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IONOSPHERIC DATA IN JAPAN

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INTRODUCTION

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

FEB. 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	A	38	30	40	36	35	39	A	54	66	72	61	67	68	78	78	62	52	35	29	35	30	35	
2	38		A	32	34	30	N		58	58	70	78	67	64	60	60	56	44	38		38	35	A	A
3	35	40	32		35	38	35	48	69	44	74	54	68	60	68	60	37	38	29	35		36		36
4	A	35	A	38	41	40	37	59	70	66	65	77	71	72	82	70	58	40	A	38	36	36	41	40
5	43	38	32	34		32	49	A	70	74	56	81	70	73	68	60	57		40	41	38	38	34	35
6	A	A	35	35	38	N			58	58		68	76	61	68	58	57	56	40	36	35		59	40
7	35	38	38	38	36	38	36	58	71	67	66	80	66	65	61	58	56	39	A	A	58	45	38	38
8	38	38	38	38	38	38	29	47	62	68	68	60	68	61	58	59	58	47	23	40	40		38	
9	49	40	31	38	29		31	54	70	73	67	64	80	68	70	76	71	72	50	41		36	42	43
10	44	39	47	45	40	57	57	58	71	70	68	80	83	77	80		60	48	41	56	58	56		50
11	57	56	57	51	56	58	40	52	58		71	69	80	71	63	72	62	43	N	41	38	38	39	44
12	42	35	31	36	35	33	41	37		69	77	77	81	71	61	78	63	58	53	46	A	55	57	
13	55	56	51	57	56	57	58	65	68	71	87	77	73	68	67	81	74	52	43	40	56	55	54	56
14	57	56		30	29	38	35	60	68	60	68	81	79	81	73	70	61	47	32	37		39	44	40
15	45	53	48	44	39	38	35	50	69	63	72	81	71	71		76	58	57	34		58	43	44	44
16	45	45	46	40			40	39	69	77	80	72	71	75	71	73	72	35	34	40	42		36	38
17	59		56	43	38	44	43	62	77	72	N	80	73		71		76	57	34	36		36	44	42
18		40	41	40	38	35	35	47		61	70	62	68	75	72	74	65	56	48	54	58	49	48	37
19	47		56		59	30	32	58	57	70	80	71	76	88	79	76	72	69	56	41	40	40	55	35
20	33		40	36	37	35	37	58		68	83	73	82	81	68	67	66	60	51	47	59	38	36	37
21	35	37	35	37	38	35	32	51	57	68	63	71	68	67	74	60	76	66	57	46		33	38	42
22	44	38	40	38	40	32	40	57	69	71	72	71	80	78	71	72	70	71	42	37	41	46	40	
23	59	38	34	34	38	32	32		70	68	73	71	74	77	77	70	68	58	58		30		40	42
24	44	45	40	50	51	42	38	70	82	68	82	81	80	81	80	76	70	63	57	37	41		42	46
25	50	46	46	48	46	40	35	59	70	70		80	80	74	72	70	68	64	59	37		38	35	
26	58	35		32	40	41	57	71	68	63	70	81	72	77	70	70	71	N	50	37	35	32		44
27		34	40	41	40	41	44	70	71	59	66	79	78	83	78	71	64	60	46		35	41	35	41
28			38	41	56	56	56	71	81	72	82	76	82	78	71	72	71	72	54	56	57	55	57	56
29																								
30																								
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	22	22	24	26	26	25	26	23	25	27	25	28	28	27	27	26	28	26	25	23	21	23	24	22
MED	44	38	40	38	38	38	38	58	69	68	71	76	74	73	71	70	64	56	43	40	40	38	40	42
U Q	55	45	46	43	41	41	43	62	70	71	78	80	80	78	77	76	71	63	53	46	57	46	46	44
L Q	38	38	34	36	36	34	35	50	60	63	67	70	69	68	68	60	58	47	34	37	35	36	37	38

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT WAKKANAI

FEB. 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	33	G	G	26	G	G	28	29	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
2	G	G	28	G	G	G	G	G	G	G	G	G	G	38	G	31	G	G	G	G	G	G	34	28
3	G	G	G	G	G	G	G	G		36	G	G	G	G	G	G	G	G	G	G	G	G	G	G
4	44	31	33	30	29	G	G	32	G	G	G	G	G	G	G	G	G	30	57	G	G	G	G	G
5	G	G	25	28	G	G	24	34	31	G	54	55	G	G	G	G	G		G	G	G	G	G	G
6	30	33	G	G	G	G	B		31	G		G	G	G	G	G	G	G	G	G	G	G	G	G
7	G	28	G	G	G	G	30	G	30	33	36	42	G	G	33	37	39	42	42	34	G	G	G	G
8	G	G	G	28	22	G	G	34	30	G	G	G	G	G	G	G	31	28	G	G	G	G	26	G
9	G	G	G	G	G	27	G	29	33	G	G	G	G	G	G	G	30	G	G	G	G	G	G	G
10	G	G	32	G	G	G	G			43	37	40	G	G	G		38	34	28	26	28	28	26	G
11	G	30	26	30	G	28	G	33	40		62	42	53	60	G	G	30	29	30	26	60	56	50	60
12	45	34	30	27	G	G	26	34	40	34	44	G	G	40	G	G	32	G	G	29	40	35	39	
13	28	24	G	G	G	G	46	39	58	61	58	64	G	G	G	G	29	28	28	28	G	G	G	G
14	43	35		26	G	G	G	27	32	35	39	G	G	43	G	G	G	30	29	G	G	G	G	G
15	29	32	26	26	G	27	G	31	34	36	G	40	G	G	G	37	36	30	28	36	29	G	29	28
16	32	29	G	G	G		G	32	32	35	G	G	40	39	G	G		30	G	G	G	G	G	G
17	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G		G	26	G
18		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	31	G	G	G	33	G	31	G
19	28		28		G	G	G	G	G	44	74	G	G	G	G	G	36	30	31	39	44	42	G	30
20	G		G	G	G	G	23	43		G	G	G	G	G	G	34	32	G	G	G	G	G	G	G
21	G	G	G	25	30	G	G	G	G	G	G	G	N	G	G	G	34	G	G	G	G	G	G	G
22	G	G	G	G	G	G	28	G	G	G	38	G	G	G	G	G	31	G	G	G	G	G	G	G
23	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	29	G	G	G
24	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	27	G	G	G	G	G	G
25	G	G	G	G	G	28	G		G	G		N	G	G	G	G	G	G	G	G	G	G	G	G
26	G	G	G	G	28	G	G		G		G	G	G	G	G	G	G	G	G	G	G	G	G	G
27	G	G	G	G	G	G	G	G	G	G	G	G	39	G	G	G	41	30	31		G	G	30	G
28	G	29	G	G	G	G	G		G	G	G	G	G	G	G	G	G	29	G	G	G	G	G	G
29																								
30																								
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	26	27	27	28	27	27	21	25	26	26	27	27	27	28	27	27	27	28	27	27	28	28	27
MED	G	G	G	G	G	G	G	29	G	G	G	G	G	G	G	G	29	G	G	G	G	G	G	G
U Q	29	29	26	26	G	G	23	33	32	35	38	G	G	G	G	G	32	30	28	26	28	G	26	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT WAKKANAI

FEB.1998

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

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT KOKUBUNJI

FEB. 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	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
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	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C							A	A	A	A	A		
13	A	A	A	A	N		A					81	76	75	80		67	A						A
14	A					N		52	62		54	76	83	78		A	67	A						
15		34						56	68					95	A	64		A			A		24	
16	N			A									85	93	85	A	64	52					26	A
17	28	29	32					56	65	74	A	78	86		75	76	A	64	A			N		
18		B				29		58	64			84		74		80	77	61		N				
19		N			28			57	91	98	126	120												
20				35	29			58	70	71	78	98	108	107	91	80	64	61	54	N				35
21	31	29	31	35	29		N	56	71	76	81	94	96	97	81	71	66	60	47		46			26
22	29	28	35	28	35	29		57	63	66	73	68	76	78	71	67	68	67		56	28			35
23		N	26	29			N	58	70	78	74	81	78	81	83	82	73	72		32	26	31	24	
24	34	35	30	31	28	28	59	58	67	76	68		80	80	78	73	77	63	A	32	46	26		56
25	34	30	30	34	28	28	35	67	72	87	74	80	C	88	96		76	52	42	43	48	58	44	41
26	56	34	56	43	38	34		38	69	71	83	85	96	82	90	86	78	89		57	26	A	56	N	59
27		35	36	36	30	35	40		71	82	74	70	85	82	76	74	65	66	49	30		36		35
28			32			34	40		92	76	73	80	86	95	88	80	71	62	56	34			34	
29		37	35	40	36	37	48	67	69	64	92	96	101	96	78	76	72	72	57	43	32	46	41	44
30																								
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								13	15	12	12	14	13	15	13	12	14	12						
MED								58	70	76	74	81	85	88	81	76	70	62						
U Q								62	71	82	83	96	91	95	87	80	76	66						
L Q								56	65	72	73	78	79	78	77	72	66	60						

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT KOKUBUNJI

FEB. 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	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
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	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	50	100	72	G		G	50	32	29	28	29		
13	32	31	30	33	G	G	25	G	G	G	G	G	G	G	G	52	52	48			G			35
14	32			G		G		G	G	G				G	58	G	G	30			30		G	
15	G	G		G		G		G			G		G	G	54	47	36	G				G	26	35
16	30	G	26	27	G			G	G	G	46	52	G		G	G	38	32	32			G		
17	G					G	G	G	G	G	G	G	G	G	G	G	G	G		G			G	
18		G		G	G			G	G	G	G	G											G	G
19	G			G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G
20	G	27	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G			G
21	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
22	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	30	G	G	G	G	G	G
23	G	G	G	G	G		G		G	G	G	G	G	G	G	37	37	34	26	G	G	G	G	G
24	G	G	G	G	G	G	G		G	G	G	G	C	48	G		G	G	G	G	G	G	G	25
25	G	G	G	G	G	G	G		G	G	G	G	49	52	42	42	37	28	G	G	33	G	G	26
26	24	G	G	G	G	G	G	31	34	G	G	G	G	G	47	G	55	59	50	G	G	G	G	G
27	G	G	G	G	G	G	G	G	G	G	46	G	G	G	G	44	36	29	G	G	G	G	G	G
28	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	48	36	38	24	28	G	G
29																								
30																								
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	15	13	11	15	13	10	11	12	15	15	15	15	14	15	16	14	16	16	12	12	13	11	13	13
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	30	G	G	G	G	G	G
U Q	24	G	G	G	G	G	G	G	G	G	G	G	G	G	21	42	37	41	32	G	26	G	G	25
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT KOKUBUNJI

FEB. 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	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
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	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	18	20	17	14		15	14	16	22	15	22		
13	18	23	23	21	21	18	17	20		18		47		21	21	17	21	22						17
14	21			66		22		44	44	49				21	18			16			21		21	
15								66			44		52		28	20	18	23					21	17
16	16	16	16	17	17			24	14		33	35	62		60	16	17	15	21			16		
17	15					16	21	26		17	91	73	64	63	91	48	44	42		20			66	
18		20			22			21			48	49											20	66
19				22	15		21	23	15	17		21					15	21	17	21	14			16
20	17	18	17	18	18		22	24	15	18					20	16	18	20	14	18	16			17
21	17	15	16	16	15	16		17							17		26	20	23	17	16	18		16
22	15	18	16	15			16	21	44	17	18			45	36	43	16	15	21	18	18	16	18	20
23	18	15	16	18	16		16	23	29	18						28	18	14	17	17	15	18	20	15
24	20	15	18	16	16	21	16	16	14				C	26	20		15	21	15	15	15	14	15	15
25	16	15	15	15	15	15	15	16	16	14	15	18	17	23	21	18	15	15	15	15	14	15	15	14
26	14	15	14	15	15	14	14	14	14	17	16	17	21		18	14	14	15	15	17	15	15	15	15
27	14	15	15	14	15	15	15	15	14	15	14	16	17	17	18	18	15	15	15	18	15	15	15	14
28	15	15	15	14	15	15	14	16	14	15	16	16	24	16	16	15	15	15	14	15	14	15	15	15
29																								
30																								
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	13	12	11	13	12		11	16	11	11		10			14	11	15	16	12	12	12	10	11	13
MED	16	15	16	16	16		16	21	15	17		20			20	18	16	16	16	18	15	16	18	16
U Q	18	18	17	19	17		21	24	29	18		47			28	28	18	21	19	19	16	18	21	17
L Q	15	15	15	15	15		15	16	14	15		17			18	16	15	15	15	16	14	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT YAMAGAWA

FEB. 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	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	63	78	81	77	88	80	85	87	84		A	79		59	55
3		32	34		69	69	59	69	66	70	74	72	73	67	66	66	69	67	48	43	43	49		69
4			25	30		28		69	69	70	76	85	80	100	92	66	61	66	64	44		A	79	
5	37	69		39	37		49		66	83	92	73	77	84	75	70	63	71	59	35		41		89
6	30	36	39		32	30		31	61	76	66	63	75	72	74	71	67	73	66	34	43			69
7	69	A	38			30			52	54	72	81	73	67	77	70	80	70	58	43		59		
8	79		37	48	44	29	N	69	70	68	68	72	75	73	65	65	62	69	57	42	48	49	79	79
9	32	79		32	34		25	49	60	81	70	72	75	108	95	67	70	74	84		31		34	N
10	N	79		38	58		31	48	66	66	78	77	72	72	80	74	63	60	48	43	37		34	59
11	59	32		34	47		N	59	68	77	79	87	85	77	66	62	70	61	68	53	61	30	34	49
12	25	69	43	23	47	36	25	37	67	87	93	88	93	74	72	66	66	65	58	42	32		27	28
13	79		50	44		48	34	44	73	79	70	73	86	107	100	86	74	73	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	92	75	66	62	62		69		
16	79	38	42			59	55	35	67	68	78	85	91	88	95	84	84	84	74	48	59	69	79	79
17	42	38	29		36	28	C	C	C	79	74	83	96	91	82	80	82	76	66	38		38		79
18	30	34		N	79		36		84	104	116	111	111	117	91	74	80	83	83	64			59	25
19	69	59	79	69	49		32	59	66	77	91	111	128	121	113	105	92	74	69	55		79	79	
20				79	48	N		48	75	86	74	93	105	114	96	75	72	70	73	54		44		
21	46	42		60	56	49	26	53	68	70	78	81	77	80	82	77	78	82	76	51		42		32
22	69	59	58	48	69	30	32	46	66	71	74	84	82	88	95	87	76	79	63		53		69	41
23		48	52	60	49		30	54	73	70	67	88	82	97	82	81	90	85	58	59	69	69		
24		69		60	48	49	59	61	66	77	84	76	80	100	100	95	86	66	52	34	61		79	49
25		39	42			58	59	50	68	87	97	98	104	101	105	96	88	92	75	65	53		49	N
26	59			43		N	69	53	76	76	84	88	78	85	86	81	74	85	74	61			59	59
27		36		62	59	69	59	52	72	76	83	77	90	97	107	100	91	78	77		32		42	
28	49	42	38	60	59	59		52	58	72	84	95	105	106	96	91	75		74	79			43	28
29																								
30																								
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	16	18	14	17	18	15	16	20	23	25	25	25	25	25	25	26	26	25	24	21	14	12	16	16
MED	54	42	40	48	48	48	35	52	67	76	78	83	82	88	86	78	75	73	66	48	50	49	59	57
U Q	69	69	50	60	59	59	59	59	72	80	84	88	94	103	96	87	84	82	74	60	61	69	79	74
L Q	34	36	37	36	44	30	30	47	66	70	73	74	76	75	76	70	69	66	58	42	37	41	38	36

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT YAMAGAWA

FEB. 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	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	G	G	38	40	46	40	44	45	49	40	39	28	G	G	G
3	G	25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	37	26	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G	81	79	54	G	G	G	G	G	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	37	G	G	G	G	G	G	G	G	G	G	24	G	G
7	G	29	30	G	G	G	G	G		G	G	G	G	G	G	G	G	41	27	G	G	G	G	G
8	G	28	G	G	G	G	G	G	29	G	40	60	61	60	56	54	G	G	31	G	G	G	G	G
9	30	28	G	28	25	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G	G	G
10	G	G	G	G	G	B	G	G	G	G	G	G	G	G	G	G	46	G	G	G	G	G	26	G
11	G	G	G	G	G	B	G	G	G	G	G	G	55	G	55	45	40	G	G	32	G	G	G	29
12	G	G	25	24	G	26	G	24	32	39	G	G	G	G	G	G	G	81	41		28	G	G	
13	29		28	29	G	27	27	27	G	G	G	40	G	G	G	G	G	G	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	G	G	40	24	G	G	G	G	G
16	30	G	G	G	G	G	G	G	G	G	G	G	G	G	45	60	55	36	G	G	G	G	26	28
17	G	G	G	G	G	G	C	C	C	G	G	62	44	G	G	G	G	G	G	G	G	G	G	G
18	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	27	25
19	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
20	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	G	G	G		G	G	G
21	G	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	31	G	G	G	G	G	G
22	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	33	G	G	G	G	G	G
23	G	G	G	G	G	B	G	G	G	G	G	G	G	G	G	G	G	G	G	G	30	G	25	24
24	G	G	G	G	G	G	G	G		G	39	52	51	60	51	43	39	G	G	G	G	G	G	G
25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	G	G	G	G	G
26	G	G	26	G	G	G	G	G	G	G	G	G		G	G	G	G	G	32	G	G	G	G	26
27	G	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G	36	G	G	G	G	G	G
28	G	G	24	G	G	G	G	G	G	G	G	G	G	G	G	G					32	32	G	26
29																								
30																								
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	24	23	24	24	24	21	23	23	20	25	24	25	24	25	25	26	25	25	24	22	24	25	25	24
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
U Q	G	G	G	G	G	G	G	G	G	G	G	G	20	G	20	G	19	34	25	G	G	G	G	12
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT YAMAGAWA

FEB. 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	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	20	18	20	30	20	18	18	18	18	16	15	14	15	14	15
3	14	14	14	16	14	14	14	14	17	17	18	18	20	18	20	18	17	21	15	15	14	15	15	14
4	15	14	14	14	14	14	14	14	21	28	20	20	23	20		20	18	22	15	14	14		16	14
5	14	14	14	14	14	15	15	15	21		20	21	22	18	18	17	26	22	16	14	14	14	15	14
6	14	14	14	14	14	14	14	14	17	20	18	20	21	20	22	20	17	16	14	15	14	15	14	14
7	15	18	18	15	14	14	14	14	16	26	17	21	22	20	24	30	21	16	15	14	14	14	15	15
8	15	14	14	14	14	14	14	14	16	18	21	20	20	20	20	20	17	22	17	14	17	15	15	15
9	14	14	14	15	15	15	15	14	17	18	18	20		20	20	18	21	18	15		14	14	14	14
10	14	16	14	14	14		15	14	22	16	18	18	20	18	20	18	22	17	15	14	16	14	17	16
11	14	14	14	14	14		14	14	17		20	20	20	21		22	15	23	15	15	16	14	14	16
12	15	14	14	14	14	15	14	14	18	16	32	18	44	44	40	46	21	16	14	14	15	15	16	16
13	15		14	14	14	15	15	15	15		17	18	20		21	18	17	21	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	21	17	16	14	15	14	14	14	14
16	14	14	14	14	14	15	15	15	22	21	20	21		47	22	23	21	18	17	15	16	15	15	15
17	15	15	15	15	15	15	C	C	C	18		36	22	21	22	21	18	21	15	15	14	14	15	14
18	14	14	15	15	14	15	15	15	22	29		40	45	44	40	40	28	21	16	14	14	15	15	14
19	14	14	14	15	15	15	14	16	22	28		49	45	46	22		22	23	17	15	15	15	15	15
20	16	14	14	15	14	15	15	16	23	17	20	22	23	22	22	21	18	16	17	14		15	14	14
21	14	14	14	14	15	15	15	16	21	18	20	22		44	44	23	21	18	16	15	14	14	14	14
22	14	14	14	14	14	14	14	17	21		22		44	44	45	20	20	17	17	14	14	14	14	14
23	14	14	14	14	14		15	16	24	17	21		47	42	44	22	20	16	17	14	15	15	15	17
24	14	14	15	15	14	14	14	16	26	32	39	37	39	41	33	22	18	17	15	14	14	14	14	14
25	14	14	14	14	14	14	15	16	20	20			22	22	22		18	17	15	14	15	14	15	15
26	14	15	14	14	14	14	15	16	23		21		36	45	22		33	29	17	16	16	15	15	15
27	14	14	14	14	14	14	14	16	23	33	33		22		46	18	21	18	17	15	14	14	14	14
28	15	14	15	14	14	14	14	15	24	34	39	43	46	21	20	24	20		17	16	16	16	16	15
29																								
30																								
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	24	23	24	24	24	21	23	23	23	20	21	20	22	23	23	23	26	25	25	24	24	24	25	25
MED	14	14	14	14	14	14	14	15	21	20	20	20	22	21	22	21	20	18	16	14	14	14	15	14
U Q	15	14	14	15	14	15	15	16	23	28	21	29	44	44	40	23	21	21	17	15	15	15	15	15
L Q	14	14	14	14	14	14	14	14	17	17	18	20	21	20	20	18	18	16	15	14	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT OKINAWA

FEB. 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	59	59	59	30	31			43	49	56	81		120	130	145	135	117	102	92			A		44
2	31	31	35	34	31			59	59	61	91	91	93	100	122	131	132	133	107	A	A	53	A	43
3	47		59	38	31			43	44	57	68	82	82	86	96	87	75	77		48	45	A	44	
4	A	A	A	59	38		31	39	66	79	83	101	93	126	126	122	100	99	92	A		A	A	42
5	50			57	59		34			94	81	93	80	76	87	82	87	92	83	74	50	A	A	47
6	A	59	59	69	25		A		A	82	89	76	72	83	92	100		96		89	70	72	63	
7	47	42	59	38	A	A	35		53		68	86	85	82	83	93	72	82	80	53	48	38		48
8		49	A		59			49	56	55	66	67	63	68	78	68	71	83	70	66	48	41	44	
9			A		69		A		49	57	67		78	115	122	92	74	93	92		56	59	43	31
10	37	38	43	44				36	55	82	86	78	76	81	81	70	67	62	69	37	43	43	41	38
11				59	32		N	47	63	83	81	91		92	68	58	63	70	71	66	44	46		
12	A	A	59	69			N	A	70	94	71	94	116	93	87	64	67	72		A	A	43		38
13			A	36	34	30		43	60		84	84	122	147	153	133	102		89	A	A	63	A	46
14	37	29	43	A	44	A		A	59	69	67	87	91	131	166	145	123	94	85	A	47	56	47	A
15	A	35			37			46		70	81	93		106	105	122	110	96	76	59	43			
16	37	31			42		69			69	75	85		116	116	144	133	128	105	A	54	A	54	N
17	43	A	38		37				50		64	80	94	116	112	93	92	94	88		57	53		
18	43	38	43	36		34	37		A	96		93	95		100	83	96	93		59		58	41	
19	69	41	48	A	46			A	61	83	89	124	138	119				124			83			A
20	A			A			69	A		66	97	104	116	120	123	117	110	126			91	74	45	47
21	44	48	56	37	42				62		71		91	96	104	93		112				75	69	69
22	59	55			58	34		44	53		88		98	112	110	112	86	84	92		89		69	42
23	56	54	58		40	42	28				66	96		114	116	117	110	126			93	71	55	43
24	45	50	44	45	A	A	A	49	57	74	94	87		114	116	96	90	83	77	A	68	66	55	52
25	48	43		59	37		29		67	94		104	114	121	132	127	132	117	117	109	96	80	79	51
26	35			40					66	79	81	105	118	110	102	98	105		83		81	81	83	48
27		43		44		69	69		70	68	75		94	118	123	132	134	125	132	A	82	71	66	68
28	58		69	69		89			56	70	91	117	117	134	148	125	97	84	80	A	A		48	A
29																								
30																								
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	18	17	15	18	19			11	21	22	26	23	23	27	27	27	25	26	20	10	20	19	17	17
MED	46	43	56	44	38			44	59	72	81	91	94	114	112	100	97	94	86	62	56	59	54	46
U Q	56	52	59	59	46			49	64	83	88	101	116	120	123	127	113	117	92	74	82	72	67	49
L Q	37	36	43	37	32			43	53	66	68	84	82	92	92	87	74	83	78	53	47	46	44	42

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

FEB. 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	G	G	G	28	G			G	G		37	G	G	G	G	40	37	G	26		24	40		G
2	G	G	G	40	G			G	G	G	36	48	56	G	48	41	39	39		46	32	29	34	26
3	G	G	G	G	G	G		G	41	33	40	41	G	39	G	G	G	36		58	38	59		
4	34	29	28	G	24	G	G	G	28	G	40	72	42	G	G	42	34	36		66		72	45	25
5	G	G	G	G	G	G	G	G		G	G	38	G	G	40	G	G	G	G		26	99	49	48
6	33	G	40	30	27		31	34	40	38	44	42	39	42	50	G	G	35	40	48	35		G	G
7	28	G	G	G	37	30	25	48	44	G	42	G	40	G	40	41	50	35	28		G	G	33	G
8		G	42	33	30			G	46	35	G	43	43	42	G	37	G	G	49	46	G	G	G	G
9	G	G	39	28	29		32	39	44	G		52		G	42	40	G	G	G	G	26	G	29	32
10	G	G	G	G	G	G	B	G	G	G	G	G	G	G	50	G	G	36	31	33	G	G	G	G
11		G		G	G	G	G	G	G	G	40	G	G	G	G	G	37	G	28	29	G	G	26	49
12	43	32	G	25	G		G	44	51	39	45	46	G	G	G	N	G	G		44	39	58	42	G
13	28	G	43	G	39	G		G		G	G	G	G	G	G	40	G	37	32	59	55	48	40	G
14	G	G	G	38	61	38	G	38	46	38	G	G		G	G	G	G	G	50	70	32	38	24	63
15	68	33	G	38	G	G		39		G	G	G	G	G	48	G	39	33	G	G	40	G	G	G
16	G	G	34	G	28		G	G		G	G	42	50	62	53	G	46	86	69	44	G	36	G	44
17	G	36	41	39	G		G	G	44	44	48	54	54	71	G	40	G	37	50			G	G	G
18	G	G	G	G	26	G	G	G	46	G	42	G	49	G	50		G	40	G	G	G	G	G	G
19	G	35	G	41	G		G	39	33	G	G	G	71	G				G	G	G	G	G	35	31
20	41		G	33	G	G	G	48	G	G	41	G	G	G	G	G	39	G	G	G	G	G	G	G
21	G	G	G	G	G	G	G	G		G	G	G	G	48	G	G		G	G	48	G	G	G	G
22	G	G			G	G		37	45	41	G		G	G	G	G	G	34	G	G	G	40	G	G
23	G	G	24	G	G	G	G	G			N	G	G	51	49	G	G	G	G	G				
24		G	G	45	39	34	26	G	45	G	G	50		56	46	50	46	35	34	50	37		G	G
25	G	G	G	G	G	G	G	G	G			G	G	G	48	G	41	34	30	G	G	40	G	G
26	27	27	33	G	G	G	G		G	G	G	G	G	G	43	G	G	G	34	42	33	G		G
27	G	G	G	G	G	G	G	G	G	G	40	G	G	51	55	G	42	37	33	26		G	G	G
28	G	G	G	36	G	G	G		52		G	42	50	G	G	G	G	35	32	46	50	33	43	
29																								
30																								
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	25	27	26	27	28	19	20	26	22	24	25	27	25	28	27	25	26	28	24	24	24	25	24	25
MED	G	G	G	G	G	G	G	G	40	G	G	G	G	G	40	G	G	34	29	43	25	G	G	G
U Q	28	G	33	36	27	G	G	38	45	34	40	43	46	42	48	40	39	36	34	48	36	40	34	28
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

