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IONOSPHERIC DATA IN JAPAN

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INTRODUCTION

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

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

APR. 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	62	61	67	57	56	55	71	82	95	110	121	124	125	125	111	113	110	108	107	92	86	71	77	66
2	70	71	65	62	58	65	86	87	107		121	122	119	115	110	112	110	110	107	90	84	78	86	76
3	71	62	73	72	66	65	88	100	118	125	127	132	127	127	114	107	105	106	109	101	90	88	64	73
4	82	89	38	54	55	52	62	77	88	92	99	97	102	108	102	98	94	94	92	87	68	76	64	64
5	66	59	62	62	51	52	86	102	93	98	114	114	114	123	120	106	97	92	90	90	85	71	80	67
6	54	58	56	62	53	55	86	106	109	122	128	126	121	118	120	110	108	100	88	92	86	66	66	74
7	65	67	63	66	62	62	86	100	110	124	125	122	127	124	114	114	117	112	111	98	88	78	73	80
8	72	72	66	62	64	65	86	109	105	114	114	120	127	132	126	122	111	108	100	87	88	86	77	80
9	72	80	80	64	64	65	88	90	102	121	124	126	131	123	119	118	118	108	104	91	84	78	87	85
10	87	66	62	64	58	59	70	70	69	62	73	67	68	68	70	66	65	62	59	64	63	48	38	35
11	22	28	30	30	20	37		58	50	49			54	59	61	58	61	59	68	64	64	66	52	54
12	50	52	42	35	29	40	53	57	81	87	84	95	87	90	73	96	78	80	100	82	74	61	63	63
13	66	66	46	37	36	54	85	108	89	86	82	91	97	96	90	95	89	86	94	89	70	81	60	63
14	38	61	64	51	N	51	64	84	89	97	108	109	100	96	95	104	91	90	97	90	75	74	72	61
15	66	60	64	56	54	63	72	83	107	116	120	129	B	124	114	111	110	103	107	90	79	76	63	66
16	N	63	63	58	51	58	70	82	86	90	96	111	107	104	103	101	106	98	95	91	85	75	68	83
17	74	66	66	71	64	71	86	90	96	101	104	110	109	114	113	105	105	108	98	91	85	88	84	86
18	63	64	48	51	42	44	53	49			54	A	55	73	73	80	79	76	80	66	73	70	67	65
19	62	66	60	60	58	72	87	94	103	105	104	111	106	108	107	104	103	103	98	94	88	84	84	86
20	78	59	73	66	67	79	85	84	91	99	92	99	102	103	104	101	95	95	102	91	88	84	80	66
21	66	67	73	65	57	63	82	67	75	76	91	89	101	107	99	96	102	102	97	91	89	58	84	68
22	78	72	72	76	70	73	94	119	98	117	111	114	120	113	117	116	109	108	104	98	90	90	88	N
23	74	70	77	66	64	66	86	84	84	91	90	103	102	100	100	93	97	100	94	90	80	71	66	68
24	66	66	53	55	65	67	62	72	80	91	89	91	90	89	86	84	86	86	91	N	87	80	54	69
25	64	62	61	61	63	76	88	92	74	A	61	A	67	84	88	83	85	85	87	87	A	70	73	65
26																								
27	85	88	84	83	66	83	90	108	117	114	115	120	122	116	110	121	114	117	108	100	90	91	90	92
28	93	83	75	72	68	80	87	90	99	98	114	107	110	118	114	114	117	113	109	96	63	89	84	81
29	64	92	71	75	74	72	87	87	84	77	A	84	88	81	68	82	81	86	85	75	76	72	72	75
30	63	58	56	52	42	A	50	A	66	68	68	55	94	90	86		79	79	81	62	66	72	60	57
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	29	29	28	28	28	28	28	26	27	26	28	29	29	28	29	29	29	28	28	29	29	28
MED	66	66	64	62	58	64	86	87	92	98	104	110	104	108	104	104	102	100	97	90	84	76	72	68
U Q	74	71	72	66	64	71	87	100	104	114	120	122	120	120	114	112	110	108	105	92	88	84	84	80
L Q	63	60	56	54	52	54	70	79	82	87	89	95	92	90	87	94	85	86	89	87	73	70	63	64

HOURLY VALUES OF FES AT WAKKANAI

APR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	G	G	G	46	G	G	G	G	G	G	G	G	G	G	G	G
2	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	G	G
3	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	G	G	G	G
4	26	G	G	G	G	G	G	G	G	G	G	57	G	G	G	G	G	G	28	G	G	29	26	25
5	24	28	27	28	31	G	G	G	G	G	G	G	G	G	G	G	G	34	G	G	G	G	G	G
6	G	G	26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
7	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
8	G	G	G	27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
10	G	G	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	25
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
12	G	G	G	G	G	31	36	G	G	G	G	G	G	55	46	G	G	G	G	G	38	44	33	59
13	27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	27	G	24	29	G
14	28	G	G	G	G	G	G	44	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
15	G	G	26	G	G	G	G	G	G	47	G	G	B	G	G	G	G	G	G	G	G	26	G	40
16	G	G	G	G	G	G	G	G	G	45	56	58	G	G	54	G	G	G	33	31	26	G	G	G
17	G	G	G	G	G	G	G	G	G	G	G	59	61	G	G	G	G	G	G	28	G	G	G	G
18	G	45	45	32	G	G	G	G	G	G	G	83	60	G	G	G	G	G	38	40	40	G	G	G
19	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	G	G	G	G	G
20	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	42	30	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	27	23	24	G
22	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	G
23	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
24	G	G	G	G	G	G	G	G	G	47	G	G	47	G	G	G	G	G	G	G	G	G	G	G
25	31	29	40	G	G	G	G	G	G	97	58	69	G	G	G	G	G	G	G	58	68	32	G	G
26																								
27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	58	62	41	G	G	28	G	G	G	G
28	G	G	G	G	G	G	G	G	G	45	55	57	58	58	G	G	G	G	G	G	G	G	G	G
29	G	G	G	G	G	30	G	G	55	57	64	73	G	62	G	G	G	G	G	G	G	30	G	28
30	26	G	24	30	32	49	41	70	78	51	G	66	G	G	G		57	69	99	72	115	44	40	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	28	29	29	29	29	29	29	29	29
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
U Q	G	G	12	G	G	G	G	G	G	23	G	57	G	G	G	G	G	G	G	28	G	25	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

APR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	16	15	15	16	24	18	23	24	39	27	39	39	26	42	21	18	20	17	16	15	16	16
2	16	15	16	15	15	16	24	20	22	22	27	28	26	39	38	36	21	26	18	18	16	15	16	16
3	16	15	15	15	16	18	24	21	21	23	36	42	39	28	38	24	22	26	22	16	17	16	16	17
4	16	15	15	16	16	17	23	23	22	26	41	39	40	39	36	26	23	27	20	16	15	16	18	17
5	16	16	18	16	15	17	26	29	24	27	32	28	39	39	24	28	21	18	20	16	16	16	16	15
6	16	15	15	15	15	18	24	20	22	23	30	39	39	38	26	24	20	26	18	16	15	16	15	16
7	15	14	16	15	14	17	26	30	33	36	40	27	28	28	38	24	21	26	20	15	15	15	15	15
8	16	15	16	17	14	17	26	21	24	24	29	40	39	51	28	26	32	27	18	16	15	15	16	15
9	15	14	15	15	15	18	21	17	21	23	27	28	27	39	29	23	30	26	18	16	16	15	17	17
10	17	16	15	15	17	18	21	20	20	26	24			42	24	38	29	18	21	16	16	N	N	17
11	N	N	N	N	N	20	26	32	22	N	70	N	38	38	48	24	20	27	21	16	15	16	15	15
12	15	14	15	15	N	16	21	22	22	40	39	43	52	36	38	27	33	27	22	18	17	15	17	17
13	16	17	16	17	18	20	28	21	22	26	40	40	44	39	38	24	23	20	21	16	16	16	16	16
14	18	18	16	15	15	21	28	22	24	36	40	43	42	49	40	24	26	28	21	14	14	16	17	16
15	16	15	17	17	15	21	18	21	23	38	41	42	B	64	49	39	26	20	23	17	16	16	16	16
16	15	15	15	15	15	21	18	21	23	46	39	39	40	41	35	24	35	32	20	16	17	18	17	14
17	16	15	14	15	16	21	28	33	27	40	38	39	40	45	42	27	23	29	22	18	16	18	16	15
18	16	16	16	16	15	21	18	23	26		49	42	43	57	43	42	22	20	18	17	18	18	16	17
19	18	18	17	14	17	22	20	22	24	33	38	42	43	50	39	24	35	29	20	16	17	17	17	16
20	16	17	18	17	16	22	20	21	29	43	44	44	48	42	40	38	23	28	18	16	15	16	16	17
21	16	15	16	18	15	20	20	35	39	51	41	50	46	42	40	38	37	18	23	17	17	15	16	16
22	15	15	15	15	16	21	20	23	27	40	42	46	48	45	41	38	34	28	21	16	16	16	17	18
23	16	16	15	15	15	21	20	22	22	40	43	44	42	40	40	23	23	20	23	16	16	16	16	16
24	18	17	17	14	17	21	18	21	23	27	41	43	40	48	43	24	22	20	22	17	17	14	16	16
25	17	20	16	16	15	22	18	23	40	38	39	42	43	40	40	24	22	18	18	14	17	17	17	16
26																								
27	16	16	15	15	15	22	29	35	26	26	40	48	49	42	33	27	22	21	22	18	16	15	16	15
28	16	16	16	16	16	21	20	21	26	26	39	39	28	38	23	39	20	21	22	17	17	15	16	15
29	15	15	17	15	17	23	17	20	24	36	40	40	42	38	43	34	20	18	21	15	16	15	15	17
30	18	15	20	16	14	18	20	22	27	26	35	47	39	30	26		21	23	18	22	18	14	16	17
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	27	29	29	29	29	27	29	27	27	29	29	28	29	29	29	29	29	28	28	29
MED	16	15	16	15	15	20	21	22	24	27	39	42	40	40	38	26	23	26	21	16	16	16	16	16
U Q	16	16	16	16	16	21	26	23	26	40	41	43	43	45	40	38	29	27	22	17	17	16	17	17
L Q	15	15	15	15	15	17	20	21	22	26	35	39	39	38	28	24	21	20	18	16	15	15	16	15

HOURLY VALUES OF FOF2 AT AKITA

APR. 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	66	67	73	61	56	57	79	89	106	122	131	132	131	135	127	116	116	119	110	91	86	80	79	78
2	77	67	74	71	64	64	85	103	105	113	120	122	124	118	114	109	N	120	111	88	82	84	84	87
3	79	35	79	79	62	63	84	105	116	133	134	127	121	128	119	112	108	111	116	111	86	90	79	79
4	86	88	70	59	54	52	78	84	102	104	102	101	111	116	114	111	103	105	103	90	66	66	54	76
5	73	64	63	57	51	43	79	108	116	121	115	122	118	117	121	115	106	102	102	85	88	84	79	71
6	64	65	54	63	51	51	85	105	121	130	130	131	118	119	117	112	115	110	86	104	87	81	79	79
7	72	72	66	67	55	66	87	99	108	111	121	122	116	120	116	117	114	116	118	104	81	79	78	80
8	78	71	68	67	65	75	86	106	117	122	121	128	129	134	131	117	118	108	108	87	89	87	82	84
9	80	88	78	73	64	66	86	103	111	115	122	132	128	129	131	124	124	118	110	109	87	87	84	87
10	105	87	66	67	63	54	80	87	90	83	72	69	75	71	80	73	72	72	76	68	72	63	72	64
11		20	31	35	31	37	50	62	53			71	65	74	68	57	76	N	84	76	67	68	52	52
12	54	57	48	43	39	51	73	76	84	106	102	103	87	104	86	95	91	90	102	104	70	64	73	68
13	70	74	51	A	42	52	77	111	104	107	120	106	106	101	99	90	95	93	104	87	74	77	67	62
14	63	66	62	57	54	55	84	102	110	114	116	116	111	110	107	108	107	96	97	104	84	83	71	77
15	77	66	68	66	65	72	86	109	122	131	126	130	B	115	126	116	116	112	113	85	81	82	80	78
16	67	77	N	67	50	64	81	88	100	112	118	122	120	116	113	111	112	107	101	87	A	79	54	85
17	86	79	77	75	67	78	87	108	113	120	114	131	126	116	115	108	111	116	111	91	107	110	118	106
18	86	81	85	66	59	52	51	N		A	A		78	78	81	90	89	86	84	80	67	69	70	73
19	A	66	67	64	61	66	A	88	99	109	112	115	116	118	118	111	107	108	109	88	86	86	76	86
20	84	84	75	79	74	80	86	90	106	114	112	116	117	114	108	111	104	102	109	109	88	84	86	86
21	80	81	81	73	68	78	86	88	88	109	114	114	111	123	110	111	113	109	102	87	87	88	87	88
22	86	85	82	77	74	84	88	102	112	116	116	126	115	119	122	113	120	111	112	106	88	89	84	87
23	84	80	83	82	67	78	104	84	106	112	111	128	124	112	113	116	113	114	109	95	84	84	80	68
24	A	63	66	51	68	71	82	89	91	106	110	108	105	102	97	92	90	92	104	104	84	84	72	76
25	83	71	64	65	68	85	108	115	110	92	103	94	112	109	105	101	105	103	88	90	79	66	78	72
26																								
27	86	88	90	86	79	85	87	115	112	120	114	117	129	134	131	125	131	126	115	107	88	88	87	87
28	86	87	83	79	79	84	90	112	113	118	119	124	118	128	130	129	131	121	115	87	87	87	90	84
29	84	87	87	80	78	84	111	110	100	87	104	101	106	87	90	88	91	102	87	81	79	52	A	86
30	76	65	66	63	52	51	52	67	76	A	85	83	108	105	102	94	88	84	100	88	68	A	A	66
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	29	28	28	29	29	28	28	28	26	27	28	28	29	29	29	28	28	29	29	28	28	27	29
MED	80	72	69	67	63	66	85	102	106	114	115	120	116	116	114	111	108	108	104	90	84	84	79	79
U Q	86	84	80	76	68	78	87	108	112	120	121	127	122	121	121	116	115	115	111	104	87	87	84	86
L Q	72	65	65	62	53	52	79	88	99	107	110	104	107	104	100	94	93	99	98	87	76	73	72	71

HOURLY VALUES OF FES AT AKITA

APR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	G	G	G	G	G	G
2	G	G	G	G	G	26	G	G	G	G	G	53	G	G	G	G	G	G	G	G	G	G	G	28
3	G	G	G	G	G	G	G	G	G	G	48	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	51	54	G	G	G	G	G	28	34	G	G	44	25
5	30	32	35	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	30	24	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	G	47	G	G	70	68	G	G	29	26	G	G	G	G
7	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	G	G	G	G	G	G
8	G	G	G	G	G	G	33	G	G	G	52	G	G	G	G	G	G	G	G	G	G	G	G	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
10	G	G	G	G	G	G	G	G	G	G	G	68	G	G	G	G	G	G	G	G	G	G	24	G
11		24	24	23	G	29	G	38	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
12	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	46	44	103
13	44	72	G	31	G	G	G	38	G	48	58	G	G	G	57	G	G	G	G	29	44	G	32	28
14	G	29	24	G	30	G	G	39	G	51	57	G	G	G	58	G	G	G	G	G	G	G	G	G
15	G	G	G	32	G	G	G	G	50	G	53	55	B	G	G	G	G	G	59	49	32	29	G	31
16	24	35	37	32	30	G	G	G	G	G	G	56	60	58	53	G	50	40	38	42	60	28	33	30
17	G	G	30	26	G	G	G	G	G	G	54	54	54	50	G	G	G	G	G	G	G	G	G	G
18	G	26	37	29	31	G	G	G	G	52	56		G	G	G	G	G	G	G	47	32	33	34	48
19	49	39	59	34	26	36	58	G	43	56	58	G	G	50	47	G	G	G	49	29	45	37	37	58
20	33	27	G	G	G	G	G	G	G	67	69	51	G	55	G	G	G	44	38	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	44	G	G	G	33	30	G	G	30
22	26	26	G	32	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
23	G	G	G	G	29	G	G	G	G	G	G	G	G	G	G	G	G	37	G	G	G	26	G	31
24	27	G	G	G	G	G	G	G	50	G	G	47	G	G	G	G	G	G	50	33	30	30	G	G
25	G	G	23	G	G	G	G	G	49	G	G	G	G	G	G	G	G	G	28	58	40	31	G	G
26																								
27	24	25	30	27	24	G	G	G	G	G	54	G	68	G	G	G	G	G	G	G	G	28	29	G
28	G	G	G	G	G	G	G	G	47	65	53	G	57	G	G	G	G	G	G	G	28	G	G	G
29	G	G	G	G	G	G	42	59	G	G	98	71	G	G	G	G	G	G	30	25	32	37	54	G
30	G	G	G	37	30	30	47	46	60	79	66	81	G	G	G	G	G	58	50	71	84	94	107	58
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	29	29	29	29	29	29	29	29	29	28	28	29	29	29	29	29	29	29	29	29	29	29
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
U Q	24	26	24	28	12	G	G	G	G	24	55	52	G	G	G	G	G	G	30	33	32	29	32	30
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT AKITA

APR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	15	15	15	15	16	23	17	20	23	26	24	43	43	39	45	20	17	21	16	16	16	17	16
2	16	16	15	15	16	17	24	18	21	23	23	32	28	24	22	18	16	27	21	16	16	16	17	16
3	16	15	15	15	15	16	18	18	20	21	22	44	28	23	24	23	18	18	22	17	18	16	17	16
4	16	15	15	15	15	20	23	18	21	21	23	36	24	30	26	24	18	16	18	15	16	16	16	17
5	16	16	16	17	18	16	22	20	20	22	26	29	24	21	29	18	15	18	16	16	17	16	16	17
6	16	15	15	15	15	16	26	17	20	21	24	23	26	46	38	18	21	17	16	17	16	17	16	16
7	18	15	15	15	15	17	20	17	18	21	22	26	24	26	26	20	20	17	18	16	16	16	16	16
8	16	15	15	15	15	17	17	16	20	20	26	22	23	51	39	23	18	18	20	16	18	16	17	16
9	16	15	15	15	15	16	28	18	18	26	24	45	28	39	34	24	20	18	21	16	16	17	16	17
10	22	15	15	15	15	18	21	33	20	20	N	38	24	24	21	17	17	15	22	17	17	N	16	18
11		15	16	15	17	15	17	16	18	23	26			48	24	22	21	18	22	16	16	15	17	16
12	16	15	15	15	15	20	16	17	18	22	48	33	64	46	45	47	23	18	22	15	16	16	16	16
13	16	15	15	15	15	20	27	20	20	23	36	45	48	23	34	24	21	30	23	18	16	16	15	16
14	16	15	15	15	15	20	26	22	26	23	23	29	50	48	35	24	22	21	20	16	16	16	16	16
15	17	15	16	15	15	20	29	20	21	30	24	28	B	79	63	32	23	18	17	16	15	16	18	16
16	18	15	15	15	15	20	28	21	22	46	48	42	40	42	26	22	35	21	16	15	15	16	16	16
17	17	16	15	15	15	18	17	21	22	24	30	33	36	38	49	41	22	20	22	20	16	16	16	15
18	15	15	15	14	15	21	28	18	18	23	35		34	53	46	23	20	32	17	16	16	16	16	15
19	17	15	15	15	15	17	17	22	23	26	27	28	45	30	23	18	17	21	17	15	16	17	17	16
20	16	16	15	15	20	20	27	18	23	24	41	26	33	29	24	21	17	15	15	21	17	16	16	16
21	17	15	15	15	18	20	29	18	23	54	50	27	46	48	34	23	39	20	23	17	15	15	17	16
22	17	16	16	15	15	20	17	21	20	23	27	46	45	45	47	26	21	17	22	16	17	17	17	21
23	16	16	15	15	15	22	17	18	23	26	28	45	49	46	44	22	21	17	24	17	16	17	17	14
24	16	15	15	15	15	22	18	20	22	23	46	28	67	47	46	38	21	16	17	15	16	15	16	18
25	15	15	15	15	15	24	17	20	23	26	24	26	47	48	45	22	21	20	20	16	16	16	18	16
26																								
27	20	15	15	15	15	21	17	37	22	35	29	28	38	44	26	23	21	15	22	17	16	16	16	16
28	16	16	16	18	15	23	18	20	23	23	47	48	44	50	46	18	15	17	22	17	18	17	18	16
29	18	16	18	17	17	22	17	15	23	22	22	38	40	24	23	20	21	17	17	15	16	16	16	18
30	17	17	20	15	15	21	20	20	22	22	24	24	29	50	28	22	22	17	16	15	17	17	16	15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	29	29	29	29	29	29	29	29	28	27	27	29	29	29	29	29	29	29	29	28	29	29
MED	16	15	15	15	15	20	20	18	21	23	26	29	38	44	34	23	21	18	20	16	16	16	16	16
U Q	17	16	15	15	15	21	26	20	23	26	35	42	46	48	45	24	21	20	22	17	17	16	17	16
L Q	16	15	15	15	15	17	17	17	20	22	24	26	28	27	25	20	18	17	17	15	16	16	16	16

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

APR. 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	67	66	79	63	53	54	79	102	114	119	131	130	135	140	138	131	129	127	125	108	89	84	86	85
2	82	77	80	72	64	58	87	111	113	114	126	124	135	123	119	116	119	128	118	101	90	88	97	88
3	85	79	79	75	60	59	82	108	122	134	136	131	126	128	130	120	113	118	122	116	88	88	87	85
4	87	104	88	65	61	63	86	100	114	127	102	111	127	134	127	118	112	108	112	99	81	68	71	74
5	74	71	60	52	52	47	70	101	119	116	124	130	137	130	130	122	113	107	106	105	92	88	84	74
6	70	63	68	62	53	52	80	113	117	128	124	128	132	129	130	123	117	115	112	107	87	84	81	86
7	85	75	68	73	62	62	85	98	111	120	118	124	127	124	123	120	120	124	118	108	84	76	82	83
8	85	76	72	68	64	68	91	106	117	117	128	130	130	138	137	128	118	113	110	107	100	96	91	88
9	88	84	82	76	59	63	89	105	113	118	126	136	135	132	134	127	126	125	126	122	102	101	98	108
10	106	102	73	73	62	60	83	94	105	96	91	91	92	98	92	90	86	86	89	78	82	66	76	86
11	N	34	46	39	34	46	60	70	85	75	78	99	84	89	82	72	78	82	83	75	62	60	55	62
12	54	66	51	47	48	45	66	88	94	100	105	108	114	110	103	100	100	95	98	107	65	70	76	70
13	67	75	56	A	38	50	83	105	114	115	131	116	112	116	113	110	106	104	111	105	90	74	70	65
14	68	64	74	59	51	58	90	102	112	115	130	121	113	114	114	115	114	105	108	110	94	88	78	74
15	78	76	67	70	62	74	84	112	126	135	130	136		137	138	132	N	120	123	111	88	84	86	85
16	82	N	81	67	57	73	87	102	110	118	133	132	132	130	122	122	120	118	104	95	89	84	87	88
17	91	82	77	76	77	83	108	117	124	118	123	131	135	127	127	120	121	121	118	102	118	106	118	109
18	87	100	96	63	58	64	63	66	67	71	71	90	96	100	95	98	96	100	92	88	68	48	77	77
19	66	72	70	66	57	67	87	102	106	110	121	128	132	127	128	121	118	113	120	111	94	92	89	98
20	88	90	84	85	74						120	128	N	131	125	122	110	114	116	115	100	90	90	87
21	87	N	84	76	66	80	104	105	104	127	128	126	122	134	124	120	120	N	112	108	95	90	90	100
22	101	99	99	88	81	88	102	108	120	126	132	131	132	127	128	128	125	124	126	110	102	93	97	91
23	90	84	86	80	73	86	108	110	114	124	128	135	136	128	124	127	126	126	111	98	94	88	85	86
24	79	82	80	70	78	82	88	102	114	119	123	117	120	112	110	112	N	111	110	104	90	90	90	88
25	88	89	77	76	73	89	110	112	117	109	121	124	N	N	123	123	118	112	110	106	83	78	85	88
26																								
27	105	96	99	86	79	85	103	110	113	114	125	128	136	137	N	136	137	130	123	108	96	103	106	102
28	96	86	88	81	83	84	105	116	119	120	119	127	135	137	138	140	139	130	124	102	94	99	101	N
29	94	90	101	79	78	89	88	114	103	105	112	115	122	124	108	111	110	110	94	81	85	71	80	88
30	82	70	68	66	64	52	67	77	87	101	104	105	124	123	118	116	106	102	106	87	76	67	66	71
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	27	29	28	29	28	28	28	28	28	29	29	26	28	28	29	27	28	29	29	29	29	29	28
MED	85	79	79	71	62	64	87	105	114	118	124	127	128	128	124	120	118	114	112	106	90	88	86	86
U Q	89	90	85	76	73	82	96	110	117	122	129	130	135	133	130	127	121	124	121	109	94	91	90	88
L Q	76	71	68	64	55	56	81	100	105	109	115	115	120	119	113	113	110	106	106	98	83	72	77	75

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

APR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	G	G	G
2	G	G	G	G	G	G	G	G	G	55	G	G	G	G	61	G	G	G	29	G	G	G	G	G
3	G	G	G	G	G	G	G	G	G	G	46	G	G	G	47	G	G	G	30	26	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	50	57	51	G	G	G	G	G	G	G	G	G	G
5	23	G	33	32	G	G	G	G	G	G	G	G	49	G	G	44	G	G	G	G	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
7	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
8	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	G
9	G	G	G	G	G	G	34	G	44	G	G	G	G	G	G	50	G	G	G	G	G	33	G	G
10	G	G	G	G	G	G	32	G	G	48	50	58	58	G	G	G	G	G	G	G	G	G	G	22
11	G	G	27	G	24	28	33	G	49	G	G	G	G	G	G	G	G	G	G	G	G	G	24	23
12	G	G	G	G	G	G	G	G	G	G	50	G	G	G	G	G	41	38	G	G	28	44	28	30
13	106	75	60	77	34	24	G	G	G	G	56	65	51	G	54	G	G	G	G	30	29	32	G	29
14	33	28	30	29	29	G	G	58	46	52	58	52	G	G	67	59	G	35	32	49	49	40	G	G
15	G	G	G	G	G	G	G	G	G	54	55	58	G	G	G	G	G	53	G	40	29	27	G	G
16	34	G	33	30	29	G	G	G	G	G	78	G	78	78	53	78	55	54	49	43	43	54	43	32
17	47	34	23	26	23	28	G	42	G	G	54	50	78	G	G	G	52	G	G	G	G	G	G	27
18	G	G	G	28	78	G	G	G	47	58	G	G	G	G	G	G	G	G	G	27	44	69	31	34
19	53	43	37	51	47	30	39	44	50	50	49	50	G	G	G	52	55	43	36	35	24	34	25	G
20	28	31	G	G	G						49	G	G	48	G	G	G	36	50	40	72	54	G	30
21	G	G	27	G	27	30	G	51	48	51	52	52	G	G	G	G	G	G	30	33	G	31	G	32
22	27	26	G	G	G	G	G	G	G	46	G	G	G	G	G	G	G	G	G	31	G	G	G	G
23	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	39	G	G	G	G	30	G
24	G	G	G	24	28	G	G	G	48	50	58	G	G	G	G	G	53	58	73	31	24	34	27	G
25	32	41	25	G	G	G	G	53	G	G	G	G	55	G	G	G	47	42	39	50	57	54	44	38
26																								
27	25	27	G	G	G	G	G	G	51	55	G	G	G	G	G	G	47	G	G	G	G	54	57	51
28	30	G	26	G	G	G	G	G	56	G	56	69	85	G	G	G	G	44	57	50	24	49	G	G
29	G	29	29	29	30	G	43	46	55	G	G	G	G	G	G	52	48	41	37	58	29	35	48	70
30	38	49	31	53	31	33	51	46	58	57	58	G	56	G	49	50	48	45	36	29	51	59	124	72
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	28	28	28	28	28	29	29	29	29	29	29	29	29	29	29	29	29	29	29
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	27	G	31	G	G
U Q	31	28	28	28	28	G	32	21	48	50	54	50	53	G	G	22	47	41	36	37	29	46	29	31
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

APR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	16	27	15	17	20	24	21	28	28	21	40	17	15	20	15	15	15	15	15
2	15	14	14	14	14	15	24	16	16	18	20	23	24	24	26	21	16	15	15	15	15	15	15	14
3	15	15	14	14	15	14	20	16	18	20	20	35	28	22	26		16	16	14	15	16	14	15	15
4	15	15	14	15	15	15	24	18	18	20	22	38	30	23	22	21	17	16	20	14	15	15	16	15
5	15	15	14	14	15	15	24	15	17	20		20	29	22	29	21	16	14	20	16	15	15	15	15
6	15	15	15	15	15	15	18	16	16	20	20	20	28	39	21	18	18	14	18	15	15	15	15	15
7	15	15	14	14	15	15	18	14	15	17	21	23	20	21	21	18	16	15	18	14	14	15	15	15
8	15	14	14	14	14	15	17	15	18	20	20	23	30	43	32	24	18	17	20	14	15	15	15	15
9	15	14	14	14	14	15	20	16	17	20	21	23	46	26	21	16	16	16	20	15	14	15	16	15
10	15	15	15	15	17	15	20	16	17	18	21	36	40	21	20	17	20	15	21	15	15	16	16	15
11	17	15	14	N	16	14	20	15	17	20	21	48	49	24	20	28	17	16	21	15	15	15	15	14
12	15	14	15	15	15	16	16	17	18	20	23	23	58	42	41	22	18	17	21	15	15	15	15	18
13	15	14	14	15	14	16	16	16	18	18	26	27	24	26	24	20	18	16	22	14	14	15	16	14
14	15	14	14	16	14	17	28	18	23	24	29	28	39	48	24	21	21	18	18	15	14	15	15	15
15	15	15	14	15	15	17	22	17	21	32	33	32	150	69	48	27	18	16	23	15	15	16	15	15
16	14	14	14	14	15	17	28	17	21	42	41	28	33	36	28	20	34	18	15	15	15	15	15	15
17	15	15	14	16	16	15	30	21	21	22	26	26	38	36	24	21	18	16	23	15	15	15	15	15
18	16	15	15	14	14	17	28	20	21	21	33	34	34	48	30	22	20	20	20	14	15	15	15	15
19	14	15	14	14	14	15	16	18	22	22	24	28	32	46	30	22	18	16	16	15	15	15	15	15
20	15	14	15	15	15						36	32	29	35	28	23	20	17	16	15	15	15	16	15
21	16	14	14	15	15	14	18	20	22	36	29	38	33	44	26	21	40	16	15	15	16	15	15	15
22	15	15	14	14	16	20	17	20	22	23	32	34	45	32	29	27	21	15	16	14	16	16	15	15
23	15	15	14	15	14	21	28	20	22	27	28	29	45	46	42	41	21	17	23	18	15	15	15	15
24	15	16	14	15	14	17	17	20	21	28	41	43	29	44	44	22	20	16	17	15	15	14	15	15
25	15	14	14	14	16	16	16	16	22	43	24	27	42	28	23	23	20	18	16	15	15	14	14	14
26																								
27	16	14	15	15	14	20	18	18	21	27	32	33	34	28	26	23	17	17	23	16	15	15	15	14
28	14	15	14	15	14	20	18	16	20	22	33	30	28	33	26	20	17	15	17	15	15	14	16	15
29	15	15	15	14	14	20	17	20	21	20	29	31	40	26	24	20	16	17	15	14	14	14	15	14
30	15	15	14	15	14	15	16	16	21	29	33	28	29	28	21	20	16	14	15	14	15	16	14	15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	28	29	28	28	28	28	28	28	29	29	29	29	28	29	29	29	29	29	29	29	29
MED	15	15	14	15	15	16	19	16	20	20	26	28	33	32	26	21	18	16	18	15	15	15	15	15
U Q	15	15	15	15	15	17	24	19	21	27	32	34	41	43	29	23	20	17	21	15	15	15	15	15
L Q	15	14	14	14	14	15	17	16	17	20	21	23	28	25	21	20	16	15	16	14	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

APR. 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																								
2										113	118	120	130	132	127	128	128	131	127	127	111	100	102	104
3	104	86	87	85	67	60	68	103	122	126	122	127	128	138	136	130	122	130	130	129	104	88	102	84
4	87	103	102	67	64	64	75	102	114	126	107	114	141	143	143	136	125	128	126	115	106	74	77	82
5	86	80	70	62	50	49	53	84	116	111	118	126	139	141	134	128	126	128	122	122	103	87	89	86
6	77	72	71	66	52	48	52	102	122	116	121	129	138	142	146	142	134	136	134	124	117	106	86	102
7	103	85	75	72	57	62	62	89	111	110	113	118	128	129	134	127	124	127	131	126	105	88	88	87
8	85	86	86	71	62	62	78	88	111	122	124	130												
9											126	124	127	138	133	134	133	132	135	136	110	103	100	112
10	88	101	82	58	60	56	61	89	110	116	117	119	130	142	131	122	118	116	119	102	102	109	105	106
11	76	47	72	62	44	64	60	86	101	103	111	138	118	120	127	102	99	108	108	98	83	56	65	67
12	50	67	62	53	50	30	63	84	96	116	127	122	129	143	130	108	121	112	116	126	87	78	80	77
13	76	74	59	48	40	47	70	93	107	122	123	120	129	132	134	130	129	125	126	111	111	82	75	76
14	75	72	76	64	59	54	80	103	100	105	128	131	131	138	141	140	134	129	130	135	134	107	88	87
15	88	85	72	66	64	77	80	104	117	125	125	136		151	150	145	146	143	139	145	121	88	84	98
16	90	81	86	84	77	73	85	103	112	127	133	133	140	144	138	141	138	128	127	118	109	109	102	97
17	86	88	49	80	78	72	86	116	121	110	119	134	141	143	140	138	137	137	129	123	111	108	122	123
18	108	106	114	68	66	62	80	102	101	102	112	125	121	122	121	109	106	113	110	108	84	N	88	88
19	86	87	86	70	63	62	76	104	110	120	116	134	140	131	128	127	124	128	122	124	111	109	110	107
20																								
21																								
22																								
23																								
24																								
25																								
26																								
27	121	110	109	85	83	80	84	103	105	108	114	130	141	145	150	146	146	146	136	131	115	116	116	120
28	110	108	108	87	85	88	87	106	114	122	121	135	143	147	148	146	146	145	136	122	111	111	107	107
29	105	102	110	86	79	81	88	100	108	114	120	132	137	144	134	129	132	122	99	108	91	80	81	86
30	90	81	76	77	66	61	66	88	101	116	120	118	124	141	135	131	134	125	114	120	87	84	85	85
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	20	20	20	20	20	20	20	20	20	21	22	22	20	21	21	21	21	21	21	21	21	20	21	21
MED	88	86	79	69	64	62	76	102	110	116	120	128	130	141	134	130	129	128	127	123	109	94	88	88
U Q	103	101	94	82	72	72	82	103	115	122	124	133	140	143	142	140	135	134	132	128	111	108	103	106
L Q	81	77	71	63	54	55	62	88	103	110	116	120	128	132	130	127	123	123	117	113	96	83	82	84

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

APR. 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																								
2										G	G	48	G	G	G	45	G	38	G	25	31	G	G	G
3	G	G	G	G	G	G	G	G	G	G	G	G	G	48	G	G	G	G	G	45	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	23	G	G	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	G	G	G	G	G
6	G	G	G	G	G	G	11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
7	G	G	G	G	G	G	G	G	G	G	49	G	G	50	G	G	G	G	31	G	G	G	G	G
8	G	G	G	G	G	G	25	G	G	G	G	G												
9											G	G	G	G	56	G	G	G	31	G	G	G	G	G
10	G	G	34	25	G	G	G	G	40	G	G	G	G	55	G	G	G	45	G	33	32	56	29	G
11	G	G	27	24	39	26	30	40	43	G	50	G	G	G	G	G	G	G	G	29	24	G	G	31
12	G	26	G	G	G	G	G	G	G	G	G	G	G	69	G	48	G	47	37	34	G	54	28	G
13	G	G	G	G	G	G	50	68	53	49	G	G	55	55	G	G	G	G	41	58	37	31	41	30
14	32	32	28	30	24	23	G	G	G	G	G	62	60	51	53	G	G	39	44	36	22	G	G	G
15	G	G	G	G	G	G	G	G	40	G	62	96	G	G	G	63	52	50	51	32	43	34	G	G
16	G	33	G	30	32	28	31	58	G	G	G	G	G	56	63	74	58	45	47	57	69	59	58	44
17	38	40	G	G	G	G	G	G	G	G	G	48	56	G	G	G	G	G	G	G	G	G	G	G
18	G	G	G	G	G	34	29	G	51	59	68	G	G	G	50	58	G	G	38	40	26	30	27	32
19	28	57	36	32	G	32	32	G	52	62	57	56	54	50	98	100	78	102	109	92	G	G	G	G
20																								
21																								
22																								
23																								
24																								
25																								
26																								
27	G	G	G	32	G	G	G	G	46	54	G	G	G	G	G	G	57	46	40	33	G	G	24	G
28	G	44	34	G	G	G	G	39	60	52	57	56	G	G	60	G	G	G	36	38	93	G	G	G
29	G	G	G	G	G	G	G	49	58	60	60	G	58	G	48	G	58	76	G	G	G	34	G	23
30	28	49	24	G	28	23	G	39	46	54	59	73	58	G	G	G	G	G	40	G	56	44	40	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	20	20	20	20	20	20	20	20	20	21	22	22	21	21	21	21	21	21	21	21	21	21	21	21
MED	G	G	G	G	G	G	G	G	20	G	G	G	G	G	G	G	G	G	36	32	G	G	G	G
U Q	G	32	25	24	G	23	27	39	48	53	57	48	54	50	51	46	26	45	40	39	34	34	27	12
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

APR. 1990

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																								
2										21	35	34	45	43	33	28	21	18	16	15	14	15	15	15
3	15	15	15	15	15	15	17	18	16	21	21	45	35	35	33	29	18	16	17	15	15	15	15	15
4	15	15	15	15	15	15	16	16	18	18	39	49	32	45	27	24	17	18	17	15	15	15	15	15
5	15	15	15	15	15	15	16	16	16	24	39	46	32	42	43	30	20	16	16	15	15	15	15	15
6	15	15	15	15	15	15	15	15	16	21	27	27	42	42	44	33	32	18	15	15	15	15	15	15
7	15	15	15	15	14	15	17	15	16	21	26	40	42	34	45	26	15	14	15	15	15	15	15	15
8	15	15	15	15	15	15	17	15	18	22	24	27												
9											27	30	30	44	38	38	21	17	16	15	15	15	15	15
10	15	15	15	15	15	15	17	16	16	21	23	40	43	39	40	39	24	15	15	15	15	15	16	15
11	15	16	15	15	14	15	15	15	20	27	30	50	46	43	34	32	23	17	15	15	16	15	15	15
12	15	15	15	15	15	15	20	18	17	22	32	33	64	36	36	29	38	23	16	15	15	16	15	15
13	15	15	15	15	15	15	15	16	17	23	38	40	39	40	45	39	27	21	15	15	15	15	15	15
14	15	15	15	15	15	15	16	16	20	22	42	40	44	50	36	34	38	20	17	15	15	15	15	15
15	15	15	15	15	15	15	15	17	20	40	32	39	150	69	49	38	34	22	17	15	15	15	15	15
16	15	15	15	15	15	15	15	16	20	40	44	45	49	42	42	36	39	24	16	15	15	15	15	15
17	15	15	15	15	15	15	17	16	21	24	43	46	44	49	49	40	29	21	17	17	15	15	15	15
18	15	15	15	15	15	15	15	20	21	28	41	46	44	53	48	40	38	24	17	16	15	15	15	15
19	15	16	15	15	15	15	16	18	22	28	32	35	34	39	44	39	35	20	17	16	15	15	15	15
20																								
21																								
22																								
23																								
24																								
25																								
26																								
27	15	15	15	15	15	15	17	20	23	32	33	44	36	49	48	45	24	21	17	15	15	15	15	15
28	15	15	15	15	15	15	16	17	33	24	34	42	48	44	42	23	18	20	16	15	16	15	15	15
29	15	15	15	15	15	15	23	17	20	22	27	30	43	48	40	38	34	18	16	17	15	15	15	15
30	15	15	15	15	15	15	23	18	18	23	34	34	32	35	29	38	21	17	16	17	15	15	14	15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	20	20	20	20	20	20	20	20	20	21	22	22	21	21	21	21	21	21	21	21	21	21	21	21
MED	15	15	15	15	15	15	16	16	19	23	32	40	43	43	42	36	24	18	16	15	15	15	15	15
U Q	15	15	15	15	15	15	17	18	20	27	39	45	45	48	45	39	34	21	17	15	15	15	15	15
L Q	15	15	15	15	15	15	15	16	16	21	27	34	34	39	35	29	20	17	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

APR. 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	141	89	121	125	87	66	67	89	104	122	123	126	138	149	163	166	163	166	161	163	164	163	142	164
2	158	146	146	146	84	53	52	88	108	127	120	113	135	139	142	146	148	144	148	145	145	145	143	146
3	161	146	145	128	86	84	86	108	131	130	106	120	140	148	148	142	142				125	136	146	142
4		130	104	63	65	68	64	87	108	120	111	121	155	151	155	162	146	152	146	142	108	90	86	87
5	85	106	86	66	54	34	32	85	107	111	120	133	146	146	146	138	146	145	144	137	107	103	108	90
6	87	86	85	73	53	35	37	96	110	107	127	136	146	164	177	171	171	171	171	165	171	165	146	160
7	145	109	88	84	66	53	55	83	105	119	107	120	128	139	141	144	140	139	138	141	108	109	85	116
8	110	107	108	86	77	67	71	88	104	127	128	121	137	140	145	141	141	148	146	143	137	142	128	128
9	122	90	122	107	79	54	69	88	110	123	120	121	129	140	144	142	156	158	158	160	159	142	101	144
10	121	107	105	53	51	60	54	82	107	114	112	122		C	C	C	C	136	137	118	109			126
11	87	57	85	85	64	57	A	80	105	112	127	140	139	147	154	132	135	144	127	126	87	78	78	85
12	86	76	66	53	48	31	50	84	104	127	134	128	143	163	155	127	154	145	146	146	104	88	84	80
13	82	77	52	44	42	43	63	80	108	124	111	126	134	152	162	169	C	C	C	164	162	130	110	97
14	86	84	85	84	65	52	73	89	N	92	121	138	145	164	168	178	176	175	180	198	184	143	146	156
15	146	146	127	78	79	86	N																	
16												134	146	156	153	156	147	147	147	148	163	170	143	138
17	108	110	109	86	86	80	85	105	120	108	122	132	145	146	146	146	146	146	146	157	145	153	142	158
18	110	87	111	80	64	62	66	96	105	111	128	136	138	138	142	137	136	136	136	130	107	127	145	135
19	143	145	150	120	82	66	62	106	119	120	125	138	145	142	138	141	146	145	145	147	145	163	N	176
20	198	190	165	164	130	86	90	110	110	121	131	138	153	145	155	161		162	164	165	143	145	173	168
21	176	178	164	90	84	77	84	96	102	128	118	127	145	161	144	154	161	164	164	162	145	164	168	175
22	164	166	145	96	88	84	83	85	105	127	138	142	146	146	146	145	142	145	146	146	142	146	145	157
23	145	142	122	95	86	80	85	104	111	123	131	141	142	136	135	145	146	135	137	146	166	142	138	129
24	140	124	128	66	91	85	94	122	129	121	135	145	141	145	138	144	145	145	137	133	145	135	142	100
25	122	125	103	84	73	60	73	88	106	112	124	141	146	154	152	157	147	N	163	161	138	133	142	141
26																								
27	187	159	131	97	81	73	83	88	96	104	118	131	146	164	170	178	176	175	178	169	166	163	165	164
28	145	145	133	90	86	86	87	90	107	118	120	139	146	160	165	166	163	162	161	158	144	144	141	128
29	119	128	126	88	78	78	83	90	100	119	105	130	146	146	146	145	136	127	122	130	87	82	84	84
30	86	86	85	76	66	64	66	78	86	126	116	132	135	145	147	151	159	158	144	158	118	104	143	126
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	28	28	28	28	28	26	27	26	27	27	28	27	27	27	27	25	25	26	27	28	27	26	28
MED	122	117	116	86	78	66	70	88	107	120	121	132	145	146	147	146	146	146	146	147	144	142	142	136
U Q	146	145	132	96	86	80	84	96	110	126	128	138	146	156	155	162	160	162	161	162	160	153	145	157
L Q	87	88	87	74	64	53	62	85	104	112	116	124	138	142	144	142	142	144	138	141	108	109	108	108

