ISSN 0021–0382

F—497

IONOSPHERIC DATA IN JAPAN

FOR MAY 1990

VOL. 42 NO. 5

CONTENTS

COMMUNICATIONS RESEARCH LABORATORY
MINISTRY OF POSTS AND TELECOMMUNICATIONS
TOKYO, JAPAN

INTRODUCTION

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

Station	Geographic		Geomagnetic		Technical Method
	Latitude	Longitude	Latitude	Longitude	
Wakkanai	45°23.5'N	141°41.2'E	35.3°N	206.5°	Vertical Sounding (I)
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

MAY 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	62	62	62	57	56	66	76	84	92	86	93	100	104	98	93	84	91	99	94	90	84	73	74	75
2	75	77	72	73	65	72	78	91	103	89	94	100	100	110	115	110	100	100	97	88	84	84	71	72
3	76	81	77	60	64	67	87	86	94	86	94	100	98	100	110	101	98	104	107	90	66	68	66	68
4	64	76	63	54	49	53	44	58	58			61	42	66	68	74	75	77	82	82	72	72	66	62
5	66	62	55	54	60	66	86	82	79	78	73	72	72	71	80	88	92	88	84	90	108	68	73	67
6	74	65	60	64	65	71	66	66	70	65	70	A	75	72	82	75	85	88	82	85	74	77	70	65
7	66	64	67	66	60	66	78	91	90	88	91	89	90	93	97	91	86	83	84	87	86	77	80	66
8	66	67	72	64	63	77	87	83	83	80	78	74	85	94	92	87	84	93	88	86	83	72	70	66
9	66	68	62	66	62	77	86	86	71	65	72	72	67	68	55	72	70	68	72	83	82	68	64	69
10	58	64	54	58	54	60	66	65	A	62	46	62		63	A	66	64	64	68	65	66	66	58	62
11	62	57	52	51	42	50	60	60	71	A	87	95	86	86	96	91	90	82	82	84	86	91	73	74
12	73	65	66	65	61	64	B	64	A	74	81	87	91	92	93	92	84	86	84	80	78	64	84	80
13	74	63	63	66	64	79	94	102	94	91	86	85	91	92	91	90	86	88	89	90	85	83	86	84
14	80	79	71	66	65	79	80	79	77	69	75	82	86	84	84	80	83	78	75	74	79	80	85	85
15	80	77	76	69	66	80	87	91	94	95	96	94	96	89	98	88	97	88	84	78	82	87	82	77
16	79	78	79	63	68	79	108	106	107	100	112	106	99	99	100	103	94	90	84	99	88	88	86	87
17	84	84	82	76	79	88	99	92	91	91	89	91	88	91	91	92	93	90	91	89	79	86	87	84
18	82	85	86	73	67	82	91	102	98	100	94	95	91	97	92	91	84	88	84	90	88	85	89	70
19	71	57	43	55	60		39		A			74	59	69	60	81	70	67	64	69	71	71	74	74
20	62	78	68	63	66	77	85	94	96	89	91	98	102	96	100	94	85	84	83	85	89	87	78	87
21	86	86	78	66	58	71	69	73	74	80	90	86	88	86	86	84	83	84	78	84	90	86	86	87
22	N	74	66	48	59	61	52	79	81	81	91	81	89	74	A	86	83	86	84	87	81	87	88	71
23	68	60	63	64	51	89	A		A	100	A	A	A	41		52	50	57	60	A	59	54	68	63
24	62	63	58	58	64	67	66	72	64		61	61	77	74	73	A		72	78	54	76	78	80	68
25	75	70	62	58	59	64	71	66	64	57	63	78	81	78	77	79	80	A	83	A	76	62	74	66
26	55	64	67	61	A	63	55	A	84	97	A	A	A	58			60	66	63	58	57	64	64	68
27	60	64	62	57	51	66	B	72	73	70	A	79	68	69	66	76	84	70	81	68	71	63	57	63
28	60	60	56	54	52	66	84	A	A		A		A	A	A	58	58	A	57	68	72	66	70	77
29	72	74	64	64	63	66	70	85	64	102	A	A	A	67	66	63	64	59	62	A	75	69	79	71
30	70	64	65	62	63	80	76	A	65	59	58	105	64	56	64	71	75	79	72	71	70	78	73	66
31	74	60	62	49	58	71	70	A		61	82	A	A	A	89	A	58	A	64	68	65	79	80	54
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	30	30	28	25	25	26	24	25	25	29	26	28	30	28	31	28	31	31	31	31
MED	70	65	64	63	62	69	77	83	81	84	86	86	88	84	90	85	84	84	82	84	79	77	74	70
U Q	75	77	72	66	65	79	86	91	94	91	92	96	93	93	96	91	90	88	84	88	85	85	84	77
L Q	62	63	62	57	58	66	66	69	70	69	72	74	73	68	73	74	70	71	72	70	71	68	70	66

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT WAKKANAI

MAY 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	28	G	G	G	G	G	G	G	46	45	G	G	G	G	G	51	G	G	38	41	30	26	G	G
2	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	24	G
3	G	G	28	G	G	G	G	G	G	56	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	46	G	39	44	G	29	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	52	42	G	56	40	G	27	G	G
6	G	G	G	G	G	G	41	47	62	56	46	94	58	G	G	G	G	42	43	66	42	28	G	45
7	G	G	36	31	G	33	G	G	57	61	G	G	G	G	G	G	45	40	38	35	31	29	28	32
8	30	39	29	G	G	G	G	G	G	G	56	G	G	G	58	G	G	G	G	G	47	37	G	29
9	G	G	G	27	28	32	54	60	73	60	74	57	G	60	G	G	G	50	42	36	32	33	36	G
10	G	G	G	G	G	G	G	48	62	G	G	G	G	G	63	47	G	G	G	G	27	G	G	24
11	29	46	29	G	G	G	47	54	166	62	57	66	58	58	97	G	G	G	40	46	44	60	39	38
12	33	32	33	G	G	37	B	54	64	59	47	47	47	G	G	G	41	46	36	G	34	28	G	G
13	G	G	G	G	G	G	G	57	73	71	G	G	G	G	63	G	G	56	56	41	26	G	G	G
14	G	G	G	G	G	G	G	40	G	G	G	G	G	G	47	G	42	G	54	39	28	49	G	G
15	G	G	G	25	G	G	G	41	55	49	52	51	54	58	G	G	G	G	38	G	29	33	G	G
16	G	G	27	27	G	38	43	G	45	G	G	G	57	G	47	78	70	78	63	95	92	70	44	G
17	G	G	G	G	G	36	G	G	G	G	G	G	G	56	G	63	43	44	58	46	55	44	G	G
18	G	G	G	G	G	G	G	G	60	60	G	G	G	G	54	G	G	38	43	32	30	G	G	G
19	G	G	G	G	30	G	G		53	G	G	G	G	G	G	G	G	G	G	41	36	32	36	44
20	30	39	32	G	36	38	G	69	G	G	G	62	G	92	G	50	59	49	47	41	44	G	G	G
21	G	G	G	G	G	36	G	G	G	G	47	G	54	G	56	G	G	G	39	59	58	28	44	G
22	G	G	G	G	G	G	44	90	59	G	G	G	G	48	80	G	G	G	G	G	G	G	G	G
23	27	33	92	73	50	94	88	176	175	110	98	78	65	G	G	G	G	49	54	66	60	70	29	24
24	G	25	27	33	G	G	85	58	50	G	G	G	G	G	G	80		44	54	37	59	G	26	26
25	G	G	G	G	G	G	G	G	50	G	65	83	G	G	G	44	58	73	46	59	33	G	48	39
26	30	G	G	50	84	60	57	93	96	104	84	126	75	80	G	G	G	44	38	57	30	33	27	G
27	23	G	G	G	G	34	B	50	69	68	62	48	G	G	G	65	G	G	G	G	G	G	31	25
28	G	58	G	34	36	40	116	130	74	G	55		81	80	66	G	55	66	71	44	71	68	31	28
29	G	G	G	G	G	32	G	48	65	92	176	62	68	88	62	G	G	47	73	72	58	39	33	29
30	54	34	G	G	31	40	66	76	45	G	G	60	G	G	G	G	G	52	63	32	32	29	38	24
31	29	G	27	G	28	40	58	70	160	82	104	88	61	74	106	98	59	100	53	80	60	33	32	28
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	29	30	31	31	30	30	31	31	31	31	30	31	31	31	31	31	31	31
MED	G	G	G	G	G	G	G	48	55	G	G	G	G	G	G	G	G	40	42	41	32	29	24	G
U Q	28	25	27	25	28	37	50	60	69	61	57	62	57	58	58	50	43	49	54	57	55	37	33	28
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	36	G	27	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

MAY 1990

LAT. 45.4N LON. 141.7E 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	17	16	15	16	15	22	18	23	24	26	27	46	35	45	39	35	21	29	20	17	16	17	16	17
2	15	14	17	17	15	22	28	33	35	50	40	52	46	32	32	35	33	20	18	16	17	15	16	15
3	17	15	15	17	16	23	29	24	27	34	45	39	30	39	40	24	32	26	21	17	14	16	16	16
4	15	15	16	17	16	22	18	22				40	39	38	24	24	23	28	18	18	17	17	15	15
5	15	15	16	15	16	17	28	22	23	26	24	49	38	40	27	34	27	24	18	18	15	15	16	15
6	17	15	15	16	16	23	20	29	33	35	40	38	38	38	49	24	23	26	18	16	15	17	16	15
7	16	17	17	17	17	18	18	21	33	35	49	50	42	40	30	26	24	27	20	16	16	16	16	15
8	15	16	15	16	16	23	18	23	34	38	42	38	39	40	29	23	33	18	24	18	17	16	16	17
9	16	14	17	17	17	18	20	24	35	39	40	40	40	35	39	23	22	18	18	16	16	16	16	17
10	17	16	17	14	17	18	20	22	26	36	39	80	80	38	35	32	24	21	20	20	18	15	17	18
11	14	14	16	16	18	27	21	30	39	52	36	40	42	44	39	55	23	18	18	18	15	17	18	15
12	16	15	15	15	17	20	B	23	24	30	40	50	38	42	45	30	24	20	18	20	17	14	17	15
13	14	15	15	15	18	27	20	36	24	39	50	53	62	49	39	24	35	32	17	18	17	16	17	16
14	17	16	15	15	20	24	33	23	39	42	48	52	52	54	38	38	23	22	20	20	17	17	15	16
15	15	16	15	15	18	28	22	39	36	43	44	40	66	40	48	39	38	23	20	20	17	17	16	15
16	15	15	15	17	18	18	23	24	39	42	55	52	43	46	44	32	27	32	20	15	15	15	16	16
17	15	15	15	15	16	21	22	26	39	26	40	56	43	46	43	36	23	22	18	17	14	17	16	14
18	15	16	15	15	18	22	22	23	27	39	49	43	43	100	32	39	26	22	20	18	18	16	17	17
19	17	17	N	15	26	22	33		44	100	90	100	100	90	80	40	53	22	21	17	16	17	15	16
20	18	16	16	15	16	17	21	30	50	42	42	42	53	50	43	27	34	29	18	18	17	17	17	15
21	16	16	15	16	18	20	18	36	36	90	58	50	39	52	39	45	40	33	20	18	17	16	16	16
22	18	14	15	16	18	22	21	23	40	41	63	100	49	42	39	40	36	18	24	18	17	16	15	16
23	15	15	14	14	17	20	18	32	27	38	39	40	40	43	80	39	34	27	23	18	14	18	20	17
24	17	17	17	18	20	23	22	32	35	90	80	80	90	42	47	39		26	18	17	16	18	15	16
25	15	15	16	15	18	17	58	40	38	90	39	40	90	56	50	57	27	27	18	17	15	16	15	16
26	15	16	18	16	16	20	22	24	35	39	42	41	42	42	80	80	N	23	20	17	20	16	17	15
27	15	15	15	14	18	21	B	27	35	35	26	39	42	53	90	38	24	18	24	20	15	15	14	16
28	14	16	16	15	16	18	21	24	33	80	39		40	39	38	90	32	21	21	17	16	16	16	18
29	18	14	16	15	18	18	20	26	24	36	27	42	39	39	29	39	23	27	17	18	16	14	16	15
30	17	14	15	17	16	20	21	34	34	36	80	38	40	90	39	36	24	22	21	17	16	15	16	16
31	15	16	15	14	16	18	18	29	27	32	38	39	39	38	36	35	28	21	20	16	17	16	17	20
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	31	31	31	29	30	30	30	30	30	31	31	31	31	29	31	31	31	31	31	31	31
MED	15	15	15	15	17	21	21	25	34	39	41	42	42	42	39	36	27	23	20	18	16	16	16	16
U Q	17	16	16	17	18	23	22	32	38	43	49	52	52	50	47	39	33	27	21	18	17	17	17	17
L Q	15	15	15	15	16	18	19	23	27	35	39	40	39	39	35	27	23	21	18	17	15	15	16	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT AKITA

MAY 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	64	66	65	57	62	74	77	92	104	93	105	112	111	110	112	89	96	106	106	86	49	77	76	76
2	79	80	80	71	62	69	81	94	101	107	112	109	118	118	122	120	110	106	102	92	89	54	84	82
3	81	82	79	68	66	69	87	109		102	111	115	111	114	118	122	108	110	110	86	78	73	85	77
4	72	79	77	51	52	54	67	67	69	72	71	72	76	82	85	91	93	94	97	87	69	54	66	66
5	73	64	65	53	52	70	83	93	83	86	81	87	82	95	93	97	103	104	97	A	66	A	75	72
6	77	78	77	70	70	66	79	86	86	93	90	92	94	94	101	100	94	99	98	90	77	72	56	65
7	66	71	66	68	62	68	80	86	88	91	96	99	106	107	102	101	87	88	92	86	80	76	76	80
8	66	67	71	54	67	82	86	93	84	88	94	91	110	110	110	105	98	103	100	92	84	66	72	A
9	68	68	64	56	63	71	84	90	88	86	86	90	95	88	85	86	84	82	85	86	78	A	68	55
10	79	52	76	66	64	64	74	73	62	72	60	71	67	74	A	72	72	76	78	70	66	52	A	67
11	66	55	53	53	49	53	63	72	76		88	103	104	90	103	73	100	88	85	90	85	A	82	76
12	75	67	52	67	68	74	77	75	A	91	103	101	114	115	106	102	91	88	81	85	80	82	A	82
13	79	72	78	73	66	76	98	109	102	92	99	94	68	103	103	97	N	119	A	A	89	86	83	81
14	84	84	76	71	67	83	87	88	88	87	80	A	95	101	96	91	86	88	84	80	80	67	A	83
15	82	79	79	66	77	79	87	97	95	104	101	112	92	112	110	105	102	101	87	90	84	84	85	85
16	87	83	84	70	65	84	87	104	102	114	113	116	112	112	111	112		93	100	87	A	A	N	86
17	90	84	88	84	84	87	107	103	102	102	91	104	102	104	106	111	108	100	96	96	88	86	91	87
18	86	87	85	75	76	89	102	105	108	102	72	85	104	108	107	N	99	93	93	86	89	89	85	84
19	84	73	54	50	61	51	50	A	A			77	78	73	73	77	76	70	65	68	68	64	78	71
20	79	78	A	64	67	87	88	106	104	103	108	111	112	109	112	106	95	92	85	86	84	83	83	84
21	83	86	82	72	68	72	86	N	70	78	102	106	98	100	74	94	96	91	90	89	83	80	87	A
22	84	85	77	66	63	72	77	77	78	92	91	96	91	99	87	97	90	84	87	87	86	86	99	85
23	79	77	N	68	51	66	62	A		A	A	A	A	A			47	A	54	58	58	58	66	66
24	A	67	59	A	63	71	83	84	85	80	88	91	92	89	86	85	83	80	79	A	82	82	85	83
25	80	74	66	64	60	77	86	80	76	82	91	97	92	101	90	86	94	99	86	83	72	86	80	76
26	80	68	77	75	67	72	76	A	A	A	A	A	A	A	45		64	74	69	63	A	57	65	69
27	65	54	66	60	54	58	B	82	77	80	76	92	A	83	77	86	94	75	79	75	70	68	56	66
28	63	63	65	62	56	68	85	A	67	A	A	A	A	A	A	A	A	67	64	75	A	A	76	73
29	74	77	67	66	62	66	82	76	73	A	A	A	A	76	84	76	A	70	A	A	81	72	85	A
30	A	73	70	68	67	84	A	77	78	77	A	A	80	75	A	A	90	86	88	65	72	78	80	78
31	80	67	66	66	66	A	A	A	A	65	68				A	A	A	A	65	A	A	A	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	31	29	30	31	30	28	25	25	25	25	24	25	27	26	25	26	29	29	26	27	25	26	27
MED	79	73	71	66	64	72	83	88	85	91	91	96	95	101	102	97	94	91	87	86	80	76	80	77
U Q	82	80	78	70	67	79	87	100	101	102	102	107	110	110	110	105	99	100	97	89	84	83	85	83
L Q	70	67	65	60	61	66	77	77	76	80	80	90	86	88	85	86	86	81	79	75	70	65	72	69

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT AKITA

MAY 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	33	30	27	30	G	G	G	42	48	48	64	67	N	61	G	58	G	36	29	31	44	54	32	G
2	G	G	G	G	24	G	G	G	G	G	G	50	62	76	52	56	54	46	G	G	G	44	28	G
3	G	G	G	G	G	G	G	G		53	G	G	G	G	G	G	G	44	G	G	29	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	41	G	26	G	40	G	G
5	G	G	G	G	G	32	39	G	G	G	50	G	G	G	G	49	52	G	41	82	56	38	31	48
6	G	28	28	28	G	G	G	49	63	61	G	55	G	G	G	50	G	46	49	42	32	30	G	38
7	45	38	30	28	G	G	G	G	47	G	61	67	50	G	G	G	G	G	G	G	28	28	G	35
8	30	58	28	G	G	40	G	45	49	52	55	54	62	G	G	45	G	38	54	31	32	40	38	58
9	32	G	36	31	G	31	39	49	60	68	67	56	54	G	G	G	G	54	54	40	43	69	59	32
10	30	23	24	G	G	G	G	49	G	55	59	59	G	G	78	G	G	36	G	G	G	G	46	24
11	G	G	G	G	G	G	G	44	G	G	G	G	G	G	G	G	G	G	G	33	35	72	37	40
12	72	38	30	54	26	G	G	57	75	64	67	76	56	G	G	G	G	G	46	60	33	32	89	36
13	28	25	29	G	G	G	G	G	G	52	G	G	G	G	58	59	G	105	94	125	59	70	G	G
14	26	G	G	G	G	G	G	G	G	54	52	117	68	G	G	53	G	G	37	31	31	55	39	29
15	40	G	29	G	24	G	G	G	50	60	G	61	G	G	G	50	G	46	44	38	60	31	78	G
16	G	32	31	31	23	G	G	G	57	60	59	66	86	73	G	G		56	77	54	116	71	83	72
17	35	G	G	G	G	G	47	52	G	G	G	G	82	55	58	45	70	53	43	37	86	30	60	40
18	26	G	G	G	G	G	36	50	58	62	79	57	86	G	G	G	G	55	40	40	27	31	30	26
19	26	27	30	G	24	33	43	54	46		G	G	G	63	53	G	G	G	71	40	31	32	26	54
20	58	59	72	31	29	36	46	48	57	71	G	G	53	53	G	G	41	52	40	69	38	46	34	G
21	G	G	G	G	31	G	58	53	50	G	G	G	70	G	G	G	G	G	G	32	50	43	48	33
22	27	46	34	37	28	G	44	50	60	74	G	57	84	72	58	62	82	48	77	57	59	37	G	G
23	G	G	G	32	45	40	58	68	G	99	74	61	50	54	G	G	41	76	81	39	38	35	89	84
24	72	49	44	43	31	G	G	G	69	77	G	G	G	G	G	54	61	65	59	60	41	92	32	36
25	33	G	G	G	G	G	G	47	G	61	57	G	G	62	72	87	45	62	52	72	33	50	34	32
26	30	50	49	49	52	62	74	77	68	51	50	55	52	66	G	G	G	59	40	81	58	41	54	33
27	29	G	G	G	G	34	B	50	58	60	83	99	77	55	47	52	G	G	G	G	G	40	32	G
28	29	G	G	G	G	36	56	93	73	59	53	54	70	76	73	60	74	42	53	50	56	62	58	40
29	G	24	G	G	G	31	G	51	60	56	55	92	87	54	G	G	58	52	94	70	92	90	69	113
30	71	41	49	46	24	58	88	74	92	50	88	58	52	G	117	91	74	53	57	G	49	38	49	40
31	47	G	G	G	36	83	81	73	98	58	61	G			72	69	73	83	52	63	101	92	80	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	31	31	31	31	31	30	31	30	30	31	31	29	30	31	31	30	31	31	31	31	31	31	31
MED	29	G	24	G	G	G	G	49	50	56	52	55	52	G	G	45	G	46	44	40	38	40	37	33
U Q	35	38	30	31	26	34	46	53	60	61	61	61	70	61	58	56	54	55	57	60	58	62	59	40
L Q	G	G	G	G	G	G	G	G	G	48	G	G	G	G	G	G	G	G	G	31	31	32	28	G

HOURLY VALUES OF FMIN AT AKITA

MAY 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	17	16	17	16	22	16	17	21	21	24	23	33	30	20	17	18	15	16	17	16	16	16	17
2	16	16	16	16	16	21	17	17	20	22	21	36	35	39	23	23	21	16	17	17	15	16	17	16
3	16	15	16	16	15	21	18	20		20	26	48	24	24	22	42	17	16	22	16	17	16	16	16
4	18	18	15	15	17	20	18	15	21	23	46	48	30	26	21	21	15	18	23	16	16	15	17	15
5	16	15	18	17	17	16	16	16	18	21	22	50	26	22	22	22	17	24	16	16	16	16	16	16
6	17	15	16	17	17	16	21	17	18	23	38	34	45	39	22	21	20	16	17	15	15	16	17	16
7	16	16	16	16	17	22	16	16	22	22	36	22	30	45	22	21	15	15	15	16	16	18	18	16
8	15	15	15	17	15	22	16	18	20	22	24	39	26	62	24	22	17	15	15	16	16	15	16	16
9	16	16	16	15	16	16	17	16	21	23	38	40	38	39	44	22	21	16	15	15	16	16	16	16
10	15	15	18	15	16	16	17	18	23	24	24	39	90	80	35	22	26	18	22	17	16	16	15	16
11	16	16	15	15	16	23	16	22	46	100	36	61	55	45	54	63	21	18	17	15	15	16	16	15
12	16	15	15	15	16	16	48	20	21	24	38	42	38	34	26	22	17	15	16	16	16	16	15	16
13	17	15	15	15	15	22	20	23	21	48	28	46	50	63	27	21	23	20	16	16	16	16	16	17
14	18	15	15	16	15	17	18	21	24	38	38	37	38	44	26	26	17	20	16	16	16	17	17	17
15	16	15	15	16	17	24	22	23	26	30	48	44	71	64	50	26	24	22	17	16	15	15	16	16
16	15	15	15	15	15	18	17	24	38	45	47	46	42	45	48	26		18	17	15	16	15	17	16
17	15	15	15	16	15	16	15	21	22	26	46	62	35	35	35	24	21	17	20	16	18	16	15	15
18	16	15	14	15	15	22	17	18	23	24	41	28	35	72	50	26	21	20	15	15	16	17	16	16
19	17	15	15	15	15	16	21	35	80		100	100	100	41	36	24	20	16	16	16	16	16	16	16
20	16	15	15	15	16	20	18	20	24	26	48	39	38	35	35	22	20	20	17	16	16	16	16	18
21	17	15	15	15	16	20	18	20	24	63	63	51	40	39	52	26	39	20	17	16	15	18	16	16
22	17	20	15	15	16	18	21	20	23	26	70	38	40	42	23	23	20	22	18	16	17	16	16	16
23	16	15	15	15	14	18	17	17	N		36	40	42	42	41	70	21	34	22	22	15	16	15	15	16
24	15	15	15	15	15	23	16	21	23	35	34	60	33	34	62	24	23	18	16	20	16	15	16	15
25	16	15	15	16	15	20	64	21	24	39	38	39	38	40	36	23	23	22	16	16	14	16	16	16
26	16	14	14	14	15	16	18	23	24	28	42	40	39	40	40	38	22	22	17	20	16	16	15	15
27	15	15	15	15	15	20	B	22	24	24	38	24	38	43	39	36	24	18	16	20	16	16	16	16
28	17	15	15	16	16	16	16	21	22	28	28	36	39	39	32	27	22	16	16	15	15	16	16	15
29	17	15	15	15	15	16	16	18	22	28	38	39	26	40	28	27	20	17	16	16	16	16	16	15
30	16	15	15	15	15	16	17	16	23	27	28	38	36	53	35	22	24	17	21	17	16	16	16	17
31	16	15	15	15	15	18	18	20	21	26	34	70			42	22	17	20	16	16	15	15	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	31	31	31	31	31	30	31	29	30	31	31	30	30	31	31	30	31	31	31	31	31	31	31
MED	16	15	15	15	15	18	17	20	23	26	38	40	38	40	35	23	21	18	16	16	16	16	16	16
U Q	17	15	16	16	16	22	18	21	24	35	46	48	42	45	44	26	23	20	17	16	16	16	16	16
L Q	16	15	15	15	15	16	16	17	21	23	28	37	33	35	23	22	17	16	16	16	15	16	16	16

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

MAY 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	68	68	71	60	54	67	85	98	110	103	116	121	126	126	124	116	112	116	108	96	72	76	82	76
2	74	80	78	70		68	86	90	97	110	112	114	120	120	124	127	117	113	102	102	90	84	84	88
3	87	84	86	77	71	76	96	107	108	108	112	126	134	129	131	135	124	113	114	93	89	84	89	87
4	81	81	87	73	57	62	79	77	80	86	84	94	94	105	102	102	104	103	101	102	73	77	83	77
5	66	83	71	63	63	64	88	99	84	85	88	91	95	106	106	107	116	114	104	88	65	72	77	82
6	78	80	78	76	68	67	80	87	91	98	98	102	104	109	118	118	107	105	108	101	81	71	73	65
7	72	76	72	70	62	65	82	96	88	90	104	112	118	121	117	110	100	98	106	103	75	70	73	80
8	76	74	74	69	68	80	94	99	89	91	108	112	118	119	122	120	111	118	A	102	87	76	80	76
9	77	72	69	67	63	80	87	97	93	91	91	105	112	112	101	100	91	89	91	88	80	69	A	78
10	86	80	82	72	65	64	78	75	68	64	59	90	83	81	80	85	81	84	81	75	70	65	70	71
11	72	67	A	57	52	56	63	70	77	87	92	96	108	109	112	116	107	105	103	102	90	87	86	86
12	76	74	74	73	74	79	B	88	95	111	112	117	124	124	117	A	102	95	88	95	84	110	86	84
13	79	78	77	65	64	75	96	104	97	85	96	104	N	110	110	108	102	100	103	103	86	87	90	90
14	89	92	88	80	75	86	101	94	90	80	91	105	112	111	103	102	94	91	96	87	84	90	86	87
15	85	84	86	72	71	87	92	92	100	105	108	114	116	120	123	121	N	107	107	97	89	88	90	88
16	88	88	84	71	67	84	103	104	107	112	115	116	120	121	121	115	104	130	108	111	106	104	103	110
17	104	88	96	84	83	93	84	105	98	106	113	108	108	110	114	117	111	108	97	100	90	102	106	106
18	107	102	91	78	80	88	108	110	110	97	105	110	112	114	115	111	105	106	103	93	90	91	87	90
19	93	80	62	62	68	67	54	A	A	69	52	80	85	81	84	85	82	74	71	A	66	77	78	71
20	78	85	79	67	66	78	102	107	101	105	117	121	121	117	114	A	105	105	94	92	89	89	97	84
21	80	100	86	78	78	81	90	85	90	96	108	115	112	120	110	108	107	106	102	95	88	88	90	88
22	98	98	86	71	68	78	74	72	85	103	106	109	108	110	102	108	96		102	95	89	88	111	102
23	72	82	76	N	63	68	76	55	A	A	A		A	A		50	51	A	A	62	55	57	66	67
24	62	67	61	60	57	67	88	95	95	101	102	106	105	102	94	98	93	84	82		89	A	85	84
25	85	80	72	65	60	76	86	84	86	92	101	105	A	110	108	96	101	107	A	90	80	A	85	80
26	84	74	75	75	69	76	87	75	68	A	A	A	A		68	66	68	78	78	70	A	61	A	A
27	72	66	67	67	64	67		87	85	89	82	95	95	96	101	98	100	87	82	81	74	69	67	64
28	72	53	68	66	63	71	83	79	A	A	A	A	A	A	A	70	68	70	75	72	71	72	A	73
29	70	77	73		63	79	83	78	75	67	A	75	77	91	95	83	72	A	72	76	84	72	71	75
30	73	74	71	72	75	73	81	83	82	A	88	83	88	89	87	95	A	101	100	84	77	80	84	77
31	77	71	71	74	69	69	78	A	60	89	N	A	A		51	A	102	84	72	72	A	71	76	81
	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	29	30	31	29	29	28	27	26	27	25	27	29	28	29	28	28	29	29	29	28	30
MED	78	80	76	71	66	75	86	90	90	92	103	106	112	110	110	108	102	104	100	93	84	77	84	82
U Q	86	84	86	74	71	80	93	99	97	105	112	114	119	120	117	116	107	107	103	101	89	88	89	88
L Q	72	74	71	65	63	67	79	78	83	86	91	95	95	105	98	95	92	88	82	82	73	71	76	76

HOURLY VALUES OF FES AT KOKUBUNJI

MAY 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	58	44	33	48	32	G	42	62	58	48	57	159	66	68	G	G	G	38	36	35	26	41	59	39
2	30	35	33	32		28	G	G	G	G	55	56	55	58	G	48	47	40	34	32	40	59	68	34
3	53	34	G	24	27	30	G	46	55	54	64	50	50	50	57	109	136	74	70	40	G	G	G	G
4	G	G	43	36	52	38	38	57	58	50	G	G	G	G	G	G	42	G	G	G	G	24	G	G
5	30	25	G	G	G	G	37	44	47	46	G	50	51	69	53	58	47	38	54	66	49	44	28	32
6	30	51	34	G	G	G	G	56	58	47	60	G	69	52	G	G	G	G	38	30	24	33	44	48
7	28	G	G	G	24	G	G	G	48	50	G	G	G	50	G	G	49	40	44	31	35	26	G	79
8	G	G	47	34	45	G	G	44	53	50	G	G	G	51	53	62	69	64	108	81	55	41	23	66
9	54	38	29	G	G	29	40	49	58	62	80	75	G	G	G	G	G	G	58	110	32	59	60	49
10	59	49	28	26	G	G	G	48	57	53	52	51	G	G	G	G	47	38	G	G	G	G	G	44
11	33	59	56	27	G	G	G	57	50	G	G	52	51	G	G	G	G	36	G	32	23	29	58	57
12	35	40	54	36	31	32	B	55	65	82	55	58	67	58	92	112	57	65	39	54	65	32	28	28
13	50	26	32	30	G	G	G	G	G	59	G	75	59	G	G	G	46	58	69	43	95	92	31	G
14	G	G	G	G	24	G	G	48	50	58	75	86	68	93	52	G	G	G	48	33	G	G	92	40
15	28	39	45	34	29	G	G	50	51	57	62	58	56	101	G	G	G	G	40	G	G	45	G	30
16	G	58	33	34	32	G	48	62	71	62	G	59	G	G	G	58	121	129	54	57	G	58	94	40
17	57	54	85	55	25	G	54	55	82	61	G	61	62	64	61	85	62	62	57	40	59	60	57	58
18	43	23	24	G	G	56	G	50	62	60	64	60	60	75	54	G	48	58	91	60	28	58	38	26
19	32	28	G	31	61	31	44	52	58	97	56	64	G	60	G	G	G	47	34	66	30	G	33	G
20	G	G	28	26	24	34	50	49	51	59	93	62	57	G	62	114	101	74	37	49	82	60	50	49
21	31	35	38	38	34	G	40	67	62	59	48	50	58	65	64	51	G	G	G	G	G	58	58	58
22	36	92	33	32	32	44	54	61	54	65	66	57	G	62	61	58	75	102	70	62	57	51	107	93
23	72	G	G	24	42	52	50	49	58	55	53	G	55	147	G	G	53	87	142	26	27	56	G	43
24	132	54	44	41	G	30	46	47	58	62	64	68	49	57	G	51	60	69	103	145	104	108	33	44
25	28	36	30	27	24	G	G	55	52	57	G	50	119	108	95	60	61	62	106	58	71	92	126	31
26	55	23	36	58	G	34	59	62	62	58	54	67	68	G	74	46	67	72	44	33	62	58	58	82
27	27	32	24	30	33	35	G	48	61	64	69	82	84	103	101	54	G	G	G	28	G	41	32	32
28	30	37	55	26	G	G	48	59	172	64	87	76	74	57	68	69	49	47	46	44	54	76	95	72
29	32	28	G		G	G	G	47	50	51	53	54	60	60	G	60	53	91	53	38	68	68	58	70
30	50	48	49	30	26	50	48	G	48	90	83	75	75	73	62	93	104	68	46	G	43	31	41	58
31	62	48	36	49	44	53	64	93	58	50	126	184	102	G	60	90	122	86	60	67	126	59	59	70
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	30	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	32	35	33	30	24	G	38	50	58	58	55	58	57	58	52	51	49	58	46	40	35	51	44	44
U Q	54	48	44	36	32	34	48	57	61	62	66	75	68	69	62	62	67	72	69	60	62	59	59	58
L Q	28	23	24	24	G	G	G	47	50	50	G	50	G	G	G	G	G	36	36	30	G	31	28	31

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

MAY 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	14	14	14	14	15	18	23	16	17	20	30	29	32	32	28	21	18	16	14	16	16	14	15	15
2	15	14	15	14		15	17	17	20	18	21	23	26	23	39	20	18	17	16	15	14	15	15	15
3	15	14	14	15	14	14	16	16	18	22	23	22	21	23	20	21	18	16	15	15	16	15	16	16
4	15	15	14	15	14	14	15	15	17	23	26	29	27	27	20	20	17	15	17	17	15	16	15	16
5	15	16	15	15	15	18	15	16	17	18	22	28	27	24	23	17	17	16	16	15	16	14	15	15
6	14	14	14	14	15	21	16	16	16	20	36	39	34	26	22	18	18	16	15	14	15	14	15	15
7	14	17	15	15	15	21	15	15	17	17	33	26	27	30	24	22	16	14	15	15	15	15	16	16
8	16	16	15	15	14	21	18	17	20	22	29	30	42	26	21	20	20	16	16	15	15	15	16	15
9	15	15	14	15	15	15	17	17	18	29	32	26	38	43	41	21	21	16	15	14	15	14	15	14
10	14	14	15	14	15	16	17	20	21	26	28	35	55	33	28	21	20	16	16	16	15	16	15	14
11	15	14	14	15	17	22	31	20	30	60	30	34	33	33	43	66	20	16	17	14	15	14	15	15
12	15	14	14	15	15	16	B	17	21	26	34	34	38	36	28	22	18	16	15	15	15	15	15	15
13	15	15	15	15	15	23	18	17	21	26	44	34	35	45	22	20	17	17	15	14	14	15	15	16
14	15	15	15	15	15	18	33	17	21	34	32	33	32	30	26	21	17	16	18	15	15	16	14	15
15	14	14	14	14	14	24	21	21	22	41	36	42	43	61	33	28	20	20	18	18	16	14	16	16
16	18	14	14	14	14	17	20	21	22	26	59	42	53	43	33	21	18	16	21	17	15	16	15	15
17	15	15	14	14	14	23	16	21	24	24	28	42	30	32	30	22	17	17	16	15	16	15	16	15
18	15	14	15	14	15	18	17	18	21	24	26	39	39	39	26	23	20	16	16	15	15	15	15	15
19	15	14	16	14	14	16	17	23	33	36	33	40	36	35	30	23	18	16	16	15	16	15	15	15
20	15	15	14	16	15	16	18	21	21	23	29	40	35	36	33	27	18	15	16	14	16	15	15	15
21	14	14	14	14	14	23	18	17	22	43	62	51	42	38	24	35	23	16	17	17	15	15	15	15
22	15	14	15	15	15	16	17	20	27	26	48	42	48	35	29	27	18	16	16	15	15	14	15	14
23	14	16	14	14	14	15	16	16	18	20	39		29	33	34	39	21	17	20	18	14	15	15	15
24	15	14	14	14	16	15	16	18	26	36	38	36	60	41	50	29	21	15	16	14	15	15	15	15
25	15	15	15	15	16	20	67	20	22	41	50	36	33	39	32	29	21	16	15	16	16	15	15	15
26	14	15	14	14	15	21	29	18	26	23	36	26	42		39	39	22	18	16	15	15	15	15	15
27	14	14	15	15	14	20	110	20	22	24	27	39	39	39	28	30	20	16	15	15	16	14	15	14
28	15	14	16	14	14	17	17	16	20	21	34	33	42	40	39	24	21	17	16	14	14	14	15	14
29	15	14	14		15	17	15	18	17	29	39	39	29	32	21	20	17	15	15	15	17	15	14	15
30	14	14	14	14	14	15	17	18	21	23	23	32	33	26	21	21	18	15	17	17	14	15	14	16
31	15	14	15	14	14	15	16	17	18	35	36	35	36	40	38	21	17	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	30	31	30	31	31	31	31	30	31	30	31	31	31	31	31	31	31	31	31	31
MED	15	14	14	14	15	17	17	17	21	24	33	34	35	34	28	22	18	16	16	15	15	15	15	15
U Q	15	15	15	15	15	21	20	20	22	34	38	39	42	39	34	28	20	16	17	16	16	15	15	15
L Q	14	14	14	14	14	15	16	16	18	22	28	29	30	30	23	21	17	16	15	15	15	14	15	15

HOURLY VALUES OF FOF2 AT YAMAGAWA

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

MAY 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	25	32	41	25	G	G	32	G	44	54	71	72	82	58	G	G	G	G	37	G	32	86	37	25
2	38	32	30	32	28	31	32	42	57	46	60	58	59	57	G	G	48	48	36	49	31	32	G	30
3	G	G	30	G	34	G	G	39	66	58	69	62	G	G	G	G	G	42	36	30	89	90	34	69
4	36	26	24	G	G	G	31	41	48	60	62	78	53	58	G	G	G	45	42	32	34	24	G	G
5	G	G	G	G	G	G	33	40	46	55	64	G	G	G	54	62	83	167	142	58	66	30	G	G
6	G	G	G	G	G	G	34	40	42	48	G	G	82	70	63	163	57	46	49	36	26	29	29	24
7	40	28	27	G	G	G	32	44	44	56	56	54		64	48	G	G	49	G	G	30	43	42	39
8	30	G	26	38	36	27	36	G	46	54	69	69	66	58	81	74	63	83	81	151	144	69	48	G
9	G	39	G	46	38	30	34	48	45	53	50	63	G	G	G	54	61	62	72	58	92	126	79	44
10	33	29	114	92	67	36	34	44	44	53	87	91	G	G	G	G	48	57	44	61	30	G	G	40
11	26	G	37	G	G	G	30	G	G	G	57	63	55	57	G	G	G	G	G	G	35	G	G	35
12	68	28	58	39	37	29	G	63	62	93	76	76	G	55	60	146	97	76	55	73	90	57	G	G
13	G	24	G	G	G	G	G	G	G	G	53	63	74	G	G	G	G	71	72	54	85	69	28	91
14	33	24	29	G	G	G	G	45	71	98	88	76	100	G	56	47	50	64	75	61	38	G	24	31
15	34	G	G	G	G	28	G	G	50	54	60	73	66	58	58	51	G	G	G	G	G	24	G	36
16	32	G	G	32	G	G	G	43	62	68	78	G	G	58	G	G	53	49	42	G	G	36	G	94
17	72	91	38	28	G	32	37	50	61	68	49	69	60	G	70	76	56	95	72	61	28	G	26	G
18	45	38	44	25	27	G	35	40	50	56	71	56	62	G	G	G	51	61	69	178	145	69	32	40
19	57	39	32	41	32	39	44	51	53	55	58	76	73	51	59	57	G	40	52	58	57	94	92	30
20	36	30	25	33	34	24	35	54	62	50	66	82	69	58	76	76	56	89	58	69	82	41	57	78
21	44	42	43	25	30	29	42	59	115	84	78	88	85	106	G	G	G	G	G	G	G	G	33	24
22	G	36	32	25	28	G	40	59	60	74		88	98	90	82	63	86	G	52	128	29	70	28	G
23	24	92	91	69	30	37	46	49	60	68	91	G	55	B	G	110	G	G	41	41	134	37	57	69
24	38	32	29	26	11	G	40	60	66	72	60	126	94	61	66	46	G	45	43	31	60	57	83	46
25	38	49	36	28	26	27	G	51	69	48	56	54	104	G	G	59	71	74	60	42	57	71	58	39
26	43	55	59	59	57	30	33	44	G	51	G	G	G	G	G	G	46	54	38	G	G	G	26	49
27	37	37	51	37	30	25	G	65	50	57	53	58	62	64	60	134	100	52	106	50	72	80	58	34
28	41	36	30	G	G	25	41	51	91	69	68	66	69	63	G	G	57	66	G	59	56	30	40	41
29	88	44	35	25	37	31	G	38	G	61	60	60	59	93	76	71	G	G	43	40	40	91	71	87
30	50	29	37	41	24	24	37	G	54	91	56	54	122	57	64	57	86	176	92	30	92	59	58	72
31	92	72	78	61	68	36	50	89	177	112	174	68	108	G	G	69	80	68	75	114	69	43	41	32
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	31	30	30	31	31	31	31	31	31	31	31	31	31
MED	36	32	32	26	27	25	33	44	53	56	61	63	64	57	G	51	50	52	49	49	56	43	33	36
U Q	44	39	43	39	34	30	37	51	62	69	71	76	82	61	63	71	63	71	72	61	85	70	57	49
L Q	25	24	25	G	G	G	G	39	44	53	56	54	53	G	G	G	G	40	37	30	30	24	G	24

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

MAY 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	16	15	15	15	15	15	16	16	16	22	34	32	34	37	45	42	21	20	17	15	15	15	15	15
2	15	15	15	15	15	15	16	18	22	24	29	39	40	39	46	33	33	22	16	15	15	15	15	15
3	15	15	15	15	15	15	17	16	18	21	32	35	33	44	38	38	22	20	20	15	15	15	15	15
4	15	15	15	15	15	15	16	15	18	33	29	27	33	32	30	28	23	18	16	15	15	15	15	15
5	15	15	15	15	15	15	16	16	17	23	36	40	41	45	39	28	17	17	15	15	15	16	15	15
6	15	15	15	15	15	15	15	16	17	23	46	36	39	32	26	22	22	18	15	15	15	15	16	15
7	15	15	15	16	15	15	15	16	17	20	35	35		32	32	28	22	18	15	17	15	15	15	15
8	15	15	15	15	15	15	15	16	18	23	35	35	40	36	38	33	23	22	16	15	15	15	15	15
9	15	15	15	15	15	15	16	16	22	34	33	39	43	46	44	40	24	18	16	15	15	15	15	15
10	15	15	15	15	16	15	17	21	22	27	34	36	56	52	44	27	36	17	16	15	15	15	15	15
11	15	15	15	15	15	15	16	17	38	54	34	39	38	38	62	58	24	18	16	18	15	15	15	15
12	15	15	15	15	15	15	34	16	23	35	39	39	54	42	33	27	24	20	15	15	15	15	15	15
13	15	15	15	15	15	15	16	16	34	44	36	43	42	48	44	50	24	20	18	15	15	15	15	15
14	15	16	15	15	15	15	16	17	24	33	35	39	40	39	44	40	21	20	16	15	15	16	15	15
15	15	16	15	15	15	15	18	20	27	32	43	45	46	44	40	40	39	35	17	20	15	15	15	15
16	15	15	15	15	15	15	16	20	29	39	45	46	55	52	54	44	38	34	20	20	15	15	15	15
17	15	15	15	15	15	15	16	16	23	29	33	44	44	35	44	44	29	18	16	15	15	15	15	16
18	15	15	15	15	16	15	16	16	22	35	34	42	43	53	45	44	24	27	17	15	15	15	15	15
19	15	15	15	15	15	15	15	22	34	40	42	43	42	45	45	42	39	21	16	15	15	15	15	15
20	16	15	15	15	15	16	17	16	24	33	40	42	36	42	39	33	24	20	16	15	15	15	15	15
21	15	15	15	15	15	15	16	17	21	42	38	42	40	44	49	45	41	35	17	15	15	15	15	15
22	15	15	15	15	15	15	16	15	38	38		44	44	46	42	40	35	23	15	15	15	15	15	15
23	15	15	15	15	15	15	15	15	22	32	34	36	41	B	90	40	41	23	23	15	15	15	15	15
24	15	15	15	15	15	15	15	20	22	35	35	36	39	36	35	38	30	17	17	15	15	15	15	15
25	15	15	15	15	15	15	35	20	23	35	36	34	36	45	38	32	24	18	16	15	15	15	15	15
26	15	15	15	15	15	15	20	17	23	38	50	44	60	55	46	47	38	23	16	16	15	15	15	15
27	15	15	15	15	15	16	34	21	23	23	39	40	40	43	38	35	24	21	16	15	16	15	15	15
28	15	15	15	15	15	16	15	16	21	26	33	37	39	42	30	49	36	23	17	15	15	15	15	15
29	15	15	15	15	15	15	16	16	17	30	34	35	34	34	30	38	22	22	15	15	15	15	16	15
30	15	15	15	15	15	15	15	16	18	23	27	39	36	38	38	38	23	21	16	15	15	15	15	15
31	15	15	15	15	15	15	15	16	18	26	36	38	37			38	35	18	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	31	31	31	31	31	31	31	30	31	30	29	30	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	16	16	22	32	35	39	40	42	41	38	24	20	16	15	15	15	15	15
U Q	15	15	15	15	15	15	17	18	24	35	39	42	43	45	45	44	36	23	17	15	15	15	15	15
L Q	15	15	15	15	15	15	15	16	18	23	34	36	37	36	38	33	23	18	16	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