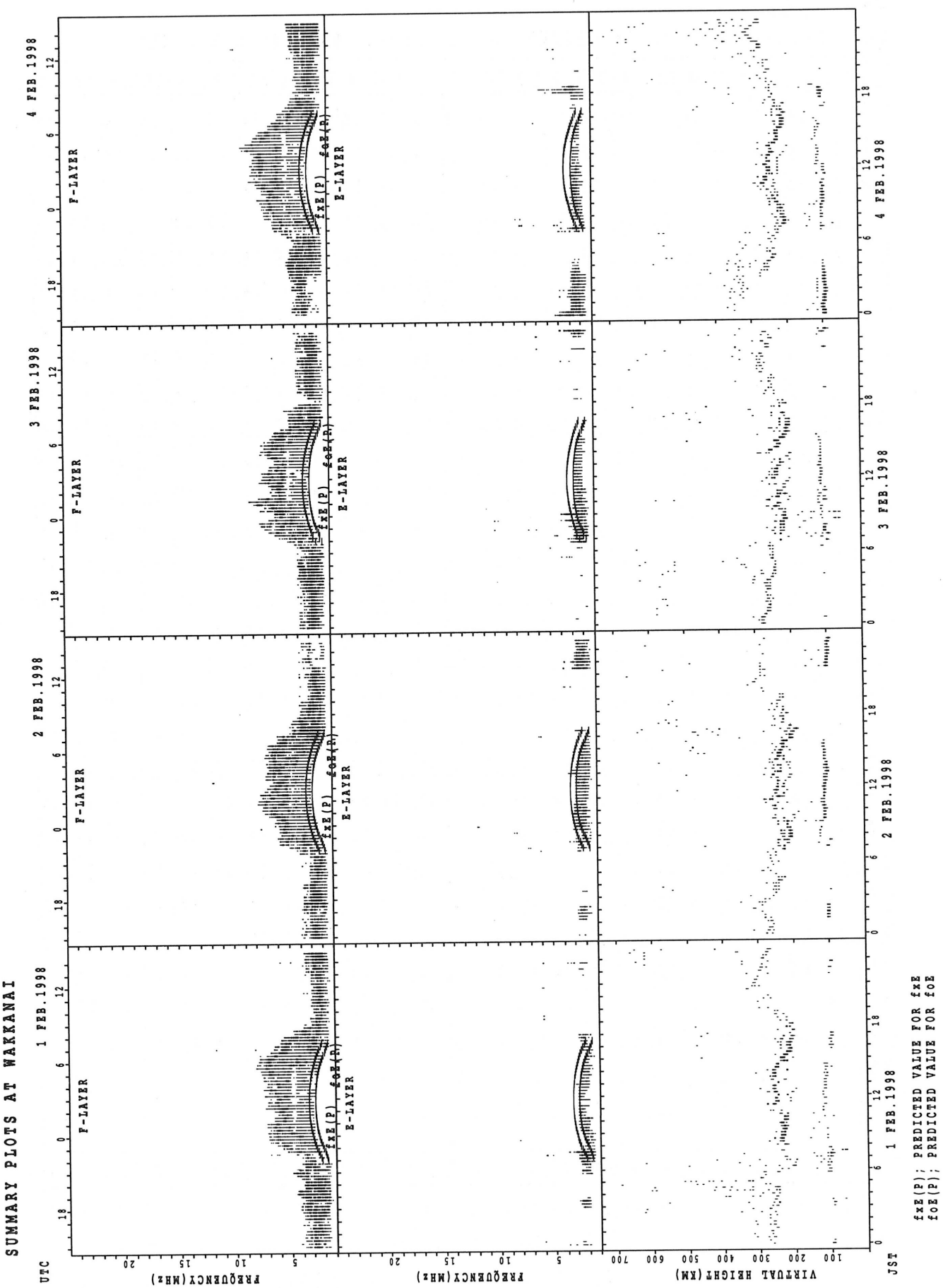
HOURLY VALUES OF fmin AT OKINAWA

FEB. 1998

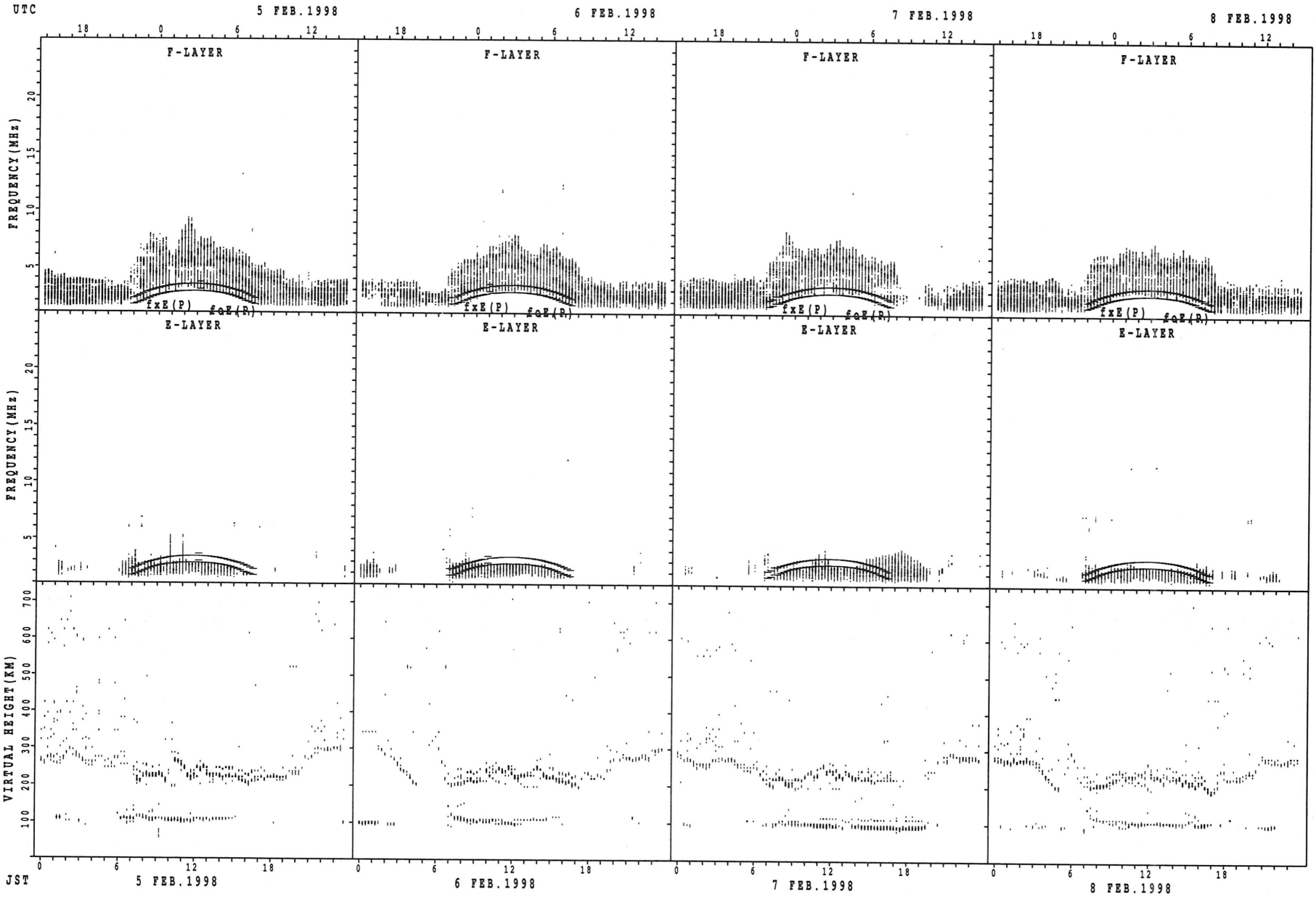
LAT. 26.3N LON. 127.8E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

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		16	15	15	14		B	14	14	14	15	18	17	17	15	15	14	14	15		14	14		15
2	15	15	14	15	15			15	14	16	16	17	18	21	27	17	16	14	14	14	15	14	14	15
3	14	15	15	14	15	15		15	16	14	15	17	17	16	16	16	14	14		14	14	14	15	
4	15	15	14	15	15	15	14	15	15	14	15	17	18	21	16	17	15	15	15	14		15	15	14
5	14	14	15	15	18	14	14	15		14	16	16	17		33	20	14	14	17	15	16	14	14	15
6	15	15	15	14	14		14	14	14	15	15	15	24	16	22	22	15	14	14	15	14	15	14	15
7	15	15	14	15	14	14	15	14	18	14	14	17	28	15	16	14	14	14	14	14	15	15	15	17
8		14	14	14	14			14	16	15	17	15	16	17	17	22	17	16	14	14	15	16	16	15
9	15	15	14	15	14		14	14	16	14	15	17	20	17	26	18	16	15	20	14	16	15	14	14
10	15	15	15	15	15	14		14	24	14	15	16	17	16	15	16	16	17	15	15	15	18	16	16
11		15		15	15	18	16	15	14	14	15	15	15	14	17	14	14	15	14	15	16	15	15	15
12	14	15	14	14	14		17	14	16	14	15	17	21		43	18	16	14		15	14	14	15	15
13	14	14	14	14	14	14		14	14	15	15	20	34	18	21	18	15	15	14	14	14	14	14	14
14	15	18	14	15	14	14	14	14	14	14	16	15	16			18	15	14	15	15	14	15	14	14
15	14	15	15	15	15	14		15		16	18	29		46	21	17	17	14	14	14	15	26	15	16
16	15	21	14	15	14		17	15		14	15	16	17	18	17	17	17	14	15	14	15	14	14	14
17	14	14	14	15	15		14		14	15	16	17	17	21	18	15	15	14	14		15	16	15	16
18	14	15	15	15	14	14	15	15	16	14	16	18	16		17	18	15	15	15	15	17	14	15	15
19	14	15	14	15	14		15	14	14	14	15	16	18	14				16	15	14	14	15	15	14
20	14		15	14		18	14	15	14	14	15	20	28	24	23	20	17	15	17	15	15	15	14	15
21	14	14	14	15	14	15	15	15	14	14	17		20	30	21	21		15	20	14	14	14	15	15
22	14	14			15	14		14	14	14	15		18		21	22	16	14	18	15	15	14	14	14
23	15	14	14	15	14	14	17	14			17	18	18	20	24	21	16	15	16	14	14	14	14	14
24	14	15	15	14	14	15	14	14	15	18	18	20		28	34	27	18	15	14	16	14	15	16	14
25	15	15	14	14	15	14	15	15	14	17		26			21	20	17	15	15	15	14	15	16	15
26	14	15	15	14	15	15	14	16	24	15	16	18	21	23	20	17	14	16	15	14	15	14	14	15
27	15	15	15	15	15	14	15	16	15	15	17	20	17	22	20	17	15	14	14	14	15	15	14	15
28	15	14	14	15	15	14	15	14	16	15	16	18		45	44	17	15	15	14	14	16	14	14	14
29																								
30																								
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	25	27	26	27	27	19	20	27	24	27	27	26	24	22	26	27	26	28	26	26	27	28	27	27
MED	14	15	14	15	14	14	15	14	14	14	15	17	18	19	21	18	15	15	15	14	15	15	15	15
U Q	15	15	15	15	15	15	15	15	16	15	16	18	20	23	24	20	16	15	15	15	15	15	15	15
L Q	14	14	14	14	14	14	14	14	14	14	15	16	17	16	17	17	15	14	14	14	14	14	14	14

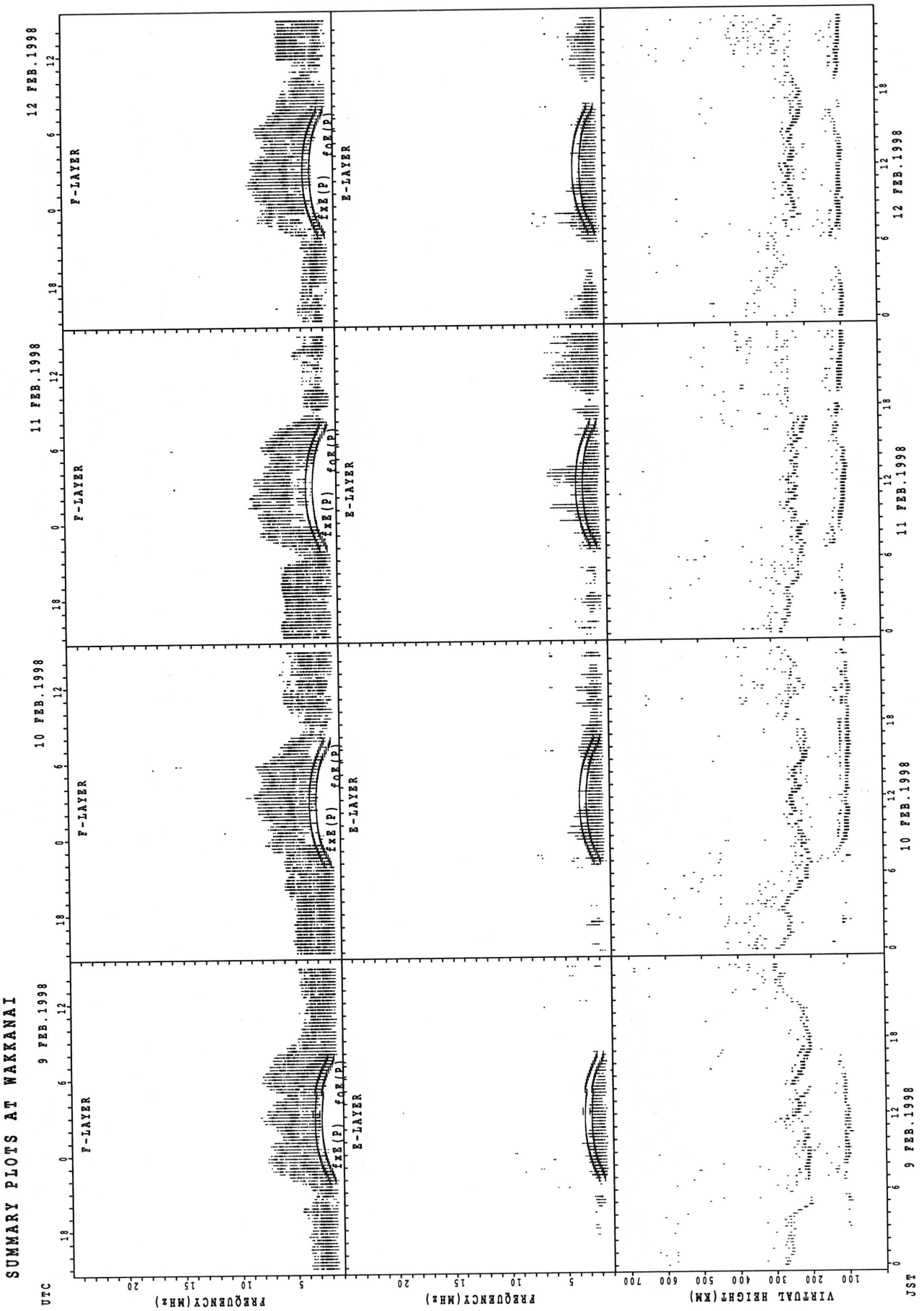
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

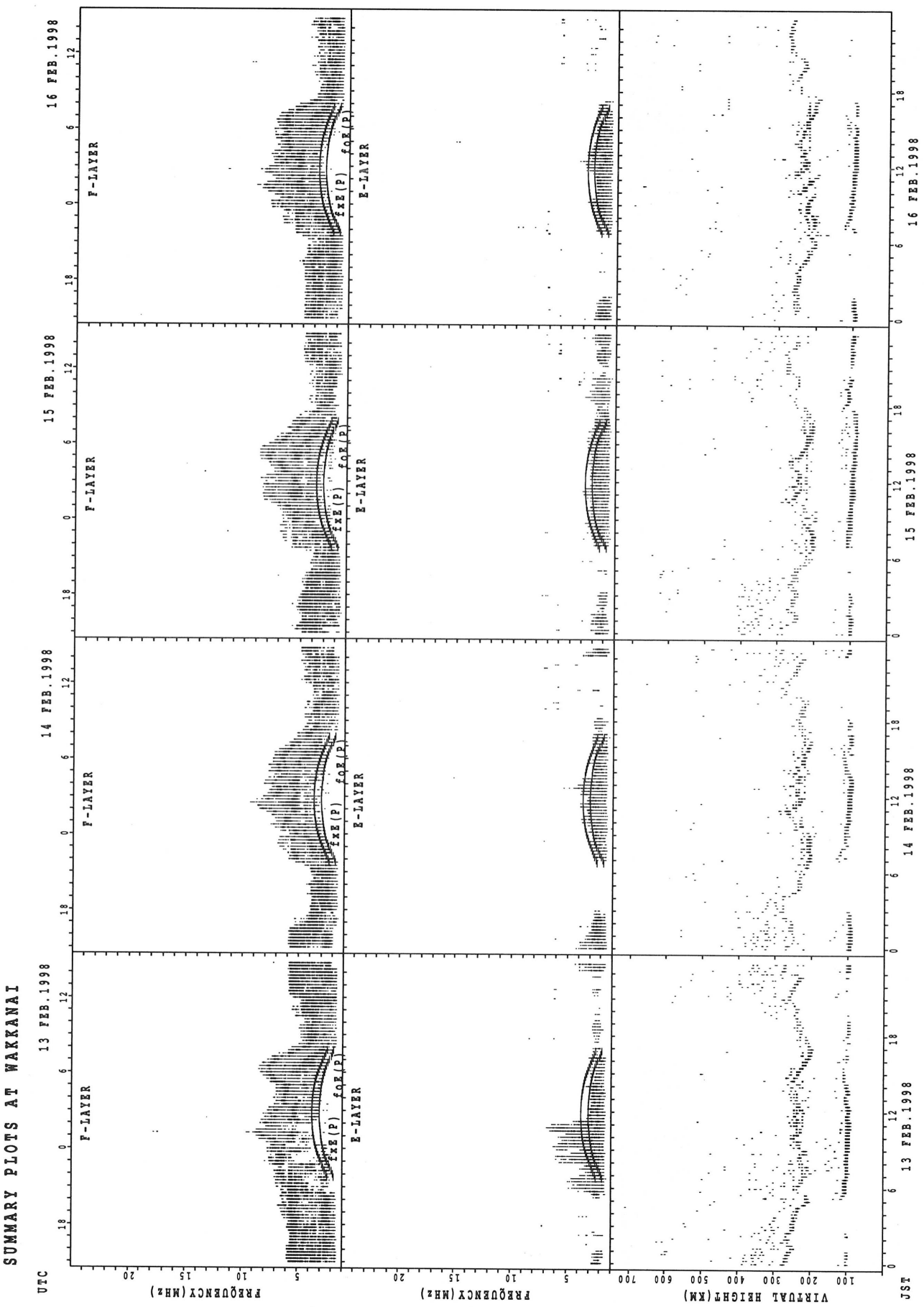

SUMMARY PLOTS AT WAKKANAI
1 FEB.1998
2 FEB.1998
3 FEB.1998
4 FEB.1998
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
UTC
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

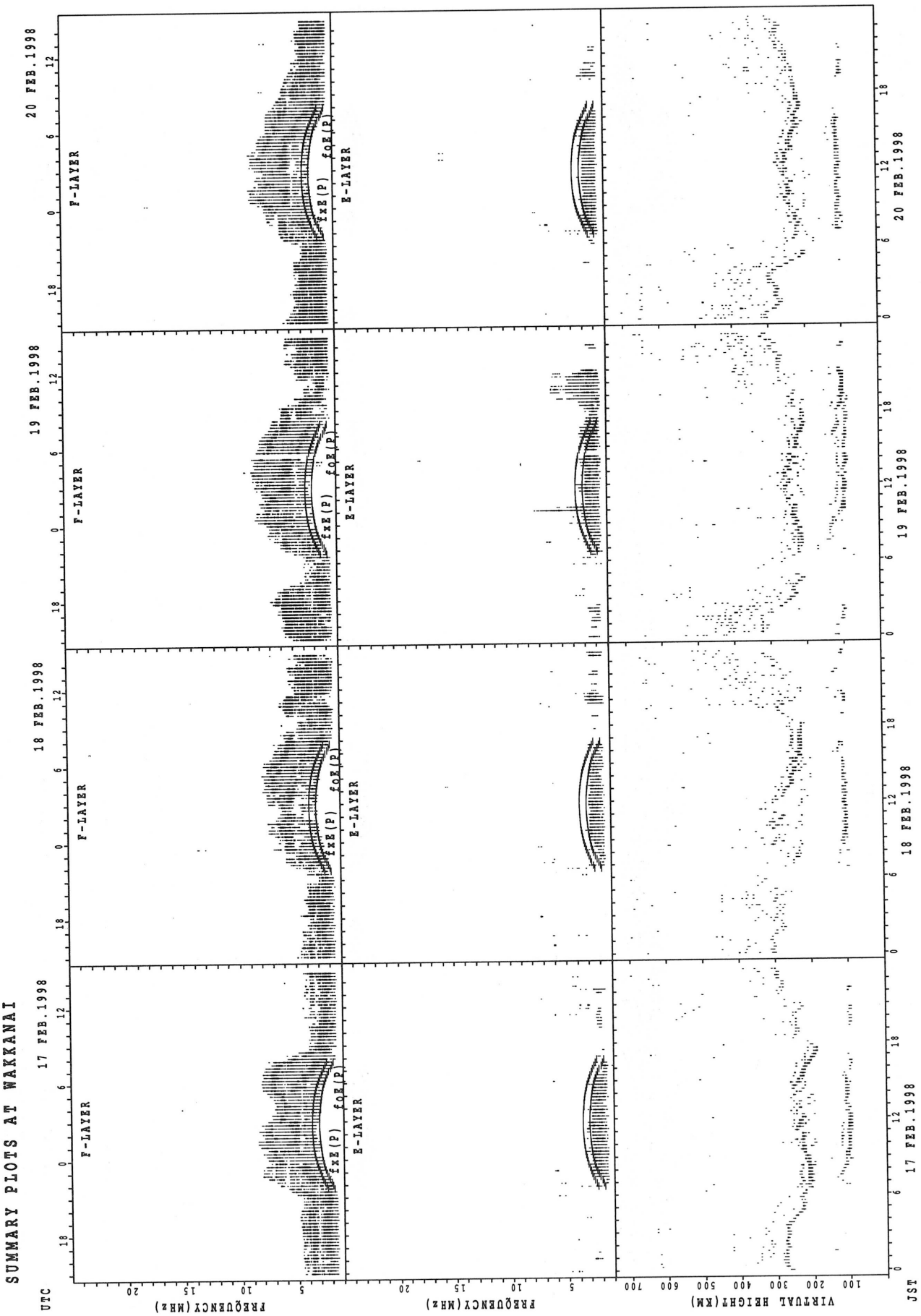
SUMMARY PLOTS AT WAKKANAI



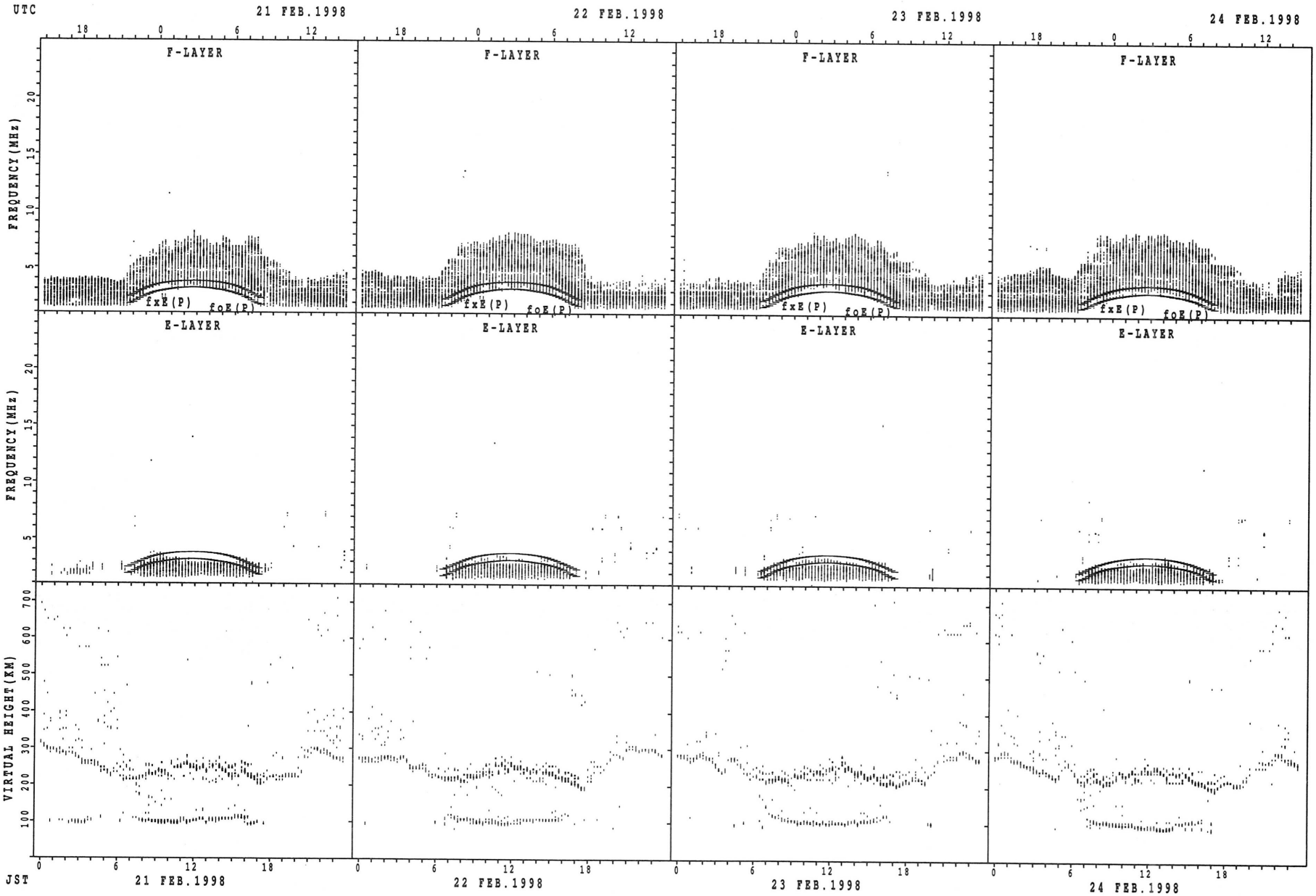
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

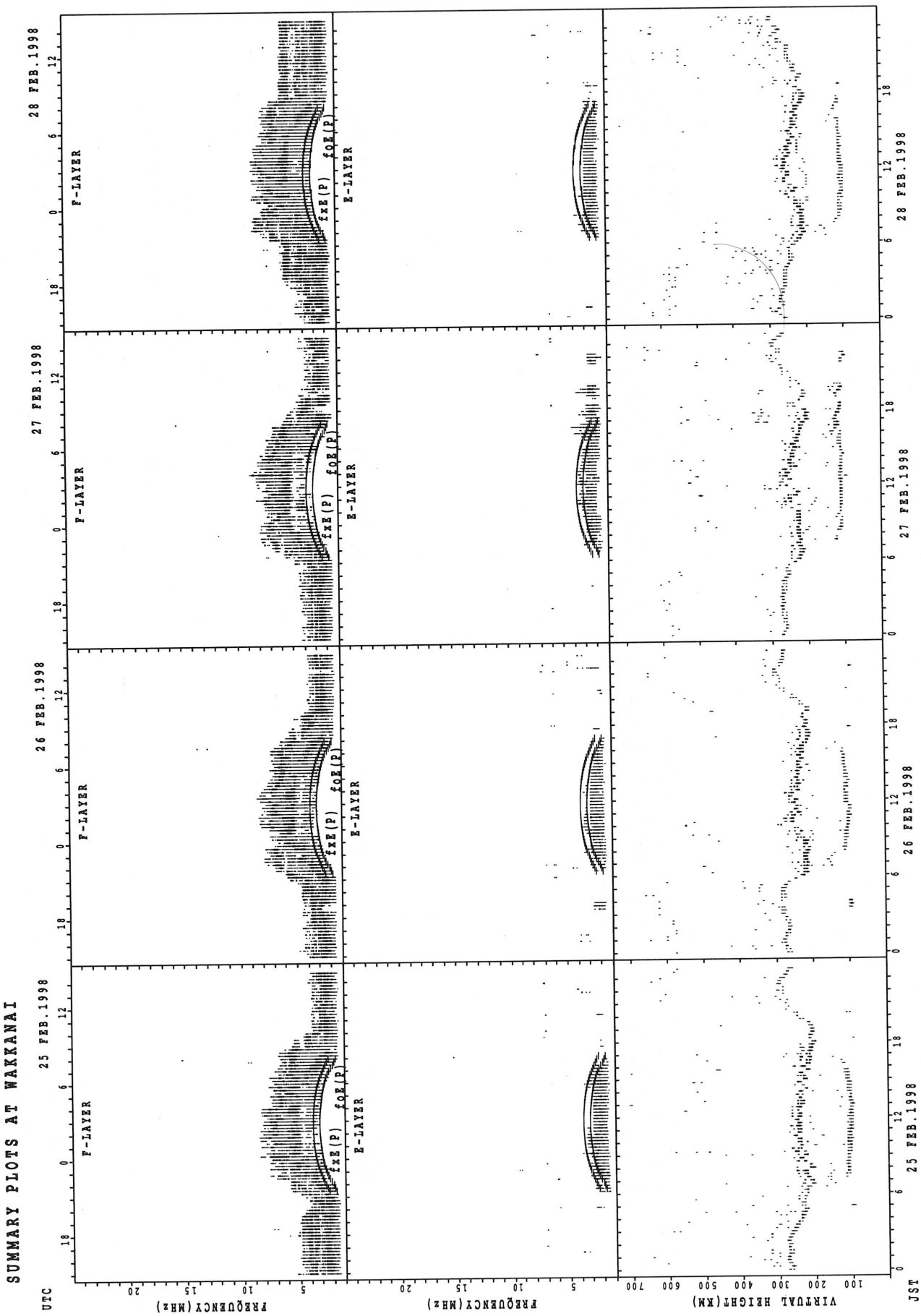

SUMMARY PLOTS AT WAKKANAI
UTC
JST
13 FEB.1998
14 FEB.1998
15 FEB.1998
16 FEB.1998
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

