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IONOSPHERIC DATA IN JAPAN

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CONTENTS

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INTRODUCTION

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

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

A. IONOSPHERE

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

A1. Automatic Scaling

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

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

a. Characteristics of Ionosphere

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

b. Descriptive Letters

The following descriptive letters are used in the tables.

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

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

C Impossible measurement because of any failure in observation.

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

N Impossible automatic scaling because of complex echoes.

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

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

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

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction (Second Edition) 1972" and its revision of chapters 1-4, published in July 1978.

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

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

(ii) Qualifying Letters

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

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

(iii) Description of Types of *Es*

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

The types are:

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

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

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

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

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

B. SOLAR RADIO EMISSION

Solar radio observations at 100, 200 and 500 MHz are carried out at Hiraiso. The observation equipment consists of two parabolic antennas, one with 10-meter diameter for 100 and 200 MHz measurements and one with 6-meter diameter for 500 MHz measurements, each being equipped with a pair of crossed doublet antennas as a primary radiator, and three appropriate receivers. Each pair of the crossed doublet antennas is used as a polarimeter. Observations are continuously carried out almost from sunrise to sunset.

B1. Daily Data at Hiraiso

The three-hourly mean and daily mean values of the solar radio emission intensities at the base-level are tabulated separately for 200 and 500 MHz measurements. Here, the base-level intensity is defined as the intensity recorded during the time when no radio emission burst is taking place. The intensities are expressed by the flux density in 10^{-22} Wm^{-2} Hz^{-1} unit.

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

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

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

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

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

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

B2. Outstanding Occurrences at Hiraiso

The table is a list of outstanding occurrences of solar radio emission bursts observed at Hiraiso during a month. Listed in the table are the date, frequencies, the type of event, the start time and the time of maximum, both in U.T. expressed in hours, minutes and tenths of a minute, the duration in minutes, the peak and mean flux densities in 10^{-22} Wm^{-2} Hz^{-1} unit, and the polarization.

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

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

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

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

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

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

C. RADIO PROPAGATION

C1. H.F. Field Strength at Hiraiso

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

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

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

C2. Radio Propagation Quality Figures at Hiraiso

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

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

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

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

C artificial accident,
S propagational accident,
U inaccurate.

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

N normal,
U unstable,
W disturbed.

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

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

C3. Phase Variation in OMEGA Radio Waves at Inubo

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

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

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

C4. Sudden Ionospheric Disturbances

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

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

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

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

Types of fade-out are as follows:

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

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

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

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

b. Sudden Phase Anomaly (SPA) at Inubo

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

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

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

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

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

Transmitting Stations

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

HOURLY VALUES OF FOF2 AT WAKKANAI

JUN. 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	74	68	66	64	66	67	63	63	67	63	49		A	65	65	64	72	66	73	72	A	72	72	62
2	68	62	59	60	58	A	73	A	A	59	51	A	A	A	64	A	60	66	63	68	68	60	66	68
3	61	66	68	63	66	77	88	88	89	87			A	88	84	80	84	82	78	83	55	92	86	82
4	79	78	80	79	74	81	88	85	67	77	76	80	72	71	68	56	81	78	86	87	66	52	69	66
5	73	65	62	63	65	A	A	A	66	57	A	55	A	A	A	52	A	85	71	71	73	80	84	77
6	74	74	71	71	64	75	72	A	71	A	80	86	80	A	75	84	79	76	75	80	80		89	92
7	91	75	77	77	75	84	91	86	87	82	71	64	69	72	A	86	A	76			83	76	65	74
8	80	80	66	70	64	76	81	80	79	90	80	75	80	85	82	84	88	A	80	87	88	90	89	86
9	86	72	73	70	78	86	86	82	83	78	78	76	59	76	82	84	84	78	85	90	88	92	79	84
10	67	79	66	67	68	64	65	67	64	A	51	A	A	A	A	90	A	89	67	65	62	A	78	77
11	74	67	63	64	64	66	66	86	78	70	72	72	73	68	69	55	A	86	89	78	74	80	84	83
12	76	70	68	70	70	90	95	92	89	90	84	N	87	87	89	87	80	72	78	82	88	88	86	90
13	89	80	58	40	48	47	48	47	56	63	A	55	54	68	73	65	68	A	77	62	87	86	85	77
14	76	62	73	72	82	83	84	89	91	88	A	80	91	91	95	83	80			89	84	81	87	76
15	86	54	51	65	55	A	A	A	71	A	A	A	89	A	A	51	A		A	95	A			87
16	79	66	65	63	64	78	87	100	91	A	90	66	73	72	80		80	A	74	76	66	85	86	88
17	86	83	86	88	73	82	85	91	84	80	56	80	78	78	78	72	59	76	79	88	87	81	75	84
18	84	79	84	82	84	98	90	102	84	84	91	88	86	83	86	83	81	88	89	89	86	90	88	84
19	86	90	84	79	77	84	90	88	78	90	82	79	78	69	81	85	80	86		67	78	80	74	77
20	66	67	70	71	74	82	84	91	88	86	86	77	74	79	78	81	74	78	82	90	90	90	79	84
21	77	78	77	77	76	86	87	103	102	90	84	86	85	85	81	80	82	86	88	90	90	90	90	87
22	85	86	79	81	65	82	97	101	98	91	91	84	90	N	83	88	83	86	89	88	86	90	79	81
23	84	78	78	76	82	98	87	86	83	81		85	90	92	84	80	77	83	76	87	90	86	89	88
24	79	80	71	68	68	81	88	98	94	91	62	85	99	79	81	78	75	86	78	84	84	86	85	87
25	87	66	77	66	60	74	82	75	71	51	45	A	A	A	A	49	57	56	53	60	66	66	68	58
26	52	57	64	49	54	66	88	88	84	71	61		65	63	49	64	56	64	74	72	82	79	80	78
27	84	77	66	62	64	67	66	68	A	64	68	66	77		62	65	63	67	70	66	80	81	73	69
28	65	70	59	57	60	58	67	76	59	A	A	56		50	46	67	65	60	64		65	66	77	71
29	68	66	66	62	63	82	101	108	A		87	A	65		66	65	A	73	52	72	75	81	66	84
30	83	84	76	73	61	70	76	82	A		82	A	A	A	80	76	75	66	75	78	75	84	84	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	27	28	26	26	23	23	20	22	20	25	28	24	25	26	28	28	27	29	30
MED	79	73	69	69	66	81	86	87	83	81	78	78	78	77	80	79	78	78	76	81	81	81	80	82
U Q	85	79	77	76	74	84	88	92	89	90	84	84	87	85	82	84	81	86	82	88	87	90	86	86
L Q	73	66	65	63	63	67	72	80	71	64	61	66	72	68	67	64	66	66	71	71	70	79	73	76

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT WAKKANAI

JUN. 1990

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

DH	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	35	28	29	27	38	68	47	55	51	62	69	G	52	55	45	G	G	44	44	38	93	44	59	41
2	66	45	34	37	46	76	42	77	44	G	G	74	61	85	66	74	61	48	50	43	54	124	48	57
3	58	36	28	39	G	44	44	53	54	69	192	144	94	58	58	G	G	48	G	36	71	50	58	91
4	92	66	31	27	30	45	46	44	90	47	G	62	G	47	G	46	G	50	65	40	50	52	38	33
5	27	40	78	45	28	58	73	116	93	68	116	60	60	74	103	63	80	85	98	60	58	65	45	38
6	33	36	G	28	G	40	66	82	82	73	70	54	58	86	G	62	58	58	56	84	65	31	31	G
7	G	G	G	G	G	G	G	G	44	47	G	G	G	61	68	88	88	53	137	69	50	83	93	61
8	32	28	41	30	G	32	38	61	67	93	48	59	G	62	54	60	70	72	57	60	95	64	58	38
9	31	31	G	G	G	G	54	61	74	64	70	64	75	74	60	62	G	G	G	G	G	58	G	G
10	27	G	60	28	34	G	52	62	61	49	49	47	78	68	116	72	146	141	G	G	51	69	86	50
11	G	G	G	49	G	G	52	46	57	G	49	G	G	G	G	91	109	101	66	40	59	28	59	G
12	G	G	G	G	G	46	64	60	58	56	G	G	G	G	G	G	50	G	G	50	G	G	G	G
13	G	G	G	G	G	G	G	G	G	G	46	47	G	G	46	48	48	78	103	74	72	70	58	57
14	28	37	48	44	33	G	46	68	62	75	117	76	104	67	66	80	58	94	180	127	66	72	79	58
15	94	33	46	28	31	40	58	66	82	77	64	123	141	102	86	57	96	148	131	100	67			66
16	28	G	G	29	32	G	59	63	86	97	86	91	75	G	60	109	74	91	125	31	47	57	65	54
17	55	58	58	G	G	G	G	96	44	G	G	G	G	G	G	56	128	71	43	59	G	G	G	26
18	G	G	G	G	G	G	G	51	71	60	60	62	63	G	47	59	109	49	59	49	33	33	45	45
19	27	28	G	G	G	37	46	67	64	111	116	60	G	108	66	69	55	101	132	93	72	92	90	31
20	34	G	G	23	G	40	69	70	54	45	G	60	G	G	G	44	54	54	57	36	58	32	G	38
21	G	G	G	28	36	G	44	47	61	65	91	G	G	G	G	G	55	63	55	42	41	28	34	G
22	G	G	G	G	G	44	G	65	58	68	60	72	G	G	G	54	52	64	76	45	44	32	G	G
23	G	G	G	G	G	G	51	51	63	53		G	G	G	G	G	G	41	56	49	54	36	35	G
24	G	G	30	G	G	G	46	54	G	G	71	53	G	63	48	G	G	60	45	47	32	33	G	32
25	26	G	32	34	G	34	58	70	54	61	59	68	90	48	46	63	48	58	61	117	59	67	69	30
26	39	26	34	25	29	G	43	61	72	64	G	G	G	G	G	G	52	55	50	60	29	37	29	G
27	27	37	28	28	G	38	45	66	75	G	G	G	G	G	G	G	G	50	68	40	41	70	27	25
28	69	G	G	G	G	G	G	54	57	58	50	57		54	53	G	G	46	53	109	65	67	58	32
29	59	34	31	G	G	G	44	74	85	139	96	72	G	G	G	56	79	68	81	56	65	48	29	47
30	70	39	28	33	33	G	55	68	123	147	58	79	103	90	54	44	G	46	46	34	44	56	36	39
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	29	30	29	30	30	30	30	30	30	30	30	29	29	30
MED	28	27	28	27	G	G	46	62	62	62	59	60	G	51	46	56	54	58	57	49	54	52	45	36
U Q	55	36	34	30	31	40	55	68	75	73	78	72	75	68	60	63	79	78	81	69	65	68	59	50
L Q	G	G	G	G	G	G	42	53	54	47	G	G	G	G	G	G	G	48	46	40	41	32	28	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

JUN. 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	17	16	15	17	16	18	18	30	36	36	39		38	36	36	42	34	18	20	15	17	18	17	15
2	17	14	15	15	17	20	24	33	35	39	39	36	39	38	35	26	30	20	18	16	14	16	15	16
3	16	15	14	15	17	20	20	23	34	24	39	49	40	38	27	48	27	20	26	17	18	14	17	15
4	17	15	16	20	18	20	20	33	33	35	54	39	51	40		35	24	18	18	18	15	18	14	16
5	15	14	18	15	18	18	20	32	34	26	39	40	36	40	35	29	24	21	20	17	18	15	18	17
6	17	16	23	18	20	21	21	32	27	42	39	58	39	48		47	34	30	21	35	16	16	17	
7	20	23	17	22	23	20	23	33	36	40	100	90	90	40	42	43	36	29	20	18	16	15	17	17
8	16	14	16	15	20	26	33	36	41	42	42	40	55	45	40	38	34	22	17	17	17	15	15	17
9	16	17	16	17	20	20	20	23	38	39	40	40	48	43	43	34	27	23	18	21	16	14	17	16
10	15	17	17	16	16	18	22	33	38	40	42		40	40	39	41	23	23	20	23	16	18	17	16
11	15	15	20	15	18	30	22	36	40	42	41	42	49		42	36	24	22	18	18	17	15	15	16
12	16	17	15	14	20	20	23	34	39	40	43	42			63	56	36	24	28	17	18	16	15	15
13	15	14	17	N	N	N	90	27	28	53		40	43	43		39	39	23	21	18	15	15	14	16
14	17	14	14	16	18	28	23	34	40	40	42	39	50	47	48	39	39	23	21	20	17	17	15	15
15	17	16	15	17	16	21	22	27	39	40	40	39	42	43	40	40	35	23	22	17	15			15
16	16	15	16	15	18	18	21	34	39	44	42	42	43		43	56	44	32	20	22	15	17	22	14
17	17	18	16	20	21	23	21	32	35	42	50		43	50	44	39	27	23	23	20	16	16	17	15
18	15	15	15	15	18	27	22	35	42	39	39	45	42	59	40	40	35	34	18	17	16	15	15	16
19	15	18	15	16	18	20	20	24	35	39	39	44	39	39	39	30	33	28	20	17	16	14	15	20
20	16	17	15	15	18	18	22	28	34	38	45	42	54	40	39	36	34	32	18	18	17	17	16	17
21	16	14	14	17	16	26	20	26	39	39	40	40	43	42	41	40	23	28	18	17	17	17	15	16
22	15	15	15	14	18	18	20	27	36	38	39	40	52	57	55	34	23	27	20	16	17	18	15	15
23	17	15	16	15	18	18	20	35	26	35		50	43	42	50	28	35	26	17	17	14	16	16	16
24	16	16	15	15	18	21	21	30	34	39	39	55	48	40	28	49	32	23	17	16	16	16	17	15
25	14	16	17	16	18	17	18	33	35	38	39	40	38	39	39	35	27	28	17	16	16	16	16	15
26	16	20	16	17	18	20	20	24	33	39	41		40		42	N	34	22	20	17	15	14	17	15
27	16	15	14	16	18	18	21	33	36	36	40	90	90	80	80	32	23	23	18	18	14	16	15	16
28	17	15	16	15	18	26	20	24	35	36	40	40		39	39		39	23	23	17	17	18	17	16
29	16	15	17	17	20	18	22	26	35	39	39	40			42	38	24	29	18	18	16	16	16	15
30	16	17	18	16	18	18	22	26	53	42	40	42	42	40	38	35	40	22	18	18	18	18	17	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	30	30	30	29	29	29	30	30	30	30	28	26	27	25	27	28	30	30	30	30	30	29	29	29
MED	16	15	16	16	18	20	21	32	36	39	40	41	43	40	40	38	34	23	20	17	16	16	16	16
U Q	17	17	17	17	19	22	22	33	39	40	42	45	50	46	43	41	35	28	21	18	17	17	17	16
L Q	15	15	15	15	18	18	20	26	34	38	39	40	40	39	39	34	24	22	18	17	15	15	15	15

HOURLY VALUES OF FOF2 AT AKITA

JUN. 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	71	73	A	65	65	A	68	A	A	A	A	A	A	A	A	75	76	73	83	77	A	A	74	78
2	63	67	51	52	51	64	73	79	68	A	A	A		73	A	A	A	75	A	71	76	67	67	67
3	A	76	68	A	67	78	85	69	73	96	86	91	88	90	87	88	A	94	86	86	A	86	84	85
4	84	79	85	85	81	83	87	70	A	86	A	86	84	A	A	A	A	88	91	A	89	A	A	83
5	A	72	A	68	66	A	70	A	A	68	A	A	A	A	A	65	60	A	79	A	A	81	A	78
6	76	75	71	71	70	73	78	80	85	84	86	91	A	A	A	94	86	80	78	77	A	85	87	87
7	78	76	76	78	76	82	104	107	95	90	80	74	A	A	A	A	66	A	80	A	A	A	A	77
8	A	72	73	66	66	78	86	78	84	68	A	A	A	A	86	A	87	A	110	A	87	97	90	97
9	88	87	82	79	88	82	87	88	82	82	A	83	A	A	88	91	94	86	A	101	A	108	84	84
10	84	77	81	78	71	66	79	84	80	55	A	A	A	A	74	76	77	77	75	75	79	81	78	80
11	A	74	N	71	66	76	83	80	80	85	86	88	88	86	88	87	83	85	A	A	A	A	A	A
12	A	79	72	52	75	86	86	93	91	84	76	80	91	86	90	92	88	84	83	86	66	83	85	90
13	85	87	76	62	55	34	49	63	A	65	A		68	76	76	A	A	74	A	109	88	92	85	A
14	A	77	75	79	84	83	87	88	88	69	84	88	84	95	95	88	81	82	86	89	A	85	87	87
15	84	A	A	66	78	54	42	A	A	A	A	A			A	68	67	68	70	80	A	A	A	A
16	77	72	64	58	66	77	88	102	98	86		A	81	83	84	A	84	84	81	82	86	88	84	90
17	86	85	84	86	85	93	90	97	84	A	A	A	A	A	A	82	81	83	84	86	86	90	A	86
18	86	87	86	88	88	90	92	94	94	91	90	88	83	87	84	93	94	98	94	85	86	84	86	83
19	85	97	91	83	77	90	106	97	A	87	97	92	89	A	107	94	97	98	96	79	A	A	A	A
20	86	86	83	76	74	80	86	91	A	90	86	80	84	85	91	85	88	A	84	93	A	90	A	84
21	82	84	82	77	77	84	97	104	96	84	89	94	90	88	90	91	92	A	101	100	84	A	85	87
22	86	86	89	79	77	85	96	100	97	87	86	86	92	94	93	92	A	86	92	91	89	84	81	86
23	91	90	84	86	92	111	88	88	93	88	94	95	105	91	88	83	A	86	85	87	86	85	88	86
24	82	85	80	73	68	80	86	101	98	99	91	91	98	99	91	86	86	110	85	83	87	84	84	86
25	82	A	86	78	79	83	86	A	A	A	A	A	A	62		60	65	66	68	54	A	66	69	72
26	74	66	66	56	50	62	83	93	76	A	A	58	C	A	A	A	C	C	77	83	79	A	81	82
27	74	79	A	A	67	67	83	72	68	74	71	67	A	67	68	68	73	71	72	A	83	48	77	77
28	66	66	64	58	57	67	72	82	68		A	70	A	62	A		A	109	90	70	66	55	71	A
29	67	73	68	67	62	74	96	98	93	88	A	A	A	A	71	A	A	73	76	A	51	80	86	90
30	81	82	80	75	71	66	73	88	94	86	A	85	A	A	108	A		78	77	86	79	84	86	84
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	28	25	28	30	28	30	26	22	23	14	19	14	16	19	20	20	24	26	23	18	22	22	25
MED	82	78	80	74	71	79	86	88	86	86	86	86	88	86	88	86	84	84	84	85	85	84	84	84
U Q	85	85	84	79	78	83	88	97	94	88	90	91	91	90	91	91	88	87	90	89	87	88	86	87
L Q	75	73	69	65	66	67	78	80	80	74	84	80	84	74	84	75	74	74	77	77	79	81	78	79

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT AKITA

JUN. 1990

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

DAY \ HR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	86	40	23	30	27	66	51	85	72	90	56	62	62	55	51	71	43	50	46	91	124	93	49	91
2	71	72	38	46	31	37	44	61	60	59	120	180	G	G	62	89	83	92	74	57	29	60	45	69
3	90	70	58	68	36	34	61	70	70	78	74	92	G	76	91	75	106	70	60	68	103	60	57	69
4	39	78	58	50	38	36	68	73	176	94	146	78	61	85	103	102	141	93	60	106	58	82	46	69
5	116	90	73	54	37	59	56	84	68	61	91	81	74	103	176	G	47	74	74	86	82	59	81	58
6	57	72	32	G	31	37	40	60	72	58	78	94	83	82	68	52	41	37	58	44	68	50	69	32
7	25	24	30	32	28	G	G	62	59	73	G	G	84	79	61	94	69	95	73	127	102	103	92	92
8	84	49	55	G	G	G	47	65	55	60	110	82	75	84	78	170	176	155	108	142	58	58	93	91
9	25	27	49	34	G	G	50	72	74	66	66	86	118	91	G	53	G	66	174	132	127	96	115	48
10	59	38	68	35	38	38	68	83	G	58	79	88	87	121	51	G	G	G	38	52	38	58	48	41
11	84	49	39	32	31	G	46	61	75	74	46	G	G	G	G	96	100	92	116	61	94	125	31	28
12	36	50	46	32	25	40	44	50	68	70	75	54	55	73	92	118	83	40	G	50	44	43	24	24
13	G	G	G	G	G	G	G	44	44	57	56	G	G	84	63	126	153	58	107	108	115	54	82	92
14	91	91	58	52	55	60	44	53	46	61	66	48	64	71	74	82	54	58	38	50	90	53	58	92
15	71	91	50	50	25	G	58	64	83	74	85	150	G	G	52	G	G	54	54	50	95	116	115	138
16	72	41	36	44	30	32	44	54	63	64	185	116	54	G	56	74	81	61	56	72	92	69	45	55
17	46	58	72	94	86	43	38	57	73	122	142	96	95	70	138	106	72	59	109	41	95	58	46	30
18	29	31	36	28	31	34	44	52	72	96	G	127	52	G	G	G	59	55	34	33	46	58	37	49
19	56	87	114	92	46	60	68	62	132	70	60	53	56	82	75	58	58	94	42	90	92	146	104	115
20	92	42	71	34	38	50	57	86	145	63	G	G	90	G	58	62	59	103	83	44	96	82	112	58
21	G	G	G	G	26	36	44	44	45	69	77	113	83	75	60	58	74	94	62	50	40	92	107	105
22	91	58	33	G	G	33	44	53	58	57	62	54	54	68	72	68	89	107	71	80	93	70	49	G
23	28	G	G	23	25	32	42	54	60	96	133	126	57	48	67	76	124	74	64	45	36	91	60	33
24	35	G	38	G	27	30	36	92	58	67	88	60	67	G	G	78	44	144	82	40	39	89	43	70
25	72	128	11	32	G	50	94	108	115	96	96	86	59	G	G	G	54	52	53	60	72	59	49	50
26	40	33	G	G	26	34	G	54	83	74	90	G	G	62	56	149	C	C	49	92	83	72	41	50
27	32	92	59	59	58	38	44	53	58	73	92	86	97	48	G	52	G	50	51	72	32	58	52	48
28	G	43	32	31	45	32	58	115	68	68	54	58	78	68	72	115	146	92	88	44	44	72	58	92
29	58	50	35	31	35	37	45	40	62	80	89	136	134	91	72	55	87	61	83	92	68	54	41	38
30	28	31	30	G	G	30	58	52	G	55	68	74	101	124	115	121	126	85	91	40	32	59	66	50
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	29	29	30	30	30	30	30	30
MED	56	49	38	32	30	35	44	61	68	70	78	82	63	70	62	74	72	70	63	60	77	64	54	56
U Q	84	72	58	50	38	40	58	73	74	78	92	96	84	84	75	102	103	93	83	91	95	91	82	91
L Q	29	31	30	G	25	30	44	53	58	61	60	54	54	G	51	53	45	54	51	45	44	58	45	41

HOURLY VALUES OF FMIN AT AKITA

JUN. 1990

LAT. 39.7N LON. 140.1E 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	16	15	15	15	17	17	16	16	21	22	38	37	38	36	36	23	20	18	17	16	15	15	16	16
2	16	14	14	14	15	16	16	18	18	23	29	29	39	30	28	35	30	16	16	15	14	15	16	16
3	16	14	14	14	14	16	17	18	23	34	24	32	33	35	26	26	23	16	14	15	15	16	16	15
4	15	15	14	14	14	16	16	18	20	27	27	30	26	26	26	26	23	20	18	16	16	16	16	16
5	16	15	15	15	15	16	16	18	23	35	36	37	26	36	24	24	21	17	17	15	16	16	16	16
6	16	15	15	15	15	16	16	18	21	23	39	40	36	39	29	33	22	20	17	16	16	16	17	16
7	18	15	15	15	16	15	21	18	22	26	80	100	40	38	44	39	22	20	17	16	17	16	15	16
8	16	15	15	15	15	27	21	27	36	38	29	35	44	44	39	24	33	20	17	16	16	17	16	16
9	17	15	14	15	16	18	17	20	23	38	40	44	38	39		26	23	17	15	16	16	16	16	17
10	16	15	15	15	15	16	17	22	27	39	39	38	40	41	41	21	21	21	17	16	15	15	16	16
11	16	15	15	15	15	26	18	32	36	39	36	27	26	34	N	27	23	22	16	16	16	16	16	16
12	15	15	15	15	18	16	21	23	21	42	40	36	36	35	34	49	27	21	15	15	16	15	16	17
13	16	15	15	15	N	24	17	18	27	27	22			23	20	35	22	16	17	15	16	15	15	15
14	15	15	15	15	15	15	16	20	22	39	40	38	27	33	33	35	28	16	17	16	15	15	15	15
15	15	16	15	15	17	16	16	20	22	26	28	34	34	24	27	24	22	16	18	15	16	15	15	15
16	15	15	15	15	16	16	18	20	23	26	36	36	35	45	26	38	18	21	18	16	15	15	15	15
17	15	15	15	15	15	15	18	20	23	22	23	39	38	38	46	23	21	17	16	15	15	16	15	16
18	15	15	15	15	15	15	16	18	24	26	27	43	42	63	28	23	18	17	16	15	15	15	15	15
19	15	15	15	15	15	15	16	20	20	21	38	40	24	38	36	18	21	16	17	15	15	15	15	15
20	15	15	15	15	15	16	15	17	20	37	39	45	39	27	22	22	20	20	16	15	16	16	15	15
21	15	15	15	15	15	16	16	18	20	24	21	35	36	35	22	23	22	17	15	15	15	16	15	15
22	16	15	15	16	20	15	15	17	22	23	23	36	39	36	34	24	20	17	15	15	15	15	16	16
23	15	15	15	15	15	15	17	18	21	22	24	26	36	33	26	26	20	16	17	16	15	15	15	15
24	15	15	15	14	20	15	15	17	18	21	22	36	34	28	26	28	26	17	15	15	15	16	16	15
25	15	15	16	14	15	16	15	17	20	21	21	24	24	24	24	18	18	17	17	15	15	15	15	15
26	15	15	15	15	15	16	16	16	18	21	21	27	34	27	23	22	C	C	17	15	15	15	15	15
27	15	15	15	15	15	15	16	17	22	22	35	36	35	26	34	23	46	20	16	15	16	15	15	15
28	16	15	15	15	14	16	17	18	21	23	39	37	36	29	27	22	21	17	16	15	15	15	15	15
29	15	15	15	15	15	18	20	17	22	24	39	38	35	24	34	23	20	18	16	16	15	15	15	15
30	15	15	16	15	15	15	17	21	53	23	23	35	42	40	38	32	24	16	16	16	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	30	30	30	30	29	30	30	30	30	30	30	29	29	30	28	30	29	29	30	30	30	30	30	30
MED	15	15	15	15	15	16	16	18	22	25	32	36	36	35	28	24	22	17	16	15	15	15	15	15
U Q	16	15	15	15	16	16	17	20	23	35	39	38	39	38	35	32	23	20	17	16	16	16	16	16
L Q	15	15	15	15	15	15	16	17	20	22	23	33	33	27	26	23	20	16	16	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

JUN. 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	75	67	64	63	62	71	81	80	A	A	68	A	77	84	84	85	85	85	86	80	76	77	82	82
2	75	69	66	52	48	57	86	86	A	A	A	68	71	76	78	86	88	83	76	A	A	71	70	68
3	76	74	71	63	66	85	81	89	74	92	95	91	A	97	91	98	100	104	108	101	88	84	90	90
4	89	92	87	83	78	80	88	98	100	90	95	94	94	94	A	88	98	96	97	78	79	77	A	84
5	84	82	78	64	65	71	79	96	A		70	A	A	A	74	71	67	68	85	A	A	A	55	77
6	77	78	71	69	65	70	80	96	92	86	89	101	97	85	95	103	99	94	79	82	75	84	91	100
7	90	83	79	77	80	82	94	112	100	85	79	88	81		78	A	86	81	87	84	82	A	76	72
8	64	69	71	66	69	85	94	87	80	82	80	96	84	A		87	92	97	98	88	88	88	103	87
9	86	88	87	88	92	82	87	100	83	85	91	92	90	96	98	108	105	95	A	104	105	88	87	90
10	A	A	90	83	73	68	82	127	112	A	N	86	A	90	96	84	87	84	85	80	84	85	B	82
11	82	78	75	76	69	78	87	87	86	82	85	88	95		96	98	108	90	90	69	82	80	86	85
12	80	74	77	77	74	81	100	102	86	80	A	78	96	102	107	104	97	97	94	92			92	102
13	88	98	79	72	54	55	34	71	60	79	A	63	A	81	90	A	83	82	81	87	84	84	88	89
14	84	89	78	82	82	88	89	88	74	84	87	95	90	92	106	95	90	86	90	90	85	86	88	90
15	85	75	61	76	43	63	41	A	80	67	A	A	A	A	A	73	69	69	78	80	74	82	79	N
16	85	84	70	66	67	78	98	104	107	91	A	A	90	96	94	91	A	94	95	88	84	88	93	91
17	88	85	85	84	84	93	105	100	92	88	A	A	95	98	94	95	88	94	100	A	88	84	89	87
18	100	102	97	92	92	97	90	88	97	92	91	91	90	92	99	104	105	A	104	100	90	88	89	89
19	96	97	99	91	86	87	102	106	97		100	99	100	A	102	N	110	107	97	88	86	87	83	97
20	84	84	A	77	68	78	90	102	104	A	97	91	102	93		96	96	97	A	96	88	90	96	94
21	91	85	78	75	78	79	98	98	86	91	92	98	90	90	96	101	105	105	106	96	88	88	90	97
22	91	85	83	83	76	90	100	102	101	A	A	90	102	103	103	105		101	92	100	85	86	89	95
23	88	100	98	99	94	94	87	84	97	92	98	N		102	100	95	98	92	94	92	90	86	87	100
24	86	88	91	75	70	78	104	109	100	102	98	104	105	111	106	99	101	90	87	84	84	85	85	82
25	84	A	80	82	79	85	97	99	A	92	A	A		A		69	68	71	72	74	67	65	67	A
26	71	73	62	53	51	60	89	89	84	A	A	A	A	A	60	A	68	68	A	A	A	84	85	86
27	81	82	A	53	68	71	78	A	78	84	80		A	A	75	76	A			A	77	82	86	83
28	72	80	72	65	67	71	67	77	A	86		78	A	A	A	A	62	70	73	71	67	68	72	72
29	69	76	74	64	65	74	84	85	88	88	85	79	A	86	76	74	76	75	79	82	76	81	82	A
30	83	98	84	78	76	74	79	98	102	A	78	86	97	A	92	93	88	88	84		87	87	83	89
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	28	30	30	30	30	28	25	21	19	21	19	19	24	25	27	28	26	24	26	27	28	27
MED	84	84	78	76	70	78	88	97	92	86	89	91	94	93	94	95	90	90	88	88	84	84	86	89
U Q	88	88	86	83	79	85	97	102	100	91	95	95	97	98	99	100	100	96	97	94	88	87	89	94
L Q	76	75	71	65	65	71	81	87	81	83	80	82	90	86	81	84	83	81	81	80	77	81	82	82

HOURLY VALUES OF FES AT KOKUBUNJI

JUN. 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	72	60	60	48	26	49	61	68	100	95	60	71	64	62	50	48	G	60	55	58	50	G	34	40
2	38	30	31	36	32	38	61	46	91	112	95	55	52	G	54	65	76	57	64	74	71	40	60	58
3	58	93	60	44	38	35	61	76	62	53	68	66	116	66	58	60	53	55	48	G	27	94	58	91
4	61	90	57	60	59	61	51	138	116	46	G	74	83	85	100	73	106	64	66	58	72	73	94	78
5	69	59	68	64	44	37	62	109	111		61	84	167	128	G	G	G	60	73	97	102	113	96	59
6	80	60	38	42	48	G	48	55	72	74	58	62	68	124	59	51	50	G	36	49	70	66	60	51
7	31	G	G	27	G	29	G	50	82	100	66	74	76	175	G	78	95	62	60	56	81	91	59	91
8	92	60	46	25	G	G	51	70	91	100	72	84	75	97	130	94	92	103	84	87	106	69	111	107
9	80	49	27	34	46	32	61	88	85	82	63	70	64	64	60	55	62	91	97	110	81	72	60	60
10	140	163	87	59	88	49	62	104	G		88	80	86	120	48	G	64	G	G	G	31	33	58	B	59
11	58	50	36	30	30	30	56	49	70	96	75	G	G		78	95	128	48	49	76	68	49	58	70
12	60	60	43	39	26	G	44	69	94	68	95	82	73	62	72	G	56	41	35	27			80	58
13	G	24	24	38	G	G	G	44	57	65	58	68	155	49	67	132	58	61	77	34	59	48	41	57
14	129	114	86	59	51	28	38	53	62	76	72	66	78	G	59	88	G	44	G	G	24	24	33	61
15	74	60	60	38	24	36	46	79	71	64	124	48	66	67	52	50	48	52	49	34	43	58	58	93
16	86	70	93	59	51	32	40	68	59	70	109	95	79	G	70	84	111	79	93	46	58	72	67	92
17	58	48	80	48	29	79	92	84	80	91	105	97	72	56	G	G	50	58	78	122	88	58	62	39
18	38	38	29	31	25	30	G	52	58	48	59	60	78	89	93	G	104	133	60	G	31	30	89	44
19	70	84	93	80	50	35	94	63	62	142	100	70	160	148	G	75	59	62	46	76	38	72	58	66
20	58	92	98	61	54	38	48	96	92	152	85	67	92	84	105	58	57	96	145	55	31	31	93	70
21	65	G	24	25	30	37	48	50	44	49	G	73	61	85	G	54	88	100	93	71	71	52	58	69
22	78	42	58	34	55	30	49	60	62	93	92	84	53	55	G	56	105	93	86	51	109	91	93	54
23	71	34	28	26	39	34	G	43	69	74	114	138	125	65	52	70	103	73	57	55	49	41	58	59
24	80	30	26	40	33	G	46	58	59	79	100	101	105	62	54	72	43	55	43	84	58	49	70	70
25	93	123	104	58	24	50	61	116	92	78	82	62	G	54		49	62	50	37	34	G	55	52	57
26	54	44	36	27	26	30	43	50	61	59	121	134	97	122	52	89	67	79	141	136	84	92	49	59
27	58	61	69	52	37	G	62	94	57	54	G	G	62	94	86	66	85			179	110	61	65	104
28	70	25	31	47	38	43	43	92	74	61	107	61	82	125	106	84	50	52	55	30	31	54	59	69
29	90	72	34	44	40	40	35	40	57	59	77	98	104	61	G	48	62	73	47	37	129	102	60	95
30	90	31	G	26	30	56	48	103	51	98	56	53	70	118	91	96	84	G	58	59	111	61	50	70
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	29	30	30	30	29	29	30	30	29	29	30	29	29	29	30
MED	70	60	44	41	35	34	48	68	70	76	76	70	77	66	58	64	62	60	58	56	68	58	60	64
U Q	80	72	69	58	48	40	61	92	91	95	100	84	104	107	82	84	92	79	81	76	86	72	75	78
L Q	58	34	29	31	26	29	43	50	59	60	60	62	64	55	G	50	50	51	46	34	35	48	58	58

COMMUNICATIONS RESEARCH LABORATORY. JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

JUN. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	14	16	14	16	17	16	20	22	26	24	23	38	21	18	18	14	16	16	14	16	15	15
2	15	15	14	14	14	15	16	16	18	22	22	23	39	26	21	22	20	15	15	14	14	14	15	14
3	15	14	15	14	15	15	16	18	18	21	21	33	28	23	26	20	20	16	16	17	16	15	15	15
4	14	14	14	15	15	15	16	17	20	22	28	24	41	33	23	18	17	17	16	15	15	14	15	15
5	15	14	14	14	14	16	17	17	18		21	36	36	33	22	21	20	16	16	15	15	14	14	14
6	15	15	14	15	14	17	16	16	21	33	34	29	38	35	27	23	20	16	16	15	15	15	15	15
7	15	15	14	14	15	16	20	16	21	27	34	34	35	39	42	39	18	20	18	15	15	15	15	15
8	14	14	14	15	15	18	21	20	26	32	36	39	36	42	26	22	21	17	17	15	14	14	15	15
9	15	14	14	15	14	15	18	16	20	21	38	40	37	35	33	32	21	16	17	15	15	15	17	15
10	14	15	15	16	15	16	18	18		32	39	34	38	39	26	23	21	18	17	15	14	16	B	15
11	15	15	15	15	15	17	16	29	27	35	39	35	33		26	28	22	18	16	16	15	15	14	15
12	15	14	15	15	16	26	20	18	22	38	39	38	38	38	35	50	26	18	21	15			15	15
13	16	15	16	15	16	23	16	17	20	30	36	24	36	43	28	24	21	16	15	15	14	15	15	14
14	15	15	15	16	16	20	17	17	18	20	39	39	38	33	27	26	20	17	17	17	17	15	15	14
15	15	14	14	14	15	16	16	18	21	26	30	33	34	30	26	22	17	16	17	15	16	14	14	14
16	15	14	15	15	14	14	17	17	20	26	24	38	38	33	28	21	20	16	17	16	15	15	15	15
17	14	15	14	15	15	15	17	18	23	23	28	32	29	33	24	22	20	16	16	16	14	14	14	15
18	15	14	14	14	15	15	17	15	18	22	32	32	30	30	21	23	18	18	17	18	15	15	15	14
19	15	14	14	14	14	15	16	17	20	21	20	34	28	34	22	20	18	15	16	14	15	15	15	15
20	15	14	15	14	14	15	17	17	18	21	27	34	33	28	26	22	18	17	18	15	15	15	14	15
21	15	14	15	14	14	15	17	17	20	21	22	35	38	34	27	22	18	17	15	15	15	15	15	15
22	15	15	14	14	15	15	15	16	18	18	29	27	32	28	44	22	23	17	16	14	15	15	15	14
23	15	15	15	15	14	16	20	15	21	20	30	28	27	34	27	21	20	17	14	15	15	15	15	14
24	15	14	15	14	15	17	15	15	18	20	22	23	35	28	33	28	22	17	15	16	15	14	14	15
25	15	14	14	14	14	14	16	16	20	18	26	29		36		38	18	20	18	16	16	15	16	15
26	15	15	16	16	16	17	20	17	21	36	39	38	32	35	80	35	22	20	20	18	15	16	15	18
27	16	15	16	15	15	24	18	20	21	35	58	42	38	38	38	39	22			15	15	14	14	15
28	15	14	15	14	15	16	17	16	20	22	32	28	34	32	26	27	22	16	17	14	14	15	15	15
29	14	15	14	15	14	15	20	17	21	21	27	37	36	33	31	29	20	15	16	15	14	14	15	14
30	14	14	14	15	14	15	17	16	40	24	33	46	40	35	23	23	21	16	16	15	14	15	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	30	30	30	30	30	30	30	30	29	29	30	30	29	29	29	30	30	29	29	30	29	29	29	30
MED	15	14	14	15	15	16	17	17	20	22	30	34	36	34	26	23	20	17	16	15	15	15	15	15
U Q	15	15	15	15	15	17	18	18	21	31	36	38	38	37	32	28	21	17	17	16	15	15	15	15
L Q	15	14	14	14	14	15	16	16	18	21	26	28	32	31	23	22	18	16	16	15	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

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

HOURLY VALUES OF FES AT YAMAGAWA

JUN. 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	90	126	92	92	152	56	48	54	74	86	85	140	114	94	80	G	G	G	G	37	38	24	58	58
2	81	70	54	58	38	26	42	81	59	81	150	148	75	G	G	G	G	43	54	40	80	85	45	40
3	72	31	59	54	57	46	G	44	68	78	126	92	77	115	58	48	59	56	52	56	58	32	27	33
4	40	90	41	70	72	29	40	43	49	48	55	G	G	G	74	80	102	88	51	58	83	86	59	71
5	90	85	103	91	112	72	75	65	90	93	118	166	71	54	G	G	G	G	54	38	106	58	69	34
6	59	94	79	48	60	59	42	60	76	76	112	112	84	116	89	G	G	48	44	91	72	38	32	70
7	58	G	G	G	27	31	32	44	54	56	66	76	74	51	G	G	G	G	54	54	60	58	69	78
8	92	44	43	44	30	27	56	67	70	84	69	49	58	70	71	62	60	66	54	62	56	46	G	92
9	89	114	70	44	27	28	43	68	86	184	75	100	110	118	100	146	74	58	56	40	33	29	159	136
10	92	93	83	92	115	130	59	44	83	169	144	107	108	60	56	55	G	G	65	82	114	90	49	39
11	38	46	45	24	G	24	32	48	93	64	54	64	74	97	58	95	85	67	89	109	107	92	41	72
12	92	41	35	59	59	G	56	55	51	85	115	97	54	55	70	82	119	95	100	92	68	40	43	43
13	50	40	35	37	30	G	G	42	51	58	62	68	73	87	G	68	73	96	47	86	72	85	71	40
14	91	93	38	87	40	29	40	45	60	98	80	148	150	G	G	50	46	76	38	36	40	34	38	70
15	70	69	85	72	40	G	40	48	61	114	85	G	G	48	48	55	G	G	46	G	25	32	92	85
16	43	32	41	37	G	23	38	52	42	108	81	98	G	G	G	54	69	47	50	62	44	40	47	84
17	72	58	46	30	30	25	32	G	46	G	G	G	61	G	G	G	44	40	40	45	40	80	93	46
18	29	28	G	G	G	G	34	G	52	47	G	G	G	G	53	69	70	68	45	32	G	39	30	29
19	G	G	G	G	G	26	G	42	56	70	58	68	60	G	54	58	57	64	66	44	73	59	70	92
20	69	35	90	91	90	68	128	59	56	107	78	96	87	97	88	84	94	67	77	49	93	56	41	90
21	72	59	58	38	27	G	35	68	92	74	76	61	G	61	57	55	66	81	94	177	58	70	29	71
22	30	90	90	45	44	33	57	61	128	92	122	77	67	63	76	89	65	44	57	51	72	70	91	91
23	48	36	41	49	32	G	32	40	44	44	74	76	62	108	97	117	133	117	91	58	79	40	40	40
24	79	71	58	40	24	30	31	45	72	94	76	55	78	60	62	73	81	124	60	55	31	34	46	32
25	29	33	26	G	G	G	32	54	93	57	111	68	85	69	62	G	G	G	G	30	G	G	40	69
26	57	73	40	28	27	23	31	60	61	108	149	62	73	64	G	G	54	60	38	29	28	26	41	41
27	30	50	50	36	G	G	G	G	43	70	G	G	G	54	G	51	57	52	G	G	G			G
28	58			53		38	78	69	109	51	60	G	G	G	75	85	50	51	G					
29						24	42	52	67	54	57	72	150	102	74	50	G	G	G	G	G	38		
30					69	68	38	46	58	52	G	G	50	97	60	64	102	142	62	152	151	39	32	30
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	27	27	28	28	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	28	27	28
MED	64	58	46	44	31	26	39	50	61	77	76	70	72	60	58	55	58	57	53	51	58	40	45	64
U Q	85	90	79	64	59	38	48	60	83	94	112	98	84	97	74	80	74	76	62	72	79	70	69	81
L Q	41	35	38	33	25	G	32	44	52	56	58	49	50	G	G	G	G	40	40	36	32	34	38	39