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

APR. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	29	34	31	34	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G
2	G	G	G	G	G	G	G	G	G	G	G	G	48	50	84	G	47	G	G	33	G	G	G	G
3	G	G	G	G	G	G	G	33	G	G	G	G	G	48	49	G	G				24	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	24	G	G	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	48	G	G	G	G	G	33	G	G	G	G
6	G	G	G	G	G	G	G	G	G	55	G	G	G	G	67	G	G	G	36	29	28	G	G	G
7	G	G	G	G	G	G	G	32	40	G	50	57	52	G	G	46	44	44	40	33	G	G	G	G
8	G	G	G	G	G	G	G	G	G	G	57	G	G	G	G	G	G	G	34	26	G	32	25	24
9	G	G	G	G	24	25	24	G	40	46	G	52	54	55	61	55	G	G	G	G	G	G	G	24
10	26	G	G	G	G	G	G	G	42	49	56	51		C	C	C	C	42	G	31	28			G
11	G	22	28	32	28	32	32	37	46	56	67	51	G	G	49	G	G	40	90	G	32	25	32	33
12	39	39	32	31	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	52	26	33
13	G	G	G	G	27	G	31	G	68	45	52	67	49	56	G	G	C	C	C	58	82	33	32	40
14	G	29	33	24	27	34	28	G	G	G	G	52	G	G	G	59	63	51	35	29	28	32	G	32
15	40	36	G	G	G	G	G																	
16												G	G	G	G	65	65	47	54	42	30	31	G	33
17	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	41	G	27	G	G	G	G
18	G	24	27	31	30	26	38	45	50	49	G	49	60	G	G	G	G	G	36	32	27	G	33	32
19	35	29	G	G	G	G	37	35	43	49	57	61	64	62	63	57	G	48	47	38	69	71	39	36
20	30	G	G	G	G	G	32	54	66	51	63	64	73	66	G	G	G	45	51	50	148	91	66	43
21	37	G	G	G	G	G	G	G	48	51	54	54	56	57	G	56	46	58	56	34	24	G	G	G
22	G	G	G	G	G	G	44	G	G	G	G	G	G	G	64	68	70	50	47	59	33	G	G	G
23	G	G	G	G	G	G	G	G	G	46	G	G	64	G	G	G	48	G	38	28	43	24	G	33
24	33	26	44	40	39	40	32	G	G	46	G	G	G	G	57	G	G	G	40	49	G	28	24	38
25	G	G	G	G	G	65	G	G	G	51	58	48	G	50	56	G	G	45	47	48	60	58	32	37
26																								
27	38	33	G	33	G	24	G	G	43	G	G	G	G	G	G	G	G	G	40	34	G	G	G	G
28	G	G	G	32	G	25	G	G	G	68	G	G	G	G	65	G	G	G	36	29	34	G	G	24
29	27	G	G	G	G	G	G	G	G	54	G	G	G	G	G	G	53	42	40	G	37	33	29	42
30	37	29	30	30	G	30	33	44	43	45	52	61	64	50	63	G	G	40	37	32	92	30	32	34
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	28	27	27	27	27	28	27	27	27	27	26	26	26	27	28	27	27	28
MED	G	G	G	G	G	G	G	G	G	45	G	G	G	G	G	G	G	20	36	32	28	G	G	24
U Q	31	25	G	27	12	25	31	33	43	51	54	52	54	50	61	46	46	45	47	38	35	32	32	33
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

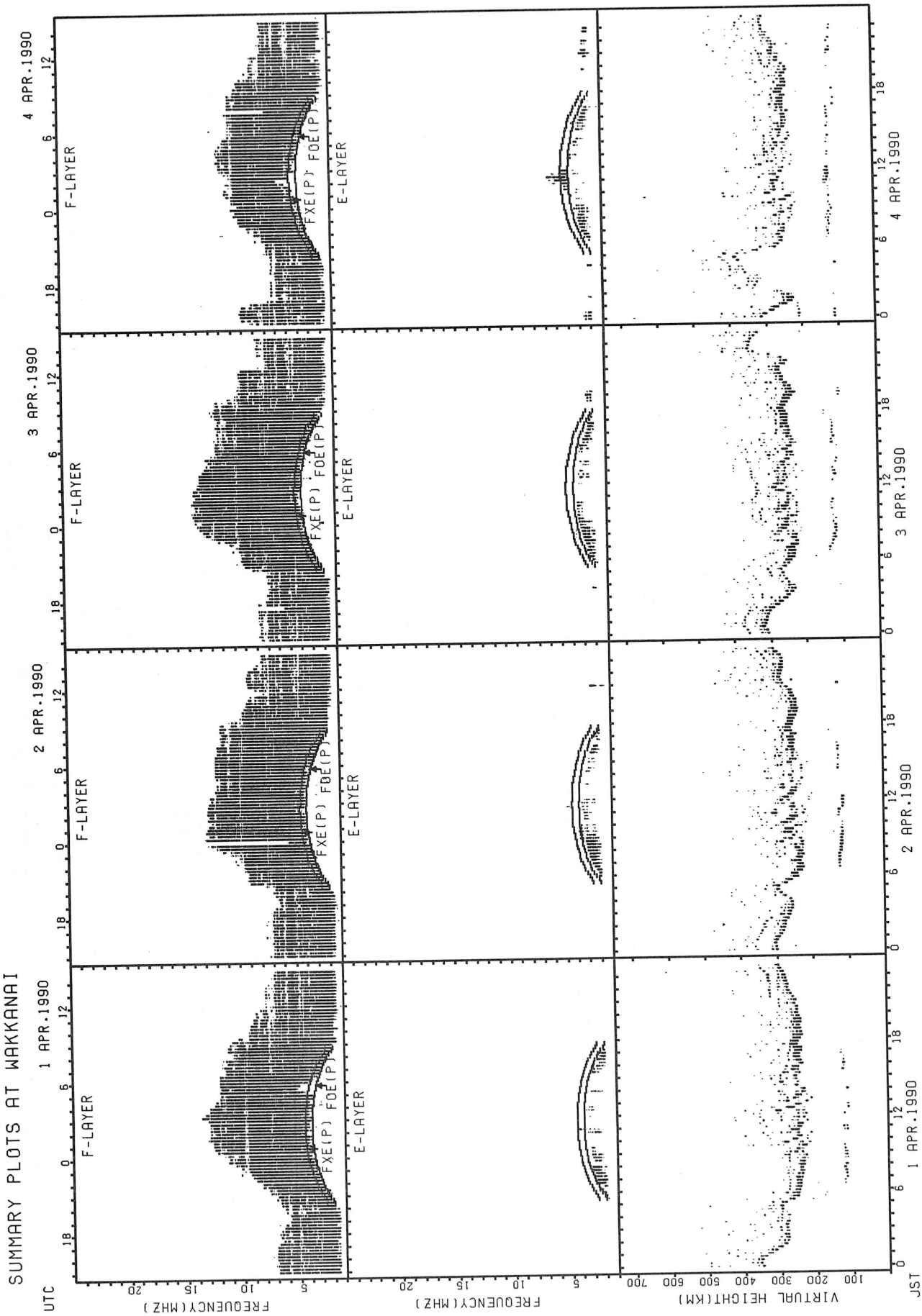
HOURLY VALUES OF FMIN AT OKINAWA

APR. 1990

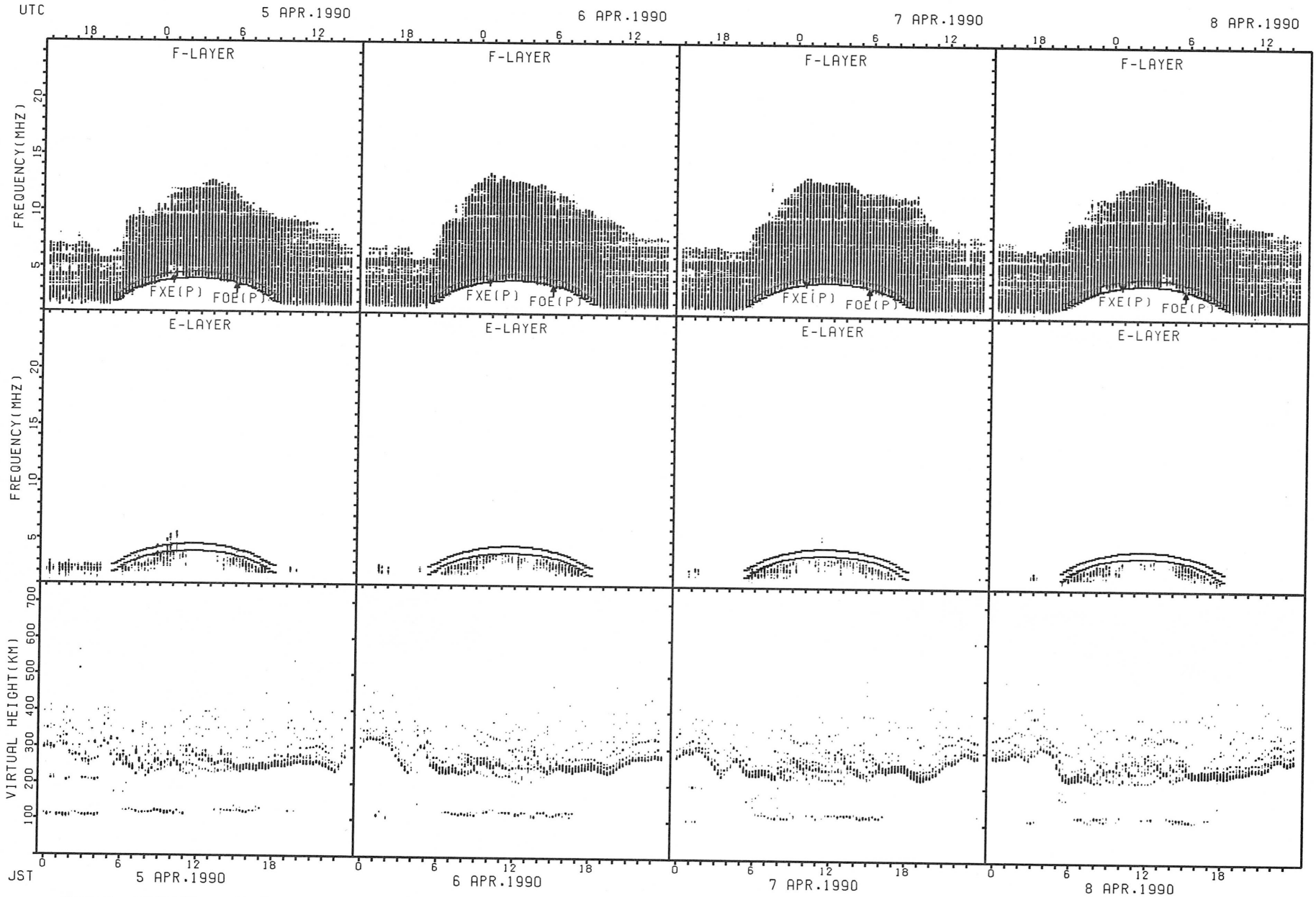
LAT. 26.3N LON. 127.8E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	14	14	15	18	23	27	28	46	30	32	50	28	30	27	16	18	15	15	15
2	15	15	15	14	15	15	15	26	23	26	24	32	35	30	28	28	23	21	17	14	15	15	15	15
3	15	15	15	14	15	15	15	15	18	23	28	48	33	29	28	27	28				15	16	15	15
4	15	15	15	15	15	15	15	26	16	24	27	42	29	32	30	40	27	21	16	15	15	15	15	15
5	15	15	15	15	15	15	15	15	20	20	29	28	28	29	27	24	26	21	16	15	15	15	15	15
6	15	15	15	15	15	15	15	15	15	20	24	27	27	28	27	26	27	22	15	15	14	15	15	15
7	15	15	15	14	15	15	15	18	18	23	26	27	29	28	29	26	21	14	14	14	15	15	15	15
8	15	15	14	15	15	15	15	15	15	22	26	27	28	52	43	27	27	30	16	15	15	15	15	15
9	15	15	15	14	15	15	15	27	18	22	26	27	27	40	28	24	18	15	15	15	15	15	15	15
10	15	15	15	15	15	15	15	15	20	24	26	28		C	C	C	C	22	16	14	15			15
11	15	N	15	15	14	14	14	15	21	23	29	28	27	35	35	33	26	18	15	15	15	15	15	17
12	15	15	15	14	15	23	17	16	18	26	27	29	64	46	46	41	36	35	15	17	15	17	15	15
13	15	15	15	15	15	15	14	15	16	23	27	32	30	43	30	28	C	C	C	15	15	15	15	15
14	15	15	15	15	15	14	14	28	17	23	26	28	50	49	45	33	28	24	15	14	15	15	15	15
15	15	15	15	14	15	14	15																	
16												49	34	47	48	29	39	26	20	14	15	15	16	16
17	16	15	15	14	14	15	18	18	18	23	28	30	48	47	31	27	26	22	16	15	15	15	15	15
18	15	14	14	14	15	15	15	15	20	27	29	43	45	52	50	43	29	26	18	14	15	15	15	15
19	15	15	15	15	15	15	14	28	22	26	29	32	29	45	44	40	28	24	16	15	15	15	15	15
20	15	16	15	14	15	15	14	17	26	26	30	36	35	46	48	46	41	34	27	15	15	15	15	15
21	15	15	15	14	15	15	27	18	24	33	29	33	38	35	34	30	32	23	15	14	15	16	15	15
22	15	15	15	15	15	14	14	18	23	28	29	36	47	49	30	29	27	20	15	15	15	15	16	15
23	15	16	15	15	15	15	22	29	26	28	33	36	34	36	32	29	26	24	17	14	15	16	15	15
24	15	15	15	14	14	15	14	16	24	27	33	32	45	45	45	44	29	24	24	15	16	15	15	15
25	15	15	15	15	15	15	20	17	26	27	29	32	36	48	34	28	27	22	16	14	15	15	15	15
26																								
27	15	15	15	15	15	15	15	29	23	26	28	33	35	33	44	46	38	26	16	14	16	16	16	15
28	15	15	15	14	14	14	22	18	23	28	32	32	50	32	44	43	26	22	17	17	15	16	16	15
29	15	15	15	14	15	15	20	16	21	26	28	30	45	30	31	39	34	20	16	14	14	14	14	15
30	15	15	14	14	15	14	14	15	22	22	26	28	32	29	29	28	23	23	16	14	15	15	15	15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	27	28	28	28	28	28	27	27	27	27	28	27	27	27	27	26	26	26	27	28	27	27	28
MED	15	15	15	14	15	15	15	17	20	24	28	32	35	36	32	29	27	22	16	15	15	15	15	15
U Q	15	15	15	15	15	15	16	26	23	27	29	34	45	47	44	41	29	26	17	15	15	15	15	15
L Q	15	15	15	14	15	14	14	15	18	23	26	28	29	30	29	27	26	21	15	14	15	15	15	15

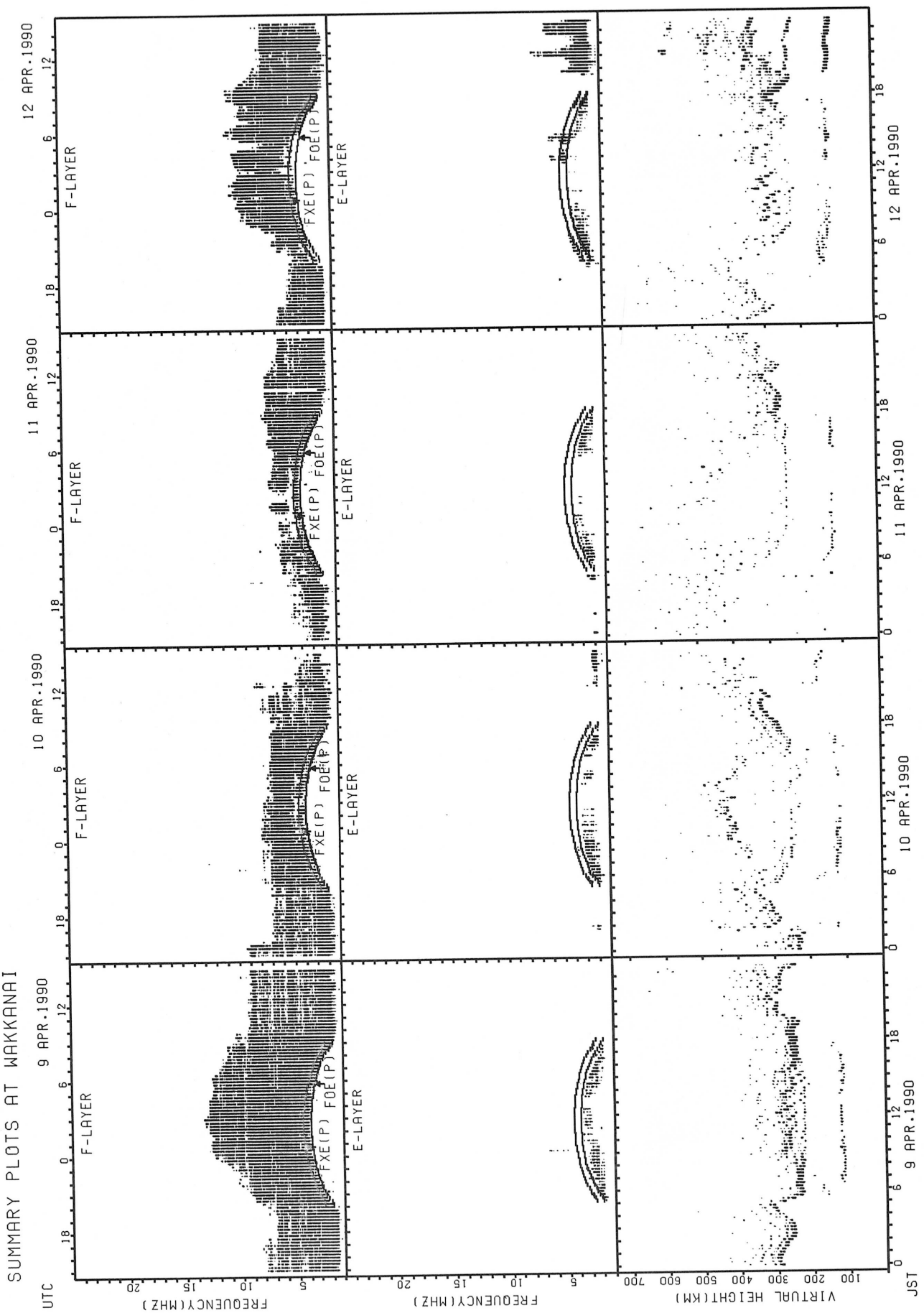
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

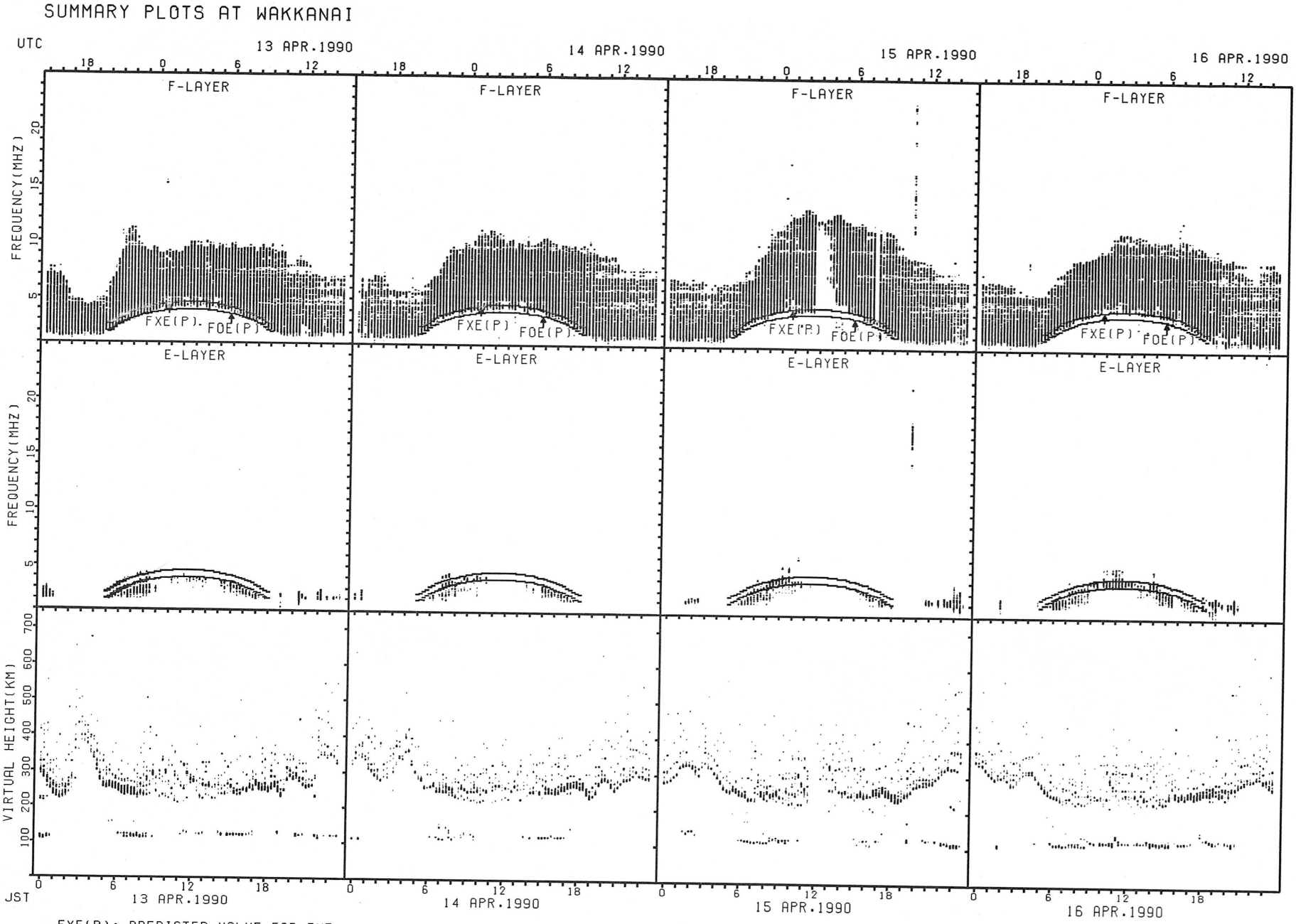

SUMMARY PLOTS AT WAKKANAI
UTC
1 APR.1990
2 APR.1990
3 APR.1990
4 APR.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

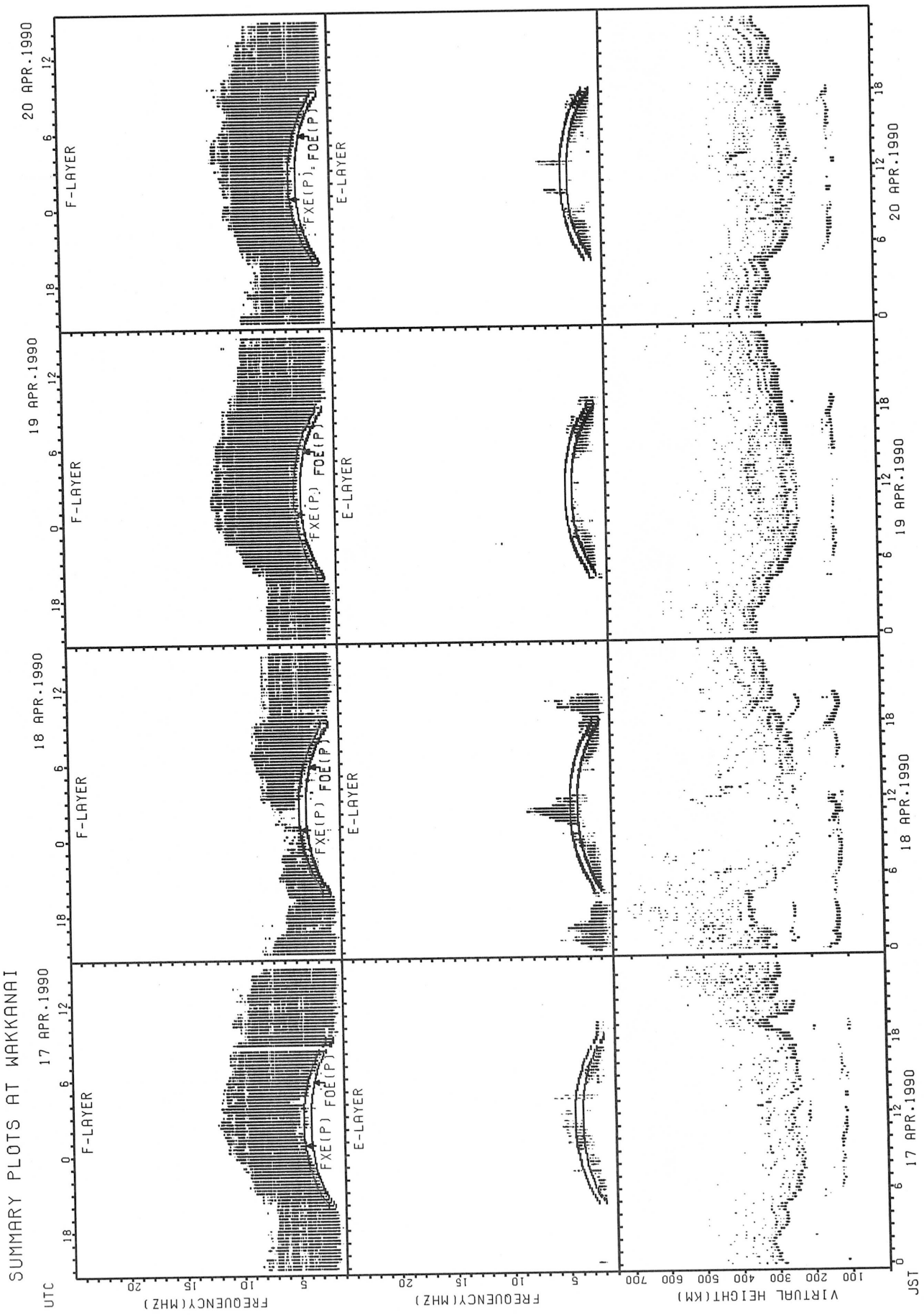
SUMMARY PLOTS AT WAKKANAI



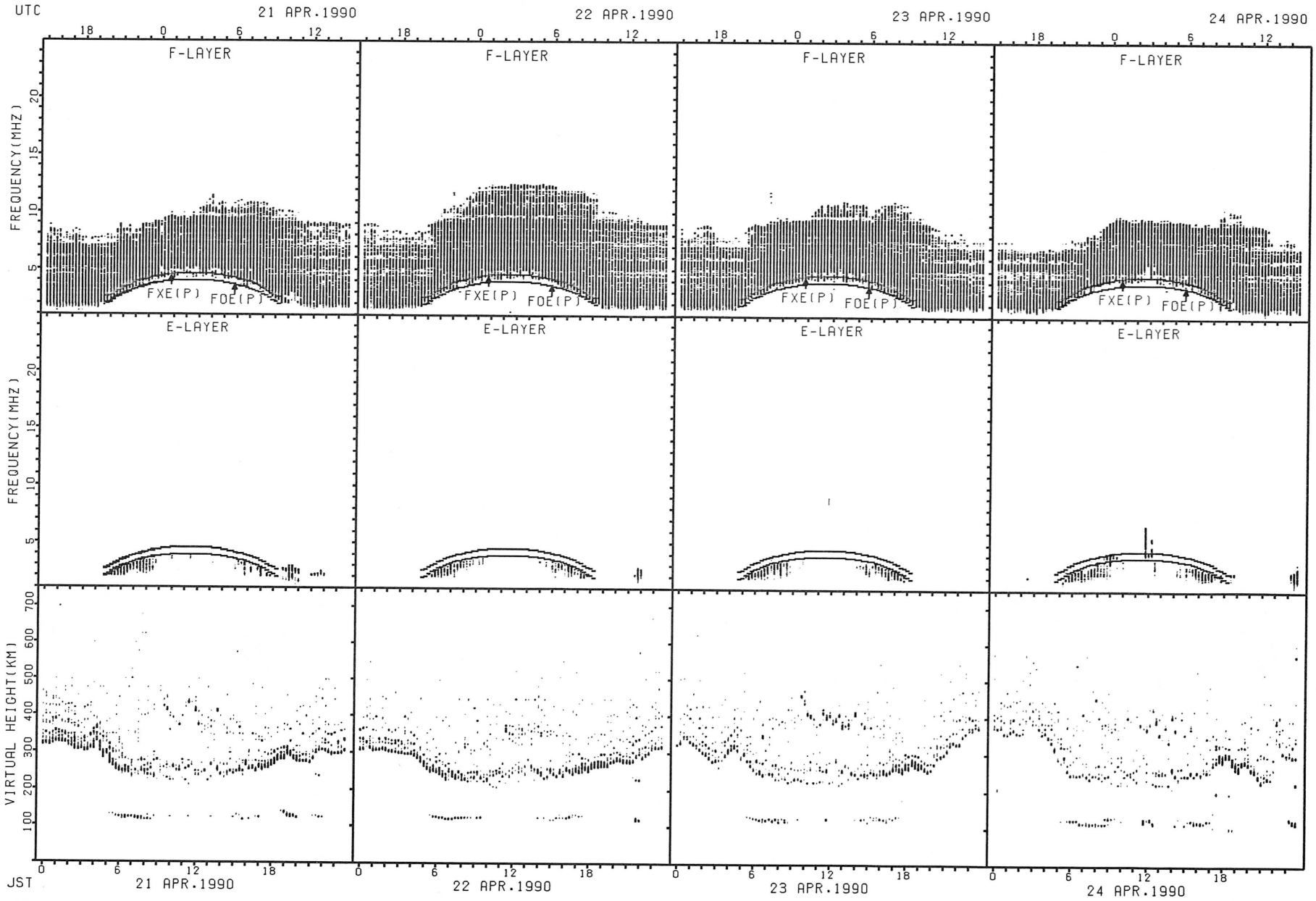
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
9 APR.1990
10 APR.1990
11 APR.1990
12 APR.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
UTC
13 APR.1990
14 APR.1990
15 APR.1990
16 APR.1990
F-LAYER
E-LAYER
FREQUENCY(MHZ)
FXE(P)
FOE(P)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

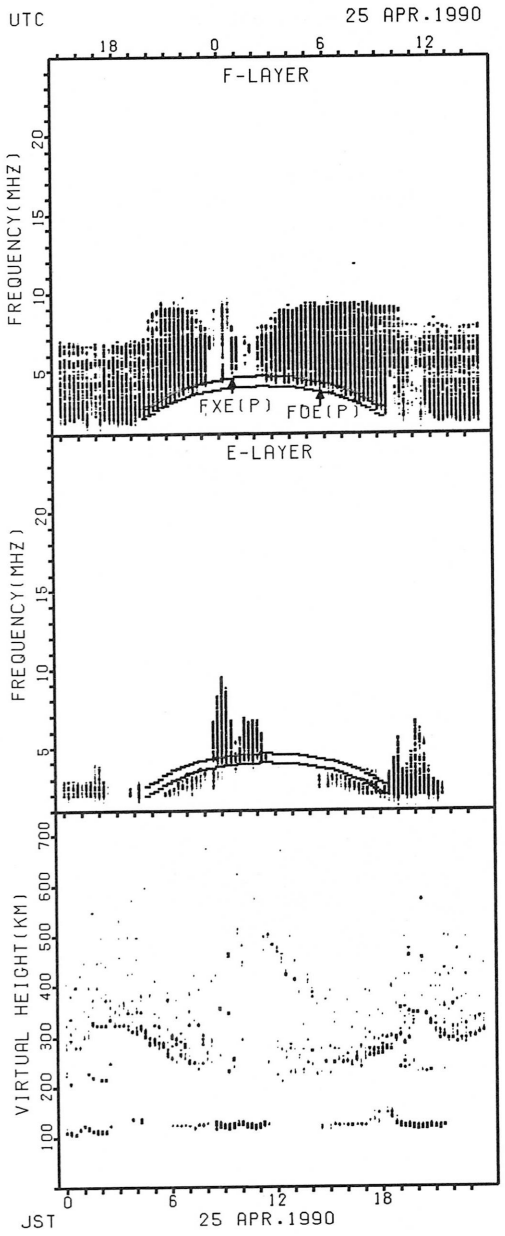

SUMMARY PLOTS AT WAKKANAI
17 APR.1990
18 APR.1990
19 APR.1990
20 APR.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI

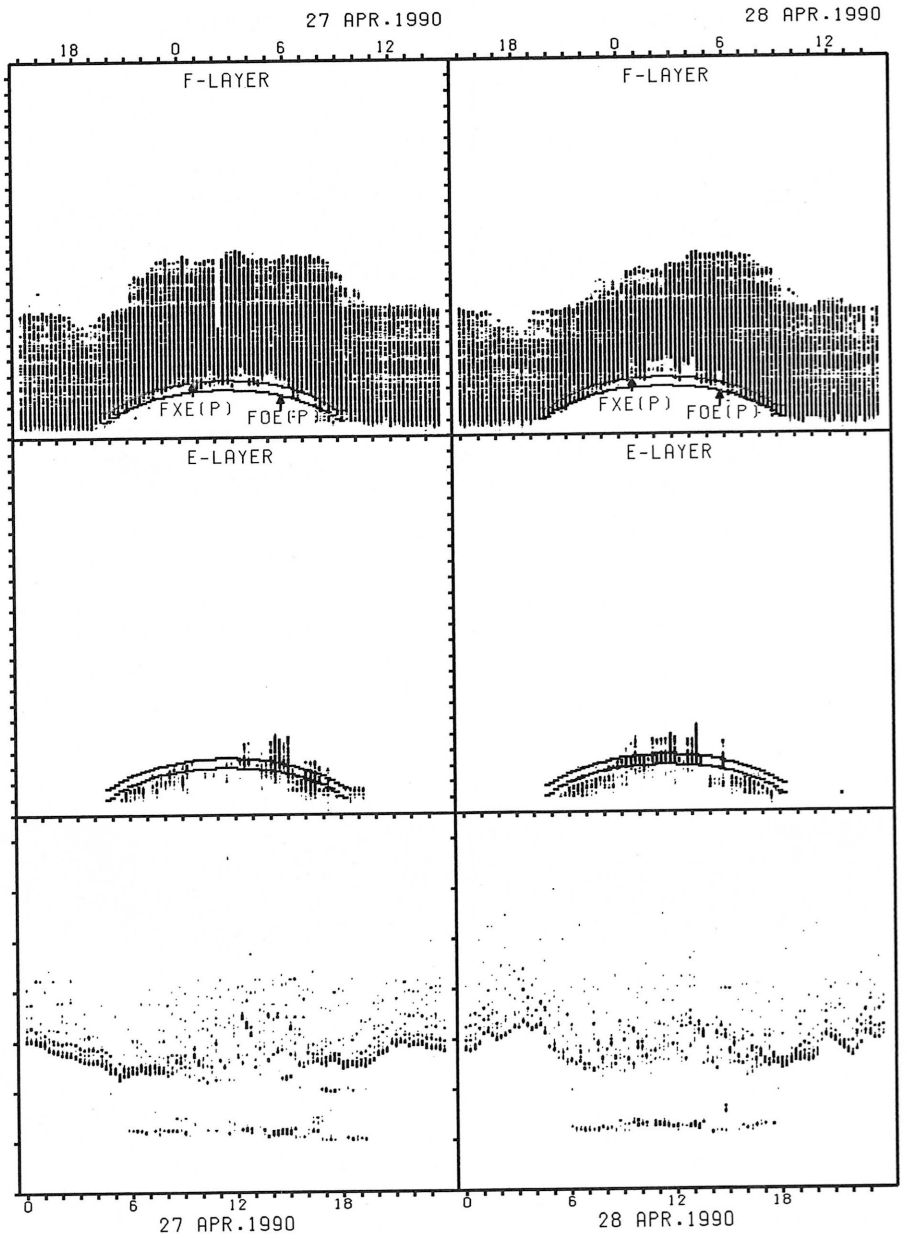


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

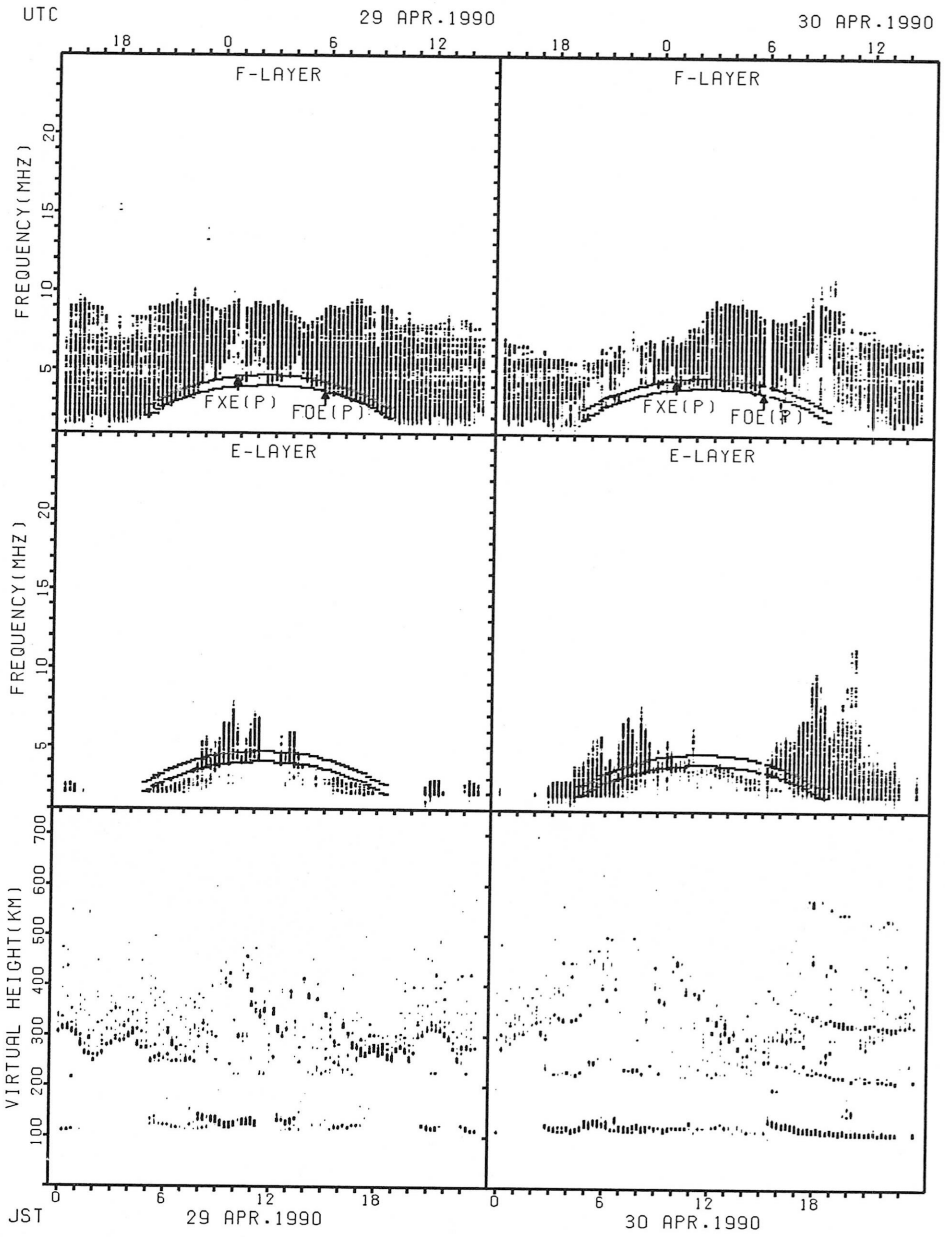
SUMMARY PLOTS AT WAKKANAI



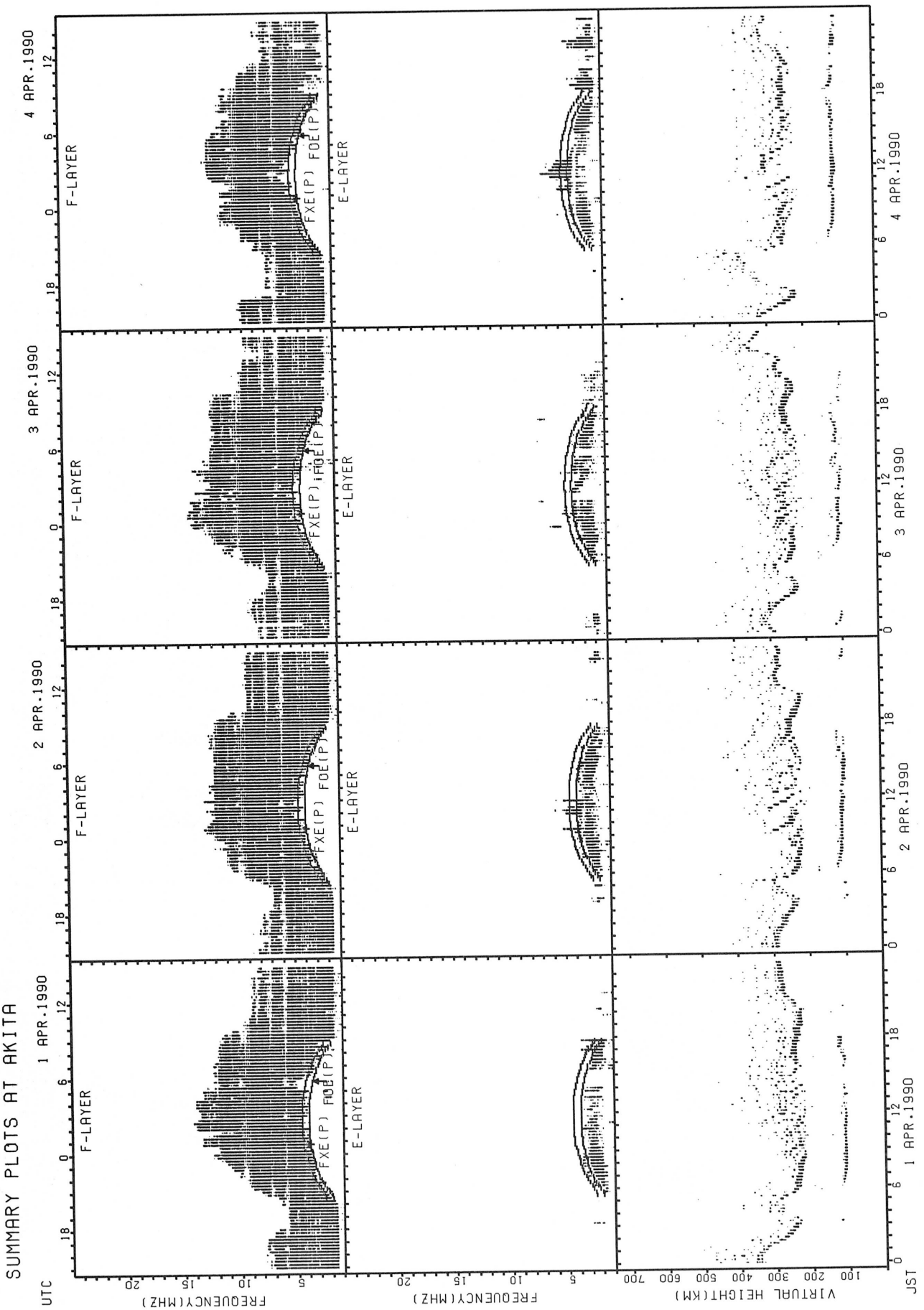
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE



