25	38	17	E B 14	20	18	E B 14
13	17	E B E B 14 13	E B E B 14	E B E B 15 14	G	G 18	34	G	39	G	G E B 44	G	G	33	31	26	43	23	18	23	17
14	E B E B 15 15	E B E B 14 15	E B E B 15 14	24	G	33	G E B 46	U Y 40	G	G	G	G	35	29	42	22	26	18	17	E B 13
15	17	E B E B 15 15	E B E B 15 15	G 17	31	38	38	44	U Y 41	U Y U Y 40	U Y 40	38	33	40	26	24	43	27	E B E B 15	E B E B 14	E B 15
16	E B E B 14	E B E B 15	E B E B 16	E B E B 14	25	32	37	38	G	U Y U Y 38	38	38	38	38	G 24	33	20	16	17	E B E B 14	E B 16	E B 16
17	E B E B 16	E B 15	E B E B 13	14	E B 25	14	25	30	36	39	39	E B 44	U G 29	U G 31	G 28	G	G 22	G	G	25	17	18	23	19
18	26	18	E B E B 16	E B E B 15	E B 15	14	24	G	G	41	64	61	63	49	50	47	G 22	26	U Y 35	25	18	21	28	18
19	24	21	16	E B E B 15	E B 15	14	26	G	36	U Y 38	39	G	U G 36	U G U G 34	U G 29	G 20	33	28	26	22	26	20	17	17
20	19	E B E B 14	14	16	E B E B 15	14	G	G	34	39	39	44	U Y 38	39	37	40	68	46	28	38	20	E B 15	E B E B 16	16
21	E B E B 16	E B 14	E B E B 16	E B E B 15	E B E B 15	15	25	33	36	41	48	47	42	42	G	39	41	30	40	63	43	18	35	17
22	E B 13	20	18	27	23	E B 16	38	38	42	41	37	G	38	G	36	35	33	33	27	45	E B 15	19	E B 14	18
23	16	24	20	17	E B E B 15	14	30	30	45	48	48	G	U G 37	38	G	B E B 44	30	28	20	21	E B 15	E B E B 14	14
24	E B E B 15	E B 14	E B E B 13	14	E B E B 14	14	23	30	36	43	49	U Y 43	38	G	G	35	45	71	66	56	25	25	E B 15	17
25	E B 15	17	E B 15	E B E B 16	E B E B 16	15	26	32	48	49	44	62	64	48	41	50	55	45	36	24	18	21	E B 16	E B 15
26	E B 14	E B E B 15	16	20	E B 14	17	25	34	36	39	39	44	37	U G 34	34	G 27	G	27	44	23	26	17	26	19
27	E B 16	20	22	17	E B E B 14	15	34	43	38	38	A A 145	60	44	43	G 30	G	33	60	44	23	19	46	23	18
28	21	16	17	28	22	22	41	53	64	54	53	50	44	G U G 34	33	G	G	32	46	33	33	45	A A 63	17
29	33	26	26	22	15	17	30	40	62	57	58	44	48	65	66	74	53	32	24	24	26	31	18	18
30	17	E B 14	18	20	E B 14	21	43	62	48	37	G U G 34	35	U G 35	U G 30	32	32	26	22	22	18	E B 14	18	E B 13
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30
MED	E B E B 16 16	E B E B 16 16	E B E B 16 16	E B E B 15 15	24	30	36	38	40	42	38	E G E G 38 36	G	33	29	26	22	20	18	18	16
U Q	20	18	17	17	15	15	26	33	38	41	48	45	44	43	40	38	41	33	38	35	26	21	26	18
L Q	E B E B 15 15	E B E B 14 15	E B E B 14 14	G 22	G	G 33	G 36	G 37	G 36	U G 37	G	G	G	G	26	21	17	E B 17	E B E B 15 15	E B 15	15

APR.1998 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 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

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	16	15	16	14	14	12	16	14	16	19	19	20	20	18	16	15	14	14	15	15	14	13	14
2	14	15	15	15	15	15	14	13	15	17	16	25	24	20	21	16	16	15	15	14	15	15	15	16
3	15	14	15	15	15	15	16	15	15	15	18	21	22	22	18	17	14	14	16	16	16	15	14	16
4	14	16	14	14	14	15	14	15	15	22	19	20	24	28	24	17	16	15	15	13	13	14	15	15
5	14	14	15	15	14	15	14	14	17	17	21	23	28	25	38	25	16	16	13	14	15	15	15	16
6	15	14	14	13	14	15	15	18	21	21	26	24	26	24	21	19	14	14	14	15	15	15	14	14
7	16	16	15	15	14	15	15	16	15	19	20	32	26	29	23	18	15	14	14	15	15	15	15	15
8	15	15	16	16	14	15	13	14	15	20	21	23	26	24	21	19	16	15	13	14	15	15	15	16
9	15	15	16	16	15	15	16	16	16	18	18	42	33	40	22	20	17	15	14	15	15	14	14	16
10	15	15	15	15	15	15	14	14	14	16	26	18	28	27	22	18	15	14	13	15	14	16	16	15
11	14	14	14	14	15	15	14	15	17	16	19	21	34	25	42	22	16	15	15	15	16	15	16	13
12	14	14	14	13	15	14	16	16	17	20	21	42	49	45	41	20	17	16	14	14	14	14	15	14
13	14	14	13	14	15	14	15	14	16	19	20	26	21	44	26	20	17	14	14	15	16	14	16	14
14	15	15	14	15	15	14	14	15	17	19	46	23	21	22	18	18	16	14	14	15	14	16	16	13
15	14	15	15	15	15	15	15	16	16	19	19	22	35	25	20	18	16	16	15	15	14	15	14	15
16	14	15	16	16	14	14	14	18	15	18	22	26	27	21	23	18	16	15	14	14	14	14	16	16
17	16	15	13	14	14	14	14	14	15	20	20	44	22	19	18	17	16	15	14	14	14	15	15	14
18	14	15	16	15	15	14	16	15	18	20	20	30	32	24	23	17	14	14	16	14	14	15	15	15
19	15	15	14	15	15	14	14	15	17	20	22	25	28	23	18	16	14	15	15	14	15	14	15	15
20	16	14	14	15	15	14	13	16	16	21	19	24	24	22	25	17	16	14	14	14	15	15	16	16
21	16	14	16	15	15	15	16	16	17	18	19	21	21	22	21	18	15	14	14	15	16	15	15	15
22	13	13	15	13	15	16	15	16	20	16	21	20	20	22	18	18	15	15	14	15	15	14	14	14
23	15	15	14	14	15	14	14	16	15	15	18	21	22	26	19	B	44	18	13	15	15	15	14	14
24	15	14	13	14	14	14	15	15	18	16	19	18	33	21	20	19	14	15	14	18	16	15	15	15
25	15	14	15	16	16	15	14	16	15	18	22	21	19	20	20	16	15	14	13	16	14	15	16	15
26	14	15	14	14	14	15	15	16	15	15	19	19	18	18	17	16	17	16	16	15	16	13	15	16
27	16	15	14	14	14	15	15	14	15	15	16	20	32	26	23	16	17	15	15	14	14	14	15	14
28	15	16	16	16	15	14	14	17	16	16	16	23	17	29	24	15	16	16	14	14	16	14	15	16
29	16	15	15	15	13	15	14	14	15	18	18	28	21	24	22	22	20	17	14	15	14	15	15	15
30	16	14	14	16	14	14	12	18	17	21	22	21	28	24	21	18	17	15	13	15	15	14	13	13
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	15	15	15	15	15	15	14	16	16	18	20	23	25	24	21	18	16	15	14	15	15	15	15	15
U Q	15	15	15	15	15	15	15	16	17	20	21	26	28	26	23	19	17	15	15	15	15	15	15	16
L Q	14	14	14	14	14	14	14	14	15	16	19	21	21	22	19	17	15	14	14	14	14	14	14	14

APR. 1998 fmin (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 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	F 296	F 279	F 302	F 325	F 324	F 315	336	345	342	321	322	320	316	308	326	316	318	331	338	338	289	293	274	280
2	296	299	327	322	312	303	342	333	338	341	317	303	314	310	315	319	331	335	338	354	303	285	F 291	F 285
3	289	286	303	333	343	298	346	359	355	330	307	297	301	310	319	314	322	330	338	316	310	283	289	303
4	303	290	283	283	281	290	354	375	338	322	298	302	301	300	302	315	313	320	325	301	289	267	285	296
5	295	299	309	332	290	289	334	333	329	322	297	299	293	312	321	315	335	341	337	300	S 295	285	289	R 290
6	282	283	306	335	329	301	333	335	328	338	303	301	303	310	315	313	323	335	323	310	304	290	285	279
7	282	284	300	316	278	277	322	325	333	328	322	302	311	305	315	308	321	328	324	313	295	294	284	F 282
8	283	F 284	F 305	313	314	F 298	R 318	322	342	331	291	305	288	295	302	312	326	330	320	311	326	286	274	280
9	279	282	R 299	320	327	312	337	344	329	332	309	288	288	295	302	302	324	319	319	312	304	284	281	276
10	259	270	275	288	287	279	332	350	340	327	320	307	311	309	310	310	315	322	326	316	318	272	269	279
11	280	282	282	F 296	308	F 265	316	319	277	328	328	296	295	295	301	316	319	335	324	311	288	279	269	284
12	285	289	304	297	304	306	317	328	307	306	310	288	300	304	307	317	314	314	302	F 306	297	300	F 273	278
13	279	279	F 283	F 308	F 307	303	333	330	333	319	319	303	298	304	301	309	322	328	322	336	318	R 295	R 289	285
14	275	281	291	300	307	309	348	342	343	315	298	292	297	298	299	310	311	315	314	321	328	289	281	274
15	286	294	R 307	291	278	294	353	360	346	332	306	301	303	308	303	315	324	316	321	313	320	285	279	276
16	289	286	299	344	342	329	336	335	336	330	321	298	291	299	297	304	309	317	312	332	323	295	275	270
17	272	273	279	294	287	292	359	333	V 328	301	310	310	298	299	309	305	311	309	319	318	298	286	R 282	280
18	298	275	293	290	309	315	336	307	321	328	325	314	304	311	322	307	324	318	318	321	328	309	285	289
19	274	F 267	F 275	291	299	295	331	R 341	342	331	320	310	304	304	311	305	314	308	320	325	328	310	288	287
20	279	278	291	R 284	270	273	327	332	340	315	303	305	305	313	314	305	315	317	317	312	312	285	286	283
21	278	286	308	296	285	289	311	R 326	330	323	331	290	310	323	321	320	316	326	329	319	327	288	274	275
22	F 286	V 286	298	286	263	F 292	356	371	342	330	311	307	300	297	305	307	321	331	343	339	327	288	280	277
23	F 276	F 286	303	294	299	F 304	339	335	358	331	325	R 311	308	311	295	B	R 319	328	353	R 344	308	281	284	279
24	293	R 305	306	315	311	315	352	320	331	304	324	R 285	286	258	289	303	309	313	295	319	318	325	277	277
25	285	278	313	314	295	283	R 325	321	345	342	297	311	304	320	303	307	305	324	331	321	318	313	286	279
26	294	278	298	303	285	328	308	331	288	280	303	294	314	287	306	318	319	298	300	321	R 332	327	278	269
27	277	273	271	276	F 279	313	A 261	337	349	284	A	A 299	301	298	310	314	316	324	314	301	F 329	A	F 282	F 284
28	283	294	F 292	F 297	F 310	311	335	322	340	304	274	306	300	282	297	320	322	315	308	321	U 348	R 289	F	A	F 289
29	F 295	F 296	F 284	F 290	F 279	F 308	328	F 330	343	330	324	284	294	289	294	323	307	309	312	R 319	321	F 261	291	F 292
30	F 285	F 269	F 293	F 289	F 291	325	355	A 352	330	330	321	311	311	299	293	312	325	322	315	311	326	314	295	294
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	29	30	30	30	30	30	29	29	30
MED	284	284	298	297	299	302	334	333	338	328	311	302	301	304	306	312	319	322	320	318	318	288	282	280
U Q	293	289	305	316	311	312	346	344	342	331	322	307	308	310	315	316	323	330	329	321	327	298	287	287
L Q	279	278	284	290	285	290	325	326	329	315	303	296	297	297	301	307	314	315	314	311	303	284	276	277