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

JUN. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	15	15	16	24	34	34	34	37	36	36	24	26	16	18	16	15	15	15	15
2	15	15	15	15	16	15	15	16	18	21	26	36	36	41	57	24	26	18	15	15	15	15	15	15
3	15	15	15	15	16	15	15	16	18	22	33	35	38	35	34	29	21	20	17	15	15	15	15	15
4	15	15	16	15	15	15	15	20	20	24	32	36	50	52	39	36	22	20	15	15	15	15	15	15
5	15	15	15	15	15	15	16	17	21	34	35	36	34	35	34	38	23	17	15	15	15	15	15	15
6	15	15	15	15	15	15	15	15	20	22	35	39	40	42	44	40	23	33	15	15	15	15	15	15
7	15	15	15	15	15	16	16	16	21	23	35	40	40	45	67	45	23	35	16	16	15	15	15	15
8	15	15	15	15	15	15	15	18	27	33	40	36	45	44	43	40	36	21	16	15	15	15	15	15
9	15	15	15	15	15	15	15	17	24	34	38	40	39	39	35	40	27	22	18	15	15	15	15	15
10	16	15	15	15	15	15	15	20	24	35	39	40	39	40	42	39	30	36	17	15	15	15	15	15
11	15	15	15	15	15	16	15	23	26	26	36	34	37	39	40	35	24	22	16	15	16	16	15	15
12	15	15	15	15	15	17	16	15	24	30	35	38		42	38	50	35	23	16	15	15	15	15	15
13	15	15	15	15	15	15	16	16	23	26	39	39	44	35	55	33	27	18	16	15	15	15	15	15
14	15	15	15	15	15	15	15	20	22	22	40	43	44	45	45	37	24	18	15	16	15	15	16	15
15	16	15	15	15	15	17	15	22	23	29	30	52	44	56	56	39	24	20	29	15	15	15	15	15
16	15	15	15	15	16	15	17	21	23	33	32	42		62	46	40	38	18	16	15	15	15	15	15
17	15	15	15	15	15	16	18	16	20	40	44	44	39	61	43	31	22	20	16	15	15	15	15	15
18	15	15	15	15	15	15	15	17	20	24	42	51	56	63	48	39	26	18	16	15	15	15	15	16
19	16	16	15	15	15	15	15	16	16	34	39	42	44	39	48	33	23	18	16	16	15	15	15	15
20	15	15	15	15	15	15	15	16	23	26	27	34	36	36	35	35	32	26	17	15	15	15	15	15
21	15	15	15	15	15	16	15	16	22	23	27	36		43	45	40	35	17	16	15	15	15	15	15
22	15	15	15	15	16	15	15	16	18	24	29	35	42	34	34	30	27	18	17	15	15	15	15	15
23	15	15	15	15	15	16	16	16	21	32	34	37	37	33	35	32	29	34	16	15	15	15	15	15
24	15	15	15	15	15	15	16	16	18	21	36	39	40	39	38	38	32	22	17	15	15	15	15	15
25	15	15	15	15	15	15	15	16	21	23	32	34	36	39	34	50	22	22	16	15	15	15	15	15
26	15	15	15	15	15	15	15	15	18	18	40	36	34	40	56	54	22	21	17	15	14	15	15	15
27	15	15	15	15	15	15	16	18	18	22	32			42	34	42	23	18	17					
28				N		15	15	17	18	24	34		59		36	34	23	26	30					
29						15	15	16	21	24	33	40	39	36	33	33	39	18	16	20	15	15		
30					15	16	16	22	40	32	34		66	36	42	38	22	29	16	16	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	27	27	27	27	28	30	30	30	30	30	30	27	26	29	30	30	30	30	30	28	28	28	27	27
MED	15	15	15	15	15	15	15	16	21	25	34	38	40	40	41	38	25	20	16	15	15	15	15	15
U Q	15	15	15	15	15	16	16	18	23	33	39	40	44	44	46	40	30	23	17	15	15	15	15	15
L Q	15	15	15	15	15	15	15	16	18	23	32	36	37	36	35	33	23	18	16	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

JUN. 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	86	93	86	86	87	78	80	80	75	A	80	81	104	112	109	136	146	145	145	130	95	88	85	85
2	87	88	80	73	60	60	74	79	84	90	85	88	87	92	108	118	121	134	125	104	77	81	79	77
3	84	87	85	55	A	A	55	73	88	112	A	A		96	109	118	121	136	141	116	105	91	88	88
4	86	86	84	80	80	80	85	80	74	78	92	68	125	102	102	111	107	104	A	100	90	84	86	85
5	87	84	80	64	66	67	82	88	A	70	A	95	112	118	129	135	136	122	108	85	86	75	75	74
6	A	A	83	77	64	59	73	88	81	A	A	88	N	102	104	A	121	106	A	85	82	81	84	83
7	84	84	84	76	77	74	77	88	90	88	86	92	102	104	105	121	121	119	119	110	84	84	90	A
8	88	101	85	77	69	79	89	84	86	85	83	82	88	90	94	103	101	112	110	103	89	86	84	85
9	85	85	85	83	85	84	97	82	85	87			110	121	135	146	160	163	146	144	160	141	136	128
10	128	142	95	118	87	77	60	85	84	A	A	107	120	120	131	144	133	127	127	122	110	102	86	102
11	110	109	102	75	88	88	87	87	87	A	80	75	96	107	120	121	112	110	104	88	86	83	88	87
12	90	86	84	78	76	70	80	90	82	80	75	88	101	120	132	142	146	145	144	122	111	97	87	98
13	86	89	90	86	70	66	45	55	66	78	A	86	107	91	105	104	104	104	101	105	90	86	88	86
14	86	82	94	86	88	79					94	102	105	108	111		107	96	94	87	84	A	80	77
15	86	83	71	63	69	A	64	A	83	91	107	117	N	124	108	103	106	106	106	104	91	88	90	84
16	90	103	87	81	66	64	84	96	102		81	96	101	105	104	105	104	115	107	110	90	90	86	88
17	75	110	86	88	89	85	88	92	90	87	86	92	105	118	120	131	133	148	147	135	88	88	141	147
18	155	146	146	122	86	85	85	88	93	96	98	98	95	106	107	116	116	126	136	130	108	96	144	144
19	146	166	146	128	86	85	94	89	89	91	97	100	108	118	122	136	136	145	145	136	104	103	84	88
20	108	101	85	87	88	81	83	96	104	88	96	106	104	105	112	114	120	119	108	106	97	76	A	84
21	83	87	102	93	85	85	90	88	88	95	90	94	98	106	107	121	121	103	122	103	134	120	138	144
22	146	166	164	135	103	83	80	90	104	85	85	91	94	102	111	106	108	108	96	87	A	78	72	82
23	86	86	102	87	75	66	71	77	85	88	96	102	112	117	118	118	122	120		105	87	84	84	84
24	76	86	86	78	76	66	66	86	87	87	90	90	98	111	127	131	131	126	110	111	108	79	83	82
25	84	88	84	87	85	61	80	82	72	82	85	97	97	A	92	101	93	94	94	85	71	52	63	62
26	62	68	62	59	54	52	63	86	83	72	60	76	92	103	108	102	103	99	103	102	88	80	85	84
27	86	88	82	80	65	63	70	88	84	76	78	84	85	101	110	120	126	120	142	104	85	80	86	79
28	71	73	76	63	63	64				77	75	79	90	96	87	85	84	77	84	85	77	64	67	66
29	54									78	75	86	96	94	104	104	105	106	109	95	87	N	84	83
30	85	84	81	66	62	59	85		82	66	76	85	91	100	103	105	105	A	120	104	103	107	109	110
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	29	29	28	27	27	25	26	24	24	28	27	29	30	28	30	29	27	30	29	28	29	29
MED	86	88	85	80	76	74	80	87	85	86	85	90	101	105	108	118	120	119	110	104	90	85	86	85
U Q	90	102	94	87	86	83	85	88	89	89	93	97	107	117	120	131	131	130	141	116	104	93	89	93
L Q	84	84	82	74	66	64	70	81	82	78	79	84	94	100	104	104	105	105	104	95	85	80	83	82

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

JUN. 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	G	G	32	60	93	112	137	G	51	59	G	G	G	G	G	G	22	G	32	32
2	46	46	68	66	58	38	59	58	48	82	68	G	G	53	71	60	84	62	56	36	37	29	31	41
3	31	33	32	73	65	76	44	44	81	109	165	176	182	169	125	83	G	43	46	41	33	30	24	G
4	G	24	G	G	G	G	84	43	58	66	69	G	48	G	69	68	84	90	114	43	33	25	G	144
5	69	34	23	38	40	44	45	45	131	70	126	82	G	51	G	G	G	42	40	40	26	G	39	144
6	90	91	92	57	36	44	36	70	103	68	94	95	81	78	66	128	81	100	113	44	39	57	34	34
7	59	39	60	26	G	G	28	64	71	65	71	90	62	G	61	G	G	G	43	36	G	G	41	86
8	58	48	33	26	24	G	31	49	G	49	67	71	64	63	58	47	G	G	G	G	25	25	33	27
9	81	135	34	34	31	58	39	57	80	69			G	72	73	61	G	G	G	G	G	G	G	68
10	151	80	69	70	91	71	68	90	87	147	173	102	163	102	87	76	62	56	46	43	50	41	144	40
11	33	35	23	G	22	G	32	43	76	109	96	64	76	100	88	77	83	G	39	G	25	33	26	23
12	23	38	34	32	31	31	G	39	45	63	66	82	66	67	70	G	79	79	92	92	110	83	38	59
13	40	69	44	34	48	43	40	39	49	60	59	67	64	G	56	G	57	48	36	28	26	G	G	30
14	37	90	160	144	79	128	179	126	114	124	108	116	78	64	60	66	88	110	82	48	46	45	59	44
15	48	90	65	66	59	61	40	70	81	66	64	G	65	58	48	63	52	42	44	32	G	G	25	33
16	38	31	28	24	G	24	31	40	57		50	53	G	G	57	73	56	47	45	41	68	58	56	40
17	59	34	28	26	G	43	28	40	42	49	52	64	60	48	51	51	47	46	61	40	41	28	G	66
18	45	26	G	G	G	G	38	43	49	63	G	56	58	106	52	G	70	89	61	50	32	31	25	28
19	G	G	G	G	G	G	31	38	45	62	70	58	G	58	54	63	66	60	93	57	58	50	24	68
20	80	87	71	42	36	33	59	47	68	48	52	93	G	57	54	G	G	48	38	46	41	90	84	33
21	28	27	34	22	G	G	G	45	56	72	67	83	G	G	G	68	54	44	40	G	108	34	59	32
22	26	G	G	G	G	44	38	54	60	82	84	66	59	70	101	90	69	45	71	40	82	38	28	33
23	34	24	24	26	G	G	G	56	82	69	110	83	G	G	G	G	G	G	G	31	30	28	G	G
24	G	G	G	G	G	G	32	G	71	74	84	105	96	55	51	G	44	68	101	50	40	25	24	33
25	28	29	26	G	G	G	28	G	40	45	47	64	78	150	68	113	G	46	41	31	G	40	65	28
26	28	67	43	42	38	29	32	43	62	63	85	G	G	55	51	52	55	58	61	59	66	32	40	28
27	28	29	33	G	G	G	G	G	44	45	66	81	57	G	G	48	G	43	37	38	22	G	G	G
28	G	58	61	58	54	24				58	66	84	66	G	G	62	G	45	47	32	26	24	58	50
29	36									62	62	69	G	114	84	58	64	43	41	46	39	33	32	41
30	25	G	G	G	G	G	G		42	46	98	G	G	G	76	71	68	102	144	90	65	29	30	32
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	29	29	29	29	29	28	27	28	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30
MED	35	34	33	26	22	24	32	45	61	66	69	69	58	58	58	60	54	46	46	40	35	30	32	33
U Q	58	68	60	49	44	44	42	58	81	78	97	87	66	72	71	71	69	62	71	46	50	40	41	50
L Q	26	25	12	G	G	G	28	40	46	59	63	54	G	G	51	G	G	42	39	31	25	24	24	28

COMMUNICATIONS RESEARCH LABORATORY. JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

JUN. 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	14	15	15	15	15	15	16	20	24	27	29	27	29	29	27	24	16	14	18	15	15	15	15
2	15	15	14	14	15	14	14	15	18	20	23	27	28	30	26	26	18	16	14	15	15	15	15	14
3	15	14	14	15	15	15	15	15	18	24	27	29	30	30	30	28	24	18	14	14	15	14	15	15
4	15	15	15	15	15	15	14	14	15	20	26	28	29	28	29	27	22	20	15	14	14	15	15	15
5	15	15	15	14	15	14	15	15	16	24	23	28	30	33	29	27	22	15	14	14	14	15	15	15
6	15	15	14	15	15	15	14	15	15	23	26	28	29	40	29	29	27	16	14	14	15	14	15	15
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31																								
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CNT	30	29	29	29	29	29	28	27	28	29	29	29	30	30	30	29	30	30	30	30	30	30	30	30
MED	15	15	15	15	15	15	15	15	20	23	27	29	30	31	29	28	26	20	15	15	15	15	15	15
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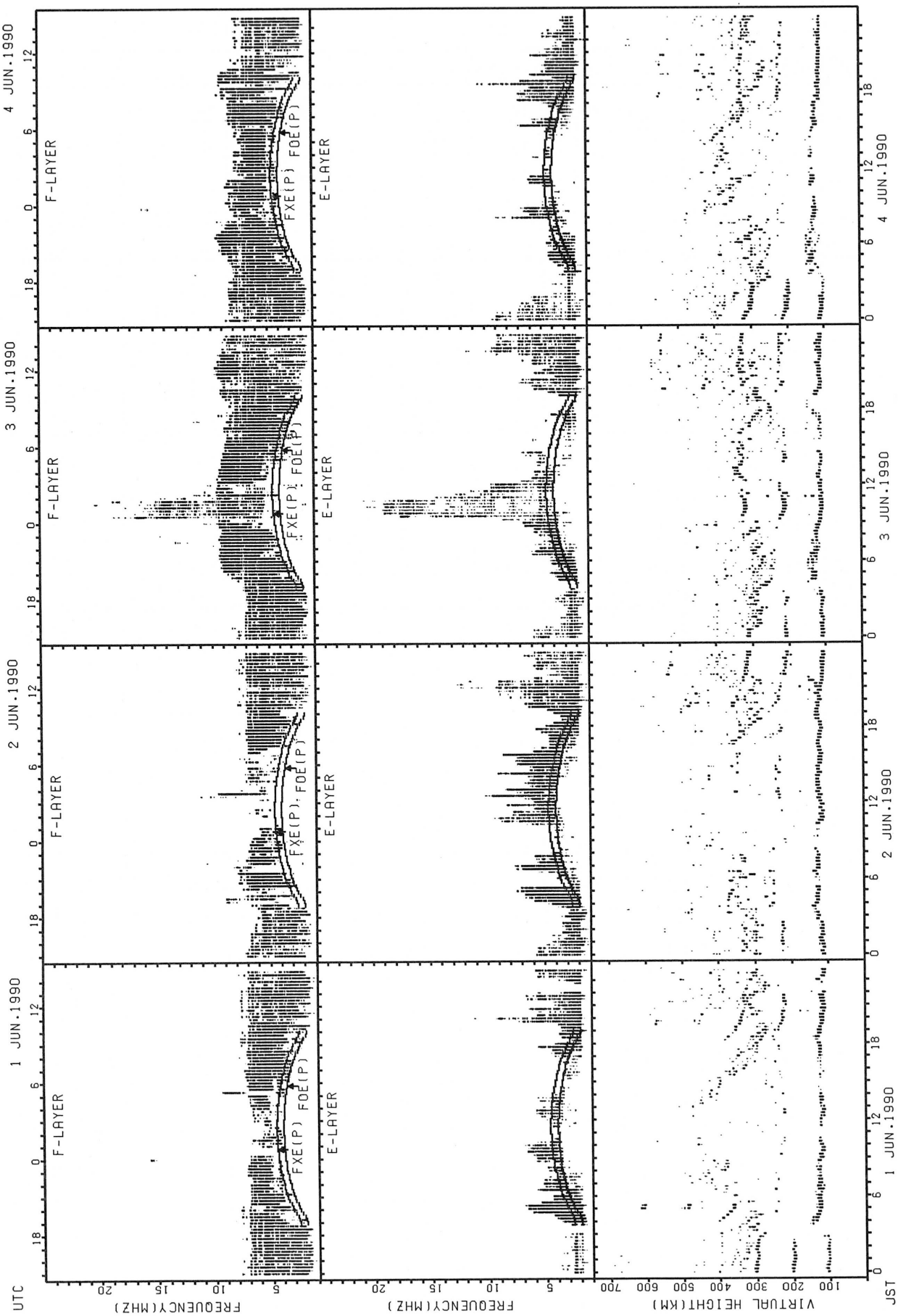
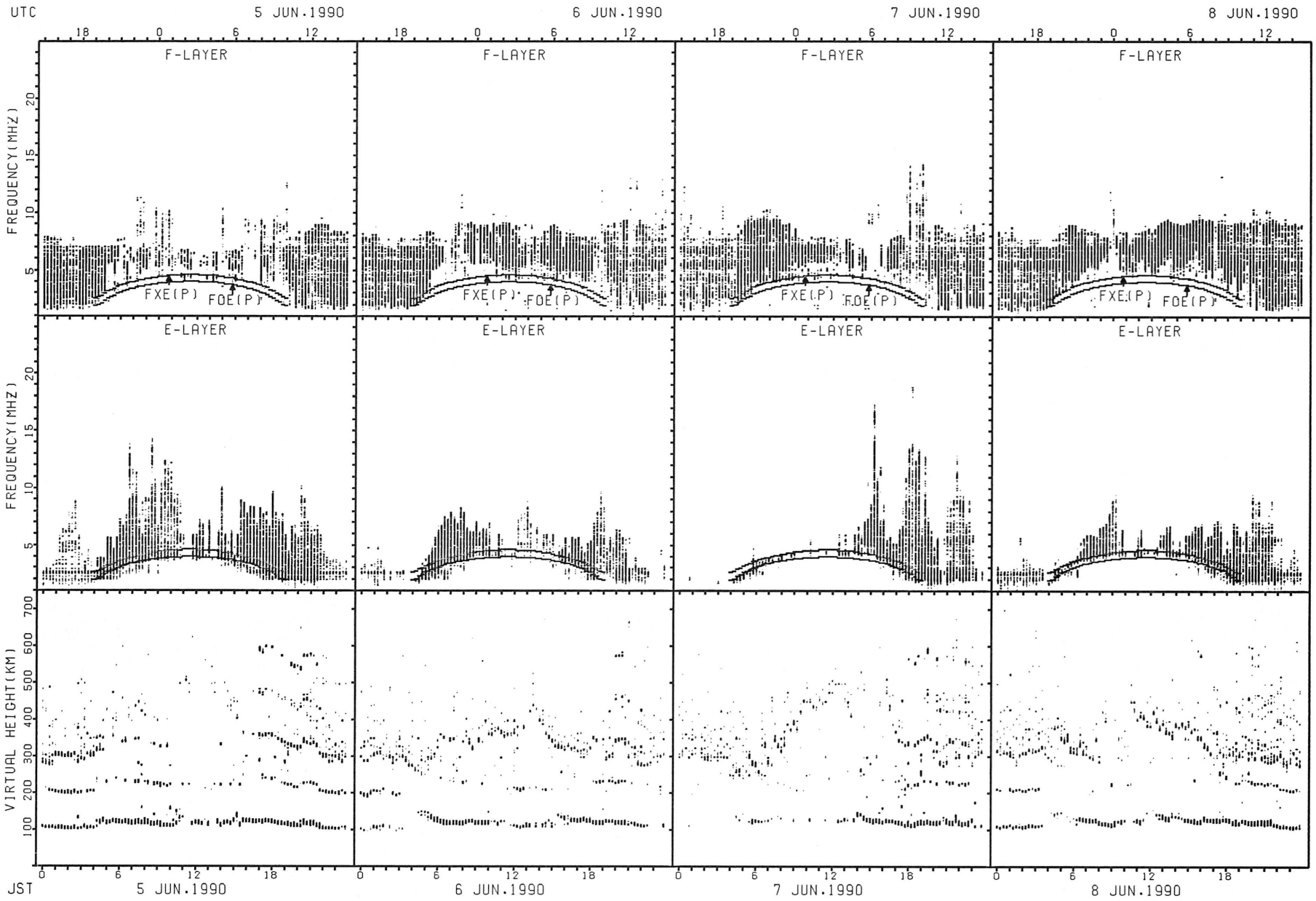
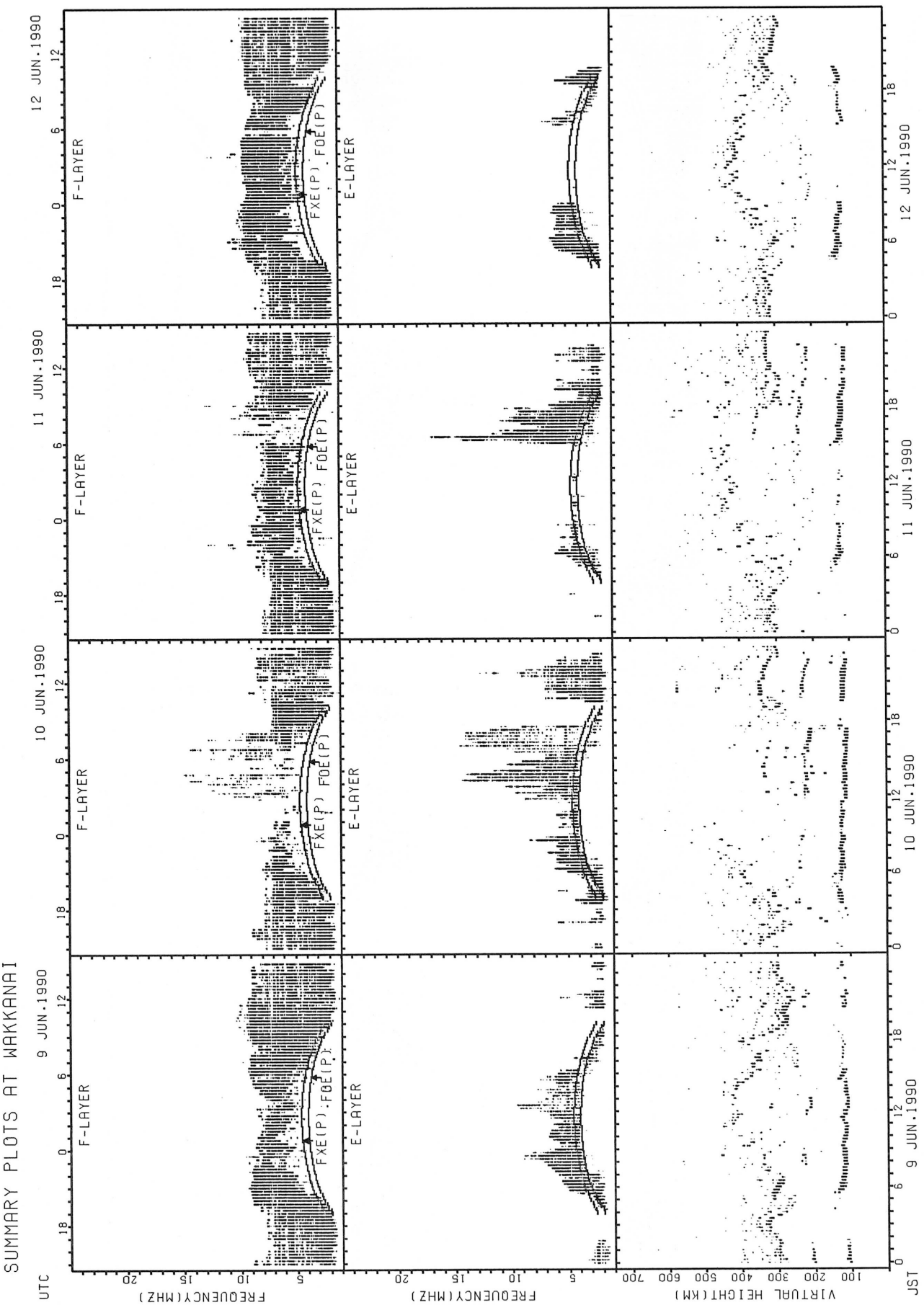

SUMMARY PLOTS AT WAKKANAI
UTC
JST
1 JUN.1990
2 JUN.1990
3 JUN.1990
4 JUN.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

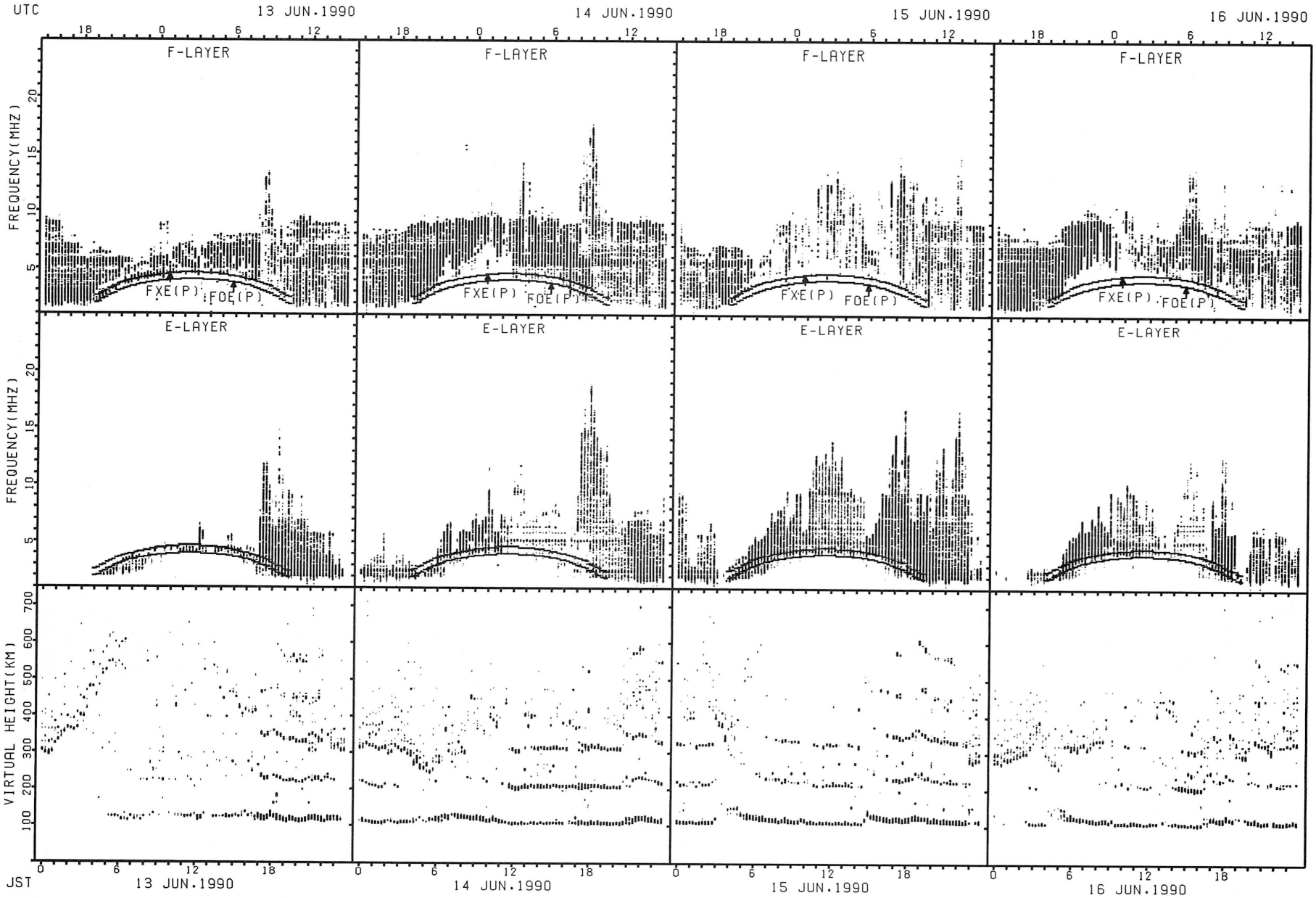
SUMMARY PLOTS AT WAKKANAI



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


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

SUMMARY PLOTS AT WAKKANAI



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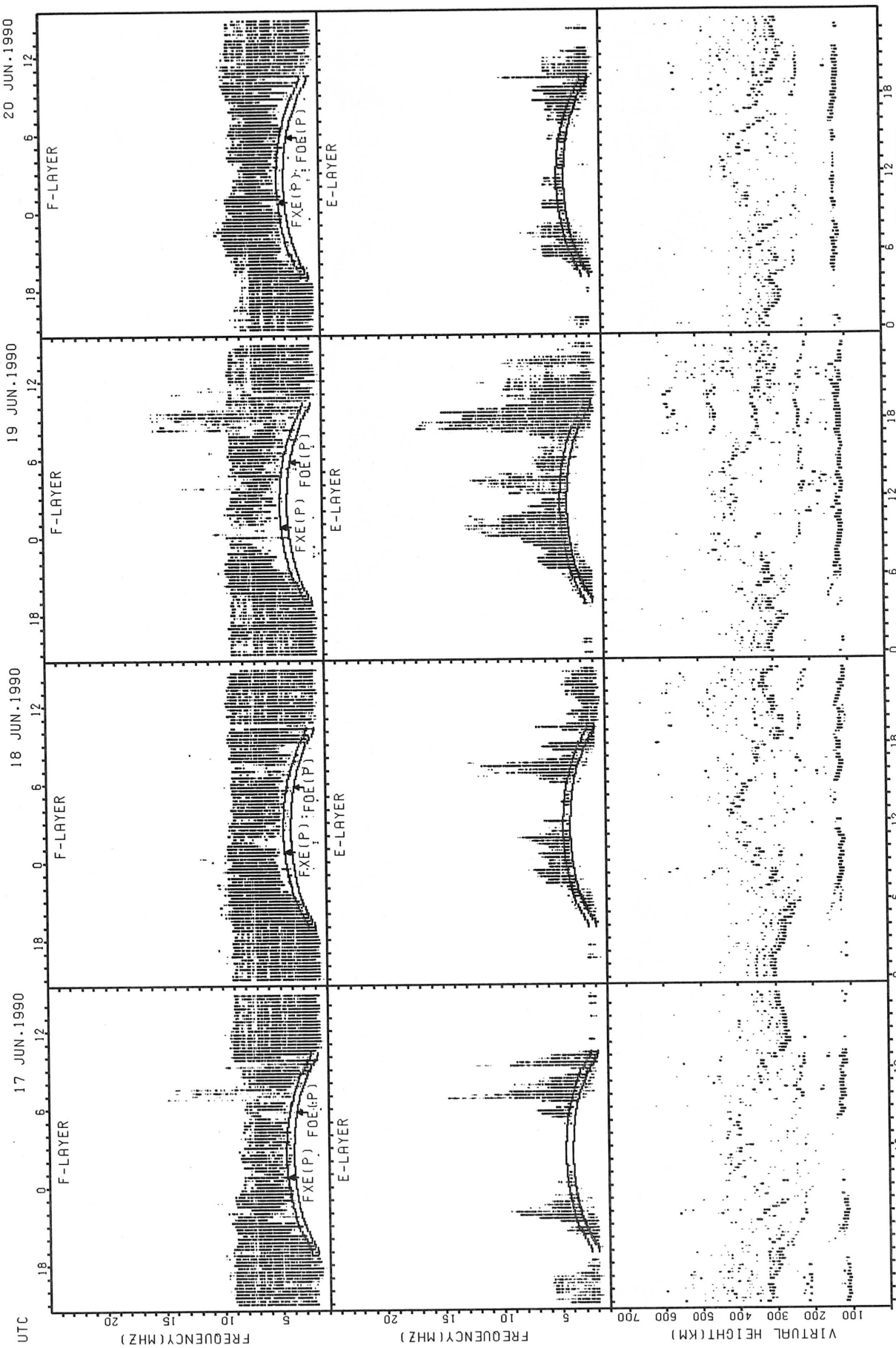
FOE(P); PREDICTED VALUE FOR FOE


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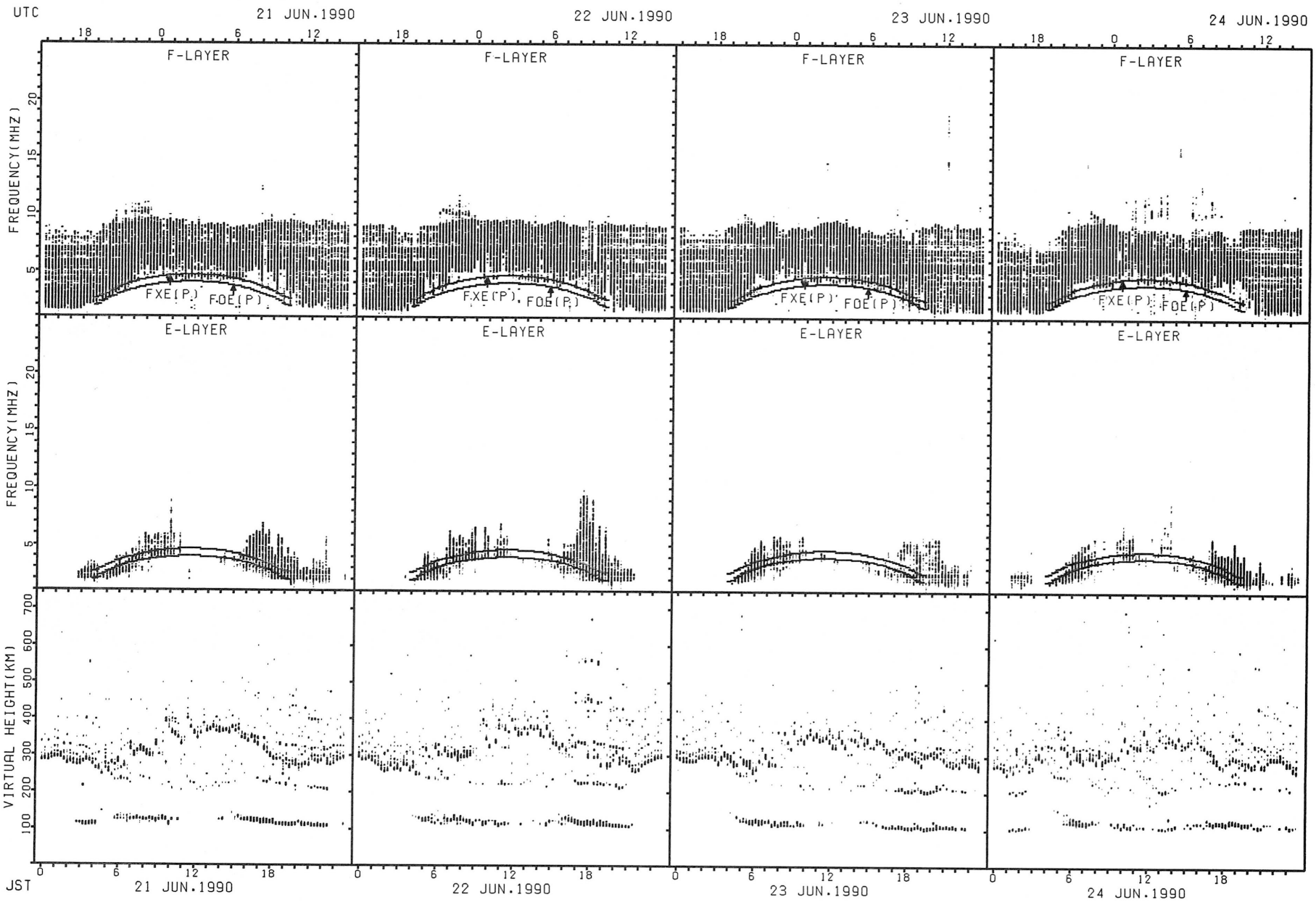
20 JUN.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



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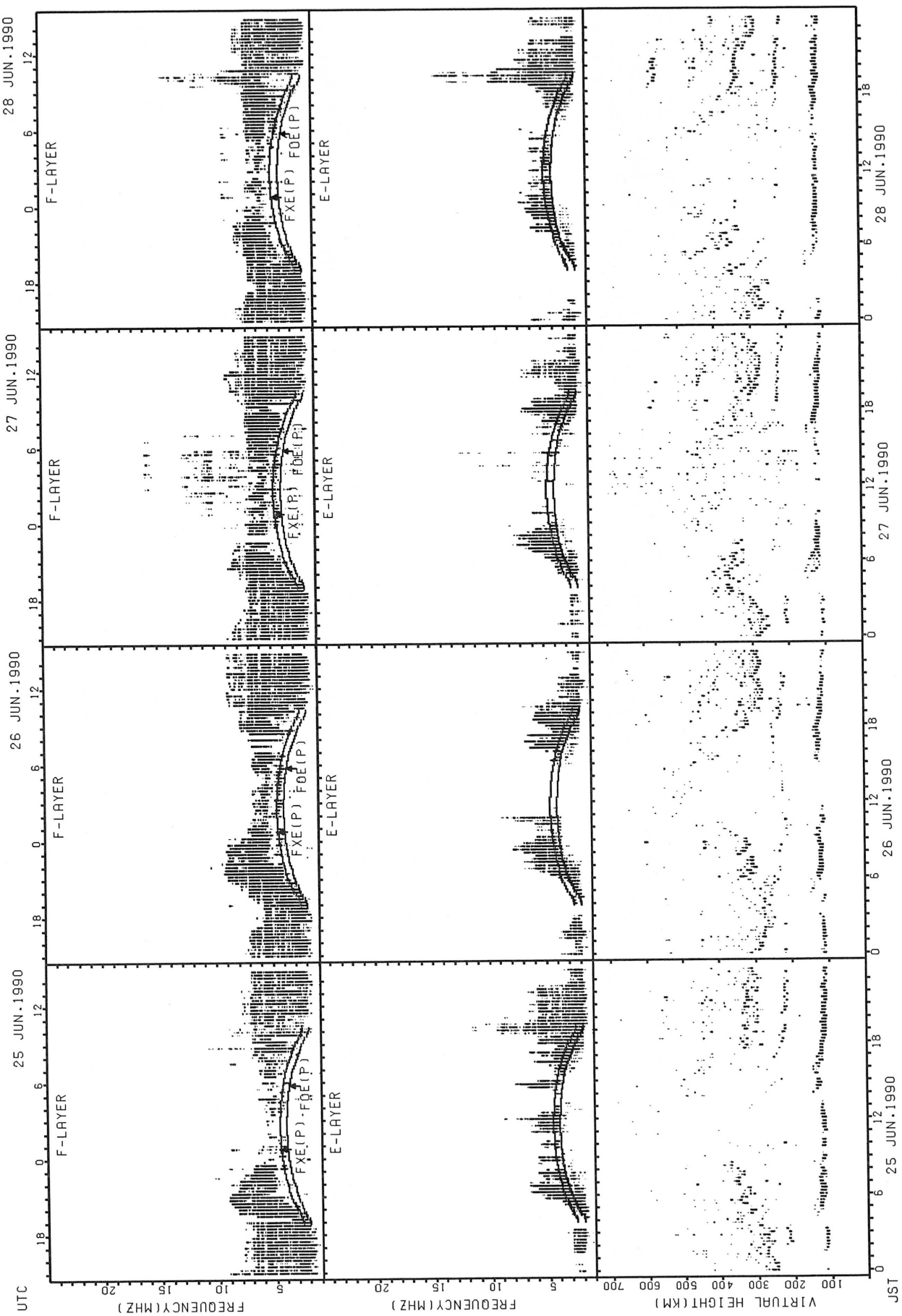
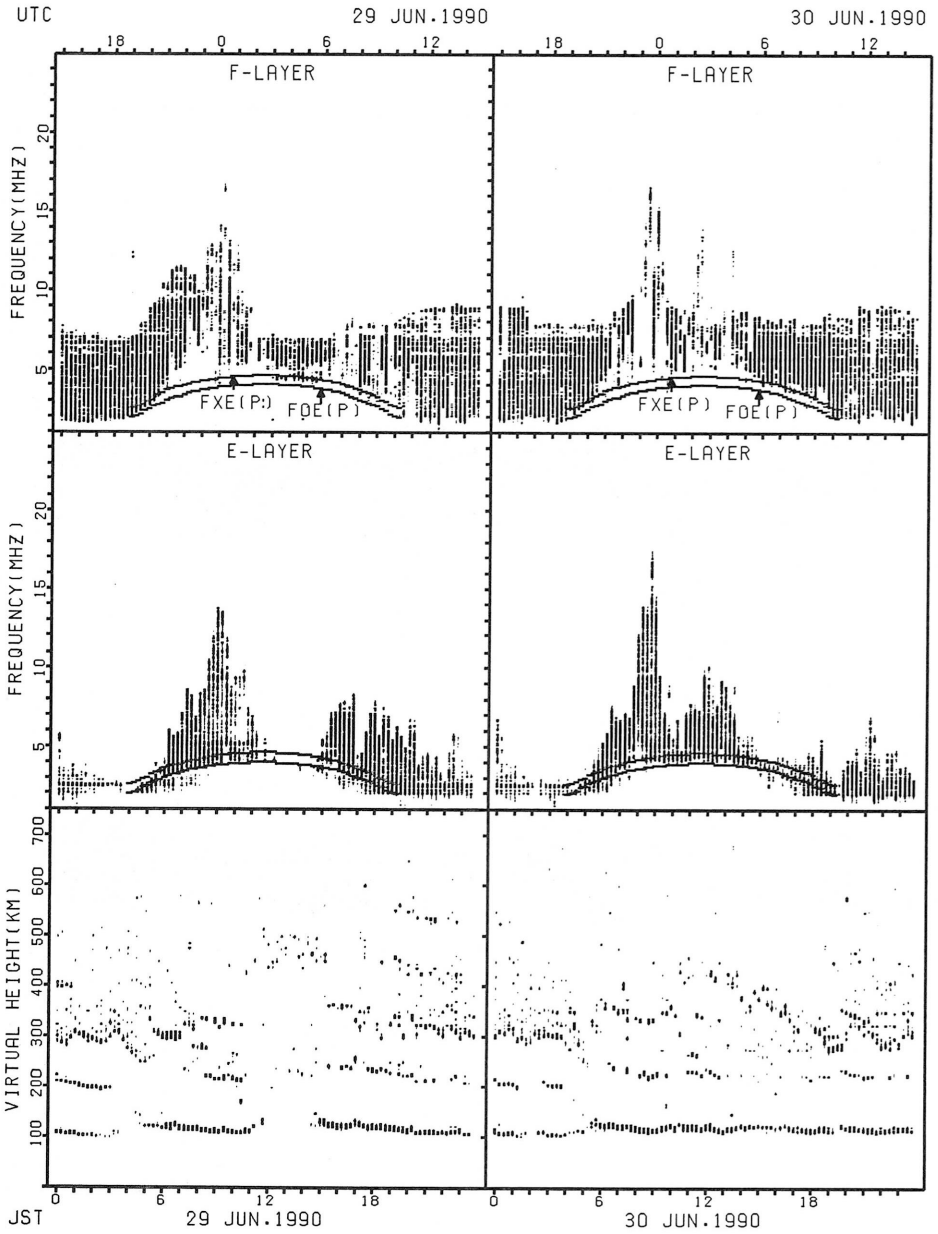
FOE(P); PREDICTED VALUE FOR FOE