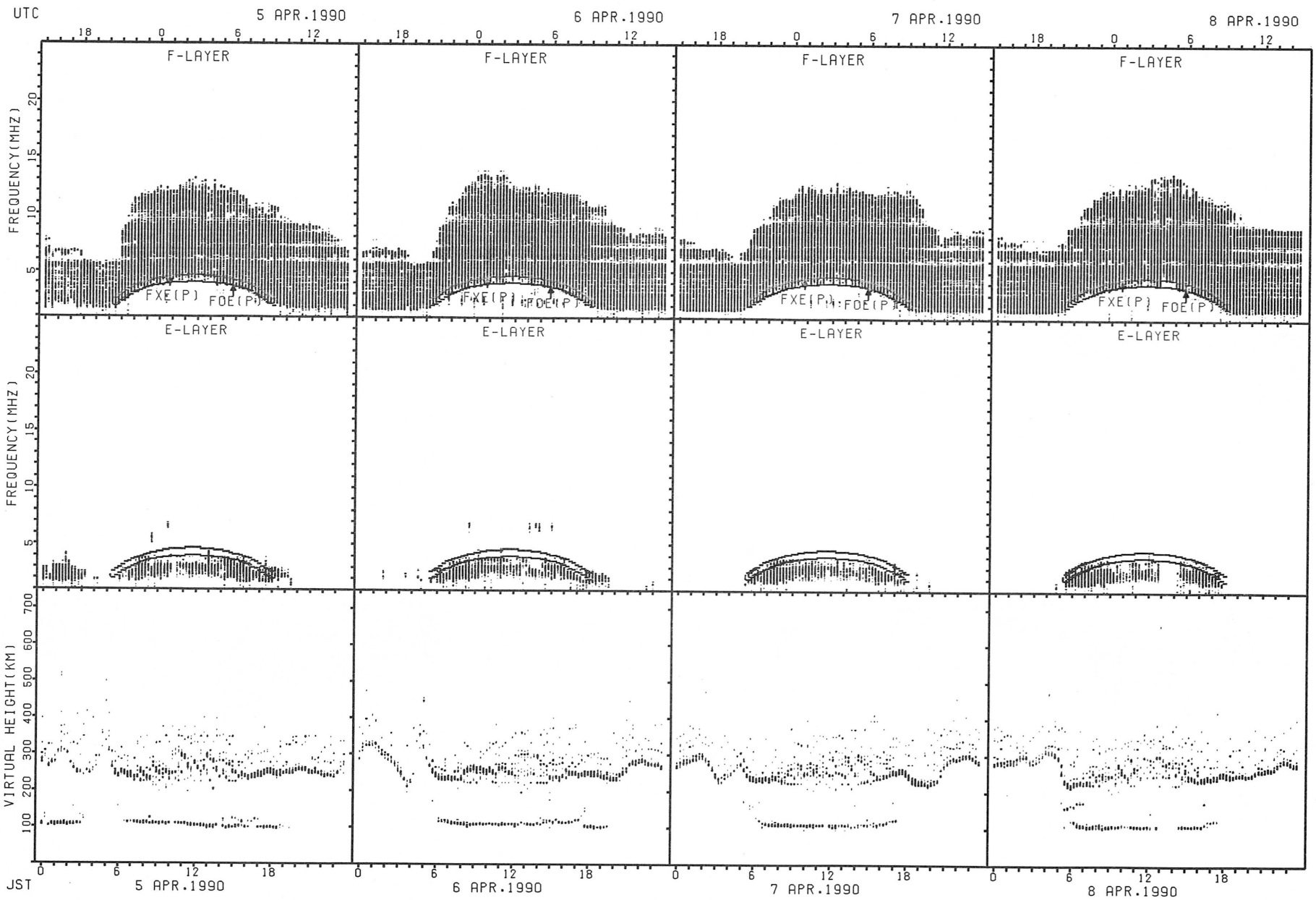
SUMMARY PLOTS AT WAKKANAI



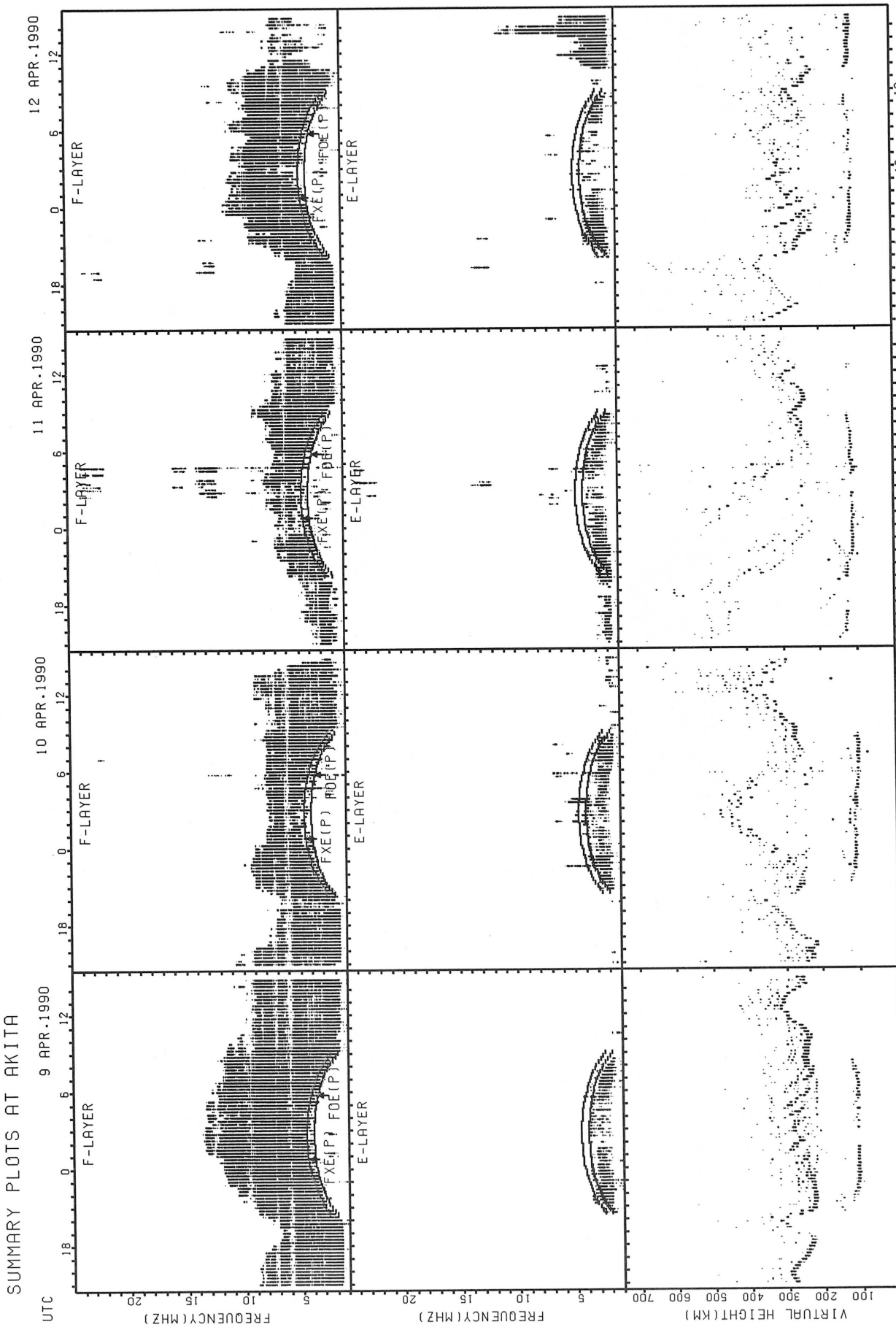
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

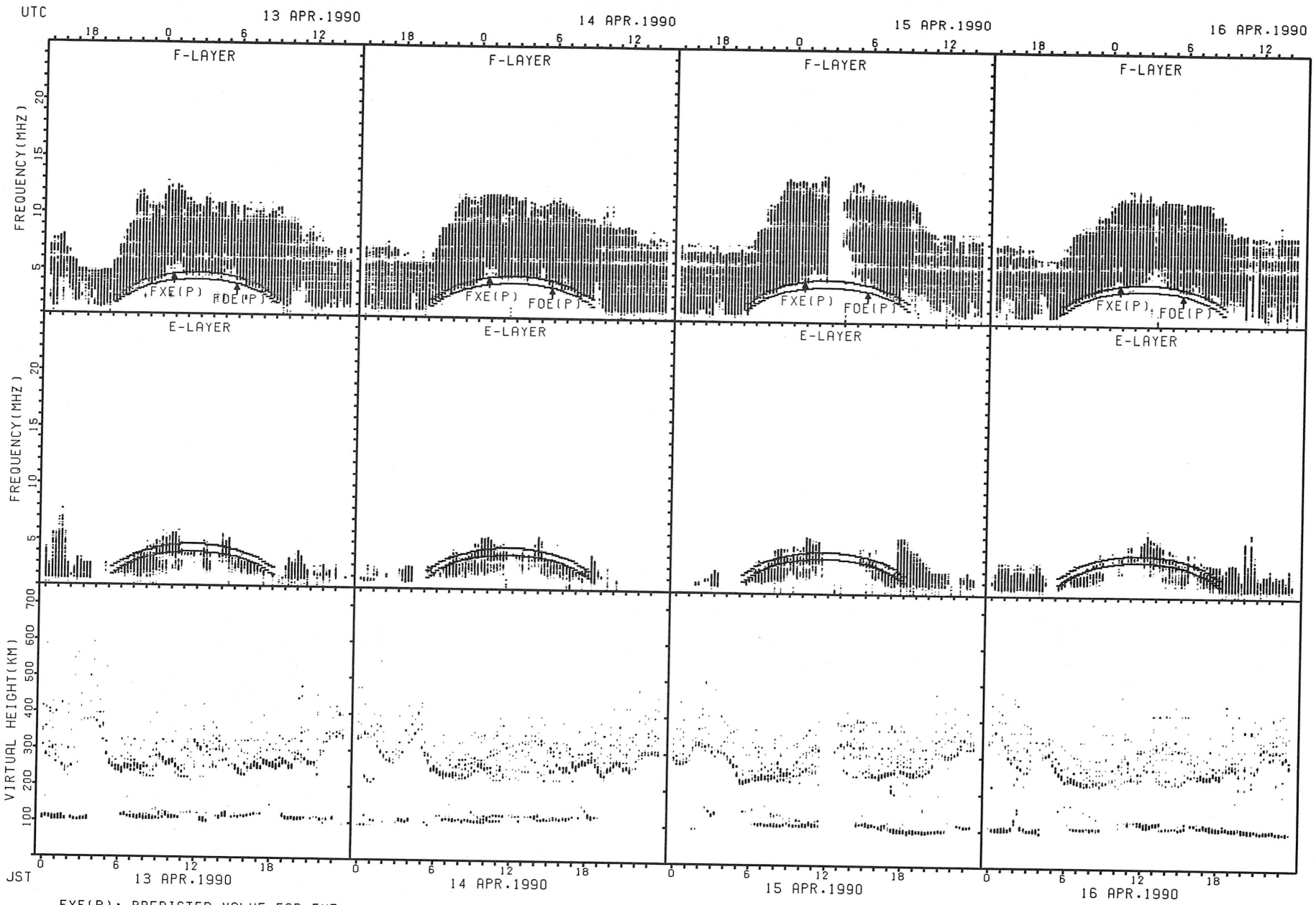
SUMMARY PLOTS AT AKITA



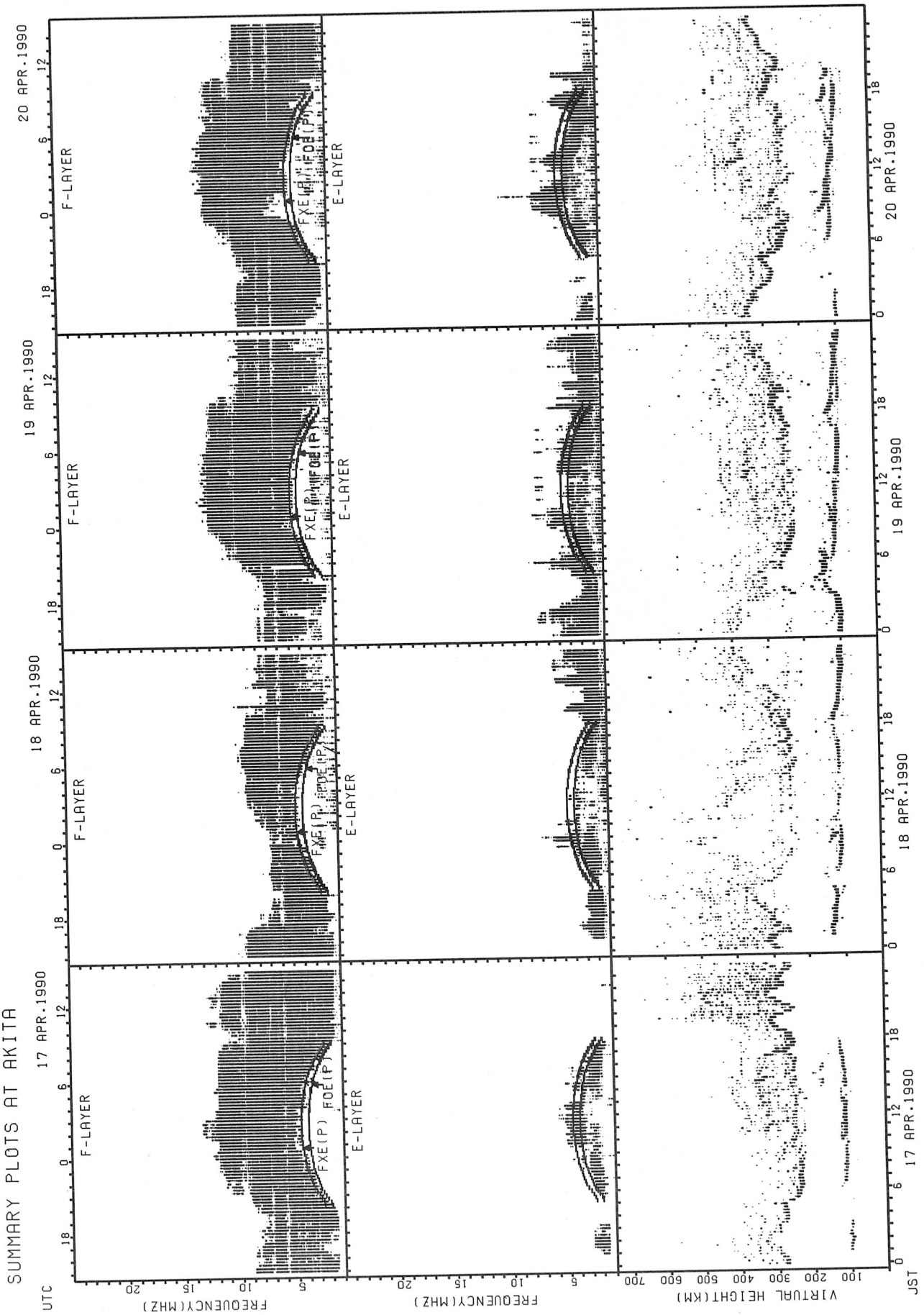
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

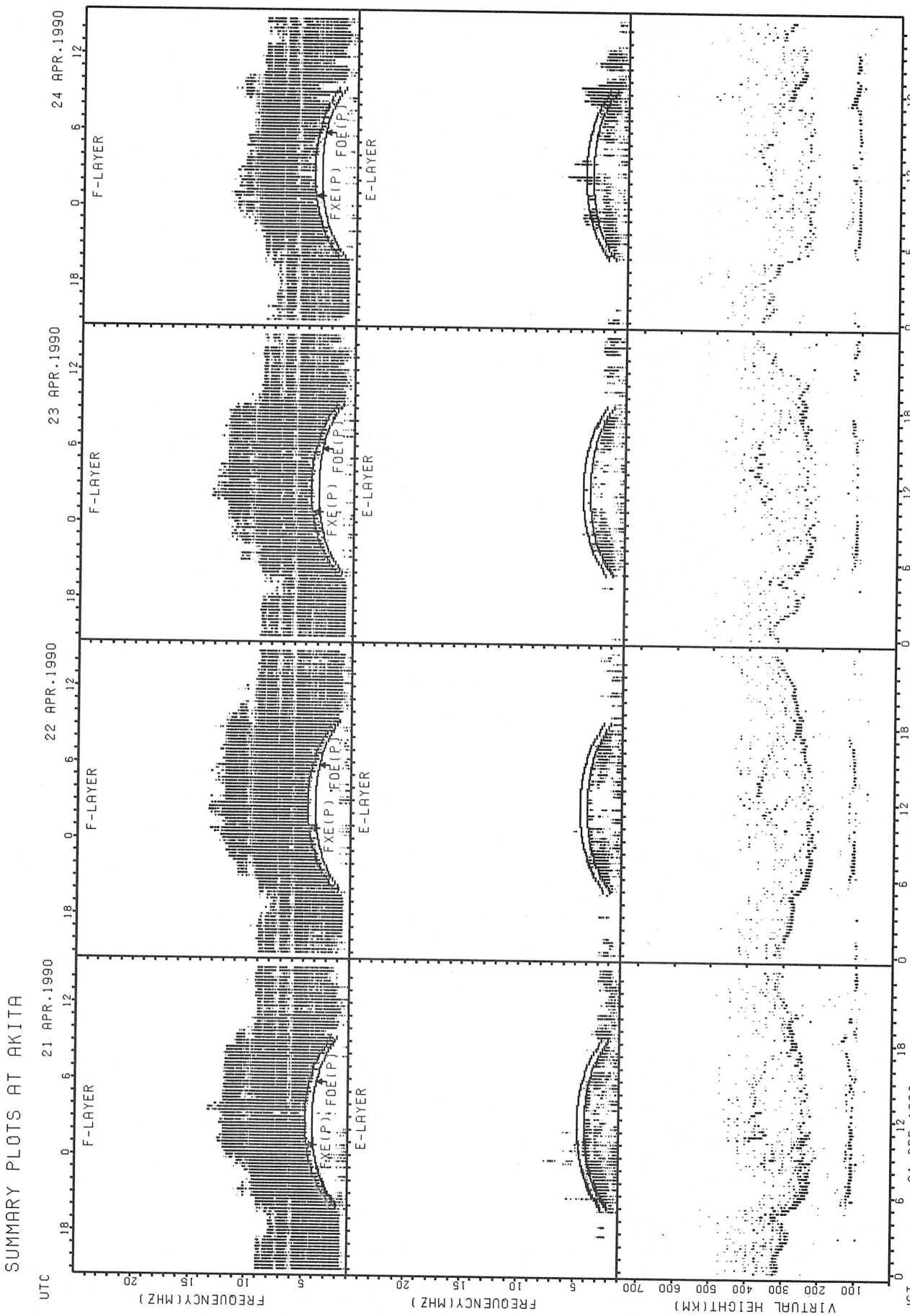

SUMMARY PLOTS AT AKITA
UTC
9 APR.1990
10 APR.1990
11 APR.1990
12 APR.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA

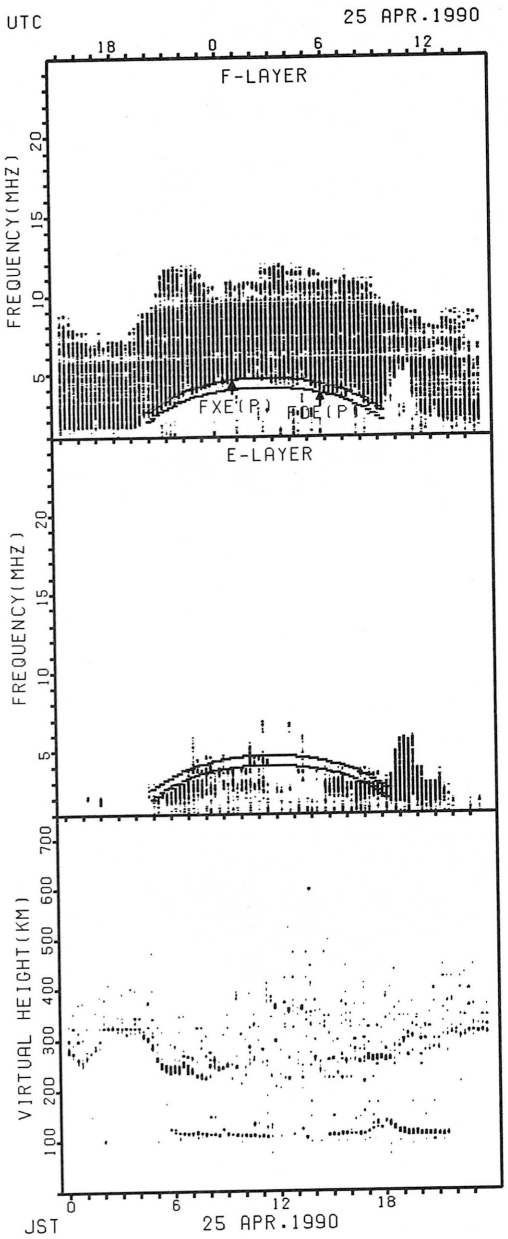


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

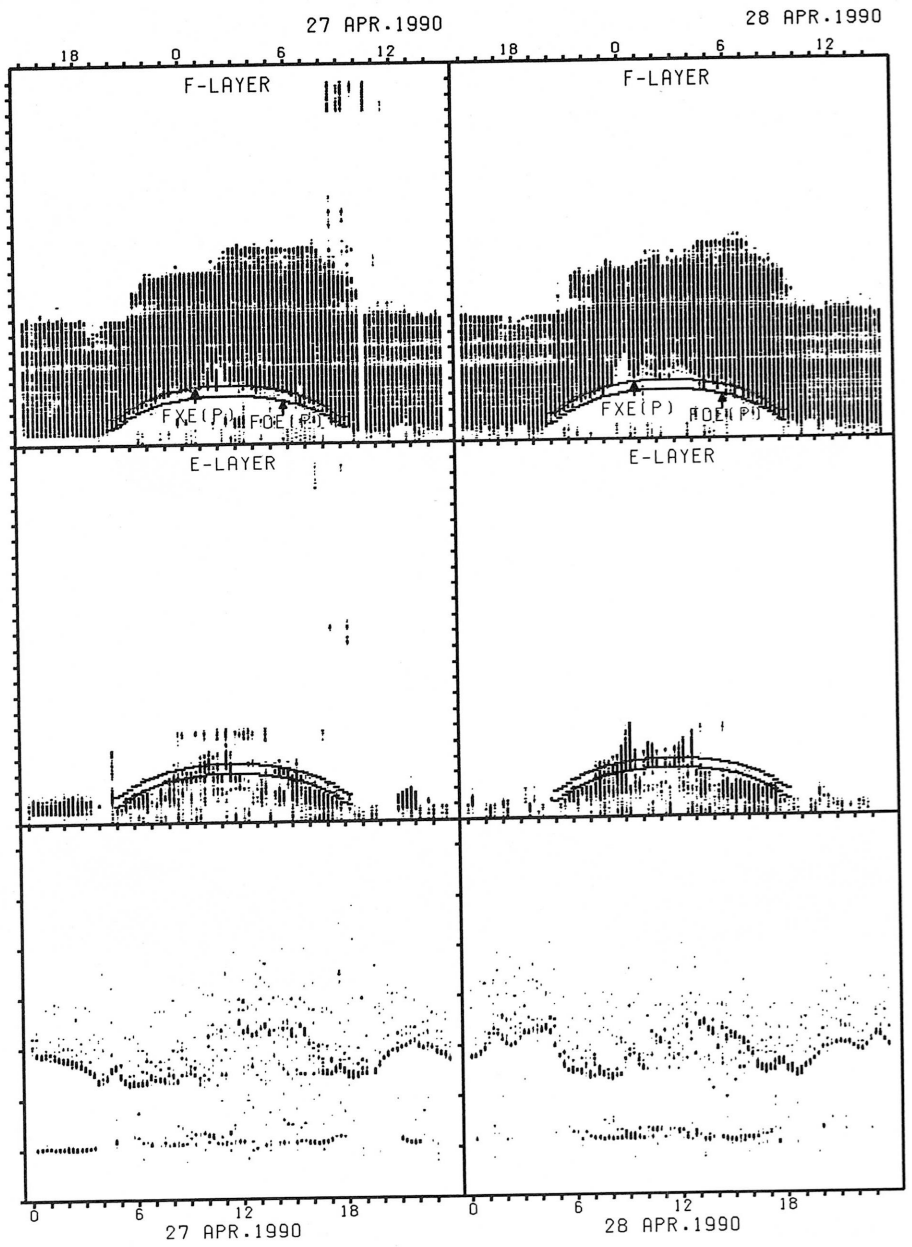

SUMMARY PLOTS AT AKITA
17 APR.1990
18 APR.1990
19 APR.1990
20 APR.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

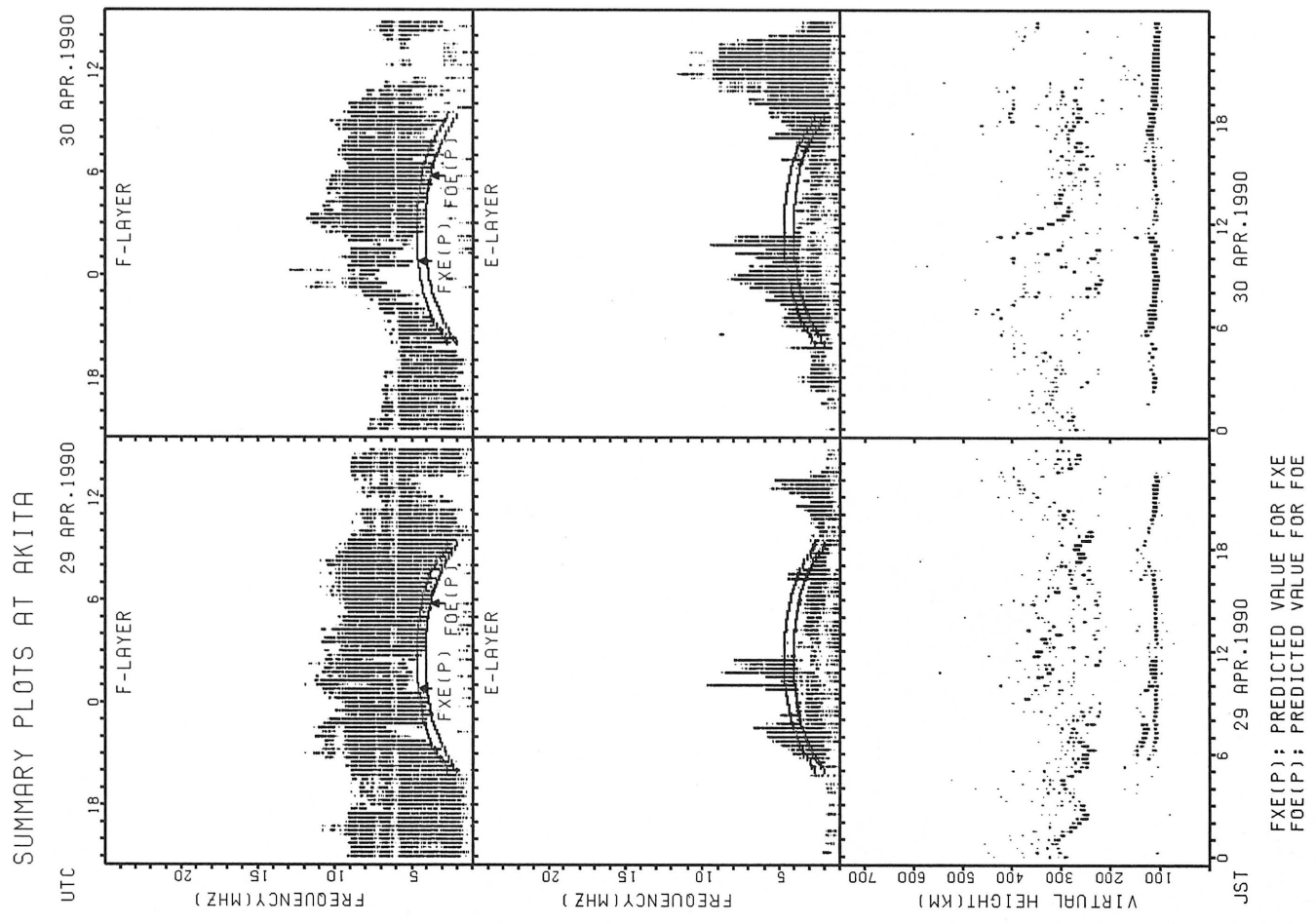

SUMMARY PLOTS AT AKITA
UTC
21 APR.1990
22 APR.1990
23 APR.1990
24 APR.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA

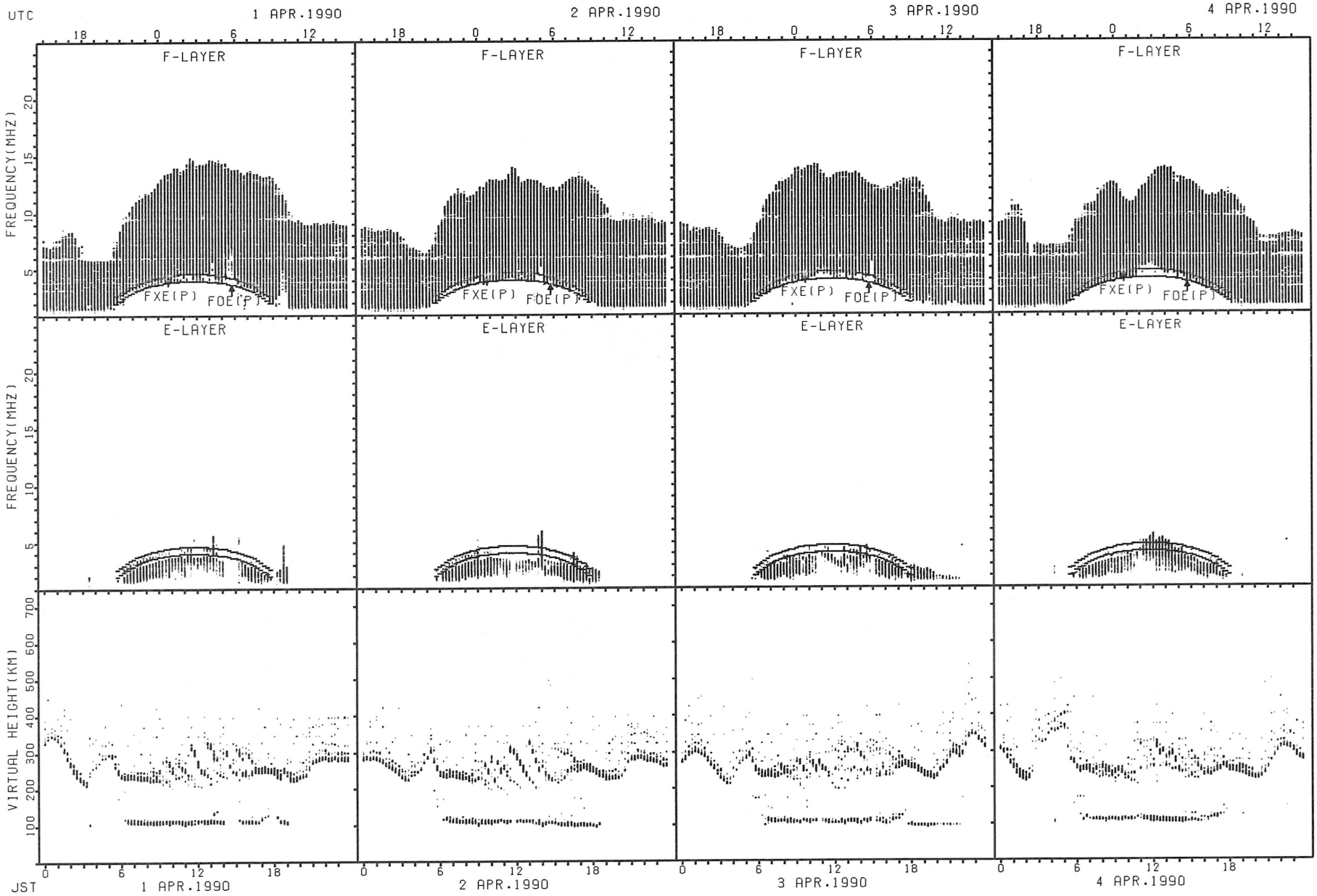


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE



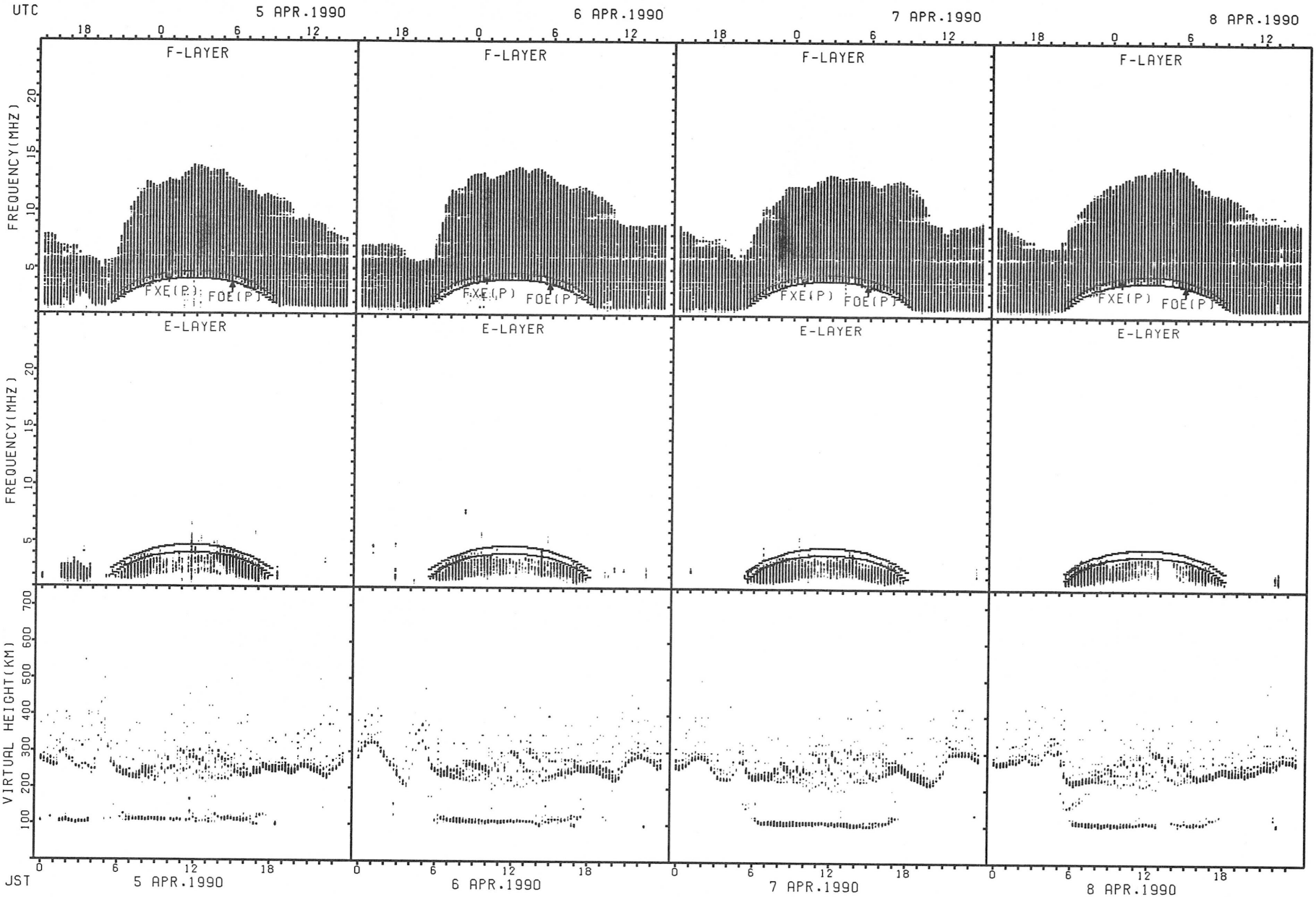

SUMMARY PLOTS AT AKITA
UTC
29 APR.1990
30 APR.1990
F-LAYER
E-LAYER
FXE(P), FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



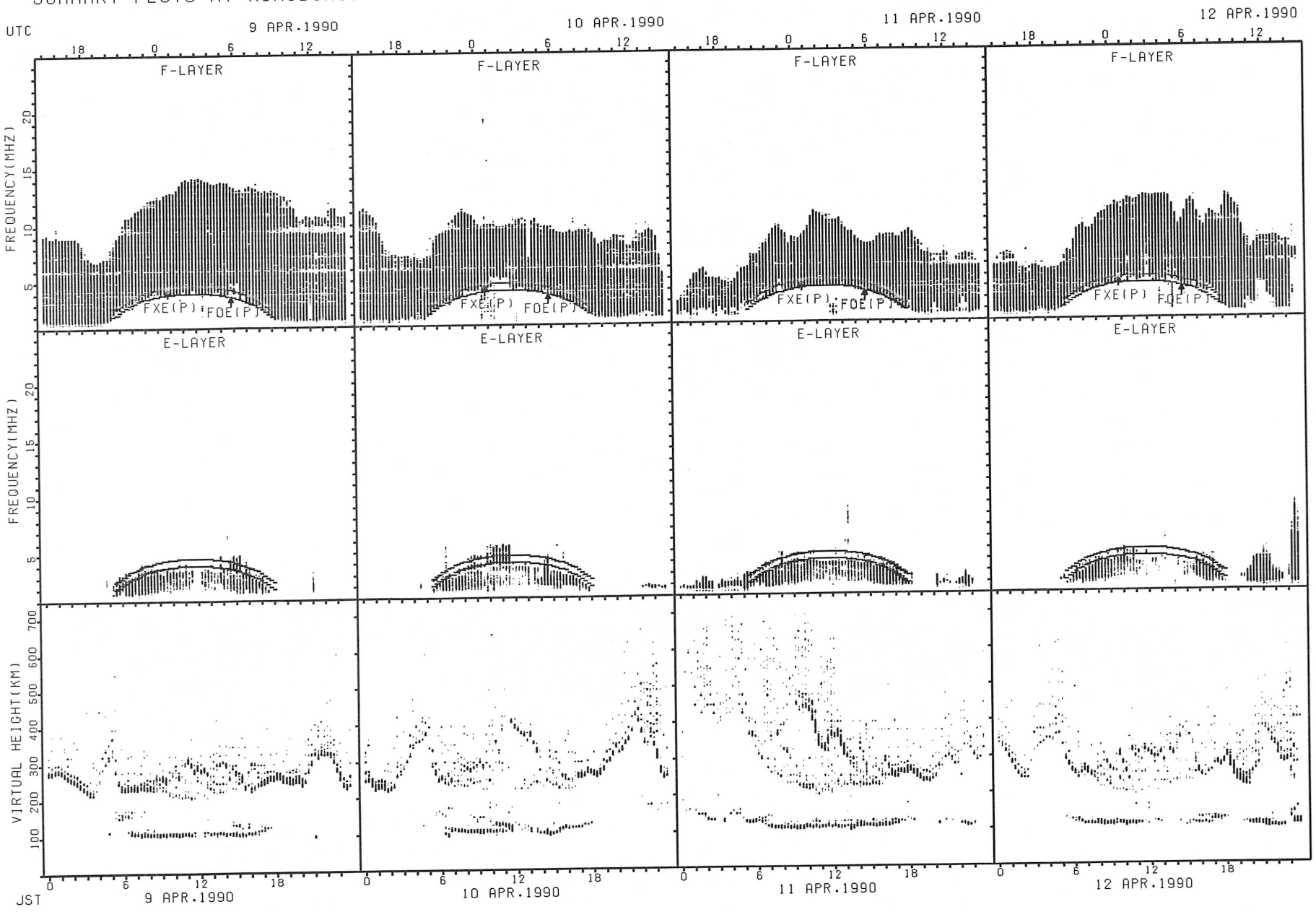
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



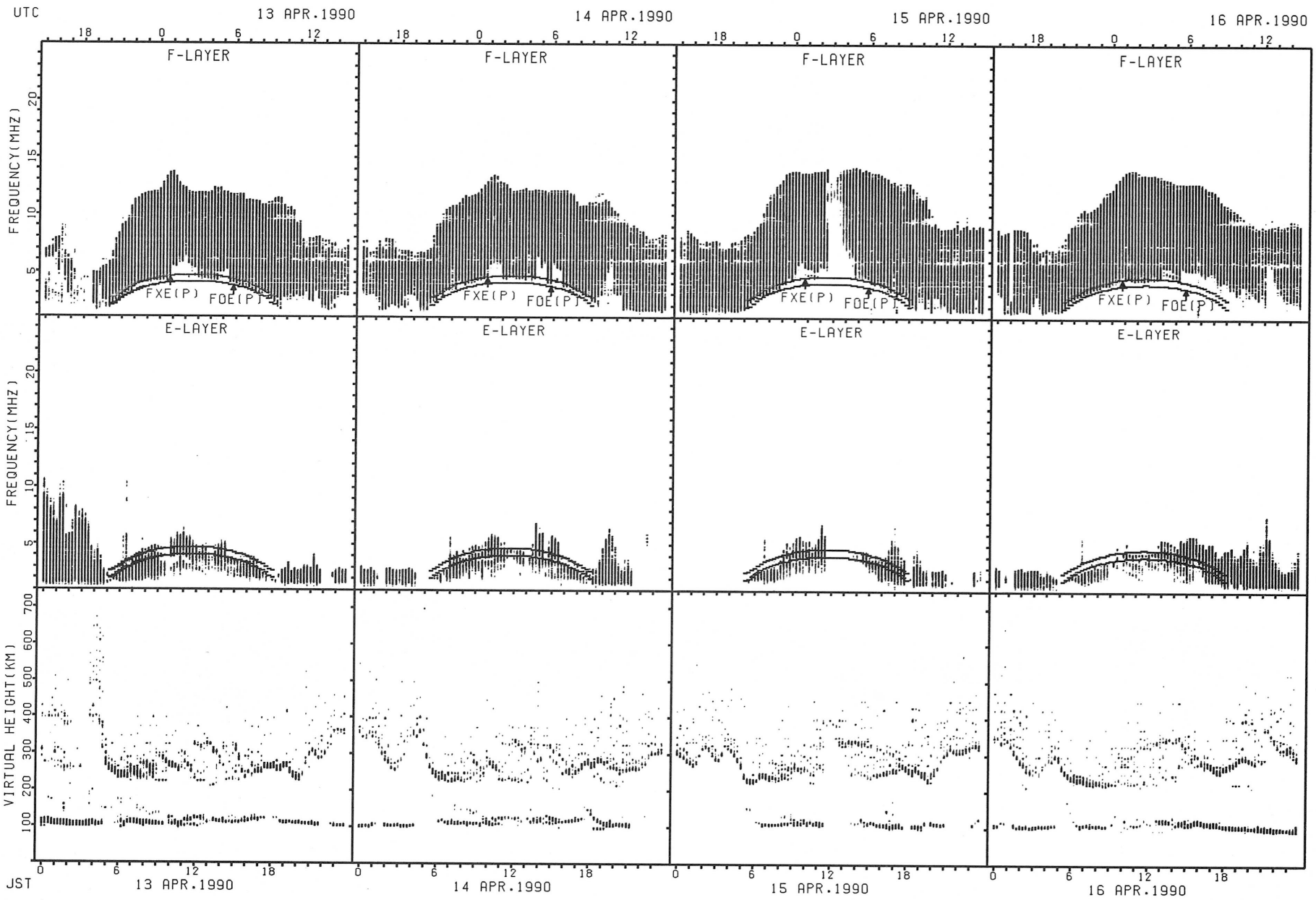
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