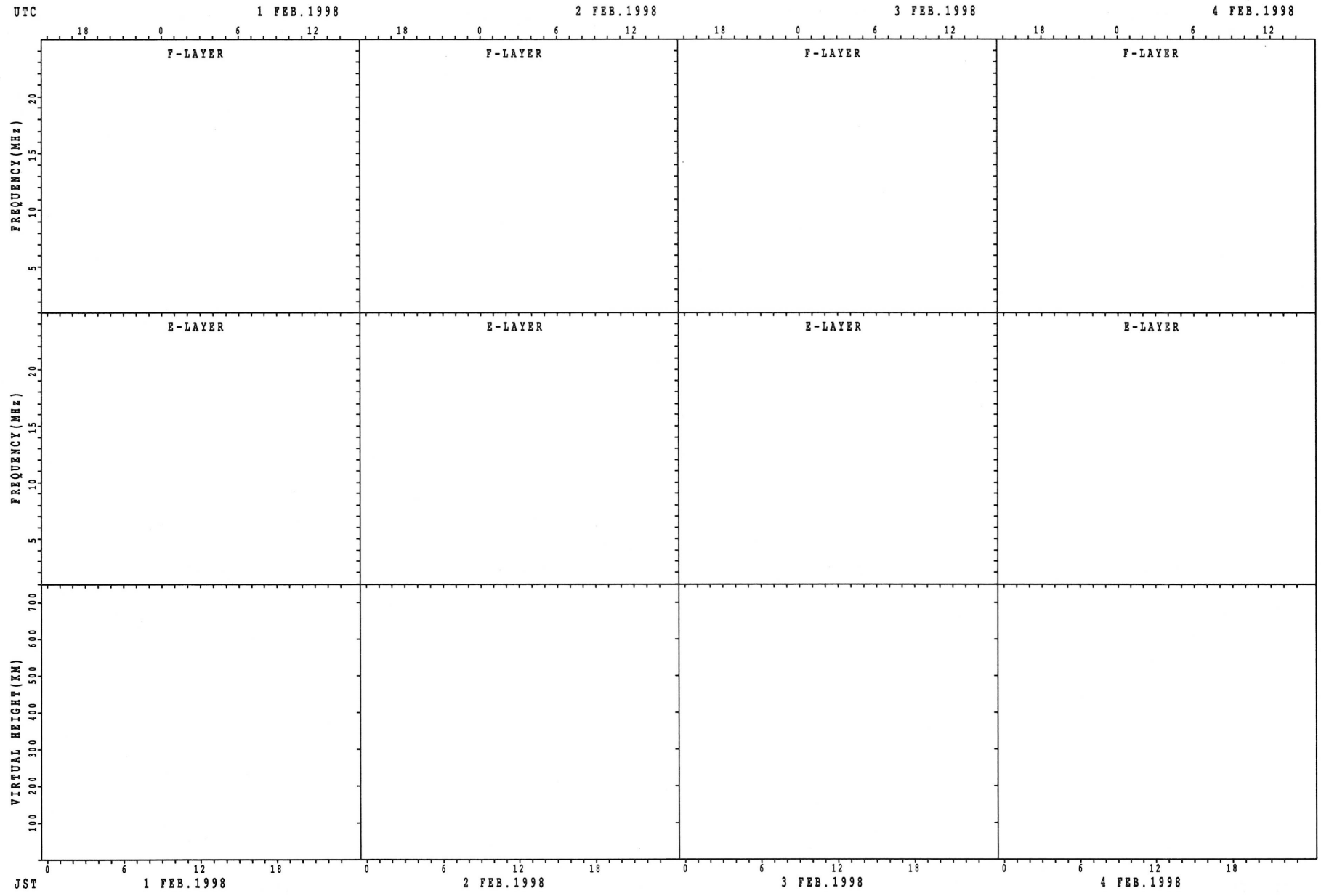
SUMMARY PLOTS AT WAKKANAI



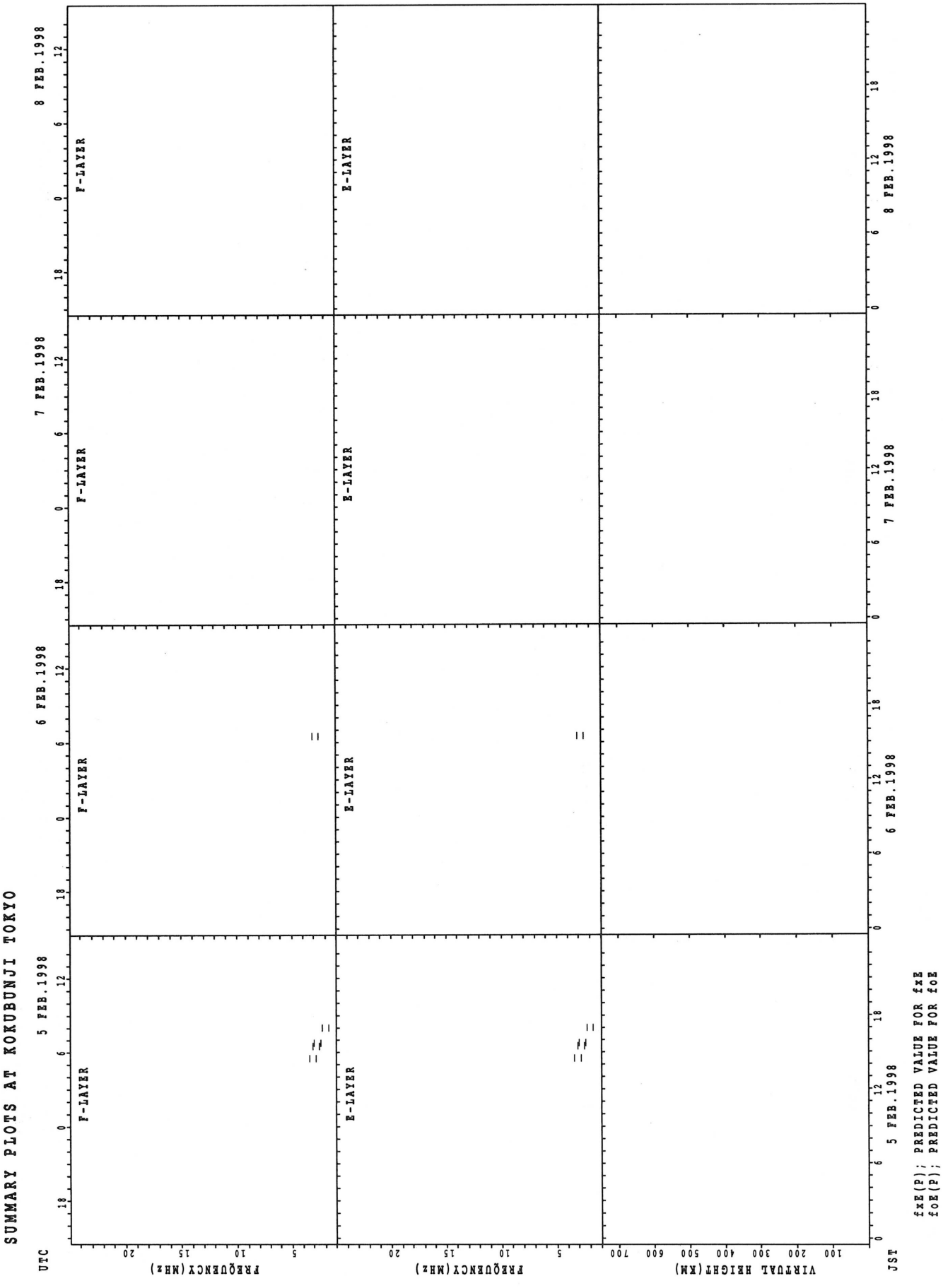
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

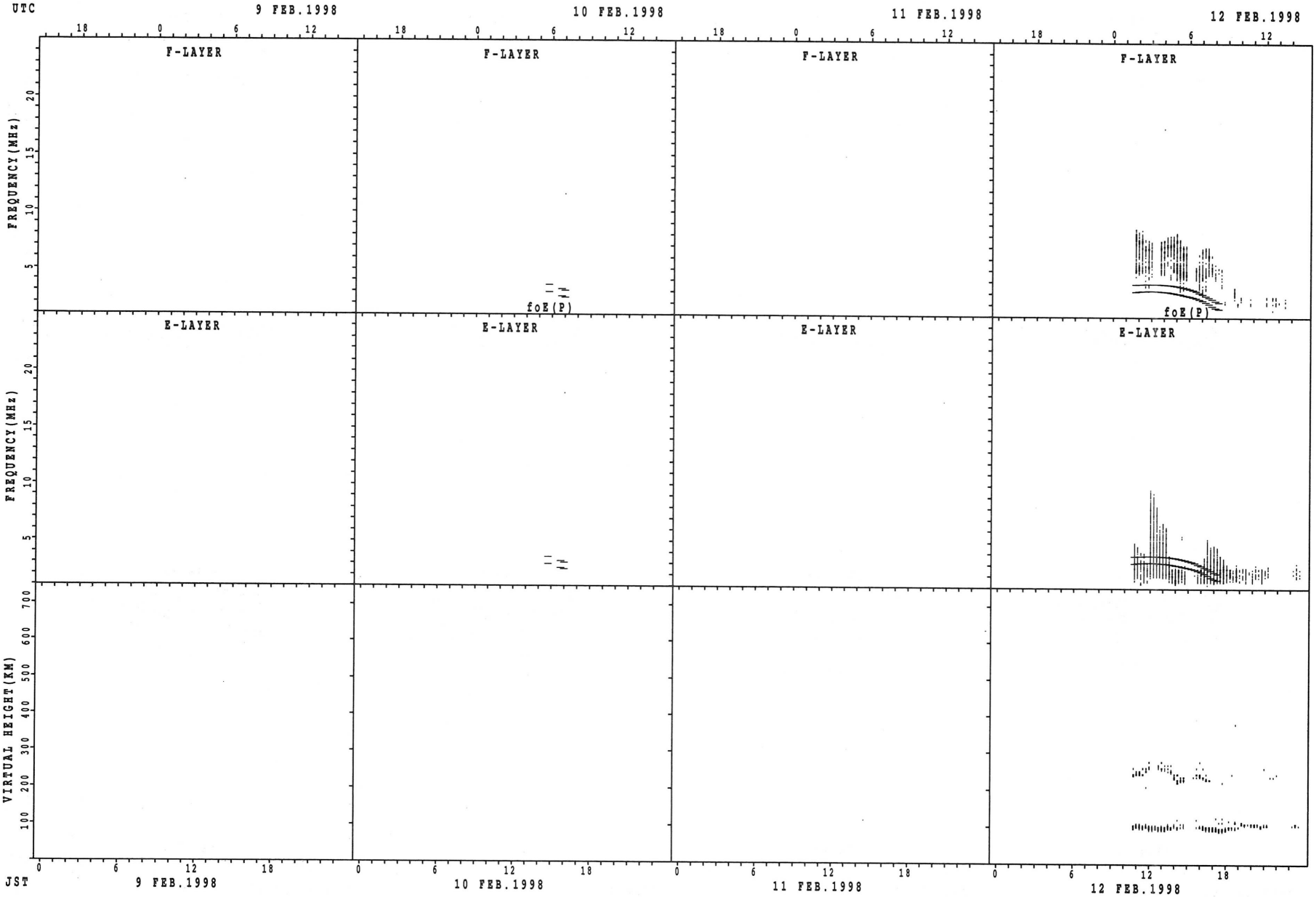
SUMMARY PLOTS AT KOKUBUNJI TOKYO



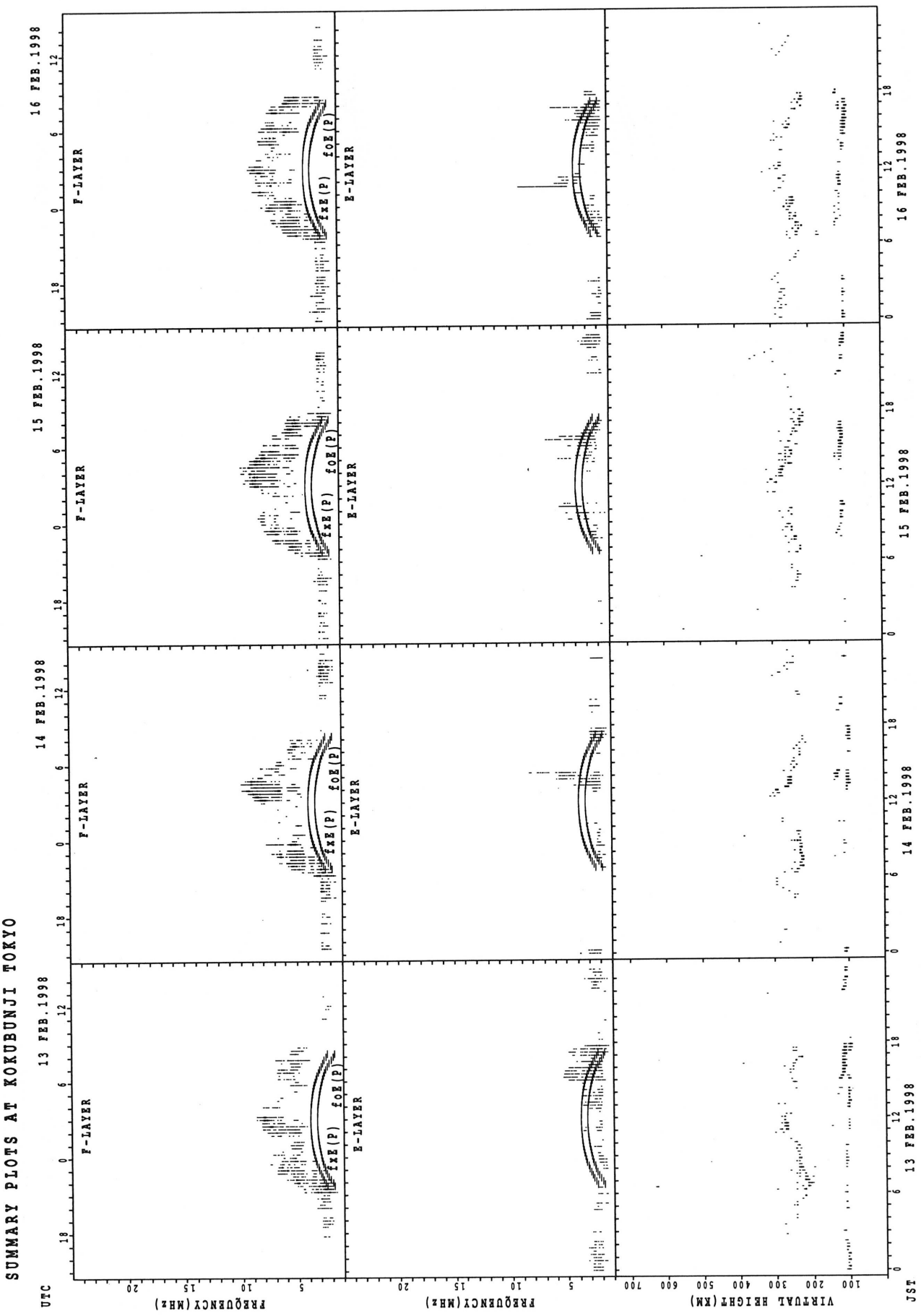
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
5 FEB.1998
6 FEB.1998
7 FEB.1998
8 FEB.1998
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

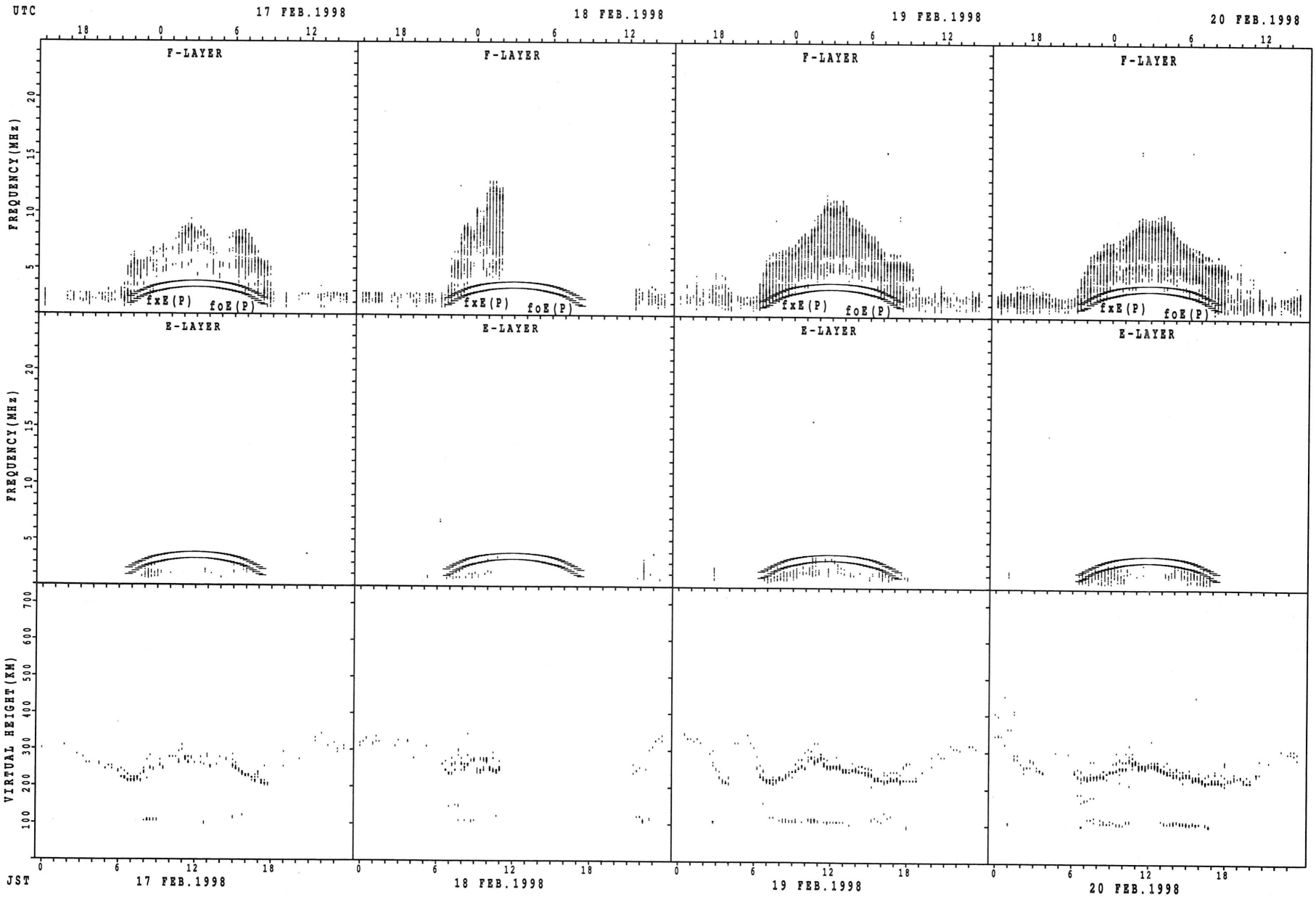
SUMMARY PLOTS AT KOKUBUNJI TOKYO



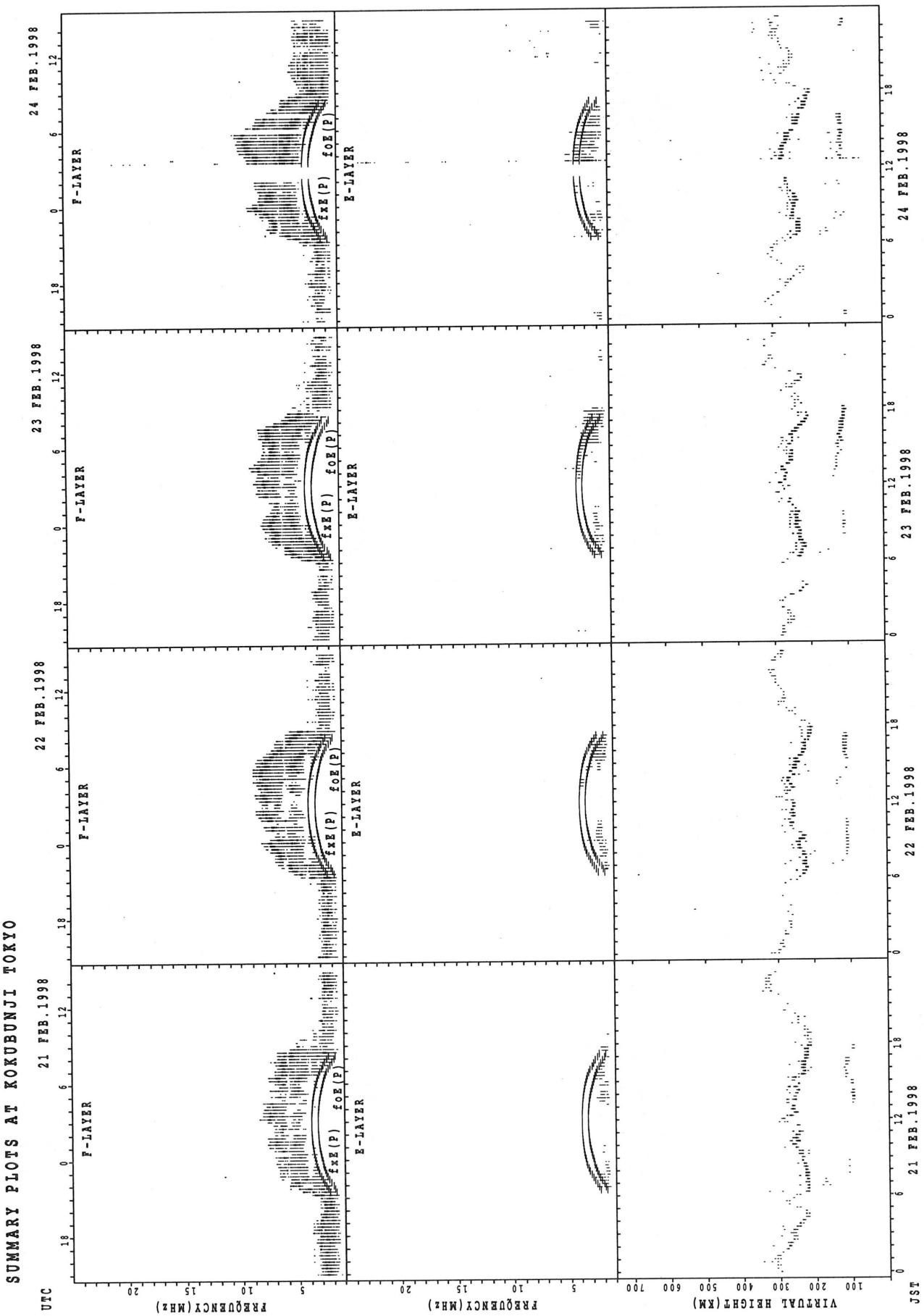
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
13 FEB.1998
14 FEB.1998
15 FEB.1998
16 FEB.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

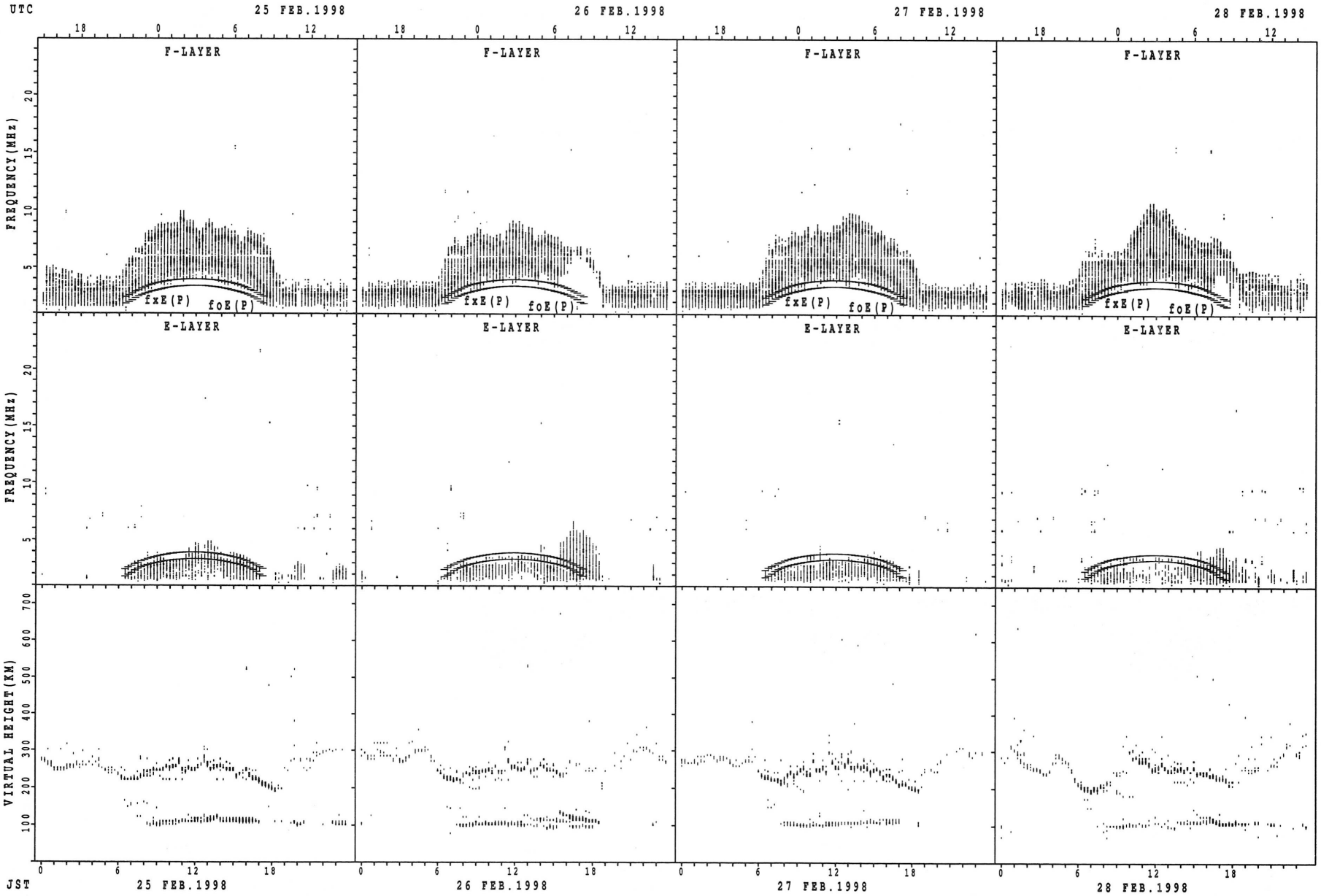
SUMMARY PLOTS AT KOKUBUNJI TOKYO



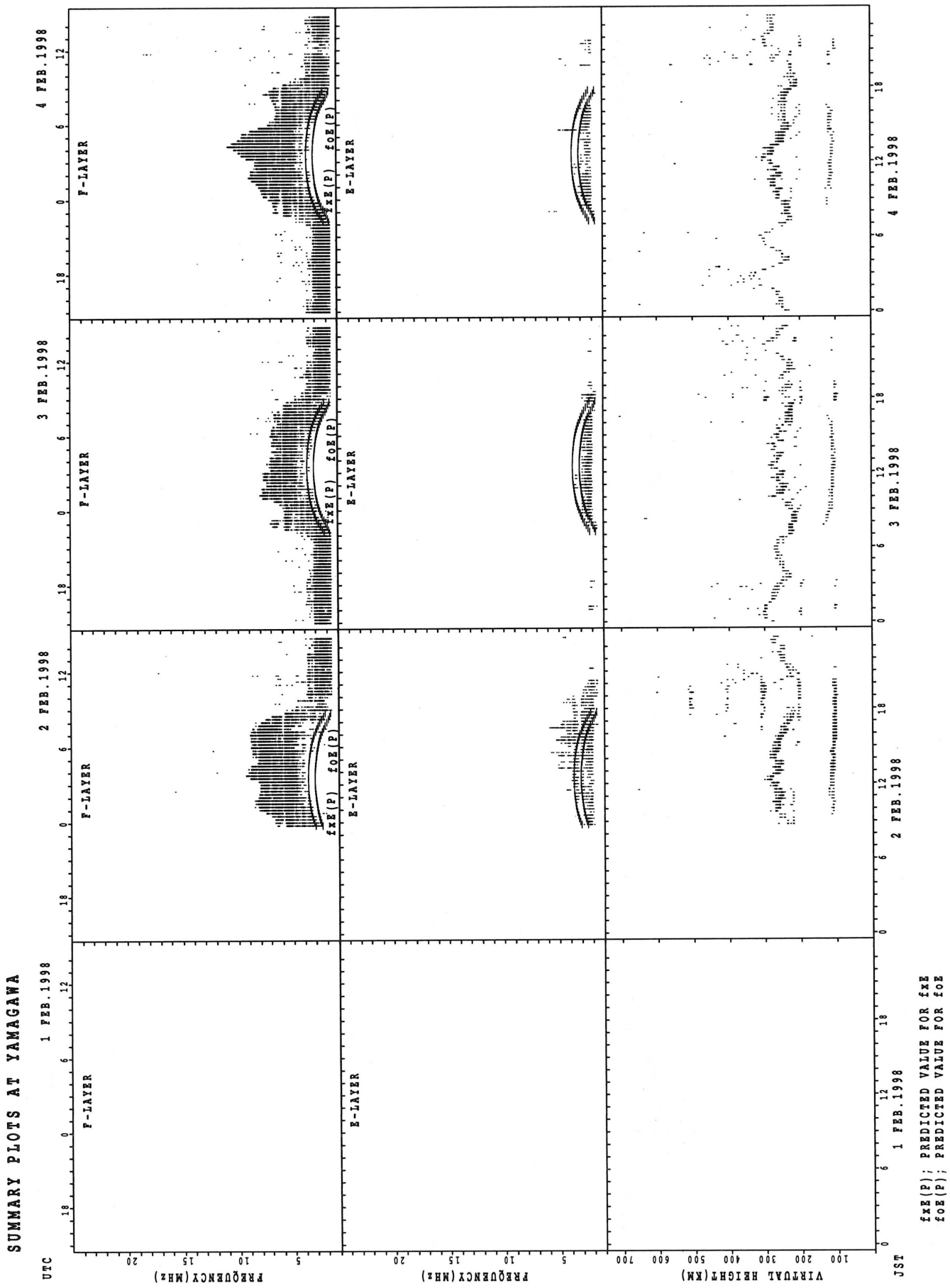
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
21 FEB.1998
22 FEB.1998
23 FEB.1998
24 FEB.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