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

SUMMARY PLOTS AT WAKKANAI



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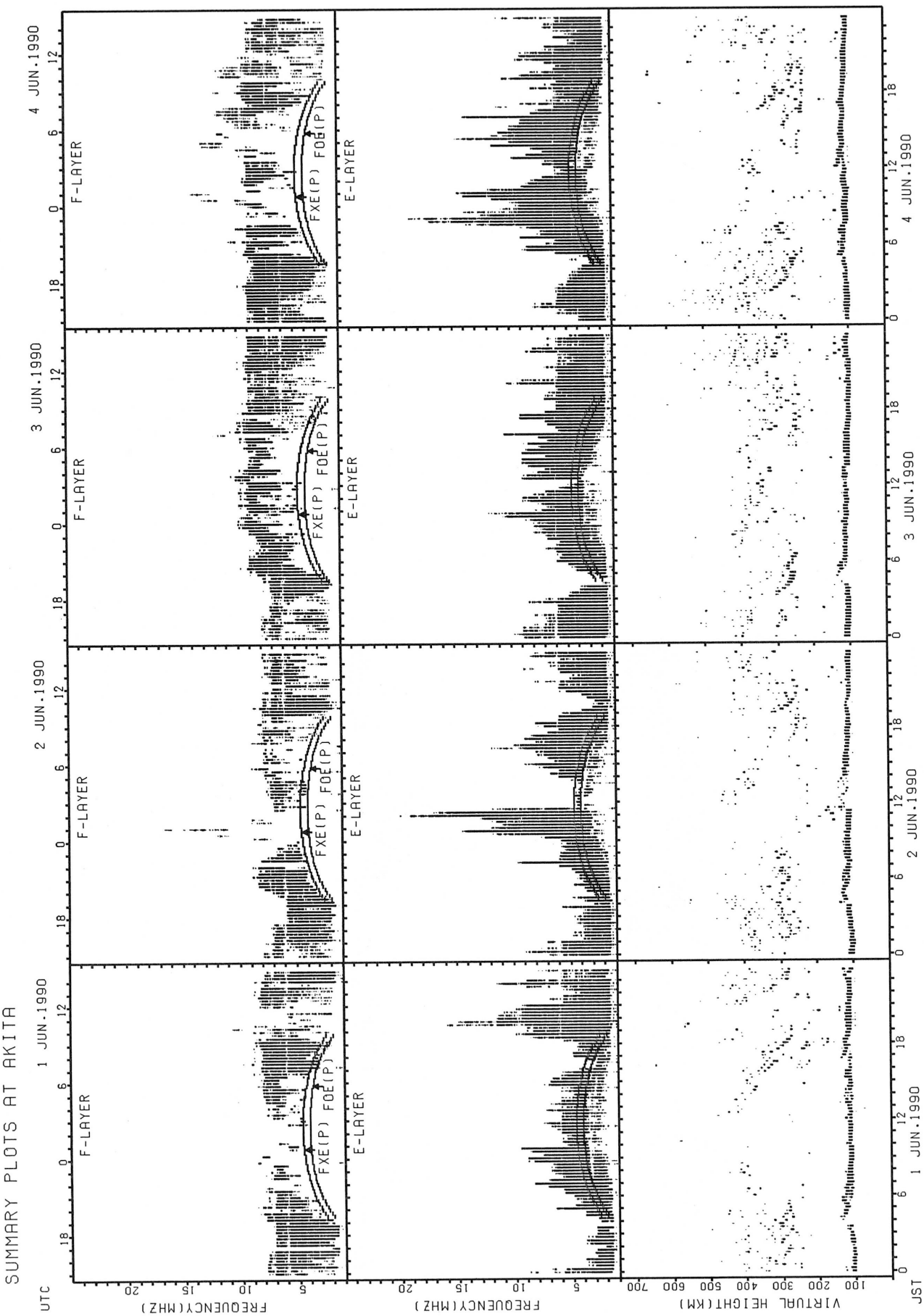
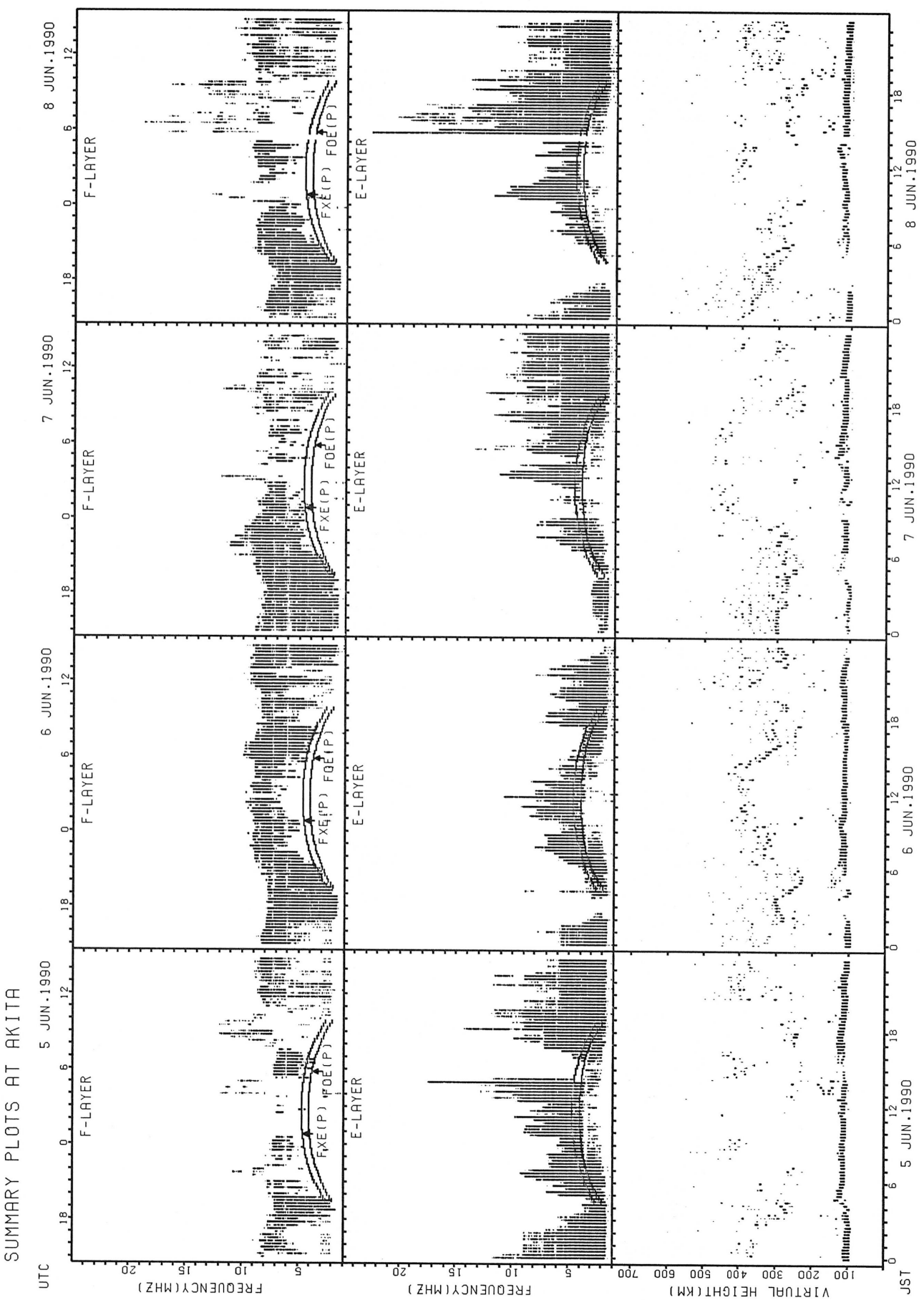
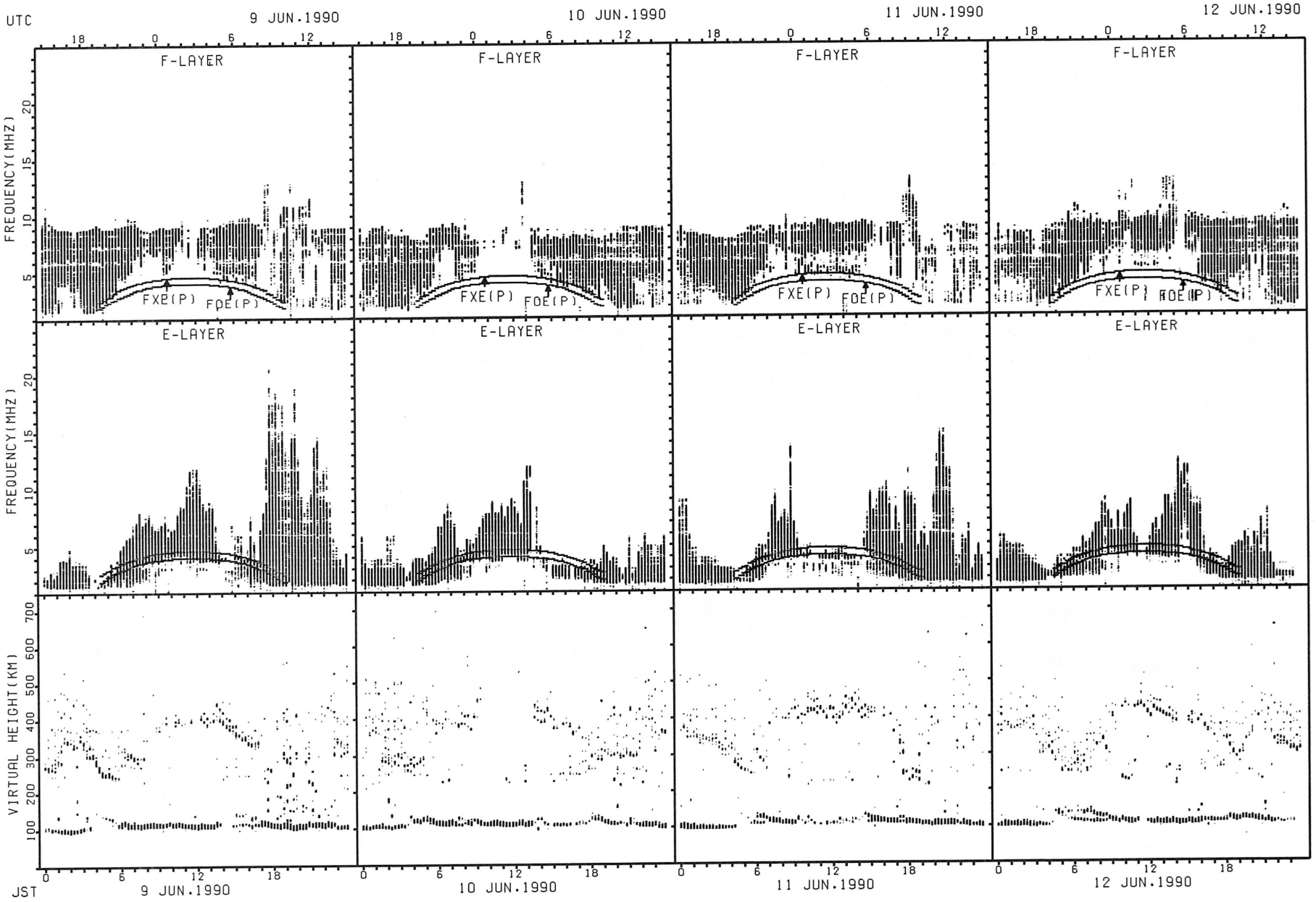
FOE(P): PREDICTED VALUE FOR FOE

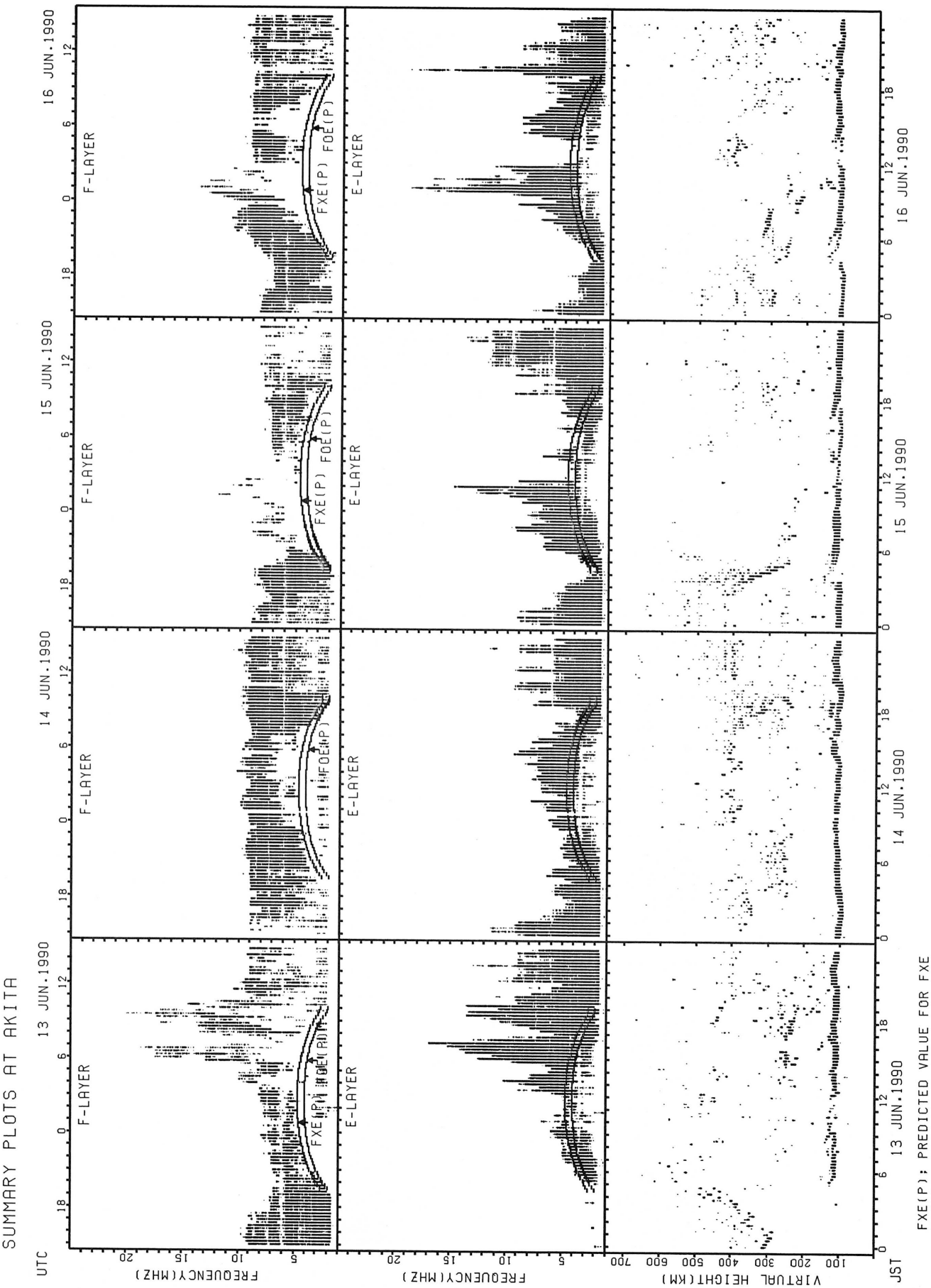

SUMMARY PLOTS AT AKITA
UTC
JST
1 JUN.1990
2 JUN.1990
3 JUN.1990
4 JUN.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

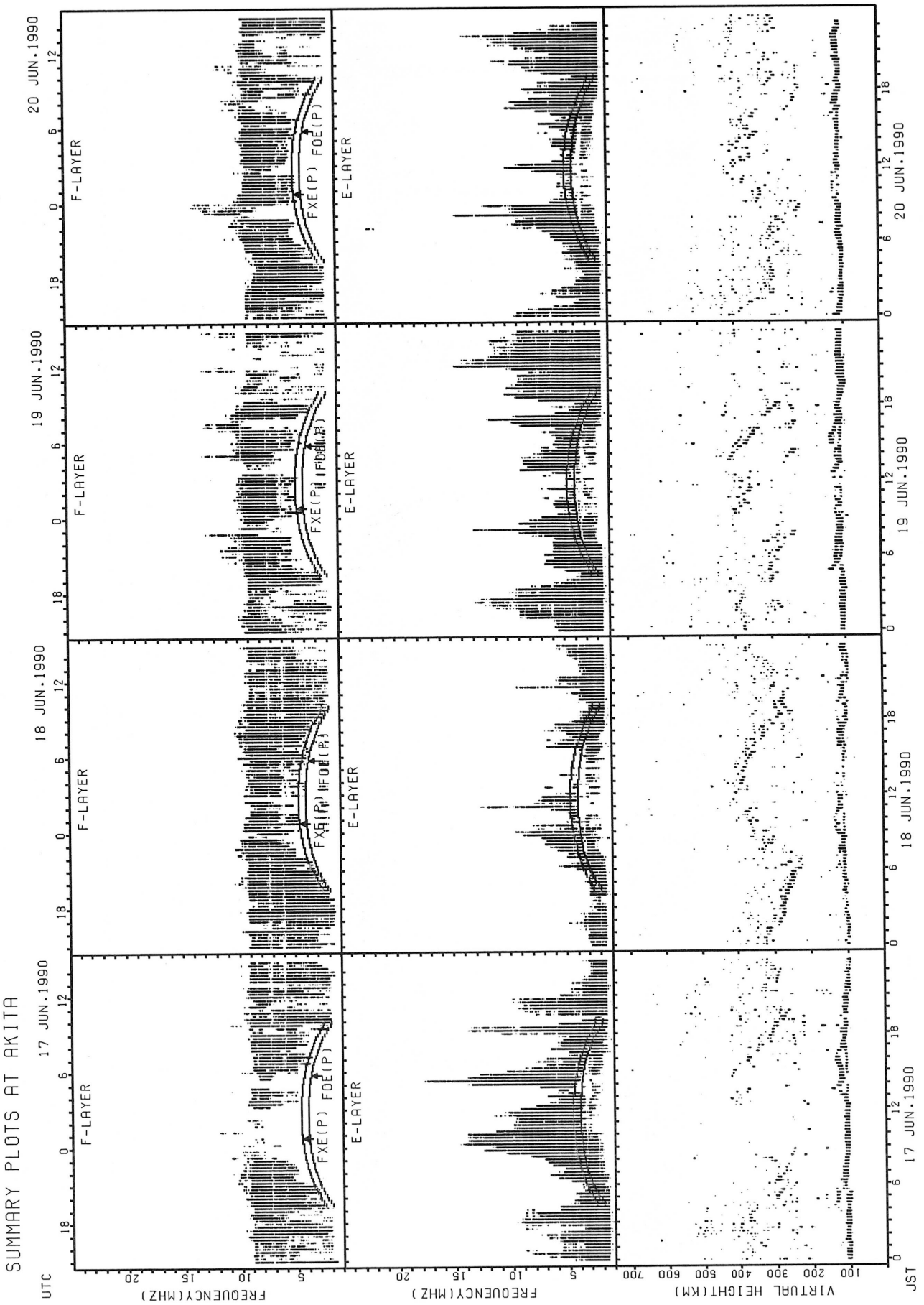

SUMMARY PLOTS AT AKITA
UTC
JST
5 JUN.1990
6 JUN.1990
7 JUN.1990
8 JUN.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

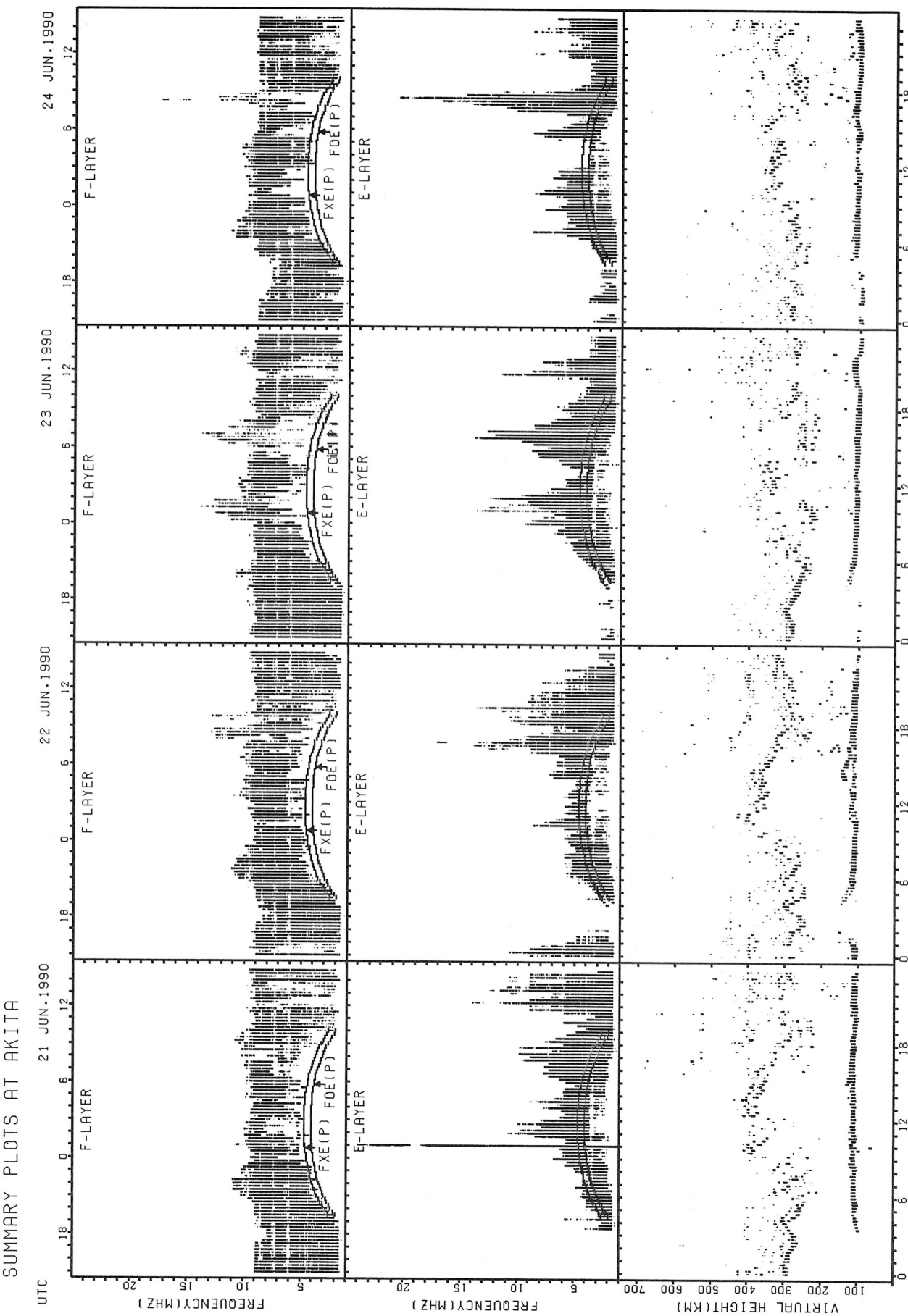
SUMMARY PLOTS AT AKITA



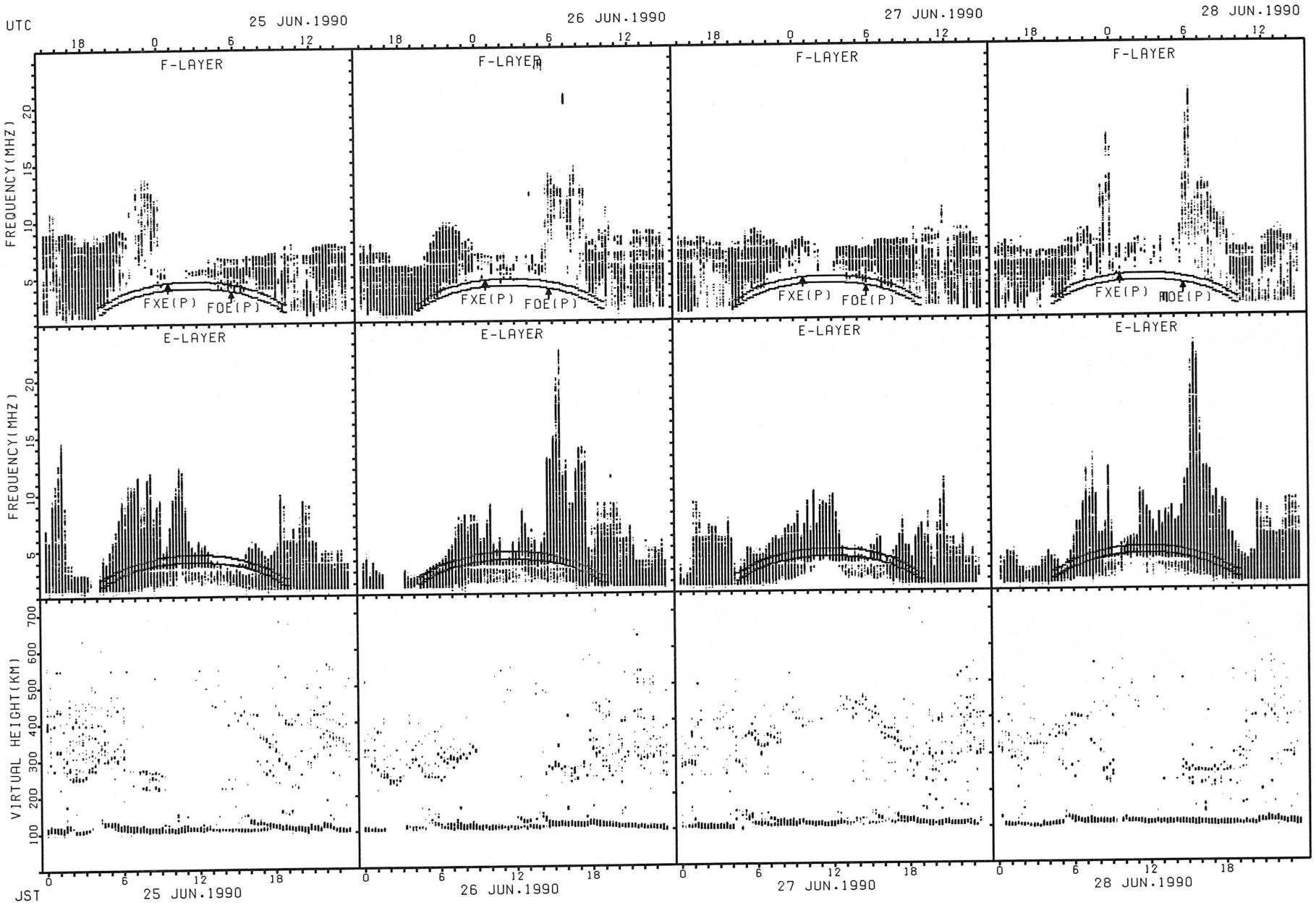
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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


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

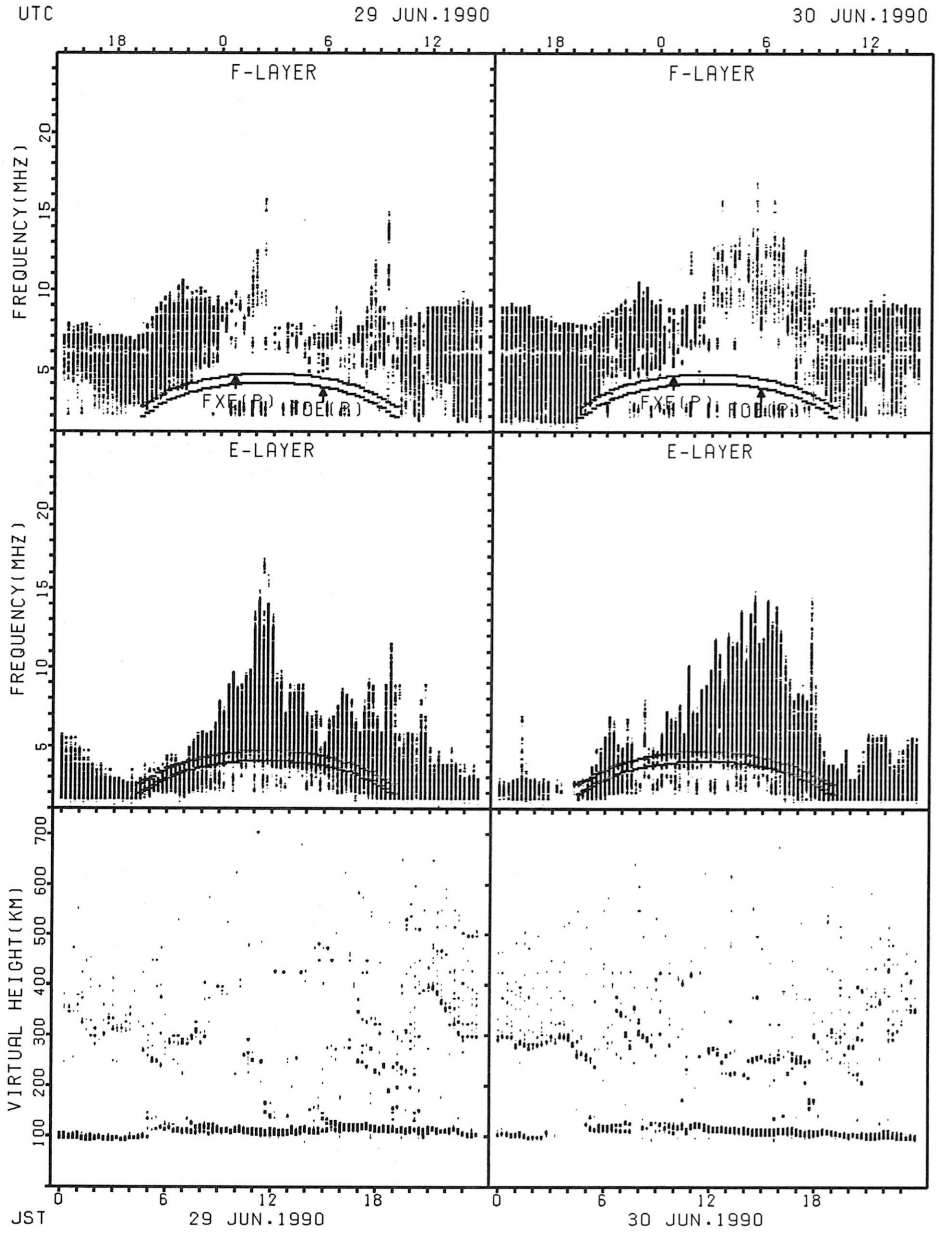

SUMMARY PLOTS AT AKITA
UTC
21 JUN.1990
22 JUN.1990
23 JUN.1990
24 JUN.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA

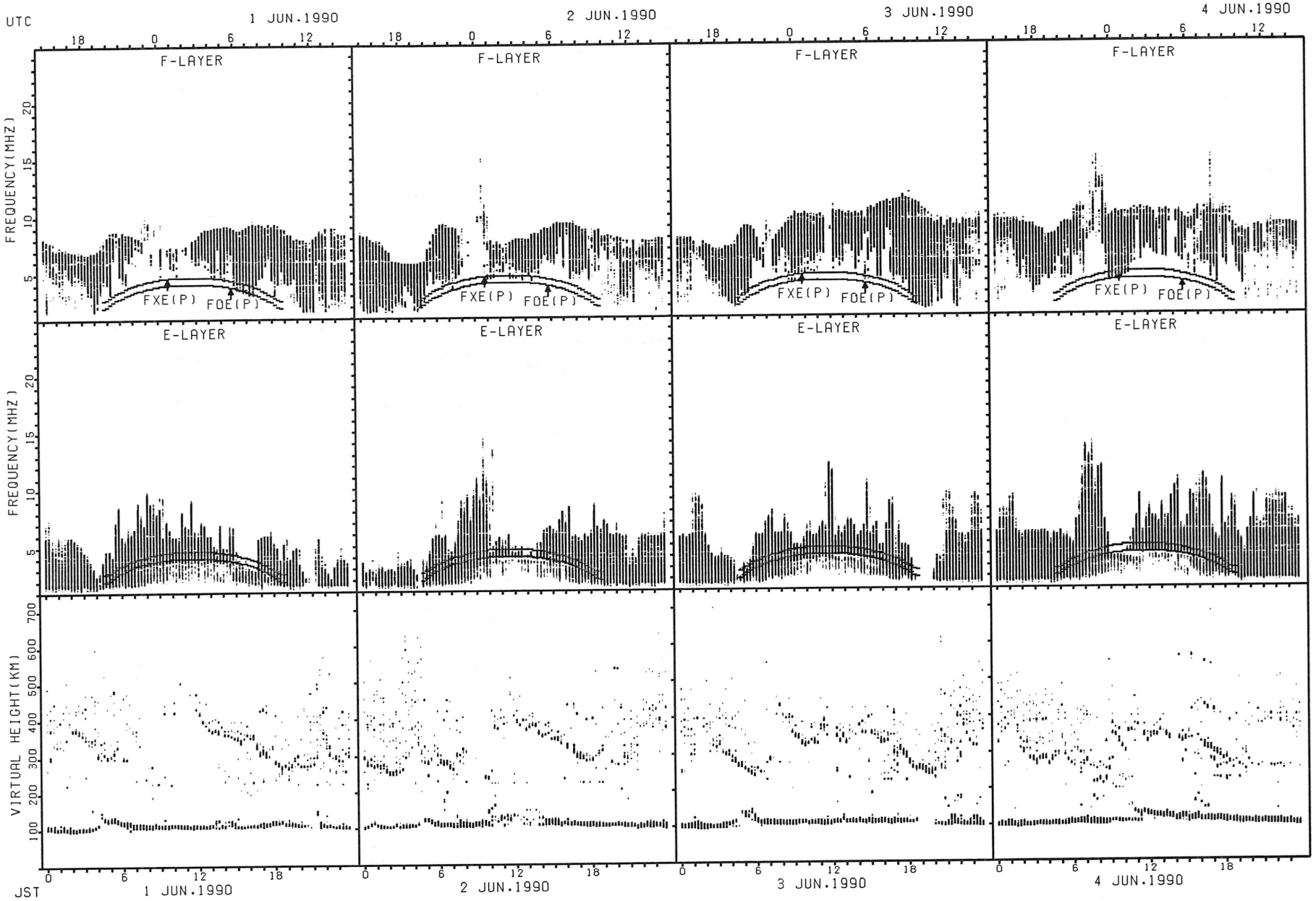


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

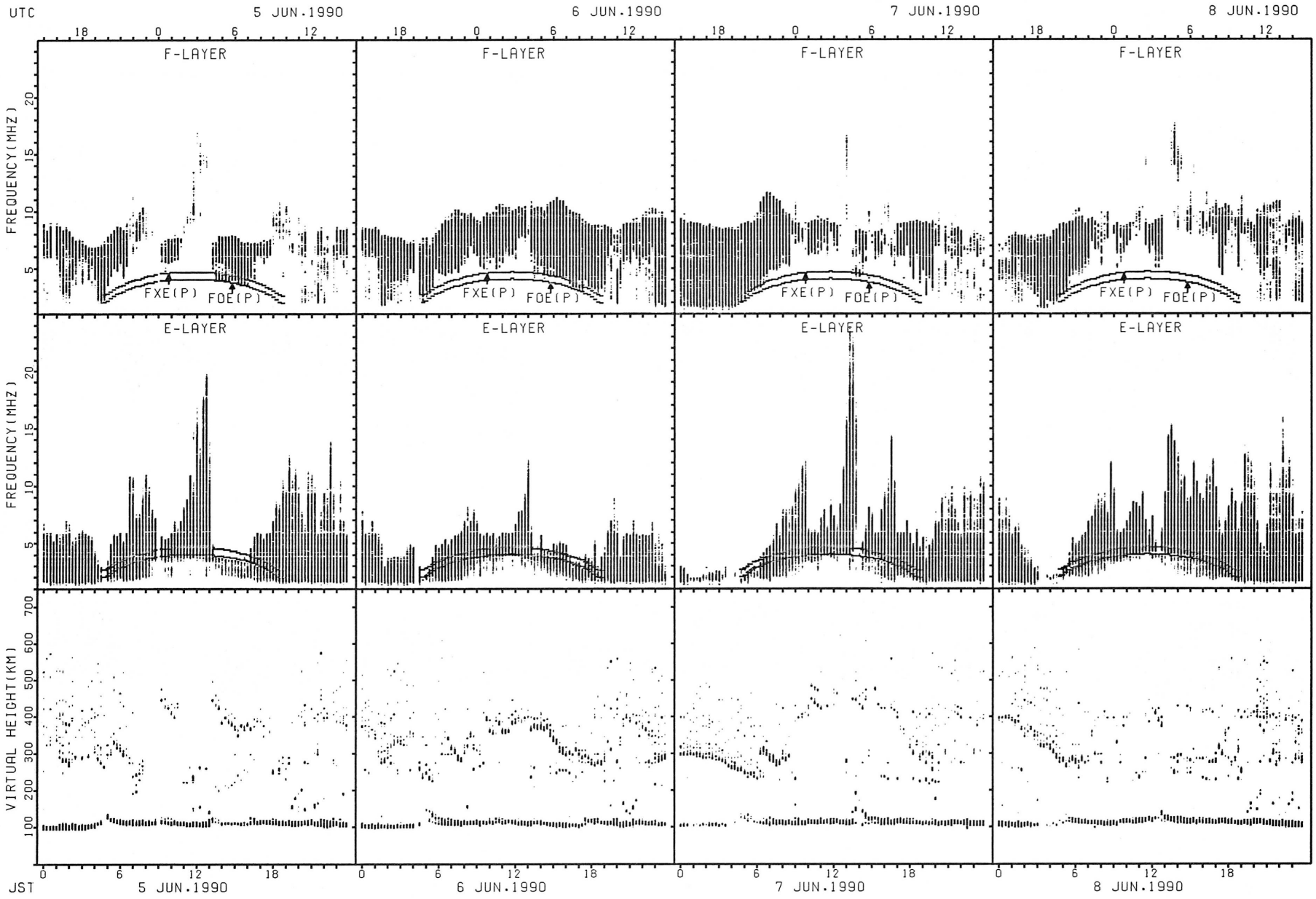
SUMMARY PLOTS AT AKITA



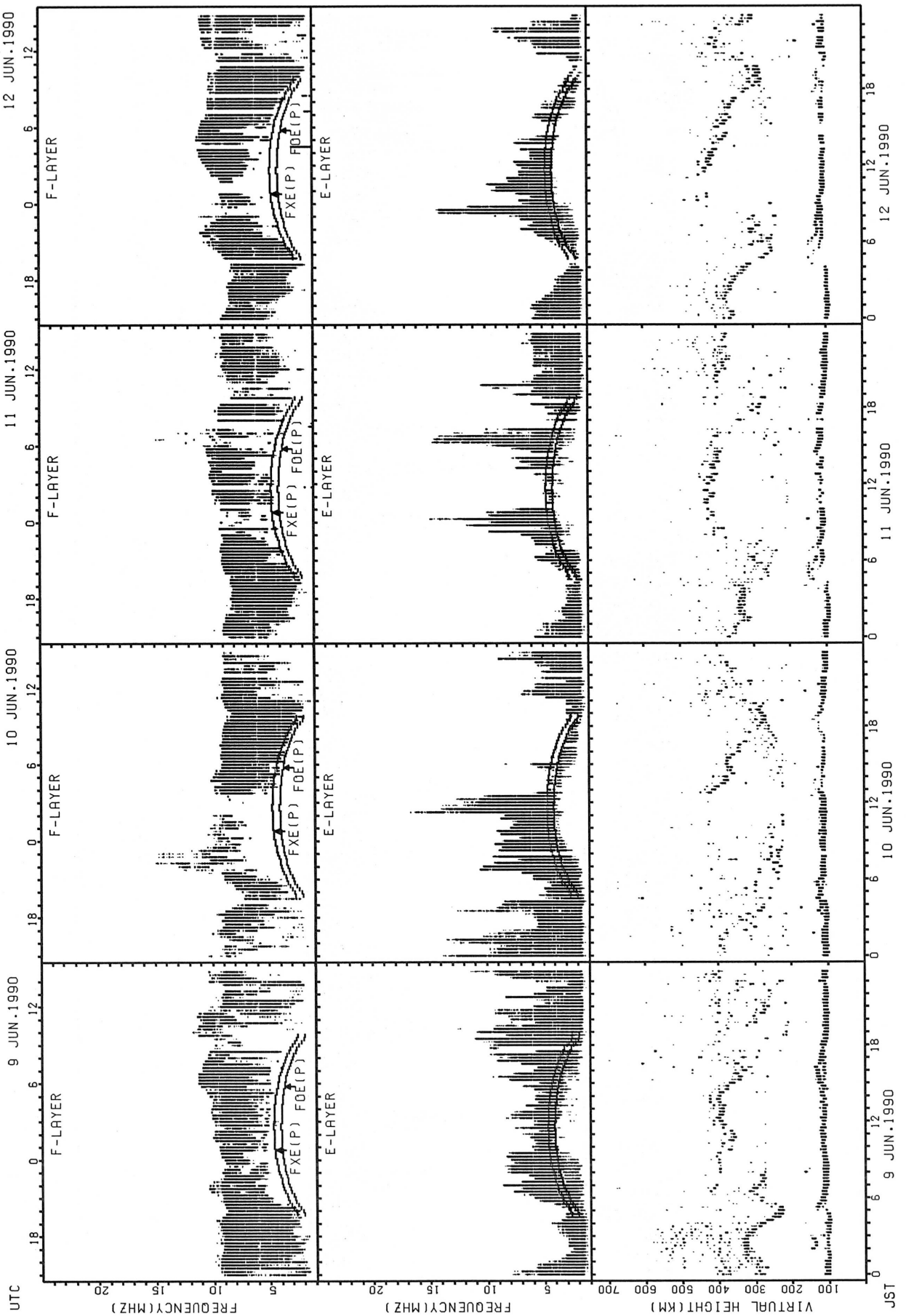
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
1 JUN.1990
2 JUN.1990
3 JUN.1990
4 JUN.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

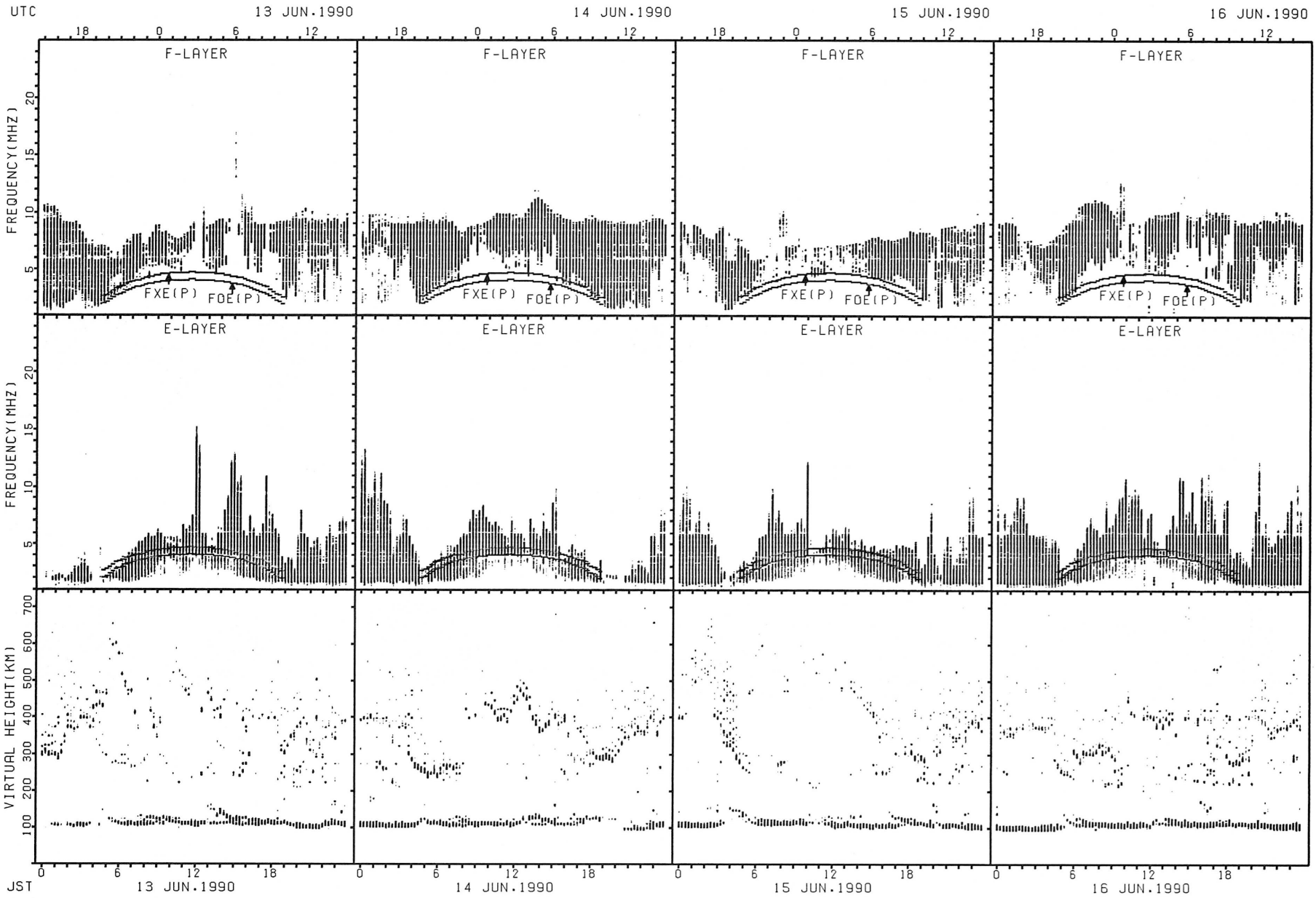
SUMMARY PLOTS AT KOKUBUNJI TOKYO



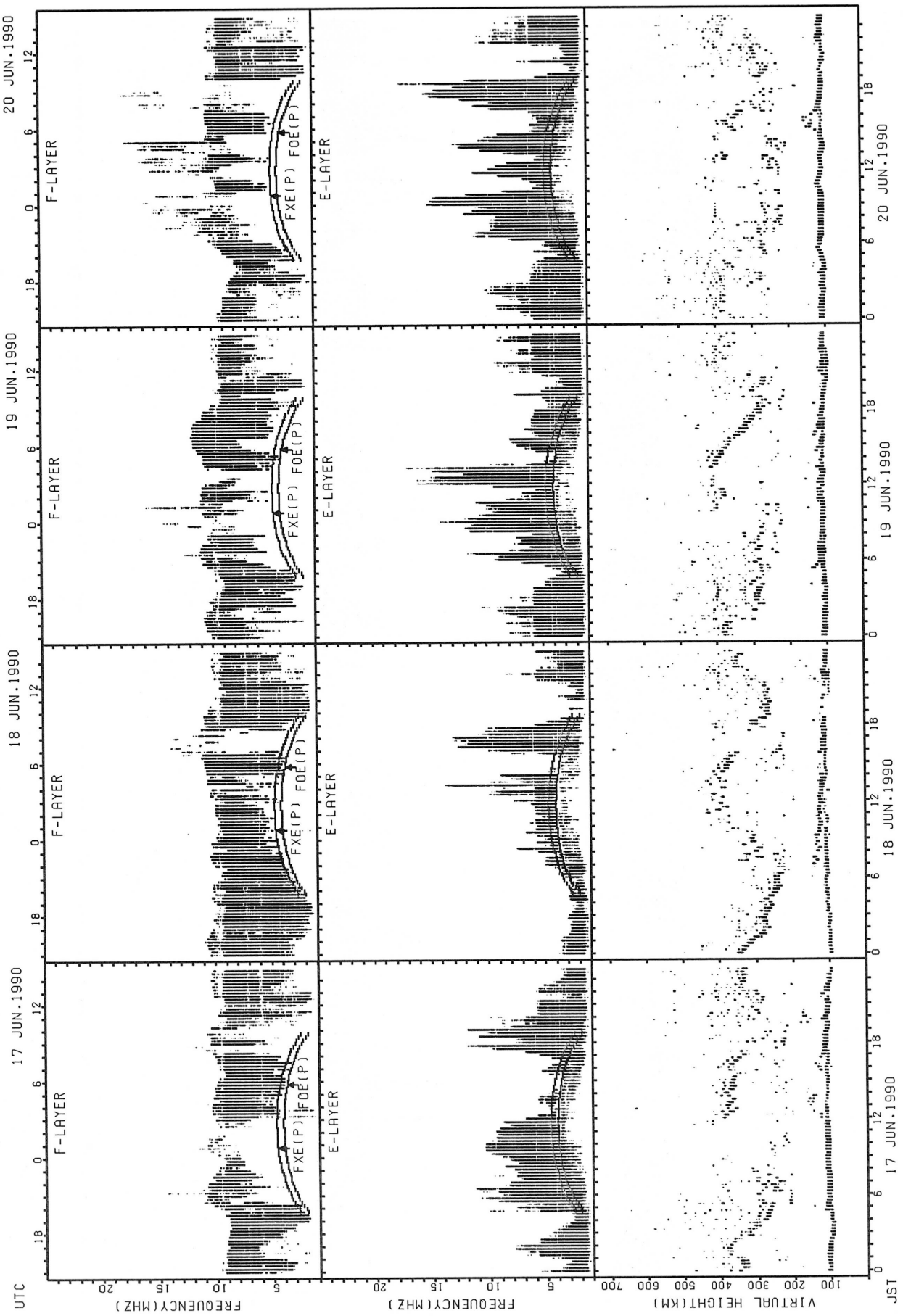
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
9 JUN.1990
10 JUN.1990
11 JUN.1990
12 JUN.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