MAY 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	146	146	122	87	79	80	86	94	104	105	128	141	146	146	148	157	158	161	141	122	122	127	146	165
2	174	148	111	81	82	77	76	85	104	109	110	116	120	122	121	128	134	133	136	134	130	125	110	90
3	109	126	103	85	67	60	60	85	89	104	117	128	138	146	158	146	144	138	144	146	164	164	146	156
4	145	122	122	86	65	76	77	87	90	97	99	117	136	139	146	145	145	153	146	139	111	122	128	110
5	105	107	104	82	78	80	84	77	85	91	98	115	120	131	139	144	137	147	120	107	103	120	127	129
6	127	122	110	103	78	63	66	83	97	108	96	96	117	141	147	146	145	139	137	134	127	107	109	106
7	105	87	108	87	66	63	73	90	87	90	98	111	122	138	137	146	147	144	144	130	87	87	83	86
8	108	86	88	85	66	66	80	86	82	89	98	108	122	168	145	153	162	159	164	160	145	145	159	145
9	141	123	103	96	85	74	87	89	88	92	93	117	141		138	126	137	129	130	117	104		103	104
10	127	110	109	86	84	73	76	80	84	80	89	110	128		131	140	130	122	122	138	104	90	90	103
11	87	98	90	77	66	62	63	74	84	93	100	104	130	146	146	166	169	168	164	159	140	111	131	89
12	90	104	92	81	77	73	80	108	95	100	139	130	145	147	156	160	162	N	168	165	164	162	164	171
13	168	167	166	139	88	86	94	97	82	90	96	113	128	137	144	146	149	153	144	144	110		110	140
14	145	145	118	86	85	80	82	96	90	91	104	116	138	142	136	146	144	145	141	145	146	148	103	145
15	133	121	88	86	83	83	83	88	96	89	96	102	118	121	134	141	146	147	144	126	104	118	N	145
16	86	127	109	97	84	80	85	96	97	91	97	108	120	128	131	135	141	146	146	145	141	146	171	178
17	177	171	164	116	103	85	96	104	101	104	101	110	111	109	130	120	111	113	N	144	130	131	133	140
18	130	143	106	86	85	77	88	110	85	89	96	100	110	128	135	144	146	138	126	104	86	84	86	88
19	110	110	74	57	71	66	61	64	A	69	85	104	115	119	142	144	146	145	120	103	90	103	85	99
20	98	86	100	71	58	59	68	87	87	95	A	108	121	127	130	136	135	136	121	105	A	88	85	90
21	86	90	82	67	65	67	80	104	95	99	104	120	126	138	141	136	130	137	142	140	134	90	104	87
22	87	88	84	67	51	62	60	66	94	109	105	124	144	146	144	146	144	128	116	120	121	108	108	143
23	109	110	86	81	A	70	72	76	61	A	A	A	A	A	A	A	71	A	70	75	65	54	A	76
24	76	76	67	63	60	60	69	76	77	78	130	118	130	144	147	147	147	146	151	144	143	141	144	138
25	146	131	122	85	85	77	81	92	94	91	105	112	124	142	148	146	142	142	132	136	110	91	113	122
26	109	110	86	85	81	77	86	84	90	95	98	100	105	127	117	112	117	122	129	126	103	87	83	86
27	88	87	91	86	74	64	70	81	81	95	99	84	96	110	118	128	130	134	106	124	88	82	A	80
28	87	A	77	86	82	57	66	78	88	95	96	A	A	111	116	110	110	118	108	106	87	81	85	86
29	84	79	86	85	78	78	85	77	75	74	A	81	99	101	112	121	130	138	142	135	111	108	107	121
30	120	111	102	100	87	71	72	82	77	84	88	88	91	96	102	104	107	120	129	138	102	83	86	86
31	77	84	76	77	66	44	70	96	104	A	63	97	A	88	68	92	104	104	88	81	85	86	87	90
	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	30	31	31	31	30	29	28	29	28	28	30	30	31	29	30	31	30	29	28	31
MED	109	110	102	85	78	73	77	86	88	92	98	110	122	134	138	144	142	138	136	134	110	108	108	106
U Q	141	127	110	87	84	78	85	96	95	99	104	117	133	143	146	146	146	146	144	144	134	129	132	143
L Q	87	88	86	81	66	63	69	78	84	89	96	101	116	120	130	128	130	128	121	117	102	87	86	88

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

MAY 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	35	30	33	G	G	G	G	G	54	84	68	81	82	G	G	G	G	G	38	G	G	32	40	46
2	58	45	25	28	30	24	44	42	48	44	G	51	61	72	G	90	46	49	38	G	G	G	24	26
3	G	G	G	G	G	30	30	G	41	56	G	G	G	G	G	G	68	G	G	G	G	G	G	G
4	G	G	G	G	G	G	29	G	41	53	49	52	68	114	56	78	86	50	83	83	61	34	G	G
5	G	G	G	G	G	G	28	45	48	77	G	G	56	67	56	66	60	67	92	45	71	57	38	G
6	G	G	G	G	G	24	31	38	54	50	53	G	G	G	G	G	G	68	38	55	35	43	G	G
7	G	G	G	G	G	G	28	35	79	50	61	68	89	67	82	95	62	56	55	40	67	23	32	81
8	84	57	G	G	G	24	32	47	90	78	72	69	92	66	76	50	G	G	G	G	G	G	24	38
9	23	G	G	G	G	G	G	40	46	48	68	80	G	57	59	64	60	62	64	65	44	40	92	144
10	38	31	33	G	G	65	129	51	68	62	73	54	G	G	G	G	G	40	G	30	58	65	40	72
11	50	30	G	G	G	G	G	38	G	G	G	G	G	G	56	65	G	G	G	42	32	40	54	32
12	G	33	71	48	37	34	28	68	65	88	176	81	65	150	115	181	44	57	46	107	43	31	28	G
13	G	G	G	G	G	G	31	40	48	61	69	G	G	G	G	54	60	72	81	72	84	84	40	28
14	30	28	G	G	G	28	G	41	60	144	71	65	58	G	55	58	G	51	44	54	30	32	24	G
15	G	G	G	G	G	G	29	52	47	52	G	48	G	60	56	53	G	G	G	G	G	G	G	G
16	G	G	G	G	37	28	G	39	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
17	109	37	24	G	G	G	G	37	G	57	G	57	G	G	100	78	83	82	78	48	82	40	32	23
18	G	G	G	G	G	50	30	48	49	56	G	97	G	G	G	47	84	98	80	47	25	159	170	82
19	71	58	31	G	G	23	34	57	76	62	81	64	G	G	G	G	G	G	G	27	29	25	58	68
20	28	28	G	G	G	44	34	55	82	92	114	146	58	G	70	G	G	G	37	33	112	50	41	37
21	34	33	27	38	37	40	30	52	66	87	66	89	76	G	G	57	G	46	56	30	G	37	44	32
22	24	28	26	30	32	30	G	46	60	58	G	68	56	79	87	52	46	65	46	38	32	32	32	G
23	31	29	G	57	92	85	68	65	60	71	96	87	91	88	110	149	79	100	43	50	40	31	58	52
24	40	34	32	24	G	G	34	45	64	60	112	94	G	56	64	54	G	40	G	32	28	41	G	37
25	57	41	41	47	51	38	39	44	69	94	88	94	53	G	64	65	56	65	61	60	70	44	58	57
26	39	49	37	43	42	30	G	41	70	81	G	G	G	G	G	G	G	42	37	G	G	28	58	40
27	36	46	67	48	36	40	40	49	79	77	78	76	G	62	118	82	60	G	49	82	44	58	135	83
28	128	134	69	51	45	33	G	44	G	60	142	124	137	64	52	66	68	61	60	G	G	24	59	38
29	39	65	44	29	33	68	43	70	76	53	92	64	51	56	77	66	48	G	39	38	37	31	G	71
30	78	73	36	41	29	G	G	41	50	70	50	64	58	55	62	68	71	56	36	G	24	25	G	45
31	39	58	61	46	59	33	44	72	104	138	80	83	178	53	G	50	51	48	46	41	58	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	31	31	31	31	31	31	31	31	31	31
MED	34	30	24	G	G	28	30	44	60	61	68	65	53	53	56	57	46	49	43	38	32	32	32	37
U Q	50	46	36	41	37	38	34	52	70	81	81	83	68	66	76	68	62	65	60	54	58	43	58	57
L Q	G	G	G	G	G	G	G	39	47	53	G	48	G	G	G	G	G	G	G	G	G	24	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

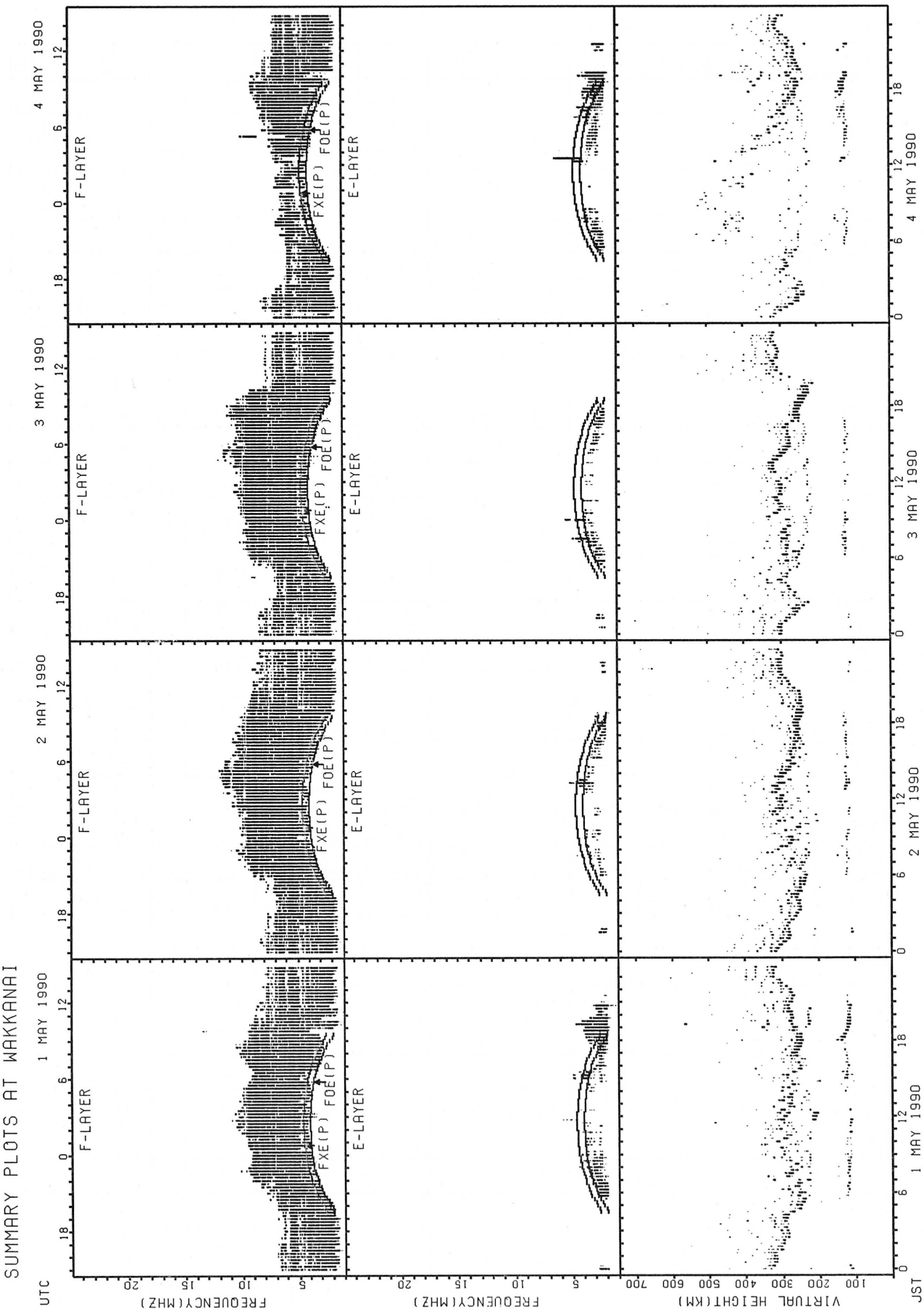
HOURLY VALUES OF FMIN AT OKINAWA

MAY 1990

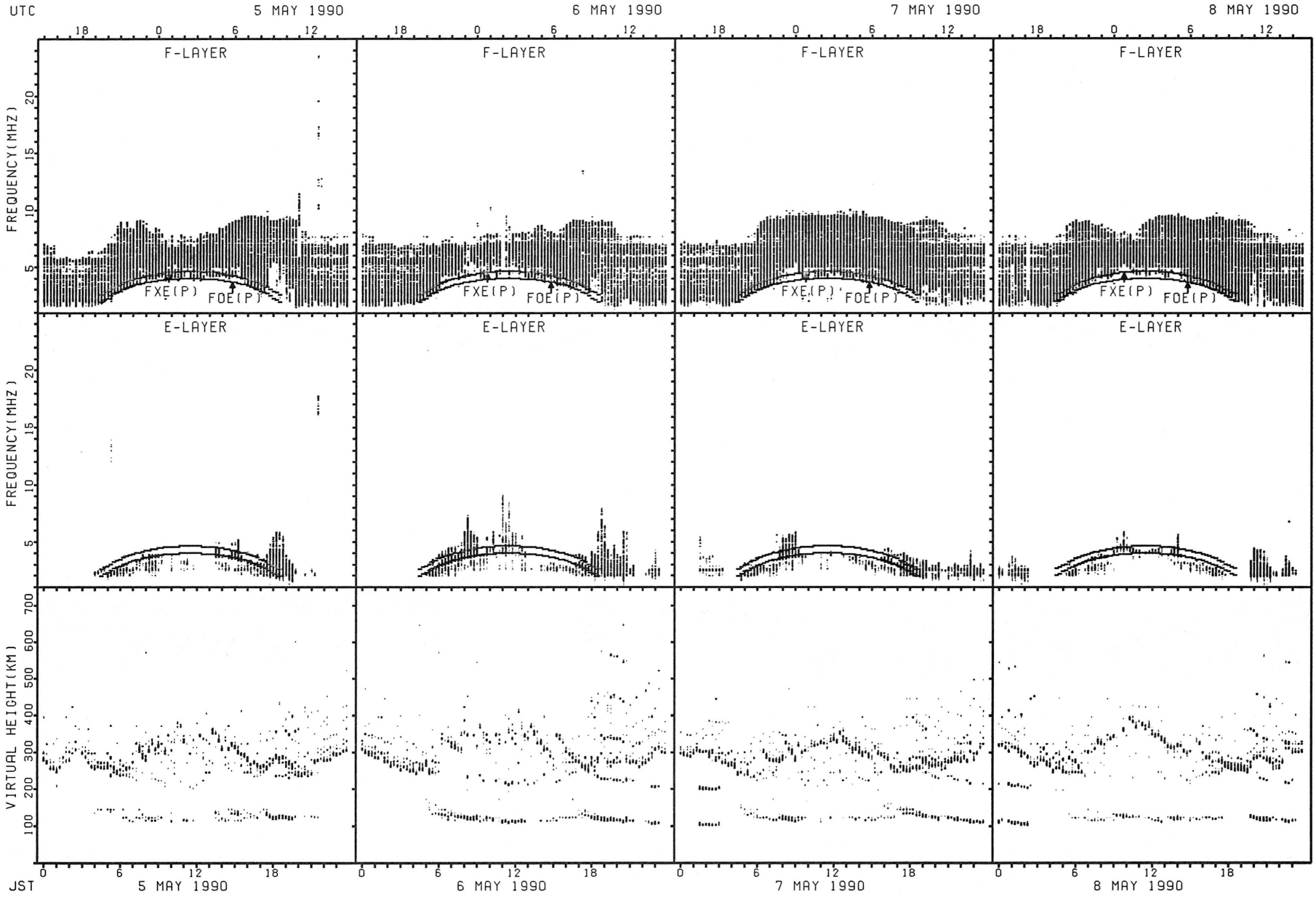
LAT. 26.3N LON. 127.8E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

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	14	14	15	15	18	17	18	26	26	32	28	33	27	27	35	23	18	18	15	15	14	14
2	15	15	15	14	14	15	14	17	22	27	27	28	39	29	48	35	32	23	16	17	15	15	15	15
3	16	15	15	14	15	15	14	16	20	24	29	29	33	30	26	36	24	18	16	17	15	16	15	15
4	15	15	15	15	14	15	14	15	16	26	26	27	32	28	27	28	24	16	15	15	15	15	15	15
5	15	15	15	15	15	15	15	14	21	26	30	40	36	40	39	28	24	16	14	14	15	14	15	15
6	15	15	15	15	15	15	16	16	17	24	32	33	33	34	28	26	22	15	14	15	14	15	15	15
7	15	15	15	14	15	15	15	14	16	21	30	32	35	30	28	27	22	16	14	14	15	15	15	15
8	15	15	15	15	15	14	14	15	20	27	32	28	29	34	27	28	26	23	14	17	15	15	15	14
9	15	15	15	15	15	15	15	14	20	26	29	29	32	36	32	29	27	20	18	15	14	15	15	15
10	15	16	15	17	16	15	15	15	21	27	28	28	54	34	36	40	28	20	18	14	15	14	14	15
11	15	14	15	15	15	15	15	15	27	48	28	34	34	34	36	50	27	17	16	15	15	15	15	15
12	15	15	15	15	15	14	22	15	26	26	29	28	27	32	30	28	26	18	14	14	15	15	15	15
13	15	15	14	15	15	15	15	15	21	24	29	33	45	50	30	42	27	17	14	14	14	14	15	14
14	15	15	15	15	15	14	15	16	22	28	28	30	42	33	32	30	27	20	14	15	15	14	15	15
15	15	15	15	15	15	15	15	22	27	29	34	34	54	34	34	30	28	24	17	20	15	15	15	15
16	15	15	15	15	14	14	16	21	24	27	50	48	45	49	34	27	26	22	17	20	15	15	15	15
17	15	15	14	14	14	15	15	20	24	27	29	33	34	51	45	29	26	23	18	15	14	14	14	15
18	15	15	14	15	15	15	18	17	24	28	30	34	32	62	30	29	28	28	21	15	14	15	15	15
19	15	15	14	N	14	14	15	18	28	28	32	39	39	48	34	45	28	26	21	15	15	15	14	15
20	14	15	15	15	15	14	16	23	24	26	27	30	44	47	32	50	26	24	18	15	15	15	14	14
21	14	15	15	15	14	15	15	15	23	42	33	36	30	49	45	30	29	24	18	16	14	15	15	15
22	15	15	14	15	14	15	16	15	27	27	58	45	30	30	28	29	24	21	16	15	14	15	15	15
23	15	15	16	15	15	14	15	15	26	24	29	39	33	44	44	28	27	26	27	15	14	15	15	15
24	15	14	15	16	16	15	15	15	20	26	27	27	56	39	30	29	26	17	14	14	14	15	15	15
25	15	14	15	15	16	15	22	21	22	28	34	32	32	57	30	30	28	23	15	15	14	14	15	15
26	14	14	15	14	14	14	16	17	22	26	44	44	32	31	43	31	27	23	17	21	15	15	15	14
27	15	14	14	15	15	15	24	17	20	24	28	28	29	46	38	28	26	23	14	15	15	15	15	15
28	15	14	14	14	15	14	20	15	17	20	24	29	30	34	32	34	26	23	17	20	15	14	15	15
29	15	14	15	14	15	15	15	18	20	26	28	29	29	29	28	28	22	17	15	16	14	15	15	15
30	15	15	15	14	14	15	21	17	21	26	27	29	29	28	28	29	27	29	27	21	15	15	15	15
31	14	14	14	14	14	15	15	16	23	27	27	28	29	32	28	38	27	22	14	14	14	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	15	16	22	26	29	32	33	34	32	29	27	22	16	15	15	15	15	15
U Q	15	15	15	15	15	15	16	17	24	27	32	34	39	47	36	35	28	23	18	17	15	15	15	15
L Q	15	14	14	14	14	14	15	15	20	26	27	28	30	31	28	28	26	17	14	15	14	15	15	15

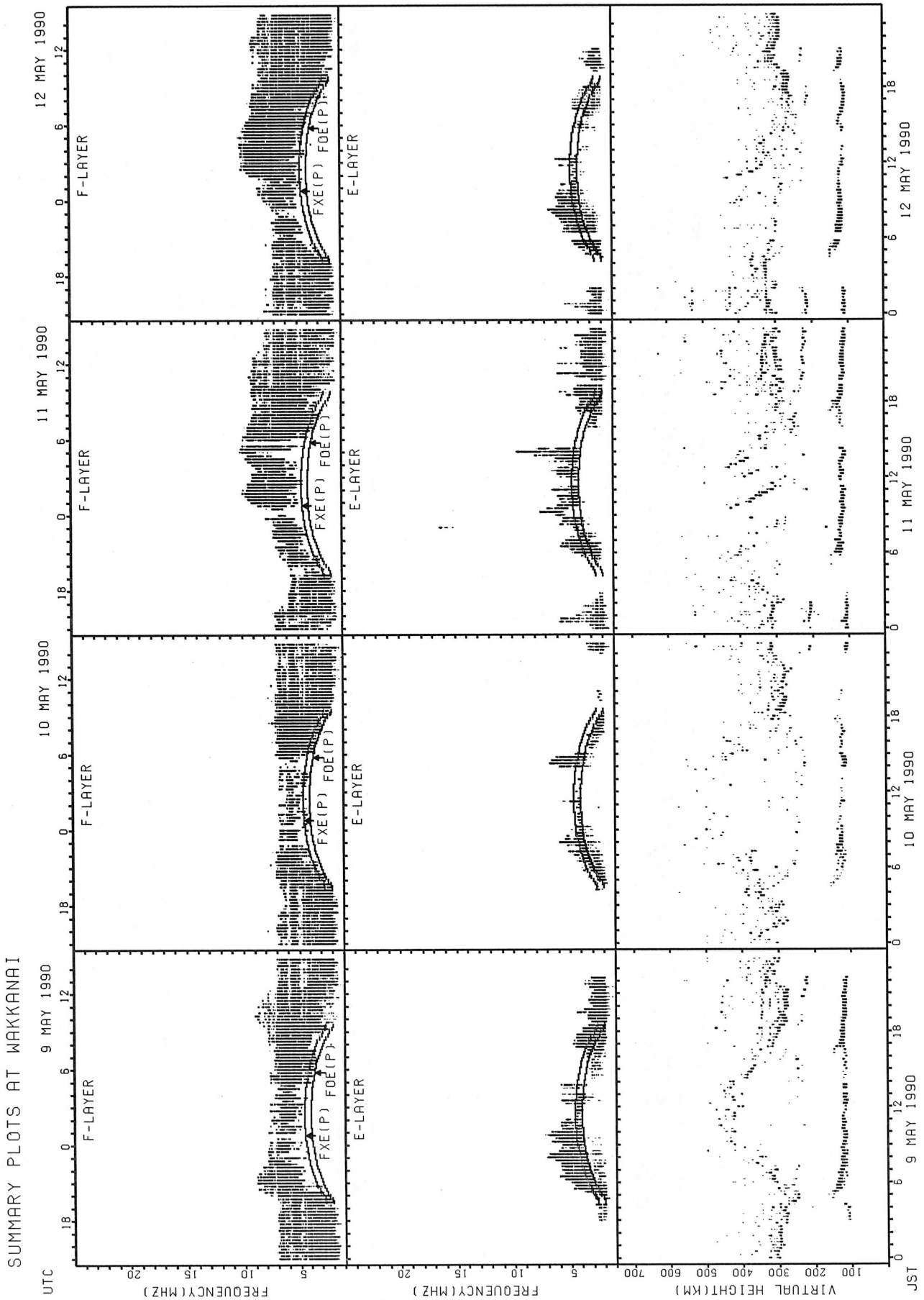
COMMUNICATIONS RESEARCH LABORATORY, JAPAN


SUMMARY PLOTS AT WAKKANAI
UTC
JST
1 MAY 1990
2 MAY 1990
3 MAY 1990
4 MAY 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

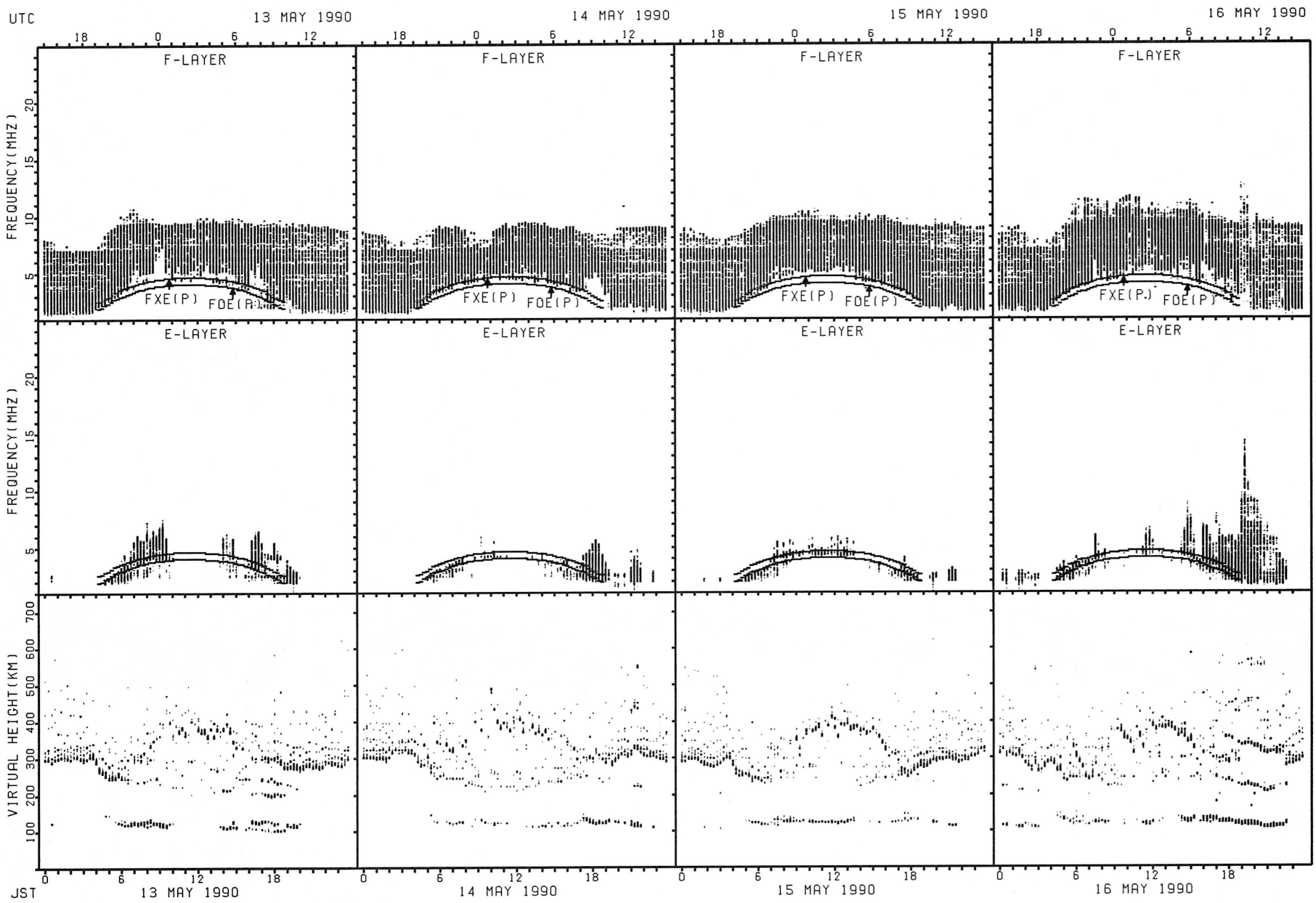
SUMMARY PLOTS AT WAKKANAI



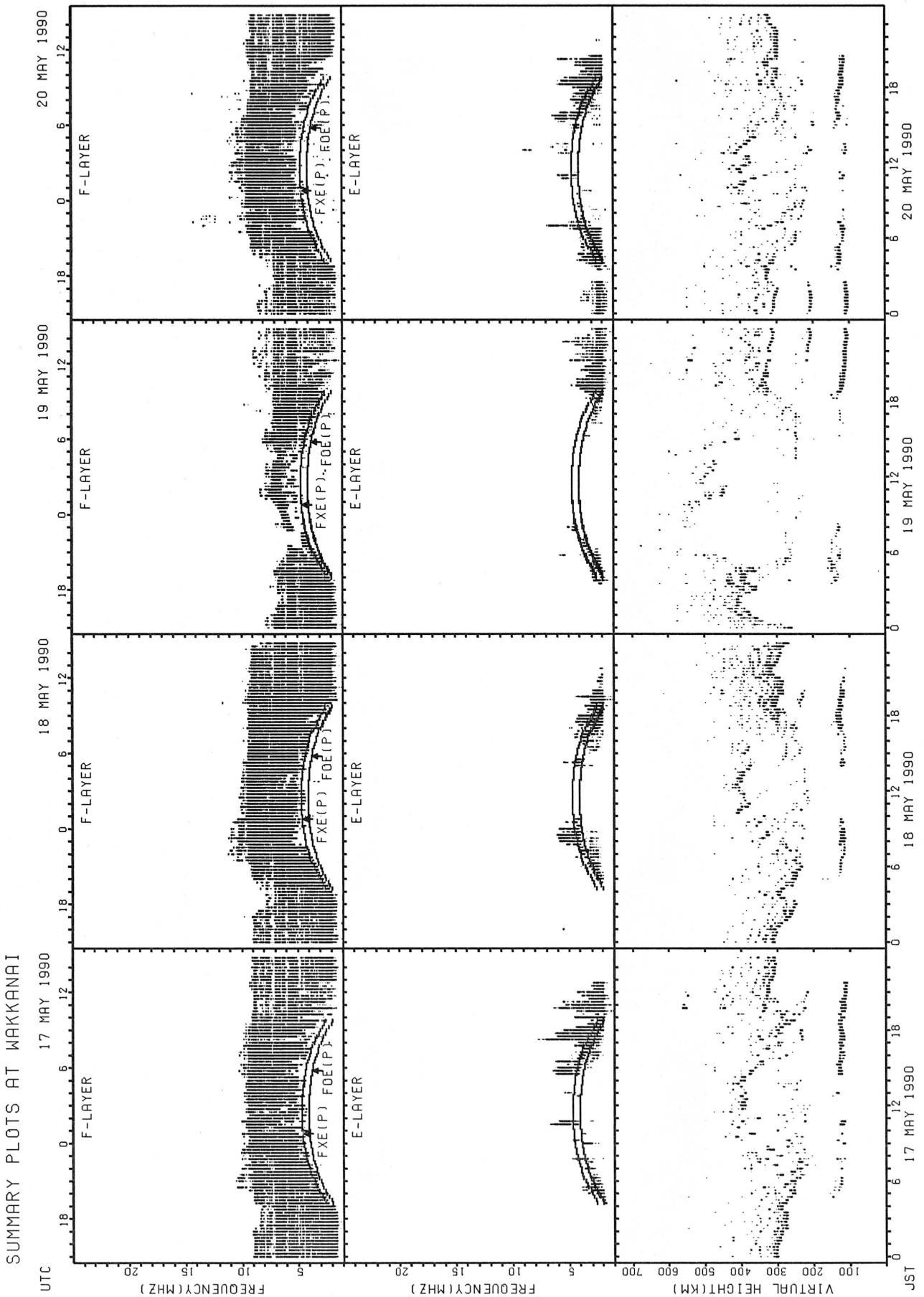
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
9 MAY 1990
10 MAY 1990
11 MAY 1990
12 MAY 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

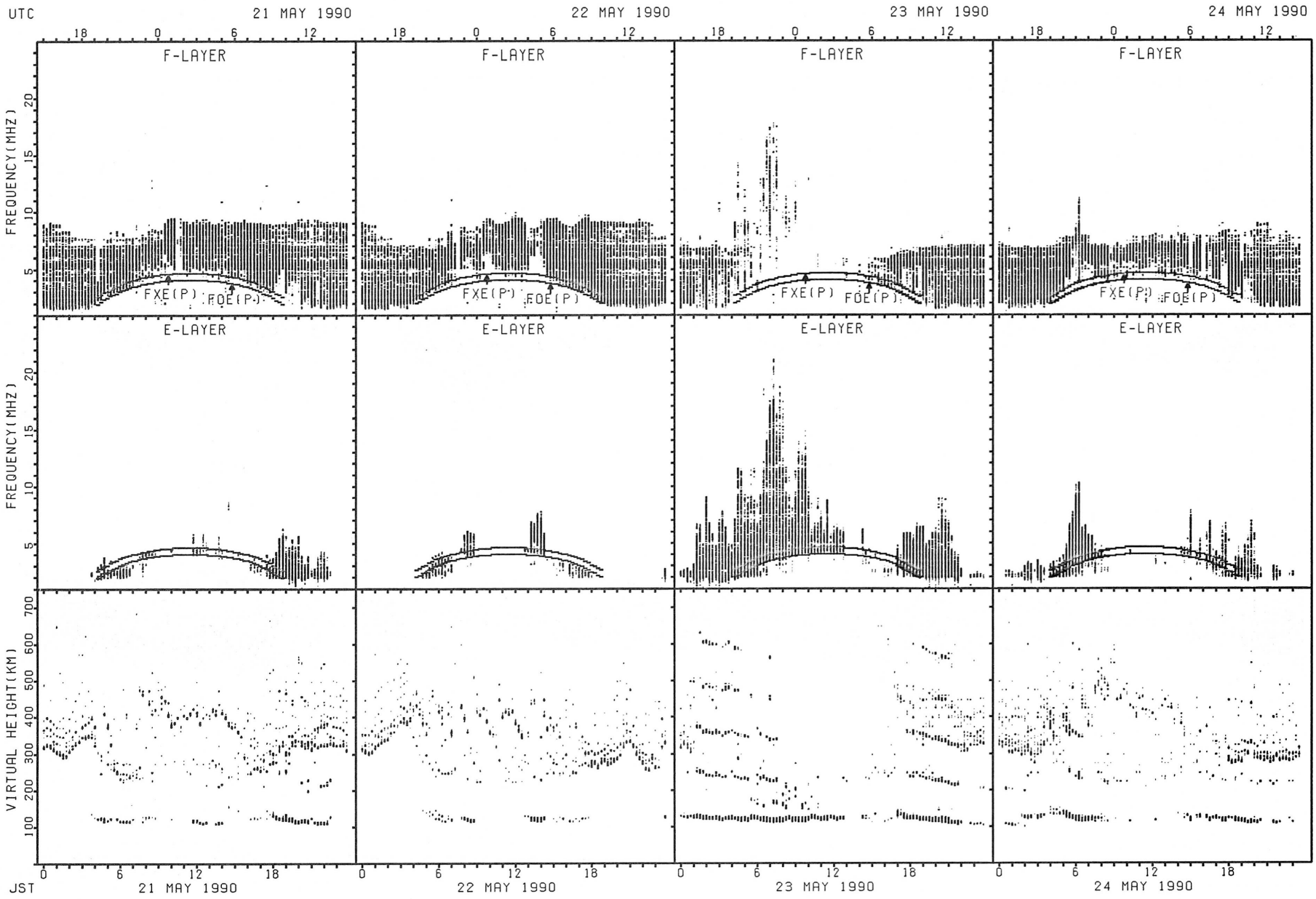
SUMMARY PLOTS AT WAKKANAI



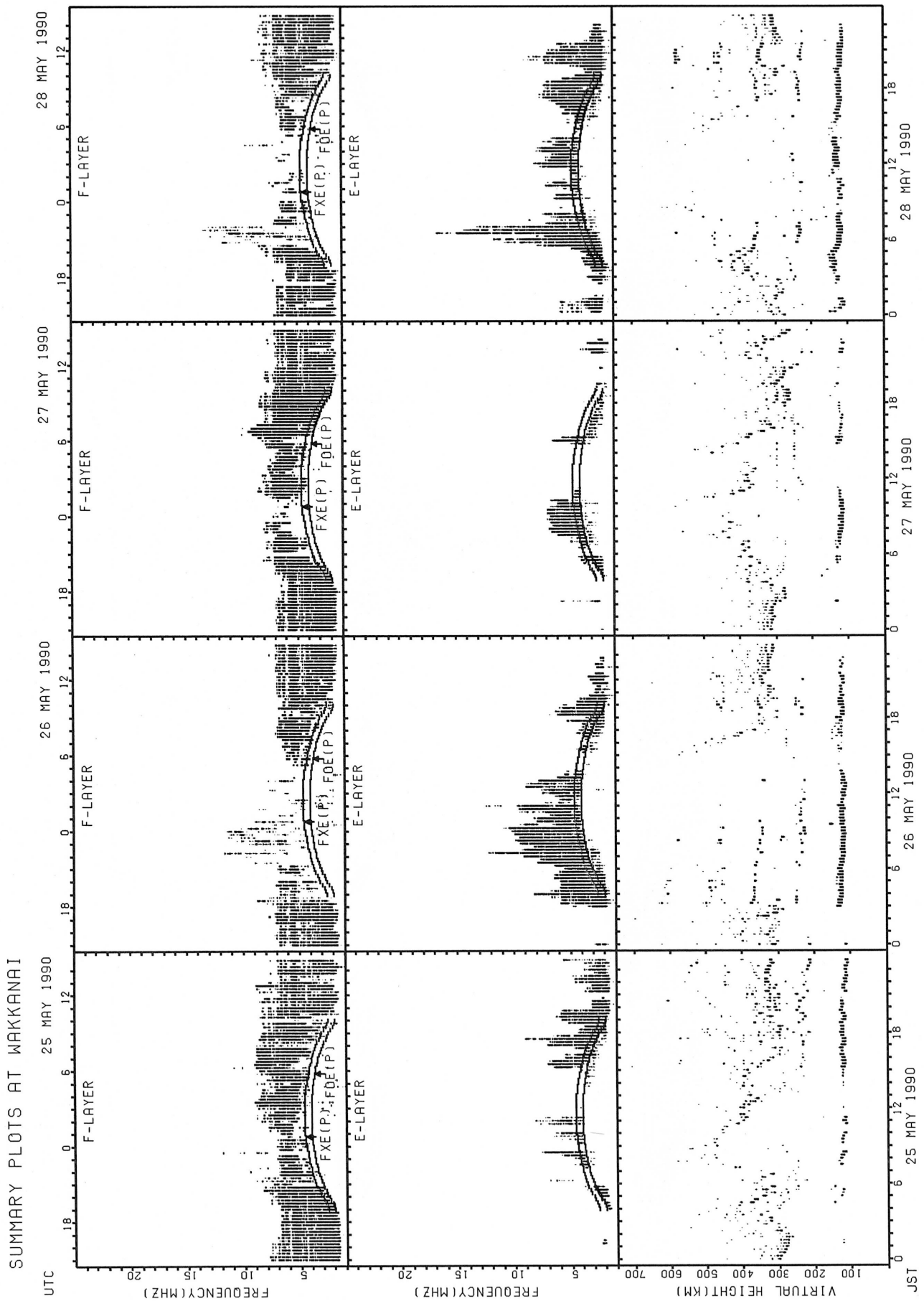
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
17 MAY 1990
18 MAY 1990
19 MAY 1990
20 MAY 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

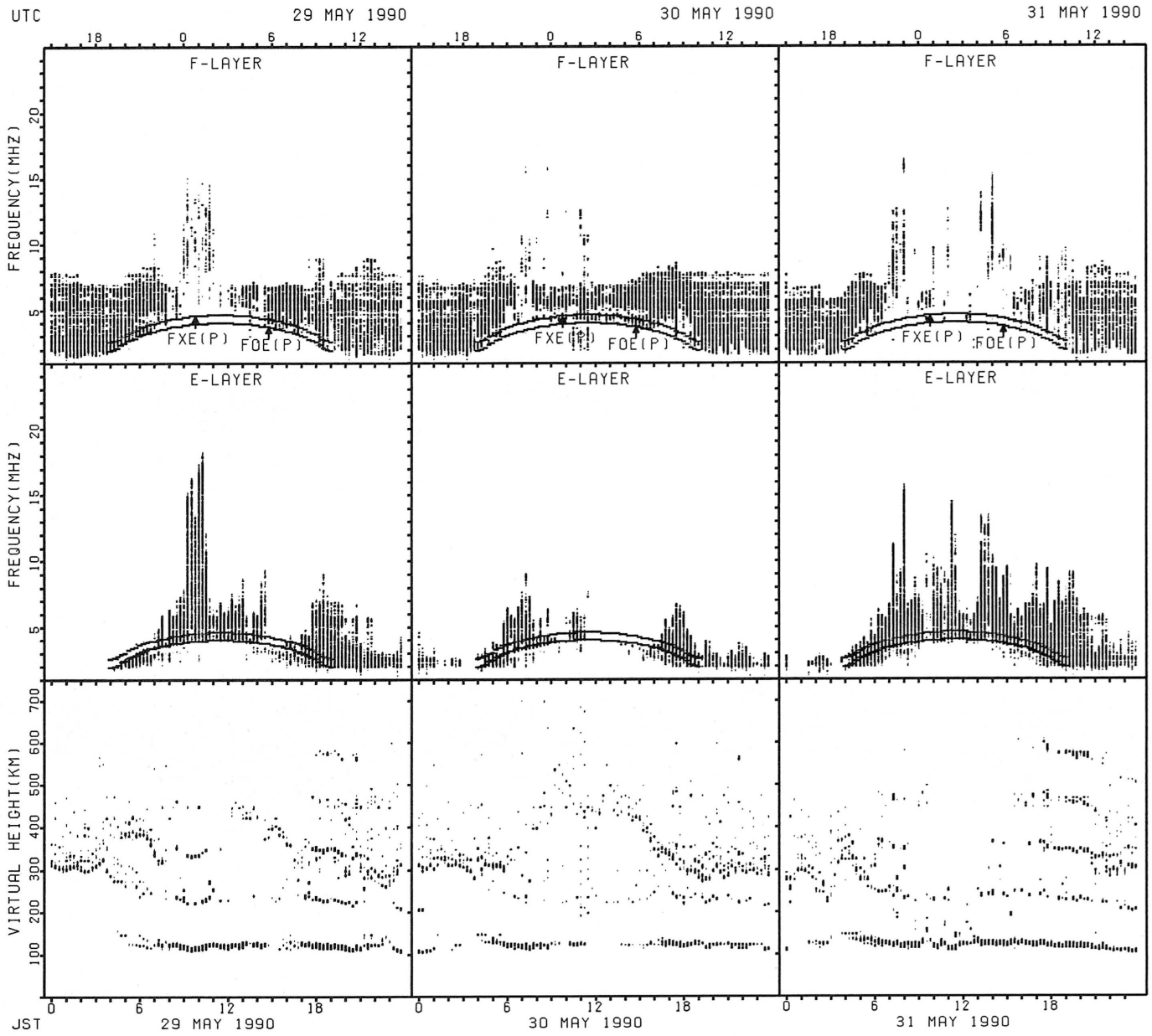
SUMMARY PLOTS AT WAKKANAI



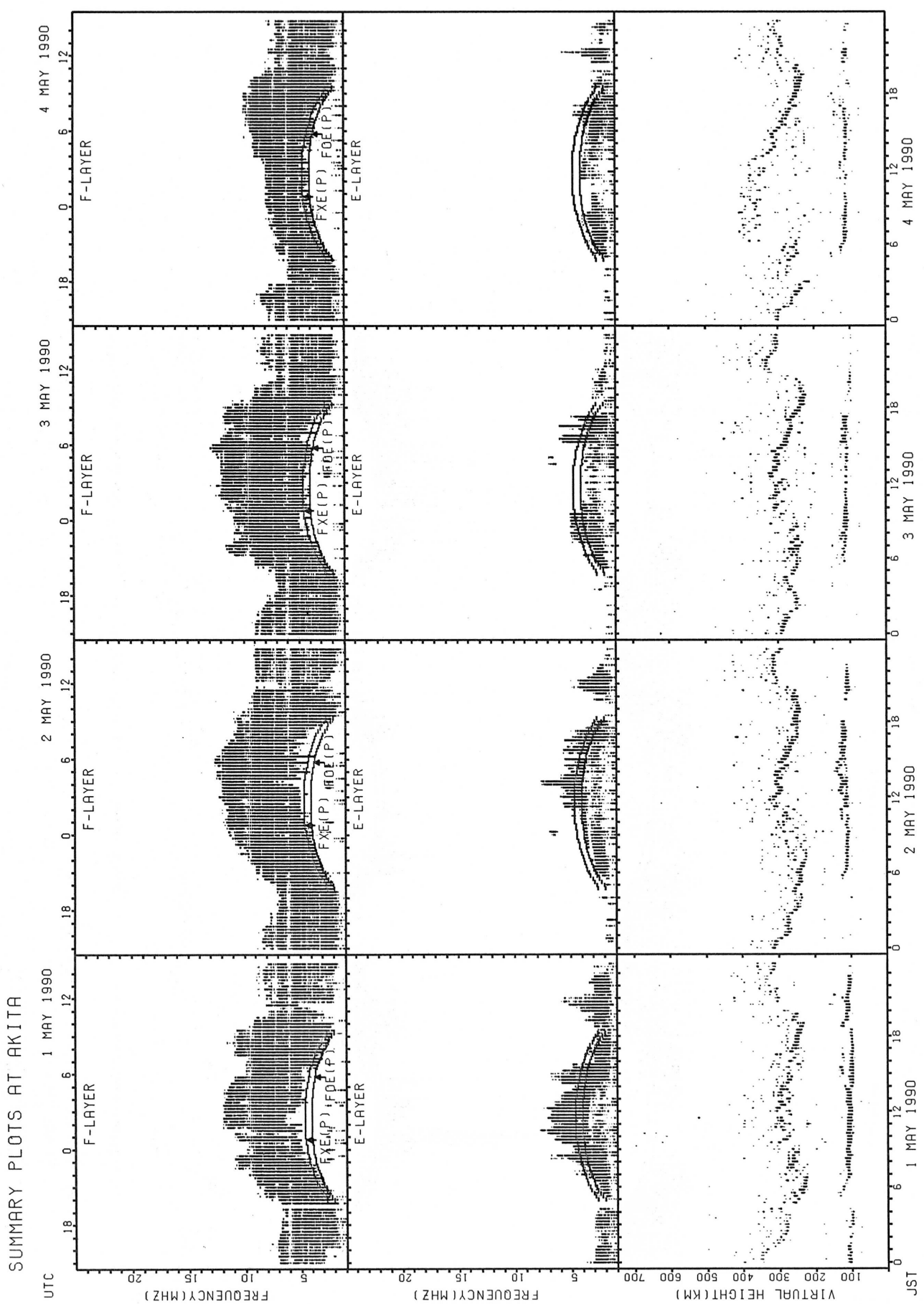
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

