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IONOSPHERIC DATA IN JAPAN

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CONTENTS

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INTRODUCTION

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

Station	Geographic		Geomagnetic		Technical Method
	Latitude	Longitude	Latitude	Longitude	
Wakkanai	45°23.5'N	141°41.2'E	35.3°N	206.5°	Vertical Sounding (I)
Akita	39°43.5'N	140°08.0'E	29.5°N	205.9°	" (I)
Kokubunji	35°42.4'N	139°29.3'E	25.5°N	205.8°	" (I)
Yamagawa	31°12.1'N	130°37.1'E	20.4°N	198.3°	" (I)
Okinawa	26°16.9'N	127°48.4'E	15.3°N	196.0°	" (I)
Hiraiso	36°22.0'N	140°37.5'E	26.3°N	206.8°	Radio Receiving (S, P)
Inubo	35°42.2'N	140°51.5'E	25.6°N	207.0°	" (P)

A. IONOSPHERE

Ionospheric observations are carried out at the above five 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 1-4, 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 transmission by *F2* and *F1* layers, respectively
h'F2 *h'F* *h'E* *h'Es*	Minimum virtual height on the ordinary wave for the *F2*, whole *F*, *E* and *Es* layers, respectively
Types of *Es*	See below b. (iii)

b. Symbols

(i) Descriptive Letters

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

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

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

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

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

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

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

G Measurement influenced 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 normal *E* trace. (Usually a daytime type.)

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

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

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

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

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

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

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

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

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

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

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

B. SOLAR RADIO EMISSION

Solar radio observations at 100, 200 and 500 MHz are carried out at Hiraiso. The observation equipment consists of two parabolic antennas, one with 10-meter diameter for 100 and 200 MHz measurements and one with 6-meter diameter for 500 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 at the base-level are tabulated separately for 200 and 500 MHz measurements. Here, the base-level intensity is defined as the intensity recorded during the time when no radio emission burst is taking place. The intensities are expressed by the flux density in 10^{-22} Wm^{-2} Hz^{-1} unit.

The table for 200 MHz measurements also presents the variability indices defined by the number of impulsive radio bursts within the three-hour intervals as follows:

0 quiet or no burst,
1 a few bursts,
2 many bursts,
3 very many bursts.

The daily variability index is defined as the daily mean of three-hourly indices.

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 Hiraiso 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.

C. RADIO PROPAGATION

C1. H.F. Field Strength at Hiraiso

Field strength observation of 15 MHz standard waves transmitted from WWV and WWVH stations which are located respectively at Fort Collins, Colorado and Kauai, Hawaii, is carried out at Hiraiso. In order to avoid interference among the same frequency waves, the upper sideband of WWV or WWVH with the audio tone 660 Hz is picked up by the use of a narrow band-pass filter with 80 Hz bandwidth. Particulars of the transmitters and the receiver are summarized in the following table.

The tabulated *field strength* expressed in dB above one microvolt per meter is the average of quasi-peak values of the incident upper sideband field intensity in 45 seconds after the universal time indicated on the table. Abbreviated symbols are as follows:

CNT	number of observed values,
MED	median,
UD	value of the uppermost decile when they are ranked according to magnitude,
LD	value of the lowest decile when they are ranked according to magnitude,
U	uncertain,
E	less than,
C	influenced by, or impossible because of, any artificial accident,
S	influenced by, or impossible because of, interferences or atmospherics.

C2. Radio Propagation Quality Figures at Hiraiso

The tabulated six-hourly quality figures are calculated for standard waves WWV transmitted from Fort Collins and WWVH transmitted from Kauai.

Quality figures expressing radio propagation conditions range over five grades as follows:

1	very poor (very disturbed),
2	poor (disturbed),
3	rather poor (unstable),
4	normal,
5	good.

Whole day quality figure ranged in grades of 1o, 1+, 2–, 2o, 2+, 3–, 3o, 3+, 4–, 4o, 4+, 5–, 5o stands for an average of six-hourly quality figures of the two circuits. Abbreviated symbols are as follows:

C	artificial accident,
S	propagational accident,
U	inaccurate.

The column of conditions presents a record of the forecast of *radio propagation conditions* which is applicable to forthcoming 12 hours and broadcast six times per hour from JJY (Japan Standard Wave) station. The conditions are denoted as follows:

N	normal,
U	unstable,
W	disturbed.

Characteristics	Transmitter		Receiver
Station Call	WWV	WWVH	
Location	Fort Collins, Colorado	Kauai, Hawaii	Hiraiso, Ibaraki
latitude	40°41′N	22°00′N	36°22′N
longitude	105°02′W	159°46′W	140°38′E
Distance	9150 km	5910 km	—
Carrier Power	10 kW	10 kW	—
Power in each sideband	625 W	625 W	—
Modulation	50 %	50 %	—
Antenna	λ/2 vertical	λ/2 vertical	4.5 m vertical rod
Bandwidth	—	—	80 Hz for upper sideband
Calibration	—	—	Every hour

Data on *geomagnetic storms* which are often correlated with radio propagation disturbances are tabulated based on reports from observation at Kakioka Magnetic Observatory, Japan Meteorological Agency. *Time* (U.T.) is expressed in hours and minutes (or tenths of an hour), and *range* in nanotesla. When they are uncertain quantitatively, /'s are used to replace the numerical values. Continuation of a geomagnetic storm is denoted by ---.

C3. 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 ($\triangle\phi$) 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.

C4. Sudden Ionospheric Disturbances

a. Short Wave Fade-out (SWF) at Hiraiso

The table of short wave fade-out (SWF) is prepared from the record of field intensities measured at Hiraiso.

Drop-out intensities of the 10 MHz, the 20 MHz, and the 25 MHz waves are respectively distinguished by marks ', '', and ''' from those of the 15 MHz wave for WWV and WWVH. Values of *start, duration, type,* and *importance* are obtained from data of the circuit whose drop-out intensity in dB is underlined as xx. When these quantities could not be determined accurately, they are accompanied by one of the following symbols.

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

Types of fade-out are as follows:

S sudden drop-out and gradual recovery,
SL slow drop-out taking 5 to 15 minutes and gradual recovery,
G gradual and irregular in both drop-out and recovery.

Importance of fade-out is scaled according to its amplitude into nine ascending grades as 1–, 1, 1+, 2–, 2, 2+, 3–, 3, 3+.

Correspondence of solar optical flare, solar radio burst, and geomagnetic crochet to SWF is marked by X, being determined with data from interchange messages of IUWDS and observations at Hiraiso.

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

b. 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	Ω/N	13.6	10	7820
Liberia	06°18'N	010°40'W	Ω/L	13.6	10	14480
Hawaii	21°24'N	157°50'W	Ω/H	13.6	10	6100
North Dakota	46°22'N	098°20'W	Ω/ND	13.6	10	9140
La Reunion	20°58'S	055°17'E	Ω/LR	13.6	10	10970
Argentina	43°03'S	065°11'W	Ω/AR	13.6	10	17640
Australia	38°29'S	146°56'E	Ω/AU	13.6	10	8270
Japan	34°37'N	129°27'E	Ω/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

MAR. 1990

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	54	64	57	50	56	52	63	89	120	137	142	132	133	130	124	122	122	121	109	90	78	78	70	58
2	66	66	55	55	55	52	66	92	122	134	147	144	140	134	130	120	122	118	98	82	A	66	67	71
3	63	62	56	60	52	53	66	102	125	137	146	138	141	140	137	131	132	122	98	88	73	66	64	67
4	60	57	55	51	45	54	64	97	119	140	134	140	140	138	134	129	126	110	96	86	65	67	66	68
5	58	54	53	58	56	48	60	91	112	128	130	130	130	130	126	128	117	116	98	90	84	73	70	68
6	64	63	65	64	66	65	65	97	119	127	135	134	137	134	134	134	130	118	103	98	90	85	65	63
7	67	60	54	55	60	59	65	106	108	130	128	136	146	141	135	127	119	114	96	75	66	66	66	60
8	56	54	57	63	50	45	52	102	128	137	134	140	136	138	125	126	120	110	92	76	79	62	63	66
9	68	58	55	53	56	58	64	98	106	130	141	146	140	136	128	121	115	108	90	83	72	66	58	61
10	58	58	57	53	54	55	66	103	108	126	129	140	140	133	127	120	120	111	84	68	64	66	66	63
11	58	58	56	60	57	53	62	97	119	124	126	134	132	134	134	128	130	107	86	82	68	64	59	64
12	62	58	59	54	51	50	62	88	109	124	129	131	138	125	126	118	114	109	98	70	65	66	63	60
13	66	56	51	52	52	55	56	78	86	91	96	146	124	98	112	121	117	117	102	74	58	64	60	60
14	60	54	52	56	40	35	40	38	N	53	62	76	64	82	84		81	91	88	78	68	66	58	64
15	62	64	66	64	56	42	56	89	93	122	123	126	130	126	119	116	116	116	104	84	69	66	62	58
16	54	54	56	58	57	51	66	90	114	108	129	134	127	123	120	116	110	112	106	90	59	62	64	64
17	65	63	62	60	59	53	76	76	107	118	126	125	120	113	116	106	108	101	103	89	78	71	64	66
18	64	62	62	62	58	54	66	97	112	121	130	127	128	122	115	111	110	111	98	88	86	81	72	66
19	62	38	62	53	60	55	66	74	80	95	104	102	108	102		110	103	97	85	71	74	66	66	68
20	59	63	62	60	50	51	77	94	111	118	130	126	124	124	122	110	116	110	96	86	82	80	79	73
21	64	59	60	63	58	58	80	89	114	128	127	128	138	132	120	106	110	105	94	90	89	86	65	82
22	66	54	54	58	63	59	86	109	125	122	112	126	116	116	118	111	107	108	100	82	74	67	66	62
23	53	66	61	41	40	44	64	71	78	82	80	52	92	96	98	95	96	91	86	79	80	67	66	66
24	63	66	55	58	43	52	64	85	100	122	124	127	124	123	114	112	114	106	99	87	66	68	72	65
25	63	65	56	54	48	55	72	88	122	130	138	138	132	131	120	112	104	103	99	90	88	N	79	82
26	76	64	58	44	40	51	66	63	91	98	107	114	119	112	109	105	104	110	102	85	80	75	66	75
27	70	67	62	54	58	64	80	90	118	126	126	132	124	131	128	119	115	119	107	87	82	84	85	86
28	76	74	67	65	65	64	86	118	112	137	139	133	N	132	126	120	121	115	106	90	90	87	84	79
29	72	73	62	64	66	66	97	108	114	133	124	120	125	130	115	114	115	112	109	90	84	64	73	72
30	66	66	55	43	44	52	72	69	86	95	91	96	103	103	108	103	107	109	88	106	55	65	54	N
31	38	32	41	30	31	44	60	64	74	88	101	117	112	114	108	106	110	107	104	84	78	79	73	64
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	30	31	31	31	30	31	30	30	31	31	31	31	30	30	31	30
MED	63	62	57	56	56	53	66	90	112	124	128	131	129	130	121	117	115	110	98	86	76	66	66	66
U Q	66	65	62	60	58	58	72	98	119	130	134	138	138	134	128	122	120	116	103	90	82	78	72	71
L Q	58	56	55	53	48	51	62	78	100	108	112	125	120	114	115	110	108	107	92	79	66	66	63	63

HOURLY VALUES OF FES AT WAKKANAI

MAR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	30	28	35	27	G
2	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	68	43	30	G
3	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	47	G	G	G	G	G	G	G	G	G	G	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	31	G	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
7	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
8	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
10	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
12	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
13	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
16	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	36	G	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	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	G	G
19	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	25
20	G	G	G	G	G	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	G
22	G	G	G	G	G	G	28	G	G	G	G	G	G	G	G	G	G	G	26	24	G	G	G	G
23	G	G	G	28	25	G	32	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	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	G	G	G	G	G	G	G
26	G	G	G	G	G	G	31	G	G	G	G	54	45	48	G	G	G	G	G	26	49	45	37	24
27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	25
28	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
29	G	G	G	G	G	G	33	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
30	G	G	G	G	G	G	G	G	G	G	47	G	G	G	G	G	G	G	G	G	G	G	G	38
31	29	38	50	G	G	G	G	G	G	G	G	G	G	G	51	G	G	G	G	28	G	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31
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	G	G	G	G	G	G	G	G	G	G	G	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

MAR. 1990

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

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT AKITA

MAR. 1990

LAT. 39.7N LON. 140.1E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	63	73	75	63	60	57	73	103	129	134	137	134	134	131	126	117	108	118	105	87	84	79	86	72
2	65	68	65	64	65	66	80	108	135	137	132	140	135	131	127	116	117	115	103	87	74	78	77	84
3	74	72	69	63	57	59	68	106	133	137	139	137	137	136	139	137	137	129	113	87	78	73	74	73
4	67	66	63	55	50	53	63	88	128	137	137	118	129	136	137	133	127	115	88	86	70	70	63	64
5	63	59	60	58	56	53	63	87	116	124	120	131	130	130	131	130	131	122	86	87	84	78	67	66
6	66	52	60	55	61	52	64	88	122	122	130	135	136	131	133	134	128	118	111	85	88	89	72	67
7	67	64	65	57	56	65	78	104	118	121	136	135	140	137	134	132	121	114	87	86	77	78	72	65
8	59	54	52	64	52	48	62	90	134	134	134	131	138	138	120	120	122	116	85	77	80	73	66	66
9	67	59	52	51	52	53	69	95	110	131	132	138	136	131	123	121	117	111	87	80	74	62	63	62
10	66	57	54	52	50	50	65	88	109	122	130	139	138	N	134	130	126	114	86	76	54	70	73	63
11	52	61	63	63	53	51	64	101	110	121	123	126	131	131	135	133	130	115	97	74	84	64	62	54
12	54	52	59	59	47	48	53	88	108	122	124	121	138	134	120	118	117	107	106	84	66	67	66	64
13	54	55	47	53	41	53	64	77	91	115	121	136	130	131	136	136	124	122	110	84	63	63	64	62
14	52	57	56	54	47	26	51	70	66	103	111	118	118	91	112	100	91	90	94	77	64	63	52	58
15	55	53	52	63	41	31	56	84	126	114	131	126	119	119	127	117	113	113	109	83	73	70	70	66
16	62	52	63	64	64	56	76	100	113	113	124	132	132	131	116	111	115	116	120	85	64	67	54	71
17	65	54	68	57	49	49	68	101	106	110	124	118	130	117	112	111	108	114	103	87	82	75	72	64
18	63	67	64	64	52	49	67	102	108	118	129	127	131	124	115	111	110	110	108	86	80	82	74	67
19	63	62	55	60	64	57	71	102	91	116	136	117	116	118	B	118	110	102	86	76	77	78	71	66
20	67	67	67	52	58	52	78	88	111	126	129	129	131	118	125	119	111	120	102	84	84	78	85	77
21	77	68	67	66	67	67	81	112	118	134	129	131	135	132	118	112	113	108	101	85	86	75	71	83
22	70	52	54	49	68	64	84	120	127	137	130	138	136	131	130	117	115	112	109	90	85	77	73	72
23	63	76	78	52	50	54	73	84	89	105	112	111	120	115	115	107	104	95	90	88	77	75	68	66
24	75	67	66	65	54	65	84	108	124	133	134	136	118	134	130	117	117	115	87	85	80	85	84	84
25	57	67	68	66	62	58	81	113	132	135	134	136	138	133	129	117	110	107	105	84	84	85	87	87
26	84	77	66	46	52	51	71		102	107	129	117	117	120	117	114	111	113	112	86	80	78	76	80
27	77	71	52	54	52	67	83	111	135	133	137	138	131	133	133	116	120	N	115	86	83	88	84	88
28	87	82	67	65	65	67	84	125	130	132	138	139	137	131	129	126	118	114	113	103	87	89	84	84
29	87	80	78	67	68	79	88	118	131	135	133	134	128	130	118	117	117	117	110	88	88	87	84	81
30	74										108	101	111	111	116	108	112	115	94	108	87	109	85	62
31	37	A	A	30	43	51	76	102	109	117	120	131	131	117	116	113	114	110	104	86	80	80	79	76
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	29	29	30	30	30	30	29	30	30	31	31	31	30	30	31	31	30	31	31	31	31	31	31
MED	65	64	63	58	54	53	71	101	117	123	130	131	131	131	126	117	117	114	103	86	80	78	72	67
U Q	74	69	67	64	62	64	80	108	129	134	134	136	136	133	133	130	122	116	110	87	84	82	84	80
L Q	59	54	54	53	50	51	64	88	108	116	124	121	128	119	117	113	111	110	88	84	74	70	66	64

HOURLY VALUES OF FES AT AKITA

MAR. 1990

LAT. 39.7N LON. 140.1E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	37	41	29	26	40	34	32	32
2	30	G	34	31	33	G	G	G	41	81	G	G	G	G	G	G	G	G	32	G	G	G	31	51
3	29	29	G	G	31	G	G	G	38	G	48	G	G	G	G	G	G	G	29	30	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	46	54	52	32	59	32	G	G	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	46	41	57	37	G	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	43	G	31	G	G	G	G	G
7	G	G	G	G	G	G	G	G	G	G	G	G	48	G	G	44	G	G	G	G	28	G	G	G
8	G	G	G	G	G	G	G	G	G	G	G	G	G	45	G	G	G	G	29	28	G	G	G	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	24	G	G	G	G	G
10	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	G	G	G	G	G
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	31	30	26	G	G	22	G
12	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	G	G	G	G
13	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	33	G	G	29	G	G	27
15	G	G	G	G	G	G	G	G	49	G	G	G	G	58	G	G	G	G	32	29	G	G	G	G
16	G	G	G	G	G	G	G	G	G	G	G	G	53	G	G	G	G	31	G	G	G	G	G	G
17	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	G	G	G	G	G
18	G	G	G	G	30	G	30	G	G	G	G	G	G	G	G	G	38	G	G	G	G	G	G	G
19	G	G	G	G	G	G	G	G	43	G	58	G	G	G	B	G	G	G	G	G	G	G	G	G
20	G	G	G	G	G	G	G	36	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	67	G	G	G	G	G	G	G	G	G	G	G	G
22	G	G	G	G	G	G	G	G	G	49	56	54	54	G	54	G	G	G	G	G	G	26	G	G
23	G	26	G	33	G	24	G	G	G	50	54	G	G	G	G	G	G	G	G	G	G	G	G	G
24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	42	G	G	G	G	G	G	G	G
25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	34	32	G	26	26	G	G
26	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	23	30	33	G
27	G	G	G	G	G	G	G	G	G	G	51	G	G	G	G	G	G	G	31	G	G	G	G	G
28	G	G	23	G	G	G	G	G	G	G	48	G	G	49	G	G	G	G	G	G	G	G	G	G
29	G	G	G	G	G	G	G	G	G	G	G	G	53	G	G	G	G	G	28	G	G	G	G	G
30	G										G	G	53	G	G	G	G	G	G	G	G	G	G	29
31	30	31	42	36	38	33	37	39	G	G	G	G	G	50	59	49	G	42	31	28	G	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	30	30	30	30	30	29	30	30	31	31	31	31	30	31	31	31	31	31	31	31	31	31
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	G	G	G	G	G	31	31	26	G	G	G	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

HOURLY VALUES OF FMIN AT AKITA

MAR. 1990

LAT. 39.7N LON. 140.1E 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	15	15	15	17	24	21	21	26	23	43	48	26	35	17	17	17	20	17	16	16	16
2	16	16	15	14	15	15	16	26	18	21	22	48	46	40	41	20	20	26	17	17	16	17	16	16
3	16	15	15	15	15	16	16	26	16	21	22	23	24	21	20	18	18	16	18	16	20	16	16	16
4	16	15	15	15	15	16	17	26	20	22	22	40	22	43	26	22	20	17	16	16	16	15	15	16
5	16	15	15	16	15	16	17	27	18	21	22	23	23	23	37	21	16	16	15	16	16	16	16	16
6	16	15	15	16	15	15	17	17	18	22	22	23	46	43	22	20	16	26	16	17	16	20	15	15
7	20	15	15	15	15	16	17	26	17	17	22	23	24	23	21	21	18	23	16	17	16	22	16	16
8	16	15	15	15	15	15	18	24	18	22	20	23	23	23	21	16	20	22	17	17	17	20	16	16
9	15	15	15	15	15	16	18	27	17	22	39	44	41	22	16	21	20	18	16	16	16	16	16	18
10	16	15	15	15	15	16	17	24	18	18	22	38	26	24	22	22	18	23	16	16	16	16	16	16
11	15	15	15	15	16	16	17	17	16	18	22	39	23	48	23	20	17	27	17	16	16	16	16	16
12	16	15	15	16	28	15	22	21	17	17	23	26	23	22	21	21	18	16	16	17	16	16	16	16
13	16	15	15	15	15	16	18	16	16	20	20	26	45	22	39	22	18	24	17	17	17	18	17	17
14	16	15	15	15	16	18	20	28	17	18	21	23	24	26	36	22	16	16	18	16	16	17	18	18
15	16	16	15	15	15	20	15	17	16	17	21	26	26	22	24	20	22	26	16	16	17	16	16	16
16	18	15	15	15	15	17	20	16	17	21	21	23	29	26	22	35	20	16	20	16	17	17	16	17
17	16	15	15	15	15	16	21	18	16	21	26	27	28	22	23	23	16	16	17	17	16	17	16	17
18	17	15	15	15	15	16	22	18	16	20	40	26	43	43	27	22	18	16	18	16	20	16	16	16
19	16	15	15	15	15	16	22	17	20	21	23	43	27	46	B	43	22	27	18	16	16	17	16	16
20	16	15	15	15	15	18	23	17	17	21	28	26	43	22	24	22	17	16	17	17	16	16	17	16
21	16	15	15	15	15	16	22	20	23	21	26	26	32	46	40	18	21	16	20	16	16	16	16	16
22	16	15	15	15	15	16	22	18	21	23	35	35	36	32	28	44	21	21	20	16	16	16	16	21
23	17	15	15	15	16	16	23	18	17	22	26	35	50	46	28	22	21	17	20	16	17	16	20	16
24	18	15	15	15	16	16	23	16	17	22	23	27	46	28	32	23	18	27	20	16	17	16	16	17
25	18	15	15	16	15	15	17	16	18	22	26	28	24	22	26	21	22	15	16	18	18	16	17	18
26	17	15	16	15	N	16	23		18	24	43	36	27	43	50	41	22	18	20	16	16	17	16	16
27	16	15	17	15	15	16	24	16	17	22	26	26	27	46	43	24	20	28	17	16	16	16	16	15
28	16	15	15	15	15	16	24	20	22	22	26	33	26	34	26	26	20	30	20	18	17	17	16	16
29	16	15	15	15	15	16	20	18	21	24	23	42	36	30	24	18	16	18	20	16	16	16	16	17
30	16										24	45	35	44	24	20	20	17	21	16	18	16	17	16
31	16	15	15	15	15	16	16	18	21	23	44	32	30	36	22	23	15	15	15	16	17	16	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	30	30	29	30	30	29	30	30	31	31	31	31	30	31	31	31	31	31	31	31	31	31
MED	16	15	15	15	15	16	19	18	18	21	23	27	28	30	25	22	18	18	17	16	16	16	16	16
U Q	16	15	15	15	15	16	22	25	20	22	26	38	43	43	32	23	20	26	20	17	17	17	16	17
L Q	16	15	15	15	15	16	17	17	17	20	22	23	24	22	22	20	17	16	16	16	16	16	16	16

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

MAR. 1990

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	77	72	81	57	57	62	74	112	130	141	138	137	141	136	130	127	122	124	109	90	84	86	87	75
2	64	A	63	59	62	67	78	108	135	138	137	141	140	136	130	123	122	124	104	92	85	84	85	85
3	81	75	68	67	58	60	72	115	135	140	141	144	146	146	146	146	147	137	128	108	90	88	83	80
4	75	71	71	56	50	54	64	99	125	145	135	140	139	145	145	140	134	122	107	87	78	75	72	71
5	66	62	61	57	54	50	67	94	112	115	128	131	130	133	138	134	130	129	118	102	87	86	78	70
6	66	58	60	62	59	54	60	90	121	121	129	138	136	133	137	138	132	125	118	93	100	98	85	71
7	66	66	65	54	59	63	74	105	120	128	132	142	140	141	138	131	123	110	103	84	83	84	78	80
8	66	56	59	67	51	50	58	102	126	131	134	140	137	141	128	121	120	116	107	83	81	76	71	73
9	70	53	52	47	52	51	61	95	123	134	132	136	140	146	138	126	118	111	106	79	77	64	66	66
10	63	59	57	54	51	49	67	89	114	132	126	140	141	143	136	138	130	125	110	80	72	74	72	67
11	63	56	61	64	50	48	60	97	126	119	123	127	138	138	139	135	131	130	110	83	78	78	70	70
12	71	67	57	54	46	44	50	90	116	122	128	122	135	136	122	118	121	116	104	86	68	75	72	66
13	65	63	50	52	50	55	68	80	100	126	133	127	122	139	145	140	137	127	117	90	78	65	67	67
14	64	59	61	54	52	44	58	92	101	128	130	138	145	125	113	118	102	97	100	83	60	59	57	52
15	57	57	62	67	37	32	52	83	105	115	128	133	132	137	132	126	118	111	114	96	73	68	67	64
16	58	57	60	58	54	52	72	100	106	114	122	127	132	135	122	119	122	124	115	81	67	72	65	71
17	71	70	71	73	54	53	72	101	113	118	118	134	131	138	126	119	120	115	108	90	86	86	77	74
18	74	73	70	71	50	51	69	90	110	121	126	136	135	127	119	111	110	109	111	84	80	82	78	72
19	67	62	62	65	71	58	69	107	110	127	144	133	128	137	132	130	116	104	98	89	84	86	79	76
20	71	68	68	62	57	52	69	101	112	130	136	130	140	137	140	130	122	115	110	90	89	78	86	82
21	80	67	70	66	71	69	86	112	119	132	138	141	147	138	127	120	116	116	107	89	90	76	81	76
22	78	59	57	63	67	66	84	119	122	142	140	144	148	142	140	138	124	120	121	107	88	87	80	86
23	72	80	83	69	54	56	83	100	120	126	136	125	137	128	121	117	110	108	111	87	80	84	76	76
24	78	78	68	68	63	75	92	118	128	139	139	142	145	144	142	131		121	111	98	86	88	87	87
25	77	73	72	65	66	70	87	117	131	141	140	145	146	143	138	131	118	109	108	102	90	90	97	91
26	92	84	78	62	59	66	78	110	122	124	134	138	131	128	132	128	122	120	116	96	85	80	79	81
27	83	76	65	67	64	64	87	114	141	140	140	146	147	138	138	136	134	130	116	100	90	90	91	95
28	91	88	76	70	70	67	84	117	135	133	145	145	144	140	136	127	122	119	119	107	88	91	90	86
29	88	84	76	76	77	77	101	127	138	140	141	140	131	138	133	123	120	117	120	109	97	93	88	86
30	86	82	73	65	66	66	85	92	108	107	115	115	119	123	120	118	122	124	110	103	88	118	111	102
31	82	70	70	70	86	53	78	98	119	128	128	131	136	128	120	118	115	116	117	104	82	86	81	78
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31
MED	71	68	65	64	57	55	72	101	120	128	134	138	138	138	133	127	122	119	110	90	84	84	79	76
U Q	80	75	71	67	66	66	84	112	128	139	139	141	144	141	138	135	130	124	117	102	88	88	86	85
L Q	66	59	60	57	51	51	64	92	112	121	128	131	132	133	126	119	118	111	107	84	78	75	72	70

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

MAR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	27	31	G	G	G	G	G	G	57	58	54	61	57	58	35	G	35	32	55	48	49
2	40	30	39	37	32	26	G	G	44	G	G	53	G	G	G	56	58	G	24	32	G	G	G	G
3	G	34	40	32	31	27	G	G	G	G	G	G	G	G	G	G	G	34	28	27	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	52	49	52	60	48	25	23	48	G	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	G	50	G	50	37	28	G	G	G	G	G
6	G	G	G	G	G	G	G	G	G	56	G	G	G	58	G	G	G	37	39	38	G	G	G	G
7	G	G	G	G	G	G	G	G	G	50	46	G	G	G	44	43	G	G	27	48	G	31	G	25
8	G	G	G	G	G	G	G	60	G	G	G	G	G	G	50	49	50	34	32	G	G	G	G	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	G	G	25	G	G
10	G	G	G	G	G	G	G	G	50	G	G	50	G	G	G	42	G	G	G	G	G	G	G	G
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	25	G	25	G	G	G
12	G	G	G	G	G	G	25	G	G	G	G	G	G	G	G	44	38	G	G	G	G	40	G	G
13	G	G	G	G	G	G	24	G	G	G	G	49	G	G	51	G	58	G	G	G	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	G	27	G	G	G	G	24
15	26	29	G	G	G	G	G	G	G	G	G	G	G	G	46	43	44	34	G	G	G	G	23	G
16	G	G	G	G	G	G	G	G	G	G	G	47	G	G	G	G	G	35	39	G	G	G	G	G
17	G	G	G	G	G	G	28	G	G	G	G	G	G	49	G	G	41	46	26	G	G	26	24	G
18	G	G	G	G	G	G	27	G	G	G	50	G	G	G	G	44	40	34	24	26	25	G	G	G
19	G	G	G	G	G	G	G	G	G	G	54	53	G	G	G	G	G	G	G	G	G	G	G	G
20	G	G	27	24	G	G	G	G	G	G	G	G	G	51	G	51	43	36	G	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	G	G	50	G	G	G	43	40	G	31	29	24	G	G	G
22	G	G	G	G	23	G	G	G	G	G	54	55	54	61	58	G	G	G	G	G	G	G	G	G
23	G	G	28	G	G	G	G	44	G	51	56	52	51	G	G	G	G	33	G	G	G	G	G	G
24	G	G	G	G	G	G	G	G	G	49	G	G	G	50	G	G		G	G	24	G	G	G	G
25	G	G	G	G	G	G	29	G	G	G	G	G	N	83	54	108	48	53	31	G	G	G	24	G
26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	40
27	25	40	G	G	G	G	G	G	G	G	51	54	G	G	G	G	G	G	38	28	G	G	G	G
28	G	G	G	G	G	G	G	G	G	44	G	54	53	82	51	62	G	G	25	G	G	G	G	G
29	G	G	G	G	G	G	30	G	54	G	G	51	52	58	49	54	G	G	24	G	G	G	32	G
30	G	G	G	G	25	G	G	G	G	49	G	G	G	50	48	56	43	G	G	G	G	G	G	G
31	24	43	31	34	48	43	G	G	G	51	49	G	54	48	G	G	G	G	25	25	G	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	30	31	31	31	31	31	31	31
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	20	G	25	G	G	G	G	G
U Q	G	G	G	G	G	G	G	G	G	G	G	51	G	51	49	51	44	35	28	26	G	G	G	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 KOKUBUNJI

MAR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	14	15	15	15	16	24	18	21	26	28	26	28	21	18	15	15	17	16	15	14	15	14
2	14	14	14	14	14	15	16	15	17	18	21	39	42	40	27	22	20	18	15	14	14	15	16	15
3	15	14	14	14	15	15	16	26	15	17	18	20	20	20	26	21	18	16	16	16	15	15	15	15
4	15	14	14	14	14	15	17	15	15	17	20	29	44	27	23	20	17	15	15	15	15	15	15	15
5	15	14	14	15	15	15	17	15	15	17	18	20	22	24	20	17	17	15	15	15	15	15	15	15
6	15	15	15	15	14	15	16	15	16	16	20	22	20	21	23	20	16	14	15	15	16	16	15	15
7	15	15	14	15	15	15	17	16	16	17	21	21	21	32	20	20	18	14	15	16	16	15	15	15
8	16	14	15	15	15	15	18	15	16	17	22	20	22	22	20	16	15	14	15	16	15	15	15	15
9	15	15	15	15	15	15	17	15	15	20	23	23	21	20	21	18	18	15	16	15	14	16	15	15
10	15	15	14	15	15	15	17	14	15	18	20	22	23	16	21	18	16	15	16	15	15	15	15	15
11	15	15	14	14	14	15	17	16	17	18	20	21	29	39	26	18	16	23	16	14	15	15	15	15
12	15	15	14	15	14	15	14	14	16	17	20	21	23	24	21	17	17	15	16	15	15	15	15	15
13	15	15	15	15	14	15	18	18	16	18	21	22	23	18	21	18	17	15	16	16	15	15	15	15
14	15	15	15	15	15	17	20	16	15	16	22	21	21	22	20	21	17	15	15	16	15	15	15	15
15	15	15	14	14	14	14	15	16	16	17	20	20	39	21	22	22	18	15	17	15	15	15	15	15
16	15	16	15	15	15	15	20	15	18	21	21	22	32	24	23	21	16	15	15	15	16	15	15	15
17	15	15	15	14	14	15	15	15	15	18	26	24	24	23	20	15	14	16	16	15	15	15	15	15
18	15	15	15	15	14	15	15	15	15	16	27	32	42	29	22	21	17	15	16	15	16	15	15	16
19	14	15	14	14	14	15	20	15	16	17	18	28	43	45	113	41	18	15	18	16	15	15	15	15
20	15	14	14	14	14	15	22	16	17	20	22	23	28	23	24	21	16	15	18	15	15	16	15	15
21	15	15	15	15	16	15	23	16	18	24	23	26	34	43	22	18	15	15	14	15	15	15	15	15
22	15	15	14	15	16	15	23	16	17	21	28	26	30	26	24	30	18	15	18	15	15	15	15	15
23	15	15	15	14	14	15	22	16	17	23	21	28	30	32	20	22	21	16	20	15	15	15	15	15
24	15	15	15	15	15	14	23	16	16	18	27	32	45	23	29	24		16	20	16	15	15	15	15
25	15	14	14	15	15	16	16	15	16	20	23	24	23	24	21	18	18	16	14	14	15	16	15	15
26	16	17	14	14	14	15	23	15	17	22	28	43	38	46	48	41	18	15	20	15	15	15	15	15
27	15	14	14	14	14	15	23	16	16	18	21	26	33	24	22	18	16	18	15	16	15	16	15	15
28	15	15	14	15	15	15	24	16	18	23	35	35	30	29	23	20	20	22	17	15	16	15	16	14
29	15	15	15	15	15	15	18	15	18	21	45	35	34	28	23	18	14	14	17	16	15	15	15	15
30	15	15	15	15	15	15	15	16	20	18	23	32	24	24	26	21	18	15	18	15	15	15	15	14
31	15	14	14	15	14	15	26	16	16	21	24	29	32	23	21	20	15	14	17	15	15	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31
MED	15	15	14	15	15	15	17	16	16	18	22	24	29	24	22	20	17	15	16	15	15	15	15	15
U Q	15	15	15	15	15	15	22	16	17	21	26	29	34	29	24	21	18	16	17	16	15	15	15	15
L Q	15	14	14	14	14	15	16	15	15	17	20	21	23	22	21	18	16	15	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

MAR. 1990

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	86	83	84	71	57	58	56	88	131	137	131	142	148	151	146	138	133	134	129	108	88	88	87	88
2	A	71	71	61	63	66	66	87	122	142	144	146	147	148	147	149	144	140	135	127	111	106	88	86
3	87	70	65	66	64	53	58	86	118	129	146	150	160	166	177	180	179	168	161	164	146	144	126	112
4	88	84	84	73	60	52	62	87	118	133	134	130	139	144	156	150	144	135	130	109	86	87	84	71
5	67	67	73	64	60	56	44	76	106	116	126	126	131	140	143	145	146	146	141	128	111	107	106	84
6	73	67	66	67	64	63	53	78	90	118	132	140	144	144	145	148	143	143	144	133	111	125	120	85
7	82	88	84	80	67	62	66	86	111	127	135	139	146	144	135	136	129	130	123	108	100	106	85	85
8	83	65	66	72	52	47	46	81	105	126	139	145	153	155	141	136	130	142	128	108	108	88	88	86
9	89	66	46	46	48	47	49	76	105	138	148	144	151	162	155	144	142	133	135	118	108	102	85	88
10	86	80	77	67	57	60	53	80	108	122	134	130	145	151	152	150	141	137	126	108	89	84	79	69
11	73	68	67	80	55	46	37	69	104	124	115	124	148	162	154	147	145	141	138	110	111	100	86	80
12	87	72	60	58	45	38	27	68	106	126	136	124	132	141	134	132	124	126	124	120	108	88	89	72
13	68	66	60	54	55	57	49	72	86	136	124		122	144	159	146	140	137	138	111	101	90	86	83
14	86	78	72	66	52	48	56	78	94	127	144	150	146	146	144	137	124	120	114	106	90	74	84	66
15	77	74	81	81	43	35	50	72	100		124	127	144	145	142	140	131	130	136	111	89	80	83	84
16	70	66	66	68	63	50	52	80	105	116	116	122	128	140	133	132	134	135	118	104	100	88	83	83
17	79	75	78	83	49	48	60	82	107	127	130	120	142	146	141	132	132	128	124	111	113	100	100	86
18	80	80	76	81	58	50	50	81	103	119	136	130	135	140	132	122	121	123	120	102	86	94	92	88
19	82	61	53	67	71	55	53	94	112	132	146	128	140	147	150	151	144	136	135	133	119	108	99	86
20	86	77	80	71	63	63	51	81	109	129	136	136	145	145	146	148	142	140	129	122	124	109	110	108
21	86	84	82	70	71	83	71	106	121	130	135	142	161	148	140	140	138	134	N	108	108	88	89	86
22	85	72	66	67	66	63	66	102	111		148	142	157	150	140	145	136	138	136	128	109	109	89	84
23	87	87	97	87	62	67	67	99	126	141	147	141	150	146	142	132	126	128	126	118	100	89	89	82
24	86	80	74	67	67	66	76	101	130	138	146	154	152	154	156	145	136	133	130	118	108	100	102	102
25	88	78	80	71	66	68	75	112	127	138	142	144	155	157	152	149	147	138	130	131	122	138	135	118
26	110	86	84	77	71	75	77	111	126	124	134	140	134	141	144	137	132	132	124	124	102	88	86	86
27	86	84	77	72	53	66	72	107	131	141	140	143	158	148	148	146	141	141	128	119	106	105	108	111
28	108	108	97	80	68	68	69	105	135	129	135	144	146	144	141	136	135	N	137	124	103	88	100	88
29	87	86	84	75	71	75	76	101	130	128	132	142	143	146	147	145	138	138	136	137	120	108	109	102
30	87	83	84	78	80	80	86	108	116	122														
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	30	30	30	30	30	30	30	28	29	28	29	29	29	29	29	28	28	29	29	29	29	29
MED	86	78	76	71	62	59	57	86	111	128	135	140	146	146	145	145	138	136	130	118	108	100	89	86
U Q	87	84	84	78	67	66	69	101	126	136	144	144	151	151	152	148	143	140	136	127	111	107	104	88
L Q	79	68	66	67	55	50	50	78	105	124	131	129	139	144	141	136	131	131	125	108	100	88	85	83

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

MAR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	24	26	G	27	G	G	G	G	47	G	G	G	G	G	41	G	G	44	24	25	G	26
2	43	43	27	27	G	G	G	30	G	G	G	G	G	54	G	G	42	G	G	G	32	G	28	26
3	G	G	27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	52	49	44	30	27	24	30	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	49	51	54	61	73	71	53	53	56	44	31
6	G	G	G	G	G	G	25	G	G	G	G	G	G	G	G	44	41	42	34	36	G	G	G	G
7	G	G	G	24	G	G	26	G	G	G	48	55	52	G	G	44	44	40	31	32	27	G	G	G
8	G	G	G	G	G	G	G	G	G	G	G	G	G	G	48	46	G	G	34	33	G	G	G	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
10	G	G	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	26	24	G	G	G
12	G	G	G	G	G	G	G	30	G	G	G	G	G	G	G	G	41	G	G	G	G	G	G	G
13	G	G	G	G	G	G	G	30	G	G	G	46	G	56	G	G	G	39	31	G	G	G	G	G
14	G	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G	45	39	G	G	G	G	G	G
15	43	G	G	G	11	G	G	G	G		G	G	G	G	G	52	44	38	G	G	23	G	G	G
16	G	G	G	G	G	G	G	32	G	G	G	G	G	G	50	G	44	G	G	G	G	G	G	G
17	G	G	G	G	G	G	G	32	G	G	G	G	G	G	G	49	G	38	G	G	G	25	G	45
18	G	G	G	G	G	G	G	32	G	G	G	G	G	G	G	51	48	43	32	28	24	G	G	G
19	G	G	G	G	G	G	G	32	G	G	G	G	49	G	G	G	G	G	37	26	G	32	33	G
20	G	G	G	G	G	G	G	G	G	G	45	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	47	G	G	42	G	37	25	36	27	G	G
22	G	G	G	G	G	G	G	G	G		G	50	54	47	57	G	G	38	G	29	G	G	G	24
23	30	G	G	G	G	G	G	33	40	G	G	G	G	52	G	G	G	G	G	G	G	G	G	G
24	G	G	G	G	G	G	G	G	G	42	G	G	G	G	G	G	G	G	G	G	G	G	G	G
25	G	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	42	G	G	G	G	G	G	G
26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	45	G	G	G	G	G	G	G
27	G	24	G	G	G	G	G	33	G	G	G	G	G	G	G	G	42	G	33	G	G	G	G	G
28	G	G	G	G	G	G	G	G	38	44	G	G	G	G	G	48	43	G	37	25	G	G	G	G
29	G	G	G	G	G	G	G	51	G	G	G	G	G	G	G	G	44	40	G	29	G	G	G	G
30	G	G	G	G	G	G	G	G	G	G														
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	28	29	29	29	29	29	29	29	29	29	29	29	29	29	29
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	41	G	G	G	G	G	G	G
U Q	G	G	G	G	G	G	G	32	G	G	G	G	G	G	G	45	44	39	32	28	24	G	G	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 YAMAGAWA

MAR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	15	15	23	17	20	22	22	44	45	41	38	20	17	21	15	15	15	15	15
2	16	15	15	15	16	15	15	15	17	21	39	44	44	36	34	24	22	18	21	15	15	15	15	15
3	15	15	15	15	15	15	15	22	16	17	20	24	42	40	43	26	22	20	21	15	15	15	15	15
4	15	15	15	15	15	15	15	16	15	16	20	39	44	44	42	30	22	18	15	15	15	15	15	15
5	15	15	15	15	15	15	15	23	15	16	17	32	40	32	36	23	20	16	15	15	15	15	16	15
6	15	15	15	15	14	15	15	22	15	17	20	23	42	41	24	22	18	16	16	15	15	15	15	15
7	15	15	15	15	15	15	14	22	16	18	21	36	36	34	26	22	22	17	16	15	15	15	15	15
8	15	15	15	15	15	15	15	15	15	16	20	39	35	35	27	23	17	18	17	15	15	15	15	15
9	15	15	15	15	15	15	15	15	15	16	26	39	39	39	39	22	17	15	15	15	15	15	15	15
10	15	15	15	15	15	15	15	17	16	21	18	23	24	39	22	23	20	16	22	15	15	16	15	15
11	15	15	15	15	14	15	15	21	16	18	21	21	39	42	23	23	22	16	15	15	15	15	15	15
12	15	15	15	15	14	15	15	18	16	17	18	21	33	33	39	22	18	16	14	15	15	15	15	15
13	15	15	15	15	15	15	15	15	16	17	20	22	33	26	27	20	16	15	15	15	15	15	15	15
14	15	15	15	15	15	15	15	17	15	16	21	22	23	38	44	20	16	17	21	15	15	15	15	15
15	15	15	15	15	14	16	15	18	15		21	27	45	33	29	30	23	17	23	15	15	15	15	15
16	15	15	15	15	15	15	15	18	16	18	22	33	43	45	38	33	22	20	22	15	15	15	15	16
17	15	15	15	15	14	15	15	18	16	18	40	28	42	44	43	35	16	15	15	15	15	15	15	15
18	15	15	15	15	14	15	15	18	15	16	43	43	43	43	42	23	21	16	16	15	14	16	15	15
19	15	15	15	15	15	15	15	17	15	18	23	44	33	35	89	44	21	17	15	15	15	15	14	15
20	15	15	15	15	15	15	15	16	16	18	27	42	46	33	33	39	23	20	16	15	15	15	15	15
21	15	15	15	15	15	15	15	15	20	22	28	43	45	45	42	33	22	20	16	14	15	15	15	16
22	15	15	15	15	15	15	15	15	16		30	34	35	38	35	51	23	16	23	15	15	15	15	15
23	15	15	15	15	15	15	15	15	15	20	33	33	44	36	27	20	23	21	24	15	15	15	15	15
24	15	15	15	15	15	15	16	15	16	23	33	41	49	44	44	43	26	18	16	16	15	15	15	16
25	15	15	16	15	17	15	15	15	16	21	24	29	44	44	45	27	22	17	24	15	15	15	15	15
26	15	15	15	15	15	15	16	16	17	24	32	35	43	48	49	44	29	16	16	15	15	15	15	15
27	15	15	15	15	15	15	15	15	17	22	41	34	48	45	32	30	22	20	15	15	15	15	15	15
28	15	14	15	15	15	15	17	16	21	26	31	43	36	46	33	34	23	38	15	15	15	15	15	15
29	15	15	15	15	15	15	16	16	17	23	30	46	48	45	38	39	23	16	15	15	15	15	15	15
30	15	15	15	15	15	15	17	16	20	29														
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	28	29	29	29	29	29	29	29	29	29	29	29	29	29	29
MED	15	15	15	15	15	15	15	16	16	18	23	34	42	40	38	27	22	17	16	15	15	15	15	15
U Q	15	15	15	15	15	15	15	18	17	21	31	41	44	44	42	36	23	19	21	15	15	15	15	15
L Q	15	15	15	15	15	15	15	15	15	17	20	23	35	35	28	22	19	16	15	15	15	15	15	15