APR. 1998 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 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		358	373	U L 348	L 367	L 347	L 342	L 375						
2								L	U L 377	L 361	L 373	L 362	350	L 352	L	L 355	L	A						
3								L	U L 370	L 365	L 355	A	389	346	A 363	A	A	L						
4								L	L 379	L	L	L 357	376	356	L 345	L 351	U L 369		392					
5									L	L	A	A	A	346	353	L 361	H 347	U L 396						
6								L	U L 365	A 380	L	A 353	A	A	L 353	U L 360	L	L						
7									U L 368	L 376	L 387	L 334	H 349	L 368	Y	L 351	L	L						
8									L 362	379	U L 343	L 357	L	L 342	L 327	L 330	U L 356	L						
9								L	L	U L 361	393	L 406	L	L 345	U L 339	L 337	U L 350							
10									L 360	L 367	L 355	L	L 352	L 337	U L 345	L	L	L						
11									U L 323	356	371	L 397	U L 344	U L 331	L 332	L 341	L	L						
12									L	U L 340	L 354	L	B	B 356	B 339	U L 355	L							
13								L	U L 370	L 365	L 362	L 362	L 361	L	L 340	U L 358	L 346	L						
14								U L 387	L	U L 352	B	L	343	333	333	U L 343	U L 354	L						
15								L	U L 385	L 384	U L 346	U L 345	348	347	L 333	340	L	L						
16									L	U L 361	U L 366	L 349	335	350	347	L	L							
17								L	L 382	U L 341	L 343	U L 353	376	L 345	349	344	U L 338	L						
18								L	L 349	L 348	A	A	A	A	A	A	U L 343	L						
19								U L 372	L 357	L 386	L 382	353	L 366	L 350	L 340	L 326	U L 345							
20							L	U L 374	L 371	L 364	U L 381	379	339	L 348	L 361	L 354	A	A						
21							L	U L 383	360	L 369	A	344	349	347	364	L	A	L						
22										L	U L 364	L 341	L 355	L 351	368	L 353	356	L						
23						L 339	L	L	A	A	A	355	L 359	358	L 344	B	B	L						
24								U L 371	346	A	A	335	373	343	Y 339	345	A	A	A					
25							L	L	A	A	L	A	A	A	A 331	A	A	A						
26								U L 354	U L 372	L	356	A 329	341	L 350	348	L 342	H 348	U L 326	A					
27							A	A		374	A	A	A	A	341	361	U L 342	A	A					
28							A	A	A	A	A	A	A 340	352	356	350	326	L						
29								A	A	A	A	L	A	A	A	A	A	L	L					
30							A	A	A	361	367	367	363	379	346	345	L 356	L 350	L					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1		6	17	20	17	20	21	24	26	22	15	4	1					
MED						L 339		U L 373	L 368	L 364	L 364	L 354	352	348	345	L 348	U L 347	L 362	392					
U Q								U L 383	U L 374	375	L 377	L 362	370	352	353	L 355	L 356	L 386						
L Q								U L 371	L 358	L 358	L 354	344	344	L 345	339	L 342	L 342	L 338						

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

IONOSPHERIC DATA STATION Kokubunji

APR. 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	250	274	298	286	284	290	278	280	278	262						
2								258	266	266	274	302	288	290	280	280	260	256						
3								240	252	270	314	286	300	292	274	270	268	252						
4								224	248	288	334	278	302	304	296	276	262		226					
5									264	272	308	302	304	290	284	268	260	240						
6								246	276	256	312	308	302	288	284	282	278	252						
7									264	256	274	320	282	294	288	300	278	258						
8									238	248	314	300	300	310	306	284	260	254						
9								244	264	260	258	266	326	316	290	292	258							
10									268	264	286	302	290	308	292	276	284	270						
11									332	264	248	268	308	312	300	280	258	250						
12									300	306	280	316	302	290	292	272	262							
13								278	286	298	286	314	296	298	282	284	280	264						
14								254	256	286	270	298	316	300	306	286	276	268						
15								242	250	260	298	292	304	292	296	286	276	260						
16									260	278	282	306	318	306	300	294	266							
17								264	252	316	306	298	288	310	290	294	272	270						
18								L 274	266	272	282	A 292	316	290	278	272	270	262						
19								258	270	266	270	298	304	294	298	300	284							
20							264	256	260	286	272	310	320	278	282	308	292	272						
21							280	280	282	294	286	364	292	290	286	282	280	266						
22										282	300	314	300	294	302	294	274	256						
23						286	254	278	258	294	306	310	300	302	314	B	280	258						
24								286	296	A 298	298	430	368	378	320	284	294	296	A E 344	A				
25							268	260	254	248	L 326	A 328	316	296	324	308	296	266						
26								268	H 254	H 278	300	336	292	296	296	282	268	296	288					
27							A	294	280	394	A	A	348	340	318	308	298	E A 302	280					
28							276	286	A 270	E A 348	A 400	318	324	356	324	280	280	268						
29								256	E A 274	A 316	A 322	L 318	358	A 342	A 320	292	290	274	270					
30							250	E A 296	296	292	298	316	318	318	322	294	268	268	266					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	6	22	29	30	29	29	30	30	30	29	30	25	6					
MED						286	266	258	264	277	298	306	303	297	296	284	276	263	272					
U Q							276	278	278	294	310	317	318	310	306	294	280	270	288					
L Q							254	252	254	264	277	295	296	290	284	280	266	256	266					

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

IONOSPHERIC DATA STATION Kokubunji

APR. 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	290	298	Q 276	242	230	252	228	238	H 202	H 206	Y 236	212	232	214	238	226	232	232	238	212	206	284	320	328
2	A 332	282	254	234	268	282	232	228	220	216	224	A 256	A 246	E A 266	284	236	E A 258	A	234	220	290	A 308	A 326	302
3	302	292	272	234	218	284	232	232	218	220	236	A	222	212	E A 264	A	A	242	236	A 288	A E	E A 352	A	294
4	278	A 300	322	302	310	314	234	Y	208	224	H 226	214	198	Y 252	Y 258	222	242	238	204	224	266	310	306	276
5	280	272	278	234	A 328	A 318	244	240	A 252	A	A	A	A	Y 248	230	224	H 210	H 220	232	240	266	310	320	296
6	A 330	312	274	232	216	236	230	238	232	A 240	A E 242	A 262	A	A	228	220	E A 258	248	246	246	240	258	276	296
7	300	306	274	248	264	290	240	234	226	216	206	230	H 192	222	Y	226	250	242	246	236	232	248	280	322
8	290	292	284	250	214	268	252	236	222	204	206	218	E Y 252	Y 236	238	234	236	248	250	236	222	242	288	298
9	312	302	276	234	232	240	228	242	226	220	210	214	E Y 282	250	236	238	246	252	250	256	252	274	286	300
10	312	310	298	274	276	300	240	238	226	226	224	224	212	218	Y 254	234	270	A 258	254	234	228	270	E A 364	290
11	310	310	294	268	258	308	228	238	224	222	216	204	230	240	B 258	224	234	246	248	236	246	278	306	298
12	294	288	260	258	252	256	242	244	236	228	232	B 236	B	B 276	E B 262	236	232	250	A 262	250	262	264	272	292
13	308	300	294	256	250	256	238	230	H 210	222	230	222	226	B 258	222	240	232	256	250	250	240	266	A 300	304
14	310	304	282	256	256	242	228	234	238	220	B	Y	208	226	220	246	238	260	264	248	236	256	288	318
15	298	282	262	268	308	280	224	234	230	214	220	250	Y 254	238	228	226	252	238	254	266	244	242	294	300
16	302	286	274	234	210	270	236	240	232	218	228	Y 230	206	214	220	A 264	250	262	252	236	230	244	294	318
17	316	308	304	270	288	274	236	226	206	220	218	E B 262	214	222	210	222	230	244	248	250	240	272	298	294
18	278	308	286	272	242	H 252	244	240	220	230	A	A	A	A	A	A	216	244	A 256	252	232	250	320	288
19	A 348	350	330	286	268	258	238	236	234	222	220	222	208	Y 248	214	214	242	258	258	242	246	230	248	298
20	312	304	286	294	320	278	248	230	230	234	226	234	A E 260	A 260	226	A 246	A	A	256	260	246	258	284	292
21	300	310	260	226	286	290	246	244	232	A 244	A	A E 270	E A 266	A 250	224	A 264	A	250	246	E A 316	A 264	270	A 346	308
22	302	304	282	A 310	A 376	284	240	232	246	A 246	212	216	204	214	212	228	220	A 262	238	240	230	298	296	308
23	314	328	284	286	270	238	230	234	A	A	A	248	A 230	220	222	B	B	A 262	228	220	266	316	306	292
24	294	272	254	262	262	254	234	222	216	A	A	A	216	216	Y	234	A	A	A	264	252	234	284	296
25	284	314	250	262	274	268	250	236	A	A	A 248	A	A	A	A	A	A	A	250	244	252	244	242	298
26	296	274	284	274	270	266	H 230	A 246	220	234	234	E A 284	222	238	218	214	H 202	244	A	254	234	208	342	342
27	320	340	A 346	322	294	268	A	A	246	222	A	A	A	A	Y 250	244	A 254	A	A	264	238	A	320	296
28	316	292	310	A 320	298	258	A	A	A	A	A	A	A	A 226	222	208	206	266	A 270	252	242	A	A	268
29	330	300	334	324	296	266	250	A	A	A	A	A 250	A	A	A	A	A	250	268	248	244	A 350	268	266
30	304	312	312	294	278	262	A	A	A	212	206	218	220	204	236	H 208	240	232	252	256	240	232	268	266
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	27	25	25	24	21	22	22	25	25	25	23	25	27	30	29	28	28	30
MED	303	303	283	265	269	268	236	236	226	222	224	225	218	231	227	228	236	248	250	248	242	263	294	297
U Q	314	310	298	286	294	284	244	240	233	229	233	E A 250	246	250	252	239	250	258	256	256	252	291	320	304
L Q	294	292	274	242	250	256	230	232	219	217	214	218	208	217	221	222	230	242	238	236	233	244	282	292