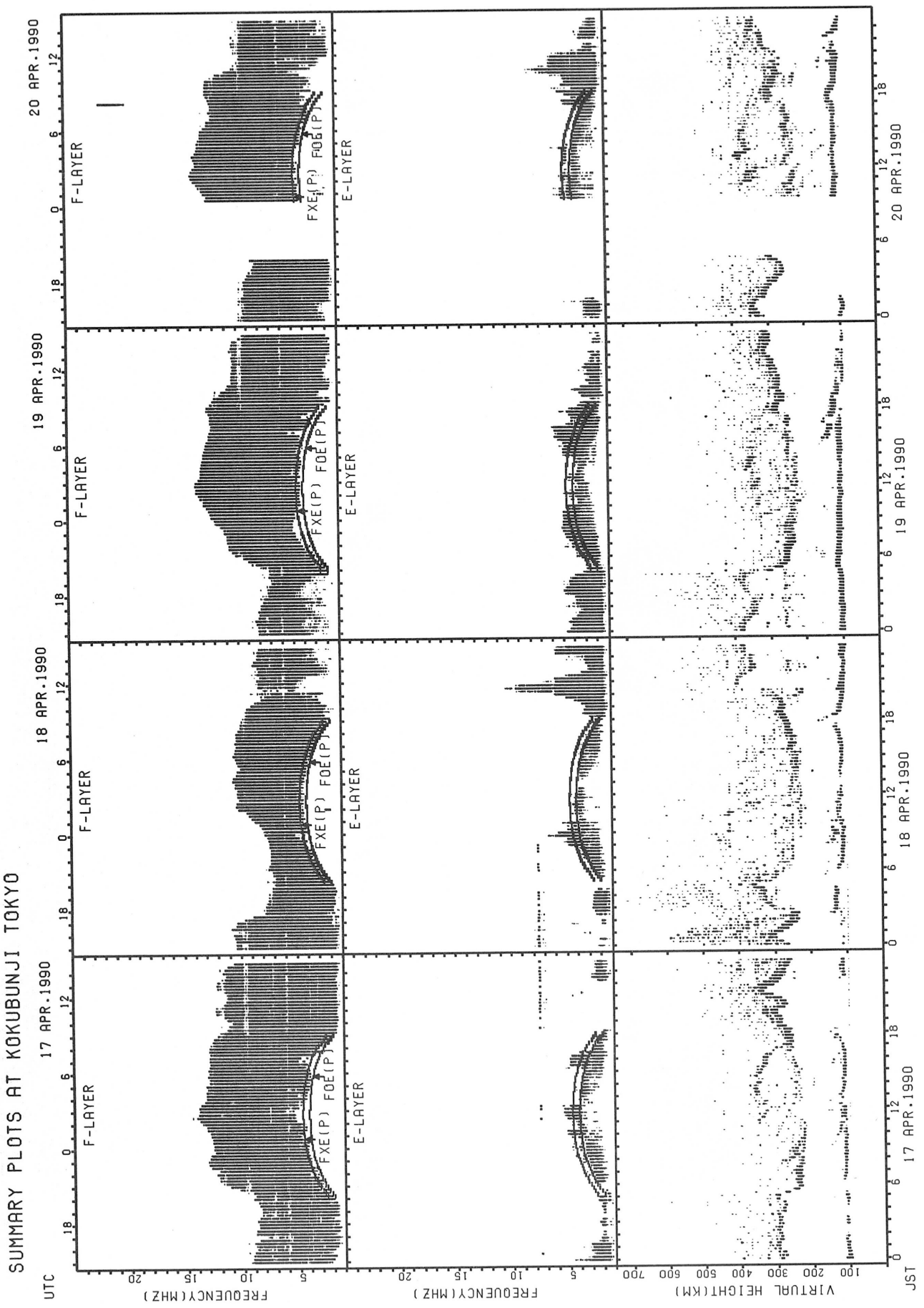


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

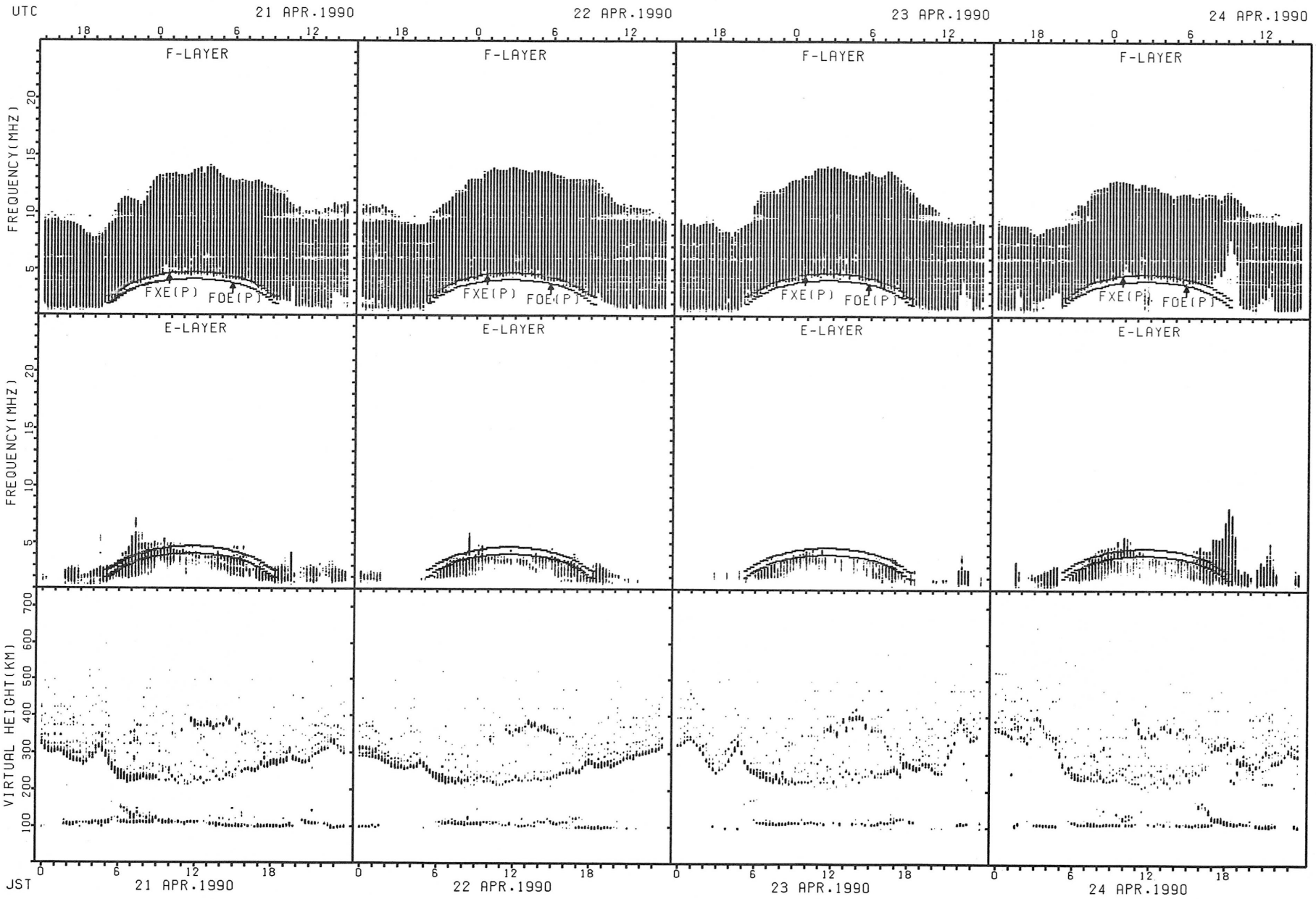
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

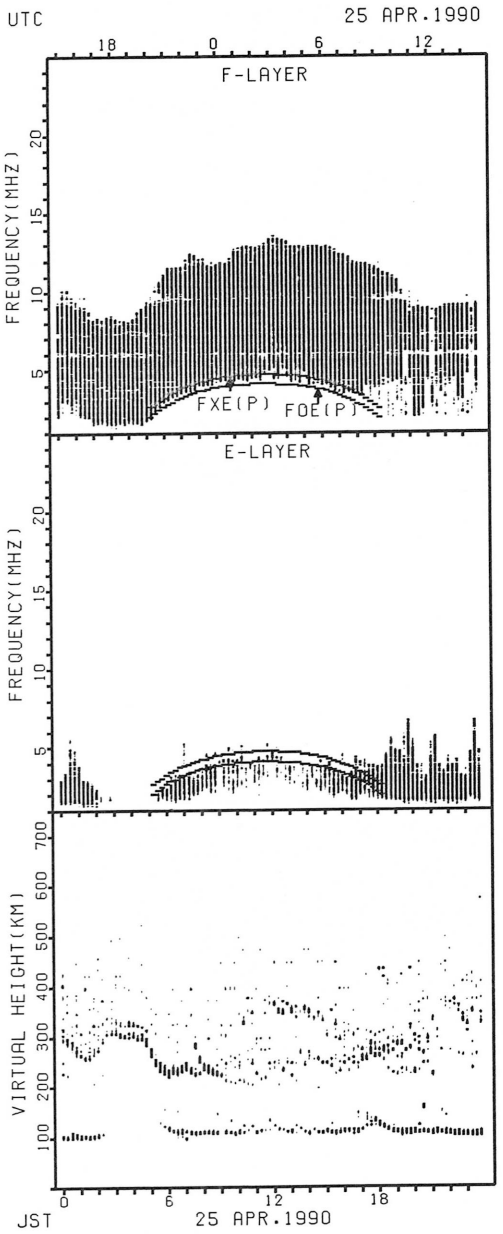

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
17 APR.1990
18 APR.1990
19 APR.1990
20 APR.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

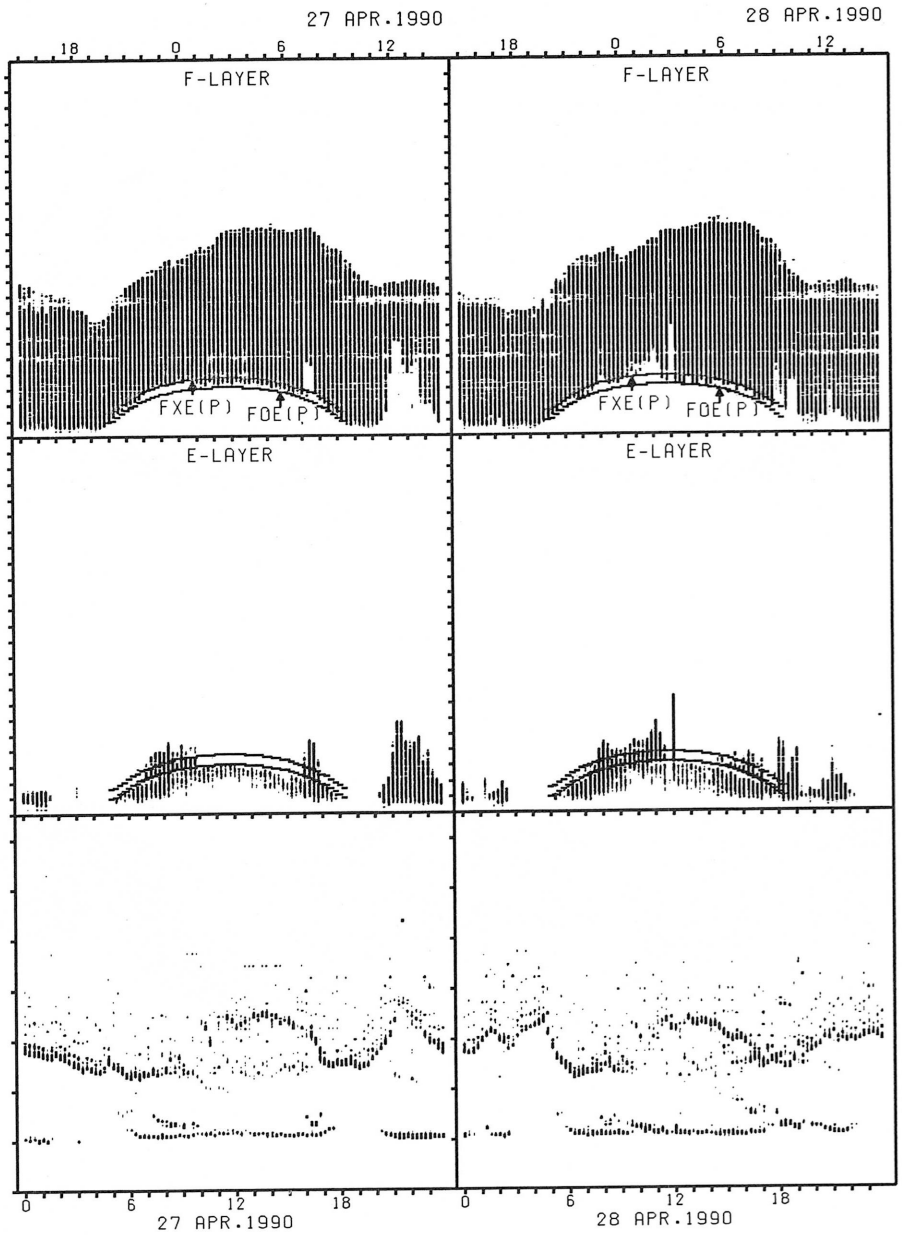


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

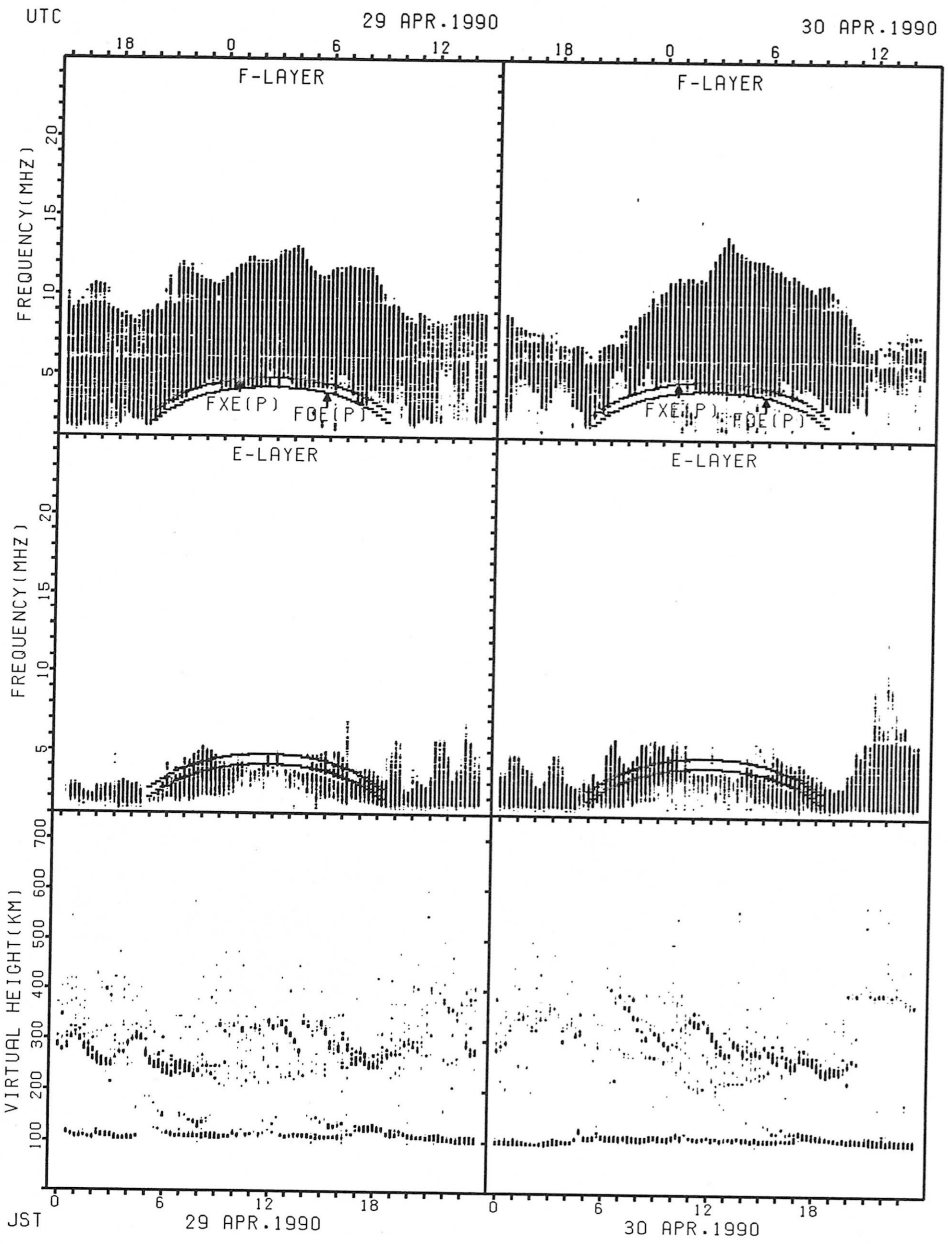
SUMMARY PLOTS AT KOKUBUNJI TOKYO



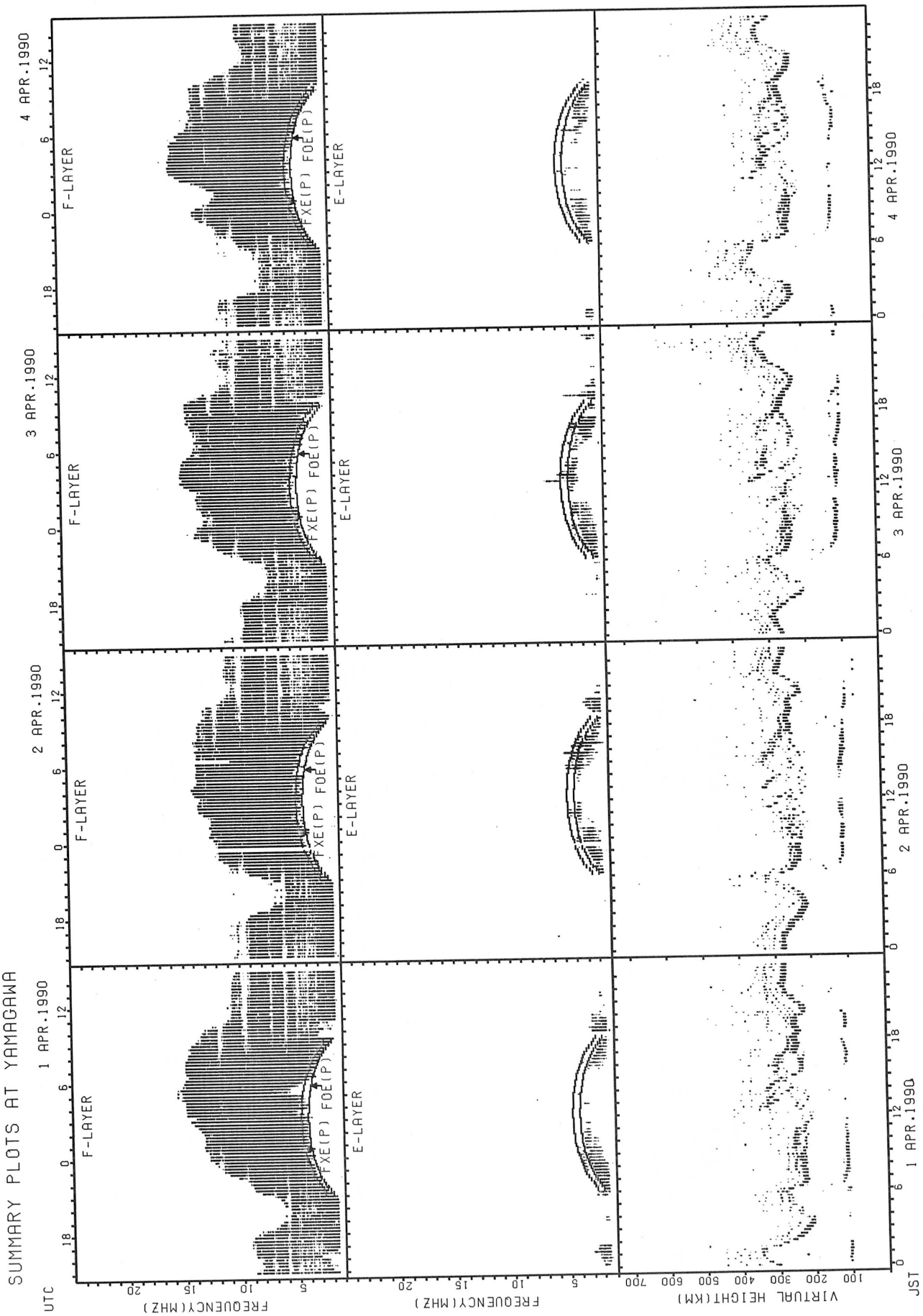
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

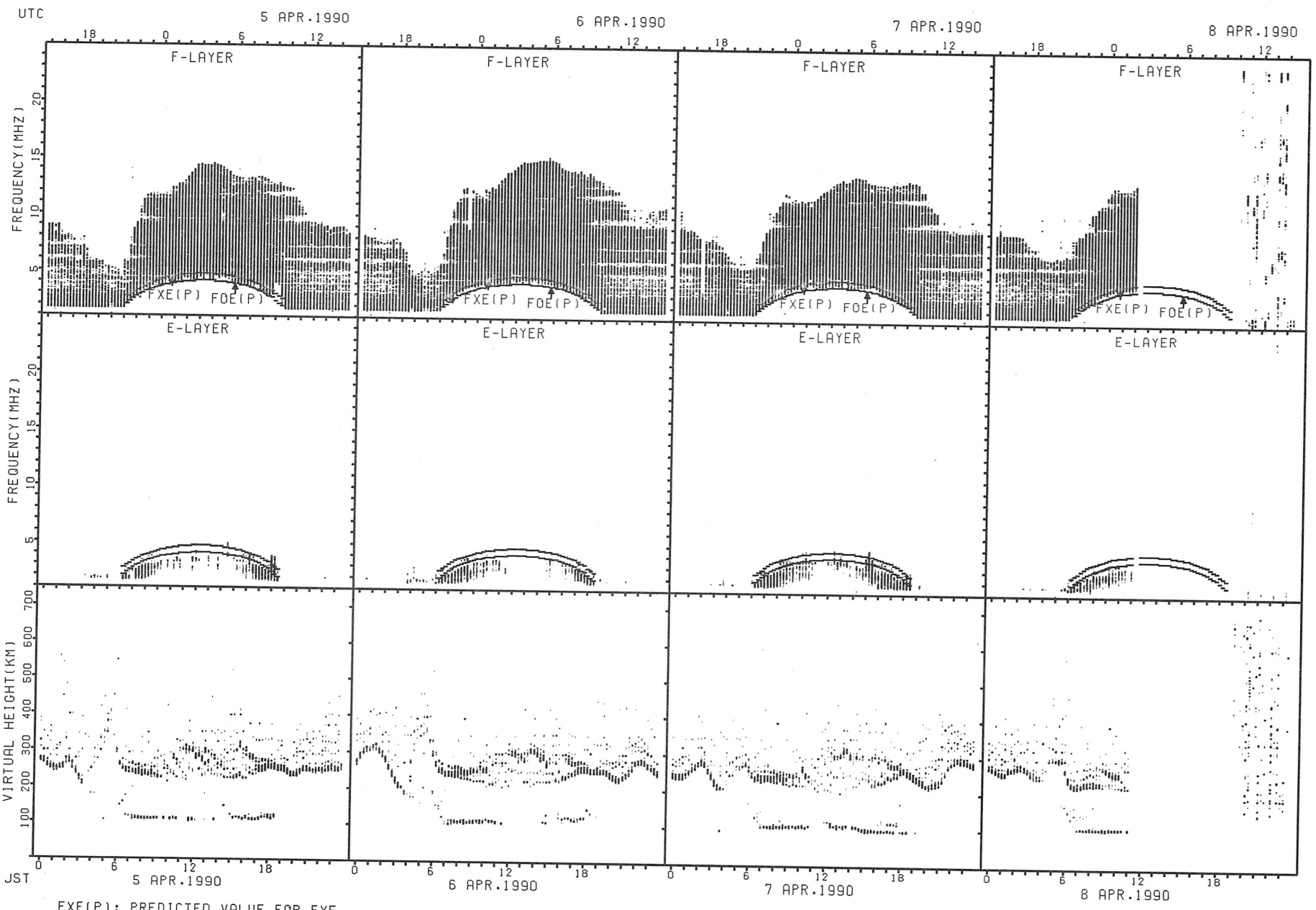


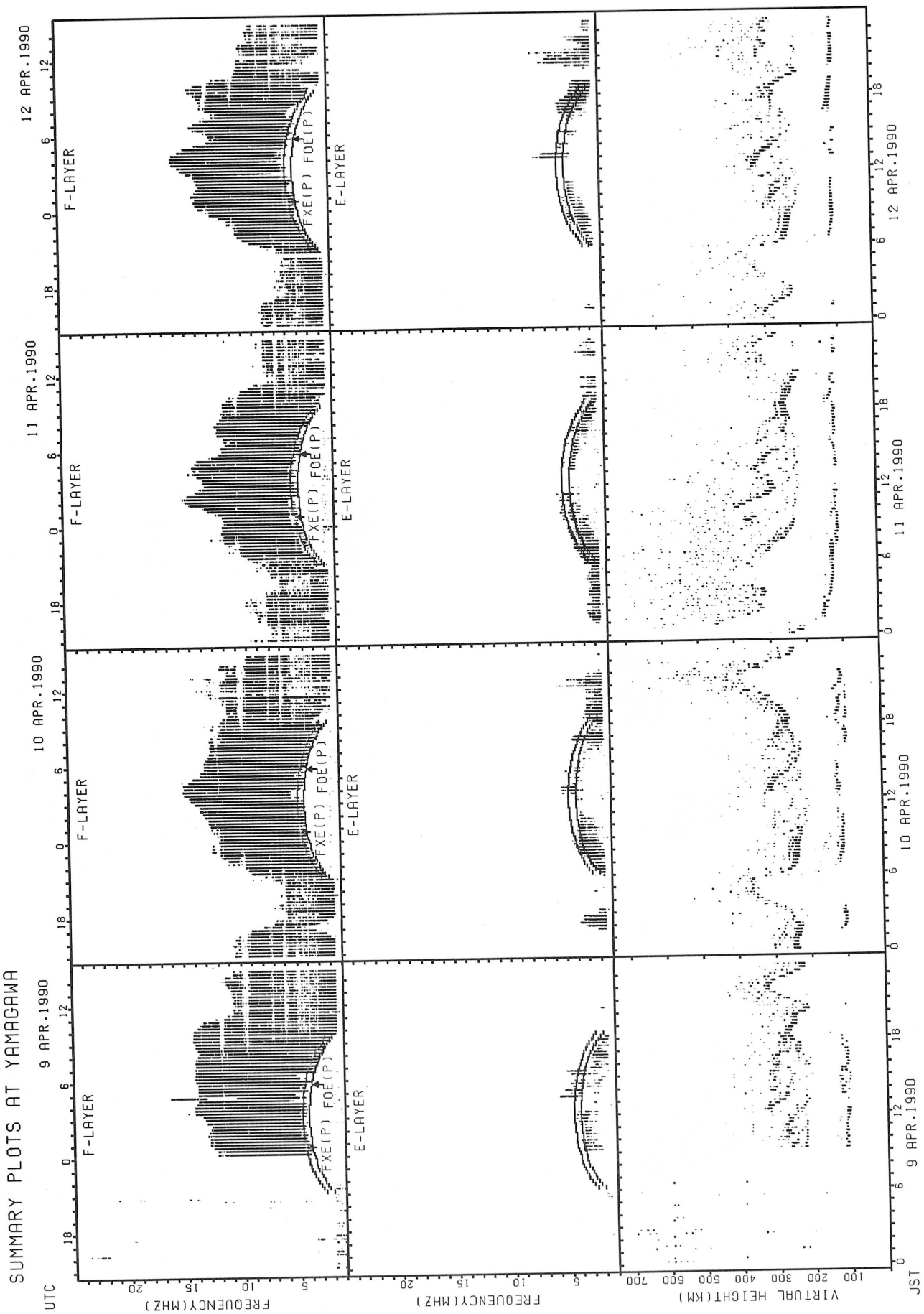
SUMMARY PLOTS AT KOKUBUNJI TOKYO



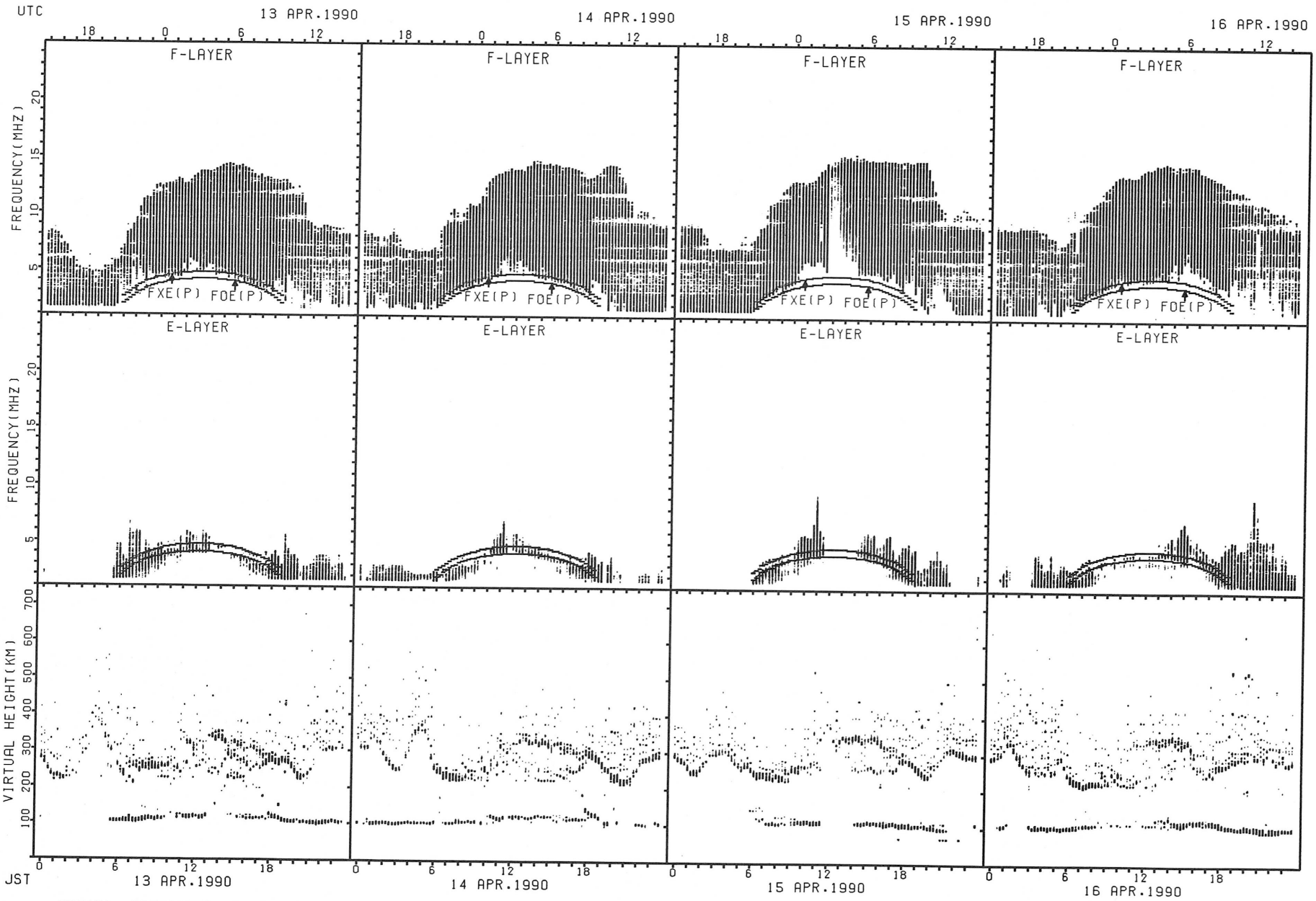
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
1 APR.1990
2 APR.1990
3 APR.1990
4 APR.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

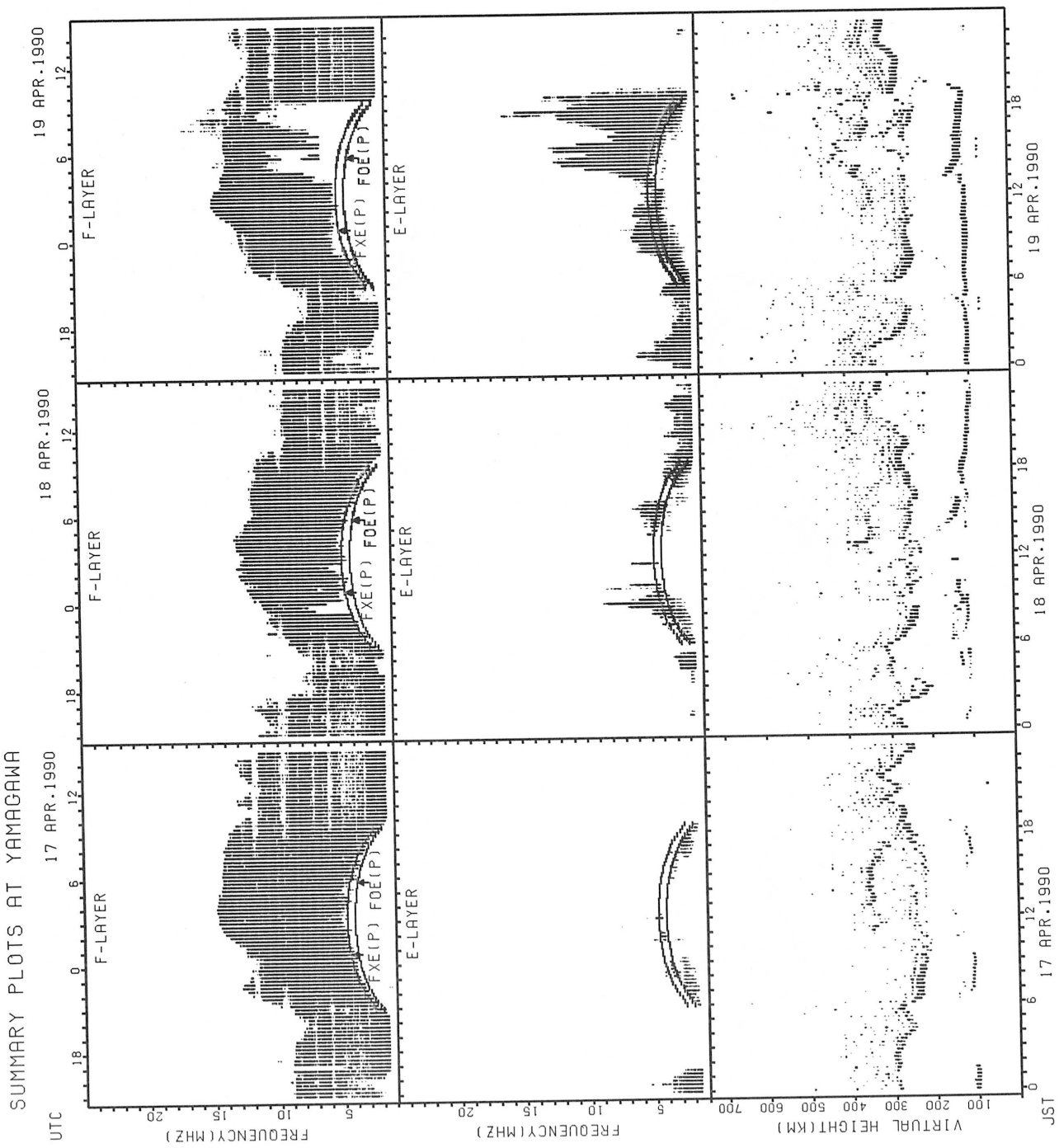

SUMMARY PLOTS AT YAMAGAWA
UTC
5 APR.1990
6 APR.1990
7 APR.1990
8 APR.1990
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P)
FOE(P)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
9 APR.1990
10 APR.1990
11 APR.1990
12 APR.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

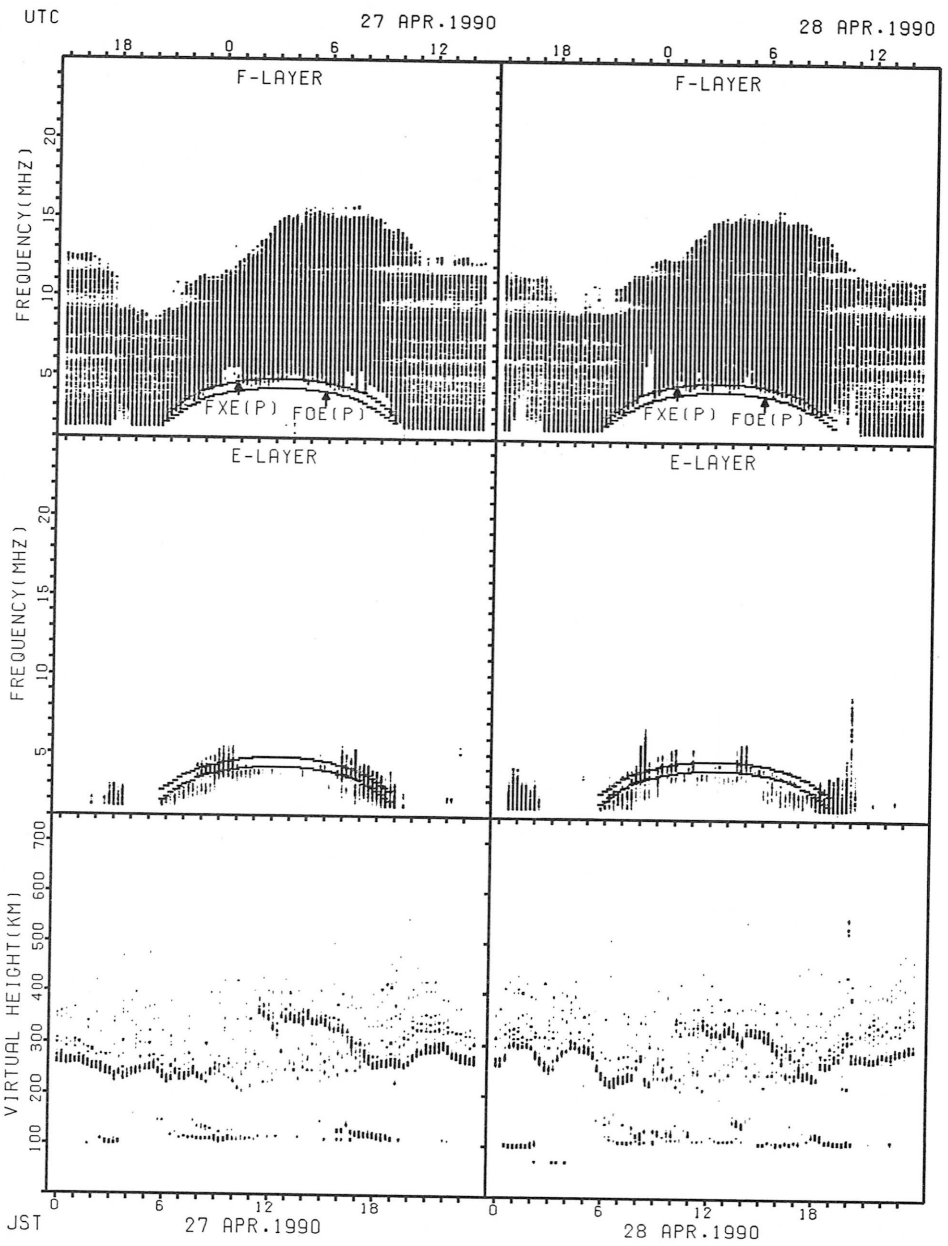
SUMMARY PLOTS AT YAMAGAWA



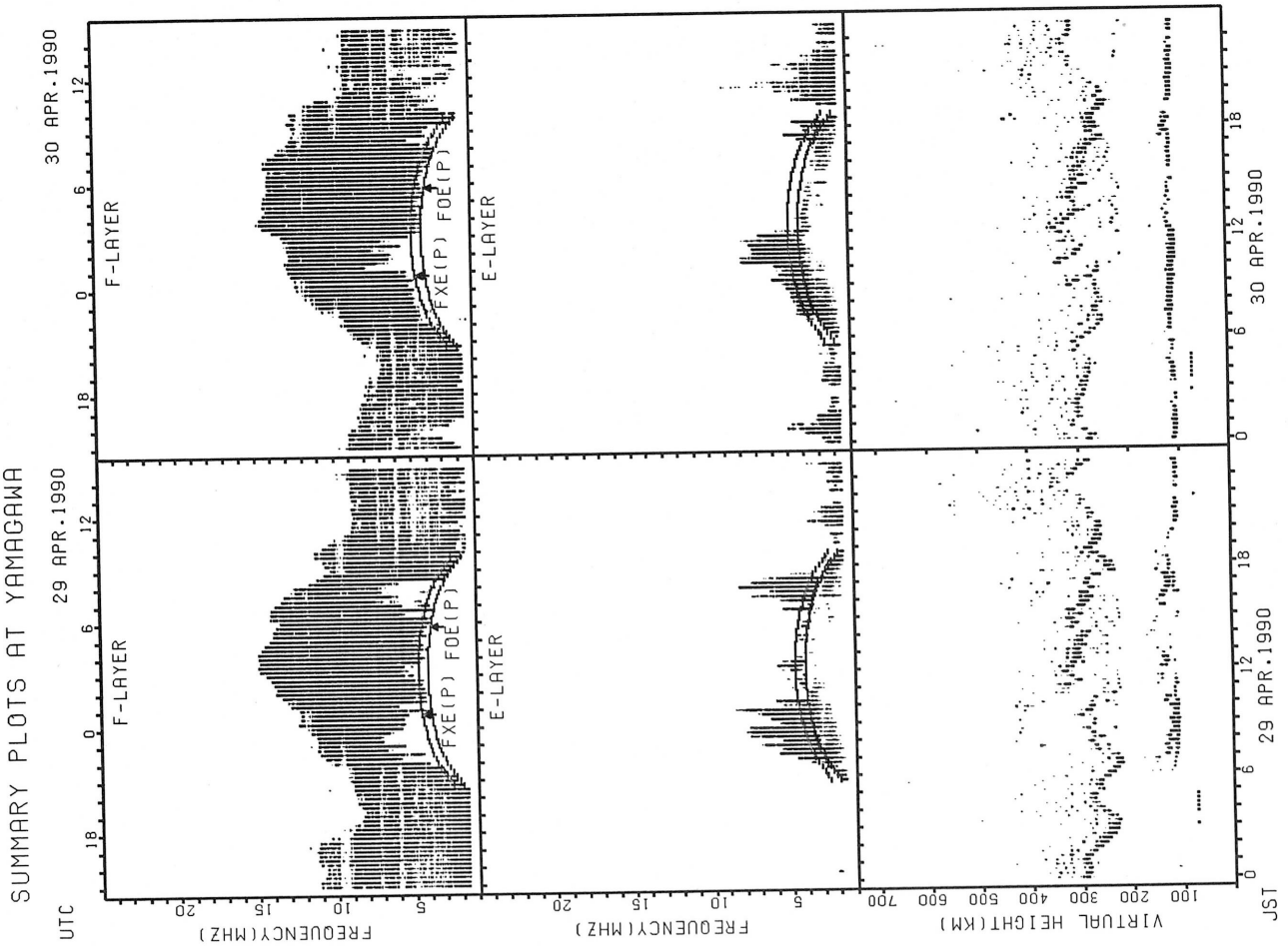
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
17 APR.1990
18 APR.1990
19 APR.1990
UTC
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