HOURLY VALUES OF FOF2 AT OKINAWA

MAR. 1990

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	144	109	97	86	58	54	50	83	120	124	136	146	150	160	163	157	154	N	150	138	108	122	122	88
2	86	80	85	66	65	68	63	88	122	142	145	147	146	146	161	168	168	171	171	171	146	105	81	108
3	86	80	72	65	65	54	48	75	107	130	158	160	163	171	194	187	178	177	182	177	183	187	186	171
4	145	122	109	80	64	51	65	87	122	128	138	146	137	152	165	164	162	159	145	145	130	121	108	83
5	84	84	97	89	65	49		66	99	119	124	126	134	147	157	151	163	169	168	174	174	172	179	145
6	96	85	86	90	84	63	50	72	97	102	138	146	146	154	N	166	168	170	193	177	177	174	189	167
7	145	146	144	135	87	86	85	88	121	131	145	146	145	146	145	144	138	140	142	144	140	111	99	108
8	83	83	76	84	64	44	37	60	88	113	146	163	156	158	154	158	146	158	146	145	163	129	86	106
9	109	80	37	44	42	38	37	66	103	122	144	159	163	172	176	169	170	171	164	172	165	162	171	140
10	130	109	110	86	66	51	51	71	94	111	140	145	146	164	171	171	169	158	162	167	146	111	111	115
11	90	112	86	97	74	34		59	100	122	126	142	155	167	162	171	175	171	171	170	170	164	144	109
12	111	88	67	52	40	27	33	60	102	119	142	144	144	154	159	158	157	151	159	164	171	146	100	86
13	85	85	80	58	77	62	43	64	87	154	120	74	119	143	155	146	146	142	146	146	145	165	167	144
14	141	114	112	88	66	54	54	74	100	121	145	158	143	156	145	146	154	145	138	135	142	142		144
15	167	138	156	110	62	36	42	66	88	111	138	141	146	147	146	158	163	158	145	145	145	145	130	108
16	86	86	86	84	80	63	42	78	110	122	128	130	132	146	155	165	165	158	145	146	145	130	103	86
17	86	86	90	83	44	42	43	76	107	126	138	136	135	146	159	146	156	154	145	145	146	145	127	140
18	89	109	109	107	64	44	43	74	96	126	138	136	137	145	144	143	146	134	128	109	120	145	160	144
19	109	86	68	77	77	67	42	87	110		141	120	141	153	163	170	171	170	177	177	170	166	145	142
20	116	109	88	86	66	44	43	78	107	136	138	136	145	158	167	169	170	171	163	159	176	171	171	164
21	144	88	86	79	78	63	66	90	110	129	138	146	171	170	161	165	171	164	146	145	160	145	144	109
22	85	84	85		73	74	81	89	104	142	145	146	162	148	140	146	145	146	145	143	140	146	121	N
23	86	86	88	106	51	44	62	91	119	N	144	148	165	165	158	146	145	144	145	143	145	111	102	88
24	88	84	84	76	62	64	63	88	130	143	144	151	158	165	N	166	158	145	146	146	129	121	121	103
25	87	86	86	66	63	64	68	106	122	140	145	146	154	164	161	168	176	163	164	166	167	176	171	161
26	135	86	86	86	64	80	86	110	120		125	145	144	155	157	148	145	136	144	142	143	144	128	110
27	109	N	86	92	63	60	58	90	102	140	132	142	164	164	161	146	144	146	143	138	142	146	139	124
28	125	128	108	85	66	65	61	88	137	134	120	144	145	148	146	143	142	156	146	143	145	143	123	124
29	123	107	88	87	79	78	68	97	121	126	127	134	146	146	146	154	153	160	N	161	159	162	145	142
30	89	86	86	77	83	78	87	108	127	135	138	131	134	143	146	149	146	154	140	102	165	N	128	123
31	131	103	88	104	80	57	19	85	112	138	141	145	148	154	156	160	156	156	158	145	145	145	149	136
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	30	31	31	29	31	31	28	31	31	31	31	29	31	31	30	30	31	31	30	30	30
MED	109	86	86	86	65	57	51	83	107	127	138	145	146	154	158	158	157	158	146	145	146	145	129	124
U Q	131	109	97	90	77	65	65	89	121	137	144	146	156	164	162	168	169	169	164	167	167	164	160	144
L Q	86	85	85	77	63	44	42	71	100	121	132	136	141	146	146	146	146	146	145	143	142	129	111	108

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

MAR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	23	28	27	G	G	G	G	G	G	G	G	G	G	G	31	G	G	G	G	G
2	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	49	43	40	31	G	26	29	G	G
3	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	25	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	41	G	G	G	24	49	24
5	26	29	G	28	G	G		G	G	G	G	G	70	52	64	66	64	48	40	32	24	G	G	G
6	G	G	G	27	25	26	26	G	G	G	48	52	G	62	51	48	44	G	G	G	G	G	G	G
7	35	32	G	G	G	G	G	G	G	43	47	53	62	62	50	46	50	40	G	32	G	G	G	G
8	G	G	G	G	G	G	G	G	G	G	G	G	55	G	77	G	G	G	36	34	G	G	G	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	48	G	60	36	32	G	G	G
10	G	G	G	G	G	G	G	G	G	G	G	G	G	G	66	G	G	G	37	G	G	G	G	G
11	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	38	G	26	G	G	G	G
12	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	47	44	38	G	G	G	G	G	G
13	G	G	G	G	G	G	G	G	G	G	G	G	G	G	56	47	G	40	34	26	G	G	G	G
14	G	G	G	G	G	G	G	31	G	G	G	50	54	G	G	52	47	40	G	G	G	G		G
15	G	38	24	G	G	G	G	32	36	G	G	G	83	50	52	50	46	42	35	34	G	G	G	G
16	G	G	G	G	G	G	G	29	G	G	G	G	G	G	G	49	G	G	32	24	24	G	G	G
17	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	53	G	G	43	24	G	G	G	G
18	G	G	G	G	G	G	G	31	G	G	G	G	54	G	G	G	G	40	69	60	41	25	G	G
19	G	G	G	G	G	G	G	G	G		69	G	G	G	G	56	43	G	44	34	28	G	G	G
20	67	G	G	G	G	G	G	G	G	G	G	G	G	G	50	79	G	G	G	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	G	G	G	G	50	G	G	43	55	G	28	G	G	G	G
22	G	G	G		G	G	G	G	G	G	G	G	58	52	72	G	85	58	32	33	G	G	G	G
23	G	G	G	G	G	G	G	G	G	G	G	G	G	G	56	60	G	40	G	G	G	G	G	G
24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	56	34	G	G	G	G	G
25	G	G	G	G	G	G	G	31	G	G	G	G	G	G	G	G	45	44	46	30	G	G	G	G
26	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G
27	G	G	G	37	G	G	G	G	G	G	G	G	G	G	G	G	G	39	G	G	G	G	G	G
28	G	G	G	G	G	G	G	G	G	43	G	G	G	61	51	46	60	G	G	27	32	29	G	G
29	G	G	G	G	G	G	G	33	G	G	G	G	G	G	G	58	54	46	36	24	G	G	G	G
30	G	G	39	G	G	G	G	32	G	G	G	G	G	G	G	G	43	40	G	32	25	G	G	30
31	33	33	53	38	90	40	33	31	39	58	50	G	55	G	51	47	54	G	G	G	G	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	29	31	31	29	31	31	31	31	31	31	31	31	31	31	31	31	30	31
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	46	43	39	31	24	G	G	G	G
U Q	G	G	G	G	G	G	G	29	G	G	G	G	54	G	51	50	47	41	36	32	24	G	G	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 OKINAWA

MAR. 1990

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	15	15	15	15	15	14	15	23	15	18	24	28	32	45	33	29	26	20	15	15	15	15	15	15
2	15	15	15	15	15	15	15	15	30	34	26	45	44	42	42	30	22	20	15	15	15	15	15	15
3	15	15	15	15	15	15	15	23	15	21	17	30	32	32	30	32	26	30	23	15	15	15	15	15
4	15	15	15	15	14	15	15	15	15	15	21	28	45	32	30	29	16	17	15	15	15	15	15	15
5	15	15	15	15	14	15		22	18	16	21	23	27	27	26	28	16	17	15	15	15	15	15	15
6	15	15	15	15	15	14	15	18	16	16	22	26	28	28	28	26	20	16	16	15	15	15	15	15
7	14	14	15	15	14	15	15	15	15	15	23	26	27	27	27	27	26	16	15	14	15	15	15	15
8	15	15	15	15	15	15	15	15	15	16	23	26	28	28	26	27	26	17	15	14	15	15	15	15
9	15	15	15	15	15	15	15	15	15	23	27	27	27	28	27	27	18	18	16	14	15	16	15	15
10	15	15	15	14	15	15	15	15	15	16	23	27	28	28	28	27	26	17	15	15	15	15	15	15
11	15	15	15	15	14	15		21	18	17	27	27	28	45	27	21	27	17	15	15	15	15	15	15
12	15	15	15	15	15	16	15	15	15	20	27	27	28	32	29	29	27	16	15	15	15	15	15	15
13	15	15	15	15	15	15	15	15	17	16	21	27	28	27	29	23	17	15	14	14	15	15	15	15
14	15	15	15	15	15	15	15	16	15	16	23	26	28	32	38	33	27	21	15	15	15	15		15
15	15	14	15	14	14	15	15	15	15	22	23	27	27	27	28	28	28	26	16	14	14	15	15	15
16	15	15	15	15	15	15	15	16	30	22	26	30	29	28	29	27	27	26	17	15	15	15	15	15
17	15	15	15	15	15	15	15	17	16	26	28	28	30	29	29	27	23	14	14	15	15	15	15	15
18	15	15	15	15	14	15	15	16	15	21	40	28	30	32	32	28	24	17	15	14	15	15	15	15
19	15	15	15	16	15	14	15	15	15		26	28	32	48	118	35	27	16	15	15	15	15	15	15
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21	15	15	15	15	15	15	15	24	21	27	28	28	33	42	32	30	27	18	15	15	15	14	15	15
22	15	15	15		15	15	15	27	18	26	28	32	42	33	30	39	27	22	15	15	15	15	15	15
23	15	15	15	15	15	15	15	27	21	26	28	29	30	37	36	27	26	17	27	16	15	15	15	15
24	15	15	15	15	15	15	16	27	20	27	28	30	48	32	46	34	28	26	17	16	17	18	15	20
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26	15	15	15	15	15	15	15	27	17		30	32	45	50	60	45	26	22	17	15	15	15	15	15
27	15	15	15	15	15	15	15	26	16	23	29	39	29	46	32	29	28	23	17	15	15	15	15	16
28	15	15	15	15	15	15	15	27	22	27	27	32	33	32	30	29	27	36	28	15	15	14	15	15
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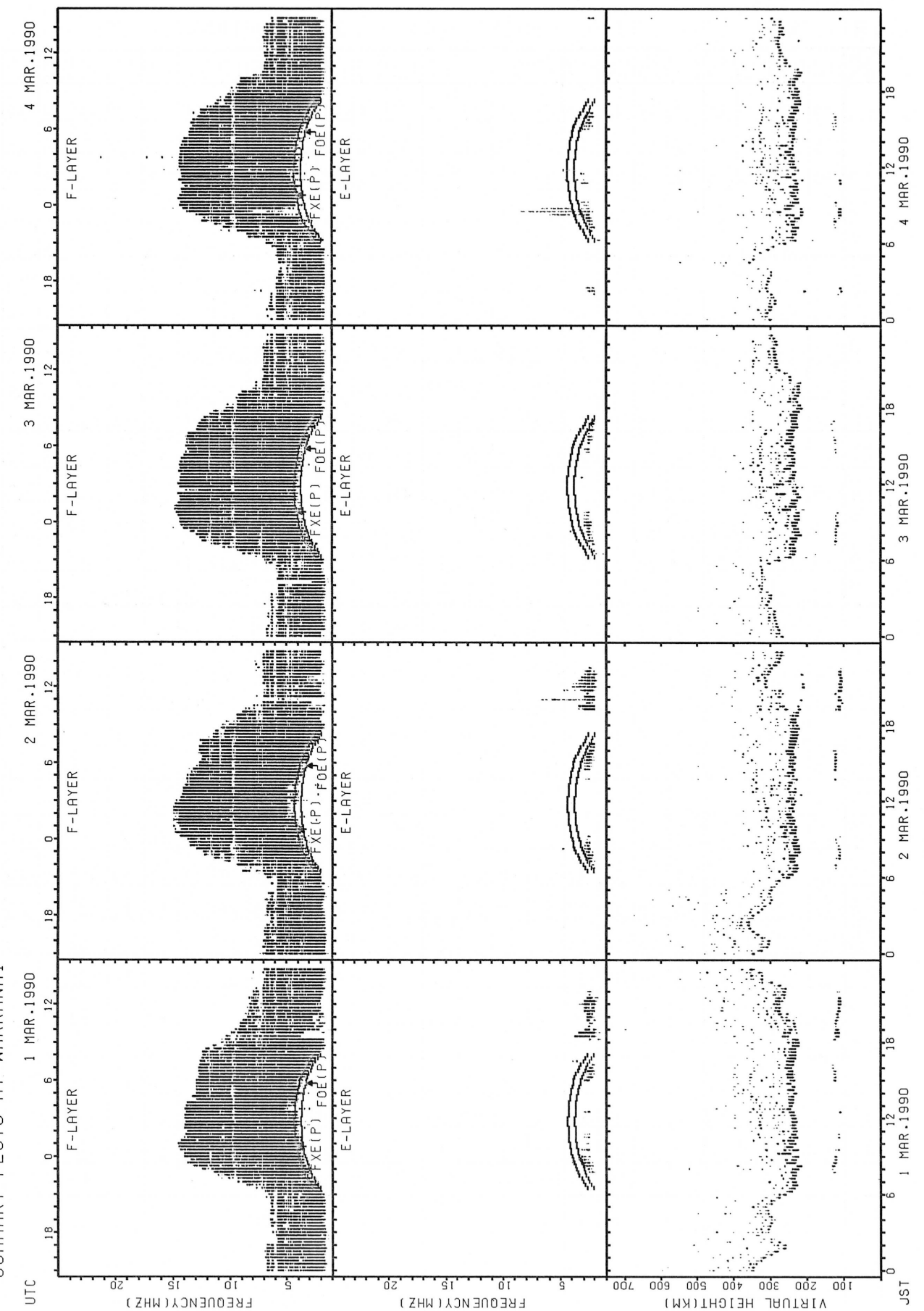
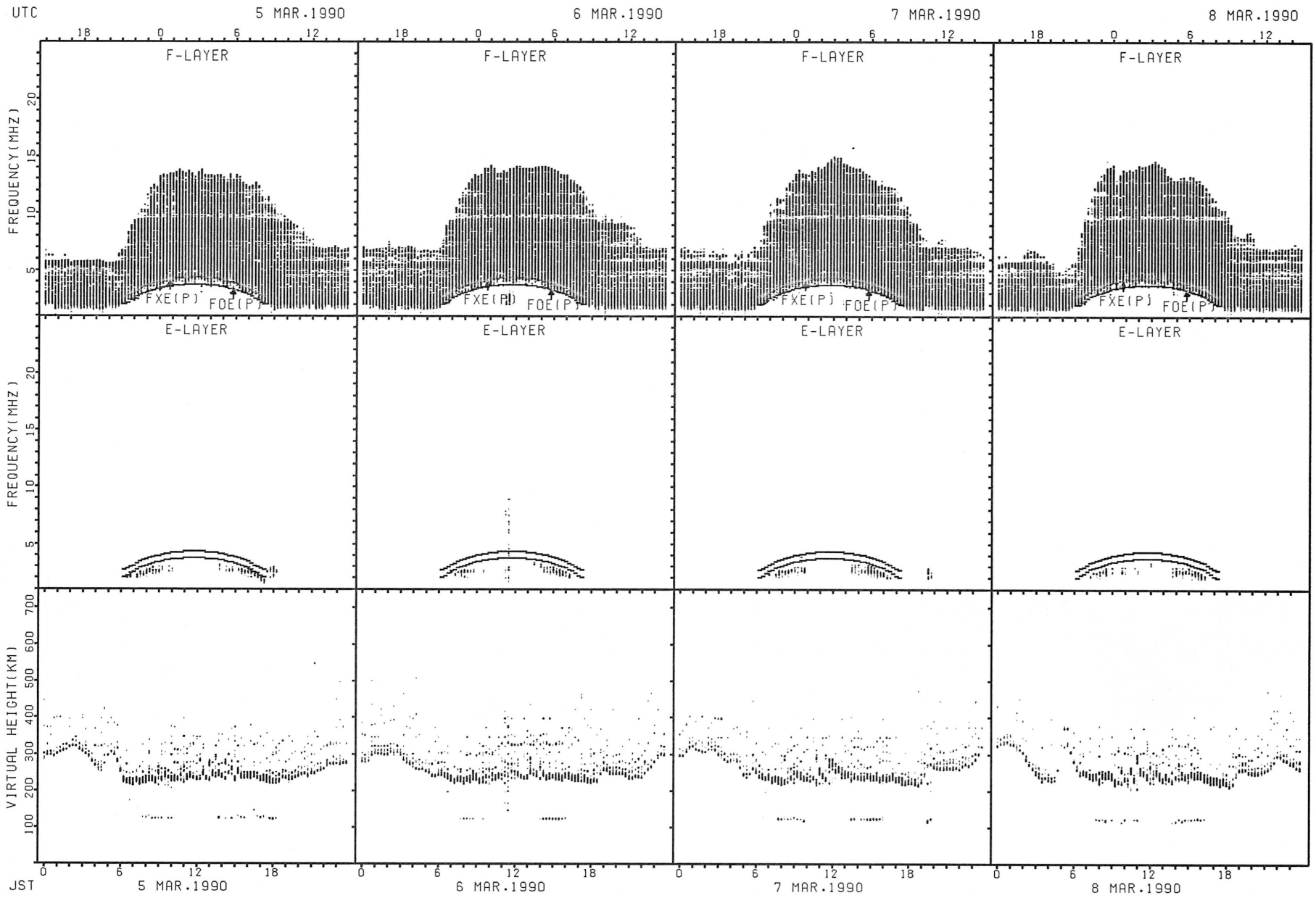
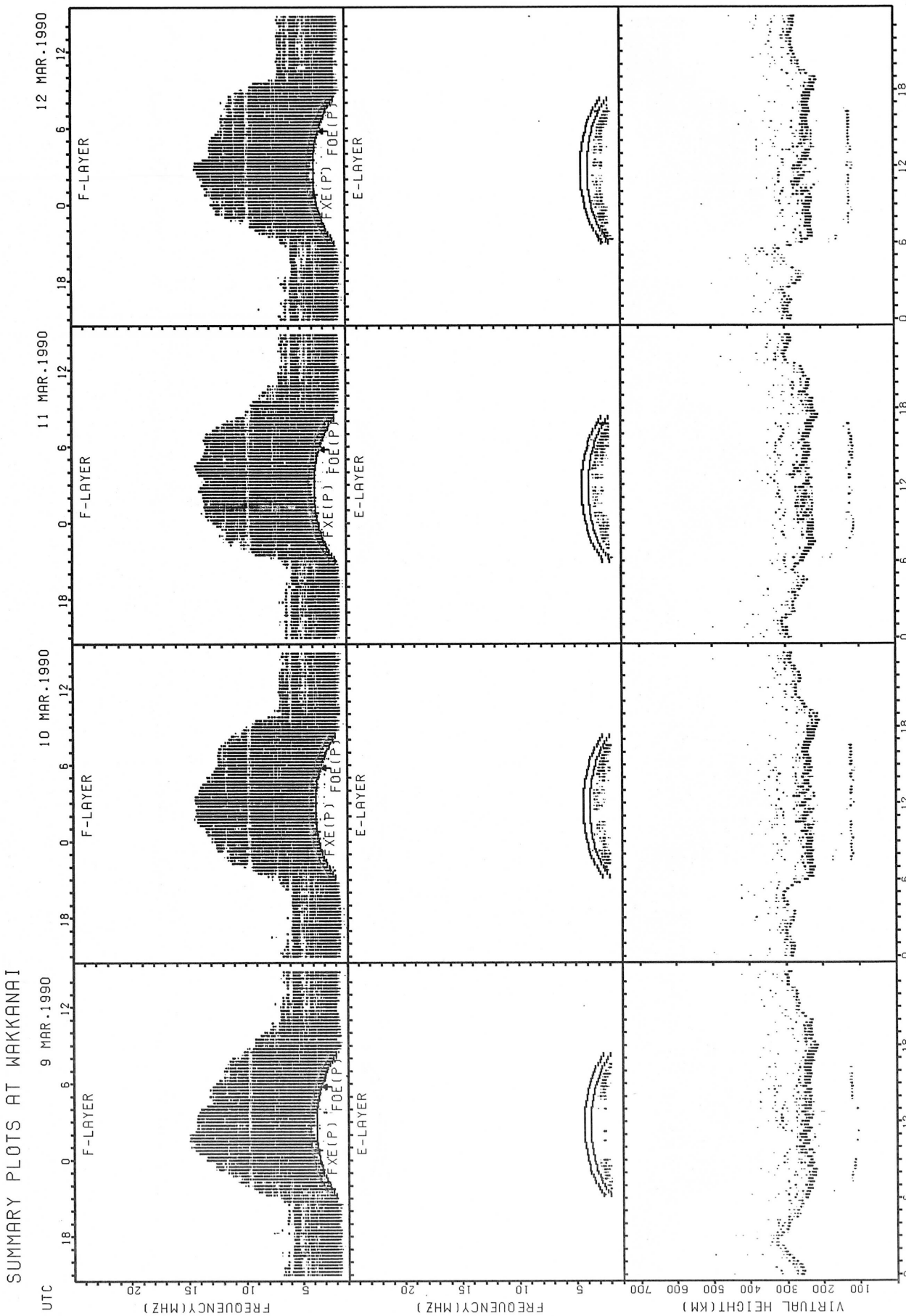
30	15	15	15	15	15	15	15	20	32	29	27	33	46	34	44	28	30	27	27	16	15	15	15	15
31	15	15	15	15	14	15	15	15	17	23	27	29	32	31	32	30	20	15	15	15	15	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	29	31	31	29	31	31	31	31	31	31	31	31	31	31	31	31	30	31
MED	15	15	15	15	15	15	15	17	16	22	27	28	30	32	30	28	26	17	15	15	15	15	15	15
U Q	15	15	15	15	15	15	15	23	18	26	28	30	33	37	36	30	27	22	17	15	15	15	15	15
L Q	15	15	15	15	15	15	15	15	15	16	23	27	28	28	28	27	23	17	15	15	15	15	15	15


SUMMARY PLOTS AT WAKKANAI
UTC
JST
1 MAR.1990
2 MAR.1990
3 MAR.1990
4 MAR.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

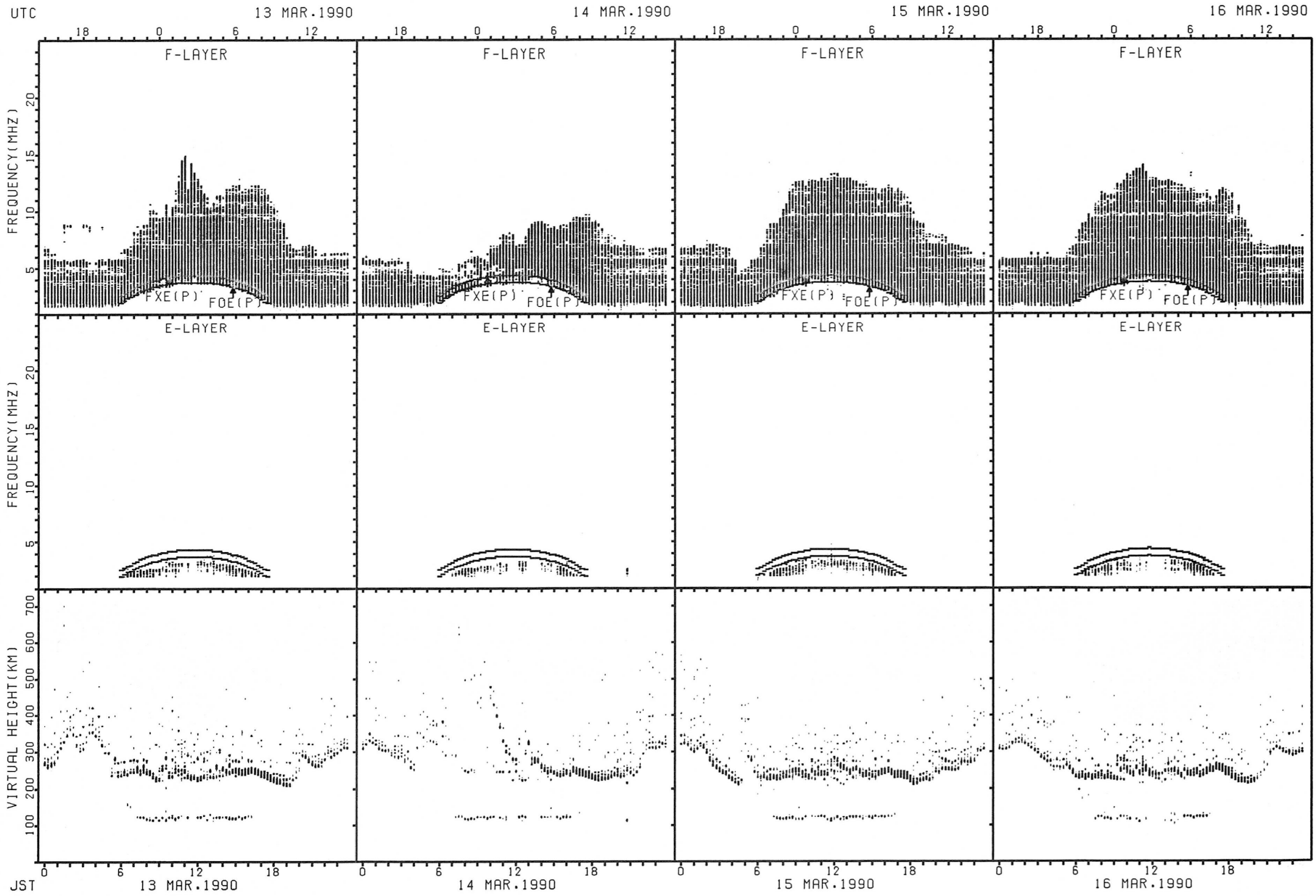
SUMMARY PLOTS AT WAKKANAI



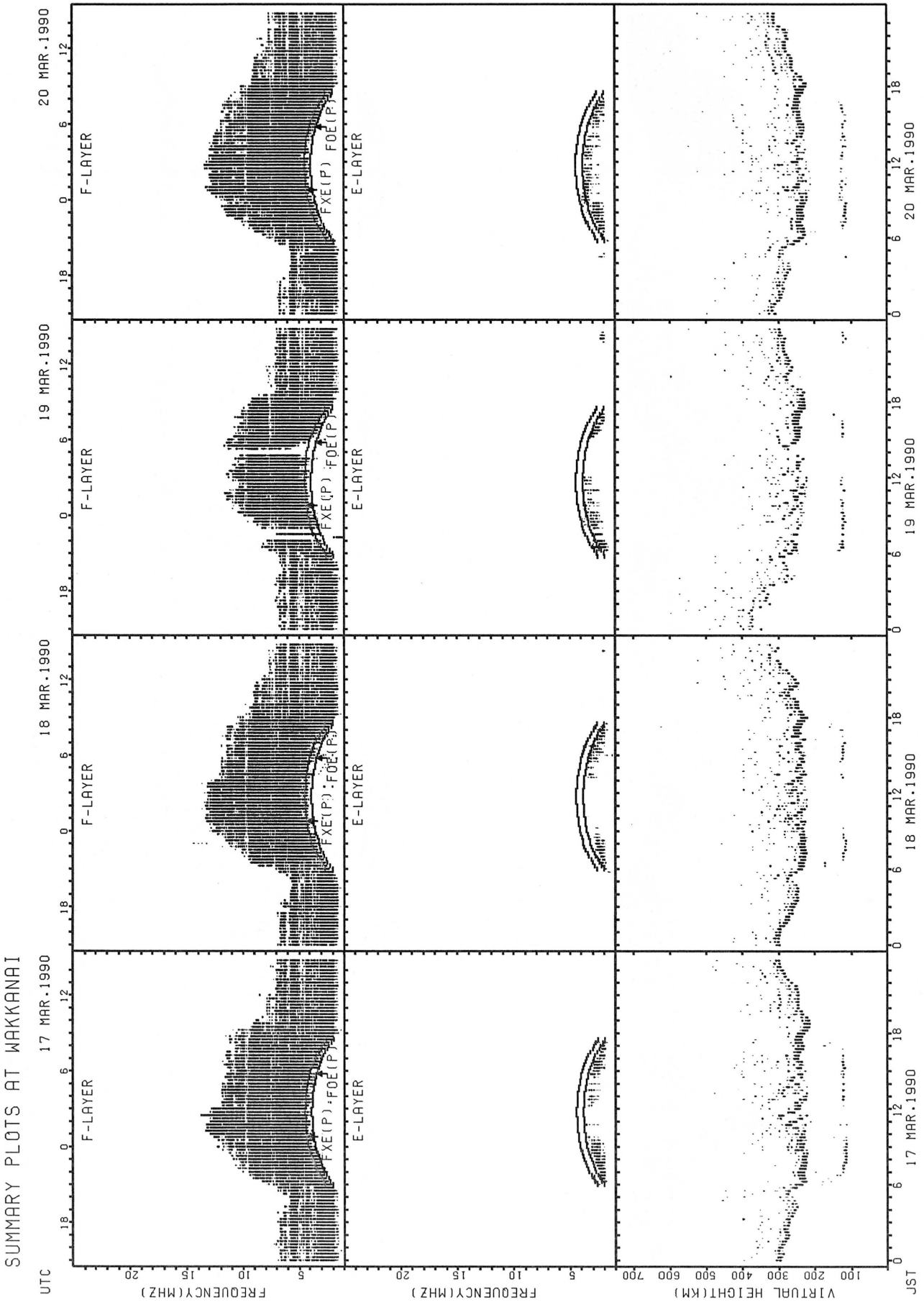
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
9 MAR.1990
10 MAR.1990
11 MAR.1990
12 MAR.1990
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

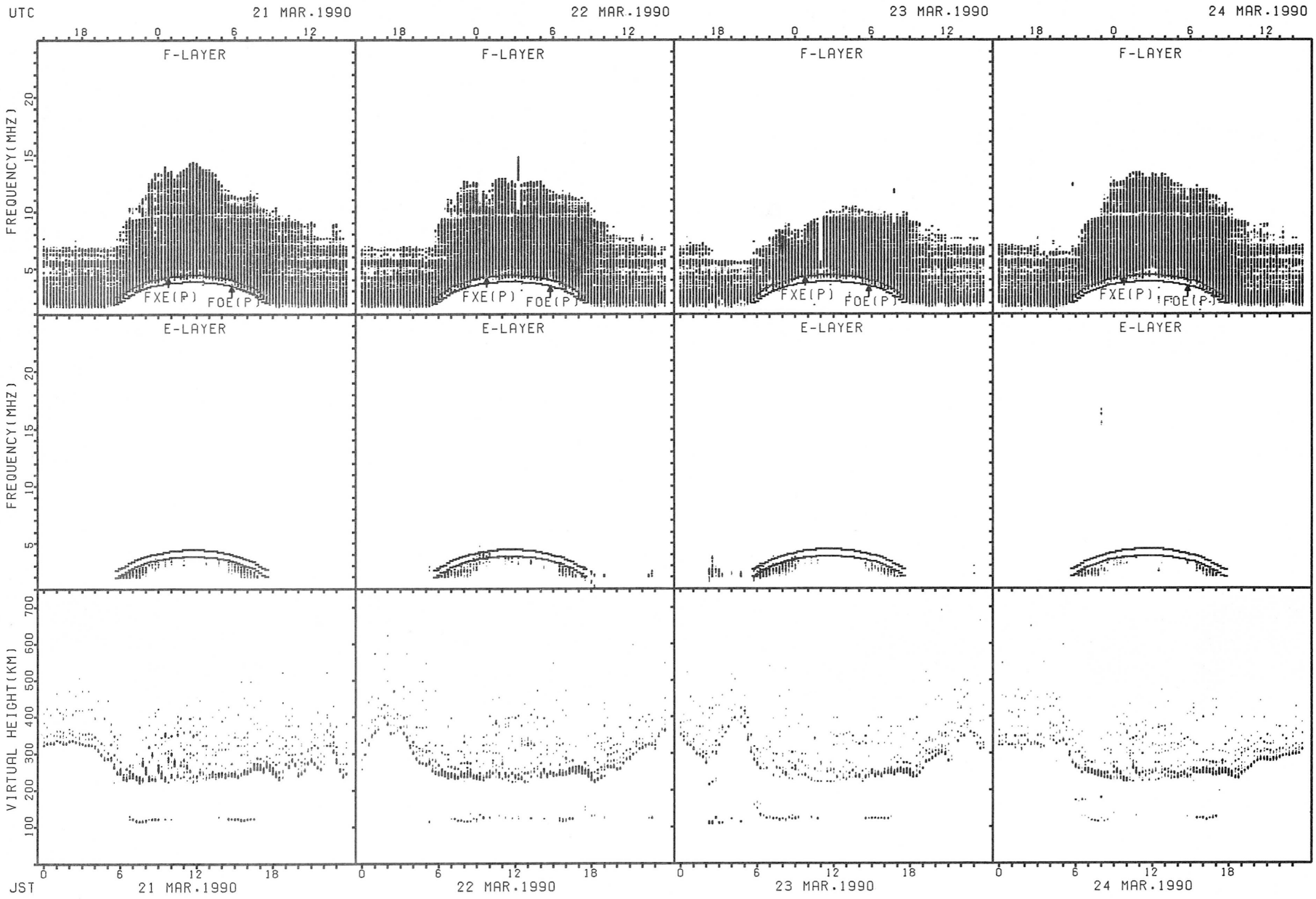
SUMMARY PLOTS AT WAKKANAI



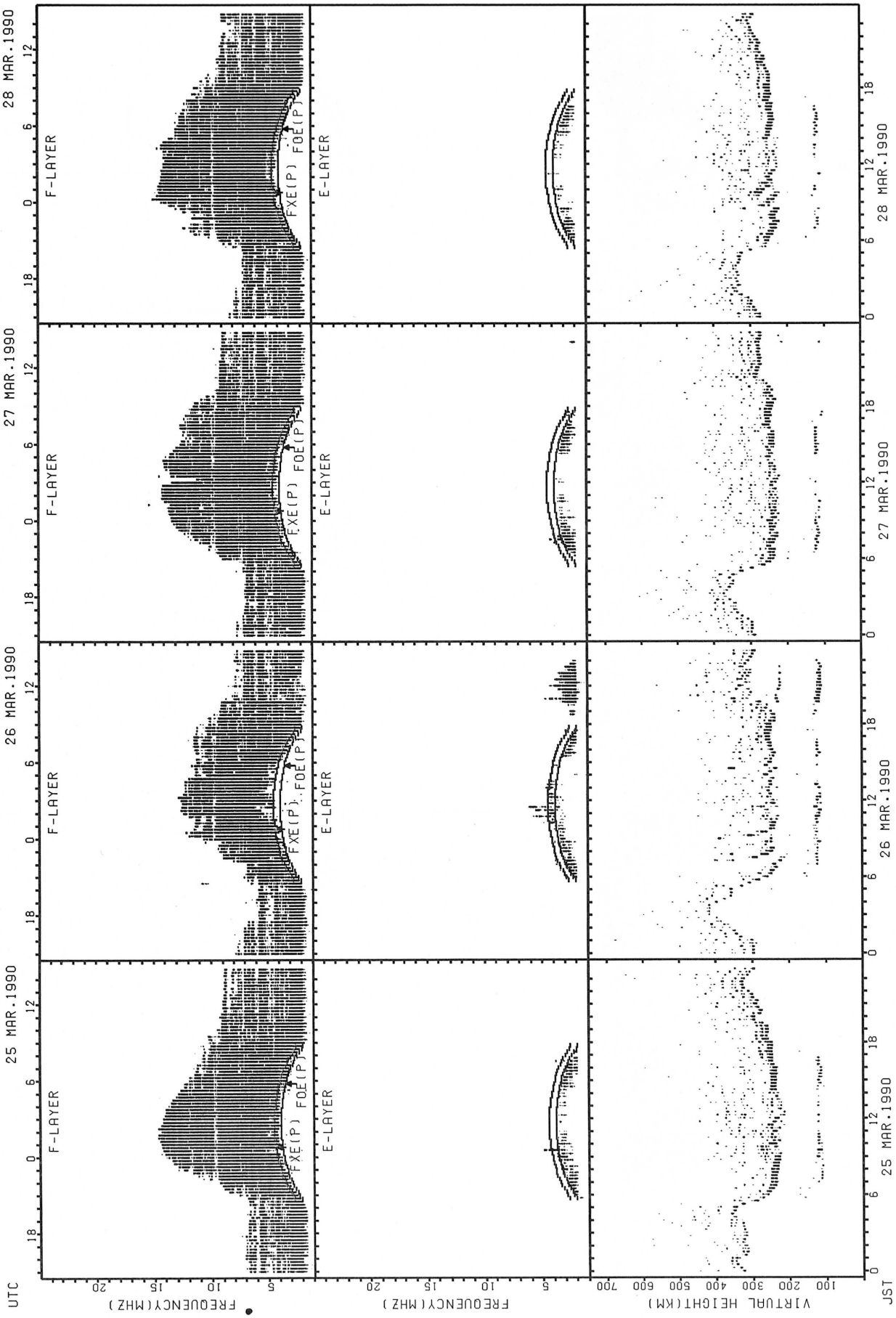
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
17 MAR.1990
18 MAR.1990
19 MAR.1990
20 MAR.1990
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

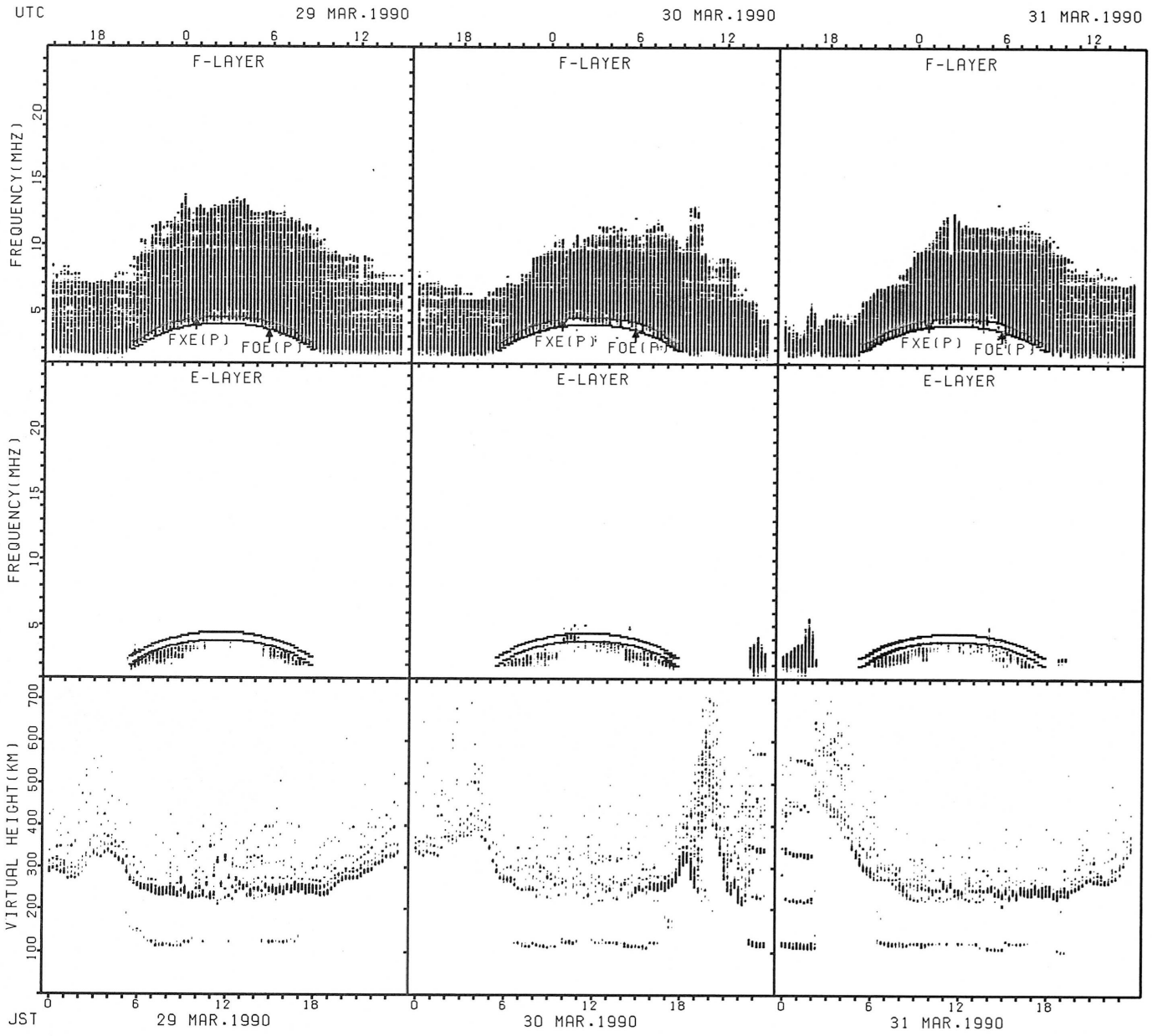
SUMMARY PLOTS AT WAKKANAI



FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

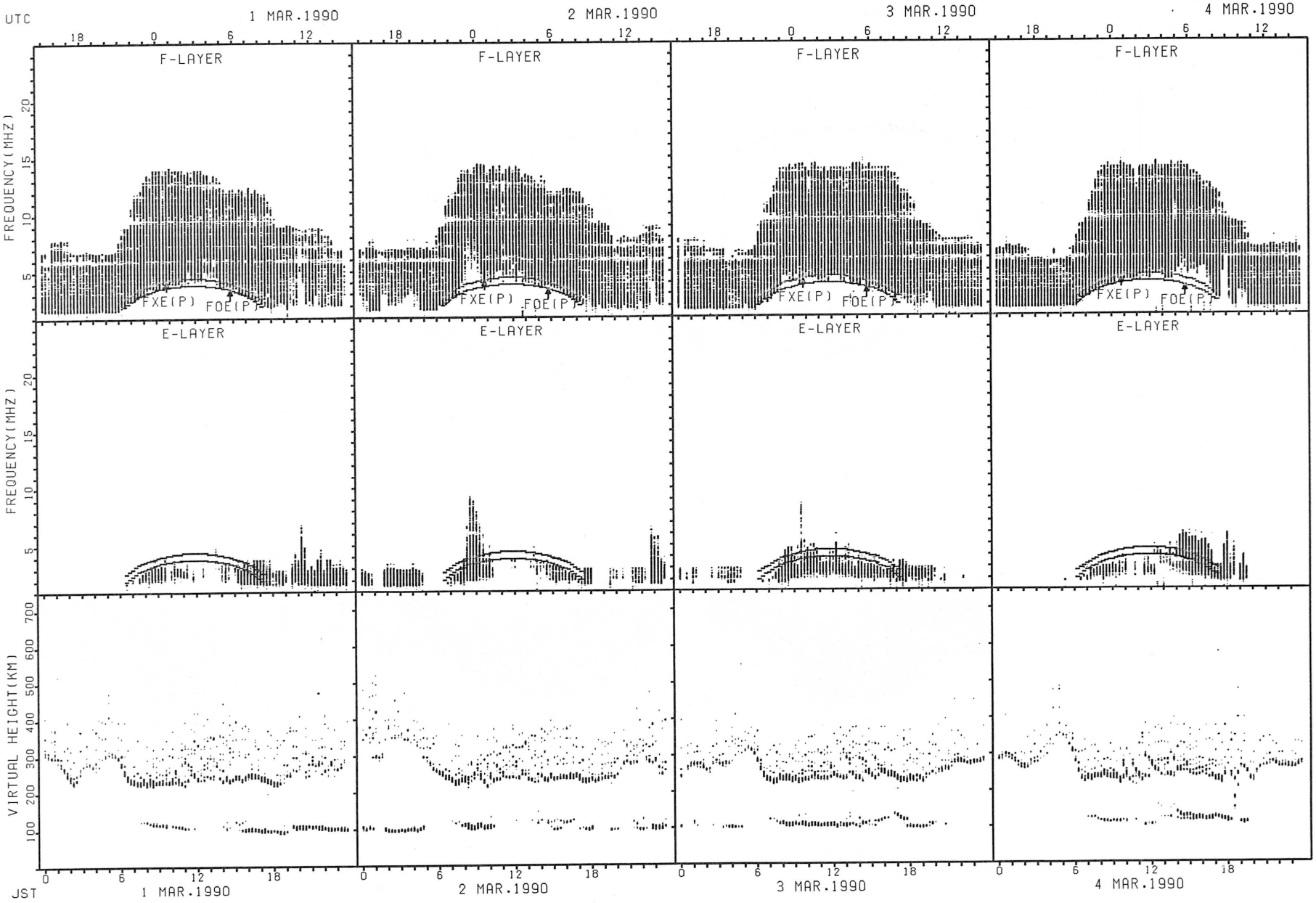

SUMMARY PLOTS AT WAKKANAI
UTC
JST
25 MAR.1990
26 MAR.1990
27 MAR.1990
28 MAR.1990
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P) FOE(P)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