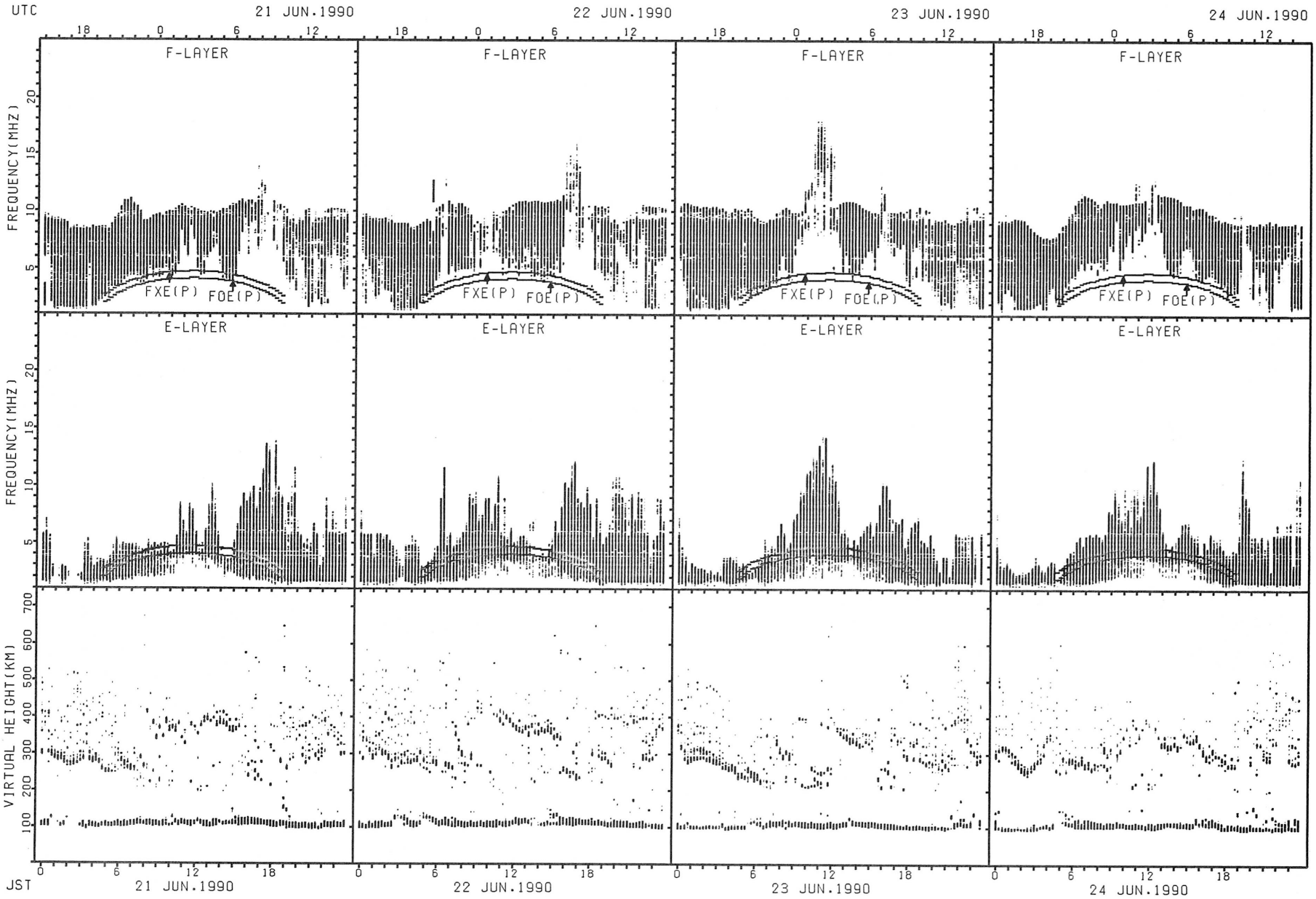
SUMMARY PLOTS AT KOKUBUNJI TOKYO



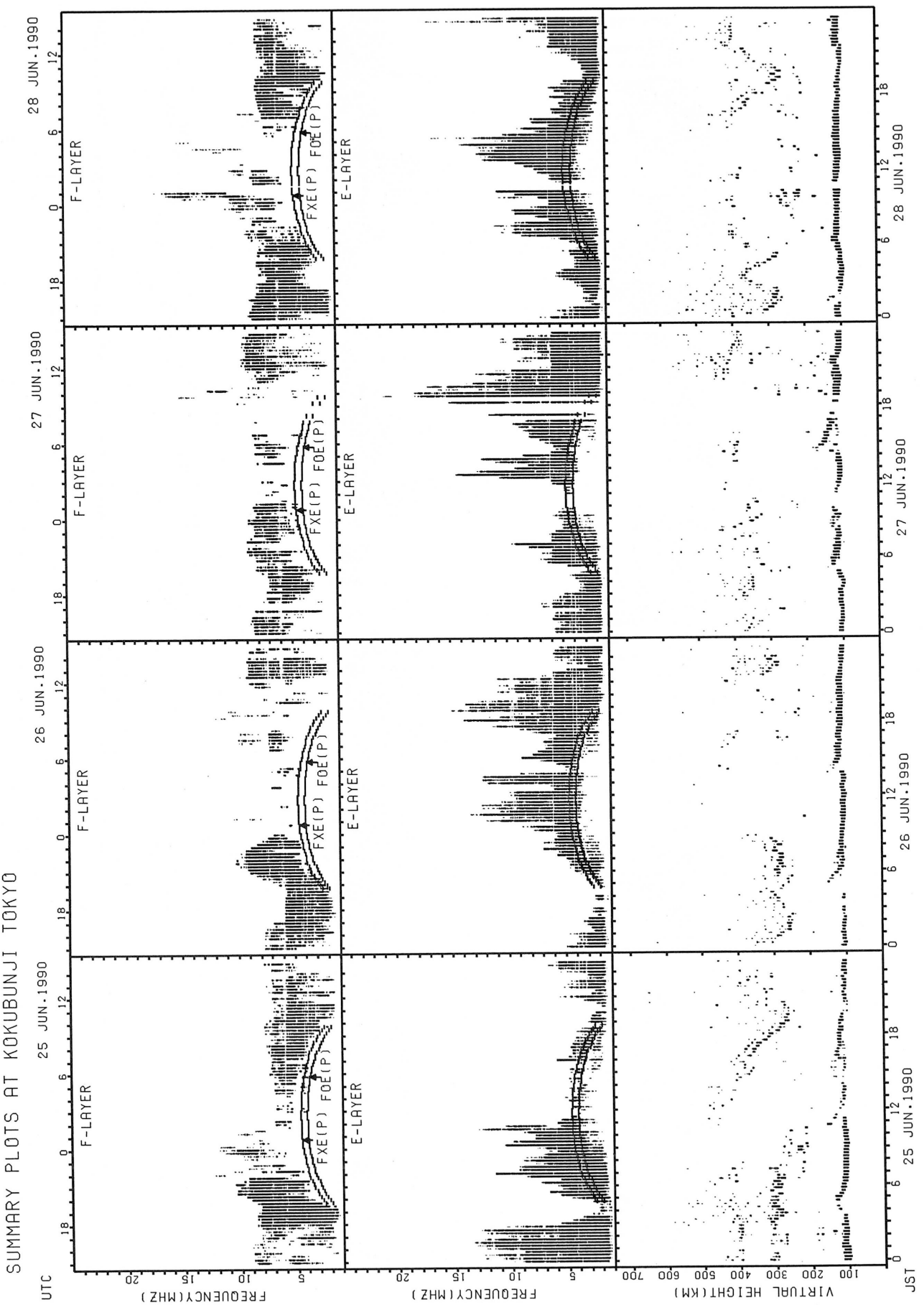
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
17 JUN.1990
18 JUN.1990
19 JUN.1990
20 JUN.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

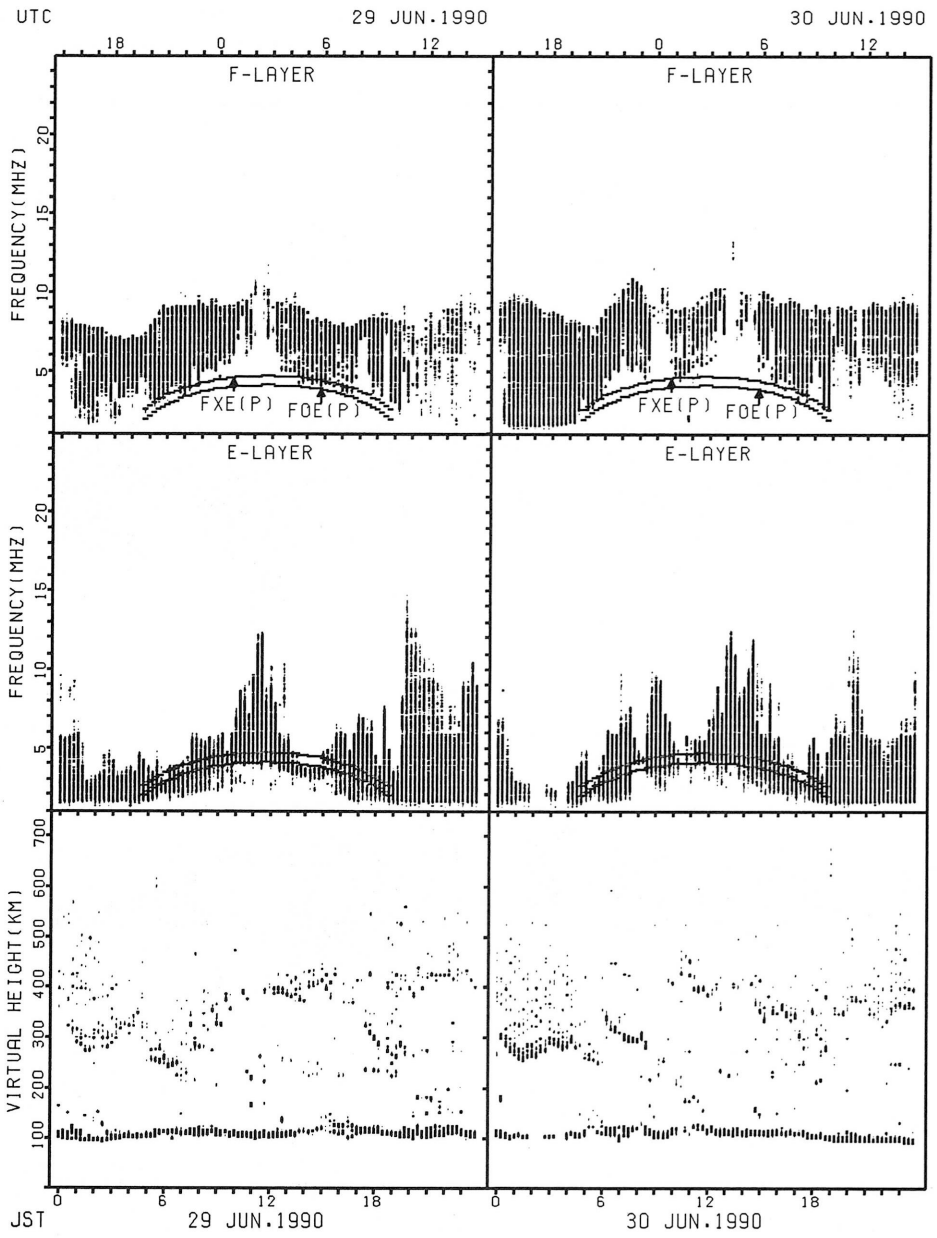
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
25 JUN.1990
26 JUN.1990
27 JUN.1990
28 JUN.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



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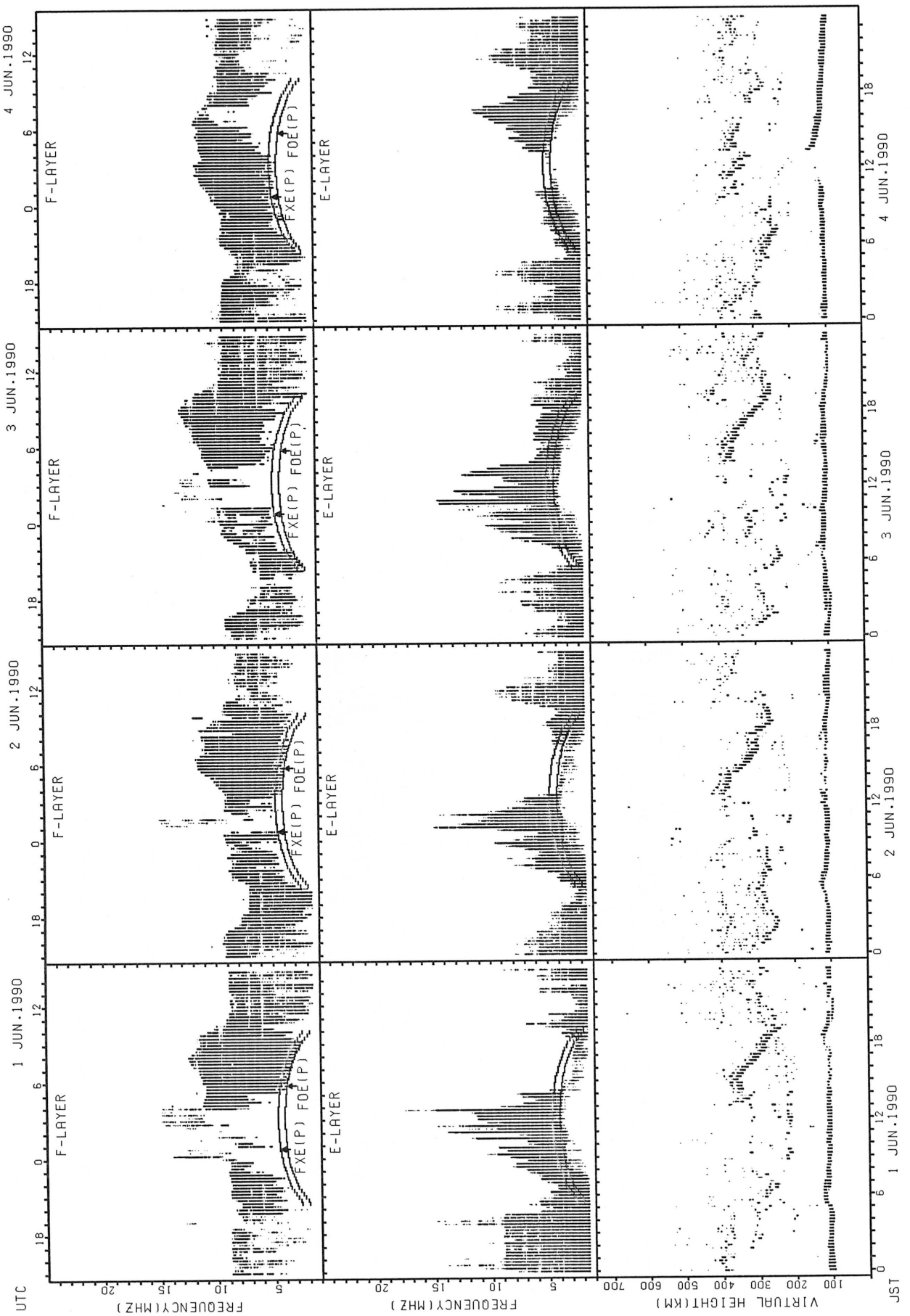
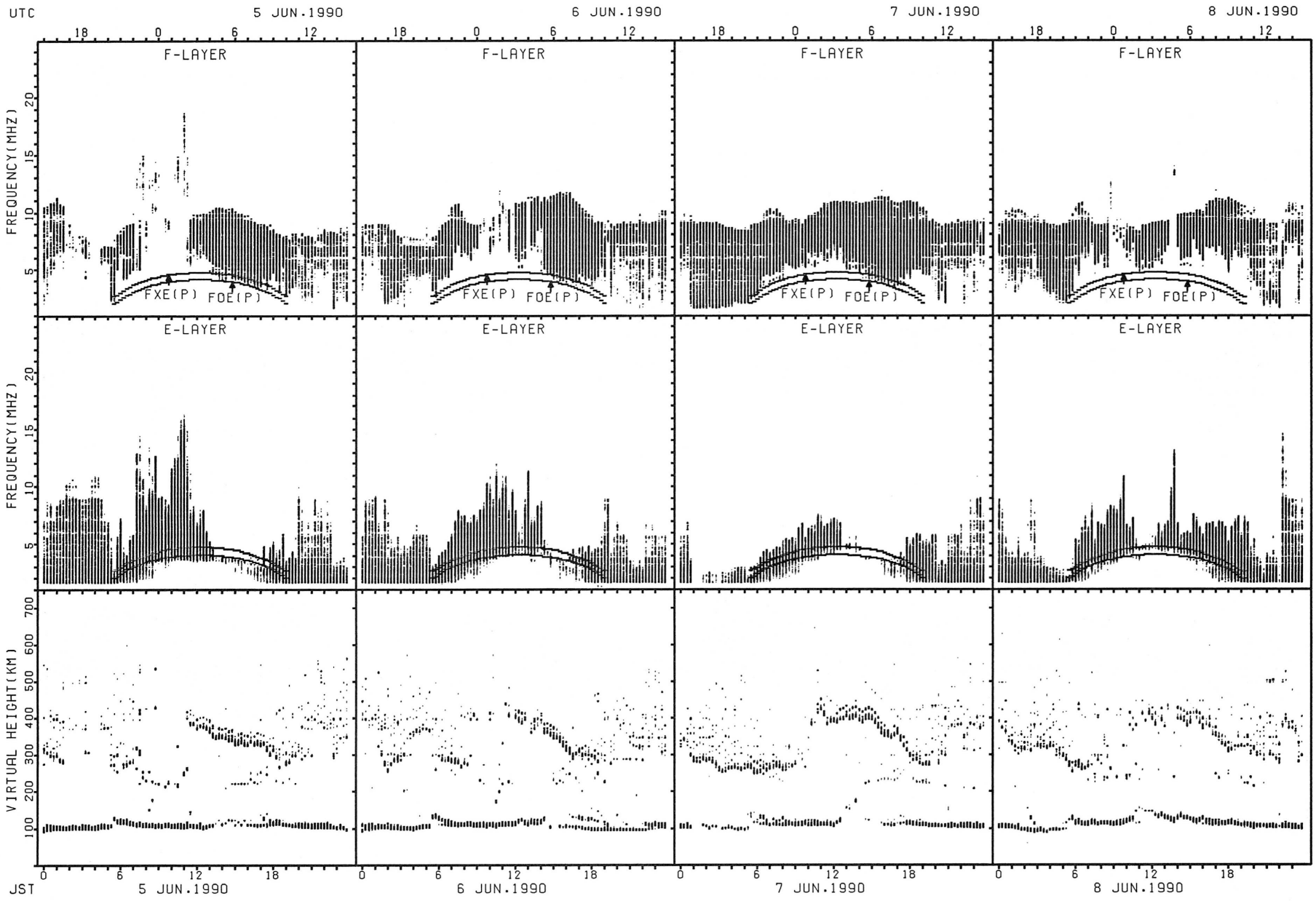
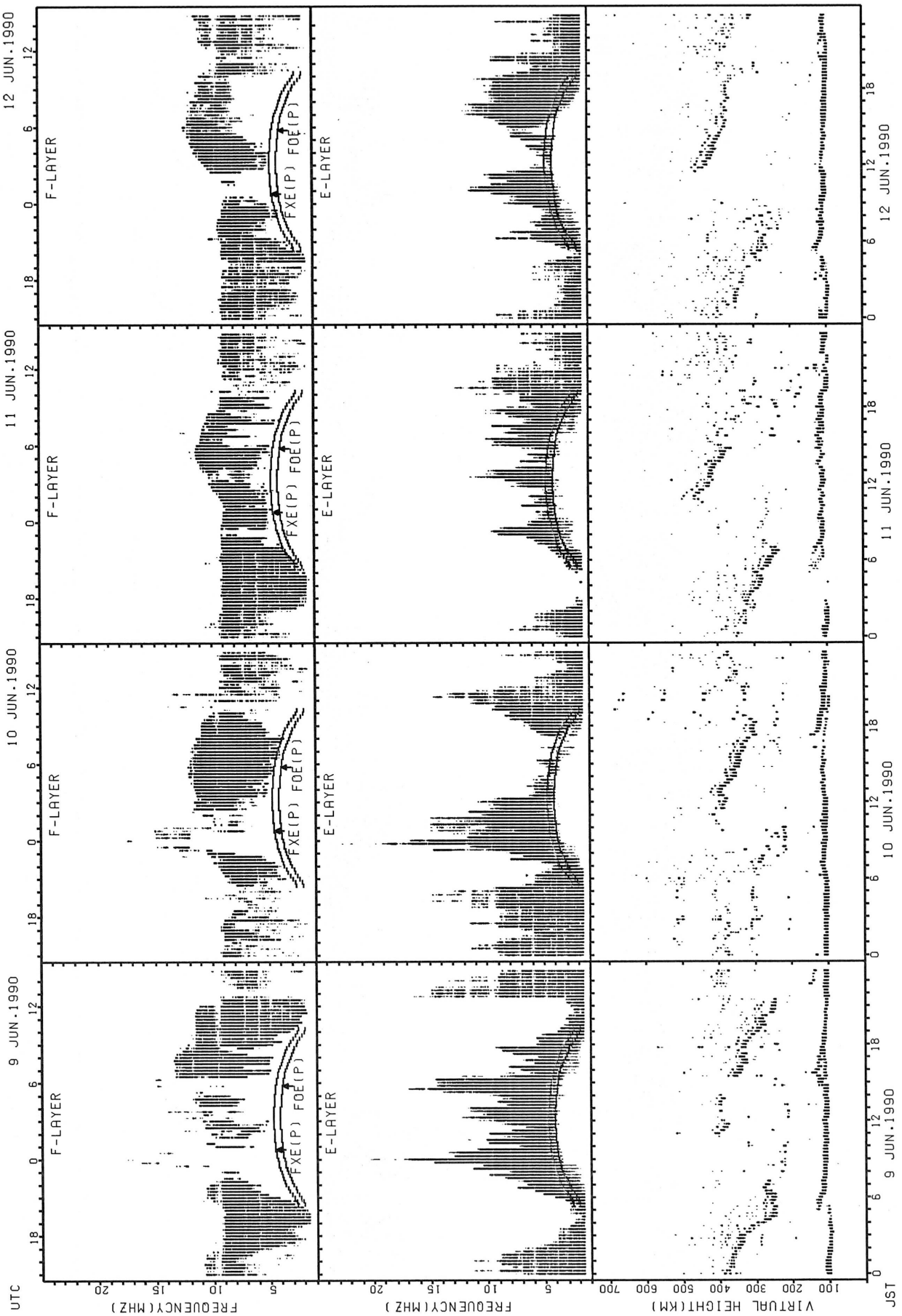

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
1 JUN.1990
2 JUN.1990
3 JUN.1990
4 JUN.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

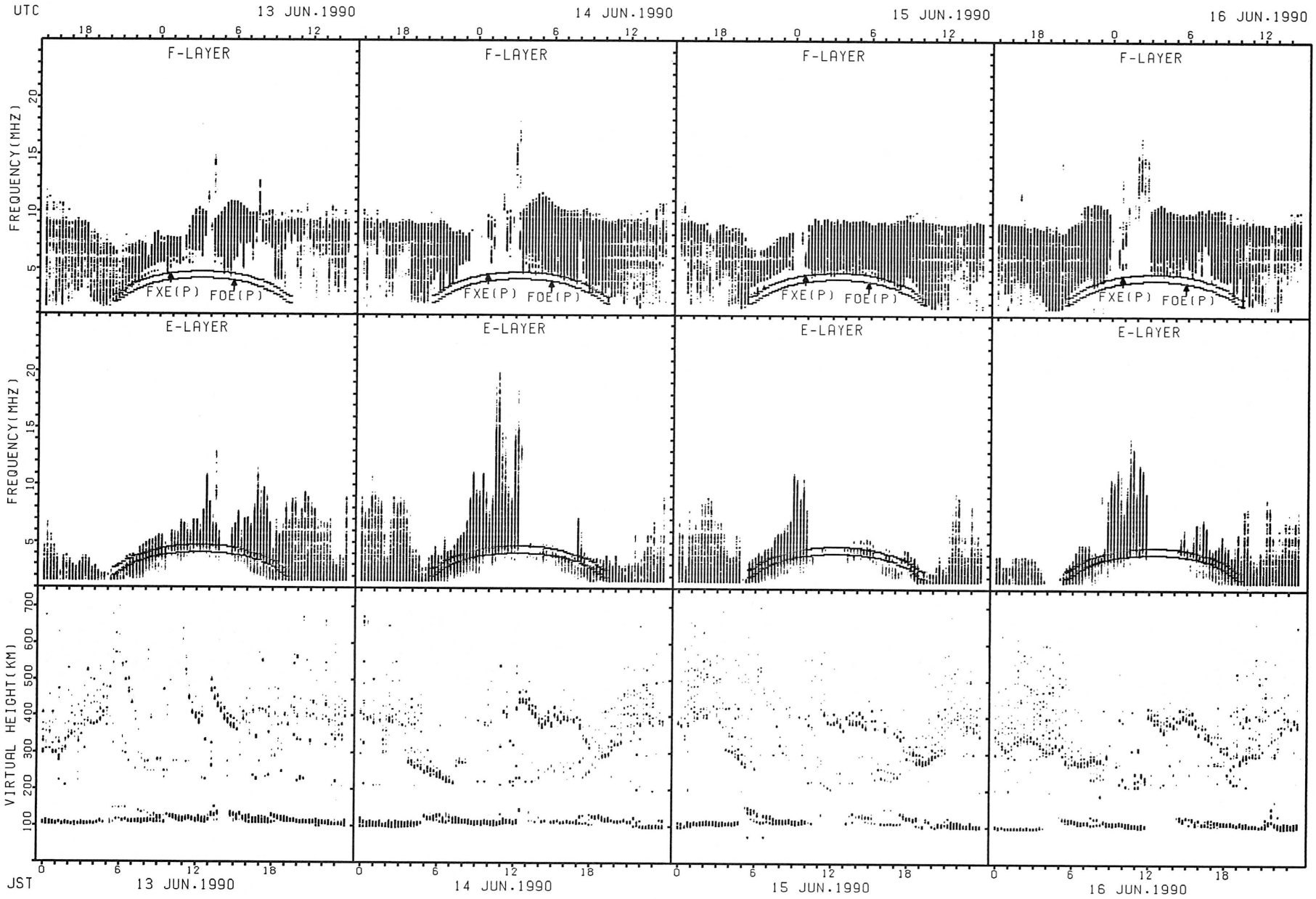
SUMMARY PLOTS AT YAMAGAWA



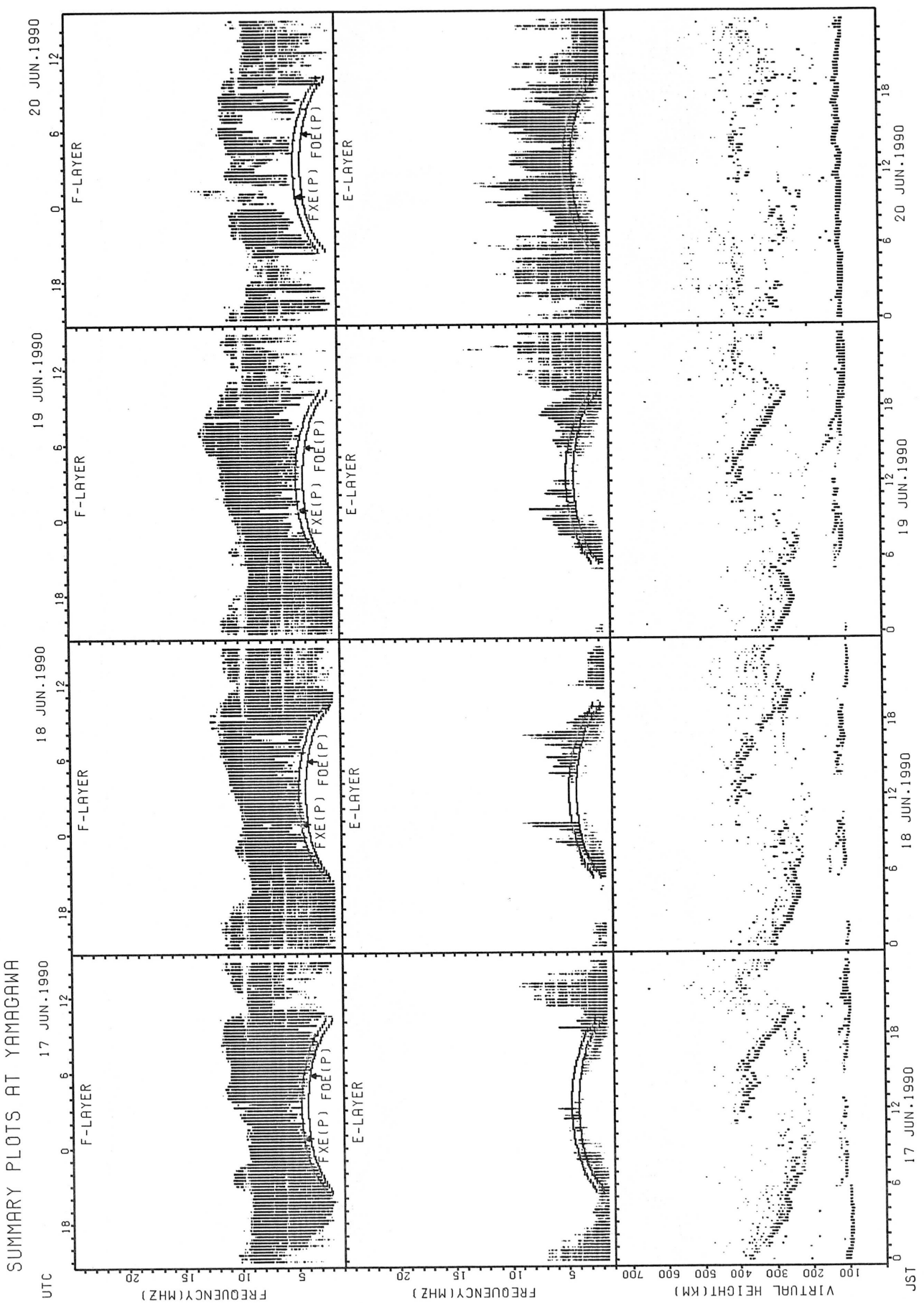
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


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

SUMMARY PLOTS AT YAMAGAWA



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


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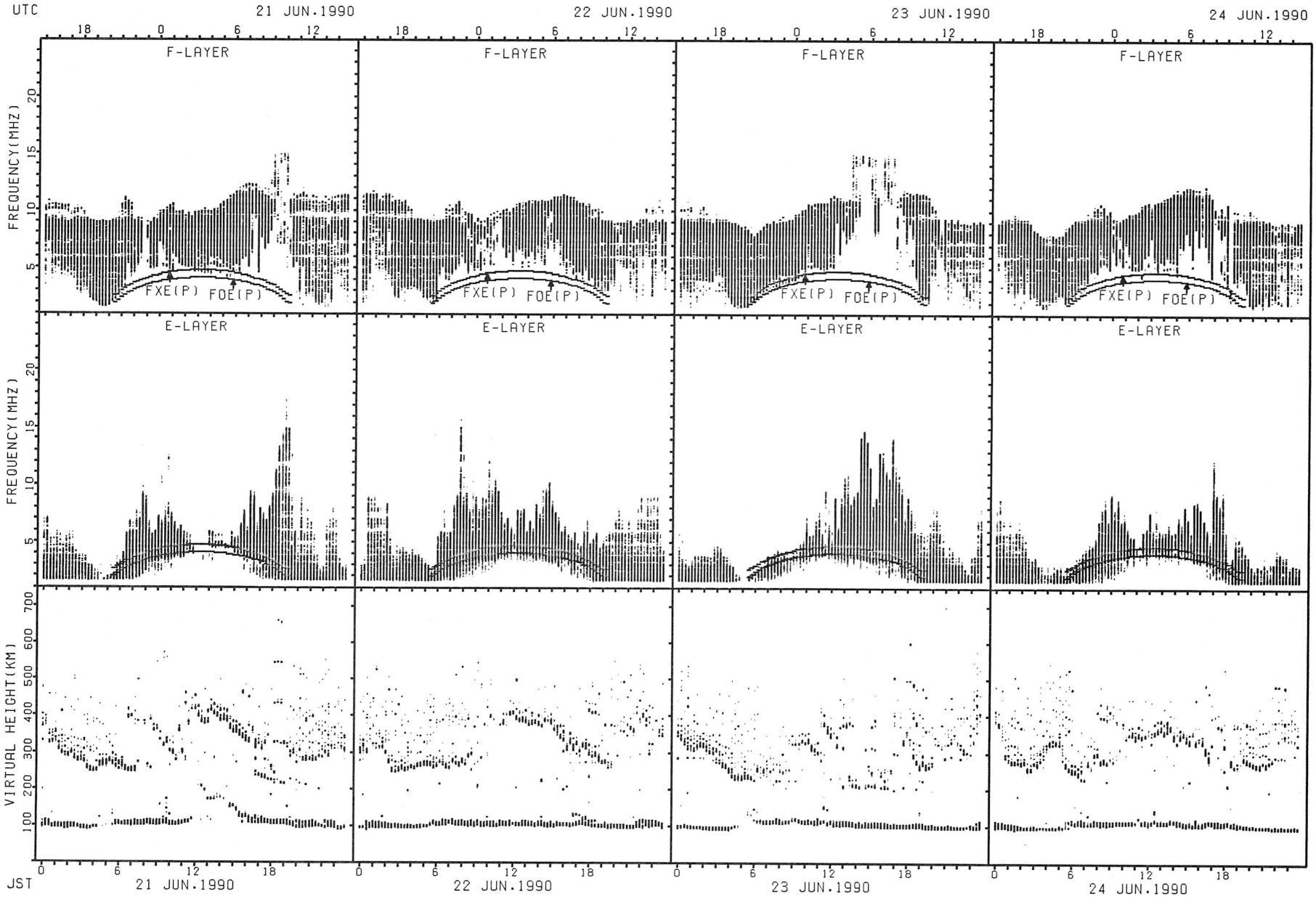
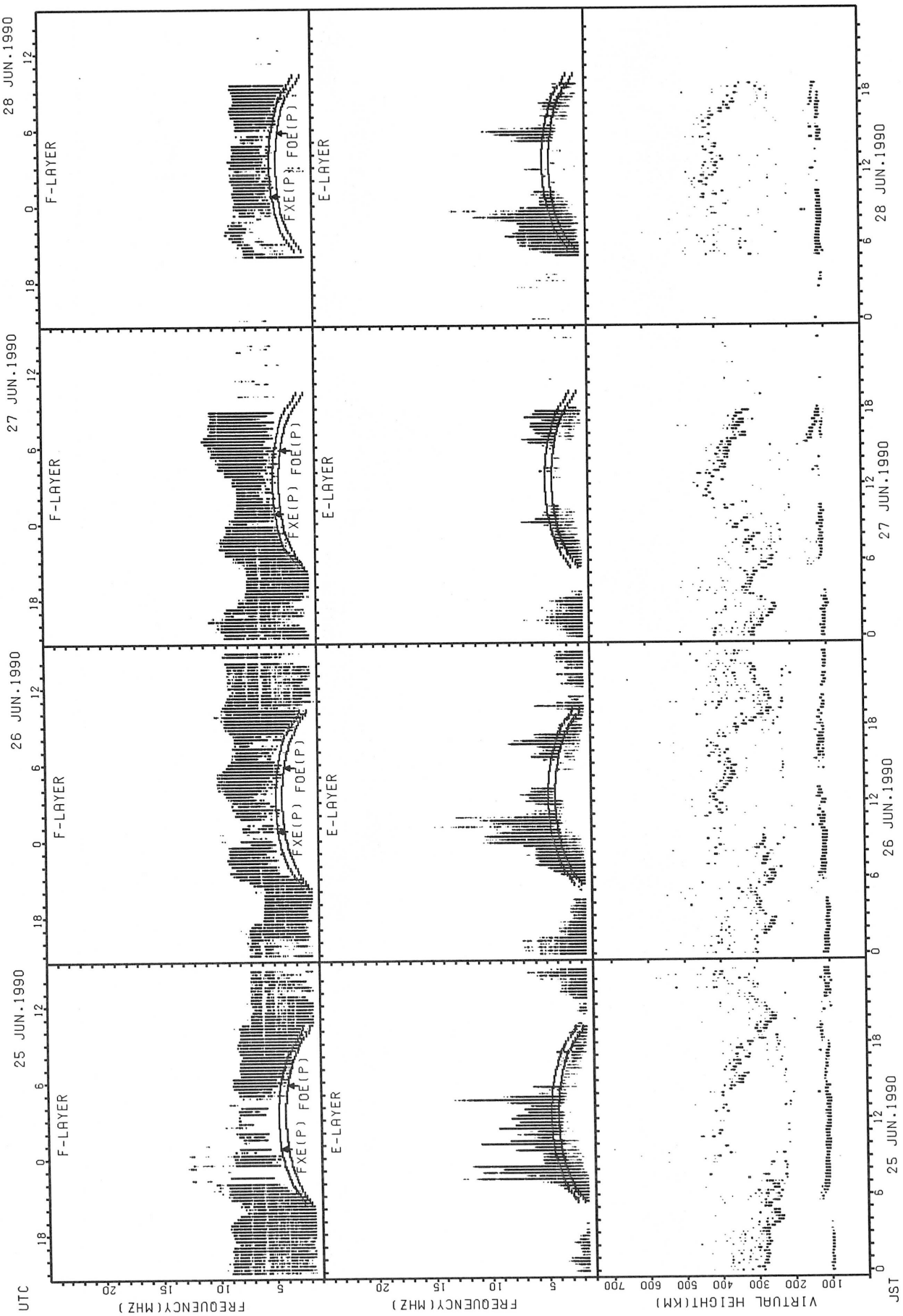
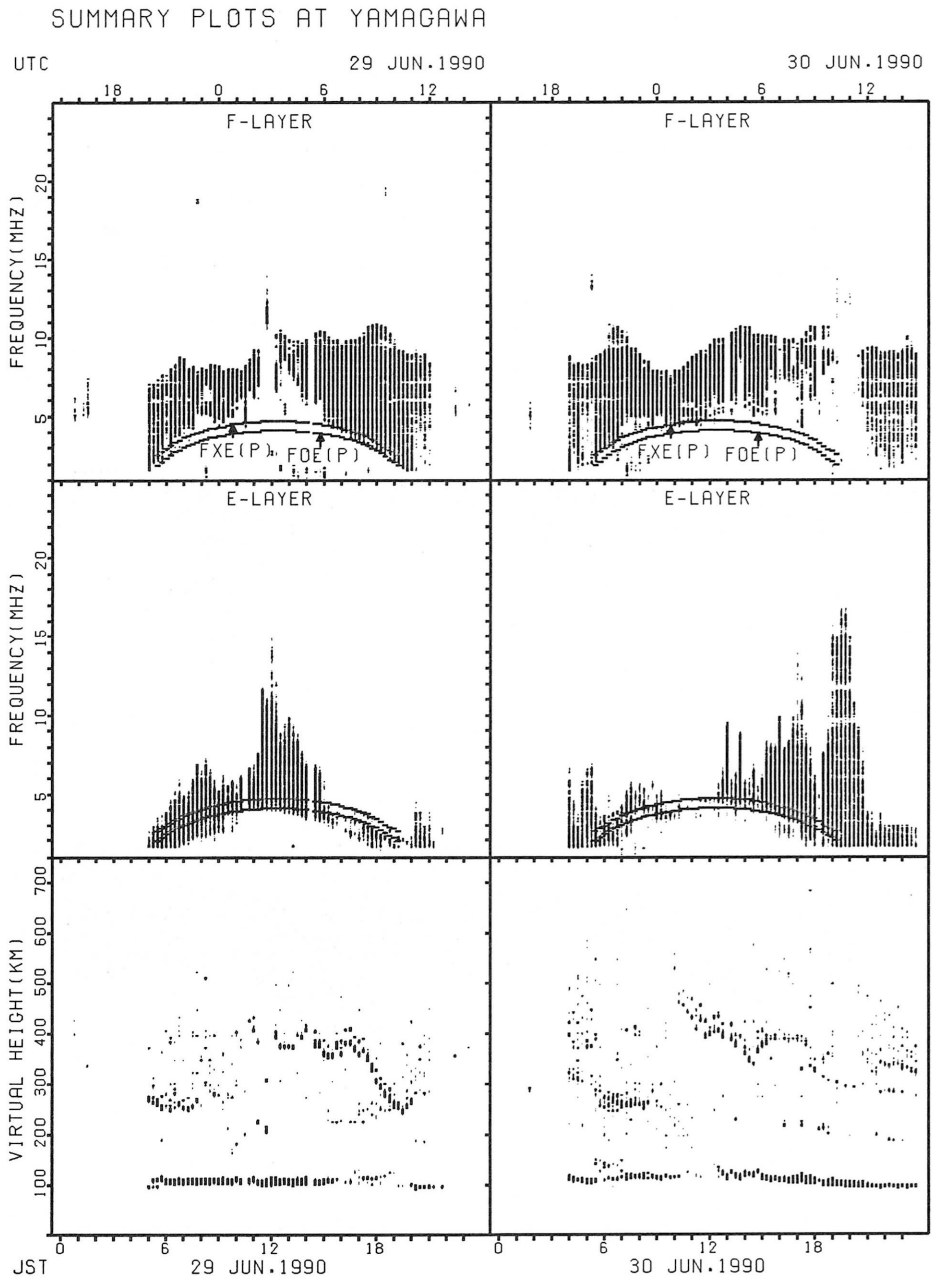
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA