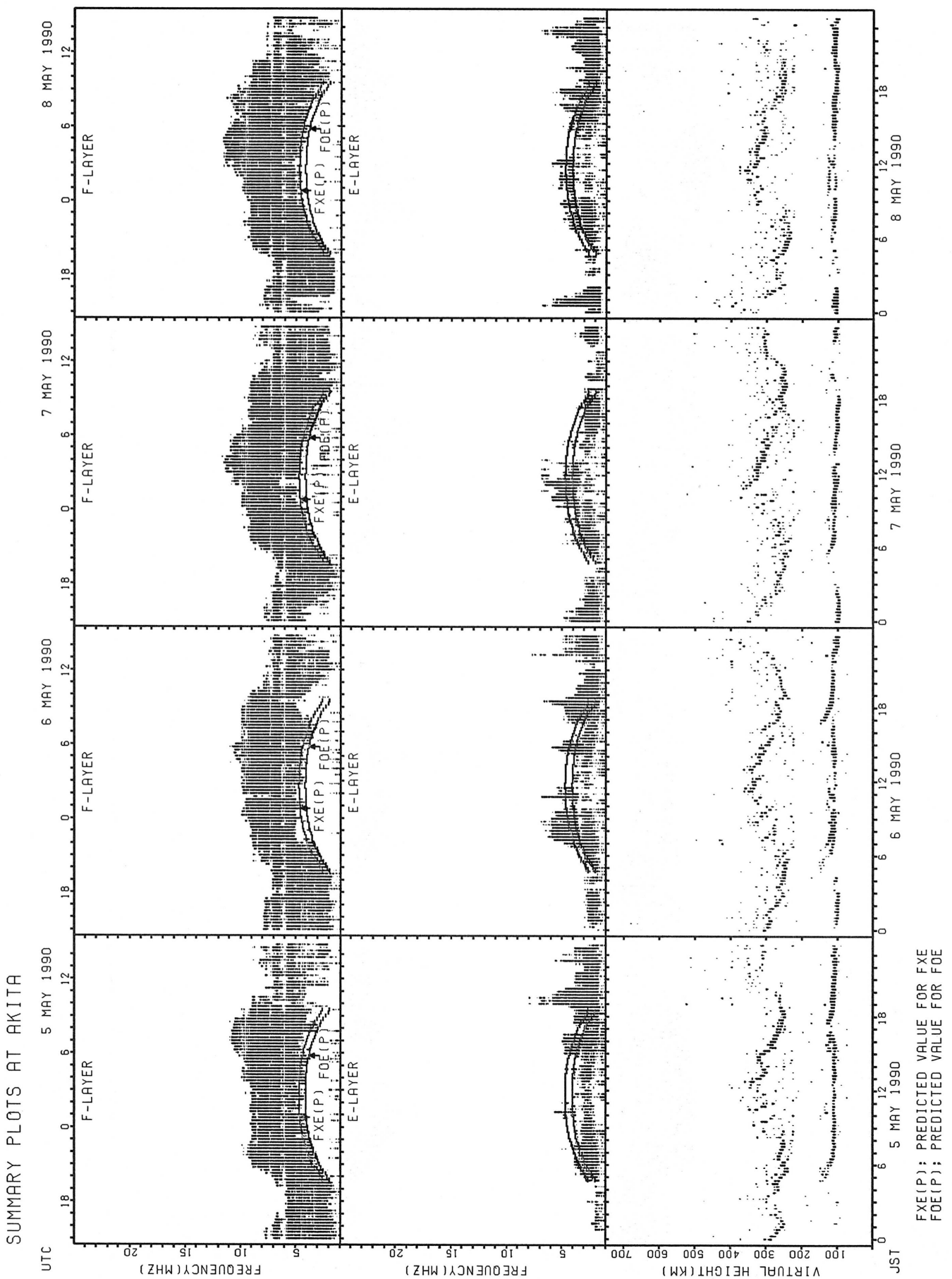

SUMMARY PLOTS AT WAKKANAI
UTC
JST
25 MAY 1990
26 MAY 1990
27 MAY 1990
28 MAY 1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

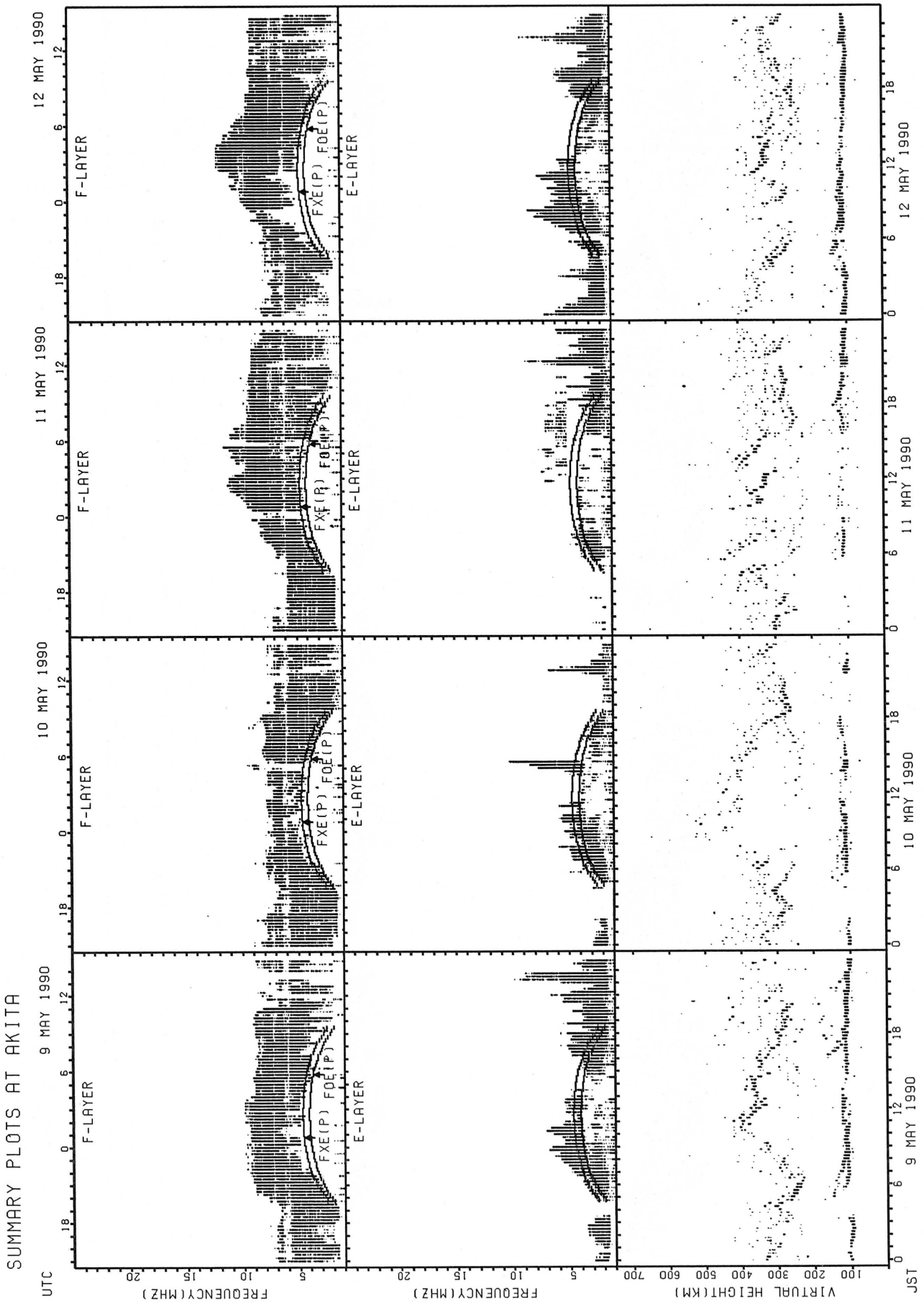
SUMMARY PLOTS AT WAKKANAI

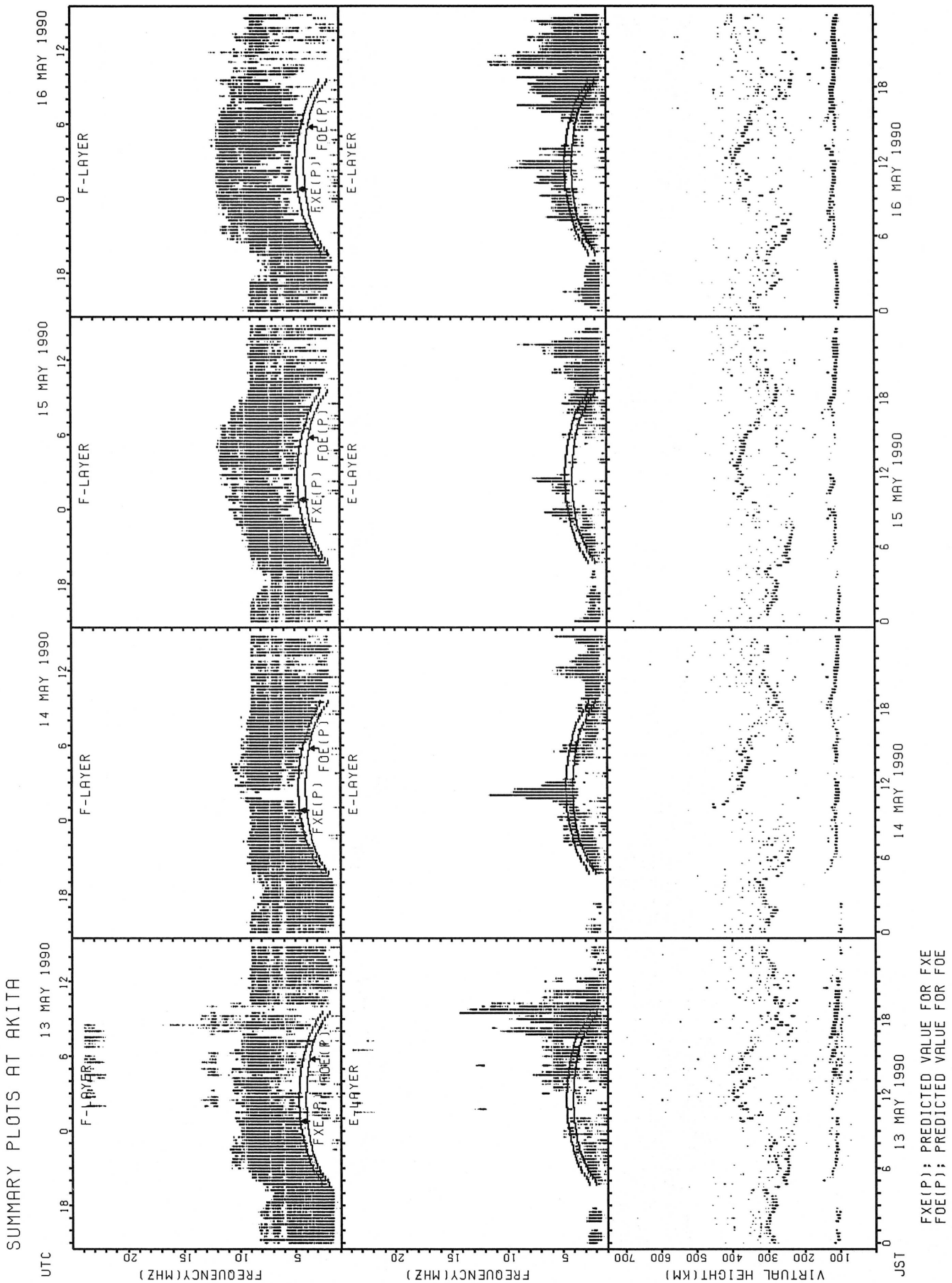


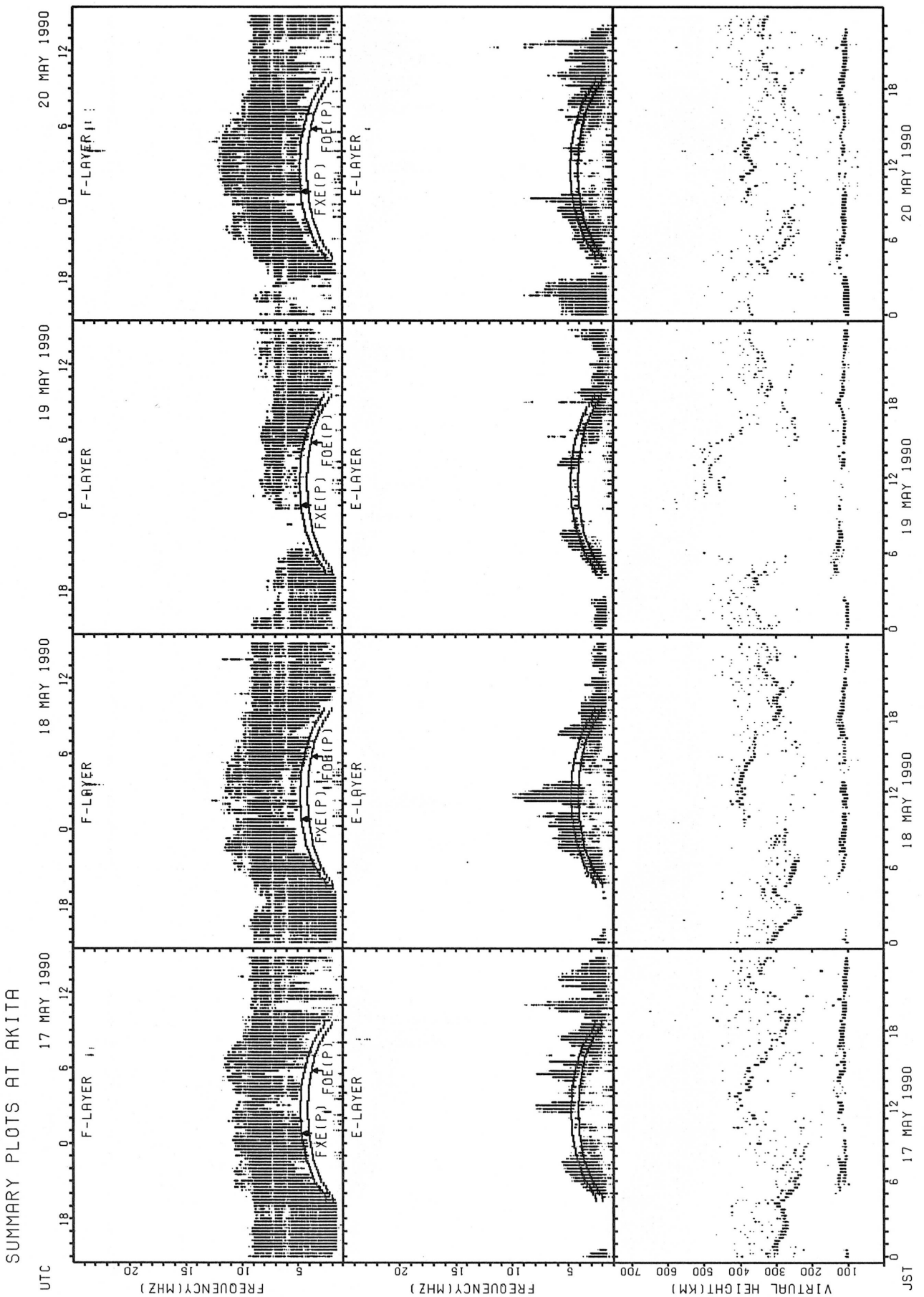
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
1 MAY 1990
2 MAY 1990
3 MAY 1990
4 MAY 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

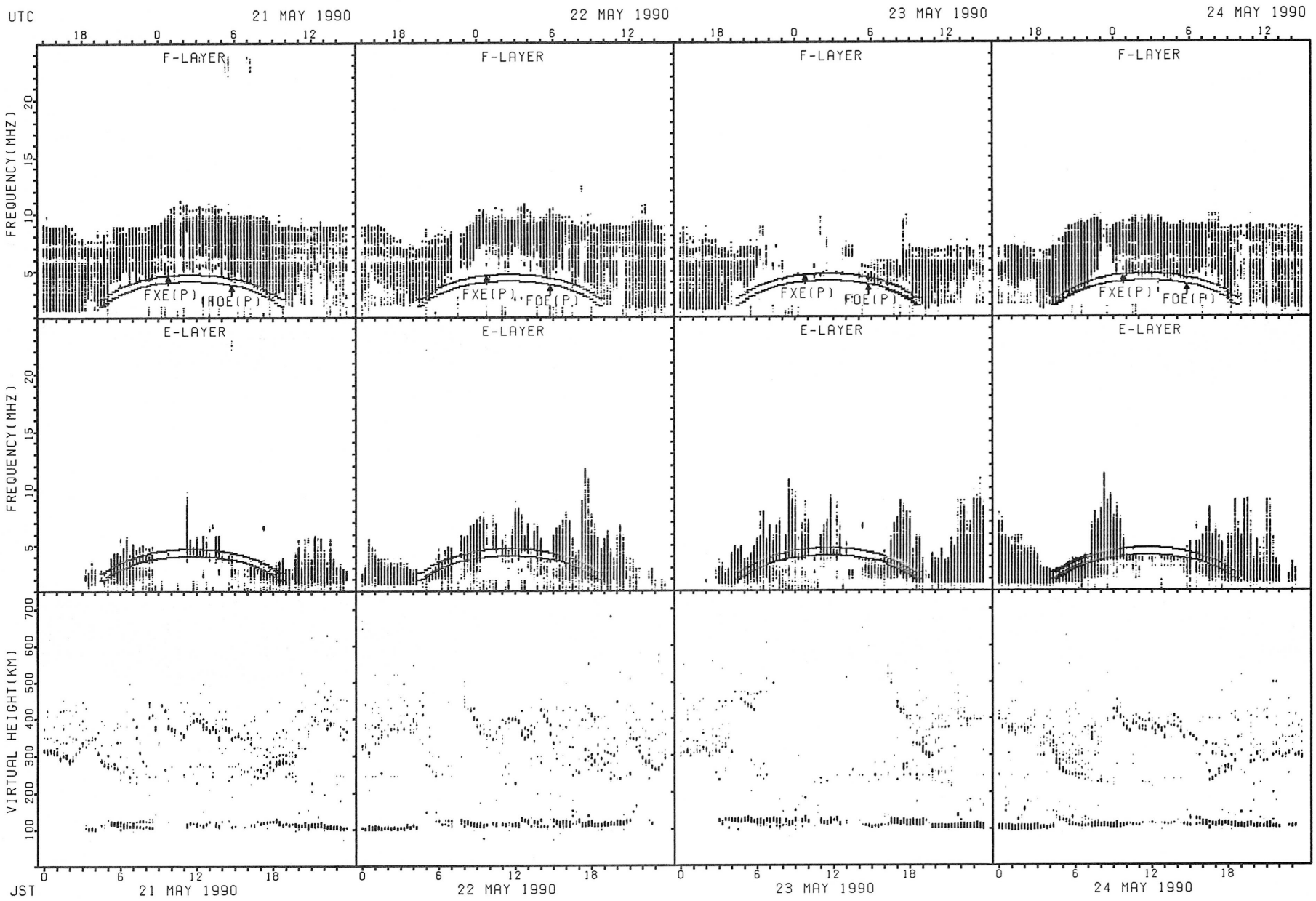

SUMMARY PLOTS AT AKITA
UTC
5 MAY 1990
6 MAY 1990
7 MAY 1990
8 MAY 1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
JST
9 MAY 1990
10 MAY 1990
11 MAY 1990
12 MAY 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

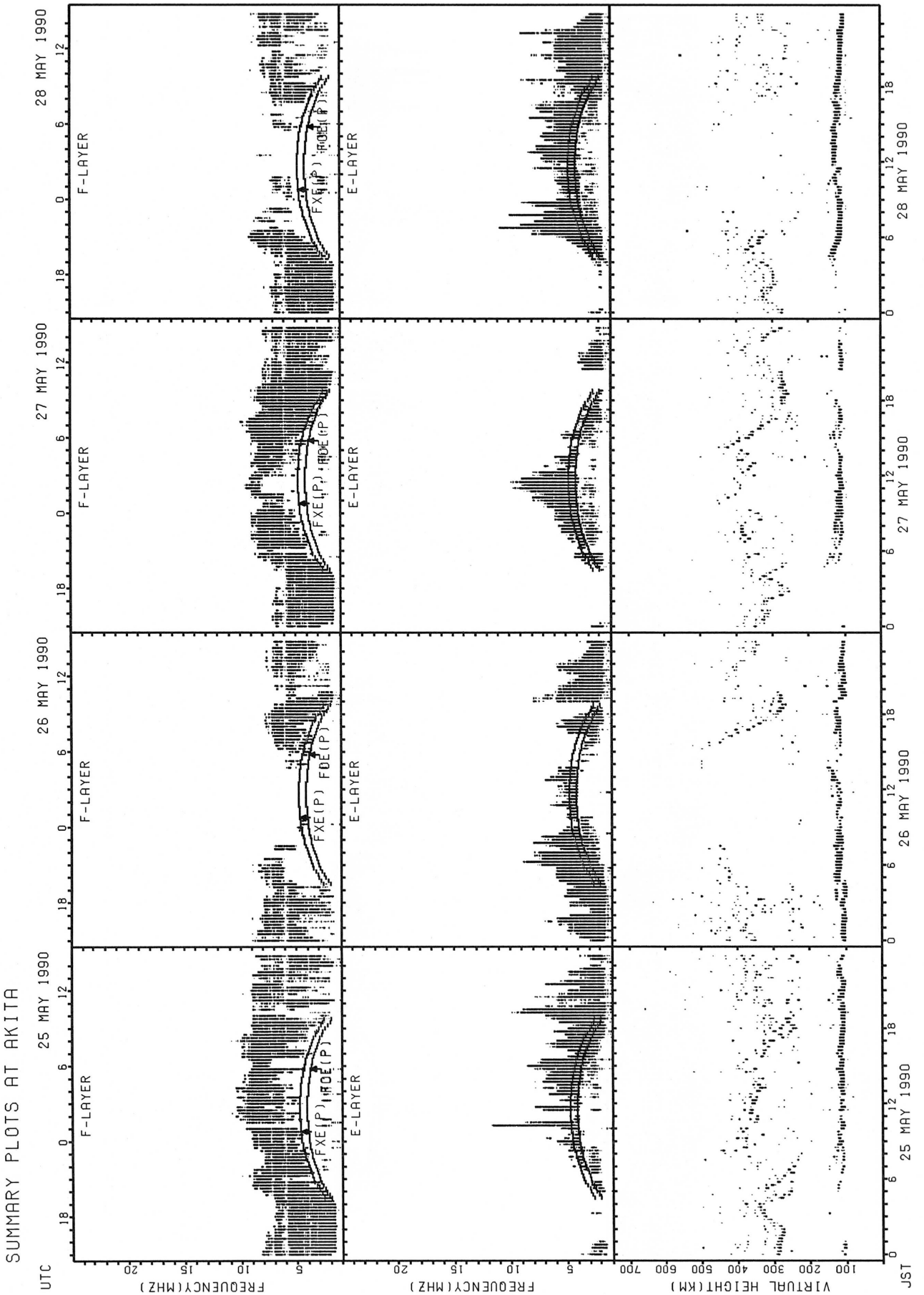

SUMMARY PLOTS AT AKITA
UTC
JST
13 MAY 1990
14 MAY 1990
15 MAY 1990
16 MAY 1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

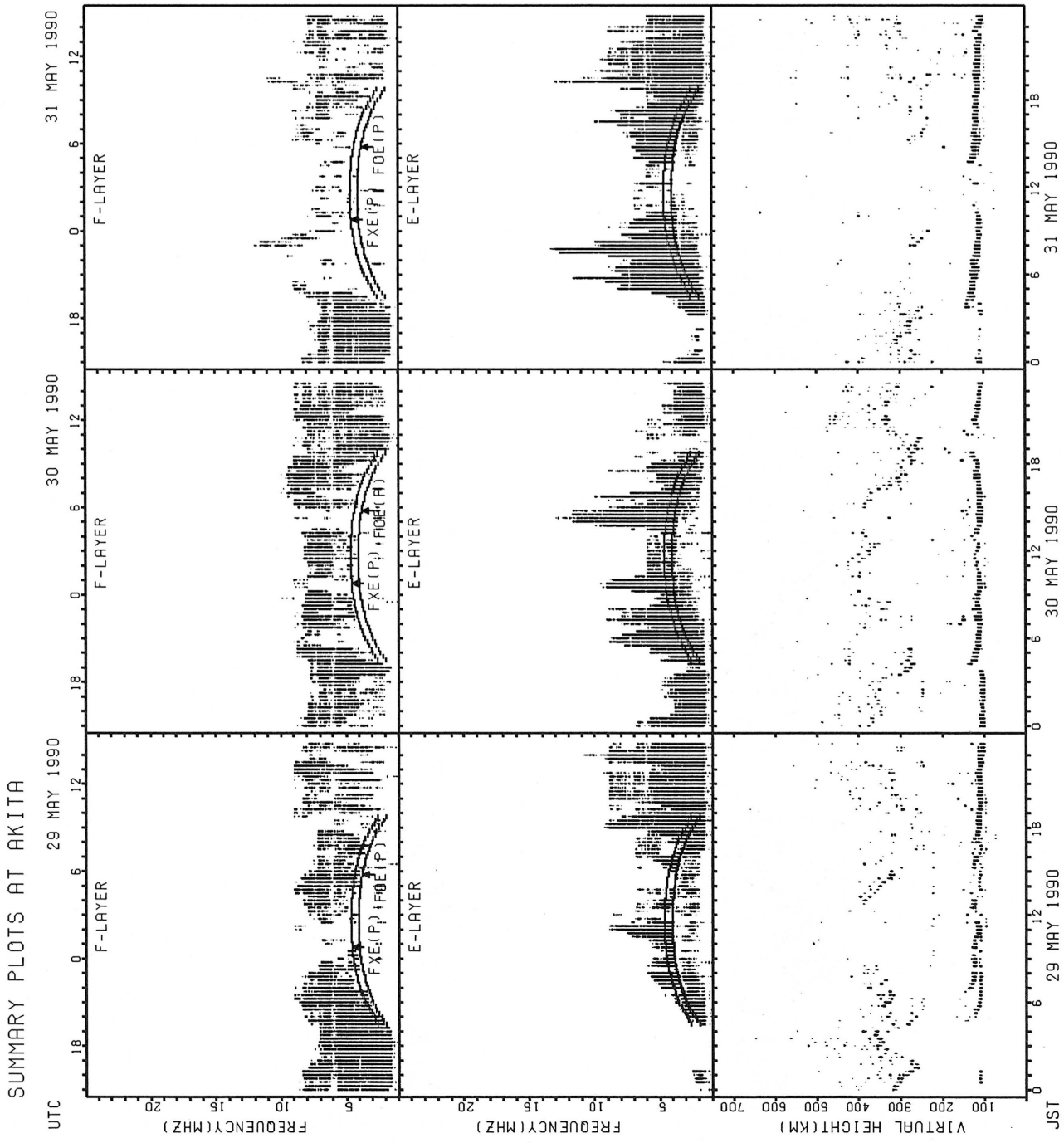

SUMMARY PLOTS AT AKITA
UTC
JST
17 MAY 1990
18 MAY 1990
19 MAY 1990
20 MAY 1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA

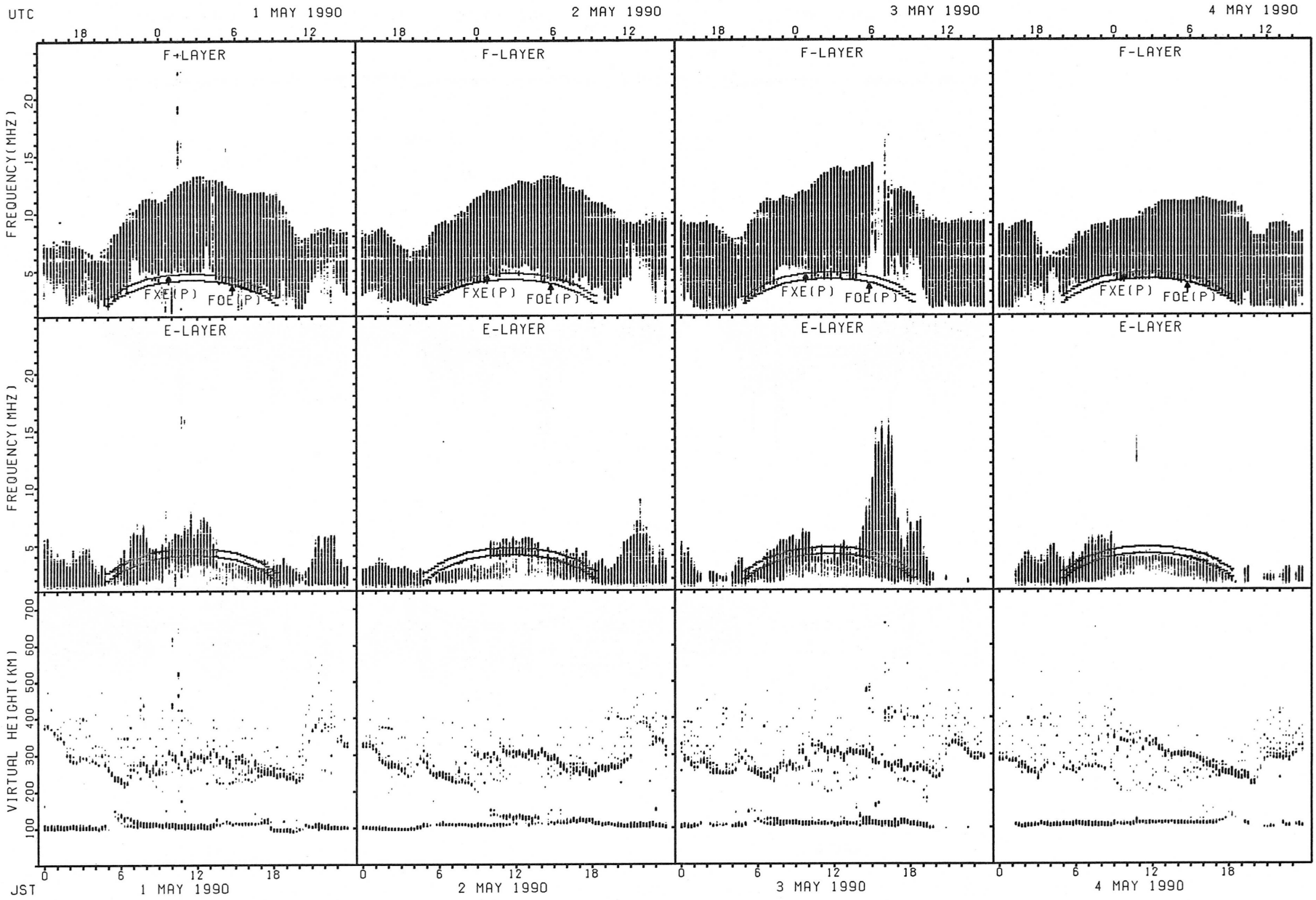


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
JST
25 MAY 1990
26 MAY 1990
27 MAY 1990
28 MAY 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

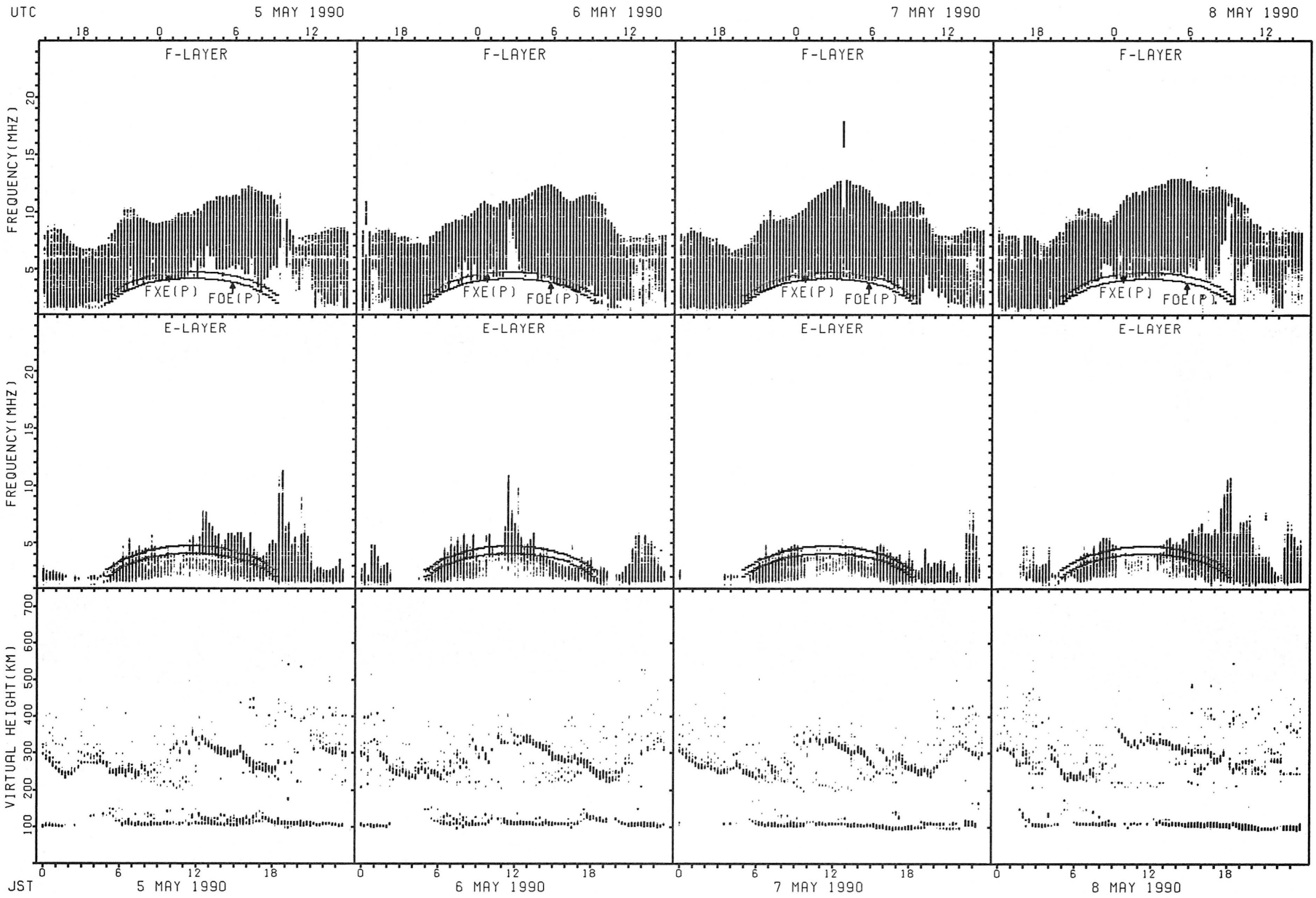

SUMMARY PLOTS AT AKITA
UTC
29 MAY 1990
30 MAY 1990
31 MAY 1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



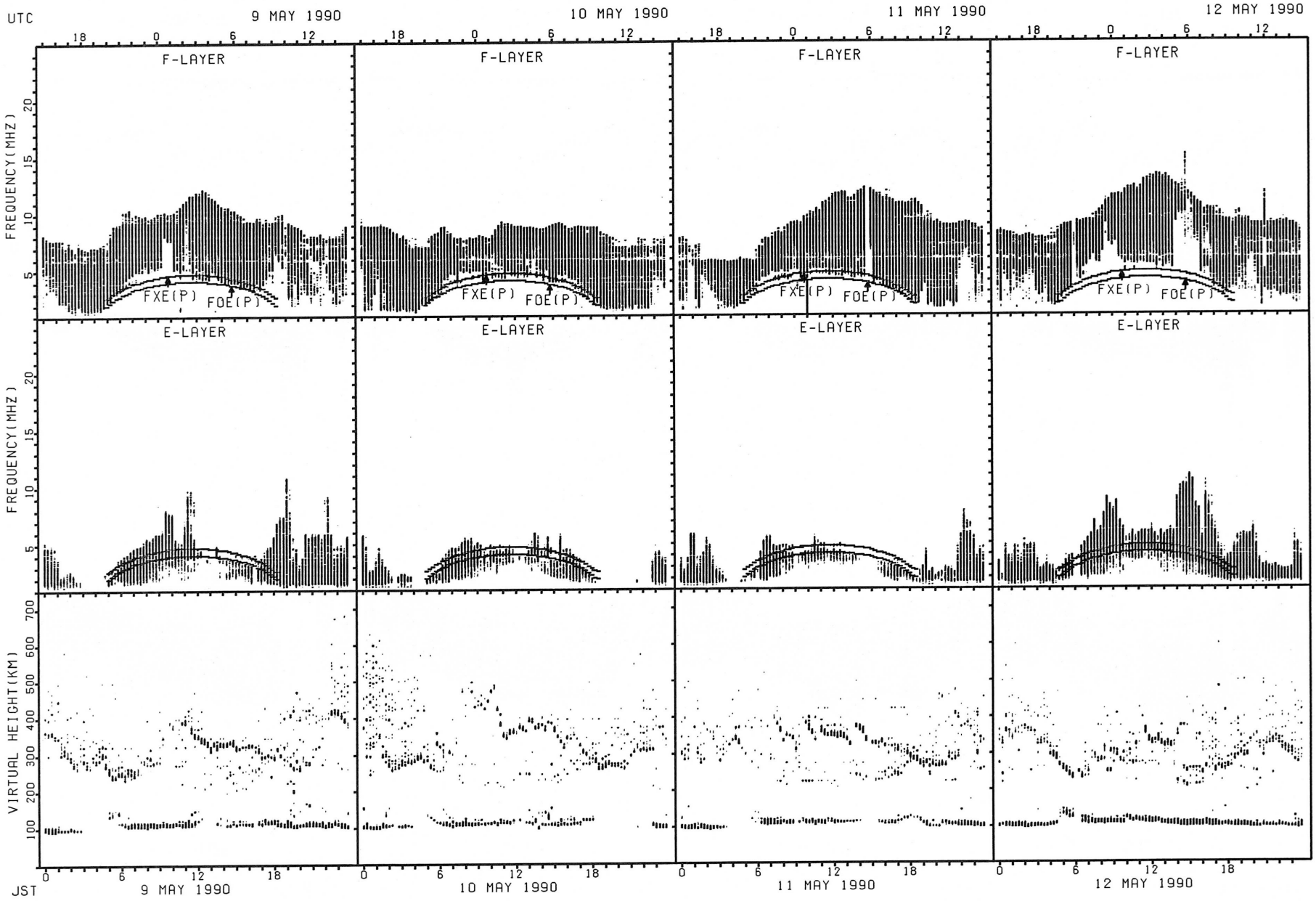
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