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

IONOSPHERIC DATA STATION Kokubunji

APR. 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							E B 150	A	A 130	A	A	118	A	122	120	A 134	A 148	118	B					
2							144	120	130	116	118	A	A	A	118	118	122	124	B					
3							144	128	124	116	116	116	116	118	118	116	116	A	B					
4							142	128	116	114	114	114	A	118	122	120	120	A	B					
5							A	A	A 136	A 130	116	116	A	122	B	124	A	A	150					
6							126	122	120	120	120	120	120	A	A	A	A	A	B					
7							126	A 130	A	118	A	A	A	122	A	A	A	A 124	A					
8							126	A 136	120	A	A	A	A	A	124	124	A 134	128	140					
9							134	128	116	126	120	B	A	B	118	120	122	130	A					
10							134	126	116	116	116	A	A	A	124	118	120	120	A					
11							134	122	116	116	116	116	A	A	B	124	124	134	B					
12						B	152	A 138	118	122	118	B	B	B	B	120	120	A 144	A					
13						B	142	124	122	116	118	118	116	B	118	116	120	120	A					
14						B	130	120	122	116	B	116	116	116	116	118	116	130	136					
15						B	138	134	118	118	118	118	A	A	A	A	116	A	A					
16						B	A 142	122	118	118	118	120	A	118	118	118	118	122	B 134					
17						B	134	120	118	118	118	B	A	122	120	116	122	124	146					
18						B	122	118	114	118	A	A	A	A	A	A	A 124	A 124	A					
19						B	126	122	116	120	120	112	A	A	A	122	120	124	A					
20						B	126	122	120	114	114	118	A	A	A	A 132	122	118	A					
21						B	132	118	116	116	116	116	116	116	116	126	122	120	B 140					
22						B	122	118	118	118	116	116	118	120	120	118	116	116	A					
23						B	128	118	116	116	116	114	A	A	120	B	B	126	B					
24						B	132	118	118	118	114	114	A	116	118	126	116	116	120					
25						B	122	118	114	A	120	A	A	A	122	120	118	118	126					
26						B	126	122	114	114	114	114	A	A	A	126	118	132	A					
27						B	126	120	116	114	114	A	A	A	120	120	120	120	A					
28						B	126	122	122	118	118	A	A	A 128	A	116	116	128	128					
29						B	132	126	116	114	116	A	A	A	A	A	A	116	A					
30						A	A 134	118	118	126	118	A	A 120	A	A	120	122	120	E B 144					
31																								
	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	28	29	27	25	17	7	12	17	24	25	25	10					
MED							132	122	118	118	116	116	116	119	120	120	120	124	136					
U Q							140	127	121	118	118	118	120	122	121	124	122	128	144					
L Q							126	119	116	116	116	114	116	117	118	118	117	119	128					

APR. 1998 h'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 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	B	B	B	B	B	B	G	166	110	112	110	G	112	G	G	116	144	130	140	124	122	116	100	110
2	112	108	108	112	110	B	160	150	164	G	124	120	118	118	120	120	118	126	126	120	116	114	110	B
3	B	B	B	B	B	B	170	114	150	G	122	116	122	G	124	120	114	114	110	110	110	108	108	108
4	106	104	104	110	B	B	164	164	G	126	124	118	132	G	E G 206	G	G	120	B	B	B	118	114	108
5	106	104	104	106	106	106	144	142	138	132	116	114	114	134	B	G	116	116	G	122	118	112	108	112
6	104	102	120	108	116	B	G	G	G	122	118	118	110	108	110	108	102	100	100	100	B	B	120	B
7	B	B	B	B	B	B	164	118	116	G	112	116	116	G	116	110	108	132	104	104	102	102	104	B
8	B	B	B	B	B	B	G	118	118	114	112	108	110	104	E G 196	108	114	146	G	B	B	B	B	B
9	B	B	B	B	B	B	166	168	G	134	G	B	126	168	G	G	138	134	128	116	114	116	B	B
10	B	B	110	B	B	B	160	146	138	132	G	116	112	114	174	G	132	128	114	116	110	B	106	B
11	104	B	B	104	B	B	164	G	124	124	G	G	114	114	B	114	142	178	124	B	B	B	118	116
12	112	110	112	114	B	B	156	150	142	140	136	B	B	B	B	G	G	150	120	120	114	116	110	108
13	114	B	B	B	B	B	132	114	144	G	134	G	G	B	G	G	160	130	120	118	108	104	108	108
14	B	B	B	B	B	B	174	G	142	G	B	126	G	G	G	G	154	140	126	120	116	116	114	112
15	108	B	B	B	B	B	126	148	130	130	128	128	120	122	118	116	110	108	128	120	116	116	114	110
16	102	B	B	B	B	186	160	142	130	130	G	122	120	124	116	118	110	138	136	124	116	114	B	B
17	B	B	B	B	110	B	142	138	130	126	132	B	114	114	112	G	108	G	G	124	116	114	104	114
18	110	108	110	B	B	B	152	G	G	122	112	114	108	112	112	110	104	184	100	104	118	114	114	112
19	110	108	114	B	B	104	168	G	128	124	124	G	112	106	106	106	180	136	132	122	116	122	116	110
20	110	104	B	114	B	B	G	G	136	126	124	122	116	112	110	138	124	118	120	116	116	B	B	B
21	B	B	B	B	B	B	150	142	136	130	120	122	124	126	G	148	142	132	130	118	114	118	116	106
22	118	108	108	108	108	B	136	136	130	126	136	G	128	G	158	150	134	128	120	114	120	112	B	110
23	120	102	108	112	B	B	150	150	128	122	118	G	120	118	G	B	B	134	120	122	112	B	118	110
24	B	106	104	B	B	B	142	142	128	118	114	116	120	G	G	144	126	114	112	114	112	110	112	110
25	112	108	108	132	126	136	130	124	116	116	116	114	110	108	148	130	124	120	116	116	116	112	B	116
26	B	114	132	120	144	130	134	126	126	126	120	118	114	112	108	110	G	154	120	118	114	114	112	120
27	110	100	98	104	B	B	132	124	118	120	108	112	120	110	110	G	134	120	116	112	112	106	110	110
28	110	106	106	102	102	120	124	116	112	112	112	110	114	110	114	G	G	136	118	118	114	116	112	126
29	106	104	100	102	102	108	130	126	116	114	112	112	112	106	108	106	104	146	126	116	128	118	114	108
30	110	104	112	108	114	140	130	124	120	130	G	110	110	112	114	120	E G 208	160	144	122	118	120	112	B
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	17	17	15	10	8	26	24	26	25	24	21	27	21	20	19	25	29	26	27	26	24	24	21
MED	110	106	108	108	110	125	150	140	129	126	119	116	114	112	114	116	124	132	120	118	116	114	112	110
U Q	112	108	112	114	116	138	164	149	138	130	124	121	120	120	136	130	142	143	128	122	116	116	114	113
L Q	106	104	104	104	106	107	132	124	118	119	112	113	112	109	110	110	110	120	116	114	112	112	108	108

IONOSPHERIC DATA STATION Kokubunji

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

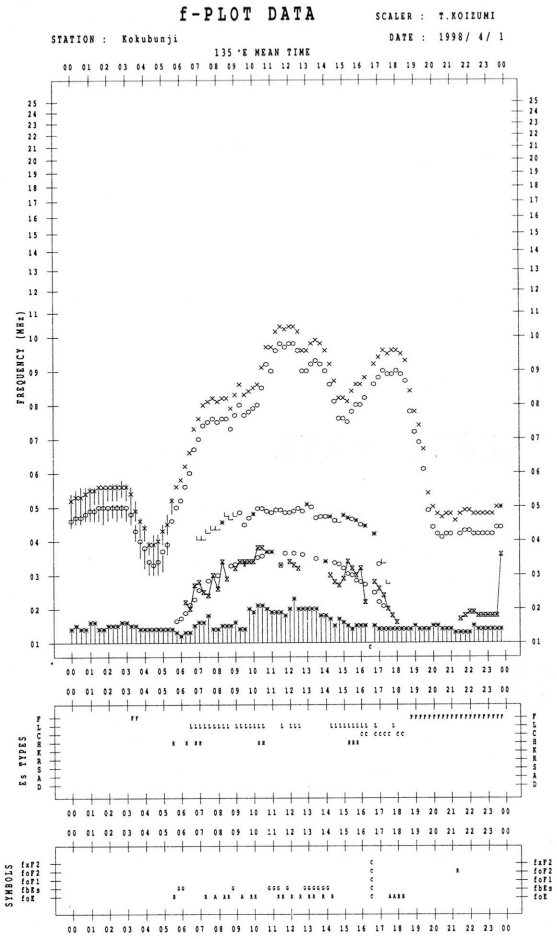
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

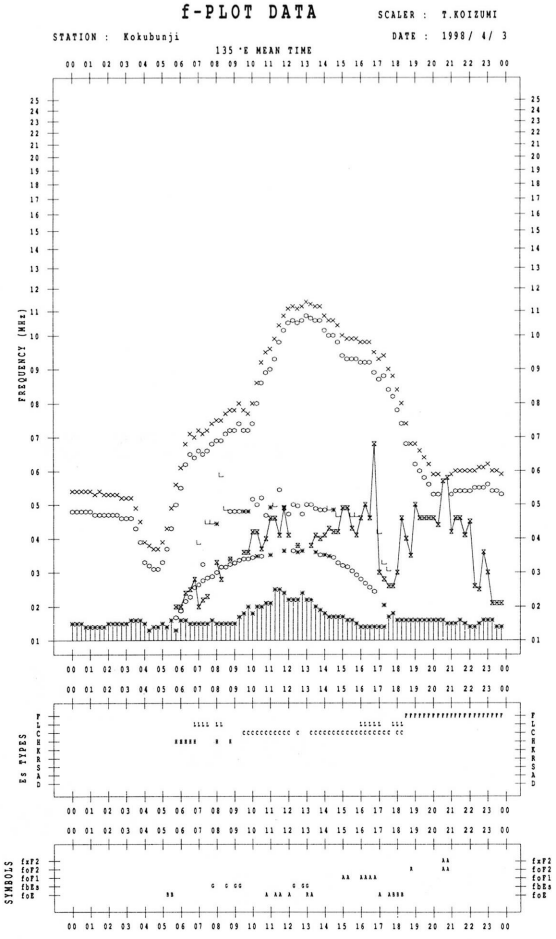
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								HL 11	L 1	L 1	L 1		L 1			L 1	CL 11	C 1	C 1	F 1	F 1	F 1	F 2	F 3
2	F 3	F 2	F 2	F 2	F 2		H 1	HL 21	HL 11		C 1	L 1	C 1	CL 21	C 1	CL 11	C 2	C 3	C 5	F 3	F 4	F 6	F 4	
3							H 1	L 1	HL 11		C 1	C 2	C 1		C 1	C 2	CL 31	CL 33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

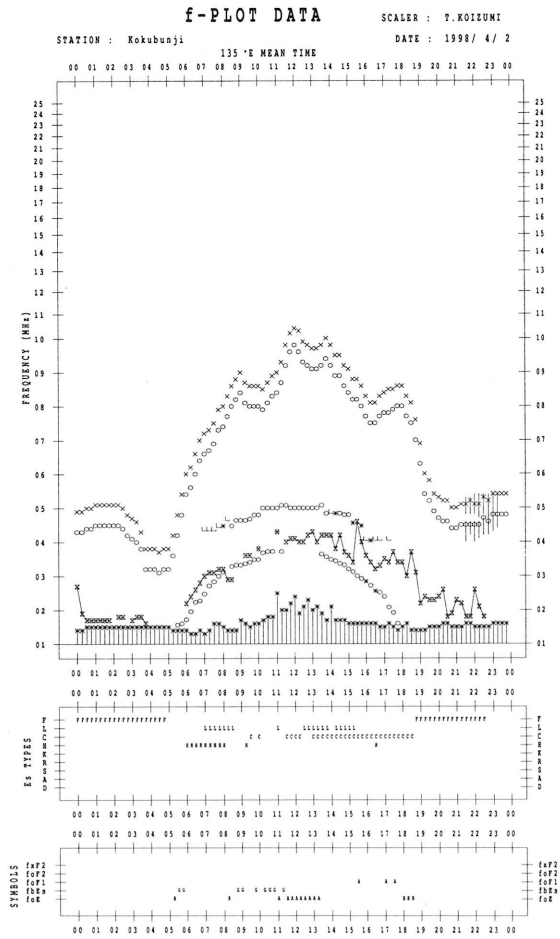
APR. 1998 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