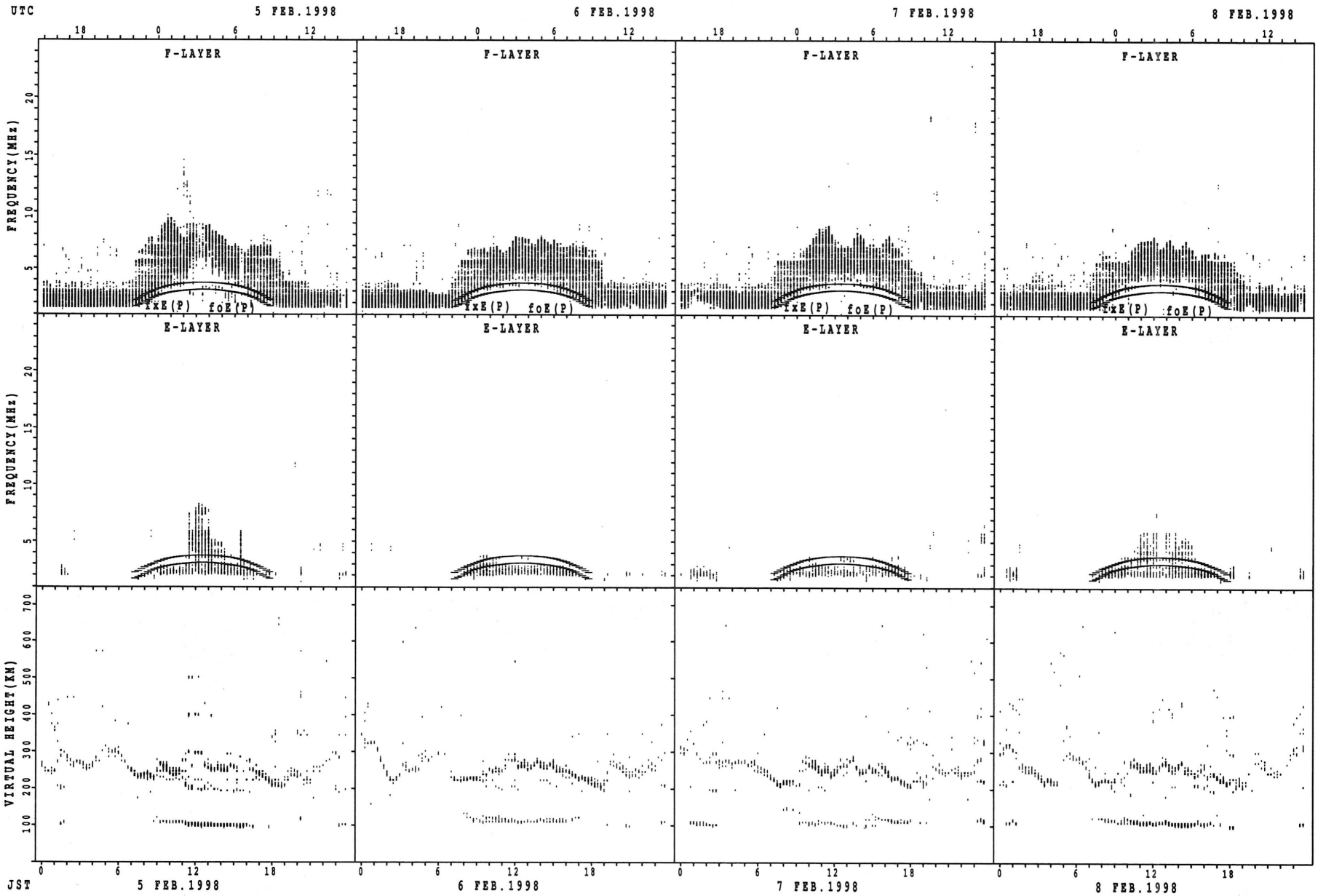
SUMMARY PLOTS AT KOKUBUNJI TOKYO



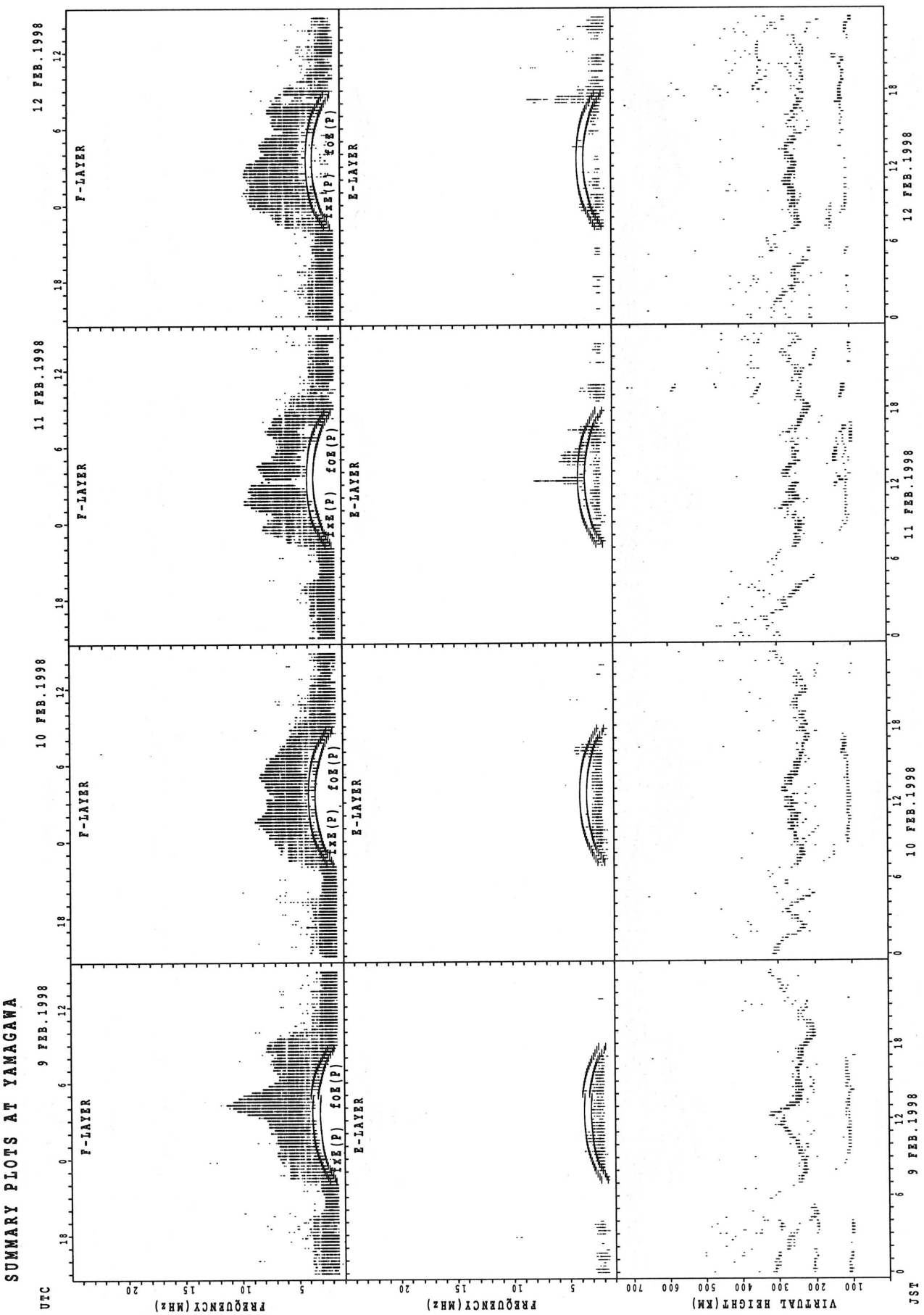
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

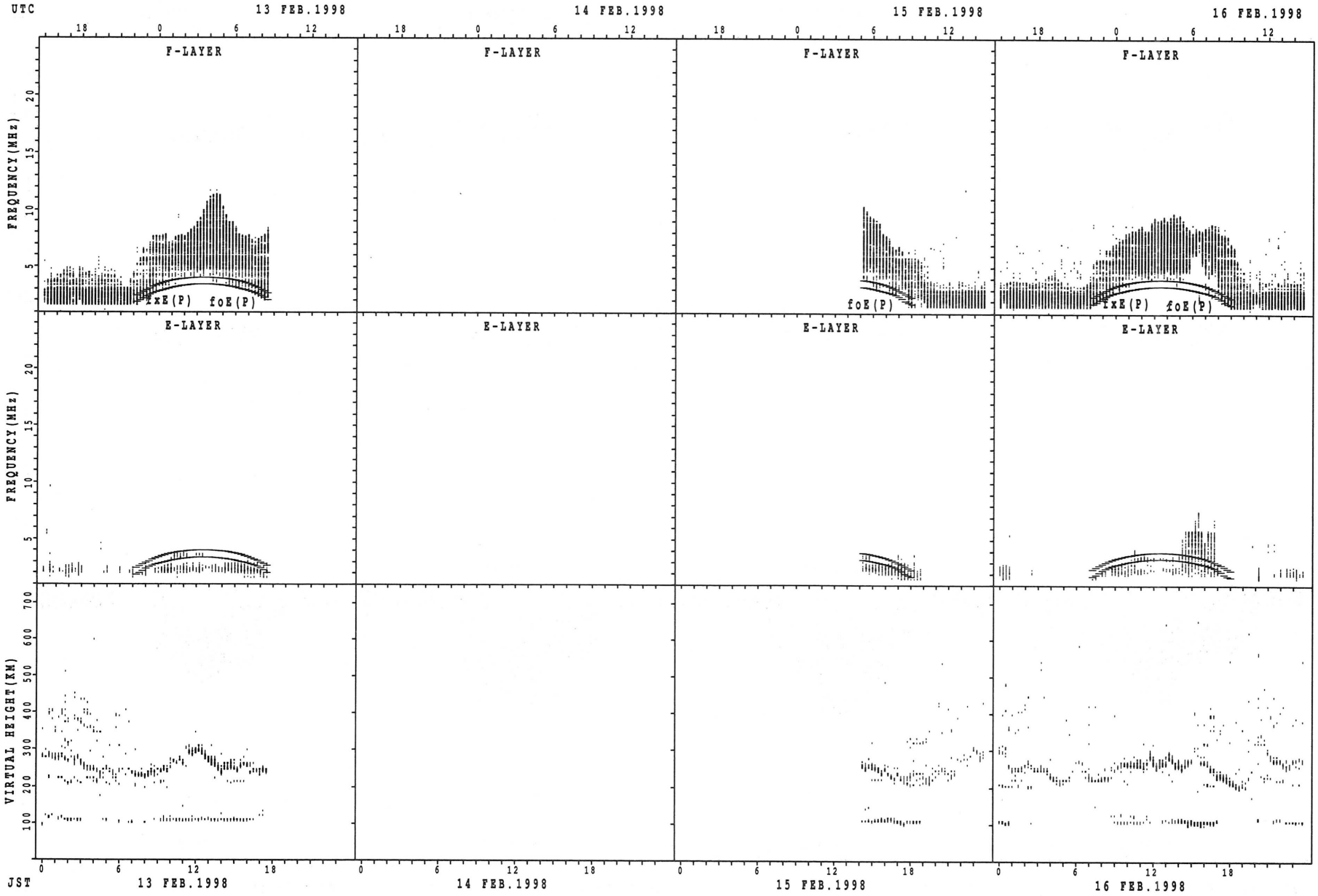
SUMMARY PLOTS AT YAMAGAWA



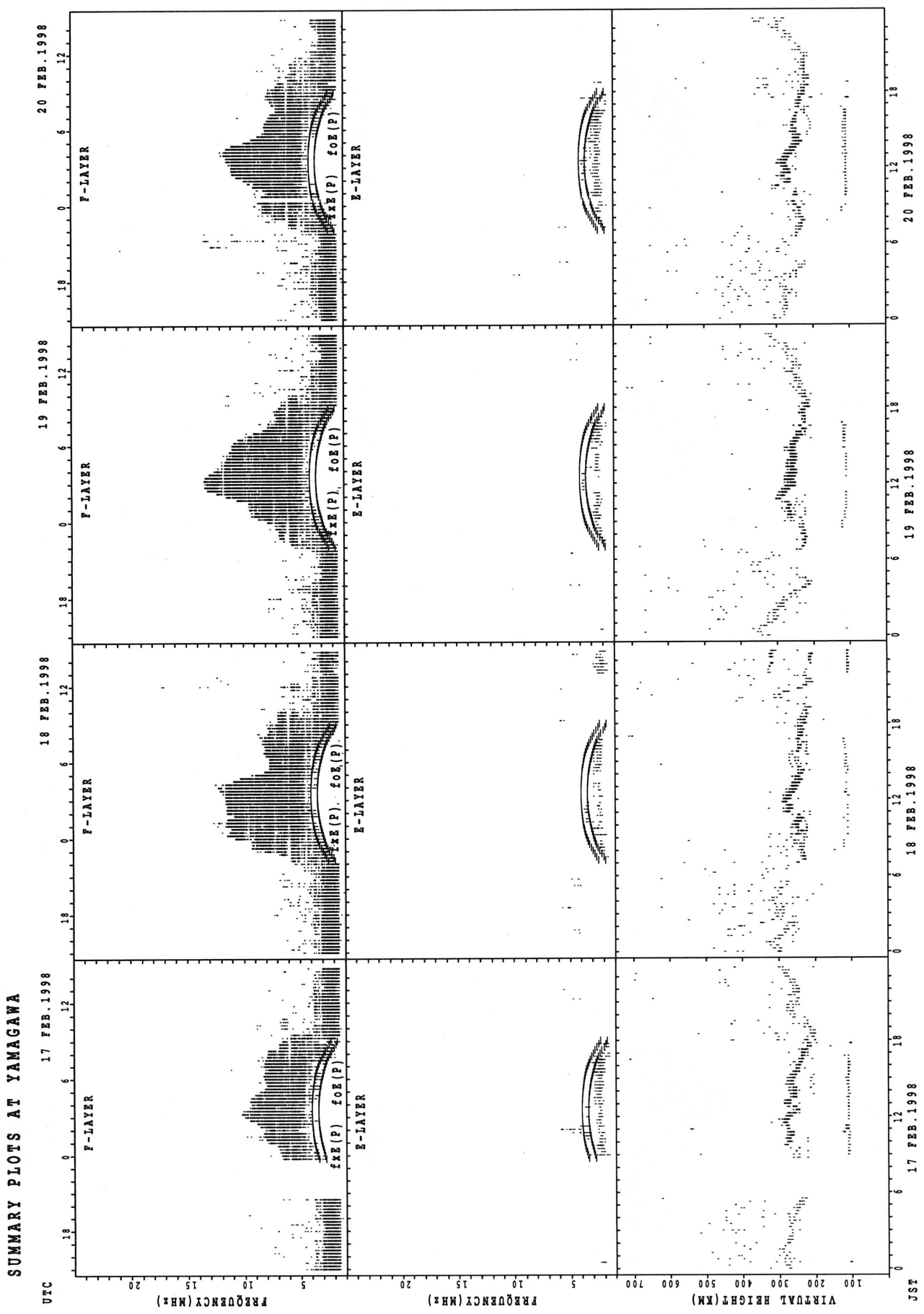
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
9 FEB.1998
10 FEB.1998
11 FEB.1998
12 FEB.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

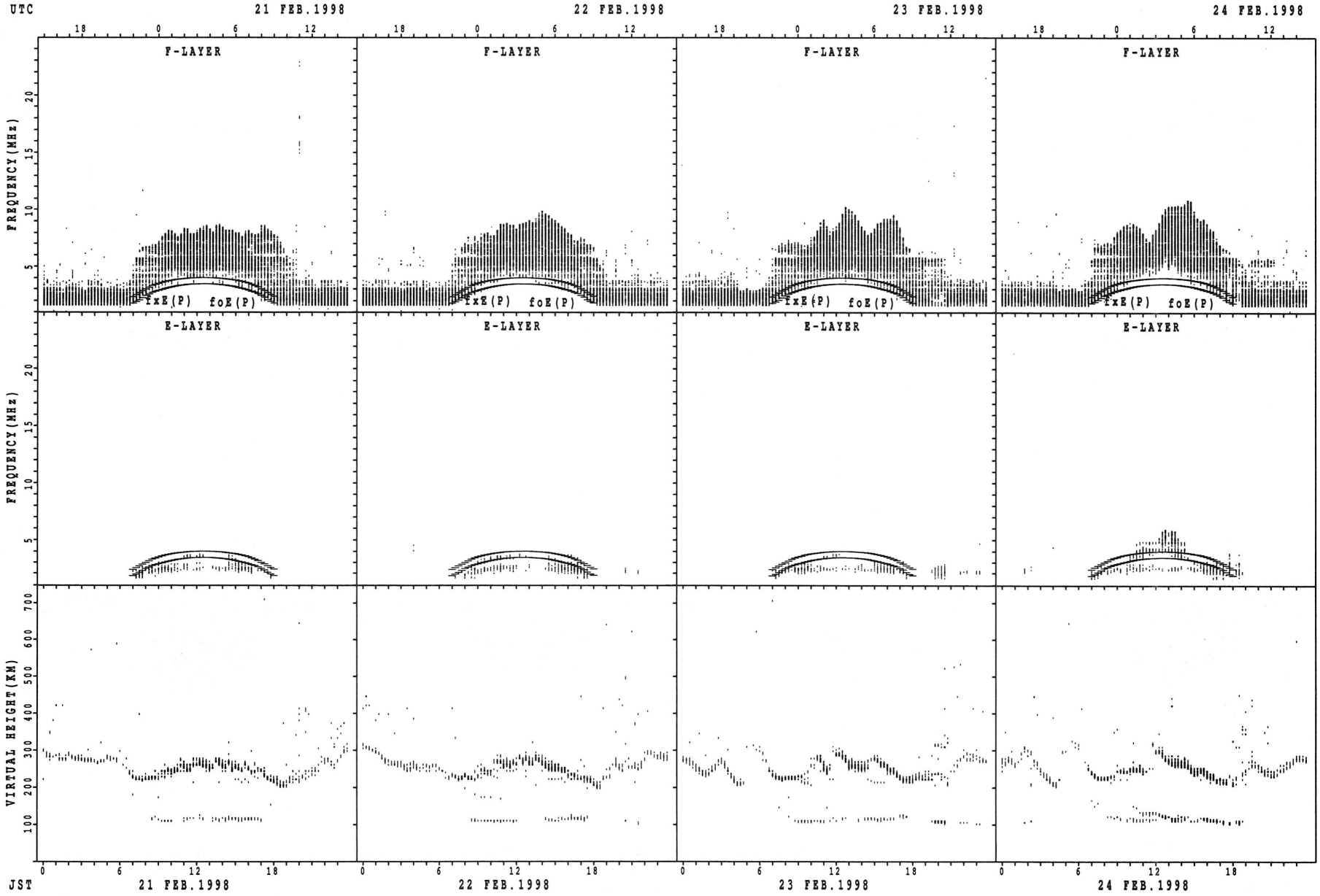
SUMMARY PLOTS AT YAMAGAWA



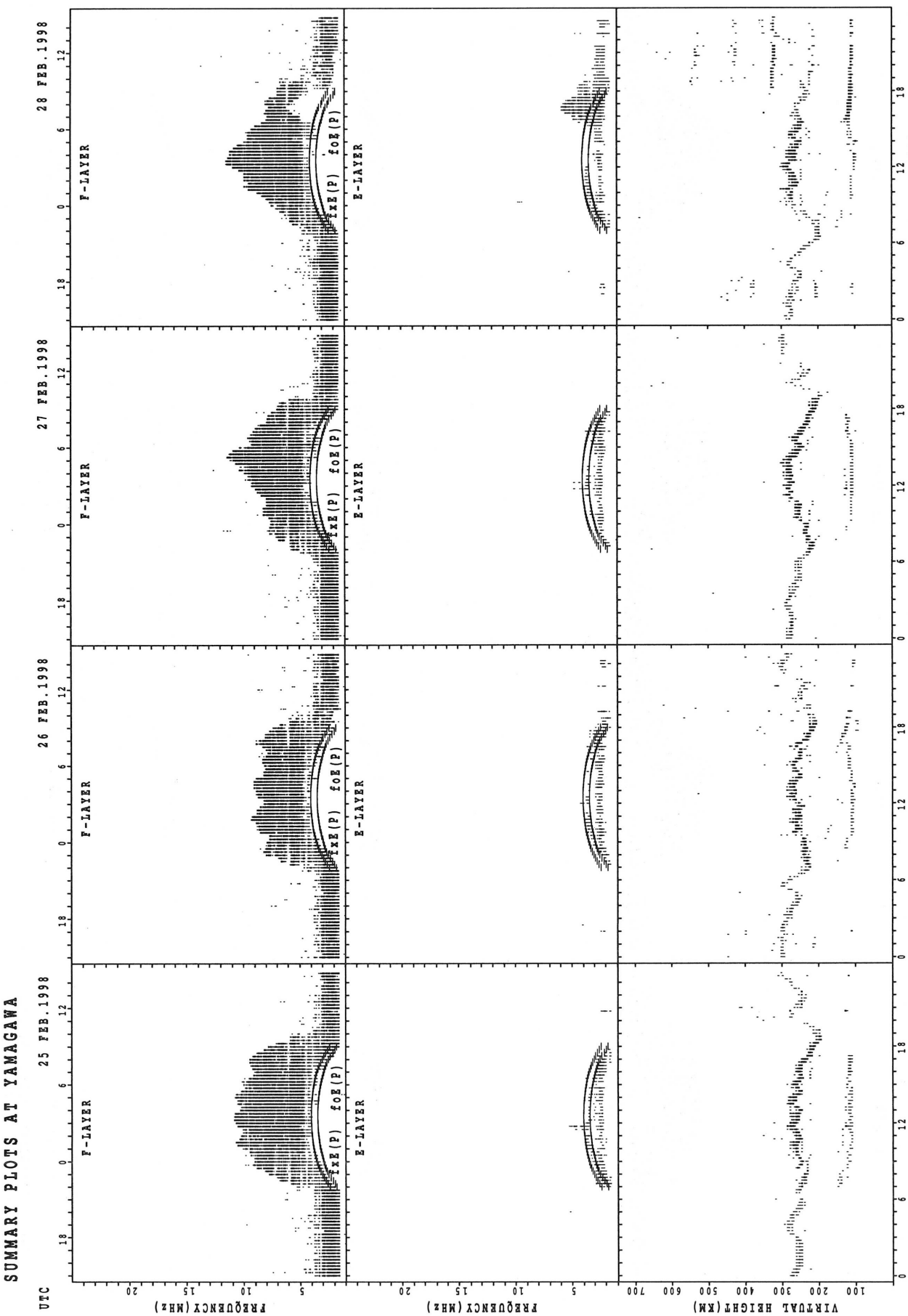
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
17 FEB.1998
18 FEB.1998
19 FEB.1998
20 FEB.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

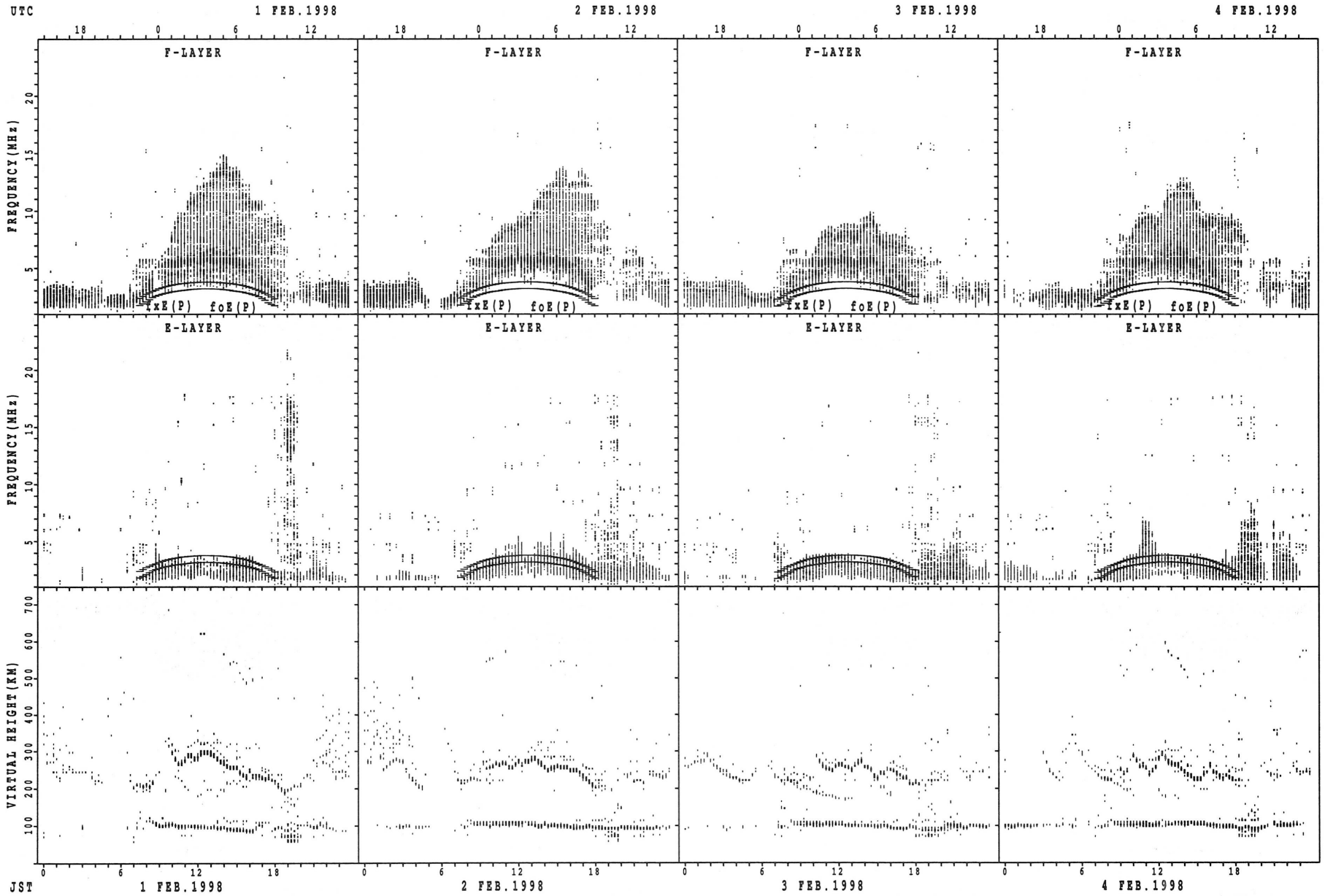
SUMMARY PLOTS AT YAMAGAWA



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

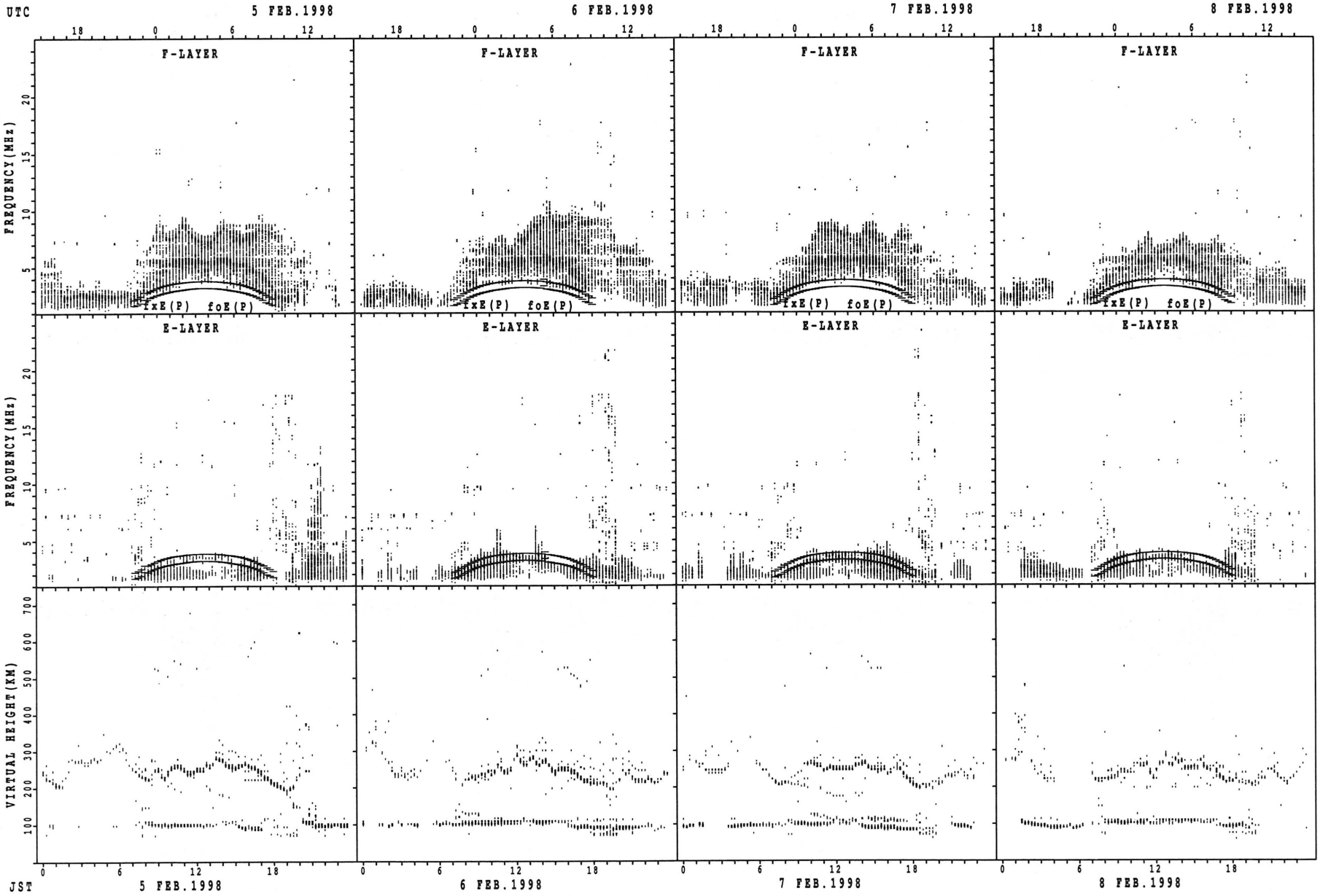

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
25 FEB.1998
26 FEB.1998
27 FEB.1998
28 FEB.1998
F-LAYER
E-LAYER
FREQUENCY (MHz)
VIRTUAL HEIGHT (KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