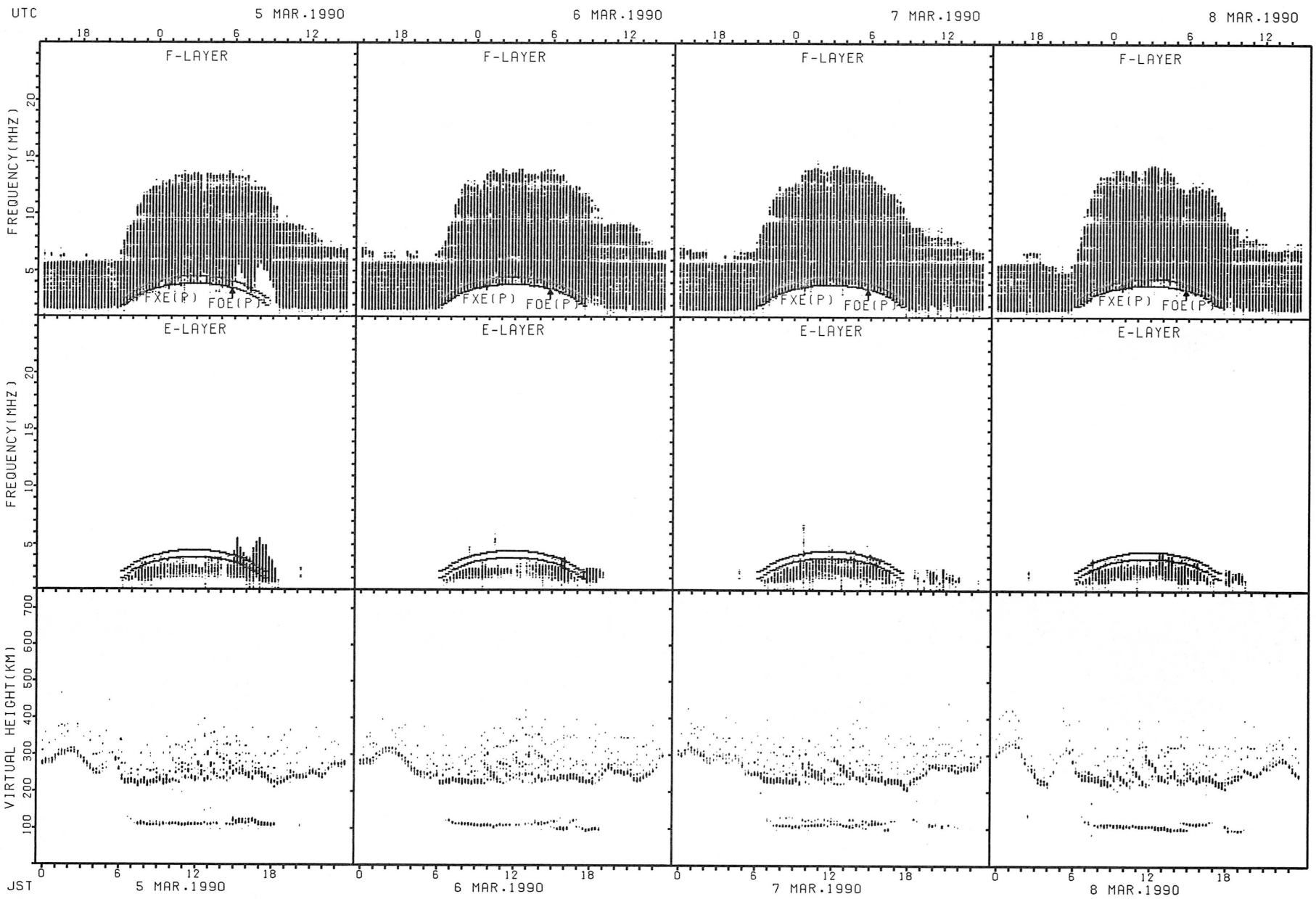
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA

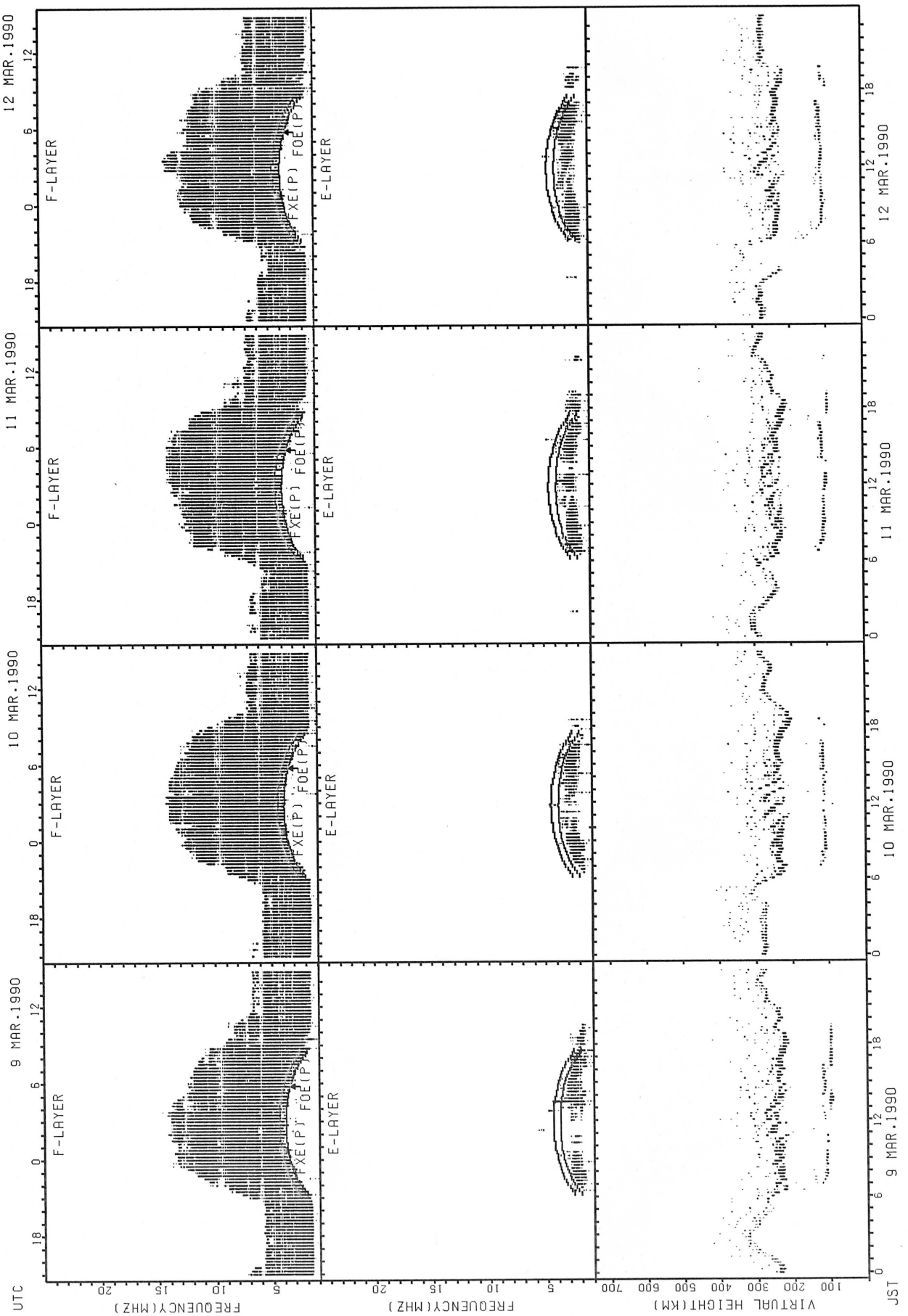


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

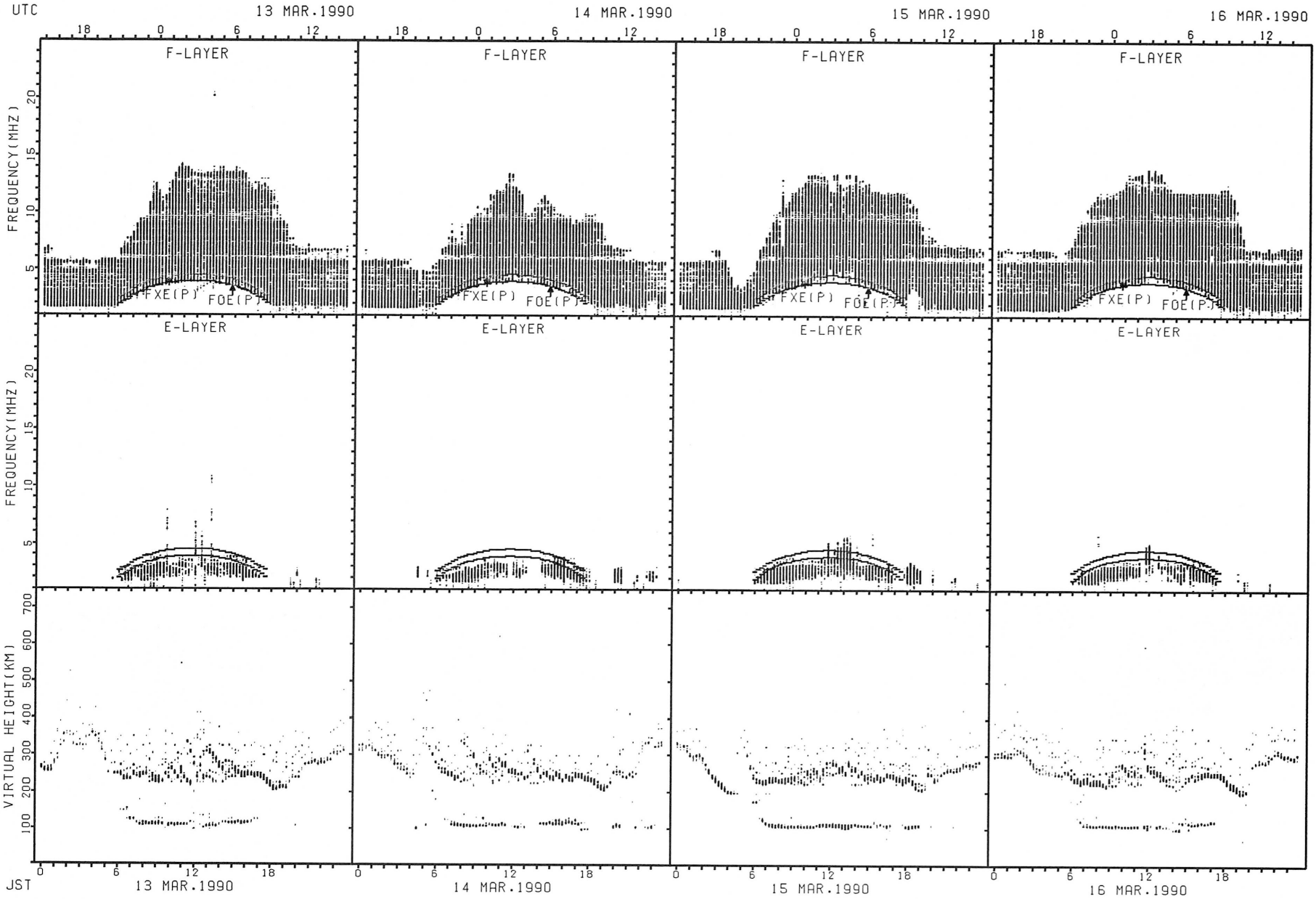
SUMMARY PLOTS AT AKITA



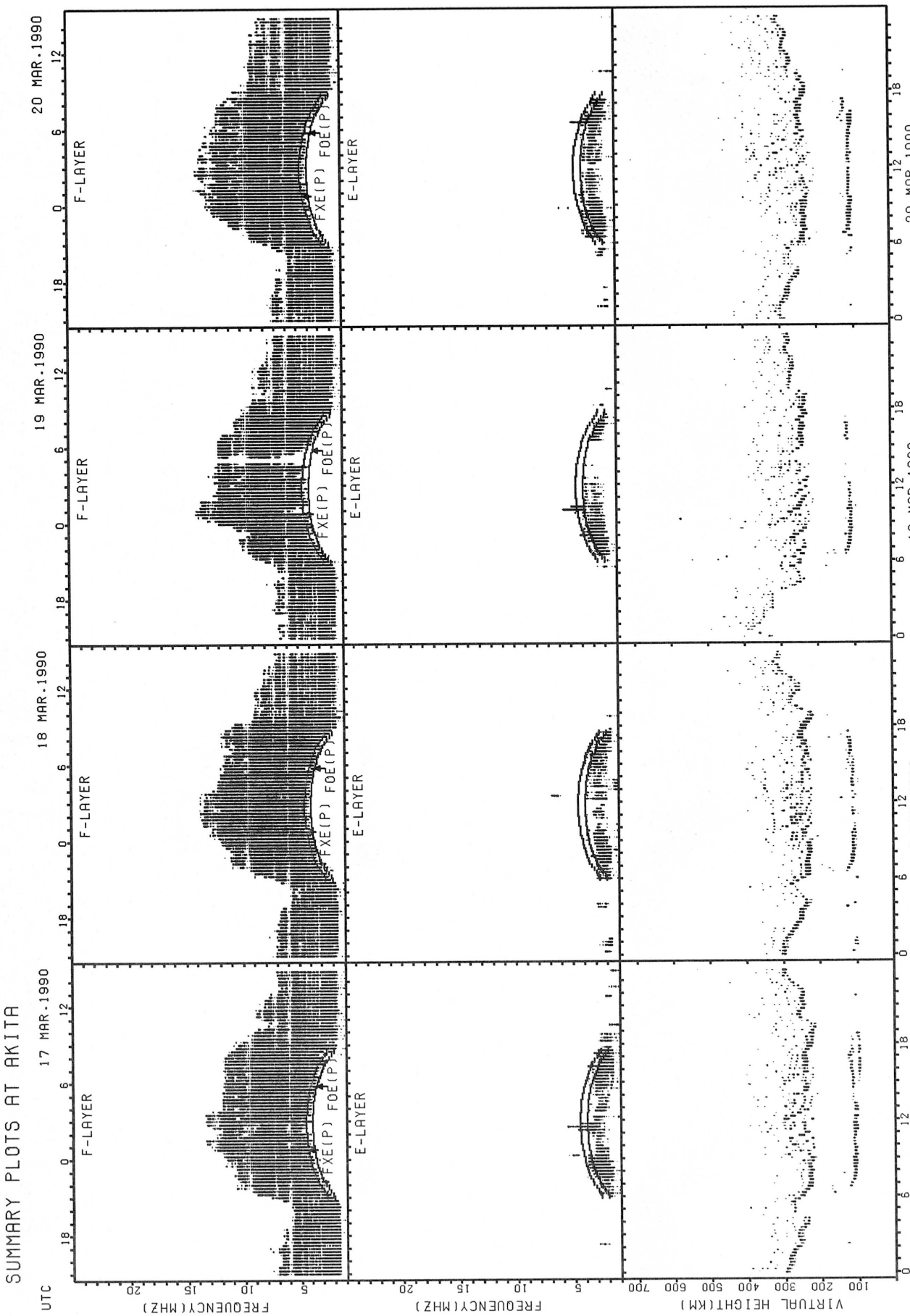
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
9 MAR.1990
10 MAR.1990
11 MAR.1990
12 MAR.1990
UTC
JST
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

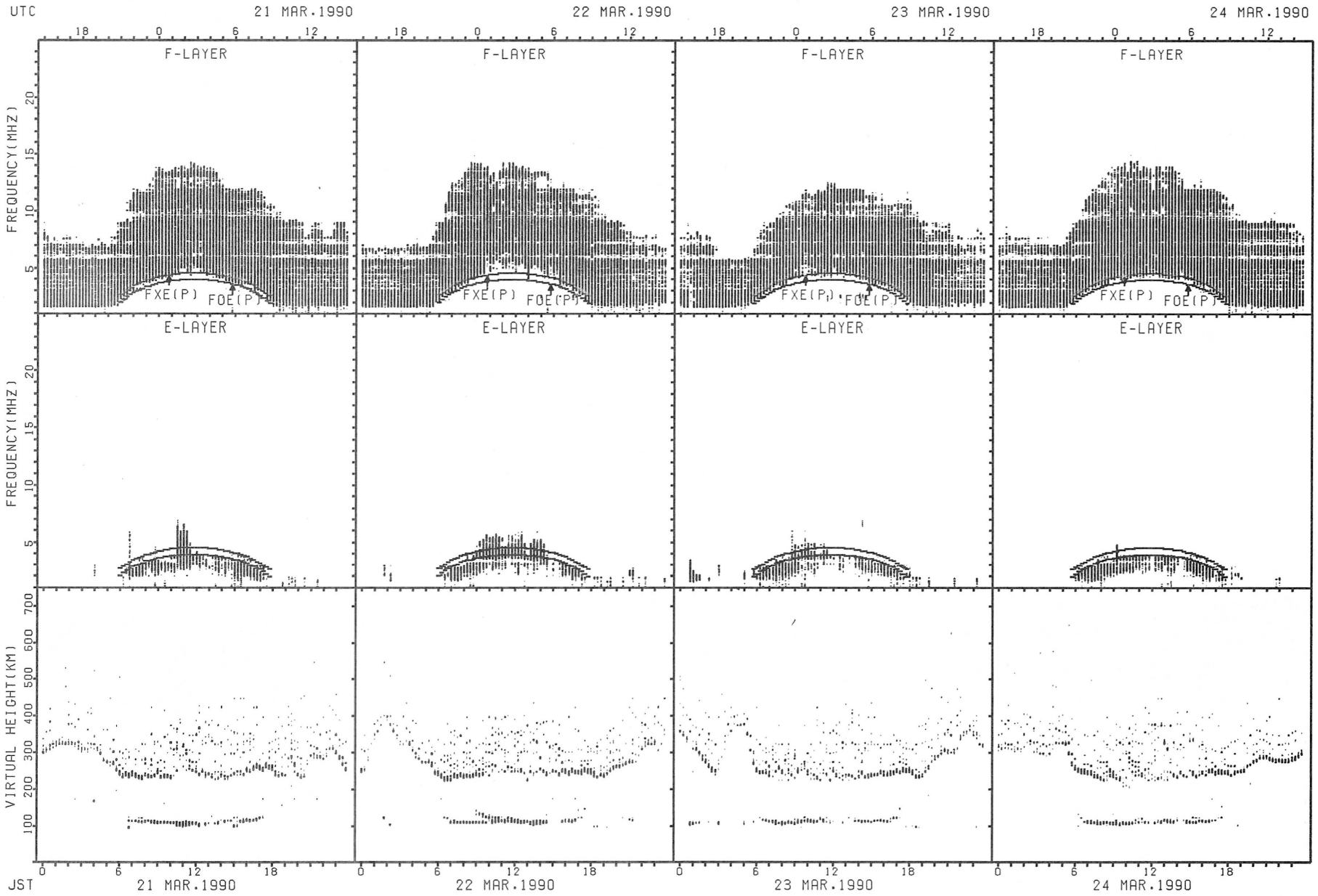
SUMMARY PLOTS AT AKITA



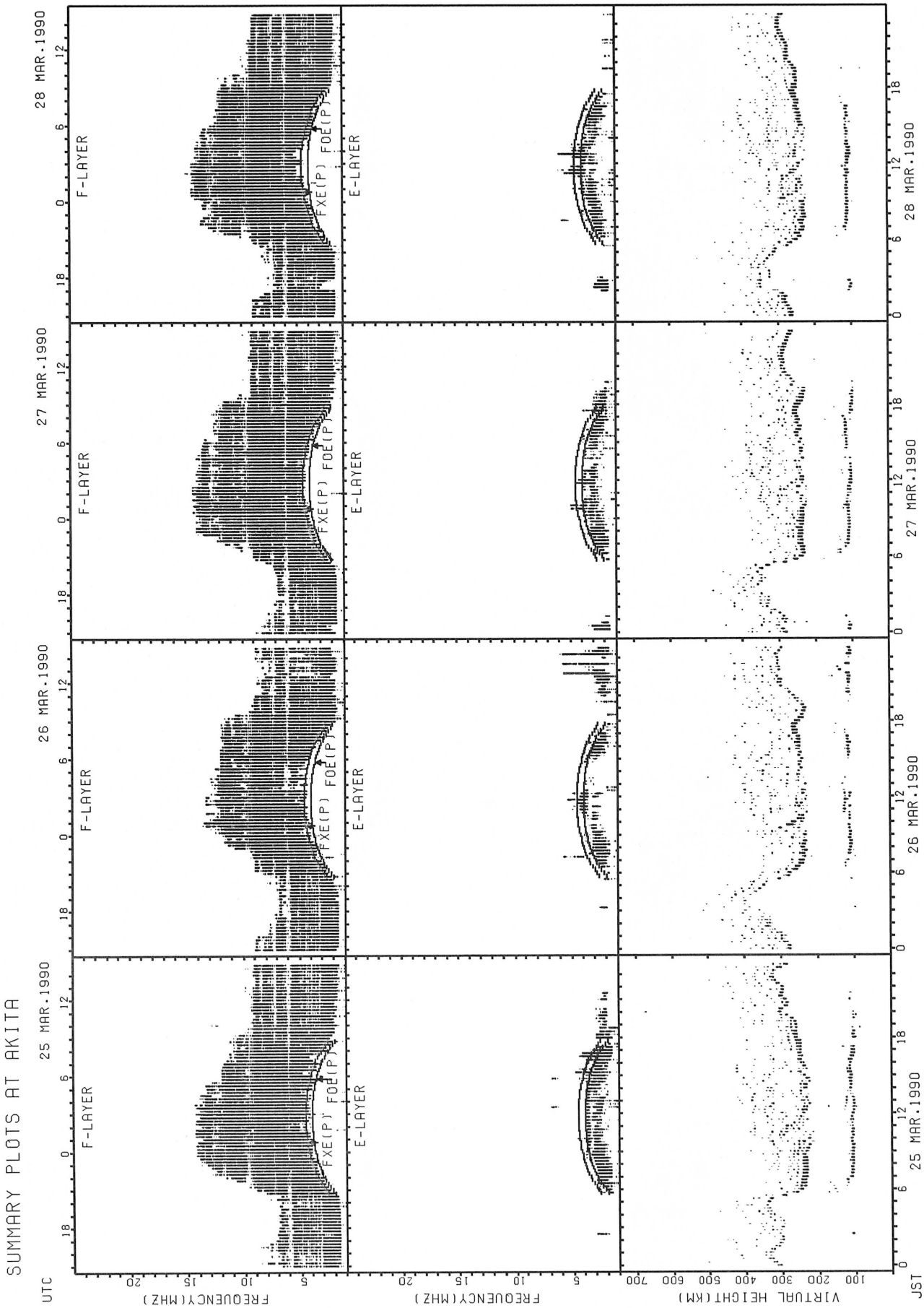
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
17 MAR.1990
18 MAR.1990
19 MAR.1990
20 MAR.1990
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

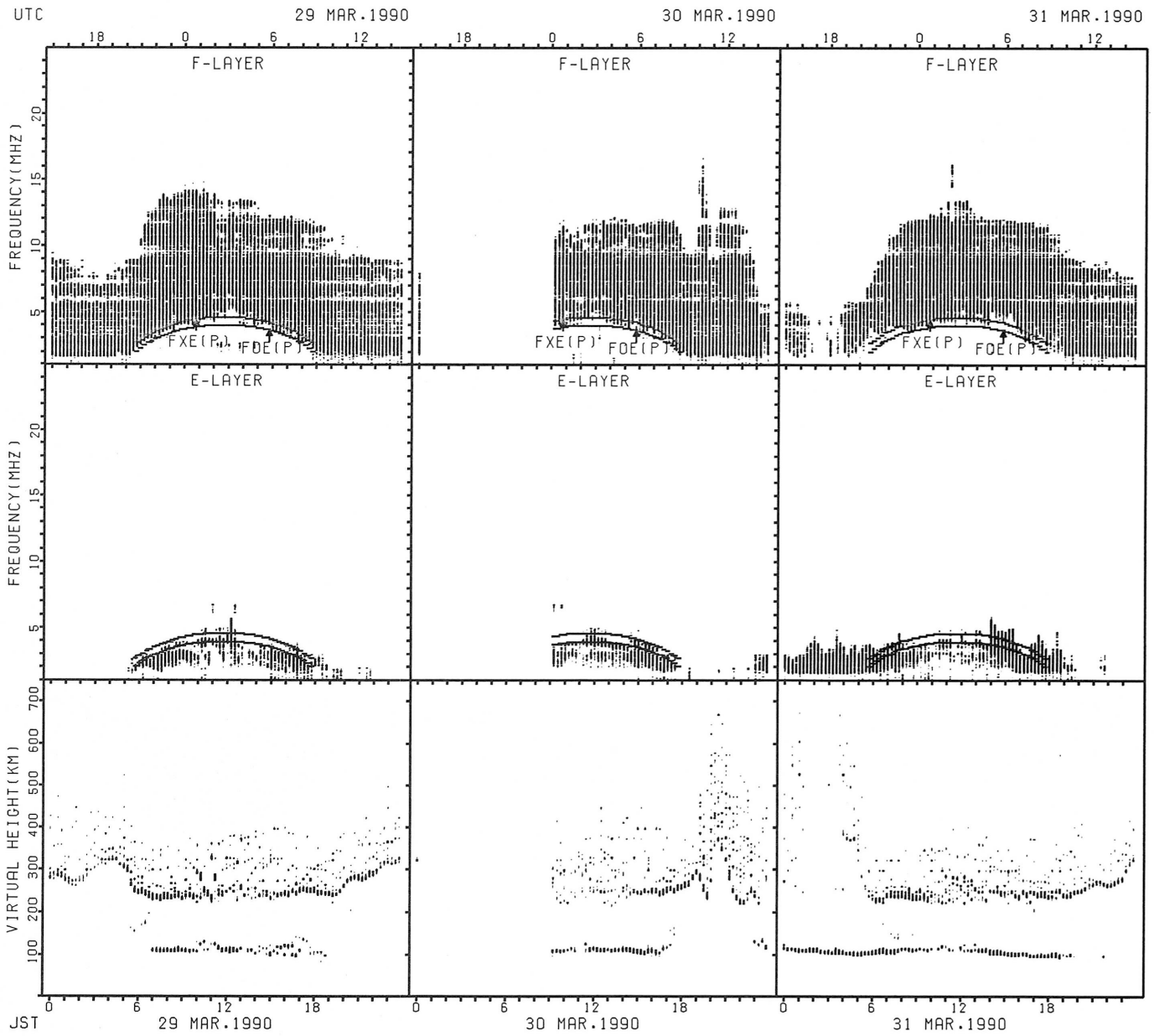
SUMMARY PLOTS AT AKITA



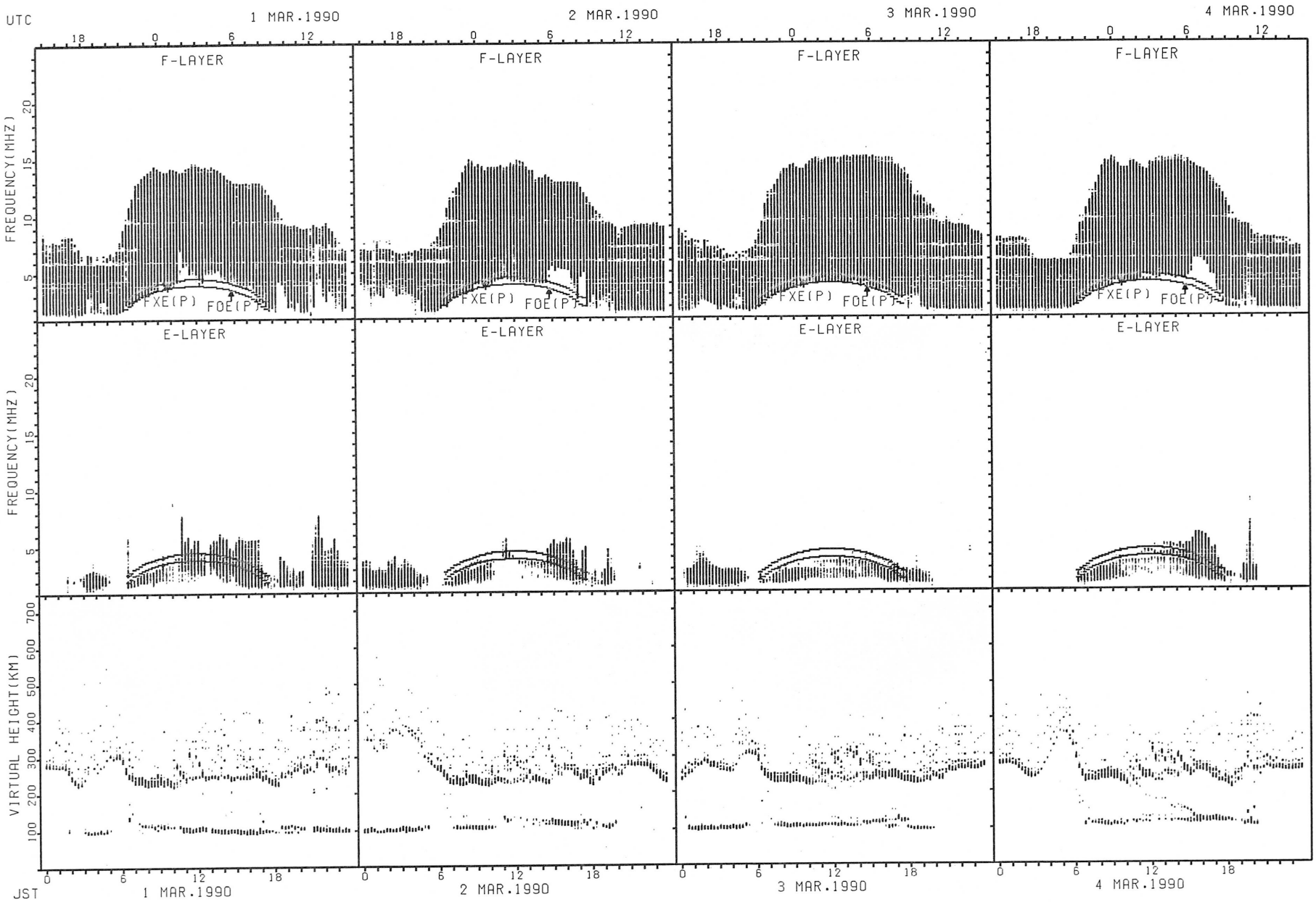
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
25 MAR.1990
26 MAR.1990
27 MAR.1990
28 MAR.1990
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

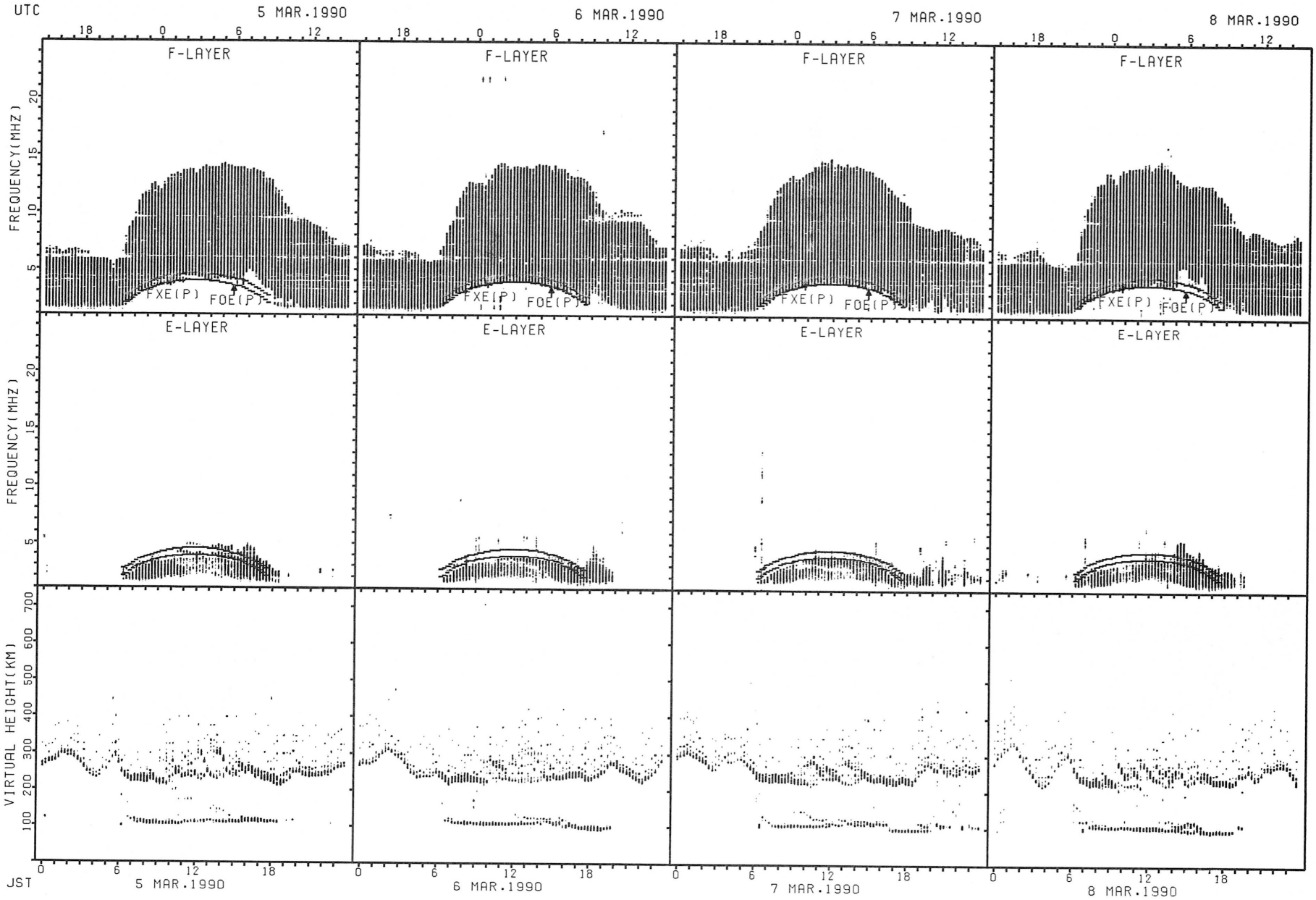
SUMMARY PLOTS AT AKITA



FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

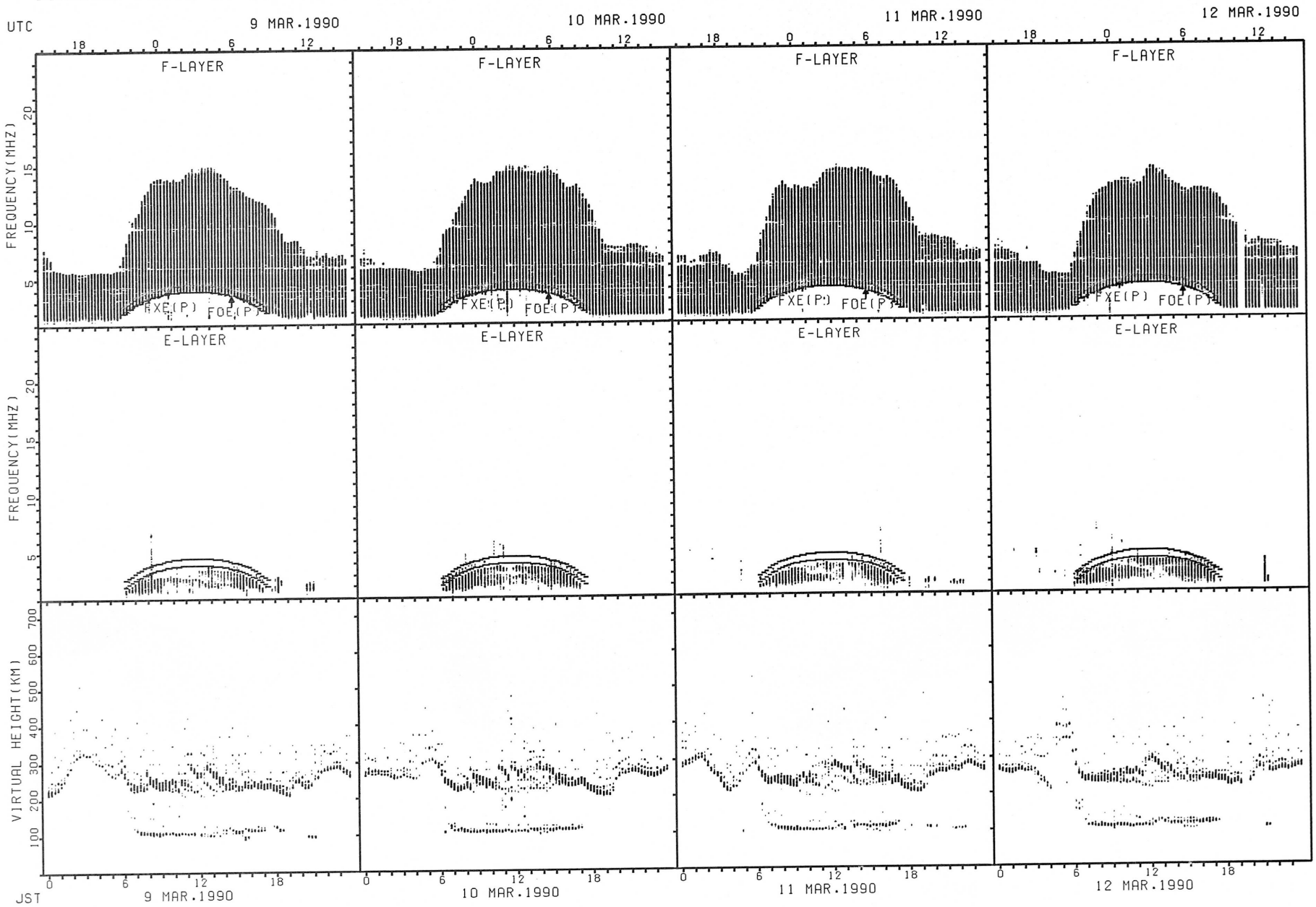

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
1 MAR.1990
2 MAR.1990
3 MAR.1990
4 MAR.1990
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P)
FOE(P)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



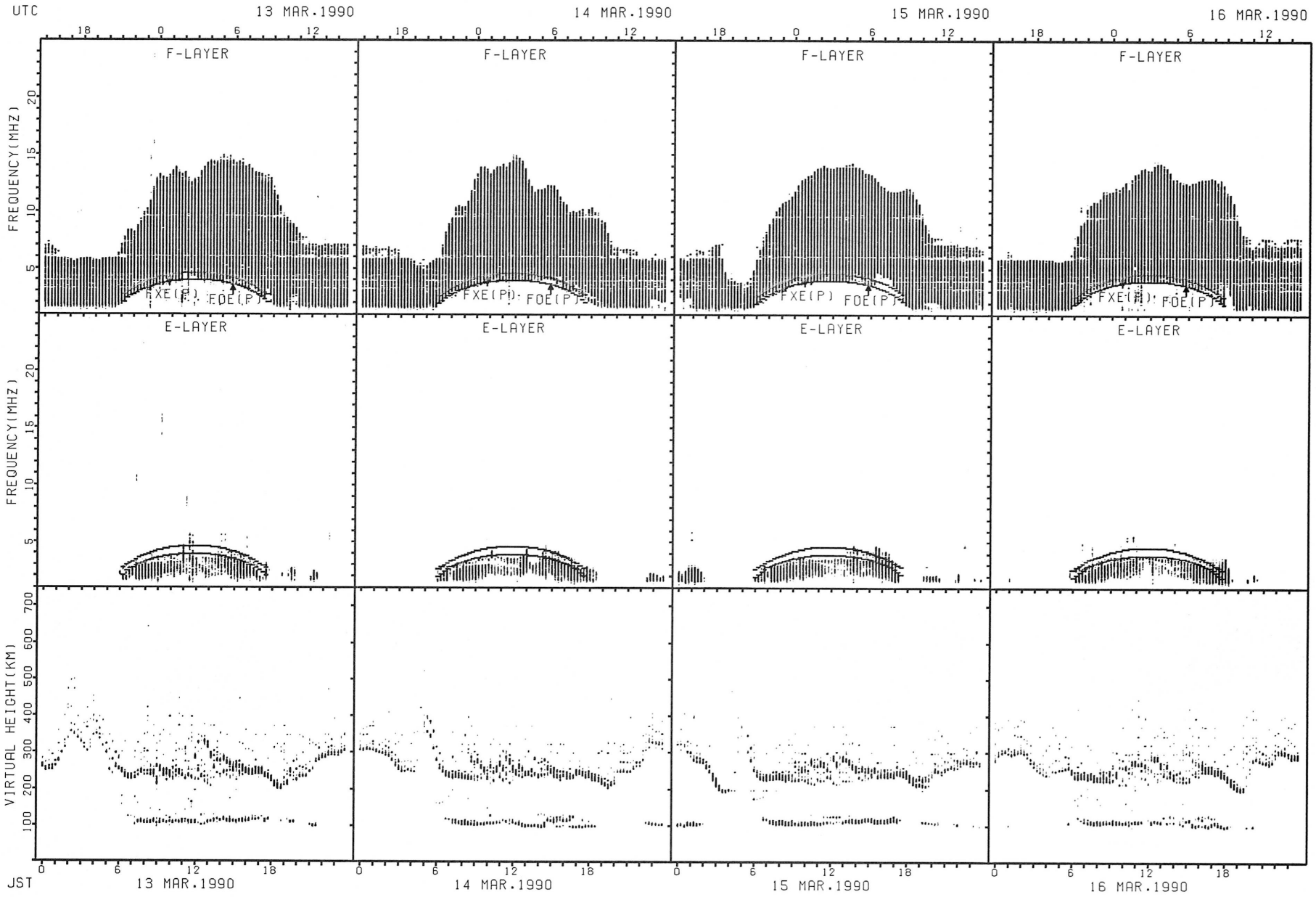
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



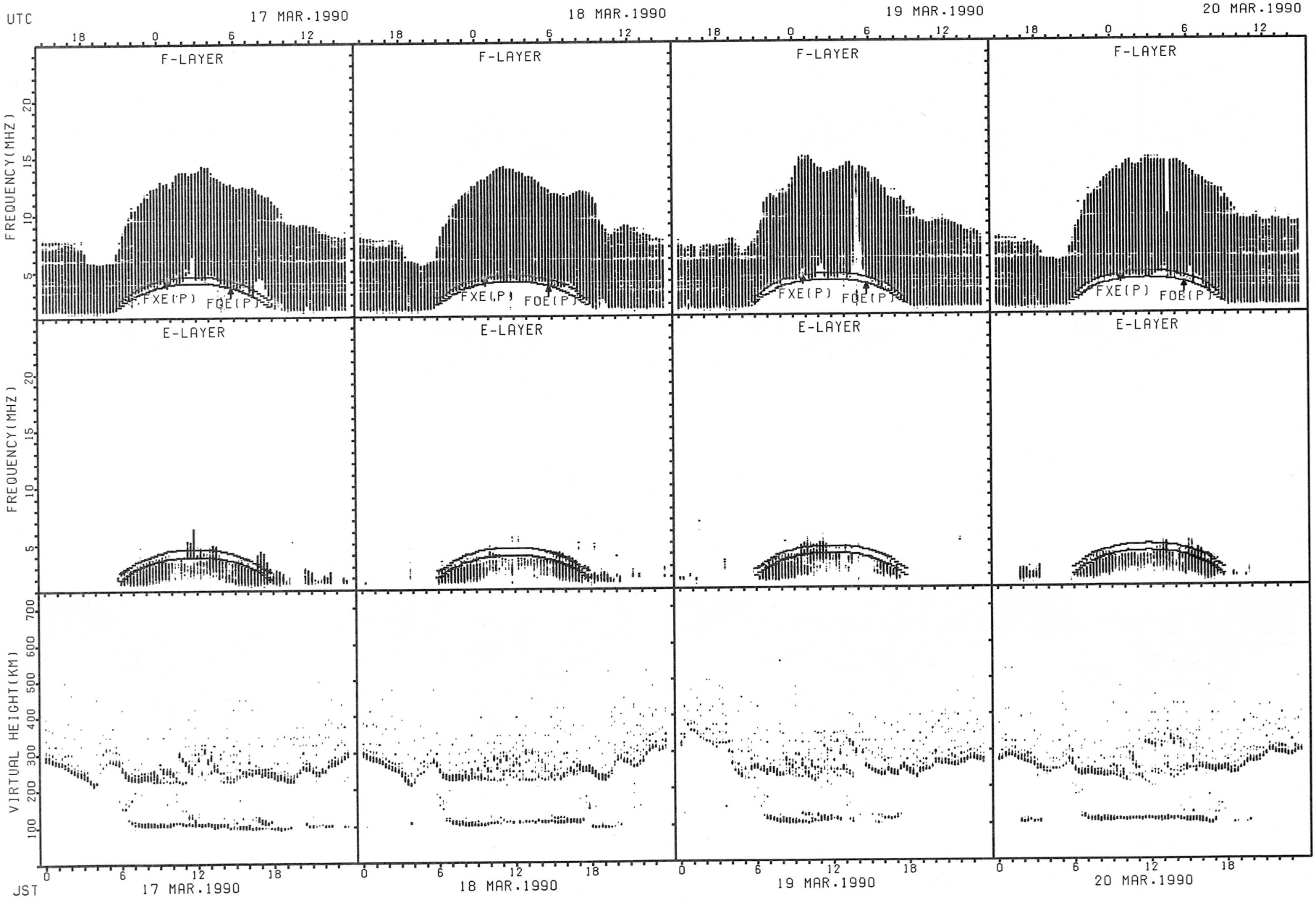
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