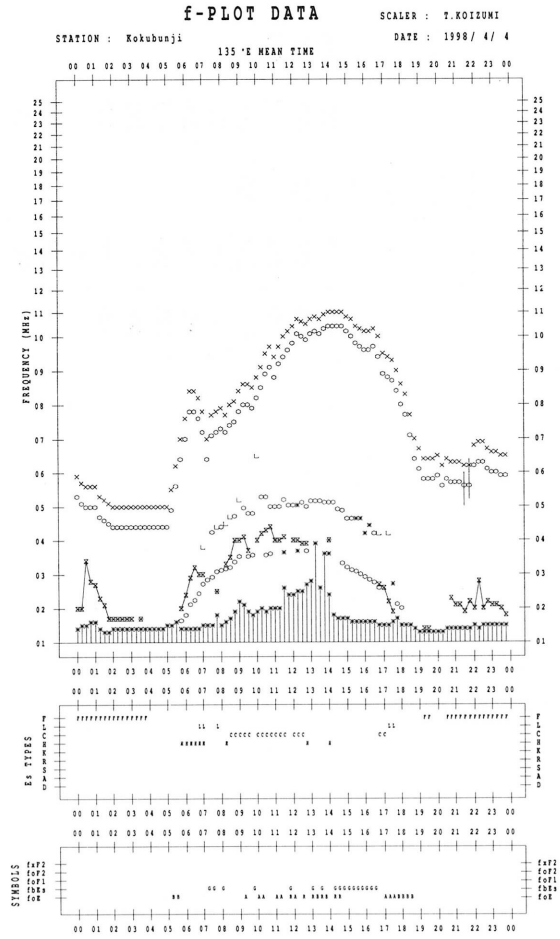
f-PLOTS OF IONOSPHERIC DATA

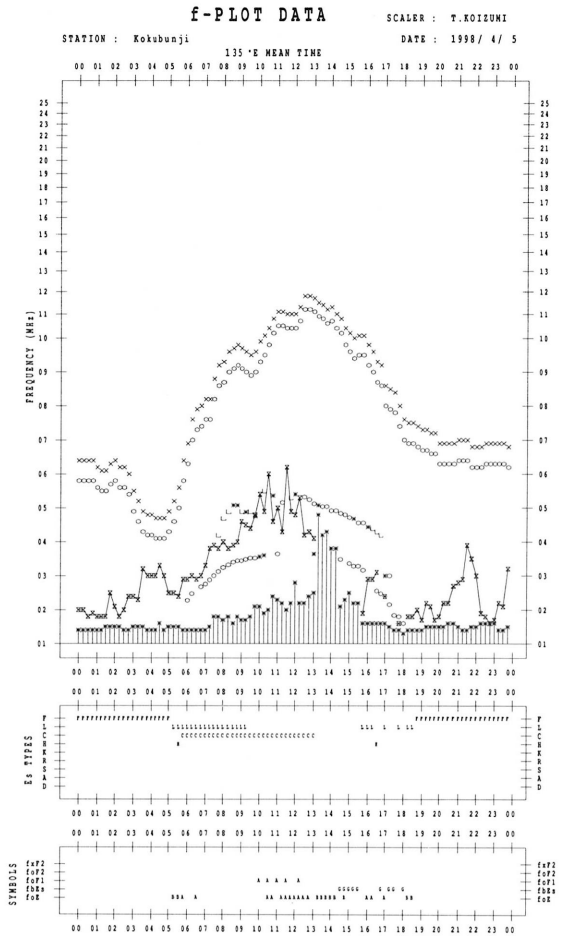
KEY OF f-PLOT	
	SPREAD
	foF2, foF1, foE
	fxF2
	DOUBTFUL foF2, foF1, foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