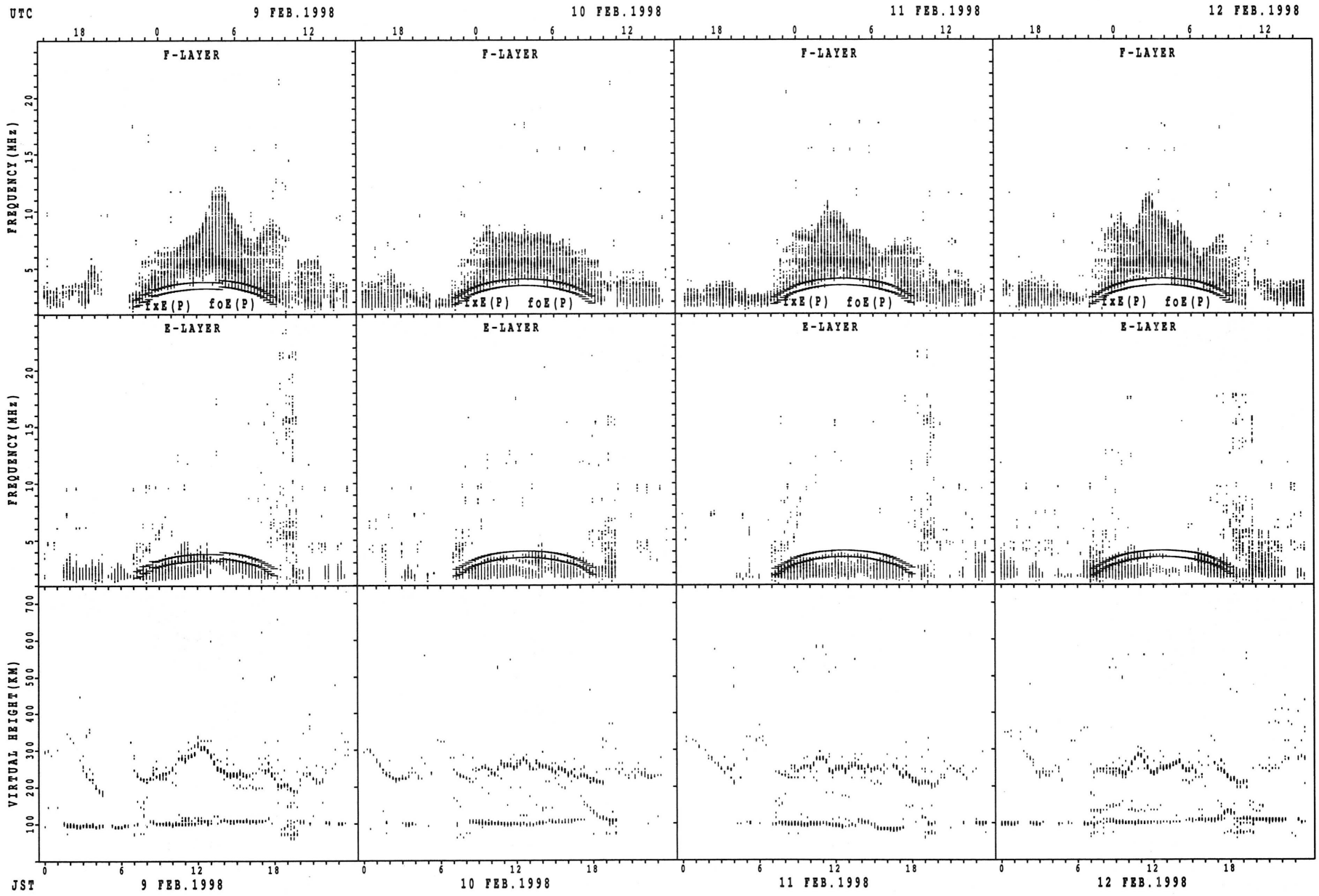
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA

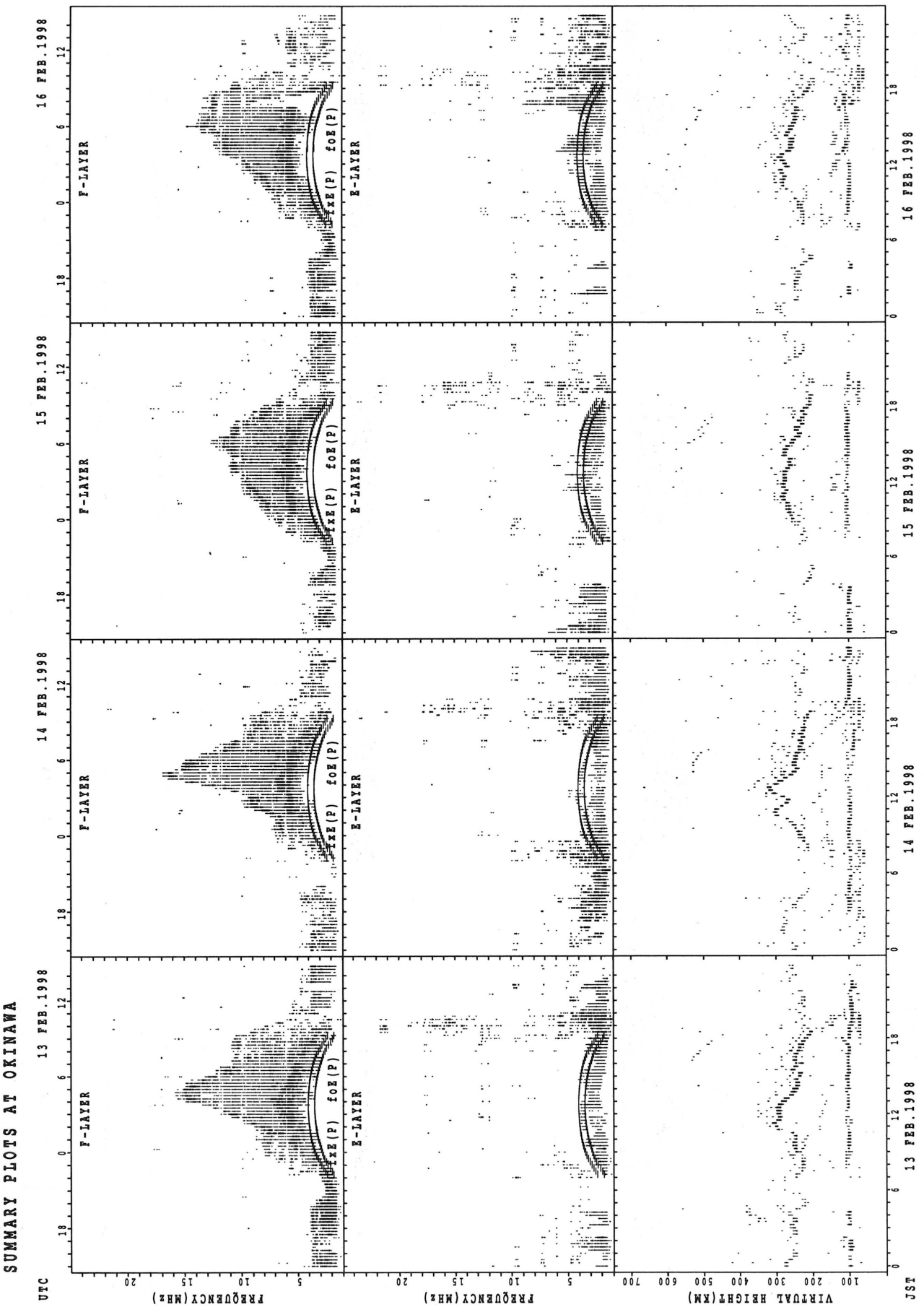


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

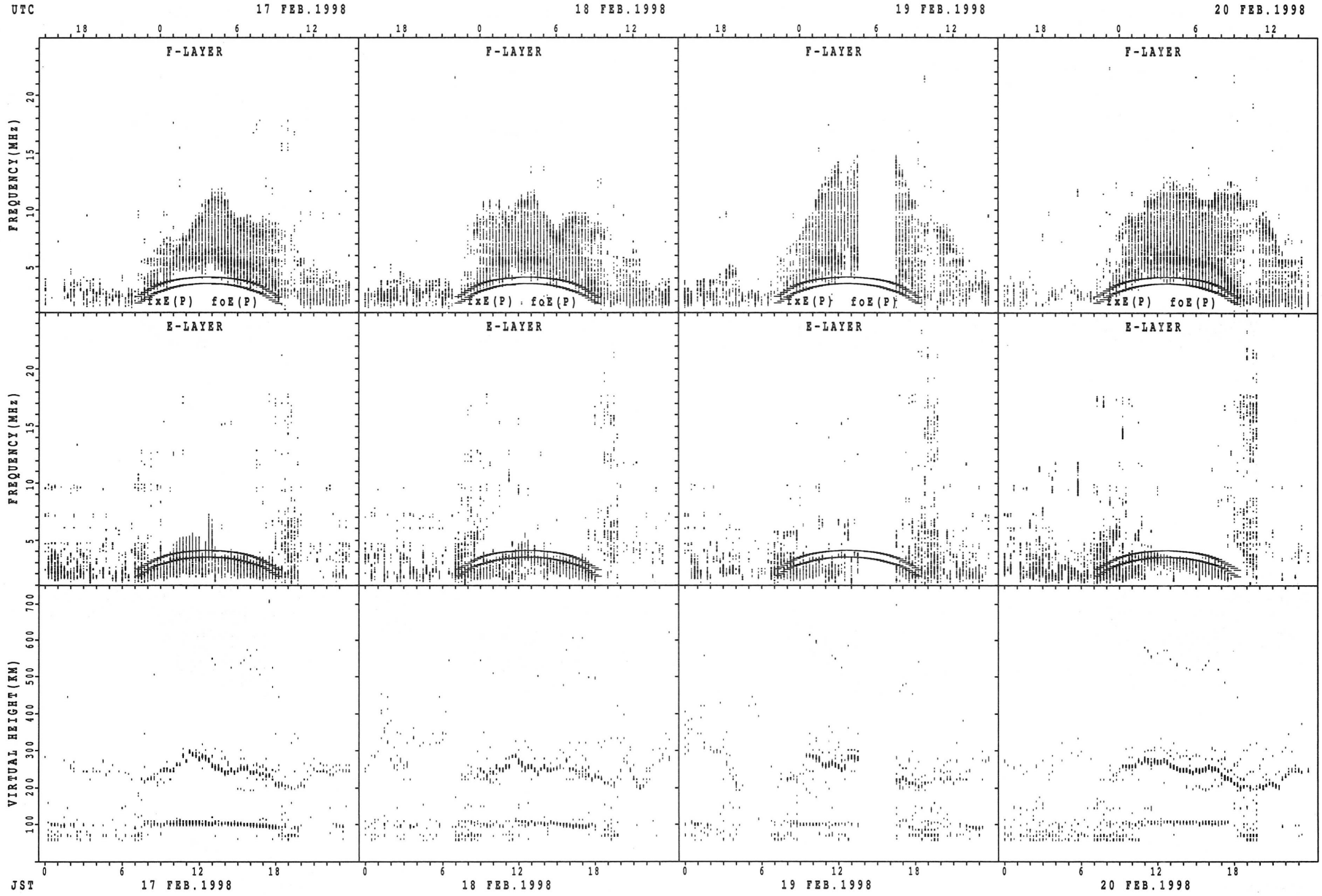
SUMMARY PLOTS AT OKINAWA



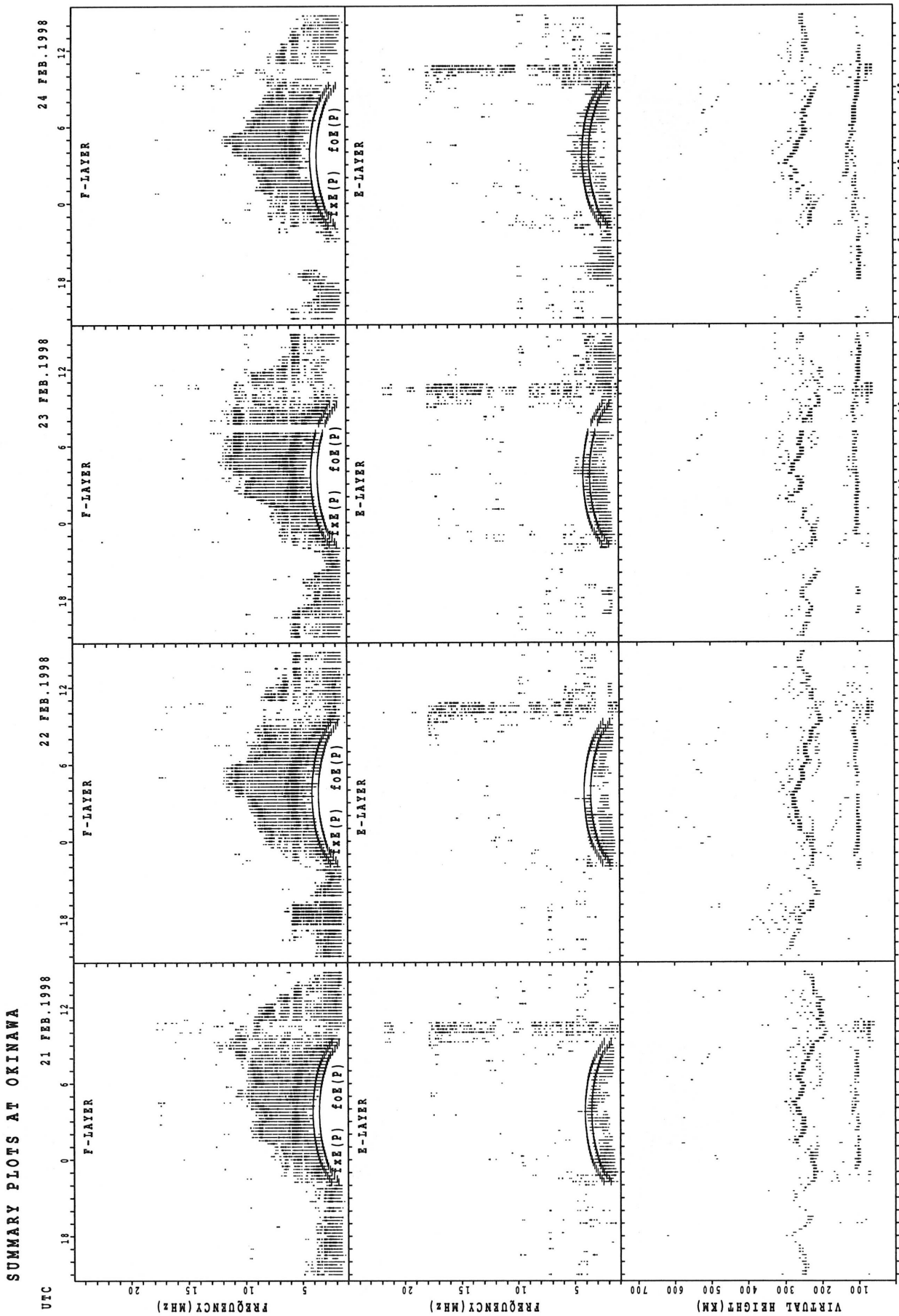
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
JST
13 FEB.1998
14 FEB.1998
15 FEB.1998
16 FEB.1998
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

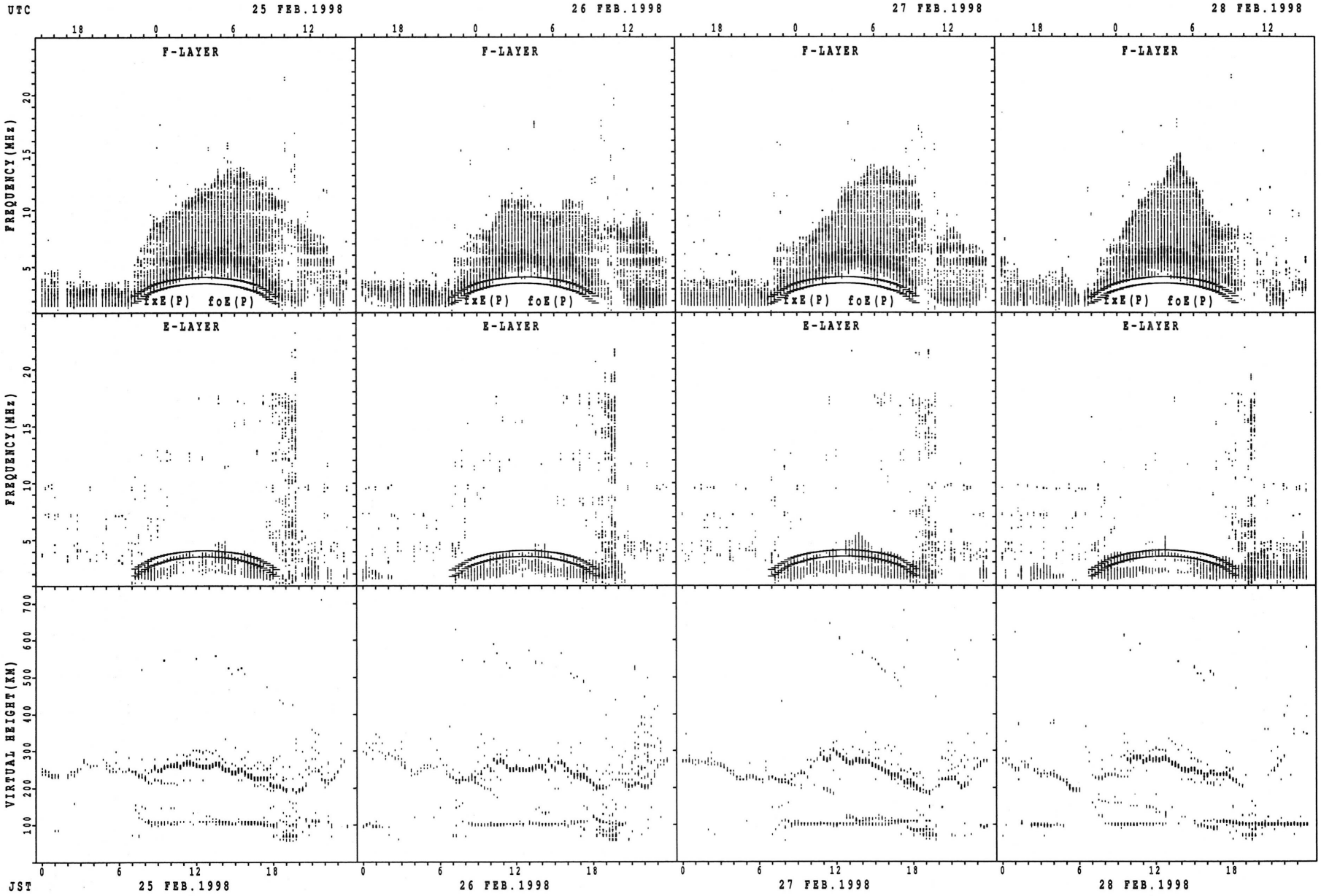
SUMMARY PLOTS AT OKINAWA



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


SUMMARY PLOTS AT OKINAWA
UTC
JST
21 FEB.1998
22 FEB.1998
23 FEB.1998
24 FEB.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

FEB. 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									19	22	18			14	24	23	17							
MED									232	240	249			248	250	244	238							
U Q									240	248	260			252	260	252	249							
L Q									228	232	244			242	246	238	231							

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		10						16	13	10							15	13						
MED		98						109	113	105							121	95						
U Q		103						142	124	121							125	115						
L Q		97						100	108	103							105	91						

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									13	10						11	10							
MED									252	250						256	251							
U Q									262	258						260	256							
L Q									245	238						252	248							

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																		10						
MED																		113						
U Q																		115						
L Q																		101						

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									13	20	18					21	22	15						
MED									252	259	264					260	254	248						
U Q									258	270	270					271	264	258						
L Q									247	247	254					254	246	234						

h'Es

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

MONTHLY MEDIANS OF h'F AND h'Es

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

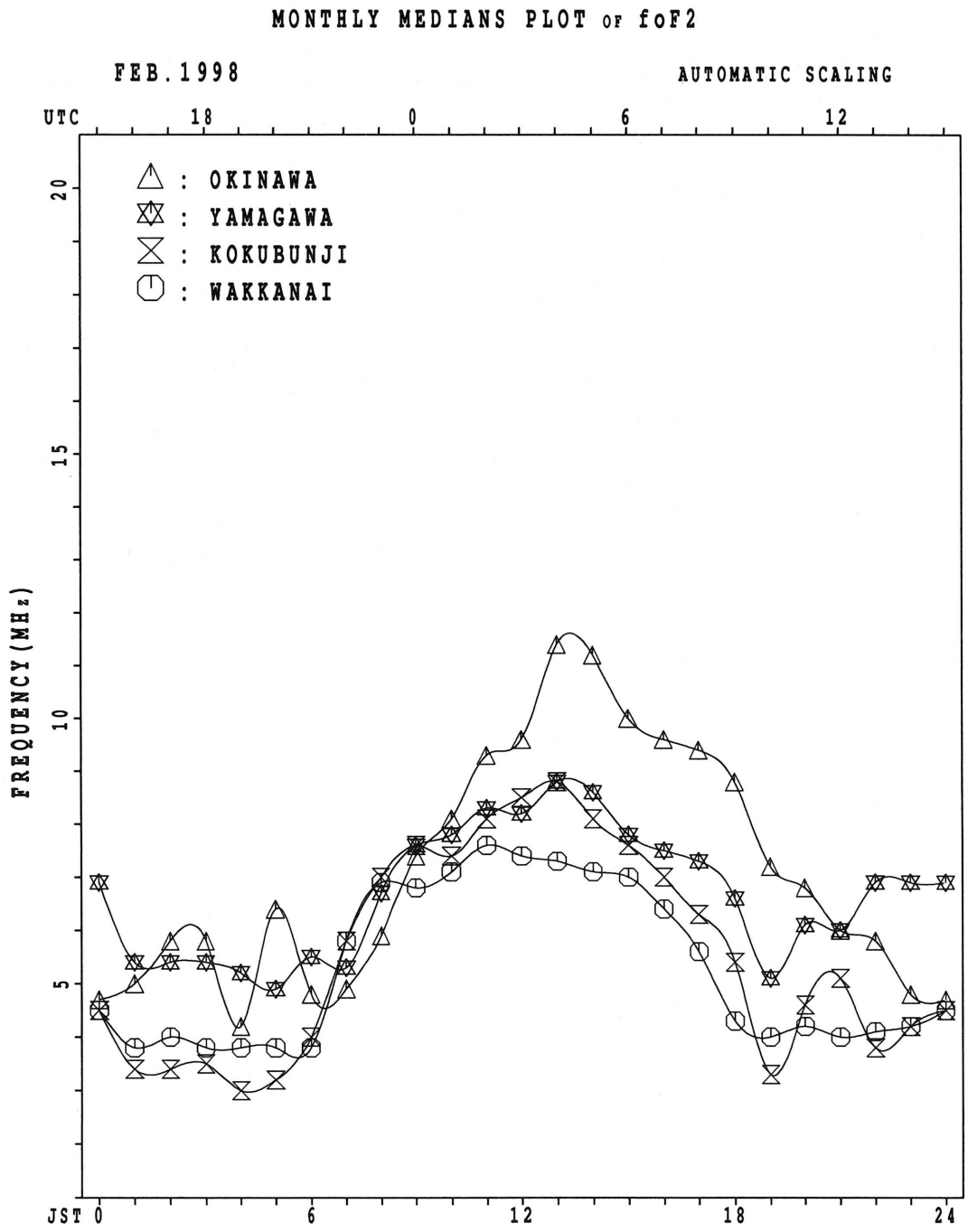
STATION OKINAWA LAT. 26.3N LON. 127.8E

h'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										22	22						25	27	23	11				
MED										249	258						248	240	226	274				
U Q										258	272						257	254	236	322				
L Q										244	250						241	232	224	234				

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT				13	10			11	16	10	13	12	12		14	10	11	16	17	18	16	15	14	10
MED				95	97			93	128	116	113	114	113		114	105	107	104	99	97	103	101	98	104
U Q				102	103			107	161	163	124	145	131		125	111	113	111	126	117	108	113	103	105
L Q				90	95			83	110	105	103	109	111		109	99	95	97	89	89	95	95	95	95


MONTHLY MEDIANS PLOT OF foF2
FEB.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

FEB.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	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	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	15	18	19	16	C	14	14	16	15	15	18	20	C
13	16	16	17	16	15	16	15	14	15	18	18	20	22	19	19	16	19	16	16	15	16	E C 20	13	15
14	17	16	23	20	19	14	15	16	16	18	18	E C 48	22	19	15	20	16	14	C	16	16	C	15	17
15	16	16	16	17	19	19	18	15	16	17	43	28	46	25	22	19	17	14	18	18	20	16	16	15
16	15	15	15	16	16	19	17	14	15	16	20	20	20	24	20	16	15	14	18	14	18	15	C	19
17	15	E C 23	17	17	18	14	18	18	15	16	18	24	21	18	15	19	18	22	16	15	16	18	15	15
18	16	15	18	16	16	18	17	15	15	16	16	19	C	C	C	C	C	C	C	C	C	C	16	18
19	14	16	15	14	13	14	14	14	16	16	17	19	23	22	22	17	16	16	16	15	14	15	16	14
20	15	14	16	15	15	15	16	15	16	14	18	20	20	20	20	16	15	15	13	15	16	20	19	14
21	14	15	15	16	15	14	15	14	15	16	20	27	25	25	16	16	18	15	15	14	15	14	15	14
22	14	14	15	14	14	16	15	14	15	15	18	20	46	36	24	18	15	14	17	14	16	15	15	17
23	16	15	14	15	15	15	14	15	15	17	18	26	20	22	26	20	16	16	14	15	14	15	14	14
24	14	15	15	15	14	15	14	16	14	16	18	29	C	22	19	C	16	16	14	15	14	14	15	14
25	14	14	15	14	14	15	14	16	14	15	16	16	16	15	17	16	15	16	15	14	14	15	14	14
26	14	14	14	14	15	14	15	14	14	16	16	16	22	20	14	15	15	13	14	16	14	15	14	15
27	14	14	15	14	14	14	13	13	15	15	14	17	16	18	17	16	15	14	16	14	14	14	14	15
28	13	14	15	14	15	15	14	14	15	16	17	16	18	17	15	16	15	15	15	14	15	15	14	14
29																								
30																								
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	16	16	16	16	16	16	16	16	16	16	16	17	15	16	16	14	16	16	15	16	16	15	16	16
MED	14	15	15	15	15	15	15	14	15	16	18	20	21	20	18	16	16	15	16	15	15	15	15	15
U Q	16	16	16	16	16	16	16	16	16	16	18	26	23	23	21	19	16	16	16	15	16	18	16	16
L Q	14	14	15	14	14	14	14	14	15	16	16	16	18	18	16	16	15	14	14	14	14	15	14	14