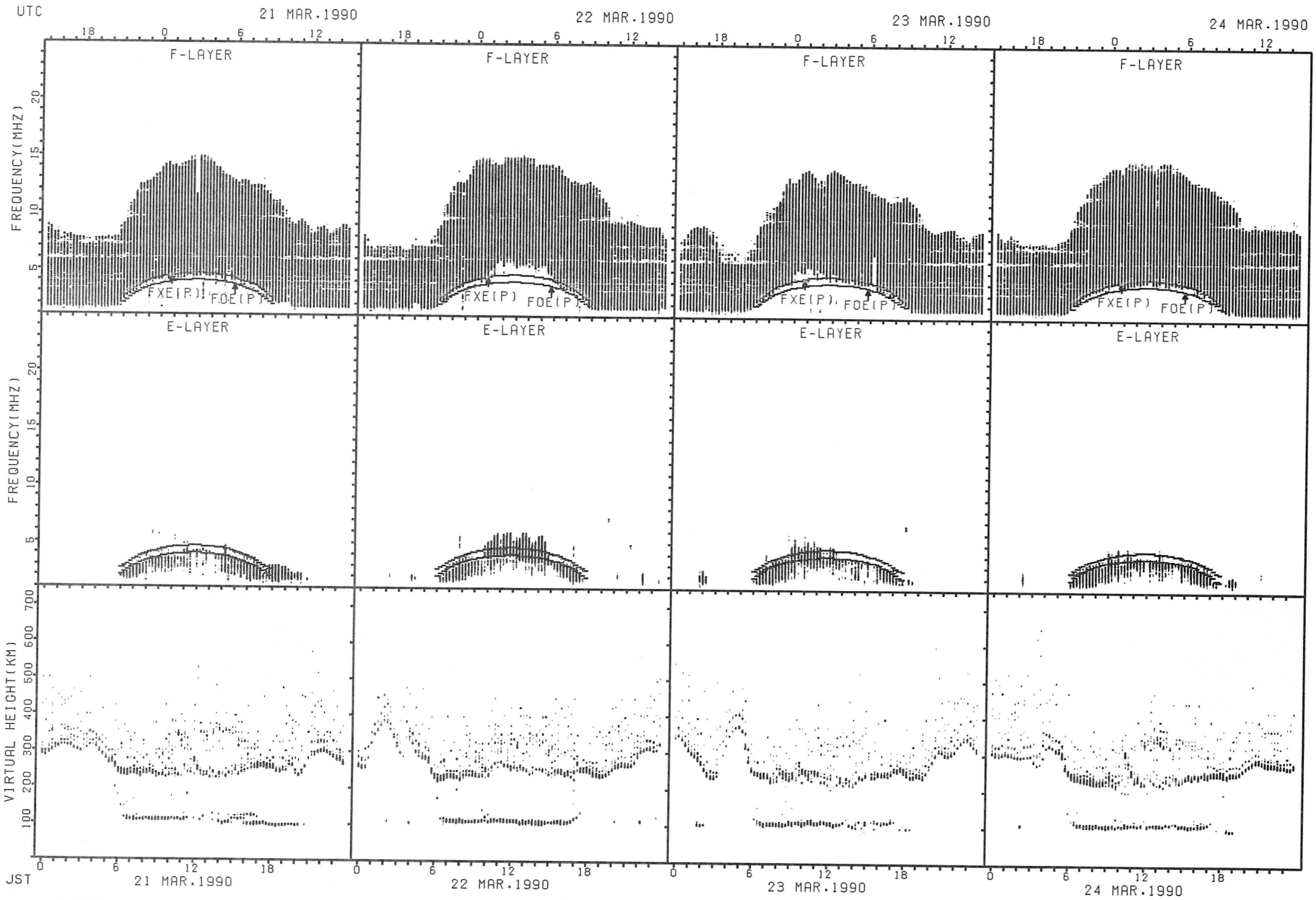
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

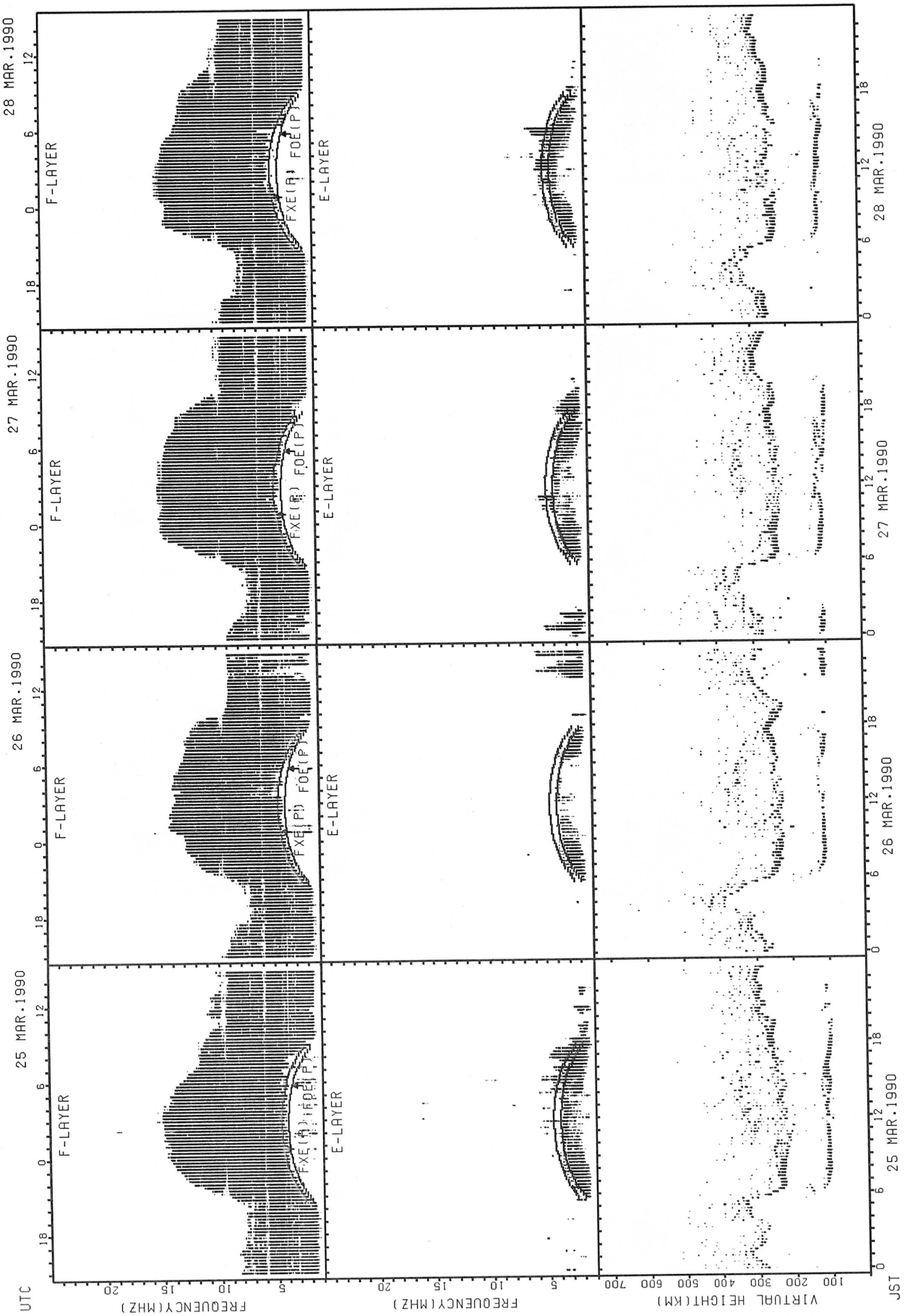


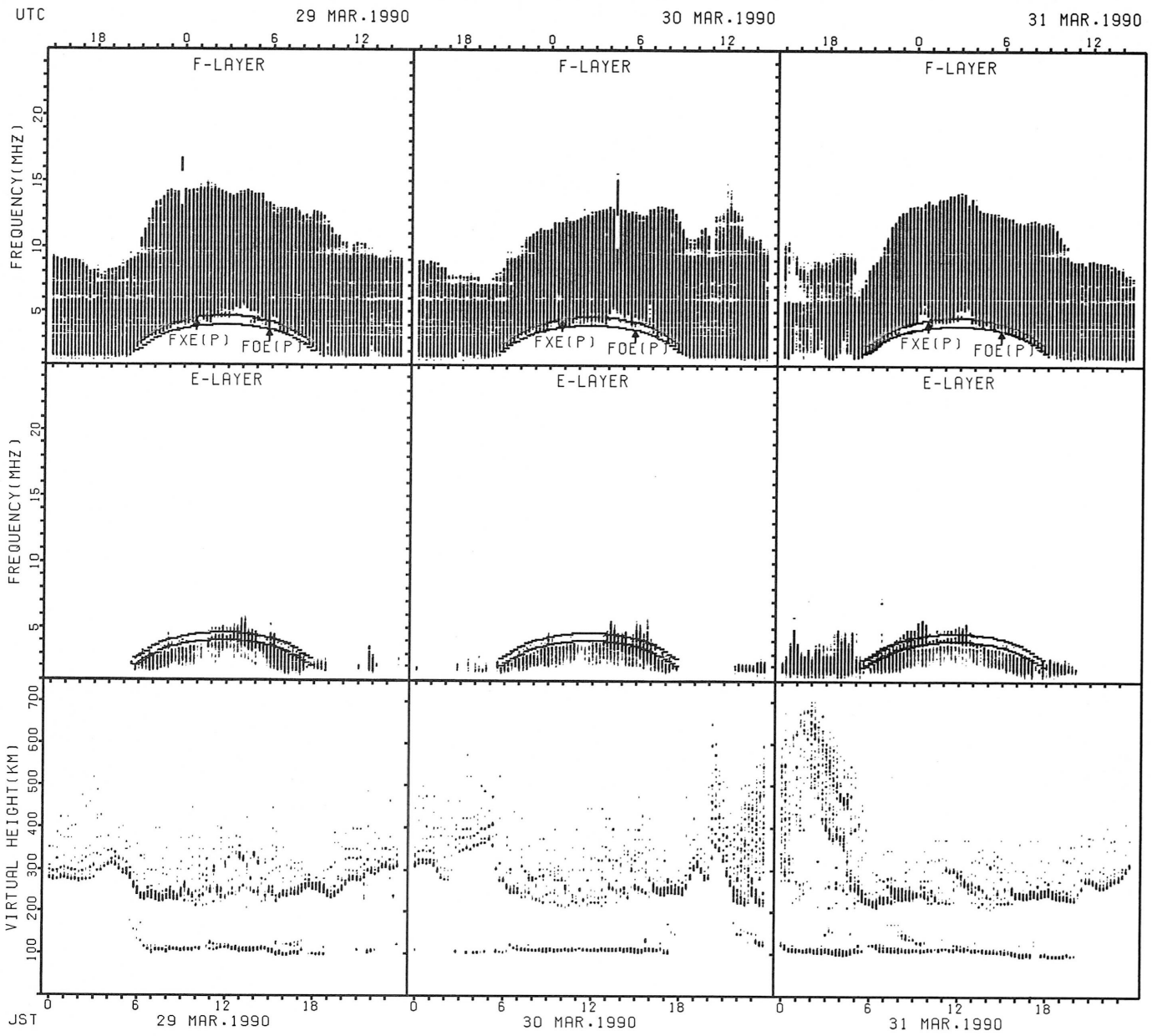
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

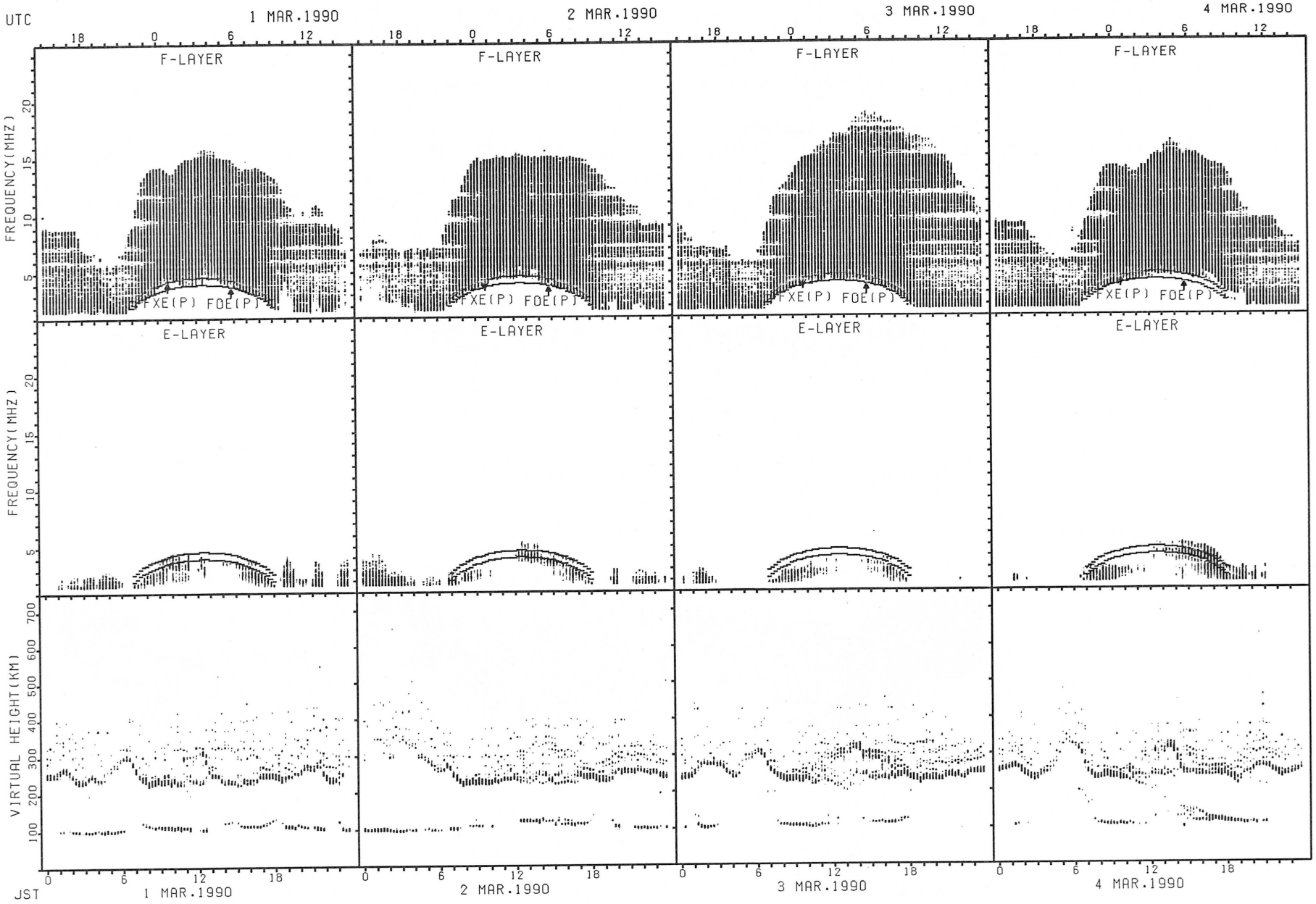


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
25 MAR.1990
26 MAR.1990
27 MAR.1990
28 MAR.1990
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

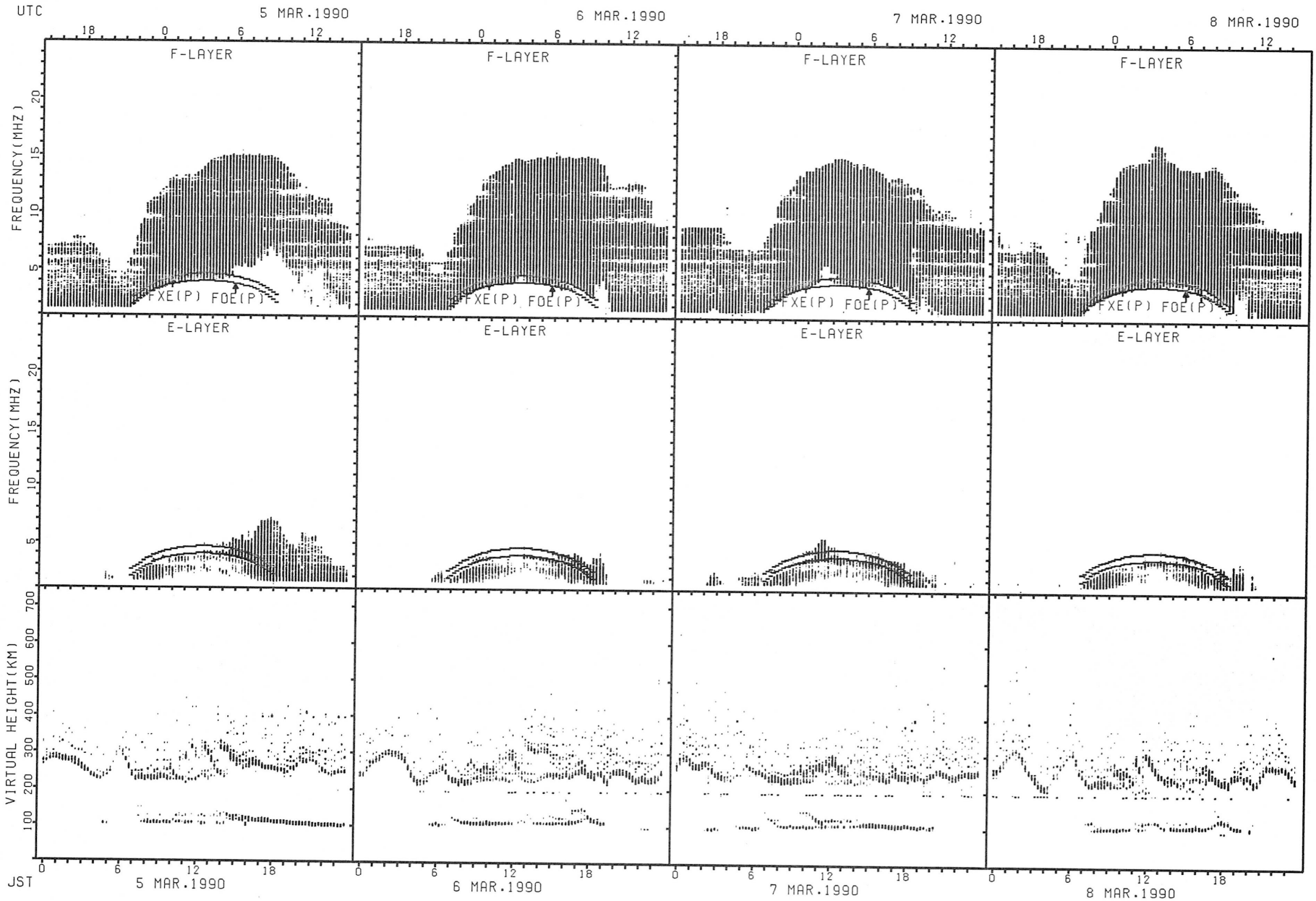

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
29 MAR.1990
30 MAR.1990
31 MAR.1990
F-LAYER
E-LAYER
FREQUENCY(MHZ)
FXE(P)
FOE(P)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA

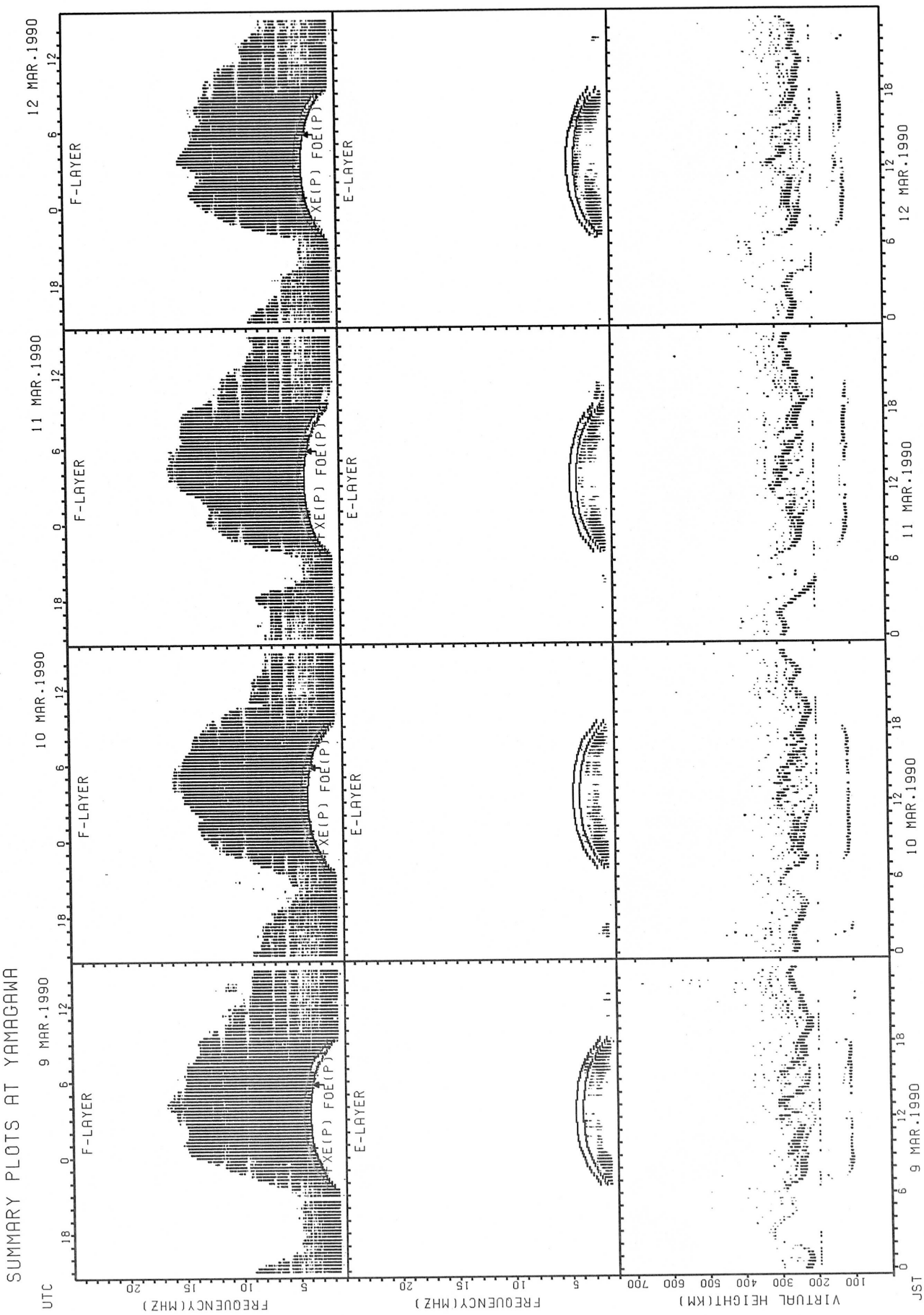


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

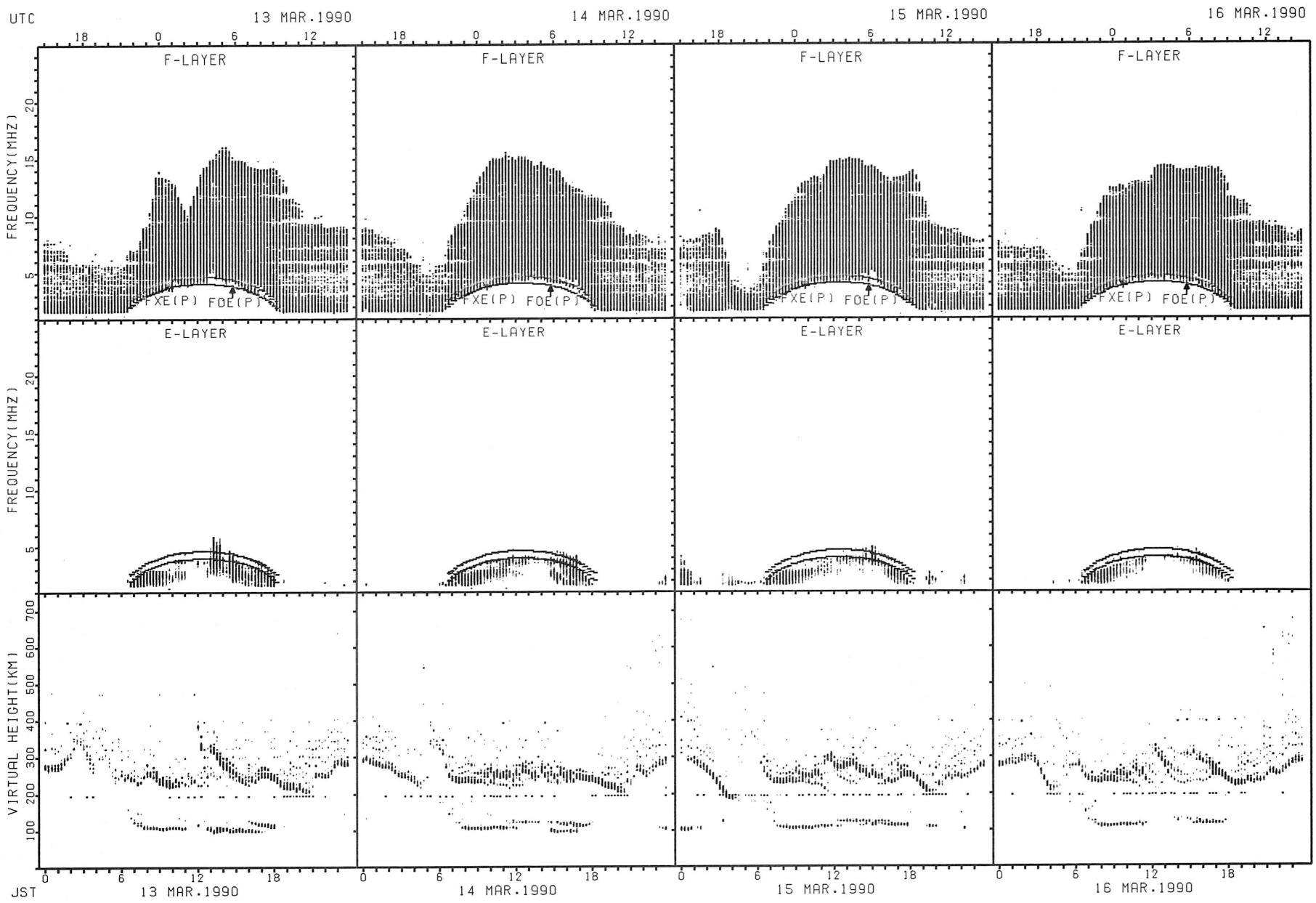
SUMMARY PLOTS AT YAMAGAWA



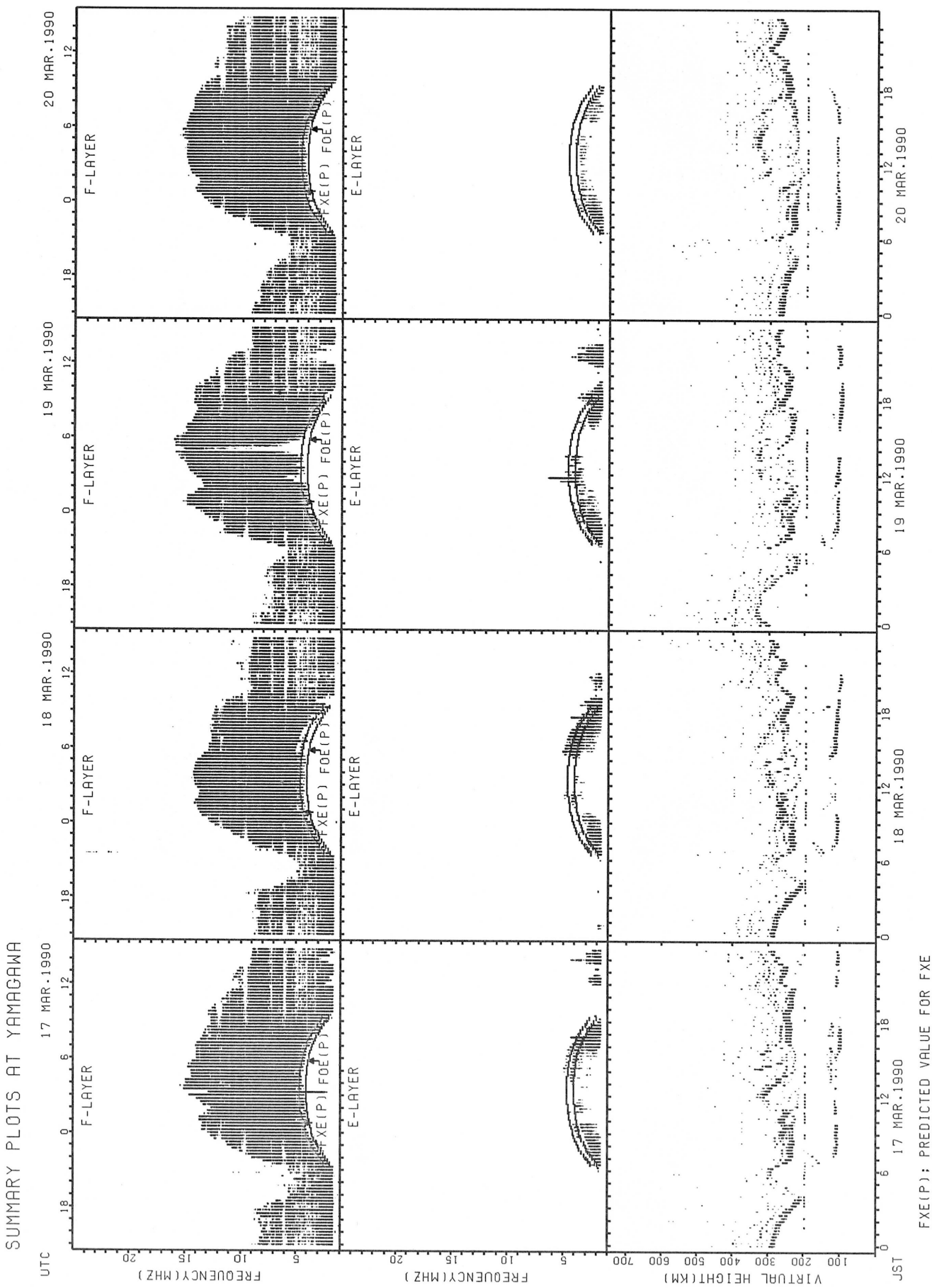
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
9 MAR.1990
10 MAR.1990
11 MAR.1990
12 MAR.1990
UTC
JST
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

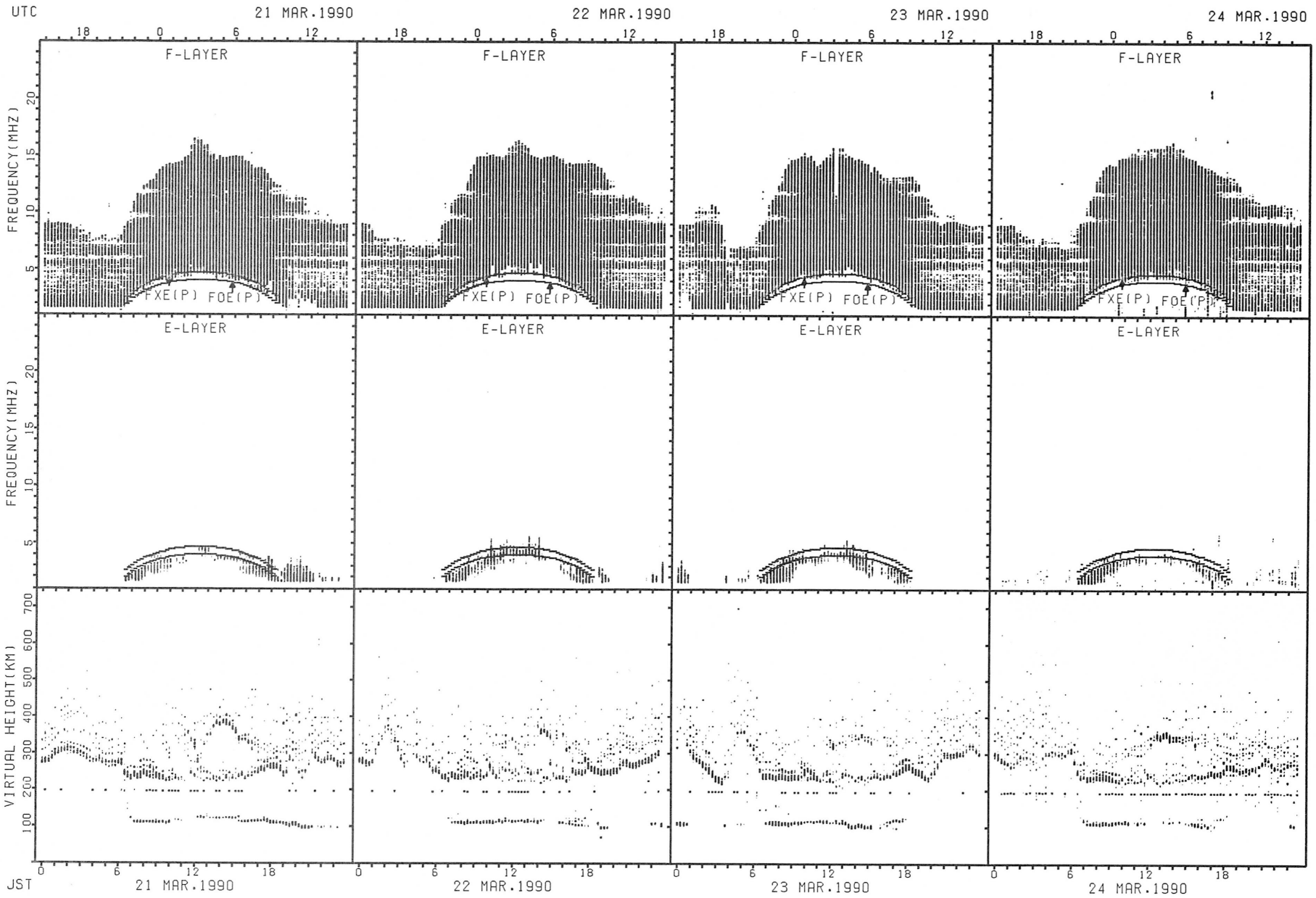
SUMMARY PLOTS AT YAMAGAWA



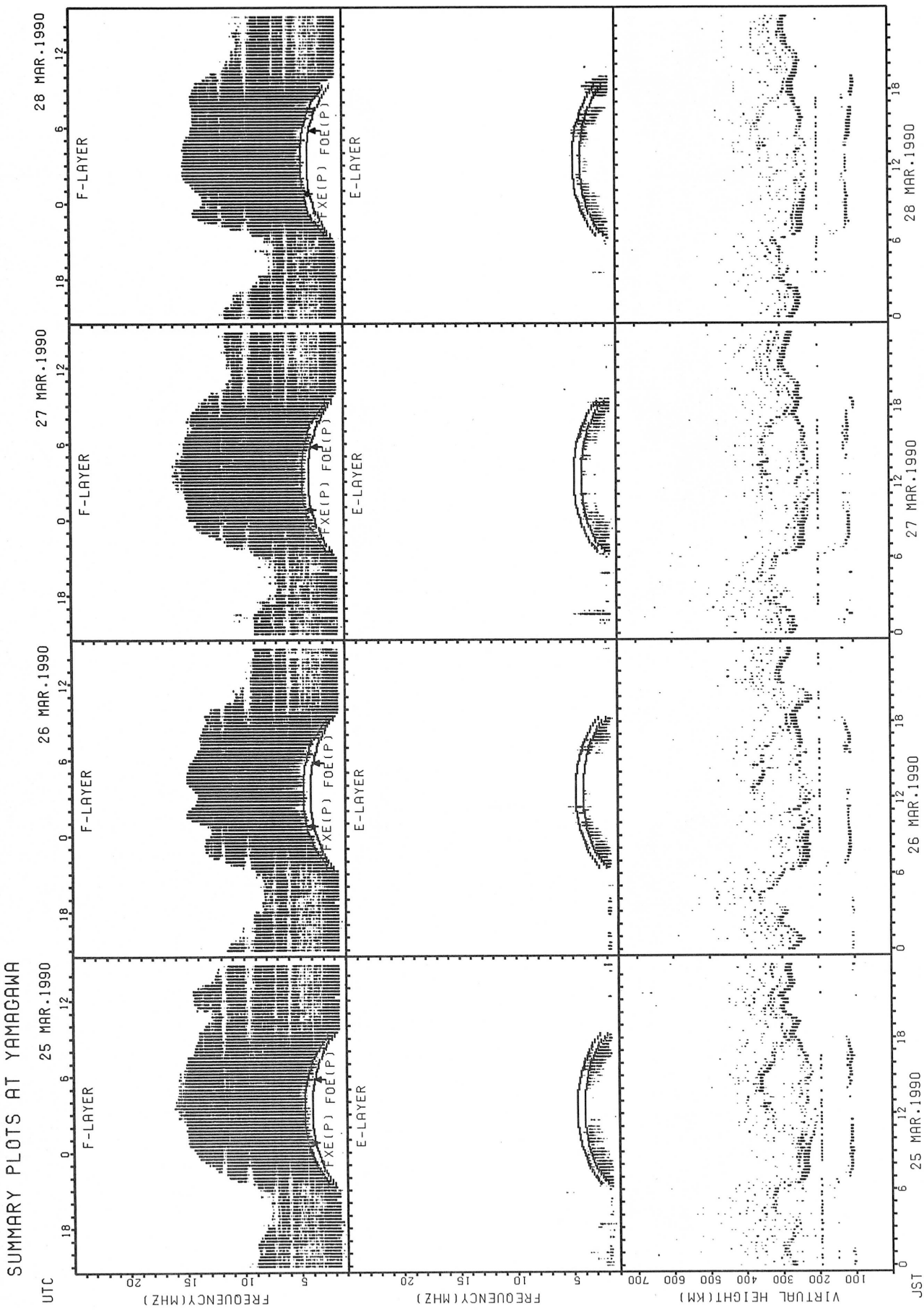
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

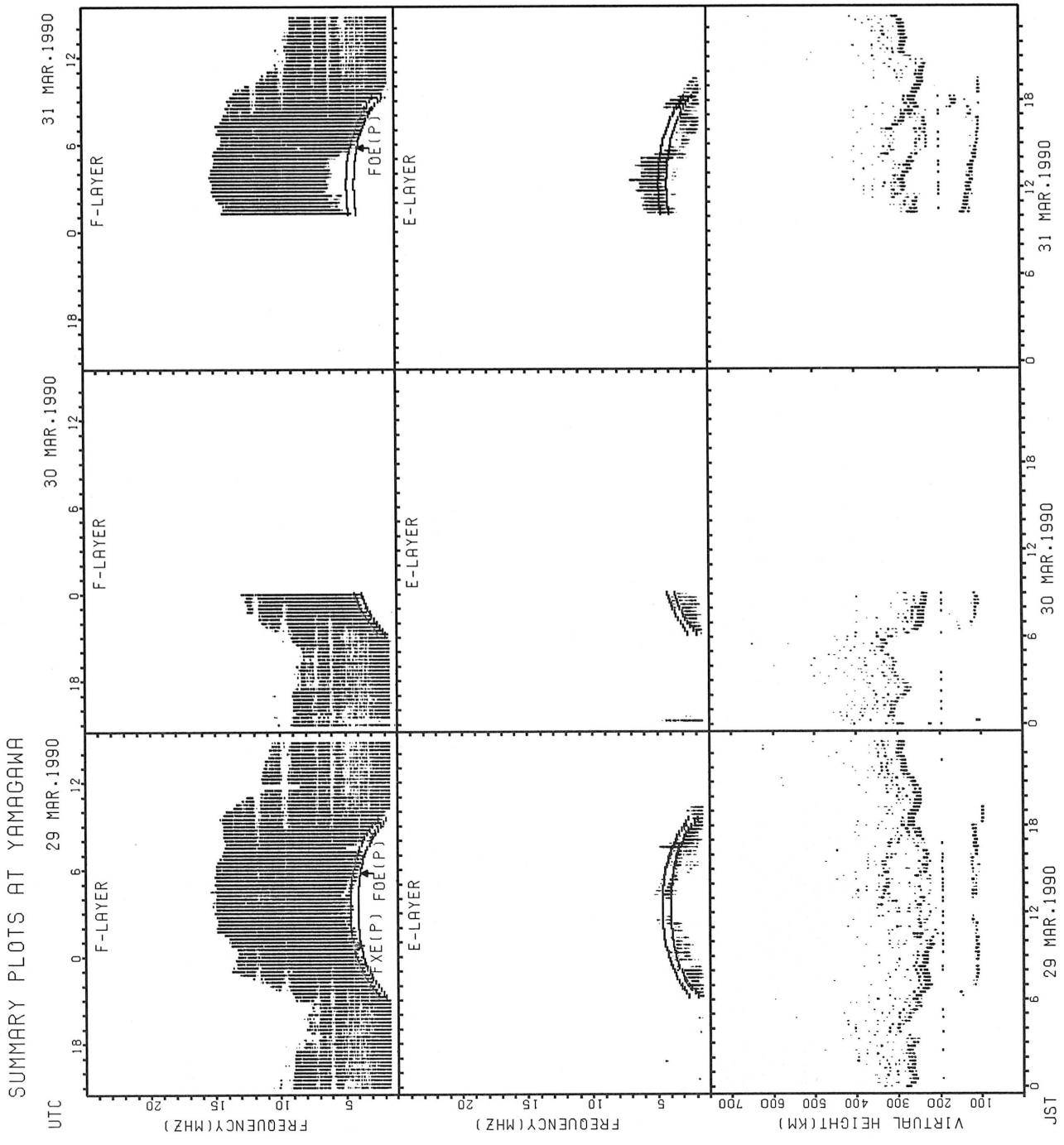

SUMMARY PLOTS AT YAMAGAWA
UTC
17 MAR.1990
18 MAR.1990
19 MAR.1990
20 MAR.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

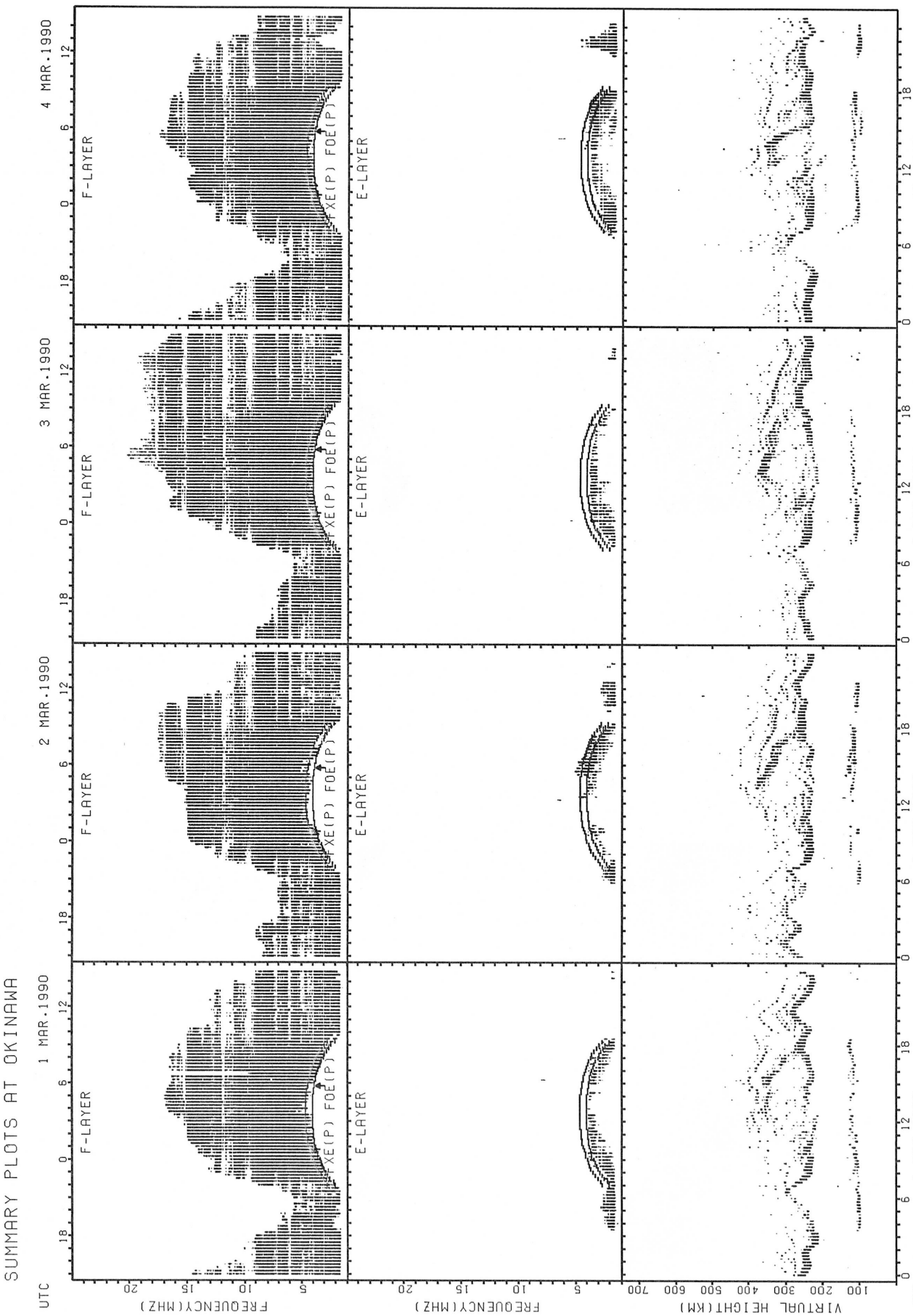
SUMMARY PLOTS AT YAMAGAWA



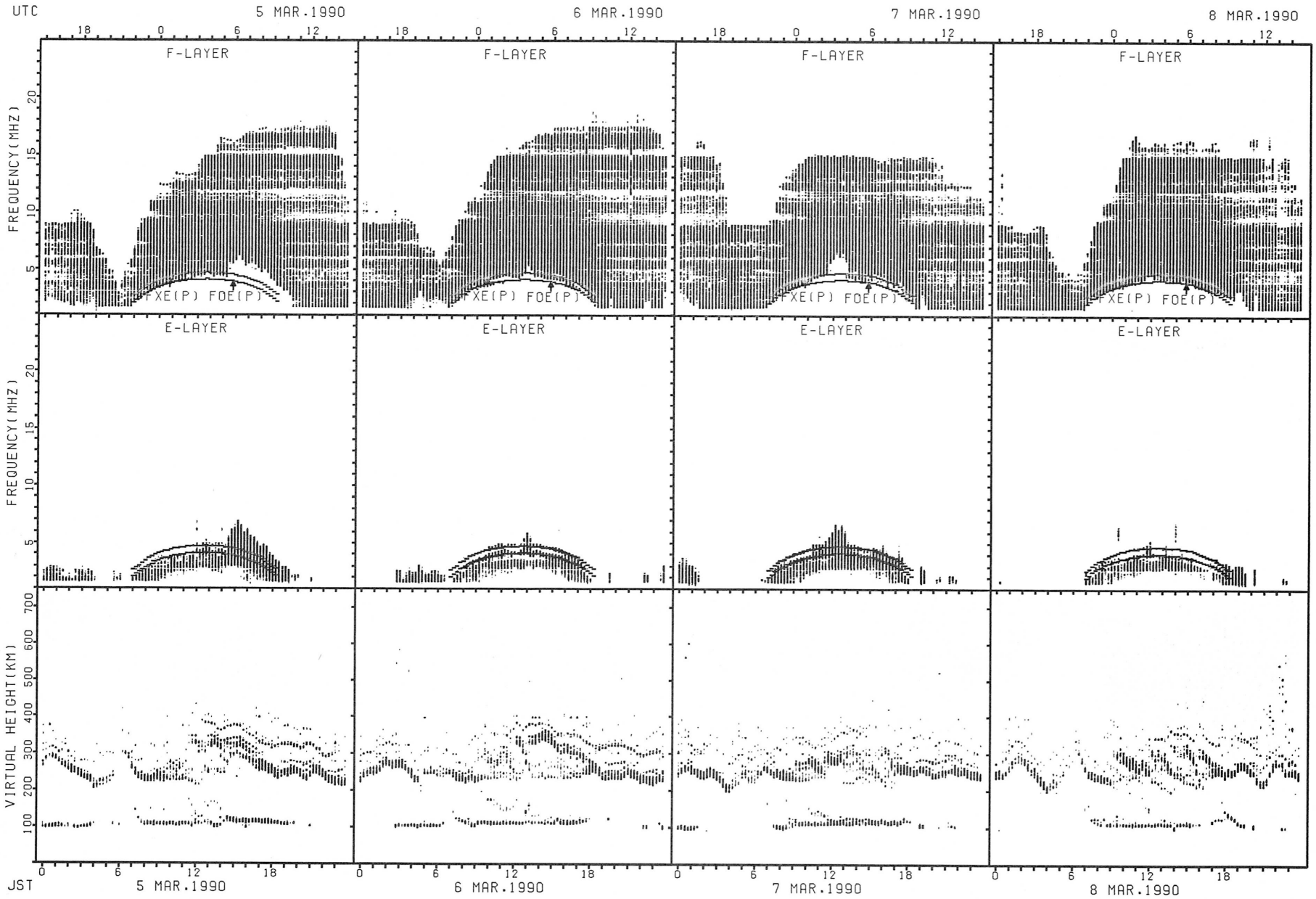
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
25 MAR.1990
26 MAR.1990
27 MAR.1990
28 MAR.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
25 MAR.1990
26 MAR.1990
27 MAR.1990
28 MAR.1990
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