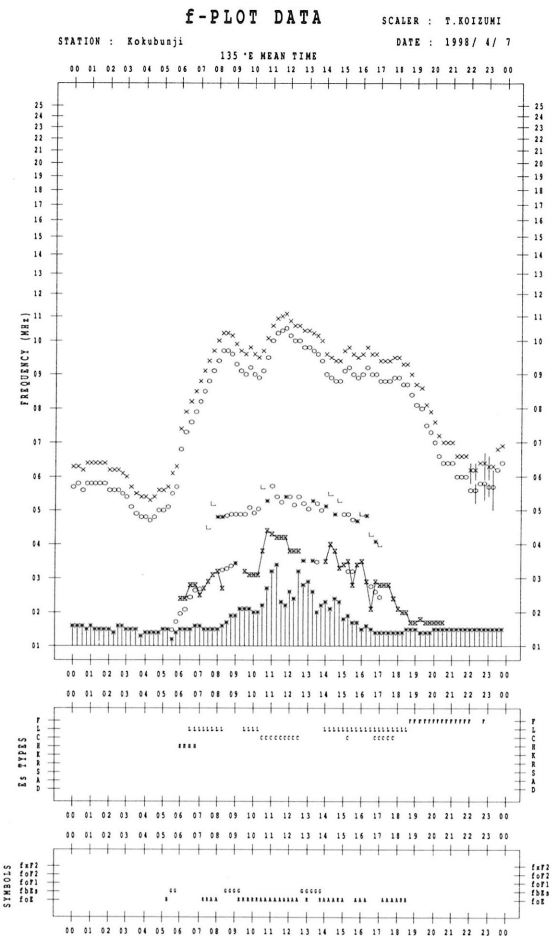

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

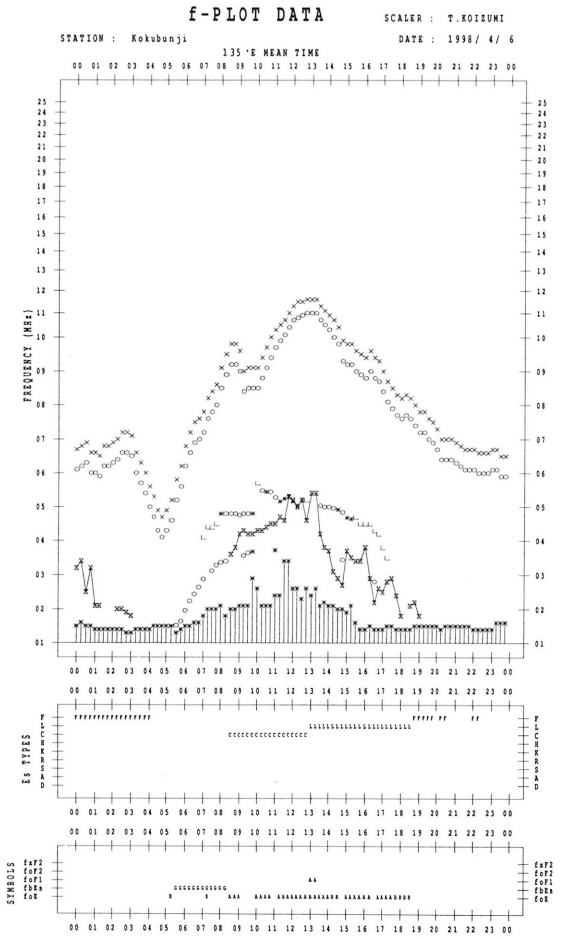

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

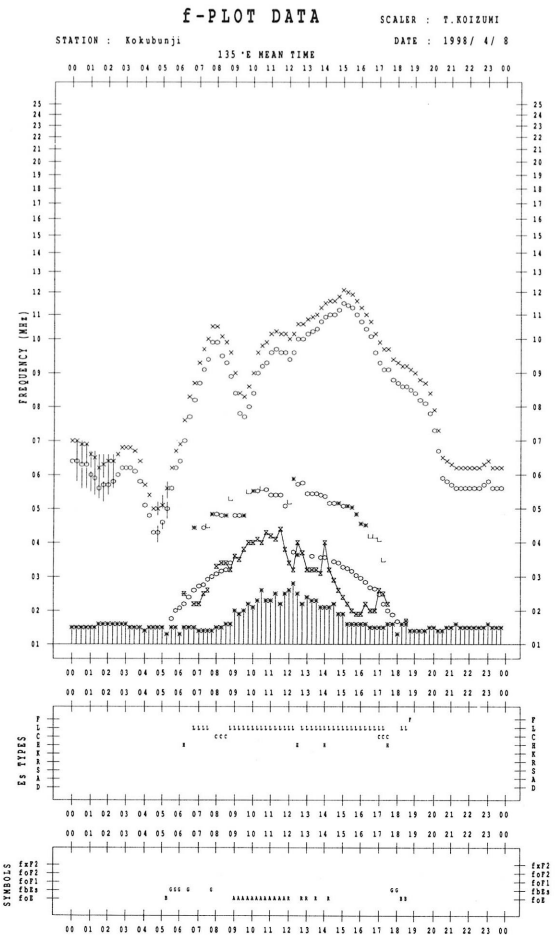

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

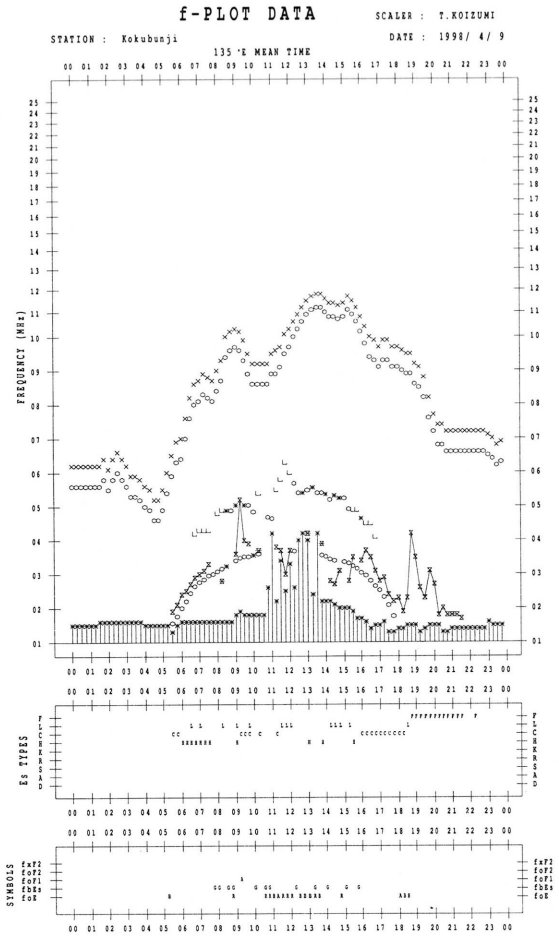

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

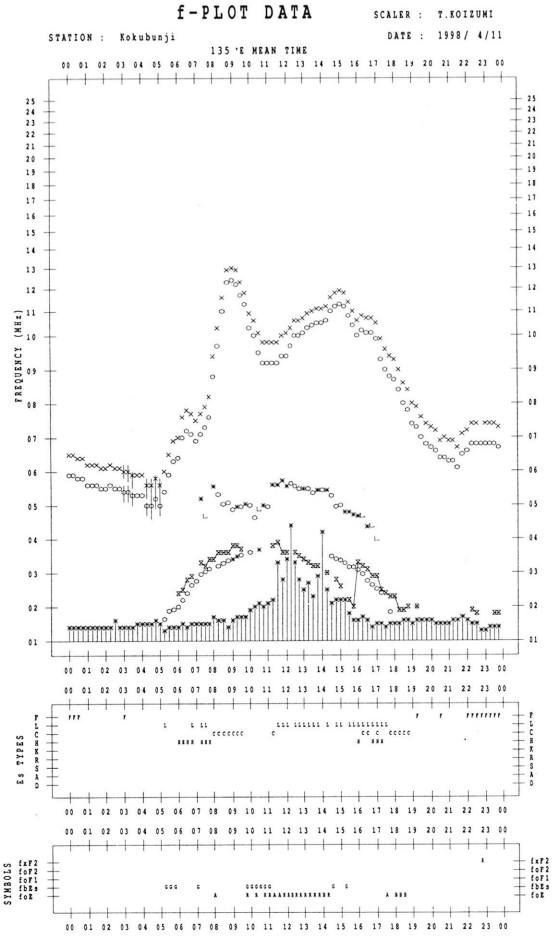

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

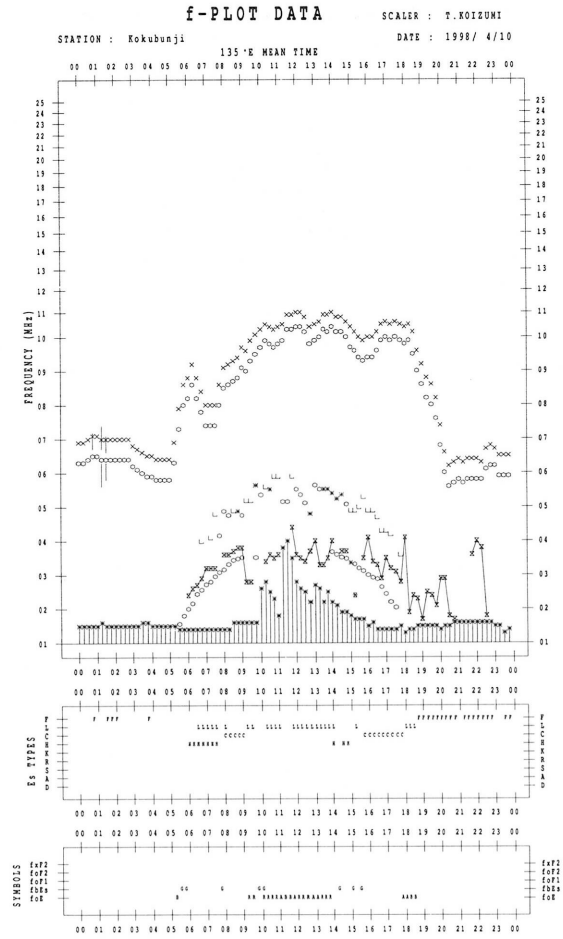

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

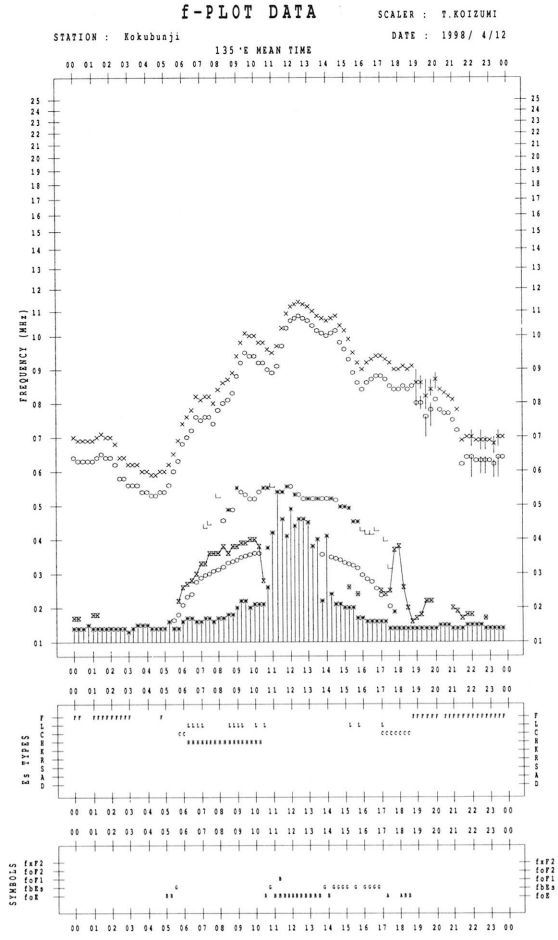

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

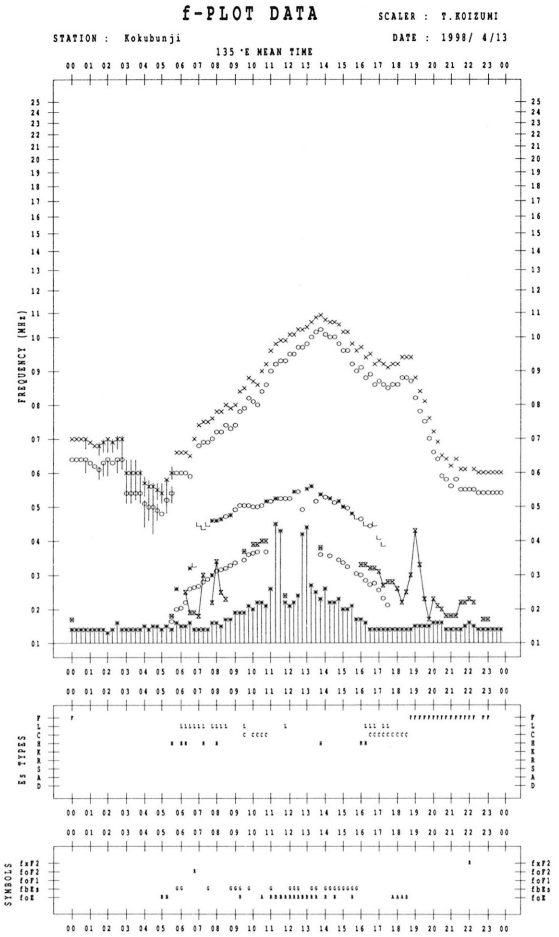

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

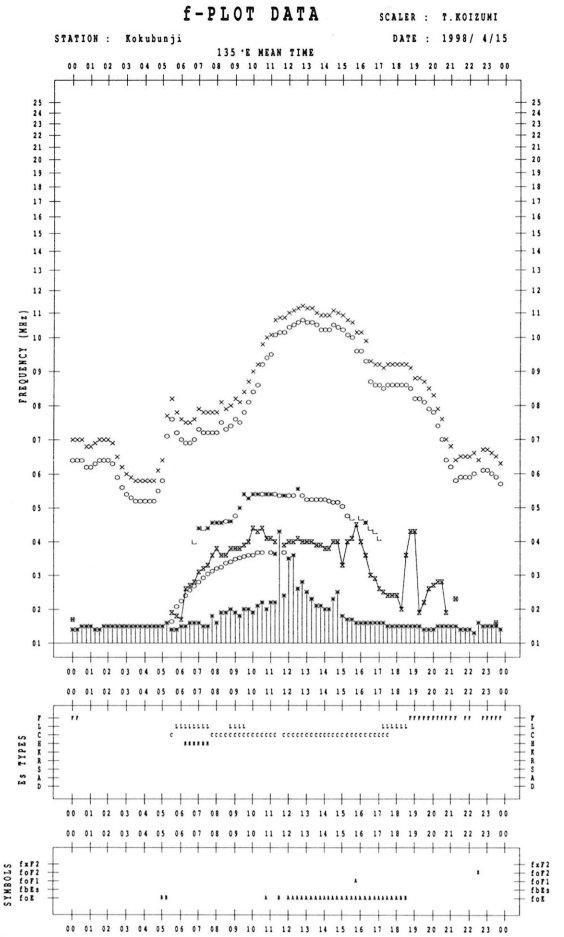

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/ 9
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

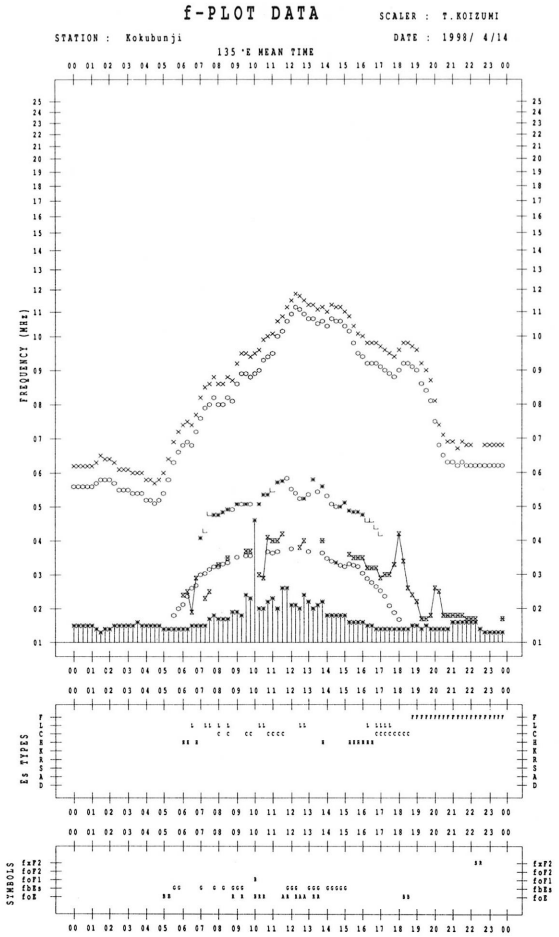

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/11
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

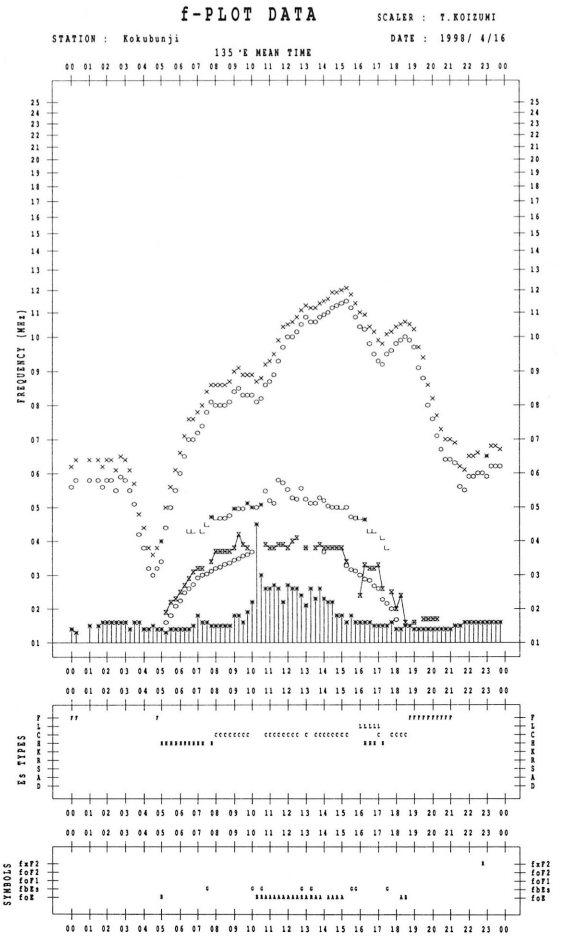

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/10
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