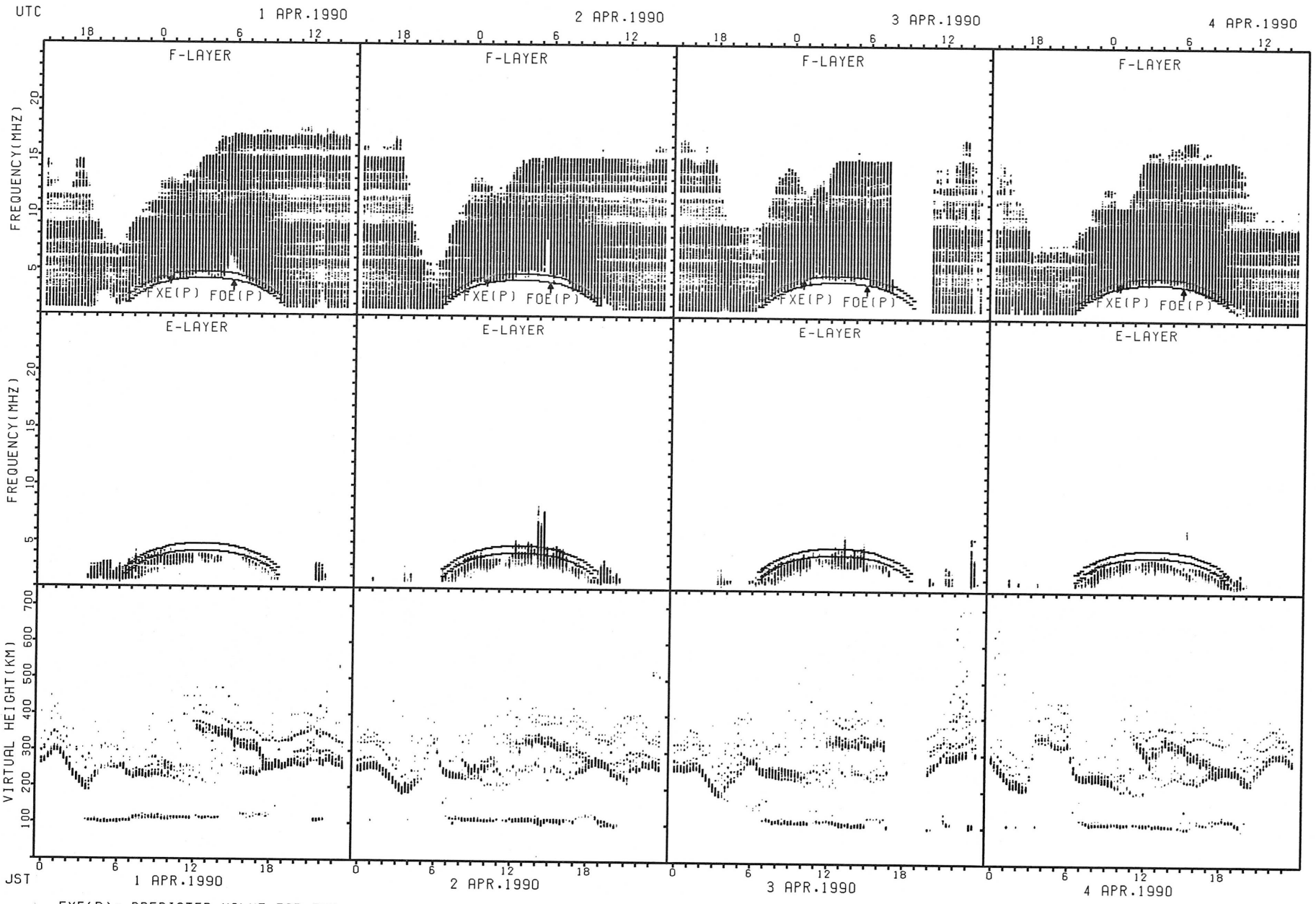
SUMMARY PLOTS AT YAMAGAWA



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

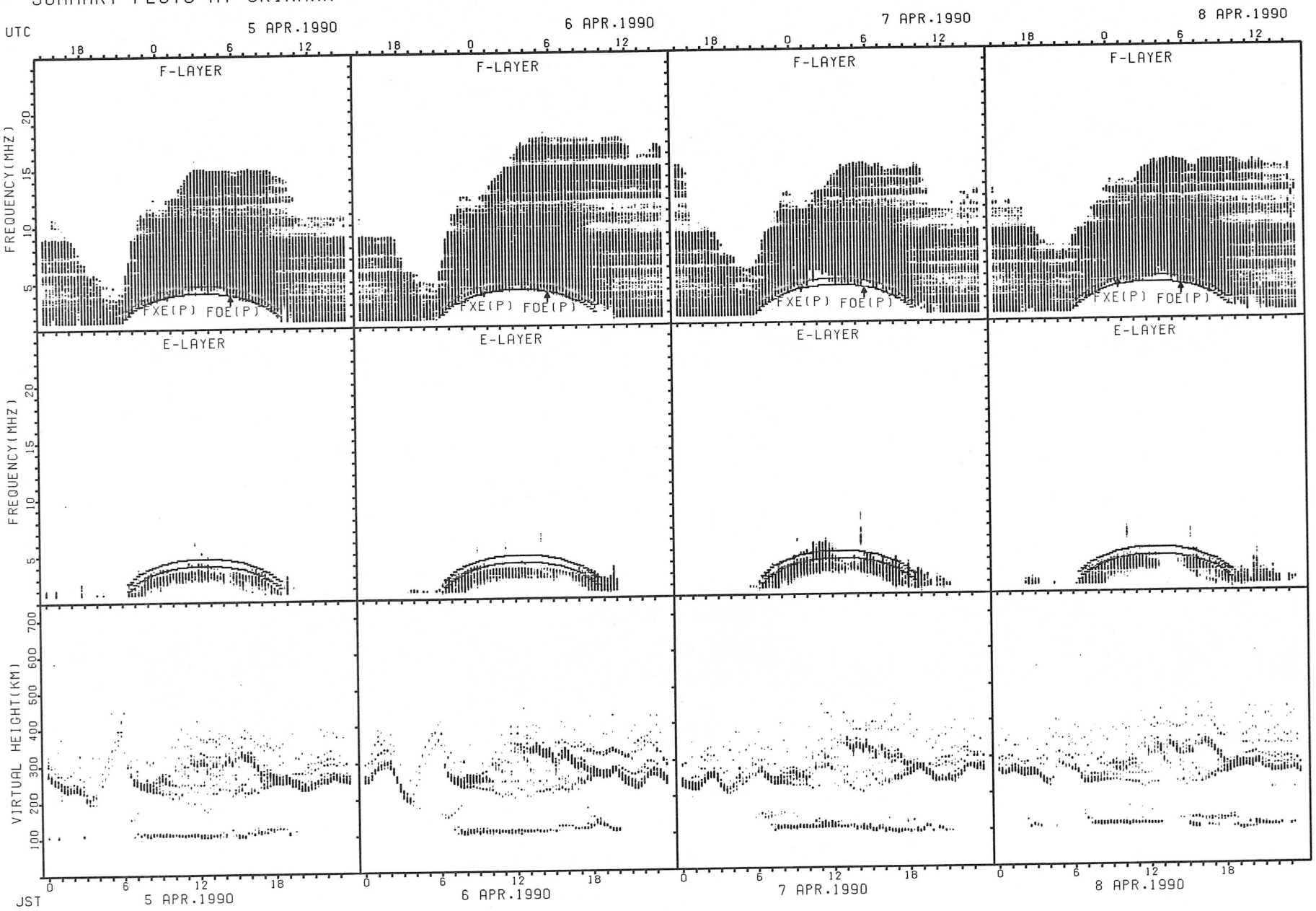

SUMMARY PLOTS AT YAMAGAWA
29 APR.1990
30 APR.1990
UTC
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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

SUMMARY PLOTS AT OKINAWA



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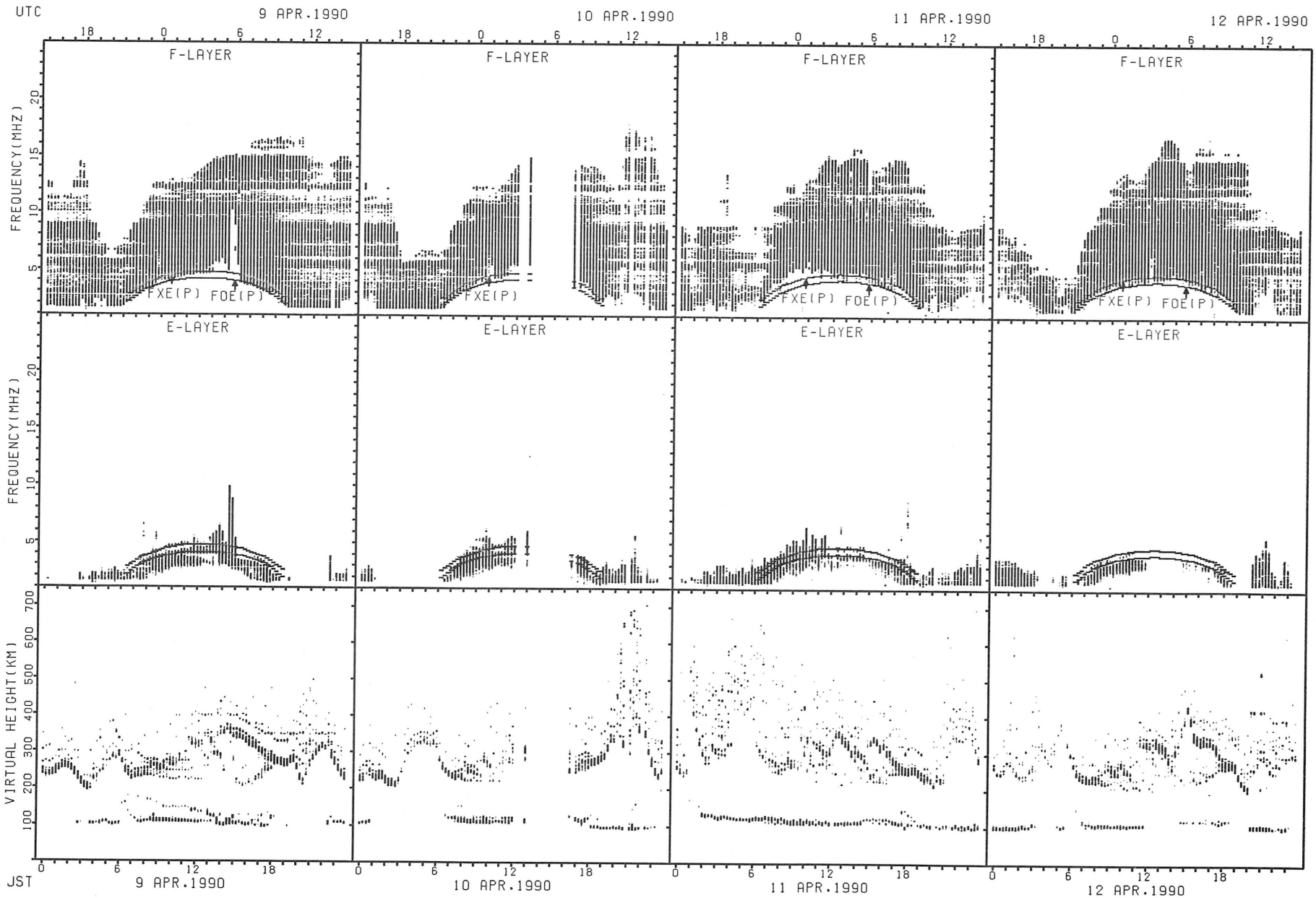
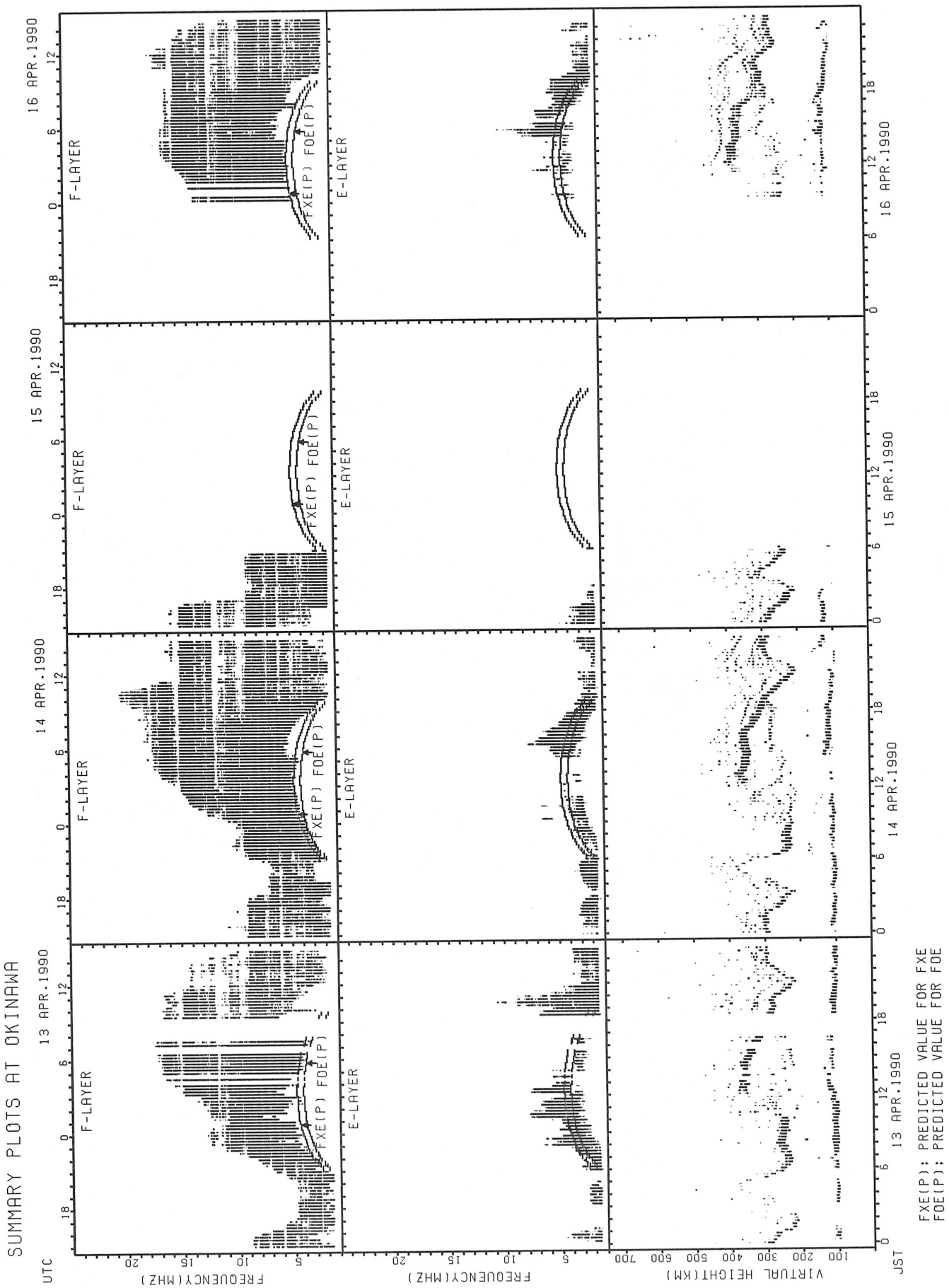
FOE(P): PREDICTED VALUE FOR FOE

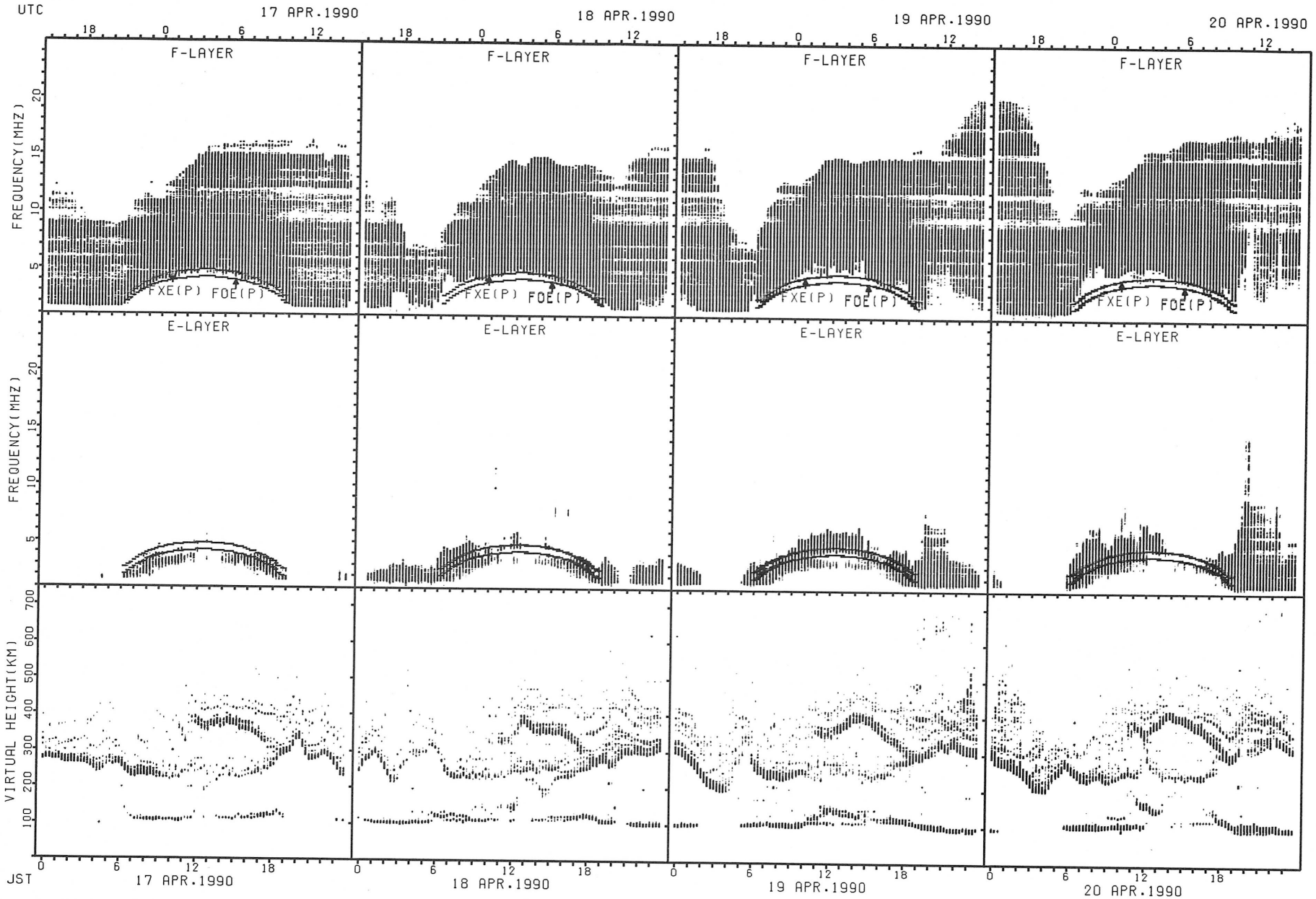
SUMMARY PLOTS AT OKINAWA



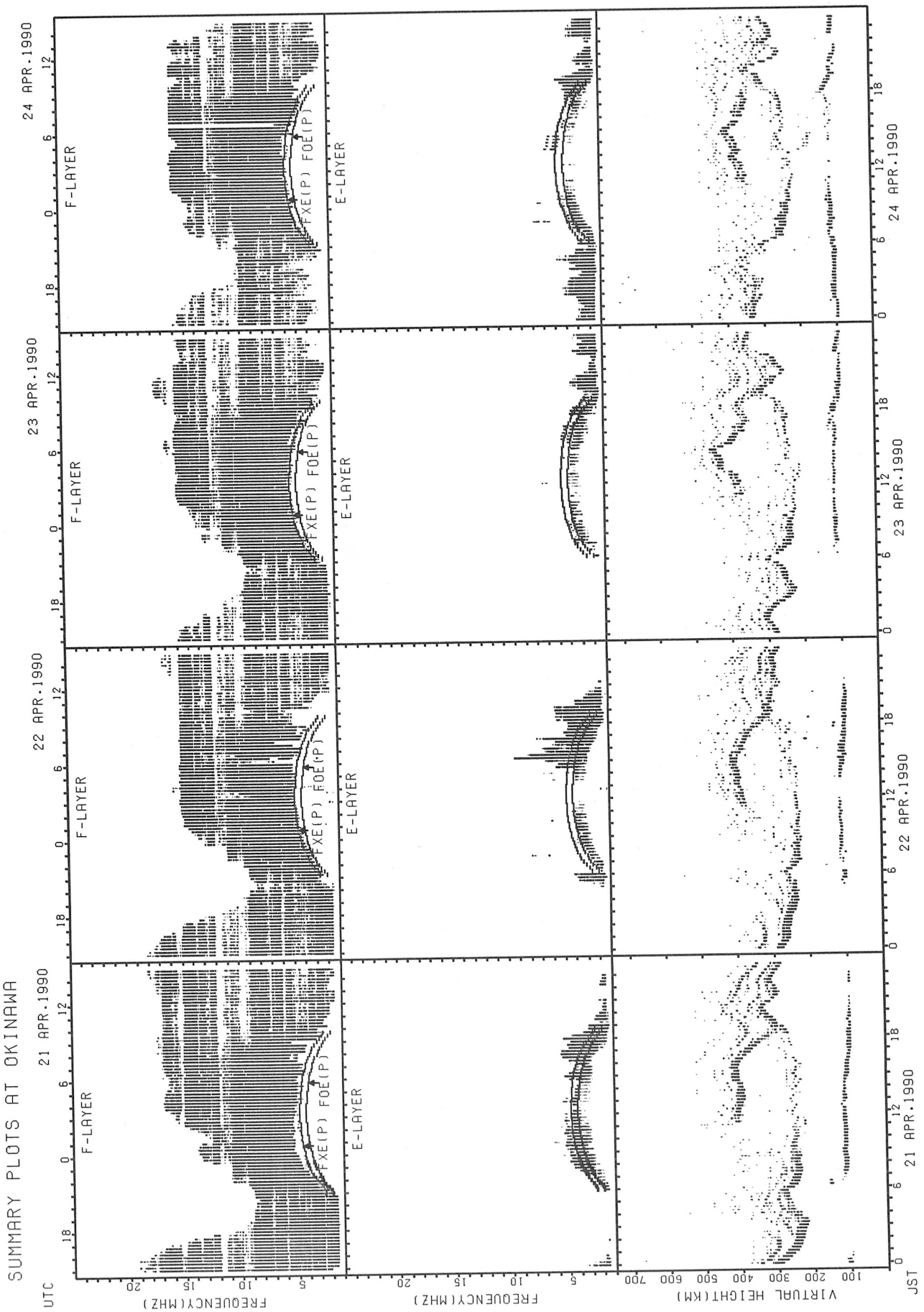
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
13 APR.1990
14 APR.1990
15 APR.1990
16 APR.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

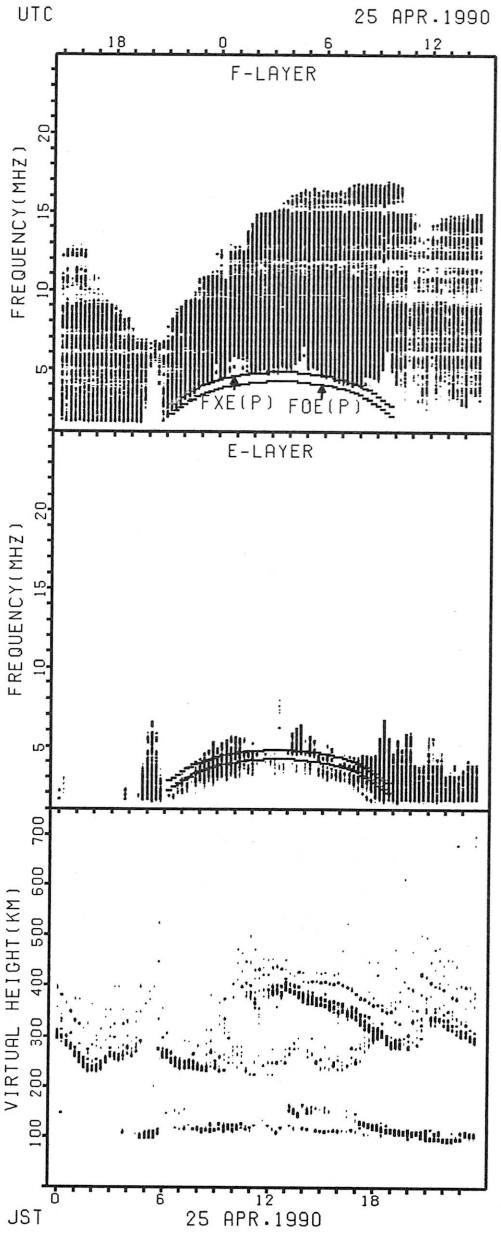
SUMMARY PLOTS AT OKINAWA



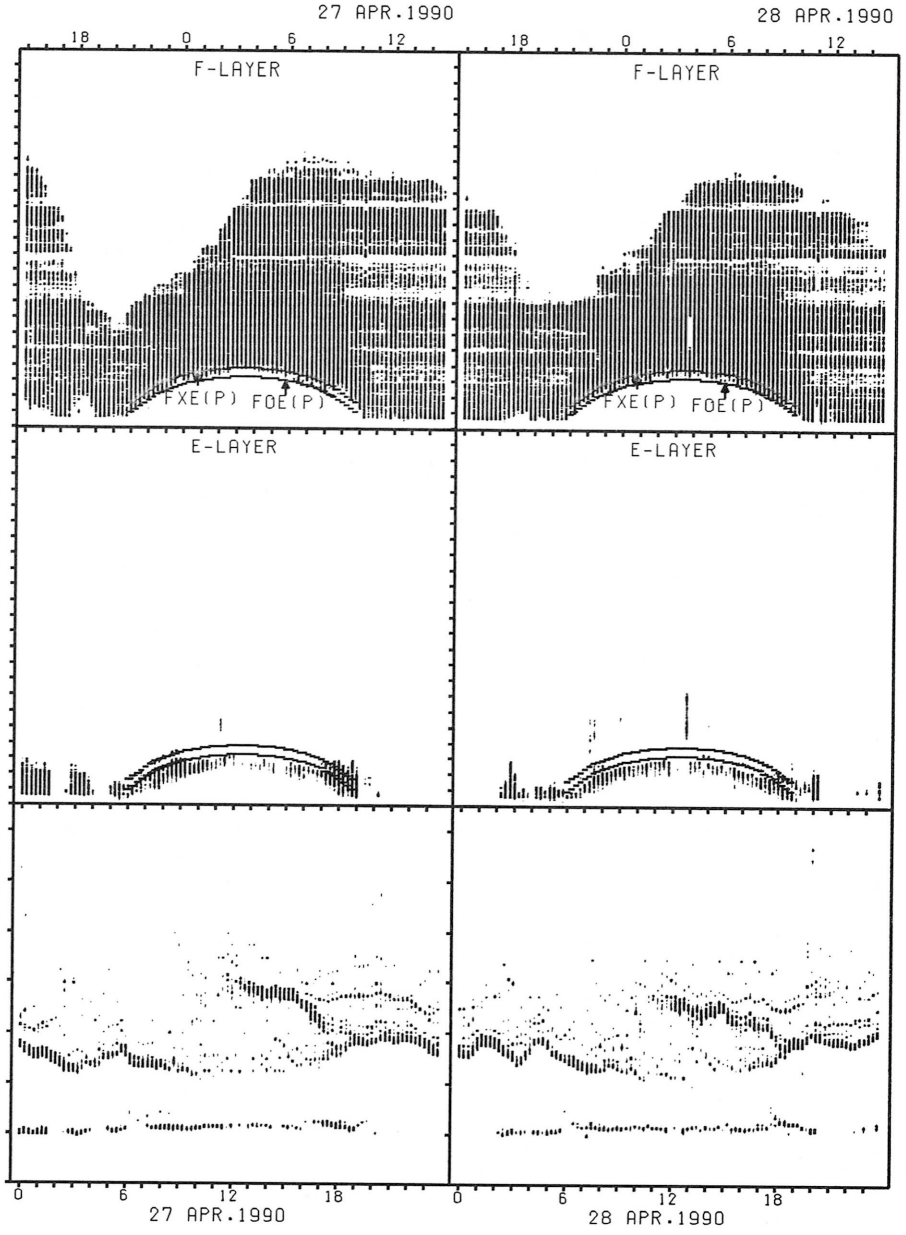
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

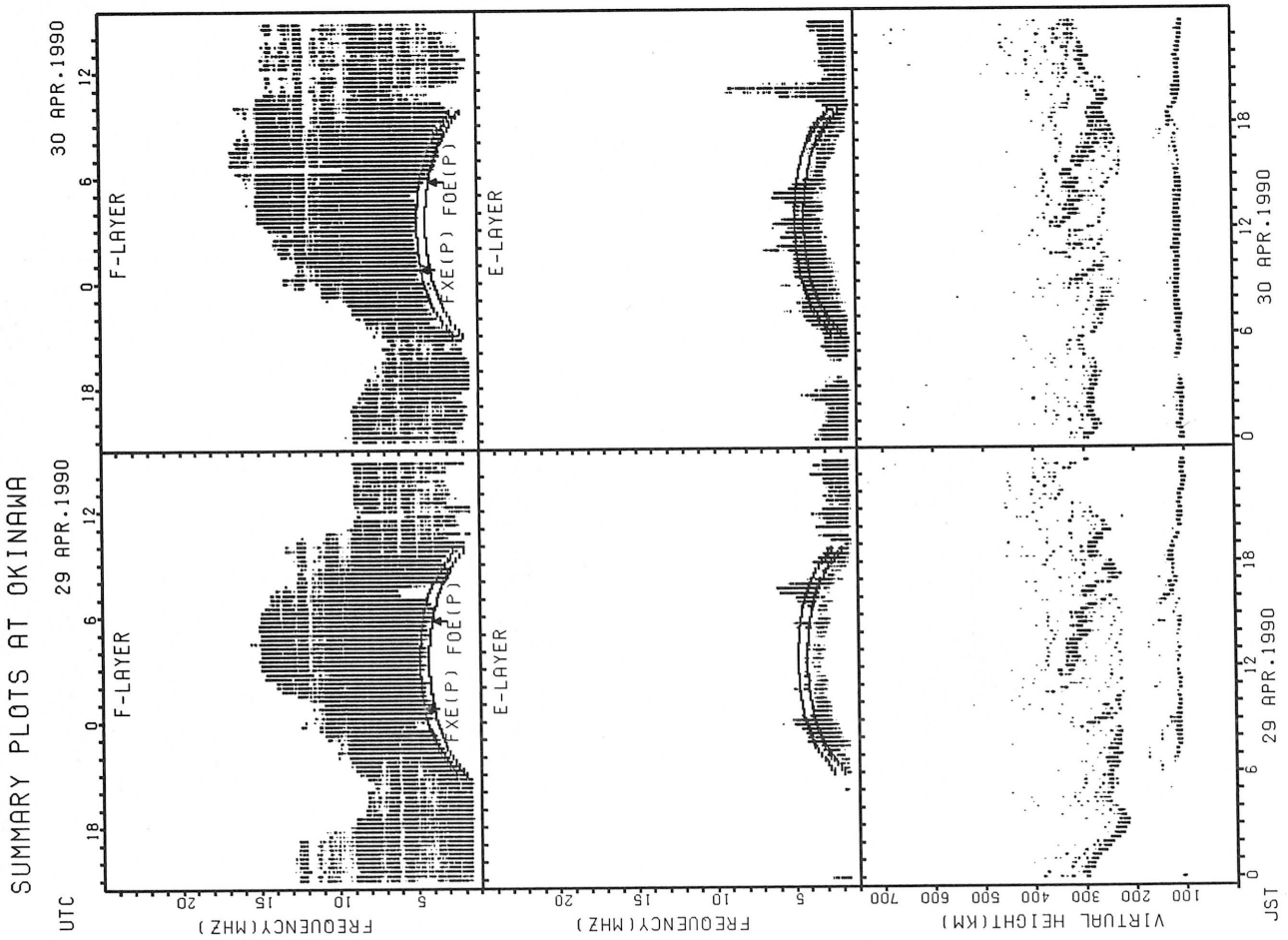

SUMMARY PLOTS AT OKINAWA
UTC
21 APR.1990
22 APR.1990
23 APR.1990
24 APR.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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




SUMMARY PLOTS AT OKINAWA
UTC
29 APR.1990
30 APR.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

MONTHLY MEDIANS OF H'F AND H'ES
APR.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							23	24	24							26	24	27	29	27	21	11	10	
MED							288	274	265							298	278	286	284	302	320	310	349	
U Q							304	314	284							330	331	302	296	310	350	360	356	
L Q							270	252	257							264	257	262	263	274	294	298	300	

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								11		11		
MED												122								127		123		
U Q												129								173		139		
L Q												119								109		119		

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10	11					22	27	27							28	27	27	30	27	18	11	11	13
MED	339	346					278	262	258							312	292	290	286	296	326	344	350	348
U Q	418	368					294	272	272							342	336	312	300	306	330	360	416	373
L Q	322	308					270	256	250							284	282	280	268	278	308	318	320	332

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10	12	11	12							14	13							13	15	14	13	12	13
MED	108	109	109	112							119	115							119	115	115	113	111	111
U Q	113	135	131	133							129	129							141	121	121	121	144	120
L Q	103	107	103	105							115	114							107	103	113	110	108	106

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	18	17	16				25	27	29			13	11			29	28	30	31	31	26	20	18	18
MED	327	352	321				268	256	256			254	270			314	294	279	280	288	307	353	357	351
U Q	348	370	364				288	272	271			269	282			336	319	300	300	306	336	363	370	376
L Q	318	327	304				248	242	248			250	260			285	286	270	266	270	280	331	342	316

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	14	12	14	12	13		11	10	14	13	15	11	10				11	14	14	18	15	18	14	15
MED	107	107	109	110	111		167	123	140	125	117	115	120				131	126	120	113	113	110	110	109
U Q	113	110	111	117	121		268	258	175	131	123	125	127				159	137	127	119	119	113	125	141
L Q	103	104	107	108	107		151	113	123	115	111	111	117				119	121	109	107	111	107	107	107

MONTHLY MEDIANS OF H'F AND H'ES

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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	22	19	19			17	26	28	28		17	10				28	29	29	29	28	22	22	24
MED	307	288	256	264			272	254	243	248		248	184				293	276	272	268	262	310	335	316
U Q	348	336	342	326			338	262	255	259		267	288				307	296	304	293	314	342	358	345
L Q	109	107	109	109			158	236	192	179		113	117				260	184	193	182	182	113	111	113

H'ES

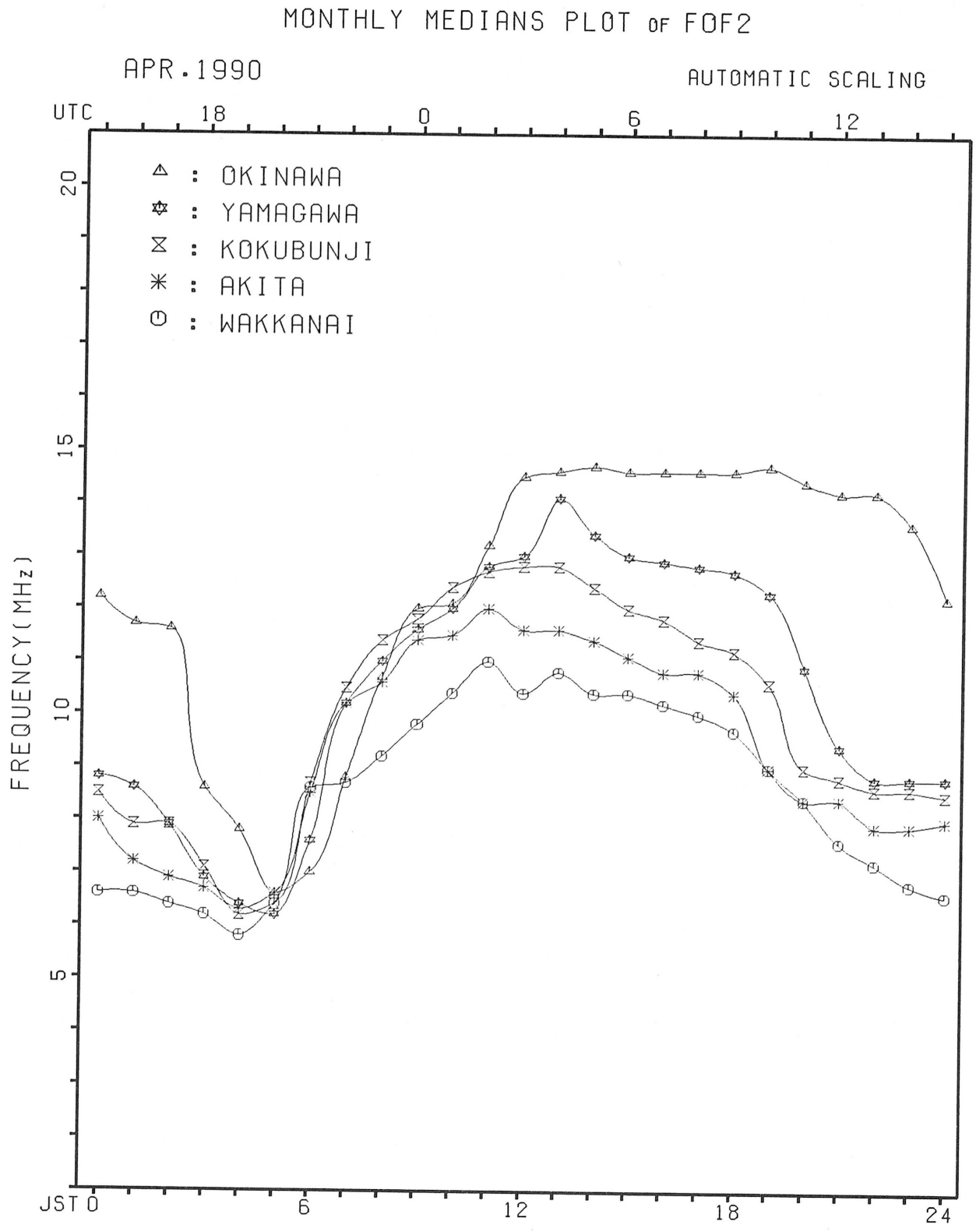
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	15	14	14			14	15	19	15	12	15	12	12	11		14	18	22	23	19	16	15	14
MED	316	288	255	259			212	258	141	248	115	141	120	124	131		301	127	135	119	117	212	334	319
U Q	340	332	284	318			280	262	250	256	129	256	143	262	159		304	292	288	284	298	322	352	334
L Q	105	107	107	109			125	127	113	111	111	113	112	114	121		129	117	117	111	107	109	109	109

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	30	28	28	23	11		10	28	29	27		10					28	28	29	29	28	25	26	26
MED	304	286	271	264	274		302	260	260	254		271					332	317	288	286	291	314	333	315
U Q	330	325	308	304	320		350	270	268	276		276					362	357	320	307	329	330	342	334
L Q	284	270	257	244	262		284	250	247	246		264					305	288	274	270	272	289	314	286

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12	11		10		12	13	10	12	17	11	14	11	11	12		12	16	21	24	19	16	15	18
MED	105	109		108		110	107	134	120	119	113	119	135	131	124		115	128	121	111	111	110	109	105
U Q	117	179		129		121	122	181	149	122	125	143	163	183	149		307	151	134	118	113	115	163	113
L Q	102	105		105		104	105	113	109	110	111	113	115	113	113		110	117	113	108	101	106	105	103


MONTHLY MEDIANS PLOT OF FOF2
APR.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

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

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	x 78	x 78	x 87	x 68	x 62	x 62														x 114	x 97	x 93	x 95	x 94
2	x 90	x 87	x 87	x 83	x 71	x 68														x 109	x 98	x 98	x 101	x 98
3	x 92	x 87	x 87	x 83	x 70	x 70														x 125	x 100	x 100	x 97	x 94
4	x 96	x 105	x 90	x 73	x 71	x 71														x 107	x 89	x 76	x 80	x 83
5	x 81	x 76	x 70	x 64	x 58	x 56														x 111	x 98	x 97	x 90	x 82
6	x 75	x 74	x 75	x 69	x 59	x 60														x 113	x 99	x 90	x 89	x 91
7	x 89	x 82	x 78	x 76	x 67	x 67														x 115	x 95	x 87	x 91	x 91
8	x 93	x 85	x 80	x 76	x 75	x 79														x 112	x 105	x 101	x 99	x 96
9	x 97	x 92	x 91	x 84	x 71	x 74														x 128	x 110	x 111	x 111	x 116
10	x 114	x 107	x 79	x 75	x 74															x 85	x 90	x 84	x 88	x 95
11	x 36	x 50	x 62	x 51	x 48	x 59	x 72	x 82	x 98	x 84	x 89	x 108	x 100							x 83	x 73	x 73	x 67	x 71
12	x 65	x 70	x 56	x 56	x 56	x 55														x 112	x 81	x 81	x 84	x 78
13	x 75	x 81	x 62	x 53	x 52	x 55														x 108	x 92	x 83	x 81	x 77
14	x 79	x 75	x 80	x 70	x 68															x 116	x 104	x 97	x 89	x 84
15	x 87	x 85	x 77	x 78	x 77															x 123	x 97	x 91	x 93	x 92
16	x 90	x 88	x 92	x 79	x 73															x 106	x 99	x 96	x 98	x 99
17	x 99	x 94	x 89	x 89	x 87															x 114	x 126	x 114	x 125	x 119
18	x 107	x 108	x 107	x 76	x 77															x 96	x 83	x 85	x 86	x 86
19	x 83	x 84	x 81	x 77	x 72															x 117	x 107	x 107	x 105	x 106
20	x 100	x 98	x 96	x 95	x 86															x 126	x 105	x 100	x 103	x 100
21	x 98	x 97	x 94	x 87	x 81															x 115	x 108	x 104	x 105	x 111
22	x 110	x 108	x 105	x 97	x 91															x 123	x 111	x 109	x 106	x 103
23	x 99	x 95	x 97	x 89	x 86															x 112	x 106	x 97	x 96	x 97
24	x 94	x 93	x 91	x 83	x 90															x 114	x 105	x 103	x 101	x 98
25	x 101	x 98	x 86	x 87	x 84															x 112	x 94	x 90	x 94	x 96
26	x 98	x 97	x 96	x 91	x 84															x 123	x 103	x 104	x 110	x 112
27	x 111	x 104	x 104	x 98	x 87															x 119	x 108	x 111	x 112	x 110
28	x 105	x 99	x 97	x 90	x 91															x 113	x 107	x 109	x 111	x 105
29	x 104	x 104	x 110	x 91	x 88															x 93	x 91	x 87	x 88	x 97
30	x 90	x 80	x 78	x 75	x 71															x 100	x 80	x 73	x 76	x 79
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	12	1	1	1	1	1	1	1							30	30	30	30	30
MED	x 94	x 90	x 87	x 78	x 74	x 64	72	82	98	84	89	108	100							x 113	x 99	x 97	x 96	x 96
UQ	x 100	x 98	x 96	x 89	x 86	x 70														x 117	x 106	x 104	x 105	x 103
LQ	x 83	x 81	x 78	x 73	x 68	x 58														x 108	x 92	x 87	x 88	x 86

APR. 1990 | FXI (0.1 MHZ)

IONOSPHERIC DATA

APR. 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	72	72	81	62	56	56	80	103	113	124	133	135	139	143	141	134	132	129	128	108	91	87	89	88
2	84	81	81	77	65	62	89	110	111	115	126	125	134	125	121	118	124	127	120	103	92	92	95	S 92
3	86	81	81	77	64	64	84	110	123	134	137	132	128	131	130	120	116	121	124	119	94	94	91	88
4	90	99	84	67	65	65	88	S 99	113	121	105	113	127	133	125	122	111	109	111	101	83	70	74	77
5	75	70	R 64	58	52	50	S 73	104	122	118	123	129	138	131	132	122	112	109	109	105	92	91	84	76
6	69	68	69	63	53	54	80	115	119	130	127	131	134	132	134	126	118	119	114	107	93	84	83	85
7	83	76	72	70	61	R 61	85	S 102	113	119	120	127	130	128	126	124	122	124	121	109	89	81	85	85
8	87	79	74	70	69	73	93	105	118	123	128	132	133	140	138	131	120	116	114	106	99	95	93	90
9	91	86	85	78	65	68	91	105	116	121	126	137	137	135	134	130	129	126	127	122	104	105	S 105	110
10	108	R 101	73	69	68	65	87	97	108	100	96	97	98	101	96	93	86	88	91	79	84	78	82	J F 88
11	Z 31	44	F 51	46	F 39	F 49	F 63	F 71	F 88	F 72	F 78	Z 100	F 89	92	82	74	80	80	84	77	67	68	61	65
12	59	64	50	50	50	F 47	69	90	94	103	107	110	113	114	107	100	99	100	103	106	75	75	78	72
13	69	75	F 52	F 45	F 42	49	82	107	113	118	133	119	114	117	116	112	109	105	110	102	86	77	S 75	71
14	73	69	74	64	62	S 63	93	104	112	116	129	123	116	119	118	117	117	107	109	110	S 98	91	83	78
15	81	79	71	72	71	78	87	113	128	136	133	136	U R 139	141	139	134	130	124	124	117	91	85	87	86
16	84	82	86	73	67	72	93	101	110	121	135	135	133	130	127	126	124	118	107	S 100	93	90	92	93
17	93	89	U S 83	83	81	87	109	119	127	122	124	133	136	129	128	127	125	125	119	108	120	108	119	113
18	S 101	101	100	F 69	F 67	S 61	67	V 67	68	71	79	93	96	100	98	99	99	98	95	90	77	79	80	80
19	77	78	75	F 69	F 61	69	90	103	107	116	122	129	133	128	127	123	119	119	122	111	S 101	100	S 98	100
20	94	92	90	89	80	84	R 104	112	114	123	121	130	134	133	129	125	118	116	120	S 120	S 99	94	S 97	94
21	92	91	88	81	75	84	105	V 106	108	128	131	128	134	136	129	124	124	123	118	109	R 102	98	99	104
22	R 104	S 102	S 99	91	85	91	101	110	121	126	135	134	136	131	133	131	127	126	127	117	105	102	S 100	97
23	93	89	91	83	80	87	109	115	119	126	130	137	138	133	130	131	130	129	118	106	100	91	90	91
24	88	87	85	77	84	89	U S 101	110	119	125	124	120	121	114	112	112	111	113	115	108	S 98	97	95	92
25	S 95	92	80	81	78	91	109	114	119	113	124	127	131	129	126	125	120	115	112	106	88	84	88	90
26	92	91	90	85	78	83	96	111	111	122	130	130	141	140	138	130	128	131	127	117	97	97	104	105
27	105	S 98	98	92	81	87	101	111	116	119	126	129	138	139	138	138	138	134	126	113	102	105	106	104
28	99	93	91	84	85	S 95	109	119	123	120	123	130	136	138	142	143	142	134	126	107	101	102	105	S 99
29	98	98	J S 104	85	82	91	R 110	115	106	107	118	119	123	127	111	112	114	112	98	86	85	81	82	91
30	84	74	72	69	65	62	69	78	90	101	107	108	126	126	119	115	109	104	106	94	74	67	70	73
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	88	84	81	72	67	68	90	106	113	120	125	129	133	130	128	124	120	118	116	107	93	91	90	90
UQ	94	92	90	83	80	87	101	112	119	124	130	132	136	135	134	130	127	126	124	111	100	97	98	97
LQ	77	75	72	67	61	61	82	102	108	115	120	119	123	125	118	115	111	109	109	102	86	81	82	80