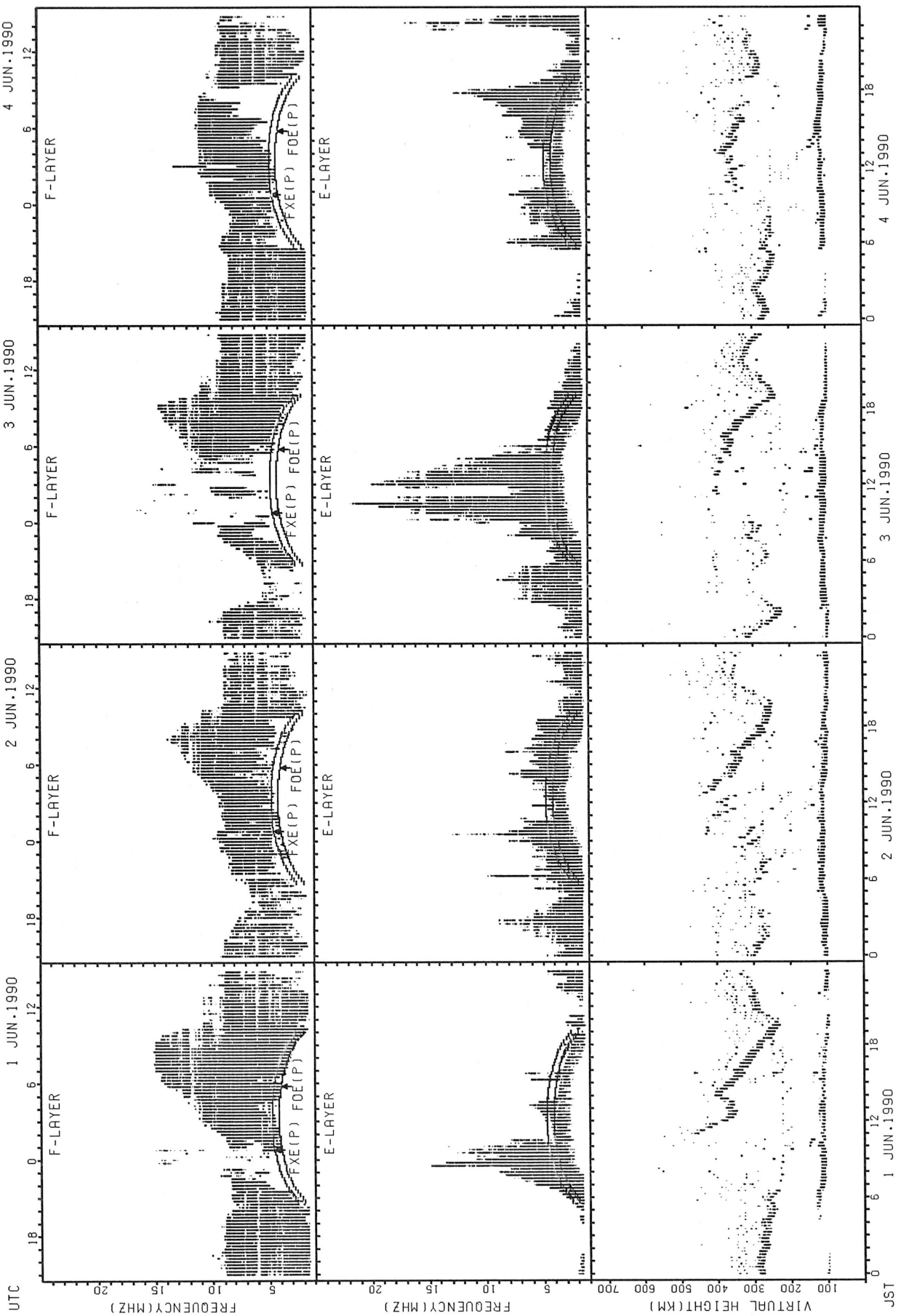


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

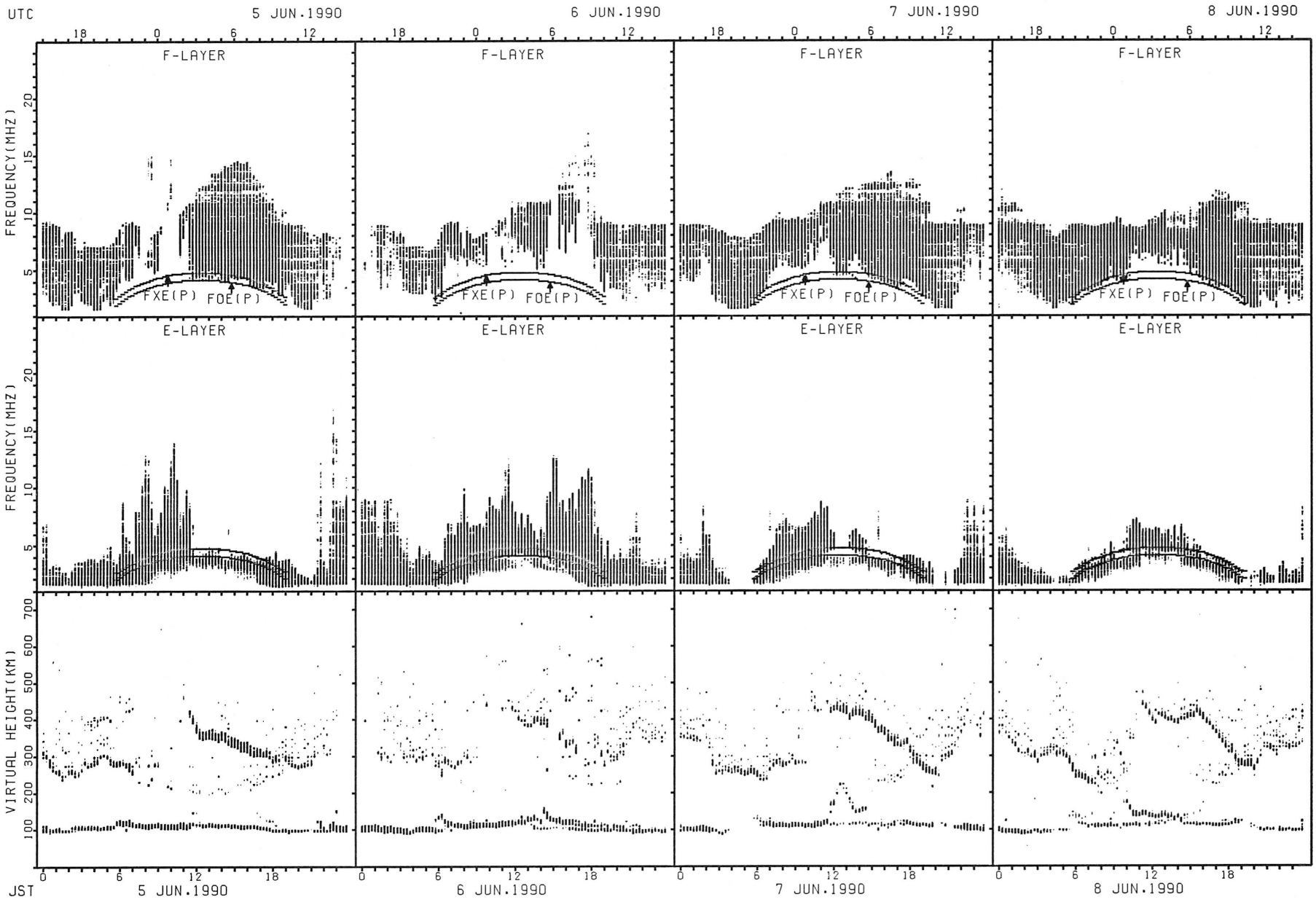

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
25 JUN.1990
26 JUN.1990
27 JUN.1990
28 JUN.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE



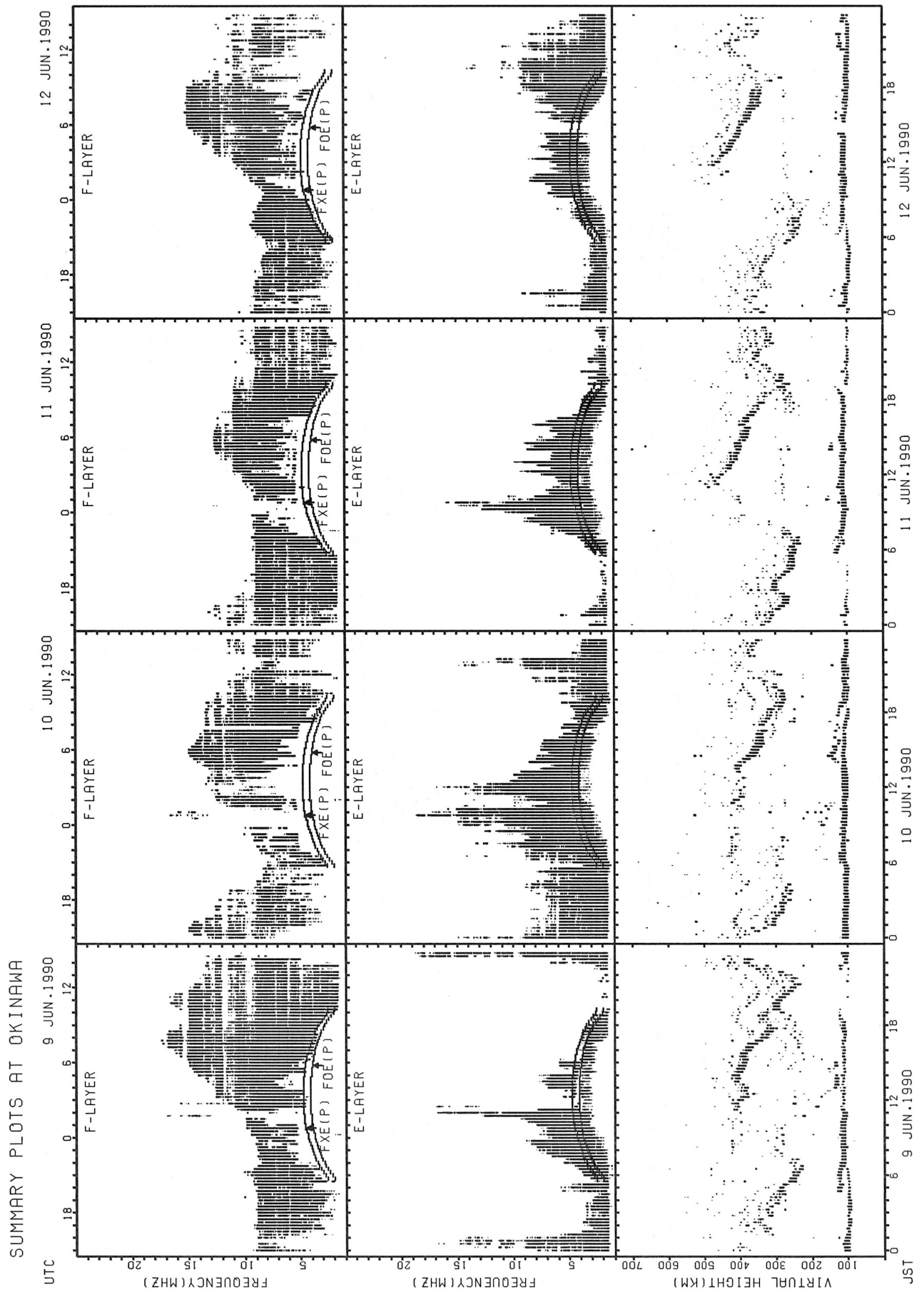
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
1 JUN.1990
2 JUN.1990
3 JUN.1990
4 JUN.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

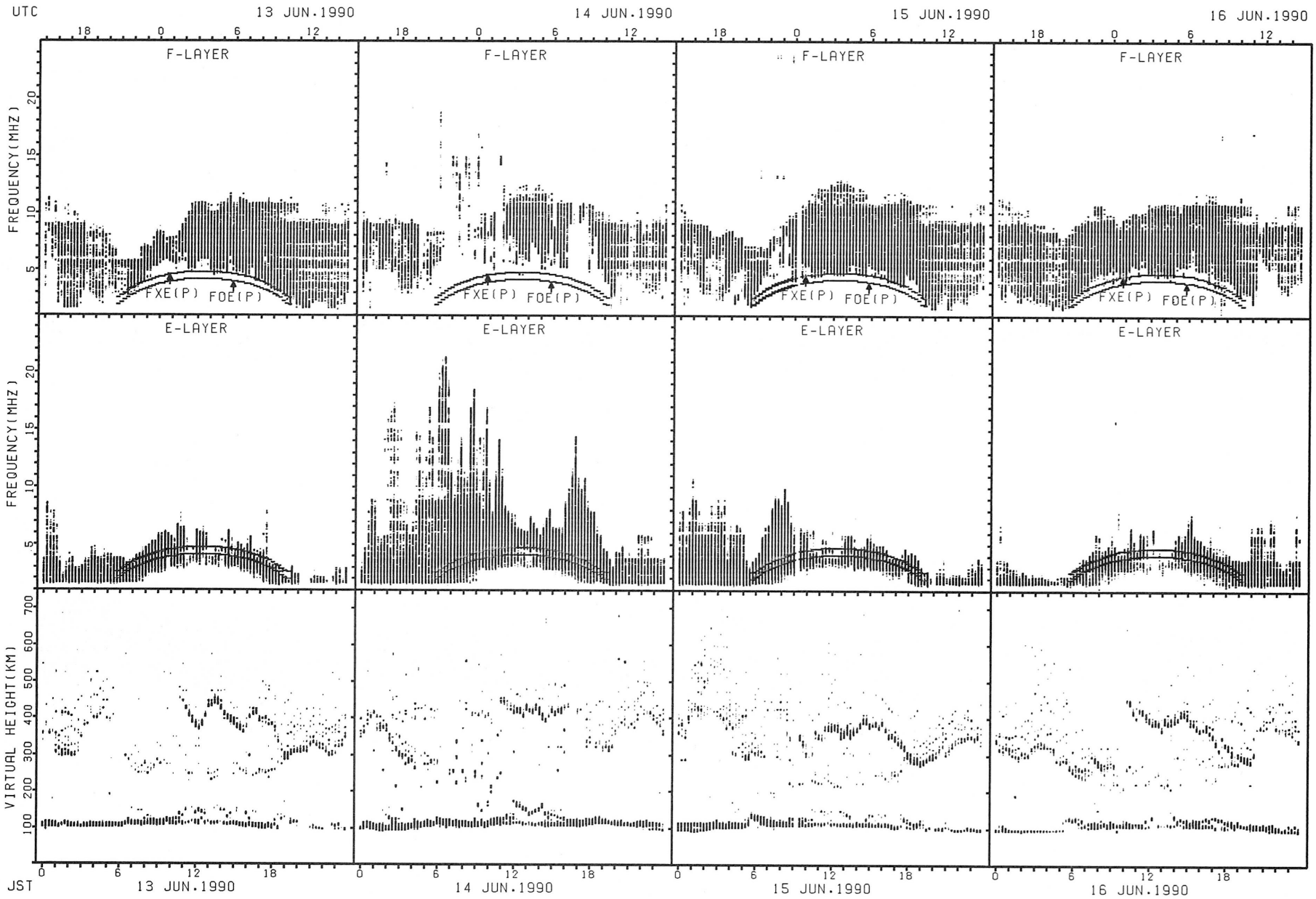
SUMMARY PLOTS AT OKINAWA



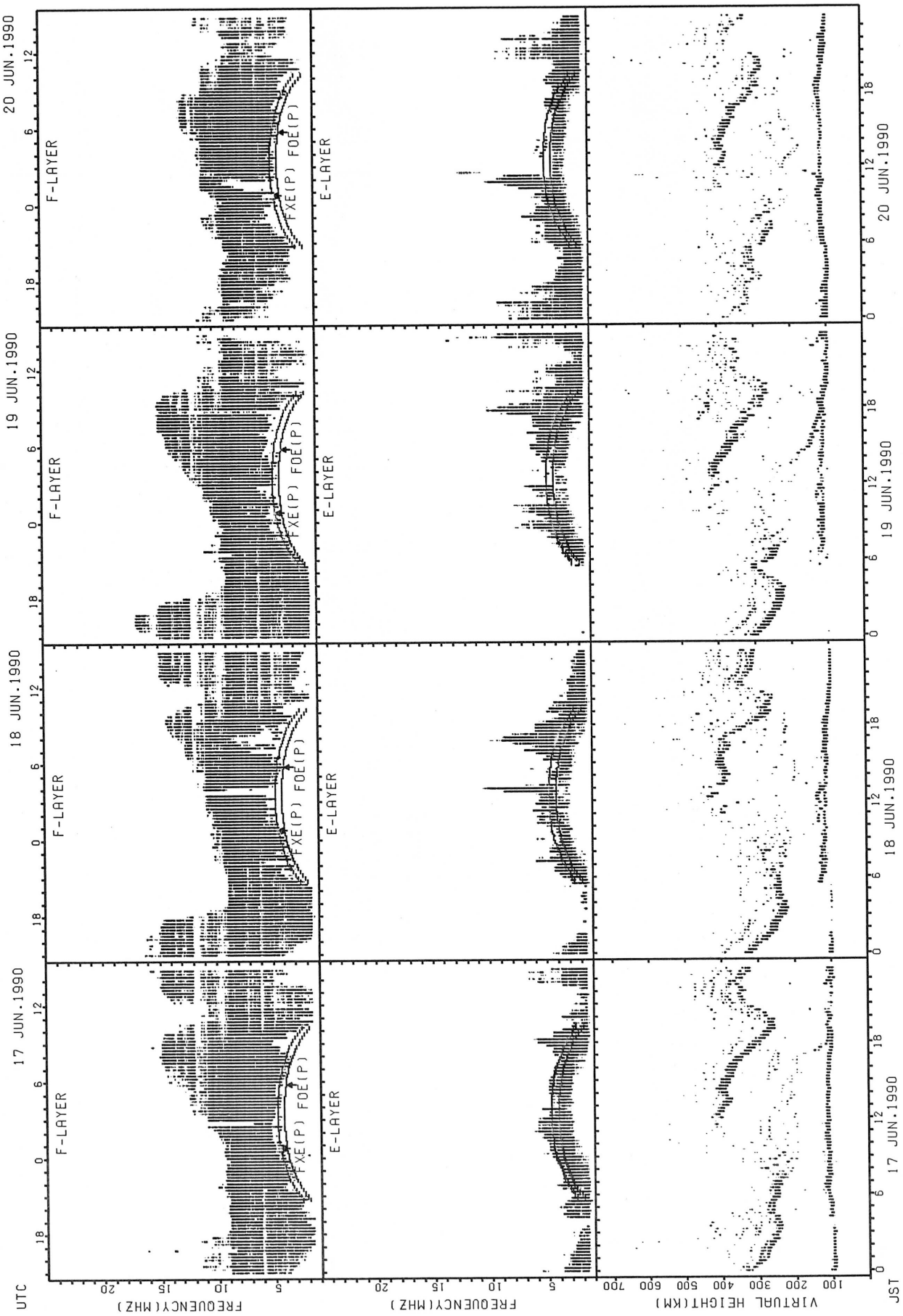
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

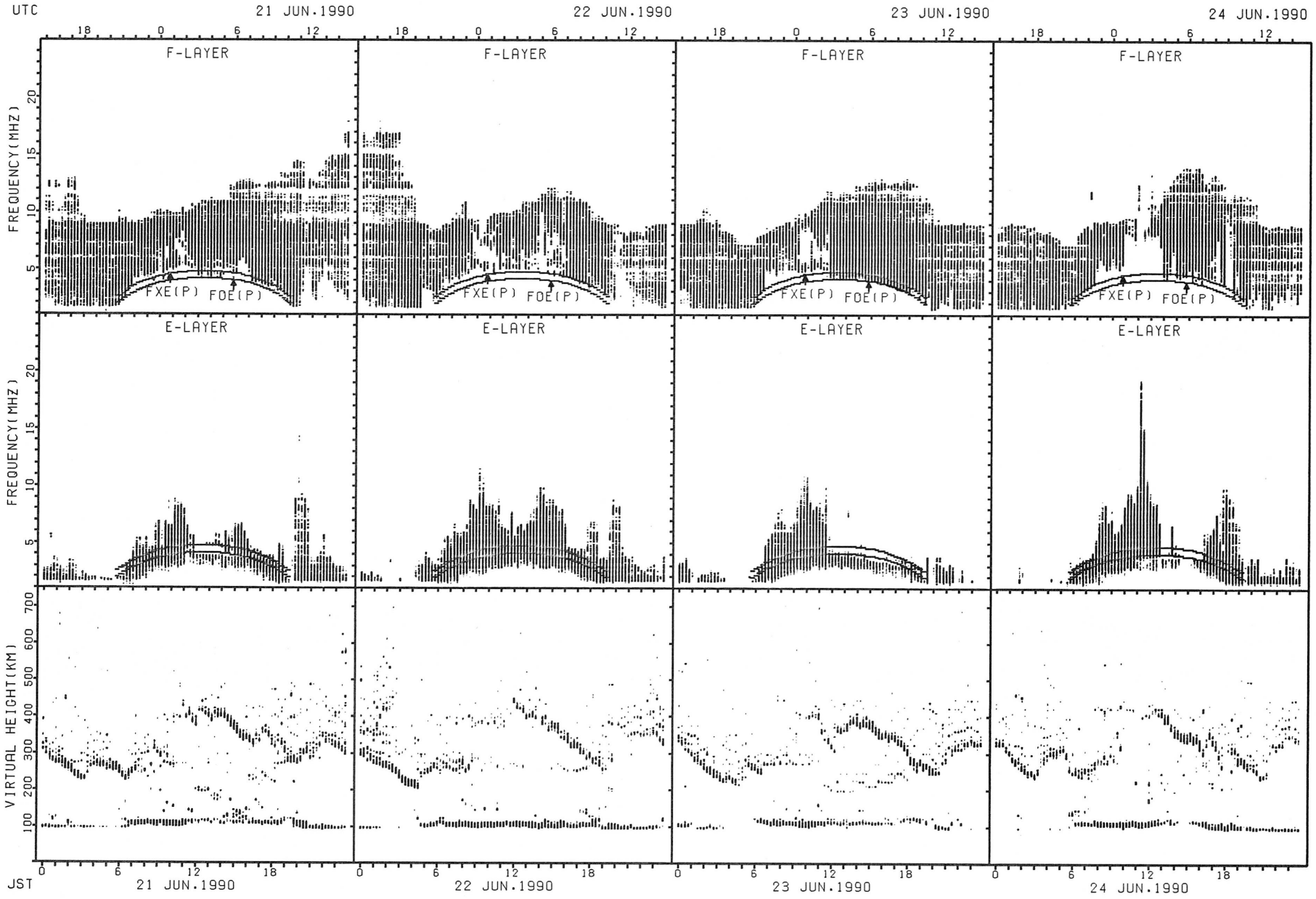
SUMMARY PLOTS AT OKINAWA



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

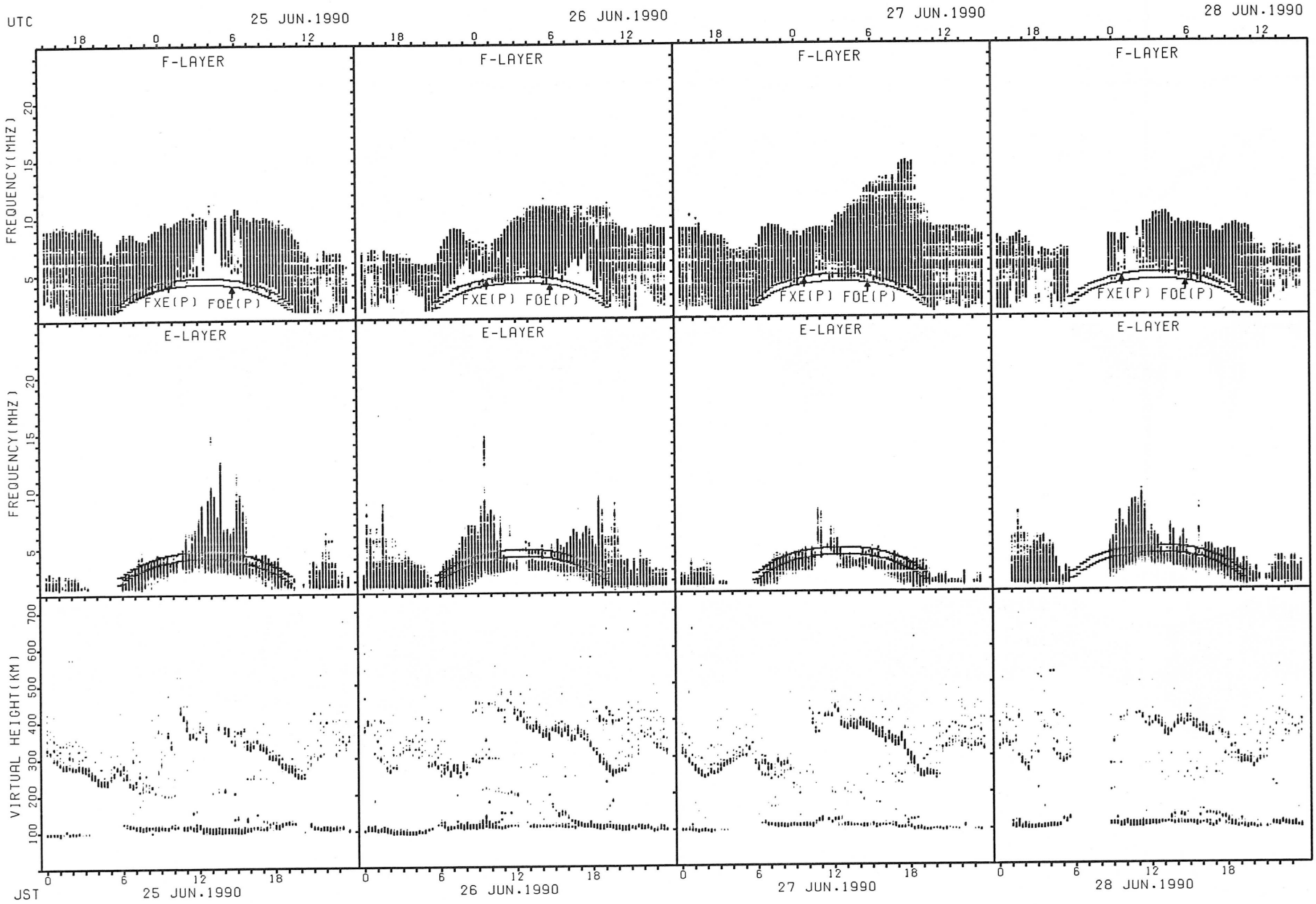

SUMMARY PLOTS AT OKINAWA
UTC
17 JUN.1990
18 JUN.1990
19 JUN.1990
20 JUN.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



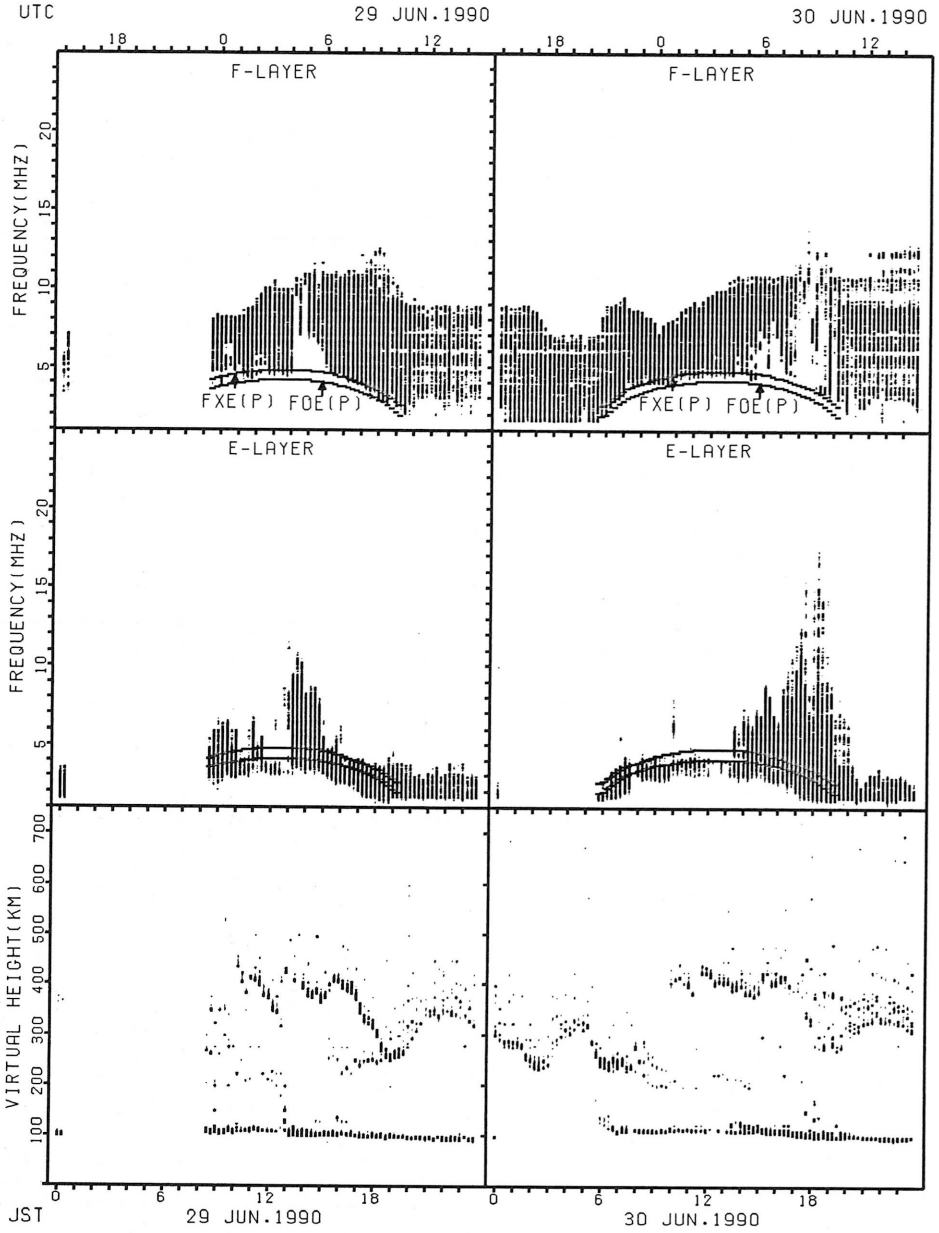
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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

SUMMARY PLOTS AT OKINAWA



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

MONTHLY MEDIANS OF H'F AND H'ES

JUN. 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	13	10	11			16	24	21									17	18	17	23	19	13	15	16
MED	354	360	356			321	318	310									338	319	264	308	314	336	330	353
U Q	368	378	376			336	335	338									348	330	343	322	362	361	350	378
L Q	311	334	350			307	291	284									271	252	224	282	294	305	324	325

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	22	17	17	19	12	15	25	29	29	25	22	22	14	18	19	22	22	29	27	29	28	28	24	23
MED	117	111	115	113	118	135	127	123	123	119	121	123	117	117	123	123	125	125	123	121	119	119	119	119
U Q	121	116	130	125	135	137	133	127	125	123	133	129	123	123	131	129	131	127	127	125	122	127	123	131
L Q	113	109	108	109	113	125	125	121	117	117	117	115	113	113	113	119	121	121	119	117	115	115	114	115

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	14	13	12			15	23	20									13	21	21	19				16
MED	363	358	368			328	320	296									334	322	296	320				355
U Q	368	379	396			358	332	312									344	348	335	334				372
L Q	356	349	346			284	298	289									248	245	234	290				339

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	28	27	26	23	25	25	28	31	29	31	28	26	25	23	25	26	27	30	30	31	31	31	31	30
MED	107	107	105	105	109	127	121	117	115	115	113	113	113	113	117	119	119	120	117	113	113	117	113	111
U Q	112	121	109	111	126	137	125	121	119	119	116	117	118	119	124	125	127	125	121	117	121	121	117	119
L Q	105	105	99	101	105	121	117	113	112	111	110	111	110	109	111	113	113	113	111	109	111	113	109	107

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	20	15	13	15	13	23	25	20								22	22	23	17	12	14	11	15
MED	362	347	356	344	342	318	290	284	282								322	299	300	312	352	353	370	356
U Q	374	353	414	376	412	359	318	309	301								346	336	338	364	369	410	422	372
L Q	352	335	324	316	322	266	276	259	240								254	236	250	266	320	334	348	328

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	29	31	28	25	27	31	30	30	28	29	29	27	22	27	27	28	29	28	29	29	30	31
MED	111	107	105	105	107	121	119	119	115	113	111	113	113	113	115	119	119	116	113	113	113	109	113	111
U Q	113	111	108	109	114	132	125	123	119	117	115	120	117	121	127	137	129	121	117	116	117	116	121	117
L Q	105	103	102	103	104	107	115	113	111	111	109	109	109	109	111	115	115	112	109	109	107	104	107	107

MONTHLY MEDIANS OF H'F AND H'ES

JUN. 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	12	19	22	13	13	15	21	27	22								17	23	28	22	21	12	10	
MED	347	336	336	320	308	336	286	270	279								334	328	306	289	324	360	355	
U Q	359	352	364	344	344	356	308	298	296								354	342	319	320	352	373	372	
L Q	337	322	298	292	288	296	276	258	262								329	310	272	280	299	350	346	

H'ES

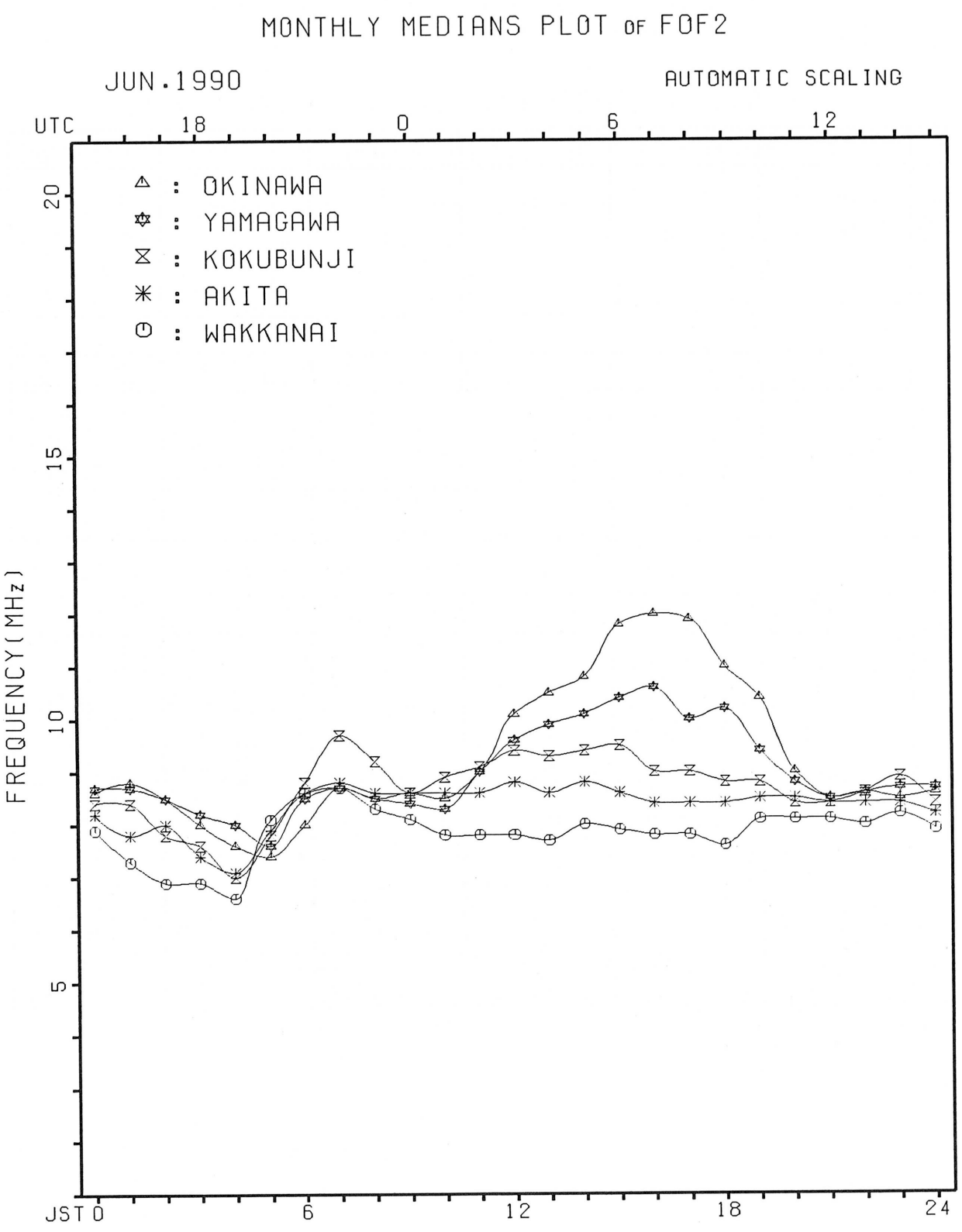
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	26	25	25	23	23	27	28	31	30	27	24	24	23	22	23	22	24	26	27	26	28	27	28
MED	112	107	105	103	107	109	125	117	115	113	113	112	111	113	117	117	117	118	115	113	109	109	107	111
U Q	115	111	111	110	109	127	131	120	119	115	123	115	116	125	125	131	125	122	119	121	115	115	113	115
L Q	106	101	101	98	101	101	115	115	111	111	111	109	109	107	107	107	109	113	109	109	105	101	99	104

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	17	23	25	18	17	12	19	27	22	11							19	23	27	27	24	12	10	
MED	338	314	306	304	314	307	282	268	281	298							340	330	316	296	328	345	355	
U Q	356	346	343	334	354	380	296	282	310	322							358	338	330	324	352	370	378	
L Q	321	292	291	260	275	283	260	256	272	242							334	318	296	278	306	329	346	

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	26	24	21	17	18	25	27	29	30	29	24	20	21	25	22	20	25	27	26	27	24	25	28
MED	103	107	104	101	107	109	125	119	117	115	113	118	120	125	125	129	123	119	115	108	107	103	101	103
U Q	111	121	111	110	112	119	134	125	121	125	119	128	129	149	140	143	128	128	119	117	113	113	113	112
L Q	99	99	97	97	95	105	117	113	111	113	111	113	113	115	112	119	113	106	113	105	101	99	99	99


MONTHLY MEDIANS PLOT OF FOF2
JUN.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

JUN. 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 84	77	74	72	70				A												X 83	X 79	X 87	X 90
2	X 84	78	75	69	58				84												X 83	X 81	X 77	X 77
3	83	82	78	72	74	68		D R 80													X 101	X 96	X 97	101
4	98	100	98	90	82	86	101		A						A						X 86	X 88	X 90	X 91
5	91	89	X 83	77	71		87	81	A			A	A							A	X 77	A	83	86
6	86	87	80	77	75																X 86	X 91	99	106
7	X 98	X 93	X 87	X 86										A							X 91	X 86	86	X 83
8	X 75	81	81	79	79									A							X 100	106	X 111	100
9	99	99	X 97	98		90															X 112	X 107	X 98	103
10	X 105	X 95	X 103	X 92				A	A												X 91	X 94	X 94	X 91
11	X 92	X 90	X 85	X 84	84																X 86	X 91	X 93	X 91
12	95	X 87	X 86	X 85																	X 99	X 104	X 108	X 109
13	X 108	106	X 93	X 87									A			A					X 103	X 104	X 101	X 102
14	X 100	100	X 91	92	93																X 96	X 97	X 96	X 101
15	X 97	91	80	X 87	62						A										X 86	X 88	X 88	X 87
16	X 94	X 92	X 80	X 76																	X 94	99	X 102	X 101
17	X 96	X 94	X 91	X 91	90						A									A	X 99	X 101	X 104	X 106
18	X 106	X 111	X 104	X 102														A			X 102	X 100	X 101	X 104
19	X 104	109	108	102	94	99				A				A							X 99	X 98	X 98	X 102
20	X 97	92	93	86	75	85													A		X 102	X 102	X 104	X 104
21	97	96	88	86	X 87	84															X 98	X 100	X 101	103
22	X 99	96	95	94	86																X 92	X 96	107	X 105
23	108	108	106	X 103								A					A				X 97	X 97	94	106
24	X 97	X 97	X 94	X 82	79																X 92	X 95	X 91	93
25	X 91	90	86	88	87	91					A										X 75	X 75	X 77	X 77
26	X 80	X 81	X 71	X 62	X 60							A	A			A			A	A	X 85	X 95	X 98	X 91
27	X 87	X 87	S	X 75	75			A						A				C	C	A	89	91	97	97
28	X 86	X 84	84	X 74	X 77						C			A							X 76	X 75	31	X 81
29	X 82	83	X 77	X 73	X 71																X 82	X 90	94	95
30	98	105	X 96	X 88	84																X 93	X 95	X 92	99
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	29	30	22	7	2	2	1												30	29	30	30
MED	X 96	92	X 87	X 86	78	88	94	80	84												X 92	X 95	X 96	X 100
UQ	X 99	99	X 95	X 91	86	90															X 99	X 100	X 101	X 103
LQ	X 86	87	80	X 76	71	86															X 86	X 90	X 90	X 91

JUN. 1990 | FXI (0.1 MHZ)