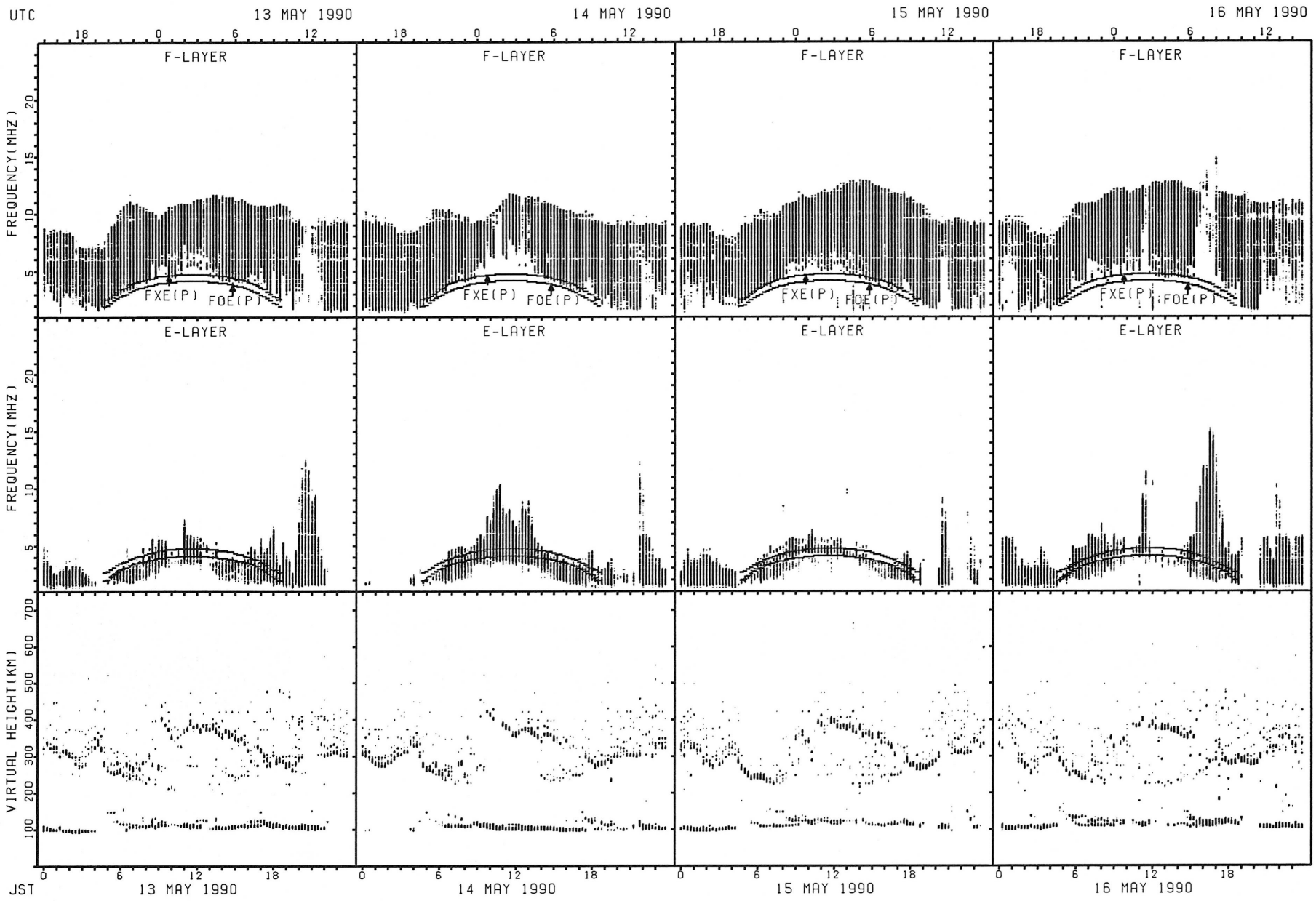


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

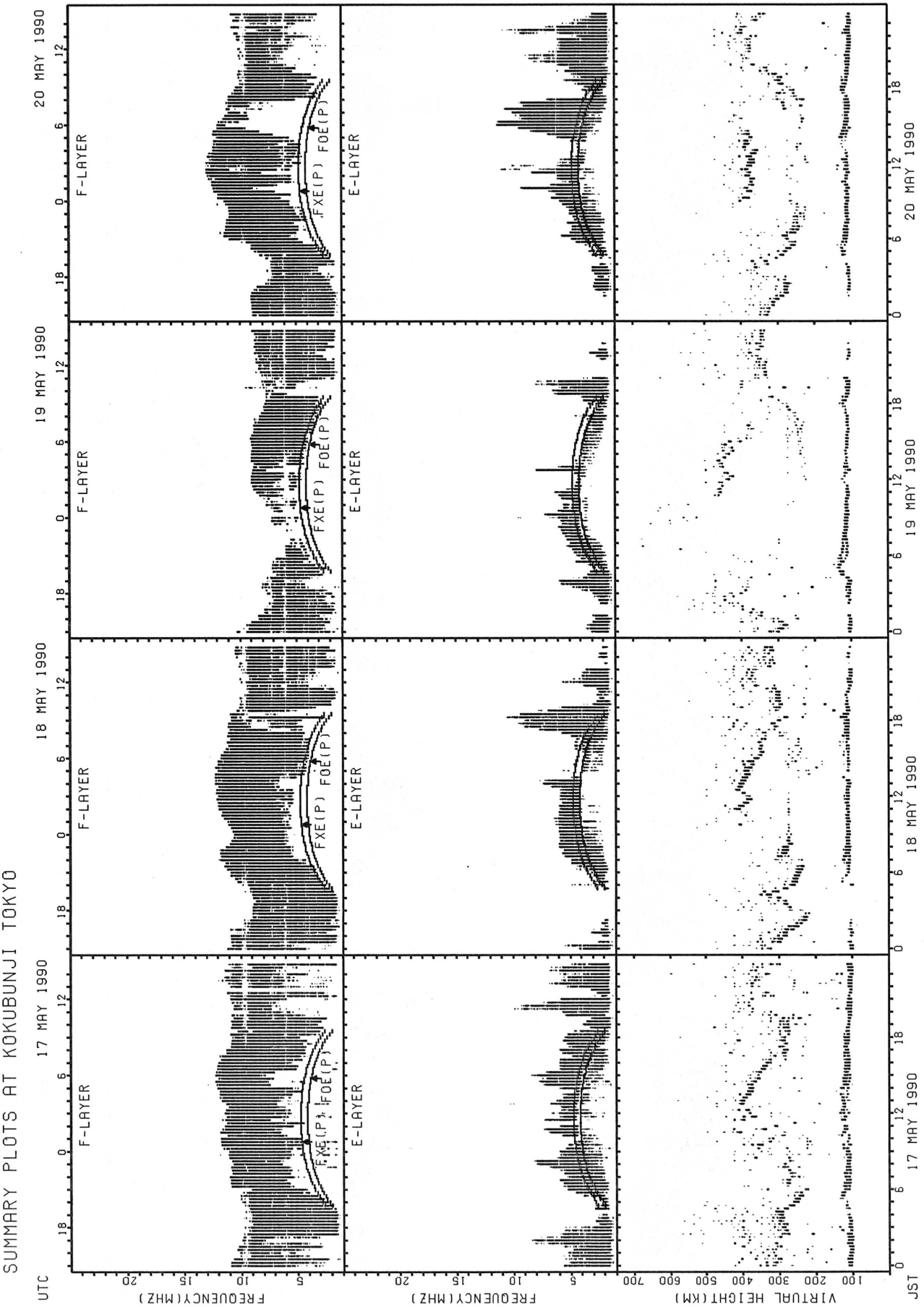
SUMMARY PLOTS AT KOKUBUNJI TOKYO

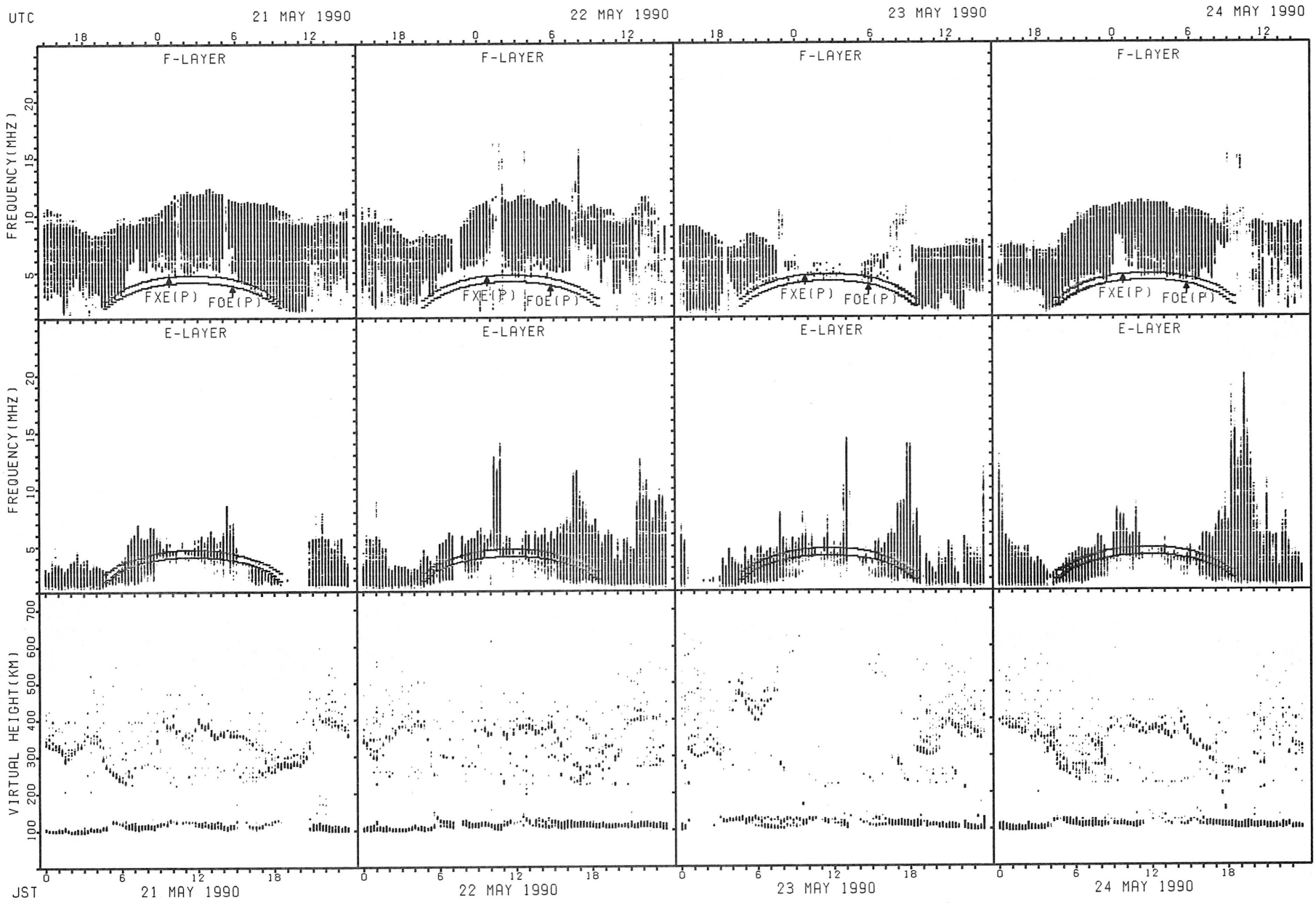


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE



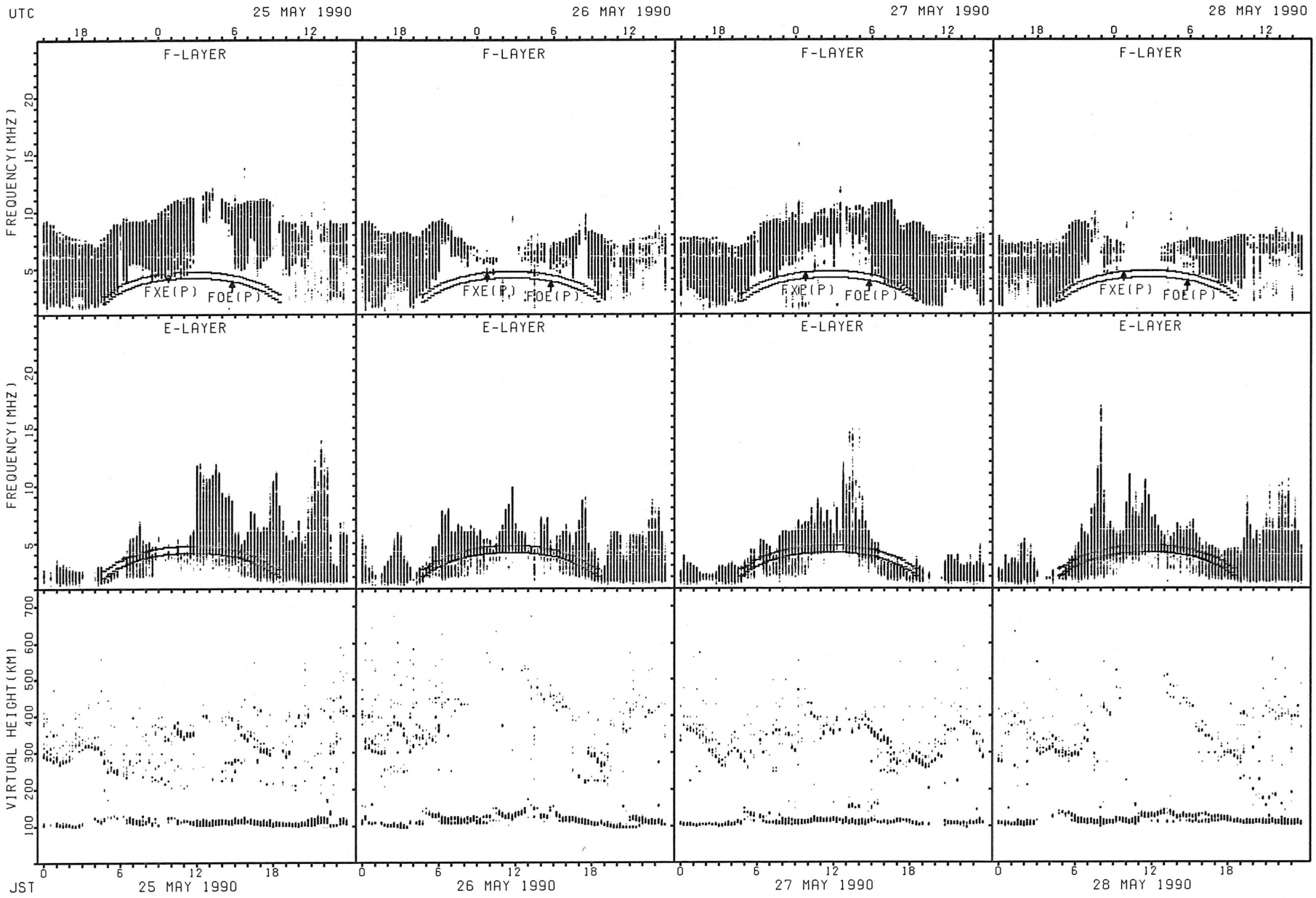
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
17 MAY 1990
18 MAY 1990
19 MAY 1990
20 MAY 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



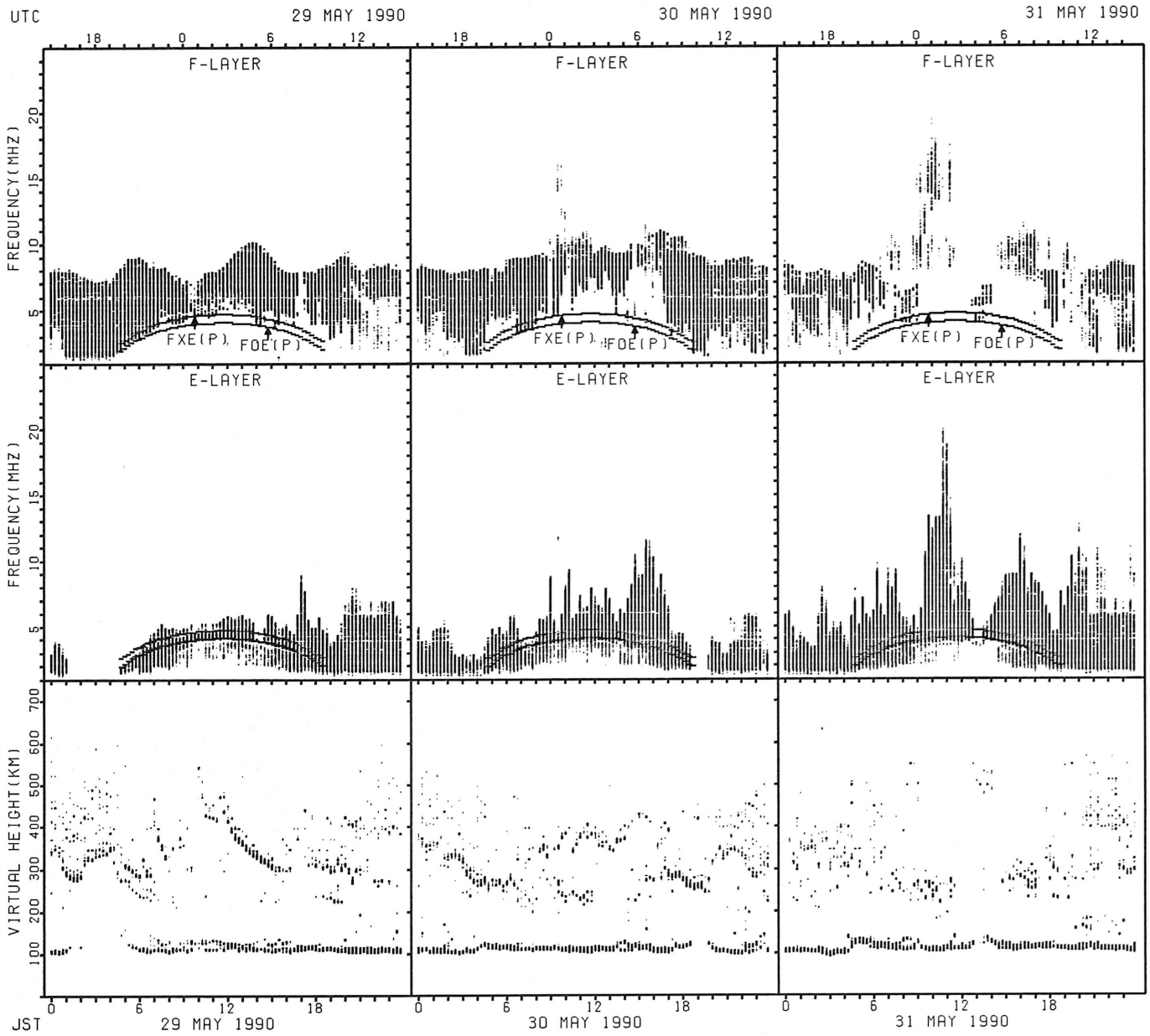
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

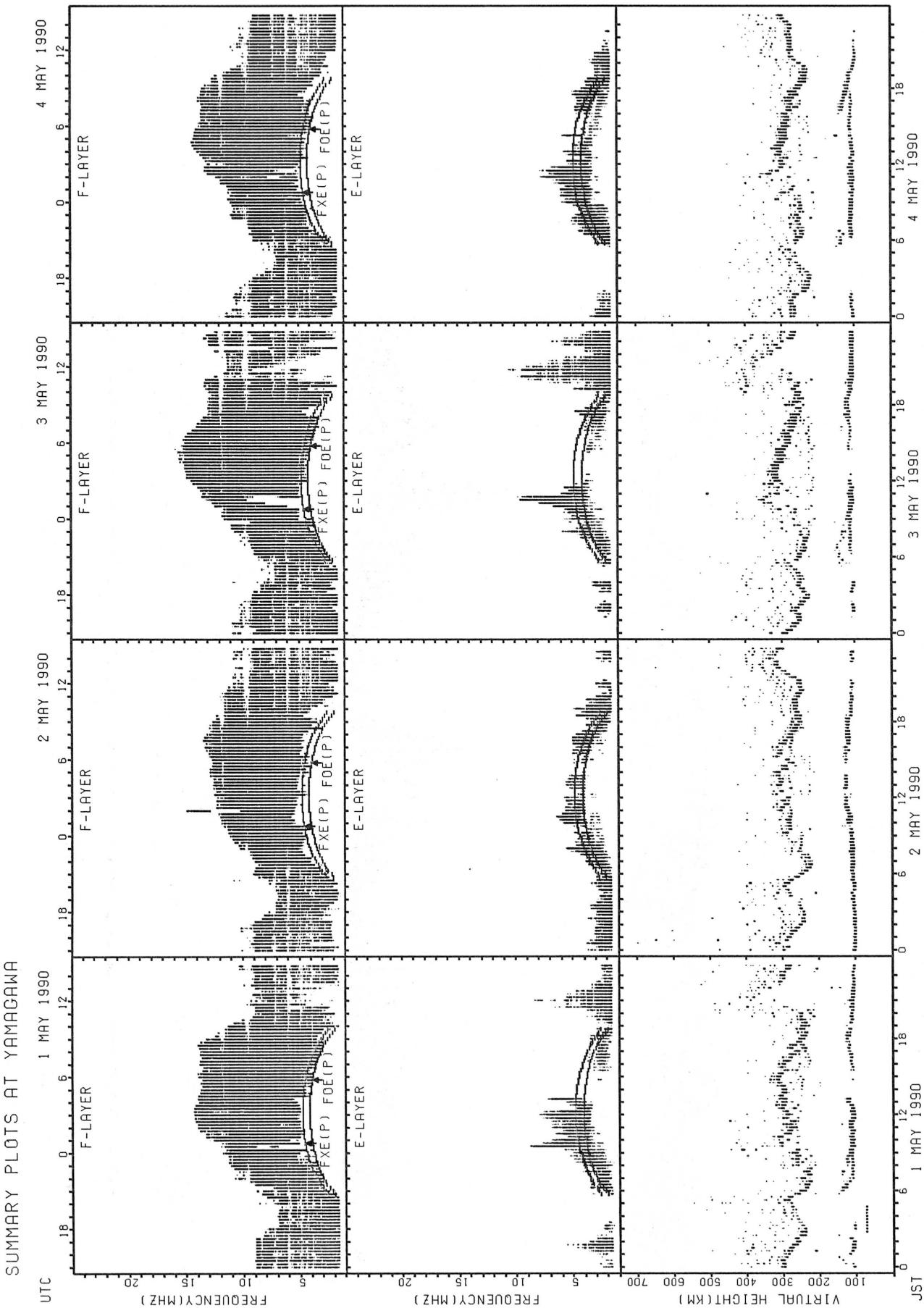


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

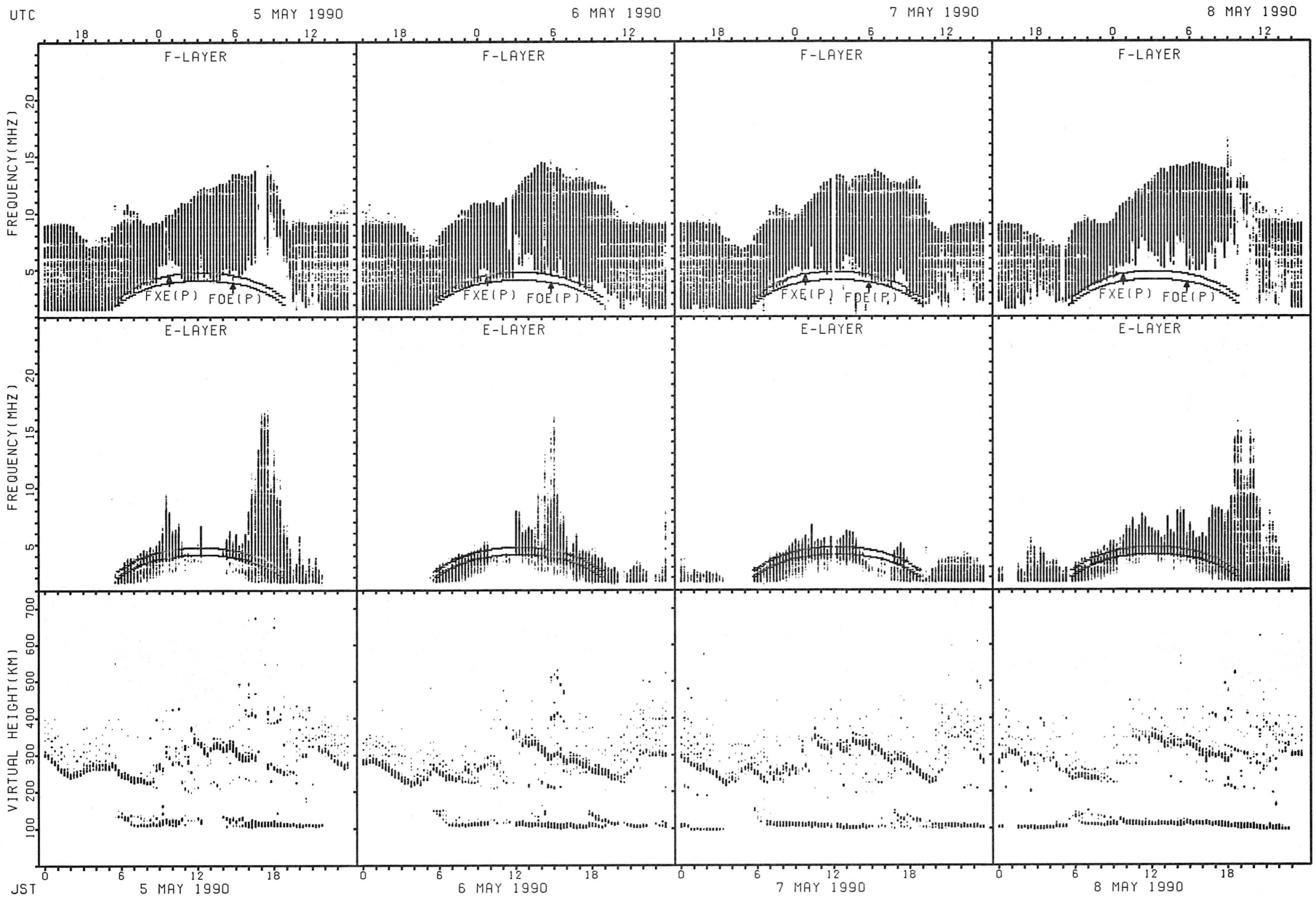
SUMMARY PLOTS AT KOKUBUNJI TOKYO



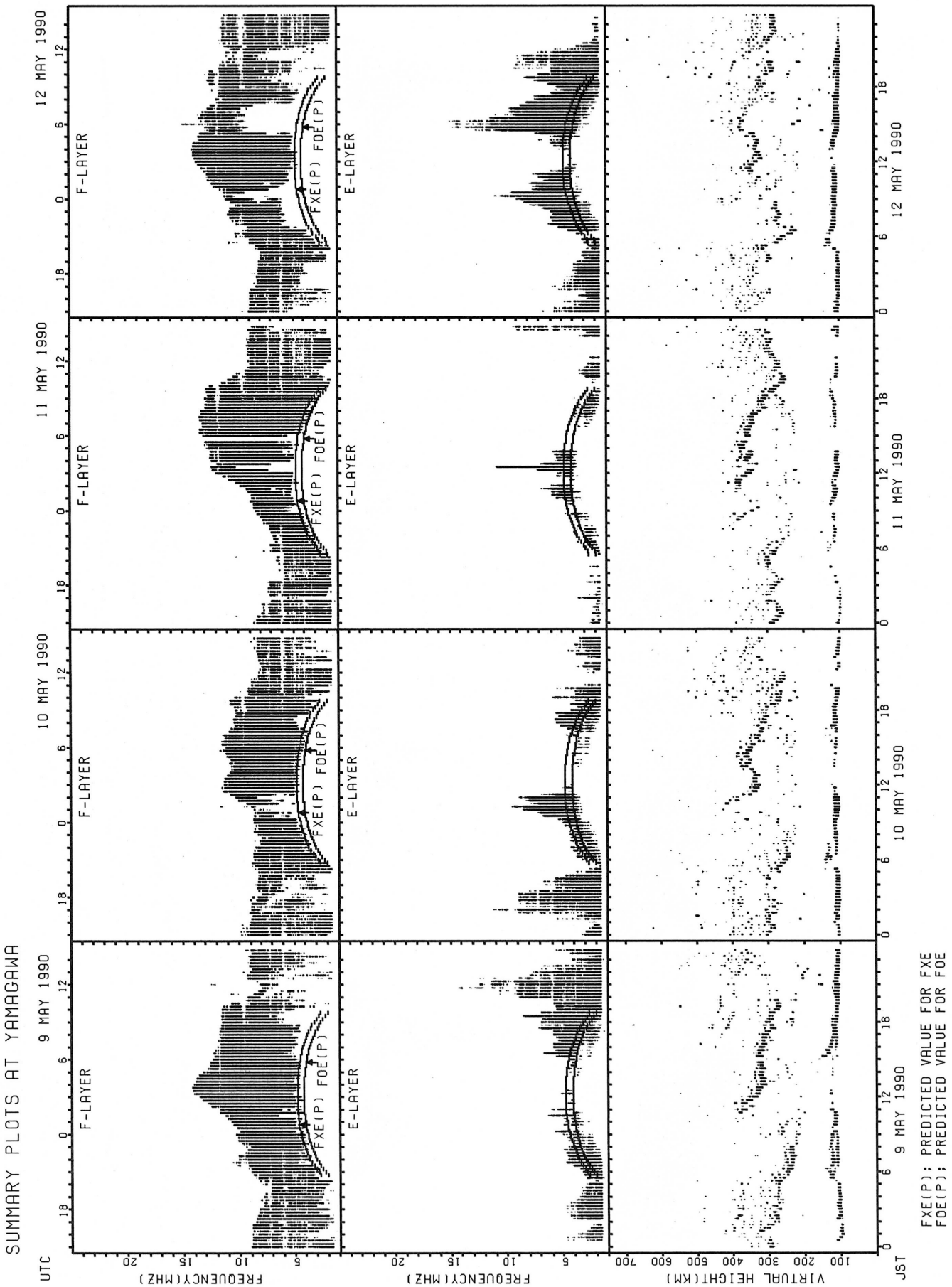
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
1 MAY 1990
2 MAY 1990
3 MAY 1990
4 MAY 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

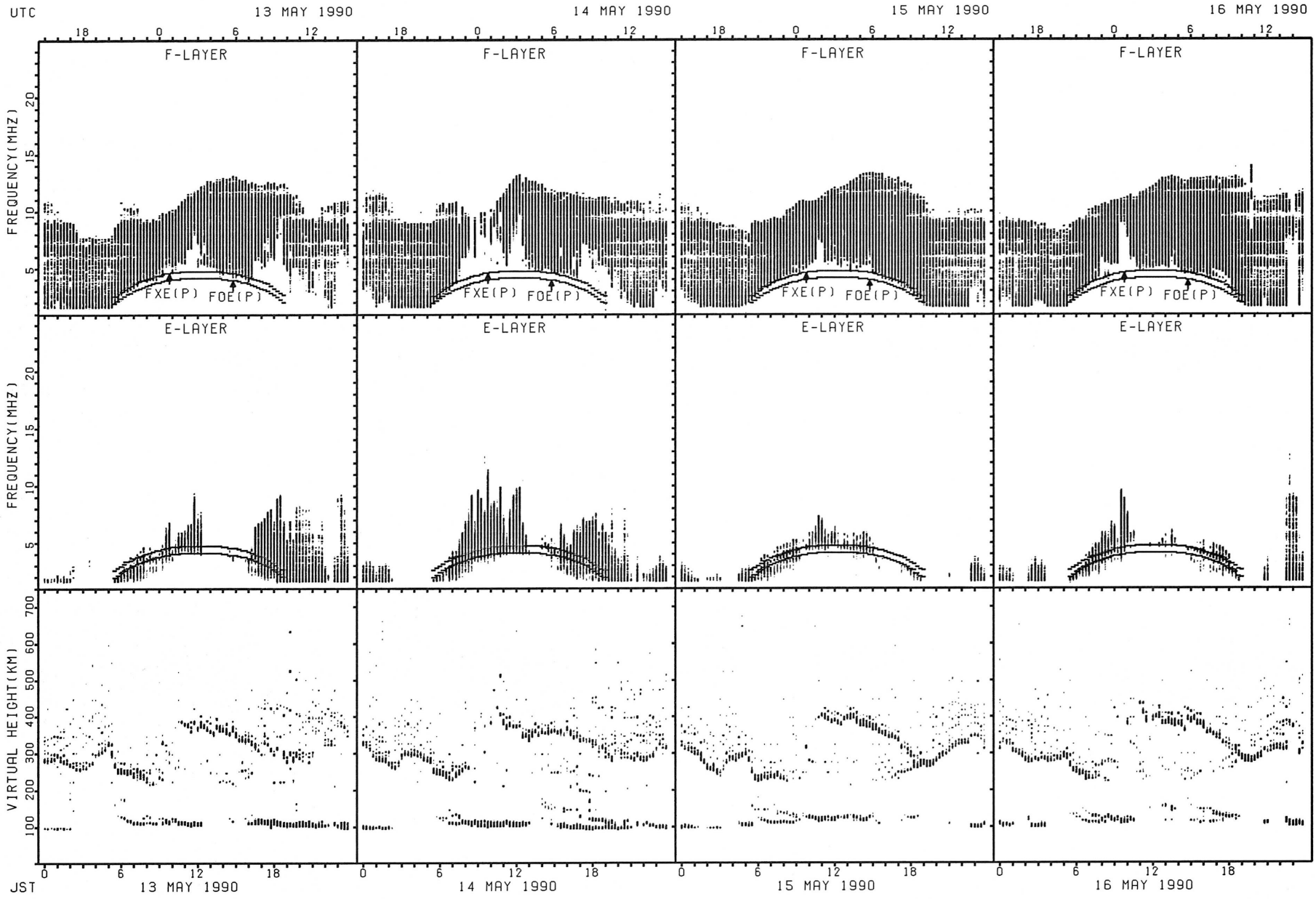
SUMMARY PLOTS AT YAMAGAWA



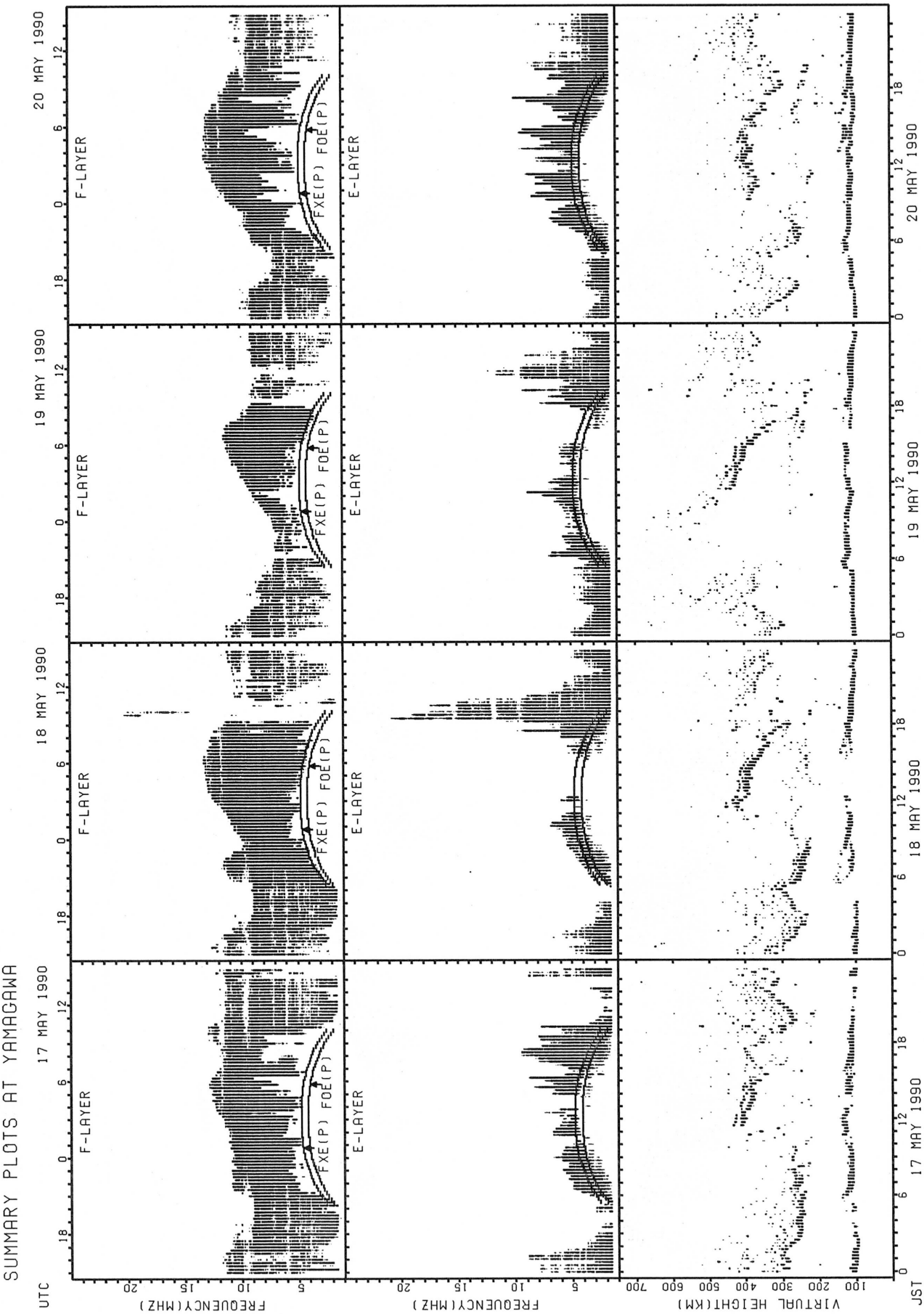
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
9 MAY 1990
10 MAY 1990
11 MAY 1990
12 MAY 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

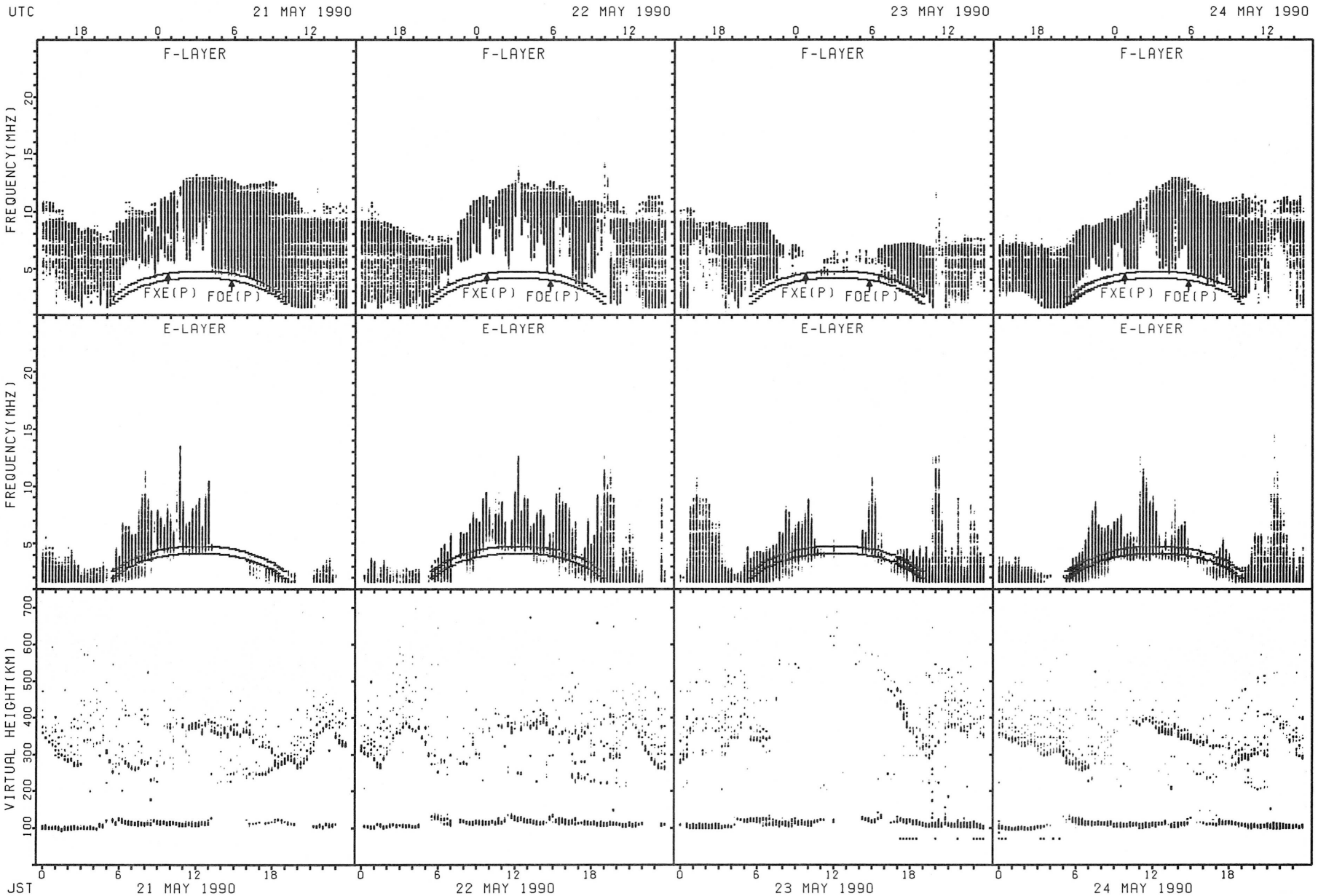
SUMMARY PLOTS AT YAMAGAWA



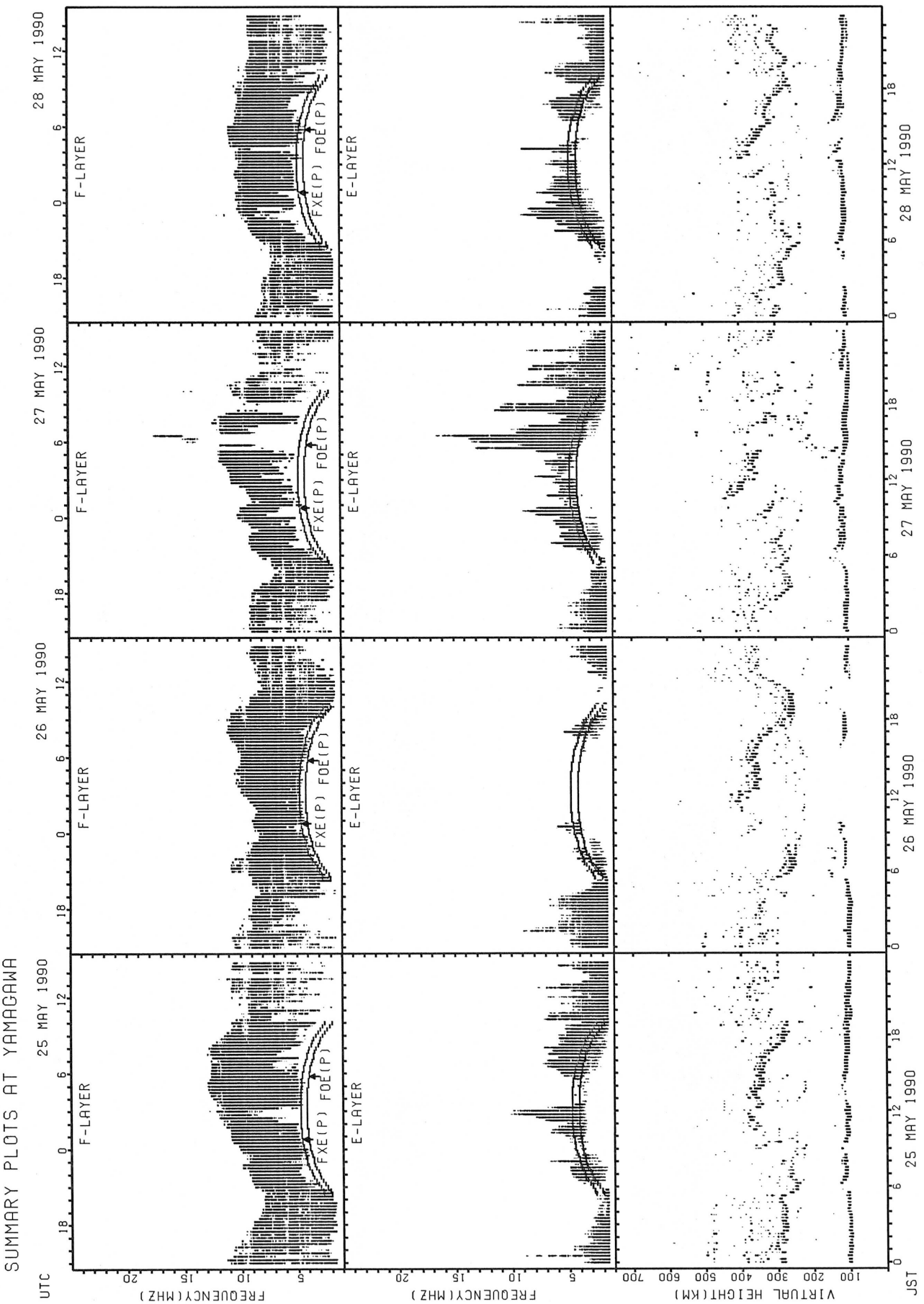
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
17 MAY 1990
18 MAY 1990
19 MAY 1990
20 MAY 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

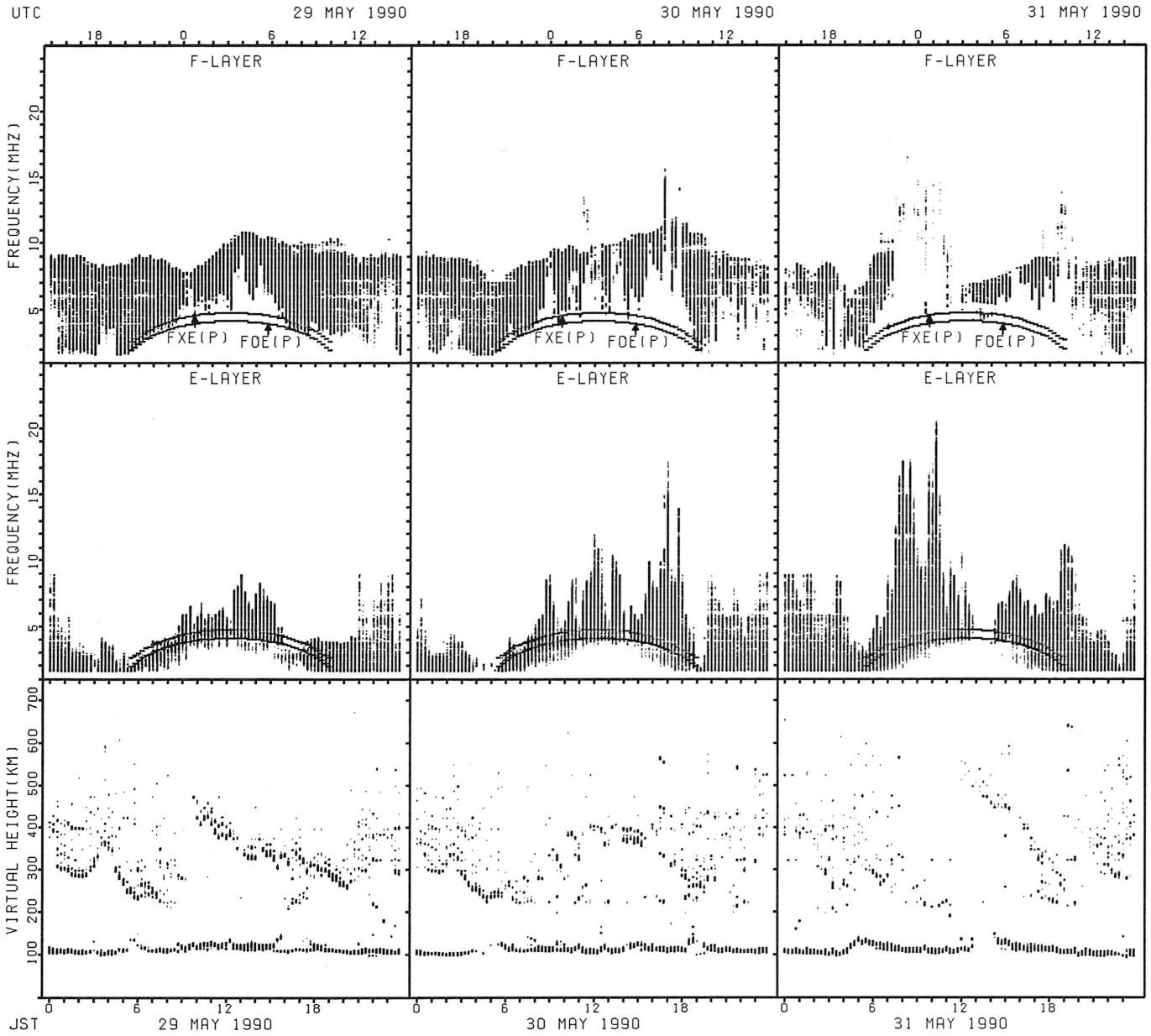
SUMMARY PLOTS AT YAMAGAWA



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

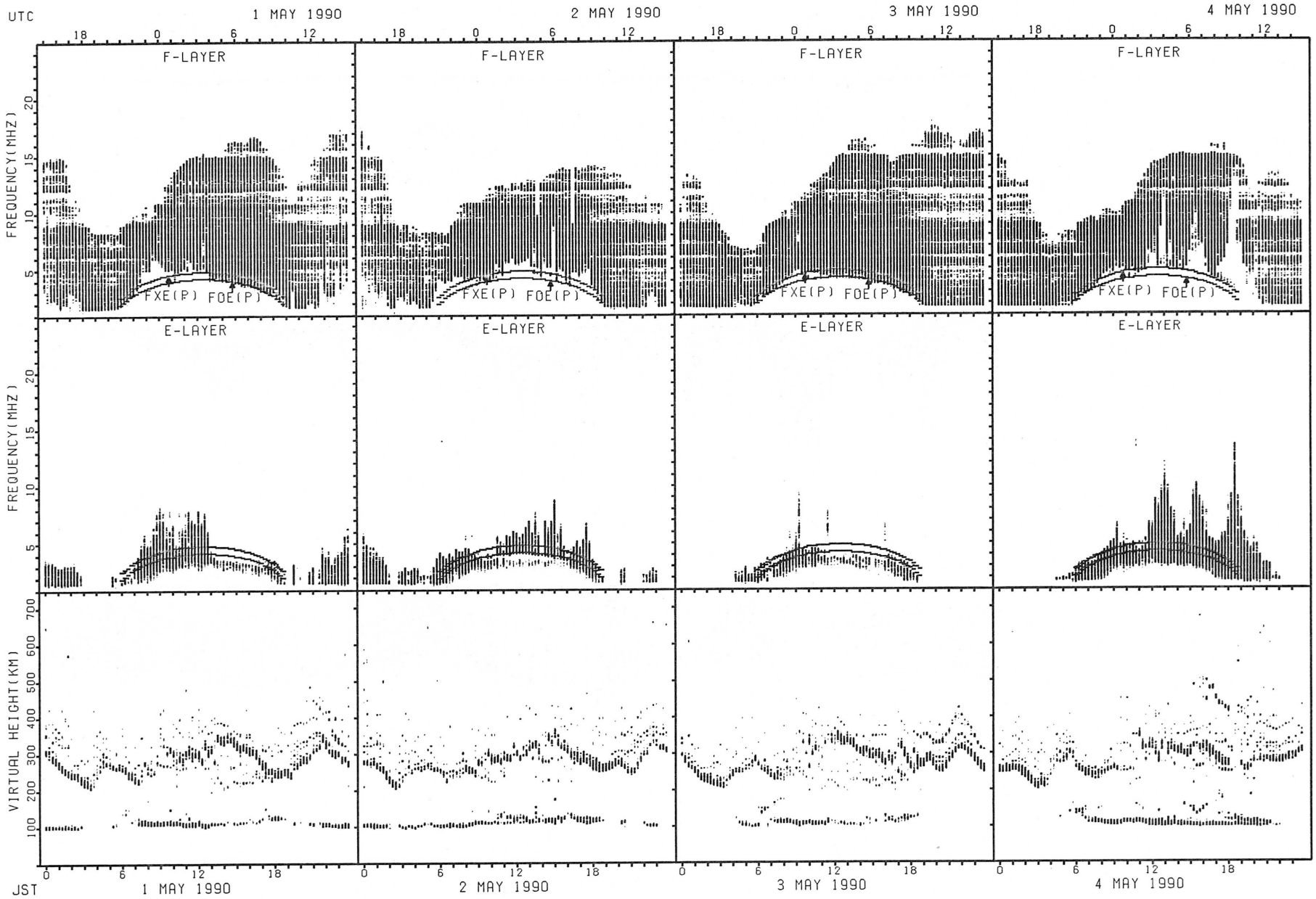

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
25 MAY 1990
26 MAY 1990
27 MAY 1990
28 MAY 1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA

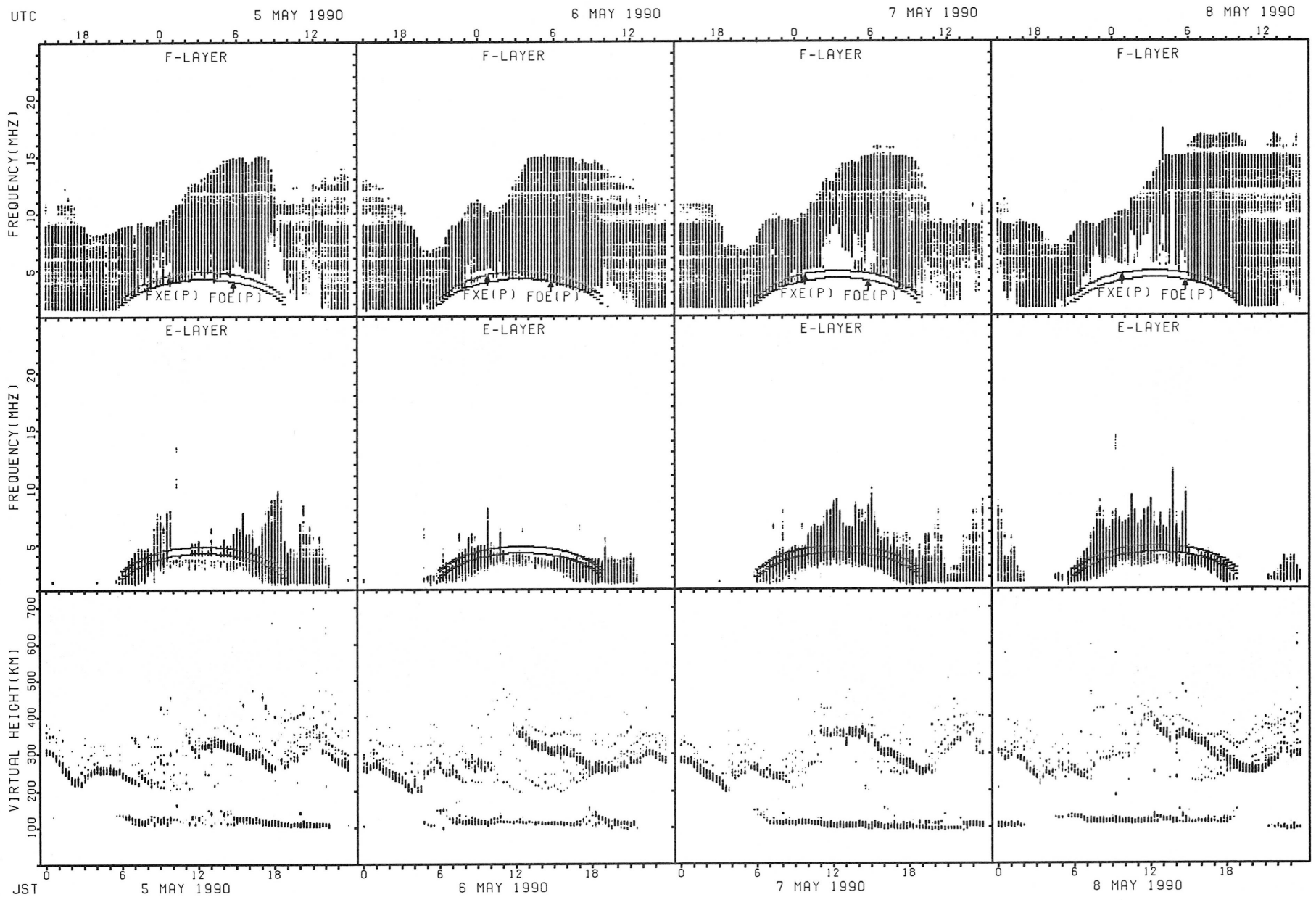


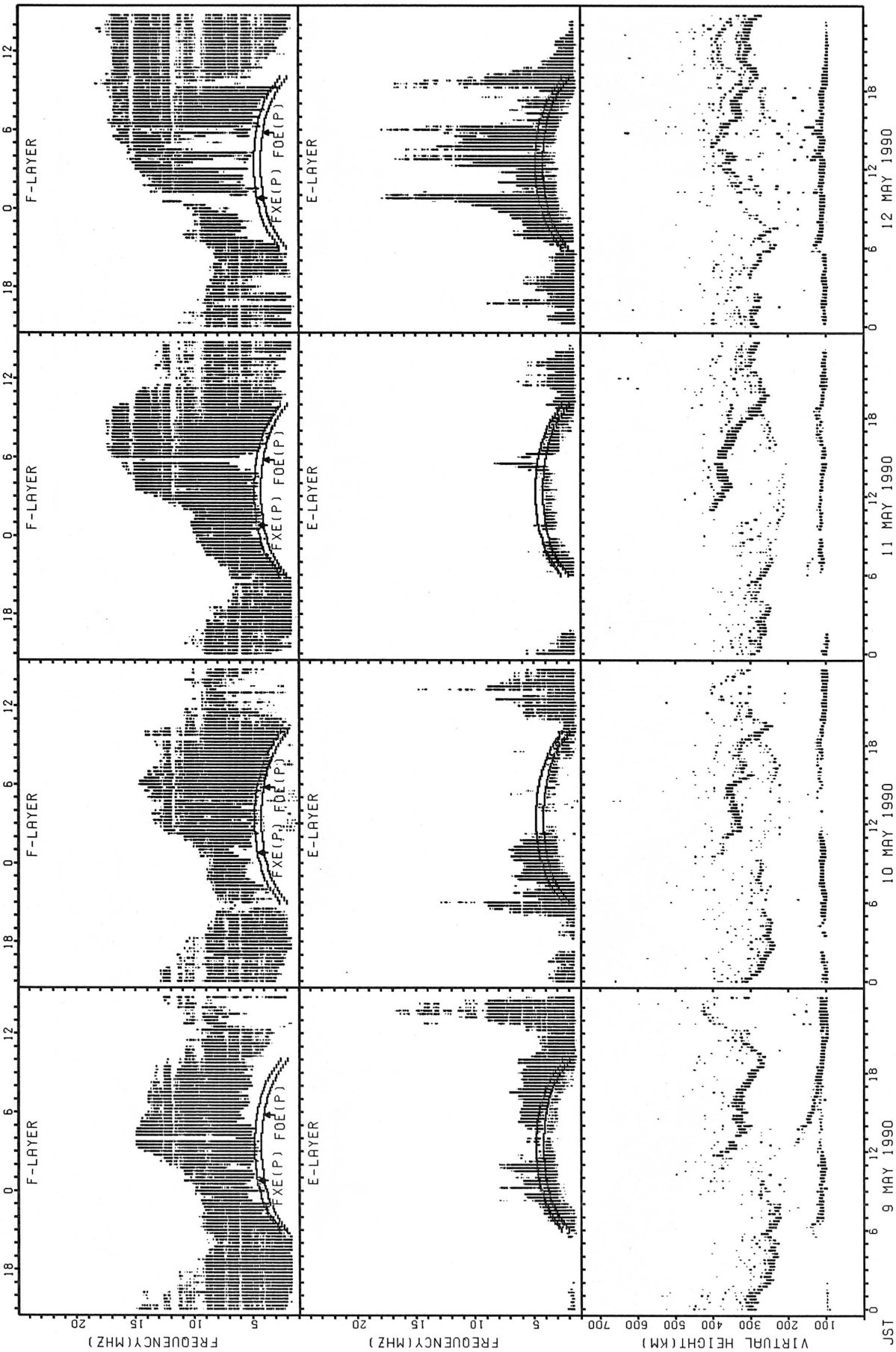
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA

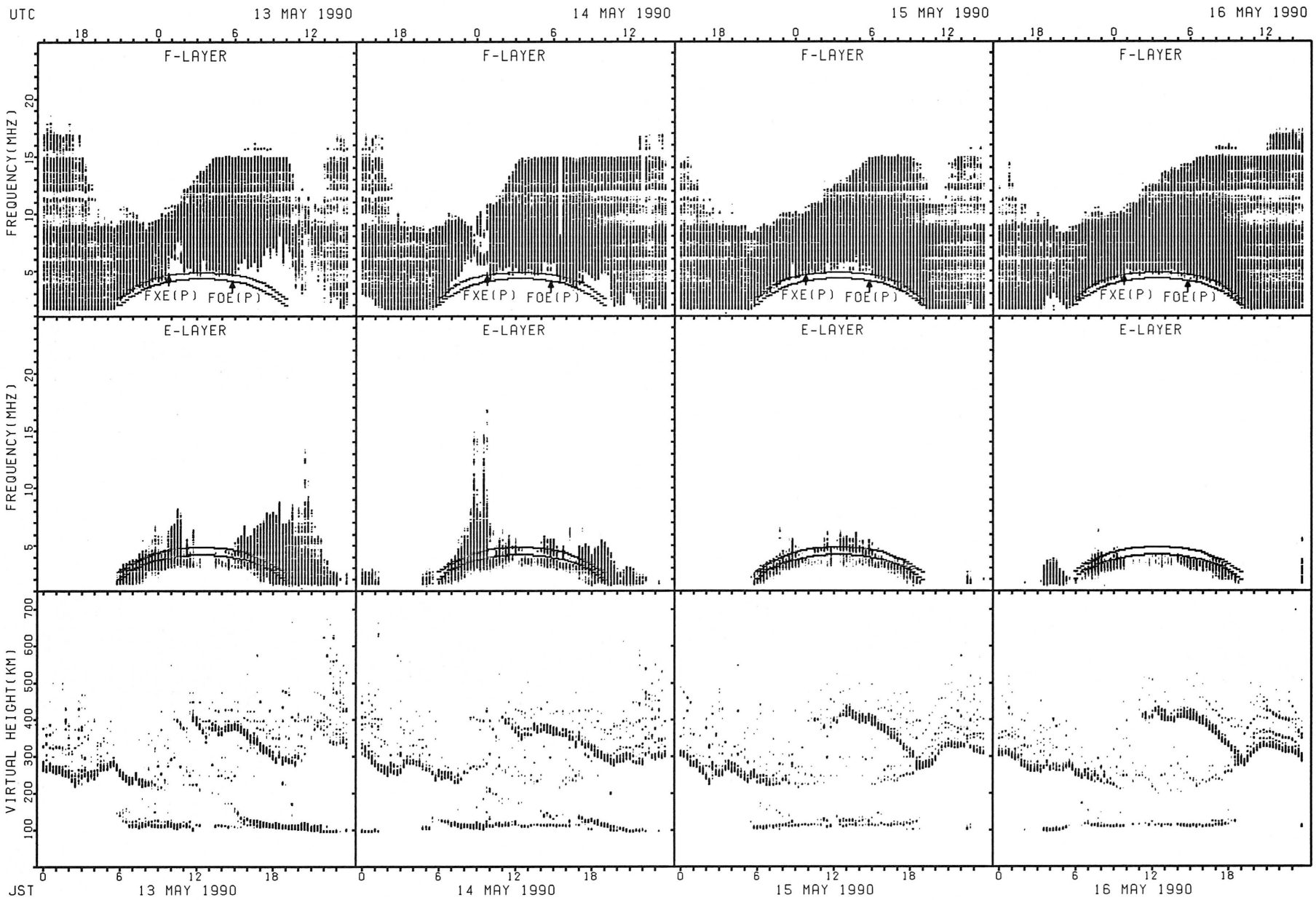


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

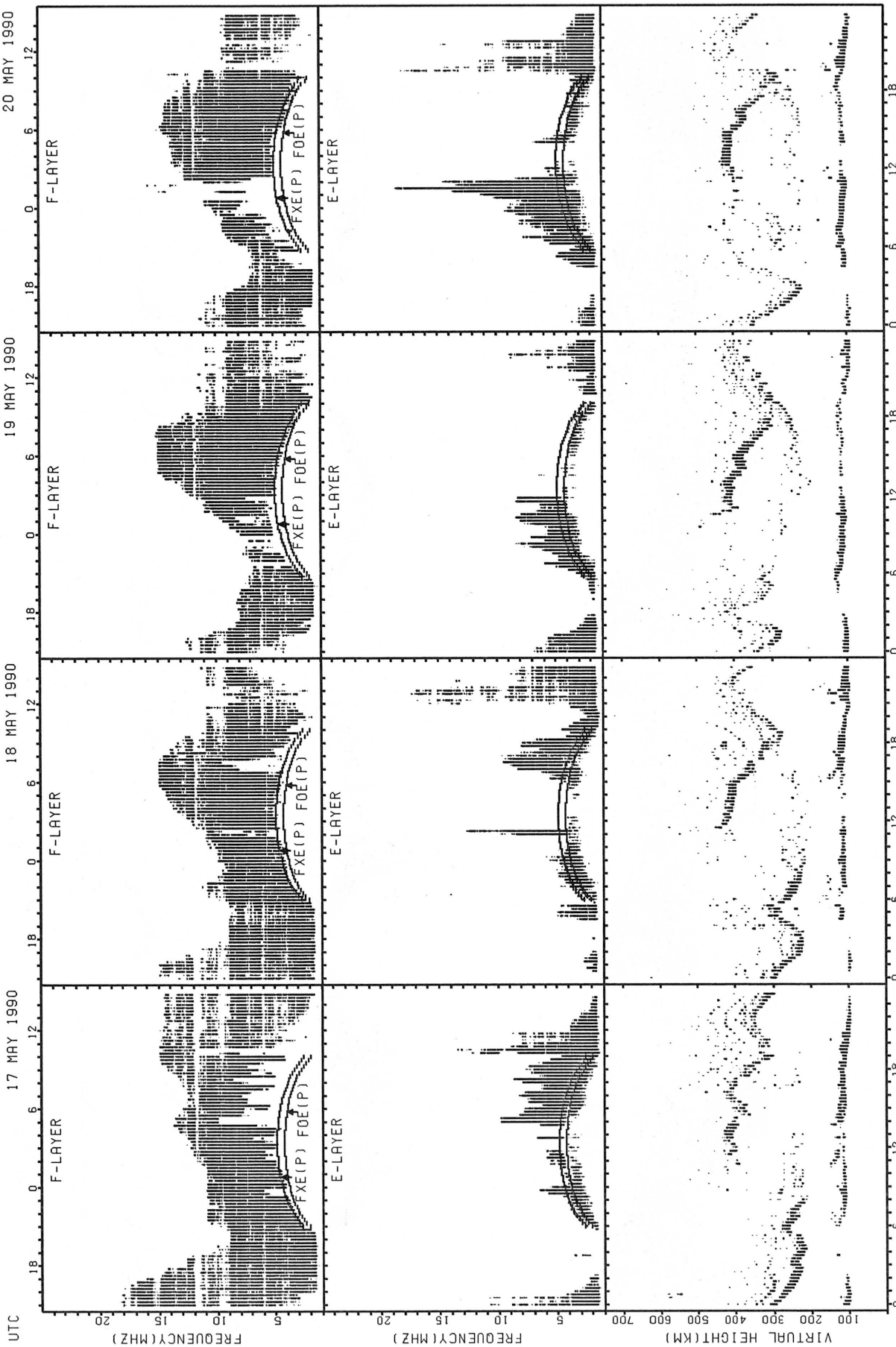

SUMMARY PLOTS AT OKINAWA
UTC
5 MAY 1990
6 MAY 1990
7 MAY 1990
8 MAY 1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
9 MAY 1990
10 MAY 1990
11 MAY 1990
12 MAY 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

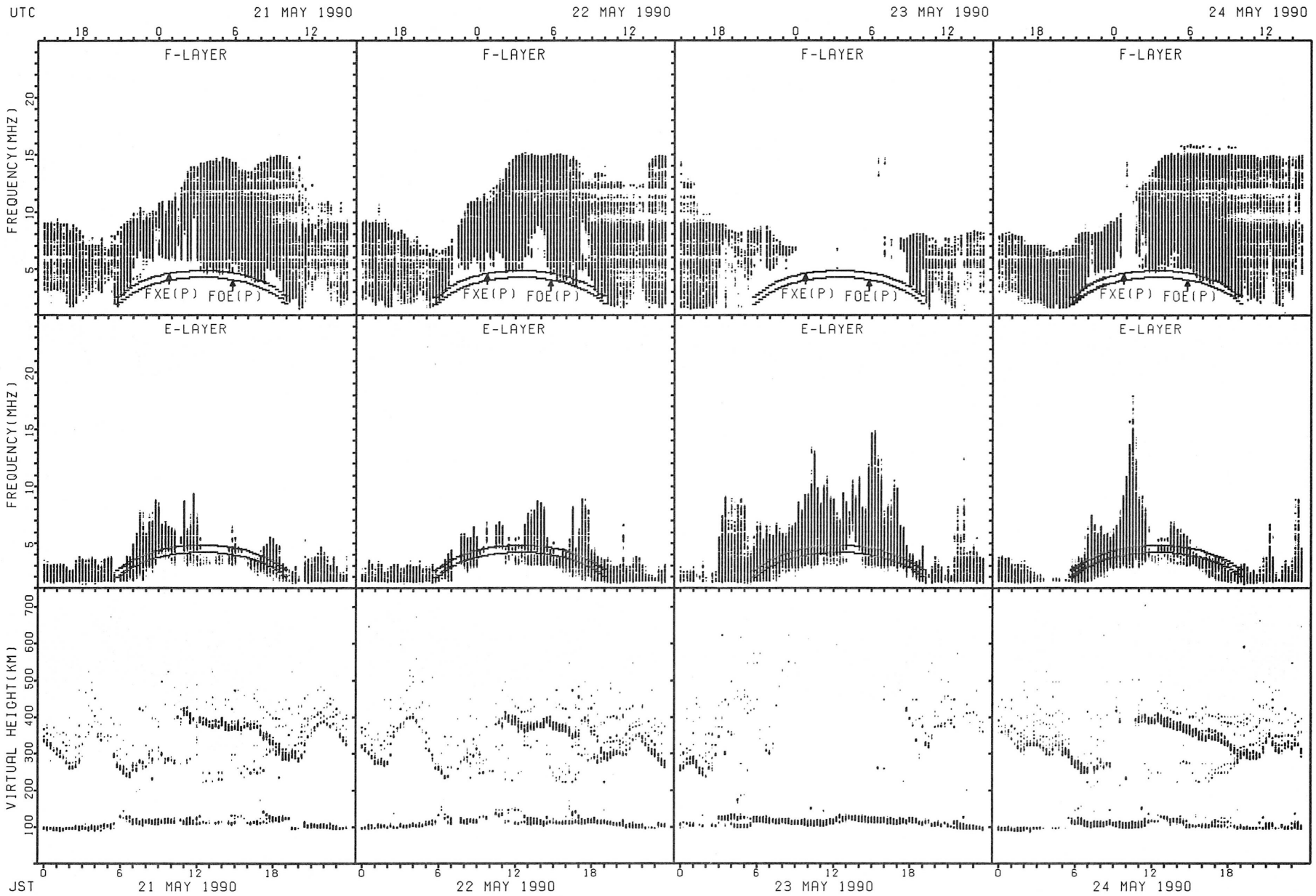
SUMMARY PLOTS AT OKINAWA



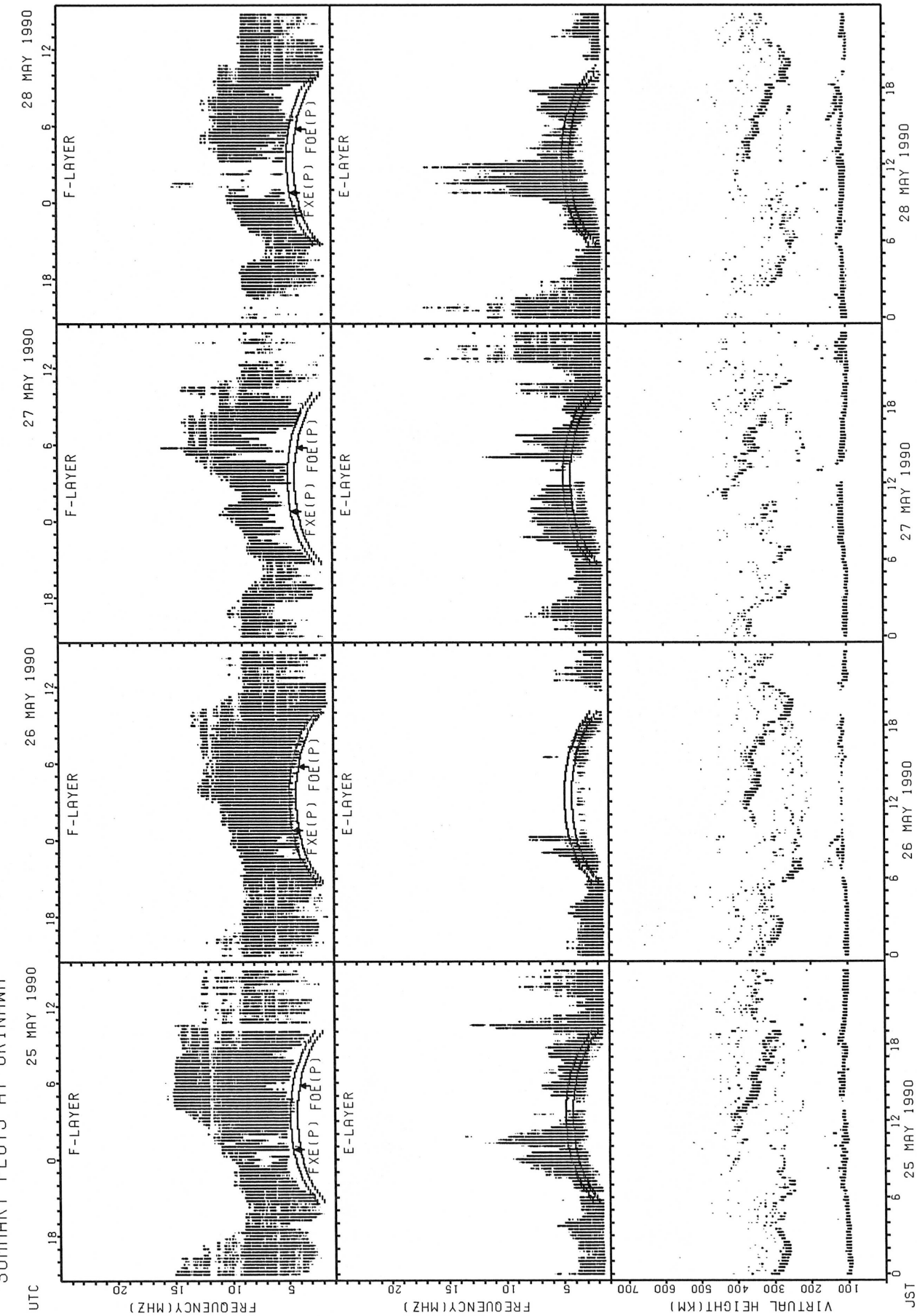
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
17 MAY 1990
18 MAY 1990
19 MAY 1990
20 MAY 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

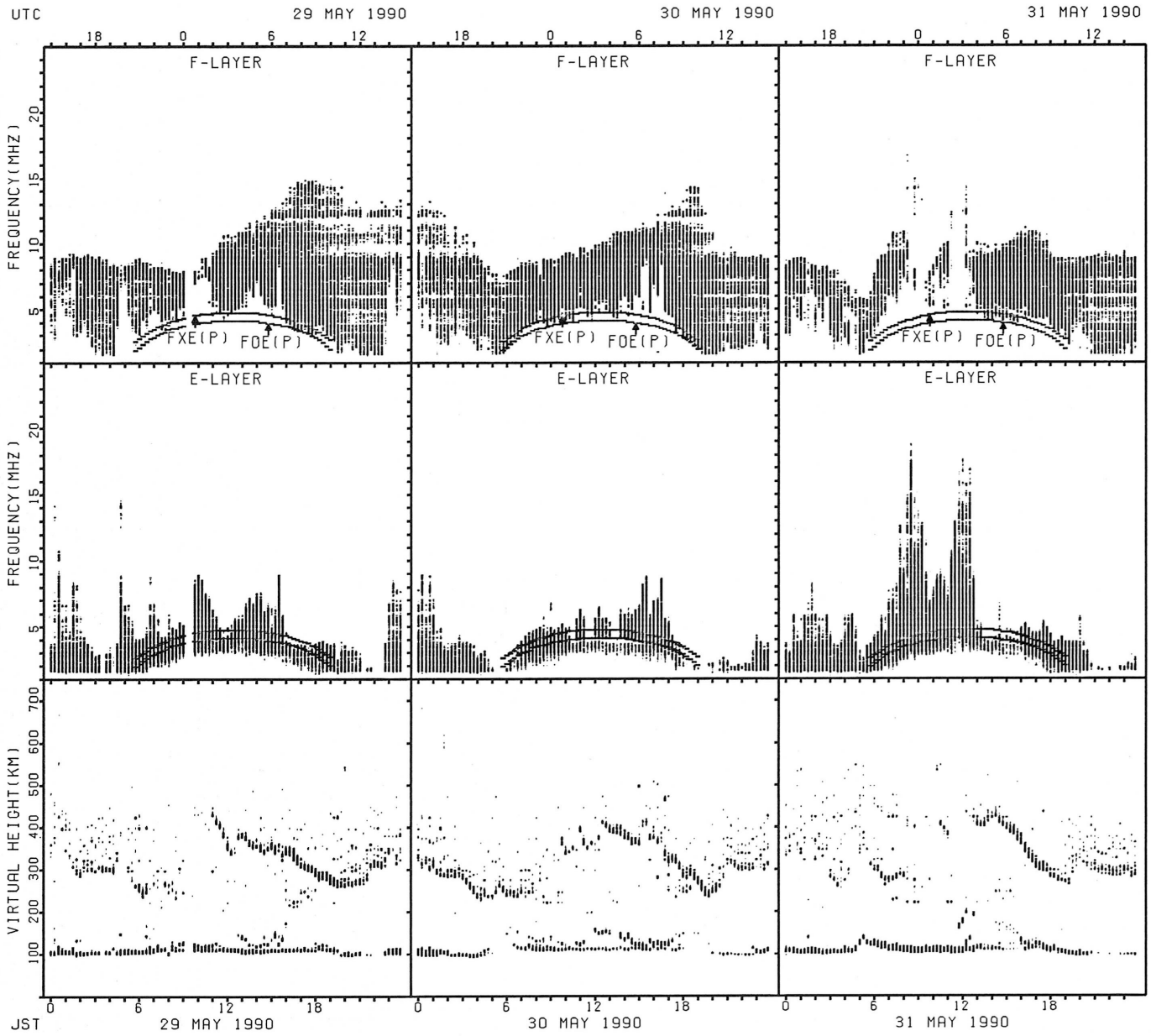
SUMMARY PLOTS AT OKINAWA



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


SUMMARY PLOTS AT OKINAWA
UTC
25 MAY 1990
26 MAY 1990
27 MAY 1990
28 MAY 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
MAY 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						10	12	17									20	16	22	22	15		11	
MED						333	327	306									323	302	293	292	352		346	
U Q						348	349	320									347	327	316	338	358		366	
L Q						282	293	274									298	286	268	274	314		338	

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10		10			14	11	18	22	15	14	13	11	10	12	10	11	17	24	23	25	21	16	14
MED	113		118			134	131	128	124	121	123	123	123	127	121	127	129	127	125	121	121	119	117	116
U Q	115		125			143	137	131	131	125	127	126	125	133	128	127	133	132	130	125	125	125	119	119
L Q	111		109			129	125	121	121	119	119	116	117	117	117	125	121	123	123	121	119	116	115	111

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		11					19	20									22	24	23	16				
MED		352					294	285									326	300	310	295				
U Q		372					302	294									338	325	332	335				
L Q		348					276	269									300	268	268	262				

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	15	16	12	13	12	13	21	20	23	18	19	18	13	11	16	13	23	23	25	27	29	25	22
MED	107	105	105	105	113	127	121	123	119	117	116	115	117	121	121	121	121	121	117	115	113	113	113	109
U Q	109	111	106	110	122	140	128	128	125	121	123	117	121	127	125	127	131	123	119	119	117	116	115	113
L Q	105	105	102	101	108	123	119	119	116	113	111	111	115	113	111	116	117	117	113	112	109	109	109	107

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	14	17	13			12	21	21	18								23	27	22	26	17			14
MED	354	354	330			307	274	270	290								318	284	305	301	348			356
U Q	376	363	349			355	304	317	336								342	314	316	324	358			362
L Q	336	343	314			283	263	256	260								278	258	262	272	317			348

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	25	24	25	19	15	16	27	29	29	22	26	23	22	16	18	22	24	26	26	23	27	25	27
MED	107	105	105	107	107	121	124	119	117	115	111	117	117	115	124	121	120	115	115	111	111	109	109	109
U Q	109	107	107	110	113	137	129	123	122	119	121	125	127	123	128	125	125	123	119	113	113	111	114	113
L Q	105	103	101	102	105	109	119	117	115	113	109	113	111	109	112	115	115	112	109	107	107	105	105	103

MONTHLY MEDIANS OF H'F AND H'ES
MAY 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	21	24	22	15			22	25	21								26	26	29	27	24	13	18	18
MED	344	337	313	332			277	260	274								331	309	286	278	316	338	356	353
U Q	360	360	338	346			316	277	289								354	330	316	302	347	352	376	370
L Q	326	319	298	278			266	246	259								298	274	255	256	291	316	348	342

H'ES

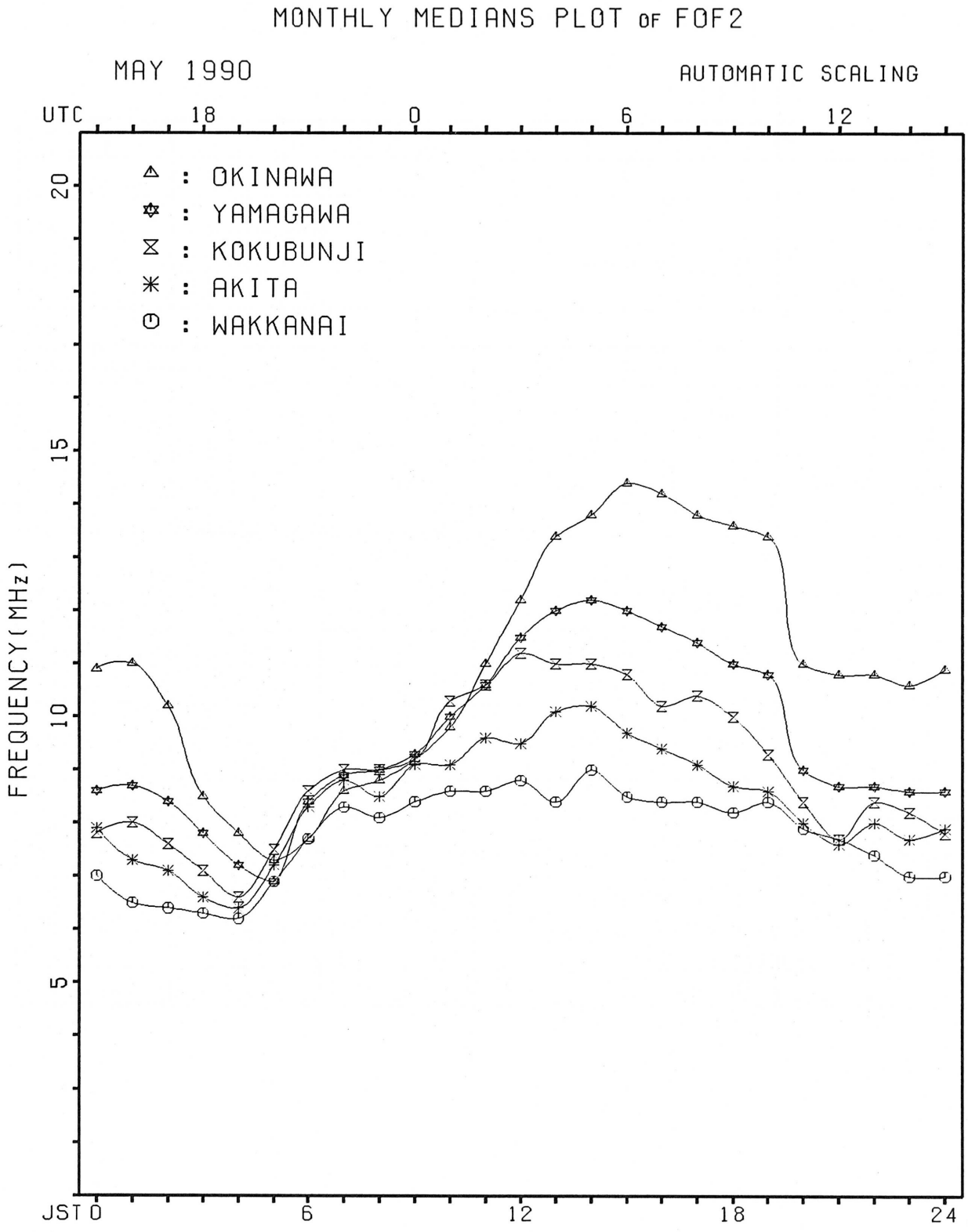
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	24	25	21	18	18	22	25	27	29	28	26	23	19	15	18	19	24	26	24	27	25	23	25
MED	105	104	103	105	105	111	130	119	119	117	113	112	113	117	115	121	119	115	116	113	111	111	107	109
U Q	109	108	107	106	107	119	137	126	121	119	118	119	119	123	121	129	127	118	121	113	115	116	111	111
L Q	103	101	99	103	105	107	121	116	113	113	109	109	111	113	111	119	113	108	113	111	109	109	105	103

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	25	27	26	24	17		15	26	25	20							26	29	30	29	26	21	18	25
MED	324	304	278	293	308		278	263	274	287							334	320	313	292	312	344	342	342
U Q	346	330	322	322	351		298	282	288	323							352	338	324	306	340	367	354	359
L Q	297	280	260	277	285		266	250	258	274							306	290	288	271	288	309	336	313

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	21	16	13	13	20	21	28	27	29	21	24	17	16	19	23	18	21	23	22	22	25	22	21
MED	103	105	104	103	103	109	125	119	117	117	115	118	117	122	117	121	123	119	117	111	109	103	107	105
U Q	107	109	107	106	108	116	134	140	121	119	122	125	135	137	125	131	131	125	123	117	113	110	111	110
L Q	99	97	101	100	101	105	108	115	113	112	110	112	113	116	109	113	119	114	113	109	105	101	101	101


MONTHLY MEDIANS PLOT OF FOF2
MAY 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

MAY. 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

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	X 75	X 76	X 79	X 71	X 66															X 104	X 81	X 83	X 89	X 87
2	X 86	X 88	X 85	X 76	X 68															X 108	X 100	X 94	X 97	X 100
3	X 99	X 93	X 95	X 87	X 79															X 103	X 98	X 92	X 98	X 100
4	X 91	X 89	X 95	X 79	X 65															X 105	X 84	X 86	X 92	X 85
5	X 84	X 86	X 77	X 69	X 70															X 95	X 79	X 83	X 85	X 88
6	X 86	X 85	X 85	X 81	X 77															X 104	X 85	X 79	X 82	X 80
7	X 81	X 84	X 78	X 75	X 68															X 105	X 83	X 81	X 85	X 88
8	X 84	X 82	X 82	X 77	X 76															X 111	X 96	X 85	X 87	X 85
9	X 84	X 77	X 76	X 73	X 71															X 100	X 91	X 83	X 82	84
10	97	93	91	84	75															X 84	X 79	X 77	X 79	X 77
11	X 81	X 74	X 66	X 65	X 62															X 108	X 93	X 93	X 92	X 92
12	X 86	X 84	X 80	X 79	X 79															X 104	X 93	X 92	X 96	X 93
13	X 89	X 88	X 85	X 76	X 75															X 108	X 98	X 98	X 98	X 100
14	X 102	X 101	X 96	X 87	X 87															X 97	X 96	X 97	X 97	X 96
15	X 95	X 94	X 94	X 83	X 81															X 108	X 101	X 100	X 101	X 99
16	X 97	X 98	X 92	X 85	X 83															X 117	X 112	X 111	X 114	X 116
17	X 114	X 105	X 101	97	96															X 111	X 109	X 112	X 115	X 117
18	X 113	X 112	X 103	X 91	X 91															X 104	X 102	X 103	X 104	X 105
19	X 105	X 89	X 79	X 78	X 79															X 79	X 83	X 87	X 89	X 89
20	X 90	X 91	X 87	X 75	X 77															X 104	X 102	X 103	X 105	X 107
21	X 108	X 107	X 99	X 88	X 86															X 106	X 100	X 99	X 102	X 105
22	X 107	X 105	X 95	X 86	X 81															X 107	X 102	X 100	119	X 111
23	92	X 90	X 86	X 82	X 77														A	X 71	X 70	X 73	X 75	X 77
24	X 75	X 75	X 72	X 70	X 68															X 96	X 98	X 93	X 92	X 96
25	X 95	X 90	X 82	X 76	X 73								A							X 97	X 91	X 93	97	93
26	X 92	X 86	85	85	81		99					A	A							X 79	X 74	X 75	X 79	X 83
27	X 80	X 79	X 76	X 75	X 70															X 90	X 83	X 80	X 77	X 80
28	X 81	X 73	X 75	X 75	X 73						A		A							X 81	X 81	X 81	X 85	X 83
29	84	84	80	77	76															X 86	X 93	X 82	X 82	87
30	X 83	84	X 79	X 80	X 81															X 96	X 87	X 89	X 90	X 86
31	X 86	X 81	X 82	81	78						A					A	A	A		X 80	X 77	X 80	82	X 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	31	31	31	31		1													31	31	31	31	31
MED	X 89	X 88	X 85	X 79	X 77		99													X 104	X 93	X 89	X 92	X 89
UQ	X 97	X 93	X 93	X 84	X 81															X 106	X 99	X 98	X 98	X 100
LQ	X 84	X 83	X 79	X 75	X 70															X 92	X 83	X 82	X 84	X 85

MAY. 1990 | FXI (0.1 MHZ)

IONOSPHERIC DATA

MAY. 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	69	70	73	65	60	69	84	98	110	108	117	124	129	126	123	115	111	114	112	98	75	77	83	81
2	80	82	79	70	62	70	86	H 91	99	110	115	117	123	122	127	129	119	116	105	102	94	88	91	V 94
3	93	87	89	81	73	79	S 98	108	109	111	117	128	134	131	133	137	125	115	115	97	92	86	92	94
4	85	83	89	S 73	59	64	78	81	84	89	89	96	98	104	105	105	107	105	102	99	78	80	86	79
5	S 78	80	71	63	64	72	90	99	88	85	90	94	98	106	109	110	119	113	107	89	73	77	79	82
6	80	79	79	75	71	70	80	88	94	100	102	106	108	R 111	113	118	107	109	110	S 98	79	73	76	S 74
7	75	78	72	69	62	65	81	S 97	91	94	104	113	120	123	119	109	103	102	105	99	77	75	79	82
8	78	76	75	71	70	82	96	99	91	94	111	112	119	121	125	123	115	118	117	105	91	S 79	81	79
9	78	71	70	67	65	74	94	98	96	98	99	107	115	112	103	100	91	92	94	94	85	77	76	U F 74
10	U F 84	F 84	F 80	F 72	F 66	69	81	79	72	76	75	90	86	84	83	85	84	84	84	78	73	71	73	S 71
11	S 75	68	60	59	56	57	R 64	75	82	90	95	105	112	113	114	117	110	106	105	102	92	88	86	86
12	80	78	74	73	72	83	89	90	98	110	115	118	128	128	119	113	103	99	92	97	88	86	90	87
13	83	82	79	70	69	80	S 93	105	101	96	102	106	109	111	111	109	106	104	104	102	93	92	92	94
14	96	95	90	81	81	90	100	97	93	90	94	108	112	110	103	103	99	95	95	91	90	91	91	90
15	89	88	88	77	75	88	96	95	103	108	111	117	120	123	126	122	118	112	110	102	95	94	95	93
16	91	92	86	79	J S 77	89	104	105	110	118	118	119	123	124	123	118	U R 115	115	113	111	106	104	108	110
17	108	99	Z 96	F 84	85	94	94	106	104	109	113	111	110	113	117	118	116	110	104	105	S 103	106	109	111
18	107	106	97	85	85	95	108	113	112	102	110	116	117	119	119	115	109	107	106	98	96	S 97	97	S 99
19	99	83	73	71	73	69	61	58	60	69	73	82	86	84	85	86	82	78	74	73	S 77	81	83	83
20	84	85	81	69	71	85	106	110	106	110	120	124	128	121	113	117	107	107	99	98	S 96	97	99	S 101
21	S 102	100	93	82	80	84	95	90	95	100	110	118	114	120	115	109	108	107	106	99	94	93	96	J S 99
22	101	99	89	80	75	81	80	77	92	104	111	111	110	111	103	109	104	98	104	S 100	96	94	111	105
23	F 84	84	80	76	71	76	80	71	60	R 61	58	57	E G 54	E G 52	58	R 61	60	63	A	66	64	67	69	71
24	69	69	66	64	62	72	91	96	100	103	105	108	107	106	98	101	96	89	86	U S 90	92	87	86	90
25	89	84	76	70	67	80	94	89	90	96	103	110	A	113	109	100	105	109	J S 98	91	85	87	88	F 84
26	86	80	F 77	F 76	F 72	82	F 89	80	70	62	62	A	A	67	69	70	71	79	81	73	68	69	73	77
27	74	73	70	69	64	70	83	90	89	94	86	99	96	99	100	101	102	89	86	84	77	74	71	74
28	75	67	69	69	67	76	89	84	72	66	A	65	A	64	69	71	70	69	71	75	75	75	79	77
29	F 72	F 73	70	J F 70	F 67	81	86	78	75	69	69	75	83	94	97	86	75	U A 71	75	80	S 87	76	76	F 77
30	77	F 77	73	74	75	R 76	83	85	86	J S 89	92	86	90	93	90	94	101	103	R 101	90	81	83	84	80
31	80	75	76	F 75	F 69	V 77	V 80	68	61	63	A	R 63	R 59	62	64	A	A	A	75	74	71	U S 74	F 73	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	31	31	31	31	31	31	31	31	29	30	28	31	31	30	30	30	30	31	31	31	31	31
MED	83	82	77	72	70	77	89	90	92	96	103	108	111	111	109	109	106	104	103	97	87	83	86	83
UQ	90	86	87	76	74	82	96	98	100	106	111	117	120	121	119	117	111	110	106	100	94	92	92	94
LQ	78	76	72	69	64	70	81	80	83	87	90	94	97	96	93	100	96	89	86	86	77	76	78	78

MAY. 1990 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

MAY. 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	L	L	L	L						
2								L	L	L	U L 560	L	L	L	L	L								
3								L	L		L	U L 640	U L 620	L	U L 575	A	L	A						
4								L	L	520	L 550	L	L	L 560	L 540	L	L	L						
5							L	L	L	L	L	L	Z 600	U A 600	L 530	A	L	L						
6								L	L	L 550	L	U L 580	L 570	560	L 560	L 500	L	L						
7								L	L	U L 660	U L 540	580	L 620	L 550	L 560	L	L	L						
8								L	L	L	L 580	L 580	600	L 600	U L 590	L	A	A	A					
9								L	L	L	A	L 620	U L 620	570	L 580	L 550	L	L	A					
10							L		U L 560	L 570	U L 610	580	U L 610	600	L 600	560	L 530	U L 490	L					
11						L	L		L 540	L	620	620	U L 630	L 610	L 600	L	U L 590	L 480	L					
12							3		A	A	L	L	U L 640	L	A	A	L	L						
13								L	L	L	L 640	L	640	L 610	L 630	L 600	L	L	A					
14							L	L	L		L 640	610	L 640	L	U L 610	600	U L 580	L						
15									L	U L 650	U L 690	670	R 650	H 660	H 650	H 600	L	L						
16									L	U L 620	L	L 700	680	650	600	U L 650		A	L					
17									A	L	U L 620	L 560	U L 690	L 670	L 650	A	L	L						
18								L	L	L	L	670	U L 710	A	L 630	L 610	U L 580	L	A					
19						L	L	510	530	550	570	580	590	600	580	580	U L 560	L						
20										U L 710	A	L 700	L 660	U L 640	U L 670	A	A	A	L					
21								L	L	L	L 650	U L 630	L 680	L 640	U L 640	L	L	L	L					
22						L		A	L	L	A	L 660	U L 720	660	L	U L 630	L	A	A					
23						350	420	450	U A 500	510	520	530	540	R 520	530	500	480	A	A					
24									L	L	L	L 630	610	590	L	570	A	L	A					
25									L	U L 650	L	U L 590	A	A	A	L	A	A	A					
26						L	U A 420	U A 480	U A 510	U A 510	530	A	A	540	U A 540	510	U A 510	A						
27							B	L	L	L	U A 600	580	590	590	A	550	U L 560	U L 430	L					
28						L	L	L	L 510	L	A	A	A	530	A	U A 500	490	L	A					
29						L	L	L 670	U L 520	L 540	570	540	550	540	530	L 520	L	A						
30								L	L	A	A	A	570	A	U A 540	A	A	L						
31						A	A	A	L 500	510	A	A	A	510	500	A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	2	4	8	13	16	21	24	23	23	16	9	3						
MED						350	420	495	L 515	L 550	L 590	L 610	L 620	L 600	L 580	L 565	U L 560	U L 480						
UQ								590	L 535	U L 650	L 630	L 660	L 655	L 625	L 620	L 600	U L 580	L 485						
LQ								465	505	520	555	580	595	555	540	515	510	L 455						