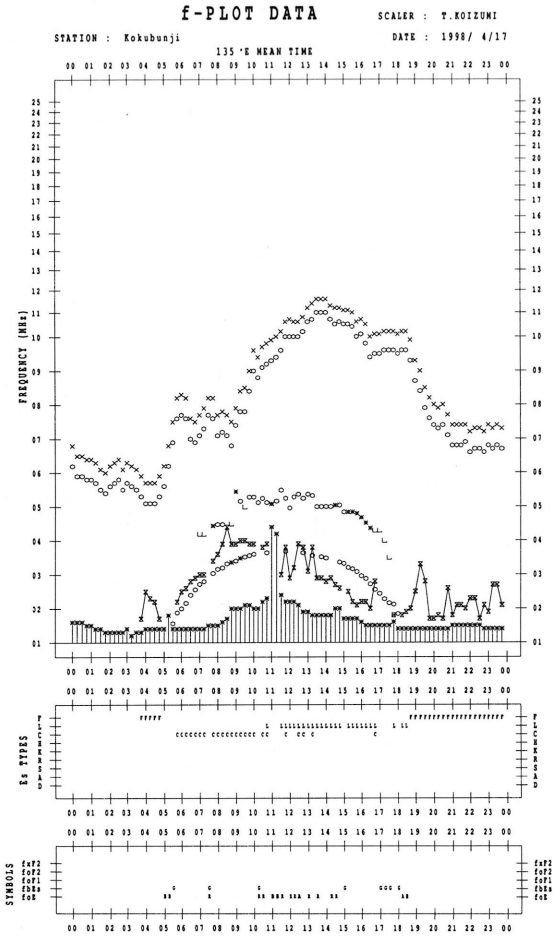

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/12
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