IONOSPHERIC DATA

JUN. 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	77	F 69	F 65	F 61	F 61	77	81	80	A	J R 71	69	70	79	84	87	34	85	90	90	84	77	73	V 81	84
2	V 77	F 70	F 64	F 50	F 49	59	84	84	76	R 69	72	70	73	76	80	87	90	86	80	79	77	75	71	71
3	F 72	F 74	F 69	J F 65	F 64	F 80	82	F 69	80	95	96	96	99	98	96	99	104	107	110	103	95	90	91	F
4	F 91	U F 89	F 84	F 80	F 73	F 78	Z 94	99	A	92	96	98	98	96	A	91	98	97	99	82	80	82	84	85
5	F 83	F 78	77	J F 70	62	73	F 78	F 73	A	71	72	A	A	69	73	74	69	70	72	A	U S 71	A	J F 77	F 78
6	F 78	78	F 71	F 70	F 66	72	81	94	95	90	96	101	100	100	100	105	100	92	83	82	80	86	U F 93	F 100
7	92	87	81	80	80	86	98	113	100	90	87	91	86	A	80	76	81	84	89	87	85	81	S 80	77
8	69	F 71	F 72	F 70	F 71	86	97	89	83	85	84	83	85	A	93	94	96	100	102	95	94	U F 98	105	U F 92
9	F 90	F 91	91	F 91	92	F 81	90	99	88	87	92	96	96	98	100	109	106	101	97	110	106	S 101	92	F 93
10	99	89	97	86	70	S 72	87	A	A	J R 91	85	90	90	93	96	88	87	86	85	82	85	88	88	85
11	J S 86	84	S 78	78	F 75	82	89	89	88	90	90	94	R 98	97	98	101	96	93	90	77	80	85	88	85
12	F 85	81	80	79	80	86	100	101	90	85	90	91	100	107	110	106	99	98	97	S 98	93	U S 98	102	103
13	S 102	S 98	87	81	69	66	66	76	71	83	76	78	A	85	91	A	88	84	85	93	S 97	98	95	96
14	94	F 92	85	F 84	F 83	90	92	90	81	87	91	98	95	100	108	97	91	88	94	92	90	91	R 90	95
15	91	F 84	F 73	81	F	67	57	61	66	68	A	U R 67	68	69	71	75	72	72	80	80	80	82	82	81
16	88	86	74	70	70	81	S 99	106	109	94	87	90	93	96	98	93	94	97	95	90	88	F 91	95	95
17	90	88	85	85	F 82	93	105	102	94	91	A	R 92	98	99	98	95	92	97	101	A	94	95	98	99
18	99	105	98	96	94	S 98	92	95	99	96	93	95	96	100	102	105	R 108	A	107	104	96	94	96	S 98
19	F 96	F 102	F 100	F 94	84	F 92	R 105	107	98	A	U R 108	107	104	A	105	111	114	110	99	93	93	92	92	96
20	91	U F 81	S 84	J F 80	U S 65	F 78	93	101	98	97	92	93	99	97	101	97	99	95	A	97	94	94	97	96
21	F 84	F	F 77	F 74	81	F 74	99	101	91	92	96	101	95	95	96	101	104	106	105	96	92	94	94	F 92
22	92	F	F	F 83	F 76	88	96	101	102	80	88	96	103	107	105	106	109	104	96	97	87	89	F 95	96
23	F 96	F	F 96	96	96	96	93	89	97	97	100	A	105	104	103	96	A	94	97	98	90	90	F 84	F 95
24	91	91	88	76	F 72	83	101	112	R 102	105	103	108	110	111	109	102	100	92	88	86	86	89	85	F 86
25	85	F	J F 80	F 80	F 78	F 84	98	J R 85	69	61	A	64	62	U R 64	65	71	68	71	73	75	69	69	71	U S 71
26	74	S 75	65	56	54	62	89	S 98	84	65	U R 60	A	A	73	67	A	68	71	A	A	J S 79	90	91	J S 85
27	81	81	I S 78	J S 69	66	75	81	A	79	84	80	71	72	A	78	79	U S 81	C	C	A	F 80	U F 78	J F 89	F 84
28	80	77	F 69	68	71	72	S 74	80	78	77	I C 76	79	76	A	67	68	70	72	74	73	70	69	F 74	75
29	76	F 74	71	67	65	74	88	87	90	90	90	90	92	90	84	79	76	78	82	81	76	84	F 84	F
30	F 85	J F 99	90	82	76	77	85	100	Z 103	85	87	91	98	D R 96	98	97	92	91	88	U S 85	V 87	89	86	F 86
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	26	29	30	29	30	30	28	26	29	27	27	27	25	29	28	29	28	27	26	30	29	30	28
MED	87	84	80	80	72	79	91	94	90	87	90	91	96	96	96	96	92	92	90	88	86	89	90	89
UQ	92	91	87	83	80	86	98	101	98	92	94	96	99	100	101	102	100	98	98	97	93	94	95	96
LQ	80	F 77	F 72	70	66	73	82	84	80	80	82	81	86	85	80	82	81	84	84	82	80	82	84	84

JUN. 1990 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

JUN. 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

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							A	A	A	A	U A 520	U A 550	U A 530	U A 530	510	500	L 520	A	A					
2							L	L	A	A	520	540	520	530	510	520		A	A	A				
3						L		A	L 540	530	540	L 590	A	A	L 610	540	L 520	L	A					
4						A	L	A	A	L 590	530	L 600	A	A	A	A	A	U L 500	A					
5							A	A	A	510	U A 510	A	A	530	510	510	490	A	A	A				
6							L	U L 510	A	A	560	570	580	A	570	530	U L 500	U L 480	L					
7							L	L	A	A	U L 580	A	A	A	540	490		A	A	A				
8								A	A	L	A	A	A	A	A	570		A	A	A	A			
9								A	A	L	U L 620	L 620	600	580	H 580	570	L 520	A	A	A				
10						L	L	A	A	A	A	A	A	580	600	L 580	550	L	L					
11						L	L	L	A	L	U A 640	610	610	U A 560	590	A	540	U L 520						
12							L	L	A	L	A	A	U A 630	610	590	650	U L 600	U L 530	L					
13					L	370	430	530	600	U L 590	L	U A 600	A	H 590	620	A	L	L	A					
14								L	L	A	A	L 590	L 650	570	570	A	570	L 530	L					
15							L 460	A	A	540	A	L	A	U L 610	570	560	L	L	L					
16							U L 490	A	L 570	A	U L 700	A	A	580	U A 570	A	560	L	L					
17							A	A	A	A	A	A	590	L 640	610	590	U L 560	U L 510	A	A				
18								L	L U L 540	U L 600		L 690	L 600	L 600	L 560	550	L 550	A	L					
19						L	A		L	A	A	L	A	A	570	A	540	A						
20							L	A	A	A	A	L	A	A	A	L 580	490	A	A					
21							L	480	460	560	560	590	L	590	560	520		A	A	A				
22						L	L	L	590	A	A	550	570	580	520	550		A	A	A	A			
23							360	L	U A 610	A	A	A	550	580	570	A	A	A	A	A				
24						L	L			A	L	A	A	560	L	550	520	U L 510	L					
25						L	U A 410	L 460	A	A	A	U A 520	520	520	520	500	A	U L 470	U L 400					
26							L	U L 430	490	A	L	A	A	A	520	A	A	A	A	A				
27						L	A	A	600	510	530	U R 550	A	A	U A 530	A	A	C	C	A				
28							U L 510	480	A	L	I C 540	540	A	A	A	520	510	480	L					
29							L	L	L	550	A	A	A	550	540	530	510	A	A					
30						L	L	A	U L 570	A	R 550	600	560	A	A	540	L	L 550	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						1	6	6	10	9	14	16	13	19	24	21	17	10	1					
MED						370	445	480	570	550	545	590	580	580	570	540	520	U L 510	U L 400					
UQ							U L 490	510	600	L 590	U 580	L 600	600	590	585	570	550	U L 530						
LQ							410	L 480	L 540	530	530	550	550	555	525	520	510	U L 480						

JUN. 1990 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

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

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					B	185	270	315	340	350	375	375	A 375	370	355	350	320	275	210	B				
2					B	195	U A 245	315	A 340	U A 370	380	400	400	390	370	355	330	270	A	B				
3					B	195	265	300	325	A	350	A	A	390	370	355	325	U A 270	A	B				
4					B	A	A	A	A	A	R 390	405	400	395	380	355	330	275	A	B				
5					B	215	265	305	340	365	375	A	A	A	380	360	330	285	210	B				
6					B	220	275	325	U A 360	U A 370	U A 380	385	R 390	365	A	A	A	300	210	B				
7					B	205	270	335	A 365	375	A	405	410	400	405	370	345	305	225	B				
8					B	220	305	345	A	A	A	405	420	415	400	375	350	300	235	B				
9					B	A	280	330	360	A	U A 405	415	A	U A 400	390	385	350	310	A	B				
10					B	205	280	330	U A 365	A 395	A 410	U A 415	A	420	405	370	345	300	240	B				
11					B	H 200	290	355	375	U A 375	B	A	A	420	A 375	395	360	310	235	B				
12					B	210	285	335	385	395	B	U A 400	U A 400	A	A	B	A	325	240	B				
13					B	185	280	345	385	400	U A 415	410	A	415	400	385	350	300	230	B				
14					B	200	295	350	375	395	400	400	A	420	405	380	345	315	240	B				
15					B	200	280	330	360	390	U A 405	415	A 420	A	400	A	A	A 300	245	B				
16					B	215	295	345	370	U A 380	390	A	A	410	400	370	345	U A 280	A	B				
17					B	A	A	A	A	A	U A 405	A	A 420	420	400	370	350	300	235	B				
18					B	220	275	330	365	390	405	405	400	400	385	365	350	A 290	A	B				
19					B	A	270	325	350	385	390	410	A 405	380	R 385	375	335	U A 300	A	B				
20					B	A	A	A	U A 350	A	U A 375	A 390	U A 390	A	A	385	355	310	B	A				
21					B	B	A	U A 265	375	375	405	405	385	355	380	380	345	290	220	B				
22					B	225	275	320	340	355	370	A	390	390	390	375	345	290	235	B				
23					B	A	275	335	345	375	385	380	375	B	375	340	295	A	B	B				
24					B	200	275	320	U A 350	380	380	U A 375	A	A	A	A	355	A 315	A	B				
25						195	270	U A 315	U A 345	A	U A 370	U A 380	410	A	A	375	340	290	230	B				
26						A	270	310	340	R 345	A	A	A	A	B	365	340	285	A	B				
27						185	270	320	A 355	380	B	B	A	A	A	380	345	I C 300	I C 225	B				
28						A	270	A	355	A	I C 385	A 395	A	A	A	A	A	A	A	B				
29						A	A	340	A	A	A	A	A	A	385	385	350	315	235	B				
30						220	290	345	B	A	U A 405	430	410	405	390	375	U A 325	U A 305	A	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						20	25	26	25	20	23	21	17	19	22	25	26	28	17					
MED						202	275	330	355	378	390	405	400	400	388	375	345	300	235					
UQ						218	280	340	365	390	405	410	410	415	400	380	350	308	235					
LQ						195	270	315	345	370	378	390	390	390	380	365	330	288	225					

JUN. 1990 | FOE (0.01 MHZ)

IONOSPHERIC DATA

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

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	J A 64	J A 53	J A 54	J A 41	J A 19	J A 43	J A 56	J A 62	J A 95	85	J A 55	J A 66	J A 61	55	44	41	G	58	54	42	35	20	J A 27	J A 37
2	36	J A 24	J A 26	J A 29	31	J A 32	J A 54	J A 41	J A 85	J A 105	J A 67	48	46	43	47	J A 58	J A 71	55	J A 57	73	J A 68	32	J A 54	J A 52
3	J A 52	J A 87	J A 54	J A 37	J A 32	28	J A 53	J A 70	J A 56	J A 47	J A 63	J A 59	J A 110	J A 61	51	J A 53	J A 47	J A 36	J A 42	E B 15	J A 21	J A 61	J A 50	J A 87
4	J A 54	J A 84	J A 50	J A 53	J A 53	J A 55	J A 44	138	115	40	G	J A 68	J A 78	J A 81	99	J A 67	91	63	65	57	J A 66	J A 65	J A 81	J A 72
5	J A 61	J A 53	J A 63	J A 56	J A 37	30	J A 55	J A 103	110	J A 53	J A 55	82	J A 167	J A 127	G	G	36	J A 55	72	98	J A 96	J A 109	J A 96	J A 53
6	J A 72	J A 55	J A 32	J A 34	J A 42	G 19	J A 42	J A 48	J A 66	J A 68	J A 52	55	61	J A 119	52	J A 44	J A 43	35	31	43	J A 66	J A 54	J A 53	J A 37
7	J A 25	20	22	J A 20	J A 15	G	G	J A 43	J A 75	J A 66	J A 69	J A 67	75	J A 168	44	J A 71	J A 91	61	J A 55	55	68	J A 85	J A 56	J A 65
8	J A 86	J A 54	J A 39	25	J A 17	27	J A 45	J A 64	J A 86	J A 94	71	83	J A 69	J A 91	J A 124	J A 87	J A 87	104	83	87	J A 101	69	J A 85	J A 100
9	J A 76	J A 42	J A 20	J A 26	J A 38	27	J A 55	J A 81	J A 78	J A 76	J A 57	J A 65	J A 58	J A 61	J A 53	J A 51	J A 56	83	J A 100	110	J A 75	J A 69	J A 54	J A 52
10	J A 136	J A 157	J A 85	59	J A 80	49	J A 58	105	J A 120	87	J A 75	86	J A 117	48	44	J A 61	G	G	27	24	32	J A 51	J A 43	J A 52
11	J A 54	J A 44	J A 35	J A 24	J A 21	25	J A 51	44	J A 64	J A 91	J A 71	45	44	56	J A 83	95	J A 122	37	J A 42	J A 71	J A 63	39	J A 44	69
12	J A 56	J A 55	J A 37	J A 35	J A 22	24	37	J A 65	J A 99	J A 61	94	80	J A 67	J A 57	J A 69	45	J A 51	J A 45	28	20	J A 22	J A 58	J A 76	J A 46
13	20	J A 17	22	J A 32	J A 14	23	31	38	J A 50	J A 58	51	J A 62	J A 149	48	J A 62	J A 128	J A 52	J A 54	J A 70	J A 23	J A 53	J A 42	J A 36	J A 49
14	J A 118	J A 110	85	J A 53	J A 45	24	31	J A 49	J A 56	J A 71	71	J A 60	J A 61	45	J A 53	J A 81	39	37	27	19	J A 17	23	J A 26	J A 54
15	J A 65	J A 54	J A 56	32	J A 17	29	39	J A 76	J A 64	J A 59	J A 117	48	J A 61	J A 62	46	J A 43	J A 41	J A 45	J A 42	33	43	J A 53	J A 37	J A 86
16	J A 66	J A 64	J A 87	J A 55	J A 47	J A 26	33	J A 61	J A 53	J A 64	J A 103	J A 91	J A 72	46	61	J A 79	J A 104	J A 77	J A 87	J A 42	48	J A 64	J A 61	J A 85
17	48	J A 36	J A 72	J A 40	J A 22	J A 72	J A 85	J A 78	J A 74	J A 85	104	96	J A 65	49	45	G	46	J A 51	J A 72	J A 116	J A 68	J A 54	J A 54	J A 33
18	J A 33	J A 32	J A 22	J A 25	J A 21	J A 25	31	45	52	48	J A 54	J A 54	J A 74	J A 60	J A 88	G	J A 101	132	J A 54	E B 15	J A 24	J A 23	J A 81	J A 39
19	J A 63	J A 77	J A 87	J A 72	J A 43	J A 29	J A 87	J A 56	J A 55	J A 137	J A 88	J A 65	J A 154	J A 142	43	74	J A 53	J A 56	45	75	J A 30	J A 73	J A 51	J A 62
20	J A 52	J A 85	J A 92	J A 54	J A 51	J A 39	J A 42	J A 88	92	J A 144	84	J A 61	92	J A 78	J A 99	50	J A 49	J A 89	J A 139	J A 49	J A 23	J A 23	J A 87	J A 65
21	J A 53	E B 14	J A 19	J A 18	J A 26	J A 29	J A 43	J A 43	G	44	G	J A 68	J A 55	J A 79	47	44	87	J A 92	J A 89	J A 67	J A 62	J A 46	J A 32	64
22	J A 65	J A 35	J A 51	J A 30	J A 47	G	J A 41	J A 53	J A 57	J A 84	J A 83	J A 54	47	J A 49	G	49	J A 98	J A 87	J A 80	J A 47	J A 103	J A 67	J A 86	J A 48
23	J A 55	J A 27	J A 21	J A 19	J A 33	J A 27	G	G	J A 62	J A 67	J A 107	J A 131	J A 115	J A 56	44	J A 63	J A 96	J A 67	J A 51	J A 48	J A 43	J A 33	J A 51	J A 52
24	J A 47	J A 23	22	J A 34	J A 30	25	J A 41	J A 52	J A 52	J A 72	J A 67	J A 94	J A 100	J A 58	47	J A 65	G	J A 47	J A 37	55	J A 50	J A 42	J A 63	J A 66
25	J A 88	J A 119	J A 99	J A 51	J A 18	J A 43	J A 54	116	J A 85	71	81	J A 54	43	48	40	44	J A 56	J A 43	32	J A 28	J A 17	J A 51	J A 47	J A 48
26	J A 48	J A 37	J A 32	J A 21	J A 19	24	37	44	J A 59	J A 53	J A 118	J A 130	96	J A 118	44	89	J A 61	J A 73	J A 136	J A 131	J A 79	J A 87	J A 43	J A 53
27	J A 51	J A 55	69	J A 47	J A 29	G	63	94	J A 51	43	E B 42	47	61	93	J A 79	65	84	C	C	J A 182	J A 104	J A 53	60	J A 99
28	J A 64	J A 19	J A 25	J A 41	J A 33	J A 36	36	J A 79	J A 68	J A 57	C	J A 54	J A 76	J A 119	93	J A 78	J A 43	J A 45	J A 49	29	30	J A 48	J A 52	J A 63
29	J A 53	J A 65	J A 28	J A 36	J A 34	J A 33	30	37	J A 51	J A 52	J A 71	J A 92	J A 98	J A 53	G	47	J A 57	J A 68	46	36	J A 130	J A 89	J A 54	J A 89
30	J A 64	J A 24	E B 13	J A 19	J A 24	J A 52	40	J A 88	52	J A 91	J A 51	52	63	J A 111	J A 84	J A 56	J A 52	35	57	J A 51	J A 56	J A 55	45	J A 62
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	29	29	30	30	30	30	30
MED	J A 56	J A 53	J A 38	J A 34	J A 30	28	J A 42	J A 62	J A 64	J A 68	J A 71	J A 65	J A 70	J A 60	49	J A 57	J A 54	J A 55	J A 54	48	J A 54	J A 54	J A 54	J A 58
UQ	J A 65	J A 65	J A 69	J A 51	J A 42	J A 36	J A 54	J A 81	J A 85	J A 85	J A 84	J A 83	J A 98	J A 93	J A 79	J A 74	J A 87	J A 73	J A 72	73	J A 68	J A 67	J A 63	J A 69
LQ	J A 51	J A 27	J A 22	J A 25	J A 21	24	36	J A 44	J A 53	J A 53	J A 55	J A 54	J A 61	49	44	44	J A 43	J A 45	42	29	J A 30	J A 42	J A 44	J A 49

JUN. 1990 | FOES (0.1 MHZ)

IONOSPHERIC DATA

JUN. 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	20	27	43	28	16	37	47	55	A A 95	73	52	55	53	53	43	40	G	45	43	34	22	E B 13	21	25
2	27	E B 13	20	20	16	23	40	38	54	55	42	47	43	42	44	49	51	47	41	65	54	25	37	32
3	40	19	29	23	21	24	40	63	48	40	42	47	74	55	49	47	37	33	39	E B 15	15	40	16	38
4	43	50	34	28	42	46	36	51	A A 115	40	G	54	70	65	A A 99	64	62	40	56	41	57	33	56	44
5	49	36	24	34	31	27	52	56	A A 110	43	51	A A 82	A A 167	45	G	G	35	45	70	A A 98	48	A A 109	17	29
6	41	36	22	23	28	G 17	35	42	53	61	51	53	55	69	50	42	34	G	27	35	18	34	40	17
7	17	E B 13	E B 13	E B 13	E B 12	G	G	38	59	58	51	64	70	A A 168	42	42	62	53	49	47	57	49	43	27
8	20	20	19	14	E B 13	26	42	56	52	55	62	76	66	A A 91	71	55	66	92	76	71	52	69	19	42
9	20	19	E B 13	16	24	24	47	55	51	56	52	50	43	49	48	43	44	57	65	84	33	21	49	16
10	59	51	50	55	43	34	48	A A 105	A A 120	86	70	73	65	47	43	42	G	G	26	23	26	19	24	20
11	39	18	24	20	E B 13	22	40	38	58	51	64	44	44	56	53	74	38	35	40	44	44	26	29	66
12	42	32	31	25	E B	24	35	51	55	55	85	73	63	53	43	U Y 45	41	34	27	19	E B 14	33	37	17
13	E B 16	E B 14	15	E B 13	E B 12	22	30	37	45	51	49	60	A A 149	47	46	A A 128	48	46	62	22	30	35	22	32
14	17	49	50	29	35	23	G 22	G	50	62	65	55	47	44	47	66	38	36	26	17	E B 13	E B 15	17	19
15	31	27	42	20	E B 13	22	36	54	61	52	A A 117	45	60	57	44	38	35	42	39	23	31	23	35	36
16	44	47	40	36	18	G 17	32	57	49	60	50	68	65	45	57	60	51	42	34	21	43	38	40	39
17	20	17	42	31	20	23	71	68	69	71	A A 104	90	54	48	43	G	40	40	50	A A 116	46	24	E B 13	23
18	23	26	15	17	E B 13	G 19	30	36	40	43	50	52	44	56	42	G	38	A A 132	40	E B 15	16	17	22	16
19	21	40	42	37	20	23	66	51	54	A A 137	73	60	70	A A 142	42	67	49	51	37	71	18	42	26	U A 51
20	36	52	50	18	18	26	34	75	77	85	74	57	83	64	74	47	39	62	A A 139	36	E B 15	23	22	34
21	E B 16	E B 14	E B 14	E B 14	16	23	31	38	G	41	G	50	48	51	46	40	71	69	75	50	36	21	17	31
22	36	25	29	E B 13	E B 13	G	40	36	47	50	81	44	45	43	G	43	97	66	74	41	34	25	44	E B 15
23	35	16	16	E B 14	26	24	G	G	61	63	81	A A 131	48	47	43	60	A A 96	50	37	44	33	22	36	43
24	20	16	E B 13	18	E B 13	22	34	45	45	67	57	64	73	49	46	51	G	39	26	44	25	23	22	E B 15
25	34	64	17	20	E B 12	21	41	41	63	57	A A 81	52	42	45	39	41	52	40	30	25	16	25	22	19
26	34	23	21	E B 15	E B 12	22	33	41	42	52	46	A A 130	A A 96	69	42	A A 89	60	47	A A 136	A A 131	58	43	29	29
27	26	46	45	24	27	G	56	A A 94	47	42	E B 42	46	U Y 61	A A 93	53	61	77	C	C	A A 182	37	39	45	45
28	21	E B 12	14	21	26	29	34	40	63	51	C	47	69	A A 119	60	45	40	40	28	20	21	31	22	19
29	32	18	17	18	25	32	30	G	40	44	69	71	74	42	G	41	37	57	37	27	39	16	43	61
30	41	E B 13	E B 13	E B 12	16	G 18	37	51	45	64	46	50	52	64	81	48	43	33	55	32	19	44	28	28
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	29	30	30	30	30	30	29	30	30	30	30	30	30	29	29	30	30	30	30	30
MED	32	24	23	20	18	23	36	48	54	55	52	55	62	53	45	46	42	45	40	38	32	26	27	29
UQ	40	40	42	28	26	26	42	56	63	63	73	71	70	65	53	60	60	53	62	65	44	39	40	39
LQ	20	16	15	15	E B 13	21	32	38	47	50	49	50	48	47	42	41	37	39	34	23	18	22	22	19

JUN. 1990 | FBES (0.1 MHZ)

IONOSPHERIC DATA

JUN. 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	13	13	16	13	14	18	17	18	22	24	23	22	25	20	17	15	13	16	14	13	13	12	13
2	13	13	13	13	12	13	16	15	17	21	22	25	28	26	21	20	17	15	14	13	13	13	13	12
3	14	13	14	14	13	13	17	19	18	20	21	30	26	21	26	20	19	16	17	15	13	13	13	13
4	13	13	13	13	14	13	16	17	18	20	22	23	34	33	20	18	16	17	16	14	15	14	14	13
5	15	13	13	14	13	16	17	17	18	21	21	24	34	25	22	18	19	15	15	14	13	13	13	14
6	14	13	13	13	14	13	15	17	17	24	33	23	28	34	27	22	20	16	14	14	14	14	14	14
7	13	13	13	13	12	15	19	16	21	20	31	32	34	34	28	24	18	18	17	14	13	14	13	14
8	14	13	13	13	13	17	20	18	25	31	32	35	32	27	21	21	18	17	17	14	13	13	14	13
9	14	13	13	13	13	14	18	16	20	21	35	32	33	35	32	28	19	15	15	13	15	14	16	14
10	14	13	14	16	13	14	18	17	20	28	33	33	E S 38	33	23	20	20	17	13	14	13	14	13	13
11	14	14	13	13	13	14	16	23	20	21	39	25	25	31	21	26	20	17	16	13	14	13	13	14
12	13	14	14	14	13	17	18	17	21	23	40	34	33	33	33	42	23	18	16	14	14	14	13	14
13	16	14	13	13	12	14	16	16	17	29	33	23	34	33	28	22	18	15	14	14	13	13	13	12
14	13	13	15	15	14	14	18	17	19	20	29	27	36	33	26	24	17	18	17	13	13	15	13	13
15	13	13	12	12	13	13	16	17	20	21	26	32	33	29	25	20	17	16	16	13	16	13	13	13
16	14	13	13	13	13	14	16	17	19	24	21	30	35	32	26	21	17	14	17	14	13	14	13	14
17	13	13	13	13	13	13	16	18	17	21	25	28	27	31	26	21	21	16	16	15	13	13	13	14
18	15	13	12	13	13	13	17	14	18	20	25	30	25	31	21	19	18	17	18	15	13	13	15	13
19	14	13	13	13	13	15	15	18	20	20	18	33	27	32	22	17	17	15	15	13	15	13	13	13
20	14	13	13	13	13	14	18	17	17	18	27	32	23	27	25	20	18	17	18	15	15	14	14	14
21	15	14	14	14	14	15	17	18	18	22	22	31	27	26	24	23	19	17	15	15	15	15	15	15
22	15	15	13	13	13	13	14	16	17	19	31	26	31	28	21	23	24	18	17	13	13	15	15	14
23	14	14	14	14	14	18	19	14	20	19	34	25	26	34	28	20	18	18	14	13	13	16	14	13
24	13	12	13	13	13	16	14	14	16	19	21	21	30	22	21	23	18	16	13	15	13	13	13	15
25	13	14	13	13	12	13	16	17	20	18	20	24	32	27	27	26	18	18	17	14	15	16	13	14
26	14	14	14	15	12	14	17	16	20	26	26	35	26	35	40	27	20	18	17	18	13	16	13	17
27	15	14	14	14	13	14	18	19	21	23	42	41	38	35	34	25	20	C	C	14	14	13	13	14
28	13	12	13	14	13	16	17	16	16	21	C	27	31	27	23	21	22	16	16	13	13	13	14	12
29	13	14	13	14	12	14	19	17	20	21	27	25	22	33	30	24	17	14	15	13	13	13	13	12
30	12	13	13	12	13	14	17	17	40	23	31	27	29	34	21	23	21	15	16	14	13	13	15	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	29	30	30	30	30	30	30	29	29	30	30	30	30	30
MED	14	13	13	13	13	14	17	17	19	21	27	28	30	32	25	22	18	16	16	14	13	13	13	14
UQ	14	14	14	14	13	15	18	17	20	23	33	32	34	33	28	24	20	17	17	14	14	14	14	14
LQ	13	13	13	13	13	13	16	16	17	20	22	25	26	27	21	20	17	15	15	13	13	13	13	13

JUN. 1990 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

JUN. 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

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	270	F 265	F 260	F 265	F 275	265	285	280	A	A	270	255	260	275	270	280	265	285	290	285	270	265	V 265	275
2	V 280	F 290	F 305	F 280	F 275	280	310	295	290	R 265	275	285	280	270	285	275	290	300	290	295	270	265	270	265
3	F 295	F 290	F 275	J F 265	F 295	F 310	325	A	260	275	275	260	270	270	265	265	265	275	295	300	285	270	265	F
4	F 280	D F 260	F 280	F 285	F 310	F 285	Z 280	300	A	260	260	260	280	275	A	275	290	290	300	280	265	255	255	285
5	F 275	F 285	300	J F 280	280	280	F 300	F 270	A	255	270	A	A	255	280	285	280	285	A	A	U S 260	A	J F 250	F 265
6	F 275	280	F 280	F 275	F 270	290	260	285	275	270	260	265	255	260	265	275	290	295	285	280	255	250	U F 275	F 275
7	270	265	265	270	280	270	265	300	295	265	245	250	250	A	255	235	265	255	270	280	270	255	S 255	270
8	250	F 260	F 260	F 255	F 260	280	290	275	275	290	270	A	255	A	265	260	265	A 270	275	265	260	U F 285	275	U F 270
9	F 280	F 275	260	F 265	290	F 295	275	295	270	260	265	275	260	260	255	265	265	265	250	265	260	S 275	255	F 250
10	270	250	285	270	310	S 255	245	A	A	A	240	250	255	255	270	270	280	280	285	265	250	255	255	235
11	J S 265	265	S 270	250	F 255	265	275	280	255	255	245	255	R 250	255	255	260	270	270	285	260	240	240	245	255
12	F 260	245	245	250	255	245	285	295	275	245	A	245	245	245	255	255	260	265	270	S 270	245	U S 245	255	255
13	S 260	S 265	230	230	220	220	215	240	220	270	280	245	A	245	260	A	265	250	245	250	S 250	260	255	255
14	255	F 265	255	F 260	F 285	305	300	295	240	250	245	255	240	235	260	255	260	255	265	255	240	240	R 245	250
15	235	F 225	F 225	230	F	265	220	230	235	250	A	U R 245	255	235	260	265	265	265	270	275	260	255	265	245
16	265	270	255	255	245	245	S 280	275	275	295	245	250	255	260	275	255	265	270	280	255	260	F 250	255	265
17	260	255	270	275	F 280	280	295	285	280	275	A	A	260	265	265	270	260	275	280	A	270	260	260	260
18	260	275	280	280	285	S 300	295	270	280	280	260	250	255	255	250	260	R 265	A	275	275	270	260	255	S 260
19	F 265	F 265	F 280	F 280	275	F 265	R 295	275	275	A	U R 260	255	255	A	250	260	270	280	290	270	265	255	255	275
20	270	U F 265	S 265	J F 275	U S 270	F 260	280	295	270	A 285	265	250	260	265	270	270	275	285	A	285	265	270	270	265
21	F 280	F	F 295	F 280	285	F 305	280	305	270	260	265	270	260	260	260	260	275	280	285	290	270	270	270	F 275
22	285	F	F	F 290	F 290	285	300	290	290	280	240	255	260	260	260	260	275	280	285	290	280	255	F 285	275
23	F 270	F	F 285	285	290	305	300	265	285	265	275	A	265	270	275	275	A	275	270	295	280	270	F 270	F 295
24	275	270	295	275	F 260	260	300	305	R 275	270	275	275	270	280	275	275	285	290	295	280	270	270	260	F 270
25	280	F	J F 265	F 280	F 280	F 270	295	R	A	A	A	255	265	U R 260	265	285	280	280	295	295	275	260	260	U S 270
26	265	S 290	285	280	275	275	295	S 305	315	285	U R 290	A	A	A	270	A	280	270	A	A	J S 280	265	280	J S 275
27	265	290	S	J S 270	255	275	265	A	255	295	285	260	260	A	270	275	U S 275	C	C	A	F 260	U F 245	J F 280	F 275
28	260	280	F 280	260	275	260	S 260	270	255	255	I C 265	280	A 280	A	A 270	270	260	275	280	285	265	265	F 250	255
29	270	F 275	275	260	265	280	315	280	280	290	240	255	265	265	255	255	270	265	280	285	255	250	F 250	F
30	F 270	J F 285	290	265	265	265	260	290	Z 285	265	255	250	260	U R 280	265	270	265	280	270	U S 280	V 260	255	260	F 265
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	26	28	30	29	30	30	26	25	26	26	25	27	24	29	28	29	28	26	26	30	29	30	28
MED	270	268	275	270	275	275	285	285	275	268	265	255	260	260	265	268	270	275	280	280	265	260	260	265
UQ	275	280	F 285	F 280	F 285	285	300	295	280	280	275	260	265	270	270	275	280	282	290	285	270	265	270	275
LQ	260	F 265	260	260	265	265	265	275	260	260	245	250	255	255	260	260	265	268	270	265	260	255	255	255

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

IONOSPHERIC DATA

JUN. 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							A	A	A	A	A	A	A	A	360	370	L 330	A	A					
2							L	L	A	A	370	A 345	375	365	A 350	A	A	A	A					
3						L		A	A	350	345	L 315	A	A	L 315	A 330	L 325	L	A					
4						A	L	A	A	L 345	375	A	A	A	A	A	A	A	A					
5							A	A	A	A	A	A	A	340	370	355	350	A	A	A				
6							L	U L 340	A	A	A 340	A	A	A	A	345	U L 345	U L 330	L					
7							L	L	A	A	U L 310	A	A	A	345	A 285	A	A	A					
8								A	A	L	A	A	A	A	A	A	A	A	A	A				
9								A	A	L	A	L 325	355	340	A	335	L 345	A	A	A				
10						L	L	A	A	A	A	A	A	345	330	L 335	320	L	L					
11						L	L	L	A	L	A	350	345	A	A	A	320	U L 315						
12							L	L	A	L	A	A	A	A 335	335	320	U L 305	U L 315	L					
13					L	295	310	320	340	U L 335	L	A	A	H 335	310	A	L	L	A					
14								L	L	A	A	A	L 315	360	355	A	320	L 315	L					
15							L 330	A	A	A	A	L	A	A	350	340	L	L	L					
16							U L 350	A	L 345	A	U L 320	A	A	355	A	A	A	L	L					
17							A	A	A	A	A	A	A	L 315	335	325	U L 335	U L 330	A	A				
18								L	L 365	U L 340		L 305	L 360	A	L 360	H 345	L 320	A	L					
19						L	A		L	A	A	L	A	A	335	A	A	A						
20							L	A	A	A	A	L	A	A	A	L 340	360	A	A					
21							L	370	400	355	360	325	L	320	340	355		A	A	A				
22						L	L	L	335	A	A	370	360	350	360	340	A	A	A	A				
23							380	L	A	A	A	A	360	345	335	A	A	A	A	A				
24						L	L			A	L	A	A	A	L	A	335	U L 330	L					
25						L	A	A	A	A	A	A	385	355	355	345	A	A	U L 330					
26							L	U L 360	A 360	A	L	A	A	A	370	A	A	A	A	A				
27						L	A	A	300	365	370	U R 375	A	A	A	A	A	C	C	A				
28							U L 285	350	A	L	C	355	A	A	A	350	335	L 330	L					
29							L	L	L	380	A	A	A	370	365	350	350	A	A					
30						L	L	A	U L 350	A	R 385	360	A 345	A	A	A 355	L	L 310	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						1	5	5	8	7	9	10	9	14	19	18	15	8	1					
MED						295	L 330	350	348	350	360	348	360	345	350	342	335	U L 322	U L 330					
UQ							L 350	360	362	360	370	360	360	355	360	350	345	U L 330						
LQ							L 310	340	338	L 342	340	L 325	345	335	335	335	320	L 315						

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

IONOSPHERIC DATA

JUN. 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							300	A 350	A	A	420	460	420	370	365	350	360	315	285					
2							285	270	315	415	400	390	395	380	355	350	325	300	290					
3						260		A	390	345	325	370	A 375	330	380	355	330	305	275					
4						A 325	L 305	275	A	350	H 310	375	A 340	355	A	A 335	325	300	280					
5							310	A 365	A	440	410	A	A	460	385	370	380	355	A	A				
6							365	315	305	310	360	360	385	375	370	340	295	300	275					
7							L 285	285	A 290	360	405	425	E A 435	A	440	A	405	385	320					
8								A 280	A 280	355	A 385	A	A 420	A	A 400	390	A 370	A	E A 350	A				
9								295	A 275	400	380	360	390	390	400	360	330	330	A	A				
10						370	355	A	A	A	E A 485	E A 450	430	410	380	380	340	L 315	295					
11						320	L 320	320	A 405	L 360	420	415	420	395	400	A 385	370	340						
12							280	310	A 295	L	A	A 460	415	410	385	395	370	355	320					
13					400	465	575	470	620	360	U L 465	485	A	470	410	A	370	L 410	A					
14								275	L 460	410	A 435	400	440	450	365	390	390	375	330					
15							570	E A 575	A	475	A	U L 470	E A 485	L 555	465	415	L 425	L	350					
16							310	305	320	300	L 460	435	405	375	360	385	385	355	305					
17							A 300	A 300	E A 310	E A 365	A	A	390	380	385	365	385	335	310	A				
18								330	300	310		430	400	390	370	365	355	A	300					
19						300	280		330	A	390	380	A 375	A	390	365	330	300						
20							305	320		A	A	A 425	A 425	370	A 365	355	335	325	A					
21							L 310	260	275	350	370	345	L 350	395	385	365	355	340	320	280				
22						L 285	285	L 265	300	A	A	390	385	370	360	365	A	330	345	295				
23							240	L 355	315	E A 300	A	A	345	355	335	335	A	335	295	295				
24						315	280			A 310	350	340	355	325	330	340	325	310	285					
25						310	290	310	A	A	A	470	475	460	440	370	380	350	310					
26							310	280	280	E A 350	L 355	A	A	A	425	A	E A 400	370	A	A				
27						355	365	A	430	340	365	465	460	A	405	390	A	C	C	A				
28							405	340	A	405	I C 410	385	A	A	E A 435	415	435	365	315					
29							260	L 305	L 350	330	A	E A 410	E A 400	390	380	415	385	A 370	295					
30						L 315	355	310	295	E A 330	410	425	385	365	A	355	355	345	340					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					1	11	25	25	21	23	21	25	26	24	28	27	27	26	22	3				
MED					400	315	305	308	310	350	395	408	395	385	384	365	365	338	305	295				
UQ						340	355	325	350	382	415	450	422	410	401	388	384	355	320	295				
LQ						305	285	280	292	320	365	378	380	370	365	355	332	315	290	288				

JUN. 1990 | H'F2 (KM)

IONOSPHERIC DATA

JUN. 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	320	A 320	A	335	310	290	A	A	A	A	A	A	A	A	A 240	240	H 205	A	A	A 260	270	280	325	A 290
2	295	275	240	260	335	270	A	A 255	A	A	220	E A 285	220	220	E A 275	A	A	A	A	A	A	A 295	E A 350	A 350
3	A 330	300	A 315	315	280	260	A 240	A	A	200	230	E A 275	A	A	E A 300	E A 290	A 245	A 250	A	255	250	A 310	295	A 330
4	A 310	E A 370	300	270	A 270	A	245	A	A	H 210	220	A	A	A	A	A	A	A	A	A 250	A	A 325	A	A 320
5	A 325	A 315	270	A 285	A 305	A 270	A	A	A	A	A	A	A	E A 260	205	215	230	A	A	A	A	A	340	A 350
6	A 340	A 310	A 295	A 320	A 320	245	245	E A 275	A	A	E A 295	A	A	A	A	E A 250	225	230	260	A 275	275	360	350	285
7	300	295	290	290	265	250	235	A 260	A	A	E A 315	A	A	A	235	A	A	A	A	E A 300	A	E A 350	E A 370	A 305
8	345	365	A 330	320	315	280	275	A	A	A	A	A	A	A	A	A	A	A	A	A	E A 380	A	285	A 330
9	290	290	310	305	280	230	E A 275	A	A	A	A	E A 260	210	E A 260	A	A 255	E A 280	A	A	A	300	250	E A 350	325
10	E A 350	A	A 320	E A 330	A 260	A	A	A	A	A	A	A	A	260	H 230	A 245	230	245	260	275	325	325	A 335	A 360
11	360	305	315	315	315	260	A 270	240	A	A	A	210	210	A	A	A	235	260	285	A	A	A 370	A 355	A
12	A 355	A 365	A 370	335	315	265	255	E A 280	A	E A 285	A	A	A	A	225	Y 265	A 255	245	265	290	305	E A 370	A 355	320
13	305	300	365	370	365	295	270	235	A 255	A	A 250	A	A	E A 260	A 280	A	A	A	A	305	A 340	305	290	A 345
14	315	A 350	E A 365	A 345	A 285	255	240	235	245	A	A	A	235	235	H 240	A	250	245	270	290	300	340	360	350
15	A 375	425	E A 470	380	F 325	265	E A 270	A	A	A	A	220	A	A	220	H 215	240	E A 275	A	290	A 310	A 350	A 340	A 385
16	A 330	E A 330	E A 355	A 365	350	255	235	A	E A 265	A	E A 260	A	A	225	A	A	A	E A 280	A	275	A 335	A 370	E A 345	E A 345
17	A 325	325	A 345	310	280	265	A	A	A	A	A	A	A	A 270	H 220	H 210	240	E A 270	A	A	E A 320	A 295	310	325
18	330	305	260	275	260	245	240	225	220	225	A	E A 270	200	A	210	H 220	A 265	A	A	270	265	270	A 340	330
19	A 330	A 335	A 300	290	275	260	A	A 265	A	A	A	A	A	A	240	A	A	A	270	A	270	E A 340	A 330	A 345
20	320	E A 350	E A 355	A 270	310	260	A 250	A	A	A	A	A	A	A	A	E A 270	255	A	A	275	260	290	300	335
21	300	290	265	280	280	250	235	230	210	215	215	E A 285	E A 275	E A 325	275	235	A	A	A	A	305	285	295	300
22	295	290	300	265	275	265	265	235	E A 260	A	A	205	A	230	220	255	A	A	A	A	280	315	330	290
23	330	285	295	275	260	240	235	225	A	A	A	A	A	A	A	A	A	A	A	A	270	270	370	A 315
24	300	295	260	265	320	255	250	265	255	A	A	A	A	A	A	A	230	A 260	E A 260	E A 295	A 280	295	A 320	285
25	A 305	A	270	320	285	275	A	A	A	A	A	A	205	E A 260	215	250	A	A	E A 270	265	265	315	A 340	315
26	E A 350	280	245	270	300	260	260	A 260	A 255	A	A	A	A	A	215	A	A	A	A	A	A	E A 350	A 300	A 290
27	315	A 330	E A 325	335	A 340	250	A	A	E A 280	220	220	235	A	A	A	A	A	C	C	A	A 320	E A 375	325	E A 355
28	335	280	275	335	310	280	245	240	A	A	C	A 255	A	A	A	E A 285	255	E A 275	A 270	265	290	A 350	350	A 330
29	320	290	275	290	310	A 255	250	H 215	235	210	A	A	A	220	235	235	225	A	A	265	E A 340	330	A	A
30	A 345	270	260	290	280	260	250	A	A 240	A	H 205	H 220	A	A	A	E A 270	E A 250	235	A	A 300	300	A 350	295	350
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	28	29	30	30	28	22	16	11	7	10	11	7	12	18	17	17	12	9	18	24	28	28	28
MED	322	302	288	303	302	260	248	238	A 245	212	222	U A 230	210	U 240	227	U 235	238	243	270	274	290	312	332	A 328
UQ	A 335	A 327	A 320	335	315	268	260	A 260	A 256	220	E A 260	E A 272	222	E A 260	240	E A 265	A E A 252	E A 272	270	290	A 312	A 342	A 345	A 346
LQ	305	290	270	275	280	252	240	232	238	210	220	220	208	225	220	228	230	245	260	265	270	295	305	310

JUN. 1990 | H'F (KM)