MAY. 1990 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

MAY. 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						R 160	245	305	A 330	A 360					355	335	310	260	A					
2						A	A	285	335	R 355	380	390	395	385	370	350	330	270	A					
3						A	255	310	340	360	A	A	A	A	380	345	305	A	A					
4						A	A	A	A	360	385	390	A	375	360	345	315	255	180					
5						170	245	305	330	355	R 370	380	395	380	360	340	305	270	A					
6						180	265	310	345	370	A	U A 400	395	A	360	350	305	270	200					
7						155	250	310	345	A 365	R 390	A	R	375	370	340	A	270	A					
8						190	255	320	355	375	390	R 400	U R 395	U A 380	355	330	A	A	A					
9						160	H 260	310	350	U A 395	U A 390	U A 390	395	395	385	370	335	290	200					
10						185	265	A 325	360	385	A	A	420	405	390	365	335	300	205					
11						205	270	330	A	B	A	A	A	A	X 390	B	335	295	225					
12						A	B	330	365	385	400	415	A 405	U A 390	A	A	A	A	A					
13						195	H 290	335	370	390	410	A 410	A	U R 420	400	385	350	295	A					
14						190	275	340	360	A	A	A	A	A	A	375	340	290	215					
15						205	295	345	380	395	420	425	425	410	400	380	345	305	U A 200					
16						210	H 295	340	380	405	U R 425	A	415	415	405	385	350	305	210					
17						195	290	340	375	400	R 410	430	430	425	415	390	355	305	205					
18						210	305	345	380	390	410	415	400	A	405	385	365	305	A					
19						205	300	355	395	410	400	A	R 425	A	405	390	350	300	225					
20						A	285	345	380	385	395	405	A	420	420	400	350	300	210					
21						H 200	285	340	380	B	U R 420	430	420	415	380	370	365	300	235					
22						A	290	340	385	U A 400	B	R 410	R 425	420	405	385	345	300	U A 195					
23						A	280	320	360	395	410	420	415	A	410	370	345	305	U A 215					
24						A	U A 270	310	350	A 385	U A 390	A	R 420	415	405	A	350	285	A					
25						200	B	335	370	B	A	A	A	A	U A 390	A 355	340	A	A					
26						200	280	325	360	385	395	410	405	U S 405	395	375	345	A 295	A					
27						U A 200	B	335	U A 365	390	390	395	400	A	A 365	360	340	300	205					
28						200	265	305	345	365	A 385	A	410	395	390	365	335	290	U A 210					
29						190	270	325	350	385	395	405	400	390	370	355	325	280	U A 205					
30						A	260	310	350	365	385	A	A 380	380	400	A	A	A	U A 200					
31						210	275	315	U A 370	360	U A 370	A	A	380	370	350	325	275	210					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						22	26	30	29	27	23	18	21	21	29	27	27	26	19					
MED						198	272	325	360	385	395	408	405	395	390	365	340	295	205					
UQ						205	290	340	375	392	410	415	420	415	405	382	350	300	212					
LQ						185	260	310	350	365	388	395	395	380	370	350	328	275	200					

MAY. 1990 | FOE (0.01 MHZ)

IONOSPHERIC DATA

MAY. 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	J A 49	J A 32	J A 27	J A 39	J A 25	20	34	J A 56	J A 52	42	J A 51	J A 62	J A 59	J A 61	G	G	35	32	33	J A 27	J A 20	36	J A 53	J A 33
2	23	J A 28	32	J A 25	J A 20	21	26	G	G	33	48	50	48	50	40	41	40	J A 35	26	J A 26	J A 33	J A 52	J A 61	J A 27
3	J A 47	J A 31	J A 16	23	J A 20	J A 24	29	39	J A 49	J A 50	J A 58	J A 45	J A 44	43	51	J A 102	J A 131	72	J A 63	J A 34	E B 14	E B 14	E B 13	E B 13
4	E B 14	E B 14	J A 37	J A 28	J A 45	J A 33	J A 32	J A 49	J A 52	J A 49	40	G 37	39	G	G	37	35	29	23	E B 13	E B 14	J A 17	J A 16	E B 13
5	J A 22	J A 19	E B 13	E B 13	J A 15	G	30	39	39	40	43	42	43	J A 62	J A 45	J A 52	J A 41	33	J A 48	J A 60	43	J A 37	J A 21	J A 24
6	J A 22	J A 46	J A 28	E B 12	E B 14	G	32	J A 50	J A 54	43	J A 53	43	J A 62	46	42	G	G	30	J A 32	J A 23	J A 13	32	J A 34	J A 42
7	J A 22	E B 15	E B 14	E B 14	J A 17	G	29	34	41	43	G 38	40	G 38	43	41	38	J A 45	36	J A 40	J A 24	33	J A 20	J A 15	J A 75
8	E B 15	E B 14	J A 34	J A 27	J A 42	G 17	G	37	45	44	43	42	43	44	47	60	J A 62	J A 58	J A 101	J A 71	J A 52	J A 33	23	61
9	J A 48	J A 33	J A 22	20	E B 14	22	33	J A 42	J A 52	J A 56	J A 73	J A 70	45	42	G	G	G	33	J A 52	J A 105	J A 24	57	J A 54	J A 38
10	J A 53	30	J A 18	J A 19	20	20	30	42	J A 50	46	46	45	G	46	46	G	40	J A 33	G 20	E B 14	E B 13	E B 13	E B 13	J A 37
11	28	J A 53	J A 49	J A 21	E B 15	G	30	J A 51	43	E 3 46	44	47	45	42	G	E B 47	G	G 19	G	J A 24	22	J A 22	J A 51	J A 50
12	J A 29	33	J A 43	J A 29	J A 24	24	E B 66	J A 48	J A 58	J A 76	48	52	J A 60	50	91	J A 104	56	J A 60	J A 34	52	J A 58	J A 27	J A 24	J A 23
13	J A 44	J A 18	J A 25	J A 21	20	G	G	36	40	J A 55	47	J A 68	J A 54	47	G 35	G	40	J A 51	65	J A 38	J A 66	J A 85	J A 24	E B 15
14	E B 13	E B 15	E B 13	E B 13	J A 17	23	G	40	43	51	J A 68	J A 80	J A 62	J A 90	J A 45	G 35	G 30	33	J A 41	J A 26	J A 20	J A 18	61	J A 34
15	J A 22	J A 33	J A 37	J A 27	J A 22	24	34	39	44	50	55	50	55	46	43	G	G	35	J A 35	18	E B 15	34	E B 14	J A 24
16	E B 13	J A 52	J A 27	J A 29	J A 26	G	42	J A 55	48	55	48	J A 52	G	G	44	52	121	J A 123	J A 46	J A 51	E B 13	J A 51	J A 68	J A 35
17	J A 52	52	J A 79	28	J A 22	23	J A 48	J A 49	J A 76	J A 55	G	J A 55	J A 58	58	J A 55	J A 80	J A 56	J A 56	J A 50	39	J A 51	60	51	39
18	J A 37	22	22	E B 13	E B 13	J A 44	32	45	J A 56	53	J A 58	J A 54	53	J A 69	G	G	41	J A 51	J A 85	J A 55	20	J A 44	J A 33	J A 20
19	J A 26	J A 21	19	J A 24	J A 55	G	38	46	51	J A 93	49	J A 57	G	J A 54	G	G	G	34	27	J A 59	J A 22	E B 13	J A 27	E B 13
20	E B 13	E B 14	J A 21	J A 19	J A 18	27	43	42	45	J A 53	J A 87	55	J A 53	G	58	J A 107	J A 95	J A 67	32	J A 42	J A 77	J A 53	J A 37	J A 37
21	J A 24	J A 29	J A 33	J A 33	J A 27	G	34	J A 60	J A 53	58	47	49	52	J A 59	J A 58	45	G	G	26	16	E B 13	J A 52	J A 52	J A 51
22	J A 29	J A 84	J A 25	J A 26	J A 24	J A 37	47	J A 55	J A 49	J A 58	65	51	G	J A 60	55	51	J A 71	J A 100	J A 67	J A 57	42	J A 44	93	J A 86
23	J A 65	E B 13	E B 13	J A 17	J A 35	J A 47	J A 44	42	J A 52	J A 51	J A 51	44	48	J A 141	G	G	47	J A 81	J A 136	17	25	J A 49	J A 14	J A 36
24	J A 118	J A 48	J A 37	J A 34	J A 18	24	39	40	J A 52	J A 56	J A 59	J A 56	48	51	43	J A 44	J A 54	J A 61	J A 100	144	J A 73	J A 104	28	J A 37
25	J A 21	J A 31	J A 24	J A 20	J A 18	25	E B 56	J A 50	46	J A 50	42	43	119	108	95	J A 55	J A 54	J A 56	106	57	J A 66	J A 88	J A 122	J A 24
26	J A 47	J A 16	J A 29	J A 51	E B 13	28	J A 53	J A 58	J A 56	51	46	J A 61	61	46	J A 68	46	J A 62	J A 66	J A 39	J A 26	J A 58	J A 50	J A 53	J A 76
27	J A 20	J A 25	J A 17	J A 23	J A 26	29	E B 68	43	J A 55	J A 61	J A 62	J A 75	52	J A 106	J A 65	49	G	G	G 20	J A 22	E B 15	J A 35	J A 25	J A 26
28	J A 22	J A 30	J A 48	J A 20	J A 15	25	J A 42	J A 53	J A 172	J A 58	85	J A 70	73	51	61	J A 63	42	J A 40	J A 39	42	J A 47	J A 69	J A 69	J A 65
29	J A 25	J A 21	20	E B 12	E B 12	21	G	40	43	43	47	48	53	55	42	53	J A 48	J A 84	51	38	J A 61	J A 63	J A 52	J A 63
30	J A 43	J A 42	J A 42	J A 23	J A 21	J A 43	J A 43	34	41	89	J A 78	J A 68	J A 69	J A 66	56	J A 88	J A 97	J A 60	J A 40	E B 15	J A 36	J A 26	J A 36	J A 51
31	J A 55	J A 42	35	J A 44	J A 36	J A 46	J A 58	J A 85	J A 54	J A 43	125	J A 192	J A 97	41	J A 54	J A 84	J A 116	85	J A 54	J A 60	111	J A 53	J A 55	J A 63
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	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	J A 28	J A 30	J A 27	J A 23	J A 20	23	33	43	J A 50	51	49	52	52	50	45	46	42	J A 51	J A 40	J A 38	J A 33	J A 44	J A 36	J A 37
UQ	J A 47	J A 38	J A 36	J A 28	J A 26	28	43	J A 50	J A 54	J A 56	J A 60	J A 62	J A 60	J A 60	56	J A 58	J A 59	J A 64	J A 58	J A 56	J A 55	J A 53	J A 54	J A 51
LQ	J A 22	J A 18	J A 20	J A 19	16	E G 17	30	40	44	44	46	45	44	44	38	G	32	33	32	J A 24	19	J A 26	J A 24	J A 24

MAY. 1990 | FOES (0.1 MHZ)

IONOSPHERIC DATA

MAY. 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	30	20	19	27	21	G	31	42	43	40	43	51	47	51	G	G	33	30	32	24	E B 15	29	40	29
2	17	18	22	22	18	20	25	G	G	37	46	46	45	48	39	40	39	32	24	22	27	39	33	25
3	33	16	E B 13	E B 13	15	18	27	36	43	41	43	40	41	42	44	98	40	61	61	32	E B 14	E B 14	E B 13	E B 13
4	E B 14	E B 14	29	23	40	25	30	36	36	G 32	40	G 36	37	G	G	36	33	28	22	E B 13	E B 14	E B 14	E B 13	E B 13
5	16	E B 13	E B 13	E B 13	E B 13	G	28	35	38	33	40	40	42	60	43	49	39	29	42	45	31	22	17	20
6	16	35	25	E B 12	E B 14	G	29	G	G	40	41	41	51	41	39	G	G	30	26	19	E B 15	23	E B 14	22
7	E B 12	E B 15	E B 14	E B 14	14	G	28	33	38	41	G 37	40	U Y 38	42	41	37	32	G 24	22	18	25	E B 14	E B 15	16
8	E B 15	E B 14	E B 14	E B 14	E B 13	G 16	G	35	44	42	42	41	41	42	44	52	61	53	98	39	26	29	E B 14	36
9	23	17	16	E B 13	E B 14	21	32	37	43	52	70	47	43	41	G	G	G	32	44	53	18	25	33	25
10	E B 13	15	14	15	E B 13	20	30	36	41	43	43	43	G	44	42	G	38	G	G 19	E B 14	E B 13	E B 13	E B 13	34
11	16	21	31	E B 13	E B 15	G	29	41	41	E B 46	42	44	42	42	G	E B 47	G	G 17	G	20	E B 13	20	35	40
12	19	20	23	16	18	22	E B 66	40	55	67	46	49	52	47	63	96	43	33	25	39	52	E B 14	E B 14	17
13	24	17	22	17	E B 13	G	G	35	40	42	44	57	50	45	G 34	G	39	33	51	29	36	63	E B 15	E B 15
14	E B 13	E B 15	E B 13	E B 13	E B 14	22	G	37	40	46	61	57	54	55	41	G 34	G 29	32	35	25	E B 15	E B 14	30	20
15	17	28	27	21	19	23	34	36	42	50	54	49	53	46	U S 43	G	G	32	32	18	E B 15	20	E B 14	19
16	E B 13	37	20	18	E B 13	G	40	44	46	46	47	50	G	G	43	44	79	43	33	17	E B 13	32	28	25
17	39	40	62	E B 13	E B 12	22	45	39	63	46	G	52	53	55	51	63	54	44	48	31	45	46	34	23
18	27	E B 13	E B 13	E B 13	E B 13	E B 15	32	40	48	51	56	50	48	64	G	G	40	41	45	39	E B 13	30	23	E B 13
19	16	19	E B 13	17	22	G	36	42	49	47	48	49	G	45	G	G	G	G	26	57	17	E B 13	24	E B 13
20	E B 13	E B 14	16	E B 15	E B 14	24	41	39	40	49	71	51	44	G	55	105	92	48	30	35	48	33	25	26
21	16	17	32	20	17	G	31	53	49	56	46	47	50	56	55	43	G	G	25	16	E B 13	21	25	28
22	20	18	18	21	16	34	44	50	43	56	U Y 64	49	G	51	51	49	49	51	54	55	32	30	62	45
23	48	E B 13	E B 13	E B 13	32	31	33	36	50	42	43	43	45	46	G	G	43	50	A A 136	16	14	16	E B 12	20
24	16	30	25	24	E B 13	22	37	34	48	53	56	46	46	47	42	40	48	50	64	79	31	66	17	26
25	20	19	18	E B 13	16	23	E B 56	41	44	41	41	43	A A 119	92	86	50	53	50	U S 91	49	58	49	68	21
26	19	15	24	33	E B 13	26	42	48	51	51	43	A A 61	A A 61	45	54	46	51	61	38	20	55	20	29	54
27	15	18	15	16	17	24	E B 68	41	51	54	60	50	50	53	62	46	G	G	G 19	15	E B 15	33	23	16
28	16	22	38	E B 13	E B 13	23	34	43	43	52	A A 85	55	A A 73	51	60	50	39	36	36	29	37	49	59	17
29	18	E B 13	E B 12	E B 12	E B 12	21	G	36	41	41	46	45	49	51	41	44	37	49	39	27	44	33	39	52
30	22	21	16	18	16	32	34	33	39	87	66	58	49	64	54	78	96	38	31	E B 15	34	22	30	17
31	50	37	32	21	29	41	46	60	38	40	A A 125	56	54	40	43	A A 84	A A 116	A A 85	47	52	51	20	38	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	17	18	18	15	E B 14	21	32	37	43	46	46	49	47	46	43	44	39	33	35	27	25	23	25	21
UQ	22	21	25	20	18	24	U 38	42	48	52	58	51	52	52	52	50	50	50	48	39	36	33	34	27
LQ	16	E B 15	E B 14	E B 13	E B 13	G	28	36	40	41	42	43	42	42	36	G	30	30	26	18	E B 14	18	E B 14	16

MAY. 1990 | FBES (0.1 MHZ)

IONOSPHERIC DATA

MAY. 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	13	14	14	13	14	13	14	16	17	20	24	29	31	32	22	21	19	14	12	15	15	14	13	14
2	13	13	16	13	13	14	17	17	19	17	20	20	26	22	24	19	18	17	13	13	13	14	13	13
3	13	13	13	13	13	13	16	16	17	21	24	20	20	21	20	19	18	15	14	14	14	14	13	13
4	14	14	13	15	13	13	14	14	17	20	26	29	24	23	20	18	17	14	15	13	14	14	13	13
5	13	13	13	13	13	13	14	14	17	20	19	27	24	22	20	16	16	14	16	13	13	13	13	14
6	13	13	13	12	14	13	14	16	17	18	30	27	21	25	21	18	16	16	13	13	15	12	14	15
7	12	15	14	14	13	13	13	14	17	17	24	22	23	26	24	22	16	13	14	14	13	14	15	13
8	15	14	14	14	13	14	17	17	20	20	27	23	33	24	20	20	19	15	15	13	13	14	14	14
9	14	13	13	13	14	13	16	17	18	19	30	23	31	33	25	21	20	16	13	13	13	13	13	13
10	13	13	13	13	13	15	16	19	20	21	26	28	34	29	25	20	19	15	14	14	13	13	13	13
11	14	13	13	13	15	16	20	20	27	46	27	32	32	33	34	47	19	14	15	12	13	13	14	14
12	13	12	13	13	13	15	66	17	20	24	34	34	33	21	25	20	19	16	13	14	15	14	14	14
13	13	13	14	15	13	16	18	17	20	26	33	34	35	32	20	19	16	17	13	13	13	15	15	15
14	13	15	13	13	14	16	19	16	20	34	30	33	31	26	25	17	17	16	14	13	15	14	14	13
15	13	13	14	15	12	18	21	20	E S 23	30	34	35	36	30	26	26	19	20	18	13	15	13	14	16
16	13	13	13	13	13	16	20	20	21	25	39	38	36	33	31	21	18	16	19	13	13	15	13	14
17	13	14	12	13	12	14	17	20	22	23	25	34	27	26	32	21	16	17	15	14	17	13	14	14
18	14	13	13	13	13	15	17	18	21	22	27	36	32	39	25	22	18	16	16	14	13	13	14	13
19	14	13	13	12	13	15	18	22	31	33	33	37	35	33	26	22	18	15	15	13	14	13	15	13
20	13	14	12	15	14	16	17	21	21	24	27	34	35	33	33	26	18	14	16	13	15	13	13	13
21	12	13	13	13	12	16	17	17	21	41	34	34	34	33	22	23	21	16	17	12	13	13	14	13
22	13	13	13	12	13	16	17	20	24	22	42	34	33	32	26	24	17	14	15	14	13	13	15	13
23	13	13	13	13	13	13	16	17	18	20	33	32	26	25	32	23	18	18	20	13	13	13	12	15
24	13	13	13	13	13	14	17	17	26	31	32	33	33	28	27	28	20	14	13	13	13	13	12	13
25	13	13	13	13	13	15	56	20	21	37	33	34	27	36	28	25	20	17	13	16	14	13	15	13
26	13	12	13	12	13	16	20	20	20	22	33	33	30	E S 32	33	26	20	17	17	13	14	13	14	14
27	13	13	13	13	13	14	68	19	22	24	26	33	34	38	28	31	20	16	13	12	15	12	13	13
28		14	14	13	13	14	17	16	20	20	30	31	24	32	27	21	21	17	14	13	13	13	13	13
29	14	13	12	12	12	14	14	20	18	26	26	26	28	31	20	18	17	15	14	14	16	14	13	14
30	13	12	13	13	13	14	17	17	21	21	23	30	31	25	20	18	17	13	16	15	12	13	13	14
31	13	13	14	13	12	14	17	17	19	30	28	26	36	33	29	20	17	14	14	15	13	14	13	13
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	13	13	13	13	13	14	17	17	20	22	28	32	31	30	25	21	18	16	14	13	13	13	13	13
UQ	13	14	14	13	13	16	18	20	21	28	33	34	34	33	28	24	19	16	16	14	15	14	14	14
LQ	13	13	13	13	13	14	16	16	18	20	26	27	26	25	22	19	17	14	13	13	13	13	13	13

MAY. 1990 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

MAY. 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	260	265	285	275	270	290	295	305	315	285	280	280	285	290	295	290	290	300	310	305	270	255	260	260
2	265	275	290	280	265	280	310	280H	280	285	285	280	285	285	285	295	290	290	295	295	290	265	250	260V
3	275	270	285	295	280	270	310S	305	300	275	270	285	285	285	285	300	285	295	300	285	275	255	260	275
4	270	275	300	310S	275	270	295	265	270	280	280	275	275	290	290	295	300	310	305	315	260	265	275	265
5	275S	290	285	275	285	305	315	320	330	290	285	280	275	285	290	290	310	310	315	305	255	255	265	265
6	275	275	290	285	295	305	315	300	290	285	285	275	275	270R	280	295	290	295	310	315S	295	270	265	265S
7	270	285	280	285	280	300	310	315S	295	270	265	270	275	285	285	285	290	280	300	315	280	260	255	270
8	260	270	275	270	275	295	305	315	300	255	275	270	270	275	280	280	275	285	295	300	295S	260	270	265
9	260	265	275	275	270	295	305	300	280	265	250	250	270	275	275	285	285	290	285	290	275	250	255	U F 245
10	U F 260	F 255	F 285	F 280	F 270	260	280	265	260	250	240	275	275	270	275	275	280	275	285	270	270	255	260	S 255
11	S 270	270	260	265	250	260	R 255	265	280	295	270	265	270	270	260	270	270	265	270	280	270	260	260	270
12	255	260	255	260	275	300	290	295	285	285	270	270	275	275	275	275	280	285	280	285	270	255	260	270
13	260	265	275	260	260	260	S 300	300	275	270	265	260	260	260	260	265	270	275	275	285	270	255	255	265
14	265	270	275	255	250	270	300	295	255	260	250	255	260	265	265	265	275	265	280	270	255	255	260	255
15	260	265	280	265	260	285	295	285	260	255	260	255	250	250	255	260	260	260	275	270	255	250	255	255
16	255	265	280	260	J S 255	270	295	270	255	265	255	250	250	250	255	255	U F 260	260	265	270	265	260	255	260
17	265	270	Z 270	F 265	270	290	300	285	270	260	270	255	255	250	255	260	265	265	260	265	S 245	245	255	260
18	265	270	290	255	255	270	295	280	280	250	245	245	245	245	250	260	255	260	270	265	255	S 245	245	S 250
19	270	245	225	235	235	240	245	215	215	240	230	250	255	250	250	260	265	275	265	255	S 240	240	235	240
20	245	260	270	250	250	255	270	270	250	245	255	255	255	255	255	255	260	265	270	260	S 255	245	250	S 245
21	S 255	260	265	245	250	250	270	265	270	250	255	260	255	265	265	260	265	265	270	270	255	245	240	J S 240
22	255	260	245	230	230	250	250	265	260	265	265	265	255	260	260	265	260	260	255	S 265	250	235	260	275
23	F 245	250	245	245	225	230	250	240	215	R 220	225	215	G	G	215	R 240	245	250	A	265	240	230	240	255
24	245	250	250	255	255	270	260	265	280	250	255	265	260	270	260	280	285	280	270	A	270	260	255	260
25	270	275	265	255	255	270	285	270	270	265	260	265	A	275	270	260	265	280	A	280	250	250	260	F 250
26	250	255	F 245	F 250	F 250	240	F 260	260	265	250	235	A	A	250	260	260	260	275	285	275	250	240	255	250
27	255	250	260	280	255	270	260	265	250	280	245	275	275	275	270	270	275	275	265	275	250	255	240	255
28	275	245	260	260	260	260	275	270	260	245	A	250	A	250	A 260	275	285	275	285	285	265	250	270	270
29	F 265	F 280	255	J F 255	F 250	270	285	265	275	275	240	260	260	275	290	300	280	A	280	275	S 275	275	260	F 265
30	255	F 265	270	275	280	R 285	265	280	265	A	275	270	270	280	265	265	A	280	R 295	280	255	260	265	265
31	265	260	265	F 280	F 285	V 270	V 275	A	275	260	A	A	A	250	250	A	A	A	280	280	245	S 270	F 265	275
	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	30	31	30	29	29	27	31	31	30	29	29	29	30	31	31	31	31
MED	260	265	270	265	260	270	290	275	270	265	260	265	270	270	265	270	275	275	280	280	260	255	260	260
UQ	270	270	282	278	275	288	300	300	280	280	270	275	275	275	280	285	285	285	295	290	270	260	260	265
LQ	255	260	260	255	250	260	268	265	260	250	250	255	255	250	258	260	265	265	270	270	252	248	255	255

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

IONOSPHERIC DATA

MAY. 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	L	L	L	L						
2								L	L	L	U L 355	L	L	L	L	L								
3								L	L		L	U L 335	U L 325	L	U L 340	A	L	A						
4								L	L	375	L 350	L	L	L 345	L 350	L	L	L						
5							L	L	L	L	L	L	Z 335	A	L 365	A	L	L						
6								L	L	L 355	L	U L 350	A	345	L 335	L 360	L	L						
7								L	L	U L 335	U L 360	345	L 325	L 355	L 340	L	L	L						
8								L	L	L	L 350	L 345	340	L 335	U L 330	L	A	A	A					
9								L	L	L	A	L 320	U L 320	350	L 335	L 350	L	L	A					
10							L		U L 330	L 335	U L 310	345	U L 315	335	L 315	320	L 340	U L 305	L					
11						L	L		L 360	L	340	340	U L 335	L 330	340	L	U L 330	L 365	L					
12							B		A	A	L	L	U L 335	L	A	A	L	L						
13								L	L	L	L 335	L	340	L 350	L 320	L 325	L	L	A					
14							L	L	L		A	A	L 325	L	U L 330	335	U L 325	L						
15									L	U L 335	U L 320	320	R 335	H 325	330	H 325	L	L						
16									L	U L 325		L 315	320	325	355	U L 315		A	L					
17									A	L	U L 330	A	U L 310	L 315	L 315	A	L	L						
18								L	L	L	L	340	U L 300	A	L 330	L 315	U L 330	L	A					
19						L	L	335	A	345	350	350	345	335	345	330	U L 345	L						
20										U L 330	A	L 300	L 320	U L 325	U L 315	A	A	A	L					
21								L	L	L	L 330	U L 325	L 325	A	A	L	L	L	L					
22						L		A	L	L	A	L 325	U L 325	330	L	U L 325	L	A	A					
23						A	A 310	340	A	360	365	365	370	R 330	345	365	A 335	A	A					
24									L	L	L	L 330	340	350	L	335	A	L	A					
25									L	U L 320	L	U L 350	A	A	A	L	A	A	A					
26						L	A	A	A	A	350	A	A	350	A	350	A	A						
27							B	L	L	L	A	A 325	345	A	A	A	U L 310	U L 365	L					
28						L	L	L	L 335	L	A	A	A	A	A	A	335	L	A					
29						L	L	L 285	U L 360	L 355	355	375	A 350	A	350	L 345	L	A						
30								L	L	A	A	A	A	A	A	A	A	L						
31						A	A	A	L 340	360	A	A	A	370	350	A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	3	5	12	14	19	22	18	20	14	8	3						
MED							A 310	335	L 340	L 340	L 350	L 340	L 330	335	L 338	332	U L 332	U L 365						
UQ								338	L 360	358	L 355	348	340	350	348	350	338	L 365						
LQ								310	L 335	U L 332	330	L 325	U L 320	330	L 330	L 325	U L 328	U L 335						

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

IONOSPHERIC DATA

MAY. 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

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										255	305	285	300	305	295	285	285	260						
2								225	275	305	285	310	305	305	310	290								
3								255	280		H 275	320	305	305	305	A 310	265	265						
4								L 340	325	350	340	350	335	295	300	300	280	255						
5							260	255	255	315	310	335	335	320	300	295	280	260						
6								275	L 275	310	L 285	335	330	335	315	285	285	275						
7								270	290	355	H 305	325	340	310	310	280	305	305						
8								285	275	L	340	320	335	330	310	310	305	280	A					
9								250	L 305	L 355	A 370	390	350	315	330	320	330	305	295					
10							325		410	440	475	355	370	395	385	365	355	330	305					
11						L 365	L 420		340	315	380	360	355	340	370	330	320	315	300					
12							E B 290		A 270	A 300	L 320	330	325	320	A 320	A	L 330	310						
13								265	285	H 270	355	L 370	385	375	360	350	320	315	A 305					
14							265	260	L 415		420	385	360	370	345	355	345	L 340						
15									360	355	340	385	400	375	375	355	350	310						
16									360	325	L 315	385	390	375	365	365	E A 390	350						
17									A 275	340	320	310	385	400	380	360	335	L 330						
18								310	285	L 420	390	410	385	400	390	360	350	355	300					
19						380	L 430	655	655	520	550	460	435	455	435	405	370	U L 345						
20										405	365	380	365	360	375	A	A	A 300	L 315					
21								U L 370	355	L 385	385	360	400	365	360	360	355	325	305					
22						355		E A 280	385	355	365	360	390	380	380	370	355	E A 345	325					
23						440	400	455	630	590	650	680	G	G	690	535	520	A 465	A					
24									320	L 385	L 390	360	370	360	365	345	320	350	E A 360					
25									355	380	330	340	A	E A 380	A 370	355	340	310	A					
26						335	360	375	405	500	555	A	A	500	460	430	420	370						
27							E B 405	L 345	L 365	310	440	340	355	355	365	355	340	270	L 310					
28						310	300	335	390	L 470	A	A	A	510	E A 460	405	360	L 360	A 295					
29						315	285	460	335	360	510	420	420	365	330	305	340	A						
30								285	L 285	A	365	365	365	340	375	E A 405	A	280						
31						A 300	A 320	A	395	465	A	A	A	510	490	A	A	A	320					
	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						8	12	20	29	27	29	28	27	31	31	28	27	28	12					
MED						345	316	285	335	355	365	360	365	362	365	354	338	311	305					
UQ						372	391	358	385	412	390	385	388	388	379	364	354	345	315					
LQ						312	282	260	285	315	320	332	335	325	318	308	312	280	300					

MAY. 1990 | H'F2 (KM)

IONOSPHERIC DATA

MAY. 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

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	A 350	A 325	285	A 290	285	260	225	A 245	255	225	225	E A 260	A 245	A 275	225	235	235	250	250	240	235	E A 345	E A 355	A 325
2	310	305	265	255	H 240	265	250	230	215	205	A 235	240	A 260	A 260	225	H 220	255	A 250	240	255	260	A 290	A 350	335
3	A 305	260	265	250	255	275	245	235	A 240	235	A 235	210	225	230	A 240	A	E A 255	A	E A 260	255	240	320	320	285
4	285	280	260	230	E A 355	A 265	245	A 255	235	230	H 200	220	220	H 200	210	225	230	240	250	235	220	290	290	295
5	295	260	245	275	270	265	245	235	230	220	225	H 205	H 205	A	A 235	A	A	235	A 245	A 255	A 285	320	315	305
6	300	A 325	275	245	240	255	240	235	245	205	H 225	205	A	215	215	225	230	250	255	240	235	A 290	300	315
7	310	280	260	250	250	250	230	220	230	220	205	215	210	215	235	235	220	260	260	250	A 250	280	320	300
8	310	305	275	260	280	250	230	230	A 230	220	215	210	220	220	260	A	A	A	A	A 260	255	A 260	280	E A 350
9	325	315	290	280	280	255	250	235	A 230	E A 275	A	A 250	225	225	H 205	210	230	260	A	E A 300	255	A 285	A 345	415
10	330	320	270	275	285	290	260	240	240	230	235	220	235	250	240	H 235	245	260	275	265	270	300	315	A 370
11	300	300	A 320	280	340	300	265	E A 270	235	H	220	220	225	H 200	240	E B 260	240	240	280	265	270	290	E A 340	A 310
12	335	A 320	335	305	300	260	B	240	A	A	225	A 240	E A 265	A 230	A	A	A 260	A 255	260	A 300	E A 330	300	310	290
13	310	310	A 300	270	320	260	260	235	230	225	215	A	H 250	220	205	230	245	255	A	A 275	A 290	A	305	315
14	310	280	285	305	325	265	250	235	H 225	H 240	A	A	A	A	230	235	230	250	A 275	280	300	305	A 310	310
15	310	320	285	275	315	260	240	230	230	250	E A 265	230	A 260	H 220	H 220	H 225	240	250	A 275	270	290	320	315	325
16	330	A 335	270	275	310	270	255	240	240	A 250	A 250	265	H 215	220	235	240	A	E A 280	A 280	285	280	A 310	320	320
17	A 315	A 310	E A 340	285	300	255	225	235	A	225	220	A	A	A	E A 285	A	A	A 275	E A 285	280	A 320	E A 355	A 350	320
18	A 315	285	240	240	300	265	245	245	A	A 255	A	240	225	A	215	H 215	250	A 275	A	A 300	300	A 355	350	315
19	305	305	395	400	330	265	E A 295	E A 275	A	E A 265	A 250	A 250	220	235	240	240	240	255	275	A	330	335	A 360	345
20	330	310	280	310	325	270	255	235	H 230	235	A	A 265	220	230	A	A	A	A	260	A	E A 350	A 340	350	355
21	315	305	A 310	320	320	270	240	A 250	E A 260	E A 270	235	230	A 260	A	A	270	255	255	265	275	280	335	380	365
22	330	295	330	385	360	A	E A 280	A	240	A	A	A 250	H 230	A 255	A	A	E A 290	A	A	E A 325	A 305	A 370	E A 360	A 290
23	E A 365	305	310	290	E A 405	A	E A 300	265	A	250	240	225	230	A	260	230	E A 310	A	A	310	310	360	355	335
24	335	A 365	A 350	330	320	260	A 255	230	A	A	A	235	235	230	230	240	A	A	A	A	A 305	A	310	A 320
25	290	280	280	310	310	250	E B 270	A 250	H 245	215	210	205	A	A	A	A	A	A	A	E A 290	A	A	A	A 325
26	A 340	305	A 330	A 365	320	300	A	A	A	A	A 250	A	A	260	A	E A 280	A	A	E A 285	270	A	355	A 355	E A 410
27	320	340	320	270	300	270	B	A 260	A	A	A	A	E A 255	A	A	A	225	240	275	265	280	E A 345	A 365	330
28	280	A 350	E A 365	305	310	290	E A 280	A	E A 275	A	A	A	A	A	A	405	A 250	E A 275	A	A 270	A 310	E A 390	A	305
29	325	290	285	330	355	280	235	H 225	230	210	220	225	E A 285	A	230	E A 260	235	A	E A 305	A 295	A 310	300	E A 350	E A 375
30	350	335	310	310	270	250	250	210	210	A	A	A	A	A	A	A	A	A	270	260	A 310	325	330	280
31	E A 365	E A 350	A 335	295	A 310	A	A	A	240	225	A	A	A	210	E A 280	A	A	A	A	A	A	310	E A 360	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	31	31	31	31	31	28	27	27	23	23	21	23	23	20	22	20	21	20	21	27	28	28	29	31
MED	312	305	285	285	305	265	248	235	232	228	225	228	228	228	231	232	238	252	265	268	284	311	328	318
UQ	330	321	320	310	321	270	255	245	240	242	A 235	242	A 244	242	240	244	250	259	A 275	283	A 308	338	A 352	334
LQ	308	292	272	270	282	258	240	232	230	220	220	218	220	218	220	225	230	250	260	258	258	295	312	305

MAY. 1990 | H'F (KM)

IONOSPHERIC DATA

MAY. 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 120	120	110	110	115	110	A	A	A	115	110	115	115	A					
2						A	A 110		110	110	110	110	110	110	115	115	115	120	A					
3						A	120	110	110	110	110	A	110	110	110	110	110	110	A					
4						A	A	110	A	E A 130	115	E A 130	A	115	110	115	115	115	E B 145					
5						130	120	110	110	110	110	115	115	110	110	110	110	115	A					
6						E B 140	115	110	110	110	120	115	110	110	110	110	110	110	130					
7						E B 145	110	110	110	105	A 120	A	A	A 125	A 130	115	A	A	A					
8						E A 170	120	115	110	115	120	115	115	110	110	110	115	A	A					
9						B 140	115	110	110	110	115	110	120	B 125	120	115	115	115	125					
10						B 145	115	110	110	115	120	120	B 130	120	115	115	115	115	E A 145					
11						B 140	120	115	120	B	A	120	115	120	120	B	110	120	130					
12						E B 145	B	115	110	115	120	120	B 120	110	115	A	A	A	A					
13						E B 145	120	110	110	110	115	A	A	E A 130	E A 120	110	110	115	A					
14						B 140	120	110	110	120	110	A	A	A	A	E A 140	E A 125	E A 135	E A 130					
15						E B 155	120	110	115	115	125	120	120	120	120	120	115	120	E B 130					
16						B 140	120	115	115	110	B 125	120	125	120	115	115	110	115	E B 135					
17						120	115	115	115	115	110	120	115	115	115	110	110	115	B 125					
18						E B 140	115	110	110	115	110	E B 125	120	A	115	115	115	110	A					
19						135	115	115	120	115	115	A	120	A	115	115	110	115	125					
20						B	115	115	110	110	115	115	A	115	115	115	110	110	130					
21						120	115	110	115	B	125	120	120	120	110	120	115	115	125					
22						A	115	115	115	115	B	120	120	120	115	115	110	115	125					
23						125	115	110	A 120	110	125	115	115	110	125	115	115	115	E B 130					
24						120	115	110	115	B 120	120	A	120	120	120	120	110	110	A					
25						130	B	110	110	B	125	A	110	A	115	115	115	110	A					
26						115	120	110	110	115	120	125	120	125	E B 130	115	120	115	A					
27						A	B	110	A	110	115	120	120	A	115	120	110	115	E A 150					
28						135	115	110	110	110	120	120	115	120	120	115	115	115	B 125					
29						130	115	110	110	115	115	110	115	120	110	110	110	110	120					
30						A	115	110	115	115	110	120	B 120	115	115	115	110	110	E B 130					
31						B 140	115	110	110	B 120	115	120	A	E B 130	B 120	115	110	115	B 125					
	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	26	31	29	28	29	23	24	25	30	29	29	28	19					
MED						B 131	115	110	110	115	115	120	120	118	115	115	110	115	128					
UQ						B 141	120	112	115	115	120	120	120	120	120	115	115	115	E E 130					
LQ						125	115	110	110	110	110	115	115	110	115	110	110	110	125					

MAY. 1990 | H'E (KM)

IONOSPHERIC DATA

MAY. 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

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	100	105	110	105	105	105	135	120	110	115	110	105	105	100	G	G	140	120	100	100	100	105	105	105
2	105	100	100	100	100	110	110	G	G	E G 185	135	130	125	125	155	135	125	120	115	110	110	105	105	110
3	105	105	120	110	105	110	145	125	115	115	110	110	110	115	130	115	110	110	110	110	B	B	B	B
4	B	B	105	110	105	110	115	105	110	115	E G 150	110	115	G	G	E G 165	150	130	140	B	B	105	110	B
5	100	105	B	B	130	G	140	135	130	140	135	140	150	120	130	120	125	140	115	110	110	105	110	110
6	110	100	105	B	B	G	150	110	105	120	115	125	110	115	130	G	G	E G 150	125	120	120	110	110	105
7	115	B	B	B	110	G	155	E G 150	125	115	110	115	115	125	E G 170	E G 170	105	100	105	115	110	115	100	110
8	B	B	130	110	130	115	G	140	125	125	130	145	125	120	110	105	105	105	105	105	110	95	105	100
9	105	110	105	95	B	140	130	120	115	115	110	115	130	E G 150	G	G	G	140	120	110	110	115	110	115
10	105	105	110	110	120	140	145	120	120	120	120	120	G	145	140	G	125	135	125	B	B	B	B	105
11	105	105	100	100	B	G	E G 145	120	115	B	115	115	115	120	G	B	G	115	G	115	105	110	105	105
12	105	105	100	105	110	135	B	120	115	110	120	115	110	110	105	105	105	105	105	105	100	105	105	100
13	110	105	100	100	100	G	G	E G 155	E G 155	120	130	115	120	140	105	G	130	145	110	110	110	105	110	B
14	B	B	B	B	100	150	G	130	130	120	110	105	105	120	110	105	100	E G 150	120	115	110	115	105	105
15	105	100	100	105	110	180	E G 150	E G 155	145	120	120	125	120	125	135	G	G	150	120	115	B	110	B	110
16	B	105	110	110	110	G	130	125	120	125	135	115	G	G	E G 165	130	120	120	120	125	B	110	110	110
17	110	105	105	110	115	140	120	120	115	115	G	120	130	125	130	120	120	120	115	110	110	110	110	105
18	100	105	110	B	B	105	E G 160	130	120	115	115	115	110	110	G	G	135	115	115	110	120	105	105	115
19	105	105	115	105	105	G	130	125	115	115	115	110	G	115	G	G	G	150	130	110	115	B	105	B
20	B	B	105	110	115	120	115	115	115	110	110	110	115	G	125	115	115	110	120	110	110	110	105	105
21	110	110	95	100	110	G	130	115	115	120	130	130	115	115	110	120	G	G	E G 135	120	B	110	110	105
22	105	120	110	105	115	105	125	120	125	115	110	115	G	125	125	120	125	115	115	115	110	115	115	115
23	105	B	B	135	130	125	125	125	120	125	130	135	120	110	G	G	125	115	110	115	110	110	110	105
24	110	105	100	105	115	125	115	115	115	110	110	110	140	130	E G 150	120	125	110	120	105	105	105	110	105
25	110	110	110	110	120	E G 170	B	120	120	105	120	120	110	110	110	115	115	110	105	105	110	120	115	110
26	110	110	110	105	B	135	130	125	120	120	125	130	130	170	125	155	120	115	110	110	100	125	120	115
27	110	105	110	105	105	140	B	125	120	115	110	115	120	115	110	145	G	G	110	110	B	115	110	110
28	110	110	105	120	130	140	120	115	115	115	110	115	130	135	125	125	135	125	120	115	110	110	110	110
29	110	110	115	B	B	160	G	135	125	130	130	125	120	120	135	120	130	115	110	115	110	110	110	110
30	110	110	125	110	115	115	120	140	125	110	110	110	115	115	130	120	110	105	115	B	115	110	120	125
31	110	105	105	110	110	130	125	120	130	130	110	110	115	E G 150	130	120	115	115	115	110	110	115	110	110
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	25	27	25	25	23	24	30	30	30	30	31	27	28	24	21	24	29	30	28	24	28	28	27
MED	108	105	105	105	110	128	128	121	120	115	115	115	115	120	128	120	122	115	115	110	110	110	110	110
UQ	110	110	110	110	115	140	138	128	125	120	130	125	125	126	132	125	128	130	120	115	110	115	110	110
LQ	105	105	102	105	105	112	120	120	115	115	110	110	112	115	110	115	112	110	110	110	110	105	105	105

MAY. 1990 | H'ES (KM)

IONOSPHERIC DATA

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

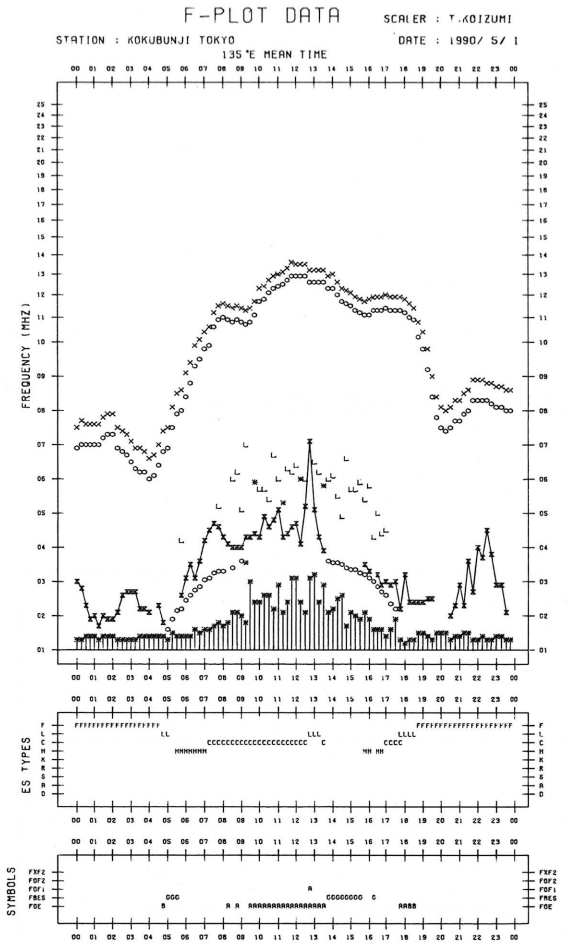
Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24sec in automatic operation