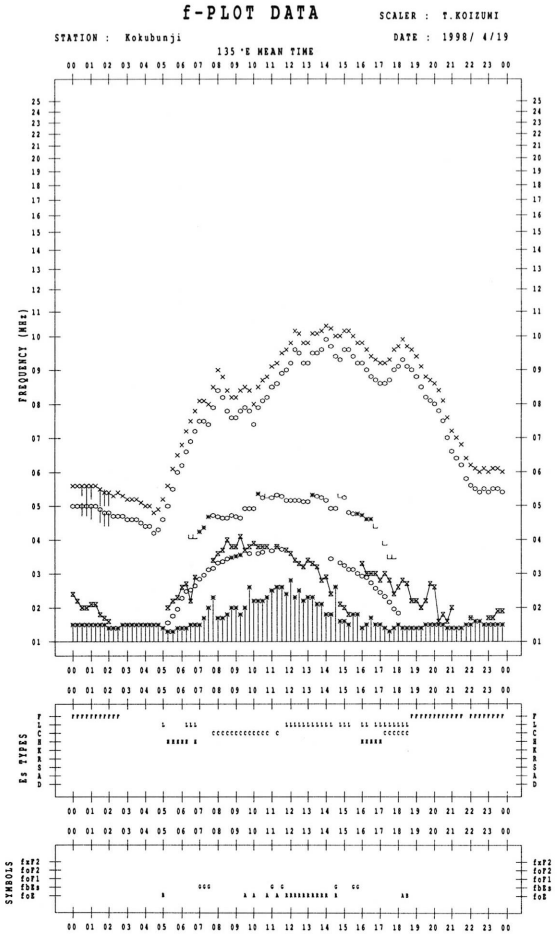

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

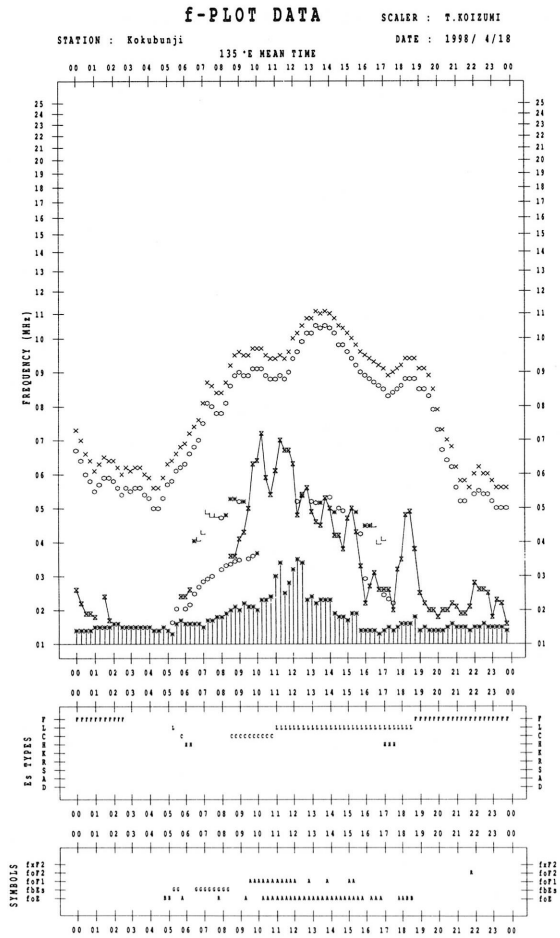

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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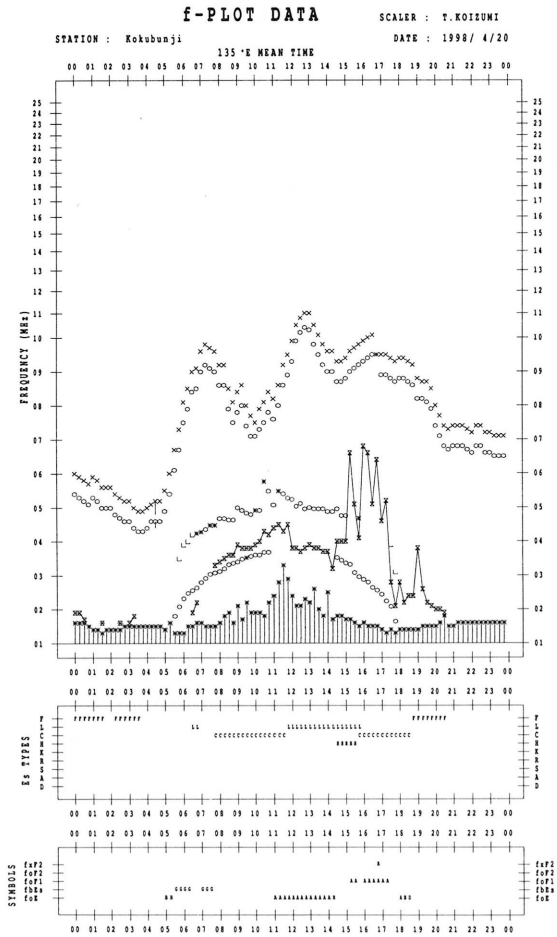
STATION : Kokubunji
DATE : 1998/ 4/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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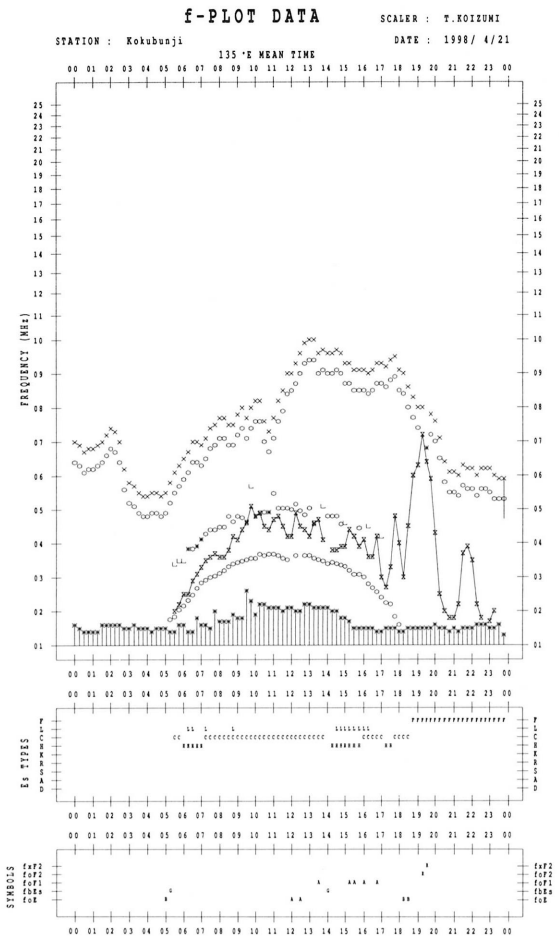
STATION : Kokubunji
DATE : 1998/ 4/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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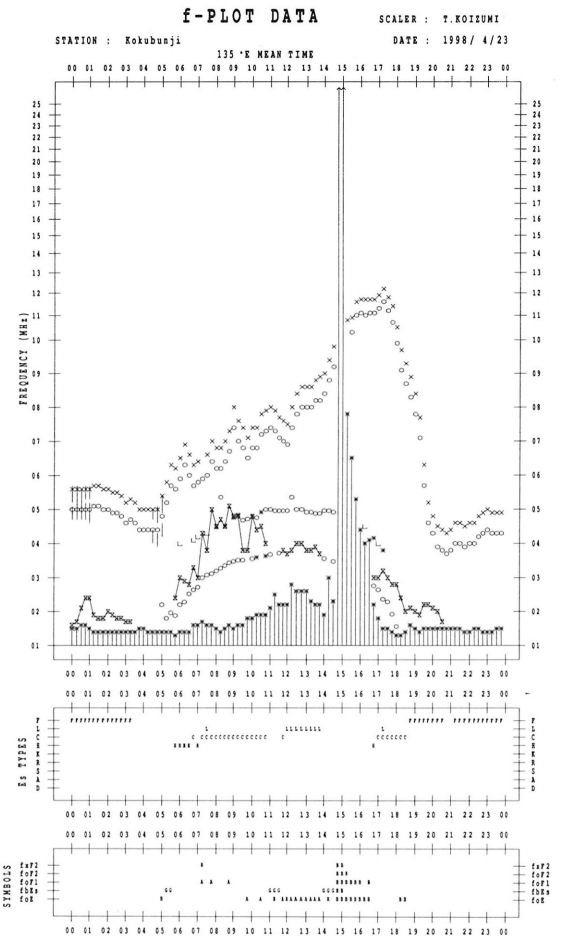
STATION : Kokubunji
DATE : 1998/ 4/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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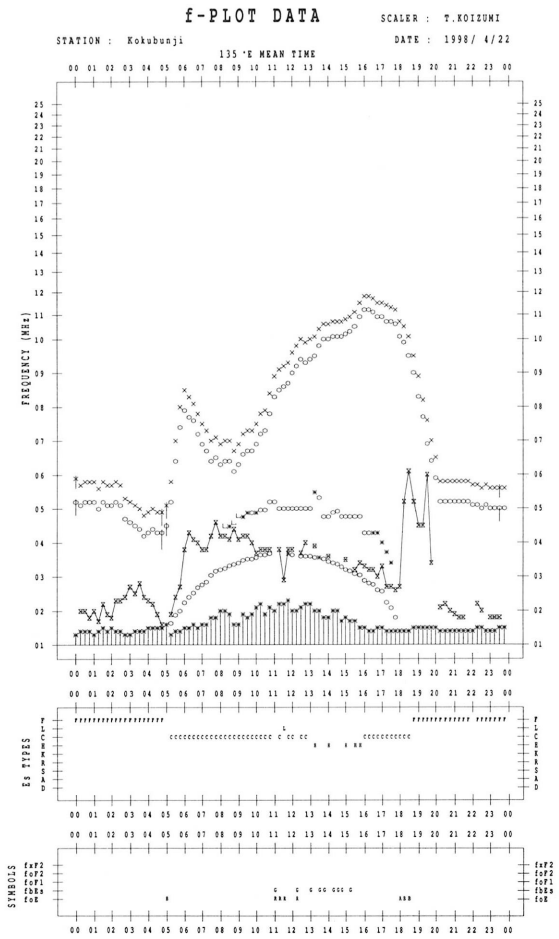
STATION : Kokubunji
DATE : 1998/ 4/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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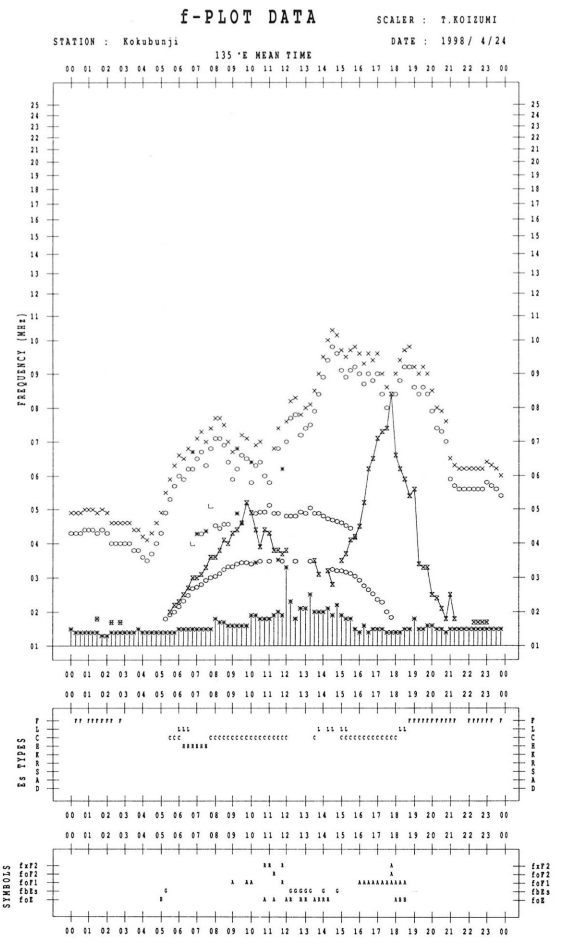
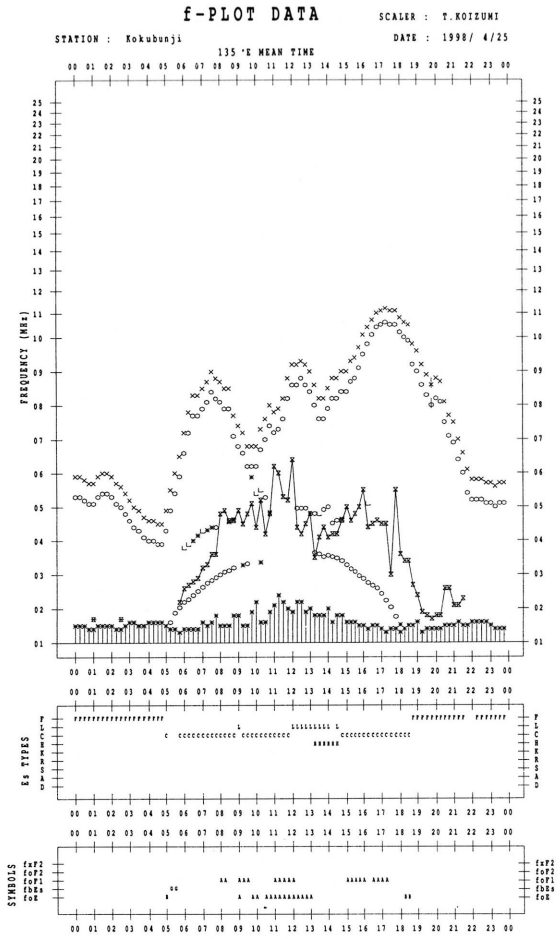
STATION : Kokubunji
DATE : 1998/ 4/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
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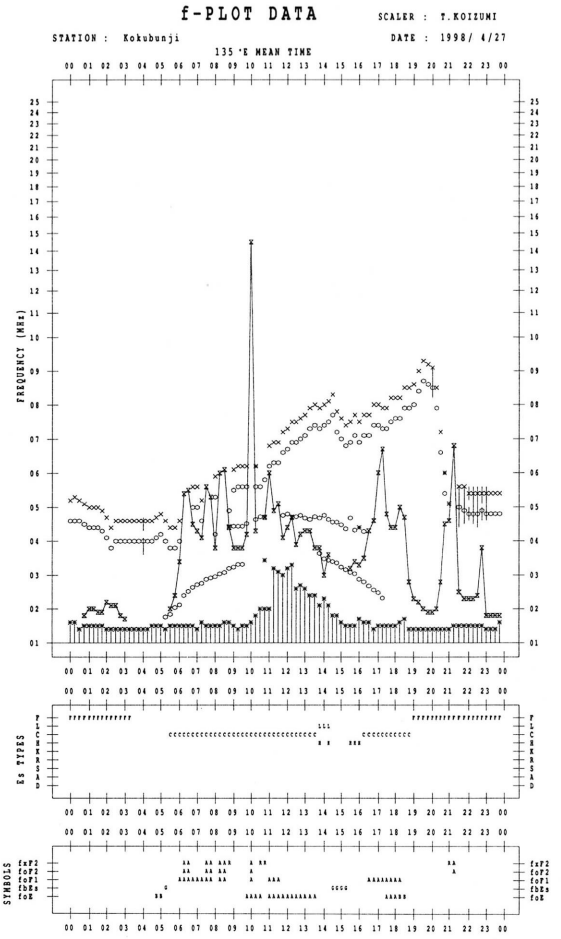
STATION : Kokubunji
DATE : 1998/ 4/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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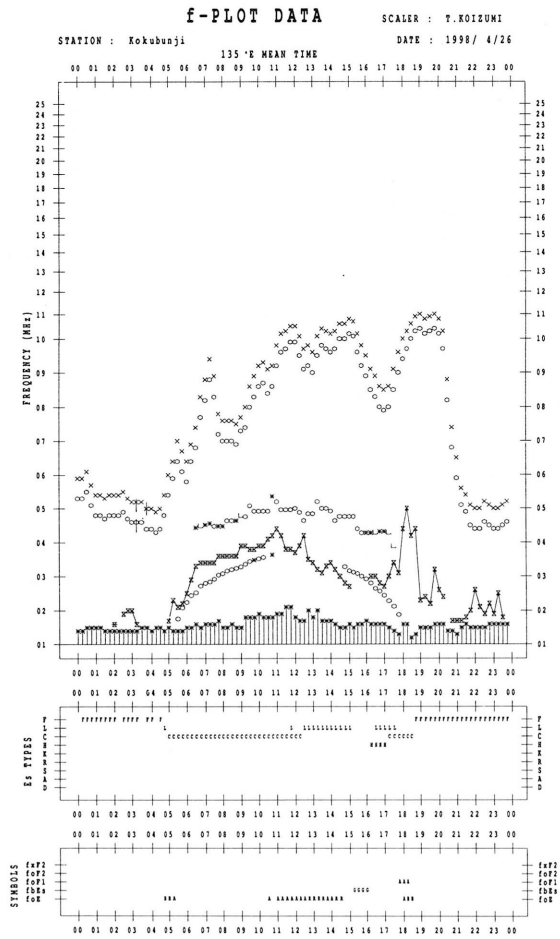
STATION : Kokubunji
DATE : 1998/ 4/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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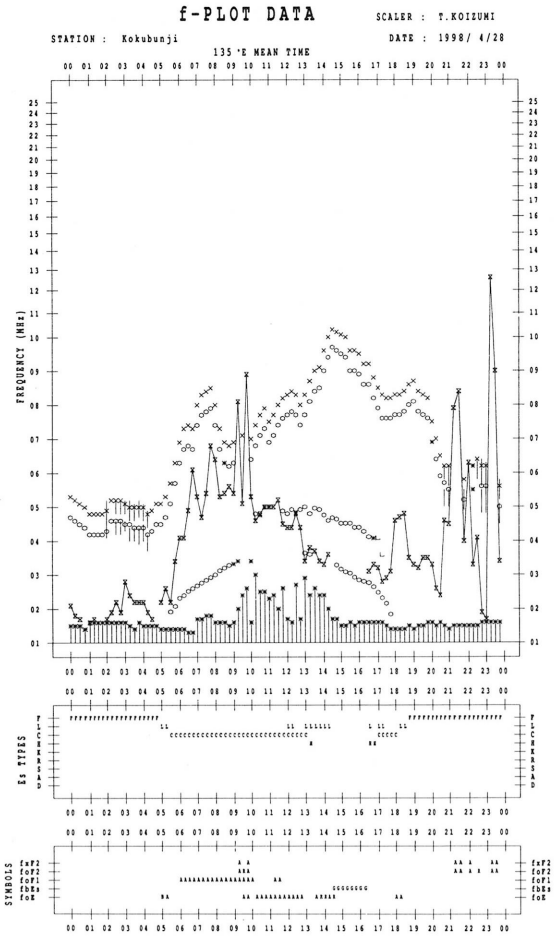
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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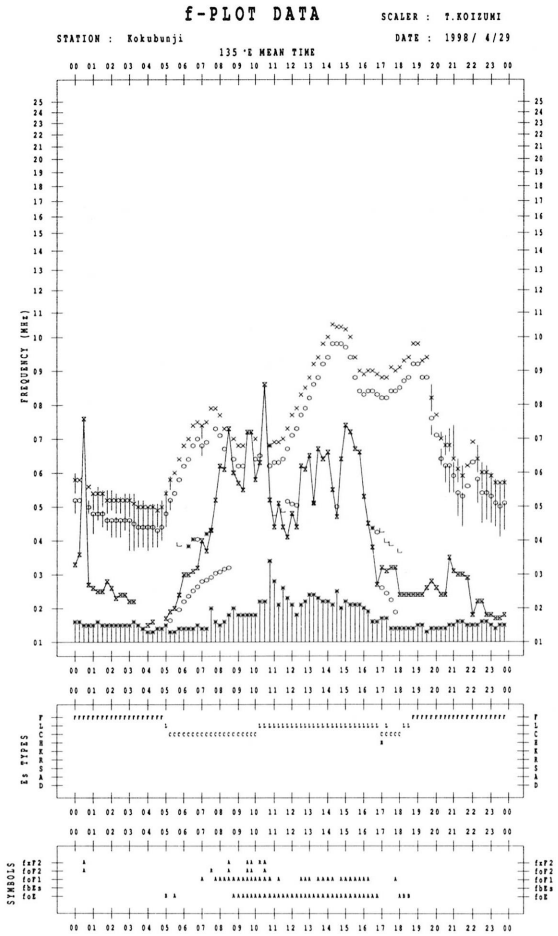
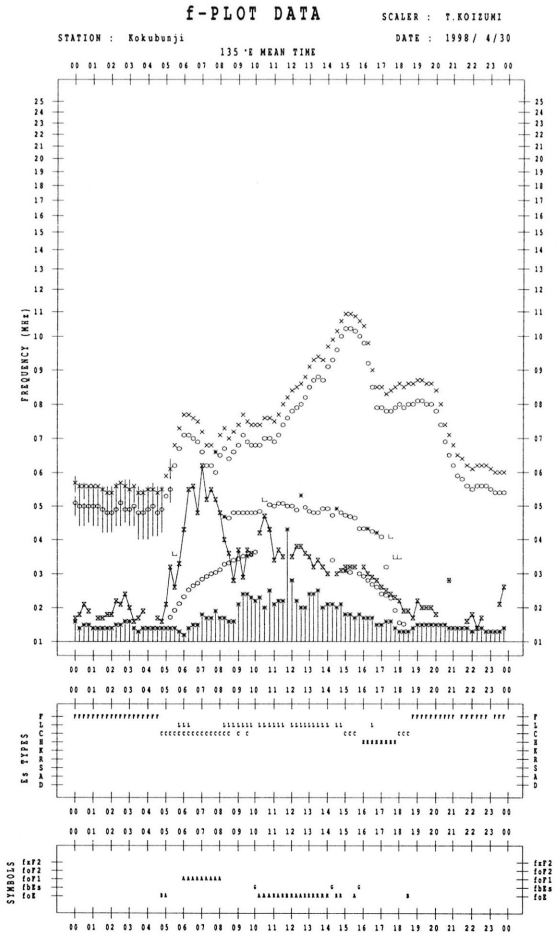
STATION : Kokubunji
DATE : 1998/ 4/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 4/30
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 April 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	31	31	31	30	31
2	31	31	31	32	31
3	31	30	30	32	31
4	31	31	31	33	31
5	33	33	34	35	34
6	37	37	37	36	37
7	36	35	34	36	35
8	35	35	35	35	35
9	34	34	33	35	34
10	34	33	34	34	34
11	34	33	33	34	33
12	34	34	34	33	34
13	-	(32)	32	32	32
14	32	31	30	31	31
15	32	32	32	33	32
16	34	33	33	33	33
17	33	34	33	33	33
18	32	31	31	32	31
19	32	31	31	31	31
20	30	29	28	30	29
21	29	26	25	30	27
22	28	27	27	28	27
23	28	28	28	27	28
24	28	28	28	28	28
25	29	29	29	30	29
26	30	29	30	29	29
27	28	29	30	29	29
28	29	28	27	29	28
29	28	28	29	32	29
30	30	30	31	31	30