IONOSPHERIC DATA

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

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					B	B 135	120	110	110	110	115	110	110	110	110	110	110	110	120	B				
2					B	130	115	110	110	110	115	110	115	115	115	115	110	110	A	B				
3					B	130	115	110	110	110	110	115	115	115	115	110	110	115	B 125	B				
4					B	A	110	110	110	110	115	115	120	120	115	110	115	115	A	B				
5					B	135	120	110	110	115	110	115	E B 130	115	115	115	110	110	120	B				
6					B	E A 140	115	110	110	115	B 125	120	115	B 120	115	A	A	A 120	115	B				
7					B	125	120	110	110	110	115	120	B 125	B 120	115	115	110	115	B 125	B				
8					B	A	120	115	120	A	120	B 125	125	120	115	115	115	115	B 120	B				
9					B	A	115	110	110	110	B 120	B 120	A	B 120	B 120	115	110	110	120	B				
10					B	125	120	110	115	115	120	120	A	120	110	110	110	110	120	B				
11					B	125	115	120	115	110	B	115	115	120	115	115	115	115	120	B				
12					B	140	120	115	115	110	B	B 120	B 115	B 120	A	B	A	E A 130	A 125	B				
13					B	130	115	110	110	115	120	110	B 120	115	115	115	110	110	115	B				
14					B	E A 165	A 125	110	105	110	115	120	A	115	110	115	110	110	120	B				
15					B	125	115	115	115	115	110	115	A	A	A	A	A	A	120	B				
16					B	E A 135	115	110	110	110	110	110	115	115	115	110	110	110	120	B				
17					B	A	A	110	110	110	110	115	A	E A 140	110	110	110	110	120	B				
18					B	E A 145	E A 145	110	A 125	110	115	115	115	120	110	110	110	115	A	B				
19					B	A	E A 135	110	110	110	110	B 120	115	B 120	115	115	115	110	A	B				
20					B	A	115	110	110	110	120	120	115	A	115	110	110	110	B	A				
21					B	B	A	110	110	110	110	115	115	115	115	115	110	110	110	B				
22					B	130	115	110	110	105	110	110	110	115	120	115	115	110	115	B				
23					B	A	120	110	110	110	E B 115	115	110	B	115	115	115	A	B	B				
24					B	E B 140	115	110	110	110	110	110	B 115	115	110	115	120	115	A	B				
25						125	115	110	110	105	110	120	120	115	A	120	115	115	125	B				
26						A	120	115	110	120	A	A	A	A	B	120	115	120	A	B				
27						135	120	115	115	115	B	B	A	A	A	115	115	I C 115	I C 120	B				
28						A	110	A	110	A	I C 110	110	A	115	115	115	110	A	A	B				
29						A	A	110	110	110	105	110	110	A	120	115	110	115	120	B				
30						E A 145	110	110	B	A	115	110	115	115	110	110	110	A	A	B				
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						19	27	29	29	27	26	28	22	24	25	27	27	26	20					
MED						130	115	110	110	110	115	115	115	115	115	115	110	111	120					
UQ						E E 140	120	110	110	112	115	120	118	120	115	115	115	115	120					
LQ						126	115	110	110	110	110	110	115	115	110	110	110	110	120					

JUN. 1990 | H'E (KM)

IONOSPHERIC DATA

JUN. 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	110	120	105	105	120	130	120	115	115	110	115	110	110	110	120	130	G	120	120	115	115	115	110	110
2	105	115	110	110	110	130	110	135	115	115	130	135	140	150	130	120	115	115	110	110	110	110	105	110
3	100	120	105	105	115	130	120	110	115	115	110	110	110	115	120	120	120	115	110	B	115	125	120	120
4	100	110	105	105	105	105	110	120	105	115	G	130	125	120	115	120	115	110	110	110	110	110	105	105
5	100	100	100	105	105	130	115	110	110	115	115	110	110	110	G	G	E G 150	120	115	110	110	110	120	110
6	110	105	105	105	105	120	125	120	115	110	115	115	115	110	115	105	105	130	115	110	115	110	115	110
7	105	110	110	110	115	G	G	130	110	110	110	110	110	110	E G 165	125	115	115	110	110	110	110	110	110
8	110	105	105	105	105	145	125	120	115	115	120	120	120	130	120	120	120	115	115	110	110	110	110	105
9	110	105	110	115	105	130	115	110	110	110	115	115	115	115	115	130	130	120	110	110	105	110	110	125
10	105	120	110	105	115	120	120	115	110	110	110	110	110	130	155	115	G	G	E G 150	120	115	110	110	105
11	100	105	95	100	100	155	130	135	110	110	110	120	120	115	110	120	120	130	115	110	110	105	105	105
12	95	95	100	100	105	E G 155	140	125	120	120	110	110	105	110	110	115	110	135	120	120	110	110	110	130
13	115	110	110	105	115	E G 190	E G 150	140	120	125	120	110	105	E G 160	140	120	130	120	115	115	105	105	120	110
14	110	105	100	105	105	160	110	120	120	110	115	110	110	155	130	115	140	135	E G 145	135	125	100	105	115
15	110	110	110	110	155	135	130	120	115	120	110	130	120	120	130	105	105	125	120	110	110	105	110	110
16	105	95	100	100	110	105	135	115	115	110	105	105	105	130	120	115	110	110	110	115	110	110	105	110
17	105	105	105	95	100	110	105	105	110	110	105	110	125	155	160	G	130	120	110	110	115	110	110	105
18	95	100	105	105	110	110	E G 160	140	130	140	130	125	125	125	120	G	120	110	115	B	120	115	115	110
19	110	110	105	105	110	110	120	120	120	110	110	120	120	110	E G 190	120	130	115	110	110	105	115	110	110
20	110	110	105	105	105	110	120	110	110	110	110	115	110	110	110	140	130	115	110	110	110	105	110	110
21	110	B	110	110	105	105	105	105	G	115	G	110	110	105	180	150	120	115	110	110	105	105	100	105
22	105	105	105	120	105	G	120	115	115	110	110	110	110	110	G	140	125	120	120	115	110	110	110	110
23	105	105	105	105	100	105	G	G	120	110	110	110	110	110	115	110	110	110	110	110	105	105	110	110
24	110	100	105	115	110	145	135	120	115	110	110	110	105	110	115	110	G	120	105	105	120	120	120	120
25	110	115	115	110	130	135	120	110	110	105	110	110	E G 160	115	120	140	130	125	125	120	120	110	130	110
26	110	110	110	110	110	145	130	125	120	115	110	110	105	110	135	120	120	115	115	115	115	115	115	110
27	110	105	105	110	105	G	125	115	120	120	B	120	110	105	110	150	130	C	C	110	120	110	110	105
28	110	105	105	100	95	105	120	110	110	110	C	110	105	105	110	105	110	105	105	105	100	100	110	110
29	105	110	95	110	105	110	115	E G 145	120	115	110	105	125	110	G	140	130	120	120	115	115	120	120	110
30	110	105	B	105	110	110	130	100	120	105	110	170	115	110	110	110	110	135	105	100	100	100	100	95
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	29	29	30	30	27	28	29	29	30	26	30	30	30	27	27	27	28	29	28	30	30	30	30
MED	110	105	105	105	105	125	120	118	115	110	110	110	110	110	120	120	120	120	112	110	110	110	110	110
UQ	110	110	110	110	110	136	129	122	120	115	115	120	120	122	131	130	130	122	118	115	115	110	115	110
LQ	105	105	105	105	105	110	115	110	110	110	110	110	110	110	115	115	112	115	110	110	110	105	110	105

JUN. 1990 | H'ES (KM)

IONOSPHERIC DATA

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

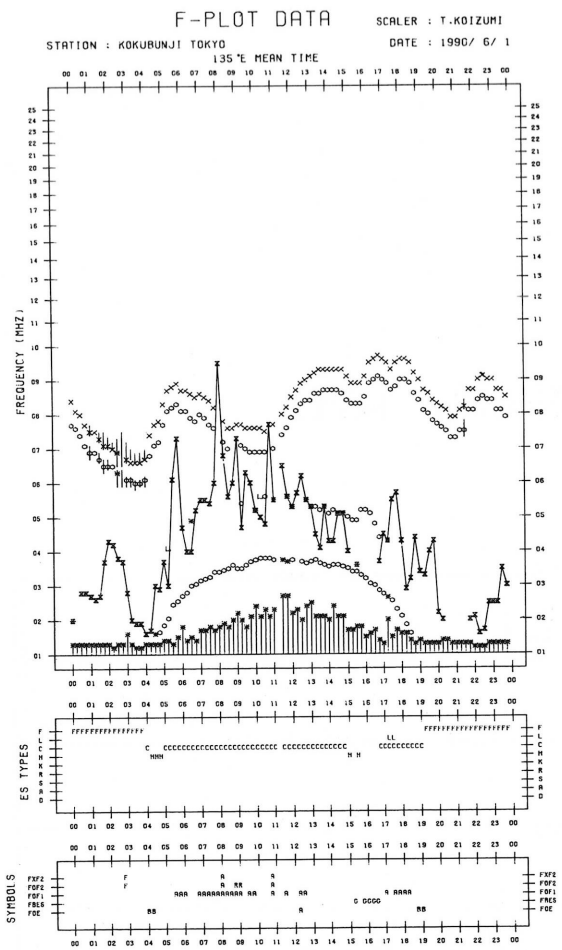
Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

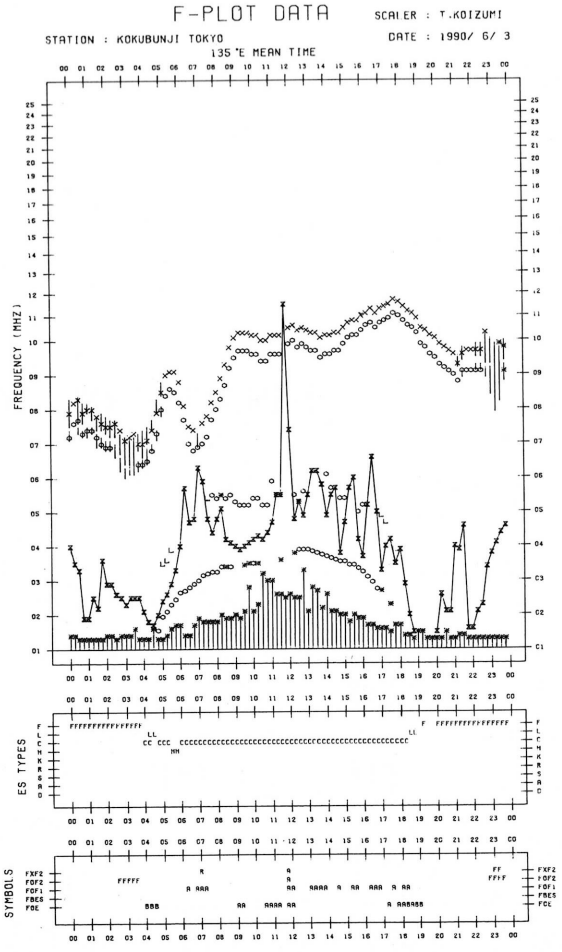
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 4	FF 14	F 5	F 6	C 2	C 4	C 4	C 4	C 3	C 3	C 2	C 2	C 2	C 2	C 2	H 2		C 4	C 4	C 5	F 6	F 1	F 3	F 4
2	F 4	F 2	F 4	F 4	L 3	C 2	C 3	H 2	C 4	C 2	H 1	A 2	A 1	A 1	H 2	C 3	C 4	C 3	C 4	C 6	F 6	F 6	F 5	F 5
3	F 4	FF 24	FF 33	F 4	C 4	C 2	C 3	C 5	C 3	C 2	C 2	C 2	C 2	C 2	C 2	C 2	C 3	C 2	C 4		FF 21	FF 24	FF 12	FF 23
4	F 5	FF 25	FF 23	F 4	L 3	L 4	L 3	CC 13	C 3	C 2		A 2	A 2	C 2	C 3	C 3	C 3	C 3	C 5	C 6	F 6	F 5	F 5	F 5
5	F 5	F 4	F 3	F 3	L 3	C 3	C 3	C 3	C 3	C 2	C 2	C 2	C 3	C 2			H 1	C 3	C 4	C 6	F 4	F 6	FF 24	F 5
6	F 5	F 5	F 5	F 5	L 4	L 1	H 3	H 2	C 3	C 3	C 2	C 2	C 2	C 2	C 1	L 2	L 2	HL 12	C 2	C 3	F 2	F 4	F 5	F 4
7	F 2	F 1	F 1	F 2	C 1			H 2	C 2	C 3	C 2	C 2	C 2	C 3	H 1	H 2	H 3	C 4	C 3	C 6	F 5	F 5	F 6	F 4
8	F 3	F 4	F 3	F 2	L 1	HL 11	H 2	C 4	C 3	C 2	C 2	C 3	C 2	H 2	H 2	C 3	C 4	C 4	C 5	C 5	F 5	F 6	F 3	F 4
9	F 3	F 3	FF 21	FF 22	L 4	CL 22	C 4	C 4	C 2	C 2	C 2	C 2	C 1	C 2	C 2	H 1	H 2	C 3	C 4	L 5	F 4	F 3	F 4	FF 22
10	F 5	FF 14	F 6	F 6	LL 34	C 4	H 3	C 3	C 3	C 3	C 2	C 2	C 2	H 1	H 1	C 2			H 1	C 2	F 4	F 3	F 3	F 5
11	F 4	F 2	F 3	F 2	L 1	H 1	H 2	H 1	C 2	C 2	C 2	L 1	L 1	C 2	C 2	H 2	C 2	H 2	C 2	C 3	F 4	F 5	F 6	F 5
12	F 4	F 4	F 4	F 3	L 1	H 1	H 1	H 2	H 3	C 2	C 3	C 2	C 2	C 2	C 1	L 1	L 2	HL 12	CL 21	CL 21	F 1	FF 52	F 4	FF 12
13	F 1	F 2	F 2	F 3	L 1	H 1	H 1	H 1	H 2	H 2	C 1	C 2	C 2	H 1	H 2	H 3	H 3	H 4	C 6	C 4	F 6	F 6	FF 24	F 6
14	F 3	F 6	F 5	F 5	L 4	HL 11	L 2	H 1	H 3	C 3	C 2	C 2	C 2	H 1	H 2	C 3	H 2	H 2	H 1	C 2	F 1	F 2	F 3	FF 32
15	F 4	F 3	F 5	F 4	R 1	C 2	H 2	H 4	C 3	C 2	C 2	H 1	HL 12	HL 22	HL 11	L 2	L 2	HL 22	C 3	C 3	F 4	F 4	F 6	FF 24
16	F 4	F 5	F 4	F 4	LL 13	L 2	H 1	C 3	C 2	C 3	C 2	C 2	C 2	H 1	C 2	C 2	C 3	C 3	C 3	C 5	F 4	F 4	F 4	F 5
17	F 3	F 3	F 4	F 4	L 1	CL 22	L 4	L 4	CL 33	C 3	C 3	C 3	HL 11	HL 11	H 1		H 1	H 2	C 5	C 6	F 5	F 3	F 2	F 5
18	F 4	F 3	F 2	F 2	L 1	L 2	HL 12	H 1	HL 11	H 2	H 2	H 2	A 1	A 2	H 1		H 2	C 4	C 3		F 2	FF 21	F 4	F 4
19	F 3	F 4	F 4	F 5	F 2	L 2	HL 42	C 4	C 3	C 3	C 2	C 2	AC 22	C 2	AC 11	H 3	H 4	C 3	C 3	C 5	F 2	FF 43	FF 33	F 5
20	F 4	F 5	F 6	F 5	L 4	L 2	C 2	C 3	C 3	C 3	C 3	C 2	C 3	C 3	C 3	H 2	H 2	C 4	C 4	L 3	F 2	F 2	F 3	F 3
21	F 2		F 1	F 1	F 2	L 2	L 2	C 2		C 1		L 2	C 1	C 2	H 1	H 1	C 3	C 3	C 4	L 3	F 3	F 2	F 2	F 3
22	F 3	F 3	F 4	F 1	L 2		C 2	C 1	C 2	C 2	C 2	C 1	C 1	C 1		H 1	C 3	C 4	C 3	L 3	F 3	F 2	F 3	F 2
23	F 3	F 2	F 1	F 2	L 2	L 2			C 2	C 2	C 2	C 3	C 2	C 2	C 1	C 3	C 3	C 3	C 2	L 4	F 4	F 4	F 3	F 4
24	FF 22	F 2	F 2	FF 22	L 1	H 1	H 2	H 3	C 2	C 3	C 2	C 3	C 3	C 2	C 2	C 2		C 2	L 2	L 5	FF 34	FF 14	FF 24	FF 22
25	FF 22	FF 42	F 3	F 3	F 1	H 2	C 3	C 3	C 3	C 3	C 2	C 2	A 1	C 1	C 1	H 1	H 2	H 2	C 2	C 2	FF 11	FF 31	FF 12	F 2
26	F 4	F 3	F 2	F 1	F 2	C 1	H 1	H 2	C 2	C 2	C 2	C 1	L 2	L 2	H 1	C 2	C 4	C 3	C 3	C 4	F 4	F 3	F 5	F 4
27	F 4	F 4	F 3	F 3	F 2		C 3	C 3	C 2	C 1		C 1	C 2	C 2	C 2	H 1	H 3			C 3	FF 25	F 4	F 5	F 4
28	FF 24	F 2	F 2	F 2	F 3	L 2	C 2	C 2	C 3	C 3		C 2	C 2	C 2	C 2	C 2	C 3	C 2	L 2	L 2	F 4	F 4	F 4	F 3
29	F 4	FF 22	F 2	F 2	F 5	L 3	L 2	H 1	C 1	C 2	C 2	CH 31	HC 22	C 1		H 1	H 1	C 4	C 3	C 3	FF 24	FF 13	FF 24	F 5
30	F 6	F 2		F 1	F 2	L 2	H 2	LC 13	C 1	C 3	C 2	H 1	C 2	C 2	C 2	C 2	C 2	HL 12	L 3	L 3	F 3	F 3	F 3	F 3
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																								

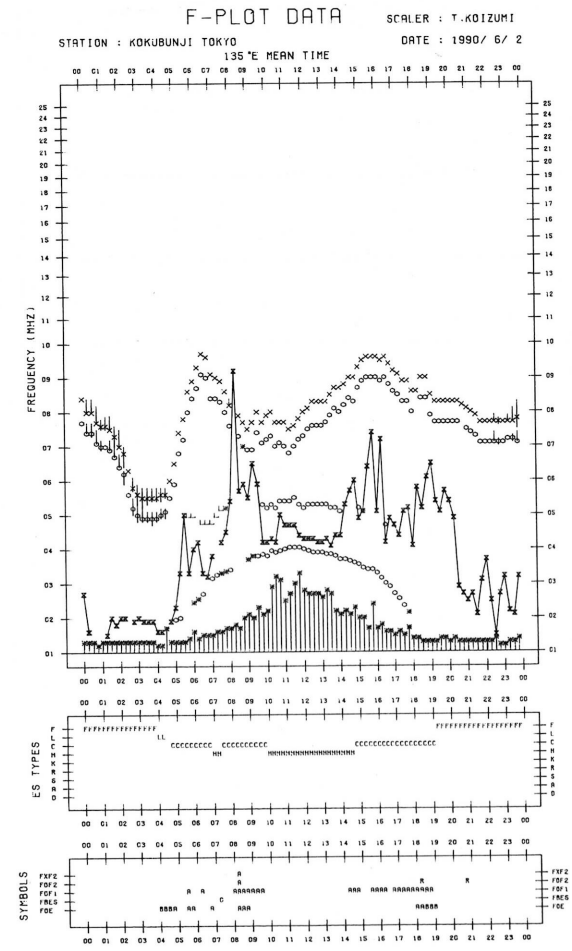
JUN. 1990 | TYPES OF ES

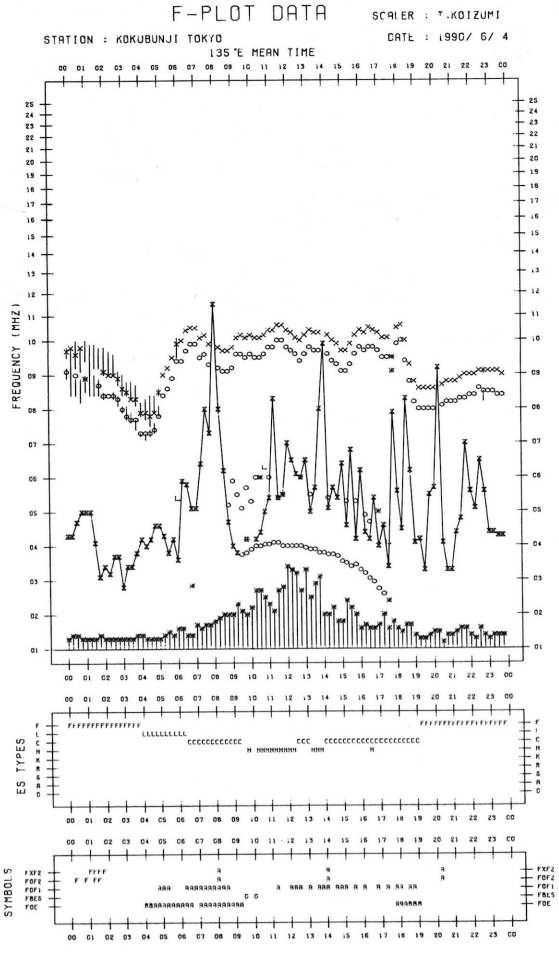
f-PLOTS OF IONOSPHERIC DATA

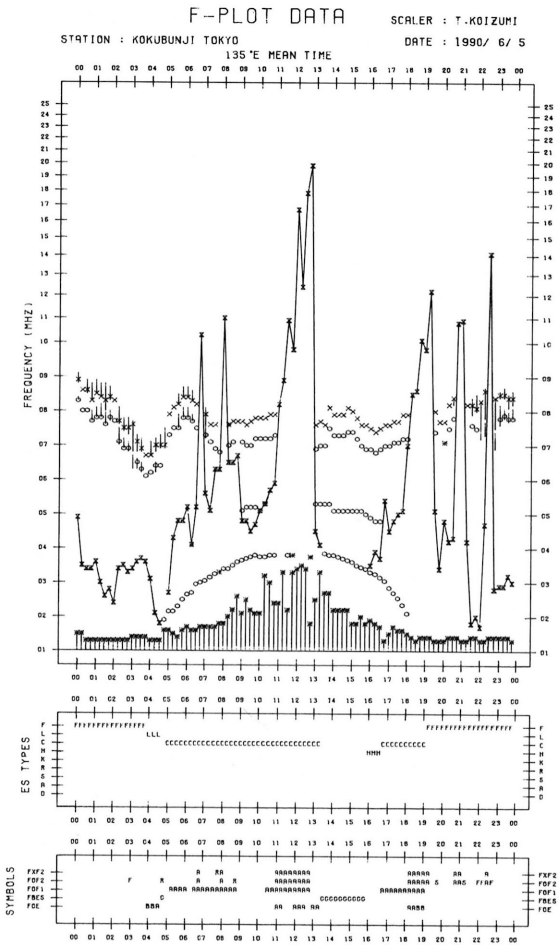
KEY OF F-PLOT	
!	SPREAD
⬡	FOF2,FOF1,FOE
×	FXF2
✳	DOUBTFUL FOF2,FOF1,FOE
⧖	FBES
∟	ESTIMATED FOF1
↑,Y	FMIN
∧	GREATER THAN
∨	LESS THAN

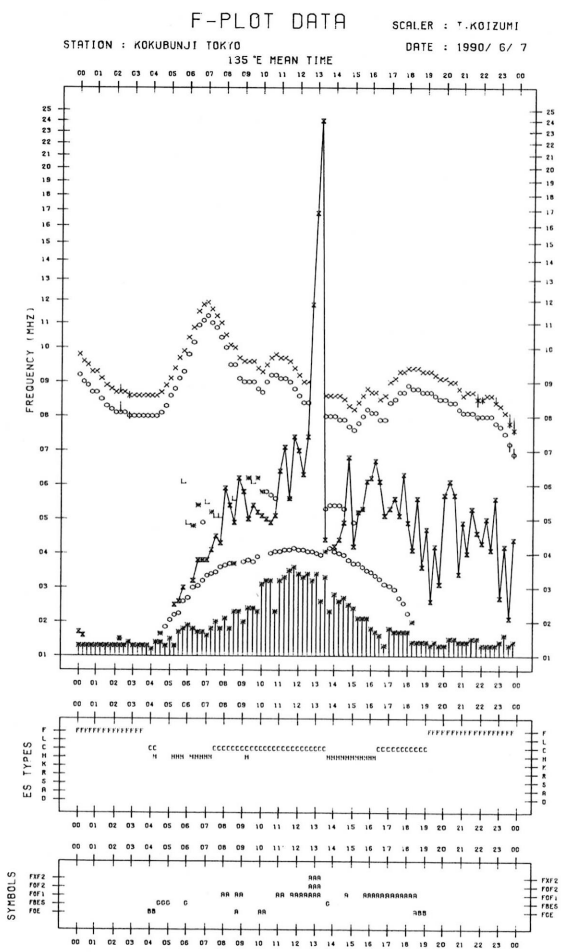

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/ 1
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


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


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/ 2
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


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


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/ 5
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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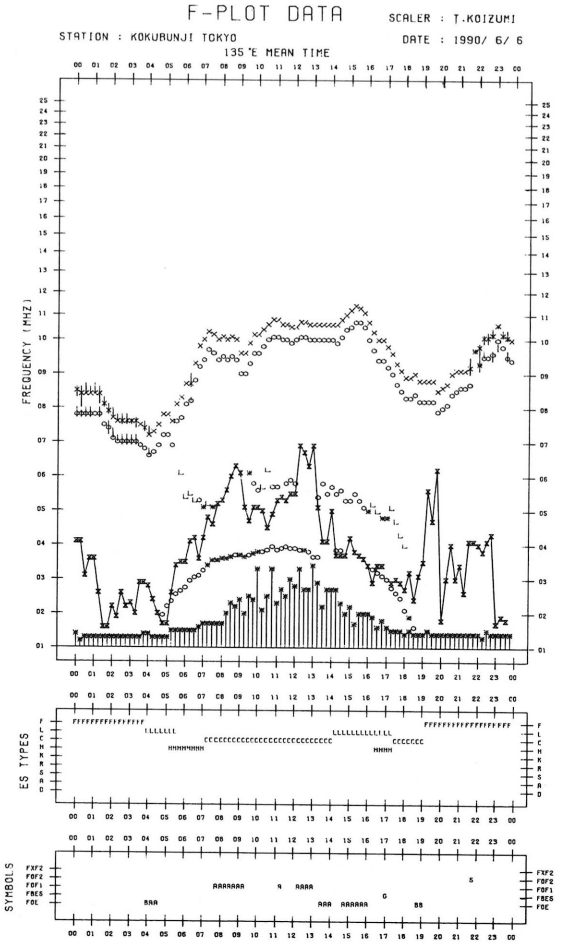
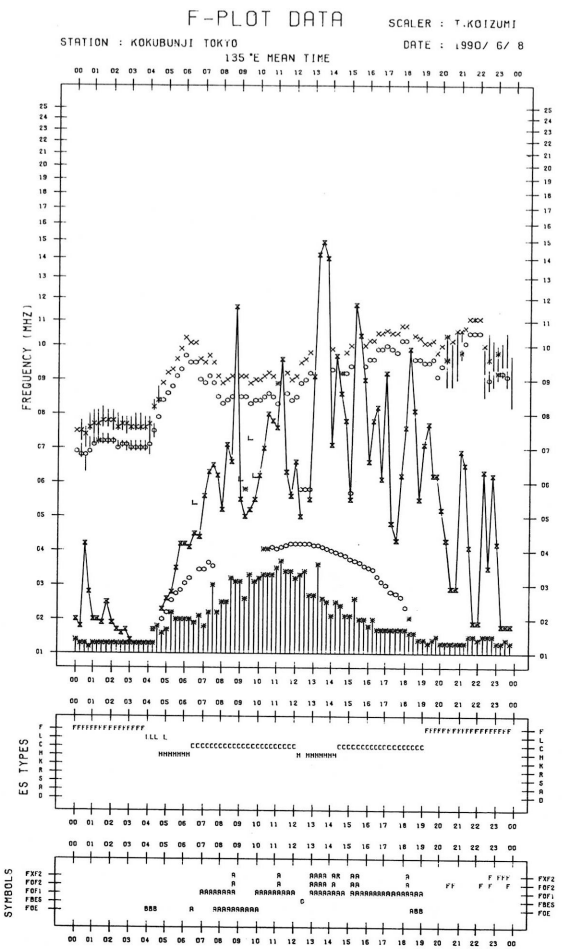
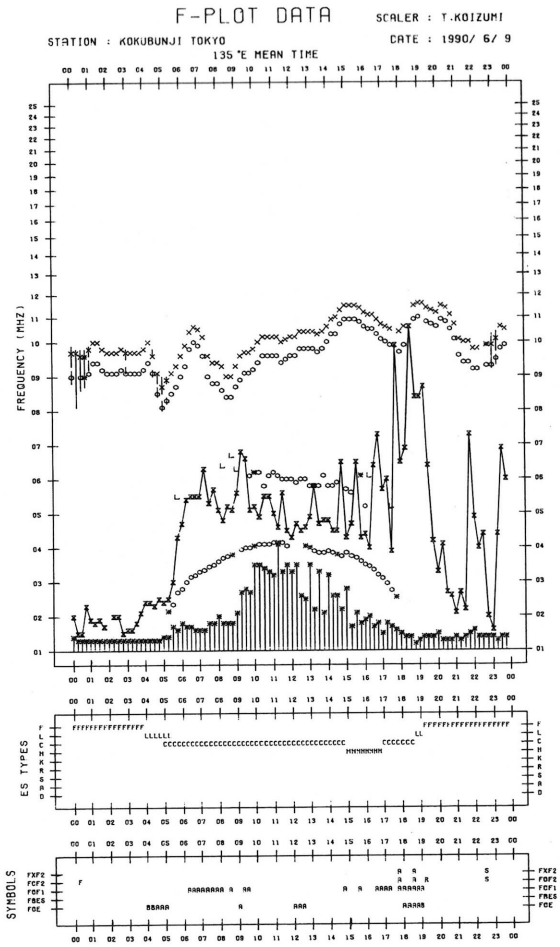
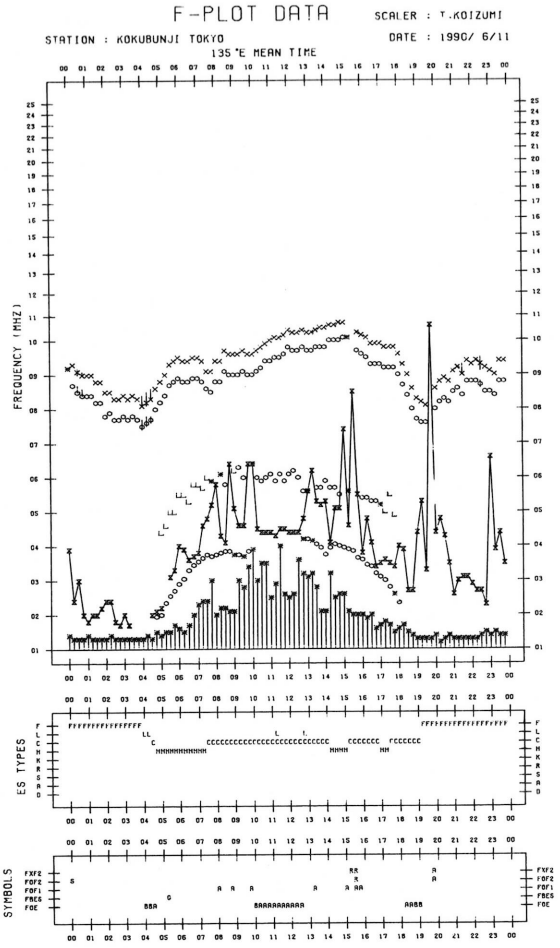
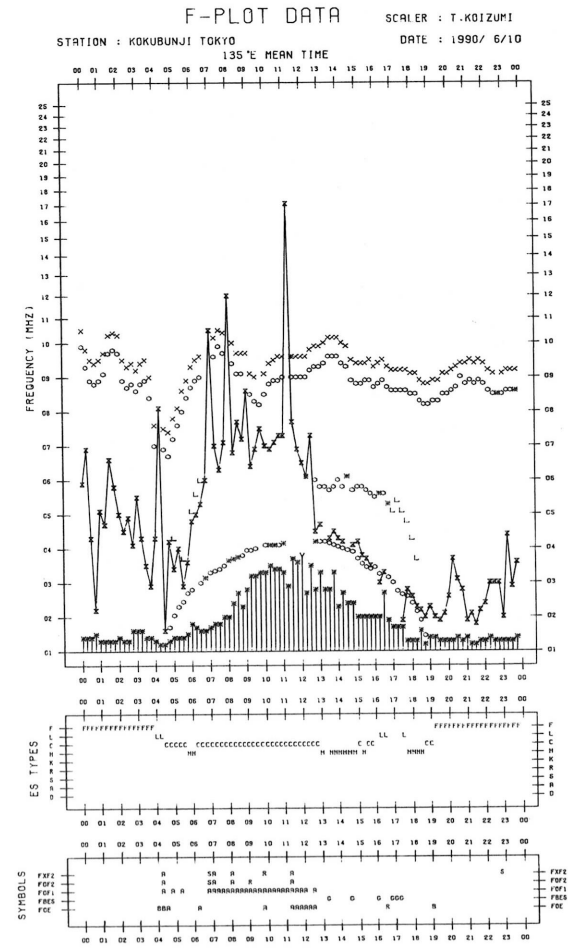
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/ 7
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

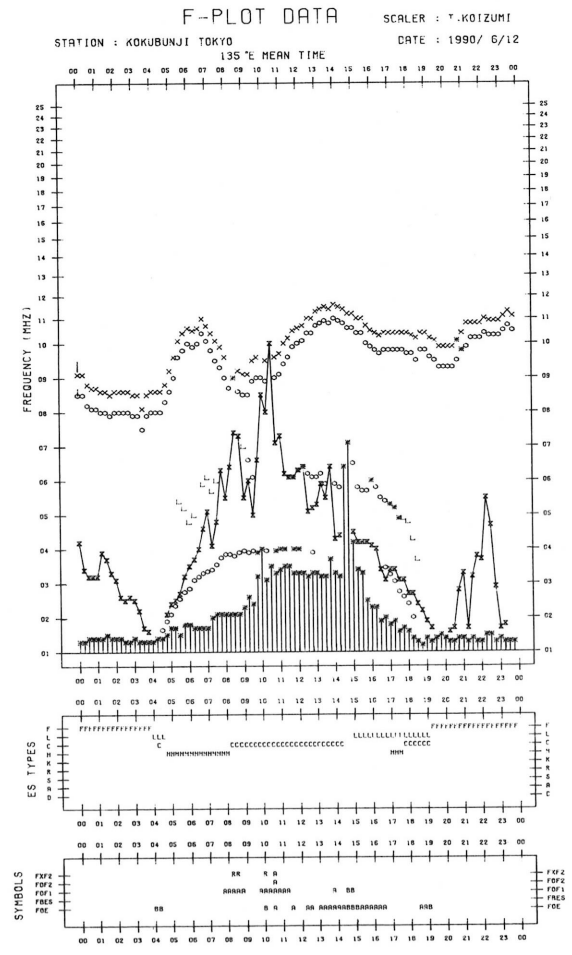

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/ 6
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

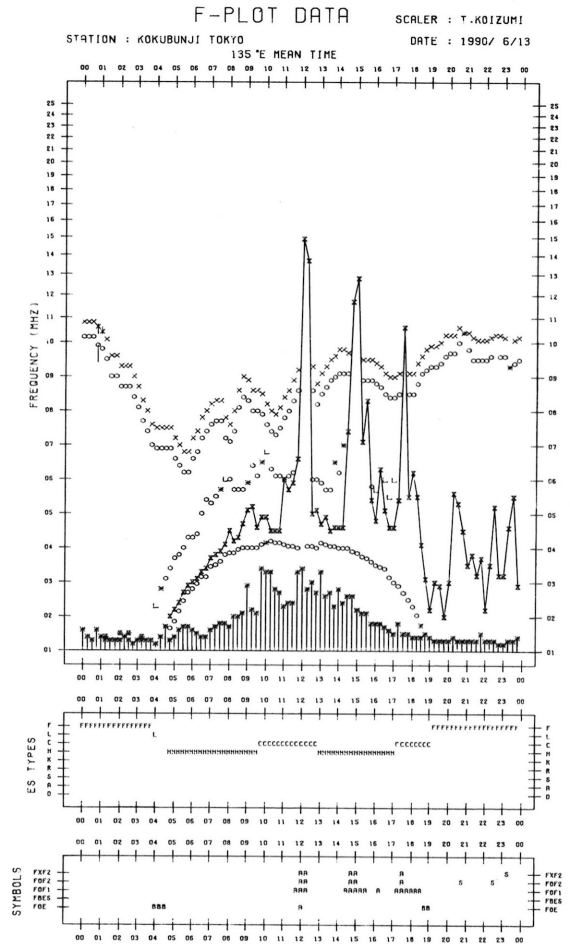

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/ 8
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

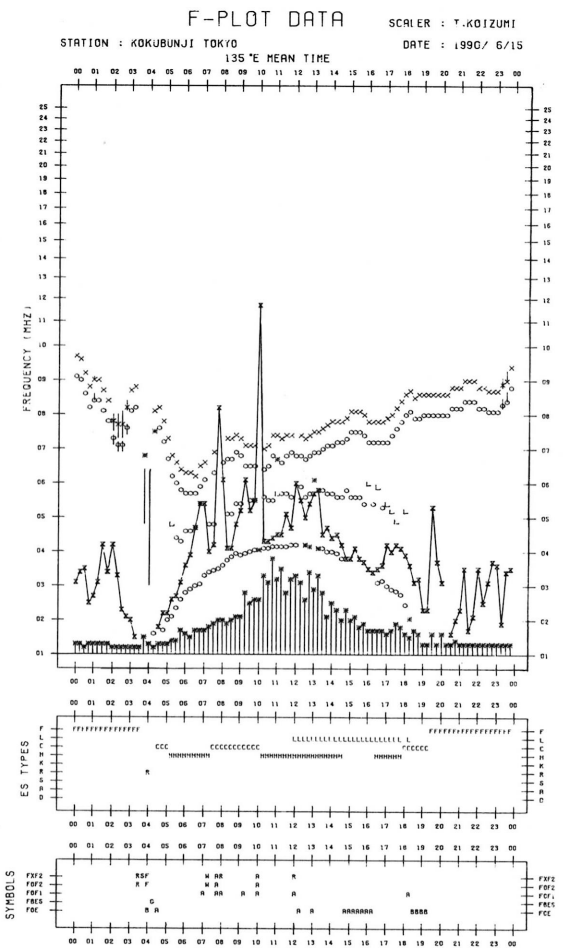

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/ 9
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FNES
FOE

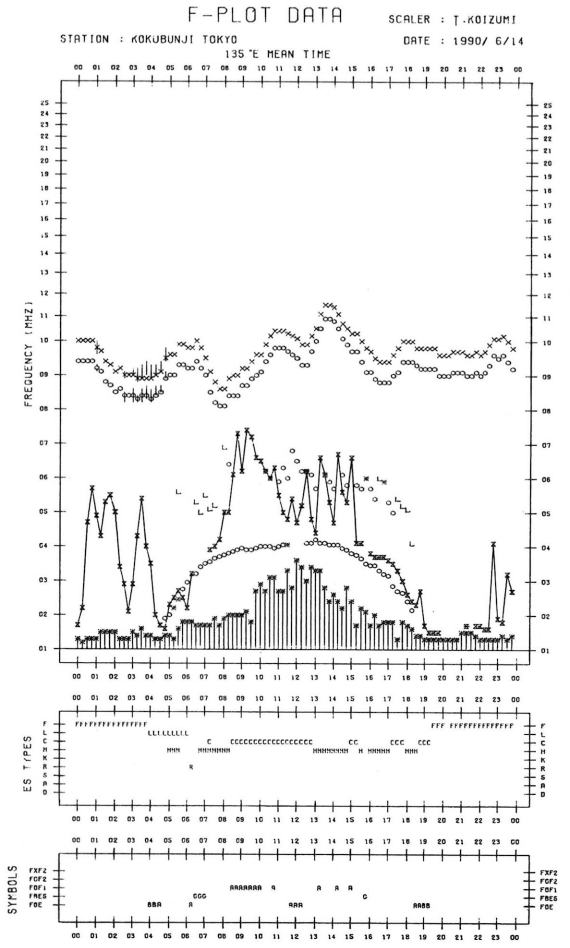

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/11
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FNES
FOE

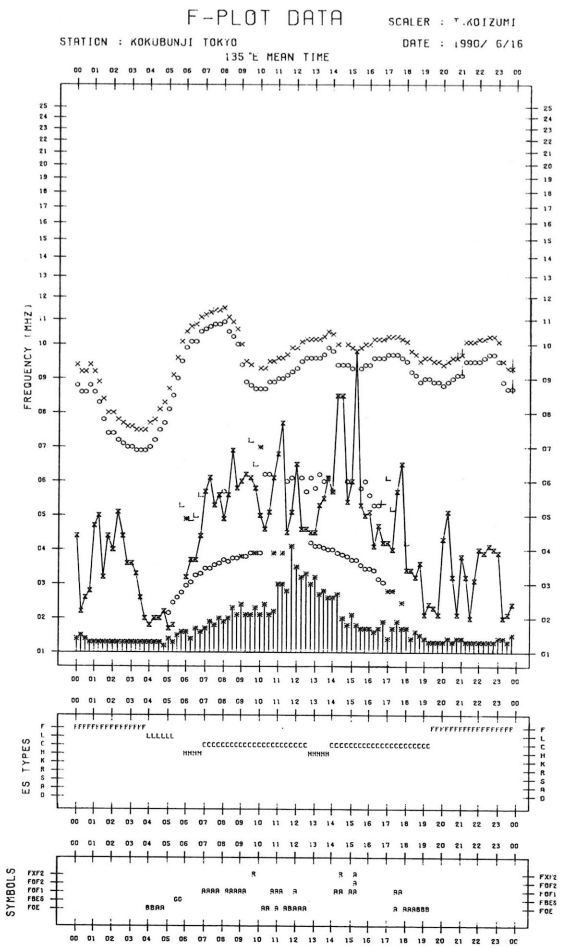

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/10
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FNES
FOE

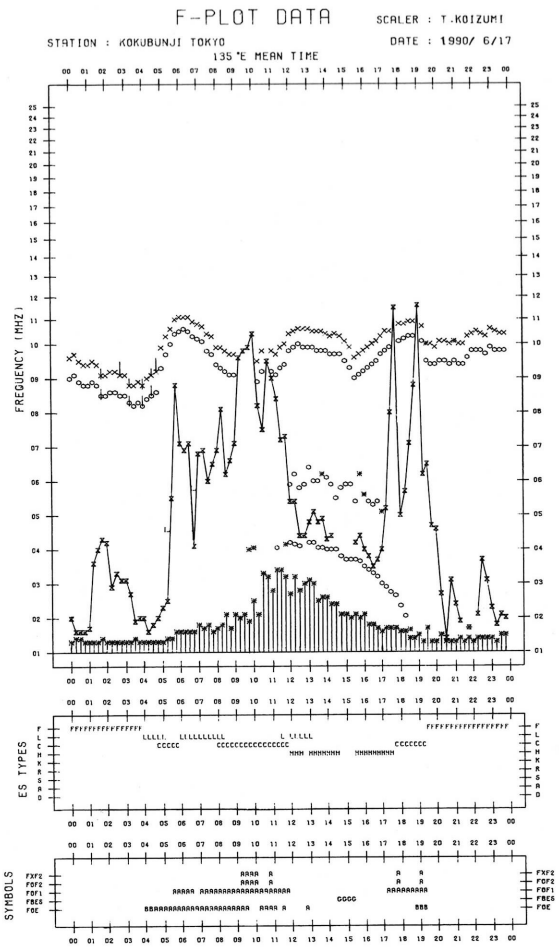

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/12
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FNES
FOE

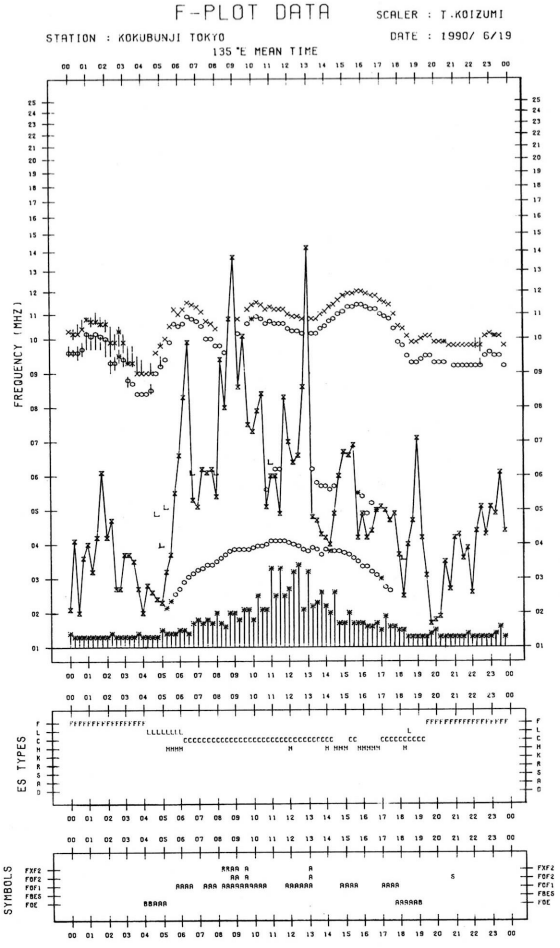

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/13
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