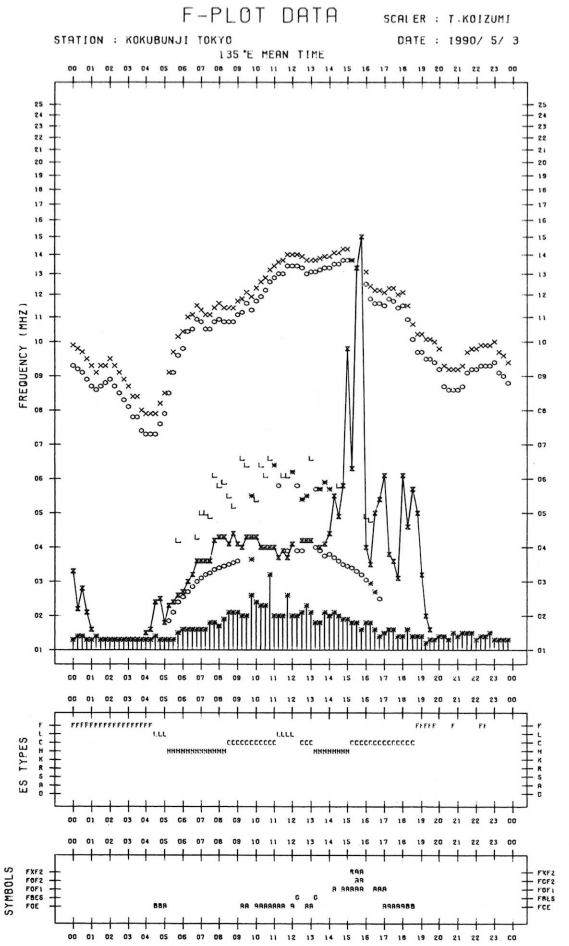
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 3	F 3	F 3	F 4	F 3	L 1	H 2	H 3	C 2	C 1	C 2	C 2	C 2	L 2			H 1	C 1	L 3	F 3	F 1	F 4	F 4	F 5
2	F 2	F 5	F 5	F 4	F 2	L 2	L 2			H 1	H 2	H 2	H 1	H 2	H 1	H 1	H 2	C 2	C 3	F 3	F 5	F 4	F 4	FF 42
3	F 4	F 2	F 1	F 1	F 2	L 2	H 1	H 2	H 2	C 1	C 2	C 1	L 2	C 1	H 2	H 3	C 3	C 4	C 3	F 3				
4			F 5	F 4	F 5	L 4	L 3	C 3	C 2	L 2	H 1	L 1	L 1			H 1	H 1	H 2	H 1			F 1	F 1	
5	F 2	F 1			F 1		H 2	H 2	H 2	H 1	H 1	H 1	H 1	H 2	H 2	H 3	H 2	H 3	C 3	F 6	F 4	F 5	F 2	F 3
6	F 2	F 5	F 4				H 1	LH 12	LH 12	H 1	C 1	H 1	C 2	C 1	H 1			H 1	C 2	F 3	F 1	F 6	F 2	F 3
7	F 1				F 1		H 2	H 1	H 1	H 1	L 1	C 1	L 1	HL 11	HL 11	H 1	L 2	LH 31	L 2	FF 21	F 5	FF 21	F 1	F 2
8			FF 11	F 2	FF 21	L 1		H 1	H 2	H 2	H 1	H 1	H 1	C 1	C 2	C 3	C 4	C 4	C 4	F 2	FF 43	F 4	F 2	F 5
9	FF 33	FF 23	F 1	F 2		C 2	H 2	H 2	C 2	C 2	C 2	C 1	H 1	H 1				H 1	C 4	F 4	F 3	F 4	F 4	F 6
10	F 6	F 4	F 2	F 2	F 1	H 1	H 1	C 2	H 2	C 1	C 1	C 1		H 1	H 1		H 1	H 1	L 2					F 4
11	F 2	FF 22	F 2	F 1			H 1	C 2	C 1		L 1	C 1	C 1	C 1				L 1		F 4	F 1	F 3	F 5	F 5
12	F 4	F 4	F 5	F 2	F 3	C 3		C 2	C 3	C 2	C 1	C 2	C 2	C 2	C 3	C 3	L 4	L 4	L 3	F 5	F 5	F 2	F 2	F 2
13	FF 22	F 2	F 3	F 2	F 2			H 1	H 1	C 1	H 1	CL 21	CL 11	HL 11	L 1		H 2	HH 11	C 3	F 6	F 4	F 5	F 3	
14					F 1	H 1		H 1	H 1	C 1	C 2	C 2	L 2	CL 12	L 2	L 2	L 2	HL 12	CL 21	F 2	F 1	F 1	F 3	F 3
15	F 2	F 4	F 3	F 4	F 3	H 1	H 1	HC 11	H 1	C 1	C 1	C 1	C 1	C 1	H 1			H 1	C 2	F 1		F 3		F 2
16		F 4	F 4	F 2	F 2		H 2	H 2	H 2	H 1	H 1	C 1			H 1	H 1	H 3	C 4	C 3	F 2		F 4	F 5	F 5
17	F 4	F 5	F 5	F 2	F 2	H 1	H 3	C 2	C 3	C 1		H 1	A 1	A 2	H 1	H 2	C 2	C 3	C 3	F 4	F 5	F 4	F 5	F 5
18	F 5	F 2	F 1			L 1	H 1	H 2	H 2	C 2	C 2	C 2	C 1	C 1			H 1	C 3	C 3	F 4	F 2	F 6	F 4	F 1
19	F 2	F 4	F 1	F 3	F 5		H 2	H 2	C 1	C 1	C 1	C 1		C 1				H 1	H 2	F 5	F 1		F 4	
20			F 3	F 2	F 1	C 2	H 2	C 1	C 1	C 2	C 2	C 2	C 1		H 2	H 4	C 4	C 4	C 3	F 4	F 6	F 4	F 4	F 4
21	F 2	F 2	F 4	F 2	F 2		C 1	C 3	C 2	C 2	C 1	C 1	C 1	C 2	C 2	C 1			H 1	F 1		F 4	F 3	F 5
22	F 4	FF 23	F 4	F 5	F 2	L 4	H 3	C 3	C 1	C 2	C 1	C 2		A 2	H 2	H 2	H 3	C 5	C 4	F 4	F 7	F 6	F 5	F 6
23	F 7			F 2	F 6	CL 31	C 2	C 2	CL 31	H 1	A 1	A 1	A 1	C 2			H 2	C 3	C 4	F 1	F 2	F 3	F 1	F 3
24	F 3	F 3	F 3	F 4	F 1	C 1	C 2	C 1	C 2	C 2	C 2	C 2	A 1	A 1	H 1	C 1	H 2	C 3	CL 44	F 6	F 4	F 5	F 3	F 6
25	F 2	F 2	F 2	F 2	F 1	H 1		C 2	C 2	L 1	C 1	C 1	C 3	C 2	C 3	C 2	C 3	C 4	C 5	F 4	F 5	FF 24	F 5	F 4
26	F 3	F 1	F 5	F 5		H 2	H 2	H 4	H 2	C 2	H 1	H 2	H 2	H 1	H 2	H 1	H 3	C 4	C 4	F 3	F 4	FF 23	FF 51	F 5
27	F 2	F 4	F 1	F 2	F 2	HL 22		H 2	HL 32	C 2	C 2	C 2	C 2	C 1	C 2	HC 22			L 2	F 2		F 5	F 6	F 2
28	F 2	F 4	F 4	F 2	F 1	C 1	C 2	C 4	C 2	C 2	C 3	C 2	C 2	A 1	H 2	H 2	H 2	H 2	C 3	F 4	F 6	F 6	F 5	F 3
29	F 3	F 2	F 1			H 1		H 2	H 2	H 1	A 1	H 2	A 2	C 2	H 1	H 2	H 2	C 4	C 4	F 5	F 5	F 4	F 5	F 5
30	F 4	F 4	FF 22	F 2	F 2	C 4	C 2	H 1	H 1	C 2	C 2	C 2	C 2	C 2	H 2	C 4	C 3	C 3	C 3		F 4	F 2	FF 24	F 3
31	F 4	F 4	F 4	FF 23	FF 34	C 4	H 3	C 3	H 2	H 1	C 3	C 3	C 2	A 1	H 2	H 3	C 3	C 4	C 4	F 4	F 7	F 3	F 5	F 4
	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																								

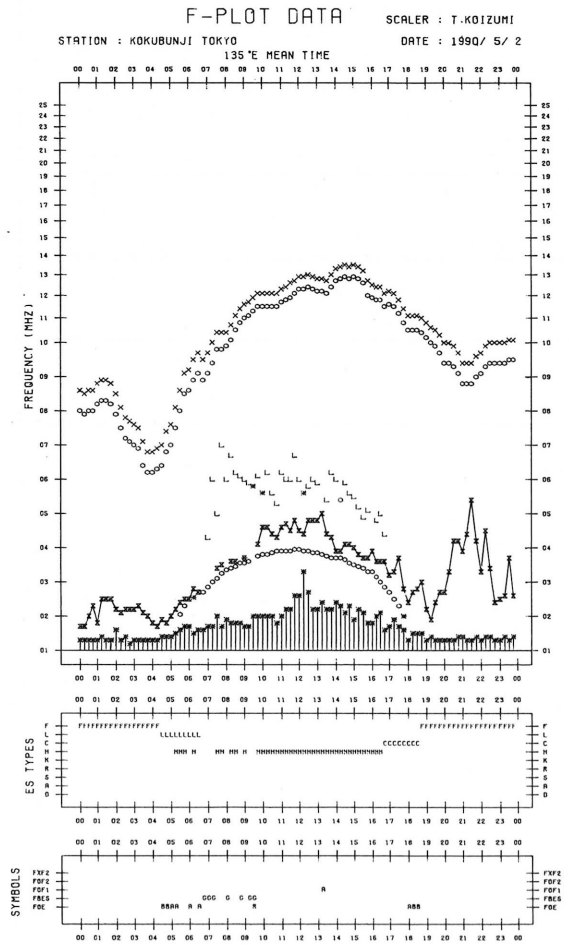
MAY. 1990 | TYPES OF ES

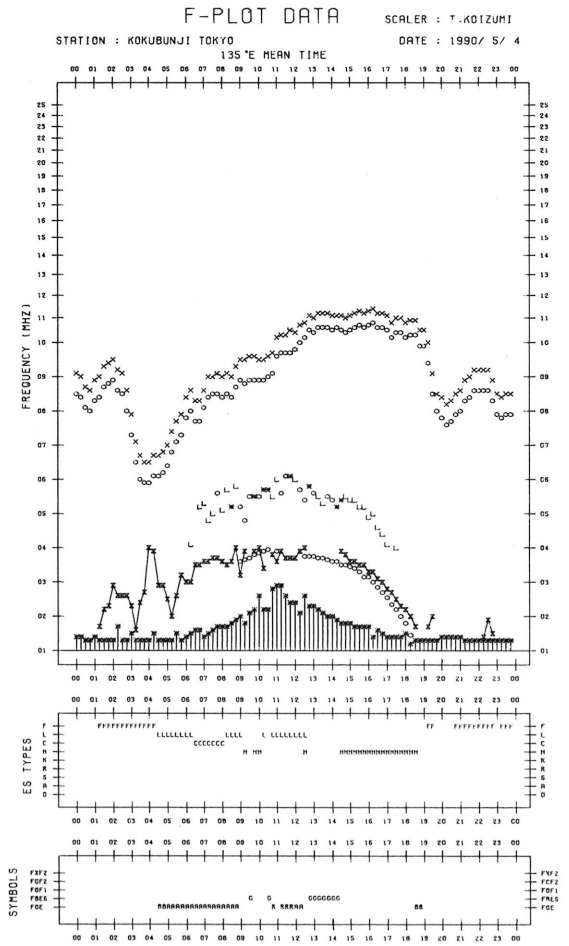
f-PLOTS OF IONOSPHERIC DATA

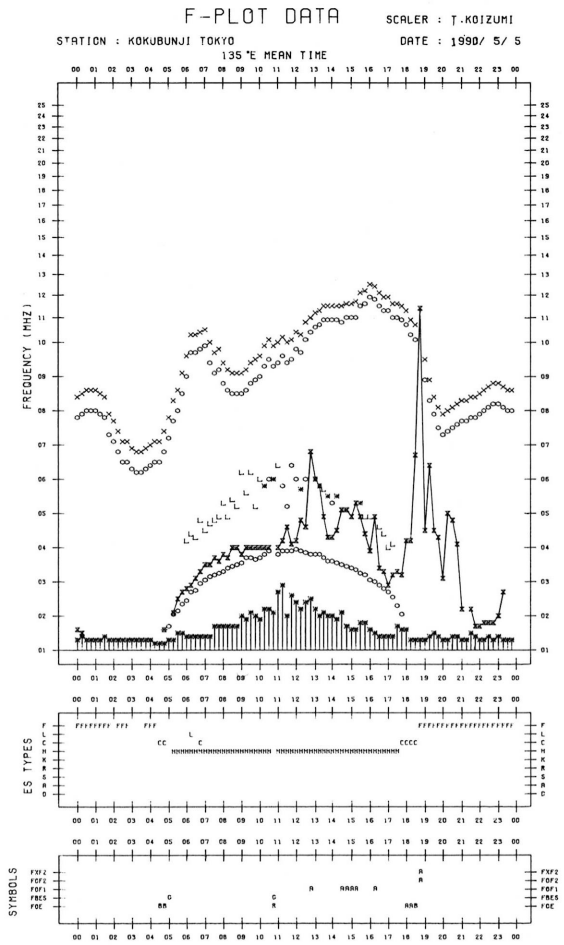
KEY OF F-PLOT	
I	SPREAD
○	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑, Y	FMIN
∧	GREATER THAN
∨	LESS THAN

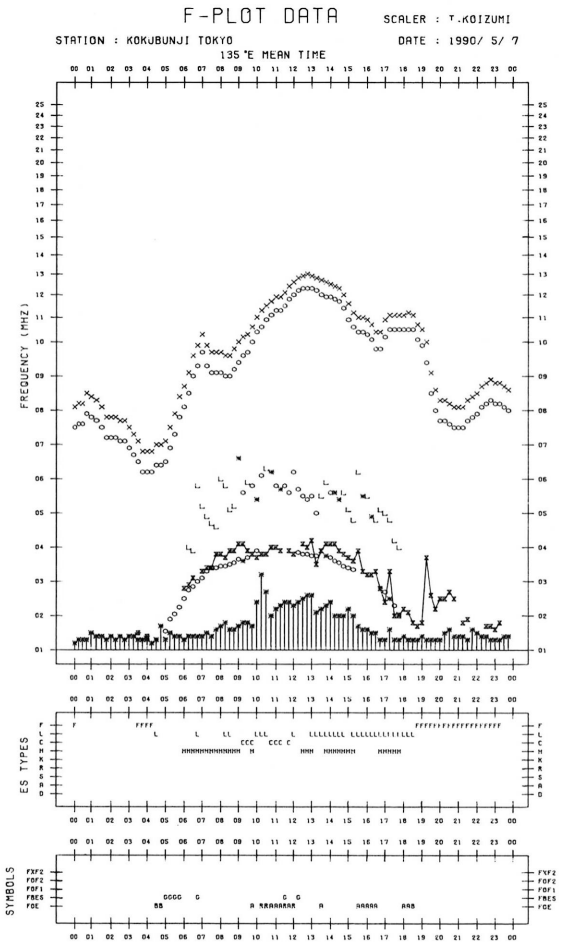

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/ 1
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

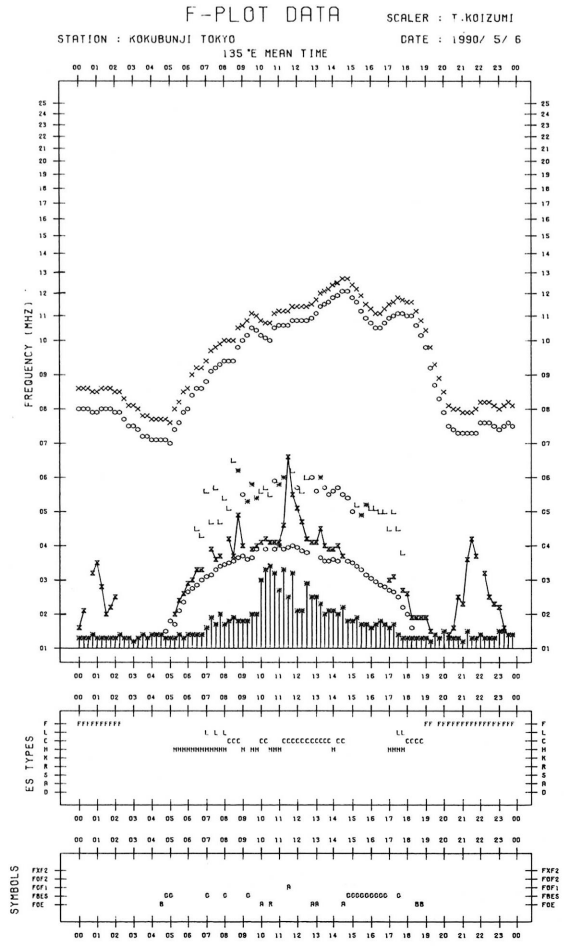

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/ 3
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

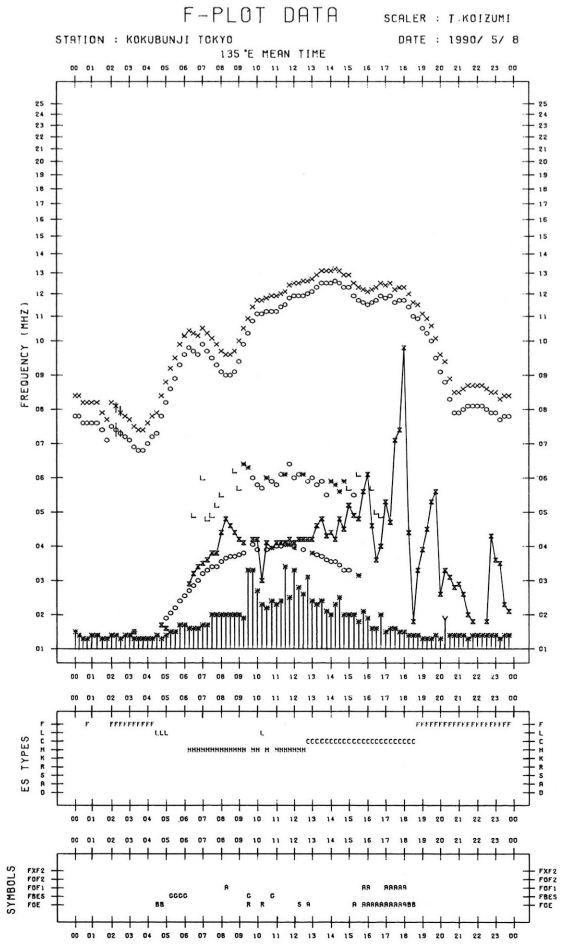

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/ 2
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

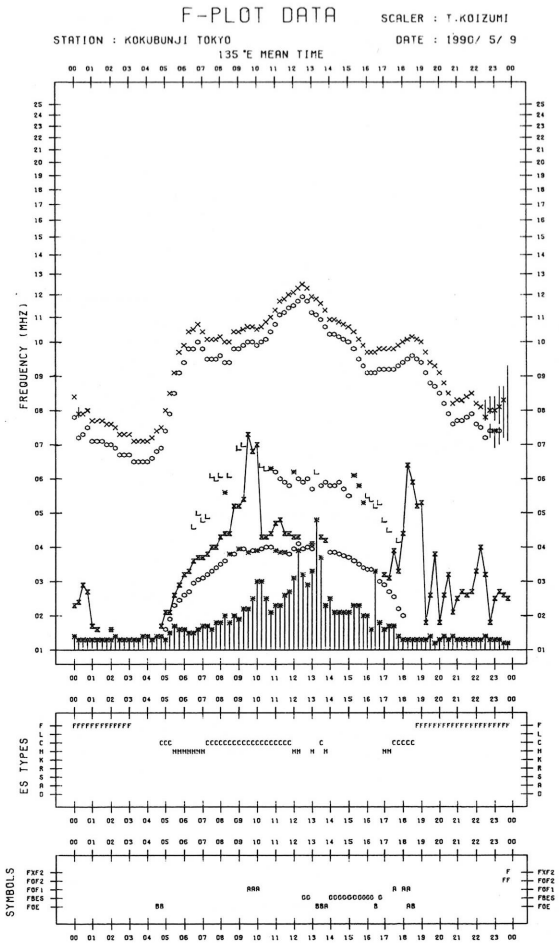

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/ 4
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

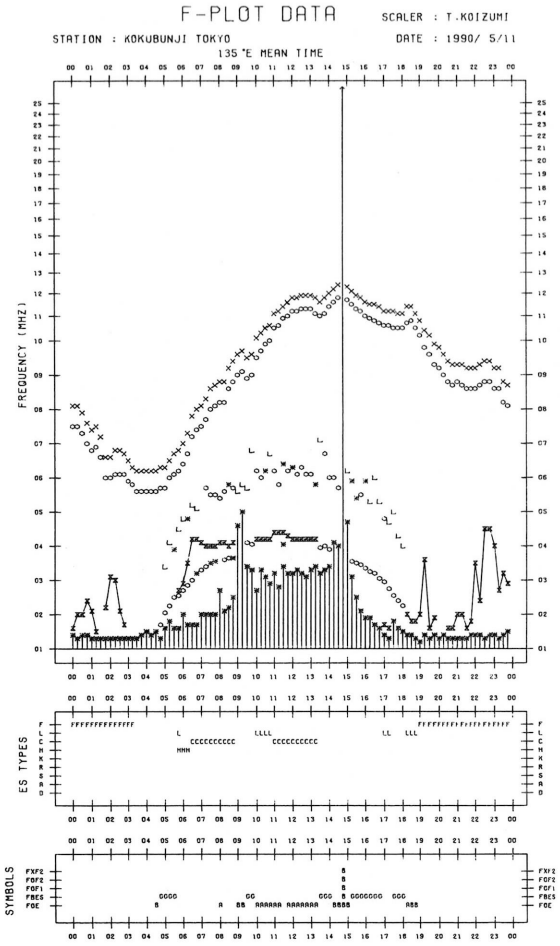

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/ 5
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

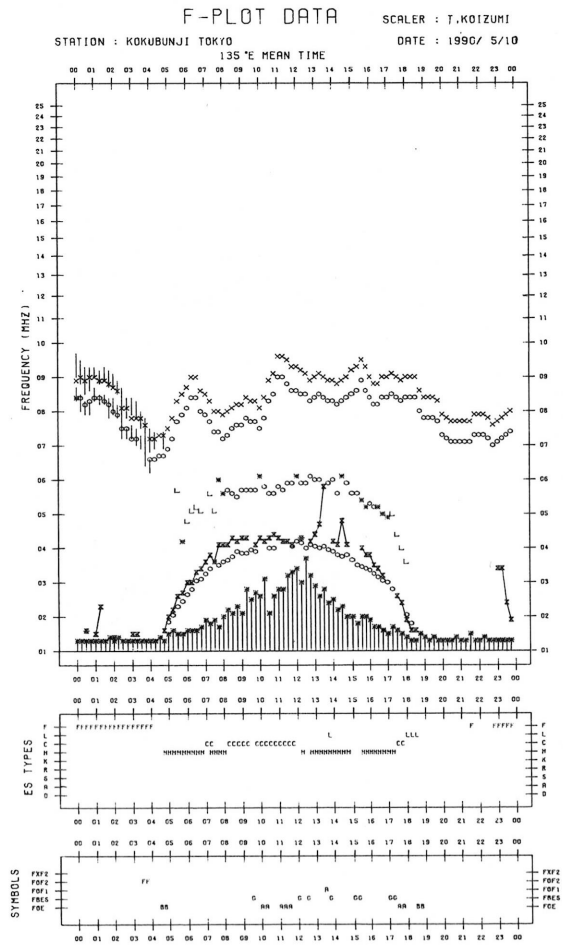

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/ 7
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

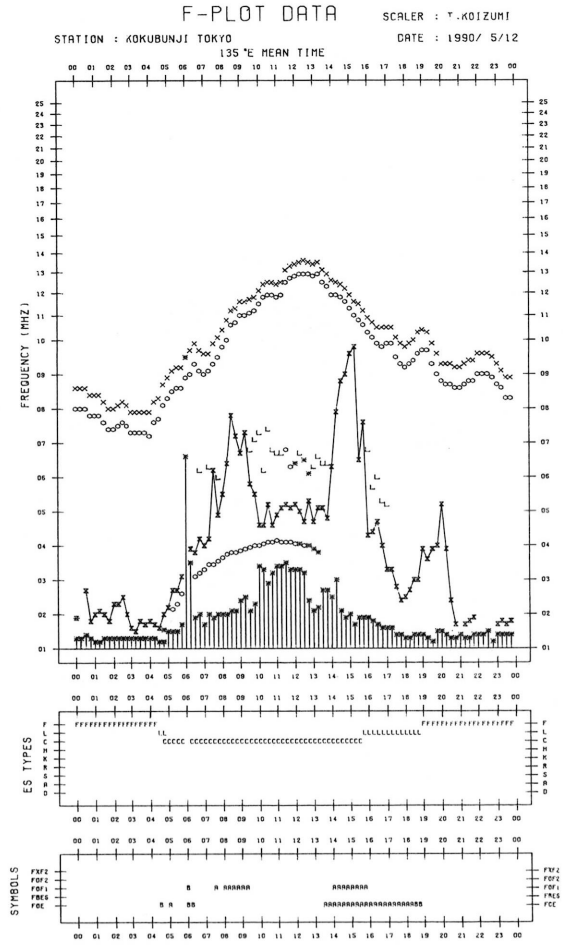

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/ 6
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

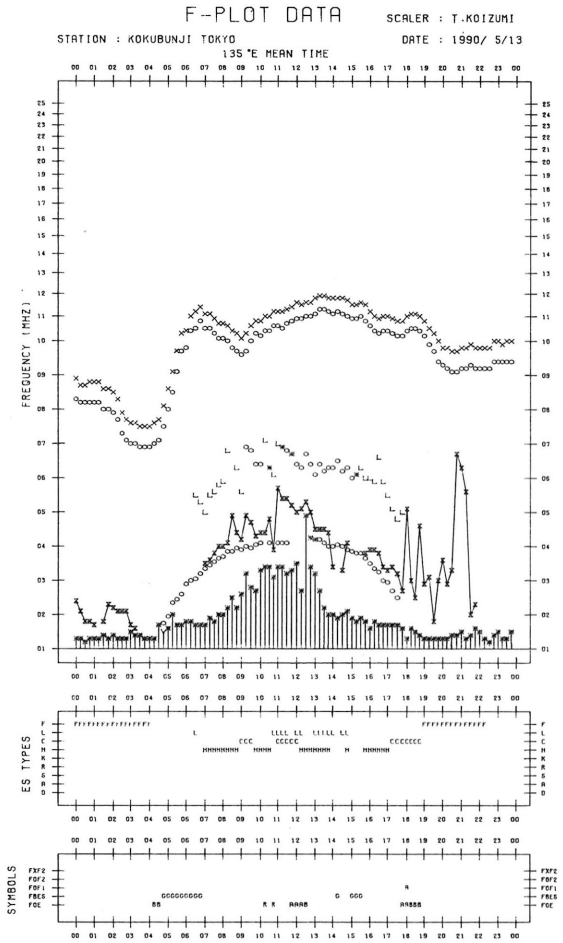

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/ 8
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

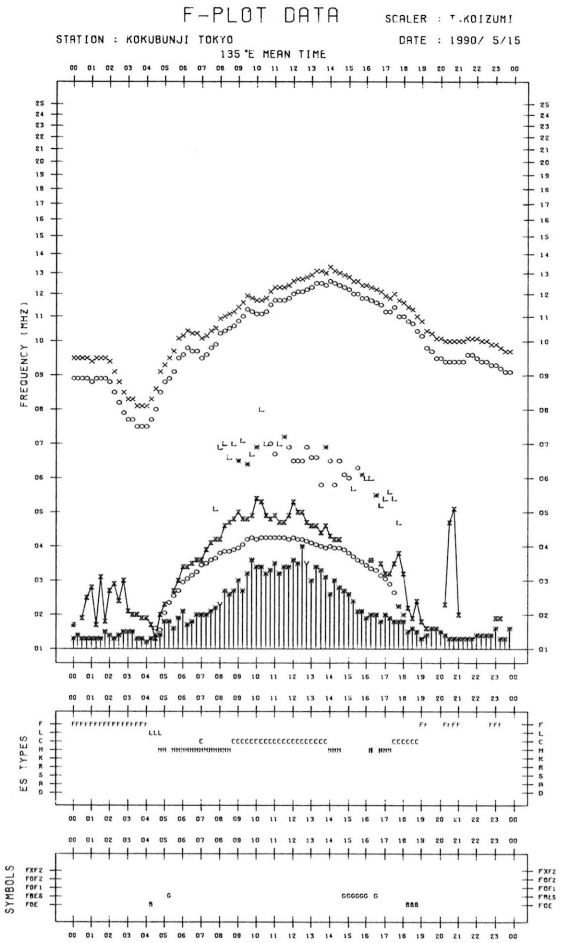

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/ 9
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

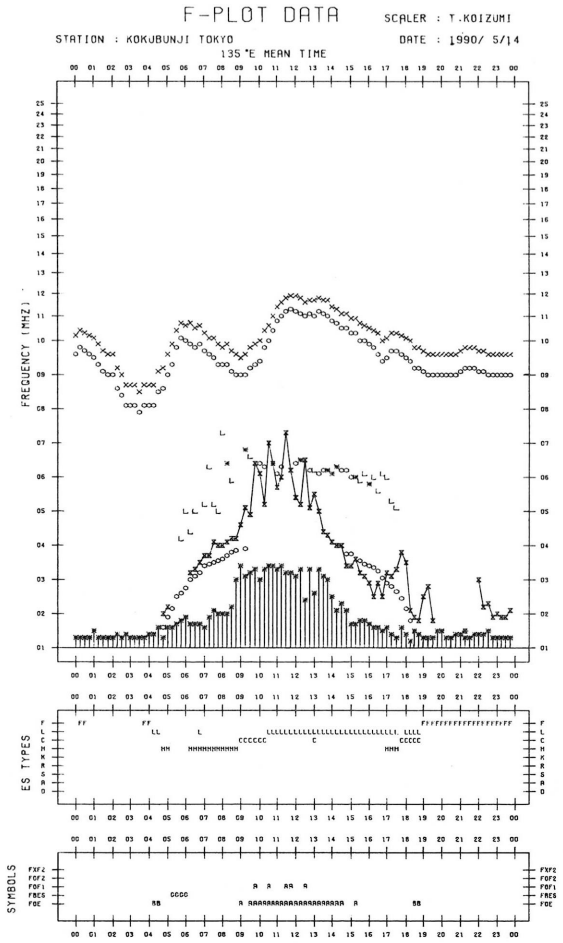

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/11
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

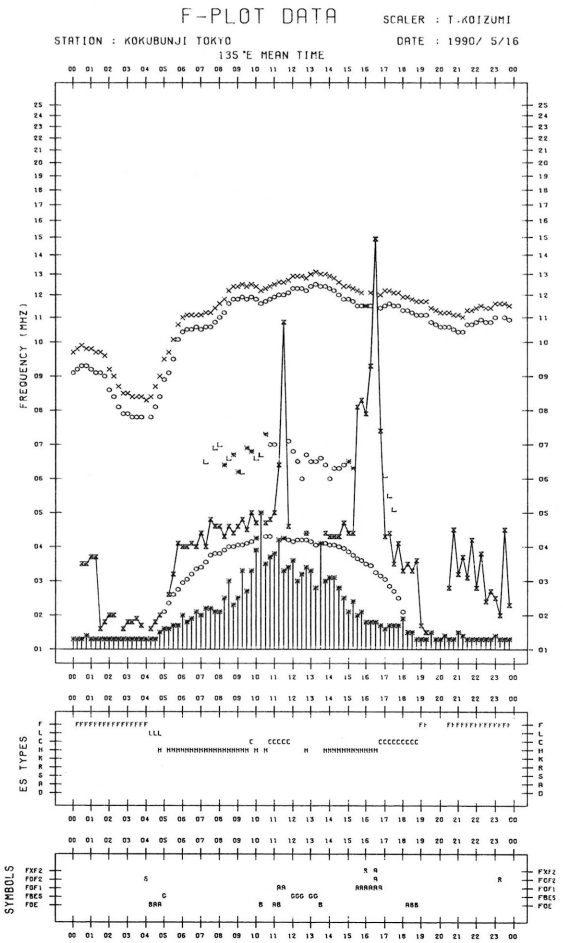

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/10
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

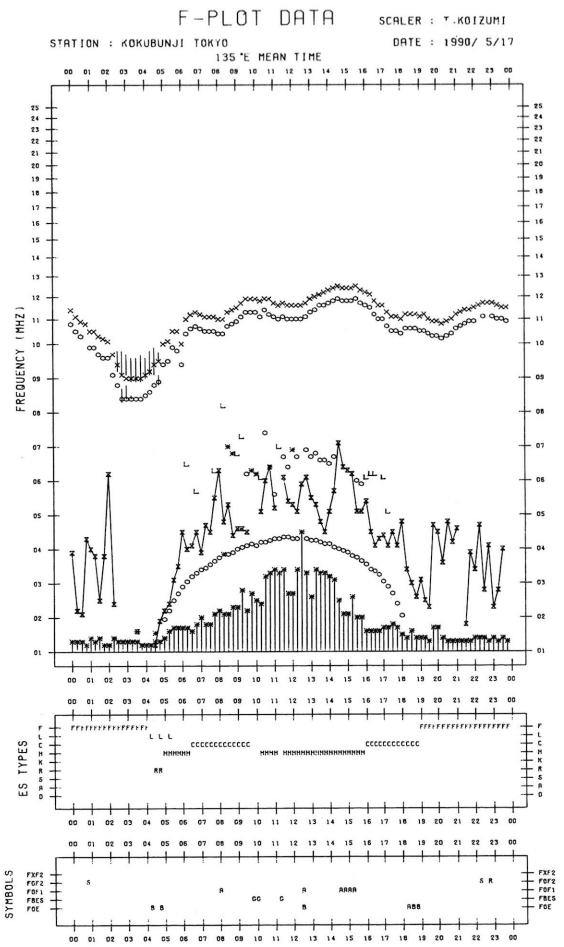

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/12
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

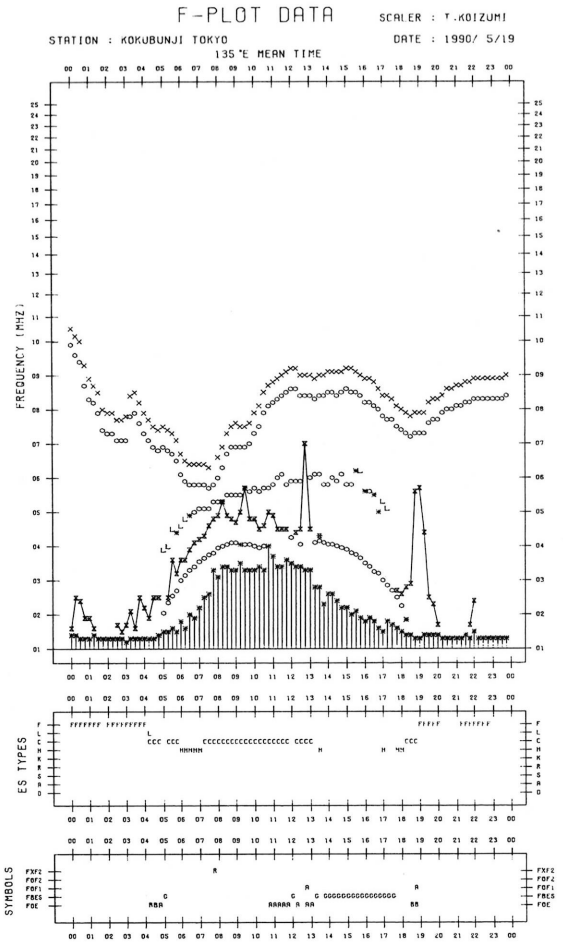

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/13
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

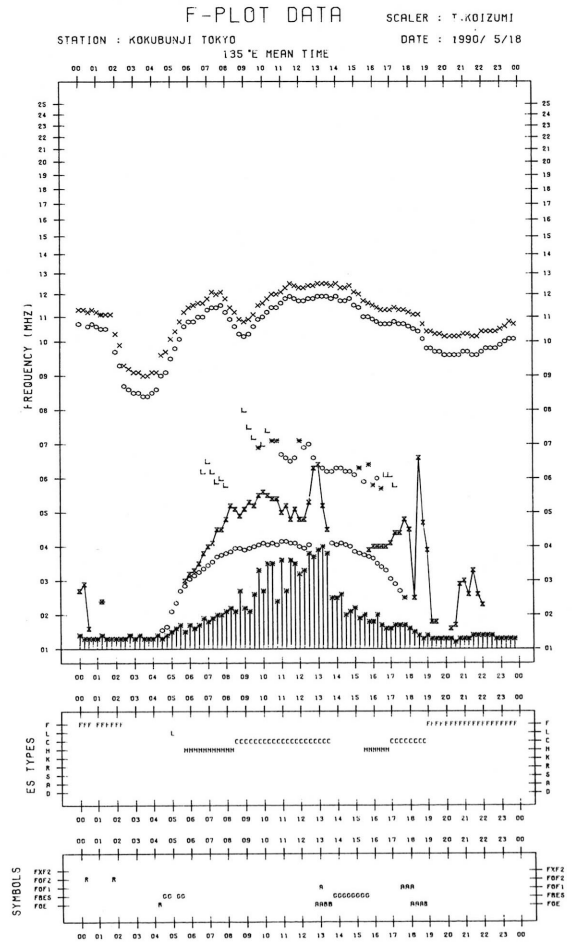

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/15
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

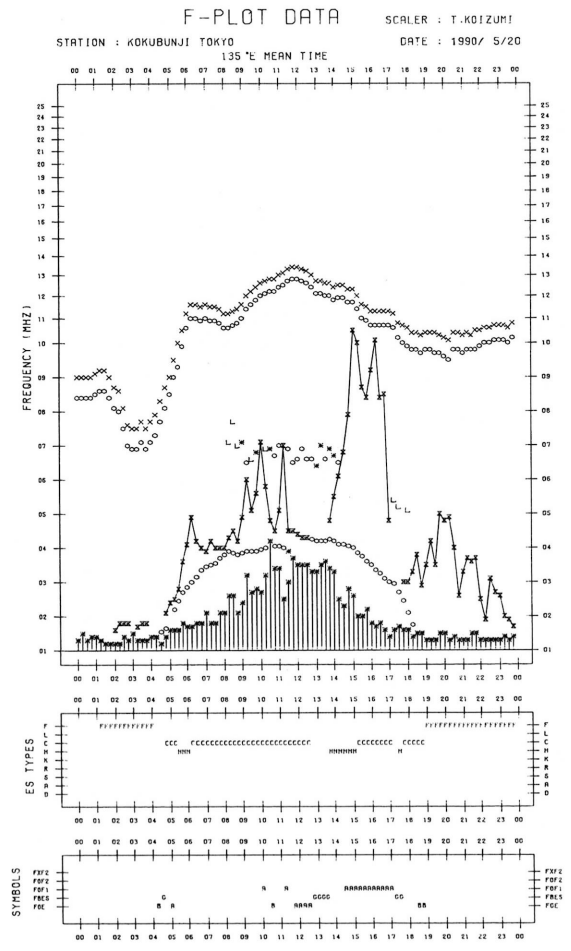

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/14
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

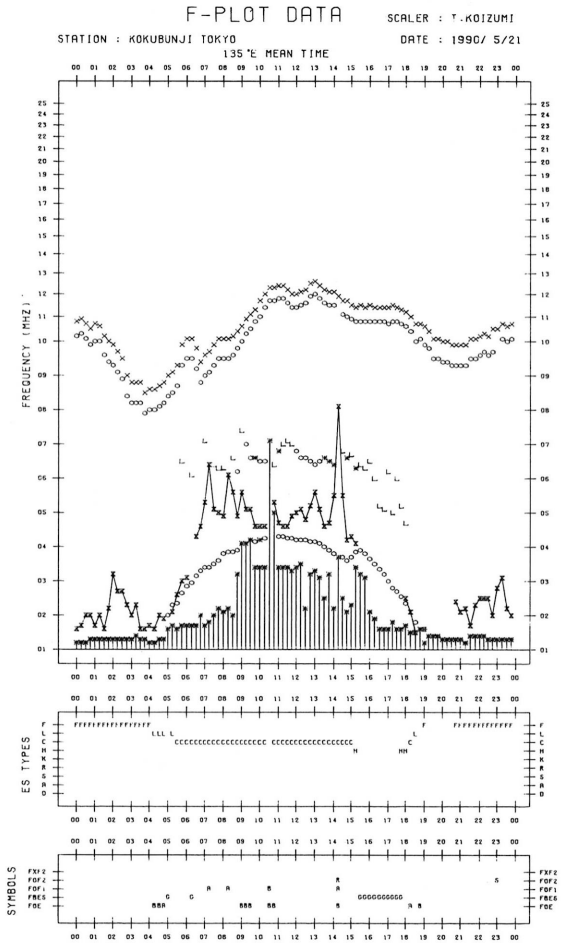

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/16
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

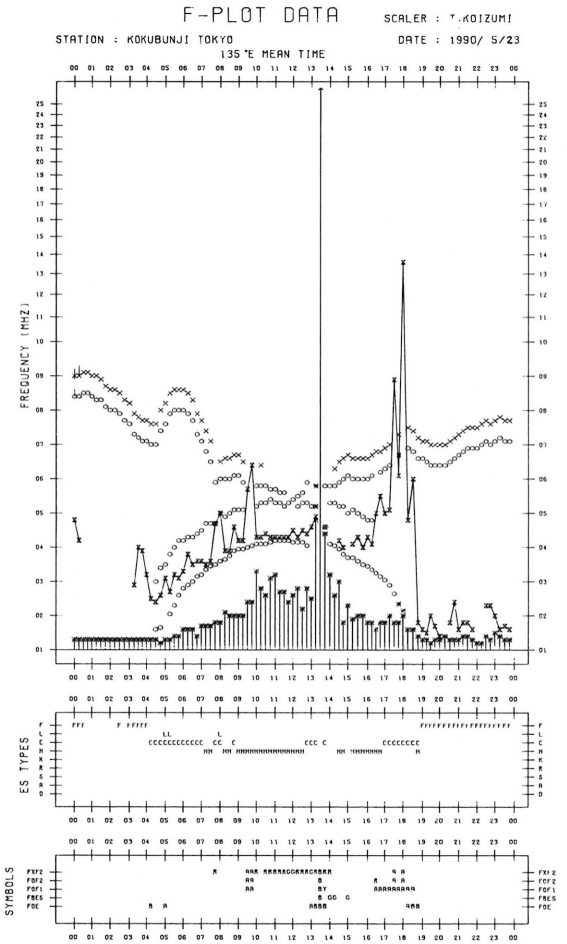

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

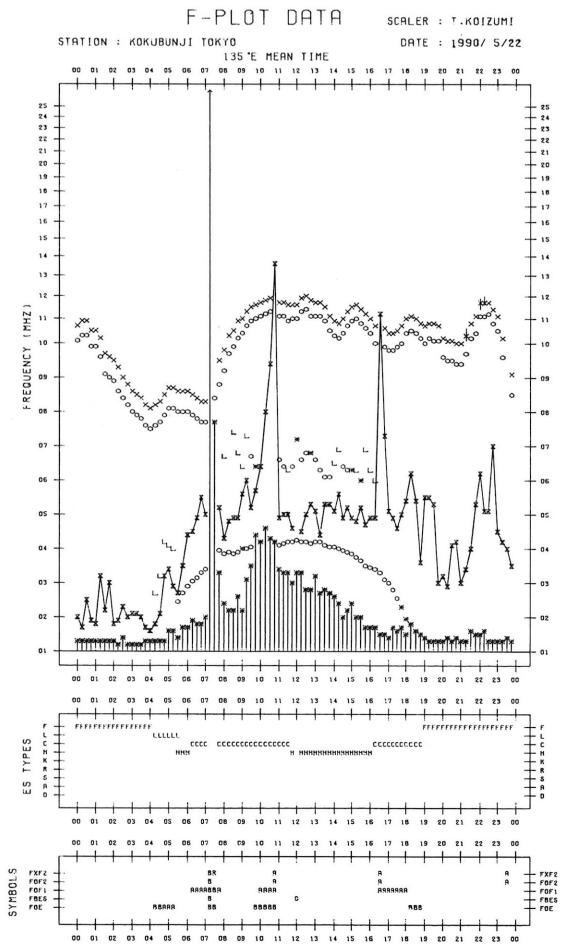

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

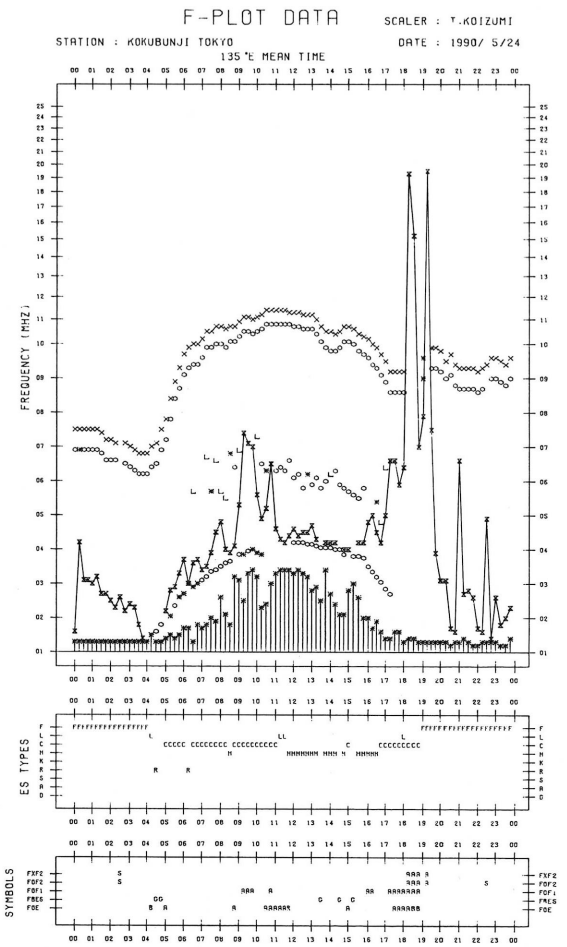

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

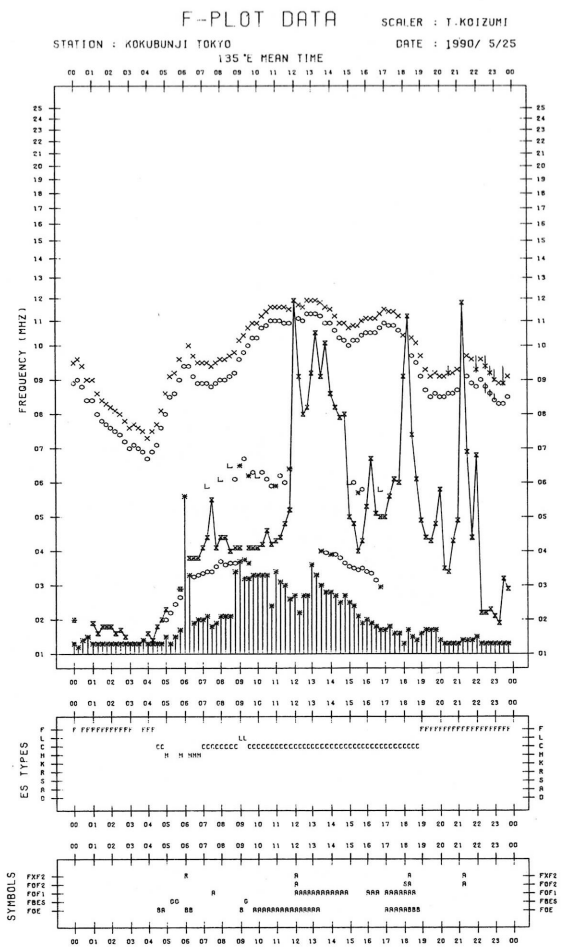

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/20
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