IONOSPHERIC DATA STATION Kokubunji

FEB.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								C	C	C	C	C	C	C	C	C	C	C						
2								C	C	C	C	C	C	C	C	C	C	C						
3								C	C	C	C	C	C	C	C	C	C	C						
4								C	C	C	C	C	C	C	C	C	C	C						
5								C	C	C	C	C	C	C	C	C	C	C						
6								C	C	C	C	C	C	C	C	C	C	C						
7								C	C	C	C	C	C	C	C	C	C	C						
8								C	C	C	C	C	C	C	C	C	C	C						
9								C	C	C	C	C	C	C	C	C	C	C						
10								C	C	C	C	C	C	C	C	C	C	C						
11								C	C	C	C	C	C	C	C	C	C	C						
12								C	C	C	C	A	A	A	304	C	240	A						
13								176	256	R 288	R	348	R	A	A	284	236	A						
14								R	252	A	R	C	R	R	A 344	304	A	A						
15								U R 200	R	R	B	A	B	R	A	A	A	A 184						
16								H 204	260	308	A	A	A	A	R 316	A	A	A						
17								B	244	R	R	R	R	R	U R 328	292	252	B						
18								208	268	R 292	312	R	C	C	C	C	C	C						
19								H 204	252	U R 288	316	A	A	R	R	292	248	A						
20								H 232	260	A	A	A	R	R	R	R	248	180						
21								176	256	296	R	U R 340	360	336	R	R 296	244	B						
22								180	252	288	U R 320	R	B	B	R 324	A 284	U A 244	A						
23								188	252	304	U R 332	R 352	R 360	348	U R 324	300	256	A						
24								176	R 256	U R 304	R 356	368	C	348	332	C	252	176						
25								196	256	308	332	352	A 356	A 332	A	U A 312	A	A						
26								196	A	300	R 332	R 344	U R 348	328	312	292	236	164						
27								164	264	300	324	340	R 348	340	324	308	252	A						
28								180	244	292	R	348	364	352	332	300	256	U A 180						
29																								
30																								
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								14	14	12	8	8	6	7	10	11	12	5						
MED								192	256	298	328	348	R 358	340	324	296	248	180						
U Q								H 204	260	304	R 332	352	360	348	332	304	252	A 182						
L Q								176	252	290	318	R 342	R 348	332	316	292	242	170						

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

IONOSPHERIC DATA STATION Kokubunji

FEB.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								C	C	C	C	C	C	C	C	C	C	C						
2								C	C	C	C	C	C	C	C	C	C	C						
3								C	C	C	C	C	C	C	C	C	C	C						
4								C	C	C	C	C	C	C	C	C	C	C						
5								C	C	C	C	C	C	C	C	C	C	C						
6								C	C	C	C	C	C	C	C	C	C	C						
7								C	C	C	C	C	C	C	C	C	C	C						
8								C	C	C	C	C	C	C	C	C	C	C						
9								C	C	C	C	C	C	C	C	C	C	C						
10								C	C	C	C	C	C	C	C	C	C	C						
11								C	C	C	C	C	C	C	C	C	C	C						
12								C	C	C	C	A	A	A	124	C	E A 142	A						
13								166	118	122	A	124	A	A	A	120	128	122						
14								142	134	116	116	C	A	A	A	122	A	A						
15								128	A	122	B	A	B	A	A	A	A	A						
16								136	118	120	A	A	A	A	120	A	A	A						
17								B	126	A	118	A	118	A	122	120	122	B						
18								146	128	118	116	116	C	C	C	C	C	C						
19								150	124	120	120	A	A	A	120	114	124	A						
20								146	122	A	A	A	A	124	A	A	120	E B 176						
21								144	126	116	116	130	126	120	A	A 120	122	B						
22								142	A 128	128	116	118	B	B	120	120	120	A						
23								140	120	120	118	120	120	122	124	124	122	A						
24								B 158	124	130	122	128	C	128	120	C	132	148						
25								156	132	A 124	124	124	118	118	118	120	120	A						
26								152	A	A 126	128	128	130	A 130	124	120	132	A 122						
27								160	A 122	128	120	124	130	114	118	118	118	A						
28								152	122	A 122	126	120	120	120	122	122	122	124						
29																								
30																								
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								15	14	14	12	10	7	8	11	11	13	5						
MED								146	124	122	119	124	120	121	120	120	122	123						
U Q								156	128	126	123	128	130	126	124	122	130	162						
L Q								142	122	120	116	120	118	119	120	120	120	122						

IONOSPHERIC DATA STATION Kokubunji

FEB. 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	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	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	50	J A 93	J A 66	31	C	30	J A 45	34	28	28	28	E B 20	C
13	34	37	29	J A 28	E B 15	27	24	G	31	G	G 26	39	37	38	35	J A 46	52	46	34	24	18	E C 20	28	37
14	34	E B 16	E B E 23	E B E 20	E B E 19	E B E 14	E B 15	G	28	32	G	E C 48	G 24	G 27	56	36	29	29	C	28	31	C	19	E B 17
15	E B 16	18	E B E 16	E B E 17	E B E 19	E B E 19	E B 18	G	G 26	G	E B 43	40	E B 46	G 30	56	45	36	21	E B E 18	E B 18	E B 20	20	25	34
16	J A E 23	E B 15	J A E 22	J A E 21	E B E 16	E B E 19	E B 17	23	29	37	J A 40	52	37	J A 45	G	32	40	33	31	19	E B E 18	B 15	C	E B 19
17	E B 15	E C 23	E B E 17	E B E 17	E B E 18	E B E 14	E B 18	E B 18	G 21	G 22	G	G 27	G	G 29	G 18	G	28	E B 22	E B E 16	E B 15	E B E 16	E B 18	E B 15	E B 15
18	E B E 16	E B 15	E B E 18	E B 16	E B E 16	E B 18	E B 17	G	28	32	35	G	C	C	C	C	C	C	C	C	C	C	J A 24	E B 18
19	E B E 14	E B 16	E B E 15	E B 14	E B E 13	E B 14	E B 14	G	G	G	34	37	37	G 28	G	G	28	20	21	E B 15	E B E 14	B E 15	E B E 16	E B 14
20	E B 15	J A E 23	E B E 16	B E 15	E B E 15	B E 15	E B 16	G	G	30	33	34	G 31	G	G 31	G 28	G	G	E B E 13	B 15	E B E 16	B E 20	E B 19	E B 14
21	E B 14	E B 15	E B E 15	B E 16	E B E 15	B E 14	E B 15	G	G 20	31	G	G	G	G	G 25	33	27	18	22	18	E B E 15	B E 14	E B 15	E B 14
22	E B E 14	E B 14	E B E 15	B E 14	E B E 14	B E 16	E B 15	G	G 22	32	G	G	E B 46	40	35	32	30	J A 23	E B E 17	B E 14	E B E 16	B E 15	E B E 15	E B 17
23	E B E 16	E B 15	E B E 14	B E 15	E B E 15	B E 15	E B 14	G	G	34	G	38	40	41	38	36	34	J A 28	24	20	E B E 14	B 15	20	E B 14
24	19	E B 15	E B E 15	B E 15	E B E 14	B E 15	E B 14	G	G 19	G 20	40	41	C	41	G	C	27	G	E B E 14	B 15	17	E B 14	E B 15	J A 20
25	20	E B E 14	E B E 15	B E 14	E B E 14	B E 15	E B 14	G	30	36	36	38	J A 43	J A 46	36	J A 36	30	J A 22	J A 15	20	J A 28	E B 15	18	29
26	23	E B E 14	E B E 14	B E 14	E B E 15	B E 14	E B 15	24	34	G 28	37	37	38	38	J A 40	33	J A 48	J A 53	48	20	E B E 14	B E 15	E B 14	18
27	E B E 14	E B 14	E B E 15	B E 14	E B E 14	B E 14	E B 13	G	G 21	G 24	39	36	G 33	38	G	37	31	21	E B E 16	B 14	E B E 14	B E 14	E B E 14	B 15
28	20	E B E 14	E B E 15	B E 14	E B 15	18	18	G	G 18	G 24	G 25	38	39	38	36	33	31	46	J A 30	26	22	J A 22	E B 14	18
29																								
30																								
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	16	16	16	16	16	16	16	16	16	16	16	17	15	16	16	14	16	16	15	16	16	15	16	16
MED	E B E 16	E B 15	E B E 15	B E 15	E B E 15	B E 15	E B 15	G	G	G	E G 34	38	37	38	33	33	30	22	21	18	E B E 16	B E 15	E B 17	E B 18
U Q	22	17	E B E 18	B 17	E B E 16	B E 18	E B 18	G	28	32	38	40	43	J A 41	37	36	35	39	31	22	21	20	20	20
L Q	E B E 14	B E 14	E B E 15	B E 14	E B E 14	B E 14	E B 14	G	G 21	G 26	G	G	G	G	G	G 32	28	20	E B E 16	B 15	E B E 14	B E 15	E B E 15	B 14

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

IONOSPHERIC DATA STATION Kokubunji

FEB.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	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	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	106	104	104	112	C	142	104	100	118	116	112	B	C
13	112	110	114	118	B	114	118	G	192	G	112	154	148	106	106	126	122	120	118	104	100	C	118	114
14	114	B	B	B	B	B	B	G	144	124	G	C	114	108	132	154	104	100	C	128	120	C	120	B
15	B	108	B	B	B	B	B	G	122	G	B	116	B	114	128	116	114	150	B	B	B	118	114	112
16	108	B	106	108	B	B	B	178	168	144	120	114	114	112	G	104	100	116	124	122	B	B	C	B
17	B	C	B	B	B	B	B	B	112	112	G	116	G	104	104	G	196	B	B	B	B	B	B	B
18	B	B	B	B	B	B	B	G	150	144	134	G	C	C	C	C	C	C	C	C	C	C	124	B
19	B	B	B	B	B	B	B	G	G	G	136	122	116	114	G	G	146	140	102	B	B	B	B	B
20	B	116	B	B	B	B	B	G	G	126	124	124	116	G	116	116	G	G	B	B	B	B	B	B
21	B	B	B	B	B	B	B	G	114	176	G	G	G	G	102	132	126	116	102	102	B	B	B	B
22	B	B	B	B	B	B	B	G	112	178	G	G	B	148	138	124	120	118	B	B	B	B	B	B
23	B	B	B	B	B	B	B	G	G	164	G	148	136	136	132	126	124	116	114	116	B	B	104	B
24	104	B	B	B	B	B	B	G	114	112	160	148	C	146	G	C	170	G	B	B	142	B	B	112
25	110	B	B	B	B	B	B	G	170	152	148	150	124	120	124	122	118	118	118	114	106	B	110	124
26	112	B	B	B	B	B	B	158	108	112	180	152	142	132	130	198	134	122	116	104	B	B	B	114
27	B	B	B	B	B	B	B	G	108	108	180	138	110	124	G	134	126	120	B	B	B	B	B	B
28	102	B	B	B	B	114	120	G	104	106	110	182	182	162	154	144	132	122	114	116	118	114	B	140
29																								
30																								
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	7	3	2	2		2	2	2	13	13	10	13	11	14	12	12	15	13	9	9	6	3	6	6
MED	110	110	110	113		114	119	168	114	126	135	138	116	117	126	126	126	118	114	116	117	114	116	114
U Q	112	116							159	158	160	151	142	136	132	139	142	122	118	120	120	118	120	124
L Q	104	108							110	112	120	116	114	108	109	119	118	116	102	104	106	112	110	112

IONOSPHERIC DATA STATION Kokubunji

FEB.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																								
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12												L 1	L 2	L 2	L 1		HL 11	L 2	F 1	FF 11	F 2	F 1		
13	F 1	F 1	F 1	F 1		F 1	F 1		H 1		L 1	HL 11	HL 11	L 1	L 1	CL 11	C 1	CL 11	FF 11	F 1	F 1		F 1	F 2
14	F 1								HL 11	C 1			L 1	L 1	HL 11	H 1	L 1	L 1		F 1	F 1		F 1	
15		F 1							L 1			L 1		L 1	CL 11	L 1	L 1	HL 11				F 1	F 1	F 2
16	F 2		F 2	F 1				HL 11	H 1	H 1	L 1	L 1	L 1	L 1		L 2	L 2	CL 11	F 1	F 1				
17									L 1	L 1		L 1		L 1	L 1		H 1							
18									HL 11	H 1	C 1												F 1	
19											C 1	C 1	L 1	L 1			C 1	H 1	F 1					
20		F 1								C 1	C 1	C 1	L 1		L 1	L 1								
21									L 1	H 1					L 2	CL 11	C 1	L 1	F 1	F 1				
22									L 1	HL 11				H 1	C 1	C 1	C 1	C 2						
23										H 1		H 1	H 1	C 1	C 1	C 1	C 2	L 2	F 1	F 1			F 1	
24	F 2								L 1	L 1	H 1	H 1		H 1			HL 11				F 1			F 2
25	F 1								HL 11	HL 11	HL 11	HL 11	C 1	C 2	C 1	C 1	C 2	L 3	F 1	F 1	F 2		F 1	FF 11
26	F 1							H 1	L 2	L 1	HL 11	HL 11	HL 11	CL 11	CL 11	HL 12	CL 31	CL 31	FF 31	F 1				F 1
27									L 2	L 1	HL 11	HL 11	L 1	C 1		C 1	C 1	L 1						
28	F 1					F 1	F 1		L 1	L 1	L 1	HL 11	H 1	HL 11	HL 11	H 1	C 2	C 3	F 2	F 2	F 1	F 1		F 1
29																								
30																								
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																								

FEB.1998 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

FEB.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	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	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	47	46	48	G 23	C	28	41	U Y 34	21	26	21	E B 20	C
13	A A 34	A A 37	26	21	E B 15	21	19	G	30	G	U G 25	39	U Y 37	U Y 37	U Y 35	42	44	43	U Y 33	U Y 24	18	E C 20	25	A A 37
14	A A 34	E B 16	E B 23	E B 20	E B 19	E B 14	E B 15	G	27	U Y 32	G	E C 48	U G 24	U G 27	U Y 56	U Y 35	U Y 29	25	C	U Y 28	U Y 30	C	E B 15	E B 17
15	E B 16	18	E B 16	E B 17	E B 19	E B 19	E B 18	G	U G 26	G	E B 43	U Y 40	E B 46	U G 30	48	42	36	U Y 21	E B 18	E B 18	E B 20	20	18	27
16	22	E B 15	20	21	E B 16	E B 19	E B 17	23	29	37	U Y 40	48	U Y 37	43	G	U Y 32	38	30	28	18	E B 18	E B 15	C	E B 19
17	E B 15	E C 23	E B 17	E B 17	E B 18	E B 14	E B 18	E B 18	G 18	U G 22	G	U G 26	G	U G 29	G 18	G	27	E B 22	E B 16	E B 15	E B 16	E B 18	E B 15	E B 15
18	E B 16	E B 15	E B 18	E B 16	E B 16	E B 18	E B 17	G	28	U Y 31	35	G	C	C	C	C	C	C	C	C	C	C	17	E B 18
19	E B 14	E B 16	E B 15	E B 14	E B 13	E B 14	E B 14	G	G	G	34	36	37	U G 28	G	G	27	20	18	E B 15	E B 14	E B 15	E B 16	E B 14
20	E B 15	18	E B 16	E B 15	E B 15	E B 15	E B 16	G	G	29	U Y 33	34	U G 31	G	U G 31	U G 28	G	G	E B 13	E B 15	E B 16	E B 20	E B 19	E B 14
21	E B 14	E B 15	E B 15	E B 16	E B 15	E B 14	E B 15	G	G 19	31	G	G	G	G	U G 25	32	27	U Y 18	E B 15	16	E B 15	E B 14	E B 15	E B 14
22	E B 14	E B 14	E B 15	E B 14	E B 14	E B 16	E B 15	G	G 19	32	G	G	E B 46	U Y 40	35	32	30	20	E B 17	E B 14	E B 16	E B 15	E B 15	E B 17
23	E B 16	E B 15	E B 14	E B 15	E B 15	E B 15	E B 14	G	G	34	G	U Y 38	U Y 39	41	U Y 38	36	33	24	18	E B 15	E B 14	E B 15	E B 14	E B 14
24	U Y 19	E B 15	E B 15	E B 15	E B 14	E B 15	E B 14	G	G 18	G 20	U Y 40	U Y 41	C	40	G	C	27	G	E B 14	E B 15	16	E B 14	E B 15	17
25	E B 14	E B 14	E B 15	E B 14	E B 14	E B 15	E B 14	G	29	35	36	37	40	40	36	34	29	18	E B 15	E B 14	24	E B 15	E B 14	17
26	16	E B 14	E B 14	E B 14	E B 15	E B 14	E B 15	23	26	G 25	37	36	37	37	36	32	44	47	40	18	E B 14	E B 15	E B 14	E B 15
27	E B 14	E B 14	E B 15	E B 14	E B 14	E B 14	E B 13	G	G 16	G 24	38	35	G 25	37	G	36	29	20	E B 16	E B 14	E B 14	E B 14	E B 14	E B 15
28	E B 13	E B 14	E B 15	E B 14	E B 15	E B 15	E B 14	G	G 17	G 22	G 23	37	U Y 38	U Y 38	35	32	30	40	28	18	17	18	E B 14	E B 14
29																								
30																								
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	16	16	16	16	16	16	16	16	16	16	16	17	15	16	16	14	16	16	15	16	16	15	16	16
MED	E B 16	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	G	G	G	E G 34	36	37	37	G	32	29	22	E B 18	E B 16	E B 16	E B 15	E B 15	E B 16
U Q	18	17	E B 18	E B 17	E B 16	E B 17	E B 17	G	28	32	38	40	40	40	36	36	34	35	28	18	19	20	18	18
L Q	E B 14	E B 14	E B 15	E B 14	E B 14	E B 14	E B 14	G	G 18	G 24	G	G	G	G	G	G 32	27	19	E B 15	E B 15	E B 14	E B 15	E B 14	E B 14

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

IONOSPHERIC DATA STATION Kokubunji

FEB. 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								C	C	C	C	C	C	C	C	C	C	C						
2								C	C	C	C	C	C	C	C	C	C	C						
3								C	C	C	C	C	C	C	C	C	C	C						
4								C	C	C	C	C	C	C	C	C	C	C						
5								C	C	C	C	C	C	C	C	C	C	C						
6								C	C	C	C	C	C	C	C	C	C	C						
7								C	C	C	C	C	C	C	C	C	C	C						
8								C	C	C	C	C	C	C	C	C	C	C						
9								C	C	C	C	C	C	C	C	C	C	C						
10								C	C	C	C	C	C	C	C	C	C	C						
11								C	C	C	C	C	C	C	C	C	C	C						
12								C	C	C	C	A	U A 460	A	L 440	C		A						
13										L	U L 436	U L 476	U Y 472	R		L 428	A							
14										L	R	C 424	R	U Y 456	A	L								
15											L	U L 480	B	U Y 480	A	L								
16										L	Y	A	U Y 448	A	L	L								
17									L	L	L	L	U L 504	R	Y	R	L							
18									L	L	L	L	C	C	C	C	C	C						
19									L 296	L	U L 480	U L 492	L 488	U L 480	U L 460	U L 432	U L 332							
20									L	L	L	L 488	476	L 468	L 440	U L 408	U L 372	L						
21										L	U L 456	U L 464	L 500	L 472	L	L	U L 372							
22									U L 376	U L 436	U L 440	U L 468	L B	L	U L 464	L 440	L	224						
23									L	U L 432	U L 440	L	U L 492	U L 492	L	U L 444	L							
24									L	L		L	C	U L 500	452	C	L 360	L						
25									L	U L 460	L 480	L 488	L 476	L 504	L 468	U L 440	U L 408							
26									L	L 440	U L 464	L 460	L 460	L 460	L	L	A	A						
27								L	L	U L 440	L 452	L 464	L 436	L 480	L 452	L 452	L	L						
28									L	L 432	U L 508	L 492	L	L 464	L 464	L 440	U L 388							
29																								
30																								
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									2	6	9	11	11	11	8	8	6	1						
MED									L 336	U L 438	U L 456	L 476	L 476	L 480	L 456	L 440	U L 372	224						
U Q										U L 440	U L 480	L 488	U L 492	U L 492	L 464	U L 442	U L 388							
L Q										L 432	U L 440	L 464	L 460	L 464	L 446	U L 430	L 360							

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

IONOSPHERIC DATA STATION Kokubunji

FEB. 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								C	C	C	C	C	C	C	C	C	C	C						
2								C	C	C	C	C	C	C	C	C	C	C						
3								C	C	C	C	C	C	C	C	C	C	C						
4								C	C	C	C	C	C	C	C	C	C	C						
5								C	C	C	C	C	C	C	C	C	C	C						
6								C	C	C	C	C	C	C	C	C	C	C						
7								C	C	C	C	C	C	C	C	C	C	C						
8								C	C	C	C	C	C	C	C	C	C	C						
9								C	C	C	C	C	C	C	C	C	C	C						
10								C	C	C	C	C	C	C	C	C	C	C						
11								C	C	C	C	C	C	C	C	C	C	C						
12								C	C	C	C	A	A	A	L 352	C		A						
13										L	U L 383	A	Y	R		A	A							
14										L	R	C	R	Y	A	L								
15											L	U L 367	B	Y	A	L								
16										L	Y	A	Y	A	L	L								
17									L	L	L	L	L	R	Y	R	L							
18									L	L	L	L	C	C	C	C	C	C						
19									L 416	L	U L 365	U L 347	L 348	U L 358	U L 374	U L 372	U L 393							
20									L	L	L	L 349	L 352	L 355	L 375	U L 378	U L 394	L						
21										L	U L 374	U L 372	L 346	L 366	L	L	U L 383							
22									U L 393	U L 360	U L 382	U L 365	B	L	U L 368	L 369	L	416						
23									L	L	U L 390	L	Y 363	Y 361	L	U L 381	L							
24									L	L		L	C	U L 370	358	C	L 384	L						
25									L	U L 381	L 364	L 355	L 377	L 345	L 364	U L 358	U L 356							
26									L	L 358	U L 361	L 385	L 373	L 374	L	L	A	A						
27								L	L	U L 373	L 372	L 363	L 400	L 367	L 347	L 357	L	L						
28									L	L 381	U L 346	L 348	L	A	L 358	L 359	U L 386							
29																								
30																								
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									2	5	9	9	7	8	8	7	6	1						
MED									L 404	U L 373	U L 372	L 363	L 363	L 364	L 361	U L 369	U L 385	416						
U Q										L 381	U L 382	U L 370	L 377	L 368	U L 371	U L 378	U L 393							
L Q										L 359	U L 362	L 348	L 348	L 356	L 355	L 358	U L 383							

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

IONOSPHERIC DATA STATION Kokubunji

FEB. 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	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	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	A	A	A	H 188	C	244	A	A	264	A 270	268	250	C
13	A	A	260	270	250	254	226	220	234	208	188	A	Y	A	250	A 226	A	A 236	A	Y	258	270	E A 360	A
14	A	282	E B 284	254	254	256	258	232	234	236	212	C	Y	Y	A	Y	230	226	C	A	E Y 296	C	276	256
15	262	272	340	290	234	232	E B 302	230	240	240	B	A 248	B	Y	A	A	236	226	232	252	260	260	326	308
16	A 276	266	274	286	260	236	272	230	234	240	A	A	A	A	224	260	A 236	226	230	U C 252	302	264	C	298
17	308	C 312	296	280	262	250	240	216	218	220	Y 264	E Y 260	E Y 260	Y	Y	Y	228	224	208	256	272	268	334	282
18	306	312	306	300	300	308	334	242	236	Y 250	222	Y 252	C	C	C	C	C	C	C	C	C	C	232	290
19	338	320	316	250	216	320	284	222	206	214	222	220	220	216	230	226	212	228	230	226	268	266	292	308
20	338	332	266	268	238	268	270	238	H 194	236	232	214	210	222	Y 236	204	210	230	222	234	226	B 260	B 304	296
21	294	308	284	266	242	238	240	228	230	214	224	222	210	216	216	220	218	230	220	224	238	262	302	330
22	304	284	272	260	276	280	242	226	204	190	178	212	B	Y	236	226	230	A 234	214	254	276	280	302	302
23	278	262	264	268	216	290	246	222	234	226	210	Y	Y	E Y 268	A	230	242	216	226	232	236	264	298	308
24	284	292	286	254	218	284	266	230	238	240	240	Y 254	C	246	224	C	218	220	200	268	260	248	282	290
25	282	260	256	264	266	252	238	228	236	238	224	220	226	A 246	226	226	228	226	204	258	A 312	260	288	294
26	296	286	290	274	286	298	254	230	210	202	224	226	204	204	242	232	A	A	236	238	266	280	310	290
27	276	274	286	284	272	276	254	234	218	210	A 230	204	198	202	216	A 236	228	224	210	244	252	278	300	294
28	288	300	270	258	268	280	224	200	202	196	H 186	234	A	A	222	222	234	232	220	264	256	274	292	298
29																								
30																								
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	14	15	16	16	16	16	16	16	16	16	14	12	7	8	12	11	14	14	13	14	16	15	16	15
MED	291	286	284	268	257	272	252	229	232	223	223	222	210	218	225	226	229	226	220	252	262	266	297	296
U Q	306	312	293	282	270	287	271	231	235	239	230	Y 250	226	246	236	232	236	230	230	258	274	274	307	308
L Q	278	272	268	259	236	251	240	222	208	209	210	217	204	210	219	222	218	224	209	234	254	260	285	290

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

IONOSPHERIC DATA STATION Kokubunji

FEB. 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								C	C	C	C	C	C	C	C	C	C	C						
2								C	C	C	C	C	C	C	C	C	C	C						
3								C	C	C	C	C	C	C	C	C	C	C						
4								C	C	C	C	C	C	C	C	C	C	C						
5								C	C	C	C	C	C	C	C	C	C	C						
6								C	C	C	C	C	C	C	C	C	C	C						
7								C	C	C	C	C	C	C	C	C	C	C						
8								C	C	C	C	C	C	C	C	C	C	C						
9								C	C	C	C	C	C	C	C	C	C	C						
10								C	C	C	C	C	C	C	C	C	C	C						
11								C	C	C	C	C	C	C	C	C	C	C						
12								C	C	C	C	250	266	268	242	C		A 252						
13										248	254	276	280	E Y 276		254	252							
14										236	Y 256	E C 272	282	270	E Y 286	246								
15											252	304	292	274	258	240								
16										246	282	276	278	270	278	260								
17									240	258	282	272	270	E Y 278	280	260	232							
18									270	276	270	256	C	C	C	C	C	C						
19									230	248	264	280	264	254	254	242	224							
20									248	258	268	280	272	262	246	246	236	228						
21										242	264	246	296	264	254	252	240							
22									232	238	266	260	262	260	256	248	230	220						
23									234	242	242	258	286	276	258	258	246							
24									244	242		268	C	276	264	C	226	214						
25									252	252	258	256	254	270	264	254	254							
26									240	248	258	246	262	272	270	248	242	250						
27								226	234	250	242	260	264	280	260	254	242	218						
28									214	252	306	284	260	254	258	260	250							
29																								
30																								
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	11	15	15	17	15	16	15	14	12	6						
MED								226	240	248	264	264	270	270	258	253	241	224						
U Q									248	252	270	278	282	276	270	258	248	250						
L Q									232	242	254	256	262	263	254	246	231	218						

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

IONOSPHERIC DATA STATION Kokubunji

FEB.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	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	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	80	74	75	80	C	67	55	Y	R	R 43	U R 40	U R 38	C
13	A	A	40	34	J R 33	39	R 33	53	68	69	U R 64	75	84	77	J R 62	64	68	62	R	R	37	R 29	30	A
14	A	U R 27	U R 32	U R 32	R 37	28	30	57	69	U R 71	R	61	R 78	98	86	70	J R 61	50	C	C	R	C	33	U R 34
15	R 32	33	30	U R 33	R	32	24	51	68	R 74	R 74	U R 69	89	96	86	R 69	63	53	J R 38	R	U R 39	U R 35	33	U R 37
16	35	34	35	35	R 36	U R 35	29	54	R 65	74	77	78	87	73	74	J R 75	69	64	U R 48	R	34	R 36	C	U R 32
17	R 31	R	J R 31	U R 33	U R 33	J R 33	34	61	R 62	70	74	83	84	U R 74	J R 62	80	R 76	62	R 39	30	35	R	R 34	U R 32
18	U R 35	R 34	U R 35	U R 32	34	U R 32	30	R 55	93	R 106	124	118	C	C	C	C	C	C	C	C	C	C	33	R 33
19	40	R	R 40	R 44	30	24	29	60	67	71	78	98	R 109	106	91	79	64	61	55	38	36	R 32	U R 32	34
20	32	34	36	34	28	26	28	55	70	74	81	94	95	97	80	70	65	61	53	50	U R 44	R 34	34	35
21	35	36	36	R 34	33	31	32	52	63	65	73	68	R 74	R 77	72	67	68	66	58	R 41	R 35	R 32	32	32
22	34	34	33	31	30	30	R 34	61	68	78	74	80	77	80	83	81	72	64	R 44	R 38	40	36	36	38
23	40	39	38	38	32	28	33	58	71	75	68	70	79	78	78	73	77	62	49	41	U R 46	32	U R 34	34
24	U R 37	35	U R 35	39	30	32	36	R 64	72	87	74	79	C	87	95	C	76	59	42	43	47	43	R 43	43
25	45	45	42	40	39	39	38	60	75	83	84	95	80	90	81	78	78	74	53	32	34	33	33	34
26	36	34	36	36	34	35	40	70	71	81	73	70	85	82	77	73	64	68	54	34	34	34	33	34
27	35	35	34	34	35	34	38	69	73	74	72	78	84	94	88	78	71	61	54	33	34	32	32	34
28	35	F 35	36	38	34	36	48	62	58	R 63	77	94	100	95	78	75	72	72	55	43	43	41	40	40
29																								
30																								
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	14	13	16	16	15	16	16	16	16	16	15	17	15	16	16	14	16	16	13	11	15	14	16	15
MED	35	34	36	34	33	32	33	59	68	74	74	79	84	84	80	74	68	62	53	38	37	34	33	34
U Q	37	36	37	38	35	35	37	62	72	80	78	94	89	96	86	78	74	65	54	43	R 43	36	R 35	37
L Q	34	34	34	U R 33	30	29	30	54	66	70	73	70	78	77	76	70	64	60	R 43	33	34	32	32	R 33