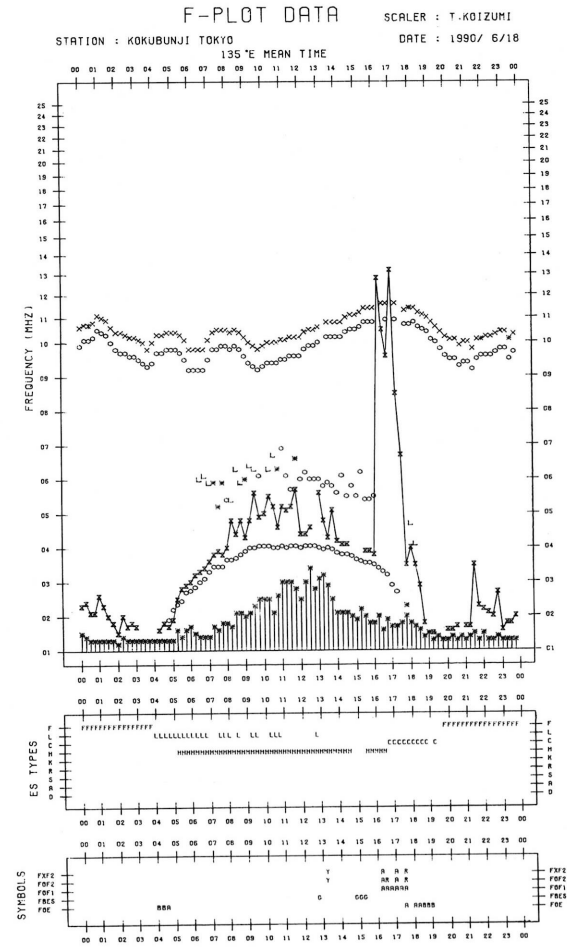

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/15
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

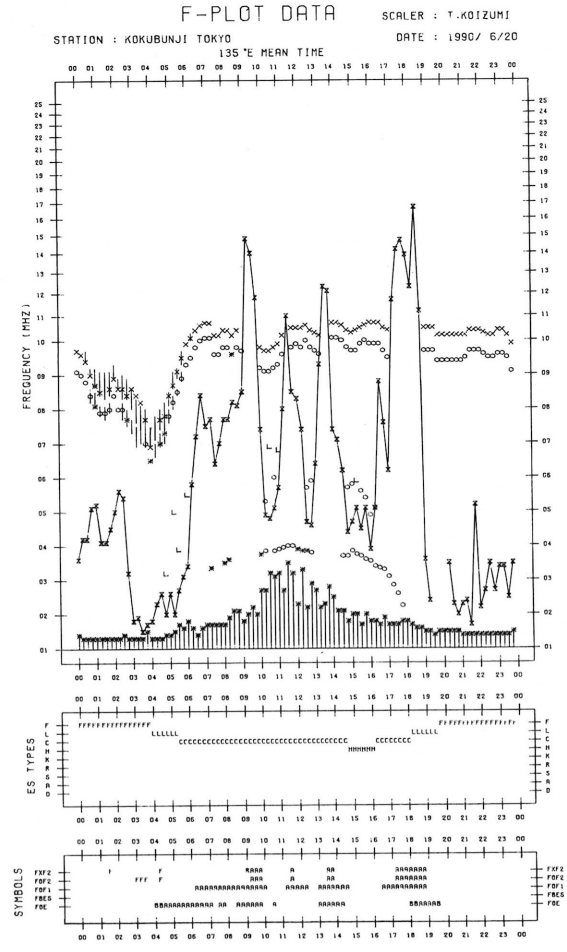

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/14
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

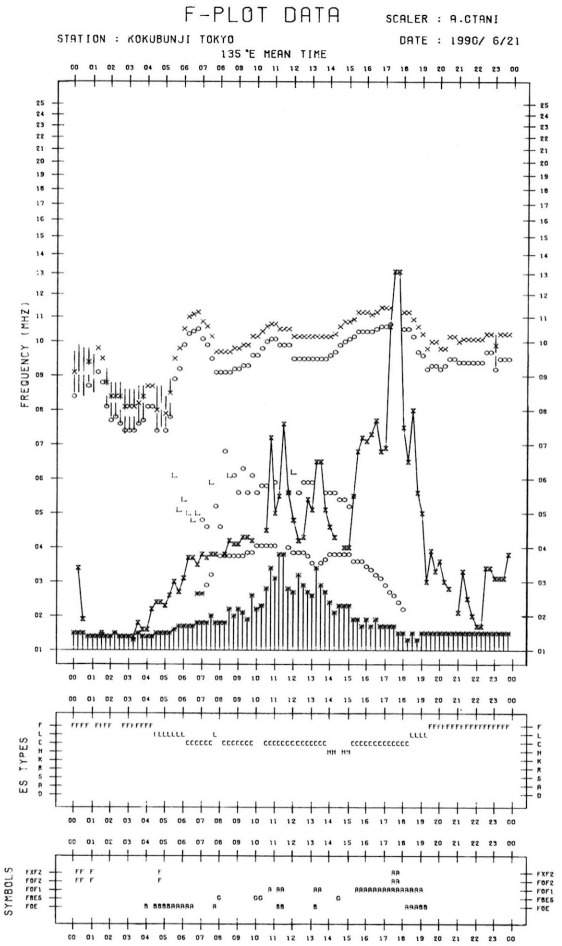

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/16
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

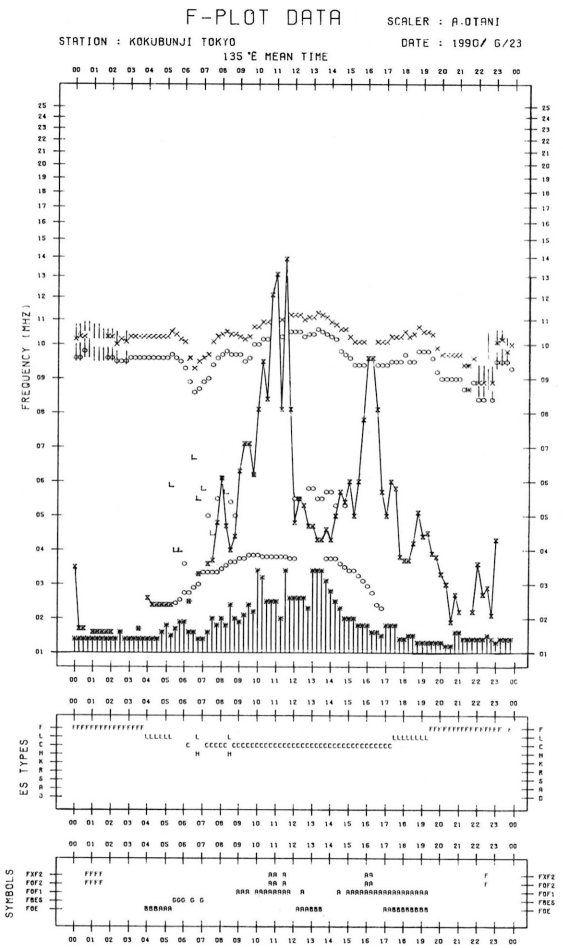

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/17
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

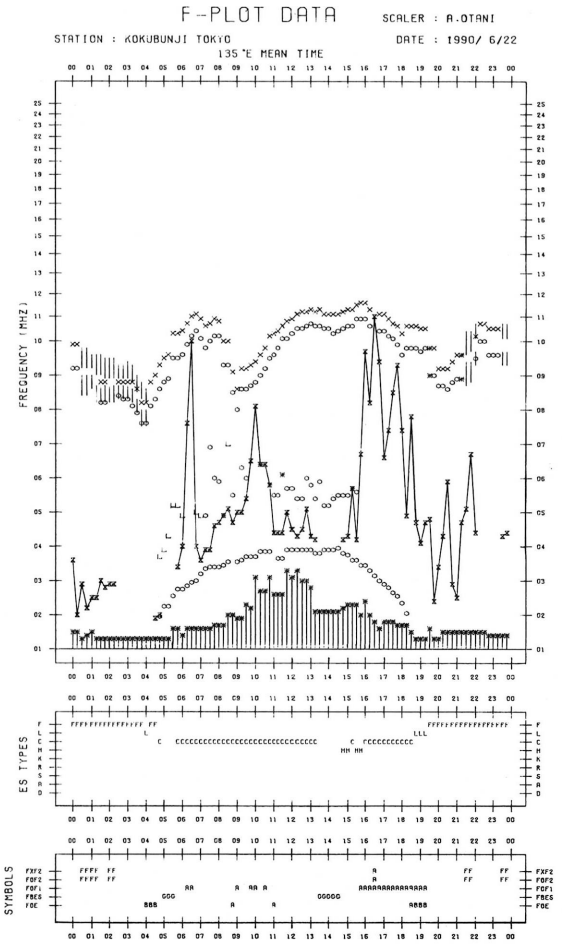

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/19
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

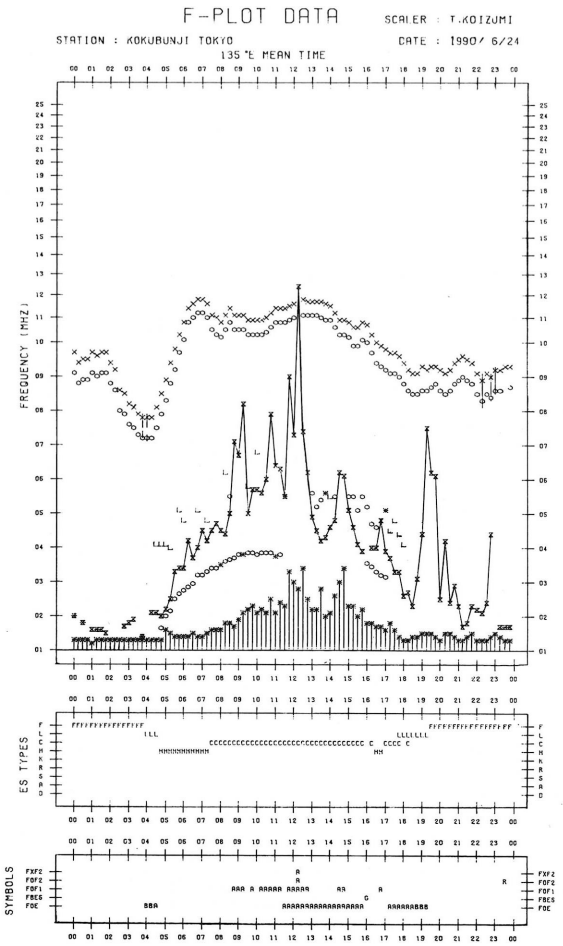

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/18
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

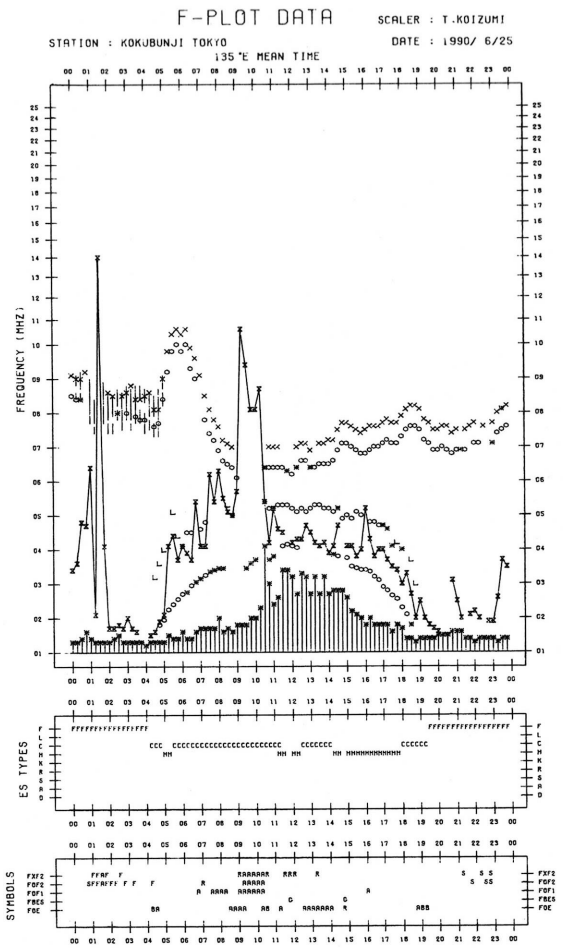

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/20
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

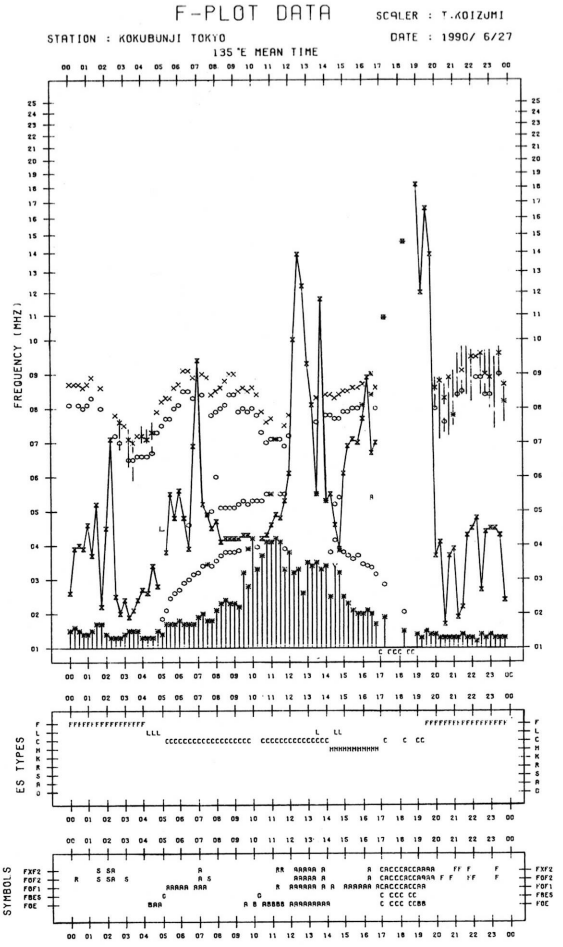

F-PLOT DATA
SCALER : A.OTANI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/21
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

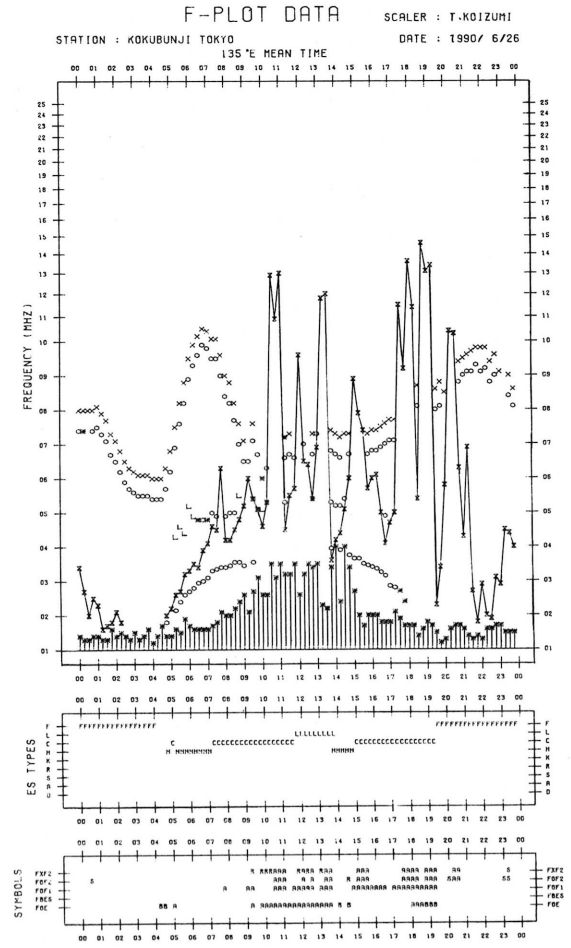

F-PLOT DATA
SCALER : A.OTANI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

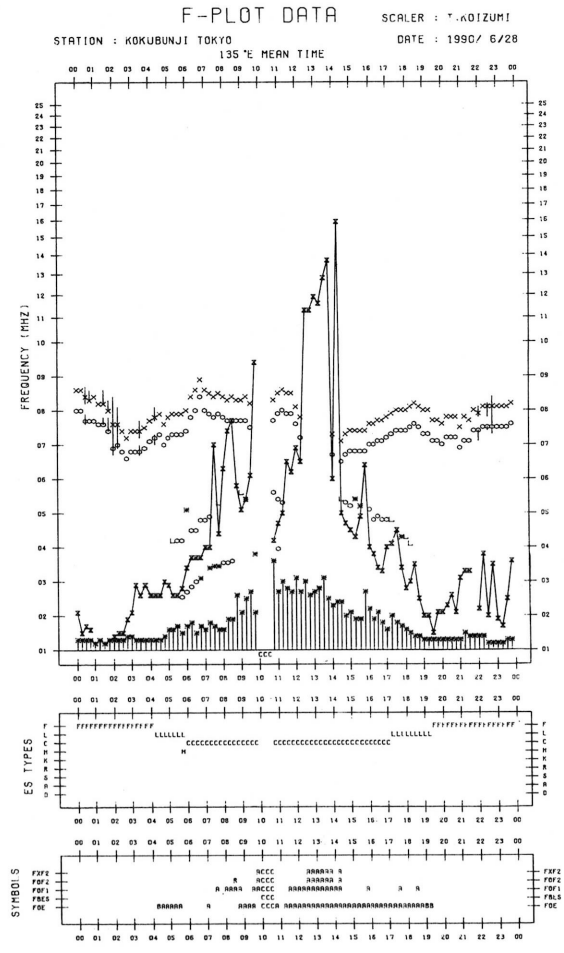

F-PLOT DATA
SCALER : A.OTANI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

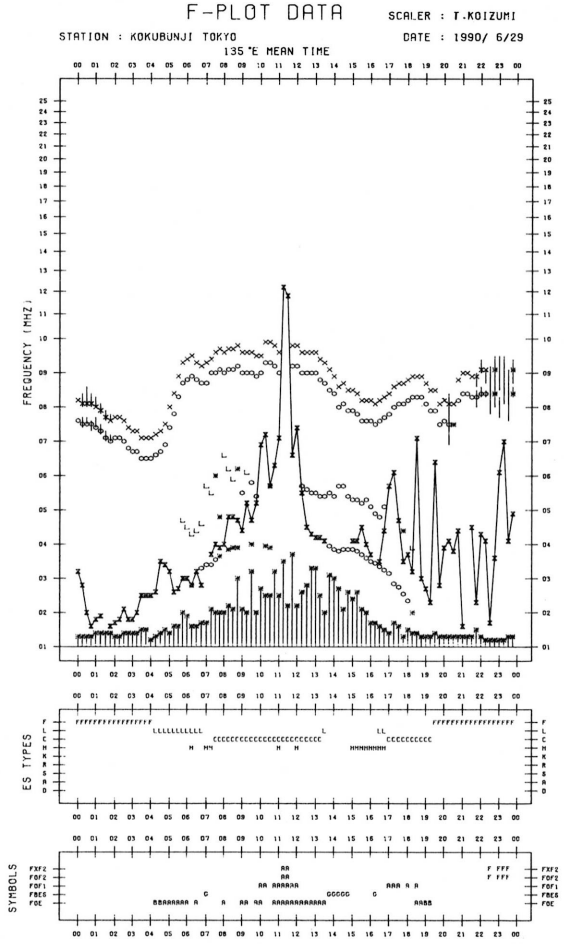

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

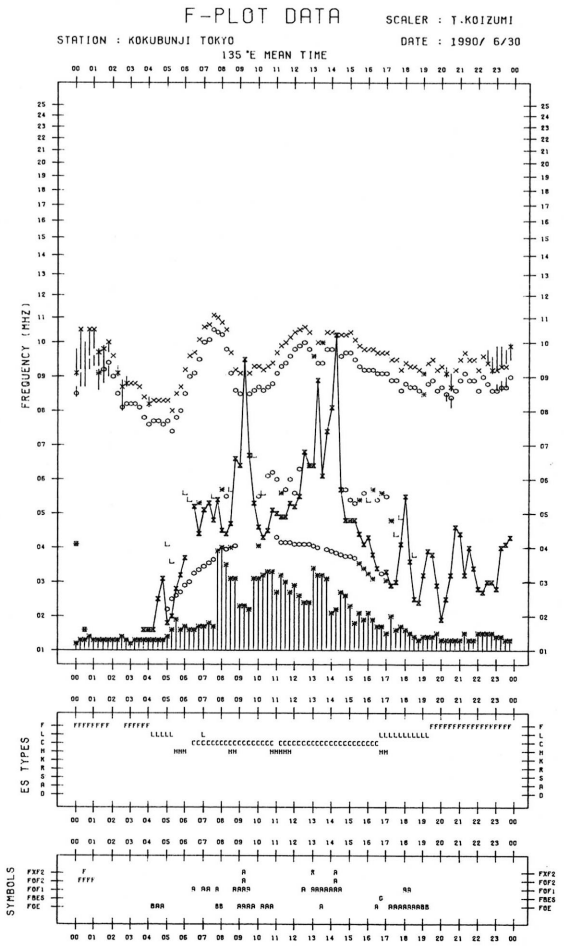

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/25
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/27
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/26
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/28
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/29
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 6/30
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

B.Solar Radio Emission

B1.Daily Data at Hiraiso

200 MHz

Hiraiso June 1990

Single-frequency total flux observations at 200 MHz

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

Note: No observations during the following periods.

3rd 0310 - 0411 14th 1925 - 15th 0030

B.Solar Radio Emission

B1.Daily Data at Hiraiso

500 MHz

Hiraiso June 1990

Single-frequency total flux observations at 500 MHz					
FLUX DENSITY: 10^{-22}Wm^{-2}Hz^{-1}					
UT	00-03	03-06	06-09	21-24	DAY
DATE					
1	(47)	46	44	42	46
2	43	43	44	43	43
3	43	43	43	43	43
4	44	44	42	44	43
5	46	45	44	45	45
6	45	46	45	47	45
7	49	49	48	49	48
8	49	50	48	50	49
9	52	52	51	54	51
10	56	57	B	B	B
11	57	57	54	56	B
12	B	57	B	55	B
13	56	56	56	58	56
14	59	56	54	(54)	57
15	56	55	53	54	55
16	56	56	55	-	55
17	56	56	-	-	56
18	52	51	50	50	51
19	51	50	49	51	50
20	50	50	50	47	50
21	46	47	47	-	47
22	44	44	(45)	-	44
23	44	44	44	44	44
24	44	46	45	45	45
25	B	46	46	47	46
26	46	47	47	47	47
27	49	48	47	49	48
28	49	49	47	49	48
29	48	48	47	-	48
30	50	51	51	53	50

Note: No observations during the following periods:

14th 2100 - 2335.
17th 0440 - 0950.
21st 1925 - 2340.
22nd 1925 - 23rd 0057.
16th 1925 - 17th 0010
17th 1925 - 2340
22nd 0645 - 0955
29th 1930 - 2345

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso June 1990

Single-frequency observations

Normal observing period: 1925 - 0955 U.T. (sunrise to sunset)

JUN 1990	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
2	500	48 C	0631.7	0637.0	20.0	3200	285	MR
				0633.0		127		0
				0635.1		1700		WR
	500	29 PBI		0653.0	35.0	9	3	WL
	200	46 C	0634.0	0637.3	13.2	395	58	0
3	500	42 SER	0609.5	0617.3	19.5	156	-	0
	200	8 S	0743.7	0743.7	0.8	140	-	0
4	500	41 F	0045.7	0046.0	1.5	65	-	WR
	500	4 S/F	0521.0	0521.8	1.4	18	-	0
	200	43 NS	2131.0	0045.0	517	120	17	SR
	100	43 NS	2200	2300	200	240	30	-
5	200	43 NS	0730	0910	139D	27	8	MR SUNSET
	200	45 C	2354.5	2355.2	1.1	80	-	0
	100	46 C	2354.6	2355.4	1.5	870	-	-
6	200	46 C	0144.9	0144.9	1.3	230	-	0
	100	46 C	0144.9	0145.7	1.5	380	-	-
	500	4 S/F	2032.3	2035.9	4.8	20	-	0
7	500	27 RF	0249.5	0259.0	30.0	3	1	0
	200	24 R	1930E	2021	630D	21	7	MR
9	200	42 SER	0652.8	0708.6	34.3	45	-	MR
	200	44 NS	1930E	-	840D	-	24	-
	200	42 SER	1954.0	2023.1	47.5	250	-	SR
10	500	46 C	0716.1	0828.5	127D	351	36	SR SUNSET
				0719.5		71		MR
	200	48 C	0720.8	0853.5	145D	530	290	SR SUNSET
				0731.0		240		MR
	100	48 C	0726.4	0923.0	139D	920	460	- SUNSET
				0840.0		730		-
	200	44 NS	1930E	-	840D	-	35	-
	100	44 NS	1930E	-	840D		20	-
	500	42 SER	2109.5	2115.0	7.5	85	-	MR
	100	46 C	2125.7	2146.9	59	470	110	-
	500	46 C	2127.0	2150.0	40.0	75	22	MR
	500	29 PBI		2214.5	65.0	28	6	MR
	200	46 C	2136.6	2150.0	123	135	15	MR

JUN 1990	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
11	200	44 NS	1925E	-	840D	-	30	-
12	100	42 SER	0047.3	0048.8	18.5	9500	-	-
	200	48 C	0047.5	0048.2	2.0	6100	-	0
	500	46 C	0047.5	0048.5	23.0	103	6	MR
				0058.6		48		MR
	200	48 C	0432.3	0433.0	5.1	7300	-	WR
	100	48 C	0432.4	0433.1	5.0	9100	920	WR
	500	41 F	0432.4	0434.2	7.5	83	-	MR
	500	48 C	0502.9	0531.5	85.5	1343	140	WR
				0523.5		353		MR
				0539.5		593		MR
	100	48 C	0515.8	0531.7	267D	1000D	210D	- SUNSET
				0621.8		1000D		-
				0716.5		430		-
	200	46 C	0516.5	0539.6	72	290	70	0
				0517.8		140		WR
				0526.4		210		WR
	500	46 C	2039.8	2039.9	8.4	138	-	0
13	500	41 F	0227.5	0227.8	4.0	43	-	0
15	500	48 C	0824.0	0828.9	16.0	547	145	0
	200	46 C	0824.4	0828.9	26.4	130	18	0
	100	42 SER	0824.9	0832.3	25.0	270	-	-
20	200	42 SER	0630.6	0636.3	19.1	43	-	0
	500	42 SER	0635.5	0645.9	14.0	22	-	0
23	100	42 SER	0126.4	0139.6	26.4	1000D	-	-
	200	44 NS	1930E	2105	860D	24	4	0
24	100	41 F	0101.3	0102.6	16.5	360	-	-
	200	46 C	0101.5	0103.3	5.9	130	47	WR
	100	45 C	0524.4	0525.1	2.6	430	170	-
	200	44 NS	1930E	0345	860D	35	11	0
25	500	46 C	0115.8	0117.5	24.5	64	18	0
				0127.0		39		0
	500	29 PBI		0145.0	75	11	4	0
	500	42 SER	0419.0	0419.5	3.5	65	-	0
	500	41 F	0701.5	0704.0	3.0	16	-	0
	200	46 C	0701.3	0704.1	5.4	23	-	0
	200	44 NS	1930E	0500	860D	27	11	WL
26	500	46 C	0313.5	0313.8	3.1	38	-	0
	200	41 F	0331.0	0333.0	40.0	146	-	0
	500	46 C	0539.4	0540.7	5.0	112	18	0
	200	44 NS	1930E	0818	860D	63	27	MR
27	200	44 NS	1930E	0438	860D	53	36	WR
28	200	44 NS	1930E	0110	860D	42	32	WR
	100	44 NS	1930E	-	860D	-	40	-
	100	46 C	2235.3	2237.6	3.3	840	250	-
	500	46 C	2237.1	2237.3	2.3	260	-	0
29	200	46 C	0139.8	0140.9	1.8	148	-	WR
	200	44 NS	1930E	2033	860D	74	35	MR
30	500	4 S/F	0121.8	0124.4	7.0	6	-	0
	200	44 NS	1930E	-	860D	-	9	-

C. RADIO PROPAGATION

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

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

MEASURED AT HIRAISO

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

C. RADIO PROPAGATION

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

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

MEASURED AT HIRAISO

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

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

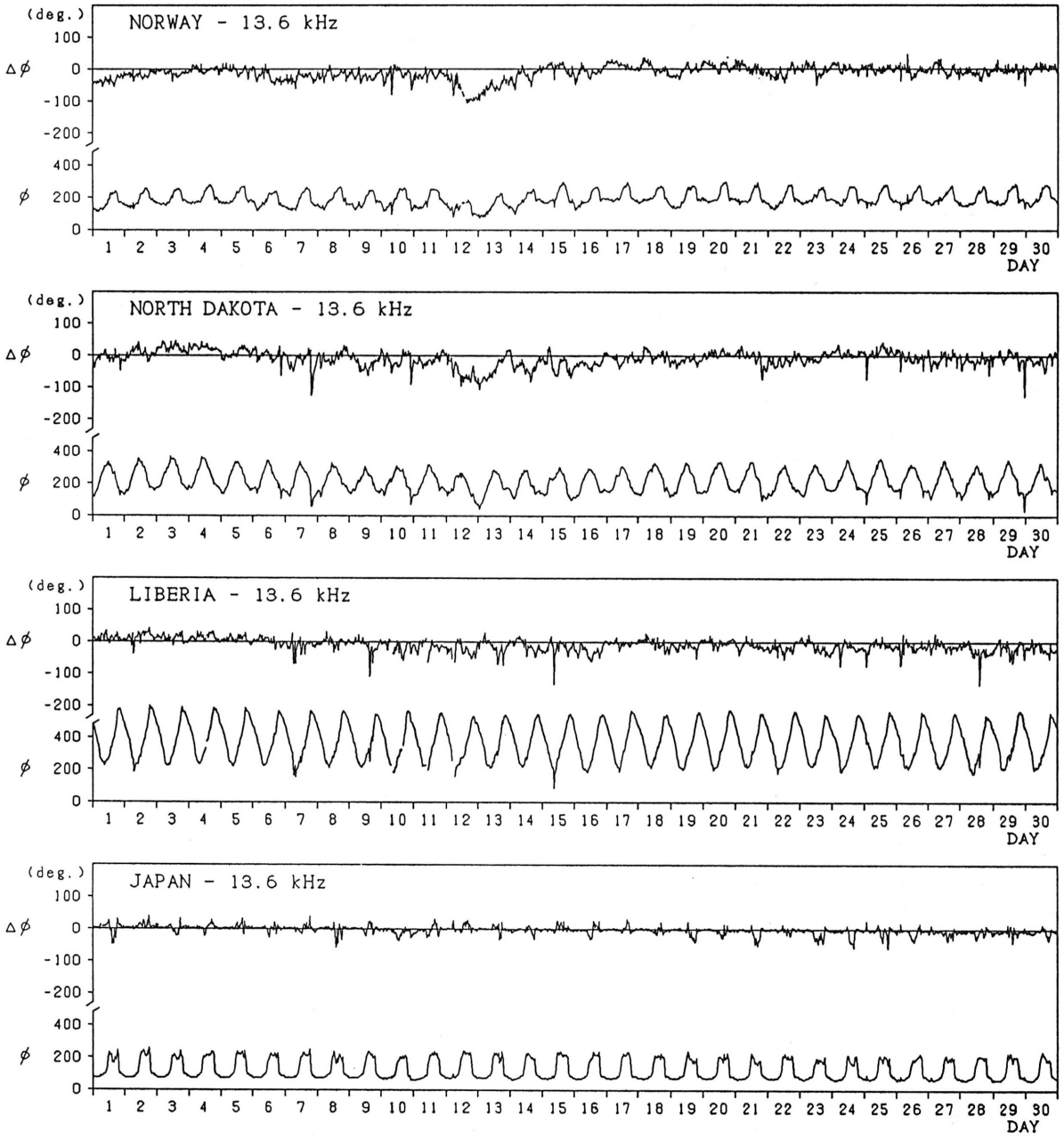
Hiraiso — Time in U.T

Jun. 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	4U 3 4 5	4 4 4 4	N N N N			
2	4o	4 4 4 4	4 4 4 4	N N N N			
3	4o	4 4 4 4	4 4 4 4	N N N N			
4	4+	4 5 5 4U	4 4 4 4	N N N N			
5	4o	4 5 4 4U	4 4 4 4	N N N N			
6	4o	4 3 3 4U	4 4 4 5	N N N N			
7	4o	4U 4 4 4U	4 4 4 3	N N N N			
8	3+	3U 2U 3 4U	3 4 4 3	N N N N			
9	3+	3U 2U 2U 3U	4 4 4 4	N N N N			
10	4-	4U 3 3 4U	4 4 4 3	N N N N			
11	4o	4 3 4 4	4 4 4 4	N N N N			
12	3+	2U 3 3 3	3 4 4 4	N N N N	0820	C	182
13	3-	2U 1U 2U 3	3 4 4 3	U U U U			
14	3o	4U 2U 1U 3	4 4 3 2U	U U U U	0310	---	148
15	3+	3U 3 3 4	3 4 4 3	U U U U	---	15	
16	4o	3U 4 4 4	4 4 4 4	N N N N			
17	4o	4 5 4 4	3 4 5 4	N N N N			
18	4o	4 5 4 4	4 4 4 4	N N N N			
19	4o	4U 4 4 4	4 4 4 4	N N N N			
20	4o	5 5 4 3	4 4 4 4	N N N N			
21	4o	4 5 4 4U	4 4 4 4	N N N N			
22	4o	4 4 5 4	4 4 4 4	N N N N			
23	4+	4U 4 4 5	4 4 4 5	N N N N			
24	4o	4 4 4 4	4 4 4 4	N N N N			
25	4o	4 3 4 5	4 4 4 4	N N N N			
26	4-	4U 2 4 4U	4 4 4 4	N N N N			
27	4o	4 3 4 4	4 4 4 4	N N N N			
28	4-	3U 2U 3 4	4 4 4 5	N N N N			
29	3+	3U 3 4 4	3 4 4 3	N N N N			
30	4-	4U 5 4 2	4 4 4 3	N N N N			

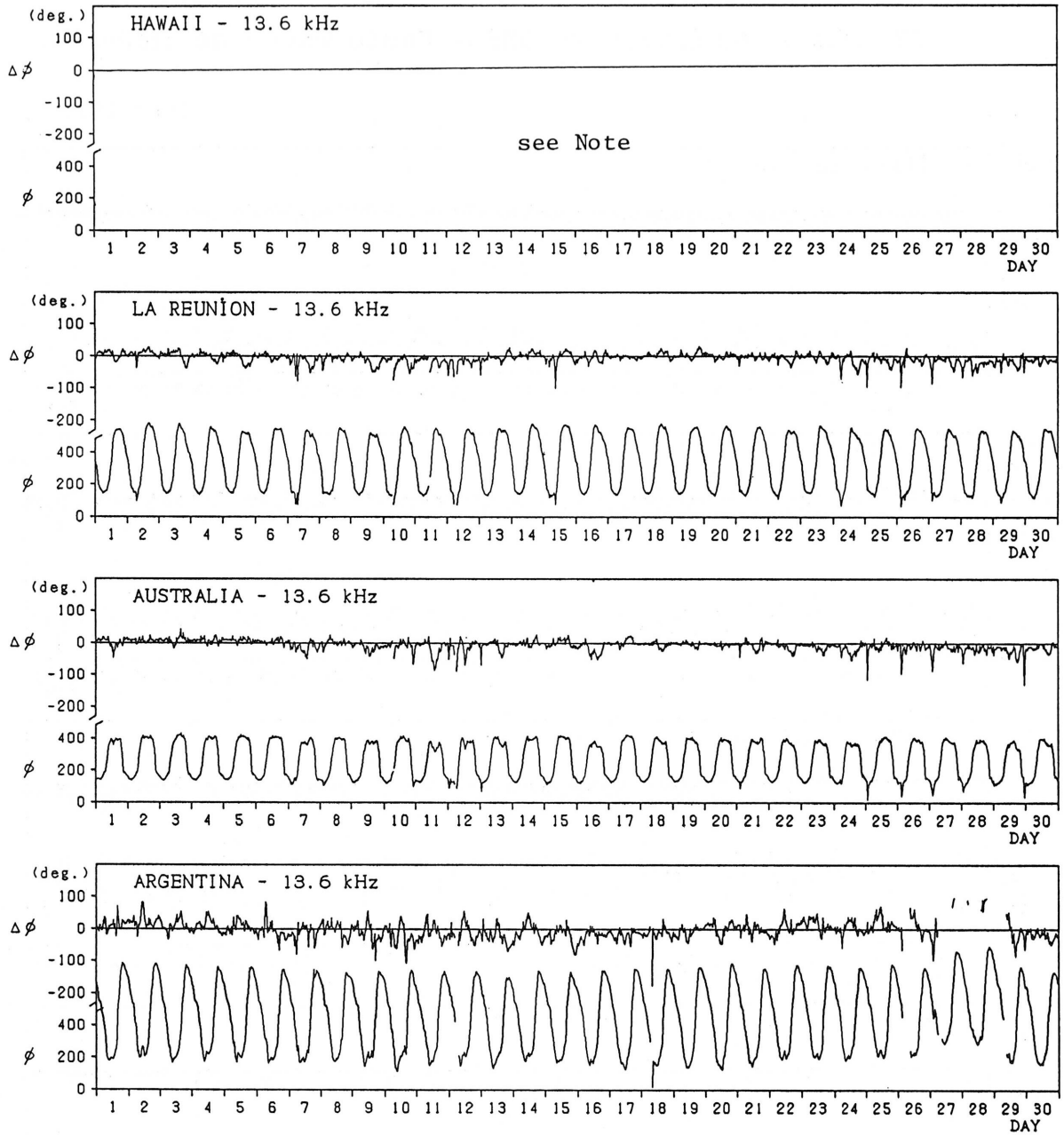
C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo

Inubo June 1990



Inubo June 1990



Note: As for HAWAII - 13.6 kHz, no record during April 02 - Jun 28, 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.)
Jun.06/1148	Jun.08/0800	Jun.07/0630	72.0
Jun.12/0800	Jun.14/1800	Jun.12/1737	134.2

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso

Time in U.T.

Jun. 1990	S W F								Correspondence	
	Drop-out Intensities (dB)					Start	Duration	Type	Imp.	Solar Flare	Solar Noise
	CO	HA	1)	2)	3)						
2			6			0637	18	S	1-	x	x
6					4	1637	33	SL	1-	x	
9					16	1419	33	SL	1	x	
9					7	1647	12	SL	1-	x	
10	22	16	19	x	22	0715	41	SL	1+	x	x
10					23	1459	35	SL	2-	x	
11				x	26	0942	16	S	2-	x	x
12			12			0047	11	S	1	x	x
12			11	x		0432	23	SL	1-	x	x
12	34	37	36	x	15	0520	44	G	3	x	x
13		25	25			0034	38	S	2	x	x
13			10			0229	17	S	1-	x	
15				x	20	0828	48	S	1+	x	
21	x	x	11	x		0210	20	S	1-	x	
24	x	x	9			0109	23	SL	1-	x	
24			15	x	x	0517	26	G	1	x	
25		32	26	x		0115	28	G	2	x	
26	25	44	16	x		0315	18	SL	1+		
27		x	7			0119	17	SL	1-		
27		x	9	x		0140	19	S	1-		
27		x	15	x		0208	23	SL	1		
27			12			0248	22	SL	1	x	
28				x	25	1358	47	SL	2-	x	
29			9			0025	15	SL	1-		
29		37	30	x		2230	51	SL	2+	x	

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

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Jun. 1990	S P A								
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
2				6	—		0228	0248	0234
2		30		11	—		0518	0542	0533
2	23	89	80	52	—		0634	0807	0649
3			21	10	—		0600	0648	0605
3			15	8	—		0749	0840	0754
6			9		—		0726	0759	0736
6		32			—		1637	1737	1645
6					—	51	1827	1938	1846
6	30	12			—	107	2027	2204	2041
7		17		32	—	12	0143	0235D	0156
7			19	22	—		0236	0408	0306
7			19	10	—		0502	0545D	0513
7			63	39	—		0545E	0615D	0600
7		78	74	49	—		0615E	0730	0624
7		74	81	33	—		0746	0917	0757
7		38	12		—		1152	1246	1203
7		42			—		1440	1524	1454
7					—	112	1904	2206	1939
8				6	—		0138	0153	0142
8	18	20	44	40	—	29	0207	0226D	0220
8	18	19	46	43	—	39	0226E	0354	0238
8		30	19		—		0821	0944	0847
9				25*	—	22	0053	0155	0112
9				10	—		0203	0232	0211
9		115			—		1413	1555	1440
9		49			—		1647	1752	1656
10			14	12	—		0427	0535	0455
10	79	—	180	93	—	32	0707	0842D	0726
10			37		—		0842E	1017	0917
10		128			—		1443	1605	1512
10	52	31	26		—	85	2133	2322	2214
11			13	—	—		0033	0103	0043
11	60	—	153	7	—		0940	1003D	0947
11	50	—	132		—		1003E	1148	1010
12	28	25	33	58	—	34	0049	0138	0053
12	32	69	78	58	—	31	0432	0519D	0444
12	110	—	234	150	—	60	0519E	0838	0539
12		34	19		—		1156	1246	1213
12	14	7		8	—		2314	2341	2320
13	49	49	69	96	—	56	0035	0200	0042

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Jun. 1990	S				P	A			
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
13			23	22	—	13	0230	0308	0235
13			9	5	—		0614	0636	0619
13		43			—		1413	1512	1427
14				18	—		0923	0957	0930
14		37			—		1218	1313	1222
15				15	—		0108	0141D	0116
15	12			33	—		0141E	0214	0151
15		16	18	16	—		0239	0319	0245
15	12		20	18	—		0420	0502	0428
15			13	11	—		0542	0611	0553
15	80		126	62	—		0823	1043	0840
16			17		—		0933	1011	0944
17	8			17	—	11	0140	0208	0144
17		38	18		—		0910	1037	0927
20			20	10	—		0728	0828	0744
21	19	24	52	42	—	29	0208	0320	0219
21		25	23		—		0655	0751	0712
22	17	31	27	17	—		0557	0641	0614
22	23	44	46	21	—		0656	0811	0714
24	35	44	68	53	—		0517	0803	0544
24			9		—		0818	0858	0833
25	53	70	98	—	—	76	0116	0206	0132
25			10	—	—		0433	0507	0442
25	22	32	47	—	—		0703	0755	0709
25	26	26	23	—	—		0940	1026	0947
26	14			16	—	22	0020	0106	0036
26	56	59	97	83	—	63	0314	0427	0324
26			42	34	—		0536	0611	0549
26				20	—		0909	0930	0911
26					—	87	1936	2040	1945
27	22		41	36	—	18	0119	0139D	0131
27	26	26	61	66	—	31	0139E	0208D	0147
27	41	27	95	87	—	43	0208E	0358	0223
27		24		19	—		0812	0834	0820
27		24			—		1647	1730	1700
27	19		7		—	68	2108	2217	2119
28	22	24	25		—	28	0048	0146	0112
28	7	20			—		0205	0232	0213
28			14	6	—		0640	0717	0649
28		50	26	8	—		0852	0930D	0912
28		54	17		—		0930E	1038	0943
28	27	120			—		1358	1521	1414
28	31				—	95	2032	2123	2044
28	36		15	21	—	26	2319	2355	2328
29	31	19	31	32	25	21	0024	0115	0033
29				7			0145	0202	0152
29				7			0205	0237	0214
29			12	8			0534	0546D	0541
29			42	29			0546E	0712	0553
29		57					1308	1423	1321
29		53					1456	1615	1516
29		31					1819	1852	1825
29	81	63	57	82	116	141	2230	0057	2244
30	12	15		29	17	19	0100	0206	0109
30			12	8			0534	0557D	0541
30			23	10			0557E	0635	0605
30			12				0637	0720	0647
30					28	40	1946	2103	1955

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