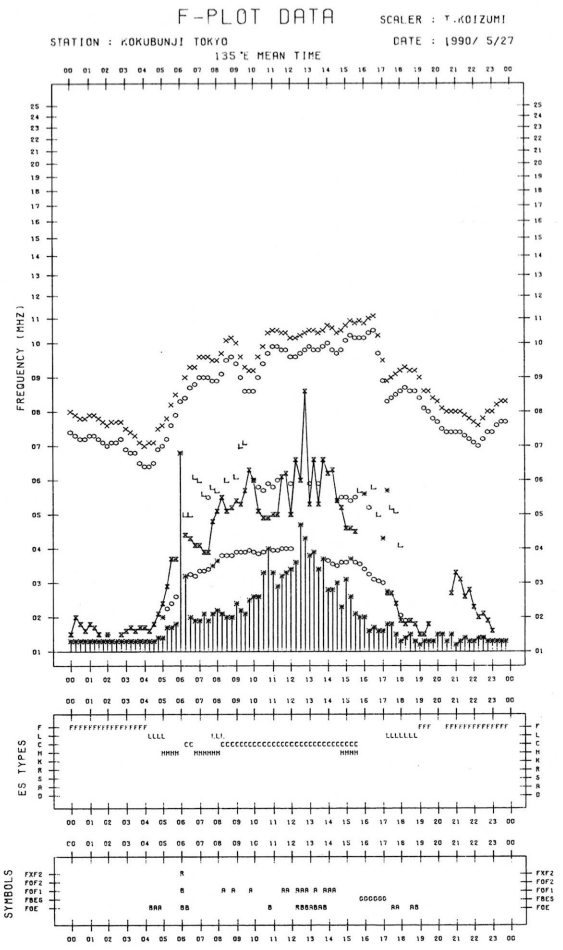

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/21
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

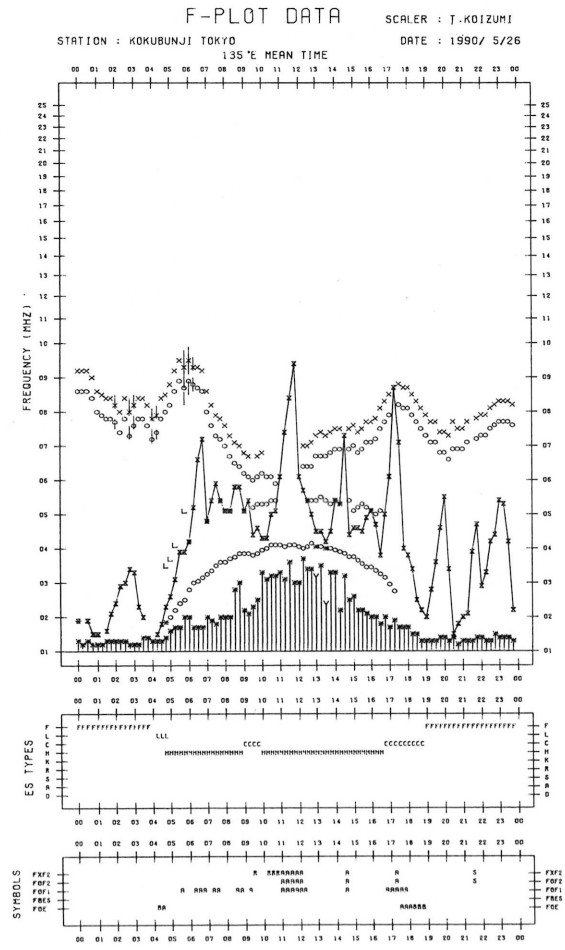

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

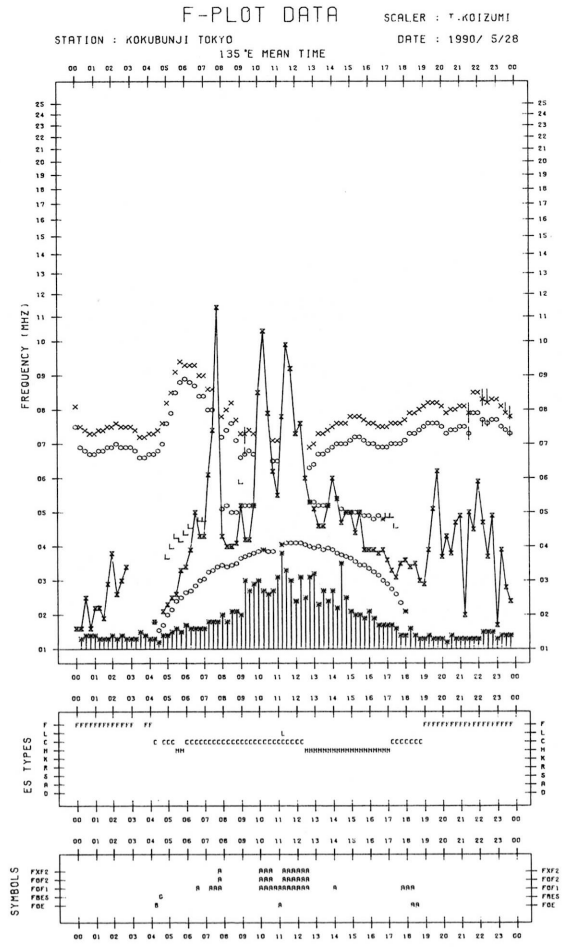

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

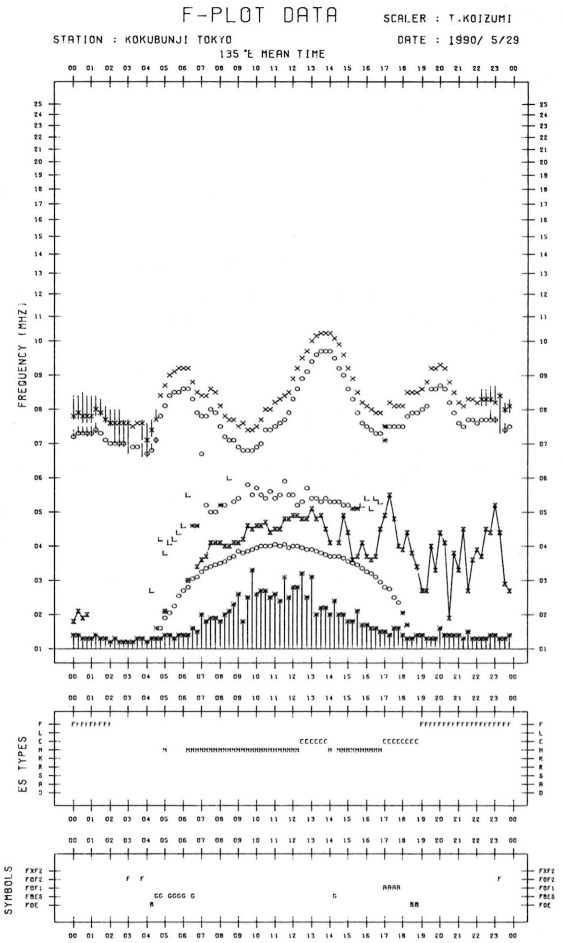

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

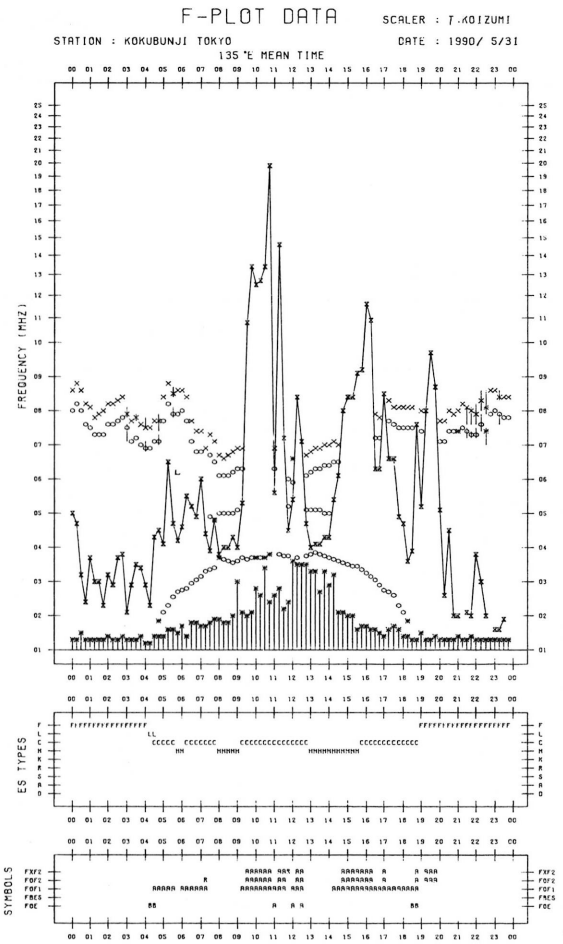

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/25
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

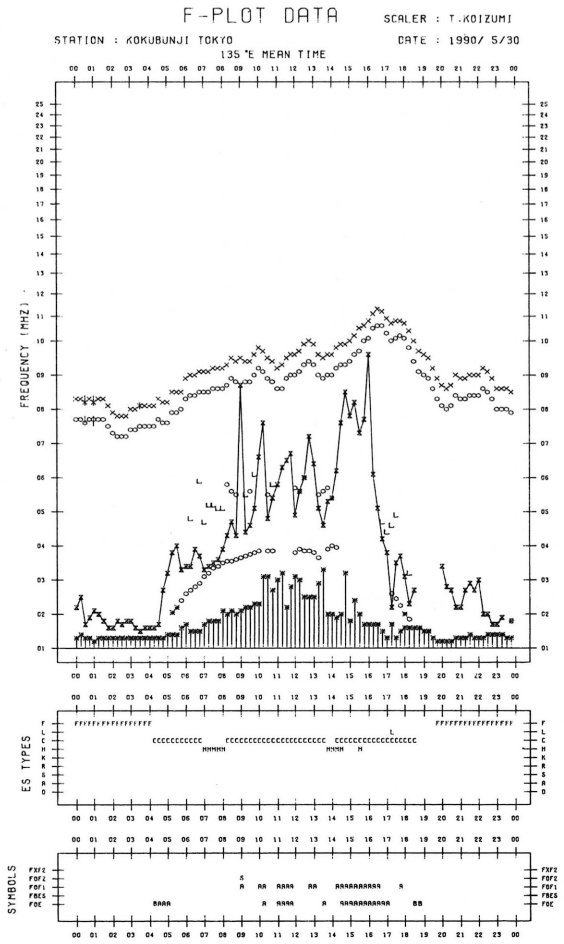

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/27
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/26
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/28
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/29
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/31
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 5/30
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

B.Solar Radio Emission

B1.Daily Data at Hiraiso

200 MHz

Hiraiso May 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	11	10	10	-	10	*	*	*	-	*
2	10	10	10	10	10	0	0	0	0	0
3	10	10	10	10	10	0	0	0	0	0
4	*	*	10	11	10	*	*	0	0	*
5	10	10	*	10	10	0	0	*	0	0
6	11	10	10	B	10	0	0	0	3	0
7	B	B	B	B	B	3	3	2	2	3
8	B	B	B	B	B	3	3	3	3	3
9	B	B	B	B	B	3	3	3	3	3
10	B	B	B	B	B	3	3	2	3	3
11	B	12	11	B	B	2	1	1	3	2
12	12	11	10	10	12	1	1	*	0	2
13	11	10	10	12	10	1	0	0	1	1
14	11	11	14	12	12	0	0	2	0	1
15	B	B	B	B	B	2	2	1	2	2
16	B	B	B	B	B	3	3	3	3	3
17	B	B	B	B	B	3	3	3	3	3
18	B	B	B	B	B	3	3	3	3	3
19	B	B	B	B	B	3	3	3	3	3
20	B	B	B	14	B	3	3	3	1	3
21	16	B	B	B	B	1	1	1	1	1
22	B	B	B	B	B	0	0	0	1	0
23	17	B	B	12	B	1	3	*	1	2
24	12	12	B	B	B	1	1	1	*	1
25	13	11	10	12	12	*	0	0	1	*
26	11	11	11	11	11	0	0	0	0	0
27	11	10	10	10	11	*	*	0	0	0
28	11	10	11	10	10	*	*	*	0	*
29	11	10	10	10	10	*	*	0	1	*
30	*	10	10	11	10	*	*	*	1	*
31	*	11	12	B	11	*	1	1	2	1

Note: No observations during the following periods.

1st 1943 - 2nd 0023

B.Solar Radio Emission

B1.Daily Data at Hiraiso

500 MHz

Hiraiso May 1990

Single-frequency total flux observations at 500 MHz					
FLUX DENSITY: $10^{-22}Wm^{-2}Hz^{-1}$					
UT	00-03	03-06	06-09	21-24	DAY
DATE					
1	47	46	46	45	46
2	46	46	45	44	45
3	45	45	44	44	45
4	44	44	43	43	44
5	44	44	43	44	43
6	45	47	46	50	46
7	51	50	50	-	50
8	48	48	48	48	48
9	49	50	48	48	49
10	50	50	51	53	50
11	52	53	52	58	53
12	57	57	56	56	57
13	57	57	56	56	56
14	58	58	58	-	58
15	60	B	B	60	B
16	63	63	B	65	B
17	66	68	66	66	66
18	66	66	66	78	66
19	72	74	80	69	76
20	71	B	63	(62)	B
21	66	65	61	B	64
22	75	78	71	59	73
23	61	B	B	58	B
24	57	57	58	56	58
25	55	53	51	52	54
26	51	51	51	53	51
27	50	50	49	52	51
28	48	48	48	47	49
29	48	47	46	-	47
30	46	46	45	-	46
31	46	47	46	-	46

Note: No observations during the following periods:

1st 0715 - 0810.
14th 1930 - 2340.
29th 1925 - 2345.
31st 1925 - 2400.
7th 1935 - 2341
20th 2100 - 2345
30th 1925 - 2345

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso May 1990

Single-frequency observations

Normal observing period: 1940 - 0935 U.T. (sunrise to sunset)

MAY 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
6	200	44 NS	1940E	2343	820D	25	10	MR
7	500	4 S/F	0825.5	0826.0	1.1	12	-	0
	200	44 NS	1940E	0326	820D	50	27	SR
	100	44 NS	1940E	-	820D	-	46	-
8	200	42 SER	0635.6	0713.2	41.0	410	-	MR
	500	4 S/F	0712.8	0713.6	1.7	19	-	WR
	100	44 NS	1936E	2130	820D	470	240	-
	200	44 NS	1936E	2342	820D	94	69	SR
	200	45 C	2039.6	2041.0	3.3	1420	-	MR
	100	48 C	2039.7	2042.3	3.3	16000D	-	-
	500	46 C	2040.7	2041.2	2.3	178	-	MR
9	200	44 NS	1936E	2033	830D	32	18	MR
	100	8 S	2207.0	2207.0	0.8	720	-	-
	200	46 C	2207.1	2207.3	1.8	230	-	WR
10	500	4 S/F	0312.0	0315.3	6.5	13	-	0
	100	46 C	0639.8	0640.1	1.3	640	-	-
	200	8 S	0640.0	0640.4	0.9	120	-	WR
	200	44 NS	1935E	0230	320D	19	8	0
11	200	41 F	0224	0307	78	23	-	0
	500	4 S/F	0540.0	0544.0	7.0	11	-	0
	100	48 C	2057.4	2058.2	26.6	16000D	750D	-
	200	46 C	2057.7	2057.8	17.2	710	80	0
	500	48 C	2058.9	2059.0	39.5	647	100	WL
		29 PBI		2141.5	70.0	11	4	0
	200	43 NS	2126	2140	165	25	6	0
12	200	42 SER	0045.5	0048.8	10.0	6500	-	0
	500	46 C	0045.9	0047.3	7.0	2540	95	MR
	100	42 SER	0046.3	0048.2	3.6	1000D	-	-
13	200	41 F	2215.8	2252.1	107	46	-	0
14	200	41 F	0646	0722	116	24	-	0
	200	45 C	2049.0	2049.5	1.5	32	-	0
15	200	43 NS	0020	0437	540D	44	7	MR
	500	41 F	0029	0032	4.0	950	-	WR
	200	46 C	0254.8	0255.6	2.6	240	-	0
	500	4 S/F	0255.2	0255.6	3.5	40	-	0
	500	23 GRF	0345	0650	280	16	6	WR
	200	44 NS	1930E	2017	83D	23	7	MR
	200	43 NS	2211	0743	690D	26	6	MR
16	500	23 GRF	0615	0655	130	18	6	WR
	100	43 NS	0642	-	165D	-	40	-
	200	44 NS	1930E	0445	840D	100	36	MR
	100	43 NS	2153	-	720D	-	43	-
17	200	46 C	0323.4	0323.8	5.1	820	150	0
	500	46 C	0323.5	0324.0	6.0	37	-	0
	100	27 RF	0502	0523	101	540	170	-
	200	44 NS	1930E	2218	840D	205	89	MR
	100	44 NS	1930E	0243	840D	630	304	-
18	200	44 NS	1930E	0634	840D	240	136	0
	100	41 F	2004.0	2006.6	4.6	1000D	-	-
	100	43 NS	2116	2238	760D	890	410	-

MAY 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
19	200	44 NS	1928E	2256	840D	94	47	MR
	100	44 NS	1928E	2013	450D	620	180	-
20	200	42 SER	0050.2	0153.0	66	540	-	0
	500	20 GRF	0124	0204	135	18	9	WL
	500	8 S	0522.8	0523.3	1.0	462	-	0
	500	45 C	0650.4	0651.0	1.6	14	-	0
21	500	46 C	0120.9	0124.4	13.0	335	40	WL
				0121.9		235		WL
	200	46 C	0120.9	0128.4	35.0	1400	85	0
				0121.8		850		0
	100	48 C	0121.5	0125.6	36.0	9300	780	WL
	100	43 NS	0158E	-	240D	-	30	-
	200	24 R	0246	0312	410D	18	6	ML
	200	46 C	2111.9	2112.0	1.5	320	-	0
	500	46 C	2112.0	2112.6	2.5	78	-	0
	500	48 C	2212.1	2213.0	21.8	3100	490	ML
				2215.0		1940		0
		29 PBI		2234.0	17.0	30	10	0
	200	48 C	2212.5	2213.9	110	35000	1140	0
				2252.1		180		SL
				2335.0		77		ML
	100	48 C	2212.5	-	116	16000D	780D	-
	500	48 C	2251.2	2252.6	4.5	1120	340	SL
22	200	24 R	0004E	0004E	390D	10	7	ML
	100	44 NS	0010E	-	570D	-	25	-
	200	24 R	2100	-	750D	-	5	-
23	500	43 NS	0250	0642	340D	26	7	WL
	200	48 C	0402.6	0510.0	284	1600	86	SL
				0404.6		37		0
				0418.5		150		WL
	500	42 SER	0412.5	0502.5	70	500	-	SL
24	200	46 C	0805.0	0837.6	90D	90	23	ML
				0920.0		80U		ML
	100	27 RF	0800	-	80D	-	-	-
	200	48 C	2046.2	2047.5	52.8	70000	3950	0
	200			2056.1		9000		0
	100	48 C	2047.3	-	45.5	16000D	1800D	-
	500	48 C	2047.7	2047.7	58.5	5800	275	WL
				2051.0		2900		0
		29 PBI		2150.0	28.0	5	2	0
26	200	41 F	0338.9	0342.9	5.9	170	-	0
	200	24 R	1926E	-	79D	-	8	0
	500	48 C	2044.1	2053.0	35.5	568	113	0
		29 PBI		2124.5	20.0	4	2	0
	200	48 C	2044.2	2053.8	36.3	13000	780	0
	100	48 C	2047.5	2047.8U	33.0	16000D	720D	-
27	500	42 SER	0500.3	0500.5	19	780	-	0
	500	42 SER	2023.0	2028.3	31.5	62	-	0
	200	42 SER	2024.4	2029.7	27	230	-	0
	500	46 C	2102.0	2114.5	73.0	26	12	WL
				2158.0		24		WR
28	100	48 C	0427.8	0418.4U	35.6	16000D	640D	-
	500	48 C	0429.0E	0432.0U	31D	2000D	-	0
	200	48 C	0429.0E	0438.3	44.0	1200	1450	0
	200	46 C	0810.0	0824.6	63	11	4	0
31	200	41 F	0233.0	0237.2	11.2	52	-	0
	500	41 F	0713.3	0718.6	7.0	29	-	0
	200	44 NS	1930E	0100	630D	18	6	WR
	200	46 C	2046.9	2047.5	2.0	275	-	0

C. RADIO PROPAGATION

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

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

MEASURED AT HIRAISO

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

C. RADIO PROPAGATION

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

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

MEASURED AT HIRAISO

UT DAY	00H 46M	01H 46M	02H 46M	03H 46M	04H 46M	05H 46M	06H 46M	07H 46M	08H 46M	09H 46M	10H 46M	11H 46M	12H 46M	13H 46M	14H 46M	15H 46M	16H 46M	17H 46M	18H 46M	19H 46M	20H 46M	21H 46M	22H 46M	23H 46M
1	-12	2	0	6	10	18	20	25	29	26	28	28	21	20	23	27	17	24	14	7	6	7	-11	-4
2	-13	-7	-2	5	17	19	21	22	28	28	27	26	23	24	24	25	38	27	19	17	7	-3	-10	-12
3	ES -15	-1	0	6	13	16	22	24	27	24	27	18	23	25	24	11	19	17	16	ES 0	ES -9	6	5	-1
4	-10	-13	8	5	16	20	25	21	28	21	19	20	17	15	9	22	21	18	1	15	7	-1	1	-1
5	-12	-7	4	11	16	20	23	25	21	18	16	24	27	19	18	13	13	20	17	11	1	-1	-3	-12
6	ES -24	-9	-3	7	13	22	26	28	28	26	25	23	23	17	20	13	24	20	0	17	8	0	-12	-12
7	-11	-11	2	5	14	14	20	24	24	26	22	27	22	29	12	-3	13	21	8	17	2	-6	-12	-12
8	ES -23	-10	-10	2	12	20	25	26	31	30	23	26	28	22	12	18	22	21	24	15	9	-4	-10	-10
9	-3	3	0	13	6	21	21	23	27	27	24	24	26	20	27	16	3	30	ES -23	17	-8	ES -23	-9	ES -23
10	ES -22	ES -22	ES -22	-1	6	17	23	21	23	22	19	24	19	22	15	13	-8	7	ES -23	ES -23	-11	ES -23	ES -23	ES -23
11	ES -23	ES -23	-3	0	18	ES -23	23	24	25	23	29	32	29	32	23	25	28	15	7	3	3	ES -23	ES -23	ES -23
12	ES -23	ES -23	ES -23	-5	3	19	24	22	25	25	29	21	25	24	22	13	16	17	3	3	-4	-8	ES -23	ES -23
13	ES -23	ES -23	-5	-9	11	20	24	26	24	27	29	33	23	23	27	24	21	21	-3	0	-9	-9	ES -23	ES -23
14	ES -23	ES -23	ES -23	-8	13	16	19	25	25	29	32	25	25	27	26	25	29	21	7	12	9	-2	ES -21	ES -21
15	ES -21	ES -21	ES -21	-2	11	18	25	C	C	C	C	C	C	C	28	26	26	20	7	1	-2	ES -21	ES -21	ES -21
16	ES -21	ES -21	ES -21	-2	9	18	24	29	33	31	29	30	25	26	31	29	29	23	13	7	1	ES -21	ES -21	ES -21
17	ES -21	ES -21	ES -21	ES -21	7	19	24	26	24	31	29	33	33	29	28	26	30	25	10	8	-3	ES -21	ES -21	ES -21
18	ES -23	ES -23	-10	ES -23	9	11	25	25	31	27	27	23	25	25	27	19	4	ES -23	11	6	-9	ES -23	ES -23	ES -23
19	ES -23	ES -23	ES -23	2	4	16	20	22	25	27	28	25	19	32	23	26	21	23	11	12	2	ES -23	-10	ES -23
20	ES -23	-10	ES -23	0	8	17	19	25	29	28	29	21	23	23	30	25	13	18	11	9	5	ES -23	ES -23	ES -23
21	ES -23	ES -23	ES -23	-4	6	8	18	23	29	26	30	25	25	19	29	26	20	14	4	6	2	-6	ES -23	ES -23
22	ES -23	ES -23	1	8	8	16	18	28	23	27	32	26	27	32	19	19	9	9	3	-4	-9	-10	ES -23	ES -23
23	ES -23	ES -23	0	-4	ES -23	10	17	19	18	20	20	20	23	14	26	20	29	18	11	13	-9	-1	-10	ES -23
24	ES -23	ES -23	-5	6	13	21	23	26	24	24	29	27	29	30	22	21	27	20	10	5	9	-9	-4	ES -23
25	-10	-6	-10	11	10	18	22	28	27	31	21	18	22	17	23	23	20	23	11	15	13	13	-10	ES -23
26	ES -24	ES -24	ES -24	-2	0	8	22	16	21	20	16	16	16	20	21	20	11	16	4	8	10	-9	-2	-2
27	-10	-10	-9	-10	14	21	19	24	26	18	27	25	5	20	18	13	18	11	1	6	8	ES 4	ES -23	ES -23
28	ES -23	ES -23	1	-1	1	8	14	18	24	20	20	21	23	19	17	12	28	-9	9	19	11	12	5	-9
29	-6	1	1	6	17	18	26	21	26	29	24	25	20	28	17	18	18	5	18	4	11	-8	-1	-5
30	-9	0	3	3	17	19	24	24	26	22	26	29	29	29	22	6	9	24	16	16	13	16	ES -23	ES -23
31	ES -23	3	2	7	-11	3	9	28	23	C	C	C	C	C	C	C	C	C	12	17	13	0	-3	-11
CNT	31	31	31	31	31	31	31	30	30	29	29	29	29	29	30	30	30	30	31	31	31	31	31	31
MED	ES -23	US -21	-5	2	10	18	22	24	26	26	27	25	23	23	23	20	20	20	10	8	3	US -6	-12	ES -21
UD	-9	2	3	11	17	21	25	28	31	31	30	32	29	32	29	26	29	25	18	17	13	12	1	-2
LD	ES -23	ES -23	ES -23	-10	0	8	17	19	21	20	19	18	17	17	12	11	4	5	-3	ES 0	-9	ES -23	ES -23	ES -23

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

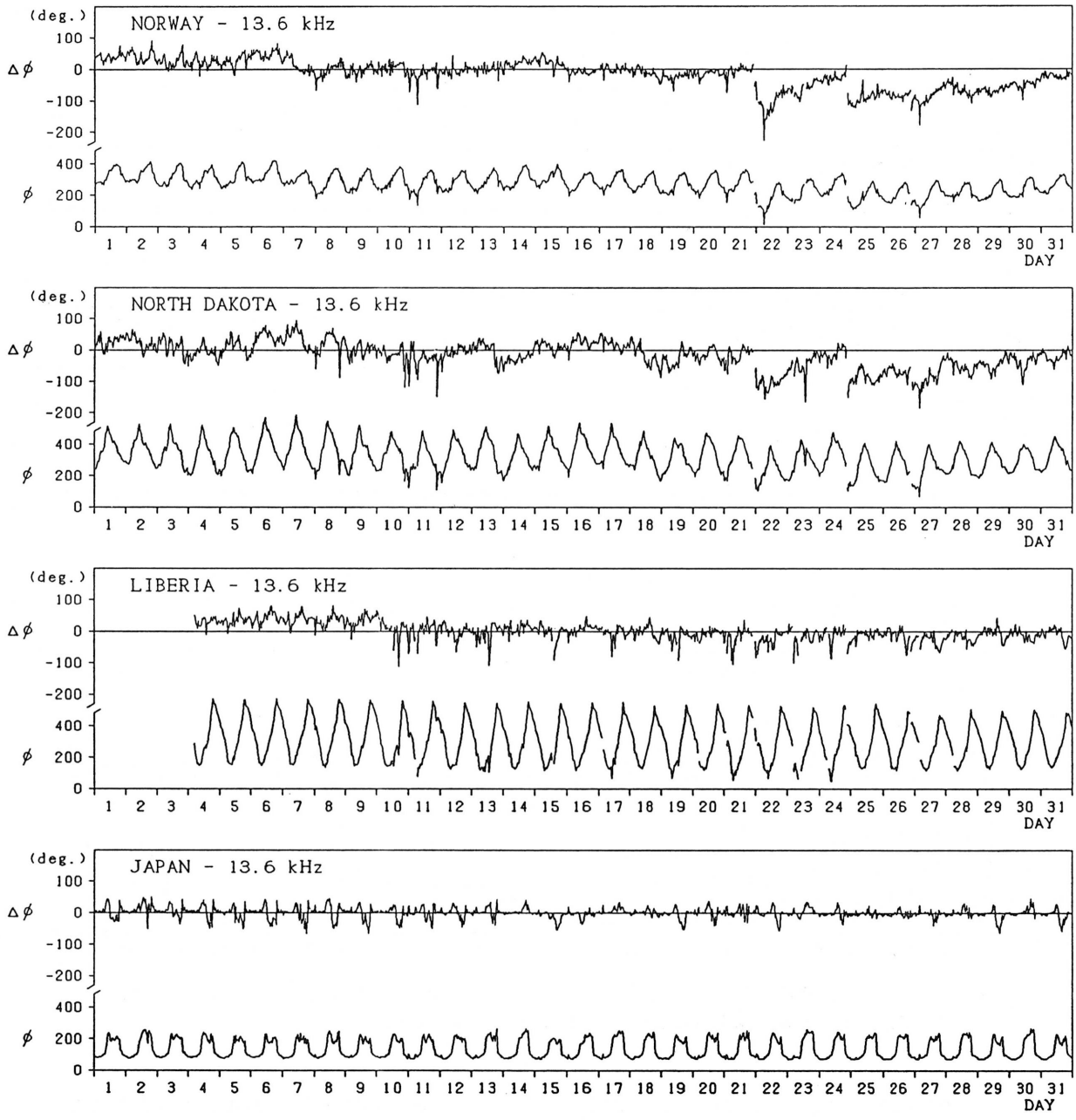
Hiraiso — Time in U.T

May 1990	Whole Day Figure	W W V 00|06 06|12 12|18 18|24	W W V H 00|06 06|12 12|18 18|24	Conditions 00|06 06|12 12|18 18|24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	4-	4U 2U 3 5U	4 4 4 4	N N N N			
2	4+	5 4 4 5U	4 4 4 4	N N N N			
3	4+	5 4 4U 5U	4 4 4 4U	N N N N			
4	4o	5 4 3 5U	5 3 3 4	N N N N			
5	4+	5 4 4 5U	5 4 4 4	N N N N			
6	4+	5 5 5 5U	4 4 4 4	N N N N			
7	4o	5 4 4 S	4 4 4 4	N N N N			
8	4+	5 3 4 5U	4 4 4 5	N N N N			
9	4-	4U 4U 3U 5U	4 4 3 3U	N N N N			
10	3o	2U 2U 3U S	4 4 3 2U	N N N N			
11	3+	3U 2U 4 S	4 4 4 3U	N N N N			
12	3+	2U 4 4 S	3 4 4 3	N N N N			
13	4o	5 4 4 5U	4 4 4 3	N N N N			
14	4o	5 4 4 S	3 4 4 4	N N N N			
15	4-	4U C 4 S	4 C 4 3U	N N N N			
16	4o	4U 5 5 S	4 4 4 3U	N N N N			
17	4o	4U 5 5 S	3 4 5 3U	N N N N			
18	4-	4 5 4 S	3 4 3 3U	N N N N	0740	24	116
19	3+	2U 2U 4 S	3 4 4 4	U U U U			
20	4o	4U 4 4 S	4 4 4 3U	N N N N			
21	4o	4 4 4 S	3 4 4 4	N N N N	1022	---	120
22	3+	4 2U 2U S	4 4 4 3	U U U U	---	24	
23	3o	2U 3U 2U S	3 3 4 4	U U U U			
24	4o	4 4 4 5U	4 4 4 4	N N N N			
25	4+	5 4U 4 S	4 4 4 5	N N N N			
26	3+	3U 3U 2U 5U	3 3 4 4	N N N N	2037	---	138
27	3+	3U 3U 3U S	4 4 3 4U	N N N N	---	24	
28	4o	3U 5 4 5U	3 3 3 5	N N N N			
29	5-	4 5 5 5U	5 4 4 5	N N N N			
30	4+	4 4U 3U 5U	5 4 4 5	N N N N			
31	4+	3U C C 5U	4 C C 5	N N N N			

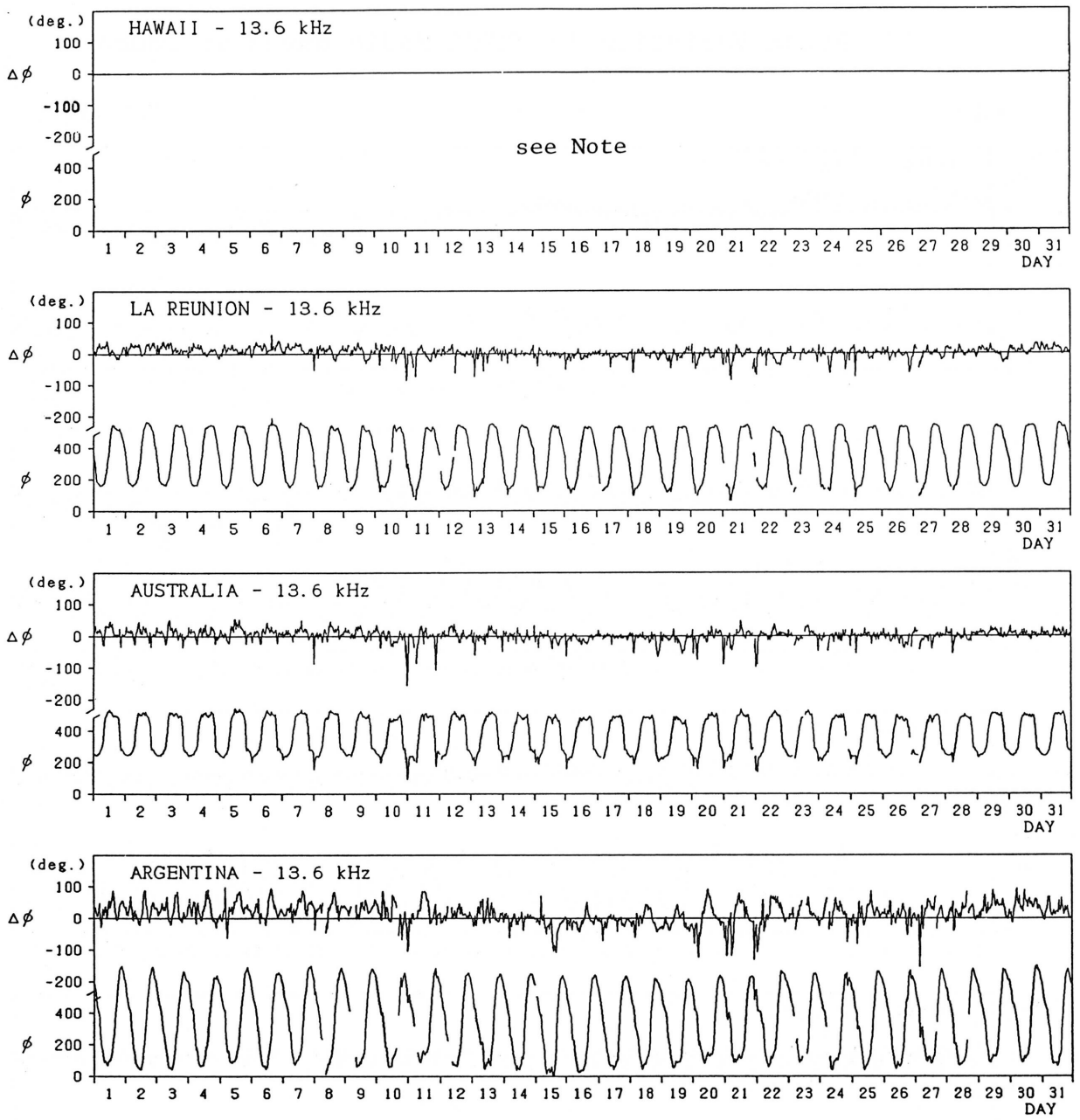
C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo

Inubo May 1990



Inubo May 1990



Note: As for HAWAII - 13.6 kHz, no record during April 02 - May 31, 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.
May 07/0930	May 10/0500	May 08/0200	55.8
May 15/2035	May 17/1800D	May 16/1558	52.2
May 17/1800E	May 21/2335D	May 19/0515	86.4
May 21/2335E	May 24/2118D	May 22/0621	169.2
May 24/2118E	May 26/2139D	May 24/2226	151.2
May 26/2139E	May 28/0500D	May 27/0236	129.6
May 28/0500E	Jun.04/0000	May 28/1647	122.4

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso — Time in U.T.

May 1990	S W F									Correspondence	
	Drop-out Intensities (dB)					Start	Duration	Type	Imp.	Solar Flare	Solar Noise
	CO	HA	1)	2)	3)						
6	x	x	22			0050	67	G	2-		
7	x	x	11			0047	32	G	1-	x	
8			18	x		0021	32	SL	1+	x	x
9	28	32	26	18		0406	21	S	2		
10					11	1057	42	SL	1-	x	
10			9		11	1523	50	SL	1-		
10			28			2352	39	S	2+		x
11		36	25	x		0539	27	S	2	x	x
11			35	x	21	2058	35	SL	1+	x	x
12			22	x		0047	19	S	2-	x	x
12			6			0433	20	SL	1-	x	
12			x	11	x	1130	22	SL	1-	x	
13	x	x	22	x		0325	30	SL	2-		
13			17			2345	10	SL	1+		
14			6			0414	15	S	1-	x	
15			15	x		0030	12	SL	1	x	x
15			12	x		0256	18	S	1	x	x
15				23	15	1300	95	S	1	x	
16			20	x		0046	47	G	2-	x	
17			19	x		0324	24	SL	1+	x	x
17					7	1028	32	S	1-	x	
17					6	1228	24	SL	1-	x	
18	x	28	23	x		0321	33	SL	2-	x	
20			14			0112	22	SL	1	x	
20			20	x		0405	36	SL	2-	x	
20			27			2334	57	G	2	x	
21			33	x		0122	36	S	3-		x
21	22	28	12	x	15	0504	21	SL	1		x
21		33	43	x	13	2212	49	SL	3+	x	x
22			23	x		0011	26	SL	2-		x
22			26	x		0037	67	SL	2		
23		x	30	x		0410	37	SL	2+	x	x
24	x		21	x	15	0600	35	SL	2-		
24	20	35	28	x	30	2048	29	S	2+		x
24	20	20	14			2328	39	G	1		x
26		x	x	x	13	2050	19	SL	1	x	x
27			25	x		0306	54	G	3-		x
28			6			0428	10	S	1-		x
28		x	14	x		0517	22	S	1		x

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

(b) Sudden Phase Anomaly (SPA) at inubo

Inubo

May 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
2		—	—	6	—		2303	2326	2312
3	21	—	—	47	—	24	2357	0057	0005
4		—	—	7	—		0212	0240	0217
6	27	37	—	56	—	38	0048	0212	0102
6			—	5	—		0444	0522	0452
7	22	22	28	—	—	29	0053	0147	0104
8	40	56	64		—	69	0022	0137	0031
8			32	20	—		0334	0436	0354
8			17		—		0751	0838	0758
8		15	12		—		0849	0922	0900
8		39	21		—		0956	1107	1007
8					—	120	1849	2023	1901
9				12	—		0030	0117	0042
9	56	93	148	100	—	59	0404	0549	0415
9			22	12	—		0615	0720	0630
9		46			—		1325	1419	1340
10				15	—	13	0243	0315D	0254
10		39	59	54	—	29	0316	0428	0332
10	30	123	79		—		1102	1233	1128
10		148			—		1523	1713	1548
10					—	223	1919	2003D	1942
10					—	175	2003E	2103	2011
10	36	32	32	44	—	61	2250	2334	2259
10	78	90	96	129	—	131	2352	0129	0011
11	26	36	41	31	—	22	0401	0455D	0414
11			95	64	—	36	0455E	0520D	0514
11	138	159	380	233	—	144	0520E	0715D	0547
11			22	25	—		0715E	0747	0722
11		32			—		1502	1540	1508
11		26			—		1616	1652	1624
11	118	103	53		—	—	2058	2225	2104
12	33	51	67	91	—	54	0046	0212	0052
12			6	9	—		0300	0341	0306
12	23	51	63	48	—	25	0432	0508D	0442
12	21		27	15	—	15	0508E	0549	0519

Inubo

May	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
12		30	21		—		1038	1100	1046
12	48	—	125		—		1129	1250	1138
12			7	10	—		2308	2348	2316
13			22	27	—	19	0100	0153D	0126
13			33	39	—	22	0153E	0257	0204
13	55	110	145	100	—	67	0326	0523	0336
13			27	12	—		0549	0604D	0556
13			35	22	—		0604E	0715	0611
13		30	29		—		0821	0950D	0840
13	28	50			—		0950E	1048	1002
13	44	31	33	60	—	32	2344	0040	2352
14	23	42	54	—	—	35	0413	0522	0426
14		37	10		—		0810	0845	0822
14	21	71	30		—		1054	1208	1110
14		41			—		1409	1451D	1417
14		74			—		1451E	1555	1502
15	—	36	42	59	—	47	0028	0138	0038
15	32	40	64	60	—	42	0255	0355	0302
15			14	7	—		0716	0817	0727
15	49	222	19		—		1258	1815	1319
15					—	28	1927	2000	1933
16	45	63	79	97	—	81	0042	0207D	0108
16	9		17	26	—	12	0207E	0249	0211
16	14	12	24	20	—	18	0250	0328	0300
16			8	6	—		0343	0409	0351
16			43	34	—	14	0423	0514	0451
16	9		30	22	—		0514E	0614	0519
16	16	37	29	18	—		0706	0756	0716
17				6	—		0224	0251	0230
17	14	18	35	29	—	19	0306	0322D	0313
17	53	88	120	88	—	67	0322E	0601	0332
17			11		—		0754	0836	0759
17		94	53		—		1000	1142	1032
17		94			—		1223	1333	1246
17		20			—		1356	1424D	1414
17		43			—		1424E	1543	1452
17						15	2247	2339	2302
18		11	9	14	—		0035	0110	0044
18		13	14	11	—	17	0257	0320D	0304
18	29	61	81	63	—	41	0320E	0523	0344
18			6		—		0759	0825	0807
18			11		—		0920	0942	0925
18	18				—		2212	2327	2234
18					—	18	2314	0009	2337
19	10			18	—	13	0129	0208	0141
19			9	10	—		0228	0250	0233
19					—	19	0254	0323	0300
19			24	—	—	20	0451	0625D	0519
19		24	36	17	—		0625E	0658D	0633
19		22	24		—		0658E	0752D	0702
19		66	50		—		0759	0947	0828
19		15			—		1109	1131D	1116
19		40			—		1131E	1227	1140
19		130	10		—		1245	1341D	1311
19		54			—		1341E	1450	1349
20	26	42	63	70	—	38	0112	0218D	0122
20				10	—	14	0213E	0232	0218
20	14		14	16	—		0316	0336D	0325
20	18		41	31	—		0337E	0402D	0345
20	23	23	73	47	—	15	0402E	0415D	0410
20	44	66	121	72	—	23	0415E	0542D	0426
20			35	15	—		0542E	0657	0547
20		24	11		—		0820	0904	0827
20			12		—		0941	1021	0957
20					—	24	2106	2144	2120

Inubo

May 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
20	14	50	62	—	—	68	2331	0121D	0011
21	90	122	184	—	—	132	0117	0333	0134
21			11	—	—		0348	0428	0358
21	45	89	117	—	—	36	0504	0600D	0514
21	25	95	93	—	—		0600E	0800D	0638
21	22	78	68	24	—		0800E	0947	0810
21		44			—		1214	1330	1223
21		21			—		1532	1559	1538
21					—	32	1808	1839	1817
21			6		—	19	1920	1953	1924
21	153	—	138	177	—	—	2213	0009D	2221
22	84	92	134	—	—	91	0012	0224	0059
22			8		—		0318	0341	0329
22				5	—		0522	0536D	0526
22			21	18	—		0522	0629	0547
22			7	5	—		0651	0720	0656
22		78	63	21	—		0835	0942	0847
22	32				—		1917	1953	1925
23	17			8	—		0017	0050	0026
23				12	—		0139	0236	0146
23			8	10	—		0335	0355	0339
23	65	228	293	185	—	112	0400	0610	0424
23		76	72	52	—		0722	0811D	0752
23	32	149	145	75	—	25	0811E	0849D	0821
23	36	206	171	77	—		0849E	1105	0907
23	29	32	35	59	—	45	2338	0023D	2348
24		18	18	31	—	13	0023E	0042D	0027
24		17	16	26	—	11	0042E	0117	0047
24	10			22	—	17	0137	0211	0141
24		16	22	14	—	8	0218	0239D	0226
24		23	39	35	—	10	0239E	0327	0249
24			23	16	—		0430	0550	0456
24	63	—	165	109	—	40	0559	0806D	0608
24		95	75	10	—		0806E	1041	0842
24		17			—		1420	1453	1427
24					—	71	1939	2023	1952
24	134	119	49		—	—	2047	2246	2058
24			8	8	—		2254	2310	2300
24	22	18	22	32	—	29	2332	0023	2348
25			21	17	—		0110	0156	0119
25				6	—		0216	0300	0236
25	29	63	83	63	—	39	0347	0520	0403
25	20			9	—		2336	0009	2346
26				13	—		0055	0122	0104
26				12	—	13	0129	0206D	0139
26		10	26	28	—	20	0206	0248	0217
26		59	69	51	—		0525	0611D	0536
26			33		—		0611E	0724D	0620
26		29	17	5	—		0726	0809	0741
26		71	51		—		1003	1100	1013
26		27			—		1752	1833	1804
26	88	74	36		—	208	2047	2200	2100
27				11	—	16	0039	0155	0048
27				7	—		0139	0212	0148
27	55	114	171	122	—	68	0303	0510D	0330
27			47	31	—		0510E	0646D	0524
27			19	10	—		0646E	0722	0653
27		23	14	8	—		0804	0836	0814
27		36			—		1551	1645	1605
27					—	12	2307	2330	2314
27				9	—	7	2345	0018	2354
28		24	14	15	—		0430	0506	0443
28	40	89	112	75	—	40	0515E	0600D	0528
28	23	47	42	35	—		0600E	0634	0605
28			9		—		0812	0835	0815
28		68			—		1500	1617	1512
29			23	—	—		0023	0110	0036
31			12	6	—		0310	0343	0319

IONOSPHERIC DATA IN JAPAN FOR MAY 1990
F-497 Vol.42 No.5 (Not for Sale)

電離層月報（1990年5月）
第42巻 第5号（非売品）
1990年8月25日 印刷
1990年8月31日 発行
編集兼 郵政省通信総合研究所
発行所 〒184 東京都小金井市貫井北町4丁目2－1
☎（0423）（21）1211（代）

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