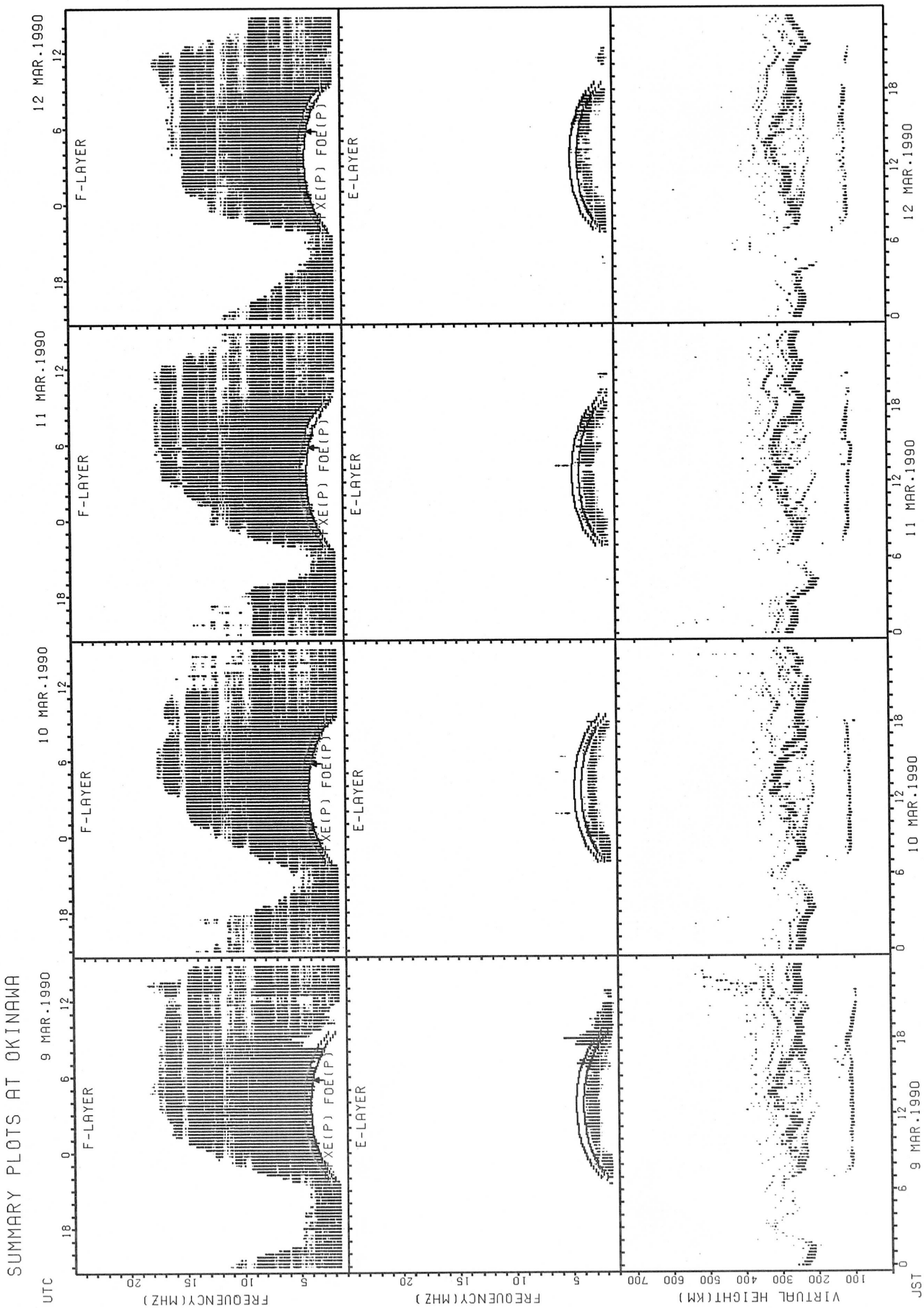

SUMMARY PLOTS AT YAMAGAWA
UTC
29 MAR.1990
30 MAR.1990
31 MAR.1990
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P) FOE(P)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
1 MAR.1990
2 MAR.1990
3 MAR.1990
4 MAR.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

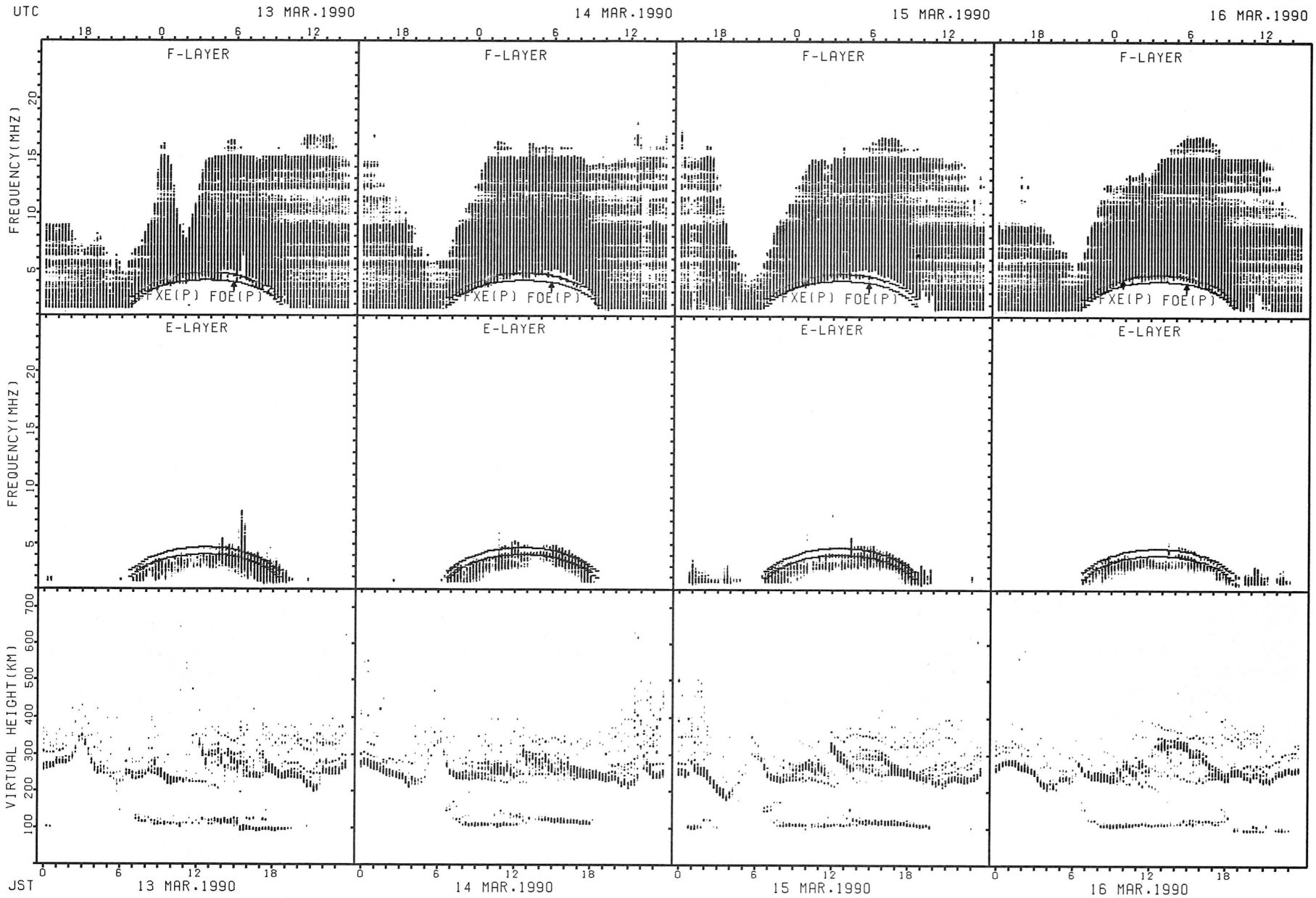
SUMMARY PLOTS AT OKINAWA



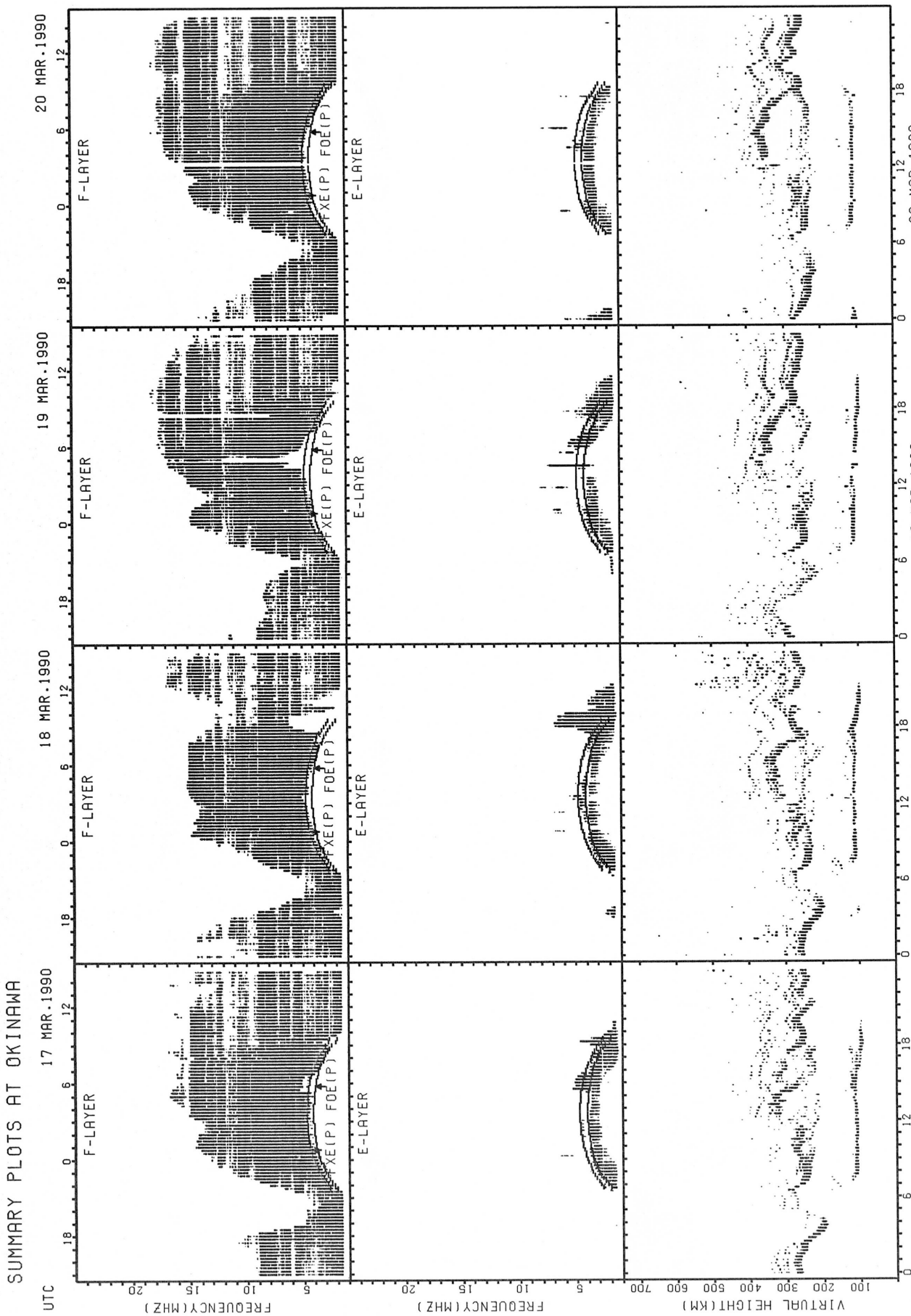
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
9 MAR.1990
10 MAR.1990
11 MAR.1990
12 MAR.1990
UTC
JST
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

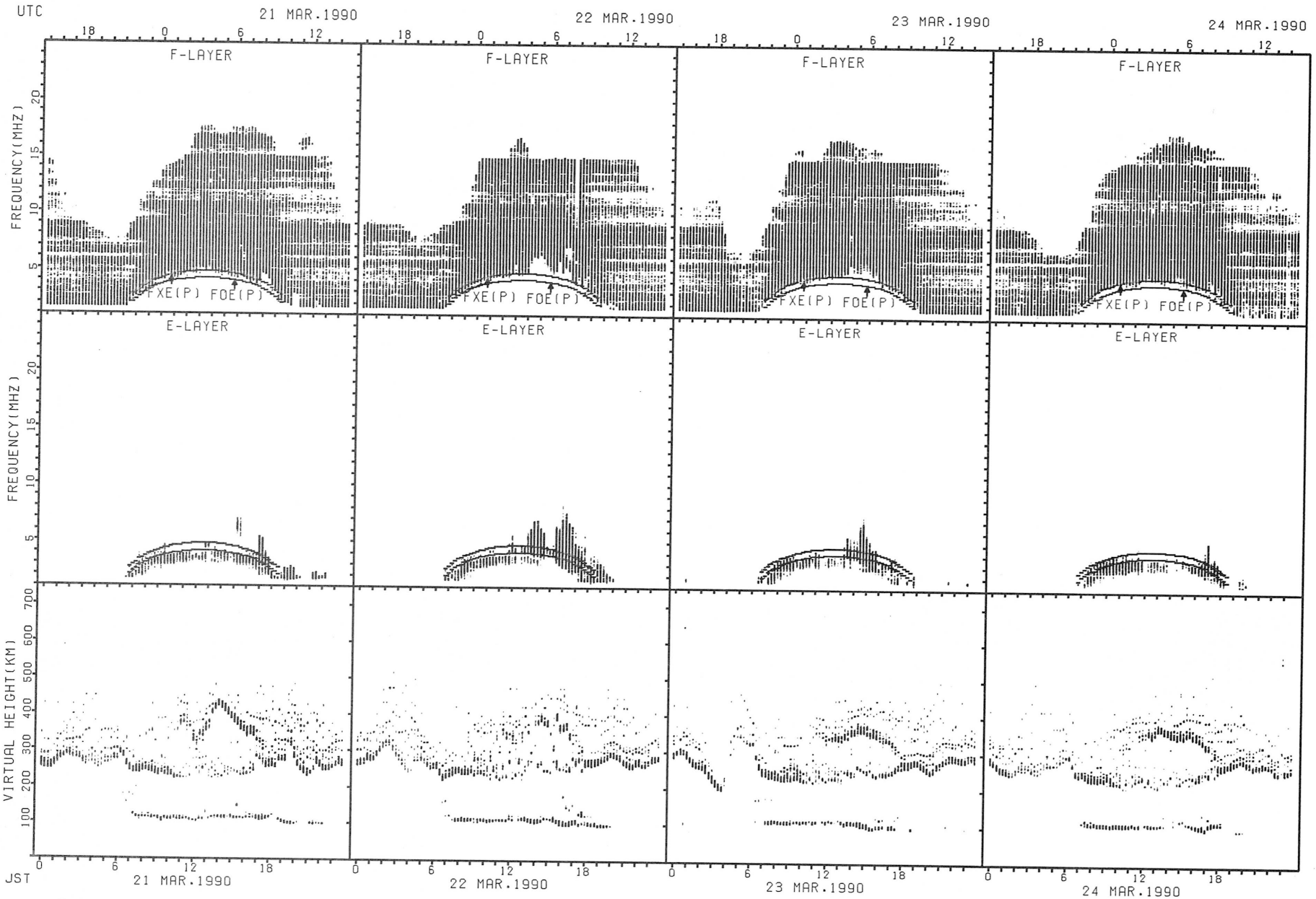
SUMMARY PLOTS AT OKINAWA



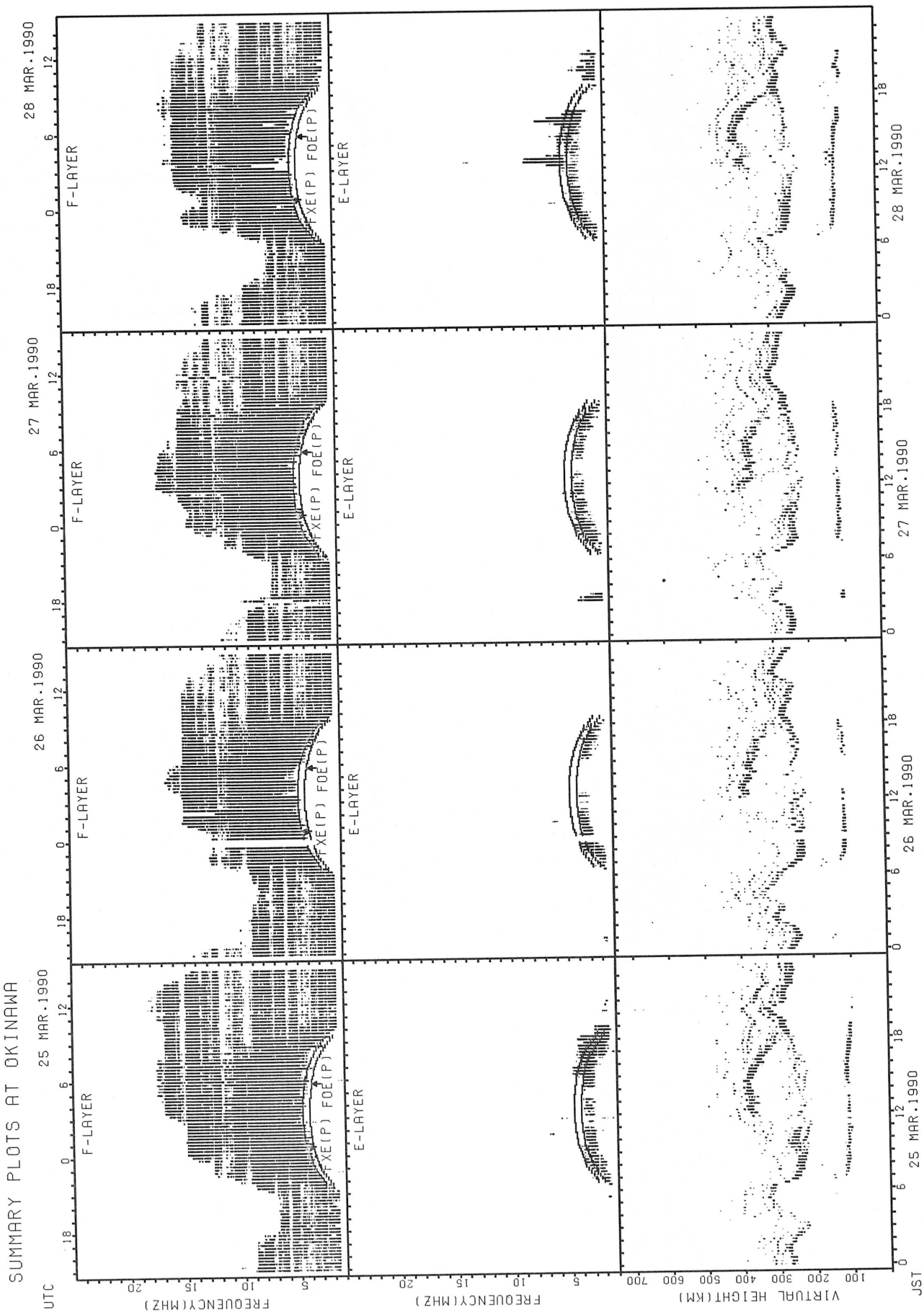
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
17 MAR.1990
18 MAR.1990
19 MAR.1990
20 MAR.1990
UTC
JST
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

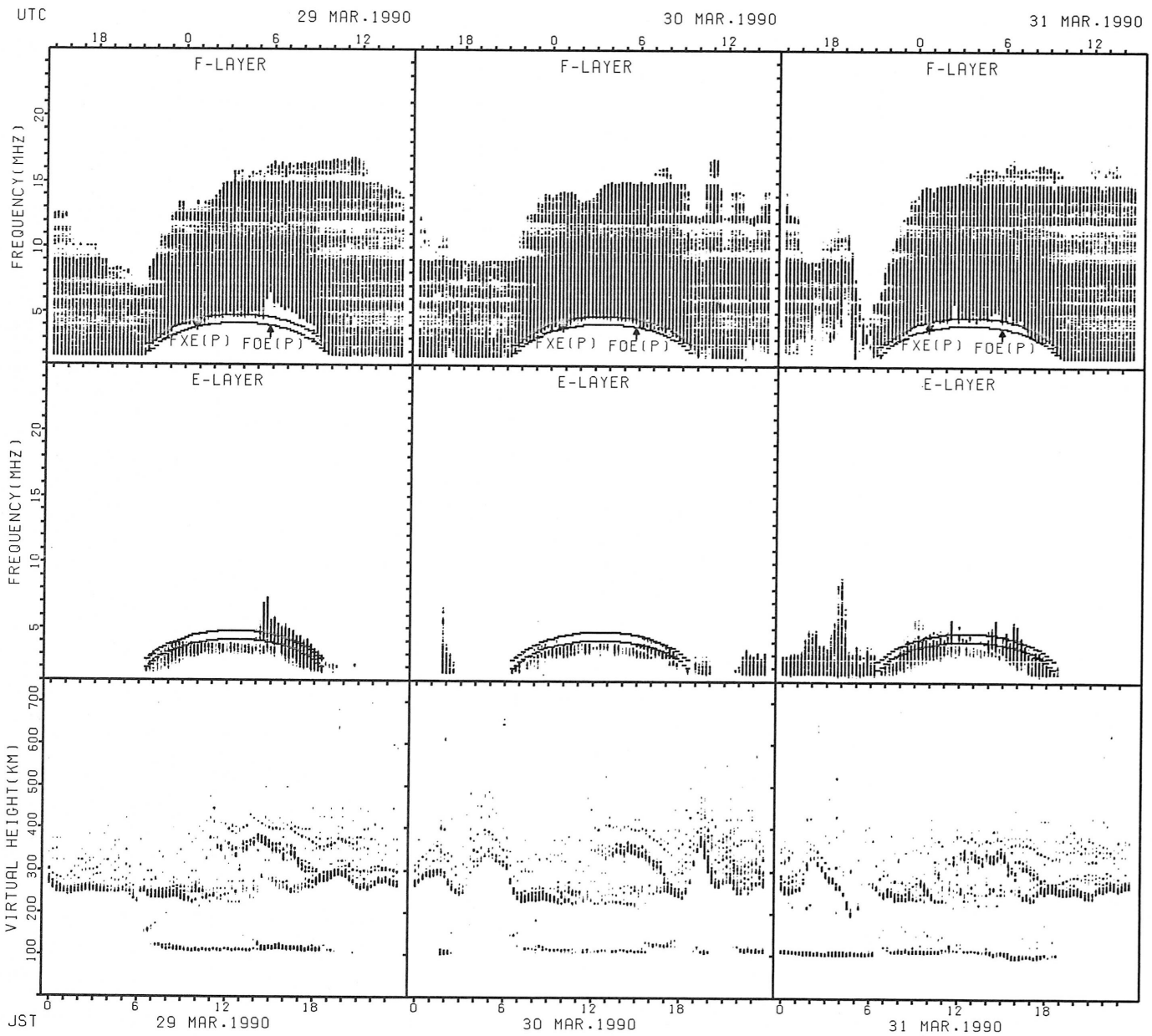
SUMMARY PLOTS AT OKINAWA



FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
25 MAR.1990
26 MAR.1990
27 MAR.1990
28 MAR.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

MONTHLY MEDIANS OF H'F AND H'ES

MAR.1990 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								25	29	29	12				22	31	31	31	30	24	11	10		
MED								252	252	250	241				254	256	260	258	262	288	324	354		
U Q								263	273	264	246				262	270	274	268	274	316	360	374		
L Q								242	232	244	234				248	248	246	246	254	274	306	332		

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																								

H'F STATION AKITA LAT. 39.7N LON. 140.1E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							10	27	30	30	11				18	31	31	31	31	15	10			
MED							281	254	247	246	250				266	270	270	264	270	300	315			
U Q							326	262	262	260	256				276	282	282	276	282	324	332			
L Q							272	248	236	242	242				262	258	260	252	252	288	308			

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																			15					
MED																			103					
U Q																			111					
L Q																			99					

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	12						11	31	31	31	10				16	31	30	31	31	29	23	22	17	19
MED	343						304	252	246	246	255				269	274	272	262	264	296	330	344	338	358
U Q	369						344	262	256	258	262				280	294	286	288	276	309	358	356	353	374
L Q	310						270	244	238	238	242				250	258	252	250	252	279	316	314	318	328

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												12		12	12	15	15	13	19	11				
MED												119		112	114	117	115	113	101	99				
U Q												127		128	125	119	117	118	107	103				
L Q												114		109	111	109	113	104	99	99				

MONTHLY MEDIANS OF H'F AND H'ES

MAR.1990 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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	24	15	16	11				29	31	29	26		16	15		31	31	31	31	31	30	29	30	22
MED	317	332	327	280				272	244	244	248		256	258		278	284	266	258	270	292	318	308	316
U Q	348	356	348	324				281	256	254	256		272	270		306	320	298	274	286	302	333	328	330
L Q	297	306	307	274				254	238	238	240		250	248		256	260	254	246	256	270	300	290	290

H'ES

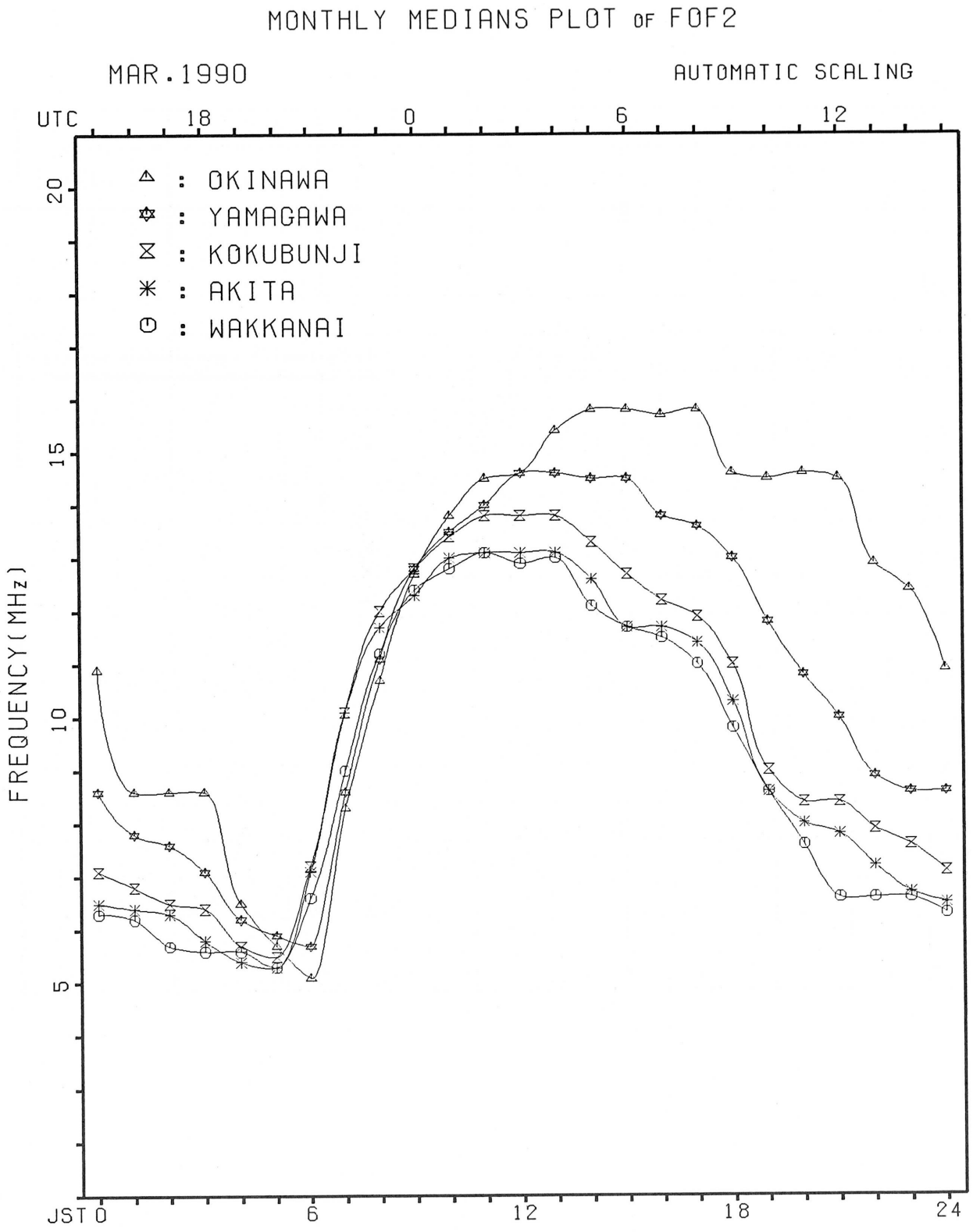
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								12								11	19	13	14	15	11			
MED								159								121	117	117	113	111	109			
U Q								167								131	119	128	129	113	115			
L Q								150								115	115	113	111	99	107			

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	29	24	21				24	31	29	31	11				28	31	31	31	31	31	31	30	30
MED	292	296	298	270				284	256	254	264	256				340	334	318	268	274	286	286	285	282
U Q	310	317	323	306				305	266	266	288	258				357	354	340	288	296	310	316	304	306
L Q	270	266	276	246				264	242	245	254	248				290	292	268	256	260	268	262	270	270

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT															12	16	16	18	16	17				
MED															116	118	116	115	115	107				
U Q															122	119	119	119	118	111				
L Q															114	110	111	115	102	100				


MONTHLY MEDIANS PLOT OF FOF2
MAR.1990
AUTOMATIC SCALING
UTC
18
0
6
12
△ : OKINAWA
✡ : YAMAGAWA
⧖ : KOKUBUNJI
✳ : AKITA
◷ : WAKKANAI
FREQUENCY(MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA

MAR. 1990 | FXI (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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	85	81	86	67	66	67													118	98	93	90	94	84
2	74	S	74	70	70	75													113	100	91	91	93	97
3	89	79	78	74	67	67													137	117	105	96	91	88
4	83	78	80	64	62	62													112	92	88	81	79	76
5	69	67	68	67	62	58													125	105	99	91	85	76
6	75	68	67	67	67	61													123	105	105	104	93	79
7	74	74	74	67	67	69													108	93	88	89	85	84
8	71	67	70	71	59	56													113	91	89	84	80	82
9	78	62	59	57	58	59													112	86	85	71	71	71
10	69	67	64	62	57	58														90	77	78	79	74
11	69	68	69	73	58	54														87	86	83	77	75
12	76	71	64	61	53	53														93	77	80	77	72
13	73	66	58	61	57	63														97	82	74	74	75
14	72	69	69	65	58	55														91	70	69	64	64
15	65	66	67	72	44	39														102	79	75	74	73
16	67	67	65	64	61	59														91	76	79	75	79
17	78	78	76	72	61	59														100	91	92	86	82
18	81	79	76	76	62	56														91	87	90	84	81
19	77	73	73	74	78	67			119											97	92	94	88	86
20	80	77	76	71	64	59														100	98	90	94	92
21	90	83	81	77	77	79														98	98	86	88	89
22	84	74	72	73	75	76														114	101	97	91	92
23	83	91	90	74	68	68														101	89	92	86	86
24	90	86	79	79	75	81														106	98	99	99	96
25	88	83	84	80	77	78														111	103	107	108	103
26	102	96	87	75	75	77														105	93	91	91	91
27	92	87	77	76	74	73														108	97	99	100	102
28	100	96	85	82	78	80														116	104	103	100	97
29	97	93	88	84	85	89														117	105	105	101	98
30	93	91	82	79	78	78														112	102	150	129	112
31	100	88	92	98	97	66														106	92	92	90	86
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	31			1										9	31	31	31	31	31
MED	80	78	76	72	67	66			119										113	100	92	91	88	84
UQ	90	86	82	76	75	76													123	106	98	96	94	92
LQ	74	68	68	67	60	58													112	92	86	82	79	76

MAR. 1990 | FXI (0.1 MHZ)

IONOSPHERIC DATA

MAR. 1990 | FOF2 (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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	79	75	80	S 61	60	S 61	S 76	114	132	138	140	138	144	140	136	127	125	125	112	92	88	84	88	78
2	68	I S 70	68	64	64	69	77	110	133	141	138	142	145	140	131	128	125	124	107	94	85	85	87	91
3	83	73	72	68	61	61	72	112	132	140	141	148	153	154	S 155	154	148	143	131	111	S 99	90	85	82
4	77	72	S 74	58	56	56	66	100	129	146	135	139	141	145	150	143	133	125	106	86	S 82	75	73	70
5	63	61	62	61	56	52	60	97	115	119	128	133	133	136	140	136	133	130	119	99	93	85	79	70
6	69	62	61	61	61	55	S 62	91	120	123	132	139	138	136	139	138	131	127	117	S 99	S 99	98	87	S 73
7	68	68	68	61	61	S 62	76	104	122	128	134	144	142	143	139	134	126	112	102	87	82	83	79	78
8	65	61	64	65	53	50	59	103	126	131	136	140	144	145	129	123	123	119	107	85	83	78	74	76
9	72	56	53	51	52	53	61	96	123	135	133	136	144	150	140	128	119	114	106	80	79	65	65	S 65
10	63	61	58	56	51	52	66	94	112	133	130	140	147	144	141	140	129	127	109	84	71	72	73	68
11	63	S 62	63	67	52	48	59	96	125	121	123	127	141	141	142	137	131	128	109	81	80	77	71	69
12	70	65	58	55	47	47	53	90	115	123	128	125	135	136	125	119	120	117	105	87	71	75	71	66
13	67	59	52	55	51	57	65	78	98	129	133	131	128	141	146	142	136	129	119	91	76	68	68	69
14	66	63	S 63	59	52	49	59	93	100	130	133	139	147	124	115	118	101	96	99	85	64	63	58	58
15	59	60	61	66	38	33	55	84	103	114	128	136	133	137	134	128	117	113	117	96	73	69	68	67
16	S 61	S 61	59	58	55	53	69	S 99	108	114	123	131	133	137	124	121	124	126	117	86	70	73	69	73
17	72	72	70	66	55	53	71	100	112	121	120	134	134	138	125	120	119	115	109	94	85	86	80	76
18	75	73	70	70	56	50	67	94	112	120	129	138	135	129	122	114	112	115	114	85	81	84	78	S 75
19	71	67	67	68	72	61	72	107	F 110	126	145	136	131	137	136	131	119	107	R 101	91	86	88	81	80
20	74	71	70	65	58	53	S 73	104	115	130	137	134	143	142	139	134	125	117	110	94	92	84	88	86
21	84	77	75	71	71	73	86	115	122	136	138	143	151	140	129	124	120	119	108	92	92	80	82	83
22	78	68	66	67	69	70	88	120	127	146	143	149	151	147	140	138	127	124	123	108	95	91	85	86
23	U S 77	85	84	68	62	62	82	S 99	119	127	136	129	137	129	125	118	113	110	111	95	83	86	80	80
24	84	80	73	73	69	75	93	117	129	140	144	148	146	146	144	131	127	122	115	S 99	92	93	93	90
25	82	77	78	74	71	S 72	89	120	131	141	144	S 151	S 154	150	140	133	120	113	112	105	S 97	S 100	S 102	96
26	S 96	90	81	69	69	71	83	109	S 119	124	137	139	134	135	134	129	123	124	118	S 98	87	85	85	84
27	86	81	71	69	68	67	89	117	141	143	143	148	151	146	145	137	134	130	121	102	91	93	94	S 96
28	94	90	79	76	72	74	88	122	137	136	149	150	148	141	136	129	127	123	122	110	S 98	97	94	91
29	91	87	82	78	78	83	103	130	139	140	144	144	135	139	136	128	125	122	123	111	S 99	S 99	95	92
30	87	85	76	S 73	72	72	86	96	108	110	118	119	123	127	124	121	126	127	109	106	96	S 118	U S 100	F
31	U F 58	U F 51	F	J F 59	U F 53	F 51	80	99	121	128	131	133	138	130	122	120	116	118	116	100	86	86	84	80
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30
MED	72	70	69	66	60	57	72	100	121	130	135	139	141	140	136	129	125	122	112	94	86	85	81	78
UQ	82	77	75	69	69	70	84	113	129	139	140	144	146	144	140	136	128	126	118	100	92	90	88	86
LQ	66	62	62	60	53	52	64	96	112	123	130	134	134	136	127	122	120	115	108	86	80	76	73	70

MAR. 1990 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

MAR. 1990 | FOF1 (0.01 MHZ)

135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											L	L	L		L	L								
2									L		L	L	L	L	L	L								
3											L	L	L	L	L	L								
4												L	L	L	L									
5											L				L									
6											L	L	L		L	L								
7											L	L	L		L									
8									L	L	L	L	L	L	L									
9										L	L	L	L	L	L	L								
10										L	L	L	L	L	L	L	L							
11										L	L	L	L	L	L	L								
12										L	L	L	L	L	L									
13										L	L	L	U L 610	U L 640	L	L								
14										L	L	L	L	L		L								
15										L	L	L	L	L	L	L								
16										L	L	L	L	L	L	L	L							
17										L	L	U L 570	L	L	L	L								
18										L	L	L	L	L	L	L	L							
19									L		L			L	B	L	L							
20										L	L	L	L	L	L	L								
21										L	L	L	L	L	U L 720	L	L							
22											L	L	L	L	L	L		L						
23									L		L	L	L	L	L	L	L							
24										L			U L 780	L	L	L	L							
25										L	L	L	L	L	U L 730	L	L							
26											L	L	L	U L 740	L	L	L							
27									L	L	L	L	L	U L 780	U L 780	L	L							
28									L		L	L		L	L	L	L							
29										L	L	L	L	L 670	U L 730	L								
30									L		L	L	L	L	L	L	L							
31												L	L	L	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												1	2	4	4									
MED												U L 570	U L 695	U L 705	U L 730									
UQ														U L 760	U L 755									
LQ														L 655	U L 725									

MAR. 1990 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

MAR. 1990 | FOE (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B	235	300	340	375	A	A	A	A	A	A	205						
2							B	240	305	340	365	390	395	385	375	355	295	A						
3							B	235	290	335	355	370	375	370	355	340	290	215						
4							B	250	305	335	360	R 380	400	380	360	340	B	A 205						
5							B	235	300	345	355	380	385	385	350	325	280	A						
6							B	H 240	300	335	350	380	350	360	350	335	275	220						
7							B	H 245	305	335	360	365	375	375	365	335	300	A						
8							B	235	290	330	360	375	375	375	355	325	280	A						
9							B	H 235	305	R 330	350	U R 365	375	360	355	335	280	H 220						
10							B	240	305	340	360	R 370	370	365	350	335	R 295	210	B					
11							B	H 240	305	330	R 355	R 380	375	R	360	335	285	215	B					
12							175	H 250	H 295	S 335	350	360	375	375	360	335	295	A	B					
13							165	245	305	330	S 360	A	R	360	350	335	295	220	B					
14							180	270	295	330	U S 355	U S 360	375	A	370	345	290	A	B					
15						U K 120	190	H 275	H 320	340	R 370	370	R	365	A	340	A	A	B					
16							185	H 270	305	350	355	U S 380	S 380	A	360	350	295	A	B					
17							H 195	H 270	310	350	375	385	375	A	370	345	290	225	B					
18							200	H 270	315	350	380	385	380	375	370	A	A	A	B					
19							H 200	H 275	330	355	365	A	385	S	B	370	325	230	B					
20							200	H 275	330	360	380	385	390	390	R 355	360	A	235	B					
21							210	H 280	330	370	R 380	390	405	395	390	365	320	240	B					
22							150	265	325	360	380	390	380	A	A	R 365	310	H 260	B					
23							200	275	335	A	A	A	A	A	390	360	330	255	B					
24							210	H 280	335	360	380	385	R 400	A	390	370	320	H 245	B					
25							210	285	330	360	370	395	A	U S 405	385	U A 360	A	A	B					
26							H 215	280	335	365	R 385	U R 390	A	A	B	U S 390	335	250	B					
27							H 215	290	340	370	400	400	400	395	385	360	315	250	A					
28							215	H 290	R 340	375	385	A	A	A	A	A	315	265	H 175					
29							H 225	285	335	355	U R 385	400	400	A	A	A	320	255	B					
30							215	H 270	330	360	380	395	400	U A 365	A	A	305	H 250	B				3	3
31							195	290	330	355	375	395	385	370	365	340	300	245	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	20	31	31	30	30	26	24	19	23	26	25	21	1					
MED						U K 120	200	270	310	343	368	382	380	375	360	342	295	235	H 175					
UQ							212	H 278	330	360	380	390	398	385	372	360	315	250						
LQ							188	240	305	335	355	370	375	365	355	335	290	220						

MAR. 1990 | FOE (0.01 MHZ)