APR. 1990 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

APR. 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											U L 500		U L 560	L 640										
2													U L 560	U L 700										
3																								
4																								
5																								
6																								
7																								
8																								
9												U L 650												
10													U L 590	U L 600										
11								U L 480	U L 530	U L 630	U L 560	U L 550	U L 590	U L 540	U L 640									
12								U L 390																
13													U L 700											
14													B	B										
15															U L 710									
16															U L 670	U L 700								
17													U L 710											
18								U L 560	U L 600															
19														U L 740										
20												U L 680		U L 700		U L 700								
21													U L 710	U L 740		U L 700								
22														U L 700	U L 690	U L 680								
23													U L 710	U L 730	U L 670					A				
24												U L 750	U L 750	U L 750	U L 700	U L 650								
25													U L 750	U L 680	U L 680									
26													U L 670											
27														U L 700										
28													A	U L 650										
29													U L 640	U L 590	U L 650									
30								U L 520	U A 480	U L 590		U L 640	U L 600	U L 560										
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								3	3	3	2	5	13	15	8	5								
MED								U L 480	U L 530	U L 600	530	L 650	L 670	L 700	U L 675	U L 700								
UQ								L 500	L 545	615		L 680	U L 710	L 715	U L 695	U L 700								
LQ								U L 435	505	U L 595		U L 640	L 590	L 620	L 660	U L 680								

APR. 1990 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

APR. 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							H 220	275	330	360	380	A	R 390	A	355	B	310	250	B					
2							H 210	285	325	345	A	U R 380	R 390	375	A	335	300	235	B					
3							H 230	H 270	320	355	A 380	A	R	380	A	B	305	250	A					
4							H 215	270	315	345	375	A	A	A	A	340	290	245	B					
5							H 215	280	340	365	R	380	385	370	360	U A 340	300	245	B					
6							H 225	280	330	U A 350	380	R 390	R 380	375	365	345	310	255	H 165					
7							200	280	320	355	R 375	380	385	380	365	340	305	255	B					
8							H 240	280	330	350	380	385	400	B	380	345	305	255	B					
9							215	275	335	355	375	385	R	385	355	340	310	255	155					
10						B	200	275	325	365	S 375	390	385	375	R	340	305	255	R 175			J K 120	J K 140	J K 155
11	J K 130	J K 135	U K 145		J K 160	K 200	255	300	325	360	365	370	385	375	370	340	305	255	155					
12						B	225	295	340	375	A	380	B	U R 375	B	355	U A 320	U A 255	B					
13							H U A 245	295	345	370	380	U A 380	A	395	A 370	365	335	U A 270	U R 160					
14						B	H 245	305	340	370	385	U A 390	420	R	395	375	330	280	175					
15						B	H 255	R 305	350	390	390	395	B	B	B	385	340	A	B					
16						B	250	300	350	B	410	410	415	405	400	370	360	285	A					
17						B	240	310	345	385	390	A	A	420	400	380	340	285	170					
18						B	R 250	310	350	385	400	410	420	B	390	370	330	280	B					
19						B	U A 250	A	A	A	A	A	I R 405	R	R	380	340	280	165					
20						B	250	315	U A 360	395	U A 410	420	420	420	405	380	350	285	185					
21						A	265	325	365	405	A	A	A	410	405	330	S	280	A					
22						170	245	335	360	400	R 410	R 420	R	410	405	380	340	275	B					
23						B	H 270	315	355	395	415	420	R	R 400	400	370	330	280	170					
24						U R 160	R 255	315	370	395	405	415	S 415	U S 400	S 380	370	340	280	170					
25						B	250	310	360	R 395	405	415	415	400	385	380	340	285	180					
26						B	260	315	360	A	U A 405	R	410	405	395	365	330	260	B					
27						170	245	330	360	390	410	415	420	400	380	360	335	285	170					
28						160	240	310	355	390	400	400	405	395	375	350	320	275	170					
29						B	250	325	S 355	380	400	395	405	390	365	350	310	275	180					
30						A	230	290	335	A	A	R 390	390	375	360	A 330	305	265	B					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	1	1	1		1	5	30	29	29	26	24	23	20	23	23	28	29	29	15			1	1	1
MED	J K 130	J K 135	U K 145		J K 160	170	245	300	345	372	390	390	405	395	380	362	320	270	170			J K 120	J K 140	J K 155
UQ						170	250	315	355	390	405	412	415	402	398	378	340	280	175					
LQ						160	225	280	330	355	380	382	388	375	365	340	305	255	165					

APR. 1990 | FOE (0.01 MHZ)

IONOSPHERIC DATA

APR. 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

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	E B 13	E B 14	E B 13	E B 13	E B 13	E B 14						38	38	40		E B 41			E B 17	31	E B 14	E B 14	E B 14	E B 15
2	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13				37	38			41	J A 54	G 27	G 25	27	J A 22	20	E B 14	E B 13	E B 14	E B 13
3	E B 13	E B 14	E B 13	E B 13	E B 13	E B 14		30		38	40	42	G 35	G 30	J A 41	E B 56	G 24	28	J A 22	25	J A 16	20	E B 14	E B 14
4	E B 14	E B 13	E B 13	E B 14	E B 13	E B 15				37	40	44	J A 50	J A 45	38	G 30	31		E B 16	J A 15	E B 15	E B 13	E B 14	E B 14
5	21	E B 14	J A 26	J A 25	J A 22	J A 16						42	J A 48		39	J A 37		28	18	E B 13	E B 14	E B 14	E B 14	E B 14
6	E B 14	J A 14	E B 13	E B 13	E B 13	E B 14	25	30		37					29	25		20		J A 14	E B 13	E B 14	E B 14	E B 14
7	E B 14	E B 13	E B 13	E B 13	E B 13	E B 14		31	35			38	G 35	G 34	G 31	G 27	G 20			E B 13	E B 13	E B 13	E B 14	E B 14
8	E B 14	E B 13	E B 14	E B 14	E B 13	E B 15		32	36	39				E B 41			34		19	E B 12	E B 14	E B 13	J A 21	E B 14
9	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13		32	38	39	40	43	G 32	43	39	43	G 25			E B 13	E B 13	J A 29	E B 15	E B 14
10	E B 13	E B 13	E B 14	E B 13	E B 14	E B 14	25		36	42	43	52			28	27				E B 14	E B 14	J K 12	J K 14	J K 16
11	J K 13	J K 14	J A 21	19	J K 16	K 20			41	40	40	39					34		20	E B 13	J A 16	J A 16	J A 16	21
12	E B 14	E B 13	E B 13	E B 14	E B 15	E B 15		33	36		44		E B 47	40	E B 41		37	32	19	E B 13	J A 21	J A 37	J A 21	J A 23
13	J A 100	J A 71	J A 53	J A 72	J A 31	18	G 20	30	39	43	49	J A 59	J A 47	43	47		40	31		J A 24	J A 21	J A 26	E B 16	J A 22
14	J A 27	J A 22	J A 23	J A 22	J A 23	E B 16		J A 51	39	44	J A 51	J A 47	46	45	J A 62	J A 53	37		25	49	37	J A 35	E B 14	E B 14
15	E B 14	E B 13	E B 13	E B 14	E B 14	E B 16			39	43	48	50	E B 112	E B 68	43			J A 45	19	J A 33	J A 23	J A 21	E B 14	E B 15
16	J A 27	E B 13	J A 25	J A 24	J A 22	E B 15		34	38	42	46	45	45	51	43	J A 53	48	J A 47	J A 42	J A 36	42	J A 47	J A 35	27
17	J A 37	J A 26	J A 16	J A 18	J A 15	J A 21		34	38	42	J A 50	45	J A 50				46		22	E B 13	E B 14	E B 14	E B 15	J A 20
18	J A 15	E B 15	20	J A 21	J A 21	E B 16			42	J A 51		44		E B 46					24	20	43	58	30	J A 27
19	J A 41	J A 37	J A 34	J A 42	46	J A 25	33	36	43	J A 45	43	43	G 37	G 36	G 38	J A 46	J A 49	35	29	J A 29	21	J A 28	J A 18	E B 13
20	J A 23	J A 24	E B 15	E B 14	E B 14	E B 15		34	38	41	43			48				39	J A 43	41	J A 63	J A 48	E B 15	J A 24
21	J A 18	E B 13	J A 21	E B 13	J A 20	J A 23		43	42	44	47	45	43		33	41		25	23	J A 23	E B 16	J A 23	E B 15	J A 24
22	J A 20	J A 20	E B 13	E B 13	E B 14	20				42	39			36		41	37	32	22	J A 24	J A 17	20	E B 13	E B 14
23	E B 14	E B 13	E B 13	E B 13	E B 13	E B 14		34	37	42	46	44			41			31		E B 14	20	E B 14	J A 22	E B 14
24	E B 14	E B 14	E B 14	J A 19	J A 21			34	41	43	53	45					45	J A 50	J A 67	30	22	J A 28	J A 20	E B 15
25	J A 25	J A 35	J A 18	19	E B 15	E B 16		34	39	42	44	43	48			40	J A 42	36	33	48	56	43	J A 38	32
26	26	E B 13	E B 14	E B 13	E B 13	E B 17		34	40	44	44	39	J A 53	45			J A 48	J A 51	J A 33	59	27	J A 27	J A 18	J A 21
27	23	J A 20	J A 19	J A 22	E B 13			39	47	49						39	J A 46			E B 13	E B 14	48	50	J A 46
28	J A 24	E B 14	J A 19	19	E B 13			34	J A 50	43	49	61	J A 79			40	39	36	J A 50	49	23	J A 37	22	E B 14
29	19	J A 22	J A 22	J A 24	28	E B 16	35	38	48	J A 41			44	42	41	47	41	34	J A 29	J A 51	J A 22	J A 28	J A 42	J A 63
30	J A 30	J A 42	30	J A 47	J A 25	J A 26	J A 44	39	J A 51	J A 52	J A 52				43	35	J A 42	J A 39	J A 32	J A 22	38	J A 53	J A 116	J A 65
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	16	E B 14	E B 14	E B 14	E B 14	E B 15		32	38	42	43	42	G 35	U G 33	G 31	G 28	34	28	22	22	18	J 24	16	E B 15
UQ	J A 25	J A 22	J A 21	J A 22	J A 21	17	G	34	41	44	47	45	46	42	41	40	42	36	J A 29	33	23	J A 37	J A 22	J A 24
LQ	E B 14	E B 13	E B 13	E B 13	E B 13	E B 14	G	G	35	38	G	G	G	G	G	G	G	G	E G 16	E B 13	E B 14	E B 14	E B 14	E B 14

APR. 1990 | FOES (0.1 MHZ)

IONOSPHERIC DATA

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

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 13	E B 14	E B 13	E B 13	E B 13	E B 14	G	G	G	G	G	U Y 37	G 37	39	G	E B 41	G	G	E B 17	27	E B 14	E B 14	E B 14	E B 15
2	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G	G	36	37	G	G	40	51	G 27	G 25	27	19	E B 14	E B 14	E B 13	E B 14	E B 13
3	E B 13	E B 14	E B 13	E B 13	E B 13	E B 14	G	29	G	37	U Y 39	42	U Y 35	G 30	37	E B 56	G 24	28	20	17	16	E B 13	E B 14	E B 14
4	E B 14	E B 13	E B 13	E B 14	E B 13	E B 15	G	G	G	37	39	42	47	42	37	G 30	31	G	E B 16	E B 13	E B 15	E B 13	E B 14	E B 14
5	E B 14	E B 14	15	20	E B 13	E B 14	G	G	G	G	G	41	41	G	37	G 28	G	26	17	E B 13	E B 14	E B 14	E B 14	E B 14
6	E B 14	E B 14	E B 13	E B 13	E B 13	E B 14	G	30	G	36	G	G	G	G	G 28	G 24	G	G 19	G	E B 13	E B 13	E B 14	E B 14	E B 14
7	E B 14	E B 13	E B 13	E B 13	E B 13	E B 14	G	30	34	G	G	G 35	G 34	G 32	G 31	G 25	G 19	G	G	E B 13	E B 13	E B 13	E B 14	E B 14
8	E B 14	E B 13	E B 14	E B 14	E B 13	E B 15	G	31	35	38	G	G	G	E B 41	G	G	32	G	18	E B 12	E B 14	E B 13	E B 14	E B 14
9	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	31	36	38	40	42	U Y 32	39	38	40	G 23	G	G	E B 13	E B 13	E B 13	E B 15	E B 14
10	E B 13	E B 13	E B 14	E B 13	E B 14	E B 14	25	G	35	40	42	49	G	G	G 28	G 25	G	G	G	E B 14	E B 14	G	K 14	K 16
11	G	K 14	G	E B 14	K 16	K 20	G	G	37	39	38	U Y 38	G	G	G	G	32	G	19	E B 13	E B 13	14	E B 16	E B 14
12	E B 14	E B 13	E B 13	E B 14	E B 15	E B 15	G	32	35	G	41	G	E B 47	U Y 40	E B 41	G	34	28	U Y 18	E B 13	19	23	E B 15	E B 16
13	28	51	30	37	15	16	G 19	G 29	37	40	46	49	42	42	43	G	G	G	G 20		18	22	E B 16	17
14	19	E B 13	18	17	18	E B 16	G	G	38	41	43	43	44	44	52	48	36	G	23	40	27	18	E B 14	E B 14
15	E B 14	E B 13	E B 13	E B 14	E B 14	E B 16	G	G	37	46	46	49	E B 112	E B 68	42	G	G	29	19	25	18	17	E B 14	E B 15
16	18	E B 13	17	20	17	E B 15	G	32	37	41	45	43	44	47	45	44	47	45	39	28	34	23	21	E B 15
17	26	18	E B 12	15	E B 14	18	G	32	37	42	45	44	46	G	G	G	43	G	21	E B 13	E B 14	E B 14	E B 15	E B 14
18	E B 15	E B 15	E B 14	16	17	E B 16	G	G	40	48	G	43	G	E B 46	G	G	G	G	21	17	34	34	20	20
19	29	31	18	32	35	20	31	34	42	42	42	42	U G 37	U G 36	U G 38	G 34	44	33	25	27	E B 14	20	E B 13	E B 13
20	16	21	E B 15	E B 14	E B 14	E B 15	G	34	38	41	43	G	G	46	G	G	G	32	41	30	41	17	E B 15	17
21	E B 15	E B 13	E B 13	E B 13	15	20	G	41	41	42	44	44	43	G	G 32	40	G	G 25	22	21	E B 16	16	E B 15	20
22	16	E B 13	E B 13	E B 13	E B 14	E B 15	G	G	G	41	G 37	G	G	G 36	G	40	36	30	U Y 22	21	E B 15	E B 14	E B 13	E B 14
23	E B 14	E B 13	E B 13	E B 13	E B 13	E B 14	G	34	37	41	45	43	G	G	41	G	G	30	G	E B 14	E B 13	E B 14	20	E B 14
24	E B 14	E B 14	E B 14	E B 13	19	G	G	34	40	42	50	44	G	G	G	G	40	48	65	20	E B 13	26	E B 14	E B 15
25	23	29	15	E B 13	E B 15	E B 16	G	33	38	42	42	43	47	G	G	40	G	33	30	41	43	35	24	22
26	17	E B 13	E B 14	E B 13	E B 13	E B 17	G	32	39	41	43	U G 39	48	42	G	G	46	37	29	29	19	24	16	16
27	E B 14	15	E B 14	E B 14	E B 13	G	G	37	42	46	G	G	G	G	G	38	36	G	G	E B 13	E B 14	39	44	27
28	19	E B 14	E B 13	E B 14	E B 13	G	G	33	42	41	47	61	76	G	G	39	36	30	34	41	E B 13	34	E B 15	E B 14
29	E B 12	18	E B 13	E B 13	20	E B 16	35	36	44	40	G	G	G	40	39	40	39	30	23	32	19	22	32	36
30	24	36	18	19	20	22	43	36	48	41	40	G	G	G	40	34	37	28	22	17	22	30	26	43
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	E B 14	E B 14	E B 13	E B 14	E B 14	E B 15	G	31	37	41	40	42	G 33	U G 33	G 31	G 26	28	26	20	17	E B 14	16	E B 15	E B 14
UQ	18	15	E B 15	15	16	E B 16	G	34	40	42	44	43	44	41	40	40	36	30	23	27	19	23	16	17
LQ	E B 14	E B 13	E B 13	E B 13	E B 13	E B 14	G	G	34	37	G	G	G	G	G	G	G	G	E G 16	E B 13	E B 14	E B 14	E B 14	E B 14

APR. 1990 | FBES (0.1 MHZ)

IONOSPHERIC DATA

APR. 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	13	13	13	14	15	14	17	20	25	21	27	27	20	41	17	13	17	14	14	14	14	15
2	14	13	13	13	13	13	16	16	17	19	19	21	24	23	25	19	15	13	13	14	14	13	14	13
3	13	14	13	13	13	14	17	17	17	19	20	33	28	22	27	56	16	15	13	13	15	13	14	14
4	14	13	13	14	13	15	15	17	17	17	21	34	30	22	21	20	17	16	16	13	15	13	14	14
5	14	14	14	13	13	14	17	15	17	20	26	20	E S 28	28	20	21	16	13	14	13	14	14	14	14
6	14	14	13	13	13	14	17	16	17	19	18	21	26	23	20	18	16	13	11	13	13	14	14	14
7	14	13	13	13	13	14	15	15	16	17	18	21	18	18	21	17	16	14	13	13	13	13	14	14
8	14	13	14	14	13	15	15	16	17	19	19	23	26	41	32	21	18	16	14	12	14	13	14	14
9	14	13	13	13	13	13	16	17	18	18	20	22	27	22	18	16	17	15	12	13	13	13	15	14
10	13	13	14	13	14	14	14	16	17	18	20	23	31	21	20	17	18	13	13	14	14	13	13	13
11	13	13	13	14	13	12	18	16	17	20	21	27	34	24	18	26	18	13	14	13	13	14	16	14
12	14	13	13	14	15	15	15	17	18	20	23	22	47	34	41	21	20	16	13	13	14	13	15	16
13	14	13	13	15	13	12	15	17	18	17	25	27	25	25	24	20	18	16	14	12	13	13	16	13
14	14	13	13	16	13	16	17	17	22	23	28	28	37	34	24	20	20	19	14	13	13	14	14	14
15	14	13	13	14	14	16	18	18	21	30	32	30	112	68	33	26	18	17	14	14	14	14	14	15
16	12	13	13	12	14	15	16	19	20	39	29	23	33	31	22	20	31	17	14	15	15	14	15	15
17	15	14	12	13	14	13	16	20	20	21	24	23	35	36	24	20	18	17	14	13	14	14	15	14
18	15	15	14	13	13	16	18	19	19	21	33	33	33	46	29	22	18	19	19	13	15	13	14	13
19	13	15	14	13	14	14	15	18	22	22	24	27	31	28	19	23	18	15	13	15	14	15	13	13
20	14	13	15	14	14	15	16	19	20	24	32	21	28	33	26	23	20	17	14	13	14	15	15	13
21	15	13	13	13	13	13	18	20	22	34	28	33	30	35	26	21	E S 25	17	14	15	16	13	15	14
22	13	13	13	13	14	15	17	17	22	22	32	33	33	30	25	27	21	14	14	13	15	14	13	14
23	14	13	13	13	13	14	20	19	21	27	27	28	36	32	26	23	23	17	15	14	13	14	14	14
24	14	14	14	13	13	13	17	18	21	25	28	31	26	E S 33	E S 27	20	20	16	13	13	13	13	14	15
25	13	14	13	13	15	16	16	16	22	24	22	26	31	27	22	21	18	18	15	15	14	13	12	13
26	13	13	14	13	13	17	17	18	20	31	33	31	31	23	22	19	18	16	15	13	13	13	14	14
27	14	13	14	14	13	14	17	18	20	27	29	32	32	27	25	22	17	16	13	13	14	14	15	13
28	13	14	13	14	13	15	16	17	19	22	31	30	28	27	23	20	17	16	14	14	13	13	15	14
29	12	13	13	13	13	16	18	19	18	20	27	30	33	26	26	18	17	16	14	13	13	13	13	13
30	13	13	14	14	13	14	16	16	20	27	31	26	27	28	20	17	16	13	14	13	15	13	14	14
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	14	13	13	13	13	14	16	17	19	21	26	27	30	28	24	20	18	16	14	13	14	13	14	14
UQ	14	14	14	14	14	15	17	18	21	25	29	31	33	33	26	23	19	17	14	14	14	14	15	14
LQ	13	13	13	13	13	14	15	16	17	19	21	22	27	23	20	19	17	14	13	13	13	13	14	13

APR. 1990 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

APR. 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	250	250	290	320	265	270	310	315	305	290	290	275	280	275	275	275	285	290	300	305	280	265	270	275
2	275	275	290	295	290	270	295	320	315	295	295	285	295	280	280	275	280	295	300	290	275	270	275	S 285
3	285	265	275	290	275	265	295	310	310	300	295	290	275	280	285	280	275	285	295	310	280	260	265	245
4	260	295	325	245	240	240	285	315	310	315	300	280	280	285	285	290	295	290	295	300	300	270	260	270
5	285	290	R 275	285	275	250	S 300	305	305	295	295	290	295	285	290	295	295	295	300	295	290	290	290	280
6	275	255	280	300	270	250	290	325	300	310	290	285	285	280	285	285	290	290	295	300	300	275	270	290
7	295	280	275	285	290	R 280	320	S 320	300	300	290	290	285	275	280	285	285	290	300	305	280	260	270	275
8	290	280	270	270	255	260	305	305	300	295	285	285	280	280	285	290	285	290	295	285	285	285	280	280
9	290	280	290	305	260	255	310	310	305	300	290	285	290	280	280	280	280	285	295	290	285	260	S 250	285
10	285	R 305	295	255	240	235	270	275	280	290	255	240	245	255	275	290	290	295	300	260	250	220	230	J F 265
11	Z 300	220	F 245	225	F 235	F 250	265	F 270	F 290	F 260	F 260	Z 280	F 270	290	285	280	300	295	295	295	280	250	245	260
12	250	285	285	255	245	F 255	315	325	295	290	285	290	295	285	285	265	285	270	260	295	260	250	265	270
13	270	290	F 300	F 255	F 250	285	320	300	300	285	295	285	280	280	280	280	280	285	290	290	310	265	S 255	250
14	250	250	280	255	245	S 255	315	315	300	290	285	285	275	275	275	275	275	275	280	290	S 290	275	255	255
15	265	270	250	270	250	280	280	295	290	290	280	270	U R 270	270	265	265	270	270	285	290	280	255	260	255
16	255	245	265	255	250	270	310	315	290	280	285	275	270	270	265	270	275	285	275	S 280	265	255	260	260
17	275	265	U S 285	260	260	265	290	300	300	280	265	260	265	260	260	260	265	275	280	255	260	250	265	265
18	S 250	265	275	F 250	F 250	S 255	250	V 260	255	260	280	275	265	270	275	270	270	285	280	275	250	240	245	245
19	245	255	250	F 260	F 250	265	285	305	285	270	265	265	265	260	260	255	265	260	280	275	S 265	255	S 260	265
20	255	255	260	270	265	260	R 300	300	295	280	260	260	260	255	255	255	255	255	265	S 275	S 280	240	S 255	250
21	255	260	265	260	245	245	295	V 290	250	270	260	255	255	255	250	245	250	260	265	265	R 255	250	250	260
22	R 260	S 265	S 280	270	265	280	305	280	270	270	265	260	255	250	250	250	255	255	265	265	255	250	S 250	255
23	250	240	260	250	245	255	290	285	270	265	255	260	255	245	245	245	250	255	265	255	260	250	235	240
24	230	235	235	220	235	235	U S 260	255	265	270	265	255	260	255	255	265	260	265	270	270	S 250	250	260	250
25	S 270	275	245	250	255	290	295	285	280	270	255	260	255	260	260	260	270	275	280	275	265	250	245	255
26	260	275	265	265	260	275	285	290	270	265	265	250	265	260	260	255	255	270	280	285	260	255	260	260
27	280	S 285	285	290	280	275	300	295	270	265	265	265	265	260	260	265	265	275	275	270	260	255	260	275
28	275	260	265	250	250	S 265	295	295	285	290	270	270	270	270	270	275	275	280	285	270	260	265	260	S 260
29	265	260	J S 295	275	260	275	R 295	310	270	260	265	270	265	280	270	270	275	290	290	280	260	245	240	270
30	275	255	260	260	250	240	250	255	280	275	275	270	275	290	290	295	290	290	295	295	295	250	250	260
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	268	265	275	260	252	262	295	300	290	282	278	272	270	272	275	272	275	285	285	285	270	255	260	260
UQ	280	280	285	285	265	275	305	315	300	295	290	285	280	280	285	280	285	290	295	295	285	265	265	275
LQ	255	255	260	255	245	250	285	285	270	270	265	260	265	260	260	260	265	270	275	270	260	250	250	255

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

IONOSPHERIC DATA

APR. 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											U L 385		U L 355	L 350										
2													L 370	U L 340										
3																								
4																								
5																								
6																								
7																								
8																								
9												U L 330												
10																								
11								U L 320	L 345	L 315	L 360	L 355	L 330	L 355	U L 335									
12								U L 385																
13													U L 335											
14																								
15													B	B										
16																								
17															L 330	U L 315								
18									U L 320	U L 330			U L 335											
19														L 325										
20												L 350		L 340		U L 315								
21													L 335	L 320		U L 315								
22														U L 325	U L 320	U L 315								
23													L 340	L 325	L 325									
24												L 345	U L 325	U L 325	U L 320	U L 325			A					
25													U L 315	L 330	U L 320									
26													L 330											
27														L 325										
28													A	U L 335										
29													U L 340	L 340	U L 335									
30								L 325	A	U L 330		L 325	L 330	U L 355										
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								3	2	3	2	5	13	15	7	5								
MED								U L 325	L 332	U L 330	372	L 345	L 335	L 330	U L 325	U L 315								
UQ								L 355		U L 330		L 350	U L 340	L 340	L 332	U L 315								
LQ								L 322		L 322		U L 330	L 330	L 325	U L 320	U L 315								

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

IONOSPHERIC DATA

APR. 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	255	260H	270	320	310	310	300							
2											290	260	285	330		310L	305							
3										270	280			305	295	320L	305L							
4									260	240	260	315	335	310		300	270							
5									250	260	275	305	295	255	285	270	255							
6								250	250	265	255	265L	310	270L	290	285L		260						
7									260	250	260	315	310L	295L	295	310L	305							
8									260	265	295	275	315L	300	290	270								
9										265	270	310	285	310L	305	275	305							
10						410L		305L	285	310	360L	375L	390	370	310	310	260							
11							370L	370	325	445	440	325	360	305	360	375L	320L							
12								255	275	310L	280L	310	300	290	315	355								
13									275	260	270		325	325	285	305	305							
14									275	280	305	260	335	315	330	320	290							
15									265	270L	305	320L	B	E B 320	345	330	310							
16											290	300L	325	345	350	330	310							
17									260	260H	310	360	320	360	355	350	330							
18							370	L	440L	455	320L	375L	385	365L	330L	L	340L							
19								255			355	U 330L	350	365	360	360	335	340L						
20									305L	265	365	340	355	375	370	365	360	350L						
21										315L	365L	365	375	380	355	385	360	320						
22									315L	260L	360L	360L	355	365	365	360	355	340L						
23									285		355L	360	370	395	400	340L	365							
24								280	255	305	335L	390	370	380	390	355	365	335	E A 325					
25									235	325L	360L	345L	370	355	355	315	305							
26										315L	330L	360	355	355	360	365L	355L	305						
27										L	345	340	340	355	340	335	315							
28										265	305	355	315A	335	325	305	295							
29								245		330L	305	325L	340	315	335	335	295							
30							L	400	325	320	305	350	325	275	285	280	270							
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	2	8	19	25	30	28	28	30	28	29	27	7	1					
MED						410L	370	268	275	270	305	328	335	328	332	320	305	335	E A 325					
UQ								338	295	315	355L	360	358	365	358	355	338	340L						
LQ								252	260	260	280	308	312	305	300	305	298	312						

APR. 1990 | H'F2 (KM)

IONOSPHERIC DATA

APR. 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	330	340	270	220	260	300	240	235	230	225	205	225	210	220	225	240	230	250	245	240A	230	270	290	280
2	285	285	260	230	240	290	240	235	225H	215	200H	200	215	225	260A	225	240	255	250	225	230	280	280	270
3	270	300	275	230	220	285	240	235	240	220	225	220H	200H	220	210	265E B	235	255	255	230	230	285	290	350
4	305	255	220	325	360	365H	255	245	230	210	225	210H	240A	255A	240	230	235	250	245	235	225	255	305	300
5	275	255	280	235	250	340	240	230	210	220	210H	230	220	220	220	235	230	240	245	250	240	255	240	250
6	280	325	285	235	220	330	245	235	230	220	215	210	220	210	220	225	245	250	250	245	225	265	290	270
7	260	270	285	250	230	275	235	230	225	225	215	215H	210H	210	230	225H	240	250	250	230	215	255	305	300
8	275	270	280	275	305	305	225	230	230	225	215	220	220H	225	240	235H	235	245	255	250	250	265	265	285
9	275	275	255	225	255	325H	230	230	235	230	220	215	210	225H	215	240	220H	255	265	250	240	310	325	255
10	250	230	225	285	355	340	255	235	235	225	230	275E A	215	230	230	235	230	255	260	300	320	380	350	310
11	265	450	420	410	440	405	315	260	235	240H	215	205	230	220	210H	230H	240	250	265	235	250	305	315	305
12	340	280	240	330	350	330	250	225	215	205H	200H	190H	265E B	220	230	235	245	265H	300	230	225	330A	300	285
13	305A	310A	260A	A	375	300	240	240	230	230	240A	250A	230	215	215	230	235	255	265	260	230	300A	290	335
14	340	325	285	265	335	320	240	225	225	225	235	235	230	235	265E A	260A	250	255	280	285E A	260	260	260	300
15	305	280	315	290	320	270	225	235	235	240	235	240	B	B	255	240	250	255	260	255	230	300	310	320
16	330A	340	285	240	280	290	240	230	220	220	225	225	225	250	245	250A	265E A	265E A	260A	280	290A	285	320	305
17	290A	300	295	295	285	300	235	235	230	230	220	235	240	215H	200H	230	260	260	265	290	300	315	310	280
18	265	300	235	280	330	345	270	250	250H	275A	220	210H	220H	240	240	235	245	250	265	265	305A	365E A	340A	340
19	365A	350A	320	325A	360E A	290	255	235	230H	225	205H	205H	230	235	230	235	260	250	285	270A	275	290	305	300
20	315	340	310	285	260	290	250	230	215H	220	210H	195H	210H	230	230	215H	245	260	300E A	275	270A	275	310	330
21	330	305	295	280	290	300	245	230	235	230	220H	215H	230	225H	225	235	260	260	270	275	280	280	310	315
22	295	290	275	265	265	270	235	225	220	220	225	215	230	230	230	230	245	250	275	265	270	290	300	310
23	325	345	305	245	285	305	250	230	225	225	220H	220H	210H	210H	210H	245	240	255	270	265	260	270	355	340
24	365	355	350	375	350	300	240	235	235	225	250A	220	205H	205H	205H	250	255	A	A	280	260	290A	280	310
25	300	270	270	310	305	265	220	240	235	225	220H	230	240	220H	255	245	235	255	260	285A	300A	325A	350A	315
26	305	280	290	285	250	265	235	235	235H	225	235	220	230	210H	215H	240	270A	260	260	265A	245A	305A	300	305
27	285	270	270	250	240	250	230	235	240	235H	215	205H	205H	225	230	240	240	255	255	245	270	335A	335A	295
28	275	295	300	305	325	285	235	235	250	230	235	A	A	215H	200H	215	240	250	245	280A	275	310A	300	305
29	285	305	260	245	295	270	235	235	240	225	225	205H	215H	230	230	250	255A	255	255	255A	300	320	365E A	325A
30	285	320A	310	315	325A	305	A	260E A	A	250	225	230	215	220	225	235	255A	245	265	245A	245	345E A	360A	370E A
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	29	30	30	29	30	29	30	30	29	28	29	30	30	30	29	29	30	30	30	30	30
MED	292	300	282	280	290	300	240	235	230	225	220	218	220	220	229	235	241	255	260	256	255	289	305	305
UQ	325	325	300	305	332	325	250	235	235	230	225	228	230	230	235	240	252	255	265	275	275	312A	322	318
LQ	275	275	260	245	255	285	235	230	225	220	215H	210H	210H	215	215	230	235	250	255	245	230	270	290	285

APR. 1990 | H'F (KM)

IONOSPHERIC DATA

APR. 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							130	115	115	110	115	110	E A 135	A	110	B	115	115	B					
2							125	110	110	105	105	115	115	E A 145	A	A 120	A 125	E A 130	B					
3							B 135	110	110	110	110	A	A	A 120	A	B	A 115	120	A					
4							135	115	110	110	110	A	115	110	A	E A 125	A 115	115	B					
5							135	110	115	110	115	110	120	B 115	A 125	115	115	A 120	B					
6							125	115	110	110	110	110	115	115	120	A 120	115	120	E B 140					
7							125	115	110	110	115	E A 140	E A 125	E A 130	E A 125	A 115	A 115	120	B					
8							125	A	115	115	115	115	120	B	B 125	115	115	120	B					
9							H 130	115	110	115	115	115	A	115	115	105	A 120	115	B					
10						B	125	115	115	110	110	115	B 120	110	A	A 120	115	120	130			B	B	B
11	B	B	A		B	K 125	130	110	110	110	110	115	B 120	115	115	120	115	120	E B 130					
12						B	120	115	115	110	115	110	B	120	B	110	110	120	B					
13							E A 130	A	110	110	115	A	A 120	115	115	115	115	A	B 130					
14						B	125	115	115	110	115	115	B 125	125	120	115	120	120	130					
15						B	E B 130	115	115	120	120	120	B	B	B	120	115	A	B					
16						B	125	110	110	B	110	110	115	120	115	115	E B 130	120	A					
17						B	120	115	115	110	110	110	B 120	B 130	115	115	115	115	E B 145					
18						B	130	110	110	115	B 120	125	115	B	120	115	115	120	B					
19						B	A	A	110	115	A	A	A	A	A	E A 135	110	A 120	B 130					
20						B	120	120	A	110	A	115	115	120	115	115	115	120	B 130					
21						A	130	115	115	120	115	120	115	120	A 120	A 120	110	E A 125	A					
22						B	120	120	115	115	E A 130	120	115	E A 120	120	120	120	A 125	B					
23						B	120	115	110	115	115	115	B 120	120	120	115	115	120	125					
24						120	115	110	110	115	115	B 115	115	120	115	115	110	115	B 125					
25						B	115	110	115	115	110	110	120	110	110	115	110	115	E B 135					
26						B	120	110	110	115	A	A	A 125	110	110	110	110	115	B					
27						E B 185	120	110	110	115	115	115	115	115	110	115	110	115	E B 135					
28						B 150	115	115	115	110	120	115	110	110	110	110	110	115	E B 140					
29						B	115	115	110	110	115	110	125	110	115	110	110	115	B 130					
30						A	115	110	115	A	A	115	115	115	110	110	110	110	B					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						4	29	27	29	28	26	25	25	25	23	28	30	28	14					
MED						130	125	115	110	110	115	115	118	115	115	115	115	120	B 128					
UQ						B 159	130	115	115	115	115	115	120	120	120	119	115	120	E B 135					
LQ						122	120	110	110	110	110	110	115	115	112	115	110	115	B 130					

APR. 1990 | H'E (KM)

IONOSPHERIC DATA

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

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	B	B	B	G	G	G	G	G	110	115	115	G	B	G	G	B	110	B	B	B	B
2	B	B	B	B	B	B	G	G	G	E G 160	115	G	G	E G 170	100	110	105	E G 170	105	125	B	B	B	B
3	B	B	B	B	B	B	G	E G 200	G	E G 155	115	110	105	110	105	B	105	E G 150	100	95	100	100	B	B
4	B	B	B	B	B	B	G	G	G	E G 150	125	115	105	105	105	110	E G 155	G	B	120	B	B	B	B
5	110	B	110	105	120	110	G	G	G	G	G	E G 170	130	G	115	115	G	145	125	B	B	B	B	B
6	B	110	B	B	B	B	115	E G 205	G	120	G	G	G	G	105	110	G	100	G	120	B	B	B	B
7	B	B	B	B	B	B	G	E G 170	E G 170	G	G	115	110	110	105	105	110	G	G	B	B	B	B	B
8	B	B	B	B	B	B	G	E G 175	E G 175	E G 155	G	G	G	B	G	G	140	G	135	B	B	B	125	B
9	B	B	B	B	B	B	G	E G 175	160	E G 155	E G 155	140	110	135	E G 160	125	110	G	G	B	B	105	B	B
10	B	B	B	B	B	B	160	G	E G 155	140	140	120	G	G	105	110	G	G	G	B	B	B	B	B
11	B	B	135	140	B	K 125	G	G	125	130	135	130	G	G	G	G	140	G	135	B	125	130	120	115
12	B	B	B	B	B	B	G	E G 160	E G 160	G	110	G	B	145	B	G	125	130	120	B	115	110	105	135
13	110	110	105	105	115	150	115	115	140	130	115	115	120	135	115	G	135	120	G	115	115	110	B	110
14	105	110	110	110	105	B	G	110	145	135	120	125	135	140	125	130	E G 210	G	150	115	110	110	B	B
15	B	B	B	B	B	B	G	G	E G 145	130	120	115	B	B	115	G	G	110	110	110	120	115	B	B
16	110	B	110	105	110	B	G	E G 180	E G 175	E G 155	130	130	135	120	130	125	120	115	110	110	110	105	100	105
17	110	110	110	110	110	110	G	E G 205	E G 170	150	120	120	115	G	G	G	130	G	140	B	B	B	B	120
18	120	B	110	130	130	B	G	G	150	130	G	130	G	B	G	G	G	G	160	120	110	110	110	110
19	105	105	105	105	105	115	155	110	110	110	110	105	110	110	110	110	135	140	120	115	105	115	110	B
20	110	95	B	B	B	B	G	E G 180	E G 165	E G 150	E G 165	G	G	E G 165	G	G	G	140	120	110	110	110	B	105
21	105	B	110	B	115	110	G	130	130	125	115	115	115	G	110	140	G	105	105	105	B	115	B	100
22	105	110	B	B	B	100	G	G	G	E G 170	115	G	G	110	G	150	E G 155	130	105	105	105	100	B	B
23	B	B	B	B	B	B	G	E G 210	E G 185	E G 150	140	E G 160	G	G	E G 170	G	G	125	G	B	105	B	110	B
24	B	B	B	110	110	G	G	E G 160	E G 145	140	125	150	G	G	G	G	155	125	120	115	115	110	115	B
25	105	105	105	115	B	B	G	E G 155	E G 150	135	125	E G 140	125	G	G	E G 200	110	140	130	110	110	110	110	105
26	110	B	B	B	B	B	G	E G 205	E G 155	110	150	110	130	150	G	G	115	110	110	110	110	110	110	110
27	110	110	120	110	B	G	G	E G 150	130	130	G	G	G	G	G	E G 175	145	G	G	B	B	110	110	110
28	110	B	110	120	B	G	G	E G 185	130	135	120	115	120	G	G	E G 180	155	155	125	120	120	110	115	B
29	120	110	110	110	110	B	150	140	125	120	G	G	E G 150	E G 160	E G 155	135	130	135	125	120	110	110	110	105
30	105	100	100	100	105	110	115	115	110	115	110	G	G	G	140	120	125	120	115	115	110	120	120	105
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	11	14	14	11	8	6	21	23	26	22	21	16	15	17	17	21	19	21	20	18	20	14	13
MED	110	110	110	110	110	110	132	E G 170	E G 150	U 123	120	118	116	U 122	110	U 118	128	128	120	115	110	110	110	110
UQ	110	110	110	115	115	120	155	E G 185	E G 162	E G 150	130	128	129	142	U 122	U 132	140	139	130	120	115	112	115	110
LQ	105	105	105	105	108	110	115	U 125	128	130	115	115	110	110	105	110	115	118	110	110	110	110	110	105

APR. 1990 | H'ES (KM)

IONOSPHERIC DATA

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

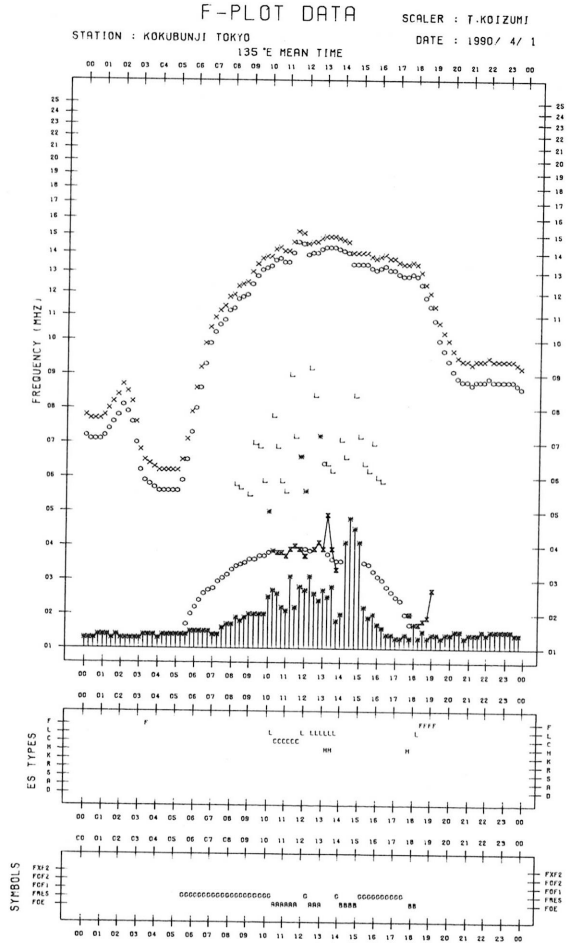
Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

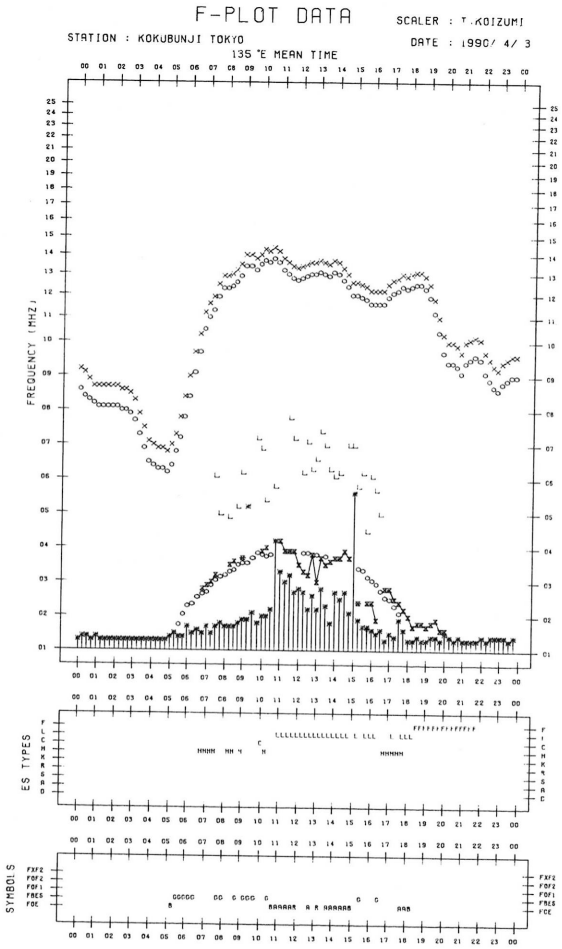
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1												C 1	L 1	L 1						F 3				
2										H 1	L 1			HL 11	L 2	L 1	L 2	HL 12	L 2	F 1				
3								H 1		H 1	C 1	L 1	L 1	L 1	L 2		L 1	H 1	L 2	F 2	F 1	F 1		
4										A 1	A 1	C 1	C 2	C 2	L 2	L 1	HL 11			F 1				
5	F 2		F 2	F 3	F 1	F 2						A 1	A 1		LL 11	L 1		HL 11	L 1					
6		F 1					L 1	H 1		C 1					L 1	L 1		L 1		F 1				
7								H 1	H 1			L 1	L 1	L 1	L 2	L 2	L 1							
8								HL 12	H 1	H 1							H 1		H 1				F 1	
9								H 1	H 1	H 1	H 1	H 1	L 1	A 1	HH 11	H 1	L 1					F 1		
10							H 1		H 1	H 1	A 1	C 2			L 1	L 1						K 1	K 1	K 1
11	K 1	K 2	HK 21	F 1	K 2	K 3			H 2	H 1	H 1	H 1					H 1		C 1		F 1	F 1	F 2	F 2
12								H 1	H 1		C 2			A 1			H 1	H 1	L 1		F 2	F 3	F 2	F 1
13	F 4	F 6	F 4	F 4	R 2	F 1	L 1	L 2	H 2	H 2	C 1	CL 21	CL 21	H 1	C 1		H 1	R 1		F 3	F 3	F 5		F 2
14	F 3	F 1	F 2	F 3	F 3			LH 11	H 1	H 1	C 1	C 1	A 1	A 1	H 2	H 2	H 1		H 2	FF 52	F 5	F 2		
15									H 1	H 2	C 1	C 2			C 1			C 2	L 1	F 3	F 1	F 2		
16	F 3		F 3	F 4	F 2			H 1	H 1	H 1	H 1	H 1	H 1	H 1	H 1	CL 21	C 1	C 3	C 3	F 4	F 5	F 4	F 3	F 2
17	FF 21	F 2	F 1	F 2	F 1	L 2		H 1	H 1	H 1	H 1	C 1	C 1				H 2		H 2					F 2
18	F 1		F 2	FF 21	FF 21				H 1	A 2		A 1							H 1	F 3	F 4	F 4	F 4	F 4
19	FF 52	F 5	F 5	F 5	F 5	L 2	HL 22	L 2	C 2	C 2	L 2	L 2	L 1	L 1	L 1	LH 21	H 2	HL 21	C 3	F 3	F 2	FF 12	FF 11	
20	FF 11	F 2						H 1	HL 12	H 1	HL 11			A 1				H 1	C 4	F 5	F 4	F 2		F 1
21	F 1		F 2		F 1	L 2		H 2	H 1	C 1	C 1	C 1	C 1		L 1	HL 11		L 2	L 2	F 2		F 2		F 2
22	F 1	F 1				L 1				H 1	L 1			L 1		H 1	H 1	HL 11	L 1	F 2	F 1	F 1		
23								H 1	H 1	H 1	A 1	A 1			H 1			H 1			F 1		F 3	
24				F 2	F 3			H 1	H 1	H 1	H 1	A 1					H 1	H 4	C 5	F 4	F 2	F 4	F 2	
25	F 6	F 6	F 2	F 1				H 1	H 1	H 1	A 1	A 1	A 1			H 1	L 1	H 2	H 3	F 5	F 6	F 6	F 4	F 4
26	F 2							H 1	HC 11	C 1	HL 11	L 1	HL 11	H 1			C 2	C 3	C 3	F 5	F 4	F 4	F 2	F 2
27	F 2	F 1	F 1	F 1				H 2	H 2	H 2						H 1	H 1					F 5	F 4	F 4
28	F 3		F 2	F 1				HC 11	H 2	H 1	A 2	C 2	A 2			H 1	H 2	H 1	C 4	F 3	F 2	F 4	F 2	
29	F 1	F 2	F 2	F 2	F 3		H 2	H 2	H 2	CH 11			A 1	A 1	H 1	H 1	H 2	H 2	C 3	F 5	F 2	F 5	F 4	F 4
30	F 5	F 4	F 5	F 3	F 4	L 2	C 3	C 2	C 3	C 1	C 1				H 1	C 1	H 2	C 1	C 2	F 2	F 4	FF 14	FF 13	F 4
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