FEB.1998 foF2 (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

FEB.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	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	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	354	347	333	364	C	346	342	Y	R	R 323	U R 339	U R 323	C
13	A	A	344	340	J R 345	344	R 340	357	350	362	U R 341	336	336	346	R	325	341	359	R	R	350	R 330	308	A
14	A	U R 332	U R 321	U R 347	R 343	338	336	357	362	U R 370	R	355	R 308	335	345	368	J R 326	362	C	C	R	C	322	U R 335
15	R 340	310	302	U R 325	R	357	334	348	343	R 350	R 347	U R 291	311	329	339	R 350	363	357	R	R	U R 329	U R 346	291	U R 320
16	324	331	331	313	R 325	U R 350	323	364	R 353	355	333	337	334	338	332	J R 338	351	349	U R 355	R	319	R 324	C	U R 311
17	R 307	R	R	U R 339	U R 310	J R 320	354	373	R 360	334	339	327	337	U R 344	J R 321	340	R 355	355	R 368	303	320	R	R 297	U R 317
18	U R 301	R 308	U R 295	U R 311	311	U R 318	287	R 348	319	R 328	326	335	C	C	C	C	C	C	C	C	C	C	317	R 300
19	269	R	R 287	R 338	353	300	309	352	357	337	322	316	R 327	340	340	347	351	343	334	345	306	R 330	U R 314	286
20	283	298	325	318	333	319	308	344	351	347	329	330	332	338	353	353	363	334	325	314	U R 337	R 341	294	303
21	308	304	320	R 336	351	340	348	349	355	355	343	361	R 327	R 341	346	342	343	346	339	R 341	R 340	R 333	282	294
22	297	309	326	319	299	300	R 356	361	358	363	330	342	322	330	339	349	365	350	R 336	R 327	306	319	309	308
23	308	325	317	313	367	297	335	362	365	360	340	316	331	335	342	346	349	374	327	313	U R 328	294	U R 290	294
24	U R 292	302	U R 318	323	338	302	299	R 355	348	355	346	337	C	323	342	C	366	367	317	292	309	319	R 292	299
25	301	304	309	307	296	317	325	353	343	340	335	352	331	346	336	353	349	359	367	305	300	305	302	301
26	285	295	297	306	305	296	318	365	346	368	349	350	336	341	324	351	345	345	361	323	322	291	293	303
27	309	304	308	306	305	309	328	372	341	350	349	352	332	325	334	342	348	369	370	310	313	309	303	306
28	314	F 298	319	326	308	304	353	392	372	R 337	315	322	328	349	345	346	342	354	362	301	305	306	293	288
29																								
30																								
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	14	13	15	16	15	16	16	16	16	16	15	17	15	16	15	14	16	16	12	11	15	14	16	15
MED	304	304	318	321	325	318	331	357	352	352	339	337	331	338	340	346	349	354	347	313	320	322	300	303
U Q	309	318	325	R 337	345	339	344	364	359	361	346	352	336	342	345	351	359	360	364	R 327	R 329	R 333	312	U R 311
L Q	292	300	302	312	305	301	314	350	344	338	329	324	327	332	334	342	344	346	330	303	306	306	292	294

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

IONOSPHERIC DATA STATION Kokubunji

FEB.1998 fxI (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

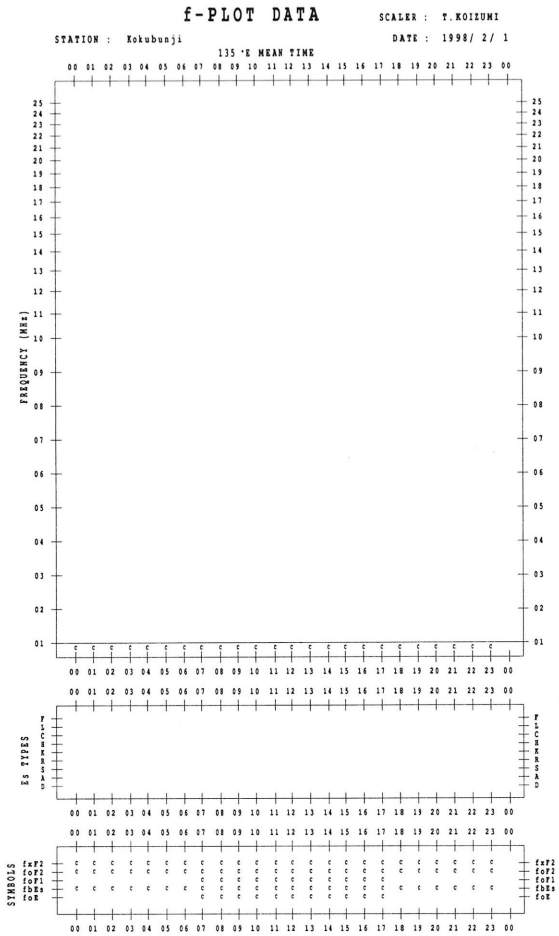
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

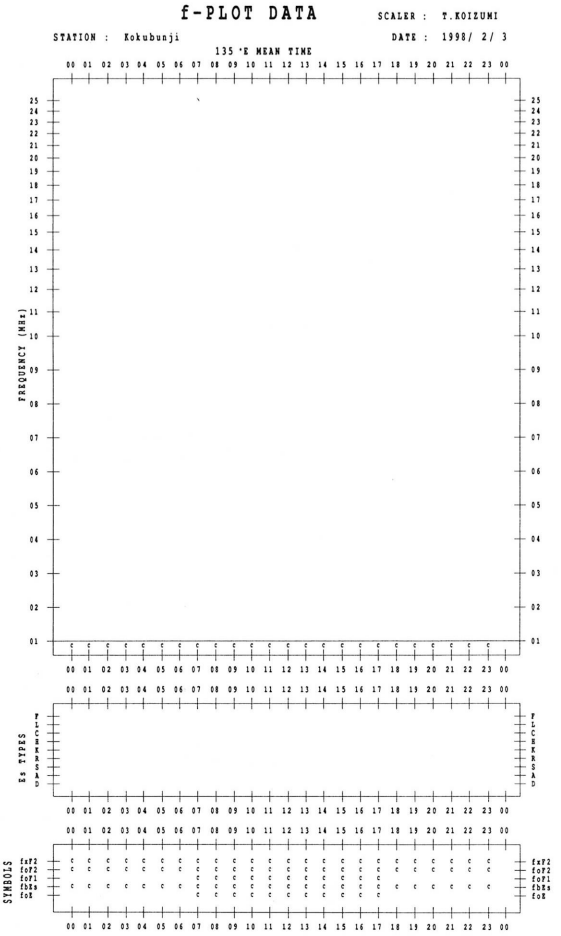
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	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	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C								Y	R	X 50	O X 46	O X 44	C
13	A	A	X 46	X 40	X 39	O X 45	X 39												R	R	O X 43	O X 35	X 36	A
14	A	X 33	O X 38	X 39	X 43	X 34	O X 36												C	C	R	C	X 39	X 40
15	X 38	X 39	X 36	O X 39	R	X 39	X 30												X 44	R	O X 45	O X 41	X 39	X 43
16	X 41	X 40	X 41	X 41	X 42	O X 41	X 35												O X 54	R	X 40	O X 42	C	X 38
17	X 37	R	X 37	X 40	O X 39	X 39	X 40												X 45	X 36	O X 41	R	X 40	X 38
18	O X 41	X 40	X 41	X 39	X 40	X 39	X 36												C	C	C	C	X 39	X 39
19	X 46	R	X 46	X 50	X 35	X 30	X 35												X 61	X 44	X 42	X 38	O X 38	X 40
20	X 38	X 40	X 42	X 40	X 34	X 32	X 34												X 59	X 56	X 50	X 40	X 40	X 41
21	X 41	X 42	X 42	X 40	X 39	X 37	X 38												X 64	X 45	X 41	X 38	X 38	X 38
22	X 40	X 40	X 39	X 37	X 36	X 36	X 40												X 50	O X 44	X 46	X 42	X 42	X 44
23	X 46	X 45	X 44	O X 44	X 38	X 34	X 39												X 55	X 47	X 52	X 38	X 40	X 40
24	O X 43	X 41	X 41	X 45	X 36	X 38	X 42						C			C			X 47	X 49	X 53	X 49	X 49	X 49
25	X 51	X 51	X 48	X 46	X 46	X 45	X 44												X 59	X 38	X 40	X 39	X 39	X 40
26	X 42	X 40	X 42	X 42	X 40	X 41	X 46												X 60	X 40	X 40	X 40	X 39	X 40
27	X 41	X 41	X 40	X 40	X 41	X 40	X 44												X 60	X 39	X 40	X 38	X 38	X 41
28	X 41	42	X 42	X 44	X 40	X 42	X 54												X 61	X 49	X 49	X 47	X 46	X 46
29																								
30																								
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	14	13	16	16	15	16	16												13	11	15	14	16	15
MED	X 41	X 40	X 42	X 40	X 39	X 39	X 39												X 59	X 44	X 43	X 40	X 39	X 40
U Q	X 43	X 42	X 43	X 44	X 41	X 41	X 43												X 60	X 49	X 50	X 42	X 41	X 43
L Q	X 40	X 40	X 40	X 40	X 36	X 35	X 36												X 48	X 39	X 40	X 38	X 38	X 39

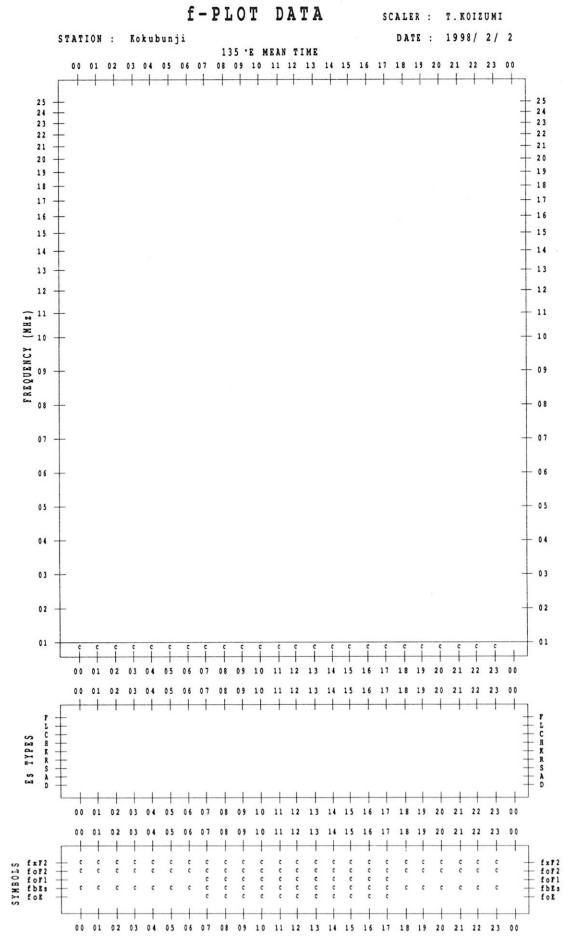
FEB.1998 fxI (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

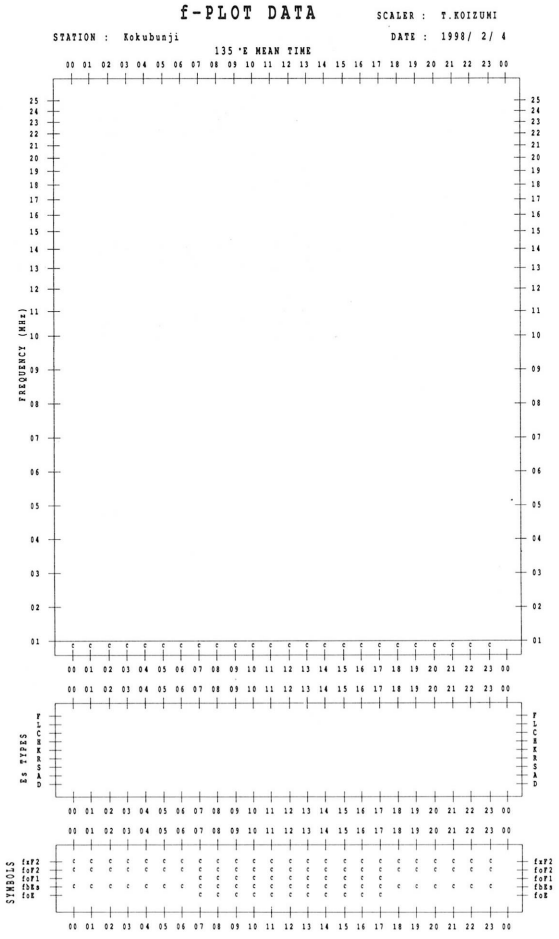
f-PLOTS OF IONOSPHERIC DATA

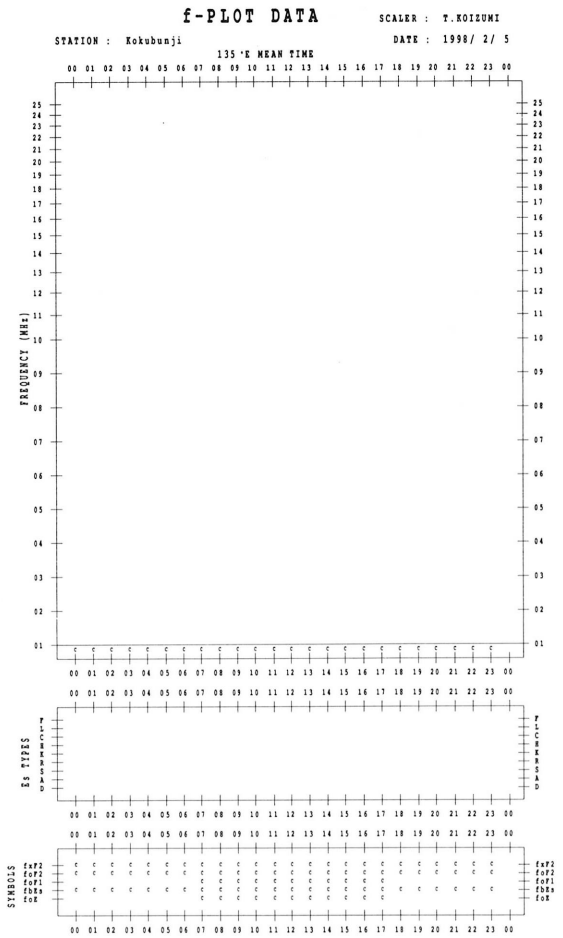
KEY OF f-PLOT	
	SPREAD
	foF2, foF1, foE
	fxF2
	DOUBTFUL foF2, foF1, foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