IONOSPHERIC DATA

MAR. 1990 | FOES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 14	E B 13	E B 13	J A 22	J A 29	J A 21	E B 13	G	G	G 33	41	J A 51	J A 53	J A 48	J A 55	J A 50	J A 52	J A 28	J A 20	J A 30	27	49	42	42
2	J A 37	28	J A 33	J A 27	J A 25	J A 20	E B 15	G 20	G 28	G 32	40	J A 51	42		G	G	52	J A 52	28	20	J A 25	E B 13	E B 13	E B 14	E B 14
3	E B 13	J A 26	J A 35	J A 26	J A 24	J A 21	E B 14	G	G 24	G	G 30	G	G	G	39	G	G	27	J A 23	J A 21	E B 15	E B 14	E B 13	E B 13
4	E B 13	E B 13	E B 13	E B 13	E B 13	E B 13	E B 15	G	G	37	39	G	45	45	42	45	J A 54	J A 41	17	J A 16	30	E B 14	E B 13	E B 13
5	E B 14	E B 14	E B 13	E B 13	E B 13	E B 13	E B 15	G	G	G	G	44	43	41	42	39	43	J A 30	J A 21	J A 15	E B 12	E B 13	E B 14	18
6	E B 13	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	G	G	G	G	41	39	30	G	G	G 20	J A 38	J A 32	J A 33	E B 13	E B 15	E B 15	E B 14
7	E B 13	E B 13	E B 13	E B 15	E B 13	E B 13	E B 15	G	G	37	40	J A 41	42	41	G	G	G	J A 23	J A 21	20	20	J A 25	E B 15	J A 21
8	E B 16	E B 13	E B 13	E B 13	E B 13	E B 14	E B 16	J A 53	G	G	G	G 33	G 36	G 33	42	42	40	J A 28	J A 25	E B 14	E B 13	E B 13	E B 14	E B 13
9	E B 14	E B 13	E B 13	E B 14	E B 13	E B 13	E B 16	G	G	G	G	G	G 28	39	G	35	G	G	21	E B 13	E B 13	23	E B 14	E B 15
10	E B 14	E B 14	E B 13	E B 13	E B 13	E B 13	E B 16	G	G	G	G	G	38	G	G	G	G	G	E B 14	E B 14	E B 14	E B 13	E B 14	E B 13
11	E B 14	E B 13	E B 14	E B 13	E B 13	E B 14	E B 16	G	G	G 28	G 28	G 28	G	G	G	G 19	G	G	17	J A 16	24	E B 13	21	E B 13
12	E B 14	E B 14	E B 13	E B 13	E B 13	E B 13	G	G	G	G	39	J A 42	G	G	39	38	G	22	E B 14	E B 14	E B 13	40	E B 13	E B 14
13	E B 13	E B 13	E B 14	E B 13	E B 13	E B 14	G	27	G	G	G	J A 42	G 34	G	39	36	G	G	E B 14	E B 13	E B 13	20	E B 14	E B 13
14	E B 14	E B 13	E B 14	E B 13	E B 13	E B 14	G	G	G	35	G	G	G	38	G 34	40	33	J A 29	20	J A 18	E B 14	E B 14	E B 14	23
15	25	J A 22	J A 16	E B 12	E B 13	U K 12	G	G	G	G	G 30	G	G	G	39	36	37	27	E B 14	19	21	E B 14	21	E B 15
16	E B 14	J A 17	E B 14	E B 12	E B 14	E B 13	G	G	G	G	38	G	G	38	39	G	G 20	J A 28	J A 32	E B 14	E B 14	E B 15	E B 15	E B 14
17	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G	G	G	G	42	44	J A 43	40	G 20	J A 33	J A 39	19	19	E B 14	24	23	E B 15
18	E B 15	E B 13	E B 13	E B 13	E B 13	E B 15	G	G	G	G	43	G	G	G	G	36	33	27	18	J A 20	J A 19	E B 15	E B 14	E B 15
19	20	E B 13	E B 12	E B 13	E B 13	E B 13	G	G	G	G	J A 47	46	G	E S 46	E B 74	G	G 22	G	E B 16	E B 13	E B 13	E B 13	E B 15	E B 13
20	E B 14	J A 15	J A 22	21	E B 13	E B 13	G	G	G	G	G	G	G	G 39	G	J A 44	J A 36	29	E B 14	18	18	E B 14	E B 14	E B 14
21	E B 14	E B 14	E B 14	E B 14	E B 13	E B 13	G	G	G	G	G	43	44	42	G	G 22	G 20	G 20	J A 24	24	23	E B 13	E B 13	E B 14
22	E B 15	E B 13	E B 13	E B 13	J A 15	E B 13	G	G	G	G	J A 49	49	J A 48	J A 54	J A 51	G 36	G 27	G	E B 16	E B 13	E B 13	E B 13	E B 14	E B 14
23	E B 13	E B 13	J A 22	19	E B 13	E B 13	G	G 26	35	45	J A 50	J A 48	45	40	G 34	G	G	G	21	E B 14	E B 14	E B 14	J A 17	E B 13
24	E B 14	E B 13	E B 14	E B 13	E B 13	E B 13	G	G	G	42	42	43	G	J A 44	G	G 34	G 27	G	E B 17	22	E B 13	E B 14	E B 14	E B 14
25	E B 14	E B 14	E B 13	E B 14	E B 14	E B 15	G	G	G	39	39	G	41	G	G	42	J A 41	J A 47	J A 24	J A 16	E B 14	J A 15	J A 18	E B 14
26	E B 15	E B 16	E B 13	E B 13	E B 13	E B 14	G	G	G	G	G	G	43	43	E B 46	G	G	G	E B 16	J A 16	E B 15	E B 14	J A 29	J A 33
27	J A 19	J A 30	20	E B 14	E B 13	E B 13	G	G	G	G	44	48	G 38	G 30	G 35	G 26	G 20	G 18	J A 33	J A 22	J A 16	E B 13	E B 14	E B 14
28	E B 14	E B 13	E B 13	E B 13	E B 13	J A 14	G	G	G	G	42	46	46	41	J A 48	62	G	G	G 17	21	E B 14	E B 15	E B 15	E B 13
29	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G 23	J A 46	G	G	45	45	J A 52	J A 42	J A 41	G 28	G 20	22	E B 13	E B 13	21	J A 25	E B 14
30	21	E B 13	E B 13	E B 13	J A 19	E B 14	G 20	G	G	G	40	G	G	44	J A 43	J A 49	39	G 20	E B 16	E B 14	E B 13	E B 13	J A 16	J A 15
31	J A 20	J A 37	J A 26	J A 29	J A 35	J A 27		G	37	43	42	43	47	43	G	G	G 23	G 21	J A 18	J A 18	J A 15	E B 15	E B 14	E B 14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G	G	G	38	41	38	39	U 36	36	G 23	22	19	16	E B 14	E B 14	E B 14	E B 14
UQ	E B 15	E B 14	E B 14	E B 14	E B 14	E B 14	E B 15	G	G	G 32	42	44	44	43	42	42	36	J A 28	J A 22	J A 20	17	15	16	E B 15
LQ	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G	G	G	G	G	G	G	G	G	G	G	E B 16	E B 14	E B 13	E B 13	E B 14	E B 13

MAR. 1990 | FOES (0.1 MHZ)

IONOSPHERIC DATA

MAR. 1990 | FBES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 14	E B 13	E B 13	E B 13	17	E B 13	E B 13	G	G	G 32	40	43	40	44	43	38	35	G 19	18	27	23	39	28	21
2	19	22	22	17	20	E B 13	E B 15	G 18	G 25	G 29	39	44	41	G	G	48	45	23	17	19	E B 13	E B 13	E B 14	E B 14
3	E B 13	15	23	16	17	E B 13	E B 14	G	G 23	G	G 29	G	G	G	38	G	G	23	15	17	E B 15	E B 14	E B 13	E B 13
4	E B 13	E B 13	E B 13	E B 13	E B 13	E B 13	E B 15	G	G	36	38	G	44	43	41	44	41	36	15	E B 13	17	E B 14	E B 13	E B 13
5	E B 14	E B 14	E B 13	E B 13	E B 13	E B 13	E B 15	G	G	G	G	42	41	40	40	35	36	28	16	E B 13	E B 12	E B 13	E B 14	E B 13
6	E B 13	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	G	G	G	G	40	38	G 30	G	G	G 19	G 17	22	22	E B 13	E B 15	E B 15	E B 14
7	E B 13	E B 13	E B 13	E B 15	E B 13	E B 13	E B 15	G	G	35	38	39	39	39	G	G	G	22	17	17	E B 15	20	E B 15	E B 14
8	E B 16	E B 13	E B 13	E B 13	E B 13	E B 14	E B 16	G	G	G	G	G 32	G 33	G 31	39	42	37	24	20	E B 14	E B 13	E B 13	E B 14	E B 13
9	E B 14	E B 13	E B 13	E B 14	E B 13	E B 13	E B 16	G	G	G	G	G	G 28	38	G	35	G	G	19	E B 13	E B 13	19	E B 14	E B 15
10	E B 14	E B 14	E B 13	E B 13	E B 13	E B 13	E B 16	G	G	G	G	G	G 28	G	G	G	G	G	E B 14	E B 14	E B 14	E B 13	E B 14	E B 13
11	E B 14	E B 13	E B 14	E B 13	E B 13	E B 14	E B 16	G	G	G 27	27	G 27	G	G	G	G 19	G	G	15	E B 14	E B 14	E B 13	E B 13	E B 13
12	E B 14	E B 14	E B 13	E B 13	E B 13	E B 13	G	G	G	G	G	38	G	G	38	35	G	22	E B 14	E B 14	E B 13	25	E B 13	E B 14
13	E B 13	E B 13	E B 14	E B 13	E B 13	E B 14	G	26	G	G	G	40	U S 33	G	37	35	G	G	E B 14	E B 13	E B 13	E B 13	E B 14	E B 13
14	E B 14	E B 13	E B 14	E B 13	E B 13	E B 14	G	G	G	G 34	G	G	G	G 37	G 33	37	31	27	18	E B 16	E B 14	E B 14	E B 14	E B 13
15	19	E B 13	E B 12	E B 12	E B 13	U K 12	G	G	G	G	G 30	G	G	G	39	35	35	24	E B 14	E B 13	E B 13	E B 14	15	E B 15
16	E B 14	E B 13	E B 14	E B 12	E B 14	E B 13			G	G	38	G	G	G Y 37	38	G	G 20	24	27	E B 14	E B 14	E B 15	E B 15	E B 14
17	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G	G	G	G	42	42	39	39	G 19	G 20	36	17	E B 14	E B 14	17	E B 14	E B 15
18	E B 15	E B 13	E B 13	E B 13	E B 13	E B 15	G	G	G	G	42	G	G	G	G	35	33	25	18	17	E B 14	E B 15	E B 14	E B 15
19	E B 13	E B 13	E B 12	E B 13	E B 13	E B 13	G	G	G	G	41	41	G	E S 46	E B 74	G	G 21	G	E B 16	E B 13	E B 13	E B 13	E B 15	E B 13
20	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G	G	G	G	G	G	G 36	G	G 30	33	28	E B 14	E B 12	E B 13	E B 14	E B 14	E B 14
21	E B 14	E B 14	E B 14	E B 14	E B 13	E B 13	G	G	G	G	G	43	43	42	G	G 22	G 20	G 19	20	20	E B 14	E B 13	E B 13	E B 14
22	E B 15	E B 13	E B 13	E B 13	E B 14	E B 13	G	G	G	G	42	45	44	47	47	G 35	G 27	G	E B 16	E B 13	E B 13	E B 13	E B 14	E B 14
23	E B 13	E B 13	16	E B 12	E B 13	E B 13	G	G 24	35	38	42	42	43	40	G 33	G	G	G	E B 16	E B 14	E B 14	E B 14	E B 14	E B 13
24	E B 14	E B 13	E B 14	E B 13	E B 13	E B 13	G	G	G	37	40	41	G	41	G	G 34	G 25	G	E B 17	E B 13	E B 13	E B 14	E B 14	E B 14
25	E B 14	E B 14	E B 13	E B 14	E B 14	E B 15	G	G	G	38	38	G	41	G	G	39	36	38	18	E B 12	E B 14	E B 13	E B 14	E B 14
26	E B 15	E B 16	E B 13	E B 13	E B 13	E B 14	G	G	G	G	G	G	41	42	E B 46	G	G	G	E B 16	E B 13	E B 15	E B 14	19	16
27	E B 14	20	E B 13	E B 14	E B 13	E B 13	G	G	G	G	42	46	G 37	G 30	G 34	G 25	G 20	G 17	24	E B 13	E B 14	E B 13	E B 14	E B 14
28	E B 14	E B 13	E B 13	E B 13	E B 13	E B 14	G	G	G	G	41	44	45	41	39	57	G	G	G 16	E B 13	E B 14	E B 15	E B 15	E B 13
29	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G 22	G	G	G	43	44	44	39	38	G 21	G 17	19	E B 13	E B 13	E B 15	17	E B 14
30	E B 14	E B 13	E B 13	E B 13	E B 13	E B 14	G 18	G	G	G	39	G	G	40	40	36	G	G 19	E B 16	E B 14	E B 13	E B 13	E B 13	E B 13
31	E B 13	28	18	16	E B 13	E B 13	G	G	36	42	41	42	46	41	G	G	G 22	G 19	17	E B 14	E B 14	E B 15	E B 14	E B 14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G	G	G	G 30	39	37	38	U 35	G 35	G 20	G 19	17	E B 14	E B 14	E B 14	E B 14	E B 14
UQ	E B 14	E B 14	E B 14	E B 14	E B 13	E B 14	E B 15	G	G	G 30	40	42	42	41	39	36	33	24	18	E B 15	E B 14	E B 15	E B 15	E B 14
LQ	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G	G	G	G	G	G	G	G	G	G	G	E B 16	E B 13	E B 13	E B 13	E B 14	E B 13

MAR. 1990 | FBES (0.1 MHZ)

IONOSPHERIC DATA

MAR. 1990 | FMIN (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	13	13	13	13	13	13	16	16	17	21	25	22	27	20	17	13	13	13	13	14	13	13	13
2	13	13	13	13	13	13	15	14	17	17	18	38	21	32	24	21	18	13	13	13	13	13	14	14
3	13	13	14	13	13	13	14	16	15	16	18	20	20	17	20	20	17	13	13	13	15	14	13	13
4	13	13	13	13	13	13	15	13	14	17	17	21	22	26	22	20	18	14	13	13	14	14	13	13
5	14	14	13	13	13	13	15	14	13	17	18	18	18	18	20	16	16	14	12	13	12	13	14	13
6	13	13	13	13	13	13	14	13	17	18	18	21	21	20	20	18	15	13	14	14	13	15	15	14
7	13	13	13	15	13	13	15	15	16	18	19	21	20	21	20	18	17	13	14	14	15	14	15	14
8	16	13	13	13	13	14	16	14	15	17	21	18	22	21	18	16	13	12	15	14	13	13	14	13
9	14	13	13	14	13	13	16	14	15	18	21	24	19	20	21	20	17	14	16	13	13	15	14	15
10	14	14	13	13	13	13	16	13	14	18	19	22	21	24	21	18	16	14	14	14	14	13	14	13
11	14	13	14	13	13	14	16	15	17	18	20	21	21	34	25	14	13	15	13	14	14	13	13	13
12	14	14	13	13	13	13	12	13	16	E S 20	18	21	20	22	21	16	14	14	14	14	13	13	13	14
13	13	13	14	13	13	14	13	17	16	17	20	21	24	18	20	19	18	14	14	13	13	13	14	13
14	14	13	14	13	13	14	13	14	14	16	19	20	21	21	20	21	13	13	14	16	14	14	14	13
15	12	13	12	12	13	12	13	13	16	16	18	19	22	19	21	20	17	15	14	13	13	14	13	15
16	14	13	14	12	14	13	14	15	17	21	21	25	E S 26	22	22	18	14	14	13	14	14	15	15	14
17	14	13	13	13	13	13	14	15	15	17	25	23	22	21	18	14	14	14	13	14	14	13	14	15
18	15	13	13	13	13	15	15	15	15	17	27	26	35	28	21	20	16	14	13	14	14	15	14	15
19	13	13	12	13	13	13	14	16	16	17	17	22	33	E S 46	74	33	18	15	16	13	13	13	15	13
20	14	13	13	13	13	13	15	15	17	20	21	21	28	21	25	21	16	12	14	12	13	14	14	14
21	14	14	14	14	13	13	14	16	19	24	21	26	E S 27	31	21	18	15	14	13	13	14	13	13	14
22	15	13	13	13	14	13	13	14	18	20	E S 28	25	28	25	22	28	17	15	16	13	13	13	14	14
23	13	13	14	12	13	13	15	14	16	20	21	28	27	21	20	22	20	14	16	14	14	14	14	13
24	14	13	14	13	13	13	13	15	17	18	27	28	36	22	24	25	18	16	17	13	13	14	14	14
25	14	14	13	14	14	15	15	14	16	20	23	22	24	22	21	19	17	13	13	12	14	13	14	14
26	15	16	13	13	13	14	15	15	17	21	25	35	E S 28	35	46	E S 31	16	14	16	13	15	14	13	14
27	14	13	13	14	13	13	14	16	16	18	21	E S 26	E S 32	23	22	18	15	13	14	13	14	13	14	14
28	14	13	13	13	13	14	16	17	19	23	27	32	32	27	22	19	18	21	13	13	14	15	15	13
29	14	13	13	13	13	13	16	15	16	19	24	25	33	26	19	17	14	12	17	13	13	15	13	14
30	14	13	13	13	13	14	14	16	19	19	21	28	21	21	26	20	18	14	16	14	13	13	13	13
31	13	13	13	13	13	13	15	16	16	21	20	21	29	24	20	18	14	12	13	14	14	15	14	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	14	13	13	13	13	13	15	15	16	18	21	22	22	22	21	19	16	14	14	13	14	14	14	14
UQ	14	13	14	13	13	14	15	16	17	20	22	26	28	26	22	20	18	14	16	14	14	14	14	14
LQ	13	13	13	13	13	13	14	14	15	17	18	21	21	21	20	18	14	13	13	13	13	13	13	13

MAR. 1990 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

MAR. 1990 | M(3000)F2 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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	270	265	290	275	265	265 S	285 S	300	310	310	295	270	280	275	275	270	275	290	295	280	280	280	295	290
2	255	255 I S	255	250	260	265	290	315	310	305	300	290	280	275	270	275	280	290	285	290	280	275	275	295
3	290	285	285	280	265	270	280	320	315	310	290	290	285	275	285 S	285	280	290	295	285	285 S	285	285	285
4	280	285	300 S	280	250	240	275	315	310	315	295	300	285	285	285	280	290	300	300	285	280 S	285	295	300
5	290	275	280	285	290	275	285	315	320	300	300	290	280	280	285	285	285	300	300	290	285	295	295	285
6	275	275	265	270	290	285	300 S	320	310	310	290	300	285	280	280	290	290	290	295	280 S	285 S	295	300	280 S
7	270	270	270	260	265	270 S	290	310	305	310	300	305	290	285	295	290	295	295	305	285	285	290	295	300
8	270	250	265	295	295	285	275	315	320	320	305	300	295	300	295	290	295	305	310	300	285	280	280	290
9	320	300	265	255	270	275	290	310	320	315	300	290	290	295	290	290	295	300	310	290	305	280	280	280 S
10	290	290	295	285	275	270	300	335	305	315	300	300	295	290	295	300	300	310	310	295	280	285	300	295
11	285	270 S	280	315	295	280	290	310	320	310	305	295	300	295	290	300	300	315	310	290	280	280	280	285
12	300	305	295	285	255	250	275	320	320	315	315	305	290	300	290	290	295	310	305	300	275	290	295	285
13	295	290	255	255	250	270	300	315	295	310	295	275	275	290	290	295	300	305	310	300	290	270	280	270
14	265	270	280 S	295	260	250	275	305	300	300	295	300	310	305	300	315	325	315	315	325	275	280	280	265
15	270	280	290	365	275	270	310	335	320	300	305	300	295	295	295	300	300	300	310	320	285	280	280	285
16	275 S	275 S	270	280	270	285	300	330 S	315	310	305	300	290	295	285	280	295	305	310	305	265	270	265	275
17	280	290	300	305	270	280	305	325	310	310	290	295	285	295	280	285	290	295	300	295	275	295	285	280
18	280	280	295	315	290	275	305	320	310	305	295	285	290	285	285	280	285	290	300	285	255	275	270	260 S
19	255	235	235	240	275	270	295	320	300 F	275	290	280	275	270	280	285	290	280	290 R	280	265	275	280	280
20	280	270	285	290	280	265	305 S	315	300	300	285	280	275	270	270	275	275	280	290	275	270	270	270	270
21	270	255	255	245	250	270	290	300	295	280	275	265	270	265	255	255	265	275	260	270	270	240	255	260
22	280	235	230	245	245	260	295	300	280	285	280	270	270	265	260	270	270	270	280	285	270	265	255	255
23	235 U S	260	290	280	240	240	285	300	290	295	295	275	275	270	270	265	270	275	290	285	245	250	245	235
24	255	250	255	250	245	255	295	295	290	290	275	275	265	260	260	265	265	270	275	275 S	260	265	270	275
25	260	245	250	250	255	255 S	295	295	295	290	275	275 S	265 S	260	260	260	265	265	275	275	260 S	260 S	260 S	255
26	270 S	255	245	230	225	240	265	305	300 S	285	280	270	260	260	260	265	265	275	280	280 S	255	255	255	260
27	275	275	250	240	240	245	280	290	300	290	280	265	270	265	260	265	265	270	280	270	255	260	270	280 S
28	290	280	270	245	245	255	265	285	300	285	280	280	270	265	265	255	265	270	280	280	270	265	265	265
29	270	265	265	245	250	265	290	310	300	295	280	280	275	270	270	270	270	275	280	285	270 S	270	270	260
30	255	250	250	240 S	240	235	260	275	290	280	285	275	275	270	270	270	280	285	290	250	240	260 S	280 U S	F
31	260 U F	260 U F	F	F	275 U F	295 F	325	310	315	305	295	280	285	285	280	285	285	290	295	300	275	275	275	270
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30
MED	275	270	270	272	265	270	290	310	305	305	295	285	280	280	280	280	285	290	295	285	275	275	280	280
UQ	282	280	290	285	275	275	300	320	315	310	300	300	290	292	290	290	295	300	308	295	282	282	285	285
LQ	268	255	255	245	250	255	280	300	300	290	282	275	275	270	270	270	270	275	282	280	265	265	270	265

MAR. 1990 | M(3000)F2 (0.01)

IONOSPHERIC DATA

MAR. 1990 | M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											L	L	L		L	L								
2									L		L	L	L	L	L	L								
3											L	L	L	L	L	L								
4												L	L	L	L									
5											L				L									
6											L	L	L		L	L								
7											L	L	L		L									
8									L	L	L	L	L	L	L									
9										L	L	L	L	L	L	L								
10										L	L	L	L	L	L	L	L							
11										L	L	L	L	L	L	L								
12										L	L	L	L	L	L									
13										L	L	L	U L 355	U L 330	L	L								
14										L	L	L	L	L		L								
15										L	L	L	L	L	L	L								
16										L	L	L	L	L	L	L	L							
17										L	L	U L 360	L	L	L	L								
18										L	L	L	L	L	L	L	L							
19									L		L			L	B	L	L							
20										L	L	L	L	L	L	L								
21										L	L	L	L	L	U L 325	L	L							
22											L	L	L	L	L	L		L						
23									L		L	L	L	L	L	L	L							
24										L			U L 330	L	L	L	L							
25										L	L	L	L	L	U L 330	L	L							
26											L	L	L	U L 330	L	L	L							
27									L	L	L	L	L	U L 320	U L 320	L	L							
28									L		L	L		L	L	L	L							
29										L	L	L	L	L 335	U L 325	L								
30									L		L	L	L	L	L	L	L							
31												L	L	L	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												1	2	4	4									
MED												U L 360	U L 342	U L 330	U L 325									
UQ														L 332	U L 328									
LQ														U L 325	U L 322									

MAR. 1990 | M(3000)F1 (0.01)

IONOSPHERIC DATA

MAR. 1990 | H'F2 (KM)

135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											295	L	290		305	315 L								
2									255		260	305	285	260	330 L	295 L								
3											305	265	305	310	285	280								
4												260	310	280	295									
5											235 H				305									
6											285 L	270	295		285	275								
7											260	275	260		265									
8									245	235	265	260	265	265	250									
9										255	250	305 L	270	275	260 L	305 L								
10										260	255	270	270	265	280	255	235							
11										245	255	300 L	285	270	270	255								
12										255	255	255	290	260	255									
13										265	240	310 L	285 H	315	280	260								
14										270	260	270	255	245		255								
15										255	250	260	290 L	280	260	250								
16										255	260	275	270 L	270	310 U L	310	280							
17										275	255	275	290	290	260 L	305								
18										260	305	300	285	280	290	260	300 L							
19									300		295 L			340 L	305 E B	310	275							
20										260	305	255	315	300 L	335 L	315								
21										240	320 L	325 L	275	330 L	360	345 L	315 L							
22											260	310	350	340 L	350	310		305						
23									270 L		255	255	320 L	335 U L	335 L	350 L	L							
24										260			340	355	340 L	355	350 L							
25										260	315 L	330 L	340	350 L	355	350	350 L							
26											305	360	360 L	355	360	355	300 L							
27									265	260	260	345	345	355	340	340	310 L							
28									260		305	310		335 L	350	360	305 L							
29										255	310 L	L	310	330	340	310 L								
30									280		280	320 L	L	330	320	L	295							
31												305 L	300	270	325 L	300								
	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	17	28	26	27	27	30	25	11	1						
MED									265	260	260	288	290	300	305	310	300 L	305						
UQ									275	260	305	310 L	312	335	340	340	312 L							
LQ									258	255	255	265	280	270	275	275	288							

MAR. 1990 | H'F2 (KM)

IONOSPHERIC DATA

MAR. 1990 | H'F (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	280	275	245	250	265	310	290	230	225	H 220	220	235	H 210	235	245	240	240	245	225	A 250	275	E A 305	A 275	A 265
2	305	305	A 330	330	335	290	260	225	225	225	220	230	235	230	235	A 255	A 250	240	220	A 250	250	275	275	255
3	240	270	285	265	260	305	290	235	230	235	225	225	H 205	H 220	225	240	235	240	225	225	245	260	265	265
4	270	275	255	245	305	360	295	235	240	235	215	210	235	250	235	240	A 250	235	220	230	250	265	260	255
5	260	280	300	270	235	255	275	220	220	220	210	235	240	250	235	235	250	240	225	220	250	235	245	255
6	270	280	310	295	250	240	255	215	H 220	225	225	235	225	230	225	230	235	245	230	255	275	255	230	250
7	290	305	285	265	285	295	255	240	235	230	225	220	240	230	230	240	235	220	225	255	265	260	255	260
8	280	325	305	250	225	280	290	235	230	230	215	220	205	235	220	230	A 240	235	230	230	260	255	270	270
9	215	240	310	320	305	270	265	230	255	235	230	H 220	210	225	230	225	235	230	230	210	240	260	285	290
10	265	270	265	265	260	310	265	225	230	H 230	230	210	220	225	225	240	235	240	215	210	260	270	260	260
11	280	305	285	240	225	265	270	235	235	220	235	215	210	235	230	230	240	235	210	220	260	270	270	280
12	265	260	260	250	210	350	275	235	235	230	225	225	215	220	235	230	240	240	220	220	240	A 280	260	265
13	265	265	340	330	345	300	255	230	240	215	215	235	230	215	235	235	250	245	225	215	225	250	285	295
14	310	310	290	260	250	325	285	235	230	225	230	H 225	220	240	235	240	240	240	235	215	215	250	265	315
15	320	290	270	210	200	315	250	225	230	225	220	220	H 230	225	250	230	235	240	235	215	230	255	260	270
16	280	300	305	270	240	255	250	235	230	230	220	205	220	230	H 230	225	240	250	235	205	H 250	275	290	295
17	295	275	260	240	220	285	260	235	235	220	225	220	240	235	225	230	235	A 240	235	225	250	250	255	275
18	290	285	260	240	220	265	250	230	235	230	H 220	225	235	220	230	220	H 230	255	245	220	285	270	280	315
19	320	355	335	320	270	H 225	260	245	235	235	H 230	230	240	240	B	250	230	230	240	245	270	270	270	280
20	275	290	270	255	240	255	245	235	230	230	215	225	H 205	230	225	235	A 250	240	240	250	265	285	290	285
21	290	310	320	300	315	280	240	240	240	225	230	230	240	235	230	235	250	260	260	250	240	280	305	290
22	265	320	390	320	320	290	230	230	225	H 235	240	240	H 230	A 245	235	240	245	245	250	235	250	265	290	310
23	340	310	270	230	320	375	255	235	H 225	230	225	225	220	225	215	240	240	250	250	245	265	310	310	345
24	310	305	300	305	290	315	255	235	225	H 220	H 210	H 205	225	220	230	235	245	245	250	255	270	290	280	270
25	285	325	295	285	325	340	260	235	230	220	H 220	210	H 205	235	230	235	235	E A 255	265	260	290	285	300	310
26	275	290	320	320	385	340	255	240	230	220	235	240	H 225	240	B 250	240	245	255	255	230	260	300	320	305
27	275	280	310	325	355	345	245	235	240	230	230	225	H 220	235	235	245	240	250	250	235	265	290	300	280
28	260	260	270	320	340	305	240	235	225	230	210	H 210	A 255	235	225	E A 270	245	255	260	250	255	280	275	290
29	280	280	270	280	310	290	245	235	230	230	210	H 245	H 220	215	H 210	235	240	250	260	240	255	275	295	310
30	315	320	280	350	350	370	275	250	235	230	220	H 225	225	225	225	H 235	240	250	250	310	280	325	230	255
31	H 250	E A 415	A	410	335	255	225	225	240	235	225	230	230	230	H 215	220	240	240	250	240	230	275	260	280
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31
MED	280	290	288	270	285	295	255	235	230	230	225	225	225	230	230	235	240	240	235	235	255	270	275	280
UQ	292	309	310	320	322	320	272	235	235	230	230	230	235	235	235	240	245	250	250	250	265	281	290	295
LQ	265	275	270	250	240	268	250	230	228	222	218	220	218	225	225	230	235	240	225	220	248	260	260	265

MAR. 1990 | H'F (KM)

IONOSPHERIC DATA

MAR. 1990 | H'E (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B 125		115	120	115	A	A	A	A	A	A	A						
2							B E A 135		E A 135	E A 140	E A 125	B	E R 130	120	115	120	120	A						
3							B 125		E A 130	110	E A 130	115	115	115	A 120	115	115	125						
4							B 120		110	110	115	115	115	120	120	115	B	120						
5							B 115		110	110	110	110	115	115	115	110	115	120						
6							B 115		110	110	110	E A 130	110	E A 125	115	110	A 115	A 125						
7							B 120		110	E A 135	E A 140	A 120	115	120	110	120	115	A						
8							B 120		110	110	110	E A 130	E A 140	E A 120	115	A 115	A 110	A						
9							B 115		115	110	110	115	A 120	115	120	115	115	120						
10							B 115		110	115	115	115	A 125	115	115	115	115	120	B					
11							B 115		115	130	E A 120	A 125	115	E B 130	120	115	115	120	B					
12							B 160	115	110	110	E A 140	110	110	120	115	115	115	A	B					
13							E B 160	120	110	110	115	115	A	110	115	120	115	120	B					
14							E B 160	115	110	105	110	115	115	A	E A 130	115	115	A	B					
15							B E B 170	120	110	110	A 120	110	115	115	115	120	115	A	B					
16							E B 165	115	115	115	110	115	110	115	120	115	A 115	A	B					
17							155	115	115	110	115	115	115	A	E A 130	A 115	A 120	A 120	B					
18							E B 160	110	110	110	115	115	B 130	120	115	115	115	120	B					
19							E B 150	115	110	110	110	115	120	B S	B	B 120	A 120	120	B					
20							E B 170	110	110	110	110	110	115	E A 125	110	A 130	A	A 130	B					
21							E B 165	120	115	110	115	115	120	B 125	110	A 120	A 120	A 120	B					
22							E B 150	115	115	115	120	115	120	115	115	E A 135	E A 120	120	B					
23							B 130	E A 140	E A 140	115	110	A	A	110	E A 120	115	115	120	B					
24							B 140	115	110	110	115	115	125	A	115	A 120	A 120	115	B					
25							E B 155	115	110	110	115	110	110	115	110	110	115	A	B					
26							E B 140	115	110	115	115	B 120	115	A	B	120	110	110	B					
27							135	115	110	110	110	115	A 135	A 120	E A 125	A 120	A 115	A 120	A					
28							E B 145	115	115	115	115	A	110	115	A	A	110	120	A					
29							E B 135	A 125	110	110	115	115	115	115	110	A	A 120	A 120	B					
30							E A 150	115	110	110	120	115	115	115	120	115	115	A 120	B				B	B
31							125	115	110	115	115	115	115	115	110	110	A 120	E A 125	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							20	31	31	31	31	27	28	25	27	28	28	22						
MED							E B 152	115	110	110	115	115	115	115	115	115	115	120						
UQ							E B 160	120	114	115	116	115	120	120	118	120	A 120	120						
LQ							E B 140	115	110	110	110	115	115	115	115	115	115	120						

MAR. 1990 | H'E (KM)

IONOSPHERIC DATA

MAR. 1990 | H'ES (KM)

135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	105	100	110	B	G	G	120	E G 200	105	105	105	100	100	95	100	100	110	110	105	105	105
2	100	95	100	105	100	110	B	110	110	105	E G 155	130	135	G	G	120	110	140	115	110	B	B	B	B
3	B	105	105	105	110	110	B	G	110	G	110	G	G	G	E G 210	G	G	125	105	100	B	B	B	B
4	B	B	B	B	B	B	B	G	G	E G 175	E G 160	G	E G 185	E G 165	150	135	115	120	120	115	110	B	B	B
5	B	B	B	B	B	B	B	G	G	G	G	E G 170	E G 160	E G 170	140	130	115	120	110	110	B	B	B	110
6	B	B	B	B	B	B	B	G	G	G	G	E G 160	130	110	G	G	105	105	100	100	B	B	B	B
7	B	B	B	B	B	B	B	G	G	150	140	125	130	140	G	G	G	95	95	115	100	110	B	115
8	B	B	B	B	B	B	B	105	G	G	G	110	110	105	125	115	110	95	100	B	B	B	B	B
9	B	B	B	B	B	B	B	G	G	G	G	G	110	E G 145	G	130	G	G	125	B	B	100	B	B
10	B	B	B	B	B	B	B	G	G	G	G	G	115	G	G	G	G	G	B	B	B	B	B	B
11	B	B	B	B	B	B	B	G	G	105	110	105	G	G	G	105	G	G	115	115	115	B	110	B
12	B	B	B	B	B	B	G	G	G	G	E G 150	125	G	G	135	125	G	115	B	B	B	105	B	B
13	B	B	B	B	B	B	G	E G 165	G	G	G	110	115	G	130	130	G	G	B	B	B	105	B	B
14	B	B	B	B	B	B	G	G	G	E G 165	G	G	G	105	105	130	120	120	110	105	B	B	B	105
15	105	105	110	B	B	B	G	G	G	G	105	G	G	G	115	120	115	120	B	115	110	B	110	B
16	B	110	B	B	B	B	G	G	G	G	135	G	G	120	140	G	110	125	100	B	B	B	B	B
17	B	B	B	B	B	B	G	G	G	G	G	145	135	110	E G 160	105	110	115	120	105	B	105	110	B
18	B	B	B	B	B	B	G	G	G	G	130	G	G	G	G	120	120	115	140	100	115	B	B	B
19	140	B	B	B	B	B	G	G	G	G	130	120	G	S	B	G	110	G	B	B	B	B	B	B
20	B	130	110	110	B	B	G	G	G	G	G	G	G	110	G	110	105	E G 150	B	105	100	B	B	B
21	B	B	B	B	B	B	G	G	G	G	G	130	135	140	G	105	105	105	100	105	100	B	B	B
22	B	B	B	B	110	B	G	G	G	G	130	115	115	110	110	110	110	G	B	B	B	B	B	B
23	B	B	105	115	B	B	G	105	E G 150	115	115	115	115	110	105	G	G	G	100	B	B	B	115	B
24	B	B	B	B	B	B	G	G	G	125	135	130	G	115	G	110	110	G	B	100	B	B	B	B
25	B	B	B	B	B	B	G	G	G	135	135	G	120	G	G	125	120	110	105	105	B	120	115	B
26	B	B	B	B	B	B	G	G	G	G	G	G	120	130	B	G	G	G	B	120	B	B	110	120
27	120	110	110	B	B	B	G	G	G	G	130	120	120	110	110	110	105	110	100	105	120	B	B	B
28	B	B	B	B	B	110	G	G	G	G	130	115	110	110	110	100	G	G	105	100	B	B	B	B
29	B	B	B	B	B	B	G	110	105	G	G	130	120	110	110	110	105	105	110	B	B	115	110	B
30	115	B	B	B	110	B	110	G	G	G	E G 145	G	G	120	115	110	135	110	B	B	B	B	160	155
31	125	110	110	110	105	115	G	G	E G 160	130	135	135	120	120	G	G	105	105	105	100	105	B	B	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	6	7	7	6	6	5	1	5	5	10	19	19	20	21	17	22	21	21	21	20	10	8	9	6
MED	118	110	110	108	108	110	110	108	108	123	132	122	119	110	112	112	110	112	105	105	110	105	110	112
UQ	125	110	110	110	110	110		110	E G U 150	140	138	130	128	125	135	125	115	120	115	112	115	112	115	120
LQ	105	105	105	105	100	110		105	110	115	130	115	115	110	110	110	105	105	100	100	100	105	110	105

MAR. 1990 | H'ES (KM)

IONOSPHERIC DATA

MAR. 1990 | TYPES OF ES | 135° E Mean Time (G.M.T. + 9 h)

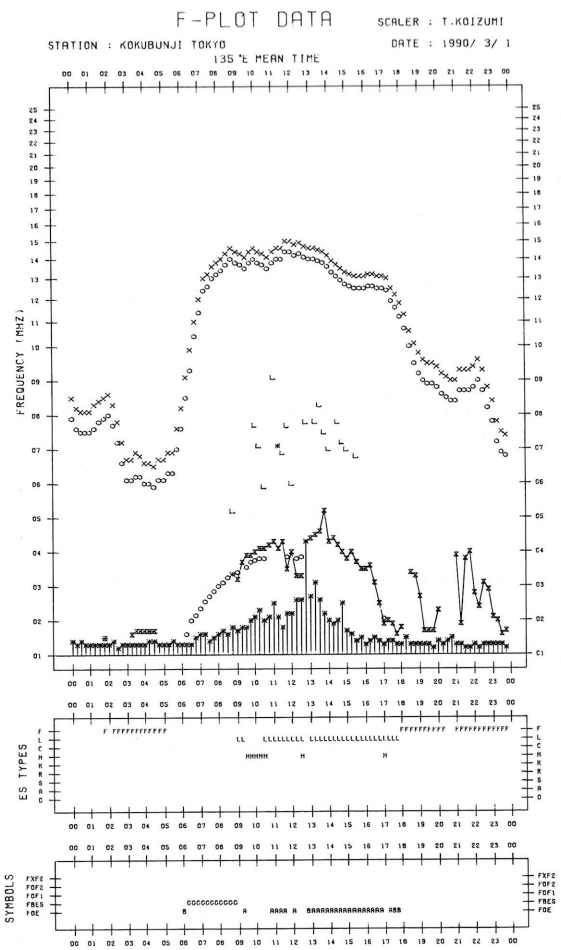
Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

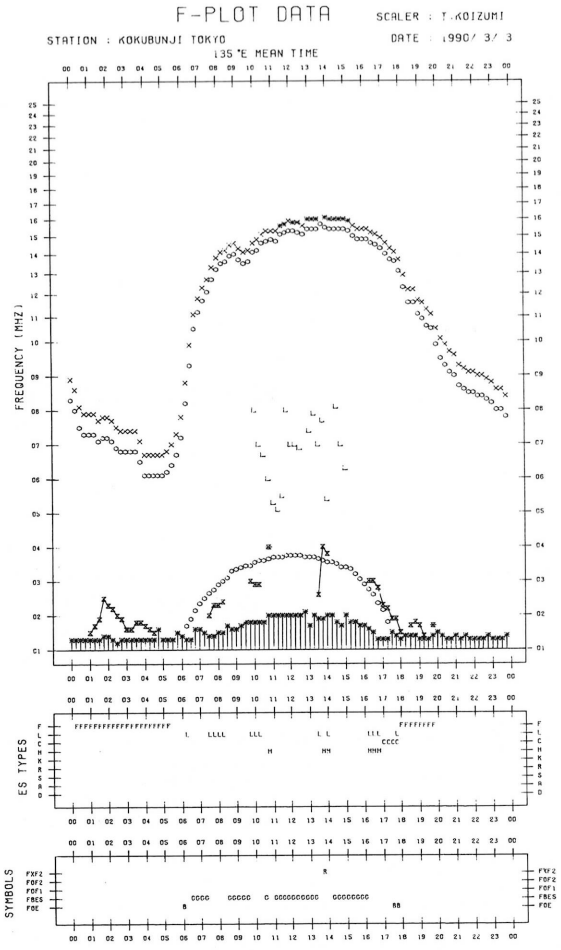
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1				F 1	F 2	F 1				L 1	H 1	L 2	L 1	L 2	L 3	L 2	L 3	LH 21	F 1	FF 41	F 2	F 3	F 5	F 5
2	F 3	F 2	F 4	F 3	F 2	F 2		L 1	L 2	L 2	HL 11	H 1	HL 11			C 2	C 3	HCL 21	FF 11	F 3				
3		F 2	F 2	F 3	F 2	F 1			L 2		L 1				HL 11			C 2	F 1	F 1				
4										H 1	H 1		H 1	H 1	H 1	H 2	C 3	C 4	F 1	F 1	F 3			
5												H 1	H 1	H 1	H 1	H 1	C 2	C 3	F 1	F 1				F 1
6												HL 11	H 1	L 1			L 1	L 2	F 2	F 2				
7										HL 11	HL 11	HL 11	H 1	H 1				L 2	F 2	FF 11	F 1	F 2		F 1
8								L 1				L 1	L 1	L 1	HL 11	CL 21	CL 31	L 3	F 2					
9													L 1	HL 11		H 1			F 1			F 1		
10													L 1											
11										L 1	L 1	L 1				L 1			L 1	F 1	F 2		F 2	
12											HL 11	H 1			H 1	CL 11		L 2				F 4		
13								H 1				C 1	L 1		H 1	H 1						F 2		
14										H 1				L 2	L 1	H 1	CL 11	CL 22	CL 21	F 1				F 2
15	F 4	F 2	F 1			K 1					L 1				C 2	C 1	C 2	C 2		F 1	F 2		F 2	
16		F 1									H 1			C 1	H 1		L 1	CL 21	L 4					
17												H 1	H 1	L 1	HL 11	L 1	L 2	CL 42	CL 21	F 2		F 2	F 2	
18											H 1					L 1	C 2	C 3	HL 11	F 2	F 1			
19	F 2										H 1	C 1					L 1							
20		F 1	F 2	F 2										L 1		L 2	L 2	HL 22		F 1	F 1			
21												H 1	H 1	H 1		L 1	L 1	L 2	L 2	FF 21	F 2			
22					F 1						H 1	C 1	C 1	C 2	C 2	L 1	L 1							
23			F 3	F 1				L 3	HL 12	C 1	C 1	C 1	L 1	C 1	L 1				L 1				F 1	
24										H 1	H 1	H 1		C 1		L 1	L 1			F 2				
25										H 1	H 1		C 1			C 1	C 1	C 3	L 3	F 1		F 1	F 2	
26													L 1	L 1						F 1			F 2	FF 22
27	F 1	F 3	F 2								H 1	C 2	L 1	L 1	L 1	L 1	L 1	L 1	L 2	F 1	F 2			
28						F 2					H 1	C 1	C 1	C 1	L 1	L 5			L 2	F 1				
29								L 1	L 1			H 1	C 1	C 1	C 2	L 2	L 2	L 2	L 1			F 1	F 4	
30	F 2				F 1		L 1				H 1			C 1	C 1	C 2	H 1	L 2					HK 11	HK 11
31	R 1	F 6	F 4	F 2	F 3	F 2			H 1	H 1	H 1	H 1	C 1	C 1			L 2	L 2	L 2	F 2	F 1			
	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																								
UQ																								
LQ																								