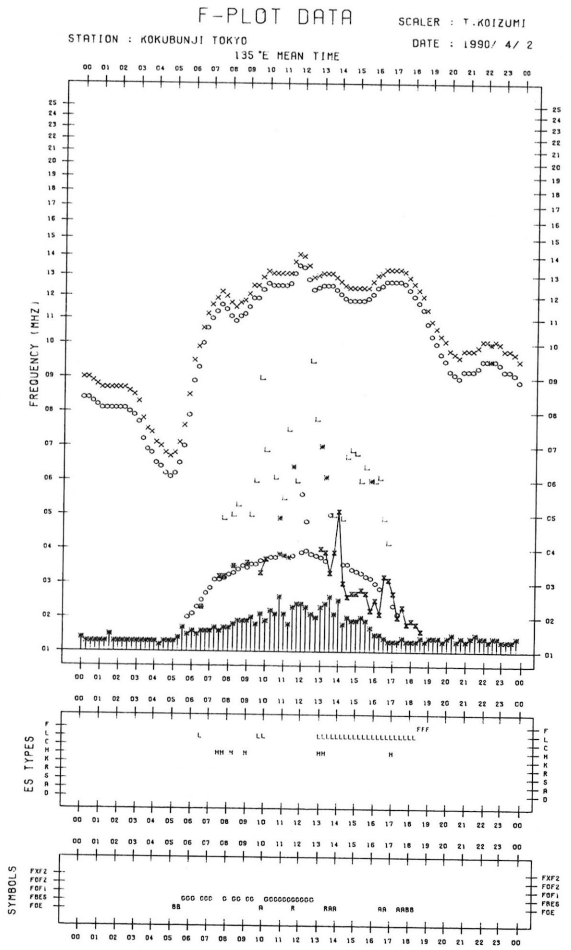
APR. 1990 | TYPES OF ES

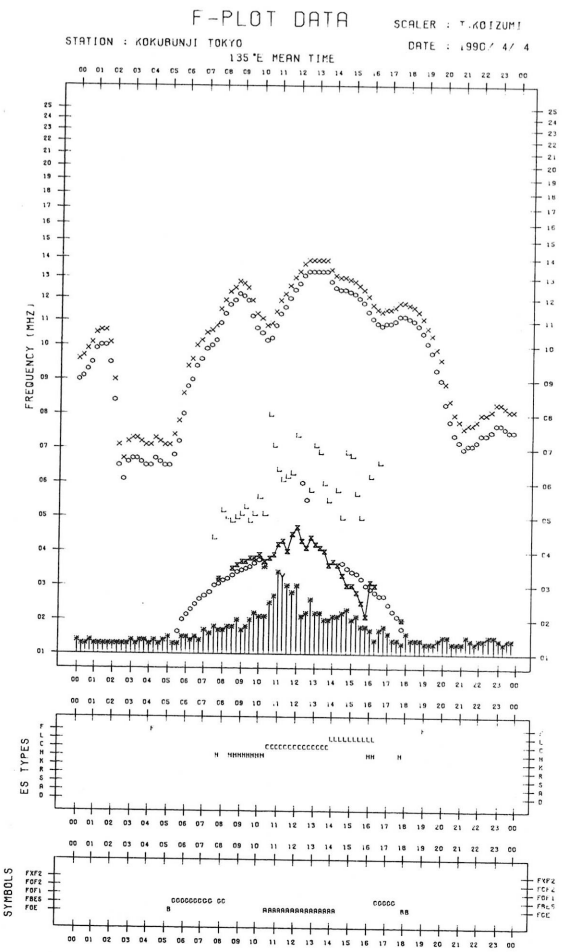
f-PLOTS OF IONOSPHERIC DATA

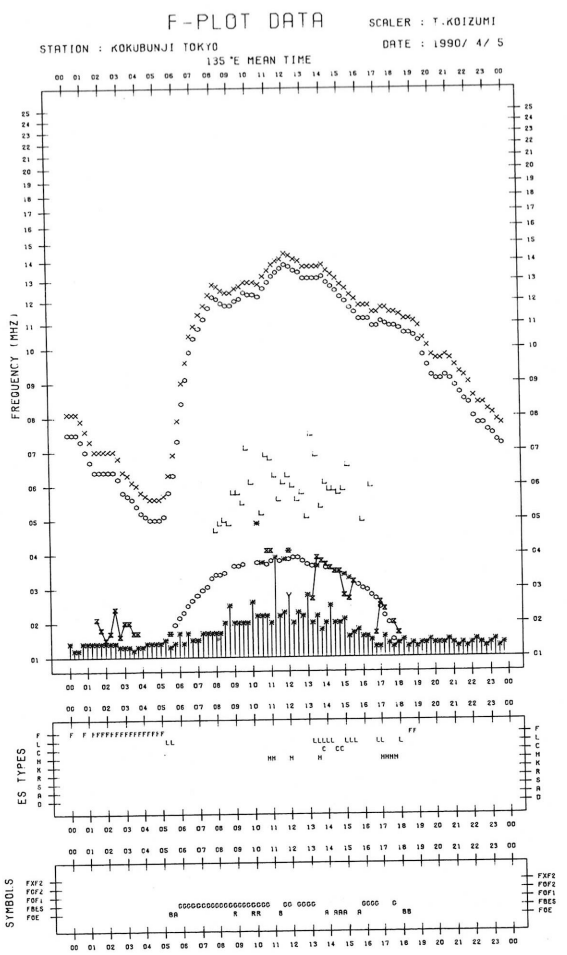
KEY OF F-PLOT	
!	SPREAD
⬡	FOF2,FOF1,FOE
×	FXF2
✳	DOUBTFUL FOF2,FOF1,FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑,Y	FMIN
∧	GREATER THAN
∨	LESS THAN

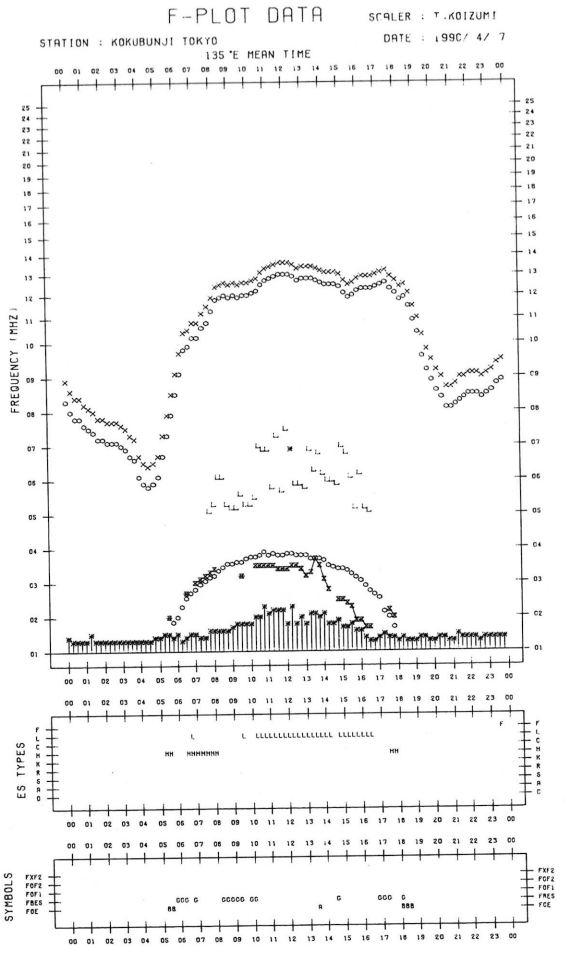

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/ 1
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

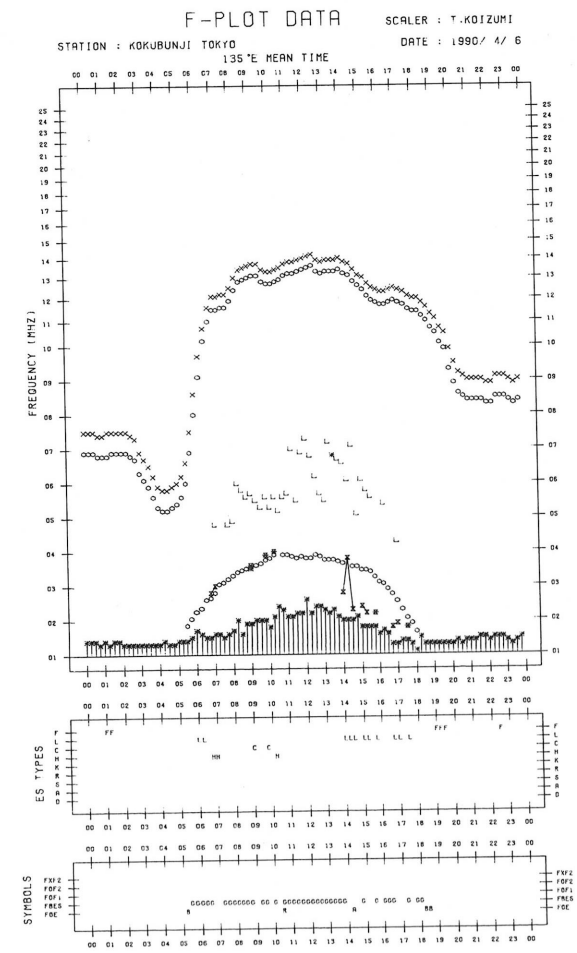

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/ 3
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

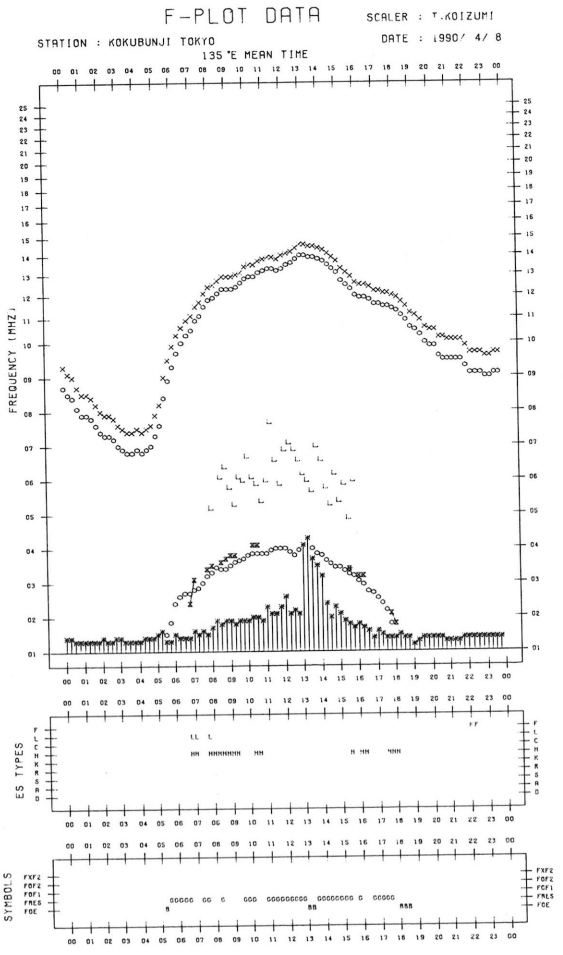

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/ 2
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

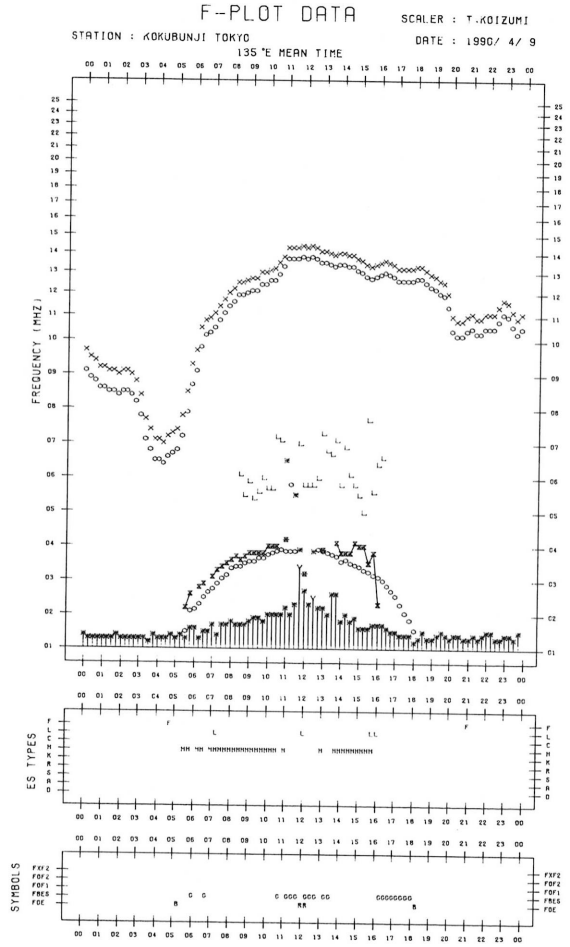

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/ 4
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

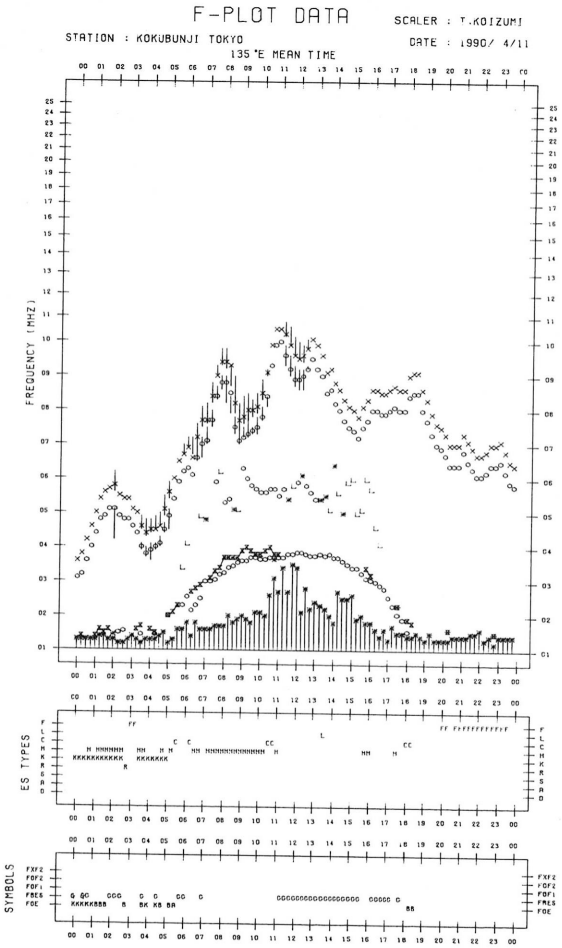

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/ 5
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

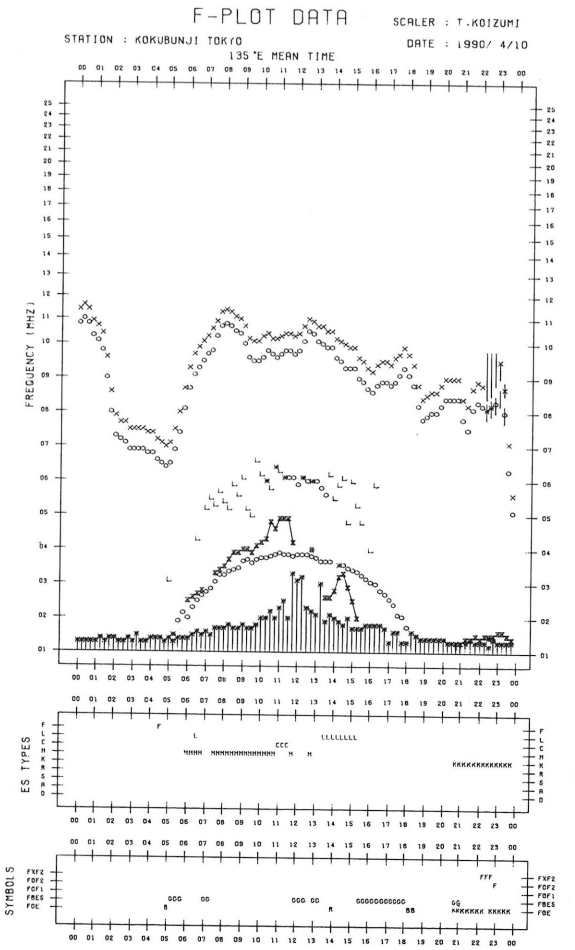

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/ 7
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

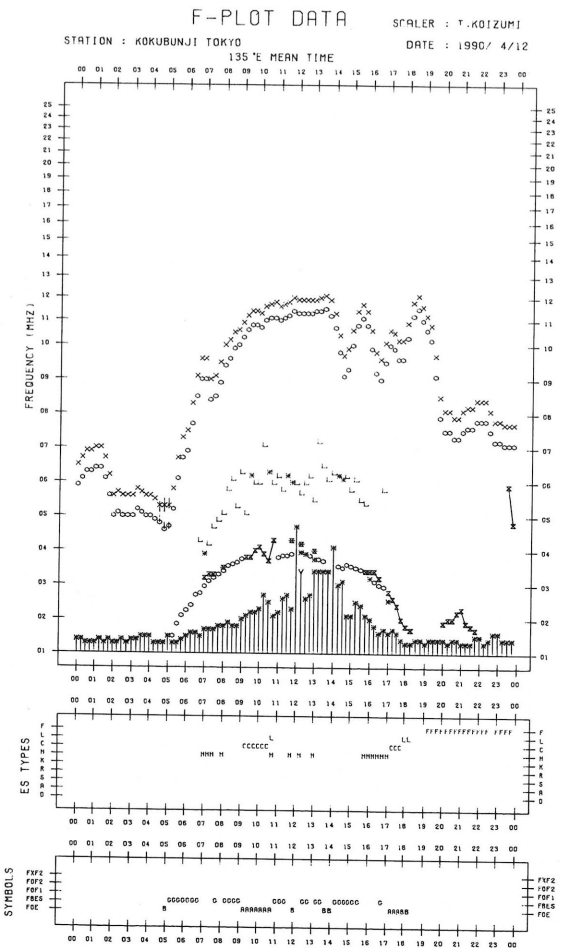

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/ 6
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

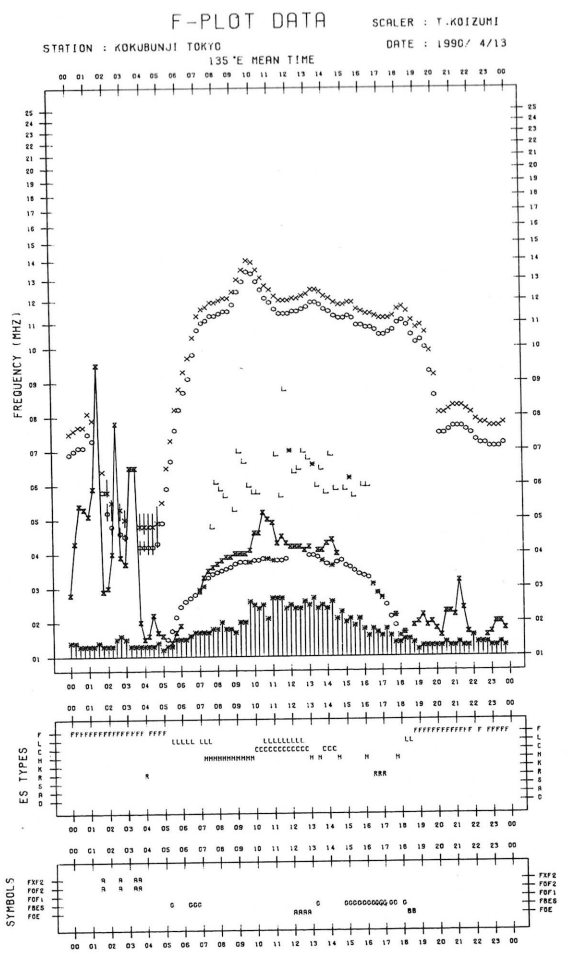

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/ 8
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

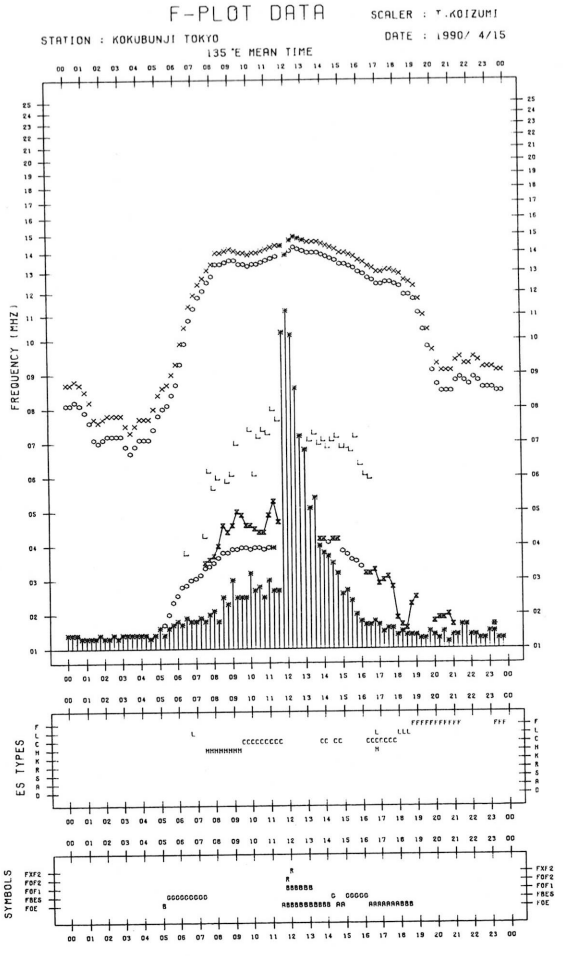

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/ 9
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

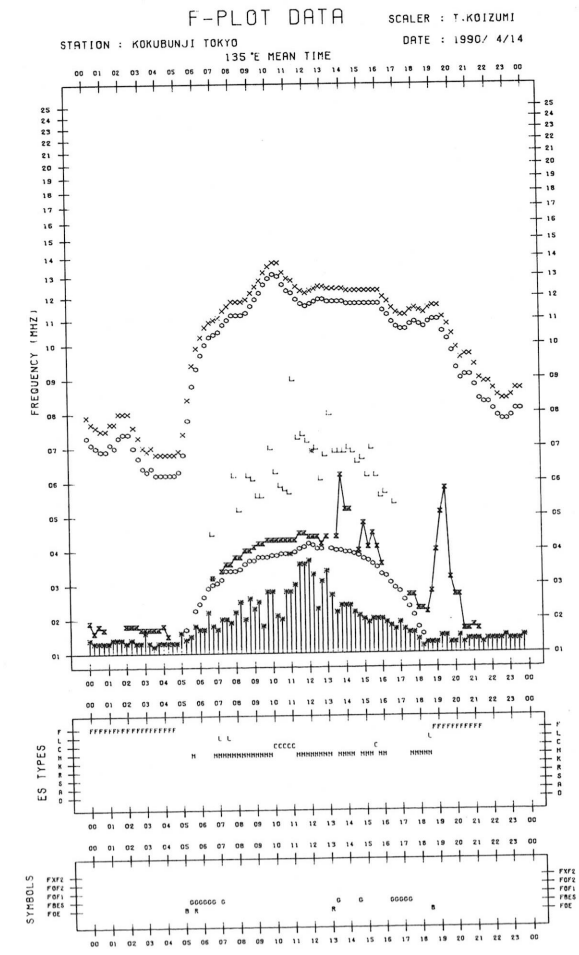

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/11
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

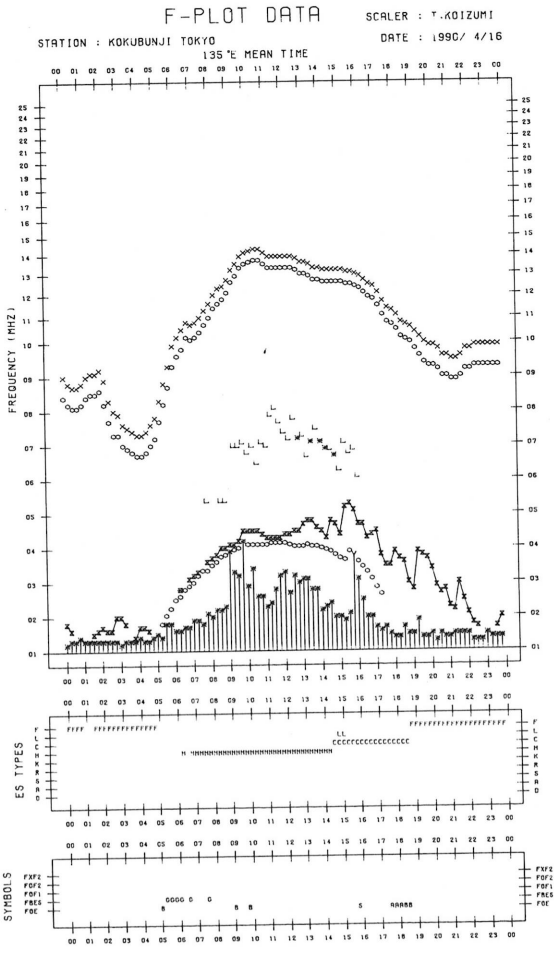

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/10
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

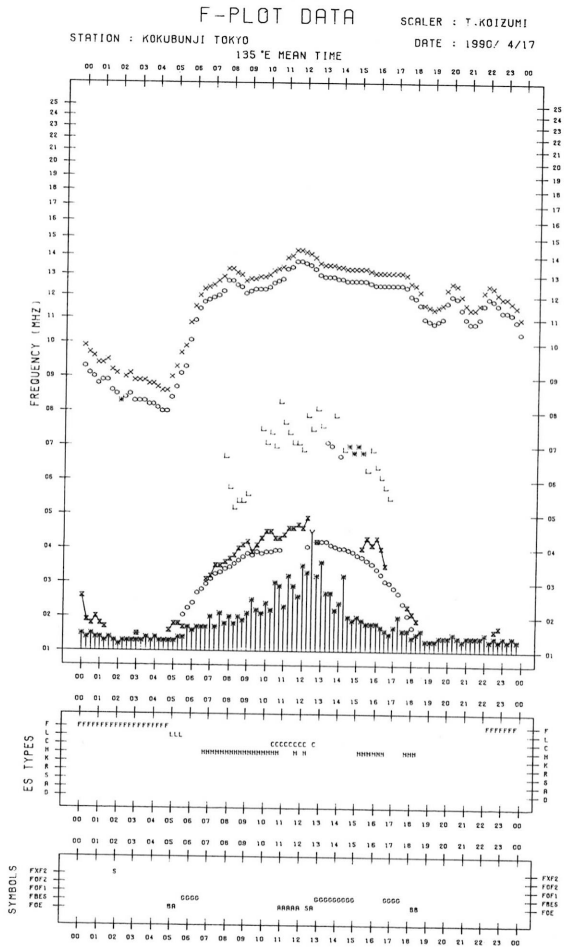

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/12
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

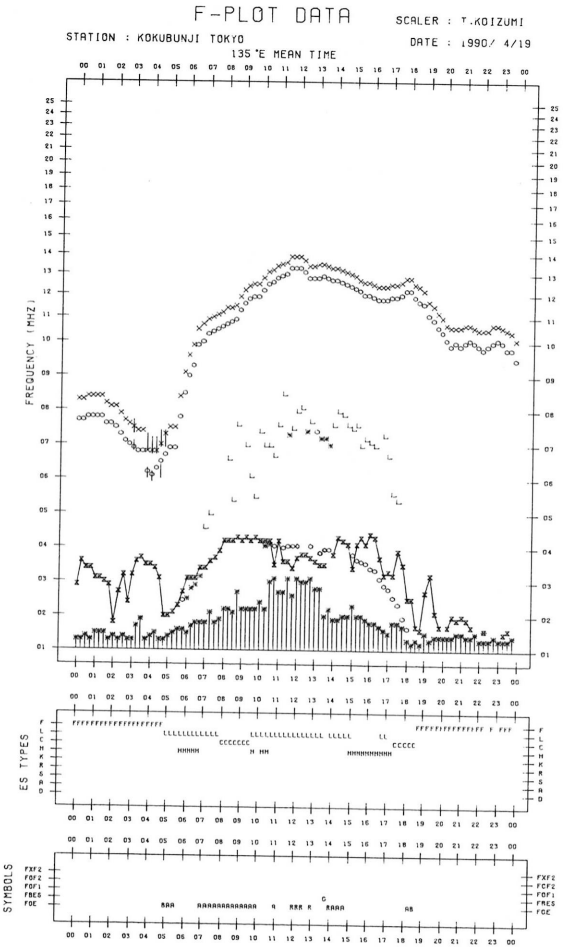

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/13
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

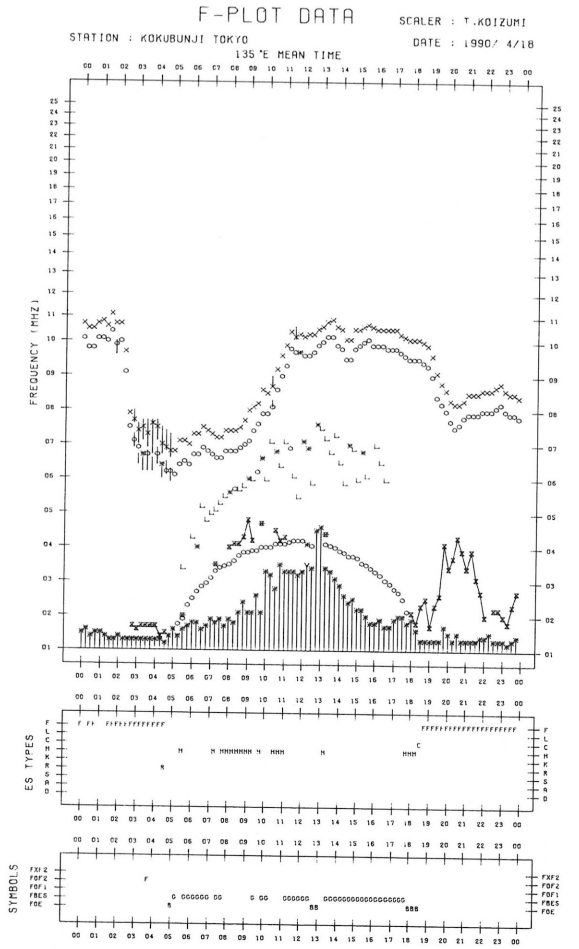

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/15
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

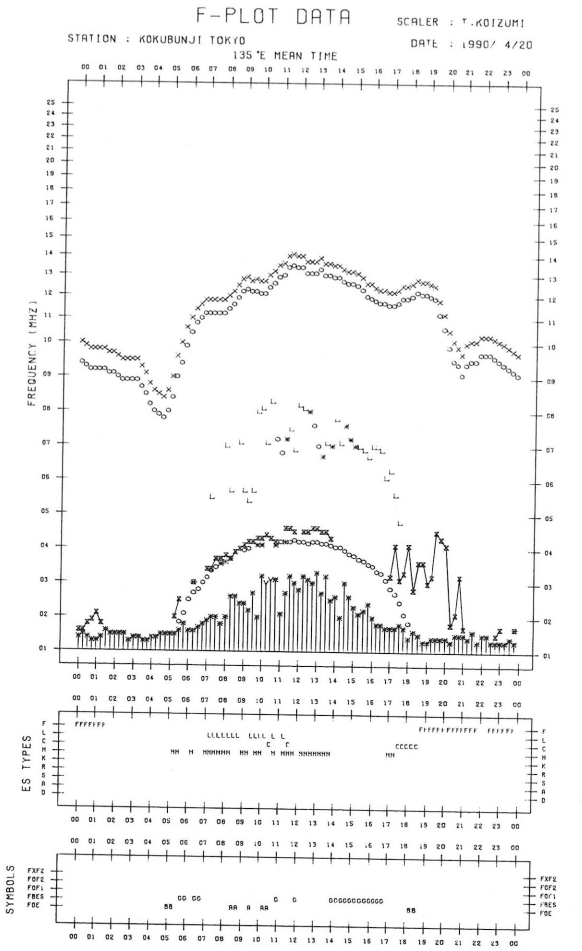

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/14
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

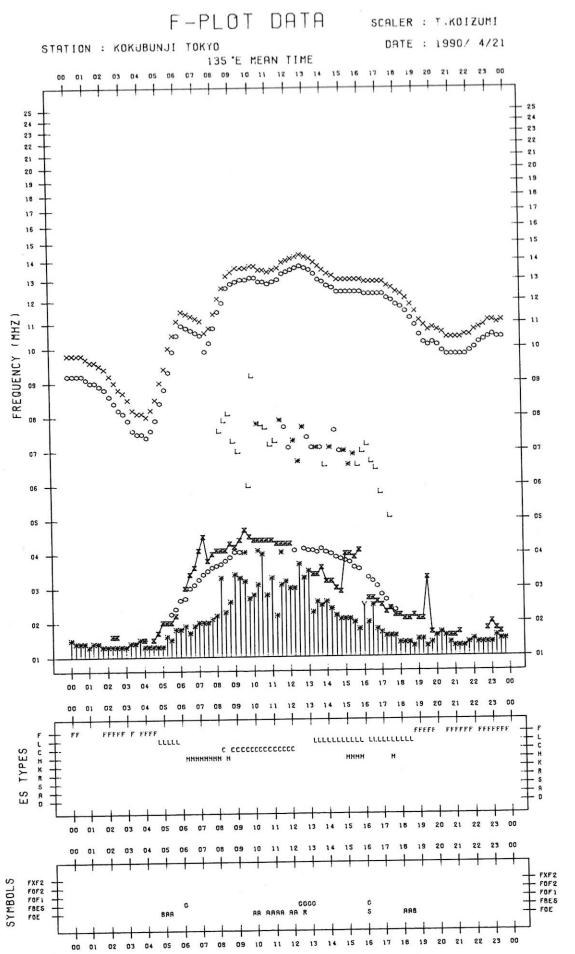

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/16
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

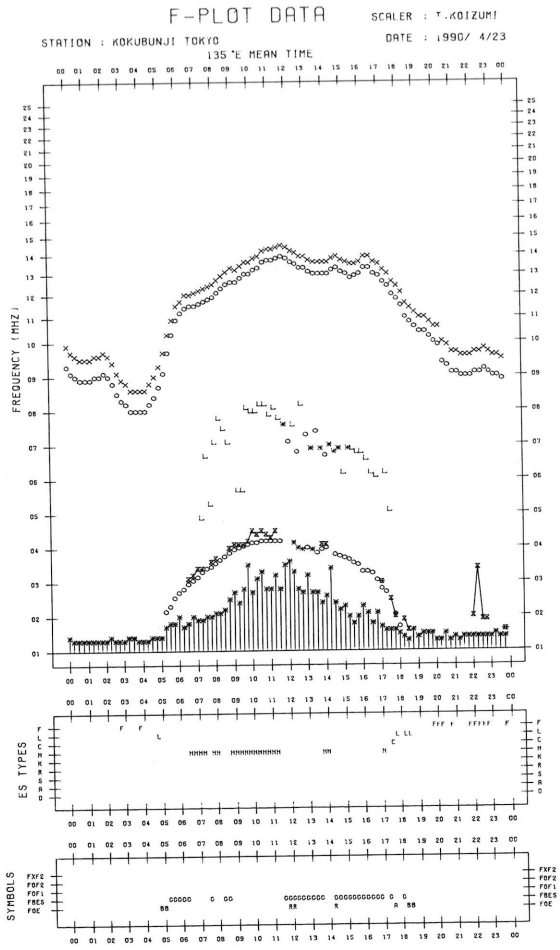

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/17
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

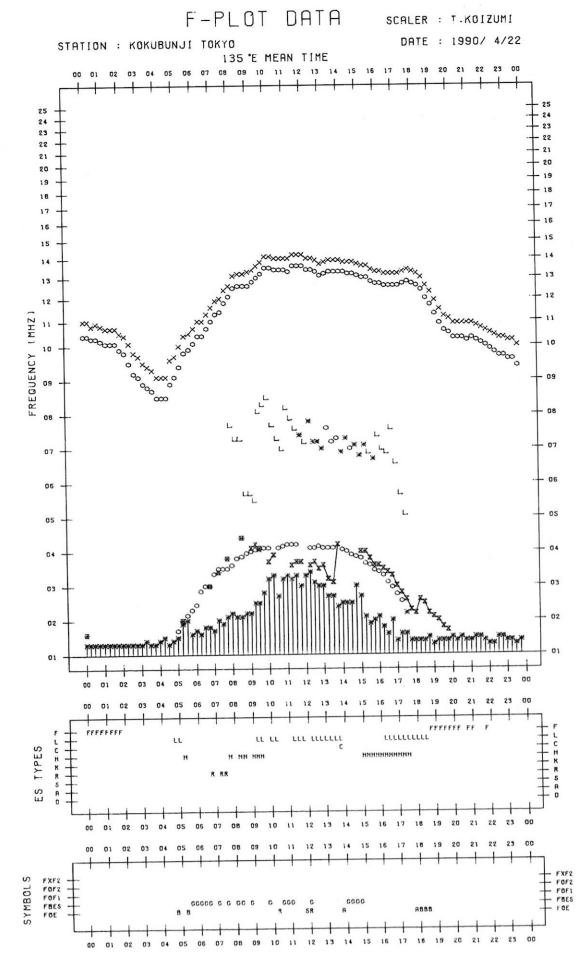

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/19
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/18
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/20
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/21
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/ 4/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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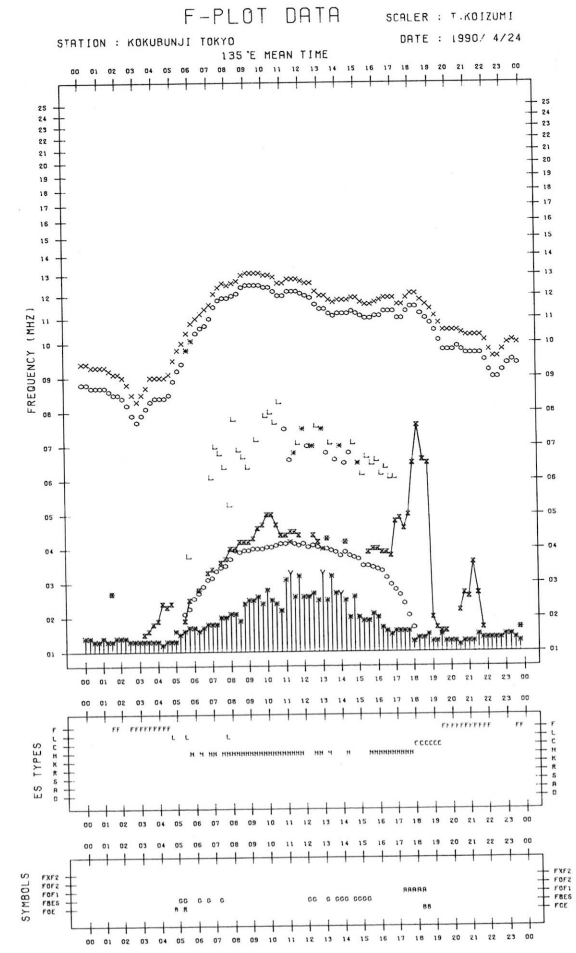
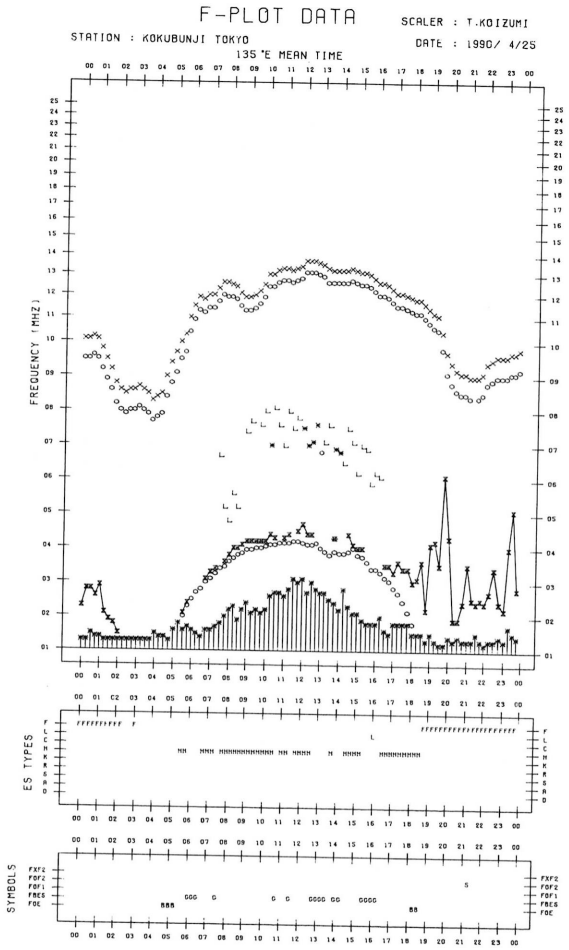
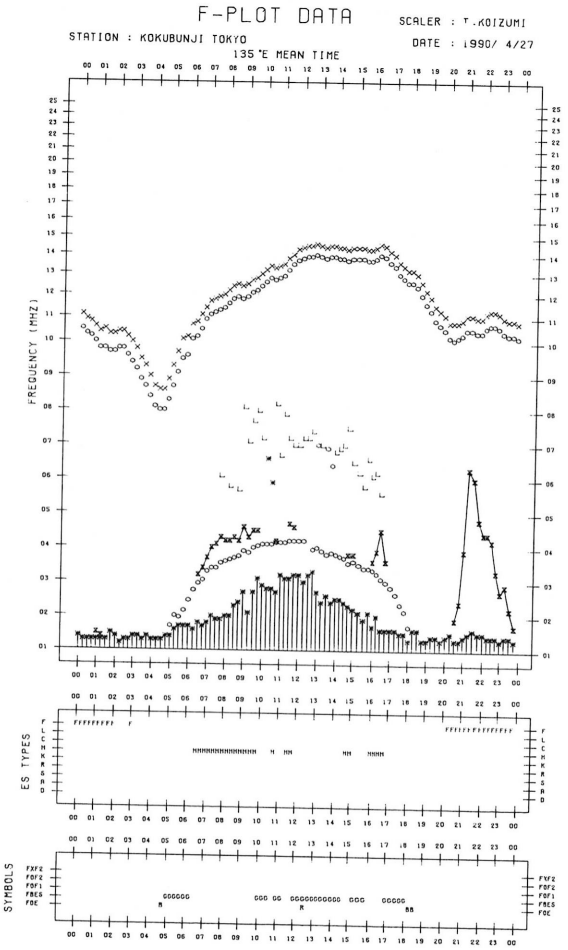
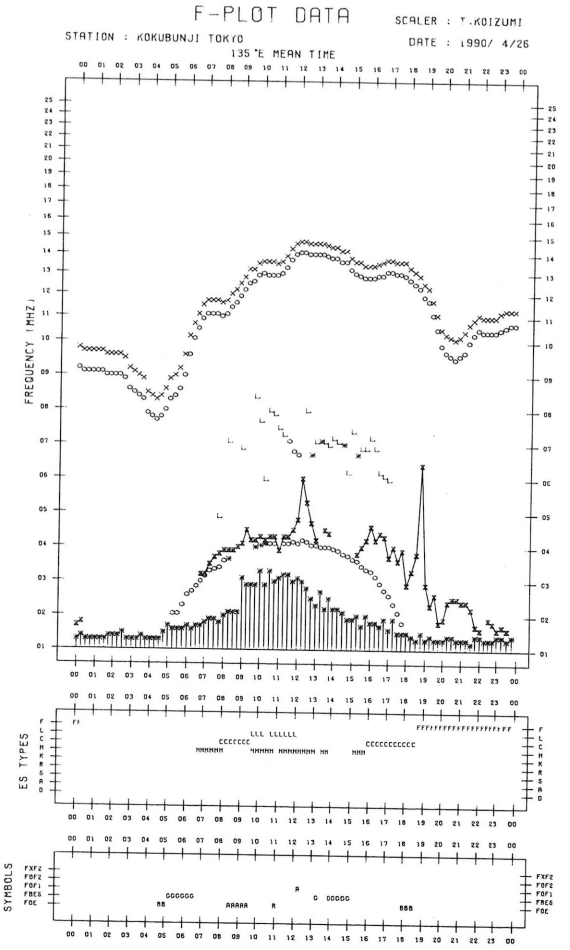
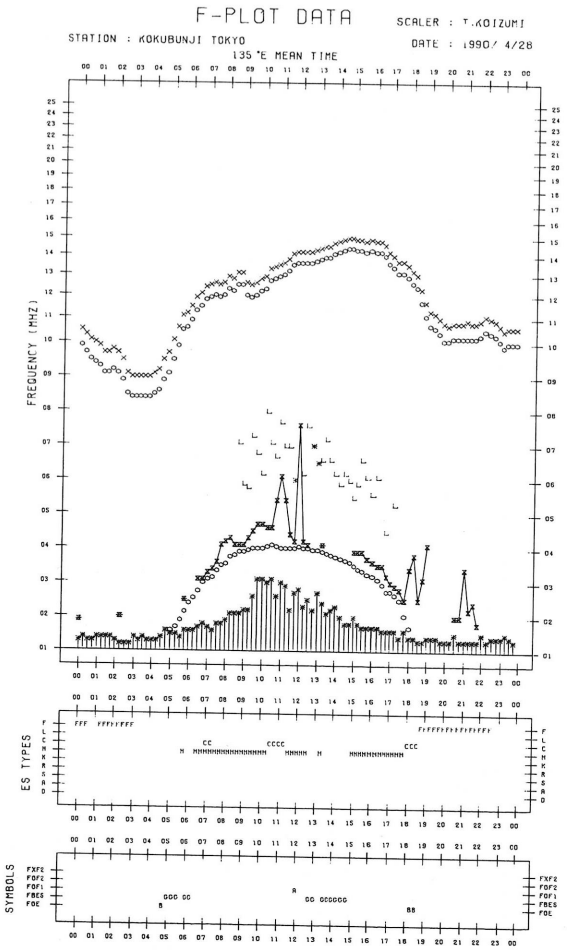
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