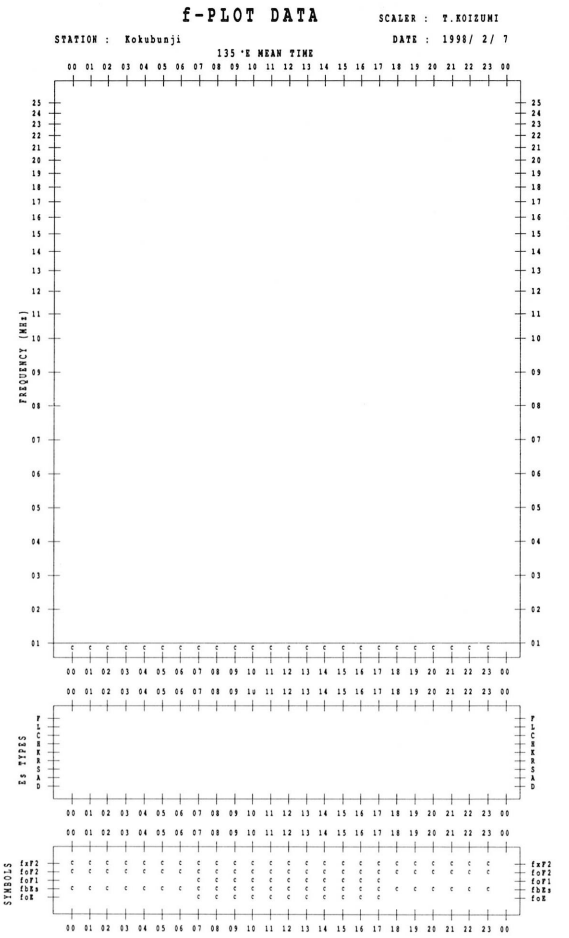

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE

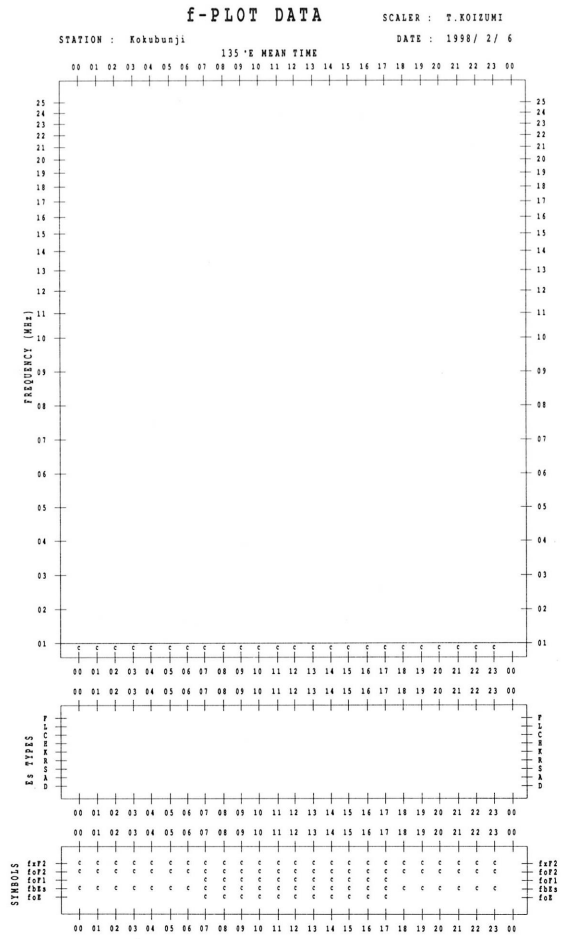

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE


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


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


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


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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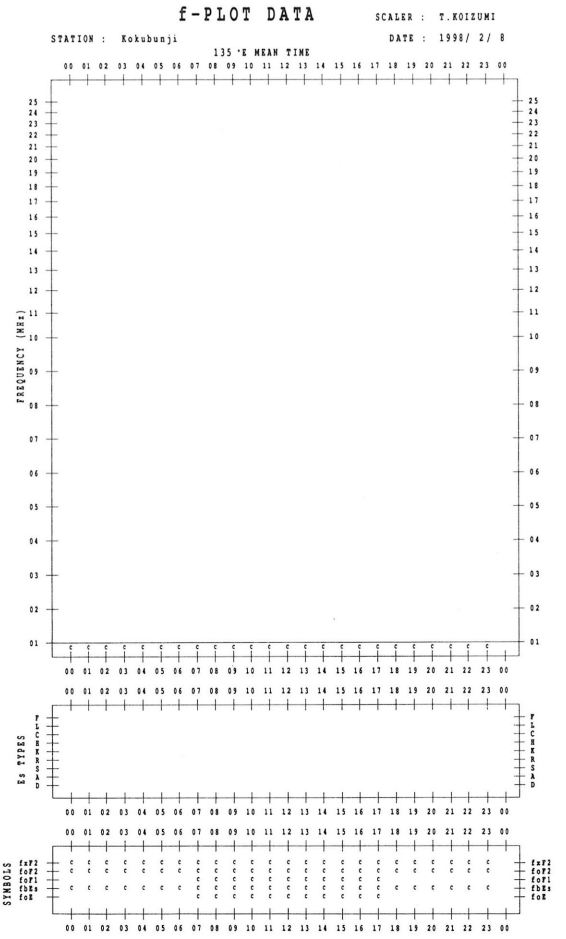
STATION : Kokubunji
DATE : 1998/ 2/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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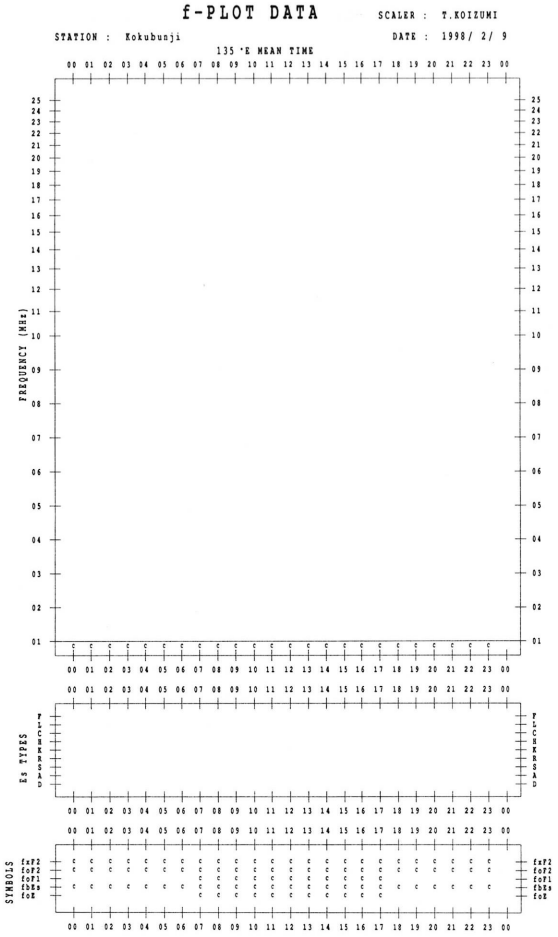
STATION : Kokubunji
DATE : 1998/ 2/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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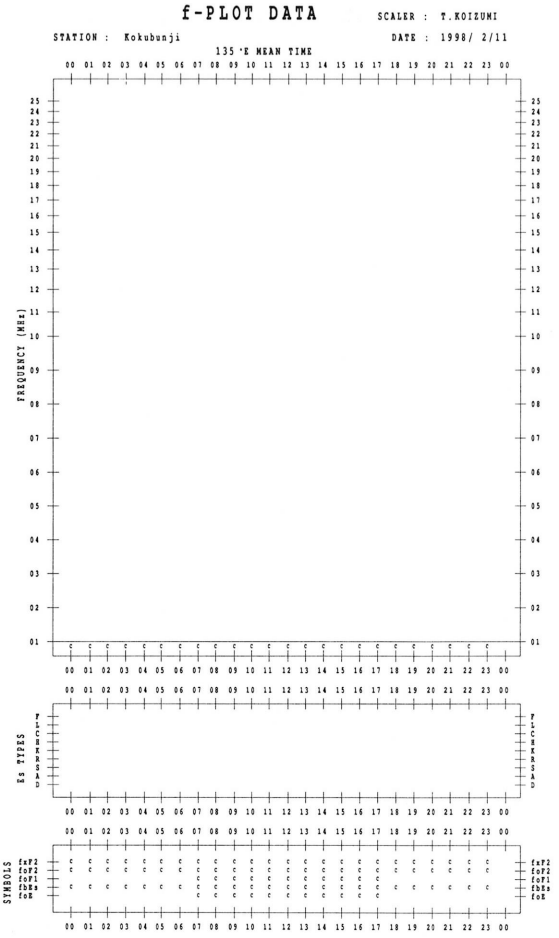
STATION : Kokubunji
DATE : 1998/ 2/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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STATION : Kokubunji
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FREQUENCY (MHz)
Es TYPES
SYMBOLS
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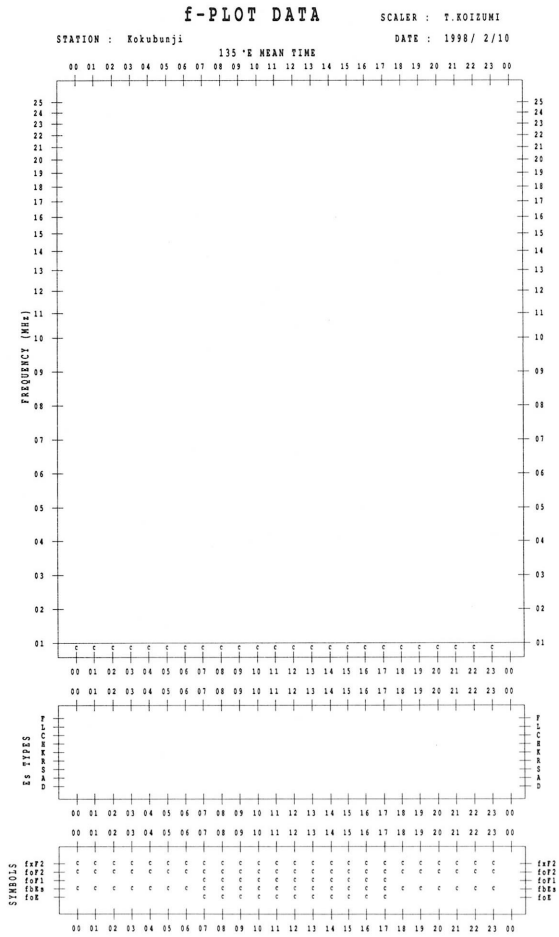
foF2
foF1
fbEs
foE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STATION : Kokubunji
DATE : 1998/ 2/10
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FREQUENCY (MHz)
Es TYPES
SYMBOLS
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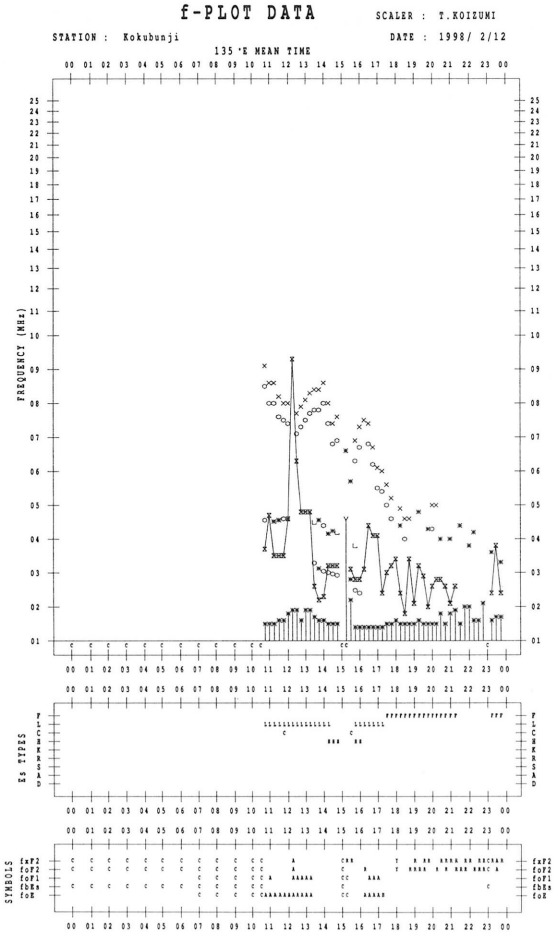
foF2
foF1
fbEs
foE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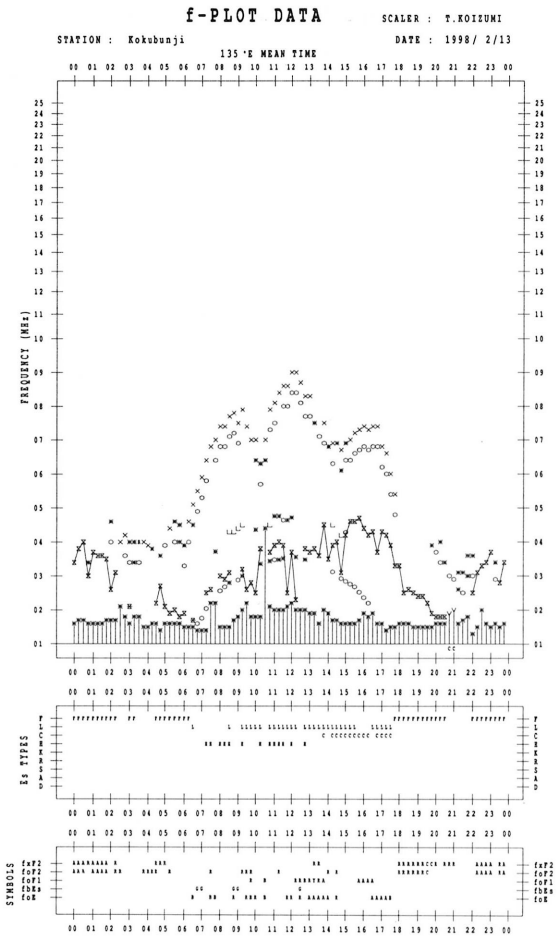
STATION : Kokubunji
DATE : 1998/ 2/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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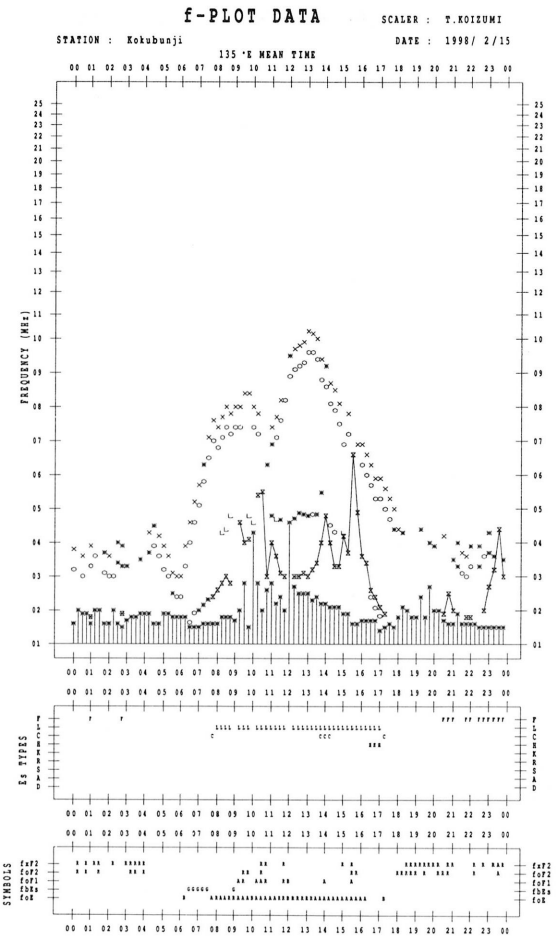
STATION : Kokubunji
DATE : 1998/ 2/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF2
foF1
fbEs
foE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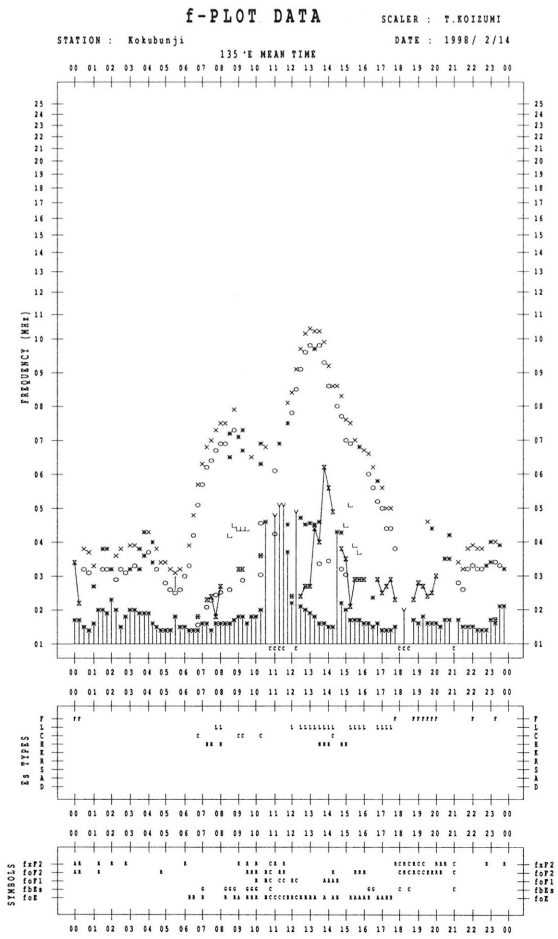
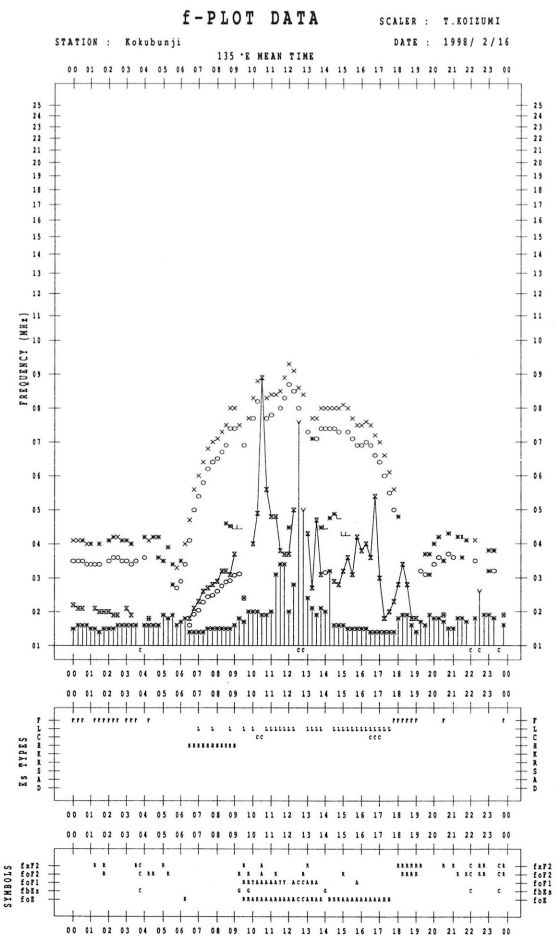
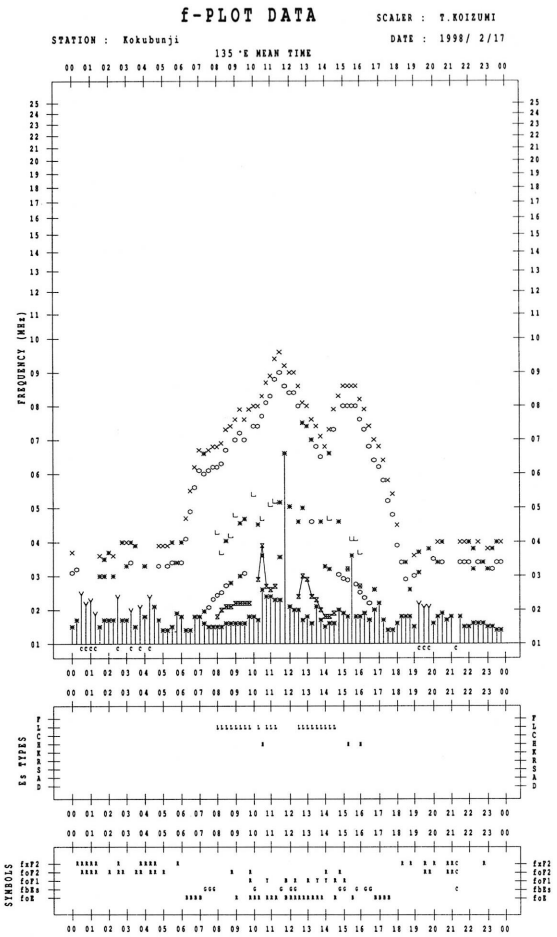
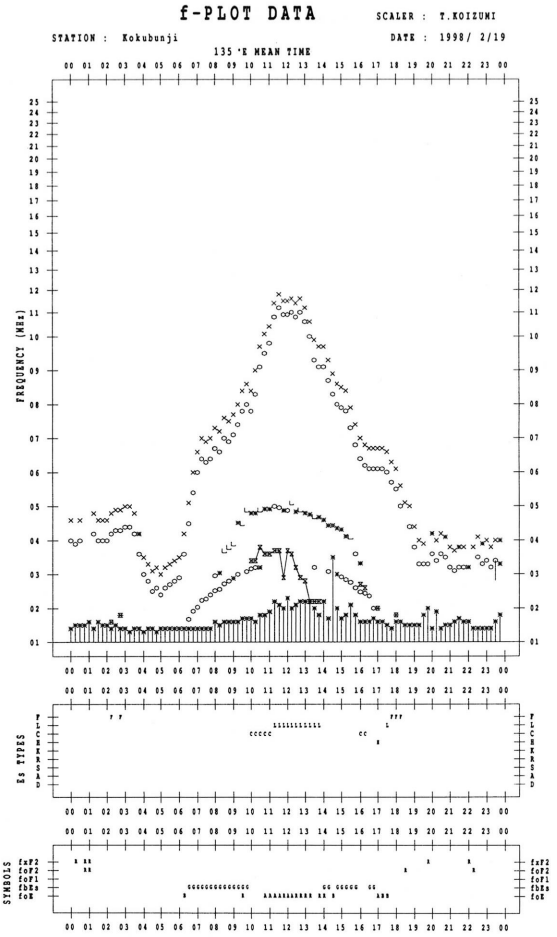
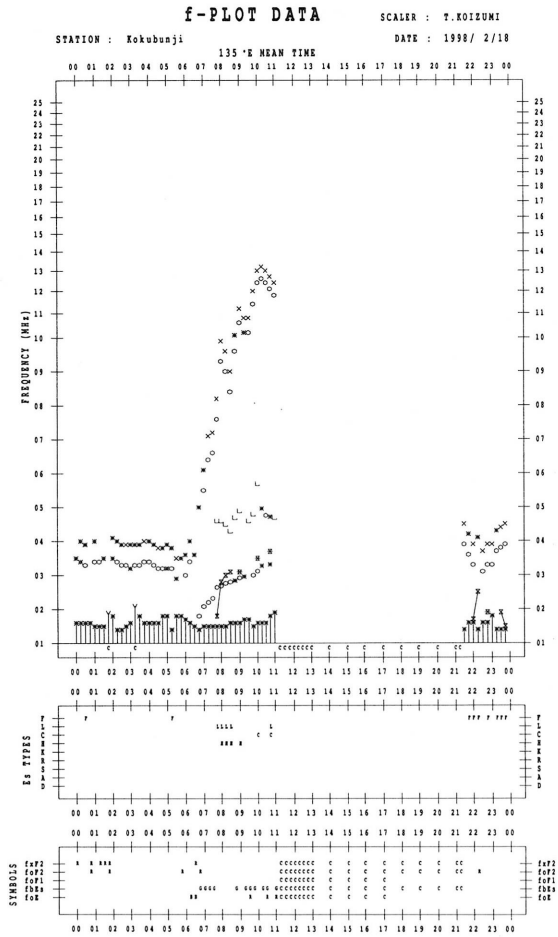
STATION : Kokubunji
DATE : 1998/ 2/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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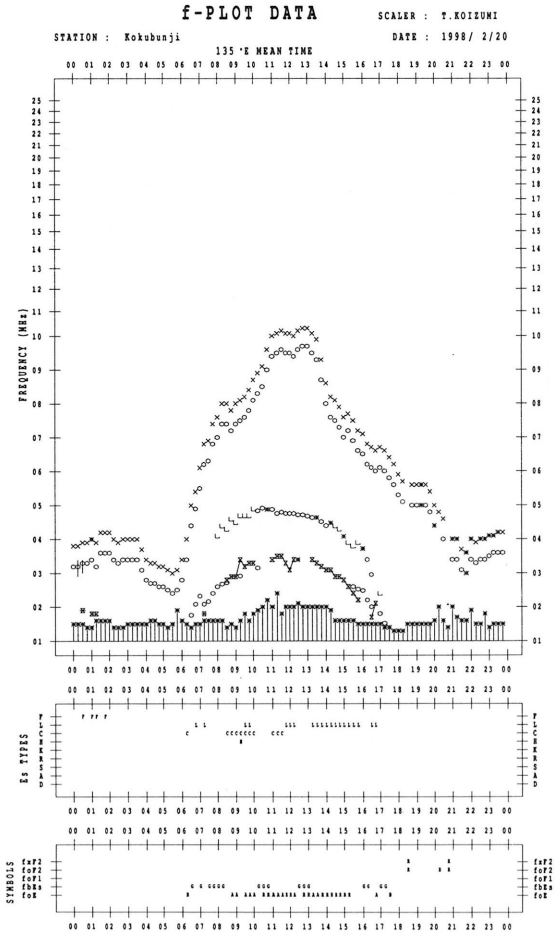
STATION : Kokubunji
DATE : 1998/ 2/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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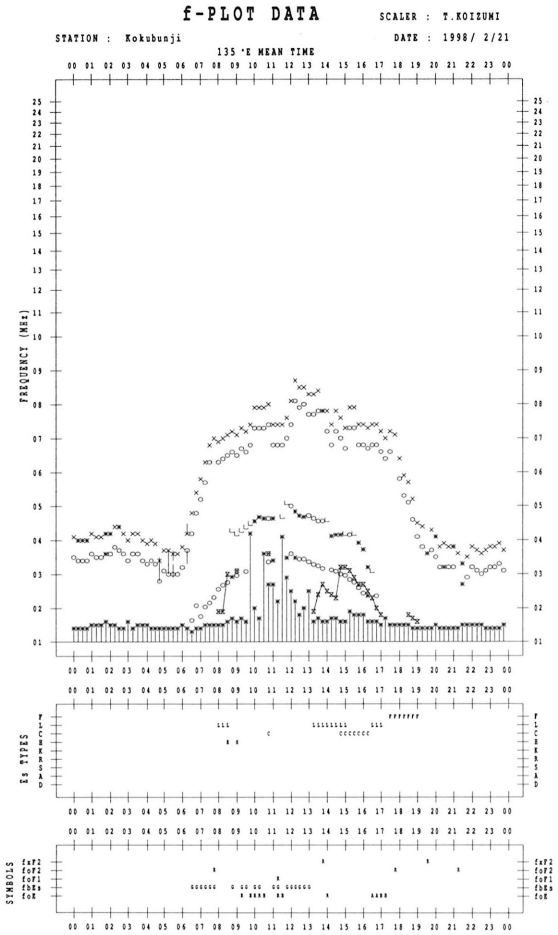
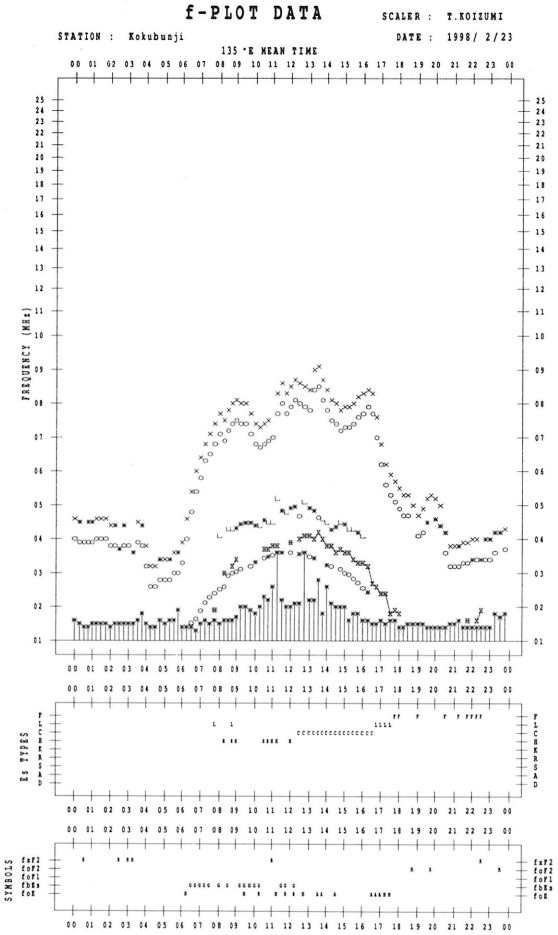
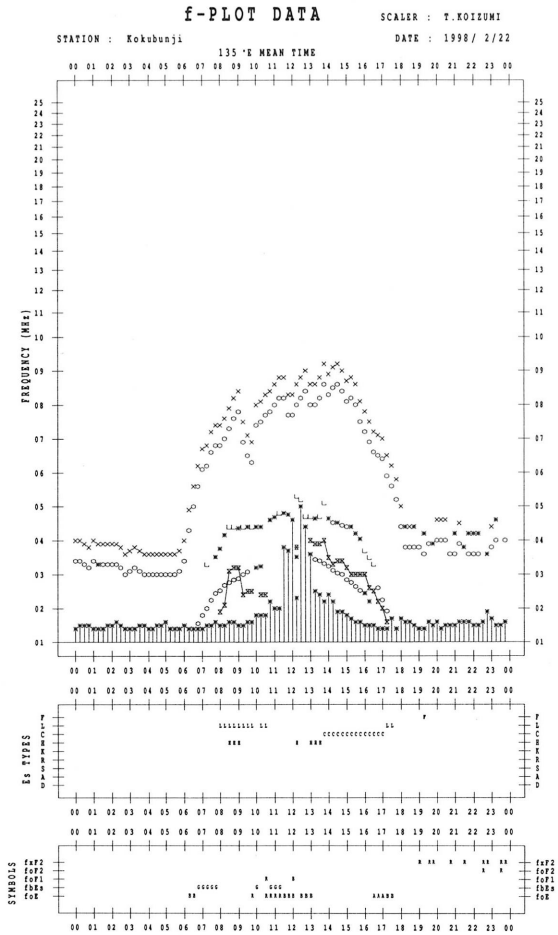
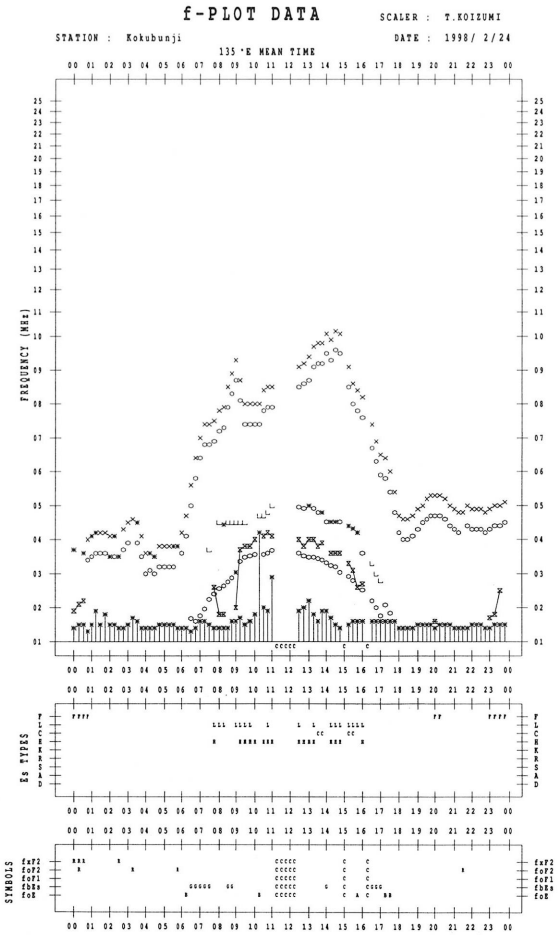
STATION : Kokubunji
DATE : 1998/ 2/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
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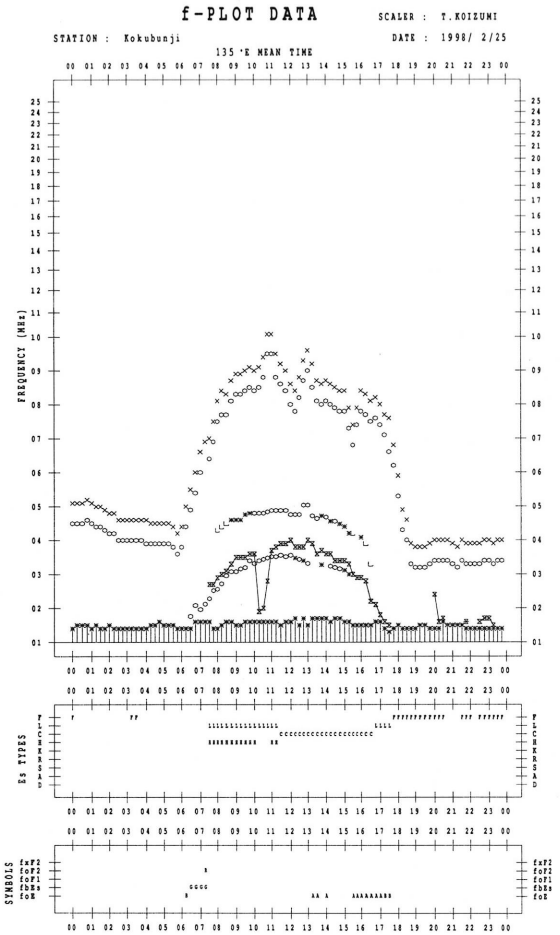
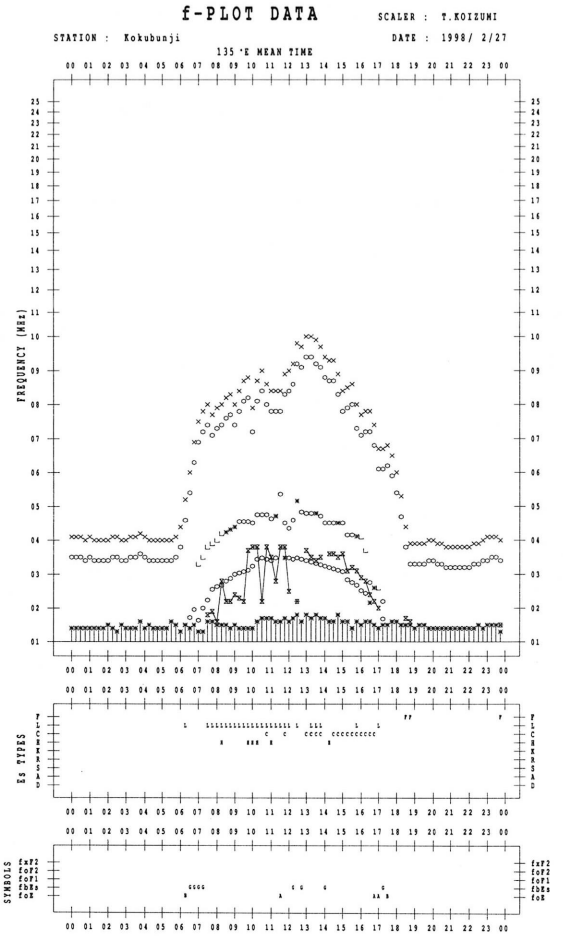
STATION : Kokubunji
DATE : 1998/ 2/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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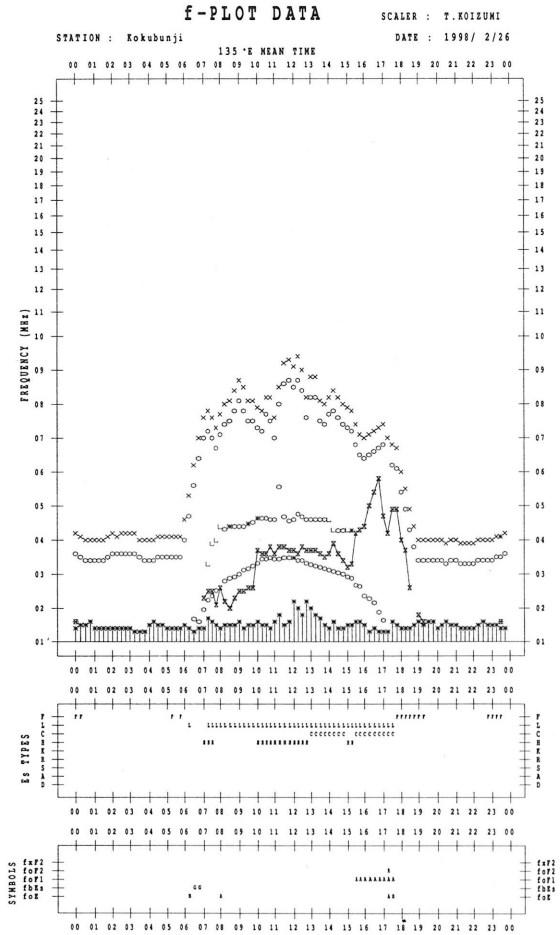
STATION : Kokubunji
DATE : 1998/ 2/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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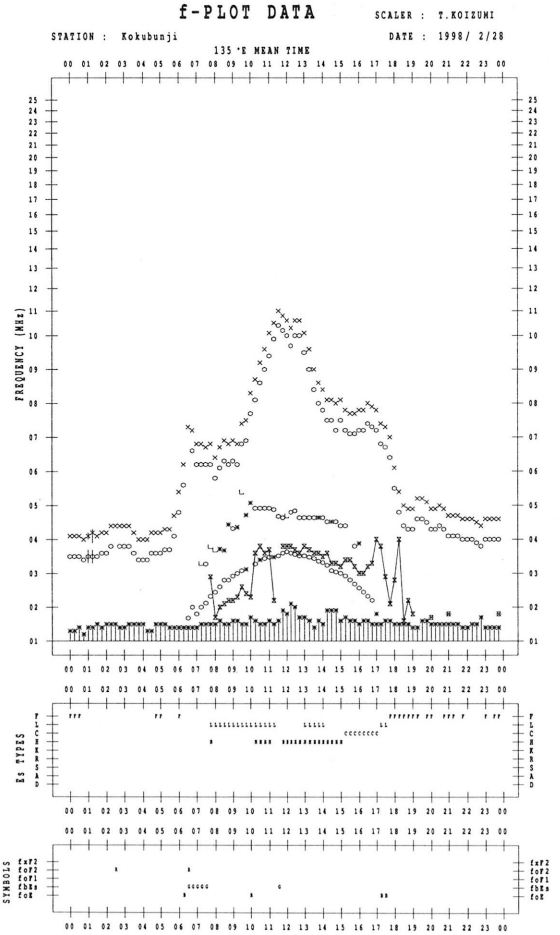
STATION : Kokubunji
DATE : 1998/ 2/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1998/ 2/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso February 1998

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

Note: No observations during the following periods.
9th 0000 - 9th 0500 16th 2100 - 17th 0700

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso February 1998

Single-frequency observations

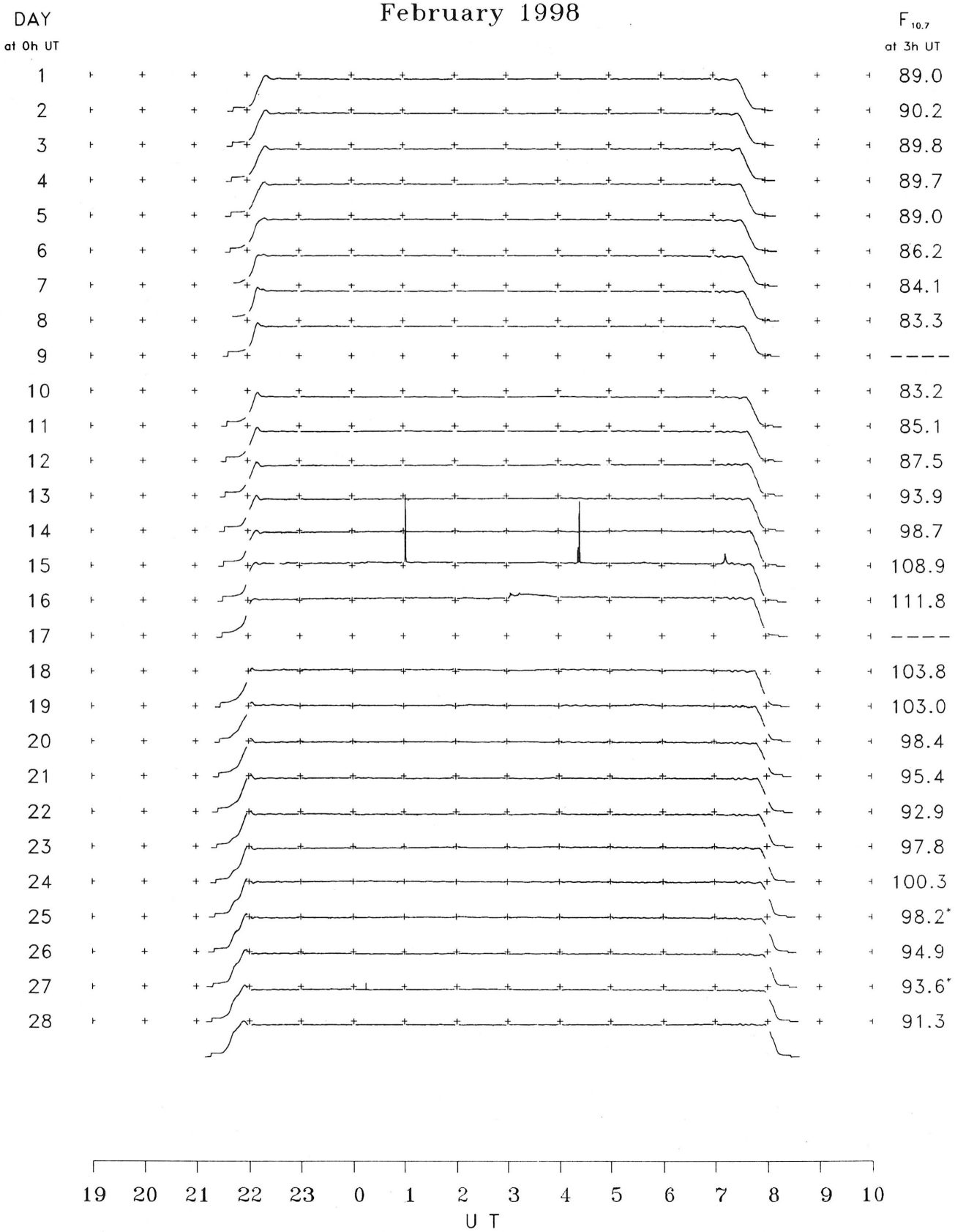
Normal observing period: 2120 - 0820 U.T. (sunrise to sunset)

FEB. 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
15	500	27 RF	0000.0	0022.0	70.0	9	3	WR
	2800	46 C	0102.5	0102.6	1.0	160	40	ML
	500	42 SER	0102.7	0103.0	0.6	27	-	0
	500	42 SER	0422.5	0424.7	2.4	23	-	0
	2800	42 SER	0422.7	0424.9	2.4	140	-	ML
	2800	3 S	0712.0	0713.5	3.2	22	6	0
17	500	8 S	2155.6	2155.7	0.2	45	-	0
	200	8 S	2155.6	2155.9	0.6	7	-	WL
	200	8 S	2350.4	2350.7	0.6	13	-	0
19	500	8 S	0630.5	0630.6	0.2	27	-	0

B. Solar Radio Emission

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

February 1998



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

IONOSPHERIC DATA IN JAPAN FOR FEBRUARY 1998
F-590 Vol.50 No.2 (Not for Sale)

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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