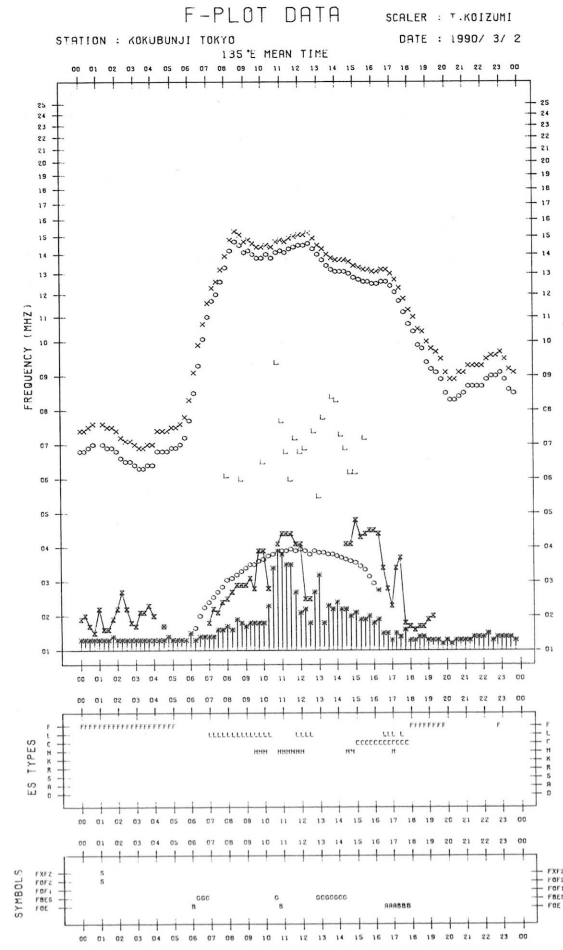
MAR. 1990 | TYPES OF ES

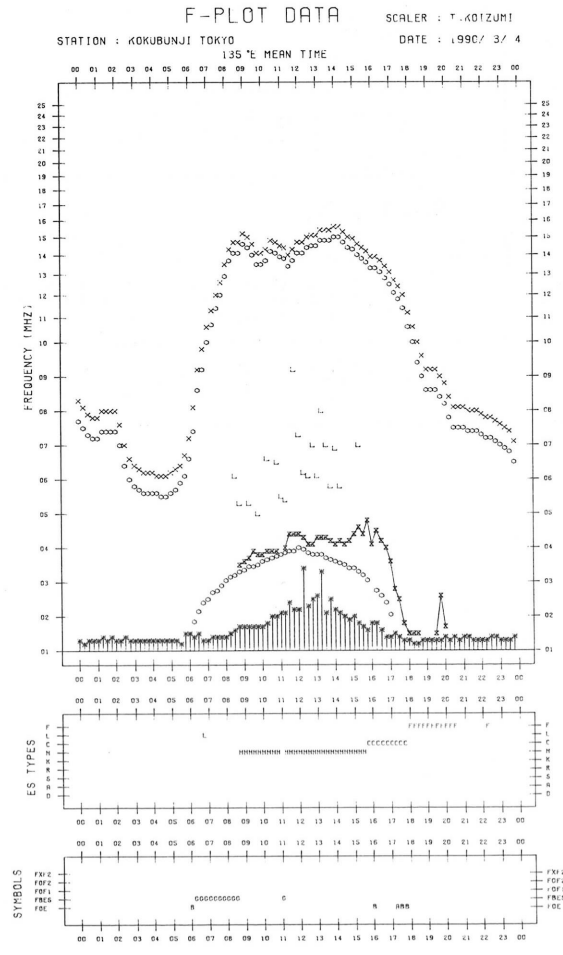
f-PLOTS OF IONOSPHERIC DATA

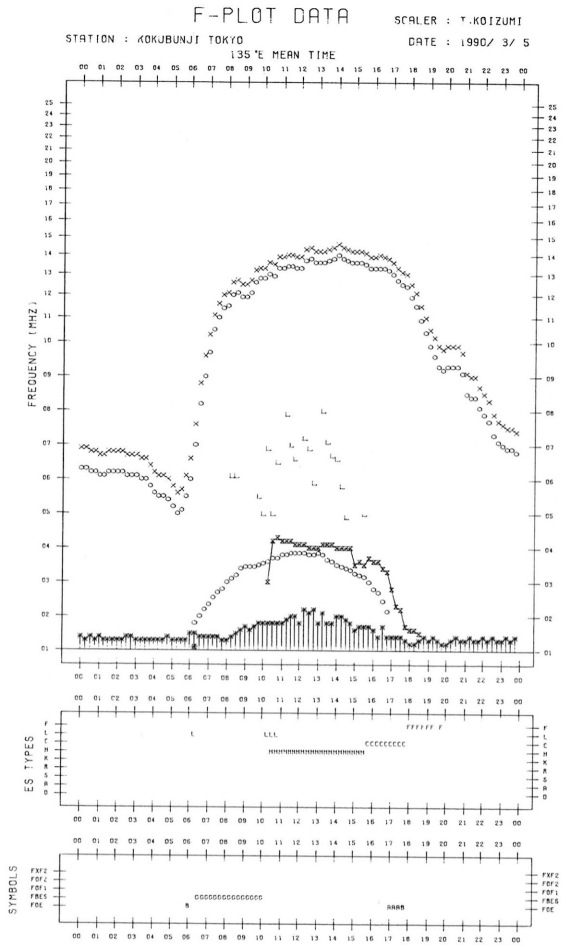
KEY OF F-PLOT	
!	SPREAD
○	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑, Y	FMIN
∧	GREATER THAN
∨	LESS THAN

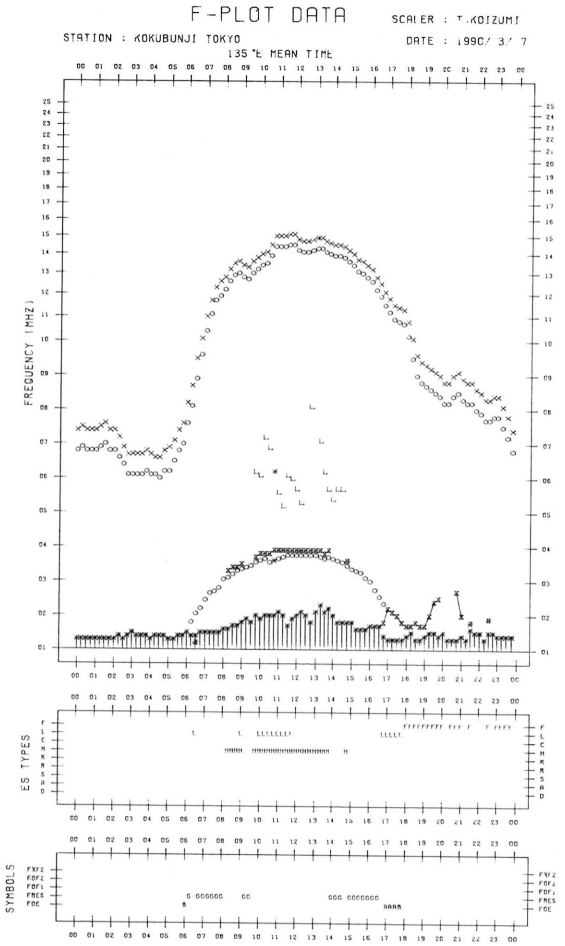

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/ 1
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

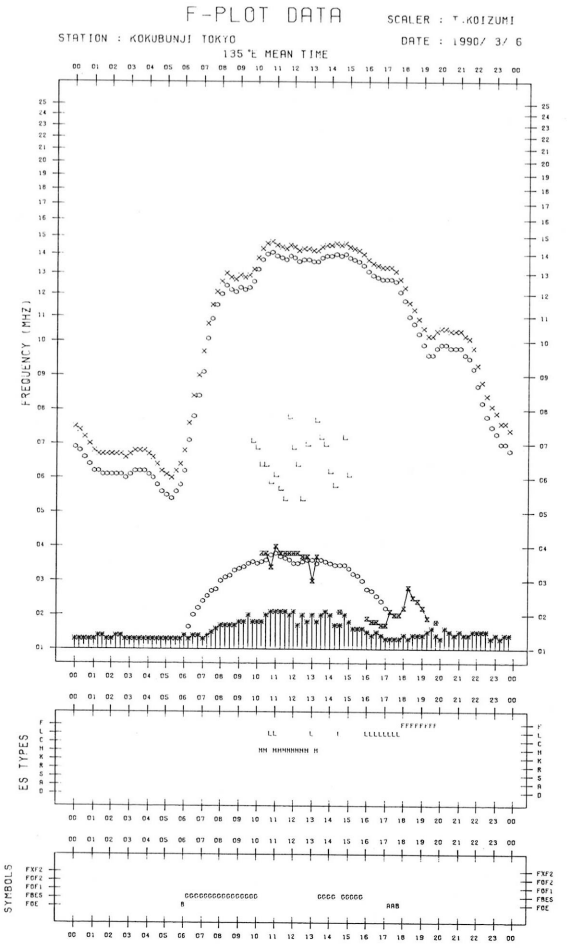

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/ 3
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

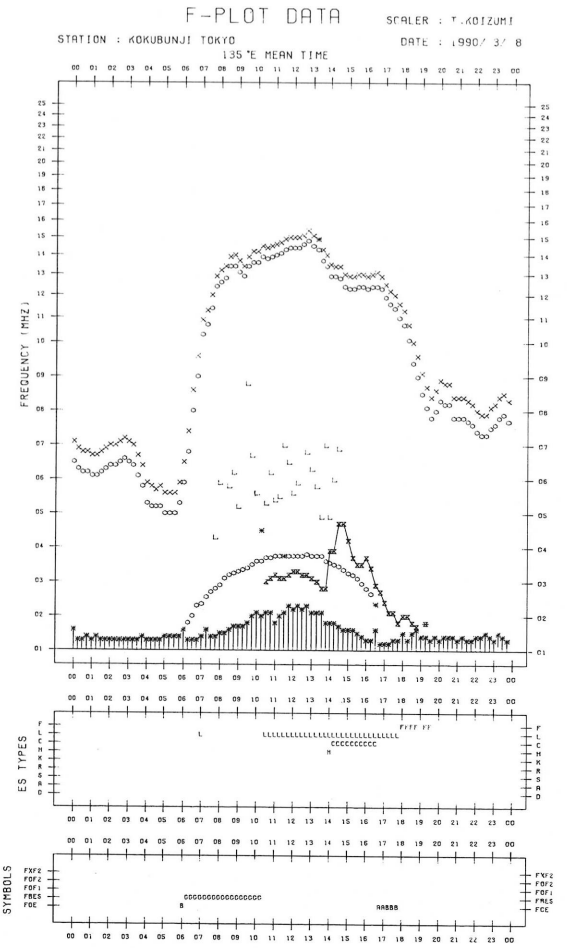

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/ 2
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

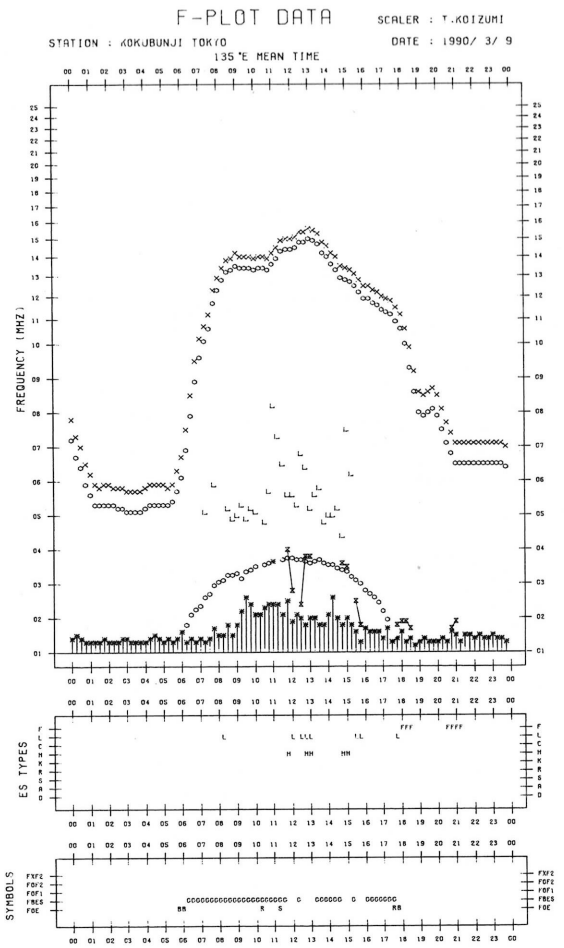

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/ 4
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

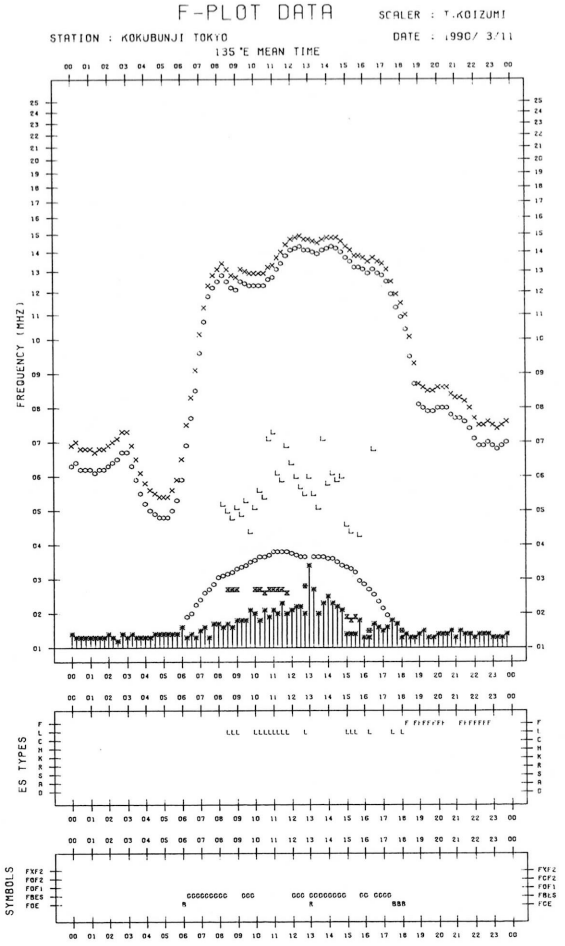

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/ 5
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FMES
FDE

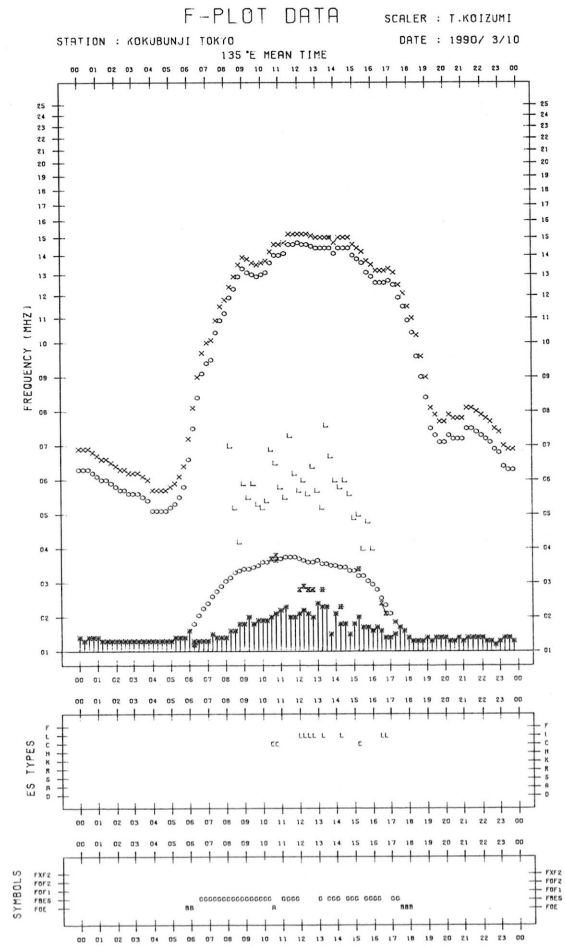

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/ 7
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FMES
FDE

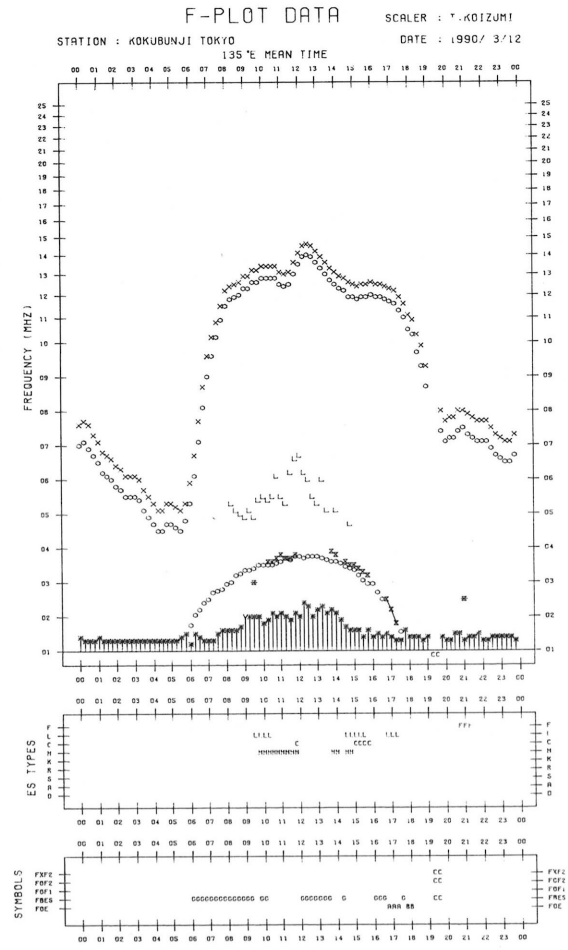

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/ 6
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FMES
FDE

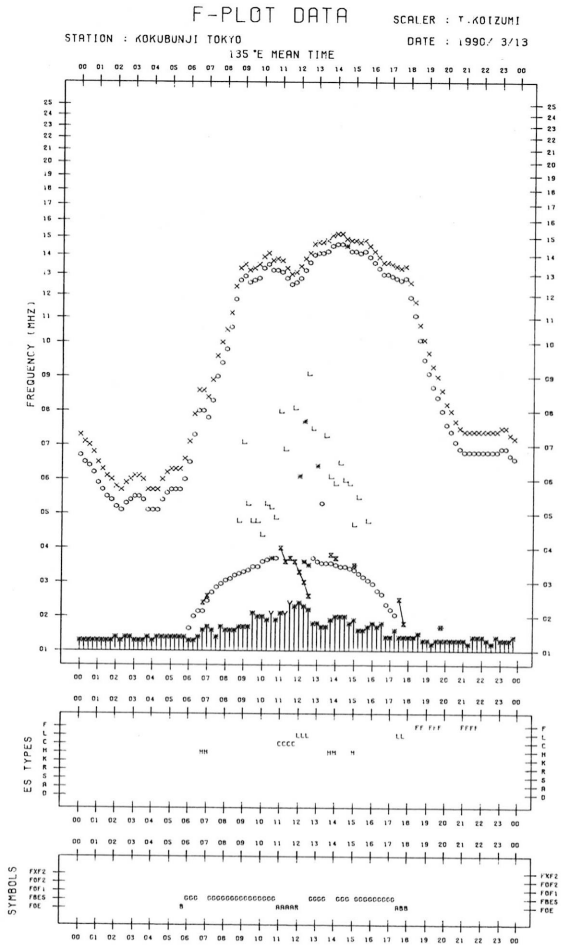

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/ 8
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FMES
FDE

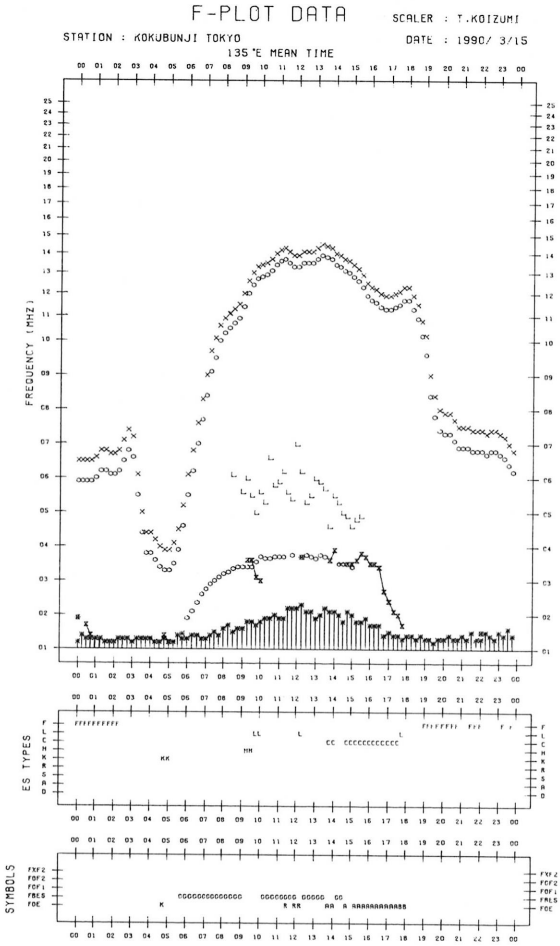

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/ 9
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

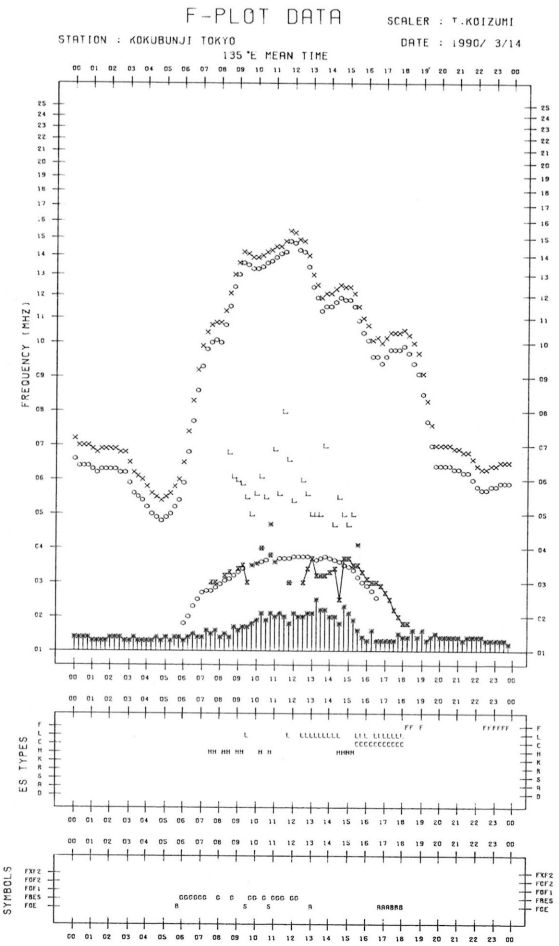

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/11
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

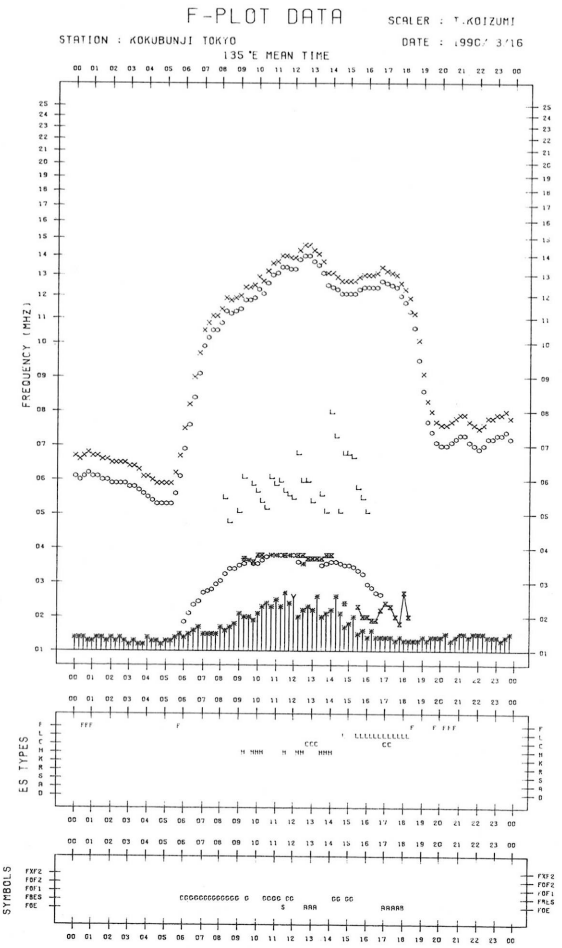

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/10
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

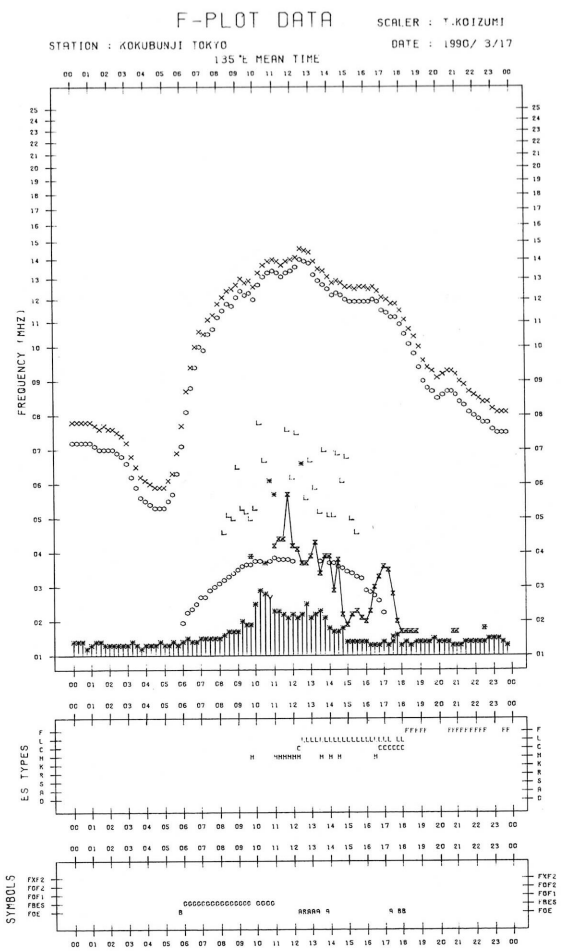

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/12
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

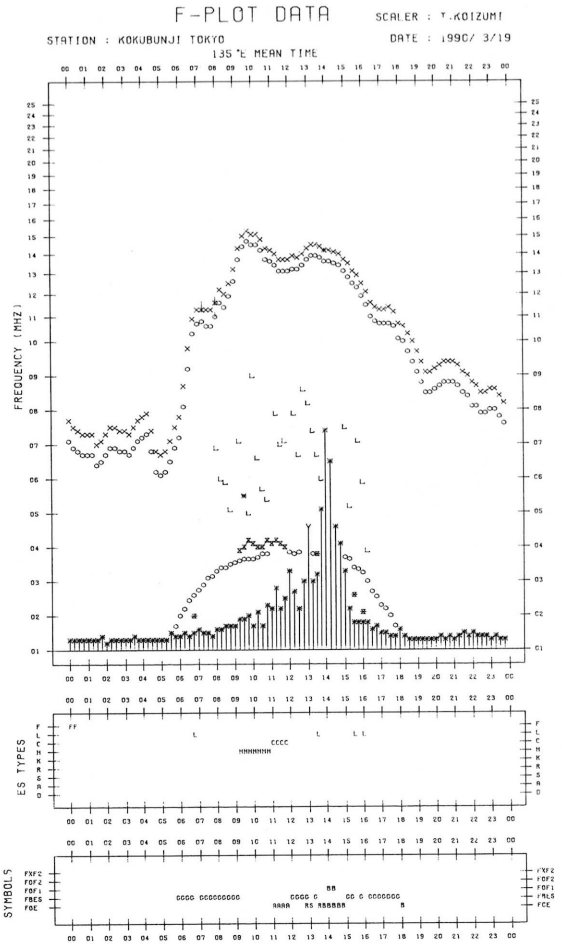

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/13
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FAES
FOE

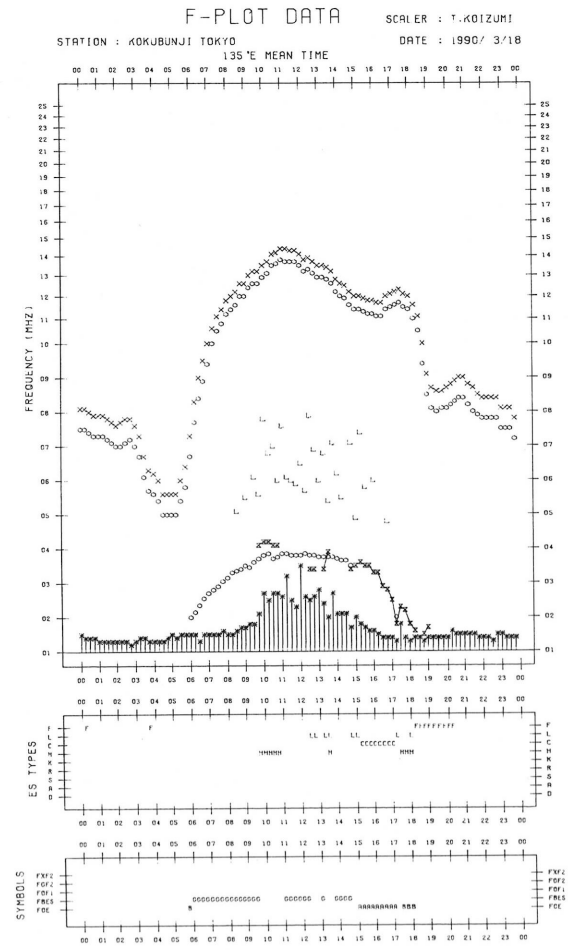

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/15
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FAES
FOE

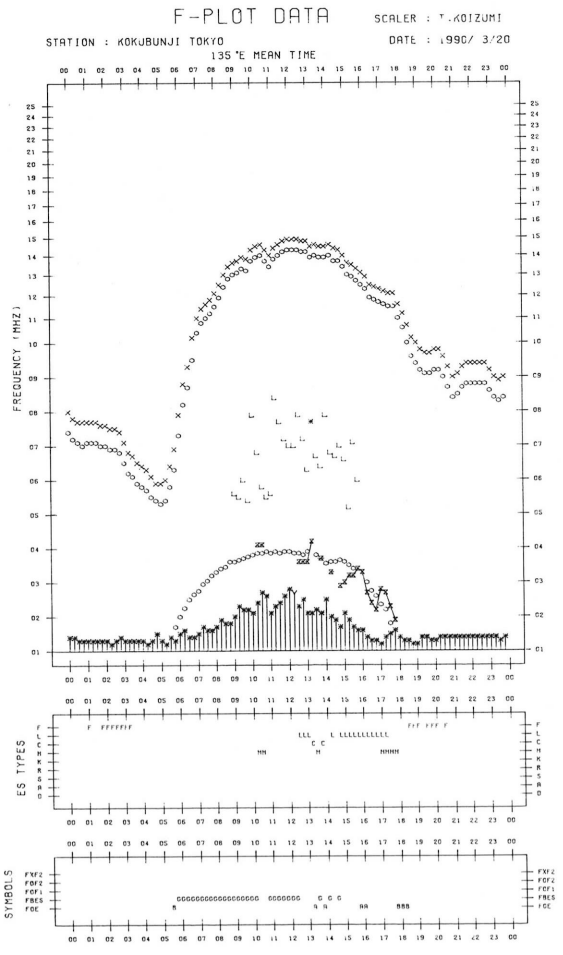

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/14
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FAES
FOE

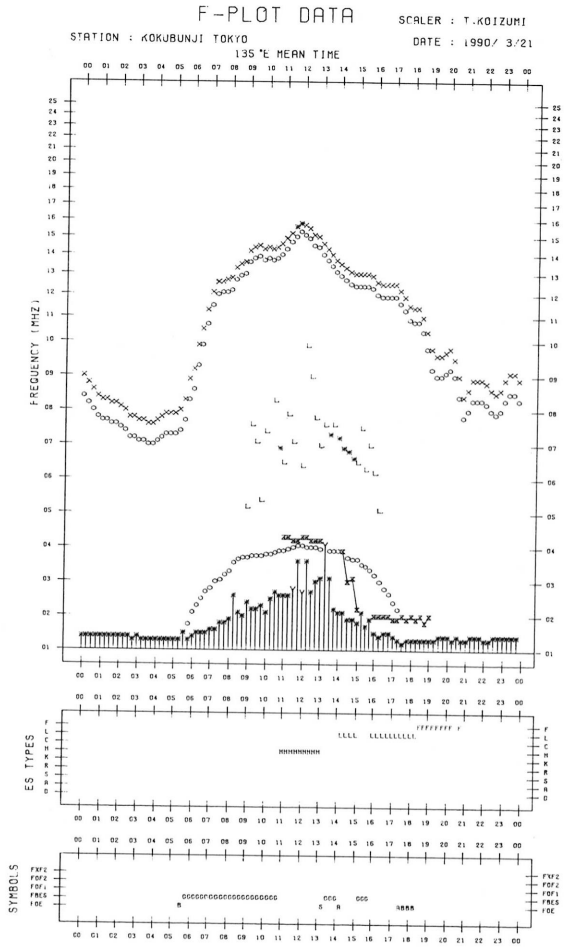

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/16
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FAES
FOE

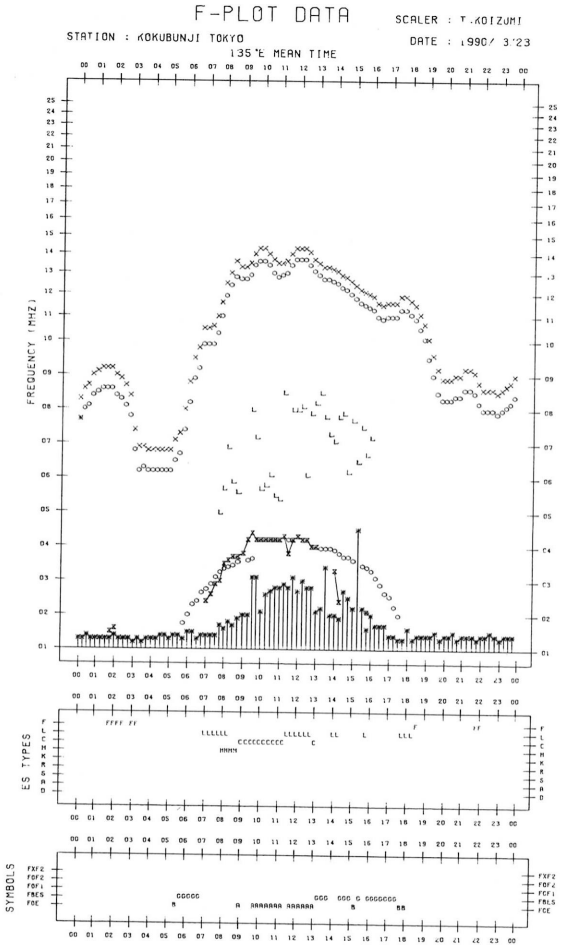

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

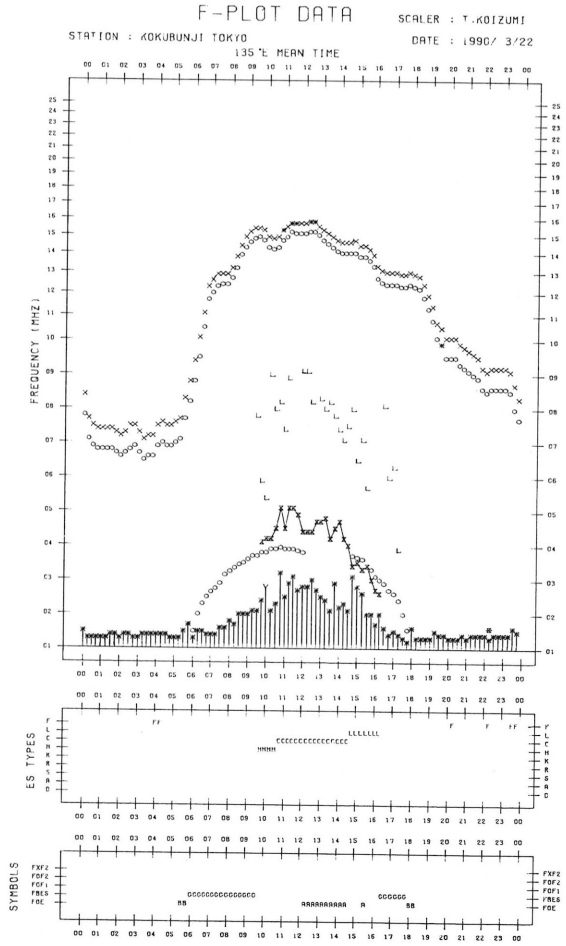

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

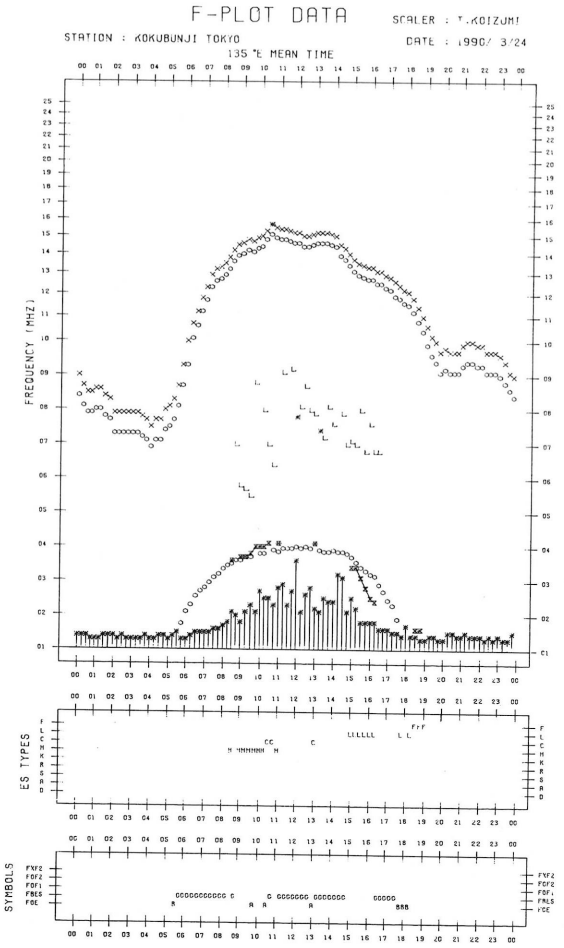

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

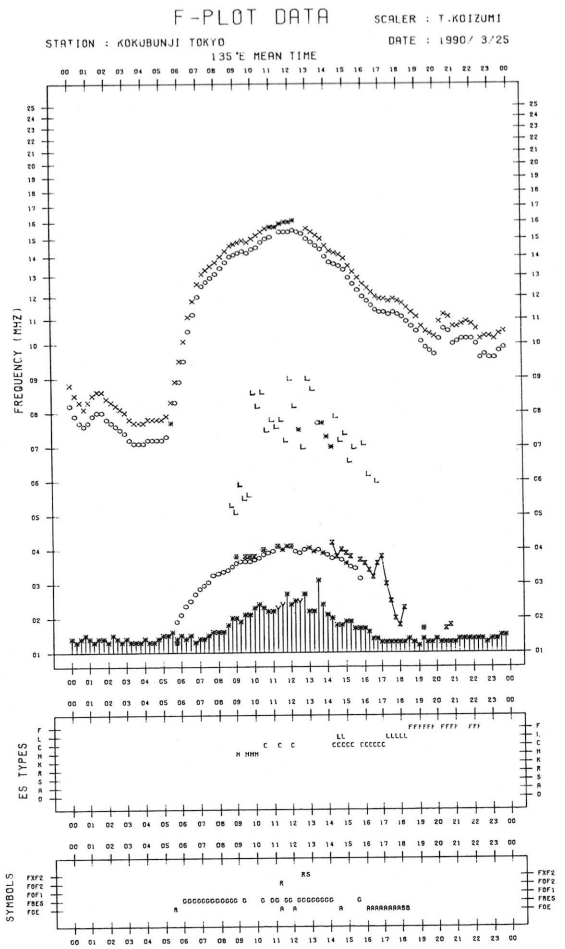

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/20
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

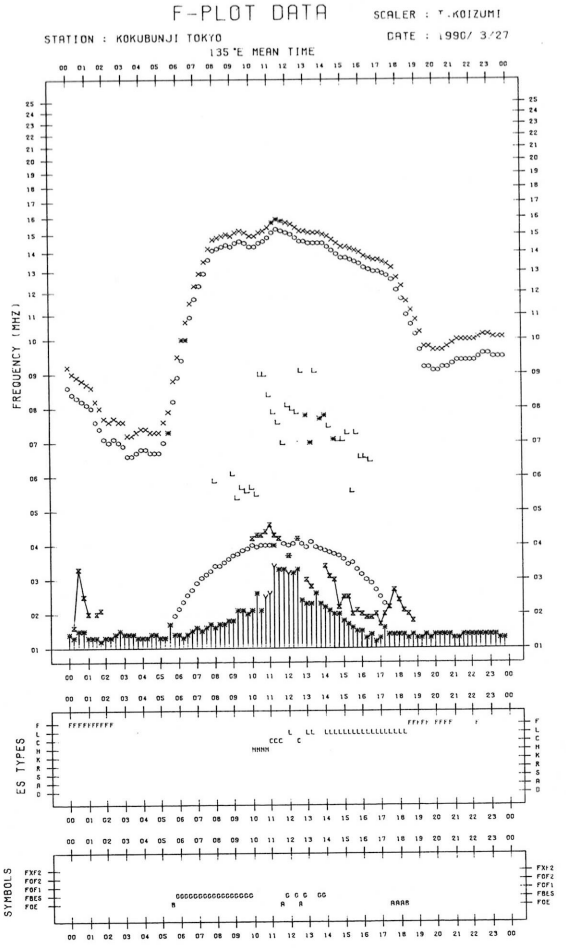

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/21
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE

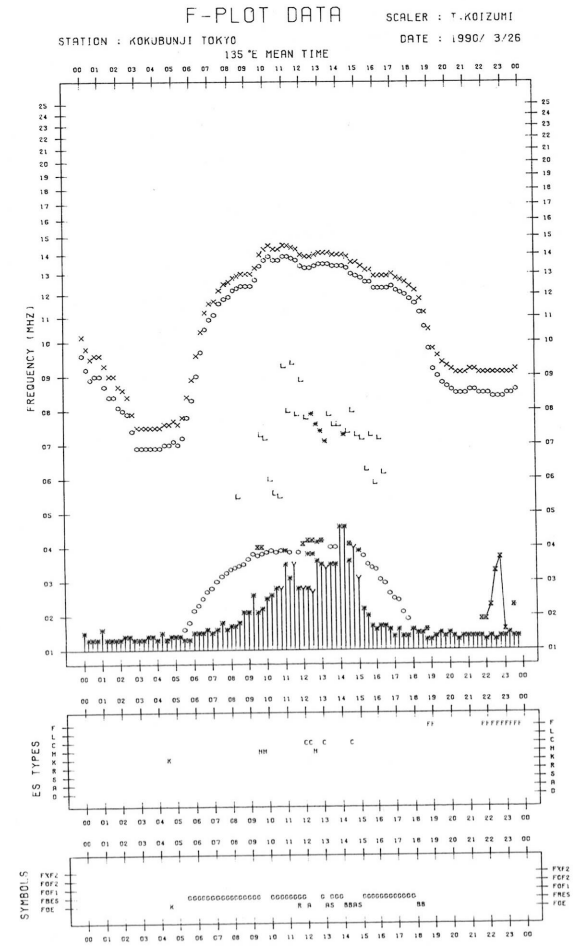

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE

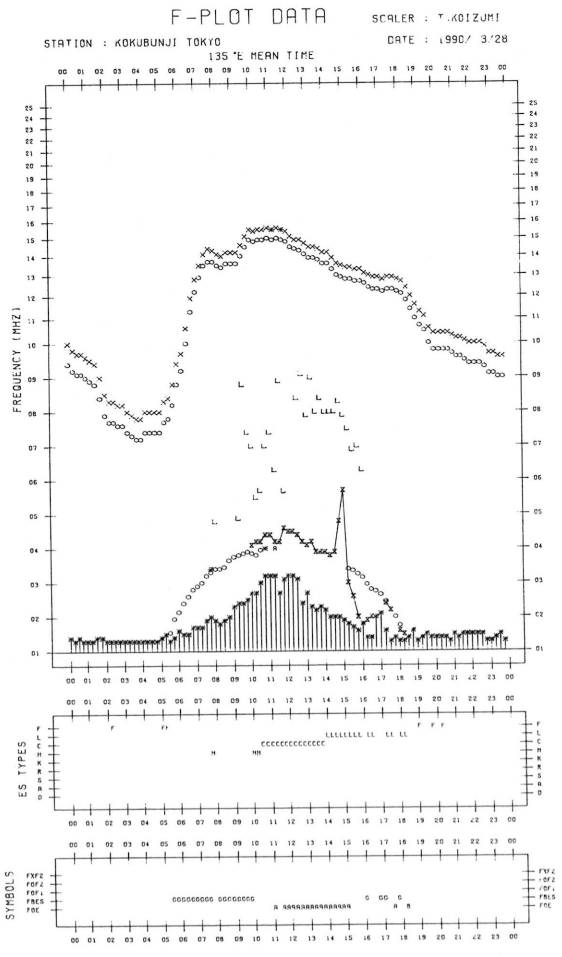

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE

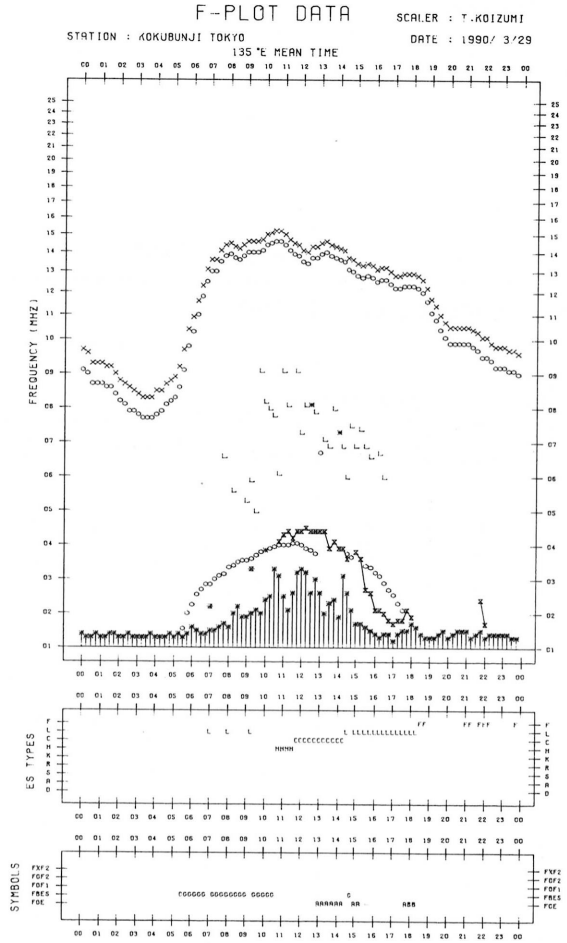

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE

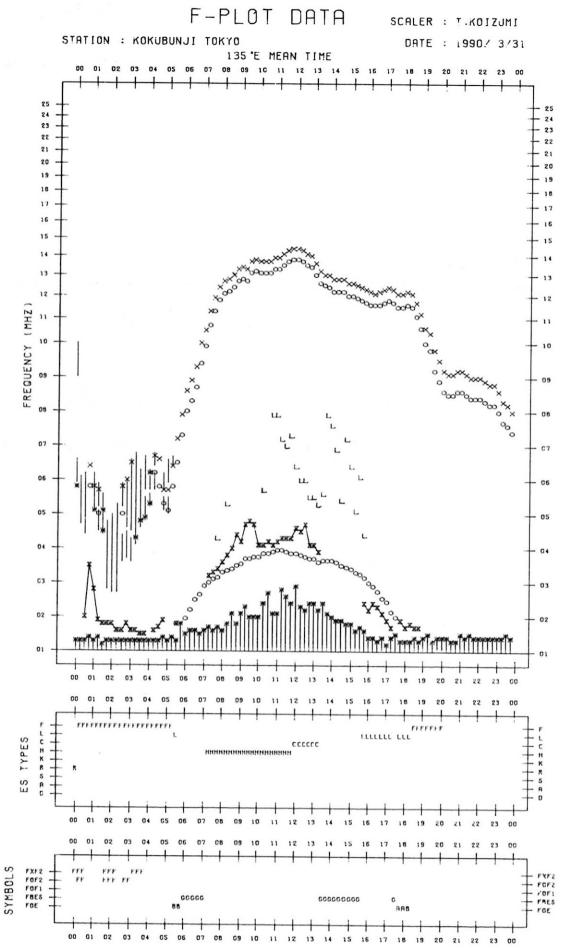

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/25
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

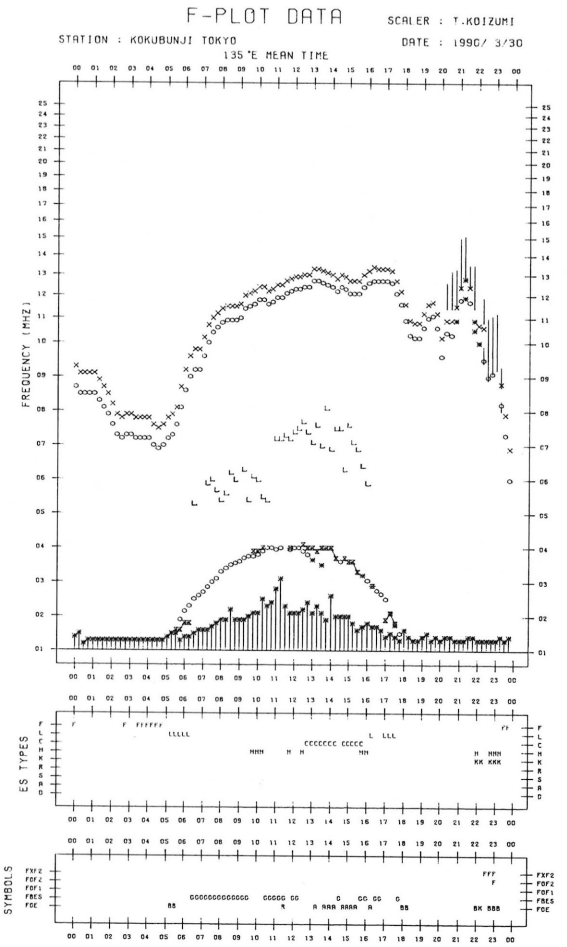

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/27
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/26
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/28
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/29
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/31
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 3/30
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

B.Solar Radio Emission

B1.Daily Data at Hiraiso

200 MHz

Hiraiso March 1990

Single-frequency total flux observations at 200 MHz

	FLUX DENSITY: $10^{-22}Wm^{-2}Hz^{-1}$					VARIABILITY: 0 TO 3				
UT	00-03	03-06	06-09	21-24	DAY	00-03	03-06	06-09	21-24	DAY
DATE										
1	B	B	B	*	B	1	1	2	*	1
2	*	*	*	B	*	*	*	*	2	*
3	B	B	B	B	B	2	2	2	2	2
4	B	B	B	B	B	1	2	2	1	2
5	11	11	11	13	11	0	0	1	1	0
6	12	12	12	B	12	0	1	1	2	1
7	B	B	B	13	B	2	2	2	2	2
8	11	11	14	10	12	*	*	*	*	*
9	10	10	13	12	11	*	*	*	*	*
10	11	9	9	12	10	1	*	*	1	*
11	12	13	11	10	12	2	1	1	0	1
12	10	*	*	12	10	*	*	*	0	*
13	12	12	12	B	12	0	*	*	2	0
14	B	12	12	B	B	1	2	0	3	1
15	B	B	B	12	B	2	3	3	1	3
16	10	11	11	11	11	0	1	1	1	1
17	11	11	11	*	11	0	0	1	*	0
18	*	*	*	B	*	*	*	*	0	*
19	B	12	12	11	B	1	1	1	*	1
20	12	11	11	13	11	*	1	*	1	*
21	10	10	11	11	11	1	0	1	0	1
22	10	10	10	11	10	0	0	*	*	0
23	12	12	12	12	12	1	1	1	1	1
24	12	13	*	12	12	1	1	*	1	1
25	11	B	B	11	12	1	3	2	1	2
26	11	B	B	B	B	1	2	2	1	2
27	B	B	B	11	B	2	1	3	0	2
28	11	10	10	11	10	0	1	0	1	0
29	11	10	*	12	11	0	0	*	2	0
30	11	B	11	11	11	1	2	2	1	2
31	11	12	10	B	11	2	2	0	*	1

Note: No observations during the following periods.

none.