Note: No observations during the following periods.
13th 0000 - 13th 0400

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso April 1998

Single-frequency observations

Normal observing period: 2000 - 0920 U.T. (sunrise to sunset)

APR. 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
1	500	8 S	0623.4	0623.5	0.2	430	-	0
	2800	8 S	0623.4	0623.5	0.2	4	-	0
2	500	8 S	0502.1	0502.2	0.2	100	-	WL
	2800	8 S	0502.1	0502.2	0.2	4	-	0
3	200	8 S	0833.3	0834.2	1.2	650	-	MR
	500	8 S	0833.5	0833.6	0.2	7	-	0
	200	46 C	2339.2	2340.5	10.5	40	5	WL
	500	46 C	2339.2	2343.6	11.0	16	3	WL
	2800	45 C	2343.2	2346.2	8.0	25	7	WL
4	500	42 SER	0530.0	0530.5	0.6	12	-	0
	500	1 S	2135.7	2135.9	1.2	8	2	WR
5	500	42 SER	0651.6	0651.7	1.0	3	-	0
	500	8 S	0722.9	0723.0	0.2	6	-	0
6	2800	3 S	0654.7	0656.2	4.0	11	3	0
	500	27 RF	2200.0	2300.0	120.0	10	3	WL
8	2800	29 PBI	2135.0	2135.4	12.0	100	14	WR
9	200	8 S	0422.9	0423.1	0.4	450	-	0
	200	8 S	0545.1	0545.3	0.4	700	-	0
	200	4 S/F	0807.5	0809.0	2.5	25	6	WR
	500	4 S/F	0808.4	0809.1	1.7	14	4	WR
15	2800	46 C	0742.0	0744.5	9.0	40	10	-
	500	46 C	0743.0	0750.2	45.0	400	-	MR
	200	46 C	0751.6	0752.7	3.0	14	3	-
	200	46 C	0806.0	0807.7	3.2	23	5	-
	2800	46 C	0806.0	0807.7	7.0	22	5	-
16	2800	46 C	0106.1	0110.4	5.0	17	4	-
	500	46 C	0110.2	0118.0	9.0	70	7	WL
	500	42 SER	0122.7	0124.6	2.5	70	-	WL
23	500	46 C	0536.0	0538.7	48.0	90	10	0
	2800	46 C	0536.0	0541.4	34.0	390	50	0
	200	46 C	0536.6	0542.0	25.0	160	10	0
	2800	46 C	0611.5	0614.0	15.0	15	3	0
	200	46 C	0618.6	0619.5	4.5	6	2	0
	500	46 C	0628.7	0629.9	12.0	5	1	0

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso April 1998

Single-frequency observations

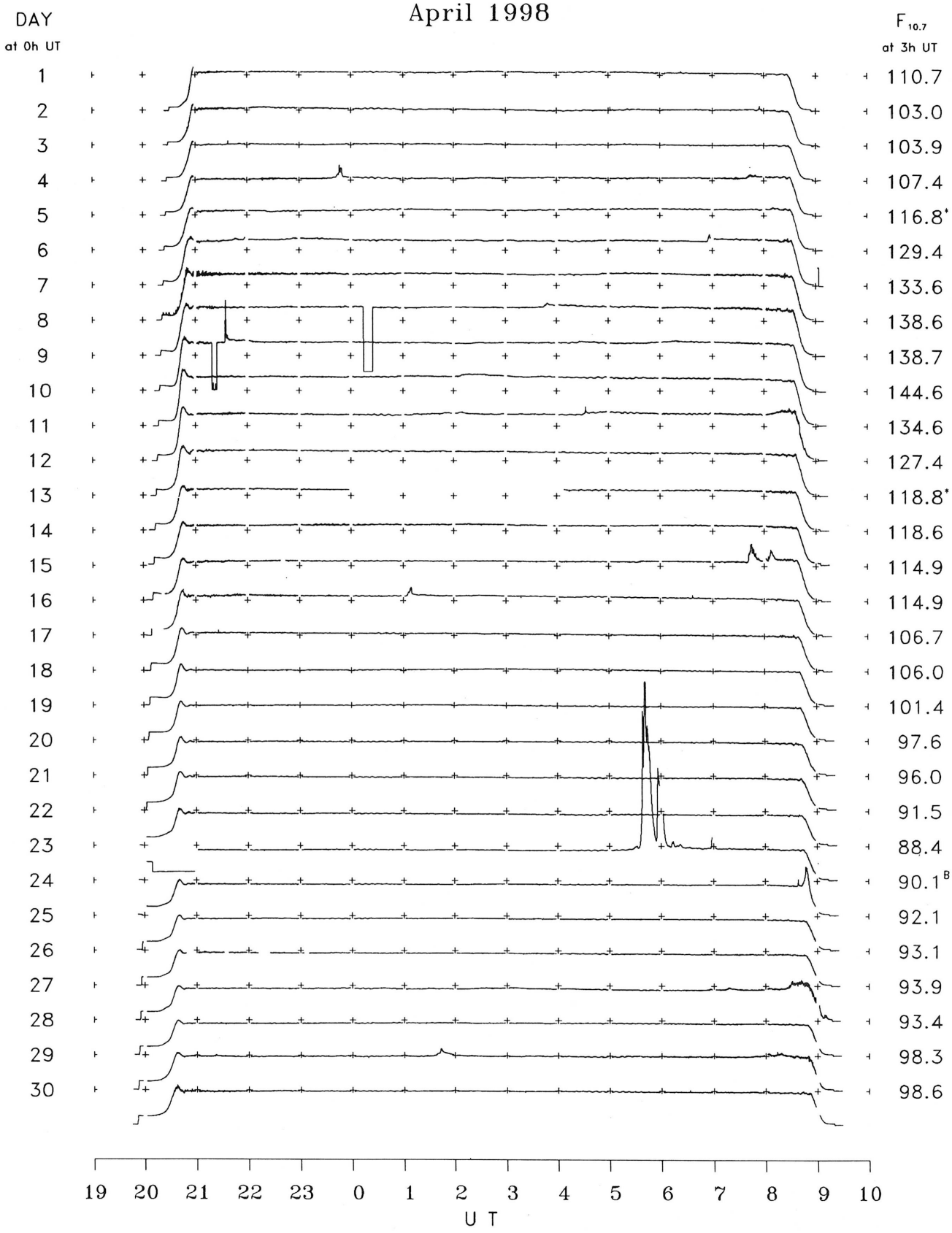
Normal observing period: 2000 - 0920 U.T. (sunrise to sunset)

APR. 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
23	500	42 SER	0656.4	0657.4	1.1	13	-	0
	2800	3 S	0657.0	0658.5	6.0	25	5	0
24	2800	2 S/F	0838.0	0838.7	1.0	13	3	0
	500	42 SER	0843.2	0845.6	2.5	5	-	0
	2800	46 C	0843.5	0847.2	10.0	35	8	0
25	200	8 S	0630.5	0630.7	0.5	160	-	0
	200	8 S	0758.5	0759.0	1.0	22	-	0
	200	8 S	0838.2	0838.4	0.5	22	-	WR
27	500	46 C	0824.0	0841.5	24.0	10	3	0
	2800	29 PBI	0826.0	0830.5	24.0	18	3	WR
	500	46 C	0901.7	0909.2	17.0	600	-	ML
	2800	3 S	0902.0	0902.5	1.2	22	3	0
	200	46 C	0904.7	0910.2	11.0	1100	-	ML
28	200	42 SER	1954.0	1954.6	0.7	13	-	0
	200	42 SER	2034.2	2034.4	6.0	80	-	0
	200	42 SER	2339.2	2340.6	11.0	320	-	0
	500	42 SER	2340.2	2340.3	4.7	14	-	0
29	200	42 SER	0129.2	0138.0	9.0	110	-	0
	500	42 SER	0137.5	0137.9	0.7	20	-	0
	2800	20 GRF	0138.5	0143.2	17.0	16	4	0
	500	42 SER	0405.2	0411.7	7.0	10	-	0
	200	42 SER	0407.2	0408.0	3.2	110	-	0
	200	42 SER	0512.1	0517.2	11.0	680	-	0
	500	42 SER	0520.2	0520.7	3.2	35	-	MR
	500	27 RF	0541.0	0600.0	65.0	6	2	WR
	200	42 SER	0643.2	0643.5	1.2	60	-	0
	500	42 SER	0806.5	0813.2	11.0	5	-	0
	200	42 SER	0809.2	0812.7	4.5	250	-	0
30	2800	29 PBI	2118.7	2122.0	50.0	90	7	0
	500	8 S	2232.7	2232.9	0.5	20	-	0
	200	42 SER	2255.6	2259.2	10.0	200	-	0
	500	42 SER	2256.5	2304.2	8.0	14	-	0

B. Solar Radio Emission

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

April 1998



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

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☎ (042) (327) ７４７８(直通)

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2-1 Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184-8795 JAPAN