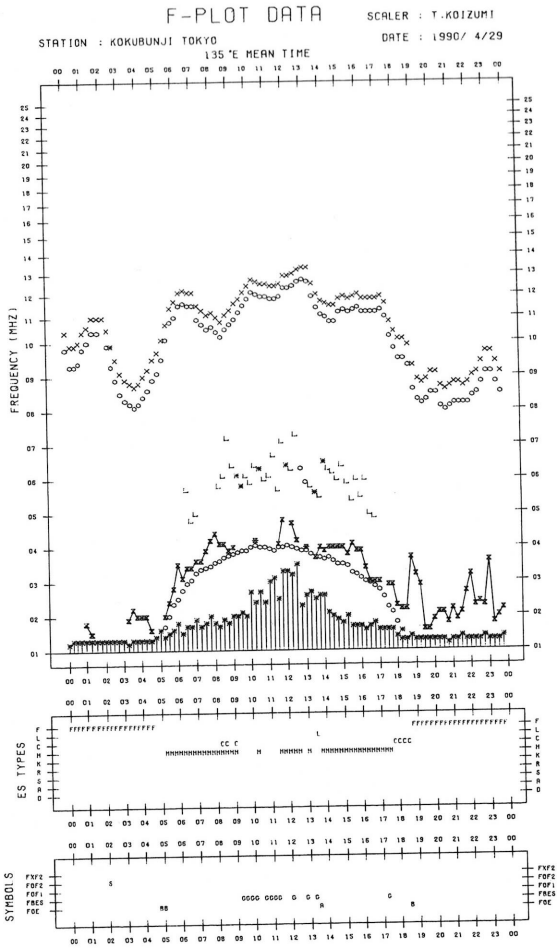

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

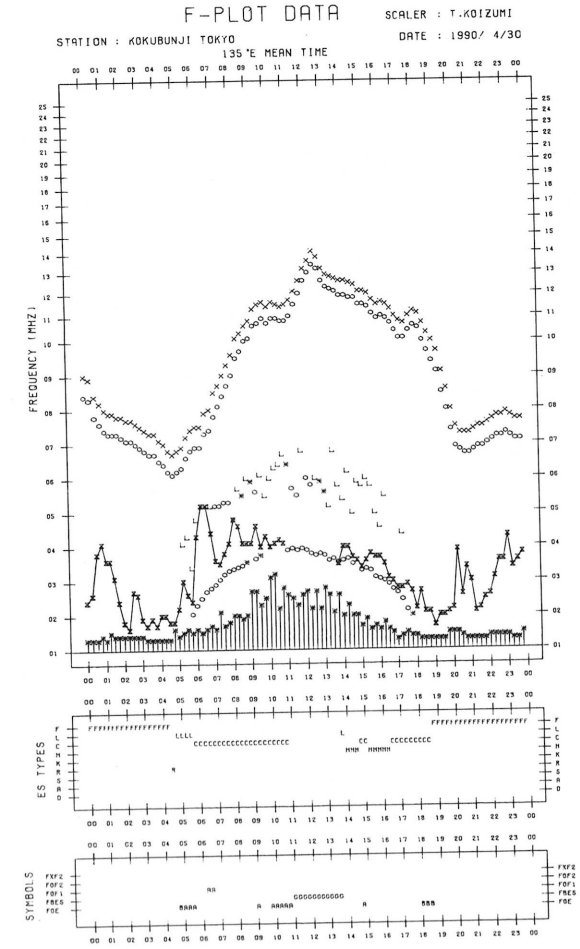

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/25
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/27
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/26
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/28
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/29
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXFE
FOFE
FOF1
FMES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 4/30
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXFE
FOFE
FOF1
FMES
FOE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

200 MHz

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

Note: No observations during the following periods.

none.

B.Solar Radio Emission

B1.Daily Data at Hiraiso

500 MHz

Hiraiso April 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	51	-	-	-	51
2	50	48	49	48	49
3	49	48	48	-	48
4	48	48	48	47	48
5	47	48	47	51	47
6	49	48	48	50	49
7	48	48	47	47	48
8	47	47	48	-	47
9	48	48	47	46	48
10	48	48	47	-	47
11	49	49	48	48	49
12	49	51	50	51	50
13	53	52	53	51	52
14	54	54	53	55	53
15	57	B	B	54	B
16	56	56	57	56	56
17	57	58	56	56	57
18	59	58	58	-	58
19	58	58	57	56	57
20	58	58	58	-	58
21	-	-	-	-	-
22	-	-	-	-	-
23	57	57	55	-	56
24	56	56	55	53	56
25	54	53	52	52	53
26	53	52	53	50	53
27	51	52	51	49	51
28	49	50	49	47	49
29	47	48	49	48	48
30	48	48	48	46	48

Note: No observations during the following periods:

1st 0200 - 0853.
3rd 2018 - 2335.
10th 2015 - 2340
20th 2000 - 22nd 2343.
2323 - 2348
8th 2015 - 2355
18th 2004 - 2342
23rd 1952 - 2338

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso — April 1990

Single-frequency observations

Normal observing period: 2010 - 0915 U.T. (sunrise to sunset)

APR 1990	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMIM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
3	100	41 F	0448.2	0510.0	109	685	-	-
	200	41 F	0458.7	0510.6	35	180	-	WR
	500	41 F	0719.0	0719.1	2.0	26	-	0
	200	42 SER	0739.4	0746.5	7.9	120	-	0
	500	46 C	0817.0	0821.5	12.5	93	18	0
	200	46 C	0819.5	0827.0	13.2	70	21	0
	100	42 SER	0820.0	0835.0	29.0	1000D	-	-
4	100	46 C	0527.5	0527.7	1.6	1000D	-	-
	200	46 C	0527.7	0528.0	1.3	340	-	0
5	200	44 NS	2018E	2230	280D	5	3	0
	500	20 GRF	2150	2242	128	7	3	WR
6	200	41 F	0610.7	0620.5	17.8	23	-	0
	500	41 F	0616.7	0618.0	3.0	72	-	0
	500	27 RF	2229.5	2245.0	45.0	15	5	0
7	200	43 NS	0233	0317	152	8	2	WL
	200	44 NS	2013E	0250	770D	11	3	0
8	100	46 C	0346.9	0353.7	47.5	640	50	-
	500	46 C	0347.5	0418.3	44.0	21	6	WR
				0358.5		16		0
	200	46 C	0348.2	0352.8	34.3	160	22	0
	200	42 SER	0426	0450.8	54	180	-	0
	500	41 F	0538.5	0544.0	8.5	17	-	0
	500	41 F	0728.0	0730.5	9.0	18	-	WR
	200	44 NS	2012E	0000	300D	5	1	0
9	200	42 SER	2035.6	2115.2	86	145	-	0
	200	42 SER	2255.8	2258.7	43.6	140	-	0
11	200	41 F	2025.7	2040.2	25	160	-	MR
	200	42 SER	2100	2100.7	7.9	95	-	MR
	500	41 F	2325.5	2326.5	2.6	21	-	0
12	500	20 GRF	0410	0450	115	8	3	0
	200	27 RF	0423.8	0455.4	80	14	4	0
	100	46 C	0546.0	0548.6	4.8	830	360	-
	200	46 C	0546.9	0549.2	31	240	18	0
	500	4 S/F	0553.5	0554.5	2.5	10	-	0
13	200	43 NS	0030	0400	300	10	1	WR
	500	8 S	0535.0	0535.1	0.6	758	-	0
	500	41 F	0738.7	0738.8	2.0	67	-	0
	200	46 C	2115.2	2115.8	22.0	605	47	0
	100	42 SER	2115.4	2117.7	14.5	900	-	-
	500	46 C	2116.5	2121.5	12.5	55	14	0
	500	46 C	2240.4	2243.9	9.5	20	-	0
	500	46 C	2337.5	2346.0	19.0	35	10	0
				2353.3		12		0
14	200	42 SER	0211.2	0221.1	19.8	84	-	0
	500	46 C	0215.6	0220.7	16.5	9	-	0
	500	41 F	0241.5	0246.0	6.0	67	-	0
	500	41 F	0307.0	0307.0	1.5	35	-	0
	200	41 F	0346.9	0351.8	11.9	108	-	0
	500	46 C	0347.5	0350.0	11.0	286	15	0
	200	42 SER	0752.8	0800.0	21.1	430	-	0
	100	41 F	2048.5	2054.8	9.6	1900	-	0
	200	41 F	2050.2	2054.1	11.0	1500	-	0
	500	41 F	2054.0	2054.5	5.5	380	-	ML
	500	4 S/F	2257.5	2257.5	1.2	11	-	0
15	500	48 C	0226.5	0445.U	370	100000D	930D	SR
				0304.5		9000		SR
				0340.0		6000		SR
				0522.3		100000		SR
				0654		1400		SR
	200	48 C	0232.3	0302.6	271	1400	90	WR
				0338.9		270		0
				0455.4		95		MR
	100	48 C	0237.6	0253.5	108	970	75	0
				0305.0		650		-
16	500	46 C	0039.0	0039.5	10.0	540	-	0
	500	27 RF	0359.0	0409.3	45	7	3	0
	500	46 C	0629.5	0630.0	23	103	14	0
	200	46 C	0630.6	0633.7	6.5	810	120	0
	100	48 C	0632.3	0636.2	7.3	6800	520	0
17	200	46 C	0350.8	0351.8	1.8	970	-	0
	100	46 C	0351.3	0352.1	2.0	710	-	-
18	100	48 C	0302.0	0304.6	5.9	1700	510	WR
	200	46 C	0303.3	0304.6	2.6	450	-	0
	500	46 C	0336.3	0336.5	3.5	1400	-	0
21	200	8 S	2313.9	2313.9	1.0	70	-	0
22	200	45 C	0354.1	0354.8	1.5	140	-	0
	200	8 S	0737.6	0737.9	0.9	460	-	0
	200	43 NS	2100	0037	300	17	3	MR
23	200	42 SER	0429.7	0431.9	7.3	610	-	0
	100	42 SER	0431.0	0435.6	5.9	420	-	-
24	500	4 S/F	0239.0	0240.5	1.5	14	-	WR
	200	46 C	0806.6	0808.3	3.3	230	-	0
	100	46 C	0807.5	0808.3	2.4	780	-	-
28	500	4 S/F	0017.0	0020.1	7.0	8	-	0
	100	41 F	0017.2	0023.1	16.5	1000D	-	-

C. RADIO PROPAGATION

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

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

MEASURED AT HIRAISO

UT DAY	00H 15M	01H 15M	02H 15M	03H 15M	04H 15M	05H 15M	06H 15M	07H 15M	08H 15M	09H 15M	10H 15M	11H 15M	12H 15M	13H 15M	14H 15M	15H 15M	16H 15M	17H 15M	18H 15M	19H 15M	20H 15M	21H 15M	22H 15M	23H 15M
1	ES -24	ES -24	ES -24	-9	1	ES -24	1	18	18	11	17	17	10	0	-11	ES -15	-11	-9	-9	ES -24	ES -24	ES -24	ES -24	ES -24
2	ES -24	-12	-12	-11	2	13	8	18	17	19	2	-1	-2	10	7	-3	-12	0	-2	ES -24	-12	ES -24	ES -24	-12
3	-11	ES -23	ES -23	-2	6	4	5	20	13	2	-2	4	4	7	3	-3	4	ES -23	ES -23	ES -23	-10	ES -23	ES -23	ES -23
4	ES -23	ES -23	-11	-10	-1	11	4	ES -23	ES -23	-11	ES -23	-11	ES -1	-11	ES -23	ES -23	ES -23	-10	-11	ES -23	ES -23	ES -23	ES 9	ES -23
5	ES -23	-11	-11	-1	10	11	11	15	ES -23	-1	ES -23	ES -23	-1	-5	ES -23	ES -23	-2	0	-10	ES -23	ES -23	-10	1	ES -23
6	-6	-9	-6	5	7	17	16	ES -24	ES -24	ES -24	ES -24	-12	-12	-7	ES -24	ES -24	6	ES -24	1	1	ES -24	-11	ES -24	-15
7	-6	-1	2	4	11	13	18	-8	-14	4	-10	-10	ES -23	-8	ES -8	-4	2	-1	6	ES -23	-10	2	-8	-14
8	ES -23	-10	-2	2	ES -23	6	-10	ES -23	-10	-6	-11	ES -23	ES -23	-3	ES -8	-10	5	3	6	ES -23	-11	ES -23	ES 3	ES -23
9	-10	-11	-8	4	17	11	19	ES -14	-8	ES -8	ES -23	ES -23	ES -23	ES -23	20	3	-8	9	9	ES -23	8	11	4	0
10	8	-1	-11	-11	11	13	ES -23	ES -23	ES -23	-11	-11	ES -23	C	C	C	C	C	C	C	C	ES -23	ES -23	ES -23	ES -23
11	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
12	ES -24	-12	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
13	ES -24	ES -24	ES -24	-12	-3	ES -24	ES -24	ES -24	ES -24	ES -24	-12	ES -24	-12	9	2	22	2	-3	ES -24	ES -24	-7	ES -24	ES -24	ES -24
14	ES -24	ES -24	ES -24	ES -24	2	-9	ES -24	ES -24	ES -24	ES -24	ES -24	0	ES -24	ES -24	-4	-12	-1	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
15	ES -24	ES -24	-12	ES -24	ES -24	ES -24	ES -24	ES -24	-12	ES -24	-2	ES -24	-11	3	7	8	3	-7	ES -24	ES -24	ES -24	ES -24	-12	ES -24
16	ES -24	ES -24	ES -24	-9	-11	3	ES -24	ES -24	ES -24	-3	-1	10	9	10	-6	-1	-3	ES -24	2	ES -24	ES -24	ES -24	ES -24	ES -24
17	ES -24	ES -24	ES -24	ES -24	-12	8	2	6	1	-3	-12	-12	ES -24	2	3	13	12	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
18	ES -24	ES -24	ES -24	-12	ES -24	ES -24	ES -24	-12	-12	-12	ES -24	ES -24	ES -24	10	16	6	-2	9	9	6	-3	-15	ES -24	ES -24
19	ES -23	ES -23	ES -23	-8	-14	-2	5	-2	4	-1	-1	1	5	19	8	-2	-1	-8	4	-11	ES -23	ES -23	ES -23	ES -23
20	ES -23	ES -23	ES -23	ES -23	ES -23	8	15	5	0	19	19	24	11	36	23	4	ES -23	3	8	-2	3	-11	ES -23	ES -23
21	ES -24	ES -24	ES -24	-1	1	13	18	10	-2	-4	-4	-3	2	21	16	0	-6	-2	-5	ES -24	ES -24	ES -24	ES -24	ES -24
22	ES -24	-12	-12	-12	1	14	17	20	24	24	18	17	17	19	3	8	3	6	7	-12	ES -24	-9	-9	ES -24
23	ES -23	ES -23	3	-3	7	4	-8	2	7	9	3	-1	-1	3	-1	9	3	3	ES -23	-5	ES -23	ES -8	ES -8	ES -23
24	ES -25	ES -25	ES -25	ES -25	ES -25	-12	-2	ES -25	ES -25	ES -25	ES -25	ES -25	1	-6	-1	-1	-7	-8	-13	-12	1	-7	ES -25	ES -25
25	ES -24	ES -24	-7	-12	2	2	8	0	1	0	1	2	2	16	9	9	13	19	12	1	2	-11	-3	-12
26	ES -24	ES -24	-9	3	16	16	ES -15	14	18	16	8	0	-5	25	19	23	15	12	8	-3	-11	-11	-11	ES -24
27	ES -24	-11	-12	9	15	16	2	-5	11	12	-9	10	17	20	17	9	2	6	15	9	3	0	ES -24	ES -24
28	-12	-3	-11	-6	0	9	-11	-4	0	-3	-2	1	17	10	0	5	6	8	ES -24	-9	13	21	11	12
29	-9	-5	-9	10	U 8	ES -15	-4	-6	-2	1	-7	-11	ES 0	-9	ES -1	-12	-12	10	ES -24	ES -24	-2	-11	3	-6
30	-1	3	-4	3	5	2	ES -24	ES -24	-11	ES -24	ES -24	ES -24	ES -24	ES -24	ES 3	-6	-1	-6	ES -24	4	7	2	6	-11
CNT	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	29	29	29	29	29	30	30	30	30
MED	ES -24	US -23	-12	-9	1	5	0	-7	-9	-3	-10	-10	US -1	3	US 2	-1	-1	-2	-9	ES -23	US -18	US -19	ES -23	ES -23
UD	-6	-1	-2	5	15	16	18	18	18	19	17	17	17	21	19	13	12	10	9	4	7	2	ES 6	-6
LD	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -23	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24

C. RADIO PROPAGATION

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

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

MEASURED AT HIRAISO

UT DAY	00H 45M	01H 45M	02H 45M	03H 45M	04H 45M	05H 45M	06H 45M	07H 45M	08H 45M	09H 45M	10H 45M	11H 45M	12H 45M	13H 45M	14H 45M	15H 45M	16H 45M	17H 45M	18H 45M	19H 45M	20H 45M	21H 45M	22H 45M	23H 45M
1	-9	-11	-6	3	12	5	26	30	21	28	27	30	29	12	24	29	26	22	26	10	5	1	-6	-12
2	-3	-6	0	5	21	21	18	25	23	26	22	22	28	22	5	30	21	28	20	14	10	1	1	1
3	-11	ES -23	-11	2	20	20	28	19	28	28	33	24	27	15	28	30	28	25	ES -23	13	0	3	-11	-11
4	ES -23	ES -23	-5	4	17	19	24	31	24	27	23	28	28	18	17	6	2	27	3	10	13	6	-1	-4
5	-11	0	1	6	13	27	34	27	25	35	23	27	32	18	-10	ES -23	ES -23	24	17	20	8	4	-8	0
6	-9	-9	2	9	19	19	23	23	28	28	29	12	30	23	ES -24	-15	22	ES -24	16	17	9	-2	-9	-9
7	-8	1	-1	18	18	20	26	28	29	27	29	15	25	11	7	17	31	29	13	13	13	2	-1	-11
8	-11	-1	2	7	4	24	24	27	26	27	29	19	27	19	20	-1	19	28	18	13	6	1	1	-5
9	-1	-11	4	11	13	23	29	24	24	28	27	9	7	14	-1	-6	-6	11	ES -23	ES -23	3	15	7	0
10	2	-2	7	13	13	14	22	23	17	30	8	-2	C	C	C	C	C	C	C	23	21	18	10	4
11	-15	-9	5	10	12	6	24	5	-9	2	-12	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	2	3	-12	ES -24	-12
12	ES -24	ES -24	ES -24	-2	2	18	17	21	25	24	24	30	21	21	26	23	20	2	ES -24	10	4	2	-12	ES -24
13	ES -24	ES -24	-12	2	8	19	22	23	23	23	19	26	5	-3	-3	18	14	12	-12	3	1	-12	ES -24	ES -24
14	ES -24	-12	ES -24	-1	3	23	21	19	26	29	22	26	21	20	27	17	18	18	4	0	-9	-11	ES -24	ES -24
15	ES -24	ES -24	ES -24	ES -24	ES -24	15	20	27	26	25	19	19	22	17	-7	-15	-3	24	-15	10	2	-11	-12	ES -24
16	ES -24	ES -24	ES -24	1	10	14	13	23	24	22	21	24	19	17	24	30	8	18	23	3	2	-15	ES -24	ES -24
17	ES -24	ES -24	-3	-11	10	19	23	26	26	26	23	17	22	19	22	21	28	6	ES -24	2	-9	ES -24	ES -24	ES -24
18	ES -24	ES -24	-1	ES -24	9	16	21	23	31	21	19	13	26	22	23	31	12	21	8	7	2	-9	ES -24	ES -24
19	ES -23	ES -23	-8	4	8	20	24	25	29	30	31	29	26	29	27	27	26	24	14	7	4	ES -23	ES -23	ES -23
20	ES -23	ES -23	-2	0	7	14	22	27	27	29	29	25	27	31	25	24	25	18	8	8	3	-11	ES -23	ES -23
21	ES -24	ES -24	-6	-4	7	22	20	23	24	26	31	24	27	22	24	31	23	19	14	2	2	-6	-15	ES -24
22	ES -24	ES -24	-12	0	9	17	22	27	28	26	28	26	29	23	24	20	17	23	10	3	-2	-9	ES -24	ES -24
23	ES -23	-11	ES -23	-6	12	24	22	21	25	28	34	25	25	22	22	22	18	18	19	4	4	-11	ES -23	ES -23
24	ES -25	ES -25	-7	-12	11	17	25	23	28	25	24	25	29	28	24	26	24	24	14	9	0	-1	ES -25	ES -25
25	ES -24	ES -24	7	6	-1	19	23	25	32	26	27	30	22	27	19	22	27	21	16	10	4	-12	-12	-9
26	ES -24	-12	-15	2	10	25	24	38	27	32	29	33	27	27	27	29	15	21	12	2	0	-11	ES -24	ES -24
27	ES -24	-12	5	2	12	12	18	21	29	27	31	27	25	23	27	26	26	19	21	9	6	0	-12	ES -24
28	ES -24	-11	-3	6	12	13	21	27	18	20	21	22	21	18	26	24	26	24	10	8	10	1	ES -24	-6
29	-9	-3	ES -24	3	8	16	18	30	22	36	26	35	28	26	17	27	23	21	12	14	3	7	-15	ES -24
30	0	-4	1	7	13	19	23	28	29	26	33	21	21	21	18	12	26	20	18	3	3	6	-3	ES -24
CNT	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	29	29	29	29	30	30	30	30	30
MED	ES -23	-12	-4	2	10	19	22	25	26	27	26	24	26	21	22	22	21	21	12	8	3	-2	-14	US -23
UD	-1	-1	5	11	19	24	28	30	29	32	33	30	29	28	27	30	28	28	21	17	13	7	1	0
LD	ES -24	ES -24	ES -24	-12	2	12	18	19	18	21	19	9	7	11	-10	-15	-6	2	ES -24	2	-2	-15	ES -24	ES -24

C. Radio Propagation

c2. Radio Propagation Quality Figures at Hiraiso

Hiraiso

Time in U.T

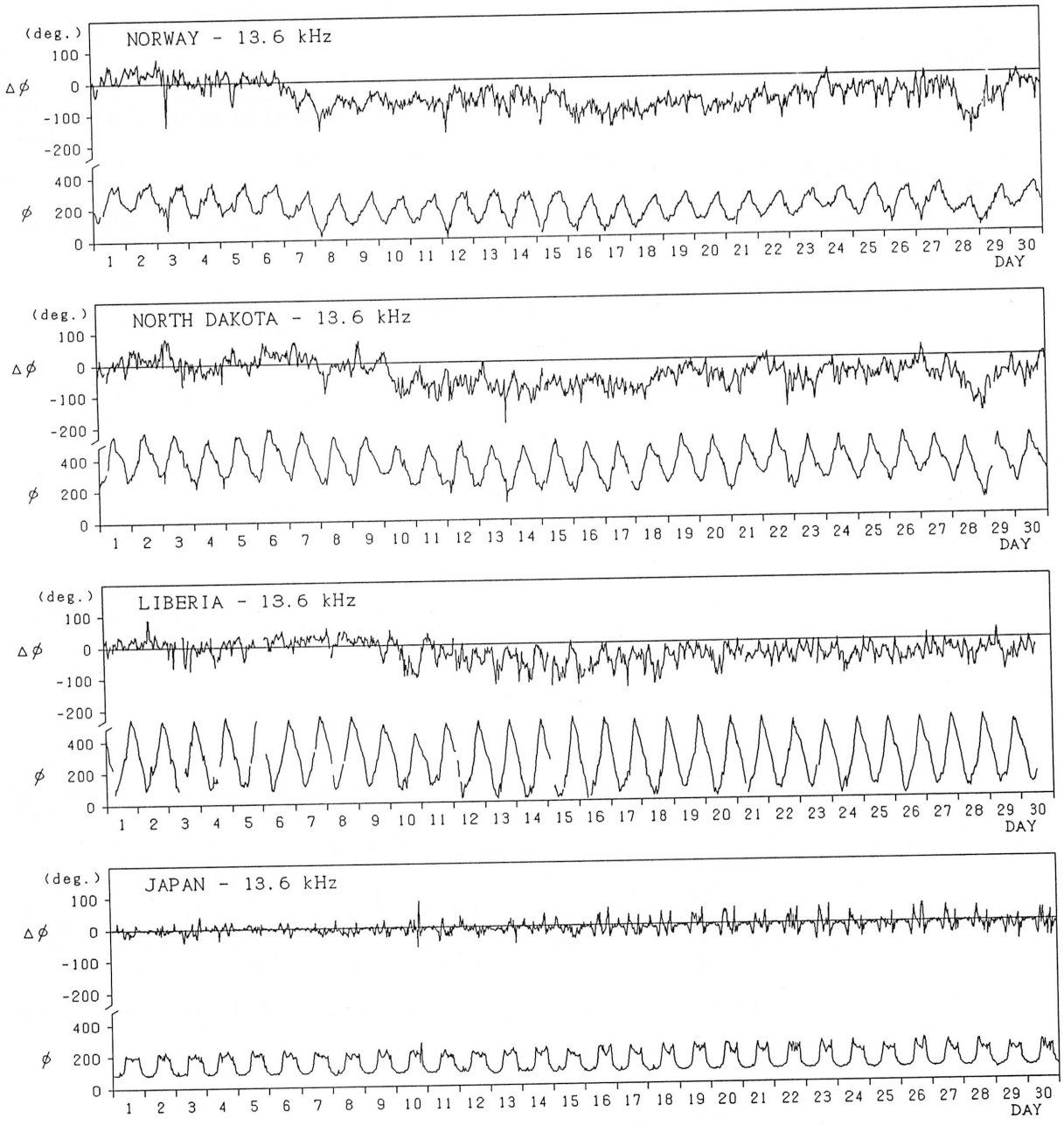
Apr. 1990	Whole Day Figure	W W V 00 06 12 18 | | | | 06 12 18 24	W W V H 00 06 12 18 | | | | 06 12 18 24	Conditions 00 06 12 18 | | | | 06 12 18 24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	4o	3U 5 4 3U	4 4 4 5	N N N N			
2	4+	4 5 4 5U	4 4 4 5	N N N N			
3	4o	4 5 4 4U	4 4 4 4	N N N N			
4	4-	4 3U 3U 3U	4 4 3 5	N N N N			
5	4+	5 4 3 4U	5 5 3 5	N N N N			
6	4o	5 3U 3 5U	5 4 3 5	N N N N			
7	4+	5 4 4 5U	5 4 4 5	N N N N			
8	4o	4 3 4 5U	4 4 4 5	N N N N			
9	4o	5 3U 4 5U	5 4 2 4U	N N N N	0843	---	354
10	4-	4 3U C S	4 3 C 5	U U U U	---	---	
11	2+	2U 2U 2U 2U	4 2 1U 3U	U U U U	---	24	
12	3-	2U 2U 2U 2U	3 4 3 3	U U U U	0326	---	206
13	3o	3U 3U 3 3U	4 4 2 3	U U U U	---	---	
14	3o	3U 3U 2U 2U	3 4 4 3	U U U U	---	24	
15	3o	2U 3U 4 3U	2U 4 2 3	U U U U			
16	4-	3U 4 4 4U	3 4 4 4	U U U U			
17	3o	3U 4 3 2U	4 4 3 2U	N N N N	0719	---	170
18	4-	2U 3U 4 5U	3 4 4 4	N N N N	---	12	
19	4o	3 5 4 4U	4 4 4 3U	N N N N			
20	4o	3U 5 4 5U	4 4 4 4	N N N N			
21	4o	4 5 4 3U	4 4 4 4	N N N N			
22	4+	4 5 5 5U	4 4 4 3	N N N N			
23	4o	4 5 4 4U	3 4 4 4	N N N N	0336	---	131
24	4o	3U 3U 4 5U	4 4 4 4	N N N N	---	24	
25	4+	4 5 5 5U	4 4 4 4	N N N N			
26	4o	4 4 5 5U	4 4 4 3	N N N N			
27	4+	5 5 5 5U	4 4 4 4	N N N N			
28	4o	4 4 4 5U	4 3 4 4	N N N N			
29	4o	4 4 3 4U	4 4 4 4	N N N N	04.7	18	103
30	4-	4 3U 3U 4U	4 4 4 4	N N N N			

C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo

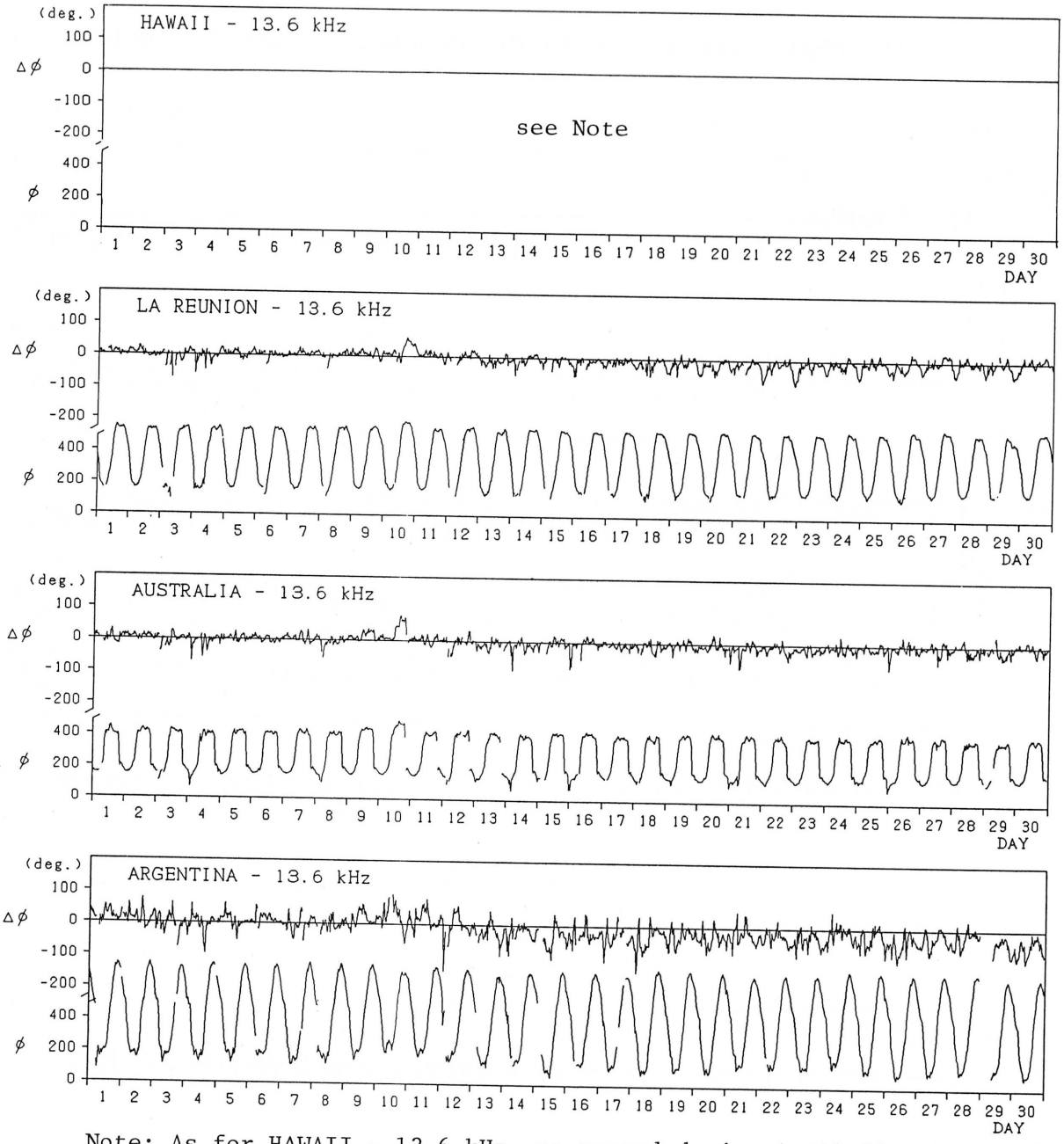
Inubo

April 1990



Inubo

April 1990



Note: As for HAWAII - 13.6 kHz, no record during April 02 - April 30, 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.)
Apr.06/2200	Apr.10/0100	Apr.08/1030	142.2
Apr.11/0430	Apr.13/1230	Apr.11/2012	144.0
Apr.16/0133	Apr.23/2330	Apr.17/1122	129.6
Apr.28/0635	Apr.29/2230	Apr.28/1347	151.2

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso

Time in U.T.

Apr. 1990	S W F								Correspondence	
	Drop-out Intensities(dB)					Start	Duration	Type	Imp.	Solar Flare	Solar Noise
	CO	HA	1)	2)	3)						
1	25	40	31	17	11	0504	86	G	2+		
3	x	x	23	x		0139	46	SL	2-		
3	x	x	6			0225	30	SL	1-	x	
3				x	22	0819	73	SL	1+		x
4		x	21			0145	36	SL	2-	x	x
4				x	24	1311	73	G	2-	x	
4					37	1918	62	G	2+		
5			12			0054	33	SL	1	x	x
5					21	1343	47	S	1+	x	
8	40	35	25	x		0342	36	G	2	x	x
12		x	28	x		0250	26	SL	2+		x
12			13	x		0418	64	G	1		x
12			7			0552	14	SL	1-		
12			8	x		0606	19	SL	1-		
13			9			0037	14	SL	1-	x	x
13			15			2120	15	SL	1	x	x
14			10			0217	14	SL	1-	x	x
14			13	x		0348	19	SL	1	x	x
15		x	25	x		0229	211	SL	2	x	x
16			25			0037	19	SL	2	x	x
16	25	50	37	x	7	0630	32	S	3	x	x
17		x	16	x		0313	23	SL	1+	x	x
18			8			0202	37	SL	1-	x	x
18			11			0248	15	SL	1-	x	
18			12			0335	18	SL	1	x	
18			12			0353	19	SL	1		
19			8			0343	24	SL	1-	x	
19			6	x		0408	16	S	1-	x	
21			15		x	0645	55	SL	1	x	
23					11	1253	26	SL	1-	x	
25			14			2345	35	SL	1	x	

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

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Apr. 1990 Date	S P A								
	Phase Advance (degrees)						Time (U.T.)		
	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
1	135	198	219	132	76	76	0500	0808	0533
1		61					1456	1626	1520
2	11		10	—		33	0434	0516	0453
2		21					1342	1426	1348
2		32					1705	1748	1713
2	15			10	—	15	2248	2309	2257
3	84	89	103	112	—	104	0132	0404	0153
3	51*	70	94	67	—	34	0455	0628D	0523
3		39*	41	20	—		0628E	0716D	0633
3	24	54	36	9	—		0717E	0742D	0735
3	65	135	88	35	—		0742E	0816D	0755
3	171	177	250	128	—		0820E	1104	0836
3		103			—	62	1709	1847	1727
3					—	24	2149	2222	2159
3	17	17		19	—	19	2328	2356	2333
4	21	20	18	31	—	24	0040	0118D	0044
4				10	—		0118E	0138	0123
4	42	48	86	77	—	47	0143	0316D	0155
4	27	22	33	23	—		0316E	0424	0321
4			16	—	—		0520	0606	0637
4		24	20	—	—		0712	0736D	0724
4		25	17	—	—		0736E	0808	0747
4			17	—	—		0908	0940	0914
4	44	195	13		—		1316	1503	1342
5			28	44	—	27	0058	0153	0104
5		32	19		—		1101	1211	1118
5	28	112			—		1344	1506	1354
5				6	—	10	2224	2242	2231
7			7	8	—		0436	0527	0453
7		55			—		1512	1643	1533

Inubo

Apr.	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
8				6	—		0231	0247	0237
8	70	119	150	145*	—	100*	0351	0653D	0423
8			25	29	—		0654E	0806	0658
8		19	19	10	—		0838	0859D	0844
8		17	9		—		0859E	0925	0907
8		59			—		1313	1400	1321
9		21	10		—		0832	0902	0836
10			8	6	—		0507	0548	0522
10		90	55	17	—		0842	1014	0907
10		93	19		—		1151	1340	1209
12				12	—		0049	0142	0055
12	49	107	151	111	—	81	0250	0415D	0300
12		101	135	86	—	71	0415E	0552D	0454
12	53	104	98	59	—	34	0548E	0852	0633
12				13	—		0906	0950	0916
12			9	5	—		2344	0010	2353
13	22	21	31	59	—	31	0035	0114D	0043
13			30	34	—		0114E	0147D	0122
13				15	—	9	0147E	0219	0151
13		13	9	16	—		0319	0335	0327
13			10	14	—		0400	0428D	0410
13			14	12	—		0428E	0457	0436
13			28	29	—		0505	0540	0509
13		22	13		—		0943	1044	0952
13		77	11		—		1149	1317	1202
13	40	20	21		—	107	2117	2242	2129
13		11			—	19	2254	2310	2301
13				7	—		2332	2358	2343
14		41	63	63	—	25	0220	0348D	0244
14	32	57	118	80	—	36	0348E	0447D	0358
14			20	18	—		0447E	0508D	0454
14			24	17	—		0508E	0607D	0517
14		26	17	10	—		0606	0639	0615
14		51	59	33	—		0648E	0858	0657
14		56	13		—		1030	1206	1045
14		47	10		—		1229	1323	1235
14		36			—		1529	1622	1550
14		11		14	—		2327	2353D	2337
14		19	14	31	—	38	2353E	0050	0004
15	90	198	293	202	—	111	0231	0850	0311
15		64	17		—		1145	1238D	1202
15		24			—		1238E	1255	1241
15					—	28	2056	2118	2104
15				8	—		2311	2326D	2319
15	11			11	—		2326E	2346D	2331
15	32	65	39	70	—	50	2346E	0039D	2359
16	57	79	51	91	—	47	0039E	0222	0047
16			20	19	—	14	0402	0519	0419
16	117	—	329	198	—	87	0629	1018	0637
17	26	42	92	—	—	28	0312	0510	0324
17	17	25	17	—	—		0619	0718	0634
17		59			—		1212	1306	1233
17		72*			—		1428	1534	1450
18				7	—		0052	0111D	0100
18	11	19	16	18	—	12	0111E	0152	0116

Inubo

Apr.	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
18	13	23	37	35	—	19	0201	0318D	0213
18			20	13	—		0318E	0336D	0328
18	36	70	118	82	—	33	0336E	0356D	0346
18	38	69	118	80	—		0356E	0537D	0403
18			44	27	—		0537E	0715	0552
18		27	13	5	—		0750	0821D	0757
18		72	57	15	—		0821E	0940	0842
18		67	26		—		1014	1247	1039
18		35			—		1350	1427D	1406
18		36			—		1427E	1527	1438
18		14		8	—		2254	2320	2257
18				8	—		2340	0003	2345
19	22	38	49	51	—	23	0336E	0524	0351
19			20		—		0919	1016	0931
19		22			—		1553	1652	1608
19	18			16	—	20	2247	2330	2307
20	28			16	—		0058	0141	0102
20				8	—		0142E	0206	0149
20	20	73	53	38	—		0616	0738	0626
20			26		—		1000	1105	1005
20		41*			—		1325	1458	1356
20					—	30	1818	1853	1830
20	36	34	31	51	—	44	2347	0106	0000
21			6	4	—		0235	0251D	0239
21			17	13	—		0251E	0355	0255
21	36	142	157	97	—	33	0644	0719D	0657
21	49	175	171	106	—	23	0719E	0926D	0726
21			21		—		0926	1023	0932
21					—	35	1909	1941	1921
22			31	32	—	16	0249	0417	0309
22			6	10	—		0655	0733	0704
23		24	17	—	—		0814	0848	0824
23		75			—		1254	1512	1319
24			11	—	—		0240	0326	0259
24			12	10	—		0526	0614	0547
24			35	22	—		0631	0740	0644
24		18	18		—		0807	0907	0822
24		64	25		—		1116	1240	1129
24				15	—		2250	2344	2256
25				6	—		0142	0208	0149
25			9	7	—		0321	0342	0326
25			28	22	—		0434	0536	0444
25		33	36	62	—	45	2345	0050D	2358
26		19		40	—		0050E	0209	0057
26			21	—	—	38	0427	0516D	0437
26			21	—	—	32	0516E	0627	0536
26			40	—	—		0623	0730D	0653
26			40		—		0730E	0856	0742
26		12			—		1316	1342	1322
26		42			—		1520	1639	1546
26					—	20	1905	1930	1910
26					—	50	1938	2013	1950
26					—	33	2157	2232	2211
27			22	14	—	14	0019	0102	0032
27			10	6	—		0519	0543D	0525
27			14	6	—		0537	0616	0547
27			10		—		0743	0814	0753
27		25			—		1355	1423	1403

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