B.Solar Radio Emission

B1.Daily Data at Hiraiso

500 MHz

Hiraiso March 1990

Single-frequency total flux observations at 500 MHz					
FLUX DENSITY: 10^{-22}Wm^{-2}Hz^{-1}					
UT DATE	00-03	03-06	06-09	21-24	DAY
1	55	56	54	-	55
2	55	55	52	53	54
3	53	52	51	52	52
4	53	52	51	-	52
5	53	51	50	50	51
6	52	51	49	50	50
7	52	51	52	50	51
8	51	51	51	49	50
9	48	47	46	-	47
10	48	46	46	50	47
11	49	50	50	48	49
12	49	49	48	49	48
13	50	51	52	51	51
14	B	48	47	-	49
15	48	48	B	47	50
16	47	46	46	48	47
17	49	48	47	53	48
18	54	53	52	52	53
19	54	54	55	54	54
20	55	55	53	-	54
21	-	-	-	-	-
22	55	53	52	55	53
23	58	56	54	54	55
24	57	56	B	-	56
25	56	55	52	54	54
26	56	56	55	57	55
27	59	58	B	57	B
28	58	57	56	-	57
29	54	53	52	52	53
30	53	53	53	52	53
31	53	53	51	50	52

Note: No observations during the following periods:

1st 2107 - 2355. 4th 2105 - 2345
9th 2057 - 10th 0017. 14th 2050 - 2355
20th 0720 - 21st 2345. 24th 2035 - 25th 0035
28th 2030 - 2345

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso March 1990

Single-frequency observations

Normal observing period: 2100 - 0845 U.T. (sunrise to sunset)

MAR 1990	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
1	100	42 SER	0109.0	0111.0	38.0	615	-	-
	200	42 SER	0130.4	0134.3	9.2	115	-	0
	500	42 SER	0338.8	0339.5	32.5	144	-	0
	200	42 SER	0426.4	0435.6	11.2	60	-	0
	200	42 SER	0503.0	0518.2	17.2	71	-	0
	100	42 SER	0613.2	0617.3	14.5	910	-	-
	200	42 SER	0614.7	0618.1	13.2	280	-	0
	500	42 SER	0617.0	0627.5	11.5	76	-	WL
2	500	46 C	0053.5	0106.5	22.0	24	6	WL
	200	44 NS	2107E	2343	680D	11	3	WR
3	100	42 SER	0305.3	0307.1	5.0	2000	-	0
	500	8 S	0306.8	0307.0	0.5	87	-	0
	200	24 R	2105E	0330	680D	5	2	0
4	200	42 SER	0510.6	0520.8	33	54	-	0
6	200	44 NS	2100E	0120	690D	7	3	0
7	200	41 F	0103.3	0105.9	3.2	230	-	0
	500	41 F	0241.2	0241.7	2.0	18	-	0
	200	41 F	0453	0509	17	29	-	MR
	100	42 SER	0521.5	0539.9	27.7	780	-	-
	200	27 RF	0523	0600	53	21	16	0
	500	27 RF	0537	0605	45	5	2	0
	500	8 S	0631.0	0631.1	0.2	550	-	0
	200	41 F	0731.4	0732.7	1.9	310	-	0
8	500	41 F	0003.8	0004.8	2.1	27	-	WL
	100	42 SER	0527.7	0528.8	3.8	105	-	-
	200	42 SER	0542.0	0547.2	48.0	130	-	0
	100	42 SER	0653.0	0653.5	2.9	435	-	-
	200	42 SER	0653.1	0653.2	3.4	190	-	0
10	200	27 RF	0030	0039	40	8	4	0
	200	42 SER	2350	0016.5	43	150	-	0
11	100	46 C	0040.6	0041.7	2.6	980	-	WR
	200	46 C	0040.6	0042.2	2.0	170	-	MR
13	100	44 NS	2050E	2137	129D	67	25	-
	200	44 NS	2050E	2237	280D	13	5	MR
	500	22 GRF	2235	0010	245	10	4	WR
14	200	27 RF	0300	0400	145	21	8	0
	500	46 C	0331.5	0351.0	42.0	19	8	WR
	200	44 NS	2050E	0720	710D	198	60	SR
	100	44 NS	2050E	0730	710D	490	130	-

MAR 1990	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	24 R	0510	0750	210D	23	11	MR
17	200	42 SER	0603.3	0603.4	2.7	45	-	O
18	200	24 R	2043E	0040	320D	8	4	WR
19	500	48 C	0437.0	0441.0	80	855	102	O
				0446.0		365		ML
				0453.0		555		ML
				0539.5		106		WR
	200	48 C	0440.3	0450.3	74.6	690	110	O
				0541.3		120		MR
	100	48 C	0442.4	0445.9	60.7	2400	146	MR
	200	42 SER	0629.7	0709.6	56.0	32	-	WL
	200	46 C	0740.3	0753.8	37.0	26	-	WL
22	200	46 C	0414.2	0415.2	3.3	910	-	O
	100	46 C	0414.5	0415.2	5.9	1700	284	WR
	500	46 C	0414.8	0415.8	8.0	198	12	O
	200	46 C	0536.0	0537.0	1.5	320	-	O
	500	4 S/F	0537.0	0540.0	7.0	13	-	O
	200	27 RF	2339	0000	54	25	4	WL
23	500	42 SER	0329.4	0329.5	7.0	443	-	O
	500	42 SER	0637.6	0639.5	3.0	106	-	O
	500	42 SER	2220.5	2225.3	5.5	350	-	O
24	500	46 C	0253.4	0256.4	17.0	334	8	O
	100	48 C	0254.0	-	6.5	15000D	-	-
	200	42 SER	0254.1	0254.3	7.9	1100	-	O
	500	46 C	0503.0	0506.3	7.5	35	-	WR
	500	42 SER	0624.8	0639.0	26.0	44	-	O
	200	46 C	0638.0	0638.7	1.5	1300	-	O
	100	46 C	0638.0	0638.9	2.0	930	-	-
25	200	43 NS	0148	0400	490	7	3	WR
	500	41 F	2201.5	2201.9	3.4	445	-	O
26	500	42 SER	0155.8	0159.5	15.5	344	-	O
	200	43 NS	0313	0512	340D	8	3	WR
	500	46 C	0610.0	0612.5	6.0	23	-	O
	200	44 NS	2032E	0636	740D	9	2	WL
27	500	20 GRF	0410	0545	200	8	4	O
	200	48 C	2238.9	2239.6	11.9	3400	80	O
	100	48 C	2239.0	2240.9	6.1	5400	305	O
	500	46 C	2240.0	2240.9	9.0	92	-	WL
28	500	46 C	0736.4	0750.0	48.0	845	56	O
				0741.2		345		O
	200	46 C	0738.9	0800.0	46.0	62	23	O
	100	46 C	0746.7	0824.9	63.0	430	54	-
30	500	46 C	0158.0	0158.2	8.5	1300	45	O
	200	43 NS	0330	0523	180	4	2	O
	100	8 S	2216.5	2217.2	0.8	1200	-	-
	100	48 C	2308.1	2309.2	1.4	7200	-	WL
	100	42 SER	2346.2	2352.8	8.6	780	-	-
	500	4 S/F	2348.5	2353.3	9.5	9	-	O
31	100	42 SER	0052.3	0054.6	4.8	970	-	-
	100	42 SER	0218.5	0228.0	12.5	910	-	-
	500	3 S	0227.6	0228.3	8.5	8	-	O
	200	41 F	0402	0428	45	46	-	O

C. RADIO PROPAGATION

C1. H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWV)

MAR 1990 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 15M	01H 15M	02H 15M	03H 15M	04H 15M	05H 15M	06H 15M	07H 15M	08H 15M	09H 15M	10H 15M	11H 15M	12H 15M	13H 15M	14H 15M	15H 15M	16H 15M	17H 15M	18H 15M	19H 15M	20H 15M	21H 15M	22H 15M	23H 15M
1	ES -24	ES -24	-12	-9	0	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-9	3	29	10	-11	ES -24	ES -24	ES -24	ES -24	ES -24	ES 0	ES -15
2	ES -24	ES -24	ES -24	ES -24	6	12	10	ES -24	ES -24	ES -24	ES -24	ES -24	5	-3	3	-1	-2	14	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
3	ES -24	ES -24	-6	1	8	5	14	17	ES -24	-1	ES -24	ES -24	ES -24	ES -24	2	-6	ES -24	2	ES -24	ES -24	ES -24	ES -24	ES -24	-9
4	ES -24	ES -24	ES -24	1	0	13	13	16	ES -24	-3	ES -24	ES -24	ES -24	ES -24	2	-3	0	ES -24	-2	-11	ES -24	-12	-11	-12
5	ES -24	-12	-11	2	3	18	10	2	-7	ES -24	ES -24	ES -24	ES -24	ES -24	-12	ES -24	ES -24	3	5	2	-9	-15	S	ES -24
6	ES -24	-15	ES -24	-3	9	7	22	21	20	7	13	22	ES 7	ES -24	ES -24	ES -24	ES -24	3	-6	-11	ES -24	ES -24	S	ES -24
7	ES -24	-15	-3	-6	7	11	10	1	ES -9	ES -9	ES -24	ES -24	ES -9	ES -24	9	ES -24	ES -24	-3	1	ES -24	ES -24	ES -24	ES -24	ES -24
8	ES -24	-6	-2	-3	10	10	2	ES -15	ES -15	ES -24	ES -24	ES -24	ES -15	ES -24	-11	ES -24	ES -24	ES -24	ES -24	1	ES -15	ES 2	3	-11
9	ES -24	ES -24	-9	-4	7	16	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-12	2	2	ES -24	ES -24	-9	-3	-15
10	-9	-6	1	-2	10	7	2	3	-15	ES -15	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-15	12	2	-1	-15	-9	-1	-9
11	-7	-9	-9	5	8	10	12	-3	ES -24	-11	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	5	14	ES -24	-15	-12	-9	-1
12	-9	-9	3	4	16	16	14	13	ES -15	ES -15	ES -24	ES -24	ES -24	ES -24	-11	ES -24	ES -24	ES -24	ES -24	ES -24	-3	10	1	5
13	3	-4	-2	10	13	3	-2	2	7	0	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-11	ES -24	-15
14	-15	ES -24	-3	-15	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-15	ES -24	2	-11	4	ES -24	ES -24	-15	ES -24	-15
15	-11	-11	0	2	5	12	-11	ES -24	ES -24	-9	-9	-15	ES -24	-15	12	0	-3	12	-11	-15	ES -24	ES -24	ES -24	ES -24
16	ES -24	ES -24	-15	2	-3	10	ES -24	ES -24	ES -24	ES -24	-15	ES -24	ES -9	ES -24	-11	-15	ES -24	2	2	ES -24	-9	ES -24	ES -15	ES -24
17	ES -24	ES -24	-15	-1	6	12	13	18	-12	-9	ES -24	ES -24	ES -24	ES -24	0	ES -24	-15	-9	0	-11	-15	-15	-9	-11
18	-15	ES -24	-3	2	12	17	17	3	ES -24	ES -9	-15	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	11	ES -24	2	-11	1	ES -24	-15
19	-15	-9	ES -24	-9	-2	ES -24	0	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-12	ES -24	6	3	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
20	ES -24	ES -24	-9	1	1	6	20	18	-4	-15	ES -24	ES -24	ES -24	-2	0	8	7	-15	12	-15	ES -24	ES -24	ES -24	ES -24
21	ES -24	ES -24	-2	-15	-15	-9	-9	ES -24	-6	-1	1	-3	ES -24	-15	-15	-15	ES -24	7	ES -24	ES -24	-15	ES -24	ES -24	ES -24
22	ES -24	ES -24	7	4	-3	-2	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	2	19	18	9	8	7	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
23	ES -24	ES -24	ES -24	ES -24	-2	ES -24	-15	-9	-6	2	-6	ES -24	ES -24	8	4	5	2	6	2	ES -24	ES -24	ES -24	ES -24	ES -24
24	ES -24	ES -24	ES -24	ES -24	6	ES -24	ES -24	ES -24	ES -24	ES -24	-15	ES -24	ES -24	1	3	1	ES -24	1	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
25	ES -24	ES -24	ES -24	-3	8	6	7	2	-15	-15	ES -24	-9	ES -3	ES -24	ES -24	3	9	ES -24	ES -24	ES -24	ES -24	ES -24	-3	ES -24
26	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-11	ES -24	ES -24	ES -24	ES -24	7	-11	-11	1	-11	ES -24	ES -24	ES -24	ES -24	-3	ES -24
27	ES -24	ES -24	-11	3	3	12	ES -24	-15	-12	ES 0	ES -24	7	ES -9	4	13	-12	-1	9	11	ES -24	ES -24	ES -24	ES -24	ES -24
28	ES -24	ES -24	ES -24	-4	2	-1	ES -24	-12	-9	-3	-1	-3	3	10	-2	-3	ES -24	3	-9	ES -24	ES -24	ES -24	ES -24	ES -24
29	ES -24	ES -24	ES -24	-11	13	4	10	18	17	22	17	-12	-12	15	17	6	9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
30	ES -24	-15	ES -24	2	8	-15	-15	-15	-15	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-3	ES -24
31	ES -24	-11	-9	1	-15	-9	ES -24	-12	ES -24	ES -24	ES -24	ES -24	-9	12	1	2	-9	-9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	31
MED	ES -24	ES -24	-11	-2	6	6	0	-12	US -15	ES -15	ES -24	ES -24	ES -24	ES -24	-11	-15	-15	2	US -24	ES -24	ES -24	ES -24	ES -24	ES -24
UD	-9	-6	1	4	13	16	17	18	7	2	1	-3	ES 3	12	17	8	8	12	11	1	-9	ES 1	ES 0	-9
LD	ES -24	ES -24	ES -24	ES -24	-15	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24

C. RADIO PROPAGATION

C1. H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWVH)

MAR 1990 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 45M	01H 45M	02H 45M	03H 45M	04H 45M	05H 45M	06H 45M	07H 45M	08H 45M	09H 45M	10H 45M	11H 45M	12H 45M	13H 45M	14H 45M	15H 45M	16H 45M	17H 45M	18H 45M	19H 45M	20H 45M	21H 45M	22H 45M	23H 45M
1	ES -24	-3	4	ES -24	10	18	28	25	30	27	28	23	23	27	16	-2	-11	ES -24	ES -24	-3	4	-2	2	2
2	-11	ES -24	ES -24	7	18	23	28	27	31	24	24	2	26	33	15	ES -24	ES -24	35	14	4	13	4	6	-6
3	US -9	-9	1	13	22	22	29	26	28	28	19	14	17	17	12	0	-15	21	-9	ES -24	0	-1	-9	7
4	-12	-9	7	6	27	24	28	38	32	28	26	22	27	6	-12	ES -24	ES -24	-11	18	8	10	13	7	-1
5	0	2	3	12	23	21	29	29	29	31	20	20	2	23	-11	ES -24	ES -24	27	19	14	14	9	2	-9
6	2	2	9	11	14	24	25	26	32	24	28	21	23	11	ES -24	ES -24	ES -24	22	16	ES -24	14	7	7	-9
7	1	2	6	10	19	26	21	23	23	31	10	5	-2	-9	ES -24	ES -24	ES -24	32	24	7	14	3	7	-3
8	-1	-11	2	10	10	24	24	27	26	27	21	20	1	2	16	ES -24	ES -24	ES -24	ES -24	-6	14	10	3	-11
9	ES -24	-9	7	14	17	21	21	23	27	22	17	14	20	15	ES -24	ES -24	ES -24	21	-6	0	9	13	-3	-6
10	-3	-6	3	10	16	21	24	29	26	26	23	-3	-1	-15	ES -24	ES -24	ES -24	26	17	8	12	13	-1	-2
11	-7	-5	10	16	10	22	26	24	23	16	26	17	9	12	10	ES -24	ES -24	26	16	-2	10	2	-1	-7
12	-9	2	5	16	20	21	26	22	16	16	20	12	20	-3	ES -24	ES -3	ES -24	ES -24	ES -24	2	16	10	11	2
13	-3	1	1	11	16	23	24	27	26	26	18	-9	-15	ES -24	ES -24	ES -24	ES -24	27	-15	-6	17	-10	-6	-3
14	-15	5	0	12	15	18	25	14	2	12	19	10	-15	ES -24	ES -24	ES -24	ES -24	24	ES -24	10	11	5	-1	1
15	0	0	2	12	15	19	23	22	33	34	21	16	0	-11	ES -24	ES -24	ES -24	19	24	17	2	-3	-3	1
16	-9	-15	2	6	12	23	27	28	28	24	2	29	20	16	ES -24	ES -24	ES -24	12	14	-1	0	7	-9	-15
17	-15	-15	8	6	16	18	31	24	32	29	26	23	22	2	12	ES -24	ES -24	23	21	-1	3	3	0	-9
18	-15	-15	1	6	14	20	30	28	30	30	28	28	18	-9	-9	ES -24	6	19	20	11	6	-6	0	-9
19	ES -24	ES -24	-3	ES -24	ES -24	10	24	28	30	29	22	10	21	17	17	6	3	10	20	8	9	8	9	-11
20	ES -24	-9	-9	4	14	22	23	28	32	31	28	27	29	27	9	30	-6	2	16	6	2	-1	ES -24	ES -24
21	-15	-9	-2	6	13	16	25	27	33	24	20	35	19	16	18	-13	ES -24	7	9	8	13	0	-15	ES -24
22	-15	ES -24	-12	13	13	13	24	27	29	21	19	28	20	22	-2	2	21	23	ES -24	-2	-3	-9	-15	ES -24
23	ES -24	ES -24	-15	4	17	23	24	26	23	31	31	26	31	-2	29	29	29	11	10	10	2	2	-15	ES -24
24	ES -24	-12	-12	3	12	23	22	29	32	22	32	17	24	19	-15	-15	-9	21	14	4	4	1	-11	-15
25	ES -24	-15	-9	-9	10	20	23	26	27	31	23	23	22	22	22	29	0	26	ES -24	5	1	-9	-11	ES -24
26	ES -24	-11	-11	ES -24	9	10	22	23	28	23	20	14	22	24	27	-9	-11	-1	ES -24	9	12	-3	2	-4
27	ES -24	-9	3	7	16	28	19	34	26	26	28	21	26	9	9	3	1	14	2	12	5	2	ES -24	ES -24
28	ES -24	ES -24	-9	4	16	27	21	18	26	26	24	26	27	21	13	12	19	20	12	4	-7	ES -24	-7	ES -24
29	ES -24	ES -24	-11	6	18	23	29	26	26	24	28	28	14	12	28	-7	0	4	-15	3	3	1	-9	-15
30	-9	-15	-1	6	16	22	24	26	25	8	16	1	-7	24	9	ES -24	ES -24	ES -24	3	1	13	2	-15	ES -24
31	-9	-11	2	12	14	18	26	26	31	28	21	12	17	12	-15	-15	22	23	4	16	14	3	-9	-15
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	-15	-9	1	7	15	22	24	26	28	26	22	20	20	12	9	US -24	US -24	20	10	4	9	2	-3	-9
UD	0	2	8	14	22	26	29	29	32	31	28	28	27	27	27	29	21	27	21	14	14	13	7	2
LD	ES -24	ES -24	-12	ES -24	10	13	21	22	23	16	16	1	-7	-15	ES -24	ES -24	ES -24	ES -24	ES -24	-6	0	-9	-15	ES -24

C. Radio Propagation

c2. Radio Propagation Quality Figures at Hiraiso

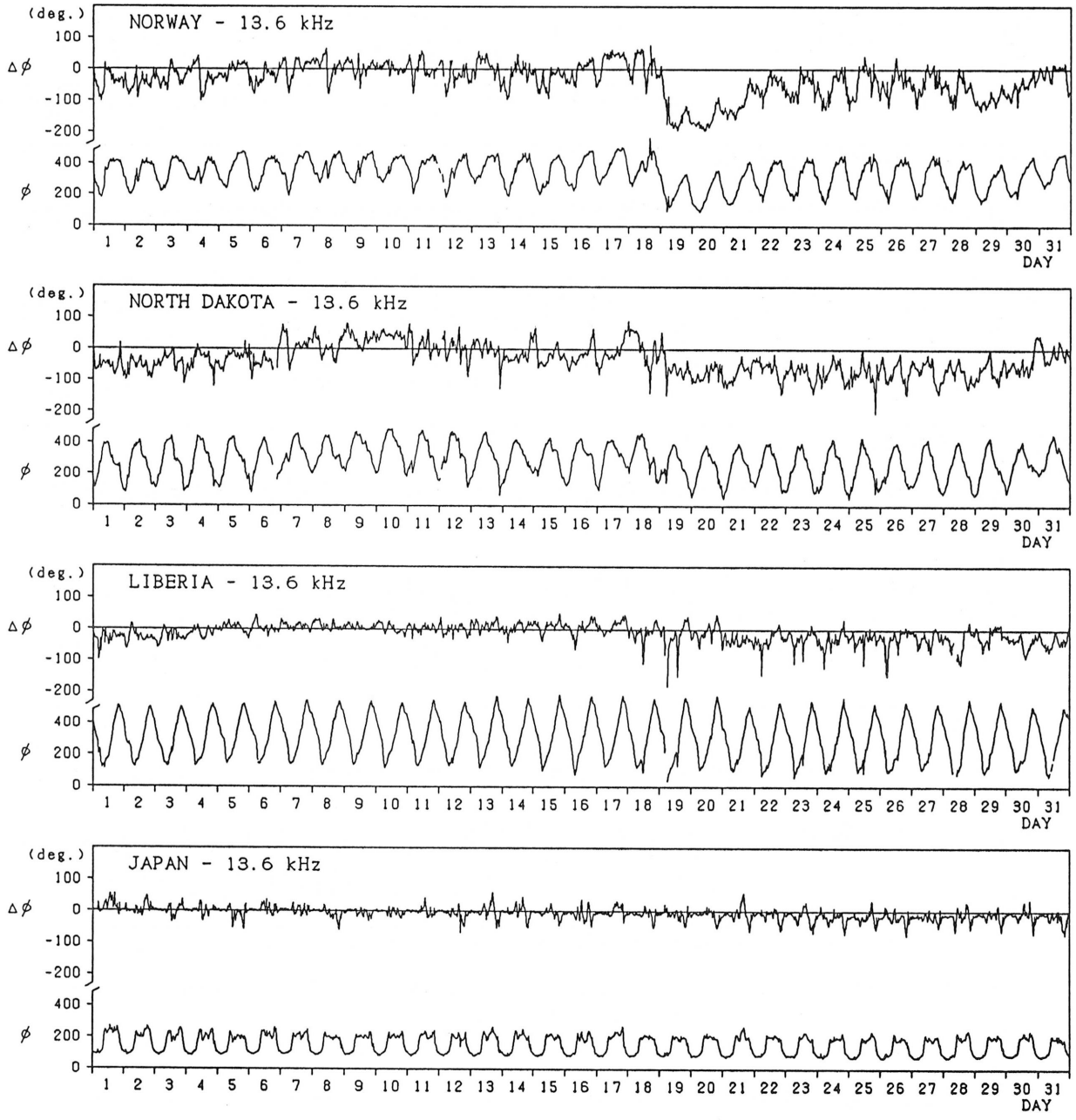
Hiraiso — Time in U.T

Mar.	Whole Day	W W V				W W V H				Conditions				Principal Geomagnetic Storms		
		00	06	12	18	00	06	12	18	00	06	12	18	Start	End	Range
		|	|	|	|	|	|	|	|	|	|	|	|			
1990	Figure	06	12	18	24	06	12	18	24	06	12	18	24	h m	h	nT
1	3+	3U	3U	4U	S	3	4	4	3	N	N	N	N			
2	4o	4U	4U	5	S	3	4	5	4	N	N	N	N			
3	4o	4	4U	4U	4U	4	4	4	3	N	N	N	N			
4	4o	4	4U	4	5U	4	4	3	5	N	N	N	N			
5	4+	4	5U	4U	5U	4	4	4	4	N	N	N	N			
6	4+	4	5U	4U	5U	4	4	4	4	N	N	N	N			
7	4o	4	5U	4U	S	4	3	4	5	N	N	N	N			
8	4o	4	4U	3U	5U	4	4	3U	4	N	N	N	N			
9	4o	4	3U	4U	5U	4	4	3	4	N	N	N	N			
10	4o	4	4U	4U	5U	4	3	3	5	N	N	N	N			
11	4+	5	4U	4U	5U	4	4	4	4	N	N	N	N			
12	4o	5	5U	3U	5U	4	4	3U	4	N	N	N	N	0503	---	169
13	4o	5	5U	3U	5U	4	3	2U	4	N	N	N	N	---	18	
14	3+	3U	3U	4	5U	4	3	2U	4	N	N	N	N			
15	4o	4	4U	5	5U	4	4	3	4	N	N	N	N			
16	4-	3	3U	4	5U	4	4	3	3	N	N	N	N			
17	4+	4	5U	4	5U	4	4	4	4	N	N	N	N			
18	4+	5	4U	4U	5U	4	4	4	4	N	N	N	N	06.3	---	113
19	4-	3U	3U	4U	S	3U	4	4	4	N	N	N	N	---	06	
20	4o	4	5U	4	5U	4	4	4	3	N	N	N	N	2244	---	133
21	4o	3	4U	4U	4U	4	4	4	4	U	U	U	U	---	---	
22	4o	4	3U	5	S	4	4	4	3	U	U	U	U	---	03	
23	4-	2U	4U	5	S	3	4	4	3	N	N	N	N			
24	3+	2U	3U	4U	S	4	4	4	3	N	N	N	N			
25	4o	4	5U	4U	4U	3	4	4	3	N	N	N	N	09.0	---	92
26	3+	2U	3U	4	4U	3	4	4	3	N	N	N	N	---	---	
27	4o	4	4U	5	S	4	4	4	3	N	N	N	N	---	09	
28	4o	3U	4U	5	S	3	4	5	3	N	N	N	N			
29	4o	4	5U	4U	S	3	4	4	3	N	N	N	N			
30	3+	4	3U	3U	4U	4	3	3	4	N	N	N	N	0721	24	219
31	4-	3	2U	5	S	4	4	4	4	N	N	N	N			

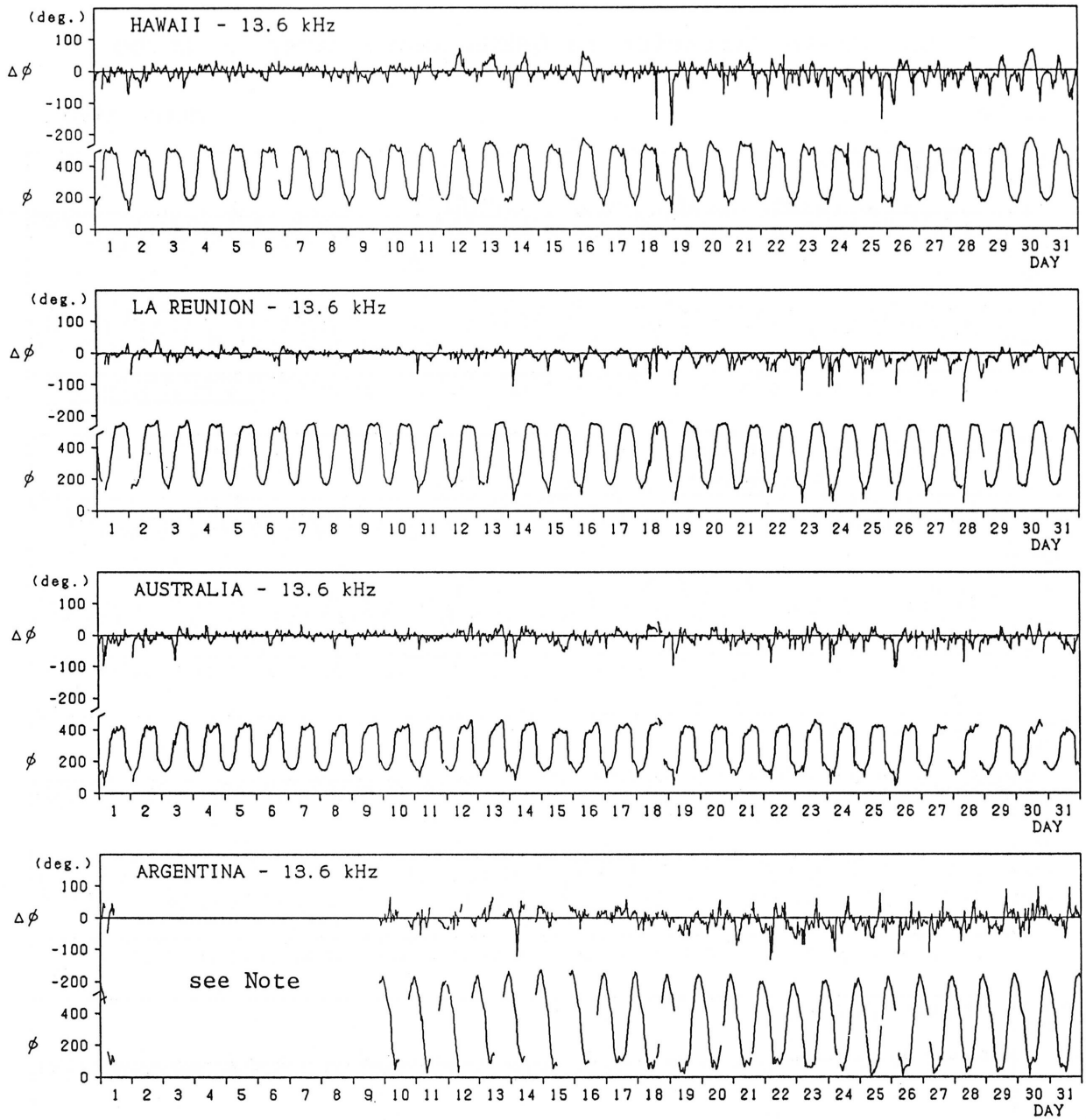
C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo

Inubo March 1990



Inubo March 1990



Note: As for ARGENTINA - 13.6 kHz, no record during March 01 - March 09 due to the maintenance of transmitter.

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

Start (U.T.)	End (U.T.)	Max. (U.T.)	Max. Phase Deviation (negative value, deg.)
Mar.19/0146	Mar.23/1000	Mar.20/0753	283.3
Mar.28/1507	Mar.31/0000	Mar.29/0745	183.6

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

(a) Short Wave Fade-out (SWF) at Hiraiso

Hiraiso Time in U.T.

Mar. 1990	S W F									Correspondence	
	Drop-out Intensities(dB)					Start	Duration	Type	Imp.	Solar Flare	Solar Noise
	CO	HA	1)	2)	3)						
1	28	38	27			0338	22	SL	2	x	x
1	22	38	23			0400	28	SL	2-	x	x
1		10	12			0428	12	S	1	x	
1			18			0530	25	SL	1+	x	x
2			7			0035	8	S	1-		x
2			24	x		0104	112	G	2		x
2			11	x		0303	31	SL	1-		x
12			10			0429	20	S	1-	x	
13			17			0210	27	SL	1+	x	
13			15			2144	22	G	1	x	
14	27	30	12			0103	12	SL	1	x	
17			17	x		0048	82	G	1+		
18					15	1122	33	SL	1	x	
19	20	20	24	x		0333	29	SL	2	x	x
19	30	38	35	26		0436	146	S	3-	x	x
19					8	1349	13	S	1-	x	
20			14			2302	28	SL	1	x	x
22	35	35	12			0408	18	S	3+	x	
22	x	x	16	18	x	0533	59	SL	1+	x	
23			10	x		0021	14	SL	1-	x	
24		x	18	x		0253	24	S	1+	x	x
24		x	17	x		0500	32	SL	1+	x	x
24		x	8	x		0532	14	SL	1-		
25	x	x	7	x		0419	28	SL	1-	x	x
26			19			0335	45	SL	1+	x	x
26		x	36		x	0437	44	G	3	x	
26			12		x	0529	12	S	1		
27			14			0412	19	SL	1	x	
27			x		6	2233	25	SL	1-		x
28			22	x	x	0737	49	SL	2-	x	x
29			5			0253	19	S	1-		
30	x	x	7			0158	11	S	1-	x	x
30	x	x	9			0209	25	S	1-		

NOTES CO: Colorado(WWV) HA: Hawaii(WWVH) 1): Australia 2): Moscow 3): Londn

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Mar. 1990	S P A								
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
1	27	6	14	17	23	11	0002E	0032D	0009
1	32	27	52	73	62	59	0031	0149	0039
1	19		12	13	8		0303	0333	0311
1	55	82	156	103	78	47	0336	0402D	0349
1	40	77	145	124	73	42	0402E	0526D	0410
1	52	89	180	112	55	40	0526E	0731D	0538
1			22	5			0731E	0808	0740
1		43	58	35			0827	0902D	0832
1		67	76	26			0902E	1014	0909
1		30					1502	1532	1510
1	23			5	12		2242	2327	2252
2			81	97	81		0055	0424	0136
2			11	10			0503	0539	0517
2	26	70	56	31			0819	0923	0840
2					5		2332	0003	2336
3			12	6			0515	0556D	0522
3			27	7			0556E	0732	0618
3			23				0742	0837	0803
3			17				0944	1025	0955
3		90	6				1302	1508	1313
3		31					1636	1746	1646
3					66		2017	2323	2044
4					7		0107	0139	0121
4			22	13	11		0137	0219	0148
4	13		32	30	18	27	0354	0512	0409
5		19					1239	1309	1252
5				10	15		2327	0039	2334
6			14	—			0439	0516	0448
6			11	—			0651	0722	0659
6		36	35	—			0758	0839	0813

Inubo

Mar.	S				P		A		
1990	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
6		28					1412	1458	1423
6					9		2152	2235	2159
6					8		2254	2325	2302
7		21	15	10	15		0523	0550	0529
7			19	13			0645	0717	0652
7			13	6			0734	0757	0741
7			49	26			0821	0853	0831
7		26	14				0906	0957	0922
8			15	17	23		0004	0052	0012
8			15	19	15		0257	0336	0306
8			12	10	6		0401	0448	0408
8		38	52	20			0734	0829	0741
8		36					1654	1747	1706
8				47	47	52	2345	0221	0043
9			25	12			0702	0814	0710
10			12	11			0344	0444	0403
10		30	25	14			0657	0807	0712
10		25					1456	1610	1505
11	22	33	75	57	37	71	0346	0543	0403
12	22	23	47		20	25	0428	0517	0435
12			10				0525	0603D	0539
12	11		8	—			0603E	0633	0608
12			23	—			0738	0826	0751
12		45	35	19			0832	0914	0844
12		65	40				1023	1113	1035
13				—	3	24	0011	0041	0021
13				—	6	13	0042	0056	0050
13				—	3		0151	0212	0202
13	31	23	39	—	33	28	0213	0315	0227
13	23	37	45	25			0650	0709D	0704
13	25	55	80	43			0709E	0845	0721
13					22		2000	2035	2006
13	19	11	12		83*	76	2144	2350	2157
14		21	33	43	33	41	0105	0209	0110
14				7	5		0239	0306	0244
14		46	107	83	50	31	0335	0529D	0419
14	20	21	64	50	32		0529E	0649	0537
14		23	13	6			0723	0812	0729
14		32					0943	1047	1004
14				—	5		2311	2343	2315
15				—	7		0015	0053	0030
15			5	—	3		0257	0331	0302
15			24	22			0513	0548D	0525
15			48	33			0548E	0803	0629
15		24	11				0927	0957	0931
15					13	16	2119	2143	2129
16	11	19	26	36	22	17	0223	0248D	0233
16		10	17	27	18		0248E	0351	0252
16			9	10	6		0409	0445	0414
16			13	10			0457	0539	0509
16			7				0542	0628	0553
16		21	22	14			0634	0655	0640
16		83	77	37			0708	0825D	0737
16		55	40	26			0825E	0915	0845
16		17					1208	1235	1218
16					7		2249	2330	2254
17	36	36		77	60	41	0047	0255	0119
17			7	10	5		0323	0347	0330
17		23					1454	1534	1505
17					6		2234	2311	2236

Inubo

Mar. 1990	S				P	A			
		Phase Advance (degrees)					Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
18	52	29		62	53	48	0025	0242	0112
18			5	6	4		0355	0414	0400
18	14	30	31	24	14	13	0432	0513D	0443
18	18		27	20			0513E	0636	0527
18			20	8		25	0824	0911	0840
18		141	56				1119	1300	1136
18		64					1345	1444	1409
18	24				6	64	2311	2224	2127
19				—	8	17	0029	0125	0037
19	47	99	157	—	77	54	0332	0435D	0351
19	99	262	314	—	143	113	0435E	0835	0459
19		34					1230	1310D	1238
19		86					1310E	1351D	1330
19		138					1351E	1523	1400
20	17		15	26	30	28	0002	0215	0040
20			10	7			0551	0608D	0600
20			27	20		11	0608E	0719	0619
20		30	23				1015	1107	1038
20		28					1439	1508	1446
20		47					1521	1624	1533
20					59	38	2010	2025D	2019
20					93	60	2025E	2135	2030
20	24	27	24	50	59	45	2258	0023	2311
21	15	32	30	40	22	17	0239	0255D	0251
21	14	31	39	50	25	15	0255E	0350D	0313
21	6	18	21	31		10	0350E	0441	0402
21		14	10	13	6	10	0446	0502	0448
21			17	12			0516	0613	0543
21		41	26				0821	0927	0847
21					40		2011	2048	2034
21				5	7	15	2237	2259	2241
22				7	6		0038	0108	0044
22				9	5		0153	0224D	0158
22			9	18	8	11	0224E	0318	0232
22	17	11	22	26	12	17	0321	0359	0324
22	24	34	74	59	30	21	0410	0532D	0422
22	43	127	141	77	49	15	0532E	0658D	0550
22	43	71	71	32		13	0652E	0737D	0718
22	12	52	45	9			0737E	0812	0745
22		18	27				0816E	0827D	0820
22		33	30				0827E	0907	0834
22			9				0919	0954	0925
22		57	39				1026	1144	1034
22		28					1558	1642	1608
22					11		2051	2127	2056
23	25	21	30	52	41	26	0018	0155	0034
23		13	19	16	11		0315	0351	0319
23		83	98	65		47	0615	0733D	0630
23		25	45	10			0733E	0829	0746
23		74	8				1251	1408	1300
24	33	42	97	78	51	35	0253	0400	0300
24	53	72	146	90	49	43	0453	0557D	0512
24		36	12	35			0600E	0639D	0605
24		23	39	30			0634E	0732	0644
24			14				0742	0810	0751
24		47	35				1014	1105	1031
24	27				19		2153	2218D	2158
24	22				15		2218E	2241	2223
25	23	46	84	59	32	20	0415	0607	0428
25		18	40	19			0643	0749	0653

Inubo

Mar.	S			P			A		
1990	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
25		52	36				0907	0955	0916
25		114	55				1113	1221	1127
25		31					1614	1806	1620
25					130	79	1933	2121	2002
25					7		2147	2220	2155
26				—	7		0011	0048D	0022
26		10		—	13	24	0047	0114	0057
26		18	22	—	13		0154	0210D	0201
26		18	24	—	15		0210E	0250	0222
26	67	135	197	—	91	75	0335	0437D	0343
26	66	110	176	—	55	46	0437E	0528D	0512
26	83	128	177	—	39	60	0528E	0741	0538
26		27	31	—			0805	0906	0821
26		24					1158	1245	1217
26		54					1318	1448	1329
26					9		2110	2153	2117
27				—	7		0145	0233	0149
27	22	46	69	50	25		0412	0551	0420
27	29	33	31	14			0734	0841	0745
27		38					1339	1455	1348
27					53	27*	2003	2105	2014
27		18	16	23	39	27	2232	2321	2244
28			31	36	23	13	0137	0228D	0156
28			14	14	8	17	0219	0258	0237
28			17	16	8		0346	0432D	0356
28			10	8			0432E	0451D	0441
28			9	9	8		0451E	0516	0456
28			31	20		13	0548	0640	0602
28		24	25	11		18	0654	0732D	0703
28	99	—	220	102	13	37	0732E	0956	0750
28					12		2031	2132D	2048
28					29		2132E	2220	2140
28					5		2256	2307D	2300
28				10	18	19	2307E	2323D	2313
28			8	12	24	19	2323E	0017	2330
29				6	8		0122	0216	0133
29		19	32	30	17	16	0252	0340	0300
29		28	25	10			0830	0910	0844
29		32*	12				0952	1038	1010
29				8	13		2256	2338	2304
30	13	10	16	26	14	10	0158	0209D	0159
30	24	36	57	65	40	42	0209E	0345	0216
30		70	65	27			0726	0844	0732
30					60	62	1923	2016	1929
30	12			10	12	12	2355	0017	0002
31		84	61	13			0912	1004	0933
31		68	22				1113	1214	1131

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